

**Fauna Assessment of Waitsia 03 access track and pipeline
with regard to the clearing principles detailed in Schedule 5,
(WA) Environmental Protection Act 1986.**



Existing track within the Waitsia 03 project area

(photo credit: Dr Mike Bamford)

Prepared for: AWE Perth Pty Ltd
679 Murray Street
West Perth WA 6005

Prepared by: Brenden Metcalf and Mike Bamford
M.J. & A.R. Bamford Consulting Ecologists
23 Plover Way
KINGSLEY WA 6026



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1 Introduction

1.1 Introduction

Bamford Consulting Ecologists was commissioned by AWE to assess the proposed development of the Waitsia 03 access track and pipeline with regards to the clearing principles detailed in Schedule 5 of the Western Australian Environmental Protection Act (1986). Bamford Consulting Ecologists have previously conducted a Level 1 fauna assessment (Bamford *et al.* 2015) for the broader Waitsia area, and an Assessment of Cockatoo Habitat (Bamford, 2016) for the Waitsia 03 project area.

1.2 Assessment objectives

Under Schedule 5 of the Environmental Protection Act (1986), any development that has the potential to impact native vegetation within Western Australia, unless declared especially exempt, needs to be assessed against the clearing principles before receiving a clearing permit. The clearing principles state:

“Native vegetation should not be cleared if —

- (a) it comprises a high level of biological diversity; or
- (b) it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia; or
- (c) it includes, or is necessary for the continued existence of, rare flora; or
- (d) it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community; or
- (e) it is significant as a remnant of native vegetation in an area that has been extensively cleared; or
- (f) it is growing in, or in association with, an environment associated with a watercourse or wetland; or
- (g) the clearing of the vegetation is likely to cause appreciable land degradation; or
- (h) the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area; or
- (i) the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water; or
- (j) the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.” Schedule 5, (WA) Environmental Protection Act 1986.

This report summarises the fauna values of the study area, based on previous studies and a recent site visit (13th November 2017) by Dr Mike Bamford, and discusses the clearing principles as they relate to project area and its fauna values.

2 Background

2.1 Site Description

2.1.1 Description of the Waitsia 03 Project Area

The survey area is located east of Dongara and south of The Midlands Highway; approximately 300 kilometres north of Perth (Figure 1). The broader Waitsia project has a total area of approximately 8400 ha, dominated by cleared agricultural land but with some tracts of native vegetation. There is a spring in the central part of the area (Ejarno Spring) and the Irwin River runs through the north-eastern part of the site.



Figure 1. Location of Waitsia Wells survey area (red border). Waitsia 03 project area shown in yellow

Within this larger area, Waitsia 03 is located towards the southern end (see Figure 1). The Waitsia 03 project will potentially impact <3.5ha, including the well pad (<2ha) and an access track/pipeline (<1.5ha). This assessment regards the track/pipeline only; a corridor from ~50 J 315917 6752955 to ~50 J 315924 6751591 (Figure 2). The access track/pipeline route utilises an existing track for part of its extent, although this track will require widening.

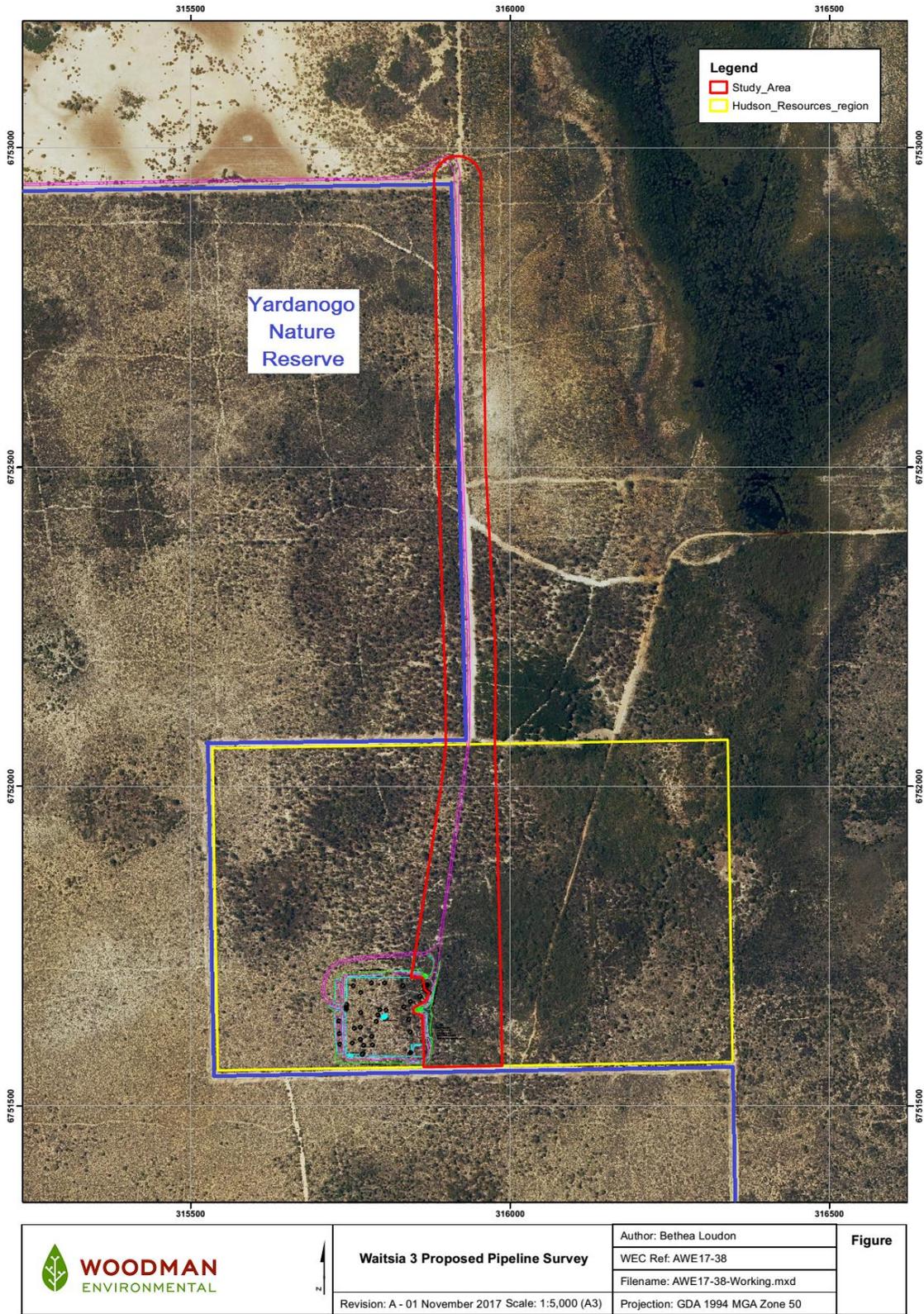


Figure 2. Waitsia 03 project area, pipeline and access track marked in red. The boundary of Yardanogo Nature Reserve marked in blue. Land within the yellow line was included in the inspection.

2.1.2 Regional Description

The Interim Biogeographic Regionalisation of Australia (IBRA) (Environment Australia, 2000) has identified 26 bioregions in Western Australia (Figure 2). Bioregions are classified on the basis of climate, geology, landforms, vegetation and fauna (Thackway and Cresswell, 1995; DoEE, 2017b). IBRA Bioregions are affected by a range of different threatening processes and have varying levels of sensitivity to impact (EPA, 2004).

The project area lies at the northern end of the Lesueur Sandplain (GES02) subregion, adjacent to the Geraldton Hills (GES01) subregion (see Figure 3), both of which form the Geraldton Sandplains Bioregion (DoEE, 2017b). This is a region extensively cleared for agriculture; as a result of the level of clearing, remnant native vegetation is generally considered to be of interest to conservation agencies. The native vegetation consists largely of Kwongan: species-rich proteaceous heath.

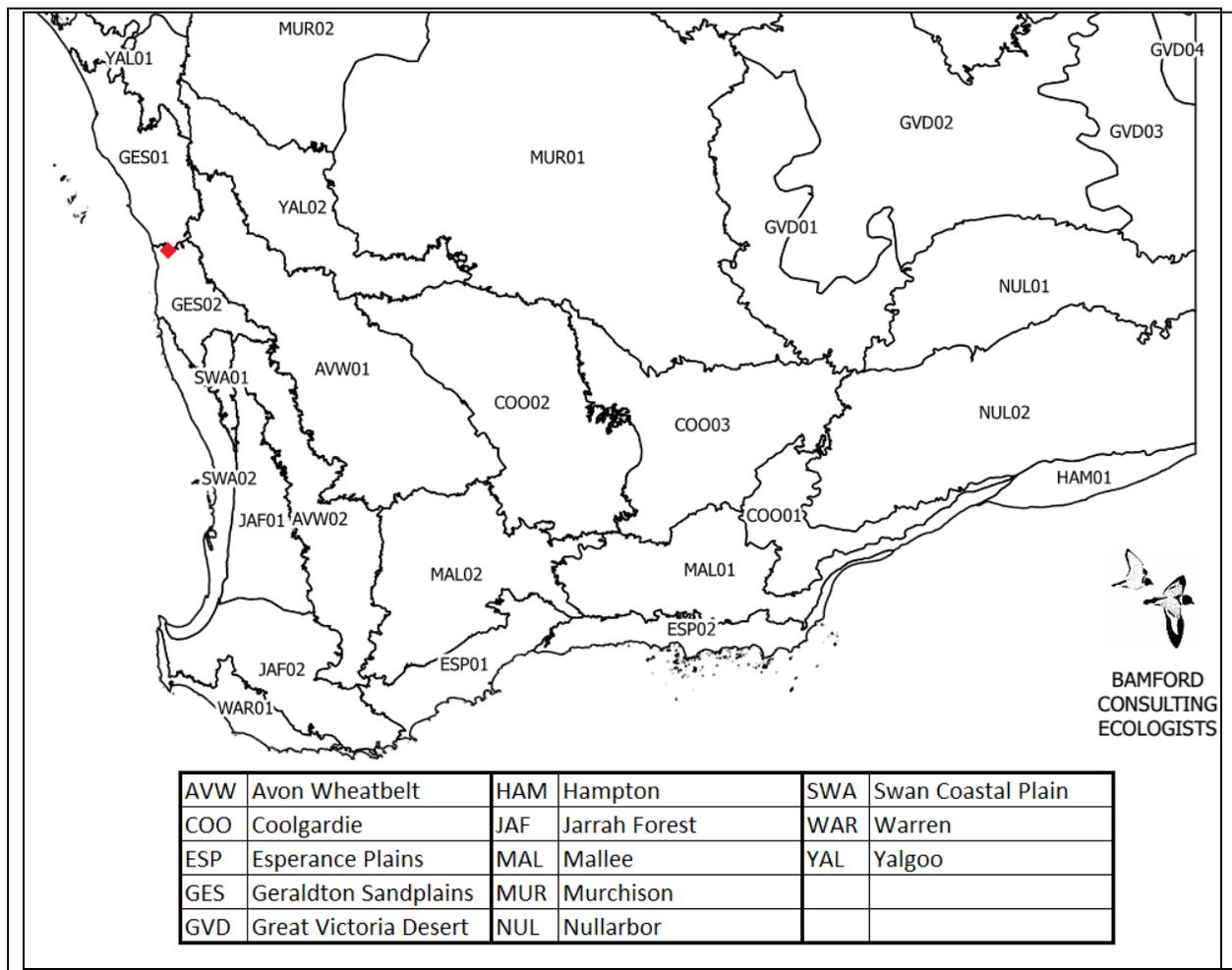


Figure 3. IBRA Subregions in southern Western Australia. Note the project area lies at the northern end of the GES02 subregion, adjacent to the GES01 subregion, as marked with red.

2.1.3 Regional Conservation Areas

Four regional conservation areas were recorded within a 25km search radius from the Waitsia 03 project area (using the Protected Matters Search Tool; DoEE, 2017a). Of greatest interest is Yordanogo Nature Reserve which is adjacent to the Waitsia 03 project area (as shown in Figure 2).

Name – Type	Area (ha)	Location*		Distance from Waitsia03* (km)
Dongara – Nature Reserve	52	114.9175	-29.2284	22.5
NTWA Bushland covenant (0084) – Conservation Covenant	20	115.0692	-29.4534	11.7
Unnamed WA47436 – Nature Reserve	65	115.1490	-29.5491	22.4
Yordanogo – Nature Reserve	6,589	115.0760	-29.3729	<0.1

* These locations are for a central point, hence the Distance from Waitsia03 is not to the nearest boundary except in the case of Yordanogo.

2.2 Fauna Studies

A number of fauna studies have previously been conducted in the region including:

- A Level 2 fauna survey conducted by BCE in the Mt Adams Road area on behalf of Tronox (Metcalf and Bamford 2008). This study area is just south of the Waitsia Wells project area, and work carried out included searching for significant species, spotlighting, trapping, bat surveys and bird surveys.
- More recent work carried out in the Tronox study area that targeted the Western Ground Parrot (Bamford 2012).
- A Level 1 fauna assessment of the Waitsia Wells study area (Bamford *et al.* 2015), part of the broader area within which the Waitsia 03 project is located.
- An assessment of the Waitsia 03 project area and its significance for Black Cockatoo spp. (Bamford 2016). This included a detailed site inspection of the Waitsia 03 site, quantification of banksia density and flowering, and a comparison of the extent of similar vegetation across Yordanogo Nature Reserve.

In conjunction with a site visit conducted by Dr Mike Bamford (13th Nov 2017), these previous studies were used to identify the fauna values of the Waitsia 03 project area. During the site visit, the road and pipeline alignments were walked and observations made on fauna and fauna habitats. This included assessing large trees their potential as nesting habitat for black-cockatoos.

2.3 Fauna Values of the Waitsia 03 Project Area

Previous studies have identified 251 vertebrate fauna species as potentially occurring in the broader Waitsia survey area (see Bamford *et al.* 2015): two fish, 10 frogs, 47 reptiles, 173 birds, 15 native and 11 introduced mammals. The vertebrate assemblage includes 28 species of conservation significance, the most likely to regularly use the site being Carnaby’s Black-Cockatoo. Two invertebrates of conservation significance may be present in the region. While previous studies covered much larger areas than the Waitsia 03 site, in combination with the site inspection they provide a framework for the prediction of fauna values of the smaller area. Fauna values within the project area can be summarised as follows:

Fauna assemblage. Generally intact and relatively diverse, but missing a large portion of the medium-sized mammal fauna and minor components of other fauna groups. The Waitsia 03 area can be expected to support a sub-set of the fauna assemblage of the general region but the majority of the regional assemblage would be present, at least occasionally. The fauna assemblage is widely represented in the general region due to the presence of Yordanogo Nature Reserve that provides similar habitat.

Vegetation and Substrate Associations (VSAs). The broader Waitsia project area has a range of VSAs including farmland and extensive shrublands, but two VSAs were recognised within the Waitsia 03 project area:

1) *Mixed tall shrubland with emergent Banksia and Allocasuarina spp. on sand.*

This VSA covers the northern part of the corridor and occurs in the adjacent Yordanogo Nature Reserves to the west and south (see cover photo). Some areas adjacent to the east of the project area had been burnt within the last two years. This VSA encompasses Vegetation Types 1, 2 and 3 (Woodman). See Plate 1 and Plate 2.

2) *Allocasuarina forest with scattered eucalypts, over an open mid- and under-storey of Melaleuca on pale grey clayey-loam soils prone to waterlogging. Occasional dense thickets of Melaleuca.*

This VSA is on the edge of an extensive dampland system; areas of open water with Paperbark woodland were recorded to the north-east (Bamford pers. records, 2017). This VSA is equivalent to Vegetation Type 4 (Woodman). See Plate 3 and Plate 4.

Species of conservation significance. A large number of significant species may be present in the region, but many of these are migratory waterbirds for which there is little if any suitable habitat. Significant species of note that are likely to occur in the project area regularly include Carnaby's Black-Cockatoos, Rainbow Bee-eaters, Rufous Fieldwrens and some Conservation Significance level 3 (locally significant) bird species. Wetlands and damplands to the east of the project area may be particularly important for bird species such as fairy-wrens and scrubwrens. There is a known roosting site for Carnaby's Black-Cockatoo in tall trees around the wetland just north-east of Waitsia 03.

Patterns of biodiversity. Detailed patterns of biodiversity could not be examined, but it can be predicted that the dampland/wetland areas east of the project area may provide seasonal refugia and breeding habitat for a range of fauna species e.g. frogs and waterbirds. The Mixed tall shrubland areas in the north of the project area may provide a seasonal food resource for a large number of birds. These shrublands were assessed for their foraging value for Carnaby's Black-Cockatoo (Bamford 2016) and it was concluded that 3ha of such vegetation in the Waitsia 03 footprint represented 0.31% of similar vegetation across Yordanogo Nature Reserve, and that 3ha had a carrying capacity of <0.2 birds/year (based on regional habitat assessments conducted by Williams *et al.* 2016).

Key ecological processes. Main processes currently affecting the fauna assemblage in the survey area include local hydrology, fire, feral species and connectivity. Connectivity is important as the broader Waitsia area lies in a position to provide linkage between other areas of bushland (via Irwin River in the

north and native vegetation in the south), which means it may have more species (especially birds) using the site regularly than might otherwise be the case, and it has a role in supporting biodiversity in nearby areas. Hydrology is especially important at the Waitsia 03 site with a nearby dampland and wetland that is part of a chain of groundwater dependent ecosystems.



Plate 1. Banksia woodland east of the entrance track. This had been burnt within the previous two years.



Plate 2. Allocasuarina woodland with Banksia – to the east of the well location.



Plate 3. Melaleuca thicket to the east of the well location.

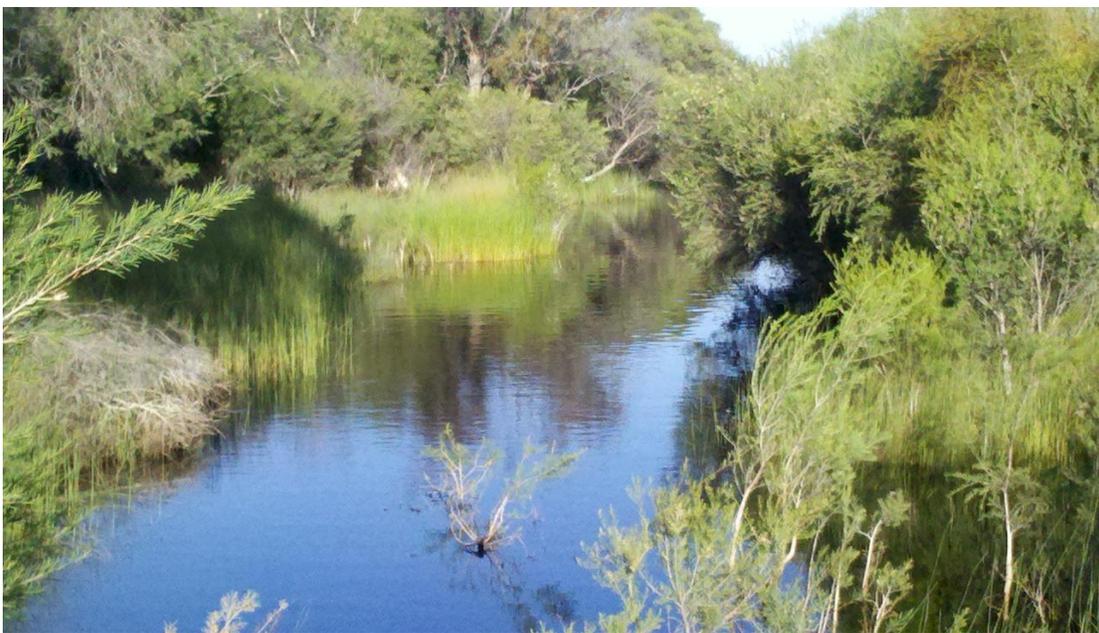


Plate 4. Wetland north-east of the well location.

Assessment of the Project with regard to the Clearing Principles

The Waitsia 03 project area is discussed with regard to each of the ten Clearing Principles as listed in Schedule 5 of the Environmental Protection Act (WA) 1986. For each of the Clearing Principles (listed as titles for Sections 2.3.1 to 2.3.10) a general statement is made on how the fauna values of the Waitsia 03 project relates to that Clearing Principle, with further discussion providing the basis for this general statement.

2.3.1 It comprises a high level of biological diversity

The project may be at variance to this Principle.

The study area lies near the northern edge of the Leseuer Sandplains subregion (GES02), adjacent to the Geraldton Hills subregion (GES01), both of which are in the Geraldton Sandplains Biogeographical Region; as recognised through IBRA v7 (DoEE, 2017b). This subregion is described as a being “...composed mainly of proteaceous scrub-heaths, rich in endemics, on the sandy earths of an extensive, undulating, lateritic sandplain...” and “exhibits extremely high floristic endemism, with over 250 species of sandplain flora endemic to the subregion. The area is known Australia-wide and internationally as having particularly high floristic diversity and levels of endemism” (Desmond and Chant, 2001).

Fauna species richness in the region is not as exceptional as flora species richness, although invertebrate richness is virtually unknown. Maryan (2005) has noted that the general region is extremely high in reptile species richness. While the project may be at variance to this principle with respect to fauna, it should be recognised that the area of direct impact is small, with <1.5ha expected to be impacted and already partially cleared for an existing track.

2.3.2 It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia

The project is considered not to be at variance to this Principle.

Several significant fauna species have been recorded from the broader Waitsia study area, including Eastern Great Egret and Carnaby’s Black-Cockatoo, with the potential for ~18 conservation significant species to occur in the Waitsia 03 project area or nearby (Bamford *et al.*, 2015). A Carnaby’s roost site was recorded from ~200m east of the Waitsia 03 project area and the shrublands with banksias are foraging habitat. However, given the small area of impact associated with this project and the widespread nature of the two VSAs present within the area, the project is considered unlikely to compromise significant habitat for Carnaby’s Black-Cockatoo or any other conservation significant fauna species. The roost site is not likely to be directly impacted and there should be no direct impacts on nearby wetlands. The small scale of the project mitigates impacts on fauna in general.

2.3.3 It includes, or is necessary for the continued existence of, rare flora

Not assessed.

2.3.4 It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community

The project is considered not to be at variance to this Principle.

The project is ~14km east of the nearest recognised Threatened Ecological Community (TEC), as recognised within the Protected Matters Search Tool. This TEC, "Subtropical and Temperate Coastal Saltmarsh", is not expected to be impacted, directly or indirectly, by the proposed development. The nearby wetland is not listed as a TEC and while it is a notable community in the local context, it should not be impacted directly or indirectly assuming suitable hydrological management.

2.3.5 It is significant as a remnant of native vegetation in an area that has been extensively cleared

The project may be at variance to this Principle.

Although the Geraldton Sandplains region is recognised as having been heavily cleared for agriculture, the western portion of the Lesueur Sandplains subregion is well represented in the reserve system (Desmond and Chant, 2001). The project area is located in an area of remnant vegetation adjacent to the eastern boundary of the Yandanogo Nature Reserve, with remnant vegetation of unknown tenure on the southern and eastern boundaries (see Figure 2). Areas to the north and east have been heavily cleared for agriculture. Although the project may be at variance to this principle on a regional level, its small scale and the extent of remnant vegetation in the immediate vicinity mitigates the impact.

2.3.6 It is growing in, or in association with, an environment associated with a watercourse or wetland

The project may be at variance to this Principle.

An extensive north-south dampland/wetland system lies east of the project area, extending into the southern end of the project area. The VSA at the southern end of the project area is associated with this dampland system. The project therefore represents some risk to a wetland and dampland system.

2.3.7 The clearing of the vegetation is likely to cause appreciable land degradation

The project is considered not to be at variance to this Principle.

The project includes an access track and pipeline corridor, ~1.38km in length, impacting an area of <1.5ha. This is a relatively small area, which will require rehabilitation at the end of the project's operation. Management systems for weeds and feral animals during the construction and operation of the project should ensure the project causes minimal land degradation.

2.3.8 The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area

The project is considered at variance to this Principle.

The main threats to the adjacent conservation areas from the project include:

- spread of dieback and weeds;
- increased access for feral fauna;
- fragmentation and disruption of fauna movements;

- fire; and
- hydrocarbon spills.

Processes to minimise the potential of these threats should be incorporated into the management plan/s of the project.

2.3.9 The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

Not assessed.

2.3.10 The clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding

The project is considered not to be at variance to this Principle.

The nearest Bureau of Meteorology station to project area, Dongara, recorded an average annual rainfall of ~405ml (st. dev. \pm 78) between 1987-2017 (BoM, 2017). With the close proximity of the wetland system to the east, major and/or sustained rainfall events would likely cause flooding within the project area, however this would not be caused or exacerbated by clearing associated with this project.

3 Assessment of the Project with regard to Threatening Processes

The Clearing Principles do not entirely capture some recognised impacting processes associated with development projects; these are discussed by Gleeson and Gleeson (2012). The following notes therefore consider key threatening processes with respect to the road and pipeline project.

- Habitat loss leading to population decline. Negligible to Minor impact as small area of habitat that is well-represented regionally.
- Habitat loss leading to population fragmentation. Possibly Moderate impact as road alignment passes through native vegetation and may create a barrier for some fauna. Also an important consideration is that the alignment passes between the wetland to the east and dryland vegetation to the west.
- Degradation of habitat due to weed invasion leading to population decline. Negligible with management.
- Ongoing mortality from operations. Negligible assuming low traffic volumes.
- Species interactions including feral and overabundant native species. Negligible to Minor. Some risk if workers at the site leave or provide food for feral species. There are already feral pigs in the area as well as Foxes, Cats and Rabbits.
- Hydrological change. Negligible if little or no change occurs, but the adjacent wetland system is likely to be very sensitive to any hydrological impacts.
- Altered fire regimes. Negligible with management and awareness-training.
- Disturbance (dust, light, noise). Probably Negligible but impact uncertain. It is not known if the facility will be brightly-lit. Shielding of light will reduce mortality of insects and reduce possible effects on the nearby Carnaby's Black-Cockatoo roost.

Overall, threatening processes of greatest concern are population fragmentation due to the alignment of the access road, with possible concern from feral species and altered hydrology if this occurs.

4 Conclusions and Recommendations

Risks in relation to clearing principles and threatening processes in general are mostly considered to be low, even where the project may be at variance with some clearing principles, due largely to the small impact area and the large extent of the adjacent Yandanogo Nature Reserve. The greatest concerns are with:

- Habitat loss leading to population fragmentation. Clearing Principle: the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation.
- Hydrological Change. Clearing Principle: growing in, or in association with, an environment associated with a watercourse or wetland.

Some management can reduce these risks, and management can also reduce other possible risks. For example, clearing footprint can be tightly controlled, culverts can be installed under the access road to facilitate movement of species such as frogs moving to and from the wetland, and hydrological impacts can be minimised. There should also be management and training in place to reduce changes in the abundance of feral species, to minimise the risk of unplanned bushfires and to minimise impacts of lighting on fauna in adjacent areas.

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6 Appendices

Appendix 1. Field notes; 13th November 2017.

AWE Visit to Waitsia 3 site

Focus of inspection was the waitsia pipeline route and access (red line). Hudson Resources area (yellow line) was also looked at. Visited site from midday until sunset.

Inspected track from paddock (for pipeline with 30m buffer), the expanded area to the east of the well site and the Hudson Resources area. Also walked down the track into the southern area of open water (NE of the Hudson area). Note that drill pad area has been cleared. This drill pad area is close to the area inspected in 2016 for the cockatoo foraging assessment (see report).

Vegetation along the track from paddock a mixed tall shrubland with emergent *Banksia prionotes* and *Allocasuarina* sp. on sand. Occasional *B. attenuata*. Previous survey found *B. menziesii* and scattered *B. elegans*. *Banksia* amounted to about 10% foliage cover, so quite low. More extensive banksia woodland to east of track. However, much of this area burnt in last 2 years.

Vegetation immediately east of drill pad and along existing diagonal track through Hudson area is a she-oak forest (and scattered Euc.) with a fairly open, shrubby mid and understorey of melaleuca on pale grey clayey-loam soils prone in waterlogging. Occasional dense thickets of melaleuca, especially just east of drill pad. This whole dampland system is at the southern end of a long wetland system. Actual open water and paperbark swamp just to north (open water visible on aerial).

The cockatoo roost (Carnaby's) found previously (see previous report) was in large trees along the drainage system but the birds could roost anyway in large trees including within the Hudson area and even within the waitsia clearing proposal area. Wrong time of year for roosting activity.

Trees that come close to meeting Black-Cockatoo criterion for DBH (500mm for most species; 400mm for Wandoo). All probably *E. camaldulensis*.

315940	6752302	Large eucalypt. DBH = 350mm.	Raven nest no large hollows
315944	6752070	Large Euc camaldulensis? DBH = 400	No large hollows
315854	6751650	Large Euc camaldulensis? DBH = 400	No large hollows
315904	6751875	Large Euc camaldulensis? DBH = 400	No large hollows

Fauna observations.

Tadpoles in wetland but species uncertain.

Tiliqua rugosa. Several along track.

Lialis burtonis. Juvenile crossing track just near drill pad.

Emu. Tracks.

Pacific Black Duck. Two on wetland.

Galah. Several seen.

Carnaby's Black-Cockatoo. None observed, but recent forging debris (few weeks old?) on *B. prionotes*.

Rainbow Bee-eater. Few around.

Splendid Fairy-wren. In dampland thickets.

White-browed Scrubwren. In dampland thickets.

Weebill. Small party in eucalypts.

Brown Honeyeater. Heard in banksia woodland.

Black-faced Cuckoo-shrike. Two flew over drill pad.

Rufous Whistler. In banksia woodland.

Golden Whistler. In dampland thickets.

Grey Fantail. One near wetland.

Tree Martin. Few overhead.

Silvereye. In dampland thickets.

Tachyglossus aculeatus. Diggings in several areas.

Macropus fuliginosus. Tracks and scats.

Sus scrofa. Diggings and tracks around wetland

Vulpes vulpes. Tracks throughout.