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PORT HEDLAND SOLAR PROJECT

**NATIVE VEGETATION CLEARING PERMIT APPLICATION
SUPPORTING INFORMATION**

5 July 2022

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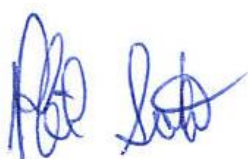

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ATTACHMENTS

Attachment 1: Section 91 Licence

Attachment 2: Letter of Authority – Main Roads Western Australia



1 INTRODUCTION

1.1 PROJECT BACKGROUND

Alinta Energy Development Pty Ltd (Alinta Energy) is proposing to carry out the phased development of a new 90 Megawatt (MW) Alternating Current (AC) solar facility (Port Hedland Solar Farm)(Project) on Unallocated Crown Land (UCL) nearby Alinta Energy's existing Port Hedland Power Station (PHPS). The Project is located approximately 5 kilometres (km) south-west of South Hedland, adjacent to Great Northern Highway in the Pilbara region of Western Australia (WA). Port Hedland is a key regional centre and port located in the Pilbara region of WA. A number of companies operate significant scale iron ore export operations in Port Hedland. These operations require a reliable power supply and more recently, a focus on renewable energy. there is demand for a new solar facility.

Ultimately, the Project will consist of a 90 MW AC solar farm, and a short (~2 km) combined underground and overground connection to the existing PHPS 66 kV switchyard. The Project will supply power to Alinta Energy's 66 kV Port Hedland power system for which Alinta Energy is the network service provider. The 90 MW facility will be developed in phases according to market demands, with the first phase likely to involve the development of a 45 MW facility utilising a 33 kV connection to the existing PHPS switchyard. This connection may be underground, overhead or a combination.

The design for the Project includes:

- Formalised access to the site approximately 770 metres (m) south of the intersection of Great Northern Highway and Boodarie Station Access Road;
- A cyclone ready security fence around the solar panel equipment including security cameras and lighting;
- Up to 220,000 solar panels. These panels will be fixed tilt, cyclone rated and mounted on steel piles;
- Up to 35 km of cabling connecting the solar panels;
- Site offices;
- A 33 kV transmission line from the solar farm to the PHPS site. This will a combination of buried cable and overhead line;
- Approximately 9 km of access tracks;
- Temporary construction compound including site office and amenities, vehicle and plant parking and laydown area; and
- Revegetation / rehabilitation as required.

The existing facilities and amenities at Alinta Energy's PHPS will be used to operate the Project. The Project has a planned 30-year operational life. This time can be extended or adjusted, if required and in accordance with any Crown lease conditions.

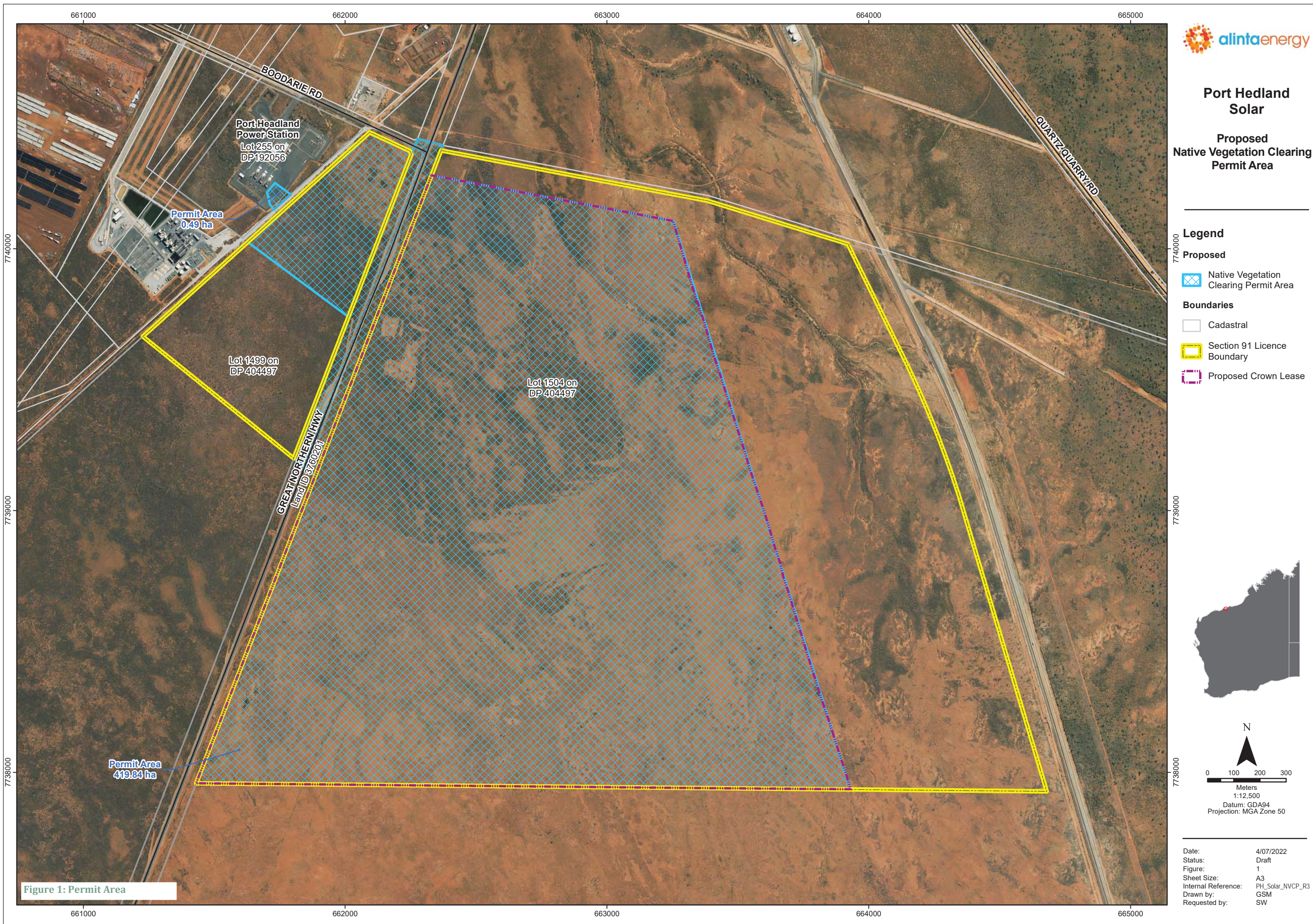
The Project was referred to the Environmental Protection Authority (EPA) on 5 April 2022 and was given a 'Not Assessed' Level of Assessment (CMS18186). The Project was also referred to the Department of Agriculture, Water and the Environment (DAWE) on 9 May 2022 (EPBC 2022/09241). DAWE have not made a formal decision on the referral at this time, however discussions with DAWE suggest the Project is likely to receive a 'Controlled Action' decision based



on potential impacts to Greater Bilby habitat. As residual impacts will require an offset under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), it is proposed that contributions to the Pilbara Environmental Offsets Fund will be required. Contributions will be made for every hectare of disturbed vegetation.

The Project will require up to 200 hectares (ha) of disturbance within a 420.33 ha Permit Area as outlined in Figure 1. The proposed Permit Area is split into two discrete polygons with 419.84 ha (99.88%) of the Permit Area east of Lot 255 DP192056 and 0.49 ha within Lot 255 DP192056.





1.2 PURPOSE

The purpose of this Native Vegetation Clearing Permit (NVCP) application is to seek approval under the *Environmental Protection Act 1986* (EP Act; Part V Division 2) to clear up to 200 ha of native vegetation within the proposed Permit Area (Figure 1) to develop the Project.



2 PERMIT AREA

A Purpose Permit is requested for the Permit Area to provide flexibility for the location of infrastructure and access during construction and operation. Ecological surveys have been undertaken over a Study Area that includes the Permit Area as part of the suite of surveys and studies undertaken for the Project.

2.1 BOUNDARY

Clearing is to be conducted within the boundaries of the Permit Area as shown in Figure 1. Key environmental values were identified in the baseline studies as outlined in Section 4.

2.2 TENURE AND LAND ACCESS

The Permit Area primarily lies within UCL on Lots 1499 and 1504 of Deposited Plan (DP) 404497. Alinta Energy currently holds a Section 91 (S91; Attachment 1) Licence No. 00841/1958_A11289097, which was obtained to enable surveys and investigations on the land being considered for Project. Alinta Energy is working with the Department of Planning, Lands and Heritage (DPLH) to obtain a Crown Lease as an appropriate form of tenure for the construction and operation of the Project. To enable connections between the solar farm and the existing power generation and distribution infrastructure, the Permit Area also intersects easements for transport. These are Lot 255 on DP192056 (Alinta Energy's Power Station) and Great Northern Highway Road Reserve (Main Roads Western Australia (MRWA)). A letter of authority MRWA have been provided as an attachment (Attachment 2).

2.3 NATIVE TITLE

All vegetation disturbance will occur within the Determined Claim Area WAD 6169/1998 of the Kariyarra People. Alinta Energy has an Indigenous Land Use Agreement (ILUA reg. no. WI2018/009) with the Kariyarra People.



3 PROPOSED ACTIVITIES

Clearing is required to facilitate the construction of the Project. Clearing will be required for the following construction activities:

- Formalised access to the site approximately 770 m south of the intersection of Great Northern Highway and Boodarie Station Access Road;
- A cyclone ready security fence around the solar panel equipment;
- Up to 220,000 solar panels. These panels will be fixed tilt, cyclone rated and mounted on steel piles;
- Up to 35 km of cabling connecting the solar panels;
- Site offices;
- A 33 kV transmission line from the solar farm to the PHPS site;
- Approximately 9 km of access tracks; and
- Temporary construction compound including site office and amenities, vehicle and plant parking and laydown area.



4 ENVIRONMENTAL CHARACTERISTICS

Environmental characteristics of the Permit Area relevant to this NVCP are detailed in the following sections. The Permit Area represents 420.33 ha of the Study Area outlined in Figure 2.

4.1 SURVEY DETAILS

Phoenix Environmental Sciences Pty Ltd (Phoenix) conducted a desktop study and detailed survey of the Study Area (Figure 2) to define the terrestrial flora values (Phoenix 2022a). The desktop assessment was completed prior to the field surveys conducted in March (Autumn) 2021 and September (Spring) 2021. Desktop searches of several biological databases were undertaken to identify and prepare lists of significant flora and vegetation that may occur within the Study Area. Desktop searches were conducted within a 40 km radius of the Study Area to provide a regional context for flora and vegetation recorded during the field surveys. Field methods for the flora and vegetation survey included:

- Surveying of quadrats and relevés;
- Targeted flora searches;
- Vegetation type and condition mapping; and
- Threatened Ecological Community (TEC)/Priority Ecological Community (PEC) assessment.

Phoenix noted that there was substantial regional information and collated flora data from numerous regional surveys, however available local reports were limited in number. Additionally, the Study Area was a patchwork of fire scars affecting 48% of the area which means the vegetation is likely to change as it matures.

Phoenix also conducted a desktop study and detailed survey of the Study Area to define the terrestrial fauna values (Phoenix 2022b). Desktop searches of several biological databases were undertaken to identify and prepare lists of significant fauna that may occur within the Study Area. Desktop searches were conducted within a 40 km radius of the Study Area to provide a regional context for fauna recorded during the field surveys. Field methods undertaken during the detailed fauna survey include:

- Habitat assessment;
- Systematic trapping;
- Active diurnal and nocturnal searches;
- Bird surveys;
- Bat echolocation recordings;
- Camera trapping;
- Targeted searches for significant fauna;
- SRE potential habitat rating; and
- SRE invertebrate sampling.

The desktop assessment was completed prior to the field survey which was conducted in March 2021. As Greater Bilby (*Macrotis lagotis*; hereafter Bilby) was originally identified as being likely to occur and evidence of Bilby presence was noted in the detailed survey, a targeted Bilby survey was also conducted by Phoenix during September 2021 to determine the local extent of the



population. The Bilby is classified as Vulnerable (VU) under the *Biodiversity Conservation Act 2016* (BC Act) and EPBC Act.

The survey area for the targeted Bilby survey is shown in Figure 2 (Targeted Survey Area). During this survey, 49 search transects were traversed totalling a combined distance of 123.5 km. There were no limitations identified in the fauna report.



4.2 BIOGEOGRAPHIC REGIONS

The Study Area lies entirely within the Pilbara Bioregion, specifically within the Roebourne Interim Biogeographic Regionalisation of Australia (IBRA) Subregion, bordered by the Chichester IBRA subregion (Figure 3). Subregions have been described in the *Biodiversity Audit of Western Australia's 53 Biogeographical Subregions* (Kendrick & Stanley 2001). The Roebourne subregion covers 2,008,983 ha, and is characterised as:

- Quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas;
- Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite. Islands are either Quaternary sand accumulations, or composed of basalt or limestone, or combinations of any of these three; and
- Climate is arid (semi-desert) tropical with highly variable rainfall, falling mainly in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually (May & McKenzie 2003).

4.3 LAND SYSTEMS

The Study Area is entirely within the Uaroo System and represents less than 1% of the 768,100 ha in the Pilbara Bioregion (Figure 4). This land system is characterised by broad sandy plains, pebbly plains and drainage tracts supporting hard and soft spinifex hummock grasslands with scattered *Acacia* shrubs (Schoknecht & Payne 2011).

4.4 PRE-EUROPEAN VEGETATION

Regional scale vegetation mapping by Shepherd et al. (2002) mapped one vegetation association (589) in the Study Area (Table 1; Figure 5). The remaining pre-European extent of vegetation association 589 exceeds 99% and is therefore considered of Least Concern (Department of Biodiversity, Conservation and Attractions (DBCA), 2018). Table 1 describes the pre-European and current extent of vegetation association 589.

Table 1: Statewide extent of pre-European vegetation associations present in the Study Area

Vegetation association	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent in DBCA lands (%)	% of Study Area
589 - Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex	728,768.20	724,695.82	99.44 %	2.11 %	100%





Figure 3: Study Area in relation to IBRA subregions

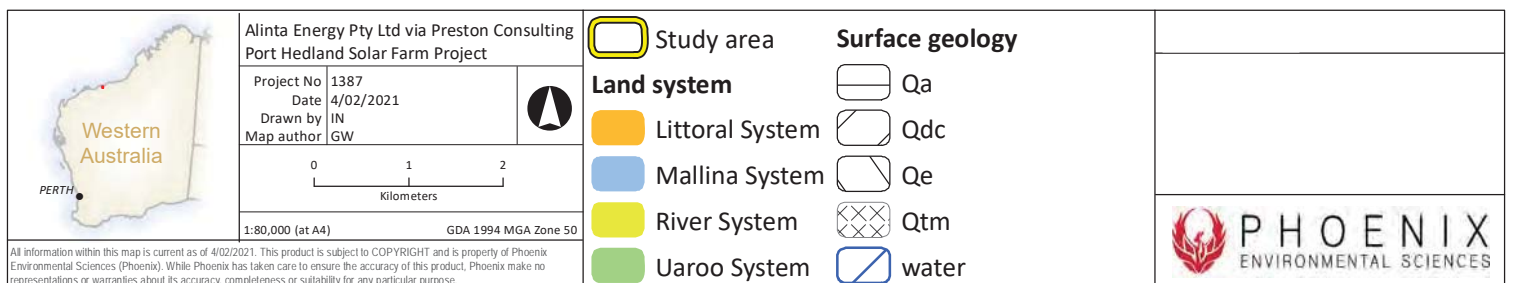
<p>Western Australia</p> <p>PERTH</p>	<p>Alinta Energy Pty Ltd via Preston Consulting Port Hedland Solar Farm Project</p>		<p> Study area</p> <p>IBRA region and subregion</p> <p> Pilbara, Chichester</p> <p> Pilbara, Roebourne</p>	
	<p>Project No 1387 Date 4/02/2021 Drawn by IN Map author GW</p>			<p>0 5 10 Kilometers</p> <p>1:250,000 (at A4) GDA 1994 MGA Zone 50</p>

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Figure 4: Land systems and surface geology in the Study Area.










657640

667600

7745100

7731750

Pre-european vegetation association

-  Bare areas; mud flats
-  Hummock grasslands, dwarf-shrub steppe; Acacia translucens over soft spinifex
-  Hummock grasslands, grass steppe; soft spinifex
-  Hummock grasslands, shrub steppe; kanji over soft spinifex
-  Low forest; mangroves (Kimberley) or thicket; mangroves (Pilbara)
-  Medium woodland; river gum (Eucalyptus camaldulensis)
-  Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex

 Study Area

Figure 5: Pre-European vegetation of the Study Area



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Alinta Energy Pty Ltd via Preston Consulting
Port Hedland Solar Farm Project

Project No 1387

Date 3/12/2021

Drawn by IN

Map author GW



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4.5 FLORA AND VEGETATION

4.5.1 LISTED FLORA

Initial desktop studies conducted by Phoenix identified 14 individual listed flora species recorded within a 40 km radius of the Study Area. This comprised one Threatened (T) flora species listed under both the EPBC Act and BC Act. Thirteen Priority (P) flora species were also recorded. None of these records occurred in the Study Area. An assessment of the likelihood of each of these 14 species occurring in the Study Area was also undertaken. Eight species were considered to possibly occur and six considered unlikely to occur. The eight species identified as possibly occurring and their conservation status are:

- *Seringia exastia* (Critically Endangered (CR), BC Act; EPBC Act);
- *Tephrosia rosea* var. Port Hedland (A.S. George 1114; P1);
- *Abutilon* sp. *Pritzelianum* (S. van Leeuwen 5095; P3);
- *Gomphrena leptophylla* (P3);
- *Heliotropium muticum* (P3);
- *Rothia indica* subsp. *Australis* (P3);
- *Eragrostis crateriformis* (P4); and
- *Goodenia nuda* (P4).

The desktop review identified the Threatened species *Seringia exastia* as possibly occurring within the Study Area, however it was not found in either of the field surveys. *S. exastia* is due to have its conservation status removed under the BC Act after a recent taxonomic study assessed genomic and morphological characters in several *Seringia* taxa and discovered that *S. exastia* is synonymous with *S. elliptica* (Binks et al. 2020). Given that *S. elliptica* is common and widespread throughout the Pilbara and beyond, following taxonomic revision, *S. exastia* will be considered common and widespread too (Phoenix, 2022a).

Of the remaining seven Priority flora identified as possibly occurring within the Study Area, six have 21 or more records and/or occur across several bioregions and subregions and/or have large population records. Therefore, any records of the species that may be within the Study Area are unlikely to represent a substantial proportion of the total population for these species. The remaining species, *Gomphrena leptophylla* (P3) has been recorded from four bioregions but is only known from eight records with population sizes ranging from one to ten plants only. There is no suitable habitat (sandy creek beds) for *G. leptophylla* within the Permit Area, however suitable habitat can be found within the minor drainage to habitat east of the Permit Area.

4.5.2 RECORDED SIGNIFICANT FLORA

No Threatened or Priority flora were recorded during the field surveys.

A solitary plant of one taxon, *Phyllanthus* sp. Port Hedland Solar Farm was collected along the minor drainage line to the east of the Permit Area during the first field survey (Figure 6). A thorough search of the length of the creek within the Study Area failed to locate any further individuals. The second field survey also failed to locate any further individuals of *Phyllanthus* sp. Port Hedland Solar Farm. The taxon has since been identified as *Phyllanthus* sp. B Kimberley Flora



which is known from two records (WA Herbarium 1998-) each associated with riparian vegetation (G. Wells, pers comm). *Phyllanthus* sp B Kimberley Flora is considered reasonably widespread and locally common, it is not considered to be Threatened (Barrett & Telford 2015). This distinctive multi-stemmed subshrub is a member of *Phyllanthus* subgenus *Macraea* and is widespread and common in seasonally damp habitats across tropical Australia and will be named as a new species (Barrett & Telford 2015).

The new record represents a large range extension of the species and therefore is considered locally significant.

No records of *Phyllanthus* sp. B Kimberley Flora were identified within the Permit Area and the entire drainage line in which it was located is outside of the Permit Area.



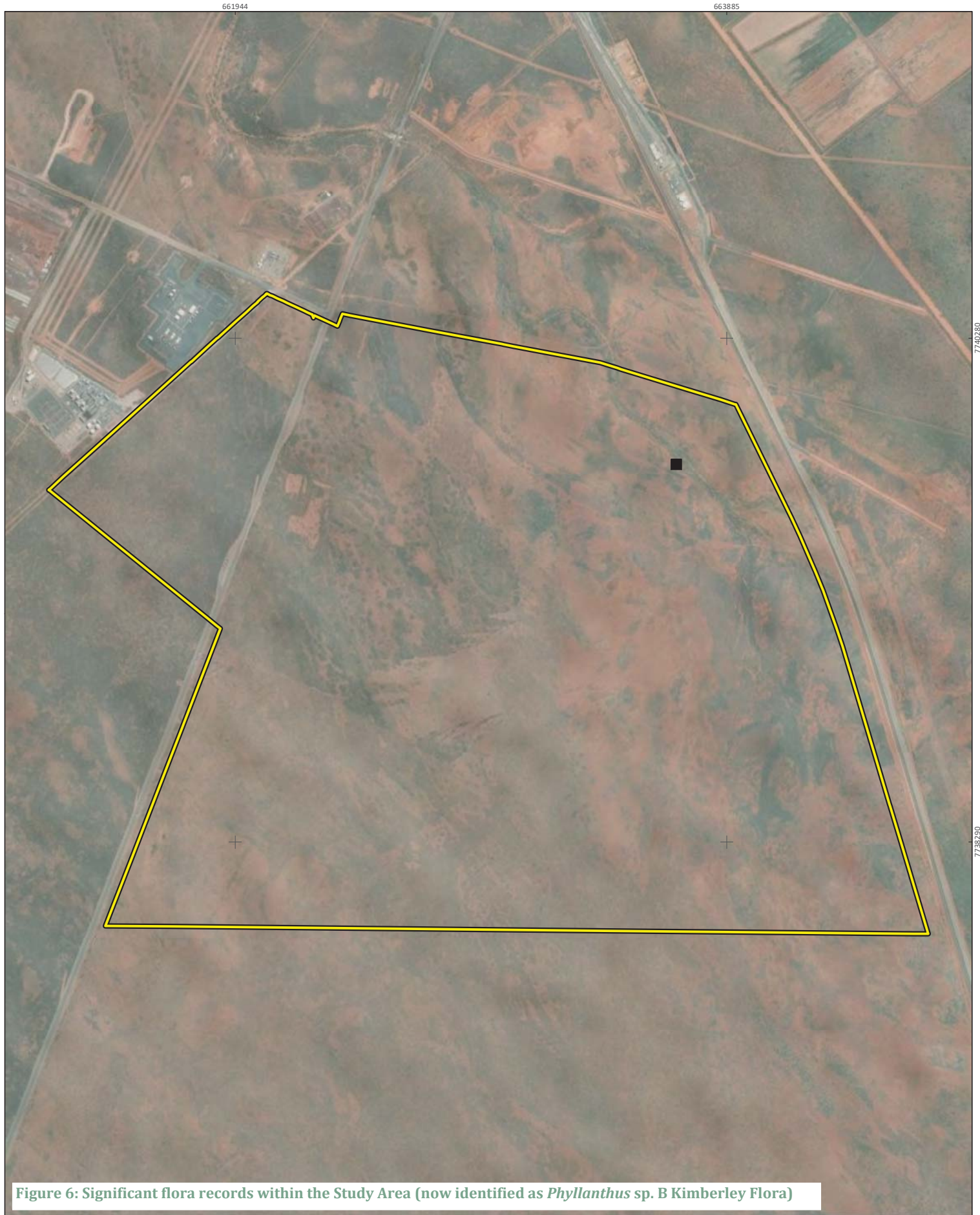
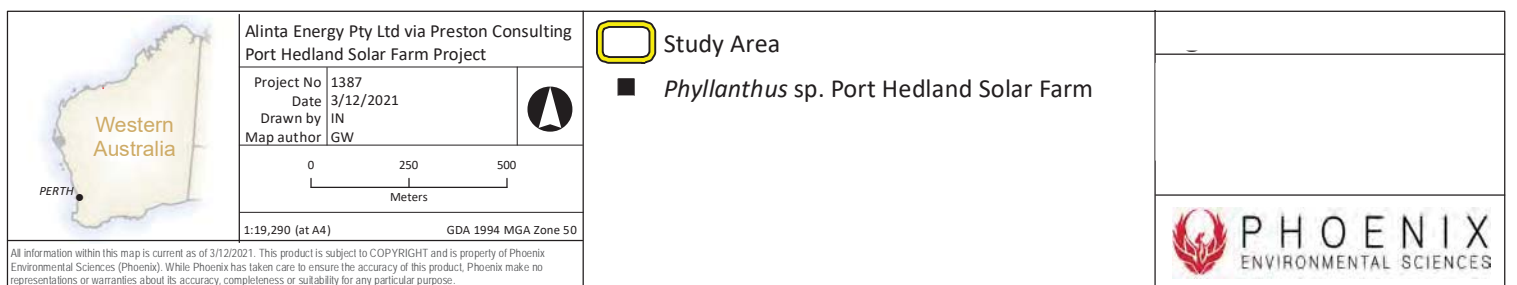


Figure 6: Significant flora records within the Study Area (now identified as *Phyllanthus* sp. B Kimberley Flora)



4.5.3 INTRODUCED FLORA SPECIES

Six introduced flora (Weed) species were recorded during the survey:

- *Aerva javanica*;
- *Stylosanthes hamata*;
- *Echinochloa colona*;
- *Cenchrus ciliaris*;
- *Chloris virgata*; and
- *Cynodon dactylon*.

Of the identified Weed species identified, none are declared or listed as Weeds of National Significance (Department of Primary Industries and Regional Development, 2021).

4.5.4 VEGETATION TYPE

Six vegetation types were recognised within the Study Area (Figure 7), however only four intersect with the Permit Area (AtpAseTe, AtpAstTe, AsTe and EsPm). Vegetation types and their relative extents across the Study Area are presented in Table 2. *Acacia* shrublands over *Triodia* hummock grasslands (vegetation types AtpAseTe and AtpAstTe) and *Triodia* hummock grasslands (vegetation types AsTe and Te) combined covered 97.6% of the Study Area.

Table 2: Vegetation types recorded within the Study Area

Vegetation type	Description	Within Study Area (ha)
AtpAseTe	Open mid shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> and <i>A. sericophylla</i> over a low shrubland of <i>A. stellaticeps</i> , <i>Corchorus incanus</i> subsp. <i>incanus</i> and <i>Bonamia erecta</i> , over mid to low grassland of <i>Triodia epactia</i> , <i>Chrysopogon fallax</i> and <i>T. schinzii</i> .	157.0
AtpAstTe	Mid sparse shrubland of <i>Acacia tumida</i> var. <i>pilbarensis</i> over low isolated shrubs of <i>A. stellaticeps</i> , <i>Senna notabilis</i> and <i>Bonamia erecta</i> , over mid to low open grassland of <i>Triodia epactia</i> , <i>Chrysopogon fallax</i> and <i>Aristida holathera</i> .	186.9
EvAaAsTe	Low isolated trees of <i>Eucalyptus victrix</i> over isolated tall shrubs of <i>Acacia ampliceps</i> and variably present <i>A. colei</i> over low isolated shrubs of <i>A. stellaticeps</i> , <i>Sesbania cannabina</i> and <i>Pluchea ferdinandi-muelleri</i> over a mid to low grassland of <i>Triodia epactia</i> , * <i>Cenchrus ciliaris</i> and <i>Chrysopogon fallax</i> .	6.3
AsTe	Mid isolated shrubs of <i>Acacia stellaticeps</i> over a mixed grassland of <i>Triodia epactia</i> , <i>Eriachne obtusa</i> and <i>Fimbristylis dichotoma</i> .	243.9
Te	Low grassland of <i>Triodia epactia</i> , <i>T. secunda</i> and <i>Eriachne obtusa</i> .	22.6
EsPm	Low sparse tussock grassland of <i>Eriachne sulcata</i> , occasionally with <i>E. obtusa</i> , over low mixed herbs including <i>Peplidium muelleri</i> , <i>Marsilea hirsute</i> and <i>Byblis liniflora</i> .	0.5



4.5.5 VEGETATION CONDITION

The condition of vegetation was mapped across the Study Area based on the appropriate condition scale for the Eremaean Botanical Province (Keighery 1994 in EPA 2016). Vegetation in the Study Area was recorded to be in Degraded to Excellent condition, with the majority (98.6 %) in Excellent to Very Good condition (Figure 8; Table 3).

Table 3: Vegetation condition recorded within the Study Area

Condition Rating	Within Study Area (ha)
Excellent	590.5
Very Good	25.9
Degraded	1.1
Completely Degraded	7.3

4.5.6 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

No TECs or PECs were found or are known to occur within the Study Area (Phoenix, 2022a).



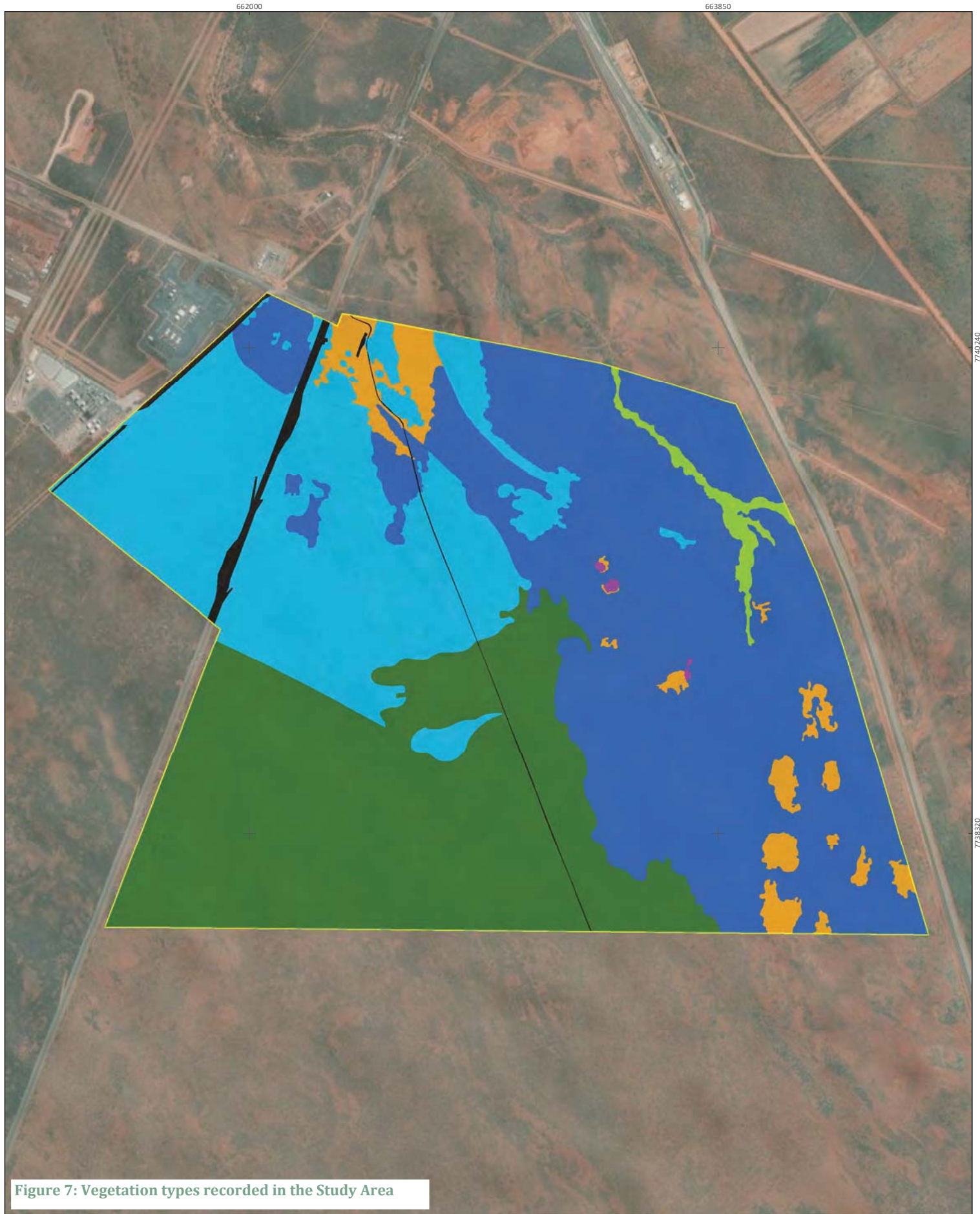


Figure 7: Vegetation types recorded in the Study Area

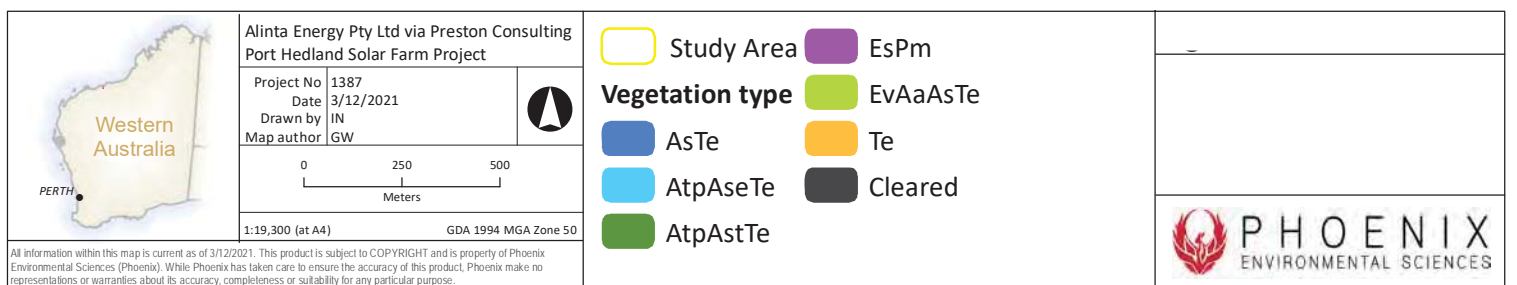
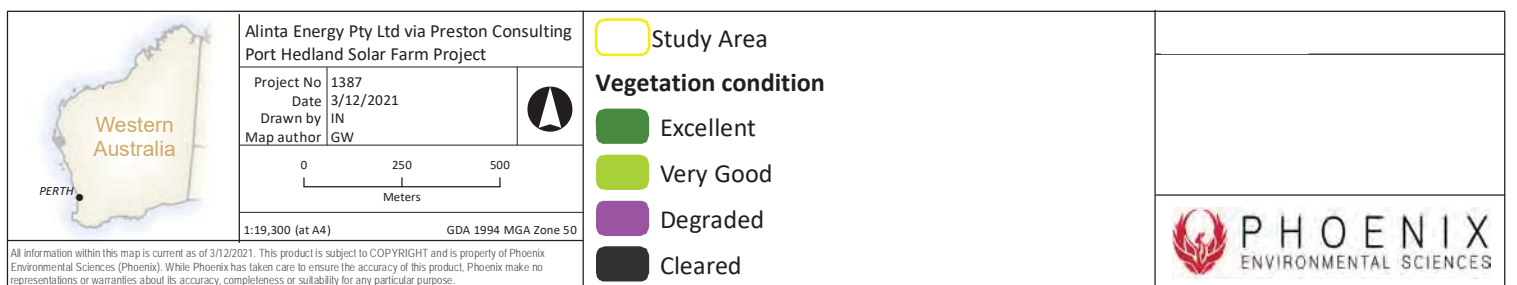




Figure 8: Vegetation condition in the Study Area



4.6 FAUNA

4.6.1 FAUNA HABITAT

Two broad fauna habitats have been defined for the Study Area with sandplain habitat accounting for 96.4% of the mapped habitat. The Permit Area is comprised entirely of the sandplain habitat which includes the following dominant vegetation complexes:

- Spinifex hummock grasslands supported by scattered low *Acacia striaticeps* shrubs;
- Isolated patches of *Acacia tumida pilbarensis* tall shrubs over low to mid mixed *Acacia* shrubs with scattered stage one spinifex hummocks;
- Open tussock grassland with mixed low fire-ephemeral shrubs; and
- Isolated patches of tall *Acacia tumida pilbaraences* over mixed mid *Acacia* dominant shrubland with evenly scattered long-unburnt, stage three, four and five spinifex hummocks.

4.6.2 LISTED FAUNA

Sixty-two significant vertebrate fauna species were identified in the desktop review, two of which were confirmed in the Study Area (Bilby and Brush-tailed Mulgara; see Section 4.6.3). Of the remaining species, none were considered likely to occur, seven were possible to occur and 53 were unlikely to occur (Phoenix, 2022b). The seven species identified as possibly occurring and their conservation status are:

- Northern Quoll (Endangered (EN); EPBC and BC Act);
- Ghost Bat (VU; EPBC and BC Act);
- Grey Falcon (VU; BC Act);
- Fork-tailed Swift (Migratory; EPBC and BC Act);
- Oriental Plover (Migratory; EPBC and BC Act);
- Oriental Pratincole (Migratory; EPBC and BC Act); and
- Peregrine Falcon (other specially protected species (OS); BC Act).

The Peregrine Falcon, Grey Falcon and Ghost Bat were identified as potential visitors as part of their wide foraging ranges but are unlikely resident species due to absence of suitable nesting or roosting habitat. Similarly, the Northern Quoll may possibly occur along minor drainage habitat during dispersal events but is unlikely to be a resident due to absence of suitable denning habitat. The remaining three migratory birds may possibly occur sporadically while foraging.

4.6.3 RECORDED SIGNIFICANT FAUNA

Phoenix (2022b) recorded secondary evidence of one Threatened and one Priority species in the Study Area and Targeted Survey Area; Bilby (VU; EPBC and BC Acts) and Brush-tailed Mulgara (P4; DBCA).



Greater Bilby (Macrotis lagotis)

Secondary evidence (tracks and scats) of the Bilby was recorded from 99 locations within the Study Area during the detailed fauna survey, however no active burrows were identified (Figure 6). The majority of the secondary evidence (87%) was recorded in or near the minor drainage habitat. The remaining locations were all located west of Great Northern Highway in long unburnt sandplain habitat. The number of observations was surprising given the close proximity of the Great Northern Highway which carries significant traffic at a speed of over 100 km /hr.

Forty-eight scats were recorded in the Study Area from the targeted Bilby survey, all of which were identified to be the remains of Bilby activity from the detailed survey six months prior. Given the widespread occurrence of feral predators throughout the Study Area, as evident from the 36 locations of secondary evidence, it is possible that the target population was decimated in the six months between survey phases. Additionally, the frequent fire history of the Study Area, most recent of which affected approximately 300 ha (48%) of vegetation within the central and southern extents, adds further weight to this explanation as fire creates favourable conditions for predators because it destroys suitable cover for prey species (Dziminski et al. 2020). Despite an extensive and targeted effort during the survey, no burrows were located. It was concluded that the core range of the target population is west of Great Northern Highway, given the widespread locations of old scats recorded during the targeted Bilby survey (Figure 10).

Brush-tailed Mulgara (Dasycercus blythi)

One track sequence and one burrow identified as Brush-tailed Mulgara were recorded from sandplain habitat. According to the DBCA (2021) *Threatened and Priority Fauna Database*, Brush-tailed Mulgara were previously recorded at 32 locations within the Study Area in 2012. Their relative absence in 2021, compared with 2012, is a likely a result of the high frequency and extent of fires within the Study Area since 2012. While the species may return to the Study Area after sufficient regeneration of spinifex grasslands, suitable habitat for the species is abundant both locally (within the Roebourne subregion and Uaroo land system) and throughout the Pilbara bioregion. Brush-tailed Mulgara are well documented from sandplain habitat in the Pilbara, predominantly in spinifex hummock grasslands and shrublands on sandy soils (Menkhorst & Knight 2011). Sandplain habitat is well represented in the Pilbara bioregion with approximately 99% of the pre-European vegetation currently remaining. As such, the relatively small area of suitable habitat present within the Study Area is not regarded as critical or high value to the species.



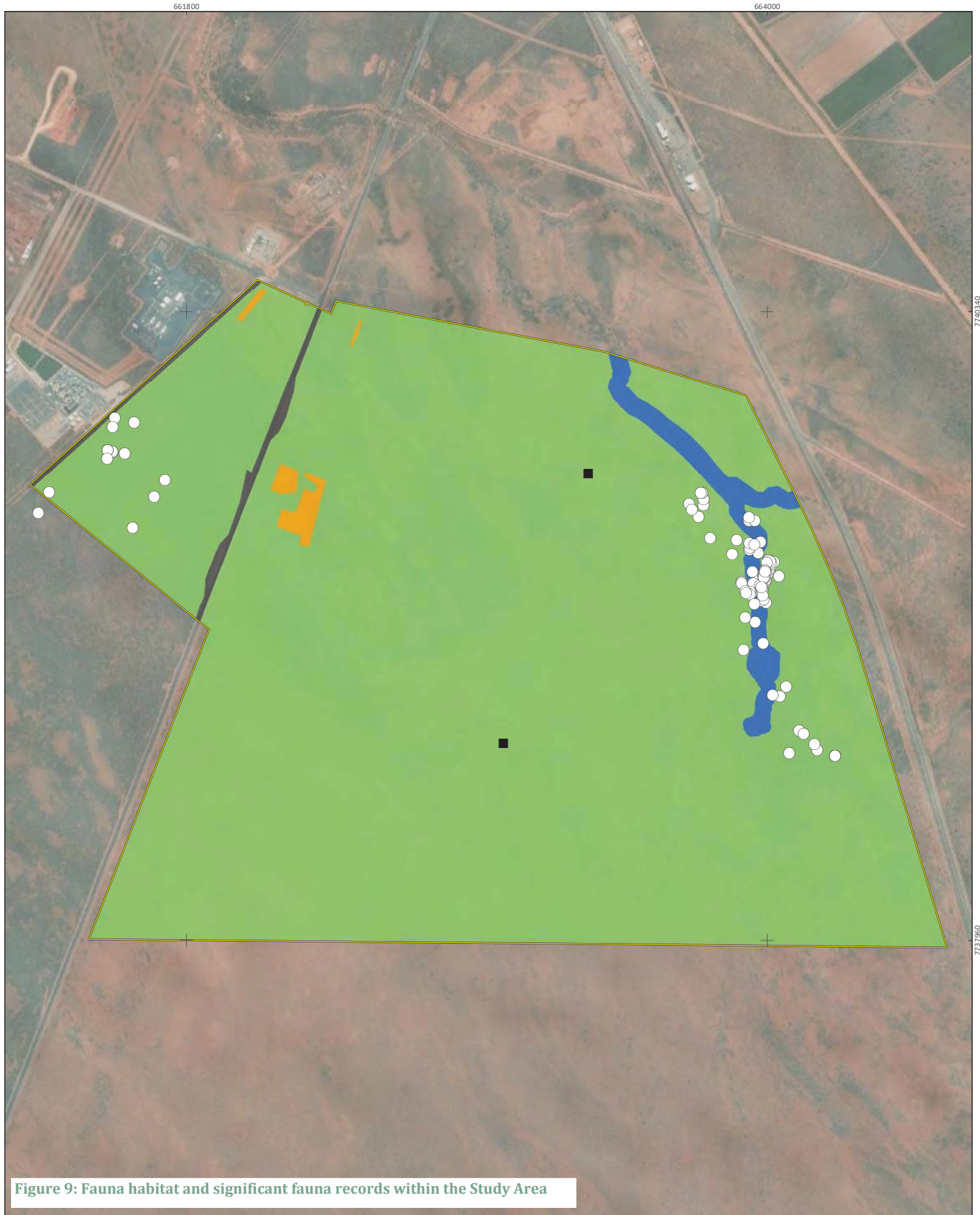












Figure 9: Fauna habitat and significant fauna records within the Study Area

 <p>Western Australia</p> <p>PERTH</p>	Alinta Energy Pty Ltd via Preston Consulting Port Hedland Solar Farm Project		 Study area	Fauna habitat	
	Project No Date Drawn by Map author	1388 21/07/2021 IN SP		Species, status	 Sandplain
				 <i>Dasycercus blythi</i> , P4 (DBCA list)	 Minor drainage
				 <i>Macrotis lagotis</i> , VU (EPBC Act, BC Act)	 Disturbed area
		<div><div></div><div>0250500</div><div>Meters</div></div>		 Road / Infrastructure	
		1:18,500 (at A4)	GDA 1994 MGA Zone 50		
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 PHOENIX ENVIRONMENTAL SCIENCES					

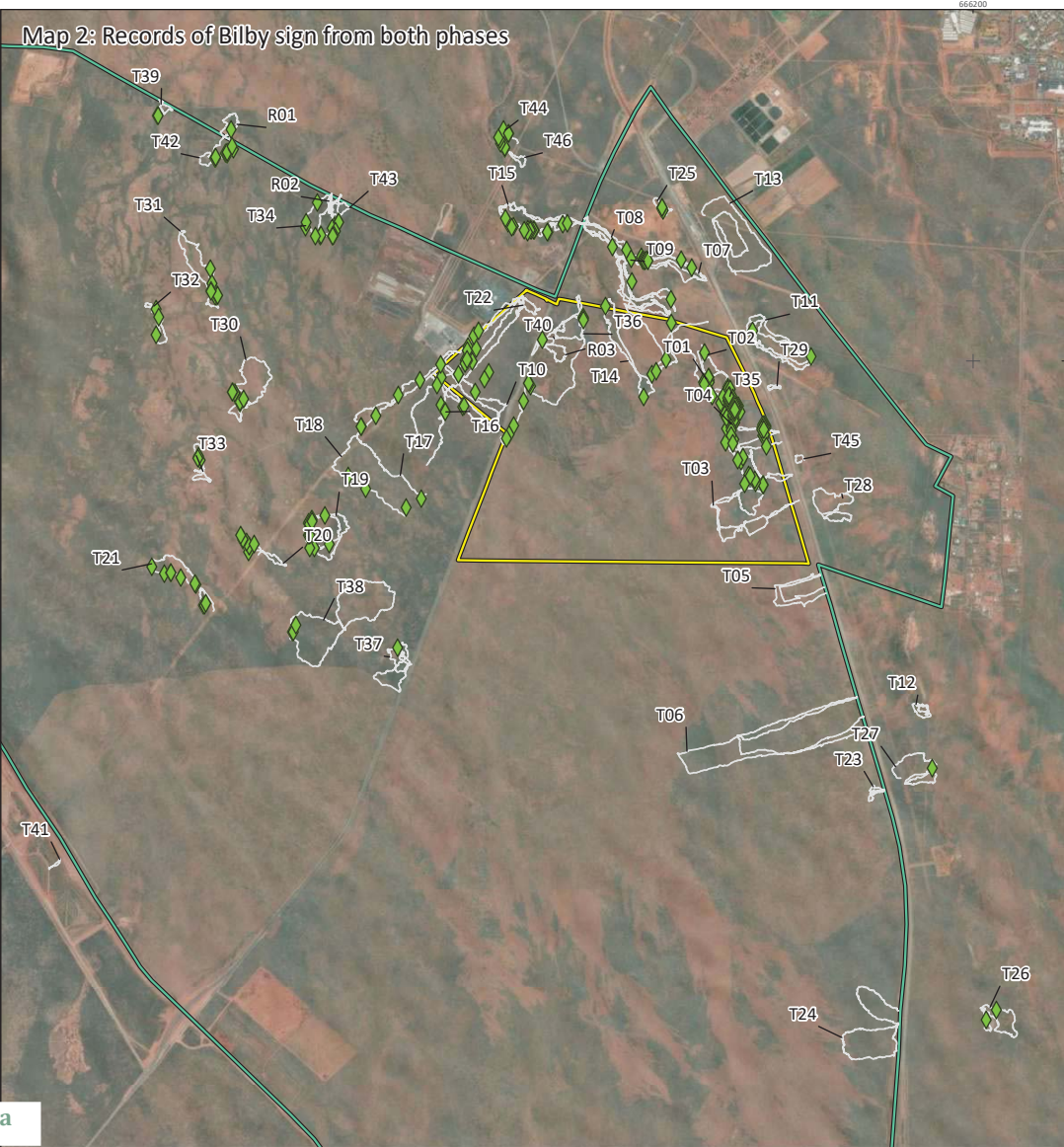
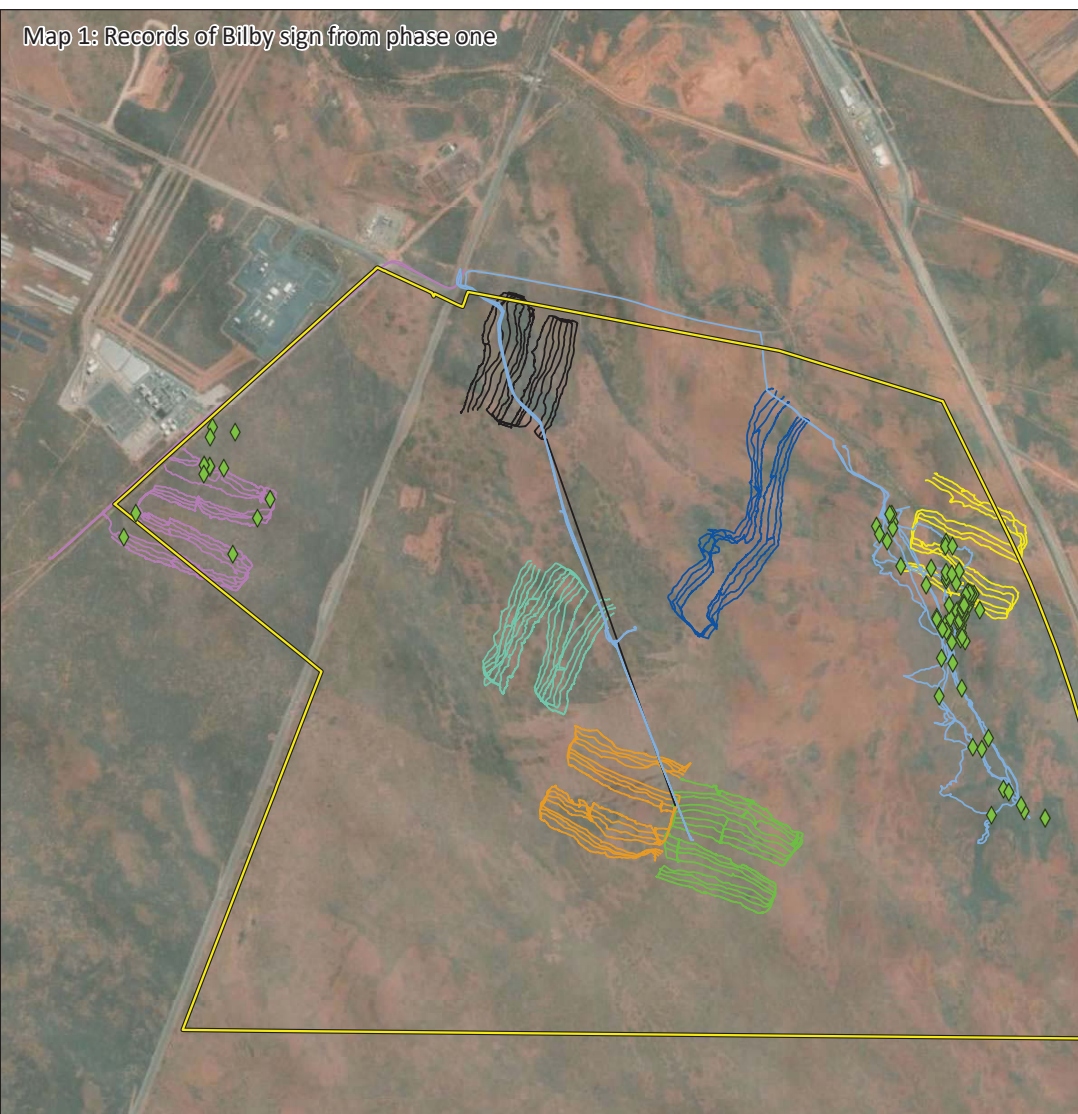


Figure 10: Locations of secondary evidence of Bilby within the Study Area and Targeted Survey Area

**Alinta Energy Pty Ltd via Preston Consulting
Port Hedland Solar Farm Project**

Project No	1454
Date	8/11/2021
Drawn by	IN
Map author	SP

Map 1

0 240 480

Meters

Map 2

0 0.5 1

Kilometers

1:17,501 (Map 1, at A3)
1:48,773 (Map 2, at A3) GDA 1994 MGA Zone 50

Study Area

Targeted Bilby survey area

◆ *Macrotis lagotis*, VU (EPBC Act, BC Act)

Map 1: Phase 1

— Transect 01

— Transect 02

— Transect 03

— Transect 04

— Transect 05

— Transect 06

— Transect 07

— Transect 08

P H O E N I X

ENVIRONMENTAL SCIENCES

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4.7 WATER AND DRAINAGE

RPS Group (RPS) completed a surface water assessment of the Study Area and surrounds to assess the impact of surface water on the Project and the impact of the Project on its surrounds (RPS, 2022). The Study Area is flat with minor undulations and after rainfall, standing water and pooling would occur. The flatness of the Study Area also means that internal flow velocities are low, typically less than 0.3 m/s.

South West Creek runs adjacent to the Permit Area on the eastern boundary of the Study Area, flowing generally to the north. The creek crosses under Great Northern Highway to the north of the Project, under a road bridge, and continues for 9 km to Port Hedland Harbour. Most of the creek catchment lies to the east of the FMG rail line. The Study Area represents approximately 0.4% of the South West Creek catchment (at the Great Northern Highway bridge). As such, the changes in runoff associated with the Project will not significantly affect flood levels and flood velocities in the local vicinity (RPS, 2022).

4.8 LAND USE

The Permit Area is located approximately 5 km south-west of South Hedland in Town of Port Hedland on a portion of UCL. UCL is not declared for any particular use. Historically the land has been a pastoral lease and used for grazing and has some remnant fencing. The land is generally flat, devoid of permanent physical infrastructure and consists of low-lying native vegetation that reflects recent fire history.

The location is close to Port Hedland in an area that already has significant transport and industrial infrastructure.



5 STAKEHOLDER CONSULTATION

Alinta Energy has consulted with the following key stakeholders regarding the Project:

- Department of Agriculture, Water, and the Environment (Commonwealth);
- Department of Water and Environmental Regulation (WA) – Part IV EP Act assessment process and Part V EP Act NVCP assessment process;
- Town of Port Hedland – Development approval, bushfire management;
- Main Roads Western Australia regarding the proposed road crossing and clearing within the Great Northern Highway parcel; and
- Kariyarra People (Prescribed Body Corporate - Kariyarra Aboriginal Corporation (KAC)).

Alinta Energy will continue to consult with key stakeholders throughout the life of the Project.

6 ASSESSMENT OF CLEARING AGAINST THE TEN CLEARING PRINCIPLES

The proposed vegetation disturbance has been assessed against the ten clearing principles described within *A Guide to the Assessment of Applications to Clear Native Vegetation* (Department of Environmental Regulation 2014; Table 4).



Table 4: Assessment of proposed vegetation disturbance against the ten clearing principles

Relevant Information	Assessment of potential impacts	Proposed control measures	Outcome – Assessment of variance with clearing principle
1. Native Vegetation should not be cleared if it comprises a high level of biological diversity			
<p>Detailed surveys of the Study Area were undertaken by Phoenix (2022a; 2022b). A total of 146 flora taxa representing 38 families and 88 genera were recorded in the Study Area during the field surveys. Species richness ranged from 3 to 53 species between quadrats.</p> <p>No Threatened or Priority flora or ecological communities were identified during surveys.</p> <p>One locally significant flora species, <i>Phyllanthus</i> sp. Kimberley Flora was identified along the minor drainage line to the east of the Study Area, outside the Permit Area.</p> <p>The vegetation in the Permit Area is identified as Vegetation Association 589. Vegetation Association 589 has over 99% of pre-European extent remaining and is classed as Least Concern.</p> <p>A total of 82 fauna taxa representing 38 families and 62 genera were recorded in the Study Area during the field survey.</p> <p>One Threatened and one Priority fauna species were recorded in the Study Area including the Greater Bilby (VU; EPBC and BC Acts) and the Brush-tailed Mulgara (P4).</p>	<p>No recorded significant flora or vegetation will be disturbed by the proposed clearing.</p> <p><i>Phyllanthus</i> sp B Kimberley Flora is considered reasonably widespread and locally common, it is not considered to be Threatened.</p> <p>The proposed clearing will result in the removal of up to 200 ha of native vegetation, which consists primarily of sandplain habitat in Excellent condition. Regionally, this clearing represents less than 0.03% of the remaining extent of Vegetation Association 589.</p> <p>All habitat types identified in the Study Area are typical of the Roebourne subregion and Uaroo land system. All fauna habitat within the Study Area is abundant and widespread throughout the Pilbara with no regionally restricted habitat types present.</p> <p>The low diversity of habitats and the small size of the Study Area (less than 1,000 ha) is reflected in the small fauna assemblage recorded in the field surveys (~22% of the desktop assemblage).</p>	<p>To minimise the impact of clearing on the environment, Alinta Energy proposes the following control measures:</p> <ul style="list-style-type: none"> The total extent of vegetation clearing is limited to 200 ha; Implementation of a Bilby Management Plan; All clearing will be managed under a clearing contractor's Ground Disturbance Permit (or similar); Locate clearing areas such that they can be utilised for other purposes if applicable (i.e. access roads, laydown); The clearing areas will be identified using GPS coordinates; All clearing kept to a minimum within the proposed Permit Area and completed only when required; All vehicles, equipment and personnel will be inspected to ensure no weed-affected soil, mulch, fill or other material is brought into the area to be cleared. If contaminated they will be directed to Port Hedland to be cleaned to prevent the incidental spread of weeds; and Restrict the movement of machines and other vehicles to the limits of the areas to be cleared. 	<p>The proposed clearing is not likely to be at variance with this principle.</p>
2. Native vegetation should not be cleared if it comprises the whole, or part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to WA			
<p>Sandplain habitat was the only fauna habitat identified within the Permit Area (Phoenix, 2022b).</p> <p>The Permit Area has been identified as suitable Bilby habitat, however this area is currently unoccupied due to recent fires. No recent evidence of Bilby has been recorded in the Permit Area.</p>	<p>While flora and vegetation are utilised by fauna for food and habitat, there are no known obligate fauna-flora correlations within the Permit Area.</p> <p>All habitat types identified in the Study Area are typical of the Roebourne subregion and Uaroo land system. All fauna habitats within the Study Area are abundant and widespread</p>	<p>Implement control measures described above.</p> <p>Undertake control measures in the Bilby Management Plan including pre-clearance surveys for active Bilby burrows.</p>	<p>The proposed clearing may be at variance with this principle.</p>



Relevant Information	Assessment of potential impacts	Proposed control measures	Outcome – Assessment of variance with clearing principle
<p>The core range of the Bilby population was concluded to be west of Great Northern Highway given the widespread locations of old scats recorded in the targeted survey.</p> <p>Sandplain habitat comprises isolated <i>Acacia</i> shrublands, patches of low <i>Acacia</i> shrublands, spinifex grasslands and open grasslands.</p>	<p>throughout the Pilbara with no regionally restricted habitat types present.</p> <p>Regionally, clearing of 200 ha represents less than 0.03% of the remaining extent of Vegetation Association 589.</p> <p>Sandplain habitat within the Study Area has been shown to be utilised by Bilby and Brush-tailed Mulgara. Recent fires in the area means the habitat is currently unoccupied. Sandplain habitat is common and widespread at both the local and regional scale. Given the large, moving home-range occupied by Bilby (Dziminski et al. 2020), the small portion of the sandplain habitat (less than 1,000 ha) present in the Study Area is not regarded as important to the local population.</p> <p>Similarly, suitable habitat for the Brush-tailed Mulgara is abundant both locally (within Roebourne subregion and Uaroo land system) and regionally throughout the Pilbara Bioregion.</p> <p>Alinta Energy are investigating revegetation with local native, fire retardant species within the solar facility following construction.</p> <p>The solar facility would be designed to allow Bilby to disperse across the development.</p>		
3. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora			
<p>No Threatened or Priority flora were recorded in the Permit Area (Phoenix, 2022a).</p> <p><i>Seringia exastia</i> is known from the general area and is listed as Threatened Flora. It is considered that this species does not warrant Conservation Listing and will be removed from the Threatened Flora list following the next census.</p> <p>A solitary plant of one taxon, <i>Phyllanthus</i> sp. B Kimberley Flora was collected along the minor drainage habitat. No records were identified in the Permit Area.</p>	<p>No known records of Threatened or Priority Flora will be impacted by the clearing.</p> <p>It is possible that significant flora may occur within the Permit Area, however based on the likelihood of occurrence assessment, on-ground survey work completed and continuity of vegetation within the region, it is unlikely that clearing of 200 ha of recently burnt habitat will affect the continued existence of any significant flora.</p> <p>The taxon <i>Phyllanthus</i> sp. B Kimberley Flora is associated with riparian vegetation which can be found along South West Creek outside of the</p>	Implement control measures described above.	The proposed clearing is not likely to be at variance with this principle.



Relevant Information	Assessment of potential impacts	Proposed control measures	Outcome – Assessment of variance with clearing principle
	<p>Permit Area. This area was specifically excluded from the Permit Area in order to preserve the ecological values that were identified in the surveys. <i>Phyllanthus</i> sp. B Kimberley Flora is considered reasonably widespread and locally common, it is not considered to be Threatened.</p> <p>Six of the seven Priority flora identified as possibly occurring in the Study Area have 21 or more records across several bioregions and subregions and have large population records. The remaining species (<i>Gomphrena letophylla</i>) is associated with sandy creek beds which is not present within the Permit Area (possibly present along South West Creek outside of the Permit Area).</p>		
4. Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a Threatened Ecological Community			
Detailed surveys of the Study Area were undertaken (Phoenix, 2022a). None of the vegetation recorded within the Study Area was considered to represent a TEC.	Not applicable.	Not applicable.	The proposed clearing is not at variance with this principle.
5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared			
<p>The Permit Area lies entirely within the Pilbara Bioregion, specifically located on the Roebourne IBRA Subregion. The Roebourne subregion covers 2,008,983 ha.</p> <p>The vegetation in the Permit Area is identified as Vegetation Association 589. Vegetation Association 589 has over 99% of pre-European extent remaining and is classed as Least Concern.</p>	<p>The Permit Area does not represent a significant remnant of native vegetation in an extensively cleared area.</p> <p>The proposed clearing will result in the removal of up to 200 ha of native vegetation. This clearing represents less than 0.03% of the remaining extent of Vegetation Association 589.</p> <p>Vegetation Association 589 has over 99% of pre-European extent remaining and thereby considered Least Concern.</p> <p>Vegetation type EsPm (Claypans) were considered locally significant due to the restricted distribution in the Study Area. The claypans were comprised of common species with a wide distribution in the Pilbara Bioregion that were also recorded other</p>	<p>Implement control measures described above.</p> <p>Where possible avoid and minimise impact to vegetation type EsPm on the eastern boundary of the Permit Area.</p>	The proposed clearing is not at variance with this principle.



Relevant Information	Assessment of potential impacts	Proposed control measures	Outcome – Assessment of variance with clearing principle
	<p>vegetation types in the Study Area. The claypans only accounted for 0.1% (0.5 ha) of the Study Area.</p> <p>The claypans will be avoided during clearing activities.</p>		
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland			
<p>The Permit Area is located within the Pilbara Surface Water Area.</p> <p>The main drainage feature is South West Creek which runs along the eastern side of the Study Area. South West Creek lies is not included in the proposed Permit Area.</p>	No watercourses or permanent wetlands are present within the Permit Area.	Not applicable.	The proposed clearing is not at variance with this principle.
7. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation			
<p>The area within and surrounding the Permit Area remains mostly uncleared with disturbance limited to that caused by Great Northern Highway and smaller access tracks.</p> <p>No declared pests or Weeds of National Significance were recorded within the Permit Area (Phoenix, 2022a).</p>	<p>Land degradation will be limited to the 200 ha of proposed land clearing required for construction and operations. This represents less than 0.03% of the remaining extent of Vegetation Association 589.</p> <p>The majority of the vegetation within the Study Area is in Excellent to Very Good condition. Alinta Energy is investigating revegetation within the Permit Area following construction of the Project.</p> <p>The Study Area is flat with low internal flow velocities, typically less than 0.3 m/s, unlikely to cause erosion.</p> <p>Dust modelling results indicate that there will be a ‘medium risk’ potential for reduced visibility along section of Great Northern Highway during construction. Any potential risk with the Project can be alleviated through a Construction Dust Management Plan (CDMP).</p>	<p>Implement control measures described above.</p> <p>Implementation of a Soil and Water Management Plan (SWMP). The SWMP will outline how soil and water issues will be identified, planned, managed and monitored to minimise adverse impacts on the downstream environment.</p> <p>Implementation of a CDMP. The CDMP would include additional controls to be implemented in the event of potential adverse wind conditions.</p>	The proposed clearing may be at variance with this principle.
8. 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			
<p>The proposed clearing area does not occur within or adjacent to any conservation areas.</p> <p>The nearest conservation reserve is Mungaroon Range Nature Reserve, located</p>	Not applicable.	Not applicable.	The proposed clearing is not at variance with this principle.



Relevant Information	Assessment of potential impacts	Proposed control measures	Outcome – Assessment of variance with clearing principle
approximately 95.2 km south-west of the Study Area.			
9. Native vegetation should not be cleared if the clearing is likely to cause deterioration in the quality of surface or underground water			
<p>The Permit Area is located within the Pilbara Surface Water Area.</p> <p>RPS (2022) completed a surface water assessment of the Study Area and surrounds to assess the impact of surface water on the Project and the impact of the Project on its' surrounds.</p> <p>South West Creek runs to the east of the site and near the north-east corner of the Study Area. It crosses Great Northern Highway under a bridge, and then continues for 9 km, to discharge into the Port Hedland Harbour. South West Creek does not intersect the Permit Area.</p>	<p>No watercourses or wetlands are present within the Permit Area. There will be no activities associated with the Project that will intersect the water table. Most of the creek catchment lies to the east of the FMG rail line. The Study Area represents approximately 0.4% of the South West Creek catchment (at the Great Northern Highway bridge). As such, the local flood regime remains largely unchanged and flood levels and flood velocities are not impacted in the local vicinity (RPS, 2022).</p> <p>The Study Area is flat with low internal flow velocities, typically less than 0.3 m/s, unlikely to cause erosion.</p>	Implement the control measures described above.	The proposed clearing is not likely to be at variance with this principle.
10. Native vegetation should not be cleared if the clearing is likely to cause, or exacerbate, the incidence or intensity of flooding			
<p>The region is generally dry, with occasional significant rainfall events often associated with cyclones.</p> <p>The Study Area only represents approximately 0.4 % of the South West Creek catchment.</p>	<p>Clearing of 200 ha of native vegetation has the potential to cause both erosion of the surface and increase the sediment downstream. This is mitigated by the low velocities over the site due to the very flat terrain. In a 100 year flood scenario, velocities are only up to 0.6 m/s due to the flatness of the site.</p> <p>Velocities less than 2 m/s in a major flood scenario are generally acceptable without engineering protection (RPS, 2022).</p>	Implement the control measures described above.	The proposed clearing is not likely to be at variance with this principle.



7 SUMMARY AND CONCLUSIONS

The purpose of this NVCP Application is to allow the clearing of up to 200 ha of native vegetation within a 420.33 ha Permit Area for development of the Project as described in Section 3.

The following key points are noted:

- The area has been extensively surveyed for Alinta Energy's Port Hedland Solar Project and the results of these surveys have been used to assess the impacts of clearing;
- Clearing of 200 ha within the Permit Area represents less than 0.03% of the remaining extent of Vegetation Association 589;
- Where possible the locally significant small claypan vegetation association (EsPm) will be avoided and/or impact minimised during clearing activities;
- Sandplain habitat is abundant and widespread throughout the Pilbara region;
- No regionally or locally restricted habitat types are present;
- Suitable habitat for the Bilby and Brush-tailed Mulgara is abundant locally and regionally;
- The proposed clearing will not result any significant impacts to the following:
 - Threatened and Priority Flora;
 - TECs or PECs;
 - Wetlands / watercourses; or
 - Conservation areas.
- The flat terrain of the Permit Area means the potential for erosion and sedimentation downstream is not likely to be significant;
- Alinta Energy is investigating revegetation of the Permit Area following completion of construction.

Alinta Energy has also identified a number of control measures to minimise the impacts to native vegetation. These measures include the following:

- Implementation of a Bilby Management Plan;
- All clearing to be managed under a clearing contractor's Ground Disturbance Permit (or similar);
- The clearing areas will be identified using GPS coordinates;
- All clearing kept to a minimum within the Permit Area and completed only when required; and
- All vehicles, equipment and personnel will be inspected and cleaned as required to prevent the incidental spread of weeds.

This NVCP application assessed the proposed vegetation clearing against the ten clearing principles described in *A Guide to the Assessment of Applications to Clear Native Vegetation* (DER, 2014).



8 GLOSSARY

Term	Meaning
AC	Alternating Current
Alinta Energy	Alinta Energy Development Pty Ltd
BC Act	<i>Biodiversity Conservation Act 2016</i>
Bilby	Greater Bilby (<i>Macrotis lagotis</i>)
CDMP	Construction Dust Management Plan
CR	Critically Endangered
DAWE	Department of Agriculture, Water and the Environment (Cth)
DBCA	Department of Biodiversity, Conservation and Attractions
DE	Development Envelope
DER	Department of Environmental Regulation (now Department of Water and Environmental Regulation)
DP	Deposited Plan
DPLH	Department of Planning, Lands and Heritage
EN	Endangered
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
ha	Hectares
IBRA	Interim Biographical Regionalisation for Australia
ILUA	Indigenous Land Use Agreement
KAC	Kariyarra Aboriginal Corporation
km	Kilometres
kV	Kilovolt
m	Metre
MRWA	Main Roads Western Australia
MW	Megawatt
NVCP	Native Vegetation Clearing Permit
OS	Specially Protected
P	Priority
PEC	Priority Ecological Communities – plant communities listed as being potentially threatened under the <i>Wildlife Conservation Act 1950</i>
Phoenix	Phoenix Environmental Sciences Pty Ltd
PHPS	Port Hedland Power Station
Permit Area	Boundary for clearing proposed in this NVCP (Figure 1)
RPS	RPS Group
S91	Section 91
Study Area	Detailed flora and fauna study area (Phoenix, 2022a & b; Figure 2)
SWMP	Surface Water Management Plan
T	Threatened



Term	Meaning
Targeted Survey Area	Targeted Bilby survey area (Phoenix, 2022b; Figure 2)
TEC	Threatened Ecological Communities – plant communities listed as being threatened and legally protected under the <i>Biodiversity Conservation Act 2016</i> and / or the <i>Environment Protection and Biodiversity Conservation Act 1999</i>
The Project	Alinta Energy’s Port Hedland Solar Farm Project
UCL	Unallocated Crown Land
VU	Vulnerable
WA	Western Australia
Weed	Introduced flora



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