BHP Mitsubishi Alliance

Appendix C

Terrestrial Ecology Significant Impact Assessment Report

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Significant Impact Assessment Report – Terrestrial Ecology

SLR Consulting Australia Pty Ltd

Horse Pit Extension Project – Caval Ridge Mine

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Contents

List of tables

List of figures

Appendices

Definitions

Term	Definition
Connectivity areas	Area of remnant vegetation outside urban areas containing prescribed RE that are required for ecosystem functioning.
Conservation significant	Listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) or the *Nature Conservation Act 1992* (Qld).
CVM existing disturbance	Disturbance footprint approved in the CVM EIS and associated Coordinator General's Change Requests and the current disturbance from Caval Ridge mining activities (2020).
Defining bank	bank which confines the seasonal flows but may be inundated by flooding from time to time. This can be either: • the bank or terrace that confines the water before the point of flooding, or • where there is no bank the seasonal high water line which represents the point of flooding.
Dense structural category regional ecosystem	regional ecosystem with a dense structural category in the Regional Ecosystem Description Database (REDD) (Queensland Herbarium, 2021a).
the disturbance footprint	The disturbance footprint is the proposed area to be impacted from the Project's mining activities. Also known as the Project Site.
Drainage feature	Determined by the Department of Regional Development, Manufacturing and Water under the *Water Act 2000* (QLD) as 'not a watercourse'.
Essential Habitat	A category B area shown on the regulated vegetation management map under the *Vegetation Management Act 1999*: a) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or b) in which the protected wildlife, at any stage of its life cycle, is located.
Grasslands	Grasslands, in the context of habitat recorded within the disturbance footprint, refers to Dichanthium species-dominant grasslands indicative of RE 11.8.11.
Habitat	The area occupied, or occasionally/periodically occupied, by any species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by species during different stages of their life cycle (*QLD Significant Residual Impact Guidelines*).

Term	Definition
Habitat critical to the survival of the species	Under the EPBC Act, 'habitat critical to the survival of a species' are areas that are necessary: • for activities such as foraging, breeding, roosting, or dispersal; • for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators); • to maintain genetic diversity and long term evolutionary development or; • for the reintroduction of populations or recovery of the species or ecological community. Such habitat may be but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.
Horse Pit	CVM EIS Pit Boundary for Horse Pit in the north of ML 1775 and ML 70403.
Important population	Under the EPBC Act, an important population is that which is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are: • key source populations either for breeding or dispersal • populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species range.
Invasive species	Under the EPBC Act, an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources, or which is a predator of native species.
Long-term decrease	Any decline in a local population that is greater than which would be apparent without the action being present (*Environmental Offset Act 2014*).
Mid-dense structural category RE	Regional ecosystem is a regional ecosystem with a mid-dense structural category in the Regional Ecosystem Description Database (REDD).
Population of a species	An occurrence of the species in a particular area. In relation to endangered, vulnerable or SLC (NC Act), occurrences include but are not limited to a geographically distinct regional population, or collection of local population, or a population/collection of local populations, that occurs within a particular bioregion (*QLD Significant Residual Impact Guidelines*).
Prescribed regional ecosystem	Remnant vegetation.
the Project	The Horse Pit Extension Project located in the northern extent of ML 1775, ML 70403 and ML 70462 north of the Peak Downs Highway.

Term	Definition
the Project area	The Project area is defined as the proposed disturbance areas outside of the CVM Existing Disturbance, specifically: • the proposed extent of additional surface area rights within ML 1775 • the extension of Horse Pit within ML 1775 • continuation of existing in-pit dumps on ML 1775 and ML 70403 • new out-of-pit dumps located on ML 70403, and • new and/or relocated associated infrastructure located on ML 1775, ML 70403 and ML 70462 (i.e. water management structures, haul roads, laydown areas (temporary and permanent), access routes (temporary and permanent) and electricity).
Regional Ecosystem	A vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil. Regional Ecosystems are described in the Regional Ecosystem Description Database, produced by the Queensland Herbarium.
Regulated vegetation	Vegetation that is mapped within the regulated vegetation management map produced by DoR. Regulated Vegetation is managed under the *Vegetation Management Act 1999* (Qld).
Sparse structural category regional ecosystem	a regional ecosystem with a sparse structural category in the Regional Ecosystem Description Database (REDD).
the Study Area	The Study Area is the geographic area surveyed during the ecology field surveys; specifically ML1775 and ML70403 north of the Peak Downs Highway (excluding Moranbah Airport), client supplied shapefile.
Target species	Threatened species (i.e. MNES and MSES) that are known, likely or have the potential to occur in the disturbance footprint as per the outcome of the Likelihood of Occurrence Assessment.
Threatened species	Critically Endangered, Endangered, Vulnerable species under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and Critically Endangered, Endangered, Vulnerable or Near Threatened under the *Nature Conservation Act 1992* (Qld).
Vegetation community	An identified vegetation community (i.e. structure, composition, condition and/or underlying geology) verified from a field survey. Communities may include Regional Ecosystems, remnant vegetation and/or disturbed/novel ecosystems (e.g. parkland, disturbed roadsides etc.).
Watercourse	A watercourse as determined by the Department of Regional Development, Manufacturing and Water under the *Water Act 2000* (Qld).

Abbreviations

Abbreviation	Description
ALA	Atlas of Living Australia

Abbreviation	Description
BMA	BM Alliance Coal Operations Pty Ltd
BVGs	Broad Vegetation Groups
Cth	Commonwealth
CVM	The Caval Ridge Mine located on Mining Lease (ML) 1775, ML 70403 and ML 70462
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DEE	Commonwealth Department of the Environment and Energy
DotE	Commonwealth Government Department of the Environment
DES	Queensland Department of Environment and Science
DoR	Queensland Department of Resources
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
E2M	E2M Pty Ltd
EA	The Environmental Authority for the Caval Ridge Mine (No. EPML00562013, effective on 10 August 2020)
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
GDE	Groundwater Dependant Ecosystem
GPS	Global Positioning System
GTRE	ground truthed Regional Ecosystem
HVR	High Value Regrowth
ML	Mining Lease
MNES	Matters of National Environmental Significance are prescribed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
MSES	Matters of State Environmental Significance as defined by Schedule 2 of the *Environmental Offsets Regulation 2014* (Qld) and include multiple prescribed environmental matters under Queensland legislation (and associated subordinate legislation and policies)
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992* (Qld)
PMST	Protected Matters Search Tool used to determine matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The PMST generates a Protected Matters Report.
QLD	Queensland
RE	Regional Ecosystem

Abbreviation	Description
REDD	Regional Ecosystem Description Database
DSEWPAC	Department of Sustainability, Environment, Water, Population and Communities (Cth)
sp.	Singular species. For example, *Eucalyptus* sp. refers to a single species of *Eucalyptus*
spp.	Multiple species. For example, *Eucalyptus* spp. refers to multiple species of *Eucalyptus*
SPRAT	Species Profile and Threats database provides information about species and ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
TEC	Threatened Ecological Community listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
VCs	Vegetation communities
VM Act	*Vegetation Management Act 1999* (Qld)
WONS	Weeds of National Significance

1 Introduction

1.1 Project background

The Caval Ridge Mine (CVM) is owned and operated by BM Alliance Coal Operations Pty Ltd (BMA), on behalf of the Central Queensland Coal Associates Joint Venture (CQCA JV). The CVM project was approved by the Coordinator-General under the *State Development and Public Works Organisation Act 1971* (Qld) in 2010 and has been in operation since 2014. Operations at the CVM are carried out under the conditions of Environmental Authority (EA) EPML00562013 and EPBC Approval (2008/4417).

In response to changes in mine sequencing, improvements in mining efficiency and further resource definition, BMA propose to extend the footprint of the existing Horse Pit at the CVM.

A terrestrial ecology assessment, conducted in 2019/2020 by E2M Pty Ltd (E2M), identified the existing environmental values within the Horse Pit Extension Project (herein referred to as the Project) including Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES).

The potential impact of the Project on the environmental values identified within the disturbance footprint are discussed in this report.

1.2 Objective and scope

E2M was engaged by SLR Consulting Australia Pty Ltd (SLR), on behalf of BMA, to conduct a Significant Impact Assessment for MNES/MSES identified as known, likely or as having the potential to occur within the disturbance footprint as per the Terrestrial Ecology Assessment Report (E2M 2021) (Appendix A). The objective of the Significant Impact Assessment (SIA) is to determine if the Project is likely to have a significant residual impact on MNES and/or MSES. The scope of the assessment includes:

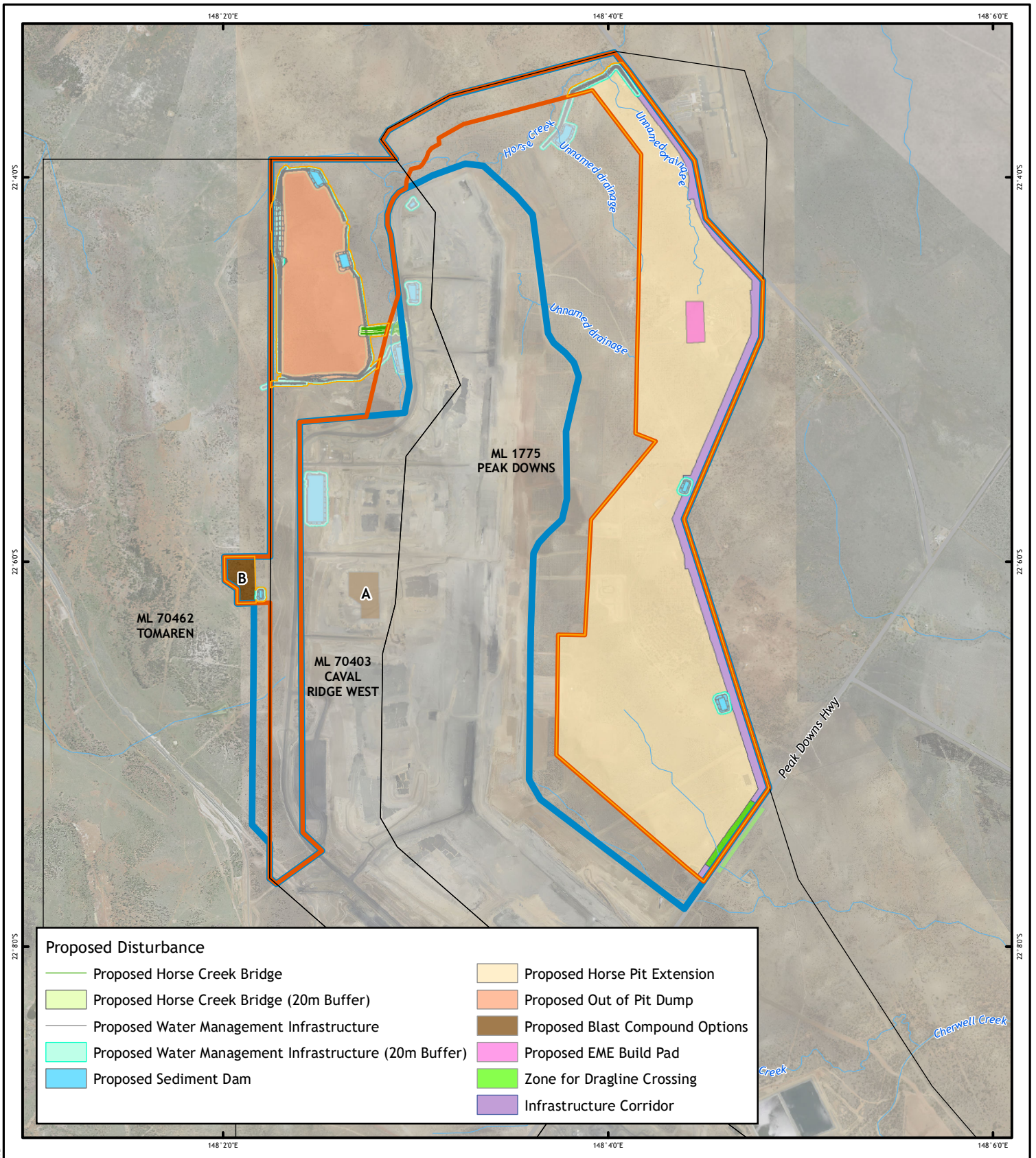
- a review of the Terrestrial Ecology Assessment Report (E2M 2021) and the Groundwater Dependent Ecosystems Report (E2M 2020);
- identifying the potential impacts of Project development on the ecological values known, likely or with the potential to occur in the disturbance footprint;
- addressing avoidance and mitigation measures; and
- evaluating the residual impact (if any) against the State and Commonwealth significant residual impact criteria.

1.3 Site overview

The CVM is situated amongst a coal mining precinct in the northern Bowen Basin where resource extraction, agriculture and livestock grazing are the predominant land uses. Consequently, the landscape has been highly modified. The Horse Pit Extension Project area (the Project area) is located within Mining Lease (ML) 1775, ML 70403 and ML 70462 north of the Peak Downs Highway (excluding the Moranbah Airport) (Figure 1). The study area is the 1772 ha area surveyed by E2M during the 2019/2020 terrestrial ecology assessment. The disturbance footprint within the study area is approximately 911 ha and consists of the Horse Pit Extension, an out of pit dump, a dragline crossing and associated infrastructure.

The study area was historically cleared and grazed and presently subject to the ongoing direct and indirect disturbances from the CVM operations. The remaining vegetation within the study area is predominately regrowth brigalow (84%) with eucalypt woodland (12%) and remnant native grassland (4%). Much of the brigalow community occurs on soils with a heavy clay content and capacity to hold water creating local depressions called melon holes or gilgai.

Horse Creek (Stream Order 3) traverses the north-eastern section of the study area where it diverges into three smaller, unnamed, Stream Order 1 drainages. Outside of the ML, Horse Creek joins the Isaac River (Stream Order 6) via Grosvenor Creek (Stream Order 5) approximately five km east of the ML 1775 boundary. Despite the highly modified landscape within the disturbance footprint and the broader landscape, the drainage systems remain relatively intact. Permanent water sources, such as farm and mine dams are scattered throughout the study area.



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint

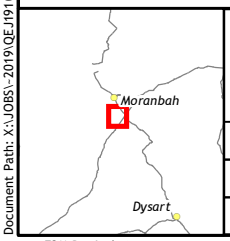
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Ordered Drainage: © DNRME 2018
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	01/09/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 1: PROJECT OVERVIEW

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_1_Site.mxd

2 Relevant Legislation

A significant residual impact was determined by evaluating the MNES and MSES that are known, likely or have the potential to occur within the disturbance footprint (as identified in the Terrestrial Ecology Assessment Report (E2M 2021)) against the Commonwealth and State environmental and offset legislation.

2.1 Commonwealth

Significant impacts on MNES are evaluated using the Australian Government's environmental and offset framework.

Environment Protection and Biodiversity Act 1999	• framework to protect and manage nationally significant flora, fauna, ecological communities and heritage places • provides a national environmental assessment and approvals process
Environmental Offsets Policy 2012	• outlines the Australian Government's approach to the application of environmental offsets • aims to achieve net positive environmental outcomes through a consistent application of best practice offset principles
MNES Significant impact guidelines 1.1	• describes the nine MNES • steps out whether or not an action is likely to have a significant impact on MNES • lists the 'Significant impact criteria' used as part of this assessment
Offsets assessment guide	• a practical tool using a balance sheet approach to compare impacts to offsets for threatened species and ecological communities (not included as part of this report)

2.2 State

Significant impacts on MSES are evaluated using the Queensland offset framework.

Environmental Offsets Act 2014	• outlines the offsets framework in Queensland • specifies the delivery of environmental offsets across jurisdictions • provides a single point-of-truth for offsets in Queensland
Environmental Offsets Regulation 2014	• lists the MSES regulated under the Environmental Offsets Act 2014 • specifies prescribed activities
Queensland Environmental Offsets Policy Version 1.10	• details how offset proposals are assessed to ensure they meet the requirements of the *Environmental Offsets Act 2014*
Significant Residual Impact Guideline	• applied to assist in determining whether or not the Project will, or is likely to have a significant residual impact on the MSES identified within the disturbance footprint • includes the Landscape Fragmentation and Connectivity tool

3 Terrestrial ecology assessment summary

The Terrestrial Ecology Assessment Report (E2M 2021) (Appendix A) published the results of a desktop assessment and two field surveys targeting conservation-significant wildlife, wildlife habitat, regulated vegetation, ecosystem function and other MNES and MSES prescribed under the EPBC Act (Cth) and the *Environmental Offsets Regulation 2014* (Qld). The dry season field survey was conducted in late November 2019 followed by a wet season survey in March 2020.

The diversity of wildlife species, habitat and vegetation communities recorded within the study area generally reflect the historical and existing disturbance associated with the operation of the CVM. Most species observed during field surveys are habitat generalists, commonly occurring or abundant and listed as Least Concern under the NC Act.

The MNES and MSES identified within the study area are discussed in terms of their occurrence within the disturbance footprint.

3.1 MNES

3.1.1 Threatened wildlife

One flora species, *Dichanthium queenslandicum* and two fauna species, ornamental snake *(Denisonia maculata)* and squatter pigeon (*Geophaps scripta scripta)* are known to occur in the study area. Ornamental snake was recorded during the 2020 wet season field survey (E2M 2021) within regrowth brigalow located east of the existing Horse Pit, while *Dichanthium queenslandicum* and squatter pigeon were recorded within ML 1775, ML 70403 and ML 70462 during the original Environmental Impact Statement (EIS) ecology studies (BMA 2009). The 2019/2020 field surveys verified the occurrence of suitable *Dichanthium queenslandicum* and squatter pigeon habitat within the disturbance footprint.

Australian painted snipe (*Rostratula australis)* has not been detected within ML 1775, ML 70403 and ML 70462 the during field assessments; however, approximately 1.80 ha of ephemeral foraging habitat was identified in the inundated drainages within the disturbance footprint.

A summary of MNES values identified within the disturbance footprint is listed in Table 1.

Table 1. Summary of MNES identified within the disturbance footprint

MNES threatened species	EPBC Act status	Habitat within the Disturbance footprint (ha)
Known to occur		
king bluegrass *Dichanthium queenslandicum*	Endangered	23.40
ornamental snake *Denisonia maculata*	Vulnerable	167.84 (preferred habitat)
squatter pigeon *Geophaps scripta scripta*	Vulnerable	54.82 (preferred habitat) 28.71 (suitable habitat)
Potential to occur		

MNES threatened species	EPBC Act status	Habitat within the Disturbance footprint (ha)
Australian painted snipe *Rostratula australis*	Endangered	1.80

3.1.2 Migratory species

The Terrestrial Ecology Assessment Report (E2M 2021) identified the potential for 10 migratory terrestrial and wetland birds listed under the EPBC Act (MNES) to occur within or near (i.e. 50 km) the disturbance footprint. The likelihood of any of the 10 migratory species utilising resources within the disturbance footprint, or study area, as important habitat is unlikely due to a lack of suitable habitat (E2M 2021).

3.1.3 Groundwater Dependent Ecosystems

E2M (2020) assessed vegetation communities within the 1 m Predicted Drawdown Extent within the study area identifying approximately 6.21 ha of likely facultative groundwater dependent ecosystems (GDEs) comprising riparian communities (RE 11.3.25) associated with Horse Creek. The full assessment is published in the Groundwater Dependent Ecosystems Report (E2M 2021).

3.2 MSES

3.2.1 Protected wildlife habitat

Under Schedule 6 of the *Environmental Offsets Regulation 2014* 'protected wildlife habitat' is defined as:

- An area that contains plants listed as Critically Endangered, Endangered or Vulnerable and located within a high risk area on the flora survey trigger map;
- An area that contains plants listed as Critically Endangered, Endangered or Vulnerable and is not located within a high risk area on the flora survey trigger map;
- koala habitat area;
- habitat for an animal listed as Critically Endangered, Endangered, Vulnerable and Special Least Concern.

Protected Wildlife Habitat recorded in the disturbance footprint during the field surveys is presented in Table 2.

3.2.2 Essential habitat

Queensland Department of Resources (DoR) have mapped essential habitat for *D. queenslandicum*, ornamental snake and squatter pigeon within the disturbance footprint (Table 2). Essential habitat for protected wildlife is defined in Section 20AC (1)(2) of the *Vegetation Management Act 1999* as a Category A, B or C area as shown on a regulated vegetation management map produced by DoR.

3.2.3 Regulated vegetation

The Terrestrial Ecology Assessment Report (E2M 2021) did not record regulated vegetation that intersects with a mapped wetland (i.e. wetland REs) or within the defined distance from the defining banks of a watercourse (i.e. watercourse REs) as defined under the VM Act.

Regulated vegetation within the disturbance footprint is limited to 23.40 ha of 'of concern' remnant RE 11.8.11 (*Dichanthium sericeum* grassland on Cainozoic igneous rocks).

3.2.4 Connectivity

Connectivity areas, as defined by the *Environmental Offsets Regulation 2014* and supported by the Environmental Offsets Policy (DES 2021), apply to prescribed REs to the extent the ecosystem contains remnant vegetation and an area of land required for ecosystem functioning that will remain despite a threatening process. Connectivity areas within the disturbance footprint are limited to remnant RE 11.8.11 and RE 11.7.1 (Table 2).

Table 2. Summary of MSES identified within the disturbance footprint

Protected wildlife habitat	NC Act Status	Ground-truthed habitat (ha)
Known to occur		
king bluegrass *Dichanthium queenslandicum*	Vulnerable	23.40
ornamental snake *Denisonia maculata*	Vulnerable	167.84 (preferred habitat)
squatter pigeon *Geophaps scripta scripta*	Vulnerable	54.82 (preferred habitat) 28.71 (suitable habitat)
Likely to occur		
short-beaked echidna *Tachyglossus aculeatus*	Special least concern	595.03
Potential to occur		
Australian painted snipe *Rostratula australis*	Vulnerable	1.80
common death adder *Acanthophis antarcticus*	Vulnerable	80.47
Essential habitat		
king bluegrass *Dichanthium queenslandicum*	Endangered	DoR mapped 13.32 ha
ornamental snake *Denisonia maculata*	Vulnerable	DoR mapped 8.08 ha
squatter pigeon *Geophaps scripta scripta*	Vulnerable	DoR mapped 0.19 ha
Connectivity Areas		
Remnant vegetation		84.19

* Central Queensland Threatened Species Habitat Descriptions (Kerswell et al., 2020)

4 Habitat Quality Assessment

Habitat quality measures the overall viability and capacity of the habitat assessed within the disturbance footprint to support the identified MNES and MSES. Habitat quality is determined by evaluating the BioCondition data collected at 17 survey sites during the 2020 wet season field survey (E2M 2021). The data is analysed in accordance with the *Guide to determining terrestrial habitat quality* (DES 2020) to generate a habitat quality score out of 10. The Habitat Quality score calculations are in Appendix B.

4.1 Site attribute scores

The site attribute habitat quality scores are derived from BioCondition data collected during the field assessments.

Table 3. MNES Habitat Quality scores within the disturbance footprint

Matter	AU	RE	Class	Habitat Area (ha)	Weighted BioCondition Score	Habitat Quality Score (/10)
king bluegrass	7	11.8.11	Remnant	23.40	3.25	3.25
ornamental snake	3	11.4.9	Regrowth	167.84	4.15	4.15
squatter pigeon (preferred)	5	11.7.1	Remnant	52.63	5.62	5.85
	6	11.8.5	Regrowth	2.19	0.22	
squatter pigeon (suitable)	1	11.3.1	HVR	0.09	0.02	4.53
	3	11.4.9	Regrowth	17.19	2.48	
	5	11.7.1	Remnant	8.16	1.66	
	7	11.8.11	Remnant	3.27	0.37	
Australian painted snipe	3	11.4.9	Regrowth	1.80	4.15	4.15

Table 4. MSES Habitat Quality scores within the disturbance footprint

Matter	AU	RE	Class	Habitat Area (ha)	Weighted BioCondition Score	BioCondition Score
Protected Wildlife Habitat						
common death adder	2	11.4.8	Regrowth	0.14	0.01	5.88
	4	11.5.9b	Regrowth	10.55	0.89	
	5	11.7.1	Remnant	60.79	4.98	
short-beaked echidna	1	11.3.1	HVR	0.09	<0.00	4.33
	2	11.4.8	Regrowth	0.14	<0.00	
	3	11.4.9	Regrowth	497.88	3.47	
	4	11.5.9b	Regrowth	10.55	0.11	
	5	11.7.1	Remnant	60.79	0.60	
	6	11.8.5	Regrowth	2.19	0.02	
	7	11.8.11	Remnant	23.40	0.13	
Regulated Vegetation						
'Of concern' RE (BVG 30b)	7	11.8.11	Remnant	23.40	3.25	3.25
Connectivity						
Remnant vegetation	5	11.7.1	Remnant	60.79	4.23	5.13
	7	11.8.11	Remnant	23.40	0.90	

4.2 Species attribute scores

Species specific habitat attribute scores indicate the ability of the habitat within the disturbance footprint to support a particular fauna species based on its respective habitat requirements (e.g. hollow-bearing trees). A summary of species habitat assessment criteria and associated scores are provided in Table 5. The full species habitat attribute score card is in Appendix B.

Table 5. Species habitat attribute score

Matter	Habitat Score (/10)
ornamental snake	6
squatter pigeon	5
Australian painted snipe	2

5 Potential Impacts

5.1 Vegetation clearing

Progressive clearing of vegetation is necessary to facilitate the development of the Project. In addition to the open cut pit extension area, the disturbance footprint includes a series of associated infrastructure.

The proposed Blast Compound Options A and B are both located west of the existing Horse Pit. The development of Compound A is located within existing disturbance and would necessitate no further vegetation clearing. In contrast, Compound B is situated within regrowth narrow-leaved ironbark woodland (RE 11.5.9b) and would require the clearance of 10.55 ha of vegetation if developed.

The proposed out-of-pit dump site requires the removal of 120 ha of regrowth brigalow, approximately 0.09 ha of HVR RE 11.3.1, 2 ha of regrowth RE 11.8.5 and 23.4 ha of remnant grassland (i.e. regulated vegetation (RE 11.8.11)). The Project area currently supports 31.44 ha remnant grassland in two nearly contiguous pockets. In its current position, the out-of-pit dump effectively bisects one of the two remaining pockets of grassland retaining approximately 8 ha within the Project area.

Project development requires the progressive removal of:

- 84.19 ha of remnant vegetation;
- 0.09 ha of High Value Regrowth (HVR) vegetation; and
- 510.75 ha of regrowth vegetation.

The vegetation communities ground-truthed within the disturbance footprint are listed in Table 6 and depicted in Figure 2.

Table 6. Vegetation clearance extent within the disturbance footprint

RE	VM Act Status[1]	Biodiversity Status[2]	RE Description	Vegetation class	Ground-truthed area (ha)
11.3.1	E	E	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	HVR	0.09
11.4.8	E	E	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	Regrowth	0.14
11.4.9	E	E	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic cl.40ay plains	Regrowth	497.88
11.5.9b	LC	NC	*Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius* +/- *Corymbia* spp. woodland on Cainozoic sandplains	Regrowth	10.55
11.7.1	LC	OC	*Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus thozetiana* or *E. microcarpa* woodland on lower scarp slopes on Cainozoic lateritic duricrust	Remnant	60.79

RE	VM Act Status[1]	Biodiversity Status[2]	RE Description	Vegetation class	Ground-truthed area (ha)
11.8.5	LC	NC	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Regrowth	2.19
11.8.11	OC	OC	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Remnant	23.40

[1] E (endangered), OC (Of Concern), LC (Least Concern) under the QLD *Vegetation Management Regulation 2012*

[2] E (endangered), OC (Of Concern), NC (No Concern at Present) under the REDD

5.2 Habitat removal

Flora and fauna habitat within the disturbance footprint can be delineated into four broad habitat types based on vegetation community, structure and/or class (E2M 2021). Clearing these four broad habitat types will impact generic flora and fauna by reducing the amount of habitat available:

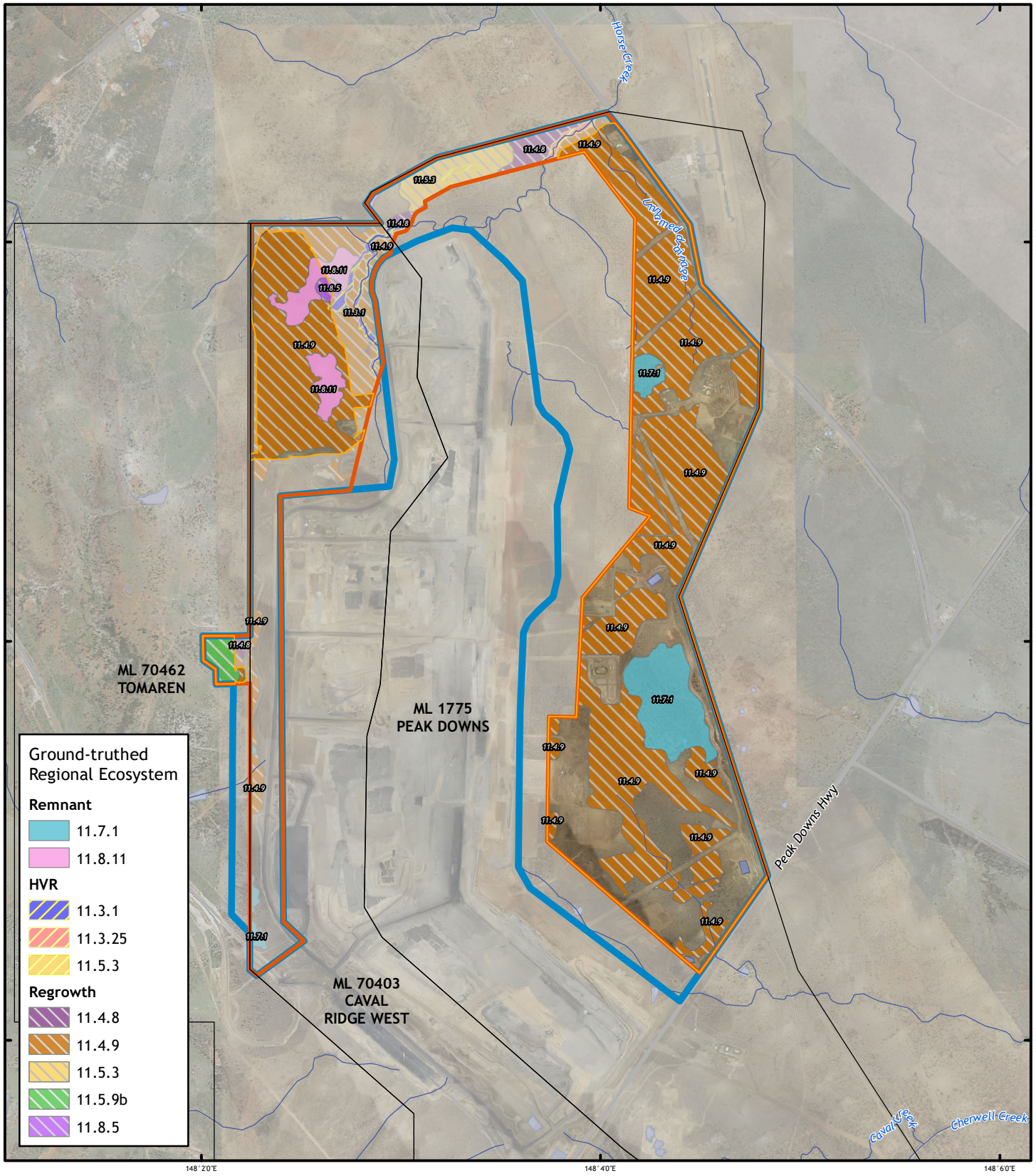
- brigalow regrowth (approximately 498.10 ha);
- *Dichanthium sp.* (bluegrass) dominant grasslands (approximately 23.40 ha);
- eucalypt woodland (approximately 73.53 ha); and
- riparian vegetation (8.60 ha).

Habitat loss affecting MNES and MSES within the disturbance footprint is listed in Table 7. DoR mapped Essential habitat is assessed under 'Protected Wildlife Habitat' as a MSES.

Table 7. Habitat removal for MNES and MSES

Nationally threatened species	EPBC Act status	NC Act status	Habitat impacted within the disturbance footprint (ha)
Known to occur			
Dichanthium queenslandicum	Endangered	Vulnerable	23.40
ornamental snake	Vulnerable	Vulnerable	167.84 (preferred*)
squatter pigeon	Vulnerable	Vulnerable	54.82 (preferred*) 28.71 (suitable*)
Likely to occur			
short-beaked echidna	N/A	Special Least Concern	595.03
Potential to occur			
Australian painted snipe	Endangered	Vulnerable	1.80
common death adder	N/A	Vulnerable	80.47

*draft Central Queensland MNES fauna habitat definitions (Kerswell et al. 2020)



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint

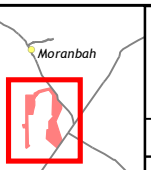
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	23/05/2022

FIGURE 2: GROUND-TRUTHED REGIONAL ECOSYSTEM

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_2_Flora_GTRE.mxd

5.3 Fauna mortality and injury

Fauna mortality and injury is most likely to occur during vegetation clearing and subsequent stripping of topsoil. Particularly susceptible species are those which are unable to easily disperse and include:

- fauna that live wholly or partially underground (i.e. fossorial), such as the ornamental snake;
- nocturnal fauna within tree hollows (e.g. possums and gliders) or under decorticating bark (e.g. microbats);
- juveniles of any species (with the exception of macropods and precocial species); and
- smaller wildlife (e.g. frogs, lizards, small mammals).

To a lesser extent, wildlife may be killed or injured via vehicle strike during Project development as well as operation.

5.4 Animal breeding places

Animal breeding places within the disturbance footprint, include:

- ephemeral water sources (i.e. wetlands, creek lines and dams);
- gilgai;
- bird nests;
- small hollow-bearing limbs and trees with small hollows recorded within the eucalypt woodland habitat (no large hollows were recorded within the disturbance footprint or wider ecology study area);
- stags;
- hollow logs and coarse woody debris; and
- arboreal termite mounds.

5.5 Feral animals

The presence and abundance of feral animals adversely impacts native fauna through increased predation, competition of resources and habitat degradation. Vegetation clearing, fragmentation and opening up contiguous areas of habitat allows feral animals access to previously unoccupied areas. Six pest fauna species were observed during field assessments within the disturbance footprint:

- cane toad (*Rhinella marina*);
- cat (*Felis catus*);
- deer (*Cervus sp.*);
- rabbit (*Oryctolagus cuniculus*);
- pig (*Sus scrofa*); and
- wild dog (*Canis lupus*).

5.6 Invasive weeds

Weed species are most often spread via seed in soil taken from one area and introduced into another or transported via vehicles, machinery and equipment moving amongst sites. Weed species readily establish on disturbed soil, outcompeting the native species resulting in diminished species diversity and ecosystem function. Weed species listed as weeds of national significance (WoNS) and/or restricted matters under the Queensland *Biosecurity Act 2014* are already established within the disturbance footprint:

- Harrisia cactus *(Harrisia martini);*
- prickly pear cactus *(Opuntia stricta);*
- velvet tree pear cactus (*Opuntia tomentosa);* and
- parthenium *(Parthenium hysterophorus).*

5.7 Edge effects

Edge effects occur when previously intact remnant vegetation is partially cleared, exposing a new boundary of vegetation to disturbance. The impact of edge effects on flora and fauna can alter habitat composition and quality, resulting in a reduction of the effective area of habitat and an increase in competition for resources. These impacts can extend well into a habitat area, resulting in the eventual displacement of more sensitive native flora and fauna.

The remnant native grassland (RE 11.8.11) located in the northwest portion of the Project area will be directly impacted by the development of the Proposed Out of Pit Dump. In its current configuration, the Out of Pit Dump will result in the removal of 23.4 ha of the 31.4 ha of grassland. The clearing will indirectly impact a portion of the remaining 8 ha of grassland in terms of edge effect. Weed species, and to a lesser degree dust, are likely to permeate the clearing boundary affecting the species composition within the grassland to a level where, over time, the grassland potentially no longer meets remnant status.

Weed management and minimising edge effects are discussed in Section 6.

5.8 Dust

Excessive dust deposition on foliage can cause impacts to vegetation, including reducing photosynthetic processes, respiration, transpiration, health and growth rates. Dust is more likely to affect vegetation near the source, such as fringing haul roads, near operating machinery and open pits.

5.9 Connectivity

Connectivity areas, as defined under the *Environmental Offsets Regulation 2014* (Qld), applies to a prescribed RE to the extent the ecosystem contains remnant vegetation and if the ecosystem contains an area of land that is required for ecosystem functioning (a connectivity area). Connectivity areas within the disturbance footprint are limited to remnant RE 11.8.11 (23.40 ha) and RE 11.7.1 (60.79 ha). The collective 84.19 ha of remnant vegetation within the disturbance footprint will be progressively cleared to facilitate the pit extension.

The remnant vegetation provides little connectivity value in terms of ecological function concerning wildlife movement/corridors as the remnant communities occur in isolated patches within the disturbance footprint. Connectivity in terms of ecological function is best represented along Horse Creek which runs

along the northern portion of the disturbance footprint (E2M 2021). The riparian vegetation within the watercourse is characterised by regrowth and HVR habitat but does not qualify for consideration under the State's definition of connectivity. What connectivity value the remnant vegetation contributes to ecological function is best represented by minimising edge effects and maintaining species diversity which enhances habitat quality.

The impact to connectivity values, as defined by the State, are assessed using the Landscape Fragmentation and Connectivity Tool (LFC) (DES, 2018) in Section 7.2.4.

6 Mitigation and Management Measures

The Commonwealth and State offset assessment frameworks operate on an 'avoid, mitigate, offset' approach to managing environmental impact. Avoiding an environmental impact is typically achieved through planning and site selection; however, where avoidance cannot be reasonably achieved, environmental impact mitigation and management measures must be demonstrated.

Avoiding the Project's impact on environmental matters is generally unreasonable due to the location of the resource and the mining method. The Project's environmental impact during the extension may be reduced via the implementation of the mitigation and management measures already in place as per the CVM environmental management framework.

- Air Emissions Management Plan, Version 7.2. CVM-PLN-0008. BMA. 2016;
- Land and Biodiversity Management, Version 7A. CVM-PLN-0021. BMA. 2016;
- Threatened Flora, Fauna and Ecological Communities Management Plan. CVM-PLN-0019. 2016; and
- Weed and Feral Animal Management, Version 2. BHP-PRO-0001. 2019.

The management plans are summarised in Table 8.

Table 8. Mitigation and management measures to potential impacts

Impact	Mitigation Measures
Vegetation clearing	• vegetation clearing shall not occur outside the delineated boundaries • vegetation clearing will be confined to the smallest practicable area required for construction and operation
Habitat removal	• relocate fauna habitat features (hollow logs/limbs, coarse woody debris) • pre-clearance surveys will be conducted ahead of clearing activities • no clearing without fauna spotter catcher present • hollow-bearing limbs to be dismantled slowly and checked for fauna • use progressive vegetation clearing methods to provide fauna time to relocate • confined to the smallest practicable area required for construction and operation
Dust	• dust suppression on haul and light vehicle roads • restrict land disturbance to what is necessary for the operation and minimise area of land disturbed at any one time • progressive rehabilitation to occur as areas become available

Impact	Mitigation Measures
Weeds	Vehicle hygiene • all vehicles, machinery and equipment shall be cleaned at designated wash down bays/pads prior to entering vegetation communities • no vehicles are to drive over topsoil stockpiles • vehicles are to remain on existing access tracks and avoid driving over weed populations Disturbance and topsoil management • all rehabilitation materials (e.g. seed, straw, hay) brought to site should be declared weed free and recorded in the site's document management system • movement of sand, gravel, rock, soil and organic matter must be controlled to ensure that it does not result in contamination by weed seeds • Where possible, all reasonable efforts should be made to limit the application of topsoil containing weed seeds Weed monitoring, treatment and reporting • conduct periodic weed monitoring to identify new weed outbreaks as well as verify the effectiveness of ongoing weed management controls • weed treatment chemical controls and herbicide application rates are conducted by an appropriately licensed person using the Department of Agriculture and Fisheries declared pest species fact sheet • treatment areas and infestations will be tracked and recorded using GIS/mapping to ensure effective management is being achieved • weed material disposed appropriately
Fauna mortality and injury	• pre-clearance surveys will be conducted ahead of clearing activities • no clearing without fauna spotter catcher present • fauna contact avoided and limited to fauna spotter catcher. • all fauna relocated to nearest undisturbed suitable habitat. • implement fauna crossing signs and speed reduction, where practical • injured wildlife to be taken to nearest vet by fauna spotter catcher • clearing activities confined to the smallest practicable area required or construction and operation
Animal breeding places	• relocate fauna habitat features (hollow logs/limbs, coarse woody debris) • pre-clearance surveys will be conducted ahead of clearing activities • fauna spotter catcher present during clearing • hollow-bearing trees to be assessed for fauna

Impact	Mitigation Measures
Feral animals	• a feral animal control program should be implemented when monitoring confirms there is an increasing trend in population (e.g. increase in the number of sightings), there is evidence feral animals are impacting on threatened species or neighbouring landholders raise valid concerns in regard to feral animals • feral animal monitoring should reflect suitable survey locations such as water sources (pigs) or crib huts (cats), suitable time of day (e.g. diurnal/nocturnal species) and the location of indirect sign of feral animal activity (e.g. scats, diggings) • feral cat and pig populations can be controlled using traps in accordance with the BHP Weed and Feral Animal Management procedure • feral dog and pig populations can be controlled using poison baits in accordance with the details specified in the BHP Weed and Feral Animal Management procedure
Edge effects	• weed hygiene protocols • feral animals excluded from site via exclusion fencing • baiting and other control measures implemented

7 Significant Residual Impact Assessment

7.1 Matters of National Environmental Significance

7.1.1 Endangered wildlife

7.1.1.1 Dichanthium queenslandicum

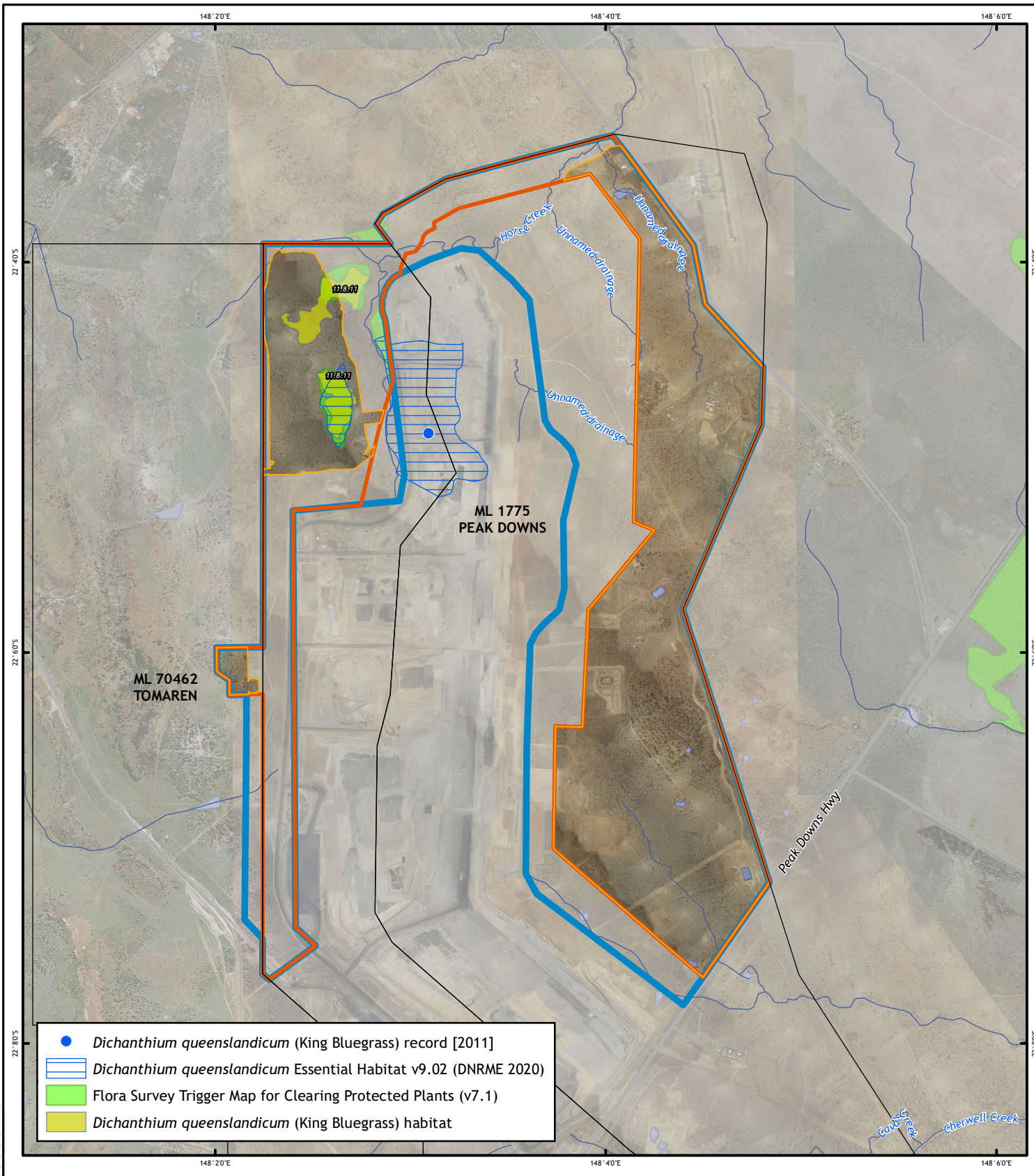
To determine if the Project is likely to have a significant impact on *D. queenslandicum*, the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE 2013) require an assessment against the significant impact criteria for endangered species listed under the EPBC Act. The assessment is detailed in Table 9.

Table 9. Significant Impact Assessment - *Dichanthium queenslandicum*

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a population	Although no individuals were recorded during the Terrestrial ecology assessment undertaken by E2M (2021), the species was recorded within the CVM ML during baseline ecological studies in 2011. Native grassland habitat adjacent to the 2011 record was confirmed during 2020 field studies as suitable for *D. queenslandicum*. The Project will require the clearing of approximately 23.40 ha of suitable *D. queenslandicum* habitat. *D. queenslandicum* is endemic to central and southern Queensland occurring in grassland communities within three disjunct populations (SEWPaC, 2013). Initial assessment by Accad et al. (2008) estimated a reduction in the extent of the occurrence from 1,100 km^2 to 245 km^2, resulting from continued expansion of agriculture, mining and infrastructure development. The removal of 23.40 ha of suitable habitat for *D. queenslandicum* is likely to decrease the size of a potential population. A total of 8.04 ha of suitable habitat for the species will be retained within the Project area. The implementation of mitigation measures (refer to Section 6) will assist in reducing any potential indirect impacts associated with edge effects. Due to the limited vegetation extent within the Study area and direct loss of 23.40 ha of suitable habitat within the disturbance footprint, the Project is considered likely to lead to a long-term decrease in the size of a local population.

MNES Significant Impact Guideline criteria	Response
Reduce the area of occupancy of the species	Although no individuals were recorded during the Terrestrial ecology assessment undertaken by E2M (2021), the species was recorded within the CVM ML during baseline ecological assessments in 2011. Due to the limited vegetation extent of habitat within the Study area and direct loss of 23.40 ha of suitable habitat within the disturbance footprint, the Project is considered likely to reduce the area of occupancy for a local population of the species. Although the removal of suitable habitat within the Study area is likely to reduce the area of occupancy for a local population, due to the isolated nature of habitat observed, species distribution and extent of potential habitat within the sub-region (approx. 58,560 ha of remnant RE 11.4.4, 11.4.11, 11.3.21, 11.8.5 and 11.8.11 (Queensland Herbarium 2021b)), the habitat impacted by the Project is localised and not considered likely to reduce the area of occupancy of the species within the greater landscape or subregion.
Fragment an existing population into two or more populations	The Project will result in the removal of 23.40 ha of suitable habitat for *D. queenslandicum*. A total of 8.04 ha of suitable habitat for the species will be retained within the Project area. Due to the nature of the disturbance associated with the Project, it is considered unlikely to result in the fragmentation of an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	Although no individuals were recorded during the terrestrial ecology assessment undertaken by E2M (2021), the species was recorded within the CVM ML during baseline ecological assessments in 2011. Native grassland habitat adjacent to the 2011 record was confirmed as suitable for *D. queenslandicum* habitat during 2020 field surveys. The Project will require the clearing of approximately 23.40 ha of suitable habitat for *D. queenslandicum*. At a local scale, this habitat is considered to be 'habitat critical to the survival of the species', as defined under the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE, 2013), for *D. queenslandicum* occurring within the Project area. However, this habitat is not considered to be 'habitat critical to the survival of the species' for the species as a whole.
Disrupt the breeding cycle of a population	The Project will result in the direct loss of 23.40 ha of habitat critical to the survival of the species and potential individuals. Although 8.04 ha of suitable habitat ('habitat critical to the survival of the species') will be retained within the Study area, the direct loss 23.40 ha of suitable habitat is considered likely to disrupt/interfere with the breeding cycle (pollination and seed dispersal) of a potential local population. Due to the isolated nature of habitat observed, the Project is considered unlikely to impact on the breeding cycle of populations within the greater landscape surrounding the Project area.

MNES Significant Impact Guideline criteria	Response
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Although no individuals were recorded during the Terrestrial ecology assessment undertaken by E2M (2021), the species was recorded within the CVM ML during baseline ecological assessments in 2011. Field assessments within the Study area identified 31.44 ha of habitat critical to the survival of the species. The Project will result in the direct loss of 23.40 ha of habitat critical to the survival of the species. Although suitable habitat within the Study area is likely to be important to a local population present, due to the extent and relative isolation of habitat within the greater landscape context, the removal of habitat is considered unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species/populations within the greater landscape is likely to decline.
Result in invasive species that are harmful to an Endangered species becoming established in the Endangered species' habitat	The Project is unlikely to result in an increase in the abundance of invasive/non-native species that may be harmful to the species, above the existing levels observed or result in the introduction of new invasive species. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species in retained habitat within the Project area.
Introduce disease that may cause the species to decline	It is considered unlikely that the Project has the potential to introduce a disease to the local area, given there are no known diseases that impact *D. queenslandicum*.
Interfere substantially with the recovery of the species	Although there is no current recovery plan for the species, priority actions are identified within the 'Approved Conservation Advice' for the species (DSEWPaC 2013). Associated recovery and abatement strategies target reduction in habitat loss and disturbance, management of weeds, disturbance by livestock and community awareness (DSEWPaC 2013). The Project will impact 23.40 ha of suitable habitat for the species, the loss of habitat is not expected to substantially interfere the with species recovery plan. The implementation of mitigation measures (refer to Section 6), including weed management and weed hygiene protocols, will assist in reducing any potential reintroduction or spread of exotic species within retained habitat within the Study area. Due to the extent and relative isolation of habitat within the greater landscape context, the Project is considered unlikely to substantially interfere with the recovery of the species,
Assessment Outcome	**Project is likely to result in a significant residual impact on *Dichanthium queenslandicum***



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint

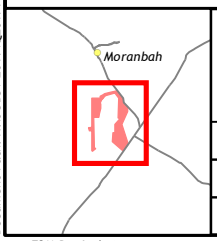
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Species record: © Wildnet 2020

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	3/09/2021
3	Issued for Use	DL	PW	23/05/2022

FIGURE 3: SIGNIFICANT RESIDUAL IMPACT *DICHANTHIUM QUEENSLANDICUM*

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_3_Flora_Dichanthium.mxd

7.1.1.2 Australian painted snipe

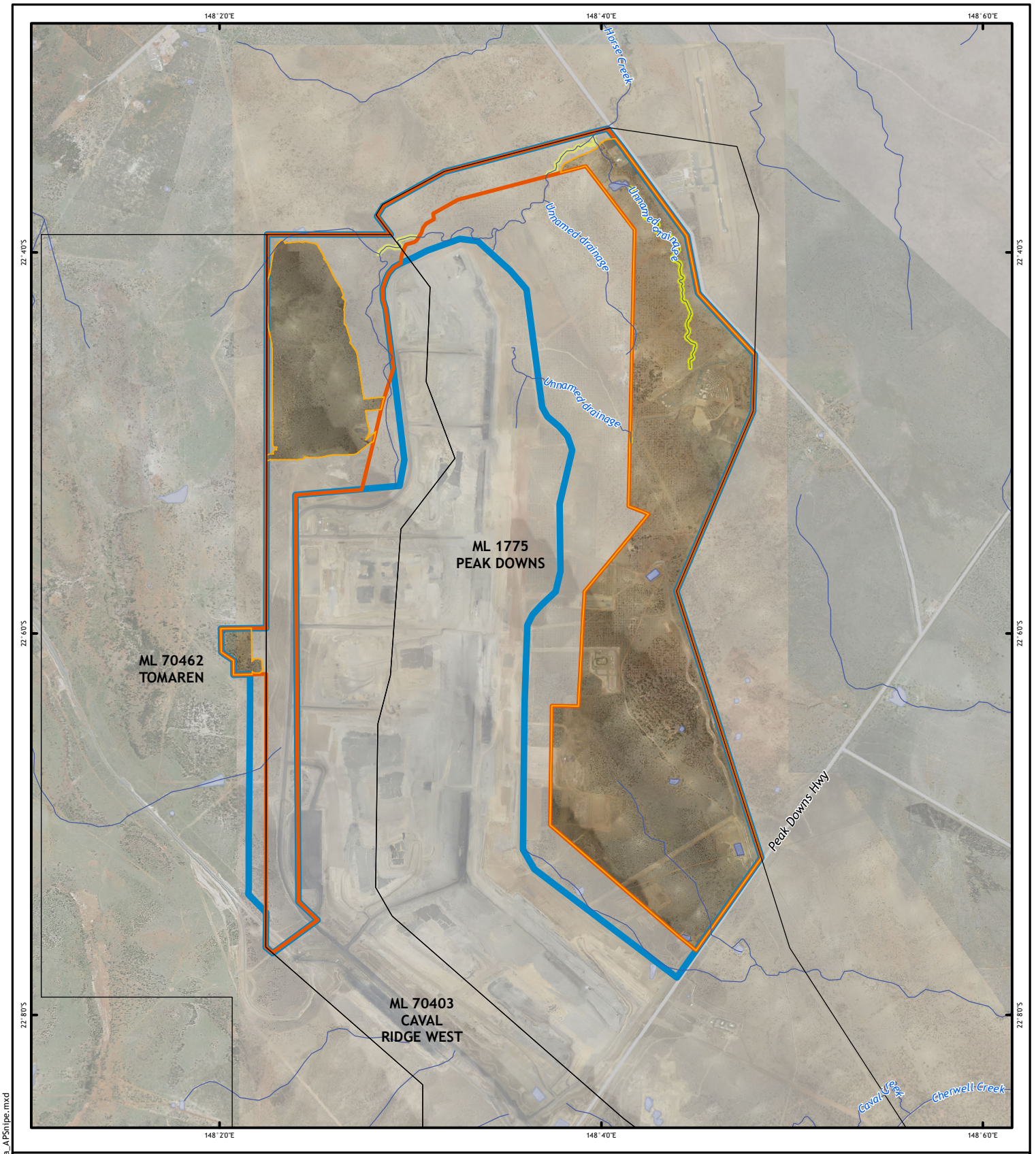
No breeding habitat was recorded within the disturbance footprint and 1.80 ha of potential intermittent foraging habitat was mapped along Horse Creek (stream order 3), three drainage lines (stream order 1) and a few scattered farm dams (E2M 2021). Many of the dams associated with CVM activities were lined with textile cloth and were not included as potential foraging habitat.

To determine if the Project is likely to have a significant impact on Australian painted snipe, the *Significant Impact Guidelines 1.1 Matters of National Environmental Significance* (DotE 2013) require an assessment against the significant impact criteria for listed endangered species (Table 10).

Table 10. Significant Impact Assessment - Australian painted snipe

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of a population	The Australian painted snipe is not considered to have a limited geographic distribution as it occurs within suitable habitat in all states and territories (Department of the Environment, 2022). The removal of 1.80 ha of potential intermittent foraging habitat identified within the disturbance footprint is highly unlikely to lead to a long-term decrease in the size of the species' population.
Reduce the area of occupancy of the species	The species' utilisation of the type of intermittent foraging habitat available within the disturbance footprint is variable, seasonal and subject to inundation. The species has the ability to be nomadic, accessing suitable foraging habitat based on its availability. As such, the removal of 1.80 ha of potential intermittent foraging habitat is unlikely to reduce the area of occupancy of the species. Although the removal of potential intermittent foraging habitat is likely to marginally reduce the area of occupancy at a local scale, due to the extent of potential habitat within the sub-region (approx. 24,260 ha of remnant and regrowth RE 11.3.1, 11.4.8, 11.4.9 and 11.3.3c (Queensland Herbarium, 2021b)), the habitat impacted by the Project is not considered likely to reduce the area of occupancy of the species within the greater landscape or subregion.
Fragment an existing population into two or more populations	The extension of an existing disturbance footprint into 1.80 ha of potential intermittent foraging habitat is unlikely to fragment the Australian painted snipe population.
Adversely affect habitat critical to the survival of a species	The 1.80 ha of potential intermittent foraging habitat to be removed is not considered critical to the survival of the species. At a regional scale, there is approximately 24,260 ha of remnant and regrowth RE 11.3.1, 11.4.8, 11.4.9 and 11.3.3c (Queensland Herbarium, 2021b) within the Northern Bowen Basin sub-region and therefore the loss of 1.80 ha within an existing mine is considered unlikely to provide habitat critical to the survival of the Australian painted snipe.
Disrupt the breeding cycle of a population	No breeding habitat was identified within the disturbance footprint; therefore, the Project is unlikely to disrupt the breeding cycle of a population.

MNES Significant Impact Guideline criteria	Response
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The removal of 1.80 ha of potential intermittent foraging habitat is unlikely to impact Australian painted snipe habitat to the extent the species is likely to decline. At a regional scale, there is approximately 24,260 ha of remnant and regrowth RE 11.3.1, 11.4.8, 11.4.9 and 11.3.3c (Queensland Herbarium, 2021b) within the Northern Bowen Basin sub-region and therefore the loss of 1.80 ha within an existing mine is considered unlikely lead to the decline of the Australian painted snipe.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	Feral cats and buffel grass are currently well established within the disturbance footprint. The Project is unlikely to result in the establishment of novel invasive species affecting Australian painted snipe foraging habitat.
Introduce disease that may cause the species to decline	Disease is not listed as a potential threat to the species (TSSC 2013). The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere substantially with the recovery of the species	The draft National Recovery Plan aims to minimise threats, protect habitat, generate knowledge and increase public awareness across the species' distribution within Australia. Large conservation focus on breeding habitat. The removal of 1.80 ha of potential intermittent foraging habitat is unlikely to substantially interfere with the species recovery.
Assessment Outcome	**Project is unlikely to result in a significant residual impact on Australian painted snipe**



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint
- Australian Painted Snipe Habitat

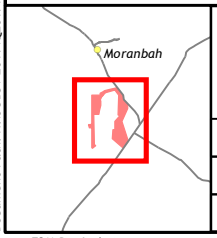
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Disturbance footprint: Horse Pit Expansion Project Area supplied 16/02/2021

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 4: AUSTRALIAN PAINTED SNIPE

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_4_Fauna_APSnipe.mxd

7.1.2 Vulnerable wildlife

Ornamental snake and squatter pigeon (southern subspecies) are listed as Vulnerable under the EPBC Act. The significant impact criteria used to assess the significance of an impact on a Vulnerable listed MNES refer to an impact on an 'important population'. An 'important population' as defined under the EPBC Act is a population that is necessary for a species' long-term survival and recovery. An important population includes:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity;
- populations located near the extent of the species range; and
- populations identified in species recovery plans.

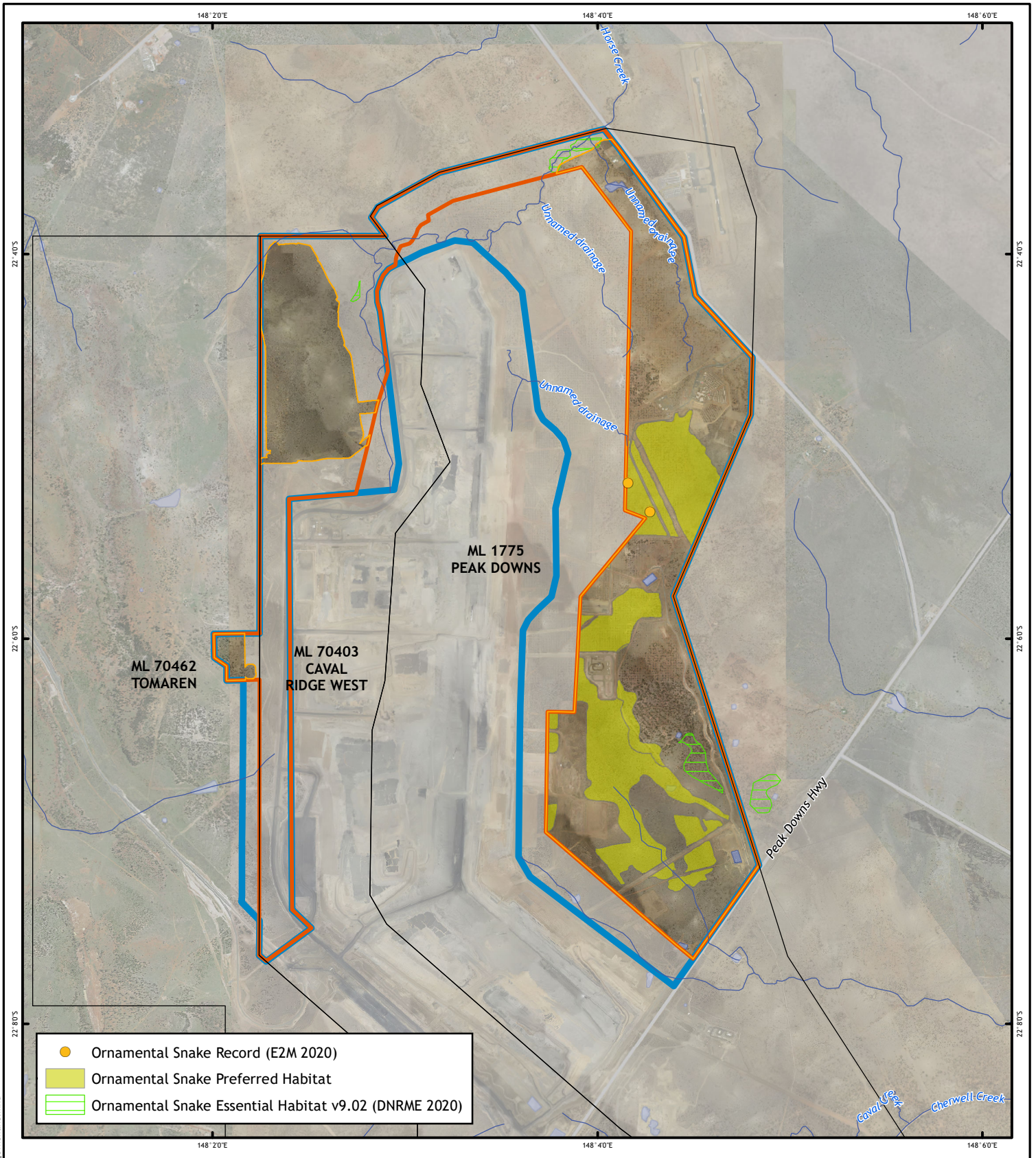
7.1.2.1 Ornamental snake

DSEWPAC (2011) states that "suitable habitat for any one of the listed Brigalow Belt reptiles is considered *important* if it is habitat where the species has been identified during a survey". As ornamental snake was positively identified during the 2020 wet season survey (E2M, 2021), the ground-truthed ornamental snake habitat mapped within the disturbance footprint qualifies as *important*. The occurrence of important habitat for the ornamental snake a surrogate metric for an 'important population' of the species in the assessment of whether an action is likely to have a significant impact (DAWE, 2020; DSEWPAC, 2011). The ornamental snake significant impact assessment is detailed in Table 11.

Table 11. Significant Impact Assessment - Ornamental snake

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of an important population	Historical vegetation clearing, land development and ongoing mining operations have increasingly fragmented and degraded ornamental snake habitat within the CVM and the wider landscape. Species habitat within the Project Area exists as an isolated patch disconnected from neighbouring habitats by the Peak Down Highway (south), Moranbah Access Road (east) and Horse Pit/CVM access tracks (west). The isolated habitat patch compounded by the diminished habitat quality (see Section 4.2) limits the carrying capacity of the environment to support the species thereby restricting the size of the population within the Project area. While the habitat is likely to be important for the limited population of ornamental snake within the Project area , the lack of connectivity or movement corridors and isolated nature of the population indicates Project impacts are expected to be localised and unlikely to be significant at a regional scale. However, the removal of 167.84 ha of preferred habitat and the confirmed presence of the species, in consideration of the nature of the impacts, the Project is likely to lead to a long-term decrease in the size of an important population on a localised scale.
Reduce the area of occupancy of an important population	The Project is expected to remove approximately 167.84 ha of ornamental snake habitat thereby reducing the area of occupancy of an important population at the local scale.

MNES Significant Impact Guideline criteria	Response
Fragment an existing important population into two or more populations	The non-linear shape and size of the disturbance is unlikely to fragment the existing ornamental snake population within the Project Area into two or more populations.
Adversely affect habitat critical to the survival of a species	The ornamental snake habitat within the Project area is subject to ongoing disturbance and likely to support a relatively small population (i.e. limited environmental carrying capacity). As such, the habitat within the disturbance footprint is not considered critical to the survival of the species.
Disrupt the breeding cycle of an important population	Removing 167.84 ha of habitat is likely to disrupt the breeding cycle of the ornamental snake population within the disturbance footprint.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Approximately 167.84 ha of ornamental snake habitat will be removed reducing the area of occupancy and likely resulting in species mortality and injury. This impact, however, affects a relatively small population in degraded habitat and is unlikely to trigger the species as a whole to decline in response.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Project is unlikely to result in novel weed and pest species becoming established within remaining ornamental snake habitat.
Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.
Interfere substantially with the recovery of the species	The draft Recovery Plan for the Queensland Brigalow Belt Reptiles and the Action Plan for Australian Reptiles focus on research, avoiding/mitigating habitat loss and addressing threatening processes across the species geographic distribution. Project development is expected to remove 167.84 ha of degraded habitat supporting a small population and unlikely to substantially interfere with the recovery of the species.
Assessment Outcome	**The Project is likely to result in a significant residual impact on the ornamental snake**



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint

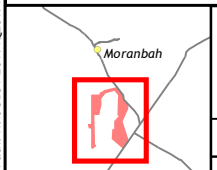
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 5: SIGNIFICANT RESIDUAL IMPACT ORNAMENTAL SNAKE

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_5_Fauna_OrnSnake.mxd

7.1.2.2 Squatter pigeon (southern subspecies)

The squatter pigeon within the disturbance footprint and the broader Moranbah region is not considered to be an 'important population' or an important subpopulation as per the EPBC Act definition.

The species has a relatively wide distribution across Queensland and into NSW extending between Burdekin-Lynd divide to Charleville and Longreach, east to the coast between Proserpine to Port Curtis and throughout scattered sites in southeast Queensland and into the Border Rivers-Gwydir Catchment Management Authority region in NSW. The southern boundary of the subspecies distribution, however, is contracting northwards and records are increasingly rare. As a result, all relatively small, isolated and sparsely distributed sub-populations occurring south of the Carnarvon Ranges are considered to be important for the subspecies (DAWE SPRAT database).

The Project area is located approximately 300 km north of the Carnarvon Ranges where squatter pigeon (southern subspecies) remain common and are likely distributed as a single, continuous (i.e. inter-breeding) sub-population (TSSC 2015).

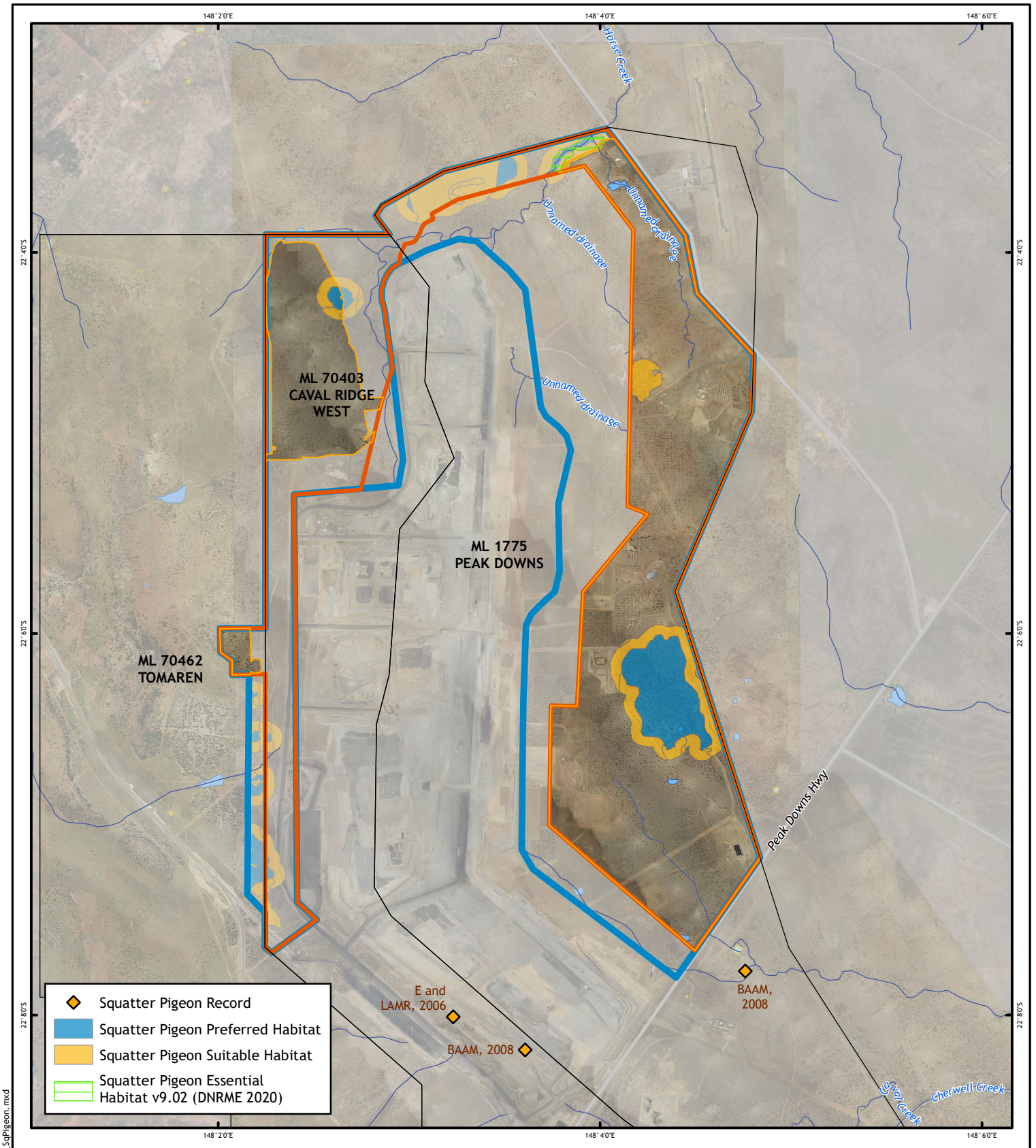
Table 12. Significant Impact Assessment - Squatter pigeon (southern subspecies)

MNES Significant Impact Guideline criteria	Response
Lead to a long-term decrease in the size of an important population	The squatter pigeon population that utilise habitat within the disturbance footprint is not considered to be an important population. As such, the Project would not lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	The squatter pigeon population that utilise habitat within the disturbance footprint is not considered to be an important population. Furthermore, at a regional scale, there is approximately 162,662 ha of remnant and regrowth REs on landzones 5 and 7 that are dominated by eucalypts within the Northern Bowen Basin sub-region and therefore the loss of 83.53 ha is considered unlikely to impact the species. As such, the Project would not reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The squatter pigeon (south) population that utilise habitat within the disturbance footprint is not considered to be an important population. As such, the Project would not fragment an existing important population.

MNES Significant Impact Guideline criteria	Response
Adversely affect habitat critical to the survival of a species	The 54.82 ha of preferred[1] habitat and 28.71 ha of suitable habitat within the disturbance footprint is not considered critical to the survival of the species. Squatter pigeon habitat within the Project area is degraded by fragmentation, dense non-native ground cover, lack of permanent water sources (n=1) and common feral predators. The reduced carrying capacity is likely to support a correspondingly low population size. No squatter pigeon were observed during the dry season survey (2019) or the wet season survey (2020). The most recent confirmed observation within the Project area was recorded in 2008 during the CVM EIS (2009). Habitat utilisation within the Project area may be intermittent as the species moves between breeding/foraging resources within the CVM and neighbouring properties. At a regional scale, there is approximately 162,662 ha of remnant and regrowth REs on land zones 5 and 7 that are dominated by eucalypts within the Northern Bowen Basin sub-region and therefore the loss of 83.53 ha is considered unlikely to affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	The squatter pigeon population that utilise habitat within the disturbance footprint is not considered to be an important population. As such, the Project would not disrupt the breeding cycle of an important population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Squatter pigeon habitat utilisation within the disturbance footprint is likely intermittent and to exist as part of a larger home range encompassing adjacent squatter pigeon habitat. As such, the local population, nor the species, is dependent on the degraded habitat present within the Project area. The removal of 83.53 ha of squatter pigeon habitat is unlikely to trigger a decline in the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The Project is unlikely to result in novel weed and pest species becoming established within remaining squatter pigeon habitat
Introduce disease that may cause the species to decline	The Project is unlikely to introduce a disease that may cause the species to decline.

[1] draft Central Queensland MNES fauna habitat definitions (Kerswell et al., 2020)

MNES Significant Impact Guideline criteria	Response
Interfere substantially with the recovery of the species	The recovery of the subspecies depends on the protection and restoration of critical habitat, reducing mortality from feral predators and developing a deeper understanding of the species' ecology within modified landscapes (Squatter Pigeon Workshop, 2011). Regionally, the Commonwealth TSSC (2015) recommend identifying, monitoring and protecting sub-populations, managing threats to vegetation that support important sub-populations and adapting management actions to adjust effectiveness. The 83.53 ha of squatter pigeon habitat within the Project area are not deemed to be critical to the survival of the species and the proposed mitigation measures support the species recovery plan by targeting feral predators. As such, the Project's removal of 83.53 ha of squatter pigeon habitat are unlikely to substantially interfere with the subspecies' recovery.
Assessment Outcome	**The Project is unlikely to result in a significant residual impact on the squatter pigeon (southern subspecies)**



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint

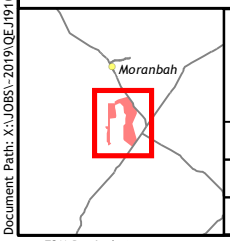
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Mining Lease: © DNRME 2020

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 6: SQUATTER PIGEON

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_6_Fauna_SqPigeon.mxd

7.1.3 Migratory species

A project is required to seek approval under the EPBC Act for actions that are likely to have 'significant impact' on listed migratory species. Under the Significant Impact Guidelines 1.1 (DotE, 2013), a project is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will exceed one or more of the following criteria in Table 13.

In accordance with the Significant Impact Guidelines 1.1 (Cth) the definition of 'important habitat' is:

- habitat that is of critical importance to the species at particular life-cycle stages, and/or;
- habitat utilised by a migratory species which is at the limit of the species range, and/or;
- habitat within an area where the species is declining.

Table 13. Significant Impact Assessment – Migratory species

MNES Significant Impact Guideline criteria	Response
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species	No 'important habitat' was identified within the disturbance footprint for the migratory birds with potential to occur in/near (i.e. 50 km) of the disturbance footprint (E2M 2021). The disturbance footprint does not meet the definition of 'important habitat' as per the Significant Impact Guidelines 1.1 (Cth)
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species	No suitable habitat was identified within the disturbance footprint for the migratory birds with potential to occur in/near (i.e. 50 km) of the disturbance footprint (E2M 2021). The disturbance footprint does not meet the definition of 'important habitat' as per the Significant Impact Guidelines 1.1 (Cth)
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species	As there is no suitable or important habitat occurs within the disturbance footprint, it is unlikely the Project's development or operation will seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species
Assessment Outcome	**The Project is unlikely to result in a significant residual impact on the migratory species**

7.2 Matters of State Environmental Significance

7.2.1 Protected wildlife habitat

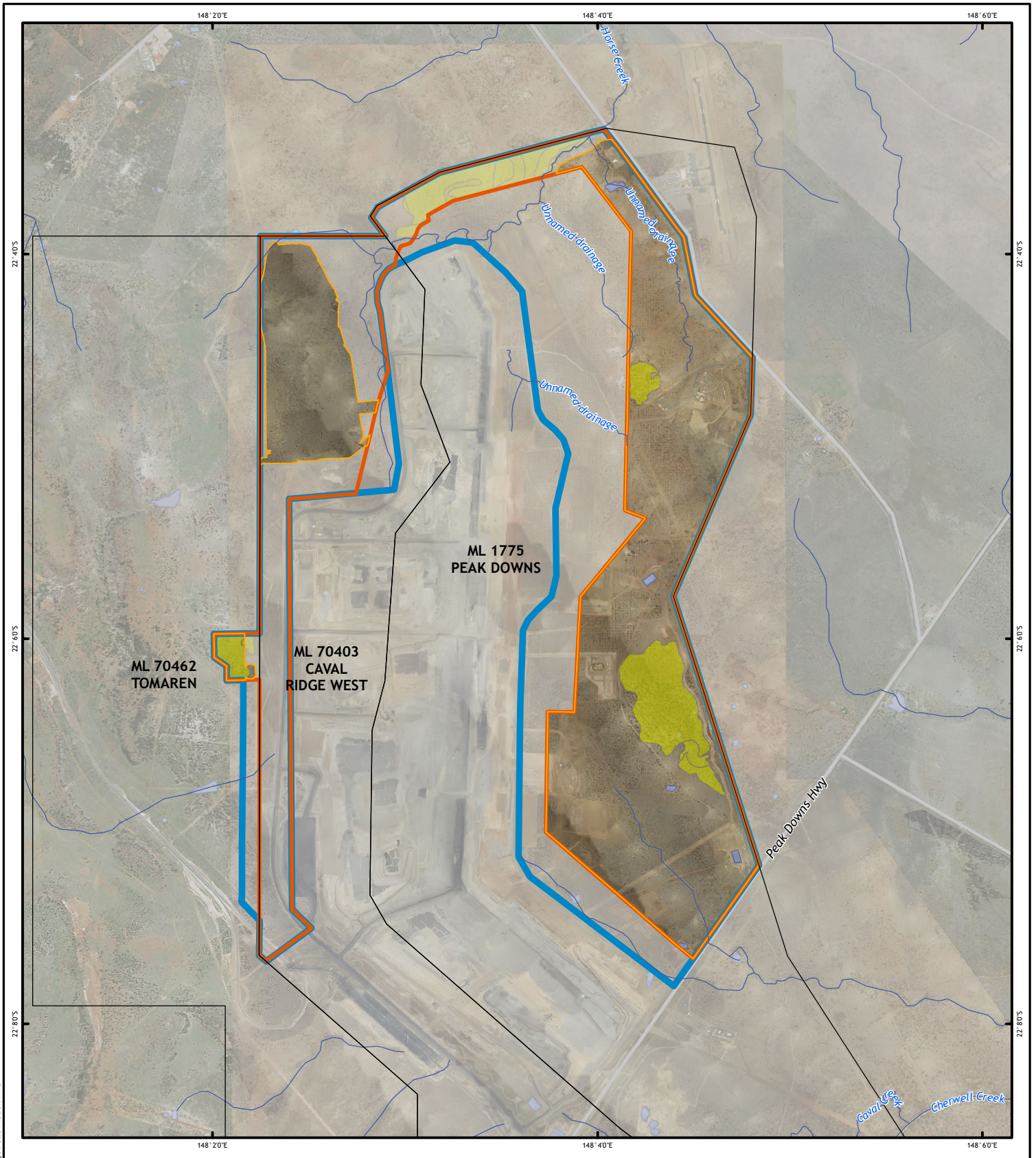
As per the Significant Residual Impact Guidelines, the Project is likely to have a significant impact on wildlife listed as Endangered, Vulnerable or Special Least Concern under the NC Act if the impact on the species/habitat is likely to exceed one or more criterion (Table *14*).

7.2.1.1 Common death adder

The common death adder is listed as Vulnerable under the NC Act.

Table 14. Significant Impact Assessment - Common death adder

Criterion	Response
Lead to a long-term decrease in the size of a local population	The common death adder is a habitat generalist occurring within woodlands across a large geographic distribution. The removal of 80.47 ha of suitable habitat from the disturbance footprint is unlikely to lead to a long-term decrease in the size of the local population.
Reduce the extent of species occurrence	Common death adder has not been recorded within the Study area. It has the potential to occur based on 80.47 ha of woodland habitat comprising abundant leaf litter. If the species occurs within the disturbance footprint, it likely occurs at a low density or intermittently. Reducing the habitat availability to the species by 80.47 ha is unlikely to reduce the extent of species occurrence.
Fragment an existing population	The Project is unlikely to increase habitat fragmentation as the Project is an extension of an existing disturbance.
Result in genetically distinct populations forming as a result of habitat isolation	The project is unlikely to fragment or isolate an existing population to any extent that a genetically distinct population forms.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the species' habitat	The Project is unlikely to result in novel invasive species becoming established within the Project area.
Introduce disease that may cause the population to decline	The Project is unlikely to introduce a disease and / or vector for disease that may cause the species to decline. Likewise, there is no documented disease that significantly affects this species.
Interfere with the recovery of a species	Potential impacts to the species resulting from vegetation clearing is likely to be minimal and are unlikely to interfere substantially with the recovery of the species.
Cause disruption to ecologically significant locations (e.g. breeding, feeding, nesting, migration or resting sites) of a species	The common death adder occurs from central Queensland through New South Wales to the southern parts of South Australia and Western Australia (Cogger 2000). The species is not restricted to a habitat type and is found in a wide variety of vegetation communities including woodlands and grasslands. The physiology of the species does not require specific ecologically significant locations apart from the presence of leaf litter, ground cover or loose substrate (i.e. shelter/foraging sites) which is not a limited habitat attribute across the species range.
Assessment Outcome	**The Project is unlikely to result in a significant residual impact on the common death adder**



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint
- Common Death Adder Habitat

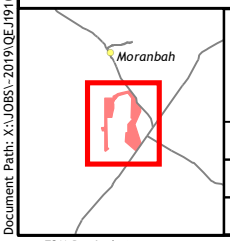
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
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Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 7: COMMON DEATH ADDER

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

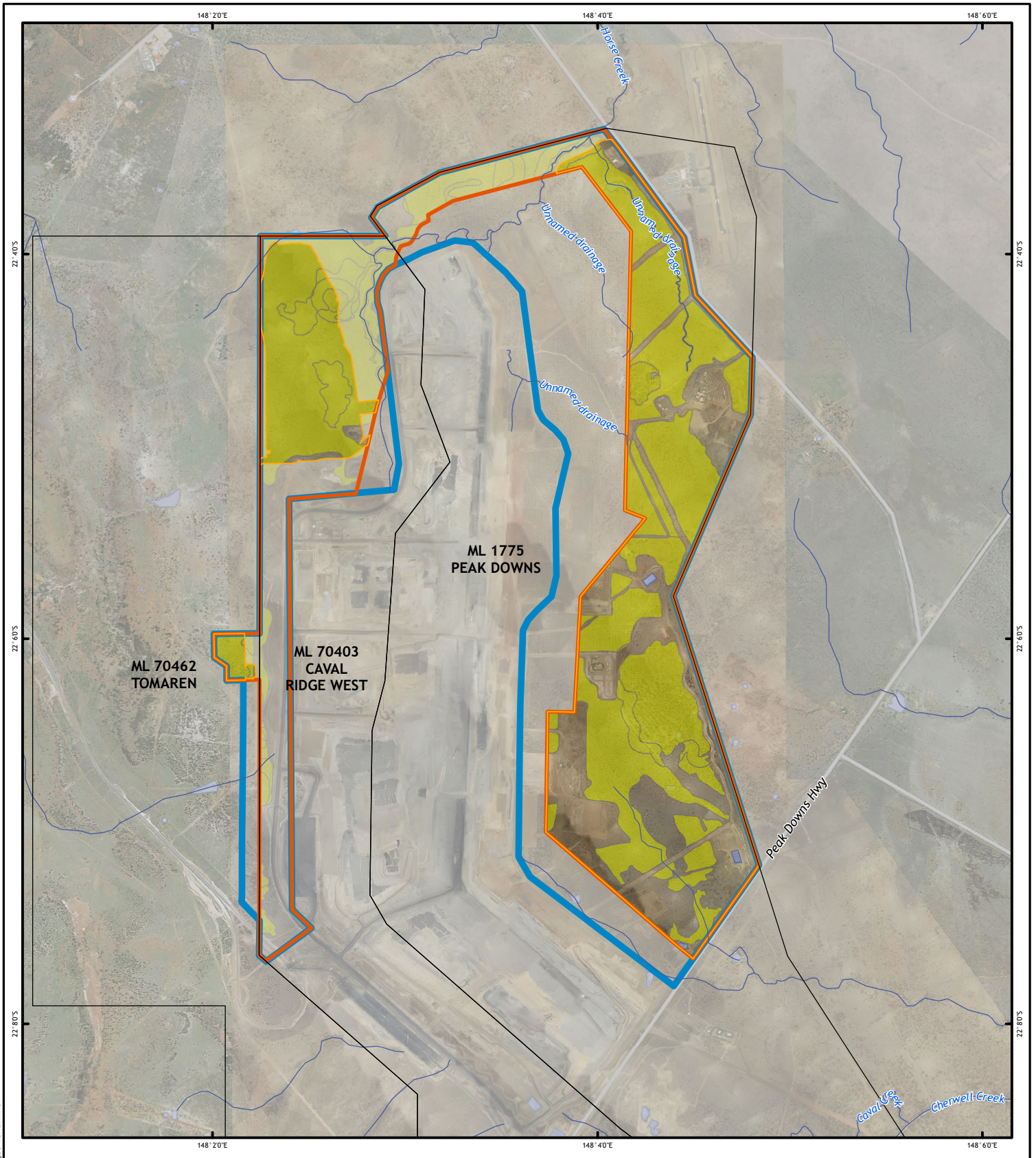
Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_7_Fauna_CDeathAdder.mxd

7.2.1.2 Short-beaked echidna

Special-least concern (non-migratory) species are likely to be significantly impacted if the Project will result in any of the criteria listed in Table 15.

Table 15. Significant Impact Assessment - Short-beaked echidna

Criteria	Response
A long-term decrease in the size of a local population	The short-beaked echidna is a habitat generalist found in suitable habitat across Australia and recorded regularly within the Bowen Basin. The loss of habitat within the disturbance footprint is unlikely to lead to a long-term decrease in the size of the local population.
A reduced extent of occurrence of the species	Short-beaked echidnas are found throughout Australia in almost all habitat types. They are prevalent in urban areas as well as rural and are relatively tolerant of disturbance. As a habitat generalist, most vegetated areas within the Horse Pit disturbance footprint posed suitable echidna habitat. The species has not been documented within the study area but is likely to utilise the eucalypt woodlands and regrowth brigalow as part of its range with adjoining habitat. Approximately 595 ha of potential echidna habitat is present within the disturbance footprint. The progressive removal of 595 ha will reduce the extent of occurrence; however, with the mitigation measures imposed, the impact generated is expected to be negligible and ultimately reversible. The short-beaked echidna species is unlikely to experience an overall reduced extent of occurrence.
Fragmentation of an existing population	The Project is unlikely to increase habitat fragmentation as the Project is an extension of CVM existing disturbance. The existing habitat is already subjected to the direct and indirect disturbances from the ongoing CVM operational activities and most areas exist in a degraded state.
Result in genetically distinct populations forming as a result of habitat isolation	The Project is unlikely to increase habitat fragmentation which leads to a disjunction in distribution and movement between local populations of a species. As such, the Project is considered unlikely to result in genetically distinct populations forming as a result of habitat isolation.
Disrupt ecologically significant locations (breeding, feeding or nesting sites) of a species	The Project will require the clearing of suitable habitat available to the species. However, it is unlikely that the Project will further restrict the species movement to surrounding suitable habitat or disrupt ecologically significant locations.
Assessment outcome	**The Project is unlikely to result in a significant residual impact on the echidna**



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint
- Short-beaked Echidna Habitat

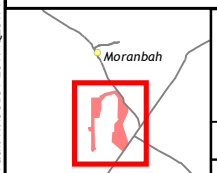
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 8: SHORT-BEAKED ECHIDNA

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_8_Fauna_Echidna.mxd

7.2.2 Essential habitat

In accordance with the Queensland *Significant Residual Impact Guideline* (DEHP, 2014), a significant residual impact on DoR mapped essential habitat is assessed by applying the same criteria as the 'Endangered and Vulnerable wildlife habitat' applied in Section 7.2.1.

The Terrestrial Ecology Assessment Report (E2M 2021) identified DoR mapped essential habitat for *Dichanthium queenslandicum*, ornamental snake and squatter pigeon within the disturbance footprint. As these species are also MNES, they were assessed using an equivalent set of criterion in Section 7.1.1.1, Section 7.1.2.1 and Section 7.1.2.2 respectively.

The Significant Residual Impact assessment of *Dichanthium queenslandicum* and ornamental snake yielded a significant residual impact on the two species (Table 9 and Table 11 respectively).

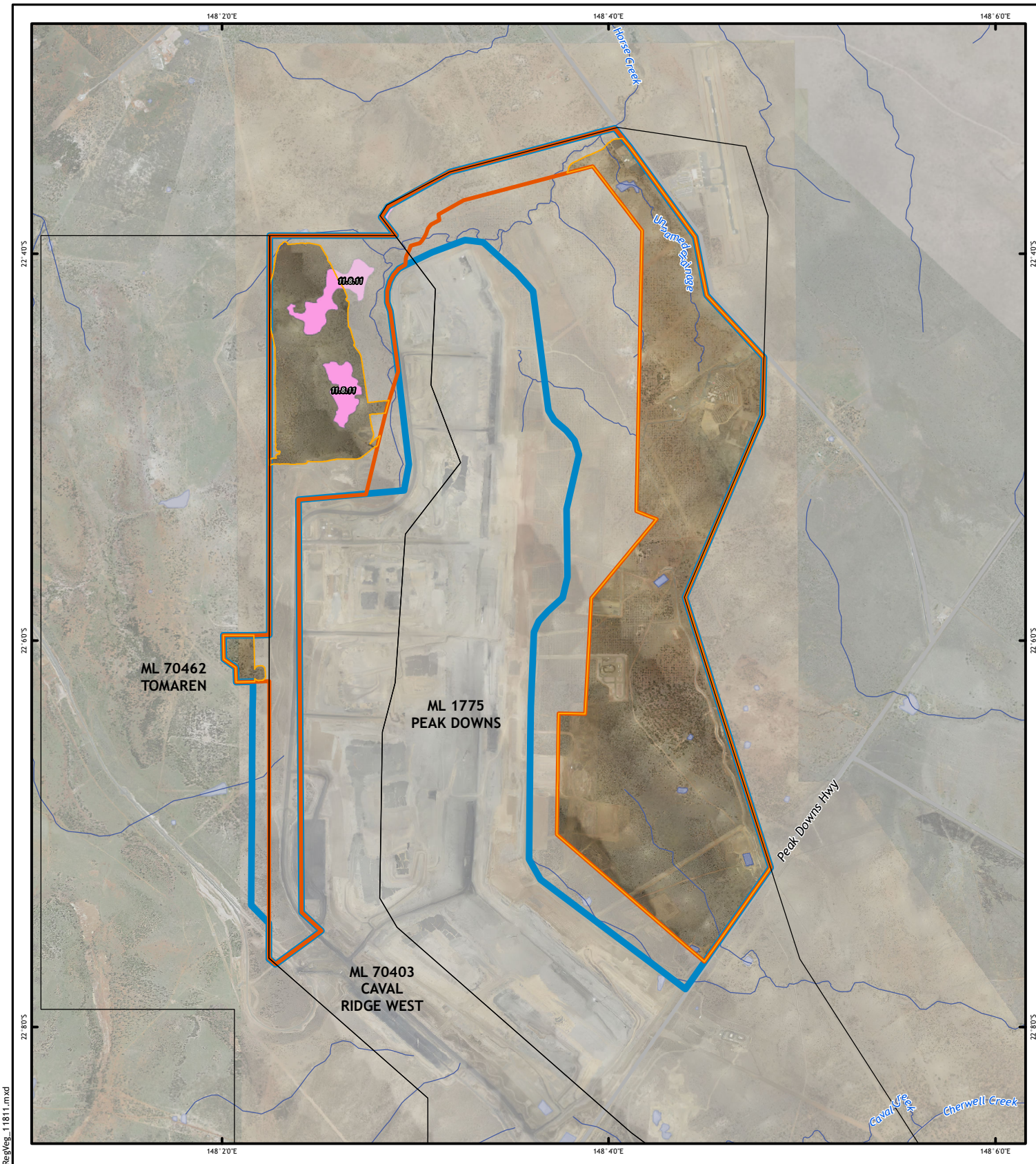
7.2.3 Regulated vegetation

The removal of 23.40 ha of 'of concern' remnant RE 11.8.11 (*Dichanthium sericeum* grassland on Cainozoic igneous rocks) constitutes as a significant residual impact under the *Queensland Environmental Offsets Policy's* Significant Residual Impact Guideline criteria for regulated vegetation (Table 16).

Table 16. Significant residual impact test - Regulated vegetation

Criteria		Clearing in an RE that is: 'endangered', or 'of concern'	Clearing within a mapped wetland	Clearing within a watercourse RE
1	Non-linear clearing area >5 ha in a grassland RE	✓	-	-
	Non-linear clearing area >2 ha in a sparse (structural category) RE	-	-	-
	Non-linear clearing area >0.5 ha in a dense to mid-dense (structural category) RE	-	-	-
2	Clearing within 50 m of the defining bank of a defined mapped wetland	-	-	-
3	Clearing within 5 m of the defining bank of a watercourse	-	-	-

- for a prescribed activity to have a significant residual impact on an RE that lies within a mapped wetland, criteria 1 and 2 must be exceeded
- for a prescribed activity to have a significant residual impact on a RE that is within the defined distance of watercourses, criteria 1 and 3 must be exceeded
- ✓ indicates criteria has been exceeded and represents a significant residual impact
- - indicates criteria has not been exceeded



Legend

- Watercourse
- Road
- Mining Lease
- Horse Pit Extension Project Area
- Terrestrial Ecology Assessment Study Area
- Disturbance Footprint

Ground-truthed Regional Ecosystem

- Remnant 11.8.11 - Of Concern (VM Act)

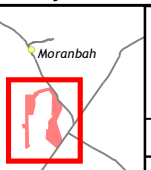
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
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Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 9: SIGNIFICANT RESIDUAL IMPACT REGULATED VEGETATION

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_9_Flora_RegVeg_11811.mxd

7.2.4 Connectivity

The Landscape Fragmentation and Connectivity Tool (LFC) (DES 2018) was used to assess the significance of impact on connectivity areas as defined in the *Environmental Offsets Regulation 2014*. The results of the Test 2 (below) returned a 'true' result indicating that the Project is likely to have a significant impact on connectivity within the disturbance footprint.

Test 1

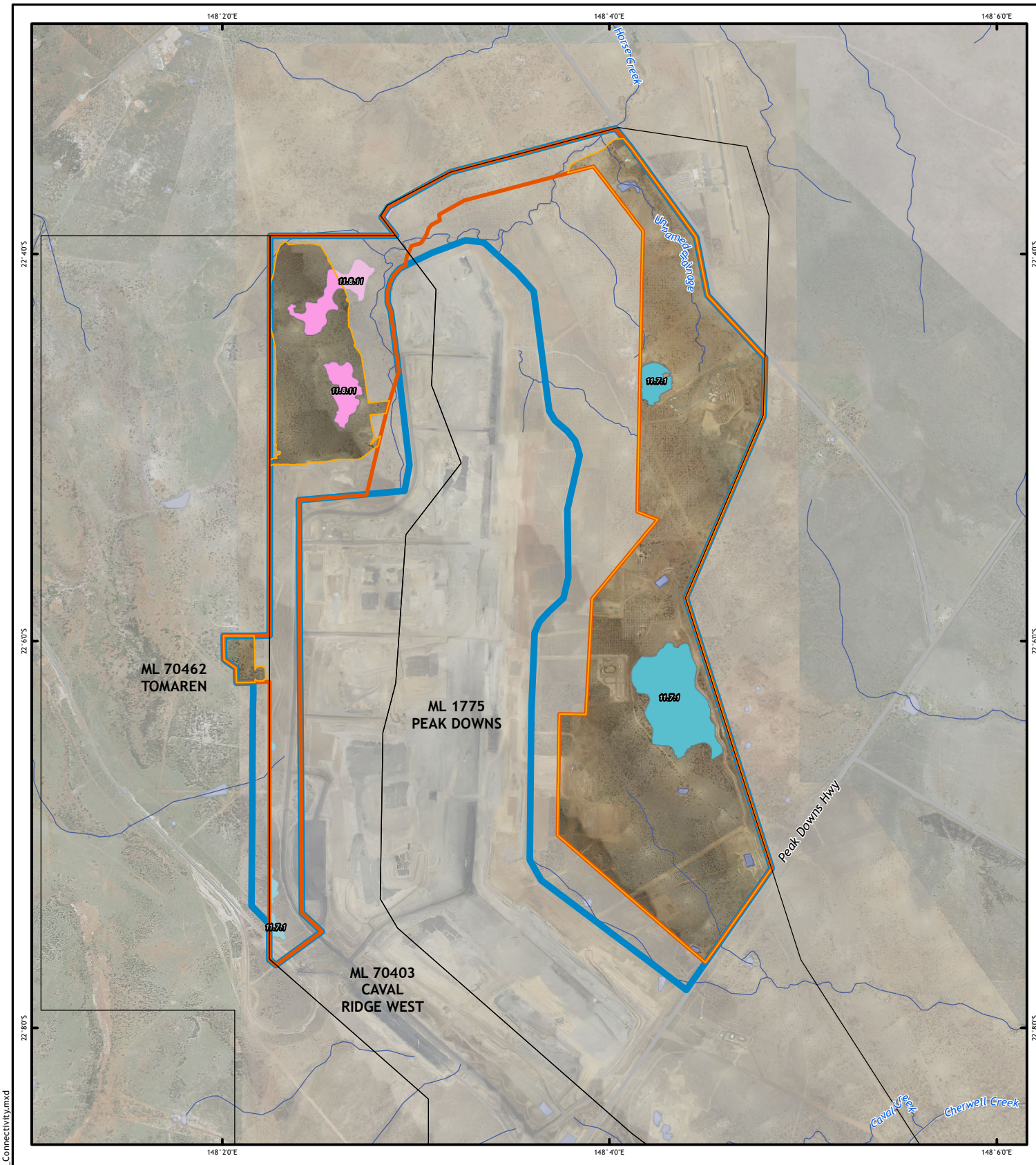
- The regional total area is 174,322.14 ha with extent of core remnant of 67,488.12 ha (38.71%) percent. This level of regional fragmentation sets a local impact threshold of 10%.
- The area of core at the local scale (pre impact) is 3,776.88 ha and area of core at the local scale (post impact) is 3,727.55 ha, yielding a percent change of core at the local scale (post impact) of 1.31%.

As the change in the core remnant ecosystem extent at the local scale (post impact) is not greater than a threshold determined by the level of fragmentation at the regional scale, this analysis has determined a significant impact on connectivity areas as 'false' (i.e. no significant impact).

Test 2

- The number of core remnant areas occurring on the site: 4
- The number of core remnant areas remaining on the site post impact: 2

This analysis has determined a significant impact on connectivity areas as there was a change from core to non-core remnant at the site scale as 'true' (i.e. significant impact).



Legend

- Watercourse
- Road
- Mining Lease
- Terrestrial Ecology Assessment Study Area
- Horse Pit Extension Project Area
- Disturbance Footprint

Remnant Ground-truthed Regional Ecosystem

- 11.7.1
- 11.8.11

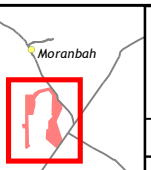
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
2	Issued for Use	DL	LW	10/08/2021
3	Issued for Use	DL	PW	21/05/2022

FIGURE 10: SIGNIFICANT RESIDUAL IMPACT CONNECTIVITY

Horse Pit Extension Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	3

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_SRI_10_Flora_Connectivity.mxd

7.3 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are legislated under the *Environmental Protection Act 1994* (Qld) and defined further under the *Environmental Protection Regulation 2008* (Qld). ESAs are not governed under the Commonwealth or State Environmental Offset Framework and therefore, are not subject to a significant residual impact assessment or environmental offset requirements as MNES and MSES.

The DES-mapped Category B ESA labelled as containing endangered remnant and regrowth RE within the disturbance footprint was ground-truthed to confirm the presence of endangered REs (E2M 2021). Endangered HVR RE 11.3.1 (approximately 0.09 ha) as well as endangered regrowth RE 11.4.8 (approximately 0.14 ha) and endangered regrowth RE 11.4.9 (approximately 497.88 ha) were confirmed present within the disturbance footprint.

These ESAs are not categorised as MSES due to the way in which REs are defined and the methodologies used to describe and classify them. As a result, the Project is likely to incur an impact on an ESA that is an endangered RE, but an environmental offset is not required because the endangered REs underpinning the ESA do not qualify as a MSES due to their regrowth and HVR status.

8 Conclusion

The development of the Horse Pit Extension Project will have an environmental impact on flora, fauna and vegetation communities largely by way of vegetation clearing, topsoil stripping and the inherent loss of habitat.

Project impacts on MNES and MSES will be mitigated through the application of the CVM environmental management framework. Residual project impacts on MNES and MSES evaluated against the Commonwealth and State environmental offset framework found the project is likely to have a significant residual impact on four environmental matters as summarised in Table *17* and Table *18*.

Table 17. MNES likely to be significantly residually impacted by the Project

Environmental matter	EPBC Act status	Habitat within the disturbance footprint (ha)
king bluegrass *Dichanthium queenslandicum*	Endangered	23.40
ornamental snake *Denisonia maculata*	Vulnerable	167.84

Table 18. MSES likely to be significantly residually impacted by the Project

Environmental matter	VM Act status	Habitat within the disturbance footprint (ha)
Regulated vegetation – RE 11.8.11 (remnant native grassland)	Of concern	23.40
Connectivity	N/A	84.19

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Appendix A Terrestrial Ecology Assessment Report

Terrestrial Ecology Assessment

SLR Consulting Australia Pty Ltd

Horse Pit Expansion Project – Caval Ridge Mine

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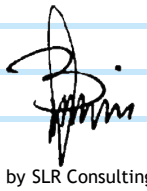

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Contents

List of tables

List of figures

Appendices

Definitions

Term	Definition
Conservation significant	Listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) or the *Nature Conservation Act 1992* (Qld).
CVM existing disturbance	Disturbance footprint approved in the CVM EIS and associated Coordinator General's Change Requests and the current disturbance from Caval Ridge mining activities (2020).
Drainage feature	Determined by the Department of Natural Resources, Mines and Energy under the *Water Act 2000* (QLD) as 'not a watercourse'.
Horse Pit	CVM EIS Pit Boundary for Horse Pit in the north of ML 1775 and ML 70403.
Population of a species	Defined under the EPBC Act as an occurrence of the species in a particular area
Prescribed regional ecosystem	Remnant vegetation
Regional Ecosystem	A vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil. Regional Ecosystems are described in the Regional Ecosystem Description Database, produced by the Queensland Herbarium.
Regulated vegetation	Vegetation that is mapped within the regulated vegetation management map produced by DNRME. Regulated Vegetation is managed under the *Vegetation Management Act 1999 (QLD)*.
The study area	The study area is the geographic area surveyed during the ecology field surveys; specifically ML1775 and ML70403 north of Peaks Downs Highway (excluding Moranbah Airport), client supplied shapefile.
Target species	Conservation significant species (i.e. MNES and MSES) that are known, likely or have the potential to occur in the study area as per the outcome of the Likelihood of Occurrence Assessment.
The Project	The Horse Pit Expansion Project located in the northern extent of ML 1775, ML 70403 and ML 70462 north of the Peak Downs Highway.
Threatened species	Critically Endangered, Endangered, Vulnerable species under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and Endangered, Vulnerable or Near Threatened (EVNT) under the *Nature Conservation Act 1992* (Qld).
Vegetation community	An identified vegetation community (i.e. structure, composition, condition and/or underlying geology) verified from a field survey. Communities may include Regional Ecosystems, remnant vegetation and/or disturbed/novel ecosystems (e.g. parkland, disturbed roadsides etc.).
Watercourse	A watercourse as determined by the Department of Natural Resources, Mines and Energy under the *Water Act 2000* (Qld).

Abbreviations

Abbreviation	Description
ALA	Atlas of Living Australia
BMA	BM Alliance Coal Operations Pty Ltd
BVGs	Broad Vegetation Groups
CVM	The Caval Ridge Mine located on Mining Leases (ML) 1775, ML 70403 and ML 70462
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DEE	Commonwealth Department of the Environment and Energy
DotE	Commonwealth Government Department of the Environment
DES	Queensland Department of Environment and Science
DNRME	Queensland Department of Natural Resources, Mines and Energy
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
E2M	E2M Pty Ltd
EA	The Environmental Authority for the Caval Ridge Mine (No. EPML00562013, effective on 10 August 2020)
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Significant Area
GDE	Groundwater Dependant Ecosystem
GPS	Global Positioning System
GTRE	ground truthed Regional Ecosystem
HVR	High Value Regrowth
ML	Mining Lease
MNES	Matters of National Environmental Significance are prescribed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
MSES	Matters of State Environmental Significance as defined by Schedule 2 of the Environmental Offsets Regulation 2014 (Qld) and include multiple prescribed environmental matters under Queensland legislation (and associated subordinate legislation and policies)
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992* (Qld)
PMST	Protected Matters Search Tool used to determine matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). The PMST generates a Protected Matters Report.

Abbreviation	Description
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
DSEWPAC	Department of Sustainability, Environment, Water, Population and Communities (Cth)
sp.	Singular species. For example, *Eucalyptus* sp. refers to a single species of *Eucalyptus*
spp.	Multiple species. For example, *Eucalyptus* spp. refers to multiple species of *Eucalyptus*
SPRAT	Species Profile and Threats database provides information about species and ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
TEC	Threatened Ecological Community listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
VCs	Vegetation communities
VM Act	*Vegetation Management Act 1999* (Qld)
WONS	Weeds of National Significance

Executive Summary

The BM Alliance Coal Operations Pty Ltd (BMA) propose to expand mining operations within Horse Pit at the Caval Ridge Mine (CVM). The Project involves the expansion of the current disturbance footprint, the development of enabling infrastructure and an out of pit dump.

E2M Pty Ltd (E2M) was engaged by SLR Consulting Australia Pty Ltd (SLR) on behalf of BMA to conduct a terrestrial ecology assessment to identify and characterise the terrestrial ecological values within the Horse Pit study area (the study area). The study area encompasses mining lease (ML) 1775 and ML 70403 north of the Peak Downs Highway (excluding the Moranbah Airport). E2M conducted a desktop assessment and two field surveys targeting conservation-significant wildlife and wildlife habitat, regulated vegetation, ecosystem function and other Matters of National and State Environmental Significance (MNES and MSES, respectively) prescribed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and the *Environmental Offsets Regulation 2014* (QLD).

The study area is subject to disturbance from the ongoing operation of the adjacent CVM as well as historical vegetation clearing and cattle grazing. Despite the past and current impacts, the study area was found to support a diversity of wildlife, habitat features and vegetation communities.

The following MNES and MSES were recorded within the study area:

- two ornamental snake observations and preferred habitat within brigalow regrowth (MNES and MSES);
- habitat for an additional 4 threatened fauna species:
  - squatter pigeon (MNES and MSES);
  - Australian painted snipe (foraging habitat only) (MNES and MSES);
  - short-beaked echidna (MSES); and
  - common death adder (MSES).
- habitat for 2 threatened flora species:
  - *Dichanthium queenslandicum* (MNES and MSES); and
  - *Solanum adenophorum*
- Category B ESA (Endangered RE 11.3.1)
- of concern remnant vegetation (RE 11.8.11) under the *Vegetation Management Act 1999* (MSES); and
- ecological connectivity value (MSES).

1 Introduction

1.1 Project background

The BM Alliance Coal Operations Pty Ltd (BMA) own and operate the Caval Ridge Mine (CVM) located approximately six kilometres (km) south of Moranbah in central Queensland. The CVM has been in operation since 2014, producing and processing hard coking coal pursuant to the conditions prescribed in the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* Approval 2008/4417 (DSEWPAC 2011), the Environmental Authority (EA) Permit EPML00562013 (DEHP, 2017) and the Coordinator-General's Report (2010).

To enable changes in mine sequencing and reflect the current Life of Asset Plan, BMA propose to expand mining operations within one of CVM's active open-cut pits, known as Horse Pit (herein referred to as the Project). The Project includes:

- the expansion of the current disturbance footprint towards the eastern boundary of Mining Lease (ML) 1775;
- the development of enabling infrastructure (e.g. haul roads, powerlines, pipelines) and;
- an out of pit dump.

An Environmental Impact Statement (EIS), published in 2009, originally catalogued the CVM baseline ecological values; however, a dataset representing the Project area's current ecological values in consideration of contemporary government legislation is required.

1.2 Objective and scope

E2M Pty Ltd (E2M) was engaged by SLR Consulting Australia Pty Ltd (SLR) on behalf of BMA to conduct a terrestrial ecology assessment within the Horse Pit study area (the study area). The study area incorporates ML 1775 and ML 70403 north of the Peak Downs Highway (excluding the Moranbah Airport) (Figure 1).

The objective of the assessment was to identify and evaluate the ecological values within the study area. The scope of the assessment included:

- a comprehensive desktop review of available vegetation mapping, environmental database records and published reports;
- a flora and fauna survey and habitat assessment with a focus on threatened/protected wildlife and wildlife habitat;
- ground truthing the occurrence, extent and condition of regulated vegetation including Threatened Ecological Communities (TECs) and Regional Ecosystems (REs);
- identifying any other Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES); and
- an assessment of the ecological features and processes essential to the maintenance and conservation of local ecosystem functioning (e.g. habitat connectivity/wetlands and watercourses/threats).

1.3 Site overview

The CVM is situated amongst a coal mining precinct in the northern Bowen Basin where resource extraction, agriculture and livestock grazing are the predominant land uses. Consequently, the landscape has been highly modified. The study area is located immediately adjacent to the operational Horse Pit and has been subject to the direct and indirect disturbances from the ongoing CVM operational activities.

The vegetation within the 1,800 ha study area is largely brigalow woodland (56%) with eucalypt woodland (4%) and remnant grassland (2%). Much of the brigalow community occurs on soils with a heavy clay content and capacity to hold water creating local depressions called melon holes or gilgai (Photo 1).

Horse Creek (Stream Order 3) traverses the north eastern section of the study area where it diverges into three smaller, unnamed, Stream Order 1 drainages. Outside of the study area, Horse Creek joins the Isaac River (Stream Order 6) via Grosvenor Creek (Stream Order 5) approximately five km east of the ML 1775 boundary. Despite the highly modified landscape within the study area and the broader landscape, the drainage systems remain relatively intact. Permanent water sources, such as farm and mine dams are scattered throughout the study area.

Photo 1. Gilgai within brigalow regrowth in the Horse Pit study area

Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area

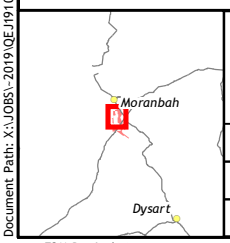
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Ordered Drainage: © DNRME 2018
Road: © PSMA 2014
HPE Area supplied 20201027

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 1: HORSE PIT SITE

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_1_Site.mxd

2 Methods

The terrestrial ecological values of the study area were evaluated through a desktop assessment and two field assessments conducted in accordance with the relevant Commonwealth and/or Queensland government guidelines. The following section details the methods employed to conduct both the desktop and the field assessments.

2.1 Desktop assessment

The desktop assessment consolidated information from relevant databases, mapping, aerial imagery, and published literature to produce an initial characterisation of the ecological values of the study area and surrounding landscape. In part, this initial characterisation guides the assessment strategy required in the field by providing information such as previously recorded threatened species, potential habitat features and mapped vegetation communities.

The desktop assessment sourced information from the:

- Environmental Impact Statement. 2009. Caval Ridge Mine Project. BMA;
- BMA and BMC Conservation Significant Species Register (Client supplied);
- Protected Matters Search Tool (PMST) Database;
- Atlas of Living Australia (ALA) species search;
- Wildlife Online Search;
- Protected Plants Flora Survey Trigger mapping;
- draft Central Queensland fauna habitat definitions (BHP unpublished document)
- HERBRECS data;
- Regulated Vegetation mapping;
- Regional Ecosystem (RE) mapping;
- Property Map of Assessable Vegetation mapping;
- Pre-clearance RE mapping;
- Environmentally Sensitive Area Map;
- MSES mapping;
- Essential Habitat mapping;
- Queensland historical imagery;
- Queensland wetland data series;
- Referrable Wetland mapping;
- GDE Atlas;
- *Vegetation Management Act 1999* (VM Act) Wetland data; and
- VM Act watercourse and drainage feature map (Version 4).

Where applicable, database search results returned records within a 50 km radius of the centre of the study area (e.g. PMST and Wildlife Online reports). This 50 km radius reflects/accounts for the:

- size of the study area;
- clumped distribution of habitat features dispersed across a highly modified landscape; and
- inclusion of data recorded in correlation with the development of neighbouring mines.

Desktop information is found in Appendix A.

2.2 Likelihood of occurrence assessment

A Likelihood of Occurrence Assessment evaluates the qualitative probability that a conservation significant flora or fauna species might inhabit the study area during all or part (e.g. breeding season, migration) of its life cycle. The objectives of the Likelihood of Occurrence Assessment are to:

- guide the field survey design by highlighting conservation-significant species that:
  - are known to occur in the area;
  - are likely to occur in the area; and
  - have the potential to occur in the area.
- inform the terrestrial ecological assessment of the potential risk of impact from the Project on the identified species/habitat.

To determine whether a species is known, likely or has potential to occur in the area, the Likelihood of Occurrence assessment considers:

- species-specific ecological and physiological requirements;
- previously recorded species observations;
- the resources and constraints present in the study area informed by the desktop assessment; and
- the resources and constraints present in the study area informed by the field surveys.

The Likelihood of Occurrence Assessment criteria is detailed in Table 1 and depicted in Chart 1.

Table 1. Likelihood of Occurrence Assessment criteria

Assessment Outcome	Criteria
known to occur	The species has been recorded within the study area. Records include E2M 2019/2020 field survey data, recent Wildnet database records as well as ecological data catalogued for the CVM EIS (2009)
likely to occur	Suitable habitat for a species is present within the study area, there are nil or negligible constraints and local records are present
potential to occur	Suitable habitat for a species occurs within the study area but local records are few/absent/not recent or a threatening process/constraint (e.g. habitat fragmentation, introduced species) within the study area reduces the probability a species/population is present

Assessment Outcome	Criteria
unlikely to occur	• A low to very low probability that a species inhabits/occurs within the study area due to the lack of suitable habitat, lack of local records or the presence of threatening process • If suitable habitat for a conspicuous species of flora is comprehensively surveyed during favourable conditions and the species is undetected, it may be considered unlikely to occur within the study area. Local threatening processes and/or a lack of local or recent records supports the assessment outcome (i.e. unlikely to occur)
does not occur	The species will not occur within the study area (e.g. marine species in terrestrial study site)

Species that are known, likely or have potential to occur in or near the study area, as based on the desktop assessment, are collectively referred to as target species.

The prescribed survey methodologies used to detect target species in the field (discussed in Section 2.3) form the basis of the field survey design. Target species recorded during the field surveys are evaluated further to determine the Project's potential impact. Target species not detected however, are not necessarily assumed to be absent from the study area. Certain species, for example, are naturally rare throughout their range or are difficult to detect in the field (e.g. cryptic or fossorial). Some populations are naturally cyclical or fluctuate in response to resource availability and environmental conditions. Mobile species, such as fauna, may utilise habitat within the study area only intermittently during migration or as part of a larger home range.

To account for the variability of detection and to maintain logistical practicality of survey design, the precautionary principle may be applied. If a particular target species is not detected in the study area during a survey of suitable habitat but there is reason to believe the species has potential or occur, the species is included in further evaluation. In contrast, if a target species is not detected in the study area and there is no reason to believe the species has potential to occur, the species may be considered unlikely to occur and not evaluated further.

A target species may also be determined unlikely to occur if the species remains undetected after all suitable habitat within the study area is comprehensively surveyed in favourable conditions and there is no reason otherwise to believe the species may be present (e.g. the species is difficult to detect). This likelihood of assessment outcome is often more pertinent for conspicuous flora species and where extensive surveys in optimal conditions allows a higher confidence that is species is unlikely to be present. Unlike fauna, which are highly mobile and may utilise habitat intermittently, flora species are more likely to be detected should they occur within the study area if all suitable habitat is surveyed systematically during suitable survey conditions (e.g. target flora species *Bertya pedicellata* grows up to 6 m tall).

Each target species is discussed Section 5.1.5 (flora) and Section 5.2.3 (fauna).

The full Likelihood of Occurrence Assessment is detailed in Appendix B.

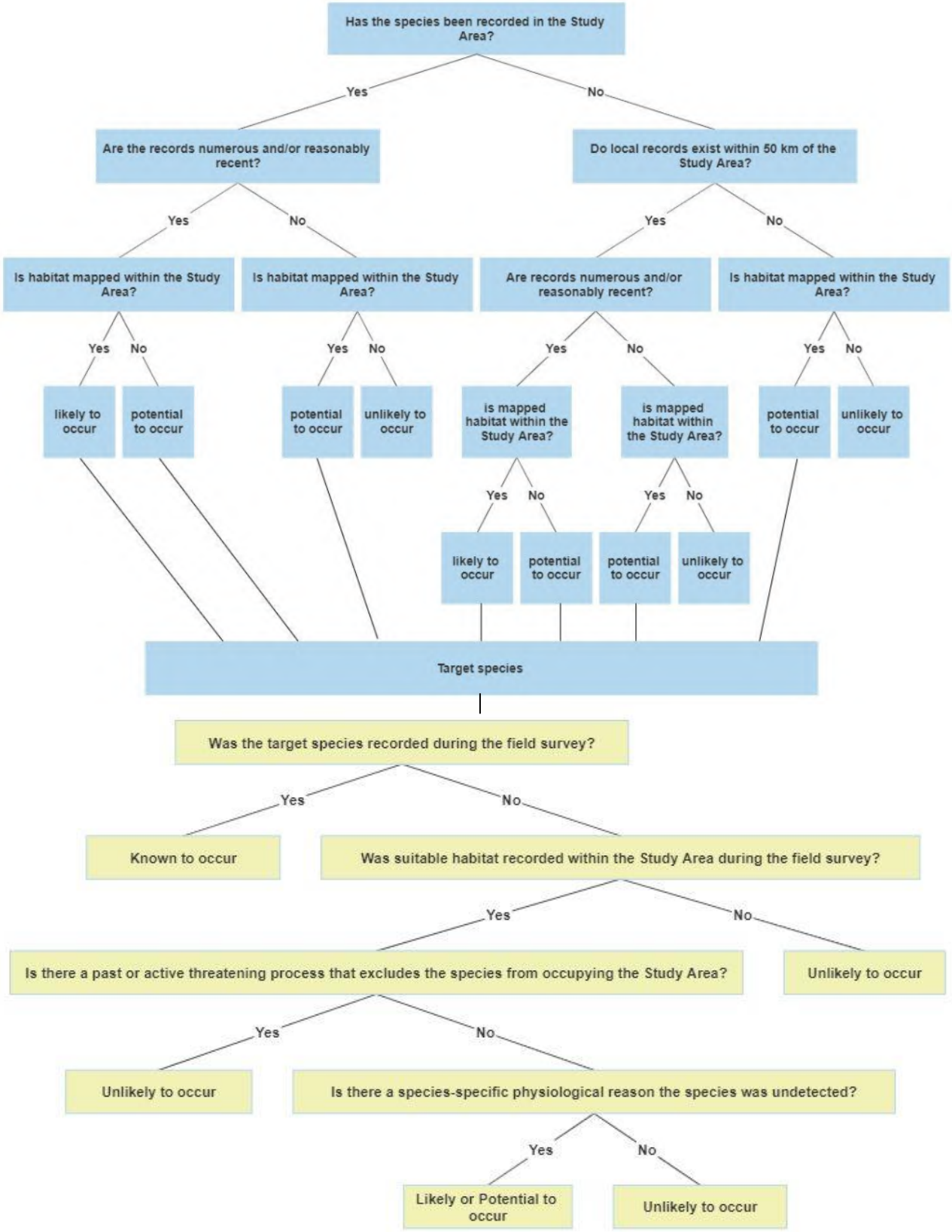


Chart 1. Depiction of the general guideline of the Likelihood of Occurrence Assessment process conducted at a desktop level (blue) and field level (green)

2.3 Field assessment

Field surveys were conducted to identify and characterise the presence, extent and condition of contemporary terrestrial ecological values within the study area. The methods employed adhere to the guidelines and methodologies prescribed or supported by the Queensland and Commonwealth governments.

2.3.1 Survey timing and conditions

Two field surveys were conducted as part of the terrestrial ecology assessment. The first survey was conducted in the late dry season (25 November to 2 December 2019) by two senior ecologists. The survey conditions during this time were unseasonably hot and dry with daily temperatures exceeding 35ºC, augmented by below average rainfall (a total of 30 mm rain was recorded in September, October and November 2019 as compared to 89 mm over the same period in 2018 and 126 mm in 2017).

The dry season survey allowed the broad ecological values within the study area to be characterised; however, the hot and dry conditions were unsuitable to effectively survey certain target flora species such as *Dichanthium queenslandicum, Dichanthium setosum* and *Solanum adenophorum;* as well as target fauna species like the ornamental snake (*Denisonia maculata)* and Australian painted snipe (*Rostratula australis)*. The optimal survey condition for these target species corresponds with the wet season when the species are more detectable due to:

- the emergence of reproductive material (i.e. seeds) that assists with the identification of annual grass species; and
- peak activity periods of fauna foraging behaviours.

Additionally, the dry season survey conditions were not ideal to sufficiently study the Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin Threatened Ecological Community (TEC) due to the lack of reproductive material (i.e. flowers and seeds) that assist in species identification.

A subsequent wet season survey was conducted between 19 March and 27 March 2020 by four ecologists during more favourable survey conditions. During the six weeks preceding the wet season survey, the study area received approximately 230 mm of rain, resulting in the emergence of annual herbs, grasses and the presence of reproductive material on many flora species. At the time of survey, Horse Creek and its tributaries had standing pools of water and the gilgai scattered throughout the study area were inundated with water providing optimal survey conditions for ornamental snake (*Denisonia maculata)* and Australian painted snipe (*Rostratula australis)*.

2.3.2 Flora survey

2.3.2.1 Broad Vegetation Groups

Broad Vegetation Groups (BVGs) were categorised in the field to reflect. BVGs are a higher-level grouping of vegetation communities and are ordered broadly to reflect major ecological and vegetative patterns across the study area. Each BVG is composed of several REs characterised by similar geology and vegetation composition. BVGs were categorised in accordance with the Broad Vegetation Groups (1:2 million scale) identified by the Queensland Herbarium (Neldner et al. 2019a).

2.3.2.2 Regional Ecosystems

Ground-truthing and validating vegetation community mapping within the study area was conducted in accordance with the Queensland Government's *Methodology for Surveying and Mapping of Regional*

Ecosystems and Vegetation Communities in Queensland (Neldner et al. 2019). Using this methodology, Tertiary and Quaternary vegetation surveys were carried out in alignment with the Queensland Herbarium's CORVEG database.

Tertiary surveys are relatively more comprehensive than quaternary surveys yet are limited in application to the wet season when favourable weather conditions promote the emergence of annual herbs and grasses, which more accurately reflects species richness. In addition to a comprehensive list of species, data collected during a tertiary survey includes a measure of relative abundance and overall vegetation structure information such as height and cover. In contrast, quaternary surveys are a rapid assessment used to verify regional ecosystem mapping and designate structure and condition status.

Vegetation communities were categorised into four classes based on RE description and vegetation structure and condition. These categories comprised:

- **Remnant** – a vegetation community that achieves remnant status as defined in the VM Act and referenced by Neldner et al. (2019b) is 'vegetation, part of which forms the predominant canopy of the vegetation:
  - covering more than 50 per cent of the undisturbed predominant canopy and
  - averaging more than 70 per cent of the vegetation's undisturbed height; and
  - composed of species characteristic of the vegetation's undisturbed predominant canopy.'
- **High Value Regrowth (HVR)** – vegetation communities that have not been cleared within the last 15 years or are degraded (e.g. dieback, selectively cleared) to the extent that it does not meet the canopy cover and/or height thresholds for remnant status. Species composition are still consistent with a RE.
- **Regrowth** - communities that have been cleared/disturbed within the last 15 years and while may lack comparable structure (i.e. woodland, forest etc), contain floristic composition consistent with a RE. These communities do not meet the criteria for remnant or HVR and are considered young, regenerating vegetation.
- **Non-remnant** –communities that have been historically cleared/disturbed or heavily modified (i.e. improved pastures, weed encroachment, etc.) and are not consistent with a particular RE.

Information provided in the RE Technical Descriptions for the Brigalow Belt (DES 2018a) and structural formations of vegetation as defined by Specht (1970) served as a baseline for the undisturbed canopy, height and species with which to compare the field data and ascertain vegetation class.

Where possible, REs mapped within the study area were ground-truthed and re-mapped as homogenous polygons where they had previously been mapped as mixed polygons.

2.3.2.3 BioCondition assessment

BioCondition assessments were conducted in accordance with the Queensland *Guide to Determining Terrestrial Habitat Quality Version 1.3* (DES 2020) (herein referred to as the 'Habitat Quality Guide'). BioCondition Assessments involve the collection of in situ vegetation data, site condition, spatial context as well as target species habitat criteria.

Vegetation data was collected within a 100 m x 50 m area (including various sub-plots) for each representative vegetation community and weighted in accordance with the methods prescribed in the Habitat Quality Guide and compared to BioCondition benchmark values obtained from the published Brigalow Belt Bioregion benchmarks for each respective Regional Ecosystem (Queensland Herbarium 2019). A summary of the site and spatial attributes that were assessed, plot area and associated weighting is

listed in Table 2. In addition, observations regarding weed species and associated densities were also recorded.

A Trimble Nomad Global Positioning System (GPS) device was used to record the location of mid-point (50 m mark) of each BioCondition survey site (depicted on Figure 2).

Table 2: Habitat Quality assessment criteria

Attribute	Description	Assessment plot	Maximum score
Site condition attributes			
Large trees	Number of large trees per hectare, as determined by exiting BioCondition benchmarks for the associated RE	100 m x 50 m	15
Tree canopy height	Median canopy height in metres of the ecologically dominant layer.	100 m x 50 m	5
Recruitment (%)	The proportion of overstorey species present at a site that are regenerating (<5 cm diameter at breast height (DBH))	100 m x 50 m	5
Tree canopy cover (%)	Vertical projection of the tree canopy crown cover along a transect	100 m transect	5
Shrub layer cover (%)	Vertical projection of the shrub layer cover of native shrubs	100 m transect	5
Coarse woody debris	The length of fallen woody logs and other coarse woody debris (>10 cm diameter and >0.5 m in length) per hectare	50 m x 20 m	5
Native plant species richness	Native plant species richness, comprising all life forms (i.e. trees, shrubs, grasses and forbs/other)	100 m x 50 m (trees) 50 m x 10 m (shrubs, grasses, forbs/other)	5 5 each
Non-native plant cover	Percentage cover of non-native/weed plant species	50 m x 10 m	10
Native perennial grass cover (%)	Average percentage cover of native perennial grass species	Five 1 m x 1 m	5
Litter cover	The average percentage cover of organic material such as fallen leaves, twigs and branches <10 cm diameter	Five 1 m x 1 m	5
Site context attributes			
Size of patch	The size of the patch assessed and associated directly connecting remnant vegetation	-	10
Connectedness	The proportion of the site's boundary that is connected to remnant vegetation	-	5
Context	The percentage of remnant and regrowth vegetation within a 1 km buffer of the site	1 km buffer	5

Attribute	Description	Assessment plot	Maximum score
Site condition attributes			
Ecological corridors	Proximity to ecological corridors (riparian or terrestrial) identified Queensland biodiversity and vegetation offsets special features map	-	6

2.3.2.4 Threatened Ecological Community (TEC)

In conjunction with Tertiary and Quaternary assessments, an additional assessment was undertaken in the field within relevant vegetation communities to verify if key diagnostic characteristics and condition thresholds for the EPBC Act listed TECs were met. Specific condition criteria and characteristics used for the assessment are based on respective information provided within each 'approved listing advice' published for each TEC identified within the desktop assessment.

2.3.2.5 Threatened flora

The random meander technique (Cropper 1993) was used to survey for potential threatened flora throughout the study area. The meander technique involves traversing suitable habitat within the study area as identified during the desktop assessment and tailored during the field survey. This method is particularly suitable for locating species that typically occur at low densities or that may be distributed in isolated clumps.

2.3.2.6 Opportunistic observations

Flora species not detected via other survey methods, including pest species, were recorded as opportunistic observations. Where observed, restricted biosecurity species identified under the Queensland *Biosecurity Act 2014* (Biosecurity Act) and Weeds of National Significance (WoNS) were recorded. Estimated weed densities were categorised based on the following densities:

- Scattered - 1-2 individuals/10m^2;
- Low - 3-4 individuals/10m^2;
- Moderate - 5-6 individuals/10m^2; and
- High - >7 individuals/10m^2.

2.3.3 Fauna survey

The fauna survey objectives were to identify and characterise:

- the species richness and general fauna assemblages within the study area;
- the type and quality of fauna habitat present within the study area;
- fauna Matters of National Environmental Significance (MNES); and
- fauna Matters of State Environmental Significance (MSES).

Fauna surveys were conducted in accordance with the relevant Commonwealth and State guidelines:

- Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Version 3.0) (Eyre et al. 2018);
- Survey guidelines for Australia's threatened birds (Cth) (DEWHA 2010);

- Survey guidelines for Australia's threatened mammals (Cth) (SEWPaC 2011);
- Survey guidelines for Australia's threatened reptiles (Cth) (DSEWPaC 2011b);
- Survey guidelines for Australia's threatened bats (Cth) (DEWHA 2010b);
- Draft Referral guidelines for the nationally listed Brigalow Belt reptiles (Cth) (SEWPaC 2011c);
- Species National Recovery Plans (Cth).

Certain threatened fauna species have individual survey guidelines that target species-specific habitat and behaviour to increase detectability in the field. Species-specific survey methods were applied for the common death adder (*Acanthophis antarcticus*) - Targeted species survey guidelines (Rowland & Ferguson 2012).

Detailed species-specific biological characteristics, habitat requirements and survey methods were also sourced from:

- Species Profile and Threats (SPRAT) Database (Department of Agriculture, Water and the Environment (DAWE))
- draft Central Queensland MNES fauna habitat definitions (Kerswell et al. 2020); and
- regulator approved Conservation Advice.

A tailored suite of fauna survey techniques were implemented as detailed below.

2.3.3.1 Systematic trap sites

The Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al. 2018) includes a recommended suite of capture/release techniques that target a range of fauna assemblages (e.g. mammals, amphibians, reptiles). This approach is a standardised, broad assessment that provides estimates of species occurrence, relative abundance, diversity and composition of vertebrate taxa at a specific site. At certain sites however, where prior knowledge or overwhelming evidence suggests a particular survey method will yield low detection rates of the target species, the overall survey effort may be varied (Eyre et al. 2018).

CVM, the broader landscape and, veritably, the Bowen Basin, have been extensively surveyed in correlation with the development of the region's mining precinct. Consequently, the broad ecological values of the area are well documented allowing this fauna survey effort to be tailored to target fauna species that are known, likely or have potential to occur in the study area (referred to as 'target species' discussed in Section 2.2 and 4).

The tailored systematic trap site employed as part of the field assessment consisted of a 15 m long drift fence, eight funnel traps and a baited camera trap. This approach differs from the standardised systematic trap site method by increasing the number of recommended funnel traps and removing box trapping and pitfall trapping. Box trapping and pitfall trapping had been previously conducted during the baseline terrestrial assessment for the CVM EIS (BMA 2009) resulting in zero captures of conservation significant species. Furthermore, box trapping (e.g. Elliot traps, cage traps) are not prescribed survey methods for this assessment's target fauna species.

Four systematic trap sites were established during the Wet Season 2020 survey within the study area. One site was located within the riparian habitat of Horse Creek in the study area's north eastern extent and three trap sites were established in remnant and regrowth brigalow/gilgai habitat (Figure 2).

2.3.3.2 Nocturnal Spotlighting

Nocturnal spotlighting surveys target fauna that are most active and detectable at night. A team of two to four ecologists walked parallel meandering transects using a handheld torch and/or a head torch to detect eye shine and investigate microhabitats (e.g. peeling bark or coarse woody debris) within the study area. Nocturnal spotlighting commenced approximately 30 minutes after sunset for a duration of approximately three hours per night over two nights during the dry season survey and four nights during the wet season survey. Survey effort is further discussed in Section 4.

Opportunistic vehicle transects were also undertaken when moving between survey sites.

2.3.3.3 Bird surveys

Standardised bird surveys were conducted in the late afternoon across multiple sites within the study area by two to four ecologists, equipped with binoculars, searching suitable habitat and recording all species observed and/or heard during a 15-30 minute survey period (DEWHA 2010). Targeted bird surveys were also conducted at:

- stationary observations at wetlands;
- scanning groups of tall trees for nests; and
- vehicle transects of unsealed roads in late afternoon.

2.3.3.4 Anabat

Two Anabat SD2 detectors were deployed within suitable detection areas (e.g. farm dams, flyways and flowering trees) to detect echolocation calls of microbats foraging within the study area. Anabats were set to operate from dusk until dawn each night within different locations to achieve spatial coverage across the study area.

2.3.3.5 Diurnal active searches

Diurnal active searches were largely conducted concurrently with fauna habitat assessments. The technique involves searching within and around various habitat features (e.g. coarse woody debris, leaf litter, peeling bark, hollows logs) as well as making note of indirect evidence of fauna, such as burrows, scratch marks, scats, etc.

2.3.3.6 Opportunistic surveys

Fauna species not detected via other survey methods, including pest species, were recorded as opportunistic observations. Fauna observed while driving between survey sites and areas were recorded as opportunistic fauna records.

2.3.3.7 Fauna habitat assessments

Fauna habitat was surveyed throughout the study area to characterise broad fauna habitat types and target species-specific habitats and essential micro habitat features. The surveys were conducted primarily on foot consisting of meandering transects through all vegetation communities throughout the study area. Attributes that contribute to habitat suitability include:

- RE and RE condition (e.g. remnant, regrowth, non-remnant);
- landform pattern (e.g. rolling hills, undulating plain);
- landform element (e.g. drainage depression, hill slope);

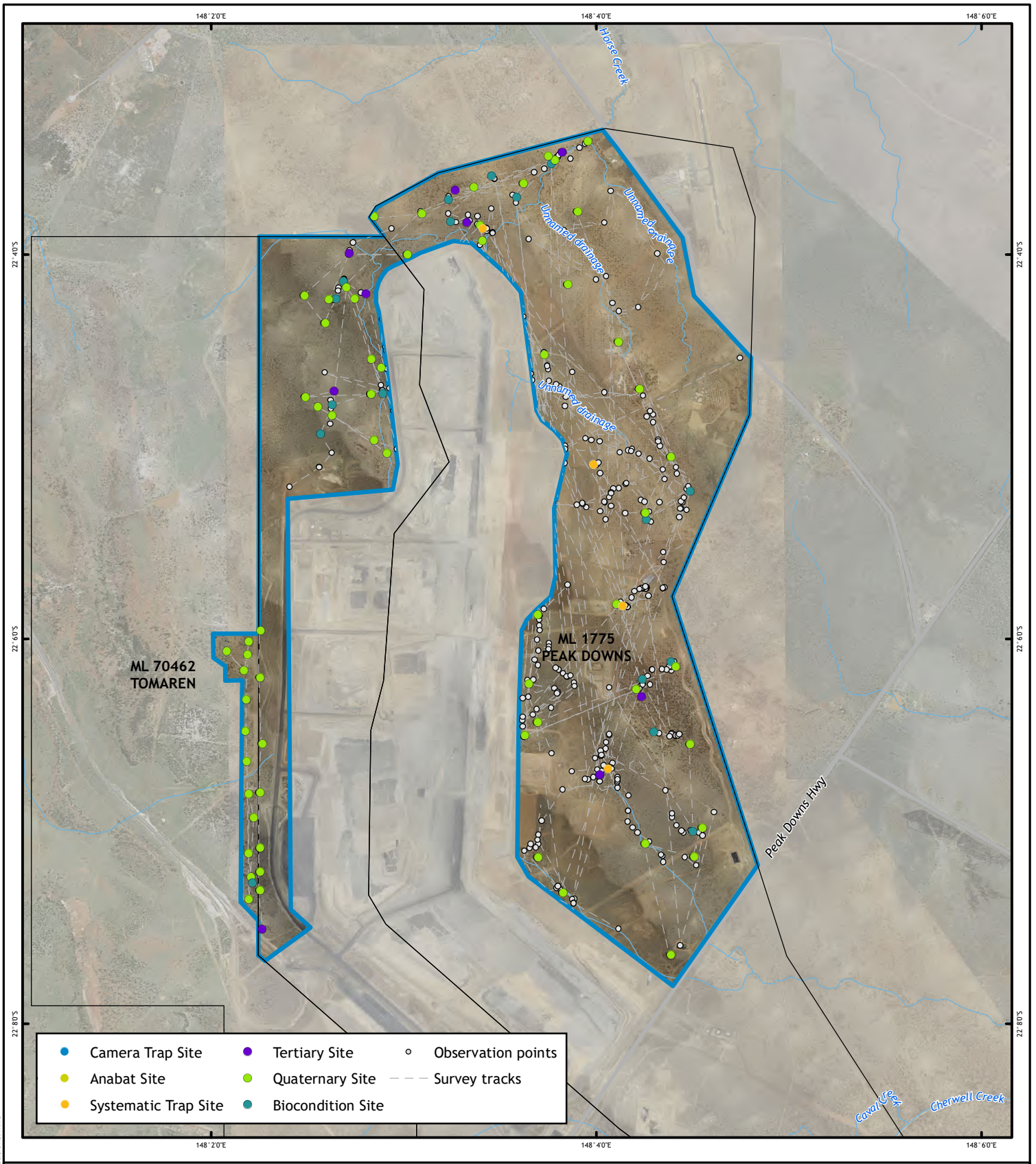
- soil texture;
- vegetation cover;
- eucalypts (flowering, species, presence of koala food trees);
- log abundance;
- tree hollow species, size and abundance;
- gilgai and cracking clays;
- foraging opportunities;
- coarse woody debris and leaf litter;
- presence and proximity to water;
- rocky outcrops and bat roosts;
- habitat connectivity; and
- presence and severity of threats (e.g. pest species, grazing, fragmentation).

Breeding habitat (a.k.a. animal breeding places) was also recorded as part of the fauna habitat assessments. Features of breeding habitat include:

- hollow logs;
- hollow trees or branches;
- stags;
- nests and nest trees;
- beehives and termite mounds;
- bounders and caves;
- dams, wetlands or sedge marshes
- course woody debris; and
- refuge sites.

A record was taken if the animal breeding place was active at the time of observation.

Target species with specialised breeding, foraging and refuge habitat requirements were assessed by collecting species-specific habitat data in the field as informed, in part, by the SPRAT database, conservation advice, published literature and recovery plans.



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area

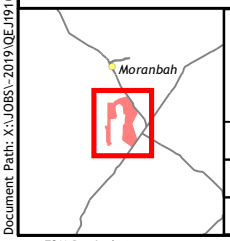
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Ordered Drainage: © DNRME 2018
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 2: SURVEY LOCATIONS

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_2_SurveyLocations.mxd

2.4 Limitations and considerations

Ecological assessments have a range of inherent limitations associated with seasonal timing of the surveys, variable climate conditions and species behaviour (e.g. fossorial, naturally rare). Two field surveys were conducted as part of the terrestrial ecological assessment to account for the seasonal variation in species presence, abundance and habitat utilisation (e.g. breeding, foraging). The dry season survey allowed for the broad ecological values within the study area to be characterised; however, the weather conditions at the time were unsuitable to effectively study certain target flora and fauna species; which are more predominant/active during the wet season.

A subsequent wet season survey was conducted following adequate rainfall events inciting an emergence of annual herbs, grasses and the presence of reproductive material on flora species as well as peak foraging behaviour of several fauna species (e.g. ornamental snake and Australian painted snipe). The survey conditions during the wet season survey were considered optimal.

As examined in Section 2.2, target species not detected during optimal survey conditions are not necessarily assumed absent from the study area. For example, certain species of target fauna are difficult to detect, possibly naturally rare throughout their range or use habitat within the study area intermittently. As such, if suitable habitat for fauna target species is recorded during the study area and there is reason to believe the species is likely or has potential to occur, the species is included in ongoing evaluation, as per the precautionary principle.

3 Desktop Assessment Results

3.1 Threatened Ecological Communities

The Protected Matters Report (PMST) issued by the Department of Agriculture, Water and the Environment (DAWE) identified five Threatened Ecological Communities (TECs) known or likely to occur within the study area (DAWE 2020), namely:

- Brigalow (*Acacia harpophylla* dominant and co-dominant);
- Natural grassland of the Queensland Central Highlands and northern Fitzroy Basin;
- Poplar Box Grassy Woodland on Alluvial Plains;
- Semi-evergreen vine thicket of the Brigalow Belt (North and South) and Nandewar Bioregions; and
- Weeping Myall Woodlands.

3.2 Target flora

The Desktop Assessment identified 16 threatened flora species listed under the EPBC Act and/or the *Nature Conservation Act 1992 (*NC Act) known or predicted to occur within or near (i.e. 50 km) the study area. Based on the results of the desktop assessment, a subset of six threatened flora species were selected to undertake targeted surveys during the field assessment (Table 3). The remaining 10 species are considered unlikely to occur primarily due to a lack of local records, restricted distributions or lack of suitable habitat mapped[1] within the study area.

The Queensland Department of Environment and Science (DES) Protected Plants Flora Survey Trigger Map identified high risk areas to the west of existing Horse Pit where endangered, vulnerable or near threatened plants are known or likely to exist. A protected plants flora survey in accordance with the DES *Flora Survey Guidelines - Protected Plants* (2020) is required within the high-risk areas prior to vegetation clearing.

Table 3. Target flora species (as identified during the Desktop Assessment)

Target Flora Species	Status			Rationale
	QLD	CTH	Matter	
Dichanthium queenslandicum	V	E	MNES and MSES	• Previously recorded within the CVM Mining Lease (HERBRECS, 2011; CVM EIS (BMA, 2009)) • DNRME mapped REs containing potentially suitable habitat • DNRME mapped essential habitat within RE 11.8.11 in NW section of study area (Section 5.1.5.1)

[1] the Department of Natural Resources, Mines and Energy (DNRME) Essential habitat, DNRME Regional Ecosystem Mapping and the Department of Environment and Science (DES) pre-clearance RE Mapping informed the mapped habitat for the target flora species

Target Flora Species	Status			Rationale
	QLD	CTH	Matter	
Dichanthium setosum	LC	V	MNES	• Not previously recorded in the desktop search extent • DNRME mapped REs containing potentially suitable habitat
Solanum adenophorum	E	N/A	N/A	• Previously recorded in the desktop search extent (i.e. 50 km) • DNRME mapped REs potentially containing suitable habitat • Difficult to detect
Solanum elachophyllum	E	N/A	N/A	• Previously recorded in the desktop search extent • DNRME mapped REs containing potentially suitable habitat
Bertya pedicellata	NT	N/A	N/A	• Previously recorded in the desktop search extent • DNRME mapped REs containing potentially suitable habitat
Cerbera dumicola	NT	N/A	N/A	• Previously recorded in the desktop search extent • DNRME mapped REs containing potentially suitable habitat

'CTH' – E (endangered) under the EPBC Act; 'QLD' – E (endangered), V (vulnerable), under the NC Act; 'Matter' relates to whether the ecological value is a matter of state or national environmental significance.

3.3 Target fauna

The EPBC Act PMST report identified the potential for 17 threatened fauna species and 10 migratory bird species listed under the EPBC Act to occur within or near (i.e. 50 km) the study area. The PMST report also referenced one migratory marine bird species and 18 marine bird species as having the potential to occur, however these species were not included in this assessment due to the lack of marine habitat within the study area (approximately 140 km from the coast).

Queensland-based databases (Wildlife Online; ALA database) identified a further eight fauna species listed under the NC Act (but not the EPBC Act) previously recorded within or near (i.e. 50 km) the study area. Essential habitat for the ornamental snake was also mapped within the study area as two relatively small, fragmented patches located along Horse Creek to the north east and within the south east of the study area (discussed in Section 5.2.3.1 and depicted in Figure 7).

The conservation significant fauna species identified during the desktop assessment were evaluated for their likelihood of occurrence (using the assessment method detailed in Section 2.2) and a subset of six fauna species were identified for targeted surveys during the field assessment (Table 4).

The full fauna species list and Likelihood of Occurrence Assessment is detailed in Appendix B.

Table 4. Target fauna species (as identified during the Desktop Assessment)

Target Fauna Species	Status			Rationale
	QLD	CTH	Matter	
ornamental snake *Denisonia maculata*	V	V	MNES and MSES	• Suitable mapped potential habitat available (gilgai) • Many recent and local records • DNRME mapped essential habitat (discussed in Section 5.2.3.1; Figure 7).
Dunmall's snake *Furina dunmalli*	V	V	MNES and MSES	• Suitable mapped potential habitat available (brigalow regrowth) • One (1) Wildnet record located 80 km from the Horse Pit study area, near Clermont in 1999 • Naturally rare, cryptic, difficult to detect
common death adder *Acanthophis antarcticus*	V	N/A	MSES	• Suitable mapped potential habitat available (eucalypt woodlands) • Six (6) Wildnet records located 28 km - 81 km from the Horse Pit study area between 2002 and 2013 • Habitat generalist, cryptic, difficult to detect
squatter pigeon *Geophaps scripta scripta*	V	V	MNES and MSES	• Previously recorded within Horse Pit study area (CVM EIS (BMA, 2009)) • Preferred, suitable and marginal habitat potentially available[2] • DNRME mapped essential habitat (discussed in Section 5.2.3.2; Figure 8)
Australian painted snipe *Rostratula australis*	V	E	MNES and MSES	• Potentially suitable habitat available (mapped drainages, wetlands and farm dams) • Few local records • Difficult to detect
short-beaked echidna *Tachyglossus aculeatus*	SLC	N/A	MSES	• Suitable mapped habitat available (remnant and regrowth vegetation communities) • Nearby records are present • Habitat generalist

'CTH' – V (vulnerable), E (endangered) under the EPBC Act; 'QLD' – V (vulnerable), SLC (special least concern) under the NC Act; 'Matter' relates to whether the ecological value is a matter of state or national environmental significance.

[2] draft Central Queensland MNES fauna habitat definitions (BHP unpublished document)

4 Survey Effort

4.1 Flora

The wet and dry season flora surveys comprised a total of 51 Quaternary survey sites, nine Tertiary survey sites and 17 BioCondition Assessment sites (Figure 2). The 17 BioCondition Assessments were conducted across nine assessment units within the study area (summarised in Table 5).

Areas comprising Brigalow and Natural Grassland REs (i.e. REs 11.3.1, 11.4.8, 11.4.9 and 11.8.11) were also assessed against key diagnostic characteristics and condition thresholds for EPBC Act-listed TECs.

Random meanders within suitable habitat for threatened flora species were undertaken concurrently with Quaternary, Tertiary and BioCondition assessments as well as active searches for fauna species (refer to Table 6).

Table 5: BioCondition assessment units and sampling

Assessment unit	Description	Sites sampled
1	HVR RE 11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	1
2	HVR RE 11.3.25 - *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	1
3	Regrowth RE 11.4.8 - *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* on Cainozoic clay plains	2
4	Regrowth RE 11.4.9 - *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	5
5	Regrowth RE 11.5.3 - *Eucalyptus populnea* woodland on Cainozoic sand plains and/or remnant surfaces	1
6	HVR RE 11.5.3 - *Eucalyptus populnea* woodland on Cainozoic sand plains and/or remnant surfaces	1
7	Remnant RE 11.7.1 - *Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus thozetiana* or *E. microcarpa* woodland on lower scarp slopes on Cainozoic lateritic duricrust	3
8	Regrowth RE 11.8.5 - *Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	1
9	Remnant RE 11.8.11 - *Dichanthium sericeum* grassland on Cainozoic igneous rocks	2

4.2 Fauna

The level of survey effort required to detect a particular fauna species in the field correlates to the:

- nature of the target species (e.g. home range size, population density);
- conditions within the study area (e.g. habitat availability); and

- recommended survey effort guidelines prescribed by the relevant Commonwealth and/or Queensland government guidelines.

Table 6 details the dry season and wet season survey effort. Table 7 outlines the expended survey effort in the field as compared to the survey guidelines/recommendations prescribed by the relevant Commonwealth and/or Queensland government guidelines.

Table 6. Detailed fauna survey effort

Survey Method	Dry Season	Wet Season	Total
Systematic trap sites	0	4 sites	4 sites
Funnel traps	0	(8 funnels/systematic trap site x 3 systematic traps sites x 4 nights) + (8 funnels/systematic trap site x 1 systematic trap site x 3 nights)	120 funnel trap nights
Camera traps	0	1 camera/systematic trap site x (3 systematic trap site x 4 nights) + (1 systematic trap site x 3 nights) + 2 free standing cameras x 4 nights each	23 camera trap nights
Anabat	0	2 Anabats x 5 nights each	10 Anabat nights
Active search	2 ecologists x (5 hrs/day x 2 days) + 3.5 hrs/day x 4 days)	4 ecologists x (8 hrs/day x 3 days) + 3 ecologists (8 hrs/day x 3 days)	168 hours
Bird survey	2 ecologists x (1.5 hrs/day x 6 days)	4 ecologists x (3 hrs/day x 4 days)	66 hours
Spotlighting	2 ecologists x (3 hrs/day x 2 days)	4 ecologists x (3 hrs/day x 4 days)	60 hours

Table 7. Summary of prescribed guidelines relative to actual survey effort

Target Species	Prescribed survey guidelines		Actual Survey Effort	Guidelines Met/Sufficient Effort	
	Cth	Qld		Cth	Qld
ornamental snake *Denisonia maculata*	• Search suitable gilgai habitat while frogs are active[4] • Diurnal active searches[4,5] • Pitfall and funnel trap[4,5] • Spotlighting 1.5hrs/ha in suitable habitat over 3 nights[5] • Driving surveys[2] • Minimum 3 survey days and nights[2] • Replicate survey if the species has not already been detected[2]	• no species-specific survey guideline[3] • general snake survey includes[3]: - funnel traps - spotlight search - tracks - nocturnal vehicle transects[3]	• 60 hours spotlighting • 120 funnel trap nights • 168 hours active search • opportunistic driving survey	The 1.5hrs spotlighting effort per hectare of suitable habitat survey effort was not met[5]; however, survey effort deemed sufficient as the species was detected during field survey [2,4] Discussed further in Section 5.2.3.1.	Yes[3]
Dunmall's snake *Furina dunmalli*	• active search [2, 4, 5] • spotlighting [2,5] • pitfall trapping [4] • opportunistic surveys of roads [2, 4, 5] • minimum of 3 survey days and nights [2,5] • at least one replicate survey employing all the recommended techniques if the species has not already been detected [2,5]	• no species-specific survey guideline[3] • general snake survey includes[3]: - funnel traps - spotlight search - tracks • nocturnal vehicle transects[5] • pitfall and funnel trapping[5]	• 60 hours spotlighting • 120 funnel trap nights • 168 hours active search • opportunistic driving survey	Yes[2, 4, 5]	Yes[3]

Target Species	Prescribed survey guidelines		Actual Survey Effort	Guidelines Met/Sufficient Effort	
	Cth	Qld		Cth	Qld
common death adder *Acanthophis antarcticus*	N/A	• no species-specific survey guideline[3] • general snake survey includes[3]: - funnel traps - spotlight search - tracks (prints in sand or mud) • nocturnal vehicle transects (approx. 500 km *or* all suitable roads surveyed multiple times)[6] • pitfall and funnel trapping[6]	• 60 hours spotlighting • 120 funnel trap nights • opportunistic driving survey	N/A	Yes [3,6]
squatter pigeon *Geophaps scripta scripta*	• no quantitative survey effort in survey areas greater than 50 ha[1] • driving surveys in suitable habitat conducted between May to October (optimal grass foraging period)[2] • waterbody surveys over two consecutive days[2]	• no species-specific survey guideline[3] • generic diurnal bird survey effort includes 6 x 5-10 min visual/auditory walking survey within a 100 x 100 m site	• 168 hours active search throughout study area • 66 hours of bird survey • waterbody survey (at dams) • opportunistic driving survey	Yes[2]	Yes[3]

Target Species	Prescribed survey guidelines		Actual Survey Effort	Guidelines Met/Sufficient Effort	
	Cth	Qld		Cth	Qld
Australian painted snipe *Rostratula australis*	• targeted stationary observations (10 hours/ 5 days) [1] • area searches or transects through suitable wetlands[1] • brief spotlight shortly after dusk[1]	• no species-specific survey guideline[3] • generic waterbird survey effort includes area search (on foot or scanning using binoculars)[3]	• 168 hours active search • survey of wetlands and ephemeral drainage lines • 66 hours of bird surveys • 60 hours of spotlighting • stationary survey at wetlands • 23 camera trap nights positioned along drainage lines and gilgai (while not yet a standard survey method, DPM Envirosciences (2018b) captured *R. australis* on a camera trap at Olive Downs)	Yes	Yes[3]
short-beaked echidna (*Tachyglossus aculeatus)*	N/A	No prescribed survey effort	• 168 hours of active search • 60 hours nocturnal spotlighting	N/A	N/A

[1] Survey Guidelines for Australia's threatened birds (DEWHA 2010)
[2] SPRAT database
[3] Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al. 2018)
[4] Survey guidelines for Australia's threatened reptiles (SEWPaC 2011b)
[5] Draft Referral guidelines for the nationally listed Brigalow Belt reptiles (SEWPaC 2011c)
[6] Rowland, J. & Ferguson, D. (2012)

5 Field Survey Results

5.1 Flora survey results

The field survey identified 173 flora species within the study area, comprising 140 native and 33 introduced species. A detailed list of species recorded is provided in Appendix C.

5.1.1 Diversity

Native vegetation within the study area has been predominantly cleared (historical) for agricultural development and to accommodate ancillary infrastructure associated with the ongoing operation of the CVM Project. As such, most of the vegetation communities within the study area comprise regrowth and non-remnant vegetation.

Non-remnant vegetation communities within the study area (approximately 664 ha) consist of improved/disturbed grasslands dominated by non-native grasses and scattered regrowth brigalow (*Acacia harpophylla)* shrublands. These non-remnant areas have been subject to historical clearing (e.g. blade ploughing), pasture improvement and weed encroachment. The ground cover layer within the non-remnant vegetation communities varied in species composition but is dominated by pasture grass species including buffel grass (*Cenchrus ciliaris**)[3], Indian bluegrass (*Bothriochloa pertusa**), red Natal grass (*Melinis repens**) and Guinea grass (*Megathyrsus maximus**).

Regrowth brigalow shrubland (<4 m in height and 10-20% cover) was observed throughout undulating clay plains across the study area. Other shrub species associated with brigalow include whitewood (*Atalaya hemiglauca)*, ebony (*Lysiphyllum carronii)* and lime bush (*Citrus glauca)*. These regrowth brigalow shrubland areas are likely to have previously contained RE 11.4.9.

Some areas within the study area contain scattered mature trees; however, these communities are not characteristic of a particular RE or exhibit suitable cover and structure consistent with remnant or HVR vegetation.

All vegetation communities show varying levels of degradation associated with CVM existing disturbance and historical land uses, namely: clearing and encroachment by non-native species.

Non-native species recorded throughout the study area include harrisia cactus *(Harrisia martini**), buffel grass *(Cenchrus ciliaris**), parthenium *(Parthenium hysterophorus**) and Indian bluegrass (*Bothriochloa pertusa**).

5.1.2 Threatened Ecological Communities

Field assessments identified no TECs occurring within the study area. While REs potentially containing the Brigalow (*Acacia harpophylla* dominant and co-dominant) TEC were identified (i.e. REs 11.3.1, 11.4.8 and 11.4.9), these REs failed to meet the condition thresholds for the TEC due to the cover of exotic perennial species (≥50%), particularly buffel grass (*Cenchrus ciliaris**), Indian bluegrass (*Bothriochloa pertusa**) and parthenium (*Parthenium hysterophorus**).

[3] flora and fauna which are introduced/non-native (a.k.a. pest) has been demarcated by '*'

Similarly, while areas containing RE 11.8.11 can potentially contain the Natural Grassland of the Queensland Central Highlands and northern Fitzroy Basin TEC (Natural Grassland TEC), these areas did not meet the condition criteria identified within the Listing Advice due to:

- greater than 30% cover of non-native species, including *C. ciliaris**, *B. pertusa**, *P. hysterophorus** and *Melinis repens**; and / or
- projective tree canopy cover exceeding 10%.

No other REs potentially containing a TEC were recorded within the study area.

5.1.3 Broad Vegetation Groups

A total of six BVGs were observed across the study area (Figure 3).

5.1.3.1 BVG 11: Dry eucalypt open forests to woodlands mainly on basalt areas

BVG 11 is located within the north-western extent of the study area in association with a small basalt outcrop (Photo 2). This community is present over approximately 3.72 ha of the study area and is associated with regrowth vegetation containing RE 11.8.5.

The community is characterised by a tree canopy (~15 m in height and 11-15% cover) dominated by *Corymbia dallachiana*, and *Eucalyptus orgadophila* with associated Sally's wattle (*Acacia salicina)*, and yellowwood (*Terminalia oblongata)*. A sparse shrub layer containing juvenile canopy species as well as dysentery bush (*Grewia latifolius),* ebony *(Lyssiphyllum carronii),* dead finish *(Archidendropsis basaltica)* and currant bush (*Carissa ovata)* was also observed. The ground layer is dominated by exotic grasses, including buffel grass* (*Cenchrus ciliaris**) and red Natal grass* (*Melinis repens**), with associated native forbs and grasses including feathertop wiregrass (*Aristida latifolia),* black speargrass *(Heteropogon contortus), Melhania oblongifolia, Cucumis melo* and bladder ketmia *(Hibiscus verdcourtii)*.

This community is subject to historical clearing, pasture improvement (*C. ciliaris** and *Bothriochloa pertusa**) and weed encroachment (*Parthenium hysterophorus**).

Photo 2. BVG 11

5.1.3.2 BVG 16: Eucalypt dominated open forest and woodlands on drainage lines and alluvial plains

BVG 16 is located along Horse Creek within the north-eastern extent of the study area (Photo 3). This community is present over approximately 3.6 ha within the study area and associated with HVR (3.07 ha) and regrowth (0.54 ha) containing RE 11.3.25.

The community is characterised by a tree canopy (~14 m in height and 10-15% cover) dominated by river red gum (*Eucalyptus camaldulensis)*. Other associated species in the tree layer includ Sally's wattle (*Acacia salicina)*, Queensland ebony (*Lysiphyllum hookeri)*, yellowwood (*Terminalia oblongata)* and weeping melaleuca (*Melaleuca fluviatalis)*. A sparse shrub layer containing juvenile canopy species as well as dysentery bush (*Grewia latifolius)* and Leichhardt bush (*Cassia brewsteri)* was also observed. The ground layer is typically dominated by exotic grasses, such as Guinea grass (*Megathyrsus maximus**), buffel grass (*Cenchrus ciliaris**) and red Natal grass (*Melinis repens**), with associated species including *Bothriochloa bladhii*, *Aristida ramosa* and *Parthenium hysterophorus**.

This community is subject to historical clearing, pasture improvement (*C. ciliaris** and *Bothriochloa pertusa**) and weed encroachment (*Parthenium hysterophorus** and *Stylosanthes scabra**).

Photo 3. BVG 16

5.1.3.3 BVG 17: *Eucalyptus populnea* dominated woodlands to open woodlands on sandplains or depositional plains

BVG 17 was observed in association with undulating rises within the northern extent of the Horse Pit study area on sandy plains (Photo 4). This community is present over 34 ha and associated with remnant, HVR and regrowth vegetation containing RE 11.5.3.

The vegetation community contained a tree canopy (11-20 m in height and 10-20% cover) dominated by poplar box (*E. populnea)* with occasional Dallachy's gum (*Corymbia dallachiana)*, Sally's wattle *(Acacia salicina)* and red ash (A. *excelsa)*. A sparse shrub layer containing ironwood (*Acacia excelsa)*, scrub bonaree (*Alectryon diversifolia)*, yellowwood (*Terminalia oblongifolia)*, currant bush (*Carissa ovata)* and dead finish (*Archidendropsis basaltica)* was also observed. The ground layer comprises a combination of native and exotic pasture grasses, including buffel grass (*Cenchrus ciliaris**), golden crown-beard grass (*Chrysopogon fallax)*, purple wire-grass (*Aristida ramosa)*, *A. calycina* and associated forbs such as *Melhania oblongifolia*, *Sida* spp. and *Rostellaria adscendens*.

This community is also subject to historical clearing, pasture improvement and is subject to ongoing weed encroachment.

Photo 4. BVG 17

5.1.3.4 BVG 18: Dry eucalypt woodlands on sandplains or depositional plains

BVG 18 is located within a 10.7 ha area in the western extent of the study area (Photo 5). This community consists of one vegetation community, RE 11.5.9b, and characterised by a poplar box (*E. populnea*) woodland with Moreton Bay ash (*C. tessellaris*), *Acacia salicina* and *Grevillea striata*. The tree canopy is approximately 16 m in height with a cover of 17%. The subcanopy contains dominant tree species recruits, largely *Acacia salicina* and Moreton Bay ash and the shrub layer is largely absent. The ground layer is predominately native grass species (*Chrysopogon fallax*, *Eriochloa pseudoacrotricha* and *Digitaria sp.*). Exotic grasses present include buffel grass* and *Stylosanthes scabra**.

Photo 5. BVG 18

5.1.3.5 BVG 25: *Acacia harpophylla* (brigalow) open forests to woodlands on clays

This BVG was recorded in association with alluvial and undulating clay plains as well as slopes on Cainozoic lateritic duricrust throughout the study area (Photo 6). A total of 1,013.49 ha of this community was verified within the study area and is associated with remnant, regrowth and HVR vegetation containing REs 11.3.1, 11.4.8, 11.4.9 and 11.7.1.

The community is typically dominated by brigalow (*Acacia harpophylla)* and occasionally co-dominant with Dawson's gum (*Eucalyptus cambageana),* ranging from 8-15 m and 11-20% cover. Other associated canopy species include *E. thozetiana*, poplar box (*E. populnea)* and narrow-leaved ironbark (*E. crebra)*. A subcanopy of younger brigalow (*A. harpophylla)* and associated ebony (*Lysiphyllum carronii)*, whitewood (*Atalaya hemiglauca)* and yellowwood (*Terminalia oblongata)* is typically present. A sparse to moderate shrub layer containing currant bush (*Carissa ovata)*, wilga (*Geijera parviflora),* scrub bonaree *(Alectryon diversifolia),* lime bush *(Citrus glauca)* and juvenile canopy species is also present. The ground layer is dominated by buffel grass (*Cenchrus ciliaris**) with Indian bluegrass (*Bothriochloa pertusa**), windmill grass (*Chloris divaricate)*, pigweed (*Portulaca oleracea**), blue trumpet (*Brunoniella australis)* and ruby saltbush (*Enchylaena tomentosa)*. Infestations of parthenium (*Parthenium hysterophorus**), harissia cactus (*Harrisia martinii**) and *Opuntia* spp. were also observed within these communities throughout the study area.

Areas containing RE 11.7.1 are dominated by *Eucalyptus thozetiana*, with limited brigalow (*A. harpophylla)* present. This community is recorded on hillocks and slopes and has a subcanopy of bendee (*Acacia catenulata)*. The sparse shrub layer contains brush hovea (*Hovea longipes)*, myrtle tree (*Psydrax oleifolia)*, *Waltheria indica* and *Carissa ovata*. The sparse ground layer is comprised of *Enchylaena tomentosa*, *Cenchrus ciliaris**, *Portulaca oleraceae** and shotgrass (*Paspalidium distans)*.

This community is subject to historical clearing (blade ploughing and selective thinning), pasture improvement and weed encroachment.

Photo 6. BVG 25

5.1.3.6 BVG 30: Native tussock grasslands

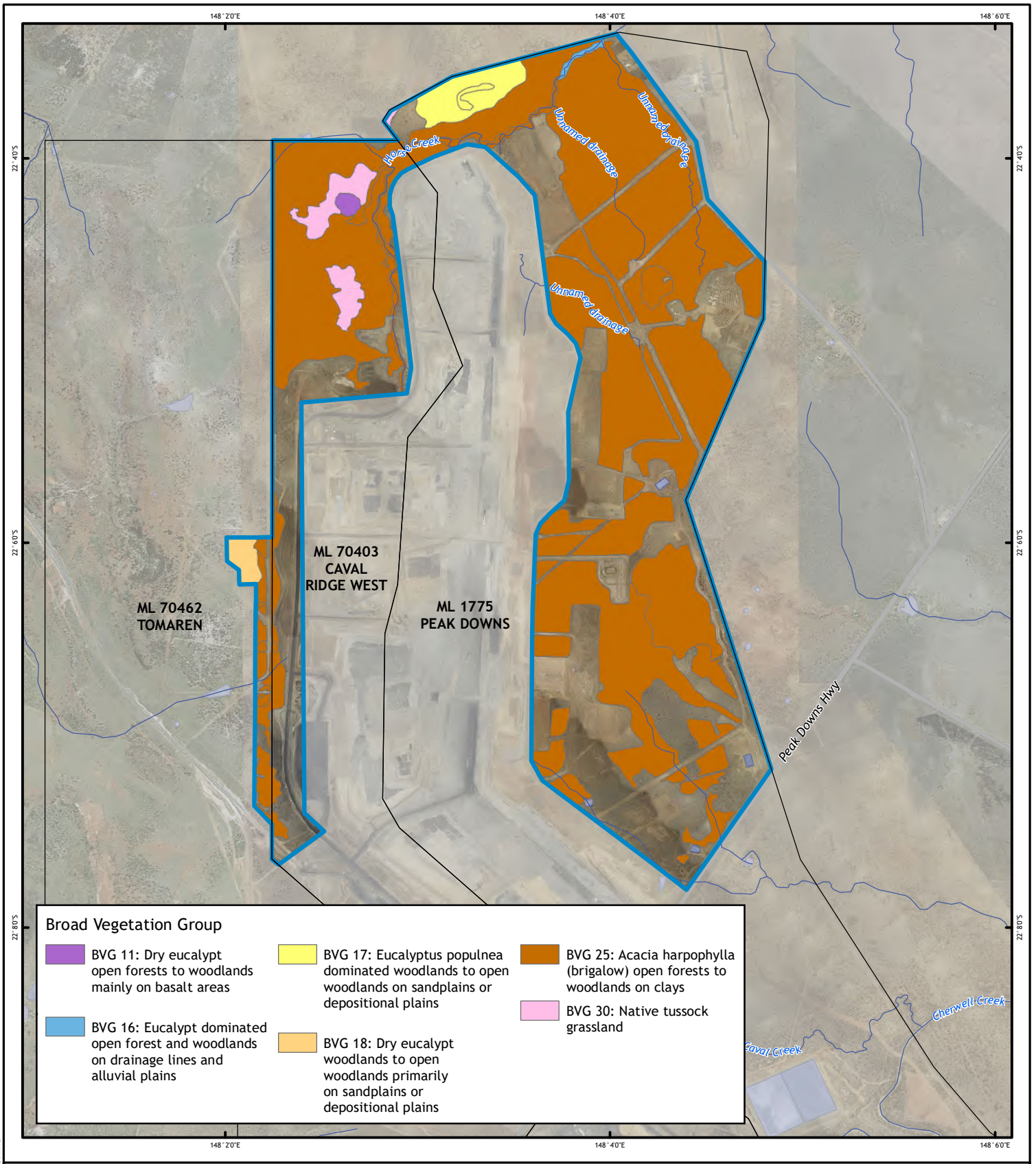
Native tussock grassland communities are located on gently undulating loamy-clay plains over underlying basalt rock (Photo 7). This community was recorded within the north-western extent of the study area, totalling approximately 31 ha and associated with remnant RE 11.8.11.

The community is dominated by native grasses (50-60%) including red Flinders grass (*Iseilema vaginiflorum)*, native millet (*Panicum decompositum)*, Queensland bluegrass (*Dichanthium sericeum)*, feathertop wiregrass (*Aristida latifolia)*, white speargrass *(A. leptopoda)* and early spring grass (*Eriochloa pseudoacrotricha)*. Occurrences of exotic pasture grasses were common throughout these areas (sometimes dominant) and include buffel grass (*Cenchrus ciliaris**), red Natal grass (*Melinis repens**) and

Indian bluegrass (*Bothriochloa pertusa**). Native forb species frequently recorded include native rosella (*Abelmoschus ficulneus), Phyllanthus spp.*, bladder ketmia (*Hibiscus verdcourtii)*, and *Ipomoea* spp. Scattered emergent shrubs (0-5% cover) are at times present comprising white wood (*Atalaya hemiglauca)*, mimosa bush (*Vachellia farnesiana**) and ebony (*Lyssiphyllum caronii)*.

These communities exhibited varying levels of intrusion by exotic pastures species from adjacent disturbed areas as well as environmental weeds (i.e. *Parthenium hysterophorus**).

Photo 7. BVG 30



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area

N

Scale 1:50,000 (A4)

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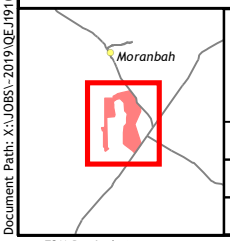
Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	25/02/2021

FIGURE 3: BROAD VEGETATION GROUP

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_3_Flora_BVG.mxd

5.1.4 Regional Ecosystems

A total of approximately 1,110 ha of REs, comprising remnant, HVR and regrowth vegetation, were ground-truthed within the study area. A summary of REs, associated vegetation condition class and area is provided in Table 8 and depicted in Figure 4. REs recorded within the study area comprised:

- 112.40 ha of remnant vegetation;
- 27.16 ha of HVR vegetation;
- 971.25 ha of regrowth vegetation; and
- 688.84 ha of non-remnant areas.

Table 8. Summary of ground-truthed regional ecosystems within the study area

RE	VM Act Status[1]	Biodiversity Status[2]	RE Description	Vegetation class	Ground-truthed area (ha)
11.3.1	E	E	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	HVR	21.54
11.3.25	LC	OC	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	HVR	3.07
				Regrowth	0.54
11.4.8	E	E	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains	Regrowth	43.57
11.4.9	E	E	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	Regrowth	871.34
11.5.3	LC	NC	*Eucalyptus populnea* +/- *E. melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	HVR	2.55
				Regrowth	41.37
				Remnant	3.93
11.5.9b	LC	NC	*Eucalyptus crebra, E. tenuipes, Lysicarpus angustifolius* +/- *Corymbia* spp. woodland on Cainozoic sandplains	Regrowth	10.71
11.7.1	LC	OC	*Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus thozetiana* or *E. microcarpa* woodland on lower scarp slopes on Cainozoic lateritic duricrust	Remnant	77.03
11.8.5	LC	NC	*Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks	Regrowth	3.72
11.8.11	OC	OC	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	Remnant	31.44

[1]E (endangered), OC (Of Concern), LC (Least Concern) under the QLD *Vegetation Management Regulation 2012*

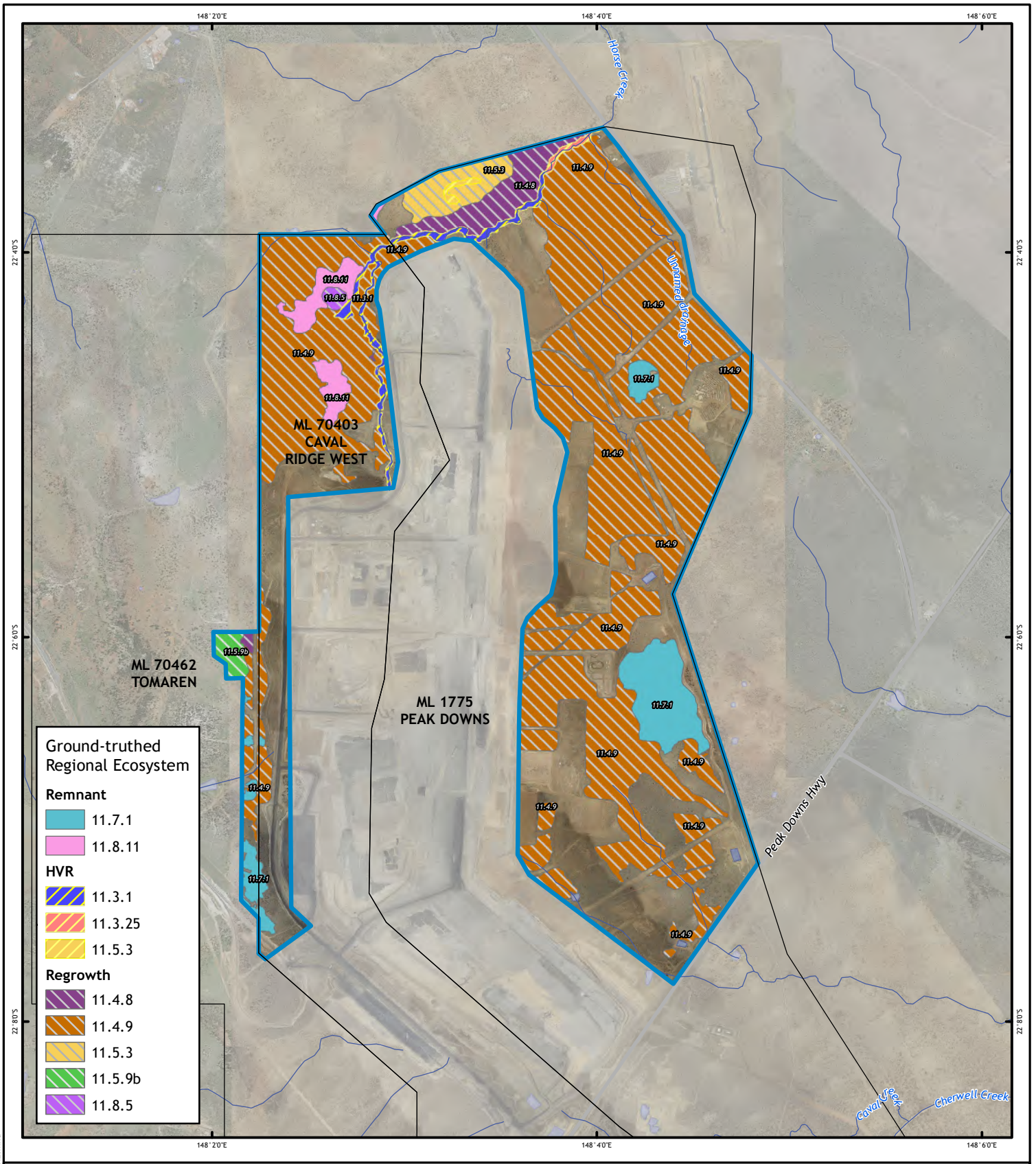
[2]E (endangered), OC (Of Concern), NC (No Concern at Present) under the REDD

5.1.4.1 Regulated vegetation

A total of 112.40 ha of remnant vegetation comprising three REs was recorded within the study area (refer to Table 8). The extent of remnant vegetation throughout the study area was largely consistent with DNRME Vegetation Management mapping. Inconsistencies between the DNRME mapped and ground-truthed extents within the study area included:

- areas of DNRME mapped regrowth (Category C) vegetation within the eastern extent of the study area was found to have structure and cover consistent with remnant vegetation; and
- areas of DNRME mapped remnant RE 11.8.5 and a small heterogenous polygon of RE 11.4.9/11.4.8 was not found to be consistent with remnant vegetation (lacked sufficient canopy height and cover). These areas were mapped as containing regrowth vegetation.

The extent of remnant RE communities recorded within the study area differed slightly from those reported during assessments undertaken as part of the EIS (BMA 2009). Differences in extents are likely attributed to works undertaken in association with the mine as well as changes to the mapping of Regulated Vegetation under the VM Act (i.e. regulated regrowth vegetation not previously mapped during 2009 assessments).



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area

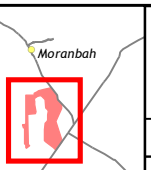
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 4: GROUND-TRUTHED REGIONAL ECOSYSTEM

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_4_Flora_GTRE.mxd

5.1.5 Threatened flora

No threatened flora species were recorded within the study area. The likelihood of the six target flora species occurring within the study area are discussed below.

5.1.5.1 King bluegrass (*Dichanthium queenslandicum*)

King bluegrass (*Dichanthium queenslandicum*) is a perennial grass species endemic to central and southern Queensland. The species is listed as Endangered under the EPBC Act as its geographic distribution is restricted and considered precarious for the survival of the species (Threatened Species Scientific Committee 2013). King bluegrass is also listed as Vulnerable under the NC Act.

Habitat consists of native grasslands and open woodlands characterised by a grassy understorey and a canopy composed of mountain coolibah (*E. orgadophila*), *Corymbia erythrophloia* and coolibah (*E. coolabah)* (DAWE 2020). King bluegrass co-occurs with other bluegrass species (*Dichanthium* spp. and *Bothriochloa* spp.) as well as other native grasses associated with heavy, black soil types (Simon, 1982). The distribution of the species also overlaps with the Brigalow TEC and the Natural Grasslands TEC (discussed in Section 5.1.2).

King bluegrass was previously recorded within the CVM ML during baseline ecological surveys in an area of grassland that is now occupied by the northern extent of the active Horse Pit (Figure 5). DNRME (2020) have mapped approximately 22 ha of Essential Habitat within the study area (Figure 5). Suitable habitat was identified during the wet season survey (March 2020) within the study area, but the species was not detected.

Due to the previous species records and the presence of suitable habitat within the study area, king bluegrass has been assessed as 'known to occur' (Appendix B). Approximately 31.44 ha of suitable king bluegrass habitat within the study area was recorded in association with remnant vegetation containing RE 11.8.11 (grasslands) (Figure 5).

5.1.5.2 *Dichanthium setosum*

Dichanthium setosum (bluegrass) is a perennial grass listed as Vulnerable under the EPBC Act. The species inhabits heavy, basalt-derived, black soils and red-brown, hard-setting, loam with clay subsoils. The species has been recorded in natural grasslands and eucalypt woodlands as well as disturbed areas such as cleared woodlands, grassy roadside remnants, grazed land and pastures (DAWE 2020; Atlas of Living Australia 2020). The distribution of the species overlaps with the Natural Grasslands and Brigalow (*Acacia harpophylla* dominant and co-dominant) TECs (as discussed in Section 5.1.2).

The species has not previously been recorded within the study area or the local area (50 km) based on the available desktop search databases (e.g. Wildlife Online; HERBRECS). Previous ecological studies however have recorded bluegrass within the Saraji East Coal Mine Project area, approximately 48 km south-east of the study area in association with RE 11.4.4 (Ecological Survey & Management 2013; SKM 2011).

E2M comprehensively surveyed the suitable *Dichanthium setosum* habitat within the study area (i.e. RE 11.8.11) during both the dry (not considered optimal conditions for identification) and wet season surveys (optimal conditions) and did not detect the species. In consideration of the comprehensive survey effort across a manageable search area of potential habitat (~31 ha), the conspicuous nature of the plant (grows up to 1 m in height) and the lack of local records, *D. setosum* is considered 'unlikely to occur' within the study area and not assessed further (Appendix B.).

5.1.5.3 Solanum adenophorum

Solanum adenophorum is a prostrate (i.e. grows flat across the ground), perennial herb listed as Endangered under the Queensland NC Act 1992. Habitat includes remnant and regrowth brigalow and *Acacia cambagei* (gidgee) woodlands on deep cracking clays (Bean 2004). The species is tolerant of disturbance and can inhabit roadsides and grazing paddocks if the soil type is favourable.

Adult leaves are dark green in colour, ovate and deeply lobed (3-4 on each side), growing to 3.5 to 5.5 cm in length and 2 to 4 cm wide (Bean 2004). Prickles are present along stems and on both leaf surfaces, along the midvein and lateral veins, ranging from 3 to 13 mm in length (Bean 2004). The species has been recorded flowering in October and fruiting in May, September and October. Approximately 4 to 8, star-shaped, white flowers (8 to 10 mm long) are produced on a stalk (Bean 2004; DES 2019b). Mature fruit are produced on a long pedicel (9 to 18 mm long) approximately 15 mm in size, round and yellowish green to green in colour (Bean 2004). The seeds of the species are dispersed by birds and mammals that feed on the fruit (Symon 1979).

Approximately 915 ha of suitable *S. adenophorum* habitat within brigalow regrowth (RE 11.4.8 and RE 11.4.9) occurs within the study area. Field surveys did not detect the species however, its small size can make detection difficult within dense grass and shrubs. *S. adenophorum* has been previously recorded within the desktop search extent (i.e. 50 km) (HERBRECS; Wildlife Online; Atlas of Living Australia 2020). In consideration of the proximity of previous species records, the presence of suitable habitat, the species tolerance of disturbance and its cryptic nature, *S. adenophorum* is considered as having the potential to occur within the study area.

S. adenophorum does not constitute a MSES as it does not meet the definition for protected wildlife habitat under the Environmental Offsets Regulation 2014.

5.1.5.4 Solanum elachophyllum

Solanum elachophyllum is a sprawling to erect, perennial shrub, listed as Endangered under the NC Act (Bean, 2004). The species is endemic to central Queensland and has been recorded from Middlemount to Theodore. Habitat is characterised by remnant, HVR and regrowth brigalow and eucalypt communities on clay plains (Bean 2004; George 1982).

Leaves are elliptical, measuring 1.2-3.4 cm long and 0.6-1.5 cm wide and discolourous with a grey-green upper and greenish-white lower surface (Bean 2004). Scattered prickles, 7-10 mm long, are commonly present along branchlets, stems and the upper surface of the midvein on leaves (Bean 2004). The species has been recorded flowering in February, March, July and September, with fruiting bodies observe in March, May and July (Bean 2004). Flowers are arranged on single peduncle, 7-10 mm long and mauve/purple in colour (Bean 2004). Mature fruit are approximately 12-14 mm in size, pale green with dark green stripes (Bean 2004). The seeds of the species are dispersed by birds and mammals that feed on the fruit (Symon 1979).

Solanum elachophyllum has previously been recorded in the desktop search extent (HERBRECS; Wildlife Online) as well as during previous surveys associated with the Olive Downs Coking Coal Project, located east of the study area (DPM Enviros ciences 2018a). Suitable habitat comprising HVR and regrowth REs 11.4.8 and 11.4.9 is present within the study area, however comprehensive field surveys did not detect the species. *Solanum elachophyllum* is more conspicuous (i.e. detectable) in its size and growth pattern as it grows vertically rather than along the ground such as *Solanum adenophorum* (discussed in Section 5.1.5.3). *Solanum elachophyllum* is also less tolerant to disturbance than *Solanum adenophorum* and is less likely to persist within the brigalow regrowth communities in the study area as a result of the CVM existing disturbance. In consideration of the species relatively conspicuous (i.e. detectable) nature, its

sensitivity to disturbance and the diminished quality of habitat recorded during the field assessment, *S. elachophyllum* is considered 'unlikely to occur' within the study area.

5.1.5.5 Bertya pedicellata

Bertya pedicellata is a shrub/small tree up to 6 m and is listed as Near Threatened under the NC Act. The species occurs on rocky hillsides in eucalypt forest and woodlands, acacia woodlands, open heathland and vine thicket communities (DES, 2019). Associated soils include skeletal to shallow sandy, sandy clay or clay loams overlaying rhyolite, trachyte or sandstone substrates (DES 2019).

Leaves have a green upper surface and white underside, are 40 to 92 mm long and 1.6 to 10 mm wide (Halford and Henderson, 2002). Leaf margins are recurved and have an acute or obtuse tip. Branchlets, petioles and leaves are covered in stellate hairs (Halford & Henderson 2002). The species has been recorded flowering from March to November, producing both male and female flowers. Male flowers (4.5 to 5.5 mm long and 3 to 4.2 mm wide) are sessile and contain five, elliptic to ovate sepals, yellow-green in colour (Halford and Henderson, 2002). Female flowers are located on pedicels 1.5 to 3 mm long with five light-green sepals (Halford and Henderson, 2002). The fruit is elliptic to narrowly ovoid in shape, 8.5 to 11.3 mm long and 4.7 to 5.2 mm wide (Halford & Henderson 2002).

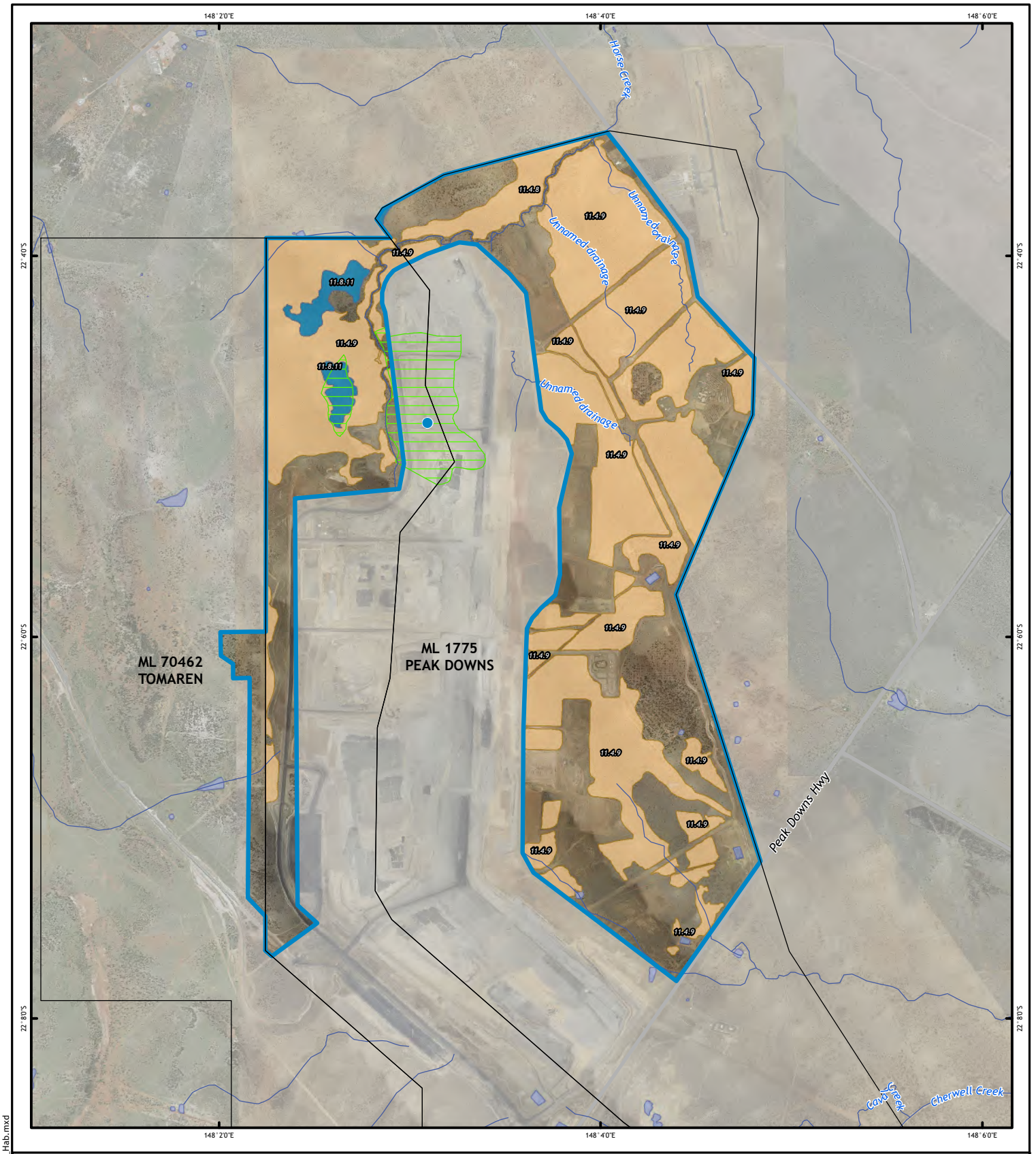
Although the species was not recorded during the field surveys, it has been previously recorded in the desktop search extent (i.e. 50 km) (HERBRECS; Wildlife Online). The species has been recorded at a number of locations surrounding the study area (11 to 25 km away) in association with acacia dominated woodlands (Atlas of Living Australia 2020). Two populations have also been previously recorded near Millennium Mine, approximately 23 km north-east of the study area in association with RE 11.7.2 (acacia spp. woodland on duricrust) (DPM Enviroscienses 2018a). Suitable habitat comprising remnant RE 11.7.1 was observed within the study area. E2M surveyed suitable habitat within RE 11.7.1 in the study area during both the dry and wet season surveys and did not detect the species. These areas were found to be of reduced habitat quality due to evidence of past disturbance (i.e. selective clearing and weed encroachment), further reducing the species likelihood of occurrence. As such the species is considered 'unlikely to occur' within the study area.

5.1.5.6 Cerbera dumicola

Cerbera dumicola is a small tree or shrub growing up to 4 m high with light grey bark, white flowers (seasonal) and glabrous, discolourous leaves approximately 5 cm to 17 cm long (Forster 1992). The species is listed as Near Threatened under the NC Act as a result of land clearing and habitat fragmentation. Habitat includes sandstone hills, plateaus and jump-ups (characteristic of Land Zone 7) comprised of mixed acacia and eucalypt woodlands (DES 2019a).

The species has been previously recorded within the desktop search databases (50 km) (Wildlife Online; HERBRECS) including a number of locations north of the study area near the Burton Coal Mine (45 to 50 km away) as well as approximately 30 km south-east of the study area, west of Saraji Mine (Atlas of Living Australia 2020). Within the study area, suitable habitat was identified within three isolated patches of remnant RE 11.7.1. Following a dry and wet season survey however, *Cerbera dumicola* was not detected.

In consideration of the species relatively conspicuous (i.e. detectable) nature, the comprehensive nature of the wet and dry field surveys and quality of habitat available, the species is considered 'unlikely to occur' within the study area.



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area
- *Dichanthium queenslandicum* Essential Habitat v9.02 (DNRME 2020)
- *Dichanthium queenslandicum* (King Bluegrass) record
- *Dichanthium queenslandicum* (King Bluegrass) habitat
- *Solanum adenophorum* habitat

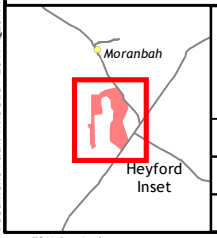
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Species record: © Wildnet 2020

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 5: THREATENED FLORA HABITAT

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_5_Flora_TF_Hab.mxd

5.1.6 Pest flora

Four weed species listed as Weeds of National Environmental Significance (WoNS) or restricted matter under the Queensland *Biosecurity Act 2014* were recorded within the study area (Table 9). The 'general biosecurity obligation' under Part 1 of the Biosecurity Act states all individuals and organisations are responsible for biosecurity risks and threats under their control.

Parthenium (*Parthenium hysterophorus*) was recorded in moderate to high densities (3-4 to >5 individuals per 10 m^2) within undulating, clay plains and alluvial areas throughout the study area. Scattered individuals (1-2 individuals per 10 m^2) of *Harrisia martinii* and *Opuntia* spp. were observed throughout the study area, particularly within vegetation on clay plains.

Table 9. Weed species recorded within the study area

Scientific name	Common name	WONS[1]	Biosecurity Act status	Location and relative abundance
Harrisia martinii	Harrisia cactus	-	Category 3	Scattered individuals on clay plains and waterways
Opuntia stricta	common prickly pear	WoNS	Category 3	Scattered individuals on clay and sand plains
Opuntia tomentosa	velvet tree pear	WoNS	Category 3	Scattered individuals on clay and sand plains
Parthenium hysterophorus	parthenium	WoNS	Category 3	Moderate to high clusters on clay plains and waterways

[1] Weeds of National Environmental Significance

5.1.7 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are recognised under the Queensland *Environmental Protection Regulation 2008* and represent locations with environmental values that contribute to maintaining biological diversity and integrity or are important in providing amenity, harmony or sense of community.

DES has mapped a Category B area within the Horse Pit study area (Appendix A). The Category B area is labelled as an "Endangered Regional Ecosystems". The mapped Category B Area was ground-truthed during the field surveys and 10.32 ha of HVR endangered RE 11.3.1 was confirmed within the Horse Pit study area. RE 11.3.1 is a brigalow dominant open forest on alluvial plains.

In accordance with the *Environmental Protection Regulation 2008*, Category B Endangered (Biodiversity status) REs include 'regrowth' and 'remnant' vegetation consistent with the descriptions identified under the Queensland Herbarium Regional Ecosystem Description Database (REDD). Although other endangered REs were observed within the study area in association with regrowth vegetation (i.e. REs 11.4.8 and 11.4.9), the maturity of vegetation observed was not considered consistent with the description provided by the REDD.

The ESAs ground-truthed in the study area comprise Endangered and Of Concern REs (as per their Biodiversity status). These ESAs however, are not listed as MSES due to the way in which REs are defined

and the methodologies used to describe and classify them differ between the Environmental Protection Act 1994 (which governs ESAs) and the Environmental Offset Regulation (which governs MSES).

5.2 Fauna survey results

5.2.1 Diversity

Nearly 400 fauna species have been recorded within 50 km of the study area (Wildlife Online; ALA database). Most of these species are commonly occurring or abundant and listed as Least Concern under the NC Act. During the two field assessments, E2M recorded 66 fauna species within the study area, including 60 native species and six pests. Birds accounted for over half (56%) of the fauna species recorded. Many bird species, such as brolga (*Grus rubicunda*), were utilising the inundated wetlands, gilgai and farm dams for foraging opportunities during the wet season survey, while other species, namely the Australian bustard (*Ardeotis australis*); Australasian grebe (*Tachybaptus novaehollandiae*); and Australian wood duck (*Chenonetta jubata*), were observed incubating nests or with young.

Many fauna species detected were conspicuous in nature (i.e. readily visible), highly mobile and able to occupy a variety of habitats (e.g. eastern grey kangaroo (*Macropus giganteus*)). Cryptic species or habitat specialists required a more concentrated survey effort. Spotlighting and funnel trapping were both successful at detecting small, cryptic species such as the spiny knob-tailed gecko (*Nephrurus asper*) (Photo 8), eastern mulch slider (*Lerista fragilis*) (Photo 8) and the Vulnerable-listed, ornamental snake (*Denisonia maculata*) (discussed further in Section 5.2.3.1).

Photo 8. Two cryptic fauna species, the spiny knob-tailed gecko (left) and eastern mulch slider (right), detected during nocturnal spotlighting and funnel trapping (respectively) within brigalow regrowth in the Horse Pit study area

Five species of native frog were seen/heard within the inundated wetlands, drainage lines and gilgai in the study area during the wet season survey. Most pools of standing water contained amphibians at various stages of development.

The two deployed Anabats (microbat echolocation recording device), positioned within Horse Creek and at a farm dam, detected numerous 'Least Concern' species of microbat, while the six baited camera traps captured pest species such as feral cats, feral dogs and rabbits (discussed in Section 5.2.5).

5.2.2 Broad habitat types

Fauna habitat within the study area can be delineated into three habitat types based on vegetation community, structure and/or class: brigalow regrowth, eucalypt woodland and riparian areas. Each habitat type is characterised by habitat features that support different fauna assemblages. Figure 6 depicts the broad fauna habitat types within the study area.

5.2.2.1 Brigalow regrowth

Brigalow regrowth habitat within the study area is characterised by shrubby (< 4m tall) brigalow (*Acacia harpophylla*) on undulating clay plains (characteristic of BVG 25 as discussed in Section 5.1.3.5). This habitat type has been historically cleared and improved for livestock grazing; but since the commencement of mining activities at CVM, brigalow vegetation has regenerated yet pasture grass species, such as buffel*, continue to be abundantly present (Photo 9).

Much of the brigalow regrowth within the study area occurs on soils with a heavy clay content causing cracks and local depressions in the soil surface called gilgai. As clay soils have the capacity to retain water, during the wet season, the gilgai become inundated and create breeding and foraging habitat for numerous fauna (e.g. amphibians, reptiles and birds). The ornamental snake is closely associated with brigalow dominant vegetation communities on clay soils.

This habitat type within the study area has been exposed to recent vegetation clearing events resulting in habitat loss, fragmentation and degradation in some areas.

Photo 9. Brigalow regrowth habitat type depicting gilgai overgrown with yellow pea bush *(Sesbania cannabina)* (left); and cracking clay soils (right)

5.2.2.2 Eucalypt woodland

Eucalypt woodland habitat within the study area is dominated by *Eucalyptus* and/or *Corymbia* species ranging between 11-20 m tall and 10-20% canopy cover. This habitat type is characteristic of BVG 11 (dry eucalypt open forest to woodland), BVG 16 (eucalypt dominated open forest and woodland on drainage

lines and alluvial plains) and BVG 17 (poplar box dominated woodlands on sandplains or depositional plains) as discussed in Sections 5.1.3.

Eucalypt woodland within the study area supports habitat for many fauna assemblages including birds, mammals and reptiles. Eucalypt woodlands provide refuge microhabitat attributes such as small tree hollows, decorticating bark, coarse woody debris, leaf litter and arboreal termite mounds. Woodlands also provide a variety of foraging habitat features including flowering eucalypt species for species of glider, possum, microbats, flying foxes and birds. The nocturnal spotlighting surveys within these areas detected sugar glider (*Petaurus breviceps*) and brush-tailed possum (*Trichosurus vulpecula*). No evidence of koala (*Phascoarctos cinereus*) or greater glider (*Petauroides volans)* was detected during the field assessment nor was the habitat considered suitable to support the species due to a lack of essential microhabitat features (e.g. large hollow bearing trees and remnant woodland (greater glider)) and the constraints present within the study area (e.g. fragmentation, ongoing disturbance).

This habitat type is generally situated towards the northern extent of the study area (e.g. north of Horse Creek to the NW corner). Eucalypt woodland also occurs around the former CVM camp and within small pockets along the south east boundary (Figure 6).

5.2.2.3 Riparian areas

Riparian areas include permanent and seasonally inundated (a.k.a. ephemeral) water sources including creek lines with defined bed and banks, drainages, farms dams, dams associated with mining activities and wetlands (Photo 10). Within the study area, riparian areas include: Horse Creek (Stream Order 3) and its three associated drainages (Stream Order 1) as well as several farm and mine dams scattered throughout the study area. At the time of the wet season survey (March 2020), many inundated wetlands had materialised in low-lying areas.

Riparian areas provide vital habitat for many fauna assemblages (e.g. amphibians) and/or species that require water for all or part of their life cycle (e.g. amphibians, water birds). In turn, breeding events can correlate to foraging opportunities for other species, such as reptiles and omnivorous/carnivorous species of bird within riparian areas.

Photo 10. A wetland providing breeding habitat for frogs and water birds (e.g. ducks, grebes) as well as foraging habitat for reptiles and wading birds (e.g. brolga

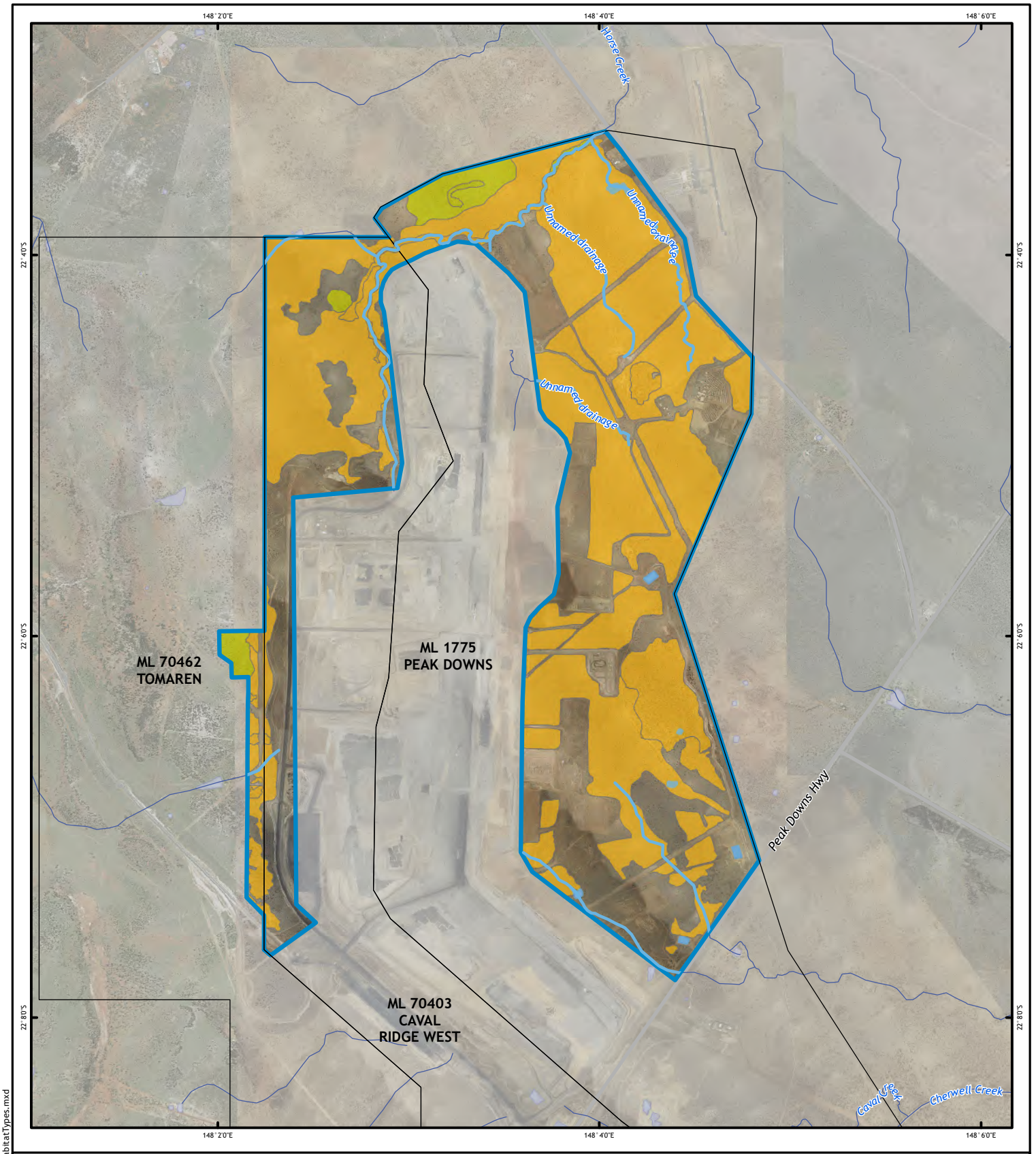
5.2.2.4 Breeding habitat

Animal breeding places were commonly recorded throughout the study area. Active breeding sites include:

- amphibian breeding activity was recorded in almost all sources of water (i.e. gilgai, wetlands, creek lines and dams);
- wetland fringing habitat supported broods of Australasian grebelets and wood ducklings; and
- a bustard nest with eggs was observed within dense buffel grass in the brigalow regrowth habitat type.

Potential breeding sites recorded within the study area included:

- hollow bearing limbs and trees recorded within the eucalypt woodland habitat type. Notably, the red river gums (*E. camaldulensis*) fringing Horse Creek were observed to provide breeding habitat for arboreal mammals (including sugar and squirrel gliders), birds and microchiropteran bats;
- stags;
- hollow logs and coarse woody debris; and
- arboreal termite mounds.



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area

Fauna Habitat Types

- Eucalypt
- Brigalow
- Riparian

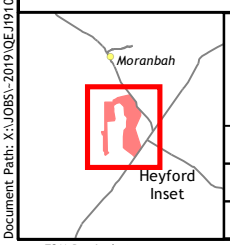
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	25/02/2021

FIGURE 6: FAUNA HABITAT TYPES

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_6_Fauna_HabitatTypes.mxd

5.2.3 Threatened fauna

5.2.3.1 Ornamental snake

Ornamental snake (*Denisonia maculata)* was recorded at two locations within the study area during the wet season survey (March 2020). Prior to these observations, the species had not been recorded within the CVM ML, but had been detected at the neighbouring Peak Downs Mine in 2005 (BMA 2009) as well as numerous localities across the Moranbah area (ALA records).

The species is listed as Vulnerable under both the EPBC Act (Cth) and the NC Act (Qld) due to a decline in population abundance as a likely result of habitat loss, fragmentation and degradation (SPRAT database).

Ornamental snakes are small (500 mm), nocturnal, venomous snakes predominately olive in colour with a black crown and distinctly barred lips (Photo *11*). The species is a habitat specialist closely dependent on gilgai for foraging and refuge habitat (Brigalow Belt Reptiles Workshop 2010). When flooded, gilgai support habitat for prey species such as green tree frogs (*Litoria caerulea)* and greenstripe frogs (*Cyclorana alboguttata)*, both regularly recorded throughout gilgai in the study area during the wet season survey. As the water ebbs and the gilgai dries, deep cracks within the clay soil provide shelter for ornamental snake. Gilgai are associated with brigalow (*Acacia harpophylla*), gidgee (*A. cambagei*), blackwood (*A. argyrodendron*) and/or coolabah (*Eucalyptus coolabah*) dominant vegetation communities (RE 11.4.8 and RE 11.4.9) (SPRAT database) (Photo 12).

Photo 11. One of two ornamental snake observed within the study area

The Survey guidelines for Australia's threatened reptiles (Cth) (SEWPAC 2011b) and the Terrestrial vertebrate fauna survey guidelines for Queensland (Eyre et al. 2018) recommend active searches (diurnal, nocturnal and opportunistic driving surveys) in suitable habitat, without reference to quantitative survey effort. The Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles (Cth) (DSEWPAC 2011c) however, recommend nocturnal spotlighting for a minimum of 1.5 hours per hectare for habitats of average complexity over a minimum of 3 nights. As approximately 325 ha of ornamental snake habitat was ground-truthed within the study area, the application of DSEWPAC's (2011c) metric equates to 487.5 hours of nocturnal spotlighting.

The ornamental snake field survey effort (as detailed in Section 4) did not meet the recommended 487.5 spotlighting hours (the combined wet and dry survey effort totalled 60 hours) but as the species was positively identified within the study area, the survey effort is considered sufficient. As the species is now known to occur within the study area and its habitat has been mapped and ground-truthed, there is negligible benefit in surveying the balance of the hours.

Both ornamental snake records in the study area were located in regrowth brigalow (*Acacia harpophylla*), representative of RE 11.4.9. The microhabitat attributes where the individual snakes were detected are characterised by:

- shallow gilgai with cracking clay soils (cracks depth varied between shallow and deep);
- coarse woody debris and/or ground litter;
- regrowth brigalow (dominant);
- presence of shot rock on soil surface;
- presence of native amphibians; and
- habitat connectivity (both snakes were found in the largest contiguous patch of vegetation).

Ornamental snake habitat within the study area was mapped in accordance with the following habitat definitions[4] (Figure 7):

- preferred habitat
  - gilgai depressions, mounds and wetlands on cracking clays (predominantly land zone 4) where essential microhabitat features are present including an abundance of deep soil cracks and fallen woody debris; and
  - seasonal flooding of habitat areas is a requirement.
- marginal habitat
  - areas currently or previously dominated by brigalow or coolabah communities where gilgai or soil cracks are infrequent or shallow;
  - non-remnant areas where threats are high (weed incursion, livestock soil compaction); and
  - areas where ornamental snake has the potential to occur, especially when water is present and prey abundance (frogs) is high.

DNRME (2020) mapped ornamental snake Essential Habitat (approximately 12 ha) within the study area as two relatively small and fragmented patches (Figure 7). Both patches were ground-truthed during the wet

[4] draft Central Queensland MNES fauna habitat definitions (BHP unpublished document)

season survey and found not to contain the microhabitat attributes necessary to provide suitable ornamental snake habitat.

The study area encompasses approximately 325.69 ha of preferred ornamental snake habitat (Figure 7).

To infer the value of ornamental snake habitat within the study area, DSEWPAC (2011c) states "suitable habitat for any one of the listed Brigalow Belt reptiles is considered important if it is habitat where the species has been identified during a survey". As ornamental snake was positively identified during the survey, the mapped habitat qualifies as 'important'. Furthermore, the Department of Agriculture, Water and the Environment (DAWE) considers an occurrence of 'important habitat' for the ornamental snake a surrogate metric for an 'important population' of the species in the assessment of whether an action is likely to have a significant impact (SPRAT database; SEWPAC 2011c).

Photo 12. Ornamental snake (*Denisonia maculata)* habitat features: gilgai (left) containing cracking clay soils (right).

5.2.3.2 Squatter pigeon

Squatter pigeon (*Geophaps scripta scripta*) was not detected during the field surveys; however, the species is known to occur within the study area as squatter pigeon was previously recorded during 2006 and 2008 terrestrial ecology studies for the CVM EIS (BMA 2009). Additionally, DNRME (2020) has mapped squatter pigeon essential habitat (based on species records) along Horse Creek within the study area (Figure 8).

Squatter pigeon are listed as Vulnerable under the EPBC Act and the NC Act after the population declined throughout most of its range as a result of habitat loss and degradation from introduced pasture grass (e.g. buffel grass* (*Cenchrus ciliaris**)) and predators such as the feral cat (SPRAT database).

The species is found in a broad range of habitats but is nearly always located within 3 km of waterbodies such as rivers, creeks and wetlands (TSSC 2015).

Squatter pigeon breeding habitat in Central Queensland is characterised by remnant or regrowth open forest to woodland dominated by *Eucalyptus*, *Corymbia* or *Acacia* with patchy, relatively sparse ground cover (<33%) on well-draining, sandy or gravelly soils within 1 km of a suitable permanent waterbody as well as any other areas in which the species is observed to be breeding (i.e. active nests are present).

Foraging habitat is defined as remnant or regrowth open forest to woodland dominated by *Eucalyptus*, *Corymbia* or *Acacia* with patchy, relatively sparse ground cover (<33%) on well-draining, sandy or gravelly soils within 3 km of a suitable permanent or seasonal waterbody (as well as any other area of remnant and regrowth vegetation in which the species is observed that is not breeding habitat).

Transitory, or dispersal, habitat includes non-remnant areas, regrowth and remnant woodland or forest areas more than 3km from a permanent or seasonal waterbody that facilitates the movement of the species between patches of foraging or breeding habitat.

Within the study area, squatter pigeon habitat suitability was assessed and mapped to align with the following definitions[5]:

- preferred habitat
  - remnant or regrowth grassy open forest to woodland dominated by Eucalyptus, Corymbia, Callitris or Acacia with patchy, relatively sparse ground cover vegetation (<33%) and sparse shrub layer on well-draining sandy, loamy or gravelly soils within 1km of a suitable permanent waterbody;
  - includes land zones 3, 5, 7, 8, 9 and 10; and
  - excludes areas dominated by introduced pasture grasses (buffel*).
- suitable habitat
  - remnant or regrowth grassy open forest to woodland dominated by Eucalyptus, Corymbia, Callitris or Acacia with patchy, relatively sparse ground cover vegetation (<33%) on well-draining sandy, loamy or gravelly soils between 1 and 3 km of a suitable permanent or season waterbody;
  - non-remnant areas within 100m of preferred habitat; and
  - includes land zones 3, 5, 7, 8, 9 and 10.
- marginal habitat
  - non-remnant areas, regrowth and remnant woodland or forest areas more than 3 km from a permanent or seasonal waterbody that facilitates the movement of the species between patches of preferred or suitable habitat.

Squatter pigeon habitat within the study area includes approximately:

- 74.12 ha preferred habitat; and
- 155.60 ha suitable habitat.

Squatter pigeon habitat is depicted in Figure 8.

5.2.3.3 Australian painted snipe

Australian painted snipe (*Rostratula australis)* was not detected during the field surveys; however, the species was recorded in 2018 within the Olive Downs property (approximately 30 km from CVM) (DPM Enviroscienes 2018b). The species is listed as Endangered under the EPBC Act and Vulnerable under the NC Act and has the potential to occur within the study area.

[5] draft Central Queensland MNES fauna habitat definitions (BHP unpublished document)

The Australian Painted Snipe is a stocky wading bird with a long bill and greyish-brown/white plumage. The species generally inhabits shallow wetlands fringed with emergent vegetation and/or coarse woody debris. Breeding habitat requirements are specific as the species typically nests within a small island within a shallow wetland that comprises exposed mud, dense low cover and potentially nearby dense canopy cover (Rogers et al. 2005).

At the time of survey, nil breeding habitat was observed within the study area and intermittent foraging opportunities were limited to Horse Creek, three drainage lines and a few scattered farm dams within the study area. Many of the dams associated with CVM activities were lined with textile cloth and were not included as foraging habitat.

Within the study area, Australian painted snipe habitat was assessed and mapped to align with the following definitions[6]:

- preferred habitat
  - shallow, permanent or ephemeral, freshwater wetlands with areas of bare, exposed wet mud and a mosaic of ground cover (e.g. tufted grasses, sedges, small woody plants); and
  - influenced by seasonal conditions (expansion of permanent wetlands or creation of ephemeral wetland habitat.
- suitable habitat
  - shallow, permanent or ephemeral freshwater or brackish wetlands and other inundated/waterlogged areas with a variable ground cover (e.g. grasses, shrubs and rushes); and
  - excludes tall, dense reedbeds associated with stabilised water levels as well as cropped wetlands or wetlands of low water quality (e.g. nutrient run-off, agricultural chemicals and turbidity).

In total, there is approximately 6.04 ha of 'suitable' foraging habitat within the study area (Figure 9).

5.2.3.4 Short-beaked echidna

The short-beaked echidna (*Tachyglossus aculeatus)* is listed as Special Least Concern under the NC Act 1992 but is not listed under the EPBC Act 1999 and is therefore assessed as an MSES. The Special Least Concern conservation status is an acknowledgment of the 'special cultural significant of the animal'. The short-beaked echidna is considered a likely occurrence within the study area as the species occurs in a wide variety of habitats, including forest, woodlands, heath and grasslands, and has been previous recorded within the wider locality (ALA records; Wildlife Online). As a habitat generalist, the short-beaked echidna is likely to inhabit remnant and regrowth vegetation communities with the study area. Habitat features that enhance the suitability of an area include:

- ant and/or termite mounds (both were detected throughout the study area);
- burrows, hollow hogs, large coarse woody debris and/or dense shrubs to be used as refuge; and
- absence of threats (vehicle-related mortality, feral dogs and cats).

Short-beaked echidna habitat covers approximately 1,110 ha within the study area (Figure 10).

[6] draft Central Queensland MNES fauna habitat definitions (BHP unpublished document)

5.2.3.5 Dunmall's snake

Dunmall's snake (*Furina dunmalli*) is a small (700 mm) venomous snake, uniform black-brown in colour that inhabits brigalow dominant forests and woodlands (Wilson & Swan 2010). The species is listed as Vulnerable under both the EPBC Act and the NC Act; however, it is rarely encountered, difficult to detect and is possibly naturally uncommon throughout its range (Wilson & Swan 2010; SPRAT database).

The species' ecological requirements are not well known; but suitable habitat includes:

- forests and woodlands on black alluvial cracking clay and clay loam soils dominated by brigalow (SEWPAC 2011c);
- soil cracks in alluvial clay (QLD DERM 2010; Richardson 2006);
- coarse woody debris and leaf litter to serve as refuge habitat (Brigalow Belt Reptiles Workshop 2010; Cogger et al. 1993); and
- prey species such as small skinks and geckos.

There is no survey method or amount of survey effort known to reliably detect the species in the field (SEWPAC 2011b); though, SEWPAC (2011b; 2011c) and Eyre et al. (2018) recommend generic reptile survey techniques as detailed in Section 4.

The Dunmall's snake survey area within the study area was largely collocated with ornamental snake habitat as both species inhabit brigalow vegetation on cracking black clay and clay loam soils (SEWPAC 2011b; SEWPAC 2011c) (i.e. RE 11.4.9 where suitable microhabitat occurs). The field survey effort met the prescribed survey guidelines but failed to detect Dunmall's snake. The absence of detection may reflect the species' inconspicuous and naturally rare nature however, the current habitat within the study area is of reduced quality for the species likely affecting its 'likelihood of occurrence'.

The brigalow vegetation community (i.e. potential habitat) within the study area has been highly fragmented, inundated in areas with introduced buffel grass, contains introduced predators, altered hydrology and subject to vehicle traffic. The species' resilience to disturbance is unknown and the ornamental snake, which shares physiological and ecological requirements, was confirmed to be present within the study area. Unlike the ornamental snake however, the Moranbah area is not known to support a local Dunmall's snake population. There are abundant and current ornamental snake records throughout suitable habitat within the wider locality; whereas the Desktop Assessment yielded few Dunmall's snake records; namely one 1999 observation near Clermont, approximately 90 km SW of CVM. The lack of records in the Moranbah area is informational considering the vast amount of ecological survey work undertaken in association with the development of the mining precinct.

Upon completion of the field surveys, the initial Likelihood of Occurrence Assessment was re-evaluated. Based on the ground-truthed data, Dunmall's snake is considered 'unlikely to occur' within the Horse Pit study area.

5.2.3.6 Common death adder

The common death adder (*Acanthophis antarcticus)* is listed as Vulnerable under the NC Act but is not listed under the EPBC Act 1999, and, as such, the species was assessed as a MSES.

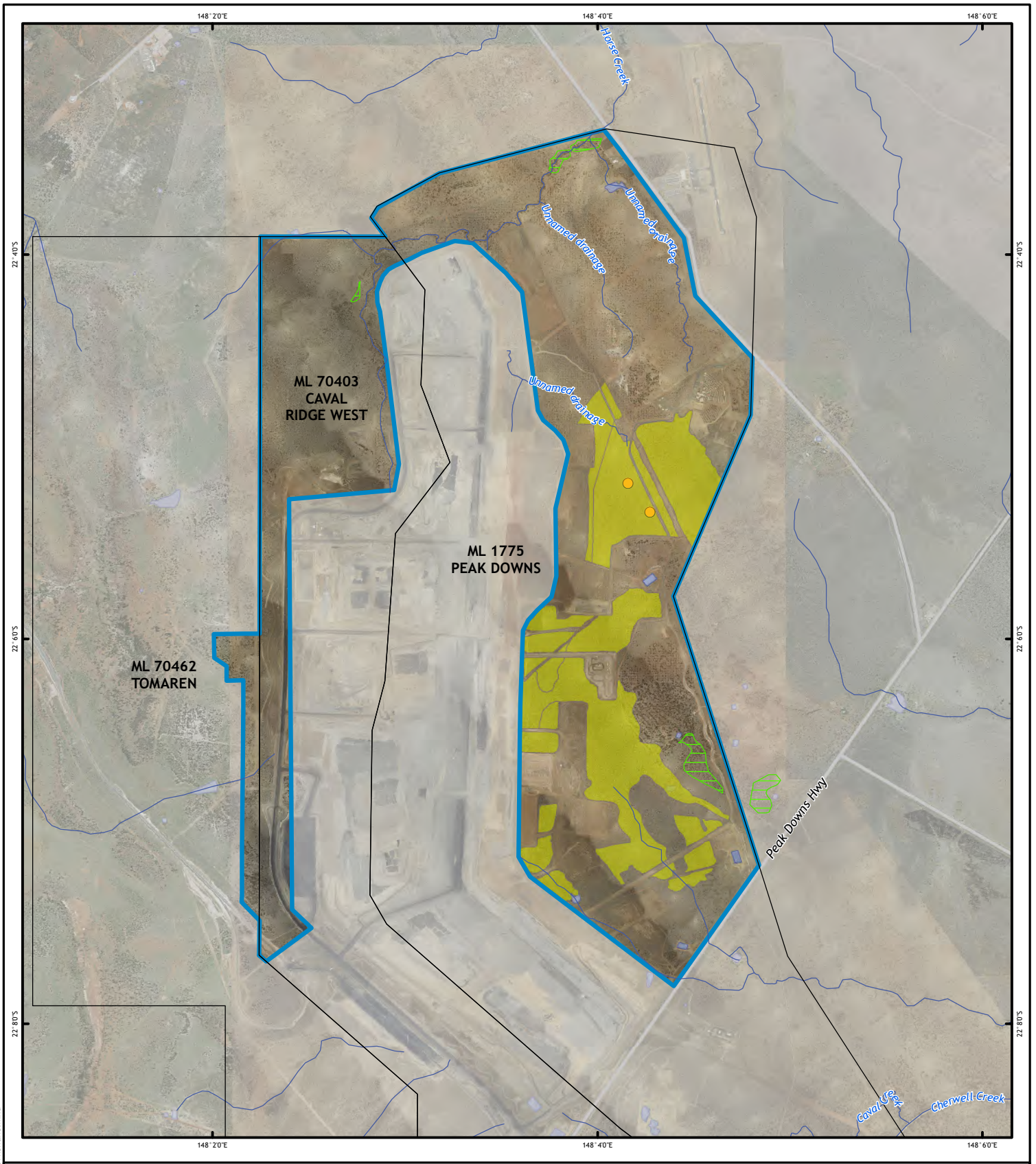
The common death adder is a venomous snake with a triangular-shaped head, short stout body and a thin tail (Wilson & Swan 2010). The species occurs over a wide distribution throughout eastern and southern Australia within forests, woodlands, rainforests, grasslands and heathland (Rowland & Ferguson 2012). Unlike most species of Australian venomous snakes that actively search for prey (including frogs, lizards

and birds), the common death adder is an ambush predator, preferring to lie in wait amongst dense leaf litter using its tail as a lure. As such, dense leaf litter is a microhabitat feature considered during the habitat assessment.

Within the study area, remnant and regrowth woodlands characteristic of GTREs: 11.3.1, 11.3.25, 11.4.8, 11.4.9, 11.5.3, 11.5.9b and 11.7.1 as well as grasslands within GTRE 11.8.11 were assessed as potentially suitable common death adder habitat. These REs were refined to exclude areas with no, or insufficient, leaf litter and/or debris. Common death adder habitat as mapped on Figure 11 is composed of:

- parts of the Horse Creek riparian corridor (RE 11.3.25) where leaf litter, abundant ground cover and habitat supporting prey species were recorded);
- portions of brigalow woodland (RE 11.4.8 and 11.4.9) that have sufficient ground cover;
- remnant eucalypt woodland within two patches of RE 11.7.1; and
- high value regrowth woodland habitat characteristic of RE 11.5.3 and RE 11.5.9b located north of Horse Creek.

In total, there is approximately 172.24 ha of common death adder habitat within the study area (Figure 11).



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area
- Ornamental Snake Record (E2M 2020)
- Ornamental Snake Preferred Habitat
- Ornamental Snake Essential Habitat v9.02 (DNRME 2020)

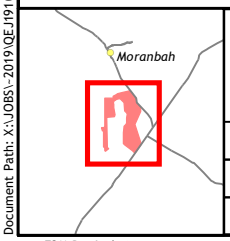
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

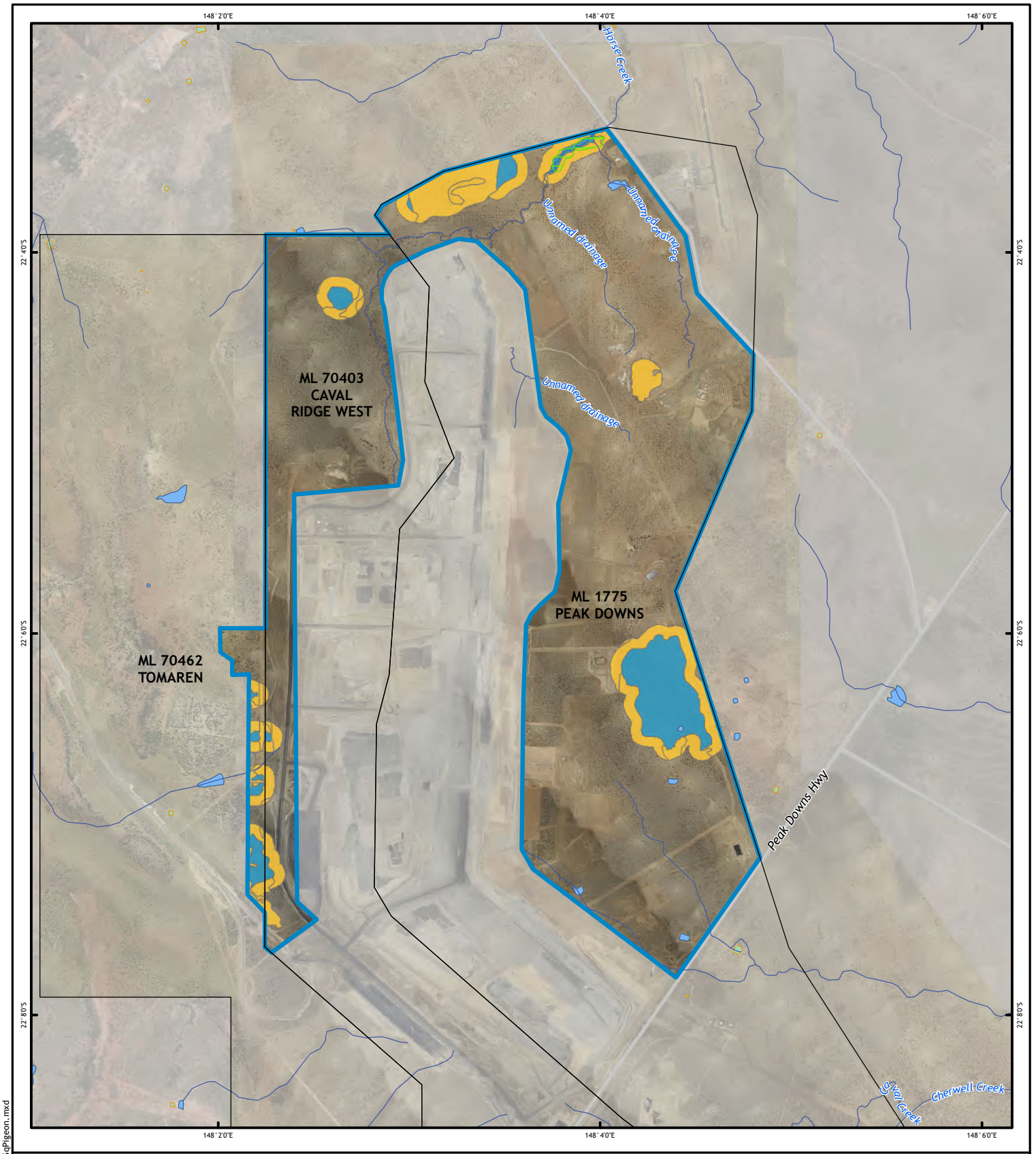
Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 7: ORNAMENTAL SNAKE HABITAT

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_7_Habitat_OrnSnake.mxd



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Mining Lease: © DNRME 2020

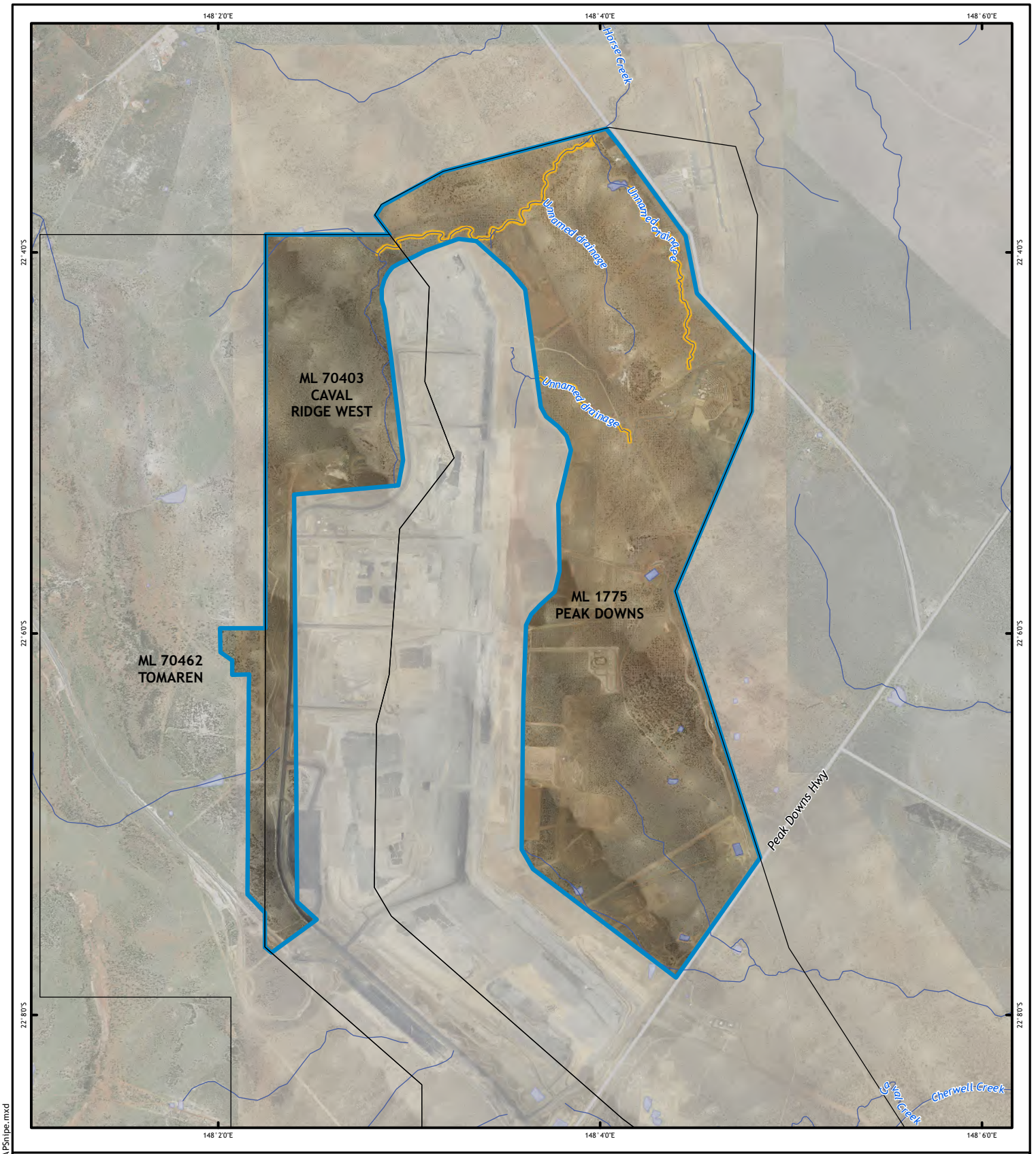
Rev	Description	Drawn	Approved	Date
0	Issued for Review	DL	LW	10/03/2021
F	Issued for Review	DL	LW	25/05/2021

FIGURE 8: SQUATTER PIGEON HABITAT

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_8_Habitat_SqPigeon.mxd



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area
- Australian Painted Snipe Habitat

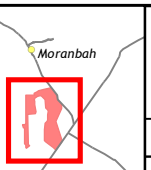
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

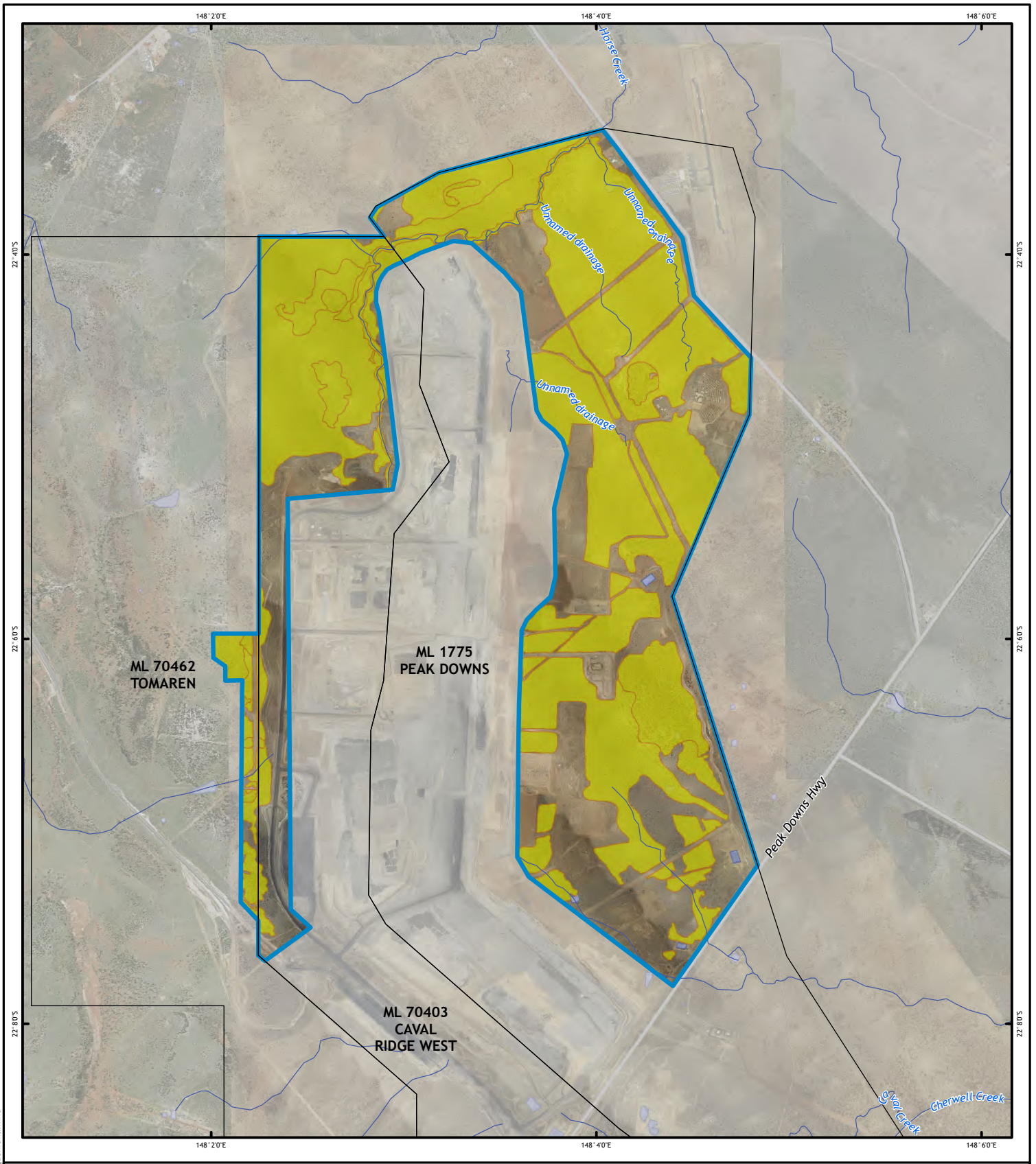
Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 9: AUSTRALIAN PAINTED SNIPE HABITAT

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_9_Habitat_APSnipe.mxd



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area
- Short-beaked Echidna Habitat

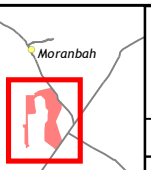
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Mining Lease: © DNRME 2020

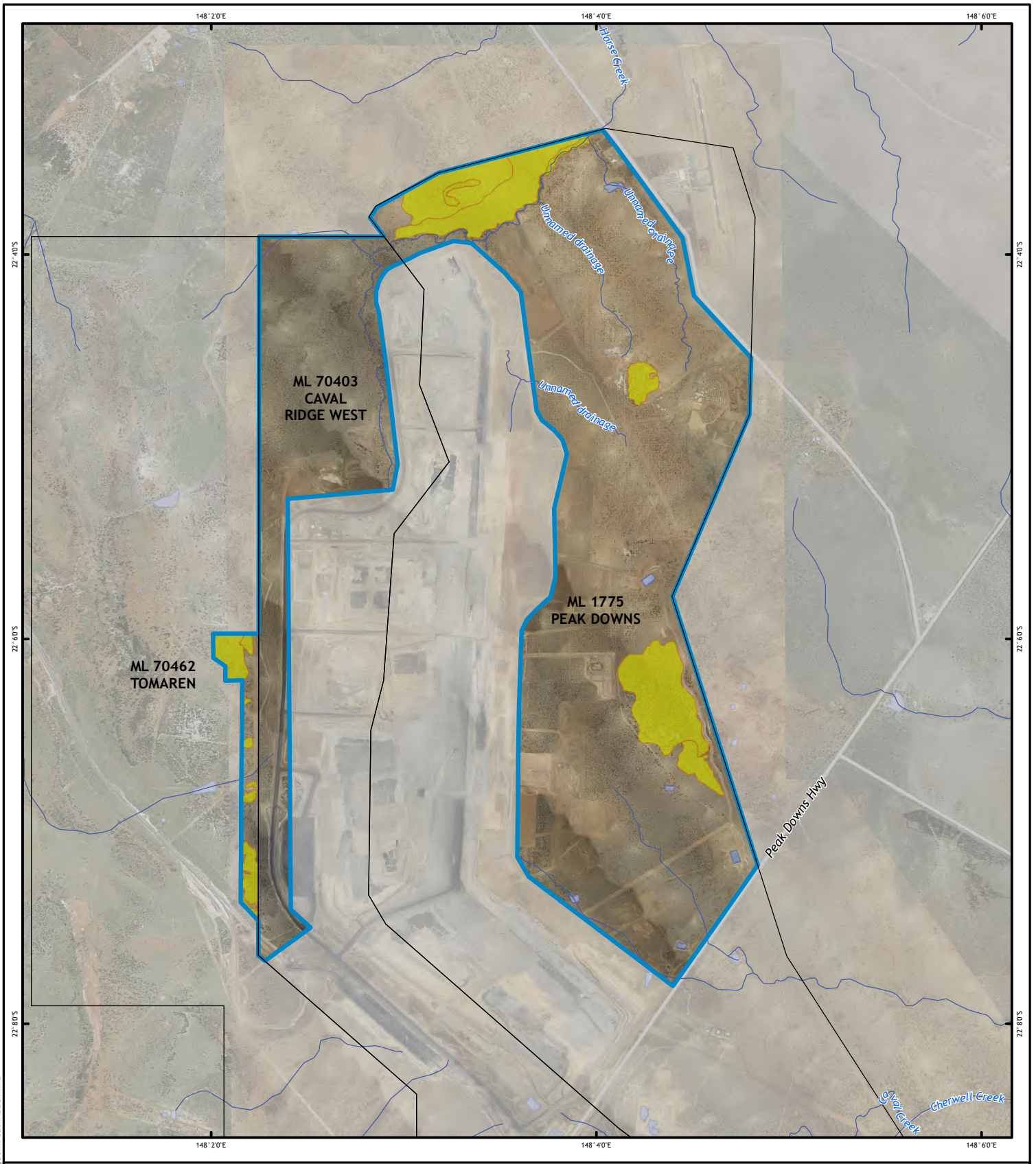
Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	26/02/2021

FIGURE 10: SHORT-BEAKED ECHIDNA HABITAT

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_10_Habitat_Echidna.mxd



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area
- Common Death Adder Habitat

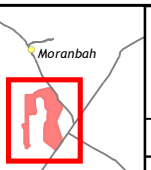
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
Aerial Imagery: © BHP, ESRI 2019
Cadastre: © DNRME 2018
Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	10/03/2021

FIGURE 11: COMMON DEATH ADDER HABITAT

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_11_Habitat_ComDeathAdder.mxd

5.2.4 Migratory fauna

The Commonwealth PMST report identified the potential for 10 migratory bird species listed under the EPBC Act 1999 (MNES) to occur within or near (i.e. 50 km) the study area. No suitable habitat for migratory birds was identified within the study area. The likelihood of migratory fauna to occur in the study area is detailed within Appendix B.

5.2.5 Pest fauna

Pest fauna species have varying adverse impacts on the environment. Feral deer and pig are known to contribute to habitat degradation by damaging the banks of wetlands, creek lines and gilgai, uprooting vegetation, causing soil erosion, spreading weeds and browsing/grazing native flora. Carnivorous pest fauna, such as feral cat, wild dog and pigs are known to predate native fauna, while cane toads outcompete native amphibians and are toxic to animals that predate upon them.

Six pest fauna species were recorded within the study area during the field assessments:

- cane toad (*Rhinella marina*);
- cat (*Felis catus*);
- deer (*Cervus sp.*);
- rabbit (*Oryctolagus cuniculus*);
- pig (*Sus scrofa*); and
- wild dog (*Canis lupus*).

At the time of survey there was little evidence of habitat degradation from deer and pig apart from some damage around the banks of gilgai in the brigalow regrowth habitat. Cane toads, cats and wild dogs however, are likely having a relatively detrimental impact on native fauna within the study area.

Cane toads were observed in abundance throughout the study area including within the brigalow regrowth habitat where they co-exist with ornamental snake habitat. As a specialist predator of amphibians, the ornamental snake is likely to predate small cane toads resulting in the snake's mortality (Photo 13).

Feral cats (Photo 14) and wild dogs are efficient predators and are likely to prey upon snakes, birds and amphibians, including the target MNES (namely ornamental snake and squatter pigeon).

Photo 13. The remains of an unidentified species of snake adjacent to the remains of a cane toad within the brigalow regrowth habitat of Horse Pit study area

Photo 14. Feral cats were frequently detected throughout the study area. This image was recorded adjacent to the light vehicle back track

6 Matters of National Environmental Significance

6.1 Flora and Fauna

Three MNES (one flora species and two fauna species) have been identified within the study area. King bluegrass and squatter pigeon were recorded within the CVM ML during the original ecological studies published in the 2009 EIS and ornamental snake was observed during the wet season survey conducted by E2M in 2020.

Australian painted snipe was not detected during the field assessment however, approximately 6 ha of foraging habitat was identified in the inundated drainages within the study area.

A summary of MNES values identified within the study area is listed in Table 10.

Table 10. Summary of MNES ground-truthed within the study area

Nationally threatened species	EPBC Act status	Habitat within the study area (ha)
Known to occur		
king bluegrass *Dichanthium queenslandicum*	Endangered	31.44
ornamental snake *Denisonia maculata*	Vulnerable	325.69 (preferred*)
squatter pigeon *Geophaps scripta scripta*	Vulnerable	74.12 (preferred*) 155.60 (suitable*)
Potential to occur		
Australian painted snipe *Rostratula australis*	Endangered	6.04

*draft Central Queensland MNES fauna habitat definitions (BHP unpublished document)

6.2 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are those that depend on access to groundwater for ongoing maintenance and survival. Typically, the main structural elements within a vegetation community (i.e. canopy flora species) directly access groundwater through 'hydraulic lift', whereby groundwater can be moved up the soil profile and accessible by less deeply rooted plant species (Eamus et al. 2006). The loss of main structural elements, such as the canopy species, can lead to the loss of the ecosystem as a whole; therefore, the community as a whole can be considered to be groundwater dependent.

There are three main types of GDEs as defined by Eamus et al. (2006), including:

- aquifer/cave ecosystems, occupied by stygofauna (subterranean GDEs);

- ecosystems dependant on the surface availability (discharge) of groundwater. These ecosystems are characterised by permanent provision of surface water (aquatic GDEs); and
- ecosystems dependent on access to subsurface groundwater, which includes many riparian communities (Terrestrial GDEs).

The National Groundwater Dependent Atlas (2016) identified no mapped GDEs located within the study area; however, GDE communities can be determined by flora species composition and their relative dependence on groundwater for survival (Eamus et al. 2006).

Potential GDEs within and/or directly adjacent to the study area are likely to be confined to land zone three communities, primarily RE 11.3.25, associated with Horse Creek within the north-eastern corner (refer to Figure 4). The fringing sclerophyll community comprised HVR RE 11.3.25, dominated by river red gum (*E. camaldulensis*), a species known to have an obligate dependence on groundwater (i.e. do not always require access to groundwater, however; in order to survive long periods of drought, access to groundwater is essential). As such, this RE 11.3.25 vegetation community may be groundwater dependent, depending on the depth to groundwater relative to the possible maximum tap root length. The groundwater profile will be determined in the hydrological study for the Project.

7 Matters of State Environmental Significance

7.1 Regulated Vegetation

Approximately 31.44 ha of RE 11.8.11, a remnant grassland listed as 'of concern' under the VM Act was ground-truthed within the study area.

7.1.1 Protected Wildlife Habitat

Under Schedule 6, Section 4 of the Environmental Offsets Regulation 2014 defines 'protected wildlife habitat' as habitat for an animal listed as critically endangered, endangered, vulnerable and special least concern under the NC Act 1992. The Protected Wildlife Habitat recorded in the study area during the field surveys is presented in Table 11.

Table 11. Ground-truthed protected wildlife habitat within the study area

Protected Wildlife Habitat	NC Act Status	Ground-truthed habitat within the study area(ha)
Known to occur		
king bluegrass *Dichanthium queenslandicum*	Vulnerable	31.44
ornamental snake *Denisonia maculata*	Vulnerable	325.69 (preferred*)
squatter pigeon *Geophaps scripta scripta*	Vulnerable	74.12 (preferred*) 155.60 (suitable*)
Likely/Potential to occur		
common death adder *Acanthophis antarcticus*	Vulnerable	172.24
Australian painted snipe *Rostratula australis*	Vulnerable	6.04
short-beaked echidna *Tachyglossus aculeatus*	Special least concern	1,110

* draft Central Queensland MNES fauna habitat definitions (BHP unpublished document)

7.1.2 Essential Habitat

Essential habitat for protected wildlife is defined in Section 20AC (1)(2) of the *Vegetation Management Act 1999* as a Category A, B or C area shown on a regulated vegetation management map that has:

- ≥3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or

- in which the protected wildlife, at any stage of its life cycle, is located.

Essential habitat as identified on regulated vegetation management maps are produced by DNRME. Within the study area, DNRME has mapped essential habitat for king bluegrass (*D. queenslandicum*), ornamental snake and squatter pigeon (Figure 5, Figure 7 and Figure 8, respectively).

7.2 Connectivity areas

Connectivity areas, as defined by the *Environmental Offsets Regulation 2014* and supported by the *Environmental Offsets Policy 2017*, applies to a prescribed RE to the extent the ecosystem contains remnant vegetation and an area of land required for ecosystem functioning that will remain despite a threatening process. The Landscape Fragmentation and Connectivity Tool (DES 2018) was used to assess the significance of impact on connectivity areas as defined in the *Environmental Offsets Regulation 2014*.

Habitat connectivity within the study area has been largely disrupted by historic vegetation clearing and the development and ongoing operation of the CVM. Habitat connectivity between the study area and the surrounding landscape has been similarly impacted by historic clearing for livestock grazing as well as infrastructure and resource development (e.g. Peak Downs highway, Moranbah access road, Moranbah airport, neighbouring mines).

Horse Creek serves as a movement corridor contributing to the ecological function of the site by connecting habitat within the study area to the Isaac River and the broader Fitzroy Basin through an otherwise modified landscape; however the habitat fringing Horse Creek is not in remnant status. Table 12 provides the results of the Landscape Fragmentation and Connectivity Tool. This area corresponds with remnant vegetation occurring within the study area.

Table 12. Landscape Fragmentation and Connectivity Tool Results

Connectivity values	Ground-truthed area (ha)
remnant vegetation	112.40

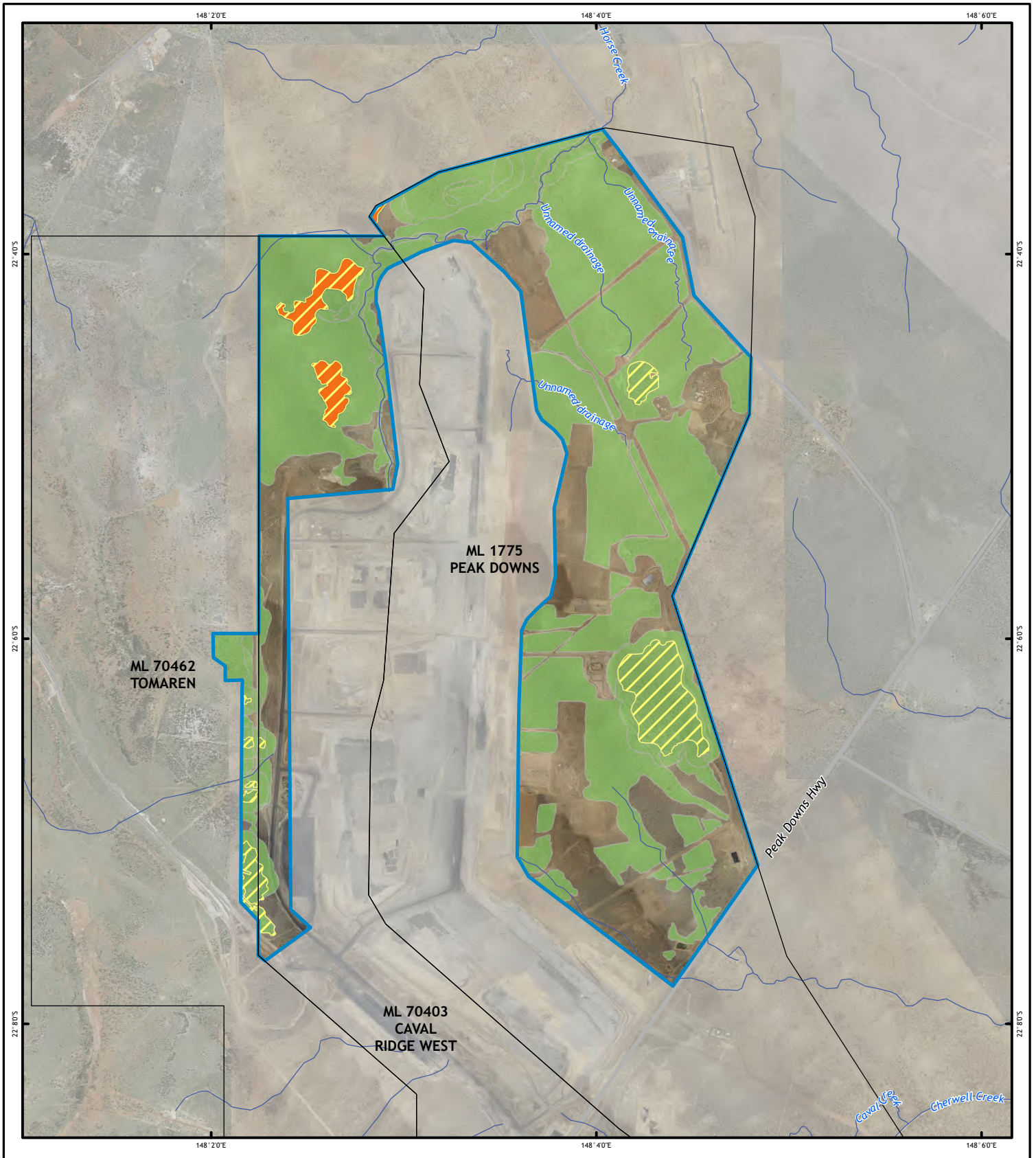
7.3 Wetlands and watercourses

No wetlands within the study area are mapped within a wetland protection area or within an area of high ecological significance, as shown on the map of Queensland wetland environmental values defined in Schedule 2 of the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*. In addition, no wetlands or watercourses located within Horse Pit study area are located within designated high ecological value waters.

There are no prescribed REs that intersect with an area shown as a wetland on the vegetation management wetlands map. There are also no prescribed regional ecosystems located within the defined distance[7] of the defining banks of a relevant watercourse or relevant drain feature (Horse Creek is approximately 80 m from RE 11.8.11).

There are no wetlands or watercourses within the study area or Project Disturbance Footprint that qualify as or trigger MSES.

[7] 50 m from the defining banks of Horse Pit (Stream Order 3) and 25 m from the defining banks of the three unnamed drainages (Stream Order 1) within the non-coastal Brigalow Belt Bioregion



Legend

- Watercourse
- Road
- Mining Lease
- Ecology Study Area
- Connectivity Areas
- Protected Wildlife Habitat

Regulated Vegetation

- Of Concern RE

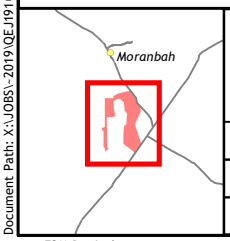
N

Scale 1:50,000 (A4)

0 1 2

Kilometres

Coordinate System: GCS GDA 1994



Notes:
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Drainage: © DNRME 2018; updated using BHP aerial imagery 2019
Road: © PSMA 2014
Mining Lease: © DNRME 2020

Rev	Description	Drawn	Approved	Date
0	Issued for Use	DL	LW	10/03/2021
F	Issued for Review	DL	LW	20/01/2021

FIGURE 12: MSES WITHIN THE STUDY AREA

Horse Pit Expansion Project
BMA Caval Ridge Mine

Map Number	Job Number	Rev
1 of 1	QEJ19105	0

Document Path: X:\JOBS\-2019\QEJ19105\GIS\QEJ19105_Horse_12_MSES.mxd

8 Conclusion

The terrestrial ecological values assessment identified and characterised the ecological values within the study area, highlighting the MNES and MSES.

While the study area has been largely modified from historical land clearing and subject to the ongoing direct and indirect impacts associated with the operation of the CVM, the study area supports a diversity of wildlife species, habitat features and vegetation communities.

The terrestrial ecology assessment identified the following ecological values within the study area:

- six broad vegetation groups;
- nine ground-truthed REs (three endangered and one of concern RE);
- 66 fauna species recorded in the field;
- 168 flora species recorded in the field;
- occurrence of generic fauna habitat;
- occurrence of animal breeding places;
- ecological connectivity value; and
- Category B ESA (endangered RE 11.3.1, not a MSES as the RE is HVR).

The MNES identified within the study area include:

- King bluegrass habitat;
- three fauna species habitat (ornamental snake (known), squatter pigeon (known) and Australian painted snipe (potential)); and
- groundwater dependent ecosystems.

The MSES identified within the study area include:

- regulated vegetation (of concern RE 11.8.11);
- protected wildlife habitat for six species;
- essential habitat for three species; and
- connectivity values.

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Appendix A Database search results

Australian Government
Department of the Environment and Energy

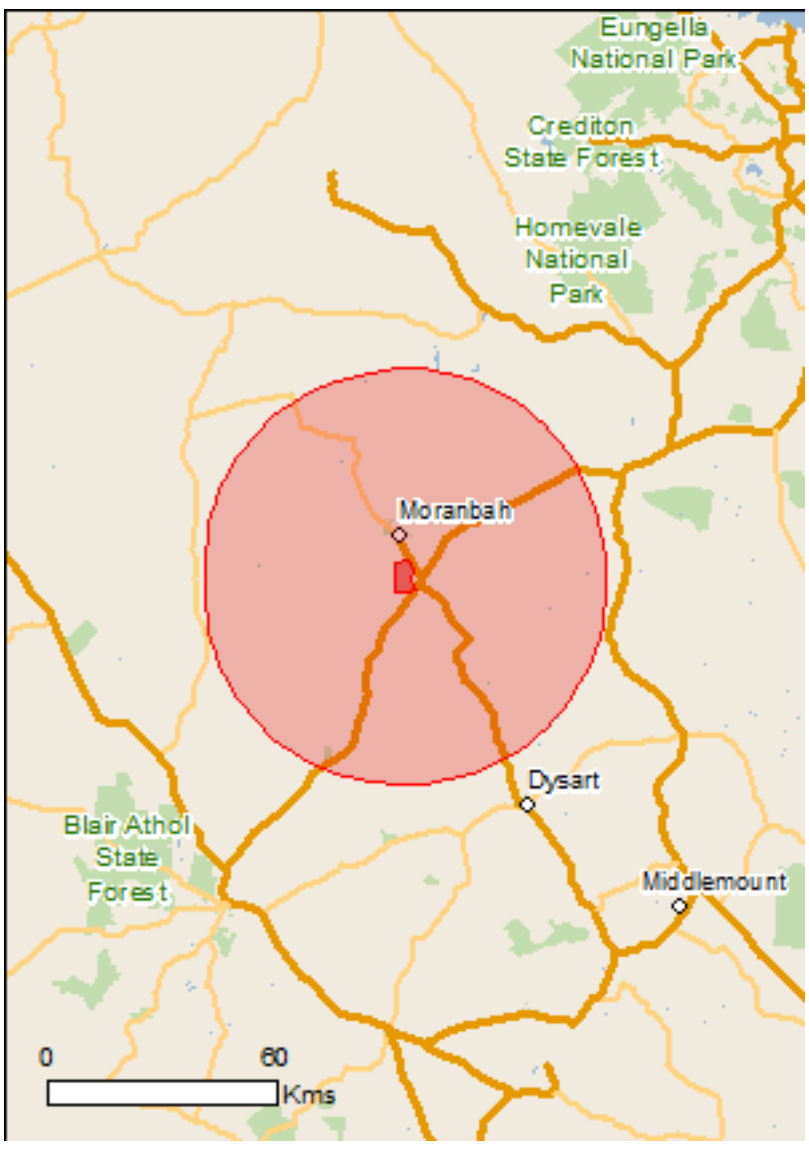
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

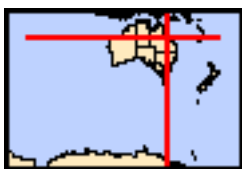
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 17/03/20 12:35:16



Coordinates
Buffer: 50.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	26
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	26
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Endangered	Community likely to occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Aristida annua		
[17906]	Vulnerable	Species or species habitat likely to occur within area
Cadellia pentastylis		
Ooline [9828]	Vulnerable	Species or species habitat may occur within area
Cycas ophiolitica		
[55797]	Endangered	Species or species habitat likely to occur within area
Dichanthium queenslandicum		
King Blue-grass [5481]	Endangered	Species or species habitat known to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus raveretiana		
Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Elseya albagula		
Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat likely to occur within area
Lerista allanae		
Allan's Lerista, Retro Slider [1378]	Endangered	Species or species habitat likely to occur within area
Rheodytes leukops		
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Peak Range	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-22.065 148.037,-22.056 148.067,-22.076 148.08,-22.081 148.08,-22.096 148.073,-22.12 148.081,-22.13 148.073,-22.127 148.037,-22.065 148.037

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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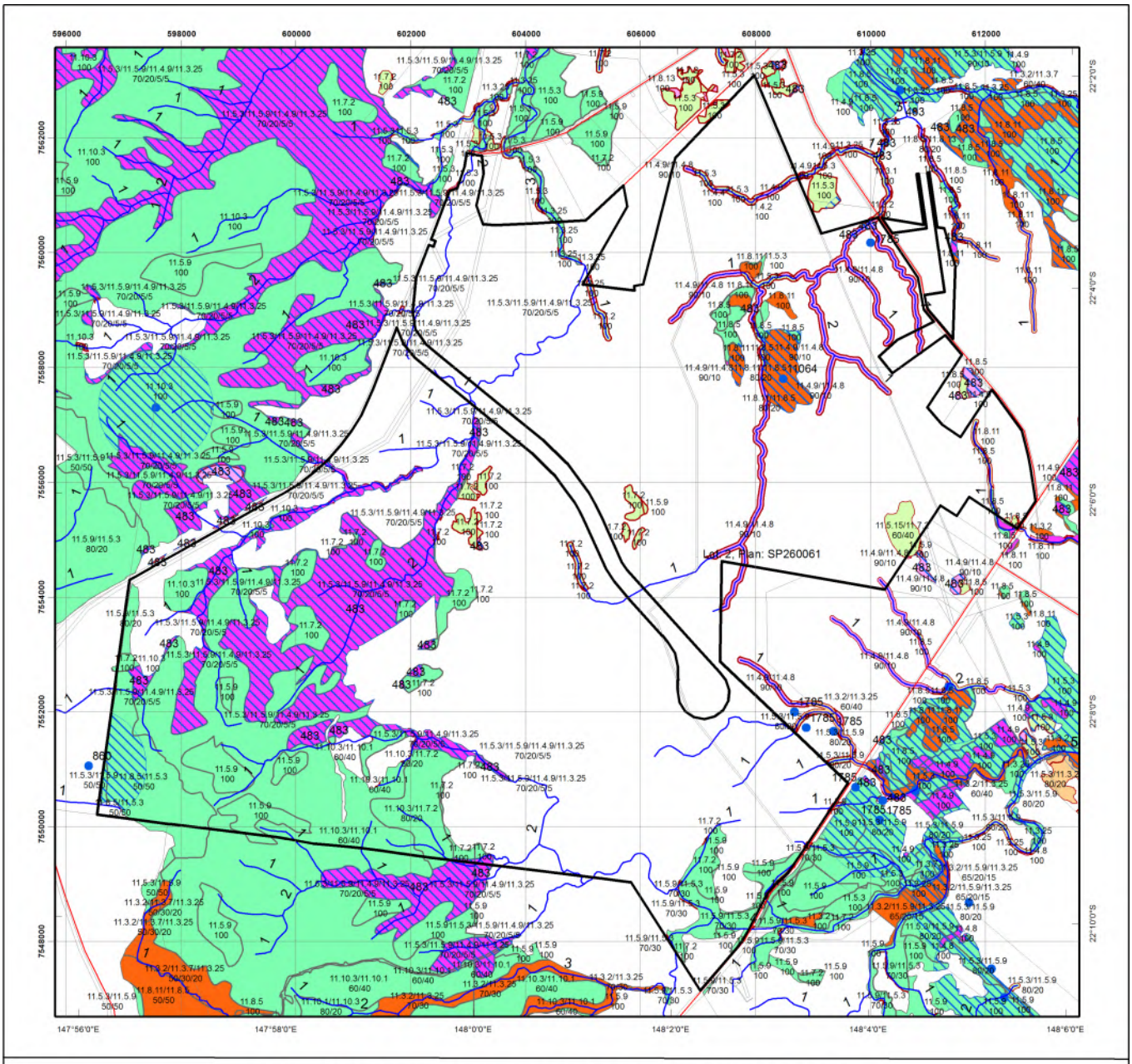
5.2 Vegetation management supporting map



Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area under Section 20AH
  These areas are edged in yellow and filled with the remnant RE Status
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category C area under Section 20AI
  These areas are edged in purple and filled with the remnant RE Status
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map
  (Stream order shown as black number against stream where available)
- Roads
- National Parks, State Forest and other reserves
- Other land parcel boundaries

Queensland Government

LOCALITY DIAGRAM

N

0 690 1,380 2,070 2,760 3,450 m

This product is projected into:
GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

02/06/2020 12:21:28
Lot: 2 Plan: SP260061

Protected Plants Flora Survey Trigger Map

Legend

- Selected Lot and Plan
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets

LOCALITY DIAGRAM

N

0 975 1,950 2,925 3,900 4,875 m

This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see section 89 of the Act.

Please see the Department of Environment and Science webpage on the clearing of protected plants for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.

Department of Natural Resources, Mines and Energy

Vegetation management report

For Lot: 2 Plan: SP260061

Current as at 02/06/2020

Queensland Government

This publication has been compiled by Operations Support, Department of Natural Resources, Mines and Energy.

Recent changes

Updated mapping

Updated vegetation mapping was released on 6 April 2020 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, wetland, high-value regrowth and essential habitat mapping.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

- *Vegetation management framework* - an explanation of the application of the framework.
- *Property details* - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s), catchment(s), coastal or non coastal status, and any applicable area management plans associated with your property.
- *Vegetation management details for the specified Lot on Plan* - specific information about your property including vegetation categories, regional ecosystems, watercourses, wetlands, essential habitat, protected plants, and koala habitat.
- *Contact information.*
- *Maps* - a series of colour maps to assist in identifying regulated vegetation on your property.
- *Other legislation contact information.*

This information will assist you to determine your options for managing vegetation under the vegetation management framework, which may include:

- exempt clearing work
- accepted development vegetation clearing code
- an area management plan
- a development approval.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as Queensland's Protected Plants framework or the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 6 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Vegetation management framework

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the Vegetation Management Regulation 2012; and
- a mangrove.

1.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify DNRME or obtain an approval approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 5.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval approval under the vegetation management framework. For all other land tenures, contact DNRME before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at
https://www.qld.gov.au/environment/land/vegetation/exemptions/.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact DNRME prior to clearing in any of these areas.

1.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at
https://www.qld.gov.au/environment/land/vegetation/codes/

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify DNRME before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://apps.dnrm.qld.gov.au/vegetation/

1.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an area management plan applies to your property for which you can make a new notification, it will be listed in Section 2.2 of this report. Before clearing under one of these AMPs, you must first notify the DNRME and then follow the conditions and requirements listed in the AMP.
https://www.qld.gov.au/environment/land/vegetation/area-plans/

1.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at
https://www.qld.gov.au/environment/land/management/vegetation/development

2. Property details

2.1 Tenure

All of the lot, plan and tenure information associated with property Lot: 2 Plan: SP260061, including links to relevant Smart Maps, are listed in Table 1. The tenure of the property (whether it is freehold, leasehold, or other) may be viewed by clicking on the Smart Map link(s) provided.

Table 1: Lot, plan and tenure information for the property

Lot	Plan	Tenure	Link to property on SmartMap
2	SP260061	Freehold	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=2\SP260061
BK	SP233247	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=BK\SP233247
F	GV77	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=F\GV77
CC	SP233524	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=CC\SP233524
BJ	SP233246	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=BJ\SP233246
C	GV293	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=C\GV293
G	SP262634	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=G\SP262634
K	SP291951	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=K\SP291951
J	SP291951	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=J\SP291951
A	GV80	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=A\GV80
CB	SP233524	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=CB\SP233524

Lot	Plan	Tenure	Link to property on SmartMap
A	RP613854	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=A\RP613854
B	RP620008	Easement	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=B\RP620008

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

2.2 Property location

Table 2 provides a summary of the locations for property Lot: 2 Plan: SP260061, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Isaac Regional

Bioregion(s)	Subregion(s)
Brigalow Belt	Northern Bowen Basin

Catchment(s)
Fitzroy

2.2.1 Area Management Plan(s)

Nil

2.2.2 For the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP), this property is regarded as*

Non Coastal

*See also Map 5.4

2.2.3 The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

Class A: 146.87ha

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See section 5 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 2 Plan: SP260061.

3. Vegetation management details for Lot: 2 Plan: SP260061

3.1 Vegetation categories

Vegetation categories are shown on the regulated vegetation management map in section 5.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 12540.8ha

Vegetation category	Area (ha)
Category B	2870.5
Category C	101.3
Category R	240.1
Category X	9328.9

Table 4

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact DNRME to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact DNRME to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

This report does not confirm if a Property Map of Assessable Vegetation (PMAV) exists on a lot. To confirm whether or not a PMAV exists on a lot, please check the PMAV layer on the Queensland Globe2, or contact DNRME on 135VEG (135 834).

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 5.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
11.10.1	Least concern	B	343.94	Corymbia citriodora woodland on coarse-grained sedimentary rocks	Sparse
11.10.3	Least concern	B	689.19	Acacia catenulata or A. shirleyi open forest on coarse-grained sedimentary rocks. Crests and scarps	Mid-dense
11.3.2	Of concern	R	0.23	Eucalyptus populnea woodland on alluvial plains	Sparse
11.3.21	Endangered	B	0.11	Dichanthium sericeum and/or Astrebla spp. grassland on alluvial plains. Cracking clay soils	Grassland
11.3.21	Endangered	C	0.11	Dichanthium sericeum and/or Astrebla spp. grassland on alluvial plains. Cracking clay soils	Grassland
11.3.21	Endangered	R	0.07	Dichanthium sericeum and/or Astrebla spp. grassland on alluvial plains. Cracking clay soils	Grassland
11.3.25	Least concern	B	51.94	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.25	Least concern	C	0.06	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.3.25	Least concern	R	2.41	Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines	Sparse
11.4.2	Of concern	R	1.94	Eucalyptus spp. and/or Corymbia spp. grassy or shrubby woodland on Cainozoic clay plains	Sparse
11.4.4	Least concern	R	1.80	Dichanthium spp., Astrebla spp. grassland on Cainozoic clay plains	Grassland
11.4.8	Endangered	B	0.09	Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains	Sparse
11.4.8	Endangered	C	0.47	Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains	Sparse
11.4.8	Endangered	R	16.83	Eucalyptus cambageana woodland to open forest with Acacia harpophylla or A. argyrodendron on Cainozoic clay plains	Sparse
11.4.9	Endangered	B	43.77	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Sparse
11.4.9	Endangered	C	4.32	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Sparse

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
11.4.9	Endangered	R	155.73	Acacia harpophylla shrubby woodland with Terminalia oblongata on Cainozoic clay plains	Sparse
11.5.15	Least concern	C	23.28	Semi-evergreen vine thicket on Cainozoic sand plains and/or remnant surfaces	Dense
11.5.3	Least concern	B	756.66	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.3	Least concern	C	1.46	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.3	Least concern	R	21.77	Eucalyptus populnea +/- E. melanophloia +/- Corymbia clarksoniana woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.9	Least concern	B	428.20	Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.9	Least concern	C	1.65	Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.5.9	Least concern	R	1.81	Eucalyptus crebra and other Eucalyptus spp. and Corymbia spp. woodland on Cainozoic sand plains and/or remnant surfaces	Sparse
11.7.2	Least concern	B	260.84	Acacia spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Sparse
11.7.2	Least concern	C	66.80	Acacia spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Sparse
11.7.2	Least concern	R	16.46	Acacia spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone	Sparse
11.8.11	Of concern	B	108.12	Dichanthium sericeum grassland on Cainozoic igneous rocks	Grassland
11.8.11	Of concern	C	0.57	Dichanthium sericeum grassland on Cainozoic igneous rocks	Grassland
11.8.11	Of concern	R	7.34	Dichanthium sericeum grassland on Cainozoic igneous rocks	Grassland
11.8.5	Least concern	B	187.65	Eucalyptus orgadophila open woodland on Cainozoic igneous rocks	Very sparse
11.8.5	Least concern	C	2.59	Eucalyptus orgadophila open woodland on Cainozoic igneous rocks	Very sparse
11.8.5	Least concern	R	13.67	Eucalyptus orgadophila open woodland on Cainozoic igneous rocks	Very sparse
non-rem	None	X	9,328.92	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work
- accepted development vegetation clearing codes
- performance outcomes in State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 5.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA), and includes endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 5.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map as assessable vegetation -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
483	Denisonia maculata	ornamental snake	V	Riparian woodland/open forest and shrub/woodland including Brigalow Acacia harpophylla; into drier habitats in summer.	100-450m.	Cracking clay with gilgai/soil crack microrelief and sandy loam substrates.	Near freshwater waterholes/creeks and low lying poorly drained areas that are frequently inundated by freshwater.

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
860	Phascolarctos cinereus	koala	V	SEQ: Open eucalypt forest and woodland that has: a) multiple strata layers containing Eucalyptus, Corymbia, Angophora, Lophostemon or Melaleuca trees that-at 1.3 metres above the ground-have a diameter both greater and less than 30 centimetres; and b) at least 1 of the following species: Eucalyptus tereticornis, E. fibrosa, E. propinqua; E. umbra, E. grandis, E. microcorys, E. tindaliae, E. resinifera, E. populnea, E. robusta, E. nigra, E. racemosa, E. crebra, E. exserta, E. seeana, Lophostemon confertus, L. suaveolens, Melaleuca quinquenervia. Outside SEQ: Open eucalypt forest and woodland that contains Eucalyptus &/or Corymbia spp. Tree species used for food varies across State and can include Eucalyptus tereticornis, E. camaldulensis, E. coolabah; E. drepanophylla, E. platyphylla, E. orgadophilla, E. thozetiana, E. melanophloia, E. populnea, E. melliodora, E. dealbata, E. microtheca, E. crebra, E. exserta, E. blakelyi, E. papuana, Corymbia tessellaris, C. citriodora, Melaleuca quinquenervia, M. leucadendra.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.
1785	Geophaps scripta scripta	squatter pigeon (southern subsp.)	V	Dry eucalypt woodland (including poplar box, spotted gum, yellow box, acacia and callitris), with sparse short grass, often on sandy areas near to permanent water; grassy eucalypt woodlands. Nest on ground near or under grass tussock, log or low bush.	None	None	Gravelly ridges, traprock and river flats.
11064	Dichanthium queenslandicum	king bluegrass	V	tussock grassland occasional with scattered trees of Corymbia spp. or Eucalyptus spp. or Acacia spp.; woodland of Corymbia erythrophloia, or Eucalyptus orgadophila, or Eucalyptus melanophloia with grassy understorey.	100 to 900 m	black cracking clay	flat terrain or gentle undulatling plain

Label	Regional Ecosystem (mandatory unless otherwise specified)
483	10.3.2, 10.3.3, 10.3.4, 10.3.7, 10.3.13, 10.3.14, 10.3.15, 10.3.16, 10.3.27, 10.3.30, 10.3.31, 10.4.1, 10.4.2, 10.4.3, 10.4.4, 10.4.5, 10.4.6, 10.4.7, 10.4.8, 10.5.5, 10.9.1. 10.9.6. 10.9.7, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.9, 11.3.10, 11.3.12, 11.3.15, 11.3.21, 11.3.23, 11.3.24, 11.3.25, 11.3.27, 11.3.28, 11.3.31, 11.3.34, 11.3.37, 11.3.38, 11.3.40, 11.4.2, 11.4.3, 11.4.4, 11.4.6, 11.4.7, 11.4.8, 11.4.9, 11.4.11, 11.5.2, 11.5.3, 11.5.16, 11.8.11, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.7, 11.9.11, 11.9.12, 11.9.14, 11.11.15, 11.12.6

Label	Regional Ecosystem (mandatory unless otherwise specified)
860	SEQ: 11.3.2, 11.3.4, 11.3.25, 11.3.26, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.9.9, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.15, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28. Outside SEQ: 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.4.1, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.57, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.4.3, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.20, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10.
1785	8.2.1, 8.2.7, 8.2.8, 8.2.12, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.13, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.9.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.12.6, 8.12.7, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.9, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.18, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.23, 9.4.1, 9.4.2, 9.4.3, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.16, 9.7.1, 9.7.2, 9.7.3, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.4, 9.8.5, 9.8.6, 9.8.9, 9.8.10, 9.8.11, 9.10.1, 9.10.3, 9.10.6, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.11, 9.11.12, 9.11.13, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.23, 9.11.26, 9.11.28, 9.11.29, 9.11.31, 9.11.32, 9.12.1, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.26, 9.12.28, 9.12.30, 9.12.31, 9.12.33, 9.12.35, 9.12.37, 9.12.39, 10.3.1, 10.3.2, 10.3.3, 10.3.4, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.19, 10.3.20, 10.3.27, 10.3.28, 10.3.30, 10.3.31, 10.4.3, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.2, 10.7.3, 10.7.5, 10.7.11, 10.7.12, 10.9.1, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.6, 11.3.7, 11.3.8, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.23, 11.3.25, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.5, 11.4.8, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.4, 11.7.6, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.9, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.2, 11.9.3, 11.9.7, 11.9.9, 11.9.14, 11.10.1, 11.10.4, 11.10.6, 11.10.7, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.15, 11.11.16, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.11, 11.12.12, 11.12.13, 11.12.14, 11.12.17, 11.12.20, 12.2.5, 12.2.6, 12.2.7, 12.2.10, 12.2.11, 12.3.3, 12.3.6, 12.3.10, 12.3.12, 12.3.14, 12.3.18, 12.3.19, 12.5.1, 12.5.2, 12.5.4, 12.5.5, 12.5.7, 12.5.8, 12.5.11, 12.5.12, 12.7.1, 12.7.2, 12.8.14, 12.8.16, 12.8.17, 12.8.19, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.12, 12.9-10.13, 12.9-10.25, 12.9-10.26, 12.9-10.28, 12.11.5, 12.11.7, 12.11.8, 12.11.14, 12.11.15, 12.11.20, 12.11.21, 12.11.22, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.7, 12.12.8, 12.12.9, 12.12.12, 12.12.14, 12.12.21, 12.12.22, 12.12.23, 12.12.24, 12.12.25, 12.12.27, 13.3.1, 13.3.4, 13.3.7, 13.11.1, 13.11.3, 13.11.4, 13.11.8, 13.12.2, 13.12.3, 13.12.5, 13.12.8, 13.12.9, 13.12.10
11064	9.8.13, 11.3.21, 11.8.11

3.6 Protected plants (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA), with clearing of protected plants in the wild regulated by the Nature Conservation (Wildlife Management) Regulation 2006. These requirements apply irrespective of the classification of the vegetation under the *Vegetation Management Act 1999*.

Prior to clearing, if the plants proposed to be cleared are in the wild (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') and the exemptions under the Nature Conservation (Wildlife Management) Regulation 2006 are not applicable to the proposed clearing, you must check the flora survey trigger map to determine if any part of the area to be cleared is within a high risk area. The trigger map for this property is provided in section 5.6. The exemptions relate to:

- imminent risk of death or serious injury (refer s261A)
- imminent risk of serious damage to a building or other structure on land, or to personal property (refer s261B)
- *Fire and Emergency Service Act 1990* (refer 261C)
- previously cleared areas (refer s261ZB)
- maintenance activities (refer s261ZC)
- firebreak or fire management line (refer s261ZD)
- accepted development vegetation clearing code (refer s261ZE)
- conservation purposes (refer s261ZG)
- authorised in particular circumstances (refer s385).

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) from the *Vegetation Management Act 1999* (i.e. listed in the Planning Regulations 2017) while some are different.

If the proposed area to be cleared is shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken in accordance with the flora survey guidelines. The main objective of a flora survey is to locate any endangered, vulnerable or near threatened plants (EVNT plants) that may be present in the clearing impact area.

If a flora survey identifies that EVNT plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing. The clearing must be conducted within two years after the flora survey report was submitted.

If a flora survey identifies that EVNT plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the application form clearing permit.

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that EVNT plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

Further information on protected plants is available at
http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/

For assistance on the protected plants flora survey trigger map for this property, please contact the Department of Environment and Science at palm@des.qld.gov.au.

3.7 Koala priority area and koala habitat area (administered by the Department of Environment and Science (DES))

The koala (*Phascolarctos cinereus*) is listed in Queensland as vulnerable by the Queensland Government under the *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Nature Conservation (Koala) Conservation Plan 2017 allows koala habitat areas and koala priority areas to be determined and requires that these are shown on the Koala Conservation Plan Map. Koala habitat areas are areas that contain koala habitat which is essential for the conservation of a viable koala population in the wild. Please note that these areas only apply to lots in the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Koala habitat areas include koala habitat areas (core) and koala habitat areas (locally refined). Following input from each local government, koala habitat areas (locally refined) were developed. Koala habitat areas (locally refined) will be afforded the same protection during a two year transitional period as if they were koala habitat areas (core) identified by the State.

Koala priority areas are areas where long-term management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring will be strategically focused as the areas have the highest likelihood of achieving conservation outcomes for koalas.

Clearing koala habitat areas in a koala priority area is prohibited, except for in certain circumstances (see Schedule 10, 16A of the Planning Regulation 2017). Clearing cannot occur (other than for exempt activities) and a development application cannot be lodged for prohibited activities.

Development located inside a koala priority area on lots that contain koala habitat area, but do not involve clearing of koala habitat, will be assessed by local government, except for in certain circumstances (see Schedule 11, Parts 1 and 2 of the Planning Regulation 2017). This is to manage and minimise impacts on koala habitat, such as edge effects.

Outside of koala priority areas, clearing of koala habitat areas must be avoided, mitigated or offset. Development that is proposing to clear koala habitat area will be assessed by the Queensland Government, except for in certain circumstances (see Schedule 10, 16B of the Planning Regulation 2017).

For more information on development requirements see https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

Landholders (or a person acting on landholder's behalf) can request to have a koala habitat area determination for an area made, amended or revoked if they believe there is an error. For more information, see https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/. The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

For further information on the regulatory framework for koala conservation, including koala priority areas and koala habitat areas, please see the Queensland Government website at https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy or contact Koala Assessment and Compliance, Department Environment and Science, at koala.assessment@des.qld.gov.au.

3.8 Emissions Reduction Fund (ERF)

The ERF is an Australian Government scheme which offers incentives for businesses and communities across the economy to reduce emissions.

Under the ERF, landholders can earn money from activities such as planting (and keeping) trees, managing regrowth vegetation and adopting more sustainable agricultural practices.

The purpose of a project is to remove greenhouse gases from the atmosphere. Each project will provide new economic opportunities for farmers, forest growers and land managers.

Further information on ERF is available at https://www.qld.gov.au/environment/land/state/use/carbon-rights/.

4. Contact information for DNRME

For further information on vegetation management:
Phone 135VEG (135 834)
Email vegetation@dnrme.qld.gov.au
Visit https://www.dnrme.qld.gov.au/?contact=vegetation to submit an online enquiry.

For contact details for other State and Commonwealth agencies, please see Section 6.

5. Maps

Maps included in this report may also be requested individually at:

- https://www.dnrme.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form
- http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/map-request.php

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

Pre-clear map

The vegetation management pre-clear regional ecosystem mapping shows the regional ecosystem, location and extent which is likely to have occurred at that location prior to clearing. This map can be used for identifying exchange areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code. It may also be used for for identifying offsets under the vegetation management framework.

Coastal/non coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP).

Agricultural Land Class A or B

The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

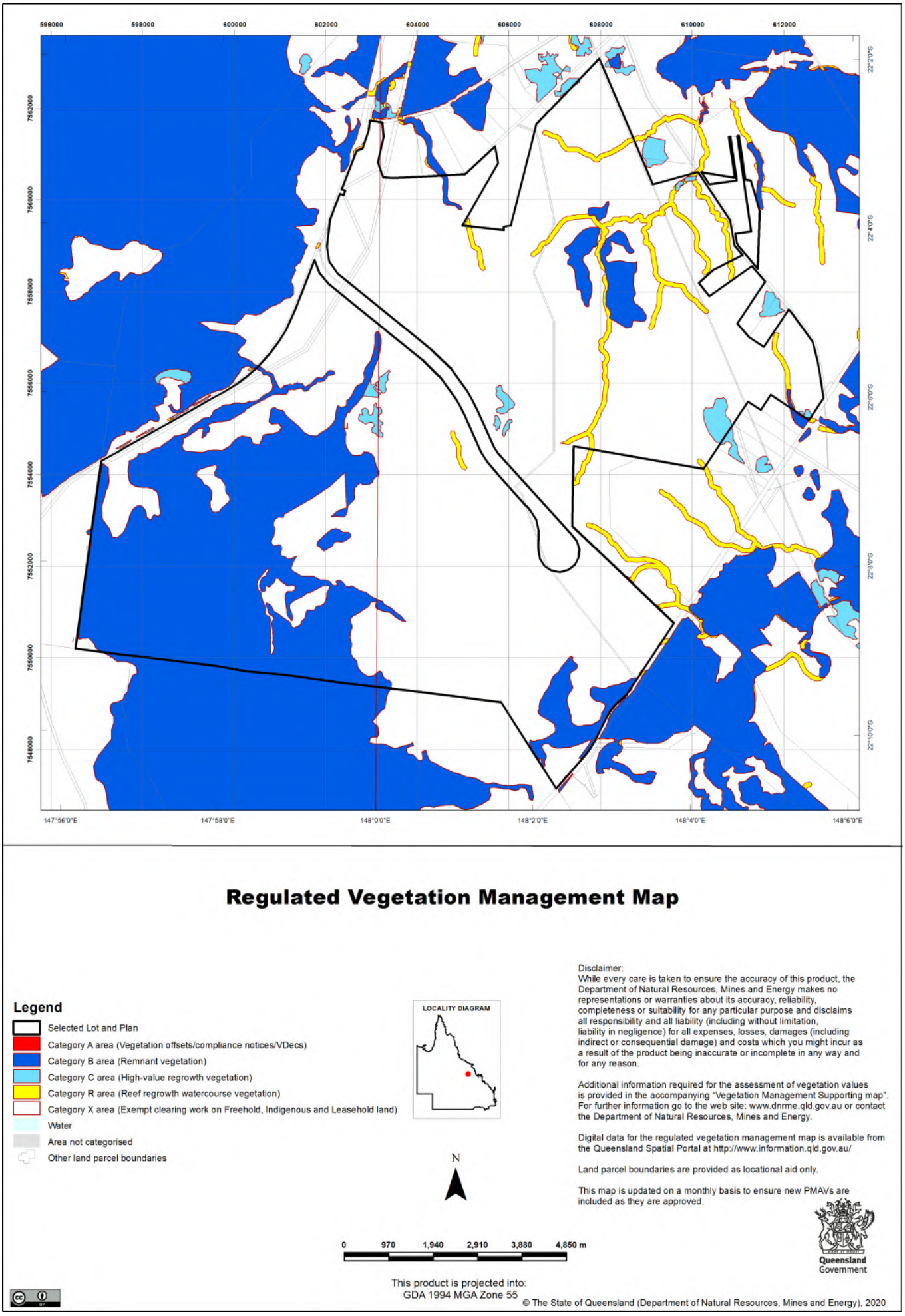
Protected plants map

The protected plants map shows areas where particular provisions of the *Nature Conservation Act 1992* apply to the clearing of protected plants.

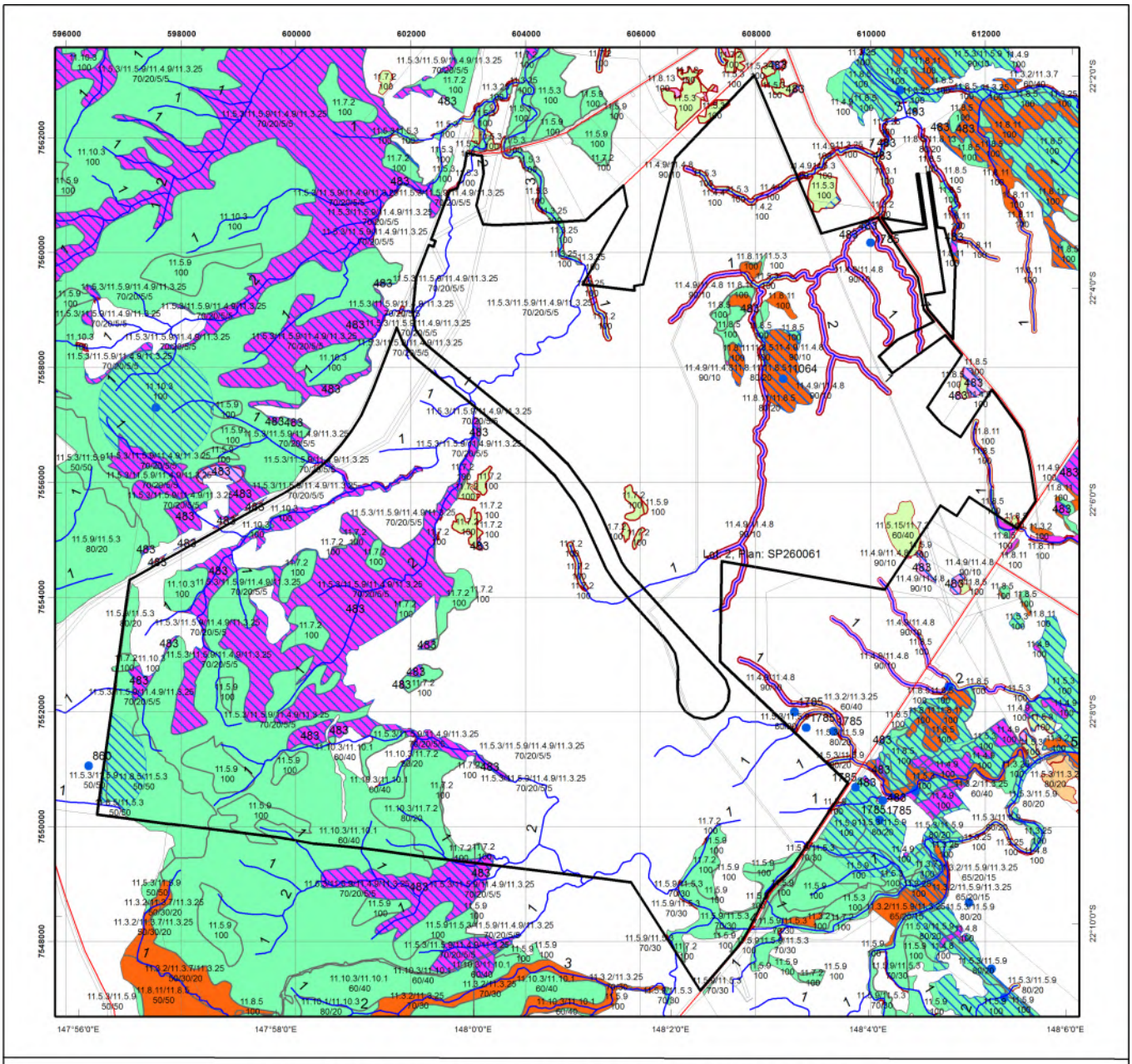
Koala priority area and koala habitat area map

The koala map shows area of koala priority area and koala habitat under the Nature Conservation (Koala) Conservation Plan 2017. Clearing of habitat in these areas is regulated under the Planning Regulation 2017. Please note that these areas only apply to lots in the South East Queensland "Shaping SEQ" Regional Plan area.

5.1 Regulated vegetation management map



5.2 Vegetation management supporting map



Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area under Section 20AH
  These areas are edged in yellow and filled with the remnant RE Status
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category C area under Section 20AI
  These areas are edged in purple and filled with the remnant RE Status
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map
  (Stream order shown as black number against stream where available)
- Roads
- National Parks, State Forest and other reserves
- Other land parcel boundaries

Queensland Government

LOCALITY DIAGRAM

N

0 690 1,380 2,070 2,760 3,450 m

This product is projected into:
GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
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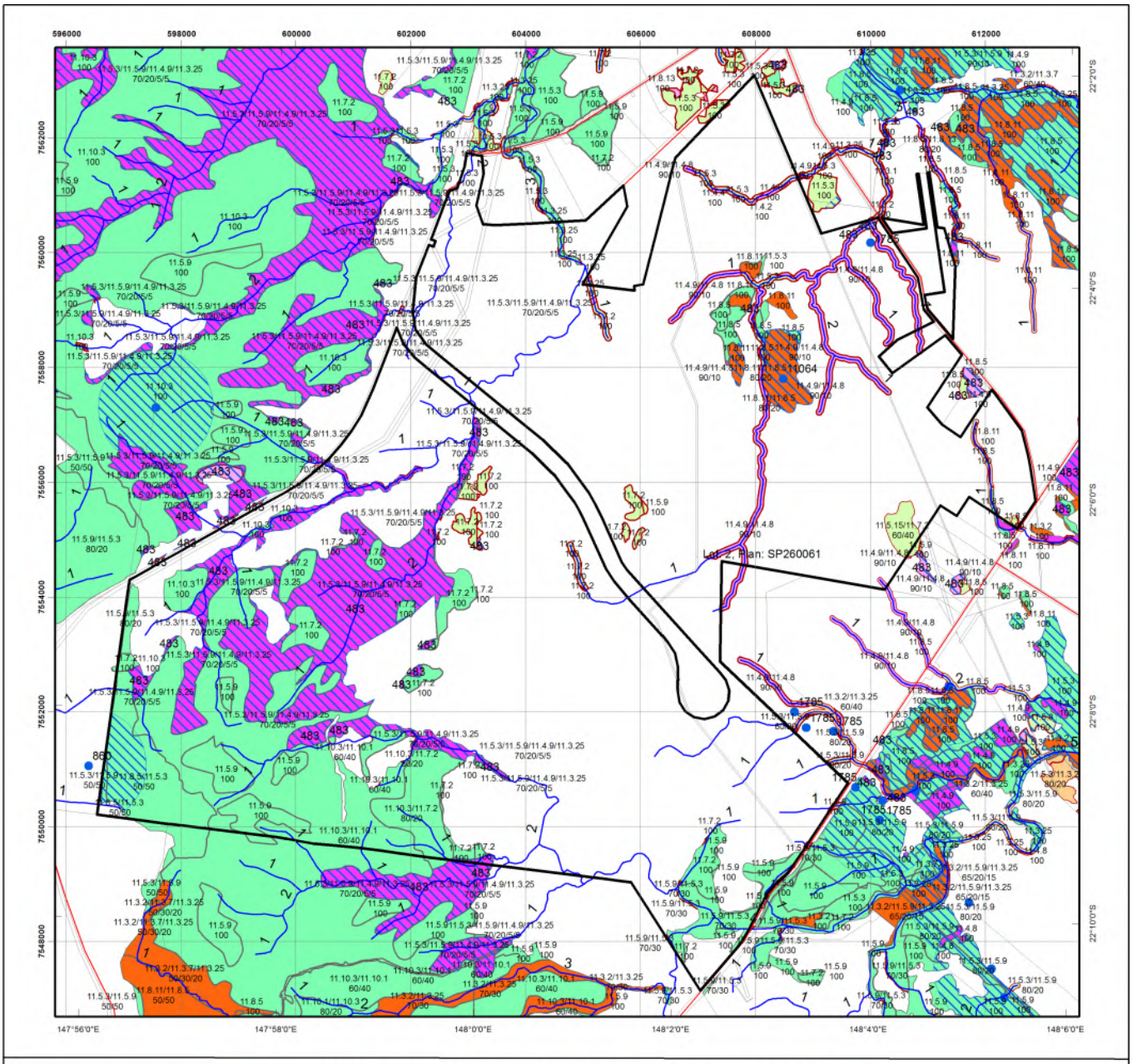
Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

5.2 Vegetation management supporting map



Vegetation Management Supporting Map

Legend

- Selected Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area under Section 20AH
  These areas are edged in yellow and filled with the remnant RE Status
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category C area under Section 20AI
  These areas are edged in purple and filled with the remnant RE Status
- Category X area
- Water
- Wetland on the vegetation management wetlands map
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- Essential habitat species record
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  (Stream order shown as black number against stream where available)
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Queensland Government

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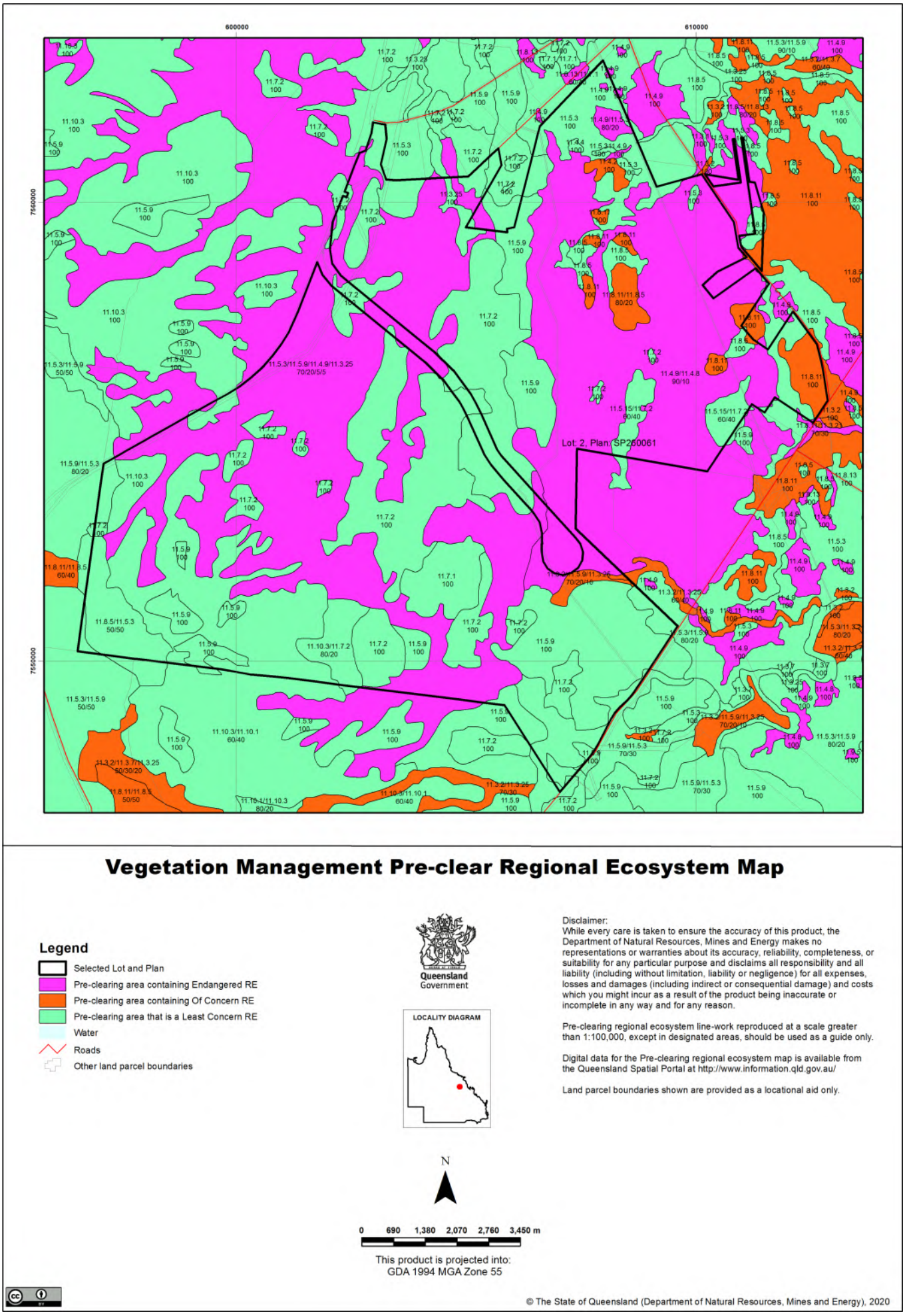
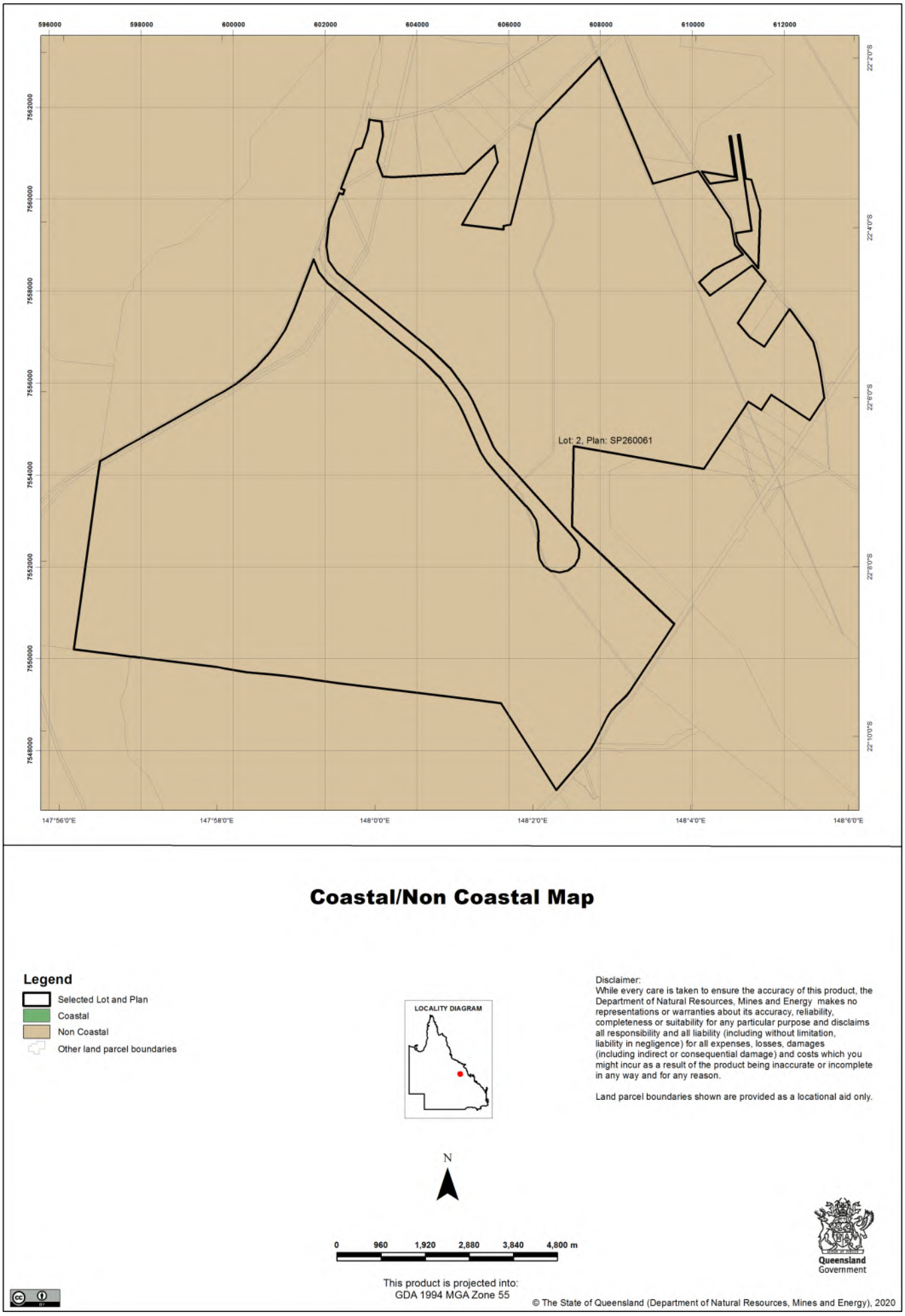
Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

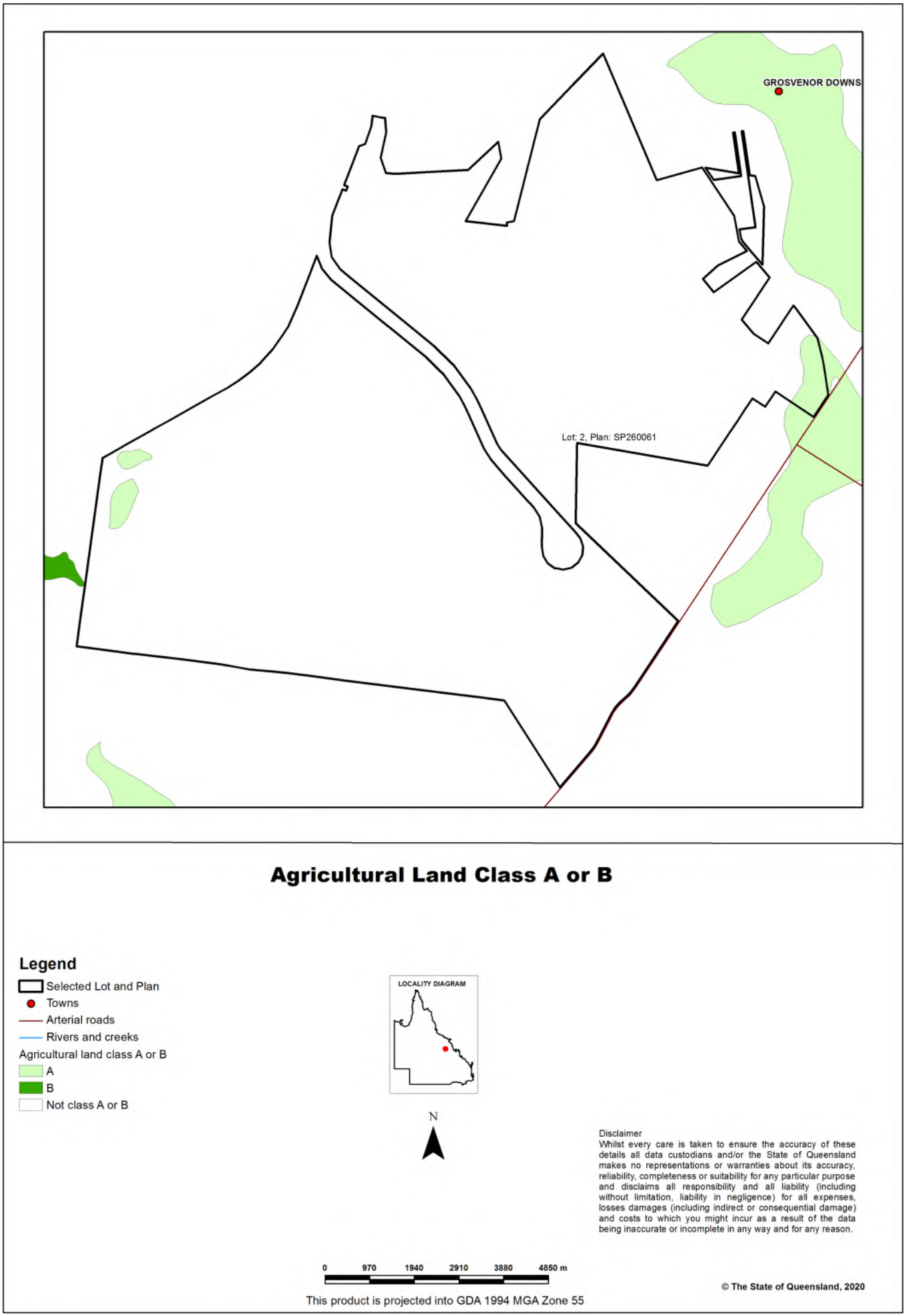
5.3 Pre-clear map



5.4 Coastal/non coastal map



5.5 Agricultural Land Class A or B map



5.6 Protected plants map administered by DES

Protected Plants Flora Survey Trigger Map

Legend

- Selected Lot and Plan
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets

N

0 640 1,280 1,920 2,560 3,200 m

This product is projected into:
GDA 1994 MGA Zone 55

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see section 89 of the Act.

Please see the Department of Environment and Science webpage on the clearing of protected plants for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

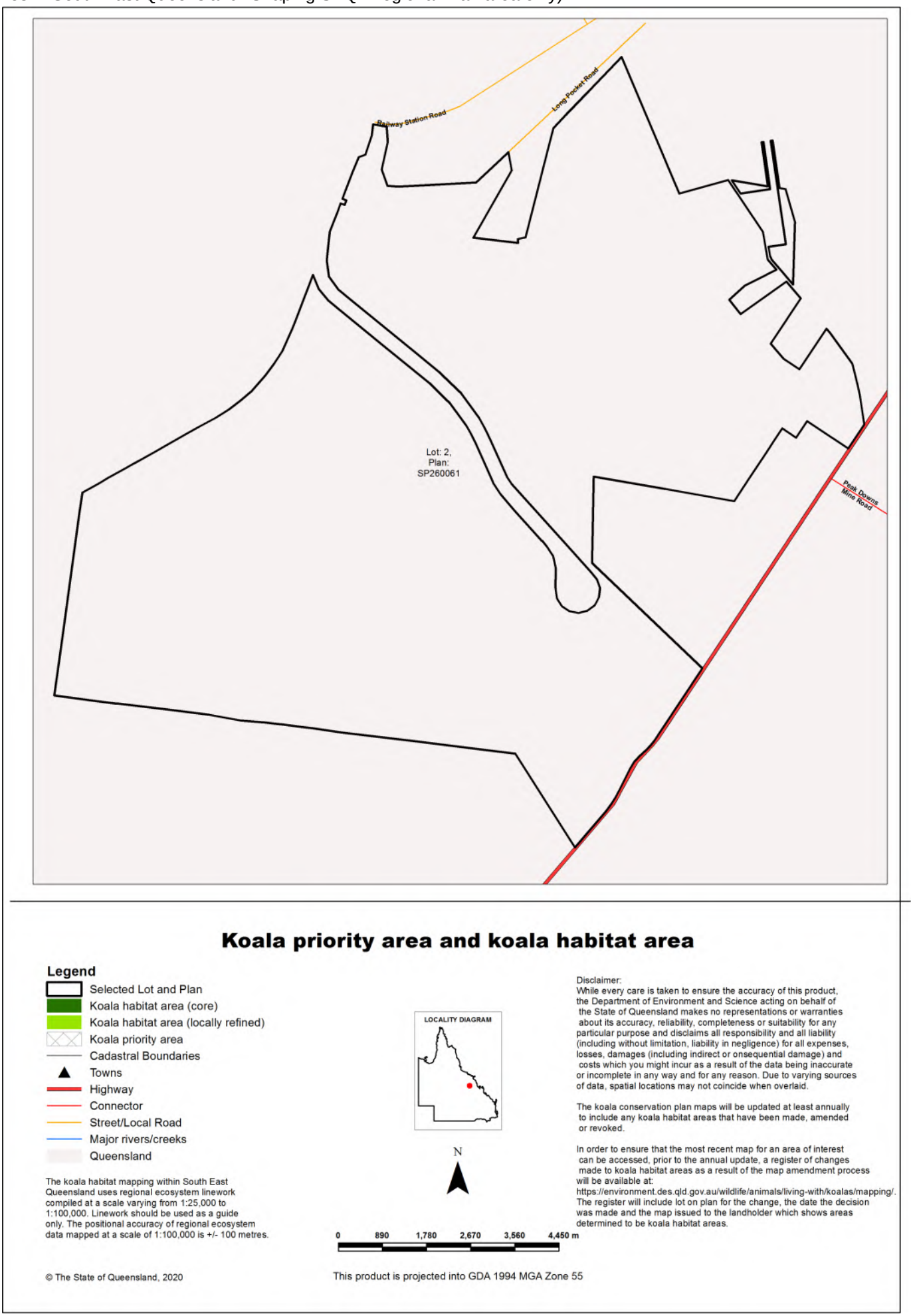
The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.

5.7 Koala priority area and koala habitat area map administered by DES

(Applies in South East Queensland "Shaping SEQ" Regional Plan area only).

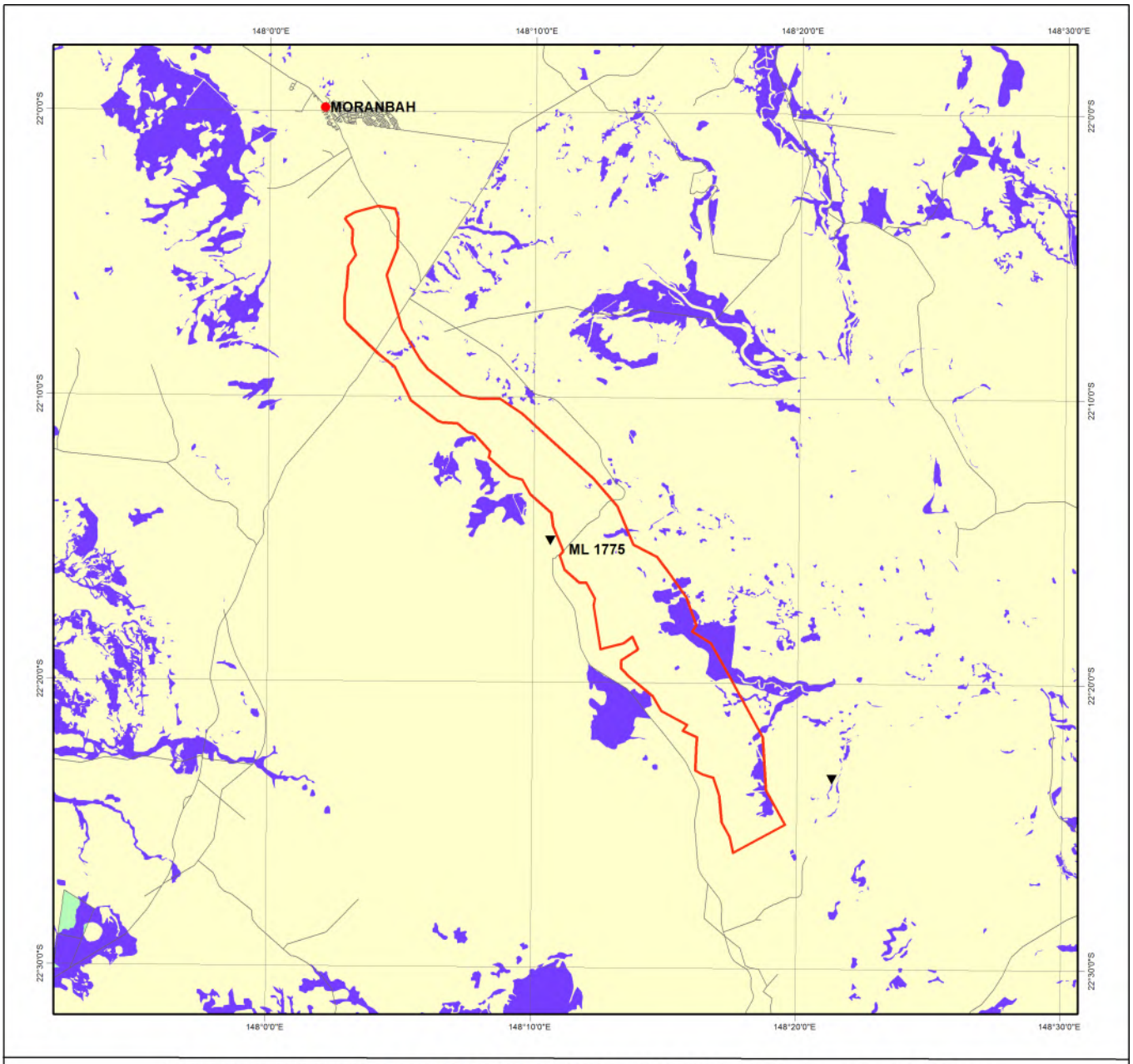


6. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Natural Resources, Mines and Energy (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dnrme.qld.gov.au
• Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Aboriginal and Torres Strait Islander Partnerships (Queensland Government)	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues • Protected plants and protected areas[1] • Koalas	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992* *Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities[2]	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Manufacturing, Infrastructure and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of Local Government, Racing and Multicultural Affairs (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office

1. In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992*, which endeavours to ensure that protected plants (whether whole plants or protected plants parts) are not illegally removed from the wild, or illegally traded. Prior to clearing, you should check the flora survey trigger map to determine if the clearing is within a high-risk area by visiting www.des.qld.gov.au. For further information or assistance on the protected plants flora survey trigger map for your property, please contact the Department of Environment and Science on 13QGOV (13 74 68) or email palm@des.qld.gov.au.

2. Contact the Department of Agriculture and Fisheries before clearing:
   - Any sandalwood on state-owned land (including leasehold land)
   - On freehold land in a 'forest consent area' or a 'forest entitlement area'
   - More than five hectares on state-owned land (including leasehold land) containing commercial timber species listed in parts 2 or 3 of Schedule 6 of the Vegetation Management Regulation 2012 and located within any of the following local government management areas-Banana, Bundaberg Regional, Fraser Coast Regional, Gladstone Regional, Isaac Regional, North Burnett Regional, Somerset Regional, South Burnett Regional, Southern Downs Regional, Tablelands Regional, Toowoomba Regional, Western Downs Regional.



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B
- World Heritage Areas
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Fish Habitat Areas
- Koala Plan
- Coordinated Conservation Areas
- Endangered Regional Ecosystems (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- Declared Catchment Areas
- Declared Irrigation Areas
- Drainage Areas
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
- Dams and Weirs

OTHERS
- Towns
- Roads
- Repealed Wild River Nominated Waterways
- Repealed Wild River Preservation Areas
- Repealed Wild River High Preservation Areas
- Mahogany Glider Habitat
- Directory of Important Wetlands
- Queensland

LOCALITY DIAGRAM

N

0 3,500 7,000 10,500 14,000 17,500 m

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External contributors (non-government parties) of the data for this product are: Great Barrier Reef Marine Park Authority

Regional ecosystem mapping (remnant biodiversity status) may incorporate amendments, resulting from property level assessments, to the release version of the mapping available on QSpatial.

NOTE TO USER: Themes presented in this map are indicative only. Field survey may be required to verify the 'true' spatial extent and value. Not all environmentally sensitive areas are presented in this map. A user should refer to the particular circumstances relevant to their situation to assess the 'completeness' of themes provided.

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Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -22.1055
Longitude: 148.0556
Distance: 50
Email: lindsay.wickson@e2mconsulting.com.au
Date submitted: Monday 18 May 2020 12:15:02
Date extracted: Monday 18 May 2020 12:20:02

The number of records retrieved = 18

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	*Geophaps scripta scripta*	squatter pigeon (southern subspecies)		V	V	60
animals	mammals	Emballonuridae	*Taphozous australis*	coastal sheathtail bat		NT		3
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	112
animals	mammals	Pseudocheiridae	*Petauroides volans minor*	northern greater glider		V	V	49
animals	mammals	Pseudocheiridae	*Petauroides volans*	greater glider		V	V	57
animals	mammals	Vespertilionidae	*Chalinolobus dwyeri*	large-eared pied bat		V	V	1
animals	reptiles	Elapidae	*Acanthophis antarcticus*	common death adder		V		1
animals	reptiles	Elapidae	*Denisonia maculata*	ornamental snake		V	V	93
animals	reptiles	Scincidae	*Lerista allanae*	Allan's lerista		E	E	1/1
plants	land plants	Amaranthaceae	*Ptilotus uncinellus*			E		1/1
plants	land plants	Apocynaceae	*Cerbera dumicola*			NT		9/6
plants	land plants	Asteraceae	*Trioncinia patens*			E		1/1
plants	land plants	Capparaceae	*Capparis humistrata*			E		1/1
plants	land plants	Euphorbiaceae	*Bertya pedicellata*			NT		19/18
plants	land plants	Mimosaceae	*Acacia arbiana*			NT		1/1
plants	land plants	Poaceae	*Dichanthium queenslandicum*			V	E	11/11
plants	land plants	Solanaceae	*Solanum elachophyllum*			E		1/1
plants	land plants	Solanaceae	*Solanum adenophorum*			E		4/4

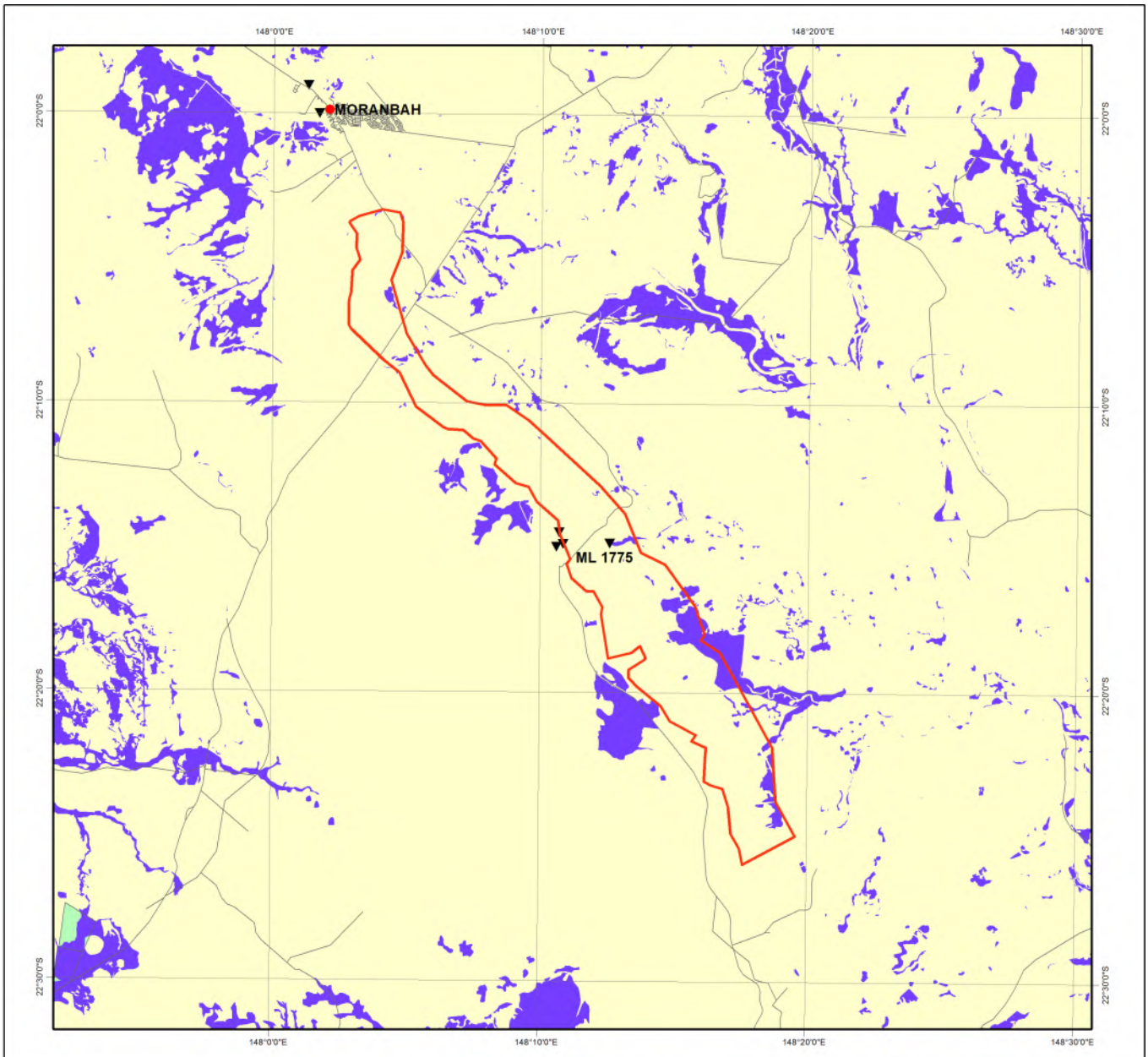
CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.



ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

CATEGORY A
- National Parks
- Conservation Parks
- Forest Reserves
- Special Wildlife Reserve
- Wet Tropics World Heritage Area
- Great Barrier Reef Marine Park Area
- Marine Parks other than General Use Zones

CATEGORY B
- Queensland Heritage Register Places
- Ramsar Sites
- Cultural Heritage Registered Areas and DLA's other than Stanbroke
- Special Forestry Areas
- Seaward Side of Highest Astronomical Tide
- Fish Habitat Areas
- Coordinated Conservation Areas
- Endangered Regional Ecosystems - regrowth and remnant (Biodiversity Status)
- General Use Zones of Marine Parks
- Marine Plants

CATEGORY C
- Nature Refuges
- Resources Reserve
- State Forests
- Timber Reserves
- River Improvement Areas
- Stanbroke DLA
- Coastal Management District
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0 3,500 7,000 10,500 14,000 17,500 m

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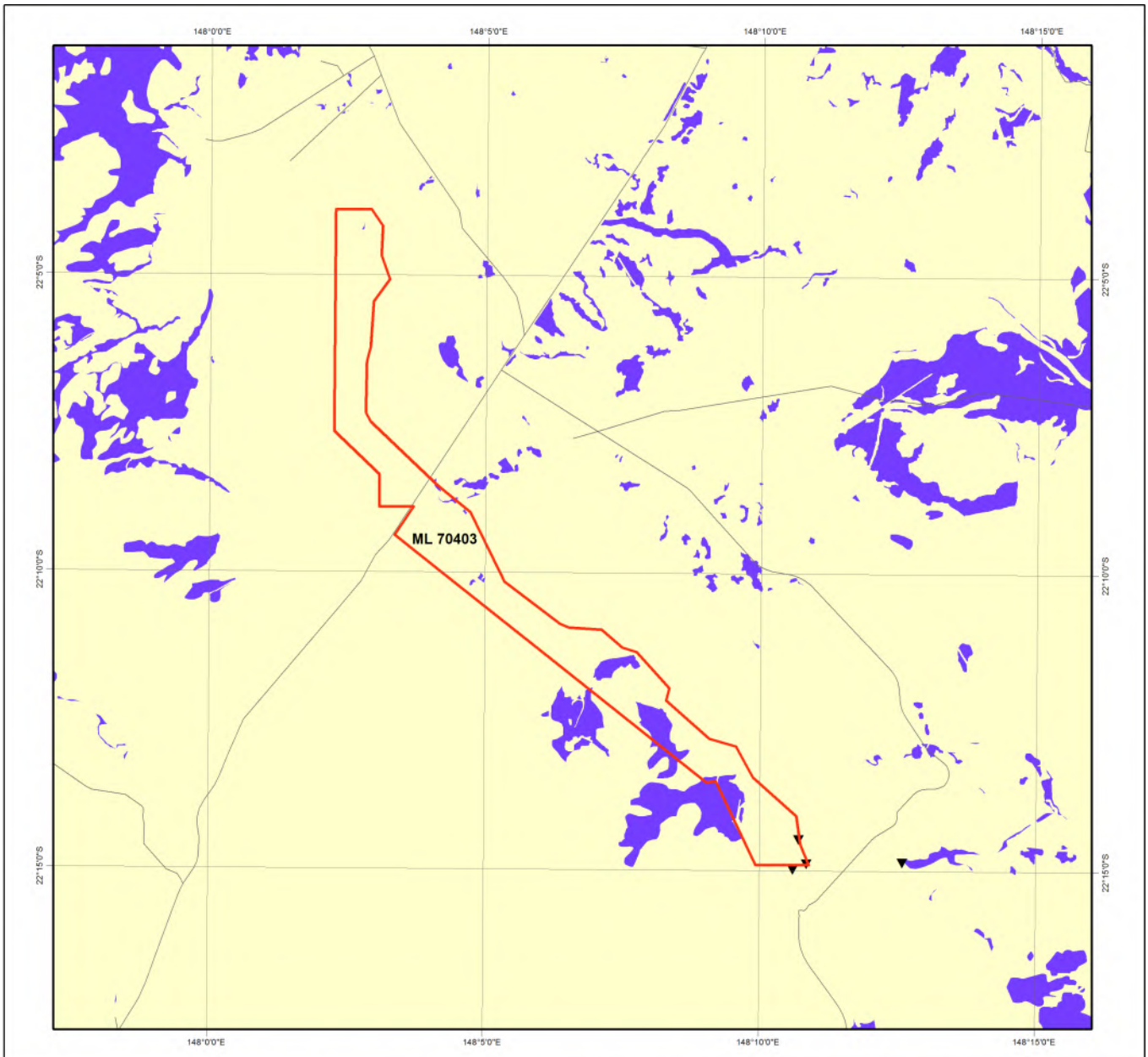

ENVIRONMENTALLY SENSITIVE AREAS - Mining Activities

- Selected Mining Lease (ML)

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N

0 1,750 3,500 5,250 7,000 8,750 m

This product is projected into GDA 1994 MGA Zone 55

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Appendix B Likelihood of Occurrence Assessments

Likelihood of Occurrence Assessment for threatened flora species

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]	Rationale
Acacia arbiana	N/A	NT	The species occurs within heathlands on rocky outcrops along the Peak Range, east of Clermont. Populations have been recorded on the Roper's and Scott's Peak (Pedley 1999). Associated species include *Corymbia trachyphloia*, *Phebalium glandulosum*, *Bertya pedicellata*, *Acacia gnidium* and *Dodonaea filifolia* (Pedley 1999).	Unlikely	Although the species has been recorded within the desktop search extent, suitable habitat for the species was not recorded within the study area.
Acacia spania	N/A	NT	This species grows mostly on rocky sandstone ridges and hills in sandy to loamy soils in eucalypt or Acacia dominated woodland communities. The species can form pure stands within these communities and has also been recorded in vine thickets along scarp edges with an altitudinal range from 400 to 600 m. Within open woodland communities *A. spania* has been recorded in association with *Eucalyptus lamprophylla* with occasional patches of *E. cloeziana*; *E. crebra* with semi-evergreen vine thicket; and *E. melanophloia*, *A. crassa*. within tall open shrubland.	Unlikely	Although the species has been recorded within the desktop search extent, suitable habitat for the species was not recorded within the study area.
Aristida annua	V	V	*Aristida annua* has been recorded within central Queensland around the Emerald and Springsure districts (DEE, 2019b). The species is known from eucalypt woodlands on black clay and basalt soils as well as disturbed sites (i.e. roadsides and pastures) (DEE 2019b; DES 2019b).	Unlikely	The species has not been previously recorded within the desktop search extent and suitable habitat was limited within the study area was limited.
Bertya pedicellata	N/A	NT	The species has been recorded on rocky hillsides in eucalypt forest or woodland, Acacia woodland or shrubland and open heathland or vine thicket communities (DES 2019b). Associated soils include skeletal to shallow sandy, sandy clay or clay loams overlaying rhyolite, trachyte or sandstone substrates (DES 2019b). Associated species include *Corymbia trachyphloia, Dodonaea filifolia, Acacia catenulata, A. curvinervia, A. shirleyi, A. rhodoxylon, A. sparsiflora, E. crebra, Acacia harpophylla* and *E. decorticans* (DES 2019b).	Unlikely	Although the species has been recorded within the desktop search extent, E2M surveyed suitable habitat (RE 11.7.1) in the study area during both the dry and wet season surveys and did not detect the species. These areas were found to be of reduced habitat quality due to past disturbance (i.e. selective clearing and weed encroachment), further reducing the species likelihood of occurrence.
Cadellia pentastylis	V	N/A	*Cadellia pentastylis* occurs in semi-evergreen vine thickets and sclerophyll vegetation on undulating terrain of various geology, including sandstone, conglomerate and claystone. Soils generally have low to medium nutrient content and are normally associated with upper and mid-slopes in the landscape. The altitude is generally 300-460 m above sea level, with some stands known to occur at 600 m above sea level. The species forms a closed or open canopy, as a dominant or commonly with *Eucalyptus albens* and *Callitris*	Unlikely	The species has not been previously recorded within the desktop search extent and suitable habitat for the species was not recorded within the study area.

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]	Rationale
			glaucophylla, with an open understorey and leaf litter dominating the forest floor (DEE 2019b).		
Capparis humistrata	N/A	E	The species has been recorded between Rockhampton and Port Curtis and one location near Harrybrandt Station near Dingo (Hewson 1982; Atlas of Living Australia 2019). The species has been recorded in eucalypt woodland with a shrubby understorey on stony ridges and serpentine soils (Hewson 1982).	Unlikely	Although the species has been recorded within the desktop search extent, suitable habitat for the species was not recorded within the study area.
Cerbera dumicola	N/A	NT	The species occurs on sandstone hills and plateaus comprising semi-evergreen vine-thicket and mixed acacia and eucalypt woodlands. Associated species include *Eucalyptus umbra, E. melanophloia, Acacia shirleyi, A. catenulata, E. thozetiana* and *Corymbia dolichocarpa* (DES 2019b).	Unlikely	Although the species has been recorded within the desktop search extent, survey of suitable habitat (marginal) within the study area did not detect the species.
Cycas ophiolitica	E	N/A	*Cycas ophiolitica* grows on hills and slopes in sparse, grassy open forest at altitude ranges from 80–400 m above sea level between Marlborough and Rockhampton in central Queensland. Although this species prefers red clay soils near Marlborough, it is more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite (DEE 2019b). The species occurs within eucalypt woodland and open woodlands containing *Corymbia dallachiana, C. erythrophloia, E. crebra, E. fibrosa* and *C. intermedia* (DEE 2019b).	Unlikely	The species has not been previously recorded in the desktop search extent and suitable habitat for the species was not recorded within the study area.
Dichanthium queenslandicum	E	V	The species typically occurs on black cracking clay in tussock grasslands mainly in association with other species of blue grasses (*Dichanthium* spp. and *Bothriochloa* spp.) but also with other grasses restricted to this soil type (DES 2019b). The species is known to occur as a component of the Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin Threatened Ecological Community (DEE 2019b).	Known	The species has been previously recorded within the desktop search extent and Caval Ridge ML (within existing pit) (HERBRECS, 2011). Suitable habitat was observed in association with RE 11.8.11.
Dichanthium setosum	V	LC	The species is associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil and is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown (DEE 2019b).	Unlikely	Although the species has not been previously recorded by available online databases, the species has been previously recorded in natural grasslands within the Moranbah area (Ecological Survey and Management, 2013; SKM 2011). E2M comprehensively surveyed the suitable habitat within the study area (i.e. RE 11.8.11) during both the dry and wet season (optimal conditions) surveys and did not detect the species. Due to the comprehensive survey effort across the area of

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]	Rationale
					potential habitat (~31 ha), the conspicuous nature of the plant (grows up to 1 m in height) and the lack of local records, the species is considered 'unlikely to occur'
Eucalyptus raveretiana	V	LC	*E. raveretiana* occurs between Rockhampton and Ayr in Queensland DEE, 2019b). The species occurs on the banks of rivers, creeks and other watercourses, on clayey or loamy soil (DEE, 2019b). The species is usually a co-dominant canopy species, associated with *Melaleuca leucadendra, M. fluviatilis, Eucalyptus tereticornis, C. tessellaris*. The species has been recorded within RE 11.3.25a, 11.3.11, 9.3.1 and 8.3.3 (DEE, 2019b).	Unlikely	The study area is not in proximity to recorded populations with no records previously recorded within the desktop search extent.
Ptilotus uncinella	N/A	E	The species has been recorded in proximity to the Newlands Coal Mine near the township of Glenden. The species grows on Acacia woodlands on slopes and plateaus with shallow, gravelly-loam soils. Associated species include *Acacia shirleyi, Erythroxylon australe, Croton insularis* and *Grevillea helmsiae*. The ground layer usually comprises *Ancistrachne uncinulata, Leptochloa decipiens* and *Paspalidium* sp. (Bean 2010).	Unlikely	Although the species has been recorded within the desktop search extent, suitable habitat for the species was not recorded within the study area.
Samadera bidwillii	V	V	The species commonly occurs in lowland rainforest often with *Araucaria cunninghamii* or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland, it is commonly found in areas adjacent to both temporary and permanent watercourses up to 510 m altitude (DES 2019b). Commonly associated trees in the open forest and woodlands include *Corymbia citriodora, Eucalyptus propinqua, E. acmenoides, E. tereticornis, C. intermedia, E. siderophloia, E. moluccana, E. cloeziana* and *E. fibrosa* (DES 2019b).	Unlikely	The species has not been previously recorded in the desktop search extent and suitable habitat for the species was limited within the study area.
Solanum adenophorum	N/A	E	The species has been recorded from the Nebo-Clermont area as well as west and north-west of Rockhampton. The species has been observed within remnant and regrowth *Acacia harpophylla* and *A. cambagei* woodlands on deep cracking clays (Bean 2004).	Potential	The species has been previously recorded within the desktop search extent and suitable habitat in association with regrowth and remnant REs 11.4.8 and 11.4.9 was recorded within the study area. Although field surveys did not detect the species, its small size can make detection difficult within dense grass and shrubs. Due to the proximity of previous species records, the presence of suitable habitat, the species tolerance of disturbance and its cryptic nature, it is considered to the potential to occur within the study area.

Flora species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurrence[2]	Rationale
Solanum elachophyllum	E	E	The species has been recorded from Middlemount to Theodore. The species has been observed within *Acacia harpophylla, Casuarina cristata, Macropteranthes leichhardtii* and *Eucalyptus cambageana* woodlands on fertile, cracking clays (Bean 2004).	Unlikely	The species has been previously recorded within the desktop search extent and suitable habitat (HVR and regrowth REs 11.4.8 and 11.4.9) is present within the study area. Extensive surveys by E2M within the study area did not detect the species. Solanum elachophyllum is more conspicuous (i.e. detectable) in its size and growth pattern in comparison to *S. adenophorum* and is also less tolerant to disturbance. Due to the extensive survey within suitable habitat, detectable nature and its sensitivity to disturbance, the species is considered unlikely to occur within the study area.
Trioncinia patens	N/A	E	*Trioncinia patens* is known from three locations around the Peak Range National Park, located between Clermont and Dysart. The species has been recorded in eucalypt woodlands on basalt derived clays and clay-loams. Associated canopy species include *Eucalyptus orgadophila, E. crebra, E. melanophloia* and *Corymbia erythrophloia* (i.e. RE 11.8.4 and 11.8.5) (Holland & Butler 2007).	Unlikely	Although the species has been previously recorded in the desktop search extent, the species has a restricted distribution and suitable habitat (RE 11.8.5) was limited and of reduced quality within the study area.

[1] EPBC Act = CE (critically endangered), E (endangered), V (vulnerable), M (migratory). NC Act = E (endangered), V (vulnerable), NT (near threatened), SLC (special least concern), LC (least concern)

[2] **Known to occur**: The species or population has been observed within the study area. **Likely to occur**: Suitable high-quality habitat for a species or population occurs within the study area and nearby records are present. **Potential**: Suitable habitat for a species or population occurs within the study area, but there is insufficient information to categorise the species as likely, or unlikely to occur. **Unlikely**: A low to very low probability that a species or population uses/occurs within the study area due to the lack of suitable habitat or the study area is outside the species known range. **Does not occur**: The species will not occur within the study area (e.g. marine species in terrestrial study site)

Likelihood of Occurrence Assessment for threatened fauna species

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]	Rationale
Birds					
Curlew sandpiper (*Calidris ferruginea*)	CE, M	E	Sheltered intertidal mudflats and muddy margins of terrestrial wetlands. Breeds in the northern hemisphere	Unlikely	• Largely coastal species • Lack of suitable foraging habitat
Red goshawk (*Erythrotriorchis radiatus*)	V	E	Undisturbed forest or woodlands adjacent to creeks and wetlands that support large populations of birds (primary food source). Nesting occurs in tall trees within 1 km of a permanent body of water	Unlikely	• study area highly disturbed • Unlikely to support prey species • Lack of breeding habitat
Squatter pigeon (*Geophaps scripta*)	V	V	Open forest to sparse, open woodlands containing *Eucalyptus, Corymbia, Acacia* or *Callitris* species in the ecologically dominant layer. Foraging and breeding habitats are largely the same however foraging occurs up to 3km from a permanent water source while breeding is typically within 1km from a permanent or ephemeral source of water (Squatter Pigeon Workshop 2011)	Known	Recorded on site as part of the 2008 terrestrial ecology studies associated with the CVM EIS (BMA 2009)
Painted honeyeater (*Grantiella picta*)	V	V	Forages on mistletoe species in a range of forests and woodlands. Nests in outer tree foliage	Unlikely	• Regrowth forests and woodlands • Mistletoe was rarely observed during field surveys
Star finch (*Neochmia ruficauda*)	E	LC	Grasslands and grassy woodlands located near fresh water. Tolerant of modified habitat (e.g. cleared or suburban areas). Forages on seeds, Casuarina cones and insects	Unlikely	No suitable habitat
Southern black-throated finch (*Poephila cincta cincta*)	E	E	Grassy, open woodlands and forests, typically dominated by *Eucalyptus, Corymbia* and *Melaleuca,* and occasionally in tussock grasslands along or near watercourses. Forages on seeds during the wet season	Unlikely	No suitable habitat
Australian painted snipe (*Rostratula australis*)	E	E	Shallow, terrestrial wetlands and waterways fringed with dense vegetation and/or coarse woody debris. Breeding habitat typically requires a small island within shallow wetlands comprised of exposed mud and various levels of vegetative cover	Potential	• Not recorded during the surveys but has been previously recorded nearby in 2018 within the Olive Downs property (DPM Enviroscienses 2018b) • The study area contains no breeding habitat • Marginal foraging habitat within ephemeral creeks and drainage lines

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]	Rationale
Migratory Terrestrial Birds					
Oriental cuckoo (*Cuculus optatus*)	M	SLC	Monsoon forest, rainforest edges, leafy trees in paddocks, river flats, mangroves, islands. The species is a regular nonbreeding migrant to coastal northern and eastern Australia	Unlikely	• Breeds in Northern Hemisphere • No suitable habitat
Black-faced monarch (*Monarcha melanopsis*)	M	SLC	Rainforests, eucalypt woodlands, coastal scrub and damp gullies. May utilise open woodland more frequently when migrating. Migrates between its range in eastern Australia	Unlikely	No suitable habitat
Yellow wagtail (*Motacilla flava*)	M	SLC	Open country near swamps, salt marshes, sewage ponds and short grassed areas (e.g. airfields). Forages on invertebrates and molluscs at water's edge	Unlikely	No suitable habitat
Satin flycatcher (*Myiagra cyanoleuca*)	M	SLC	Eucalypt forests, often near wetlands or permanent watercourses	Unlikely	• No suitable habitat • Closest record is Mount Britton (NE of Moranbah)
Migratory Wetland Birds					
Common sandpiper (*Actitis hypoleucos*)	M	SLC	Wide range of wetland habitats of varying salinity. Forages in shallow water and on bare soft mud at the edges of wetland	Unlikely	No suitable habitat
Sharp-tailed sandpiper (*Calidris acuminate*)	M	SLC	Muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation	Unlikely	No suitable habitat
Pectoral sandpiper (*Calidris melanotos*)	M	SLC	Shallow fresh to saline wetlands typically in coastal or near coastal areas but occasionally further inland	Unlikely	• Breed in the Northern Hemisphere • No suitable habitat
Latham's snipe (*Gallinago hardwickii*)	M	SLC	Freshwater wetlands on or near the coast generally among dense, low vegetation. Can be found in modified or artificial habitats.	Unlikely	• No breeding habitat on site (breeds in Japan) • No local records • Wetlands lack dense, low vegetation
Eastern osprey (*Pandion cristatus*)	M	SLC	Habitat strongly associated with open waterbodies containing fish (prey source)	Unlikely	No suitable breeding or foraging habitat
Common greenshank (*Tringa nebularia*)	M	SLC	Inland wetlands and sheltered coastal habitats of varying salinity.	Unlikely	• Breeds in the northern hemisphere • No suitable habitat

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]	Rationale
Mammals					
Northern quoll (*Dasyurus hallucatus*)	E	LC	Inhabits rocky areas as well as a broad range of dry eucalypt woodlands. Den sites include rocky outcrops, caves, hollow logs/trees.	Unlikely	No suitable habitat
Ghost bat (*Macroderma gigas*)	V	E	Habitat generalist (arid Pilbara, tropical savanna woodlands, rainforests). Roost in caves, rock crevices and old mines. The average foraging distance is approximately 2 km from the roost	Unlikely	No suitable habitat
Corben's long-eared bat (*Nyctophilus corbeni*)	V	V	Open, inland and contiguous woodlands. Roosts under tree bark and in tree hollows. Foraging can occur up to 3 km from the roost.	Unlikely	No suitable habitat
Large eared pied bat (*Chalinolobus dwyeri*)	V	V	Woodland valleys, rainforest, eucalypt forests within proximity to sandstone cliffs. Roosting sites include disused mineshafts, caves, overhangs and tree hollows.	Unlikely	No suitable habitat
Greater glider (*Petauroides Volans*)	V	V	Remnant eucalypt forest and woodland communities with large tree hollows	Unlikely	No suitable habitat. No large hollows. No remnant woodlands. High disturbance (CVM, highway). No connectivity with better quality habitat.
Koala (*Phascolarctos cinereus*)	V	V	Remnant eucalypt forest and woodland communities	Unlikely	No suitable habitat to support a population. Isolated and small stands of eucalypts, ongoing disturbance associated with CVM.
Grey-headed flying fox (*Pteropus poliocephalus*)	V	LC	Remnant eucalypt forest and woodland communities	Unlikely	No suitable roosting or foraging habitat
Short-beaked echidna	N/A	SLC	Forest, woodlands, heath, grasslands and arid environments. Forages on ant and termite mounds.	Likely	Suitable habitat
Reptiles					
Ornamental snake (*Denisonia maculata*)	V	V	Deep cracking clay soils of gilgai habitats associated with brigalow vegetation communities	Known	Recorded within the study area by E2M (2020).
Common death adder (*Acanthophis antarcticus*)	N/A	V	Dense leaf litter and abundant coarse woody debris from forest and woodland communities	Potential	• Suitable habitat, including dense leaf litter, occurs the study area. • Numerous local records

Fauna Species	EPBC Act Status[1]	NC Act Status[1]	Habitat	Likelihood of occurence[2]	Rationale
Yakka skink (*Egernia rugosa*)	V	V	Sclerophyll forest and woodland dominated by *Acacia harpophylla, A. aneura, A. catenulata, A. shirleyi, Casuarina cristata, Eucalyptus populnea, Eucalyptus spp.* and *Callitris glaucophylla*. Refuge and breeding habitat include dense ground vegetation, large hollow logs, cavities in soil-bound root systems of fallen trees and beneath rocks.	Unlikely	• No previous nearby records • Threatening processes identified (e.g. habitat fragmentation) limit dispersal ability (high site fidelity) • Limited microhabitat features (large hollow logs, soil cavities, fallen trees, rocks)
Dunmall's snake (*Furina dunmalli*)	V	V	Brigalow (*Acacia harpophylla*) on cracking black clay and clay loam soils with soil cracks, fallen timber and ground letter (refuge habitat)	Unlikely	• Degraded habitat within study area • Nearest recorded is from 1999 near Clermont approximately 90 km from the site • Naturally rare throughout its range
Allan's lerista (*Lerista allanae*)	E	E	*Eucalyptus orgadophila/E. erythrophloia* open woodlands and *Melaleuca bracteata* with leaf litter and loose surface soils commonly associated with land zone 8.	Unlikely	No suitable habitat (no land zone 8)

[1] EPBC Act = CE (critically endangered), E (endangered), V (vulnerable), M (migratory). NC Act = E (endangered), V (vulnerable), SLC (special least concern), LC (least concern) [2]**Known to occur**: The species or population has been observed within the study area. **Likely to occur**: Suitable high-quality habitat for a species or population occurs within the study area and nearby records are present. **Potential**: Suitable habitat for a species or population occurs within the study area, but there is insufficient information to categorise the species as likely, or unlikely to occur. **Unlikely**: A low to very low probability that a species or population uses/occurs within the study area due to the lack of suitable habitat or the study area is outside the species known range. **Does not occur**: The species will not occur within the study area (e.g. marine species in terrestrial study site)

Appendix C Species Lists

Flora species recorded during field assessment

Common Name	Scientific Name
blue trumpet	*Brunoniella australis*
-	*Dipteracanthus australisicus*
pastel flower	*Pseuderanthemum variabile*
black pigweed*	*Trianthema portulacastrum**
chaff flower*	*Achyranthes aspera**
hairy joyweed	*Alternanthera nana*
Murray lily	*Crinum flaccidum*
currantbush	*Carissa ovata*
-	*Cynanchum viminale*
cobbler's pegs*	*Bidens pilosa**
yellow burr daisy	*Calotis lappulacea*
yellow buttons	*Chrysocephalum apiculatum*
veronia	*Cyanthillium cinereum*
native cobbler's pegs	*Glossocardia bidens*
Parthenium weed*	*Parthenium hysterophorus**
Praxelis*	*Praxelis clematidea**
pineapple daisy	*Pterocaulon redolens*
tridax daisy	*Tridax procumbens**
native daisy	*Vittadinia sulcata*
wonga vine	*Pandorea pandorana*
weeping koda	*Ehretia membranifolia*
camel bush	*Trichodesma zeylanicum*
-	*Waltheria indica*
Harrisia cactus*	*Harrisia martinii**
Leichhardt bean	*Cassia brewsteri*
ebony tree	*Lysiphyllum carronii*
Queensland ebony	*Lysiphyllum hookeri*
silver cassia	*Senna artemisioides*
broom bush	*Capparis anomala*
nipan	*Capparis lasiantha*

Common Name	Scientific Name
narrow-leaf bumble	*Capparis loranthifolia*
-	*Polycarpaea corymbosa*
belah	*Casuarina cristata*
fishweed	*Einadia trigonos*
ruby saltbush	*Enchylaena tomentosa*
small-leaf bluebush	*Maireana microphylla*
-	*Rhagodia parabolica*
-	*Salsola australis*
grey copper burr	*Sclerolaena diacantha*
black roly-poly	*Sclerolaena muricata*
yellowwood	*Terminalia oblongata*
wandering jew	*Commelina diffusa*
baby blue eyes	*Evolvulus alsinoides*
bellvine	*Ipomoea plebeia*
-	*Jacquemontia paniculata*
-	*Cucumis melo*
slender sedge	*Cyperus gracilis*
common fringe-rush	*Fimbristylis dichotoma*
-	*Fimbristylis nuda*
small-leaved ebony	*Diospyros humilis*
cocaine tree	*Erythroxylum australe*
soft acalypha	*Acalypha eremorum*
castor oil bush*	*Ricinus communis**
budda pea	*Aeschynomene indica*
-	*Crotalaria medicaginea*
-	*Crotalaria montana*
emu-foot	*Cullen tenax*
brush hovea	*Hovea longipes*
native indigo	*Indigofera linifolia*
phasey bean*	*Macroptilium lathyroides**
rhynchosia	*Rhynchosia minima*

Common Name	Scientific Name
sesbania pea	*Sesbania cannabina*
shrubby stylo*	*Stylosanthes scabra**
-	*Vigna radiata*
common rush	*Juncus usitatus*
wombat berry	*Eustrephus latifolius*
slender wire lily	*Laxmannia gracilis*
spiny-headed mat-rush	*Lomandra longifolia*
native rosella	*Abelmoschus ficulneus*
dwarf lantern flower	*Abutilon fraseri*
-	*Hibiscus sturtii*
bladder ketmia	*Hibiscus verdcourtii*
spiked malvastrum*	*Malvastrum americanum**
-	*Melhania oblongifolia*
flannel weed*	*Sida cordifolia**
-	*Sida fibulifera*
-	*Sida hackettiana*
spiked sida	*Sida spinosa*
high sida	*Sida trichopoda*
emu apple	*Owenia acidula*
ironwood	*Acacia excelsa*
brigalow	*Acacia harpophylla*
silky wattle	*Acacia holosericea*
doolan	*Acacia salicina*
dead finish	*Archidendropsis basaltica*
leucaena*	*Leucaena leucocephala**
mimosa bush*	*Vachellia farnesiana**
sandpaper fig	*Ficus opposita*
Clarkson's bloodwood	*Corymbia clarksoniana*
Dallachy's gum	*Corymbia dallachiana*
Moreton Bay ash	*Corymbia tessellaris*
river red gum	*Eucalyptus camaldulensis*

Common Name	Scientific Name
Dawson's gum	*Eucalyptus cambageana*
poplar box	*Eucalyptus populnea*
-	*Eucalyptus thozetiana*
black tea-tree	*Melaleuca bracteata*
weeping paperbark	*Melaleuca fluviatilis*
tarvine	*Boerhavia dominii*
desert jasmine	*Jasminum didymum*
willow primrose	*Ludwigia octovalvis*
coffee bush	*Breynia oblongifolia*
hairy phyllanthus	*Phyllanthus fuernrohrii*
-	*Phyllanthus maderaspatensis*
quinine tree	*Petalostigma pubescens*
-	*Scoparia dulcis*
-	*Plumbago zeylanica*
hooky grass	*Ancistrachne uncinulata*
many-headed wire grass	*Aristida caput-medusae*
feathertop wiregrass	*Aristida latifolia*
white speargrass	*Aristida leptopoda*
Indian bluegrass*	*Bothriochloa pertusa**
buffel grass*	*Cenchrus ciliaris**
spreading windmill grass	*Chloris divaricata*
Rhodes grass*	*Chloris gayana**
purpletop chloris*	*Chloris inflata**
feathertop rhodes grass*	*Chloris virgata**
golden beard grass	*Chrysopogon fallax*
button grass	*Dactyloctenium radulans*
Queensland blue grass	*Dichanthium sericeum*
silky umbrella grass	*Digitaria ammophila*
cotton panic grass	*Digitaria brownii*
summer grass*	*Digitaria ciliaris**
awnless barnyard grass*	*Echinochloa colona**

Common Name	Scientific Name
slender nineawn	*Enneapogon gracilis*
wiry panic	*Entolasia stricta*
weeping lovegrass	*Eragrostis parviflora*
woodland lovegrass	*Eragrostis sororia*
-	*Eragrostis trichophora**
early spring grass	*Eriochloa pseudoacrotricha*
giant speargrass	*Heteropogon triticeus*
Red Flinders grass	*Iseilema vaginiflorum*
umbrella canegrass	*Leptochloa digitata*
Guinea grass*	*Megathyrsus maximus**
red Natal grass*	*Melinis repens**
native millet	*Panicum decompositum*
comet grass	*Perotis rara*
-	*Sehima nervosum*
South African pigeon grass*	*Setaria sphacelata**
-	*Setaria surgens*
-	*Sorghum nitidum*
fairy grass	*Sporobolus caroli*
western rat's tail grass	*Sporobolus creber*
sabi grass*	*Urochloa mosambicensis**
smartweed	*Persicaria attenuata*
native water hyacinth	*Monochoria cyanea*
slender pigweed	*Portulaca filifolia*
pigweed*	*Portulaca oleracea**
-	*Portulaca pilosa*
-	*Grevillea parallela*
beefwood	*Grevillea striata*
corkwood	*Hakea lorea*
booral	*Persoonia falcata*
soap tree	*Alphitonia excelsa*
-	*Everistia vacciniifolia*

Common Name	Scientific Name
myrtle tree	*Psydrax oleifolia*
lime bush	*Citrus glauca*
scrub leopardwood	*Flindersia dissosperma*
wilga	*Geijera parviflora*
sandalwood	*Santalum lanceolatum*
scrub boonaree	*Alectryon diversifolius*
boonaree	*Alectryon oleifolius*
whitewood	*Atalaya hemiglauca*
winter apple	*Eremophila debilis*
false sandalwood	*Eremophila mitchellii*
thorn apple	*Datura stramonium*
-	*Physalis lanceifolia**
dysentery plant	*Grewia latifolia*
dysentery bush	*Grewia retusifolia*
Jamaican snakeweed*	*Stachytarpheta jamaicensis**
common verbena*	*Verbena litoralis**
spade flower	*Afrohybanthus enneaspermus*
orange spade flower	*Afrohybanthus stellarioides*

*introduced species

Fauna species recorded during field assessment

Common Name	Scientific Name
Amphibians	
greenstripe frog	*Cyclorana alboguttata*
striped marshfrog	*Limnodynastes peronii*
common green treefrog	*Litoria caerulea*
naked treefrog	*Litoria rubella*
Wilcox's frog	*Litoria wilcoxii*
cane toad*	*Rhinella marina**
Birds	
Pacific black duck	*Anas superciliosa*
Australasian pipit	*Anthus novaeseelandiae*
wedge-tailed eagle	*Aquila audax*
Australian bustard	*Ardeotis australis*
hardhead	*Aythya australis*
pheasant coucal	*Centropus phasianinus*
Australian wood duck	*Chenonetta jubata*
rufous songlark	*Cincloramphus mathewsi*
Torresian crow	*Corvus orru*
brown quail	*Coturnix ypsilophora*
pied butcherbird	*Cracticus nigrogularis*
Australian magpie	*Cracticus tibicen*
black swan	*Cygnus atratus*
laughing kookaburra	*Dacelo novaeguineae*
emu	*Dromaius novaehollandiae*
singing honeyeater	*Gavicalis virescens*
diamond dove	*Geopelia cuneata*
peaceful dove	*Geopelia striata*
western gerygone	*Gerygone fusca*
brolga	*Grus rubicunda*
whistling kite	*Haliastur sphenurus*
welcome swallow	*Hirundo neoxenaneoxena*

Common Name	Scientific Name
red-backed fairy-wren	*Malurus melanocephalus*
black kite	*Milvus migrans*
southern boobook	*Ninox boobook*
crested pigeon	*Ocyphaps lophotes*
striated pardalote	*Pardalotus striatus*
tree martin	*Petrochelidon nigricans*
little friarbird	*Philemon citreogularis*
tawny frogmouth	*Podargus strigoides*
grey-crowned babbler	*Pomatostomus temporalis*
willie wagtail	*Rhipidura leucophrys*
Australasian grebe	*Tachybaptus novaehollandiae*
double-barred finch	*Taeniopygia bichenovii*
zebra finch	*Taeniopygia guttata*
forest kingfisher	*Todiramphus macleayii*
eastern barn owl	*Tyto delicatula*
Mammals	
rufous bettong	*Aepyprymnus rufescens*
feral dog*	*Canis lupus familiaris**
deer*	*Cervus* species*
feral cat*	*Felis catus**
eastern grey kangaroo	*Macropus giganteus*
red kangaroo	*Macropus rufus*
rabbit*	*Oryctolagus cuniculus**
sugar glider	*Petaurus breviceps*
squirrel glider	*Petaurus norfolcensis*
feral pig*	*Sus scrofa**
brushtail possum	*Trichosurus vulpecula*
swamp wallaby	*Wallabia bicolor*
Reptiles	
zig zag velvet gecko	*Amalosia rhombifer*
nobbi dragon	*Amphibolurus nobbi*

Common Name	Scientific Name
rainbow skink	*Carlia vivax*
Ctenotus skink	*Ctenotus* species
ornamental snake	*Denisonia maculata*
dubious dtella	*Gehyra dubia*
Bynoe's gecko	*Heteronotia binoei*
Lerista	*Lerista fragilis*
Burton's legless lizard	*Lialis burtonis*
spiny knob-tailed gecko	*Nephrurus asper*
keelback	*Tropidonophis mairii*

*introduced species

Appendix B Habitat Quality Calculations

Horse Pit Expansion Project - Site attribute habitat quality scores

		Matter Areas								
		Dicanthium queenslandicum	ornamental snake	squatter pigeon (preferred habitat)	squatter pigeon (suitable habitat)	Australian painted snipe	common death adder	short-beaked echidna	regulated vegetation (RE 11.8.11)	connectivity (RE 11.8.11 and 11.7.1)
		Matter Area BioCondition Score (Bcmatter area) out of 10								
		3.25	4.15	5.85	4.53	4.15	5.88	4.33	3.25	5.13
Assessment Unit (AU)	**AU BioCondition Score (BC AUx) out of 10**	**Weighted BioCondtion Scores (WBC AUx)**								
2	5.59	-	-	-	-	-	0.01	0.00	-	-
3	4.15	-	4.15	-	2.48	4.15	-	3.47	-	-
5	5.85	-	-	5.62	1.66	-	4.98	0.60	-	4.23
7	3.25	3.25	-	-	0.37	-	-	0.13	3.25	0.90
1	5.06	-	-	-	0.02	-	-	0.00	-	-
6	5.63	-	-	0.22	-	-	-	0.02	-	-
4	6.00	-	-	-	-	-	0.89	0.11	-	-

Horse Pit Expansion Project - BioCondition Assessment Data

Assessment Unit	**4**			**2**			**3**			**3**	
Site	A8			B12			B13			B14	
Regional ecosystem	11.5.9b			11.4.8			11.4.9			11.4.9	
Broad condition state	Remnant			Regrowth			Regrowth			Regrowth	
Biocondition attribute	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**
Recruitment of woody perennial species (%)		50	3		100	5		50	3		100
Native plant species richness - trees (No.)	3	4	5	3	2	2.5	5	2	2.5	5	3
Native plant species richness - shrubs (No.)	6	2	2.5	10	6	2.5	10	5	2.5	10	3
Native plant species richness - grasses (No.)	9	3	2.5	9	7	2.5	5	3	2.5	5	3
Native plant species richness - forbs (No.)	11	1	0	7	5	2.5	10	10	5	10	12
Tree emergent height (m)	na	0		na	0		na	0		na	0
Tree canopy height (m)	17	16	5	17	6	3	13	6	3	13	5
Tree sub-canopy height (m)	8	5	3	9	0	0	8	0	0	8	0
Tree height - average			4			1.5			1.5		
Tree emergent cover (%)	na	0		na	0		na	0		na	0
Tree canopy cover (%)	25	16.8	5	40	0	0	25	0	0	25	0
Tree sub-canopy cover (%)	5	14.2	3	3	18	3	10	11	5	10	7
Tree cover - average			4			1.5			2.5		
Native shrub canopy cover (%)	10	0	0	5	6	5	5	5	5	5	4
Native perennial grass cover (%)	26	37	5	20	18	5	20	8	1	20	4
Organic litter (%)	30	28	5	37	17	3	45	24	5	45	15
Large trees/ha - total	20	12	10	42	46	15	45	0	0	45	0
Coarse woody debris (m/ha)	342	160	2	813	195	2	1200	280	2	1200	300
Non-native plant cover (%)	0	5	5	0	60	0	0	55	0	0	65
Maximum site-based score			80			80			80		
Site-based BioCondition score (out of 10)			**6**			**6**			**4.0625**		

Assessment Unit (AU)	**4**	**2**	**3**	**5**	**7**	**1**	**6**
AU BioCondition Score	6	5.40625	3.9625	5.541667	3.25	4.875	5.4375
AU Area							
AU Weighted BioCondition Score							

	3			5			5			5			3	
	B15			B16			B17			B18			B19	
	11.4.9			11.7.1			11.7.1			11.7.1			11.4.9	
	Regrowth			Remnant			Remnant			Remnant			Regrowth	
Score	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**
5		100	5		50	3		100	5		60	3		100
2.5	5	2	2.5	4	4	5	4	3	2.5	4	5	5	5	2
2.5	10	2	0	8	6	2.5	8	4	2.5	8	6	2.5	10	4
2.5	5	5	5	8	1	0	8	4	2.5	8	4	2.5	5	2
5	10	8	2.5	9	4	2.5	9	9	5	9	9	5	10	8
	na	0		na	0		na	0		na	0		na	0
3	13	5	3	20	16	5	20	15	5	20	17	5	13	7
0	8	0	0	9	0	0	9	0	0	9	0	0	8	0
1.5			1.5			2.5			2.5			2.5		
	na	0		na	0		na	0		na	0		na	0
0	25	0	0	27	7.5	2	27	23	5	27	11	2	25	0
5	10	29	3	5	22	3	5	6	5	5	25	3	10	35
2.5			1.5			2.5			5			2.5		
5	5	4	5	10	7	5	10	0	0	10	3	3	5	2
1	20	9	1	20	2	1	20	9	1	20	17	3	20	9
3	45	38	5	20	7	3	20	49	3	20	39	5	45	17
0	45	0	0	20	4	5	20	14	10	20	8	5	45	4
2	1200	350	2	424	420	5	424	320	5	424	20	0	1200	140
0	0	55	0	0	30	3	0	20	5	0	15	5	0	55
80			80			80			80			80		
4.0625			**3.875**			**5**			**6.125**			**5.5**		

	3			7			1			7			6	
	B3			B4			B5			B6			B7	
	11.4.9			11.8.11			11.3.1			11.8.11			11.8.5	
	Regrowth			Remnant			HVR			Remnant			Regrowth	
Score	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**	**Score**	**Benchmark**	**Value**
5		100	5		0	0		60	3		0	0		50
2.5	5	3	2.5	na	na		3	5	5	na	na		2	4
2.5	10	7	2.5	na	2		5	6	5	na	2		3	7
2.5	5	2	2.5	11	6	2.5	4	5	5	11	5	2.5	6	2
2.5	10	12	5	17	7	2.5	8	7	2.5	17	3	0	16	9
	na	0		na	0		na	0		na	0		na	0
3	13	6	3	na	0		14	8	3	na	0		15	10
0	8	0	0	na	0		4	0	0	na	0		5	0
1.5			1.5						1.5					
	na	0		na	0		na	0		na	0		na	0
0	25	15	5	na	0		29	7	2	na	0		13	10
3	10	0	0	na	0		9	0	0	na	0		3	1.5
1.5			2.5						1					
3	5	7.5	5	na	0		8	3	3	na	2		2	8
1	20	2	1	43	29	3	8	11	5	43	9	1	60	15
3	45	14	3	13	6	3	34	10	3	13	9	5	25	16
5	45	0	0	na	0	0	170	8	5	na	0	0	6	2
2	1200	50	0	na	0		1752	60	0	na	60		250	150
0	0	75	0	0	55	0	0	60	0	0	70	0	0	60
80			80			30			80			30		
4			**3.8125**			**3.666667**			**4.875**			**2.833333**		

	2		
	B9		
	11.4.8		
	Regrowth		
Score	**Benchmark**	**Value**	**Score**
3		100	5
5	3	3	5
5	10	8	2.5
2.5	9	6	2.5
2.5	7	4	2.5
	na	0	
3	17	10	3
0	9	0	0
1.5			1.5
	na	0	
5	40	1.5	0
5	3	7	3
5			1.5
3	5	5	5
1	20	9	1
5	37	20	5
5	42	4	5
5	813	90	2
0	0	55	0
80			80
5.4375			**4.8125**

Species	Habitat attributes	Indicators	Score	Score (out of 25)	Weighting	Weighted score
ornamental snake	Quality and availability of food and habitat required for foraging (25%)	1. Abundance of native amphibians (absent (0) to high (5)) x5	4	20.00	1	20
					Subtotal	20
	Quality and availability of habitat required for shelter and breeding	1. Abundance and quality of gilai, soil cracks (absent (0) to high (5)) x5	4	20.00	1	20
					Subtotal	20
	Quality and availability of habitat required for mobility (25%)	1. Fragmentation (completely fragmented (0) to highly connected (5)) x5	2	10.00	1	10
					Subtotal	10
	Threat Abundance (25%)	1. Habitat loss / fragmentation (abundant (0) to absent (5)) x5	2	10.00	0.33	3
		2. Abundance of feral predators (including cane toads) (abundant (0) to absent (5)) x5	3	15.00	0.33	5
		3. Vehicle strike risk (high (0) to absent (5)) x5	4	20.00	0.33	7
					Subtotal	15
					Total	6
Squatter Pigeon (preferred/suitable)	Quality and availability of food and habitat required for foraging (25%)	1. Average ground cover less than 33% (dense ground cover (>70%) (0) to less than 33% (5)) x 5	2	10.00	0.5	5
		2. Average distance to water (>3km (0), 1-3km (12.5), <1km (25))	20	20.00	0.4	8
		3. Abundance of seeds (absent (0) to abundant (5)) x 5	2	10.00	0.1	1
					Subtotal	14
	Quality and availability of habitat required for shelter and breeding (25%)	1. Average ground cover less than 33% (dense ground cover (>70%) (0) to less than 33% (5)) x 5	2	10.00	0.5	5
		2. Average distance to water (>1km (0), <1km (25))	20	20.00	0.4	8
		3. Well draining soil for nesting (absent (0) to majorly (5)) x 5	1	5.00	0.1	1
					Subtotal	14
	Quality and availability of habitat required for mobility (25%)	1. Dispersal habitat (no barrier to movement) present connecting fragmented patches of breeding and foraging habitat (ground cover (>70%) (0) to less than 33% (5)) x 5	2	10.00	1	10
					Subtotal	10
	Threat Abundance (25%)	Abundance of feral predators (abundant (0) to absent (5)) x5	2	10.00	0.2	2
		Encroachment of non-native pasture grass (e.g. buffel grass) (increases ground cover) (abundant (0) to absent (5)	2	10.00	0.2	2
		Habitat loss (e.g. clearing for agriculture) (total loss of habitat (0) to no clearing (5))	2	10.00	0.2	2
		Overstocking (abundant (0) to absent (5))	5	25.00	0.2	5
		Bushfire (high risk (0) to low risk (0)) x 5	5	25.00	0.2	5
					Subtotal	16
					Total	5
Australian painted snipe	Quality and availability of food and habitat required for foraging (25%)	Draingees, wetlands and dams with dense fringing vegetation (none (0) to abundant (5)) x 5	1	5.00	1	5
					Subtotal	5
	Quality and availability of habitat required for shelter and breeding 25%)	exposed mudflats on islands and adjacent dense vegetation (none (0) to abundant (5) x 5	0	0	1	0
					Subtotal	0
	Threat Abundance (50%)	Abundance of feral predators (abundant (0) to absent (5)) x5	2	10	1	10
					Subtotal	10
					Total	2