

**DATE** 17 January 2018

**REFERENCE No.** 1777179-036-M-Rev0

**TO** Abbie Crawford, Senior Clearing Regulation Officer  
Department of Water and Environmental Regulation

**CC** Jake Hickey, Alkina Holdings Pty Ltd

**FROM** Craig Currie

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**TREE SURVEY TO SUPPORT NATIVE VEGETATION CLEARING PERMIT APPLICATION (NVCP)  
FOR THE PROPOSED GREAT SOUTHERN LANDFILL**

## 1.0 INTRODUCTION

On 12 January 2018 representatives of Golder Associates Pty Ltd (Golder) and Alkina Holdings Pty Ltd (Alkina) visited the site of the proposed Great Southern Landfill development to carry out a tree survey. The aim of the tree survey was to investigate the area for the presence of nesting trees, or trees with the potential to be used by any or all of the three species of Black Cockatoo: Carnaby's Black Cockatoo (Endangered) *Calyptorhynchus latirostris*, Baudin's Black Cockatoo (Vulnerable) *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo (Vulnerable) *Calyptorhynchus banksii naso*; and to obtain general information on tree age and size to assist the Department of Water and Environmental Regulation (DWER) in their processing of a NVCP for the abovementioned, proposed development.

## 2.0 METHODOLOGY

The methodology for the assessment was based broadly on the guidelines published by the then Department of Sustainability, Environment, Water, Population and Communities (DoSEWPaC) for these three-target species, which define the criteria for breeding for each of the three species (Table 1, pp 15 in the Guidelines) (DoSEWPaC, 2012) and comprised a systematic walk-over of the site and an inspection of each individual tree >300 mm in diameter. The investigation did not include a targeted survey for individuals nor did it include an assessment of the presence and value of feeding trees. Tree diameters were recorded at breast height (DBH) and visual inspections were conducted for potential hollows.

Suitable nesting trees must support hollow apertures that are at least 100 mm in diameter and these apertures must open to hollows that are near-vertical and between 500 and 400 mm deep, individual hollows were not measured. Each tree surveyed was photographed and marked using a handheld GPS. Attachment A shows the four survey locations and an aerial overview of the site.

## 3.0 CONSIDERATIONS

This Technical Memorandum (Memo) presents photographs of the surveyed trees, information on their diameter and any notable features, along with a figure showing the location of each tree. Corresponding spatial data is also provided. This Memo presents only the information obtained from the 12 January 2018 Tree Survey, it is not intended to provide analysis or technical advice.

## 4.0 ROAD REALIGNMENT FOOTPRINT

Figure 1 shows the (approximate) proposed clearing footprint resulting from the road realignment and widening. The extent of this footprint was determined in the field using design drawings, map scales and a measuring tape in order to identify which trees lie within the proposed clearing footprint. In total 17 trees were surveyed with three trees: T02, T04 and T17, lying just outside the proposed clearing area.

Two trees, T02 and T11 (Figure 4 and Figure 19) were identified as having possible hollows.

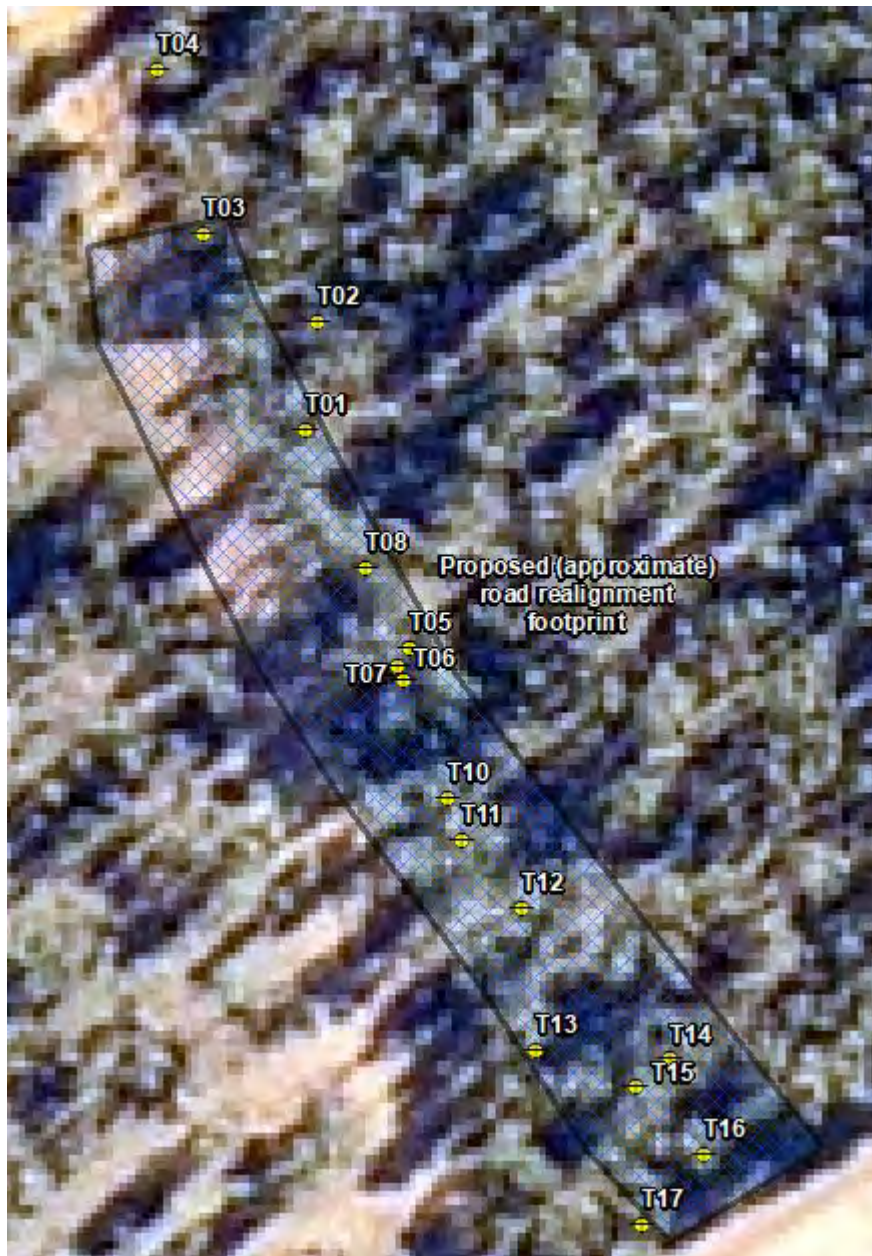


Figure 1: Proposed (approximate) road realignment footprint and surveyed trees

#### 4.1 Surveyed trees

Table 1: Tree features

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
T01	2 trunks, 1 tree, 680 mm and 350 mm	6471026.516	460332.1607
T02	570 mm, dead tree, fire damage, possible hollows, lies outside clearing area	6471044.369	460334.0775
T03	440 mm	6471058.927	460315.2028
T04	540 mm, lies outside clearing area	6471085.944	460307.6276
T05	2 trunks, 1 tree, 310 mm and 380 mm	6470990.448	460349.4164
T06	300 mm	6470987.447	460347.3476
T07	480 mm	6470985.012	460348.3972
T08	5 trunks, 1 tree, all trunks less than 300 mm	6471003.721	460342.1782
T10	340 mm	6470965.643	460355.6589

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
T11	1500 mm, large dead tree, possible hollows, lies on edge of clearing area	6470958.669	460358.05
T12	290 mm	6470947.511	460367.8332
T13	350 mm	6470923.911	460370.2885
T14	360 mm	6470922.445	460392.422
T15	580 mm	6470917.878	460386.6713
T16	340 mm	6470906.727	460398.1565
T17	380 mm	6470895.049	460387.8943

## 4.2 Figures



Figure 2: T01



Figure 3: T01



*Figure 4: T02*



*Figure 5: T03*



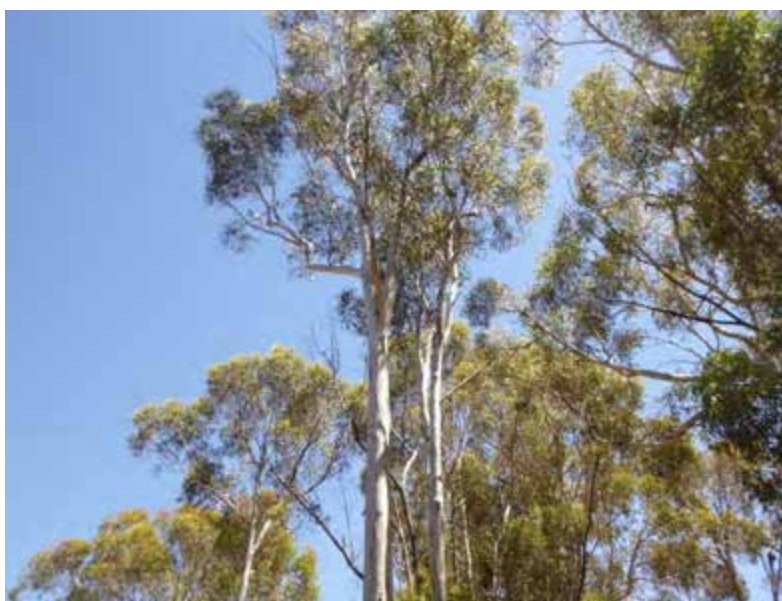
*Figure 6: T04*



*Figure 7: T05*



*Figure 8: T06*



*Figure 9: T06*



*Figure 10: T07*



*Figure 11: T07*



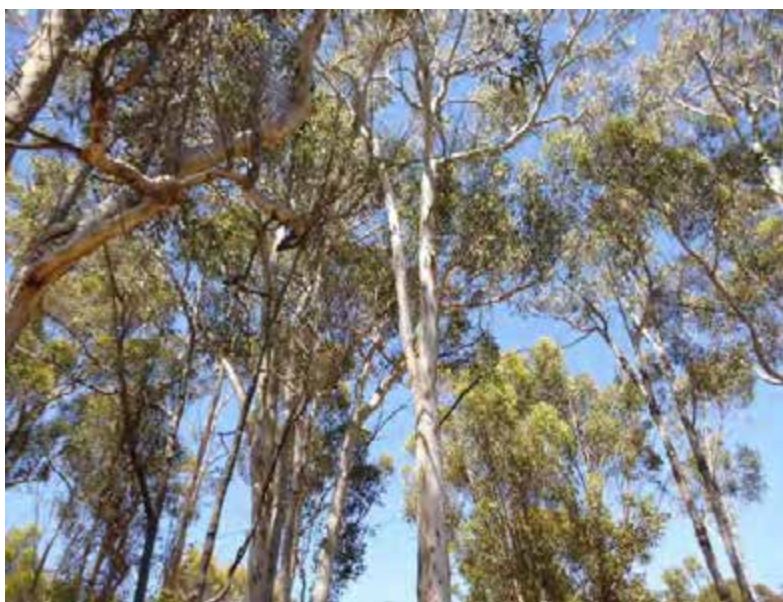
Figure 12: T08



Figure 13: T08



Figure 14: T09



*Figure 15: T09*



*Figure 16: T10*



Figure 17: T10



Figure 18: T11



Figure 19: T11



Figure 20: T12



Figure 21: T13



Figure 22: T14



Figure 23: T15



*Figure 24: T16*



*Figure 25: T17*

## 5.0 LANDFILL FOOTPRINT

Figure 26 shows the proposed clearing footprint resulting from the construction of the landfill's first cells. This area was demarcated in the field using a handheld GPS and spatial coordinates showing the extent of the area. A total of 59 trees were surveyed with one tree: LT20, lying just outside the proposed clearing area.

No trees were identified as having possible hollows.



Figure 26: Proposed landfill footprint and surveyed trees

## 5.1 Surveyed trees

Table 2: Tree features

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
LT01	2 trunks, 1 tree, 640 mm and 680 mm	6468997.718	462534.3193
LT02	660 mm	6469005.157	462537.9793
LT03	2 trunks, 1 tree, 480 mm and 400 mm	6469009.375	462539.5712
LT04	7 tree cluster, 360 mm, 500 mm, 320 mm, 370 mm, 450 mm, 700 mm and 340 mm	6469009.92	462476.3183
LT05	870 mm	6468988.773	462392.2504
LT06	2 trunks, 1 tree, 440 mm and 380 mm	6468943.796	462399.2227

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
LT07	3 trunks, 1 tree, 460 mm, 490 mm and 530 mm	6469014.598	462361.5228
LT08	680 mm	6469129.021	462310.2364
LT09	2 tree cluster, both at 400 mm	6469120.424	462293.2497
LT10	2 trunks, 1 tree, both at 600 mm	6469146.049	462298.7336
LT11	3 tree cluster, 770 mm, 920 mm and 560 mm	6469061.37	462390.7548
LT12	680 mm	6469039.006	462579.6448
LT13	870 mm	6469065.374	462697.731
LT14	970 mm	6469083.717	462681.9696
LT16	980 mm	6469111.22	462655.3964
LT17	740 mm	6469087.262	462620.7853
LT18	2 tree cluster, 680 mm and 450 mm	6469117.973	462622.6587
LT19	680 mm	6469159.463	462662.5953
LT20	1100 mm	6469265.153	462647.6498
LT21	5 trunks, 1 tree, 500 mm, 800 mm, 400 mm, 480 mm, and 300 mm	6469300.371	462578.4067
LT22	440 mm	6469191.245	462593.5546
LT23	660 mm	6469191.835	462573.0357
LT24	2 trunks, 1 tree, 920 mm and 1000 mm	6469256.721	462463.4069
LT25	980 mm	6469280.614	462449.8936
LT26	720 mm	6469189.993	462402.763
LT27	2 tree cluster, 600 mm and 440 mm	6469186.556	462432.747
LT28	2 tree cluster, 500 mm and 720 mm	6469170.635	462443.7728
LT29	5 tree cluster, 460 mm, 300 mm, 500 mm, 380 mm and 450 mm	6469161.472	462453.9229
LT30	2 tree cluster, 530 mm and 560 mm	6469192.132	462472.2473
LT31	430 mm	6469166.814	462490.0203
LT32	2 tree cluster, 450 mm and 360 mm	6469166.275	462494.3714
LT33	490 mm	6469178.933	462500.2816
LT34	2 tree cluster, 350 mm and 430 mm	6469177.175	462504.4481
LT35	550 mm	6469173.305	462507.1095
LT36	600 mm	6469161.297	462497.1315
LT37	680 mm	6469147.349	462501.9099
LT38	770 mm	6469137.614	462507.2401
LT39	3 trunks, 1 tree, 370 mm, 320 mm and 340 mm	6469127.162	462528.6459
LT40	310 mm	6469131.936	462530.6139
LT41	380 mm	6469139.493	462535.9755
LT42	2 trunks, 1 tree, 460 mm and 490 mm	6469139.058	462538.4353
LT43	2 trunks, 1 tree, both at 300 mm	6469137.176	462539.104
LT44	2 trunks, 1 tree, 400 mm and 350 mm	6469128.423	462539.9869
LT45	420 mm	6469125.023	462549.9267
LT46	440 mm	6469121.589	462550.412
LT47	400 mm	6469120.057	462555.9013
LT48	510 mm	6469101.905	462563.2477
LT49	2 trunks, 1 tree, 380 mm and 400 mm	6469130.498	462561.8196
LT50	510 mm	6469134.043	462561.2393
LT51	5 trunks, 1 tree, 360 mm, 260 mm, 300 mm, 400 mm and 200 mm	6469137.609	462566.6155
LT52	380 mm	6469140.3	462575.0203
LT53	3 trunks, 1 tree, 350 mm, 360 mm and 300 mm	6469165.384	462584.0997
LT54	590 mm	6469160.978	462591.6796
LT55	2 trunks, 1 tree, both at 300 mm	6469153.214	462590.3843

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
LT56	3 tree cluster, 290 mm, 440 mm and 340 mm	6469146.687	462593.8118
LT57	3 tree cluster, 320 mm, 370 mm and 330 mm	6469151.366	462600.3184
LT58	2 tree cluster, 300 mm and 600 mm	6469138.853	462603.5787
LT59	3 tree cluster, 430 mm, 350 mm and 400 mm	6469123.962	462593.2329

## 5.2 Figures



Figure 27: LT01



Figure 28: LT01



Figure 29: LT02



Figure 30: LT03



Figure 31: LT04



Figure 32: LT04



Figure 33: LT05

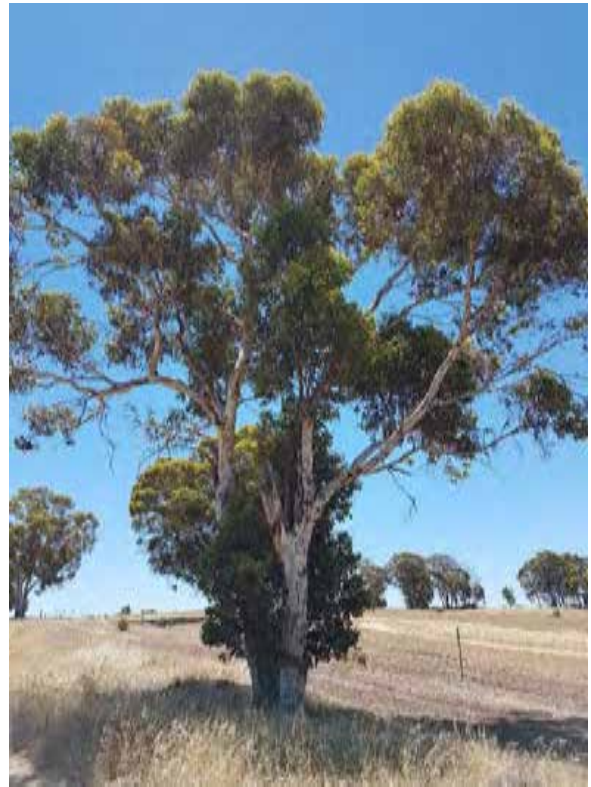


Figure 34: LT06



Figure 35: LT07



Figure 36: LT08



Figure 37: LT09



Figure 38: LT10



Figure 39: LT11



Figure 40: LT11



Figure 41: LT12



Figure 42: LT13



Figure 43: LT14



Figure 44: LT15



Figure 45: LT16



Figure 46: LT17



Figure 47: LT18



Figure 48: LT19



Figure 49: LT20



Figure 50: LT21



Figure 51: LT22



Figure 52: LT23



Figure 53: LT24



Figure 54: LT25



Figure 55: LT26



Figure 56: LT27



Figure 57: LT28



Figure 58: LT29



Figure 59: LT30



Figure 60: LT31



Figure 61: LT32



Figure 62: LT33



Figure 63: LT34



Figure 64: LT35



Figure 65: LT36



Figure 66: LT37



Figure 67: LT38



Figure 68: LT39



Figure 69: LT40



Figure 70: LT41



Figure 71: LT42



Figure 72: LT42



Figure 73: LT43



Figure 74: LT43



Figure 75: LT44



Figure 76: LT44



Figure 77: LT45



Figure 78: LT45



Figure 79: LT46



Figure 80: LT46



Figure 81: LT47



Figure 82: LT47



Figure 83: LT48



Figure 84: LT49



Figure 85: LT49



Figure 86: LT50



Figure 87: LT50



Figure 88: LT51



Figure 89: LT52



Figure 90: LT53



Figure 91: LT54



Figure 92: LT55



Figure 93: LT56

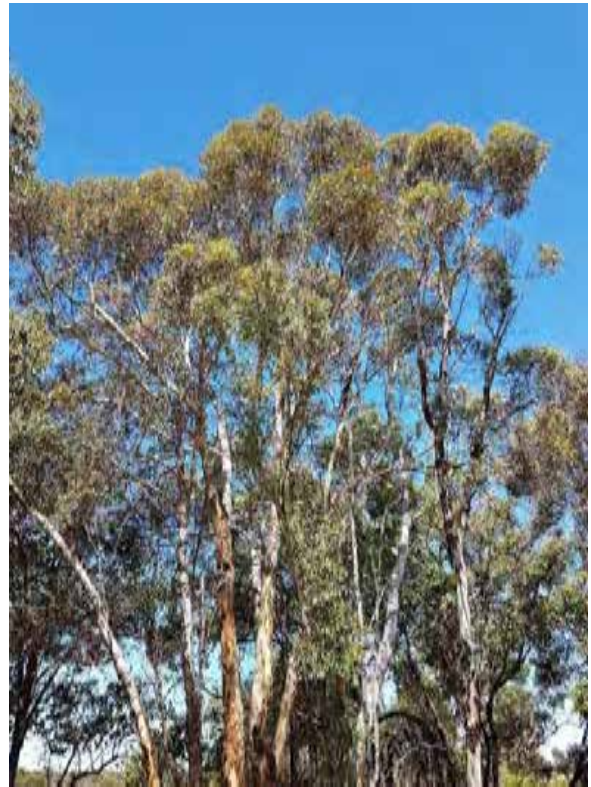


Figure 94: LT56



Figure 95: LT57



Figure 96: LT58



*Figure 97: LT59*

## **6.0 DAM FOOTPRINT**

Figure 98 shows the proposed clearing footprint from the construction of the landfill's dam. This area was demarcated in the field using a handheld GPS and spatial coordinates showing the extent of the area. A total of 15 trees were surveyed with two trees: D07 and D09, lying just outside the proposed clearing area.

Two trees, D08 and D11 (Figure 106 and Figure 113), was identified as having possible hollows.

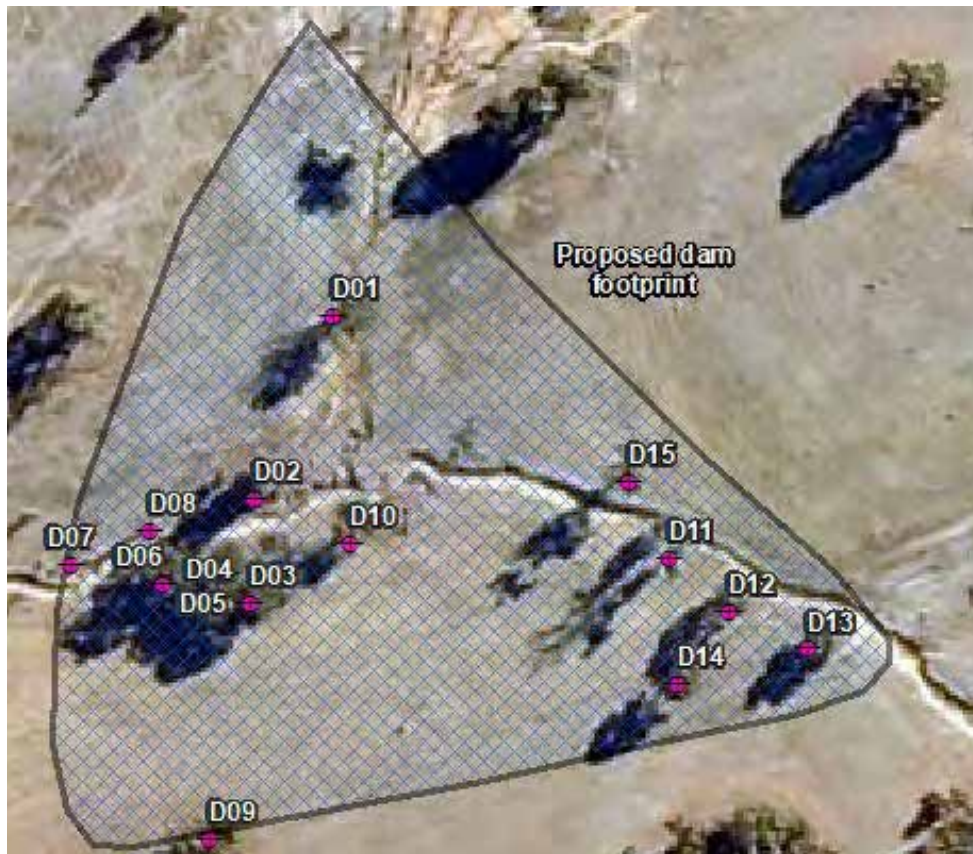


Figure 98: Proposed dam footprint and surveyed trees

## 6.1 Surveyed trees

Table 3: Tree features

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
D01	2 tree cluster, 420 mm and 400 mm	6468972.982	462864.5613
D02	820 mm	6468917.028	462840.088
D03	720 mm, fire damage	6468885.101	462838.9747
D04	4 tree cluster, 400 mm, 300 mm, 200 mm and 260 mm	6468887.284	462829.4178
D05	490 mm	6468894.164	462831.7564
D06	6 tree cluster, 300 mm, 410 mm, 430 mm, 190 mm, 370 mm and 340 mm	6468891.212	462812.3856
D07	550 mm, dead tree	6468897.206	462784.095
D08	1110 mm, possible hollows	6468907.603	462808.5443
D09	4 tree cluster, outside of clearing area, 490 mm, 590 mm, 270 mm and 760 mm	6468812.897	462826.4732
D10	580 mm	6468903.722	462869.2559
D11	6 tree cluster, possible hollows on large dead tree, 630 mm, 430 mm, 540 mm, 650 mm, 670 mm and 450 mm	6468898.868	462967.4106
D12	550 mm	6468882.638	462985.3382
D13	7 trunks, one tree, 310 mm, 270 mm, 280 mm, 230 mm, 300 mm, 320 mm and 340 mm	6468871.31	463009.7715
D14	720 mm	6468860.747	462970.1011
D15	580 mm	6468922.21	462954.8464

## 6.2 Figures



Figure 99: D01



Figure 100: D02



Figure 101: D03



Figure 102: D04



Figure 103: D05



Figure 104: D06



Figure 105: D07



Figure 106: D08



Figure 107: D09



Figure 108: D09



Figure 109: D09



Figure 110: D10



Figure 111: D11



Figure 112: D11



Figure 113: D11



Figure 114: D12



*Figure 115: D13*



*Figure 116: D14*



*Figure 117: D15*

## 7.0 SEDIMENT DAM FOOTPRINT

Figure 118 shows the proposed clearing footprint resulting from the construction of the landfill's sediment dam. This area was demarcated in the field using a handheld GPS and spatial coordinates showing the extent of the area. A total of five trees were surveyed, all situated within the proposed clearing area.

No trees were identified as having possible hollows.

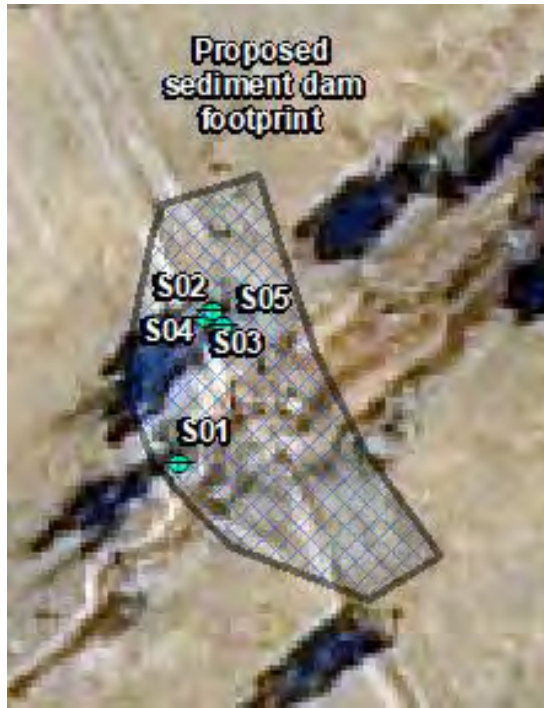


Figure 118: Proposed sediment dam footprint and surveyed trees

### 7.1 Surveyed trees

Table 4: Tree features

Tree Identity	Trunk Numbers, Diameter(s) and Features	Y Projection	X Projection
S01	2 trunks, 1 tree, 490 mm and 360 mm	6468766.821	462471.3468
S02	4 tree cluster, 1 large and 3 small, 460 mm on large tree, others less than 300 mm	6468797.878	462476.9057
S03	2 trunks, 1 tree, 480 mm and 330 mm	6468799.767	462478.0333
S04	420 mm	6468799.768	462478.4115
S05	3 tree cluster, 340 mm, 270 mm and 150 mm	6468796.561	462480.5032

## 7.2 Figures



Figure 119: S01



Figure 120: S01



Figure 121: S02



Figure 122: S03



Figure 123: S03



Figure 124: S04



Figure 125: S05



Figure 126: S05

## 8.0 CLOSING

We trust that this information will assist with the NVCP application assessment. If you have any questions, or require any further information, please do not hesitate to contact the undersigned.

### GOLDER ASSOCIATES PTY LTD



Craig Currie  
Environmental Scientist

CC/EWC/hn



Ed Clerk  
Principal Consultant and Division Lead

## REFERENCES

Department of Sustainability, Environment, Water, Population and Communities. (2012). *EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species: Carnaby's Black Cockatoo (Endangered) Calyptorhynchus latirostris, Baudin's Black Cockatoo (Vulnerable) Calyptorhynchus baudinii, Forest Red-tailed Black Cockatoo (Vulnerable) Calyptorhynchus banksii naso.*

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**FIGURE**  
**Site Overview**



#### LEGEND

- DAM CLEARING TREES
- LANDFILL CLEARING TREES
- ROAD CLEARING TREES
- SEDIMENT DAM CLEARING TREES
- ROADS
- PROPOSED FOOTPRINTS

#### NOTES

1. COORDINATE SYSTEM: GDA 1994 MGA ZONE 50

#### REFERENCE

AERIAL IMAGERY 2018-01-17 © NEARMAP (2018)  
ROADS SOURCED FROM MAIN ROADS WA.



CLIENT  
ALKINA HOLDINGS PTY LTD

PROJECT  
GREAT SOUTHERN LANDFILL - TREE SURVEY

TITLE  
**TREE SURVEY TO SUPPORT NATIVE VEGETATION CLEARING PERMIT APPLICATION**

CONSULTANT	YYYY-MM-DD	2018-01-17
DESIGNED	CC	
PREPARED	CC / SR	
REVIEWED	SR	
APPROVED	CC / SR	

PROJECT NO. 1777197 CONTROL 036 M REV. A FIGURE 1

