ANGLOGOLD ASHANTI
AUSTRALIA

TROPICANA GOLD PROJECT
Operational Area Threatened Flora Assessment

Providing sustainable environmental strategies, management and monitoring solutions to industry and government.

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ENVIRONMENT

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TROPICANA GOLD PROJECT
Operational Area

Threatened Flora Assessment

TROPICANA JOINT VENTURE

ANGLOGOLD ASHANTI AUSTRALIA

INDEPENDENCE GROUP NL

July 2009

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Executive Summary

The Tropicana JV (TJV) is currently undertaking pre-feasibility studies on the viability of establishing the Tropicana Gold Project (TGP), which is centred on the Tropicana and Havana gold prospects. The proposed TGP is located approximately 330 km east north-east of Kalgoorlie, and 15 km west of the Plumridge Lakes Nature Reserve, on the western edge of the Great Victoria Desert (GVD) biogeographic region of Western Australia. The project is a joint venture between AngloGold Ashanti Australia Limited (70% and Manager) and the Independence Group NL.

AngloGold commissioned *ecologia* Environment (*ecologia*) on behalf of the TJV to undertake threatened flora species surveys to determine the locations and population size of threatened species (Declared Rare and Priority Flora taxa) occurring inside and outside the proposed operational footprint. The project was broken up into three separate field trips between Q3 2007 and Q4 2008. The 2007 field trip focused on the sand dune area adjacent to and extending into the resource area. The 2008 surveys focused on the proposed airstrip / solar thermal field and the waste material landform areas.

As a result of these surveys 18 populations of the DRF, *Conospermum toddii*, were recorded on the dunes to the west of the resource area, and 12 Priority Flora taxa were recorded. Of the 12 priority tax recorded 9 taxa were recorded inside and outside the operational footprint. The taxa recorded within the operational footprint were:

- *Baeckea* sp. Great Victoria Desert (Priority 2);
- *Dicrastylis nicholasii* (Priority 2);
- *Olearia arida* (Priority 2);
- *Acacia eremophila* numerous-nerved variant (Priority 3);
- *Dicrastylis cundeeleensis* (Priority 3);
- *Microcorys macredieana* (Priority 3);
- *Micromyrtus stenocalyx* (Priority 3); and
- *Daviesia purpurascens* (Priority 4).

An assessment of impact on the species recorded within the proposed operational footprint has determine that the no DRF population are removed although the proposed project will removed more than 25% of the observed populations of 4 priority taxa. The taxa affected are:

- *Dicrastylis nicholasii* (28.8%)
- *Acacia eremophila* numerous-nerved variant (53.5%);
- *Dicrastylis cundeeleensis* (89.4%);
- *Daviesia purpurascens* (75.4%)

All other priority taxa are either not affected or are affected by less than 12% of their recorded population.

The quantitative estimates of local and regional impacts are derived from populations recorded by ecologia only, since numeric estimates of abundance are unavailable for other records lodged with the WA Herbarium. Given that several of the taxa are relatively broadly distributed, the estimates of regional impacts are likely to be overestimated.

1.0 INTRODUCTION

1.1 Project Background

The Tropicana JV (TJV) is currently undertaking pre-feasibility studies on the viability of establishing the Tropicana Gold Project (TGP), which is centred on the Tropicana and Havana gold prospects. In May 2008 the project was refer to the WA Environmental Protection Authority under Section S38 of the *Environmental Protection Act* 1986. Following this referral the EPA determined that the project would be formally assessed as a Public Environmental Review with an 8-week public comments period.

The proposed TGP is located approximately 330 km east north-east of Kalgoorlie, and 15 km west of the Plumridge Lakes Nature Reserve, on the western edge of the Great Victoria Desert (GVD) biogeographic region of Western Australia (Figure 1-1). The project is a joint venture between AngloGold Ashanti Australia Limited (70% and Manager) and the Independence Group NL.

The TGP consists of three main components:

- Operational Area (OA)- this area contains the mine, processing plant, aerodrome, village and other associated infrastructure;
- Water Supply Area - two basins have been investigated, the Minigwal Trough and Officer Basin; and
- Infrastructure Corridor - two options are under consideration (Cable Haul Road and Pinjin Road options).

The TJV commissioned *ecologia* Environment (*ecologia*) to undertake threatened flora species assessment to determine the locations and numbers of plants of any populations of threatened species (Declared Rare and Priority Flora taxa), occurring inside and outside the proposed Operational footprint. The assessment was undertaken via three separate surveys between Q3 2007 and Q4 2008.

The first (Spring 2007) survey focused on surveying 23 sand dunes located within or adjacent to the proposed resource area primarily focused on the Declared Rare Flora (DRF) *Conospermum toddii.*

The second and third survey occurred in July and November 2008 respectively and focused on recording priority flora taxa within the proposed operational footprint and similar vegetation communities outside the impact area.

The primary objective of these surveys was to provide sufficient information for TJV to assess the potential impact of the project on the conservation significant flora taxa occurring within the operational areas.

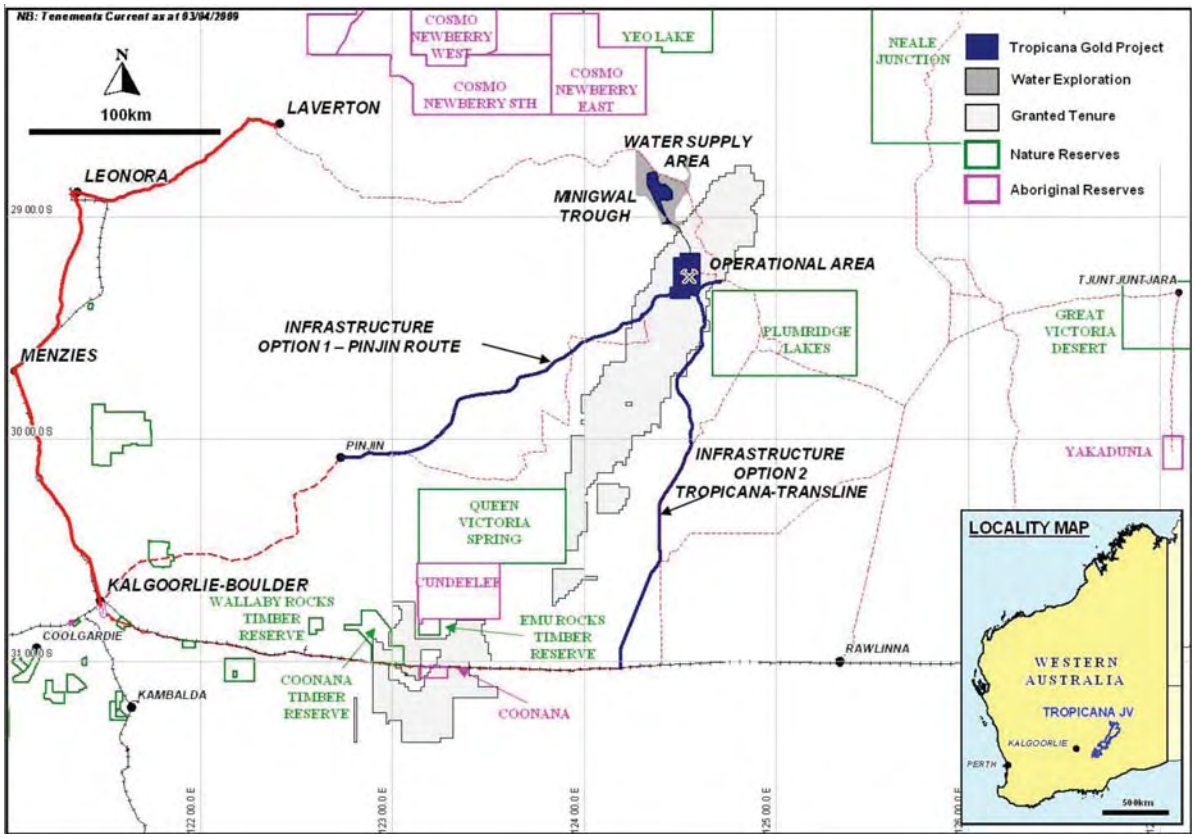

Figure 1-1 Location of the Tropicana Gold Project

2.0 EXISTING ENVIRONMENT

2.1 Climate

The climate of the Great Victoria Desert is arid to semi-arid, with erratic year-round rainfall ranging from 150 to 180 mm per year (http://www.bom.gov.au, accessed 18/12/08). Average weather conditions from the study area can be interpreted from weather data from Laverton to the north-west, and Balgair to the south-east (Figure 2-1and Figure 2-2).

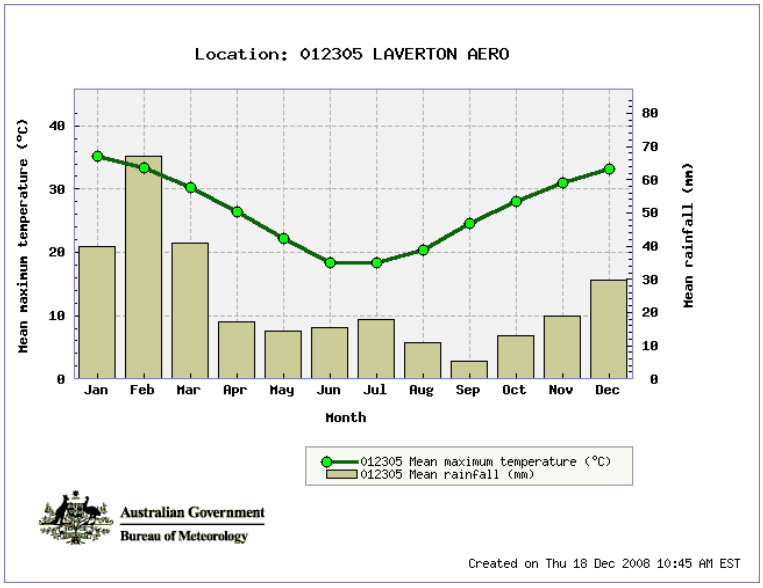

Figure 2-1 Summary of climatic data for Laverton Aero (Bureau of Meteorology, 2008).

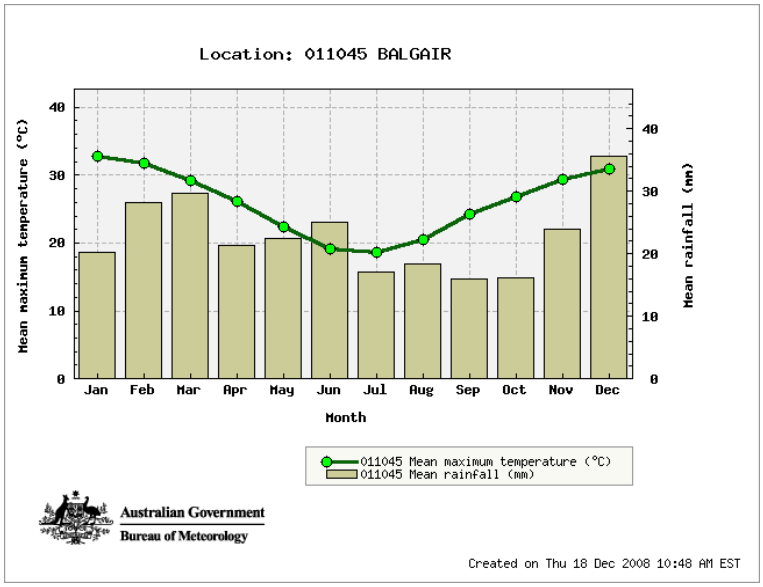

Figure 2-2 Summary of climatic data for Balgair Bureau of Meteorology, 2008)

2.2 Geology

Tropicana lies in the Gunbarrel geological Province and is situated over the Phanerozoic sedimentary rocks of the Gunbarrel Basin. These rocks include Cretaceous sandstone, Carboniferous-Permian glacigene, marine and continental siliclastic sedimentary rocks, and Devonian arenite. A small area of Ordovician basalt is also present near Lake Gillen. The Gunbarrel Basin overlies the Officer Basin, which comes to the surface in the north-east (along the boundary with the Musgrave and Warburton Range Provinces). Neoproterozoic conglomerate, sandstone and arenite occur in this area. In the south-west Mesoproterozoic granite, dolerite, gabbro and ultra-basic intrusions, and Archaean gneiss of an outlier of the Biranup Complex occur (Albany-Fraser Orogen) (Tille, 2006).

2.3 Landforms

The Great Victoria Desert is dominated by sandplains with longitudinal and ring dunes separated by interdunal corridors and plains. These sandplains sit at an elevation of 350-500 m AHD dropping to less than 300 m in the south. They contain occasional outcrops of sandstones, laterites and silcretes, some calcareous mounds, and occasional salt pans. Also present are scarpland-breakaways and residuals of various forms (cuestas, mesas, buttes, stony hillocks and hills). These are usually surrounded by stone and gravel pavements. Shallow valleys (with lakes, claypans, salt pans, calcrete platforms, sand dunes, kopi dunes and calcareous dunes) are usually a relatively minor component of the landscape. Some prominent salt lakes also occur in the area (Tille, 2006).

2.4 Soils

The project area lies in the Southern Great Victoria Desert zone (87 550 km^2) and occurs within the Gunbarrel Province of the Sandy Desert Region. The zone is located in the southern Arid Interior between Lake Minigwal and the South Australian border. It comprises sandplains and dunes (with some gravelly and calcrete plains) on sedimentary rocks of the Gunbarrel (and Officer) Basin. Some red deep sands and red sandy earths (clays) with some red loamy earths also occur in this zone (Tille, 2006).

2.5 Vegetation Assemblages

2.5.1 Earlier Surveys

Vegetation of the Southern Great Victoria Desert Zone comprises spinifex grasslands with mallee scrub and some mulga (*Acacia*) and eucalypt woodlands (Tille, 2006).

The project area is situated in the Helms Botanical District, near the border of the Great Victoria Desert and the Nullarbor Plain, within the Eremaean Botanical Province. At a broad scale (1:1,000,000) Beard (1975) described three distinct vegetation units in close proximity to and including the Tropicana project area:

1. *Acacia aneura* (mulga) low woodland between sand ridges.

2. Tree (*Eucalyptus gongylocarpa, E. youngiana*) and shrub steppe between sand hills with hummock grassland (*Triodia basedowii*).

3. *Acacia aneura / Casuarina cristata* (*C. pauper***)** woodland (Mulga and sheoak).

2.5.2 Recent Surveys

As part of a biological assessment of the Operational Area the vegetation communities have been mapped using aerial photography and multivariate analysis of floristic data collected from a two phase survey (Figure 2-3). The vegetation of the OA has been mapped into the following eight main units:

- *Acacia aneura* woodlands over grasses +/- *Triodia basedowii* on plains. Open to moderately dense woodlands and shrublands dominated by *Acacia aneura* are widespread throughout the survey area.
- Scattered *Eucalyptus gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii* on longitudinal sand dunes.
- Mixed *Eucalypt* woodlands over mixed open shrubs and *Triodia basedowii*. *Eucalyptus gongylocarpa* over open shrubland over open *Dodonaea viscosa* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
- Scattered *Acacia nyssophylla*/*Grevillea sarissa* over open herbs and grasses on clay pans.
- Scattered trees over open low shrubs and moderately dense tussock grasslands.
- *Eucalyptus gongylocarpa* over *Triodia desertorum* or *T. basedowii*.
- *Acacia aneura* woodlands over soft grasses and *Triodia basedowii* on clay loam plains.
- *Open to mode*rately dense *Casuarina pauper* woo*dland over open m*ixed shrubs and scattered soft grasses and/or *Triodia scariosa*.

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6780000 6770000 6760000 6750000

Legend

- Conceptual Site Layout
- Tropicana Operational Area
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

N

0 5 10

Kilometres

Absolute Scale - 1:176,337

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Vegetation community types present within the Operational Area of the Tropicana Gold Project

Figure: 2.3
Project ID: 844

Drawn: SG
Date: 20/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M001

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3.0 RARE FLORA SURVEY

3.1 Survey Methods

Three surveys have been conducted in October 2007, July 2008 and November 2008. There were some differences in the methodology employed for each of these surveys, as the information regarding the location of infrastructure and taxa of significance within the area was progressively refined. The areas covered by each of these surveys are detailed in Figure 3-1 to Figure 3-3

3.1.1 October 2007 survey

A survey primarily targeting the DRF *Conospermum toddii* was undertaken from the 2nd to the 6th of October 2007. The survey targeted all dunes, the preferred habitat of this taxon, within and adjacent to the TGP resource area.

The dunes to be surveyed were identified from aerial photography and field observations Twenty three sand dunes were traversed by foot in a zigzag pattern from crest to swale. A separate traverse of the northern and southern slopes of each dune was conducted to maximise coverage. In areas where the sand dune was broad, these areas were more intensely searched by crisscrossing the area to make sure all areas were thoroughly checked for *C. toddii*. Approximately 23 linear kilometres of sand dunes were searched.

Plant species were either identified in the field, or specimens were collected for later identification and verification. Boundary waypoints or population start and end waypoints were recorded for sizeable populations of *C. toddii,* while single waypoints were recorded for isolated plants or small populations. The number of plants in each population was also recorded. Many of the plant species were flowering at the time of the survey, and *C. toddii* could therefore be easily distinguished from other species of similar form.

3.1.2 July 2008 survey

A targeted threatened flora survey focussing on all taxa known to occur within the Operational Area at that time was conducted between the 24th and 30th July 2008.

An area of approximately 5 km^2 was surveyed and along with a subset of areas within the proposed airstrip / solar thermal field polygon, using existing tracks in the area (Figure 3-2.) Areas searched were traversed by foot.

Plant species were either identified in the field, or specimens were collected for later identification and verification. As the area requested to be surveyed was large given the available time, the percentage cover of large Priority Flora populations was recorded rather than individual plant counted. Plants in small and isolated populations were individually counted.

3.1.3 November 2008 survey

A targeted threatened flora survey focussing on all taxa known to occur within the Operational Area was conducted between the 11th and 20th of November 2008 inside and outside the main operational footprint (Figure 3-3). As the OA was too large (86 km^2) to be completely searched within the time available, a sub-set of the area was searched, using transects positioned at even spacing within each of the vegetation types mapped (Figure 3-3).

In most instances transects were 150 m long, 10 m wide and positioned 100 m apart. Where the size of the vegetation unit precluded transects of 150 m, the deviation from this fixed length was recorded. The number of transects walked at was determined by the area of the vegetation unit and the densities of populations of conservation significant taxa occurring in them.

Plant species were either identified in the field, or specimens were collected for later identification and verification. Boundary waypoints or population start and end waypoints were recorded for sizeable populations of threatened taxa, while single waypoints were recorded for isolated plants or small populations occurring within transects. The number of plants in each population was also recorded as well as the vegetation unit in which the population was situated. Any threatened taxa occurring between or outside transects were considered as opportunistic collections – these populations were also waypointed and the number of plants were recorded.

The objective of surveying both within and outside the OA (i.e. in proposed impact and non-impact areas) is to be able to provide an estimate of the local impact on each of the threatened species occurring in the OA by comparing data from the operational areas and the non-impact areas. Data collected from the each of the surveys was used to estimate the localised (i.e. within the OA) impact to the threatened of the proposed impact footprint. Data collected from the much broader area (1,356 km^2) included within the Tropicana flora and vegetation survey (ecologia 2009a) and other surveys of infrastructure corridors in the broader vicinity was used to estimate the broader impact to each taxon. However since this estimate excludes data from other sources for which populations numbers are unavailable, it underestimates the total number of plants outside the area of impact and hence overestimates the regional impact.

640000

650000

6760000

Legend

- Dunes Searched
- Dune Survey Area
- Conceptual Site Layout
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

1A 2A 3A 4A 5A 6A 7A 8A 9A 10A 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A 21A 22A

N

0 1 2

Kilometres

Absolute Scale - 1:50,000

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Boundaries of October 2007 threatened flora survey

Figure: 3.1
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M002a

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6770000 6760000 6750000

Legend

- July 08 Search Area
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
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a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
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xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

N

0 3 6

Kilometres

Absolute Scale - 1:100,000

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Areas searched during the July 2008 threatened flora survey

Figure: 3-2
Project ID: 844

Drawn: SG
Date: 24/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M036

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Legend

- November 08 Transects
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
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k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
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a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

N

0 3 6

Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Areas searched during November 2008 threatened flora survey

Figure: 3-3
Project ID: 844

Drawn: SG
Date: 24/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M037

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3.2 Flora of Conservation Significance

3.2.1 Statutory Framework

Flora species are protected at a National level under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Act contains a list of species that are considered Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Extinct or Extinct in the Wild. Definitions of categories are detailed in Appendix A. Currently one taxa protected by this act, *Conospermum toddii* (Endangered), is known to occur at Tropicana.

Flora of conservation significance within Western Australia are protected under the *Wildlife Conservation Act 1950* (WC Act) and termed Declared Rare Flora (DRF). The current list of DRF is provided in the *Western Australian Wildlife Conservation (Rare Flora) Notice 2008(2)*. Declared Rare Flora taxa are defined as "taxa which have been adequately searched for and deemed to be either rare, in danger of extinction, or otherwise in need of special protection in the wild". Currently one taxa protected by this act, *Conospermum toddii* (DRF) is taxa protected by this act

3.2.2 Priority flora recorded during the current survey

The Department of Environment and Conservation (DEC) also maintains a list of Priority Flora taxa, which are considered poorly known, uncommon, or under threat, but for which there is insufficient justification based on known distribution and population sizes for inclusion on the DRF schedule. Priority Flora taxa are assigned to one of four Priority categories (Atkins 2008) (Appendix A). Fourteen Priority Flora taxa have been recorded in the broader area of 1,356 km^2 surrounding the operational area surveyed during the Tropicana flora and vegetation survey (ecologia 2009): *Baeckea* sp. Sandstone (P1), *Dampiera eriantha* (P1), *Baeckea* sp. Great Victoria Desert (P2), *Dicrastylis nicholasii* (P2), *Grevillea secunda* (P2), *Malleostemon* sp. Officer Basin (P2), *Olearia arida* (P2), , *Acacia eremophila* numerous nerved variant (P3), *Acacia eremophila* var. *variabilis* (P3), *Dicrastylis cundeeleensis* (P3), *Microcorys macredieana* (P3), *Micromyrtus stenocalyx* (P3), , *Daviesia purpurascens* (P4) and *Lepidobolus deserti* (P4).

Twelve confirmed Priority Flora species were collected during the three surveys as detailed in Table 3-1. The specimens of *Dicrastylis* species collected during the October 2007 survey were not flowering at the time of the survey and hence the determinations of *D. ?nicholasii* for this survey is equivocal. *Dicrastylis cundeeleensis* was not formally described until December 2007 (Nuytsia 2007) and not listed as a Priority taxon until 2008 and hence was not included in the scope of the October 2007 search.

Table 3-1 Threatened flora taxa located during three main surveys of Tropicana

Conservation Significant Flora	Cons. status	Oct-07	Jul-08	Nov-08
Conospermum toddii	DRF	✓		
Baeckea sp. Sandstone	P1			✓
Dampiera eriantha	P1		✓	✓
Baeckea sp. Great Victoria Desert	P2	✓	✓	✓
Dicrastylis nicholasii	P2	✓	✓	✓
Malleostemon sp. Officer Basin	P2	✓		✓
Olearia arida	P2	✓	✓	✓
Acacia eremophila numerous-nerved variant	P3		✓	✓
Dicrastylis cundeeleensis	P3			✓
Microcorys macredieana	P3	✓		✓
Micromyrtus stenocalyx	P3	✓		✓
Daviesia purpurascens	P4			✓
Lepidobolus desertii	P4	✓		✓
Caesia talingka ms	[S]Species of interest	✓		

These taxa are described below and photographs are included in Appendix B Plate 1 to Plate 15

Conospermum toddii (DRF) (Desert Smoke bush) (Plate 1, Plate 2) is a shrub growing to less than 2 m in height with long, fine, thread-like leaves that are bent upwards in a soft curve. The small, white flowers are likely to be seen from July to October, particularly following favourable rainfall. It typically occurs on the crests of sand dunes but can also be found in the interdunal swales. In recently burnt areas the smokebush regenerates from seed, and small seedlings may be present in a variety of habitats.

Baeckea sp. Sandstone (P1) (Plate 3) is a low spreading to upright shrub that grows to 1m in height. The stems tend to be sparse with a limited number of small branches present. It has small leaves that occur in groups along the sides of the stems. The flowers are small and pink to white, and can often be seen in the months after good rainfall. This species occurs in low woodlands or with Mulga, or among mallee and taller shrubs with spinifex. It tends to be found on flat, red, loamy sand plains.

Dampiera eriantha (P1) (Plate 4) is an erect perennial to 60 cm, hairless other than on the flowering structures. The leaves are sessile (without stalks), linear to oblong, with curled margins. The flowers are borne in axillary clusters with pale grey flowers.

Malleostemon sp. Officer Basin (P2) (Plate 5) is a shrub species that grows to 1 m in height in open vegetation, but possibly up to 3 m in tall shrubland. This species has small and almost round leaves that are close to the stem and arranged in overlapping rows. The stems have an open to sparse arrangement. The flowers are white and typically appear in December. This species was recorded on the crests and upper slopes of sand dunes.

Olearia arida (Arid Daisybush) (P2) (Plate 6) is a low shrub that grows up to 0.7 m in height. This species has sparsely branched stems and young stems that are stiff and sticky with short white hairs. The narrow leaves are up to 2 cm in length, smooth and hairless on the top and white with a green vein on the underside. At flowering time (July to September), a single white daisy head about 2 cm in diameter is produced at the end of each stem. It was recorded on dune swales and flats.

Baeckea sp. Great Victoria Desert (P2) (Plate 7) is a low spreading to upright shrub that grows to 1 m in height. The stems tend to be sparse with a limited number of small branches present. It has small leaves that occur in groups along the sides of the stem. The flowers are small and pink to white and occur between April and June. It can be found on undulating plains and gentle slopes on red sand and yellow sandy loam. During this survey it was found on slopes and swales.

Dicrastylis nicholasii (P2) (Plate 8) is an upright shrub growing to about 0.6 m in height with dense white hairs on the stems, young leaves and lobes of the flowers.. The blue flowers occur in groups at the end of branching stems. The species has been recorded as flowering in January and April, but it possibly flowers at other times of the year in response to good rainfall. During these surveys, it was found on crests, slopes, swales and flats.

Dicrastylis cundeeleensis (P3) (Plate 9) is an upright shrub growing up to 0.5 m in height, with dense white to yellow, or more rarely reddish hairs on the young stems, leaves and peduncles. . The new growth and young leaves usually have a yellowish tinge to them. The flowers are white and grow in a pyramid shaped inflorescence at the end of side stems. It has been recorded to flower mainly between October and December; however, with one flowering record occurring in April, it is more likely it flowers in response to good rainfall events. This species occurs on yellow sand dunes and associated swales.

Acacia eremophila numerous nerved variant (P3) (Plate 10) is a dense shrub with a rounded crown from 1 to 2 m high. The phyllodes are pale green to bronze green, erect, with brown, slightly hooked tips. The flowerheads are mid-golden, with flowering occurring during September. It grows in sandy soil and on flats. A photo of the non priority taxa, which looks very similar, is provided in Appendix D Plate D.9.

Microcorys macredieana (P3) (Plate 11) is a wispy, broom-like low shrub in the mint family that grows to between 0.2 and 1.5 m in height. It has narrow, aromatic leaves that grow in groups of three from the stem, and each leaf has a slight hook at its tip. The plant has unevenly shaped white flowers. It is conspicuous in unburnt vegetation at Tropicana due to the lush, light green colour of its leaves and stems, which differs from the mostly dark or dull coloured plants occurring with it. The plants grow in yellow sand on dunes and plains and are often found growing in small groups. This species was recorded on the lower slopes of sand dunes.

Micromyrtus stenocalyx (Wispy Desert Myrtle) (P3) (Plate 12) is a very slender shrub with tiny, creamy - yellow flowers that occur between April and December, and miniscule leaves. It grows to about 1.5 m in height. The flowers are short tubes with petals that are about 1 mm wide. The leaves are very small and narrow and lie close to the stem. The plants were found growing on slopes and crests of sand dunes.

Daviesia purpurascens (P4) (Plate 13) is a prickly erect shrub under 1 m in height that produces yellow-brown-red pea flowers during October. The stems and leaf-like parts of this species are a blue-green to grey colour, round in cross section, and very spiny. Plants occur on sandy or loamy soils over laterite on flats and ridges.

Lepidobolus deserti (Desert Twine Rush) (P4) (Plate 14) grows in tufts and has wiry leafless stems that twist and curl back and forth. The short stems have with a number of dark to mid-brown patches at regular spacing. The above-ground stems grow to about 40 cm (but often to about 25 cm) in height from an underground horizontal stem. The underground stem is covered with dense, light brown hairs. This species often grows in clumps that are 20 to 40 cm wide. It is often located on red, sandy loam soils on flat to slightly undulating plains in association with mallee, shrubs and spinifex. It was found on crests, slopes and swales of sand dunes.

Caesia talingka ms (C Tauss) (of potential conservation significance) (Plate 15) is a sedge-like rhizomatous, tufted perennial herb. It forms a thick, dark green grass–like clump up to 50 cm high and about 70 cm in diameter and it was found on the crests and slopes of sand dunes. It has folded viscid (sticky) leaves. Although not listed at present it may become a Priority taxon once formally described.

The locations and sizes of all populations of all threatened flora taxa located during the surveys are included as Appendix C (on CD). The distribution of populations is mapped in Figures 3.4 to 3.18. Note that in mapping the distributions, records from locations within 50 metres of each other were plotted as a single point to improve clarity.

It should be noted that as the numbers below are compiled from a variety of surveys with differing methodologies, the total number is an estimate that will include:

1. Locations at which the exact number of plants was counted;
2. Locations at which, due to the abundance of the taxon, the total number present was estimated e.g. >100 plants, >1000 plants. Where estimates were made, the lower end of the range has been incorporated into the figures below;
3. Locations from surveys using quadrate based methodology in which only a percentage cover ranking was made. In these instances the assumptions as to the number of plants are summarised in Table 3-2

Table 3-2 Number of plants estimated to occur when no counts were recorded, based on % cover

Cover ranking	No plants assumed
Not stated	1
0.5% or 1%	5
Fewer than 10 plants	5
2-10%	10
10-30%	20
30-70%	30

It should be noted that these estimates are extremely conservative and in most instances would result in an underestimate of the number of plants present. In almost all instances

coverage were recorded for collections outside the proposed impact footprint. Therefore it is likely that the numbers outside the impact area are underestimated, and hence that the percentage impact calculated in Table 3-3 is probably overestimated rather than underestimated.

Table 3-3 indicates the total numbers of each of the Threatened Flora taxa recorded during the current assessment and all other surveys conducted by ecologia in the vicinity of the Tropicana Gold Project. These latter figures incorporate data from the much larger area surrounding the Operational Area surveyed at a lower intensity (ecologia, 2009) and all other surveys undertaken by ecologia within the region. A summary of the scope and methodologies of these surveys is included in Appendix D.

Table 3-3 Flora of conservation significance recorded during the current and associated ecologia surveys

Conservation Significant Flora	Cons Code	Total plants impact area recorded during threat. flora surveys	Total plants impact area recorded during all other ecologia surveys	**Total within impact area**	Total plants in OA recorded during threat. flora surveys	Total plants in OA recorded during all other surveys	**Total plants within OA**	% impact to plants in OA	Total plants outside OA recorded during threat. flora surveys	Total plants outside OA during all other ecologia surveys	**Total all plants recorded during ecologia surveys**	% impact to plants recorded within impact area
Conospermum toddii	DRF	0	0	**0**	1264	60	**1324**	NIL	0	46	**1370**	NIL
Baeckea sp. Sandstone	P1	0	0	**0**	0	0	**0**	NIL	0	0	**0**	NIL
Dampiera eriantha	P1	0	0	**0**	438	0	**438**	NIL	0	29	**467**	NIL
Baeckea sp. Great Victoria Desert	P2	301	42	**343**	3215	59	**3274**	10.5	0	221	**3495**	9.8
Dicrastylis nicholasii	P2	5859	81	**5940**	15219	587	**15806**	37.6	430	4378	**20614**	**28.8**
Grevillea secunda	P2	0	0	**5**	0	5	**5**	**100.0**	0	312	**317**	1.6
Malleostemon sp. Officer Basin	P2	0	0	**0**	421	15	**436**	NIL	0	21	**457**	NIL
Olearia arida	P2	179	23	**202**	558	191	**749**	27.0	0	917	**1666**	12.1
Acacia eremophila numerous-nerved variant	P3	440	10	**450**	789	47	**836**	**53.8**	0	5	**841**	**53.5**
Dicrastylis cundeeleensis	P3	5830	15	**5845**	6201	95	**6296**	**92.8**	0	241	**6537**	**89.4**
Microcorys macredieana	P3	41	20	**61**	978	105	**1083**	5.6	0	489	**1572**	3.9
Micromyrtus stenocalyx	P3	87	0	**87**	2874	380	**3254**	2.7	1	553	**3808**	2.3
Daviesia purpurascens	P4	521	0	**521**	521	0	**521**	**100.0**	0	170	**691**	**75.4**
Lepidobolus desertii	P4	0	0	**0**	5356	171	**5527**	NIL	0	1630	**7157**	NIL
Caesia talingka ms	[$]Sp. of int.	30	0	**30**	791	160	**951**	3.2	0	127	**1078**	2.8

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Legend

- *Conospermum toddii*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Distribution of *Conospermum toddii* (DRF) recorded during the threatened flora surveys of the Operational Area

Figure: 3.4
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M003

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Legend

- *Baeckea sp. Sandstone*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

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ANGLOGOLD ASHANTI

Baeckea sp. Sandstone (P1) recorded within the Operational Area

Figure: 3.5
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M004

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Legend

- *Dampiera eriantha*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

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ANGLOGOLD ASHANTI

Dampiera eriantha (P1) recorded within the Operational Area

Figure: 3.6
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M005

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Legend

- *Baeckea sp.* Gt. Victoria Desert (A.S. Weston 14813)
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Baeckea sp. Great Victoria Desert (P2) recorded within the Operational Area

Figure: 3.7
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M006

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Legend

- *Dicrastylis nicholasii*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Dicrastylis nicholasii (P2) recorded within the Operational Area

Figure: 3.8
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M007

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Legend

- *Grevillea secunda*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Grevillea secunda (P2) recorded within the Operational Area

Figure: 3.9
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M010

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Legend

- *Malleostemon* sp. Officer Basin (D. Pearson 350)
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Malleostemon sp. Officer Basin (P2) recorded within the Operational Area

Figure: 3.10
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M008

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Legend

- *Olearia arida*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

Olearia arida (P2) recorded within the Operational Area

Figure: 3.11
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M009

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Legend

- *Acacia eremophila* numerous-nerved variant
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Acacia eremophila* numerous-nerved variant (P3) recorded within the Operational Area**

Figure: 3.12
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M011

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Legend

- *Dicrastylis cundeeleensis*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Dicrastylis cundeeleensis*(P3) recorded within the Operational Area**

Figure: 3.13
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M012

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Legend

- *Microcorys macredieana*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Microcorys macredieana*(P3) recorded within the Operational Area**

Figure: 3.14
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M013

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Legend

- *Micromyrtus stenocalyx*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Micromyrtus stenocalyx* (P3) recorded within the Operational Area**

Figure: 3.15
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M014

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Legend

- *Daviesia purpurascens*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

N

0 3 6

Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Daviesia purpurascens*(P4) recorded within the Operational Area**

Figure: 3.16
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M015

A3

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630000 640000 650000 660000

6770000 6760000 6750000

Legend

- *Lepidobolus deserti*
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Lepidobolus desertii*(P4) recorded within the Operational Area**

Figure: 3.17
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M016

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6770000

6760000

6750000

Legend

- *Caesia talingka* (C. Tauss) ms
- Tropicana Operational Area
- Conceptual Site Layout Dec 08
- Access Road

ex.Lt2H	Mixed Eucalypt woodlands over mixed open shrubs over *Triodia basedowii*.
e19L.t2t7H	*Eucalyptus gonglyocarpa* over open shrubland over open *Dodonaea viscose* subsp. *angustissima/Eremophila platythamnos* subsp. *platythamnos* shrubland over *Triodia desertorum* or *T. basedowii*.
e19exL.xS.t7H	*Eucalyptus gonglyocarpa/E. youngiana/E. concinna* over open mixed shrubland over *Triodia desertorum*.
xS.t2t7H	Scattered *E. gongylocarpa* over mixed shrubs and *Triodia desertorum* or *T. basedowii*.
e71LxZ.t8H	Undulating plains: Open mallee *Eucalyptus. concinna* over sparse to open low shrubs over open *Triodia scariosa*.
c2ex.xS	Open to moderately dense *Cauarina pauper* woodland over open mixed shrubs and scattered soft grasses and/or *Triodia scariosa*.
a33g3S.G	Clay Pan: Scattered *Acacia nyssophylla/Grevillea sarissa* over open herbs and grasses.
kxZ.GF	White to grey-brown clay pans: Dwarf halophytic shrublands of variable composition over sparse to dense herbs and grasses.
k3k1Z.G	Pale orange to orange clay pans: Low open to sparse scrub dominated by *Frankenia cinerea/ Atriplex vesicaria* over sparse cover of *Eragrostis pergracilis/Aristida contorta*.
m7S.kxZ.G	Shallow depressions and areas fringing some claypans: Moderately dense *Melaleuca interioris* shrubland over sparse chenopods and soft grasses.
exc2.kxZ.G	Mallee Eucalypts ± *Casuarina pauper* over *Dodonaea viscosa* subsp. *angustissima/Senna artemisioides* subsp. *petiolaris* over Chenopod species and soft grasses.
a1L.GH	*Acacia aneura* woodlands over grasses+/- *Triodia basedowii*.
a1L.al1a9S.t2H	Open to moderately dense *Acacia aneura* over *Aluta maisonneuvei* subsp. *auriculata/ Acacia ramulosa* var. *ramulose* over *Eremophila forrestii* subsp. *forrestii* over *Triodia basedowii*.
a14d4S.G	Rocky breadaways and associated slopes : Open *Acacia quadrimarginata/Dodonaea rigida* over sparse mixed shrubs over mixed soft grasses.
xZ.G	Isolated to sparse *Acacia* spp. trees or shrubs over mixed low shrubs over moderately dense to closed grassland.
a1L.k1k2Z.G	Narrow drainage channel: Sparse *Acacia aneura* over sparse to open shrubs and scattered to moderately dense tussock grasses.

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Kilometres

Absolute Scale - 1:100,000

ecologia ENVIRONMENT

ANGLOGOLD ASHANTI

***Caesia talingka* (C. Tauss) ms (SOI) recorded within the Operational Area**

Figure: 3.18
Project ID: 844

Drawn: SG
Date: 23/03/09

Coordinate System
Name: GDA 1994 MGA Zone 51
Projection: Transverse Mercator
Datum: GDA 1994

Unique Map ID: M017

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4.0 DISCUSSION

The quantitative estimates of impact within Table 3-3 are constrained to an assessment of populations recorded by ecologia alone, since numeric estimates of abundance are unavailable for other records.

An assessment of impact on the species recorded within the proposed operational footprint has determine that the no DRF population are removed although the proposed project will removed more than 25% of the observed populations of 4 priority taxa. The taxa affected are:

- *Dicrastylis nicholasii* (28.8%)
- *Acacia eremophila* numerous-nerved variant (53.5%);
- *Dicrastylis cundeeleensis* (89.4%);
- *Daviesia purpurascens* (75.4%)

All other priority taxa are either not affected or are affected by less than 12% of their recorded population.

It is also apparent that on the basis of the above data, the localised impact (i.e. within the operational area) of the proposed footprint to the taxa *Grevillea secunda, Dicrastylis cundeeleensis* and *Daviesia purpurascens* is very high and moderately high for the taxon *Acacia eremophila* numerous nerved variant. However once the populations recorded in the broader area around the TGP are incorporated into the data, the impact to *Grevillea secunda* becomes minor. The impact to *Daviesia purpurascens* and *Dicrastylis cundeeleensis*, whilst still considerable, is diminished. The impact to *Acacia eremophila* numerous nerved variant remains relatively unchanged as few additional plants have been recorded during other ecologia surveys outside the boundaries of the operational area.

It is considered likely that the local distribution and abundance of *Dicrastylis cundeeleensis* is still significantly underestimated due to its recent description in December 2007 and very recent placement on the Priority Flora list in 2008. Earlier collections of this taxon, both by ecologia and by other collectors are likely to have been attributed to other species within the genus. Similarly *Acacia eremophila* numerous-nerved variant is probably poorly lodged due its current undescribed status. *Dicrastylis nicholasii* was observed to be extremely abundant in a range of vegetation associations surveyed and estimates of local populations are likely to be considerably larger than recorded to date.

A more detailed discussion of the impact of the proposed development, which considers not only the populations of the above taxa recorded during the surveys by ecologia, but also all previous records within the state that have been lodged at the Western Australian Herbarium, is contained within the TGP Operational Area and its Surroundings Vegetation and Flora Survey (ecologia 2009a).

5.0 STUDY TEAM

The survey described in this document was planned, coordinated and executed by:

ecologia ENVIRONMENT

1025 Wellington St

WEST PERTH WA 6005

Project Staff		
Carol Macpherson	BSc. (Honours)	Principal Botanist
Christina Cox	PhD	Project Manager, Manager Botany
Scott Hitchcock	BSc.	Botanist
Melissa Hay	BSc. (Honours)	Botanist
Rochelle Haycock	BSc.	Botanist
Peter Jobson	MSc.	Plant Taxonomist

Combined Licences - "Licence to take flora for scientific purposes"		
This survey was conducted under the authorisation of the following licences issued by the Department of Environment and Conservation:		
	Permit Number	**Valid Until**
Scott Hitchcock	SL008095	30th April 2009
Caroline McCormick	SL007817	30th April 2008
Jeremy Naaykens	SL008097	30th April 2009
Melissa Hay	SL008100	30th April 2009
Rochelle Haycock	SL008171	30th April 2009
Marisa Fulton	SL008183	30th April 2009
Pali Jayasekara	SL008354	30th April 2009
Conrad Slee	SL008098	30th April 2009

6.0 REFERENCES

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Appendix A Explanation of conservation codes

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Explanation of Conservation Codes

Table B.1: Definition of categories described under the EPBC Act.

Conservation Category	Definition
Extinct	A species is extinct if there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	A species is categorised as extinct in the wild if it is only known to survive in cultivation, in captivity or as a naturalised population well outside its past range; or if it has not been recorded in its known/expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered	The species is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	The species is likely to become extinct unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate; or its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction.
Vulnerable	Within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate.
Conservation Dependent	The species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of five years.

Table B.2: Definition of Declared Rare and Priority categories.

Code	Definition
DRF	Declared Rare Flora-Extant Taxa. Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
P1: Priority One	Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. rd verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2: Priority Two	Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3: Priority Three	Poorly Known Taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.
P4: Priority Four	Rare Taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

(From Atkins, K.J., Declared Rare and Priority Flora List 2006, Dept. CALM)

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Appendix B Photographs of Flora of Conservation Significance

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Plate 1 Flowers of Conospermum *toddii* DRF (photos ecologia)

Plate 2 Habit of *Conospermum toddii* DRF (photos ecologia)

Plate 3 *Baeckea* sp. Sandstone (P1) (photos ecologia)

Plate 4 Habit and flower of *Dampiera eriantha* (P1) (photos ecologia)

Plate 5 Habit and leaf of *Malleostemon* sp. Officer Basin (P2) (photos ecologia)

Plate 6 Habit and flower of *Olearia arida* (P2) (photos ecologia)

Plate 7 Habit & form of *Baeckea* sp. Great Victoria Desert (P3) (photos ecologia)

Plate 8 Habit and flower of *Dicrastylis nicholasii* (P2) (photos ecologia)

Plate 9 *Dicrastylis cundeeleensis* (P2) (photos ecologia)

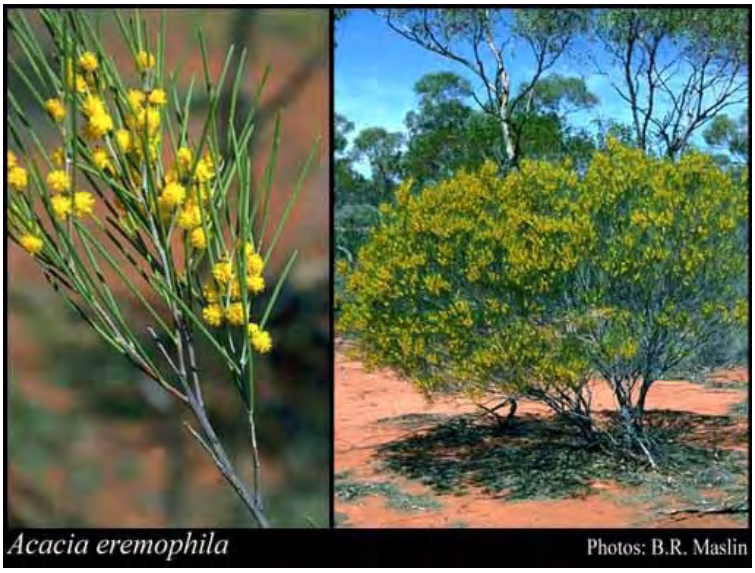

Plate 10 *Acacia eremophila* similar to *Acacia eremophila* numerous-nerved variant (P3) (photo B Maslin)


Plate 11 ***Microcorys macredieana*** **P3 (photos ecologia)**


Plate 12 ***Micromyrtus stenocalyx*** **(P3) (photos ecologia)**


Plate 13 ***Daviesia purpurascens*** **P4 (photos ecologia)**

Plate 14 ***Lepidobolus deserti*** **P4 (photos ecologia)**

Plate 15 ***Caesia talingka*** **ms (C Tauss) (photos ecologia)**

Appendix C Locations of Flora of Conservation Significance recorded during the Threatened Flora Assessment

NB: all locations in Zone 51J WGS 84 ± approx. 5 m

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Conospermum toddii	104	647[redacted]	6766[redacted]	Boundary waypoints, S facing upper slope
		647[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
		64[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
		647[redacted]	6766[redacted]	
	4	647[redacted]	6766[redacted]	
	17	645[redacted]	6765[redacted]	Boundary waypoints, S facing upper slope
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
	35	646[redacted]	6765[redacted]	Boundary waypoints
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
	1	646[redacted]	6765[redacted]	
	3	645[redacted]	6765[redacted]	
	36	646[redacted]	6765[redacted]	
	3	645[redacted]	6765[redacted]	
	58	645[redacted]	6765[redacted]	Centre line
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
		645[redacted]	6765[redacted]	
	47	646[redacted]	6765[redacted]	Boundary waypoints
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Conospermum toddii	51	646[redacted]	6765[redacted]	Boundary waypoints
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
		646[redacted]	6765[redacted]	
	2	646[redacted]	6765[redacted]	Swale area north side of dune
	32	646[redacted]	6765[redacted]	
	11	646[redacted]	6765[redacted]	
	4	646[redacted]	6765[redacted]	
	6	646[redacted]	6765[redacted]	
	6	646[redacted]	6765[redacted]	
	17	646[redacted]	6765[redacted]	
	1	646[redacted]	6765[redacted]	
	53	646[redacted]	6765[redacted]	
	7	646[redacted]	6765[redacted]	
	283	645[redacted]	6765[redacted]	
	78	645[redacted]	6765[redacted]	
	125	645[redacted]	6765[redacted]	
	21	645[redacted]	6765[redacted]	
	2	645[redacted]	6765[redacted]	
	162	645[redacted]	6764[redacted]	Boundary waypoints
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
	113	645[redacted]	6764[redacted]	Boundary waypoints
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Conospermum toddii		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
	64	646[redacted]	6764[redacted]	Boundary waypoints
		646[redacted]	6764[redacted]	
		646[redacted]	6764[redacted]	
		646[redacted]	6764[redacted]	
	4	646[redacted]	6764[redacted]	
	162	645[redacted]	6764[redacted]	Predominantly on south side slope with numbers reducing towards crest
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
	113	645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
		645[redacted]	6764[redacted]	
Olearia arida	4	647[redacted]	6765[redacted]	
	2	647[redacted]	6765[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Dicrastylis nicholasii	20+	648[redacted]	6765[redacted]	
	50+	648[redacted]	6765[redacted]	
	20+	647[redacted]	6765[redacted]	
	15+	647[redacted]	6765[redacted]	
	5+	647[redacted]	6765[redacted]	
	150+	647[redacted]	6765[redacted]	Interswale, DN dominant understorey shrub
	15+	647[redacted]	6765[redacted]	
	25+	646[redacted]	6765[redacted]	
	10+	646[redacted]	6765[redacted]	
	200+	647[redacted]	6765[redacted]	Dominant understorey shrub in the interswale
	50+	647[redacted]	6765[redacted]	
	25+	645[redacted]	6766[redacted]	Becoming dominant lower slope heading east from this point
	13	646[redacted]	6766[redacted]	
	16	647[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	13	647[redacted]	6766[redacted]	
	40+	647[redacted]	6766[redacted]	
	10+	646[redacted]	6766[redacted]	
	11	646[redacted]	6766[redacted]	
	3	646[redacted]	6766[redacted]	
	2	645[redacted]	6766[redacted]	
	4	646[redacted]	6766[redacted]	
	50+	647[redacted]	6766[redacted]	Interswale
	30+	647[redacted]	6766[redacted]	
	7	647[redacted]	6766[redacted]	
	40+	647[redacted]	6766[redacted]	
	100+	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	13	646[redacted]	6766[redacted]	
	3	646[redacted]	67666[redacted]	
	40+	646[redacted]	6766[redacted]	
	60+	646[redacted]	6766[redacted]	
	50+	645[redacted]	6766[redacted]	
	100+	645[redacted]	6766[redacted]	
	12	646[redacted]	6766[redacted]	
	13	646[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Dicrastylis nicholasii	20+	647[redacted]	6766[redacted]	
	15+	647[redacted]	6766[redacted]	
	12	647[redacted]	6766[redacted]	
	5	646[redacted]	6766[redacted]	
	4	646[redacted]	6766[redacted]	
	16	646[redacted]	6766[redacted]	
	35	646[redacted]	6766[redacted]	
	27	647[redacted]	6766[redacted]	
	20+	648[redacted]	6766[redacted]	
	15	648[redacted]	6766[redacted]	
	30+	647[redacted]	6765[redacted]	
	50+	647[redacted]	676[redacted]	
	30+	647[redacted]	6765[redacted]	
	10+	647[redacted]	6765[redacted]	
	15+	646[redacted]	6765[redacted]	
	2	646[redacted]	6765[redacted]	
	7	645[redacted]	6765[redacted]	
	40+	645[redacted]	6765[redacted]	
	3	647[redacted]	6765[redacted]	
	20+	647[redacted]	6765[redacted]	
	3	647[redacted]	6765[redacted]	
	20+	647[redacted]	6765[redacted]	
	70+	647[redacted]	6765[redacted]	
	20+	647[redacted]	6765[redacted]	
	10+	647[redacted]	6765[redacted]	
	50+	646[redacted]	6765[redacted]	
	4	646[redacted]	6765[redacted]	
	2	646[redacted]	6765[redacted]	
	20+	646[redacted]	6765[redacted]	
	7	646[redacted]	6765[redacted]	
	10	646[redacted]	6765[redacted]	
	30	646[redacted]	6765[redacted]	
	100+	646[redacted]	6765[redacted]	
	70+	646[redacted]	6765[redacted]	
	100+	646[redacted]	6765[redacted]	
	20+	646[redacted]	6765[redacted]	
	70+	647[redacted]	6765[redacted]	
	50+	647[redacted]	6765[redacted]	
	50+	647[redacted]	6765[redacted]	
	20+	647[redacted]	6766[redacted]	
	15+	647[redacted]	6766[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Dicrastylis nicholasii	80	647[redacted]	6765[redacted]	
	50+	647[redacted]	6765[redacted]	
	50+	647[redacted]	676[redacted]	
	100+	6470[redacted]	6765[redacted]	
	50+	646[redacted]	6765[redacted]	
	100+	646[redacted]	6765[redacted]	
	20+	646[redacted]	6765[redacted]	
	20+	646[redacted]	6765[redacted]	
	20+	645[redacted]	6765[redacted]	
	50+	645[redacted]	6765[redacted]	
	3	646[redacted]	6763[redacted]	
	20+	64[redacted]	6764[redacted]	
	15+	645[redacted]	6764[redacted]	
	11	647[redacted]	6764[redacted]	
	40+	647[redacted]	6764[redacted]	
	20+	647[redacted]	6764[redacted]	
	30+	646[redacted]	6764[redacted]	
	40+	646[redacted]	6764[redacted]	
	20+	645[redacted]	6764[redacted]	
	5	648[redacted]	6764[redacted]	
	30+	647[redacted]	6764[redacted]	
	100+	647[redacted]	6764[redacted]	
	50+	647[redacted]	6764[redacted]	
	20+	646[redacted]	6764[redacted]	
	50+	646[redacted]	6764[redacted]	
	4	645[redacted]	6764[redacted]	
	5	644[redacted]	6764[redacted]	
	50+	663[redacted]	6773[redacted]	
	20+	665[redacted]	6774[redacted]	
	100+	665[redacted]	6774[redacted]	
	100+	665[redacted]	6774[redacted]	
	100+	665[redacted]	6774[redacted]	
	50+	661[redacted]	6772[redacted]	
	50+	661[redacted]	6772[redacted]	
	30	662[redacted]	6772[redacted]	
	30+	662[redacted]	6772[redacted]	
	10+	662[redacted]	6772[redacted]	
	5	650[redacted]	6762[redacted]	
	1	643[redacted]	6762[redacted]	
	1	643[redacted]	6762[redacted]	
	2	644[redacted]	6762[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Dicrastylis nicholasii	50+	651[redacted]	6762[redacted]	
	20+	650[redacted]	6762[redacted]	
Malleostemon sp. Officer Basin	10+	646[redacted]	6765[redacted]	
	1	646[redacted]	6765[redacted]	
	2	645[redacted]	6766[redacted]	
	7	645[redacted]	6766[redacted]	
	1	645[redacted]	6766[redacted]	
	17	645[redacted]	6766[redacted]	
	29	645[redacted]	6765[redacted]	
	1	645[redacted]	6765[redacted]	
	50+	643[redacted]	6763[redacted]	
	30+	643[redacted]	6763[redacted]	
	50+	643[redacted]	6763[redacted]	
	1	643[redacted]	6763[redacted]	
	20	643[redacted]	6763[redacted]	
	15+	644[redacted]	6763[redacted]	
	10+	644[redacted]	6763[redacted]	
	80+	644[redacted]	6763[redacted]	
	100+	644[redacted]	6763[redacted]	
	3	644[redacted]	6763[redacted]	
	1	662[redacted]	6772[redacted]	
	12	662[redacted]	6772[redacted]	
	10	663[redacted]	6773[redacted]	
Malleostemon sp. Officer Basin	7	663[redacted]	6773[redacted]	
Microcorys macradieana	5	647[redacted]	6765[redacted]	
	2	647[redacted]	6765[redacted]	
	40	643[redacted]	6763[redacted]	
	1	646[redacted]	6764[redacted]	
	1	644[redacted]	6763[redacted]	
	1	662[redacted]	6772[redacted]	
Baeckea sp. Sandstone	14	646[redacted]	6766[redacted]	
	30+	646[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	20+	646[redacted]	6766[redacted]	
	16	646[redacted]	6766[redacted]	
	12	646[redacted]	6766[redacted]	
	10+	645[redacted]	6763[redacted]	
	10	643[redacted]	6762[redacted]	
	100+	644[redacted]	6763[redacted]	Swale

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Baeckea sp. Sandstone	150+	644[redacted]	6763[redacted]	Swale
	5	644[redacted]	676[redacted]	
	1	662[redacted]	6772[redacted]	
	3	643[redacted]	6762[redacted]	
Micromyrtus stenocalyx	1	645[redacted]	6766[redacted]	Fairly uniformly distributed across north face of dune
	2	645[redacted]	6766[redacted]	
	6	645[redacted]	6766[redacted]	
	7	645[redacted]	6766[redacted]	
	12	645[redacted]	6766[redacted]	
	7	645[redacted]	6766[redacted]	
	15	645[redacted]	6766[redacted]	
	19	645[redacted]	6766[redacted]	
	1	645[redacted]	6766[redacted]	
	3	645[redacted]	6766[redacted]	
	2	645[redacted]	6766[redacted]	
	6	645[redacted]	6766[redacted]	
	4	646[redacted]	6766[redacted]	
	2	646[redacted]	6766[redacted]	
	20+	646[redacted]	6766[redacted]	
	20+	646[redacted]	6766[redacted]	
	1	646[redacted]	6766[redacted]	
	15	646[redacted]	6766[redacted]	
	3	647[redacted]	6766[redacted]	
	1	647[redacted]	6766[redacted]	
	1	647[redacted]	6766[redacted]	
	6	647[redacted]	6767[redacted]	
	4	647[redacted]	6766[redacted]	
	2	647[redacted]	6766[redacted]	
	3	646[redacted]	6767[redacted]	
	6	646[redacted]	6767[redacted]	
	1	646[redacted]	6766[redacted]	
	11	646[redacted]	6766[redacted]	
	1	646[redacted]	6767[redacted]	
	5	647[redacted]	6767[redacted]	
	1	647[redacted]	6766[redacted]	
	1	647[redacted]	6767[redacted]	
	2	646[redacted]	6767[redacted]	
	1	647[redacted]	6766[redacted]	
	1	646[redacted]	6763[redacted]	
	6	646[redacted]	6763[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Micromyrtus stenocalyx	7	644[redacted]	6764[redacted]	
	18	644[redacted]	6764[redacted]	
	3	644[redacted]	6764[redacted]	
	17	645[redacted]	6764[redacted]	
	14	645[redacted]	6764[redacted]	
	1	647[redacted]	6764[redacted]	
	4	644[redacted]	6764[redacted]	
	5	644[redacted]	6764[redacted]	
	3	644[redacted]	6764[redacted]	
	7	644[redacted]	6764[redacted]	
	6	644[redacted]	6764[redacted]	
	5	644[redacted]	6764[redacted]	
	3	645[redacted]	6762[redacted]	
	4	645[redacted]	6762[redacted]	
	5	645[redacted]	6762[redacted]	
	25	646[redacted]	6762[redacted]	
	15	646[redacted]	6762[redacted]	
	4	648[redacted]	6764[redacted]	
	9	647[redacted]	6764[redacted]	
	9	646[redacted]	6764[redacted]	
	7	646[redacted]	6764[redacted]	
	19	646[redacted]	6764[redacted]	
	21	646[redacted]	6764[redacted]	
	46	645[redacted]	6765[redacted]	
	2	644[redacted]	6764[redacted]	
	5	644[redacted]	6764[redacted]	
	3	644[redacted]	6764[redacted]	
	1	644[redacted]	6764[redacted]	
	2	644[redacted]	6764[redacted]	
	2	645[redacted]	6764[redacted]	
	15	645[redacted]	6764[redacted]	
	3	645[redacted]	6764[redacted]	
	1	663[redacted]	677[redacted]	
	3	662[redacted]	677[redacted]	
	4	662[redacted]	6772[redacted]	
	1	662[redacted]	6772[redacted]	
	13	649[redacted]	6762[redacted]	
	11	649[redacted]	67620[redacted]	
	4	649[redacted]	6762[redacted]	
	3	650[redacted]	6762[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Micromyrtus stenocalyx	1	651[redacted]	6762[redacted]	
	3	643[redacted]	6762[redacted]	
	1	643[redacted]	6762[redacted]	
	7	643[redacted]	6762[redacted]	
	1	643[redacted]	6762[redacted]	
	8	643[redacted]	6762[redacted]	
	2	645[redacted]	6762[redacted]	
	1	645[redacted]	6762[redacted]	
	1	646[redacted]	6762[redacted]	
	2	646[redacted]	6762[redacted]	
Lepidibolus deserti	5+	647[redacted]	6765[redacted]	
	4	647[redacted]	6765[redacted]	
	3	647[redacted]	6765[redacted]	
	6	646[redacted]	6765[redacted]	
	7	647[redacted]	6765[redacted]	
	6	647[redacted]	6765[redacted]	
	15	647[redacted]	6765[redacted]	
	6	647[redacted]	6765[redacted]	
	4	647[redacted]	6765[redacted]	
	1	647[redacted]	6765[redacted]	
	2	646[redacted]	6766[redacted]	
	1	646[redacted]	6766[redacted]	
	20+	6462[redacted]	6766[redacted]	
	16	646[redacted]	6766[redacted]	
	6	646[redacted]	6766[redacted]	
	7	646[redacted]	6766[redacted]	
	4	647[redacted]	6766[redacted]	
	6	647[redacted]	6766[redacted]	
	12	647[redacted]	6766[redacted]	
	6	646[redacted]	6766[redacted]	
	10	646[redacted]	6766[redacted]	
	8	646[redacted]	6766[redacted]	
	20+	646[redacted]	6766[redacted]	
	15+	646[redacted]	6766[redacted]	
	4	645[redacted]	6766[redacted]	
	1	645[redacted]	6766[redacted]	
	8	646[redacted]	6766[redacted]	
	15+	646[redacted]	6766[redacted]	
	3	647[redacted]	6766[redacted]	
	1	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Lepidibolus deserti	50+	647[redacted]	6766[redacted]	
	100+	647[redacted]	6766[redacted]	South facing slope and crest
	20+	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	5	647[redacted]	6766[redacted]	
	40+	647[redacted]	6766[redacted]	
	150+	647[redacted]	6766[redacted]	
	35	647[redacted]	6766[redacted]	
	30+	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	15+	647[redacted]	6766[redacted]	
	10+	646[redacted]	6766[redacted]	
	15+	645[redacted]	6766[redacted]	
	25+	646[redacted]	6766[redacted]	
	10+	646[redacted]	6766[redacted]	
	21+	646[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	15+	647[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	25	647[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	4	647[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	15+	647[redacted]	6766[redacted]	
	2	647[redacted]	6766[redacted]	
	30	647[redacted]	6766[redacted]	
	50	647[redacted]	6766[redacted]	
	25	647[redacted]	6766[redacted]	
	31	647[redacted]	6766[redacted]	
	16	647[redacted]	6766[redacted]	
	40+	646[redacted]	6766[redacted]	
	30+	646[redacted]	6766[redacted]	
	20+	646[redacted]	6766[redacted]	
	10+	647[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	15+	647[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	20	647[redacted]	6765[redacted]	
	2	646[redacted]	6765[redacted]	
	3	647[redacted]	6765[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Lepidibolus deserti	12	647[redacted]	6765[redacted]	
	10+	647[redacted]	6765[redacted]	
	2	647[redacted]	6765[redacted]	
	6	646[redacted]	6765[redacted]	
	15+	646[redacted]	6765[redacted]	
	10+	646[redacted]	6765[redacted]	
	2	646[redacted]	6765[redacted]	
	20+	646[redacted]	6765[redacted]	
	30	646[redacted]	6765[redacted]	
	5	647[redacted]	6765[redacted]	
	50+	647[redacted]	6766[redacted]	
	30+	647[redacted]	6766[redacted]	
	13	647[redacted]	6766[redacted]	
	20+	647[redacted]	6766[redacted]	
	50+	647[redacted]	6766[redacted]	
	30+	647[redacted]	6766[redacted]	
	30+	647[redacted]	6767[redacted]	
	50+	647[redacted]	6766[redacted]	
	30+	64[redacted]	6767[redacted]	
	13	647[redacted]	6767[redacted]	
	4	648[redacted]	6765[redacted]	
	2	647[redacted]	6765[redacted]	
	10	647[redacted]	6765[redacted]	
	20	647[redacted]	6765[redacted]	
	100+	647[redacted]	6765[redacted]	
	50+	646[redacted]	6765[redacted]	
	10+	645[redacted]	6765[redacted]	
	1	647[redacted]	6766[redacted]	
	1	647[redacted]	6766[redacted]	
	10	647[redacted]	6767[redacted]	
	1	647[redacted]	6767[redacted]	
	200+	645[redacted]	6763[redacted]	
	3	644[redacted]	6764[redacted]	
	2	645[redacted]	6764[redacted]	
	7	646[redacted]	6764[redacted]	
	14	647[redacted]	6764[redacted]	
	20+	647[redacted]	6764[redacted]	
	20+	645[redacted]	6764[redacted]	
	10+	643[redacted]	6764[redacted]	
	30+	645[redacted]	6762[redacted]	
	100+	645[redacted]	6762[redacted]	

Appendix C: DRF/Priority Flora locations recorded during the Threatened Flora Assessment

Species	Population size	Easting (mE)	Northing (mN)	Notes
Lepidibolus deserti	50+	646[redacted]	6762[redacted]	
	10+	6461[redacted]	6762[redacted]	
	2	648[redacted]	6764[redacted]	
	50+	647[redacted]	6764[redacted]	
	20+	646[redacted]	6764[redacted]	
	10+	645[redacted]	6764[redacted]	
	20+	661[redacted]	6772[redacted]	
	10+	661[redacted]	6772[redacted]	
	50+	662[redacted]	6772[redacted]	
	4	662[redacted]	6772[redacted]	
	100+	645[redacted]	6762[redacted]	Dominant across crest and slopes
	100+	645[redacted]	6762[redacted]	
	100+	646[redacted]4	6762[redacted]	

Appendix D Summary or other ecologia surveys from which additional DRF and Priority Flora locations are derived

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Location	Date of survey	Type of survey	No. species	DRF/Priority flora recorded	Status	Reference
Tropicana Pre Clearance Flora Assessment of track between old PNG camp and Tropicana exploration camp	February 2006	Foot and vehicular traverses of approximately 140 km of track. Opportunistic collection of potential species of conservation significance and dominant plants within vegetation communities	156	*Baeckea* sp. Great Victoria Desert *Micromyrtus stenocalyx* *Grevillea secunda* *Olearia arida* *Micromyrtus macredieana* *Conospermum viscidulum* *Daviesia purpurascens* *Lepidobolus deserti*	P2 P2 P2 P2 P3 P4 P4 P4	*ecologia,* 2006a
Plumridge Lakes Nature Reserve Bypass track (Plumridge east-west Track to Cable Haul Rd track)	April 2006	Foot and vehicular traverses of approximately 55 km of track. Opportunistic collection of potential species of conservation significance and dominant plants within vegetation communities	166	*Conospermum toddii* *Dicrastylis nicholasii* *Micromyrtus stenocalyx* *Grevillea secunda* *Olearia arida* *Micromyrtus macredieana* *Daviesia ?purpurascens* *Lepidobolus deserti*	DRF P2 P2 P2 P2 P3 P4 P4	*ecologia*, 2006b
Area of approximately 27km^2 within the proposed Tropicana operational area	Aug 2006	Foot traverses in a grid pattern searching for specific flora of significance. Dominant taxa from vegetation community types were also collected.	115	*Dicrastylis nicholasii* *Olearia arida* *Lepidobolus deserti*	P2 P2 P4	*ecologia*, 2006c

Location	Date of survey	Type of survey	No. species	DRF/Priority flora recorded	Status	Reference
TGP Minigwal Water Supply area and pipeline corridor: Approximately 33 km of 100 metres width extending to the north to a 400 km^2	April 08	Combination of linear transects within the proposed pipeline corridor and quadrate based collection within the polygon		*Dicrastylis nicholasii* *Olearia arida* *Acacia eremophila numerous-nerved variant* *Lepidobolus deserti*	P2 P2 P3 P4	ecologia, 2008
Tropicana Operational Flora and Vegetation Survey: Area of approximated 1,356 km^2 surrounding the proposed infrastructure area	Nov 2006 & July 2007	Two phase Level 2 survey with 204, 400 m^2 quadrates broadly distributed to reflect the range of vegetation types present.	446	*Baeckea* sp. Sandstone *Dampiera eriantha* *Baeckea* sp. Great Victoria Desert *Dicrastylis nicholasii* *Grevillea secunda* *Malleostemon* sp. Officer Basin *Olearia arida* *Acacia eremophila* numerous nerved variant *Acacia eremophila* var. *variabilis* *Dicrastylis cundeeleensis* *Microcorys macredieana* *Micromyrtus stenocalyx* *Daviesia purpurascens* *Lepidobolus deserti*	P1 P1 P2 P2 P2 P2 P2 P3 P3 P3 P3 P3 P4 P4	ecologia 2009a

Location	Date of survey	Type of survey	No. species	DRF/Priority flora recorded	Status	Reference
Cable Haul Rd Infrastructure Corridor, 215 km corridor south of the proposed TGP, west of the boundary of Plumridge Lakes Nature Reserve and south to the Trans Australian Railway Line Access Rd	Jul-Aug 2007	114, 400m^2 quadrates and 59 linear transects	417	*Dampiera eriantha* *Baeckea* sp. Great Victoria Desert *Dicrastylis nicholasii* *Grevillea secunda* *Isotropis canescens* *Malleostemon* sp. Officer Basin *Olearia arida* *Physopsis chrysotricha* *Dicrastylis cundeeleensis* *Microcorys macredieana* *Micromyrtus stenocalyx* *Comesperma viscidulum* *Daviesia purpurascens* *Lepidobolus deserti*	P1 P2 P2 P2 P2 P2 P2 P2 P3 P3 P3 P4 P4 P4	ecologia 2009b