Napier Downs Irrigation Project

Native Vegetation Clearing Permit Application – Supporting Information

Napier Corporation Pty Ltd

Prepared by Phoenix Environmental Sciences Pty Ltd

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Document control

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1 INTRODUCTION

1.1 BACKGROUND

Napier Corporation Pty Ltd (Napier Corporation) is proposing to develop the Napier Downs Irrigation Project (the Project) on Napier Downs Station (NDS) in the Shire of Derby-West Kimberley, 240 km east northeast of Broome, Western Australia (Figure 1-1).

The Project will entail pivot irrigation to grow cattle fodder crops (Rhodes grass) for use on NDS, Mount-House Station and other Napier Corporation managed properties. The Project will support sustainable pasture and soil management and more effective cattle production. The Project is critical to providing a supplementary food source for station cattle in particularly dry conditions. It is a key adaptative strategy for the stations in response to climate change.

The Project was referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act) on 6 June 2023 (APP-0000385). The EPA issued a 'Not Assessed' level of assessment on 1 November 2023.

An *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) self-assessment was conducted for the Project to determine whether referral would be required to the Department of Climate Change, Energy, the Environment and Water (DCCEEW). The assessment found that, with implementation of proposed Project staging, controls, and environmental monitoring and management, referral would not be required under the EPBC Act.

An initial application for a 6 GL / annum water abstraction licence under the *Rights in Water and Irrigation Act 1914* (RIWI Act) was lodged with DWER on 3 Dec 2018 (ref. 024277). Following consideration of potential environmental impacts, the application was withdrawn, modified and re-submitted on 23 Jan 2023 for a 3 GL / annum licence (ref. 053947). A detailed water resource operating strategy has been prepared to meet requirements of DWER. This contains the monitoring and management framework for managing impacts of groundwater abstraction.

1.2 PURPOSE

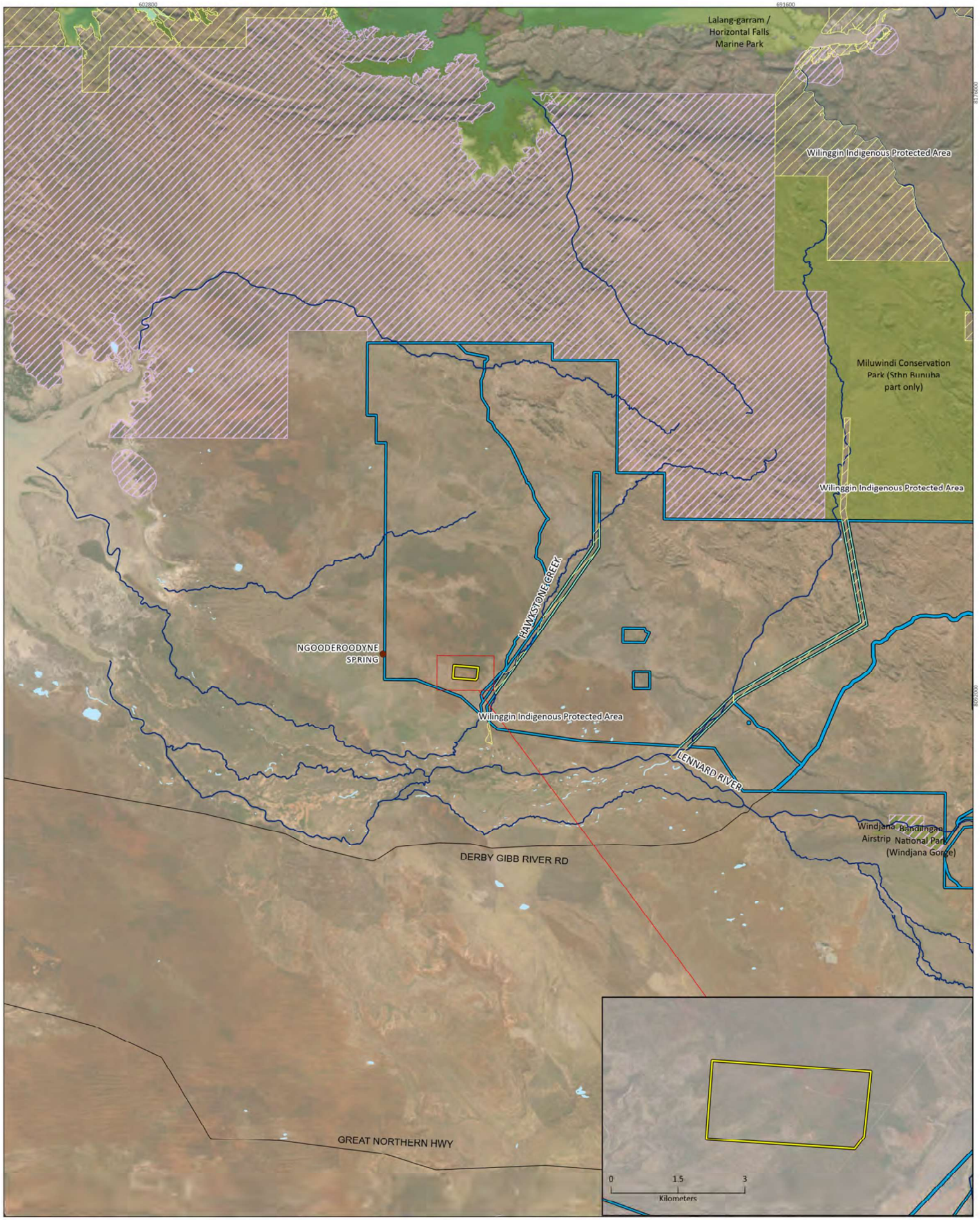
The purpose of this native vegetation clearing permit (NVCP) application is to seek approval under Part V Division 2 of the EP Act to clear up to 200 ha of native vegetation within the proposed Permit Area (Figure 1-2), in order to develop the Project.

1.3 PERMIT AREA

The proposed 586.5 ha Permit Area is located within Scrubby Paddock on NDS, towards the southwestern corner of the station (Figure 1-2). Clearing is to be conducted within the boundaries of the Permit Area.

This application is for a purpose permit which allows for the clearing of different areas from time to time for the specific clearing purpose, in accordance with Section 51E(1)(b)(ii) of the EP Act. Clearing is intended to be conducted progressively, in line with staging of pivots.

A purpose permit will also provide greater flexibility to position pivots to avoid environmental values identified during baseline studies.



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Project No	1628
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Drawn by	JL
Map author	KC

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Kilometers

1:480,000 (at A3) GDA 1994 MGA Zone 51

- Permit area
- Indigenous Protected Areas
- Napier Downs Station
- Environmentally sensitive areas
- DBCA managed land
- Lakes
- Rivers

Figure 1-1

Project location

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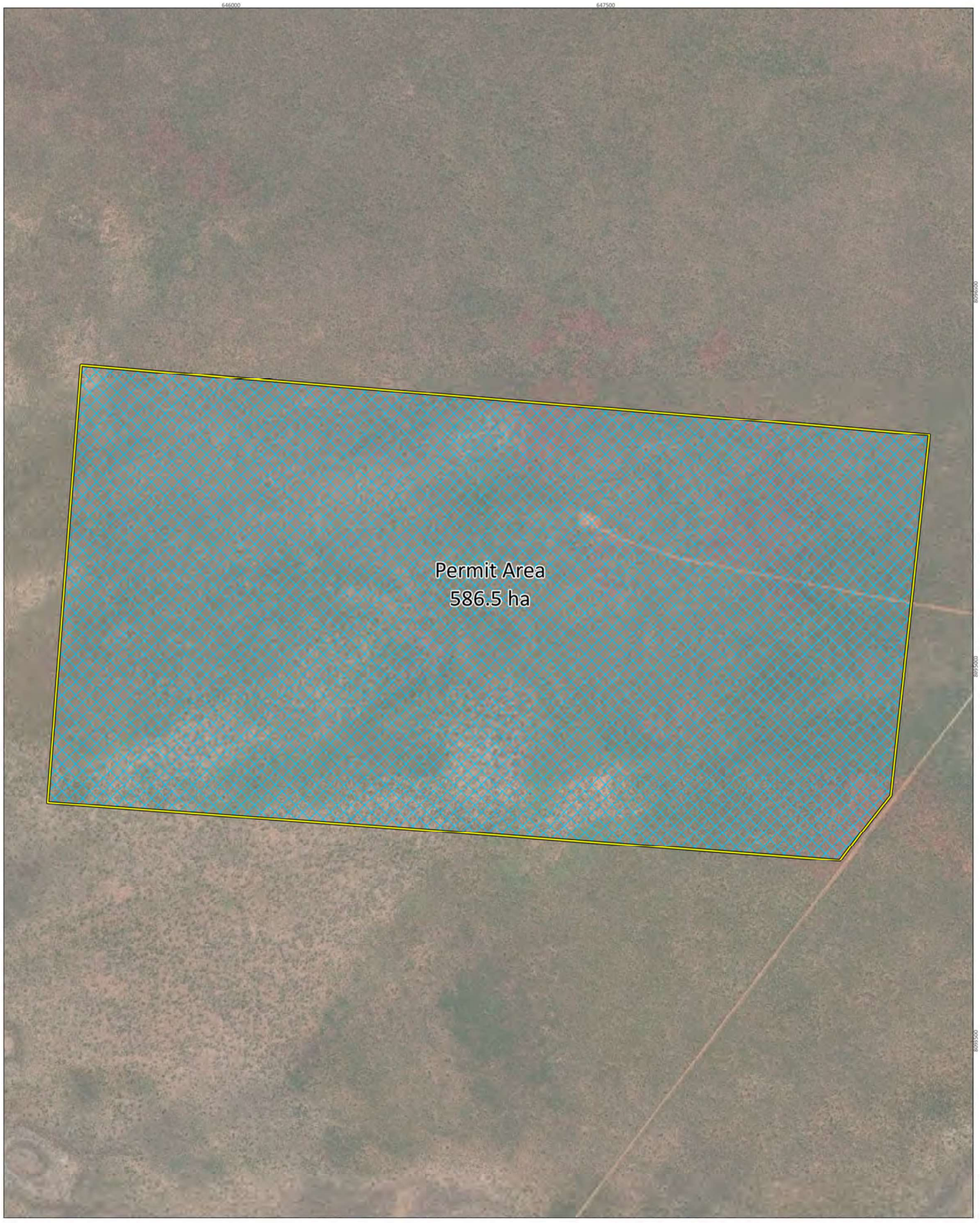

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1:13,800 (at A3) GDA 1994 MGA Zone 51

Permit area

Figure 1-2

Proposed Permit Area

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1.4 TENURE AND LAND ACCESS

The Permit Area is located within Napier Downs pastoral lease (N49855L), and on Lot 22 on Deposited Plan 220112 being the whole of the land in Volume 3014 Folio 876. Napier Corporation owns and operates the pastoral lease.

An application for a diversification permit for the proposed pivot irrigation activity was submitted to the Pastoral Lands Board (PLB) under the *Land Administration Act 1997* (LA Act) on 28 June 2023. PLB met on 5 October and determined to approve the diversification permit. Final approval is conditional on meeting all environmental approvals (email from Eileen Lemoine, Senior State Land Officer, DPLH, 13 October 2023).

1.5 NATIVE TITLE

The Permit Area is located within the Warrwa Part A Native Title Determination area.

Napier Corporation intends to enter into a heritage protection agreement with the Warrwa People.

2 PROPOSED ACTIVITIES

The Project will require up to 200 ha of vegetation clearing within a 586.5 ha footprint (Permit Area; Figure 1-2).

The Project design includes:

- 4 centre irrigation pivots at ~40 ha each**.**
- 4 groundwater production bores (one already established) within the centre pivots and 5 monitoring bores (one already established)
- Access to the site is via existing access tracks on NDS from Napier Downs Road.
- New access tracks within the site.
- Infrastructure / laydown area for vehicle parking, plant and equipment storage.

Groundwater will be sourced from the Grant Group Aquifer, at a rate up to 3 GL / annum. Each pivot will have a total water demand of up to 750 megalitres / annum to meet crop water requirements.

The Project will be staged to enable monitoring of ecological responses to groundwater abstraction., with 2 pivots established initially.

The Project is planned to be ongoing with no maximum operational life.

3 ENVIRONMENTAL CHARACTERISTICS

3.1 BIOGEOGRAPHIC REGION

The Permit Area is situated within the Fitzroy Trough (DL1) subregion of the Dampierland bioregion (Figure 3-1). The Fitzroy Trough subregion is comprised of 4 basic components, described as (Graham 2001):

- Quaternary sandplain overlying Jurassic and Mesozoic sandstones with Pindan, with hummock grasslands on hills.
- Quaternary marine deposits on coastal plains, with mangal, samphire – *Sporobolus* spp. Grasslands, *Melaleuca alsophila* low forests, and *Spinifex* spp. – *Crotalaria* spp., strand communities.
- Quaternary alluvial plains associated with the Permian and Mesozoic sediments of Fitzroy Trough support tree savannahs of ribbon grass (*Chrysopogon* spp.), bluegrass (*Dichanthium* spp.) and Mitchell grass (*Astrebla* spp.) scattered coolabah (*Eucalyptus microtheca*) – *Bauhinia cunninghamii*, with riparian forests of river red gum (*Eucalyptus camaldulensis*) and Cadjeput (*Melaleuca* spp.) fringe drainages.
- Devonian reef limestones in the north and east supporting sparse tree steppe over lobed spinifex (*Triodia intermedia*) and limestone spinifex (*T. wiseana*) hummock grasses.

The subregion experiences a dry hot tropical and semi-arid climate with summer rainfall. Average summer rainfall is between 500–800 mm and is often influenced by cyclonic activity in the northwest of WA.

3.2 LAND SYSTEMS

The Permit Area intersects 3 land systems but falls predominantly within one of these, the Sisters System (Table 3-1; Figure 3-2).

Table 3-1 Land systems and extent in the detailed study area

Land system	Description	Area (ha)	% of Permit Area
Sisters System	Low sandy plateaux and lower slopes supporting pindan woodlands with *Acacia*'s and eucalypts and curly spinifex-ribbon grass, and valley plains supporting mixed woodlands with ribbon grass.	537.0	91.6
Wanganut System	Sandplains and linear dunes supporting pindan woodlands with *Acacia*'s and bloodwoods and curly spinifex- ribbon grass, and broad low-lying swales supporting bloodwood-grey box woodlands with curly spinifex-ribbon grass.	0.7	0.1
Yeeda System	Red sandplains supporting pindan vegetation with dense *Acacia* shrubs, scattered bloodwood and grey box trees and curly spinifex and ribbon grass.	48.8	8.3
	Total	**586.5**	**100**

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0 7.5 15
Kilometers

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Permit Area

Region, subregion

- Central Kimberley, Mount Eliza
- Dampierland, Fitzroy Trough
- Northern Kimberley, Mitchell

Figure 3-1

IBRA region

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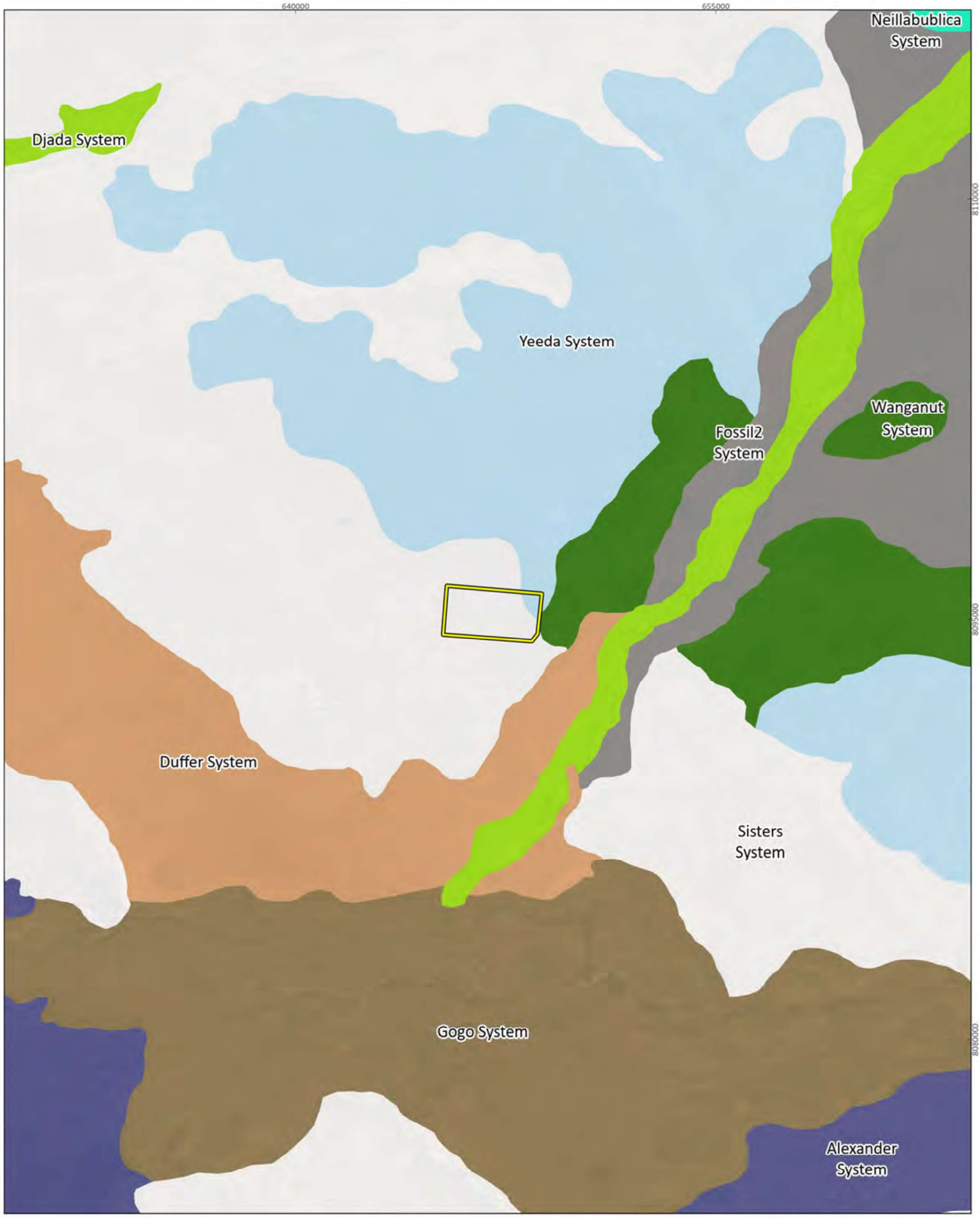

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Kilometers

1:174,300 (at A4) GDA 1994 MGA Zone 51

Permit Area

Land system

- Alexander System
- Djada System
- Duffer System
- Fossil2 System
- Gogo System
- Neillabublica System
- Sisters System
- Wanganut System
- Yeeda System

Figure 3-2

Land systems

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3.3 AREAS OF CONSERVATION SIGNIFICANCE

The Permit Area is not situated within any conservation reserves or Environmentally Sensitive Areas (ESAs). The closest conservation reserve, King Leopold Ranges Conservation Park, is situated 58 km northeast and the closest ESA is 33.5 km northeast (Figure 1-1). Wilinggin Indigenous Protected Area (IPA) is located 2.6 km to the east (Figure 1-1).

The Permit Area is situated within the West Kimberley National Heritage Place, which is listed on the National Heritage List (Figure 1-1). The listing is vast in extent, covering 949.9 km^2 of the Kimberley region, and is recognised as nationally significant under several criteria (DoEE 2019). While the Permit Area overlies the extensive King Leopold Orogen geological province, it does not intersect any more specific features described in the West Kimberley National Heritage Place.

3.4 FLORA AND VEGETATION

3.4.1 Surveys completed

An environmental desktop assessment, including flora and vegetation, was undertaken during early planning for the Project in 2019, focusing on 2 earlier potential sites, 'Lennard' and Hawkstone' (Phoenix 2019), with an addendum prepared specifically for the Permit Area in 2020 (Phoenix 2020). Subsequently, a detailed flora and vegetation survey was undertaken in the Permit Area in October 2021 and May 2022 (Phoenix 2023) that included: quadrat and relevé sampling; targeted flora searches; and vegetation type and condition mapping.

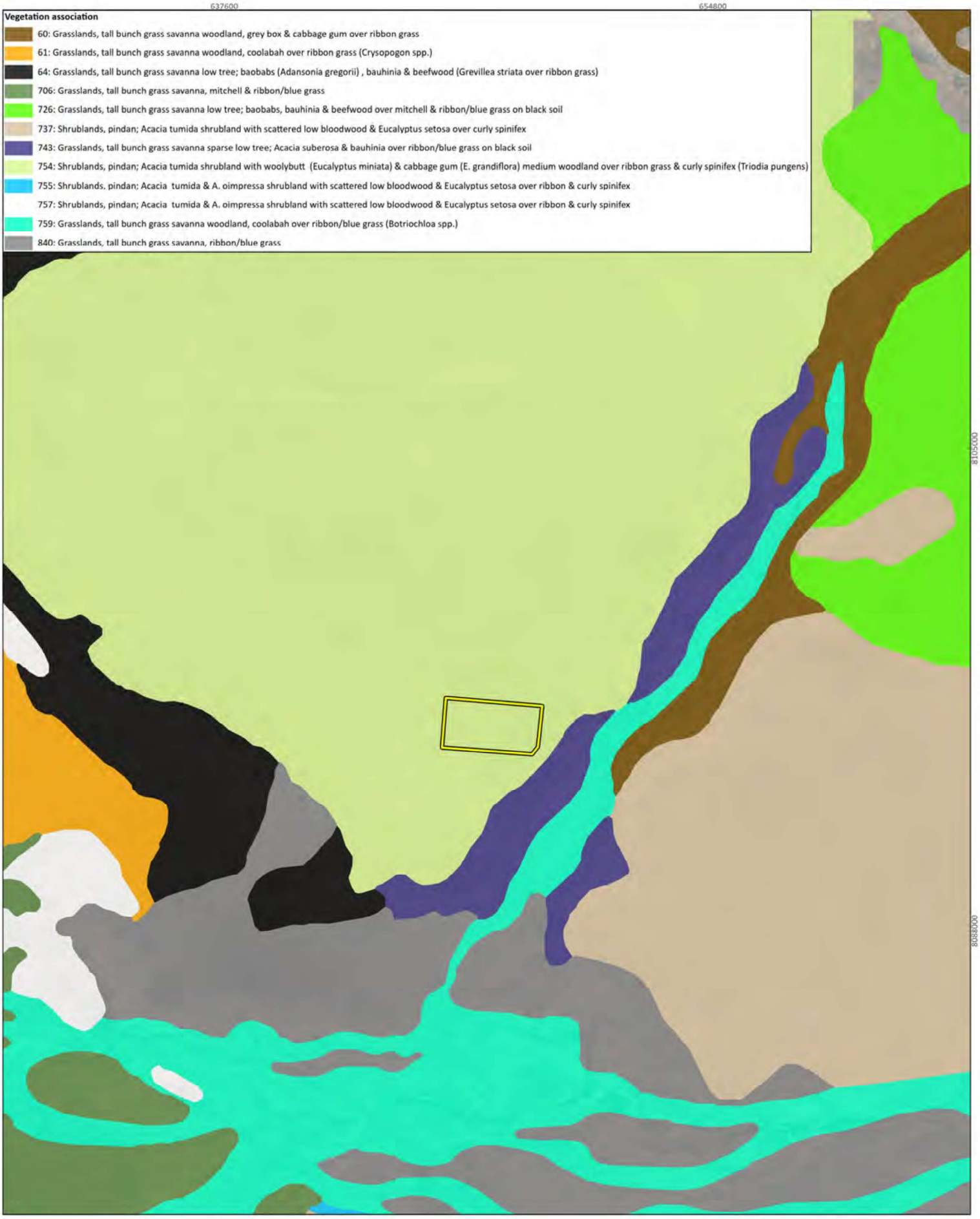
A reconnaissance survey was also undertaken within a 15 km buffer of Permit Area to conduct relevé sampling and identify riparian vegetation and potential groundwater dependent indicator species (Phoenix 2022), particularly for 3 potential groundwater dependent ecosystems identified by the hydrogeological assessment conducted for the Project (IGS 2021).

3.4.2 Broad-scale vegetation associations

Regional scale vegetation mapping by Shepherd, Beeston et al. (2002) defined a single broad-scale vegetation association in the Permit Area (Figure 3-3), association 754, Fitzroy Sandplains. Association 754 had 100% or nearly so of its pre-European extent remaining in 2019 (Government of Western Australia 2019) and is classified as of Least Concern (Table 3-3).

Table 3-2 Pre-European vegetation association in Permit Area (Government of Western Australia 2019)

Assoc.	Description	Dampierland bioregion			Current DBCA managed lands (ha)	Status	Extent in Permit Area (ha)
		Pre-European extent (ha)	Current extent (ha)	% remaining			
754	*Acacia* thicket with eucalypt woodland over spinifex *Acacia tumida*, *Eucalyptus tectifica*, *Corymbia grandifolia*, *Triodia pungens*, *T. bitextura*	195,333.2	195,333.2	100	172.3	Least concern	586.5



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Kilometers

1:172,000 (at A4) GDA 1994 MGA Zone 51

Permit Area

Figure 3-3

Pre-European vegetation associations

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3.4.3 Flora assemblage

A total of 104 flora taxa representing 40 families and 78 genera identified to species level were recorded in the Permit Area. Species richness ranged from 19 - 36 species between quadrats. The assemblage in the Permit Area represented a small proportion (11.5%) of the flora identified in the desktop assessment to occur in the wider vicinity, attributable to the small size of the Permit Area, limited number of vegetation types in the Permit Area and substantially larger and more diverse habitats in the desktop study area. The survey was considered to have adequately captured the flora richness of the Permit Area based on statistical analysis.

The most prolific families in the Permit Area were the Poaceae (grasses) and Fabaceae (legumes), Malvaceae (38), Myrtaceae (15) and Amaranthaceae (15). These were also most prominent in the desktop assessment.

No introduced species were recorded in the Permit Area.

3.4.4 Significant flora

No Threatened flora were recorded during the field survey. This was expected as the desktop assessment determined that no Threatened flora have been recorded for the Fitzroy Trough IBRA subregion.

Two Priority flora were recorded in the Permit Area: *Lophostemon grandiflorus* subsp. *grandiflorus* (P3) and *Goodenia sepalosa* var. *glandulosa* (P3).

L. g. subsp. *grandiflorus* was recorded at two nearby sites in the Permit Area (Figure 3-4) where it was a dominant overstorey species in a tall shrubland that surrounded a seasonally wet depression (vegetation types MccLggCr and MvPsp). The species was also recorded at 7 additional locations in the reconnaissance study area (Figure 3-4) out of 15 sites visited, indicating it is common locally and additional populations are likely to occur in the broader vicinity. The records were all from small seasonal wetlands/depressions.

The survey records for *L. g.* subsp. *grandiflorus* represent an infill of the known distribution of this species, which occurs across the Dampierland and Victoria Bonaparte bioregions (WA Herbarium 1998). Records for the species in Florabase are sporadic but widespread, occurring ~180 – 200 km west, NW and SW of the Permit Area, and ~460 km NE. The survey populations represent the first records of the species for the Fitzroy Trough subregion. All Florabase records are associated with wet/mesic habitats, including drainage basins, vine thickets, swamps and seepages.

G. s. var. *glandulosa* was recorded at a single quadrat site in the Permit Area (Figure 3-4) where it was present in low numbers under isolated *Corymbia* trees over a tall *Acacia* shrubland (vegetation type AttSs). This species has a wide distribution having been recorded from the Dampierland, Northern Kimberley, Victoria Bonaparte bioregions. It has been recorded in the Fitzroy Trough subregion previously, in similar Pindan vegetation to that of the survey records.

Habitat descriptions in Florabase for *G. s.* var. *glandulosa* include herb/sedgelands on minor drainage channel, *Corymbia* woodlands over tall *Acacia* shrublands and Pindan woodland (WA Herbarium 2023). Population sizes recorded in Florabase are limited, but mention single plants, less than 1% cover and uncommon.

A significant (212.6 km south-west) range extension was identified for one other species at the time of the survey, *Phyllanthus* sp. B Kimberley Flora (T.E.H. Aplin et al. 809); however, this species has since been recorded roughly 700 km south-west of the Permit Area (G. Wells pers. comm.). The survey records therefore represent an infill population within the species known distribution, not a range extension. *Phyllanthus* sp. B Kimberley Flora is considered a widespread species (Barrat and Telford 2015).

The desktop assessment identified 9 other Priority species that could possibly occur in the Permit Area based on presence of suitable habitat (Table 3-4). All except one species (*Acacia monticola* x *tumida* var. *kulparn*) are known from more than one bioregion. While only known from the Dampierland bioregion, *A. m.* x *tumida* var. *kulparn* has many (20) records in florabase and occurs in two subregions with a known extent of occurrence of >30,000 km^2.

Most of the species also have many (13+) records in Florabase, therefore, if any records of these species are present in the Permit Area, they are unlikely to represent a substantial proportion of the total population.

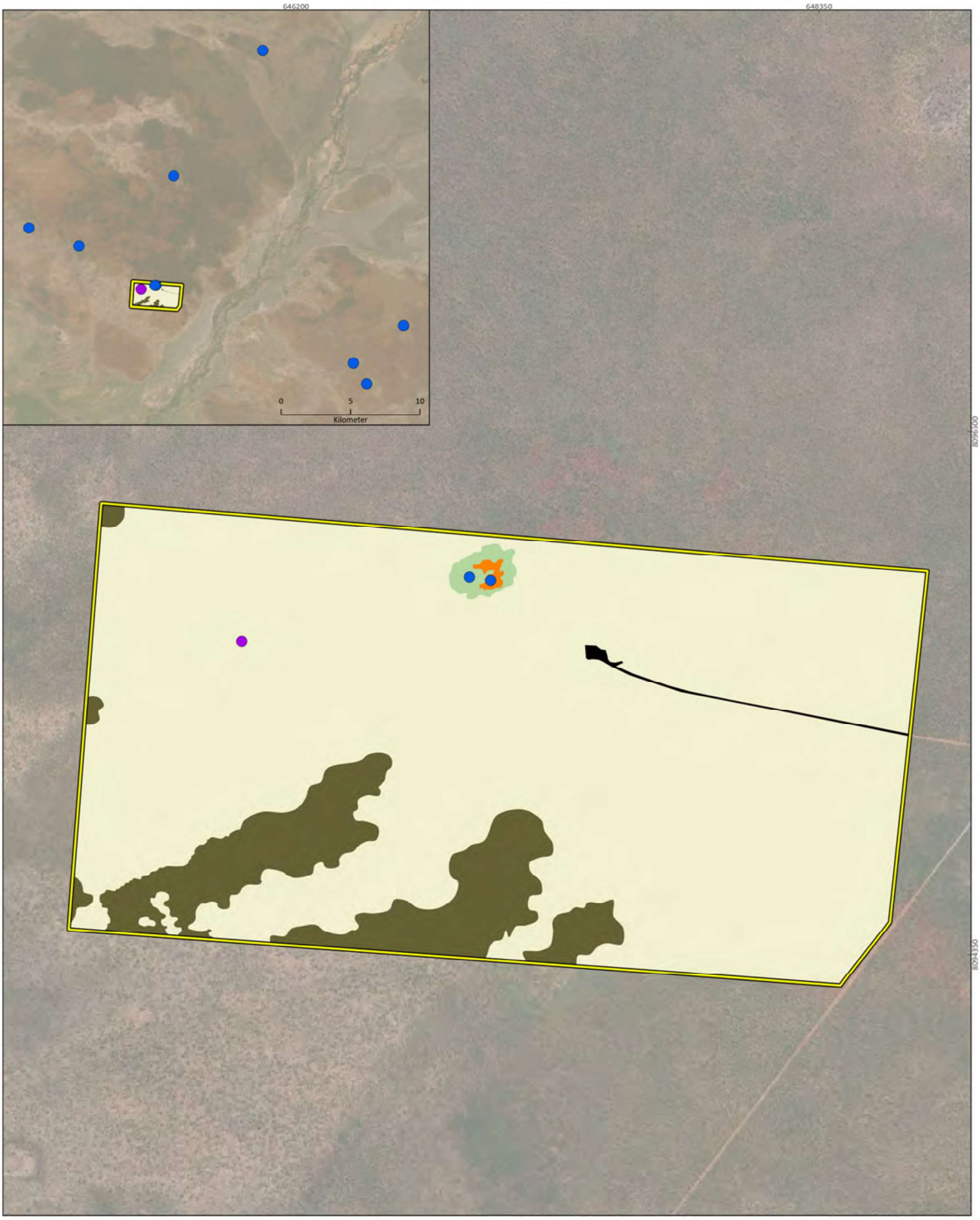
Three species have only a few records in Florabase:

- *Euploca parviantrum* – the extent of occurrence based on disjunct Florabase records for this species is roughly 50,000 km^2. It is highly likely that additional populations occur within its range and therefore any records in the Permit Area (if present) are unlikely to represent a substantial proportion of the species population.
- *Ipomoea johnsoniana* – there are 2 known locations for this species in Florabase > 100 km apart, including one on NDS. The NDS record is from on top of Devonian limestone reef, north of the Permit Area and this habitat type is not present in the Permit Area, therefore low potential for the species to occur in the Permit Area.
- *Schoenoplectiella humillima* – there are 5 records for this species in Florabase over an extent of >15,000 km, and distance between records of >450 km. It is highly likely that additional populations occur within its range and therefore any records in the Permit Area (if present) are unlikely to represent a substantial proportion of the species population.

Table 3-3 Significant flora from desktop assessment identified as possibly occurring in the Permit Area

Species	Status	Distribution, ecology and likelihood of occurrence	Suitable veg. types in Permit Area
Acacia monticola x *tumida* var. *kulparn*	P3	Coastal cliffs and dunes, sand in shrubland over grassland. Known only from the Dampierland bioregion but recorded across the Fitzroy Trough and Pindanland subregions. 20 records in Florabase.	AttSs
Corchorus fitzroyensis	P3	Open *Corymbia* and *Eucalyptus* woodland, savanna on alluvial and colluvial flats, floodplains and riverine woodlands in sandy – clay loam soils. Known from Dampierland and Central Kimberley bioregions. 24 records in Florabase.	AttSs, EmDhaSs
Decaisnina biangulata	P3	Hemiparasitic aerial shrub on *Lophostemon*, *Syzygium*, *Tristania* and *Terminalia*. Known from Central Kimberley, Dampierland and Northern Kimberley bioregions. 14 records in Florabase.	AttSs, EmDhaSs, MccLggCr, MvPsp.
Dendrolobium cheelii	P3	*Eucalyptus* and *Terminalia* open woodlands in clay-loam soil, open *Eucalyptus* forest in deep red clay on edge of swamp, open woodland in loam soil. Known from Central Kimberley and Northern Kimberley bioregions. 14 records in Florabase.	AttSs, EmDhaSs
Euploca parviantrum (formerly	P1	Flats, plains, rocky slopes. Sandy soils. Known from Dampierland and Pilbara bioregions. 4 records in Florabase. No abundance records in Florabase.	AttSs, EmDhaSs

Species	Status	Distribution, ecology and likelihood of occurrence	Suitable veg. types in Permit Area
Heliotropium parviantrum)			
Gomphrena cucullata	P3	Open floodplains. Red sandy loam, clayey sand. Known from Dampierland and Pilbara bioregions. 13 records in Florabase.	EmDhaSs
Ipomoea johnsoniana	P1	Flat open woodland on sandstone outcrop on plain, sandy flats over calcareous limestone. Known from Central Kimberley and Northern Kimberley bioregions. 3 records in Florabase. Records of locally common.	AttSs, EmDhaSs
Schoenoplectiella humillima	P2	Seepages, pools, red-brown clay. Known from Central Kimberley, Dampierland, Northern Kimberley bioregions. 5 records in Florabase. No abundance records in Florabase.	MccLggCr, McPsp.
Stylidium costulatum	P3	Open *Eucalyptus* and *Corymbia* woodlands and pindan vegetation frequently in riparian vegetation and seasonally wet areas in sand, clayey-sand soils. Likely to occur as records near Permit Area Known from Central Kimberley, Dampierland and Northern Kimberley bioregions. 15 records in Florabase.	MccLggCr, McPsp.
Stylidium pindanicum	P3	Damp, sandy soils, clay flats. Known from Dampierland, Northern Kimberley and Ord Victoria Plain bioregions. 19 records in Florabase.	AttSs, MccLggCr, Mvsp.



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Map author	KC

0 250 500
Meters

1:20,100 (at A4) GDA 1994 MGA Zone 51

Permit Area

Vegetation type

- AttSs
- Cleared
- EmDhaSs
- MccLggCr
- MvPsp.

Significant flora records

- *Goodenia sepalosa* var. *glandulosa*, P3 (DBCA list)
- *Lophostemon grandiflorus* subsp. *grandiflorus*, P3 (DBCA list)

Figure 3-4

Vegetation types and significant flora

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3.4.5 Vegetation types

Four vegetation types were recorded in the Permit Area (Figure 3-4). Two of these, AttSs (tall *Acacia* shrubland over *Sorghum* and *Chrysopogon* tussock grassland) and EmDhaSs (low open *Eucalyptus* woodland over open mixed shrublands and mixed tussock grasses) collectively occupy 98.9% of the Permit Area (Table 3-5). Vegetation types MvPsp. and MccLggCr represent restricted vegetation types given the confined distribution to a small soak (Figure 3-4).

Vegetation types AttSs and EmDhaSs are representative of the pre-European vegetation association 754 mapped for the Permit Area, which has a current extent of 195,333 ha indicating that a considerable area of similar vegetation occurs outside of the Permit Area.

The only existing cleared areas within the Permit Area are at the single existing bore and an access track to this, totalling 1.7 ha.

Table 3-4 Vegetation types recorded in Permit Area and extent

Vegetation type and description	Extent (ha)	Representative photograph
AttSs Isolated trees of *Eucalyptus miniata* and *Corymbia greeniana* over a tall shrubland of *Acacia tumida* var. *tumida*, *Grevillea refracta* subsp. *refracta* and *Petalostigma pubescens* over a tall open tussock grassland of *Sorghum stipoideum* and *Chrysopogon latifolius*.	514.2	
EmDhaSs Mid to low open woodland of *Eucalyptus miniata*, *Terminalia canescens* and *Corymbia* spp. over a tall open shrubland of *Dodonaea hispidula* var. *arida*, *Petalostigma pubescens* and *Grevillea refracta* subsp. *refracta* over a mixed open tussock grassland of *Sorghum stipoideum*, *Triodia caelestialis* and *Chrysopogon fallax*.	66.2	
MccLggCr Mid open woodland of *Melaleuca cajuputi* subsp. *cajuputi* and *Eucalyptus tectifica* over a low open forest of *Lophostemon grandiflorus* subsp. *grandiflorus* over a low mixed forbland of *Crotalaria ramosissima*, *Indigofera hirsuta* and *Eriocaulon cinereum* with mixed grasses.	3.5	

Vegetation type and description	Extent (ha)	Representative photograph
MvPsp. Low open forest of resprouting *Melaleuca viridiflora* and *Lophostemon grandiflorus* subsp. *grandiflorus* over low, mixed isolated forbs and grasses including *Phyllanthus* sp. B Kimberley Flora (T.E.G. Aplin et al. 809), *Stemodia lathraia* and *Aristida hygrometrica*.	0.9	
Cleared Areas devoid of vegetation	1.7	NA

3.4.6 Vegetation condition

Vegetation in the Permit Area was recorded to be in Very Good to Excellent condition (Figure 3-5) with the majority (99.1%) in Excellent condition (Table 3-6). MccLggCr was the only vegetation unit to record a condition rating other than Excellent, due to the presence of livestock tracks and evidence of grazing (Table 3-6).

Table 3-5 Vegetation condition and extent by condition rating in Permit Area

Condition rating	Area (ha)	Vegetation types
Excellent	581.3	AttSs, EmDhaSs, MvPsp.
Very Good	3.5	MccLggCr
Good	-	-
Poor	-	-
Degraded	-	-
Completely Degraded	-	-
Cleared	1.7	-

Western Australia

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0 250 500
Meters

1:19,600(at A4)

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Permit Area

Vegetation condition

- Excellent
- Very good
- Completely degraded

Figure 3-5

Vegetation condition

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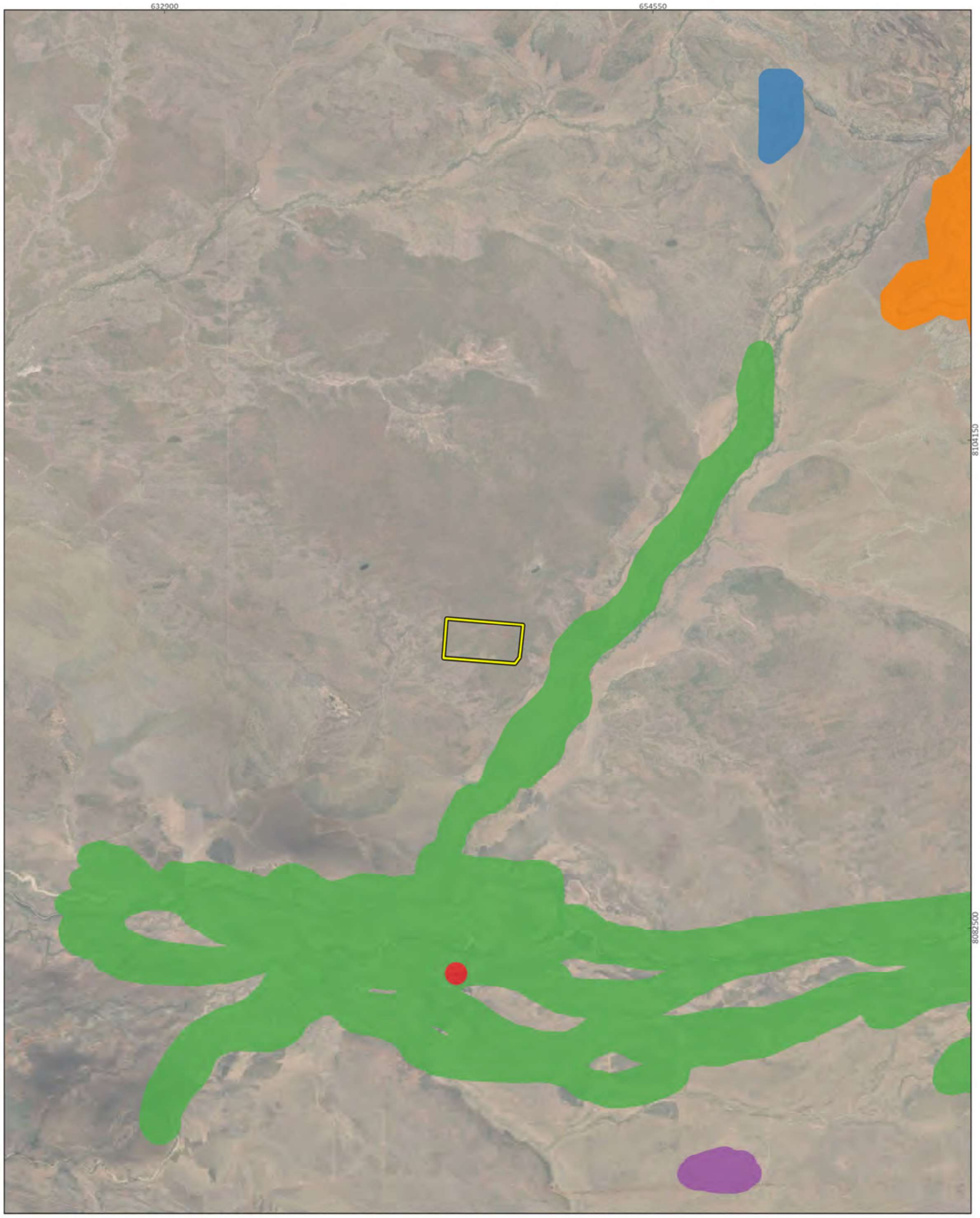
3.4.7 Threatened and Priority Ecological Communities

No Threatened or Priority Ecological Communities (TECs or PECs) were recorded in the Permit Area.

Six PECs occur within the desktop search extent (Figure 3-6). The closest buffer zone, of the Kimberley Vegetation Association 759 PEC, occurs approximately 1.3 km east of the Permit Area (buffer zone of 500 m); this PEC is associated with the riparian and floodplain zones of the Lennard River and Hawkstone Creek. All other PECs are more than 20 km from the Permit Area.

3.4.8 Groundwater dependent ecosystems / vegetation

Two groundwater dependent vegetation (GDV) indicator species were recorded in the vegetation types associated with the small soak (MvPsp. and MccLggCr): *Melaleuca viridiflora* and *Lophostemon grandiflorus* subsp. *grandiflorus.*



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0 2.5 5
Kilometers

1:216,500 (at A4) GDA 1994 MGA Zone 51

Permit Area

Name, category

- Gogo Land System, Priority 3
- Kimberley Vegetation Association 33, Priority 1
- Kimberley Vegetation Association 759, Priority 3
- Kimberley Vegetation Association 760, Priority 1
- Monsoon vine thickets and Camaenid land snails of limestone ranges (Napier Range), Priority 1

Figure 3-6

Priority ecological communities

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3.5 TERRESTRIAL FAUNA

3.5.1 Surveys completed

A review of terrestrial fauna was undertaken as part of the desktop assessment (Phoenix 2020). This was followed by a targeted detailed terrestrial fauna survey of the Permit Area in June-July and August 2022 (Phoenix 2023), which included targeted sampling for significant fauna species, avifauna surveys, short-range endemic (SRE) invertebrate sampling and habitat assessment and mapping (Permit Area plus 1 km buffer). A reconnaissance fauna survey was also undertaken at potential GDEs within a 15 km buffer of the Permit Area (Phoenix 2022).

3.5.2 Fauna habitat

Three fauna habitat types were identified in the Permit Area (Table 3-7; Figure 3-7). Two of these were also present in the 1 km buffer and represent broad habitat types that are widespread in the Kimberley region. The third, open woodland over mixed herbs and grasses surrounding a seasonally inundated depression, has restricted distribution within the landscape, though several other similar seasonal soaks and associated habitat are present in the vicinity as evidenced by the reconnaissance survey.

All habitats were assessed as having low habitat potential for SRE invertebrates.

Table 3-6 Fauna habitat in Permit Area and 1 km buffer, types and extent

Habitat type	Permit Area (ha)	Habitat mapping area[1] (ha)
Open woodland over open shrubland over grassland Mid *Corymbia, Eucalyptus* and *Acacia* open woodland over mixed open shrubland over *Sorghum stipoideum*, *Chrysopogon* and *Triodia* grassland.	75.9	487.7
Shrubland over grassland Sparse *Corymbia* and *Eucalyptus* open woodland over mixed open shrubland over *Sorghum* grassland.	506.2	1,354.5
Open woodland (shrubby regrowth) over mixed herbs and grasses surrounding a seasonally inundated depression Open *Melaleuca* and *Corymbia* woodland (primarily shrubby regrowth) over mixed herbs and grasses.	4.3	4.3

[1] Habitat mapping area comprises the Permit Area plus 1 km buffer.

3.5.3 Vertebrate assemblage

A total of 114 terrestrial vertebrate species were recorded in the Permit Area and 1 km buffer during the field survey, with the assemblage dominated by birds (89 species), with mammals, reptiles and amphibians also represented. The assemblage equated to approximately one third of the 330 species identified in the desktop review, including 5 introduced species. This reflects the small size of the Permit Area and low diversity of habitats relative to the wide vicinity.

3.5.4 Significant vertebrate fauna

3.5.4.1 *Isoodon auratus auratus* Golden Bandicoot

One significant vertebrate species was recorded in the Permit Area during the fauna survey, *Isoodon auratus auratus* Golden Bandicoot (mainland subspecies), listed as Vulnerable under the BC and EPBC Acts. This species was captured in traps at a site on the southern boundary of the Permit Area (Figure 3-7). One male in breeding condition, and one female with 2 juvenile offspring were recorded on separate days at the same site.

Isoodon sp. diggings were recorded within the Permit Area, mainly in the central area, as well as the 1 km buffer (Figure 3-7). These were considered likely to be from both Golden Bandicoot and the similar Northern Brown Bandicoot, which was also captured.

The Golden Bandicoot was formerly widespread, occurring across much of northern and central Australia. It is now restricted to the north-west Kimberley, as well as several islands in the Kimberley and Northern Territory (Threatened Species Scientific Committee 2015).

The taxon *Isoodon auratus* is currently recognised to comprise three subspecies: *I. a. auratus* from the Kimberley region, *I. a. arnhemensis* from the Northern Territory and *I. a. barrowensis* from Barrow Island, although Rick, Bryne et al. (2023) identified a fourth genetic cluster on Augustus Island in the Kimberley. The Threatened species listing for *I. a. auratus* under the EPBC Act merges *I. a. auratus* with *I. a. arnhemensis*.

Decline of *I. a. auratus* on the mainland has been attributed mainly to introduced predators, particularly feral cats (Woinarski, Burbidge et al. 2014). Inappropriate fire regimes are also listed as a key threat to mainland populations as frequent, extensive hot fires have been implicated in the decline of critical weight range mammals.

Golden Bandicoot is considered likely to be resident in and surrounding the Permit Area. Survey records indicate breeding and foraging, although the only evidence of breeding was on the Permit Area southern boundary. The species is at least utilising the Permit Area for foraging.

The most widely mapped habitat type, 'Shrubland over grassland', appeared to be most used by the species; this provides better protection from predators with typically densest understory, and likely contained an abundance of food. The importance of diurnal refuges to Golden Bandicoots for predator protection, insulation from temperature extremes and stable food resources (invertebrates) is highlighted in several studies (e.g. Graham 1996, Chambers and Dickman 2002, Lohr, Nilsson et al. 2021). Diggings were however also recorded in 'Open woodland over open shrubland over grassland' habitat, which was also widespread in the Permit Area and buffer.

It is possible that the population is preferentially utilising the 'Shrubland over grassland' habitat as primary diurnal refuge habitat but foraging in the 'Open woodland over open shrubland over grassland' habitat. Studies have found differing foraging ranges by Golden Bandicoots from their primary refuge habitat (Graham 1996, Southgate, Palmer et al. 1996, Lohr, Nilsson et al. 2021). Possible explanations for this variability were the availability of food resources relative to primary refuge and density of animals and associated intraspecific competition. Bandicoot home range has been negatively correlated with food abundance (Broughton and Dickman 1991).

Both 'Shrubland over grassland' and 'Open woodland over open shrubland over grassland' habitat were observed to be common across the wider region from the reconnaissance survey.

The Golden Bandicoot is known to have multiple breeding events within a year. In the Kimberley, they have previously been recorded with pouch young in both autumn and spring (Office of Environment and Heritage 2019), as well as in July during the terrestrial fauna survey (Phoenix 2023). Elsewhere

they have been recorded breeding continuously throughout the year (Office of Environment and Heritage 2019). Most likely they breed in response to rainfall. It is considered unlikely that clearing for the Project will significantly disrupt the breeding cycle of the species.

Golden Bandicoots are well adapted to survive in arid conditions. A study of *I. a. barrowensis* on Barrow Island found they had high ability to maintain physiological homoeostasis under conditions of extreme aridity (Bradshaw, Morris et al. 1994). The majority of currently known *I. auratus* populations exist within conservation land tenures and Indigenous Protected Areas (Rick, Bryne et al. 2023).

3.5.4.2 Other significant fauna

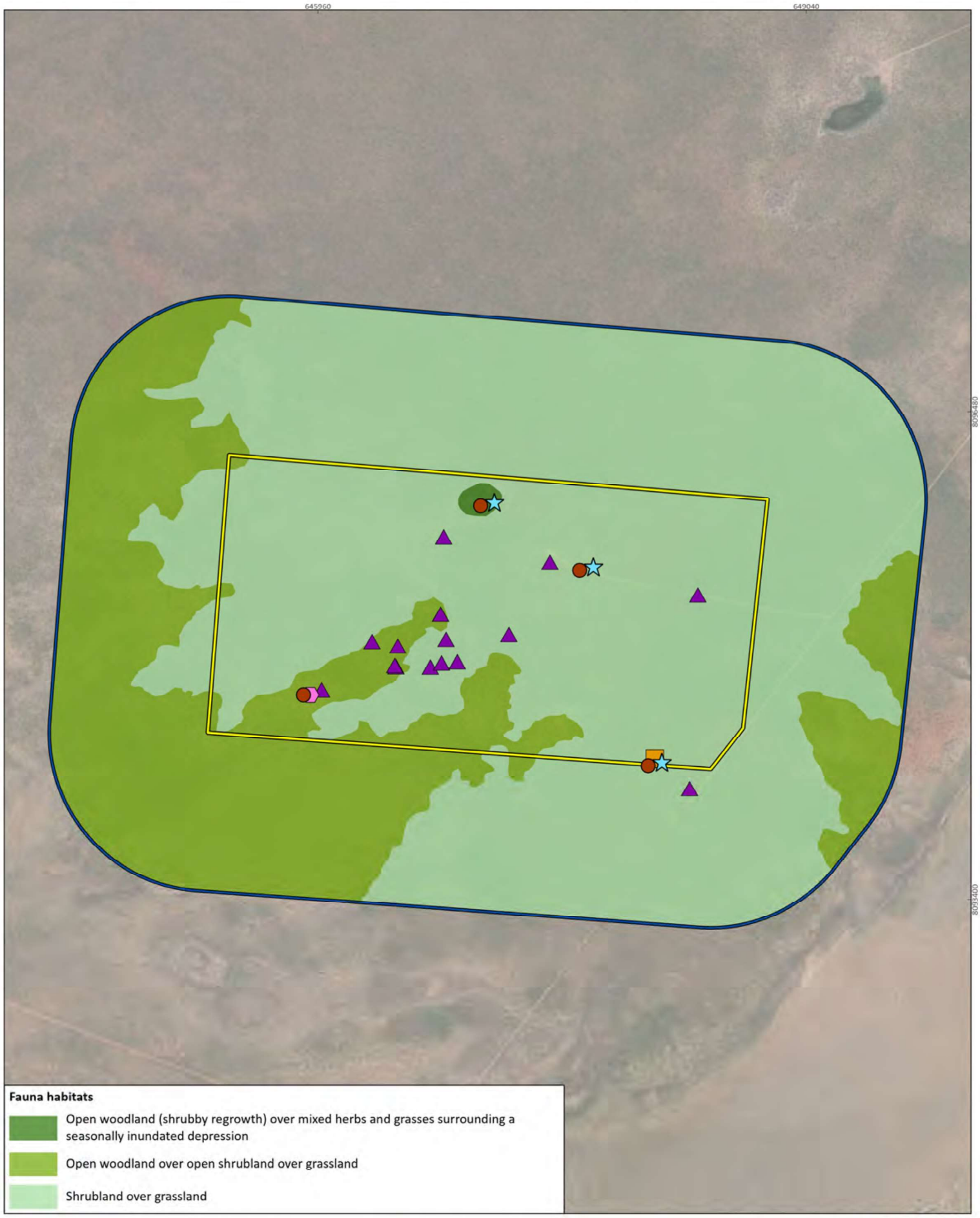
Considering the evidence of presence being readily detected and the wide availability of suitable habitat, the species is likely to occur much more widely than the extent of the survey records.

Several other significant fauna were considered to possibly occur but were not detected in the field survey:

- *Amytornis housei* Black Grasswren (Priority 4) – recorded in the field survey, outside the Permit Area (Figure 3-7)
- *Erythrura gouldiae* Gouldian Finch (Priority 4; Endangered under EPBC Act) – recorded in the field survey, outside the Permit Area (Figure 3-7)
- *Apus pacificus* Fork-tailed Swift (Migratory)
- *Erythrotriorchis radiatus* Red Goshawk (Vulnerable)
- *Falco hypoleucos* Grey Falcon (Vulnerable)
- *Falco peregrinus* Peregrine Falcon (Other Specially Protected)
- *Glareola maldivarum* Oriental Pratincole (Migratory)
- *Hirundo rustica* Barn Swallow (Migratory)
- *Tyto novaehollandiae Kimberli* Masked Owl (Priority 1; Vulnerable under EPBC Act)
- *Dasyurus hallucatus* Northern Quoll (Endangered)
- *Hipposideros aurantia* Northern Leaf-nosed Bat (Priority 2)
- *Leggadina lakedownensis* Northern Short-tailed Mouse (Priority 4)
- *Macroderma gigas* Ghost Bat (Vulnerable)
- *Macrotis lagotis* Bilby (Vulnerable)
- *Phascogale tapoatafa kimberleyensis* Kimberley Brush-tailed Phascogale (Vulnerable)
- *Rhinonicteris aurantia* Orange Leaf-nosed Bat (Priority 4)
- *Saccolaimus saccolaimus nudicluniatus* Bare-rumped Sheath-tailed Bat (Priority 1; Vulnerable under EPBC Act)
- *Trichosurus vulpecula arnhemensis* Northern Brushtail Possum (Vulnerable).

The habitat of the Permit Area is not considered critical habitat for any of the other significant species. Several of these species are likely to forage only, as denning / roosting / nesting habitat is not present, with the exceptions of Gouldian Finch, Grey Falcon, Masked Owl, Kimberley Brush-tailed Phascogale, Bare-rumped Sheath-tailed Bat and Northern Brushtail Possum – for which the open woodland habitat is potential breeding / nesting habitat. This habitat type is much more abundant in the surrounds of the Permit Area than within it.

While not detected in the survey, there is a 2013 desktop record of Northern Quoll along the eastern side of Hawkstone Creek, 5.4 km east of the Permit Area, most likely representing a dispersing / foraging individual. No suitable rocky denning habitat is present in the Permit Area or 1 km buffer; however, the habitats within and surrounding it may be used for dispersal and foraging.



Australian Capital Equity
Napier Downs Irrigation Project

Project No	1628
Date	14/11/2023
Drawn by	JL
Map author	KC

0 0.5 1
Kilometers

1:30,800 (at A4) GDA 1994 MGA Zone 51

Permit Area
Habitat mapping area

Species, status

- *Isoodon auratus auratus* Golden Bandicoot, (VU)
- *Isoodon auratus auratus* or *macrourus*
- *Aname* 'MYG771', Potential SRE
- *Cubaris* sp. indet. 'Napier', Potential SRE
- *Lychas* 'annulatus group', Potential SRE

Figure 3-7
Fauna habitats and significant fauna

PHOENIX ENVIRONMENTAL SCIENCES

3.6 SRE INVERTEBRATES

Seven invertebrate taxa from groups known to contain SRE members were recorded in the survey, comprising 3 species of pseudoscorpions, 2 species of mygalomorph spider, and one species each of scorpion and isopod. Three of these are potential SRE invertebrates (Figure 3-7):

- *Aname* 'MYG771' – a mygalomorph spider, collected from all 4 SRE survey sites, in and out of the Permit Area, and from all 3 habitat types
- *Cubaris* sp. indet. 'Napier' – an isopod, collected from 3 SRE survey sites, in and out of the Permit Area, and from 2 habitat types
- *Lychas* 'annulatus group' – a scorpion, collected from a single site in a widespread habitat type.

All 3 potential SRE taxa were collected from widespread habitat types and are likely to occur more widely in the vicinity of the Permit Area.

3.7 HYDROLOGY

No rivers, drainage lines or significant wetlands intersect the Permit Area. The only surface water feature in the Permit Area is the minor seasonal soak with which vegetation types MvPsp. and MccLggCr are associated. These will not be cleared.

Hawkstone Creek runs north to south-west approximately 2.5 km (at its closest point) east of the Permit Area (Figure 3-8). The Lennard River is approximately 12.5 km south of the Permit Area (Figure 3-8).

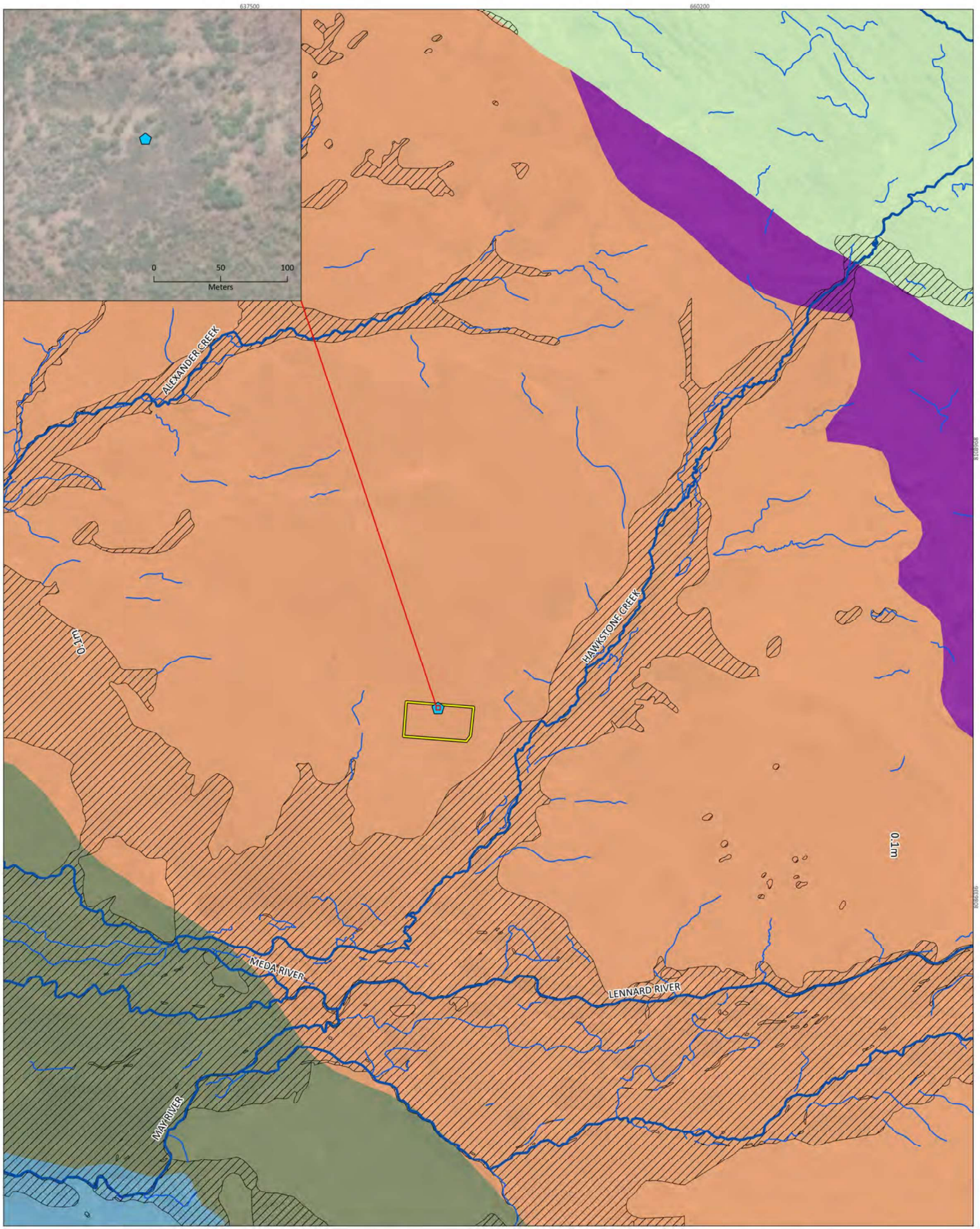
Floodplains of Hawkstone Creek are approximately 1.4 km east of the Permit Area boundary at their closest point. There are some minor drainage lines that drain into the Hawkstone Creek, the closest point of any to the Permit Area is approximately 1.5 km (Figure 3-8).

The Permit Area is located within the Lennard River surface water allocation area (and Lennard River catchment) which has an area of 14,746 km^2. There are no public water drinking source areas in proximity to the Permit Area.

The Permit Area is predominantly a flat sand plain. The mapped surface geology unit in the Permit Area is 'Sand plain 38499 (Czs)', which is described as 'Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand'. The soil type is characteristically Pindan, mainly red-orange loamy sands, which are fast draining.

The Permit Area is located in the Canning-Kimberley groundwater subarea of the Canning-Kimberley groundwater area, as proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). The Permit Area overlies the Grant Group/Poole Sandstone aquifer; which is the target aquifer for the Project (Figure 3-9). The aquifer occurs at the northern extremity of the expansive Canning Basin, which consists predominantly of Palaeozoic sedimentary rocks with a thin Mesozoic and Tertiary cover (Paul, George et al. 2013). Most of the underlying geology of the Canning Basin is covered by Cainozoic colluvium and alluvium. Groundwater levels are roughly 30 m below ground level within the Permit Area.

Ngooderoodyne Spring, which is groundwater fed, is located 10 km to west of the Permit Area (Figure 3-9). Several additional small wetlands/seasonal soaks were recorded with potential groundwater dependent species in the 15 km reconnaissance survey area (Figure 3-9).



Australian Capital Equity
Napier Downs Irrigation Project

Project No	1628
Date	16/11/2023
Drawn by	JL
Map author	KC

0 5 10
Kilometers

1:174,300 (at A3) GDA 1994 MGA Zone 51

- Permit Area
- Rivers
- Minor watercourse / drainage
- Seasonal soak
- Floodplains/ land subject to inundation

Aquifer name (WRIMS)

- Canning - Erskine, Unconfined
- Canning - Grant, Unconfined
- Canning - Limestone, Unconfined
- Canning - Liveringa, Unconfined
- Combined - Fractured Rock Central, Unconfined

Figure 3-8

Hydrological features

PHOENIX ENVIRONMENTAL SCIENCES

4 STAKEHOLDER CONSULTATION

Napier Corporation has consulted with the following stakeholders regarding the Project:

- Department of Water and Environment Regulation – regarding Part IV EP Act assessment, Part V EP Act NVCP assessment and RIWI Act Water licencing
- Department of Primary Industries and Regional Development (DPIRD) – regarding LA Act diversification permit
- Warrwa traditional owners regarding – heritage, native title and land access
- Willinggin traditional owners – regarding native title and land access
- Meda and Kimberley Downs Stations – regarding access to groundwater monitoring locations

Consultation is ongoing with several stakeholders.

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

An assessment of the proposed vegetation clearing against the ten clearing principles is presented in Table 5-1. The assessment is based on the guidance provided in (Department of Environment Regulation 2014).

Table 5-1 Summary of assessment against the ten clearing principles

Relevant information	Assessment of potential impacts	Proposed mitigation and management measures	Outcome
Principle (a) – Native vegetation should not be cleared if it comprises a high level of biological diversity			
A detailed flora and vegetation survey was undertaken in the Permit Area in October 2021 and May 2022 and a targeted detailed fauna survey in June-July and August 2022. The survey recorded 104 flora taxa representing 40 families and 78 genera. Species richness ranged from 19 - 36 species between quadrats. The vegetation in the Permit Area is identified as vegetation association 754, Fitzroy Sandplains which has over 99% of pre-European extent remaining and is classified as Least Concern. Four vegetation types were identified in the Permit Area; 2 of these (AttSs and EmDhaSs) occupy 98.9% of the Permit Area. The remaining 2 vegetation types MccLggCr and MvPsp are both associated with a seasonally wet depression and considered locally significant due to restricted distribution. No PECs are present in the Permit Area. Two Priority flora were recorded in the Permit Area: • *Lophostemon grandiflorus* subsp. *grandiflorus* (P3) at 2 nearby sites the Permit Area in vegetation types MccLggCr and MvPsp; also recorded at 7 other locations outside the Permit Area. • *Goodenia sepalosa* var. *glandulosa* (P3) at a single site in the Permit Area in vegetation type AttSs. Fauna habitats were of low diversity in the Permit Area. Three broad fauna habitats were identified, 2 of which corresponded with the 2 dominant vegetation types	The Permit Area is not considered to be area of high biological diversity. The flora species diversity of the Permit Area represents a small proportion (11.5%) of the recorded flora identified in the desktop assessment to occur in the vicinity. The proportion of the fauna assemblage recorded relative to the desktop records was also small (34%). This is reflective of the small size of the Permit Area, limited number of vegetation/habitat types in the Permit Area and more diverse habitats in the wider vicinity. The 2 prominent vegetation types, AttSs and EmDhaSs, comprising 98.9% of the Permit Area, are representative of vegetation association 754 which has an extent remaining (based on latest vegetation statistics) of 195,333 ha, indicating that a considerable area of similar vegetation occurs outside of the Permit Area. The 2 locally restricted vegetation types associated with the seasonally wet depression, MccLggCr and MvPsp, will not be cleared. No Priority Ecological Communities or Priority fauna have been recorded in the Permit Area. The population of *Lophostemon grandiflorus* subsp. *grandiflorus* (P3) in the Permit Area will not be impacted as it is associated with the 2 vegetation types that will not be cleared. *L. g.* subsp. *grandiflorus* is unlikely to occur elsewhere in the Permit Area as vegetation types MccLggCr and MvPsp represent the only suitable habitat for the species.	Proposed extent of clearing has been reduced from 360 ha to 200 ha. Total extent of vegetation clearing will be limited to 200 ha within the 586.5 ha Permit Area. Clearing areas will be identified using GPS coordinates and demarcated prior to clearing Clearing avoidance areas (at the seasonal wetland) will be permanently demarcated. Implementation of the management measures via environmental management plan. Weed and biosecurity management plan will be implemented to minimise risk of introducing pests, disease, weeds and contaminants to the Permit Area. This will be developed in consultation with DPIRD.	The proposed clearing is unlikely to be at variance with Principle A.

Relevant information	Assessment of potential impacts	Proposed mitigation and management measures	Outcome
occupying >99%: 'Open woodland over open shrubland over grassland' and 'Shrubland over grassland'. The third (open woodland over mixed herbs and grasses surrounding a seasonally inundated depression) has restricted distribution; however, several other similar seasonal soaks and associated habitat are present in the vicinity. A total of 114 terrestrial vertebrate species were recorded in the Permit Area plus a 1 km buffer, representing 51 families and 83 genera. One Threatened fauna species was recorded in the Permit Area, *Isoodon auratus auratus* Golden Bandicoot (Vulnerable under BC and EPBC Act). Recorded in the southern boundary of the Permit Area. Secondary evidence of presence (*Isoodon* sp. diggings) recorded both in and out of the Permit Area and likely to be from both Golden Bandicoot and the non-significant Northern Brown Bandicoot. No Priority fauna were recorded in the Permit Area. The habitat of the Permit Area was assessed as having low potential to support short-range endemic (SRE) invertebrate fauna. Three potential SREs out of 7 invertebrate taxa collected were recorded, all from widespread habitat types, with two collected both in and out of the Permit Area. All three are likely to occur more widely in the region.	One known population of *Goodenia sepalosa* var. *glandulosa* (P3) occurs in the Permit Area and may be impacted by clearing. There are 15 records for the species on Florabase, all representing separate populations, therefore the population in the Permit Area represents 6% of the known populations. Two records are in Yampi Private Nature Reserve and the species has a wide distribution across three bioregions, including one record near the Northern Territory border. It is highly likely that additional populations occur within its range. It is possible that additional populations occur in the Permit Area; however, given the wide distribution, any records in the Permit Area are likely to represent a negligible proportion of the total species population. Within the Permit Area and buffer, 2 main fauna habitat types (Shrubland over grassland and Open woodland over open shrubland over grassland) cover 1,842 ha. As clearing will be limited to a maximum of 200 ha, no more than 10.9% of their total mapped extent will be cleared. Both habitats occur much more widely in the landscape as they are representative of widespread, common Kimberley habitats. The only restricted habitat type (Open woodland over mixed herbs and grasses surrounding a seasonally inundated depression) will not be cleared. None of the potential SRE taxa are likely to be significantly impacted by vegetation clearing as the Permit Area is likely to represent a very small extent of their habitat.		

Relevant information	Assessment of potential impacts	Proposed mitigation and management measures	Outcome
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 indigenous to Western Australia.			
Both broad fauna habitats in the Permit Area were identified as habitat for *Isoodon auratus auratus* Golden Bandicoot (mainland subspecies; VU). Likely to forage in the Permit Area, with evidence (diggings) likely belonging to both *I. a. auratus* and the similar Northern Brown Bandicoot recorded in and out of the Permit Area. Evidence of breeding was recorded only on the southern boundary of the Permit Area but it is possible breeding activity occurs within the Permit Area. 'Shrubland over grassland' habitat possibly preferentially used for primary diurnal refuge habitat due to better protection from predators with typically denser understory than 'Open woodland over open shrubland over grassland' habitat. Both habitats were observed to be common across the wider region from the reconnaissance survey.	Up to 200 ha of fauna habitat is proposed to be cleared that represents suitable habitat for Golden Bandicoot. This represents no more than 10.9% of the total mapped extent of suitable habitat for the species within the Permit Area and 1 km buffer. Maximum potential clearing for each habitat type is: • Shrubland over grassland – 506.2 ha present in the Permit Area, 848.3 ha present in the 1 km buffer. Allowing maximum flexibility for site layout (i.e. assuming all clearing takes place in this habitat type), a maximum of 200 ha, out of 1,354.5 ha of mapped extent (15%) will be cleared. Extensive beyond the buffer, particularly to the north and south. • Open woodland over open shrubland over grassland – 75.9 ha present in Permit Area, 411.8 ha present in 1 km buffer. Clearing of this habitat unlikely to be greater than 40 ha (8% of mapped extent) based on the distribution of this habitat type within the Permit Area. Extensive beyond 1 km buffer particularly to the west and SW. Regionally, clearing represents 0.3% of remaining extent of vegetation association 754, Fitzroy Sandplains. There is potential for localised displacement and direct mortality of Golden Bandicoot during clearing. There is potential for feral cats to increase predation pressure on Golden Bandicoot following vegetation clearing.	Proposed extent of clearing has been reduced from 360 ha to 200 ha. Clearing will be conducted progressively in line with pivot development. This will reduce risk of mortality and displacement on Golden Bandicoot. Feral animal control – feral cat and dog control is already undertaken on Napier Station. The existing control program will be refined in response to risks identified in association with the Project. This will include targeting feral cats in the vicinity of the Permit Area. Annual monitoring of the local Golden Bandicoot population and feral animals will be undertaken to assess population persistence for a sufficient period to demonstrate no significant impact to Golden Bandicoot.	The proposed clearing may be at variance with Principle B.

Relevant information	Assessment of potential impacts	Proposed mitigation and management measures	Outcome
Principle (c) – Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.			
No Threatened flora were recorded during the field survey. This was expected as the desktop assessment determined that no Threatened flora have been recorded for the Fitzroy Trough IBRA subregion.	The vegetation in the Permit Area does not contain, nor is necessary for the continued existence of Threatened (rare) flora.		The proposed clearing is not at variance with Principle C.
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.			
No TECs were recorded in the Permit Area during the field survey. No TECs were identified in the desktop assessment for the Project.	The vegetation in the Permit Area does not comprise, in whole or part, nor is necessary for the maintenance of a TEC.		The proposed clearing is not at variance with Principle D.
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.			
A single regional vegetation association (Shepherd, Beeston et al. 2002) is mapped in the study area, association 754: *Acacia* thicket with eucalypt woodland over spinifex *Acacia tumida*, *Eucalyptus tectifica*, *Corymbia grandifolia*, *Triodia pungens*, *T. bitextura*. Association 754 is recorded as having 100% remaining (Government of Western Australia 2019) and therefore is of least concern.	The Permit Area is does not represent a remnant of native vegetation that has been extensively cleared. The Permit Area is located in a region of largely intact remnant native vegetation. Regionally, the proposed clearing of 200 ha represents less than 0.1% of remaining extent of vegetation association 754, Fitzroy Sandplains.	Implement control measures as described above.	The proposed clearing is not at variance with Principle E.
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.			
The Permit Area is located within the Lennard River surface water allocation area. No rivers, drainage lines or significant wetlands intersect the Permit Area. The only surface water feature in the Permit Area is the minor seasonal soak with which vegetation types MvPsp. and MccLggCr are associated.	Vegetation types MccLggCr and MvPsp associated with the minor seasonal soak in the Permit Area will not be cleared. No vegetation growing in or in association with a watercourse or wetland will be cleared.		The proposed clearing is not at variance with Principle F.
Principle (g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.			
The Permit Area is a flat sandplain with fast draining Pindan soils.	Clearing for the Project is unlikely to cause significant erosion or impacts to soil structure or quality due to the flat topography and fast draining Pindan soils. In addition, the proposed crop, Rhodes grass, is recognized as a useful crop	Drainage controls will be implemented to manage water runoff and avoid erosion risk.	The proposed clearing is unlikely

Relevant information	Assessment of potential impacts	Proposed mitigation and management measures	Outcome
The Permit Area and surrounds is mostly uncleared, intact remnant vegetation. The only cleared areas in the Permit Area are at the existing bore and access track to this. Vegetation type MccLggCr associated with the seasonal soak had evidence of livestock tracks and grazing, other than this, the vegetation of the Permit Area was recorded to be in Excellent condition. Disturbance in the vicinity of the Permit Area is also limited to station tracks and livestock tracks/grazing.	for erosion control because of its spreading growth habitat (Pastures Australia 2007). It is therefore likely to have a stabilizing, rather than degrading effect on the soils of the Permit Area. The Permit Area is not in an area at risk of acid sulphate soils or land salinisation.		to be at variance with Principle G.
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.			
The Permit Area is not situated within or adjacent to any conservation reserves. The closest conservation reserve, King Leopold Ranges Conservation Park, is situated 58 km northeast. Wilinggin Indigenous Protected Area (IPA) is located 2.6 km to the east. The closest Environmentally Sensitive Area is 33.5 km northeast of the Permit Area. The Permit Area occurs within the vast West Kimberley National Heritage Place, listed under the EPBC Act. The Permit Area is situated over the King Leopold Orogen geological province, one of the values associated with the listing; however, no surface expressions of the King Leopold orogen are present in the Permit Area. The Permit Area does not intersect any of the other specific features described in the West Kimberley National Heritage Place.	Vegetation clearing will not have an impact on the environmental values of any adjacent or nearby conservation area.		The proposed clearing is not at variance with Principle H.
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.			
The Permit Area is located within the Lennard River surface water allocation area and the Canning-Kimberley groundwater subarea of the Canning-Kimberley groundwater area. There are no public water drinking source areas in proximity to the Permit Area.	No watercourses are present in the Permit Area. The proposed clearing is unlikely to lead to sedimentation of water bodies or increase nutrient levels in the Lennard River Catchment due to distance of the Permit Area from any	Drainage controls will be implemented to manage water runoff and avoid erosion risk.	The proposed clearing is unlikely to be at variance with Principle I.

Relevant information	Assessment of potential impacts	Proposed mitigation and management measures	Outcome
The Permit Area overlies the Grant Group/Poole Sandstone aquifer. The aquifers are extensive in area and are recharged via diffuse rainfall infiltration and localised infiltration from rivers and creeks. The Project will abstract groundwater from the Grant Group aquifer under an approved groundwater licence. Groundwater levels are roughly 30 m below ground level within the Permit Area. The nearest creek is Hawkstone Creek, which runs north to south-west approximately 2.5 km (at its closest point) east of the Permit Area. Floodplains associated with the creek are approximately 1.4 km east of the Permit Area boundary at their closest point. The Lennard River is approximately 12.5 km south of the Permit Area.	waterways, the small size and nature of the Project, and low erosion potential of the site. Vegetation clearing for the Project is unlikely to affect the groundwater regime for the Grant Group/Poole Sandstone aquifer. The proposed extent of clearing is negligible when compared to the extensive area that recharges these aquifers.		
Principle (j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.			
The Permit Area is a flat sandplain with fast draining Pindan soils.	Clearing for the Project is unlikely to exacerbate the incidence of flooding at the site. Waterlogging is not an issue in the Permit Area due to the sandy, fast draining soils. This is unlikely to change with clearing of vegetation and replacement with Rhodes grass.	Drainage controls will be implemented to manage water runoff and avoid erosion risk.	The proposed clearing is unlikely to be at variance with Principle I.

6 SUMMARY

The purpose of this NVCP application is to seek approval to clear up to 200 ha of native vegetation within the Permit Area in order to develop the Project as described in section 2.

Biological surveys have been conducted to define the botanical and faunal characteristics of the Permit Area; the results of these have informed the assessment against the clearing principles.

The Permit Area is not located within or adjacent to any conservation areas.

Floral species diversity in the Permit Area is modest, due to the limited vegetation types present and relatively small size of the Permit Area. Two vegetation types, AttSs and EmDhaSs, collectively comprise 98.9% of the Permit Area, and are representative of regional vegetation association 754 which has a current extent of 195,333 ha. The Permit Area represents 0.3% of the remaining extent of association 754.

Two locally restricted vegetation types, MccLggCr and MvPsp, associated with a minor seasonally wet depression will not be cleared.

Of two Priority flora recorded in the Permit Area:

- *Lophostemon grandiflorus* subsp. *grandiflorus* (P3) will not be impacted as it is associated with vegetation types MccLggCr and MvPsp that will not be cleared
- *Goodenia sepalosa* var. *glandulosa* (P3) – one known population may be impacted by clearing however, the species has a wide distribution and records in the Permit Area are likely to represent a negligible proportion of the total population.

One Threatened fauna species, Golden Bandicoot (mainland subspecies; VU), was recorded in and adjacent to the Permit Area. No more than 10.9% of local extent (Permit Area plus 1 km buffer) of suitable habitat for the species will be cleared and suitable habitat is extensive and contiguous beyond the 1 km buffer.

No Threatened flora, TECs or PECs will be impacts by the proposed clearing.

No Priority fauna have been recorded in the Permit Area.

No rivers, drainage lines or significant wetlands intersect the Permit Area. The Permit Area is a flat sandplain with fast draining Pindan soils, therefore potential for erosion and sedimentation is unlikely to be significant.

Environmental impacts will be managed under an environmental management plan and weed and biosecurity management plan.

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