Wonmunna Iron Ore Project

Great Northern Highway Intersection

NATIVE VEGETATION CLEARING PERMIT

Proponent:

Address:

Postal Address:

Corporate contact:

Phone:

Email:

[redacted]

18 December 2020

TABLE OF CONTENTS

TABLES

FIGURES

1. INTRODUCTION

1.1 PROJECT BACKGROUND

The Wonmunna Iron Ore Project (WIOP) is a high-grade iron ore Project owned by Wonmunna Iron Ore Pty Ltd (WIOPL), a wholly owned subsidiary of Mineral Resources Ltd (MRL). The WIOP is located approximately 70km west-northwest of Newman, in the Shire of East Pilbara Western Australia (WA; Figure 2) and involves the extraction of high-grade iron ore from multiple open cut mining pits. Ore from the WIOP will be hauled to Port Hedland for export via the Great Northern Highway (GNH).

WIOPL plan to construct a haul road, via Miscellaneous licence L 47/726, that will connect the WIOP infrastructure to the GNH. Most of the road is already approved under the WIOP Mining Proposal Addendum (REG ID 82535) however, clearing within the GNH road reserve, for the construction of the intersection of the GNH and the WIOP haul road, has not yet been approved.

MRL have secured authorisation from Main Roads Western Australia (MRWA) to conduct clearing for and construct an intersection where the WIOP haul road enters the GNH (SLK 1250.92). To maintain road safety associated with road trains entering and exiting the highway, the intersection design will include slip lanes, an overtaking lane and a truck acceleration lane. The construction of the intersection will require the clearing of native vegetation.

Photos looking east and west of the proposed intersection are shown in Figure 1.

1.2 PURPOSE

The purpose of this Native Vegetation Clearing Permit (NVCP) application is to provide clearing authorisation, within the GNH road reserve, to allow the construction of the intersection of the GNH and the WIOP haul road including slip lanes, an overtaking lane and a truck acceleration lane (GNH Intersection). This application seeks approval for up to 10 ha of clearing within a 79.5 ha Purpose Permit area centred along a 3.75 km stretch of the GNH.

WIOPL plan to commence clearing (pending approval) in Q1 CY2021.

FIGURE 1: PHOTOS OF THE PROPOSED INTERSECTION LOCATION

Legend

Wonmunna Project

0 15 30 60
km
Scale: 1:2,500,000 @ A4

N

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY

Source: Cadastre - Landgate, 2018
Orthophoto - Landgate. 2018

Preston Consulting

CREATED	JOB	DATE	REVISION
ENVIRONMAPS	PC2900250	4/12/2020	0

MINERAL RESOURCES

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FIGURE 2: REGIONAL LOCATION

2. PURPOSE PERMIT AREA

2.1 BOUNDARY

All clearing of native vegetation for the GNH Intersection is proposed to be conducted within the Purpose Permit boundary (Permit Area) shown by the blue border in Figure 3. The Permit Area in relation to the WIOP is shown in Figure 4.

Shapefiles of the Permit Area are provided in Appendix 1.

2.2 TENURE AND LAND ACCESS

The Permit Area is entirely within the GNH road reserve (SLK 1250.92) which is managed by MRWA. MRWA have provided written authority for MRL to conduct clearing, for the purpose of constructing the GNH Intersection, within the GNH road reserve.

119°2'30"E

M 282SA

E 47/542-I

GREAT NORTHERN HWY

PROPOSED ROAD

E 47/1137-I

L 47/726

L 47/727

LAYDOWN

PIT
& WRL

NMM WEST

M 47/1424-I

CAMP

23°7'30"S

119°2'30"E

Legend

- Permit Area
- Cadastre
- Tenement
- Wonmunna Iron Ore Project
- Weeli Wolli Creek Exclusion Zone

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- TENEMENTS SOURCED DMRS 2020
- LOCALITY MAP SOURCED LANDGATE 2006
- AERIAL PHOTOGRAPHY OPEN SOURCE

Preston Consulting

0 100 200 300 400
m

Scale: 1:15,000 @ A3

N

LOCALITY MAP

CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900250	7/12/2020	0

MINERAL RESOURCES

ENVIRONMAPS | t: 0406 590 006
Environmental Mapping Solutions | www.environmaps.com.au

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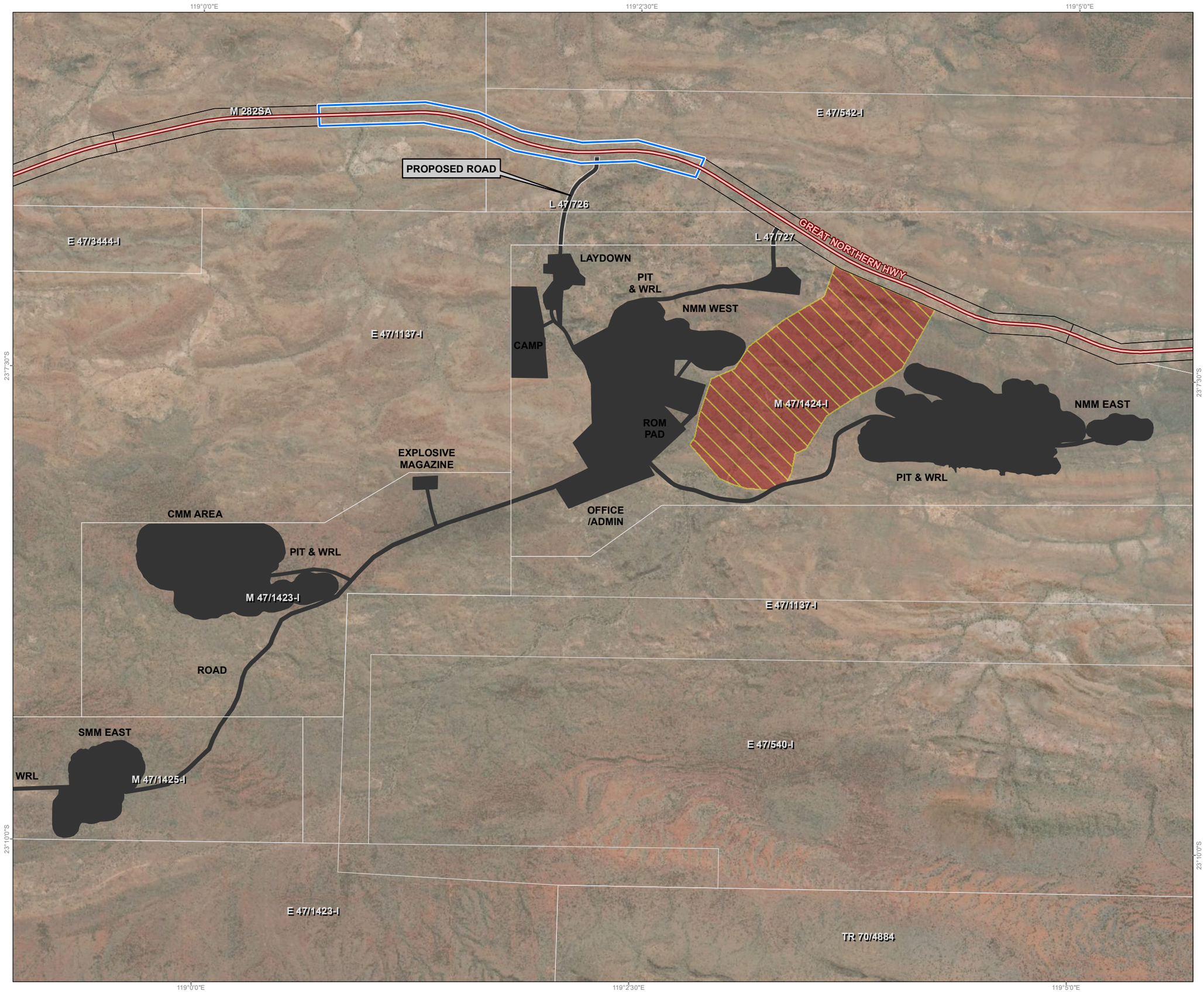
FIGURE 3: PERMIT AREA



Legend

- Permit Area
- Cadastre
- Tenement
- Wonmunna Iron Ore Project
- Weeli Wolli Creek Exclusion Zone

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- TENEMENTS SOURCED DMRS 2020
- LOCALITY MAP SOURCED LANDGATE 2006
- AERIAL PHOTOGRAPHY OPEN SOURCE

Preston Consulting

0 0.5 1 1.5 2 km

N

Scale: 1:35,000 @ A3

LOCALITY MAP

CREATED BY	JOB	DATE	REVISION
ENVIRONMAPS	PC2900250	7/12/2020	0

MINERAL RESOURCES

ENVIRONMAPS | t: 0406 590 006 | Environmental Mapping Solutions | www.environmaps.com.au

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FIGURE 4: PERMIT AREA IN RELATION TO THE WIOP

3. PROPOSED ACTIVITIES

3.1 DESCRIPTION OF PROPOSED ACTIVITIES

This NVCP application seeks approval for the clearing of up to 10 ha of native vegetation for the construction of the GNH Intersection which includes slip lanes, an overtaking lane and a truck acceleration lane.

The GNH Intersection will be constructed according to road safety standards and in accordance with MRWA specifications. In accordance with MRWA requirements, construction of the intersection will include a bitumen sealed road surface, that will extend 100 m or to the boundary of the road reserve (whichever is greatest), along the WIOP haul road.

The vegetation disturbance is associated with widening an existing road, and hence will not significantly change existing impacts associated with the Great Northern Highway - such as changes to drainage, barriers to fauna and noise. Where necessary drainage line crossings will include erosion control, including culverts, to maintain surface water flows.

3.2 METHOD OF VEGETATION DISTURBANCE

Vegetation will be stripped using dozers with a clearing rake blade attached. The cleared vegetation will be stockpiled in wind rows adjacent to topsoil stockpiles. Vegetation will be utilised in the rehabilitation of disturbed areas.

3.3 ESTIMATED VEGETATION DISTURBANCE REQUIREMENTS

This application seeks approval for up to 10 ha of native vegetation clearing, within the 79.5 ha Permit Area, centred along a 3.75 km stretch of the GNH.

3.4 REHABILITATION AND MAINTENANCE

Management strategies to minimise the impact of land clearing will be consistent with the WIOP Mining Proposal and Mine Closure Plan. These strategies will include:

- Disturbance areas will be minimised and clear delineation of clearing limits will be installed;
- Existing tracks and roads will be utilised where possible;
- Clearing of preferred habitats within the Permit Area should be minimised as far as practicable;
- Disturbance to habitat trees will be avoided where possible;
- No off-road driving will be permitted;
- Topsoil management strategies will be implemented, including:
    - Remove and stockpile topsoil and vegetation from mining areas for later use in rehabilitation;
    - Strip topsoil at a depth of 10cm to minimise dilution of soil seed bank reserves;
    - Topsoil and subsoil stockpiles will be located away from designed drainage pathways;
    - Utilise topsoil and vegetation to rehabilitate areas at the earliest opportunity to minimise losses of seed reserves that occur during storage;
    - If topsoil stockpiles are required to be left in situ for some time, and if stockpiles have not vegetated, ripping and seeding will occur to maintain the quality of the resource;
    - Undertake seed collection from local populations to preserve provenance.
- Disturbance areas and topsoil stockpiles will be monitored for erosion losses and weed growth;

- All disturbed areas will be rehabilitated as soon as possible, consistent with procedures outlined in the WIOP Mining Proposal and Mine Closure Plan;
- Strategies to limit erosion and sedimentation will be implemented through surface water management measures;
- The road surface will be constructed with a camber, table drains and regular turnouts to discharge surface runoff into the natural surrounds;
- Road crossings of waterways will be constructed and designed for minimal disturbance, with care given to limit erosion and scour at the crossing point to remove the potential of subsequent sedimentation impact downstream;
- Impacts to the populations of Western Pebble-mound Mouse will be minimised by avoiding disturbance in the vicinity of known active mounds and suitable habitat (spinifex grasslands and stony plains) as far as is practicable;
- Known, active pebble mound areas in areas adjacent to disturbed areas will be protected with buffers established around the mounds to reduce interference;
- For mounds located within disturbance areas where impacts cannot be avoided, discussions with the Department of Biodiversity, Conservation and Attractions (DBCA) will occur to determine the most appropriate and up-to- date management procedures;
- Disruption to the natural hydrological regimes will be avoided as far as practicable;
- Clearing, movement and disturbance around creeklines will be strictly limited;
- Strict weed hygiene measures will be employed during construction and operation of the mine. This will include:
    - Stringent vehicle hygiene (including wash down) to minimise the potential of importing weed species into the area;
    - Staff trained to recognise weed species prior to commencing work to allow reporting of new infestations and to facilitate minimisation of weed spread through avoidance of weed infested areas;
    - Minimising soil disturbance, particularly where weeds are present;
    - Ensuring soil from weed infested areas is not transported from the site, nor mixed with salvaged topsoil for utilisation in progressive rehabilitation of disturbed sites;
    - Conducting regular vehicle wash downs; and
    - Undertaking regular monitoring for weeds to identify and manage any new infestations.
- Fire risk will be managed through the implementation of Standard Operating Procedures and will include:
    - Risk management and fire management training for all staff;
    - Creation of firebreaks around infrastructure sites; and
    - Installation of appropriate fire-fighting equipment on all heavy and light machinery.

3.5 INDICATIVE TIMELINE

The proposed clearing is planned to occur between January 2021 and December 2026.

4. RELEVANT ENVIRONMENTAL CHARACTERISTICS

This section contains information about the environmental characteristics of the Permit Area (within the context of the region) that may be relevant to this NVCP application.

In November 2020, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by MRL to undertake a reconnaissance survey and desktop review of a 75.9 ha area, centred along a 3.75 km stretch of the GNH (Study Area; Figure 5). The survey was undertaken to provide data to support this NVCP application. The survey aimed to document any significant flora and fauna values within the Study Area.

The scope of work included *Biodiversity Conservation Act 2016* (WA; BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (Cth; EPBC Act) Threatened flora and fauna database searches, identification of the potential occurrence of conservation significant taxa or communities, a field survey and mapping of vegetation types and condition.

The survey report prepared by Phoenix for the GNH Intersection is provided in Appendix 2. The information in this section has been sourced from this document unless otherwise referenced.

4.1 BIOGEOGRAPHIC REGIONS

The Study Area is located entirely within the Hamersley subregion (PIL03) of the Pilbara bioregion which is characterised as a mountainous area of Proterozoic sedimentary ranges and plateaux dissected by basalt, dolerite and shale gorges (Kendrick, 2001). The vegetation of the region is largely characterised by Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (Kendrick, 2001).

4.2 LAND SYSTEMS AND SOILS

The Study Area intersects two land systems described, as follows, by Van Vreeswyk et al. (2004):

- Newman – Rugged high mountains, ridges and plateaux with near vertical escarpments of jaspilite, chert and shales supporting hard spinifex grasslands. Newman was the second largest land system recorded by Van Vreeswyk et al. (2004).
- Rocklea - Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands, with relief up to 110m. This was the largest land system recorded by Van Vreeswyk et al. (2004) and widespread throughout the Pilbara.

Both land systems are represented within the Hamersley Range National Park conservation estate.

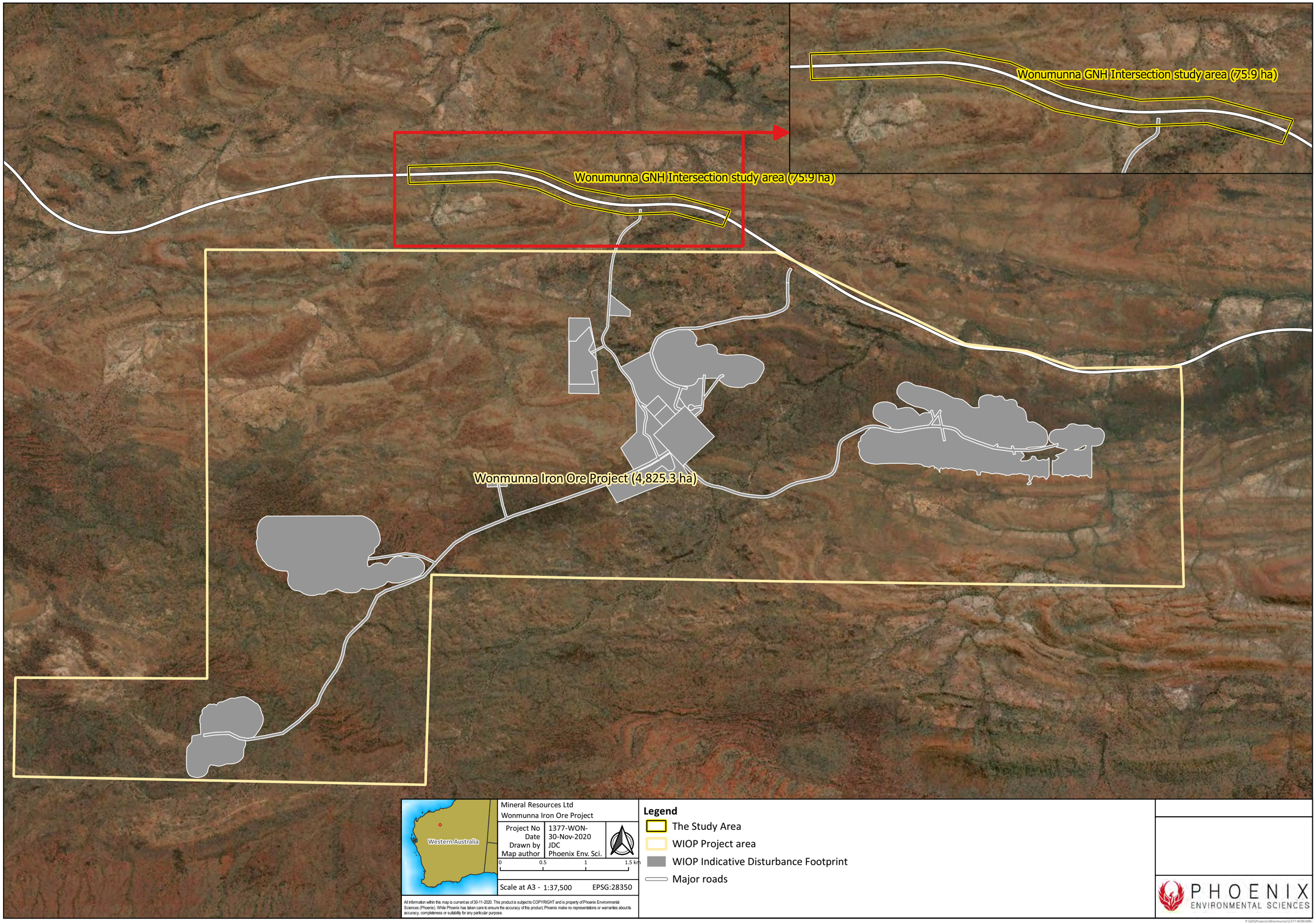

FIGURE 5: STUDY AREA

4.3 TOPOGRAPHY AND DRAINAGE

The Central Pilbara region is drained by the Ashburton and Fortescue Rivers, which flow northwest towards the Indian Ocean (Johnson and Wright, 2001). All rivers are seasonal, reflecting the erratic nature of rainfall, and only flow after heavy rain. Pools and springs are often present in the river beds after the rivers cease to flow. The rivers mostly flow through single well-defined channels however, the channels often become poorly defined in a network of braided tidal creeks and salt flats along the coast (Kendrick, 2001). The Weeli Wolli Creek catchment, including Marillana Creek and Yandicoogina Creek, represents a significant surface water flow (10%) into the Fortescue Marshes (Johnson and Wright, 2001) 70km to the north. Weeli Wolli Creek can be divided into three zones:

- An upper catchment (above Weeli Wolli Springs);
- a lower catchment; and
- a broad outwash on the Fortescue Plain.

The upper catchment comprises a number of tributaries that flow between east-west trending ranges before flowing through a narrow gorge in the Packsaddle Range at Weeli Wolli Spring. The gorge forms the surface and groundwater outlet from the southern half of the Weeli Wolli catchment. The spring is a permanent water feature that is supported by groundwater discharge. Surface water flow disappears about 2km downstream of the spring as a result of seepage and evaporation.

Groundwater is fresh and slightly alkaline, although there is increasing groundwater salinity towards the spring (up to 600 mg/L TDS). This results from increased evapotranspiration near the gorge as the shallow water table supports extensive stands of phreatophytic vegetation. Groundwater in the fractured-rock aquifers occurs where secondary porosity has developed in fractured and weathered zones or along bedding plane partings or joints (Van Vreeswyk *et al*., 2004). Recharge is episodic and affected by direct infiltration of rainfall over areas where the rocks are fractured, weathered and jointed. Surface leakage flows into the basement rocks or through superficial sediments will also account for recharge.

Stream flow in the Pilbara region is directly in response to rainfall and is extremely dynamic with the majority of the stream flow therefore occurring during the summer months. The area experiences large changes in stream flow, with some associated variation observed in groundwater levels (particularly in shallow waters) from year to year and even decade to decade. Stream flow in the smaller flow channels is typically of short duration and ceases soon after the rainfall passes. In the larger river channels which drain the larger catchments, runoff can persist for several weeks and possibly months following major rainfall events such as those resulting from tropical cyclones.

It is not uncommon for base flow to be uneven with some years exhibiting extremely low flow in creek systems and some years exhibiting relatively high flow which may be attributable to either once off large events (cyclones) or multiple smaller events (fronts and rain depressions) (RPS, 2012). Surface water drainage in the Project area generally trends north but is locally variable in dissected terrain.

4.4 FLORA AND VEGETATION

The information in this section has been sourced from the reconnaissance flora and fauna field survey and desktop study conducted by Phoenix (2020) unless referenced otherwise.

The desktop study identified within a 10 km radius, 82 flora taxa, from 24 families and 48 genera that included 81 native flora, one naturalised species and five Priority flora species (Phoenix, 2020; Figure 6).

A total of 68 flora taxa representing 17 families and 39 genera identified to species level were recorded in the Study Area during the field surveys (Phoenix, 2020). The assemblage included 66 native species and two introduced species, including 59 perennial species, eight annual or short-lived species and one for which life cycle is not recorded. The most prominent families recorded were Fabaceae (17 spp.), Poaceae (12 spp.),

Myrtaceae (8 spp.) and Amaranthaceae (6 spp.). A full list of these species can be viewed in the table provided in Appendix 5 of Appendix 2.

4.4.1 Conservation Significant Flora

No significant flora was recorded in the Study Area.

Records of ten significant flora species were identified within the desktop search extent, comprising one Threatened flora listed under the EPBC Act and nine Priority flora listed by DBCA. Phoenix (2020) assessed the likelihood of occurrence of these species within the Study Area and determined that all are unlikely to occur (Table 1).

TABLE 1: LIKELIHOOD OF OCCURRENCE FOR SIGNIFICANT FLORA IDENTIFIED IN THE DESKTOP REVIEW

Species	Status	Likelihood of occurrence
Acacia subtiliformis	P3 (DBCA)	Unlikely, suitable habitat found in the Study Area, but area adequately searched for the species
Aristida lazaridis	P2 (DBCA)	Unlikely, no habitat found in the Study Area
Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)	P3 (DBCA)	Unlikely, no suitable habitat in Study Area
Grevillea saxicola	P3 (DBCA)	Unlikely, suitable habitat found in the Study Area but adequately searched for the species
Gymnanthera cunninghamii	P3 (DBCA)	Unlikely, suitable habitat found in the Study Area but adequately searched for the species
Hibiscus sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	P2 (DBCA)	Unlikely, no suitable habitat in Study Area
Lepidium catapycnon	VU (EPBC Act); P4 (DBCA)	Unlikely, suitable habitat found in the Study Area but adequately searched for the species
Ptilotus mollis	P4 (DBCA)	Unlikely, suitable habitat found in the Study Area but adequately searched for the species
Rhagodia sp. Hamersley (M. Trudgen 17794)	P3 (DBCA)	Unlikely, no suitable habitat in Study Area
Triodia sp. Mt Ella (M.E. Trudgen 12739)	P3 (DBCA)	Unlikely, no suitable habitat in Study Area

700000

7450000

Weeli Wolli Spring Community

Wonumunna GNH Intersection study area (75.9 ha)

Wonmunna Iron Ore Project (4,825.3 ha)

Western Australia

Mineral Resources Ltd
Wonmunna Iron Ore Project

Project No	1377-WON-
Date	30-Nov-2020
Drawn by	JDC
Map author	Phoenix Env. Sci.

0 1 2 3 km

Scale at A3 - 1:90,000 EPSG:28350

Legend

- The study area
- Desktop review area
- WIOP Project area
- WIOP Disturbance Footprint
- Major roads
- TEC/PEC within the desktop boundary

Desktop significant flora

- VU (EPBC Act; P4 DBCA list)
- P2 (DBCA list)
- P3 (DBCA list)
- P4 (DBCA list)

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FIGURE 6: DESKTOP RECORDS OF SIGNIFICANT FLORA AND VEGETATION

4.4.2 Introduced Flora

Two introduced flora species were recorded during the survey, neither of which are a Weed of National Significance/Declared Pest (Table 2).

TABLE 2: INTRODUCED FLORA RECORDED IN THE FIELD SURVEY

Family	Species	Declared Pest	WoNS
Asteraceae	*Flaveria trinervia*	no	no
Poaceae	*Cenchrus ciliaris*	no	no

4.4.3 Vegetation Association

Regional scale vegetation mapping by Shepherd *et al.* (2002) mapped two vegetation associations in the Study Area (Table 3, Figure 7). The remaining extent of both vegetation associations, at the state-wide scale, exceeds 50% and they are therefore considered of Least Concern (Table 3). Both associations have over 95% remaining at the bioregional and subregional scales (Shepherd *et al.* 2002).

TABLE 3: STATE-WIDE EXTENT OF PRE-EUROPEAN VEGETATION ASSOCIATIONS PRESENT IN THE STUDY AREA (SHEPHERD ET AL. 2002)

Vegetation association	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent in conservation estates (%)	% of Study Area
29; Mulga (*Acacia aneura*) and associated species	7,903,991	7,898,973	99.9	472,982	37.2
82; Hummock grassland with scattered bloodwoods & snappy gum *Triodia* spp., *Corymbia dichromophloia*, *Eucalyptus leucophloia*	2,565,901	2,553,206	99.5	32,222	62.8

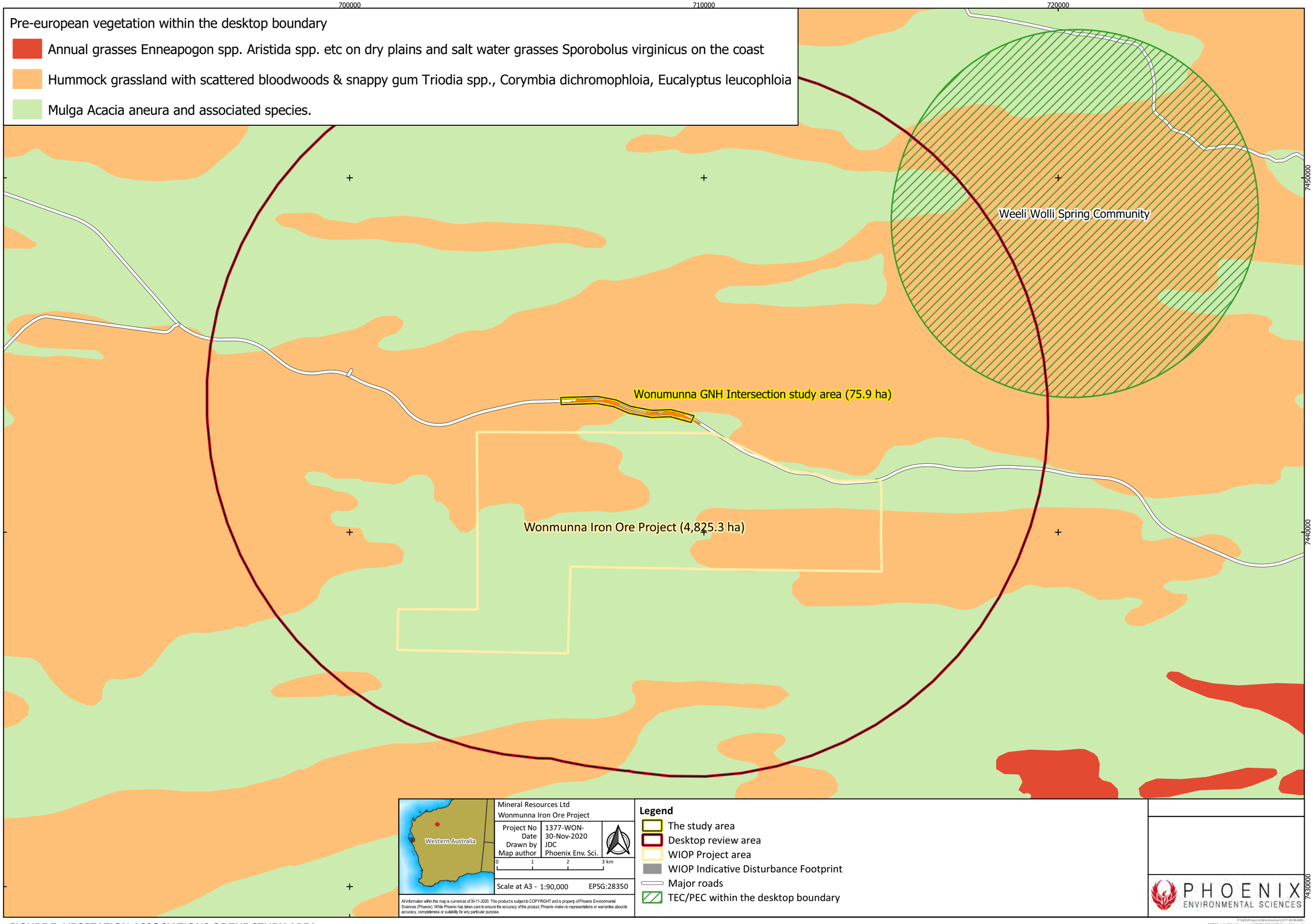

FIGURE 7: VEGETATION ASSOCIATIONS OF THE STUDY AREA

4.4.4 Vegetation Types

Four vegetation types were defined for the Study Area (Table 4; Figure 8). None of the vegetation types were considered significant or restricted (Phoenix, 2020).

All vegetation types closely resemble previously recorded, common and widespread vegetation communities of the Pilbara and are represented in conservation areas and on vacant Crown land.

TABLE 4: VEGETATION TYPES OF THE STUDY AREA

Vegetation type	Site/s	Vegetation description	Extent in Study Area (ha and %)	Representative photograph
ChEvTt (C2 in G&G Environmental 2014)	W001	Low *Corymbia hamersleyana* and *Eucalyptus victrix* woodland over tall open *Acacia* ssp., *Melaleuca bracteata* and *Petalostylis labicheoides* shrubland over **Cenchrus ciliaris*, *Eulalia aurea* and *Themeda triandra* grassland.	3.7, 4.8%	
ChAiTw (SS1 in G&G Environmental 2014)	W002 W003 W006	Isolated low *Corymbia hamersleyana* trees and *Eucalyptus gamophylla* mallee over isolated mid *Acacia inaequilatera*, *A. bivenosa* and *Hakea chordophylla* shrubs over low *Triodia wiseana* hummock grassland.	54.6, 72%	
ElErTw (M2 in G&G Environmental 2014)	W005 W008	Isolated low trees to open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *E. repullulans* over isolated *Acacia inaequilatera*, *Acacia arida and Scaevola acacioides* shrubs over low *Triodia wiseana* hummock grassland.	8.6, 11.4%	
ChAdTspp (C6 in G&G Environmental 2014)	W007	Low open *Corymbia hamersleyana* and *Acacia distans* woodland over tall open *Petalostylis labicheoides* and *Acacia bivenosa* shrubland over *Cymbopogon ambiguus*, *Themeda triandra* and *Triodia* spp. grassland.	1.8, 2.4%	
Road		Great Northern Highway.	7.1, 9.4%	

706000 707000 708000 709000

Vegetation
- Great Northern Highway
- Isolated low C. hamersleyana trees and E. gamophylla mallee over isolated mid A. inaequilatera, A. bivenosa and H. chordophylla shrubs over low T. wiseana hummock grassland.
- Isolated low trees to open woodland of E. leucophloia subsp. leucophloia and E. repullulans over isolated A. inaequilatera, A. arida and S. acacioides shrubs over low T. wiseana hummock grassland.
- Low C. hamersleyana and E. victrix woodland over tall open Acacia ssp., M. bracteata and P. labicheoides shrubland over *C. ciliaris, E. aurea and T. triandra grassland.
- Low open C. hamersleyana and A. distans woodland over tall open P. labicheoides and A. bivenosa shrubland over C. ambiguus, T. triandra and Triodia spp. grassland.

ChEvTt
ChAiTw
ChAiTw
ChEvTt
ChAiTw
ChAiTw
ChAiTw
ChAiTw
Road
Wonumunna GNH Intersection study area (75.9 ha)
ChEvTt
ChEvTt
ChAiTw
ChEvTt
ChAiTw
ChEvTt
ChAiTw
ChEvTt
ElErTw
ChAdTspp
ChAdTspp
ElErTw

7444000
7443000

Western Australia

Mineral Resources Ltd
Wonmunna Iron Ore Project

Project No	1377-WON-
Date	30-Nov-2020
Drawn by	JDC
Map author	Phoenix Env. Sci.

0 0.1 0.2 0.3 km

Scale at A3 - 1:9,375 EPSG:28350

Legend
- The study area
- Major roads

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FIGURE 8: VEGETATION TYPES RECORDED IN THE FIELD SURVEY

4.4.5 Vegetation Condition

Vegetation in the Study Area was recorded to be in Excellent to Good condition (Figure 9) with the majority (95%) in Excellent to Very Good condition (Table 5). The disturbances included vehicle tracks, gas pipeline and weed infestation in creeks and were included in condition rating assessed within sampling sites. Only the GNH was rated as Completely Degraded.

TABLE 5: VEGETATION CONDITION – EXTENT OF EACH CONDITION RATING IN STUDY AREA

Condition rating	Area (ha)	% of Study Area	% of native vegetation
Excellent	31.8	42	46.3
Very Good	33.2	43.8	48.3
Good	3.7	4.8	5.4
Poor	0	0	0
Degraded	0	0	0
Completely Degraded	7.1	9.4	100.0

4.4.6 Threatened and Priority Ecological Communities

No Threatened Ecological Communities (TEC), Priority Ecological Communities (PEC) or other significant vegetation were recorded within the Study Area (Phoenix, 2020).

There were no records of TECs within the 10 km desktop search radius however, one PEC was identified. The Weeli Wolli Spring's woodland and forest associations are located 7.2 km north east of the Study Area (Figure 7).

706000
707000
708000
709000
7444000
7443000

Wonumunna GNH Intersection study area (75.9 ha)

Western Australia

Mineral Resources Ltd
Wonmunna Iron Ore Project

Project No	1377-WON-
Date	30-Nov-2020
Drawn by	JDC
Map author	Phoenix Env. Sci.

0 0.1 0.2 0.3 km

Scale at A3 - 1:9,375 EPSG:28350

Legend

- The study area
- Major roads

Vegetation condition

- Completely Degraded
- Excellent
- Very Good
- Good

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FIGURE 9: VEGETATION CONDITION

4.5 TERRESTRIAL FAUNA

The information in this section has been sourced from the reconnaissance flora and fauna field survey and desktop study conducted by Phoenix (2020) unless referenced otherwise.

Phoenix (2020) identified records of 36 vertebrate taxa within a 10 km desktop search radius. The list comprised four reptiles, 17 birds and 15 mammals (including nine introduced). A full list is provided in Appendix 4 of Appendix 2.

4.5.1 Fauna Habitat

Phoenix (2020) identified four broad fauna habitats within the Study Area based on flora and vegetation survey data (Table 6). Open shrubland of Acacia over hummock (*Triodia* spp.) grasses was the dominant habitat, occupying approximately 72% of the Study Area, followed by Spinifex grassland habitat (11.4%), with the remaining fauna habitats occupying less than 5% each. Approximately 10% of the Study Area has been previously cleared for infrastructure including roads and tracks.

The distribution of fauna habitats (Table 6; Figure 10) indicates that the western 70% of the Study Area is dominated by open shrubland of Acacia over hummock (*Triodia* spp.) grasses bisected by two minor drainage lines. In the eastern 30%, open shrubland of Acacia over hummock (*Triodia* spp.) grasses are replaced by Spinifex hummock grasslands on stony plains south of the highway and a third drainage line intersects both of these habitats. The Priority 4 *Pseudomys chapmani* (Western Pebble-mound Mouse) was expected to occur on the Spinifex hummock grasslands on stony plains however, no individuals or distinctive pebble mounds were recorded (Phoenix, 2020).

TABLE 6: FAUNA HABITATS OF THE STUDY AREA

Habitat description	Corresponding vegetation types and mapping units	Area (ha)	% of Study Area
Open shrubland of Acacia over hummock (*Triodia spp.*) grasses (shrubland) Open shrubland habitat with variable structure and species diversity. Often dominated by *Acacia* species over mixed small to medium shrubs and mixed hummock (*Triodia* spp.) grasses.	ChAiTw	54.6	72.0
Spinifex hummock grasslands on stony plains (hummock grassland) Spinifex hummock grasslands (*Triodia* species) on stony plains and low stony hills dominated by of various life stages with scattered or sparsely scattered patches of small to medium *Acacia* shrubs on stony substrates.	ElErTw	8.6	11.4
Cleared Existing cleared areas or infrastructure including tracks and roads	Road	7.1	9.4
Woodland on minor creekline (woodland) Mainly linear habitat occurring from hill slopes extending to the surrounding plains, or small tributaries that flow into more major drainage lines.	ChEvTt	3.7	4.9
Open woodland on drainage line (open woodland) Similar to open woodland habitat in species diversity and structure but vegetation along drainage line is more enclosed creating thicker vegetation within the overstorey cover in this area. A shrubland of Acacia over tussock grasses dominates the understorey.	ChAdTspp	1.8	2.4
Total	**4**	**75.9**	**100%**

Of the fauna habitats identified within the Study Area, drainage lines are the most restricted and possibly have the highest value for the majority of conservation significant species (Phoenix, 2020). These areas are likely to act as wildlife corridors providing foraging and dispersal opportunities for a variety of fauna species due to their greater structural diversity and periodic availability of water. It is, however, unlikely that any significant species are restricted to this habitat (Phoenix, 2020).

Open shrubland of Acacia over hummock (*Triodia* spp.) grasses are abundant within the Study Area and the broader region. Spinifex hummock grasslands on stony plains occur over a moderate portion of the Study Area however, the stony soil/substrate and reduced vegetation structure means it is likely to support fewer significant species, compared with the more abundant habitat evident in the open shrubland of Acacia over hummock (*Triodia* spp.) grasses (Phoenix, 2020). It is, however, typical habitat for Western Pebble-mound Mouse in this area of the Pilbara.

4.5.2 Conservation Significant Fauna

No conservation significant fauna were recorded in the Study Area (Phoenix, 2020).

Twenty-one significant vertebrate species were identified in the desktop review, comprising seven species listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or BC Act (Figure 11). Nine avifauna species are listed as Migratory under the EPBC Act and BC Act. A further five species are listed as Priority by DBCA (Table 7).

Phoenix (2020) assessed the likelihood of occurrence of these species within the Study Area and determined that seven species may possibly occur and 13 were unlikely to occur (Table 7). The Western Pebble-mound Mouse has been recorded several times in close proximity to the Study Area and is therefore considered likely to occur in the Study Area, despite none of their characteristic mounds being located during the field survey (Phoenix, 2020).

TABLE 7: LIKELIHOOD OF OCCURRENCE ASSESSMENT FOR SIGNIFICANT VERTEBRATE FAUNA IDENTIFIED IN THE DESKTOP REVIEW

Species	Status	Likelihood of occurrence
Reptiles (4)		
Anilios ganei Gane's blind snake (Pilbara)	P1 (DBCA)	**Possible**. Suitable habitat present.
Lerista macropisthopus remota unpatterned robust slider (Robertson Range)	P2 (DBCA)	**Possible**. Suitable habitat present.
Liasis olivaceus subsp. Barroni Pilbara Olive Python	VU (EPBC, BC Act)	**Unlikely.** No suitable habitat.
Underwoodisaurus seorsus Pilbara Barking Gecko	P2 (DBCA)	**Unlikely**. No suitable habitat present.
Birds (13)		
Actitis hypoleucos Common Sandpiper	Mig (EPBC, BC Acts)	**Unlikely.** No suitable habitat.
Apus pacificus Fork-tailed Swift	Mig (EPBC, BC Acts)	**Possible**. Could forage, occasionally above the Study Area
Calidris acuminate Sharp-tailed Sandpiper	Mig (EPBC, BC Acts)	**Unlikely.** No suitable habitat.
Calidris ferruginea Curlew Sandpiper	CR (EPBC Act); CR/Mig (BC Act)	**Unlikely.** No suitable habitat.

Species	Status	Likelihood of occurrence
Calidris melanotos Pectoral Sandpiper	Mig (EPBC, BC Acts)	**Unlikely.** No suitable habitat.
Charadrius veredus Oriental Plover	Mig (EPBC, BC Acts)	**Unlikely** to occur due to lack of suitable habitat.
Elanus scriptus Letter-winged Kite	P4 (DBCA)	**Possible**. May forage within the study area if rodent population number permit. It will not breed in the Study Area.
Falco hypoleucos Grey Falcon	VU (BC Act)	**Possible**. May forage within the Study Area. It will not breed in the Study Area.
Hirundo rustica Barn Swallow	Mig (EPBC, BC Acts)	**Unlikely** . Study Area outside known range.
Motacilla cinereal Grey Wagtail	Mig (EPBC, BC Acts)	**Unlikely**. No suitable habitat.
Motacilla flava Yellow Wagtail	Mig (EPBC, BC Acts)	**Unlikely**. No suitable habitat.
Pezoporus occidentalis Night Parrot	EN (EPBC Act); CR (BC Act)	**Unlikely**. No suitable habitat.
Rostratula australis Australian Painted Snipe	EN (EPBC Act, BC Act)	**Unlikely**. No suitable habitat.
Mammals (4)		
Dasyurus hallucatus Northern Quoll	EN (EPBC Act, BC Act)	**Possible**. Suitable foraging/dispersal habitat present only.
Macroderma gigas Ghost Bat	VU (EPBC Act, BC Act)	**Possible**. Suitable foraging habitat only.
Pseudomys chapmani Western Pebble-mound Mouse	P4 (DBCA)	**Likely**. Recorded 130m north the Study Area. Suitable habitat present (predominantly Spinifex hummock grasslands on stony plains). Twenty-eight records within close proximity to the Study Area.
Rhinonicteris aurantia (Pilbara) Pilbara Leaf-nosed Bat	VU (EPBC Act, BC Act)	**Unlikely**. No suitable habitat.

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Wonumunna GNH Intersection study area (75.9 ha)

Western Australia

Mineral Resources Ltd
Wonmunna Iron Ore Project

Project No	1377-WON-
Date	30-Nov-2020
Drawn by	JDC
Map author	Phoenix Env. Sci.

0 0.1 0.2 0.3 km

Scale at A3 - 1:9,375 EPSG:28350

Legend

- The study area
- Major roads

Fauna habitats

- cleared
- Open shrubland of Acacia over hummock (Triodia spp.) grasses
- Spinifex hummock grasslands on stony plains
- Woodland on minor creekline

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FIGURE 10: FAUNA HABITATS

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Weeli Wolli Spring Community

Wonumunna GNH Intersection study area (75.9 ha)

Wonmunna Iron Ore Project (4,825.3 ha)

Western Australia

Mineral Resources Ltd
Wonmunna Iron Ore Project

Project No	1377-WON-
Date	30-Nov-2020
Drawn by	JDC
Map author	Phoenix Env. Sci.

0 1 2 3 km

Scale at A3 - 1:90,000 EPSG:28350

Legend

Desktop significant fauna

- CR/Mig./CR (EPBC & BC Act)
- EN (EPBC & BC Acts)
- EN/CR (EPBC Act; BC Act)
- VU (BC Act)
- VU (EPBC & BC Acts)
- Mig. (EPBC & BC Acts)
- P1 (DBCA list)
- P2 (DBCA list)
- P4 (DBCA list)

- The study area
- Desktop review area
- The Project area
- WIOP Indicative Disturbance Footprint
- Major roads
- TEC/PEC within the desktop boundary

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FIGURE 11: DESKTOP RECORDS OF SIGNIFICANT VERTEBRATE FAUNA

4.6 LAND USE

The Permit Area occurs within the GNH road reserve and is managed by MRWA. Some previous disturbance, associated with road and pipeline infrastructure and minor tracks, intersects the Permit Area.

No pastoral leases overlay the Permit Area.

A recent search of the Department of Planning, Lands and Heritage's Aboriginal Heritage Inquiry System indicated that no registered Aboriginal heritage sites occur within or in close proximity to the Permit Area.

4.7 STAKEHOLDER CONSULTATION

WIOPL has consulted with the following stakeholders, regarding construction of the GNH Intersection and WIOP access to the GNH:

- Department of Mines, Industry Regulation and Safety;
- East Pilbara Shire;
- Native Title Claimants - Ngarlawangga and Nyiyaparli people;
- Department of Transport; and
- MRWA.

5. ASSESSMENT OF CLEARING AGAINST 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 Water and Environmental Regulation; DWER, 2014) under Part V Division 2 of the *Environmental Protection Act 1986* (WA). Table 8 assesses the Project against these ten clearing principles.

The results of flora, vegetation and fauna surveys described in Section 4 have been used in the assessment of the ten clearing principles in Table 8.

TABLE 8: 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			
Vegetation is not highly diverse and is well represented within the region. No Environmentally Sensitive Areas (ESAs) were identified within the Permit Area. None of the vegetation types or vegetation associations mapped within the Study Area correspond to a known TEC or PECs. Shepherd et al. (2002) mapped two vegetation associations that intersect the Study Area: • 29; Mulga (*Acacia aneura*) and associated species; and • 82; Hummock grassland with scattered bloodwoods & snappy gum *Triodia* spp., *Corymbia dichromophloia*, *Eucalyptus leucophloia*. Both associations have over 99% remaining at the bioregional and subregional scales (Shepherd et al. 2002). Four vegetation types were defined for the Study Area (Table 4). None of the vegetation types were considered significant or restricted: • ChEvTt - Low *Corymbia hamersleyana* and *Eucalyptus victrix* woodland over tall open *Acacia* ssp., *Melaleuca bracteata* and *Petalostylis labicheoides* shrubland over *Cenchrus ciliaris* (Introduced), *Eulalia aurea* and *Themeda triandra* grassland; • ChAiTw - Isolated low *Corymbia hamersleyana* trees and *Eucalyptus gamophylla* mallee over isolated mid *Acacia inaequilatera*, *A. bivenosa* and *Hakea chordophylla* shrubs over low *Triodia wiseana* hummock grassland; • ElErTw - Isolated low trees to open woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *E. repullulans* over isolated *Acacia inaequilatera*, *Acacia arida and Scaevola acacioides* shrubs over low *Triodia wiseana* hummock grassland; and • ChAdTspp - Low open *Corymbia hamersleyana* and *Acacia distans* woodland over tall open *Petalostylis labicheoides* and *Acacia bivenosa* shrubland over *Cymbopogon ambiguus*, *Themeda triandra* and *Triodia* spp. grassland. The majority (95%) of vegetation types were assessed by Phoenix (2020) as being in excellent or very good condition. All vegetation types closely resemble previously recorded, common and widespread vegetation communities of the Pilbara and are represented in conservation areas and on vacant Crown land. No Threatened or Priority Flora were recorded by Phoenix (2020) within the Study Area. Records of ten significant flora species were identified within the 10 km desktop search extent. All of these species were assessed by Phoenix (2020) as being unlikely to occur in the Study Area. The habitat types present in the Permit Area appear to be well represented in the surrounding areas. Western Pebble-mound Mouse was expected to occur on the Spinifex hummock grasslands on stony plains but was not recorded. Of the fauna habitats identified within the Study Area, drainage lines are the most restricted and possibly have the highest value for the majority of significant species however each of these fauna habitats occupy less than 5% of the Study Area. Two introduced flora species were recorded during the survey, of which none are a Weed of National Significance/Declared Pest.	The native vegetation within the Permit Area is not expected to comprise a level of biological diversity that is significant within the Pilbara bioregion. The vegetation within the proposed Permit Area is broadly representative of vegetation from the surrounding area and is known to occur in much larger areas outside of the proposed Permit Area. The Phoenix (2020) survey report stated that all vegetation associations had greater than 95% of their pre-European extent remaining. Therefore, the implementation of the Project is not expected to significantly impact the regional representation of the identified vegetation associations. Habitat types present in the Permit Area appear to be well represented in the surrounding areas and no Western Pebble-mound Mouse mounds were recorded in the survey. Drainage lines are potentially of high value to significant species however, these habitats represent only a small portion of the Permit Area. Drainage Line disturbance will be minimised, with only a small portion of proposed clearing within these areas.	• Disturbance areas will be minimised and clear delineation of clearing limits will be installed; • Existing tracks and roads will be utilised where possible; • Where necessary drainage line crossings will include culverts to maintain surface water flows; • Disturbance within drainage lines will be avoided where reasonably practicable; • Cleared areas are to be rehabilitated if not required during operations; • All clearing kept to minimum required area within the Permit Area and completed only as required; and • Strict weed hygiene measures (consistent with commitments made in the WIOP Mining Proposal) will be employed.	The proposed vegetation disturbance is not expected to be at variance with this principle.
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			
The fauna habitats within the Permit Area do not form significant habitat for terrestrial fauna. All habitats are common and well represented in the surrounding areas. The Phoenix (2020) desktop study returned 21 significant fauna species that potentially occur within the 10 km search radius. Of these seven were assessed as possible and only the Western Pebble-mound Mouse likely to occur within the Study Area. No Conservation Significant fauna were recorded by Phoenix (2020) within the Study Area. Western Pebble-mound Mouse was expected to occur on the Spinifex hummock grasslands on stony plains but was not recorded. Of the fauna habitats identified within the Study Area, drainage lines are the most restricted and possibly have the highest value for the majority of significant species however each of these fauna habitats occupy less than 5% of the Study Area.	The proposed disturbance within the Permit Area is not expected to comprise the whole, or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA as: • The small area proposed to be cleared consists of vegetation that does not constitute a significant fauna habitat; • Fauna habitat within the proposed Permit Area extends well beyond the boundaries of the Permit Area; and • The Permit Area intersects with only small portions of drainage line habitat.	• Implement measures described above; • Fauna refuges such as logs will be pushed to the side of the clearing areas and retained where practicable; • Before vegetation clearing, areas will be examined for any active Pebble-Mound Mouse mounds; and • Active mounds, if present, will be avoided where possible.	The proposed vegetation disturbance is not expected to be at variance within this principle.

Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with clearing principle
	Although potential Western Pebble-mound Mouse habitat occurs, no mounds were recorded within the Study Area. For the fauna habitats identified, the clearing area will contain only a small percentage of the broader habitat. Impacts on conservation significant fauna habitat therefore will be negligible in extent.		
3. Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora			
No threatened or priority flora were recorded within the Study Area. Records of ten significant flora species were identified within the 10 km desktop search extent. All of these species were assessed by Phoenix (2020) as being unlikely to occur in the Study Area.	No threatened or priority flora were recorded within the Study Area and those species returned in the desktop searches were assessed as being unlikely to occur within the Permit Area.	• Cleared areas are to be rehabilitated if not required during operations; and • All clearing kept to minimum required area within the Permit Area and completed only as required.	The proposed vegetation disturbance is not at variance with this principle.
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			
No vegetation types recorded within the Study Area resemble any known TECs or PECs. There were no records of TECs within the 10 km desktop search radius however, one PEC (Weeli Wolli Spring's woodland and forest associations) was identified 7.2 km north east of the Study Area.	No impacts to TECs expected.	• Not Applicable.	The proposed vegetation disturbance 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			
The Permit Area is located within the Pilbara Bioregion that has not been extensively cleared. Four vegetation types were defined for the Study Area (Table 4; Figure 5). None of the vegetation types were considered significant or restricted. The majority (95%) of vegetation types were assessed by Phoenix (2020) as being in excellent or very good condition. All vegetation types closely resemble previously recorded, common and widespread vegetation communities of the Pilbara and are represented in conservation areas and on vacant Crown land.	Up to 10 ha is proposed to be cleared for the construction of the GNH Intersection. This amount of clearing within a largely uncleared regional landscape is not expected to be significant.	• Implement measures described above.	The proposed vegetation disturbance is not expected to be at variance with this principle.
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland			
Vegetation that is proposed to be cleared within the Permit Area is not associated with any wetland. The Permit Area intersects some minor, ephemeral drainage lines. Of the fauna habitats identified within the Study Area, drainage lines are the most restricted and possibly have the highest value for the majority of significant species however, each of these fauna habitats occupy less than 5% of the Study Area.	There are no watercourses or wetlands within the Permit Area. Drainage in the area is ephemeral, and clearing within the Permit Area is not expected to have any impact on any watercourse or wetland.	• Implement measures described above; and • Drainage line crossings will be fitted with culverts to maintain surface water flow.	The proposed vegetation disturbance is not expected to be 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			
The Permit Area is relatively small, requiring only 10 ha of clearing. The area adjacent to the Permit Area remains mostly uncleared with disturbance predominately associated with the GNH. No declared pests or Weeds of National Significance were recorded within the Study Area (Phoenix, 2020).	The Permit Area is surrounded by extensive, continuous areas of undisturbed native vegetation. Given the extent of remaining vegetation, disturbance of the type and at the scale proposed would not be expected to cause salinity, eutrophication or flooding. Whilst minor, local soil erosion may occur the topography is not steep and significant gullying would not be expected. Drainage mechanisms such as culverts will be installed, where necessary, to minimise erosion across drainage lines.	• Implement measures described above; and • Erosion control will be fitted on drainage lines if required.	The proposed vegetation disturbance is not expected to 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			
There are no nearby or adjacent conservation areas. The nearest conservation estate is more than 50 km to the north east of the Permit Area. The Permit Area is not located within an ESA.	The proposed clearing is unlikely to have an impact on the environmental values of any conservation areas or environmentally significant areas.	Not Applicable	The proposed vegetation disturbance is not at variance with this principle.
9. Native vegetation should not be cleared if the clearing is likely to cause deterioration in the quality of surface or underground water			
The Permit Area does not intersect any major watercourses and drainage in the area is ephemeral. The Permit Area intersects some minor, ephemeral drainage lines. There are no wetlands located within the Permit Area. Groundwater will be managed in accordance a 5C Licence to Take Groundwater. The Permit Area intersects a number of shallow, ephemeral drainage lines.	The proposed clearing is not expected to have any impact on the quality of underground water. Potential impacts to surface quality as a result of the clearing include sediment loss from disturbed areas and minor hydrocarbon spills, which may occur as a result of leaks from hydraulics, earthmoving equipment or vehicles. Given that the	• Implement measures described above; • Standard engineering controls will be used to limit the potential for erosion and sediment loss; • Limit changes in topography as much as possible; • Groundwater encountered during the mining process will be managed in accordance a *5C Licence*	The proposed vegetation disturbance is not expected to be at variance with this principle.

Relevant information	Assessment of potential impacts	Proposed control measures	Outcome - Assessment of variance with clearing principle
	proposed clearing is relatively small in scale (10 ha), the GNH Intersection is unlikely to cause deterioration in the quality of surface water. Any changes to surface water quality will be temporary, small scale and isolated.	*to Take Groundwater;* • Any storage or handling of hazardous materials in the Permit Area will be controlled by portable bunds/drip trays; and • If any spillage of hydrocarbons or other pollutants occur during construction, the contaminated soil shall be removed and treated in an onsite bioremediation farm or disposed of at a licenced landfill facility.	
10. Native vegetation should not be cleared if the clearing is likely to cause, or exacerbate, the incidence or intensity of flooding			
The proposed clearing is relatively small scale (10 ha), does not intersect any major watercourses and drainage in the region is typically ephemeral. Vegetation that is proposed to be cleared within the Permit Area is not associated with any wetland. The Permit Area intersects some minor, ephemeral drainage lines.	The clearing is not proposed to include the damming or retention of surface water. There may be minor changes to localised surface drainage through the clearing of vegetation however, there is not expected to be any significant or ongoing impact to surface water caused by construction or operation and maintenance activities. The road surface will be developed to allow surface water to flow across it during inundation events. The clearing will only cause localised disturbance that will not exacerbate the incidence or intensity of flooding.	• Implement measures described above; and • Water retention structures will not be developed within ephemeral drainage lines.	The proposed native vegetation disturbance is not expected to be at variance with this principle.

6. SUMMARY AND CONCLUSIONS

The purpose of this NVCP application is to provide clearing authorisation, within the GNH road reserve, to allow the construction of the intersection of the GNH and the WIOP haul road including slip lanes, an overtaking lane and a truck acceleration lane (GNH Intersection). This NVCP application seeks approval for up to 10 ha of clearing within a 79.5 ha Purpose Permit area centred along a 3.75 km stretch of the GNH.

All vegetation disturbance detailed in this NVCP application is proposed to occur within the Permit Area shown in Figure 3.

The vegetation disturbance is associated with widening an existing road, and hence will not significantly change existing impacts associated with the Great Northern Highway - such as changes to drainage, barriers to fauna and noise.

The assessment against the ten clearing principles described within A Guide to the Assessment of Applications to Clear Native Vegetation (DWER, 2014) under Part V Division 2 of the EP Act was based on information derived from the Phoenix (2020) report.

Vegetation represented within the Permit Area is well represented within the region and the small area of proposed clearing is unlikely to have any major effect on the environmental values of the region. There are no recorded TECs, PECs and Threatened or Priority flora or fauna within the Permit Area and the closest conservation estate is more than 50 km away.

During the field survey, characteristic mounds of the Priority 4 *Pseudomys chapmani* (Western Pebble-mound Mouse) were searched for on foot concurrently with the targeted flora survey. The Western Pebble-mound Mouse was expected to occur on the Spinifex hummock grasslands on stony plains however, no individuals or characteristic pebble mounds were recorded (Phoenix, 2020).

The GNH Intersection will form an integral part of the WIOP, therefore management strategies to minimise the impact of land clearing will be consistent with the WIOP Mining Proposal and Mine Closure Plan.

The proposed clearing is not expected to be at variance with any of the ten clearing principles (Table 4).

7. REFERENCES

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8. GLOSSARY

Term	Meaning
BC Act	*Biodiversity Conservation Act 2016* (WA)
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
GNH	Great Northern Highway
GNH Intersection	The intersection of the WIOP haul road and the GNH
MRL	Mineral Resources Ltd
MRWA	Main Roads Western Australia
NVCP	Native Vegetation Clearing Permit
PEC	Priority Ecological Communities
Phoenix	Phoenix Environmental Sciences Pty Ltd
Study Area	The study area defined in the Phoenix (2020) flora and fauna surveys
TEC	Threatened Ecological Communities
WA	Western Australia
WIOP	Wonmunna Iron Ore Project
WIOPL	Wonmunna Iron Ore Pty Ltd

9. APPENDICIES

Appendix 1: Shapefiles

Appendix 2: Phoenix 2020 flora and fauna survey for the GNH Intersection