

Biodiversity Impact Assessment for EA Amendment Application

Hopeland - Jammat Phase 1 development project

Prepared for: Arrow Energy Pty Ltd

Date: 31/03/2026

Document information

Document	Biodiversity Impact Assessment for EA Amendment Application
Attexo ref	ARR-002
Date	31 March 2026
Prepared by	Ecologists, Senior Ecologists and Principal Environmental Consultant – Attexo
Reviewed by	Principal Environmental Scientist

Quality information

Rev	Date	Details	Authorisation	
			Position	Signature
0	19-03-2026	Final	Principal Environmental Scientist	JC
1	31-03-2026	Final	Principal Environmental Scientist	JC

Prepared for:
Arrow Energy Pty Ltd

Prepared by:
Attexo Group Pty Ltd
attexo.com.au
ABN 75 637 138 008

Attexo Group Pty Ltd 2026
The information contained in this document produced by Attexo Group Pty Ltd is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and Attexo Group Pty Ltd undertakes no duty to or accepts any responsibility to any third party who may rely upon this document. All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored or transmitted in any form without the consent of Attexo Group Pty Ltd.

Contents

1. Introduction 5

1.1 Project description and key terms 5

1.2 Approach to assessment of impacts 7

1.2.1 Likelihood of occurrence assessment 7

1.2.2 Study area versus Project footprint 7

1.3 Scope of this report 7

1.3.1 Limitations 7

1.4 Regulatory framework 8

1.4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) 8

1.4.2 *Environmental Protection Act 1994* (Queensland) 8

1.4.3 Environmental Offsets Act 2014 10

1.4.4 Nature Conservation Act 1992 10

1.4.5 Vegetation Management Act 1999 11

2. Methodology 12

2.1 Desktop assessment 12

2.1.1 Likelihood of Occurrence Matrix 12

2.2 Field-based assessments 13

2.2.1 Flora survey effort 13

2.2.2 Fauna survey effort 13

3. Description of ecological values 18

3.1 Description of environmental values - general 18

3.1.1 Environmentally Sensitive Areas 18

3.2 Description of environmental values – terrestrial flora 24

3.2.1 Vegetation communities 24

3.2.2 Conservation-significant flora 27

3.2.3 Protected plants trigger map 27

3.3 Description of environmental values – terrestrial fauna 30

3.3.1 Habitat types and condition 30

3.3.2 Watercourses 32

3.3.3 Wetlands 34

3.3.4 State Forests 34

3.3.5 Conservation-significant fauna 34

3.3.6 Near Threatened fauna species 46

3.3.7 Essential habitat mapping 46

4. Impact assessment 48

4.1 Planning and design 48

4.1.1 Co-location 48

4.1.2 Waterway crossing methodologies 49

4.2 Overview of impacts 49

4.2.1 Vegetation clearing 49

4.2.2 Habitat fragmentation and landscape connectivity 50

4.2.3 Impacts to hollow-bearing trees 50

4.2.4 Indirect impacts 51
4.3 Impacts on State Forests 51
4.4 Impacts on terrestrial flora values 51
4.4.1 Impacts on conservation significant flora species 51
4.4.2 Endangered REs by VM Class 51
4.4.3 Of Concern REs by VM Class 51
4.4.4 Impacts on watercourse vegetation 51
4.5 Impacts on terrestrial fauna values 51
4.5.1 Impacts on habitat for endangered fauna species 52
4.5.2 Impacts on habitat for vulnerable fauna species 59
4.5.3 Impacts on habitat for Special Least Concern species 68
4.5.4 Impacts on mapped essential habitat 69
4.5.5 Impacts to fish passage 69
5. Summary of proposed amendments 73
5.1 Environmentally sensitive areas 73
5.2 Prescribed environmental matters 76
6. References 80

Appendices

Appendix A EPBC Approval
Appendix B Environmental Authority
Appendix C LoOM species habitat criteria
Appendix D PEC Reports
Appendix E LFC tool results

Figures

Figure 1.1: Project Study area 6
Figure 2.1: Fauna survey efforts 17
Figure 3.1: Ecological context 20
Figure 3.2: Environmentally Sensitive Areas (Category B) 21
Figure 3.3: Environmentally Sensitive Areas (Category C) 22
Figure 3.4: Environmentally Sensitive Areas (Category C) – protected wildlife habitat 23
Figure 3.5: State RE Mapping 25
Figure 3.6: Ground-truthed Regional Ecosystem mapping 28
Figure 3.7: Conservation significant flora species records 29
Figure 3.8: Conservation-significant fauna records that are known likely to occur in the Study area 37
Figure 3.9: Conservation-significant fauna records (birds) 39
Figure 3.10: Conservation-significant fauna records (invertebrates) 41
Figure 3.11: Conservation-significant fauna records (mammals) 43
Figure 3.12: Conservation significant fauna records (reptiles) 45
Figure 3.13: Essential Habitat mapping 47

Tables

Table 2.1: Summary of Ecological Surveys conducted either within the Study area or in the broader vicinity 13
Table 2.2: Summary of main survey effort (EcoSmart, 2017) 15
Table 2.3: Supplementary fauna survey effort 15
Table 3.1: Project Environmentally Sensitive Areas 18
Table 3.2: State Regional Ecosystem mapping by VM Act Status 24
Table 3.3: Ground-truthed Regional Ecosystems by Biodiversity Status 26
Table 3.4: Summary of fauna species known or likely to occur in the Study area 35
Table 4.1: Vegetation clearing for the pipeline footprint by RE type 49
Table 4.2: Summary of the Project impacts on protected wildlife habitat 52
Table 4.3: Significant Residual Impact Assessment for the Endangered Brigalow Woodland Snail 52
Table 4.5: Significant Residual Impact Assessment for the Endangered Koala 55
Table 4.7: Significant Residual Impact Assessment for the Vulnerable Dunmall's snake 59
Table 4.8: Significant Residual Impact Assessment for the Vulnerable Glossy Black-cockatoo 62
Table 4.9: Significant Residual Impact Assessment for the Vulnerable diamond firetail 64
Table 4.10: Assessment of significant residual impacts for the Vulnerable southern whiteface 66
Table 4.11: Significant Residual Impact Assessment for the Special Least Concern short-beaked echidna 68
Table 4.12: Significant Residual Impact Assessment for impacts to fish passage 71
Table 5.1: Proposed disturbance in ESAs 74
Table 5.2 Proposed amendments to Protecting biodiversity values, Table 3 – Significant residual impacts to prescribed environmental matters 76

1. Introduction

Arrow Energy Pty Ltd (Arrow) operates the Surat Gas Project (SGP) in the Surat Basin located in southern Queensland. The SGP is planned to contribute to fulfilling a growing demand for natural gas in both domestic and international markets.

Attexo Pty Ltd (Attexo) has been engaged by Arrow Pty Ltd (Arrow) to undertake an assessment of biodiversity impacts associated with the development of the Surat Gas Project (SGP) to inform an application to amend the approved Environmental Authority (EA0001401) (Hopeland EA) under the *Environmental Protection Act 1994* (Qld) (EP Act). Specifically, amendments are being sought to authorise impacts associated with the Hopeland gas area Jammat Phase 1 development project (the Project).

For the purposes of this assessment, values and impacts have been reported using a Study area around the development footprint (refer **Figure 1.1**) which is based on a 500 m buffer of proposed infrastructure.

The Project involves the construction of wells and associated supporting activities and additional infrastructure and incidental activities on Petroleum Lease (PL) tenement PL253.

Attexo has been engaged to undertake the following to inform an EA amendment application under the EP Act:

- assess the ecological values of the Study area
- calculate anticipated impacts on these values associated with the updated Project design
- confirm the extent to which these impacts are already approved or trigger an amendment to the current EA, and
- where the impacts are not already approved under the current EA, assess and report on the likely significance of those impacts.

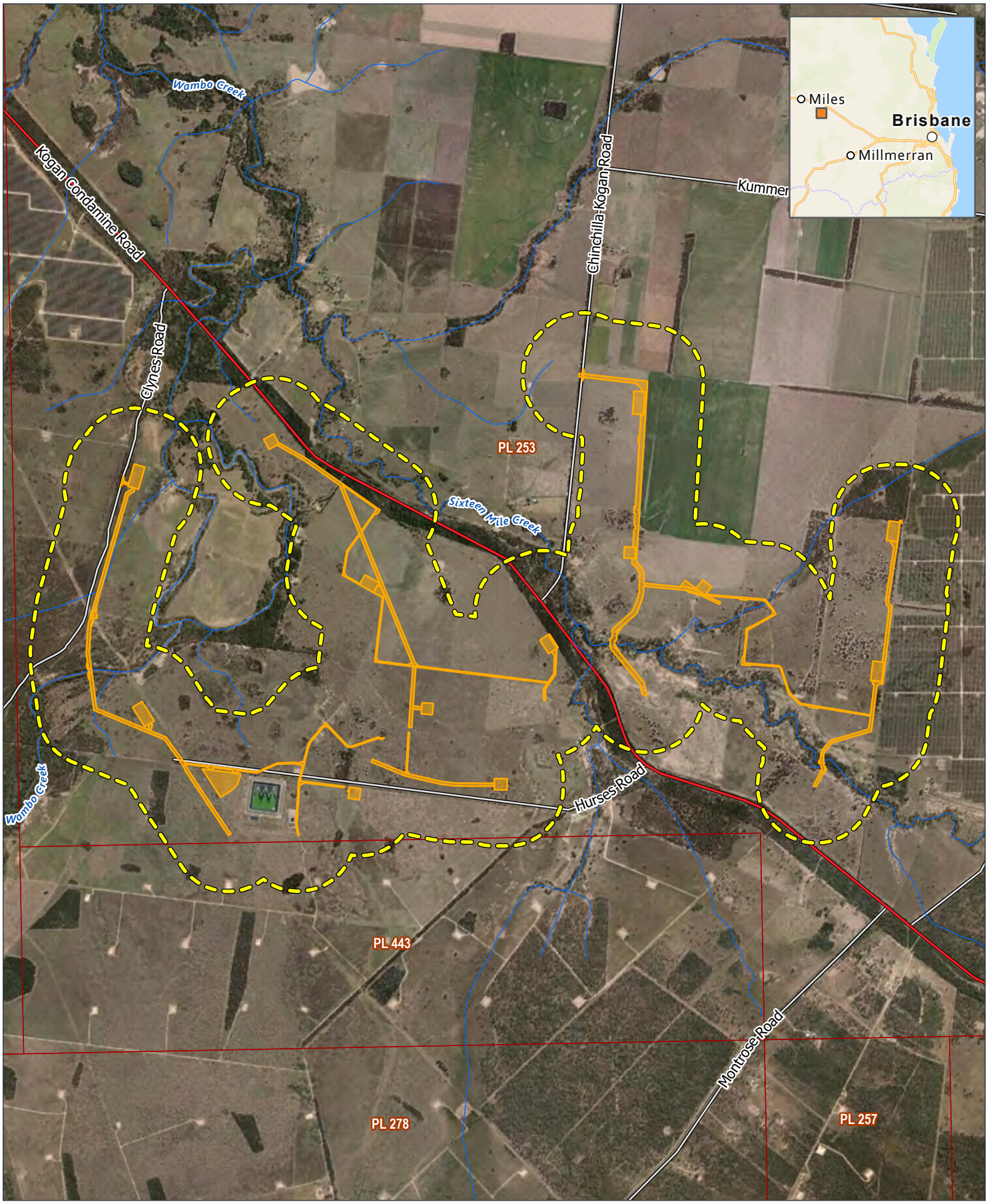
This report has been prepared specifically to support the amendment application documentation for the Hopeland EA.

1.1 Project description and key terms

An overview of the configuration of the Project is described below and depicted in **Figure 1.1**. The application seeks approval for 55 new production wells on PL253 as included in this EA amendment application. The exact number and timing of these wells will be phased to optimise gas production to meet Arrow's gas supply obligations and opportunities. The rate of development will be influenced primarily by subsurface performance (i.e. gas volumes extracted from each well over time). The proposed EA amendment seeks to authorise impacts associated with the following infrastructure:

- existing access tracks
- laydown areas
- Right of Ways (RoWs) for the construction of gathering lines, access tracks
- RoW construction working areas, and
- coal seam gas well pads.

The area in which this infrastructure is proposed is referred to as the Project footprint throughout this report, which encompasses an approximate total area of 79.0 ha. The Study area defined for the purposes of this report comprises the Project footprint plus a 500 m buffer (refer to **Figure 1.1)**. Ecological values have been described for the Study area using the methods set out in **Section 2**.



Project Study Area

Figure 1.1

- Study Area (500m buffer)
- Project Footprint
- PL Granted
- Watercourse

DWG No: ARR-002_146[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N

0 1,000

Meters

GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

1.2 Approach to assessment of impacts

1.2.1 Likelihood of occurrence assessment

A Likelihood of Occurrence Assessment (LOO) as part of this report (**Section 2.1.1**) is the basis for determining whether State listed threatened species are considered in this biodiversity impact assessment (**Section 4.5**). Only those species that are described as either 'known to occur' or 'likely to occur' (refer to **Section 2.1.1** for specific definitions of these terms) are included in **Section 3** and only these species that have mapped habitat in the Project footprint (refer to the discussion of Study area versus Project footprint below) are assessed in accordance with the Significant Residual Impact (SRI) Guidelines (DEHP, 2014).

1.2.2 Study area versus Project footprint

It is important to note that the LOO was conducted across the 'Study area' (defined as the proposed infrastructure layout or Project footprint plus a 500 metre buffer), while Prescribed Environmental Matters (PEMs) values are calculated based on the area of *impacted habitat within the Project footprint*.

This approach is standard for linear infrastructure projects where impact areas are often quite narrow and/or fragmented and there are no firm boundaries that would prevent mobile fauna species entering into the Project footprint even where it does not contain significant habitat resources for a particular species. As such, it is possible for a species to be 'known to occur' or 'likely to occur' within the Study area but not have habitat mapped within the Project footprint.

Whilst relevant environmental values were assessed at both the 'Project footprint' and 'Study area' scale, the Impact Assessment (presented in **Section 5**), only summarises impacts within the Project footprint.

1.3 Scope of this report

Arrow has commissioned Attexo to prepare this biodiversity impact assessment to accompany the associated application for an amendment to EA0001401. The scope of this report includes the following matters relevant to the EA application:

- a review of desktop biodiversity information within and surrounding the Project to identify any values relevant to the application
- a review of ecological field survey information within the Study area
- defining where activities in Environmentally Sensitive Areas (ESAs) protected under the EP Act may require a variation to the standard conditions for petroleum pipeline activities
- the calculation of predicted impacts on Prescribed Environmental Matters (PEMs) protected under the *Environmental Offsets Act 2014* (EO Act)
- significant residual impact assessments for conservation significant flora and fauna species identified as "Known to occur" or "Likely to occur" within the Project footprint
- additional Matters of State Environmental Significance (MSES) not already covered under EPBC approvals for the broader SGP, and
- an impact assessment for all trigger values.

1.3.1 Limitations

In undertaking this biodiversity impact assessment, Attexo has relied on ecological assessment reports, spatial data (including conservation significant records, ground-truthed regional ecosystem data and species habitat mapping) and data extracts provided by Arrow in January and February 2026. Any subsequent amendments or additions to this spatial data have not been incorporated into the assessment. Survey effort data has been collated from a range of sources, with information on survey effort at individual spatial locations based on advice provided by Arrow Energy's ecology team.

Impacts related to RoWs for the other co-located pipelines are to be assessed separately under their respective approval processes. For the purposes of this report, Attexo notes the following limitations:

- the RoW for the Project will be co-located with those for other pipeline infrastructure as described in **Section 1.1**. The cumulative width of the overall RoW has been taken into account when considering the impact of the corridor on fauna movement however, only the impacts (i.e. hectares) directly attributable to the Project Footprint have been assessed in this report.
- survey effort data has been collated from a range of sources, with information on survey effort at individual spatial locations based on advice provided by Arrow.
- it is understood that all for linear infrastructure that is an essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40 m in total width and are compliant with Condition Biodiversity 5.
- it has been assumed that Arrow has undertaken reviews of the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register and that cultural heritage values do not exist in the study area.
- this report relates to terrestrial biodiversity values only and does not include biodiversity values associated with groundwater (e.g. groundwater dependent ecosystems, stygofauna).

1.4 Regulatory framework

1.4.1 *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)

The Environmental Impact Statement (EIS) for the broader Surat Gas Project was assessed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2013. Maximum disturbance limits to core habitat for Matters of National Environmental Significance (MNES) listed under the EPBC Act at the time of the approval are conditioned in Table 1 of the EPBC approval (EPBC 2010/5344) (**Appendix A**) for the Petroleum Lease (PL) (i.e. on-tenement) areas of the SGP.

Disturbance to the habitat of MNES species and communities already approved under EPBC 2018/8223 has not been considered in this assessment. However, impacts on MNES are included in the assessment where a species that has been historically recorded in the Study area has been listed as conservation-significant under both the EPBC Act and Queensland *Nature Conservation Act 1992* subsequent to the original approval in 2020.

Specifically, the following MNES species have been included in the assessment:

- brigalow woodland snail (*Adclarkia cameroni*) – listed as 'endangered' in December 2016
- koala (*Phascolarctos cinereus*) – first listed in April 2012; upgraded to 'endangered' in February 2022
- grey snake (*Hemiaspis damelii*) - listed as 'endangered' in October 2022
- Dunmall's snake (*Furina dunmalli*) – listed as 'vulnerable' in July 2000
- glossy black cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*) – listed as 'vulnerable' in August 2022
- brown treecreeper (south-eastern) (*Climacteris picumnes victoriae*) – listed as 'vulnerable' in March 2023
- diamond firetail (*Stagonopleura guttata*) – listed as 'vulnerable' in March 2023
- southern whiteface (*Aphelocephala leucopsis*) – listed as 'vulnerable' in March 2023, and
- Australian painted-snipe (*Rostratula australis*) – listed as 'endangered' in May 2013.

1.4.2 *Environmental Protection Act 1994* (Queensland)

The primary environmental approval governing the operation of the Hopeland development area at the State level is Environmental Authority (EA) EA0001401 issued under the EP Act. The Hopeland EA as currently in force was authorised in May 2025 and includes eligibility criteria, standard conditions and variation conditions (**Appendix B**). Authorisation is being sought for additional impacts associated with the Project that cannot be accommodated under the Hopeland EA, as described in **Section 1.1**.

The EA as currently in force was issued on the 23 May 2025 and authorises 6 ha of existing wells, 55 ha Stage 1 wells (i.e. 55 gas production wells) and up 155 ha of gathering and raw water pipelines, 74 km of access tracks, 3 ha or borrow pits, 0.76 ha sediment ponds and 21 ha for the Hopeland water dam across PL253.

The existing EA was approved on the basis of a concept or 'reference' design, which has now been subject to further engineering design and the application of the avoidance principle in the mitigation hierarchy with additional ecology survey data. Arrow is seeking to amend the Hopeland EA to reflect impacts associated with the current design and ensure that Arrow are not offsetting impacts to matters that have been avoided or reduced.

The total number of wells for the proposed gas areas in this BIA is 55 wells currently authorised in *Schedule A, Table 1 – Authorised Petroleum Activities* in the Hopeland EA, and out of a total of 370 wells authorised in this table under PL493 and PL1040 combined.

The primary conditions protecting the biodiversity values of the SGP South area are contained in the "Biodiversity conditions" schedule of the Hopeland EA (Conditions "Biodiversity 1" to "Biodiversity 17"). A number of amendments are being sought to these conditions to update impacts associated with the development of the SGP South gas areas and associated infrastructure under this proposed amendment. Details of the proposed amendments are provided in **Section 5.0**.

1.4.2.1 Environmentally Sensitive Areas

The definitions of Environmentally Sensitive Areas (ESA) categories set out in Hopeland EA have been adopted for the purposes of this report, except for Category C ESAs. This report has adopted definitions of Category C ESAs that have more recently been applied to EAs by DETSI (refer **Section 3.1.1**).

1.4.2.2 Conservation Status of Regional Ecosystems

The Regional Ecosystem Description Database (REDD) (Herbarium, 2024) lists regional ecosystem (RE) types by their biodiversity status (BD status) and the vegetation management class (VM class). The BD status is based on an assessment of the condition of remnant vegetation in addition to the criteria used to determine the class under the *Vegetation Management Act 1999* (VM Act). It is used for a range of planning and management applications including the determination of ESAs that are used for the regulation of the mining and petroleum industry through provisions in the EP Act.

For the purposes of the current assessment:

- ESAs are based on the BD status of a given RE type, with 'endangered' REs mapped as Category B ESAs and 'of concern' by BD status mapped as Category C ESAs, and
- PEMs are based on VM class.

1.4.2.3 Essential Habitat

Under the definitions of the Hopeland EA, a Category C ESA an area validated as 'essential habitat' or 'essential regrowth habitat' from ground-truthing surveys in accordance with the VM Act for a species of wildlife listed as endangered or vulnerable wildlife under the NC Act. For the purposes of this report, Queensland Government 'essential habitat' mapping has been adopted as the basis for the assessment of impacts to essential habitat. Only essential habitat for critically endangered, endangered and vulnerable wildlife is considered as an ESA in this report.

Similarly, essential habitat only constitutes a PEM where it is for an animal or plant that is listed as critically endangered, endangered, or vulnerable under the NC Act (see Schedule 2 of the Environmental Offsets Regulation 2014 (Qld) (EO Regulation)). An area of essential habitat for a near threatened species only constitutes a PEM for the EO Act where it is being impacted by a development being assessed under the *Planning Act 2016* that triggers consideration of State Code 16 (Clearing of native vegetation) as set out in Schedule 2 of the EO Regulation (refer Section 1.2 of Queensland Environmental Offsets Policy.

Conditions and the definition of Category C ESA within the Hopeland EA contain references to 'essential regrowth habitat'. However, 'essential regrowth habitat' is not defined within the Hopeland EA.

Essential Habitat in relation to this Project are discussed further in **Section 3.3.7** and **Section 5.1**.

1.4.3 Environmental Offsets Act 2014

Under the Queensland Environmental Offsets Framework, implemented by the *Environmental Offsets Act 2014* (Qld) (EO Act) and associated legislation, an environmental offset is required where a significant residual impact (SRI) occurs to a Matter of State Environmental Significance (MSES). MSES are prescribed in Schedule 2 of the EO Regulation and include:

- flora and fauna species listed as endangered or vulnerable under the NC Act, and habitat for those species
- special least concern fauna species under the NC Act and their habitats
- remnant vegetation communities listed as 'endangered' or 'of concern' Regional Ecosystem types under the VM Act
- essential habitat (as mapped by the Department of the Environment, Tourism, Science and Innovation (DETSI))
- regulated vegetation that intersects with wetlands and watercourses
- connectivity values
- wetlands of high ecological significance
- protected areas (including nature refuges)
- declared fish habitat areas and waterways providing for fish passage, and
- legally secured offset areas.

It is noted that only prescribed regional ecosystems (REs) in a Category B area on the Regulated Vegetation Management Map (RVMM) constitute an MSES pursuant to Schedule 2, Part 1 and Part 2 of the Environmental Offsets Regulation. MSES within the Study area have been identified through a combination of desktop and field assessments as described in **Section 2**, with MSES values described in **Section 3**.

1.4.3.1 Significant residual impact assessment

Under Section 8 of the EO Act, an SRI is generally an adverse impact, whether direct or indirect, of a prescribed activity on all or part of a PEM that:

- remains, or will or is likely to remain, (whether temporarily or permanently) despite on-site avoidance and mitigation measures for the prescribed activity, and
- is, or will or is likely to be, significant.

SRI assessments for MSES impacted by the Project are presented in **Section 4.5**.

1.4.4 Nature Conservation Act 1992

The NC Act provides for the gazettal of protected areas including nature refuges, prescribes classes of wildlife and sets out restrictions on the taking or harm to native wildlife without a valid permit. Threatened flora and fauna species have been assessed in terms of those with potential to occur in the Study area. Classes of wildlife recognised under the NC Act include:

- Extinct in the Wild
- Critically endangered
- Endangered
- Vulnerable
- Near Threatened, and
- Special Least Concern.

Essential habitat for a near threatened species does not constitute an ESA under the definitions provided in the Hopeland EA and also does not constitute a PEM under the EO Act. The presence or potential presence of a near threatened species also triggers requirements under the NC Act that are approved and managed separately to the EA.

Habitat for a Special Least Concern fauna species also constitutes a PEM for the purposes of the EO Act and these impacts have been included in the PEMs table (where applicable) and discussed further in **Section 3.3.5.7** and **Section 4.5.3.1** .

1.4.5 Vegetation Management Act 1999

Petroleum activities do not require permits under the VM Act as clearing is regulated through the EA process under the EP Act. Where appropriate, the VM Class of regional ecosystems (REs) is referred to in the assessment. The VM Class is used to define PEMs for the purposes of the EO Act.

1.4.5.1 High value regrowth

Under the VM Act, vegetation communities, which are known in Queensland as REs, are assigned to one of three classes. These classes are known as the VM Class and are:

- Endangered RE – less than 10% of the pre-clearing extent of a particular community remains across a given bioregion; or 10-30% of the pre-clearing extent remains and the remnant area is less than 10,000 ha
- Of concern RE – 10-30% of the pre-clearing extent of a particular community remains across a given bioregion; or more than 30% of the pre-clearing extent remains and the remnant area is less than 10,000 ha, and
- Least concern RE – more than 30% of the pre-clearing extent of a particular community remains across a given bioregion, and the remnant area is greater than 10,000 ha.

2. Methodology

The ecological values discussed in this biodiversity impact assessment were identified as being relevant to this Project during comprehensive Project Environmental Clearance (PEC) reports undertaken across the Study area. A separate PEC report was prepared by CHEC environmental (CHEC) for each land parcel that the Study area interested.

In addition to these Project specific reports, ecological survey information undertaken as part of the broader Surat Gas Project (SGP), and within the vicinity of the Project, was also used to identify ecological values that could be relevant to the Project. These studies have provided Arrow with a comprehensive understanding of the ecological values, flora and fauna assemblages, characteristic of vegetation communities and habitats in the broader SGP area. This BIA also draws on QGC's ecological survey program within the 'Upstream' and 'Midstream' project areas through CHEC Environmental's ecological survey and assessment of the Project.

The following section summarises the desktop and field-based information relevant to the Project and the processes by which this information was collected.

2.1 Desktop assessment

A comprehensive desktop assessment was undertaken between October 2025 and March 2026 to identify ecological values potentially relevant to the Study area. The intent of this desktop assessment was to identify ESAs and PEMs relevant to the Study area, including threatened and migratory species of conservation significance (MNES) that have been listed since the EPBC approval was granted in 2020 (EPBC 2018/8223). The following desktop resources were reviewed as part of this assessment:

- DCCEEW Species Profile and Threats Database (SPRAT)
- Queensland Government mapping products including certified Regional Ecosystem Mapping (Version 13) and Protected Plants Trigger Mapping
- Essential habitat mapping
- Project-specific ground-truthed regional ecosystem (GTRE) and ESA mapping for the Study area
- Threatened flora and fauna records sourced from historical SGP ecological surveys and available online resources including Atlas of Living Australia (https://www.ala.org.au/) and eBird (https://ebird.org/map)
- Soils and land resource area mapping
- Wetland values (MNES – high ecological significance wetlands mapping and wetland protection areas)
- Catchment and waterway values (Queensland major watercourses mapping)
- Connectivity values (Brigalow Belt Biodiversity Planning Assessment), and
- Available published ecological information for threatened flora and fauna species where available.

2.1.1 Likelihood of Occurrence Matrix

The Likelihood of Occurrence Matrix (LoOM) was developed by CHEC to facilitate consistency in habitat assessments by its ecologists. The LoOM, in its current version, considers the likelihood of 34 threatened (Commonwealth and/or State listed) fauna species occurring at a proposed development site. The included species are those with potential to occur within QGC's 'Upstream' and 'Midstream' project areas (and are applicable to Arrow Energy's Surat Gas Project areas), which are detailed in QGC's combined Significant Species Management Plan (SSMP). The LoOM (and SSMP) is regularly reviewed and revised to ensure alignment with changes to Commonwealth and State conservation status listings. The distribution and habitat information contained in the LoOM (and SSMP) were sourced from the latest reliable reference material, including published texts and journals, SPRAT profiles, Atlas of Living Australia maps, Wildlife Online searches, Arrow and QGC GIS records.

The LoOM assessment is a systematic process, where you work across the spreadsheet from left to right for each species, starting with viewing a distribution map, then making selections (where prompted) from lists for 'broad area of occurrence', then 'habitat attributes', occurrence of 'Essential Habitat', 'historical' or 'recent' confirmed records.

Depending on the responses, a determination of 'Unlikely', 'Potential', 'Likely' or 'Known' is provided for the species. The LoOM species habitat criteria have been included in **Appendix C**.

2.2 Field-based assessments

Several ecological surveys have been undertaken within the Study area and in areas immediately adjacent to the Project. A summary of these survey programs has been provided in **Table 2.1**, with a more detailed breakdown of the flora and fauna survey efforts provided in the following sections. Data included in the Project Environmental Clearance (PEC) reports by CHEC ecologists has been provided in **Appendix D**.

Table 2.1: Summary of Ecological Surveys conducted either within the Study area or in the broader vicinity

Survey	Survey Type	Timing	Undertaken by
CHEC PEC Reports	Flora and Fauna	October 2025	CHEC Environmental
Surat Gas Project: Terrestrial Ecology Report	Flora and Fauna	2016-2017	EcoSmart
Surat Gas Project: Off-tenement Terrestrial Ecology Survey Report	Fauna	March 2019	EcoSmart
Surat Ecological Studies	Flora	2017 - present	Arrow

2.2.1 Flora survey effort

Vegetation surveys relevant to the Project were undertaken in 2021 and again in October 2025 by CHEC Environmental as part of an ecological survey of the Project footprint and surrounds. The PEC survey reports are provided in **Appendix D**. The surveys were conducted in accordance with a previous version of the *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (Neldner, et al., 2023).

2.2.2 Fauna survey effort

The habitat types in the Study area are widely distributed across the Brigalow Belt and have been extensively sampled as part of a substantial and sustained fauna survey effort across the broader SGP Project area between 2016 and 2026. Resultantly, fauna assemblages and characteristic microhabitats associated with the broad vegetation communities and habitats are well understood. As the fauna survey effort presented in this report represents a subset of the survey effort for the wider SGP, all sites within 15 km of the Study area have been regarded as relevant and have been included in overall effort.

The primary Project-specific field assessments that inform the description of terrestrial fauna habitats and fauna assemblages in the Study area are derived from CHEC Environmental 2025 fauna surveys (**Appendix D**) and Surat Gas Project Terrestrial Ecology Report (EcoSmart, 2017). Since 2017, these fauna surveys have been supplemented by habitat assessments, Koala Spot Assessment Technique (SAT) surveys and opportunistic fauna observations undertaken by Arrow field ecologists.

2.2.2.1 Main fauna survey effort

In addition to the CHEC Environmental 2025 fauna surveys (**Appendix D**), areas for field survey were identified based on the results of desktop searches and interpretation of aerial photography to select patches of remnant and non-remnant vegetation for targeted fieldwork. As part of the terrestrial fauna surveys conducted by EcoSmart in 2016-2017, the following methodology was applied to select sites for further assessment:

- areas with little or no historic survey effort were identified by overlaying the locations of previous fauna work on pre-existing RE mapping to identify focus areas for the fauna survey

- Broad Vegetation Group (BVG) mapping prepared by the Queensland Herbarium was used to identify the location and extent of BVGs at the 2 million scale. The contribution of each BVG to the extent of remnant vegetation was calculated and theoretical trap effort distributed accordingly
- a five-day pilot study was conducted in August 2016 to visually inspect focus areas, identify survey constraints and located possible detailed fauna trap surveys, and
- detailed survey sites were selected on the basis of spatial and BVG stratification, taking into consideration landholder access constraints, travel logistics and limitations, notable geomorphological features such as rock outcrops and caves, habitats likely to support specially protected species and vegetation condition (in particular, fire scarring).

Once selected, each site was inspected and approved by traditional owners to ensure trapping activities would not impact upon indigenous cultural values. As no pitfall trapping could occur without prior cultural heritage assessment, trap site locations could not be relocated after the pilot study. The pilot study occurred prior the flora investigations and did not account for any subsequent vegetation mapping changes. Where possible, trap sites were surveyed during both the dry and wet season, though in some cases this was not possible without compromising spatial or BVG representation.

The following survey techniques were adopted in accordance with the with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre, et al., 2022):

- **Trap Sites**: These trap sites consisted of a combination of several trapping techniques that were tailored to the available habitat and the fauna species being targeted including pitfall trapping, Elliot trapping and funnel trapping, typically deployed for four nights in each location. Pitfall trapping involved the installing four 20 L buckets along drift fences established in a T configuration. Funnel traps were installed at the end of these drift fences, augmenting the pitfall traps. Elliot traps were established in the vegetation surrounding the pitfall/funnel trap array, located approximately 5 m apart from each other. Trapping sites were visited twice daily, once in the morning and once in the late afternoon. Traps typically deployed for four nights at each location in accordance with the recommended survey effort set out in the Terrestrial Fauna Survey Guidelines (Eyre, et al., 2022):
  - 4 pitfall traps (representing 96 trap nights)
  - 6 funnel traps (representing 144 trap nights), and
  - 10 Elliot traps (representing 240 Elliot trap nights).
- **Harp Traps**: Insectivorous micro-bat capture was undertaken using harp traps which were deployed along obvious flyways, which are linear clearings through vegetation such as tracks and creek lines. Harp traps were typically conducted in different locations to the other terrestrial fauna trapping methods.
- **Camera Traps**: Remote sensor cameras were used to survey small to large terrestrial vertebrates for four nights at each location. Cameras were baited by smearing quantities of peanut butter and macadamia oil on the ground within the detection zone.
- **Ultrasonic Bat Call Detection**: Ultrasonic calls of micro-bats were recorded using Anabat devices that were set to record from dawn until dusk. The deployment locations were selected based on the likelihood of high bat activity, such as along flyways or over water bodies.
- **Bird Surveys**: In addition to being undertaken at each trap site, opportunistic bird surveys were also conducted within other areas of suitable habitat throughout the consolidated survey program. Each bird survey was conducted for between 20 – 30 minutes and typically before 9am.
- **Diurnal Search**: Active diurnal searches involved two observers meandering through suitable fauna habitat for 30 minutes rolling rocks and logs, searching debris, inspecting trees for scratches and searching for scats or feeding remains.
- **Koala SAT Surveys**: SAT surveys were adopted as the most appropriate survey technique at the time of these surveys in accordance with *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus* (Phillips & Callaghan, 2011). This survey technique involved searching for Koala scats around the base of 30 suitable food trees at each survey site.
- **Spotlighting**: Spotlighting surveys were conducted by two observers (on foot) who would walking through suitable and spotlight for arboreal and terrestrial mammal, reptile and amphibian species. Spotlighting surveys

were typically conducted for periods of 60 minutes over two nights at each site with animals being detected by eye shine, call or direct observation.

- **Habitat Assessments**: In addition to the direct survey methods used to detect fauna species, habitat assessments were also conducted. The focus of these assessments was to collect sufficient microhabitat information to inform the development of habitat mapping rules that have subsequently been adopted across the broader SGP.

A summary of these fauna survey efforts undertaken as part of the main fauna survey effort has been provided in **Table 2.2** and the location of these survey efforts in relation to the broader environmental authority area which includes the Study area has been presented in **Figure 2.1**.

Table 2.2: Summary of main survey effort (EcoSmart, 2017)

Survey method	Main Fauna Survey Effort 2017
Pitfall trap sites	6 sites (96 trap nights)
Funnel trap sites	6 sites (144 trap nights)
Elliot trap sites	6 sites (240 trap nights)
Harp trap sites	3 sites (12 trap nights)
Camera trap sites	7 sites (28 trap nights)
Anabat	6 sites (12 trap nights)
Active searches	8 sites (4 person hours)
Bird surveys	9 sites (3 person hours)
Spotlighting	6 sites (24 person hours)

2.2.2.2 Supplementary fauna survey efforts

In addition to the main survey efforts undertaken by EcoSmart during the 2016-2017 survey period, several other supplementary fauna survey programs have also been undertaken in the vicinity of the Project and were identified as being relevant to this BIA report. The most recent Project specific fauna survey is by CHEC Environmental in 2025. A summary of these nearby supplementary survey efforts has been provided in **Table 2.3** and shown on **Figure 2.1**.

Table 2.3: Supplementary fauna survey effort

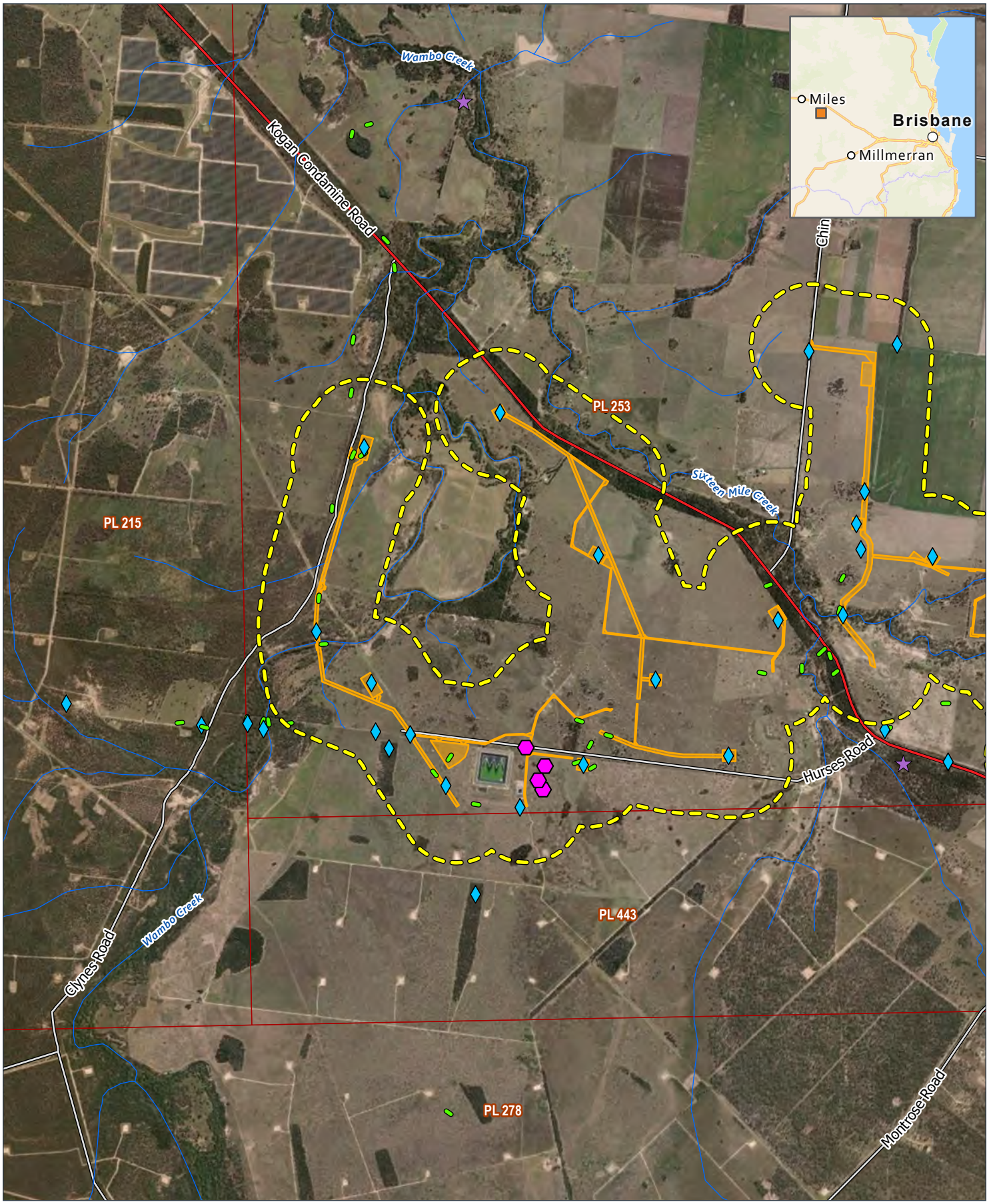
Survey method	2011-2023 Supplementary Surveys	2025 Supplementary Surveys	Total Supplementary Surveys
Active searches	4 sites (2 person hours)	-	4 sites (2 person hours)
Koala SAT surveys	253 sites	23 sites	276 sites
Habitat Assessment	239 sites	23 sites	262 sites

2.2.2.3 Survey for cryptic species

For the purposes of this assessment, a species is considered 'cryptic' if it is unlikely to be detected using standard survey techniques (trapping, searching or spotlighting). Of the fauna species considered 'likely' or 'possibly occurring' within the Study area, the following difficult to detect using these survey methods:

- Brigalow Woodland Snail, *Adclarkia cameroni*
- Dulacca Woodland Snail, *Adclarkia dulacca*
- Dunmall's Snake, *Furina dunmalli,* and
- Grey Snake, *Hemiaspis damelii*.

Both snake species are subterranean by nature (i.e. they spend most of their time underground) and are recognised as difficult to detect in relevant conservation guidelines. Similarly, the brigalow woodland snail required moist environments (typically along watercourses) where there is sufficient coarse woody debris to provide shaded and moist microhabitats. These species are typically associated with Brigalow and/or riparian habitats which are limited in extent within the Study area. Whilst no specific surveys have focused on the detection of these species, the microhabitat features noted within each of the PEC reports has allowed for the development of relatively reliable habitat mapping that has been used to inform this impact assessment.



Fauna Survey Effort

Page 1 of 2

Figure 2.1

Study Area (500m buffer)
Project Footprint
Watercourse
Diurnal Search
Habitat Asessement
Habitat Asessement

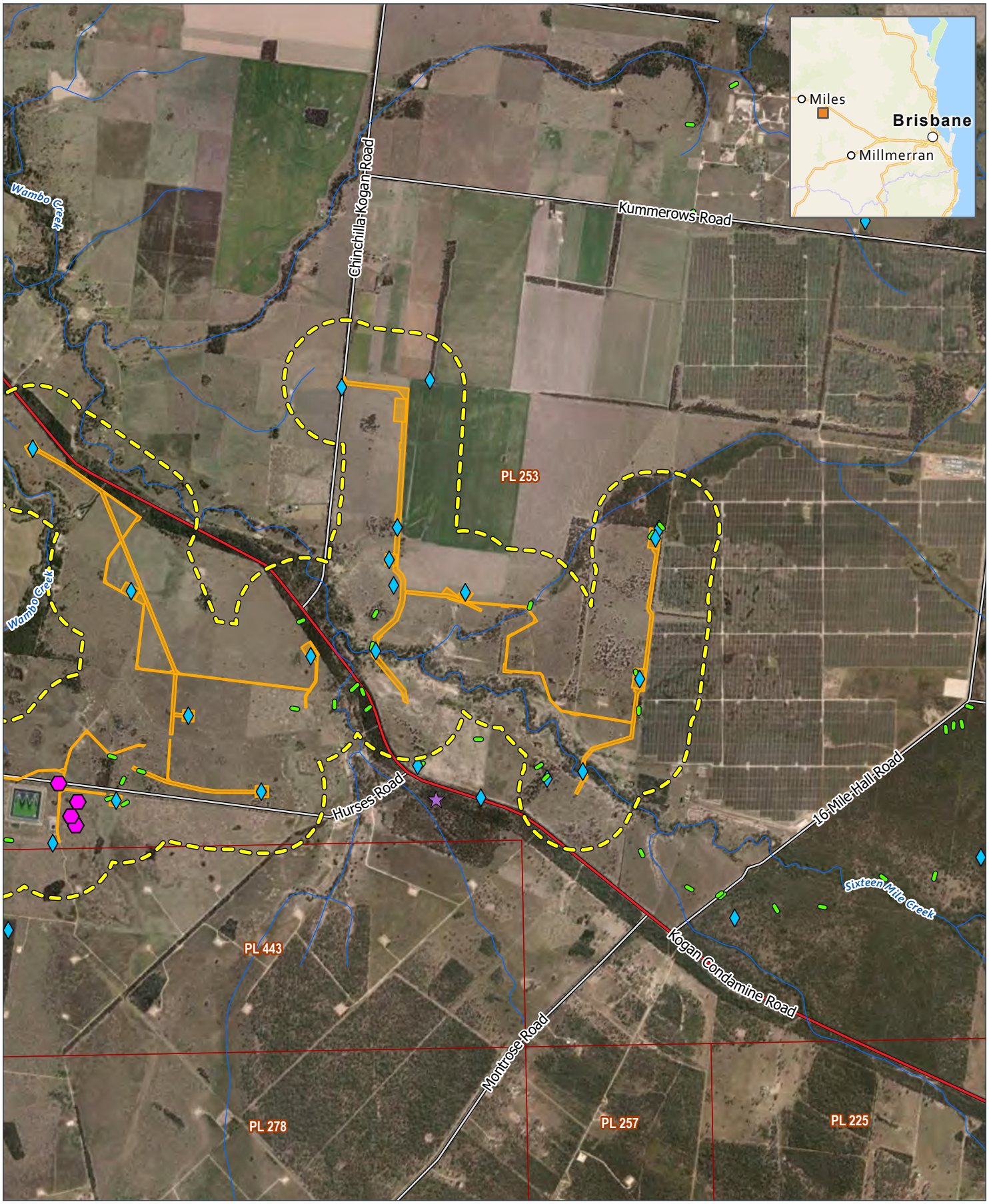
DWG No: ARR-002_146[0]
DATE: 25/02/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1,000
Meters

GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Fauna Survey Effort

Page 1 of 2

Figure 2.1

Study Area (500m buffer)

Project Footprint

Watercourse

Diurnal Search

Habitat Asessement

Habitat Asessement

DWG No: ARR-002_146[0]
DATE: 25/02/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N

0 1,000

Meters

GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3. Description of ecological values

3.1 Description of environmental values - general

The Project is located approximately 12 km to the northwest of Kogan in the Inglewood Sandstones subregion of the Brigalow Belt bioregion. The Study area contains both cleared grazing land and eucalypt and brigalow woodlands either usually dominated by a mixture of river redgum (*Eucalyptus tereticornis*) and/or poplar box (*E. populnea*) or brigalow (*Acacia harpophylla*) and belah (*Casuarina cristata*).

Melonhole gilgai on clay plains are present in the cleared grazing land (east of Wambo Creek) along the eastern section of the Study area. Small patches of brigalow (*Acacia harpophylla*) also occur on the clay plains and the road reserves in the areas such as the Kogan Condamine Road. A narrow riparian open woodland dominated by forest red gum (*E. tereticornis*) is associated with Wambo Creek and occurs to the east of Clynes Road.

A Regional Terrestrial biodiversity corridor is mapped along Wambo and Sixteen Mile Creeks that traverse the Study area (refer to **Figure 3.1**).

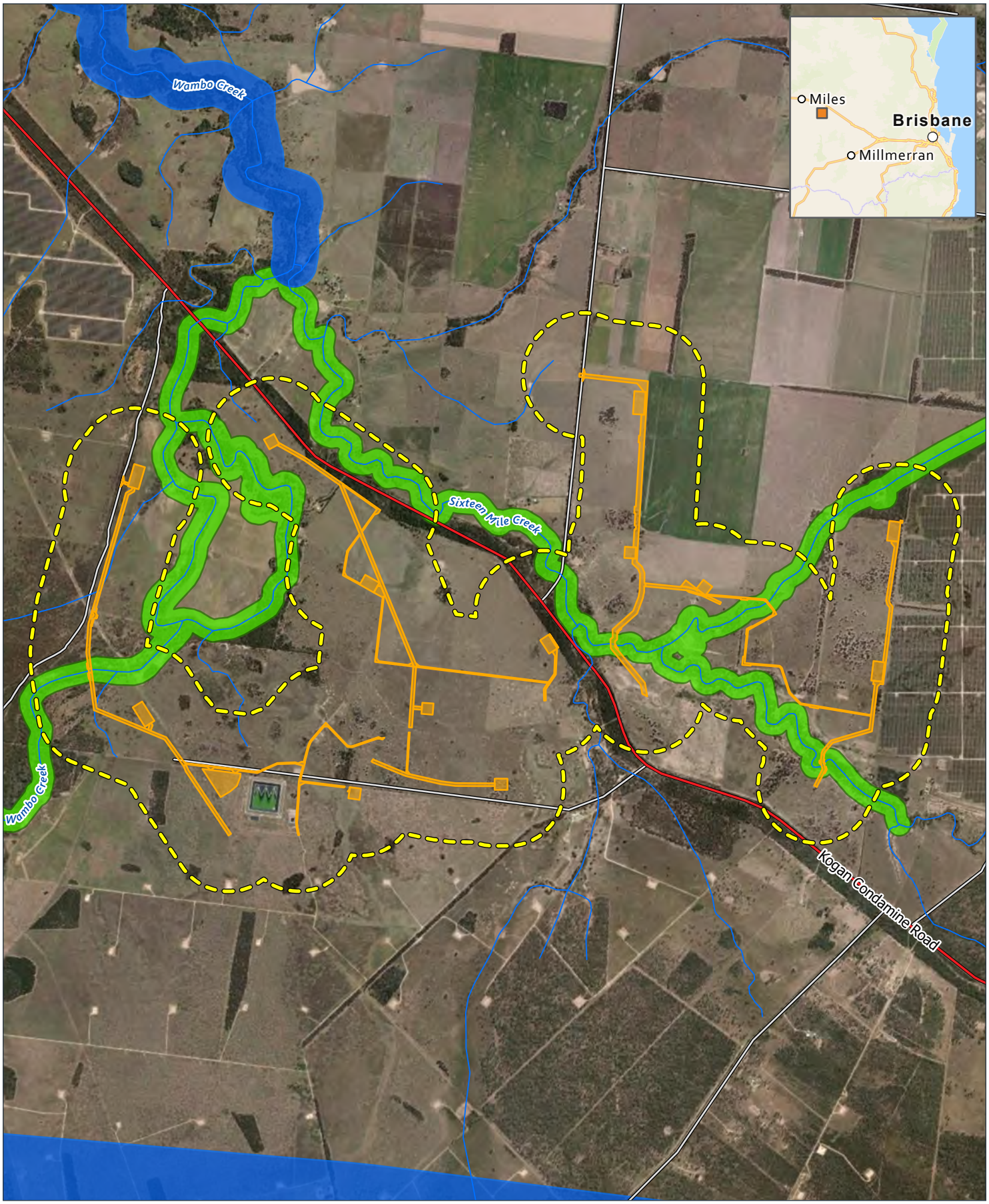
3.1.1 Environmentally Sensitive Areas

A summary of the ESAs as defined in the *Environmental Protection Regulation 2019* (EP Reg) (for Category A & B ESAs), and recent definitions of Category C ESAs used by DETSI that are relevant to the Project have been provided in **Table 3.1** and shown on **Figure 3.2**, **Figure 3.3** and **Figure 3.4**. Considering the location of the Project, ESAs relating to marine areas have been excluded from this assessment.

Table 3.1: Project Environmentally Sensitive Areas

ESA Category	ESA Type	Occurrence in Study Area
Category A	A National Park, Conservation Park, Special Wildlife Reserve, or a Forest Reserve.	None
	The Wet Tropics Area under the *Wet Tropics World Heritage Protection and Management Act 1993*.	None
Category B	A coordinated conservation area, an area of critical habitat for major intersect identified under a conservation plan or an area subject to an interim conservation order.	None
	An area subject to the 'Convention on the Conservation of Migratory Species of Wild Animals', the 'Convention on Wetlands of International Importance, especially as Waterfowl Habitat' or the 'Convention Concerning the Protection of the World Cultural and Natural Heritage'.	None
	Under the *Queensland Heritage Act 1992*, a place of cultural heritage significance or a Queensland Heritage place, unless there is an exemption certificate issued under the Act.	None
	An area recorded in the Aboriginal Cultural Heritage Register established under the *Aboriginal Cultural Heritage Act 2003*, section 46, other than the area known as the 'Stanbroke Pastoral Development Holding', leased under the *Land Act 1994*.	None
	A feature Protection Area, State Forest Park or Scientific area under the *Forestry Act 1959*.	None

ESA Category	ESA Type	Occurrence in Study Area
	A declared fish habitat area under the *Fisheries Act 1994*.	None
	An 'Endangered Regional Ecosystem' identified in the REDD database (by Biodiversity Status)	There are two (2) 'endangered' REs in the Study area (RE 11.4.3 and 11.3.1). These REs are discussed further in **Section 3.2.1.1** and mapped in **Figure 3.6**.
Category C	Nature refuges as defined in the conservation agreement for that refuge under the *Nature Conservation Act 1992* Guideline Streamlined model conditions for petroleum activities.	None
	State forests or timber reserves as defined under the *Forestry Act 1959*	None
	Regional parks (previously known as resource reserves) under the *Nature Conservation Act 1992*	None
	An area validated as from ground-truthing surveys as 'essential habitat' on the Queensland Government essential habitat map in accordance with section 20AC of the *Vegetation Management Act 1999* for a species of wildlife listed as critically endangered, endangered, vulnerable under the *Nature Conservation Act 1992*	Essential habitat for one fauna species has been identified within the Study area. These areas are discussed further in **Section 3.3.7** and mapped in **Figure 3.13**.
	An area validated from ground-truthing surveys as 'protected wildlife habitat' that is category A, B or C on the remnant vegetation management map, in accordance with section 20A of the *Vegetation Management Act 1992*, for a species of wildlife listed as critically endangered, endangered or vulnerable under the *Nature Conservation Act 1992*.	Protected wildlife habitat for threatened species assessed in this report is presented in **Section 3.3.5** and mapped in **Figure 3.4.**
	'Of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.	There are two 'of concern' REs in the Study area (RE 11.3.25 and 11.3.27f, 11.3.2 and 11.3.4). These REs are discussed further in **Section 3.2.1.1** and mapped in **Figure 3.6**.



Ecological Context

Figure 3.1

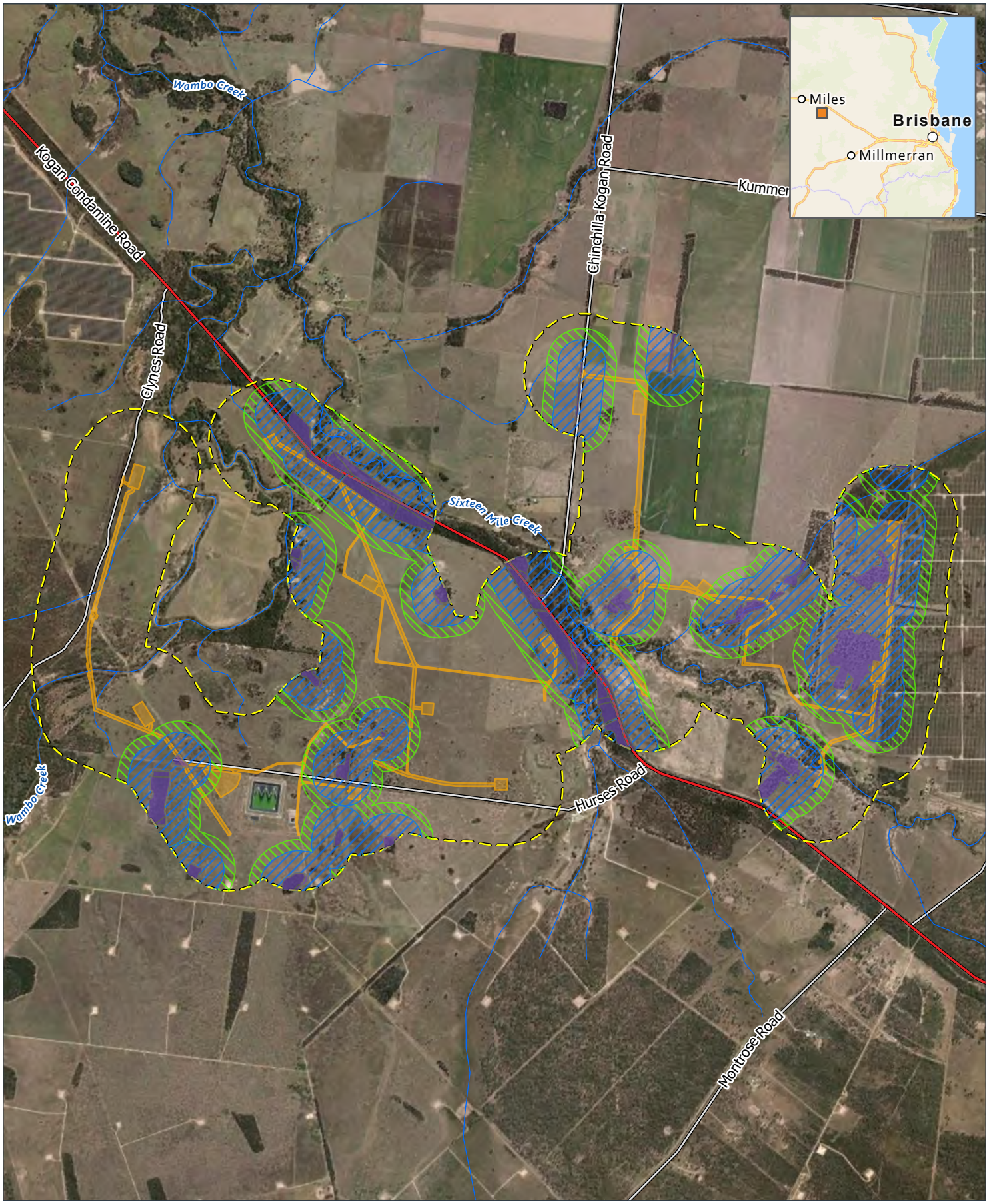
Study Area (500m buffer)
Project Footprint
Watercourse
State Biodiversity Corridor
Regional Biodiversity Corridor

DWG No: ARR-002_148[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1
Kilometers
GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, © State of Queensland (Department of Environment and Science) 2022., © State of Queensland (Department of Environment, Science and Innovation) 2024, © State of Queensland (Department of Environment and Heritage Protection) 2017, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Environmentally Sensitive Area Category B

Study Area (500m buffer)
Project Footprint
Watercourse
Category B ESA
Category B PPZ
Category B SPZ

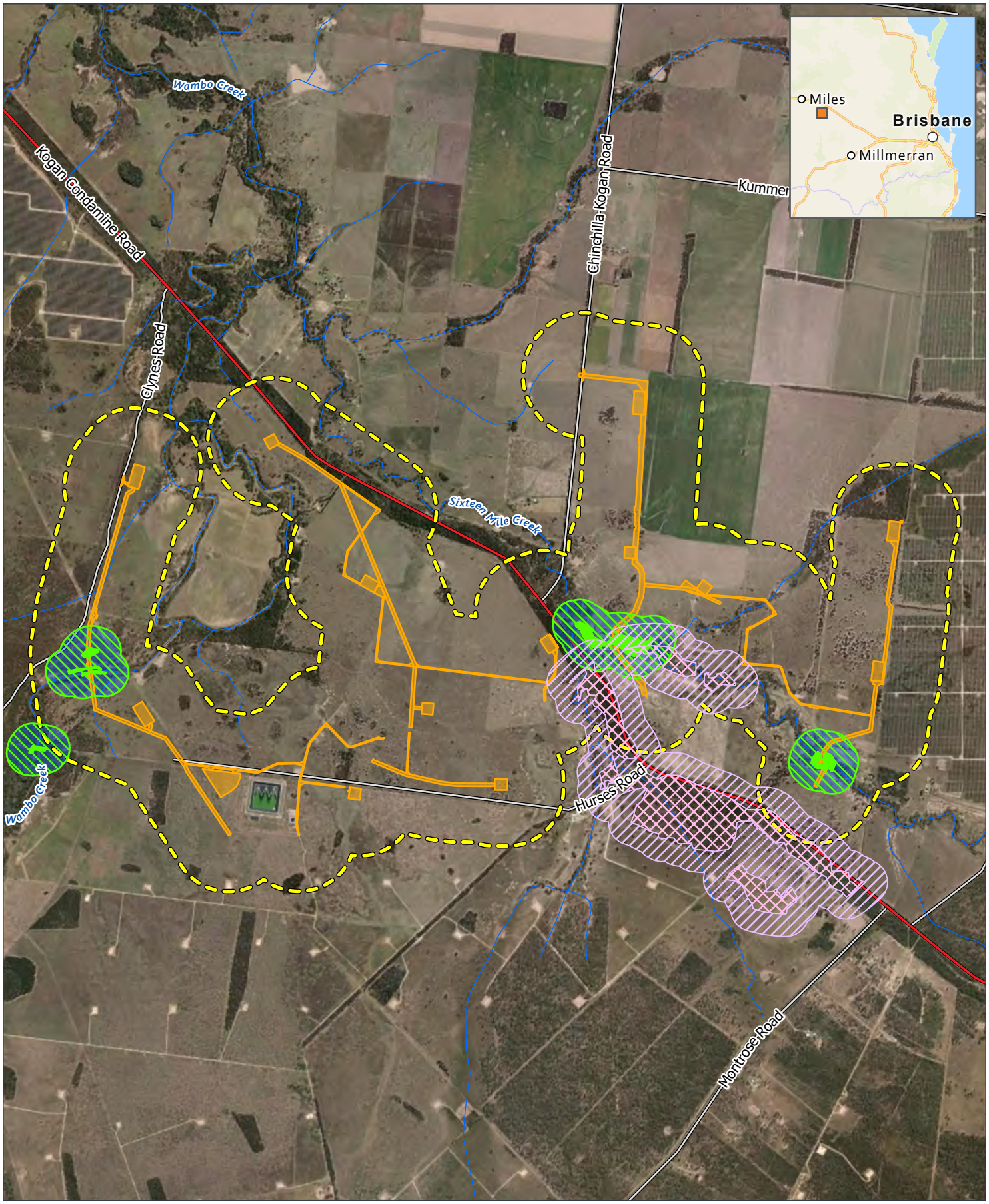
Figure 3.2

DWG No: ARR-002_149[0]
DATE: 18/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1
Kilometers
GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Environmentally Sensitive Area Category C

Figure 3.3

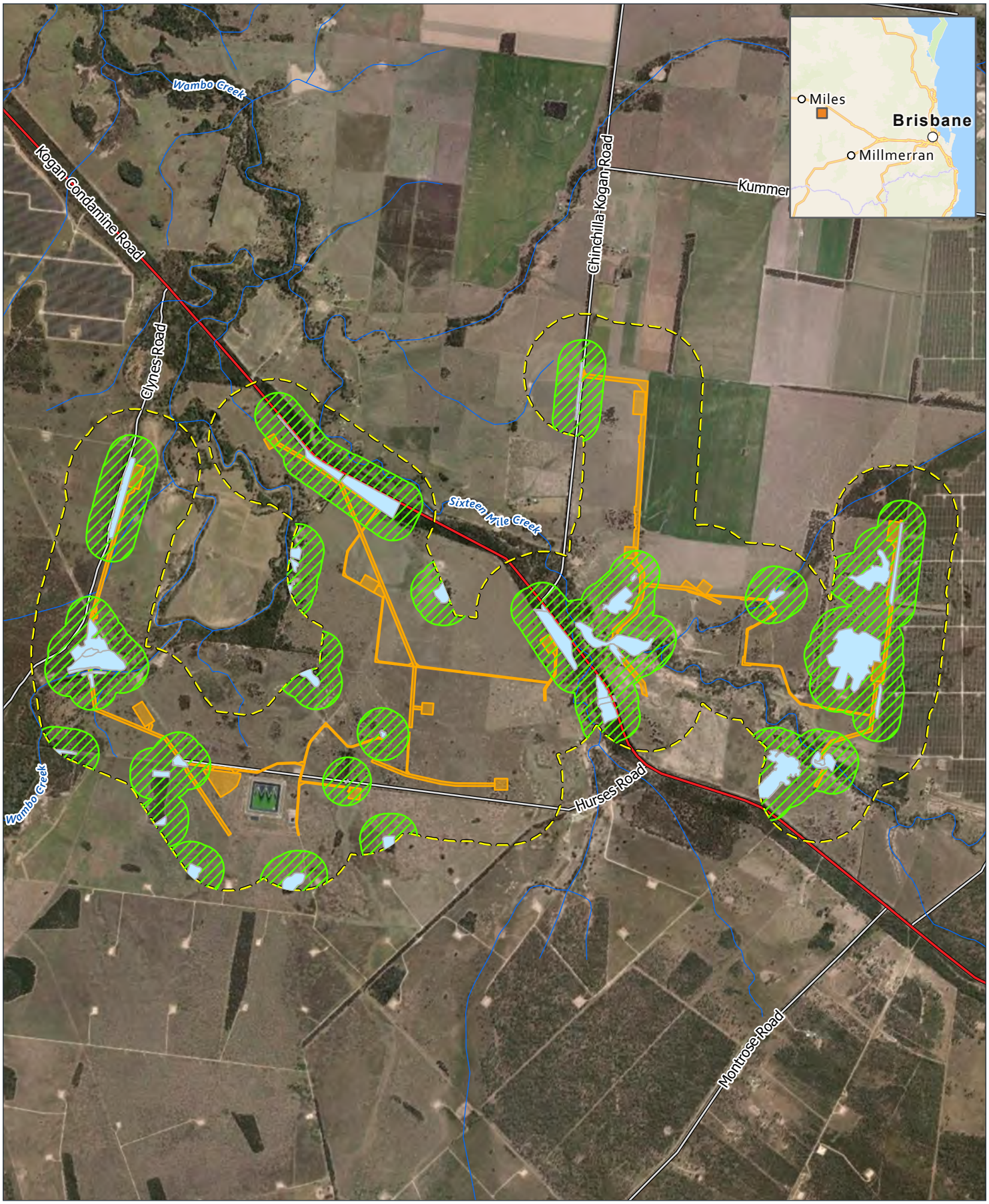
DWG No: ARR-002_150[0]
DATE: 2/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1
Kilometers
GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Project Footprint
- Watercourse
- ESA Cat C Essential Habitat
- ESA Cat C Essential Habitat - PPZ (200m)
- ESA Cat C 'Of concern' PPZ (200m)
- ESA Cat C 'Of concern'

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Environmentally Sensitive Area
Category C (Protected wildlife habitat)

Study Area (500m buffer)
Project Footprint
Watercourse
Category C ESA Protected Wildlife Habitat
Category C ESA PWH PPZ (200 m)

Figure 3.4

DWG No: ARR-002_151[0]
DATE: 18/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1
Kilometers

GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

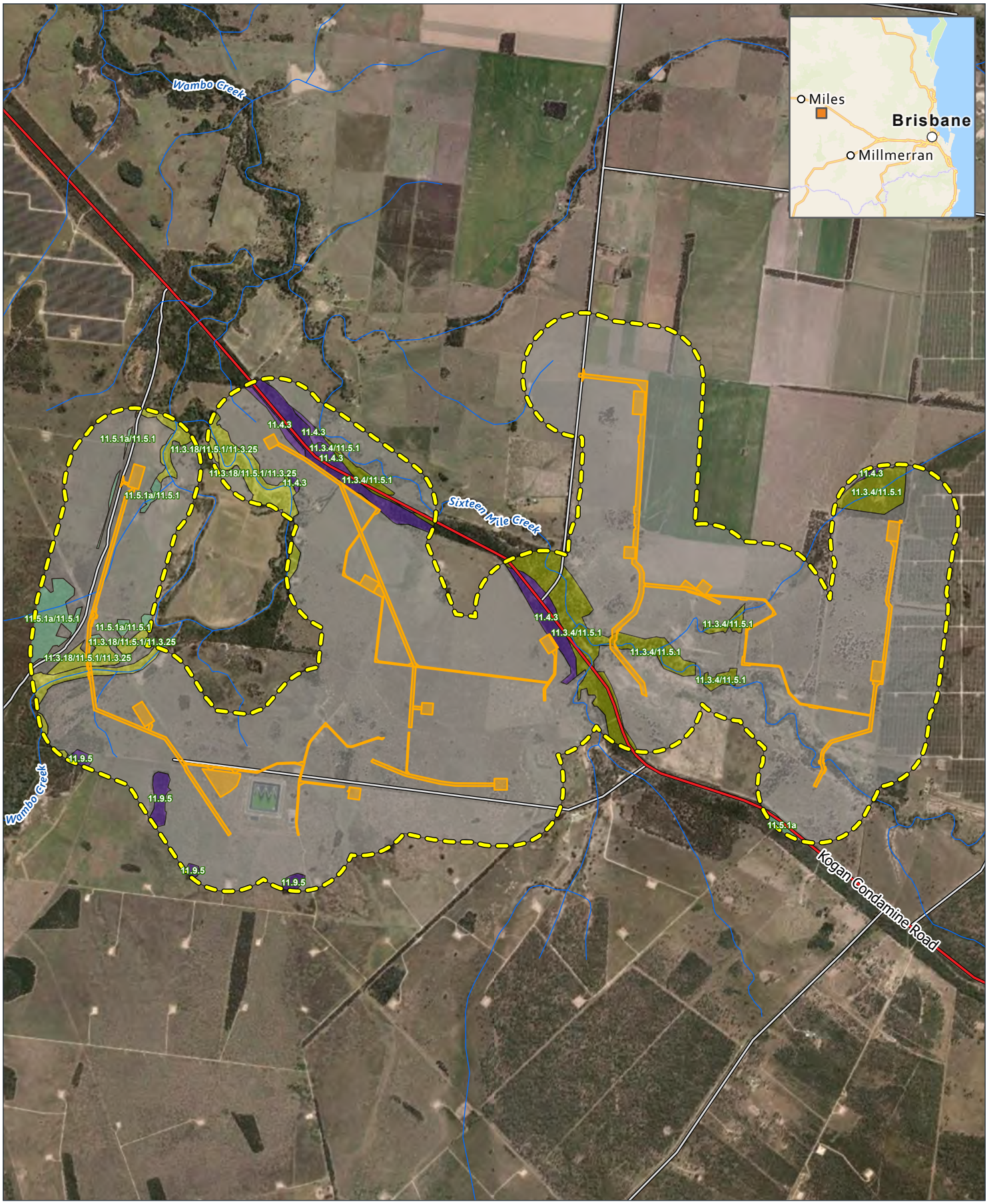
3.2 Description of environmental values – terrestrial flora

3.2.1 Vegetation communities

Current vegetation mapping prepared by the DoR identifies seven (7) REs (comprising remnant vegetation communities) in the Study area (**Figure 3.5**). Descriptions and total areas of these mapped REs have been provided in **Table 3.2** and include two REs classified as 'Endangered', one RE classified as 'Of Concern' and four REs classified as 'Least concern'.

Table 3.2: State Regional Ecosystem mapping by VM Act Status

Land zone	RE Code	Description	Occurrence in Study area (ha)
Least Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.18	*Eucalyptus populnea*, *Callitris glaucophylla*, *Allocasuarina luehmannii* shrubby woodland on alluvium	24.05
	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	12.02
5 – Cainozoic sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces	64.58
	11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones. Duplex soils with sandy surfaces.	15.69
Of Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus spp.* woodland on alluvial plains	64.24
Endangered (remnant)			
4 – Tertiary-early Quaternary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	50.75
9 – Fined grained sedimentary rocks	11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on fine-grained sedimentary rocks	11.48
Subtotal (remnant)			242.81
Non-remnant			2,128.57
Total			**2,371.38**



State Mapped Regional Ecosystems (Biodiversity status)

Figure 3.5

DWG No: ARR-002_152[0]
DATE: 17/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1
Kilometers
GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Project Footprint
- Watercourse
- Endangered - Dominant vegetation
- Of Concern - Dominant
- Of Concern - Sub-dominant
- No concern at present
- Non-remnant vegetation, cultivated or built environment

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.2.1.1 Field-verified Regional Ecosystems

GTRE mapping prepared for the Study area has been based on the consolidated survey efforts undertaken across the Project footprint by CHEC Environmental and Arrow Ecologists from 2021 and 2025. These surveys are discussed in **Section 2.2** and the GTRE mapping (by Biodiversity Status) has been shown on **Figure 3.6**.

Of the seven (7), REs originally mapped by the DoR for the Study area, most were confirmed to be present within the Study area (**Table 3.3**). One RE 11.9.5 was mapped under DoR but were not found in the Study area during ecological surveys.

Table 3.3: Ground-truthed Regional Ecosystems by Biodiversity Status

Land zone	RE Code	Description	Occurrence in Study area (ha)
Least Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.14	*Eucalyptus spp., Angophora spp., Callitris spp.* woodland on alluvial plains	6.49
	11.3.18	*Eucalyptus populnea*, Callitris *glaucophylla*, *Allocasuarina luehmannii* shrubby woodland on alluvium.	27.04
5 – Cainozoic sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces.	34.52
	11.5.1a	*Eucalyptus populnea* woodland with *Allocasuarina luehmannii* low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones. Duplex soils with sandy surfaces.	9.79
	11.5.20	*Eucalyptus moluccana* and/or *E. microcarpa* and/or *E. woollsiana* +/- *E. crebra* woodland on Cainozoic sand plains.	21.65
Of Concern (Remnant)			
3 – Quaternary alluvial plains	11.3.2	*Eucalyptus populnea* woodland on alluvial plains	4.81
	11.3.4	*Eucalyptus tereticornis* and/or Eucalyptus spp. woodland on alluvial plains	15.00
	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.	46.53
	11.3.27f	*Eucalyptus coolabah* and/or *E. tereticornis* open woodland to woodland fringing swamps.	2.70
Endangered (Remnant)			
3 – Quaternary alluvial plains	11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	5.66
4 – Tertiary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains	50.50
Subtotal remnant			**224.69**

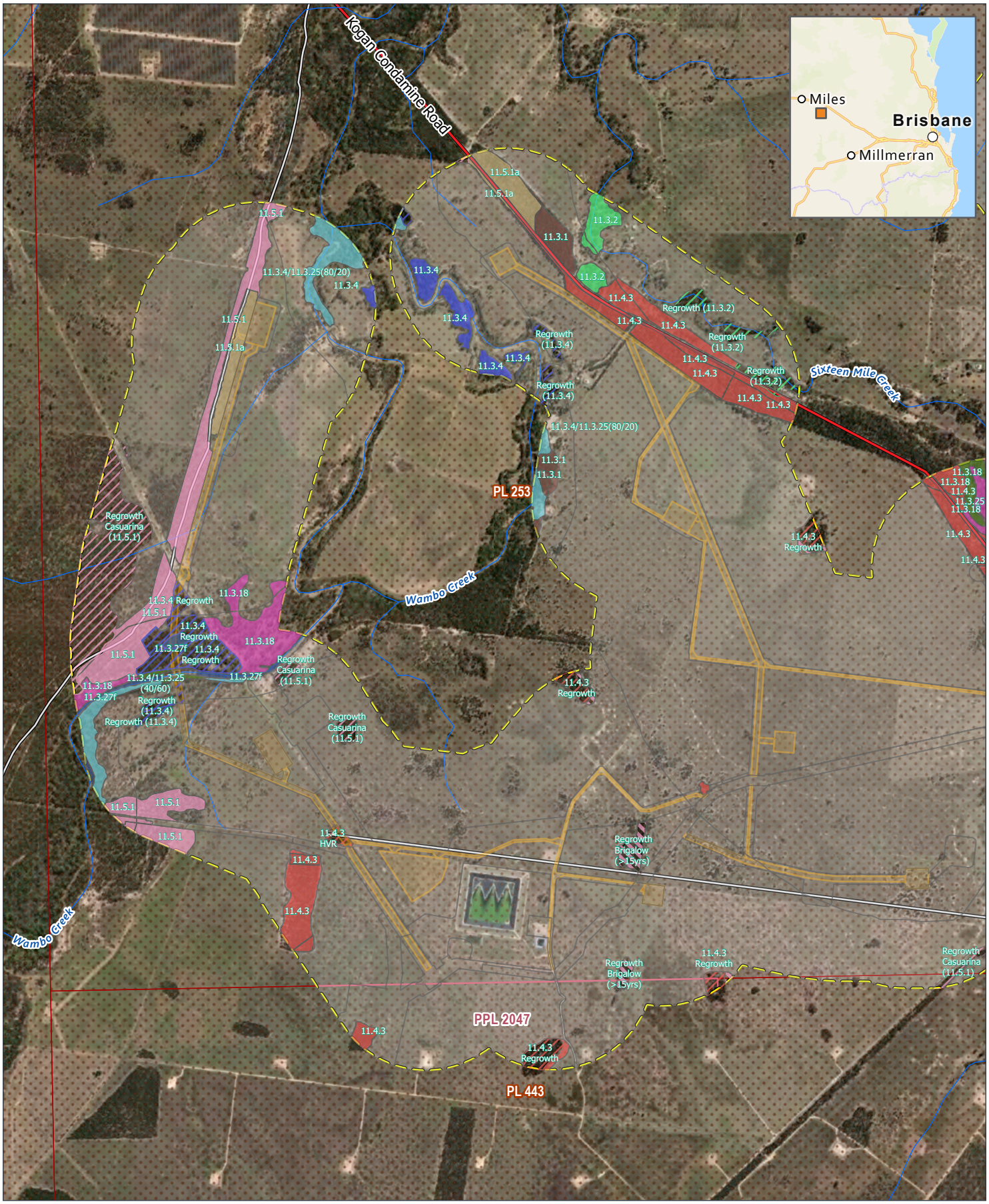
Land zone	RE Code	Description	Occurrence in Study area (ha)
Least Concern (Regrowth vegetation)			
5 – Cainozoic sandy plains and plateaus	11.5.1	*Eucalyptus crebra* and/or *E. populnea*, *Callitris glaucophylla*, *Angophora leiocarpa*, *Allocasuarina luehmannii* woodland on Cainozoic sand plains and/or remnant surfaces.	29.51
Of Concern (Regrowth vegetation)			
3 – Quaternary alluvial plains	11.3.2	*Eucalyptus populnea* woodland on alluvial plains	4.72
	11.3.4	*Eucalyptus tereticornis* and/or Eucalyptus spp. woodland on alluvial plains	14.97
	11.3.25	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines.	0.30
Endangered (Regrowth vegetation)			
4 – Tertiary to early Quaternary clay plains	11.4.3	*Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains.	45.17
Other regrowth vegetation			
Brigalow			9.31
Subtotal Regrowth vegetation			**103.98**
Non-remnant / cleared			2,005.52
Existing track / road			1.64
Derived grassland			35.57
Total			**2,371.38**

3.2.2 Conservation-significant flora

Ecological surveys of the Study area have been undertaken by CHEC Environmental in October 2025. No conservation significant flora species were identified. Refer to **Appendix D** for the PEC reports for the October 2025 ecological surveys. A map showing the location of all conservation significant flora records in the vicinity of the Study area is provided in **Figure 3.7**.

3.2.3 Protected plants trigger map

There are no 'high risk' areas shown on the Protected Plants Flora Survey Trigger Map within the Study area.



Ground-truthed Regional Ecosystems

Page 1 of 2

Figure 3.6

DWG No: ARR-002_153[0]
DATE: 18/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

N

0 1

Kilometers

GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Project Footprint
- Watercourse

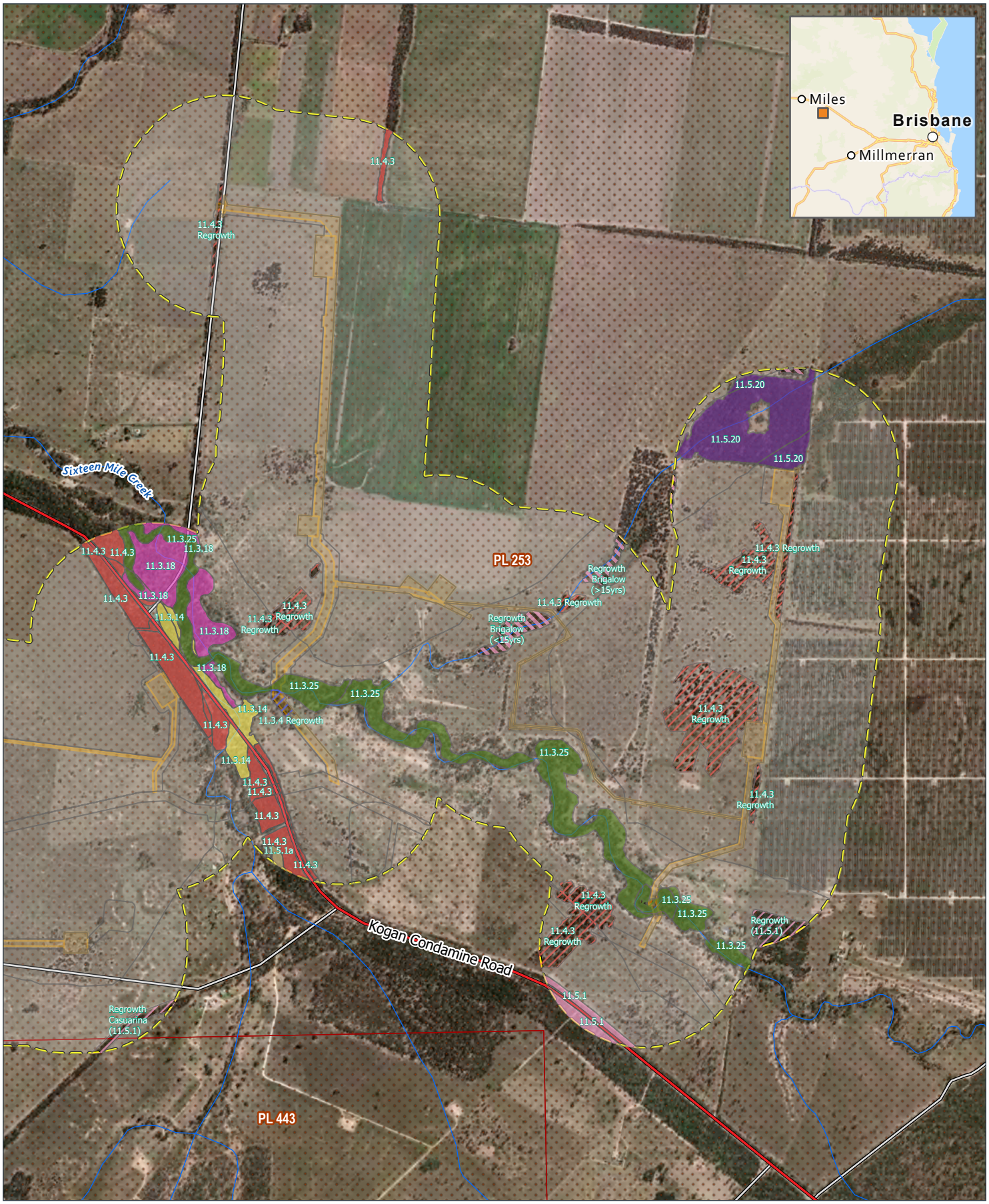
Remnant
- 11.3.1
- 11.3.2
- 11.3.4
- 11.3.4/11.3.25
- 11.3.18
- 11.3.25
- 11.3.27f
- 11.4.3
- 11.5.1
- 11.5.1a

Regrowth
- 11.3.2
- 11.3.4
- 11.4.3
- 11.5.1
- Brigalow

Non-remnant
- Non-remnant

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Ground-truthed Regional Ecosystems

Page 1 of 2

Figure 3.6

DWG No: ARR-002_153[0]
DATE: 18/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

N

0 1

Kilometers

GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Project Footprint
- Watercourse

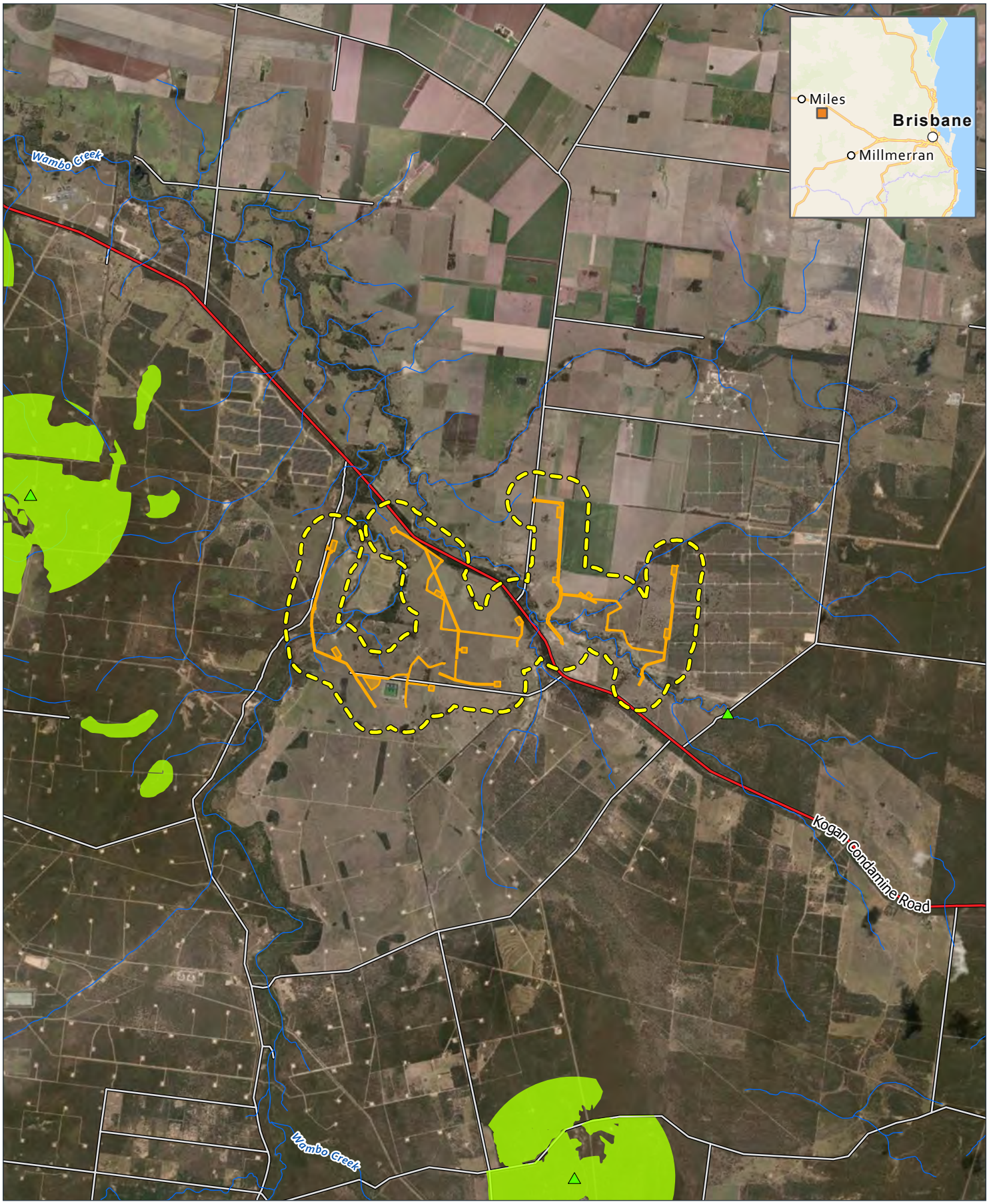
Remnant
- 11.3.14
- 11.3.18
- 11.3.25
- 11.4.3
- 11.5.1
- 11.5.1a
- 11.5.20

Regrowth
- 11.3.4
- 11.3.25
- 11.4.3
- 11.5.1
- Brigalow

Non-remnant
- Non-remnant

© State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Conservation Significant Flora

Figure 3.7

Study Area (500m buffer)
Project Footprint
Watercourse
Protected plants trigger map
Kogan Waxflower Record

DWG No: ARR-002_154[0]
DATE: 2/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:100,000

N
0 2
Kilometers
GDA2020 MGA Zone 56

© State of Queensland (Department of Environment and Science) 2023, © State of Queensland (Department of Environment and Science), 2023, © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.3 Description of environmental values – terrestrial fauna

3.3.1 Habitat types and condition

The Study area is dominated by riparian woodland habitats on watercourses and gilgaied clay plains with isolated patches of Brigalow to the east of Wambo Creek. Remnant vegetation is mostly restricted to road reserves and riparian areas. Most remnant vegetation have been impacted by logging activities (either broadscale or selective) or other forms of disturbance. The majority of the Study area has been almost completely cleared to support pastoral activities, however patches of brigalow vegetation (RE 11.4.3) have been retained within these areas . Additionally, the Project is located within an area of existing CSG infrastructure.

The vegetation communities that have been ground-truthed across the Study area (**Figure 3.6**) represent the following broad habitat types:

- Eucalypt woodlands to open forests: A few of eucalypt communities have been identified within the Study area, including RE 11.5.1, RE 11.5.1a, and RE 11.5.20. This habitat type represents approximately 4.0% of the total Study area (**Plate 1**). Of these communities RE 11.5.20 and RE 11.5.1 are the most abundant communities and are dominated by grey box (*Eucalyptus moluccana*), narrow-leaved ironbark (*E. crebra*) and poplar box (*E. populnea*). Regrowth patches of these communities have also been incorporated into this habitat type.
- Riparian woodlands: Several eucalypt woodland communities were identified along mapped watercourses within the Study area and are predominately RE 11.3.18, RE 11.3.25 and RE 11.3.4. This habitat type represents approximately 5.3% of the total Study area (**Plate 2**). These communities are dominated by forest red gum (*E. tereticornis*) and poplar box. No regrowth communities were identified within the Study area.
- Acacia woodlands: Several isolated patches of remnant and regrowth RE 11.4.3 and RE 11.3.1 dominated by brigalow (*Acacia harpophylla*) have also been identified within the study area. These patches represent approximately 4.3% of the total Study area (**Plate 3**) and are located east of Wambo Creek.
- Cleared and/or non-remnant: The remaining areas within the Study area have been described as cleared and/or non-remnant. This habitat type represents approximately 86.1% of the total Study area (**Plate 4**). Whilst these areas contain no little to no vegetation, they do contain large areas of highly disturbed gilgai.



Plate 1: Example of the eucalypt woodland to open forest habitat type (access point from Clynes Road in remnant RE 11.5.1)



Plate 2: Example riparian woodlands habitat type (regrowth RE 11.3.4 north of Wambo Creek)



Plate 3: Example Acacia woodland habitat type (regrowth RE 11.4.3)



Plate 4: Example cleared and/or non-remnant habitat type (with gilgai)

3.3.2 Watercourses

Major watercourses are important landscape elements which act as significant migratory and dispersal pathways for many fauna species, contain important habitat resources (including food, water, sheltering, roosting and nesting sites) as well as provide refugia during periods of drought. Unlike other parts of the Brigalow Belt bioregion where waterways often provide the only remaining landscape connectivity, the Study area retains a significant amount of native vegetation and landscape connectivity. Despite this, the major creek systems (Wambo Creek and Sixteen Mile Creek) identified within the Study area does represent habitat that are often less impacted by historical clearing and are more likely to contain large trees due to their position in the landscape (**Plate 5**).

The drainage in the Study area generally flows in a northernly direction, eventually draining into the Condamine River. Wambo Creek and Sixteen Mile Creek are the major drainage systems in the Study area, with several tributaries of Sixteen Mile Creek occurring in the eastern portion of the Study area. Wambo and Sixteen Mile Creek that intersect with the Project Footprint are ephemeral and only likely to contain water following substantial rainfall events. The Project has a crossing on Wambo Creek and two (2) crossings on Sixteen Mile Creek. These watercourses are generally buffered by riparian vegetation (RE 11.3.25). Refer to the water feature checklists in **Appendix D**. These watercourses are also mapped as a Regional biodiversity corridors as shown in **Figure 3.1**.



Plate 5: Wambo Creek looking upstream of main channel from centre of RoW



Plate 6: Sixteen Mile Creek looking downstream of main channel from centre of RoW

3.3.3 Wetlands

Whilst there are no wetlands of high ecological significance mapped within the Study area.

3.3.4 State Forests

There are no state forests in the Study area.

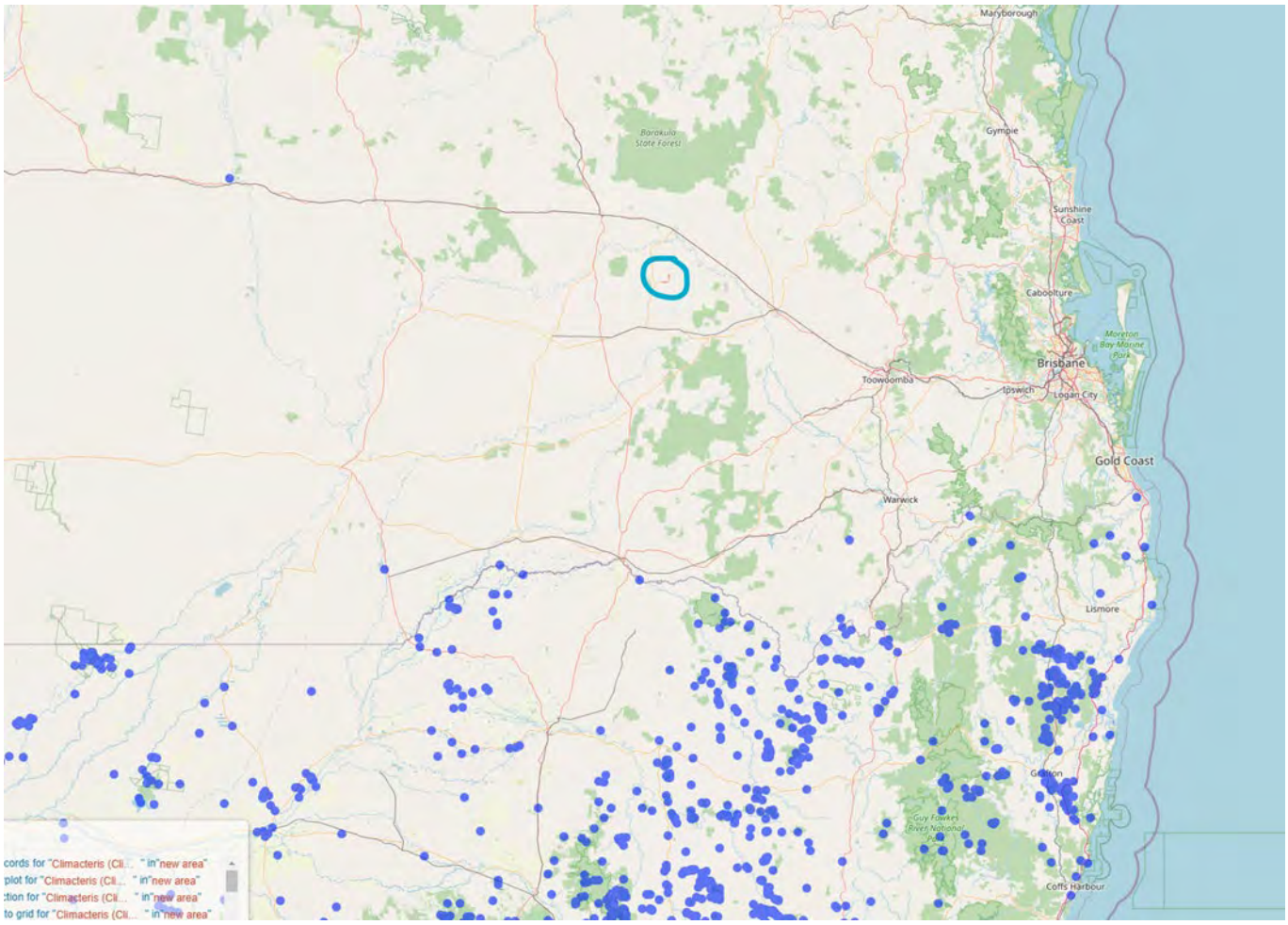
3.3.5 Conservation-significant fauna

Of the 34 species initially considered as part of the LoOM assessment as potentially occurring within the Study area, 9 species were ultimately identified as 'known to occur' or 'likely to occur' based on the proximity to nearby records and the availability of suitable microhabitat features within the Study area (refer to **Appendix D** for the individual PEC reports). The records of known or likely to occur species are shown on **Figure 3.8**. Whilst the short-beaked echidna (*Tachyglossus aculeatus*) was not considered during these PEC assessments, Arrow have included this species in this preliminary shortlist based on their experience with similar Projects in the region.

Following a detailed review of the likelihood of occurrence and undertaking an SRI assessment for species listed in the PEC reports for the study area, two species were reassessed as **Unlikely to Occur** as documented below:

- Brown treecreeper (south-eastern) (*Climacteris picumnes victoriae*) was relatively recently listed (March 2023) and in undertaking an SRI assessment it was determined that the listed subspecies of brown treecreeper, *Climacteris picumnes victoriae,* is **Unlikely to Occur** in the Study area. The justification for this update is provided below:
  - the Study area is located outside the distribution of this subspecies (refer to the map below, **Map 1**, with records of the listed subspecies). The south-eastern subspecies is the only one listed under the EPBC Act or NC Act and its distribution appears to be confined to the Queensland-Ner South Wales border (with the exception of a few extraneous and disjunct records). In contrast there are records of other brown treecreeper subspecies throughout Queensland and in proximity to the Study area (1 record was observed within the Study area).
- Australian painted snipe (*Rostratula australis*) has been assessed as **Unlikely to Occur** based on the location of known records in the vicinity of Lake Broadwater / Long Swamp and marginal / unsuitable habitat in the Study area:
  - most of the nearby records for the Australian painted snipe are concentrated around Lake Broadwater and Long Swamp (approximately 60 km to the south-east) which likely triggered the inclusion of this species as in the LoOM species list that was used during the field assessment. The Australian painted snipe typically requires permanent or ephemeral waterbodies with ample fringing vegetation (grasses, rushes, reeds and low scrub) (DSEWPC, 2013). Whilst the Study area is located within the known distribution of this species and does intersect several watercourses (as shown in **Plate 5** and **Plate6** above), the disturbance footprint is unlikely to contain any suitable habitat for this species.

The 'known to occur' and 'likely to occur' species have been summarised in **Table 3.4**, with nearby records and habitat mapping for this species been shown on **Figure 3.9**, **Figure 3.10**, **Figure 3.11** and **Figure 3.12**. For the purposes of this report, whilst microhabitat data collected from the surrounding areas was used to make these determinations, habitat for these 'known to occur' and 'likely to occur' species has been mapped within the disturbance footprint and adjacent areas. Species that were assessed as 'unlikely to occur' or 'potentially occurring' within the Study area have not been considered further in this report and are not a PEM (under the EO Act) for the project. The following sections provide a broad overview of the ecology for these species.



Map 1: Records for the listed subspecies of brown treecreeper, *Climacteris picumnes victoriae*

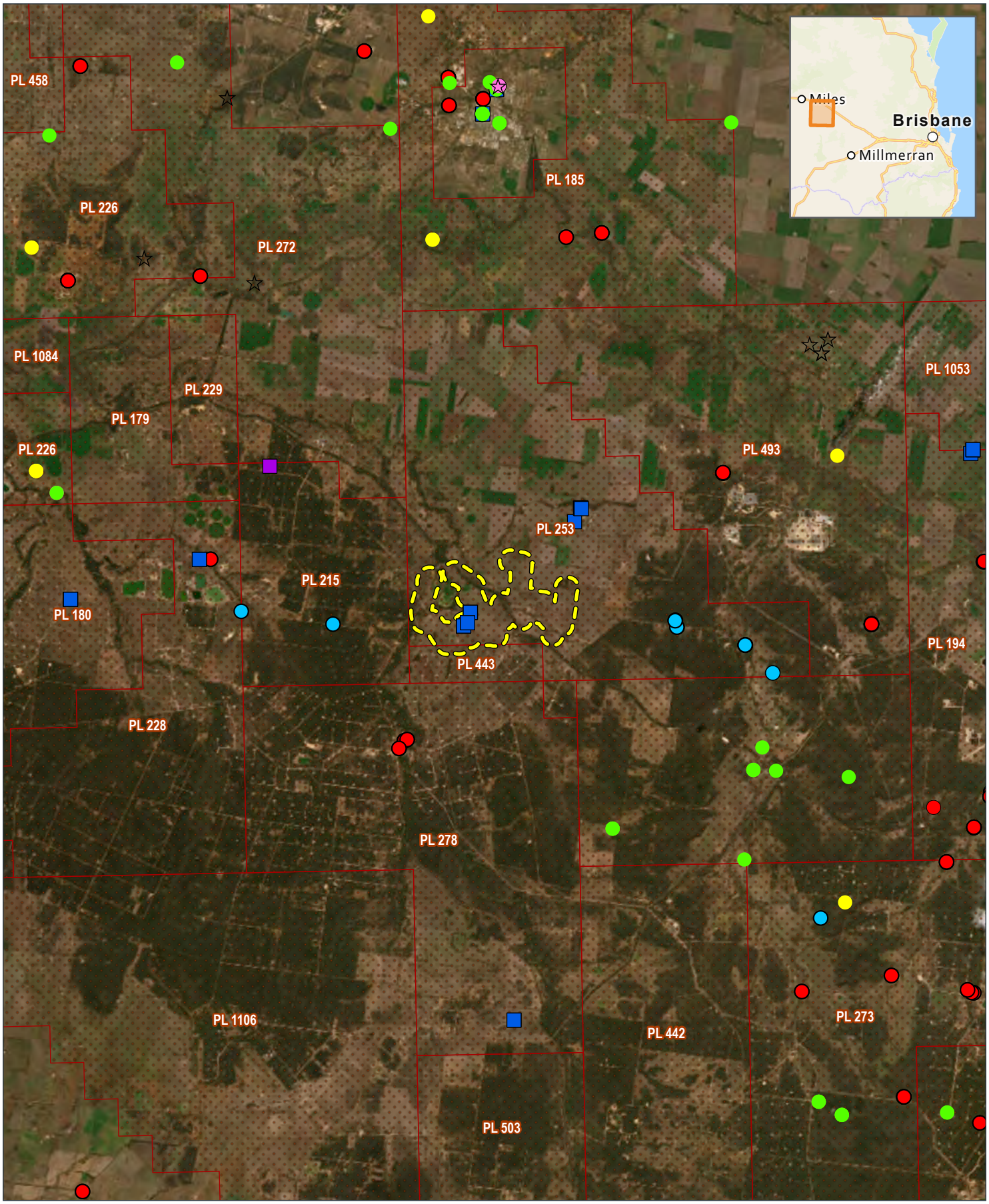
Table 3.4: Summary of fauna species known or likely to occur in the Study area

Fauna Species	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
Bird Species			
Diamond firetail (*Stagonopleura guttata*)	V	V	**Likely to Occur**. This species breeds and forages within a wide range of habitats, many of which have been observed within the Study area. Whilst records of this species in the surrounding landscape have been spatially concealed, they appear to be ubiquitous in the regions surrounding Barakula State Forest, the Condamine River and Braemar State Forest. The nearest spatially concealed record is approximately 15 km to the north-east (ALA).
South-eastern glossy black-cockatoo (*Calyptorhynchus lathami lathami*)	V	V	**Likely to Occur**. Potential foraging resources (Belah *Casuarina cristata*) were observed within the eastern portion of the Study area. No suitable breeding habitat (i.e. large tree hollows) were observed within the Study area. The nearest recent record of this species is approximately 28 km to the north-west (ALA 2020).

Fauna Species	EPBC Act Status[1]	NC Act Status[2]	Likelihood of Occurrence & Rationale
Southern whiteface (*Aphelocephala leucopsis*)	V	V	**Likely to Occur**. This species breeds and forages within a wide range of habitats, many of which have been observed within the Study area. The nearest record of this species is approximately 40 km to the south (ALA 2008) along the Moonie River.
Invertebrate Species			
Brigalow woodland snail (*Adclarkia cameroni*)	E	E	**Likely to Occur**. Microhabitat features utilised by this species including decaying logs, woody debris, leaf litter, and dense overstory cover of shrubs and tree, most of which have been observed in portions of the Study area. The nearest record of this species is approximately 16 km to the north-west (ALA 2007).
Mammal Species			
Koala (*Phascolarctos cinereus*)	E	E	**Likely to Occur**. Suitable breeding and foraging habitat has been identified for this species within the Study area, primarily as riparian vegetation dominated by *Eucalyptus tereticornis* along the mapped watercourses. The nearest record is approximately 5 km so the south-west (Arrow 2018).
Short-beaked echidna (*Tachyglossus aculeatus*)	-	SLC	**Likely to Occur**. Short-beaked echidnas can utilise a wide range of habitat types (BHA, 2024) and are well known from the border SGP Project area. The nearest record of this species is approximately 4 km to the north-west (ALA 2024).
Reptile Species			
Dunmall's snake (*Furina dunmalli*)	V	V	**Likely to Occur**. Microhabitat features utilised by this species including soil cracks, woody debris, leaf litter, and dense overstory cover of shrubs and trees, most of which have been observed in portions of the Study area. The nearest record of this species is approximately 10 km to the north-west (ALA 2000).
Grey Snake (*Hemiaspis damelii*)	E	E	**Likely to Occur**. Microhabitat features for this species include heavy clay soils with cracks in gilgai, woody debris, leaf litter and dense overstory cover of shrubs and trees, most of which were observed in portions of the Study area. The nearest record of this species is in the Study area (Arrow 2014).
Golden-tailed Gecko (*Strophurus taenicauda*)	-	NT	**Known to Occur**. Suitable habitat (trees with loose/peeling bark) for this species was common throughout the Study area. The nearest record of this species is approximately 3 km to the west (ALA 2008).

[1] EPBC Act Status: E = Endangered, V = Vulnerable, Mi = Migratory, Ma = Marine

[2] NC Act Status: E = Endangered, V = Vulnerable, NT = Near Threatened, SLC = Special Least Concern



Conservation-Significant Fauna Records that are known or likely to occur in the Study area

Figure 3.8

DWG No: ARR-002_155[1]
DATE: 7/04/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:250,000

N

0 5

Kilometers

GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Watercourse
- PL Granted
- Diamond Firetail
- Glossy Black-cockatoo
- Southern Whiteface
- Dunmall's Snake
- Grey Snake
- Brigalow Woodland Snail
- Koala
- Short-beaked Echidna

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Apem Limited\ARR-002 - SGP North Ecology - Documents\v4 GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.3.5.1 Diamond Firetail (Stagonopleura guttata)

Diamond firetails occur on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia, and about 300 km inland from the sea (DCCEEW, 2023). Their range once extended to north Queensland inland from Cardwell, but they now occur only in the very south of the state. They have also disappeared from many of the more settled parts of New South Wales, Australian Capital Territory and Victoria, and birds in South Australia appear to have been separated into three isolated subpopulations.

This species occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees (DCCEEW, 2023). They typically prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover. They occur in flocks of between 5 to 50 and occasionally more. Whilst they are thought to be sedentary, some populations move locally. They predominantly feed at ground level, on ripe and partly ripe grass seeds, herb seeds, green leaves and on insects. The nearest (dated) record to the Project is approximately 36 km to the south-east (ALA 2024).

Most of the eucalypt woodland communities mapped within the Study area have been identified as suitable habitat for this species. Suitable habitat for this species has been shown on **Figure 3.9**.

3.3.5.2 Glossy Black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami)

South-eastern glossy black-cockatoos widespread and can be found from Mitchell, Queensland, through eastern New South Wales to East Gippsland, Victoria (DCCEEW, 2022). Their distribution is continuous through the forested parts of the Great Dividing Range but becomes more scattered inland, to as far west as the Riverina in New South Wales.

Typically encountered in small family parties, Glossy Black-cockatoos are dietary specialists feeding exclusively on the seeds of *Allocasuarina* and less frequently *Casuarina* spp. Favoured species include *A. torulosa*, *A. littoralis*, *A. distyla*, *A. diminuta*, *A. gymnanthera* and *A. verticillata*. Birds show a preference for productive trees (e.g. higher seed/cone weight ratio), notwithstanding the influence of other factors such as distance from water or breeding hollows. Stands of *Allocasuarina* are not, therefore, of uniform value and the loss of individual stands or trees can have disproportionate impacts. Although an *Allocasuarina* species, *A. luehmannii*, has small seeds and is infrequently used (DCCEEW, 2022). The nearest historical record of this species to the Study area is approximately 9.5 km to the south-east (ALA 1983).

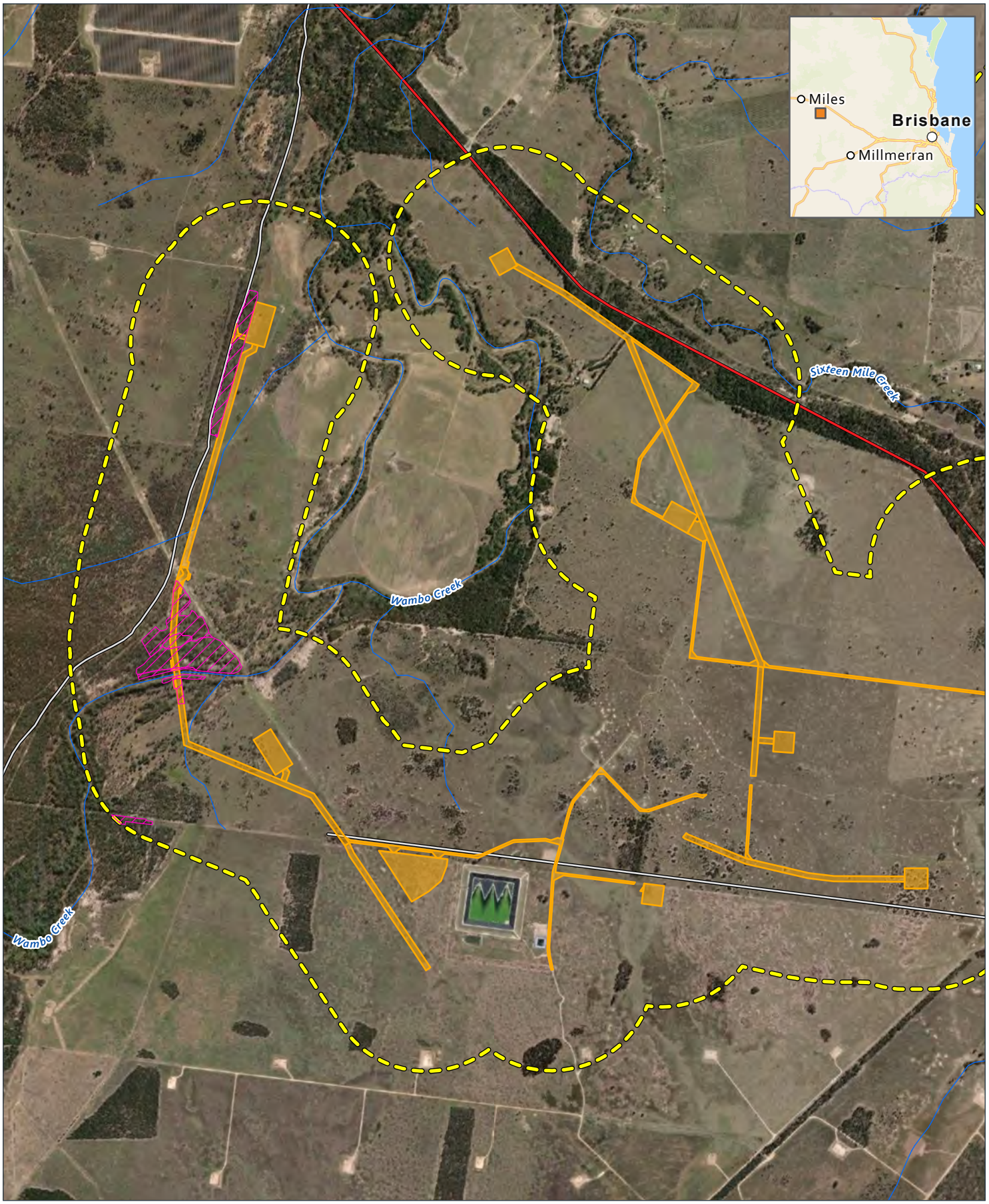
Within the Study area, suitable habitat for this species has been mapped within a several patches of RE 11.4.3 recorded to contain belah (*Casuarina cristata*) and is shown on **Figure 3.9**.

3.3.5.3 Southern whiteface (Aphelocephala leucopsis)

Southern whitefaces occur across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range (DCCEEW, 2023). There is a broad hybrid zone between the two subspecies extending north from the western edge of the Nullarbor Plain. The northern boundary extends to about Carnarvon in the west, to the southern Northern Territory in central Australia, but is slightly further south in Queensland where the species is largely confined to the south-west of the Mitchell Grass Downs and along the southern state border.

Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs, or both. They are usually in habits dominated by acacias or eucalypts on ranged, foothills and lowlands, and plains (DCCEEW, 2023). They are considered mostly sedentary, however individuals have been observed moving into wetter areas outside of their normal range during drought years. They forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understory litter cover where they primarily feed on insects, spiders and seeds gleaned from the bare ground or leaf litter (DCCEEW, 2023).

Most of the eucalypt woodland communities mapped within the Study area have been identified as suitable habitat for this species. Suitable habitat for this species has been shown on **Figure 3.9**.



Conservation-significant fauna records (birds)

Page 1 of 2

Figure 3.9

DWG No: ARR-002_155[1]
DATE: 7/04/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

N

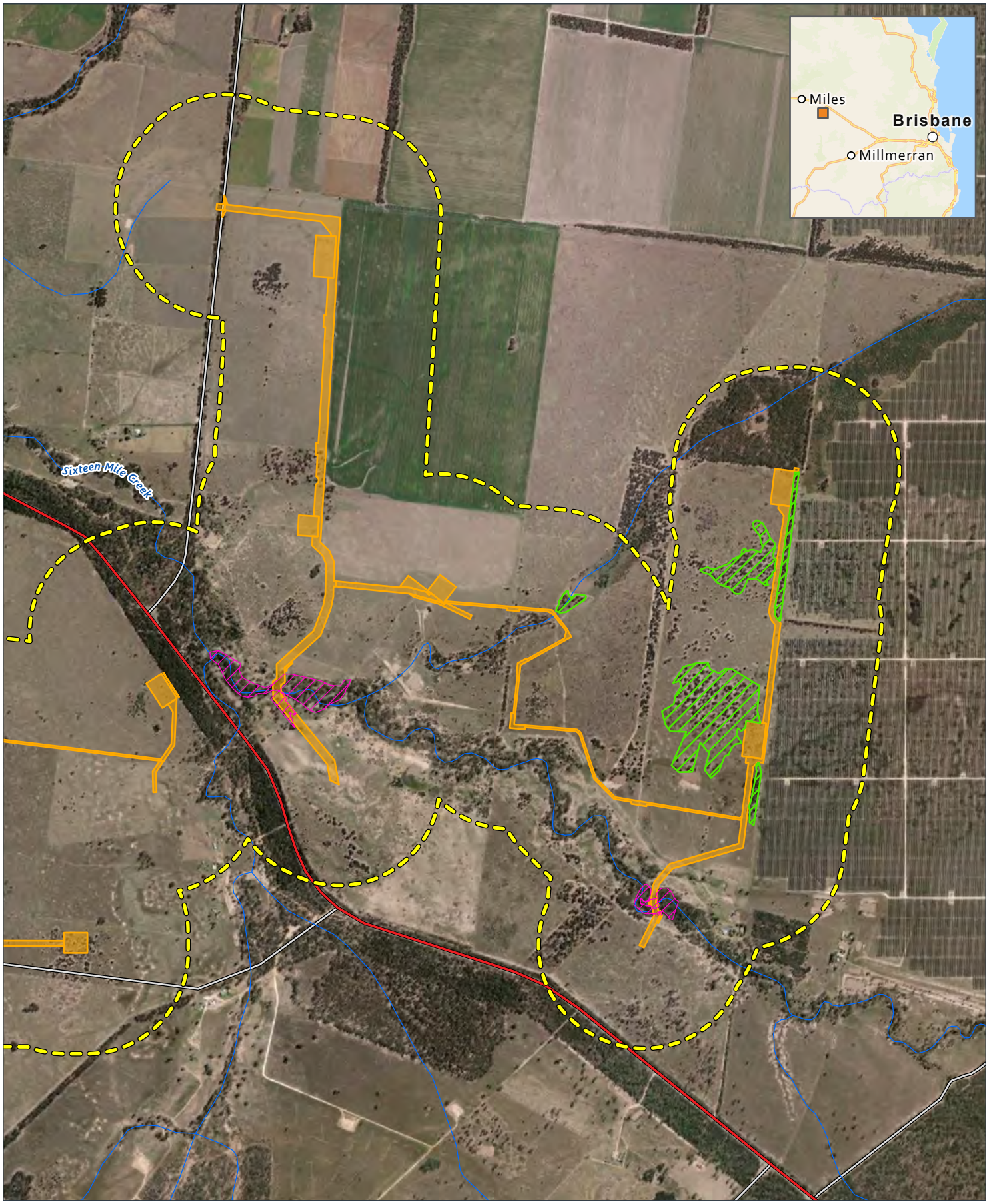
0 500 Meters

GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Project Footprint
- Watercourse
- Diamond firetail / Southern whiteface habitat
- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Southern Whiteface

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Apem Limited\ARR-002 - SGP North Ecology - Documents\v4 GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Conservation-significant fauna records (birds)

Page 1 of 2

Figure 3.9

DWG No: ARR-002_155[1]
DATE: 7/04/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

N

0 500 Meters

GDA2020 MGA Zone 56

- Study Area (500m buffer)
- Project Footprint
- Watercourse
- Glossy black-cockatoo habitat
- Diamond firetail / Southern whiteface habitat
- Diamond Firetail Records
- Glossy Black-cockatoo Records
- Southern Whiteface

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

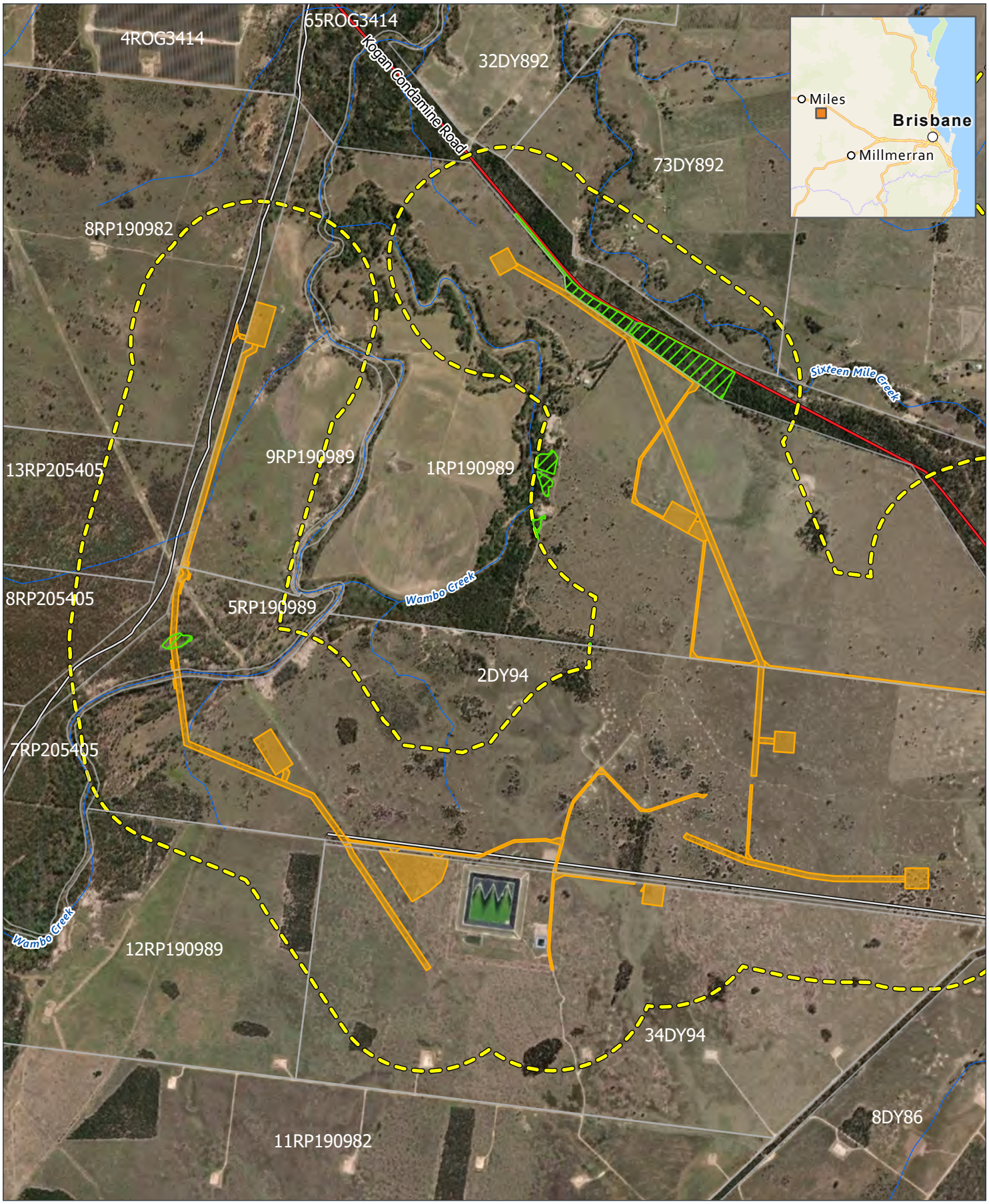
C:\Users\JustinClaridge\Apem Limited\ARR-002 - SGP North Ecology - Documents\v4 GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.3.5.4 Brigalow Woodland Snail (Adclarkia cameroni)

The Brigalow Woodland Snail is part of the family *Camaenidae* and is a medium-sized species characterised by a somewhat flattened shell, with rounded and tightly coiled whorls, the last of which is flared (TSSC, 2016a). This species is endemic to southeast Queensland, where it occurs in a small number of remnant and scattered *Acacia harpophylla* and eucalypt woodland patches (commonly along road verges and riparian corridors) along the Condamine River floodplain, especially in the area around Dalby and Chinchilla (TSSC, 2016b).

The current distribution of this species is severely fragmentated. The Brigalow communities within the Condamine River floodplain (located to the north of the Study area) that were once contiguous throughout the species' historical distribution have been extensively cleared to support agricultural and pastoral activities (TSSC, 2016a). The current distribution of this species along the floodplain (from approximately 17 km south of Dalby to around Miles), reflects this broad scale clearing (TSSC, 2016b). The nearest recorded individual to the Study area is located approximately 1 km to the north-east (Arrow 2012).

Suitable habitat for this species has been identified within remnant brigalow dominated communities (RE 11.3.1 and RE 11.4.3) mapped along the Kogan-Condamine Road Reserve and within wetland eucalypt communities (RE 11.3.27f) mapped along Wambo Creek. These areas are shown on **Figure 3.10**.



Conservation-significant fauna records (Invertebrates)

Figure 3.10

Study Area (500m buffer)

Project Footprint

Watercourse

Brigalow woodland snail habitat

Brigalow Woodland Snail

N

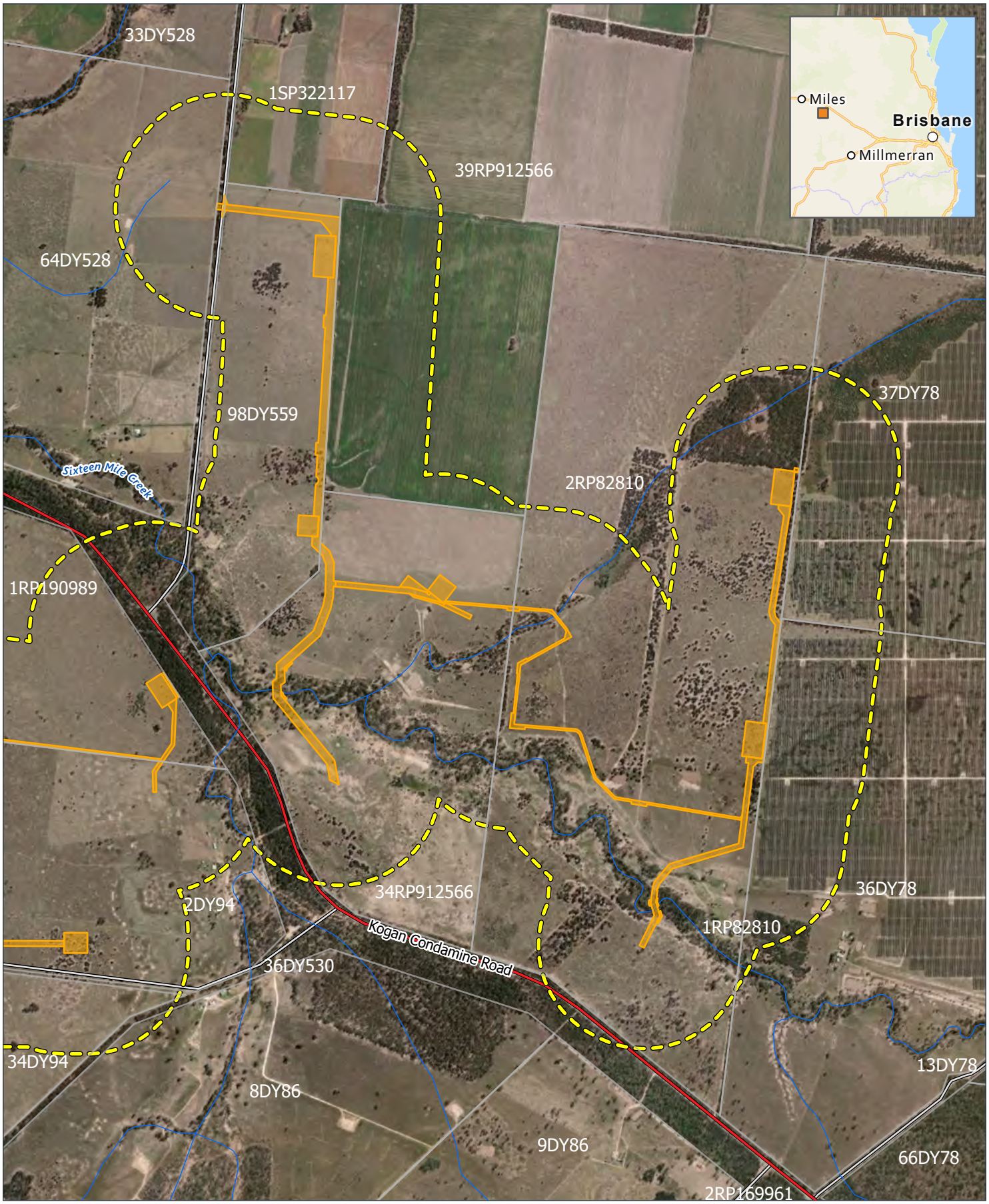
0 500 Meters

GDA2020 MGA Zone 56

DWG No: ARR-002_156[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

© State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4 GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Conservation-significant fauna records (Invertebrates)

Page 1 of 2

Figure 3.10

Study Area (500m buffer)

Project Footprint

Watercourse

Brigalow Woodland Snail

DWG No: ARR-002_156[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

N

0 500 Meters

GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.3.5.5 Koala (Phascolarctos cinereus)

Koalas are widespread across Queensland, occurring in patchy and often low-density populations across the different bioregions where they inhabit moist coastal forests, southern and central western sub-humid woodlands, and a number of eucalypt woodlands adjacent to waterbodies in the semi-arid western parts of the state (DAWE, 2022a).

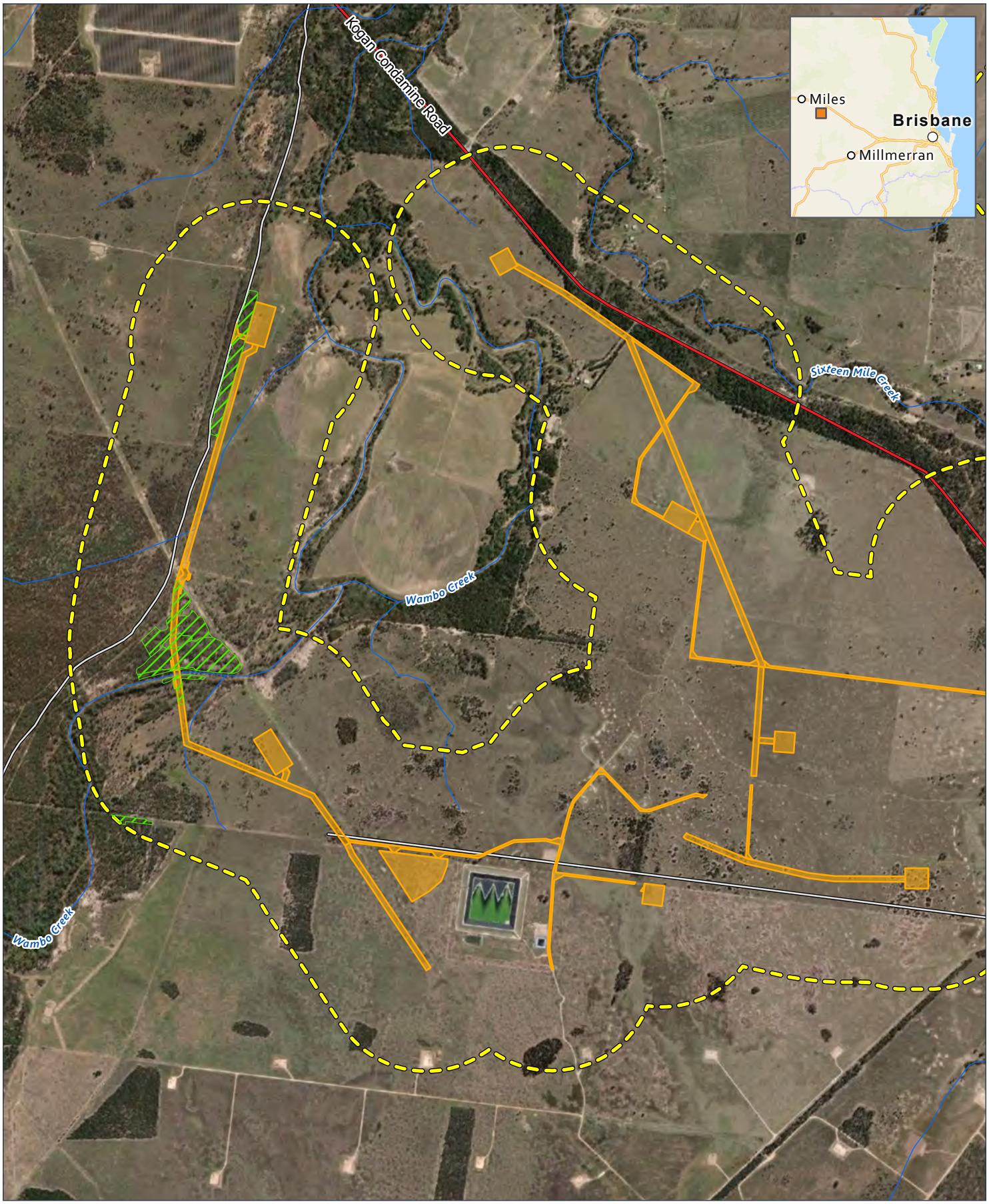
Closer to the western extent of their distribution, Koalas are often associated with watercourses, though they are not restricted to them (DAWE, 2022a). They are not strongly territorial and home ranges will overlap. Home ranges vary in size from 1-2 ha in optimum habitat up to 135 ha in semi-arid regions. Koalas are surprisingly mobile and able to move large distances across artificial (cleared) land. There are no limitations on patch size, and they are also often seen in regrowth vegetation. The abundance of records in non-remnant habitats likely reflect these behaviours with individuals able to utilise isolated trees in an otherwise unsuitable landscape.

Koalas feed on eucalypt trees but show dietary preference based on geographical region and the types of tree species present. In the Brigalow Belt, Koalas have at least 24 species of *Eucalyptus* on which they preferentially forage (Australian National University, 2021). Of these tree species, the following have been recorded in the broader SGP: *Corymbia tessellaris*, *C. citriodora*, *Eucalyptus camaldulensis*, *E. chloroclada*, *E. coolabah*, *E. crebra*, *E. exserta*, *E. fibrosa*, *E. melanophloia*, *E. moluccana*, *E. ochrophloia*, *E. populnea* and *E. tereticornis*. Numerous historical koala records have been identified within the Study area, the most recent of which was recorded in 2018 (Arrow).

Within the Study area, most remnant and regrowth eucalypt woodlands have been identified as suitable habitat for this species. Habitat mapping for this species has been shown on **Figure 3.11**.

3.3.5.6 Short-beaked Echidna, (Tachyglossus aculeatus)

The short-beaked echidna can be found across most of Australia, where they live in forests and woodlands, heaths, grasslands and arid environments (BHA, 2024). Considering the broad range of habitats that the Echidna could occupy, they could occur anywhere across the Study area. For the purposes of this assessment, habitat has been mapped by buffering known records by 1 km as set out in the *Method for mapping matters of state environmental significance, Version 7* (DESI, 2024). Whilst several records of the short-beaked echidna have been identified in the surrounding landscape, the nearest record is approximately 5 km to the north-west (ALA 2008). Following the guidance outlined in (DESI, 2024), there is no mapped habitat for the short-beaked echidna within the Study area.



Conservation-significant fauna records (Mammals)

Figure 3.11

Study Area (500m buffer)
Project Footprint
Watercourse
Koala habitat
Koala
Short-beaked echidna

N

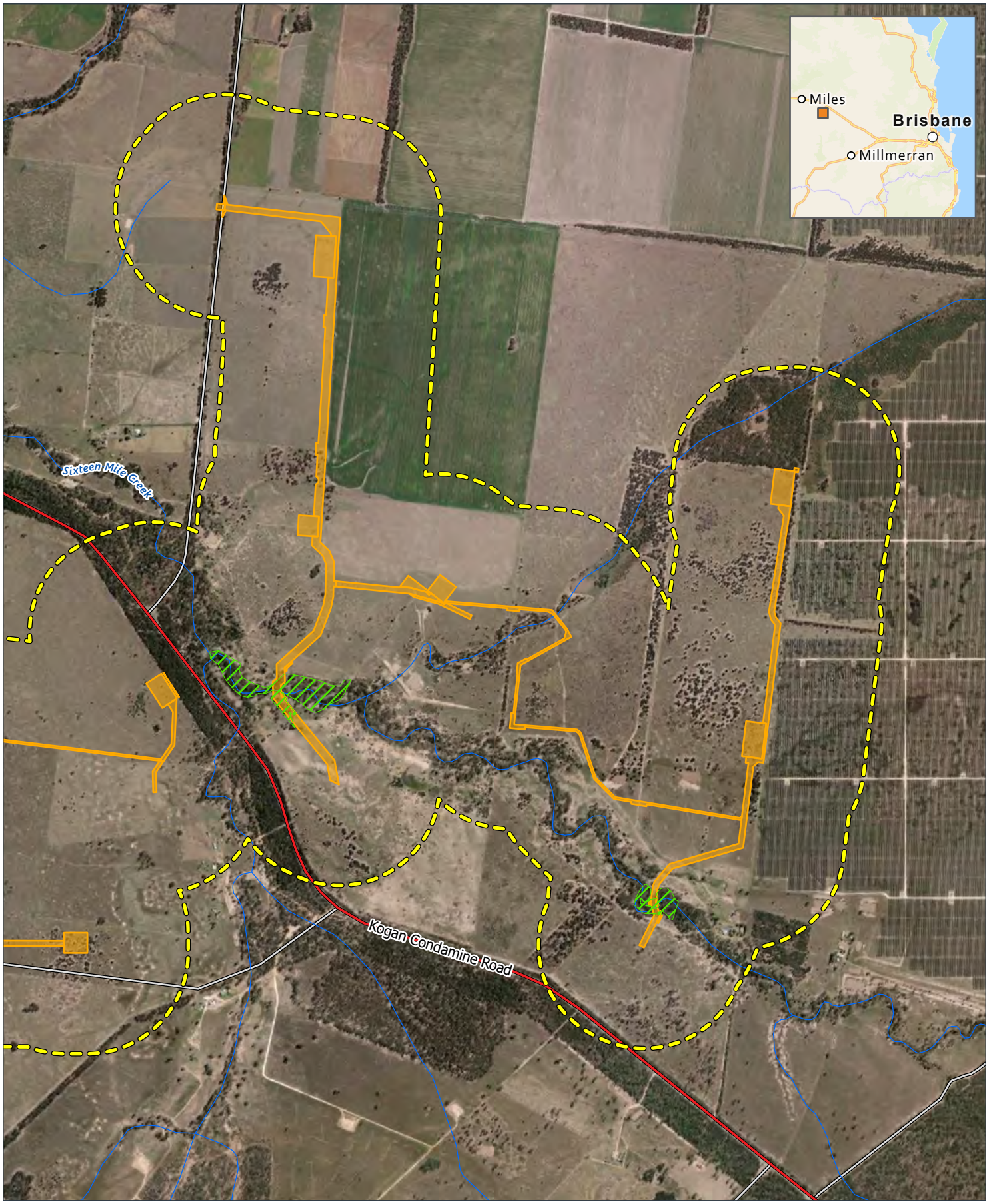
0 500 Meters

GDA2020 MGA Zone 56

DWG No: ARR-002_157[0]
DATE: 19/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Conservation-significant fauna records (Mammals)

Figure 3.11

Study Area (500m buffer)
Project Footprint
Watercourse
Koala habitat
Koala
Short-beaked echidna

DWG No: ARR-002_157[0]
DATE: 19/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

N
0 500 Meters
GDA2020 MGA Zone 56

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.3.5.7 Dunmall's snake (Furina dunmalli)

Dunmall's snake is found in central and south-central Queensland and may potentially extend into inland north-eastern New South Wales (DOE, 2014). In Queensland, its range extends from Yeppoon and the Expedition Range in the north, to Oakey, Glenmorgan and Inglewood in the south. Most locality records are from between 200-500 m in elevation.

This species is typically found in open forest, particularly brigalow (*Acacia harpophylla*) forests and woodlands growing on floodplains of deep-cracking black clay and clay loam soils. Very little is known about this species although it is thought to be uncommon within its limited range (DOE, 2014). Captive specimens indicate that it is a nocturnal species, sheltering under fallen timber and in deep soil cracks and other cavities. Its diet consists primarily of small skinks and geckos. The nearest Dunmall's snake record to the Study area is approximately 13 km to the north-west (ALA 2000).

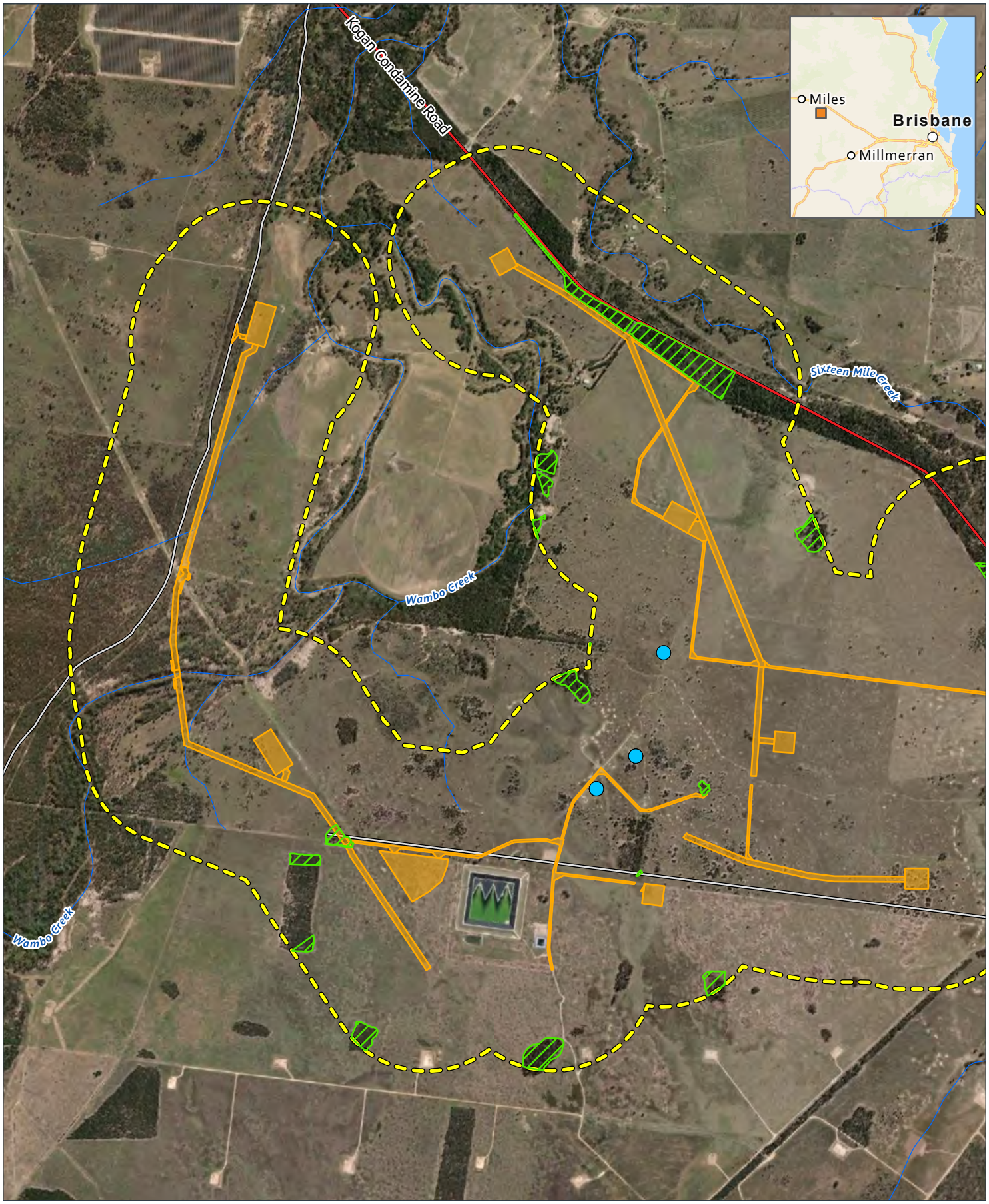
Within the Study area, suitable habitat for this species was identified within patches of mapped RE 11.3.1 and RE 11.4.3. Suitable habitat for this species has been shown on **Figure 3.12**.

3.3.5.8 Grey Snake (Hemiaspis damelii)

Grey snakes potentially occur from southern, inland New South Wales to south-eastern Queensland (Cogger, 2018), however the conservation advice indicates that the occurrence in New South Wales is represented by heavily fragmented, isolated areas, rather than continuous distribution as indicated by the Cogger distribution map (DCCEEW, 2022a). In Queensland, grey snake distribution is more widespread, with a concentration of records of the species along the Macintyre and Condamine Rivers and associated floodplains of the southern Brigalow Belt from Goondiwindi and Dalby west to Glenmorgan on the Darling Downs and western Lockyer Valley. The species has been recorded at two locations within the Study area in the western portion of the Project, with suitable habitat modelled in multiple locations, associated mostly with water features along the length of the Study area.

Grey snakes occur in dry sclerophyll forests and woodlands throughout their range and are normally found under cover during the day but are only partly nocturnal (Cogger, 2018). In Queensland, habitat is specifically in Brigalow (*Acacia harpophylla*) and Belah (*Casuarina cristata*) woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments. Logs, rocks and soil cracks provide important cover requirements for the species. Primary prey for this species is frogs; thus the floodplains and ephemeral water features that support the prey are important habitat for Grey Snake. The nearest grey snake record to the Study area is approximately 1 km to the north-east (Arrow 2012).

Within the Study area, suitable habitat for this species was identified within patches of mapped RE 11.3.1 and RE 11.4.3. Suitable habitat for this species has been shown on **Figure 3.12**.



Conservation-significant fauna records (Reptiles)

Page 1 of 2

Figure 3.12

Study Area (500m buffer)

Project Footprint

Watercourse

Dunmall's snake / Grey snake habitat

Dunmall's Snake Records

Grey Snake Records

N

0 500

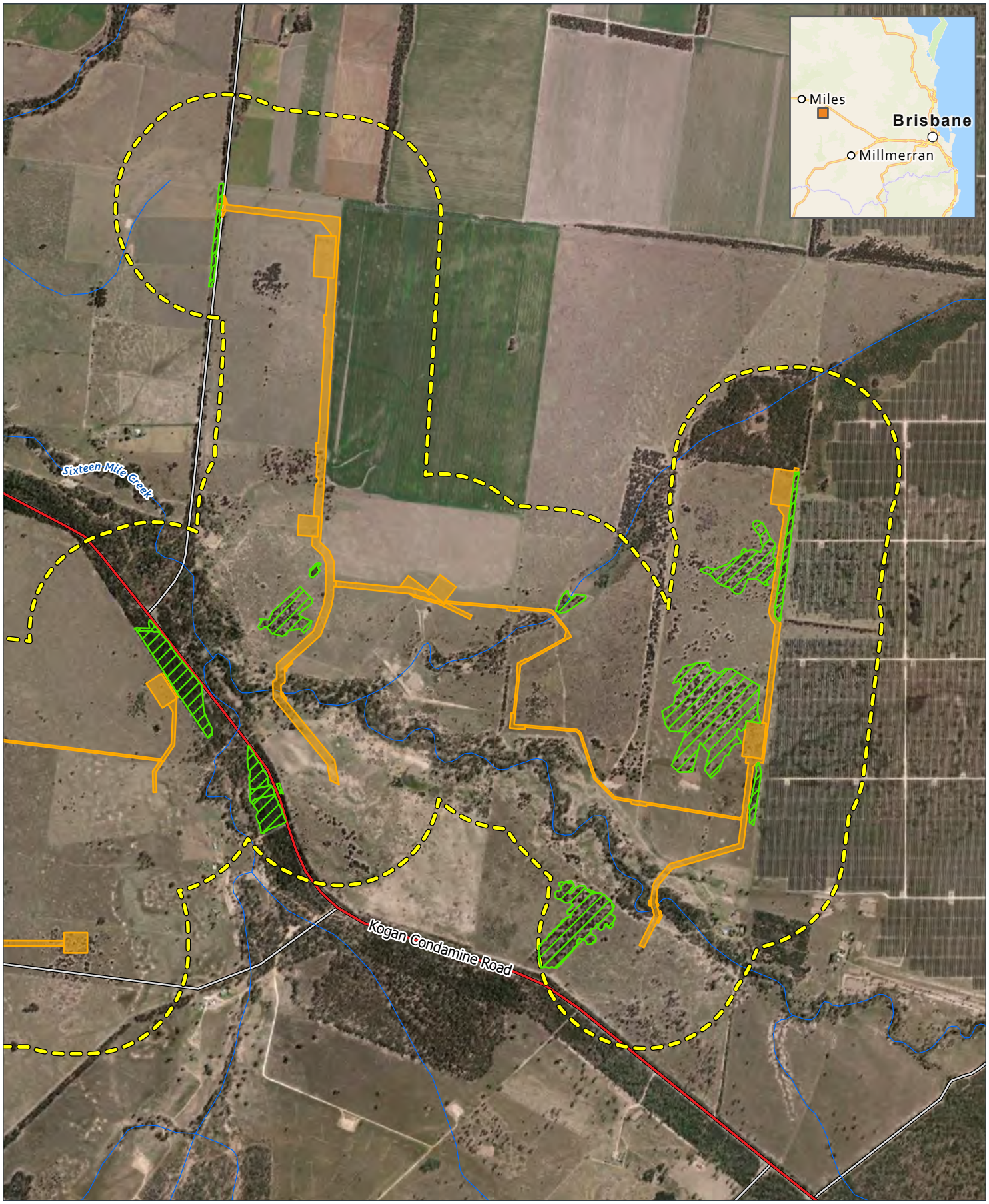
Meters

DWG No: ARR-002_158[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

GDA2020 MGA Zone 56

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx



Conservation-significant fauna records (Reptiles)

Figure 3.12

Study Area (500m buffer)
Project Footprint
Watercourse
Dunmall's snake / Grey snake habitat
Dunmall's Snake Records
Grey Snake Records

N
0 500
Meters

DWG No: ARR-002_158[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:25,000

GDA2020 MGA Zone 56

© State of Queensland (Department of Environment and Science), © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Earthstar Geographics, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4. GIS\4.6 Working\19_Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

3.3.6 Near Threatened fauna species

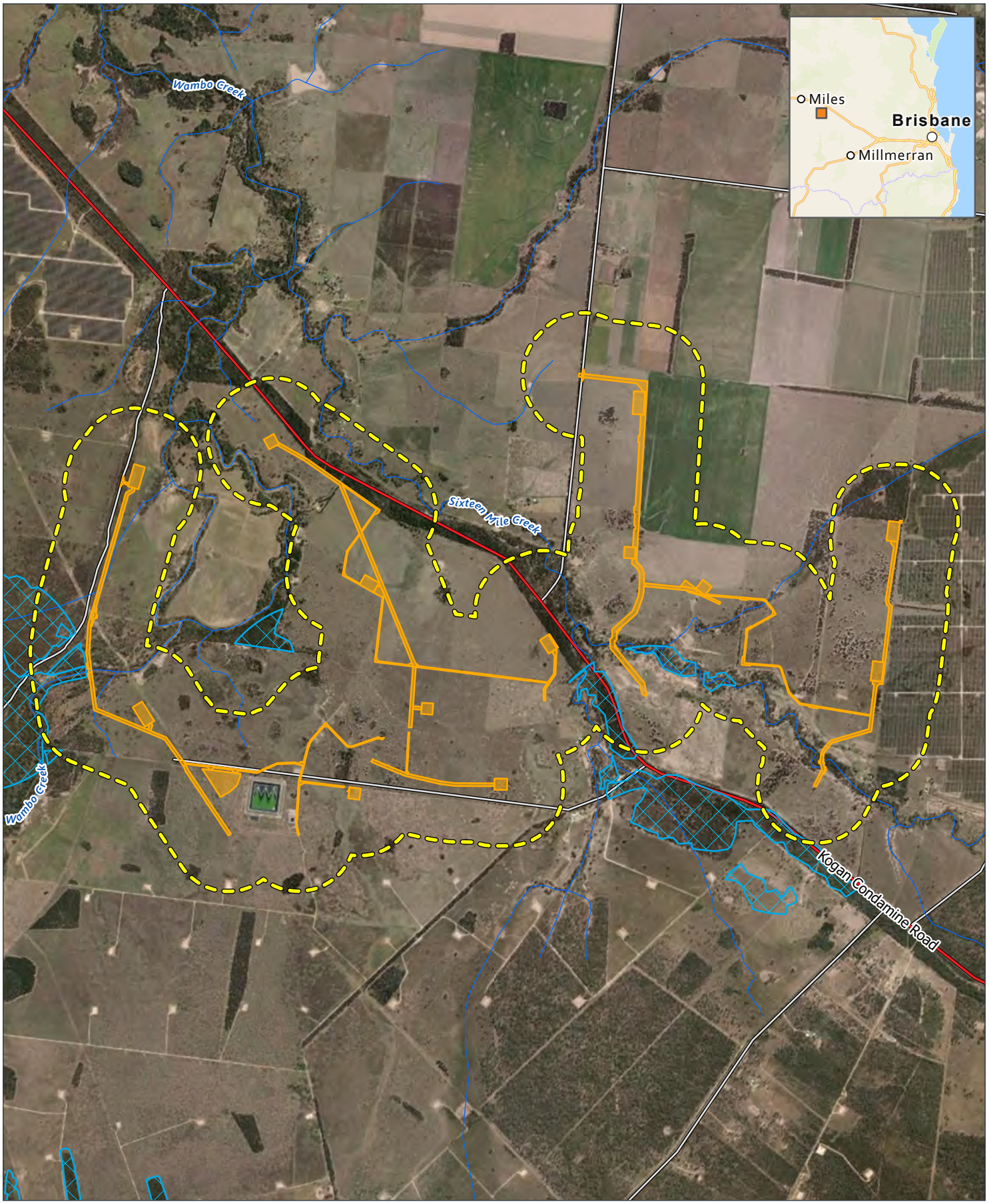
Whilst the Golden-tailed Gecko (*Strophurus taenicauda*) has been described as likely to occur within the Study area, habitat for near threatened species does not constitute an ESA, nor is it a PEM under the EO Act. The presence or potential presence of a near threatened species triggers requirements under the NC Act that are approved and managed separately to the EA. Therefore, the occurrence or potential occurrence of near threatened species or their habitat does not trigger any requirement to amend the EA however, the presence of these species is noted.

3.3.7 Essential habitat mapping

Mapped Essential habitat occurs within the Study area for the following species (refer to **Figure 3.13**):

- Pale imperial hairstreak, *Jalmenus eubulus*, and
- Golden-tailed Gecko, *Strophurus taenicauda*.

As only essential habitat for critically endangered, endangered and vulnerable wildlife is considered as an ESA in this report, no further assessment is made of essential habitat mapping for Golden-tailed Gecko (refer **Section 1.4.2.3**).



Essential Habitat Mapping

Figure 3.13

Study Area (500m buffer)
Project Footprint
Watercourse
Mapped Essential Habitat

DWG No: ARR-002_159[0]
DATE: 3/03/2026
DRAWN: JUC
REVIEWED MW
SCALE (A4): 1:45,000

N
0 1
Kilometers
GDA2020 MGA Zone 56

© State of Queensland (Department of Resources) 2024, © State of Queensland (Department of Resources) 2022, © State of Queensland (Department of Resources) 2023, Vantor, © State of Queensland (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development), Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

C:\Users\JustinClaridge\Attexo Group\ARR-002 - SGP North Ecology - Documents\4 GIS\4.6 Working\19 Hopelands_ClynesRd\Hopelands_ClynesRd.aprx

4. Impact assessment

4.1 Planning and design

Coal seam gas developments apply an iterative process in terms of locating pipeline infrastructure to manage competing constraints associated with the RoW and location of surface infrastructure, including ecological values, landholder preferences, geological features, existing infrastructure, and access tracks. Planning and management of surface activities and ground disturbance is undertaken utilising a set of hierarchical management principles to avoid, minimise and mitigate impacts to environmental values. These principles are:

- Avoid: Arrow Energy's first preference is to avoid PEMs, threatened ecological communities and the habitat of PEMs listed threatened species
- Minimise: where other competing constraints or the scale / location of PEMs communities or species habitat dictate that avoidance is not possible (e.g. where there is riparian vegetation that need to be crossed or large areas of suitable habitat for wide ranging species such as the Koala, Greater Glider or Painted Honeyeater), Arrow Energy's will preferentially locate infrastructure in a manner that minimises the impact to these values (e.g. cross the riparian vegetation at the narrowest or most degraded part or where practicable on the edge of suitable habitat for listed species so as not to bisect good quality habitat)
- Mitigate: implement mitigation measures to further minimise the direct and indirect impacts on ecological values
- Remediate and rehabilitate: actively remediate and rehabilitate impacted areas to promote and maintain long term recovery
- Offset: Arrow Energy will offset unavoidable significant residual impacts to PEMs.

Project development has also considered the hierarchical management principles for primary and secondary protection zones of Category B and C ESAs as set out in conditions of the Hopeland EA (refer **Section 5**).

Proposed Project impacts have been compared against the standard criteria, standard conditions, and variation conditions within the Hopeland EA to identify any impacts that are not consistent with approved conditions. These matters are discussed further in **Section 5**.

4.1.1 Co-location

The proposed well locations and the gathering / access track alignment has been designed using the management hierarchy as described above. The project is co-located adjacent to existing linear infrastructure as much as possible to avoid fragmenting vegetated areas which also allows for a narrower RoW during construction due to being able to use the existing tracks or RoWs for access. Many of the construction workspaces and activities such as laydowns, access tracks and extra workspaces use gas field infrastructure or have been located in areas previously disturbed as part of the development of the gas field and are already approved under existing EAs.

The Project also propose to use of deviated wells (instead of traditional vertical wells) as a key method of reducing the disturbance area and managing surface constraints to avoid high value ecological areas. A total of 55 wells are planned for this Project on 15 well pads with up to 8 wells located on a single well pad.

Refinement of the project infrastructure locations and design has minimised the Project's impact by co-locating with other pipelines and in or adjacent to previously disturbed areas. This has resulted in a comparatively small construction footprint for a project of this size.

4.1.2 Waterway crossing methodologies

A range of pipeline construction methods are available for watercourse crossings, including standard 'open cut' trenching, watercourse flow diversion and trenchless technology. A brief description of each and the associated advantages and disadvantages is provided below:

- Standard 'open cut' trenching involves in-stream construction of a trench using excavators or backhoes to stockpile trench spoil away from the streambed. The prefabricated pipe is placed across the waterway, lowered in and the trench and backfilled immediately. This method is often applied in dry or shallow low flow watercourses but may also be applied in sensitive watercourses where rapid construction is the best means of minimising environmental impacts.
- Watercourse flow diversion techniques involve construction of temporary dams up and downstream of a crossing and the diversion of water around the crossing site to create a dry construction area between the dams. This method is generally applied at crossings where water flow is required to be maintained for ecological, social or engineering reasons.
- Trenchless options, such as horizontal directional drilling (HDD) can cause less disruption to the surface environment and can be a viable alternative where there are significant surface constraints that exclude standard open cut trenching as a construction methodology. However, the cost of HDD is significantly higher compared to standard trenching and there are technical constraints and environmental risks (e.g. HDD failure, accidental release of drilling muds where geology is uncohesive, etc) that also need to be considered. A cleared area equivalent to the length of the HDD is also required to 'string' the pipe length (i.e. welding together all sections of the pipe that are then pulled through the HDD). Other technical considerations include are not limited to, ground conditions and depth of channels.

All crossings for the Project are proposed to be standard 'open cut' with a bed level access track where required. Refer to **Section 4.5.5** for an assessment of impacts to fish passage.

4.2 Overview of impacts

4.2.1 Vegetation clearing

The most significant impact associated with the construction of the Project is the direct loss vegetation through clearing of the RoW, which includes impacts on 0.75 ha of remnant vegetation and 2.66 ha of regrowth vegetation. Given the often linear nature of remaining vegetated areas, clearing of remnant vegetation and associated habitat is an unavoidable aspect of the Project development. Despite this however, most of the clearing proposed is in relatively widespread, least concern vegetation types (predominantly RE 11.3.25) or regrowth vegetation. **Table 4.1** summarises the total area of remnant and regrowth vegetation proposed to be disturbed by the Project. The Project avoids clearing of brigalow endangered remnant vegetation which relatively common in the Study area.

Table 4.1: Vegetation clearing for the pipeline footprint by RE type

RE Type	VM Act Class	Biodiversity Status	Impact area (ha)
Remnant			
11.3.25	Least concern	Of concern	0.45
11.3.27f	Least concern	Of concern	0.16
11.5.1a	Least concern	No concern at present	0.14
Subtotal (remnant)			**0.75**
Regrowth			
11.3.4	Of concern	Of concern	2.06
11.3.25	Least concern	Of concern	0.19

RE Type	VM Act Class	Biodiversity Status	Impact area (ha)
11.4.3	Endangered	Endangered	0.41
Subtotal (regrowth)			**2.66**
Cleared / existing road / track	-	-	0.82
Non-remnant (derived grassland)	-	-	3.05
Non-remnant	-	-	71.75
Total Clearing			**79.03**

4.2.2 Habitat fragmentation and landscape connectivity

Habitat fragmentation occurs when continuous areas of habitat are subdivided into several smaller, separate components. This term encompasses two interrelated components: habitat loss (i.e. a reduction in the amount of habitat) and fragmentation (i.e. the breaking apart of habitat which increases 'edge effects'). The impacts of habitat fragmentation are also scale-dependent and may differ depending on the species or community under consideration. For example, loss of small areas of habitat that do not present a significant barrier to movement by highly mobile species (e.g. birds of prey) may represent a much greater barrier to dispersal of less mobile or far-ranging species (e.g. amphibians or small reptiles). Habitat fragmentation and landscape connectivity impacts are assessed for individual species in **Section 4.5**.

To help determine whether the development of the Project will result in an SRI on connectivity (a recognised PEM under the EO Act), the Landscape Fragmentation and Connectivity (LFC) Tool was used. This tool performs a desktop assessment of development impacts on connectivity areas containing remnant vegetation to determine whether these developments are likely to result in a significant impact to regional and local vegetation connectivity. The analysis of the LFC on connectivity areas from the Project were identified as not significant, based on DETSI RE mapping and based on Arrow's GTRE mapping. The LFC outputs have been attached in **Appendix E**.

4.2.3 Impacts to hollow-bearing trees

The Glossy Black-cockatoo is a species assessed as known or likely to occur in the Study area which can be described as hollow-dependant species.

The location of wells and alignment of other infrastructure such as gathering RoWs and access tracks have been designed to minimises impact to vegetation where possible and there is particular emphasis on minimising impacts to riparian vegetation through RoW minimisation and locating any temporary workspaces outside of these areas.

The importance of riparian vegetation along the major creek systems in the Study area is discussed in **Section 3.3.2** and do represent habitats that are often less impacted by historical clearing and are more likely to contain large trees due to their position in the landscape.

Habitat trees with notes on their size and hollows has been captured during the ecological survey with six (6) habitat trees identified within the Project footprint. Based on the PEC reports (**Appendix C**) the riparian vegetation associated with Sixteen Mile Creek and the road reserve of Clynes road are where the project footprint intersects large mature trees that contain hollows or potential nest sites. This data allows the identification of Glossy Black-cockatoo habitat which requires large hollows suitable for nesting.

During construction hollow bearing trees, beyond the essential clearing footprint, identified from ecological survey data are flagged for retention and exclusion zones established to avoid potential impacts. Where required, clearing of hollows will be undertaken in accordance with the Arrow Energy Species Management Program (SMP) (Doc. No. ORG-ARW-HSM-PLA-00070) which authorises activities if it will impact on breeding places of protected animals, which includes relocation of hollows if breeding fauna are observed.

4.2.4 Indirect impacts

Indirect impacts on ecological values that may arise during the construction and ongoing operation of the Project include:

- edge effects resulting from the creation of smaller patches of vegetation with a greater edge to surface ratio, including increased exposure to weed invasion, light and wind penetration (which can alter microclimate features) potentially resulting changes in community structure and composition over time
- dust generation during construction, which has the potential to smother plants, reducing photosynthesis and resulting in decreased vegetation health and condition
- increased noise from the vegetation clearing operations, the operation of machinery and vehicle traffic which may affect the behaviour of wildlife (typically limited to the construction period)
- increased lighting during construction and operation, with the potential to disrupt the behaviour of nocturnal species, and
- mortality resulting from vehicle collision.

Indirect impacts on the ecological values of the Project will be managed in accordance with Arrow's existing Environmental Management Framework.

4.3 Impacts on State Forests

There will be no impacts to State Forests.

4.4 Impacts on terrestrial flora values

4.4.1 Impacts on conservation significant flora species

No conservation significant flora species were identified during field surveys and will not be impacted by the Project.

4.4.2 Endangered REs by VM Class

No 'Endangered' REs by VM Status will be impacted by the Project. There is 50.50 ha of Endangered RE 11.4.3 and 5.66 ha of RE 11.3.1 within the study area that has been avoided.

4.4.3 Of Concern REs by VM Class

Two 'Of concern' REs 11.3.2 and 11.3.4 by VM Status were found to occur in the Study area but will not be impacted by the Project. Impacts on RE 11.3.25 and RE 11.3.27f (listed as 'Of concern' by BD status) will be captured as an impact under the Environmentally Sensitive Area PEM as they qualify as a Category C ESA (refer to **Section 3.1.1**).

4.4.4 Impacts on watercourse vegetation

As part of the ecological survey the high banks of watercourses associated with the Project were mapped. The Project footprint will impact 0.14 ha of RE 11.3.25 watercourse vegetation associated with the Wambo Creek and Sixteen Mile Creek crossings.

4.5 Impacts on terrestrial fauna values

The Project will have an impact on protected wildlife habitat for the species identified as 'known to occur' or 'likely to occur' as discussed in **Section 3.3.5.2** . Habitat mapping for these species have been provided in **Figure 3.9**, **Figure 3.10**, **Figure 3.11** and **Figure 3.12**, and a summary of the Projects' impacts on habitat for these species has been provided in **Table 4.2**. Whilst the Project will impact suitable habitat for the Golden-tailed Gecko (as mapped by Arrow), this species is listed as Near Threatened and does not constitute a PEM under the EO Act and has been excluded from this summary table.

Table 4.2: Summary of the Project impacts on protected wildlife habitat

Species	Area of impact (ha)
Habitat for animals listed as endangered wildlife under the NC Act	
Brigalow Woodland Snail, *Adclarkia cameroni*	0.16 ha
Koala, *Phascolarctos cinereus*[1]	3.00 ha
Grey Snake, *Hemiaspis damelii*	0.41 ha
Habitat for animals listed as vulnerable wildlife under the NC Act	
Glossy Black-cockatoo (south-eastern), *Calyptorhynchus lathami lathami*	0 ha
Diamond Firetail, *Stagonopleura guttata*	3.00 ha
Southern whiteface, *Aphelocephala leucopsis*	3.00 ha
Dunmall's Snake , *Furina dunmalli*	0.41 ha
Habitat for animals listed as special least concern wildlife under the NC Act	
Tachyglossus aculeatus, Short-beaked Echidna	0 ha

[1]MNES species that have impacts approved under EPBC Approval (EPBC 2018/8223)

SRI Assessments have been undertaken for these species in accordance with the *Significant Residual Impact Guidelines* (SRI Guidelines) (DEHP, 2014) for endangered, vulnerable and special least concern wildlife habitat and have been provided in the following sections. Only those species that are assessed to have a likely SRI are considered to be a PEM and subsequently included in **Table 5.2**.

The SRI Guidelines provide an explanation of some key terms used in these impact assessments, which include:

- Habitat: is the area occupied, or periodically or occasionally occupied, by any species, population or ecological community and includes all the different aspects (both biotic and abiotic) used by the species during the different stages of their life cycles.
- Long-term decrease: and decline in a local population that is greater than which could be apparent without the action being present.
- Population: defined as an occurrence of the species in a particular area. In relation to endangered, vulnerable and special least concern species, occurrences include but are not limited to:
  - A geographically distinct regional population, or collection of local populations; or
  - A population, or collection of local populations, that occurs within a particular bioregion.

4.5.1 Impacts on habitat for endangered fauna species

4.5.1.1 Brigalow Woodland Snail (Adclarkia cameroni)

Construction of the Project will result in the direct loss of 0.16 ha of potentially suitable habitat for the brigalow woodland snail. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Brigalow Woodland Snail has been provided in **Table 4.3**. The distribution of potentially suitable habitat for this species is presented in **Figure 3.10**.

Table 4.3: Significant Residual Impact Assessment for the Endangered Brigalow Woodland Snail

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in	**Unlikely** Our limited understanding of brigalow woodland snail ecology makes determining population dynamics difficult. This species has been described from and is known to occur along the Condamine River floodplain which is located to the north of the

SRI Criteria	Project Response
the size of a local population?	Project. Whilst no historical records have been identified within the Study area, numerous records have been previously identified along Condamine Creek, with the nearest being approximately 16 km to the north-west (ALA 2007). The occurrence of these records and the proximity of the Project to known populations suggests that a local population may occur within suitable habitat that has been identified within the Project area. Despite the occurrence of approximately 0.16 ha of suitable habitat for this species, no local populations have been identified within the Study area, or along the portions of Wambo Creek or Sixteen Mile Creek that intersects with the Study area. This species also has extremely limited dispersal capabilities. The construction and ongoing operation of the Project is therefore considered unlikely to lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the brigalow woodland snail is approximately 27,924 km^2 (TSSC, 2016b). While the Project will require the removal of approximately 0.16 ha of suitable habitat for the brigalow woodland snail, no records of this species have been identified along the branches of Wambo Creek of Sixteen Mile Creek that intersect with the Study area. Despite the Project being located well within the known distribution of this species and the fact that the region has already experienced localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** The current distribution of the Brigalow Woodland Snail is already highly fragmented (TSSC, 2016b). Suitable habitat for this species along the Condamine River floodplain that was once contiguous, have been extensively cleared for agriculture and farming. For the purposes of this assessment, it has been assumed that each known record represents an isolated sub-population of the species, as it is very unlikely that there is movement between these records. To facilitate the construction of the Project, approximately 0.16 ha of suitable habitat will be permanently removed, rendering it unsuitable as habitat for this species. Whilst suitable habitat for this species has been identified within remnant brigalow dominated communities (RE 11.3.1 and RE 11.4.3) and wetland eucalypt communities (RE 11.3.27f) along Wambo Creek, the surrounding landscape is highly fragmentated, and unlikely to provide additional dispersal opportunities. It is therefore considered unlikely that the removal this suitable habitat will contribute to the existing fragmentation already experienced by local populations.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Population genetic studies are currently listed as one of the key research priorities for the Brigalow Woodland Snail suggesting that very little is known about the genetics of this species (TSSC, 2016b). For the purposes of this assessment, it has been assumed that each known record represents an isolated, and potentially genetically distinct, sub-population of the Brigalow Woodland Snail, as it is very unlikely that there is movement between these records.

SRI Criteria	Project Response
	Whilst the construction of the Project will result in the direct loss of 0.16 ha of suitable habitat for this species, no local records have been observed within he Study area, nor along the portions of Wambo Creek or Sixteen Mile Creek that pass through the Study area. Furthermore, the surrounding landscape is already highly fragmentated, suggesting that dispersal outside of these riparian corridors is unlikely. It is therefore considered unlikely that the construction of the Project will result in genetically distinct populations forming as a result of habitat isolation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Several invasive species have been identified as conservation and management priorities for the Brigalow Woodland Snail, including Buffel Grass (*Cenchrus ciliaris*), Feral Pigs (*Sus scrofa*) as well as introduced rat and mice species (TSSC, 2016b). The occurrence of these pest and weed species has been well documented in the region surrounding the Study area. To help manage pest species across the Project, Arrow have developed an overarching pest management strategy and a Biosecurity Procedure for the broader SGP. This procedure will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. This is supported by the Vehicle, Machinery, Equipment and Loads Hygiene Procedure to minimise the spread of Buffel Grass and other invasive species listed under the *Biosecurity Act 2014*. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the Brigalow Woodland Snail. It is considered unlikely that the construction and ongoing operation of the Project will introduce any that could cause potentially occurring local populations to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The Conservation Advice for the Brigalow Woodland Snail (TSSC, 2016b), lists preventing clearing of brigalow habitat and in other areas where this species may occur within its range, retaining a buffer of native vegetation and leaf litter around records of the species and controlling Buffel Grass infestations as priority conservation and recovery objectives. Arrow have developed a WMP that has general vehicle hygiene requirements that will be followed during the construction and operational phases of the Project to help manage the spread or Buffel Grass. Despite this however, the Project will require the removal of 0.16 ha of suitable habitat for this species which is likely to interfere with the recovery of this species, especially considering the Projects' location within the known distribution of the brigalow woodland snail.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** It is assumed that each known record, or group of records, represents an isolated sub-population of the Brigalow Woodland Snail, as it is very unlikely that there is movement between these records. Given the limited understanding of this species' ecology, including breeding, feeding, and dispersal requirements, it is difficult to define ecologically significant locations for Brigalow Woodland Snail.

SRI Criteria	Project Response
	Considering the absence of any local records from within the Study area, or from the portions of Wambo Creek and Sixteen Mile Creek that intersect the Study area, it is unlikely that the Project will disrupt any ecologically significant locations for this species.
It is considered **likely** that the Project will have a significant residual impact on the brigalow woodland snail.	

4.5.1.2 Koala (Phascolarctos cinereus)

Construction of the Project will result in the direct loss of 3.00 ha of suitable habitat for the Koala. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the Koala has been provided in **Table 4.5**. Suitable habitat mapping for this species can be found in **Figure 3.11**.

Table 4.4: Significant Residual Impact Assessment for the Endangered Koala

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** Numerous records of a local koala population have been identified in the region surrounding the Study area, suggesting a strong local population is likely to be present any may utilise suitable habitat within the Study area. The closest record is approximately 5 km to the south-west (Arroe 2018). Koalas are reported to utilise more than 400 different tree species for their food and habitat requirements (DAWE, 2022) suggesting that all mapped remnant and regrowth vegetation within the Study area is likely to represent habitat for this species. To facilitate the construction and ongoing operation of the Project, 3.00 ha of suitable habitat for the koala will be removed Unlike other forms of infrastructure focussed on a single site, the impacts of linear infrastructure on habitat are somewhat dispersed meaning that areas of suitable habitat remain in any given location along the corridor. Clearing will therefore be dispersed over the full length of the disturbance footprint with abundant suitable habitat remaining beyond the Project footprint. Considering that an abundance of suitable habitat will remain unaffected in the surrounding landscape, it is unlikely that the construction and ongoing operation of the Project will lead to a long-term decrease in the size of the local koala population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the Koala is approximately 1,665,850 km^2 (DAWE, 2022a). Whilst the Project will require the removal of approximately 3.00 ha of suitable habitat for this species, this impact only represents a fraction of the total habitat available to this species within the broader landscape. Considering that the Project is situated well within the known distribution of the Koala and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** Whilst koalas are known to be sensitive to habitat loss resulting from land clearing (DAWE, 2022) they are capable of dispersing between areas of suitable habitat distance. In addition to regular movements across the ground between trees within

SRI Criteria	Project Response
	their own home ranges, koalas, particularly subadult males but also females, are known to disperse across distances of 1 to 3 km but sometimes over 10 km (Melzer 1995; White 1999; Dique et al. 2003a; Matthews et al. 2016). Establishment of the overall RoW for the Project and other co-located pipelines will result in the creation of a corridor which is approximately 70 m wide. This distance is navigable by individual Koalas and is not likely to fragment the local population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Conservation advice for the Koala (DAWE, 2022a) has identified four spatially distinct, genetic koala management units, including: • QLD and NSW populations north of the Clarence River Valley, NSW • South of the Clarence River Valley, NSW to north of the Sydney Basin • South of the Sydney Basin to approximately the NSW/VIC boarder, and • VIC and SA populations. Given the Project's location within the QLD and NSW Koala management unit, any localised habitat fragmentation is unlikely to result in a genetically distinct subpopulation from forming. Koalas are more than capable of traversing the ROW and associated infrastructure areas (Youngentob, Marsh, & Skewes, 2021), indicating that this ROW is unlikely to fragment an existing population. It is therefore unlikely that the construction of the Project will result in genetically distinct populations from forming from habitat isolation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Predation by Feral Dogs (*Canis sp.*) is listed as a key threatening process for the Koala (DAWE, 2022a). It is considered unlikely that the construction and ongoing operation of the Project will result in this species becoming established in the area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** The Koala retrovirus and Chlamydia (*Chlamydia percorum*) are known to be present within Koala populations (DAWE, 2022a). They can be a major contributor to population decline and reduction in population viability. It is currently unknown whether these diseases are present within the local population of Koalas that have been identified within the Study area, but it is considered unlikely that the construction and ongoing operation of the Project will introduce these diseases to local populations, or exacerbate any preexisting diseases that may already be present. Whilst the prevalence of these diseases has been found to increase following localised habitat loss and fragmentation, the scale of the Projects' impacts on suitable habitat for this species is considered unlikely to trigger such outbreaks. It is therefore considered unlikely that the Project could introduce diseases that could cause populations to decline.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** Given the high-profile nature of the Koala there is an abundance of conservation advice and recovery objectives documented for this species. Both the National Recovery Plan for the Koala (DAWE, 2022b) and the South-East Queensland Koala Conservation Strategy 2020-2025 (DES, 2020) lists ecosystem health and habitat protection as priority conservation objectives. Considering that the construction of the Project will require the removal of 3.00 ha of potentially suitable habitat for the Koala, it is therefore considered likely that this action could interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Likely** Koalas are reported to utilise more than 400 different species of tree for their food and habitat requirements (DAWE, 2022a) resulting in all vegetated areas within the Study area being mapped as potential habitat for this species. Breeding, feeding and resting sites for Koalas are not location-specific and will be dispersed across habitat throughout the Study area, though there is some evidence that Koalas have a preference for individual trees in any given area of habitat (DAWE, 2022a). Considering that the development of the Project will result in the removal of 3.00 ha of potentially suitable habitat for the Koala, it is likely that the Project will disrupt ecologically significant locations for this species.
It is considered **likely** that the Project will have a significant residual impact on the koala.	

4.5.1.3 Grey Snake (Hemiaspis damelii)

Construction of the Project will result in the direct loss of 0.41 ha of suitable habitat for the grey snake. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the grey snake has been provided in **Table 4.6**. Suitable habitat mapping for this species can be found in **Figure 3.12**.

Table 4.5: Significant Residual Impact Assessment for the Endangered Grey Snake

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** The presence of Grey Snake records in the region surrounding the Study area suggests that local population is likely to occur within suitable habitat mapped within the Study area. Several nearby records have also been recorded within the Study area (Arrow 2012). Grey snakes are cryptic species that are typically only active for a few hours after sunset where they forage for prey (frogs) within soil cracks, in the open or beneath vegetation, typically during warmer weather and especially after heavy rain (DCCEEW, 2022a). Several areas of suitable habitat have been identified for this species within the Study area, all of which are associated with brigalow (*Acacia harpophylla*) dominated communities (i.e. RE 11.3.1 and RE 11.4.3). The construction of the Project will require the removal of 0.41 ha of suitable habitat for this species. Considering the cryptic nature of this species and the highly fragmentated nature of suitable habitat within the Study area however, it is considered unlikely that the construction and ongoing operation of the Project could lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known,

SRI Criteria	Project Response
the extent of occurrence of the species?	inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the grey snake is approximately 471,500 km^2 (DCCEEW, 2022a). Whilst several patches of suitable habitat have been identified for this species within the Study area, these patches are relatively isolated from other larger tracts of suitable habitat that have been identified in the broader landscape. Furthermore, the Project will not directly impact any mapped habitat for this species. Considering that the Project is situated well within the known distribution of the grey snake and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** The overall grey snake population is considered severely fragmented due to specific ecological constraints. Moreover, intra-population fragmentation is caused by agricultural practices removing suitable habitat (DCCEEW, 2022a). There is currently no information available about home range and dispersal ability of the grey snake, however based on the information available from other Australian elapids, it is inferred that the Grey Snake is likely to have little capacity to move between isolated populations (DCCEEW, 2022a). While the construction of the Project will require the removal of 0.41 ha of suitable habitat, Arrow has also attempted to co-locate this pipeline with existing linear infrastructure to further reduce the effects of habitat fragmentation. Localised fragmentation may occur during construction activities, however once these areas have been constructed and rehabilitated, these areas are unlikely to represent ongoing physically barriers to the movement of local grey snake populations. It is therefore considered unlikely that the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Although it is considered that there is considerably little gene flow among isolated and fragmented populations (DCCEEW, 2022a), localised intra-population dispersal may still occur. Project infrastructure is unlikely to physically inhibit the dispersal of locally fragmented populations. Given the Project's location within the QLD and NSW grey snake distribution, any localised habitat fragmentation is unlikely to result in a genetically distinct population from forming.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Predation by Feral Cats (*Felis catus*) and European Red Foxes (*Vulpes vulpes*), and habitat destruction by Feral Pigs (*Sus scrofa*) are listed as potential threatening processes for the grey snake (DCCEEW, 2022a). It is considered unlikely that the construction and ongoing operation of the Project will result in these species' becoming established in the area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the grey snake. It is therefore considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The conservation advice for the Grey Snake (DCCEEW, 2022a), lists protecting habitat from destruction and controlling invasive species as priority conservation and recovery objectives. Considering that the construction and ongoing operation of the project will require the removal of 0.41 ha of suitable habitat for this species (i.e. RE 11.3.1 and RE 11.4.3), this impact is likely to interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Likely** Whilst several nearby populations of grey snakes have been confirmed in proximity to the Study area, the presence of a local population has not been verified. Given that the occurrence of grey snakes is limited to specific microhabitats (i.e. cracking soils near alluvial systems), it is reasonable to assume that any suitable habitat mapped for this species could be utilised for breeding and/or foraging activities. Records of this species within the Study area suggests that a local population is likely to be present with these areas of suitable habitat. Considering that the construction and ongoing operation of the Project will require the removal of 0.41 ha of suitable habitat for this species, it is likely that this impact will disrupt an ecologically significant location for this cryptic species.
It is considered **likely** that the Project will have a significant residual impact on the grey snake.	

4.5.2 Impacts on habitat for vulnerable fauna species

4.5.2.1 Dunmall's Snake (Furina dunmalli)

Construction of the Project will result in the direct loss of 0.41 ha of suitable habitat for Dunmall's snake. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the grey snake has been provided in **Table 4.7**. Suitable habitat mapping for this species can be found in **Figure 3.12**.

Table 4.6: Significant Residual Impact Assessment for the Vulnerable Dunmall's snake

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** The presence of Dunmall's snakes in the region surrounding the Study area suggests that there may be sufficient suitable habitat to support a local population of this species. The nearest record is approximately 10 km to the north-west (ALA 2000). Whilst little is known about this cryptic species, captive specimens have indicated that they are nocturnal and are likely to shelter under fallen timber and in deep soil cracks and other cavities (DOE, 2014). Their diet is thought to consist primarily small skinks and geckos. Patches of RE 11.3.1 and RE 11.4.3, both of which are dominated by *Acacia harpophylla*, constitute suitable habitat for this species within the Study area. The construction and ongoing operation of the project will require the removal of approximately 0.41 ha of suitable habitat for this species. Considering the cryptic nature of this species and the highly fragmentated nature of suitable habitat within the Study area however, it is considered unlikely that the

SRI Criteria	Project Response
	construction and ongoing operation of the Project could lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). Whilst the extent of occurrence for this species has not been formally calculated as part of its conservation advice, it is estimated to be approximately 169,262 km^2 using the built-in ALA tool (ALA 2024). Whilst several patches of suitable habitat have been identified for this species within the Study area, these patches are completely isolated from other larger tracts of suitable habitat that have been identified in the broader landscape. Considering that the Project is situated well within the known distribution of the Dunmall's snake and this region is already experiencing localised habitat fragmentation, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** The broader distribution of Dunmall's snakes across its known range has been severely fragmentated by broadscale land clearing and habitat modification (DOE, 2014). Habitat preferred by this species continues to be extensively modified through clearing for agriculture or pasture, overgrazing by stock and urban development. There is currently no information available about home range and dispersal capabilities of the Dunmall's snake, however based on the information available from other Australian elapids, it is inferred that this species is likely to have little capacity to move between isolated populations. During the design stages of this Project, Arrow has also attempted to co-locate this pipeline with existing linear infrastructure to further reduce the effects of habitat fragmentation. Localised fragmentation may occur during construction activities, however once these areas have been constructed and rehabilitated, these areas are unlikely to represent ongoing physically barriers to the movement of local Dunmall's snake populations. It is therefore considered unlikely that the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Although it is considered that there is considerably little gene flow among isolated and fragmented populations (DCCEEW, 2022a), localised intra-population dispersal may still occur. Project infrastructure is unlikely to physically inhibit the dispersal of locally fragmented populations. Given the Project's location within the QLD and NSW Grey Snake distribution, any localised habitat fragmentation is unlikely to result in a genetically distinct population from forming.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or	**Unlikely** Predation by feral animals has been listed as a threatening process for the Dunmall's snake (DOE, 2014). It is considered unlikely that the construction and ongoing operation of the Project will result in feral species becoming established in the Study area or exacerbate an existing occurrence of these pest species.

SRI Criteria	Project Response
vulnerable species' habitat?	To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as potential threatening processes for the Dunmall's snake. It is therefore considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause the population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Likely** The conservation advice for the Dunmall's snake (DOE, 2014), lists several local priority actions to support the recovery of this species including: • Minimise adverse impacts from land use (in the form of habitat loss, disturbance and modification) at known sites • Ensure land owners/managers use appropriate management regimes and stocking density to reduce trampling by livestock • Continue baiting and population control measures for feral animals. Considering that the construction and ongoing operation of the Project will require the removal of approximately 0.41 ha of suitable habitat, it is likely that this action will interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Whilst a nearby population of Dunmall's snake have been confirmed in proximity to the Study area, the presence of a local population has not been verified. Given that the occurrence of this species is limited to suitable habitat with specific microhabitat features (i.e. fallen timber and in deep soil cracks and other cavities), it is reasonable to assume that any suitable habitat mapped for this species could be utilised for breeding and/or foraging activities. While suitable habitat for this species has been mapped within the Study area, there are no local records of this species have been identified. The Project is therefore considered unlikely to impact any ecologically significant locations for this species.
It is considered **likely** that the Project will have a significant residual impact on the Dunmall's snake.	

4.5.2.2 Glossy Black-cockatoo (Calyptorhynchus lathami lathami)

Construction of the Project will not result in any loss of suitable habitat for the Glossy Black-cockatoo. An assessment undertaken in accordance with the SRI Guideline (DEHP, 2014) for the Glossy Black-cockatoo has been provided in **Table 4.8**. Suitable habitat mapping for this species can be found in **Figure 3.9**.

Table 4.7: Significant Residual Impact Assessment for the Vulnerable Glossy Black-cockatoo

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** No glossy black-cockatoo records have been observed within the Study area, however, the occurrence of numerous records in the region surrounding the project suggests that local populations may utilise nearby suitable habitat. The nearest historical record of this species is approximately 28 km to the north-west (ALA 2020). Suitable habitat for this species has been observed within the eastern portion of the Study area within a patch of RE 11.4.3 containing belah (*Casuarina cristata*), which is a known foraging species in Queensland (Hourigan, 2012). Despite the occurrence of this suitable habitat within the Study area, the development footprint for the Project has been redesigned to avoid these areas of vegetation. It is therefore considered unlikely that the Project will lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the glossy black-cockatoo is approximately 470,000 km^2 (DCCEEW, 2022). While suitable habitat has been observed in the broader Study area, the construction and ongoing operation of the Project will not require the removal of any suitable habitat. Furthermore, the glossy black-cockatoo is highly dispersive and any individuals using the Study area are likely to occupy a far greater range. It is unlikely that any population would rely heavily on suitable habitat observed within the Study area for the entirety of its resource needs. It is therefore considered unlikely that the Project will reduce the extent of occurrence of this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** Glossy black-cockatoos' are known to be susceptible to habitat fragmentation (DCCEEW, 2022), however they are also highly mobile and capable of traveling considerable distances to isolated fragments in search of food. The region surrounding the Project is already highly fragmented from pastoral activities and existing CSG infrastructure. Considering that the Project will not require the removal of any suitable habitat for this species, it is unlikely that the construction and ongoing operation of the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** Glossy black-cockatoos have already been broken up into three genetically distinct distinct subspecies: *C. l. lathami* (south-eastern), *C. l. halmaturinus* (King Island), and *C. l. erebus* (northern). The location of the Project is situated within the core range of the south-eastern subspecies. The high mobility of this species suggests that the construction of Project is unlikely to present a significant barrier to this species' movement. Furthermore, the Project will not require the removal of any suitable habitat for this species. It is therefore unlikely that the construction of the Project will result in genetically distinct populations from forming from habitat isolation.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Localised fragmentation and the removal of HBT may increase predation of nestlings or result in higher competition for hollows by 'edge' species such as the common brushtail possum (DCCEEW, 2022). The Project is not expected to introduce and new invasive species to the Study area, nor are any established invasive species such as cats, foxes and invasive weeds, likely to pose a threat to resource accessibility. Regardless of this, Arrow have developed a PMP for the broader SGP. This WPMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. This WPMP will also include hygiene procedure to minimise the spread of Buffel Grass and other invasive species listed under the *Biosecurity Act 2014*. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** Psittacine Beak and Feather Disease (PBFD) is a potentially fatal disease caused by psittacine circovirus, typically transferred between adults, nestlings and contaminated nest hollows. Although glossy black-cockatoos are susceptible to PBFD, the threat level is relatively low compared to other threats (DCCEEW, 2022). Considering that the Project will not require the removal of any suitable habitat for this species, it is unlikely that the construction and ongoing operation of the Project will introduce any diseases that cause the local population to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Unlikely** The Conservation Advice for glossy black-cockatoo (DCCEEW, 2022) lists protecting, restoring and enhancing the quality of known suitable habitat, maintaining connectivity, increasing hollow availability and appropriate fire regimes as priority conservation and recovery objectives for this species. Arrow will implement bushfire mitigation strategies across the Project in accordance with those already established for the broader SGP. These have been designed to account for both buried infrastructure and exposed vents/drains so that during the construction and operational phases of the Project, bushfire risks are mitigated. Considering that the construction and ongoing operation of the Project will not require the removal of any suitable habitat for this species, it is unlikely that the Project will interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** The glossy black-cockatoo rely on nine species of she-oaks (*Allocasuarina spp*. and *Casuarina spp*.) for feeding. In south-east Queensland, they show preference for Black Sheoak (*A. littoralis*) and Forest Sheoak (*A. torulosa*) for foraging resources and they prefer Narrow-leaved Ironbark (*Eucalyptus crebra*) for nesting hollows (DCCEEW, 2022). Considering that the Project will not require the removal of any suitable habitat for this species, it is unlikely that the construction and ongoing operation of the Project will disrupt any ecologically significant locations for this species.
It is considered **unlikely** that the Project will have a significant residual impact on the Glossy Black-cockatoo.	

4.5.2.3 Diamond Firetail (Stagonopleura guttata)

Construction of the Project will result in the direct loss of 3.00 ha of potentially suitable habitat for the diamond firetail. An assessment undertaken in accordance with the SRI Guideline (DEHP, 2014) for the diamond firetail has been provided in **Table 4.9**. Suitable habitat mapping for this species can be found in **Figure 3.9**.

Table 4.8: Significant Residual Impact Assessment for the Vulnerable diamond firetail

SRI Criteria	Project Response
Are impacts to suitable habitat likely to lead to a long-term decrease in the size of a local population?	**Unlikely** Whilst no diamond firetails have been observed within the Study area, there are historical records in the vicinity of the Project, indicating that a local population may be present. The nearest (dated) record to the Project is approximately 15 km to the north-east (ALA 1995). Diamond firetails are thought to be sedentary, through some populations have been recorded locally suggesting that this species may be less susceptible to localised fragmentation (DCCEEW, 2023). Whilst the construction and ongoing operation of the Project will require the removal of approximately 3.00 ha of suitable habitat, the absence of local records from within the Study area and the linear nature of the proposed disturbance suggests that this impact is unlikely to result in a long-term decrease in the size of a potentially occurring local population
Are impacts to suitable habitat likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the diamond firetail is approximately 1,500,000 km^2 (DCCEEW, 2023). Whilst the Project will require the removal of approximately 3.00 ha of suitable habitat for this species, they are able to use a wide range of habitats for foraging and nesting, and an abundance of suitable habitat will remain within the Project area and broader landscape. It is unlikely that local population would rely solely on the suitable habitat identified within the Project footprint for the entirety of its resource needs. Project impacts are therefore considered unlikely to reduce the extent of occurrence for this species.
Are impacts to suitable habitat likely to fragment an existing population?	**Unlikely** Some diamond firetail populations have been recorded dispersing locally, suggesting that this species may be less susceptible to localised fragmentation (DCCEEW, 2023). The landscape surrounding the Study area, whilst containing large tracts of intact remnant vegetation, has been subjected to ongoing historical disturbance to support pastoral activities and existing CSG infrastructure. Given the linear nature of the proposed disturbance and the absence of records within the Study area, it is considered unlikely that the construction and ongoing operation of the Project is likely to effectively fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** There are currently no known subspecies of diamond firetail, and all individuals are considered to belong to the same genetic population. Some diamond firetail populations have been recorded dispersing locally, suggesting that this species may be less susceptible to localised fragmentation (DCCEEW, 2023). Given the linear nature of the proposed disturbance, and their ability to disperse locally, it is considered unlikely that the construction and ongoing operation of the

SRI Criteria	Project Response
	Project could lead to a genetically distinct population forming as a result of habitat fragmentation.
Are impacts to suitable habitat likely to result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Habitat degradation from European rabbits (Oryctolagus cuniculus) and exotic weeds are listed as threatening processes for the diamond firetail (DCCEEW, 2023). It is considered unlikely that the construction and ongoing operation of the Project will result in these feral species becoming established in the Study area or exacerbate an existing occurrence of these pest species. To help manage pest species across the Project, Arrow have developed a PMP for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint. It is therefore considered unlikely that the Project will result in invasive species being established.
Are impacts to suitable habitat likely to introduce disease that may cause the population to decline?	**Unlikely** There are no known diseases listed as threatening processes for the diamond firetail. It is considered unlikely that the construction and ongoing operation of the Project will introduce any that could cause potential populations to decline.
Are impacts to suitable habitat likely to interfere with the recovery of the species?	**Unlikely** The conservation advice for the diamond firetail (DCCEEW, 2023) lists retaining and protecting woodland, open forest, grassland and mallee habitat from clearing and fragmentation as a key conservation objective for this species. Whilst the construction and ongoing operation of the Project will require the removal of approximately 3.00 ha of suitable habitat, suitable breeding and foraging habitat for this species is ubiquitous within the surrounding landscape. The diamond firetail can occur within a broad range of woodland habitats, open forests and other lightly timbered habitats including farmland and grassland with scattered trees (DCCEEW, 2023). Considering this, it is unlikely that this action could interfere with the recovery of the species.
Are impacts to suitable habitat likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Diamond firetails are known to utilise a wide range of habitat types including eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees (DCCEEW, 2023). Their ability to utilise such a wide range of habitats suggests that any suitable habitat identified for this species, could constitute an ecologically significant location. Despite the occurrence of 3.00 ha of suitable habitat for the diamond firetail, this species has not been recorded within the Study area, and the nearest record is approximately 15 km to the north-east. This suggests that there are no active ecological significant locations within the Project area. It is therefore considered unlikely that the construction and ongoing operation of the Project will disrupt any ecologically significant locations for this species.
It is considered **unlikely** that the Project will have a significant residual impact on the Glossy Black-cockatoo.	

4.5.2.4 Southern whiteface (Aphelocephala leucopsis)

To determine whether the Project will have a significant residual impact on this species, an assessment of potential impacts against the Significant Residual Impact Guidelines (DEHP, 2014) for this vulnerable species has been undertaken, the results of which are provided in **Table 4.10**.

Table 4.9: Assessment of significant residual impacts for the Vulnerable southern whiteface

SRI Criteria	Project Response
Is the action likely to lead to a long-term decrease in the size of a local population?	**Unlikely** Whilst no southern whitefaces have been observed within the Study area, there are historical records in the vicinity of the broader SGP, indicating that a local population may occur or opportunistically utilise suitable habitat within the Project. The nearest (dated) record to the Project is approximately 40 km to the south (ALA 2020). Southern whitefaces occur in a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs, or both. They are considered mostly sedentary, however individuals have been observed moving into wetter areas outside of their normal range during drought years (DCCEEW, 2023). Whilst the construction and ongoing operation of the Project will require the removal of approximately 3.00 ha of suitable habitat, the absence of local records from within the Study area and the linear nature of the proposed disturbance suggests that this impact is unlikely to result in a long-term decrease in the size of a potentially occurring local population
Is the action likely to reduce the extent of occurrence of the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). The estimated extent of occurrence for the diamond firetail is approximately 4,910,000 km^2 (DCCEEW, 2023). Whilst the Project will require the removal of approximately 3.00 ha of suitable habitat for this species, they are able to use a wide range of habitats for foraging and nesting, and an abundance of suitable habitat will remain within the Project area and broader landscape. It is unlikely that local population would rely solely on the suitable habitat identified within the Project footprint for the entirety of its resource needs. Project impacts are therefore considered unlikely to reduce the extent of occurrence for this species.
Is the action likely to fragment an existing population?	**Unlikely** Habitat fragmentation is thought to be a likely cause in the decline of the species (DCCEEW, 2023). Despite this however the habitat with the Project and within the landscape surrounding is already highly fragmented due to a history of clearing to support agricultural and pastoral activities. Whilst the construction and ongoing operation of the Project will require the removal of 3.00 ha of suitable habitat, the Project is unlikely to introduce any new barriers to movement/dispersal or significantly exacerbate existing barriers. Given the linear nature of the proposed disturbance and the absence of records within the Study area, it is considered unlikely that the construction and ongoing operation of the Project is likely to effectively fragment an existing population.

SRI Criteria	Project Response
Is the action likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** There are currently two recognised subspecies of southern whiteface (*A. l. leucopsis* and *A. l. castaneiventris* (DCCEEW, 2023). A. l. leucopsis is the only subspecies known to occur in eastern Australia. Whilst extensive genetic studies have not yet been conducted on this species, it is believed that all individuals found in Queensland belong to a single genetic population. It is therefore considered unlikely that the construction and ongoing operation of the Project will result in genetically distinct populations forming.
Is the action likely to result in invasive species that are harmful to the endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat?	**Unlikely** Whilst numerous invasive flora and fauna species have been observed across the broader SGP Project, there are currently no invasive species listed as threatening processes for the southern whiteface (DCCEEW, 2023). Regardless of this, to help manage pest species across the Project, Arrow have developed an overarching pest management strategy and Pest Management Plan (PMP) for the broader SGP. This PMP will help to ensure that appropriate management strategies are implemented to control pest species that could occur within the Project footprint, including the Black Rat. It is therefore considered unlikely that the construction and ongoing operation of the Project will result in any invasive species becoming established.
Is the action likely to introduce disease that may cause the population to decline?	**Unlikely** The conservation advice does not list any diseases as threatening processes for the White-throated Needletail (TSSC, 2019). It is therefore considered unlikely that the construction and ongoing operation of the Project will introduce any diseases that could cause this species to decline.
Is the action likely to interfere with the recovery of the species?	**Unlikely** The conservation advice for the southern whiteface (DCCEEW, 2023) lists ceasing all land clearing of habitat critical to the survival of the species as a key conservation and management priority for this species. Whilst suitable habitat has been identified within the Project area, the lack of nearby records suggest that these areas are unlikely to represent habitat critical to the survival of this species. Furthermore, breeding and foraging habitat for this species is ubiquitous within the surrounding landscape. The southern whiteface can occur within a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs, or both. Considering this, it is unlikely that this action could interfere with the recovery of the species.
Is the action likely to cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species?	**Unlikely** Southern whitefaces can occur within a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs, or both (DCCEEW, 2023). Their ability to utilise such a wide range of habitats suggests that any suitable habitat identified for this species, could constitute an ecologically significant location. Despite the occurrence of 3.00 ha of suitable habitat for the southern whiteface, this species has not been recorded within the Study area, and the nearest record is approximately 40 km to the south. This suggests that there are no active ecological significant locations within the Project area.

SRI Criteria	Project Response
	It is therefore considered unlikely that the construction and ongoing operation of the Project will disrupt any ecologically significant locations for this species.
It is considered **unlikely** that the Project will have a significant residual impact on the southern whiteface.	

4.5.3 Impacts on habitat for Special Least Concern species

4.5.3.1 Short-beaked Echidna (Tachyglossus aculeatus)

Construction of the Project will not result in any direct loss of potentially suitable habitat for the short-beaked echidna. An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for the short-beaked echidna has been provided in **Table 4.11**. The distribution of potentially suitable habitat for this species is presented in **Figure 3.11**.

Table 4.10: Significant Residual Impact Assessment for the Special Least Concern short-beaked echidna

SRI Criteria	Project Response
Are impacts to suitable habitat likely to result in a long-term decrease in the size of a local population?	**Unlikely** The presence and abundance of short-beaked echidna records in the region surrounding the Study area suggests that there is sufficient suitable habitat to support a local population of this species. The nearest record is approximately 4 km to the north-west (ALA 2024). Whilst the construction of the Project will not result in any direct loss of potentially suitable habitat for this species, they are capable of utilising a broad range of habitats including forests and woodlands, heaths, grasslands and arid environments (BHA, 2024), suggesting that there is an abundance of suitable habitat in the surrounding landscape. Whilst designing the Project, Arrow have attempted to co-locate this linear infrastructure with other linear infrastructure and avoid vegetated areas wherever possible and to avoid further fragmentation of non-remnant habitat. Given the scale and type of disturbance associated with linear infrastructure, the construction and ongoing operation of the Project is not likely to permanently displace echidnas from the Study area. It is therefore unlikely that the Project will lead to a long-term decrease in the size of a local population.
Are impacts to suitable habitat likely to result in a reduced extent of occurrence for the species?	**Unlikely** The extent of occurrence is defined as "the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy (IUCN, 2024). Whilst a formal assessment of the short-beaked echidna's extent of occurrence hasn't been undertaken, the EOO tool embedded in the Atlas of Living Australia (ALA) indicates that the extent of occurrence for this species is will cover the entire Australian landmass. The Project will not result in any direct loss of potentially suitable habitat for the short-beaked echidna. The Project impacts on 0.75 ha of remnant vegetation and 1.57 ha of regrowth vegetation and this only represents only a fraction of the suitable habitat identified in the Study area. Considering the distribution of this species throughout Australia and the localised habitat fragmentation already present within the broader Study area, it is considered unlikely that the construction and ongoing operation of the Project will reduce the extent of occurrence for this species.

SRI Criteria	Project Response
Are impacts to suitable habitat likely to result in fragmentation of an existing population?	**Unlikely** The short-beaked echidna forages at ground level and it may travel considerable distances through fragmentated landscapes in search of food (BHA, 2024). Arrow co-located the Project RoW with other linear infrastructure to minimise the impact of the overall construction RoW wherever possible. Given the scale and type of impact required for this Project (i.e. linear infrastructure 18-29 m wide), development at this location is not likely to impact dispersal of the echidna. Whilst dispersal opportunities may be impacted during the construction of the project (i.e. trenching and storage of infrastructure above ground), once constructed the project is not likely to physically inhibit the dispersal of the echidna throughout the Study area. It is therefore considered unlikely that the Project will fragment an existing population.
Are impacts to suitable habitat likely to result in genetically distinct populations forming as a result of habitat isolation?	**Unlikely** The short-beaked echidna is a very widespread species, colonising most of the Australian mainland. The development and ongoing operation of the Project does not completely dissect or isolate a population or populations, nor will it physically inhibit echidnas from travelling between fragmented areas of suitable habitat. It is unlikely that impacts to suitable habitat will isolate populations of the Short-beaked Echidna to the extent that genetically distinct populations will be formed.
Are impacts to suitable habitat likely to result in disruption to ecologically significant locations (breeding, feeding or nesting sites) or a species?	**Unlikely** The Short-beaked Echidna is widespread and occupies are a variety of vegetation types, allowing it to remain fairly non-specialised. A key requirement for this species is the availability of day shelters. Day shelters can consist of a variety of habitat structures, such as hollow logs, rabbit burrows, depressions in the ground under fallen trees or leaf litter, and various crevices and cavities (Wilkinson, Grigg, & Beard, 1998). Re-use of day shelters has also been observed (Wilkinson, Grigg, & Beard, 1998), indicating site recognition of particularly good shelters. Suitable habitat for the short-beaked echidna has been identified in accordance with the *Method for mapping matters of state environmental significance, Version 7* (DESI, 2024). Whilst this habitat mapping is likely an underestimation of the actual extent of useable habitat for the species, it has been adopted for the purposes of this impact assessment. Based upon this approach, no suitable habitat for the echidna has been mapped within the Study area. Considering the construction of the Project will not result in any direct loss of potentially suitable habitat for the short-beaked echidna, it is unlikely that the Project will disrupt any ecologically significant locations for this species.
It is considered **unlikely** that the Project will have a significant residual impact on the Short-beaked Echidna.	

4.5.4 Impacts on mapped essential habitat

There are no impacts to 'essential habitat' on the Queensland Government Essential Habitat Map in accordance with section 20AC of the *Vegetation Management Act 1999* for a species of wildlife listed as critically endangered, endangered, vulnerable under the *Nature Conservation Act 1992*.

4.5.5 Impacts to fish passage

The construction of the Project will involve crossing one Green (low impact) and one Purple (major impact) waterway crossings. Crossing methodologies for the pipe installations are discussed in **Section 4.1.2**.

The two creek crossings associated with the Project will be bed level crossings that will comply with the 'Accepted development requirements for operational work that is constructing or raising waterway barrier works" (ADR (DAF 2018). There will be no culvert crossings or other structures placed in the waterways. Pipe crossing works and the use of bed-level crossings will be undertaken in accordance with the accepted development requirements (ADR) of the waterway barrier (WWB) self-assessable code or the temporary WWB code.

To assess the potential impacts to fish passage, waterways have been grouped based on their level of risk for impacts to fish passage.

Sixteen Mile Creek usually has defined bed and banks that frequently contain water. It is crossed in three (3) locations and is moderate risk waterway (Orange waterway) at two crossings on lot plan 34RP912566 and the other on lot plan 2RP82810. The other crossing is a low risk crossing (Green waterway) on lot plan 2RP82810. An SRI assessment is presented in **Table 4.12**. An assessment of the potential fish passage area impacted by the Project on Sixteen Mile Creek is estimated to be 0.2 ha (2 x 40 m W x 20 m L) (**Plate 8, Plate 9, Plate 12** and **Plate 13**).

Wambo Creek has defined bed and banks that frequently contain water and is considered to be higher risk waterway (Red waterway) and an SRI assessment is presented in **Table 4.12**. An assessment of the potential fish passage area impacted by the Project on Wambo Creek is estimated to be 0.1 ha (40 m W x 20 m L) (**Plate 14** and **Plate 15**).



Plate 8: Facing downstream towards crossing on Sixteen Mile Creek (on lot plan 34RP912566)



Plate 9: Facing upstream towards crossing on Sixteen Mile Creek (on lot plan 34RP912566)



Plate 10: Facing downstream towards crossing on Sixteen Mile Creek (on lot plan 2RP82810)



Plate 11: Facing upstream towards crossing on Sixteen Mile Creek (on lot plan 2RP82810)



Plate 12: Facing downstream towards crossing on Sixteen Mile Creek (on lot plan 2RP82810)



Plate 13: Facing upstream towards crossing on Sixteen Mile Creek (on lot plan 2RP82810)



Plate 14: Facing upstream towards crossing on Wambo Creek



Plate 15: Facing downstream towards crossing on Wambo Creek

An assessment undertaken in accordance with the SRI Guidelines (DEHP, 2014) for impacts to fish passage has been provided in **Table 4.12**. A conservative assessment has been undertaken based on the proposed works. An action is likely to have a significant impact on a waterway providing for fish passage if there is a real possibility that it will cause an impact on any of the criteria in the table below.

Table 4.11: Significant Residual Impact Assessment for impacts to fish passage

SRI Criteria	Low risk waterway (Plate 10 & 11)	Higher risk waterways (Wambo and Sixteen Mile Creeks)
Result in the mortality or injury of fish	**Unlikely** These waterways are generally dry except during high flow events and construction will not occur during these times.	**Possible** Waterways contain water more often and dewatering during construction maybe required.
Result in conditions that substantially increase risks to the health, wellbeing and productivity	**Unlikely** The construction will preferentially be undertaken during no/low flow	**Unlikely** The construction will preferentially be undertaken during no/low flow

SRI Criteria	Low risk waterway (Plate 10 & 11)	Higher risk waterways (Wambo and Sixteen Mile Creeks)
of fish seeking passage such as through the depletion of fishes energy reserves, stranding, increased predation risks, entrapment or confined schooling behaviour in fish	periods, the area affected by construction is small and standing water in these waterways are uncommon.	periods, the area affected by construction is small.
Reduce the extent, frequency or duration of fish passage previously found at a site	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.
Substantially modify, destroy or fragment areas of fish habitat (including, but not limited to in-stream vegetation, snags and woody debris, substrate, bank or riffle formations) necessary for the breeding and/or survival of fish	**Unlikely** No significant habitat is present in these waterways and the profiles and substrates are reinstated to their original location.	**Possible** Temporary impacts to fish habitat may occur. The works are only for a small area of potential habitat and the profiles and substrates are reinstated to their original location.
Result in a substantial and measurable change in the hydrological regime of the waterway, for example, a substantial change to the volume, depth, timing, duration and frequency of flows	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.	**Unlikely** The crossing will be a bed-level crossing that will be constructed in accordance with the WWB ADR.
Lead to significant changes in water quality parameters such as temperature, dissolved oxygen, pH and conductivity that provide cues for movement in local fish species	**Unlikely** The construction will preferentially be undertaken during low flow periods, the area affected by construction is small and standing water in these waterways are uncommon.	**Unlikely** The construction will preferentially be undertaken during low flow periods, the area affected by construction is small and will be undertaken in accordance with the WWB ADR.
	It is considered **Unlikely** that the Project will have a significant residual impact on fish passage for this waterway.	It is considered **Possible** that the Project will have a significant residual impact on fish passage for this waterway.

5. Summary of proposed amendments

Impacts associated with the construction of the proposed Project are set out below and have been compared against the current conditions in the Hopeland EA.

5.1 Environmentally sensitive areas

Standard conditions within the Hopeland EA state that only low impact petroleum activities may be undertaken in Category A ESAs or Category B ESAs or Category C ESAs other than state forests or timber reserves, or within the ESAs' Primary Protection Zones (PPZs). However, the Hopeland EA includes conditions with a 'despite' clause that authorise Extra Work Areas (EWAs) within primary protection zones, secondary protection zones and significant disturbance at the location and maximum extent specified in 'Table 2'. Conditions with 'despite' clauses that are relevant to the Project include:

- Biodiversity 7: Despite condition (Biodiversity 8A), Extra Work Areas (EWAs) are authorised in areas clear of vegetation, including primary protection zone (PPZ) and secondary protection zone (SPZ).
- Biodiversity 8B: Despite condition Biodiversity 8A, significant disturbance is authorised to be undertaken at the location and maximum extent of impact in *Protecting Biodiversity Values, Table 2—Authorised petroleum activities in environmentally sensitive areas and their protection zones* (included below).

Protecting Biodiversity Values, Table 2—Authorised petroleum activities in environmentally sensitive areas and their protection zones

Environmentally Sensitive Area	Location of Impact	Maximum Disturbance (ha)
Category B environmentally sensitive areas that are 'endangered' regional ecosystems	PL253	0.79
Category C environmentally sensitive areas that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems	PL253	9.78
Category C environmentally sensitive area primary protection zones	PL253	2.08

For the purposes of this assessment non-essential petroleum activities proposed within ESAs for the Project include:

- extra work areas, such as those required to accommodate well pads on sloping topography, and
- laydown areas.

No impacts are proposed to Category A or Category B ESAs. However, the Project footprint will impact the following:

- Category C ESAs and their PPZs for of concern RE, as initially discussed in **Section 3.1.1** and **Section 4.4.**
- Category B ESA PPZ's and secondary protection zones (SPZ's) for an Endangered RE, as initially discussed in **Section 3.2.1.1** and **Section 4.2.1**.

A summary of these impacts has been provided in **Table 5.1**.

Table 5.1: Proposed disturbance in ESAs

ESA Type	Details	Allowable activities	Proposed Activities
Category B ESA			
Endangered RE	Endangered RE	Only low impact petroleum activities	Access Track Only – 0.02 ha ROW – 0.39 ha **Total disturbance – 0.41 ha** **Currently EA authorises up to 0.79 ha (Biodiversity 8B) but will need an additional 0.41 ha**
Total disturbance in Category B ESA			**0.41 ha**
Category B PPZ			
Endangered RE	PPZ (within 200 m)	Only essential petroleum activities	Access Track Only – 3.34 ha Drill pads – 7.07 ha ROW – 13.88 ha EWA – 0.08 ha Laydown – 0.24 ha **Total disturbance – 24.61 ha** **Disturbance authorised apart from the laydown of 0.24 ha and EWA 0.08 ha conservatively added in case vegetated (Biodiversity 7)**
Category B SPZ			
Endangered RE	SPZ (within 300 m)	Only essential petroleum activities permitted.	Access Track Only – 1.52 ha Drill pads - 0.92 ha EWA – 0.13 ha Laydown – 1.13 ha ROW – 7.38 ha **Total disturbance – 11.09 ha** **Laydown not currently authorised 1.13 ha** **EWA is mapped as undifferentiated regrowth, conservatively added to despite table 0.13 ha in case it is vegetated (Biodiversity 7)**
Category C ESA			
Of concern REs	RE 11.3.25	Only low impact petroleum activities	EWA - 0.04 ha ROW - 0.74 ha **Total disturbance - 0.78 ha** **Not authorised under Biodiversity 8A**

ESA Type	Details	Allowable activities	Proposed Activities
'Protected wildlife habitat' that is located within Category A, B or C remnant regulated vegetation	Habitat for Koala, Glossy Black-cockatoo (south-eastern), Brigalow Woodland Snail, Diamond Firetail, Dunmall's Snake, Grey Snake and Southern white-face	Only low impact petroleum activities	Access Track Only – 0.17 ha EWA – 0.26 ha ROW – 2.98 ha **Total disturbance – 3.41 ha** **Not authorised under Biodiversity 8A**
Total disturbance in Category C ESA			**3.41 ha** **Biodiversity 8B authorises 9.78 ha but will need an additional 3.41 ha**
Category C PPZ			
Of concern REs		Only essential petroleum activities permitted.	EWA - 0.29 ha ROW - 5.46 ha **Total disturbance – 5.75 ha**
Essential Habitat			Access Track Only - 0.19 ha EWA - 0.10 ha ROW - 2.36 ha **Total disturbance - 2.65 ha**[1]
'Protected wildlife habitat'			Access Track Only - 2.43 ha Drill pads - 9.08 ha EWA - 0.24 ha Laydown - 0.24 ha ROW - 18.56 ha **Total disturbance – 30.55 ha**
Total disturbance in Category C ESA PPZ			**30.55 ha** **Unauthorised disturbance for EWAs and laydowns assuming they are vegetated is 0.47 ha to be added to Biodiversity 8B**

[1]The area of Category C PPZ does not contain buffers of Near Threatened Essential Habitat.

5.2 Prescribed environmental matters

A summary of the Projects' impacts to recognised PEMs have been included in **Table 5.2**. These PEMs are based on the prescribed environmental matters are outlined in Schedule 2 of the *Environmental Offsets Regulation 2014* and the impacts identified in **Section 3** of this report.

As discussed in **Section 1.4.1**, an EPBC approval (EPBC 2018/8223; **Appendix A**) is in effect for the Project which authorises impact on Koala and Dunmall's Snake habitat up to the limits listed in the approval.

Table 5.2 Proposed amendments to Protecting biodiversity values, Table 3 – Significant residual impacts to prescribed environmental matters

Prescribed Environmental Matter	Significant Residual Impact (SRI) and Offset required (Yes/No/NA)	Total Maximum area of impact (current approved)	Maximum area of impact
			The Project
Endangered regional ecosystem			
11.4.3 (remnant)	No	MNES[1]	0 ha
Of concern regional ecosystem			
11.3.4 (remnant)	No	0.58 ha	0 ha
Regional ecosystems (not within an urban area) that intersect a wetland on the vegetation management wetlands map			
-	N/A	N/A	N/A
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map			
RE 11.3.25 (16a)	Yes	0.41 ha	0.14 ha
RE 11.5.1 (18b)	No	0.65 ha	0 ha
RE 11.3.4 (BVG 16c)	No	0.02 ha	0 ha
Essential habitat (not in an urban area) for vulnerable wildlife			
Jalmenus eubulus (Pale Imperial Hairstreak)	No	0.23 ha	0 ha
Essential habitat (not in an urban area) for endangered wildlife			
Phascolarctos cinereus (Koala)	N/A	0 ha	0 ha
Petaurus australis (Yellow-Bellied Glider – southern subspecies)	N/A	2.76 ha	0 ha
Philotheca sporadica (Kogan Waxflower)	N/A	8.37 ha	0 ha

Prescribed Environmental Matter	Significant Residual Impact (SRI) and Offset required (Yes/No/NA)	Total Maximum area of impact (current approved)	Maximum area of impact
			The Project
Connectivity areas			
Connectivity areas	No	0 ha	0 ha
Wetlands and watercourses			
A wetland in a wetland protection area shown on the map of referable wetlands	N/A	N/A	N/A
A wetland of high ecological significance shown on the Map of referable wetlands	N/A	N/A	N/A
Designated precincts in a strategic environmental area			
Designated precinct in a strategic environmental area	N/A	N/A	N/A
Protected wildlife habitat			
An area shown as high-risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife			
-			
An area not shown as high-risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife			
-			
Habitat for an animal that is endangered wildlife			
Phascolarctos cinereus, Koala	No	MNES[1] 66.84 ha	3.00 ha
Hemiaspis damelii, Grey Snake	Yes	17.65 ha	0.41 ha
Petauroides Volans, Greater Glider	No	40.37 ha	0 ha
Adclarkia cameroni, Brigalow woodland snail	Yes	N/A	0.16 ha
Habitat for an animal that is vulnerable wildlife			
Acanthophis antarcticus, Death Adder	No	40.65 ha	0 ha

Prescribed Environmental Matter	Significant Residual Impact (SRI) and Offset required (Yes/No/NA)	Total Maximum area of impact (current approved)	Maximum area of impact
			The Project
Calyptorhynchus lathami lathami, Glossy Black-cockatoo	No	3.92 ha	0 ha
Furina dunmalli, Dunmall's Snake	No	MNES[1] 39.42 ha	0.41 ha
Jalmenus eubulus, Pale Imperial Hairstreak	No	0.75 ha	0 ha
Nyctophilus corbeni, South-eastern Long-eared Bat	No	MNES[1] 39.44 ha	0 ha
Stagonopleura guttata, Diamond firetail	No	N/A	3.00 ha
Aphelocephala leucopsis, Southern whiteface	No	N/A	3.00 ha
Habitat for an animal that is special least concern wildlife			
Tachyglossus aculeatus, Short-beaked Echidna	No	3.75 ha	0 ha
Protected areas			
National park	N/A	N/A	N/A
Regional park	N/A	N/A	N/A
Nature refuge	N/A	N/A	N/A
Highly protected zones of State marine parks			
Conservation park zone	N/A	N/A	N/A
Marine national park zone	N/A	N/A	N/A
Preservation zone	N/A	N/A	N/A
Other zones	N/A	N/A	N/A
Fish habitat areas			
A declared fish habitat area	N/A	N/A	N/A
Waterway providing for fish passage			
Fish passage (not in an urban area)	No	0.15 ha	0 ha

Prescribed Environmental Matter	Significant Residual Impact (SRI) and Offset required (Yes/No/NA)	Total Maximum area of impact (current approved)	Maximum area of impact
			The Project
Marine plants			
Marine plant (not in an urban area)	N/A	N/A	N/A
Legally secured offset area			
Legally secured offset area	NA	NA	NA

[1] Impact managed under EPBC approval 2010/5344

6. References

ALA. (2001). *https://biocache.ala.org.au/occurrences/d0ce0020-114f-48af-9501-188fda32a8ba*. Retrieved from Human observation of Grantiella picta (Gould, 1838) | Painted Honeyeater recorded on 2001-11-04: https://biocache.ala.org.au/occurrences/d0ce0020-114f-48af-9501-188fda32a8ba

ALA. (2015). *Area of Occupancy and Extent of Occurrence*. Retrieved from https://www.ala.org.au/spatial-portal-help/aoo/.

Arrow. (n.d). *Jammat Petroleum Pipeline Application Report.* Brisbane, Queensland: Arrow Energy.

Australian National University. (2021). *A review of Koala habitat assessment criteria and methods.* . Canberra: Australian National University.

BHA. (2024). *Bush Heritage Australia*. Retrieved from https://www.bushheritage.org.au/species/echidna#:~:text=Echidnas%20are%20solitary%2C%20wanderers%3A%20they,their%20young%20in%20a%20burrow.

Braby, M. (2016). *The Complete Field Guide to Butterflies of Australia.*

Cogger, H. G. (2018). *Reptiles & Amphibians of Australia* (7th ed.). Clayton South, Victoria: CSIRO Publishing.

DAWE. (2022a). *Conservation Advice for Petaurus australis australis (yellowbellied glider (south-eastern)).* Canberra: Department of Agriculture, Water and the Environment.

DAWE. (2022a). *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory.* Canberra: Department of Agriculture, Water and the Environment.

DCCEEW. (2022). *Conservation Advice for Calyptorhynchus lathami lathami (South-eastern Glossy Black Cockatoo).* Department of Climate Change, Energy, the Environment and Water. Canberra: Australian Government.

DCCEEW. (2022a). *Conservation Advice for Hemiaspis damelii (grey snake).* Department of Climate Change, Energy, the Environment and Water. Canberra: Australian Government.

DCCEEW. (2022b). *Conservation Advice for Petauroides volans (greater glider (southern and central)).* Department of Climate Change, Energy, the Environment and Water. Canberra: Australian Governmnet.

DCCEEW. (2023). *Conservation advice for Apholocephala leucopsis (southern whiteface).* Canberra: Australian Government.

DCCEEW. (2023). *Conservation advice for Climacteris picumnus victoriae (brown treecreeper (south-eastern)).* Canberra: Australian Government.

DCCEEW. (2023). *Conservation Advice for Stagonopleura guttata (diamond firetal).* Canberra: Australian Government.

DCCEEW. (2023). *Species Profile and Threats Database. Grantiella picta — Painted Honeyeater.* Retrieved from https://www.environment.gov.au/cgibin/sprat/public/publicspecies.pl?taxon_id=470 [Accessed July 14, 2023

DCCEEW. (2024). *Conservation Advice for Gallinago hardwickii (Latham's snipe).* Canberra: Australian Government.

DEHP. (2014). *Significant Residual Impact Guideline* . Canberra: Department of Environment and Heritage Protection.

DEHP. (2015). *Eligibility criteria and standard conditions Petroleum pipeline activities – Version 2.* Retrieved from Department of Environment and Science: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.des.qld.gov.au/policies?a=272936:policy_registry/rs-es-petroleum-pipeline.pdf

DES. (2020). *South East Queensland Koala Conservation Strategy 2020–2025*. Brisbane: Department of Environment and Science.

DESI. (2023). *Queensland Environmental Offsets Policy*. Brisbane: Department of Environment, Science and Innovation.

DESI. (2024). *Method for mapping matters of state environmental significance, Version 7*. Department of Environment, Science and Innovation.

DOE. (2014). *Approved Conservation Advice for Furina dunmallii*. Canberra.

DOE. (2015). *Conservation Advice for Grantiella picta (painted honeyeater)*. Canberra: Australian Government.

DSEWPC. (2013). *Approved Conservation Advice for Rostratula australis (Australian painted snipe)*. Canberra.

DSEWPC. (2013). *Conservation advice for Rostrantula australis (Australian painted snipe)*. Canberra: Australian Government.

EcoSmart. (2014). *Daandine Phase 1 Project. EPBC Terrestrial Flora and Fauna Survey*.

EcoSmart. (2017). *Surat Gas Project Terrestrial Ecology Report*. EcoSmart ecology.

EcoSmart. (2018). *Daandine Loopline Dunmall's Snake (Furina dunmalli): Targeted Survey Report*. EcoSmart Ecology.

EcoSmart Ecology. (2018). Mark Sanders Incidental Recordings - Painted Honeyeater.

EcoSmart Ecology. (2023). *Threatened Species Mapping Rules Review - Surat Gas Project*.

EcoSmart Ecology. (2023). *Threatened Species Mapping Rules Review: Surat Gas Project*. Brisbane: Arrow Energy.

Environments, C. (2013). *Supplementary Report to the Surat Gas Project EIS*.

Eyre, T. J., Ferguson, D. J., Smith, D. C., Mathieson, M. T., Venz, M. F., Hogan, L. D., . . . Rowland, J. (2022). *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland*. Brisbane: Department of Environment and Science, QUeensland Government.

Eyre, T. J., Smith, G. C., Venz, M. F., Mathieson, M. T., Hogan, L. D., Starr, C., . . . McDonald, K. (2022). *Guide to greater glider habitat in Queensland*. Brisbane: Department of Agriculture, Water and the Environment; Department of Environment and Science.

Herbarium, Q. (2024). *Regional Ecosystem Description Database (REDD). Version 13.1*. Brisbane: Department of Science and Innovation.

Higgins, P. J., Peter, J., & Steele, W. (2001). *Handbook of Australian, New Zealand and Antarctic Birds*. Melbourne: Oxford University Press.

Hourigan, C. (2012). *Glossy black-cockatoo, Calyptorhynchus lathami. Targeted species survey guidelines*. Queensland Herbarium.

IUCN. (2024). *Guidelines for Using the IUCN Red List Categories and Criteria*. Retrieved from Atlas of Living Australia: https://support.ala.org.au/support/solutions/articles/6000208436-area-of-occupancy-and-extent-of-occurrence

MCD. (2020). *Central Darling Downs Land Management Manual, Southern Queensland*. Retrieved from https://www.publications.qld.gov.au/dataset/land-resource-areas-central-darling-downs-mcd

Menkhorst, P., Rogers, D., Clarke, R., Davies, J., Marsack, P., & Franklin, K. (2022). *The Austalian Bird Guide*. CSRIO Publishing .

MWD. (2022). *Murilla, Tara and Chinchilla Shires Land Management Manual, Southern Queensland*. Retrieved from https://www.publications.qld.gov.au/dataset/land-resource-areas-murilla-tara-chinchilla-mwd

Neldner, V. J., Wilson, B. A., Dillewaard, H. A., Ryan, T. S., Butler, D. W., McDonald, W. J., . . . Appelman, C. N. (2023). *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland Version 7.0*. Queensland Herbarium, Science and Technology Division, Department of Environment and Science. Brisbane: Queensland Government.

NSW Environment & Heritage. (2021). *Jalmenus eubulus, (a butterfly) - critically endangered species listing*. Retrieved from NSW Environment & Heritage: https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/jalmenus-eubulus-a-butterfly-critically-endangered-species-listing

Oliver, D., Chambers, M., & Parked, D. (2003). *Habitat and resource selection of the Painted Honeyeater (Grantiella picta) on the northern floodplains region of New South Wales.* Emu - Austral Ornithology.

Phillips, S., & Callaghan, J. (2011). The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. *Australian Zoologist, 35*(3), 744-780.

Pizzey, G., Knight, F., & Pizzey, S. (2012). *The field guide to the birds of Australia.* Sydney: Harper Collins Publishers.

QI. (2025). *Queensland Imagery*. Retrieved from https://qimagery.information.qld.gov.au/

Stanisic, J., Shea, M., Potter, D., & Griffiths, O. (2010). *Australian Land Snails Volume 1. A field guide to eastern Australian Species.* Rivière-des-Anguilles, Mauritius: Bioculture Press.

TSSC. (2016a). *Conservation Advice Adclarkia dulacca Dulacca woodland snail.* Threatened Species Scientific Committee.

TSSC. (2016b). *Conservation Advice Adclarkia cameroni brigalow woodland snail.* Threatened Species Scientific Committee.

TSSC. (2019). *Conservation advice Hirundapus caudacutus White-throated Needletail.* Canberra: Threatened Species Scientific Committee.

Wilkinson, D., Grigg, G., & Beard, L. (1998). *Shelter selection and home range of echidnas, Tachyglossus aculeatus, in the highlands of south-east Queensland.* CSIRO.

Youngentob, K. N., Marsh, K. F., & Skewes, J. A. (2021). *A review of koala habitat assessment criteria and methods.* Canberra: Department of Agriculture, Water and the Environment.

Attexo

Appendix A

EPBC Approval

Approval

Surat Gas Expansion Project (EPBC 2010/5344)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

person to whom the approval is granted	Arrow Energy Pty Ltd
proponent's ABN	ABN: 73 078 521 936
proposed action	To expand coal seam gas operations in the Surat Basin, Queensland, as described in the referral received under the EPBC Act on 2 February 2010; and as described in the Surat Gas Project Environmental Impact Statement (March 2012) and Supplementary Report to the Environmental Impact Statement (June 2013).
decision	To approve the proposed action for each of the following controlling provisions: • Listed threatened species and communities (sections 18 and 18A) • Listed migratory species (sections 20 and 20A) • A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
Conditions of approval	This approval is subject to the conditions specified below.
expiry date of approval	This approval has effect until **31 December 2080**.

Decision-maker	Greg Hunt
name and position	The Hon Greg Hunt MP Minister for the Environment
signature	
date of decision	19:12:2013

Conditions of approval

1. The **Minister** may determine that a plan, strategy or program approved by the Queensland Government satisfies a plan required under these conditions.

Disturbance Limits

2. For the purpose of the action, the **approval holder** must not take any action outside the **project area**.
3. The action is limited to a maximum of 6,500 coal seam gas production wells and associated infrastructure.
4. The **approval holder** must not undertake hydraulic fracturing.
5. To protect **EPBC listed species** and **EPBC communities** within the **project area** the maximum disturbance limits in Table 1 apply to the project. The **approval holder** must not exceed these disturbance limits.

Table 1: Whole of project maximum disturbance limits

Terrestrial species	**Maximum disturbance (hectares) to core habitat**
Curly-bark Wattle, *Acacia curranii*	1210
Hando's Wattle, *Acacia handonis*	1210
Belson's Panic, *Homopholis belsonii*	140
Lobed Blue Grass, *Bothriochloa biloba*	305
Kogan Waxflower, *Philotheca sporadica*	480
Prostanthera sp Dunmore	380
Small-leaved Denhamia, *Denhamia parvifolia*	50
Calytrix gurulmundensis	1210
Ooline, *Cadellia pentastylis*	No disturbance
Finger Panic Grass, *Digitaria porrecta*	174
Austral Toadflax, *Thesium australe*	160
Acacia lauta	990
Cobar Greenhood Orchid, *Pterostylis cobarensis*	2 170
Xerothamnella herbacea	110
Hawkweed, *Picris evae*	120
Austral Cornflower, *Rhaponticum australe*	160
Eucalyptus virens	170
King Blue-grass, *Dichanthium queenslandicum*	160
Queensland White-gum, *Eucalyptus argophloia*	10
Macrozamia machinii	No disturbance
South-eastern Long-eared Bat, *Nyctophilus corbeni*	4 080
Dunmall's Snake, *Furina dunmalli*	4 400
Five-clawed Worm-skink, *Anomalopus mackayi*	560
Squatter Pigeon (Southern), *Geophaps scripta scripta*	3261

Regent Honeyeater, *Anthochaera phrygia*	20
Collared Delma, *Delma torquata*	90
Yakka Skink, *Egernia rugosa*	310
Australian Painted Snipe, *Rostratula australis*	5
EPBC Communities	**Maximum disturbance (hectares)**
Brigalow (*Acacia harpophylla* dominant and co-dominant)	106
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	8
Weeping Myall Woodlands	1
Natural Grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	No disturbance
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	No disturbance
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	No disturbance

6. To protect **EPBC listed species and communities** within the **project area** the maximum disturbance limits in Table 2 apply to **Stage 1**. The **approval holder** must not exceed these disturbance limits.

Table 2: Maximum disturbance limits for Stage 1

Terrestrial species	**Maximum disturbance (hectares) to core habitat**
South-eastern Long-eared Bat, *Nyctophilus corbeni*	167
Dunmall's Snake, *Furina dunmalli*	66
Five-clawed Worm-skink, *Anomalopus mackayi*	2
Squatter Pigeon (Southern), *Geophaps scripta scripta*	203
Regent Honeyeater, *Anthochaera phrygia*	1
Collared Delma, *Delma torquata*	11
Yakka Skink, *Egernia rugosa*	19
EPBC Communities	**Maximum disturbance (hectares)**
Brigalow (*Acacia harpophylla* dominant and co-dominant)	39
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	8

EPBC Species Impact Management and Offset Plan

EPBC Species Impact Management and Offset Plan – Stage 1

7. An EPBC Species Impact Management and Offset Plan for **Stage 1** must be submitted for approval of the **Minister** at least 3 months prior to **commencement**, and must include:

    (a) measures to report the methodology and results of **pre-clearance surveys,** and quantification of actual impacts, in the annual reporting required by condition 28. **Pre-clearance surveys** must be undertaken in accordance with the **Department's survey guidelines** in effect at the time of the survey or other survey methodology approved by the **Department** in writing;

(b) a map of the location of each **EPBC listed threatened species** and its habitat or **EPBC community** in relation to infrastructure and proposed disturbance for **Stage 1**;

(c) potential threats and **impacts** to **EPBC listed species** and **EPBC communities** from **Stage 1**;

(d) a description of the measures that will be taken to avoid, mitigate and manage **impacts** to the **EPBC listed species** and its habitat, including to the **Murray Cod** and **Fitzroy River Turtle,** or an **EPBC community**;

(e) measures to report to the **Department** on the occurrence and circumstances of **EPBC listed species** deaths as a result of the action and actions taken to reduce the likelihood of any such circumstance reoccurring;

(f) a monitoring program to determine the success of mitigation and management measures and inform the next Stage of the EPBC Species Impact Management and Offset Plan to ensure adaptive management for the duration of the project approval;

(g) a discussion of relevant **conservation advice**, **recovery plans** and **threat abatement plans** and how the EPBC Species Impact Management and Offset Plan - **Stage 1** is consistent with these documents;

(h) details of the following minimum offset areas for **Stage 1** including, for each area, the location, tenure, site description and map of environmental values:

i. 112 hectares for Brigalow (*Acacia harpophylla* dominant and co-dominant);

ii. 30 hectares Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions;

iii. 80 hectares for Yakka Skink, *Egernia rugosa*;.

iv. 42 hectares for Collared Delma, *Delma torquata*;

v. 230 hectares for Dunmall's Snake, *Furina dunmalli*;

vi. 545 hectares for Squatter Pigeon (Southern), *Geophaps scripta scripta*;

vii. 6.5 hectares for Five-clawed Worm-skink, *Anomalopus mackayi*;

viii. 4 hectares for Regent Honeyeater, *Anthochaera phrygia*; and

ix. 765 hectares for South-eastern Long-eared Bat, *Nyctophilus corbeni.*

(i) a process for any significant **impact** to an **EPBC listed species** or **EPBC community** for **Stage 1**, where the species or community is not identified in Table 2, to be offset in accordance with the **EPBC Act Offsets Policy**;

(j) an offset area management plan for each offset area, which sets out management measures that will be implemented to improve the offset site for the respective **EPBC species** and/or **EPBC community**; and

(k) a timeline for when actions identified in the EPBC Species Impact Management and Offset Plan will be implemented and for legally securing offsets including, for each area, the proposed legal mechanism for securing the offset. Offsets for **Stage 1** must be legally secured prior to **commencement** of **Stage 2**.

8. The EPBC Species Impact Management and Offset Plan for **Stage 1** must be peer reviewed by a **suitably qualified ecologist** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the EPBC Species Impact Management and Offset Plan for **Stage 1** and a statement from the **suitably qualified ecologist** stating that they carried out the peer review and endorse the findings of the peer review.

9. The **approval holder** must not **commence** the action until the EPBC Species Impact Management and Offset Plan for **Stage 1** has been approved by the **Minister** in writing.

EPBC Species Impact Management and Offset Plan – Stages 2 to 4

10. The **approval holder** must update the EPBC Species Impact Management and Offset Plan for the next **development stage** (i.e. **Stage 2, Stage 3** and **Stage 4**) and submit for approval of the **Minister** at least 3 months prior to **commencement** of each **development stage**. Each updated plan must include:

    (a) the information required for the EPBC Species Impact Management and Offset Plan in conditions 7 (a) to (g) and conditions 7 (j) and 7 (k) for the respective **development stage**;

    (b) where **impacts** are unavoidable, an offset strategy to compensate for residual **impacts** to each **EPBC species** or **EPBC community** for that **development stage** in accordance with the **EPBC Act Offsets Policy**. The offset strategy must:

        i. demonstrate how the offset builds on offsets secured as part of the EPBC Species Impact Management and Offset Plan – **Stage 1** and any other **development stage** and, where possible, will contribute to a larger strategic offset for whole of project **impacts**;

        ii. identify land (including a map, site description and shapefile) that has or will be acquired and how it has been or will be legally secured;

        iii. include a detailed discussion of the quality, condition, site context and environmental values of the impact and offset site relevant to the **EPBC species** or **EPBC community** being offset;

        iv. include a description of potential risks to successful implementation of the offset, including a description of contingency measures that would be implemented to mitigate against these risks; and

        v. discuss connectivity of the offset area with other habitats and biodiversity corridors.

    (c) a reconciliation of **impacts** against whole of project disturbance limits. To incentivise avoidance, the **approval holder** is only required to offset realised **impacts**. Where the full **impact** from **Stage 1, Stage 2** or **Stage 3** that has been offset is not realised, the balance of the offset can be transferred to a future offset liability for a future **development stage** for this project.

11. The updated EPBC Species Impact Management and Offset Plan for each **development stage** must be peer reviewed by a **suitably qualified ecologist** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the EPBC Species Impact Management and Offset Plan for each **development stage** and a statement from the **suitably qualified ecologist** stating that they carried out the peer review and endorse the findings of the peer review.

12. The **approval holder** must not **commence Stage 2, Stage 3** or **Stage 4** until the EPBC Species Impact Management and Offset Plan for that **development stage** has been approved by the **Minister** in **writing**. The approved EPBC Species Impact Management and Offset Plan for each **development stage** must be implemented.

Note 1: The Minister may determine that a plan, strategy or program approved by the Queensland Government satisfies the requirements for the EPBC Species Impact Management and Offset Plan under these conditions.

Note 2: Offsets for some species may be accommodated within ecological communities or overlap State approval requirements or other species habitat requirements, as long as they meet the requirements of these conditions of approval in respect of each individual species being offset.

Coal Seam Gas Water Monitoring and Management Plan

Stage 1 CSG Water Monitoring and Management Plan

13. Prior to **commencement**, the proponent must submit a Stage 1 Coal Seam Gas Water Monitoring and Management Plan (Stage 1 CSG WMMP) for the approval of the **Minister,** who may seek the advice of an **expert panel**. The Stage 1 CSG WMMP must include:

    (a) an analysis of the results of the most recent **OGIA model** (built or endorsed by **OGIA**), relevant to all of the project's tenement areas;

    (b) a fit for purpose numerical simulation to assess potential impacts on water resources arising from the action in the project area, subsequent surface water-groundwater interactions in the Condamine Alluvium and impacts to dependent ecosystems;

    (c) an assessment of potential **impacts** from the action on non-spring based groundwater dependent ecosystems through potential changes to surface-groundwater connectivity and interactions with the sub-surface expression of groundwater;

    (d) an assessment of predicted project wide groundwater drawdown levels and pressures from the action, together with confidence levels;

    (e) parameters and a sampling regime to establish baseline data for surface and groundwater resources that may be impacted by the action, including: surface water quality and quantity in the **project area**, and upstream and downstream of potential impact areas; groundwater quality, levels and pressures for areas that may be **impacted** by the project; and for determining connectivity between surface water and groundwater that may be **impacted** by the project;

    (f) a best practice baseline monitoring network that will enable the identification of spatial and temporal changes to surface water and groundwater. This must include a proposal for aquifer connectivity studies and monitoring of relevant aquifers to determine hydraulic connectivity (including potential groundwater dependence of Long Swamp and Lake Broadwater) and must also enable monitoring of all aquatic ecosystems that may be **impacted** by the action;

    (g) a program to monitor subsidence **impacts** from the action, including trigger thresholds and reporting of monitoring results in annual reporting required by condition 28. If trigger thresholds are exceeded, the **approval holder** must develop and implement an action plan to address impacts within 90 calendar days of a trigger threshold being exceeded;

    (h) provisions to make monitoring results publicly available on the **approval holder's** website to facilitate a greater understanding of cumulative **impacts**;

    (i) a discussion on how the **approval holder** is contributing to the **Joint Industry Plan,** including its periodic review. The **approval holder** must contribute to the **Joint Industry Plan** and comply with any part of the **Joint Industry Plan**, or future iterations of the **Joint Industry Plan**, that applies to the **approval holder**;

    (j) a groundwater early warning monitoring system, including:

        i. groundwater drawdown limits for all consolidated aquifers potentially impacted by the action, excluding the Walloon Coal Measures;

        ii. for the Condamine Alluvium, appropriate triggers and groundwater limits and a rationale for their selection;

        iii. early warning indicators and trigger thresholds, including for Lake Broadwater, Long Swamp and other groundwater dependent ecosystems that may potentially be impacted by the action, including

those that may occur outside the **project area** and may be impacted by the action; and

iv. investigation, management and mitigation actions, including substitution and/or groundwater repressurisation, for both early warning indicators and trigger thresholds to address flux impacts on the Condamine Alluvium.

(k) early warning indicators and trigger thresholds, including corrective actions for both early warning indicators and trigger thresholds, for aquatic ecology and aquatic ecosystems;

(l) a CSG water management strategy for produced salt/brine, which discusses how co-produced water and brine will be managed for the action, including in the context of other coal seam gas activities in the Surat Basin;

(m) an analysis of how the **approval holder** will utilise beneficial use and/or groundwater repressurisation techniques to manage produced CSG water from the action, and how any potential adverse **impacts** associated with groundwater repressurisation will be managed;

(n) a discharge strategy, consistent with the recommendations and requirements of the Department of the Environment and Heritage Protection in its **Assessment Report** (pages 94 to 95 and pages 254 to 255) and that includes scenarios where discharge may be required, the quality of discharge water (including water treated by reverse osmosis), the number and location of monitoring sites (including upstream and downstream sites), frequency of monitoring and how the data from monitoring will be analysed and reported, including recommendations on any changes or remedial actions that would be required;

(o) a flood risk assessment for processing facilities and any raw co-produced water and brine dams, which addresses flood risks to the environment from the action in the case of a 1:1000 ARI event. The risk assessment should estimate the consequences if major project infrastructure was subject to such an event, including release of brine and chemicals into the environment;

(p) a cumulative **impact** assessment based on the outputs of the **OGIA model** which integrates groundwater model outputs with known and potential groundwater dependent ecosystems and presents the outputs in map form. Contribute to investigations coordinated through the OGIA to assess hydrological and ecological characteristics of **impacted** groundwater dependent ecosystems;

(q) details of performance measures; annual reporting to the **Department**; and publication of reports on the internet; and

(r) an explanation of how the Stage 1 CSG WMMP will contribute to work undertaken by other CSG proponents in the Surat Basin to understand cumulative **impacts**, including at the local and regional scale, and maximise environmental benefit.

14. The Stage 1 CSG WMMP must be peer reviewed by a **suitably qualified water resources expert/s** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the Stage 1 CSG WMMP and a statement from the **suitably qualified water resources expert/s** stating that they carried out the peer review and endorse the findings of the Stage 1 CSG WMMP.

15. The **approval holder** must not exceed the groundwater drawdown or groundwater limits for each aquifer specified in the Stage 1 CSG WMMP.

16. Unless otherwise agreed in writing by the **Minister**, the **approval holder** must not **commence** the action until the Stage 1 CSG WMMP is approved in writing by the **Minister**. The approved Stage 1 CSG WMMP must be implemented.

Note 3: to ensure efficiency the approval holder may prepare and align the Stage 1 WMMP with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Stage 2 CSG Water Monitoring and Management Plan

17. Prior to **Stage 2** the **approval holder** must submit a Stage 2 Coal Seam Gas Water Monitoring and Management Plan (Stage 2 CSG WMMP) to the **Minister** for approval, who may seek the advice of an **expert panel.** The Stage 2 CSG WMMP must:

    (a) include all matters in the Stage 1 CSG WMMP, and discuss how the Stage 1 CSG WMMP is informing adaptive management for the Stage 2 CSG WMMP;

    (b) include any updated modelling for the project, including in respect of the **OGIA model** or any updates to the **OGIA model** by **OGIA**;

    (c) include an explanation of how the **approval holder** will contribute to the **Condamine Interconnectivity Research Project**. The Stage 2 CSG WMMP must present the findings of the Condamine Interconnectivity Research project and any modelling done by the **OGIA** to validate predicted drawdown and a review of trigger thresholds and corrective actions for the action;

    (d) report on the potential for flow reversal from the Condamine Alluvium to underlying aquifers, based on data obtained during the Stage 1 CSG WMMP;

    (e) review and update the monitoring network in Stage 1 WMMP to reflect changes in understanding of **impacts** to water resources, including from baseline monitoring and relevant research;

    (f) identify any predicted changes in stream connectivity due to groundwater drawdown from the action and assess potential impacts to groundwater dependent ecosystems due to any predicted changes in stream connectivity, including to water quality, quantity and ecology;

    (g) address any uncertainty in the groundwater-dependency of ecosystems and springs with supporting evidence from field-based investigations for any groundwater-dependent ecosystems and springs confirmed in the **OGIA model**;

    (h) provide details of an ongoing monitoring plan that:

        i. sets out the frequency of monitoring and rationale for the frequency;

        ii. includes continued collection of baseline data for each monitoring site over the life of the project;

        iii. outlines the approach to be taken to analyse the results including the methods to determine trends to indicate potential **impacts**; and

        iv. builds on the groundwater early warning system required at condition 13 (j) and sets out early warning indicators and trigger thresholds and limits for groundwater and surface water.

    (i) include a risk based exceedance response plan that details the actions the **approval holder** will take and the timeframes in which those actions will be undertaken if: early warning indicators and trigger threshold values contained in the Stage 2 CSG WMMP are exceeded, or there are any emergency discharges.

18. The Stage 2 CSG WMMP must be peer reviewed by a **suitably qualified water resources expert/s** approved by the **Minister** in writing. The peer review must be submitted to the **Minister** together with the Stage 2 CSG WMMP and a statement from the **suitably qualified water resources expert/s** stating that they carried out the peer review and endorse the findings of the Stage 2 CSG WMMP.

19. The **approval holder** must not exceed the groundwater drawdown or groundwater limits specified in the Stage 2 CSG WMMP.

20. The **Minister** may direct in writing that the **approval holder** cease water/gas extraction and/or water discharge or use if an early warning indicator, trigger threshold or limit is exceeded, and if the **Minister** is not satisfied that the action proposed or taken by the proponent will remedy the situation. The **Minister** may direct the proponent to implement alternative action at the expense of the proponent.

Note 4: The proponent will be provided with a reasonable opportunity to comment on any such direction before it is required to be implemented.

21. Unless otherwise agreed by the **Minister** in writing, the Stage 2 CSG WMMP must be approved in writing by the **Minister** prior to first extraction of gas. The approved Stage 2 CSG WMMP must be implemented. The Stage 1 CSG WMMP will apply until the commencement of the approved Stage 2 CSG WMMP.

Note 5: to ensure efficiency the approval holder may prepare and align the Stage 2 WMMP with the requirements of the Queensland Government, as long as the relevant matters under the conditions of this approval are clearly and adequately addressed.

Revision of the Stage 2 CSG WMMP

22. To ensure an adaptive management approach, the proponent must submit periodic revisions of the Stage 2 CSG WMMP for approval by the **Minister** in writing, who may seek the advice of an **expert panel**. Revisions must be submitted at least 3 months prior to planned **commencement** of each new **development stage** for the project. The revised CSG WMMP must take into account outcomes of the ongoing monitoring program in the Stage 2 CSG WMMP, groundwater model updates and any bioregional assessments.

23. If the **OGIA model** ceases to exist, then the **approval holder** must submit an alternate model to be used for the purpose of these conditions that replaces the **OGIA model** as referred to in these conditions. The alternate model must be approved by the **Minister** in writing before the next relevant stage of the CSG WMMP is submitted to the **Minister** for approval.

24. The **approval holder** must not **commence Stage 3** or **Stage 4** until a revised Stage 2 CSG WMMP is approved in writing by the **Minister** for that **development stage.** The approved revised Stage 2 CSG WMMP must be implemented.

25. The **Minister** may, by written request to the **approval holder**, require the Stage 1 or Stage 2 CSG WMMP to be revised, including to address expert advice. Any request must be acted on by the **approval holder** within the timeframe specified in the request.

Note 6: The Minister may throughout the life of the project life seek advice from experts, or an expert panel. As a consequence specific matters identified through such advice may need to be addressed in the CSG WMMP Plan. Where such advice is sought the approval holder would be provided with opportunity to submit information and respond to the specific matters identified, in order to ensure the CSG WMMP Plan is based on the best available information. Review requirements will facilitate adaptive management, align with Queensland Government approval requirements, and account for potential cumulative impacts as new scientific information becomes available over the life of the project.

General

26. Within 20 business days after the **commencement** of the action, the **approval holder** must advise the **Department** in writing of the actual date of **commencement.**

27. The **approval holder** must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans, reports or strategies required by this approval, and make them available upon request to the **Department**. The annual report (condition 28) must state all confirmed cases of non-compliance along with details of any remedial actions. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act,** or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.

28. Within three months of every 12 month anniversary of the **commencement** of the action, the **approval holder** must publish a report on its website for the life of the approval outlining how they have been compliant with the conditions of this approval over the previous 12 months, including implementation of any management plans as specified in the conditions. The **approval holder** must also report against disturbance limits. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published.

29. The **approval holder** must notify the **Department** in writing of potential non-compliance with any condition of this approval as soon as practical and within no later than ten business days of becoming aware of the potential non-compliance. The notice provided to the **Department** under this condition must specify:

    a) the condition which the **approval holder** has potentially breached;

    b) the nature of the potential non-compliance;

    c) when and how the **approval holder** became aware of the non-compliance;

    d) how the non-compliance will affect the approved action;

    e) how the non-compliance will affect the anticipated **impacts** of the approved action, in particular how the non-compliance will affect the **impacts** on the matters of national environmental significance;

    f) the measures the approval holder will take to address the **impacts** of the non-compliance on the matters of national environmental significance and rectify the non-compliance; and

    g) the time by when the approval holder will rectify the non-compliance.

30. Upon the direction of the **Minister**, the **approval holder** must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister.**

31. If the **approval holder** wishes to carry out any activity other than in accordance with the management plans as specified in the conditions, the **approval holder** must submit to the **Department** for the **Minister's** written approval a revised version of that management plan. The approval holder must not **commence** the varied activity until the **Minister** has approved the varied management plan. The **Minister** will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan, that management plan must be implemented in place of the management plan originally approved.

32. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species, listed migratory species or water resources to do so, the **Minister**

may request that the **approval holder** make specified revisions to the management plans specified in the conditions and submit the revised management plan for the **Minister's** written approval. The **approval holder** must comply with any such request within the timeframe specified by the **Minister**. The revised approved management plan must be implemented. Unless the **Minister** has approved the revised management plan, then the person taking the action must continue to implement the management plan originally approved, as specified in the conditions.

33. If, at any time after five years from the date of this approval, the **approval holder** has not **commenced** the action, then the **approval holder** must not **commence** the action without the written agreement of the **Minister.**

34. Unless otherwise agreed to in writing by the **Minister**, the **approval holder** must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved and remain available on that website for the life of the approval.

Definitions

Approval holder: means the person to whom the approval is granted.

Assessment Report: means the Queensland Department of Environment and Heritage Protection's report under the *Environmental Protection and Biodiversity Conservation Act 1994* for the action.

Commenced/commencement: means any physical disturbance, including clearance of native vegetation, new road work and the establishment of well sites to develop the gas field project area. Commencement does not include:

a) minor physical disturbance necessary to undertake pre-clearance surveys or establish monitoring programs or geotechnical investigations; or

b) activities that are critical to commencement that are associated with mobilisation of plant and equipment, materials, machinery and personnel prior to the start of development only if such activities will have no adverse impact on matters of national environmental significance, and only if the proponent has notified the Department in writing before an activity is undertaken.

Core habitat: means core habitat known and core habitat possible as defined in the rules for habitat mapping for each individual species in the *Supplementary Report to the Surat Gas Project EIS (March 2012), Attachment 1 – Matters of National Environmental Significance.*

Conservation advice: means an approved conservation advice under the EPBC Act for an EPBC Act listed species or community.

Core habitat known: means habitat where a spatially accurate confirmed record of a particular species exists (e.g. Herbrecs or survey record). Core habitat known is attributed to the particular habitat polygon in which it occurs, based on either regional ecosystem (RE) mapping provided by the Queensland Department of Environment and Heritage Protection (or successor agency) or high resolution habitat mapping developed for a specific purpose. Core habitat known also means a 1 km buffer around all spatially accurate (< 400 metres accuracy) species records.

Condamine Interconnectivity Research Project: means the Condamine Interconnectivity Research Project being undertaken by the Queensland Office of Groundwater Impact Assessment as part of the implementation of the Surat Underground Water Impact Report (UWIR), which was prepared by the Queensland Water Commission (QWC) in 2012.

Core habitat possible: means an area where previous records of a particular species are not known to occur within a given area or habitat, although specific habitat features are present which are known to be favoured by the species and the habitat occurs within the species known geographic range.

Department: means the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999.*

Department's survey guidelines: means:
Matters of National Environmental Significance, Significant Impact Guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999 - http://www.environment.gov.au/epbc/publications/nes-guidelines.html.

Survey Guidelines for Australia's Threatened Frogs, Threatened Birds, Threatened Fish, Threatened Mammals, Threatened Reptiles and Threatened Bats: http://www.environment.gov.au/epbc/guidelines-policies.html.

Development stage: means Stage 1, Stage 2, Stage 3 or Stage 4 of project development, as defined in these definitions.

EPBC/ EPBC Act: means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Act Offsets Policy: means the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (October 2012) including the Offsets Assessment Guide.

EPBC community: means an endangered ecological community listed under the EPBC Act.

EPBC listed threatened species: means a threatened flora or fauna species listed under the EPBC Act.

Expert panel: means an expert panel appointed by the Minister.

Fitzroy River Turtle: means the Fitzroy River Turtle, *Rheodytes leukops*, listed as vulnerable under the EPBC Act.

General habitat: means where a species has not been recorded in a given location and habitat accounts for some of the features favoured by a particular species. The habitat occurs on the margins of a species known geographic range. Otherwise, the habitat is suitable for the species

Impact: has the definition assigned to it in section 527E of the EPBC Act.

Joint Industry Plan: means the *Joint Industry Plan for an Early Warning System for the Monitoring and Protection of EPBC Springs* established with other coal seam gas proponents operating within the Surat Cumulative Management Area.

Minister: means the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Murray Cod: means the Murray Cod, *Maccullochella peelii*, listed as vulnerable under the EPBC Act.

OGIA: means the Office of Groundwater Impact Assessment or its successor body,

OGIA model: means the groundwater model developed by the Office of Groundwater Impact Assessment, or its successor body, for the Surat Cumulative Management Area.

Pre-clearance surveys: means surveys that are undertaken for EPBC species and EPBC communities for all areas of the project area that may be disturbed by project activities.

Project area: means the area identified as the project area in Attachment A.

Recovery plan: means an approved recovery plan under the EPBC Act for an EPBC listed species or EPBC community.

Stage 1: means year 1 to 3 (inclusive) of the action, starting at the date of commencement.

Stage 2: means year 4 to 11 (inclusive) of the action.

Stage 3: means year 12 to 20 (inclusive) of the action

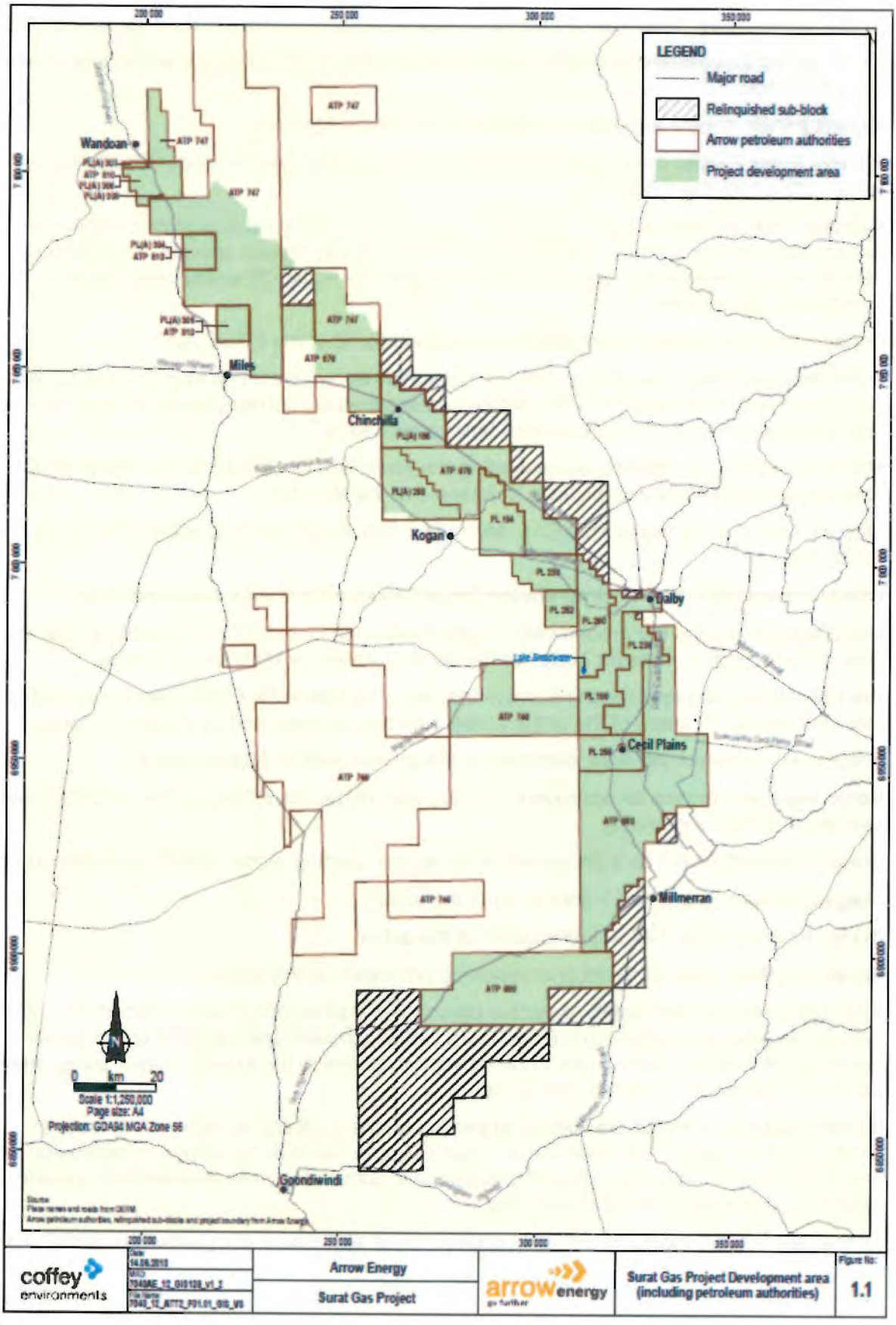
Stage 4: means year 21 to decommissioning (inclusive) of the action.

Suitably qualified ecologist: means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using relevant protocols, standards, methods and literature.

Suitably qualified water resources expert/s: means a natural person with at least a postgraduate degree (or equivalent) in a suitable area (such as hydrology or hydrogeology) and a minimum of 10 years relevant experience in water resources assessment, including at least one year of experience in Australia.

Threat abatement plan: means an approved threat abatement plan under the EPBC Act.

ATTACHMENT A



Attexo

Appendix B

Environmental Authority

Permit

Environmental Protection Act 1994

Environmental authority EA0001401

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EA0001401

Environmental authority takes effect on 23 May 2025. This is the take effect date.

The anniversary date of this environmental authority is the same day each year as the take effect date. The payment of the annual fee will be due each year on this day.

An annual return will be due each year on 01 April.

Environmental authority holder(s)

Name(s)	Registered address
ARROW CSG (AUSTRALIA) PTY LTD	Level 39 111 Eagle Street BRISBANE CITY QLD 4000

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3 - 06 – A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL253
Schedule 3 – 03 – A petroleum activity that is likely to have a significant impact on a category A or B environmentally sensitive area.	PL253

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any

Queensland Government

inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Mobile and temporary activities

If you operate a mobile and temporary environmentally relevant activity (ERA), other than regulated waste transport, you are required to maintain a work diary. You must:

- use the approved form for a work diary (ESR/2015/1696);
- keep the work diary records for 2 years after the last entry;
- inform the administering authority within 7 days of the work diary being lost or stolen;
- record the information required in the work diary for each location within 1 day of leaving the location.

Contaminated land

It is a requirement of the EP Act that an owner or occupier of land give written notice to the administering authority if they become aware of the following:

- the presence of, or happening of an event involving, a hazardous contaminant on the land that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours); or
- if the land is contaminated land – a change in the condition of the land that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the land (notice must be given within 20 business days).

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority – on the nominated day; or

b) if the authority states a day or an event for it to take effect – on the stated day or when the stated event happens; or

c) otherwise – on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

The anniversary day of this environmental authority is the same day each year as the effective date. The payment of the annual fee will be due each year on this day. An annual return will be due each year on 01 April.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

	23 May 2025
Signature	Date

Amelia Sellars
Department of the Environment, Tourism, Science and Innovation
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Energy and Extractive Resources Business Centre
GPO Box 2454, Brisbane QLD 4001
(07) 3330 5715
EnergyandExtractive@des.qld.gov.au

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access State controlled roads), the Department of Resources (to clear vegetation), and the Department of Agriculture and Fisheries (to clear marine plants or to obtain a quarry material allocation).

Conditions of environmental authority

<table>
<tr><th colspan="2">General Conditions</th></tr>
<tr><th>Condition Number</th><th>Condition</th></tr>
<tr><td>General 1</td><td>
This environmental authority authorises the carrying out of the following resource activities:

(a) The petroleum activities and specified relevant activities listed in General, Table 1 - Authorised Petroleum Activities to the extent they are carried out in accordance with the activity's corresponding intensity or maximum number or both (where applicable); and

(b) The following specified relevant activities:

(i) Resource Activity, Schedule 3 – 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam;

(ii) Resource Activity, Schedule 3 – 03: A petroleum activity that is likely to have a significant impact on a category A or B environmentally sensitive area.

(c) Incidental activities that are not otherwise specified relevant activities.

General, Table 1 – Authorised Petroleum Activities
<table>
<tr><th rowspan="2">Petroleum Activities and Infrastructure</th><th colspan="2">Scale</th></tr>
<tr><th>Intensity (Extent)</th><th>Maximum</th></tr>
<tr><td>Existing Wells</td><td>6 ha
See definition of Essential Petroleum Activities for well pad disturbance size (in hectares)</td><td>6</td></tr>
<tr><td>Stage 1 Wells</td><td>55 ha
See definition of Essential Petroleum Activities for well pad disturbance size (in hectares)</td><td>55</td></tr>
<tr><td>Existing and additional Water Monitoring Bores</td><td>0.03 ha for shallow monitoring bores
1 ha for deep monitoring bores</td><td>30</td></tr>
<tr><td>Gathering and Raw Water Pipelines</td><td>155 ha</td><td>N/A</td></tr>
<tr><td>Access Tracks</td><td>74 km</td><td>74 km</td></tr>
<tr><td>Borrow Pits</td><td>3 ha</td><td>6 borrow pits</td></tr>
<tr><td>Sediment Ponds</td><td>0.76 ha</td><td>2 sediment ponds</td></tr>
</table>
</td></tr>
</table>

	Hopeland Water Dam (regulated structure)	21 ha	1 dam
General 2	This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.		
General 7	All monitoring must be undertaken by a suitably qualified person.		
General 8	If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.		
General 9	All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.		
General 10	Notwithstanding condition (General 9), where there are no NATA accredited laboratories for a specific analyte or substance, then duplicate samples must be sent to at least two separate laboratories for independent testing or evaluation.		
General 11	Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time: (a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2018 – *Environmental Protection (Water and Wetland Biodiversity) Policy 2019;* (b) for groundwater, *Groundwater Sampling and Analysis – A Field Guide* (2009:27 GeoCat #6890.1); (c) for noise, the *Environmental Protection Regulation 2019;* and (d) for dust, the relevant Australian standard.		
General 12	In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events: (a) any unauthorised significant disturbance to land (b) potential or actual loss of structural or hydraulic integrity of a dam (c) when the level of the contents of any regulated dam reaches the mandatory reporting level (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year (e) likely or actual loss of well integrity		

	(f) when the seepage trigger action response procedure required under condition (Water 29(g)) is or should be implemented (g) unauthorised releases of any volume of prescribed contaminants to waters (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than: (i) 200 L of hydrocarbons; or (ii) 5 000 L of untreated coal seam gas water; or (iii) 1 000 L of brine; or (iv) 5 000 L of raw sewage; or (v) 10 000 L of treated sewage effluent. (i) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.
General 16	Petroleum activities involving significant disturbance to land cannot commence until the development of written contingency procedures for emergency environmental incidents which include, but are not necessarily limited to: (a) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity. (b) consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity. (c) response procedures to be implemented to prevent or minimise the risks of environmental harm occurring. (d) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused. (e) procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land. (f) training of staff to enable them to effectively respond. (g) procedures to notify the administering authority, local government and any potentially impacted landholder.
General 17	All plant and equipment must be maintained and operated in their proper and effective condition.
General 18	The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable: (a) regulated dams and low consequence dams (b) exploration, appraisal and development wells (c) sewage treatment facilities; and

	(d) any chemical storage facility associated with the environmentally relevant activity of chemical storage.
General 19	Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.
General 20	For activities involving significant disturbance to land, control measures that are commensurate to the site-specific risk of erosion, and risk of sediment release to waters must be implemented to: (a) allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities; (b) minimise soil erosion resulting from wind, rain, and flowing water; (c) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water; (d) minimise work-related soil erosion and sediment runoff; and (e) minimise negative impacts to land or properties adjacent to the activities (including roads).
General 21	Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.
General 22	A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that: (a) relevant material, including current published guidelines (where available) have been considered in the written document; (b) the content of the written document is accurate and true; and (c) the document meets the requirements of the relevant conditions of the environmental authority.
General 23	All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
General 24	All documents required to be developed under this environmental authority must be kept for five years.
General 25	All documents required to be prepared, held or kept under this environmental authority must be provided to the administering authority upon written request within the requested timeframe.
General 26	A record of all complaints must be kept including the date, complainant's details, source, reason for the complaint, description of investigations and actions undertaken in resolving the complaint.

Waste Conditions	
Condition Number	**Condition**
Waste 1	Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.
Waste 2	Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by condition Waste 3, Waste 4, Waste 8 and Waste 16 to be disposed of or used on site.
Waste 3	Waste fluids other than residual drilling material or drilling fluids stored in sumps, must be contained in either: (a) an above ground container; or (b) a structure which contains the wetting front.
Waste 4	Green waste may be used on-site for either rehabilitation or sediment and erosion control, or both.
Waste 7	Produced water may be re-used in: (a) drilling and well hole activities.
Waste 8	Produced water may be used for dust suppression provided the following criteria are met: (a) the amount applied does not exceed the amount required to effectively suppress dust; and (b) the application: (i) does not cause on-site ponding or runoff; (ii) is directly applied to the area being dust suppressed; (iii) does not harm vegetation surrounding the area being dust suppressed; and (iv) does not cause visible salting.
Waste 9	Produced water may be used for construction purposes provided the use: (a) does not result in negative impacts on the composition and structure of soil or subsoils (b) is not directly or indirectly released to waters; (c) does not result in runoff from the construction site; and (d) does not harm vegetation surrounding the construction site.

Waste 10	If there is any indication that any of the circumstances in condition (Waste 8)(b)(i) to (Waste 8(b)(iv)) or (Waste 9)(a) to (Waste 9)(d) is occurring the use must cease immediately and the affected area must be remediated without delay.
Waste 11	Treated sewage effluent or greywater can be released to land provided it: (a) meets or exceeds secondary treated class B standards for a treatment system with a daily peak design capacity of between 150 EP and 1500 EP; or (b) meets or exceeds secondary treated class C standards for a treatment system with a daily peak design capacity of less than 150 EP.
Waste 12	The release of treated sewage effluent or greywater authorised in condition (Waste 11) must: (a) be to a fenced and signed contaminant release area(s); (b) not result in pooling or run-off or aerosols or spray drift or vegetation die-off; (c) be to a contaminant release area(s) that is kept vegetated with groundcover, that is: (i) not a prohibited matter, restricted matter species or weed of national significance; (ii) kept in a viable state for transpiration and nutrient uptake; and (iii) grazed or harvested and removed from the contaminant release area as needed, but not less than every three months.
Waste 13	Notwithstanding condition (Waste 11), treated sewage effluent that meets or exceeds secondary treated class A standards may be used for dust suppression or construction activities, provided the use meets the criteria in condition (Waste 8) or (Waste 9), as relevant to the use.
Waste 14	Sewage pump stations must be fitted with a: (a) stand-by pump; and (b) high level alarm to warn of imminent pump station overflow, that operates without mains power or with a back-up power source that starts automatically in the event of a power failure.
Waste 15	If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
Waste 16	Residual drilling material can only be disposed of on-site: (a) by mix-bury-cover method if the residual drilling material meets the approved quality criteria; or (b) if it is certified by a suitably qualified third party as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.

Waste 17	Records must be kept to demonstrate compliance with condition (Waste 15) and (Waste 16).

Noise Conditions

Condition Number	Condition
Noise 1	Notwithstanding condition (General 21), emission of noise from the petroleum activity(ies) at levels less than those specified in *Protecting acoustic values, Table 1—Noise nuisance limits* are not considered to be environmental nuisance.

Protecting acoustic values, Table 1—Noise nuisance limits

Time Period	Metric	Short term noise event	Medium term noise event	Long term noise event
7:00am-6:00pm	$L_{Aeq,adj,15\ min}$	45 dBA	43 dBA	40 dBA
6:00pm-10:00pm	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
10:00pm-6:00am	$L_{Aeq,adj,15\ min}$	28 dBA	28 dBA	28 dBA
	Max $L_{pA,\ 15mins}$	55 dBA	55 dBA	55 dBA
6:00am-7:00am	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
Drilling activities undertaken from 10:00pm-7:00am[2]	$L_{Aeq,adj,15\ min}$	28 dBA (measured indoors) 33 dBA (measured outdoors)		

[1] The noise limits in Protecting acoustic values, Table 1—Noise nuisance limits have been set based on the following deemed background noise levels (LABG):

7:00am—6:00pm: 35 dBA

6:00pm—10:00pm: 30 dBA

10:00pm—6:00am: 25 dBA

6:00am—7:00am: 30 dBA

[2] Drilling activities undertaken from 10:00pm – 7:00am must be temporary and mobile in nature, and must not contribute to long-term background noise creep.

Noise 2	If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in Protecting acoustic values, Table 2—Adjustments to be added to noise levels at sensitive receptors are to be added to the measured noise level(s) to derive $L_{Aeq,\ adj,\ 15\ min.}$

Protecting acoustic values, Table 2—Adjustments to be added to noise levels at sensitive receptors

Noise characteristic	Adjustment to noise
Tonal characteristic is just audible	+2 dBA

	Tonal characteristic is clearly audible	+5 dBA
	Impulsive characteristic is detectable	+2 to +5 dBA
Noise 3	Notwithstanding condition (Noise 1), emission of any low frequency noise must not exceed either (Noise 3(a)) and (Noise 3(b)), or (Noise 3(c)) and (Noise 3(d)) in the event of a valid complaint about low frequency noise being made to the administering authority: (a) 60 dB(C) measured outside the sensitive receptor; and (b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or (c) 50 dB(Z) measured inside the sensitive receptor; and (d) the difference between the internal A-weighted and Z-weighted ($\underline{\text{Max } L_{pZ,\ 15\ min}}$) noise levels is no greater than 15 dB.	
Air Conditions		
Condition Number	**Condition**	
Air 1	Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (Air 1(a)) and (Air 1(b)) and (Air 1(c)), or with (Air 1(d)): (a) an automatic ignition system is used, and (b) a flame is visible at all times while the waste gas is being flared, and (c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or (d) it uses an <u>enclosed flare</u>.	
Air 2	Other than as permitted within this environmental authority, odours or airborne contaminants must not cause environmental harm to any sensitive place.	
Air 3	Petroleum activities must not cause an exceedance of the following dust and particulate matter concentrations at any sensitive place: (a) dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 (or more recent editions), or (b) a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, when monitored in accordance with Australian Standard AS 3580.9.6 (or more recent editions) or any other method approved by the administering authority.	
Land Conditions		

Condition Number	Condition
Land 1	Contaminants must not be directly or indirectly released to land except for those releases authorised by condition Waste 3, Waste 4, Waste 8, Waste 11 and Waste 16.
Land 2	Top soil must be managed in a manner that preserves its biological and chemical properties.
Land 3	Land that has been significantly disturbed by the petroleum activities must be managed to ensure that mass movement, gully erosion, rill erosion, sheet erosion and tunnel erosion do not occur on that land.
Land 5	Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.
Land 6	Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the APGA Code of Practice for Upstream Polyethylene Gathering Networks in the Coal Seam Gas Industry (2019 or latest version).
Land 7	Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.
Land 8	Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.
Land 9	Backfilled, reinstated and revegetated pipeline trenches and right of ways must be: (a) a stable landform; (b) re-profiled to a level consistent with surrounding soils; (c) re-profiled to original contours and established drainage lines; and (d) vegetated with groundcover which is not a prohibited matter, restricted matter species or weed of national significance, and which is established and growing.
Biodiversity Conditions	
Condition Number	**Condition**
Biodiversity 1	Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground biodiversity values of the native vegetation communities at that location must be undertaken by a suitably qualified person.
Biodiversity 2	A suitably qualified person must develop and certify a methodology so that condition (Biodiversity 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.

<table>
<tr><td>Biodiversity 3</td><td>For conditions (Biodiversity 4) to (Biodiversity 9), where mapped biodiversity values differ from those confirmed under conditions (Biodiversity 1) and (Biodiversity 2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity value.</td></tr>
<tr><td>Biodiversity 4</td><td>The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles:
(a) maximise the use of areas of pre-existing disturbance;
(b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative; impacts, on areas of native vegetation or other areas of ecological value;
(c) minimise disturbance to land that may result in land degradation;
(d) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
(e) in order of preference, avoid then minimise clearing of native mature trees.</td></tr>
<tr><td>Biodiversity 5</td><td>Linear infrastructure corridors must:
(a) maximise co-location;
(b) be minimised in width to the greatest practicable extent; and
(c) for linear infrastructure that is an essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40m in total width.</td></tr>
<tr><td>Biodiversity 7</td><td>Despite condition (Biodiversity 8A), Extra Work Areas (EWAs) are authorised in areas clear of vegetation, including primary protection zone (PPZ) and secondary protection zone (SPZ).</td></tr>
<tr><td>Biodiversity 8A</td><td>Where petroleum activities are to be carried out in environmentally sensitive areas or their protection zones, the petroleum activities must be carried out in accordance with Protecting Biodiversity Values, Table 1— Authorised petroleum activities in environmentally sensitive areas and their protection zones.
Protecting Biodiversity Values, Table 1—Authorised petroleum activities in environmentally sensitive areas and their protection zones
<table>
<tr><th>Environmentally Sensitive Area</th><th>Within the Environmentally Sensitive Area</th><th>Primary protection zone of the Environmentally Sensitive Area</th><th>Secondary protection zone of the Environmentally Sensitive Area</th></tr>
</table></td></tr>
</table>

Category A environmentally sensitive areas	No petroleum activities permitted.	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.
Category B environmentally sensitive areas that are other than 'endangered' regional ecosystems	Only low impact petroleum activities permitted.	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.
Category B environmentally sensitive areas that are 'endangered' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	Only essential petroleum activities permitted.
Category C environmentally sensitive areas that are 'nature refuges' or 'koala habitat'	Only low impact petroleum activities permitted.	Only low impact petroleum activities permitted.	
Category C environmentally sensitive areas that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	
Category C environmentally sensitive areas that are 'regional parks' (previously known as 'resources reserves')	Only essential petroleum activities permitted.	Only essential petroleum activities permitted.	
Category C environmentally sensitive areas that are 'state forests' or 'timber reserves'	Only essential petroleum activities permitted.	Petroleum activities permitted.	
Areas of vegetation that are 'critically limited'	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	

Biodiversity 8B

Despite condition Biodiversity 8A, significant disturbance is authorised to be undertaken at the location and maximum extent of impact in *Protecting Biodiversity Values, Table 2—Authorised petroleum activities in environmentally sensitive areas and their protection zones.*

Protecting Biodiversity Values, Table 2—Authorised petroleum activities in environmentally sensitive areas and their protection zones

Environmentally Sensitive Area	Location of Impact	Maximum Disturbance (ha)
Category B environmentally sensitive areas that are 'endangered' regional ecosystems	PL253	0.79
Category C environmentally sensitive areas that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems	PL253	9.78
Category C environmentally sensitive area primary protection zones	PL253	2.08

Biodiversity 9

A report must be prepared for each annual return period for all petroleum activities that involved clearing of any environmentally sensitive area or protection zone which includes:

(a) records able to demonstrate compliance with conditions (Biodiversity 4), (Biodiversity 5), (Biodiversity 7) and (Biodiversity 8A and 8B);

(b) a description of the work;

(c) a description of the area and its pre-disturbance values (which may include maps or photographs, but must include GPS coordinates for the works); and

(d) based on the extent of environmentally sensitive areas and primary protection zones on the relevant resource authority(ies), the proportion of native vegetation cleared per environmentally sensitive area and primary protection zone, including regional ecosystem type, over the annual return period.

Biodiversity 10

Impacts to prescribed environmental matters are not authorised under this environmental authority or the *Environmental Offsets Act 2014* unless the impact(s) is specified in *Protecting biodiversity values, Table 3—Impacts to prescribed environmental matters.*

Protecting biodiversity values, Table 3—Impacts to prescribed environmental matters

Prescribed Environmental Matter	Location of impact	Maximum extent of impact (ha)	Significant Residual Impact and Offsets required

REGULATED VEGETATION			
Endangered regional ecosystem			
RE 11.4.3	PL253	0.75	Yes
Of concern regional ecosystem			
RE 11.3.4	PL253	0.58	Yes
Regional ecosystems (not within an urban area) within the defined distances from the defining banks of a relevant watercourse on the vegetation management watercourse map			
RE 11.3.25 (BVG 16a)	PL253	0.41	Yes
RE 11.5.1 (BVG 18b)	PL253	0.65	Yes
RE 11.3.4 (BVG 16c)	PL253	0.02	Yes
Essential habitat (not in an urban area) on the essential habitat map for endangered wildlife			
Phascolarctos cinereus (Koala)	PL253	0	No
Petaurus australis (Yellow-Bellied Glider - southern subspecies)	PL253	2.76	Yes
Philotheca sporadica (Kogan Waxflower)	PL253	8.37	No
Essential habitat (not in an urban area) on the essential habitat map for vulnerable wildlife			
Jalmenus eubulus (Pale Imperial Hairstreak)	PL253	0.23	Yes
CONNECTIVITY AREAS			
Connectivity area that is a regional ecosystem (not in an urban area)	PL253	0	No
PROTECTED WILDLIFE HABITAT			
An area shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife	PL253	In accordance with the protected plant clearing framework and relevant protected plant clearing permit under the *Nature Conservation Act 1992*	
An area not shown as a high risk area on the flora survey trigger map that contains plants that are endangered or vulnerable wildlife	PL253	In accordance with the protected plant clearing framework and relevant protected plant clearing permit under the *Nature Conservation Act 1992*	

	Habitat for an animal that is endangered wildlife			
	Hemiaspis damelii (Grey snake)	PL253	17.65	Yes
	Phascolarctos cinereus (Koala)	PL253	66.84	Yes
	Petauroides volans (Greater Glider)	PL253	40.37	Yes
	Habitat for an animal that is vulnerable wildlife			
	Acanthophis antarcticus (Common Death Adder)	PL253	40.65	Yes
	Calyptorhynchus lathami (Glossy Black Cockatoo)	PL253	3.92	Yes
	Jalmenus eubulus (Pale Imperial Hairstreak)	PL253	0.75	Yes
	Furina dunmalli (Dunmall's Snake)	PL253	39.42	Yes
	Nyctophilus corbeni (South-Eastern Long-Eared Bat)	PL253	39.44	Yes
	Habitat for an animal that is special least concern wildlife			
	Tachyglossus aculeatus (Echidna)	PL253	3.75	Yes
	WATERWAY PROVIDING FOR FISH PASSAGE			
	Fish passage (not in an urban area)	PL253 - Kogan Creek, Sixteen Mile Creek	0.15	No

Biodiversity 11	Records demonstrating that each impact to a prescribed environmental matter not listed in *Protecting biodiversity values, Table 3—Impacts to prescribed environmental matters* did not, or is not likely to, result in a significant residual impact to that matter must be: (a) completed by an appropriately qualified person; and (b) kept for the life of the environmental authority.
Biodiversity 12	An environmental offset made in accordance with the *Environmental Offsets Act 2014* and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in *Protecting biodiversity values, Table 3—Impacts to prescribed environmental matters*, unless a lesser extent of the impact has been approved in accordance with condition (Biodiversity 14).
Biodiversity 13	The impacts to a prescribed environmental matter authorised in condition (Biodiversity 10) for which an environmental offset is required by condition (Biodiversity 12) may be carried

	out in stages. An environmental offset can be delivered for each stage of the impacts to prescribed environmental matters.
Biodiversity 14	Prior to the commencement of each stage, a report completed by an appropriately qualified person, that includes an analysis of the following must be provided to the administering authority: (a) for the forthcoming stage—the estimated significant residual impacts to each prescribed environmental matter; and (b) for the previous stage, if applicable—the actual significant residual impacts to each prescribed environmental matter, to date.
Biodiversity 15	The report required by condition (Biodiversity 14) must be approved by the administering authority before a notice of election for the forthcoming stage, if applicable, is given to the administering authority.
Biodiversity 16	A notice of election for the staged environmental offset referred to in condition (Biodiversity 15), if applicable, must be provided to the administering authority no less than three months before the proposed commencement of that stage, unless a lesser timeframe has been agreed to by the administering authority.
Biodiversity 17	Within six months from the completion of the final stage of the project, a report completed by an appropriately qualified person, that includes the following matters must be provided to the administering authority: (a) an analysis of the actual impacts on prescribed environmental matters resulting from the final stage; and (b) if applicable, a notice of election to address any outstanding offset debits for the authorised impacts.
Water Conditions	
Condition Number	**Condition**
Water 1	Prior to the commencement of drilling for Stage 1 Activities the holder must: 1) In accordance with condition Water 12, obtain 12 months' worth of monitoring results for new groundwater monitoring wells required by condition Water 5; 2) Incorporate the results from condition Water 1(1) into the relevant groundwater model in condition Water 2; 3) An appropriately qualified hydrogeologist must prepare an interim review of the annual report in accordance with the requirements set out in condition Water 9 and submit it to the administering authority; and

	4) Develop a Groundwater Monitoring Plan (GMP) in accordance with the requirements set out in condition Water 2 and submit it to the administering authority.
Water 2	The GMP must be prepared by an appropriately qualified hydrogeologist and include, but not be limited to: 1) An assessment of the potential for the activity to impact on groundwater flow and pressure within the Springbok Sandstone and the Macalister coal seam (and its relevant aquifers) within the Walloon Coal Measures; 2) Site conceptual model of Lot 40 on DY85; 3) A groundwater model that targets aquifers on and in the vicinity of Lot 40 on DY85 including the Springbok Sandstone and the Macalister coal seam (and its relevant aquifers) of the Walloon Coal Measures that will measure and predict changes in contaminant movement, groundwater flow direction and drawdown; 4) A monitoring program for the early detection of any changes in groundwater pressure, groundwater level, bore gas pressure, groundwater flow direction, and groundwater quality in all aquifers monitored by groundwater monitoring bores included in *Water Conditions, Table 1 – Groundwater Monitoring Locations* and the section of the Walloon Coal Measure targeted for coal seam gas extraction; 5) Details (location, depth and aquifer) of all existing, replacement and proposed groundwater monitoring bores; and 6) Details of notification and investigation procedures in accordance with conditions Water 14 to Water 17.
Water 3	The site conceptualisation model in condition Water 2(2) must: 1) Characterise the residual contaminant source of Lot 40 on DY85 using: a. Information available on Lot 40 DY85 including existing wells both on and off Lot 40 DY85; and b. Information obtained under condition Water 5 and condition Water 7; 2) Identify mobilisation pathways and present the groundwater pressure and flow regime around Lot 40 on DY85; 3) Provide an analysis of how contaminants may migrate over time with and without Stage 1 Activities; 4) Provide uncertainties in conceptualisation resulting from formation heterogeneity, preferential pathways and structural influences; and 5) Assess the potential for long-term release of contaminants in the groundwater.
Water 4	The relevant groundwater model in condition Water 2(3) must: 1) Be calibrated annually (at a minimum) and updated with the data collected as part of the GMP required under condition Water 2(4) and the site conceptualisation model under condition Water 3 to inform the Annual Report under condition Water 9;

	2) Include a simulation period to at least the year 2200 that extends to beyond when groundwater levels are expected to have recovered in 2040 and contaminant transport off-site becomes possible; 3) Include a contaminant transport model that: a. uses the most recent water quality data for validation; and b. has dual porosity or permeability capability (fracture and matrix) to better represent transport into and out of dead pore volumes and fractures that might contain residual sources of contaminants; 4) Include a review and assessment of the density of particle tracking; 5) Include particle starting locations of: a. multiple particles per cell, both horizontally and vertically; b. multiple particles located on each edge of Lot 40 DY85; c. multiple particles on the northern edge of gasifier 5; d. multiple particles at each groundwater monitoring well location including HSMBS1-HSMBS4; 6) Assess the effect of particle tracking starting in wells that have exhibited elevated Underground Coal Gasification contaminants; 7) Assess particle tracks (travel times, distances and trajectories) to inform where to best install new groundwater monitoring wells required by condition Water 5 and condition Water 11; 8) Include a sensitivity analysis and uncertainty analysis; 9) Analyse the prior and posterior parameter distributions to provide insight into which parameters are constrained and which are not, and to compare the calibrated parameter set with the ensemble; 10) Provide correlation coefficients, standard error of estimate, 95% upper and lower limit for the parameters; a. Initial concentration of component species in water; b. Longitudinal dispersivity; c. Transverse dispersivity; d. Bulk density; e. Adsorption coefficient; f. Freundlich adsorption isotherm; g. First order decay coefficient in water and soil. 11) Describe impacts of the authorised activities relative to the Quantity of Interest; 12) Discuss the value of using non-reactive chemicals as tracers to improve solute transport calibration; 13) Discuss characterisation of the initial contamination source term; 14) Discuss how model parameter values near the gasifiers are influenced by observed potentiometric data and any bias in parameter estimates introduced by calibrating against recovery head observations without accounting for possible dual phase flow; 15) Resolve inconsistencies in the number of coal seam gas wells between the amended EA and groundwater modelling report; and 16) Resolve inconsistencies between modelled development scenarios and document assumptions and rationale to support the selected model simulation period.

Water 5	Within 12 months, 4 new groundwater monitoring wells must be drilled in the Springbok Sandstone at locations informed by particle tracking (travel times, distances and trajectories), and in the vicinity of: 1) south of HSMB1S; 2) east of HSMB2S; 3) west of HSMB4S; and 4) north of HSMB3S2.
Water 6	The wells under condition Water 5, are subject to the monitoring, reporting and investigations requirements in conditions Water 11 to Water 18 upon commissioning of each well.
Water 7	The wells under condition Water 5 must have core samples taken and an analysis completed for: 1) residual contamination; and 2) presence of condensates and other compounds that might release benzene over time.
Water 8	By 1 December of each year, an Annual Report prepared by an appropriately qualified hydrogeologist must be submitted to the administering authority.
Water 9	The Annual Report in condition Water 8 must: 1) Summarise and analyse all results from field testing, sampling and analysis data collected in accordance with condition Water 2(4), as well as graphical (groundwater contour plots) and tabulated presentation of the data to demonstrate data trends; 2) Discuss the methodology for sampling and reporting groundwater methane data and any potential impact on data analysis; 3) Assess both long-term and short-term data trends including but not limited to contaminant movement, groundwater flow direction and drawdown; 4) Summarise and analyse predicted impacts, including but not limited to excessive drawdown and likelihood of wells becoming dry as a result of groundwater drawdown; 5) Assess whether the requirements in conditions Water 2, Water 3 and Water 4 are being complied with; 6) Recommend improvements or changes to the program to ensure the GMP complies with condition Water 2, including: a. Submission of any amendments to the administering authority for review and comment; and b. Incorporating comments from the administering authority.

	7) Provide details of any recent impact assessments from the Arrow Full Field Development Plan scenarios showing the long-term impact on drawdown in the relevant region; and 8) Include the Peer Review Report in condition Water 10.
Water 10	The Annual Report in condition Water 8 must be peer reviewed by an independent suitably qualified expert who must: 1) Assess whether the findings in the Annual Report are accurate; 2) Assess whether the groundwater modelling undertaken complies with condition Water 2(3) and condition Water 4; 3) Recommend improvements or changes to the program to ensure the GMP complies with condition Water 2; and 4) Produce a report (the Peer Review Report) detailing the outcomes of the peer review.
Water 11	Any monitoring bores identified in Water conditions, *Table 1 – Groundwater Monitoring Locations* that are or predicted to be dewatered, plugged and abandoned or can no longer be accessed, must be either drilled/screened deeper or replaced within six (6) months of submission of the Annual Report each year.
Water 12	**Monitoring and reporting** All groundwater monitoring points identified in condition Water 2(4), must be monitored quarterly (at a minimum) at the locations listed in Water conditions, *Table 1 – Groundwater Monitoring Locations* and for the parameters and chemical groups identified in *Water Conditions, Table 2 – Groundwater Parameters* and *Water Conditions, Table 3 – Investigation Limits*.
Water 13	Prior to groundwater monitoring in accordance with condition Water 12, the well integrity of each bore must be monitored for the potential of fugitive gas emissions from the area immediately surrounding each monitoring bore.

Water conditions, Table 1 – Groundwater Monitoring Locations

Monitoring Bore	Coordinates		Target Formation	Depth (mbgl)
	Latitude	Longitude		
On-site Lot 40 DY85				
HSMB1S (RN 172597)	-26.92481589	150.68201871	Springbok Sandstone	123.5
HSMB1D (RN 172598)	-26.92516937	150.68211216	Macalister coal seam	162.1
HSMB2S (RN 172596)	-26.93190354	150.68223621	Springbok Sandstone	127.54
HSMB2D (RN 172604)	-26.9331186	150.68204019	Macalister coal seam	164.47
HSMB3S1 (RN 172600)	-26.9220583	150.67457499	Springbok Sandstone	133.46

HSMB3D1 (RN 172599)	-26.92219531	150.67577018	Macalister coal seam	148.25
HSMB3S2 (RN 172605)	-26.92177379	150.6715506	Springbok Sandstone	139.54
HSMB3D2 (RN 172601)	-26.9218484	150.6722437	Macalister coal seam	163.22
HSMB4S (RN 172595)	-26.92776613	150.66828637	Springbok Sandstone	124.39
HSMB4D (RN 172602)	-26.92659637	150.66849166	Macalister coal seam	156.34
HSMB5D (RN 172603)	-26.9319377	150.67116057	Macalister coal seam	162.3
NB01D	-26.9230946	150.6733920	Macalister coal seam	155.06
NB01S	-26.9229506	150.6734110	Springbok Sandstone	120.1
NB02D	-26.9238223	150.6710016	Macalister coal seam	139.4
NB02S	-26.9239661	150.6709690	Springbok Sandstone	120.9
HSMB6D2 (RN 180099)	-26.917717	150.671382	Macalister Coal Seam	187.0
HSMB6S (RN 180101)	-26.917535	150.671403	Springbok Sandstone	126.55
NB04D(S)	-26.92935598	150.676414437	Springbok Sandstone	167.4
NB05S	-26.9320806	150.6745252	Springbok Sandstone	123.4
Off-site Lot 40 DY85				
HSMB7D (RN 180100)	-26.931049	150.661133	Macalister coal seam	187.25
HSMB7S (RN 180102)	-26.931019	150.660937	Springbok Sandstone	128.75
Hopeland 20 (RN 180107)	-26.923571	150.699995	Macalister coal seam	115.3
Hopeland 21 (RN 180108	-26.923550	150.699838	Wambo Seam Package	148.36
Hopeland 22 (RN 108109)	-26.932776	150.668254	Springbok Sandstone Lower	104.03
Hopeland 23 (RN 180110)	-26.932756	150.668104	Macalister coal seam	148.71
Hopeland 24 (RN 180111)	-26.932735	150.667954	Wambo Seam Package	176.2
Hopeland 25 (RN 180112)	-26.925521	150.667447	Springbok Sandstone Lower	99.04
Hopeland 26 (RN 180113)	-26.925507	150.667296	Macalister coal seam	138.93
Hopeland 27 (RN 180114)	-26.925493	150.667145	Wambo Seam Package	162.83
Existing Landholder Bores				
RN 147004	-26.930542	150.708260	Springbok Sandstone	80.5
RN 160158	-26.944361	150.718290	Macalister coal seam	154.0

Water Conditions, Table 2 - Groundwater Parameters

Parameter	**Measurement / Analyte**
Groundwater level	Water level
Groundwater pressure	Water and gas pressure
	pH
	Electrical Conductivity (EC)

Physicochemical field parameters	Dissolved oxygen (DO)
	Temperature
	Oxidation Reduction Potential (ORP)
Inorganic parameters	Total Dissolved Solids (TDS)
	Major ions (Ca, Mg, Na, K, F, Cl, SO_4, alkalinity) and hardness (calculated)
	Ammonia
	Total cyanide, weak acid dissociable, cyanate and thiocyanate
Total and dissolved metals	Arsenic
	Barium
	Beryllium
	Boron
	Cadmium
	Chromium VI
	Chromium (total)
	Cobalt
	Copper
	Mercury
	Manganese
	Nickel
	Lead
	Lithium
	Selenium
	Vanadium
	Zinc
Dissolved gases	Methane
	Unionised hydrogen sulfide
Organic compounds	Total organic carbon (TOC)
	Total recoverable hydrocarbons (TRH)

Water Conditions, Table 3 – Investigation Limits

Chemical Group	Investigation Limits (mg/L)
Total Phenolic compounds	>Limit of Reporting (LOR)

Polynuclear aromatic hydrocarbons (PAHs) including Naphthalene	>LOR
Total recoverable hydrocarbons (TRH) (Silica Gel cleanup)	>LOR
Cyanide	0.08
Benzene	0.001
Toluene	0.8
Ethylbenzene	0.3
Xylene	0.6

Water 14	**Exceedance Investigation** If groundwater quality monitoring results exceed any of the investigation limits specified in *Water Conditions, Table 3 – Investigation Limits*, the holder must notify the administering authority within 48 hours of receiving the results and complete an investigation in accordance with condition Water 15.
Water 15	If required by conditions Water 14 or Water 18 of this environmental authority, the holder must: 1) Complete an investigation into the potential for environmental harm and provide a written report to the administering authority, outlining: a. Results and interpretation of any samples taken and analysed; b. An analysis of the trends in groundwater quality and groundwater contours, and the direction of groundwater flow; c. An analysis of the holder's contribution to changes in groundwater conditions; d. Outcomes of actions taken at the time to prevent or minimise environmental harm; and e. Proposed actions to prevent a recurrence of the exceedance.
Water 15A	The holder must provide the report required by condition Water 15 to the administering authority within 10 business days of either: (a) receiving the result, if the investigation is required by condition Water 14; or (b) receiving the request, if the investigation is required by condition Water 18.
Water 16	If an investigation in accordance with condition Water 15 for any of the parameters specified in *Water Conditions, Table 3 – Investigation Limits*, has been completed, a repeat exceedance investigation report in accordance with condition Water 15 is not required to be prepared within a twelve month period unless the change in the groundwater quality monitoring result is more than twice the value reported in the initial investigation.
Water 17	Production of water authorised by Stage 1 Activities must immediately cease if the report required in accordance with condition Water 15 fails to demonstrate that the activity is not impacting the migration of groundwater contaminants from Lot 40 DY85.

Water 17A	The holder must notify the administering authority within 24 hours of ceasing the production of water authorised by Stage 1 Activities as required by condition Water 17.
Water 18	**Other Investigations** The holder must undertake an investigation in accordance with condition Water 15 at the request of the administering authority.
Water 19	The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a wetland.
Water 20	Petroleum activities must not occur in or within 200m of a: (a) wetland of high ecological significance adjacent land use(s); (b) Great Artesian Basin Spring; (c) subterranean cave groundwater dependent ecosystem (GDE).
Water 21	Only construction or maintenance of linear infrastructure is permitted in or within any wetland of other environmental value or in a watercourse.
Water 22	The construction or maintenance of linear infrastructure in a wetland of other environmental value must not result in the: (a) clearing of riparian vegetation outside of the minimum area practicable to carry out the works; or (b) ingress of saline water into freshwater aquifers; or (c) draining or filling of the wetland beyond the minimum area practicable to carry out the works.
Water 23	After the construction or maintenance works for linear infrastructure in a wetland of other environmental value are completed, the linear infrastructure must not: (a) drain or fill the wetland; (b) prohibit the flow of surface water in or out of the wetland; (c) lower or raise the water table and hydrostatic pressure outside the bounds of natural variability that existed before the activities commenced; (d) result in ongoing negative impacts to water quality; (e) result in bank instability; or (f) result in fauna ceasing to use adjacent areas for habitat, feeding, roosting or nesting.
Water 24	The construction or maintenance of linear infrastructure activities in a watercourse must be conducted in the following preferential order: (a) firstly, in times where there is no water present;

<table>
<tr><td></td><td>(b) secondly, in times of no flow;
(c) thirdly, in times of flow, providing a bankfull situation is not expected and that flow is maintained.</td></tr>
<tr><td>Water 25</td><td>The construction or maintenance of linear infrastructure authorised under condition (Water 21) must comply with the water quality limits as specified in Protecting water values, Table 1—Release limits for construction or maintenance of linear infrastructure.
Protecting water values, Table 1—Release limits for construction or maintenance of linear infrastructure
<table>
<tr><th>Water quality parameters</th><th>Units</th><th>Water quality limits</th></tr>
<tr><td>Turbidity</td><td>Nephelometric Turbidity Units (NTU)</td><td>For a wetland of other environmental value, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within a 50m radius of the construction or maintenance activity.
For a watercourse, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within 50m downstream of the construction or maintenance activity.</td></tr>
<tr><td></td><td></td><td>For a wetland of other environmental value, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity.
For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.</td></tr>
<tr><td>Hydrocarbons</td><td>-</td><td>For a wetland of other environmental value, or watercourse, no visible sheen or slick.</td></tr>
</table></td></tr>
<tr><td>Water 26</td><td>Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition Water 25.</td></tr>
<tr><td>Water 27</td><td>Register of activities in wetlands and watercourses
A register must be kept of all linear infrastructure construction and maintenance activities in a wetland of other environmental value and watercourses, which must include:
(a) location of the activity (e.g. GPS coordinates (GDA94) and watercourse name);</td></tr>
</table>

	(b) estimated flow rate of surface water at the time of the activity; (c) duration of works, and (d) results of impact monitoring carried out under condition Water 26.
Water 28	A seepage monitoring program must be developed by a suitably qualified person which is commensurate with the site-specific risks of contaminant seepage from containment facilities, and which requires and plans for detection of any seepage of contaminants to groundwater as a result of storing contaminants.
Water 29	The seepage monitoring program required by condition Water 28 must include but not necessarily be limited to: (a) identification of the containment facilities for which seepage will be monitored; (b) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities; (c) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities; (d) installation of background seepage monitoring bores where groundwater quality will not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts; (e) installation of seepage monitoring bores that: (i) are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact); (ii) provide for the early detection of negative impacts prior to reaching groundwater dependent ecosystems, landholder's active groundwater bores, or water supply bores; (iii) provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations); (f) monitoring of groundwater at each background and seepage monitoring bore at least annually for the trigger parameters identified in condition Water 29(b); (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions Water 29(b) and Water 29(c) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination; (h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and (i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

Water 30	A bore drill log must be completed for each seepage monitoring bore in condition Water 29 which must include: (a) bore identification reference and geographical coordinate location; (b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details; (c) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible trigger parameters; (d) lithological data, preferably a stratigraphic interpretation to identify the important features including the identification of any aquifers; and (e) target formation of the bore.
Rehabilitation Conditions	
Condition Number	**Condition**
Rehabilitation 1	A Rehabilitation Plan must be developed by a suitably qualified person and must include the: (a) rehabilitation goals; and (b) procedures to be undertaken for rehabilitation that will: (i) achieve the requirements of conditions (Rehabilitation 2) to (Rehabilitation 8), inclusive; and (ii) provide for appropriate monitoring and maintenance.
Rehabilitation 2	Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria: (a) contaminated land resulting from petroleum activities is remediated and rehabilitated; (b) the areas are: (i) non-polluting; (ii) a stable landform; (iii) re-profiled to contours consistent with the surrounding landform; (c) surface drainage lines are re-established consistent with natural flow patterns and self-sustaining; (d) top soil is reinstated; and (e) either:

	(i) groundcover, that is not a prohibited matter, restricted matter species or weed of national significance, is growing; or (ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.
Rehabilitation 3	All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use: (a) greater than or equal to 70% of native ground cover species richness; (b) greater than or equal to the total per cent of ground cover; (c) less than or equal to the per cent species richness of prohibited matter, restricted matter species or weed of national significance; and (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.
Rehabilitation 4	Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre-disturbance biodiversity values assessment (required by conditions (Biodiversity 1) and (Biodiversity 2)) must be met: (a) greater than or equal to 70% of native ground cover species richness; (b) greater than or equal to the total per cent ground cover; (c) less than or equal to the per cent species richness of prohibited matter, restricted matter species or weed of national significance; (d) greater than or equal to 50% of organic litter cover; (e) greater than or equal to 50% of total density of coarse woody material; and (f) all predominant species in the ecologically dominant layer, that define the pre disturbance regional ecosystem(s) are present.
Rehabilitation 5	Conditions (Rehabilitation 2) and (Rehabilitation 3) continue to apply after this environmental authority has ended or ceased to have effect.
Rehabilitation 6	Where there is a dam (including a low consequence dam) that is being or intended to be utilised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Well Construction, Maintenance and Stimulation Activities Conditions	
Condition Number	**Condition**
Well activities 1	Oil based or synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).
Well activities 3	Practices and procedures must be in place to detect, as soon as practicable, any fractures that have or may result in the connection of a target formation and another aquifer as a result of drilling activities.
Well activities 4	Stimulation activities are not permitted.
Regulated Dam Conditions	
Condition Number	**Condition**
Dams 1	**Assessment of Consequence Category** The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) at the following times: (a) prior to the design and construction of the structure, if it is not an existing structure; or (b) prior to any change in its purpose or the nature of its stored contents.
Dams 2	A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
Dams 3	Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).*
Dams 4	**Operation of a regulated structure** For existing structures that are regulated structures: (a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and (b) there must be a current operational plan for the existing structures.

Dams 5	Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
Dams 6	**Mandatory reporting level** Conditions Dams 7 to Dams 8 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.
Dams 7	The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
Dams 8	The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
Dams 9	The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
Dams 10	The holder must record any changes to the MRL in the Register of Regulated Structures.
Dams 11	**Design storage allowance** The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
Dams 12	By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
Dams 13	The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
Dams 14	The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
Dams 15	**Annual inspection report** Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

Dams 16	At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.
Dams 17	The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).*
Dams 18	The holder must within 20 business days of receipt of the annual inspection report, provide to the administering authority: (a) The recommendations section of the annual inspection report; and (b) If applicable, any actions being taken in response to those recommendations; and (c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days of receipt of the request.
Dams 19	**Transfer arrangements** The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.
Dams 20	**Register of Regulated Structures** A Register of Regulated Structures must be established and maintained by the holder for each regulated structure.
Dams 21	The holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated dam is submitted to the administering authority.
Dams 22	The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with Dams 4 has been achieved.
Dams 23	The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.
Dams 24	All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.

<table>
<tr><td>Dams 25</td><td>The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.</td></tr>
<tr><td>Dams 26</td><td>Transitional arrangements

All existing structures that have not been assessed in accordance with either the Manual or the former Manual for Assessing Hazard Categories and Hydraulic Performance of Dams must be assessed and certified in accordance with the Manual within 6 months of amendment of the authority adopting this schedule.</td></tr>
<tr><td>Dams 27</td><td>All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in Table 1 (Transitional hydraulic performance requirements for existing structures), depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.</td></tr>
<tr><td>Dams 28</td><td>Table 1 ceases to apply for a structure once any of the following events has occurred:

(a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or

(b) it has been decommissioned; or

(c) it has been certified as no longer being assessed as a regulated structure.</td></tr>
<tr><td>Dams 29</td><td>Certification of the transitional assessment required by Dams 26 and Dams 27 (as applicable) must be provided to the administering authority within 6 months of amendment of the authority adopting this schedule.

Regulated Dam conditions, Table 1 – Transitional hydraulic performance requirements for existing structures

<table>
<tr><th colspan="4">Transition period required for existing structures to achieve the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</th></tr>
<tr><th>Compliance with criteria</th><th>High consequence</th><th>Significant consequence</th><th>Low consequence</th></tr>
<tr><td>>90% and a history of good compliance performance in last 5 years</td><td>No transition required</td><td>No transition required</td><td>No transitional conditions apply. Review consequence assessment every 7 years.</td></tr>
<tr><td>>70%-≤90%</td><td>Within 7 years, unless otherwise agreed with the administering authority, based on</td><td>Within 10 years, unless otherwise agreed with the administering authority, based on</td><td>No transitional conditions apply. Review consequence</td></tr>
</table>
</td></tr>
</table>

	no history of unauthorised releases.	no history of unauthorised releases.	assessment every 7 years.
>50-≤70%	Within 5 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Within 7 years, unless otherwise agreed with the administering authority, based on no history of unauthorised releases.	Review consequence assessment every 7 years.
≤50%	Within 5 years or as per compliance requirements (e.g. TEP timing).	Within 5 years or as per compliance requirements (e.g. TEP timing).	Review consequence assessment every 5 years.
Regulated levee designed to prevent the ingress of clean flood water <100% compliant[1]	Within 5 years, unless otherwise agreed with the administering authority.		

[1] Levees designed for the diversion of contaminated waters or protection of the structural integrity of a dam are not to be considered as part of this provision. These levees are considered a key design element of the relevant dam and transitional periods should as such align to that relevant compliance criteria and consequence category.

Definitions

Key terms and/or phrases used in this document are defined in this section. Where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Term	Definition
acid sulfate soil(s)	means a soil or soil horizon which contains sulfides or an acid soil horizon affected by oxidation of sulfides.
administering authority	means: (a) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the Environmental Protection Act 1994—the local government; or (b) for all other matters—the Chief Executive of the Department of Environment and Science; or

	(c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.
alternative arrangement	means a written agreement about the way in which a particular environmental nuisance impact will be dealt with at a sensitive place, and may include an agreed period of time for which the arrangement is in place. An alternative arrangement may include, but is not limited to, a range of nuisance abatement measures to be installed at the sensitive place, or provision of alternative accommodation for the duration of the relevant nuisance impact.
analogue site(s)	means an area of land which contains values and characteristics representative of an area to be rehabilitated prior to disturbance. Such values must encompass land use, topographic, soil, vegetation, vegetation community attributes and other ecological characteristics. Analogue sites can be the pre-disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.
annual inspection report	means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan); (a) against recommendations contained in previous annual inspections reports; (b) against recognised dam safety deficiency indicators; (c) for changes in circumstances potentially leading to a change in consequence category; (d) for conformance with the conditions of this authority; (e) for conformance with the 'as constructed' drawings; (f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); (g) for evidence of conformance with the current operational plan.
annual return period	means the 12 month period from 1 January to 31 December in a calendar year.
appraisal well	means a petroleum well to test the potential of one (1) or more natural underground reservoirs for producing or storing petroleum. For clarity, an appraisal well does not include an exploration well.
appropriately qualified person /	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment,

<table>
<tr><td>suitably qualified person</td><td>advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.</td></tr>
<tr><td>approved quality criteria</td><td>for the purposes of residual drilling materials, means the residual drilling material meets the following quality standards:

Part A In all cases:

<table>
<tr><th>Parameter</th><th>Maximum concentration</th></tr>
<tr><td>pH</td><td>6–10.5 (range)</td></tr>
<tr><td>Electrical Conductivity</td><td>20dS/m (20,000µS/cm)</td></tr>
<tr><td>Chloride*</td><td>8000mg/L</td></tr>
</table>
*Chloride analysis is only required if an additive containing chloride was used in the drilling process The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing.

Part B If any of the following metals are a component of the drilling fluids, then for that metal:

<table>
<tr><th>Parameter</th><th>Maximum concentration</th></tr>
<tr><td>Arsenic</td><td>20mg/kg</td></tr>
<tr><td>Selenium</td><td>5mg/kg</td></tr>
<tr><td>Boron</td><td>100mg/kg</td></tr>
<tr><td>Cadmium</td><td>3mg/kg</td></tr>
<tr><td>Chromium (total)</td><td>400mg/kg</td></tr>
<tr><td>Copper</td><td>100mg/kg</td></tr>
<tr><td>Lead</td><td>600mg/kg</td></tr>
</table>
The limits in Part B and Part C refer to the post soil/by-product mix.

Part C If a hydrocarbon sheen is visible, the following hydrocarbon fractions:

<table>
<tr><th>TPH</th><th>Maximum concentration</th></tr>
<tr><td>C6-C10</td><td>170mg/kg</td></tr>
<tr><td>C10-C16</td><td>150mg/kg</td></tr>
<tr><td>C16-C34</td><td>1300mg/kg</td></tr>
<tr><td>C34-C40</td><td>5600mg/kg</td></tr>
</table>
</td></tr>
</table>

	<table><tr><td>Total Polycyclic Aromatic Hydrocarbons (PAHs)</td><td>20mg/kg</td></tr><tr><td>Phenols (halogenated)</td><td>1mg/kg</td></tr><tr><td>Phenols (non-halogenated)</td><td>60mg/kg</td></tr><tr><td>Monocyclic aromatic hydrocarbons *(Total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para and meta xylenes) and styrene)*</td><td>7mg/kg</td></tr><tr><td>Benzene</td><td>1mg/kg</td></tr></table>
areas of pre-existing disturbance	means areas where environmental values have been negatively impacted as a result of anthropogenic activity and these impacts are still evident. Areas of pre-disturbance may include areas where legal clearing, logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or pest species are present which have inhibited re-colonisation of native regrowth, or where there is existing infrastructure (regardless of whether the infrastructure is associated with the authorised petroleum activities). The term 'areas of pre-disturbance' does not include areas that have been impacted by wildfire/s, controlled burning, flood or natural vegetation die-back.
assessed or assessment	by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment: (a) exactly what has been assessed and the precise nature of that determination; (b) the relevant legislative, regulatory and technical criteria on which the assessment has been based; (c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and (d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.
Australian Standard 3580	means any of the following publications or their subsequent replacements: ▪ AS3580.10.1 Methods for sampling and analysis of ambient air—Determination of particulate matter—Deposited matter—Gravimetric method. ▪ AS3580.9.6 Methods for sampling and analysis of ambient air—Determination of suspended particulate matter—PM10 high volume sampler with size-selective inlet—Gravimetric method

	▪ AS3580.9.9 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter— PM10 low volume sampler—Gravimetric sampler.
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90% of the measurement time period T of not less than 15 minutes (or $L_{A\ 90,\ adj,\ 15\ mins}$), using Fast response.
being or intended to be utilised by the landholder or overlapping tenure holder	for significantly disturbed land, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use of the land such that rehabilitation standards for revegetation by the holder of the environmental authority are not required. For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.
BTEX	means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.
Category A Environmentally Sensitive Area	has the meaning in the Environmental Protection Regulation 2019.
Category B Environmentally Sensitive Area	has the meaning in the Environmental Protection Regulation 2019.
Category C Environmentally Sensitive Area	means any of the following areas: ▪ nature refuges as defined in the conservation agreement for that refuge under the *Nature Conservation Act 1992* ▪ koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006 ▪ state forests or timber reserves as defined under the Forestry Act 1959 ▪ regional parks (previously known as resource reserves) under the *Nature Conservation Act 1992* ▪ an area validated as 'essential habitat' from ground-truthing surveys in accordance with the *Vegetation Management Act 1999* for a species of wildlife listed as endangered or vulnerable under the *Nature Conservation Act 1992*

	▪ 'of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.
certified or certification	in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams means, a Statutory Declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating: ▪ the person's qualifications and experience relevant to the function ▪ that the person has not knowingly included false, misleading or incomplete information in the document ▪ that the person has not knowingly failed to reveal any relevant information or document to the administering authority ▪ that the document addresses the relevant matters for the function and is factually correct; and ▪ that the opinions expressed in the document are honestly and reasonably held.
certification	in relation to regulated dam conditions means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).
clearing	has the meaning in the dictionary of the *Vegetation Management Act 1999* and for vegetation— (a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but (b) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
consequence category	means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).*
control measure	has the meaning in section 32 of the Environmental Protection Regulation 2019 and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.

coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.
dam(s)	means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the Environmental Protection Regulation 2019 as the higher equivalent person (EP) for the works calculated using each of the formulae found in the definition for EP.
design storage allowance or DSA	means an available volume, estimated in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933)*, published by the administering authority, as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.
document	has the meaning in the *Acts Interpretation Act 1954* and means: ▪ any paper or other material on which there is writing; and ▪ any paper or other material on which there are marks; and ▪ figures, symbols or perforations having a meaning for a person qualified to interpret them; and ▪ any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).
enclosed flare	means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.
environmental harm	has the meaning in section 14 of the *Environmental Protection Act 1994* and means any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance. Environmental harm may be caused by an activity— (a) whether the harm is a direct or indirect result of the activity; or (b) whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.

environmental nuisance	has the meaning in section 15 of the *Environmental Protection Act 1994* and means unreasonable interference or likely interference with an environmental value caused by— (a) aerosols, fumes, light, noise, odour, particles or smoke; or (b) an unhealthy, offensive or unsightly condition because of contamination; or (c) another way prescribed by regulation.
environmentally sensitive area	means Category A, B or C environmentally sensitive areas (ESAs)
equivalent person or EP	has the meaning under section 3 of the Planning Guidelines for Water Supply and Sewerage, 2005, published by the Queensland Government. It is calculated in accordance with Schedule 2, Section 63 of the Environmental Protection Regulation 2019 where: ▪ EP = V/200 where V is the volume, in litres, of the average dry weather flow of sewage that can be treated at the works in a day; or ▪ EP = M/2.5 where M is the mass, in grams, of phosphorus in the influent that the works are designed to treat as the inlet load in a day.
essential petroleum activities	means activities that are essential to bringing the resource to the surface and are only the following: ▪ low impact petroleum activities ▪ geophysical, geotechnical, geological, topographic and cadastral surveys (including seismic, sample /test / geotechnical pits, core holes) ▪ single well sites not exceeding 1 hectare disturbance and multi-well sites not exceeding 1.5 hectare disturbance ▪ well sites with monitoring equipment (including monitoring bores): o for single well sites, not exceeding 1.25 hectares disturbance o for multi-well sites, not exceeding 1.75 hectares disturbance ▪ well sites with monitoring equipment (including monitoring bores) and tanks (minimum 1 ML) for above ground fluid storage: o for single well sites, not exceeding 1.5 hectares disturbance o for multi-well sites, not exceeding 2.0 hectares disturbance ▪ well sites with slope considerations (>2% slope) for cut and fill earthworks and drainage: o for single well sites, not exceeding 1.5 hectares disturbance o for multi-well sites, not exceeding 2.5 hectares disturbance

	▪ well sites including a communications tower: o for single well sites, not exceeding 1.5 hectares disturbance o for multi-well sites, not exceeding 3.0 hectares disturbance ▪ on site disposal of residual drilling material as per condition (Waste 16) ▪ communications towers, not exceeding 1.0 hectares disturbance. ▪ associated infrastructure located on a well site necessary for the construction and operations of wells: o water pumps and generators o flares o flare pits o chemical / fuel storages o sumps for residual drilling material and drilling fluids o tanks, or dams which are not significant or high consequence dams to contain wastewater (e.g. stimulation flow back waters, produced water) o pipe laydown areas o soil and vegetation stockpile areas o a temporary camp associated with a drilling rig that may involve sewage treatment works that are no release works o temporary administration sites and warehouses o dust suppression activities using water that meets the quality and operational standards approved under the environmental authority ▪ communication and power lines that are necessary for the undertaking of petroleum activities and that are located within well sites, well pads and pipeline right of ways without increasing the disturbance area of petroleum activities ▪ supporting access tracks ▪ gathering / flow pipelines from a well head to, or between, any one or more of the following: o initial compression facility o water storage facility o the initial compression facility and/or to, or between, o water storage facilities

	▪ activities necessary to achieve compliance with the conditions of the environmental authority in relation to another essential petroleum activity (e.g. sediment and erosion control measures, and rehabilitation).
exploration well	means a petroleum well that is drilled to: ▪ explore for the presence of petroleum or natural underground reservoirs suitable for storing petroleum; or ▪ obtain stratigraphic information for the purpose of exploring for petroleum. For clarity, an exploration well does not include an appraisal or development well.
flare pit	has the meaning in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635) and means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.
flare precipitant	means waste fluids which result from the operation of a flare.
flowable substance	means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.
GDA	means Geocentric Datum of Australia.
Great Artesian Basin (GAB) spring	means an area protected under the *Environment Protection and Biodiversity Conservation Act 1999* because it is considered to be a Matter of National Environmental Significance and identified as a: ▪ community of native species dependent on natural discharge of groundwater from the Great Artesian Basin; or ▪ Great Artesian Basin spring; or ▪ Great Artesian Basin discharge spring wetland. A GAB spring includes a spring vent, spring complex or watercourse spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows. *Note: The Australian Government's Protected Matters Search Tool should be used to get an indication of whether the area of interest may contain an MNES spring.* *Note: The GAB springs dataset can be requested from the Queensland Government Herbarium*

green waste	means waste that is grass cuttings, trees, bushes, shrubs, material lopped from trees, untreated timber or other waste that is similar in nature but does not include prohibited matter, restricted matter species or weeds of national significance.
Groundwater dependent ecosystem (GDE)	means ecosystems which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as "unknown".
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.
holder	means: (a) where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or (b) where this document is a development approval, any person who is the registered operator for that development approval.
hydraulic integrity	refers to the capacity of a dam to contain or safely pass flowable substances based on its design.
impulsive (for noise)	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
incidental activity	for this environmental authority means an activity that is not a specified relevant activity and is necessary to carry out the activities listed in *General, Table 1 – Authorised Petroleum Activities.*
Independent suitably qualified expert	means a person with: (a) at least a post graduate degree (or equivalent) in a suitable are such as hydrology or hydrogeology; (b) a minimum of 10 years relevant experience in water resource assessment; and (c) who is independent of the appropriately qualified hydrogeologist in condition Water 2 and the holder.
$L_{A\ 90,\ adj,\ 15\ mins}$	means the A-weighted sound pressure level, adjusted for tonal character that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response.

$L_{Aeq, adj, 15 mins}$	means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within any 15 minute period has the same square sound pressure as a sound level that varies with time.
linear infrastructure	means powerlines, pipelines, flowlines, roads and access tracks.
liquid	means a substance which is flowing and offers no permanent resistance to changes of shape.
long term noise event	means a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not classified as high or significant as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, published by the administering authority, as amended from time to time.
low impact petroleum activities	means petroleum activities which do not result in the clearing of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in significant disturbance to land which cannot be rehabilitated immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test pits), topographic surveys, cadastral surveys and ecological surveys, may include installation of monitoring equipment provided that it is within the meaning of low impact and traversing land by car or foot via existing access tracks or routes or in such a way that does not result in permanent damage to vegetation.
Mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)* published by the administering authority.
Max $L_{pA, 15 min}$	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
Max $L_{pZ, 15 min}$	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
maximum extent of impact	means the total, cumulative, residual extent and duration of impact to a prescribed environmental matter that will occur over a project's life after all reasonable avoidance and reasonable on-site mitigation measures have been, or will be, undertaken.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is

	observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
methodology	means the science of method, especially dealing with the logical principles underlying the organisation of the various special sciences, and the conduct of scientific inquiry.
month	has the meaning in the Acts Interpretation Act 1954 and means a calendar month and is a period starting at the beginning of any day of one (1) of the 12 named months and ending— ▪ immediately before the beginning of the corresponding day of the next named month; or ▪ if there is no such corresponding day—at the end of the next named month.
NATA accreditation	means accreditation by the National Association of Testing Authorities Australia.
prescribed environmental matters	has the meaning in section 10 of the *Environmental Offsets Act 2014*, limited to the matters of State environmental significant listed in schedule 2 of the Environmental Offsets Regulation 2014.
pre-disturbed land use	means the function or use of the land as documented prior to significant disturbance occurring at that location.
prescribed water contaminants	has the meaning in section 440ZD of the *Environmental Protection Act 1994* and means: (a) earth (meaning sand, soil, silt or mud); or (b) a contaminant prescribed under section 440ZF of the *Environmental Protection Act 1994.*
primary protection zone	means an area within 200m from the boundary of any Category A, B or C ESA.
produced water	has the meaning in Section 15A of the *Petroleum and Gas (Production and Safety) Act 2004* and means CSG water or associated water for a petroleum tenure.
prohibited matter	has the meaning in section 19 of the *Biosecurity Act 2014.*
protection zone	means the primary protection zone of any Category A, B or C ESA or the secondary protection zone of any Category A or B ESA.
Quantity of Interest	The Quantity of Interest is the Arrow Energy incremental impact in the simulated particle track output of the groundwater model required by condition Water 2.
restricted matter	has the meaning in section 21 of the *Biosecurity Act 2014.*
regional ecosystem	has the meaning in the *Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 7, December*

	2023) and means a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil. Regional ecosystems of Queensland were originally described in Sattler and Williams (1999). The Regional Ecosystem Description Database (Queensland Herbarium 2013) is maintained by Queensland Herbarium and contains the current descriptions of regional ecosystems.
Register of regulated structures	includes: (a) Date of entry in the register; (b) Name of the structure, its purpose and intended/actual contents; (c) The consequence category of the dam as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933); (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam; (e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings; (f) For the regulated dam, other than in relation to any levees – (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam; (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area (iii) Dam crest volume (megalitres); (iv) Spillway crest level (metres AHD). (v) Maximum operating level (metres AHD); (vi) Storage rating table of stored volume versus level (metres AHD); (vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD); (viii) Mandatory reporting level (metres AHD); (g) The design plan title and reference relevant to the dam; (h) The date construction was certified as compliant with the design plan; (i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan; (j) Details of the composition and construction of any liner;

	(k) The system for the detection of any leakage through the floor and sides of the dam; (l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year; (m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority; (n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.
regulated dam	means any dam in the significant or high consequence category as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), published by the administering authority, as amended from time to time.
regulated structure	means any structure in the significant or high consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority. A regulated structure does not include: ▪ a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container; ▪ a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities ▪ a flare pit.
rehabilitation or rehabilitated	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration.
reinstate or reinstatement	for steel pipelines, means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface typography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines (2013).
reporting limit	means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as “less than” the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and,

	depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L–0.02 ug/L.
residual drilling material	means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.
restoration	means the replacement of structural habitat complexity, ecosystem processes, services and function from a disturbed or degraded site to that of a pre-determined or analogue site. For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.
revegetation or revegetating or revegetate	means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.
secondary treated class A standards	means treated sewage effluent or greywater which meets the following standards: ▪ total phosphorous as P, maximum 20mg/L ▪ total nitrogen as N, maximum 30mg/L ▪ 5-day biochemical oxygen demand (inhibited) (e.g. release pipe from sewage treatment plant), maximum 20mg/L ▪ suspended solids, maximum 30mg/L ▪ pH, range 6.0 to 8.5 ▪ e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 100cfu per 100mL, maximum 1000cfu per 100mL.
secondary treated class B standards	means treated sewage effluent or greywater which meets the following standards: ▪ total phosphorous as P, maximum 20mg/L ▪ total nitrogen as N, maximum 30mg/L ▪ 5-day biochemical oxygen demand (inhibited) (e.g. release pipe from sewage treatment plant), maximum 20mg/L ▪ suspended solids, maximum 30mg/L ▪ pH, range 6.0 to 8.5 ▪ e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 1000cfu per 100mL, maximum 10 000cfu per 100mL.
secondary treated class C standards	means treated sewage effluent or greywater which meets the following standards: ▪ total phosphorous as P, maximum 20mg/L ▪ total nitrogen as N, maximum 30mg/L

	▪ 5-day biochemical oxygen demand (inhibited) (e.g. Release pipe from sewage treatment plant), maximum 20mg/L ▪ suspended solids, maximum 30mg/L ▪ pH, range 6.0 to 8.5 ▪ e-Coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 10 000cfu per 100mL, maximum 100 000cfu per 100mL.
sensitive place	means: ▪ a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel) ▪ a library, childcare centre, kindergarten, school, university or other educational institution ▪ a medical centre, surgery or hospital ▪ a protected area ▪ a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment ▪ a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads ▪ for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2019.
sensitive receptor	is defined in Schedule 2 of the Environmental Protection (Noise) Policy 2019, and means an area or place where noise is measured.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven (7) days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significant residual impact	has the meaning in section 8 *Environmental Offsets Act 2014.*
significantly disturbed or significant disturbance or significant disturbance to land or areas	means Land is *significantly disturbed if*– (a) it is contaminated land; or (b) it has been disturbed and human intervention is needed to rehabilitate it– (i) to a condition required under the relevant environmental authority; or

	(ii) if the environmental authority does not require the land to be rehabilitated to a particular condition–to the condition it was in immediately before the disturbance. Without limiting subsection (1)(b), land requires human intervention to rehabilitate it if– (a) the disturbance has made the land more susceptible to erosion; or (b) the land use capability or suitability of the land is diminished; or (c) the quality of water in a watercourse downstream of the land has been significantly reduced.
species richness	means the number of different species in a given area.
stable	means the rehabilitation and restoration of the site is enduring or permanent so that the site is unlikely to collapse, erode or subside.
Stage 1 activities	includes up to an additional 55 coal seam gas wells approved and with the required statutory authorisations to address the actions required for this environmental authority to take effect.
statement of compliance	for a condition in an environmental authority has the meaning in section 208 of the *Environmental Protection Act 1994* and is a condition that requires the holder to give the administering authority a statement of compliance about a document or work relating to a relevant activity. The condition must also state— (a) the criteria (the compliance criteria) the document or work must comply with; and (b) that the statement of compliance must state whether the document or work complies with the compliance criteria; and (c) the information (the supporting information) that must be provided to the administering authority to demonstrate compliance with the compliance criteria; and (d) when the statement of compliance and supporting information must be given to the administering authority.
stimulation	means a technique used to increase the permeability of natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. It includes hydraulic fracturing / hydrofraccing, fracture acidizing and the use of proppant treatments. **Explanatory note:** This definition is restricted from that in the *Petroleum and Gas (Production and Safety) Act 2004* in order to only capture the types of stimulation activities that pose a risk to environmental values of water quality in aquifers.
structure	means a dam or levee.

subterranean cave GDE	▪ means an area identified as a subterranean cave in the mapping produced by the Queensland Government and identified in the Queensland Government Information System, as amended from time to time; and ▪ means a cave ecosystem which requires access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain its communities of plants and animals, ecological processes and ecosystem services. Subterranean cave GDEs are caves dependent on the subterranean presence of groundwater. Subterranean cave GDEs have some degree of groundwater connectivity and are indicated by either high moisture levels or the presence of stygofauna, or both, referred to in the Queensland Government WetlandsInfo mapping program, as amended from time to time. *Note: the Subterranean GDE (caves) dataset can be displayed through the Queensland Government WetlandInfo mapping program.* *Note: the Subterranean GDE (caves) dataset can be obtained from the Queensland Government Information System.*
suitably qualified and experienced person	in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 2002, and has demonstrated competency and relevant experience: ▪ for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design ▪ for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. *Note:* It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.
suitably qualified person	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.
suitably qualified third party	means a person who: (a) has qualifications and experience relevant to performing the function including but not limited to: (i) a bachelor's degree in science or engineering; and (ii) 3 years' experience in undertaking soil contamination assessments; and (b) is a member of at least one organisation prescribed in Schedule 14 of the Environmental Protection Regulation 2019; and

	(c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.
sump	means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.
top soil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
valid complaint	means all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.
waste and resource management hierarchy	has the meaning provided in section 9 of the Waste Reduction and Recycling Act 2011 and is the following precepts, listed in the preferred order in which waste and resource management options should be considered— (a) AVOID unnecessary resource consumption (b) REDUCE waste generation and disposal (c) RE-USE waste resources without further manufacturing (d) RECYCLE waste resources to make the same or different products (e) RECOVER waste resources, including the recovery of energy (f) TREAT waste before disposal, including reducing the hazardous nature of waste (g) DISPOSE of waste only if there is no viable alternative.
waste and resource management principles	has the meaning provided in section 4(2)(b) of the *Waste Reduction and Recycling Act 2011* and means the: (a) polluter pays principle (b) user pays principle (c) proximity principle (d) product stewardship principle.
waste fluids	has the meaning in section 13 of the *Environmental Protection Act 1994* in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.

watercourse	has the meaning in Schedule 4 of the *Environmental Protection Act 1994* and means: 1) a river, creek or stream in which water flows permanently or intermittently— a. in a natural channel, whether artificially improved or not; or b. in an artificial channel that has changed the course of the watercourse. 2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.
weeds of national significance	includes the weeds declared in Appendix B of the Australian Weeds Strategy 2017–2027.
well integrity	the ability of a well to contain the substances flowing through it.
wetland	for the purpose of this environmental authority, wetland means an area shown as a wetland on the map of Queensland Wetland Environmental Values. *Note: The Environmental Protection (Water and Wetland Biodiversity) Policy 2019 Schedule 2, Map of Queensland Wetland Environmental Values means the document 'Map of Queensland Wetland Environmental Values' made by the Chief Executive and published on the website.* *Environmental values in section 8 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 apply to wetland areas on the map, which are categorised as wetlands of high or general ecological significance.*
wetland of high ecological significance	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'high ecological significance' or wetland of 'high ecological value' on the Map of referable wetlands.
wetland of other environmental value	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'general environmental significance' or wetland of 'other environmental value' on the Map of referable wetlands.

END OF ENVIRONMENTAL AUTHORITY

Attexo

Appendix C

LoOM species habitat criteria

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Secluded small lagoons / wetlands not associated with any particular Regional Ecosystem.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Large Gilgai wetland with surrounding terrestrial vegetation, aquatic flora and shallow water.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Shallow water in the broad by-wash of large farm dams where there is aquatic vegetation and nearby adjacent terrestrial vegetation.	Permanent shallow water or water of varying depths.	Permanent shallow water or water of varying depths.	Permanent shallow water or water of varying depths.	Not Mapped as Essential Habitat (No)			Likely
		Shallow permanent water in the flood out zones of major streams or "anabranches' of smaller streams where there is still water, sedges, aquatic vegetation and dense ground cover. Mostly associated with open pasture areas surrounded by mature vegetation.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Wetlands, marshes and swamps associated with water of varying depths, aquatic vegetation and Melaleuca specie (paperbark trees).							Needs More Info
		Brackish Melaleuca wetlands and swamps in coastal dune swales.							N/A
		Not in listed vegetation types							Yes
									No
Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Brigalow Scrub with semi evergreen vine thicket (SEVT) understory and dense leaf litter ground cover and emergent bottletrees.	Dense ground covering of leaf litter and fine debris.	Dense ground covering of leaf litter and fine debris.	Dense ground covering of leaf litter and fine debris.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	SEVT/Acacia sp. with a canopy height of 4-6 metres, dense shrub layer and no ground cover. Ground cover typically covered with dense layer of leaves and fine debris.	Brigalow with SEVT understory, SEVT and/or microphyll vine forest.	Brigalow with SEVT understory, SEVT and/or microphyll vine forest.	Brigalow with SEVT understory, SEVT and/or microphyll vine forest.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Araucarian vine forest with a canopy height of 25+m, dense mid stratum and understory with very little ground cover except for leaf litter and woody debris.	Dense low thicket of Acacia or woodland species with 80-100% canopy cover and dense understory.	Dense low thicket of Acacia or woodland species with 80-100% canopy cover and dense understory.	Dense low thicket of Acacia or woodland species with 80-100% canopy cover and dense understory.	Not Mapped as Essential Habitat (No)			Likely
		Coastal SEVT with a dense understory and a deep covering of leaf litter. Will not occur west of the divide and highly unlikely to occur in the gas fields.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Simple notophyll vine forest with a dense understory and a deep covering of leaf litter. Occurs as small pockets of unmapped vegetation in gullies on western side of ranges.							
		Coastal rainforest with a dense understory and a deep covering of leaf litter. May occur as small pockets of unmapped vegetation in gullies on eastern side of ranges.							
		Not in listed vegetation types							
Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah.	Timbered watercourses with Casuarina spp. associated with permanent water.	Timbered watercourses with Casuarina spp. associated with permanent water.	Timbered watercourses with Casuarina spp. associated with permanent water.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river she-oak or Casuarina species.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Nesting habitat, specifically trees with large nesting hollows with entrances >/= 150mm.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypts on rocky jump up and scarps with hollows trees and Casuarina species.	Isolated medium to large belah trees containing cones	Isolated medium to large belah trees containing cones	Isolated medium to large belah trees containing cones				Known
		Mixed Eucalypt / Oak woodland with hollow trees and feed trees.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				
		Bull-oak Woodland.							
		Cleared country with scattered belah trees							
		Not in listed vegetation types							
Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Intact open Acacia scrub, Eucalypt and Callitris communities.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Dry Eucalypt woodlands of ironbark, spotted gum or species with flaking bark.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Eucalypt woodland of poplar box.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Not Mapped as Essential Habitat (No)			Likely

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Lancewood scrub on ridges with dense woody debris and flaking bark. Brigalow melon-hole country with woody debris, soil cracks and water. Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Open forest.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Riverine woodlands.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Dry sclerophyll low woodland.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Not Mapped as Essential Habitat (No)			Likely
		Brigalow with woody debris, soil cracks and water. Woodland, open forests and riverine equivalence in close proximity to water bodies in cleared country. Cleared land with good-quality melon holes Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Primary feed trees, being *E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada* and *E. tereticornis ssp. tereticornis* represent the **dominant** canopy species within the vegetation community.	Primary feed trees, being *E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada* and *E. tereticornis ssp. tereticornis* represent the **dominant** canopy species within the vegetation community.	Primary feed trees, being *E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada* and *E. tereticornis ssp. tereticornis* represent the **dominant** canopy species within the vegetation community.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypt woodlands on low ranges and undulating country with mixed Eucalypts.	Secondary feed trees, being *E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon* represent the **dominant** canopy species within the vegetation community.	Secondary feed trees, being *E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon* represent the **dominant** canopy species within the vegetation community.	Secondary feed trees, being *E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon* represent the **dominant** canopy species within the vegetation community.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypts on alluvial soils in close proximity to water. Cleared land on fertile soil with scattered koala primary food trees Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Eucalypt woodlands on watercourses with sandstone ledges and caves in close proximity.	Sandstone/volcanic, rocky outcrops or the interface of a sandstone escarpment and fertile valleys with crevices, caves and overhangs on land zones 7, 9 and 10.	Sandstone/volcanic, rocky outcrops or the interface of a sandstone escarpment and fertile valleys with crevices, caves and overhangs on land zones 7, 9 and 10.	Sandstone/volcanic, rocky outcrops or the interface of a sandstone escarpment and fertile valleys with crevices, caves and overhangs on land zones 7, 9 and 10.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Dry open Eucalypt woodland with bull-oa and cypress on rocky jump-ups / scarps.	Erosion gullies with vertical banks containing crevices, ledges and tree hollows associated with land zone 3 and 5.	Erosion gullies with vertical banks containing crevices, ledges and tree hollows associated with land zone 3 and 5.	Erosion gullies with vertical banks containing crevices, ledges and tree hollows associated with land zone 3 and 5.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Semi evergreen vine thicket with Brigalow canopy on surface rock or sandstone interface.	Intact Eucalypt, SEVT and Acacia dominated communities with good structural representation <3kms from roosting structures listed in the other two attributes.	Intact Eucalypt, SEVT and Acacia dominated communities with good structural representation <3kms from roosting structures listed in the other two attributes.	Intact Eucalypt, SEVT and Acacia dominated communities with good structural representation <3kms from roosting structures listed in the other two attributes.	Not Mapped as Essential Habitat (No)			Likely
		Bendee or lancewood scrub, dry, open forest in land zone 5, 7 and 10 or where softer country transitions to scarps, jump-ups and rock ledges. Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Northern Quoll	Occur as far south as Gracemere and Mt Morgan, south of Rockhampton, as far north as Weipa in Queensland and extends as far west into CQ to the vicinity of Carnarvon Range NP. Occasional records as far south in QLD as Maleny on the Sunshine Coast Hinterland.	Rocky escarpments' with formations of large rocks and crevices on land zone 10 (horizontally bedded plateaus, ledges an scarps).	Rocky sandstone escarpments, rocky outcrops, caves and crevices.	Rocky sandstone escarpments, rocky outcrops, caves and crevices.	Rocky sandstone escarpments, rocky outcrops, caves and crevices.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Steep rocky slopes with large boulders, large mature eucalypts, hollow trees and large woody debris on land zones 10 and 9. Farms, dams or permanent water is usually nearby.	Moderately dense diverse vegetation with a range of eucalypts, tree hollows, large woody debris.	Moderately dense diverse vegetation with a range of eucalypts, tree hollows, large woody debris.	Moderately dense diverse vegetation with a range of eucalypts, tree hollows, large woody debris.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Ironstone jump-ups and sandy soils over duri-crusts with small caves & eucalypts with moderate dense vegetation. Often in close proximity to farm dams and caged chickens.	Permanent water, large pools and associated sand flats with diverse range of micro-habitat for insects, small birds, rodents and small mammals.	Permanent water, large pools and associated sand flats with diverse range of micro-habitat for insects, small birds, rodents and small mammals.	Permanent water, large pools and associated sand flats with diverse range of micro-habitat for insects, small birds, rodents and small mammals.	Not Mapped as Essential Habitat (No)			Likely
		Sandstone plateaus, escarpments and ledges with nearby permanent watercourses and eucalypt woodlands associated with land zones 3 (alluvial) and 9 (sandstone) where they occur together.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Rocky and isolated gorge country with vertical gullies, dense undisturbed eucalypt vegetation and pools of water with a diversity of wildlife.							
		Sandstone escarpment and steep rocky gorges with large body of permanent water and deposited alluvial sands with diverse vegetation.							
		Not in listed vegetation types							
Ornamental Snake	Occurs in central eastern Queensland in the Dawson and Bowen Basins. Generally restricted to heavy black soil habitat where it shelters under litter and fallen timber during the day. This includes Brigalow communities with Gilgai formations and altered and degraded habitat.	Degraded Brigalow habitat on cracking clay black/brown soils and Gilgai usually associated with Land zones 3 and 4.	Seasonally flooded gilgais on degraded grazing lands with heavy black cracking clay soils.	Seasonally flooded Gilgais on degraded grazing lands with heavy black cracking clay soils.	Seasonally flooded Gilgais on degraded grazing lands with heavy black cracking clay soils.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Flooded Gilgai/low lying habitats on cracking clays in association with aquatic vegetation, regrowth Brigalow and frog breeding habitat.	Scattered regrowth brigalow on low-lying plains, no obvious water with fallen wood material, leaf litter, evidence of previous aquatic vegetation and black/brown cracking clays.	Scattered regrowth brigalow on low-lying plains, no obvious water with fallen wood material, leaf litter, evidence of previous aquatic vegetation and black/brown cracking clays.	Scattered regrowth brigalow on low-lying plains, no obvious water with fallen wood material, leaf litter, evidence of previous aquatic vegetation and black/brown cracking clays.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Brigalow with woody debris, sparse tussock grasses, low shrubs, leaf litter, soil cracks, pools of water, frog habitat and woody debris.	Remnant brigalow on black/brown cracking clays with soil cracks, woody debris, evidence of aquatic vegetation, seasonally flooded gilgai and obvious fro habitat.	Remnant brigalow on black/brown cracking clays with soil cracks, woody debris, evidence of aquatic vegetation, seasonally flooded gilgai and obvious fro habitat.	Remnant brigalow on black/brown cracking clays with soil cracks, woody debris, evidence of aquatic vegetation, seasonally flooded gilgai and obvious fro habitat.	Not Mapped as Essential Habitat (No)			Likely
		Degraded pasture with minimal vegetation where there are numerous seasonally flooded Gilgai with low aquati vegetation on black/brown cracking clays.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Swamps, wetlands, seasonally flooded lowlands and riparian areas with black/brown cracking clays, Brigalow and aquatic vegetation.							
		Not in listed vegetation types							
Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Brigalow open forest with a low-moderately dense tree mid-story of SEVT species on gently undulating clay and/or weathered basalt plains with much surface gravel.	Colonies of small black ants (Iridomyrme species) present.	Colonies of small black ants (Iridomyrme species) present.	Colonies of small black ants (Iridomyrme species) present.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Roadside strips of Brigalow/Belah.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Brigalow open woodland on alluvial plain with low tree layer of wilga and false sandalwood.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)			Likely
		Brigalow/Belah open forest on clay soils with gilgai present, most containing deeper water. Understory often has wilga and false sandalwood.							Known

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Mapped/unmapped HVR of brigalow with a moderately dense SEVT understory. Often have emergent bottle-trees, sometimes with belah or occasional Eucalypt species.							
		Not in listed vegetation types							
Red goshawk	Coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. It is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia, from western Kimberley Division to northeastern NSW, and occasionally on continental islands.	Open forest and woodlands on land zone 5.	Watercourse with permanent water.	Watercourse with permanent water.	Watercourse with permanent water.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Riparian / riverine woodlands with a shrub layer and abundant small birds on alluvial terraces on land zone 3.	Open forests, woodlands and partially cleared country with tall retained roosting trees.	Open forests, woodlands and partially cleared country with tall retained roosting trees.	Open forests, woodlands and partially cleared country with tall retained roosting trees.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Tall open forests of mixed Brigalow / eucalypts with a shrubby understory on land zone 4 in association with water bodies.	Gorge and rocky escarpments.	Gorge and rocky escarpments.	Gorge and rocky escarpments.	Not Mapped as Essential Habitat (No)			Likely
		Mapped/unmapped sparse riverine woodlands/watercourses with permanent water surrounded by partially cleared country and tall retained roosting trees.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Ironstone jump-ups with ironbarks, tall lancewood and Acacia sp. on land zone 7.							
		Gorge and escarpment country in close proximity to water on land zone 9 and 10.							
		Not in listed vegetation types							
Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Eucalypt woodlands with water less than 3km away, sandy areas dissected by gravel ridges, and burnt areas.	Open box woodland with sandy soils, farm tracks, previously burnt areas and a grassy understory.	Open box woodland with sandy soils, farm tracks, previously burnt areas and a grassy understory.	Open box woodland with sandy soils, farm tracks, previously burnt areas and a grassy understory.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Riverine woodlands with sandy areas, cattle tracks and low impact grazing.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Poplar box woodlands and non-remnant areas in close proximity to farm dams, cattle troughs and dry sandy creek beds.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypt woodlands, non-remnant vegetation areas and old sandy farm tracks in close proximity to grasslands, old cultivation paddocks and watercourses. Often observed on the sandy track or 2-3 metres off the track in small open areas of sandy grassland.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Cattle troughs and old leaking farm tanks adjacent to old cultivation paddocks, overgrazed land, and degraded areas frequented by cattle and buildings. Often observed in groups of 2-3 pairs.							
		Not in listed vegetation types							
Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Mixed lancewood scrub and Eucalypts on rocky jump-ups / scarps.	Cavities under and partly between partly buried rocks, rock piles, rock shale, crevices, caves.	Cavities under and partly between partly buried rocks, rock piles, rock shale, crevices, caves.	Cavities under and partly between partly buried rocks, rock piles, rock shale, crevices, caves.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Mulga and/or other low Acacia scrub country with dense woody debris.	Log piles, scattered large hollow logs associated with fallen trees, dense wood debris, stick-raked windrows and abandoned animal burrows.	Log piles, scattered large hollow logs associated with fallen trees, dense wood debris, stick-raked wind-rows and abandoned animal burrows.	Log piles, scattered large hollow logs associated with fallen trees, dense wood debris, stick-raked wind-rows and abandoned animal burrows.	Not Mapped as Essential Habitat (No)			Likely
		Dense lancewood scrub with dense woody debris and rock.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Brigalow melon-hole country with woody debris, soil cracks and water.							

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Bendee scrub on jump-ups or ridges with dense woody debris and rock.							
		Not in listed vegetation types							
Boggomoss snail	Endemic to the Dawson River catchment in inland south-eastern Queensland, occurring on alluvial flats and in riparian environments between Mt Rose (approximately 30km north of Monto) and Theodore.	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Riparian woodlands dominated by Queensland Blue Gum Eucalyptus tereticornis, Carnarvon Fan Palm Livistona nitida and Coolibah Eucalyptus coolabah	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Timbered watercourses in REs 11.3.3, 11.3.4, 111.3.25, 11.3.27 and 11.3.36	Riparian forest associations within Regional Ecosystem (RE) 11.3.25 on the Dawson River, which support Queensland Blue Gum or River Red Gum Eucalyptus camaldulensis with Carnarvon Fan Palm as a co-dominant species in the canopy or a dominant sub-canopy species	Riparian forest associations within Regional Ecosystem (RE) 11.3.25 on the Dawson River, which support Queensland Blue Gum or River Red Gum Eucalyptus camaldulensis with Carnarvon Fan Palm as a co-dominant species in the canopy or a dominant sub-canopy species	Riparian forest associations within Regional Ecosystem (RE) 11.3.25 on the Dawson River, which support Queensland Blue Gum or River Red Gum Eucalyptus camaldulensis with Carnarvon Fan Palm as a co-dominant species in the canopy or a dominant sub-canopy species	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Not in listed vegetation types	Open Queensland Blue Gum forests fringing ephemeral wetlands and artesian springs, on the Dawson River floodplain.	Open Queensland Blue Gum forests fringing ephemeral wetlands and artesian springs, on the Dawson River floodplain.	Open Queensland Blue Gum forests fringing ephemeral wetlands and artesian springs, on the Dawson River floodplain.	Not Mapped as Essential Habitat (No)			Likely
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
									Needs More Info
Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow/Belah in REs 11.3.1, 11.4.3, 11.4.10 and 11.9.5.	Poplar box, gum-topped box, or forest re gum over ground cover of native grasses	Poplar box, gum-topped box, or forest re gum over ground cover of native grasses	Poplar box, gum-topped box, or forest re gum over ground cover of native grasses	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river she-oak or Casuarina species in REs 11.3.14, 11.3.17, 11.3.18, 11.3.25 and 11.3.27a.	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	Not Mapped as Essential Habitat (No)			Likely
		Woodland and grassland on alluvial plains in REs 11.3.21 and 11.3.3 Woodland on Cainozoic clay plains in RE 11.4.12	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Not in listed vegetation types							
Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Woodland and scrub on alluvial or sand plains in all REs from land zones 3, 4 and 5 (excluding wetlands such as 11.3.25f and 11.3.27).	Any wooded ecosystem (remnant or regrowth) that develops a dense leaf litter layer	Any wooded ecosystem (remnant or regrowth) that develops a dense leaf litter layer	Any wooded ecosystem (remnant or regrowth) that develops a dense leaf litter layer	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah in REs 11.3.1, 11.3.16, 11.3.17, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.11, 11.5.16, 11.7.1, 11.9.1, 11.9.4, 11.9.5, 11.9.4, 11.9.5, 11.9.6, 11.9.10, 11.9.11, 11.9.12, 11.11.13, 11.11.14, 11.11.16, 11.11.19 and 11.12.21.	Deep, fixed leaf litter suitable for concealment	Deep, fixed leaf litter suitable for concealment	Deep, fixed leaf litter suitable for concealment	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Woodland and scrub on sedimentary rocks in all REs from land zones 8 and 9.	Healthy shrub layer present	Healthy shrub layer present	Healthy shrub layer present	Not Mapped as Essential Habitat (No)			Likely
		Forests and scrub on rocky jump up and scarps in all REs from land zones 7 and 10.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Forests and scrub on hills and lowlands on sedimentary or granitic rocks in all REs from land zones 11 and 12.							
		Semi-evergreen vine thicket (SEVT) in REs 11.3.11, 11.4.1, 11.5.15, 11.7.1, 11.8.3, 11.8.13, 11.9.4, 11.10.8, 11.11.18, 11.11.21, 11.12.4, 11.12.7.Semi-evergreen vine thicket (SEVT) in REs 11.3.11, 11.4.1, 11.5.15, 11.7.1, 11.8.3, 11.8.13, 11.9.4, 11.10.8, 11.11.18, 11.11.21, 11.12.4, 11.12.7.							
		Not in listed vegetation types							

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Woodland sites, including open dry eucalypt woodland, includes sites with ar understorey of grasses and creeping lantana (Lantana montevidensis) on ston soils or rocky ridges.	Suitable, dense ground structure; such as woody debris and logs and/or rocky habitats	Suitable, dense ground structure; such as woody debris and logs and/or rocky habitats	Suitable, dense ground structure; such as woody debris and logs and/or rocky habitats	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalyptus populnea woodland on alluvia plains in RE 11.3.2.	Dense vegetation within the canopy and mid-strata, with minimal impacts from grazing.	Dense vegetation within the canopy and mid-strata, with minimal impacts from grazing.	Dense vegetation within the canopy and mid-strata, with minimal impacts from grazing.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Brigalow / Eucalyptus populnea open forest on fine-grained sedimentary rocks in RE 11.9.10.	No evidence of recent fire; moderate or intense.	No evidence of recent fire; moderate or intense.	No evidence of recent fire; moderate or intense.	Not Mapped as Essential Habitat (No)			Likely
		Corymbia citriodora woodland on coarse-grained sedimentary rocks in RE 11.10.1	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Eucalypt and Lysicarpus woodland on coarse-grained sedimentary rocks in RE 11.10.4							
		Not in listed vegetation types							
Dulacca woodland snail	The Dulacca woodland snail is endemic to south-east Queensland, where it occurs as a small number of isolated and fragmented populations in the area between Miles and Dulacca, and south to Meandarra.	Mapped/unmapped remnant and scattered vine thicket and Acacia harpophylla (brigalow) woodland patches on rocky outcrops with clay to loam soils	Tree cover and accumulated ground debris of loose bark	Tree cover and accumulated ground debris of loose bark	Tree cover and accumulated ground debris of loose bark	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow open forest with a low-moderately dense tree mid-story of SEVT species, usually 11.4.9 on gently undulating clay and/or weathered basalt plains with much surface gravel.	Brigalow and/or SEVT with rocks in the ground layer	Brigalow and/or SEVT with rocks in the ground layer	Brigalow and/or SEVT with rocks in the ground layer	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Roadside strips of Brigalow/Belah in REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.9.1, 11.9.4, 11.9.5, 11.9.6 and 11.9.11.	Decaying logs and other forest debris.	Decaying logs and other forest debris.	Decaying logs and other forest debris.	Not Mapped as Essential Habitat (No)			Likely
		Eucalyptus citriodora and E. crebra woodland on course-grained sedimentary rocks in RE 11.10.1	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Not in listed vegetation types							
Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Remnant and high value regrowth (HVR) in open forest and woodland. Furina dunmalli prefers dry sclerophyll forests usually on black clay and clay loam soils.	Shelter available from features such as rocks or soil cracks.	Shelter available from features such as rocks or soil cracks.	Shelter available from features such as rocks or soil cracks.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah in REs 11.3.1, 11.4.3, 11.7.1, 11.9.4, 11.9.5, 11.9.6 and 11.9.10	Shelter available from ground debris and features such as logs and bark slabs.	Shelter available from ground debris and features such as logs and bark slabs.	Shelter available from ground debris and features such as logs and bark slabs.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Narrow-leaved ironbark and spotted gum woodland on course-grained sedimentary rocks in REs 11.10.1 and 1.10.7	Deep cracking black clay and loam soils.	Deep cracking black clay and loam soils.	Deep cracking black clay and loam soils.	Not Mapped as Essential Habitat (No)			Likely
		Woodland adjacent to ephemeral water courses with cracking clay and clay-loam soils in RE 11.3.17	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Woodland with cracking clay and clay-loam soils adjacent to ephemeral palustrine wetlands in RE 11.4.3a							
		Woodland adjacent to ephemeral water courses with cracking clay and clay-loam soils in RE 11.3.25							
		Not in listed vegetation types							
Fork-tailed swift	The species probably occurs as a transitory non-breeding visitor (mostly October to March) to the Darling Downs and Australia more widely, occasionally extending west of Dalby.	Transitory in airspace (1m to >1000m above ground) over remnant native vegetation, including open woodlands, forests, riparian woodlands, shrublands, grasslands and wetlands; potentially over any RE's across Gas Field.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	Airspace (from 1m to >1000m above ground level) over remnant or regrowth vegetation.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Transitory in airspace (1m to >1000m above ground) over regrowth of native vegetation, including High Value Regrowth of open woodlands, forests, riparian woodlands and shrublands; potentially over any regrowth across Gas Field.	Airspace (from 1m to >1000m above ground level) around cliffs and hills.	Airspace (from 1m to >1000m above ground level) around cliffs and hills.	Airspace (from 1m to >1000m above ground level) around cliffs and hills.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Transitory in airspace (1m to >1000m above ground) over cleared or sparsely wooded land, including farmland, inland open plains and settled areas (e.g. towns roads). Also recorded over parks and gardens, plantations and heavily populated areas (large towns and cities).	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settle areas.	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settle areas.	Airspace (from 1m to >1000m above ground level) over farmland, roads, cleared land, inland open plains or settle areas.	Not Mapped as Essential Habitat (No)			Likely
		Transitory in airspace (1m to >1000m above ground) above cliffs and hills.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Not in listed vegetation types							
Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Mixed eucalypt woodland on sedimentary rocks in REs 11.9.2, 11.9.7, 11.9.9, 11.9.10, 11.10.1, 11.10.1d, 11.10.7, 11.10.11 and 11.11.1.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypt forest with Brigalow / Belah in REs 11.4.7, 11.4.10 and 11.9.10.	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	High density of hollow-bearing trees, particularly trees with large (150-300mm) to very-large (>300mm) hollows	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses dominated by eucalypt species in REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Presence of very large and mature trees, particularly those with a DBH greater tha 50cm	Presence of very large and mature trees, particularly those with a DBH greater tha 50cm	Presence of very large and mature trees, particularly those with a DBH greater tha 50cm	Not Mapped as Essential Habitat (No)			Likely
		Eucalypts on duricrust, (potentially rocky jump up and scarps) with hollows trees ir REs 11.7.4, 11.7.6 and 11.7.7.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Eucalypt woodland on clay plains in REs 11.4.2, 11.4.7, 11.4.10 and 11.4.12.							
		Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.							
		Not in listed vegetation types							
Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Timbered lowland plains, with acacia shrublands that are crossed by tree-lined watercourses	Timbered lowland plains, with acacia shrublands that are crossed by tree-lined watercourses	Timbered lowland plains, with acacia shrublands that are crossed by tree-lined watercourses	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Eucalyptus coolabah Coolibah-lined water course in lowland sandy and stony plains	Treeless areas, tussock grassland and open woodland.	Treeless areas, tussock grassland and open woodland.	Treeless areas, tussock grassland and open woodland.	Not Mapped as Essential Habitat (No)			Likely
		Occur in sparsely-timbered habitats such as tussock grasslands, open woodlands and sand-dunes	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Sometimes recorded near and over swamps, bores and waterholes where surface water attracts prey.							
		Not in listed vegetation types							
Major Mitchell cockatoo	In Queensland, the species occurs in the south-western and south-central part of the state, extending from west of Eromanga, north along the Barcoo River to the vicinity of Isisford and east to Roma and St George. There are occasional records further east to Goondiwindi and the Darling Downs, eas to around Warra.	Dry ironbark and cypress pine, bull-oak scrub country in REs 11.5.1, 11.5.4, 11.5.15, 11.5.20 and 11.5.21.	Trees with suitable nesting hollows and within close proximity to fresh surface water.	Trees with suitable nesting hollows and within close proximity to fresh surface water.	Trees with suitable nesting hollows and within close proximity to fresh surface water.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypts on alluvial in close proximity to water in REs 11.3.2, 11.3.4 and 11.3.14	Timbered watercourses with large eucalypts or Callitris spp. associated with permanent water.	Timbered watercourses with large eucalypts or Callitris spp. associated with permanent water.	Timbered watercourses with large eucalypts or Callitris spp. associated with permanent water.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with Callitris gracilis or Casuarina species in REs 11.3.17, 11.3.18 and 11.3.25 / 11.3.25a.	Nesting habitat, specifically trees with nesting hollows >150mm.	Nesting habitat, specifically trees with nesting hollows >150mm.	Nesting habitat, specifically trees with nesting hollows >150mm.	Not Mapped as Essential Habitat (No)			Likely

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
		Eucalypt / box woodlands and semi-arid areas with gum/box in REs 11.3.6, 11.3.14, 11.3.37, 11.4.2, 11.4.10 and 11.4.12	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Mixed eucalypt / sheoak woodland with hollow trees and feed trees in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5 and 11.5.16							
		Not in listed vegetation types							
Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Dry ironbark and cypress pine, Bull-oak scrub or gum/box country in REs 11.5.1, 11.5.4, 11.5.15, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	Forest and woodland eucalypts containing mistletoes of the genus Amyema.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow / Belah in REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9 and 11.4.10, 11.9.5, 11.9.10 and 11.9.13, containing mistletoes of the genus Amyema.	Boree/weeping myall (Acacia pendula) woodlands, brigalow (A. harpophylla) woodlands, box-gum woodlands and box-ironbark forests with abundant mistletoes of the genus Amyema.	Boree/weeping myall (Acacia pendula) woodlands, brigalow (A. harpophylla) woodlands, box-gum woodlands and box-ironbark forests with abundant mistletoes of the genus Amyema.	Boree/weeping myall (Acacia pendula) woodlands, brigalow (A. harpophylla) woodlands, box-gum woodlands and box-ironbark forests with abundant mistletoes of the genus Amyema.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with river red gum in REs 11.3.14, 11.3.17 and 11.3.25 / 11.3.25a, containing mistletoes of the genus Amyema.	Riparian woodlands of river red gum and forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum and forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum and forest red gum with an abundance of mistletoes of the genus Amyema.	Not Mapped as Essential Habitat (No)			Likely
		Eucalypt / Box woodlands and semi arid areas with gum/box in REs 11.3.2, 11.3.4, 11.3.6, 11.3.14, 11.3.37, 11.4.2, 11.4.10, 11.4.12, , 11.5.5, 11.5.9 and 11.5.13 containing mistletoes of the genus Amyema.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Bull-oak Woodland on in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes of the genus Amyema.							
		Not in listed vegetation types							
Regent honeyeater	In Queensland, their current predicted distribution is limited to the south-east at scattered sites including the Brisbane region, Bribie Island and several sites in the Granite Belt from Warwick, west to Gore and south to Sundown National Park. The BAAM habitat modelling extends as far west as Miles.	Mapped/unmapped remnant or High Value Regrowth (HVR) woodlands where mistletoe is present, including dry eucalypt forests and woodlands dominated by box and ironbark eucalypts on inland slopes of the Great Divide, particularly more fertile, moister sites along creeks, broad river valleys and the lower slopes of foothills.	Forest or woodland containing mugga (or red) ironbark, yellow box, white box, yellow gum, spotted gum, broad-leaved ironbark, containing abundant mistletoes of the genus Amyema or long-flowered mistletoe (Dendropthoe vitellina).	Forest or woodland containing mugga (or red) ironbark, yellow box, white box, yellow gum, spotted gum, broad-leaved ironbark, containing abundant mistletoes of the genus Amyema or long-flowered mistletoe (Dendropthoe vitellina).	Forest or woodland containing mugga (or red) ironbark, yellow box, white box, yellow gum, spotted gum, broad-leaved ironbark, containing abundant mistletoes of the genus Amyema or long-flowered mistletoe (Dendropthoe vitellina).	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Eucalypt / box woodlands and semi-arid areas with gum/box in REs 11.3.4, 11.3.6, 11.3.14, 11.3.37, 11.4.2, 11.4.10 and 11.4.12, containing numerous mistletoes	Mature, large individual trees on highly fertile sites and in riparian areas.	Mature, large individual trees on highly fertile sites and in riparian areas.	Mature, large individual trees on highly fertile sites and in riparian areas.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Ironbark / sheoak woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, 11.5.20 and 11.5.21, containing mistletoes	Riparian woodlands of river red gum or forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum or forest red gum with an abundance of mistletoes of the genus Amyema.	Riparian woodlands of river red gum or forest red gum with an abundance of mistletoes of the genus Amyema.	Not Mapped as Essential Habitat (No)			Likely
		Timbered watercourses with river red gum, forest red gum and river sheoak in RE 11.3.25 / 11.3.25a, containing an abundance of mistletoes	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Ironbark woodland and open forests with numerous mistletoes in REs 11.7.4 and 11.7.7							
		Not in listed vegetation types							

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
Rufous fantail	Can potentially occur as a non-breeding visitor to many of the QGC tenements and widely across the Gas Field. The species probably occur as an uncommon or rare non-breeding visitor (from autumn to spring) to the Darling Downs, occasionally extending west of Dalby	Brigalow / Belah forests or woodlands, particularly with shaded areas of dense o damp understory vegetation; potentially i RE's 11.3.1, 11.4.3, 11.4.7, 11.4.10, 11.9.5, 11.9.6 and 11.9.10	Brigalow / Belah or Semi-Evergreen Vine Thicket associated with Land Zones 3, 4 and 9	Brigalow / Belah or Semi-Evergreen Vine Thicket associated with Land Zones 3, 4 and 9	Brigalow / Belah or Semi-Evergreen Vine Thicket associated with Land Zones 3, 4 and 9	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Semi-evergreen Vine Thicket in RE 11.9.4	Timbered watercourses or eucalypt-dominated woodlands and open forests associated with Land Zones 3, 4, 5, 7, 9 and 10	Timbered watercourses or eucalypt-dominated woodlands and open forests associated with Land Zones 3, 4, 5, 7, 9 and 10	Timbered watercourses or eucalypt-dominated woodlands and open forests associated with Land Zones 3, 4, 5, 7, 9 and 10	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses and wetlands, especially with shaded areas of dense or damp understory vegetation; potentially i RE's 11.3.25 and 11.3.27f	Dense or moist understory or mid-story vegetation, particularly shaded and sheltered sites (e.g. in gullies)	Dense or moist understory or mid-story vegetation, particularly shaded and sheltered sites (e.g. in gullies)	Dense or moist understory or mid-story vegetation, particularly shaded and sheltered sites (e.g. in gullies)	Not Mapped as Essential Habitat (No)			Likely
		Mixed Eucalypt woodland or open forest, especially in gullies or shaded areas of dense or damp understory vegetation; potentially in RE's 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.12, 11.5.1, 11.5.2, 11.5.4, 11.5.5, 11.5.20, 11.7.6, 11.7.7, 11.9.7, 11.10.1 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Occasionally parks and gardens with areas of dense or damp understory vegetation							
		Not in listed vegetation types							
South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Dry ironbark and cypress pine, bull-oak o gum/box country in REs 11.4.7, 11.5.1, 11.5.4, 11.5.5, 11.5.20, 11.5.21, 11.9.9 and 11.9.10	Poplar box, ironbark, cypress pine, buloke woodlands.	Poplar box, ironbark, cypress pine, buloke woodlands.	Poplar box, ironbark, cypress pine, buloke woodlands.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Poplar box woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, where there is cypress and buloke.	Large intact, extensive stands of vegetation with old-growth vegetation.	Large intact, extensive stands of vegetation with old-growth vegetation.	Large intact, extensive stands of vegetation with old-growth vegetation.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Distinct canopy with a dense, cluttered understorey layer.	Distinct canopy with a dense, cluttered understorey layer.	Distinct canopy with a dense, cluttered understorey layer.	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
									Needs More Info
									N/A
									Yes
									No
Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August to south-eastern Queensland, occasionally extending to the Darling Downs	Eucalyptus and/or Corymbia dominated woodlands with large nectar-bearing trees, especially box-ironbark communities and woodlands dominated by key foraging tree species; potentially i RE's 11.3.4, 11.4.10, 11.5.1, 11.5.20, 11.7.6, 11.7.7 and 11.10.1	Woodlands and forests, particularly box-ironbark communities or Queensland Blue Gum-dominated woodlands on Lan Zones 3, 4, 5, 7 and 10	Woodlands and forests, particularly box-ironbark communities or Queensland Blue Gum-dominated woodlands on Lan Zones 3, 4, 5, 7 and 10	Woodlands and forests, particularly box-ironbark communities or Queensland Blue Gum-dominated woodlands on Lan Zones 3, 4, 5, 7 and 10	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Other eucalypt-dominated woodlands an forests, including riparian woodlands: potentially in REs 11.3.2, 11.3.3, 11.3.17 11.3.18, 11.3.25, 11.3.27f, 11.4.12, 11.5.4, 11.5.5, 11.7.4, 11.9.7, 11.9.10 and 11.10.7	Other eucalypt-dominated woodlands on Land Zones 3, 4, 5, 7, 9 and 10	Other eucalypt-dominated woodlands on Land Zones 3, 4, 5, 7, 9 and 10	Other eucalypt-dominated woodlands on Land Zones 3, 4, 5, 7, 9 and 10	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Occasionally parks, gardens, farmland and wind-breaks with mature nectar-bearing eucalypts such as Sugar Gum E. cladocalyx	Woodlands or forests with mature and large (DBH ≥60cm) nectar-producing trees, particularly the following key Swift Parrot foraging tree species: Mugga Ironbark Eucalyptus sideroxylon, Grey Box E. microcarpa / E. woollsiana, Gum-topped Box E. mollucana, White Box E. albens, Yellow Box E. melliodora, Spotte Gum Corymbia maculata, Queensland Blue Gum E. tereticornis or River Red Gum E. camaldulensis	Woodlands or forests with mature and large (DBH ≥60cm) nectar-producing trees, particularly the following key Swift Parrot foraging tree species: Mugga Ironbark Eucalyptus sideroxylon, Grey Box E. microcarpa / E. woollsiana, Gum-topped Box E. mollucana, White Box E. albens, Yellow Box E. melliodora, Spotte Gum Corymbia maculata, Queensland Blue Gum E. tereticornis or River Red Gum E. camaldulensis	Woodlands or forests with mature and large (DBH ≥60cm) nectar-producing trees, particularly the following key Swift Parrot foraging tree species: Mugga Ironbark Eucalyptus sideroxylon, Grey Box E. microcarpa / E. woollsiana, Gum-topped Box E. mollucana, White Box E. albens, Yellow Box E. melliodora, Spotte Gum Corymbia maculata, Queensland Blue Gum E. tereticornis or River Red Gum E. camaldulensis	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
White-throated needletail	Distribution includes all coastal regions ir QLD and NSW, through to the Great Dividing Ranges and occasionally on to the plains inland of the range. Hirundapus caudacutus are also found through most of Victoria and Tasmania and south-eastern SA	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	High, open spaces above open wooded areas	High, open spaces above open wooded areas	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Above forest on sand plains in Land Zone 5	Above or below canopy of forests or rainforests	Above or below canopy of forests or rainforests	Above or below canopy of forests or rainforests	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Above forest on scarps and rocky jump ups in Land Zone 7 and 10	Large tracts of native vegetation	Large tracts of native vegetation	Large tracts of native vegetation	Not Mapped as Essential Habitat (No)			Likely
		Above forest on rocky ground in Land zone 8 and 9	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Above forest on hills and lowlands in Land Zones 11 and 12							
		Not in listed vegetation types							
Woma	In Queensland, the Woma occurs in the dry subtropics from the Queensland-Northern Territory and Queensland-South Australia borders east to the Yuleba-Miles-St George areas in Brigalow Biogeographic Region (BBR)	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Brigalow Acacia harpophylla woodland and grasslands on black soils and in stony ridge country.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Brigalow in REs 11.4.3, 11.4.7 and 11.9.10	Poplar box Eucalyptus populnea, white cypress-pine Callitris glaucophylla and beefwood Grevillea striata on reddish sandy soils.	Poplar box Eucalyptus populnea, white cypress-pine Callitris glaucophylla and beefwood Grevillea striata on reddish sandy soils.	Poplar box Eucalyptus populnea, white cypress-pine Callitris glaucophylla and beefwood Grevillea striata on reddish sandy soils.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Poplar box Eucalyptus populnea and white cypress-pine Callitris glaucophylla in REs 11.3.2, 11.3.17, 11.3.18, 11.4.10, 11.4.12, 11.9.7 and 11.9.10.	Presence of suitable refugia such as hollow logs, rock shelters and/or animal burrows (e.g., rabbit warrens).	Presence of suitable refugia such as hollow logs, rock shelters and/or animal burrows (e.g., rabbit warrens).	Presence of suitable refugia such as hollow logs, rock shelters and/or animal burrows (e.g., rabbit warrens).	Not Mapped as Essential Habitat (No)			Likely
		Woodland on stony ridges in REs 11.7.1, 11.7.2, 11.7.4, 11.7.5 and 11.9.10.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
		Poplar box and Brigalow woodland in stony ridge areas in REs 11.9.10 and often with adjacent REs 11.7.1, 11.7.2, 11.7.4 and 11.7.5							
		Not in listed vegetation types							
Brown treecreeper (south-eastern)	Brown treecreepers (southeastern) are endemic to southeastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Eucalypt / box woodlands in REs 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.7, 11.4.10 and 11.4.12.	Relatively undisturbed grassy woodland on flats and lower slopes (particularly areas dominated by smooth-barked eucalypts, poplar box and grey/Pilliga box) with open or sparse shrub cover and open native grassy and herbaceous ground cover.	Relatively undisturbed grassy woodland on flats and lower slopes (particularly areas dominated by smooth-barked eucalypts, poplar box and grey/Pilliga box) with open or sparse shrub cover and open native grassy and herbaceous ground cover.	Relatively undisturbed grassy woodland on flats and lower slopes (particularly areas dominated by smooth-barked eucalypts, poplar box and grey/Pilliga box) with open or sparse shrub cover and open native grassy and herbaceous ground cover.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Ironbark / smooth-barked apple / box woodland in REs 11.5.1, 11.5.4, 11.5.20 and 11.5.21.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Fallen timber, logs and leaf litter which provide essential foraging habitat.				Known
			No Habitat Attribute Present	No Habitat Attribute Present	No Habitat Attribute Present				
Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Open grassy forests and woodlands, dry pastures at wooded edges and occasionally in farmlands and grasslands with scattered trees.	Landforms 3, 4, 5 and possibly 9.	Landforms 3, 4, 5 and possibly 9.	Landforms 3, 4, 5 and possibly 9.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	They occur mainly in eucalypt, acacia or casuarina woodlands and open forests with a predominantly grassy ground cover.	Eucalypt, acacia or casuarina woodlands open forests and other lightly timbered habitats.	Eucalypt, acacia or casuarina woodlands open forests and other lightly timbered habitats.	Eucalypt, acacia or casuarina woodlands open forests and other lightly timbered habitats.	Mapped, ground truthed as Not-Valid (No)	No	No	Potential

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
			Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Not Mapped as Essential Habitat (No)			Likely
		Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Hooded robin (south-eastern)	The Hooded Robin (southeastern) occurs in south-eastern Australia from far southern Queensland to Yorke Peninsula	Occur in lightly timbered woodlands and shrublands dominated by eucalypts and/or wattles.	Dry eucalypt and/or acacia woodlands and shrublands (patches as small as 3ha but usually >10ha) with an open understorey, complex and well-developed grassy and herbaceous ground layer, ample leaf litter and dead or fallen timber	Dry eucalypt and/or acacia woodlands and shrublands (patches as small as 3ha but usually >10ha) with an open understorey, complex and well-developed grassy and herbaceous ground layer, ample leaf litter and dead or fallen timber	Dry eucalypt and/or acacia woodlands and shrublands (patches as small as 3ha but usually >10ha) with an open understorey, complex and well-developed grassy and herbaceous ground layer, ample leaf litter and dead or fallen timber	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	Often occur in dry woodland dominated by eucalypts (e.g., Grey Box, Yellow Box, Manna Gum, Blakely's Red Gum), rough-barked apple and cypress pine Callitris spp.;	Standing dead or live trees or shrubs (eucalypts, angophoras, wattles, casuarinas and cypress pines) and tree stumps for nesting, roosting and foraging. Low perching sites (usually to 3m high) from which to forage	Standing dead or live trees or shrubs (eucalypts, angophoras, wattles, casuarinas and cypress pines) and tree stumps for nesting, roosting and foraging. Low perching sites (usually to 3m high) from which to forage	Standing dead or live trees or shrubs (eucalypts, angophoras, wattles, casuarinas and cypress pines) and tree stumps for nesting, roosting and foraging. Low perching sites (usually to 3m high) from which to forage	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
		They also occur in tall to low shrublands and low woodlands dominated by acacia (including Lancewood Acacia shirleyi, Brigalow Acacia harpophylla and Mulga).	Moderately-deep to deep soils, rocks and fallen timber, which provide essential foraging habitat.	Moderately-deep to deep soils, rocks and fallen timber, which provide essential foraging habitat.	Moderately-deep to deep soils, rocks and fallen timber, which provide essential foraging habitat.	Not Mapped as Essential Habitat (No)			Likely
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly occur in arid and semi-arid acacia eucalypt and cypress pine Callitris woodlands and shrublands	Relatively undisturbed open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly semi-arid acacia, eucalypt and cypress pine communities. Potentially occur on Landforms 3, 4, 5 and possibly 9.	Relatively undisturbed open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly semi-arid acacia, eucalypt and cypress pine communities. Potentially occur on Landforms 3, 4, 5 and possibly 9.	Relatively undisturbed open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly semi-arid acacia, eucalypt and cypress pine communities. Potentially occur on Landforms 3, 4, 5 and possibly 9.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence		Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
			Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	Not Mapped as Essential Habitat (No)			Likely
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known
Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and nea coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts o the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Yellow-bellied Gliders (south-eastern) occur in dry eucalypt-dominated forests and woodlands, including wet and dry sclerophyll forests, typically in areas of high rainfall.	Large contiguous areas of floristically diverse and old-growth eucalypt forest, which are dominated by a mixture of trees, particularly winter-flowering and smooth-barked eucalypts.	Large contiguous areas of floristically diverse and old-growth eucalypt forest, which are dominated by a mixture of trees, particularly winter-flowering and smooth-barked eucalypts.	Large contiguous areas of floristically diverse and old-growth eucalypt forest, which are dominated by a mixture of trees, particularly winter-flowering and smooth-barked eucalypts.	Mapped and Validated (Yes)	Yes	Yes	Unlikely
	Not in the Broad Area of Occurrence	There is a strong preference for forests dominated by winter-flowering and smooth-barked eucalypts with the latter providing a wide range of foraging substrates and food resources.	Mature living hollow-bearing trees (particularly old, smooth-barked eucalypts) and sap trees Spotted Gum Corymbia citriodora / C. maculata, Grey Gum E. longirostrata, Queensland Blue Gum E. tereticornis and Smooth-barked Apple with DBH 41-60cm).	Mature living hollow-bearing trees (particularly old, smooth-barked eucalypts) and sap trees Spotted Gum Corymbia citriodora / C. maculata, Grey Gum E. longirostrata, Queensland Blue Gum E. tereticornis and Smooth-barked Apple with DBH 41-60cm).	Mature living hollow-bearing trees (particularly old, smooth-barked eucalypts) and sap trees Spotted Gum Corymbia citriodora / C. maculata, Grey Gum E. longirostrata, Queensland Blue Gum E. tereticornis and Smooth-barked Apple with DBH 41-60cm).	Mapped, ground truthed as Not-Valid (No)	No	No	Potential
			Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) and/or habitat corridors required to facilitate dispersal o the gliders between fragmented habitat patches and/or that enable recolonization or movement away from threats.	Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) and/or habitat corridors required to facilitate dispersal o the gliders between fragmented habitat patches and/or that enable recolonization or movement away from threats.	Short or long-term post-fire refuges (i.e., unburnt habitat within or adjacent to recently burnt landscapes) and/or habitat corridors required to facilitate dispersal o the gliders between fragmented habitat patches and/or that enable recolonization or movement away from threats.	Not Mapped as Essential Habitat (No)			Likely

Species	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record	Recent Confirmed Species Record	Occurrence Likelihood
			No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present				Known

Attexo

Appendix D

PEC Reports

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 07	Date:	27/10/25
Tenure:	12RP190989.	Assessor(s):	BM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		Assessment Location information	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	-26.97655
☐ Pilot Well + Dam	☐ Dam	Northing (N)	150.59725.
☐ Monitoring	☐ Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	Other description	Adjacent to AdG.
☐ Work over	☑ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)		18 | 9	9 | 5		2.5 | 1		0.2
Avg. height (m)		16	8		2		
Canopy cover (%)		45.	15		30		~~30~~ 15
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification								
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
A. harpophylla	☐	☐	☑	☑	☐	☑	☐	☐	
A. cristata	☐	☐	☑	☑	☐	☑	☐	☐	
E. woollsiana	☐	☐	☑	☐	☐	☐	☐	☐	
G. pauciflora	☐	☐	☐	☐	☐	☑	☐	☐	
E. raspifolium	☐	☐	☐	☐	☐	☐	☐	☑	
E. acervulans	☐	☐	☐	☐	☐	☐	☐	☑	
E. ramosus	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE	11.9.5				
Observed RE[7]	11.3.4	Rem	E	E	E
Additional notes					
Photo numbers	North:	East:	South:	West:	
	33 28	30	32	34	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Clynes Road (1RP190989) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 3400 metres of access and gathering (30m), 3600m of access (10m) and wells (WP080, WP090 & WP102)		
Lot Plan:	1RP190989	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	27-28/10/2025 BM
Facility Type / Activity:	Wells ☐ Appraisal ☐ Microseismic ☐ Gravel Pit	☐ Core ☑ Development / Production ☑ Directional ☐ Campsite	☐ Exploration ☐ Monitoring ☐ Tiltmeter Array ☑ Access Track
	☐ Seismic ☐ Trunkline ☐ Comms Towers ☐ FCS (Field Compression Station) ☐ Other:	☑ Gathering System ☐ Gas Pipeline ☐ Fibre Optic Cable ☐ CPP (Central Processing Plant)	☐ Security Hut ☐ Water Pipeline ☐ Pond ☐ WTP (Water Treatment Plant) ☐ Frac Pond

RECOMMENDATIONS:		
☐ No Environmental issues on site	☑ Environmental issues identified & surveyed	☑ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Vegetation within the Kogan Condamine road reserve is mapped RE11.4.3 and was assessed as being 11.4.3 (and Cat B ESA) and the Brigalow TEC. This ESA is adjacent to WP080 and the proposed access from the Kogan Condamine Road passes through this vegetation along an existing narrow track. Some clearing of this ESA would be required to use the access as proposed.

Under EA0001401 (which applies to this project) section Biodiversity 6 states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* To disturb these areas would require an EA amendment.

A LoOM (Likelihood of Occurrence Matrix) which examines habitat for threatened fauna species found that Grey Snake (*Hemiaspis dameli*) (Endangered NC Act and EPBC Act), Dunmall's Snake (*Furina dunmalli*) (Vulnerable NC Act and EPBC Act) and Brigalow Woodland Snail (*Adclarkia cameronii*) (Endangered NC Act and EPBC Act) were likely to occur. While the highest likelihood of occurrence is in the remnant RE11.4.3 vegetation in the Kogan Condamine Road reserve, suitable habitat elements exist in the cleared country within the property, especially in respect to areas of regularly inundated gilgai with deep cracking clay soils.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use is grazing with the property mapped as non-remnant vegetation in all the proposed impact areas. Vegetation is improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is state-mapped as non-remnant throughout. Proposed access from Kogan Condamine Road is through remnant vegetation in the road reserve. Vegetation on the Kogan Condamine Road is DoR mapped RE11.4.3 (Acacia harpophylla and/or Casuarina cristata shrubby open forest on Cainozoic clay plains). This ecosystem has a VM Status of Endangered and Biodiversity Status of Endangered.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	No ESAs were mapped or observed within the property. ESA buffers were present in the survey area over gathering and access to WP080 and WP102 and are associated with the Cat B ESA in the Kogan Condamine Road reserve for Endangered RE11.4.3. This ESA is adjacent to WP080 and the proposed access to Lot 1RP190989 from the Kogan Condamine Road passes through this vegetation along an existing narrow track. Some clearing of this ESA would be required to use the access as proposed. Under EA0001401 **(**which applies to this project**)** section Biodiversity 6 states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* **To disturb these areas would require an EA amendment.**
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There are no mapped or observed TECs within the property, however, vegetation within the Kogan Condamine road reserve is mapped RE11.4.3 and was assessed as being the Brigalow TEC. This TEC is adjacent to WP080 and the proposed access from the highway passes through this vegetation along an existing narrow track. Some clearing of this TEC would be required to use the access as proposed. Access and gathering to WP102 is also adjacent this vegetation in the road reserve.
DoR-mapped High-value Regrowth present / impacted:	There is no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is largely cleared but some areas have scattered regrowth up to 5 metres tall of brigalow community species.
EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.

EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of how site conditions are unsuitable.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Grey Snake (*Hemiaspis dameli*) (Endangered NC Act and EPBC Act), Dunmall's Snake (*Furina dunmalli*) (Vulnerable NC Act and EPBC Act) and Brigalow Woodland Snail (*Adclarkia cameronii*) (Endangered NC Act and EPBC Act) were likely to occur. While the highest likelihood of occurrence is in the remnant RE11.4.3 vegetation in the Kogan Condamine Road reserve, suitable habitat elements exist in the cleared country within the property, especially in respect to areas of regularly inundated gilgai with deep cracking clay soils.

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	There were no mapped watercourses crossed by gathering and access on the lot. There were no mapped wetlands on the property or within buffer distance.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing although much of the area is cleared. However, there is habitat present such as shallow gilgai on cracking clay soils and fallen logs in addition to a small numbers of tree hollows.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Bruce McLennan	05/11/25
Completed By	**Date**

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 1RP190989
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint of and access and gathering layout 30 metres wide and access tracks 10 metres wide. There were no environmental constraints noted at the time of survey that would require realignment.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	1RP190989 is a grazing property mostly cleared of woody vegetation and with improved pasture in areas that were historically cultivated.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering within the lot is state mapped as non-remnant. This mapping is correct. A proposed access to WP080 in the Kogan Condamine Road reserve is state mapped as RE 11.4.3 (Acacia harpophylla and/or Casuarina cristata shrubby open forest on Cainozoic clay plains). This ecosystem has a VM Status of Endangered and Biodiversity Status of Endangered. This vegetation is correctly mapped.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No ESAs were mapped or observed within the property. A Cat B ESA buffer extends over access and gathering to wells WP080 and WP102 and over WP080. These proposed infrastructure are on previously cleared land within the buffer. ESA buffers were present in the survey area over gathering and access to WP080 and WP102 and are associated with the Cat B ESA in the Kogan Condamine Road reserve for Endangered RE11.4.3. This ESA is adjacent to WP080 and the proposed access to Lot 1RP190989 from the Kogan Condamine Road passes through this vegetation along an existing narrow track. Some clearing of this ESA would be required to use the access as proposed. Under EA0001401 (which applies to this project) section Biodiversity 6 states that Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas. **To disturb these areas would require an EA amendment.**
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There are no mapped or observed TECs within the property, however, vegetation within the Kogan Condamine Road reserve is mapped RE11.4.3 and was assessed as being the Brigalow TEC. This TEC is adjacent to WP080 and the proposed access from the highway passes through this vegetation along an existing narrow track. Some clearing of this TEC would be required to use the access as proposed.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.

Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. This LoOM covers vegetation in the adjacent main roads reserve which is mapped remnant RE11.4.3. The LoOM found that Grey Snake (*Hemiaspis dameli*) (Endangered NC Act and EPBC Act), Dunmall's Snake (*Furina dunmalli*) (Vulnerable NC Act and EPBC Act) and Brigalow Woodland Snail (*Adclarkia cameronii*) (Endangered NC Act and EPBC Act) were likely to occur. While the highest likelihood of occurrence is in the remnant RE11.4.3 vegetation in the Kogan Condamine Road reserve, suitable habitat elements exist in the cleared country within the property, especially in respect to areas of regularly inundated gilgai with deep cracking clay soils.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	There were no mapped watercourses crossed by gathering and access on the lot. There were no mapped wetlands on the property or within buffer distance.
Current road access to proposed site: Existing / to be upgraded / new	Road access is bitumen main roads and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: Eucalyptus woollsiana (inland grey box), *Acacia harpophylla* (brigalow), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), *Melaleuca bracteata* (black tea-tree), *Acacia melvillei* (yarran) Shrubs: *Psydrax oleifolia* (brush myrtle), Citrus glauca (lime bush), Eremophila mitchellii (bastard sandalwood), Geijera parviflora (wilga), Eremophila deserti (Ellangowan poison bush), Denhamia *cunninghamii* (yellow berry bush), *Amyema quandang var. bancroftii* (broad-leafed grey mistletoe), *Amyema miquelii* (box mistletoe), *Maireana microphylla* (bluebush), *Acacia muelleriana* (Mueller's wattle) Ground: *Aristida caput-medusae* (many-headed wiregrass), *Cheilanthes sieberi* (brigalow fern), *Arundinella nepalensis* (reedgrass), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Senecio brigalowensis* (native fireweed), *Aristida leichhardtiana, Lomandra longifolia* (spike rush), *Dianella brevipedunculata* (blue flax-lily), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Sclerolaena birchii* (galvanised burr), *Themeda triandra* (kangaroo grass), *Enteropogon acicularis* (windmill grass), *Aristida ramosa* (purple wiregrass), *Panicum coloratum** (bambatsi panic), Sporobolus creber (slender rats-tail grass), *Enteropogon ramosus* (windmill grass), *Eleocharis blakeana* (Blake's spike rush)
Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans
Vegetation density to be disturbed:	25-50

(%) 0-25, 25-50, 50-75, 75-100	
Soil type & erodibility (Sodic: Y/N):	Deep and shallow cracking clay soils with low erodibility.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-2%
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High Risk: *Opuntia tomentosa* (velvety tree pear) in low numbers. High Risk: *Opuntia stricta* (common pest pear) in low numbers.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: Access along northern boundary to WP080. RE11.4.3 (Endangered) in road reserve to north.



Photo 2: Proposed access on the southern boundary crosses large shallow gilgai (swamp)



Photo 3: Access and gathering across previously cultivated country (centre of lot)



Photo 4: Access and gathering to WP102 runs adjacent to remnant RE11.4.3 (E) in road reserve.



Photo 5: Proposed access through remnant RE11.4.3 in the Kogan Condamine Road reserve. This area has a moderate infestation of *Bryophyllum delagoense* (mother-of-millions).

Photo 6:

Photo 7:

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP080	Development: (Infrastructure Type)	Development
Lot Plan:	1RP190989	Disturbance size:	100 x 145 (4 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is within the PPZ of a Cat B ESA (RE 11.4.3 Endangered). Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 of EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site. A proposed access to WP080 will impact the Cat B ESA (mentioned above) in the Kogan Condamine Road corridor.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area of the lot. Vegetation in the adjacent road corridor was assessed as being the Brigalow (Acacia harpophylla dominant and co-dominant) Threatened Ecological Community. A proposed access through this vegetation along an existing track will likely result in minimal impact to the TEC.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna was observed during the survey. Specific microhabitat features were observed during the survey with marginal habitat for Grey Snake (*Hemiaspis damelii*) Endangered under NC Act and EPBC Act noted. In particular areas of shallow gilgai with cracking clay soils.

Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site. • If no alternative exists, peg in area of least disturbance and provide justification Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The closest mapped watercourse is a SO2 watercourse approximately 150m to the northeast.
Distance to Wetlands *(not including melon holes):* • Complete Wetland Features Report • Record wetland status and type: o Referable and Validated (Mapped and ground truthed as a wetland) o Referable and Not Validated (Mapped and ground truthed as not a wetland) o Non-referable and Validated (Unmapped ground-truthed wetland) Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.: 200m buffer applies for static, GES (no buffer)	There are no mapped wetlands within buffer distance of the site.
Melon Holes (rate on ecological value): *Give details on width, depth, area, vegetation, fauna habitat, disturbance etc*	1 | 2 | 3 | 4 | 5 2: Melon holes are shallow (up to 0.3m deep) and contain Eleocharis and sometimes Juncus species. Likely to be dry for extended periods.
Weeds present (and general abundance): • Record general composition density & species. • Survey any Restricted Invasive Weeds	*Opuntia stricta* and *Opuntia tomentosa* were both observed in low numbers in the survey area.
Additional Considerations:	

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees:, ***Eucalyptus populnea, Acacia harpophylla, Casuarina cristata, Melaleuca bracteata***			
Shrubs: ***Citrus glauca, Geijera parviflora, Eremophila deserti***			
Forbs:			
Grasses and Associates: ***Enteropogon ramosus, Bothriochloa decipiens, Aristida sp.,***			
Structural Form:			
Average Tree Height (m): 7.5	Canopy layer (%): <5		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?		Y	N
			N
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: 1	Aspect of Slope: SE		
Soil:			
Colour:	Grey brown		
Texture[2]:	Light to medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil:15	Grass/Herbs: 60		
Shrubs <1m: 10	Other (rocks, logs, weeds): 15		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
✓	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

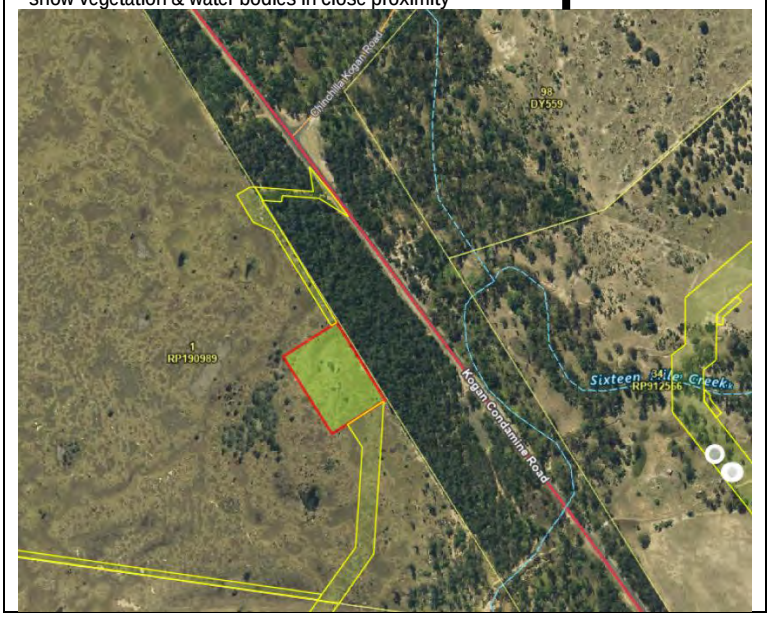
Disturbance

Erosion:								
Insignificant	✓	Minor		Moderate		Severe		
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):								

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south

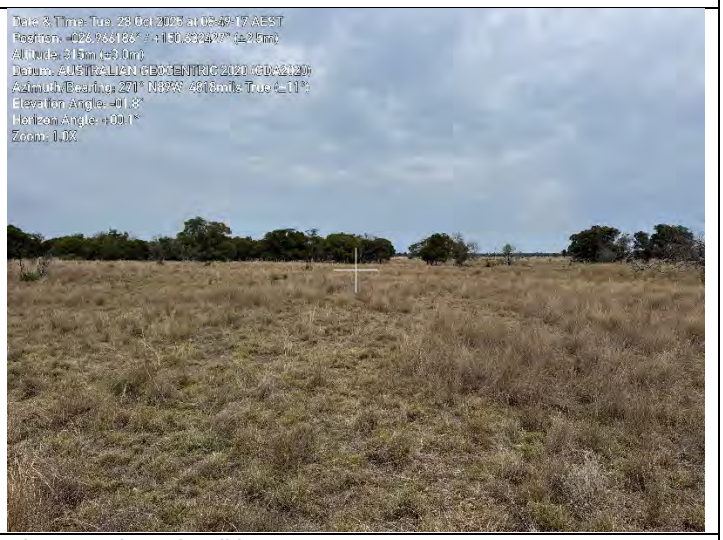


Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP090	Development: (Infrastructure Type)	Development
Lot Plan:	1RP190989	Disturbance size:	100 x 145 (4 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is not located within an ESA or buffers.
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna or microhabitat was observed during the survey.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.	The closest mapped watercourse is a SO4 watercourse approximately 650m to the west.

• If no alternative exists, peg in area of least disturbance and provide justification Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	
Distance to Wetlands *(not including melon holes):* • Complete Wetland Features Report • Record wetland status and type: o Referable and Validated (Mapped and ground truthed as a wetland) o Referable and Not Validated (Mapped and ground truthed as not a wetland) o Non-referable and Validated (Unmapped ground-truthed wetland) Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.: 200m buffer applies for static, GES (no buffer)	There are no mapped wetlands within buffer distance of the site.
Melon Holes (rate on ecological value): *Give details on width, depth, area, vegetation, fauna habitat, disturbance etc*	1 | 2 | 3 | 4 | 5
Weeds present (and general abundance): • Record general composition density & species. • Survey any Restricted Invasive Weeds	
Additional Considerations:	

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: **Shrubs:** **Forbs:** **Grasses and Associates: *Panicum coloratum****			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?		Y	N N
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Grey brown		
Texture[2]:	Light to medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil:15	Grass/Herbs: 75		
Shrubs <1m:	Other (rocks, logs, weeds): 10		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance							
Erosion:							
Insignificant	✓	Minor		Moderate		Severe	

Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

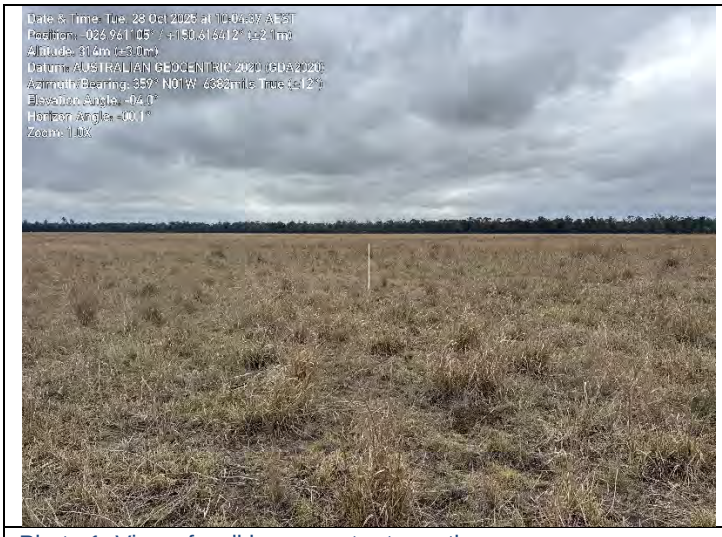


Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP102	Development: (Infrastructure Type)	Development
Lot Plan:	1RP190989	Disturbance size:	100 x 100

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is within the PPZ of a Cat B ESA (RE 11.4.3 Endangered). Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 of EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area of the lot. Vegetation in the adjacent road corridor was assessed as being the Brigalow (Acacia harpophylla dominant and co-dominant) Threatened Ecological Community.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna or microhabitat was observed during the survey.

Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site. • If no alternative exists, peg in area of least disturbance and provide justification Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The closest mapped watercourse is a SO4 watercourse approximately 160m to the west.
Distance to Wetlands *(not including melon holes):* • Complete Wetland Features Report • Record wetland status and type: o Referable and Validated (Mapped and ground truthed as a wetland) o Referable and Not Validated (Mapped and ground truthed as not a wetland) o Non-referable and Validated (Unmapped ground-truthed wetland) Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.: 200m buffer applies for static, GES (no buffer)	There are no mapped wetlands within buffer distance of the site.
Melon Holes (rate on ecological value): *Give details on width, depth, area, vegetation, fauna habitat, disturbance etc*	1 | 2 | 3 | 4 | 5
Weeds present (and general abundance): • Record general composition density & species. • Survey any Restricted Invasive Weeds	
Additional Considerations:	

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: ***Acacia melvillei***			
Shrubs: ***Citrus glauca, Sclerolaena birchii***			
Forbs:			
Grasses and Associates: ***Panicum coloratum*, Sporobolus creber, Urochloa panicoides****			
Structural Form:			
Average Tree Height (m): 4	Canopy layer (%): <5%		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?		Y	N
			N
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: 1%	Aspect of Slope: W		
Soil:			
Colour:	Grey brown		
Texture[2]:	Light clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil:15	Grass/Herbs: 60		
Shrubs <1m: 5	Other (rocks, logs, weeds): 20		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
✓	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance				
Erosion:				
Insignificant	✓	Minor	Moderate	Severe
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):				

SITE LOCATION RECOMMENDED

Yes ☒ No ☐ Yes with conditions ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 11	**Date:**	28 - 10 - 25.
Tenure:	PRP190989	**Assessor(s):**	BM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				**Assessment Location information**	
☑	Well pad	☐	Gas Processing Facility	**Easting (E)**	-26.96618
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	150.63243
☐	Monitoring	☐	Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	**Other description**	WP080
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)					2 | 1		0.3
Avg. height (m)			7.5	4	1.5		
Canopy cover (%)					10		60
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
E. populnea	☐	☐	☑	☐	☐	☐	☐	☐	one tree.
A. harpophylla	☐	☐	☐	☑	☐	☐	☐	☐	
C. cristata	☐	☐	☐	☑	☐	☐	☐	☐	
M. bracteata	☐	☐	☐	☑	☐	☐	☐	☐	
C. glauca	☐	☐	☐	☐	☐	☑	☐	☐	
C. parviflora	☐	☐	☐	☐	☐	☑	☐	☐	
B. decipiens	☐	☐	☐	☐	☐	☐	☐	☑	
E. ramosus	☐	☐	☐	☐	☐	☐	☐	☑	
Aristida sp	☐	☐	☐	☐	☐	☐	☐	☑	
O. foraminosa	☐	☐	☐	☐	☐	☐	☐	☐	scattered.
O. stricta	☐	☐	☐	☐	☐	☐	☐	☐	occasional.
E. desertii	☐	☐	☐	☐	☐	☑	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE	non rem.				
Observed RE[7]	Non Rem				
Additional notes					

Photo numbers	**North:**	**East:**	**South:**	**West:**
	3458	60	62	64

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BM CR 13	**Date:**	28-12-25.
Tenure:	IRP 190989	**Assessor(s):**	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				**Assessment Location information**	
☑	Well pad	☐	Gas Processing Facility	**Easting (E)**	-26.9611
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	150.6164
☐	Monitoring	☐	Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	**Other description**	WP 090
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]		☐	☐	☐	☐	☐	☐
Height range (m)							0.7
Avg. height (m)							
Canopy cover (%)							75.
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
Panicum coloratum	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE					
Observed RE[7]	NR				
Additional notes	Bambatsi pasture				
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3512	14	16	18	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 14	**Date:**	28 - 10 - 25
Tenure:	IRP 190989	**Assessor(s):**	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				**Assessment Location information**	
☑	Well pad	☐	Gas Processing Facility	**Easting (E)**	-26.94946
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	150.6078
☐	Monitoring	☐	Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	**Other description**	WP 102
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)		5 | 2			1.5 | 0.5		
Avg. height (m)		4			5		
Canopy cover (%)		<5					
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
A. ~~melleriana~~ melvillei	☐	☐	☑	☐	☐	☐	☐	☐	
C. glauca	☐	☐	☐	☐	☐	☑	☐	☐	
S. birchii	☐	☐	☐	☐	☐	☐	☑	☐	
P. coloratum	☐	☐	☐	☐	☐	☐	☐	☑	
S. creber	☐	☐	☐	☐	☐	☐	☐	☑	
Urochloa	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE					
Observed RE[7]	NR.				
Additional notes					
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3534	36	38	40	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Ecological Field Survey

arrow energy

SITE IDENTIFICATION			
Site Name:	BMCR 10	Date:	28-10-25
Tenure:	Road Reserve	Assessor(s):	BM

DEVELOPMENT TYPE & LOCATION			
Development Type		Centre of Ecological Stratification Unit (ESU) or 100m x 100m area	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	-26.96381
☐ Pilot Well + Dam	☐ Dam	Northing (N)	150.63166.
☐ Monitoring	☐ Pipeline	Datum	GDA2020, MGA zone: 55 or 56
☑ Roads & Tracks	☐ Seismic Line	Other description	Access off Highway.
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	Notes	Number	Notes
North	# 3438		#	
East	# 40		#	
South	# 42		#	
West	# 44		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pans, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill			Inland dune, inland sand hill
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash			Inland channel country, stream distributary system, intermittently flooded
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole		Saltwater, sea, swamp

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank

Ecological Field Survey

arrow energy

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)							
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Road	
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance	
Dieback	0%	1-25%	26-75%		>76%	n/a	
Site condition	Very good	Good	Moderate		Poor	Degraded	
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**
Disturbance notes	Weeds						

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											
Ecologically dominant layer (EDL)	T1		T2		S1		S2		G		
Avg height (m) of EDL	17				**Avg DBH (cm) of EDL**		35				
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		10-30% (sparse)		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		Sparse		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found on Site
Weed infestations	Found on Site – records below	Not Found on Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
Bryophyllum delagoense	Med.				
Cereus uruguayensis	Low				
Opuntia tomentosa	Med.				
Harrisia martinii	Low				
Cp					

* Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.

Ecological Field Survey ORG-ARW-HSM-FOR-00067

arrow energy

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	-26.96361	End Easting	-26.96400
		Start Northing	150.63155	End Northing	150.63177

Stratum	E	T1	T2	T3	S1	S2/G
Height range (m)		19.10	10 5.		3 1	0.2
Canopy cover (%)		50	15.		35	30

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2/G
		TOTALS						
A. harpophylla				6	5		4	
C. eristata				7				
G. parviflora					1		32	
E. Homentosa								✓
E. nutans								✓
S. stelligerum								
E. aciculars								✓
C. Sarberi								✓
W. subxerophila								✓
Pasp. caespitosum								✓
A. uncinulata								✓
Coleus australis								✓
E. ramosus								✓
Nyssanthes erecta								
Commelina Cyanea								
Abutilon oxycarpum								

Ecological Field Survey ORG-ARW-HSM-FOR-00067

arrow energy

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #						
Native perennial grass	5		2	10		3.4
Native other grass (if relevant)						
Native forbs and other species (non-grass)	2	2			25	5.8
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs	5		8	3	3	3.8
Litter	73	98	90	72	69	80
Rock						
Bare ground	15			15	3	6.6
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	11.4.3	E		
Survey result	11.4.3	E	E	E
Agree with mapped RE? If no, provide justification from field data	Yes.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm diameter)	0	No. of hollow logs	0	Total length of logs (>10cm)	26.5	No. of logs (>10cm)	5
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for nectar / pollen	Absent	Scattered	Common	Abundant
Potential for fleshy fruiting plants	Absent	Scattered	Common	Abundant
Potential for seeding grass cover	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large non-eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Coarse woody debris	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks (>5mm wide & >50mm deep)	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER habitat within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

GREY SNAKE habitat suitability analysis (Grey snake habitat must have the presence of suitable land use, landform, and micro-habitat features within 50 m of freshwater)		
1. LAND USE	No significant ground disturbance (defined as areas with frequent surface disturbance, e.g. cropping, cultivation, roads/tracks). (AND)	Yes / No
2. LANDFORM	Presence of suitable landform (defined as Plains, 'alluvial plain or flat, flood plain' or 'inland clay pan' or 'unspecified, flat, gentle slopes, undulating terrain'; Streams, any feature; Water, any feature (excluding saltwater features). (AND)	Yes / No
3. PHYSIOGRAPHY / Soil	Presence of cracking clay soils (Vertosols, generally >30% clay; defined as 'clay loam' to 'heavy clay') and/or soil cracks (defined as > 5mm wide and 50mm deep: Scattered, Common or Abundant) within **50 m of freshwater** wetlands, drainage features likely to hold water for protracted periods (up to 2-3 months) or gilgai microrelief. (OR)	Yes / No
4. FAUNA HABITAT	Presence of habitat providing suitable shelter (e.g. leaf litter, coarse woody debris; defined as 'leaf litter depth' – multiple or deep layers or 'leaf litter coverage' – abundant or 'coarse woody debris' – abundant) within **50 m of freshwater** wetlands, drainage features likely to hold water for protracted periods (up to 2-3 months) or gilgai microrelief.	Yes / No
Grey snake habitat	**PRESENT** (Grey snake habitat present if: Items 1 and 2 are present in association with 3 and/or 4)	**ABSENT**

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If required, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No		Is the vegetation suitable for slashing only?
	Yes / No		Is the slope < 5%?
	Yes / No		Is the clay content > 20%?
	Yes / No		Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

SSMP- Likelihood of Occurrence Ma[1] 1RP190989

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**: In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types	No Habitat Attribute Present								Unlikely	No	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Brigalow/Belah in REs 11.3.1, 11.4.3, 11.4.10 and 11.9.5.	Remnant or advanced regrowth Acacia harpophylla (brigalow) and Casuarina cristata (belah)	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Brigalow / Belah in REs 11.3.1, 11.4.3, 11.7.1, 11.9.4, 11.9.5, 11.9.6 and 11.9.10	Shelter available from features such as rocks or soil cracks.	Shelter available from ground debris and features such as logs and bark slabs.	Deep cracking black clay and loam soils.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Brigalow / Belah.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Brigalow melon-hole country with woody debris, soil cracks and water.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Cleared land with good-quality melon holes	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Open Eucalypt and Brigalow forests and woodlands <1km from permanent water as well as floodplains including riverine communities.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Roadside strips of Brigalow/Belah.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Brigalow melon-hole country with woody debris, soil cracks and water.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Clynes Road (2DY94) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 3100 metres of access and gathering (30m), 2300m of access (10m) and wells (WP050, WP088 & WP085)		
Lot Plan:	2DY94	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	27/10/2025 BM

Facility Type / Activity:

Wells	☐ Core	☐ Exploration
☐ Appraisal	☑ Development / Production	☐ Monitoring
☐ Microseismic	☑ Directional	☐ Tiltmeter Array
☐ Gravel Pit	☐ Campsite	☑ Access Track
☐ Seismic	☑ Gathering System	☐ Security Hut
☐ Trunkline	☐ Gas Pipeline	☐ Water Pipeline
☐ Comms Towers	☐ Fibre Optic Cable	☐ Pond
☐ FCS (Field Compression Station)	☐ CPP (Central Processing Plant)	☐ WTP (Water Treatment Plant)
☐ Other:		☐ Frac Pond

RECOMMENDATIONS:

☐ No Environmental issues on site	☑ Environmental issues identified & surveyed	☑ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

An unmapped shade area crossed by gathering on the south of the survey area was assessed as being advanced regrowth / remnant Endangered RE11.4.3 and subsequently identified as the Brigalow TEC. As such this area is a Category B ESA. It is recommended that the alignment be moved to the west to avoid this ESA.

Vegetation in the Wambo Creek corridor was assessed as remnant RE11.3.25, which has a Biodiversity Status of Of Concern. As such, this vegetation is a Category C ESA.

Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.*

To disturb these areas would require an EA amendment. Consideration should be given to underboring of Wambo Creek.

A LoOM (Likelihood of Occurrence Matrix) which examines habitat for threatened fauna species found that Australian Painted Snipe (*Rostratula australis*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur and utilise riverine habitat present on Wambo Creek.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use is grazing with the property mapped as non-remnant vegetation in all the proposed impact areas. Vegetation is improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is state mapped as non-remnant throughout Lot 2DY94. Vegetation in the crossing of Wambo Creek is mapped as RE11.3.18/11.5.1/11.3.25 (40/40/20). At this location the vegetation conforms to RE 11.3.25 which has a VM Status of Least Concern and a Biodiversity Status of Of Concern. The vegetation at this location is in a degraded condition due to an irrigation impoundment on the creek.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	No ESAs were mapped within the property. However, an unmapped shade area crossed by gathering on the south of the survey area was assessed as being advanced regrowth and remnant Endangered RE11.4.3 and subsequently identified as the Brigalow TEC. As such this area is a Cat B ESA. Vegetation in the Wambo Creek corridor was assessed as remnant RE11.3.25 which has a Biodiversity Status of Of Concern. As such this vegetation is a Category C ESA. Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas*. To disturb these areas would require an EA amendment. Consideration should be given to realignment to avoid the Cat B ESA and underboring of Wambo Creek Cat C ESA.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There are no mapped TECs within the property, however, vegetation mentioned above is regrowth/remnant RE11.4.3 and was assessed as being the Brigalow TEC. It is recommended that the alignment be moved to the west to avoid this TEC.
DoR-mapped High-value Regrowth present / impacted:	There is no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is largely cleared but some areas have scattered regrowth up to 5 metres tall of brigalow community species.
EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.

EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of how site conditions are unsuitable.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Australian Painted Snipe (*Rostratula australis*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur and utilise riverine habitat present on Wambo Creek.

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	Wambo Creek (SO4) is crossed by the gathering system on the northern side of the property. There is a SO1 drainage to the south of Wambo Creek that will be crossed by the gathering system. There were no mapped wetlands on the property or within buffer distance.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area. High Risk species *Bryophyllum delagoense* was observed in medium densities along Wambo Creek and at lower levels on other drainages.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing although much of the area is cleared. However, there is habitat present such as shallow gilgai on cracking clay soils, windrows and fallen logs in addition to a small numbers of tree hollows.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Bruce McLennan	14/11/25
Completed By	**Date**

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 2DY94
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint of an access and gathering layout 30 metres wide and access tracks 10 metres wide. One area of environmental constraint (CAT B ESA - Endangered RE11.4.3) noted at the time of survey will require a realignment.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	2DY94 is a grazing property mostly cleared of woody vegetation and with improved pasture.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering within the lot is state mapped as non-remnant. This mapping is correct. Vegetation in the crossing of Wambo Creek is mapped as RE11.3.18/11.5.1/11.3.25 (40/40/20). At this location the vegetation conforms to RE 11.3.25 which has a VM Status of Least Concern and a Biodiversity Status of Of Concern.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No ESAs were mapped within the property. However, an unmapped shade area crossed by gathering on the south of the survey area was assessed as being advanced regrowth / remnant Endangered RE11.4.3 and subsequently identified as the Brigalow TEC. As such this area is a Category B ESA. Vegetation in the Wambo Creek corridor was assessed as remnant RE11.3.25 which has a Biodiversity Status of Of Concern. As such this vegetation is a Category C ESA. Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas*. **To disturb these areas would require an EA amendment.** Consideration should be given to realignment to avoid the Cat B ESA and underboring of Wambo Creek (Cat C ESA).
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There are no mapped TECs within the property, however, vegetation mentioned above is regrowth/remnant RE11.4.3 and was assessed as being the Brigalow TEC.

	It is recommended that the alignment be moved to the west to avoid this TEC.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Australian Painted Snipe (*Rostratula australis*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur and utilise riverine habitat present on Wambo Creek.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	Wambo Creek (SO4) is crossed by the gathering system on the northern side of the property. There is a SO1 drainage to the south of Wambo Creek that will be crossed by the gathering system. There were no mapped wetlands on the property or within buffer distance.
Current road access to proposed site: Existing / to be upgraded / new	Road access is gravel shire roads and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: *Eucalyptus tereticornis* (Queensland blue gum), *Blakella tessellaris* (Moreton Bay ash), *Angophora floribunda* (rough barked apple), *Callitris glaucophylla* (white cypress pine), *Allocasuarina luehmannii* (bull oak), *Eremophila mitchellii* (bastard sandalwood), *Eucalyptus woollsiana* (inland grey box), *Acacia harpophylla* (brigalow), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), *Melaleuca bracteata* (black tea-tree) Shrubs: *Denhamia cunninghamii (*orange berry bush), *Jasminum didymum lineare* (desert jasmine), *Acacia leiocalyx* (black wattle), *Myoporum acuminatum* (western boobialla), *Leptospermum polygalifolium* (tantoon), *Acacia salicina* (Sally wattle), *Psydrax oleifolia* (brush myrtle), *Citrus glauca* (lime bush), *Eremophila mitchellii* (bastard sandalwood), *Geijera parviflora* (wilga), *Eremophila deserti* (Ellangowan poison bush), *Maireana microphylla* (bluebush), *Acacia muelleriana* (Mueller's wattle), *Santalum lanceolatum* (sandalwood), *Capparis lasiantha* (nipan), *Grevillea striata* (beefwood), *Sclerolaena birchii* (galvanised burr), *Sclerolaena tetracuspis* (brigalow burr) Ground: *Aristida caput-medusae* (many-headed wiregrass), *Cheilanthes sieberi* (brigalow fern), *Arundinella nepalensis* (reedgrass), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Senecio brigalowensis* (native fireweed), *Aristida jerichoensis* (Jericho wiregrass), *Lomandra longifolia*

	(spike rush), *Dianella brevipedunculata* (blue flax-lily), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Themeda triandra* (kangaroo grass), *Enteropogon acicularis* (windmill grass), *Aristida ramosa* (purple wiregrass), *Sporobolus creber* (slender rats-tail grass), *Enteropogon ramosus* (windmill grass),
Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	25-50
Soil type & erodibility (Sodic: Y/N):	Deep and shallow cracking light to medium clay soils with low erodibility. Some areas with moderate gilgai structure. Texture contrast soils with sandy A horizons and highly erodible sodic B horizons.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	A natural drainage crossed by access and gathering is an active gully erosion with tunnelling in the sodic substrate. This area will need careful attention to sediment control and subsequent rehabilitation of the site. (Photo 2)
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-2%
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High Risk: *Opuntia tomentosa* (velvety tree pear) in low numbers. High Risk: *Opuntia stricta* (common pest pear) in low numbers. High Risk: *Bryophyllum delagoense* (mother-of-millions) in low to moderate numbers on drainage lines.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Brigalow regrowth TEC	5		Cat B ESA	Move alignment to west and go around

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Natural drainage (SO1)	2		Active erosion zone	Sediment control plan and rehabilitation plan

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Wambo Creek crossing (SO4)	1		Riparian	

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: Access and gathering crossing point on Wambo Creek (SO4) RE 11.3.25.



Photo 2: Natural drainage with active erosion zone at the crossing point



Photo 3: Access and gathering with scattered regrowth



Photo 4: Poplar box regrowth south of Wambo Creek.



Photo 5: Regrowth RE11.4.3 (TEC) to be avoided



Photo 6: Access across level cleared pasture with light gilgai



Photo 7: Access with areas of larger deeper gilgai in the centre of the lot.

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP050	Development: (Infrastructure Type)	Development
Lot Plan:	2DY94	Disturbance size:	100 x 205 (8 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is not located within an ESA or buffers.
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna or microhabitat was observed during the survey.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.	The closest mapped watercourse is a SO4 watercourse approximately 280m to the north.

• If no alternative exists, peg in area of least disturbance and provide justification Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	
Distance to Wetlands *(not including melon holes):* • Complete Wetland Features Report • Record wetland status and type: o Referable and Validated (Mapped and ground truthed as a wetland) o Referable and Not Validated (Mapped and ground truthed as not a wetland) o Non-referable and Validated (Unmapped ground-truthed wetland) Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.: 200m buffer applies for static, GES (no buffer)	There are no mapped wetlands within buffer distance of the site.
Melon Holes (rate on ecological value): *Give details on width, depth, area, vegetation, fauna habitat, disturbance etc*	1 | 2 | 3 | 4 | 5
Weeds present (and general abundance): • Record general composition density & species. • Survey any Restricted Invasive Weeds	*Opuntia* species in low numbers
Additional Considerations:	

Ecological Characteristics
Dominant Species: (trees, bushes, grasses)
Trees: ***Eucalyptus populnea, Geijera parviflora, Citrus glauca, Eremophila mitchellii***
Shrubs: ***Psydrax oleifolia, Eremophila mitchellii, Capparis lasiantha, Callitris glaucophylla, Grevillea striata***
Forbs:
Grasses and Associates: ***Aristida jerichoensis, Bothriochloa decipiens, Enteropogon acicularis, Aristida caput medusae***

Structural Form:	
Average Tree Height (m): 5	Canopy layer (%): 5
Structural Form (Specht 1970[1]): derived grassland	

Habitat Description:		
Is a further detailed flora/fauna assessment required?	Y	N
		N
If yes, what type and reasons for:		

Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0
Hollow bearing trees (count): 0	
Slope: <1%	Aspect of Slope:

Soil:	
Colour:	Brown
Texture[2]:	Light clay
Land Zone:	4/5
Salinity:	

Groundcover: (%)	
Bare soil: 20	Grass/Herbs: 45
Shrubs <1m: 10	Other (rocks, logs, weeds): 25

	Environmentally Sensitive Areas (ESA) Tick, if site is located within:
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance

Erosion:							
Insignificant	✓	Minor		Moderate		Severe	
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):							

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

	
Photo 1: View of well lease centre to north	Photo 2: View of well lease centre to east
	
Photo 3: View of well lease centre to south	Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP085	Development: (Infrastructure Type)	Development
Lot Plan:	2DY94	Disturbance size:	100 x 125

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant. There is scattered brigalow community regrowth to 8 metres on the site.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is not located within an ESA or buffers.
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna was observed during the survey. Low relief gilgai was observed on the site and rated 2 on the habitat quality scale. The area has low habitat potential for Grey Snake (*Hemiaspis damelii*). Refer to the LoOM for this property.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist*	The closest mapped watercourse is a SO2 watercourse approximately 800m to the east.

<table>
<tr><td>

- For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.
- If no alternative exists, peg in area of least disturbance and provide justification

Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

</td><td></td></tr>
<tr><td>

Distance to Wetlands *(not including melon holes):*

- Complete Wetland Features Report
- Record wetland status and type:
  - Referable and Validated (Mapped and ground truthed as a wetland)
  - Referable and Not Validated (Mapped and ground truthed as not a wetland)
  - Non-referable and Validated (Unmapped ground-truthed wetland)

Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.:

200m buffer applies for static, GES (no buffer)

</td><td>There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td>

Melon Holes (rate on ecological value):

Give details on width, depth, area, vegetation, fauna habitat, disturbance etc

</td><td>

1	2	3	4	5

2: Shallow gilgai over much of the site with Juncus common. Currently dry.

</td></tr>
<tr><td>

Weeds present (and general abundance):

- Record general composition density & species.
- Survey any Restricted Invasive Weeds

</td><td>*Opuntia* species in low numbers</td></tr>
<tr><td>Additional Considerations:</td><td></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: ***Acacia harpophylla, Melaleuca bracteata***			
Shrubs: ***Geijera parviflora, Eremophila deserti***			
Forbs:			
Grasses and Associates: ***Paspalidium caespitosum, Walwhalleya subxerophila***			
Structural Form:			
Average Tree Height (m): 8	Canopy layer (%): 30		
Structural Form (Specht 1970[1]): derived grassland/shrubland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Grey Brown		
Texture[2]:	Light to medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil: 40	Grass/Herbs: 50		
Shrubs <1m: 5	Other (rocks, logs, weeds): 5		
Environmentally Sensitive Areas (ESA) Tick, if site is located within:			
	Category A ESA (e.g., national park, conservation park)		
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).		
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).		
	300m of Category A or B ESA		
	In or within 300m of a Category C ESA		
	within an area with overlapping ESAs		
If YES in any of the above, provide justification or tick appropriate box below:			
	pre-existing area of significant disturbance in the buffer zone		
	undisturbed areas more than 100m from the ESA		
	undisturbed areas less than 100m from the ESA		
	pre-existing areas of significant disturbance within the ESA		
	areas within the ESA of lower environmental value		
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon		
Vegetation Management			
Does the proposed development involve vegetation clearing?			
	that isolates clumps or dissects corridors of vegetation		
	on dispersible soils		
	in existing or potential discharge areas		
If YES in any of the above, provide justification:			
Disturbance			
Erosion:			

Insignificant	✓	Minor		Moderate		Severe	
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):							

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

	
Photo 1: View of well lease centre to north	Photo 2: View of well lease centre to east
	
Photo 3: View of well lease centre to south	Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP088	Development: (Infrastructure Type)	Development
Lot Plan:	2DY94	Disturbance size:	100 x 100

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is not located within an ESA or buffers.
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna was observed during the survey. Low relief gilgai was observed on the site and rated 2 on the habitat quality scale. The area has low habitat potential for Grey Snake (*Hemiaspis damelii*). Refer to the LoOM for this property.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.	The closest mapped watercourse is a SO2 watercourse approximately 1200m to the east.

<table>
<tr><td>

- If no alternative exists, peg in area of least disturbance and provide justification

Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

</td><td></td></tr>
<tr><td>

Distance to Wetlands *(not including melon holes):*

- Complete Wetland Features Report
- Record wetland status and type:
  - Referable and Validated (Mapped and ground truthed as a wetland)
  - Referable and Not Validated (Mapped and ground truthed as not a wetland)
  - Non-referable and Validated (Unmapped ground-truthed wetland)

Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.:

200m buffer applies for static, GES (no buffer)

</td><td>There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td>

Melon Holes (rate on ecological value):

Give details on width, depth, area, vegetation, fauna habitat, disturbance etc

</td><td>

1	2	3	4	5

2: Shallow gilgai over most of the site with Eleocharis and Juncus common throughout. Currently dry.

</td></tr>
<tr><td>

Weeds present (and general abundance):

- Record general composition density & species.
- Survey any Restricted Invasive Weeds

</td><td></td></tr>
<tr><td>Additional Considerations:</td><td></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: ***Casuarina cristata***			
Shrubs: ***Maireana microphylla***			
Forbs: ***Eleocharis blakeana, Juncus usitatus***			
Grasses and Associates: ***Bothriochloa decipiens, Walwhalleya subxerophila, Sporobolus creber***			
Structural Form:			
Average Tree Height (m): 5	Canopy layer (%): 5		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Grey Brown		
Texture[2]:	Light to medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil: 20	Grass/Herbs: 70		
Shrubs <1m: 5	Other (rocks, logs, weeds): 5		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance				
Erosion:				
Insignificant	✓	Minor	Moderate	Severe
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):				

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

	
Photo 1: View of well lease centre to north	Photo 2: View of well lease centre to east
	
Photo 3: View of well lease centre to south	Photo 4: View of well lease centre to west

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Arrow Jammat (2DY94)			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Crossed by access.			
Lot Plan:	2DY94	**Crossing type:**	Existing Crossing / No Upgrade Required: Existing Crossing / Upgrade Required: New Crossing in previously disturbed area: New Crossing in undisturbed area:	☐ ☐ ☐ ☒
Survey sketch point #:		**Bank full width**		
		Bank width		
		Bed width		
		Bank height from bed		
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y		SO1
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	Y	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	Y		
c) does not appear to have enough continuing flow to create a riverine environment.	Y		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).		If **YES** to all, the feature is a watercourse.	
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature		If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	

<u>Summary is required for how determination was made of the water feature:</u>

The watercourse feature has no defined banks. There are no aquatic species or riparian habitat. The crossing point coincides with an area of active erosion.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Water Features – Pre-works Notification Photos

5 photos required for each bed-level access crossing. Photos to be taken as per instructions below.

Latitudinal and longitudinal extent for area (decimal degrees i.e. ddd.ddddd):
Survey sketch point #:
Photo (A) – Looking across the waterway at the proposed site of works *Across the watercourse at the proposed site of the bed-level crossing.*



Photo (B) – Looking upstream from crossing *Standing at the point of the crossing, and looking upstream.*

Photo (C) – Looking downstream from crossing *Standing at the point of the crossing, and looking downstream.*

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (D) – Looking upstream towards crossing
Standing slightly downstream of the point of the crossing, and looking upstream (photographing the crossing point and upstream of it).

Photo (E) – Looking downstream towards crossing
Standing slightly upstream of the point of the crossing, and looking downstream (photographing the crossing point and downstream of it.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Arrow Jammat (2DY94)			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Crossed by access.			
Lot Plan:	2DY94	**Crossing type:**	Existing Crossing / No Upgrade Required: Existing Crossing / Upgrade Required: New Crossing in previously disturbed area: New Crossing in undisturbed area:	☐ ☐ ☐ ☒
Survey sketch point #:		**Bank full width**	**50**	
		Bank width	**15**	
		Bed width	**20**	
		Bank height from bed	**3**	
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y	Wambo Creek	SO4
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	N	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	Y		
c) does not appear to have enough continuing flow to create a riverine environment.	N		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).	Y	If **YES** to all, the feature is a watercourse.	
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature	Y	If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	

<u>Summary is required for how determination was made of the water feature:</u>

The watercourse has an established riparian ecology with defined banks and semi-permanent water due to an irrigation impoundment. The impoundment and raised water levels has resulted in the dieback of trees lower in the channel and some on the higher bank.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Water Features – Pre-works Notification Photos

5 photos required for each bed-level access crossing. Photos to be taken as per instructions below.

Latitudinal and longitudinal extent for area (decimal degrees i.e. ddd.ddddd):
Survey sketch point #:

Photo (A) – Looking across the waterway at the proposed site of works *Across the watercourse at the proposed site of the bed-level crossing.*

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (B) – Looking upstream from crossing
Standing at the point of the crossing, and looking upstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (C) – Looking downstream from crossing
Standing at the point of the crossing, and looking downstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (D) – Looking upstream towards crossing
Standing slightly downstream of the point of the crossing, and looking upstream (photographing the crossing point and upstream of it).

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (E) – Looking downstream towards crossing
Standing slightly upstream of the point of the crossing, and looking downstream (photographing the crossing point and downstream of it.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 05	**Date:**	27-10-25
Tenure:	2D494	**Assessor(s):**	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		**Assessment Location information**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	-26.97104
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	150.59578
☐ Monitoring	☐ Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	**Other description**	WP050
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)		6 | 3				3 | 1	0.5
Avg. height (m)		5				2.5	
Canopy cover (%)		5				10	45
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
E. populnea	☐	☐	☑	☐	☐	☐	☐	☐	
C. pauciflora	☐	☐	☐	☑	☐	☐	☐	☐	
C. glauca	☐	☐	☐	☑	☑	☐	☐	☐	
E. mitchellii	☐	☐	☐	☑	☐	☑	☐	☐	
P. oleifolia	☐	☐	☐	☐	☐	☑	☐	☐	
C. lasiantha	☐	☐	☐	☐	☐	☑	☐	☐	
B. decipiens	☐	☐	☐	☐	☐	☐	☐	☑	
A. capitmedusae	☐	☐	☐	☐	☐	☐	☐	☑	
A. jeffreysii	☐	☐	☐	☐	☐	☐	☐	☑	
E. cambageana	☐	☐	☐	☐	☐	☐	☐	☑	
C. glaucophylla	☐	☐	☐	☑	☐	☐	☐	☑	
G. striata	☐	☐	☐	☐	☐	☑	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE	Non Rem				
Observed RE[7]	Non Rem				
Additional notes					

Photo numbers	**North:**	**East:**	**South:**	**West:**
	3312	14	16	18

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 06	**Date:**	27-10-25
Tenure:	2D494.	**Assessor(s):**	BM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		**Assessment Location information**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	-26.97525
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	150.59918.
☐ Monitoring	☑ Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	**Other description**	TEC ? 11.4.3
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]		☐	☐	☐	☐	☐	☐
Height range (m)		15 | ~~8~~	8 | 4				0.3
Avg. height (m)		10	5.				
Canopy cover (%)		30	25.				20.
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification								
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
A. harpophylla.	☐	☐	☑	☑	☐	☐	☑	☐	
C. cristata.	☐	☐	☑	☑	☐	☐	☐	☐	
G. parv. flora.	☐	☐	☐	☑	☐	☑	☐	☐	
S. lanceolatum.	☐	☐	☐	☑	☐	☐	☐	☐	
P. caespitosum	☐	☐	☐	☐	☐	☐	☐	☑	
Wallwalleya sp.	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE	Non-Re				
Observed RE[7]	11.3.4.3	HVR ?			
Additional notes					
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3320	22	24	26.	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 09	**Date:**	27-10-25
Tenure:	2DY94.	**Assessor(s):**	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				**Assessment Location information**	
☑	Well pad	☐	Gas Processing Facility	**Easting (E)**	-26.97745
☐	Pilot Well + Dam	☐	Dam	**Northing (N)**	150.62776
☐	Monitoring	☐	Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	**Other description**	WP085
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)		9 | 5			1·5 | 1		0·3
Avg. height (m)		8			1		
Canopy cover (%)		30			5		40
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
A. harpophylla	☐	☐	☑	☐	☐	☑	☐	☐	
M. bradleyana	☐	☐	☑	☐	☐	☑	☐	☐	
G. pannifloria	☐	☐	☐	☐	☐	☑	☐	☐	
Paspalidium	☐	☐	☐	☐	☐	☐	☐	☑	
W. subxerophila	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE					
Observed RE[7]	Non Rem.				
Additional notes					
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3424	26	28	30	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrowenergy

Site Identification			
Site Name:	BMCR 12	Date:	28 - 10 - 25.
Tenure:	2D494	Assessor(s):	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				Assessment Location information	
☑	Well pad	☐	Gas Processing Facility	Easting (E)	
☐	Pilot Well + Dam	☐	Dam	Northing (N)	
☐	Monitoring	☐	Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	Other description	WP088.
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)		6 | 3					0.3
Avg. height (m)		5.					
Canopy cover (%)		5.					40
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
C. cristata	☐	☐	☑	☐	☐	☐	☐	☐	
B. decipiens	☐	☐	☐	☐	☐	☐	☐	☑	
E. blakeana.	☐	☐	☐	☐	☐	☐	☐	☑	
W. Subxerophila	☐	☐	☐	☐	☐	☐	☐	☑	
M. microphyll –	☐	☐	☐	☐	☐	☑	☐	☐	
S. creber	☐	☐	☐	☐	☐	☐	☐	☑	
T. usitatus.	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE					
Observed RE[7]	Non Rem				
Additional notes	Verging melon hole – very shallow.				
Photo numbers	North:	East:	South:	West:	
	3494	96	98	3500	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Ecological Field Survey ORG-ARW-HSM-FOR-00067

arrow energy

SITE IDENTIFICATION			
Site Name:	BM CR 04	**Date:**	27-10-25.
Tenure:		**Assessor(s):**	Bm

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	-26.96779
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	150.59111
☐ Monitoring	☑ Pipeline	**Datum**	GDA2020, MGA zone: 55 or 56
☐ Roads & Tracks	☐ Seismic Line	**Other description**	Creek crossing -
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 3272		#	
East	# 74		#	
South	# 76		#	
West	# 78.		#	

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pans, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill		Inland dune, inland sand hill	
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash		Inland channel country, stream distributary system, intermittently flooded	
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)				
	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)				
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red				
	Black	Grey	Pale	Dark	Mottled				
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'		
	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'		
	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)				
Erosion	Absent	Scattered	Frequent					
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank		

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	(Grazing)	Forestry	Cropping	Conservation	Mining	Other:		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	(26-75%)	>76%	~~n/a~~			
Site condition	Very good	Good	Moderate	(Poor)	Degraded			
Fire scars	(Absent)	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes	~~cleared pasture throughout.~~ Creek highly disturbed – impound water canopy death.							

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	(**RIP**)	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											
Ecologically dominant layer (EDL)	(T1)		T2		S1		S2		G		
Avg height (m) of EDL	24				**Avg DBH (cm) of EDL**		50				
Canopy cover (%) of EDL	>70% (dense/closed)		30-70% (mid-dense)		(10-30% (sparse))		<10% (very sparse)		n/a		
Functional shrub layer density (<2m)	Dense/closed		Mid-dense		(Sparse)		Very sparse		Absent		

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	(Not Found on Site)
Weed infestations	(Found on Site – records below)	Not Found on Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number
D. delagoense.	low.				

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey

arrow energy

VEGETATION FLORISTICS (record all species within 50m x 10m transect)												
Transect Start compass bearing			Start Easting			End Easting	-26.96781					
			Start Northing			End Northing	150.59086					
Stratum	E		T1		T2		T3		S1		S2/G	
Height range (m)		24	28	14	14	7						
Canopy cover (%)			20		9.							

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2/G
		TOTALS						
E. tetraticornis				2				
A. hookeriana				1				
C. sieberiana					1		2	
L. longifolia								✓
B. delagoense*								✓
L. polygalifolium							6	
A. latifrons					23			✓
Poidolepis								✓
J. usitatus								
A. nepalensis								
H. contortus								

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	**1**	**2**	**3**	**4**	**5**	**Mean**
Photo #						
Native perennial grass			15		15.	6
Native other grass (if relevant)						
Native forbs and other species (non-grass)	70	40	15	75	35.	47
Native shrubs (<1m)						
Non-native grass						
Non-native forbs and shrubs					5.	1
Litter	20	10	65.	15.	40.	~~50~~ 30
Rock						
Bare ground	10	50	5	10	5	16
Cryptogams						
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	**EPBC Status**	**VM Act Status**	**Biodiversity Status**
Mapped RE	11.3.25			
Survey result	11.3.25		LC	OC
Agree with mapped RE? If **no**, provide justification from field data				

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm diameter)	✓	**No. of hollow logs**	✓	**Total length of logs (>10cm)**	12.5.	**No. of logs (>10cm)**	3
Per hectare (x 20)		**Per hectare (x 20)**		**Per hectare (x 20)**		**Per hectare (x 20)**	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	**Status**			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large non-eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Coarse woody debris	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks (>5mm wide & >50mm deep)	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER habitat within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

GREY SNAKE habitat suitability analysis (Grey snake habitat must have the presence of suitable land use, landform, and micro-habitat features within 50 m of freshwater)		
1. LAND USE	No significant ground disturbance (defined as areas with frequent surface disturbance, e.g. cropping, cultivation, roads/tracks). (AND)	Yes / No
2. LANDFORM	Presence of suitable landform (defined as Plains, 'alluvial plain or flat, flood plain' or 'inland clay pan' or 'unspecified, flat, gentle slopes, undulating terrain'; Streams, any feature; Water, any feature (excluding saltwater features). (AND)	Yes / No
3. PHYSIOGRAPHY / Soil	Presence of cracking clay soils (Vertosols, generally >30% clay; defined as 'clay loam' to 'heavy clay') and/or soil cracks (defined as > 5mm wide and 50mm deep: Scattered, Common or Abundant) within **50 m of freshwater** wetlands, drainage features likely to hold water for protracted periods (up to 2-3 months) or gilgai microrelief. (OR)	Yes / No
4. FAUNA HABITAT	Presence of habitat providing suitable shelter (e.g. leaf litter, coarse woody debris; defined as 'leaf litter depth' – multiple or deep layers or 'leaf litter coverage' – abundant or 'coarse woody debris' – abundant) within **50 m of freshwater** wetlands, drainage features likely to hold water for protracted periods (up to 2-3 months) or gilgai microrelief.	Yes / No
Grey snake habitat	PRESENT (Grey snake habitat present if: Items 1 and 2 are present in association with 3 and/or 4)	ABSENT

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

SSMP- Likelihood of Occurrence Ma[1] 2DY94

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**: In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Shallow permanent water in the flood out zones of major streams or "anabranches" of smaller streams where there is still water, sedges, aquatic vegetation and dense ground cover. Mostly associated with open pasture areas surrounded by mature vegetation.	Permanent shallow water or water of varying depths.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	No Habitat Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Timbered watercourses dominated by eucalypt species in REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E. acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Riverine woodlands.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary feed trees, bieng E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada and E. tereticornis ssp. tereticornis represent the dominant canopy species within the vegetation community.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluczana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Riverine woodlands with sandy areas, cattle tracks and low impact grazing.	Watercourse with sandy bed and degraded remnant or non-remnant eucalypt/ box vegetation.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Other eucalypt-dominated woodlands and forests, including riparian woodlands: potentially in REs 11.3.2, 11.3.3, 11.3.17, 11.3.18, 11.3.25, 11.3.27f, 11.4.12, 11.5.4, 11.5.5, 11.7.4, 11.9.7, 11.9.10 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Jammat Clynes Road (2RP82810) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 2580 metres of access and gathering (30m), 3580m of access (10m) and wells (WP112, WP115 & WP330)		
Lot Plan:	2RP82810	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	29-30/10/2025 BM
Facility Type / Activity:	Wells ☐ Appraisal ☐ Microseismic ☐ Gravel Pit	☐ Core ☑ Development / Production ☑ Directional ☐ Campsite	☐ Exploration ☐ Monitoring ☐ Tiltmeter Array ☑ Access Track
	☐ Seismic ☐ Trunkline ☐ Comms Towers ☐ FCS (Field Compression Station) ☐ Other:	☑ Gathering System ☐ Gas Pipeline ☐ Fibre Optic Cable ☐ CPP (Central Processing Plant)	☐ Security Hut ☐ Water Pipeline ☐ Pond ☐ WTP (Water Treatment Plant) ☐ Frac Pond

RECOMMENDATIONS:		
☐ No Environmental issues on site	☑ Environmental issues identified & surveyed	☑ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Vegetation in the Sixteen Mile Creek corridor was assessed as remnant RE11.3.25 which has a Biodiversity Status of Of Concern. As such this vegetation is a Category C ESA.

Under EA0001401 (which applies to this project) section Biodiversity 6 states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* **To disturb these areas would require an EA amendment.** Consideration should be given to underboring of Sixteen Mile Creek.

A LoOM (Likelihood of Occurrence Matrix) which examines habitat for threatened fauna species found that Australian Painted Snipe (*Rostratula australis*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act), Grey Snake (*Hemiaspis damelli*) (Endangered NC Act and EPBC Act), Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur. Koala, Australian Painted Snipe and Brown Treecreeper were most likely to utilise riverine habitat and permanent water present on Sixteen Mile Creek. Grey Snake and Glossy Black-cockatoo were more likely to utilise Brigalow Belah gilgai and scattered feed tree habitat in the north of the study area.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use is grazing with the property mapped as non-remnant vegetation in all the proposed impact areas. Vegetation is improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is state mapped as non-remnant throughout Lot 2RP82810. Vegetation in the crossing of Sixteen Mile Creek is mapped as non remnant. At the crossing location the vegetation conforms to remnant RE 11.3.25 which has a VM Status of Least Concern and a Biodiversity Status of Of Concern. The vegetation at this location is in good condition.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	No ESAs were indicated by mapping within the property. However, two shade lines on the eastern boundary were assessed as being advanced regrowth of Endangered RE11.4.3 and subsequently identified as the Brigalow TEC. As such these areas are Cat B ESAs. The alignment detours around these areas. Vegetation in the Sixteen Mile Creek corridor was assessed as remnant RE11.3.25 which has a Biodiversity Status of Of Concern. As such this vegetation is a Category C ESA.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There are no mapped TECs within the property, however, vegetation mentioned above is regrowth RE11.4.3 and was assessed as being the Brigalow TEC.
DoR-mapped High-value Regrowth present / impacted:	There is no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is largely cleared but some areas have scattered regrowth up to 7 metres tall of brigalow community species.
EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected?	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Australian Painted Snipe (*Rostratula australis*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act), Grey Snake (*Hemiaspis damelli*) (Endangered NC Act and EPBC Act), Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) (Vulnerable NC

3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of how site conditions are unsuitable.	Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur. Koala, Australian Painted Snipe and Brown Treecreeper were most likely to utilise riverine habitat and permanent water present on Sixteen Mile Creek. Grey Snake and Glossy Black-cockatoo were more likely to utilise Brigalow Belah gilgai and scattered feed tree habitat in the north of the study area.

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	Sixteen Mile Creek (SO2) is crossed by the gathering system within the property. There is a SO3 drainage on the western side of the property that will be crossed by the gathering system. There were no mapped wetlands on the property or within buffer distance.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area. High Risk species *Bryophyllum delagoense* was observed in low to medium densities along Sixteen Mile Creek.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing although much of the area is cleared. However, there is habitat present such as shallow gilgai on cracking clay soils, windrows and fallen logs in addition to a small numbers of tree hollows.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Completed By	Date
Bruce McLennan	14/11/25

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 2RP82810
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint of an access and gathering layout 30 metres wide and access tracks 10 metres wide.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	2RP82810 is a grazing property mostly cleared of woody vegetation and with improved pasture.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering within the lot is state mapped as non-remnant. This mapping is correct for the most part. However, unmapped vegetation along Sixteen Mile Creek is remnant RE11.3.25 (Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines). Vegetation in the crossing of Sixteen Mile Creek is mapped as non remnant. At this location the vegetation conforms to remnant RE 11.3.25 which has a VM Status of Least Concern and a Biodiversity Status of Of Concern.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No ESAs were indicated by mapping within the property. However, two shade lines on the eastern boundary were assessed as being advanced regrowth of Endangered RE11.4.3 and subsequently identified as the Brigalow TEC. As such these areas are Cat B ESAs. The alignment detours around these areas. Vegetation in the Sixteen Mile Creek corridor was assessed as remnant RE11.3.25 which has a Biodiversity Status of Of Concern. As such this vegetation is a Category C ESA. Under EA0001401 (which applies to this project) section Biodiversity 6 states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* **To disturb these areas would require an EA amendment.** Consideration should be given to underboring of Sixteen Mile Creek.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There are no mapped TECs within the property, however, vegetation mentioned above is regrowth RE11.4.3 and was assessed as being the Brigalow TEC. This area will not be impacted.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.

Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Australian Painted Snipe (*Rostratula australis*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act), Grey Snake (*Hemiaspis damelli*) (Endangered NC Act and EPBC Act), Glossy Black-cockatoo (*Calyptorhynchus lathami lathami*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur. Koala, Australian Painted Snipe and Brown Treecreeper were most likely to utilise riverine habitat and permanent water present on Sixteen Mile Creek. Grey Snake and Glossy Black-cockatoo were more likely to utilise Brigalow Belah gilgai and scattered feed tree habitat in the north of the study area.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	Sixteen Mile Creek (SO2) is crossed by the gathering system on the south of the property. There is a SO3 natural drainage in the northwest of the property that will be crossed by the gathering system. There were no mapped wetlands on the property or within buffer distance.
Current road access to proposed site: Existing / to be upgraded / new	Road access is bitumen main roads and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: *Eucalyptus tereticornis* (Queensland blue gum), *Blakella tessellaris* (Moreton Bay ash), *Angophora floribunda* (rough barked apple), *Callitris glaucophylla* (white cypress pine), *Allocasuarina luehmannii* (bull oak), *Eremophila mitchellii* (bastard sandalwood), *Eucalyptus woollsiana* (inland grey box), *Acacia harpophylla* (brigalow), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), Shrubs: *Jasminum didymum lineare* (desert jasmine), *Acacia leiocalyx* (black wattle), *Psydrax oleifolia* (brush myrtle), *Citrus glauca* (lime bush), *Eremophila mitchellii* (bastard sandalwood), *Geijera parviflora* (wilga), *Eremophila deserti* (Ellangowan poison bush), *Maireana microphylla* (bluebush), *Acacia muelleriana* (Mueller's wattle), *Santalum lanceolatum* (sandalwood), *Sclerolaena birchii* (galvanised burr), *Sclerolaena tetracuspis* (brigalow burr), *Pimelea neoanglica* (poison pimelea), *Acacia decora* (pretty wattle) Ground: *Aristida caput-medusae* (many-headed wiregrass), *Cheilanthes sieberi* (brigalow fern), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Senecio brigalowensis* (native fireweed), *Aristida jerichoensis* (Jericho wiregrass), *Lomandra longifolia* (spike rush), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Themeda triandra* (kangaroo grass), *Enteropogon acicularis* (windmill grass), *Aristida ramosa* (purple wiregrass), *Sporobolus creber* (slender rats-tail grass), *Enteropogon ramosus* (windmill grass), *Bothriochloa pertusa** (Indian couch), *Eleocharis blakeana* (Blake's spikerush), *Calotis cuneata* (white burr daisy)

Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	25-50
Soil type & erodibility (Sodic: Y/N):	Deep and shallow cracking light to medium clay soils with low erodibility. Some areas with moderate gilgai structure. Texture contrast soils with sandy A horizons and highly erodible sodic B horizons.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-2%
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High Risk: *Opuntia tomentosa* (velvety tree pear) in low numbers. High Risk: *Opuntia stricta* (common pest pear) in low numbers. High Risk: *Bryophyllum delagoense* (mother-of-millions) in low numbers on drainage lines.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Regrowth RE11.4.3 shadelines assessed as TEC	2		Cat B ESA (TEC)	Have been avoided by the alignment

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Sixteen Mile Creek crossing (SO3)	1		Riparian	

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: Access and gathering crossing point on Sixteen Mile Creek (SO2) RE 11.3.25.



Photo 2: Regrowth RE11.4.3 shadelines – assessed as TEC (Cat B ESA)



Photo 3: Proposed access tracks following existing laneways.



Photo 4: Proposed access and gathering with scattered brigalow regrowth. Note: older regrowth shade lines to right of photo.



Photo 5: Access crossing natural drainage (SO2) northwest of survey area.

Photo 6:

Photo 7:

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP112	Development: (Infrastructure Type)	Development
Lot Plan:	2RP82810	Disturbance size:	100 x 100

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is located within the buffer of a Cat C ESA. This ESA relates to mapped Essential Habitat for the Imperial Hairstreak Butterfly (*Jalmenus eubulus*) which has an NC Act status of Vulnerable. Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems and Category C environmentally sensitive areas other than 'nature refuges' or 'koala habitat' areas, providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 of EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna or microhabitat was observed during the survey.

<table>
<tr><td>Distance to mapped and unmapped Water Features:
• Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc.
• Complete Water Features Checklist
• For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.
• If no alternative exists, peg in area of least disturbance and provide justification
Refer to EA Conditions Matrix for buffer distances and permitted activities.</td><td colspan="5">The closest mapped watercourse is a SO2 watercourse approximately 500m to the west.</td></tr>
<tr><td>Distance to Wetlands (not including melon holes):
• Complete Wetland Features Report
• Record wetland status and type:
o Referable and Validated (Mapped and ground truthed as a wetland)
o Referable and Not Validated (Mapped and ground truthed as not a wetland)
o Non-referable and Validated (Unmapped ground-truthed wetland)
Refer to EA Conditions Matrix for buffer distances and permitted activities, e.g.:
200m buffer applies for static, GES (no buffer)</td><td colspan="5">There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td rowspan="2">Melon Holes (rate on ecological value):
Give details on width, depth, area, vegetation, fauna habitat, disturbance etc</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Weeds present (and general abundance):
• Record general composition density & species.
• Survey any Restricted Invasive Weeds</td><td colspan="5"></td></tr>
<tr><td>Additional Considerations:</td><td colspan="5"></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: **Shrubs:** ***Acacia muelleriana, Acacia decora, Acacia harpophylla, Citrus glauca*** **Forbs:** **Grasses and Associates:** ***Bothriochloa pertusa*, Themeda triandra***			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Brown		
Texture[2]:	Sandy light clay		
Land Zone:	5		
Salinity:			
Groundcover: (%)			
Bare soil: 5	Grass/Herbs: 75		
Shrubs <1m: 20	Other (rocks, logs, weeds):		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
✓	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

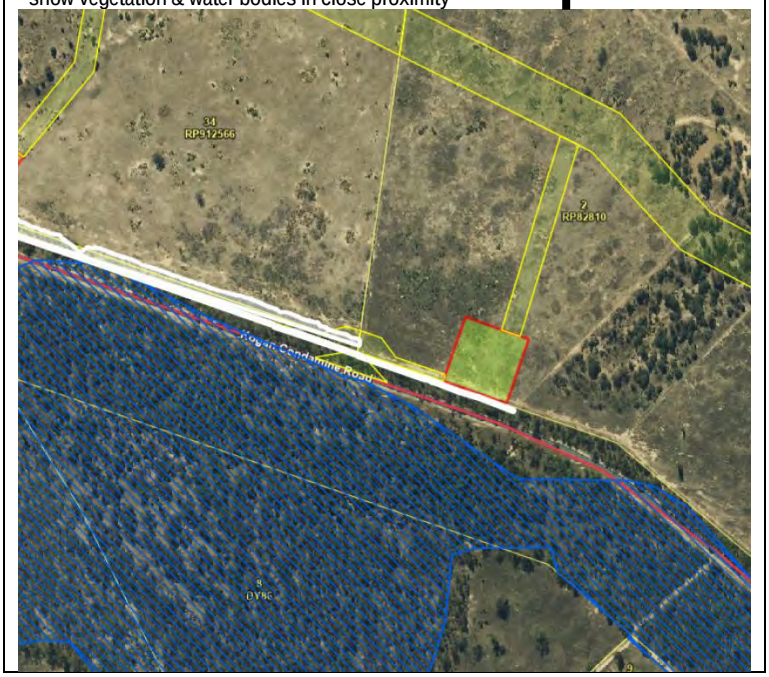
Disturbance

Erosion:								
Insignificant	✓	Minor		Moderate		Severe		
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):								

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity

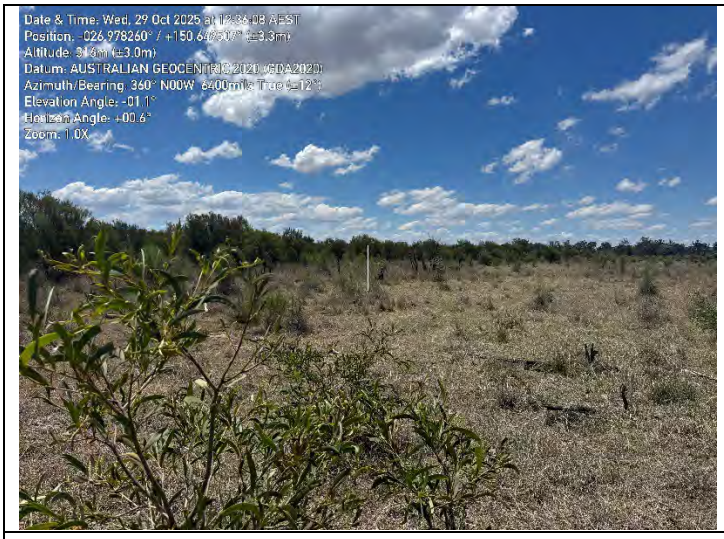


[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

	
Photo 1: View of well lease centre to north	Photo 2: View of well lease centre to east
	
Photo 3: View of well lease centre to south	Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP115	Development: (Infrastructure Type)	Development
Lot Plan:	2RP82810	Disturbance size:	100 x 175 (6 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is located within the buffer of a Cat B ESA. This ESA relates to regrowth RE 11.4.3 (Acacia harpophylla and/or Casuarina cristata shrubby open forest on Cainozoic clay plains) (Endangered biodiversity status) located to the south. This vegetation was assessed as being the Brigalow TEC. Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems and Category C environmentally sensitive areas other than 'nature refuges' or 'koala habitat' areas, providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 of EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	Regrowth RE 11.4.3 located to the south of the proposed well pad was assessed as being the Brigalow TEC. The well pad is within the buffer.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)?	No evidence of EVNT fauna was observed during the survey.

• If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	Marginal microhabitat was present for Grey Snake (*Hemiaspis damellii*) in the form of shallow gilgai formation. See attached LoOM for details.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site. • If no alternative exists, peg in area of least disturbance and provide justification Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	The closest mapped watercourse is a SO3 watercourse approximately 700m to the southwest.
Distance to Wetlands *(not including melon holes):* • Complete Wetland Features Report • Record wetland status and type: o Referable and Validated (Mapped and ground truthed as a wetland) o Referable and Not Validated (Mapped and ground truthed as not a wetland) o Non-referable and Validated (Unmapped ground-truthed wetland) Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.: 200m buffer applies for static, GES (no buffer)	There are no mapped wetlands within buffer distance of the site.
Melon Holes (rate on ecological value): *Give details on width, depth, area, vegetation, fauna habitat, disturbance etc*	1 | 2 | 3 | 4 | 5 2: melon holes were shallow but contained Juncus and Eleocharis species. At the time of survey the melon holes were dry.
Weeds present (and general abundance): • Record general composition density & species. • Survey any Restricted Invasive Weeds	
Additional Considerations:	

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: **Shrubs:** ***Acacia harpophylla, Santalum lanceolatum, Pimelea neoanglica, Eremophila desertii*** **Forbs:** ***Senecio brigalowensis*** **Grasses and Associates:** ***Bothriochloa decipiens, Sporobolus creber***			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Grey Brown		
Texture[2]:	Light to medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil: 30	Grass/Herbs: 35		
Shrubs <1m: 20	Other (rocks, logs, weeds): 15		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
✓	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance

Erosion:								
Insignificant	✓	Minor		Moderate		Severe		
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):								

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments

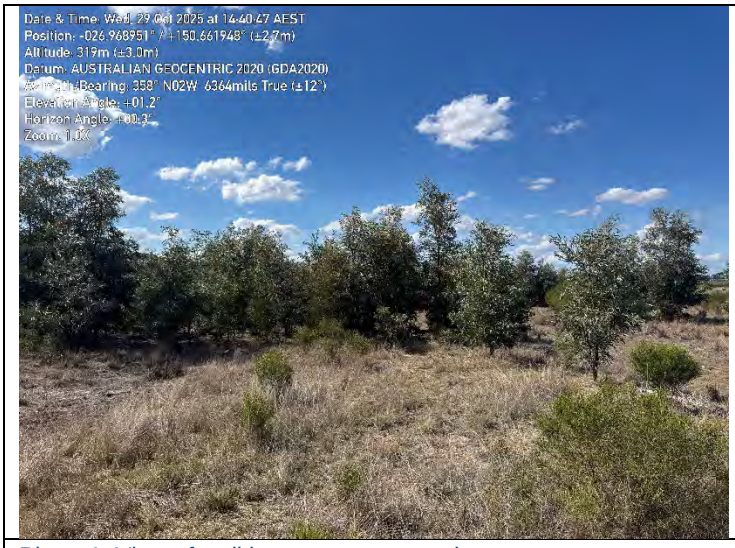


Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP330	Development: (Infrastructure Type)	Development
Lot Plan:	2RP82810	Disturbance size:	100 x 175 (6 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is located within the buffer of two Cat B ESAs. Vegetation to the north in the neighbouring lot is poorly mapped and mapped boundaries are incorrect. State mapping suggests this area is RE11.3.4/11.5.1. This vegetation was ground truthed as RE11.4.10 (Eucalyptus populnea or E. woollsiana, Acacia harpophylla, Casuarina cristata open forest to woodland on margins of Cainozoic clay plains) (Endangered biodiversity status). The second ESA relates to regrowth RE 11.4.3 (Acacia harpophylla and/or Casuarina cristata shrubby open forest on Cainozoic clay plains) (Endangered biodiversity status) located to the south and east. This vegetation was assessed as being the Brigalow TEC. Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems and Category C environmentally sensitive areas other than 'nature refuges' or 'koala habitat' areas, providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	Regrowth RE 11.4.3 located to the south and east of the proposed well pad was assessed as being the Brigalow TEC. The well pad is within the buffer.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.

<table>
<tr><td>Flora Survey Trigger Areas:
Does the infrastructure intersect the latest DoR mapping?
If yes, Flora Trigger Survey to be recommended</td><td>There was no High-Risk Area of a Flora Trigger Map over the proposed well location.</td></tr>
<tr><td>EVNT Fauna:
Complete Likelihood of Occurrence Matrix (LoOM) to determine the following:
Is the area ‘Potential’, ‘Likely,’ or ‘Known’ Habitat for any EVNT species (EPBC or NCA)?
If ‘Yes’, does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected?
Survey microhabitat features or fauna encounters for inclusion on survey sketch.</td><td>No evidence of EVNT fauna was observed during the survey.

Marginal microhabitat was present for Grey Snake (Hemiaspis damellii) in the form of shallow gilgai formation. See attached LoOM for details.</td></tr>
<tr><td>Distance to mapped and unmapped Water Features:
Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc.
Complete Water Features Checklist
For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.
If no alternative exists, peg in area of least disturbance and provide justification
Refer to EA Conditions Matrix for buffer distances and permitted activities.</td><td>The closest mapped watercourse is a SO3 watercourse approximately 280m to the northwest.</td></tr>
<tr><td>Distance to Wetlands (not including melon holes):
Complete Wetland Features Report
Record wetland status and type:
Referable and Validated (Mapped and ground truthed as a wetland)
Referable and Not Validated (Mapped and ground truthed as not a wetland)
Non-referable and Validated (Unmapped ground-truthed wetland)
Refer to EA Conditions Matrix for buffer distances and permitted activities, e.g.:
200m buffer applies for static, GES (no buffer)</td><td>There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td>Melon Holes (rate on ecological value):
Give details on width, depth, area, vegetation, fauna habitat, disturbance etc</td><td><table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table>2: melon holes were shallow but contained Juncus and Eleocharis species. At the time of survey the melon holes were dry.</td></tr>
<tr><td>Weeds present (and general abundance):
Record general composition density & species.
Survey any Restricted Invasive Weeds</td><td></td></tr>
<tr><td>Additional Considerations:</td><td></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: **Shrubs:** ***Acacia harpophylla, Eremophila deserti*** **Forbs:** ***Senecio brigalowensis, Calotis cuneata, Juncus usitatus, Eleocharis blakeana*** **Grasses and Associates:** ***Bothriochloa decipiens***			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?		Y	N
			N
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Grey Brown		
Texture[2]:	Light to medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil: 20	Grass/Herbs: 70		
Shrubs <1m: 5	Other (rocks, logs, weeds): 5		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
✓	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance
Erosion:

Insignificant	✓	Minor		Moderate		Severe	
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):							

SITE LOCATION RECOMMENDED

Yes ☒ No ☐ Yes with conditions ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Arrow Jammat (2RP82810)			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Crossed by proposed access? and gathering. As this is a dammed creek with standing water it is possible an alternative access may be required.			
Lot Plan:	2RP82810	**Crossing type:**	Existing Crossing / No Upgrade Required: Existing Crossing / Upgrade Required: New Crossing in previously disturbed area: New Crossing in undisturbed area:	☐ ☐ ☐ ☒
Survey sketch point #:		**Bank full width**	**25**	
		Bank width	**6**	
		Bed width	**13**	
		Bank height from bed	**2.5**	
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y	Sixteen Mile Creek	SO2
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	N	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	Y		
c) does not appear to have enough continuing flow to create a riverine environment.	N		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).	Y	If **YES** to all, the feature is a watercourse.	
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature	Y	If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	

<u>Summary is required for how determination was made of the water feature:</u>

The watercourse has an established riparian ecology with defined banks and semi-permanent water due to dam bank. Riparian vegetation is in good condition.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Water Features – Pre-works Notification Photos

5 photos required for each bed-level access crossing. Photos to be taken as per instructions below.

Latitudinal and longitudinal extent for area (decimal degrees i.e. ddd.ddddd):
Survey sketch point #:

Photo (A) – Looking across the waterway at the proposed site of works *Across the watercourse at the proposed site of the bed-level crossing.*

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (B) – Looking upstream from crossing
Standing at the point of the crossing, and looking upstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (C) – Looking downstream from crossing
Standing at the point of the crossing, and looking downstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (D) – Looking upstream towards crossing
Standing slightly downstream of the point of the crossing, and looking upstream (photographing the crossing point and upstream of it).

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (E) – Looking downstream towards crossing
Standing slightly upstream of the point of the crossing, and looking downstream (photographing the crossing point and downstream of it.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Arrow Jammat (2RP82810)			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Crossed by proposed access.			
Lot Plan:	2RP82810	**Crossing type:**	Existing Crossing / No Upgrade Required: Existing Crossing / Upgrade Required: New Crossing in previously disturbed area: New Crossing in undisturbed area:	☐ ☒ ☐ ☐
Survey sketch point #:		**Bank full width**		
		Bank width		
		Bed width		
		Bank height from bed		
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y		SO3
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	Y	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	Y		
c) does not appear to have enough continuing flow to create a riverine environment.	Y		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).		If **YES** to all, the feature is a watercourse.	
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature		If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	

<u>Summary is required for how determination was made of the water feature:</u>

The is a broad drainage with little difference to surrounding vegetation. There is no defined channel or bank.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Water Features – Pre-works Notification Photos

5 photos required for each bed-level access crossing. Photos to be taken as per instructions below.

Latitudinal and longitudinal extent for area (decimal degrees i.e. ddd.ddddd):
Survey sketch point #:

Photo (A) – Looking across the waterway at the proposed site of works *Across the watercourse at the proposed site of the bed-level crossing.*

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (B) – Looking upstream from crossing
Standing at the point of the crossing, and looking upstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (C) – Looking downstream from crossing
Standing at the point of the crossing, and looking downstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (D) – Looking upstream towards crossing
Standing slightly downstream of the point of the crossing, and looking upstream (photographing the crossing point and upstream of it).

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (E) – Looking downstream towards crossing
Standing slightly upstream of the point of the crossing, and looking downstream (photographing the crossing point and downstream of it.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 25.	Date:	29-10-25
Tenure:	QRP 825810	Assessor(s):	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				Assessment Location information	
☑	Well pad	☐	Gas Processing Facility	Easting (E)	
☐	Pilot Well + Dam	☐	Dam	Northing (N)	
☐	Monitoring	☐	Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	Other description	WP112
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☐	☐	☑
Height range (m)					3 | 1		
Avg. height (m)					2		
Canopy cover (%)					20		
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
Acacia mivelleriana.	☐	☐	☐	☐	☐	☑	☐	☐	
A. decora	☐	☐	☐	☐	☐	☑	☐	☐	
A. leptophylla	☐	☐	☐	☐	☐	☑	☐	☐	
C. glauca	☐	☐	☐	☐	☐	☑	☐	☐	
B. spertusa *	☐	☐	☐	☐	☐	☐	☐	☑	
T. triandra	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE					
Observed RE[7]	NR.				
Additional notes	cleared pasture.				
Photo numbers	North: 3662	East: 64	South: 66	West: 68	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 27	**Date:**	29-10-25
Tenure:	2RP 828510	**Assessor(s):**	RM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		**Assessment Location information**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	-26.96894
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	150.66196
☐ Monitoring	☐ Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	**Other description**	WP ~~300~~ 115
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]	☐	☐	☐	☐	☑	☐	☐
Height range (m)					4 | 2	2 | 1	| 0.3
Avg. height (m)					3	1.2	
Canopy cover (%)					30	20	35
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D**[4]	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
A. harpophylla	☐	☐	☐	☐	☐	☑	☐	☐	
E. desertii	☐	☐	☐	☐	☐	☐	☑	☐	
E. lanceolatum	☐	☐	☐	☐	☐	☑	☐	☐	
S. creber	☐	☐	☐	☐	☐	☐	☐	☑	
B. decipiens	☐	☐	☐	☐	☐	☐	☐	☑	
S. brigalowensis	☐	☐	☐	☐	☐	☐	☐	☑	
Dimeria neoanglica	☐	☐	☐	☐	☐	☑	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
O. stricta	☐	☐	☐	☐	☐	☐	☐	☐	Low
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition**[5]	**EPBC Status**[6]	**VM Act Status**	**Biodiversity Status**
Mapped RE					
Observed RE[7]	NR.				
Additional notes	Brigalow regrowth to 3.5m high. light gilgai				
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3714	16	18	20	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BM CR 29	Date:	30-10-25
Tenure:	ORP 82810	Assessor(s):	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				Assessment Location information	
☑	Well pad	☐	Gas Processing Facility	Easting (E)	-26.95763
☐	Pilot Well + Dam	☐	Dam	Northing (N)	150.66362
☐	Monitoring	☐	Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	Other description	WP 330
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☑	☐	☑
Height range (m)					3 | 1.5.	1.5 | 0.5	0.4
Avg. height (m)					2.5	1	
Canopy cover (%)					5	5	70
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
A. hapophylla	☐	☐	☐	☐	☐	☑	☐	☐	
E. desertii	☐	☐	☐	☐	☐	☑	☐	☐	
J. usitatus	☐	☐	☐	☐	☐	☐	☐	☑	
B. decipiens	☐	☐	☐	☐	☐	☐	☐	☑	
Calotis cuneata	☐	☐	☐	☐	☐	☐	☐	☑	
S. brigalowensis	☐	☐	☐	☐	☐	☐	☐	☑	
E. blakeana	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
D. stricta	☐	☐	☐	☐	☐	☐	☐	☐	L.
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE					
Observed RE[7]	NR.				
Additional notes	Areas of shallow gilgai				
Photo numbers	North:	East:	South:	West:	
	3732	34	36	38.	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

SSMP- Likelihood of Occurrence Ma[1] 2RP82810

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**; Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**; In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**; For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Shallow permanent water in the flood out zones of major streams or "anabranches" of smaller streams where there is still water, sedges, aquatic vegetation and dense ground cover. Mostly associated with open pasture areas surrounded by mature vegetation.	Permanent shallow water or water of varying depths.	The presence of numerous aquatic vegetation species, particularly rushes, sedges and Lignum.	Dense terrestrial vegetation cover and surrounding trees and shrubs.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	No Habitat Attribute Present	No Habitat Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Remnant and high value regrowth (HVR) in open forest and woodland. Furina dunmalli prefers dry sclerophyll forests usually on black clay and clay loam soils.	Deep cracking black clay and loam soils.	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Brigalow / Belah.	Brigalow / belah scrub, bull-oak or any vegetation containing Casuarina/Allocasuarina spp. as food trees associated with Land Zones 3, 4 and 5.	Isolated medium to large belah trees containing cones	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Brigalow melon-hole country with woody debris, soil cracks and water.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Timbered watercourses dominated by eucalypt species in REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E. acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Cleared land with good-quality melon holes	Suitable structural elements including, soil cracks, rocky outcrops, bark, logs, grass tussocks and other forms of woody debris.	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary feed trees, bieng E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada and E. tereticornis ssp. tereticornis represent the dominant canopy species within the vegetation community.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Roadside strips of Brigalow/Belah.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	No 2nd Attribute Present	No 3rd Attribute Present		No	No			Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Other eucalypt-dominated woodlands and forests, including riparian woodlands: potentially in REs 11.3.2, 11.3.3, 11.3.17, 11.3.18, 11.3.25, 11.3.27f, 11.4.12, 11.5.4, 11.5.5, 11.7.4, 11.9.7, 11.9.10 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Jammat Clynes Road (5RP190989) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 500 metres of access and gathering (30m).		
Lot Plan:	5RP190989	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	27/10/2025 BM
Facility Type / Activity:	Wells ☐ Appraisal ☐ Microseismic ☐ Gravel Pit	☐ Core ☐ Development / Production ☐ Directional ☐ Campsite	☐ Exploration ☐ Monitoring ☐ Tiltmeter Array ☑ Access Track
	☐ Seismic ☐ Trunkline ☐ Comms Towers ☐ FCS (Field Compression Station) ☐ Other:	☑ Gathering System ☐ Gas Pipeline ☐ Fibre Optic Cable ☐ CPP (Central Processing Plant)	☐ Security Hut ☐ Water Pipeline ☐ Pond ☐ WTP (Water Treatment Plant) ☐ Frac Pond

RECOMMENDATIONS:		
☐ No Environmental issues on site	☑ Environmental issues identified & surveyed	☑ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Vegetation in the Wambo Creek riparian corridor is remnant RE 11.3.25 (BD Status OC) and is a Category C ESA.

Vegetation in an unmapped wetland to the north of Wambo Creek is RE 11.3.27f (BD Status OC) and is a Category C ESA.

Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* To disturb these areas would require an EA amendment. Consideration should be given to realignment avoiding the wetland area and underboring of Wambo Creek.

A LoOM (Likelihood of Occurrence Matrix) which examines habitat for threatened fauna species found that Brigalow Woodland Snail (*Adclarkia cameroni*) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act), Diamond Firetail (*Stagonopleura guttata*) (Vulnerable NC Act and EPBC Act), Golden-tailed Gecko (*Strophurus taenicauda*) (Near Threatened NC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use is grazing with the property mapped as mostly non-remnant vegetation in the proposed impact areas. Vegetation is improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is state mapped as non-remnant throughout Lot 5RP190989. Approximately 10 metres of the approach to Wambo Creek is remnant RE 11.3.25 (BD Status OC). The creek section (crown land) has been reported in the report for Lot 2DY94. A shallow unmapped wetland (RE 11.3.27f) was noted approximately 150 metres north of the Wambo Creek crossing and the boundary walked and recorded. This RE has a BD Status of OC. Vegetation between this wetland and Wambo Creek is mapped as HVR and was field validated as advanced regrowth of RE 11.3.4 (Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains) and has a BD Status of OC. This patch exceeds the benchmark for canopy height but is below 50% of the benchmark for canopy cover.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	Vegetation in the Wambo Creek riparian corridor is remnant RE 11.3.25 (BD Status OC) and is a Category C ESA. Vegetation in the unmapped wetland to the north of Wambo Creek is RE 11.3.27f (BD Status OC) and is a Category C ESA. Under EA0001401 (which applies to this project) section Biodiversity 6 states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* To disturb these areas would require an EA amendment. Consideration should be given to realignment avoiding the wetland area and underboring of Wambo Creek.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There are no mapped or unmapped TECs within the lot.
DoR-mapped High-value Regrowth present / impacted:	Vegetation in the proposed alignment for approximately 100 metres to the north of Wambo Creek is mapped as HVR and was field validated as advanced regrowth of RE 11.3.4 (Eucalyptus tereticornis and/or Eucalyptus spp. woodland on alluvial plains).
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is mostly advanced to scattered regrowth of RE 11.5.1 and RE 11.3.4 along the proposed alignment.
EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.

EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of how site conditions are unsuitable.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Brigalow Woodland Snail (Adclarkia cameroni) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (Climacteris picumnus victoriae) (Vulnerable NC Act and EPBC Act), Diamond Firetail (Stagonopleura guttata) (Vulnerable NC Act and EPBC Act), Golden-tailed Gecko (Strophurus taenicauda) (Near Threatened NC Act) and Koala (Phascolarctos cinereus) (Endangered NC Act and EPBC Act) were likely to occur.

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	Wambo Creek is to be crossed by the alignment on the southern side of the lot. An assessment of this watercourse crossing and vegetation has been included in the report for 2DY94. There were no mapped wetlands on the property or within buffer distance. An unmapped wetland conforming to RE 11.3.27f (BD Status OC) was observed approximately 150 metres north of the southern boundary.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area. High Risk species *Bryophyllum delagoense* (mother of millions) was observed in moderate numbers in the flood plain of Wambo Creek.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing. There is minimal habitat present such as windrows and fallen logs.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Bruce McLennan	14/11/25
Completed By	**Date**

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 5RP190989
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint of access and gathering layout 30 metres wide.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	5RP190989 is a grazing property previously cleared of woody vegetation but now with advanced regrowth of RE 11.5.1 and 11.3.4.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering within the lot is state mapped as non-remnant and Category C (HVR). This mapping is largely correct. A shallow unmapped wetland (RE 11.3.27f) was noted approximately 150 metres north of the Wambo Creek crossing and the boundary walked and recorded. This RE has a BD Status of OC.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No ESAs or ESA buffers were indicated by mapping within the property. Vegetation in the Wambo Creek riparian corridor is remnant RE 11.3.25 (BD Status OC) and is a Category C ESA. Vegetation in the unmapped wetland to the north of Wambo Creek is RE 11.3.27f (BD Status OC) and is a Category C ESA. Under EA0001401 (which applies to this project) section Biodiversity 6 states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas.* **To disturb these areas would require an EA amendment.** Consideration should be given to realignment avoiding the wetland area and underboring of Wambo Creek.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There are no mapped or unmapped TECs within the lot.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.

Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Brigalow Woodland Snail (Adclarkia cameroni) (Endangered NC Act and EPBC Act), Brown Treecreeper (south-eastern) (Climacteris picumnus victoriae) (Vulnerable NC Act and EPBC Act), Diamond Firetail (Stagonopleura guttata) (Vulnerable NC Act and EPBC Act), Golden-tailed Gecko (Strophurus taenicauda) (Near Threatened NC Act) and Koala (Phascolarctos cinereus) (Endangered NC Act and EPBC Act) were likely to occur.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	There were no waterways crossed by proposed access and gathering in the lot. Wambo Creek is to be crossed by the alignment on the southern side of the lot. An assessment of this watercourse crossing and vegetation has been included in the report for 2DY94. There were no mapped wetlands on the property or within buffer distance. An unmapped wetland conforming to RE 11.3.27f (BD Status OC) was observed approximately 150 metres north of the southern boundary.
Current road access to proposed site: Existing / to be upgraded / new	Road access is gravel shire roads (Clynes Road) and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: *Callitris glaucophylla* (white cypress pine), *Allocasuarina luehmannii* (bull oak), *Eremophila mitchellii* (bastard sandalwood), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), *Eucalyptus tereticornis* (Queensland bluegum), *Angophora floribunda* (rough-barked apple) Shrubs: *Jasminum didymum lineare* (desert jasmine), *Acacia leiocalyx* (black wattle), *Psydrax oleifolia* (brush myrtle), *Eremophila mitchellii* (bastard sandalwood), *Geijera parviflora* (wilga), *Maireana microphylla* (bluebush), *Xanthorrhoea johnsonii* (grass tree) Ground: *Aristida caput-medusae* (many-headed wiregrass), *Cheilanthes sieberi* (brigalow fern), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Aristida jerichoensis* (Jericho wiregrass), *Lomandra longifolia* (spike rush), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Aristida ramosa* (purple wiregrass), *Sporobolus creber* (slender rats-tail grass), *Enteropogon ramosus* (windmill grass), *Walwhalleya subxerophila* (brigalow canegrass), *Cyperus sp., Heteropogon contortus* (black spear grass), *Arundinella nepalensis* (reedgrass),
Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans

Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	25-50
Soil type & erodibility (Sodic: Y/N):	Texture contrast soils with sandy A horizons and erodible sodic B horizons.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-3%
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area. High Risk species *Bryophyllum delagoense* (mother of millions) was observed in moderate numbers in the flood plain of Wambo Creek.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
RE 11.3.27f wetland	1		CAT C ESA	Realignment required

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: From eastern edge of proposed alignment facing SW across the small wetland



Photo 2: Access and gathering facing south. Advanced 11.5.1 regrowth.



Photo 3: Advanced regrowth 11.3.4 (mapped HVR) north of Wambo Creek
Photo 4:
Photo 5:
Photo 6:
Photo 7:

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 03	**Date:**	27/10/25.
Tenure:	SRP 190989.	**Assessor(s):**	BM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		**Assessment Location information**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	-26.96682
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	150.59092
☐ Monitoring	☑ Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	**Other description**	
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)		21 | 12	12 | 6			2. | 1	0.9
Avg. height (m)		18	9			1.5	
Canopy cover (%)		15.	35			20.	25.
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
E. tereticornis	☐	☐	☑	☐	☐	☑	☐	☐	
A. floribunda	☐	☐	☑	☐	☐	☐	☐	☐	
C. glaucophylla	☐	☐	☑	☑	☐	☑	☐	☐	
A. leiocalyx	☐	☐	☐	☐	☐	☐	☑	☐	
L. longifolia	☐	☐	☐	☐	☐	☐	☐	☑	
A. nepelensis	☐	☐	☐	☐	☐	☐	☐	☑	
B. delagoense *	☐	☐	☐	☐	☐	☐	☐	☑	
A. capit medusae	☐	☐	☐	☐	☐	☐	☐	☑	
H. Contortus	☐	☐	☐	☐	☐	☐	☐	☑	
X. johnsonii	☐	☐	☐	☐	☐	☑	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE	HVR				
Observed RE[7]	11.3.4		Ø	LC	OC
Additional notes					
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3256	58	60	62	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Ecological Field Survey

arrow energy

SITE IDENTIFICATION			
Site Name:	BM CR 01	**Date:**	27-10-25.
Tenure:	Road Reserve	**Assessor(s):**	BM.

DEVELOPMENT TYPE & LOCATION			
Development Type		**Centre of Ecological Stratification Unit (ESU) or 100m x 100m area**	
☐ Well pad	☐ Gas Processing Facility	**Easting (E)**	-26.95253
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	150.59461
☐ Monitoring	☐ Pipeline	**Datum**	GDA2020, MGA zone: 55 or 56
☒ Roads & Tracks	☐ Seismic Line	**Other description**	access to WP060
☐ Work over	☐ Property (area) wide		

Photos from centre of ESU			Photos of landscape and features	
	Number	**Notes**	**Number**	**Notes**
North	# 3198		#	N
East	# 3200		#	E
South	# 02		#	S
West	# 04		#	W

LANDFORM estimated within 500m (broad assessment – view of the area; circle the most characteristic feature, one only)					
Plains	Downs – open, rolling, ashy, pebbly	Alluvial plain or flat, flood plain	Inland clay pans, salt flat, salt pan	Coastal tidal flat or salt flat	Unspecified, flat, gentle, slopes, undulating terrain
Hill, Mountain, Tableland	Slope or hill not specified	Cliff, steep rock, rocky ledge, rocky outcrop, scarp, crevice	Coastal rocky headland	Top, crest of mountain or ridge	Jump-up, mesa, tableland, plateau
Dunes	Fossil coastal dune, high dune	Coastal dune – unspecified, beach dune, recent dune, low dune, coastal sand hill	Inland dune, inland sand hill		
Streams	Permanent lake, river, stream, watercourse, levees and/or their banks	Seasonal or intermittent creek, gully, drainage line, ravine, gorge, outwash	Inland channel country, stream distributary system, intermittently flooded		
Water	Freshwater lake, lagoon, spring	Freshwater swamp, marsh, soak, seepage area	Gilgai, melon hole, sinkhole	Saltwater, sea, swamp	

PHYSIOGRAPHY estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Slope	Level (<1%)	Gently sloping (1-4%)	Moderately sloping (5-10%)	Strongly sloping (11-24%)	Moderately steep (25-38%)	Steep (39-55%)	Very steep (56-100%)	Slope >100% (45°)
Aspect	N	S	E	W	NE	NW	SE	SW	Nil
Soil Colour	White	Yellow	Orange	Brown	Red	Black	Grey	Pale	Dark	Mottled
Soil ('field texture grade in order of increasing clay content L to R, hatching indicates >20% clay content)	'Sand'	'Loamy sand'	'Clayey sand'	'Sandy loam'	'Loam'	'Silty loam'	'Sandy clay loam'	'Clay loam'	'Clay loam sandy'	'Silty clay loam'	'Light clay'	'Light medium clay'	'Medium clay'	'Medium heavy clay'	'Heavy clay'	(Saline mud)
Erosion	Absent	Scattered	Frequent									
Erosion Type	Tunnelling	Sheet	Rill	Gully	Mass failure	Stream-bank						

DISTURBANCE estimated within ESU or 100m x 100m area (broad assessment – random meander)								
Land use	Grazing	Forestry	Cropping	Conservation	Mining	Other: Road Res		
Evidence	Clearing	Cultivation	Regrowth	Logging	Thinning	No disturbance		
Dieback	0%	1-25%	26-75%	>76%	n/a			
Site condition	Very good	Good	Moderate	Poor	Degraded			
Fire scars	Absent	Scattered	Frequent	**Time since**	Recent	Old	**Average Height (m)**	
Disturbance notes								

VEGETATION STRUCTURE and CONTEXT estimated within ESU or 100m x 100m area (broad assessment – random meander)											
Macrohabitat(s) present	**CEST**	**Rf**	**H**	**FOR**	**WDL**	**GRL**	**IMP**	**LKE**	**RIP**	**SHR**	**SW**	**DIS**
Key: **CEST**-Coastal & estuarine; **Rf**-Rainforest (including SEVT); **H**-Heath; **FOR**-Forest; **WDL**-Woodland; **GRL**-Grassland; **IMP**-Improved pasture; **LKE**-Lake/dam; **RIP**-Riparian; **SHR**-Shrubland; **SW**-Swamp/Wetland; **DIS**-Disturbed areas (e.g. roadsides, cropping land, urban areas).											

Ecologically dominant layer (EDL)	T1	T2	S1	S2	G
Avg height (m) of EDL	17		**Avg DBH (cm) of EDL**	40	
Canopy cover (%) of EDL	>70% (dense/closed)	30-70% (mid-dense)	10-30% (sparse)	<10% (very sparse)	n/a
Functional shrub layer density (<2m)	Dense/closed	Mid-dense	Sparse	Very sparse	Absent

Threatened Flora and Weeds (declared and locally significant)		
Threatened Flora	Found on Site – records below	Not Found on Site
Weed infestations	Found on Site – records below	Not Found on Site

Threatened Flora and Weeds (declared and locally significant) (Locations across ESU)

Species	Density*	Waypoint/Polygon	Easting	Northing	Photo number

*** Scattered/Low = <10% of area, Medium = 10-30% of area, High = >30% of area; if confined to a specific location(s) across ESU estimate the number of individuals/stems per 100m² (10m x 10m) and provide GPS coordinates.**

Ecological Field Survey ORG-ARW-HSM-FOR-00067

arrowenergy

VEGETATION FLORISTICS (record all species within 50m x 10m transect)

Transect Start compass bearing		Start Easting	-26.95211	End Easting	-26.95254
		Start Northing	150.59465.	End Northing	150.59456.

Stratum	E	T1	T2	T3	S1	S2/G
Height range (m)	(17)	12 | 20	4 | 8		2 | 1	0.5
Canopy cover (%)		40	20		20	70

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2/G
		TOTALS						
E. populnea.				4				
A. Jehmannii					4		7	
E. melchelli					5		12	
D. cunninghamii							59.	
J. didymus linearis.							5.	
Aristida jerichoensis								✓
Paspalidium.								✓
C. reflactus.								✓
A. Capot medesa*								✓
M. maximus.								✓
C. Seberi								✓
E. trichophora*								✓
D. brevipedunculata								✓
Enteropogon								✓
P. effusum.								✓
A. leiocalyx							3	
M. acuminatum							1	
S. creber								✓
B. decipiens								✓
Brunoniella australe.								✓
P. variabile								✓

arrow energy

Common name/collection name	Species name	Sample (Field No.)	Stem Count (50m x 10m plot) or (50m x 2m plot for dense cover in S1 and S2) – Denote plot type employed					
NB: Record ground cover species within 50m x 10m transect			E	T1	T2	T3	S1	S2
		TOTALS						
C. gracilis								

GROUND COVER (five 1m x 1m quadrats along 50m transect)						
Five 1 x 1m ground cover plots:	1	2	3	4	5	Mean
Photo #						
Native perennial grass	55.	5	65.	20	35.	36
Native other grass (if relevant)						
Native forbs and other species (non-grass)		5		2		1.4
Native shrubs (<1m)					55.	11
Non-native grass						
Non-native forbs and shrubs						
Litter	25.	90	20	30	10	35
Rock						
Bare ground	10		5	48		12.6
Cryptogams	10		10			4
Total	=100%	=100%	=100%	=100%	=100%	

REGIONAL ECOSYSTEM MAPPING				
	RE Code	EPBC Status	VM Act Status	Biodiversity Status
Mapped RE	Non rem.			
Survey result	11.5.1	/	Lc	NC.
Agree with mapped RE? If no, provide justification from field data	Unmapped road reserve.			

FAUNA HABITAT within 50m x 10m transect							
No. of trees with hollows (>10cm diameter)	26	No. of hollow logs	3	Total length of logs (>10cm)	7.5.	No. of logs (>10cm)	6
Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)		Per hectare (x 20)	

FAUNA HABITAT FEATURES estimated within ESU or 100m x 100m (broad assessment – random meander)				
Habitat feature	Status			
Cliffs / outcrops	Absent		Present	
Wetland / Swamp / Waterbody	Absent		Present	
Waterway	Absent		Present	
Potential for **nectar / pollen**	Absent	Scattered	Common	Abundant
Potential for **fleshy fruiting plants**	Absent	Scattered	Common	Abundant
Potential for **seeding grass cover**	Absent	Scattered	Common	Abundant
Dense shrub/grass shelter	Absent	Scattered	Common	Abundant
Large Eucalypts (>30cm DBH)	Absent	Scattered	Common	Abundant
Large non-eucalypts (>20cm DBH)	Absent	Scattered	Common	Abundant
Large rocks (>30cm)	Absent	Scattered	Common	Abundant
Small rocks (10-30cm)	Absent	Scattered	Common	Abundant
Leaf litter depth	Absent	Single layer	Multiple layers	Deep layers
Leaf litter coverage	Absent	Scattered	Common	Abundant
Coarse woody debris	Absent	Scattered	Common	Abundant
Termite mounds (>50cm)	Absent	Scattered	Common	Abundant
Rock piles	Absent	Scattered	Common	Abundant
Trees with shedding bark	Absent	Scattered	Common	Abundant
Soil cracks (>5mm wide & >50mm deep)	Absent	Scattered	Common	Abundant
Koala feed trees	Absent	Scattered	Common	Abundant
Mistletoe/Epiphytes	Absent	Scattered	Common	Abundant

GREATER GLIDER habitat within a 1 hectare area (ONLY to be completed in REs 11.7.6 and 11.7.7)			
No. of trees with hollows (>50cm)		No. of trees with hollows (>30cm)	

GREY SNAKE habitat suitability analysis (Grey snake habitat must have the presence of suitable land use, landform, and micro-habitat features within 50 m of freshwater)		
1. LAND USE	No significant ground disturbance (defined as areas with frequent surface disturbance, e.g. cropping, cultivation, roads/tracks). (AND)	Yes / No
2. LANDFORM	Presence of suitable landform (defined as Plains, 'alluvial plain or flat, flood plain' or 'inland clay pan' or 'unspecified, flat, gentle slopes, undulating terrain'; Streams, any feature; Water, any feature (excluding saltwater features). (AND)	Yes / No
3. PHYSIOGRAPHY / Soil	Presence of cracking clay soils (Vertosols, generally >30% clay; defined as 'clay loam' to 'heavy clay') and/or soil cracks (defined as > 5mm wide and 50mm deep: Scattered, Common or Abundant) within **50 m of freshwater** wetlands, drainage features likely to hold water for protracted periods (up to 2-3 months) or gilgai microrelief. (OR)	Yes / No
4. FAUNA HABITAT	Presence of habitat providing suitable shelter (e.g. leaf litter, coarse woody debris; defined as 'leaf litter depth' – multiple or deep layers or 'leaf litter coverage' – abundant or 'coarse woody debris' – abundant) within **50 m of freshwater** wetlands, drainage features likely to hold water for protracted periods (up to 2-3 months) or gilgai microrelief.	Yes / No
Grey snake habitat	**PRESENT** (Grey snake habitat present if: Items 1 and 2 are present in association with 3 and/or 4)	**ABSENT**

FAUNA SIGNS estimated within ESU or 100m x 100m area (broad assessment – random meander)

N.B. GPS all potential breeding places but not necessarily all fauna signs.

Fauna signs: Animal tracks Feed scars Scratches Diggings Scats Casts Bones Feathers Other

Breeding places: Nests Burrows Shelters Drays Bowers Other

Fauna Sign / Breeding Place	Likely Species/Group	Conservation Status (see below)	Coordinates (GDA94)		Other Information (e.g. age, collected, active/inactive)
			Easting	Northing	

E	Endangered
V	Vulnerable
NT	Near Threatened
SLC	Special Least Concern
CBS	Colonial Breeding Species

Special Least Concern Species
Echidna, Platypus, Migratory Species

Colonial Breeding Species
Microbats, wetland birds

AC Recommendations – Site Preparation			
	Required?		If **required**, why?
Fauna spotter/catcher	Yes	No	
Ecologist	Yes	No	
Species Management Plan	Yes	No	
Minimal disturbance suitability assessment: Suitable – if all 4 questions are yes	Yes / No Yes / No Yes / No Yes / No		Is the vegetation suitable for slashing only? Is the slope < 5%? Is the clay content > 20%? Are gilgais absent?
Suitable for minimal disturbance?	Yes	No	
Notes			

SSMP- Likelihood of Occurrence Ma[1] SRP190989

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**: In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Poplar box/gum, cypress pine and bull-oak country in REs 11.3.2, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.5.1, 11.5.4 and 11.5.20.	Poplar box, gum-topped box, or forest red gum over ground cover of native grasses	Tree canopy and on-ground timber cover and leaf litter for survival and egg-laying	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Eucalypt / box woodlands in REs 11.3.2, 11.3.3, 11.3.4, 11.3.14, 11.3.17, 11.3.18, 11.4.7, 11.4.10 and 11.4.12.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Open grassy forests and woodlands, dry pastures at wooded edges and occasionally in farmlands and grasslands with scattered trees.	Landforms 3, 4, 5 and possibly 9.	Sapling and small tree regrowth with low cover of shrubs, logs and leaf litter; moderate to high grass cover with grasses <40cm height for foraging.	Eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Clay and/or alluvial soils associated with land zones 3, 4 and 5 in close proximity to water.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E. acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	Favoured nest trees are river red gum Eucalyptus camaldulensis and coolibah E. coolabah. They roost in live or dead trees and on bare, open ground	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypts on alluvial soils in close proximity to water.	Primary feed trees, bieng E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada and E. tereticornis ssp. tereticornis represent the dominant canopy species within the vegetation community.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present		No	No			Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly occur in arid and semi-arid acacia, eucalypt and cypress pine Callitris woodlands and shrublands	Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Eucalypt woodlands with water less than 3km away, sandy areas dissected by gravel ridges, and burnt areas.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Jammat Clynes Road (9RP190989) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 2170 metres of access and gathering (30m), 60m of access through Clynes Road and well (WP060).		
Lot Plan:	9RP190989	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	27/10/2025 BM
Facility Type / Activity:	Wells ☐ Appraisal ☐ Microseismic ☐ Gravel Pit	☐ Core ☑ Development / Production ☑ Directional ☐ Campsite	☐ Exploration ☐ Monitoring ☐ Tiltmeter Array ☑ Access Track
	☐ Seismic ☐ Trunkline ☐ Comms Towers ☐ FCS (Field Compression Station) ☐ Other:	☑ Gathering System ☐ Gas Pipeline ☐ Fibre Optic Cable ☐ CPP (Central Processing Plant)	☐ Security Hut ☐ Water Pipeline ☐ Pond ☐ WTP (Water Treatment Plant) ☐ Frac Pond

RECOMMENDATIONS:		
☐ No Environmental issues on site	☐ Environmental issues identified & surveyed	☐ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

A LoOM (Likelihood of Occurrence Matrix) which examines habitat for threatened fauna species found that Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act), Diamond Firetail (*Stagonopleura guttata*) (Vulnerable NC Act and EPBC Act), Golden-tailed Gecko (*Strophurus taenicauda*) (Near Threatened NC Act), Southern Whiteface (*Aphelocephala leucopsis*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur. This assessment applies to the unmapped remnant RE11.5.1a within the Clynes Road reserve.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use is grazing with the property mapped as non-remnant vegetation in all the proposed impact areas. Vegetation is improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is state mapped as non-remnant throughout. The state mapping is correct. A proposed access through vegetation to the west in the Clynes Road reserve is unmapped 11.5.1a (Eucalyptus populnea woodland with Allocasuarina luehmannii low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones). This vegetation is in remnant condition. This RE has a Biodiversity Status of No Concern at Present.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	No ESAs were indicated by mapping or observed within the property.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There are no mapped or observed TECs within the property.
DoR-mapped High-value Regrowth present / impacted:	There is no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is largely cleared but some areas have scattered regrowth of mainly acacia species.
EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of how site conditions are unsuitable.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. General habitat features for some species were considered present on the property, although no evidence of EVNT fauna was observed during the survey.

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	There were no mapped or observed watercourse features in the study area. There were no mapped wetlands on the property or within buffer distance.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing although much of the area is cleared. However, there is habitat present such as shallow gilgai on cracking clay soils, windrows and fallen logs.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Completed By	Date
Bruce McLennan	07/11/25

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 2RP82810
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint of an access and gathering layout 30 metres wide and access tracks 10 metres wide.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	9RP190989 is a grazing property mostly cleared of woody vegetation and with improved pasture.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering within the lot is state mapped as non-remnant. This mapping is correct. A proposed access through vegetation to the west in the Clynes Road reserve is unmapped 11.5.1a (Eucalyptus populnea woodland with Allocasuarina luehmannii low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones). This vegetation is in remnant condition. This RE has a Biodiversity Status of No Concern at Present.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No ESAs were indicated by mapping or were observed within the property.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There were no mapped or observed TECs within the property.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following:	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to

• Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	this report. No EVNT fauna species were observed, however, some areas contain microhabitat features that might support EVNT fauna species.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	There were no mapped or observed watercourse features in the study area. There were no mapped wetlands on the property or within buffer distance.
Current road access to proposed site: Existing / to be upgraded / new	Road access is via gravel shire roads and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: *Callitris glaucophylla* (white cypress pine), *Allocasuarina luehmannii* (bull oak), *Eremophila mitchellii* (bastard sandalwood), *Acacia harpophylla* (brigalow), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), Shrubs: *Jasminum didymum lineare* (desert jasmine), *Acacia leiocalyx* (black wattle), *Psydrax oleifolia* (brush myrtle), *Citrus glauca* (lime bush), *Eremophila mitchellii* (bastard sandalwood), *Geijera parviflora* (wilga), *Eremophila deserti* (Ellangowan poison bush), *Maireana microphylla* (bluebush), *Santalum lanceolatum* (sandalwood), *Sclerolaena birchii* (galvanised burr), Ground: *Aristida caput-medusae* (many-headed wiregrass), *Cheilanthes sieberi* (brigalow fern), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Senecio brigalowensis* (native fireweed), *Aristida jerichoensis* (Jericho wiregrass), *Lomandra longifolia* (spike rush), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Themeda triandra* (kangaroo grass), *Enteropogon acicularis* (windmill grass), *Aristida ramosa* (purple wiregrass), *Sporobolus creber* (slender rats-tail grass), *Enteropogon ramosus* (windmill grass), *Eleocharis blakeana* (Blake's spikerush)
Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	25-50
Soil type & erodibility (Sodic: Y/N):	Texture contrast soils with sandy A horizons and erodible sodic B horizons.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-2%

Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High Risk: *Opuntia tomentosa* (velvety tree pear) in low numbers. High Risk: *Opuntia stricta* (common pest pear) in low numbers.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: Access point from Clynes Road in remnant RE 11.5.1.



Photo 2: Access and gathering in non-remnant. RE 11.5.1 vegetation in road reserve to the right.



Photo 3: Windrows containing habitat for reptiles on the ROW.

Photo 4:

Photo 5:

Photo 6:

Photo 7:

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP060	Development: (Infrastructure Type)	Development
Lot Plan:	9RP190989	Disturbance size:	100 x 205 (8 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The infrastructure is not located with an ESA or its buffers.
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering to the south is non-remnant as per the well site. A proposed access through vegetation to the west in the Clynes Road reserve is unmapped 11.5.1a (Eucalyptus populnea woodland with Allocasuarina luehmannii low tree layer. Occurs on flat to gently undulating plains formed from weathered sandstones). This vegetation is in remnant condition. This RE has a Biodiversity Status of No Concern at Present.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna or microhabitat was observed during the survey.

<table>
<tr><td>Distance to mapped and unmapped Water Features:
• Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc.
• Complete Water Features Checklist
• For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.
• If no alternative exists, peg in area of least disturbance and provide justification
Refer to EA Conditions Matrix for buffer distances and permitted activities.</td><td colspan="5">The closest mapped watercourse is a SO1 watercourse approximately 130m to the southeast.</td></tr>
<tr><td>Distance to Wetlands (not including melon holes):
• Complete Wetland Features Report
• Record wetland status and type:
o Referable and Validated (Mapped and ground truthed as a wetland)
o Referable and Not Validated (Mapped and ground truthed as not a wetland)
o Non-referable and Validated (Unmapped ground-truthed wetland)
Refer to EA Conditions Matrix for buffer distances and permitted activities, e.g.:
200m buffer applies for static, GES (no buffer)</td><td colspan="5">There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td rowspan="2">Melon Holes (rate on ecological value):
Give details on width, depth, area, vegetation, fauna habitat, disturbance etc</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Weeds present (and general abundance):
• Record general composition density & species.
• Survey any Restricted Invasive Weeds</td><td colspan="5">Scattered Opuntia stricta and O. tomentosa present in low numbers.</td></tr>
<tr><td>Additional Considerations:</td><td colspan="5"></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: ***Casuarina cristata*** **(one tree),** ***Eucalyptus populnea*** **(one tree),** ***Grevillea striata*** **(one tree)** **Shrubs:** ***Psydrax oleifolia, Maireana microphylla*** **Forbs:** ***Cheilanthes sieberi, Sphaeromorphaea australe, Chrysocephalum apiculatum*** **Grasses and Associates:** ***Aristida jerichoensis, Panicum effusum, Eragrostis lacunaria, Heteropogon contortus, Aristida caput-medusae***			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Brown		
Texture[2]:	Sandy light clay		
Land Zone:	5		
Salinity:			
Groundcover: (%)			
Bare soil: 50	Grass/Herbs: 30		
Shrubs <1m: 5	Other (rocks, logs, weeds): 15		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance								
Erosion:								
Insignificant	✓	Minor		Moderate		Severe		
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):								

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 02	Date:	27/10/25.
Tenure:	QRP 190989.	Assessor(s):	BM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		Assessment Location information	
☑ Well pad	☐ Gas Processing Facility	Easting (E)	-26.95205
☐ Pilot Well + Dam	☐ Dam	Northing (N)	150.59553
☐ Monitoring	☐ Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	Other description	WP060
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)							0-2
Avg. height (m)							
Canopy cover (%)		2	3				30
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
C. cristata	☐	☐	☑	☐	☐	☐	☐	☐	one tree.
E. populnea	☐	☐	☐	☑	☐	☐	☐	☐	one tree.
Gl. stricta.	☐	☐	☐	☑	☐	☐	☐	☐	one tree
P. olifolia	☐	☐	☐	☐	☐	☑	☐	☐	occasional.
M. microphylla	☐	☐	☐	☐	☐	☑	☐	☐	
A. jerichoensis	☐	☐	☐	☐	☐	☐	☐	☑	
C. J Seibesi	☐	☐	☐	☐	☐	☐	☐	☑	
P. effusum	☐	☐	☐	☐	☐	☐	☐	☑	
C. apiculatum	☐	☐	☐	☐	☐	☐	☐	☑	
E. lacunaria	☐	☐	☐	☐	☐	☐	☐	☑	
H. contortus	☐	☐	☐	☐	☐	☐	☐	☑	
S. australe	☐	☐	☐	☐	☐	☐	☐	☑	
A. capit medusae	☐	☐	☐	☐	☐	☐	☐	☑	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE	Non Reg				
Observed RE[7]	Non Reg				
Additional notes					
Photo numbers	North: 3224	East: 26	South: 28	West: 30	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

SSMP- Likelihood of Occurrence Ma' 9RP190989

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**; Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**; In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**; For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Ironbark / smooth-barked apple / box woodland in REs 11.5.1, 11.5.4, 11.5.20 and 11.5.21.	Trees (particularly dead trees or tree stumps) with hollows, spouts or fissures which are preferred nesting sites.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	Fallen timber, logs and leaf litter which provide essential foraging habitat.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Open grassy forests and woodlands, dry pastures at wooded edges and occasionally in farmlands and grasslands with scattered trees.	Landforms 3, 4, 5 and possibly 9.	Eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Dry ironbark and cypress pine scrub or gum/box country.	Standing trees with loose, flaky bark, cracking soils, dense woody debris and leaf litter/fallen dead timber.	Intact open Acacia scrub, Eucalypt and Callitris communities.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Eucalypt woodlands	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Eucalypt/box woodlands and semi-arid areas with gum/box.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present		No	No			Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Poplar box woodland in REs 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.16, where there is cypress and buloke.	Poplar box, ironbark, cypress pine, buloke woodlands.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Open woodlands and shrublands with a low shrub layer and grassy ground cover; mainly occur in arid and semi-arid acacia, eucalypt and cypress pine Callitris woodlands and shrublands	Habitat with low tree densities and an herbaceous understory litter cover, which provides essential foraging habitat	Living and dead trees with hollows, holes or crevices, or dense, spiny-leaved shrubs, which are essential for roosting and nesting.	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Eucalypt woodlands with water less than 3km away, sandy areas dissected by gravel ridges, and burnt areas.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Dry ironbark and cypress pine scrub or gum/box country.	Intact Eucalypt and Acacia dominated woodland to open forest communities with a shrub understory <1m tall and native grasses (combined) >50% cover.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Jammat Clynes Road (34DY94) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 870m of access (10m) and well (WP087)		
Lot Plan:	34DY94	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	27/10/2025 BM
Facility Type / Activity:	Wells ☐ Appraisal ☐ Microseismic ☐ Gravel Pit ☐ Core ☑ Development / Production ☐ Directional ☐ Campsite ☐ Exploration ☐ Monitoring ☐ Tiltmeter Array ☑ Access Track		
	☐ Seismic ☐ Trunkline ☐ Comms Towers ☐ FCS (Field Compression Station) ☐ Other: ☑ Gathering System ☐ Gas Pipeline ☐ Fibre Optic Cable ☐ CPP (Central Processing Plant) ☐ Security Hut ☐ Water Pipeline ☐ Pond ☐ WTP (Water Treatment Plant) ☐ Frac Pond		

RECOMMENDATIONS:		
☑ No Environmental issues on site	☐ Environmental issues identified & surveyed	☐ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use is grazing with the property mapped as non-remnant vegetation in all the proposed impact areas. Vegetation is improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is state mapped as non-remnant throughout. State mapping is correct.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	No ESAs were indicated by mapping within the property. However, an unmapped shade area within 50 metres of WP087 was assessed as being remnant Endangered RE11.4.10 and subsequently identified as the Brigalow TEC. As such this area is a Cat B ESA. WP087 is within the buffer of this ESA.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There are no mapped TECs within the property, however, vegetation mentioned above is remnant RE11.4.10 and was assessed as being the Brigalow TEC. This TEC is not within the proposed impact area.
DoR-mapped High-value Regrowth present / impacted:	There is no mapped HVR in the survey area.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is largely cleared but some areas have scattered low regrowth of brigalow community species.
EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. General habitat features for some species were considered present on the property, although no evidence of EVNT fauna was observed during the survey.

how site conditions are unsuitable.	

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	There were no mapped or observed watercourses within the survey area. There were no mapped wetlands on the property or within buffer distance.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in very low numbers across the survey area.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing although much of the area is cleared. However, there is habitat present as shallow gilgai on cracking clay soils.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Bruce McLennan	12/11/25
Completed By	**Date**

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 34DY94
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint access tracks 10 metres wide.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	34DY94 is a grazing property mostly cleared of woody vegetation and with improved pasture.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering within the lot is state mapped as non-remnant. This mapping is correct.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	No ESAs were indicated by mapping within the property. However, an unmapped shade area within 50 metres of WP087 was assessed as being remnant Endangered RE11.4.10 and subsequently identified as the Brigalow TEC. As such this area is a Cat B ESA. Access tracks and proposed pipelines run through the buffers for this ESA.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There are no mapped TECs within the property, however, vegetation mentioned above is regrowth RE11.4.10 and was assessed as being the Brigalow TEC.
EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following:	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to

• Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	this report. No EVNT fauna species were observed, however, some areas contain microhabitat features that might support EVNT fauna species.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	There were no mapped or observed watercourses within the survey area. There were no mapped wetlands on the property or within buffer distance.
Current road access to proposed site: Existing / to be upgraded / new	Road access is bitumen main roads and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: *Eucalyptus woollsiana* (inland grey box), *Acacia harpophylla* (brigalow), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), Shrubs: *Jasminum didymum lineare* (desert jasmine), *Psydrax oleifolia* (brush myrtle), *Citrus glauca* (lime bush), *Eremophila mitchellii* (bastard sandalwood), *Geijera parviflora* (wilga), *Santalum lanceolatum* (sandalwood), *Sclerolaena birchii* (galvanised burr), *Melaleuca bracteata* (black tea tree) Ground: *Cheilanthes sieberi* (brigalow fern), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Senecio brigalowensis* (native fireweed), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Enteropogon acicularis* (windmill grass), *Aristida ramosa* (purple wiregrass), *Sporobolus creber* (slender rats-tail grass), *Enteropogon ramosus* (windmill grass), *Bothriochloa pertusa** (Indian couch), *Eleocharis blakeana* (Blake's spikerush), *Calotis cuneata* (white burr daisy)
Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	25-50
Soil type & erodibility (Sodic: Y/N):	Deep and shallow cracking light to medium clay soils with low erodibility. Some areas with moderate gilgai structure.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-2%

Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High Risk: *Opuntia tomentosa* (velvety tree pear) in low numbers. High Risk: *Opuntia stricta* (common pest pear) in low numbers.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Remnant RE11.4.10 shadeline assessed as TEC	3		Cat B ESA (TEC)	avoided

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

DETAILS OF WATERCOURSES AND WETLANDS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
	1		Riparian	

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: Access assessed, existing gravel well access to south.



Photo 2: Access to WP087 assessed, existing farm track to east



Photo 3: Assessed shade of RE 11.4.10 (Cat B ESA and TEC) within 50 m of WP087.

Photo 4

Photo 5:

Photo 6:

Photo 7:

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP087	Development: (Infrastructure Type)	Development
Lot Plan:	35DY94	Disturbance size:	100 x 100

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	The well pad is located within the buffer of a Cat B ESA. This ESA relates to an unmapped shadeline which was assessed as being remnant RE 11.4.10 which has a VM Act Status of Endangered and a Biodiversity Status of Endangered. Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems and Category C environmentally sensitive areas other than 'nature refuges' or 'koala habitat' areas, providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 of EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There are no TECs mapped in the survey area. The area of RE 11.4.10 above was assessed as being the Brigalow TEC. This TEC is not in the proposed impact area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected?	No evidence of EVNT fauna or microhabitat was observed during the survey.

<table>
<tr><td>

- Survey microhabitat features or fauna encounters for inclusion on survey sketch.

</td><td></td></tr>
<tr><td>

Distance to mapped and unmapped Water Features:

- Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc.
- Complete *Water Features Checklist*
- For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.
- If no alternative exists, peg in area of least disturbance and provide justification

Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

</td><td>The closest mapped watercourse is a SO1 drainage feature approximately 900m to the northwest.</td></tr>
<tr><td>

Distance to Wetlands *(not including melon holes):*

- Complete Wetland Features Report
- Record wetland status and type:
  - Referable and Validated (Mapped and ground truthed as a wetland)
  - Referable and Not Validated (Mapped and ground truthed as not a wetland)
  - Non-referable and Validated (Unmapped ground-truthed wetland)

Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.:

200m buffer applies for static, GES (no buffer)

</td><td>There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td>

Melon Holes (rate on ecological value):

Give details on width, depth, area, vegetation, fauna habitat, disturbance etc

</td><td>

1	2	3	4	5

</td></tr>
<tr><td>

Weeds present (and general abundance):

- Record general composition density & species.
- Survey any Restricted Invasive Weeds

</td><td></td></tr>
<tr><td>Additional Considerations:</td><td></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: **Shrubs:** ***Melaleuca bracteata, Sclerolaena birchii*** **Forbs:** ***Eleocharis blakeana*** **Grasses and Associates: Scattered native grasses**			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: <1%	Aspect of Slope:		
Soil:			
Colour:	Brown/Grey		
Texture[2]:	Medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil: 20	Grass/Herbs: 30		
Shrubs <1m: 5	Other (rocks, logs, weeds): 45		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
✓	300m of Category A or B ESA
	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance							
Erosion:							
Insignificant	✓	Minor		Moderate		Severe	

Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site:
- including surrounding infrastructure
- show vegetation & water bodies in close proximity

N



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMRC 08	Date:	27-10-25
Tenure:	3&DY 94	Assessor(s):	BM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location					
Development Type				Assessment Location information	
☑	Well pad	☐	Gas Processing Facility	Easting (E)	-26.97795
☐	Pilot Well + Dam	☐	Dam	Northing (N)	150.6147
☐	Monitoring	☐	Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐	Roads & Tracks	☐	Seismic Line	Other description	WP087
☐	Work over	☐	Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☐	☐	☐
Height range (m)							0.3
Avg. height (m)							
Canopy cover (%)							30
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
M. bracteata.	☐	☐	☐	☐	☐	☑	☐	☐	
S. birchii.	☐	☐	☐	☐	☐	☑	☐	☐	
eleocharis blakeana	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE					
Observed RE[7]	non Reg.				
Additional notes					
Photo numbers	North:	East:	South:	West:	
	58	60	62	363 64	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

350 360 ±500 340

SSMP- Likelihood of Occurrence Ma' 34DY94

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**: In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Not in listed vegetation types	No Habitat Attribute Present	No Habitat Attribute Present	No Habitat Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Cleared land with good-quality melon holes	Heavy textured soils including deeply cracking clays and loam soils associated with Land zones 3, 4 and 9.	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present		No	No			Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Not in listed vegetation types	Poplar box, ironbark, cypress pine, buloke woodlands.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Eucalypt woodlands with water less than 3km away, sandy areas dissected by gravel ridges, and burnt areas.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence	Not in listed vegetation types	High, open spaces above open wooded areas	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SUMMARY ECOLOGICAL SURVEY REPORT

SURVEY DETAILS			
Project Batch (Infra. Surveyed): (Survey Title from invite)	Surat Basin – Jammat Clynes Road (34RP912566) wells, gathering and access.		
Type of Survey:	Rapid Ecological		
Scope of Activity: Quantify the scope details; include length and width of surveyed RoW, number and names of well leases, gravel pits, camps etc. If this report is uprevved following additional assessments or sketch changes, detail the additional scope, sketch change, ecologist name and date of additions	Approximately 1350 metres of access and gathering (50m), 880m of access and gathering (30m) 340m of access (10m) and wells (WP336 & WP110)		
Lot Plan:	34RP912566	**Date of Survey:** Include dates and ecologist initials for follow-up assessment	29/10/2025 BM
Facility Type / Activity:	Wells ☐ Appraisal ☐ Microseismic ☐ Gravel Pit	☐ Core ☑ Development / Production ☑ Directional ☐ Campsite	☐ Exploration ☐ Monitoring ☐ Tiltmeter Array ☑ Access Track
	☐ Seismic ☐ Trunkline ☐ Comms Towers ☐ FCS (Field Compression Station) ☐ Other:	☑ Gathering System ☐ Gas Pipeline ☐ Fibre Optic Cable ☐ CPP (Central Processing Plant)	☐ Security Hut ☐ Water Pipeline ☐ Pond ☐ WTP (Water Treatment Plant) ☐ Frac Pond

RECOMMENDATIONS:

☐ No Environmental issues on site	☑ Environmental issues identified & surveyed	☑ EA amendment required
☑ Fauna spotter required	☐ Protected Flora Trigger Map Survey required	☐ Other:

ISSUES Requiring Follow-up:

Only detail significant issues here that are required to be followed up, e.g., infrastructure in ESA buffers* requiring EA amendment, additional flora or fauna surveys required etc.

*Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

Vegetation in the Sixteen Mile Creek corridor is mapped as mostly HVR but was assessed at the gathering and access crossing point as being remnant RE11.3.25, which has a BD Status of Of Concern. As such this vegetation is a Category C ESA.

Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas*. **To disturb a Cat C ESA would require an EA amendment.** Consideration should be given to underboring of Sixteen Mile Creek.

A LoOM (Likelihood of Occurrence Matrix) which examines habitat for threatened fauna species found that Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) (Vulnerable NC Act and EPBC Act) and Koala (*Phascolarctos cinereus*) (Endangered NC Act and EPBC Act) were likely to occur. Koala, and Brown Treecreeper were most likely to utilise riverine habitat and semi-permanent water present on Sixteen Mile Creek.

SUMMARY OF ECOLOGICAL CONSTRAINTS (FURTHER DETAIL IN ECOLOGICAL FIELD SURVEY FORM)	
Brief description of broader vegetation / land use:	The land use was grazing with the property mapped as non-remnant vegetation in all the proposed impact areas. Vegetation was improved and natural pasture species with scattered regrowth in places.
Were any REs identified and what are they? Are these correctly mapped by DoR? (Survey new extents) Updates to DoR RE Mapping IDs: What is the vegetation currently mapped as (RE and status) and what should it be mapped as? *Refer to VMA Mapping and Biodiversity Status.*	Vegetation on the access/gathering is mostly state mapped as non-remnant throughout. There is a small, mapped component where the proposed alignment crosses Sixteen Mile Creek with the vegetation mapped as RE 11.3.4/11.5.1 (70/30). Vegetation at the crossing location conforms to remnant RE 11.3.25 (Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines), which has a VM Status of Least Concern and a Biodiversity Status of Of Concern. The vegetation at this location is in good remnant condition and exceeds the benchmark for canopy cover and is 90% of the benchmark for height. A proposed access from the Kogan Condamine Road on the southeast corner of the lot is through unmapped remnant vegetation in the road reserve. This vegetation at the access point was assessed as a small patch of remnant RE 11.5.20 (Eucalyptus moluccana and/or E. microcarpa and/or E. woollsiana +/- E. crebra woodland on Cainozoic sand plains). This ecosystem has a BD Status of No Concern at Present.
Environmentally Sensitive Areas (ESAs) Provide a summary of mapped and unmapped ESAs surveyed/validated. If surveyed infrastructure would impact ESAs or buffers, include impact details on front page	State mapping along Sixteen Mile Creek is a mix of remnant and HVR but does hint at RE 11.3.4 being present. Vegetation in the Sixteen Mile Creek corridor is mapped as HVR but was assessed as being remnant RE11.3.25, which has a BD Status of Of Concern. As such this vegetation is a Category C ESA. Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas*. To disturb a Cat C ESA would require an EA amendment. Consideration should be given to underboring of Wambo Creek.
Threatened Ecological Communities (TEC) identified: Survey TEC polygon for inclusion on survey sketch.	There were no mapped or observed TECs within the property,
DoR-mapped High-value Regrowth present / impacted:	Most of the riparian vegetation along Sixteen Mile Creek is mapped as HVR RE 11.3.4/11.5.1 (70/30). Where this HVR vegetation was indicated in the impact zone the vegetation was assessed as being remnant RE 11.3.25.
Regrowth Present/Impacted: *(i.e., Species & Common name/rough estimate when cleared in years)*	The property is largely cleared but some areas have scattered regrowth of brigalow community species. South of Sixteen Mile Creek the flats have a scattering of regrowth and larger paddock trees consistent with RE 11.3.4. This area was assessed as being non remnant due to low canopy cover.

EVNT Flora species present / impacted (EPBC or NCA): Is proposed infrastructure in a High-risk Area identified on a Protected Plant Trigger Map? (If yes, add requirement for Flora Survey to front page – refer to *Flora Survey Guidelines – Protected Plants*).	No EVNT flora were observed during the survey. The proposed infrastructure does not intersect High-Risk areas as mapped on the Protected Plant Trigger Map.
EVNT Fauna – Does the area contain Potential Habitat for any EVNT species (EPBC or NCA)? 1. Is the area Core Habitat 'Known' or 'Possible' for any EVNT species (EPBC or NCA)? 2. If 'Yes', does the area contain microhabitat features, which would indicate likely habitat for the species OR was the species detected? 3. Survey microhabitat features or fauna encounters for inclusion on survey sketch. 3. If no suitable habitat for any threatened species is detected, provide a summary of how site conditions are unsuitable.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Brown Treecreeper (south-eastern) (Climacteris picumnus victoriae) (Vulnerable NC Act and EPBC Act) and Koala (Phascolarctos cinereus) (Endangered NC Act and EPBC Act) were likely to occur. Koala, and Brown Treecreeper were most likely to utilise riverine habitat and semi-permanent water present on Sixteen Mile Creek.

Watercourses and Wetlands: Brief summary of mapped and unmapped watercourses, wetlands and buffers impacted. Assessment information to include: • any downgrades of mapped watercourses to drainage features • infrastructure in buffers • Details on wetlands: o Mapped referrable HES or GES o Unmapped o Impacts in buffers	Sixteen Mile Creek (SO3) is crossed by the gathering system within the property. There were no mapped wetlands on the property or within buffer distance.
Restricted Invasive Plants (Weeds): Summary of invasive weeds surveyed/recorded	Low to medium numbers of invasive weed species were observed. High Risk species *Opuntia tomentosa* and *Opuntia stricta* were observed in low numbers across the survey area. High Risk species *Bryophyllum delagoense* was observed in low to medium densities along Sixteen Mile Creek.
Additional Considerations:	A suitably-qualified spotter catcher is required during clearing although much of the area is cleared. However, there is habitat present such as shallow gilgai on cracking clay soils, windrows and fallen logs in addition to a small numbers of tree hollows in the riparian corridor.

This survey has been completed by a suitably qualified ecologist. Survey approval applies to the location & environmental constraints outlined in this report. At the time of submission, the ecologist deems the report to be satisfactory.

Features of ecological and environmental significance were identified and mapped where present in accordance with Arrow's Ecological Impact Assessment Procedure and Ecology Survey Guideline.

Bruce McLennan	14/11/25
Completed By	**Date**

ENVIRONMENTAL FIELD APPROVAL LINEAR (EFAL) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Jammat 34RP912566
ATP / PL number:	PL253
Changes to Linear Infrastructure (not including small changes to access and gathering due to small moves on static infrastructure) - If changes to conceptual layout were made due to environmental constraints, summarise below:	
Changes to Infrastructure & Outcome: (E.g., "Access was realigned from survey point xx to survey point xx to avoid an unmapped Cat B ESA")	The survey assessed a construction footprint of an access and gathering layouts 50 & 30 metres wide and access tracks 10 metres wide.

Subject	Detailed Description
General Description of Current Land Use: (Remnant vegetation, regrowth, cultivation, pasture or other)	34RP912566 is a grazing property mostly cleared of woody vegetation and with improved pasture.
Confirm REs present: • What is the vegetation currently mapped as (RE and Biodiversity status) and what should it be mapped as? • Survey new/correct extents of REs. o Fully survey polygons, if practicable; o Buffer partially-surveyed edges; and • Provide reference survey points and site photos.	Vegetation on the access/gathering is mostly state mapped as non-remnant throughout. There is a small, mapped component where the proposed alignment crosses Sixteen Mile Creek with the vegetation mapped as RE 11.3.4/11.5.1 (70/30). Vegetation at the crossing location conforms to remnant RE 11.3.25 (Eucalyptus tereticornis or E. camaldulensis woodland fringing drainage lines) which has a VM Status of Least Concern and a Biodiversity Status of Of Concern. The vegetation at this location is in good remnant condition. A proposed access from the Kogan Condamine Road on the southeast corner of the lot is through unmapped remnant vegetation in the road reserve. This vegetation at the access point was assessed as a small patch of remnant RE 11.5.20 (Eucalyptus moluccana and/or E. microcarpa and/or E. woollsiana +/- E. crebra woodland on Cainozoic sand plains). This ecosystem has a BD Status of No Concern at Present.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; and • Provide reference survey points and site photos. Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	State mapping along Sixteen Mile Creek is a mix of remnant and HVR but does suggest that RE 11.4.3 is dominant. Vegetation in the Sixteen Mile Creek corridor is mapped as HVR but was assessed as being remnant RE11.3.25 which has a BD Status of Of Concern. As such this vegetation is a Category C ESA. Under EA0001401 (which applies to this project) section *Biodiversity 6* states that *Petroleum activities are not permitted in Category A, B or C environmentally sensitive areas*. To disturb a Cat C ESA would require an EA amendment. Consideration should be given to underboring of Wambo Creek.
Threatened Ecological Communities present/impacted: Survey polygons for inclusion on survey sketch. If impacted by or adjoining infrastructure complete Quantification Report.	There were no TECs mapped or observed within the survey area.

EVNT Flora present/impacted: (If impacted by or adjoining infrastructure complete *Quantification Report.)*	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure impact the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There are no High-Risk areas on the Protected Plant Trigger Map that intersect the survey area.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Unlikely', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	A Likelihood of Occurrence Matrix (LoOM) assessment, considering 34 threatened species with potential to occur in Arrow's upstream tenements, was conducted for the surveyed infrastructure on the property. The completed LoOM is appended to this report. The LoOM found that Brown Treecreeper (south-eastern) (Climacteris picumnus victoriae) (Vulnerable NC Act and EPBC Act) and Koala (Phascolarctos cinereus) (Endangered NC Act and EPBC Act) were likely to occur. Koala, and Brown Treecreeper were most likely to utilise riverine habitat and semi-permanent water present on Sixteen Mile Creek.
Watercourses / Wetlands: • Ground truth mapped watercourses and wetlands crossed by infra. or within buffer distance (complete *Water Features Checklist / Wetland Features Report*) • Survey unmapped watercourses / wetlands Refer to *EA Conditions Matrix* for buffer distances and permitted activities.	Sixteen Mile Creek (SO3) is crossed by the gathering system on the south of the property. There were no mapped wetlands on the property or within buffer distance.
Current road access to proposed site: Existing / to be upgraded / new	Road access is bitumen main roads and internal tracks on the property.
Dominant vegetation species to be disturbed: Trees, Shrubs, Groundcover	Trees: *Eucalyptus tereticornis* (Queensland blue gum), *Blakella tessellaris* (Moreton Bay ash), *Angophora floribunda* (rough barked apple), *Callitris glaucophylla* (white cypress pine), *Allocasuarina luehmannii* (bull oak), *Eremophila mitchellii* (bastard sandalwood), *Eucalyptus woollsiana* (inland grey box), *Acacia harpophylla* (brigalow), *Eucalyptus populnea* (poplar box), *Casuarina cristata* (belah), *Corymbia clarksoniana* (Clarkson's bloodwood) Shrubs: *Jasminum didymum lineare* (desert jasmine), *Acacia leiocalyx* (black wattle), *Psydrax oleifolia* (brush myrtle), *Citrus glauca* (lime bush), *Eremophila mitchellii* (bastard sandalwood), *Geijera parviflora* (wilga), *Eremophila deserti* (Ellangowan poison bush), *Maireana microphylla* (bluebush), *Acacia muelleriana* (Mueller's wattle), *Santalum lanceolatum* (sandalwood), *Sclerolaena birchii* (galvanised burr), *Sclerolaena tetracuspis* (brigalow burr), *Pimelea neoanglica* (poison pimelea), *Leptospermum polygalifolium* (tantoon), *Pittosporum angustifolium* (gumbi gumbi), *Capparis lasiantha* (nipan), *Capparis anomala* (warrior bush) Ground: *Aristida caput-medusae* (many-headed wiregrass), *Cheilanthes sieberi* (brigalow fern), *Chrysocephalum apiculatum* (yellow buttons), *Eragrostis elongata* (clustered lovegrass), *Senecio brigalowensis* (native fireweed), *Aristida jerichoensis* (Jericho wiregrass), *Lomandra longifolia* (spike rush), *Bothriochloa decipiens* (pitted bluegrass), *Juncus usitatus* (common rush), *Themeda triandra* (kangaroo grass), *Enteropogon acicularis* (windmill grass), *Aristida ramosa* (purple wiregrass), *Sporobolus creber* (slender rats-tail grass), *Enteropogon ramosus* (windmill grass), *Bothriochloa pertusa** (Indian couch), *Eleocharis blakeana* (Blake's spikerush), *Dichanthium sericeum* (Queensland bluegrass), *Chrysopogon*

	filipes (Australian vetiver), *Dianella rara* (northern vanilla lily), *Cymbopogon refractus* (barbed-wire grass)
Vegetation disturbance size: *(Area – m^2)*	As per final disturbance plans
Vegetation density to be disturbed: (%) 0-25, 25-50, 50-75, 75-100	25-50
Soil type & erodibility (Sodic: Y/N):	Deep and shallow cracking light to medium clay soils with low erodibility. Some areas with low to moderate gilgai structure. Texture contrast soils with sandy A horizons and erodible B horizons toward southern boundary.
Potential Sediment and Erosion Zones: Provide references to survey points and site photos	
Site slope (approx.) 10% slope maximum limit for vegetation clearing. Survey any areas where clearing would occur on slopes >10% for inclusion in the survey sketch	0-2%
Weed Details and Risk Rating*: • Record general composition density & species. • Survey any Restricted Invasive Weeds ***** Weed risk rating refers to the level of risk involved with transporting weeds from the property: 1. High risk – restricted invasive weeds confirmed on the construction site 2. Medium risk – restricted invasive weeds on the site, however not on the actual construction site 3. Low risk – other invasive weeds are found throughout the site, however no restricted weeds are present 4. Negligible risk – no invasive weeds are present on the site	High Risk: *Opuntia tomentosa* (velvety tree pear) in low numbers. High Risk: *Opuntia stricta* (common pest pear) in low numbers. High Risk: *Bryophyllum delagoense* (mother-of-millions) in low numbers on drainage lines.
Notes:	

LOCATION OF VEGETATION OR AREAS NOT TO BE DISTURBED (This can represent a grouping of vegetation)				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

LOCATION OF POTENTIAL SEDIMENT AND EROSION ZONES				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

DETAILS OF WATERCOURSES AND WETLANDS

Site Description	Photo #	GPS / Location	Environmental Value	Action Taken
Sixteen Mile Creek crossing (SO3)	1		Riparian, Cat C ESA	

OTHER CONSIDERATIONS				
Site Description	Photo #	GPS / Location	Environmental Value	Action Taken

Photography - Linear Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: Proposed access and gathering crossing point on Sixteen Mile Creek (SO3) RE 11.3.25.



Photo 2: Access and gathering looking east towards WP336 with shallow gilgai



Photo 3: Proposed A&G through scattered paddock trees south of Sixteen Mile Creek.



Photo 4: Proposed access and gathering to WP110 with scattered regrowth.

Photo 5:
Photo 6:
Photo 7:

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP110	Development: (Infrastructure Type)	Development
Lot Plan:	34RP912566	Disturbance size:	100 x 115 (2 wells)

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	There were no mapped or observed ESAs within the survey area. The well pad is located within the buffer of a Cat C ESA. This ESA relates to mapped Essential Habitat for the Imperial Hairstreak Butterfly (*Jalmenus eubulus*) which has an NC Act status of Vulnerable. Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of Category B environmentally sensitive areas that are 'endangered' regional ecosystems and Category C environmentally sensitive areas other than 'nature refuges' or 'koala habitat' areas, providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area. (Biodiversity 7 of EA0001401)
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There were no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)?	No evidence of EVNT fauna or microhabitat was observed during the survey.

<table>
<tr><td>

- If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected?
- Survey microhabitat features or fauna encounters for inclusion on survey sketch.

</td><td></td></tr>
<tr><td>

Distance to mapped and unmapped Water Features:

- Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc.
- Complete *Water Features Checklist*
- For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.
- If no alternative exists, peg in area of least disturbance and provide justification

Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

</td><td>The closest mapped watercourse is a SO1 watercourse approximately 150m to the southwest.</td></tr>
<tr><td>

Distance to Wetlands *(not including melon holes):*

- Complete Wetland Features Report
- Record wetland status and type:
  - Referable and Validated (Mapped and ground truthed as a wetland)
  - Referable and Not Validated (Mapped and ground truthed as not a wetland)
  - Non-referable and Validated (Unmapped ground-truthed wetland)

Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.:

200m buffer applies for static, GES (no buffer)

</td><td>There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td>Melon Holes (rate on ecological value):
Give details on width, depth, area, vegetation, fauna habitat, disturbance etc</td><td>

1	2	3	4	5

</td></tr>
<tr><td>

Weeds present (and general abundance):

- Record general composition density & species.
- Survey any Restricted Invasive Weeds

</td><td></td></tr>
<tr><td>Additional Considerations:</td><td></td></tr>
</table>

Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: ***Acacia harpophylla***			
Shrubs: ***Citrus glauca, Capparis mitchellii, Sclerolaena birchii, Capparis anomala, Eremophila deserti***			
Forbs:			
Grasses and Associates: ***Setaria* sp., Eragrostis sp., Aristida ramosa, Sporobolus creber, Enteropogon ramosus, Cymbopogon refractus***			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y	N	
		N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: 1-2%	Aspect of Slope: SE		
Soil:			
Colour:	Brown		
Texture[2]:	Sandy light clay		
Land Zone:	4/5		
Salinity:			
Groundcover: (%)			
Bare soil: 15	Grass/Herbs: 65		
Shrubs <1m: 10	Other (rocks, logs, weeds): 30		

Environmentally Sensitive Areas (ESA) Tick, if site is located within:	
	Category A ESA (e.g., national park, conservation park)
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).
	300m of Category A or B ESA
✓	In or within 300m of a Category C ESA
	within an area with overlapping ESAs
If YES in any of the above, provide justification or tick appropriate box below:	
✓	pre-existing area of significant disturbance in the buffer zone
	undisturbed areas more than 100m from the ESA
	undisturbed areas less than 100m from the ESA
	pre-existing areas of significant disturbance within the ESA
	areas within the ESA of lower environmental value
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon

Vegetation Management	
Does the proposed development involve vegetation clearing?	
	that isolates clumps or dissects corridors of vegetation
	on dispersible soils
	in existing or potential discharge areas
If YES in any of the above, provide justification:	

Disturbance

Erosion:								
Insignificant	✓	Minor		Moderate		Severe		
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):								

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south



Photo 4: View of well lease centre to west

ENVIRONMENTAL FIELD APPROVAL STATIC (EFAS) REPORT

PACR (Block – Infra. Surveyed): (Survey Title from invite)	Surat Basin - Jammat		
ATP / PL number:	PL253		
Site name: (Field and Well#)	WP336	Development: (Infrastructure Type)	Development
Lot Plan:	34RP912566	Disturbance size:	100 x 100

Was the infrastructure shifted and why?	No shift
What vegetation is present? (Remnant, regrowth, ERE, OCRE, pasture, cultivation, etc.). Is the DoR-mapped RE correct (*if applicable*)? • Survey new/correct extents of REs • Reference survey points and site photos	Vegetation over the site is state mapped as non-remnant. The site was assessed as being non-remnant.
Significant Vegetation (including ESAs): • Ground truth any mapped ESAs within buffer distance of infrastructure; • Survey any unmapped ESAs and buffers; • Reference survey points and site photos. Refer to EA Conditions Comparison Spreadsheet for buffer distances and permitted activities.	There were no mapped or observed ESAs or buffers in the survey area.
Vegetation on Access and Gathering: • For remnant vegetation - 10m access width max; • For Category B or C ESA or PPZ (200m buffer): - 6m access width max; - 15m gathering width max (1 or 2 lines), 20m width (3, 4, 5 lines) etc; - access must be co-located with gathering within an ESA;	Vegetation on access and gathering is non-remnant as per the well site.
Threatened Ecological Communities: (Survey polygon, provide detail of TEC including proposed disturbance area and justification for impact). Note: Complete Quantification Report if impacted by or bordering infrastructure.	There were no TECs mapped in the survey area.
EVNT Flora: Note: Complete Quantification Report if impacted by or bordering infrastructure.	No EVNT flora was observed during the survey.
Flora Survey Trigger Areas: Does the infrastructure intersect the latest DoR mapping? If yes, Flora Trigger Survey to be recommended	There was no High-Risk Area of a Flora Trigger Map over the proposed well location.
EVNT Fauna: Complete *Likelihood of Occurrence Matrix* (LoOM) to determine the following: • Is the area 'Potential', 'Likely,' or 'Known' Habitat for any EVNT species (EPBC or NCA)? • If 'Yes', does the area contain microhabitat features as per the SSMP, which would indicate likely habitat for the species OR was the species detected? • Survey microhabitat features or fauna encounters for inclusion on survey sketch.	No evidence of EVNT fauna or microhabitat was observed during the survey.
Distance to mapped and unmapped Water Features: • Confirm type i.e., Stream Order watercourse, drainage feature, erosion gully and give description of feature i.e., width of bed and banks, vegetation etc. • Complete *Water Features Checklist* • For Stream Orders, if infrastructure is proposed within the buffer from the high bank, seek alternative site.	The closest mapped watercourse is a SO3 watercourse approximately 280m to the south

<table>
<tr><td>

- If no alternative exists, peg in area of least disturbance and provide justification

Refer to *EA Conditions Matrix* for buffer distances and permitted activities.

</td><td></td></tr>
<tr><td>

Distance to Wetlands *(not including melon holes):*

- Complete Wetland Features Report
- Record wetland status and type:
  - Referable and Validated (Mapped and ground truthed as a wetland)
  - Referable and Not Validated (Mapped and ground truthed as not a wetland)
  - Non-referable and Validated (Unmapped ground-truthed wetland)

Refer to *EA Conditions Matrix* for buffer distances and permitted activities, e.g.:

200m buffer applies for static, GES (no buffer)

</td><td>There are no mapped wetlands within buffer distance of the site.</td></tr>
<tr><td>

Melon Holes (rate on ecological value):

Give details on width, depth, area, vegetation, fauna habitat, disturbance etc

</td><td>

<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td colspan="5">1: Melon holes are shallow with a scatter of sedges.</td></tr>
</table>

</td></tr>
<tr><td>

Weeds present (and general abundance):

- Record general composition density & species.
- Survey any Restricted Invasive Weeds

</td><td>Environmental pest *Phyla canescens* was noted in low numbers scattered in seasonally wet depressions.</td></tr>
<tr><td>Additional Considerations:</td><td></td></tr>
</table>

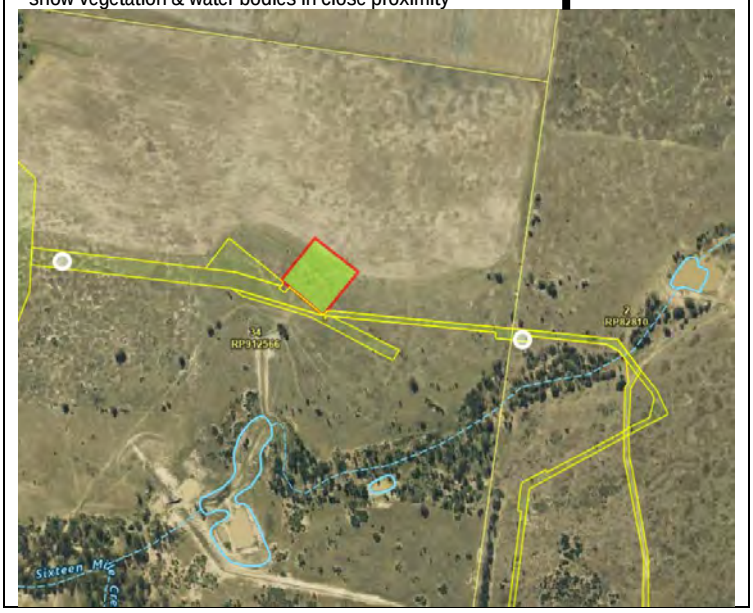
Ecological Characteristics			
Dominant Species: (trees, bushes, grasses)			
Trees: **Shrubs:** ***Citrus glauca, Capparis lasiantha, Sclerolaena tetracuspis, Maireana microphylla, Eremophila deserti*** **Forbs:** **Grasses and Associates:** ***Enteropogon acicularis, Dichanthium sericeum, Sporobolus creber***			
Structural Form:			
Average Tree Height (m):	Canopy layer (%):		
Structural Form (Specht 1970[1]): derived grassland			
Habitat Description:			
Is a further detailed flora/fauna assessment required?	Y N	N N	
If yes, what type and reasons for:			
Logs >30cm Ø (count): 0	Rocks >50cm Ø (count): 0		
Hollow bearing trees (count): 0			
Slope: 1-2%	Aspect of Slope: SE		
Soil:			
Colour:	Grey/Brown		
Texture[2]:	Medium clay		
Land Zone:	4		
Salinity:			
Groundcover: (%)			
Bare soil: 25	Grass/Herbs: 45		
Shrubs <1m: 10	Other (rocks, logs, weeds): 20		
Environmentally Sensitive Areas (ESA) Tick, if site is located within:			
	Category A ESA (e.g., national park, conservation park)		
	Category B ESA (e.g., endangered regional ecosystem, a place of cultural significance).		
	Category C ESA (e.g., state forest, OCRE, Timber Reserve, Essential Habitat).		
	300m of Category A or B ESA		
	In or within 300m of a Category C ESA		
	within an area with overlapping ESAs		
If YES in any of the above, provide justification or tick appropriate box below:			
	pre-existing area of significant disturbance in the buffer zone		
	undisturbed areas more than 100m from the ESA		
	undisturbed areas less than 100m from the ESA		
	pre-existing areas of significant disturbance within the ESA		
	areas within the ESA of lower environmental value		
	areas where clearing of an ERE or OCRE is unavoidable; clearing does not exceed 10% of the mapped polygon		
Vegetation Management			
Does the proposed development involve vegetation clearing?			
	that isolates clumps or dissects corridors of vegetation		
	on dispersible soils		
	in existing or potential discharge areas		
If YES in any of the above, provide justification:			
Disturbance			

Erosion:							
Insignificant	✓	Minor		Moderate		Severe	
Describe (e.g., sheet, gully, tunnel, stream, original cause, e.g., cattle, slope, etc):							

SITE LOCATION RECOMMENDED

Yes ☒ **No** ☐ **Yes with conditions** ☐

Draft sketch of site: N
- including surrounding infrastructure
- show vegetation & water bodies in close proximity



[1]Structural Forms of vegetation, Specht 1970

	Percentage foliage cover of tallest plant layer			
Life form / height of tallest stratum	**Dense (70-100%)**	**Mid-dense (30-70%)**	**Sparse (10-30%)**	**Very sparse (<10%)**
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open -forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed -scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed -heath	Open-heath	Low shrubland	Low open-shrubland

Photography - Static Infrastructure

Please ensure photo(s) are captioned including location and GPS Coordinates, description and any additional comments



Photo 1: View of well lease centre to north



Photo 2: View of well lease centre to east



Photo 3: View of well lease centre to south

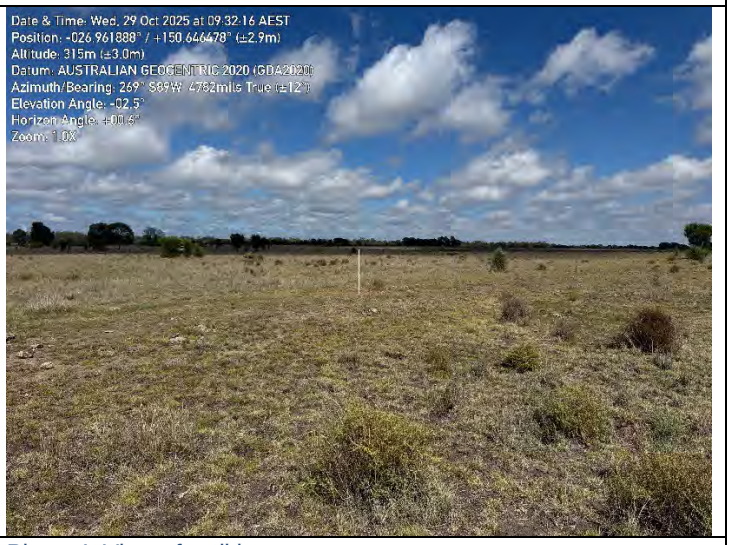


Photo 4: View of well lease centre to west

WATER FEATURE CHECKLIST - ENVIRONMENTAL SURVEY REPORT

Field Assessment				
Block – PACR Name: (Survey Title from invite)	Arrow Jammat (34RP912566)			
Infrastructure impact on water feature (Provide details) **Is it:** • Crossed by access? (bed-level crossing) • Crossed by gathering? • In proximity to static infrastructure? (well, camp, gravel pit, STP effluent area) *Refer to *EA Conditions Comparison Spreadsheet* for buffer distances and permitted activities.	Crossed by proposed access and gathering.			
Lot Plan:	34RP912566	**Crossing type:**	Existing Crossing / No Upgrade Required: Existing Crossing / Upgrade Required: New Crossing in previously disturbed area: New Crossing in undisturbed area:	☐ ☐ ☐ ☒
Survey sketch point #:		**Bank full width**	**35**	
		Bank width	**6**	
		Bed width	**23**	
		Bank height from bed	**2.5**	
Instructions for Assessment	1. A separate checklist shall be completed where there is deemed to be a change in hydrological or topographic conditions, which may change the outcome of any of the below questions: (e.g. area of permanent flow, occurrence of contiguous riparian vegetation, obvious changes in landscape such as the occurrence of beds or banks) 2. This checklist should be accompanied by mapping, which indicates the location of each individual assessment. Each assessment should be numbered and reflected and/or identified on the map. 3. A work sheet is to be completed for all water features encountered during the survey.			

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Question to determine if the feature is a watercourse	Y/N	Justification	Comments
Is the feature mapped within the state mapping data set? If so, what is the stream order number? Is the feature named?	Y	Sixteen Mile Creek	SO3
A non-watercourse drainage feature is defined as having all of the following attributes; assessor to complete assessment of the following parameters: a) is the feature formed by the concentration of, or operates to confine or concentrate overland flow water only during and immediately after rainfall events; and	N	If **YES** to <u>all</u> of these questions the feature is only a drainage feature, the feature doesn't constitute a mappable watercourse and no further assessment is required. If **NO** to <u>any</u> of these continue with the assessment	
b) appears to flow for only a short duration after a rainfall event, regardless of the frequency of flow events; and	Y		
c) does not appear to have enough continuing flow to create a riverine environment.	N		
Is there a presence of defined bed and banks? (The bed and banks must be continuous rather than isolated and broken sections of a depression).	Y	If **YES** to all, the feature is a watercourse.	
Does the feature have sufficient flow adequacy: the flow needs to be sufficient to sustain basic ecological processes and to maintain additional biodiversity, than that of the surrounding landscape, within the feature	Y	If **NO** to any of these, the feature doesn't constitute a mappable watercourse and no further assessment is required under the *Fisheries Act*. Construct the watercourse crossing under the Environmental Authority. No DAFF notification is required.	

<u>Summary is required for how determination was made of the water feature:</u>

The watercourse has an established riparian ecology with defined banks and channel. Riparian vegetation is in good remnant condition.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Water Features – Pre-works Notification Photos

5 photos required for each bed-level access crossing. Photos to be taken as per instructions below.

Latitudinal and longitudinal extent for area (decimal degrees i.e. ddd.ddddd):
Survey sketch point #:

Photo (A) – Looking across the waterway at the proposed site of works *Across the watercourse at the proposed site of the bed-level crossing.*

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (B) – Looking upstream from crossing
Standing at the point of the crossing, and looking upstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (C) – Looking downstream from crossing
Standing at the point of the crossing, and looking downstream.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (D) – Looking upstream towards crossing
Standing slightly downstream of the point of the crossing, and looking upstream (photographing the crossing point and upstream of it).

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.



Photo (E) – Looking downstream towards crossing
Standing slightly upstream of the point of the crossing, and looking downstream (photographing the crossing point and downstream of it.

This Assessment worksheet has been prepared to assist with ensuring Arrow reviews drainage features/watercourses in accordance with the Water Act and the Environmental Authorities in which Arrow operates.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BM CR 23	**Date:**	29-10-25.
Tenure:	34 RR912566	**Assessor(s):**	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		**Assessment Location information**	
☑ Well pad	☐ Gas Processing Facility	**Easting (E)**	
☐ Pilot Well + Dam	☐ Dam	**Northing (N)**	
☐ Monitoring	☐ Pipeline	**Datum**	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	**Other description**	WP 336
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	**E**	**T1**	**T2**	**T3**	**S1**	**S2/seedlings**	**Ground**
EDL[1]		☐	☐	☐	☐	☐	☑
Height range (m)							0.2
Avg. height (m)							
Canopy cover (%)							45
Functional shrub layer density[2]		**Dense/closed**	**Mid-dense**	**Sparse**	**Very sparse**	**Absent**	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	**D[4]**	**E**	**T1**	**T2**	**T3**	**S1**	**S2**	**G**	**Notes (e.g. sample name)**
S. tetracuspis	☐	☐	☐	☐	☐	☑	☐	☐	
C. glauca	☐	☐	☐	☐	☐	☑	☐	☐	
C. glaziantha	☐	☐	☐	☐	☐	☑	☐	☐	
E. acicularis	☐	☐	☐	☐	☐	☐	☐	☑	
S. creber	☐	☐	☐	☐	☐	☐	☐	☑	
D. sericeum	☐	☐	☐	☐	☐	☐	☑	☑	
M. microphylla	☐	☐	☐	☐	☐	☑	☐	☐	
E. deserti	☐	☐	☐	☐	☐	☑	☐	☐	
Phyla canescens *	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	**RE Condition[5]**	**EPBC Status[6]**	**VM Act Status**	**Biodiversity Status**
Mapped RE					
Observed RE[7]					
Additional notes					
Photo numbers	**North:**	**East:**	**South:**	**West:**	
	3602	04	06	08.	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR24	Date:	29-10-25
Tenure:	34 RP912566	Assessor(s):	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		Assessment Location information	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	-26.96629
☐ Pilot Well + Dam	☐ Dam	Northing (N)	150.63628
☐ Monitoring	☑ Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	Other description	Crossing 12 Mile Creek.
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]		☑	☐	☐	☐	☐	☐
Height range (m)		25 | 13	13 | 7		2 | 1		0.7
Avg. height (m)		21	8		1.5		
Canopy cover (%)		40	5		10		60
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
E. tereticornis	☐	☐	☑	☐	☐	☐	☐	☐	
A. floribunda.	☐	☐	☑	☐	☐	☐	☐	☐	
G. parviflora	☐	☐	☐	☐	☐	☑	☐	☐	
L. polygalifolium	☐	☐	☐	☐	☐	☑	☐	☐	
L. longifolia	☐	☐	☐	☐	☐	☐	☐	☑	
J. usitatus	☐	☐	☐	☐	☐	☐	☐	☑	
C. fillipes	☐	☐	☐	☐	☐	☐	☐	☑	
M. maximus *	☐	☐	☐	☐	☐	☐	☐	☑	
S. rhombifolia *	☐	☐	☐	☐	☐	☑	☐	☐	
P. angustifolium	☐	☐	☐	☐	☐	☑	☐	☐	
C. charlsoniana	☐	☐	☑	☐	☐	☐	☐	☐	
D. rara	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE					
Observed RE[7]	11.3.25	Rem		LC	OC
Additional notes	Not HVR - should be remnant.				
Photo numbers	North: 3624	East: 26	South: 28	West: 30	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BMCR 25.	Date:	29-10-25
Tenure:	34RP 912566	Assessor(s):	ZM.
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		Assessment Location information	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	-26.97559
☐ Pilot Well + Dam	☐ Dam	Northing (N)	150.64185.
☐ Monitoring	☐ Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☐ Roads & Tracks	☐ Seismic Line	Other description	WP110
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]	☐	☐	☐	☐	☐	☐	☑
Height range (m)					2 | 1		0.3
Avg. height (m)					1.5.		
Canopy cover (%)					20		65.
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
Cy mitchellii	☐	☐	☑	☐	☐	☑	☐	☐	
C. anomala	☐	☐	☐	☐	☐	☑	☐	☐	
A. harpophylla	☐	☐	☑	☐	☐	☐	☐	☐	
C. glauca	☐	☐	☐	☐	☐	☑	☐	☐	
E. desertii	☐	☐	☐	☐	☐	☑	☐	☐	
S. birchii	☐	☐	☐	☐	☐	☑	☐	☐	
Setaria sp*	☐	☐	☐	☐	☐	☐	☐	☑	
E. crebra	☐	☐	☐	☐	☐	☐	☐	☑	
Eragrostis	☐	☐	☐	☐	☐	☐	☐	☑	
Aristida ramosa	☐	☐	☐	☐	☐	☐	☐	☑	
E. ramosus	☐	☐	☐	☐	☐	☐	☐	☑	
C. refractus	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE					
Observed RE[7]	NR				
Additional notes	Scattered regrowth.				
Photo numbers	North:	East:	South:	West:	
	3654	56	58	60	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

Quaternary Assessment

arrow energy

Site Identification			
Site Name:	BNCR 26	Date:	29-10-25
Tenure:	Road reserve	Assessor(s):	BM
Corresponding EFS site name of Environmental Stratification Unit (ESU):			

Development Type and Location			
Development Type		Assessment Location information	
☐ Well pad	☐ Gas Processing Facility	Easting (E)	-26.97827
☐ Pilot Well + Dam	☐ Dam	Northing (N)	150.64749
☐ Monitoring	☐ Pipeline	Datum	GDA2020, MGA zone: 55 ☐ or 56 ☐
☑ Roads & Tracks	☐ Seismic Line	Other description	Access - turnout to highway
☐ Work over	☐ Property (area) wide		

Vegetation Stratification, Structure and Context of ESU							
Stratum	E	T1	T2	T3	S1	S2/seedlings	Ground
EDL[1]		☑	☐	☐	☐	☐	☐
Height range (m)		18 | 10	10 | 5		3 | 1		0.2
Avg. height (m)		16	8		2		
Canopy cover (%)		40	5		45		30
Functional shrub layer density[2]		Dense/closed	Mid-dense	Sparse	Very sparse	Absent	

1. Ecologically Dominant Layer – check the box next to the single layer that represents the dominant stratum of vegetation. Next to the EDL check box, note if dense/closed (>70%), mid-dense (30-70%), sparse (10-30%), very sparse (<10%).
2. Select the option that best represents the functional shrub layer density under 2 metres.

Species Stratification									
Scientific Name[3]	D[4]	E	T1	T2	T3	S1	S2	G	Notes (e.g. sample name)
E. woollsiana	☐	☐	☑	☑	☐	☐	☐	☐	
E. populnea	☐	☐	☑	☐	☐	☐	☐	☐	
Q. parviflora	☐	☐	☐	☐	☐	☑	☐	☐	
A. shuttleworthii	☐	☐	☐	☐	☐	☑	☐	☐	
E. decaris	☐	☐	☐	☐	☐	☑	☐	☐	
P. caespitosum	☐	☐	☐	☐	☐	☐	☐	☑	
S. creber	☐	☐	☐	☐	☐	☐	☐	☑	
C. refractus	☐	☐	☐	☐	☐	☐	☐	☑	
Aristida	☐	☐	☐	☐	☐	☐	☐	☑	
	☐	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	☐	
D. tomentosa	☐	☐	☐	☐	☐	☐	☐	☐	E.M
	☐	☐	☐	☐	☐	☐	☐	☐	

3. Group in order of stratum.
4. Select if the species is dominant within the selected stratum. If the community has co-dominant EDL species, select both.

Regional Ecosystem Mapping					
	RE Code	RE Condition[5]	EPBC Status[6]	VM Act Status	Biodiversity Status
Mapped RE	NR				
Observed RE[7]	11.5.20	Rem.		LC	NC
Additional notes					
Photo numbers	North:	East:	South:	West:	
	3674	76	78	80	

5. Vegetation community definition – Remnant, Regrowth, High Value Regrowth (HVR), Regrowth Undifferentiated, Derived Grassland, Pasture/Grazing, Cleared, or Cultivated.
6. If present, the EPBC Status of TEC (Vulnerable, Endangered, or Critically Endangered). Additional site assessment required for TEC status.
7. For vegetation to be recognised as HVR, the minimum crown cover percentage for the REs vegetation structure category must be met. Each RE is assigned a vegetation structure category in the Regional Ecosystems Description Database (very sparse, sparse, mid-dense and dense). Minimum crown cover for structure category as follows: Very sparse – 5%, Sparse – 10%, Mid-dense – 25%, and Dense – 40%.

SSMP- Likelihood of Occurrence Ma' 34RP912566

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**: In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Timbered watercourses with river she-oak or Casuarina species in REs 11.3.14, 11.3.17, 11.3.18, 11.3.25 and 11.3.27a.	Poplar box, gum-topped box, or forest red gum over ground cover of native grasses	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	No Habitat Attribute Present	No Habitat Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E. acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Treeless areas, tussock grassland and open woodland.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary feed trees, bieng E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada and E. tereticornis ssp. tereticornis represent the dominant canopy species within the vegetation community.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Roadside strips of Brigalow/Belah.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	No 2nd Attribute Present	No 3rd Attribute Present		No	No			Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Riverine woodlands with sandy areas, cattle tracks and low impact grazing.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Other eucalypt-dominated woodlands and forests, including riparian woodlands: potentially in REs 11.3.2, 11.3.3, 11.3.17, 11.3.18, 11.3.25, 11.3.27f, 11.4.12, 11.5.4, 11.5.5, 11.7.4, 11.9.7, 11.9.10 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present					Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	Above or below canopy of forests or rainforests	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

SSMP- Likelihood of Occurrence Ma' 34RP912566

LoOM Steps: (1) View **Distribution Map** (column 'A') in relation to your site; (2) **Broad Area of Occurence**: Select a choice from drop-down list in column 'C'; (3) If subject site is within **Broad Area of Occurrence**, select a choice from the drop-down lists in **every** column, as required, from 'D' to 'J'; (4) **ESPT Reference points**: In column 'K', provide the ESPT survey points for the subject area/areas of habitat on the property for that particular species; (5) **Likelihood-of-Occurrence** (LoO) is displayed in column 'L'; (6) **Is Further Action Required?**: For a LoO of 'Likely', or 'Known', a 'Yes' will appear in column 'N'. The LoO for the species should be stated on the front page of the PEC summary and that the LoOM recommends further action is required ; (7) The decision on what further action is taken for that particular Lot/Plan will be made by the **Biodiversity Advisor**, in consultation with the **Asset Team.** (8) **Survey Type**: If the decision is to proceed with a fauna survey, links to the relevant survey type are provided for each species in cloumns 'O' and 'P'.

Distribution Map and Records	Common Name	Broad Area of Occurrence	Broad Vegetation Types	Habitat Attribute 1	Habitat Attribute 2	Habitat Attribute 3	Mapped and Validated Essential Habitat	Historical Confirmed Species Record within 1km	Recent Confirmed Species Record within 1km (within last 20yr)	ESPT Reference Points	Comments	Occurrence Likelihood	Is further action required?	Link to Active Survey	Link to In-Depth Survey
View Map	Australian painted snipe	In Queensland, it occurs in suitable habitat from about Cairns in the north to the NSW border, west to Mount Isa and east to the coast	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Black-breasted button-quail	In Queensland, known to occur from the Byfield region in the north to the Border Ranges in the south,and west to about Canarvon Gorge	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Boggomoss snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Brigalow woodland snail	The range runs from Condamine River floodplain and associated tributaries, within the project area. From Pittsworth in the east to just east of Surat in the west and north to the Barakula State Forest.	Timbered watercourses with river she-oak or Casuarina species in REs 11.3.14, 11.3.17, 11.3.18, 11.3.25 and 11.3.27a.	Poplar box, gum-topped box, or forest red gum over ground cover of native grasses	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Brown treecreeper (south-eastern)	Brown treecreepers (south-eastern) are endemic to south-eastern Australia from the Grampians in western Victoria, through central New South Wales to the Bunya Mountains in Queensland	Timbered watercourses and palustrine wetlands with river red gum, forest red gum and she-oak in RE 11.3.25 / 11.3.25a and 11.3.27f.	Remnant and advanced regrowth patches of at least 6ha required and patches larger than 20ha preferred, particularly with good connectivity to other woodland patches (i.e., non-fragmented habitat). Areas subject to periodic or prescribed burning are preferred.	No Habitat Attribute Present	No Habitat Attribute Present	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Collared delma	Delma torquata is likely to occur in south-east Queensland as far north as the Blackdown Tableland and inland as far as St. George. Additionally, D. torquata may occur further north to Middle Mount and into NSW to South of Tenterfield.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Common death adder	Occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales then through southern parts of South Australia and Western Australia.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Diamond firetail	The species currently occurs from south-eastern and south-central Qld, from around Maryborough and Calliope regions, south through eastern and central NSW, and further south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Dulacca woodland snail	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Dunmall's snake	Dunmall's snake has a patchy distribution. Its range extends from Yeppoon in the north and the Expedition Range in the west, to the NSW border in the south.	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Fork-tailed swift	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Glossy black-cockatoo	In Queensland, from about Ingham in the north to the NSW border in the south; inland in Qld west to about Mitchell	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Golden-tailed gecko	From around Emerald in central Qld, south to about St. George and to just west of the Canarvon Ranges	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Greater glider	Greater gliders occur in tropical, subtropical, and temperate regions of Queensland, New South Wales, and Victoria. In Queensland their predicted distribution extends from the coast to Carnarvon National Park in the west and potentially as far north as Townsville.	Eucalypt woodland on alluvial or sand plains in REs 11.3.2, 11.3.3, 11.3.4, 11.3.25, 11.3.26, 11.3.39, 11.5.1, 11.5.1a, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.20 and 11.5.21.	Canopy dominated by Eucalypts. e.g., Eucalyptus tereticornis, E. camaldulensis, E. crebra, E. populnea E. acmenoides, E. fibrosa, E. moluccana, Corymbia citriodora, C. tessellaris, C. clarksoniana	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey falcon	The grey falcon is endemic to mainland Australia where it is a rare species. The species mainly occurs in the arid and semi-arid zone (mainly where annual rainfall is <500 mm) west and north of the Great Dividing Range from Queensland to Victoria.	River red gum Eucalyptus camaldulensis and coolibah forest red gum E. tereticornis-lined watercourses	Treeless areas, tussock grassland and open woodland.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Grey snake	In Qld, from about Wandoan in the north, to about Goondiwindi in the south and west to Roma	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Hooded robin (south-eastern)	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Koala	In Queensland, from Cairns in the north to the NSW order in the south; west to about Quilpie	Timbered watercourses with river red gum, forest red gum, poplar box and coolabah.	Primary feed trees, bieng E. camaldulensis ssp. camaldulensis, E. camaldulensis ssp. simulate, E. chloroclada and E. tereticornis ssp. tereticornis represent the dominant canopy species within the vegetation community.	Secondary feed trees, being, E. cabageana, E. conica, E. coolabah ssp. coolabah, E. crebra, E. drepanophylla, E. exserta, E. intertexta, E. largiflorens, E. melanophloia, E. melliodora, E. macrocarpa, E. moluccana, E. orgadophila, E. pilligaensis, E. populnea, E. sideroxylon represent the dominant canopy species within the vegetation community.	Primary and/or secondary feed trees <1km from ephemeral to permanent surface water. In drought years, survival of a population may be dependent on the presence of vegetation near permanent waterways.	Not Mapped as Essential Habitat (No)	No				Likely	Yes	Active Survey	In-Depth Survey
View Map	Large-eared pied bat	In Qld, from Shoalwater Bay in the north to Stanthorpe in the south and west to Carnarvon NP	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Major Mitchell cockatoo	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Northern quoll	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Ornamental Snake	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Painted honeyeater	The painted honeyeater is endemic to mainland Australia and is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory.	Not in listed vegetation types									Unlikely	No	Active Survey	In-Depth Survey
View Map	Pale imperial hairstreak butterfly (PIHB)	In Queensland, as far north and west as Tambo, south to about Gore and east to near Toowoomba	Roadside strips of Brigalow/Belah.	Brigalow-dominated community often in association with belah on heavy textured soils on flat to gently undulating plains. Eucalypt emergents may be present in association with Wilga.	No 2nd Attribute Present	No 3rd Attribute Present		No	No			Unlikely	No	Active Survey	In-Depth Survey
View Map	Red goshawk	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Regent honeyeater	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	South-eastern long-eared bat (SELEB)	In Queensland, found from Gladstone in the north to the NSW border in the south and from about Augathella in the west to about Kingaroy in the east. Most of its range is in the Murray Darling Basin.	Timbered watercourses with mixed eucalypt species REs 11.3.14, 11.3.17, 11.3.18 and 11.3.25.	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Southern whiteface	Southern Whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present	Not Mapped as Essential Habitat (No)	No				Unlikely	No	Active Survey	In-Depth Survey
View Map	Squatter pigeon	Distribution extends south from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland.	Riverine woodlands with sandy areas, cattle tracks and low impact grazing.	Cattle troughs, leaking farm tanks and farm buildings in proximity to grazing paddocks, old cultivation and cattle.	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Swift parrot	Can potentially occur as a rare non-breeding autumn-winter visitor to southern-eastern QGC tenements and the southern part the Gas Field. The species occurs as an uncommon or rare non-breeding visitor (from May to August) to south-eastern Queensland, occasionally extending to the Darling Downs	Other eucalypt-dominated woodlands and forests, including riparian woodlands: potentially in REs 11.3.2, 11.3.3, 11.3.17, 11.3.18, 11.3.25, 11.3.27f, 11.4.12, 11.5.4, 11.5.5, 11.7.4, 11.9.7, 11.9.10 and 11.10.7	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present					Unlikely	No	Active Survey	In-Depth Survey
View Map	White-throated needletail	Not in the Broad Area of Occurrence	Above forest on plains in Land Zones 3 and 4	High, open spaces above open wooded areas	Above or below canopy of forests or rainforests	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Woma	Not in the Broad Area of Occurrence										Unlikely	No	Active Survey	In-Depth Survey
View Map	Yakka skink	In Queensland, from about Proserpine in the north to St George in the south, and west to about Charleville. Also in the Atherton Tablelands and on northern Cape York around Coen	Not in listed vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey
View Map	Yellow-bellied glider (south-eastern)	In Qld, Yellow-bellied Gliders (south-eastern) occur mainly in coastal and near-coastal forests from around Mackay, coastal-central Qld south to the ranges on the NSW-Qld border. There are isolated sub-populations in inland parts of the state, including Blackdown and Carnarvon Ranges of central Qld and on the Darling Downs and western slopes of the Great Divide.	Not listed in vegetation types	No Habitat Attribute Present	No 2nd Attribute Present	No 3rd Attribute Present						Unlikely	No	Active Survey	In-Depth Survey

Attexo

Appendix E

LFC tool results

Department of Environment and Heritage Protection (DEHP)
Landscape Fragmentation and Connectivity (LFC) Tool version 1.4 LOGFILE
Process started at 23-02-2026 01:46:02 PM
Python version: 2.7.18 (v2.7.18:8d21aa21f2, Apr 20 2020, 13:19:08) [MSC v.1500 32 bit (Intel)]
Arcpy version: 10.8.1
Username: tstringer

INPUT PARAMETERS
Output Workspace: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow
Threshold lookup table:
R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\scripts_Toolbox\LFC_data.gdb\tbl_Regional_frag_local_threshold
Remnant cover layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\LFC_data.gdb\ArrowRegVeg
Remnant cover layer edited: False
Regional buffer extent: 20 kilometres
Local buffer extent: 5 kilometres
Impact layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Disturbance\New File Geodatabase.gdb\Disturbance_
layer projection: GDA2020
Raster cell resolution for analysis: 10 metres
Edge Width: 50 metres
(The distance from non-remnant landscapes through to the core ecosystem - the edge of remnant ecosystems)
Default projection: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\GDA 2020 Queensland AlbersOFFSET.prj

13:46:03 Checking out the spatial analyst tool - required for LFC

13:46:03 _____BEGINNING LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

13:46:03 This tool will categorise the landscape into:
{0: 'non-rem', 1: 'patch', 2: 'edge', 3: 'perforated', 4: 'core (< 100 hectares)', 5: 'core (100-500 hectares)', 6: 'core (> 500 hectares)', 7: 'water'}

13:46:24 R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\lyr_file does not exist, creating it now.
13:46:24 Copying across impact site feature(s) and calculating area in hectares (AreaHA)
13:46:42 Making a local copy of the impact site
13:46:55 Preparing remnant cover layer for analysis
13:47:01 Created regional scale buffer of 20 kilometres
13:47:03 Created local scale buffer of 5 kilometres
13:47:25 Clipped the remnant cover to the regional buffer extent
13:47:29 Unioned the pre impact remnant layer with the impact site
13:47:38 Attributed the impact area as not RVM Cat B
13:47:38 Area of RVM Cat B clearing is 1.58 hectares
13:47:38 SQL selection used is "RVM_CAT" = 'B' and "Cover" = 'Not RVM Cat B' on shapefile R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\main_output\clip_remcover_post.shp

13:47:44 Categorised the cover attributes in clip_remcover_pre.shp ready for raster conversion
13:48:35 Converted clip_remcover_pre.shp to raster

13:48:41 Categorised the cover attributes in clip_remcover_post.shp ready for raster conversion

13:49:33 Converted clip_remcover_post.shp to raster

13:49:33 Run Landscape fragmentation analysis on the pre impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 14.2 MINUTES)

14:03:44 Run Landscape fragmentation analysis on the post impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 13.9 MINUTES)

Extracting a local subset of lfc_regional_pre_impact
Extracting a local subset of lfc_regional_post_impact

Collating pre and post impact statistics and trigger assessment
14:18:43 Summarising area statistics for: lfc_localmsk_pre_impact
14:18:44 Summarising area statistics for: lfc_localmsk_post_impact
14:18:44 Summarising area statistics for: lfc_regional_pre_impact
14:18:47 Summarising patch count for lfc_localmsk_pre_impact
14:19:09 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 166133.40
The regional extent of core remnant is 44686.59
The regional extent of core remnant is 26.90 percent
This level of regional fragmentation sets a local impact threshold of: 5.0 percent

The table below lists the local impact thresholds for categories of regional core remnant extent:

REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD
< 10	2.0
10 - 30	5.0
30 - 50	10.0
50 - 70	20.0
70 - 90	30.0
>90	50.0

Area of core at the local scale (pre impact): 4084.62
Area of core at the local scale (post impact): 4084.6
Percent change of core at the local scale (post impact): 0.00 percent

SIGNIFICANCE TEST TWO
No core remnant areas occur on the site
(lfc_site_scale_summary.csv table will not be available)

RESULT

14:19:51 This analysis has determined any impact on connectivity areas is NOT significant
(A significant reduction in core remnant at the local scale is False OR a change from core to non-core remnant at the site scale is False)

The significance table has been written to: ..\main_output\lfc_significance_assessment.csv
The local scale summary table has been written to: ..\main_output\lfc_local_scale_summary.csvGIS layer files copied into folder \lyr_file within the project folder.
View layers in ArcMAP
using..\R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Arrow\OutputArrow\lyr_file\lyr_file\Connectivity Area Impact Assessment.lyr

Please scrutinise the output tables and spatial layers to confirm the desktop modelling of connectivity area impact

This analysis used an unedited copy of the Regulated Vegetation layer.

14:28:34 _____COMPLETED LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

Department of Environment and Heritage Protection (DEHP)
Landscape Fragmentation and Connectivity (LFC) Tool version 1.4 LOGFILE
Process started at 23-02-2026 02:40:02 PM
Python version: 2.7.18 (v2.7.18:8d21aa21f2, Apr 20 2020, 13:19:08) [MSC v.1500 32 bit (Intel)]
Arcpy version: 10.8.1
Username: tstringer

INPUT PARAMETERS
Output Workspace: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov
Threshold lookup table:
R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\scripts_Toolbox\LFC_data.gdb\tbl_Regional_frag_local_threshold
Remnant cover layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\LFC_data.gdb\GovRegVeg
Remnant cover layer edited: False
Regional buffer extent: 20 kilometres
Local buffer extent: 5 kilometres
Impact layer: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Disturbance\New File Geodatabase.gdb\Disturbance_
layer projection: GDA2020
Raster cell resolution for analysis: 10 metres
Edge Width: 50 metres
(The distance from non-remnant landscapes through to the core ecosystem - the edge of remnant ecosystems)
Default projection: R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\GDA 2020 Queensland AlbersOFFSET.prj

14:40:04 Checking out the spatial analyst tool - required for LFC

14:40:04 _____BEGINNING LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

14:40:04 This tool will categorise the landscape into:
{0: 'non-rem', 1: 'patch', 2: 'edge', 3: 'perforated', 4: 'core (< 100 hectares)', 5: 'core (100-500 hectares)', 6: 'core (> 500 hectares)', 7: 'water'}

14:40:17 R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\lyr_file does not exist, creating it now.
14:40:17 Copying across impact site feature(s) and calculating area in hectares (AreaHA)
14:40:25 Making a local copy of the impact site
14:40:33 Preparing remnant cover layer for analysis
14:40:36 Created regional scale buffer of 20 kilometres
14:40:38 Created local scale buffer of 5 kilometres
14:40:52 Clipped the remnant cover to the regional buffer extent
14:40:55 Unioned the pre impact remnant layer with the impact site
14:40:59 Attributed the impact area as not RVM Cat B
14:40:59 Area of RVM Cat B clearing is 0.52 hectares
14:40:59 SQL selection used is "RVM_CAT" = 'B' and "Cover" = 'Not RVM Cat B' on shapefile R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\main_output\clip_remcover_post.shp

14:41:02 Categorised the cover attributes in clip_remcover_pre.shp ready for raster conversion
14:41:52 Converted clip_remcover_pre.shp to raster

14:41:55 Categorised the cover attributes in clip_remcover_post.shp ready for raster conversion

14:42:45 Converted clip_remcover_post.shp to raster

14:42:45 Run Landscape fragmentation analysis on the pre impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 14.4 MINUTES)

14:57:10 Run Landscape fragmentation analysis on the post impact regional landscape

REGULATED VEGETATION TYPES BEING EXTRACTED FROM LAND COVER
IDENTIFICATION OF CORE, PATCH, EDGE AND PERFORATIONS
COMBINING FRAGMENTATION CLASSES
CLASSIFYING CORE FOREST PATCHES BY AREA
COMPOSING FINAL FRAGMENTATION MAP
COMPOSING FINAL FRAGMENTATION MAP
(FRAGMENTATION CALCULATION TIME WAS 13.9 MINUTES)

Extracting a local subset of lfc_regional_pre_impact
Extracting a local subset of lfc_regional_post_impact

Collating pre and post impact statistics and trigger assessment
15:12:12 Summarising area statistics for: lfc_localmsk_pre_impact
15:12:12 Summarising area statistics for: lfc_localmsk_post_impact
15:12:13 Summarising area statistics for: lfc_regional_pre_impact
15:12:16 Summarising patch count for lfc_localmsk_pre_impact
15:12:39 Summarising patch count for lfc_localmsk_post_impact

Analysing impact on Connectivity Areas

SIGNIFICANCE TEST ONE

The regional total area is 166133.40
The regional extent of core remnant is 43188.69
The regional extent of core remnant is 26.00 percent
This level of regional fragmentation sets a local impact threshold of: 5.0 percent

The table below lists the local impact thresholds for categories of regional core remnant extent:

REGIONAL CORE CATEGORY	LOCAL IMPACT THRESHOLD
< 10	2.0
10 - 30	5.0
30 - 50	10.0
50 - 70	20.0
70 - 90	30.0
>90	50.0

Area of core at the local scale (pre impact): 3769.64
Area of core at the local scale (post impact): 3769.43
Percent change of core at the local scale (post impact): 0.01 percent

SIGNIFICANCE TEST TWO
No core remnant areas occur on the site
(lfc_site_scale_summary.csv table will not be available)

RESULT

15:13:22 This analysis has determined any impact on connectivity areas is NOT significant
(A significant reduction in core remnant at the local scale is False OR a change from core to non-core remnant at the site scale is False)

The significance table has been written to: ..\main_output\lfc_significance_assessment.csv
The local scale summary table has been written to: ..\main_output\lfc_local_scale_summary.csvGIS layer files copied into folder \lyr_file within the project folder.
View layers in ArcMAP
using..\R:\GIS\Geomatics_Shared\Scripts\MSES_MNES\4_LFC\Gov\OutputGov\lyr_file\lyr_file\Connectivity Area Impact Assessment.lyr

Please scrutinise the output tables and spatial layers to confirm the desktop modelling of connectivity area impact

This analysis used an unedited copy of the Regulated Vegetation layer.

15:22:06 _____COMPLETED LANDSCAPE FRAGMENTATION AND CONNECTIVITY ANALYSIS_____

Attexo

T.C. Beirne Building
Level 4, 315 Brunswick Street
Fortitude Valley QLD 4006

www.attexo.com.au