

Appendix A

Population Growth Scenarios

Population projections

Two sets of independent population projections have previously been prepared by Economic Consulting Services as part of the *Needs Analysis for the Shires Impacted by Re-Opening the Boddington Gold Mine* and by id. Consulting on behalf of the Shire of Murray.

The population projections undertaken by Economic Consulting Services in preparation for the re-opening of the BGM project that are relevant to the SP Review, solely focus on the traditional Dwellingup townsite and do not include persons living within the rural hinterland.

The population projections undertaken by id Consulting incorporate the entire southern area of the Shire of Murray. In order to make a comparison between both data-sets the average annual growth rates from each study were applied to the known Dwellingup townsite population (346 Persons) which was recorded during the 2006 ABS Census (note: this data does not take into consideration any increase in population as a direct result of the BGM operations and only predicts natural growth). Each respective growth predictions indicate various levels of positive growth within the townsite, which can largely be attributed to the “tree change” phenomena whereby individuals and families seek to relocate into a rural environment whilst still having easy access to the metropolitan area.

Table A1 – Natural Population Expansion (BGM)¹

Year	Dwellingup Townsite Total Population (BGM)	Change	Annual Growth Rate
2006	346	-	2%
2007	352.9	+6.9	2%
2008	359.9	+7	2%
2009	367.1	+7.2	2%
2010	374.4	+7.3	2%
2011	381.8	+7.4	2%
2012	388.8	+7	1.85%
2013	396	+7.2	1.85%
2014	403.3	+7.3	1.85%
2015	410.7	+7.4	1.85%
2016	418.2	+7.7	1.85%
2017	425.1	+6.9	1.65%
2018	432.1	+7	1.65%
2019	439.2	+7.1	1.65%
2020	446.4	+7.2	1.65%
2021	453.7	+7.3	1.65%

¹ *Needs Analysis for the Shire Impacted by the Re-Opening of the Boddington Gold Mine* (April 2008) Economic Consulting Services

Table A2 – Natural Population Expansion (Shire of Murray)²

Year	Dwellingup Townsite Total Population (Shire of Murray)	Change	Annual Growth Rate
2006	346	-	0.75%
2007	348.5	+2.5	0.75%
2008	351.1	+2.6	0.75%
2009	353.7	+2.6	0.75%
2010	356.3	+2.6	0.75%
2011	358.9	+2.6	0.75%
2012	361.6	+2.7	0.75%
2013	364.3	+2.7	0.75%
2014	367.0	+2.7	0.75%
2015	369.7	+2.7	0.75%
2016	372.5	+2.8	0.75%
2017	375.3	+2.8	0.75%
2018	378.1	+2.8	0.75%
2019	380.9	+2.8	0.75%
2020	383.7	+2.8	0.75%
2021	386.5	+2.8	0.75%

As the BGM project comes online, it is anticipated that all townsites within a 50km radius of the mine site will experience varying degrees of growth, above and beyond what would normally be anticipated. It is estimated that when the mine is running at full operational capacity up to 650 persons will be employed by the mine, although some of the workforce will be accommodated onsite within temporary accommodation. Notwithstanding, for each new job opportunity created by the mine there will be associated flow-on effects above and beyond this. For example, it is known that for each job created in the area there will be additional associated population increases due to the new employees moving to the area and the families of the employees moving to the area. BGM have prepared population projections which have taken into consideration the impacts and flow on effects of the mine-site. The projections detailed in **Table A3** are for the Dwellingup townsite only and does not include the surrounding hinterland.

Table A3 – Population Projections (inc. Growth Attributed to BGM Operations)¹

Year	Dwellingup Townsite Total Population (BGM)	Change	Annual Growth Rate
2006	346	-	-
2007	352	+6	1.7%
2008	362	+10	2.7%
2009	378	+16	4.2%
2010	404	+26	6.4%
2011	438	+34	7.7%
2012	461	+23	5.6%
2013	474	+13	2.7%
2014	485	+10	2.1%
2015	494	+10	2.0%
2016	505	+10	1.9%
2017	515	+10	1.9%
2018	519	+4	0.77%

² Shire of Murray – Population and Household Forecasts (Rural South) (October 2008) id. Consulting

¹ Needs Analysis for the Shire Impacted by the Re-Opening of the Boddington Gold Mine (April 2008) Economic Consulting Services

Year	Dwellingup Townsite Total Population (BGM)	Change	Annual Growth Rate
2019	524	+5	0.9%
2020	531	+7	1.3%
2021	539	+8	1.5%

It should be noted, that for Sections 7-11 of this report, Land Insights has only utilised the BGM natural growth projections (**Table A2**) and BGM accelerated growth projections (**Table 3.3**). It was deemed inappropriate to utilise the projections prepared by id Consulting, as the 'Rural South' precinct area is predominantly rural hinterland and did not accurately represent the DSP Study Area. Furthermore, the BGM natural growth population projections (**Table A1**) are less conservative than the id Consulting projections and will allow a comparison to the largest anticipated population growth.

Appendix B

Residential Land Requirements

Residential land requirements

Projected residential land requirements for the Dwellingup townsite are presented in **Table B1** to **Table B8** below. These calculations have been based upon BGM population data for expected natural growth models as well as increased growth attributed to BGM activities. The growth models have been extrapolated from the confirmed population of the Dwellingup townsite as identified during the 2006 ABS Census (346 Persons).

Table B1 – BGM Natural Growth Model – Compared to TPS No.4

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (TPS No.4 only)	Shortfall/Surplus of Dwellings
2010	+28.4	11	42	+31
2015	+64.7	25	42	+17
2020	+100.4	39	42	+3

Table B2 – BGM Natural Growth Model – Compared to Draft TPS No.5

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (draft TPS No.5 only)	Shortfall/Surplus of Dwellings
2010	+28.4	11	85	+74
2015	+64.7	25	85	+60
2020	+100.4	39	85	+46

Table B3 – BGM Natural Growth Model – Compared to DSDP

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (SP only)	Shortfall/Surplus of Dwellings
2010	+28.4	11	140	+129
2015	+64.7	25	140	+115
2020	+100.4	39	140	+101

Table B4 – BGM Natural Growth Model – Compared to Total Undeveloped Potential

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Total Undeveloped Potential	Shortfall/Surplus of Dwellings
2010	+28.4	11	232	+221
2015	+64.7	25	232	+207
2020	+100.4	39	232	+193

As indicated from **Table B1 – B4**, under natural population growth models there is a sufficient land-bank of residential allotments to cater for the growth of the Dwellingup townsite over the next 15 years.

Table B5 – Growth Attributed to BGM Operations – Compared to TPS No.4

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (TPS No.4 only)	Shortfall/Surplus of Dwellings
2010	+58	23	42	+19
2015	+148	58	42	-16
2020	+185	72	42	-30

Table B6 – Growth Attributed to BGM Operations – Compared to Draft TPS No.5

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (draft TPS No.5 only)	Shortfall/Surplus of Dwellings
2010	+58	23	85	+62
2015	+148	58	85	+27
2020	+185	72	85	+13

Table B7 – Growth Attributed to BGM Operations – Compared to DSDP

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (SP only)	Shortfall/Surplus of Dwellings
2010	+58	23	140	+117
2015	+148	58	140	+82
2020	+185	72	140	+68

Table B8 – Growth Attributed to BGM Operations – Compared to Total Undeveloped Potential

Year	Additional Population Projected	Additional Number of Dwellings Required	2009 Undeveloped Potential (SP, TPS No.4, Draft TPS No.5 & PRS)	Shortfall/Surplus of Dwellings
2010	+58	23	232	+209
2015	+148	58	232	+174
2020	+185	72	232	+160

As indicated in **Table B5 – B8** even under the highest population growth rates the existing land-bank is sufficient to cater for population growth under all scenarios. The exception being if the current provisions of TPS No.4 remain in-place up until 2015 and beyond, however it extremely unlikely that this scenario will occur given the significant efforts the Shire of Murray has invested into progressing TPS No.5.

Appendix C

Commercial Land Requirements

Commercial Land Requirements

Under the current TPS No.4 commercial/retail zoned land within the town centre has been created as demand necessitated, however commercial development has generally been restricted to Newton Street and McLarty Street. Under the proposed provisions of draft TPS No.5 in accordance with the recommendation of the existing Dwellingup SP, 48 allotments fronting Marinup Street and McLarty are to be zoned *Town Centre* and are proposed to accommodate a wide variety of uses (it should be noted that *Single House* is proposed to be a 'D' use and there permissible at Council's discretion). It should be noted that the figures calculated below relating to draft TPS No.5 relate solely to commercial uses and do not take into account land requirements for other uses desirable in the *Town Centre* zone (such as community, administrative and tourist facilities).

Using the broad methodologies above the following areas are required for commercial development over the next 15 years.

Table C1: Commercial Land Requirements Based on BGM Natural Growth Model and the provisions of TPS No.4

Population Projection Scenario	Area Currently zoned Town Centre (m ²)	Commercial Land Requirement SPP 2.9 (m ² NLA)		
		Required ¹	Excess Land ²	Excess potential floorspace ³
2006 – 346	19 878	321.7	19 556.22	4 889.0
2010 – 374	19 878	347.8	19 530.18	4 882.5
2015 – 410	19 878	381.3	19 496.7	4 874.2
2020 – 446	19 878	414.7	19 463.3	4 865.82

Table C2: Commercial Land Requirements Based on Growth Attributed to BGM Mine Site and the provisions of TPS No.4

Population Projection Scenario	Area Currently zoned Town Centre (m ²)	Commercial Land Requirement SPP 2.9 (m ² NLA)		
		Required	Excess Land	Excess potential floorspace
2006 – 348	19 878	323.6	19 554.4	4 888.6
2010 – 404	19 878	375.7	19 502.3	4 875.5
2015 – 494	19 878	459.4	19 418.6	4 854.6
2020 – 531	19 878	493.8	19 384.2	4 846.0

Table C3: Commercial Land Requirements Based on BGM Natural Growth Model and the provisions of Draft TPS No.5

Population Projection Scenario	Area Currently zoned Town Centre (m ²)	Commercial Land Requirement SPP 2.9 (m ² NLA)		
		Required	Excess Land	Excess potential floorspace
2006 – 346	48 391	321.7	48 069.3	12 017.3
2010 – 374	48 391	347.8	48 043.2	12 010.8
2015 – 410	48 391	381.3	48 009.7	12 002.4
2020 – 446	48 391	414.7	47 976.3	11 994.0

¹ This is the amount of land that is required under the policy

² This is the amount of land currently zoned for *Town Centre* in excess of the required or maximum amounts

³ This the amount of floorspace potentially available based on a 1:4 floorspace/land ratio

Table C4: Commercial land Requirements based on Growth Attributed to BGM Mine Site and the provisions of Draft TPS No.5

Population Projection Scenario	Area Currently zoned Town Centre (m ²)	Commercial Land Requirement SPP 2.9 (m ² NLA)		
		Required	Excess Land	Excess potential floorspace
2006 – 348	48 391	323.6	48 067.4	12 016.8
2010 – 404	48 391	375.7	48 015.3	12 003.8
2015 – 494	48 391	459.4	47 931.6	11 982.9
2020 – 531	48 391	493.8	47 897.2	11 974.3

Appendix D

Flora Assessment

**Flora and Vegetation Assessment
Dwellingup Structure Plan
Dwellingup**

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EXECUTIVE SUMMARY

This report has been prepared by Kylie Del Fante on behalf of Land Insights to review remnant vegetation on four precincts surrounding the Dwellingup townsite, identified in the Dwellingup Structure Development Plan Review (DSDP). The assessment was based on a botanical survey of the flora and vegetation on the site.

The Flora and Vegetation Assessment identified a number of flora species within the study area. The vegetation ranged from “Degraded” to “Very Good” Condition, and existing tracks were rated as “Completely Degraded”. No species of DRF or Priority Flora, or TEC’s pursuant to subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and listed by CALM were located during the time of the survey.

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APPENDICES

Appendix A	Vascular Plant Species Recorded in Vegetation Communities
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1. INTRODUCTION

1.1 BACKGROUND

This report has been prepared by Kylie Del Fante on behalf of Land Insights to review the remnant vegetation within the 4 precincts located for the Dwellingup Structure Plan. This survey consisted of a general flora survey, recording vegetation types and conditions. The survey was undertaken on the 22nd -23rd August 2009; due to the timing of the survey it is recommended that a spring survey is undertaken prior to development to confirm the presence or absence of Declared Rare Flora (DRF) and Threatened Ecological Communities (TEC's).

The survey was undertaken by traversing the site by vehicle and foot to record the flora species and identify vegetation communities and condition. Aerial photography was used to extrapolate and map plant communities in combination with running notes made during the course of the survey.

A recent review of the Dwellingup structure plan identified 4 precincts surrounding the Dwellingup townsite as possible urban expansion areas. The precincts are number in accordance with priority (1 highest priority & first to be developed - 4 lowest priority last to be developed).

Precinct 1

This precinct includes reserves and unallocated crown land which has been identified in either the existing Dwellingup Structure Development Plan or the Peel Region Scheme as being suitable for urban development.

Precinct 2

During our discussions with the Australian School of Fine Wood they brought to our attention their plans to expand their services and significantly increase the number of students attending this facility. Currently the only constraint holding back this process is the lack of student housing in the townsite. They have stated that they require a 10ha site, preferably in this locality, to create a student village style development.

Precinct 3

Council has indicated that they would like this plan to identify future growth areas, even if they will not be developed within the 10-15yr lifespan of the new SDP. Council have stated that if growth is to occur it will be an in west and/or east direction.

Precinct 4

It has been suggested that the land immediately north of the existing DEC sawmill or behind the DEC

administration offices could potentially be well suited to a specialist service industry precinct, perhaps providing a location for graduates of the school of fine wood to establish new businesses. Also, given the noise constraints associated with the sawmill it is unlikely that this locality would be suitable for sensitive land uses (i.e. residential).

1.2 PURPOSE OF THIS REPORT

This report was prepared to document the flora and vegetation that occurs within the four precincts. The flora species and vegetation were used to determine the significance of the site in regards to vegetation types and condition.

In summary this report provides:

- Documentation of vegetation types and dominant flora species; and
- Vegetation condition

2. EXISTING ENVIRONMENT

2.1 SOILS AND LANDFORMS

Jarrah forest exists only on the western edge of the Darling Plateau in the South West Division of Western Australia. Jarrah forests occur in a mosaic with a variety of species rich shrublands.

In particular in relation to the Dwellingup site the Northern Jarrah Forest incorporates the area east of the Darling Scarp, overlying Archaean granite and metamorphic rocks of an average elevation of 300m, capped by an extensive lateritic duricrust, dissected by later drainage and broken by occasional granite hills.

There is considerable soil variation through the Jarrah forest area. It's caused partly by the nature of the parent rock and also by the landforms and climate. Upland soils usually differ from those in the valleys; the degree of slope, drainage, position in the rainfall range and many other factors have resulted in an array of soils.

2.2 CLIMATE

The climate of the Jarrah Forest region is described as warm and Mediterranean. Rainfall ranges from 1100 mm on its western edge (Darling Scarp) to 700 mm in the east and north most of which falls between June and September (May and McKenzie 2003).

3. FLORA AND VEGETATION

The survey area lies in the Drummond Botanical Subdistrict within the southwest Botanical Province as described by Beard (1990). Flora composition has been described by Beard (1990) as predominantly consisting of *Banksia* Low Woodlands on leached sands with *Melaleuca* swamps where ill drained and Woodlands of *Eucalyptus* spp. on less leached soils.

The vegetation assessed in Dwellingup is commonly known as Jarrah Forest Vegetation which comprises of Jarrah - Marri forest in the west with Bullich and Blackbutt in the valleys grading to Wandoo and Marri woodlands in the east with Powder bark on breakaways. There are extensive but localized sand sheets with *Banksia* low woodlands. Heath is found on granite rocks and as a common understorey of forests and woodlands in the north and east. The majority of the diversity in the communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions.

3.1 VEGETATION METHODS

A Botanical survey was undertaken on the 22nd and 23rd August 2009. The site was surveyed for flora, vegetation communities and condition. The survey was undertaken by traversing the site by vehicle and foot to record the flora species and identify vegetation communities and condition. Data was recorded to statistically determine vegetation types and condition. An assessment was undertaken in each of the four precincts, data is available in **Appendix A**

All plant specimens collected during the field survey were dried, pressed and then sorted in accordance with the requirements of the Western Australian State Herbarium. Identification of specimens occurred through comparison with named material and through the use of taxonomic keys. Nomenclature of species used in this report follows current usage (Western Australia Herbarium 1998-2003).

The vegetation communities occurring on this site were described in detail. Aerial photography was used to extrapolate and map plant communities in combination with running notes made during the course of the survey.

3.2 VEGETATION ASSESSMENT RESULTS

A total of 69 taxa, comprising 28 families and 49 genera were recorded on site shown in **Appendix A**. Species representation was greatest among the Proteaceae (Proteas), and Papilionaceae. Fifteen introduced (weed) species were collected.

In general all sites consisted of Good – Very Good vegetation of predominately Jarrah Forrest vegetation. Most sites consisted of good understorey with limited weeds and a dense canopy of Jarrah and Marri. Most weed species were present on tracks and edges. There is evidence of disturbance in most areas. Area 2 consisted of the overall best vegetation and parts of Area 3 and 4, however prior developments of the caravan park and other accommodation has disturbed parts of these two areas. Area 1(a) and 1(b) are the most disturbed with the highest percentage of weeds.

3.2.1 *Precinct 1 (a) (Pinjarra – Williams Rd)*

Precinct 1 (a) is the highest disturbed site consisting of Jarrah woodland vegetation with a limited understorey and a high presence of weed species. The vegetation condition is rated as Degraded – Completely Degraded. This site is recommended for future development as it contains the least ecological values out of the 4 sites.

3.2.2 *Precinct 1 (b) (behind School)*

Precinct 1 (b) consists of isolated pockets of Good vegetation with weeds mainly present on the edges of the site. The vegetation is represented by Jarrah woodland. The area adjacent to McLarty Street is in Good condition; however the area behind the school is Degraded-Good. This area is rated as the second lowest out of the 4 precincts, and the vegetation found on this site is also represented in better condition in precinct 2 and 3.

3.2.3 *Precinct 2*

Precinct 2 contains the greatest variations in vegetation complexes. This site is represented by three vegetation types, which are described below. This site varied significantly in vegetation condition, some areas directly behind the houses on Marginator Crescent and near the railway are Completely Degraded and the area closer to Pinjarra-Williams Rd consists of Good-Very Good vegetation.

SECTION 1- Jarrah woodland, degraded with a high percentage of weed species and a limited understorey

SECTION 2 – Jarrah Woodland, vegetation in Good condition with a good understorey and few weed species

SECTION 3 – Allocasuarina Woodland, vegetation in Good condition with a good understorey and few weed species. This vegetation complex was poorly represented throughout the other precincts.

3.2.4 *Precinct 3*

Precinct 3 varied in condition. There are a number of tracks throughout the area and the caravan park where the vegetation is Degraded. The area to the south of the precinct has the highest percentage of weeds. The vegetation in the western section displays the best vegetation, in Good-Very Good

condition. Overall this area consisted of Jarrah woodland with a dense understorey and weeds mainly on tracks and edges of the site.

3.2.5 *Precinct 4*

Precinct 4, similar to precinct 3 varied in vegetation condition and is represented by Jarrah woodland. The area to the west, which has previously been developed is Degraded however still retains some vegetation in Good condition. The vegetation to the north and east of the site consists of Good – Very Good vegetation. There are some weeds on tracks and edges throughout the site.

3.2.6 *Declared Rare and Priority Flora*

No species of Declared Rare Flora (DRF) or Priority Flora (PF), pursuant to subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and listed by CALM were located during the time of the survey. The survey was neither comprehensive nor undertaken in spring; therefore it is recommended that a spring survey is undertaken prior to development.

3.2.7 *Local Vegetation Communities*

Two vegetation communities were represented on the site at a local level. Photographic representations of these vegetation communities are shown in Figure 2 and **Photographic Plates 1-7**.

Table 1: Local Vegetation Communities Recorded

Mapping Code	Community Descriptions
Vegetation Community 1 – Open Forest of <i>Eucalyptus marginata</i> - <i>Corymbia calophylla</i>	
1	Open Forest of <i>Eucalyptus marginata</i> - <i>Corymbia calophylla</i> –with mixed understorey species, including <i>Trymalium floribundum</i> , <i>Acacia extensa</i> and <i>Phyllanthus calycinus</i>
Vegetation Community 2– Open Forest of <i>Allocasuarina fraseriana</i> - <i>Eucalyptus marginata</i>	
2	Open Forest of <i>Allocasuarina fraseriana</i> - <i>Eucalyptus marginata</i> - <i>Corymbia calophylla</i> - <i>Banksia grandis</i> with scattered understorey, including <i>Adenanthos barbiger</i>

3.2.8 *Vegetation Condition*

Many bushland remnants are historically subject to ongoing degradation and are especially susceptible to disturbances arising as a result of indirect impacts from surrounding developments and human activity. Degradation is caused by a wide range of factors, including isolation and edge effects, weed invasion, plant diseases, changes in fire frequency and behaviour, landscape fragmentation, increased predation on native fauna by feral animals, decrease in species richness and general modification of ecological function. These issues can affect the biodiversity rating and ecological viability of areas of remnant vegetation and should be assessed in line with conservation values.

The Vegetation Condition was rated according to the Vegetation Condition Scale commonly used in the Perth Metropolitan Region (Government of WA 2000). The definitions are described in **Table 2** below.

Table 2: Vegetation Condition Scale (Taken from Bush Forever (Government of WA 2000))

Vegetation Condition	Definition
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good (3)	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing
Good (4)	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded (6)	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees or shrubs.

In general, the vegetation condition ranged from “Degraded” to “Very Good”. Tracks and edges of the site had a higher presence of weeds. Vegetation condition mapping is provided in **Figure 3**.

3.2.9 *Introduced Species*

Fifteen introduced Flora species were recorded on the site. This represents 21 % of the total flora recorded on site.

4. CONCLUSIONS

The flora and vegetation assessment undertaken on the four precinct outlined in the review of the Dwellingup structure plan identified a number of flora species within the study area. The vegetation ranged from “Degraded” to “Very Good” Condition, tracks and existing development were rated as “Completely Degraded”. All four precincts contained weeds species however precinct 1a and 1b had the highest number of weed species and hence was the highest disturbed area. One vegetation complex was recorded which was represented by two local vegetation communities over the four precincts.

The flora and vegetation assessment identified precinct 1a and 1b as the most degraded, followed by precinct 3 and 4 which are only degraded in areas due to previous and existing developments, some areas in both these precinct are in Good Condition. Due to its size precinct 3 retains a larger area in Good-Very Good Condition Precinct 2 also displayed areas of degraded vegetation, however the southern portion of this precinct represented vegetation in Good-Very Good as well as changes in the local vegetation type. Most areas on the outer edges from the townsite were in the best condition.

No species of DRF or Priority Flora, or TEC’s pursuant to subsection 2 of section 23F of the *Wildlife Conservation Act 1950* and listed by CALM were located during the time of the survey. However due to the timing of the survey it is recommended that a spring survey is undertaken prior to development

5. REFERENCES

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FIGURES

FIGURE 1 LOCATION OF SUBJECT SITE



FIGURE 2 VEGETATION TYPES



The red section in the south east corner represents Allocasuarian Woodland. The remaining areas are dominated by Jarrah Woodland

FIGURE 3 VEGETATION CONDITION



PHOTOGRAPHIC PLATES



Plate 1: Precinct 1 (a) Degraded Jarrah woodland



Plate 2: Precinct 1 (b) Degraded – Good Jarrah Woodland



Plate 3: Precinct 2 – Section 1 Degraded – Good Jarrah Woodland



Plate 4: Precinct 2 – Section 2 Good Jarrah Woodland



Plate 5: Precinct 2 – Section 3 Good Allocasuarina Woodland



Plate 6: Precinct 3 Degraded - Very Good Jarrah Woodland



Plate 7: Precinct 4 Degraded – Very Good Jarrah Woodland

APPENDIX A
VASCULAR PLANT SPECIES RECORDED ON THE FOUR
PRECINCTS

**APPENDIX A: VASCULAR PLANT SPECIES RECORDED AT
PRECINCTS 1A AND 1B AUGUST 2009**

(*DENOTES A WEED SPECIES)

Family	Genus	Species
Apocynaceae	* <i>Vinca</i>	<i>major</i>
Cyperaceae	<i>Lepidosperma</i>	? <i>leptostachyum</i>
Cyperaceae	<i>Lepidosperma</i>	? <i>tenue</i>
Cyperaceae	<i>Tetaria</i>	? <i>octandra</i>
Dennstaedtiaceae	<i>Pteridium</i>	<i>esculentum</i>
Droseraceae	<i>Drosera</i>	<i>pallida</i>
Epacridaceae	<i>Astroloma</i>	<i>cillatum</i>
Epacridaceae	<i>Leucopogon</i>	<i>propinquus</i>
Epacridaceae	<i>Leucopogon</i>	<i>verticillata</i>
Fumariaceae	* <i>Fumaria</i>	<i>muralis</i>
Goodeniaceae	<i>Lechenaultia</i>	? <i>biloba</i>
Iridaceae	* <i>Freesia</i>	<i>sp</i>
Iridaceae	* <i>Watsonia</i>	<i>bulbillifera</i>
Iridaceae	<i>Patersonia</i>	<i>occidentalis</i>
Iridaceae	<i>Patersonia</i>	<i>rudis</i>
Mimosaceae	* <i>Acacia</i>	<i>decurrens</i>
Mimosaceae	<i>Acacia</i>	<i>extensa</i>
Mimosaceae	<i>Acacia</i>	<i>lasiocarpa</i>
Mimosaceae	<i>Acacia</i>	<i>pulchella</i>
Myrtaceae	* <i>Eucalyptus</i>	<i>sp</i>
Myrtaceae	<i>Corymbia</i>	<i>calophylla</i>
Myrtaceae	<i>Eucalyptus</i>	<i>marginata</i>
Myrtaceae	<i>Kunzea</i>	<i>baxterii</i>
Orchidaceae	<i>Diuris</i>	<i>longifolia</i>
Orchidaceae	<i>Thelymitra</i>	<i>crinita</i>
Oxalidaceae	* <i>Oxalis</i>	<i>pes-caprae</i>
Oxalidaceae	* <i>Oxalis</i>	<i>purpurea</i>
Papilionaceae	* <i>Chamaecytisus</i>	<i>palmensis</i>
Papilionaceae	<i>Hardenbergia</i>	<i>comptoniana</i>
Papilionaceae	<i>Hovea</i>	<i>trisperma</i>
Papilionaceae	<i>Kennedia</i>	<i>prostrata</i>
Papilionaceae	<i>Mirbelia</i>	<i>dilata</i>
Poaceae	* <i>Ehrharta</i>	<i>calycina</i>
Poaceae	* <i>Paspalum</i>	<i>sp</i>
Proteaceae	<i>Banksia</i>	<i>grandis</i>
Proteaceae	<i>Banksia</i>	<i>nivea</i>
Proteaceae	<i>Conospermum</i>	<i>sp</i>
Proteaceae	<i>Hakea</i>	<i>lissocarpha</i>
Proteaceae	<i>Hakea</i>	<i>prostrata</i>
Proteaceae	<i>Persoonia</i>	<i>longifolia</i>
Restionaceae	<i>Loxocarya</i>	<i>flexuosa</i>
Rosaceae	* <i>Rubus</i>	<i>fruticosus</i>
Stylidiaceae	<i>Stylidium</i>	? <i>piliferum</i>
Thymelaeaceae	<i>Pimelea</i>	<i>sp</i>
Xanthorrhoeaceae	<i>Xanthorrhoea</i>	<i>gracilis</i>