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# Arboricultural Impact Assessment

Granville Park
188 Woodville Road, Merrylands

Proposed Stadium Development

Prepared for Cumberland Council

Prepared 16 April 2019,
Revised 23 April 2019, 20 June 2019, 22 August 2019
by
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# Executive Summary

This **revised** Arboricultural Impact Assessment (AIA) report has been prepared for Cumberland Council, to assist in the assessment of a Development Application to be submitted to Cumberland (formerly Holroyd) Council in relation to residential development works at Granville Park - 188 Woodville Road, Merrylands.

The proposed development consists of construction of a stadium building with grandstand, associated alterations to the carpark including stormwater infrastructure, and addition of hard and soft landscape works as shown on the plans by DWP, Northrop and Clouston Associates.

This report assesses thirty nine (39) trees within the property. Details of the species, dimensions, health, and condition of the assessed tree are contained in the **Tree Survey Information Table** (page 4).

In the context of the proposed development, fourteen (14) trees on site will need to be removed (two of which may be able to be transplanted), as shown on the **Tree Protection Plan** (page 7) and specified in the **Recommendations** (page 12).

The following are the outcomes of the arboricultural impact assessment regarding the trees in the context of the currently proposed works.

- Retain and protect **Trees 2, 3, 4, 5, 6, 7, 8, 9, 14, 26, 27, 28, 29, 33, 34, 35, 36, & 39**. Tree protection fencing, ground protection, trunk protection, and tree sensitive design and construction measures will be required.
- Remove **Trees 1, 10, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 30,31, 32, 37, & 38** as they have major encroachments from the proposed development.
- Consider transplanting **Trees 11** and **12** which are within the proposed carpark alterations and will require removal. They should be relocated to a suitable position in the surrounding park, with sufficient soil and above ground space for their future growth. A qualified and experienced tree transplanter should be engaged to carry out the transplant.
- Remove **Tree 13** due to its poor condition and Short Useful Life Expectancy.
- Install five (5) large (15m mature height) and ten (10) medium to large (8m mature height) native replacement trees in the park, and five (5) large native replacement trees in the verge to the west of the new carpark.

# Contents

# 1. Introduction

## 1.1 Summary

This **revised** Arboricultural Impact Assessment (AIA) report has been prepared for Cumberland Council, to assist in the assessment of a Development Application to be submitted to Cumberland (formerly Holroyd) Council in relation to residential development works at Granville Park - 188 Woodville Road, Merrylands. The report is prepared in accordance with Australian Standard *AS4970-2009 – Protection of trees on development sites.*

## 1.2 Purpose

The purpose of this report is to assess the potential impacts of the proposed works on the trees on the site, and detail tree protection measures required for retained trees including tree sensitive design and construction measures.

## 1.3 The Site

The site is a sportsground located on the eastern side of Montrose Avenue, and is surrounded by low density residential properties. The property contains a sportsground and associated carpark, play equipment, paths, and landscaped park areas containing a mixture of planted exotic and endemic and planted native trees. Most of the landscaped areas are lawn or mulched gardens.

## 1.4 The Trees

This report assesses thirty nine (39) trees within the site. Details of the species, dimensions, health, and condition of the assessed trees are contained in the **Tree Survey Information Table** (page 4).

## 1.5 The Proposed Development

The proposed development consists of construction of a stadium building with grandstand, associated alterations to the carpark including stormwater infrastructure, and addition of hard and soft landscape works as shown on the plans by DWP, Northrop and Clouston Associates.

# 2. Background

## 2.1 Tree Management Controls

*Holroyd Development Control Plan (DCP) 2013 Part A Section* 4.1 applies to any woody and soft wooded perennial plant over 3.6 metres in height. Exemptions include noxious weeds, trees within 2m of an approved residential dwelling, and Liquidambar trees located less than 5m from an approved residential dwelling. The trees assessed in this report are subject to the DCP.

## 2.2 Reference Documents

The following documents were referred to in the preparation of this report:

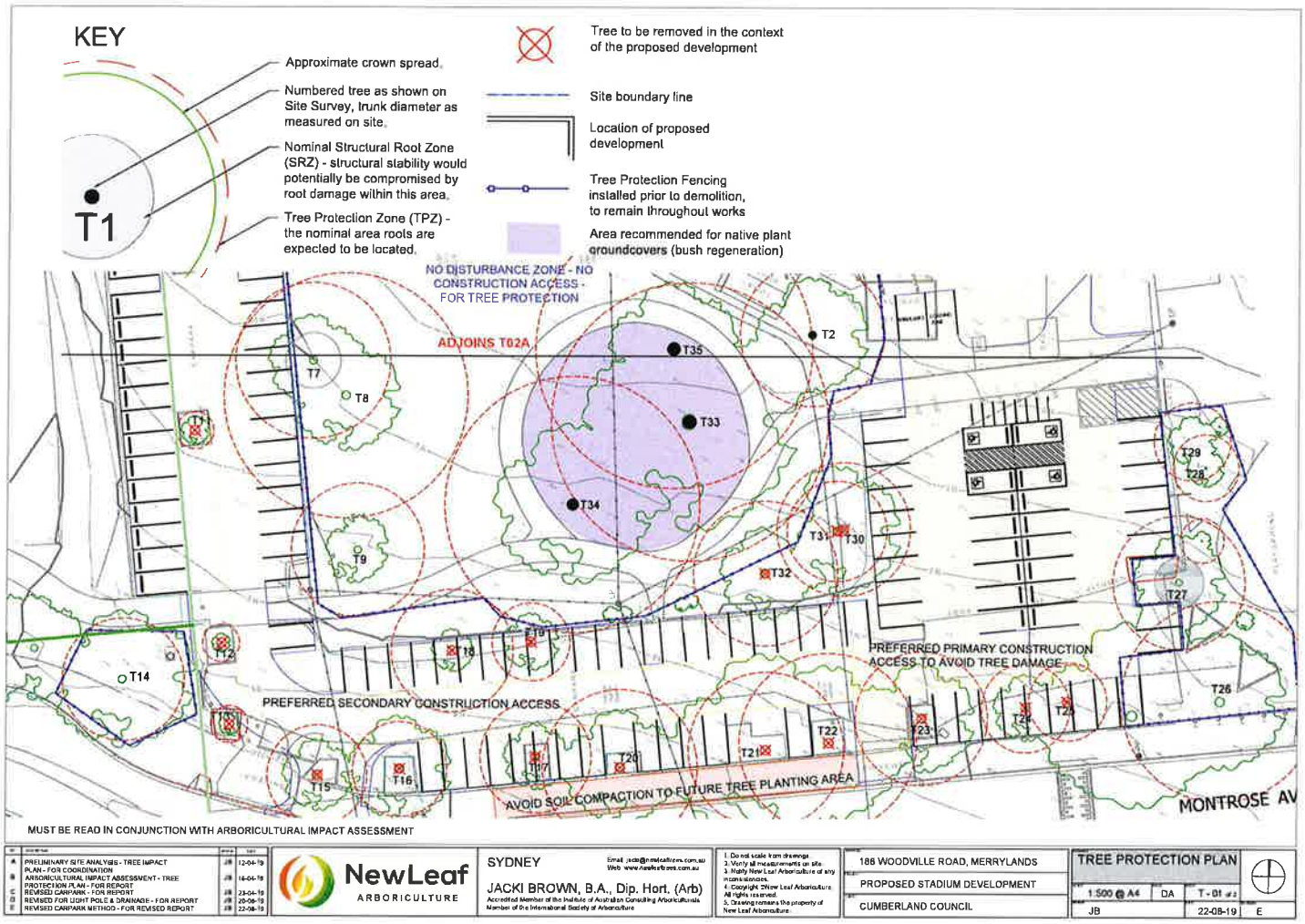
- Survey Plan: Keatley Surveyors, Drawing Ref. 20895, Rev. A, September 2018.
- Architectural Plan Set, DWP, Project No. 18-0612, Drawing No. A1101, Revision D, 25.03.19.
- Landscape Plan: Clouston Associates, Concept Plan, S18-0062, Issue B, 03/04/19
- Australian Standard *AS4373-2007 Pruning of amenity trees.*
- Australian Standard *AS4970-2009 Protection of trees on development sites.*
- *Holroyd Development Control Plan (DCP) 2013 Part A Section* 4.1 *Preservation of Trees.*
- Holroyd Local Environmental Plan 2013.
- *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017.*

| Tree No. | Botanical & Common Name | Height | Spread | Multi Stem DBH (mm) | DBH (mm) | DRB (mm) | Age | Health | Condition | ULE | Significance | Amenity Value | Ecological Value | SRZ | TPZ | Site Notes | Development Encroachment | Development Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Araucaria bidwillii* Bunya Pine | 35 | 6 | | 500 | 600 | M-OM | Av-P | Av-P | M | H | H | M | 2.7 | 6.0 | Compacted soil. Wounds on trunk. Dieback, deadwood. Sparse. 3m to first low branch. | 100% | Within proposed building footprint. |
| 2 | *Eucalyptus moluccana* Grey Box | 30 | 12N 8S 12E 8W | | 650 | 750 | M | G-Av | G-Av | M | H | H | H | 2.9 | 7.8 | Small fungal fruiting body on trunk @ 1m W side. Deadwood. Most of crown to E only 10m radius - ore branch to 12m could be reduced. Recent excavation 0.5m depth to NE 3m from base. | <10% | No impact provided that services are outside TPZ, and no excavation within TPZ. |
| 3 | *Lagerstroemia indica* Crepe Myrtle | 7 | 5 | 100 / 100 / 100 / 100 | | 350 | M | G-Av | G-Av | M | L-M | L-M | L | 2.1 | 2.4 | Multistem | 0% | No impact. |
| 4 | *Araucaria bidwillii* Bunya Pine | 35 | 14 | | 800 | 900 | M | G-Av | G-Av | M-L | H | H | M | 3.2 | 9.6 | Shipping container @ base to NW 1m from base. Bark cracks with kino flow. Some dieback. Band @ top of trunk. | 22% | Minimal impact if bitumen laid on top of existing. |
| 5 | *Lophostemon confertus* Brush Box | 5 | 3 | 80 / 80 / 60 / 50 | | 400 | SM | G-Av | Av | S-M | L-M | L-M | M | 2.3 | 2.0 | Coppiced from base. | 0% | No impact. |
| 6 | *Eucalyptus microcorys* Tallowwood | 25 | 18 | | 1000 | 1100 | M | Av | Av | M | M-H | M-H | M | 3.4 | 12.0 | Large wound from base to 1m - bulge, lean to compression side. Dieback. Large deadwood. Bitumen to base. | 37% | Minimal impact if bitumen laid on top of existing. |
| 7 | *Araucaria bidwillii* Bunya Pine | 28 | 8N 6S 6E 8W | | 700 | 800 | M-OM | Av | G-Av | M | H | H | M | 3.0 | 8.4 | Dieback, deadwood, wounds on trunk. | 0% | Minimal impact if bitumen laid on top of existing. Underground services should be located at least 6m from this tree. |
| 8 | *Eucalyptus tereticornis* Forest Red Gum | 30 | 12 | | 1100 | 1100 | M | Av | Av | M | HH | H | H | 3.4 | 13.2 | Active habitat hollows - 4x branch keet nests hollows. Likely decay column - lot of dead stubs, tear out. Somewhat sparse. Small occlusion. | 0% | Minimal impact if bitumen laid on top of existing. Underground services should be located at least 9m from this tree. |
| 9 | *Eucalyptus microcorys* Tallowwood | 20 | 2N 8S 6E 5W | | 600 | 700 | M | G-Av | Av | S-M | M-H | M-H | M | 2.8 | 7.2 | Storm damage - lost leader. Wound @10m N side. Moderate epicormics pruned for powerlines. Wound @ base. Girdled roots @ surface & mower damage. | <5% | Minor impact provided that bitumen is laid above existing, and any underground services are located within the existing carpark area. |
| 10 | *Melaleuca bracteata* Black Tea Tree | 5 | 4 | | 100 | 150 | M | Av | Av-P | S | L | L | M | 1.5 | 2.0 | In raised planter. lopped. 2x small trees. | 100% | Planter and tree to be removed. |
| 11 | *Lophostemon confertus* Brush Box | 7 | 3 | | 100 | 150 | SM | G | G | L | L-M | L-M | M | 1.5 | 2.0 | In raised planter. Suitable for transplant. | 100% | Planter and tree to be removed. Tree should be transplanted to another location on site. |
| 12 | *Lophostemon confertus* Brush Box | 6 | 3 | | 150 | 200 | SM | G-Av | G-Av | L | L-M | L-M | M | 1.7 | 2.0 | Old stump next to base - exposed roots over. Multistem from 2m. | 100% | Planter and tree to be removed. Tree should be transplanted to another location on site. |
| 13 | *Lophostemon confertus* Brush Box | 5 | 2 | | 80 | 100 | SM | Av | P | S | L | L | M | 1.5 | 2.0 | Wound & borer holes around stem @1.8m - partially ring barked. Epicormics from above this wound. Sparse. Additional wounds @ 2.5m. | 0% | No impact but recommended for removal and replacement due to poor condition. |

| Tree No. | Botanical & Common Name | Height | Spread | Multi Stem DBH (mm) | DBH (mm) | DRB (mm) | Age | Health | Condition | ULE | Significance | Amenity Value | Ecological Value | SRZ | TPZ | Site Notes | Development Encroachment | Development Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | *Corymbia citriodora* Lemon-Scented Gum | 18 | 8N 9S 6E 9W | | 550 | 650 | M | G | G | M-L | H | H | M | 2.8 | 6.6 | Mulch ring around, 3rd in row along park edge. | 0% | No impact. |
| 15 | *Lagunaria patersonia* Norfolk Island Hibiscus | 10 | 5 | | 450 | 500 | M | G-Av | Av | M | L-M | M | L | 2.5 | 5.4 | Lot of wounds on trunk, Small wound @ base, Epicormics, Species has irritant fruit, In planter in carpark next to fiveway. | 100% | Within proposed relocated driveway main entrance from roundabout. |
| 16 | *Erythrina x sykesii* Coral Tree | 9 | 8 | 300 / 300 | | 600 | M | Av | Av-P | S | L-M | M | L | 2.7 | 5.1 | 2 stems from base with hollow & partial failure, low branches pruned, Branch tearouts, Poor structure, In planter in carpark. | 100% | Recommended for removal and replacement due to condition. |
| 17 | *Lophostemon confertus* Brush Box | 12 | 8 | | 500 | 600 | M | Av | G | M-L | M | M | M | 2.7 | 6.0 | Somewhat sparse, Bifurcated @2m, In planter in carpark. | 100% | Within proposed parking space. |
| 18 | *Lopped Eucalyptus* | 11 | 4 | | 550 | 650 | M | Av | P | R | M | M | M | 2.8 | 6.6 | Slight lean to N, Lot of epicormic, Wounds @ ground level & on trunk, Borer holes, Phellinus fungal fruiting bodies on exposed heartwood @ base NE side. | 100% | Recommended for removal, Within proposed parking space. |
| 19 | *Lophostemon confertus* Brush Box | 11 | 5 | | 300 | 350 | M | G-Av | G | M-L | M | M | M | 2.1 | 3.6 | At edge of carpark. | 100% | Within proposed parking space & excavation to install parking surface would be a major encroachment on 3 sides if tree was retained. |
| 20 | *Corymbia citriodora* Lemon-Scented Gum | 24 | 16 | | 600 | 700 | M | G-Av | G | M-L | M-H | M-H | M | 2.8 | 7.2 | Somewhat sparse, In planter in carpark, Some dieback. | 100% | Within proposed parking space & excavation to install parking surface would be a major encroachment on 3 sides if tree was retained. |
| 21 | *Eucalyptus microcorys* Tallowwood | 22 | 9N 1S 6E 8W | | 600 | 700 | M | Av | Av | M | M-H | M-H | M | 2.8 | 7.2 | Moderate lean to NW away from T22. Low branches pruned. Lot of kino on trunk. Moderate epicormics. Lot of insect frass. Moderate deadwood. | 100% | Within proposed parking space & excavation to install parking surface would be a major encroachment on 3 sides if tree was retained. |
| 22 | *Eucalyptus microcorys* Tallowwood | 24 | 8N 9S 9E 9W | | 700 | 800 | M | G-Av | G-Av | M | H | H | M | 3.0 | 8.4 | Low crown density. Large & moderate epicormics. | 100% | Within proposed parking space & excavation to install parking surface would be a major encroachment on 3 sides if tree was retained. |
| 23 | *Erythrina x sykesii* Coral Tree | 7 | 7 | | 500 | 600 | M | Av | G-Av | M | L-M | M | L | 2.7 | 6.0 | Close to driveway in planter in carpark. Broken branches. Decay in branch stub. | 100% | Within proposed parking spaces. |
| 24 | *Erythrina x sykesii* Coral Tree | 8 | 4N 1S 1E 3W | | 350 | 400 | M | G-Av | Av-P | S | L-M | M | L | 2.3 | 4.2 | Broken & lopped branches. Skew to NW. Large tearout E side. Decayed stubs.Recent tree removal/ failure nearby | 100% | Within proposed parking spaces. |
| 25 | *Erythrina x sykesii* Coral Tree | 4 | 3 | 200 / 150 | | 350 | M | Av | P | S | L | L | L | 2.1 | 3.0 | Large tearouts & pruned wounds. Skew to N. Wounds on trunk. Codominant @ base srossing stems. Recent tree removal/ failure nearby | 100% | Within proposed parking spaces. |
| 26 | *Eucalyptus microcorys* Tallowwood | 25 | 20 | | 800 | 900 | M | G-Av | Av | M | M-H | M-H | M | 3.2 | 9.6 | Deadwood, dieback, dead epicormics. Small epicormics. Codominant from 1m in mulched garden. | 5% | Minor encroachment. |

| Tree No. | Botanical & Common Name | Height | Spread | Multi Stem DBH (mm) | DBH (mm) | DRB (mm) | Age | Health | Condition | ULE | Significance | Amenity Value | Ecological Value | SRZ | TPZ | Site Notes | Development Encroachment | Development Impact |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | *Eucalyptus sideroxylon* Mugga Ironbark | 20 | 16 | | 600 | 600 | M | G-Av | G-Av | M-L | M-H | M-H | M | 2.7 | 7.2 | In mulched garden near carpark corner. Codominant @1.5m, 2 stems from 2m | 34% | Minimal impact if bitumen laid on top of existing. |
| 28 | *Eucalyptus sideroxylon* Mugga Ironbark | 15 | 6 | | 250 | 300 | SM | G | G-Av | M-L | M | M | M | 2.0 | 3.0 | 2 main leaders from 6m. | 0% | No impact. |
| 29 | *Eucalyptus sideroxylon* Mugga Ironbark | 13 | 7 | | 300 | 350 | SM | G | G | L | M | M | H | 2.1 | 3.6 | - | <5% | Minor impact. |
| 30 | *Eucalyptus moluccana* Grey Box | 21 | 8 | | 500 | 600 | M | Av | P | S | M | M | H | 2.7 | 6.0 | Large vertical wound from base to 2m. Borer holes. Kino flow. Skew to SW. Wounds on opposite side also. | 42% | Major impact from carpark involving excavation, & subsoil drainage. |
| 31 | *Eucalyptus tereticornis* Forest Red Gum | 20 | 8 | | 350 | 450 | M | Av | P | S | M | M | H | 2.4 | 4.2 | Previous stem removed @ base. Lost leader. Codominant with T30. | 25% | Major impact from carpark involving excavation, & subsoil drainage. |
| 32 | *Eucalyptus microcorys* Tallowwood | 23 | 12 | | 550 | 650 | M | G-Av | Av | M | M-H | M-H | M | 2.8 | 6.6 | Recent 200Ø branch failure N side. Cockatoo damage @ top of junction, Slight lean to NW. Lot of insect frass. Small & moderate epicormics. Large western branch over carpark shows signs of defect - aerial inspection. | 37% | Major impact from carpark involving excavation, & subsoil drainage. |
| 33 | *Eucalyptus moluccana* Grey Box | 28 | 14N 13S 6E 14W | | 1200 | 1350 | M | G | G-Av | M-L | H | H | H | 3.8 | 14.4 | Wound from base E side with borer holes. Large tearout N side, 4 stems from 2m. Small vertical wounds on trunk. | <5% | Landscape structures (e.g. seats) should not be located close to the base of these trees. Native plant regeneration recommended in central area - "no mow" area. Avoid soil disturbance. |
| 34 | *Eucalyptus tereticornis* Forest Red Gum | 25 | 13N 10S 11E 9W | | 1050 | 1150 | M | G | G-Av | M-L | H | H | H | 3.5 | 12.6 | Wound @ base. Bulge. Leans N. Small hollow @3m. Cockatoos, lorikeets. Branch hollows. Slight lean to N. | <5% | Landscape structures (e.g. seats) should not be located close to the base of these trees. Native plant regeneration recommended in central area - "no mow" area. Avoid soil disturbance. |
| 35 | *Eucalyptus moluccana* Grey Box | 27 | 9N 14S 9E 9W | | 1250 | 1350 | M | G-Av | G-Av | M-L | H | H | H | 3.8 | 15.0 | Hollow @ junction N side - birds? & hollow below. Multiple wounds @ hollows. Broken branches. Somewhat sparse. Ants nest @ base N side. Trunk concave on E side. | 12% | Landscape structures (e.g. seats) should not be located close to the base of these trees. Native plant regeneration recommended in central area - "no mow" area. Avoid soil disturbance. |
| 36 | *Eucalyptus microcorys* Tallowwood | 10 | 8 | | 650 | 750 | M | Av | Av | S-M | M | M | M | 2.9 | 7.8 | Lot of epicormics. Dieback. Crossing branches. Wound @ base with hollow - likely decay column. Broken branch stubs. On hill beside sportfield. | 14% | Minimal impact if bitumen laid on top of existing. |
| 37 | *Grevillea robusta* Silky Oak | 12 | 7 | | 300 | 350 | M-OM | Av | Av | S-M | M | M | M | 2.1 | 3.6 | Moderate dieback and deadwood. Congested branches. | 100% | Within proposed building footprint. |
| 38 | *Callistemon sp.* Bottlebrush | 4 | 3 | | 100 | 150 | M | G-Av | G | M | L-M | L-M | M | 1.5 | 2.0 | Small tree | 100% | Within proposed light pole and drainage line. |
| 39 | *Eucalyptus microcorys* Tallowwood | 14 | 8 | | 450 | 500 | M | | | M-L | M | M-H | M | 2.5 | 5.4 | | 0% | No impact. |

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




MUST BE READ IN CONJUNCTION WITH ARBORICULTURAL IMPACT ASSESSMENT

| | | | |
|---|---|---|---|
| A | PRELIMINARY SITE ANALYSIS - TREE IMPACT PLAN - FOR COORDINATION | JB | 12-04-19 |
| B | ARBORICULTURAL IMPACT ASSESSMENT - TREE PROTECTION PLAN - FOR REPORT | JB | 16-04-19 |
| C | REVISED CARPARK - FOR REPORT | JB | 23-04-19 |
| D | REVISED FOR LIGHT POLE & DRAINAGE - FOR REPORT | JB | 26-06-19 |
| E | REVISED CARPARK METHOD - FOR REVISED REPORT | JB | 22-08-19 |

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1. Do not scale from drawings.
3. Verify all measurements on site.
3. Notify New Leaf Arboriculture of any inconsistencies.

5. Drawing remains the property of New Leaf Arboriculture.

188 WOODVILLE ROAD, MERRYLANDS
PROPOSED STADIUM DEVELOPMENT
CUMBERLAND COUNCIL

TREE PROTECTION PLAN

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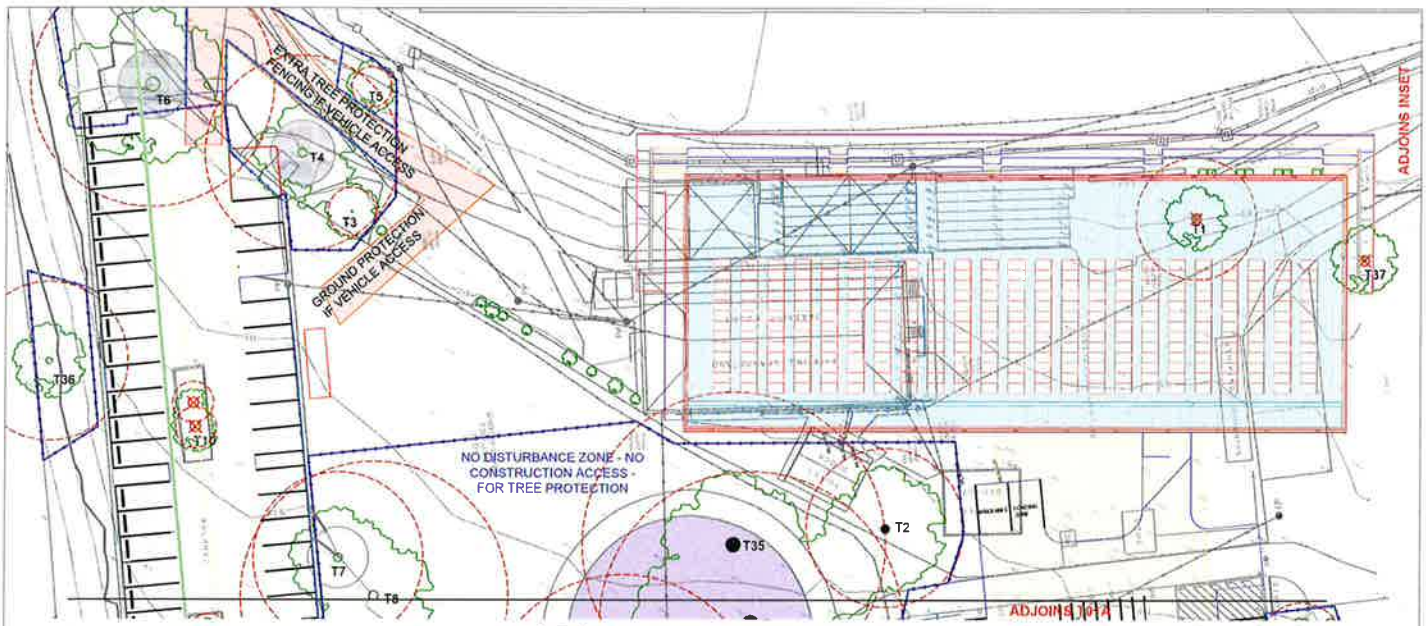
| JB | 22-08-19 | E | |

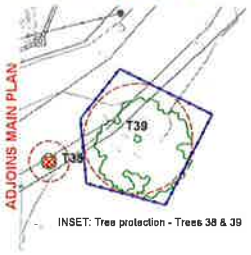



## KEY

T1

- Approximate crown 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 to be removed in the context of the proposed development
- Site boundary line
- Location of proposed development
- Tree Protection Fencing installed prior to demolition, to remain throughout works
- Area recommended for native plant groundcovers (bush regeneration)




INSET: Tree protection - Trees 38 & 39

MUST BE READ IN CONJUNCTION WITH ARBORICULTURAL IMPACT ASSESSMENT

| | | | |
|---|---|---|---|
| A | PRELIMINARY SITE ANALYSIS - TREE IMPACT PLAN - FOR COORDINATION | JB | 12-04-19 |
| B | ARBORICULTURAL IMPACT ASSESSMENT - TREE PROTECTION PLAN - FOR REPORT | JB | 19-04-19 |
| C | REVISED CARPARK - FOR REPORT | JB | 23-04-19 |
| D | REVISED CARPARK METHOD - FOR REVISED REPORT | JB | 23-08-19 |

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| | |
|---|---|
| 188 WOODVILLE ROAD, MERRYLANDS | |
| PROPOSED STADIUM DEVELOPMENT | |
| CUMBERLAND COUNCIL | |

**TREE PROTECTION PLAN**

| | | | |
|---|---|---|---|
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| JB | | 22-08-19 | |

# 5. Tree Assessment Methodology

### 5.1 Limitations and Assumptions

The recommendations in this report rely on the provided information, including architectural plans and documents, limited to those listed in **2.2 Reference Documents**.

Care has been taken to obtain all information from reliable sources; however the author makes no representations, guarantees or warranties as to the accuracy of information provided by others. Similarly, no warranties are made as to the accuracy or completeness of any reproduction of this report. This report is only valid in its entirety and for the purpose for which it was prepared.

Conditions on the site may change after the tree assessment. Liability will not be accepted for damage or injury as a result of unforeseeable events or natural processes.

This report does not constitute or include a tree risk assessment. Where defects are noted, these are recommended for further investigation where warranted. Other tree defects may be present which have not been noted.

### 5.2 Tree Assessment

Visual tree assessment was carried out by Jacki Brown, Arboricultural Consultant in April 2019. The tree inspection was limited to a visual assessment from ground level, without excavation, coring, drilling, climbing or other testing. Trunk diameters were measured using a standard tape measure, crown spreads were paced out on site, and tree heights were estimated by eye.

The Arboricultural Impact Assessment utilises the Australian Standard *AS4970-2009 Protection of trees on development sites.*

### 5.3 Tree Survey Data

Refer to the Tree Survey Information Table (page 4).

***Useful Life Expectancy (ULE)*** ratings are given for each tree, of either Long (40+ years), Medium (15-40 years), Short (5-15 years) or Remove (less than 5 years). The ratings are estimates based on the assessed health, condition and structure of each tree at the time of assessment, in its specific location. The ratings are not static, and may be revised during future assessments if conditions change.

***Significance*** ratings are given for each tree, based on their Amenity Value, Ecological Value, size and location. While High significance trees provide substantial values to their surroundings, Low and Medium significance trees also contribute to the Urban Forest and in many cases may grow to become High significance trees, given the opportunity.

An ***Ecological Value*** rating of High, Medium or Low has been assigned to each tree, based on the species and potential habitat values, however this should not be taken as ecological advice.

# 6. Observations and Discussion

6.1 Trees with Major Encroachment from the Proposed Development

**High Significance Trees Proposed to be Removed**

One (1) large sized *Araucaria bidwillii* (Bunya Pine) tree (**Tree 1**) is located within the proposed stadium building. This tree is of High significance due to its age, size and amenity, however it is in Average to Poor health and condition with dieback and sparse crown. If this tree was to be retained, major design modifications to the layout of the stadium would be required. In the context of the proposed development, removal of this tree will be required. A replacement tree of similar species and potential size should be installed on site to offset the loss of this tree.

One (1) large native tree (**Tree 22**) is located in a small garden in the existing carpark. The proposed carpark replacement requires excavation of approximately 500mm depth to stabilise the soil for carpark use. As a result this tree would have major encroachments on three sides, and is likely to be significantly impacted. This tree is in good to average health and condition with low crown density and large epicormic shoots. In the context of the carpark construction, this tree will require removal.

**Medium to High Significance Trees Proposed to be Removed**

Three (3) large sized native trees (**Trees 20, 21,** and **32**) have the proposed carpark excavation and subsoil drainage lines within their TPZ areas which will be a major encroachment for Trees 20 and 21, and the excavation will be at the edge of the Structural Root Zone (SRZ) of Tree 32. Due to the extent of excavation proposed and the current condition of the trees, it is unlikely that these trees will be able to be sustainably retained. In the context of the proposed carpark construction, these trees will require removal.

**Medium Significance Trees Proposed to be Removed**

Three (3) medium sized native trees (**Trees 17, 18** and **37**) are located within the proposed carpark and stadium building, respectively. **Tree 17** is suitable for retention, but is located within a proposed parking space. **Tree 18** is unsuitable for retention as it has been lopped/topped and the remaining tree is in poor structure. **Tree 37** is nearing overmaturity and should not be considered a constraint on the proposed development. Replacement native species trees should be planted to offset the loss of these trees.

Three (3) large sized native trees (**Trees 19, 30** and **31**) are located close to the existing carpark. The proposed carpark replacement requires excavation of approximately 500mm depth to stabilise the soil for carpark use. As a result, these trees would have significant impacts to their roots. **Trees 30** and **31** are in average health and poor condition, with Short Useful Life Expectancies. **Tree 19** would have excavation on three sides due to the carpark engineering requirements. These trees should not be considered a constraint on the development, provided that suitable replacement tree planting occurs on site to offset the loss of trees.

**Low to Medium Significance Trees Proposed to be Removed**

Seven (7) Low to Medium Significance trees (**Trees 11, 12, 15, 16, 23, 24, and 38**) are within the proposed altered carpark. **Trees 11** and **12** are young *Lophostemon confertus* (Brush Box) in raised planters which are suitable for transplant. **Trees 15, 16, 23** and **24** are in average condition and are nuisance species, and should not be considered constraints on the proposed development, provided that suitable replacement trees are planted on site as part of the landscape works. **Tree 38** is a small native tree and is located within the footprint of

the proposed light pole and close to the proposed drainage line. This tree can be replaced within the short to medium term with a suitable native tree.

**Low Significance Trees Proposed to be Removed**
Two (2) Low Significance trees (**Trees 10** and **25**) are located within the proposed altered carpark and will require removal. Due to these trees' species and condition, they should not be considered a constraint on the proposed development.

**High Significance Trees Proposed to be Retained**
Two (2) High Significance trees (**Trees 4** and **35**) have proposed works within their TPZ areas, and will require tree sensitive construction measures to minimise the impact on their health and condition. Removal of the shipping container and ground surfacing around **Tree 4** will need to be done carefully without soil disturbance to avoid root damage in close proximity to the tree. **Tree 35** will have the proposed stadium and stormwater swale at the edge of its TPZ area. The extent of excavation for the swale should be minimised and carried out with Project Arborist attendance. Ground levels outside the building should remain as existing, with no more than 400mm depth of topsoil added.

**Medium to High Significance Tree Proposed to be Retained**
One (1) large native tree (**Tree 6**) is located close to the eastern end of the northern carpark, which will encroach into approximately 37% of the TPZ. The carpark within the TPZ of this tree should be laid above grade without excavation to avoid impact to this tree.

One (1) large native tree (**Tree 27**) has proposed carpark excavation in close proximity. The excavation will need to be done using non-destructive excavation, with Project Arborist attendance, to minimise the impacts on tree roots. If tree roots greater than 40mm diameter are encountered, the Project Arborist must assess the overall impact of root pruning, prior to any root pruning occurring. Further advice will be required depending on the roots found.

**Medium Significance Tree Proposed to be Retained**
One (1) Medium Significance tree (**Tree 36**) is located on a grassed embankment above the carpark, and the new carpark installation will involve excavation within approximately 14% of the tree's TPZ. The excavation closest to the tree should be carried out carefully with Project Arborist present, and any roots encountered which cannot be retained in situ should be cleanly pruned with sharp, sterile hand pruning tools.

### 6.2 Trees with Minor Encroachment from the Proposed Development

**High Significance Trees Proposed to be Retained**
Three (3) large locally native trees (**Trees 2, 33**, and **34**) will have minor encroachments from the proposed development.

Proposed stormwater works near **Tree 2** have been redesigned to be outside the TPZ. Regrading within this tree's TPZ needs to be avoided, to minimise damage to the tree's roots. All works in the TPZ require Project Arborist attendance.

**Trees 33** and **34** will have landscape works within their TPZ areas. Minimal cultivation of the soil should occur, and minimal container size plants should be installed, to avoid excessive soil disturbance and root damage. No underground services should be routed through the TPZ of these trees. The pedestrian path should be laid over the existing path, to avoid unnecessary disturbance of the underlying soil. Other structures including landscape seating should be located outside the TPZ of the trees.

**Medium to High Significance Trees Proposed to be Retained**
Two (2) large native trees (**Trees 9** and **26**) will have minor encroachments within their TPZ areas. Soil disturbance should be minimised by installing the new carpark above existing levels in the TPZ of these trees. Where bitumen is removed to increase the size of garden beds around trees, this should be done carefully with Project Arborist attendance to avoid root damage and soil disturbance.

**Medium Significance Tree Proposed to be Retained**
One (1) native tree (**Tree 29**) will have a minor encroachment from the proposed development and can be protected by minimising the excavation outside the carpark footprint and installing tree protection measures as shown on the Tree Protection Plan.

### 6.3 Trees with no Encroachments from the Proposed Development
Six (6) trees (**Trees 5, 7, 8, 14, 28,** and **39**) will not be impacted by the proposed development, provided that tree protection is installed prior to works commencing and the northern carpark is installed above grade without excavation, as shown on the Tree Protection Plan. Soil disturbance should be minimised by installing the new carpark over the existing bitumen.

### 6.4 Tree Recommended for Removal due to its Condition
One (1) small tree (**Tree 13**) is proposed for removal and replacement. This tree is a young, recently planted *Lophostemon confertus* (Brush Box) with multiple wounds to its trunk and borer holes in the exposed heartwood. The tree's crown is sparse. While this tree will not be impacted by the proposed works, it is likely to have a Short Useful Life Expectancy, and should be removed and replaced with a healthy advanced sized planting of the same species, or another suitable native species.

# 7. Results

## 7.1. Tree Removal, Retention, and Transplant

| Sig. Rating | Removed | Retained | Trans-plant | Total |
|---|---|---|---|---|
| **High** | **2**<br>Tree 1, 22 | **8**<br>Trees 2, 4, 7, 8, 14, 33, 34, 35 | - | **10** |
| **Medium - High** | **3**<br>20, 21, 32 | **4**<br>Trees 6, 9, 26, 27 | - | **7** |
| **Medium** | **6**<br>Trees 17, 18, 19, 30, 31, 37 | **4**<br>Trees 28, 29, 36, 39 | - | **10** |
| **Low-Medium** | **5**<br>Trees 15, 16, 23, 24, 38 | **2**<br>Trees 3, 5 | **2**<br>Trees 11, 12 | **9** |
| **Low** | **3**<br>Tree 10, 13, 25 | **0**<br>- | - | **3** |
| **Totals** | **19** | **18** | **2** | **39** |

# 8. Recommendations

8.1 Tree Removal

- Remove **Trees 1, 10, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 30, 31, 32, 37 & 38** as they have major encroachments from the proposed development.
- Consider transplanting **Trees 11** and **12** which are within the proposed carpark alterations and will require removal. They should be relocated to a suitable position in the surrounding park, with sufficient soil and above ground space for their future growth. A qualified and experienced tree transplanter should be engaged to carry out the transplant.
- Remove **Tree 13** due to its poor condition and Short Useful Life Expectancy.

8.2 Tree Retention

- Retain and protect **Trees 2, 4, 5, 6, 7, 8, 9, 14, 26, 27, 28, 29, 33, 34, 35, 36 & 39.**

8.3 Tree Protection

- Install tree protection fencing (as shown on the Tree Protection Plan) around the whole area of the following groups of trees to exclude all works access, including demolition, excavation, storage or dumping of materials, washdown of equipment, machinery, vehicle and personnel movement:
  **Trees 26, 27, 28 & 29**
  **Trees 2, 7, 8, 9, 33, 34 & 35**
  **Trees 3, 4, 5 & 6**
- Install tree protection fencing around the TPZ areas (as shown on the Tree Protection Plan) of the following individual trees: **Trees 14, 36 & 39.**
  Ground protection where any construction access including vehicle or machinery access is required through or within Tree Protection Zone areas. Ground protection should be in the form of rumble boards or steel plates over 100mm depth of mulch. Trunk protection and/or additional fencing would also be required if access occurs inside TPZ fencing.
- Landscape planting should preference tubestock and bush regeneration techniques over large container size planting within the circular garden area containing **Trees 33, 34 & 35**. The area should be treated as a "no-mow" garden bed, and pedestrian/user access should not be encouraged in the garden bed - for the protection of the trees and also for risk management due to these trees age and presence of deadwood and hollows.
- Any excavation and access within TPZ areas must have Project Arborist attendance.

8.4 Replacement Tree Planting

- Install five (5) large (15m mature height) and ten (10) medium to large (8m mature height) native replacement trees in the park, for example around the northern carpark. Locate trees at least 1m from carpark edges and other structures.
- Install five (5) large (15m mature height) native replacement trees in the Council verge on the western side of the car park, to replace the shading amenity of the trees removed in the context of the development.
- Replacement trees should be installed from minimum 75L containers, in suitably prepared and improved site soil within the property to offset the loss of tree canopy, as shown on the landscape plans. Trees should be high quality nursery grown plant stock and planted by persons with horticultural qualifications. The trees should be maintained to maturity, with intensive maintenance for at least 6 months, and replaced if they fail or die.
- Avoid storage and dumping of materials, and machine and construction access to landscape soil areas to be planted, except where ground protection is installed.
- New trees should not be planted within the TPZ of other retained trees, except where approved by the Project Arborist.

The recommendations of this report do not constitute consent to carry out works. Approval is required in the form of Development Consent to prune or remove trees, as well as the consent of the tree owner where trees are on neighbouring properties.

Further information and clarification can be obtained from the author.

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