Arboricultural Impact Assessment, Tree Survey, and Tree Management Plan

Client:	Il Capitano investments Pty Ltd c/0 Allen Jack + Cottier Architects
Site Address:	Lots: 7-11 Castlereagh St, and 77-79 Bathurst st, Liverpool
Trees in question:	9
Information provided:	(19 FEB, 2019); 18005_DA2000.1
Consulting Arborist:	Chris Carne BSc, Dip Arb, BR2
Date of report:	13 March 2019 (Version 2)
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Arboriculture Australia™

QTRA Tree Safety Management Systems

Contents

1. Scope of Assessment

1.1 This report summarises the findings of a site inspection of no less than nine trees on and around the property referred to as *the site*, Lots: 7-11 Castlereagh St, and 77-79 Bathurst St, Liverpool. The trees are street trees under legislative protection by Liverpool Municipal Council, (herein *the council*), which is the presiding council.

1.2 The purpose of the inspection and report is to assess and document the trees and the proposed dwelling by *the client;* at *the site*. In particular, provide an opinion regarding the conditions of the existing trees and determine whether the proposed changes will have a detrimental impact on the longevity of any trees in question. Recommendations will be made regarding each potentially affected tree. General recommendations will be made regarding the site. Specific protective methods are to be deployed to ensure no loss of tree vitality sustained during the proposed development and soft landscaping upgrade.

1.3 Tree Technics Pty Ltd, has been consigned by Aliza Teo of Allen Jack + Cottier Architects, on behalf of *the client* Il Capitano Pty Ltd

1.4 The *author*, Christopher Carne (BSc, Dip Arb, BR2), is the director of Tree Technics Pty Ltd, located at 10 the Glade, Wahroonga, NSW. Contact numbers are (02) 94872446 and 0407485437. Email is chris@treetechnics.com.au

1.5 This is an arboricultural analysis of types of trees and general recommendations based upon the site analysis. No underground root mapping, decay mapping, specific hazard assessments or aerial inspections have been consigned.

2. Methodology

2.1. Christopher Carne (BSc (Geography), Dip Arb, BR2) (*the author*) provided a Visual Tree Assessment (VTA) (after Mattheck, Breloer Lolf Mitteilungun 1993) upon each tree to determine approximate tree height, spread and age; crown condition and crown class; and general tree defects. No root exploration, aerial inspection, internal probing, soil nor empirical diagnostics were consigned.

2.2. The information derived from the VTA has been used to determine a Safe Useful Life Expectancy (SULE – Barrell 1995). The SULE rating gives an estimate of the expected life span of the tree and takes into account age, species life span, local environmental conditions, location and tree safety.

2.3. All information including the SULE rating is an assessment of the tree at the time of inspection. This rating may change due to local and environmental changes or extreme weather conditions. Not all the trees were marked on the survey, some trees are approximate locations.

2.4. Ecological value has been set based upon four values:

Value	*Definition*
Very High	From an endemic Ecological Community
High	Australian Tree
Low	Introduced (Ornamental/Amenity) Tree
Very Low	Either environmental or noxious weed.

2.5. Pi has been used at 3.14159

2.6. The photographs included in this report were taken at the time of the first inspection on Sunday 21st October, 2018 using a Samsung A5)

2.7. The site plan was provided to the author by AJ+P on 17th October 2018.

3. Site description:

3.1. The site is relatively flat and is at the crown of the profile. Soil is Blacktown, likely podzolic on Wianamatta Shale (if not disturbed), and, according to Chapman and Murphy (Soil Landscapes of Sydney 1:100,000 Sheet) likely cleared Eucalypt woodland and tall open forest.

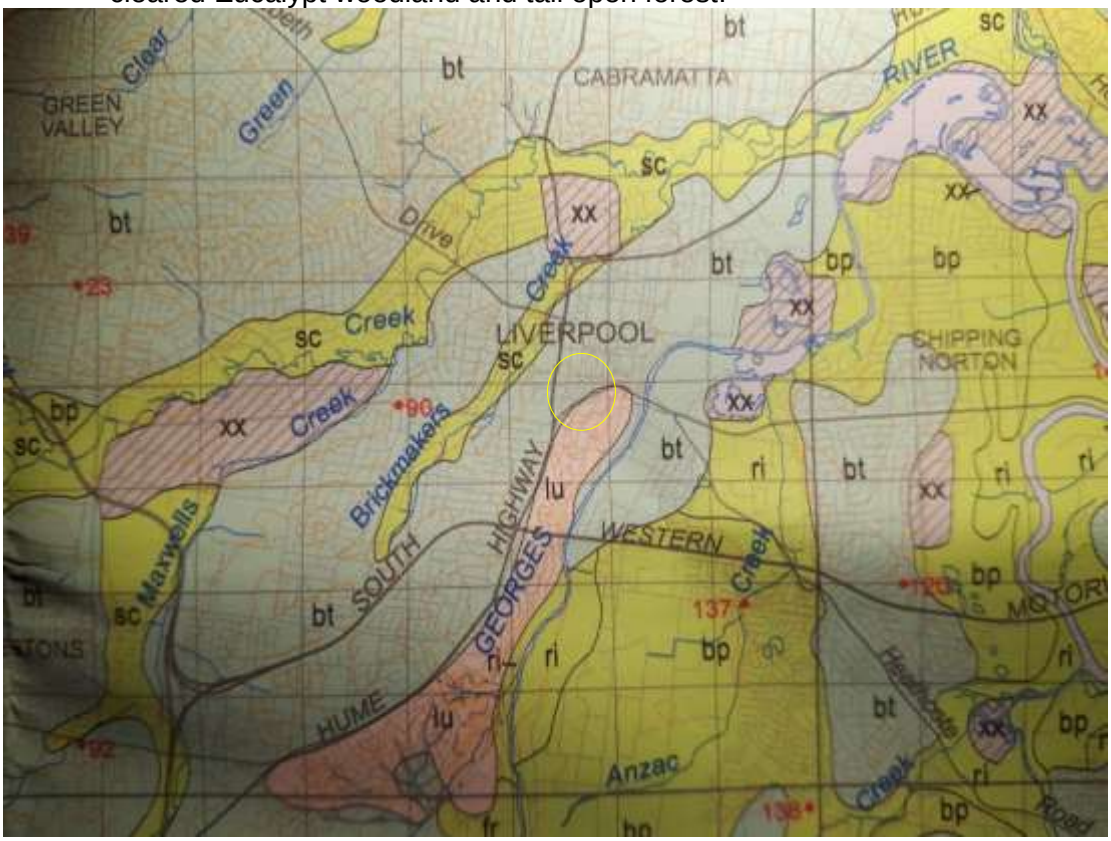


Figure 1: Blacktown soils: rich podzolic on Wianamatta shale, marked with a yellow circle

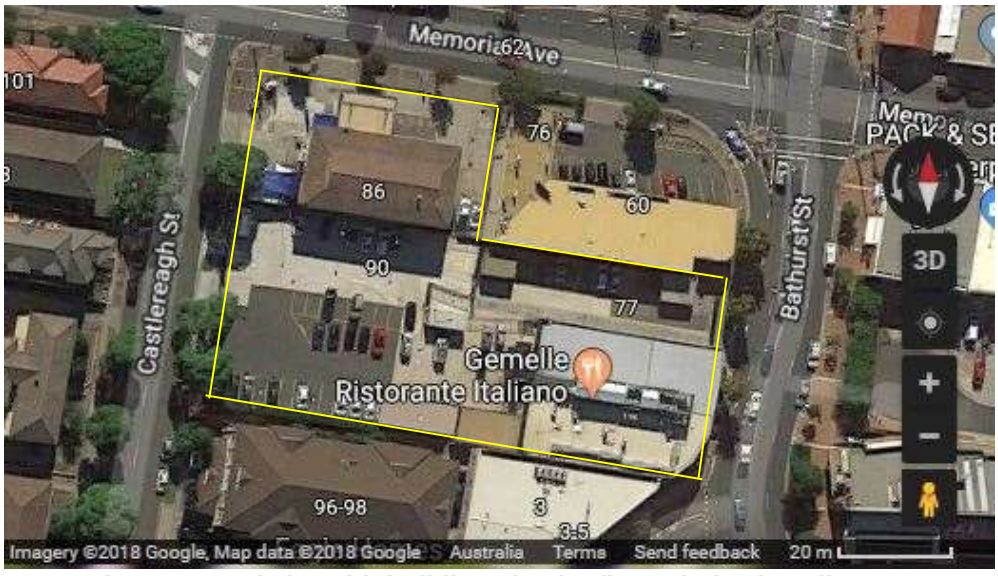


Figure 2: the proposed site with buildings in situ (boundaries in yellow are approximate) Source: Google Maps.

3.2. No hollows were visible from the ground. There were therefore no substantial cavities or wildlife habitats apart from natural forks or unions.

4. Discussion of trees in question

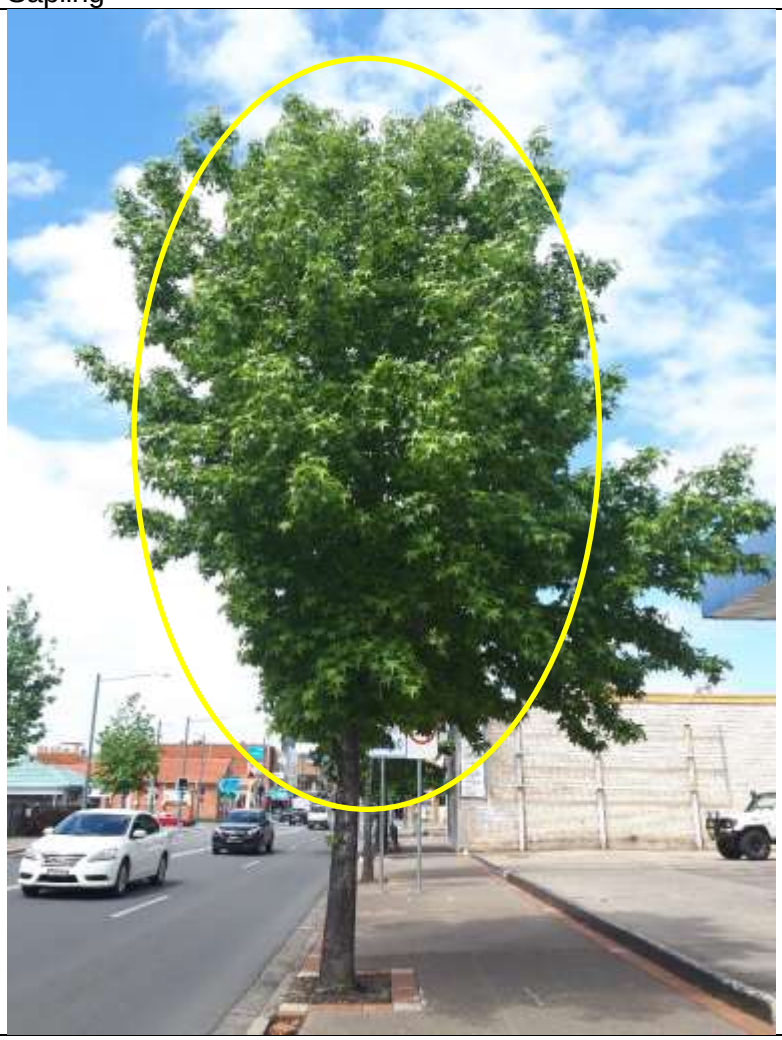
4.1. Trees on Survey and Site plan

There were in excess of 14 trees inspected. Refer to Appendix 1 and Appendix b for individual metrics and position on site. The following discussion is an account for all trees perceived as relevant to the project. Should a tree not be mentioned and has been afforded the legislative protection of the councils Tree Protection Order (TPO), then it is to be maintained and preserved for its natural full length of life.

Tree 1: *Liquidambar styraciflua* Liquid Amber

Tree	One
Species	Liquid amber *Liquidambar styraciflua*
DBH (m)	0.22
Height (m)	8
Spread (m)	4
Notes	Sapling, garden
Image	

Tree 2: *Liquidambar styraciflua* Liquid Amber

Tree	Two
Species	Liquid amber *Liquidambar styraciflua*
DBH (m)	0.23
Height (m)	9
Spread (m)	5
Notes	Sapling
Image	

Tree 3: *Liquidambar styraciflua* Liquid Amber

Tree	Three
Species	Liquid amber *Liquidambar styraciflua*
DBH (m)	.19
Height (m)	10
Spread (m)	4
Notes	Sapling
Image	

Tree 4: *Liquidambar styraciflua* Liquid Amber

Tree	Four
Species	Liquid amber *Liquidambar styraciflua*
DBH (m)	.35
Height (m)	14
Spread (m)	11
Notes	Sapling
Image	

Tree 5: Hedge Maple *Acer campestre*

Tree	Five
Species	Hedge Maple *Acer campestre*
DBH (m)	0.24
Height (m)	16
Spread (m)	5
Notes	Sapling, garden, included codominants
Image	

Tree 6: Hedge Maple *Acer campestre*

Tree	Six
Species	Hedge Maple *Acer campestre*
DBH (m)	0.22
Height (m)	16
Spread (m)	5
Notes	Sapling, garden, included codominants
Image	

Tree 7: Brush Box *Lophostemon confertus*

Tree	Seven
Species	Brush Box *Lophostemon confertus*
DBH (m)	0.55
Height (m)	15
Spread (m)	9
Notes	Early Mature, Power pruning, grassed
Image	

Tree 8: Brush Box *Lophostemon confertus*

Tree	8
Species	Brush Box *Lophostemon confertus*
DBH (m)	0.47
Height (m)	15
Spread (m)	7
Notes	Early Mature, Power pruning, grassed
Image	

Tree 9: Brush Box *Lophostemon confertus*

Tree	Nine
Species	Brush Box *Lophostemon confertus*
DBH (m)	0.63
Height (m)	14
Spread (m)	10
Notes	Early Mature, Power pruning, grassed
Image	

General and tree specific accommodation

- The existing garden / undergrowth observed by the author is not endemic to Sydney region, or of an endangered / amenity value. Ubiquitous shaped shrubs, and a few wind borne exotic weeds fill the planting pits.
- All tree protection measures are to be signed off by the site arborist before commencement of the project. This is to be certified and sent to the PCA / Council for approval to proceed.
- All tree removals are to be signed off by the site arborist.
- Damage by ingress and egress of trucks is to be minimized by judiciously pruning by no less than a L3 qualified arborist. This is to be overseen by the site arborist.
- Collateral damage to the trees is not acceptable.
- All excavations within the tree protection zones are to be overseen by the site arborist. Any excavations within the Structural Root Zones must be conducted by hand excavation, and must be overseen by the site arborist.
- All pruning to facilitate trucks, the proposed structure, or any associated scaffolding is to be conducted by the site arborist.
- Any roots that are found to be needing cutting, are ONLY TO BE CUT BY THE SITE ARBORIST. Any retaining wall footings that may interact with roots, are to be bridged with either a lintel or a concrete footing with appropriate reinforcing.

4.2. *Tree 7;* the incursion has been calculated at 5%. This shouldn't pose a major problem, with regards to the roots, however, specific measures are to be adhered particularly regarding the canopy and trimming in anticipation of the structure. This is to be in line with the Tree Management Plan (separate document)

4.3. *Trees 8 and 9;* There has been a problem discovered by the traffic planner. The proposed driveway (between trees 8 and9) are to comply with AS2890. This means that the trees will be substantially compromised by compliant works.

In the recommendations section of this report, the spatial allowances, and Tree Management issues will be outlined, and mapped in and in a second report, the Tree Management Plan, specific mechanisms will be deployed to ensure that these specimens do not suffer detriment as a result of the proposed development.

5. Recommendations for tree retention, pruning and removals

i. The following recommendations are based upon ranking the values of trees and their lifespans.

HOLD POINTS:

1. No *Construction certificate*, or commencement of works until Tree protection measures are inspected and signed off by the site arborist. This will be documented presented to the client to be forwarded to the PCA or council.
2. No *excavation* within any TPZ without overseeing, signing off and certification of adherence to 4970 by the site arborist.
3. No *mechanical Excavation* within any Structural Root Zones. Hand digging only, to be overseen, signed off and certified by the site arborist.

4. *Monthly* tree inspections, quarterly certification of all trees retained on and around site.
5. No *Occupation Certificate* unless all tree measures are upheld, and the trees are in a condition consistent to current heath.
    - Retain trees 1,2,3,4,5,6, and 7 according to AS 4970, and 4373. Pay particular attention to roots, trunk and canopy. All efforts for retention are to be influenced by and exceed methods of protection by AS 4970.
    - Removal of specimens 8 and 9 as per best practice and code of conduct.
    - Prior to commencement of works, all tree protection fencing (if necessary) and measures are to be witnessed, documented and certified to ensure they are congruent with AS 4970. Particular efforts are to be made to prune the driveway trees prior to use as a haul road, appropriate location of temporary services, Site Office, Washout and storage.
    - The site arborist is to oversee and document the manual excavation within any of the Tree Protection Zones (particularly Trees 7,8, and 9) and sign off that no attrition to any structural roots occur. Should roots greater than 50 mm be encountered, then hand pruning and excavation must be the method deployed by the site arborist.
    - It is prohibited to store materials and wash out chemicals of any kind within the TPZ's. Alternative options are to be discussed prior to engagement.
    - Replacement of Trees 8 and 9 with 2 x 75 L Brush box specimens. The specimens are to be grown with NATSPEC standards, and installed by a L3 Arborist.

ii. Collateral damage to other structures including street trees shall be deemed unacceptable.

iii. ***All excavations, pruning, removals and plant installations are to be overseen by the site arborist.***

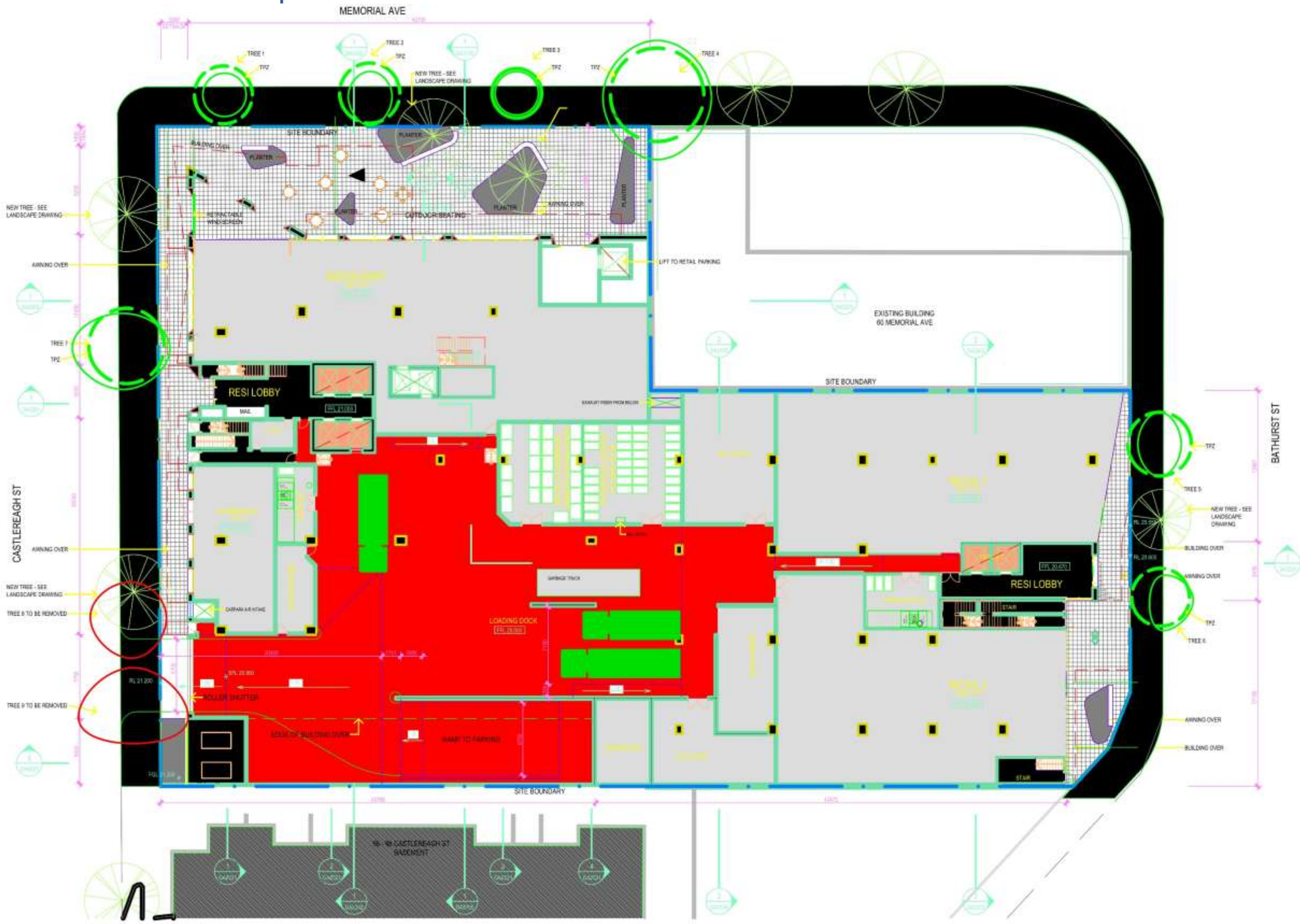
6. Summary

At the request of the property owner, the author, director of Tree Technics Pty Ltd carried out a site inspection of the proposed construction site at Lots: 7-11 Castlereagh St, and 77-79 Bathurst st, Liverpool.
With the site plans provided there will be a need to protect 7 street trees around the site. Particular methods to ensure that there are no deleterious effects of this proposal include but are not limited to the site arborist overseeing the site planning, haul road allocation, material storage allocation ongoing retention of trees 1,2,3,4,5,6 and 7. There will be a need to install 2 semi mature replacement street trees.

Tree Technics would be honoured to assist with further management of the trees during the construction process.

Chris Carne
B Sc (Geog), Dip Arb, BR2
13 March 2019
Director
Tree Technics Pty Ltd
ABN: 77604857972.

APPENDIX A: Site Plan with tree canopies marked



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APPENDIX B: Tree Survey

Tree No.	Tree species	Age Class	Tree Height (m)	DBH (m)	TPZ (m)	DRF (m)	SRZ (m)	Canopy dimensions (N,E,S,W)	Ecol. Value	Vigour	SULE	Comments	Recommendations (Retention value)
1.	Liquid amber	S	8	.22	2.67	c.29	1.96	2.2.2.2	Low	Good	L	Garden	Retain
2.	Liquid amber	S	9	.23	2.78	.35	2.13	2.2.3.2	Low	Good	L		Retain
3.	Liquid amber	S	10	.19	2.29	.29	1.96	2.2.2.2	Low	Good	L		Retain
4.	Liquid amber	S	14	0.35	4.31	.49	2.45	5.5.6.5	Low	Good	L		Retain
5.	Hedge Maple	S	16	.24	2.94	.29	1.96	3.2.3.2	Low	Good	L	Garden, included codominant unions	Retain
6.	Hedge Maple	S	16	.22	2.67	.29	1.96	2.3.3.1	Low	Good	L	Garden, included codominant unions	Retain
7.	Brush Box	EM	15	.55	3.48	.7	2.85	3.4.4.5	High	Good	L	Power pruning, grassed	Retain
8.	Brush Box	EM	15	.47	5.65	.57	2.62	3.3.4.4	High	Good	L	Power pruning, grassed	Retain
9.	Brush Box	EM	14	.63	7.63	.77	2.97	5.5.2.5	High	Good	L	Power pruning, grassed	Retain

APPENDIX C: Notes on Tree Survey Chart *(where appropriate) *

Title	Category	Description
	Tree No.	Relates to number on site diagram
	**	Specimen has more than one stem
	c	Approximate.
Age Class	Sap	Juvenile, a sapling
	EM	Early mature <20% of life expectancy
	M	Mature 20-80% life expectancy
	OM	>80% life expectancy
	Height	Height of the tree in metres
Crown Dimensions	(n,e,s,w)	In metres on the cardinal points (north, east, south, west)
Crown Condition	Dead	No physiological signs of life
	Severe decline	<20% live crown substantial dieback
	Decline	20-60% live crown moderate dieback
	Average / Low	60-90% live crown mild dieback
	Good	90-100 live crown, deadwood
	Excellent	100 % live crown
Root Zone	C	Compaction
	D	Damaged roots
	Ga	Tree in garden bed
	Gr	Grass to trunk
	Gi	Girdled roots
	K	Kerb close to trunk
	L+	Soil level raised
	L-	Soil level lowered
	M	Mulched bed
	Pa	Paving, concrete, bitumen
	Pr	Roots pruned
Defects	B	Borers / Longicorns
	C	Cavity
	D	Decay / Fungus body
	F	Previous failures
	Incl	Inclusions
	Lop	Lopped
	M	Mistletoe/Vines
	S	Splits / Cracks
	T	Termites
	Pwr	Power lines nearby

APPENDIX D: SULE Rating (updated 1/4/01)

1.Long SULE: Trees that appear to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	**2.Medium SULE:** Trees that appear to be retainable at the time of assessment for more than 15-40 years with an acceptable level of risk.	**3.Short SULE:** Trees that appear to be retainable at the time of assessment for more than 5-15 years with an acceptable level of risk.	**4.Remove:** Trees that should be removed within the next 5 years.	**5.Small, young or regularly pruned:** Trees that can be reliably removed or replaced.
(A) Structurally sound trees located in positions that can accommodate future growth.	**(A)** Trees that may only live between 15 and 40 more years.	**(A)** Trees that may only live between 5 and 15 years.	**(A)** Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.	**(A)** Small trees less than 15 metres in height.
(B) Trees that could be made suitable for retention in the long term by remedial tree care.	**(B)** Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.	**(B)** Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.	**(B)** Dangerous trees because of instability or recent loss of adjacent trees.	**(B)** Young trees less than 15 years old but over 5 metres in height.
(C) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	**(C)** Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.	**(C)** Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.	**(C)** Dangerous trees because of structural defects including cavities, decay, including bark, wounds or poor form.	**(C)** Formal hedges and trees intended for regular pruning to artificially control growth.
	(D) Trees that could be made suitable for retention in the medium term by remedial tree care.	**(D)** Trees that requires substantial remedial tree care and are only suitable for retention in the short term.	**(D)** Damaged trees that are clearly not safe to retain.	
			(E) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.	
			(F) Trees that are damaging or may cause damage to existing structures within 5 years.	
			(G) Trees that will become dangerous after removal of other trees for the reasons given in (A) to (F).	
			(H) Trees in categories (A) to (G) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.	

APPENDIX E: References

Soil Landscapes of the Sydney 1:100000 sheet report Chapman and Murphy Soil Conservation Service NSW
Australian Standard 4970 (2009): *Protection of trees on Development Sites*
Matheny, N. and Clark, J. *Trees and Development.* (1998) ISA