Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9683/1
Permit type:	Purpose permit
Applicant name:	Regional Power Corporation trading as Horizon Power
Application received:	5 April 2022
Application area:	9 hectares of native vegetation
Purpose of clearing:	Installing overhead power lines
Method of clearing:	Mechanical clearing
Property:	Lot 292 on Plan 217712 Lot 291 on Plan 217711 Lot 425 on Plan 218390 Lot 461 on Plan 40702 Lot 463 on Plan 40702 Lot 516 on Plan 56733 Lot 523 on Plan 56733 Lot 525 on Plan 56733 Lot 514 on Plan 56733 Lot 522 on Plan 56733 Lot 526 on Plan 56733 Lot 513 on Plan 56733 Lot 517 on Plan 56733 Lot 519 on Plan 56733 Lot 521 on Plan 56733 Lot 518 on Plan 56733 Lot 520 on Plan 56733 Lot 515 on Plan 56733 Lot 524 on Plan 56733 Un-named road PIN: 1157365 Un-named road PIN: 1157366 Un-named road PIN: 1157367 Un-named road PIN: 1157368 Un-named road PIN: 1157369 Un-named road PIN: 11249988

	Broome Road PIN: 11731057 Broome Road PIN: 11731060
Location (LGA area/s):	Shire of Broome
Localities (suburb/s):	Roebuck

1.2. Description of clearing activities

Regional Power Corporation trading as Horizon Power (referred to as Horizon Power throughout the report) propose to clear nine hectares of native vegetation for an overhead transmission line along Broome Road, to support Western Australia's regional economy by providing power to farms, stations and potentially a new prison (Horizon Power, 2022). The vegetation proposed to be cleared comprises a linear strip of native vegetation along a length of approximately 13 kilometres (see Figure 1, Section 1.5).

The vegetation is proposed to be mechanically cleared using a stick rake along the length of the line and vehicle access. Bare earth clearing is proposed around pole bases for initial installation of the power poles. The final corridor will be approximately eight metres wide. Due to the vegetation type, ongoing vegetation maintenance will involve slashing, resulting in significant ground cover remaining on site (Horizon Power, 2022).

1.3. Decision on application

Decision:	Granted
Decision date:	26 August 2022
Decision area:	9 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (the department) advertised the application for 14 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix F.1), the findings of a flora, vegetation and fauna survey (see Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the purpose of the clearing is to install high voltage distribution power poles to support Western Australia's regional economy by providing reliable power to farms, stations, and potentially a new prison (Horizon Power, 2022).

The assessment identified that the proposed clearing will result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- the loss of four individuals of the Priority 3 flora species, *Terminalia kumpaja*;
- potential impact to fauna (including the Bilby) utilising the site during the time of clearing;
- potential land degradation in the form of wind and water erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on environmental values and can be minimised and managed to unlikely lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid and minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- undertake slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activities;
- undertake a pre-clearance fauna survey within seven days prior to clearing activities to identify Bilby and other conservation significant fauna using a qualified fauna specialist, authorised under section 40 of the *Biodiversity Conservation Act 2016* (BC Act);

- ensure the presence of a fauna specialist during the clearing;
- demarcation of priority flora for avoidance where possible, as per the applicant's commitment (see Section 3.1);
- construction must commence within two months of undertaking clearing activities to minimise wind and water erosion.

1.5. Site maps

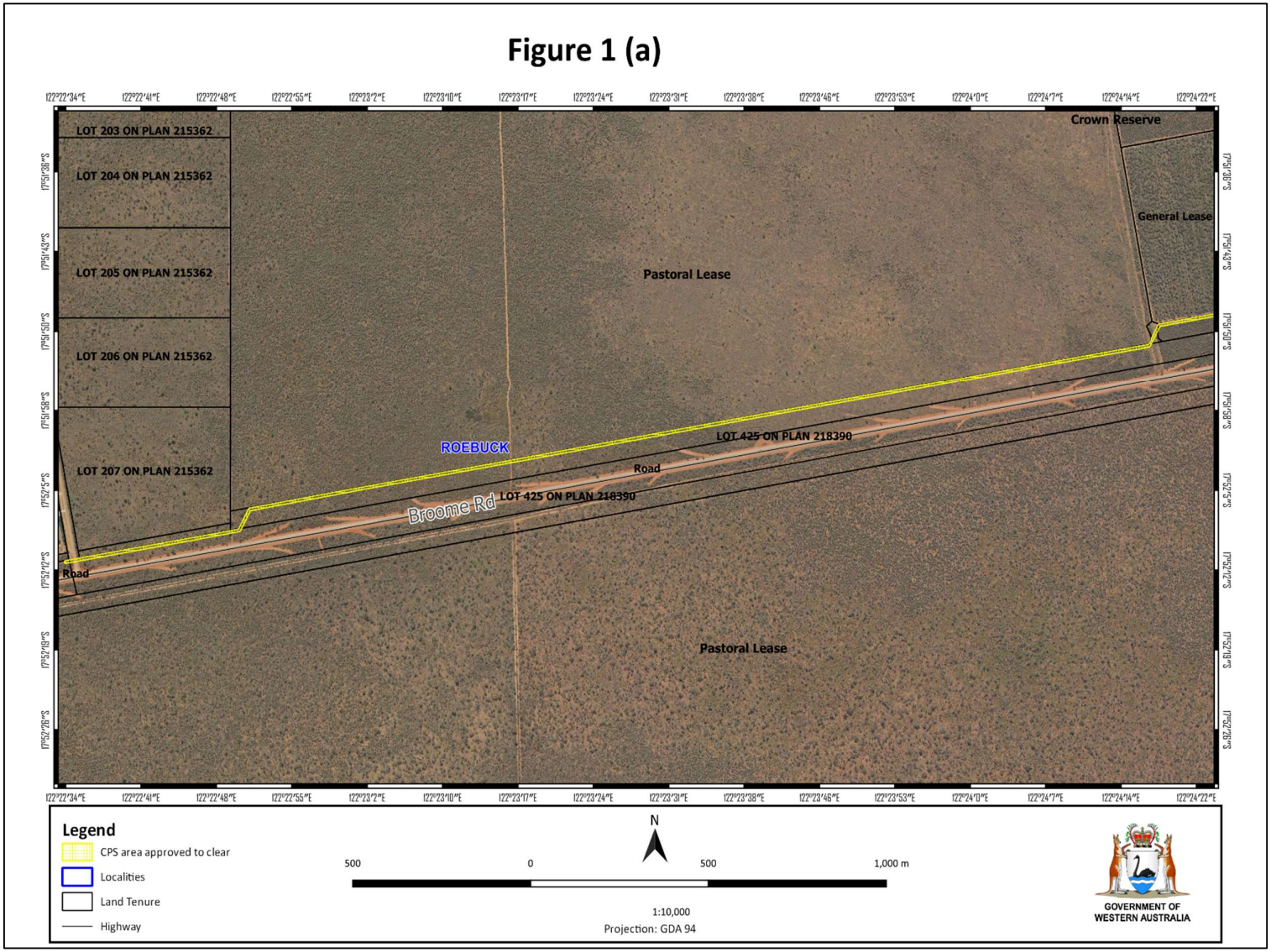

Figure 1a Map of the application area

The area cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Figure 1 (b)

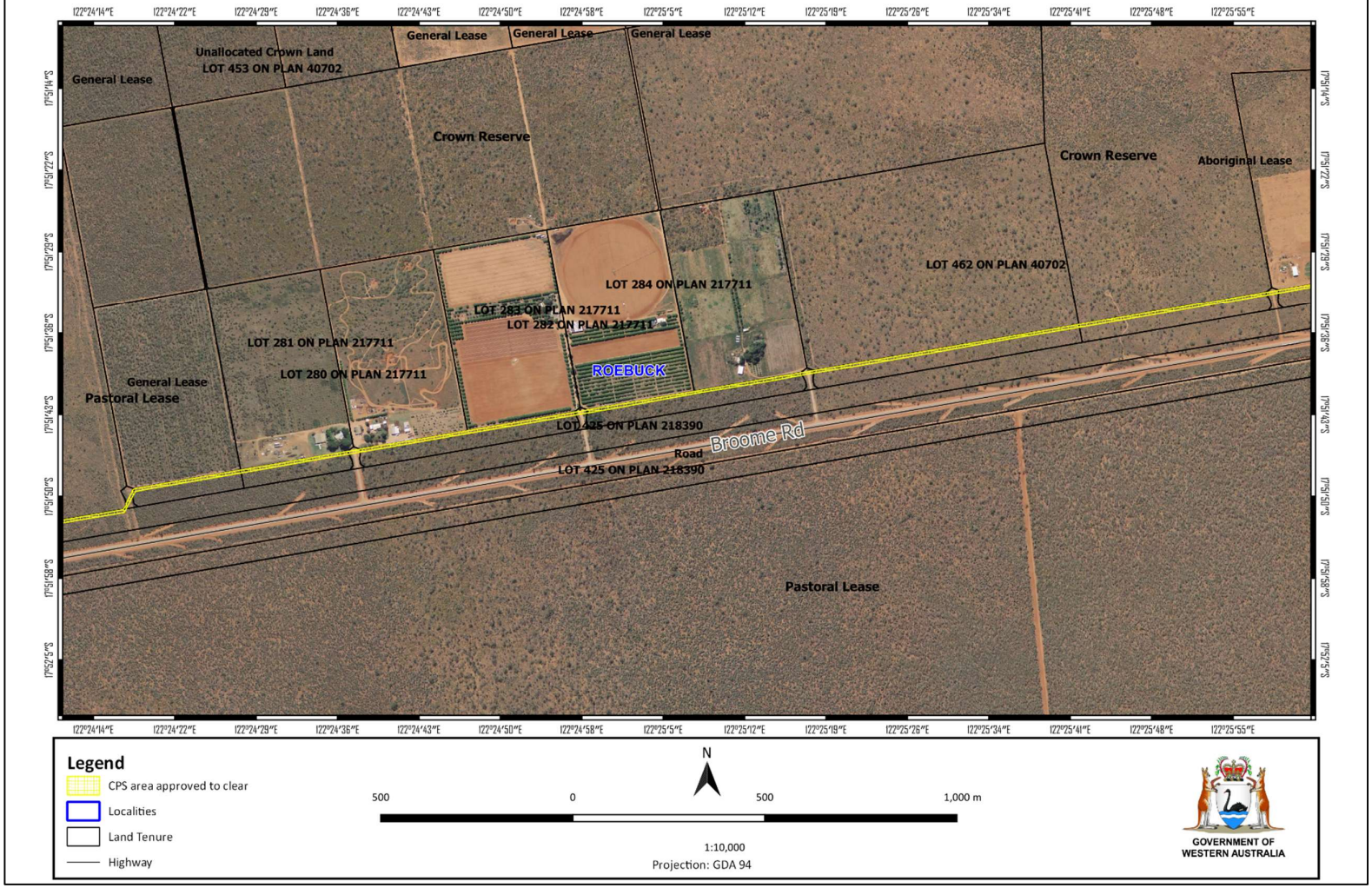

Figure 1b Map of the application area

The area cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Figure 1 (c)

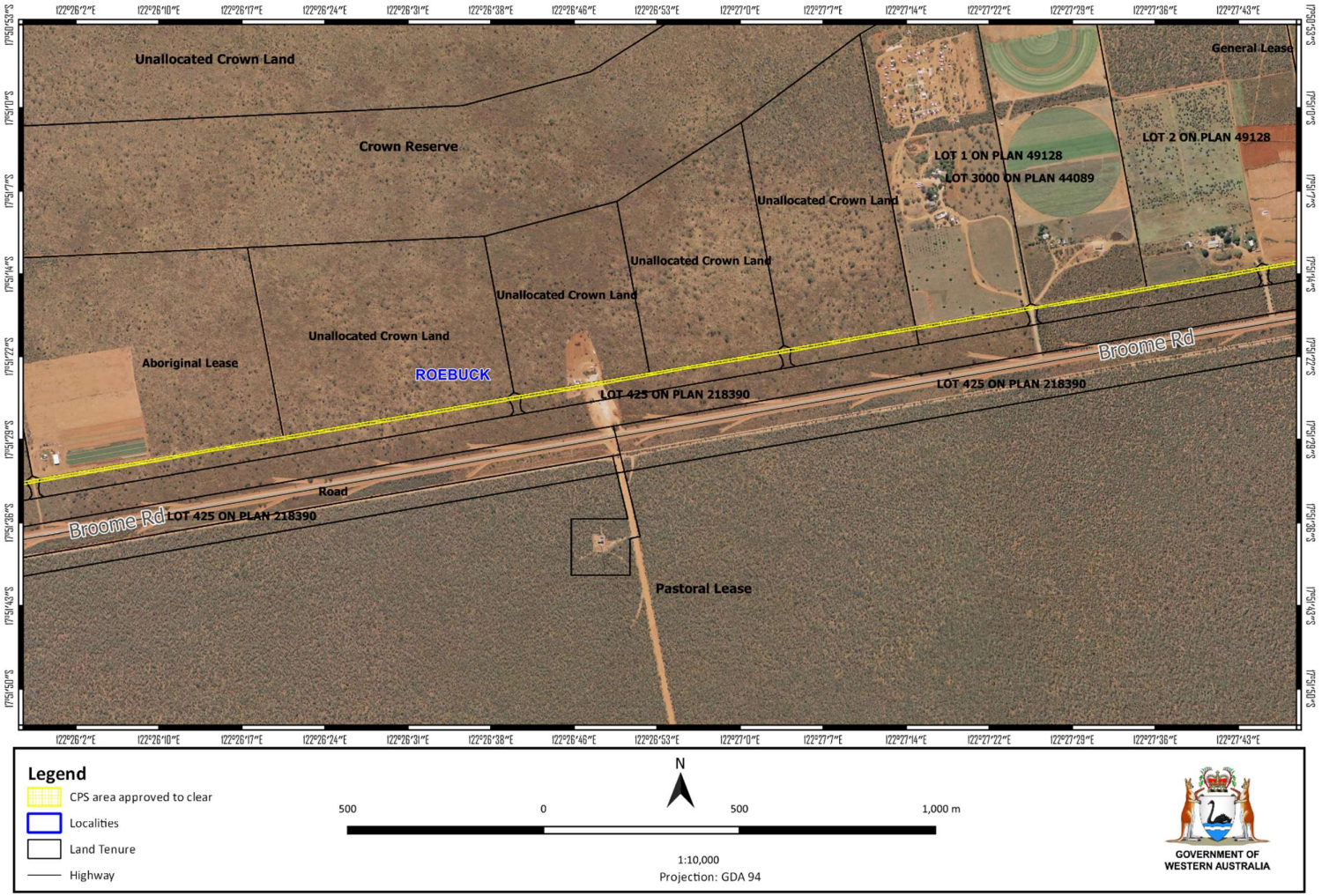

Figure 1c Map of the application area

The area cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Figure 1 (d)

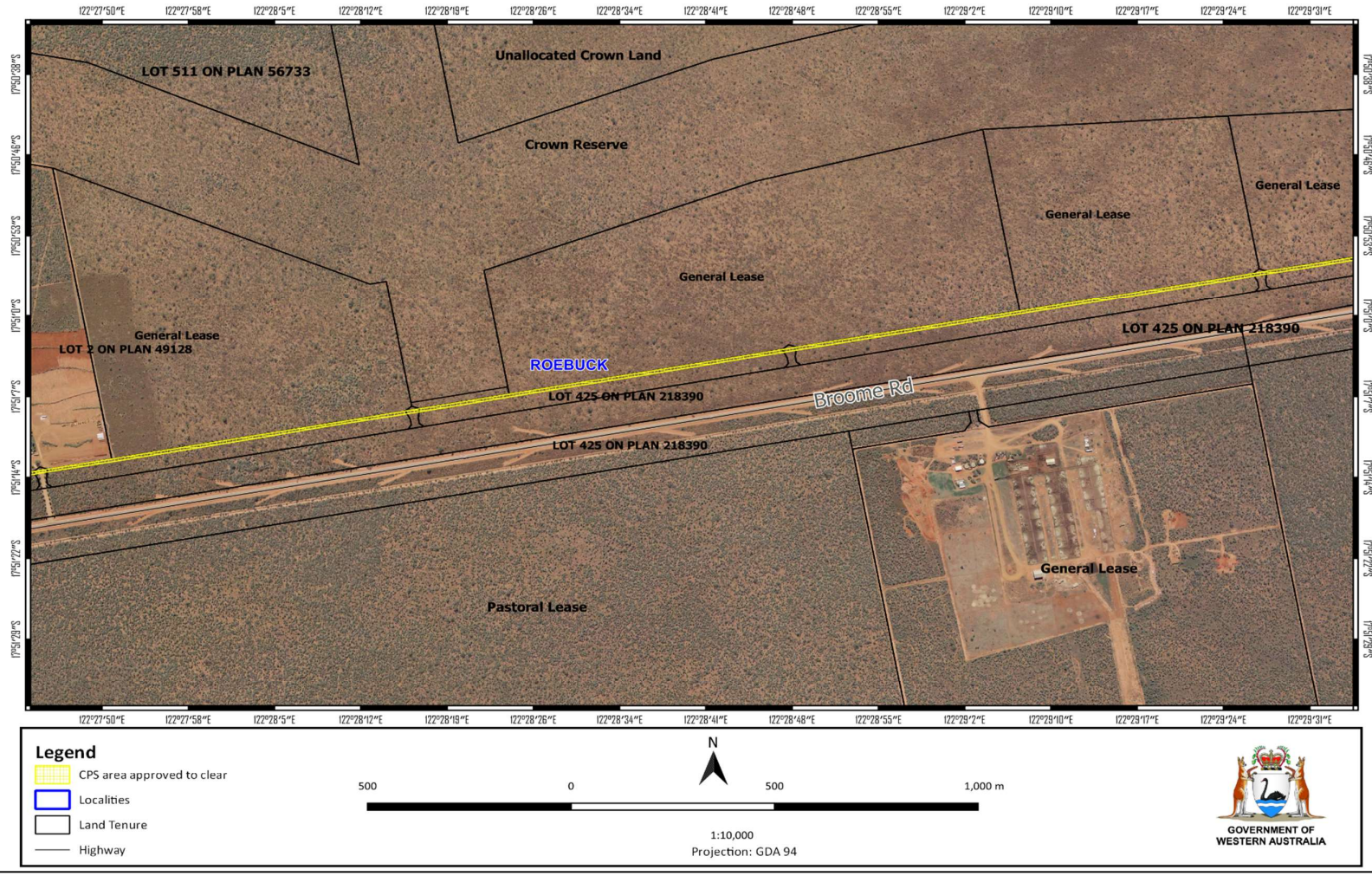

Figure 1d Map of the application area

The area cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit

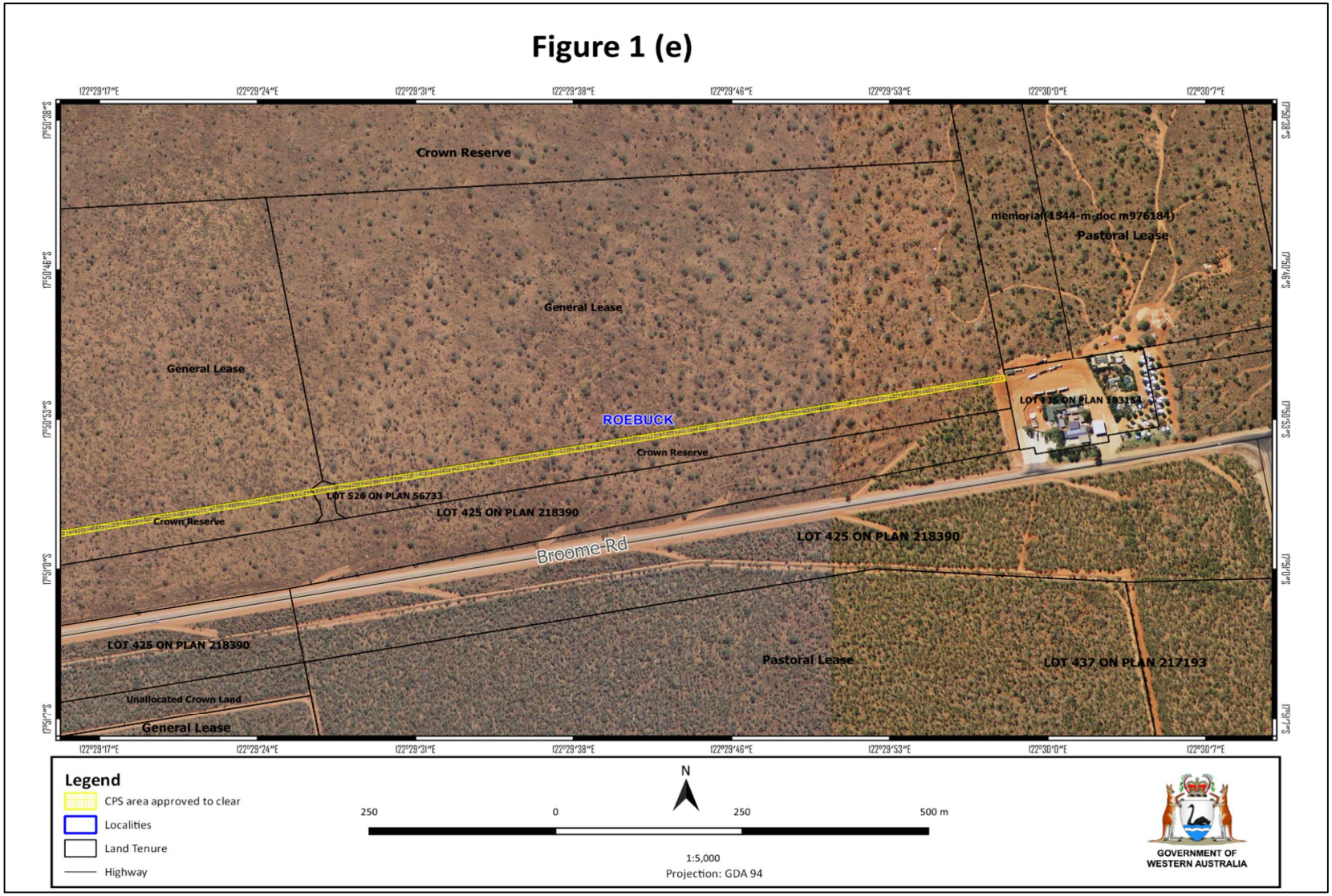

Figure 1d Map of the application area

The area cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Soil and Land Conservation Act 1945* (WA)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Horizon Power has advised the department that the majority of the vegetation within the application area has already been cleared for fire breaks for the neighbouring farms and properties and the actual clearing proposed by Horizon Power could be less than the proposed nine hectares (Horizon Power, 2022).

In relation to the clearing of the four individual *Terminalia kumpaja*, given the extremely narrow nature of the clearing corridor, and the restrictions Horizon Power encounter in regard to the fence line and bordering private properties, Horizon Power cannot commit to avoid the clearance of these Priority 3 species. As this species is a large tree, it has the potential to interfere with the power poles and the overhead lines, creating a potential fire hazard (Horizon Power, 2022).

The department has raised with Horizon Power the option of pruning as an alternative to complete removal and Horizon Power informed the department that pruning cannot be considered in this situation as the risk of fire hazard still remains. Horizon Power will endeavour to retain individuals of this species if they fall outside of the safe maintenance zone of the overhead line. Information, including pictures will be provided to the contractor who is undertaking the work, to ensure contractors are able to identify and avoid clearing of the Priority species where possible.

The Delegated Officer was satisfied that the applicant has undertaken reasonable measures to avoid and minimise potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological or land and water resource values.

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a risk to biological values (fauna and flora) and land degradation. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values - Clearing Principle (a)

Assessment

The proposed clearing area is within the Dampierland bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA). The application area is located over the Pindan woodland vegetation association 750 described as

acacia thicket with eucalypt woodland over spinifex *Acacia tumida*, *Eucalyptus tectifica, Corymbia grandifolia, Triodia pungens* and *T. bitextura*.

The application area is a long, linear strip of approximately 13 kilometres of vegetation and is part of an expansive tract of native vegetation. A detailed flora, vegetation and fauna survey (referred to as 'the survey' throughout the report) was conducted by 360 Environmental from 16 November 2021 to 19 November 2021. The survey was undertaken over a large area (approximately 67.5 hectares) encompassing the application area. The purpose of the survey was to identify key biological values within the application area (360 Environmental, 2022a).

The survey identified one vegetation type across the survey area, which is the mixed acacia shrubland, described as *Corymbia greeniana, Bauhinia cunninghamii* and *Brachychiton diversifolius* subsp. *diversifolius* low isolated to sparse trees over *Acacia eriopoda* tall open shrubland over *Sorghum* sp. mid sparse to open tussock grassland and *Triodia schinzii* mid sparse to open hummock grassland. The area also included some rehabilitation with *Corymbia greeniana* low isolated trees over mixed acacia (*A. eriopoda*, *A. tumida*) tall open shrubland over *Sorghum* sp. mid open tussock grassland and planted non-native garden vegetation (360 Environmental, 2022a).

The vegetation condition (Trudgen, 1991) throughout the survey area varied from Completely Degraded (Trudgen, 1991) to Excellent (Trudgen, 1991) condition with the majority of the survey area containing vegetation of Excellent (Trudgen, 1991) to Very Good (Trudgen, 1991) condition. Evidence of disturbances included the presence of weeds, litter and infrastructure (360 Environmental, 2022a). Although the condition of the vegetation within the survey area is mapped as Excellent to Vey Good condition (Trudgen, 1991), according to Horizon Power, the majority of the application area falls within cleared land for fire breaks, neighbouring farms and properties (Horizon Power, 2022).

The native vegetation identified within the application area does not represent a conservation significant ecological community (360 Environmental, 2022a) and according to the available databases, no conservation significant ecological communities are mapped over the application area.

Flora

According to the available databases, 21 priority flora listed by the Department of Biodiversity, Conservation and Attractions (DBCA) and one threatened flora listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Biodiversity Conservation Act 2016* (BC Act) were identified within the 50-kilometre radius of the application area. Twenty of the 22 records were identified over ten kilometres from the application area. Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and those present within the application area, it was determined that four flora species have the likelihood of occurrence over the application area. These species are *Aphyllodium glossocarpum, Glycine pindanica, Jacquemontia* sp. Broome (A.A. Mitchell 3028) and *Terminalia kumpaja*. The survey recorded a total of 55 taxa from 44 genera across 25 families. A total of six introduced flora species were recorded within the survey area but none of the introduced taxa were identified as a weed of national significance (360 Environmental, 2022a). None of the above listed flora species or any other flora taxa identified from the local area have been previously mapped over the application area.

The species identified as having a likelihood of occurrence over the application area are considered below.

- *Aphyllodium glossocarpum* (Priority 3): The Florabase website (WAH, 1998-) describes this species as a spreading or erect shrub, approximately one to two metres high and known to flower between April to October, growing in sand and associated with pindan vegetation. Florabase indicates that this species is known from seven recorded populations. The nearest record is approximately 15.14 kilometres from the application area. The recorded species are over the same broad scale vegetation type as the application area, however, not within the same soil type and two records are restricted to wetland/dampland areas. Information from the survey (360 Environmental, 2022a) indicates that the *Aphyllodium glossocarpum* has a medium likelihood to occur within the application area. However, the flora survey did not identify this species over the survey area.

- *Glycine pindanica* (Priority three): The Florabase website (WAH, 1998-) describes this species as a prostrate or scrambling perennial, herb or climber known to flower in February to March June, growing in pindan soils. Florabase indicates that this species is known from 19 recorded populations. The nearest record is approximately 9.19 kilometres from the application area. Information from the survey (360 Environmental, 2022a) indicates that the *Glycine pindanica* has a low likelihood to occur within the application area. The survey did not identify the species over the survey area.

- *Jacquemontia* sp. Broome (A.A. Mitchell 3028) (Priority 1): The Florabase website (WAH, 1998-) describes this species as a creeping herb that grows to around 0.3 metres, known to flower in April, growing in pindan soils. Florabase indicates that this species is known from nine recorded populations. The nearest record is

approximately 7.29 kilometres from the application area. Information from the survey (360 Environmental, 2022a) indicates that the *Jacquemontia* sp. Broome (A.A. Mitchell 3028) has a medium likelihood to occur within the application area. it is also noted that a previous survey which was undertaken within the 50-kilometre radius of the application area identified a total of three populations and 365 individuals of *Jacquemontia* sp. Broome (A.A. Mitchell 3028). The survey did not identify the species over the survey area.

The department notes that the flora survey was undertaken during November which is outside of the optimum survey period for the Dampierland Bioregion. However, considering the approach undertaken to identify the species, the department is confident that if conservation significant flora was to occur over the application area, these would have been identified by the qualified botanist and taxonomists. The species identification approach includes where field identification of plant taxa was not possible, specimens were collected for identification using resources of the Western Australian Herbarium (WAH) and identification of flora collections was completed by an experienced taxonomist at the WAH and WAH specialists were consulted for difficult specimens (360 Environmental, 2022a).

No threatened flora species pursuant to the EPBC Act or listed as threatened under the BC Act 2016 were recorded during the survey. The survey identified one priority flora species within the application area, being, *Terminalia kumpaja.* Four individuals of this species were recorded from a single location among the mixed acacia shrubland within the centre of the application area (360 Environmental, 2022a).

Terminalia kumpaja is a small tree growing in sandy soil along the coast of the Dampier Botanical District up to a height of six metres (WAH, 1998-). According to the available databases, six records of this species have been identified within a 50-kilometre radius, with the nearest record approximately 11.63 kilometres from the application area. The Florabase website (WAH, 1998-) indicates that this species is known from a total of 22 recorded populations. Suitable habitat for this species extends into surrounding areas and is not locally restricted to the application area.

Advice from DBCA was sought in regard to the clearing of the *Terminalia kumpaja* individuals. DBCA provided comments on the findings of the survey and advised that if cumulative impacts are considered and if species identified in other locations within the 50-kilometre radius buffer no longer persist, then the clearing of the four *T. kumpaja* individuals is likely to result in a significant impact at a local and a regional level. The DBCA further advised that as *T. kumpaja* is known from 22 locations over a range of 275 kilometres, the loss of four plants is not considered significant to the conservation of the species and appropriate management measures to mitigate the secondary impacts should be considered. The advice also included that any additional plants of *T. kumpaja* located during the clearing should be avoided (DBCA, 2022) if possible. The department has imposed a condition on the permit which requires *Terminalia kumpaja* to be demarcated by the permit holder to avoid impacts on this species where possible.

Based on the above and given that additional individuals of *Terminalia kumpaja* are likely to occur outside of the application area given the similar habitat extending into the larger surroundings, the Delegated Officer has determined that the clearing of the four individuals of *T. kumpaja* will not lead to a significant residual impact.

Weed
The survey identified a total of six weed species over the survey area and the survey has noted that additional weed species and abundance could be recorded following significant rainfall and with systematic searching (360 Environmental, 2022a).

Weeds have the potential to out-compete native flora and reduce the biodiversity of an area. Potential impacts to biodiversity of the adjacent native vegetation as a result of the introduction and spread of weeds may be minimised by the implementation of a weed management condition.

Fauna
Two broad fauna habitat types (excluding cleared areas and garden vegetation) have been identified within the survey area. The two fauna habitats included the acacia shrubland and the rehabilitated acacia shrubland (360 Environmental, 2022a).

The potential impact to fauna as a result of the proposed clearing is further discussed in section 3.2.2 of the report.

Conclusion

The native vegetation proposed to be cleared comprise of vegetation types and flora taxa typical to the region. Noting the size and context of the proposed clearing, avoidance and minimisation condition imposed on the permit and the findings from the above assessment, it is unlikely the proposed clearing will have a significant residual impact on the biological diversity.

It is noted that weeds have the potential to out-compete native flora and vegetation and reduce the biodiversity of an area. Potential impacts to biodiversity as a result of the introduction and spread of weeds may be minimised by the implementation of a weed management condition.

Condition
To address above impacts, the following management measures will be required as conditions on the clearing permit:

- implement weed management measures, to mitigate the risk of the introduction and spread of weeds into adjacent vegetation.
- avoid and minimise clearing wherever possible.

3.2.2. Biological values (fauna) - Clearing Principle - (b)

Assessment
The fauna survey identified two fauna habitat types over the application area which are listed below. A detailed description of the fauna habitats is included in Appendix E. Habitat condition remained consistent throughout the survey area, with the most prolific disturbances being clearing and weeds (360 Environmental, 2022a). The major fauna habitat mapped over the application area is the acacia shrubland (covering 66.80 per cent of the survey area) which provides habitat for native birds, mammals and reptiles.

According to the available databases, 97 conservation significant fauna species within the 50-kilometre radius buffer of the application area (excluding the area which extended into the ocean) were recorded, including 74 birds, one fish, 12 mammals and ten reptiles. The majority of the birds identified from the local area are avian migratory birds protected under international agreement, which are associated with aquatic habitats and breed in northern latitudes. Noting the absence of wetlands or major watercourses within the application area, the proposed clearing is not likely to have a significant impact on the identified migratory birds or any other aquatic species identified from the local area. The closest species identified was the *Macrotis lagotis* (Bilby, dalgyte, ninu), approximately 0.26 kilometres from the application area.

The department's likelihood of occurrence assessment identified that ten conservation significant fauna species identified from the local area has the potential to occur over the application area and required further consideration. The following assessment is based on the habitat requirements, distribution, mapped vegetation types and condition of the vegetation as well as the findings of the survey.

- *Apus pacificus* (fork-tailed swift) – Migratory (MI)
- *Lagorchestes conspicillatus leichardti* (Spectacled hare-wallaby (mainland) – Priority 4 (P4)
- *Elanus Scriptus* (Letter-winged kite) – Priority 4 (P4)
- *Macrotis lagotis* (Greater Bilby, Dalgyte) – Vulnerable (VU)
- *Falco hypoleucos* (Grey Falcon) - Vulnerable (VU)
- *Falco peregrinus* (Peregrine Falcon) – Other specially protected (OS)
- *Lerista separanda* (Dampierland plain slider) – Priority 2 (P2)
- *Simoselaps minimus* (Dampierland burrowing snake) – Priority 2 (P2)
- *Varanus sparnus* (Dampier Peninsula goanna) – Priority 1 (P1)
- *Tyto novaehollandiae* Kimberli (Masked owl (northern)) – Priority 3 (P3)

Class: Bird

Falco peregrinus (Peregrine falcon) may regularly overfly the application area. According to the Australian Museum, the Peregrine Falcon 'is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites and prefers coastal and inland cliffs or open woodlands near water and may even be found nesting on high city buildings. This species is widespread and highly mobile and is found in various habitats (Australian Museum, 2019). The biological survey did not identify any evidence of the Peregrine falcon (360 Environmental, 2022). It is likely that the Peregrine falcon may overfly the application area but based on the habitat preference and the large home range of this bird, the proposed clearing will not have a significant impact on the Peregrine falcon.

Falco hypoleucos (Grey falcon) is identified from seven locations within the 50-kilometre radius buffer. The Grey falcon is associated with lowland plains, particularly acacia shrublands crossed by watercourses in arid to semi-arid Australia; preys on other bird species including doves, pigeons, parrots and cockatoos; breed from June to November

in nests within tall trees along watercourse (DCCEEW, n.d). Given no watercourses are mapped within the application area, it is unlikely the vegetation proposed for clearing will provide core habitat for this species. The Grey falcon may utilise the application area as a hunting ground but due to the mobile nature, no impact to this species will occur from the proposed clearing.

The Masked owl was recorded twice (in 1906 and 1909) within the local area. Noting the lack of recent records for this species and that the Masked owl is a highly mobile avian species, the proposed clearing is not likely to significantly impact on this species. Similarly, noting that the Letter-winged kite and the fork-tailed swift are highly mobile avian species with large home ranges, the proposed clearing is considered unlikely to significantly impact on these species.

Class: Mammal

The *Macrotis lagotis* (Bilby) is known from 1035 records within the local area and largely occupies three major vegetation types; open tussock grassland on uplands and hills, mulga woodland or shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas. The distribution of the greater Bilby is highly fragmented in Western Australia (Commonwealth of Australia, 2019). Bilbies are found in a range of habitats from arid rocky soils with little ground cover to semi-arid shrublands and woodlands (DCCEEW, n.d). The closest record was identified 10.36 kilometres from the application area. Bilbies are known to emerge after dark to forage for food. The biological survey did not identify evidence of bilby activity (footprint, scats and digging) within the survey area (360 Environmental, 2022a). While this species was not identified within the survey area, it may transiently occur on site given the high mobility of the species and the habitat suitability of the application area.

No sightings or secondary signs (burrows, tracks and scats) of the Bilby were recorded during the survey (360 Environmental, 2022a). However, given the numerous recordings of the Bilby within the surroundings, this species may use habitat over the application area for foraging and shelter. The survey has determined that the soils within the survey area are a sandy loam, suited to the deep, complex burrows the species uses for daytime shelter and Bilby indicator species were present in the survey area (360 Environmental, 2022a).

The DBCA provided comments on the assessment findings and advised that whilst the nearby highway may discourage Bilbies from utilising the area, there have been a number of confirmed records within a ten-kilometre buffer and the mixed acacia shrubland is potentially suitable habitat. There is potential for Bilbies to move into the application area prior to clearing. Therefore, the proposed clearing may have a direct impact to individuals, particularly via mortality during the clearing process. The DBCA concluded that to ensure compliance with the BC Act, a pre-clearance survey is recommended. According to the DBCA and the department's assessment, a Bilby pre-clearance survey(s) should also include searches for other conservation significant species (DBCA, 2022). It is also recommended that clearing activities are conducted slowly, in one direction and the proposed clearing is limited to daylight hours as the Bilby is known to be active during the night.

The *Lagorchestes conspicillatus leichardti* (Spectacled hare-wallaby) is known in the local area from 399 locations. This species is uncommon in Western Australia and exists in a few isolated populations within the Pilbara and Kimberly regions. This species occupies a wide variety of habitat types including open forests, open woodlands, tall shrublands, tussock grassland and hummock grasslands. In the drier southern parts of its range in WA, it commonly occupies spinifex (*Triodia* sp.) sandplains interspersed with low shrubs and a diversity of soft grasses, sedges, or forb species (Winter et al, 2016). The preferred habitat for this species is poorly understood. However, suitable habitat for this species may occur within the application area. It is also understood that the Spectacled hare-wallabies are agile and would be expected to move away from clearing activities, and any impact to this species is likely to be minimal. The fauna survey did not identify evidence of this species. Noting that this species may occur over the application area, potential impacts to this species will be mitigated through the condition for directional clearing and the fauna spotter/handler being on site during the clearing activities.

Class: Reptile

There is relatively little available information regarding the Dampierland plain slider and Dampierland burrowing snake, however noting that there are relatively recent records of these species within the local area and the species are associated with pindan woodlands in Dampierland bioregion, it is considered that these species have a potential to utilise the application area. These species may be susceptible to mortality if present during the clearing activities, therefore, a directional clearing condition and a pre-clearance survey is conditioned on the permit to mitigate potential significant impact to these species.

The Dampier peninsula goanna was not identified during the fauna survey. The preferred habitat for this species is within pindan shrubland and it is known to be an active burrower in captivity and is likely to shelter under hard objects on the round or within spinifex or other dense shrubs and therefore has limited ability to disperse (Doughty, P. & Shea, G, 2018). The closest record of this species was identified 26.68 kilometres from the proposed application area. Given the very narrow, long, linear shape of the application area, it is considered unlikely the species will be utilising the application area. However, it is recommended that during the pre-clearance survey this species is also taken into consideration.

A basic fauna survey was undertaken in November 2021 and no conservation significant fauna species, or evidence of species such as tracks, scats, nest, digging, burrows or direct sightings were recorded within or directly surrounding the survey area. No scats, tracks, burrows, or diggings of the Bilby (*Macrotis lagotis*) were detected during the fauna survey (360 Environmental, 2022a).

Conclusion

It is determined that the fauna habitat types identified within the survey area are well connected and forms part of a largely contiguous landscape. The fauna habitats of the survey area are part of a much larger area of similar habitats within the local area and the surrounding region (360 Environmental, 2022a).

It is considered that the impacts of the proposed clearing on Bilby can be managed by slow directional clearing to allow fauna to move into adjacent vegetation, undertaking a pre-clearance survey and having a fauna spotter on site during the clearing activities to direct the fauna into adjacent vegetation.

Based on the above assessment, the delegated officer has determined that the proposed clearing is not likely to result in a significant residual impact on conservation significant fauna. The proposed clearing may result in injury to fauna individuals if present during the clearing activities, with conditions imposed on the permit to mitigate this risk. The conditions imposed on the clearing permit and the proposed clearing being located within a narrow corridor will have a minimal impact on fauna habitat availability as there are other larger similar or better-quality habitat locations immediately adjacent to the clearing corridor (360 Environmental, 2022b).

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity will minimise impact to individuals.
- targeted bilby pre-clearance survey(s) must be undertaken prior to any vegetation clearing. These surveys will also search for other conservation significant species.
- .
- ensure the presence of an appropriately qualified and authorised fauna specialist during clearing activities.

3.2.3. Land and water - Clearing Principles (g)

Assessment

The application area is located within the Yeeda land system, described as red sandplain supporting pindan vegetation with dense acacia shrubs, scattered bloodwood and grey box trees over curly spinifex and ribbon grass (DPIRD, 2019).

It is likely that the proposed clearing may lead to land degradation in the form of water erosion during a high intensity rainfall event. This region is known to experience episodic high intensity rainfall event, especially during the accumulation of rainfall over the wet season. There is also a risk of increased wind erosion causing land degradation, should the surface soils within the application area be exposed post-clearing (DPIRD, 2019). However, given the narrow, linear nature of the proposed clearing with consideration that the purpose of clearing is for installation of power poles for an overhead power line, it is not likely that the proposed clearing will lead to appreciable land degradation.

Horizon Power has advised the department that Horizon Power actively manages the erosion in the vicinity of its assets due to the potential safety risks associated with integrity of its assets, for example pole stability and access for maintenance and faults. Horizon Power conduct six monthly vegetation / asset inspections and this would mitigate the risk of any ongoing erosion continuing should a significant rain event have any impact on the integrity of the land from an erosion perspective. Management practices after construction include maintaining a vegetation groundcover, managing surface water flows such as drainage, runoff and undertaking regular inspections (Horizon Power, 2022).

Conclusion

Whilst erosion can be expected in a high rainfall region, given the nature of the clearing and the implementation of mitigation and ongoing management measures, erosion issues are not likely. Most importantly, the nature of the clearing being a linear shape, with one side being protected by a buffer zone, and the other from vegetated freehold lots, the area is considered to be protected (360 Environmental, 2022b). The Delegated Officer determined that the risk of wind and water erosion can be mitigated through a condition to minimise the length of exposure of soils to wind and water erosion.

Condition

To mitigate any potential land degradation, the following management measures will be required as a condition on the clearing permit:

- The proposed work is to be undertaken no later than two months after the clearing.

3.3. Relevant planning instruments and other matters

The Shire of Broome advised the department that local government approvals are not required, and that the proposed clearing is consistent with the Shire's Local Planning Scheme. The Shire did not have any objections to the proposed clearing (Shire of Broome, 2022).

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

Appendix A. Additional information provided by applicant

Information	Description
Flora, vegetation and fauna survey (360 Environmental, 2022a)	Horizon Power commissioned 360 Environmental to undertake a flora, vegetation and fauna survey for the Broome to Skuthorpe Line Extension. The survey was undertaken from 16 November to 19 November 2021 (360 Environmental, 2022a).
Clearing permit application supporting document (360 Environmental, 2022b)	On behalf of Horizon Power, 360 Environmental compiled a document which provided a summary from the flora, vegetation and fauna survey and 360 Environmental undertook their own assessment against the clearing principles (360 Environmental, 2022b).

Appendix B. Site characteristics

B.1. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to the department at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix C.

Characteristic	Details
Local context	The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia, approximately 12 kilometres northwest of the Broome town centre. The application is located within the Dampierland bioregion and the Pindanland subregion. Aerial imagery and spatial data indicates the local area (50-kilometre radius from the centre of the area proposed to be cleared) retains approximately 99 per cent of the original native vegetation cover.
Ecological linkage	No formal ecological linkages are mapped over the application area, or occur in the vicinity of the application area.
Conservation areas	No conservation areas of significance are mapped within the application area (DBCA-012, DBCA-026). There are numerous un-named conservation areas located approximately 17 kilometres west of the application area.
Vegetation description	Photographs supplied by the applicant within the flora survey indicate the vegetation within the proposed clearing area consists of mixed acacia shrubland (360 Environmental, 2022a). Representative photos and the full survey descriptions and maps are available in Appendix E. The broad mapped vegetation type over the application area is: • Beard vegetation association 750, which is described as acacia thicket with eucalypt woodland over spinifex *Acacia tumida, Eucalyptus tectifica, Corymbia grandifolia, Triodia pungens, T. bitextura* (Shepherd et al, 2001) The mapped vegetation type retains approximately 99 per cent of the original extent (Government of Western Australia, 2019).
Vegetation condition	Photographs supplied by the applicant within the flora survey (360 Environmental, 2022a) indicate the vegetation within the survey area ranged from Degraded to Excellent

Characteristic	Details
	(Trudgen, 1991) condition. The majority of the vegetation was in Very good – Excellent (Trudgen, 1991) condition. The full Trudgen (1991) condition rating scale is provided in Appendix D. Representative photos and the full survey descriptions and mapping are available in Appendix E.
Climate and landform	The Dampierland IBRA bioregion has a semi-arid to tropical monsoonal climate, receiving much of its rainfall during December to March with a mean annual rainfall of 614.6 millimetres. The application area falls within the Yeeda (335Ye) soil landscape system which is a widespread land system and is well represented through the Pindaland subregion of the Dampierland bioregion. The landform is described as sandplain and dunefields with little organised drainage; sandplain up to 16 kilometres in extent, with shallow valleys, plains with thin sand cover, and scattered pans; with limited surface drainage in zones of sheet-flow up to 3.2 kilometres wide and extending up to eight kilometres downslope from adjacent uplands. The application area is relatively flat (DPIRD, 2019).
Soil description	The soil is mapped as sandplain, deep red and yellow sands supporting pindan and tall woodlands (DPIRD, 2019).
Land degradation risk	The mapped soil type is generally not prone to land degradation or erosion unless during a high rainfall event. Although the water erosion risk is mapped as low, water erosion is likely to occur during the episodic high rainfall typically experienced in the region, especially during the accumulation of rainfall over the wet season. Wind erosion may occur if the application area is being exposed post-clearing.
Waterbodies	The application area is within the Cape-Leveque Coast Basin (DPIRD-069). The desktop assessment and aerial imagery indicated that no natural watercourses or wetlands transect the area proposed to be cleared. The Roebuck plains system which is mapped Directory of important wetland in Australia is located approximately five kilometres south of the application area. This area is also mapped as an inundation area.
Hydrogeography	The proposed application area falls within the Broome Groundwater Area, proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act) (DWER-034). The applicant has no intention to abstract groundwater. Application area does not fall within an area subject to *Country Areas Water Supply Act 1947* and does not fall within a proclaimed surface water area under the RIWI Act, nor does it occur within a Public Drinking Water Source Area. Groundwater salinity level (Total Dissolved Solids) is mapped as less than 500 milligrams per litre, which is considered fresh (DWER-026).
Flora	The desktop assessment identified 22 flora records within the local area which include 21 priority species and one threatened species. The closest species, *Jacquemontia* sp. Broome (A.A. Mitchell 3028), which is a Priority 1 species was identified 7.29 kilometres from the application area. The Priority three flora species *Terminalia Kumpaja* was recorded within the survey area.
Ecological communities	The application area is not mapped within a conservation significant ecological community, with the closest mapped being the Priority three, Kimberley Vegetation Association 73, located approximately 4.3 kilometres south of the application area. The application area is not considered to be representative of a Threatened Ecological Community or a Priority Ecological Community.

Characteristic	Details
Fauna	The desktop assessment identified 97 conservation significant fauna species within the local area, including of 74 birds, one fish, 12 mammals and ten reptiles. The closest species identified to the application area was the *Macrotis lagotis* (Bilby, dalgyte, ninu), approximately 0.26 kilometres away. The fauna survey did not identify evidence of conservation listed species within the application area (360 Environmental, 2022a).

B.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Dampierland	8,343,944.95	8,319,879.14	99.71	142,055.31	1.70
Vegetation complex					
Beard vegetation association 750 *	1,229,182.16	1,225,280.52	99.68	34,114.53	2.78

*Government of Western Australia (2019)

B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Did survey identify? [Y, N, N/A]
Aphyllodium glossocarpum	P3	Y	15.14	2	N
Glycine pindanica	P3	Y	9.19	18	N
Jacquemontia sp. Broome (A.A. Mitchell 3028)	P1	Y	7.29	8	N
Terminalia kumpaja	P3	Y	11.63	6	Y

B.4. Fauna analysis table

Given the distance from the coast and the absence of a major watercourse over the application area, species classified as migratory shorebirds, terns and species aquatic in nature have been excluded from the fauna analysis table below.

Species scientific name	Species common name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Year of the most recent record	Did survey identify ? [Y, N, N/A]
BIRDS							
Apus pacificus	Fork-tailed Swift, Pacific Swift	MI	Y	0.51	90	2015	N
Elanus scriptus	Letter-winged kite	P4	Y	11.78	3	1994	N
Falco hypoleucos	Grey falcon	VU	Y	12.16	7	2014	N
Falco peregrinus	Peregrine falcon	OS	Y	6.70	36	2015	N
Tyto novaehollandiae kimberli	Masked owl (northern)	P1	Y	17.59	2	1909	N
MAMMAL							
Lagorchestes conspicillatus leichardti	Spectacled hare-wallaby (mainland)	P4	Y	23.66	399	2017	N
Macrotis lagotis	Bilby, dalgyte, ninu	VU	Y	0.26	1035	2019	N
REPTILE							
Lerista separanda	Dampierland plain slider	P2	Y	21.33	11	2009	N
Simoselaps minimus	Dampierland burrowing snake	P2	Y	21.33	5	2009	N
Varanus sparnus	Dampier Peninsula goanna	P1	Y	26.68	7	2017	N

Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared contain four individuals of the Priority three flora species, *Terminalia kumpaja*. The vegetation over the application area also provides suitable habitat for conservation significant fauna species identified from the local area (360 Environmental, 2022a). No significant ecological communities are mapped or likely to occur over the application area.	May be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The area proposed to be cleared may provide suitable habitat for ten species of conservation listed fauna. None of these species, or evidence of these species were identified within the application area (360 Environmental, 2022a). Noting the above and the extent of suitable habitat for these species within the local area, the application area is not likely to be significant for these species. However, given the presence of suitable habitat within the application, there is potential that these species may be present during the clearing activities. A permit condition has been imposed to mitigate this risk.	May be at variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared is unlikely to contain threatened flora species over the application area. It is noted that the threatened species *Seringia exastia* was identified from nine different locations within the 50-kilometres radius local area, with the closest record identified 17.59 kilometres from the application area. All nine records appeared near the coast. According to the Species Profile and Threats Database, the application area does not occur within the *Seringia exastia* distribution map representing likely or potential habitat for the species (DCCEEW, n.d). The survey did not identify records of threatened flora within the application area (360 Environmental, 2022a).	Not likely to be at variance	No
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The area proposed to be cleared does not contains species that can indicate a Threatened Ecological Community (TEC). According to available databases, no TECs are mapped over the application area.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not at variance	No
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of conservation areas mapped within the local area.	Not at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: Given no watercourses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality. The proposed clearing will not impact riparian vegetation.	Not at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are moderately susceptible to wind and water erosion. Noting the extent, location and the linear nature of the application area, the proposed clearing is not likely to have an appreciable impact on land degradation. To further minimise the risk of wind and water erosion, the applicant will be required to commence the proposed work within two months of clearing to reduce the exposure of bare sandy soils.	May be at variance	Yes *Refer to Section 3.2.3, above.*
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: Given no watercourses, wetlands and Public Drinking Water Sources Areas are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Given no watercourses and wetlands are recorded within the application area, the proposed clearing is unlikely to contribute to waterlogging.		

Appendix D. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix E. Biological survey information excerpts and photographs of the vegetation (360 Environmental, 2022a)

Table 9: Vegetation of the Survey Area

Vegetation Type	Description	Coverage	Photograph
Mixed *Acacia* Shrubland	*Corymbia greeniana*, *Bauhinia cunninghamii*, and *Brachychiton diversifolius* subsp. *diversifolius* low isolated to sparse trees over *Acacia eriopoda* tall open shrubland over *Sorghum* sp. mid sparse to open tussock grassland and *Triodia schinzii* mid sparse to open hummock grassland	45 ha, 66.8% of the Survey Area	
Rehabilitation	*Corymbia greeniana* low isolated trees over mixed *Acacia* (*A. eriopoda*, *A. tumida*) tall open shrubland over *Sorghum* sp. mid open tussock grassland.	0.6 ha, 0.89% of the Survey Area	
Planted, non-native garden vegetation	Non-native or garden variety plants, not considered native vegetation.	0.35 ha, 0.52% of the Survey Area	
Cleared	Cleared land for existing tracks and paddocks.	21.46 ha, 31.8% of the Survey Area	

Figure 2: Vegetation type identified over the survey area

4.2.8 Vegetation Condition

Vegetation condition within the Survey Area ranged from Excellent to Degraded, with the vast majority (65.42%) in either Excellent or Very Good condition, and the majority of the remaining areas previously cleared for roads and infrastructure (Table 10, Figure 9).

Evidence of disturbance included clearing for access tracks and fence lines and litter.

Table 10: Vegetation Condition of the Survey Area

Vegetation Condition	Area (ha)	Percentage of Survey Area
Excellent	23.03	33.92 %
Very Good	21.38	31.50 %
Good	1.17	1.72 %
Degraded	1.72	2.53 %
Completely degraded/Cleared	20.57	30.30 %

Figure 3: Vegetation condition identified over the survey area

Table 11: Fauna Habitat Type Descriptions with the Survey Area

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Acacia Shrubland	45.08 ha, 66.80%	*Corymbia greeniana, Bauhinia cunninghamii, Brachychiton diversifolius* subsp. *diversifolius* low isolated to sparse trees over *Acacia eriopoda* tall open shrubland over *Sorghum* sp. mid sparse to open tussock grassland and *Triodia schinzii* mid sparse to open hummock grassland. Peeling bark, termite mounds, and woody debris provide shelter for small reptiles and mammals. Isolated trees provide shelter and foraging habitat for birds. Peregrine Falcons and Pacific Swifts may use this habitat for hunting. Greater Bilbies may use this habitat for foraging and shelter. Vegetation condition impacted by vehicle tracks, litter and the presence of European Cattle and Rabbits.	
Rehabilitation (*Acacia* Shrubland)	0.60 ha, 0.90%	Ripped rehab consisting of *Corymbia greeniana* low isolated trees over mixed *Acacia* (*A. eriopoda*, *A. tumida*) tall open shrubland over *Sorghum* sp. mid open tussock grassland. Peeling bark, termite mounds, and woody debris provide shelter for small reptiles and mammals. Rock piles provide shelter for reptiles. Isolated trees provide shelter and foraging habitat for birds. Peregrine Falcons and Pacific Swifts may use this habitat for hunting. Vegetation condition impacted by vehicle tracks, litter, and clearing.	

Fauna Habitat	Total Area, Proportion of the Survey Area	Habitat Description	Representative Photo
Planted, non-native garden vegetation	0.35 ha, 0.52%	Non-native or garden variety plants, not considered native vegetation. May provide shelter and foraging opportunities to some native fauna species. Increased access to water due to gardens may increase animal abundances.	
Cleared	21.46 ha, 31.80%	Cleared land for existing tracks and paddocks. Limited to no value to native fauna species.	
Total	67.49 ha		

Figure 4: Fauna habitat type identified over the survey area

Figure 5a: Mapped vegetation type identified over the survey area

Figure 5b: Fauna habitat type identified over the survey area

Figure 5c: Mapped vegetation type identified over the survey area

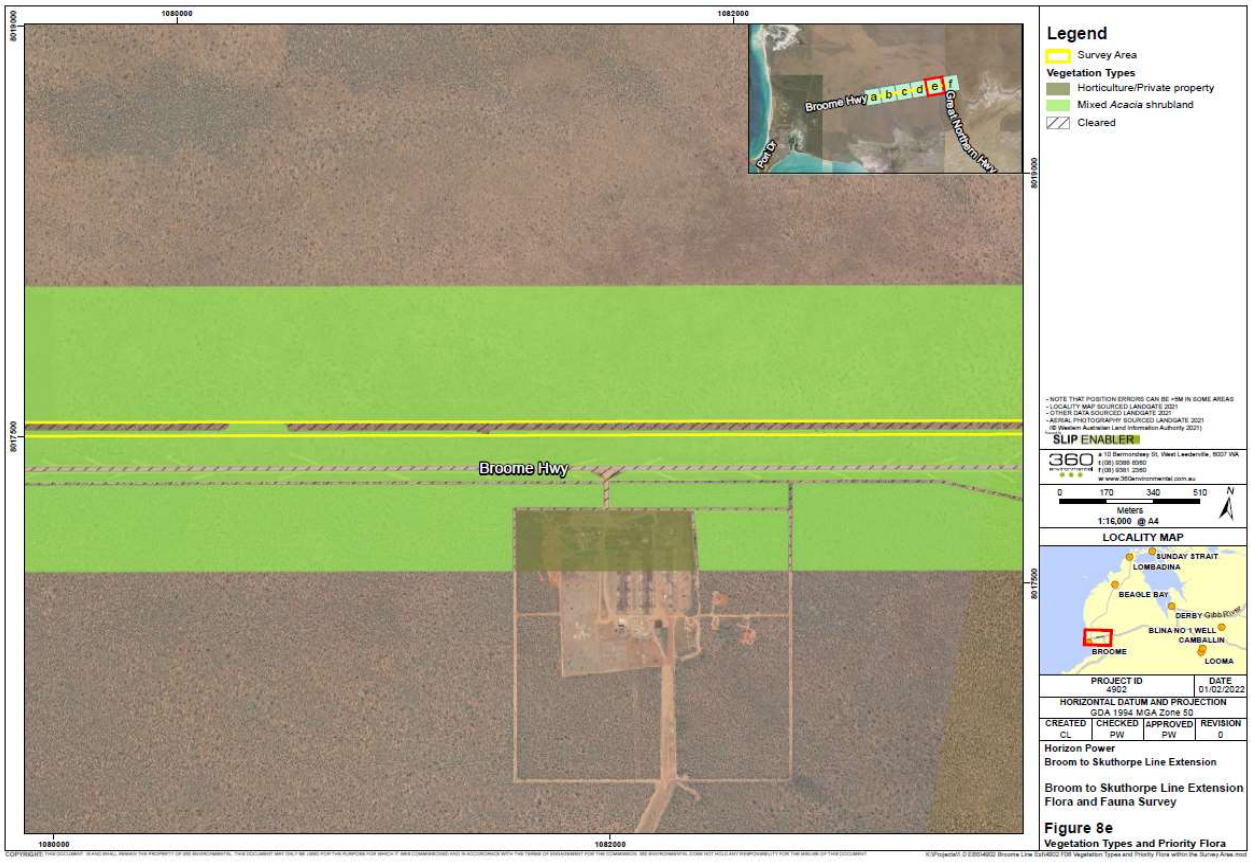

Figure 5d: Mapped vegetation type identified over the survey area

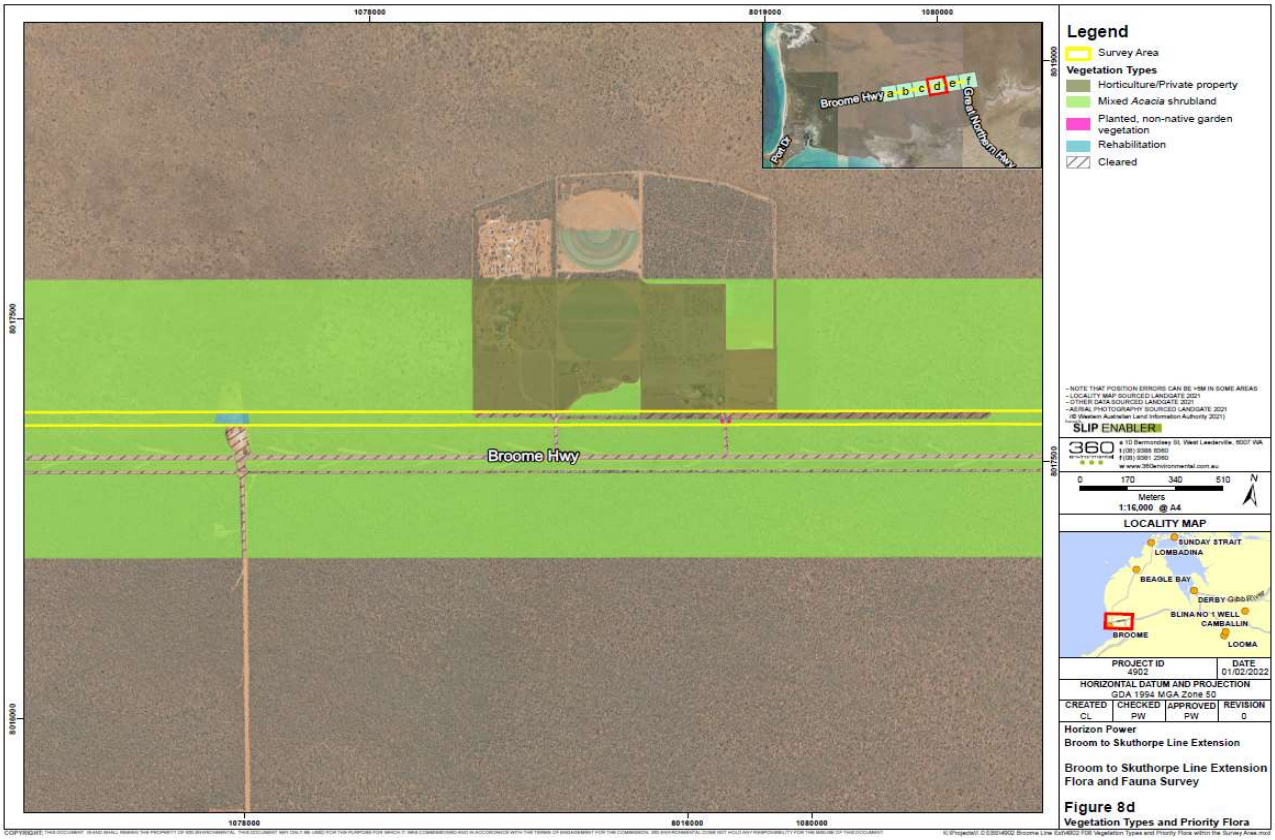

Figure 5e: Mapped vegetation type identified over the survey area

Figure 5f: Mapped vegetation type identified over the survey area

Hab01

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	16/11/2021		**Personnel**	PW	
Zone	50	**Easting** 1083301		**Northing**	8018059
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	None	
Soil type	Sand		**Surface stone cover**		
Soil colour	Orange, Red		**Surface stone size classes present**		
Condition			**Habitat Features**		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	Litter		**Microhabitats**	Leaf litter, Termite mounds, Woody debris	
Introduced fauna	Cattle				
Vegetation					
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Brachychiton diversifolius subsp. diversifolius, Acacia eriopoda, Hakea*		
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia schinzii*		

Fulcrum photo ID [illegible]

Hab02

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	16/11/2021		**Personnel**	PW	
Zone	50	**Easting** 1082396		**Northing**	8017934
Landform and soil			**Rock**		
Landform	Plain		**Rock type/s**	None	
Soil type	Sand		**Surface stone cover**		
Soil colour	Orange, Red		**Surface stone size classes present**		
Condition			**Habitat Features**		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		**Water Source**	Absent	
Disturbance	Litter		**Microhabitats**	Hummocks, Leaf litter, Termite mounds, Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia eriopoda*		
Ground stratum	Tall (1-2 m)	Open hummock grassland (20-50%), Sparse tussock grass	*Triodia schinzii, Sorghum sp.*		

Fulcrum photo ID [illegible]

Hab03

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	16/11/2021		Personnel	PW	
Zone	50	Easting 1081528		Northing	8017805
Landform and soil			Rock		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
Condition			Habitat Features		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Woody debris dumping		Microhabitats	Hummocks, Leaf litter, Termite mounds, Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Corymbia dendromerinx*		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*		
Ground stratum	Tall (1-2 m)	Open hummock grassland (20-50%)	*Triodia schinzii*		

Fulcrum photo ID [illegible]

Hab04

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	17/11/2021		Personnel	PW	
Zone	50	Easting 1080516		Northing	8017656
Landform and soil			Rock		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
Condition			Habitat Features		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Litter		Microhabitats	Hummocks, Leaf litter, Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Brachychiton diversifolius subsp. diversifolius, Acacia eriopoda, Hakea*		
Ground stratum	Tall (1-2 m)	Sparse hummock grassland (0.25-20%), Sparse tussock gr	*Triodia schinzii, Sorghum sp., Eragrostis eriopoda*		

Fulcrum photo ID [illegible]

Hab05

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	17/11/2021		Personnel	PW	
Zone	50	Easting 1079777		Northing	8017545
Landform and soil			Rock		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
Condition			Habitat Features		
Quality	Disturbed				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Clearing, Litter		Microhabitats	Hummocks, Leaf litter, Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Mid (10-30 m)	Isolated trees (<0.25%)	*Corymbia dendromerinx*		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*		
Ground stratum	Tall (1-2 m)	Sparse hummock grassland (0.25-20%), Sparse tussock grassland (0.25-20%)	*Triodia schinzii, Sorghum sp.*		

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Hab06

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	17/11/2021		Personnel	PW	
Zone	50	Easting 1079486		Northing	8017484
Landform and soil			Rock		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
Condition			Habitat Features		
Quality	Highly degraded				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Clearing, Infrastructure, Litter		Microhabitats	Leaf litter, Peeling bark	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Mid (10-30 m)	Open woodland (0.25-20%)	*Corymbia greeniana (Planted)*		
Mid stratum	Absent				
Ground stratum	Absent				

Fulcrum photo ID fb382af6-7d87-4c90-975b-7688f8ae26b9

Hab07

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey		
Date	17/11/2021	Personnel	PW
Zone	50 Easting 1079018	Northing	8017446
Landform and soil		**Rock**	
Landform	Plain	Rock type/s	None
Soil type	Sand	Surface stone cover	
Soil colour	Orange, Red	Surface stone size classes present	
Condition		**Habitat Features**	
Quality	Highly degraded		
Fire History	Burnt (1-5 years)	Water Source	Absent
Disturbance	Clearing, Infrastructure, Litter, Vehicle tracks	Microhabitats	Leaf litter
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Brachychiton diversifolius subsp. diversifolius, Corymbia dendromerinx*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia, mixed shrubs (Rehab)*
Ground stratum	Absent		

Fulcrum photo ID: 820b8abc-59be-45e1-a23a-f40db3e94dbf

Hab08

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey		
Date	17/11/2021	Personnel	PW
Zone	50 Easting 1078599	Northing	8017344
Landform and soil		**Rock**	
Landform	Plain	Rock type/s	None
Soil type	Sand	Surface stone cover	
Soil colour	Orange, Red	Surface stone size classes present	
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Little or no fire evidence (>5 years)	Water Source	Absent
Disturbance	Clearing, Infrastructure	Microhabitats	Leaf litter
Introduced fauna	None observed		

Vegetation			
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Corymbia dendromerinx*
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*
Ground stratum	Tall (1-2 m)	Open hummock grassland (20-50%)	*Sorghum sp.*

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Hab09

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey		
Date	17/11/2021	Personnel	PW
Zone	50 Easting 1077751	Northing	8017234
Landform and soil		**Rock**	
Landform	Plain	Rock type/s	Laterite, Quartz, Sandstone
Soil type	Sand	Surface stone cover	50 - 75%
Soil colour	Orange, Red	Surface stone size classes present	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm)
Condition		**Habitat Features**	
Quality	Disturbed		
Fire History	Little or no fire evidence (>5 years)	Water Source	Absent
Disturbance	Clearing, Litter, Ripping for rehabilitaion, Asbestos, Water monitoring bore	Microhabitats	Leaf litter
Introduced fauna	None observed		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia*
Ground stratum	Absent		

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Hab10

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey		
Date	17/11/2021	Personnel	PW
Zone	50 Easting 1076978	Northing	8017113
Landform and soil		**Rock**	
Landform	Plain	Rock type/s	None
Soil type	Sand	Surface stone cover	
Soil colour	Orange, Red	Surface stone size classes present	
Condition		**Habitat Features**	
Quality	Good		
Fire History	Burnt (1-5 years)	Water Source	Absent
Disturbance	None observed	Microhabitats	Leaf litter
Introduced fauna	None observed		

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia*
Ground stratum	Tall (1-2 m)	Open hummock grassland (20-50, Sparse tussock grasslar	*Triodia schinzii, Eragrostis eriopoda*

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Hab11

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	17/11/2021		Personnel	PW	
Zone	50	Easting	1075809	Northing	8016940
	Landform and soil			Rock	
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
	Condition				
Quality	Good			Habitat Features	
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	None observed		Microhabitats	Leaf litter, Woody debris	
Introduced fauna	None observed				
			Vegetation		
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)		*Corymbia dendromerinx*	
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)		*Acacia tumida, Acacia eriopoda*	
Ground stratum	Mid (0.5-1 m)	Open tussock grassland (20-50%)		*Sorghum sp.*	

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Hab12

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	17/11/2021		Personnel	PW	
Zone	50	Easting	1074937	Northing	8016806
	Landform and soil			Rock	
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
	Condition				
Quality	Disturbed			Habitat Features	
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Clearing, Weeds		Microhabitats	Leaf litter, Termite mounds, Woody debris	
Introduced fauna	None observed				
			Vegetation		
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)		*Acacia, Bauhinia cunninghamii*	
Ground stratum	Mid (0.5-1 m)	Sparse forbland (0.25-20%)		*Trichodesma zeylanicum var. zeylanicum*	

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Hab13

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	18/11/2021		Personnel	PW	
Zone	50	Easting	1073803	Northing	8016629
	Landform and soil			Rock	
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
	Condition				
Quality	Highly degraded			Habitat Features	
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Clearing, Litter, Vehicle tracks, Weeds		Microhabitats	Leaf litter, Woody debris	
Introduced fauna	None observed				
			Vegetation		
Upper stratum	Absent				
Mid stratum	Absent				
Ground stratum	Absent				

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Hab14

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	18/11/2021		Personnel	PW	
Zone	50	Easting	1073272	Northing	8016505
	Landform and soil			Rock	
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
	Condition				
Quality	Good			Habitat Features	
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Clearing, Vehicle tracks		Microhabitats	Leaf litter, Termite mounds, Woody debris	
Introduced fauna	None observed				
			Vegetation		
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)		*Acacia*	
Ground stratum	Tall (1-2 m)	Open hummock grassland (20-50%)		*Sorghum sp.*	

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Hab15

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	18/11/2021		Personnel	PW	
Zone	50	Easting 1072285		Northing	8016354
Landform and soil			**Rock**		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Brown, Red		Surface stone size classes present		
Condition			**Habitat Features**		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	None observed		Microhabitats	Leaf litter, Termite mounds, Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Absent				
Mid stratum	Tall (>2 m)	Shrubland and/or heathland (50-80%)	*Acacia eriopoda*		
Ground stratum	Tall (1-2 m)	Sparse hummock grassland (0.25-20%), Sparse tussock grassland (0.25-20%)	*Triodia schinzii, Sorghum sp.*		

Fulcrum photo ID

Hab16

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	18/11/2021		Personnel	PW	
Zone	50	Easting 1071557		Northing	8016250
Landform and soil			**Rock**		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Orange, Red		Surface stone size classes present		
Condition			**Habitat Features**		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Old fence line		Microhabitats	Leaf litter, Termite mounds, Woody debris	
Introduced fauna	None observed				
Vegetation					
Upper stratum	Low (<10 m)	Isolated trees (<0.25%)	*Corymbia dendromerinx*		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia tumida, Acacia eriopoda*		
Ground stratum	Tall (1-2 m)	Sparse hummock grassland (0.25-20%), Sparse tussock gr	*Triodia schinzii, Sorghum sp.*		

Fulcrum photo ID

Hab17

Project:	Broome to Skuthorpe Line Extension: Flora and Fauna Survey				
Date	18/11/2021		Personnel	PW	
Zone	50	Easting 1070331		Northing	8016012
Landform and soil			**Rock**		
Landform	Plain		Rock type/s	None	
Soil type	Sand		Surface stone cover		
Soil colour	Brown, Red		Surface stone size classes present		
Condition			**Habitat Features**		
Quality	Good				
Fire History	Little or no fire evidence (>5 years)		Water Source	Absent	
Disturbance	Litter		Microhabitats	Leaf litter, Termite mounds	
Introduced fauna					
Vegetation					
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Corymbia dendromerinx*		
Mid stratum	Tall (>2 m)	Open shrubland and/or heathland (20-50%)	*Acacia, Bauhinia cunninghamii*		
Ground stratum	Tall (1-2 m)	Open hummock grassland (20-50%)	*Sorghum sp.*		

Fulcrum photo ID

Figure 6: Fauna habitat assessment

Plate 1: *Terminalia kumpaja* (P3) a) habit and habitat, b) leaves, and c) fruit.

Figure 7: The Priority three species identified from the survey area

Appendix F. Sources of information

F.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics

- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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