TREESCAN

URBAN FOREST MANAGEMENT

Tree Report

West Pymble Indoor Pool Facility
Ku-ring-gai Bicentennial Park, West Pymble
Revision 3

For Colston Budd Hunt & Kafes Pty Ltd

December 2010

45 Glossop Road, Linden NSW 2778
Ph: 02 4753 1018, Fax: 02 4753 1167, Mobile: 0415 864 669
Email: mail@treescan.com.au Website: www.treescan.com.au

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Introduction

It is proposed to redevelop the existing facilities at West Pymble Pool including the construction of a new indoor pool, stormwater system and landscaping. Several trees are located near and within the footprint and some would be affected by the proposed construction. This report assesses the trees on the site and comments on the effects of the proposal.

Plans considered are:

Landscape DA Plan DA-0901-01Rev A dated 24 September 2010 prepared by Sturt Associates

Siteworks and Stormwater Details 08P172-DAC120 Rev D dated 8 December 2010 prepared by Hughes Trueman

Overlay drawing showing the existing survey of the site with the footprint of the proposed development indicated in colour provided by Suters Architects.

Comments provided by Ku-Ring-Gai Council in Landscape Referral dated 10 November 2010 are also considered.

The site

The site consists of the surrounds of the existing 50m pool and Learn to Swim pool within Ku-ring-gai Bicentennial Park, with emphasis on the northern and western areas where construction would take place.

Soils are sandy loams of the Lucas Heights soil landscape derived from the underlying Mittagong Formation interbedded shale and sandstone parent rock (Chapman & Murphy 1989). Site vegetation consists of grouped or scattered canopy trees, with an understorey of turfgrass and shrubs.

Present state of the trees

The site trees are assessed in Table 1 below; tree numbers are noted on the plan attached. Trees were inspected from the ground only and no aerial and only limited subterranean inspections were carried out. The site trees are a mixture of planted deciduous landscape species and native evergreen species. Some of the latter species are indigenous to the site.

Discussion

Trees proposed for removal

Several trees are proposed for removal, although most are of exotic species. A total of 21 trees would be removed, chiefly because they would be within or very close to the footprint of the building. Of these 21 trees, the following ten are of exotic species:

Trees 8, 12 and 13 *Camellia sasanqua* (Camellia) (Plate 8)
Tree 17 *Ulmus parvifolia* (Chinese Elm)
Trees 19 and 20 *Ulmus glabra* (Wych Elm)
Trees 21 and 28 *Liquidambar styraciflua* (Liquidambar) (Plate 6)
Tree 26 and 27 *Koelreuteria paniculata* (Golden Rain Tree) (Plate 7)

Trees 8, 12 and 13 *Camellia sasanqua* (Camellia) are large shrubs and not of great landscape prominence (Plate 8). If required, they could be relocated to other parts of the site.

Trees 17, 19, 20, 26 and 27 have some landscape significance, being semimature to mature specimens of the commonly planted deciduous species *Ulmus parvifolia* (Chinese Elm), *Ulmus glabra* (Wych Elm) and *Koelreuteria paniculata* (Golden Rain Tree) (Plate 7).

Trees 21 and 28 *Liquidambar styraciflua* (Liquidambar) are of a species regarded as nuisance due to its potential for very large eventual size and its vigorous root system; specimens up to 12m in height are exempt from the provisions of the Ku-Ring-Gai Council Tree Preservation Order. However these subject trees are greater in height and not exempt.

Trees 21A and 36 *Eucalyptus microcorys* (Tallowwood) although in good health and condition are semimature examples of a native species which is not indigenous to the area.

Indigenous trees proposed for removal are:

Trees 2, 3, 6, 14 and 21A *Eucalyptus pilularis* (Blackbutt)
Tree 4, 5 and 22 *Syncarpia glomulifera* (Turpentine)
Trees 20A, 20B, 20C and 25 *Eucalyptus saligna* (Sydney Blue Gum) (Plate 4)

An assessment of the ecological value of the trees is being undertaken by others.

Of the twelve indigenous trees proposed for removal, some are semimature and not of large dimensions although Trees 2, 3, 6 and 14 *Eucalyptus pilularis* (Blackbutt) and Trees 20A and 25 *Eucalyptus saligna* (Sydney Blue Gum) have trunk diameters of over 300mm. Tree 25 *Eucalyptus saligna* (Sydney Blue Gum) is the largest tree proposed for removal, with a trunk diameter of 1050mm (Plate 5).

Most of the indigenous trees proposed for removal are in good health and condition although some lower branches of Tree 25 *Eucalyptus saligna* (Sydney Blue Gum) have been injured by storm.

Trees 2 and 3 *Eucalyptus pilularis* (Blackbutt) are within the footprint of a proposed retaining wall near the footpath entry to the new building. They are associated with Tree 1 (see below) and should be considered as a group. Provision has been made for further root investigation near Tree 1 prior to the start of construction; if significant roots are found the footpath would need to be redesigned and Trees 2 and 3 would thus also be retained.

Trees proposed for retention
Some of the other trees noted in the Tree Table below are remote from the construction zone and would not be affected by the proposed development. Several trees would be in the vicinity of other works including paving and stormwater lines. These trees are:

Trees 30 and 31 *Eucalyptus saligna* (Sydney Blue Gum) are close to the line of a low-profile grass-lined swale in the northeast area of the site. New paving around the existing pool would also be laid near the trees.

The swale bunds should be constructed above existing levels without excavation into the root zone of the trees. A minor amount of coarsely textured fill deposited on natural ground and covered by turf would have minimal effect on the trees. Paving near these trees would be laid at the existing levels over a porous subgrade of a suitable material such crushed river pebble or recycled glass (Benedict GlassSand) with a paver such as Rocla Ecotrihex pavers for the surface. Excavation including topsoil stripping or trenching for services should be avoided within 8m of the trunks.

Tree 32 *Liquidambar styraciflua* (Liquidambar) is of a species which would be exempt from the Ku-Ring-Gai Council Tree Preservation Order if it had been under 12m in height and is therefore considered to be an undesirable specimen. It is prominent in the landscape but does not have a long life expectancy due to defects in the trunk and likely future nuisance. A stormwater pipe and pit are proposed near the trunk and assuming that major roots are present the required excavation may cause root loss. Paving near the tree should be constructed as noted above for Trees 30 and 31.

Trees 33, and 34 *Fraxinus excelsior* (Common Ash) and Tree 35 *Koelreuteria paniculata* (Golden Rain Tree) are prominent in the landscape now all three are in full leaf, but

they are poor specimens due to defects with decaying stubs in junctions resulting from poor pruning in the past. Some dieback is also present in the upper crowns of Trees 33 and 34, a possible early indication of decline. The stormwater pipe would be excavated near the trunks and would be likely to cause root loss. If the pipe cannot be relocated or deleted these trees would need to be removed and replaced.

Tree 45 *Eucalyptus saligna* (Sydney Blue Gum) is a major specimen located to the south of the site. A bitumen footpath currently crosses part of the root system and the surface has been lifted and cracked by root activity. A replacement footpath would be constructed on the same alignment, but would need to be suspended above the existing levels at the trunk base to retain the roots and to allow for future root expansion.

Tree 41 *Syncarpia glomulifera* (Turpentine), Tree 43 *Angophora costata* (Sydney Red Gum) and Tree 44 *Eucalyptus paniculata* (Grey Ironbark) would be close to the proposed footpath along the southern roadway. This footpath would be constructed above existing levels to avoid injury to any roots in the vicinity. The proposed bicycle racks would be installed without the need for regrading or concreting.

Trees 24 and 24A *Angophora costata* (Sydney Red Gum) would not be affected by the boundary fence shown on the overlay plan; there is no retaining wall in this vicinity. The normal construction zone fencing would be required to protect these trees from any possible adverse impact.

Tree 1 *Eucalyptus pilularis* (Blackbutt) root investigation

Tree 1 *Eucalyptus pilularis* (Blackbutt) is a mature specimen in good health and in fair structural condition, with a codominant junction between the subtrunks. It is located immediately to the south of the proposed building. The footing would be located approximately 6m to the north of the trunk, within the theoretical tree protection zone radius of approximately 12m (for a tree with a combined trunk diameter of 1m as defined in Australian Standard AS 4970 *Protection of trees on development sites*). Accordingly a root investigation by means of hand excavation was undertaken to ascertain whether root injury would occur, and the results are noted below.

A trench was excavated by hand along the approximate line of the building footprint and to the level of the hard compacted clay subsoil at approximately 600mm depth. The trench was approximately 9.3m in length. The trench was discontinued in the vicinity of Tree 6 *Eucalyptus pilularis* (Blackbutt) to avoid root injury.

Eight small roots to a maximum diameter of 45mm were found in the trench. Other roots were smaller, with diameters between 15mm and 35mm. Roots were found at depths between 290mm and 400mm. See root investigation plan below.

The loss of the eight roots encountered in the trench would not have an adverse impact on the stability, vigour or life expectancy of the tree. The roots are small and

not structurally important for anchorage. They appear to be small roots extending towards open soft soil landscape area which are not essential for the continuing vigour of the tree.

Thus the proposed building could be constructed at the design setback without causing significant injury, as long as reasonable tree protection measures are undertaken.

Subsequent to the root investigation it was found that a footpath 1.8m wide and a retaining wall to a height of approximately 1.5m are proposed between the tree and the building footprint, requiring excavation at a setback of approximately 4.2m from the trunk. Although the root investigation was undertaken at the building line 6m from the trunk and the retaining wall would be located approximately 4.2m from the trunk, it is considered that the findings of the root investigation remain valid. Roots encountered in the trench at 6m from the trunk are small and widely separated: at 4.2m there would be fewer roots of slightly larger diameter and the point at which these few roots are cut would make little difference.

The proposed excavation would be beyond the minimum structural root zone radius of 3.3m as defined in AS4970 and this comparatively minor impact is considered acceptable if excavation is limited to the area required for access to the building.

The proposed retaining wall curves around the tree to the west, where no root investigation has been undertaken. The retaining wall would be located only approximately 1m from the structural root zone radius around approximately one-third the circumference of the root zone. The stability of the tree may thus be compromised, possibly resulting in the creation of a risk to the public.

The path alignment has been moved further from the tree by removing the planter bed shown to the stormwater corner of the building. Root investigation by hand excavation under arborist supervision should be undertaken along the proposed footpath alignment to ascertain whether excavation would compromise the tree. Should the arborist reach a negative conclusion, the relocation of the footpath to the east of the tree would be recommended. An alternative location for the proposed footpath would be designed to the east of the tree; this footpath could be located within the 12m theoretical tree protection zone radius, as long as the footpath is constructed above ground level and no excavation is required. Levels appear satisfactory for accessibility purposes.

Bushfire constraints
The Bushfire Report recommends that a 5m clearance is maintained between buildings and tree crowns. Most of the trees concerned have a relatively high branch habit so that much of the crown which may overhang a roof is over 5m above the roof. Pruning required for clearance has not been specifically assessed but for this reason it is likely that any pruning require would not be drastic. Tree 1 *Eucalyptus pilularis* (Blackbutt) for example has few low branches to the north side of the trunk and achieving a 5m vertical clearance would not be difficult (Plate 1).

Conclusions

Twenty-three trees are proposed for removal, and of these ten are deciduous exotic species. The twelve indigenous trees proposed for removal are of species listed as part an endangered ecological community and an ecologist's report has been prepared to assess this.

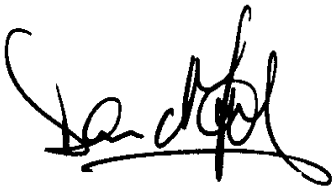
Other trees proposed for removal have some landscape value for their maturity and prominence, but could be replaced as part of the landscape plan.

Trees proposed for retention are chiefly remote from the construction zone so that minimal protection measures would be required. However several trees near the footprint would require protection during construction.

Excavation in the vicinity of Tree 1 should be undertaken initially by hand and the extent of any roots encountered should be assessed by an arborist.

The proposed excavation near the structural root zone radius to the north and northeast of Tree 1 is acceptable if excavation is limited to the area required for access to the building. Excavation in the vicinity of Tree 1 should be undertaken initially by hand and the extent of any roots encountered should be assessed by an arborist. See detail above. The retaining wall near Tree 1 should be designed to minimise excavation near the tree, without any overexcavation for drainage or footings.

The proposed footpath to the north and west of Tree 1 could be relocated to the east of the tree and constructed above ground level. The level of the footpath adjacent to the building would need to be adjusted to accommodate this design. If this relocation is implemented Trees 2 and 3 *Eucalyptus pilularis* (Blackbutt) could be retained.



David Ford, Adv Dip Land Management, Dip Horticulture (Arboriculture), Cert Horticulture, Cert Bush Regeneration, MAIH

Consulting Arborist

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Barrell, J. 1993, 'Preplanning Tree Surveys: Safe Useful Life Expectancy (SULE) is the Natural Progression', *Arboricultural Journal* 17:1, February 1993, pp. 33-46.

Barrell, J. 1995, 'Pre-development Tree Assessments', in *Trees & Building Sites, Proceedings of an International Conference Held in the Interest of Developing a Scientific Basis for Managing Trees in Proximity to Buildings*, International Society of Arboriculture, Illinois, USA, pp. 132-142.

Chapman, G.A. & Murphy, C.L. 1989, *Soil Landscapes of the Sydney 1:100 000 Map Sheet*, Soil Conservation Service of NSW, Sydney.

Standards Australia 2009, Australian Standard AS 4970 *Protection of trees on development sites*, Standards Australia, Sydney.

Tree protection during construction

The following measures should be undertaken to reduce the possible effects of construction on the trees.

Excavation in the vicinity of trees should be done initially by hand. Any roots encountered <50mm in diameter should be cut cleanly with a hand saw. Any roots encountered >50mm in diameter should retained intact and referred to the site arborist for advice.

Prior to the start of construction trees should be fenced (in groups where possible) to a radius of 6m from each trunk except where access is required for construction, to form tree protection zones. Fences should be chainlink 1.8m high supported by steel posts.

In the vicinity of Tree 1 *Eucalyptus pilularis* (Blackbutt) the remaining area of the assumed root zone to a radius of 12m from the trunk should be protected by fencing and soil surface protection measures as noted in Figure 3 below from Australian Standard AS 4970 *Protection of trees on development sites.* Fences should be chainlink panels 1.8m high.

Near Trees 30, 31 and 45 the fence should extend to a radius of 10m from the trunks.

Where access is required within these radii for building purposes, the fence should be set back 1.5m from the building face and the soil surface between the fence and the building should be protected by plywood sheets or strapped planking as noted in Figure 5 below.

Where not otherwise protected trunks should be armoured with 2m lengths of 50x100mm hardwood timbers spaced at 150mm centres and secured by 8 gauge wires or steel strapping at 300mm spacing. The trunk protection should be maintained intact until the completion of all work on the site.

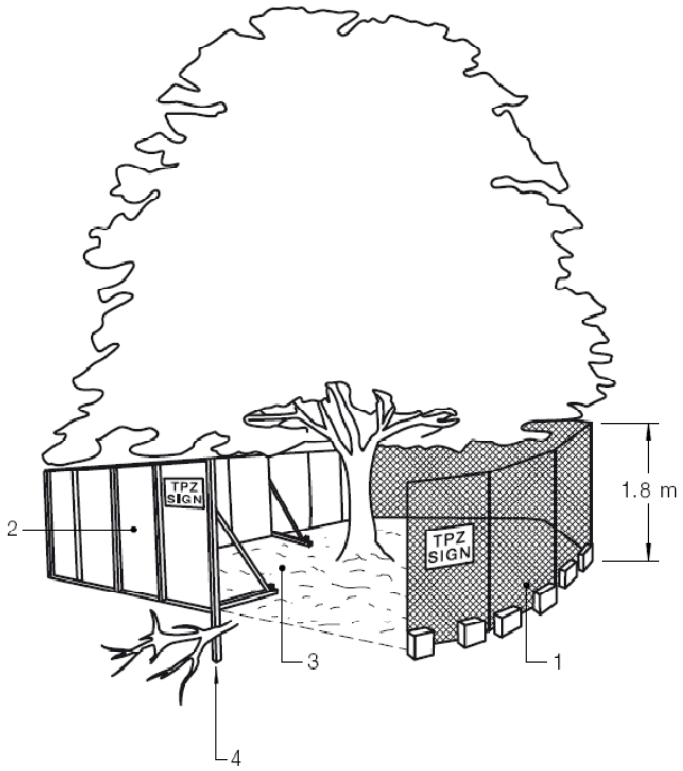
There should be no pedestrian or vehicular access to the tree protection zones. No building activities should take place within the tree protection zones, including storage or stockpiling. Runoff from the site should not be allowed to enter the tree protection zones.

Site access and haulage roadways should be designed to remain clear of any retained trees to a setback of at least 5m. Where vehicle movements must take place near trees, soil and branch protection as noted in Figure 4 below should be undertaken.

A site arborist should supervise any activities in the vicinity of trees, including fencing, excavation and root pruning, and make periodic visits and reports to monitor the state of the trees.

At the end of construction all retained trees should be pruned to remove deadwood and weak branches. All pruning should be done in accordance with Australian Standard AS4373- *Pruning of Amenity Trees*.

Guidelines for tree protection are noted in Australian Standard AS4970-2009 Protection *of Trees on Development Sites*. Figures below show fencing, ground protection and scaffold fencing details.



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 3 PROTECTIVE FENCING

4.5.2 Trunk and branch protection

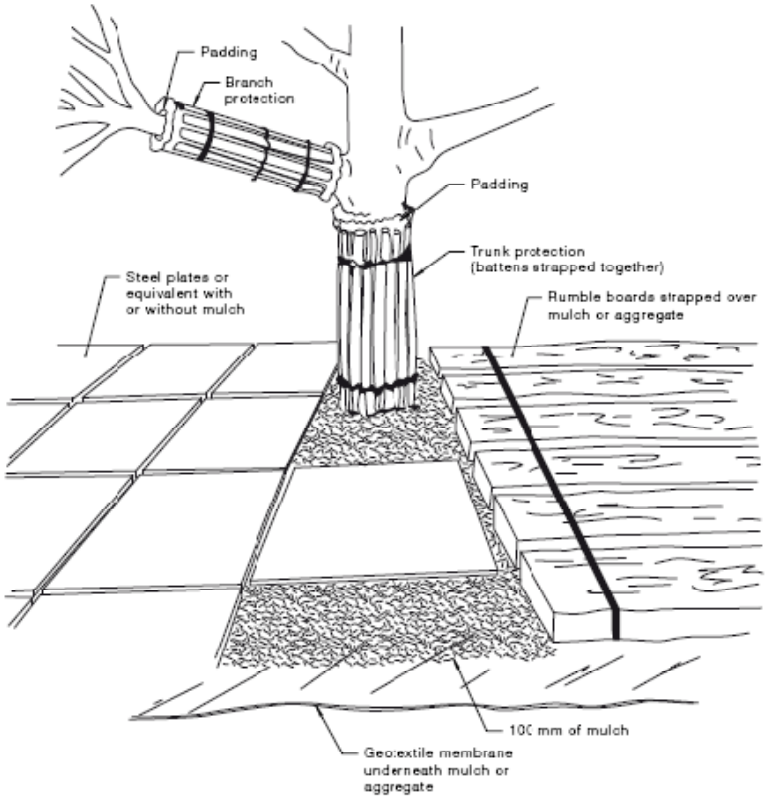
Where necessary, install protection to the trunk and branches of trees as shown in Figure 4. The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2 m is recommended.

Do not attach temporary powerlines, stays, guys and the like to the tree. Do not drive nails into the trunks or branches.

4.5.3 Ground protection

If temporary access for machinery is required within the TPZ ground protection measures will be required. The purpose of ground protection is to prevent root damage and soil compaction within the TPZ. Measures may include a permeable membrane such as geotextile fabric beneath a layer of mulch or crushed rock below rumble boards as per Figure 4.

These measures may be applied to root zones beyond the TPZ.

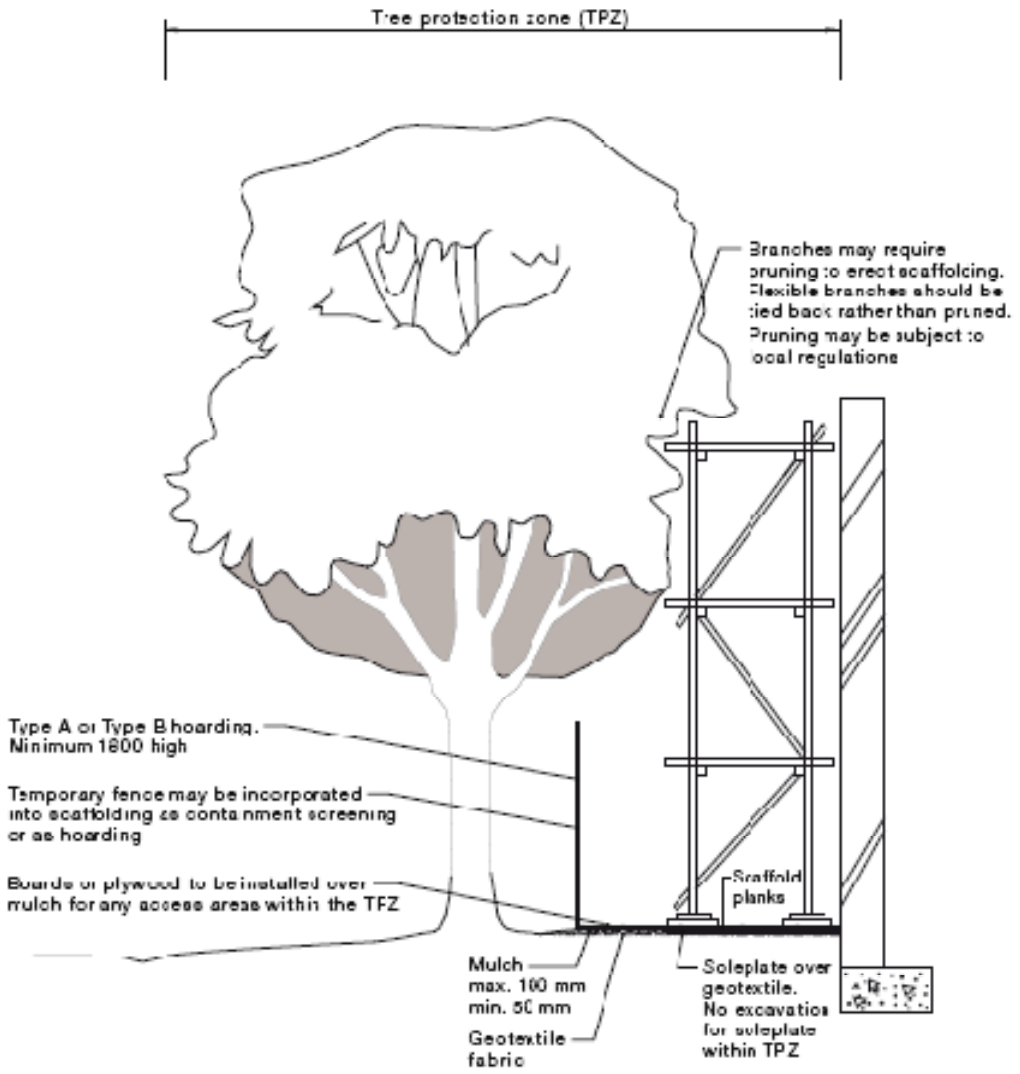


NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION



NOTE: Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20 mm in diameter, without the prior approval of the project arborist.

FIGURE 5 INDICATIVE SCAFFOLDING WITHIN A TPZ

Table 1: Site trees

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
1	*Eucalyptus pilularis* (Blackbutt)	730 and 740. Co-dominant at 600.	25	15	Good	Fair	2B	Co-dominant inclusion.	Retention
2	*Eucalyptus pilularis* (Blackbutt)	600	25	12	Good	Good	2D	Mature epicormic growth – suspect branch attachment.	Removal
3	*Eucalyptus pilularis* (Blackbutt)	500	20	10	Good	Fair	3B	Multiple branch attachments.	Removal
4	*Syncarpia glomulifera* (Turpentine)	250	4	4	Good	Fair	2B	Co-dominant inclusion. Suppressed by dominant trees.	Removal: near footprint
5	*Syncarpia glomulifera* (Turpentine)	250	8	4	Good	Good	2D	Suppressed by dominant trees.	Removal: near footprint
6	*Eucalyptus pilularis* (Blackbutt)	360	20	8	Good	Good	1A		Removal: within footprint
7								Not located.	
8	*Camellia sasanqua* (Camellia)	200	4	2	Good	Fair	3C	Deadwood. Crossing branches. Decay at base.	Removal: within footprint

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
9								Not located.	
10								Not located.	
11								Not located.	
12	*Camellia sasanqua* (Camellia)	200	4	2	Good	Fair	3C	Deadwood. Crossing branches. Decay at base	Removal: within footprint
13	*Camellia sasanqua* (Camellia)	280	5	4	Good	Fair	3C	Small diameter deadwood. Lopped.	Removal: within footprint
14	*Eucalyptus pilularis* (Blackbutt)	400	8	12	Good	Good	2A	Surface root damage.	Removal: within footprint
15								Not located.	
16								Not located.	
17	*Ulmus parvifolia* (Chinese Elm)	250	7	8	Good	Good	3B	Not in leaf. Small diameter deadwood. Adjacent structure.	Removal: within footprint
18								Not located.	

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
19	*Ulmus glabra* (Wych Elm)	500	17	15	Good	Fair	2A	Not in leaf. Adjacent structure. Co-dominant at 1.7m.	Removal: within footprint
20	*Ulmus glabra* (Wych Elm)	400	13	14	Good	Good	2A	Not in leaf. Adjacent structure.	Removal: within footprint
20A	*Eucalyptus saligna* (Sydney Blue Gum)	400	22	6	Good	Good	2D	Normal deadwood.	Removal: within footprint
20B	*Eucalyptus saligna* (Sydney Blue Gum)	150	11	2	Fair	Poor	4A	Decay at base, north side. Deadwood. Suppressed.	Removal: within footprint
20C	*Eucalyptus saligna* (Sydney Blue Gum)	200	15	3	Good	Fair	2D	Suppressed.	Removal: within footprint
21	*Liquidambar styraciflua* (Liquid Amber)	300	13	7	Good	Good	2D	Not in leaf. Girdled root.	Removal: within footprint
21A	*Eucalyptus microcorys* (Tallowwood)	250	12	6	Good	Good	1A		Removal: within footprint
22	*Syncarpia glomulifera* (Turpentine)	450	10	9	Good	Good	2A		Removal: near footprint
23								Dead.	
24	*Angophora costata* (Sydney Red Gum)	450	18	15	Fair	Fair	3D	Large diameter deadwood throughout canopy. Partially suppressed.	Retention

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
24A	*Angophora floribunda* (Rough-Barked Apple)	400	16	12	Fair	Fair	3D	Partially suppressed. Large diameter deadwood.	Retention
25	*Eucalyptus saligna* (Sydney Blue Gum)	1050	25+	20	Good	Good	2D	Storm damage. Normal deadwood.	Removal: within footprint
26	*Koelreuteria paniculata* (Golden Rain Tree)	350	8	10	Fair	Fair	3C	Not in leaf. Suppressed. Epicormic growth. Small diameter deadwood.	Removal: within footprint
27	*Koelreuteria paniculata* (Golden Rain Tree)	300	9	10	Good	Fair	3C	Not in leaf. Epicormic growth. Small diameter deadwood.	Removal: within footprint
28	*Liquidambar styraciflua* (Liquidambar)	480	14	12	Good	Good	2D	Not in leaf. Girdled root.	Removal: within footprint
29	*Koelreuteria paniculata* (Golden Rain Tree)	250	6	8	Good	Good	2D	Not in leaf. Epicormic growth. Small diameter deadwood.	Retention
30	*Eucalyptus saligna* (Sydney Blue Gum)	950	22	15	Good	Poor	3B	Epicormic growth. Wound with bracket at 9m (*Phellinus sp.*?). Resistograph test required	Retention
31	*Eucalyptus saligna* (Sydney Blue Gum)	700	22	10	Good	Poor	3B	Pruning wound with possible decay. Wound with bracket at 6m (*Phellinus*?). Resistograph test required	Retention
32	*Liquidambar styraciflua* (Liquidambar)	750	13	16	Good	Fair	3B	Not in leaf. Cavity in trunk with decay extending into heartwood. Hangers.	Retention: possible root injury
33	*Fraxinus excelsior* (Common Ash)	600	5	10	Fair	Poor	4B	Not in leaf. Decay at pruning wounds. Poor graft union with superfluous wood growth.	Retention: possible root injury

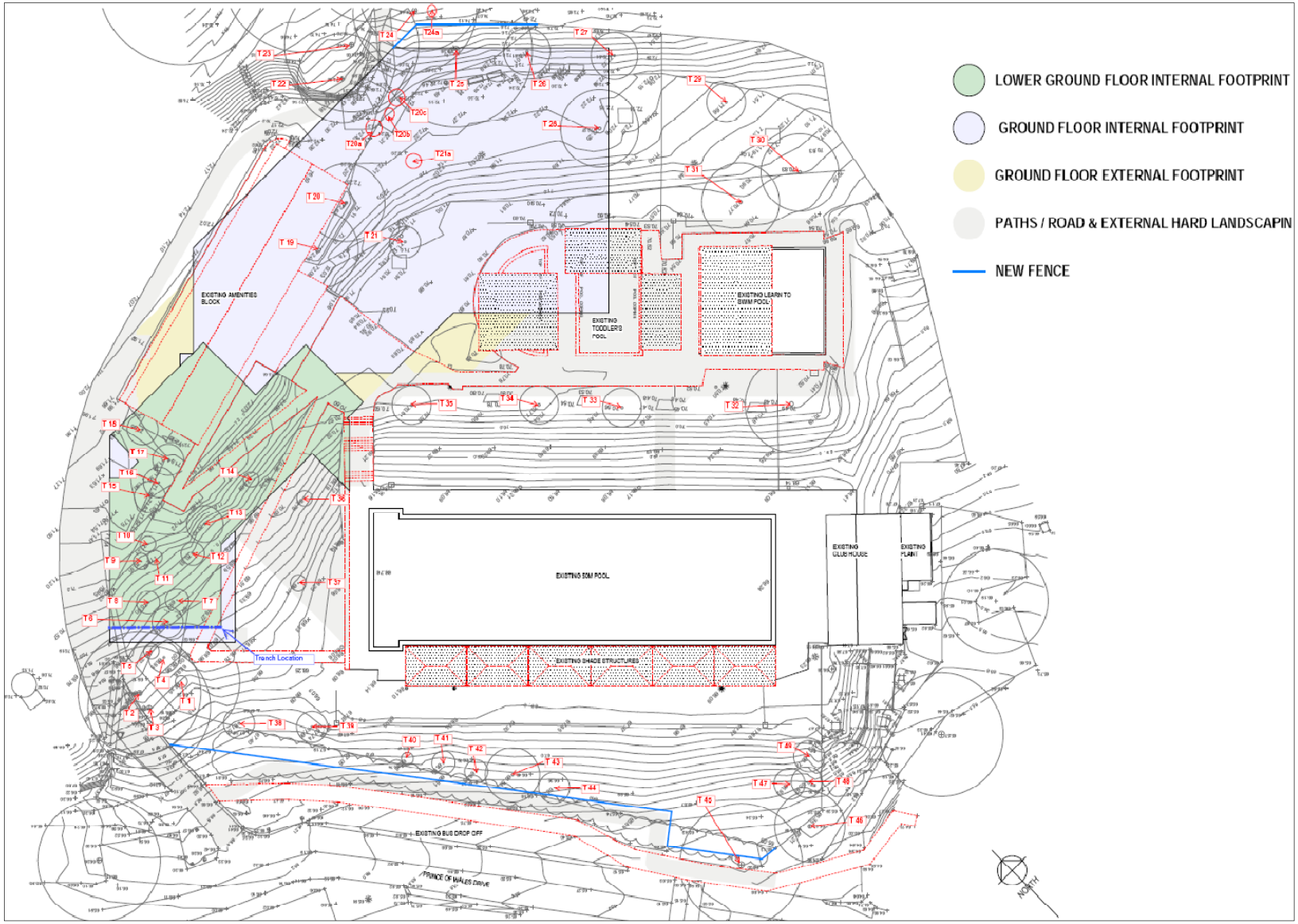
Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
34	*Fraxinus excelsior* (Common Ash)	400	5	9	Fair	Fair	3D	Not in leaf. Decay at pruning wounds. Borer damage.	Retention: possible root injury
35	*Koelreuteria paniculata* (Golden Rain Tree)	300	5	10	Fair	Fair	3C	Not in leaf. Epicormic growth. Possible decay from pruning wounds.	Retention: possible root injury
36	*Eucalyptus microcorys* (Tallowwood)	350	14	10	Good	Good	1A		Removal: near footprint
37								Not located.	
38								Not located.	
39	*Eucalyptus paniculata* (Grey Ironbark)	250 and 150. Co-dominant at base.	10	9	Fair	Fair	3B	Co-dominant inclusion. Epicormic growth. Deadwood.	Retention
40								Not located.	
41	*Syncarpia glomulifera* (Turpentine)	250 and 250. Co-dominant at base.	10	6	Good	Fair	3B	Co-dominant inclusion.	Retention
42								Not located.	

Tree no	Species	Approx trunk dbh mm	Approx height m	Approx crown spread m	Health	Condition	SULE	Comment	Effect of proposed development
43	*Angophora costata* (Sydney Red Gum)	350	13	11	Good	Good	2A		Retention
44	*Eucalyptus paniculata* (Grey Ironbark)	150	9	5	Poor	Fair	3B	Epicormic growth. Small diameter deadwood.	Retention
45	*Eucalyptus saligna* (Sydney Blue Gum)	800	25+	18	Good	Good	2A	Adjacent asphalt path.	Retention
46	*Eucalyptus saligna* (Sydney Blue Gum)	400	21	12	Good	Good	2A	Adjoining fence. Possible future mechanical damage.	Retention
47	*Eucalyptus paniculata* (Grey Ironbark)	200	7	5	Fair	Poor	3D	Wound at base. Included branch junctions. Suppressed.	Retention
48	*Eucalyptus pilularis* (Blackbutt)	300	14	9	Good	Good	2D	Normal deadwood. Minor branch inclusions.	Retention
49	*Syncarpia glomulifera* (Turpentine)	200 and 100. Co-dominant at 750.	7	4	Good	Fair	3D	Minor deadwood. Co-dominant inclusion.	Retention

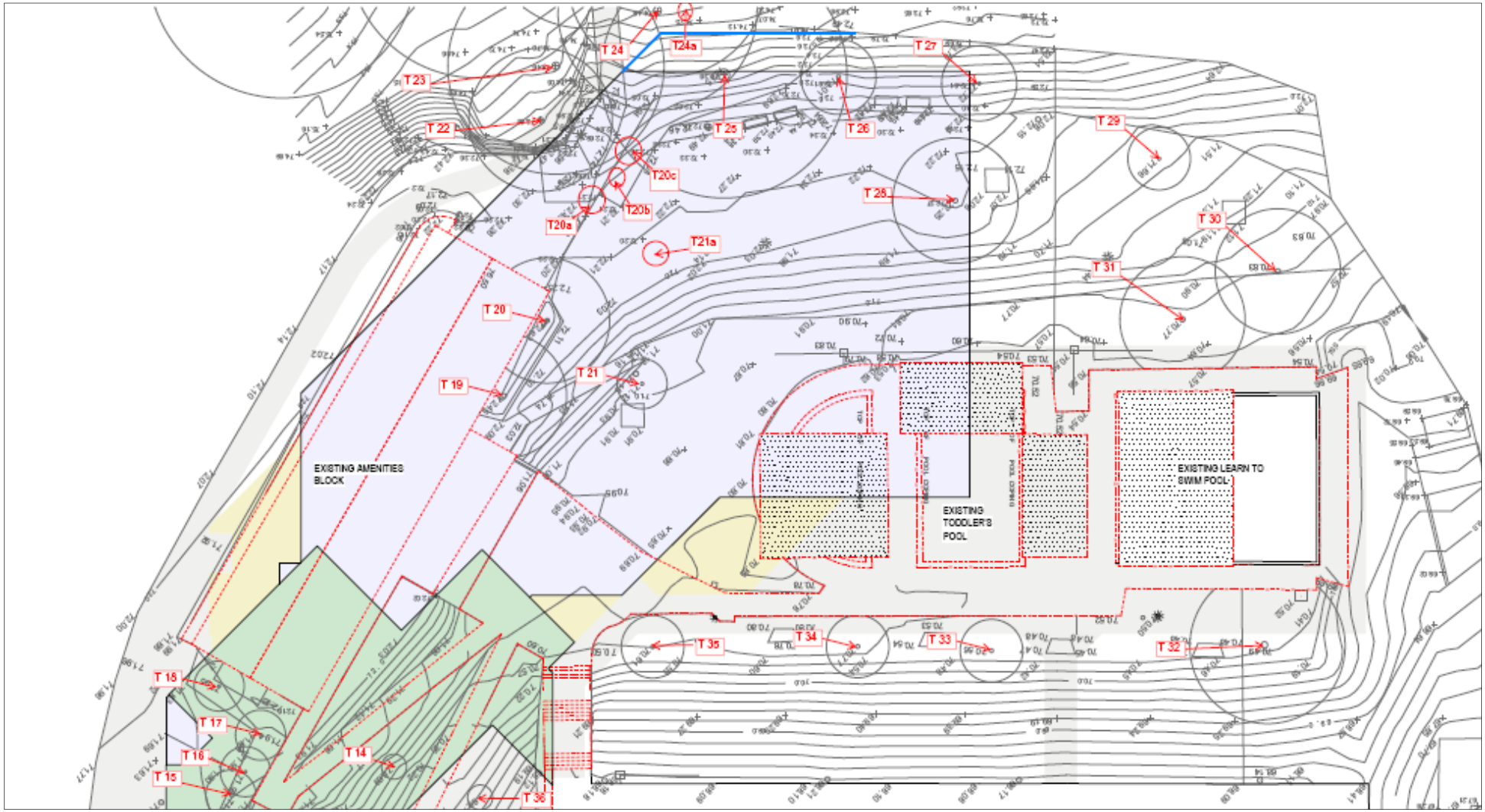
Table 2: SULE categories (after Barrell 1995)

	1	2	3	4
	Long: Appeared to be retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Medium: appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance.	Short: appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance.	Transient: trees which should be removed within the next 5 years.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees which may only live between 15 and 40 years.	Trees which may only live between 5 and 15 years.	Dead, dying, suppressed or declining trees.
B	Trees which could be made suitable for long-term retention by remedial care.	Trees which may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees which may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through damage, structural defect, instability or recent loss of adjacent trees. Urgent removal may be required if near assets.
C	Trees of special significance which would warrant extraordinary efforts to secure their long-term retention.	Trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees which 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.
D		Trees which could be made suitable for retention in the medium term by remedial care.	Trees which require substantial remediation and are only suitable for retention in the short term.	Trees which are damaging or may cause damage to existing structures within the next 5 years.

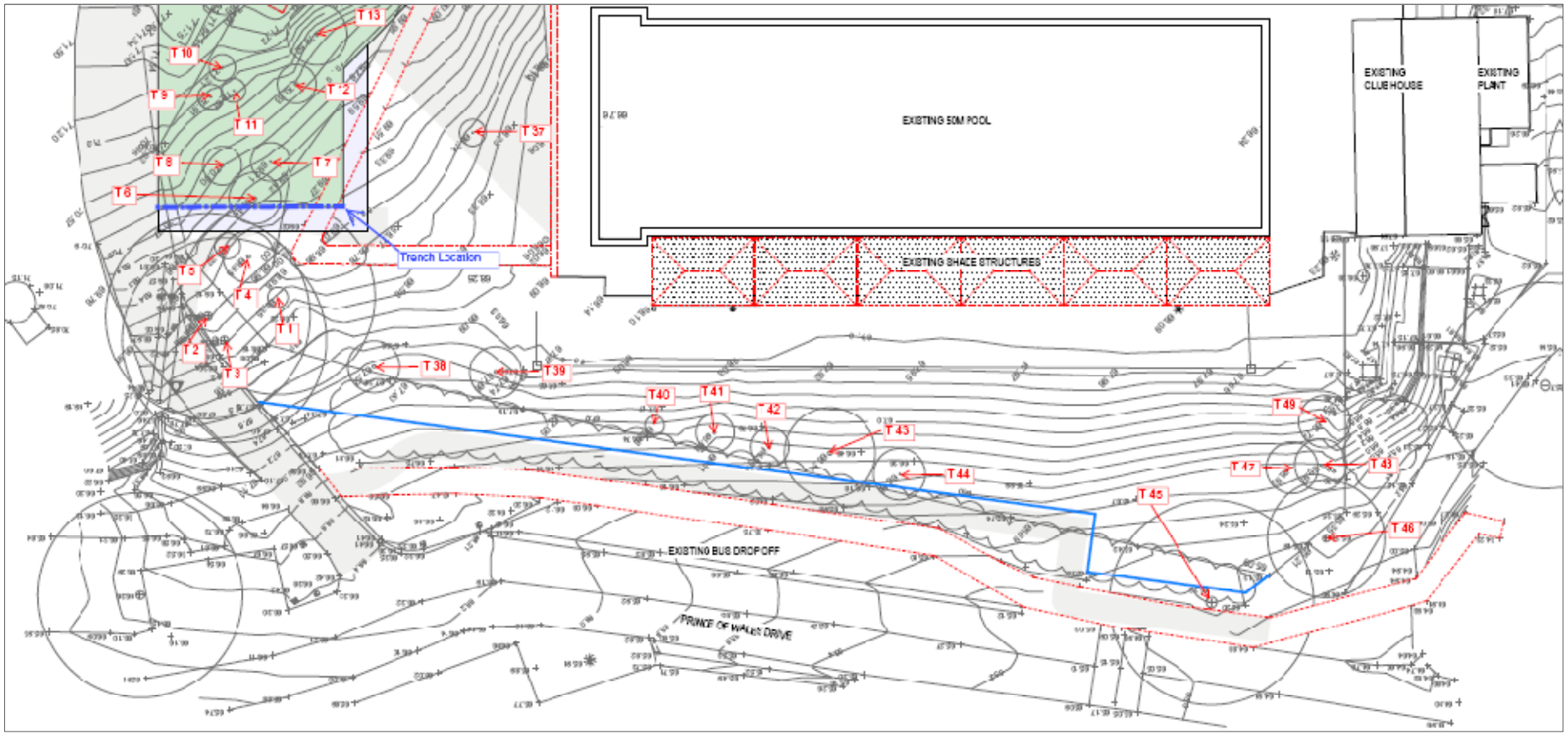
Tree location plans



North section



South section



Plates

Plate 1: Tree 1 (left) and Tree 6 *Eucalyptus pilularis* (Blackbutt)

Plate 2: Tree 14 *Eucalyptus pilularis* (Blackbutt) left and Tree 36 *Eucalyptus microcorys* (Tallowwood)

Plate 3: Trees 19 and 20 *Ulmus glabra*(Wych Elm)

Plate 4: Trees 20A-20C and Tree 25 (right) *Eucalyptus saligna* (Sydney Blue Gum)

Plate 5: Tree 25 *Eucalyptus saligna* (Sydney Blue Gum)

Plate 6: Tree 21 *Liquidambar styraciflua* (Liquidambar)

Plate 7: Trees 26 and 27
Koelreuteria paniculata (Golden Rain Tree)

Plate 8: Trees 12 and 13
Camellia sasanqua (Camellia)

Terminology used in the report

Age classes (I) *Immature* refers to a well-established but juvenile tree. (S) *Semimature* refers to a tree at growth stages between immaturity and full size. (M) *Mature* refers to a full sized tree with some capacity for further growth. (O) *Overmature* refers to a tree about to enter decline or already declining.

Health refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback.

Condition refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils), and the state of the scaffold (ie trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Health	
Good	In good vigour with full leaf coverage of the crown; deadwood if present is internal and a normal feature of the species
Fair	Generally vigorous but shows symptoms of stress or decline, leaf coverage thinner than normal for the species; deadwood of smaller diameter may be present
Poor	Shows symptoms of advanced stress or decline including sparse crown with twig and branch dieback, lack of response to pests or disease
Structural condition	
Good	Has well-spaced branches and strong branch collars; form and habit typical of the species; good example of the species with low probability of significant failure
Fair	Has structural defects of moderate severity with low propensity for failure which could be remediated by pruning or modification of its environment
Poor	Has structural defects which have already failed and/or have a high propensity for failing in the future

Safe Useful Life Expectancy (SULE). In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. SULE is a system designed to classify trees into a number of defined categories so that information regarding tree retention can be concisely communicated in a non-technical manner. SULE categories are easily verifiable by experienced personnel without great disparity. A tree's SULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give safe life expectancy), then by economics (ie cost of maintenance; retaining trees at an excessive management cost is not normally acceptable), effects on better trees, and sustained amenity (ie establishing a range of age classes in a local population). SULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with short SULE may at present be making a contribution to the landscape but their value to the local amenity will decrease rapidly towards the end of this period, prior to their being removed for safety or aesthetic reasons. For details of SULE categories see Table 2, adapted from Barrell (1993 and 1995).

Decay is the result of invasion by fungal diseases through a wound.

Epicormic shoots are sprouts produced from dormant buds in the bark. Production can be triggered by fire, pruning or root damage but may also be as a result of stress or decline.

Sparse crown refers to reduced leaf density, often a precursor to dieback and may imply stress or decline. Also possibly a response to drought or root damage.

Weak junctions are points of possible failure in the scaffold. They are usually caused by the trunk or branch bark being squeezed within the junction so that the necessary interlocking of the wood fibres does not occur and the junction is forced open by the annual increments in growth. This is often a genetic problem.

Weed species are plants which are known to invade native remnant bushland. The species concerned may be exotic or may be native species from other parts of Australia.

Wounds are areas where the bark has been damaged by branch breakage, impact or insect attack. Some wounds decay and cause structural defects or weakness. Healthy trees are able to resist and contain infection by walling off areas within the wood. Tree wounds are often eventually covered over by new bark but the walled off or infected areas still remain internally and may lead to weakness of the heartwood.

Disclaimer

This is not a hazard assessment report and it should be noted that trees are always inherently dangerous. This assessment was carried out from the ground, and covers what was reasonably able to be assessed and available to the assessor at the time of inspection. No aerial or subterranean inspections were carried out and structural weakness may exist within roots, trunk or branches.

Any protection or preservation methods recommended are not a guarantee of tree survival or safety but are designed to improve vigour and reduce risk. Timely inspections and reports are necessary to monitor the trees' condition. No responsibility is accepted for damage or injury caused by the trees and no responsibility is accepted if the recommendations in this report are not followed.

Limitations on the use of this report

This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, and directly attached to that submission, report or presentation.

Assumptions

Care has been taken to obtain information from reliable resources. All data have been verified insofar as possible; however, Treescan Urban Forest Management can neither guarantee nor be responsible for the accuracy of information provided by others.

Unless stated otherwise:

Information contained in this report covers only the trees that were examined and reflects the condition of the trees at the time of inspection: and

The inspection was limited to visual examination of the subject trees without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

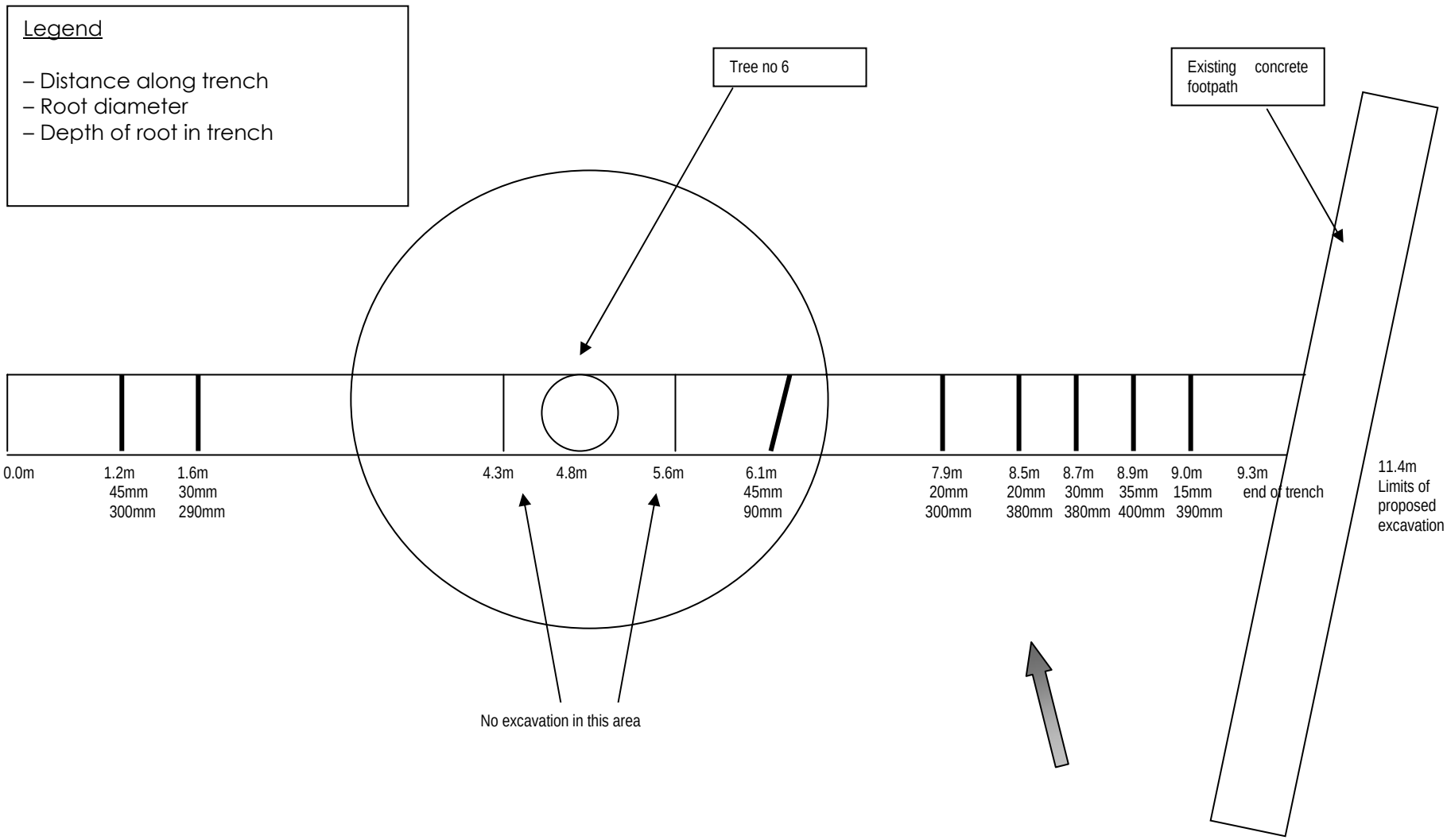
Appendix 1: Tree 1 Root Investigation

Arrow indicates extent of proposed excavation; Tree 6 is near the trench and Tree 1 out of picture is to the right

Root mapping trench viewed from the west

Roots located at 7.9m – 9.0m along trench.
Low numbers of small diameter (<10mm) roots were also present in the trench.

Trench depth to 500mm. The clearly visible lower soil horizon comprises of hard compacted clay sub soils containing large sand stone boulders.


Legend
– Distance along trench
– Root diameter
– Depth of root in trench
Tree no 6
Existing concrete footpath
0.0m
1.2m 45mm 300mm
1.6m 30mm 290mm
4.3m
4.8m
5.6m
6.1m 45mm 90mm
7.9m 20mm 300mm
8.5m 20mm 380mm
8.7m 30mm 380mm
8.9m 35mm 400mm
9.0m 15mm 390mm
9.3m end of trench
11.4m Limits of proposed excavation
No excavation in this area