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October 21, 2016

APP Corporation Pty Ltd
Level 7, 116 Miller Street
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Sent to: Andrew.McConnell@app.com.au

Summary of Arboricultural Advice (Arboricultural Impact Assessment)

Re: Trees at Dawn Fraser Avenue, Olympic Park adjacent and within proposed NSWRL 'Centre of Excellence' works

This letter has been prepared for APP Corporation Pty Ltd as project managers for the proposed NSW Rugby League 'Centre of Excellence' development at Dawn Fraser Avenue, Sydney Olympic Park.

Following a site inspection of the trees within and adjacent the site on the southern side of Dawn Fraser Avenue, this advice is provided in relation to impacts on trees of the proposed development works within the lot identified as Pt. Lot 14 D.P.1125680 on the Craig & Rhodes survey.

Inspection

The Department of Planning requested an Arborist's advice on the trees near and within the development, to assess the likely impacts of the works on the retained trees and an arboricultural assessment of the significance of the tree removals. This letter has been based on observations during a site inspection involving visual tree assessment from ground level on 17 October 2016, and analysis of the provided development plans and documents, as per Australian Standard *AS4970-2009*.

The brief received was to *provide a letter from an appropriately qualified arborist to:*

- *review the conclusion of the tree statement (Appendix N);*
- *clearly detail trees for removal and retention (including a plan); and*
- *recommend protective measures for retained trees*.

Limitations

Due to the short time frame available and limited scope, a full Visual Tree Assessment was carried out only on the trees above the retaining wall which have the potential to be retained in the context of the proposed development. The remainder of the trees on site were subject to a "walk over" general assessment of size range, species and general condition. Additionally, part of the site was enclosed with construction zone fencing associated with the neighbouring development so access to trees within this area was restricted.

Background

The following have been referred to in assessing the tree impacts of the development:

- State Environmental Planning Policy (SEPP) (State Significant Precincts) 2005 Sydney Olympic Park
- SOPA Urban Elements Design Manual section 3.5 Tree Planting
- Australian Standard *AS4980-2009 Protection of trees on development sites*
- Detail Survey over part of Lots 14 & 17 D.P.1125680 & Lot 161 D.P.1155500, Dawn Fraser Avenue, Sydney Olympic Park, Ref. 155-15, Amend No. 05, 23/08/2016, Craig & Rhodes
- Landscape Development Application plans, Project No. 2516041, Rev. A, 13th September 2016, Place Design Group
- Landscape Tree Statement, 12 September 2016, Paul Kohn, Place Design Group

General Findings

The trees on site are mostly mature native trees, planted in association with the Olympic Park development prior to the 2000 Olympic Games, meaning they are generally around 20-30 years old. Several young trees have been planted more recently as fill in or replacement street tree plantings. The land on which the trees are situated was historically cleared, and has been extensively disturbed and redeveloped – hence the trees are not considered to be associated with endangered ecological communities or threatened species. The site is identified as one of the "green fingers" in the Olympic Park masterplan.

The majority of the trees on site have been assessed as having a Medium or Medium to High Significance rating, due to their mature size, general good health and condition, native species and ecosystem and microclimate contributions. The trees consist of a small range of non-local native trees, which are moderately well suited to their current growing conditions, with most considered to have Medium to Long Useful Life Expectancies.

It is unknown whether the existing trees were planted into tree vaults or structural soils – if so, the tree's Useful Life Expectancies may be longer as these provide improved growing conditions.

Arboricultural Impact Assessment

Sixty-eight (68) trees are addressed in this assessment, fifteen of these are above the rock wall, and fifteen are located in the verge along the kerb alignment. Fifty-six (56) trees are proposed for removal, with an additional six (6) trees requiring Arborist inspection during rock wall demolition to ascertain whether they will require removal. If the verge trees are considered for retention, 12-14 of these can be retained in the context of the proposed development.

Trees within the Development Footprint

Thirty-five (35) trees within the footprint of the proposed building and associated carpark will need to be removed in the context of the proposed development. This will include 21 trees within the building footprint, approximately 14 trees within the carpark and driveway footprint (approximately 9 not shown on the survey).

Given the zoning and planned use of the site, these trees should not be considered a constraint on the development, provided that replacement tree planting (of large native trees) and landscape areas are installed on site as part of the development works.

Trees Adjacent the Development Footprint

Fifteen (15) trees adjacent the footprint of the proposed retaining wall have been assessed and encroachments calculated in accordance with the Australian Standard *AS4970-2009 Protection of trees on development sites*.

Five of these trees (Trees 1, 4, 6, 7, and 11) are located close to the proposed retaining wall, with proposed excavation within their Structural Root Zones (SRZ) and it is considered likely that structural roots will be located behind the existing rock wall, which will necessitate the trees' removal in the context of the proposed development.

Six of the trees above the retaining wall (Trees 2, 3, 5, 13, 14 and 15) are recommended for retention, pending Arborist inspections during the removal of the rock wall to determine the extent and size of any tree roots in the footprint of the proposed excavation for the vertical retaining wall.

Additionally, four of the trees above the retaining wall (Trees 8, 9, 10 and 12) have minor or zero encroachments within their Tree Protection Zones and will be able to be retained in the context of the proposed development with minimal impact from the proposed works.

Street/Verge Trees

Sixteen (16) street/verge trees are proposed for removal on the design plans (six trees not shown on the survey have not been indicated on design plans). One of these trees is located in close proximity to the proposed driveway crossover, and two other trees not shown on the survey plan may be located in close proximity to the second driveway crossover – the locations should be confirmed before assessing whether the trees can be retained. Three trees are located close to the proposed driveway and carpark. Due to their location it is likely that excavations associated with the carpark, driveway and building will encroach on three or four sides of these trees' Tree Protection Zones (TPZ). As a result, these trees should be considered for removal and replacement.

There are no arboricultural reasons for removal of the other ten street trees, and consideration should be given to retaining these trees. Retention of healthy mature trees within developments, where significant impacts to the trees can be avoided, is part of best practice urban forest management.

If all of the street/verge trees are removed in the context of the proposed development as proposed, the growing conditions provided for the replacement street tree plantings should be an improvement on current conditions, to allow for long term retention of the trees. This may include structural soils, permeable pavement, adequate soil volume to support the long term growth of large trees, design to allow for ongoing maintenance including water and nutrient application and allowing for the normal growth of roots, increase in stem size including root crowns, and maintenance pruning. Details and specifications should be coordinated with an AQF5 Arborist. Two of the existing verge trees have recently been planted, and if removed should be transplanted to alternative nearby locations, in coordination with SOPA. The larger trees are not suitable for transplanting, as their root systems are likely to be interspersed amongst the street infrastructure and underground services.

Two additional street trees located to the east of the site should be retained as they are not impacted by the proposed development and not located adjacent the site.

Discussion

Trees proposed for removal in the context of the development should be replaced on or near the site (as specified by the land manager and/or consent authority) with advanced size locally native species trees, from a range of species to increase the biodiversity in the area, grown to quality standards such as Natspec and/or the Draft Standard AS2303.

Where land use density is increased, it is expected that some existing trees and landscaped areas will be replaced with development and structures. If the loss of landscaped area and trees is aimed to be offset, the quality of replacement planting and the space and resources provided for tree growth should be an improvement upon the previous situation (e.g. soil volume, access to water and nutrients, appropriate species selection and ongoing maintenance).

Arboricultural Review of Place Design Group "Tree Statement"

It is agreed that the trees are planted native species, not representative of remnant vegetation, which are generally in good health and provide visual amenity. The trees also provide multiple ecosystem contributions and benefits. The hardscape elements of the streetscape are in need of rejuvenation, however the trees close to the kerb (aka street or verge trees) are considered worthy of retention within any streetscape upgrades, wherever possible. Trees provide multiple benefits apart from aesthetic value and landscape amenity, and all of these values should be considered when making decisions regarding tree retention and removal.

However, if the design intent is to remove all trees, the replacement plantings should utilise best practice tree planting specifications including Water Sensitive Urban Design and "tree vault" or similar systems to provide adequate soil volumes. The plantings should be trees capable of attaining large size, planted from minimum 200L container sizes, with adequate soil volume, suitable soil media, drainage, permeable pavement and access to water and nutrients, to replace the amenity and ecosystem services the existing trees provide within a reasonable time frame (5-10 years).

Tree Protection Requirements

The retained trees will require tree protection measures prior to, during and following the development works, to avoid damage to the health, condition and/or stability of trees, including the following:

- Tree Protection Fencing around any retained trees within the works zone, including but not limited to the fencing indicated on the attached Tree Protection Plan
- Trunk protection and ground protection for any trees within the works zone which can't be fenced
- Works excluded from Tree Protection Zones as per AS4970-2009 (including excavation, underground services, storage or wash down of waste and materials, and passage or parking of vehicles or plant)
- Location of trees not shown on the survey to be confirmed by a surveyor to enable impact assessment of these trees
- Arborist attendance during removal of the rock wall, to inspect for tree roots prior to bulk excavation. Tree removal may be required if major roots are found – this should occur prior to continuing excavation, due to the potential for trees to be destabilised during works.
- No roots of 40mm diameter or greater to be damaged or severed unless approved by the AQF5 Arborist.
- Avoid over-excavation towards the retained trees during works for the retaining wall, e.g. with vertical piling or similar method – Arborist input should be sought.

Recommendations

1. Confirm the locations of trees not shown on the survey to inform decision making regarding these trees, in coordination with an AQF5 Arborist.
2. Tree protection for all retained trees, as specified above. Engage a Project Arborist to advise on works near trees.
3. Consider retention of the verge trees as discussed in this report, OR provide best practice replacement large tree planting to ensure the amenity and other values of removed trees are replaced in a reasonable timeframe.
4. Minimise excavation in Tree Protection Zone areas shown on the Tree Protection Plan. Arborist attendance during deconstruction of the rock wall, to advise on methods to avoid damage to trees, and whether additional trees require removal based on tree roots found.

All information has been verified as far as possible, however the author is not responsible for the accuracy of information provided by others. Further information and clarification can be obtained from the author.

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Attachments (2): Tree Survey Information Table, Tree Protection Plan

20/10/16 Tree Survey Information - Arboricultural Impact Assessment
SITE: NSWRL Centre of Excellence, DAWN FRASER AVE, OLYMPIC PARK, INSPECTED: 17 October 2016
MUST BE READ IN CONJUNCTION WITH ARB. IMPACT ASSESSMENT

Tree No.	Botanical & Common Name	Height	Spread	DBH (mm)	DRB (mm)	Age	Health	Condition	ULE	Significance	Amenity Value	Ecological Value	SRZ	TPZ	Site Notes	Development Encroachment	Development Impact
1	*Eucalyptus microcorys* Tallowwood	12	8	350	450	M	Av	G	L	M	M	M	2.4	4.2	Crownlifted. Small epicormics.	42%	Close to rock wall to be demolished, excavation & construction of new retaining wall within SRZ. **Remove tree.**
2	*Eucalyptus microcorys* Tallowwood	13	8	400	450	M	G	G	L	M	M	M	2.4	4.8	Large epicormic @2m. Crownlifted.	11%	Careful deconstruction of rock wall, ascertain extent of tree roots behind wall prior to bulk excavation for retaining wall.
3	*Corymbia citriodora* Lemon scented Gum	9	6	200	250	SM	Av	Av	M-L	L-M	L-M	M	1.8	2.4	Somewhat sparse.	22%	Encroachment in SRZ however young tree may have less extensive roots. Careful deconstruction of rock wall, ascertain extent of tree roots behind wall prior to bulk excavation for retaining wall and Arborist to determine whether tree can be retained.
4	*Corymbia citriodora* Lemon scented Gum	11	10	300	350	M	Av	Av	M-L	M	M	M	2.1	3.6	1.2m from fence. Sparse, deadwood.	50%	Close to rock wall to be demolished, excavation & construction of new retaining wall within SRZ. **Remove tree.**
5	*Corymbia citriodora* Lemon scented Gum	14	10	400	500	M	G	G	M-L	M-H	M-H	M	2.5	4.8	Irrigation pipe against buttress, S side.	17%	Careful deconstruction of rock wall, ascertain extent of tree roots behind wall prior to bulk excavation for retaining wall.
6	*Corymbia citriodora* Lemon scented Gum	12	8	300	350	M	Av	G	M-L	M	M	M	2.1	3.6	Sparse.	25%	Close to rock wall to be demolished, excavation & construction of new retaining wall within SRZ. **Remove tree.**
7	*Eucalyptus microcorys* Tallowwood	9	10	300	400	M	G	G	L	M	M	M	2.3	3.6	Small deadwood.	31%	Close to rock wall to be demolished, excavation & construction of new retaining wall within SRZ. **Remove tree.**
8	*Eucalyptus microcorys* Tallowwood	8	10	350	400	M	Av	Av	M-L	M	M	M	2.3	4.2	Slight lean to W. 2 large low branches pruned - minor occlusion only. Epicormics.	8%	Careful deconstruction of rock wall, ascertain extent of tree roots behind wall prior to bulk excavation for retaining wall.
9	*Eucalyptus microcorys* Tallowwood	12	10	300	400	M	Av	G	M-L	M	M	M	2.3	3.6	Sparse, small deadwood.	0%	No impact.
10	*Eucalyptus tereticornis* Forest Red Gum	9	4	200	250	SM	P	Av	S	L	L	M	1.8	2.4	Vertical wound N side. Blackened stem. Sparse.	0%	No impact.

20/10/16 Tree Survey Information - Arboricultural Impact Assessment
SITE: NSWRL Centre of Excellence, DAWN FRASER AVE, OLYMPIC PARK, INSPECTED: 17 October 2016
MUST BE READ IN CONJUNCTION WITH ARB. IMPACT ASSESSMENT

Tree No.	Botanical & Common Name	Height	Spread	DBH (mm)	DRB (mm)	Age	Health	Condition	ULE	Significance	Amenity Value	Ecological Value	SRZ	TPZ	Site Notes	Development Encroachment	Development Impact
11	*Eucalyptus microcorys* Tallowwood	12	8	300	350	M	G	Av	M-L	M	M	M	2.1	3.6	Most of crown to N.	22%	Close to rock wall to be demolished, excavation & construction of new retaining wall within SRZ. **Remove tree.**
12	*Corymbia citriodora* Lemon scented Gum	16	8	350	400	M	G	G	L	M-H	M-H	M	2.3	4.2	Slight lean to W. Multiple broken branch stubs. Wound @highest junction with kino flow.	1%	Minor impact.
13	*Corymbia citriodora* Lemon scented Gum	14	10	300	350	M	Av	G	M-L	M-H	M-H	M	2.1	3.6	Sparse.	21%	Deconstruction of low rock wall close to SRZ - careful deconstruction needed, ascertain extent of tree roots and Arborist to determine whether tree can be retained.
14	*Corymbia citriodora* Lemon scented Gum	14		350	400	M	Av	G	M-L	M-H	M-H	M	2.3	4.2	1.5m from fence. Not on survey.	25% approx.	Deconstruction of low rock wall close to SRZ - careful deconstruction needed, ascertain extent of tree roots and Arborist to determine whether tree can be retained.
15	*Corymbia citriodora* Lemon scented Gum	9		300	350	M	Av	G	M-L	M-H	M-H	M	2.1	3.6	Low broken branch. 1.6m from fence. Not on survey.	31% approx.	Deconstruction of low rock wall within SRZ - careful deconstruction needed, ascertain extent of tree roots and Arborist to determine whether tree can be retained.

Key: Height (in metres) ; Spread (crown spead in metres) ; DBH (Diameter at Breast Height / 1.4m) in millimetres ; DRB (Diameter above Root Buttress) in millimetres ; Age (Semi-mature, Mature, Overmature, or Senescent) ; Health (Good, Average or Poor) ; Condition (Good, Average or Poor) ;
Useful Life Expectancy (ULE) (Short, Medium or Long) ; Significance (High, Medium or Low) ; Amenity Value (High, Medium or Low) ; Ecological Value (High, Medium or Low) ; SRZ (Structural Root Zone) in metres ; TPZ (Tree Protection Zone) in metres

TREE LOCATIONS TO BE CHECKED

APPROXIMATE LOCATIONS of TREES NOT SHOWN ON SURVEY

ADJOINS T-01 - inset

ADDITIONAL TREES IN THIS AREA (NOT ASSESSED) MAY BE IMPACTED

T1 T2 T3 T4 T5 T6 T7 T8

Em Em Em Em Em Em Em Em

Cc Cc Cc

STAFF CAR PARK

NEW RETAINING WALL

ADJOINS T-01 - main plan

ADDITIONAL TREES IN THIS AREA (NOT ASSESSED) MAY BE IMPACTED

T01A - INSET

ADJOINS T-02

KEY

T3

Approximate canopy spread.

Numbered tree as shown on Site Survey, trunk diameter as measured on site.

Nominal Structural Root Zone (SRZ) - structural stability would potentially be compromised by root damage within this area.

Tree Protection Zone (TPZ) - the nominal area roots are expected to be located.

Tree not shown on Site Survey, location approximate

Tree to be removed in the context of proposed development

Location of proposed development

Tree Protection Fencing installed prior to demolition, to remain throughout works

Area requiring careful deconstruction & tree sensitive construction measures to avoid tree root damage (except where trees have been removed prior to works)

Em	*Eucalyptus microcorys* (Tallowwood)
Es	*Eucalyptus sideroxylon* (Mugga Ironbark)
Cc	*Corymbia citriodora* (Lemon scented Gum)
Cm	*Corymbia maculata* (Spotted Gum)

MUST BE READ IN CONJUNCTION WITH ARBORICULTURAL IMPACT ASSESSMENT LETTER

REVISION	DESCRIPTION	DRAWN	DATE
A	PRELIMINARY SITE ANALYSIS - FOR COORDINATION	JB	19-10-16
B	ARBORICULTURAL IMPACT ASSESSMENT - FOR SUBMISSION	JB	20-10-16

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ADDRESS: DAWN FRASER AVENUE, SYDNEY OLYMPIC PARK

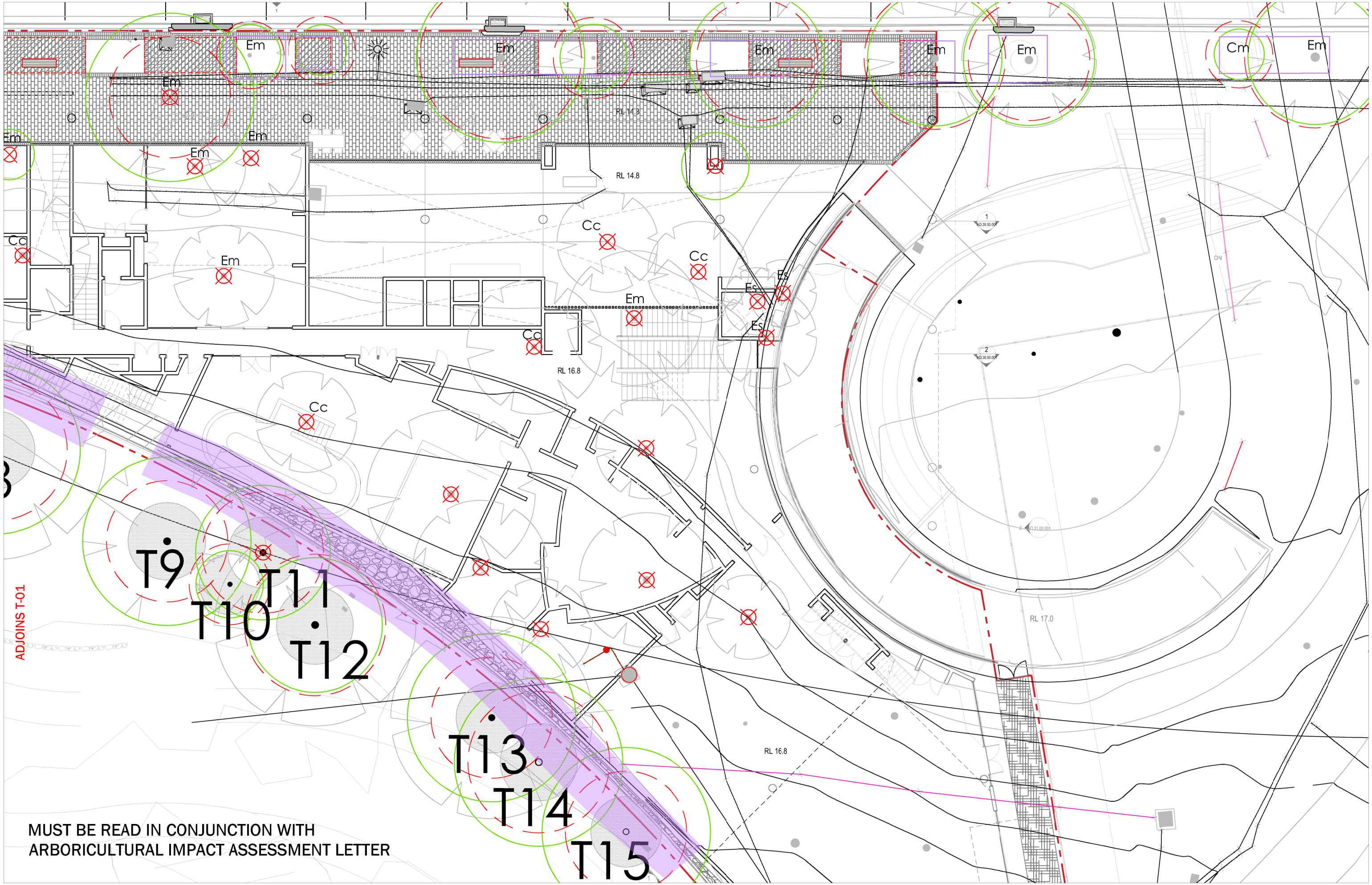
PROJECT: PROPOSED NSWRL CENTRE OF EXCELLENCE

CLIENT: APP PTY LTD

DRAWING: TREE PROTECTION PLAN

SCALE	ISSUE	SHEET
1:200 @ A3	DoP	T - 01

DRAWN	DATE	REVISION
JB	20-10-16	B



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1. Do not scale from drawings.
2. Verify all measurements on site.
3. Notify New Leaf Arboriculture of any inconsistencies.
4. Copyright ©New Leaf Arboriculture. All rights reserved.
5. Drawing remains the property of New Leaf Arboriculture.

ADDRESS: DAWN FRASER AVENUE, SYDNEY OLYMPIC PARK
PROJECT: PROPOSED NSWRL CENTRE OF EXCELLENCE
CLIENT: APP PTY LTD

DRAWING: TREE PROTECTION PLAN
SCALE: 1:200 @ A3
ISSUE: DoP
SHEET: T - 02
DRAWN: JB
DATE: 20-10-16
REVISION: B