

# Tree Removals and Plantings

Surface Works (Excluding HV Power Alignment, Cooks River/Castlereagh Ironbark Forest Kingsgrove, Road Widening Works at St Peters)

Project Name: WestConnex New M5

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## Document Approval

Rev.	Date	Prepared by	Reviewed by	Recommended by	Approved by	Remarks
00	13/05/16	ATC	CDS-JV			For issue
01	03/06/16	ATC	CDS-JV			For issue
02	17/06/16	ATC	CDS-JV			For Issue
03	06/07/16	ATC	CDS-JV			For Approval
Signature:						

# Tree Removals and Plantings



## Purpose of Report

This report was prepared by Australian Tree Consultants for CDS-JV to address condition B63 of Infrastructure Approval SS6788. This report specifically addresses trees to be removed and retained within and on the periphery of the surface works sites. This report does not include trees associated with the following works, which will be addressed in separate reports:

- HV Power alignments;
- Road Widening Works at St Peters; and
- Removal of trees from the Cooks River/Castlereagh Ironbark Forest at Kingsgrove.

The tree removal and planting report does not address replacement plantings. These will be addressed in subsequent reports. The scope of this report is limited to the trees outlined in this report.

## Tree Removals and Plantings

The report has been prepared to address condition B63 of Infrastructure Approval SS6788. The condition reads as follows:

*B63 The SSI must be designed to retain as many trees as possible and provide a net increase in the number of replacement trees. The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) prior to removing any trees on the periphery and/or outside the construction footprint as identified in the figures in Section 6 of the document referred to in condition A2(b), including any tree(s) removed along Euston Road. The Tree Report may be prepared for the entire SSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the SSI on trees and vegetation within and adjacent to the construction footprint. The report(s) must include:*

- a) a visual tree assessment with inputs from the design, landscape architect, construction team;*
- b) consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and*
- c) measures to avoid the removal of trees or minimise damage to existing trees and is to ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, excavation works, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.*

*In the event that trees are to be removed, then replacement trees are to be planted within, or in close proximity to, the SSI boundary, including along Euston Road where feasible and reasonable. The location of the trees must be determined in consultation with the relevant council(s). The replacement trees are to have a minimum pot size of 75 litres. A copy of the report(s) must be submitted to the Secretary for approval prior to the removal, damage and/or pruning of any trees, including those affected by site establishment works. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Secretary.*

## Tree Removals and Plantings




### Design Team, Landscape Architect and Construction Team Inputs

A review of the surface works associated with the scope of this report was carried out by the Independent Arborist (Australian Tree Consultants), Design Team and the Construction Team. The review focused on assessing both permanent and temporary design and construction requirements with the aim of minimising (as far as possible) tree removal at surface work locations, including along the periphery of the surface works sites. The trees listed in the report were assessed (as retained and removed) based on the following design and construction considerations and analysis.

- Safety considerations including but not limited to:
  - Safe construction ingress and egress to the sites;
  - Safety in design for various temporary works requirements including the erection and removal of temporary perimeter fencing and noise barriers;
  - Safe design of permanent works
  - Safe operation of construction plant
  - Safety issues for perimeter interfaces including residences / businesses
- The amount of area required for storage of construction materials to effectively facilitate construction works.
- The special requirements of large plant and materials handling
- The effects of changes in temporary requirements to the permanent design
- Knock on affects in changing design to other temporary or permanent design components
- Impacts to changes in design, construction requirements and the approval requirements associated with those changes

Specific input and comments from the Design Manager, Landscape Architect (Urban Design Manager) and the Construction Team are given below.

Design Manager	
Input / Review	There is little opportunity to preserve the trees identified for removal for both temporary and permanent works at the surface works locations. This is due to the constrained sites and the stringent design criteria, including safety in design considerations. There may be scope to trim branches where trees are close to the proposed boundary if space constraints permit. Construction teams attended with arborist to discuss space constraints as appropriate.
Signature	<div style="display: flex; align-items: center;"> <div style="background-color: black; width: 100px; height: 1.2em; margin-right: 5px;"></div> <span>– Design Manager</span> <div style="margin-left: 20px; text-align: center;">  </div> </div>

Landscape Architect	
Input / Review	There are no possibilities to preserve any of the trees nominated, other than where already nominated in the report. The final urban design and landscape plan will address replacement of these trees in accordance with condition B63.
Signature	<div style="display: flex; align-items: center;"> <div style="background-color: black; width: 100px; height: 1.2em; margin-right: 5px;"></div> <span>– Landscape Architect, Urban Design Manager</span> <div style="margin-left: 20px; text-align: center;">  </div> </div>

## Tree Removals and Plantings



Construction Team	
Arncliffe Surface works	The construction team undertook an analysis of the design and construction requirements for the surface works area. Construction and design drawings were provided to the arborists for reference. Members of the construction team (EW, JM & MK) attended the site with the independent arborist on 29/04/2016 and 23/05/2016 to discuss safety, design, constructability and locations of key construction infrastructure. The arborists identified and assessed trees within the construction boundary in reference to the design drawings and input from the construction team. This included the entire construction surface works area and trees on the periphery of this compound. Three hundred trees (300) have been identified for removal from this site, from a total of 337 surveyed. Due to constraints on the size of the site and the approved site layout, limited options are available for the retention of trees.
Bexley Surface Works	The construction team undertook an analysis of the design and construction requirements for the surface works area. A total of 70 trees (57 native trees) were surveyed within and on the periphery of the Bexley Surface Works (including Bexley East, Bexley North and Bexley South). The survey included the entirety of the surface works area. Construction and design drawings were provided to the independent arborists and the construction team attended site with the arborists on 03/05/2016 and 25/5/2016. Due to constraints identified during the analysis, limited options are available for the retention of trees. Forty (40) trees will need to be removed.
St Peters Surface Works	The construction team undertook an analysis of the design and construction requirements for the surface works area. A total of 435 trees, including 331 native trees were surveyed at the St Peters Interchange (SPI) surface works. The arborists attended site with members of the construction team (MR, WB, LR) on 29/04/16 and 25-26/05/2016. Design and construction drawings were consulted during the inspection, along with advice from the construction team. Due to significant constraints on the size of site and the approved site layout including bridges and significant earthworks including remediation, all trees at this site (435) require removal.
Kingsgrove Surface Works	The construction team undertook an analysis of the design and construction requirements for the surface works area. Trees within the Kingsgrove surface works area were assessed by the arborists from 19/05/2016 to 21/05/2016. Construction and design drawings were provided to the arborists and members of the construction team (NB, JS) attended site with the arborists to provide construction inputs. A small area inside the existing M5 noise wall could not be assessed due to traffic safety constraints. This area will be assessed during the next scheduled M5 shutdown (June 19-22, 2016). A subsequent assessment will also be required for the areas west of the Kindalin underpass and the Commercial Road compound (C3) that will be impacted by construction works from October 2016.  This current survey included assessment of 444 trees, including 426 native trees. Due to the installation of significant infrastructure at this site and constraints on the size of site and the approved site layout 424 trees at this site require removal.
Signature	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>██████████ – Construction Director, Tunneling and M&amp;E</p> </div> <div style="width: 45%; text-align: right;"> <p>████████████████████</p> </div> </div>

6/07/16.



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Date: 6 July 2016

**To** Mr. Howard Chemney  
Environment & Sustainability Manager  
CDS-JV (WestConnex New M5)

**Re – Arboricultural Reports**

I refer to your request to undertake site reviews of the surface work sites for the WestConnex project and prepare an Arboricultural report.

Australian Tree Consultants Pty Ltd undertook the site inspections on 29<sup>th</sup> April, 3<sup>rd</sup> May and between 19<sup>th</sup> – 26<sup>th</sup> May, 2016.

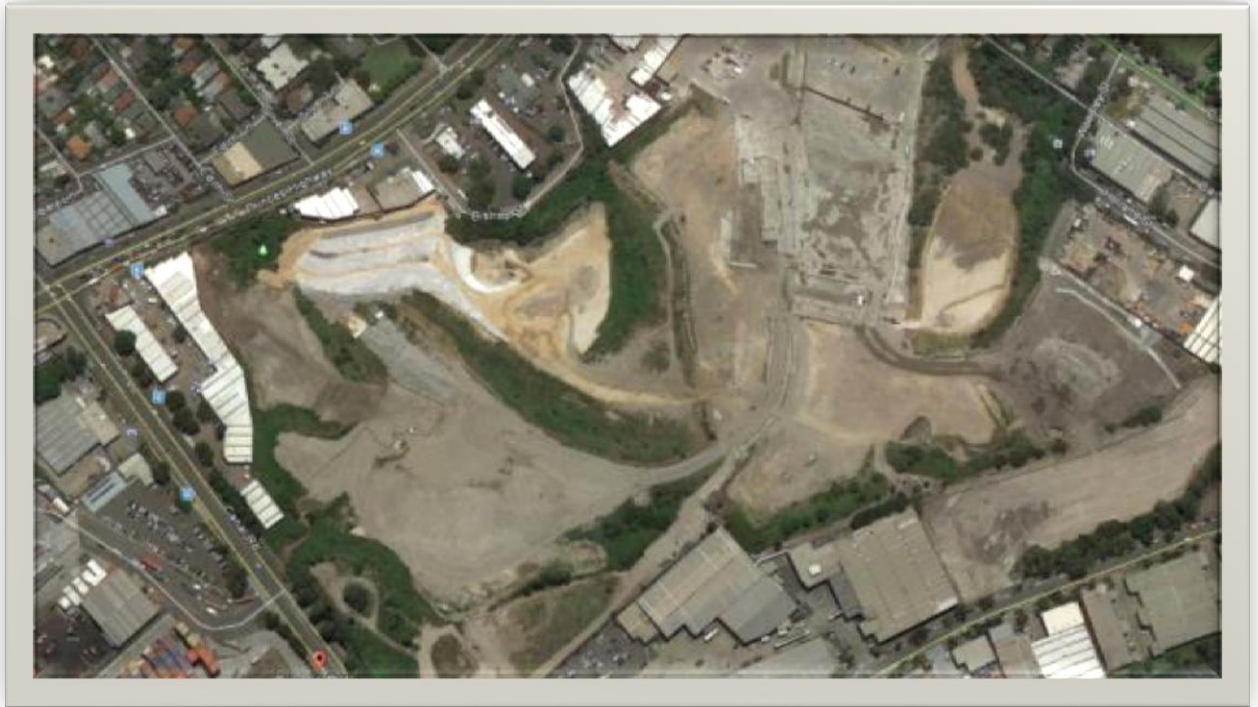
If you require any further information in relation to this report, please contact us on 0418 474 796.

Yours sincerely

**Hugh Taylor**

Director Australian Tree Consultants  
Registered Consulting Arborist No 1268  
BA (L) Major in Wilderness Management/Outdoor Education  
Diploma Horticulture – Arboriculture (Level 5)  
Arborist/ Tree Surgeon/ Horticulturist  
Certificate IV Occupational Health & Safety

# ARBORIST REPORT



## Surface works sites

- Bexley Surface Works Area (including but not limited to C4, C5 & C6)
- Arncliffe Surface Works Area (including but not limited to C7)
- Peters Interchange Surface Works Area (including but not limited to C8, C9, C10 & C11)
- Kingsgrove Surface Works Area (including but not limited C1, C2, C3)

**Client** CDS-JV

**Report Prepared By** Australian Tree Consultants Pty. Ltd.

**Date** 6 July 2016

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**Appendix 1 - Protection of Trees on Development Sites**

**Appendix 2 - Detail on trees at periphery of sites (extract of previous report)**

# 1. INTRODUCTION

CDS-JV has commissioned Australian Tree Consultants Pty Ltd (ATC) to prepare an Arboricultural report of four surface works areas and to demonstrate compliance with the Infrastructure Approval SSI6788, in particular condition B63.

Australian Tree Consultants Pty Ltd undertook the site inspections on 29<sup>th</sup> April, 3<sup>rd</sup> May 2016 and between 19<sup>th</sup>– 27<sup>th</sup> May, 2016. Inspections and all field work were undertaken by Hugh Taylor Consulting Arborist for Australian Tree Consultants.

The four surface works areas that are included in this arboricultural report are:

- Bexley Surface Works Area (including but not limited to C4, C5 & C6)
- Arncliffe Surface Works Area (including but not limited to C7)
- St Peters Interchange Surface Works Area (including but not limited to C8, C9, C10 & C11)
- Kingsgrove Surface Works Area (including but not limited C1, C2, C3)

# 2. METHODOLOGY

All directions on tree locations and proposed works were received by ATC via emails from CDS-JV on 28<sup>th</sup> April. Sites were then inspected and data collected to formalize this Arboricultural report. Australian Tree Consultants is an independent Consulting Arborist company and all staff is qualified to AQF Level 5. The consent authority has requested that all surface work sites be inspected by a consulting arborist and that the following Arboricultural report contain:-

- A visual tree assessment with input from the design, landscape architect, construction team.
- Consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services.
- Measures to avoid the removal of trees or minimize damage to existing trees and to ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, excavation works, site controls on waste disposal, vehicular access, the storage of materials and protection of public utilities.

Trees were located with our GNSS sub cm survey equipment. All data is collected in Map Zone 56 and Map Grid of Australia.



### 3. TREE PROTECTION

With the data collected on each tree, the Tree Protection Zone and Structural Root Zones have been calculated. The Tree Protection Zone (TPZ) is the means by which to protect trees on development sites and should protect both roots and crown spread simultaneously. The TPZ should be considered as sacrosanct, that is it should be isolated from any construction disturbance unless previously agreed with the Project Arborist. The dimensions of the TPZ are determined from the Diameter of the Tree at Breast Height (DBH).

The Structural Root Zone (SRZ) is an area considered essential for tree stability: loss of roots in this area is likely to cause the tree to become unstable in the ground. The dimensions of the SRZ are determined from the Diameter of the Tree taken above the root flare. Australian Standard - Protection Trees on Development Sites (AS4970-2009).

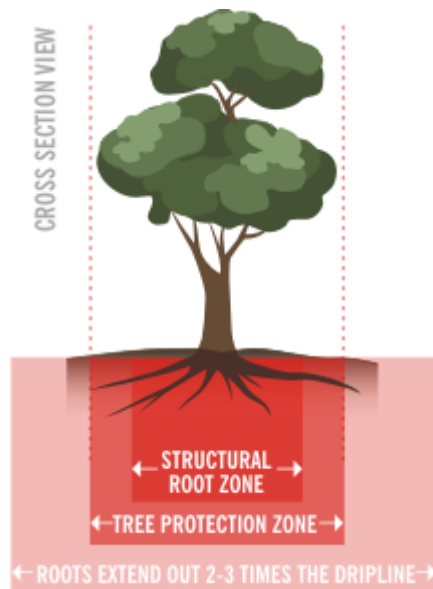


Fig 1. TPZ and SRZ protection zones.

Retained vegetation should be protected by the implementation of No-Go Zones (at the extent of the TPZ or greater). Entry to No Go Zones must be via a permit system only, that includes specific controls related to the reason of incursion. Any excavation within the TPZ or the SRZ must be approved by the Project's consulting arborist prior to any works within this area. See Appendix 1. Tree Protection on Construction Sites.

## 4. RESULTS & RECOMMENDATIONS

### a. Site 1: Bexley Rd Surface Works Area



Map 1. Bexley Rd Surface Works Area.

The Site was inspected on 3<sup>rd</sup> and 25<sup>th</sup> May 2016. Trees located within the Bexley Road surface works area require either removal or directional pruning of branches that overhang into the proposed site areas.

In total seventy (70) trees were surveyed within the proposed work areas or within close proximity to the work areas.

The following is a summary of findings for the Bexley Rd Compounds.

- A total of seventy (70) trees surveyed and data recorded. Of the 70 trees surveyed forty two (42) trees were given GNSS locations as the same species of trees located close together with similar health and structure (they have been grouped together).
- Native trees made up fifty-seven (57) of the total trees.
- Non-native and weed species made up the other trees.

- Fifty-one (51) trees were in good health. Sixteen (16) trees were in moderate health and two (2) trees were in poor health. One (1) tree was dead and in a hazardous condition and should be removed prior to any works being undertaken.
- Thirty (30) trees can be retained. Thirteen (13) of these trees require directional pruning to allow for fence line clearances.
- Removal of forty (40) trees is required for construction of the compounds. The majority of the removals are within the Bexley South Site (C5).

**Recommendations: Bexley Surface Works Area (including C4, C5 & C6)**

- All trees along the boundary fence lines of the sites to be laterally reduced to minimize overhang of foliage into site.
- All tree work is to be undertaken to AS 4373 "Pruning of Amenity Trees".
- Retained trees may require pruning for maintenance and access requirements and if pruning is required works will be undertaken AS 4373 "Pruning of Amenity Trees".
- All tree material to be mulched and taken off site and stored for landscaping use or disposal.



Map 2. Bexley Trees surveyed. Red dot denotes tree removal. Green dot denotes tree retention.

## BEXLEY SURFACE WORKS AREA

Trees to be removed (40)

Trees to be retained ( 30)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
1	1	<i>Lagerstroemia indica</i>	5	4	150	MODERATE	GOOD	2	1.5	Fenceline Clearance	Remove	325377.367	6243375.302	16.807
2	1	<i>Jacaranda mimosifolia</i>	15	10	300	GOOD	GOOD	3.6	2	Fenceline Clearance	Remove	325377.478	6243379.334	17.627
3	1	<i>Castanospermum australe</i>	13	10	300	GOOD	GOOD	3.6	2	Fenceline Clearance	Remove	325379.192	6243384.445	17.685
4	2	<i>Xylosma japonica</i>	8	7	300	GOOD	GOOD	3.6	2	Neighbouring Tree	Retain and lateral prune	325368.688	6243391.724	17.072
5	3	<i>Syzygium luehmannii</i>	12	8	350	GOOD	GOOD	4.2	2.13	Neighbouring Tree	Retain and lateral prune	325365.592	6243406.464	17.687
6	1	<i>Corymbia maculata</i>	18	12	600	GOOD	GOOD	7.2	2.67	Neighbouring Tree	Retain and lateral prune	325358.014	6243429.063	19.511
7	1	<i>Eucalyptus microcorys</i>	16	11	500	GOOD	MODERATE	6	2.47	Neighbouring Tree	Retain and lateral prune	325354.591	6243438.532	20.817
8	1	<i>Mixed weed species</i>	6	6	150	MODERATE	MODERATE	2	1.5	Neighbouring Tree	Retain and lateral prune	325355.149	6243453.072	16.601
9	4	<i>Lophostemon confertus</i>	12	5	250	GOOD	GOOD	3	1.85	Boundary Tree	No work required	325389.335	6243360.488	16.041
10	1	<i>Acacia species</i>	8	8	250	GOOD	GOOD	3	1.85	Boundary Tree	No work required	325432.654	6243367.031	16.666
11	1	<i>Dead eucalyptus</i>	8	2	250	POOR	MODERATE	3	1.85	Boundary Tree	No work required	325508.009	6243344.932	16.454
12	1	<i>Corymbia gummifera</i>	4	2	150	GOOD	GOOD	2	1.5	Boundary Tree	No work required	325512.745	6243352.504	17.892
13	1	<i>Eucalyptus tereticornis</i>	25	15	800	GOOD	GOOD	9.6	3.01	Boundary Tree	No work required	325517.033	6243350.678	18.812
14	2	<i>Eucalyptus species</i>	3	2	150	GOOD	GOOD	2	1.5	Boundary Tree	No work required	325515.624	6243363.081	18.753
15	1	<i>Eucalyptus tereticornis</i>	16	12	300	GOOD	GOOD	3.6	2	Boundary Tree	No work required	325518.521	6243369.044	20.711

## BEXLEY SURFACE WORKS AREA

Trees to be removed (40)

Trees to be retained ( 30)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
16	1	<i>Eucalyptus tereticornis</i>	12	4	250	GOOD	GOOD	3	1.85	Boundary Tree	No work required	325528.986	6243364.073	19.631
17	1	<i>Mixed weed species</i>	5	5	200	MODERATE	MODERATE	2	1.5	Boundary Tree	No work required	325538.049	6243352.844	19.449
18	1	<i>Cupressus macrocarpa</i>	15	8	600	GOOD	GOOD	7.2	2.67	Boundary Tree	No work required	325543.822	6243341.92	25.653
19	1	<i>Melia azedarach</i>	4	2	150	GOOD	GOOD	2	1.5	Construction	Remove	325536.672	6243330.148	16.339
20	1	<i>Eucalyptus species</i>	6	3	200	GOOD	GOOD	2	1.5	Construction	Remove	325538.837	6243327.228	17.65
21	1	<i>Eucalyptus species</i>	5	5	150	GOOD	MODERATE	2	1.5	Construction	Remove	325551.369	6243318.397	16.77
22	1	<i>Mixed weed species</i>	7	5	150	MODERATE	MODERATE	2	1.5	Fenceline Clearance	Remove	325570.204	6243345.929	18.01
23	1	<i>Lophostemon confertus</i>	16	10	700	POOR	MODERATE	8.4	2.85	Construction	Remove	325580.595	6243340.726	18.198
24	1	<i>Lophostemon confertus</i>	16	8	600	GOOD	GOOD	7.2	2.67	Boundary Tree	No work required	325598.893	6243342.357	23.437
25	1	<i>Angophora costata</i>	17	14	600	MODERATE	MODERATE	7.2	2.67	Boundary Tree	No work required	325609.532	6243338.337	25.167
26	2	<i>Eucalyptus saligna</i>	17	4	300	GOOD	GOOD	3.6	2	Construction	Remove	325609.367	6243326.272	18.95
27	1	<i>Eucalyptus robusta</i>	17	16	500	GOOD	GOOD	6	2.47	Retain - Prune northern side of canopy as required	Retain and lateral prune	325579.598	6243267.715	7.475
28	3	<i>Eucalyptus robusta</i>	10	4	300	GOOD	GOOD	3.6	2	Retain - Prune northern side of canopy as required	Retain and lateral prune	325584.415	6243274.411	10.515
29	1	<i>Acacia parramattensis</i>	13	8	250	GOOD	GOOD	3	1.85	Boundary Tree	No work required	325522.752	6243251.724	13.08
30	1	<i>Acacia parramattensis</i>	6	4	250	GOOD	GOOD	3	1.85	Construction	Remove	325507.991	6243265.87	12.776

## BEXLEY SURFACE WORKS AREA

Trees to be removed (40)

Trees to be retained ( 30)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
31	1	<i>Group planting of palms</i>	3	2	200	GOOD	GOOD	2	1.5	Construction	Remove	325501.865	6243248.467	11.967
32	1	<i>Eucalyptus cinerea</i>	7	5	200	GOOD	MODERATE	2	1.5	Construction	Remove	325507.279	6243238.385	10.598
33	2	<i>Eucalyptus species</i>	4	2	150	GOOD	GOOD	2	1.5	Construction	Remove	325514.455	6243240.171	12.983
34	3	<i>Acacia parramattensis</i>	8	7	250	GOOD	GOOD	3	1.85	Construction	Remove	325526.124	6243226.008	8.726
35	2	<i>Erythrina crista - galli</i>	7	9	400	MODERATE	POOR	4.8	2.25	Construction	Remove	325536.354	6243230.625	8.419
36	1	<i>Eucalyptus cinerea</i>	3	1	150	MODERATE	MODERATE	2	1.5	Construction	Remove	325540.744	6243233.722	9.628
37	1	<i>Corymbia maculata</i>	12	3	200	GOOD	GOOD	2	1.5	Construction	Remove	325539.158	6243232.983	10.195
38	1	<i>Eucalyptus species</i>	4	4	250	GOOD	MODERATE	3	1.85	Construction	Remove	325464.128	6243249.026	11.8
39	8	<i>Livistona australis</i>	4	3	250	GOOD	GOOD	3	1.85	Construction	Remove	325453.168	6243253.92	12.703
40	1	<i>Casuarina cunninghamiana</i>	14	7	500	GOOD	MODERATE	6	2.47	Construction	Remove	325451.453	6243247.335	10.432
41	8	<i>Acacia species</i>	4	8	150	MODERATE	MODERATE	2	1.5	Construction	Remove	325423.551	6243259.358	11.689
42	1	<i>Erythrina crista - galli</i>	8	8	300	MODERATE	MODERATE	3.6	2	Neighbouring Tree	Retain and lateral prune	325427.201	6243242.381	9.591





The following is a summary of findings for the Arncliffe surface works area:

- A total of three hundred and thirty seven (337) trees were surveyed and data recorded. Of the 337 trees surveyed two hundred and sixty five (265) were given GNSS locations as same species trees located close together and with similar health and structure have been grouped together.
- Native trees made up two hundred and eighty eight (288) of the trees. *Melaleuca quinquenervia* and Casuarina trees were the dominant tree species within this site.
- Non-native and weed species made up the other trees.
- Two hundred and fifty eight (258) trees were in good health. Fifty eight (58) trees were in moderate health and twenty one (21) trees were in poor health.
- Thirty seven (37) trees can be retained. Thirty (30) of these trees require directional pruning for clearance of the boundary fence line.
- Removal of three hundred (300) trees is required and reasons for removal are listed below:

<b>Reason for trees removal</b>	<b>Trees to be removed</b>
Decline area	33
Fence line clearance	32
Internal haul roads	107
ASS treatment and Stockpile area	40
Office area	5
Permanent facilities	22
Shed area	22
Site parking	29
Site storage	4
Tunnel support equipment	6
<b>Total trees to be removed</b>	<b>300</b>

- Note: *Melaleuca quinquenervia* will be very hard to replace due to Myrtle rust fungus within Australia now severely affecting *Melaleuca* sp trees. Most plant nurseries now will not sell *Melaleuca quinquenervia* so a different species of native tree will be required to replace these trees.

## **Summary Arncliffe Surface Works Area:**

This site is located within Kogarah Golf Course. The site inspection with representatives from CDS-JV identified trees along the boundary fence line of the works area that either needed removal or lateral branch removal to allow for the installation of boundary fences. See extract of previous report in Appendix 2 of this document for pruning specifications on the marked trees.

Trees represented as numbers 208-246 at Arncliffe in the south-eastern end of the compound (C7) are in an area designated for the treatment and storage of acid sulfate soils and storage of topsoil (refer to Map 4 – Arncliffe Site Establishment Layout). Arncliffe construction compound includes soils that are classified as acid sulfate soils. CDS-JV will need to treat PASS on site, particularly during the excavation of the shaft (3,000 m<sup>3</sup>) and decline (~24,000m<sup>3</sup>). These are bank figures and equate to approximately 40,000m<sup>3</sup> when excavated. The useable area of site in this section is approximately 12600m<sup>2</sup> (taking into account clearance from hoarding and other works). This equates to a 3metre high stockpile for the area (as such we will require all of this area for treatment and storage). This area is located close to the WTP to capture and treat water run-off from the stockpile and treatment area.

Trees represented as numbers 41-54 & 56-59 are adjacent to the decline and haul road (refer to Map 3 - Arncliffe Site Construction Compound). There is ~3metres between the sheetpiles for the decline and the site boundary in this area which means that most of these trees need to be removed (only tree 46 can be retained in this area). In the small space between the decline/haul road and the boundary, we are required to house a frog exclusion fencing, hoarding, a ten metre high golf ball protection netting, as well as sediment and erosion control measures. Trees 42, 43, 44 and 47 are directly outside of the site boundary (refer to Map 7), but with trunk centres within 2.35 metres of the boundary. The fence line conflicts with these trees, with piling required within the structural root zone (and under a canopy), and in some cases the fence line conflicts with the majority of the canopy of the trees. There is no possibility of retaining these trees.

## **Recommendations Arncliffe Surface Works Area:**

- All trees along the boundary fence lines of the work areas to be laterally reduced to minimize overhang of foliage into site.
- All tree work is to be undertaken to AS 4373 "Pruning of Amenity Trees".
- All tree material to be mulched and used onsite or taken off site and stored for landscaping use or disposal.
- Mulch from the *Olea europea* 'Europea' and *Salix babylonica* should be taken to a landfill site and not used on site as it will increase the risk of spread the weed species of tree.



Map 5. Arncliffe. Overall view of trees surveyed. Red dot denotes tree removal. Green dot denotes tree retention.



Map 6. Arncliffe. Close up view. Trees for removal and retention.



Map 7 Arncliffe. Close up view of trees 41-59 which are in close proximity of the decline, haul road, frog fence, hoarding and ten metre high golf ball netting



Map 8. Arncliffe. Close up view. Trees for removal and retention.

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
1	1	<i>Melaleuca quinquenervia</i>	5	4	600	GOOD	GOOD	7.2	2.67	Fenceline Clearance	Remove tree	329759.77	6243504.218	1.97
2	1	<i>Melaleuca quinquenervia</i>	6	5	600	GOOD	MODERATE	7.2	2.67	Decline area	Remove tree	329751.735	6243501.912	2.526
3	1	<i>Callistemon viminalis</i>	3	2	100	GOOD	MODERATE	2	1.5	Decline area	Remove tree	329748.55	6243497.928	1.618
4	1	<i>Melaleuca quinquenervia</i>	5	4	600	GOOD	GOOD	7.2	2.67	Decline area	Remove tree	329743.304	6243498.087	2.169
5	1	<i>Melaleuca quinquenervia</i>	5	5	600	GOOD	GOOD	7.2	2.67	Decline area	Remove tree	329737.708	6243493.359	2.09
6	1	<i>Melaleuca quinquenervia</i>	7	5	600	MODERATE	MODERATE	7.2	2.67	Decline area	Remove tree	329735.965	6243487.137	2.002
7	1	<i>Brachychiton acerifolius</i>	3	1	150	POOR	POOR	2	1.5	Officers area	Remove tree	329712.947	6243483.379	1.456
8	1	<i>Lagunaria pattersonii</i>	4	4	200	MODERATE	GOOD	2.4	1.68	Officers area	Remove tree	329704.405	6243480.272	1.817
9	1	<i>Lagunaria pattersonii</i>	4	4	250	MODERATE	GOOD	3	1.85	Officers area	Remove tree	329695.877	6243475.846	1.815
10	1	<i>Lagunaria pattersonii</i>	3	2	150	POOR	POOR	2	1.5	Officers area	Remove tree	329687.13	6243475.308	1.137
11	1	<i>Lagunaria pattersonii</i>	5	4	300	GOOD	MODERATE	3.6	2	Officers area	Remove tree	329684.047	6243472.992	1.406
12	1	<i>Melaleuca quinquenervia</i>	5	5	600	MODERATE	MODERATE	7.2	2.67	Site Parking area	Remove tree	329685.784	6243464.53	1.437
13	1	<i>Melaleuca quinquenervia</i>	4	4	600	MODERATE	MODERATE	7.2	2.67	Site Parking area	Remove tree	329681.669	6243460.89	1.667
14	1	<i>Melaleuca quinquenervia</i>	5	5	600	MODERATE	MODERATE	7.2	2.67	Site Parking area	Remove tree	329680.571	6243468.305	1.2
15	1	<i>Melaleuca quinquenervia</i>	5	4	700	MODERATE	MODERATE	8.4	2.85	Site Parking area	Remove tree	329673.898	6243468.942	3.819
16	1	<i>Melaleuca quinquenervia</i>	6	5	600	GOOD	MODERATE	7.2	2.67	Site Parking area	Remove tree	329648.151	6243453.505	1.649
17	1	<i>Melaleuca quinquenervia</i>	5	4	500	GOOD	MODERATE	6	2.47	Site Parking area	Remove tree	329649.801	6243449.743	1.374
18	1	<i>Melaleuca quinquenervia</i>	7	6	700	GOOD	MODERATE	8.4	2.85	Site Parking area	Remove tree	329645.19	6243445.782	1.551
19	1	<i>Melaleuca quinquenervia</i>	10	7	700	GOOD	MODERATE	8.4	2.85	Site Parking area	Remove tree	329641.748	6243446.18	1.838
20	1	<i>Melaleuca quinquenervia</i>	9	3	300	GOOD	MODERATE	3.6	2	Site Parking area	Remove tree	329641.354	6243446.412	2.089
21	1	<i>Melaleuca quinquenervia</i>	12	9	700	GOOD	MODERATE	8.4	2.85	Site Parking area	Remove tree	329640.148	6243445.315	1.935
22	1	<i>Melaleuca quinquenervia</i>	9	7	400	GOOD	MODERATE	4.8	2.25	Site Parking area	Remove tree	329638.096	6243443.676	1.923
23	1	<i>Melaleuca quinquenervia</i>	8	6	400	GOOD	POOR	4.8	2.25	Site Parking area	Remove tree	329639.37	6243442.437	1.671
24	1	<i>Melaleuca quinquenervia</i>	5	4	400	GOOD	MODERATE	4.8	2.25	Site Parking area	Remove tree	329625.578	6243430.571	2.018
25	1	<i>Melaleuca quinquenervia</i>	9	6	400	GOOD	MODERATE	4.8	2.25	Site Parking area	Remove tree	329619.426	6243430.694	1.814
26	1	<i>Melaleuca quinquenervia</i>	9	6	500	GOOD	MODERATE	6	2.47	Site Parking area	Remove tree	329614.588	6243431.678	1.536
27	1	<i>Melaleuca quinquenervia</i>	12	9	700	GOOD	MODERATE	8.4	2.85	Site Parking area	Remove tree	329613.524	6243426.066	1.368
28	1	<i>Melaleuca quinquenervia</i>	9	7	500	GOOD	MODERATE	6	2.47	Site Parking area	Remove tree	329608.679	6243426.248	1.542
29	1	<i>Melaleuca quinquenervia</i>	9	7	500	GOOD	MODERATE	6	2.47	Site Parking area	Remove tree	329609.666	6243422.422	2.454
30	1	<i>Melaleuca quinquenervia</i>	11	7	600	GOOD	MODERATE	7.2	2.67	Site Parking area	Remove tree	329606.173	6243421.296	1.289
31	1	<i>Casuarina glauca</i>	10	9	400	MODERATE	MODERATE	4.8	2.25	Site Parking area	Remove tree	329598.834	6243422.542	2.033

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
32	1	<i>Eucalyptus robusta</i>	9	6	300	GOOD	POOR	3.6	2	Site Parking area	Remove tree	329597.916	6243412.835	1.477
33	1	<i>Casuarina glauca</i>	12	9	500	GOOD	MODERATE	6	2.47	Site Parking area	Remove tree	329589.443	6243413.889	2.127
34	1	<i>Casuarina glauca</i>	13	9	450	GOOD	MODERATE	5.4	2.37	Site Parking area	Remove tree	329592.169	6243405.208	1.566
35	1	<i>Melaleuca quinquenervia</i>	5	4	350	GOOD	MODERATE	4.2	2.13	Site Parking area	Remove tree	329593.485	6243400.714	2.243
36	1	<i>Melaleuca quinquenervia</i>	6	5	500	GOOD	MODERATE	6	2.47	Site Parking area	Remove tree	329587.488	6243401.075	1.213
37	1	<i>Tristaniopsis laurina</i>	3	1	100	MODERATE	MODERATE	2	1.5	Site Parking area	Remove tree	329587.065	6243395.298	1.172
38	1	<i>Populus nigra 'itallica'</i>	12	4	300	MODERATE	POOR	3.6	2	Site Parking area	Remove tree	329579.994	6243392.114	1.224
39	1	<i>Populus nigra 'itallica'</i>	9	2	250	MODERATE	POOR	3	1.85	Site Parking area	Remove tree	329573.098	6243380.93	1.216
40	1	<i>Populus nigra 'itallica'</i>	10	2	200	MODERATE	POOR	2.4	1.68	Site Parking area	Remove tree	329570.63	6243376.849	1.027
41	1	<i>Melaleuca quinquenervia</i>	5	7	450	GOOD	MODERATE	5.4	2.37	Decline area	Remove tree	329687.807	6243434.448	1.894
42	2	<i>Melaleuca quinquenervia</i>	5	7	450	GOOD	MODERATE	5.4	2.37	Decline area	Remove tree	329690.941	6243426.938	1.935
43	3	<i>Agonis flexuosa</i>	8	12	1000	GOOD	POOR	12	3.31	Decline area	Remove tree	329679.928	6243415.535	3.921
44	4	<i>Melaleuca quinquenervia</i>	9	6	600	GOOD	MODERATE	7.2	2.67	Decline area	Remove tree	329662.296	6243397.25	1.777
45	4	<i>Melaleuca quinquenervia</i>	10	9	800	GOOD	MODERATE	9.6	3.01	Decline area	Remove tree	329653.731	6243393.402	1.588
46	1	<i>Agonis flexuosa</i>	4	5	800	MODERATE	POOR	9.6	3.01	No work required	Retain	329640.559	6243377.306	1.857
47	5	<i>Casuarina glauca</i>	12	9	350	GOOD	MODERATE	4.2	2.13	Decline area	Remove tree	329635.365	6243377.044	1.561
48	1	<i>Melaleuca quinquenervia</i>	12	7	500	GOOD	MODERATE	6	2.47	Decline area	Remove tree	329631.903	6243379.875	1.514
49	1	<i>Melaleuca quinquenervia</i>	10	6	400	GOOD	MODERATE	4.8	2.25	Decline area	Remove tree	329623.63	6243378.618	1.462
50	1	<i>Melaleuca quinquenervia</i>	12	9	500	GOOD	MODERATE	6	2.47	Decline area	Remove tree	329625.497	6243373.582	1.625
51	1	<i>Melaleuca quinquenervia</i>	16	8	600	GOOD	MODERATE	7.2	2.67	Decline area	Remove tree	329610.21	6243369.106	1.425
52	1	<i>Melaleuca quinquenervia</i>	4	3	200	GOOD	MODERATE	2.4	1.68	Decline area	Remove tree	329611.386	6243365.293	1.286
53	1	<i>Melaleuca quinquenervia</i>	12	9	450	GOOD	MODERATE	5.4	2.37	Decline area	Remove tree	329598.588	6243359.231	1.77
54	1	<i>Melaleuca quinquenervia</i>	7	5	350	MODERATE	MODERATE	4.2	2.13	Decline area	Remove tree	329592.739	6243352.263	1.527
55	1	<i>Melaleuca quinquenervia</i>	9	7	400	GOOD	MODERATE	4.8	2.25	Decline area	Remove tree	329584.593	6243349.207	1.969
56	1	<i>Melaleuca quinquenervia</i>	11	7	450	MODERATE	MODERATE	5.4	2.37	Decline area	Remove tree	329581.037	6243345.629	1.889
57	6	<i>Casuarina cunninghamiana</i>	12	6	500	MODERATE	MODERATE	6	2.47	Internal haul roads	Remove tree	329571.095	6243330.195	2.226
58	1	<i>Casuarina glauca</i>	8	8	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329563.604	6243329.117	1.719
59	1	<i>Casuarina glauca</i>	8	5	400	MODERATE	POOR	4.8	2.25	Internal haul roads	Remove tree	329548.073	6243317.291	1.299
60	1	<i>Casuarina glauca</i>	12	15	1000	GOOD	MODERATE	12	3.31	Permanent facilities	Remove tree	329505.148	6243310.145	1.763
61	1	<i>Casuarina cunninghamiana</i>	15	10	450	GOOD	MODERATE	5.4	2.37	Permanent facilities	Remove tree	329502.033	6243305.276	1.575
62	1	<i>Eucalyptus robusta</i>	12	4	250	GOOD	GOOD	3	1.85	Permanent facilities	Remove tree	329494.651	6243301.613	1.356

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
63	1	<i>Eucalyptus botryoides</i>	18	16	1000	GOOD	MODERATE	12	3.31	Permanent facilities	Remove tree	329488.688	6243308.181	1.57
64	1	<i>Casuarina cunninghamiana</i>	13	8	400	GOOD	MODERATE	4.8	2.25	Permanent facilities	Remove tree	329457.114	6243311.272	4.272
65	1	<i>Casuarina cunninghamiana</i>	12	12	400	GOOD	MODERATE	4.8	2.25	Permanent facilities	Remove tree	329465.733	6243310.441	1.444
66	1	<i>Populus nigra 'itallica'</i>	12	2	250	MODERATE	POOR	3	1.85	Permanent facilities	Remove tree	329466.161	6243292.553	1.395
67	1	<i>Eucalyptus robusta</i>	14	7	300	GOOD	MODERATE	3.6	2	Permanent facilities	Remove tree	329473.243	6243301.989	2.029
68	1	<i>Ficus species</i>	4	3	200	GOOD	MODERATE	2.4	1.68	Permanent facilities	Remove tree	329479.199	6243301.6	1.623
69	1	<i>Populus nigra 'itallica'</i>	10	2	200	POOR	POOR	2.4	1.68	Permanent facilities	Remove tree	329479.292	6243294.083	1.932
70	1	<i>Casuarina glauca</i>	15	8	400	GOOD	GOOD	4.8	2.25	Permanent facilities	Remove tree	329488.272	6243298.099	3.069
71	1	<i>Casuarina glauca</i>	15	8	450	GOOD	MODERATE	5.4	2.37	Permanent facilities	Remove tree	329488.31	6243293.413	2.399
72	1	<i>Casuarina glauca</i>	12	8	400	GOOD	MODERATE	4.8	2.25	Internal haul roads	Remove tree	329499.568	6243275.394	1.625
73	1	<i>Casuarina glauca</i>	12	8	350	GOOD	MODERATE	4.2	2.13	Internal haul roads	Remove tree	329502.488	6243273.044	1.664
74	1	<i>Casuarina glauca</i>	12	8	400	GOOD	MODERATE	4.8	2.25	Internal haul roads	Remove tree	329498.904	6243261.498	1.15
75	1	<i>Casuarina glauca</i>	12	7	350	MODERATE	POOR	4.2	2.13	Internal haul roads	Remove tree	329503.003	6243259.235	0.998
76	1	<i>Casuarina glauca</i>	13	7	300	GOOD	MODERATE	3.6	2	Internal haul roads	Remove tree	329505.197	6243263.1	1.429
77	1	<i>Casuarina glauca</i>	12	7	400	MODERATE	POOR	4.8	2.25	Internal haul roads	Remove tree	329510.804	6243261.741	1.507
78	1	<i>Casuarina glauca</i>	12	7	450	MODERATE	POOR	5.4	2.37	Internal haul roads	Remove tree	329507.344	6243254.588	5.635
79	1	<i>Casuarina cunninghamiana</i>	12	12	700	GOOD	MODERATE	8.4	2.85	Internal haul roads	Remove tree	329533.506	6243247.267	5.773
80	1	<i>Casuarina cunninghamiana</i>	12	12	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329541.332	6243241.371	2.649
81	1	<i>Melaleuca quinquenervia</i>	4	4	250	POOR	POOR	3	1.85	Internal haul roads	Remove tree	329536.133	6243249.892	2.562
82	1	<i>Melaleuca quinquenervia</i>	10	8	350	GOOD	MODERATE	4.2	2.13	Internal haul roads	Remove tree	329540.984	6243251.872	1.528
83	1	<i>Flindersia australis</i>	4	5	350	GOOD	GOOD	4.2	2.13	Internal haul roads	Remove tree	329552.046	6243251.91	1.203
84	1	<i>Shinus species</i>	6	7	300	MODERATE	MODERATE	3.6	2	Internal haul roads	Remove tree	329576.378	6243270.877	1.828
85	1	<i>Shinus species</i>	12	8	1000	GOOD	MODERATE	12	3.31	Internal haul roads	Remove tree	329575.473	6243263.861	2.388
86	1	<i>Schefflera actinophylla</i>	3	3	100	GOOD	MODERATE	2	1.5	Internal haul roads	Remove tree	329578.753	6243261.823	4.864
87	1	<i>Melaleuca quinquenervia</i>	10	12	1100	GOOD	MODERATE	13.2	3.44	Internal haul roads	Remove tree	329579.106	6243258.35	4.369
88	1	<i>Callistemon species</i>	3	3	100	POOR	POOR	2	1.5	Internal haul roads	Remove tree	329577.045	6243252.527	2.775
89	1	<i>Populus species</i>	15	2	300	POOR	POOR	3.6	2	Internal haul roads	Remove tree	329573.833	6243245.802	5.796
90	1	<i>Melaleuca quinquenervia</i>	10	7	400	GOOD	MODERATE	4.8	2.25	Internal haul roads	Remove tree	329578.526	6243238.804	5.113
91	7	<i>Olea europea 'Europea'</i>	12	9	400	GOOD	MODERATE	4.8	2.25	Internal haul roads	Remove tree	329580.23	6243240.558	4.3
92	1	<i>Populus species</i>	14	2	300	MODERATE	POOR	3.6	2	Safety risk	Remove tree	329584.012	6243241.386	5.575
93	1	<i>Nerium oleander</i>	3	3	1000	GOOD	GOOD	12	3.31	Internal haul roads	Remove tree	329601.751	6243220.754	2.448



## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
94	1	<i>Olea europea 'Europea'</i>	3	3	200	GOOD	GOOD	2.4	1.68	Shed area	Remove tree	329646.368	6243210.849	4.345
95	1	<i>Casuarina cunninghamiana</i>	8	4	300	GOOD	MODERATE	3.6	2	Fenceline Clearance	Remove tree	329655.678	6243210.883	3.07
96	1	<i>Callistemon viminalis</i>	3	3	200	GOOD	MODERATE	2.4	1.68	Shed area	Remove tree	329656.033	6243206.698	2.362
97	1	<i>Syzigium</i>	3	3	150	MODERATE	MODERATE	2	1.5	Shed area	Remove tree	329657.34	6243202.66	2.433
98	1	<i>Casuarina glauca</i>	8	4	300	GOOD	MODERATE	3.6	2	Shed area	Remove tree	329656.938	6243197.675	3.132
99	1	<i>Melaleuca quinquenervia</i>	8	4	350	GOOD	MODERATE	4.2	2.13	Shed area	Remove tree	329661.138	6243194.67	2.451
100	1	<i>Acacia longifolia</i>	8	10	350	POOR	POOR	4.2	2.13	Shed area	Remove tree	329663.865	6243190.116	2.589
101	1	<i>Melaleuca quinquenervia</i>	11	4	350	GOOD	MODERATE	4.2	2.13	Shed area	Remove tree	329682.829	6243191.94	2.261
102	1	<i>Melaleuca armillaris</i>	3	3	350	POOR	POOR	4.2	2.13	Shed area	Remove tree	329693.631	6243175.963	2.472
103	1	<i>Melaleuca quinquenervia</i>	4	4	350	POOR	POOR	4.2	2.13	Shed area	Remove tree	329704.533	6243180.188	2.505
104	1	<i>Casuarina glauca</i>	8	7	350	MODERATE	POOR	4.2	2.13	Shed area	Remove tree	329717.182	6243159.247	2.642
105	1	<i>Melaleuca armillaris</i>	3	4	350	POOR	POOR	4.2	2.13	Shed area	Remove tree	329723.716	6243164.439	2.82
106	1	<i>Melaleuca armillaris</i>	3	4	350	POOR	POOR	4.2	2.13	Shed area	Remove tree	329738.088	6243165.19	3.58
107	1	<i>Melaleuca quinquenervia</i>	4	4	350	POOR	POOR	4.2	2.13	Shed area	Remove tree	329724.346	6243156.922	2.767
108	1	<i>Pinus radiata</i>	16	10	600	MODERATE	POOR	7.2	2.67	Shed area	Remove tree	329726.838	6243150.707	3.482
109	1	<i>Acacia longifolia</i>	12	14	600	POOR	POOR	7.2	2.67	Internal haul roads	Remove tree	329737.933	6243144.624	3.666
110	1	<i>Pinus radiata</i>	4	4	350	POOR	POOR	4.2	2.13	Internal haul roads	Remove tree	329739.781	6243140.448	3.904
111	1	<i>Melaleuca armillaris</i>	4	5	350	POOR	POOR	4.2	2.13	Internal haul roads	Remove tree	329749.476	6243149.019	4.122
112	1	<i>Melaleuca quinquenervia</i>	15	8	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329749.677	6243135.68	3.403
113	1	<i>Melaleuca quinquenervia</i>	12	7	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329753.168	6243133.062	5.848
114	1	<i>Melaleuca quinquenervia</i>	10	8	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329754.71	6243135.313	4.785
115	1	<i>Casuarina glauca</i>	12	8	400	MODERATE	MODERATE	4.8	2.25	Internal haul roads	Remove tree	329763.717	6243136.172	2.445
116	1	<i>Melaleuca armillaris</i>	4	4	350	POOR	POOR	4.2	2.13	No work required	Remove tree	329762.379	6243180.027	3.98
117	1	<i>Ficus hillii</i>	4	4	300	GOOD	MODERATE	3.6	2	No work required	Remove tree	329791.848	6243169.618	2.515
118	1	<i>Melaleuca quinquenervia</i>	12	10	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329766.285	6243123.044	2.432
119	1	<i>Melaleuca quinquenervia</i>	8	6	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329769.645	6243119.284	2.445
120	1	<i>Casuarina glauca</i>	10	8	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329780.904	6243126.541	3.251
121	1	<i>Casuarina glauca</i>	9	4	350	GOOD	POOR	4.2	2.13	Internal haul roads	Remove tree	329789.472	6243127.088	3.682
122	1	<i>Melaleuca quinquenervia</i>	13	8	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329782.985	6243110.995	3.739
123	1	<i>Melaleuca quinquenervia</i>	14	8	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329787.721	6243108.825	3.628
124	1	<i>Melaleuca armillaris</i>	3	2	150	GOOD	GOOD	2	1.5	Site storage	Remove tree	329797.735	6243113.885	2.823

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
125	8	<i>Melaleuca quinquenervia</i>	8	5	350	GOOD	MODERATE	4.2	2.13	Fenceline Clearance	Remove tree	329805.391	6243099.076	2.676
126	9	<i>Melaleuca quinquenervia</i>	8	10	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Remove tree	329804.87	6243092.192	2.486
127	3	<i>Melaleuca quinquenervia</i>	9	8	350	GOOD	MODERATE	4.2	2.13	Fenceline Clearance	Retain and prune	329812.911	6243073.652	3.401
128	1	<i>Eucalyptus species</i>	4	4	150	POOR	POOR	2	1.5	Fenceling Clearance. Trees in poor condition and not worth retaining	Remove tree	329787.787	6242998.192	2.403
129	1	<i>Casuarina glauca</i>	15	16	600	GOOD	MODERATE	7.2	2.67	Fenceline	No work required	329722.194	6242985.974	4.298
130	1	<i>Melaleuca quinquenervia</i>	8	12	450	GOOD	POOR	5.4	2.37	Fenceline Clearance	Retain and lateral prune	329720.012	6242993.648	4.356
131	10	<i>Melaleuca quinquenervia</i>	8	7	500	GOOD	POOR	6	2.47	Fenceline Clearance	Retain and lateral prune	329714.119	6243001.578	3.34
132	11	<i>Melaleuca quinquenervia</i>	8	9	450	GOOD	MODERATE	5.4	2.37	Fenceling Clearance. Trees in poor condition and not worth retaining	Remove tree	329706.729	6243008.739	3.703
133	1	<i>Eucalyptus robusta</i>	4	3	200	GOOD	MODERATE	2.4	1.68	Fenceline	No work required	329654.611	6243046.529	2.709
134	1	<i>Eucalyptus robusta</i>	4	3	200	MODERATE	GOOD	2.4	1.68	Utilities	Remove tree	329642.72	6243062.288	2.221
135	1	<i>Stenocarpus sinuatus</i>	4	4	200	GOOD	GOOD	2.4	1.68	Utilities	Remove tree	329634.184	6243069.476	2.054
136	1	<i>Melaleuca quinquenervia</i>	10	7	500	GOOD	MODERATE	6	2.47	Utilities	Remove tree	329625.531	6243074.846	2.078
137	1	<i>Melaleuca quinquenervia</i>	10	8	500	GOOD	MODERATE	6	2.47	Fenceline Clearance	Retain and lateral prune	329619.978	6243073.168	2.081
138	1	<i>Eucalyptus species</i>	4	4	250	POOR	POOR	3	1.85	Utilities	Remove tree	329619.309	6243083.022	1.993
139	1	<i>Araucaria columnaris</i>	4	2	250	GOOD	GOOD	3	1.85	Fenceline	No work required	329613.925	6243079.016	3.363
140	1	<i>Callistemon viminalis</i>	8	4	300	GOOD	MODERATE	3.6	2	Internal haul roads	Remove tree	329607.866	6243093.117	3.011
141	1	<i>Melaleuca quinquenervia</i>	16	12	900	GOOD	MODERATE	10.8	3.17	Internal haul roads	Remove tree	329600.128	6243100.204	2.161
142	1	<i>Melaleuca quinquenervia</i>	10	8	550	GOOD	MODERATE	6.6	2.57	Internal haul roads	Remove tree	329591.285	6243106.09	1.089
143	1	<i>Melaleuca quinquenervia</i>	14	10	800	GOOD	MODERATE	9.6	3.01	Shed area	Remove tree	329588.966	6243116.523	2.369
144	1	<i>Melaleuca quinquenervia</i>	12	8	700	GOOD	MODERATE	8.4	2.85	Shed area	Remove tree	329580.545	6243113.622	1.758
145	1	<i>Eucalyptus nicholii</i>	7	9	450	GOOD	POOR	5.4	2.37	Fenceling Clearance. Trees in poor condition and not worth retaining	Remove tree	329571.934	6243110.029	1.486
146	1	<i>Angophora costata</i>	12	8	350	MODERATE	MODERATE	4.2	2.13	Shed area	Remove tree	329568.781	6243123.026	2.491
147	1	<i>Eucalyptus robusta</i>	10	8	300	GOOD	MODERATE	3.6	2	Shed area	Remove tree	329569.935	6243128.697	2.131
148	1	<i>Stenocarpus sinuatus</i>	3	1	150	MODERATE	POOR	2	1.5	Fenceline	No work required	329547.76	6243128.209	2.05
149	1	<i>Pinus radiata</i>	14	15	450	GOOD	MODERATE	5.4	2.37	Fenceline	No work required	329540.979	6243128.519	2.019

# ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
150	1	<i>Corymbia citriodora</i>	16	9	350	GOOD	GOOD	4.2	2.13	Shed area	Remove tree	329545.109	6243135.431	2.068
151	1	<i>Brachychiton acerifolius</i>	6	3	250	GOOD	GOOD	3	1.85	Shed area	Remove tree	329559.688	6243144.331	1.925
152	1	<i>Callistemon species</i>	4	3	250	MODERATE	MODERATE	3	1.85	Shed area	Remove tree	329559.405	6243150.749	1.58
153	1	<i>Corymbia citriodora</i>	16	12	450	GOOD	GOOD	5.4	2.37	Shed area	Remove tree	329554.681	6243148.199	2.448
154	1	<i>Casuarina glauca</i>	14	12	600	GOOD	MODERATE	7.2	2.67	Internal haul roads	Remove tree	329557.475	6243175.398	1.473
155	1	<i>Casuarina glauca</i>	12	3	250	GOOD	MODERATE	3	1.85	Internal haul roads	Remove tree	329556.437	6243170.199	1.116
156	1	<i>Tristaniopsis laurina</i>	4	5	250	GOOD	GOOD	3	1.85	Internal haul roads	Remove tree	329550.318	6243162.537	1.418
157	1	<i>Melaleuca quinquenervia</i>	6	3	300	POOR	POOR	3.6	2	Internal haul roads	Remove tree	329547.589	6243157.812	6.199
158	1	<i>Melaleuca quinquenervia</i>	14	16	800	GOOD	MODERATE	9.6	3.01	Internal haul roads	Remove tree	329544.663	6243153.401	2.627
159	1	<i>Melaleuca quinquenervia</i>	12	12	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329540.132	6243149.561	2.412
160	1	<i>Melaleuca quinquenervia</i>	17	14	1200	GOOD	MODERATE	14.4	3.57	Internal haul roads	Remove tree	329533.983	6243147.429	5.776
161	13	<i>Melaleuca quinquenervia</i>	12	9	500	GOOD	MODERATE	6	2.47	Fenceline Clearance	Retain and lateral prune	329530.531	6243146.318	2.034
162	1	<i>Casuarina glauca</i>	15	10	350	GOOD	MODERATE	4.2	2.13	Fenceline	No work required	329468.276	6243210.873	1.519
163	1	<i>Casuarina glauca</i>	15	9	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Retain and lateral prune	329454.772	6243222.294	0.29
164	1	<i>Casuarina glauca</i>	15	10	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Retain and lateral prune	329439.423	6243240.462	2.066
165	1	<i>Callistemon viminalis</i>	4	4	250	GOOD	MODERATE	3	1.85	Permanent facilities	Remove tree	329497.05	6243224.554	4.538
166	1	<i>Melaleuca quinquenervia</i>	8	7	1200	GOOD	MODERATE	14.4	3.57	Permanent facilities	Remove tree	329500.301	6243229.338	1.735
167	1	<i>Melaleuca armillaris</i>	9	4	250	MODERATE	MODERATE	3	1.85	Permanent facilities	Remove tree	329505.404	6243221	2.441
168	1	<i>Lagunaria pattersonii</i>	14	7	350	GOOD	GOOD	4.2	2.13	Permanent facilities	Remove tree	329508.937	6243225.929	2.384
169	1	<i>Eucalyptus crebra</i>	16	12	300	GOOD	MODERATE	3.6	2	Permanent facilities	Remove tree	329511.921	6243226.376	2.747
170	1	<i>Melaleuca quinquenervia</i>	15	10	900	GOOD	MODERATE	10.8	3.17	Permanent facilities	Remove tree	329516.124	6243229.49	2.968
171	1	<i>Melaleuca quinquenervia</i>	14	10	1200	GOOD	MODERATE	14.4	3.57	Permanent facilities	Remove tree	329515.749	6243220.994	2.786
172	1	<i>Callistemon viminalis</i>	4	4	300	GOOD	GOOD	3.6	2	Permanent facilities	Remove tree	329517.014	6243213.764	4.475
173	1	<i>Lagunaria pattersonii</i>	12	4	250	GOOD	GOOD	3	1.85	Permanent facilities	Remove tree	329523.117	6243222.285	2.15
174	1	<i>Eucalyptus nicholii</i>	8	2	250	POOR	MODERATE	3	1.85	Permanent facilities	Remove tree	329523.189	6243218.036	1.404
175	1	<i>Unknown species</i>	8	8	300	MODERATE	GOOD	3.6	2	Utilities	Remove tree	329526.399	6243216.62	1.576
176	1	<i>Unknown species</i>	8	8	300	MODERATE	GOOD	3.6	2	Utilities	Remove tree	329526.52	6243208.2	0.769
177	1	<i>Acacia podalirifolia</i>	5	4	200	MODERATE	GOOD	2.4	1.68	Internal haul roads	Remove tree	329558.975	6243226.327	1.407
178	1	<i>Eucalyptus species</i>	3	4	200	MODERATE	MODERATE	2.4	1.68	Internal haul roads	Remove tree	329559.344	6243223.851	2.527
179	1	<i>Salix babylonica</i>	5	3	350	MODERATE	POOR	4.2	2.13	Internal haul roads	Remove tree	329548.573	6243220.986	1.516

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
180	1	<i>Brachychiton acerifolius</i>	3	2	150	GOOD	MODERATE	2	1.5	Internal haul roads	Remove tree	329553.582	6243219.333	2.276
181	1	<i>Eucalyptus species</i>	13	12	700	GOOD	GOOD	8.4	2.85	Internal haul roads	Remove tree	329553.641	6243214.43	2.453
182	1	<i>Angophora floribunda</i>	4	2	150	GOOD	GOOD	2	1.5	Internal haul roads	Remove tree	329558.445	6243207.186	2.401
183	1	<i>Eucalyptus robusta</i>	9	10	350	GOOD	POOR	4.2	2.13	Internal haul roads	Remove tree	329553.166	6243191.951	1.933
184	1	<i>Melaleuca quinquenervia</i>	12	12	700	MODERATE	MODERATE	8.4	2.85	Internal haul roads	Remove tree	329560.704	6243163.858	2.78
185	1	<i>Melaleuca quinquenervia</i>	10	10	700	GOOD	MODERATE	8.4	2.85	Internal haul roads	Remove tree	329568.827	6243145.99	1.722
186	1	<i>Melaleuca quinquenervia</i>	15	14	1200	GOOD	MODERATE	14.4	3.57	Internal haul roads	Remove tree	329575.652	6243138.653	1.42
187	1	<i>Eucalyptus nicholii</i>	6	3	300	MODERATE	MODERATE	3.6	2	Internal haul roads	Remove tree	329617.453	6243159.792	2.811
188	1	<i>Shinus ariera</i>	6	8	450	GOOD	GOOD	5.4	2.37	Internal haul roads	Remove tree	329625.123	6243168.653	2.463
189	1	<i>Melaleuca quinquenervia</i>	4	2	200	GOOD	GOOD	2.4	1.68	Internal haul roads	Remove tree	329640.423	6243165.694	3.847
190	1	<i>Acacia longifolia</i>	6	4	250	GOOD	POOR	3	1.85	Internal haul roads	Remove tree	329642.145	6243162.156	3.308
191	1	<i>Shinus areira</i>	3	3	200	GOOD	MODERATE	2.4	1.68	Internal haul roads	Remove tree	329642.417	6243158.011	2.85
192	1	<i>Acacia species</i>	9	6	300	MODERATE	POOR	3.6	2	Internal haul roads	Remove tree	329652.257	6243154.385	2.976
193	1	<i>Corymbia maculata</i>	18	14	500	GOOD	GOOD	6	2.47	Internal haul roads	Remove tree	329628.985	6243157.655	1.562
194	1	<i>Corymbia maculata</i>	16	8	500	MODERATE	POOR	6	2.47	Internal haul roads	Remove tree	329625.235	6243157.994	3.572
195	1	<i>Eucalyptus microcorys</i>	6	5	250	POOR	POOR	3	1.85	Internal haul roads	Remove tree	329624.035	6243152.094	2.984
196	1	<i>Melaleuca quinquenervia</i>	16	16	600	GOOD	MODERATE	7.2	2.67	Internal haul roads	Remove tree	329617.249	6243150.001	4.424
197	1	<i>Melaleuca quinquenervia</i>	15	12	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329631.708	6243149.921	2.031
198	1	<i>Eucalyptus robusta</i>	14	10	400	GOOD	MODERATE	4.8	2.25	Internal haul roads	Remove tree	329636.908	6243146.535	2.841
199	1	<i>Melaleuca quinquenervia</i>	16	16	700	GOOD	MODERATE	8.4	2.85	Internal haul roads	Remove tree	329630.528	6243137.315	2.657
200	1	<i>Melaleuca quinquenervia</i>	10	14	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329622.314	6243138.581	2.59
201	1	<i>Melaleuca quinquenervia</i>	14	12	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329627.195	6243126.799	2.701
202	1	<i>Melaleuca quinquenervia</i>	15	15	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329648.334	6243100.749	2.273
203	1	<i>Leptospermum petersonii</i>	3	2	100	MODERATE	POOR	2	1.5	Internal haul roads	Remove tree	329659.807	6243097.486	1.941
204	1	<i>Casuarina glauca</i>	16	12	700	GOOD	MODERATE	8.4	2.85	Internal haul roads	Remove tree	329691.16	6243079.521	2.406
205	1	<i>Melaleuca quinquenervia</i>	12	12	600	GOOD	MODERATE	7.2	2.67	Internal haul roads	Remove tree	329693.739	6243072.855	2.344
206	1	<i>Casuarina glauca</i>	16	14	700	GOOD	GOOD	8.4	2.85	Internal haul roads	Remove tree	329712.004	6243057.588	4.324
207	1	<i>Melaleuca quinquenervia</i>	15	12	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329717.875	6243055.115	2.672
208	1	<i>Casuarina glauca</i>	15	8	550	GOOD	GOOD	6.6	2.57	ASS Treatment and Stockpile	Remove tree	329720.528	6243047.887	2.378
209	1	<i>Lagunaria pattersonii</i>	15	8	500	GOOD	GOOD	6	2.47	ASS Treatment and Stockpile	Remove tree	329728.039	6243057.586	4.452

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
210	1	<i>Melaleuca quinquenervia</i>	17	8	350	GOOD	MODERATE	4.2	2.13	ASS Treatment and Stockpile	Remove tree	329729.91	6243062.99	2.966
211	1	<i>Casuarina glauca</i>	14	12	600	GOOD	MODERATE	7.2	2.67	ASS Treatment and Stockpile	Remove tree	329744.934	6243037.674	2.183
212	1	<i>Eucalyptus saligna</i>	23	15	800	GOOD	MODERATE	9.6	3.01	ASS Treatment and Stockpile	Remove tree	329752.81	6243028.638	2.754
213	1	<i>Eucalyptus punctata</i>	14	12	250	GOOD	MODERATE	3	1.85	ASS Treatment and Stockpile	Remove tree	329751.811	6243045.147	3.126
214	1	<i>Casuarina glauca</i>	16	14	700	GOOD	MODERATE	8.4	2.85	ASS Treatment and Stockpile	Remove tree	329741.501	6243049.297	1.148
215	1	<i>Pinus radiata</i>	6	3	250	MODERATE	MODERATE	3	1.85	ASS Treatment and Stockpile	Remove tree	329746.361	6243055.854	3.408
216	1	<i>Melaleuca quinquenervia</i>	13	8	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329752.909	6243057.832	3.051
217	1	<i>Melaleuca quinquenervia</i>	10	9	500	MODERATE	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329761.514	6243053.098	3.878
218	1	<i>Melaleuca quinquenervia</i>	14	6	400	GOOD	MODERATE	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329772.824	6243044.46	3.985
219	1	<i>Pinus radiata</i>	12	3	200	MODERATE	MODERATE	2.4	1.68	ASS Treatment and Stockpile	Remove tree	329767.941	6243037.921	2.68
220	1	<i>Melaleuca quinquenervia</i>	12	8	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329773.613	6243035.584	4.153
221	1	<i>Melaleuca quinquenervia</i>	15	15	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329781.021	6243042.007	2.967
222	1	<i>Melaleuca quinquenervia</i>	10	3	400	GOOD	MODERATE	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329779.336	6243029.482	2.401
223	1	<i>Casuarina glauca</i>	17	9	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329776.908	6243024.64	2.445
224	1	<i>Lagunaria pattersonii</i>	12	7	400	GOOD	GOOD	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329783.613	6243024.086	1.554
225	1	<i>Casuarina glauca</i>	12	12	350	MODERATE	POOR	4.2	2.13	ASS Treatment and Stockpile	Remove tree	329784.319	6243017.799	3.314
226	1	<i>Brachychiton acerifolius</i>	6	3	250	GOOD	GOOD	3	1.85	ASS Treatment and Stockpile	Remove tree	329777.745	6243011.955	3.12
227	1	<i>Lagunaria pattersonii</i>	12	6	350	GOOD	GOOD	4.2	2.13	ASS Treatment and Stockpile	Remove tree	329777.173	6243000.46	3.197
228	1	<i>Lagunaria pattersonii</i>	15	8	400	GOOD	GOOD	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329786.237	6243006.251	2.55
229	1	<i>Casuarina glauca</i>	14	9	600	GOOD	MODERATE	7.2	2.67	ASS Treatment and Stockpile	Remove tree	329790.804	6243008.414	3.208
230	1	<i>Ulmus parvifolia</i>	16	12	300	GOOD	GOOD	3.6	2	ASS Treatment and Stockpile	Remove tree	329792.391	6243022.589	3.561
231	1	<i>Casuarina glauca</i>	16	12	450	MODERATE	POOR	5.4	2.37	ASS Treatment and Stockpile	Remove tree	329801.825	6243017.211	3.226
232	1	<i>Casuarina glauca</i>	15	12	500	GOOD	MODERATE	6	2.47	ASS Treatment and	Remove tree	329803.228	6243022.798	3.526

## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
										Stockpile				
233	1	<i>Casuarina glauca</i>	18	12	450	GOOD	MODERATE	5.4	2.37	ASS Treatment and Stockpile	Remove tree	329799.602	6243028.684	4.101
234	1	<i>Casuarina glauca</i>	19	12	450	GOOD	POOR	5.4	2.37	ASS Treatment and Stockpile	Remove tree	329796.248	6243038.473	5.829
235	1	<i>Casuarina glauca</i>	16	10	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329792.559	6243043.286	4.505
236	1	<i>Casuarina glauca</i>	12	8	400	MODERATE	MODERATE	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329789.66	6243049.088	3.02
237	1	<i>Lagunaria pattersonii</i>	8	8	400	GOOD	MODERATE	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329784.277	6243055.771	3.725
238	1	<i>Eucalyptus saligna</i>	19	10	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329778.263	6243052.453	2.697
239	1	<i>Melaleuca quinquenervia</i>	13	8	500	GOOD	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329770.771	6243064.79	2.84
240	1	<i>Melaleuca quinquenervia</i>	8	7	400	GOOD	MODERATE	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329764.015	6243064.492	3.667
241	1	<i>Casuarina cunninghamiana</i>	16	9	450	GOOD	MODERATE	5.4	2.37	ASS Treatment and Stockpile	Remove tree	329771.082	6243073.387	3.297
242	1	<i>Lagunaria pattersonii</i>	12	9	400	GOOD	GOOD	4.8	2.25	ASS Treatment and Stockpile	Remove tree	329767.37	6243073.78	2.712
243	1	<i>Melaleuca quinquenervia</i>	12	7	500	MODERATE	MODERATE	6	2.47	ASS Treatment and Stockpile	Remove tree	329761.265	6243071.329	5.544
244	1	<i>Casuarina glauca</i>	18	8	450	GOOD	MODERATE	5.4	2.37	ASS Treatment and Stockpile	Remove tree	329754.016	6243068.785	4.801
245	1	<i>Lagunaria pattersonii</i>	8	7	300	GOOD	MODERATE	3.6	2	ASS Treatment and Stockpile	Remove tree	329755.341	6243084.063	2.894
246	1	<i>Melaleuca quinquenervia</i>	14	12	700	GOOD	MODERATE	8.4	2.85	ASS Treatment and Stockpile	Remove tree	329749.756	6243074.503	3.085
247	1	<i>Casuarina glauca</i>	18	16	1200	GOOD	GOOD	14.4	3.57	Internal haul roads	Remove tree	329737.156	6243077.743	1.956
248	1	<i>Melaleuca armillaris</i>	7	5	300	MODERATE	MODERATE	3.6	2	Internal haul roads	Remove tree	329736.863	6243086.438	3.484
249	1	<i>Casuarina cunninghamiana</i>	18	12	800	GOOD	MODERATE	9.6	3.01	Internal haul roads	Remove tree	329724.553	6243072.348	9.444
250	1	<i>Pinus radiata</i>	4	2	150	GOOD	GOOD	2	1.5	Internal haul roads	Remove tree	329718.253	6243078.272	2.749
251	1	<i>Lagunaria pattersonii</i>	19	8	450	GOOD	GOOD	5.4	2.37	Internal haul roads	Remove tree	329717.149	6243083.443	5.039
252	1	<i>Lagunaria pattersonii</i>	16	12	450	GOOD	GOOD	5.4	2.37	Internal haul roads	Remove tree	329725.612	6243083.936	3.082
253	1	<i>Melaleuca quinquenervia</i>	7	4	350	MODERATE	MODERATE	4.2	2.13	Internal haul roads	Remove tree	329717.683	6243099.907	2.834
254	1	<i>Casuarina cunninghamiana</i>	17	13	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329713.131	6243100.39	6.762
255	1	<i>Callistemon viminalis</i>	3	2	100	GOOD	GOOD	2	1.5	Internal haul roads	Remove tree	329707.726	6243093.077	4.189
256	1	<i>Melaleuca quinquenervia</i>	10	10	500	GOOD	MODERATE	6	2.47	Internal haul roads	Remove tree	329704.043	6243088.167	5.466
257	1	<i>Melaleuca quinquenervia</i>	8	8	350	GOOD	MODERATE	4.2	2.13	Internal haul roads	Remove tree	329694.078	6243091.258	8.229

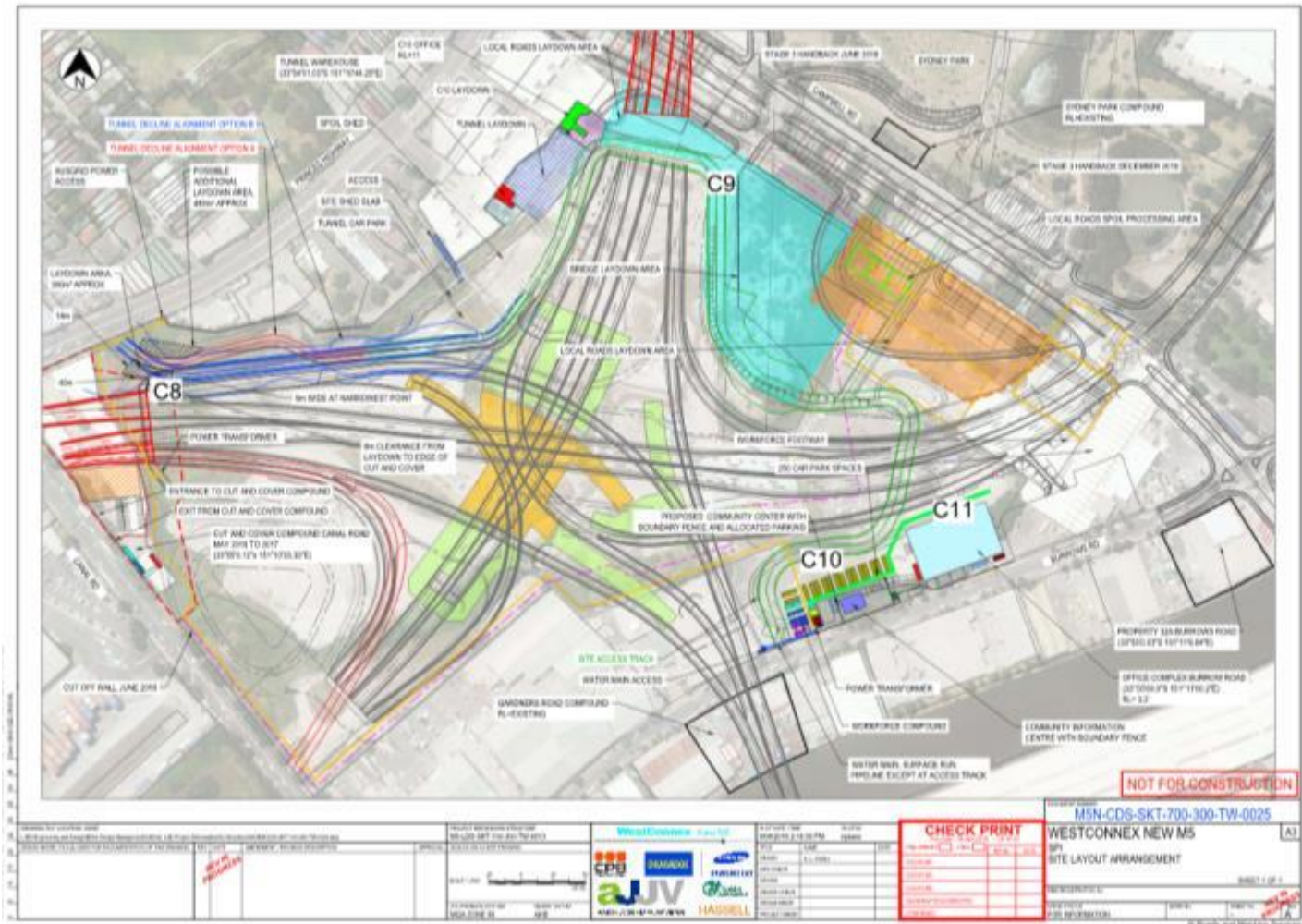
## ARNCLIFFE SURFACE WORKS AREA

Tree to be removed (300)

Tree to be retained (37)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
258	1	<i>Casuarina glauca</i>	10	10	450	GOOD	MODERATE	5.4	2.37	Internal haul roads	Remove tree	329674.914	6243096.154	4.26
259	1	<i>Melaleuca quinquenervia</i>	12	12	700	GOOD	MODERATE	8.4	2.85	Internal haul roads	Remove tree	329686.266	6243098.519	2.605
260	1	<i>Melaleuca quinquenervia</i>	7	7	300	GOOD	MODERATE	3.6	2	Internal haul roads	Remove tree	329697.828	6243103.996	2.562
261	1	<i>Melaleuca quinquenervia</i>	14	14	1200	GOOD	MODERATE	14.4	3.57	Internal haul roads	Remove tree	329695.784	6243112.672	5.014
262	1	<i>Casuarina glauca</i>	12	12	100	GOOD	MODERATE	2	1.5	Internal haul roads	Remove tree	329677.135	6243118.097	4.571
263	1	<i>Acacia species</i>	4	5	300	MODERATE	POOR	3.6	2	Internal haul roads	Remove tree	329683.386	6243119.391	2.012
264	1	<i>Cinnamomum camphora</i>	3	3	200	MODERATE	MODERATE	2.4	1.68	Internal haul roads	Remove tree	329687.752	6243125.962	2.508
265	1	<i>Eucalyptus crebra</i>	18	12	500	GOOD	GOOD	6	2.47	Internal haul roads	Remove tree	329683.346	6243128.117	1.943

## c. Site 3: St Peters Interchange Surface Works Area



This site was inspected on the 29<sup>th</sup> April 2016 and the 25 – 26<sup>th</sup> May. The site was walked and all trees within the surface works area and within close proximity to the boundary fence were recorded for this report, this included street trees.

In total four hundred and thirty five (435) trees were surveyed within St Peters Interchange surface works area that were either within the proposed area or within close proximity to the area.

The following is a summary of findings for St Peters Interchange surface works area:

- Four hundred and thirty five (435) trees surveyed and data recorded. Of the 435 trees surveyed two hundred and fifty three (253) trees were given GNSS locations as same species trees located close together and with similar health and structure have been grouped together.
- Native trees made up three hundred and thirty one (331) of the trees.
- Non-native and weed species made up the other trees.



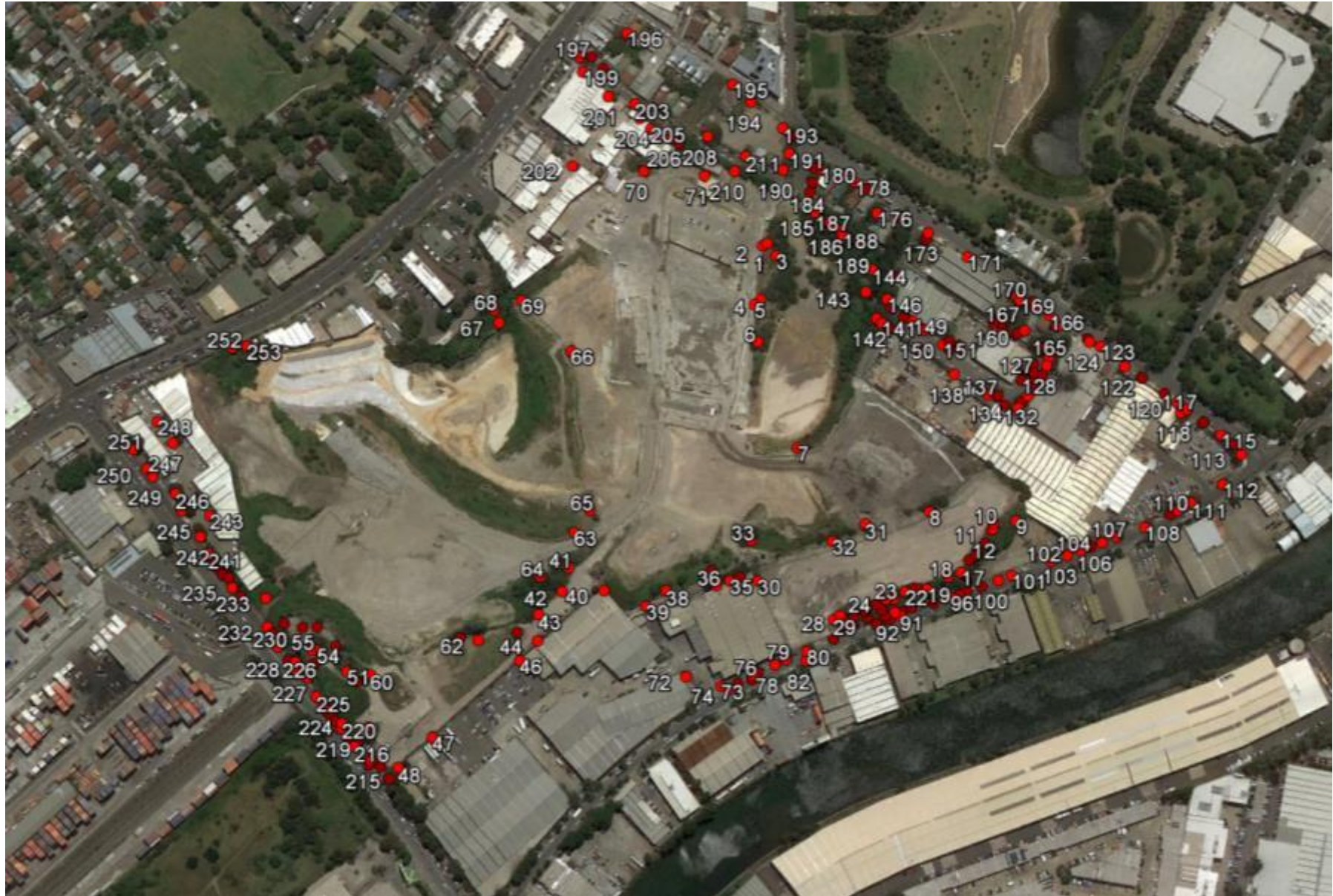
- Two hundred and twenty three (223) trees were in good health. One hundred and ninety five (195) trees were in moderate health and seventeen (17) trees were in poor health.
- Four hundred and thirty five (435) trees require removal. No trees can be retained as all trees are within the footprint of the proposed works.

### **Summary St Peters Interchange Surface Works Area:**

This site is located within St Peters Interchange, Canal Rd Compound. The site inspection with representatives from CDS-JV identified trees along the boundary fence line and internally that are required to be removed for either construction or clearance of the fence line. All trees (435) are required to be removed.

### **Recommendations St Peters Interchange Surface Works Area:**

- Trees will be required to be removed most likely in a stage removal program. As areas become active, trees in these areas will be removed.
- All trees along the boundary fence lines will be retained in the interim to allow for site screening, dust interception and noise abatement. As required, these boundary trees will be removed.
- Mulch from the *Olea europea* 'Europea' and other weed species should not be used on site or re-used offsite as it will spread the weed species of tree.



Map 10. St Peter's Interchange Surface Works Area. Overall view of trees surveyed. Red dot denotes tree removal.



Map 11. St Peter's Interchange Surface Works Area. Close up of trees surveyed. Red dot denotes tree removal.



Map 12. St Peter's Interchange Surface Works Area. Close up of trees surveyed. Red dot denotes tree removal.



Map 13. St Peter's Interchange Surface Works Area. Close up of trees surveyed. Red dot denotes tree removal.

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
1	1	<i>Casuarina glauca</i>	6	3	200	GOOD	GOOD	2.4	1.68	Construction area	Remove	331840.37	6245857.766	16.856
2	1	<i>Acacia longifolia</i>	6	10	200	GOOD	MODERATE	2.4	1.68	Construction area	Remove	331836.58	6245855.478	15.201
3	1	<i>Weed species</i>	5	5	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331848.624	6245846.358	18.104
4	1	<i>Casuarina glauca</i>	6	3	150	GOOD	GOOD	2	1.5	Construction area	Remove	331835.751	6245809.522	13.865
5	1	<i>Triadica sebifera</i>	4	2	150	GOOD	GOOD	2	1.5	Construction area	Remove	331830.367	6245805.228	8.596
6	1	<i>Celtis australis</i>	6	4	250	MODERATE	MODERATE	3	1.85	Construction area	Remove	331833.933	6245773.376	11.469
7	1	<i>Triadica sebifera</i>	5	3	250	POOR	MODERATE	3	1.85	Construction area	Remove	331869.728	6245683.514	8.015
8	3	<i>Acacia longifolia</i>	3	3	150	GOOD	GOOD	2	1.5	Construction area	Remove	331984.641	6245630.581	9.898
9	5	<i>Ficus species</i>	10	8	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	332059.569	6245624.232	12.288
10	1	<i>Populus nigra 'itallica'</i>	12	2	250	POOR	POOR	3	1.85	Construction area	Remove	332039.768	6245621.597	6.743
11	1	<i>Eucalyptus saligna</i>	15	9	250	GOOD	GOOD	3	1.85	Construction area	Remove	332039.967	6245616.881	7.367
12	2	<i>Banksia integrifolia</i>	8	4	250	GOOD	GOOD	3	1.85	Construction area	Remove	332038.33	6245616.031	6.887
13	3	<i>Eucalyptus saligna</i>	14	8	300	GOOD	GOOD	3.6	2	Construction area	Remove	332033.208	6245604.365	7.722
14	5	<i>Eucalyptus saligna</i>	12	9	300	GOOD	GOOD	3.6	2	Construction area	Remove	332026.51	6245597.376	7.435
15	5	<i>Banksia integrifolia</i>	6	3	250	GOOD	MODERATE	3	1.85	Construction area	Remove	332025.541	6245593.951	6.688
16	1	<i>Eucalyptus saligna</i>	14	8	300	GOOD	GOOD	3.6	2	Construction area	Remove	332019.45	6245589.861	6.686
17	3	<i>Eucalyptus botryoides</i>	13	8	300	GOOD	GOOD	3.6	2	Construction area	Remove	332012.985	6245579.312	6.679
18	7	<i>Eucalyptus saligna</i>	12	4	250	POOR	MODERATE	3	1.85	Construction area	Remove	332002.007	6245575.212	7.501
19	1	<i>Eucalyptus saligna</i>	17	8	350	GOOD	GOOD	4.2	2.13	Construction area	Remove	331983.68	6245564.082	6.688
20	1	<i>Eucalyptus species</i>	11	5	250	POOR	POOR	3	1.85	Construction area	Remove	331977.648	6245564.432	6.283

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
21	2	<i>Banksia integrifolia</i>	6	3	200	MODERATE	MODERATE	2.4	1.68	Construction area	Remove	331972.214	6245565.011	7.77
22	2	<i>Eucalyptus robusta</i>	14	9	200	MODERATE	GOOD	2.4	1.68	Construction area	Remove	331964.974	6245561.451	6.269
23	2	<i>Eucalyptus saligna</i>	7	3	250	GOOD	GOOD	3	1.85	Construction area	Remove	331955.332	6245555.33	8.296
24	4	<i>Casuarina glauca</i>	7	2	150	GOOD	GOOD	2	1.5	Construction area	Remove	331948.558	6245554.858	6.603
25	1	<i>Eucalyptus botryoides</i>	12	10	250	MODERATE	GOOD	3	1.85	Construction area	Remove	331939.759	6245550.242	5.823
26	2	<i>Eucalyptus saligna</i>	13	3	300	GOOD	GOOD	3.6	2	Construction area	Remove	331930.337	6245544.212	8.083
27	2	<i>Eucalyptus botryoides</i>	14	5	300	GOOD	GOOD	3.6	2	Construction area	Remove	331920.53	6245539.118	7.392
28	1	<i>Eucalyptus saligna</i>	14	12	400	GOOD	GOOD	4.8	2.25	Construction area	Remove	331909.06	6245539.852	4.892
29	1	<i>Jacaranda mimosifolia</i>	7	5	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331903.269	6245536.448	2.926
30	1	<i>Shinus molle</i>	10	8	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331837.219	6245568.426	4.784
31	3	<i>Acacia species</i>	3	4	150	GOOD	MODERATE	2	1.5	Construction area	Remove	331929.277	6245619.359	6.699
32	2	<i>Acacia longifolia</i>	6	6	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331901.077	6245603.876	5.711
33	1	<i>Acacia species</i>	4	6	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331830.817	6245603.406	12.383
34	1	<i>Casuarina cunninghamiana</i>	14	10	450	GOOD	MODERATE	5.4	2.37	Construction area	Remove	331821.808	6245571.775	4.747
35	1	<i>Celtis australis</i>	13	10	450	MODERATE	GOOD	5.4	2.37	Construction area	Remove	331813.282	6245568.216	5.733
36	2	<i>Casuarina cunninghamiana</i>	16	12	500	GOOD	MODERATE	6	2.47	Construction area	Remove	331801.94	6245564.116	3.08
37	1	<i>Ficus hillii</i>	3	3	200	MODERATE	MODERATE	2.4	1.68	Construction area	Remove	331797.624	6245576.749	9.063
38	4	<i>Ficus hillii</i>	3	3	250	MODERATE	MODERATE	3	1.85	Construction area	Remove	331758.431	6245559	10.658
39	1	<i>Casuarina glauca</i>	13	7	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331741.3	6245545.067	5.499
40	1	<i>Celtis australis</i>	4	4	150	GOOD	GOOD	2	1.5	Construction area	Remove	331704.961	6245557.971	6.637

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
41	1	<i>Acacia species</i>	5	5	350	GOOD	MODERATE	4.2	2.13	Construction area	Remove	331673.223	6245576.798	2.954
42	1	<i>Celtis australis</i>	16	12	450	MODERATE	MODERATE	5.4	2.37	Construction area	Remove	331668.087	6245556.385	4.667
43	10	<i>Mixed weed species</i>	6	6	200	MODERATE	MODERATE	2.4	1.68	Construction area	Remove	331648.029	6245536.201	5.249
44	1	<i>Celtis australis</i>	3	2	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331647.76	6245513.608	4.95
45	1	<i>Acacia longifolia</i>	3	3	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331629.872	6245520.498	4.812
46	1	<i>Celtis australis</i>	4	4	200	MODERATE	GOOD	2.4	1.68	Construction area	Remove	331632.606	6245496.219	4.249
47	1	<i>Tristanopsis laurina</i>	12	10	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	331558.037	6245428.646	5.773
48	1	<i>Celtis australis</i>	4	4	200	MODERATE	MODERATE	2.4	1.68	Construction area	Remove	331528.935	6245402.408	2.692
49	1	<i>Syagrus romanzoffiana</i>	7	2	300	MODERATE	GOOD	3.6	2	Construction area	Remove	331502.965	6245436.774	6.919
50	3	<i>Casuarina glauca</i>	4	3	200	GOOD	MODERATE	2.4	1.68	Construction area	Remove	331492.894	6245475.754	7.442
51	1	<i>Ficus macrophylla</i>	4	4	200	GOOD	GOOD	2.4	1.68	Construction area	Remove	331484.686	6245484.802	13.142
52	1	<i>Acacia species</i>	3	3	150	GOOD	MODERATE	2	1.5	Construction area	Remove	331473.96	6245496.641	11.164
53	1	<i>Casuarina glauca</i>	4	3	250	GOOD	GOOD	3	1.85	Construction area	Remove	331456.562	6245491.075	11.496
54	1	<i>Acacia longifolia</i>	10	10	450	GOOD	MODERATE	5.4	2.37	Construction area	Remove	331458.741	6245502.834	9.804
55	1	<i>Casuarina glauca</i>	6	2	150	GOOD	MODERATE	2	1.5	Construction area	Remove	331453.478	6245502.702	9.918
56	1	<i>Casuarina glauca</i>	6	3	150	GOOD	MODERATE	2	1.5	Construction area	Remove	331429.863	6245525.026	14.869
57	1	<i>Ficus macrophylla</i>	6	7	200	GOOD	GOOD	2.4	1.68	Construction area	Remove	331446.006	6245521.75	11.461
58	1	<i>Melia azedarach</i>	7	5	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331458.505	6245522.329	10.371
59	1	<i>Weed species</i>	3	3	100	MODERATE	MODERATE	2	1.5	Construction area	Remove	331474.812	6245506.416	11.187
60	3	<i>Weed species</i>	3	3	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331504.048	6245482.04	4.008



## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
61	8	<i>Eucalyptus microcorys</i>	10	7	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331580.059	6245514.761	8.398
62	1	<i>Eucalyptus microcorys</i>	12	8	350	GOOD	MODERATE	4.2	2.13	Construction area	Remove	331596.294	6245513.039	7.258
63	1	<i>Casuarina glauca</i>	4	2	150	GOOD	GOOD	2	1.5	Construction area	Remove	331677.569	6245607.22	3.376
64	20	<i>Mixed weeds</i>	5	5	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331648.22	6245568.844	7.003
65	2	<i>Acacia species</i>	4	4	200	GOOD	MODERATE	2.4	1.68	Construction area	Remove	331691.14	6245626.567	7.008
66	2	<i>Casuarina glauca</i>	3	2	150	GOOD	GOOD	2	1.5	Construction area	Remove	331672.981	6245762.85	8.651
67	1	<i>Weed species</i>	4	4	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331610.486	6245785.987	12.368
68	1	<i>Dead tree</i>	7	7	300	POOR	POOR	3.6	2	Construction area	Remove	331606.753	6245796.312	18.189
69	1	<i>Acacia species</i>	8	6	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331630.114	6245805.095	11.52
70	3	<i>Eucalyptus scoparia</i>	16	11	300	MODERATE	POOR	3.6	2	Construction area	Remove	331733.677	6245917.099	11.379
71	1	<i>Syagrus romanzoffiana</i>	4	2	150	MODERATE	GOOD	2	1.5	Construction area	Remove	331785.822	6245914.062	12.095
72	3	<i>Livistona australis</i>	4	2	250	GOOD	GOOD	3	1.85	Fenceline Clearance	Remove	331776.795	6245485.179	7.632
73	1	<i>Robinia pseudoacacia</i>	7	6	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	331807.105	6245477.532	5.239
74	1	<i>Angophora costata</i>	3	2	100	GOOD	GOOD	2	1.5	Fenceline Clearance	Remove	331814.121	6245475.488	3.033
75	1	<i>Eucalyptus species</i>	7	5	250	GOOD	MODERATE	3	1.85	Fenceline Clearance	Remove	331821.585	6245479.802	3.562
76	1	<i>Eucalyptus scoparia</i>	12	8	450	MODERATE	MODERATE	5.4	2.37	Fenceline Clearance	Remove	331834.787	6245487.422	3.437
77	1	<i>Melaleuca quinquenervia</i>	12	12	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Remove	331838.91	6245489.684	4.474
78	1	<i>Eucalyptus siderloxyn</i>	14	8	450	GOOD	GOOD	5.4	2.37	Fenceline Clearance	Remove	331853.263	6245496.838	3.597
79	1	<i>Eucalyptus scoparia</i>	12	8	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331862.759	6245501.378	3.761
80	1	<i>Eucalyptus scoparia</i>	12	8	400	MODERATE	MODERATE	4.8	2.25	Fenceline Clearance	Remove	331880.72	6245508.679	3.763

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
81	1	<i>Eucalyptus scoparia</i>	5	2	200	MODERATE	MODERATE	2.4	1.68	Fenceline Clearance	Remove	331903.815	6245519.749	2.752
82	5	<i>Melaleuca quinquenervia</i>	4	4	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	331880.397	6245500.526	6.326
83	1	<i>Melaleuca quinquenervia</i>	4	4	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	331833.52	6245483.794	5.279
84	2	<i>Melaleuca armillaris</i>	4	3	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	331914.753	6245529.632	3.946
85	1	<i>Eucalyptus microcorys</i>	17	11	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	331919.795	6245530.717	3.726
86	3	<i>Eucalyptus botryoides</i>	15	9	400	GOOD	MODERATE	4.8	2.25	Construction area	Remove	331932.717	6245538.982	5.332
87	1	<i>Corymbia maculata</i>	18	12	550	GOOD	POOR	6.6	2.57	Fenceline Clearance	Remove	331940.896	6245533.162	3.61
88	1	<i>Casuarina glauca</i>	16	8	400	GOOD	GOOD	4.8	2.25	Construction area	Remove	331944.778	6245545.668	5.558
89	4	<i>Melaleuca styphelioides</i>	6	5	500	GOOD	MODERATE	6	2.47	Construction area	Remove	331948.048	6245540.42	3.549
90	1	<i>Eucalyptus scoparia</i>	8	8	200	POOR	POOR	2.4	1.68	Fenceline Clearance	Remove	331952.089	6245537.602	3.328
91	1	<i>Angophora costata</i>	5	2	150	GOOD	GOOD	2	1.5	Construction area	Remove	331960.99	6245540.915	2.892
92	1	<i>Eucalyptus scoparia</i>	12	10	500	MODERATE	POOR	6	2.47	Fenceline Clearance	Remove	331956.43	6245543.75	4.259
93	2	<i>Melaleuca styphelioides</i>	7	6	350	GOOD	MODERATE	4.2	2.13	Fenceline Clearance	Remove	331962.868	6245543.894	4.205
94	1	<i>Corymbia maculata</i>	18	13	600	MODERATE	MODERATE	7.2	2.67	Fenceline Clearance	Remove	331970.732	6245548.038	3.875
95	1	<i>Acmena smithii</i>	10	8	350	MODERATE	GOOD	4.2	2.13	Fenceline Clearance	Remove	331989.736	6245552.399	3.384
96	1	<i>Eucalyptus saligna</i>	12	8	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	332004.454	6245557.407	3.127
97	1	<i>Angophora costata</i>	3	1	150	GOOD	GOOD	2	1.5	Fenceline Clearance	Remove	332011.926	6245560.16	2.842
98	1	<i>Angophora costata</i>	3	1	150	GOOD	GOOD	2	1.5	Fenceline Clearance	Remove	332018.343	6245562.707	3.021
99	1	<i>Angophora costata</i>	4	2	150	GOOD	GOOD	2	1.5	Fenceline Clearance	Remove	332030.884	6245567.254	2.987
100	1	<i>Eucalyptus siderloxyn</i>	9	3	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	332045.319	6245572.687	3.881

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
101	1	<i>Angophora floribunda</i>	6	3	150	GOOD	GOOD	2	1.5	Fenceline Clearance	Remove	332056.689	6245577.038	2.948
102	1	<i>Eucalyptus scoparia</i>	8	7	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	332091.064	6245590.062	2.919
103	1	<i>Eucalyptus scoparia</i>	7	5	150	MODERATE	MODERATE	2	1.5	Fenceline Clearance	Remove	332104.804	6245595.383	3.056
104	1	<i>Eucalyptus siderloxyn</i>	15	10	400	GOOD	GOOD	4.8	2.25	Fenceline Clearance	Remove	332116.465	6245599.401	3.148
105	1	<i>Eucalyptus siderloxyn</i>	12	9	500	GOOD	GOOD	6	2.47	Fenceline Clearance	Remove	332125.041	6245603.148	3.003
106	1	<i>Eucalyptus siderloxyn</i>	12	9	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Remove	332134.476	6245606.881	3.478
107	1	<i>Eucalyptus siderloxyn</i>	12	9	350	GOOD	GOOD	4.2	2.13	Fenceline Clearance	Remove	332147.033	6245611.812	3.742
108	1	<i>Eucalptus crebra</i>	9	8	450	GOOD	GOOD	5.4	2.37	Fenceline Clearance	Remove	332171.237	6245620.533	3.181
109	1	<i>Angophora costata</i>	16	10	500	GOOD	MODERATE	6	2.47	Fenceline Clearance	Remove	332193.425	6245632.307	3.15
110	1	<i>Angophora costata</i>	16	8	500	GOOD	GOOD	6	2.47	Fenceline Clearance	Remove	332199.739	6245635.678	3.011
111	1	<i>Angophora costata</i>	16	10	550	GOOD	GOOD	6.6	2.57	Fenceline Clearance	Remove	332211.092	6245642.21	3.428
112	1	<i>Angophora costata</i>	12	5	300	GOOD	GOOD	3.6	2	Fenceline Clearance	Remove	332238.271	6245658.621	3.573
113	1	<i>Melaleuca quinquenervia</i>	8	8	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Remove	332253.617	6245684.927	3.344
114	1	<i>Melaleuca quinquenervia</i>	16	9	550	GOOD	POOR	6.6	2.57	Fenceline Clearance	Remove	332247.181	6245693.877	2.976
115	1	<i>Melaleuca quinquenervia</i>	14	9	550	GOOD	POOR	6.6	2.57	Fenceline Clearance	Remove	332235.683	6245701.091	5.146
116	1	<i>Melaleuca quinquenervia</i>	16	8	550	GOOD	POOR	6.6	2.57	Fenceline Clearance	Remove	332220.484	6245711.828	4.84
117	2	<i>Livistona australis</i>	12	3	600	GOOD	GOOD	7.2	2.67	Fenceline Clearance	Remove	332206.092	6245722.708	4.877
118	1	<i>Eucalyptus saligna</i>	18	12	550	GOOD	GOOD	6.6	2.57	Fenceline Clearance	Remove	332200.464	6245719.744	5.292
119	1	<i>Melaleuca quinquenervia</i>	9	8	500	GOOD	POOR	6	2.47	Fenceline Clearance	Remove	332185.947	6245735.659	3.701
120	1	<i>Melaleuca quinquenervia</i>	7	3	500	GOOD	MODERATE	6	2.47	Fenceline Clearance	Remove	332197.47	6245728.914	3.838

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
121	1	<i>Melaleuca quinquenervia</i>	14	10	500	GOOD	MODERATE	6	2.47	Fenceline Clearance	Remove	332166.496	6245748.875	7.019
122	1	<i>Melaleuca quinquenervia</i>	14	8	500	GOOD	POOR	6	2.47	Fenceline Clearance	Remove	332151.336	6245758.47	3.741
123	2	<i>Callistemon species</i>	4	4	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	332129.972	6245775.536	6.151
124	1	<i>Melaleuca quinquenervia</i>	12	9	600	MODERATE	POOR	7.2	2.67	Fenceline Clearance	Remove	332120.4	6245779.288	6.951
125	1	<i>Callistemon viminalis</i>	4	4	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	332118.798	6245781.63	6.805
126	1	<i>Eucalyptus microcorys</i>	16	9	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332093.833	6245773.134	4.779
127	1	<i>Eucalyptus microcorys</i>	17	12	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332085.611	6245764.781	6.575
128	1	<i>Eucalyptus microcorys</i>	18	9	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332083.805	6245758.37	6.191
129	1	<i>Eucalyptus microcorys</i>	17	9	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332080.456	6245749.593	9.409
130	1	<i>Eucalyptus microcorys</i>	17	9	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332072.727	6245746.999	6.856
131	1	<i>Eucalyptus microcorys</i>	16	10	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332072.94	6245742.381	-2.689
132	1	<i>Eucalyptus microcorys</i>	17	9	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	332068.148	6245731.69	5.049
133	1	<i>Eucalyptus microcorys</i>	18	11	500	GOOD	MODERATE	6	2.47	Construction area	Remove	332062.223	6245726.354	9.507
134	1	<i>Eucalyptus microcorys</i>	17	12	500	GOOD	MODERATE	6	2.47	Construction area	Remove	332059.667	6245721.27	6.717
135	1	<i>Eucalyptus species</i>	3	2	100	GOOD	GOOD	2	1.5	Construction area	Remove	332047.779	6245723.247	2.338
136	1	<i>Eucalyptus microcorys</i>	18	14	650	GOOD	POOR	7.8	6.5	Construction area	Remove	332041.896	6245731.636	0.383
137	1	<i>Eucalyptus microcorys</i>	18	12	900	GOOD	MODERATE	10.8	3.17	Construction area	Remove	332033.605	6245732.206	8.954
138	6	<i>Callistemon viminalis</i>	4	2	200	GOOD	GOOD	2.4	1.68	Construction area	Remove	332003.878	6245749.264	2.693
139	3	<i>Angophora costata</i>	5	2	200	GOOD	MODERATE	2.4	1.68	Construction area	Remove	331973.753	6245770.166	5.142
140	1	<i>Eucalyptus microcorys</i>	18	12	650	GOOD	MODERATE	7.8	6.5	Construction area	Remove	331946.978	6245787.909	8.865

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
141	1	<i>Eucalyptus microcorys</i>	18	12	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	331940.294	6245791.757	4.223
142	1	<i>Eucalyptus microcorys</i>	17	12	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	331935.715	6245795.638	6.929
143	15	<i>Weed species</i>	7	7	250	MODERATE	MODERATE	3	1.85	Construction area	Remove	331925.972	6245817.46	10.56
144	7	<i>Eucalyptus microcorys</i>	18	12	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	331930.993	6245837.127	7.998
145	1	<i>Melaleuca quinquenervia</i>	12	6	400	MODERATE	POOR	4.8	2.25	Construction area	Remove	331949.828	6245832.051	3.896
146	1	<i>Eucalyptus microcorys</i>	24	16	1100	GOOD	MODERATE	13.2	3.44	Construction area	Remove	331944.551	6245812.301	5.776
147	1	<i>Melaleuca quinquenervia</i>	8	4	250	GOOD	MODERATE	3	1.85	Construction area	Remove	331947.867	6245805.427	3.733
148	1	<i>Eucalyptus microcorys</i>	8	5	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331959.09	6245796.824	5.528
149	1	<i>Melaleuca quinquenervia</i>	7	2	250	GOOD	MODERATE	3	1.85	Construction area	Remove	331967.079	6245794.269	4.252
150	1	<i>Melaleuca quinquenervia</i>	6	3	250	MODERATE	MODERATE	3	1.85	Construction area	Remove	331977.402	6245786.625	5.424
151	1	<i>Melaleuca quinquenervia</i>	5	4	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331993.721	6245774.455	3.643
152	1	<i>Melaleuca quinquenervia</i>	7	5	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331999.072	6245777.474	5.916
153	1	<i>Eucalyptus microcorys</i>	16	12	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	331998.918	6245770.833	6.083
154	1	<i>Eucalyptus microcorys</i>	16	10	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	332007.59	6245773.834	9.689
155	1	<i>Eucalyptus microcorys</i>	16	8	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	332008.113	6245770.522	4.951
156	1	<i>Melaleuca quinquenervia</i>	12	5	250	GOOD	GOOD	3	1.85	Construction area	Remove	332062.13	6245745.356	8.211
157	1	<i>Melaleuca quinquenervia</i>	18	14	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	332073.062	6245751.377	16.109
158	1	<i>Melaleuca quinquenervia</i>	16	7	500	GOOD	MODERATE	6	2.47	Construction area	Remove	332071.892	6245759.44	4.949
159	1	<i>Ficus species</i>	18	18	1100	GOOD	GOOD	13.2	3.44	Construction area	Remove	332057.87	6245785.143	8.579
160	1	<i>Jacaranda mimosifolia</i>	16	15	400	GOOD	GOOD	4.8	2.25	Construction area	Remove	332063.965	6245788.017	13.501

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

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161	1	<i>Syagrus romanzoffiana</i>	12	3	200	GOOD	GOOD	2.4	1.68	Construction area	Remove	332044.63	6245788.707	8.993
162	1	<i>Glochidion ferdinandi</i>	13	15	600	MODERATE	MODERATE	7.2	2.67	Construction area	Remove	332043.566	6245794.594	10.215
163	1	<i>Lagerstroemia indica</i>	10	4	250	MODERATE	GOOD	3	1.85	Construction area	Remove	332036.876	6245793.573	8.57
164	1	<i>Eucalyptus microcorys</i>	18	16	600	GOOD	GOOD	7.2	2.67	Construction area	Remove	332078.112	6245773.53	2.902
165	1	<i>Melaleuca quinquenervia</i>	7	8	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	332092.15	6245791.608	9.916
166	1	<i>Cupressus sempervirens</i>	14	8	300	GOOD	MODERATE	3.6	2	Construction area	Remove	332085.318	6245801.63	5.492
167	2	<i>Melaleuca quinquenervia</i>	12	9	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	332072.937	6245806.79	6.551
168	1	<i>Eucalyptus species</i>	18	12	600	GOOD	POOR	7.2	2.67	Construction area	Remove	332070.94	6245812.57	10.629
169	1	<i>Melaleuca quinquenervia</i>	8	8	200	GOOD	MODERATE	2.4	1.68	Construction area	Remove	332059.268	6245813.586	7.196
170	1	<i>Cedrus deodara</i>	10	6	250	GOOD	POOR	3	1.85	Construction area	Remove	332056.695	6245816.5	7.826
171	1	<i>Eucalyptus scoparia</i>	12	9	400	POOR	POOR	4.8	2.25	Construction area	Remove	332013.288	6245849.988	4.123
172	1	<i>Melaleuca quinquenervia</i>	4	4	450	MODERATE	POOR	5.4	2.37	Construction area	Remove	331977.941	6245865.113	5.677
173	1	<i>Melaleuca quinquenervia</i>	12	9	500	MODERATE	POOR	6	2.47	Construction area	Remove	331979.292	6245870.238	5.704
174	1	<i>Pittosporum undulatum</i>	6	4	200	MODERATE	MODERATE	2.4	1.68	Construction area	Remove	331957.504	6245882.43	5.016
175	1	<i>Eucalyptus microcorys</i>	18	17	600	GOOD	MODERATE	7.2	2.67	Construction area	Remove	331953.429	6245883.367	6.708
176	1	<i>Melaleuca quinquenervia</i>	8	8	600	MODERATE	POOR	7.2	2.67	Construction area	Remove	331934.58	6245885.664	18.217
177	1	<i>Triadica sebifera</i>	3	2	150	GOOD	GOOD	2	1.5	Construction area	Remove	331924.532	6245905.886	6.662
178	3	<i>Melaleuca quinquenervia</i>	12	9	1200	MODERATE	POOR	14.4	3.57	Construction area	Remove	331914.846	6245911.758	7.185
179	1	<i>Pittosporum undulatum</i>	12	10	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	331904.641	6245918.387	8.694
180	1	<i>Flindersia australis</i>	10	8	300	MODERATE	GOOD	3.6	2	Construction area	Remove	331884.801	6245921.637	9.453

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

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181	1	<i>Flindersia australis</i>	12	8	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	331879.288	6245923.016	9.659
182	1	<i>Flindersia australis</i>	9	5	300	MODERATE	GOOD	3.6	2	Construction area	Remove	331878.352	6245910.657	11.531
183	1	<i>Corymbia citriodora</i>	18	12	450	MODERATE	MODERATE	5.4	2.37	Construction area	Remove	331876.281	6245902.034	8.953
184	2	<i>Eucalyptus pilularis</i>	18	12	500	GOOD	MODERATE	6	2.47	Construction area	Remove	331881.018	6245884.835	10.873
185	2	<i>Corymbia maculata</i>	12	5	250	MODERATE	MODERATE	3	1.85	Construction area	Remove	331893.99	6245876.603	9.669
186	1	<i>Eucalyptus pilularis</i>	18	15	500	GOOD	POOR	6	2.47	Construction area	Remove	331896.953	6245873.508	10.17
187	2	<i>Corymbia maculata</i>	18	9	400	GOOD	MODERATE	4.8	2.25	Construction area	Remove	331903.321	6245869.541	13.321
188	2	<i>Eucalyptus pilularis</i>	18	15	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	331905.365	6245865.628	14.223
189	1	<i>Eucalyptus saligna</i>	17	12	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331920.038	6245857.967	13.762
190	3	<i>Eucalyptus species</i>	16	9	350	GOOD	MODERATE	4.2	2.13	Construction area	Remove	331852.911	6245920.629	13.335
191	2	<i>Eucalyptus saligna</i>	18	15	1200	GOOD	GOOD	14.4	3.57	Construction area	Remove	331857.922	6245934.855	14.261
192	1	<i>Eucalyptus species</i>	13	4	400	POOR	POOR	4.8	2.25	Construction area	Remove	331859.787	6245949.637	13.577
193	1	<i>Eucalyptus saligna</i>	16	8	450	GOOD	MODERATE	5.4	2.37	Construction area	Remove	331852.1	6245956.168	14.834
194	1	<i>Callistemon viminalis</i>	6	5	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331824.492	6245977.442	16.048
195	1	<i>Jacaranda mimosifolia</i>	10	12	400	MODERATE	MODERATE	4.8	2.25	Construction area	Remove	331808.563	6245991.533	6.576
196	1	<i>Tristaniopsis laurina</i>	4	4	300	GOOD	GOOD	3.6	2	Construction area	Remove	331717.537	6246033.24	21.073
197	1	<i>Robinia pseudoacacia</i>	8	12	450	POOR	POOR	5.4	2.37	Construction area	Remove	331677.851	6246012.294	6.26
198	1	<i>Robinia pseudoacacia</i>	5	9	300	POOR	POOR	3.6	2	Construction area	Remove	331687.602	6246012.548	7.341
199	1	<i>Tristaniopsis laurina</i>	3	3	150	MODERATE	GOOD	2	1.5	Construction area	Remove	331680.095	6245999.631	17.68
200	3	<i>Corymbia citriodora</i>	16	5	300	GOOD	GOOD	3.6	2	Construction area	Remove	331697.627	6246002.797	7.001

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
201	1	<i>Corymbia maculata</i>	17	8	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331702.373	6245979.266	18.565
202	1	<i>Tristaniopsis laurina</i>	3	3	200	GOOD	GOOD	2.4	1.68	Construction area	Remove	331672.816	6245919.651	23.126
203	4	<i>Corymbia maculata</i>	16	7	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331725.25	6245973.595	8.479
204	1	<i>Corymbia maculata</i>	16	5	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331729.848	6245961.425	19.578
205	2	<i>Lophostemon confertus</i>	17	5	300	GOOD	GOOD	3.6	2	Construction area	Remove	331739.084	6245952.384	19.367
206	1	<i>Ficus rubiginosa</i>	18	16	900	GOOD	MODERATE	10.8	3.17	Construction area	Remove	331757.216	6245945.438	18.813
207	2	<i>Eucalyptus saligna</i>	18	9	400	GOOD	MODERATE	4.8	2.25	Construction area	Remove	331763.648	6245940.87	19.057
208	4	<i>Ficus rubiginosa</i>	12	7	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331787.916	6245947.378	16.361
209	20	<i>Weed species</i>	5	5	200	MODERATE	MODERATE	2.4	1.68	Construction area	Remove	331790.657	6245929.64	16.237
210	1	<i>Eucalyptus saligna</i>	12	10	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331811.356	6245918.699	16.34
211	2	<i>Eucalyptus botryoides</i>	17	12	700	GOOD	MODERATE	8.4	2.85	Fenceline Clearance	Remove	331820.593	6245931.376	13.466
212	1	<i>Eucalyptus botryoides</i>	4	4	150	GOOD	GOOD	2	1.5	Fenceline Clearance	Remove	331521.552	6245392.498	6.946
213	1	<i>Eucalyptus species</i>	12	4	300	POOR	POOR	3.6	2	Fenceline Clearance	Remove	331513.627	6245402.765	3.897
214	1	<i>Lophostemon confertus</i>	6	5	400	GOOD	MODERATE	4.8	2.25	Fenceline Clearance	Remove	331503.86	6245404.376	3.824
215	1	<i>Triadica sebifera</i>	5	5	250	MODERATE	MODERATE	3	1.85	Fenceline Clearance	Remove	331505.377	6245408.052	5.484
216	1	<i>Corymbia maculata</i>	18	8	400	MODERATE	GOOD	4.8	2.25	Fenceline Clearance	Remove	331490.893	6245419.73	3.839
217	2	<i>Corymbia maculata</i>	5	2	150	MODERATE	GOOD	2	1.5	Fenceline Clearance	Remove	331493.369	6245423.94	5.18
218	1	<i>Corymbia maculata</i>	18	9	350	GOOD	GOOD	4.2	2.13	Fenceline Clearance	Remove	331487.025	6245423.813	3.896
219	1	<i>Eucalyptus robusta</i>	16	16	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331479.362	6245435.022	3.873
220	6	<i>Corymbia maculata</i>	16	9	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331480.211	6245439.695	6.252



## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

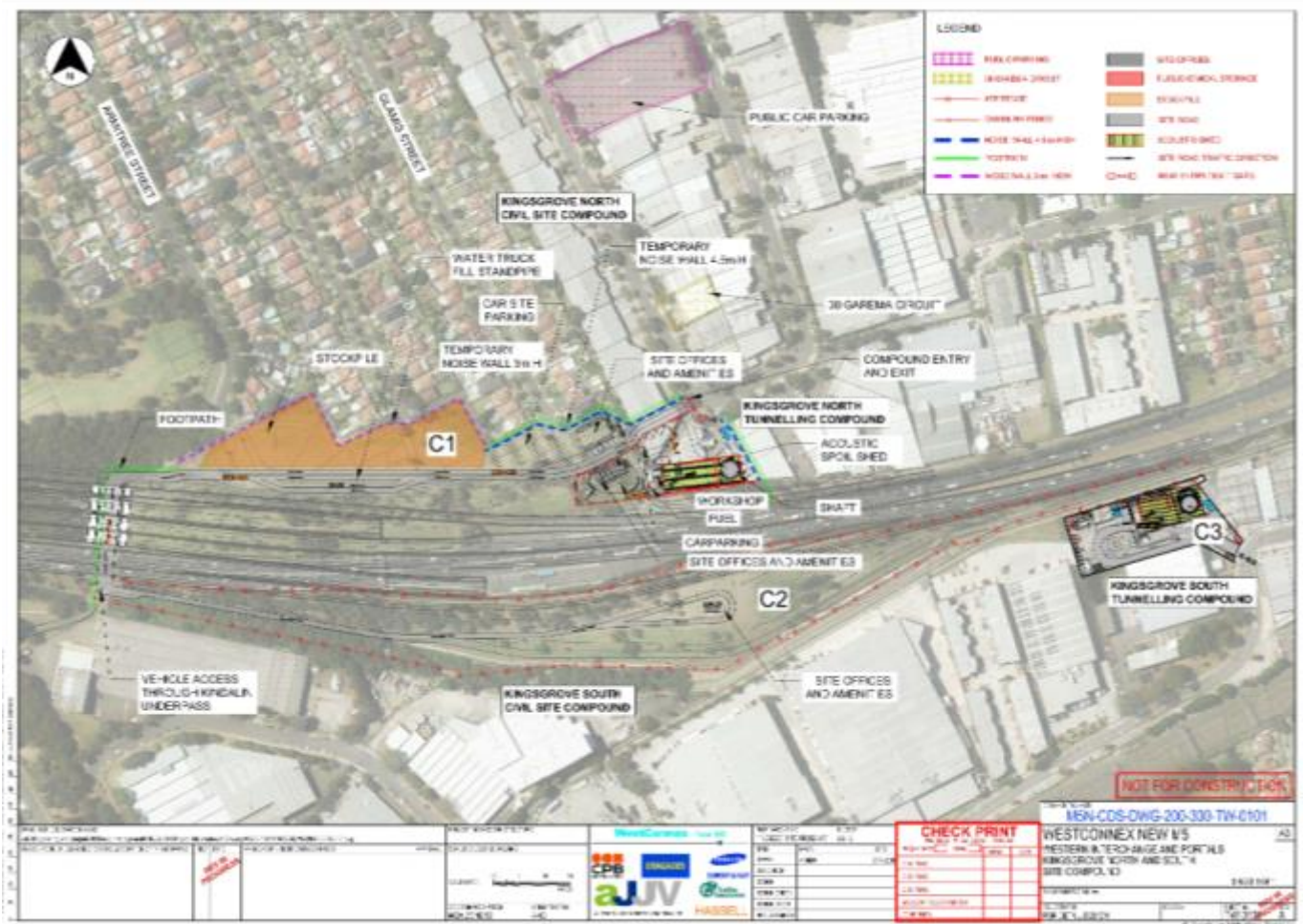
NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
221	1	<i>Corymbia maculata</i>	16	9	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331473.861	6245441.571	5.002
222	1	<i>Corymbia maculata</i>	17	8	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331471.12	6245445.34	4.061
223	1	<i>Corymbia maculata</i>	17	7	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331466.973	6245449.774	7.058
224	1	<i>Corymbia maculata</i>	16	8	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331463.939	6245453.824	5.516
225	1	<i>Casuarina glauca</i>	15	7	300	MODERATE	MODERATE	3.6	2	Construction area	Remove	331457.812	6245462.366	4.044
226	3	<i>Corymbia maculata</i>	18	10	400	GOOD	MODERATE	4.8	2.25	Fenceline Clearance	Remove	331449.783	6245478.647	4.544
227	1	<i>Casuarina glauca</i>	12	3	250	GOOD	GOOD	3	1.85	Fenceline Clearance	Remove	331441.087	6245482.571	3.813
228	2	<i>Corymbia maculata</i>	18	10	450	GOOD	MODERATE	5.4	2.37	Fenceline Clearance	Remove	331439.548	6245491.928	8.466
229	1	<i>Corymbia maculata</i>	16	12	350	GOOD	MODERATE	4.2	2.13	Fenceline Clearance	Remove	331433.196	6245492.608	3.969
230	1	<i>Eucalyptus robusta</i>	15	16	500	MODERATE	MODERATE	6	2.47	Construction area	Remove	331423.874	6245504.373	4.069
231	1	<i>Casuarina glauca</i>	4	3	150	GOOD	GOOD	2	1.5	Construction area	Remove	331419.018	6245516.059	4.417
232	1	<i>Corymbia maculata</i>	16	8	350	GOOD	MODERATE	4.2	2.13	Fenceline Clearance	Remove	331414.146	6245521.389	5.895
233	1	<i>Corymbia maculata</i>	16	12	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331411.569	6245545.892	11.207
234	1	<i>Corymbia maculata</i>	16	9	350	GOOD	MODERATE	4.2	2.13	Fenceline Clearance	Remove	331390.068	6245547.013	4.685
235	1	<i>Corymbia maculata</i>	16	9	350	MODERATE	MODERATE	4.2	2.13	Fenceline Clearance	Remove	331382.186	6245554.486	7.185
236	1	<i>Casuarina glauca</i>	14	5	300	GOOD	MODERATE	3.6	2	Fenceline Clearance	Remove	331378.969	6245563.112	4.193
237	2	<i>Corymbia maculata</i>	16	8	400	GOOD	MODERATE	4.8	2.25	Fenceline Clearance	Remove	331376.626	6245565.739	8.416
238	1	<i>Corymbia maculata</i>	17	8	300	GOOD	MODERATE	3.6	2	Fenceline Clearance	Remove	331373.885	6245565.277	4.034
239	1	<i>Corymbia maculata</i>	18	8	350	MODERATE	MODERATE	4.2	2.13	Fenceline Clearance	Remove	331369.358	6245571.411	6.49
240	1	<i>Corymbia maculata</i>	14	8	300	GOOD	MODERATE	3.6	2	Fenceline Clearance	Remove	331365.381	6245575.932	6.28

## ST PETERS SURFACE WORKS AREA

Trees to be removed ( 435)

NO	TREES IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	HEALTH	STRUCTURE	TPZ (m)	SRZ Radius (m)	OTHER NOTES	OUTCOME	Easting	Northing	MSL
241	1	<i>Casuarina glauca</i>	16	8	300	MODERATE	MODERATE	3.6	2	Fenceline Clearance	Remove	331360.881	6245583.539	4.374
242	4	<i>Casuarina glauca</i>	16	4	400	GOOD	GOOD	4.8	2.25	Construction area	Remove	331354.257	6245597.876	4.475
243	1	<i>Casuarina glauca</i>	14	9	300	GOOD	MODERATE	3.6	2	Construction area	Remove	331362.083	6245615.92	5.378
244	1	<i>Casuarina glauca</i>	17	10	400	GOOD	MODERATE	4.8	2.25	Fenceline Clearance	Remove	331351.197	6245627.956	4.92
245	5	<i>Casuarina glauca</i>	16	10	500	GOOD	MODERATE	6	2.47	Fenceline Clearance	Remove	331337.922	6245619.749	8.236
246	1	<i>Casuarina glauca</i>	17	12	400	GOOD	MODERATE	4.8	2.25	Construction area	Remove	331332.681	6245634.437	5.155
247	1	<i>Fraxinus griffithii</i>	4	3	150	MODERATE	MODERATE	2	1.5	Construction area	Remove	331330.11	6245677.897	5.636
248	1	<i>Corymbia maculata</i>	16	8	400	GOOD	GOOD	4.8	2.25	Fenceline Clearance	Remove	331316.756	6245695.877	8.17
249	1	<i>Corymbia maculata</i>	16	8	400	GOOD	GOOD	4.8	2.25	Fenceline Clearance	Remove	331312.586	6245648.741	5.529
250	1	<i>Eucalyptus saligna</i>	22	12	700	GOOD	GOOD	8.4	2.85	Construction area	Remove	331307.676	6245655.428	6.801
251	1	<i>Celtis australis</i>	12	12	400	MODERATE	GOOD	4.8	2.25	Fenceline Clearance	Remove	331296.212	6245671.817	7.269
252	1	<i>Tibouchina species</i>	3	3	150	MODERATE	MODERATE	2	1.5	Fenceline Clearance	Remove	331382.852	6245760.064	17.446
253	1	<i>Photinia robusta</i>	3	2	150	GOOD	MODERATE	2	1.5	Fenceline Clearance	Remove	331395.631	6245761.323	15.198

## d. Site 4: Kingsgrove Surface Works Area



Map 14. Kingsgrove Surface Works Area.

This site was inspected on 19<sup>th</sup> – 21<sup>st</sup> May 2016. The site was walked and all trees within the area and within close proximity to the boundary fence were recorded for this report, this included neighboring property trees.

In total four hundred and forty four (444) trees were surveyed within Kingsgrove surface works area that were either within the proposed area or within close proximity to the area.

The following is a summary of findings for Kingsgrove compound.

- Four hundred and forty four (444) trees surveyed and data recorded. Of the 444 trees surveyed three hundred and nineteen (319) trees were given GNSS locations as same species trees located close together and with similar health and structure have been grouped together.
- Native trees made up four hundred and twenty six (426) of the trees.
- Non-native and weed species made up the other trees eighteen.

- Three hundred and three (303) trees were in good health, eighty seven (87) trees were in moderate health and fifty four (54) trees were in poor health.
- Twenty (20) trees can be retained with fifteen (15) requiring directional pruning away from the proposed boundary line fence.
- Four hundred and twenty four (424) trees are required to be removed due to construction.

### **Summary Kingsgrove Surface Works Area:**

This site is located within Kingsgrove Surface Works Area. The site inspection with representatives from CDS-JV identified trees along the boundary fence line and internally that are required to be removed for either construction or clearance of the fence line. In total four hundred forty four (444) trees were inspected and four hundred and twenty four (424) trees are required to be removed for construction.

Twenty (20) trees can be retained with fifteen (15) requiring directional pruning away from the proposed boundary line fence.

### **Recommendations Kingsgrove Surface Works Area:**

- Mulch from the *Olea europea* 'Europea' and other weed species should be taken to a landfill site and not used on site as it will spread the weed species of tree.
- All pruning work is to be undertaken to AS 4373 "Pruning of Amenity Trees".
- All tree material to be mulched and re-used on site or stored for landscaping use or disposal off site.



Map 15. Kingsgrove Surface Works Area. Overall view of trees surveyed. Red dot denotes tree removal. Green dot denotes tree retention.



Map 16. Kingsgrove Surface Works Area. Close up of trees surveyed.



Map 17. Kingsgrove Surface Works Area. Close up of trees surveyed.

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
1	1	Casuarina glauca	10	5	200	2.4	1.68	GOOD	GOOD	Construction	Remove	323346.842	6242861.647	22.766
2	1	Casuarina glauca	8	4	200	2.4	1.68	GOOD	GOOD	Construction	Remove	323356.105	6242856.257	23.087
3	1	Acacia species	10	4	100	2	1.5	MODERATE	MODERATE	Boundary tree, prune for clearance	Retain tree - Prune	323354.058	6242866.826	23.63
4	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323367.527	6242857.585	23.404
5	2	Eucalyptus robusta	8	3	200	2.4	1.68	MODERATE	GOOD	Remove due to constuction. Psyllid damage to tree.	Remove	323374.784	6242864.84	23.994
6	10	Melaleuca styphoides	8	5	150	2	1.5	GOOD	MODERATE	Boundary pruning	Retain tree - Prune	323377.5	6242879.03	23.618
7	1	Eucalyptus robusta	6	3	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction. Psyllid damage to tree.	Remove	323400.998	6242874.33	25.303
8	1	Eucalyptus robusta	4	4	150	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323424.132	6242883.166	25.864
9	1	<u>Mixed planting</u>	<u>10</u>	<u>6</u>	<u>400</u>	<u>4.8</u>	<u>2.25</u>	<u>GOOD</u>	<u>MODERATE</u>	<u>Retain tree</u>	<u>Retain tree</u>	<u>323429.493</u>	<u>6242909.978</u>	<u>26.916</u>
10	1	Casuarina glauca	10	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323451.39	6242884.797	26.732
11	1	Lophostemon confertus	4	2	100	2	1.5	POOR	MODERATE	Remove due to constuction	Remove	323454.943	6242899.883	25.72
12	1	Lophostemon confertus	3	2	100	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323467.414	6242910.079	24.894
13	1	Hakea salicifolia	2	3	100	2	1.5	POOR	MODERATE	Remove due to constuction	Remove	323497.442	6242933.957	24.417
14	1	Jacaranda mimosifolia	4	5	250	3	1.85	GOOD	GOOD	Retain tree	Retain tree	323518.79	6242948.819	26.42
15	1	Ficus macrophylla	3	1	100	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323518.824	6242931.791	24.497
16	1	Angophora costata	6	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323582.321	6242927.166	24.276
17	1	Lophostemon confertus	4	3	200	2.4	1.68	GOOD	GOOD	Retain tree and canopy prune, southern side	Retain tree - Prune	323592.015	6242922.041	25.015
18	1	Eucalyptus species	9	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323594.142	6242916.234	25.573
19	1	Eucalyptus tereticornis	12	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323598.759	6242893.5	24.876
20	1	Corymbia maculata	13	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323612.866	6242882.917	25.254
21	1	Eucalyptus tereticornis	12	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323608.739	6242906.56	25.057



# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
22	1	Lophostemon confertus	7	3	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323603.249	6242926.679	24.864
23	1	Angophora costata	10	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323607.542	6242927.235	25.152
24	1	Lophostemon confertus	10	4	200	2.4	1.68	GOOD	GOOD	Retain tree and crown raise southern side	Retain tree - Prune	323606.737	6242931.462	24.806
25	1	Eucalyptus fibrosa	12	6	250	3	1.85	GOOD	POOR	Remove tree due to construction Included bark junction	Remove	323613.748	6242930.124	25.493
26	1	Ficus macrophylla	3	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323632.282	6242931.395	25.473
27	1	Lophostemon confertus	5	3	150	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323634.168	6242939.645	25.311
28	1	Callistemon viminalis	4	5	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323664.722	6242908.66	27.076
29	1	Eucalyptus species	13	4	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323695.549	6242890.821	25.805
30	1	Eucalyptus species	12	4	250	3	1.85	MODERATE	POOR	Remove tree due to construction Included bark junction	Remove	323695.271	6242890.777	25.471
31	1	Eucalyptus species	12	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323699.385	6242891.847	25.412
32	1	Eucalyptus microcorys	12	4	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323704.169	6242894.042	25.578
33	1	Syncarpia glomulifera	4	2	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323704.545	6242911.877	25.344
34	1	Callistemon viminalis	4	5	300	3.6	2	MODERATE	MODERATE	Retain tree - no work	Retain tree	323716.279	6242921.125	25.586
35	1	Syncarpia glomulifera	4	3	250	3	1.85	MODERATE	MODERATE	Remove due to constuction	Remove	323714.718	6242924.274	25.75
36	1	Eucalyptus species	14	6	200	2.4	1.68	GOOD	GOOD	Retain tree and crown raise southern side	Retain tree - Prune	323733.184	6242921.695	26.109
37	1	Syncarpia glomulifera	4	3	300	3.6	2	GOOD	POOR	Retain tree - no work	Retain tree	323736.289	6242927.664	26.533
38	1	Eucalyptus species	12	6	250	3	1.85	GOOD	GOOD	Retain tree - no work	Retain tree	323758.754	6242934.094	27.805
39	1	Angophora floribunda	12	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323762.57	6242928.013	27.417
40	1	Eucalyptus siderloxyn	12	5	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323746.8	6242905.007	26.494
41	1	Eucalyptus siderloxyn	12	5	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323761.711	6242919.734	27.11

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
42	1	Angophora costata	4	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323768.141	6242913.805	27.1
43	1	Eucalyptus species	5	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323763.86	6242900.653	26.056
44	1	Casuarina glauca	12	4	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323773.551	6242900.947	26.113
45	1	Weeds	7	7	100	2	1.5	MODERATE	POOR	Remove due to constuction	Remove	323780.748	6242889.06	25.87
46	1	Dead tree	7	7	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323765.257	6242913.9	26.65
47	1	Ligustrum spp	8	6	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323775.5	6242906.851	28.252
48	1	Casuarina glauca	12	10	1000	12	3.31	MODERATE	MODERATE	Remove due to constuction	Remove	323782.226	6242892.272	28.989
49	1	Cinnamomum camphora	12	8	700	8.4	2.85	GOOD	MODERATE	Remove due to constuction	Remove	323785.414	6242888.621	30.149
50	1	Casuarina glauca	14	5	600	7.2	2.67	MODERATE	GOOD	Remove due to constuction	Remove	323784.191	6242881.52	24.271
51	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323786.797	6242881.498	26.064
52	1	Eucalyptus fibrosa	14	16	700	8.4	2.85	MODERATE	MODERATE	Remove due to constuction	Remove	323794.482	6242872.706	24.779
53	4	Casuarina cunninghamiana	12	4	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323801.264	6242870.107	25.642
54	2	Eucalyptus robusta	8	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323816.014	6242868.778	25.78
55	1	Angophora floribunda	10	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323825.607	6242865.41	24.308
56	1	Casuarina cunninghamiana	10	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323834.342	6242861.233	24.41
57	4	Casuarina cunninghamiana	12	2	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323841.184	6242861.756	23.689
58	1	Casuarina cunninghamiana	8	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323845.561	6242862.271	23.725
59	1	Angophora floribunda	7	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323844.784	6242867.885	24.943
60	1	Acacia species	9	4	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323845.952	6242862.248	23.734
61	1	Casuarina cunninghamiana	13	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323848.227	6242861.259	24.364
62	14	Casuarina cunninghamiana	9	2	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323852.058	6242863.751	23.836

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
63	4	Casuarina cunninghamiana	10	4	250	3	1.85	MODERATE	MODERATE	Remove due to constuction	Remove	323852.932	6242864.159	25.571
64	1	Dead tree	4	4	300	3.6	2	POOR	POOR	Remove due to constuction	Remove	323856.82	6242868.951	27.309
65	1	Cinnamomum camphora	8	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323854.418	6242861.421	31.911
66	2	Casuarina cunninghamiana	12	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323855.228	6242871.834	28.083
67	2	Casuarina cunninghamiana	8	3	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323856.207	6242875.575	29.252
68	1	Acacia species	7	3	150	2	1.5	POOR	POOR	Remove due to constuction	Remove	323865.398	6242869.987	27.502
69	1	Angophora floribunda	7	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323861.833	6242864.143	27.013
70	1	Casuarina cunninghamiana	10	3	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323864.182	6242864.475	26.018
71	2	Casuarina cunninghamiana	10	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323867.517	6242865.083	25.586
72	3	Ligustrum lucidum	4	3	150	2	1.5	MODERATE	POOR	Remove due to constuction	Remove	323871.937	6242864.219	25.094
73	3	Melaleuca armillaris	3	3	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323873.738	6242872.072	26.77
74	2	Casuarina cunninghamiana	3	2	100	2	1.5	MODERATE	POOR	Remove due to constuction	Remove	323873.446	6242874.43	27.228
75	1	Angophora floribunda	4	3	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323882.655	6242877.064	23.422
76	4	Casuarina cunninghamiana	10	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323877.489	6242862.5	25.34
77	2	Angophora floribunda	6	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323879.744	6242864.793	25.603
78	2	Casuarina cunninghamiana	3	2	100	2	1.5	POOR	POOR	Remove due to constuction	Remove	323887.867	6242873.096	22.889
79	1	Angophora floribunda	4	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323894.175	6242867.578	22.848
80	1	Casuarina glauca	8	7	250	3	1.85	MODERATE	POOR	Remove due to constuction	Remove	323900.319	6242866.069	24.912
81	3	Casuarina glauca	3	2	100	2	1.5	POOR	MODERATE	Remove due to constuction	Remove	323903.588	6242867.151	25.716
82	1	Casuarina cunninghamiana	12	6	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	323900.668	6242873.873	24.411
83	1	Angophora floribunda	4	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323908.902	6242867.979	24.277

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
84	4	Casuarina cunninghamiana	5	2	150	2	1.5	POOR	POOR	Remove due to constuction	Remove	323911.724	6242875.231	23.269
85	1	Angophora floribunda	8	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323913.586	6242869.825	25.982
86	1	Angophora costata	8	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323921.206	6242870.933	25.775
87	3	Casuarina cunninghamiana	3	2	100	2	1.5	POOR	POOR	Remove due to constuction	Remove	323933.296	6242873.212	24.617
88	1	Angophora floribunda	8	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323932.887	6242874.76	24.198
89	1	Angophora floribunda	7	3	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323937.398	6242871.627	24.753
90	1	Casuarina cunninghamiana	3	2	100	2	1.5	POOR	POOR	Remove due to constuction	Remove	323939.836	6242875.087	24.297
91	1	Angophora floribunda	8	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323949.362	6242875.397	26.514
92	1	Malus spp	7	5	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323952.047	6242877.67	25.799
93	1	Casuarina cunninghamiana	4	3	150	2	1.5	MODERATE	POOR	Remove due to constuction	Remove	323969.041	6242880.148	25.293
94	1	Angophora floribunda	13	9	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323978.432	6242887.092	25.516
95	1	Casuarina glauca	4	3	250	3	1.85	GOOD	POOR	Growing on top of soundwall. Remove tree due to constuction	Remove	324059.256	6242901.005	23.684
96	1	Casuarina cunninghamiana	10	9	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	324082.499	6242905.294	22.498
97	1	Lagerstroemia indica	4	4	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	324204.702	6242934.886	26.177
98	1	Ficus macrophylla	4	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	324206.82	6242960.784	21.364
99	1	Eucalyptus moluccana	4	2	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	324224.718	6242965.785	17.765
100	1	Casuarina cunninghamiana	4	3	100	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	324226.979	6242956.411	18.022
101	1	Acacia species	4	3	100	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323762.067	6242887.36	30.529
102	1	Sapium saberiferum	3	3	100	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323759.381	6242890.592	30.585
103	1	Casuarina cunninghamiana	7	1	100	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323753.372	6242891.173	30.564
104	1	Eucalyptus bauerana	7	5	200	2.4	1.68	MODERATE	POOR	Remove due to constuction	Remove	323748.666	6242882.149	34.072

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
105	1	Eucalyptus moluccana	14	8	250	3	1.85	MODERATE	MODERATE	Remove due to constuction	Remove	323741.409	6242874.145	34.482
106	1	Eucalyptus moluccana	14	7	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	323743.347	6242879.345	33.937
107	1	Eucalyptus moluccana	8	3	250	3	1.85	MODERATE	MODERATE	Remove due to constuction	Remove	323739.065	6242885.022	31.919
108	1	Eucalyptus moluccana	14	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323734.188	6242890.991	29.252
109	1	Eucalyptus moluccana	8	4	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323732.135	6242876.638	34.187
110	1	Eucalyptus moluccana	16	8	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323722.409	6242887.128	30.363
111	1	Eucalyptus moluccana	16	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323721.066	6242873.864	34.399
112	1	Acacia longifolia	4	3	100	2	1.5	POOR	MODERATE	Remove due to constuction	Remove	323717.101	6242879.034	32.133
113	1	Acacia species	4	3	100	2	1.5	POOR	MODERATE	Remove due to constuction	Remove	323712.483	6242883.666	30.448
114	1	Casuarina glauca	14	4	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323694.887	6242874.266	31.678
115	1	Angophora floribunda	10	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323676.311	6242862.581	32.995
116	1	Angophora floribunda	15	6	350	4.2	2.13	GOOD	GOOD	Remove due to constuction	Remove	323640.454	6242872.58	31.27
117	1	Eucalyptus species	14	5	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	323656.906	6242833.651	30.197
118	1	Angophora floribunda	13	6	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323652.438	6242840.238	32.641
119	1	Angophora floribunda	7	7	400	4.8	2.25	GOOD	MODERATE	Remove due to constuction	Remove	323649.014	6242831.471	31.675
120	1	Angophora costata	14	6	350	4.2	2.13	MODERATE	MODERATE	Remove due to constuction	Remove	323646.088	6242836.453	33.393
121	1	Angophora floribunda	15	7	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	323643.623	6242852.199	36.294
122	1	Angophora floribunda	16	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323639.148	6242857.906	33.74
123	1	Casuarina glauca	12	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323635.584	6242864.404	32.164
124	1	Angophora floribunda	8	8	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323636.907	6242864.798	30.582
125	1	Angophora floribunda	16	12	400	4.8	2.25	GOOD	MODERATE	Remove due to constuction	Remove	323633.482	6242847.814	37.044

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
126	1	Angophora floribunda	11	5	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323634.397	6242850.125	37.439
127	1	Angophora floribunda	16	4	400	4.8	2.25	GOOD	MODERATE	Remove due to constuction	Remove	323630.485	6242862.789	16.648
128	1	Casuarina glauca	15	3	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323624.529	6242849.203	36.138
129	1	Casuarina cunninghamiana	4	4	150	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323619.626	6242853.282	34.342
130	1	Eucalyptus species	8	8	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323605.215	6242870.516	13.965
131	1	Acacia species	5	3	150	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323601.179	6242847.152	36.276
132	1	Angophora costata	14	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323577.269	6242831.094	34.201
133	1	Eucalyptus robusta	8	4	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323577.181	6242851.718	19.129
134	1	Acacia species	5	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323546.157	6242859.419	30.474
135	1	Eucalyptus robusta	6	4	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323532.854	6242822.771	31.661
136	1	Eucalyptus robusta	19	8	400	4.8	2.25	GOOD	GOOD	Remove due to constuction	Remove	323529	6242834.074	37.527
137	1	Eucalyptus robusta	7	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323523.26	6242846.332	36.734
138	1	Casuarina glauca	9	5	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323512.134	6242876.561	10.342
139	1	Casuarina glauca	12	3	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323510.887	6242849.997	34.847
140	1	Eucalyptus robusta	8	5	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323513.539	6242835.203	37.625
141	1	Eucalyptus robusta	14	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323510.546	6242856.4	18.278
142	1	Acacia species	6	4	150	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323506.817	6242854.597	22.874
143	1	Pittosporum undulatum	7	5	250	3	1.85	MODERATE	MODERATE	Remove due to constuction	Remove	323498.556	6242864.573	19.991
144	1	Syncarpia glomulifera	7	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323484.822	6242851.687	34.408
145	1	Sapium sebiferum	3	3	100	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323462.771	6242823.759	31.512
146	1	Sapium sebiferum	10	4	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323450.084	6242828.945	35.763

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
147	1	Acacia species	8	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323435.617	6242828.429	34.077
148	1	Acacia species	5	6	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323449.215	6242861.224	34.557
149	1	Acacia longifolia	6	5	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323441.482	6242868.212	33.5
150	1	Acacia species	3	3	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323394.396	6242829.462	33.492
151	1	Ligustrum spp	4	3	100	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323396.619	6242854.786	29.831
152	1	Acacia species	8	7	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	323418.291	6242849.785	36.481
153	1	Casuarina glauca	8	7	250	3	1.85	MODERATE	MODERATE	Remove due to constuction	Remove	324252.615	6242905.899	20.76
154	1	Acacia decurrens	8	7	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	324237.444	6242902.707	24.794
155	1	Acacia decurrens	5	5	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	324229.285	6242899.587	22.026
156	1	Acacia decurrens	5	5	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	324220.001	6242891.117	15.947
157	1	Casuarina glauca	5	4	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	324218.322	6242894.958	21.369
158	1	Casuarina glauca	5	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324207.855	6242892.799	23.603
159	1	Casuarina glauca	5	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324146.046	6242875.876	26.11
160	1	Casuarina glauca	5	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324113.694	6242864.97	23.096
161	1	Casuarina glauca	5	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324095.159	6242863.356	22.56
162	1	Casuarina glauca	6	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324085.128	6242862.465	22.382
163	1	Casuarina glauca	6	3	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	324066.588	6242852.975	20.462
164	1	Eucalyptus robusta	6	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324060.593	6242850.943	20.547
165	1	Casuarina glauca	5	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	324051.004	6242849.271	21.062
166	1	Casuarina glauca	6	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324043.998	6242852.089	22.473
167	1	Casuarina glauca	7	4	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	324039.552	6242851.318	22.768

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
168	1	Casuarina glauca	8	5	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324036.533	6242853.845	24.288
169	1	Casuarina glauca	6	4	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324030.293	6242850.058	23.525
170	1	Casuarina glauca	7	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324031.839	6242844.99	21.536
171	1	Casuarina glauca	4	2	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324024.711	6242843.91	21.298
172	1	Casuarina glauca	5	2	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	324023.811	6242848.792	23.419
173	1	Casuarina glauca	6	5	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324020.211	6242850.126	24.086
174	1	Casuarina glauca	4	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	324021.405	6242843.321	21.569
175	1	Casuarina glauca	6	3	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	324013.17	6242847.774	23.792
176	1	Casuarina glauca	7	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	324012.03	6242842.017	21.903
177	1	Casuarina glauca	6	3	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	324005.91	6242847.139	24.376
178	1	Casuarina glauca	7	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	324005.512	6242840.593	22.071
179	1	Eucalyptus moluccana	7	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	324001.361	6242843.885	23.911
180	1	Eucalyptus moluccana	7	2	200	2.4	1.68	MODERATE	POOR	Remove due to constuction	Remove	323997.477	6242843.591	25.064
181	1	Eucalyptus moluccana	7	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323990.212	6242843.158	25.909
182	1	Eucalyptus moluccana	8	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323804.933	6242783.918	28.813
183	1	Eucalyptus moluccana	8	4	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323797.726	6242780.862	28.508
184	1	Acacia decurrens	5	5	300	3.6	2	MODERATE	POOR	Remove due to constuction	Remove	323789.433	6242782.987	28.661
185	1	Ficus macrophylla	2	1	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323784.205	6242776.435	28.291
186	1	Eucalyptus species	4	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323786.698	6242766.98	28.247
187	1	Ficus macrophylla	5	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323773.989	6242761.185	27.562
188	1	Eucalyptus grandis	16	10	300	3.6	2	GOOD	GOOD	Retaine tree. Crown raise northern first order branch over pathway	Retain tree - Prune	323764.838	6242766.336	27.356



# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
189	1	Eucalyptus robusta	10	10	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323687.352	6242753.619	25.545
190	1	Eucalyptus robusta	15	10	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323673.207	6242750.71	25.019
191	1	Casuarina glauca	9	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323572.42	6242753.837	22.884
192	1	Eucalyptus robusta	12	5	200	2.4	1.68	MODERATE	POOR	Remove due to constuction	Remove	323564.13	6242767.328	23.786
193	1	Eucalyptus robusta	12	8	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323550.622	6242781.801	29.517
194	1	Eucalyptus robusta	12	8	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323559.442	6242784.243	31.248
195	1	Eucalyptus robusta	16	6	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323556.3	6242770.03	24.556
196	1	Eucalyptus robusta	15	8	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323551.185	6242773.721	28.343
197	1	Eucalyptus grandis	17	9	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323545.16	6242785.783	31.83
198	1	Eucalyptus robusta	9	7	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323545.418	6242777.531	26.327
199	1	Eucalyptus robusta	13	4	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323545.695	6242769.977	21.433
200	1	Eucalyptus robusta	12	8	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323543.282	6242759.339	23.629
201	1	Eucalyptus robusta	12	8	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323539.866	6242776.179	26.659
202	1	Eucalyptus robusta	12	8	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323526.779	6242788.265	36.591
203	1	Casuarina cunninghamiana	6	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323533.69	6242770.576	22.353
204	1	Acacia decurrens	6	4	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323527.954	6242776.414	31.3
205	1	Casuarina glauca	8	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323522.534	6242783.887	26.723
206	1	Casuarina glauca	7	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323973.902	6242834.943	27.851
207	1	Casuarina glauca	8	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323967.439	6242841.233	27.868
208	1	Casuarina glauca	6	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323975.948	6242848.013	26.323
209	1	Acacia species	6	4	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323958.829	6242840.8	27.905

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
210	1	Casuarina glauca	6	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323945.71	6242839.214	26.587
211	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323940.163	6242820.098	28.962
212	1	Casuarina glauca	8	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323929.164	6242819.163	28.087
213	1	Casuarina glauca	8	4	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323925.631	6242822.82	28.636
214	1	Casuarina glauca	3	2	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323929.248	6242837.375	27.141
215	1	Casuarina glauca	8	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323912.936	6242833.847	26.875
216	1	Casuarina glauca	5	2	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323915.04	6242820.859	28.696
217	1	Eucalyptus robusta	4	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323903.478	6242822.683	29.707
218	1	Casuarina glauca	4	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323892.471	6242830.519	28.832
219	1	Eucalyptus microcorys	3	2	100	2	1.5	GOOD	POOR	Remove due to constuction	Remove	323893.398	6242823.348	29.617
220	1	Casuarina glauca	8	2	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323889.399	6242819.464	29.579
221	1	Casuarina glauca	5	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323879.628	6242818.894	30.082
222	1	Eucalyptus microcorys	3	1	100	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323859.389	6242815.092	30.571
223	1	Eucalyptus microcorys	4	2	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323859.822	6242823.505	28.57
224	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323853.876	6242815.065	30.53
225	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323852.108	6242813.266	30.095
226	1	Eucalyptus moluccana	3	2	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323846.722	6242813.934	30.545
227	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323851.936	6242824.201	27.856
228	1	Casuarina glauca	5	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323842.911	6242822.765	27.615
229	1	Eucalyptus moluccana	3	2	100	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323834.122	6242810.41	30.389
230	1	Casuarina glauca	7	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323825.557	6242819.76	28.064

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
231	1	Casuarina glauca	5	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323822.935	6242808.131	30.779
232	1	Casuarina glauca	9	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323816.279	6242805.148	30.318
233	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323819.14	6242801.659	30.152
234	1	Casuarina glauca	5	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323812.316	6242806.571	31.208
235	1	Acacia species	4	2	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323812.673	6242816.129	28.53
236	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323803.326	6242813.889	28.753
237	1	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323805.053	6242798.046	29.835
238	1	Eucalyptus moluccana	10	4	300	3.6	2	MODERATE	POOR	Remove due to constuction	Remove	323799.974	6242808.298	30.464
239	2	Eucalyptus moluccana	13	6	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323799.024	6242803.775	31.22
240	1	Eucalyptus moluccana	6	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323792.277	6242808.95	28.551
241	1	Eucalyptus moluccana	14	6	300	3.6	2	POOR	POOR	Remove due to constuction	Remove	323796.004	6242802.195	31.434
242	1	Eucalyptus moluccana	12	8	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323785.27	6242792.314	32.735
243	1	Eucalyptus moluccana	14	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323783.777	6242798.819	32.371
244	7	Casuarina glauca	8	2	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323783.501	6242806.042	32.075
245	1	Eucalyptus moluccana	14	7	300	3.6	2	MODERATE	POOR	Remove due to constuction	Remove	323778.525	6242798.08	32.341
246	6	Casuarina glauca	8	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323772.631	6242803.297	30.05
247	1	Acacia decurrens	7	5	300	3.6	2	POOR	POOR	Remove due to constuction	Remove	323764.322	6242785.14	32.934
248	12	Casuarina glauca	8	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323760.924	6242801.158	30.332
249	1	Acacia decurrens	7	4	300	3.6	2	POOR	POOR	Remove due to constuction	Remove	323756.042	6242786.5	32.453
250	1	Acacia decurrens	7	5	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323749.651	6242784.478	32.288
251	3	Acacia decurrens	6	5	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323739.85	6242777.938	31.322

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
252	1	Acacia decurrens	5	4	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323734.534	6242780.661	32.297
253	1	Acacia decurrens	6	5	350	4.2	2.13	POOR	POOR	Remove due to constuction	Remove	323722.233	6242780.987	33.774
254	2	Acacia decurrens	9	7	300	3.6	2	POOR	POOR	Remove due to constuction	Remove	323720.641	6242768.466	29.148
255	2	Eucalyptus species	6	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323702.399	6242765.912	29.026
256	1	Eucalyptus species	9	7	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323692.418	6242765.116	29.101
257	1	Eucalyptus species	8	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323691.873	6242771.292	31.675
258	1	Eucalyptus species	6	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323691.275	6242779.014	32.784
259	1	Eucalyptus species	12	8	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323687.448	6242764.055	26.961
260	1	Eucalyptus species	12	5	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323687.843	6242769.671	30.612
261	1	Eucalyptus species	6	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323688.852	6242774.318	31.896
262	1	Eucalyptus species	8	8	300	3.6	2	MODERATE	POOR	Remove due to constuction	Remove	323685.403	6242773.6	31.232
263	1	Eucalyptus species	6	4	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323683.148	6242769.565	29.561
264	1	Eucalyptus species	6	6	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323680.297	6242773.491	31.934
265	1	Angophora costata	6	4	350	4.2	2.13	GOOD	GOOD	Remove due to constuction	Remove	323670.648	6242768.676	29.93
266	6	Angophora costata	7	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323662.257	6242772.076	30.626
267	1	Acacia species	10	6	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323655.463	6242766.236	29.914
268	1	Angophora costata	10	6	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323653.561	6242767.57	28.796
269	1	Acacia species	8	5	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323647.443	6242767.586	29.932
270	1	Angophora costata	7	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323645.421	6242769.614	29.794
271	2	Casuarina glauca	5	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323648.705	6242787.548	32.964
272	1	Acacia decurrens	3	4	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323641.691	6242779.164	33.416

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
273	1	Angophora costata	9	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323641.385	6242769.113	29.294
274	2	Angophora costata	9	5	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323630.967	6242774.127	30.77
275	1	Casuarina glauca	4	3	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323632.472	6242782.931	33.943
276	2	Angophora costata	9	6	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323623.744	6242773.769	32.141
277	1	Acacia decurrens	14	8	350	4.2	2.13	MODERATE	POOR	Remove due to constuction	Remove	323618.53	6242767.402	29.143
278	1	Acacia decurrens	13	9	350	4.2	2.13	POOR	POOR	Remove due to constuction	Remove	323613.295	6242774.038	31.594
279	3	Angophora costata	8	4	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323608.706	6242774.323	32.033
280	4	Angophora costata	12	7	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323601.698	6242775.85	31.333
281	3	Angophora costata	7	5	200	2.4	1.68	GOOD	GOOD	Remove due to constuction	Remove	323592.89	6242774.522	29.904
282	2	Acacia species	12	5	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323585.967	6242776.242	29.656
283	2	Angophora costata	8	4	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323581.96	6242777.404	29.572
284	1	Acacia species	13	8	350	4.2	2.13	POOR	POOR	Remove due to constuction	Remove	323575.645	6242774.117	28.837
285	4	Angophora costata	8	7	250	3	1.85	GOOD	GOOD	Remove due to constuction	Remove	323575.948	6242776.946	30.284
286	1	Angophora costata	10	9	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323566.621	6242780.413	29.759
287	1	Casuarina glauca	13	8	350	4.2	2.13	GOOD	MODERATE	Remove due to constuction	Remove	323571.36	6242784.526	31.378
288	1	Casuarina glauca	6	3	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323519.271	6242775.157	32.274
289	2	Casuarina glauca	7	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323518.454	6242780.083	28.386
290	2	Acacia decurrens	10	5	300	3.6	2	POOR	POOR	Remove due to constuction	Remove	323510.587	6242778.494	33.135
291	2	Acacia decurrens	10	5	300	3.6	2	MODERATE	POOR	Remove due to constuction	Remove	323505.945	6242785.117	35.815
292	2	Casuarina glauca	8	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323501.758	6242784.171	34.736
293	1	Acacia species	11	6	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323498.559	6242780.367	30.924

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
294	1	Melaleuca linariifolia	5	3	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323495.342	6242777.847	28.172
295	1	Casuarina glauca	12	3	250	3	1.85	GOOD	MODERATE	Remove due to constuction	Remove	323494.305	6242783.624	31.478
296	6	Casuarina glauca	12	3	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323492.098	6242782.255	29.167
297	1	Melaleuca linariifolia	8	4	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323489.609	6242777.878	27.457
298	3	Casuarina glauca	11	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323487.235	6242783.793	30.872
299	1	Acacia decurrens	12	5	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323486.352	6242779.053	25.767
300	2	Acacia species	9	4	200	2.4	1.68	POOR	POOR	Remove due to constuction	Remove	323479.924	6242782.347	30.225
301	4	Casuarina glauca	12	3	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323477.692	6242786.159	33.822
302	1	Eucalyptus robusta	12	3	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323476.351	6242784.899	33.552
303	1	Eucalyptus grandis	14	8	300	3.6	2	GOOD	GOOD	Remove due to constuction	Remove	323471.998	6242786.029	28.86
304	2	Casuarina glauca	9	2	200	2.4	1.68	MODERATE	MODERATE	Remove due to constuction	Remove	323471.129	6242786.761	28.265
305	3	Melaleuca linariifolia	4	2	150	2	1.5	MODERATE	MODERATE	Remove due to constuction	Remove	323470.597	6242782.808	26.433
306	1	Acacia species	12	7	300	3.6	2	MODERATE	POOR	Remove due to constuction	Remove	323465.407	6242790.576	34.373
307	1	Acacia species	14	7	300	3.6	2	MODERATE	MODERATE	Remove due to constuction	Remove	323464.293	6242786.205	30.924
308	1	Acacia species	9	2	150	2	1.5	POOR	POOR	Remove due to constuction	Remove	323460.325	6242793.517	35.138
309	3	Casuarina glauca	10	3	200	2.4	1.68	GOOD	MODERATE	Remove due to constuction	Remove	323456.06	6242791.288	34.575
310	1	Eucalyptus robusta	10	7	300	3.6	2	GOOD	MODERATE	Remove due to constuction	Remove	323451.47	6242787.604	31.225
311	1	Acacia species	9	2	200	2.4	1.68	POOR	MODERATE	Remove due to constuction	Remove	323448.025	6242788.711	31.376
312	1	Acacia decurrens	14	9	350	4.2	2.13	POOR	POOR	Remove due to constuction	Remove	323442.728	6242790.231	29.622
313	1	Casuarina glauca	3	2	150	2	1.5	MODERATE	MODERATE	Remove tree due to construction. Tree on retaining wall	Remove	323427.677	6242796.133	35.292
314	1	Eucalyptus grandis	2	2	150	2	1.5	MODERATE	MODERATE	Remove tree due to construction. Tree on	Remove	323422.018	6242794.93	35.084

# KINGSGROVE SURFACE WORKS AREA

Trees to be removed (424)

Trees to be retained (20)

TREE NO	TREE IN GROUP	BOTANICAL NAME	HEIGHT (m)	SPREAD (m)	DBH (mm)	TPZ (m)	SRZ Radius (m)	HEALTH	STRUCTURE	OTHER NOTES	OUTCOME	Easting	Northing	MSL
										retaining wall				
315	2	Syzigium	3	2	150	2	1.5	GOOD	GOOD	Remove due to constuction	Remove	323417.771	6242791.371	28.253
316	5	Syzigium	3	2	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323406.077	6242792.537	28.178
317	1	Acacia species	12	7	250	3	1.85	POOR	POOR	Remove due to constuction	Remove	323393.893	6242794.757	25.667
318	1	Acacia decurrens	13	8	400	4.8	2.25	MODERATE	POOR	Remove due to constuction	Remove	323377.487	6242798.376	26.812
319	1	Eucalyptus microcorys	4	2	150	2	1.5	GOOD	MODERATE	Remove due to constuction	Remove	323372.695	6242798.123	25.351

If you require any further information in relation to this report, please contact us on 1300 737 674 or 0418 474796.



Director Australian Tree Consultants  
Registered Consulting Arborist No 1268  
BA (L) Major in Wilderness Management/Outdoor Education  
Diploma Horticulture – Arboriculture (Level 5)  
Arborist/ Tree Surgeon/ Horticulturist  
Certificate IV Occupational Health & Safety

## **LIMITATION OF LIABILITY**

Australian Tree Consultants Pty Ltd and their employees are tree specialists who use their qualifications, education, knowledge, training, diagnostic tools and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of this assessment and report.

Australian Tree Consultants Pty Ltd and its employees cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that sometimes fail in ways the arboriculture industry does not fully understand. Conditions are often hidden within trees and below ground. Unless otherwise stated, observations have been visually assessed from ground level. Australian Tree Consultants Pty Ltd cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of Australian Tree Consultants Pty Ltd services, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters, and related incidents. Australian Tree Consultants Pty Ltd cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise Australian Tree Consultants Pty Ltd cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

In the event that Australian Tree Consultants Pty Ltd recommends retesting or inspection of trees at stated intervals or installs any cable/s, bracing systems and support systems, Australian Tree Consultants Pty Ltd must inspect the system installed at intervals not greater than 12 months unless otherwise specified in written reports. It is the client's responsibility to make arrangements with Australian Tree Consultants Pty Ltd to conduct the re- inspection.

Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk. The only way to eliminate all risks associated with a tree is to eliminate the tree.

All written reports must be read in their entirety, at no time shall part of the written assessment be referred to unless taken in full context of the whole written report.

If this written report is to be used in a court of law or any legal situation Australian Tree Consultants Pty Ltd must be advised in writing prior to the written assessment being presented in any form to any other party.



## **Appendix 1**

### **Protection of Trees on Development Sites**

AS 4970—2009  
(Incorporating Amendment No. 1)

Australian Standard<sup>®</sup>

**Protection of trees on development sites**



This Australian Standard® was prepared by Committee EV-018 (formerly BD-068), Arboriculture. It was approved on behalf of the Council of Standards Australia on 31 July 2009.

This Standard was published on 26 August 2009.

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The following are represented on Committee EV-018 (formerly BD-068):

- Australian Council of National Trusts
- Australian Institute of Building Surveyors
- Australian Institute of Horticulture
- Australian Institute of Landscape Architects
- Australian Local Government Association
- Australian Pipeline Industry Association
- Australian Property Institute
- Energy Networks Association
- Institute of Australian Consulting Arboriculturists
- International Society of Arboriculture (Australia Chapter)
- Local Government Tree Resources Association
- National Arborists Association of Australia
- Nursery and Garden Industry Australia
- Parks and Leisure Australia
- TAFE NSW
- The University of Melbourne
- Water Services Association of Australia

Additional Interests:

- National Trusts of Australia NSW
  - Wollongong City Council
- 

This Standard was issued in draft form for comment as DR AS 4970.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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AS 4970—2009  
(Incorporating Amendment No. 1)

Australian Standard<sup>®</sup>

## Protection of trees on development sites

First published as AS 4970—2009.  
Reissued incorporating Amendment No. 1 (March 2010).

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## PREFACE

This Standard was prepared by the Standards Australia Committee EV-018, Arboriculture.

*This Standard incorporates Amendment No. 1 (March 2010). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.*

This Standard provides guidance for arborists, architects, builders, engineers, land managers, landscape architects and contractors, planners, building surveyors, those concerned with the care and protection of trees, and all others interested in integration between trees and construction.

This document describes the best practices for the planning and protection of trees on development sites. The procedures described are based on plant biology and current best practices as covered in recently published literature.

The assistance obtained from the 1991 and 2005 editions of BS 5837, *Trees in relation to construction—Recommendation*, along with Matheny and Clark (1998)\* and Mattheck and Breloer (1994)\* is acknowledged.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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\* See bibliography in Appendix E for details.

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## FOREWORD

Landscape design is an important component of most development. Established trees of appropriate species and sound structure are beneficial components of the built environment and a potential asset to any development site. Trees may be retained because of their—

- (a) aesthetic qualities;
- (b) heritage values;
- (c) ecosystem benefits, including—
  - (i) stormwater management;
  - (ii) shade and heat reduction qualities;
  - (iii) wildlife habitat and biodiversity;
  - (iv) carbon dioxide absorption;
  - (v) particulate pollution capture;
  - (vi) salt wind protection; and
- (d) social and psychological values.

A living tree is a dynamic organism that needs specific environmental conditions to continue healthy, stable growth. It is rarely possible to repair stressed and injured trees, so substantial injury needs to be avoided during all stages of development and construction. For trees to be retained and their requirements met, procedures must be in place to protect trees at every stage of the development process. This should be taken into account at the earliest planning stage of any outdoor event or design of a development project where trees are involved.

Trees and their root systems may occupy a substantial part of any development site and because of their potential size, can have a major influence on planning the use of the site.

Existing trees of appropriate species and sound structure can significantly enhance new development by providing immediate benefits such as shade and stormwater reduction as well as complementing new development.

Most trees will take many years and possibly decades to establish but can be injured or killed in a very short time as their vulnerability is commonly not understood. This is especially so in relation to tree root systems which cannot usually be seen. Irreparable injury frequently occurs in the early stages of site occupation and remedial measures routinely fail.

Early identification and protection of important trees on development sites is essential from the outset and will minimize the problems of retaining inappropriate trees.

Successful long term retention of trees on development sites depends on an acceptance and acknowledgment of the constraints and benefits that existing trees generate. Protecting trees in accordance with this Standard may influence design and construction costs and this should be considered in project budgets and contracts. The gains and benefits of retaining trees will accrue if the measures detailed in this Standard are applied.

STANDARDS AUSTRALIA  

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**Australian Standard**  
**Protection of trees on development sites**  

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SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE**

This Standard provides guidance on the principles for protecting trees on land subject to development. It follows, in sequence, the stages of development from planning to implementation.

This Standard aims to assist those concerned with trees in relation to development. Where development is to occur, the Standard provides guidance on how to decide which trees are appropriate for retention, and on the means of protecting those trees during construction work. It does not argue for or against development, or for the removal or retention of trees nor does it consider the monetary value of trees. The Standard does not apply to the establishment of new trees.

**1.2 APPLICATION**

This Standard gives guidance to horticulturists, arborists, architects, builders, engineers, land managers, landscape architects, contractors, planners, determining authorities, building surveyors, certifiers, those concerned with the care and protection of trees, and all others involved in the management of trees and development.

**1.3 REFERENCED DOCUMENTS**

The following documents are referred to in this Standard:

AS

1319 Safety signs for the occupational environment

4373 Pruning of amenity trees

4454 Composts, soil conditioners and mulches

4687 Temporary fencing and hoardings

**1.4 DEFINITIONS**

For the purpose of this Standard, the following definitions apply:

**1.4.1 Determining authority**

Those bodies responsible for issuing approvals.

**1.4.2 Development**

Includes the following:

- (a) The use of land (e.g. festival events, use of park areas and other events) that requires approval.
- (b) The subdivision of land.
- (c) The erection of a building.
- (d) The carrying out of a work.



- (e) The demolition of a building or works.
- (f) Road works.
- (g) The installation of utilities and services.
- (h) Any other act, matter or thing as defined by the relevant legislation.

#### **1.4.3 Diameter at breast height (DBH)**

The nominal trunk diameter at 1.4 m above ground level determined from the circumference of the trunk divided by  $\pi$  ( $\pi$ ) (see Appendix A).

#### **1.4.4 Project arborist**

The person responsible for carrying out the tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The project arborist will be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) Level 5, Diploma of Horticulture (Arboriculture)) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this Standard.

#### **1.4.5 Structural root zone (SRZ)**

The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres.

This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.

#### **1.4.6 Tree**

Long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks (or as defined by the determining authority).

#### **1.4.7 Tree protection zone (TPZ)**

A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

#### **1.4.8 Vigour**

Ability of a tree to sustain its life processes.

The term 'vigour' in this document is synonymous with commonly used terms such as 'health' and 'vitality'.

#### **1.4.9 Work**

Any physical activity in relation to land that is specified by the determining authority.

## SECTION 2 PLANNING AND THE TREE MANAGEMENT PROCESS

### 2.1 TREE MANAGEMENT PROCESS

The success of the tree management process will depend on the cooperation of all involved in the design and development team. In particular, it is essential for those involved in site works to appreciate the need for maintaining the area of protection around the trees.

An example of the tree management process in relation to the stages of a typical development is set out in Table 1.

NOTE: Appendix B outlines potential damage to trees on development sites.

### 2.2 DETERMINING AUTHORITIES

Legal controls and liabilities under common law should be considered at the earliest stages of potential site development.

NOTE: Trees may be subject to legislation. Where development is proposed, additional protection may be appropriate and may be enforced by a determining authority.

Determining authorities have an important role in encouraging and enforcing the development process. Table 1 indicates the common stages in the development process and typical considerations and actions applicable to trees.

When development has been approved, planning conditions may be imposed for the management of trees.

**TABLE 1**  
**INDICATIVE STAGES IN DEVELOPMENT AND THE TREE MANAGEMENT  
PROCESS**

Stage in development	Tree management process	
	Matters for consideration	Actions and certification
<b>Planning (Sections 2 and 3)</b>		
Site acquisition	Legal constraints	
Detail surveys	Council plans and policies Planning instruments and controls Heritage Threatened species	Existing trees accurately plotted on survey plan
Preliminary tree assessment	Hazard/risks Tree retention value	Evaluate trees suitable for retention and mark on plan Provide preliminary arboricultural report and indicative TPZs to guide development layout
Preliminary development design	Condition of trees Proximity to buildings Location of services Roads Level changes Building operations space Long-term management	Planning selection of trees for retention Design review by proponent Design modifications to minimize impact to trees

*(continued)*

TABLE 1 (continued)

Stage in development	Tree management process	
	Matters for consideration	Actions and certification
Development submission	Identify trees for retention through comprehensive arboricultural impact assessment of proposed construction. Determine tree protection measures Landscape design	Provide arboricultural impact assessment including tree protection plan (drawing) and specification
Development approval	Development controls Conditions of consent	Review consent conditions relating to trees
<b>Pre-construction (Sections 4 and 5)</b>		
Initial site preparation	State based OHS requirements for tree work  Approved retention/removal  Refer to AS 4373 for the requirements on the pruning of amenity trees  Specifications for tree protection measures	Compliance with conditions of consent  Tree removal/tree retention/transplanting  Tree pruning Certification of tree removal and pruning  Establish/delineate TPZ Install protective measures  Certification of tree protection measures
<b>Construction (Sections 4 and 5)</b>		
Site establishment	Temporary infrastructure Demolition, bulk earthworks, hydrology	Locate temporary infrastructure to minimize impact on retained trees Maintain protective measures Certification of tree protection measures
Construction work	Liaison with site manager, compliance Deviation from approved plan	Maintain or amend protective measures Supervision and monitoring
Implement hard and soft landscape works	Installation of irrigation services Control of compaction work Installation of pavement and retaining walls	Remove selected protective measures as necessary Remedial tree works Supervision and monitoring
Practical completion	Tree vigour and structure	Remove all remaining tree protection measures Certification of tree protection
<b>Post construction (Section 5)</b>		
Defects liability/maintenance period	Tree vigour and structure	Maintenance and monitoring Final remedial tree works Final certification of tree condition

## NOTES:

- 1 Owing to variations in planning legislation this table is a general indication of the process only.
- 2 Certification of tree protection and condition should be carried out by the project arborist.

## 2.3 PLANNING

### 2.3.1 Site survey

A detailed topographical survey should be made showing all existing site features.

NOTE: This should be made by a registered surveyor.

The survey plans should include—

- (a) location of all individual trees or groups of trees and other vegetation;

- (b) location of trees on land adjacent to the development site that may be impacted by the development;
- (c) crown spread, measured and drawn to scale, defining the actual crown spread;
- (d) other features, such as streams, creeks, watercourses, buildings and above and below ground services; and
- (e) spot heights of ground level throughout the development site and specifically including level at the base of individual trees as a basis for evaluating changes in soil level around retained trees.

NOTES:

- 1 Before commencing this survey, advice should be sought from the project arborist to confirm relevant items for inclusion in the survey.
- 2 Other vegetation may need to be surveyed to meet specific provisions of the determining authority or legislation.

### 2.3.2 Preliminary tree assessment

The preliminary assessment of the trees should take place at the beginning of the project, once any site surveys have been completed. The purpose of this assessment is to provide quantitative and qualitative information on the trees. All trees included in the site survey should be numbered and assessed by the project arborist as the basis for deciding which trees are suitable for retention. For each tree consideration should be given to—

- (a) correct botanical identification and common name;
- (b) vigour;
- (c) structure;
- (d) dimensions, height, crown spread and DBH;
- (e) age class;
- (f) estimated life expectancy;
- (g) heritage and/or cultural matters (refer Note 3);
- (h) ecological and habitat matters (refer Note 3);
- (i) the location relative to existing site features, e.g. its function as a screen or as a landmark feature;
- (j) other matters relevant to the site, e.g. surface roots; and
- (k) retention value.

NOTES:

- 1 These criteria should also be recorded for trees surveyed on adjacent properties.
- 2 Accuracy of the survey data to be verified by the arborist.
- 3 Input from other specialists may be required.
- 4 If trees require tagging use a temporary, non-injurious method.
- 5 A number of commonly used assessment methods are contained in documents listed in Appendix E.

### 2.3.3 Preliminary arboricultural report

Tree protection is most effective when considered at the earliest stage of development planning. The process will require reports at different stages. The most crucial reports are the Preliminary Arboricultural Report and the Arboricultural Impact Assessment.

The preliminary report is not intended to be the comprehensive tree protection report. This information is to be used by planners, architects and designers, in conjunction with any planning controls and other legislation, to develop the design layout in such a way that trees selected for retention are provided with enough space.

The report should list all the trees, providing all the details collected in the tree assessment (see Clause 2.3.2). Trees (or groups of trees) should be placed into categories based on their suitability for retention (for examples refer to documents listed in Appendix E).

Trees suitable for retention should be identified and marked on the detailed survey plan. This plan should also show the location of TPZs, trees to be transplanted and trees to be removed. TPZs are to be calculated as shown in Section 3.

#### **2.3.4 Development design and review**

The preliminary arboricultural report should guide the development layout. During the design and documentation stages, the project arborist should be involved in ongoing review of architectural, engineering (e.g. bulk earth works and construction drawings), services and landscape drawings. The purpose of this is to determine the potential impact on trees proposed to be retained.

Consideration should be given to tree sensitive measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling.

Service corridors should be established at the planning stage to avoid their redirection after works have commenced. It is essential that detailed plans show the routing of all services (above and below ground) in the proximity of trees.

Consideration should be given to activities required during the construction stage, such as over-excavation, scaffolding, temporary access roads, stockpiling materials, site sheds, temporary services and sediment control measures as well as the permanent elements of the development such as onsite water detention and storage.

#### **2.3.5 Arboricultural impact assessment**

The arboricultural impact assessment will be prepared once the final layout is complete. The report will identify trees to be removed, retained or transplanted. The report will identify possible impacts on trees to be retained. The report will explain design and construction methods proposed to minimize impacts on retained trees where there is encroachment into the calculated TPZ (refer to Clause 3.3.2). It will recommend measures necessary to protect the trees throughout all demolition and construction stages. Review of architectural, services and landscape plans should be included to provide an accurate impact assessment. If these plans are not available for review, it should be clearly stated in the report. Specification of tree protection measures will be included in construction documentation (refer to Section 4).

The report will include a tree protection plan (drawing) showing the TPZs for trees being retained taking into account the matters referred to in Section 3 and other protection measures. Groups of trees with overlapping TPZs may be included within a single protection area. A copy of this plan will form part of the development plans.

The tree protection plan should be included in subsequent construction documentation. The location of tree protection measures should also be shown on other documents such as demolition, bulk earth works, construction and landscape plans.

## SECTION 3 DETERMINING THE PROTECTION ZONES OF THE SELECTED TREES

### 3.1 TREE PROTECTION ZONE (TPZ)

The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.

The TPZ incorporates the structural root zone (SRZ) (refer to Clause 3.3.5).

### 3.2 DETERMINING THE TPZ

The radius of the TPZ is calculated for each tree by multiplying its DBH  $\times$  12.

$$\text{TPZ} = \text{DBH} \times 12$$

where

$$\text{DBH} = \text{trunk diameter measured at 1.4 m above ground}$$

Radius is measured from the centre of the stem at ground level.

A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required). Clause 3.3 covers variations to the TPZ.

The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1 m outside the crown projection.

### 3.3 VARIATIONS TO THE TPZ

#### 3.3.1 General

It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

#### 3.3.2 Minor encroachment

If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ (see Clause 3.3.5), detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. Variations must be made by the project arborist considering relevant factors listed in Clause 3.3.4. The figures in Appendix D demonstrate some examples of possible encroachment into the TPZ up to 10% of the area.

#### 3.3.3 Major encroachment

If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ (see Clause 3.3.5), the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors listed in Clause 3.3.4.

### 3.3.4 TPZ encroachment considerations

When determining the potential impacts of encroachment into the TPZ, the project arborist should consider the following:

- (a) Location and distribution of the roots to be determined through non-destructive investigation methods (pneumatic, hydraulic, hand digging or ground penetrating radar). Photographs should be taken and a root zone map prepared.

NOTE: Regardless of the method, roots must not be cut, bruised or frayed during the process. It is imperative that exposed roots are kept moist and the excavation back filled as soon as possible.

- (b) The potential loss of root mass resulting from the encroachment: number and size of roots.
- (c) Tree species and tolerance to root disturbance.
- (d) Age, vigour and size of the tree.
- (e) Lean and stability of the tree.

NOTE: Roots on the tension side are likely to be most important for supporting the tree and are likely to extend for a greater distance.

- (f) Soil characteristics and volume, topography and drainage.
- (g) The presence of existing or past structures or obstacles affecting root growth.
- (h) Design factors.

Tree sensitive construction measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimize the impact of encroachment.

When siting a structure near to a tree, the future growth of the tree, both above and below ground should be taken into account. Precautions should be taken at the planning and design stage to minimize potential conflict between trees and new structures.

When the root zone is reactive clay, techniques such as localized pier and beam (bridged), screwpile footings or root and soil moisture control barriers may be appropriate to minimize effects on structures.

NOTE: Collaboration may be required between the project arborist and the geotechnical or structural engineer. Further information is provided in the documents listed in Appendix E.

### 3.3.5 Structural root zone (SRZ)

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula or Figure 1. Root investigation may provide more information on the extent of these roots.

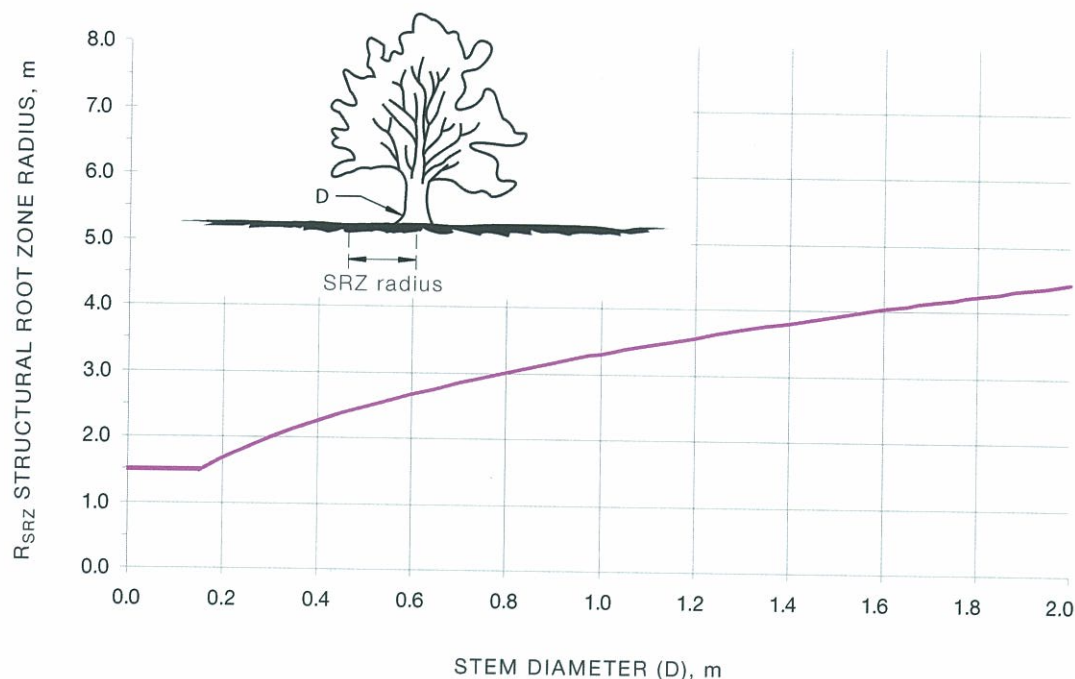
$$\text{SRZ radius} = (D \times 50)^{0.42} \times 0.64$$

where

$D$  = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15 m will be 1.5 m (see Figure 1).

A1



The curve can be expressed by the following formula:

$$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$$

NOTES:

- 1  $R_{SRZ}$  is the calculated structural root zone radius (SRZ radius).
- 2  $D$  is the stem diameter measured immediately above root buttress.
- 3 The  $R_{SRZ}$  for trees less than 0.15 m diameter is 1.5 m.
- 4 The  $R_{SRZ}$  formula and graph do not apply to palms, other monocots, cycads and tree ferns.
- 5 This does not apply to trees with an asymmetrical root plate.

FIGURE 1 STRUCTURAL ROOT ZONE CALCULATION

### 3.3.6 Crown protection

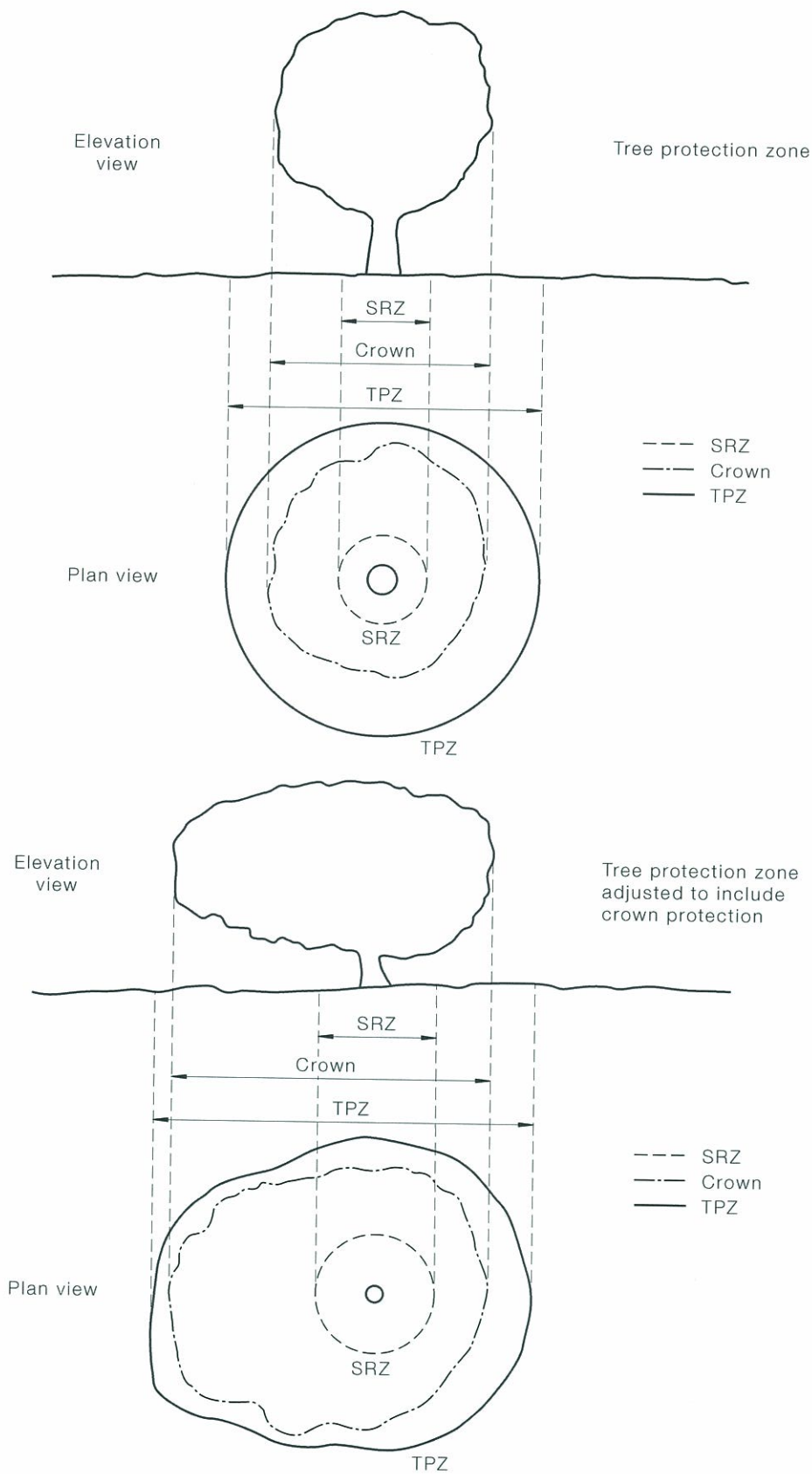
Tree crowns may be injured by machinery such as excavators, drilling rigs, cranes, trucks, hoarding installation and scaffolding. The TPZ may need to include additional protection of the above ground parts of the tree.

Where crown protection is required, it will usually be located at least one metre outside the perimeter of the crown (see Figure 2). The erection of scaffolding may require an additional setback from the edge of the crown.

Crown protection may include pruning, tying-back of branches or other measures. If pruning is required, requirements are specified in AS 4373 and should be undertaken before the establishment of the TPZ.

NOTE: Pruning may require approval from the determining authority.





NOTE: Refer to Clause 3.2 for calculation of TPZ.

FIGURE 2 INDICATIVE TREE PROTECTION ZONE

## SECTION 4 TREE PROTECTION MEASURES

### 4.1 GENERAL

Tree protection measures include a range of activities and structures. Structures are used to identify and isolate the TPZ (refer to Section 3). These measures are identified in the arboricultural impact assessment and tree protection plan.

The TPZ is a restricted area usually delineated by protective fencing (or use of an existing structure such as an existing fence or wall). It is installed prior to site establishment and retained intact until completion of the works.

Some works and activities within the TPZ may be authorized by the determining authority. These must be supervised by the project arborist. Any additional encroachment that becomes necessary as the site works progress must be reviewed by the project arborist and be acceptable to the determining authority before being carried out.

Approved tree removal and pruning should be carried out before the installation of tree protection measures.

### 4.2 ACTIVITIES RESTRICTED WITHIN THE TPZ

Activities generally excluded from the TPZ include but are not limited to—

- (a) machine excavation including trenching;
- (b) excavation for silt fencing;
- (c) cultivation;
- (d) storage;
- (e) preparation of chemicals, including preparation of cement products;
- (f) parking of vehicles and plant;
- (g) refuelling;
- (h) dumping of waste;
- (i) wash down and cleaning of equipment;
- (j) placement of fill;
- (k) lighting of fires;
- (l) soil level changes;
- (m) temporary or permanent installation of utilities and signs, and
- (n) physical damage to the tree.

### 4.3 PROTECTIVE FENCING

Fencing should be erected before any machinery or materials are brought onto the site and before the commencement of works including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist. The TPZ should be secured to restrict access.

AS 4687 specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter and liquids into the protected area.

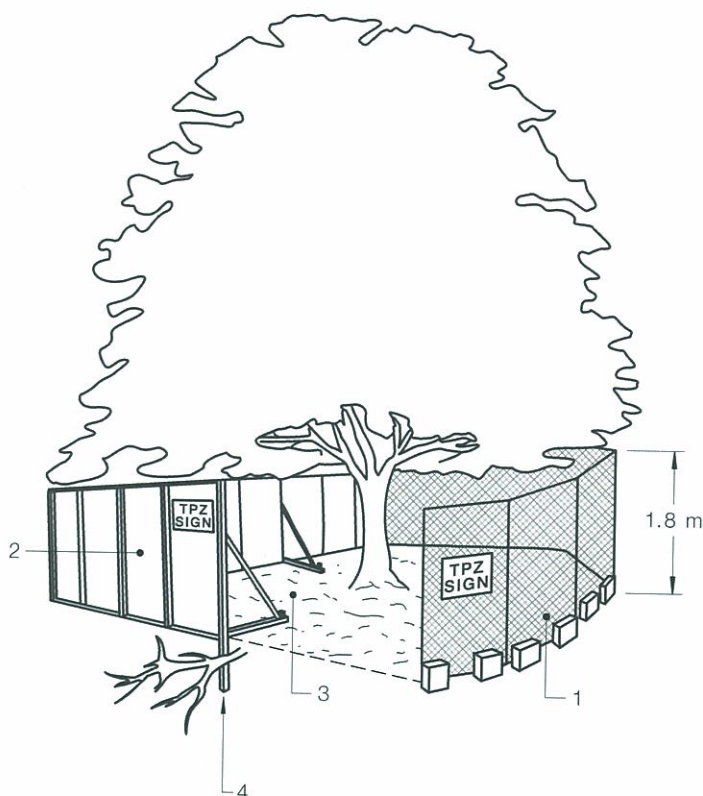
Fence posts and supports should have a diameter greater than 20 mm and be located clear of roots.

Existing perimeter fencing and other structures may be suitable as part of the protective fencing.

Figure 3 indicates an example of protective fencing.

#### 4.4 SIGNS

Signs identifying the TPZ should be placed around the edge of the TPZ and be visible from within the development site (refer Figure 3). The lettering on the sign should comply with AS 1319. Appendix C provides an example of a suitable TPZ sign.



#### 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 OTHER TREE PROTECTION MEASURES

##### 4.5.1 General

When tree protection fencing cannot be installed or requires temporary removal, other tree protection measures should be used, including those set out below.

#### 4.5.2 Trunk and branch protection

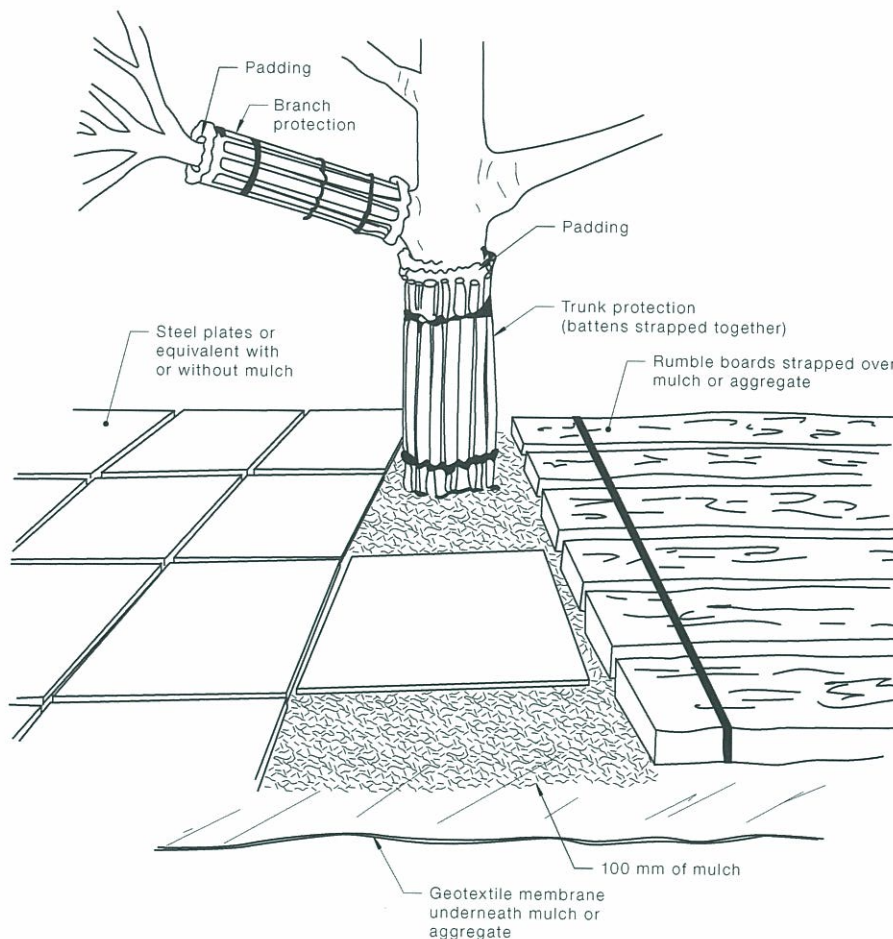
Where necessary, install protection to the trunk and branches of trees as shown in Figure 4. The materials and positioning of protection are to be specified by the project arborist. A minimum height of 2 m is recommended.

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

#### **4.5.4 Root protection during works within the TPZ**

Some approved works within the TPZ, such as regrading, installation of piers or landscaping may have the potential to damage roots.

If the grade is to be raised the material should be coarser or more porous than the underlying material. Depth and compaction should be minimized.

Manual excavation should be carried out under the supervision of the project arborist to identify roots critical to tree stability. Relocation or redesign of works may be required.

Where the project arborist identifies roots to be pruned within or at the outer edge of the TPZ, they should be pruned with a final cut to undamaged wood. Pruning cuts should be made with sharp tools such as secateurs, pruners, handsaws or chainsaws. Pruning wounds should not be treated with dressings or paints. It is not acceptable for roots within the TPZ to be 'pruned' with machinery such as backhoes or excavators.

Where roots within the TPZ are exposed by excavation, temporary root protection should be installed to prevent them drying out. This may include jute mesh or hessian sheeting as multiple layers over exposed roots and excavated soil profile, extending to the full depth of the root zone. Root protection sheeting should be pegged in place and kept moist during the period that the root zone is exposed.

Other excavation works in proximity to trees, including landscape works such as paving, irrigation and planting can adversely affect root systems. Seek advice from the project arborist.

#### **4.5.5 Installing underground services within TPZ**

All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches.

The directional drilling bore should be at least 600 mm deep. The project arborist should assess the likely impacts of boring and bore pits on retained trees.

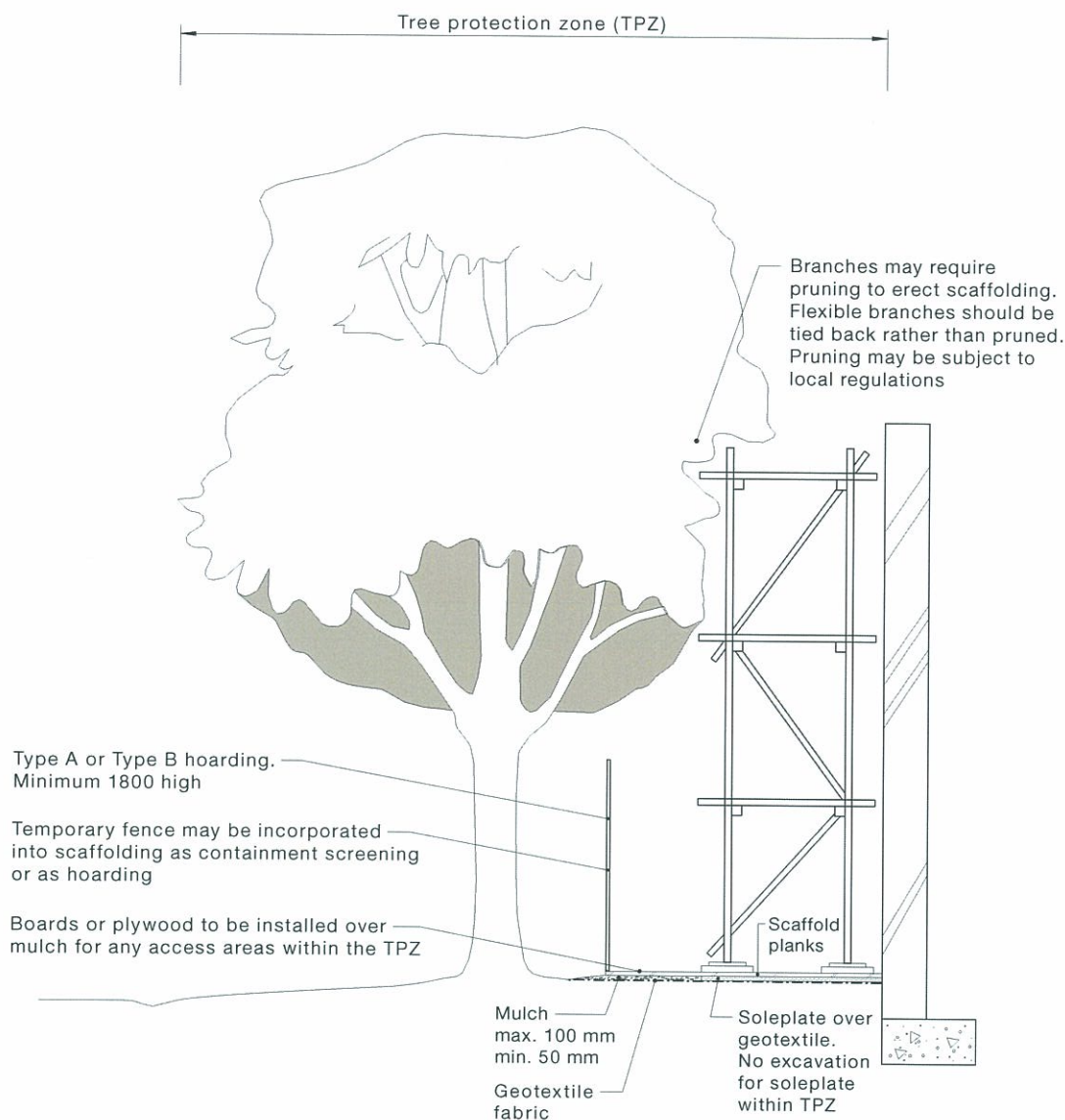
For manual excavation of trenches the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of pneumatic and hydraulic tools. Refer Clause 4.5.3.

#### **4.5.6 Scaffolding**

Where scaffolding is required it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimized. This can be achieved by designing scaffolding to avoid branches or tying back branches. Where pruning is unavoidable it must be specified by the project arborist in accordance with AS 4373.

NOTE: Pruning works may require approval by determining authority.

Ground below the scaffolding should be protected by boarding (e.g. scaffold board or plywood sheeting) as shown in Figure 5. Where access is required, a board walk or other surface material should be installed to minimize soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed.



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

## 4.6 MAINTAINING THE TPZ

### 4.6.1 Mulching

The area within the TPZ should be mulched. The mulch must be maintained to a depth of 50–100 mm using material that complies with AS 4454. Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required.

### 4.6.2 Watering

Soil moisture levels should be regularly monitored by the project arborist. Temporary irrigation or watering may be required within the TPZ. An above-ground irrigation system should be installed and maintained by a competent individual.

### 4.6.3 Weed removal

All weeds should be removed by hand without soil disturbance or should be controlled with appropriate use of herbicide.

## SECTION 5 MONITORING AND CERTIFICATION

### 5.1 GENERAL

There are many stages in the development process from site acquisition to completion where the project arborist is required to monitor or certify tree protection. Table 1 summarizes the process and indicates the stages that normally require certification (a written statement of compliance). This Section provides details of the monitoring and certification process.

### 5.2 TREE PROTECTION PLAN

The approved tree protection plan must be available onsite prior to the commencement of and during works. The tree protection plan will identify key stages where monitoring and certification will be required.

A pre-construction meeting should be attended by the site manager, the project arborist and contractors to introduce the tree protection plan and its requirements.

### 5.3 PRE-CONSTRUCTION

#### 5.3.1 Tree removal and pruning

Trees for removal or transplanting should be marked onsite as per the approved tree protection plan. Before removal, the project arborist should confirm that all marked trees correspond with those shown on the schedule or plan. Other tree work may be specified in the tree protection plan.

Tree removal should be carried out prior to erection of protection fencing. Contractors should be instructed to avoid damage to trees within protection areas when removing or pruning trees. This may include restrictions of vehicle movements.

Any approved pruning required to allow for works should be done at this stage. AS 4373 specifies requirements for pruning.

Stumps to be removed from within a TPZ must be removed in a manner that avoids damaging or disturbing roots of trees to be retained.

The project arborist should supervise tree removal, transplanting and pruning and certify the works on completion.

#### 5.3.2 Installing tree protection fencing and other protection measures

Fencing and other protection measures are to be installed in compliance with Section 4 and as detailed in the tree protection plan.

Protection measures are to be certified by the project arborist.

### 5.4 CONSTRUCTION STAGE

#### 5.4.1 General

In order to ensure that protection measures are being adhered to during the pre-construction and construction stages, there should be a predetermined number of site inspections carried out by the project arborist. Matters to be monitored and reported should include tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.

If there is non-compliance with tree protection measures or if trees have been damaged, a timeframe for compliance and remedial works should be specified by the project arborist. The determining authority may need to be notified of non-compliance issues. Monitoring, reporting and certification should be carried out at the following critical stages of construction.

#### **5.4.2 Site establishment**

The project arborist will monitor the impacts of demolition, bulk earth works, installation of temporary infrastructure including bunding, sediment control works and drainage works.

The construction management plan (site establishment plan) should be checked for compliance with the tree protection plan. The construction management plan normally includes location of site sheds, stockpile areas, temporary access roads and sediment control devices.

At completion of site establishment, the project arborist should certify that tree protection measures comply with the tree protection plan.

#### **5.4.3 Construction work**

The project arborist will monitor the impacts of general construction works on retained trees. Monitoring should be done at regular intervals or in consultation with the site manager. Monitoring is to be recorded for inclusion in certification at practical completion.

Critical stages typically include installation of services, footings and slabs, scaffolding, works within the TPZ and at completion of building works.

#### **5.4.4 Landscape works**

The landscape plan should be checked for compliance with the tree protection plan. The project arborist may need to approve the staged removal of protection measures required to allow for landscape works. The project arborist should supervise any works within TPZs, including retaining walls, irrigation and lighting installation, topdressing, planting and paving. The project arborist should specify any remedial works above and below ground. Monitoring is to be recorded for inclusion in certification at practical completion.

#### **5.4.5 Practical completion**

Practical completion assumes that all construction and landscaping works are finished. At practical completion all remaining tree protection measures should be removed. The project arborist should assess tree condition and provide certification of tree protection.

### **5.5 POST-CONSTRUCTION**

#### **5.5.1 Defects liability period**

Completion of outstanding building or landscaping works following the construction period must not injure trees.

#### **5.5.2 Final certification**

The project arborist should assess the condition of trees and their growing environment, and make recommendations for any necessary remedial actions.

Following the final inspection and the completion of any remedial works, the project arborist should certify (as appropriate) that the completed works have been carried out in compliance with the approved plans and specifications for tree protection. Certification should include a statement on the condition of the retained trees, details of any deviations from the approved tree protection measures and their impacts on trees. Copies of monitoring documentation may be required.

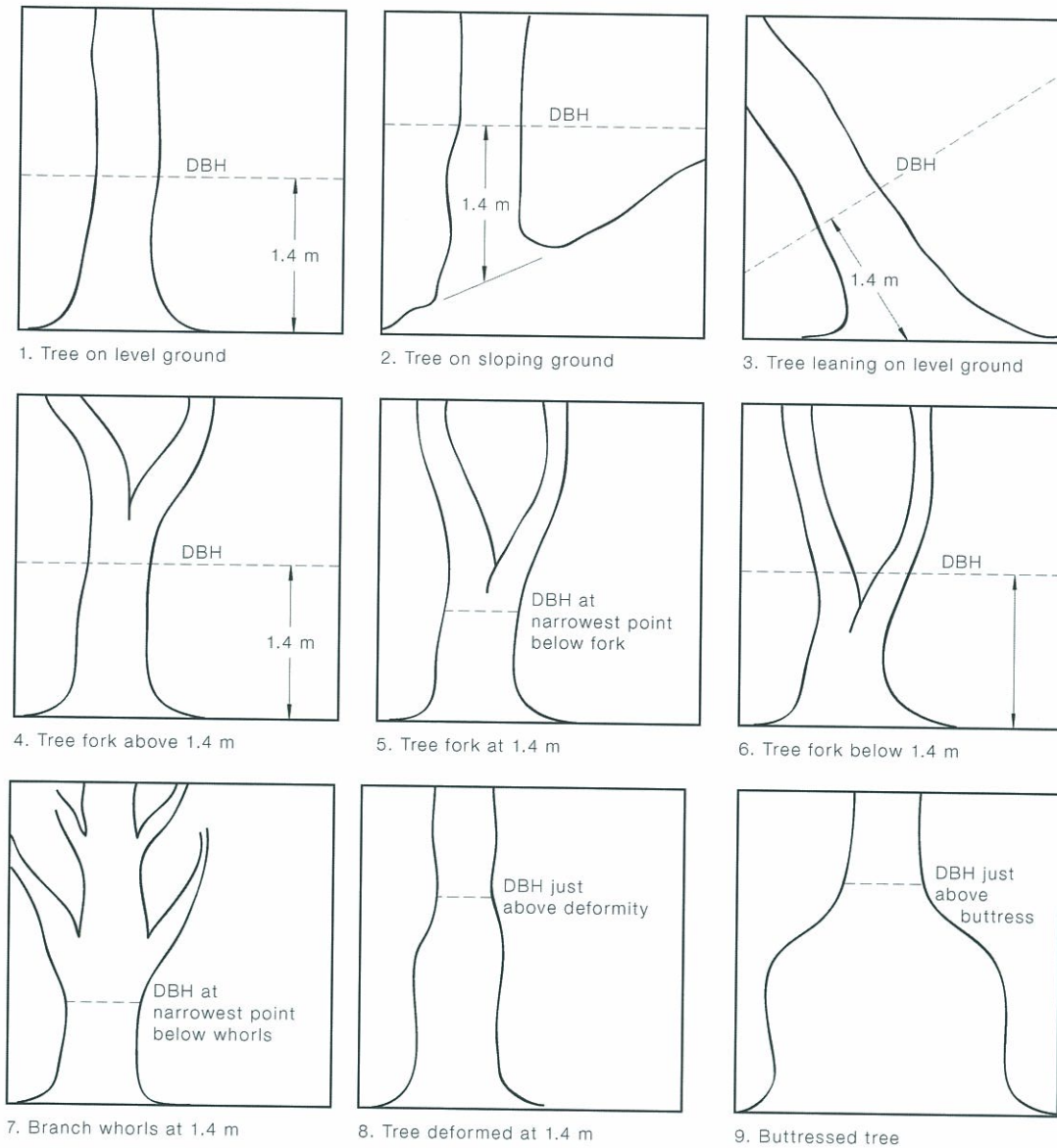


## NOTES:

- 1 Remedial actions may include pruning in accordance with AS 4373 and/or soil remediation.
- 2 If the project arborist has not been involved throughout the project, they should have access to inspection reports by others and should review construction drawings to determine likely impacts on trees.

APPENDIX A  
DIAMETER AT BREAST HEIGHT (DBH)  
(Informative)

The diversity of trunk shapes, configurations and growing environments requires that DBH be measured using a range of methods to suit particular situations and Figure A1 provides examples.



NOTE: For example 6, the combined stem DBH may be calculated using the formula:

$$\text{Total DBH} = \sqrt{(\text{DBH}_1)^2 + (\text{DBH}_2)^2 + (\text{DBH}_3)^2}$$

FIGURE A1 MEASUREMENT OF DBH OF A TREE

APPENDIX B  
POTENTIAL DAMAGE TO TREES ON DEVELOPMENT SITES  
(Informative)

## **B1 INTRODUCTION**

Established trees of good vigour and structure represent an asset to any development site, particularly if landscaping is a significant component of the proposed development. Trees may be retained because of their aesthetic features, for shade, for the scale that they will give to new buildings or for their historical value.

Trees are living organisms that require certain environmental conditions in order to maintain their value as an asset. As remediation of badly stressed or damaged trees is rarely successful, damage must be avoided or minimized during development. Hence, if trees are to be retained and their requirements met, procedures which ensure the protection of trees must be in place at all stages of the development including the demolition stage.

## **B2 BACKGROUND BIOLOGY**

### **B2.1 General**

All plants consist of three main sections: a crown (leaves), a stem or trunk and a root system. Each one of these sections carries out specific functions necessary for the survival of the tree as all of the parts interact. A tree is in a state of physiological equilibrium between the above ground and below ground sections, so that if one of these sections is damaged, the entire tree will suffer and symptoms may appear in any part of the tree.

Thus any demolition and construction operations that occur around trees must be carried out in such a way as to minimize the impact on the health of the tree.

### **B2.2 Leaves**

The main function of leaves is photosynthesis, that is, the production of sugars. The sugars produced by the leaves (and any other green tissue) are the source of chemical energy for all living cells in the entire plant and as such are essential for the normal functioning and survival of the tree. Anything that directly or indirectly damages the leaves will interfere with photosynthesis.

### **B2.3 Trunks and branches**

Branches and trunks are composed of many tissues with specialized functions including the bark (protection), phloem (transport of sugars from the leaves), vascular cambium (growth of new transport tissues), sapwood (transport of water and nutrients from the roots), heartwood (strength and structural support) and rays (internal transport and storage of sugars). Damage to branches or trunks may allow infection by plant pathogens (disease-causing organisms), disrupt the movement of vital materials and structurally weaken the tree.

### **B2.4 Roots**

The main functions of roots include the uptake of water and nutrients, anchorage, storage of sugar reserves and the production of some plant hormones required by the shoots. In order for roots to function, they must be supplied with oxygen from the soil. The root system of trees consists of several 'types' of roots found in different parts of the soil and is generally much more extensive than commonly thought. The importance of roots is easily overlooked because they are not visible, that is 'out of sight, out of mind'. Damage to the root system is a common cause of tree decline and death and is the most common form of damage associated with development sites.

Root growth is opportunistic and takes place wherever the soil environment is favourable. The most limiting factor for root growth is air. A number of studies have indicated that roots are much more extensive than commonly thought. In general roots extend outward from the trunk and occupy irregularly shaped areas 4 to 7 times larger than the projected crown area with an average diameter of two or more times the height of the tree. It is a fallacy that tree roots only extend to the edge of the crown.

Root systems consist of three main parts—

- (a) the structural woody roots (anchorage, storage and transport);
- (b) lower order roots (anchorage, storage and transport); and
- (c) non-woody roots (absorption of water and nutrients, extension, synthesis of amino acids and growth regulators) (see Figure B1).

In addition to lateral root spread being underestimated, root depth in trees has also been grossly exaggerated. Deep root systems or taproots are the exception rather than the rule. Most roots of most trees are found in the very top of the soil. The vast majority of these roots are small non-woody absorbing roots which grow upward into the very surface layers of the soil and leaf litter. This delicate, non-woody system, because of its proximity to the surface, is very vulnerable to injury.

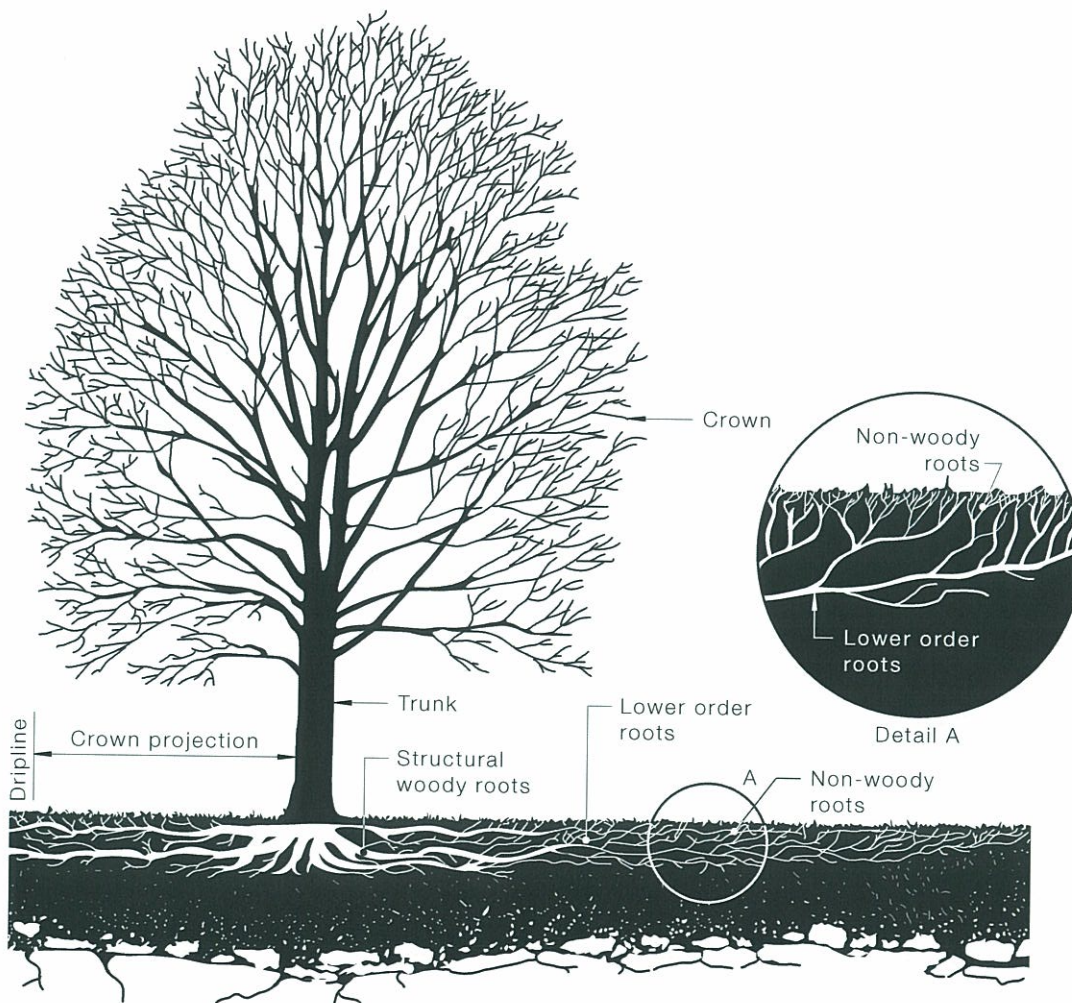


FIGURE B1 STRUCTURE OF A TREE IN A NORMAL GROWING ENVIRONMENT

### **B3 EFFECTS OF DEVELOPMENT ON TREES**

#### **B3.1 General**

All parts of the tree may be damaged by development. Damage to any one part of the tree will affect its functioning as a whole. This Paragraph (B3) considers the possible impact of injury on the functioning of each main section of the tree. This highlights the specific protective measures that need to be undertaken.

#### **B3.2 Crown damage**

The canopy of trees can be directly or indirectly damaged. Indirect damage will occur as a result of trunk and or root damage and will not be discussed here.

Usually, foliage may be lost or damaged on development sites by pruning or mechanical injury by trucks, cranes, excavators and so on. The removal of leaves reduces the level of photosynthesis and thus the production of sugars. This in turn reduces the tree's capacity to function normally and to withstand stresses imposed by a change in its environment.

Incorrect techniques of pruning such as lopping or flush cutting may produce wounds that are susceptible to infection by wood decay organisms. Similarly, mechanical damage to branches by machinery, etc. will also create wounds. Trees automatically respond to wounding and in doing so use stored sugars. Any wound places an additional load on trees that will inevitably be stressed during construction.

#### **B3.3 Trunk damage**

Trunks of trees may be wounded mechanically during demolition and construction work. This not only predisposes a tree to potential decay but it also interferes with the transport of water, nutrients and sugars throughout the tree. Serious impacts may structurally weaken the tree.

#### **B3.4 Root damage**

Root damage is the most common cause of damage to trees on development sites. As already mentioned in Paragraph B2.4, roots are far more extensive and closer to the surface than commonly thought. Roots can be damaged in the following ways:

- (a) Removed during grading, excavation and trenching for foundations services, etc.
- (b) Mechanically wounded, crushed or torn.
- (c) Compaction by machinery, storage of materials, and installation of work sheds.
- (d) Soil buildup.
- (e) Laying of pavements.
- (f) Chemical contamination of the soil by solvents, fuel, oil, diesel, herbicides, cement waste, etc.
- (g) Changes in air levels through changes in drainage patterns.
- (h) Changes in available water.

Apart from the actual removal of roots during excavation or trenching, soil compaction is one of the major causes of root damage on development sites. Compaction is defined as the loss of large pore spaces (macropores) within the soil with a net loss of total pore space. Macropores are essential for the exchange of gases between the soil air and the atmosphere (aeration) and the removal of excess water from the soil (drainage).

Compaction results from loads or stress forces applied to the soil as well as shear forces. Both foot traffic and vehicle traffic exert both forces on soils. Vehicle traffic may cause significant compaction at depths of 150–200 mm (the area in which most absorbing roots are located). The degree of compaction will depend on weight of vehicles, number of movements, soil moisture levels and clay content. Soil handling, stockpiling and transporting also tend to lead to the breakdown of soil structure and thus to compaction. Vibration as a result of frequent traffic or adjacent construction activities will also compact soils.

The effects of compaction include—

- (i) reduced aeration (oxygen levels decrease and carbon dioxide concentration increases to perhaps toxic levels);
- (ii) low oxygen levels discourage root growth and thus the uptake of water and nutrients;
- (iii) reduced infiltration of water into the soil and more run-off;
- (iv) increased run-off increases soil losses by erosion;
- (v) low oxygen levels also lead to chemical changes in the soil which can reduce the availability of some plant nutrients; and
- (vi) the reduction in the number and diversity of beneficial soil organisms (including mycorrhizal fungi).

In summary, the effects of root loss or damage by any means could include—

- (A) loss of stability if structural woody roots or even lower order woody roots are cut;
- (B) reduction in water and nutrient uptake;
- (C) an eventual loss of leaves, reduced photosynthesis and thus sugar production;
- (D) decay as a result of wounding; and
- (E) predisposition to soil borne pathogens.

It is commonly observed that trees may take many years to decline and eventually die from root damage.

## **B4 CONCLUSIONS**

The negative impacts of inadequate development design, planning and supervision are cumulative and very difficult to remediate after development is completed. The best way to ensure the long term retention of established trees is to follow the guidelines outlined in this Standard.

Additional guidance may be found in the documents listed in Appendix E.

APPENDIX C  
TREE PROTECTION ZONE SIGN EXAMPLE  
(Informative)

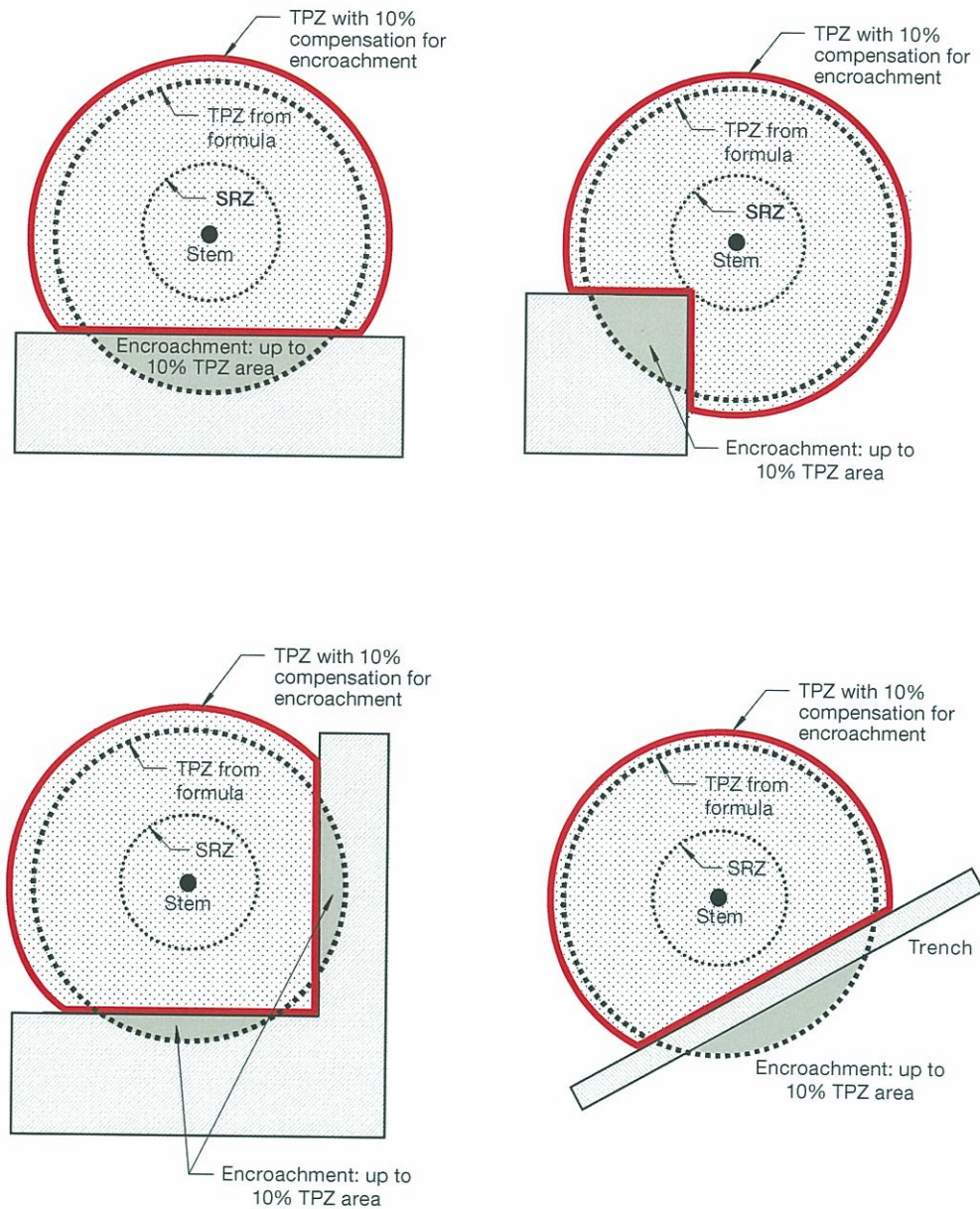
A TPZ sign provides clear and readily accessible information to indicate that a TPZ has been established. Figure C1 provides an example of a suitable sign.



FIGURE C1 TREE PROTECTION ZONE SIGN

APPENDIX D  
ENCROACHMENT INTO TREE PROTECTION ZONE  
(Informative)

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ



APPENDIX E  
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(Informative)

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**AMENDMENT CONTROL SHEET**

**AS 4970—2009**

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**Amendment No. 1 (2010)**

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**CORRECTION**

*SUMMARY:* This Amendment applies to the Preface and Figure 1.

Published on 26 March 2010.

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## **Appendix 2**

### **Extract of Arborist's Report: Detail on trees at periphery of sites**

## Site 1: Bexley Rd North (C4) Construction Compound



Map 1. Bexley Rd North Compound. (Google map)

Trees located on the western edge of the compound require either removal or directional pruning of branches that overhang into the proposed compound area.

**Area 1.** A mixed group of three (3) trees are growing at the southern end of the compound area. It is proposed that this area will be constructed on and no trees within this area can be retained. The two (2) prominent trees within this planting are a *Castanospermum australe* (Black Bean) and a *Jacaranda mimosifolia* (Jacaranda) a smaller deciduous tree also is growing here as well. All trees appear to be in fair health and fair structure.



Pic 1. Group of trees southern end of compound, area 1.



Pic 2. Jacaranda tree within area 1, showing vines around trunk.

**Area 2.** Three (3) Eucalyptus trees and one (1) Corymbia tree are growing within the neighbouring properties to the east of the compound site. Directional lateral pruning works is required on all trees to reduce the overhang of branches into the compound area. All required pruning works can be undertaken with only a minor amount of live foliage removed from all trees. All pruning works to be undertaken to Australian Standards AS 4373 "Pruning of Amenity Trees".



Pic 3. Eucalyptus trees growing along the boundary fence.

### **Recommendations Site 1:**

- Remove the three (3) trees in the southern end of the compound.
- All trees along the boundary fenceline to be laterally reduced to minimize overhang of foliage into site.
- All tree work is to be undertaken to AS 4373 "Pruning of Amenity Trees".
- All tree material to be mulched and taken off site and stored for future use at the completion of the works.

## Site 2: Arncliffe (C7) Construction Compound



Map 2. Arncliffe Site Layout.

This site was inspected on the 29<sup>th</sup> April 2016. The site was walked and trees that are growing in close proximity to the proposed boundary fence were inspected. Alternative considerations for each tree inspected were explored to have the minimal amount of works undertaken on these trees. The site was inspected with a representative from WestConnex where the alternative proposals were discussed and either adopted or rejected due to site constraints.



**Tree 1:**



Remove low branches only on the western side to a height of 2.5 metres.

Pic 4. Edge of boundary fenceline which is the brown grass area.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusion. Small amount of internal deadwood.

Works required. Directional pruning of western branches that will be affected by the 2.5 metre fence.

Risk Rating. Low

## Tree 2.



Pic 5. Edge of boundary fenceline which is the brown grass area.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood.

Works required. Directional pruning of western branches that will be affected by the 2.5 metre fence.

Risk Rating. Low



Pic 6. Branches to be removed.

### Tree 3.



Pic 7. Tree 3 Growing on boundary line.

Species. *Agonis flexuosa* (Willow Myrtle)

Health. Fair

Structure. Poor

Defects. Stem inclusions. Large previous failure. Cracks and split inclusions. Weak unions. Poor past pruning.

Works required. Removal of tree for safety reasons and the tree is growing on the boundary line.

Risk Rating. High

## Tree 4.



Pic 8. Tree 4 Directional pruning required.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood.

Works required. Directional pruning of western branches (branch with number) that will be affected by the 10 metre cloth fence.

Risk Rating. Medium

## Tree 5.



Pic 9. Growing on boundary line.

Species. *Casuarina glauca* (Swamp she-oak)

Health. Fair

Structure. Fair

Defects. Small amount of internal deadwood.

Works required. Removal of tree required for fenceline clearance.

Risk Rating. Low

**Tree 6.**



Pic 10. Growing on boundary line.

Species. *Casuarina glauca* (Swamp she-oak)

Health. Fair

Structure. Poor

Defects. Small amount of internal deadwood. Mid-sized past failures. Lower trunk inclusion.

Works required. Removal of tree required for fenceline clearance.

Risk Rating. Medium

## Tree 6A.



Pic 11. Growing on boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Poor

Defects. Stem inclusions. Small amount of internal deadwood. Past failures upper canopy.

Works required. Removal of tree required for fenceline clearance.

Risk Rating. Low

## Tree 6B.



Pic 12. Growing on boundary line.

Species. *Olea europaea subsp. cuspidata* (African Olive)

Health. Fair

Structure. Poor

Defects. Stem inclusions. Moderate amount of internal deadwood. Past failures upper canopy. Cavities throughout canopy and lower trunk area.

Works required. Removal of tree required for fenceline clearance.

Risk Rating. High



## Tree 6C.



Pic 13. Two trees growing on boundary line and dam.

Species. *Populus nigra* 'Italica' (Lombardy Poplar) x 2 trees

Health. Fair

Structure. Poor

Defects. Stem decay. Small amount of internal deadwood. Cavity lower trunk. Large amount of suckers growing at base of trees.

Works required. Removal of tree required for fenceline clearance.

Risk Rating. Low

**Tree 6D.**



Pic 14. Two trees growing on boundary line and dam.

Species. *Schinus areira* (Peppercorn) x 2 trees

Health. Fair

Structure. Fair

Defects. Small amount of internal deadwood. Past small branch failures. Past poor pruning works. Borer damage lower trunk

Works required. Removal of tree required for fenceline clearance.

Risk Rating. Low

## Tree 7.



Pic 15. Growing on boundary line.

Species. *Casuarina glauca* (Swamp she-oak)

Health. Fair

Structure. Fair

Defects. Small amount of internal deadwood. Stem inclusions lower trunk.

Works required. Removal of tree required for fenceline clearance.

Risk Rating. Low

**Tree 8.**



Remove lower branches.

Pic 16. Growing near boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Fair

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood. Past failures lower canopy.

Works required. Lateral branch removal for fence clearance of 2.5m on the south western side of tree. Had proposed to alter fenceline to retain tree but not viable to alter fenceline.

Risk Rating. Low

## Tree 9.



Pic 17. Growing on boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Fair

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood. Past failures lower canopy.

Works required. Due to location on fenceline and not being able to alter location of fenceline removal of this tree is required.

Risk Rating. Low

## Tree 10.



Select branch removal

Pic 18. Growing near boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood. Past failures lower canopy. Exposed roots with mower damage.

Works required. Lateral branch removal for fence clearance of 2.5m on the south western side of tree.

Risk Rating. Medium

## Tree 11.



Select branch removal

Pic 19. Growing on boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood. Past failures lower canopy. Exposed roots with mower damage.

Works required. Tree was selected for removal but the fence was able to be removed away from the tree and the tree can be retained with lateral branch removal for fence clearance of 2.5m on the northern side of tree.

Risk Rating. Medium

## Tree 12.



Select branch removal

Pic 20. Growing near boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood. Past failures lower canopy.

Works required. Tree was selected for removal but the fence was able to be removed away from the tree and the tree can be retained with lateral branch removal for fence clearance of 2.5m on the northern side of tree.

Risk Rating. Medium



## Tree 13.



Pic 21. Growing near boundary line.

Species. *Melaleuca quinquenervia* (Broad-leaved Paperbark)

Health. Good

Structure. Fair

Defects. Stem inclusions. Small amount of internal deadwood. Past failures lower canopy. Mower damage to base of tree

Works required. Due to the location of the tree and the alignment of the fence cannot be altered removal of this tree is recommended.

Risk Rating. Medium

## **Summary:**

This site is located within Kogarah Golf Course and is the Arncliffe Construction Compound. The site inspection with representatives from WestConex identified trees along the boundary fenceline that either needed removal or lateral branch removal to allow for the installation of boundary fences.

Trees had previously been marked with a number and during the Arborist inspection for this report an additional four (4) trees were added. It was determined during the site investigation that it was possible to alter the boundary fence and two (2) trees that had been listed for removal can now be retained with only lateral branch removal required.

## **Recommendations Site 2:**

- Remove ten (10) trees at this site. Trees listed for removal: 3, 5, 6, 6A, 6B, 6C, 6D, 7, 9 and 13.
- Undertake lateral branch reduction of trees: 1, 2, 4, 8, 10, 11 and 12.
- All tree work is to be undertaken to AS 4373 "Pruning of Amenity Trees".
- All tree material to be mulched and taken off site and stored for future use at the completion of the works.

### Site 3: Canal Rd (C8) Construction Compound



Map 3. Canal Rd (C8) Construction Compound. (Google Map)

Four (4) areas were inspected for this Canal Rd Construction Compound. Due to the construction required within this location all trees are required to be removed.

## Area 1.

Four (4) mature trees are located in this area. General health of the trees range from fair to very poor. All trees are native trees which have been planted and none of the trees are endemic to the area.

### Tree 1.



Pic 22. Tree 1. Tree is inside compound area but outside of gates.

Species. *Eucalyptus sp.* (Gum tree)

Health. Fair

Structure. Fair

Defects. Small amount of internal deadwood. Past failures lower canopy.

Works required. Due to the location of the tree removal is required.

Risk Rating. Low

## Tree 2.



Lower trunk damage

Pic 23. Tree 2. Street tree near to the gates to site.

Species. *Corymbia maculata* (Spotted Gum)

Health. Poor

Structure. Very poor

Defects. Large amount of deadwood and general dieback. Past failures lower canopy. Large amount of lower stem damage from car impact. Borer damage to lower trunk.

Works required. Due to the location of the tree removal is required. Tree should be removed irrespective of the construction works.

Risk Rating. High

### Tree 3.



Pic 24. Tree 3. Tree is inside compound.

Species. *Eucalyptus sp.* (Gum tree)

Health. Fair

Structure. Fair

Defects. Small amount of internal deadwood. Lower canopy stem inclusions.

Works required. Due to the location of the tree removal is required.

Risk Rating. Low

## Tree 4.



Pic 25. Tree 4. Street tree near to the proposed entry to site.

Species. *Corymbia maculata* (Spotted Gum)

Health. Good

Structure. Fair

Defects. Small amount of deadwood. Soil compaction.

Works required. Due to the location of the tree removal is required.

Risk Rating. Low

## Area 2.



Pic 26 & 27. Site two trees within two groups of trees.

Area 2 consists of ten (10) *Casuarina glauca* trees planted within two garden beds near by the roadway.

All trees are semi-mature and have been planted to act as a screen to the factories. Tree health is good and form of the trees is fair. Defects include lower trunk damage from vehicles, minor amount of internal deadwood, stem inclusions, exposed roots and suckers.

Removal of all ten (10) trees is required for the site compound.



### Area 3.



Pic 28. Tree growing on edge of property boundary.

Species. *Eucalyptus saligna* (Sydney Blue Gum)

Health. Good

Structure. Fair

Defects. Small amount of deadwood. Large branch failure which is still on the factory roof.

Works required. Due to the location of the tree removal is required.

Risk Rating. Medium

## Area 4.



Pic 29. Small bushes growing in garden within a raised garden bed.

Small bush on the right hand side of the picture is a *Tibouchina laurina* (Tibouchina) which is in good health and good vigour.

The other seven (7) small bushes are *Photinia robusta* (Large-leafed photinia)

Both the Tibouchina and the Photinia bushes are well maintained and kept to small heights.

Due to the construction of the compound and the removal of the raised garden bed these eight (8) bushes require removal.

### **Recommendations Site 3:**

- In total twenty two (22) trees require removal from this site to make way for the Canal Road (C8) construction compound.
- All tree material to be mulched and taken off site and stored for future use at the completion of the works.

## Site 4: Burrows Rd (C11) Construction Compound



Map 4. Site of Burrows Rd construction compound.

The site inspection was undertaken from both the compound side of the trees and the street side of the trees.

The trees within this area were used to act as a screen and have been planted in a raised soil embankment. The soil levels within the compound have been altered as soils have been added and removed over the years.

The planting is a mix of native trees and exotic trees as well as weed trees and weed bushes. Trees within the site include:

- *Melaleuca styphellioides* (Prickly-leaved Paperbark)
- *Melaleuca quinquenervia* (Broad-leaved Paperbark)
- *Eucalyptus saligna* (Sydney Blue Gum)
- *Eucalyptus microcorys* (Tallowwood)
- *Corymbia maculata* (Spotted Gum)
- *Corymbia gummifera* (Red Bloodwood)
- Dead trees
- *Casuarina sp* (She-oak)
- *Jacaranda mimosifolia* (Jacaranda)
- *Leptospermum petersonii* (Lemon Scented Tea Tree)
- *Ricinus communis* (Castor Oil)



Pic 30. Raised soil levels under trees and dead tree to the left of picture and weeds as understory.

A mature *Corymbia maculata* (spotted Gum) (see Pic 31 below) which is a street tree has been included in this part of the report as the tree is in poor health and is structurally compromised. This tree should be removed prior to any works starting.



Pic 31. Wound on street tree *Corymbia maculata* which has compromised the retention of this tree.

## Recommendations Site 4:

- Due to the construction activities within this area of the compound all trees within this area require removal prior to occupation of the site.
- The street tree in the above picture (Pic 31) should also be removed. In total thirty three (33) trees require removal at this site.
- All tree material to be mulched and stored for future use at the completion of the works.

If you require any further information in relation to this report, please contact us on 1300 737 674 or 0418 474796.



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## **LIMITATION OF LIABILITY**

Australian Tree Consultants Pty Ltd and their employees are tree specialists who use their qualifications, education, knowledge, training, diagnostic tools and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of this assessment and report.

Australian Tree Consultants Pty Ltd and its employees cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that sometimes fail in ways the arboriculture industry does not fully understand. Conditions are often hidden within trees and below ground. Unless otherwise stated, observations have been visually assessed from ground level. Australian Tree Consultants Pty Ltd cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments cannot be guaranteed.

Treatment, pruning and removal of trees may involve considerations beyond the scope of Australian Tree Consultants Pty Ltd services, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters, and related incidents. Australian Tree Consultants Pty Ltd cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise Australian Tree Consultants Pty Ltd cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

In the event that Australian Tree Consultants Pty Ltd recommends retesting or inspection of trees at stated intervals or installs any cable/s, bracing systems and support systems, Australian Tree Consultants Pty Ltd must inspect the system installed at intervals not greater than 12 months unless otherwise specified in written reports. It is the client's responsibility to make arrangements with Australian Tree Consultants Pty Ltd to conduct the re- inspection.

Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk. The only way to eliminate all risks associated with a tree is to eliminate the tree.

All written reports must be read in their entirety, at no time shall part of the written assessment be referred to unless taken in full context of the whole written report.

If this written report is to be used in a court of law or any legal situation Australian Tree Consultants Pty Ltd must be advised in writing prior to the written assessment being presented in any form to any other party.