

## Purpose Permit to Clear Native Vegetation - Supporting Information

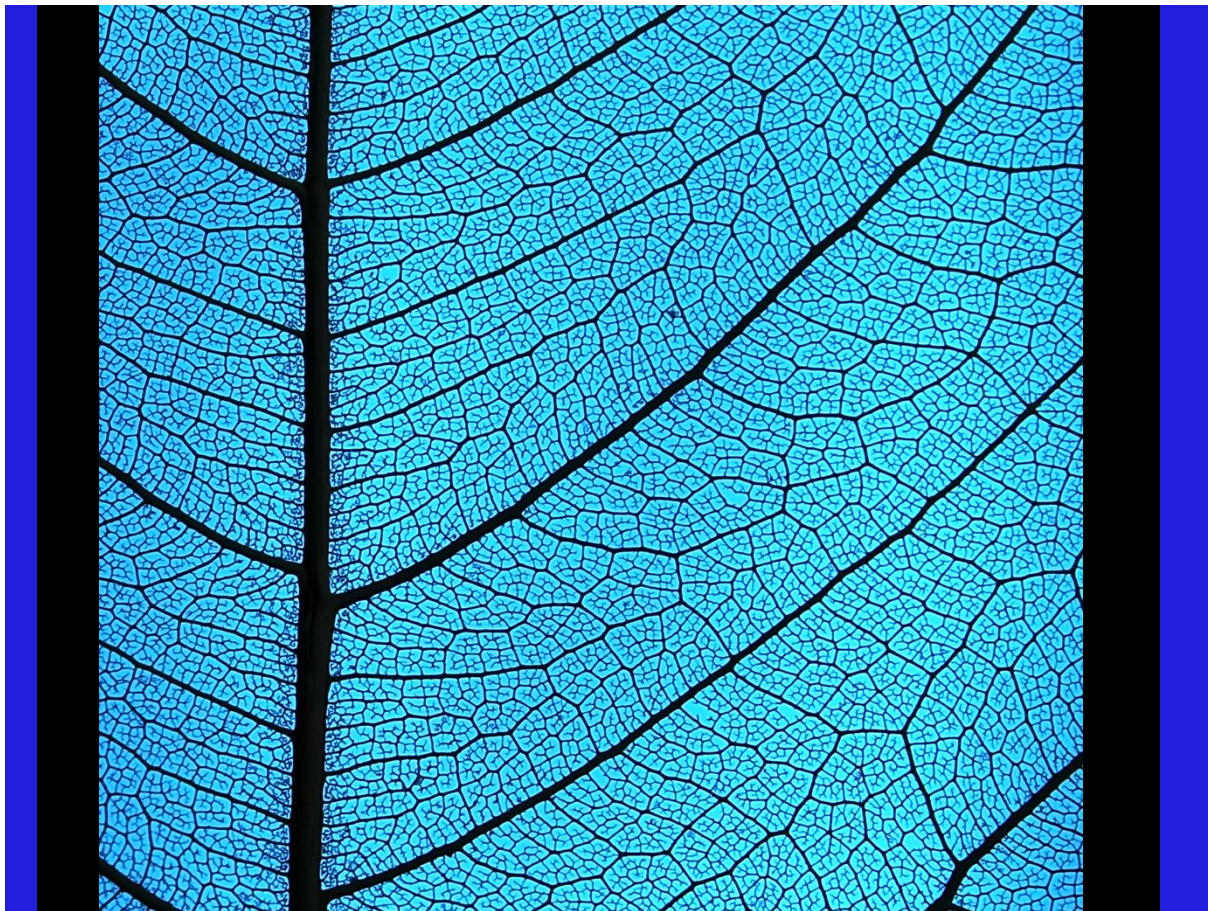
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**Main Roads Western Australia**

D23#540669 Material Pits – PMPSB02, PMPSB03 and PMPSB04

28 July 2023



## Purpose Permit to Clear Native Vegetation - Supporting Information

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B	LB	2/06/23	Main Roads	Draft for review
C	LB	26/06/23	Main Roads	Final Draft
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## Acronyms and abbreviations

ASM	<i>Corymbia</i> trees with mixed <i>Acacia</i> shrublands over <i>Triodia epactia</i> on stony substrates fauna habitat
BC Act	<i>Biodiversity Conservation Act 2016</i>
BOM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986</i>
ESA	Environmentally Sensitive Area
ha	hectares
IBRA	Interim Biogeographic Regionalisation of Australia
km	kilometres
m	metres
MDE	<i>Eucalyptus</i> fringed major drainage lines and associated tributaries: Open <i>Eucalyptus victrix/E. camaldulensis</i>
MRDH	Manuwarra Red Dog Highway
NVCP	Native vegetation Clearing Permit
PEC	Priority Ecological Community
TEC	Threatened Ecological Community
VA	Vegetation Association
WA	Western Australia

## 1. Introduction

Main Roads has identified three areas (pits) from which material will be sourced for construction of the initial 10km of the Manuwarra Red Dog Highway (MRDH) Stage 4 and other road maintenance and construction works in the Pilbara (the project). The precise location of the material to be targeted for extraction within the pits will be determined following laboratory analysis of geotechnical samples that are currently being collected. Native vegetation clearance will be required to access the pits and allow for extraction, stockpiling and loading of material.

### 1.1 Scope and Purpose of this Document

This document has been prepared in support of an application for a Native Vegetation Clearing Permit (NVCP) (Purpose Permit) under Section 51E of Part V of the *Environmental Protection Act 1986* (EP Act) to clear up to 70 hectares (ha) of native vegetation within a Purpose Permit (the Permit) area of 349.05 ha, which is the combined area of the three material pit boundaries (NVCP application area). The location of the NVCP application area is shown in Figure 1.

This document includes:

- an overview of the works required and description of the clearing activities to be undertaken;
- an overview of the existing physical and biological environment;
- the environmental management measures to be implemented to minimise potential clearing impacts; and
- an assessment of the proposed clearing against the ten Clearing Principles, as defined in Schedule 5 of the EP Act.

### 1.2 Terminology

The following terms are used in this supporting document:

- **NVCP application area** – The maximum extent within which the clearing area will be located
- **Study Area** – Area covered by the Desktop Assessment. The Study Area for the Proposal is confined to a local area of a 40km buffer from the NVCP Application Area .
- **Survey Area** – Area covered by the Biological Survey, which is typically larger than the NVCP Application Area.

### 1.3 Location and Land Ownership

The NVCP application area is located adjacent to the southern end of Stage 3 off the MRDH and the northern section of the proposed alignment for Stage 4 in the Shire of Ashburton, in the Pilbara region of Western Australia as shown on Figure 1. All required clearing will be within the proposed material pit boundaries identified on Figure 1 (referred to as the application area). The following material pits are part of the scope of this application:

- PMPSB02 (two discrete areas)
- PMPSB03
- PMPSB04

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**Table 1-1: Material Pit Locations**

<b>Material Pit</b>	<b>Area (ha)</b>	<b>Easting (centre point)</b>	<b>Northing (centre point)</b>
PMPSB02a	120	550318	7599364
PMPSB02b	108	550795	7598256
PMPSB03	74	539936	7603613
PMPSB04	47	536517	7604061

Coordinates are provided in MGA Zone 50 GDA2020

The Proposal is entirely within Crown Reserve R 38991 (Millstream Water Reserve) with management responsibility vested in the Water Corporation, for the purpose of water supply.

Two Exploration licences (E47/4514 and E47/4521) have been applied for (but not yet granted) over the area by One Eight Two Capital Investments Pty Ltd.

## 2. Description of Clearing Activities

The project involves development of three material pits to facilitate extraction of road construction materials for use in construction of Stage 4 of the MRDH and other road maintenance activities in the Pilbara region. Each material pit will consist of:

- Pit access
- Material extraction area
- Material stockpiling area
- Road train/truck loading area

The combined total area identified for the NVCP application area is 349.05 ha, however clearing will be limited to 70 ha split across the three material pits. The precise location of the material to be targeted for extraction within the pits will be determined following laboratory analysis of geotechnical samples that are currently being collected. Exact clearing areas will be flagged on the ground prior to clearing commencing.

Clearing will be undertaken using a Caterpillar D9/D10 or equivalent. Once flagging is in place, a dozer will clear the vegetation to access the deposit. Clearing will include an area approximately 15 metres (m) beyond the edge of the deposit. Topsoil and overburden will be pushed to the edge of the pit batter, allowing a dozer width between the vegetation and overburden stockpile to facilitate easy pit rehabilitation. Material will then be stockpiled with a dozer/excavator/loader in the nominated road train loading area.

The proposal will involve the clearing of up to 70 ha of native vegetation.

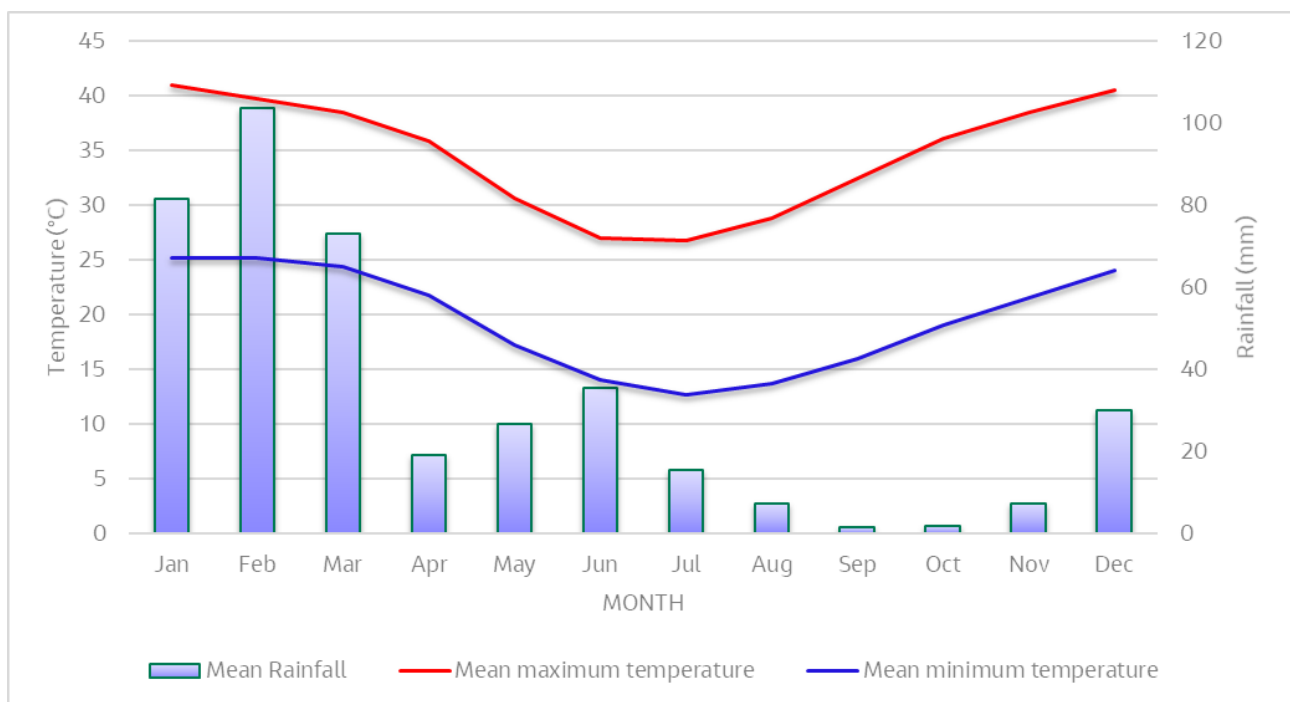


### 3. Existing Environment

#### 3.1 Climate

The NVCP application area experiences very hot summers, mild winters and low and variable rainfall. The Pilbara is a semi-arid and arid region with a monsoonal climate. Peak rainfalls occur in the warmer summer months between December and March (i.e. the wet season) as a result of monsoonal thunderstorm activity (Graph 1; Sudmeyer, 2016). Tropical lows or cyclones may occur during these months also. Climate data has been collected by the Bureau of Meteorology (BoM) weather station at Pannawonica (Station Number 005069), approximately 105 km due west of the material pits, since November 1971. Temperature data is available for a period of 33 years (2071 – 2005) while rainfall data is available for a period of 52 years (1971 – 2023). Review of the available data indicates mean maximum monthly temperatures vary between 27°C (June) and 41°C (January) and mean minimum temperatures range between 13°C (July) and 25°C (January and February) (BoM, 2023).

Temperature ranges are generally greater in inland districts away from the moderating effects of the onshore winds common to the coastal districts. Temperatures within the local area of the NVCP application area are, therefore, likely to be more variable than those at Pannawonica. For comparison, mean monthly maximum temperatures at the BoM weather station located in Paraburdoo (Station Number 007185) about 155 km south of the material pits, vary between 25°C (June) and 41°C (January) and mean minimum temperatures range between 10°C (July) and 26°C (January) (BoM, 2023). Mean annual rainfall is lower; 317 mm compared with 407 mm at Pannawonica (BoM, 2023). Pannawonica has been used as the primary source of climate data as the station at Paraburdoo has only been collecting temperature data since 1996.



Graph 3-1: Climate Data Recorded at the Pannawonica BoM Climate Station (BoM, 2023)

#### 3.2 Land Use

The Proposal is entirely within Crown Reserve R 38991 (Millstream Water Reserve) with management responsibility vested in the Water Corporation, for the purpose of water supply.

Two Exploration licences (E47/4514 and E47/4521) have been applied for (but not yet granted) over the area by One Eight Two Capital Investments Pty Ltd.



### 3.3 Soils and Landforms

Two land systems mapped by Tille (2006) occur within the NVCP application area. These are the Boolgeeda (material pits PMPSB02 and PMPSB04) and Hooley (material pit PMPSB03) land systems. The Boolgeeda land system comprises stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands. Hooley land system comprises alluvial clay plains supporting a mosaic of snakewood shrublands and tussock grasslands.

The soil degradation risk for both soil types recorded within the NVCP application area has been determined to be very low for wind and water erosion. Acid Sulphate Soil Risk is considered to be low.

### 3.4 Flora and Vegetation

The NVCP application area is mapped as vegetation associations (VA) 607 and 646, described as 'hummock grasslands, low tree steppe; snappy gum and bloodwood over soft spinifex and *Triodia wiseana*' and 'hummock grasslands, shrub steppe; snakewood over *Triodia basedowii*' respectively (Beard *et al* 2013). Table 3-1 details the pre-European and remaining extents for these vegetation associations.

A reconnaissance and targeted flora and vegetation survey was undertaken by Biota (2023), which covered 12 potential material pit locations along the entire MRDH Stage 4 corridor (only three of which are the subject of this NVCP application). A quadrat or relevé sampling method was used to survey the extent of the three material pits (PMPSB02; PMPSB03; and PMPSB04). The survey recorded five vegetation units within and adjacent to the NVCP application area as follows:

- Vegetation of Stony Plains and Sloping Plains:
  - P2: *Corymbia hamersleyana* low open woodland over mixed *Acacia* shrubland over *Triodia epactia* hummock grassland.
  - P7: *Triodia wiseana* hummock grassland with *Eriachne flaccida* scattered tussock grasses.
- Clay Vegetation:
  - C2: *Acacia xiphophylla* low woodland over *Triodia epactia* very open hummock grassland over *Eragrostis xerophila* scattered tussock grasses.
- Vegetation of Floodplains:
  - F2: *Corymbia hamersleyana* low woodland over mixed *Acacia* tall open shrubland over *Triodia wiseana*, *T. epactia* open hummock grassland.
  - F3: *Corymbia hamersleyana* low open woodland over mixed *Acacia* open shrubland over *Triodia epactia* very open hummock grassland with *Chrysopogon fallax* very open tussock grassland.

Following the biological survey, Main Roads excluded all floodplain vegetation (F2 and F3), *Triodia wiseana* hummock grassland (P7) and all clay vegetation (C2) from the NVCP application boundary. Subsequently the only vegetation being cleared under the NVCP application is *Corymbia hamersleyana* low open woodland over mixed *Acacia* shrubland over *Triodia epactia* hummock grassland (P2) as shown on Figure 2 and detailed in Table 3-2.

The *Corymbia hamersleyana* (P2) vegetation condition was recorded as Excellent throughout the NVCP application area. This vegetation type was found on gently undulating plains supporting minor drainages, throughout the survey area concentrated in the northern section. The shrub layer comprised a mixture of *Acacia* species, including *A. ancistrocarpa*, *A. atkinsiana* and *A. trachycarpa*. *Triodia epactia* was the dominant hummock grass, however *T. wiseana* was also present in sparse patches.

No significant vegetation types will be cleared under this NVCP application and no Threatened flora species listed under the *Biodiversity Conservation Act 2016* (BC Act), or DBCA listed Priority flora species, occur within the NVCP application area (Biota, 2023).

No weeds were identified within the proposal area. Material pit PMPSB02 is situated adjacent to vegetation unit F2 (*Corymbia hamersleyana* low woodland over mixed *Acacia* tall open shrubland over *Triodia wiseana*, (*T. epactia*) open hummock grassland), which showed some evidence of scattered weeds.

**Table 3-1: Pre-European Vegetation Representation (GoWA, 2019)**

Pre-European Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	% Current Extent in DBCA Managed Land (proportion of pre-European Extent)
<b>Veg Assoc No.</b> 607	<b>Statewide</b>	120,789	120,600	99.8	12.84
	<b>IBRA Bioregion</b> Pilbara	120,789	120,600	99.8	12.84
	<b>IBRA Sub-region</b> Chichester (PIL 1)	119,022	118,833	99.8	13.03
	<b>Local Government Authority</b> Ashburton	120,789	120,560	99.8	12.84
<b>Veg Assoc No.</b> 646	<b>Statewide</b>	47,556	47,556	100	26.88
	<b>IBRA Bioregion</b> Pilbara	47,547	47,547	100	26.89
	<b>IBRA Sub-region</b> Chichester (PIL 1)	18,625	18,625	100	1.45
	<b>Local Government Authority</b> Ashburton	47,556	47,556	100	26.88

**Table 3-2. Summary of Vegetation Units Mapped in the NVCP Application Area (Biota, 2023)**

Vegetation Type	Extent within Clearing Area (ha)	Total Extent Mapped (ha) within NVCP Application Area	Comments
P2 - <i>Corymbia hamersleyana</i> low open woodland over mixed Acacia shrubland over <i>Triodia epactia</i> hummock grassland.	70 ha	349.05 ha	Vegetation description and condition determined from biological survey (Biota, 2023).

### 3.5 Fauna and Habitat

Biota (2023) undertook a basic fauna survey of the proposed material pits, which included the potential maximum boundaries for 11 proposed borrow pits and two road realignment areas along the MRDH Stage 4 corridor. Only three of the material pits surveys are the subject of this NVCP application. The total combined survey area was 2,710 ha. Various methods were used to target significant fauna species identified as potentially occurring in the survey area, including the deployment of passive recording equipment such as ultrasonic automated recording units (ARUs) and motion cameras (Biota, 2023). Traverses were also conducted on foot to search for evidence of significant species. No conservation significant fauna species were recorded in the NVCP application area during the field survey.

The fauna habitats defined from the survey area aligned broadly with the landforms present. The Biota (2023) survey identified the following fauna habitats within and adjacent to the NVCP application area (Figure 4):

- Flats/Plains
  - ASM: Mixed *Acacia* shrublands
  - ASCC: *Acacia xiphophylla* shrublands over cracking clay
- Drainage Lines
  - MDE: – *Eucalyptus* fringed major drainage lines and associated tributaries.

The habitat quality within the NVCP application area was recorded as excellent.

Main Roads excluded from the NVCP application boundary all Drainage Lines (MDE) and *Acacia xiphophylla* shrublands over cracking clay (ASCC) habitat with only mixed *Acacia* shrublands (ASM) being impacted.

### 3.6 Conservation Areas

No conservation reserves or environmentally sensitive areas are in the immediate vicinity of the proposed vegetation clearing. The nearest reserve is the Millstream-Chichester National Park, which is located approximately 16 km north of the northern-most material pits and intersects the study area boundary.

### 3.7 Hydrology

The NVCP application area does not comprise any surface waterbodies or riparian vegetation. Material pit PMPSB02 is situated immediately adjacent to minor creeks. The areas of vegetation associated with these creeks (F2 and F3) have been excluded from the NVCP application to minimise any potential impact on the adjacent surface waterbodies. All three material pits are close to minor, ephemeral watercourses.

A search of publicly available data indicates no significant wetlands (Ramsar wetlands or Nationally Important wetlands) are located within 100 metres of the NVCP application area. The closest Nationally Important Wetland to the material pits is the Millstream Pools, over 24 km west of material pit PMPSB04. The Ramsar listed Fortescue Marshes is over 75 km southeast of material pit PMPSB02.

The NVCP application area is situated within the Millstream Water Reserve drinking water source protection area - Priority 1 (P1) area. The Millstream wellfield is located over 22 km west of PMPSB04. PMPSB02 and PMPSB03 are situated above the Upper Tertiary fluvial sediment aquifer (Palaeovalley), however based on the proposed depth of excavation (approximately 2 m) and historic borehole data in the region suggesting water depths range from around four to 37 m below ground level (Jacobs, 2022), it is not anticipated that groundwater will be intersected during material excavations.

## 4. Environmental Management Framework

The mitigation hierarchy has been applied for the NVCP application area as follows:

- **Avoid:** The boundary of PMPSB02 was amended to exclude areas mapped as supporting habitat for Threatened fauna (MDE) and riparian vegetation (vegetation units F2 and F3). The boundary of PMPSB03 was modified to exclude an area mapped as Vegetation unit P7, which is considered locally significant due to similarities to the Priority 3 Priority Ecological Community (PEC) *Mitchell grass and Roebourne Plain grass (Eragrostis xerophila) plain on gilgai* (a component of the *Four plant assemblages of the Wona Land System*) and as it provides habitat for the Priority 3 species *Dolichocarpa* sp. Hamersley Station (Figure 2). With these modifications, no significant vegetation types or conservation significant flora were recorded within the NVCP application area.

Sourcing material from third party commercial supplier was considered as an alternative to creating new material pits. This was deemed to not be feasible however, due to the significant costs associated with haulage of material from Karratha or Tom Price, where these commercial suppliers are located.

- **Minimise:** A Vegetation management plan will be prepared as part of the Contractor's Construction Environmental Management Plan (CEMP). Locations of Priority Flora or significant vegetation that are not within the NVCP application area will be identified as "no-go" zones and flagged in the field. Areas of dense vegetation will be preferentially avoided in siting the specific extraction areas, where this is practical.
- **Rehabilitate:** Cleared areas will be reinstated and revegetated once the material pits are no longer required.
- **Offset:** No offsets required.

## **5. Assessment Against Clearing Principles**

Clearing of native vegetation is an offence unless it is done under the authority of a clearing permit under Part V Division 2 of the EP Act, where an exemption applies (as defined in Schedule 6 of the EP Act), or is a type prescribed by regulation in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004, and it is not in an Environmentally Sensitive Area (ESA).

Schedule 5 of the EP Act defines 10 Clearing Principles for native vegetation. These principles aim to ensure that all potential impacts resulting from removal of native vegetation can be assessed in an integrated way.

Clearing required for the proposed works has been assessed against the ten Clearing Principles, with each principle being assessed in accordance with the DWER's A Guide to the Assessment of Applications to Clear Native Vegetation (Department of Environment Regulation (now DWER), 2014) to determine whether the application is at variance to the principles. The assessment indicates that clearing is not at variance with the ten Clearance Principles.

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**Table 5-1. Assessment Against Clearing Principles**

Principle	Assessment	Outcome										
<p><b>A</b> Native vegetation should not be cleared if it comprises a high level of biological diversity.</p>	<p>The proposed vegetation clearing is relatively small in extent (70 ha) and is spread across three discrete areas. The vegetation to be cleared comprises of a single vegetation unit, <i>Corymbia hamersleyana</i> low open woodland over mixed <i>Acacia</i> shrubland over <i>Triodia epactia</i> hummock grassland and was mapped as in Excellent condition. Biological survey of the proposed material pits completed by Biota (2023) noted the dominant native plant families and genera recorded from the survey area are typical of species lists from this region. A total of 280 native vascular flora species from 122 genera and 46 families were recorded from the survey area. The dominant native plant families and genera recorded from the survey area are Fabaceae; Poaceae; Malvaceae; and Amaranthaceae.</p> <p>No DBCA listed Threatened Ecological Communities (TECs), or Priority Ecological Communities (PEC) are located within or in the immediate vicinity of the NVCP application area. The closest PEC (Brockman Iron cracking clay communities) is situated approximately 4.5km to the south west of PMPSB04. In addition, no DBCA listed Priority flora species are located within the NVCP application area. One Priority 3 species (<i>Dolichocarpa</i> sp. Hamersley Station) is located approximately 100 m from the boundary of PMPSB03. No clearing of this individual or the vegetation within a 20 m buffer of its location will occur. The area is also not located within an area identified as being a biodiversity hotspot for priority action, as identified by the Commonwealth Threatened Species Scientific Committee.</p> <p>A number of significant flora species have been recorded in the survey area, the closest is the Priority 3 <i>Dolichocarpa</i> sp. Hamersley Station, discussed above. This species was reported in the Biota (2023) report as Likely to occur given the suitable habitat present, however predominantly in the southern section of the survey area, which is over 60km south of PMPSB02; PMPSB03; and PMPSB04. While this species was considered 'likely' to occur in the biological survey area, it is unlikely to occur in the NVCP area given the lack of suitable habitat in the 'P3' vegetation type (stony plains habitat). The species occurs on cracking clay plains.</p> <p>The desktop search of the study area identified a number of other Priority 2, 3 and 4 flora species within 40km of the NVCP application area. The likelihood of occurrence for each significant flora species recorded in the survey area is summarised in the following table.</p> <table border="1" data-bbox="555 1034 1809 1407"> <thead> <tr> <th data-bbox="555 1034 987 1099">Species Name</th> <th data-bbox="987 1034 1809 1099">Likelihood of Occurrence</th> </tr> </thead> <tbody> <tr> <td data-bbox="555 1099 987 1174"><i>Calotis squamigera</i></td> <td data-bbox="987 1099 1809 1174">May occur however known records are from near Tom Price, Wittenoom and Karijini NP, over 100 km from the NVCP application area</td> </tr> <tr> <td data-bbox="555 1174 987 1249"><i>Helichrysum oligochaetum</i></td> <td data-bbox="987 1174 1809 1249">May occur. Some suitable habitat and known record from Fortescue River, east of the RTIO railway</td> </tr> <tr> <td data-bbox="555 1249 987 1324"><i>Josephinia</i> sp. Woodstock (A.A. Mitchell PRP 989)</td> <td data-bbox="987 1249 1809 1324">May occur. Suitable habitat present. Recorded from one location along the Manuwarra Hwy corridor ~23 km SW of PMPSB02</td> </tr> <tr> <td data-bbox="555 1324 987 1407"><i>Aristida lazaridis</i></td> <td data-bbox="987 1324 1809 1407">May occur. Some suitable habitat present. Recorded from one location along the Manuwarra Hwy corridor in the foothills of the Hamersley Range</td> </tr> </tbody> </table>	Species Name	Likelihood of Occurrence	<i>Calotis squamigera</i>	May occur however known records are from near Tom Price, Wittenoom and Karijini NP, over 100 km from the NVCP application area	<i>Helichrysum oligochaetum</i>	May occur. Some suitable habitat and known record from Fortescue River, east of the RTIO railway	<i>Josephinia</i> sp. Woodstock (A.A. Mitchell PRP 989)	May occur. Suitable habitat present. Recorded from one location along the Manuwarra Hwy corridor ~23 km SW of PMPSB02	<i>Aristida lazaridis</i>	May occur. Some suitable habitat present. Recorded from one location along the Manuwarra Hwy corridor in the foothills of the Hamersley Range	<p>Not at Variance</p>
Species Name	Likelihood of Occurrence											
<i>Calotis squamigera</i>	May occur however known records are from near Tom Price, Wittenoom and Karijini NP, over 100 km from the NVCP application area											
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<i>Josephinia</i> sp. Woodstock (A.A. Mitchell PRP 989)	May occur. Suitable habitat present. Recorded from one location along the Manuwarra Hwy corridor ~23 km SW of PMPSB02											
<i>Aristida lazaridis</i>	May occur. Some suitable habitat present. Recorded from one location along the Manuwarra Hwy corridor in the foothills of the Hamersley Range											

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Principle	Assessment		Outcome
	<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	Likely to occur. Suitable habitat and records from previous surveys of similar habitat within 500m of PMPSB03	
	<i>Euphorbia inappendiculata</i> var. <i>queenslandica</i>	May occur. Some suitable habitat, but soils may not be preferred for this species	
	<i>Paspalidium retiglume</i>	May occur. some suitable habitat present but infrequently recorded	
	<i>Astrebla lappacea</i>	May occur. Some suitable habitat but soils may not be preferred	
	<i>Dolichocarpa</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	Recorded. Recorded within the original boundary of PMPSB03. The boundary of this pit has since been modified to exclude the recorded location of this species and vegetation within at least 20 m.	
	<i>Euphorbia australis</i> var. <i>glabra</i>	Likely to occur. Suitable habitat present and recorded during previous survey ~6km east of PMPSB03 and 4km north of PMPSB02	
	<i>Iotasperma sessilifolium</i>	May occur. Suitable habitat present	
	<i>Rostellularia adscendens</i> var. <i>latifolia</i>	May occur. Suitable habitat present	
	<i>Streptoglossa</i> sp. Cracking clays (S. van Leeuwen et al. PBS 7353)	May occur. Suitable habitat present but more likely to occur south of Hamersley Range	
	<i>Swainsona thompsoniana</i>	Likely to occur. Suitable habitat present	
	<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	May occur. Suitable habitat present and recorded from previous surveys ~1km east of PMPSB03	
	<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684)	May occur. Suitable habitat present	
<p>The likelihood of occurrence of these species within the NVCP application area is considered to be low given the vegetation type recorded and that none of these species were recorded during the targeted searches conducted by Biota (2023). The risk of impact on conservation significant flora is considered to be unlikely due to the limited amount of habitat supporting these species within the NVCP application area, and no significant flora recorded in the NVCP application area during the biological survey (Biota, 2023).</p>			
<p>A combined total of 53 vertebrate fauna species were recorded from the survey area during the field survey, four of which are considered to be significant (the Northern Quoll, Western Pebble-mound Mouse, Ghost Bat, and Pilbara Leaf-nosed Bat). The fauna habitat recorded in the NVCP application area consists of ASM (Mixed <i>Acacia</i> shrublands) associated with</p>			



## Purpose Permit to Clear Native Vegetation - Supporting Information

Principle	Assessment	Outcome
	<p>flats or plains. Adjacent habitat was recorded as ASCC (<i>Acacia xiphophylla</i> shrublands over cracking clay) and MDE (<i>Eucalyptus</i> fringed major drainage lines and associated tributaries). The fauna habitats defined from the survey area aligned broadly with the landforms present and are not considered to represent a key ecological linkage. The habitat quality within the NVCP application area was recorded as excellent.</p> <p>The ASM habitat is noted to be suitable for the Western Pebble-mound Mouse. Although the Biota report identifies the Western Pebble-mound Mouse as 'likely to occur' in the wider study area, the closest record to the NVCP application area is approximately 37km to the north and therefore it is considered unlikely that the Western Pebble-mound Mouse occurs in any of the areas to be cleared. Given this habitat occurs throughout a large proportion of the survey area and is continuous throughout the broader landscape, the NVCP application area is not considered critical habitat for the species.</p> <p>The MDE habitat type was noted by Biota (2023) to be suitable for the Northern Quoll (as dispersal habitat), Pilbara Leaf-nosed Bat (as foraging habitat) and Ghost Bat (as foraging habitat). This habitat aligns with the F2 and F3 vegetation units that have been excluded from the boundary of PMPSB02. The MDE habitat (adjacent vegetation) is not considered critical to the survival of any of these species as it does not provide denning, roosting (i.e. caves) or breeding habitat.</p> <p>All habitat types were also identified as suitable habitat for the Grey Falcon (<i>Falco hypoleucos</i>), Peregrine Falcon (<i>Falco peregrinus</i>) and the Fork-tailed Swift (<i>Apus pacificus</i>), however the ASM or MDE habitats are not critical to the survival of the species.</p> <p>The vegetation type and fauna habitat to be cleared is common and widespread in the region and comprises a similar level of biological diversity compared to the surrounding area. In addition, no conservation significant flora species are within the areas to be cleared and the vegetation does not represent critical habitat for Threatened fauna. As such, the proposed clearing is considered unlikely to decrease the level of biological diversity and is not at variance to this principle.</p>	
<p><b>B</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</p>	<p>No conservation significant fauna species were recorded during the Biota (2023) survey within the NVCP application area, however the ASM habitat has the potential to support the Priority 4 Western Pebble-mound Mouse, Grey Falcon, Peregrine Falcon and Fork-tailed Swift.</p> <p>The following conservation significant fauna were recorded in the broader survey area (Biota, 2023):</p> <ul style="list-style-type: none"> <li>• Northern Quoll (<i>Dasyurus hallucatus</i>)</li> <li>• Pilbara Leaf-nosed Bat (<i>Rhinonictis aurantia</i>)</li> <li>• Ghost Bat (<i>Macroderma gigas</i>)</li> <li>• Western Pebble-mound Mouse (<i>Pseudomys chapmani</i>)</li> </ul> <p>These species were all recorded from the Hamersley Range, at least 50 km south of the southern boundary of PMPSB02. The MDE habitat type was noted by Biota (2023) to be suitable for the Northern Quoll, Pilbara Leaf-nosed Bat and Ghost Bat. The boundaries of PMPSB02 were modified to exclude the MDE habitat from the NVCP application area, in order to avoid potential impacts to these significant fauna species.</p>	<p>Not at Variance</p>

## Purpose Permit to Clear Native Vegetation - Supporting Information

Principle	Assessment	Outcome
	<p>The NVCP application area consists of 349.05 ha of habitat type ASM (<i>Corymbia</i> trees with mixed <i>Acacia</i> shrublands over <i>Triodia epactia</i> on stony substrates). Species expected to occur in this habitat include those with particular associations to spinifex (e.g. mammals that forage on seeds, such as <i>Pseudomys hermannsburgensis</i> and <i>P. desertor</i>), or with associations to stony flats (e.g. the dragon species <i>Tympanocryptis fortescuensis</i>, <i>T. diabolicus</i> and <i>Diphoriphora valens</i>), along with a wide range of species that utilise shrubs and spinifex for cover and/or foraging. The habitat recorded does not provide a key ecological linkage given the large areas of similar intact habitat in the surrounding area.</p> <p>The ASM habitat type recorded has the potential to support Western Pebble-mound Mouse (<i>Pseudomys chapmani</i>), however no signs of pebble mounds were recorded in the relevant survey area during the targeted searches for this species during the field survey (Biota 2023). This habitat occurs throughout a large proportion of the survey area and is continuous throughout the broader landscape. Although the Biota report identifies the Western Pebble-mound Mouse as 'likely to occur' in the wider study area, the closest record to the NVCP application area is approximately 37km to the north and therefore it is considered unlikely that the Western Pebble-mound Mouse occurs in any of the areas to be cleared.</p> <p>The ASM habitat type was also identified as suitable habitat for the Grey Falcon (<i>Falco hypoleucos</i>), Peregrine Falcon (<i>Falco peregrinus</i>) and the Fork-tailed Swift (<i>Apus pacificus</i>). Should any of the three bird species occur within the NVCP application area, it is likely that they would only be present as they overfly the area and would not make use of the area for roosting or nesting due to a lack of tall trees or cliffs. Additionally, the Fork-tailed Swift is a largely aerial species, rarely coming to land. The ASM habitat, and in particular the area of the NVCP application area, is therefore not considered critical habitat for these species.</p> <p>It is not anticipated that the required clearing would be at variance to this Principle given the low likelihood of occurrence of conservation significant fauna within the area to be cleared and that none of the habitats have been identified as critical to the survival of any of these conservation significant species. As such the required clearing is not at variance to this Principle.</p>	
C	<p>Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.</p> <p>No Threatened flora species were identified as potentially occurring in the study area in the desktop assessment conducted by Biota (2023). No Threatened flora species have been identified within or in the immediate vicinity of the NVCP application area, or within the wider survey area.</p> <p>As such the required clearing is not at variance to this Principle.</p>	Not at Variance
D	<p>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.</p> <p>No Threatened Ecological Communities (TECs) are located within or in the immediate vicinity of the NVCP application area. The <i>Themeda</i> grasslands TEC was recorded in the survey area, however this was over 60km to the south of the NVCP application area.</p> <p>As such the required clearing is not at variance to this Principle.</p>	Not at Variance
E	<p>Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an</p> <p>Up to 70 ha of native vegetation will be cleared from the NVCP application area. The NVCP application area occurs within the Beard Vegetation Association 607 and 646 as described in the following table.</p>	Not at Variance

## Purpose Permit to Clear Native Vegetation - Supporting Information

Principle	Assessment	Outcome									
<p>area that has been extensively cleared.</p>	<table border="1" data-bbox="551 331 1816 549"> <thead> <tr> <th data-bbox="551 331 1240 411">Summary of Project Area's Mapped Pre-European Vegetation Associations Vegetation Association</th> <th data-bbox="1240 331 1563 411">Extent within NVCP Application Area (ha)</th> <th data-bbox="1563 331 1816 411">Extent remaining in Bioregion</th> </tr> </thead> <tbody> <tr> <td data-bbox="551 411 1240 480">607: hummock grasslands, low tree steppe; snappy gum and bloodwood over soft spinifex and Triodia wiseana</td> <td data-bbox="1240 411 1563 480">286</td> <td data-bbox="1563 411 1816 480">99.8%</td> </tr> <tr> <td data-bbox="551 480 1240 549">646: hummock grasslands, shrub steppe; snakewood over Triodia basedowii</td> <td data-bbox="1240 480 1563 549">66</td> <td data-bbox="1563 480 1816 549">100%</td> </tr> </tbody> </table> <p data-bbox="551 571 1816 740">The pre-European vegetation extent remaining for both VA 607 and VA 646 across statewide, bioregion, subregion and local government authority is &gt;99%. The National Objectives and Targets for Biodiversity Conservation recognise that the retention of 30% or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected (Commonwealth of Australia 2001) except in constrained areas (Perth &amp; Peel) where 10% representation should be maintained. Given the high percentage of the pre-European vegetation extent remaining for both VA 607 and VA 646, the NVCP application area is not considered to be a significant remnant of native vegetation.</p> <p data-bbox="551 762 1816 788">As such the required clearing is not at variance to this Principle.</p>	Summary of Project Area's Mapped Pre-European Vegetation Associations Vegetation Association	Extent within NVCP Application Area (ha)	Extent remaining in Bioregion	607: hummock grasslands, low tree steppe; snappy gum and bloodwood over soft spinifex and Triodia wiseana	286	99.8%	646: hummock grasslands, shrub steppe; snakewood over Triodia basedowii	66	100%	
Summary of Project Area's Mapped Pre-European Vegetation Associations Vegetation Association	Extent within NVCP Application Area (ha)	Extent remaining in Bioregion									
607: hummock grasslands, low tree steppe; snappy gum and bloodwood over soft spinifex and Triodia wiseana	286	99.8%									
646: hummock grasslands, shrub steppe; snakewood over Triodia basedowii	66	100%									
<p><b>F</b> Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</p>	<p data-bbox="551 807 1816 887">The area of proposed vegetation clearing does not comprise of any surface waterbodies, riparian vegetation or any vegetation growing within or in association with a watercourse or wetland. The boundaries of PMPSB02 were modified to exclude areas of vegetation units F2 and F3, which are considered to be riparian vegetation types.</p> <p data-bbox="551 906 1816 1015">A search of publicly available data indicates no significant wetlands (Ramsar wetlands or Nationally Important Wetlands) are located within 100 metres of the NVCP application area. The closest Nationally Important Wetland to the material pits are the Millstream Pools, over 24 km west of material pit PMPSB04 and the Ramsar listed Fortescue Marshes is over 75 km southeast of material pit PMPSB02.</p> <p data-bbox="551 1034 1816 1059">As such it is considered that the required clearing is not at variance to this Principle.</p>	Not at Variance									
<p><b>G</b> Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</p>	<p data-bbox="551 1083 1816 1166">The Proposal is situated within both the Boolgeeda and Hooley Land systems. The soil degradation risk for both Land Systems recorded within the NVCP application Area has been determined to be very low for wind and water erosion, and the application area is located within an area mapped as low risk for acid sulphate soils.</p> <p data-bbox="551 1185 1816 1326">The Department of Primary Industries and Regional Development's 'Soil Landscape Mapping - Best Available' data was reviewed to assess the soil characteristics within the NVCP application area, however the available soil data for the region is relatively limited and at a broad scale. The soil landscape for PMPSB03 is described as alluvial clay plains, supporting a mosaic of snakewood shrublands and tussock grasslands. The soil landscape for PMPSB04 and PMPSB02 is described as stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.</p> <p data-bbox="551 1345 1816 1388">The soil infiltration rates have been determined at a broad scale based in the land systems present. The soils associated with the Hooley Land System consists of Red/brown non-cracking clay (622), red loamy earth (544) and Self-mulching</p>	Not at Variance									

## Purpose Permit to Clear Native Vegetation - Supporting Information

Principle	Assessment	Outcome
	<p>cracking clay (602) (van Vreeswyk <i>et al</i>, 2004). The permeability of these soil types is determined to be slow to moderate (Schoknecht <i>et al</i>, 2013). The soils associated with the Boolgeeda Land System are Stony soils (203), red shallow loams (522), red loamy earths (544) and minor self-mulching cracking clays (602) (van Vreeswyk <i>et al</i>, 2004). The permeability of these soil types is determined to be slow to moderate, with the exception of the sandy matrix qualifier which is considered to be rapid. Given the broader soil types recorded, the permeability of the soil within the NVCP application area is likely to be slow to moderate. The removal of vegetation therefore has the potential to increase the rate at which water ponds within cleared areas and flows over the surface, however given the relatively small amount of clearance proposed and taking place in discrete separated areas and the reasonably sparse nature of the vegetation, it is not anticipated to significantly affect surface water flows or exacerbate land degradation in the surrounding area.</p> <p>Given the topography of the NVCP application area is relatively flat, the required clearing is not anticipated to exacerbate erosion in the NVCP application area. Furthermore, no deep-rooted vegetation will be cleared and areas surrounding the NVCP application areas will remain vegetated. As such it is unlikely that clearing will influence processes that result in salination or acidification of soils (such as water table rise).</p> <p>As such it is considered that the required clearing is not at variance to this Principle.</p>	
H	<p>Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.</p> <p>No conservation reserves or environmentally sensitive areas are in the immediate vicinity of the proposed vegetation clearing. The nearest reserve is the Millstream-Chichester National Park, which is located approximately 16 km north of the northern-most material pit.</p> <p>Given the distance between the clearing and the closest reserve the required clearing is not at variance to this Principle.</p>	Not at Variance
I	<p>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.</p> <p>The NVCP application area is adjacent to minor, ephemeral creeks. The areas of vegetation associated with these creeks (F2 and F3) have been excluded from the material pit boundaries to minimise any potential impact on the surface waterbodies. A search of DWER's contaminated sites database indicates no contaminated sites are located within 100 metres of the Proposal area with the closest recorded area of historic contamination (from the DWER database) located approximately 5km to the north west of PMPSB04.</p> <p>Only common substances, such as fuel and oil, will be used and works will adhere to Main Roads standard management actions and Safety Data Sheets. Appropriate pollution prevention control measures will be implemented and adhered to throughout the clearing activities to minimise the potential risk of spill accidents, such as spill kits will be readily available during all works and stocked as appropriate to the risk; and bulk storage of chemicals and hydrocarbons will only occur at the construction compound, where secondary containment measures will be implemented. Temporary storage of minor quantities of chemicals required during construction activities will not occur within 100 m of a watercourse or within the 100-year Average Recurrence Interval (ARI) flood high water mark. This will limit the potential for pollution of surface water runoff or groundwater. Clearing activities will therefore not result in the mobilisation of pollutants.</p> <p>The NVCP application area is situated within the Millstream Water Reserve drinking water source protection area - Priority 1 (P1) area. The closest water bore to the NVCP application area is approximately 22km to the north west. To prevent impacts to the Millstream Water Reserve Drinking Water Source, Main Roads will undertake consultation with Water</p>	Not at Variance

## Purpose Permit to Clear Native Vegetation - Supporting Information

Principle	Assessment	Outcome
	<p>Corporation and DWER to obtain the required access permits and develop a spill response strategy and will include detailed control measures to avoid potential pollution incidents in line with those discussed above.</p> <p>The removal of 70 ha of vegetation across three locations that are located in relatively flat terrain and surrounded by large areas of vegetation is unlikely to alter the current hydrological regime of the area as the clearing is unlikely to impact the velocity, flow path or quantity of surface water traveling across the cleared areas. In addition, the relatively small amount of clearing required across the three areas will not contribute to issues such as groundwater level rise, mobilisation of salts within soils or dryland salinity. Interaction with the groundwater is anticipated to be minimal given the shallow depths of excavation associated with the proposed clearing works.</p> <p>As such it is not anticipated that the required clearing would be at variance to this Principle.</p>	
<p>J Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.</p>	<p>The Proposal includes clearance of up to 70 ha of native vegetation situated outside of any existing floodway. The topography within the NVCP application area is generally flat and increased ponding of water is unlikely to occur as a result of the required clearing.</p> <p>PMP5B03 is situated adjacent to Kanjanjie Creek approximately 150m to the east of the watercourse, just outside of the flood plain. Cowcumba Creek is also in proximity to the NVCP application area, approximately 2.4km to the west of PMP5B02. In addition to this there are a number of unnamed drainages in the study area. The Creeks and drainages are predominantly dry for the majority of the year with some pools remaining in the larger creeks.</p> <p>Peak rainfalls occur in the warmer summer months between December and March (i.e. the wet season) as a result of monsoonal thunderstorm activity. Mean annual rainfall is relatively low across the region; 317 mm at the BoM weather station located in Paraburdoo (Station Number 007185) about 155 km south of the material pits compared with 407 mm at Pannawonica (BoM, 2023) approximately 105 km due west of the material pits.</p> <p>The soil characteristics are discussed in Principle G above. Given the broader soil types recorded, the permeability of the soil within the NVCP application area is likely to be slow to moderate. The removal of vegetation therefore has the potential to increase the rate at which water ponds within cleared areas, however given the relatively small amount of clearance proposed and taking place in discrete separated areas, it is not anticipated to significantly affect surface water flows or flood capacity in the area</p> <p>As the surrounding area is vegetated and the area to be cleared is relatively flat, it is unlikely that there will be significant changes to the velocity, flow path or quantity of surface water traveling across the cleared areas and therefore the clearing is unlikely to alter the current hydrological regime of the area, including incidence or intensity of flood events. During the wet season, flooding would be common along the creeks and drainage lines, and the clearing of vegetation associated with the project would not exacerbate flooding upstream or downstream of the works.</p> <p>As such it is considered that the required clearing is not at variance to this Principle.</p>	<p>Not at Variance</p>

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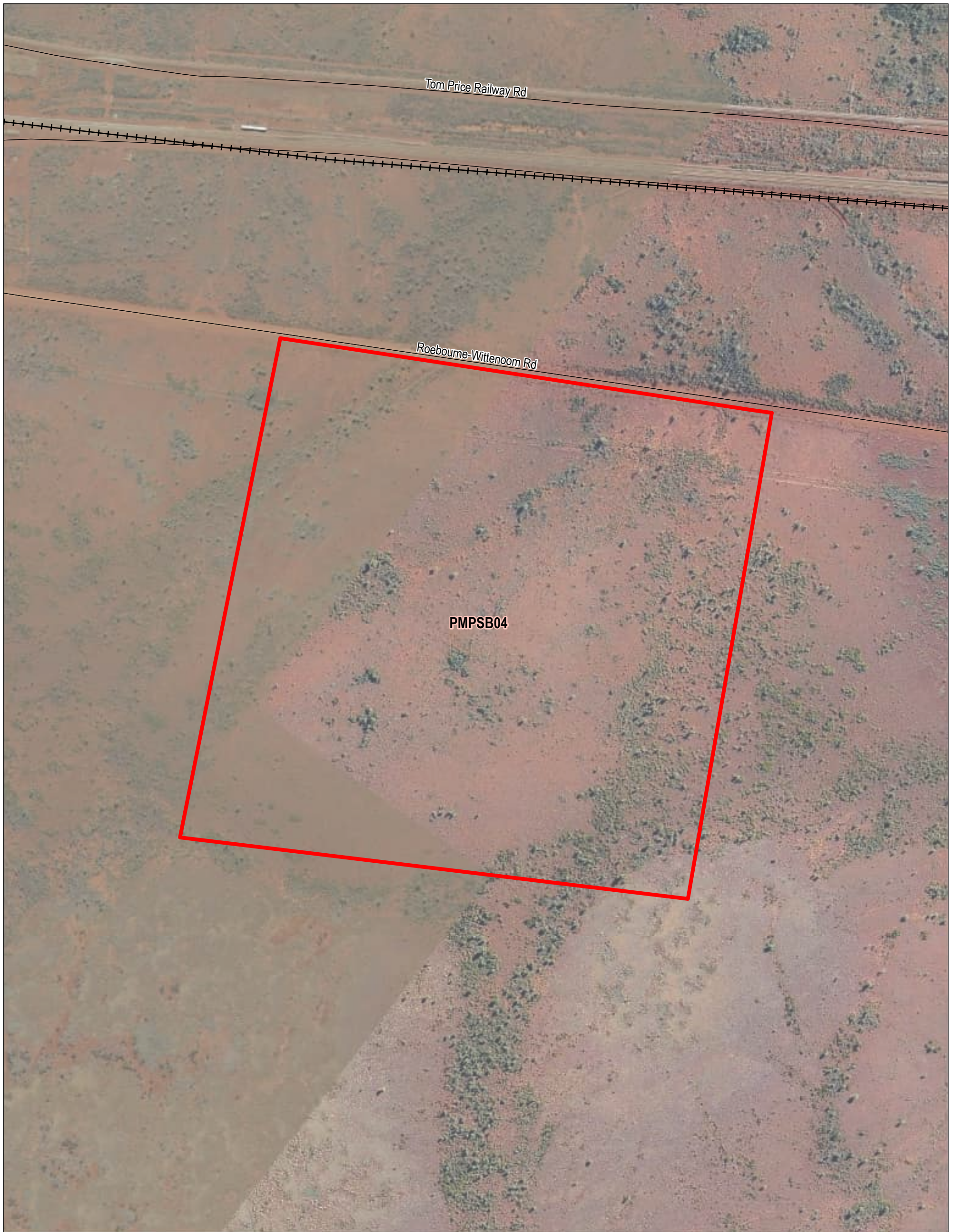
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## **Appendix A. Figures**



**Figure 1. Location Plan**





**Figure 1 - Location Plan**

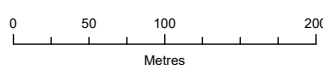
Page 1 of 3

**Legend**

— Roads

+ Railways

▭ NVCP application area



**Jacobs**

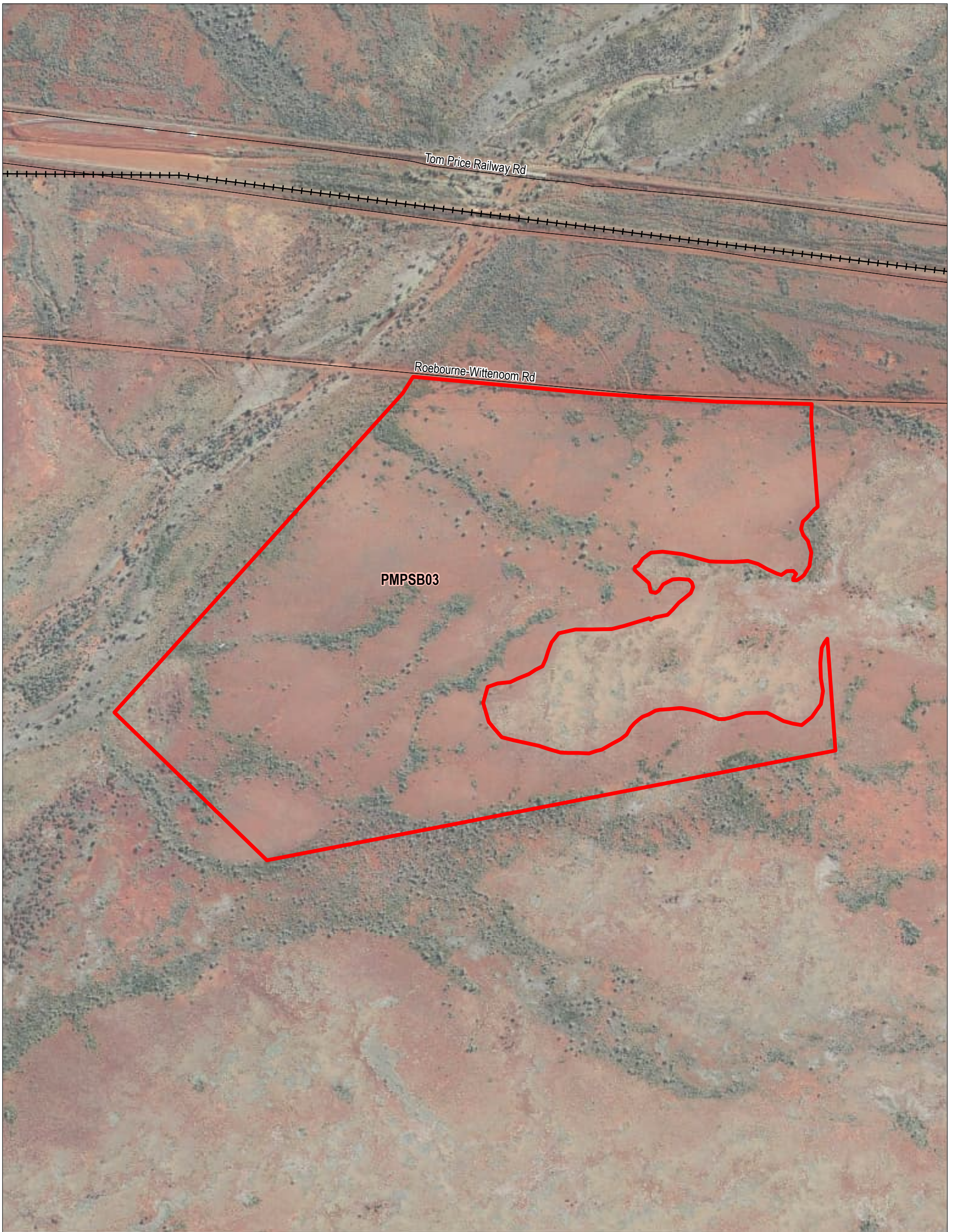
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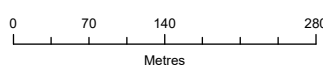
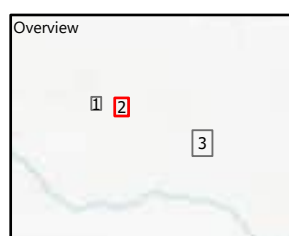


**Figure 1 - Location Plan**

Page 2 of 3

**Legend**

- Roads
- + Railways
- NVCP application area



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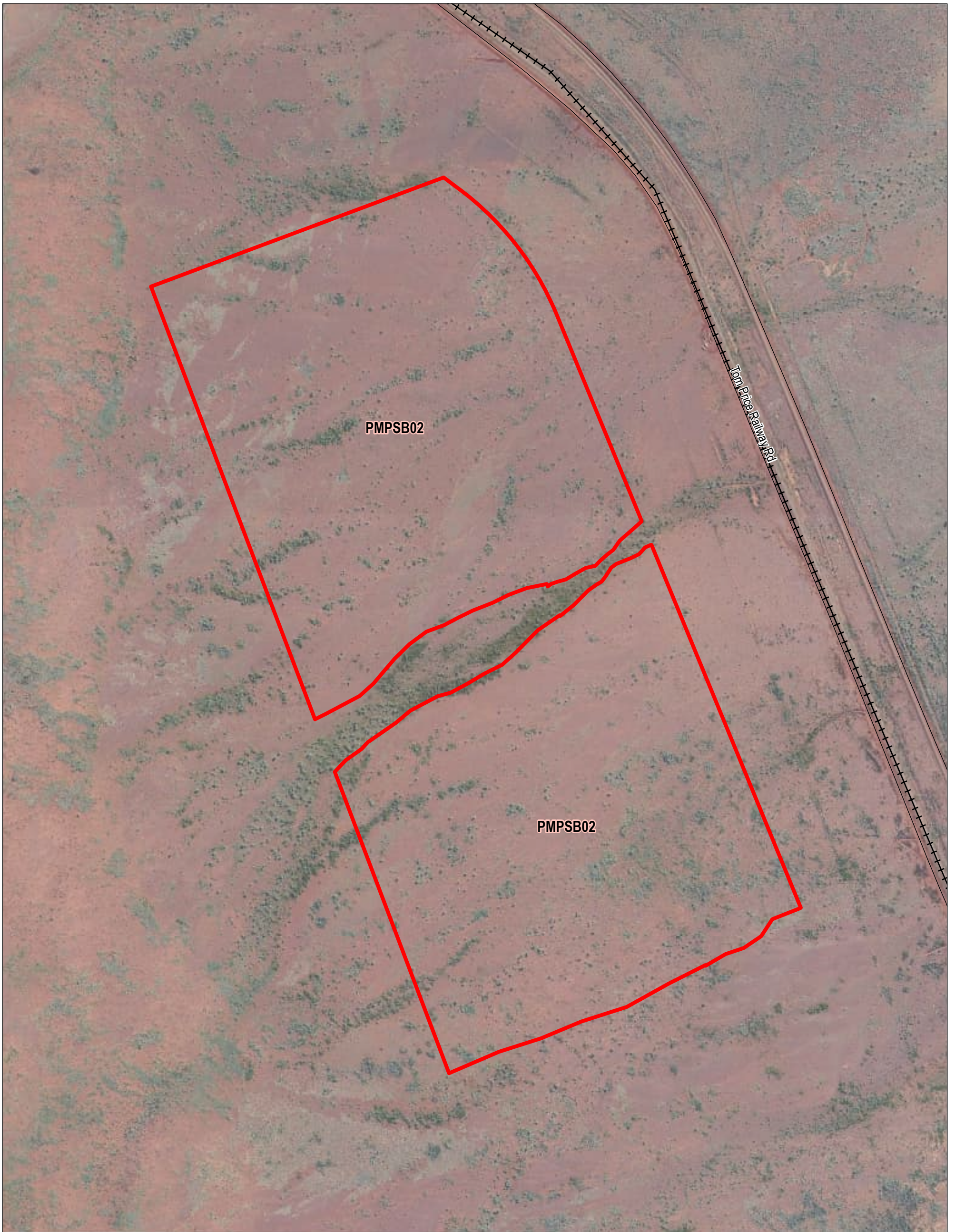
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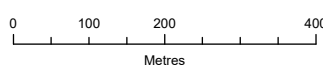
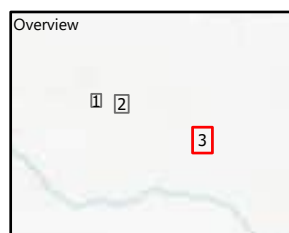


**Figure 1 - Location Plan**

Page 3 of 3

**Legend**

- Roads
- + Railways
- NVCP application area



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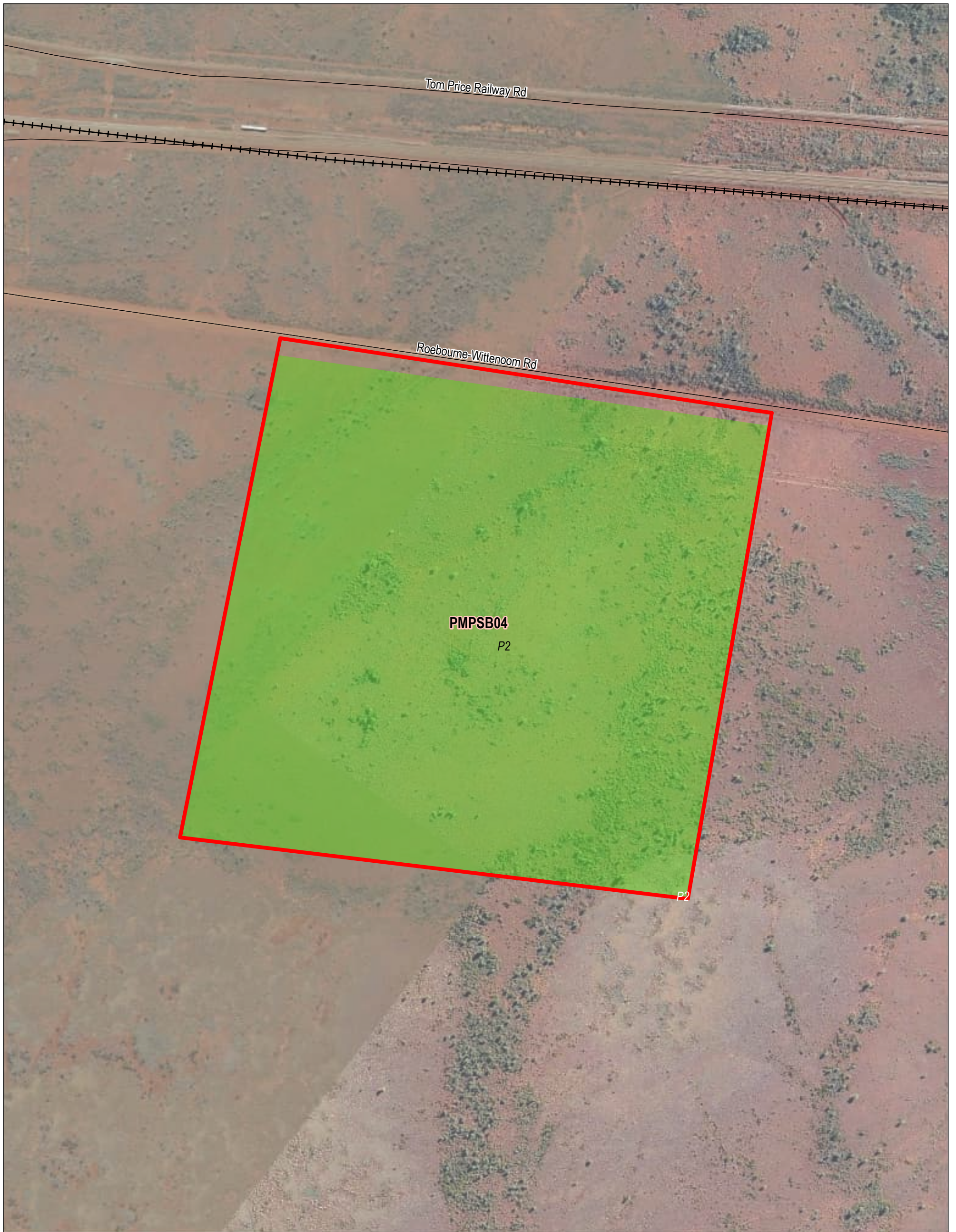
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**Figure 2. Mapped Vegetation Within Clearing Areas**



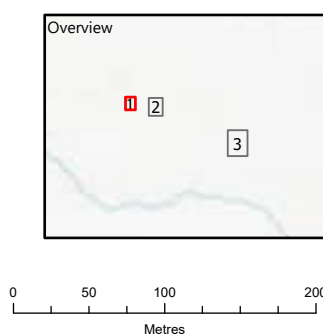


**Figure 2 - Vegetation within the Clearing Areas**

Page 1 of 3

**Legend**

- Roads
- Railways
- NVCP Application Area
- *Corymbia hamersleyana* low open woodland over mixed Acacia shrubland over *Triodia epactia* hummock grassland. (P2)
- Removed from the Material Pit Boundary



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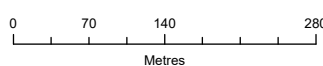
**Figure 2 - Vegetation within the Clearing Areas**

Page 2 of 3

**Legend**

- Significant Flora (*Dolichocarpa sp.* Hamersley Station P3)
- Roads
- Railways
- NVCP Application Area
- Corymbia hamersleyana* low open woodland over mixed *Acacia* shrubland over *Triodia epactia* hummock grassland. (P2)

- Removed from the Material Pit Boundary
- (P7: *Triodia wiseana* hummock grassland with *Eriachne flaccida* scattered tussock grasses.
- C2: *Acacia xiphophylla* low woodland over *Triodia epactia* very open hummock grassland over *Eragrostis xerophila* scattered tussock grasses)



**Jacobs**

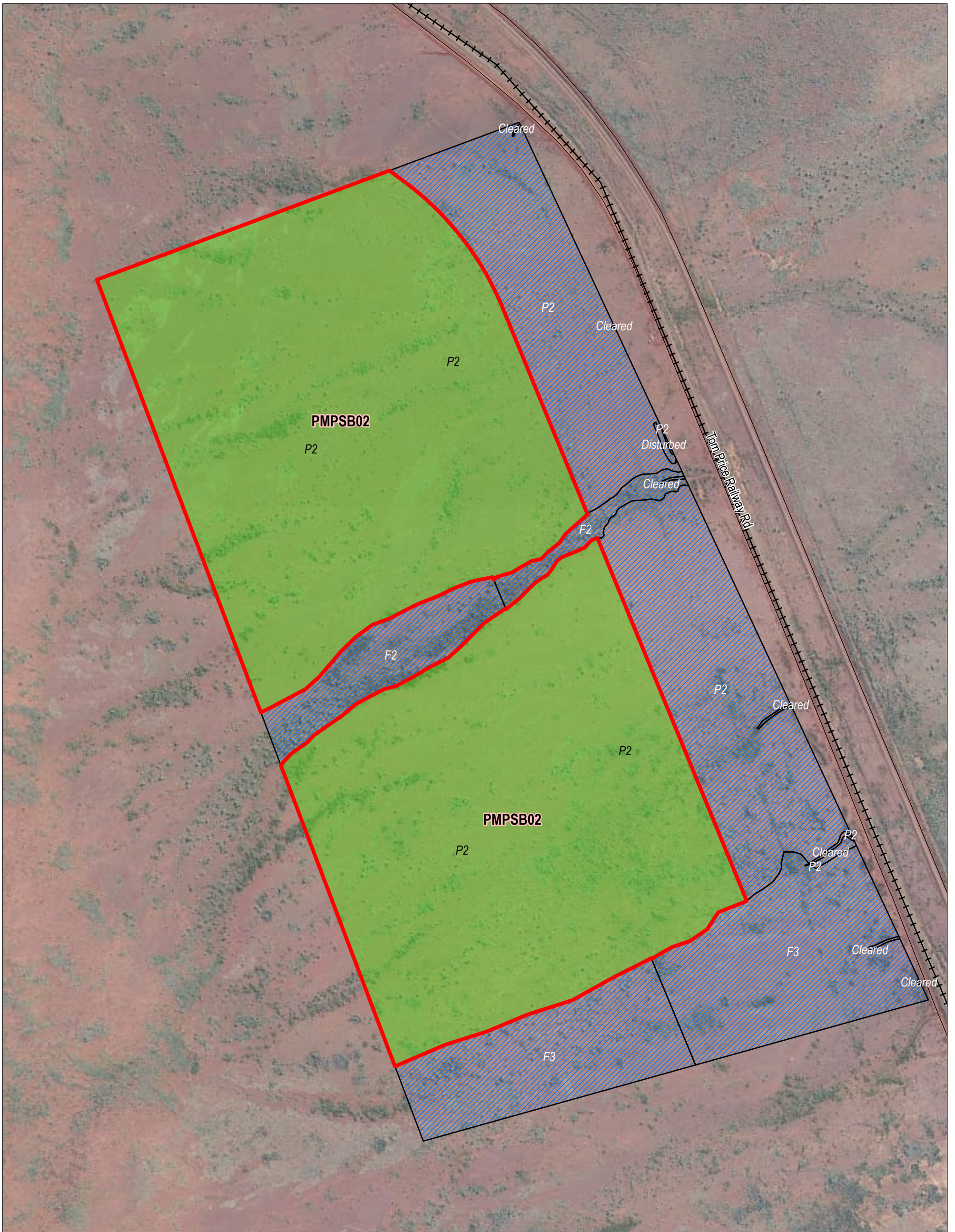
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**Figure 2 - Vegetation within the Clearing Areas**

Page 3 of 3

**Legend**

- Roads
- Railways

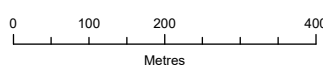
■ NVCP Application Area

■ *Corymbia hamersleyana* low open woodland over mixed *Acacia* shrubland over *Triodia epactia* hummock grassland. (P2)

Removed from the Material Pit Boundary

(F2: *Corymbia hamersleyana* low woodland over mixed *Acacia* tall open shrubland over *Triodia wiseana*, *T. epactia* open hummock grassland.

F3: *Corymbia hamersleyana* low open woodland over mixed *Acacia* open shrubland over *Triodia epactia* very open hummock grassland with *Chrysopogon fallax* very open tussock grassland)



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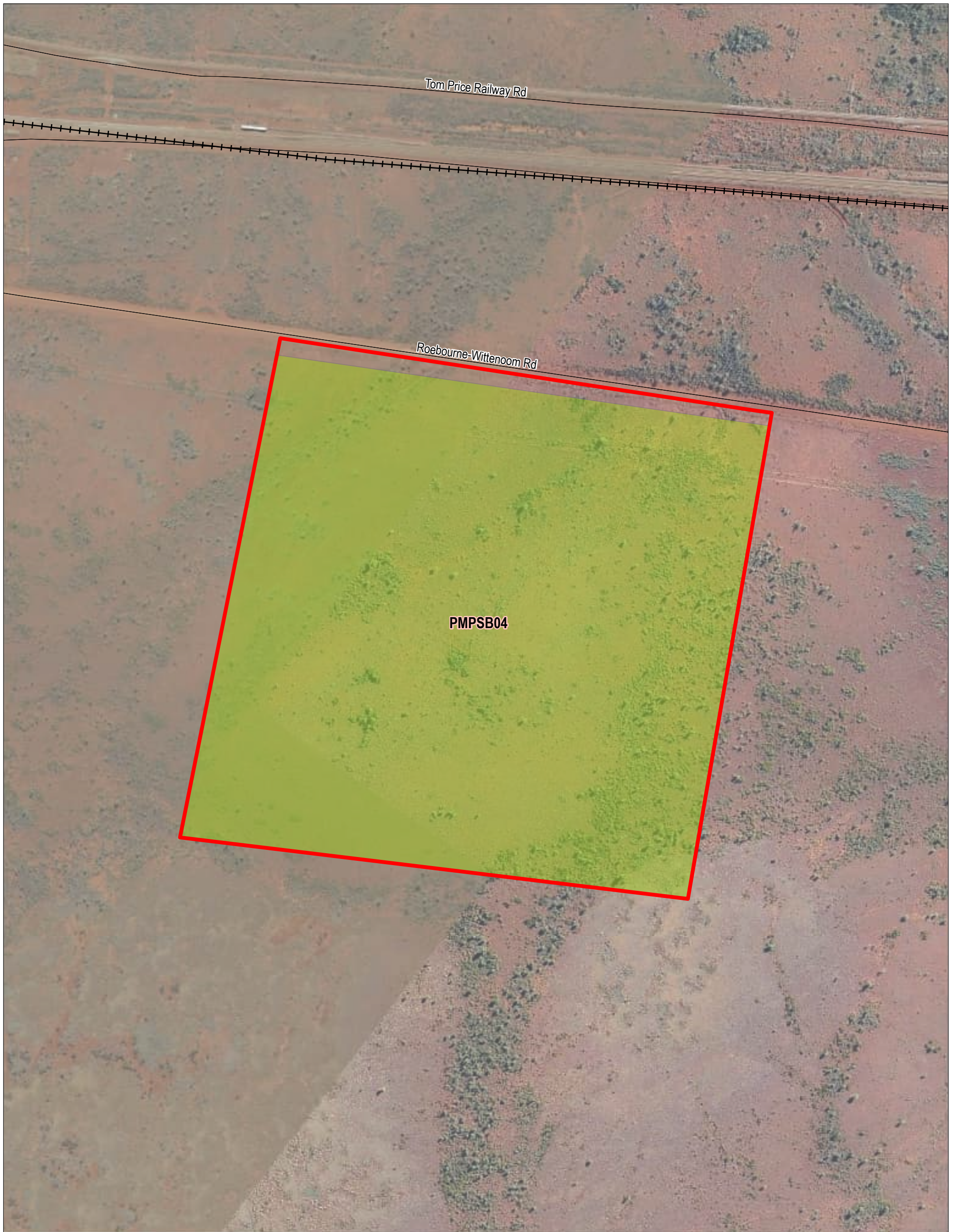
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**Figure 3. Vegetation Condition**



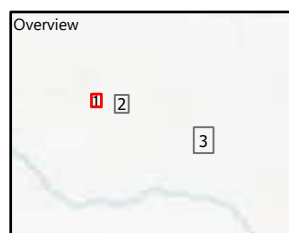


**Figure 3 - Vegetation Condition**

Page 1 of 3

**Legend**

- Roads
- + Railways
- NVCP Application Area
- Vegetation Condition**
- Excellent



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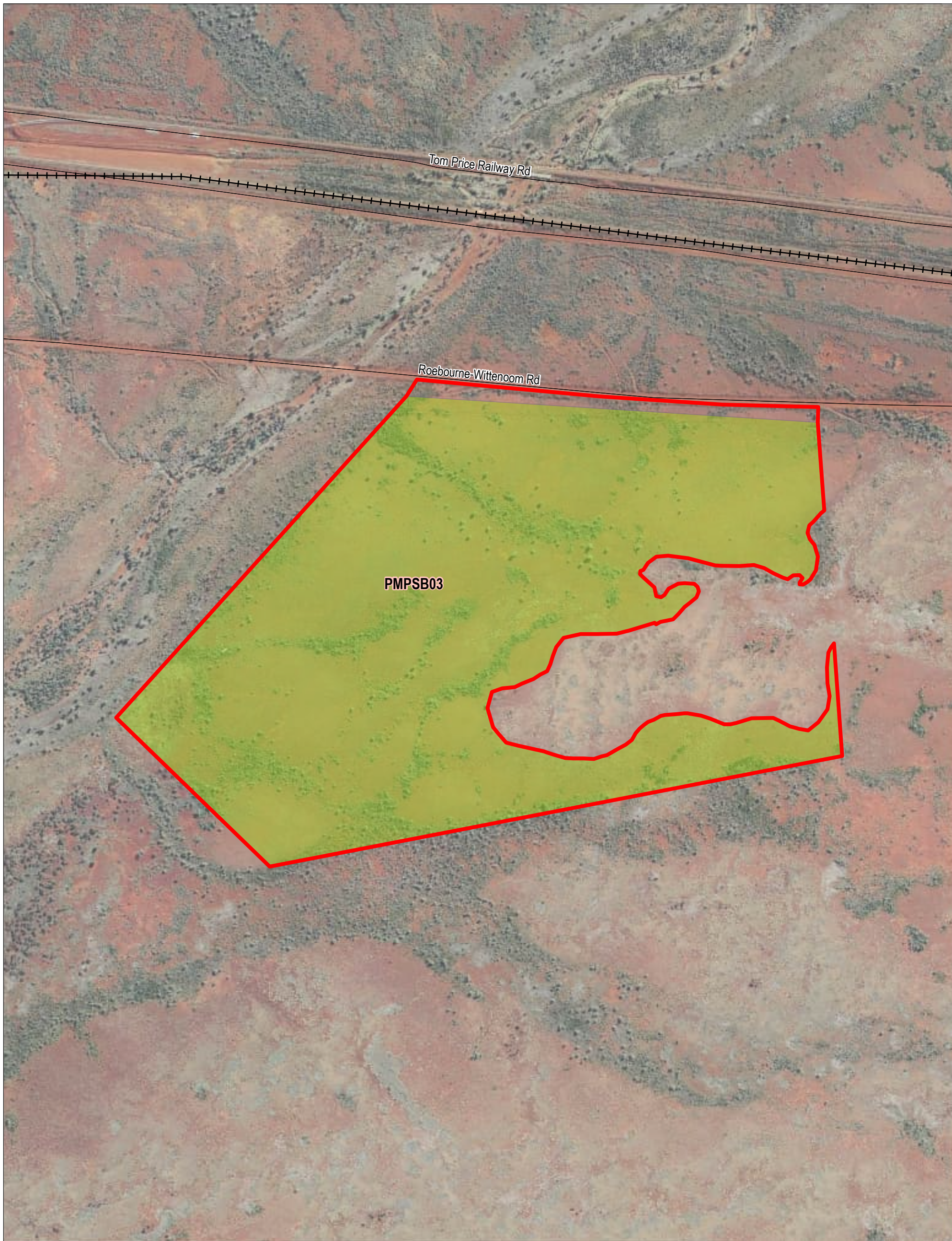
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**Figure 3 - Vegetation Condition**

Page 2 of 3

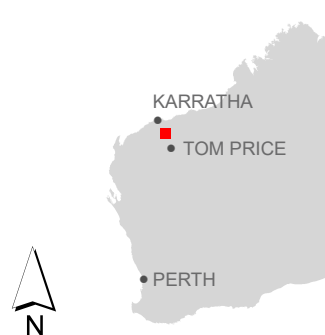
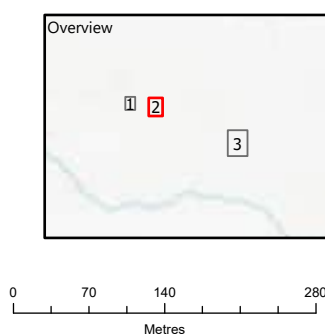
**Legend**

- Roads
- + Railways
- NVCP Application Area

**Vegetation Condition**

- Excellent

Note: The condition of the vegetation excluded from the application area was 'Excellent', with the exception of C2 which was 'Very Good'



**Jacobs**

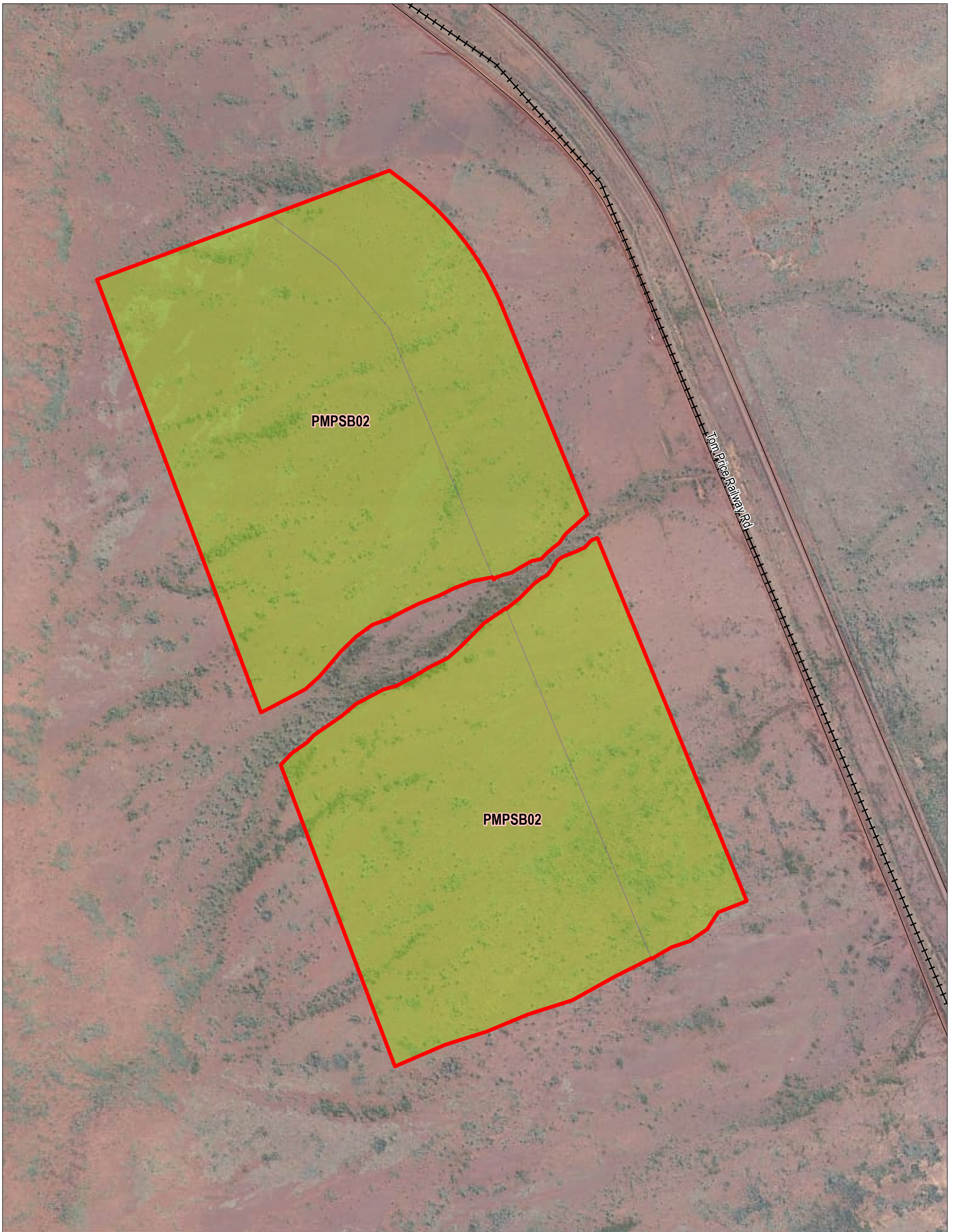
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**Figure 3 - Vegetation Condition**

Page 3 of 3

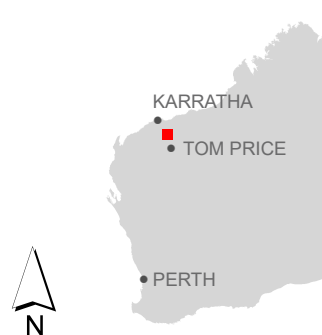
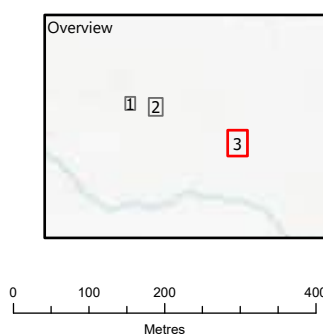
**Legend**

- Roads
- + Railways
- NVCP Application Area

**Vegetation Condition**

- Excellent

Note: The condition of the vegetation excluded from the application area was 'Excellent'



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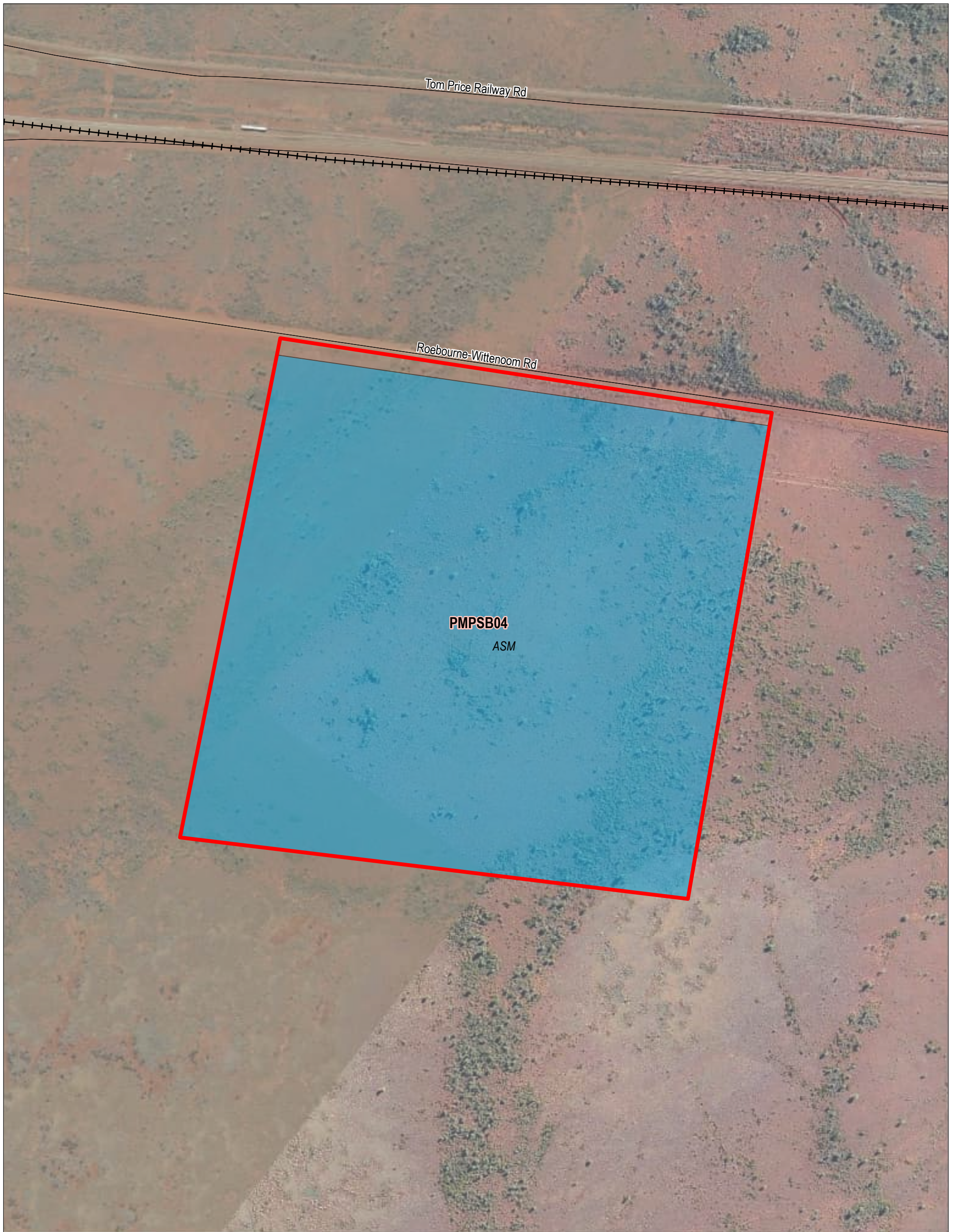
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**Figure 4. Fauna habitats within Clearing Areas**



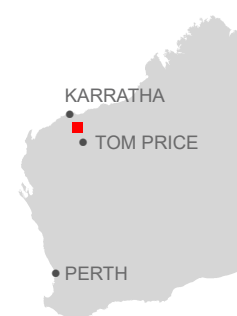
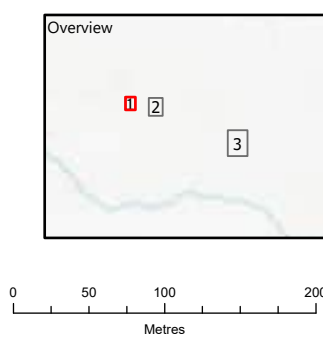


**Figure 4 - Fauna Habitats within Clearing Areas**

Page 1 of 3

**Legend**

- Roads
- + Railways
- NVCP Application Area
- ASM - Mixed *Acacia* shrublands



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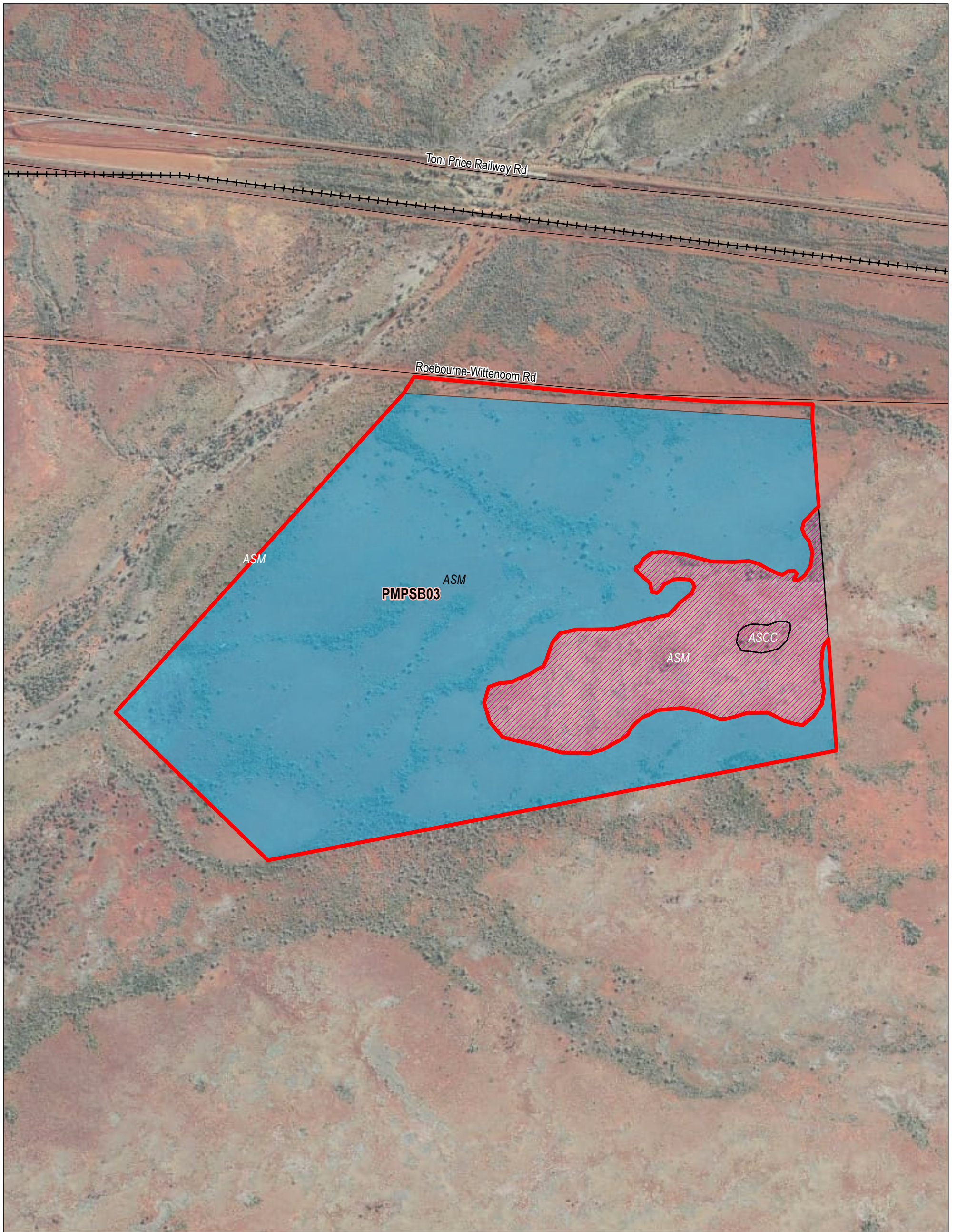
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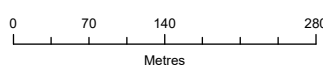


**Figure 4 - Fauna Habitats within Clearing Areas**

Page 2 of 3

**Legend**

- Roads
- + Railways
- NVCP Application Area
- ASM - Mixed *Acacia* shrublands
- Removed from the Material Pit Boundary



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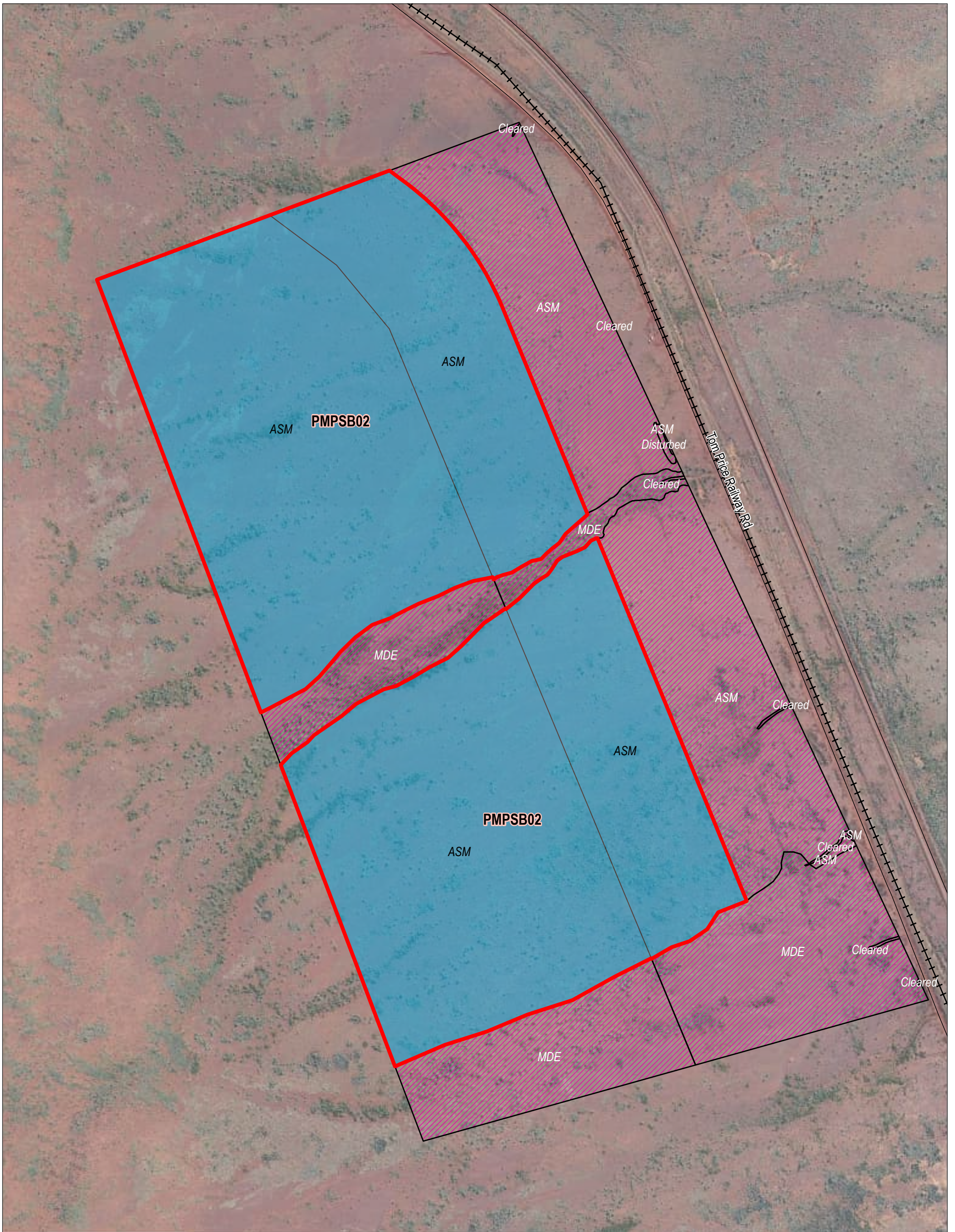
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**Figure 4 - Fauna Habitats within Clearing Areas**

Page 3 of 3

**Legend**

- Roads
- + Railways
- NVCP Application Area
- ASM - Mixed *Acacia* shrublands
- Removed from the Material Pit Boundary



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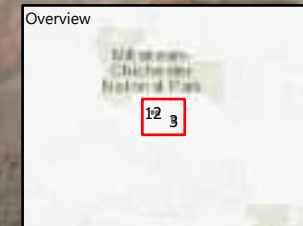
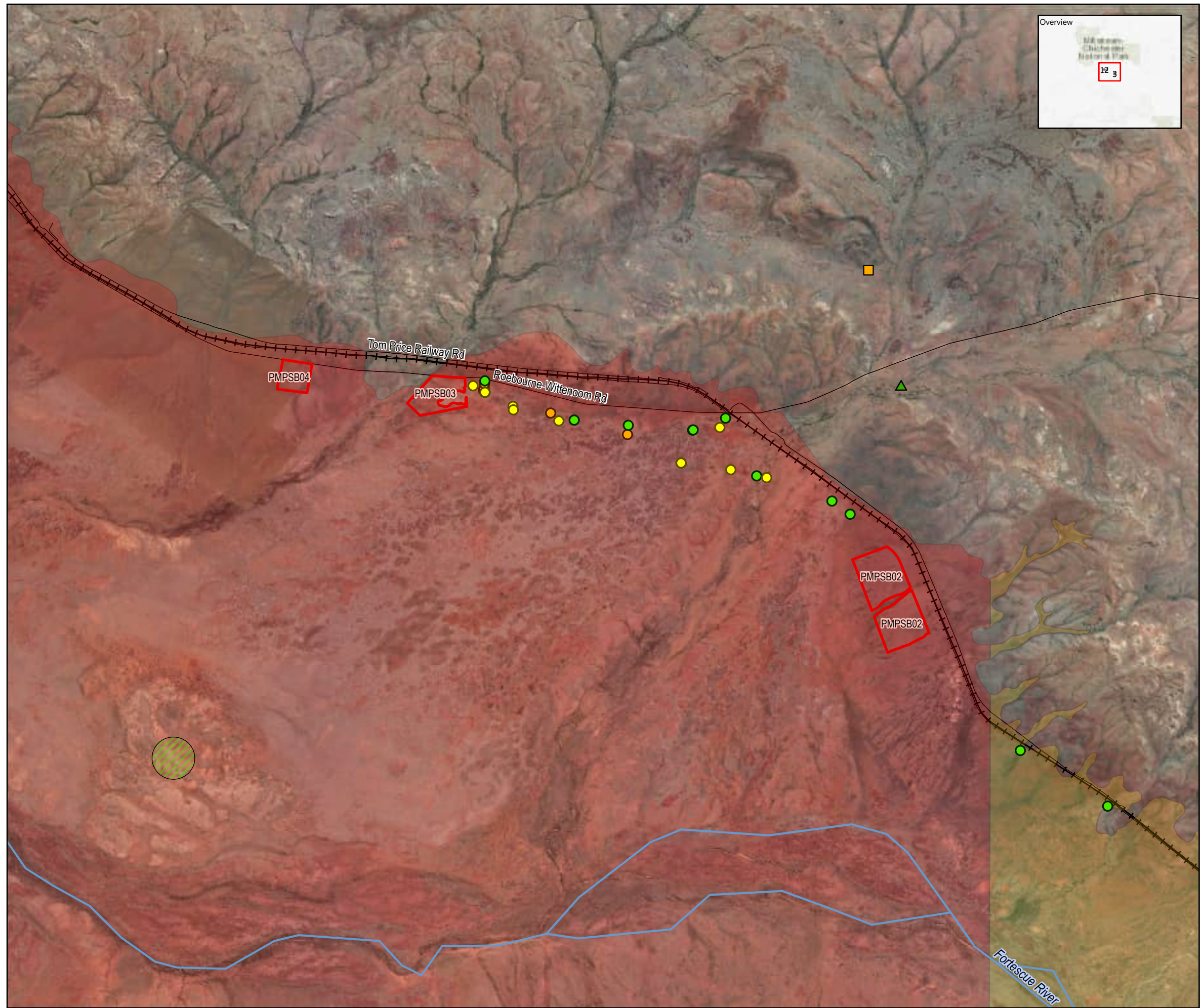
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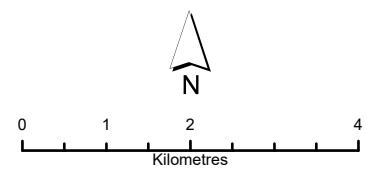


**Figure 5. Ecological Constraints and Hydrological Features**





- Legend**
- Threatened and Priority Flora (WA ConStat)**
    - Priority 2
    - Priority 3
    - Priority 4
  - Threatened and Priority Flora (DBCA)**
    - Priority 2
  - Threatened and Priority Fauna**
    - ▲ Priority Fauna
  - Roads
  - ++ Railways
  - Rivers and Creeks
  - ▭ NVCP Application Area
  - Threatened Ecological Communities**
    - ▨ Priority
  - Public Drinking Water Source Areas**
    - Protection Area-P1
    - Protection Area-P2



Scale: 1:90,000 (A3 Print)  
 Project Name: Environmental Services for MRDH Geotech and Material Pits  
 Projection: GDA 1994 MGA Zone 50  
 Sources: Jacobs - Material Pits; DBCA - Threatened Fauna and Flora; Landgate - Roads, Imagery 2023  
 Map Produced: 5/31/2023.  
 Project Number: IW218151  
 Rev A

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**Figure 5 - Ecological Constraints and Hydrological Features**