

HUNTER INDOOR SPORTS CENTRE (HISC)

ARBORICULTURAL IMPACT ASSESSMENT



MAY 2024

Ficus microcarpa var. *hillii*



Arboricultural Impact Assessment

SITE & CLIENT

Site Address:	2 Monash Road and 24 Wallarah Road, New Lambton
Client:	Basketball Association of Newcastle Limited (BANL)
C/-:	EJE Architecture (Attn: Bede Campbell)
ADDRESS:	412 King Street, Newcastle, NSW,2300
EMAIL/PHONE:	+61 400 294 028
JURISDICTION:	Newcastle/Awabakal

ASSESSING ARBORIST

Company:	Bark. Trees & Landscapes
AQF5 Arborist:	Phillip Williams
Qualifications:	B.Sc.(Arch.), B.Land.Arch., Hort Cert., Dip.Hort.(Arboriculture - No. 6262394), QTRA Reg. No. 7712
Memberships	Institute of Australian Consulting Arborists (IACA), Australian Institute of Landscape Architects (AILA)
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1. PROJECT OVERVIEW

Bark. Trees & Landscapes has been commissioned by Basketball Association of Newcastle Limited (BANL) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application (SSD-65595459) for the proposed Hunter Indoor Sports Centre with courts, indoor stadium, amenities and associated civil and landscaping works, at 2 Monash Road and 24 Wallarah Road, New Lambton.

The aim of the report is to determine what impact the proposed development may have on the existing vegetation and to provide advice on how best to ensure the trees can be retained where appropriate.

The tree inspections were conducted from the ground applying Mattheck's and Breloer's Visual Tree Inspection (VTA) methodology recording relevant data to assist in determining the suitability of a tree's retention and to influence design outcomes for better tree retention. (Note: refer to Section 4 for a more complete description of the methodology used when assessing the trees.) The results contained within this report are based on observations made during site inspections carried out on 10th February and 16th - 17th February 2024

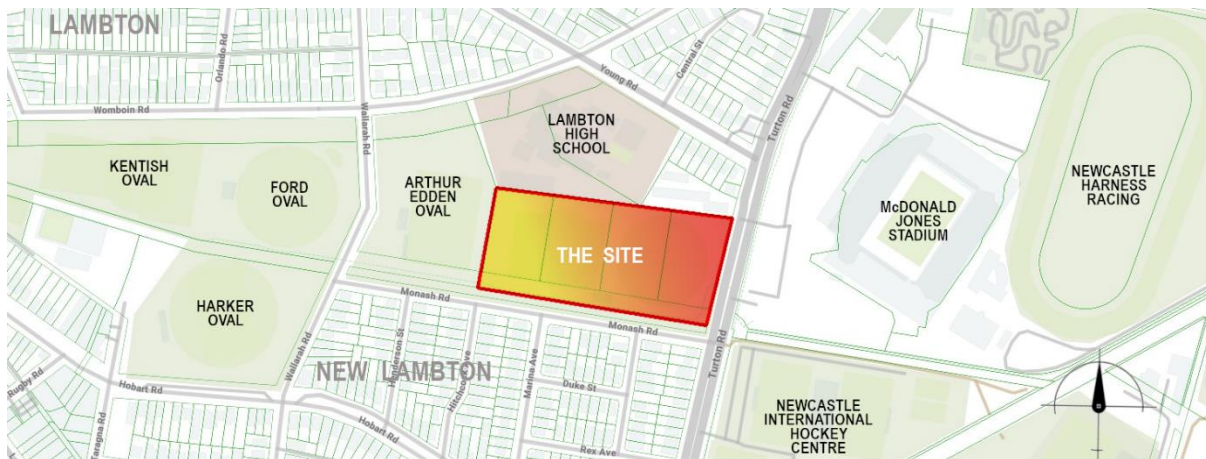


FIGURE 1: LOCATION PLAN
[Base Map Source <https://meonemosaic.au/>]



2. THE SITE

The site is comprised of 4 lots; Lot 2377 DP755247, Lot 2389 DP755247, Lot 2398 DP755247 and Lot 2380 DP755247 and having a total site area of 7.83ha.



FIGURE 2: SITE AERIAL

[Base Image Source www.merconemosaic.com]

Pre-European settlement, the area would have comprised of Freshwater Wetlands with the vegetation being mainly *Eleocharis equisetina* (Australian Giant Hairgrass) growing in organically enriched fine-grain sediments. There would have also been a sparse emergent layer of trees such as *Casuarina glauca* (Swamp She-oak) and *Melaleuca spp.* (Swamp Paperbark and smaller species)¹. At some stage the area was reclaimed eventually becoming the playing fields that currently exist. The area is commonly used for organised sports such as cricket and soccer with the adjoining Lambton High School using the Wallarah Ovals as additional playground. An amenities block is located towards the southern boundary along with three containers used to store equipment and tools.

The site is flat having a slight crossfall from west to east with a central crown shedding water to the outer edges. The current vegetation consists predominantly of maintained turf with cultural plantings occurring to the eastern and southern boundaries. Cultural plantings also occur within the northern, neighbouring properties.



FIGURE 3: VIEW LOOKING EAST TO TURTON ROAD AND THE NEWCASTLE INTERNATIONAL SPORTS CENTRE

¹ NSW Government, *Trees Near Me*, www.treesnearme.app



3. METHODOLOGY

The following is a summary of the approach taken to assess the trees leading to the preparation of this report:

- Visual Tree Inspection (VTA), (Mattheck & Breloer, 1994) was undertaken. All trees were inspected and assessed from the ground. The VTA included all visible above ground parts of the tree including; exposed roots; trunk; branches; and, foliage.
- Diameter at breast height (DBH) and diameter at base—above the basal flare (DARB) measurements were taken and used to calculate the tree protection zones (TPZ) and structural root zones (SRZ) of each tree undertaken in accordance with AS 4970 -2009 *Protection of trees on development sites*.
- Tree structure was assessed by:
 - visual evidence of structural faults and/or potential points of failure;
 - poor pruning practices;
 - physical and/or storm damage;
 - suppressed or distorted growth including trunk divergence and canopy asymmetry.
- Tree health was determined by:
 - canopy density, growth extension, foliage size (applicable to species) and colour;
 - presence of disease and/or pests;
 - termite activity;
 - the amount of deadwood and/or dieback within the crown and its location; and,
 - presence of epicormic growth.
- Life expectancy ratings were assessed using several factors such as: location; species; age; health; and, structure.

It should be noted that the following, more detailed assessment measures did not form part of the VTA inspection:

- No below ground inspections or analyses were undertaken within the root zone.
- No internal inspections or tissue analyses were undertaken on the subject trees.
- No aerial inspections were undertaken.

4. SUMMARY TREE ASSESSMENT

The trees have been assessed as two groups: those occurring on site (numeric, Trees 1-19) and those occurring off site and likely to be affected by the works (alphabetic, Trees A-G). Survey was used to locate the majority of trees (blue squares – Figure 4). Where trees had not been picked up by survey, they were located with the use of aerial imagery and by ground-truthing (pink squares-Figure 4). Access could only be arranged for Lambton High School and so estimates were made for trees growing on the unit site (303-305 Turton Road).



FIGURE 4: TREE LOCATIONS & NOTATION.
[BASE AERIAL: NEARMAP]



Trees 1-12 are located along the eastern boundary and running parallel to Turton Road. They are comprised mainly of *Ficus microcarpa* var. *hillii* (Hills Weeping Fig) growing within a formed garden bed that has come into disrepair. The timber edging used to form the garden bed on the western side has acted as a root deflector for the surface roots resulting in the early surface roots running north and south (Figure 5A). Deeper roots have spread beyond the timber edge and can be seen growing away from the trunk of the tree in a typical radial configuration. It is unlikely that the current root pattern, although not desirable, will result in pronounced instability for the figs as they develop in size. Most of the figs have included bark at branch junctions that on occasions can lead to failure end weights become excessive. This is a typical characteristic of these figs if not specifically bred to avoid this tendency. In some instances, the roots of the trees have led the lifting of the nearby footpath resulting in some sections having to be repaired (Figure 5B). Most trees in this grouping have had to have their canopies trimmed to provide clearances to the powerlines occurring alongside Turton Road (Figure 5C) resulting in asymmetric canopies. All trees in this group (Trees 1-12) except for Trees 4 and 6, are good specimens.



FIGURE 5: TREES 1-12 – COMMON PROBLEMS

Trees 13-19 occur along the southern boundary as a group of 6 and a single tree. Tree species are either *Casuarina glauca* (Swamp She-oak) or *Melaleuca quiquenervia* (Swamp Paperbark). All trees with the exception of Tree 16 are in good condition. Tree 16 is in decline and consideration should be given to its removal and replacement although not critical at this stage. Trees 13 and 19 are located close to the fenceline and are causing damage to the fence (Figure 6A). Consideration should be given to removing the affected fencing panels to prevent possible damage to the trees and allow future growth to be unimpeded.



FIGURE 6: TREES 13, F & G

Trees A – F are without significant problems that would justify their removal. All are suitable for retention.



5. PROPOSED DEVELOPMENT

The proposal is seeking to create a multi-use indoor sports facility concentrating on the provision of 15 courts with complementary facilities including: entry foyer, change rooms; bathrooms; cafe; a retail tenancy; function rooms; training spaces; offices; and, corporate spaces. One of the courts is to be a show court with retractable grandstand seating. It is proposed to construct the facility as a staged development with associated external car parking added progressively resulting in a total of 240 car spaces.

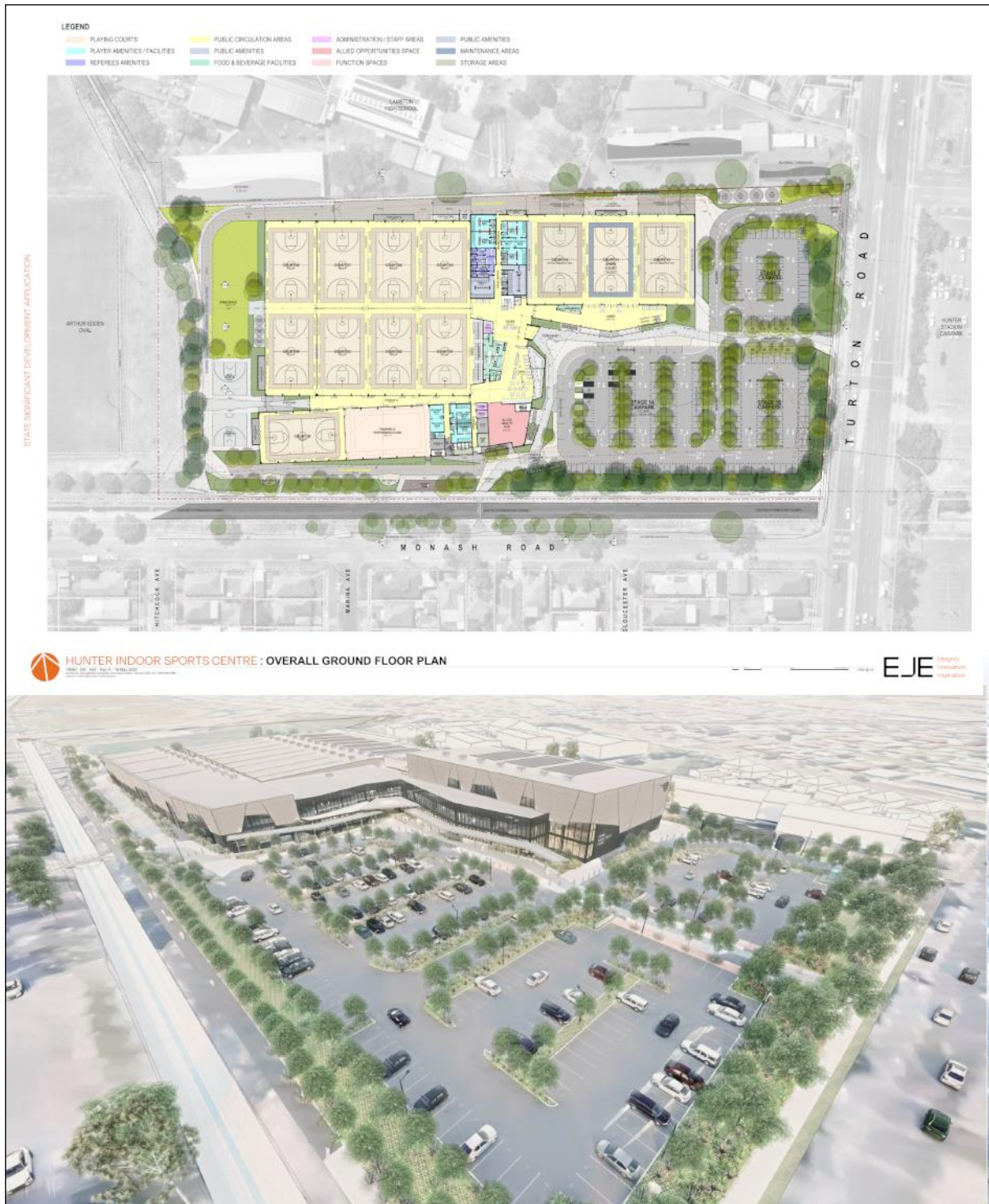


FIGURE 7: SITE PLAN & PERSPECTIVE OF THE PROPOSED DEVELOPMENT.



6. IMPACT ASSESSMENT

Figure 8 (and Appendix C2) shows that Trees 1, 9, 10, 11, 12 & 17 will need to be removed based on the proposed design.

On-site, Trees 2, 3, 4, 5, 6, 8, 13, 14, 15, 18 and 19 will not be impacted by the the proposed works as the TPZs of these trees will be subjected to minor encroachments only, if at all. Off-site Trees A, B, C, D, and E will also be retained as encroachments are within acceptable limits of encroachment having regard to their locations, type of tree and condition. It should be noted that Tree D has an encroachment of 21% which is the upper tolerance for this species having average health. Nevertheless routine monitoring will be required.

Trees 7, 16, F and G have been assessed as being "Threatened". Although the encroachments for these trees exceeds the requirements of AS 4970, it is considered that the type of encroachment and with proper management of the areas associated with the trees including implementing the the Tree Protection Plan (Appendix D), it will be possible for these trees to be retained.

The encroachment for Tree 7 is a combination of 11% reduced root plate within the TPZ and a 20% change of levels with the addition of fill. It is proposed that during the detailed design, that the amount of fill covering the root plate will be locally reduced to an extent that will not impact significantly on the tree. Levels within the TPZ of Tree F are not being modified greatly as a suspended ramp is proposed for the ramped section of road including approaches. The amount of cover is shown as a 32% encroachment, although the impact will be considerably less. At the detailed design stage, an allowance will need to be made that permits water to enter under the slab to prevent the soil from drying out in this area. Tree G has a 34% encroachment due to a reduction of levels and the installation of a decomposed granite track. Levels within the TPZ of Tree G are being reduced by no greater than 100mm which is not significant for a Swamp Mahogany

Tree 16 has also been noted as being "Threatened". This tree is in decline and even if left undisturbed, it is likely to fail. By removing the existing containers and making changes nearby, it is likely that its decline will be hastened although not directly affected by the construction works. It would be possible to minimise the decline by removing grass from around the base of the tree and covering the exposed area with an organic mulch.

It is considered reasonable to take the effort in retaining Trees 16, F and G with the understanding that should they fail, then compensatory planting will need to be undertaken.

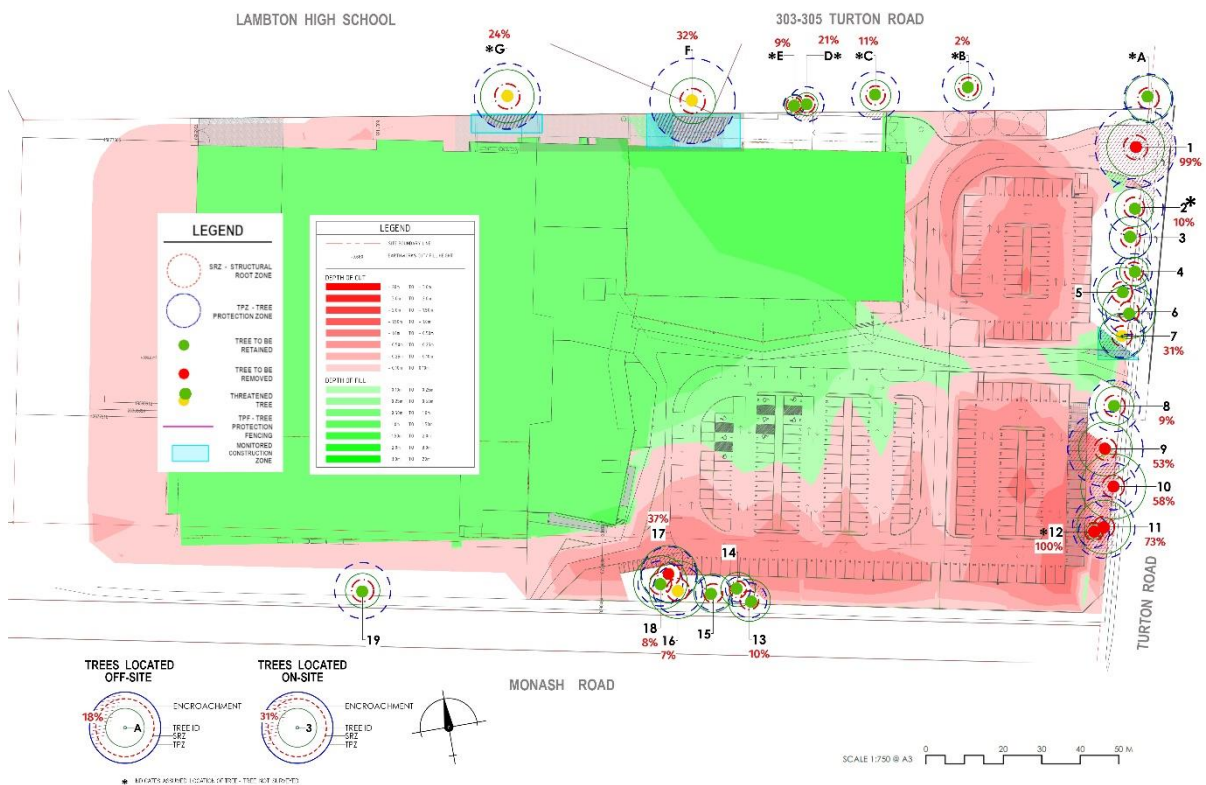


FIGURE 8: TREE IMPACT ASSESSMENT DIAGRAM.
[SOURCE: E.E ARCHITECTURE]



7. RECOMMENDATIONS

Based on the above assessment, the following is recommended:

- that Trees 1, 9, 10, 11, 12 & 17 be removed;
- that Trees 2, 3, 4, 5, 6, 8, 13, 14, 15, 18, 19, A, B, C, D, and E be retained; and,
- that Trees 7, 16, F and G be retained by following the requirements of the Tree Protection Plan (refe Appendix D) subject to careful detailing during the detailed design and documentation phases and further investigations occurring at the commencement of construction to ensure major roots are not damaged and/or further action taken.

Further, to compensate for the loss of Trees 1, 9, 10, 11, 12 and 17, it is recommended that 28 standard trees [45litre] be planted on the site. Compensatory planting has been calculated using Section 4.3 of the *Newcastle Urban Forest Technical Manual* using a rate of one standard tree/20m² of projected crown cover (i.e. 550m² of combined projected cover for the 6 trees to be removed). This can be addressed as a condition within the Notice of Determination as can the requirement that the Tree Protection Plan described in Appendix D be implemented.

8. REFERENCES

The City of Newcastle	<i>Newcastle Development Control Plan 2012</i>
The City of Newcastle	<i>Newcastle Urban Forest Technical Manual 2018</i>
Draper, D. & Richards, P.A.	<i>Dictionary for Managing Trees in Urban Environments</i> . CSIRO, Collingwood Vic, 2009
Link Tree System Ltd. (Barrell, J.)	<i>Arboricultural Journal</i> 1993, Vol. 17pp. 33-46, 01/03/98
Mattheck, C. & Breloer, H.	<i>The Body Language of Trees: A Handbook for Failure Analysis</i> . TSO, London, England, 1994
NSW Government	<i>Trees Near Me</i> , https://www.treesnearme.app/explore
NSW Government	<i>SEED</i> , https://geo.seed.nsw.gov.au
Safe Work Australia	<i>Guide to Managing Risks of Tree Trimming and Removal Work</i> , Australian Government, 2016
Standards Australia	<i>Australian Standard: AS 4970-2009 Protection of trees on development sites</i> , 2009
Standards Australia	<i>Australian Standard, AS 4373-2007 Pruning of amenity trees</i> , 2007

9. DISCLAIMER

This report has been prepared for the intended use by the client only.

All observations, recommendations and advice expressed within this report are based on the following:

- the requirements and practices contained within *AS 4970-2009 Protection of trees on development sites*;
- the training and professional experience of the consulting arborist;
- observations made at the time of inspection; and,
- information either supplied by the client, other consultants (where applicable) or supplementary research.

Trees are dynamically growing organisms that change over time. No guarantee is implied with respect to future tree condition or safety beyond the advice and recommendations made within the report. It is recommended that trees be inspected periodically, at least, annually and after major storm events.

11. APPENDICES

APPENDIX A: TREE IMAGES

The following images are intended to provide a record of the condition of the trees at the time of the inspection (2024/02/10, 2024/02/17) and to provide a frame of reference for future observations. Further details on each tree are provided in Appendix B.

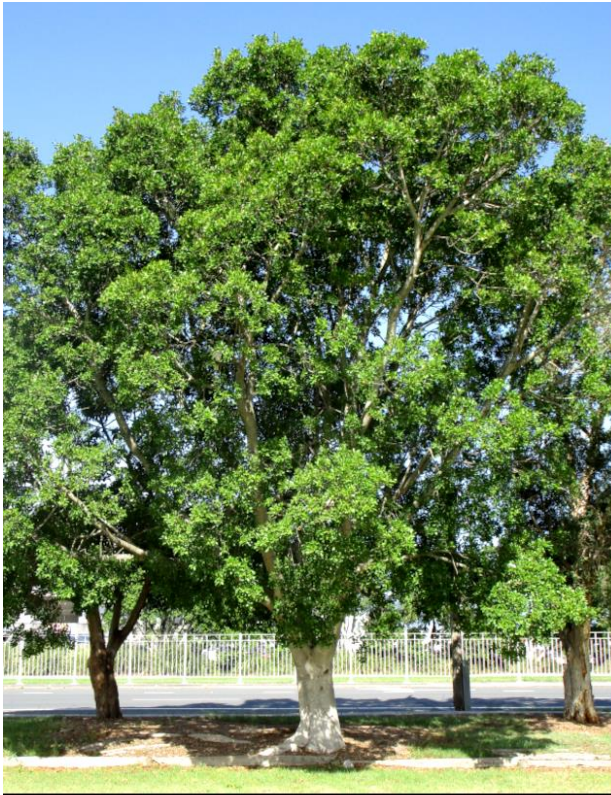
FIGURE A1: Trees 1-4



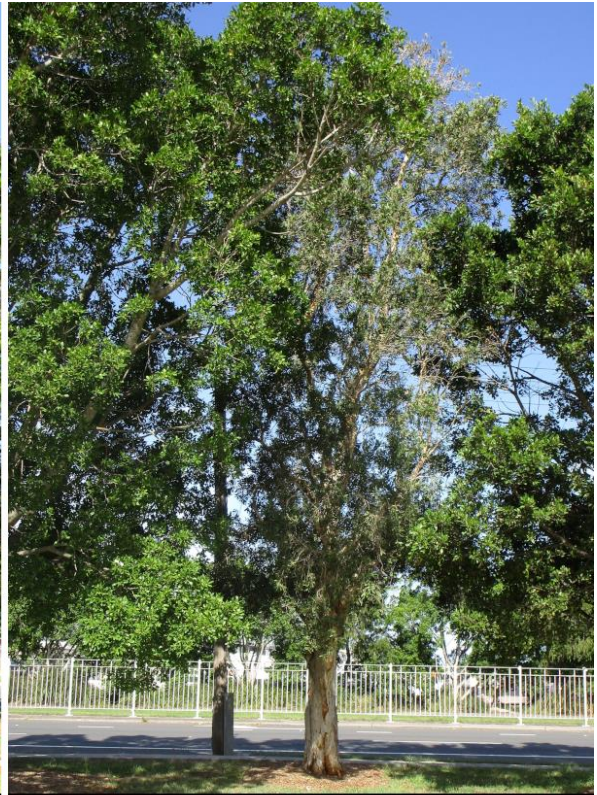


A	B
C	D

FIGURE A2: Trees 5-8



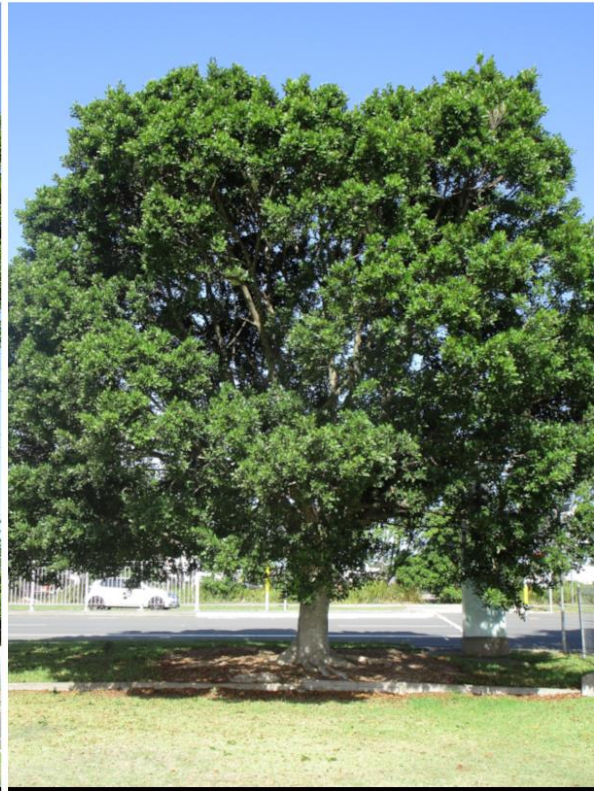
TREE 5 - *FICUS MICROCARPA* VAR. *HILLII*



TREE 6 - *MELALEUCA QUINQUENERVIA*



TREE 7 - *FICUS MICROCARPA* VAR. *HILLII*

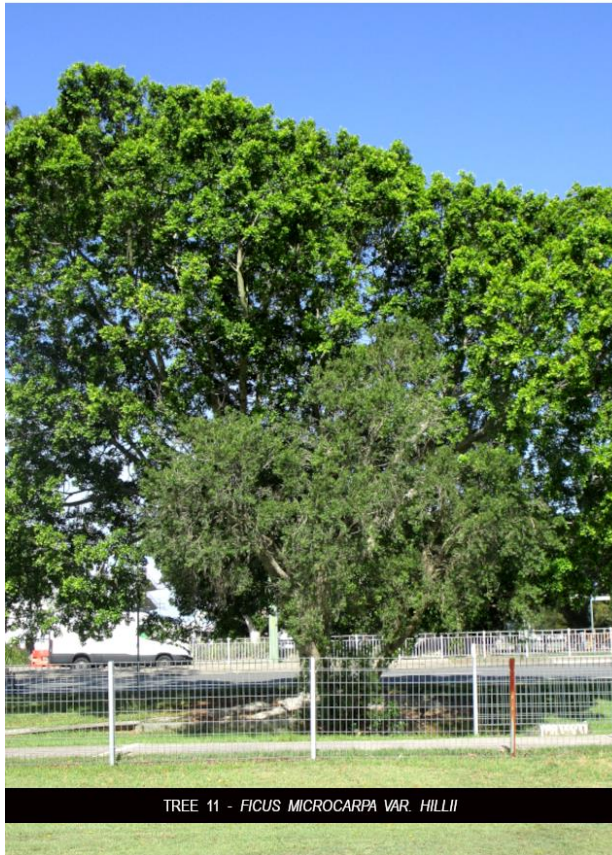
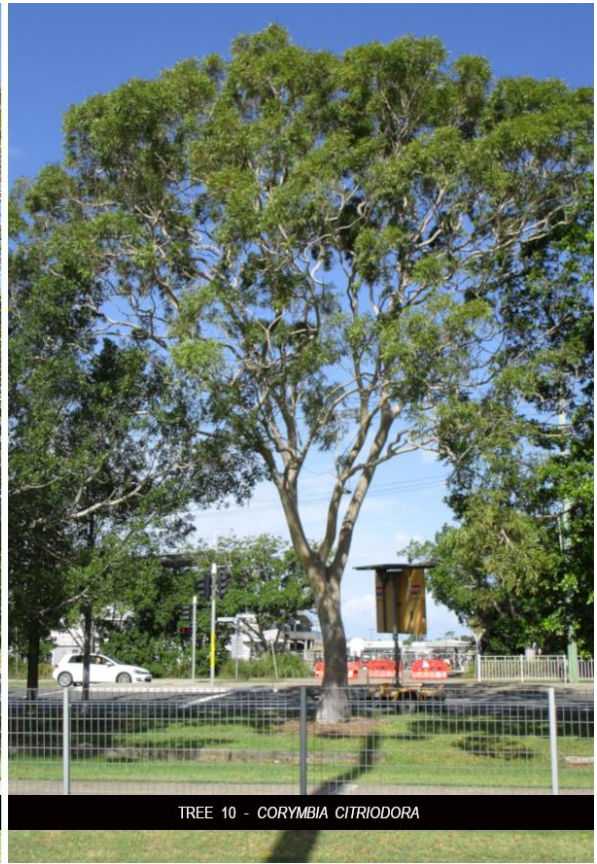


TREE 8 - *FICUS MICROCARPA* VAR. *HILLII*



A	B
C	D

FIGURE A3: Trees 9-12





A	B
C	D

FIGURE A4: Trees 13-16





FIGURE A5: Trees 17- 19, A-B





A	B
C	D

FIGURE A6: Trees C-F





APPENDIX B: TREE ASSESSMENT TABLES

SUMMARY TREE ASSESSMENT TABLE: HUNTER INDOOR SPORTS CENTRE

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH ¹ [MM]	TPZ [M]	DARB ² [MM]	SRZ [M]	USEFUL LIFESPAN [YEARS]	STRUCTURE	HEALTH	TREE AZ	IMAGE REF (APPX A)	COMMENTS
TREES OCCURRING ON COUNCIL CONTROLLED LAND														
1	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	15	880 ¹	10.56	900	3.17	+40	AV	AV	A1	A1A	1. [CoN TREE ID 67125] [DBH: 660/580] PAST PRUNING OF LOWER LIMBS. LARGE SURFACE ROOTS MANY RUNNING PARALLEL TO ROAD DUE TO THE PRESENCE OF TIMBER EDGING TO THE WEST AND FOOTPATH TO THE EAST. TREE ROOTS NOW RUNNING BEYOND EDGING AND INTO NEARBY TURF. BETTER GROWTH NOTED THAN ADJOINING TREES ASSUMED TO BE THE RESULT OF BETTER GROWING CONDITIONS AND ACCESS TO MOISTURE FROM NEARBY SWALE. LIFTING OF NEARBY FOOTPATH. INCLUDED BARK PRESENT BETWEEN CO-DOMINANT TRUNKS. TO BE REMOVED. IMPACTED BY ENTRY ROAD
2	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	10	630	7.56	600	2.67	+40	F	AV	A1	A1B	2. [CoN TREE ID 67124] TREE WITH CROWDED STRUCTURE WITH CROSSING BRANCHES. LARGE SURFACE ROOTS MANY RUNNING PARALLEL TO ROAD DUE TO THE PRESENCE OF TIMBER EDGING TO THE WEST AND FOOTPATH TO THE EAST. TREE ROOTS NOW RUNNING BEYOND EDGING AND INTO NEARBY TURF. MINOR BARK INCLUSIONS PRESENT. LIFTING OF NEARBY FOOTPATH. TO BE RETAINED
3	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	11	460	5.52	540	2.55	+40	AV	AV	A1	A1C	3. [CoN TREE ID 67123] LARGE SURFACE ROOTS MANY RUNNING PARALLEL TO ROAD DUE TO THE PRESENCE OF TIMBER EDGING TO THE WEST AND FOOTPATH TO THE EAST. TREE ROOTS NOW RUNNING BEYOND EDGING AND INTO NEARBY TURF. PRUNING TO ROADSIDE CANOPY RESULTING IN AN ASYMMETRIC CANOPY. TO BE RETAINED
4	<i>Lophostemon confertus</i>	Brush Box	M	7.5	390 ¹	4.68	480	2.43	15-40	P	AV	A1	A1D	4. [CoN TREE ID 67122] [DBH: 300/250] TREE PLANTED CLOSER TO POWERLINES. PRUNING TO ROADSIDE CANOPY RESULTING IN AN ASYMMETRIC CANOPY. EPICORMIC GROWTH PRESENT AT PRUNING SITES. SNAPPED FIRST ORDER BRANCH WITH BRANCH TEAR (OLD). TO BE RETAINED
5	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	13	630	7.56	630	2.73	+40	AV	AV	A1	A2A	5. [CoN TREE ID 67121] TREE WITH SLIGHT LEAN TO THE WEST. TREE DISLODGING EDGING. LARGE SURFACE ROOTS MANY RUNNING PARALLEL TO ROAD DUE TO THE PRESENCE OF TIMBER EDGING TO THE WEST AND FOOTPATH TO THE EAST. TREE ROOTS NOW RUNNING BEYOND EDGING AND INTO NEARBY TURF. MINOR ENCROACHMENT. TO BE RETAINED
6	<i>Melaleuca quinquenervia</i>	Swamp Paperbark	M	14	500 ¹	6.00	600	2.67	15-40	P	AV	A1	A2B	6. [CoN TREE ID 67120] [DBH: 240/440] EXTENSIVE PRUNING INCLUDING THE REMOVAL OF A ROADSIDE CO-DOMINANT TRUNK. PAST BORER ACTIVITY NOTED. PRUNING TO ROADSIDE CANOPY RESULTING IN AN ASYMMETRIC CANOPY. MODERATE CANOPY DENSITY. TO BE RETAINED
7	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	12	470	5.64	570	2.61	+40	AV	AV	A1	A2C	7. [CoN TREE ID 67119] TREE WITH UPRIGHT FORM PARTIALLY DUE TO REDUCTION OF CANOPY. ROOT GROWTH MODIFIED BY TIMBER EDGING BUT NOT AS MARKEDLY AS OTHER LOCATIONS. THE TREE WILL NEED TO BE MONITORED DURING CONSTRUCTION AND AN EFFORT TO REDUCE FILL LEVELS WITHIN THE TPZ.
8	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	10	560	6.72	650	2.76	+40	F	AV	A1	A2D	8. [CoN TREE ID 67118] TREE CONTAINS ONE NEST. GOOD, SPREADING CANOPY WITH SOMEWHAT CROWDED FORM. MINOR ENCROACHMENT. TO BE RETAINED
9	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	14	820	9.84	720	2.88	+40	AV	AV	A1	A3A	9. [CoN TREE ID 67117] TREE CONTAINS ONE NEST AND BRUSH-TAILED POSSUM. LARGE SURFACE ROOTS MANY RUNNING PARALLEL TO ROAD DUE TO THE PRESENCE OF TIMBER EDGING TO THE WEST AND FOOTPATH TO THE EAST. TREE ROOTS NOW RUNNING BEYOND EDGING AND INTO NEARBY TURF. PREVIOUS FOOTPATH DAMAGE AND REPAIRS NOTED. THIS TREE WILL NEED TO BE REMOVED.
10	<i>Corymbia citriodora</i>	Lemon-scented Gum	M	17	510	6.12	720	2.88	+40	AV	AV	A1	A3B	10. [CoN TREE ID 67116] PAST PRUNING OF LOWER CANOPY WITH UPPER BRANCHES CLEAR OF WIRES. PRUNING TO ROADSIDE CANOPY RESULTING IN AN ASYMMETRIC CANOPY. MINOR ENCROACHMENT. TO BE RETAINED
11	<i>Ficus microcarpa var. hillii</i>	Hills Weeping Fig	M	14	680	8.16	650	2.76	+40	AV	AV	A1	A3C	11. [CoN TREE ID 67115] SEWER MANHOLE NOTED NEARBY INDICATING PRESENCE OF SEWER. MECHANICAL DAMAGE TO SURFACE ROOTS. PRUNING TO ROADSIDE CANOPY RESULTING IN AN ASYMMETRIC CANOPY. THIS TREE WILL NEED TO BE REMOVED.
12	<i>Callistemon viminalis</i>	Weeping Bottlebrush	M	4	340	4.08	460	2.39	15-40	F	AV	A1	A3D	12. [CoN TREE ID 67114] [DBH: 160/300] TREE OCCURRING CLOSE TO TREE 11 RESULTING IN SUPPRESSED GROWTH AND ASYMMETRIC CANOPY. BASE OF TREE BEING ENCIRCLED BY ROOTS FROM TREE 11. PREVIOUS PRUNING OF LOWER BRANCHES. THIS TREE WILL NEED TO BE REMOVED.
13	<i>Casuarina cunninghamiana</i>	River She-oak	M	11	380	4.56	480	2.43	+40	F	F	A1	A4A	13. [CoN TREE ID 67109] TREE LOCATED ON FENCELINE RESULTING IN DISTORTION OF FENCE. LOWER BRANCHES REMOVED ESPECIALLY THOSE THAT WOULD HAVE IMPACTED ON SHARE PATH USERS. CO-DOMINANT TRUNK OCCURRING @ 1.7M AGL SLIGHT LEAN IN THE TRUNK FROM THE MIDDLE AND UPPER CANOPY. THIS TREE WILL NEED TO BE REMOVED.
14	<i>Casuarina cunninghamiana</i>	River She-oak	M	9	270	3.24	370	2.18	15-40	F	F	A1	A4B	14. [CoN TREE ID 67108] TREE WITH STORM DAMAGE AND LOST LIMBS RESULTING IN ELONGATED BRANCH STUBS. TRUNK WITH SLIGHT LEAN TO THE NORTH SELF-CORRECTING MID-HEIGHT. TO BE RETAINED.
15	<i>Casuarina cunninghamiana</i>	River She-oak	M	10	380	4.56	500	2.47	+40	AV	AV	A1	A4C	15. [CoN TREE ID 67107] [DBH: 250/290] STAR PICKET EMBEDDED INTO THE BASE OF THE TREE. OLD CAVITIES EXIST AT OLD PRUNING SITES. CO-DOMINANT TRUNG @ 750MM AGL. TO BE RETAINED.
16	<i>Casuarina glauca</i>	Swamp She-oak	M	15	540	6.48	770	2.97	5-15	F	P	Z4	A4D	16. [CoN TREE ID 67106] [DBH: 370/400] OVER-MATURE TREE. SPARSE CANOPY. DEADWOOD IN CANOPY. LARGE CAVITY (OLD) WHERE BRANCH HAS BEEN LOST. ACAULESCENT CO-DOMINANT TRUNKS. SHIPPING CONTAINER PLACED NEAR TREE COVERING A PORTION OF ITS ROOT PLATE. BRANCHES OVERHANGING CONTAINER. REMOVED. RECOMMENDED FOR RETENTION AT THIS STAGE WITH ASSISTANCE PROVIDED TO PROLONG LIFE.

1. MULTI-TRUNKED TREES HAVE AN AVERAGE MEASUREMENT CALCULATED IN ACCORDANCE WITH AS 4970. 2. DARB = DIAMETER AT ROOT BUTTRESS USED WHEN CALCULATING SRZ. * ASSUMED AS PROPERTY NOT ACCESSED

LEGEND

AGE CLASS	Y	SM	M	OM	
	YOUNG SAPLING/HAS NOT REACHED 1 ST ADULT FORM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS	
STRUCTURE	P	F	AV	EX	
	POOR NUMEROUS STRUCTURAL FAULTS/HIGH RISK OF SEVERE FAILURE	FAIR STRUCTURAL FAULTS PRESENT /MODERATE RISK OF SEVERE FAILURE	AVERAGE SOME MINOR FAULTS/MODERATE RISK FOR MAJOR FAILURE	EXCELLENT SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES	
HEALTH	P	F	AV	EX	
	POOR SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	FAIR SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	AVERAGE LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	EXCELLENT NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD	
RETENTION	TREES TO BE RETAINED		TREES TO BE REMOVED		TREE TO BE MONITORED DURING & POST CONSTRUCTION



SUMMARY TREE ASSESSMENT TABLE: HUNTER INDOOR SPORTS CENTRE

No	BOTANICAL NAME	COMMON NAME	AGE CLASS	HEIGHT [M]	DBH ¹ [MM]	TPZ [M]	DARB ² [MM]	SRZ [M]	USEFUL LIFESPAN [YEARS]	STRUCTURE	HEALTH	TREE AZ	IMAGE REF (APPX A)	COMMENTS
17	<i>Melaleuca quinquenervia</i>	Swamp Paperbark	M	15	600	7.20	800	3.01	+40	AV	AV	A1	A5A	17. [CoN TREE ID 67105] [DBH: 440/410] SHIPPING CONTAINER PLACED NEAR TREE COVERING A PORTION OF ITS ROOT PLATE. THIS TREE WILL NEED TO BE REMOVED.
18	<i>Casuarina cunninghamiana</i>	River She-oak	M	14	490	5.88	700	2.85	+40	AV	AV	A1	A5A	18. [CoN TREE ID 67104] SOME MINOR SUCKER GROWTH FROM BASE. STAR PICKET EMBEDDED INTO THE BASE OF THE TREE. TO BE RETAINED
19	<i>Melaleuca quinquenervia</i>	Swamp Paperbark	M	9	610	7.32	720	2.88	+40	F	AV	A1	A5B	19. [CoN TREE ID 671098] MINOR LIFT OF ADJOINING AC PATH CAUSED BY TREE ROOTS. TREE PLANTED HARD AGAINST FENCELINE. FENCE AFFECTED BY TREE. TO BE RETAINED. FUTURE GRAVEL TRACK SHOULD CONSIDER USING A CELLULAR PLASTIC GRID LAID OVER A GEOTEXTILE LINER TO AVOID EXCAVATION AND COMPACTION ISSUES.
TREES OCCURRING ON ADJOINING PROPERTIES														
A*	<i>Liquidambar formosana</i>	Chinese Sweet Gum	M	12	530	6.36	650	2.76	+40	AV	AV	A1	A5C	A. TREE LOCATED CLOSE TO CORNER BOUNDARY CLOSE TO FOOTPATH. EXTENSIVE SURFACE ROOTS. SOME RECENT REMOVAL OF LARGE LIMBS. TO BE RETAINED.
B*	<i>Callistemon viminalis</i>	Weeping Bottlebrush	M	7	560	6.72	530	2.53	15-40	F	AV	A1	A5D	B. [DBH: 250/330/370] TREE WITH ASYMMETRIC CROWN DUE TO COMPETITION FROM NEARBY TREE (RECENTLY REMOVED.) INCLUDED BARK AND REACTION WOOD PRESENT. SOME MINOR DEADWOOD OCCURRING WITHIN CANOPY. TO BE RETAINED
C*	<i>Callistemon viminalis</i>	Weeping Bottlebrush	M	8	520	6.24	500	2.47	15-40	F	AV	A1	A6A	C. [DBH: 380/360] BROAD, SPREADING CANOPY. TRUNK WITH PRONOUNCED SWEEP OCCURRING @ 1200MM AGL WITH CANOPY COMPENSATING. TO BE RETAINED
D*	<i>Populus nigra Italica'</i>	Lombardy Poplar	M	11	380	4.56	380	2.20	+40	F	AV	A1	A6B	D. [DBH: 230/300] SUCKERS OCCURRING AT BASE. POSSIBLE RUST ON LEAVES. MINOR ENCROACHMENT. TO BE RETAINED
E*	<i>Populus nigra Italica'</i>	Lombardy Poplar	M	9	230	2.76	300	2.00	+40	F	AV	A1	A6B	E. SLIGHT MECHANICAL DAMAGE AT THE BASE OF THE TREE. IT APPEARS THAT THE TREE MAY HAVE BEEN LOPPED AT 3M AGL SOME TIME AGO AS SECONDARY GROWTH NOW WELL ESTABLISHED. TO BE RETAINED
F	<i>Melaleuca quinquenervia</i>	Swamp Paperbark	M	12	930	11.16	970	3.27	+40	AV	AV	A1	A7C	F. MULTI-TRUNKED TREE WITH 6 MAJOR LEADERS FORMING AT 800MM AGL. PAST PRUNING HAS BEEN DONE POORLY, RESULTING IN THE EXISTENCE OF BRANCH STUBS - SOME WITH WOOD ROT. GROUND AROUND THE BASE OF THE TREE HEAVILY COMPACTED BY STUDENTS GATHERING UNDER THE TREE. NEARBY DISH DRAIN AFFECTED BY TREE ROOT. THREATENED TREE. DETAILED DESIGN OF SUSPENDED ROADWAY AND SUPPLY OF MOISTURE TO UNDERLYING ROOTS WILL BE NEEDED. IMPLEMENTATION OF TREE PROTECTION PLAN REQUIRED.
G*	<i>Eucalyptus robusta</i>	Swamp Mahogany	M	14	720	8.64	800	3.01	+40	AV	AV	A1	A7D	G. CO-DOMINANT TRUNK @ 1.3M AGL. SPREADING CANOPY. MINOR DEADWOOD AND EPICORMIC GROWTH THROUGHOUT. SURROUNDING GROUND MILDLY COMPACTED. MEDIUM CROWN DENSITY. TREE REQUIRES DETAILED DESIGN TO ENSURE LEVELS AND INSTALLATION OF DECOMPOSED GRANITE TRACK DO NOT SIGNIFICANTLY IMPACT ON THE TREE'S ROOT PLATE. CONSIDERATION SHOULD BE GIVEN TO USING A CELLULAR PLASTIC GRID LAID OVER A GEOTEXTILE LINER TO AVOID EXCAVATION AND COMPACTION ISSUES FOR THE GRAVEL TRACK.
H														
I														
J														

1. MULTI-TRUNKED TREES HAVE AN AVERAGE MEASUREMENT CALCULATED IN ACCORDANCE WITH AS 4970. 2. DARB = DIAMETER AT ROOT BUTTRESS USED WHEN CALCULATING SRZ. * ASSUMED VALUES AS PROPERTY NOT ACCESSED

LEGEND

AGE CLASS	Y	SM	M	OM
	YOUNG SAPLING/HAS NOT REACHED 1 ST ADULT FORM	SEMI-MATURE DBH < 300mm/APPROACHING FULL HEIGHT	MATURE DBH BET. 300 -700/APPROACH. MAX HT & SPREAD	OVER-MATURE/SENESCENT LGE DBH, LGE BRANCH FAILURES/STRUCT FAILTS
STRUCTURE	P NUMEROUS STRUCTURAL FAULTS/HIGH RISK OF SEVERE FAILURE	F STRUCTURAL FAULTS PRESENT /MODERATE RISK OF SEVERE FAILURE	AV SOME MINOR FAULTS /MODERATE RISK FOR MAJOR FAILURE	EX SOME MINOR FAULTS/LOW-MOD RISK OF MINOR FAILURES
HEALTH	P SIG. SIGNS OF LOST VIGOUR EG DIEBACK, REDUCED CANOPY	F SIGNS OF REDUCED VIGOUR EG LEAF UNDER STRESS, STUNTING	AV LOCALISED PATCHES OF LOST VIGOUR/NOT WIDESPREAD	EX NO EVIDENCE OF STRESS/SIGNS OF NEW GROWTH/WIDESPREAD
RETENTION	TREES TO BE RETAINED		TREES TO BE REMOVED	TREE TO BE MONITORED DURING & POST CONSTRUCTION



APPENDIX C: TREE ASSESSMENT DIAGRAMS

FIGURE C1 – TPZ/SRZ DIAGRAM [BASE SURVEY SOURCE: DE WITT CONSULTING]

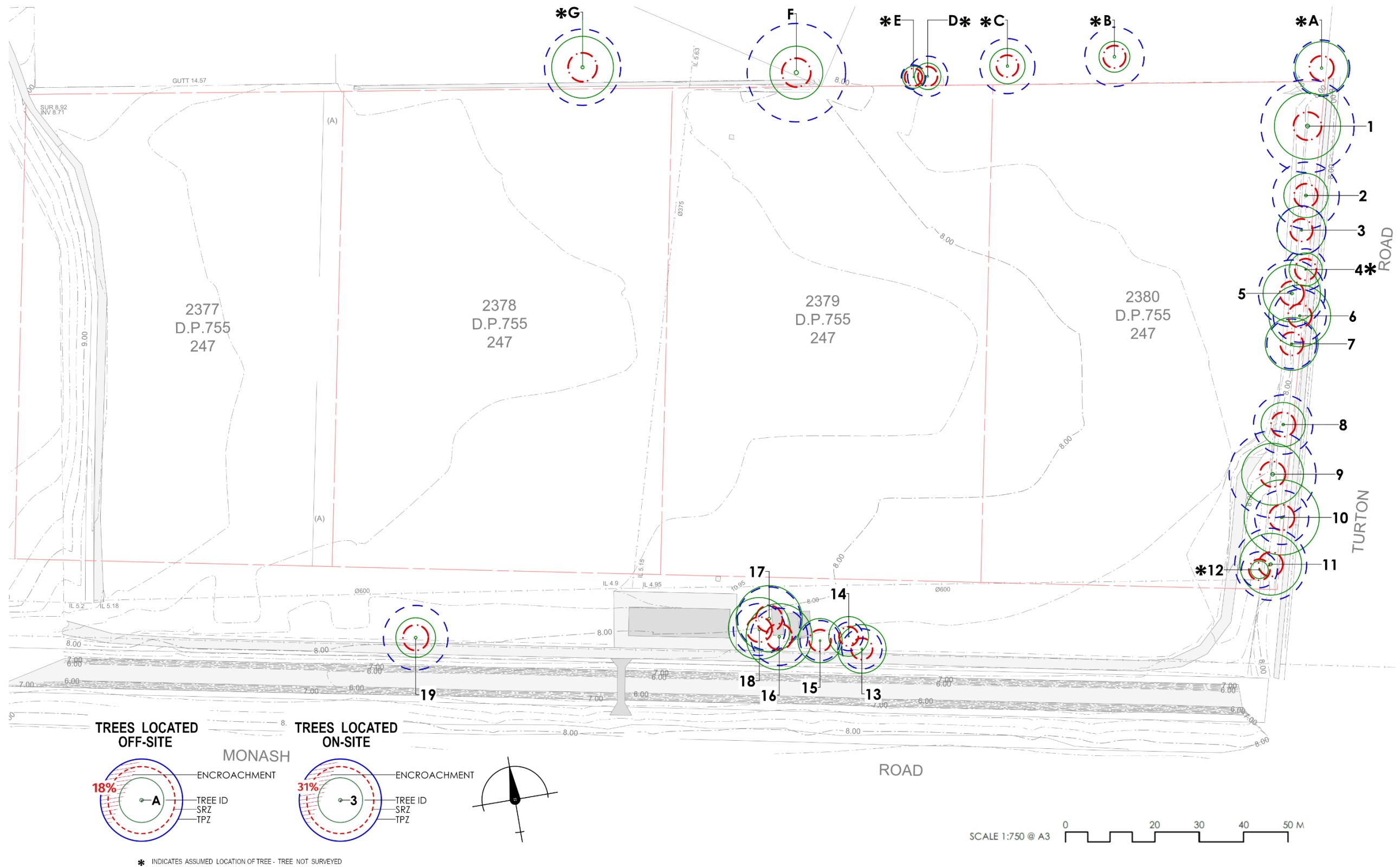




FIGURE C2 – TREE IMPACT ASSESSMENT DIAGRAM [BASE DRAWING SOURCE: EJE ARCHITECTURE & NORTHROP]

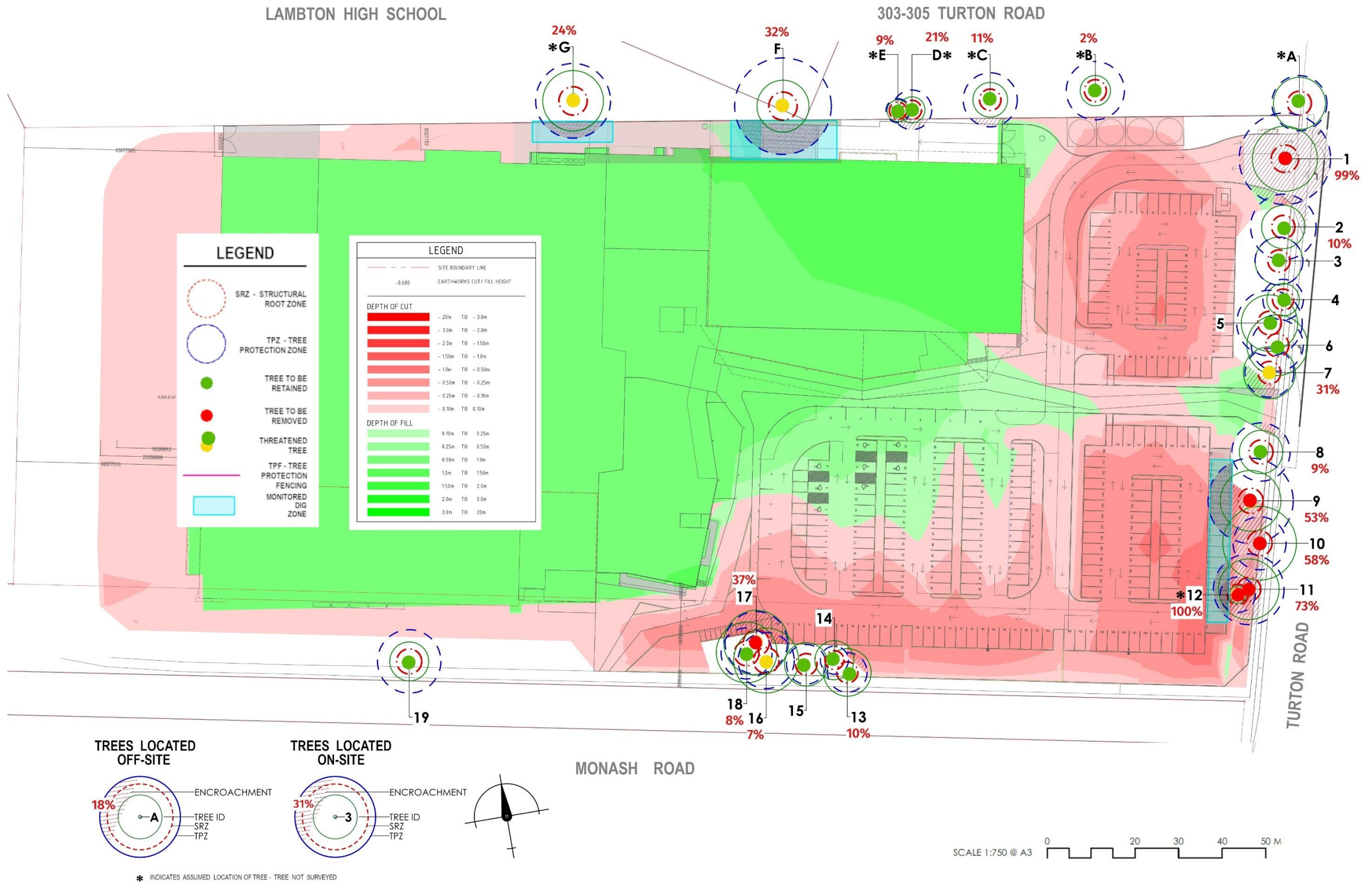
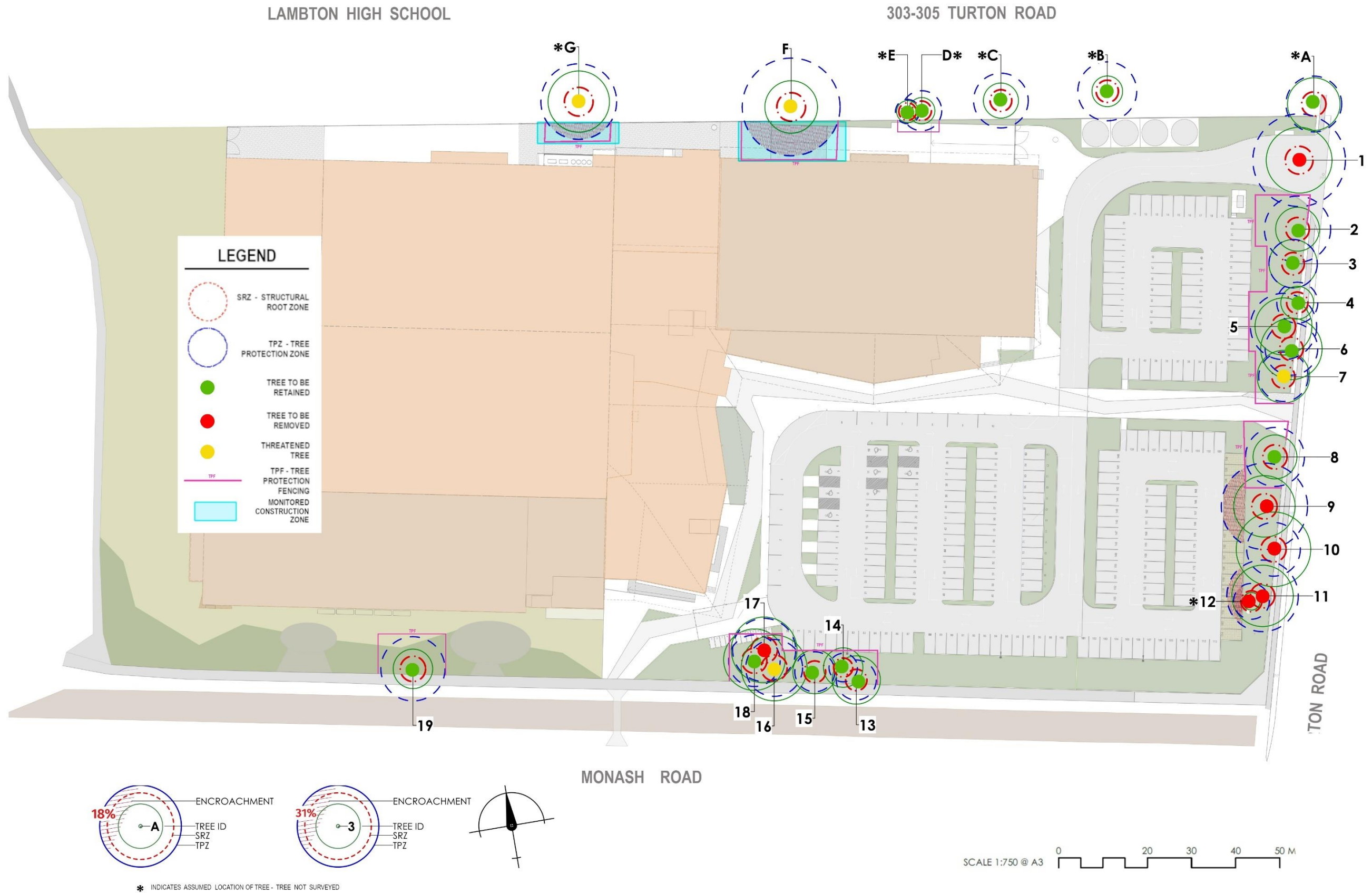




FIGURE C3 – TREE PROTECTION DIAGRAM (TO BE READ IN CONJUNCTION WITH APPENDIX D) [BASE DRAWING SOURCE: EJE ARCHITECTURE]



APPENDIX D: TREE PROTECTION PLAN (TPP)

The following outlines in detail the responsibilities and work required to be undertaken by the adequately protect the trees to be retained. (Refer also to Appendix C3.)

D.1 GENERAL INSTRUCTIONS

- A Project Arborist is to be engaged **by the client** for the full period of the contract including the Defects Liability Period.
- The Project Arborist must have qualifications equal to or greater than AQF Level 5 Arborist.
- Contact details, including mobile phone number, of the Project Arborist is supplied to the Construction Manager, Site Supervisor and other similar team members.
- Should any damage occur to the trees, both above and below ground components, then contact is to be made with the Project Arborist so that the damage may be inspected and remedial action taken, if required.
- All works proposed to be undertaken within the nominated TPZs of the threatened trees (refer Figure 8) shall be discussed with the Project Arborist prior to the works commencing to ensure that the appropriate methods and equipment are being employed.
- Give a minimum of 24 hours' notice when requiring the Project Arborist to attend site and advise the client when such requests are made.

D.2 DESIGN/DOCUMENTATION PHASE

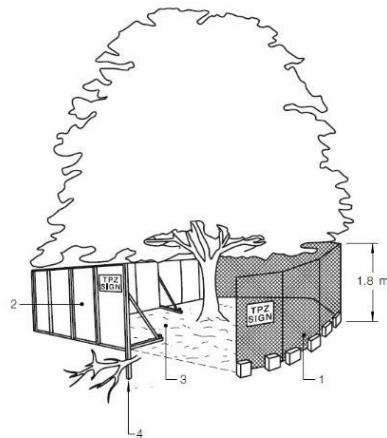
- The proposed gravel tracks within the TPZs of affected trees, should be constructed from a permeable material that requires only minimal excavation. It is recommended that this be comprised of a recycled plastic cellular grid infilled with 7mm-10mm crushed aggregate laid over a prepared subgrade and geotextile membrane. (Products to consider are GEOHEX™, DiamondGrid™, TRUEGRID®).
- The design of the northern road occurring within the TPZ of Tree F be undertaken with the involvement of the Project Arborist such that a structure is created that prevents damage to the tree's root plate. There is an element of risk associated with this work as noted above, and so an undertaken should be made with the school for the client to provide compensatory planting should the tree fail within five years after the completion of the project.

D.3 PRE-CONSTRUCTION PHASE

- A pre-construction meeting is to be held on site with the Project Arborist and relevant members of construction team, including the Construction Manager and Site Supervisor (or similar), to discuss all aspects of the TPP including: the erection of tree protection measures and management of the works within the TPZs.
- Erect tree protection measures as described in this TPP and as shown in the Tree Protection Diagram (Appendix C3). Tree Protection Fencing (TPF) shall comply with the requirements of AS 4970-2009 *Protection of trees on development sites*. (Refer Figure D2)
- Signs shall be attached to the TPF (or temporary site fencing, if appropriate) notifying people of the presence of TPZs and shall include the name and contact details of the Project Arborist. (Refer Figure D1 or similar.)
- It is further suggested with the approval of the high school, to the base of Tree F: remove picnic seating; hand cultivate the TPZ area to a depth of 100mm-150mm to breakup the surface crust; undertake an application of a plant growth regulator that assists the initiation of compensatory root growth (e.g. Seasol®); apply 25mm (approx.) of a root zone conditioner (e.g. soured lucerne, worm castings and well-composted mulch followed by 50mm (approx.) thick application of an organic mulch (e.g. Mixed Leaf and Wood Chip Mulch) for the purpose of retaining moisture and to provide a protective layer to prevent further compaction.



FIGURE D1: EXAMPLE OF TPZ SIGN
SOURCE: www.newsigns.com.au



- LEGEND:
- 1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
 - 2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
 - 3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
 - 4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

FIGURE D2: TREE PROTECTION FENCING (TPF)
[SOURCE: AS 4970-2009]

D.4 CONSTRUCTION PHASE

- During induction sessions and toolbox talks with the construction team, and its sub-contractors, if relevant, reference should be made to the restrictions of undertaking work within the TPZs.
- Any excavation works to be carried out within the TPZs shall be supervised by the Project Arborist. This is particularly important when undertaking work within the nominated Investigation Zone as root mapping will be required prior to any excavation works. (Refer Appendix C3).
- Any required branch removal shall only be undertaken with the written approval of the Project Arborist and undertaken in accordance with the requirements of AS 4373-2007 *Pruning of amenity trees*.
- Any exposed roots are to be temporarily protected, such as overlaying form ply sheeting and dampened hessian.
- Any root pruning, if required, shall be inspected and instructions given by the Project Arborist. The work shall then be supervised by the Project Arborist. Only clean, sharp implements are to be used.
- All care should be taken to keep woody roots intact. Any roots encountered being less than 50mm diameter may be neatly severed using clean, sharp tools ensuring not to leave ragged cuts.
- Any root pruning should be undertaken to meet the requirements of AS 4373-2007 *Pruning of amenity trees* with the work being undertaken by at least an AQF3 Arborist in accordance with *Guide to Managing Risks of Tree Trimming and Removal Work* (Safe Work Australia 2016).
- Roots once cut shall be kept moist using hessian-like material until covered over. Severed roots shall be treated with a suitable root growth hormone with the active ingredients Indole-3-Butyric Acid (IBA) and 1-Naphylacetic Acid (NAA) to assist with regeneration of the root system.

D.5 POST-CONSTRUCTION PHASE

- Remove tree protection measures at the completion of the works.
- Arrange for the Project Arborist to undertake a final inspection and provide a certificate confirming that the TPP has been complied with documenting any inconsistencies or departures. This report shall be made available to LMCC upon request
- The Project Arborist shall undertake an inspection of the trees two weeks prior to the end of the Defects Liability Period and report on their condition.



APPENDIX E: TREE AZ

The following table provides supplementary information to assist in interpreting the previous tables with respect to Tree AZ classifications.

TREE AZ CATEGORIES	
CATEGORY Z: UNIMPORTANT TREES NOT WORTHY OF BEING A MATERIAL CONSTRAINT	
Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species.	
Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection.
Z2	Too close to a building i.e. exempt from legal protection because of proximity.
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remediation care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions.
Z6	Instability, i.e. poor anchorage and/or increased exposure.
Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people	
Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognised court or tribunal would be likely to authorise removal, i.e. dominance, debris and/or interference.
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognised court or tribunal would be likely to authorise removal, i.e. severe structural damage to surfacing and buildings.
Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population	
Z9	Severe damage and/or structural defects where high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions.
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings and/or poor architectural framework.
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference and/or suppression.
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance.
NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorisation hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.	
CATEGORY A: IMPORTANT TREES SUITABLE FOR RETENTION FOR MORE THAN 10 YEARS AND WORTHY OF BEING A MATERIAL CONSTRAINT	
A1	No significant defects and could be retained with minimal remedial care.
A2	Minor defects that could be addressed remedial care and/or work to adjacent trees.
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years.
A4	Trees that may be worthy of legal protection from ecological reasons (Advisory requiring specialist assessment)
NOTE: Category A1 trees that are already large and exceptional, or have potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A trees are sufficiently important to be material constraints, AA trees are at the top of the categorisation hierarchy and should be given the most weight in any selection process.	
CAUTION: Tree AZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The preceding category descriptions are designed to be a brief field reference and are not to be self explanatory. They must be read in conjunction with the most current explanations published at www.treeaz.com	
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REV	DESCRIPTION	DATE
A	DRAFT REPORT FOR CLIENT REVIEW	2024-03-25
B	REVISED REPORT FOR CLIENT REVIEW	2024-05-22

