AngloAmerican

Moranbah North and Grosvenor Mines Rail & Pipeline Realignment

Preliminary Documentation for EPBC Act referral 2023/09489

Issue: 7

Date: 12/12/2025

Document Control

Project name	Moranbah North & Grosvenor Mines Rail and Pipeline Realignment
Report name	Preliminary Documentation
Date	12/12/2025
Version	7
Status	Final
Prepared by	2rog Consulting
Company	2rog Consulting
Reviewed by	2rog Consulting and Anglo American Steelmaking Coal
Approved by	Anglo American Steelmaking Coal

Version History

Version	Date	Description	Reviewed by	Approved by
1	23/08/2024	Draft for review	2rog Consulting	Anglo American Steelmaking Coal
2	26/09/2024	Draft for review	2rog Consulting	Anglo American Steelmaking Coal
3	12/12/2024	Final for use	2rog Consulting	Anglo American Steelmaking Coal
4	03/03/2025	Reissued final for use (minor updates)	2rog Consulting	Anglo American Steelmaking Coal
5	29/04/2025	Reissued following adequacy review	2rog Consulting	Anglo American Steelmaking Coal
6	20/11/2025	Reissued following adequacy review	2rog Consulting	Anglo American Steelmaking Coal
7	12/12/2025	Reissued following adequacy review	2rog Consulting	Anglo American Steelmaking Coal

Executive Summary

Introduction

Anglo Coal (Moranbah North Management) Pty Limited (Anglo Coal) operates on behalf of the Moranbah North Coal Joint Venture, two underground metallurgical coal mines north of the Moranbah township in central Queensland – Moranbah North Mine and Grosvenor Mine. Anglo Coal is owned by Anglo American.

An existing rail line known as the North Goonyella Branch rail line (managed and operated by Aurizon, on land subleased from DTMR) and a water pipeline owned and operated by Whitehaven Coal (Braeside Pipeline) traverse the surface areas of both mines and overlie the coal resource.

To maximise mining of the coal resource, sections of the rail line and water pipeline are proposed to be relocated (collectively the Project). The resources have an approximate sale value of $9B.

The Project is located in Central Queensland, approximately 8 km north of Moranbah, with Emerald lying approximately 180 km to the south, and Mackay 150 km to the northeast.

The disturbance footprint for the Project is 66 ha permanent disturbance and 129ha of temporary disturbance.

The impact assessment for the Project concluded that the Project is unlikely to have a significant residual impact on any MNES.

Matters of National Environmental Significance

Detailed ecological surveys were undertaken covering the proposed action area in 2023 and 2024. The survey results provide a comprehensive understanding of the environmental values present in the proposed action area. Table ES-0-1 provides a summary of the Matters of National Environmental Significance that have the potential to occur and/or be impacted by the Project.

Table ES-0-1: Matters of National Environmental Significance within the proposed action area

MNES	Presence in the proposed action area
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar Sites)	None
Great Barrier Reef Marine Park	None
Commonwealth Marine Areas	None
Listed Threatened Ecological Communities	Known to occur:

MNES	Presence in the proposed action area
	• Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC)

Listed Threatened Species	Known, likely or potentially occurring:
	• Known to occur:
	  ○ Koala (*Phascolarctos cinereus*)
	  ○ Greater glider (central and southern) (*Petauroides volans*)
	  ○ Squatter pigeon (southern) (*Geophaps scripta scripta*)
	• Likely to occur:
	  ○ Ornamental Snake (*Denisonia maculata*)
	• Potential to occur:
	  ○ Australian painted snipe (*Rostratula australis*)

Potential impacts

Potential impacts resulting from the Project are related to activities associated with the construction including:

- Vegetation clearance and associated habitat removal
- Habitat disturbance and degradation
- Fragmentation and edge effects including weed and pest animal incursions
- Fauna injury and/or mortality

Measures to avoid and reduce impacts

The infrastructure has been located to avoid impacting areas of MNES value. This included narrowing the design to the minimum area required to adequately construct the rail and pipeline. The alignment of the rail and pipeline corridor was altered after the Project was referred, to further reduce impacts to MNES by minimising the earthworks footprint and avoiding areas of MNES habitat.

The proponent has developed comprehensive mitigation strategies that will reduce the impacts to the environment. This includes measures related to vegetation clearing, construction-related impacts, and weed management.

Revegetation will also be undertaken for temporarily disturbed areas. Revegetation will focus on reducing weed species and stabilising disturbed areas, to reduce erosion and sedimentation.

Residual impacts and outcomes

The Project has the potential to impact the following MNES, primarily due to removal of habitat:

- Koala
- Greater glider
- Squatter pigeon

- Australian painted snipe
- Ornamental Snake
- Brigalow TEC

Table ES-0-2 below presents a summary of the residual impact assessment for each MNES. The outcome of the assessment is that the Project is unlikely to have a significant residual impact to MNES.

Table ES-0-2: Summary of predicted residual impacts to MNES

MNES	Presence in proposed action area	Area of impact		Significant residual impact outcomes
		Permanent disturbance	Temporary disturbance	
Species				
Koala	Known	0.9 ha of breeding and foraging habitat 24.3ha of dispersal habitat	1.0 ha of breeding and foraging habitat 21.9 ha of dispersal habitat	Unlikely
Greater glider	Known	0.5 ha of denning and breeding habitat 1.5 ha of foraging and dispersal habitat	0.5 ha of denning and breeding habitat 1.5 ha of foraging and dispersal habitat	Unlikely
Squatter pigeon	Known	0.05 ha of breeding habitat 24.7 ha of foraging and dispersal habitat	0 ha of breeding habitat 23.5 ha of foraging and dispersal habitat	Unlikely
Australian painted snipe	Potential	0.9 ha of habitat	1.0 ha of habitat	Unlikely
Ornamental snake	Potential	0ha of habitat	0.2 ha of habitat	Unlikely
TEC				
Brigalow TEC	Known	4.2 ha	3.6 ha	Unlikely

Conclusion

Detailed site assessment has been undertaken over the course of four field-based ecology assessments, with the results confirming the presence and potential for MNES. The Project has been designed to avoid areas of MNES habitat however removal of habitat will be required.

An impact assessment has been undertaken to identify the types and potential severity of impacts from the Project on MNES, including direct impacts from construction, facilitated impacts the operation of the relocated rail line, and cumulative

impacts. On the basis of the above information and assessment it is considered that the project is unlikely to have a significant residual impact on any MNES.

Contents

Abbreviations

ALA	Atlas of Living Australia
AOO	Area of occupancy
BoM	Bureau of Meteorology
Cwth	Commonwealth
EMP	Environmental Management Plan
EOO	Extent of occurrence
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ESC	Erosion and Sediment Control
ESD	Ecologically Sustainable Development
GDE	Groundwater Dependent Ecosystem
GTRE	Ground-truthed Regional Ecosystem
LoO	Likelihood of Occurrence
MNES	Matters of National Environmental Significance
OMP	Offset Management Plan
PD	Preliminary Documentation
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
RFI	Request for Information
SAT	Spot Assessment Technique
TAB	Threat Abatement Plan
TEC	Threatened Ecological Community
WoNS	Weeds of National Significance

Request For Information (RFI)

	Information required	PD Section
1.	Description of the Action	
1.1	Provide all information presented in the referral on the description of the action in the preliminary documentation.	Section 2
1.2	The location, boundaries and size (in hectares) of the study area, proposed action area, and disturbance footprint, including any adjoining areas which may be indirectly impacted by the proposal, including nearby vegetation, as well as any reasonably foreseeable facilitated impacts arising from the placement and stockpiles and laydown areas including laydown areas of the rail infrastructure (tracks, sleepers etc.). Include mapping and coordinates.	Section 1.3; Section 5.6
1.3	A description of all components of the action, including the anticipated timing and duration (including start and completion dates) of each component of the proposed action. In addition, any components which were included in the referral material, but are no longer part of the proposed action, must be clarified. This includes any changes that have been made to the project since the referral documentation was submitted.	Section 2.1; Section 2.2; Section 2.3; Section 2.4
1.4	A description of the operational requirements of the action including any anticipated maintenance works.	Section 2.2
1.5	A description of the land uses surrounding the proposed action area that may be directly or indirectly impacted by the proposed action.	Section 3.5
1.6	An indicative layout plan for the proposed action area, including the location and type of land use, key infrastructure, and the number and location of other features, e.g. dwellings, other buildings, open space, rail infrastructure, laydown, stockpiles and conservation areas. Include mapping and coordinates for each of the above.	Section 2.1; Figure 2-1
1.7	To the extent reasonably practicable provide any alternatives to the proposed action and project design, including taking no action, with a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action.	Section 2.4
1.8	Provide a description of any approval that has been obtained from a State or Commonwealth agency or authority, including any conditions that apply to the action. Include a statement identifying any additional approval that is required.	Section 1.5.4
2.	HABITAT ASSESSMENT	
2.1	Species and communities general information	
2.1.1	Provide a habitat assessment for relevant listed threatened species and communities, including any outside the	Section 9.2.3 (koala); Section 9.3.3 (greater glider); Section 9.4.3 (squatter pigeon);

	Information required	PD Section
	proposed action area where they have the potential to be impacted.	Section 9.5.3 (Australian painted snipe); Section 9.6.3 (ornamental snake); Section 9.7.3 (Brigalow TEC);
2.1.2	Identify and describe known historical records of the listed threatened species and ecological communities in the broader region. All known records must be supported by an appropriate source (i.e. Commonwealth and State databases, published research, publicly available survey reports, etc.), the year of the record and a description of the habitat in which the record was identified, if available.	Section 9.2.3 (koala); Section 9.3.3 (greater glider); Section 9.4.3 (squatter pigeon); Section 9.5.3 (Australian painted snipe); Section 9.6.3 (ornamental snake); Section 9.7.3 (Brigalow TEC);
2.1.3	Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the proposed action area, where relevant) for all listed threatened species and communities, which: • is specific to the habitat assessment undertaken for each listed threatened species and ecological community (i.e. does not only illustrate relevant Queensland Regional Ecosystems) • includes an overlay of the project disturbance footprint • includes an overlay of the survey effort undertaken • includes known records of individuals derived from desktop analysis and field surveys • additional to their inclusion within the PD as attachment in JPEG format.	Section 9.2.3 (koala); Section 9.3.3 (greater glider); Section 9.4.3 (squatter pigeon); Section 9.5.3 (Australian painted snipe); Section 9.6.3 (ornamental snake); Section 9.7.3 (Brigalow TEC);
2.1.4	Include an assessment of the adequacy of any surveys undertaken (including survey effort and timing). Assess the extent to which these surveys were appropriate and undertaken in accordance with relevant departmental survey guidelines for the listed species or community.	Section 4.3
2.1.5	Include the total area of habitat (in hectares) for each relevant protected matter, including: • total habitat within the proposed action area • where relevant, total habitat in the proposed action area and surrounds.	Section 9.2.3 (koala); Section 9.3.3 (greater glider); Section 9.4.3 (squatter pigeon); Section 9.5.3 (Australian painted snipe); Section 9.6.3 (ornamental snake); Section 9.7.3 (Brigalow TEC);
2.1.6	Provide the G100s EPBC Report (2020), in approved or draft format, as an appendix to the preliminary documentation as supporting evidence for field surveys. Note, the adequacy of the field surveys conducted to inform the G100s EPBC Report (2020) will be assessed by the department. Additional surveys may be required if the report does not demonstrate that field surveys were not conducted in	This report has been superseded. Comprehensive ecological surveys of the proposed action area have been undertaken and are provided in Appendix 3.

	Information required	PD Section
	accordance with departmental guidelines or as defined by best practice.	
2.2	**Species-specific information for Listed threatened species and communities**	
	Ornamental Snake (*Denisonia maculata*) – Vulnerable	
2.2.1	A description of the vegetation composition and structure for relevant land zones (i.e. riparian vegetation, gilgai mounds and depressions, Brigalow TEC, cracking clay soils, and microhabitat features) and a discussion of their relevance to the Ornamental Snake.	Section 9.6.2
2.2.2	Details and locations (including a map) of known food sources (i.e. frog species).	Section 9.6.3
2.2.3	A discussion of the habitat use requirements of the Ornamental Snake (e.g. shelter/refuge, foraging, dispersal, etc.), including consideration of known important habitat and suitable habitats.	Section 9.6.2; Section 9.6.3
2.2.4	The total area (in hectares) of each identified habitat type (e.g. shelter/refuge, foraging, dispersal, etc.)	Section 9.6.3
	Greater Glider (southern and central) (*Petauroides volans*) – Endangered	
2.2.5	Identification of all areas of Eucalypt forest and woodland within and adjacent to the proposed action area which contain hollow-bearing trees.	Section 9.3.3
2.2.7	An analysis of tree hollow size and density suitable for use by the Greater Glider (e.g. denning) in the identified areas of Eucalypt forest and woodland containing hollow-bearing trees within and adjacent to the proposed action area. Note, 'Selection of some tree species over others for denning by Greater Gliders will foremost depend on the age and senescence stage of the tree and the species inherent propensity to form hollows.' Species Specific Guidance - greater glider habitats in Queensland (agriculture.gov.au).	Section 9.3.3
2.2.8	A detailed discussion of potential foraging habitat in Eucalypt forest and woodland adjacent to areas of Eucalypt forest and woodland which contain tree hollows.	Section 9.3.3
2.2.9	The total area (in hectares) of Greater Glider habitat, including foraging habitat and potential refugia habitat.	Section 9.3.3
	Squatter Pigeon (southern) (*Geophaps scripta scripta*) – Vulnerable	
2.2.10	A discussion of vegetation composition and structure on relevant land zones (i.e. specific tree and grass species).	Section 9.4.2
2.2.11	A discussion of breeding, foraging and dispersal habitat requirements.	Section 9.4.1
2.2.12	Identification and mapping of permanent water bodies or watercourses within one (1) kilometre of the disturbance footprint to support breeding habitat.	Section 9.4.3
2.2.13	Identification and mapping of permanent or seasonal water bodies or watercourses within three (3) kilometres of the disturbance footprint to support foraging habitat.	Section 9.4.3

	Information required	PD Section
2.2.14	The total area (in hectares) of each breeding, foraging and dispersal habitat type, including consideration of disturbed (non-remnant vegetation) areas.	Section 9.4.3
	Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) – Endangered	
2.2.15	A discussion of vegetation composition and structure relevant to the persistence of the Koala in the proposed action area and surrounding region (known food trees, access to dispersal corridors, proximity to known populations, etc,).	Section 9.2.3
2.2.16	A discussion of habitat use requirements (e.g. foraging, dispersal, shelter, climate refugia, etc.)	Section 9.2.1
2.2.17	The total area (in hectares) of each identified habitat type (e.g. foraging, dispersal, shelter, climate refugia, etc.). The department notes that koala habitat definitions presented in the MG Rail and Powerline Realignment Ecology Survey (2023) do not align with habitat definitions in departmental documents.	Section 9.2.3 The MG Rail and Powerline Realignment Ecology Survey (2023) has been superseded by ERM 2024 as presented in Appendix 3
	Australian Painted Snipe (*Rostratula australis*) – Endangered	
2.2.18	A discussion of ecosystem composition and structure relevant to the persistence of the Australian Painted Snipe in the proposed action area and surrounding region (location of suitable waterbodies, availability of appropriate breeding habitat, likely presence of food resources, etc).	Section 9.5.3
2.2.19	A discussion of habitat use requirements (e.g. breeding, foraging, dispersal, etc.) relevant to the Australian Painted Snipe within the proposed action area and surrounding region.	Section 9.5.3
2.2.20	The total area (in hectares) of each identified habitat type (e.g. breeding, foraging, dispersal, etc.).	Section 9.5.3
	Bluegrass (*Dichanthium setosum*)-Vulnerable	
2.2.21	A discussion of habitat composition (i.e. soil composition, cleared woodland, grassy roadside remnants etc) relevant to the persistence of Bluegrass in the proposed action area and surrounding region.	Section 7.1.2
	Fitzroy River Turtle (*Rheodytes leukops*)- Vulnerable	
2.2.21	A discussion of habitat composition (including information on water permanence, riparian vegetation, connection to surrounding populations, etc.) relevant to the persistence of the Fitzroy River Turtle in the proposed action area and surrounding region.	Section 7.1.3
	Brigalow (*Acacia harpophylla* dominant and co-dominant) threatened ecological community – Endangered	
2.2.22	An assessment (in a cross-reference table) of vegetation composition against the key diagnostic characteristics and	Section 9.7.3

	Information required	PD Section
	condition thresholds for Brigalow TEC, including consideration of remnant and regrowth Brigalow TEC.	
2.2.23	A description of historical land use practices within the proposed action area and surrounding region, and a discussion of how this relates to the Brigalow TEC.	Section 9.7.3
2.2.24	The total area (in hectares) of identified remnant and regrowth Brigalow TEC.	Section 9.7.3
	Poplar Box Grassy Woodland on Alluvial Plains threatened ecological community – Endangered	
2.2.25	An assessment (in a cross-reference table) of vegetation composition against the key diagnostic characteristics and condition thresholds for Poplar Box TEC, including consideration of remnant and regrowth Poplar Box TEC	Section 7.1.1
2.2.26	A description of historical land use practices within the proposed action area and surrounding region, and a discussion of how this relates to the Poplar Box Grassy Woodland TEC.	Section 7.1.1
2.2.27	The total area (in hectares) of identified remnant and regrowth Poplar Box TEC.	Section 7.1.1
2.3	**Summary of habitat assessment information required**	
2.3.1	Provide a summary table stating: • the relevant departmental documents used for the listed species or community • the survey requirements for the listed species or community within these documents • the survey methods utilised • the survey effort undertaken.	Section 4.3
2.3.2	Provide a summary table of the area (in hectares) of habitat for each listed threatened species and community within the disturbance footprint of the proposed action.	Section 9.1
3.	**IMPACT ASSESSMENT**	
3.1	**Listed threatened species and communities**	

3.1.1	An assessment of the likely impacts (direct, indirect, facilitated, and cumulative) associated with each stage and/or component of the proposed action. At a minimum, assess the potential impacts listed above within the proposed action area and surrounds:
	• vegetation clearance and loss of habitat
	• habitat degrading processes, including edge effects and weed invasion
	• dust, erosion and sedimentation
	• increased predation from introduced species
	• habitat avoidance
	• fauna injury during construction and operation activities, including but not limited to:
	  ○ injury resulting from clearing operations
	  ○ operational impacts from train movements
		Section 5;
		Section 9;
		Section 10

	Information required	PD Section
	○ risk of vehicle strike • increase light and noise pollution	
3.1.2	Include the direct and indirect loss and/or disturbance of protected matters and their habitat as a result of the proposed action. This must include the area (in hectares) and quality of the habitat to be impacted and quantification of the individuals to be impacted (where applicable)	Section 9
3.1.3	An assessment of the impacts of habitat fragmentation in the proposed action area and surrounding areas, including consideration of species' movement and breeding patterns.	Section 5; Section 9
3.1.4	A discussion of whether any impacts are likely to be repeated for example as part of maintenance	Section 5.6
3.1.5	Discuss and identify whether the impacts are likely to be unknown, unpredictable or irreversible.	Section 5
3.1.6	Justify, with supporting evidence, how the proposed action will not be inconsistent with: • Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) • a recovery plan or threat abatement plan.	Section 8
3.1.7	An assessment of the nature and extent of the likely short-term and long-term relevant impacts on MNES, taking into consideration any edge effects from these impacts and the likely duration of impacts to protected matters as a result of the proposed action.	Section 9
3.1.8	An assessment of the impacts from the construction and operation of the project to protected matters and their habitat in the project and surrounding area. This includes: • reduce the area of occupancy of the species; • modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; • interfere with the recovery of the species.	Section 9
3.1.9	Include a discussion on the post-impact viability of each habitat patch within and adjacent to the proposed action area, specifically considering whether habitat fragmentation would occur because of the positions of laydown areas and stockpiles informed by the presences of TECs and habitat areas and/or habitat degradation.	Section 5.2; Section 9
4.	AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES	
4.1	Include the plan specified above [Weed and Pest Animal Management Plan] (in approved or draft format as appendices to the preliminary documentation.	CEMP
4.2	Provide a detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and	CEMP

	Information required	PD Section
	manage relevant impacts of the proposed action on relevant protected matters (including any measures required through Commonwealth, State and/or local government approvals). Proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence. All commitments must be drafted using committal language (e.g. 'will' and 'must') when describing the proposed measures. All proposed measures must be drafted to meet the 'S.M.A.R.T' principle: • S – Specific (what and how) • M – Measurable (baseline information, number/value, auditable) • A – Achievable (timeframe, money, personnel) • R – Relevant (conservation advices, recovery plans, threat abatement plans) • T – Time-bound (specific timeframe to complete).	
4.3	Describe how habitat fragmentation and patch isolation will be avoided, with consideration of whether avoidance areas will enable species mobility across the proposed action area and still be connected to habitat in the broader landscape.	Section 5.2; Section 6; Section 9
4.4	Information on the timing, frequency and duration of the proposed avoidance, mitigation, and management measures to be implemented.	CEMP
4.5	Details of specific and measurable environmental outcomes to be achieved for relevant protected matters, including an assessment of the expected or predicted effectiveness of the proposed measures.	CEMP
4.6	Any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advice, recovery plan or threat abatement plan, and a discussion of how the proposed measures are consistent with relevant plans.	CEMP
4.7	Details of ongoing management and monitoring programs, including timing, to validate the effectiveness of proposed measures and demonstrate that environmental outcomes will be, or have been, achieved.	CEMP
4.8	Details of tangible, on-ground corrective actions that will be implemented, including timing, in the event that monitoring programs indicate that the environmental outcomes have not been, or will not be, achieved.	CEMP
4.9	Discuss how the likely location of laydown areas and stockpiles, clearly consider how to avoid the TECs and habitat areas.	Section 6
4.10	Details of management and monitoring measures to avoid train strike to Koalas.	Section 6.4
4.11	Details of dust, erosion and sedimentation management and monitoring measures to mitigate impacts to MNES.	CEMP

	Information required	PD Section
5.	REHABILITATION REQUIREMENTS	
5.1	The details of any rehabilitation activities proposed to be undertaken and how they meet best practice standards, including for the restoration of habitat for relevant MNES and avoidance of sedimentation/erosion.	CEMP
5.2	The details of any rehabilitation activities proposed to be undertaken, including any activities required through other Commonwealth, State and/or local government approvals.	CEMP
5.3	Provide a summary of the vegetation community/habitat that is being rehabilitated and the dominant species that will be included in the rehabilitation site. Note: climate suitable local seed mix should be included in the rehabilitation methodology where appropriate.	CEMP
5.4	The proposed final landform and its relation to the pre-disturbance vegetation community. Include an assessment of the expected or predicted effectiveness of the proposed rehabilitation activities.	CEMP
5.5	Provide detailed mapping of the proposed action area that clearly identifies areas to be rehabilitated.	Figure 2-1
5.6	Information on the timing, frequency and duration of the proposed rehabilitation activities to be implemented, including anticipated time to completion (refer to 'S.M.A.R.T' principle above). All commitments must be drafted using committal language (e.g. 'will' and 'must).	CEMP
5.7	Details of ongoing management and monitoring programs, including timing, to validate the effectiveness of proposed rehabilitation activities and demonstrate that completion criteria will be, or have been, achieved.	CEMP
5.8	Details of tangible, on-ground corrective actions that will be implemented if monitoring programs indicate that the completion criteria have not been, or will not be, achieved.	CEMP
6.	OFFSETS	
6.1	An assessment of the likelihood of residual significant impacts occurring on relevant protected matters, after avoidance, mitigation, and management measures have been applied.	Section 9
6.2	A summary of the proposed environmental offset and key commitments to achieve a conservation gain for each protected matter.	Section 11
6.3	If an offset area has not been nominated, include a draft OS as an appendix to the preliminary documentation. The draft OS must meet the information requirements set out in Appendix A1.	NA
6.4	Where offset area/s have been nominated, include a draft OMP as an appendix to the preliminary documentation. The draft OMP must meet the information requirements set out in Appendix A2, and must be prepared by a suitably qualified	Appendix 5

	Information required	PD Section
	ecologist and in accordance with the department's Environmental Management Plan Guidelines (2014).	
7.	ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)	
7.1	A description of how the proposed action meets the principles of ESD, as defined in section 3A of the EPBC Act. The following principles are ***principles of ecologically sustainable development***: • decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations • if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation • the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations • the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making • improved valuation, pricing and incentive mechanisms should be promoted.	Section 14
8.	ECONOMIC AND SOCIAL MATTERS	
8.1	An analysis of the economic and social impacts of the action, both positive and negative.	Section 13
8.2	Details of any public consultation activities undertaken and their outcomes.	Section 12
8.3	Details of any consultation with Indigenous stakeholders. **Indigenous engagement** Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to Indigenous peoples and communities, possibly impacted by the proposed action and the potential for managing those impacts. Describe any Indigenous consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes. The department considers that best practice consultation, in accordance with the Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act (2016) includes: • identifying and acknowledging all relevant affected Indigenous peoples and communities • committing to early engagement	Section 12

	Information required	PD Section
	• building trust through early and ongoing communication for the duration of the project, including approvals, implementation and future management • setting appropriate timeframes for consultation • demonstrating cultural awareness. Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action with regards to Indigenous peoples and communities.	
8.4	Projected economic costs and benefits of the project, including the basis for their estimate through cost/benefit analysis or similar studies.	Section 13
8.5	Employment opportunities expected to be generated by the project (including construction and operational phases).	Section 13
9.	**ENVIRONMENTAL RECORD OF THE PERSON PROPOSING TO TAKE THE ACTION**	
9.1	Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against: • the person proposing to take the action • for an action for which a person has applied for a permit, the person making the application • if the person is a body corporate—the history of its executive officers in relation to environmental matters • if the person is a body corporate that is a subsidiary of another body or company (the parent body)—the history in relation to environmental matters of the parent body and its executive officers.	Section 1.4.1

1 Introduction and background

1.1 Project Background

Anglo Coal (Moranbah North Management) Pty Limited ACN 069 603 587 (Anglo Coal) operates, on behalf of the Moranbah North Coal Joint Venture, two underground metallurgical coal mines north of the Moranbah township in central Queensland – Moranbah North Mine and Grosvenor Mine. Anglo Coal is owned by Anglo American.

An existing rail line known as the North Goonyella Branch rail line (managed and operated by Aurizon, on land that is leased from DTMR) and a water pipeline owned and operated by Whitehaven Coal (Braeside Pipeline) traverse the surface areas of both mines and overlie the coal resource.

To maximise mining of the coal resource, sections of the rail line and water pipeline are proposed to be relocated (collectively the Project)

Anglo Coal referred the Project to the Department of Climate Change, Energy, Environment and Water (DCCEEW) on 9 March 2023. DCCEEW accepted the referral on 19 June 2023 (EPBC 2023/09489). A request to formally vary the Project to incorporate an updated footprint was submitted to DCCEEW in December 2024. The request to vary the Project was approved on 9 March 2025.

The delegate of the Minister for the Environment (Cwth) (the Minister) decided on 15 February 2024 that the Project was a Controlled Action within the controlling provision Sections 18 and 18A (Listed threatened species and communities).

The Project and associated proposed action area are located in Central Queensland, approximately 8 km north of Moranbah, with Emerald lying approximately 180 km to the south, and Mackay 150 km to the north east (Figure 1-1).

The objectives of the Project are to:

- Enable recovery of the coal resource that would otherwise be sterilised by the overlying infrastructure. The resources has an approximate sale value of $9B.
- Minimise environmental and social impacts.

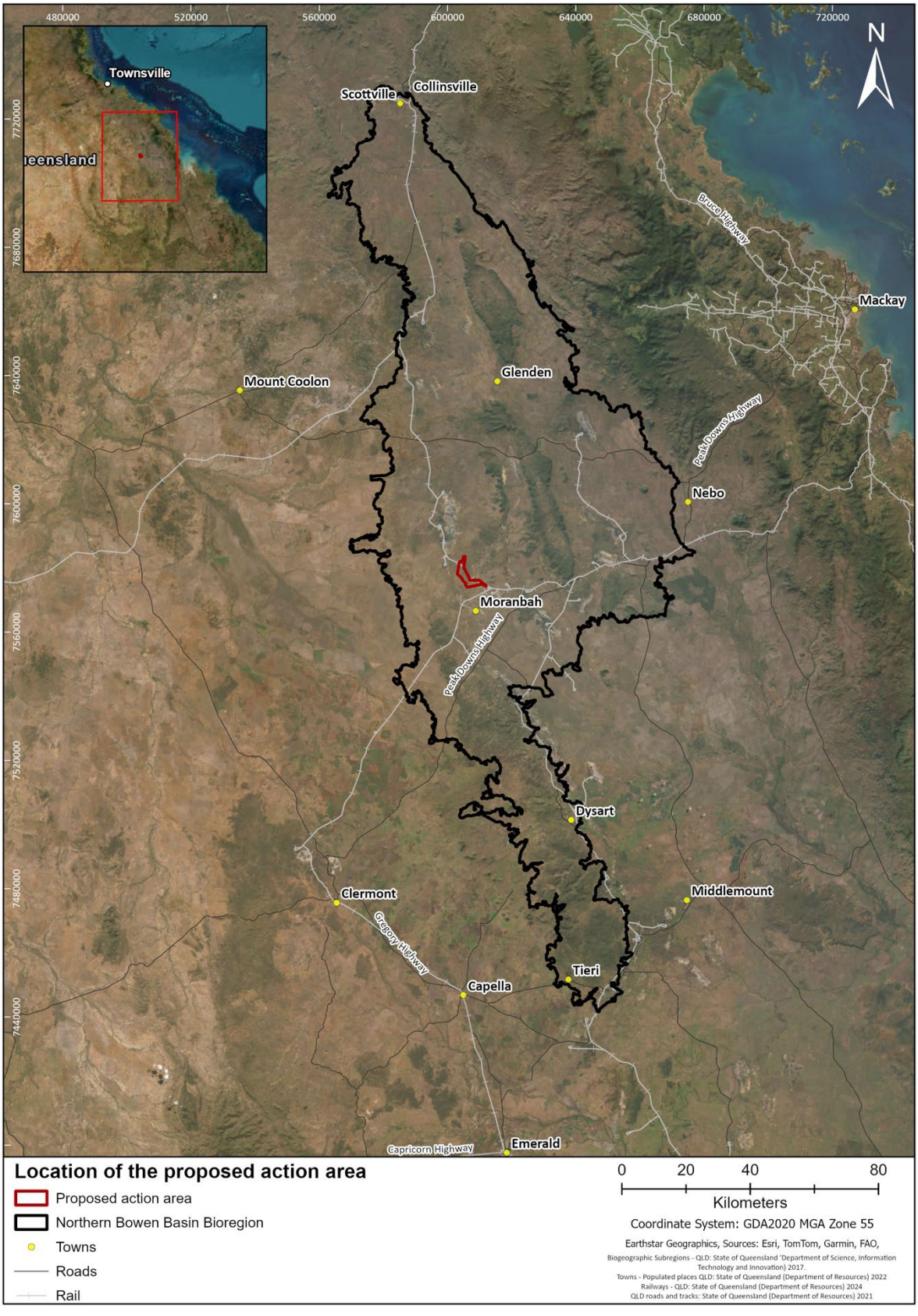

Figure 1-1: Location of the proposed action area

1.2 Purpose and scope

This Preliminary Documentation (PD) has been prepared in support of the referral made under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) for the Project.

This PD responds to the Request for Information (RFI), issued by DCCEEW on 12 April 2024. A checklist to cross reference the RFI within this PD is located at the front of this PD.

This PD also includes an assessment of the potential impacts of the Project on Matters of National Environmental Significance (MNES) know, or considered likely, to occur within the proposed action area.

1.3 Nomenclature used in Preliminary Documentation

1.3.1 Project

The 'Project' refers to the relocation of sections of the North Goonyella Branch rail line and Braeside Pipeline, and associated infrastructure. For further detail, refer to Section 2.

1.3.2 Disturbance footprint

The disturbance footprint for the Project includes the rail corridor, pipeline corridor and areas required to enable construction. The easement incorporating the rail corridor and pipeline corridor is up to approximately 90 meters wide. The disturbance footprint is 195 ha in total and comprises both temporary and permanent disturbance areas (Figure 12).

The permanent disturbance footprint for the Project, which includes the rail corridor, pipeline, and permanent structures such as culverts, bridges, and level crossings, covers an area of 66 ha.

The temporary disturbance footprint for the Project, which includes the working room required for construction equipment and earthworks, topsoil stockpiles, construction laydown areas, construction facilities, and borrow pits, covers an area of 129 ha

1.3.3 Proposed action area

The proposed action area refers to the 2,342 ha area of land, encompassing the area within which the proposed Project works will take place, and immediate surrounds upon which field surveys have been undertaken to determine ecological values known, likely or with potential to occur (Figure 1-2).

The proposed action area is synonymous with the study area.

1.3.4 Study area

The study area refers to the 2,342 ha of land, encompassing the area within which the proposed Project works will take place, and immediate surrounds upon which field

surveys have been undertaken to determine ecological values known, likely or with potential to occur (Figure 1-2). The study area is synonymous with the proposed action area.

Figure 1-2: Proposed action area/study area and disturbance footprint

1.4 Proponent

The proponent is Anglo Coal (Moranbah North Management) Pty Limited ACN 069 603 587 (Anglo Coal).

Anglo Coal is the manager of the Moranbah North Coal Joint Venture and operates the Moranbah North Mine and Grosvenor Mine on behalf of the joint venture participants who are Moranbah North Coal Pty Ltd, NS Moranbah North Pty Ltd, NS Coal (Moranbah North) Pty Ltd, Mitsui Moranbah North Investment Pty Ltd, JFEMA Moranbah North Pty Ltd and Shinsho Moranbah Coal Pty Ltd.

1.4.1 Environmental record

Anglo Coal (Moranbah North Management) Pty Limited has not been the subject of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.

Anglo Coal is owned by Anglo American. Anglo American is an experienced coal mine operator with five operating mines in Queensland (Moranbah North, Grosvenor, Capcoal, Aquila and Dawson). Each of the mines has a sound environmental record.

In 2022 Anglo Coal self-reported a potential non-compliance under the EPBC Act at the Grosvenor Mine and agreed to enter into an enforceable undertaking.

Anglo American has established environmental management systems such as the Anglo Safety, Health and Environment (SHE) Way. The Anglo SHE Way contains environmental management system standards and environmental performance standards. These internal procedures are consistent with international standards and all Anglo American mines are operated in accordance with these procedures. The procedures provide a comprehensive framework of environmental policies, standards and principles compliant with Statutory and contemporary expectations that relate to the company's operation as a whole. The documents are designed to ensure the company upholds the corporate commitments to environmental management and which have been made to stakeholders.

1.5 Legislative background

1.5.1 Commonwealth legislation

Anglo Coal is currently seeking approval for the Project under the EPBC Act. Anglo Coal referred the Project to DCCEEW on 9 March 2023. DCCEEW accepted the referral on 19 June 2023 (EPBC 2023/09489). A request to formally vary the project to incorporate an updated footprint was submitted to DCCEEW in December 2024 and accepted on 9 March 2025.

The delegate of the Minister for the Environment (Cwth) (the Minister) decided on 15 February 2024 that the Project was a Controlled Action within the controlling provision Sections 18 and 18A (Listed threatened species and communities).

The Minister's delegate decided the Project will be assessed by preliminary documentation. The information required for the preliminary document assessment was provided by the Minister's delegate and is included in the front of this PD. A detailed cross-reference table is included in the front of this PD.

1.5.2 Other relevant legislation, planning frameworks or policy documents

In addition to the EPBC Act, the following State legislation and planning frameworks are applicable to the Project:

- The *Transport Infrastructure Act 1984* (Qld) will be utilised for land access and tenure conversion for the rail line.
- The *Planning Act 2016* (Qld) and the *Planning Regulation 2017* (Qld) will apply in respect of the water pipeline, as relevant.
- The *Nature Conservation Act 1992* (Qld) and the *Nature Conservation (Wildlife Management) Regulation 2006* will apply for disturbance to animal breeding places during vegetation clearing activities.

1.5.3 Relationships with other actions

The Project is not part of a staged development or related to other actions or proposals in the region.

1.5.4 Other approvals and conditions

To date, no approvals have been obtained from a State or Commonwealth agency or authority for the Project.

Key approvals for the Project that are either in progress or will be applied for from a State or Commonwealth agency or authority are:

- An approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) in respect to potential significant impacts to threatened species and communities.
- The gazettal of the relocated rail corridor as future railway land under the *Transport Infrastructure Act 1994* (Qld).
- Other processes for land access and tenure conversion for the rail line.
- Processes for the grant of tenure for the water pipeline.
- A Ministerial infrastructure designation under the *Planning Act 2016* (Qld) for the water pipeline. This assessment will include matters of state environmental significance.
- Other planning processes under the *Planning Act 2016* (Qld) and *Planning Regulation 2017* (Qld) in respect of the rail line and water pipeline, as relevant.
- Approval to disturb animal breeding places during vegetation clearing activities under the *Nature Conservation Act 1992* (Qld) and the *Nature Conservation (Wildlife Management) Regulation 2006* (Qld), if required.

2 Description of the Action

2.1 Detailed Project Description

The Project is the relocation of a section of the existing North Goonyella Branch rail line (owned by DTMR and operated by Aurizon) and an existing water pipeline known as the Braeside Pipeline (owned and operated by Whitehaven Coal).

Anglo Coal will undertake the clearing of a rail and pipeline corridor, construction of track foundations and a water pipeline. These are the elements of the Project considered to have a direct or indirect impact on Matters of National Environmental Significance (MNES), as listed under the EPBC Act (refer section 5).

The Project activities will include (but not be limited to):

- Vegetation clearing
- Civil works
- Bridge and culvert construction
- Relocation of overhead powerlines
- Revegetation of temporarily disturbed areas
- Laydown and construction area establishment
- Heavy vehicle movements
- Erosion, sediment and dust control.

The Project will utilise existing public and private roads. The Project will take place inside the proposed action area.

Permanent disturbance areas include the rail corridor, pipeline, and permanent structures such as culverts, bridges, and level crossings.

Temporary disturbance areas include the working room required for construction equipment and earthworks, topsoil stockpiles, construction laydown areas, construction facilities, and borrow pits. The indicative temporary disturbance areas are shown on Figure 1-2.

Revegetation of temporary disturbance areas will be undertaken at the end of the construction phase (see Section 6.3).

2.2 Excluded actions

The placement and laydown of the rail infrastructure (tracks, sleepers, etc.) and construction of traction power and signals will be undertaken separately by Aurizon within the corridor and does not form part of the Project. These activities will be undertaken in areas already cleared and prepared by Anglo Coal as part of the Project.

The Project does not include the operation or maintenance of the rail line and pipeline. These services are already operational and will continue to operate following completion of the Project. There are no new operational impacts.

These excluded actions are incorporated into the consideration of facilitated impacts from the Project.

2.3 Project timeline and staging

The proposed construction and commissioning period for the Project is Quarter 2 2025 through to Quarter 1 2027. The detailed Project timeline is outlined in Table 2-1 below.

Table 2-1: Project timeline

Component	Timing		Duration
	Start	End	
Regulatory approvals (state, Cwth)	Q1 2023	Q1 2025	18-24 months
Prelim design and optimisation	Q2 2023	Q3 2023	4 months
Detailed design and IFC approvals	Q4 2023	Q3 2024	12 months
Construction	Q2 2025	Q3 2026	18 months
Rail planned outages, tie-ins and commissioning	Q4 2026	Q1 2027	6 months
Diversion operational	Q2 2027		

2.4 Design approach and feasible alternatives

Multiple options for the alignment of the rail and pipeline have been explored, considering mining and surface infrastructure constraints as well as potential impacts to MNES (Figure 2-1).

The alignment submitted as part of the referral submission for the Project (EPBC 2023/09489) was the preferred option at the time of lodgement (Figure 2-1). Since lodgement of the referral, an iterative design optimisation process (including consideration of avoiding and minimising impacts to MNES) has resulted in changes to the rail and pipeline alignment. As part of this, the width of the easement changed between the project referral footprint and the final footprint. This is to account for temporary disturbance required to enable construction. Although there was an increase in the easement width, the alignment has been made as narrow as possible, and located to avoid MNES where possible.

The revised and final alignment is shown in Figure 2-1. A formal request to vary the proposed action was provided to the Department in December 2024 and accepted in March 2025 to reflect the revised alignment.

If the rail and pipeline relocation does not proceed, there will be a portion of the coal resource that will be sterilised. The 'No Relocation' approach is inconsistent with the mining lease requirements of maximising the extraction of resources for the benefit of Queenslanders.

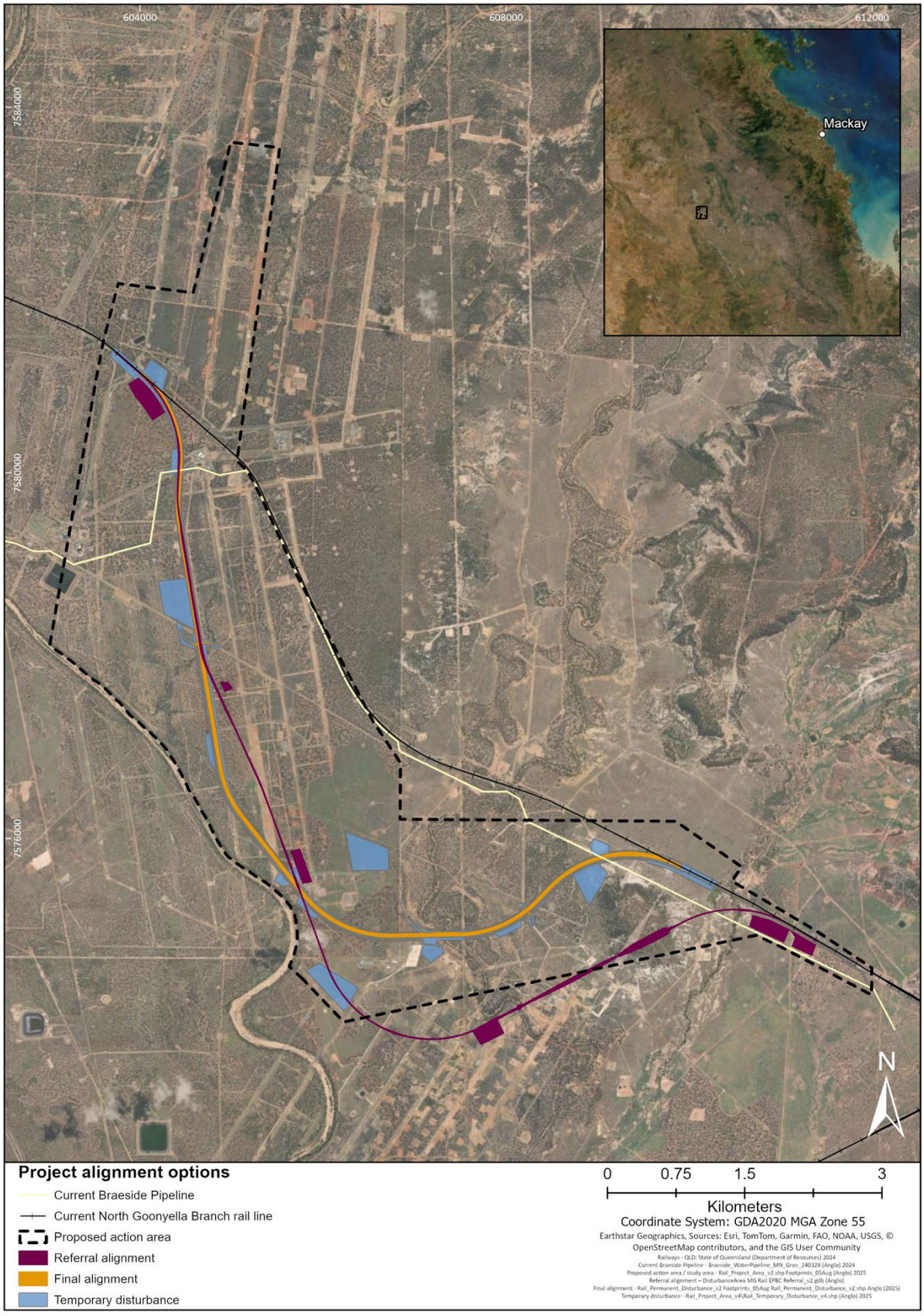

Figure 2-1: Project alignment options

3 Existing environment

This section provides an overview of the existing environment within and surrounding the proposed action area. This provides useful context in relation to ecological values, particularly MNES that are known, likely or have potential to occur, which intersect with the disturbance footprint and may be impacted by Project activities.

3.1 Bioregion

The proposed action area sits within the Northern Bowen Basin subregion of the Brigalow Belt North bioregion. The Brigalow Belt North bioregion contains a mix of landscapes, including undulating to rugged ranges and alluvial plains. Vegetation is dominated by acacia open forests and eucalypt woodlands. Rural land use is dominated by beef cattle grazing, with several coal mines and coal seam gas fields also within the bioregion.

3.2 Climate

The proposed action area is located in the Isaac Region of Central Queensland, and has a semiarid to tropical climate, characterised by hot summers and mild winters with predominantly summer rainfall. The nearest Bureau of Meteorology (BoM) weather station to the proposed action area is Moranbah Airport (034035), located ~15 km south of the proposed action area. A summary of climate statistics for this station is provided in Table 3-1 (BoM 2024).

Table 3-1: Climate summary for Moranbah Airport

Statistic	Average
Annual maximum temperature (°C)	30.6
Annual minimum temperature (°C)	15.7
Annual rainfall (mm)	561.1

3.3 Geology and Soils

The Geology of the proposed action area is primarily sedimentary and colluvium soils of the Suttor Formation and quaternary alluviums associated with the Isaac River and tributaries. The landform is dominated by sandy loams on flat plains.

3.4 Hydrology

The Isaac River (stream order (SO) 5) lies immediately to the west of the proposed action area and is an ecologically important watercourse in the region (Figure 3-1). Other creeks within the proposed action area include Teviot Brook (SO 4) and Skeleton Gully (SO 3), both of which the disturbance footprint intersects once. Teviot

Brook and Skeleton Gully flow into the Isaac River which is a significant watercourse in the Upper Isaac sub-basin of the Fitzroy Basin.

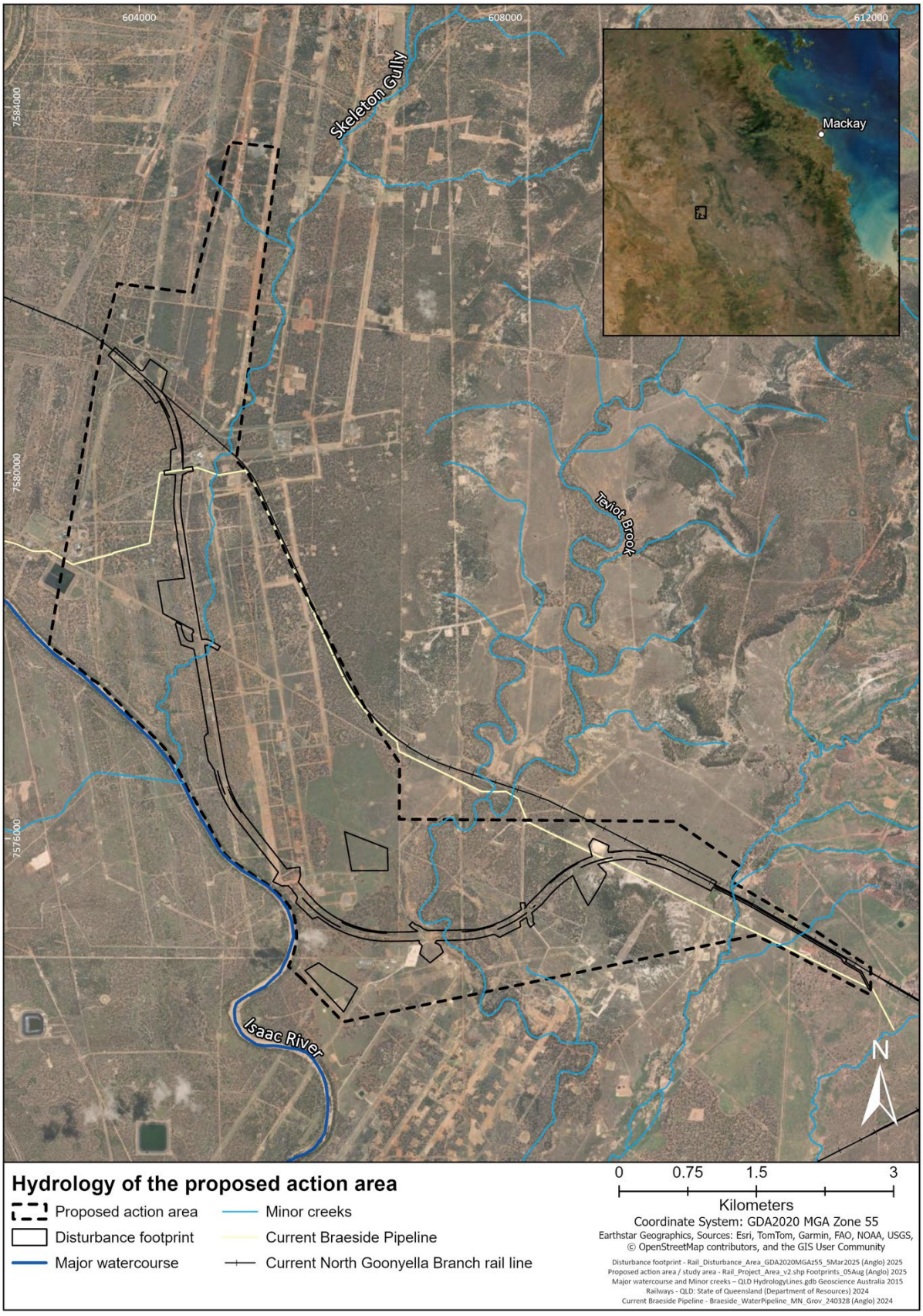

Figure 3-1: Hydrology of the proposed action area

3.5 Current land use and condition

The proposed action area contains a mix of cleared land, and discrete patches of remnant and regrowth vegetation. Most areas of remnant vegetation within the proposed action area and surrounds have been disturbed by either cattle grazing, mining exploration/production, or gas exploration/production at some stage over the past 50 years. Large areas of the proposed action area are dominated by exotic grass species and weed species. Moranbah is to the south of the Project and contains residential and light infrastructure, where land is used for residential and light industrial purposes. The Isaac River also traverses to the west and south of the proposed action area, running in a north-east to south-west direction.

There is no proposed land use change associated with the action or project site, as it will simply realign existing infrastructure in the same area. The proposed action will not have any direct or indirect impact on the surrounding environment.

3.6 Vegetation

The proposed action area contains a number of ground-truthed Regional Ecosystems (REs) (ERM 2024). These include vegetation communities on the following land zones:

- Land zone 3 – recent Quaternary alluvial systems
- Land zone 4 – Tertiary-early Quaternary clay plains
- Land zone 5 – Tertiary-early Quaternary loamy and sandy plains and plateaus
- Land zone 7 – Cainozoic duricrusts

Ground-truthed REs, and potential corresponding Threatened Ecological Communities (TECs) as listed under the EPBC Act, are outlined in Table 3-2 and shown in Figure 3-2 below.

Table 3-2: Ground-truthed REs within the proposed action area

RE	Condition	Short description (REDD 2023)	Associated TEC
11.3.2	Remnant	*Eucalyptus populnea* woodland on alluvial plains	-[1]
11.3.7	Remnant	*Corymbia* spp. open woodland on alluvial plains	-
11.3.25	Remnant / regrowth	*Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines	-
11.4.9	Remnant	*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains	Brigalow
11.5.3	Remnant / regrowth	*Eucalyptus populnea* ± *E. melanophloia* ± *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces	-

[1] RE 11.3.2 is associated with Poplar Box TEC, however RE 11.3.2 within the proposed action area did not meet minimum condition thresholds to be considered part of the TEC during ground-truthing.

RE	Condition	Short description (REDD 2023)	Associated TEC
11.5.9	Remnant	*Eucalyptus crebra* and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and/or remnant surfaces	-
11.5.9c	Remnant	*Eucalyptus crebra* +/- *Corymbia intermedia* +/- *E. moluccana* +/- *C. dallachiana* woodland. Occurs on Cainozoic sandplains formed on plateaus and broad crests of hills and ranges. Soils are generally deep red earths. Not a Wetland.	-
11.7.2	Remnant / regrowth	*Acacia* spp. woodland on Cainozoic lateritic duricrust – scarp retreat zone	-
Non-remnant	N/A	-	N/A

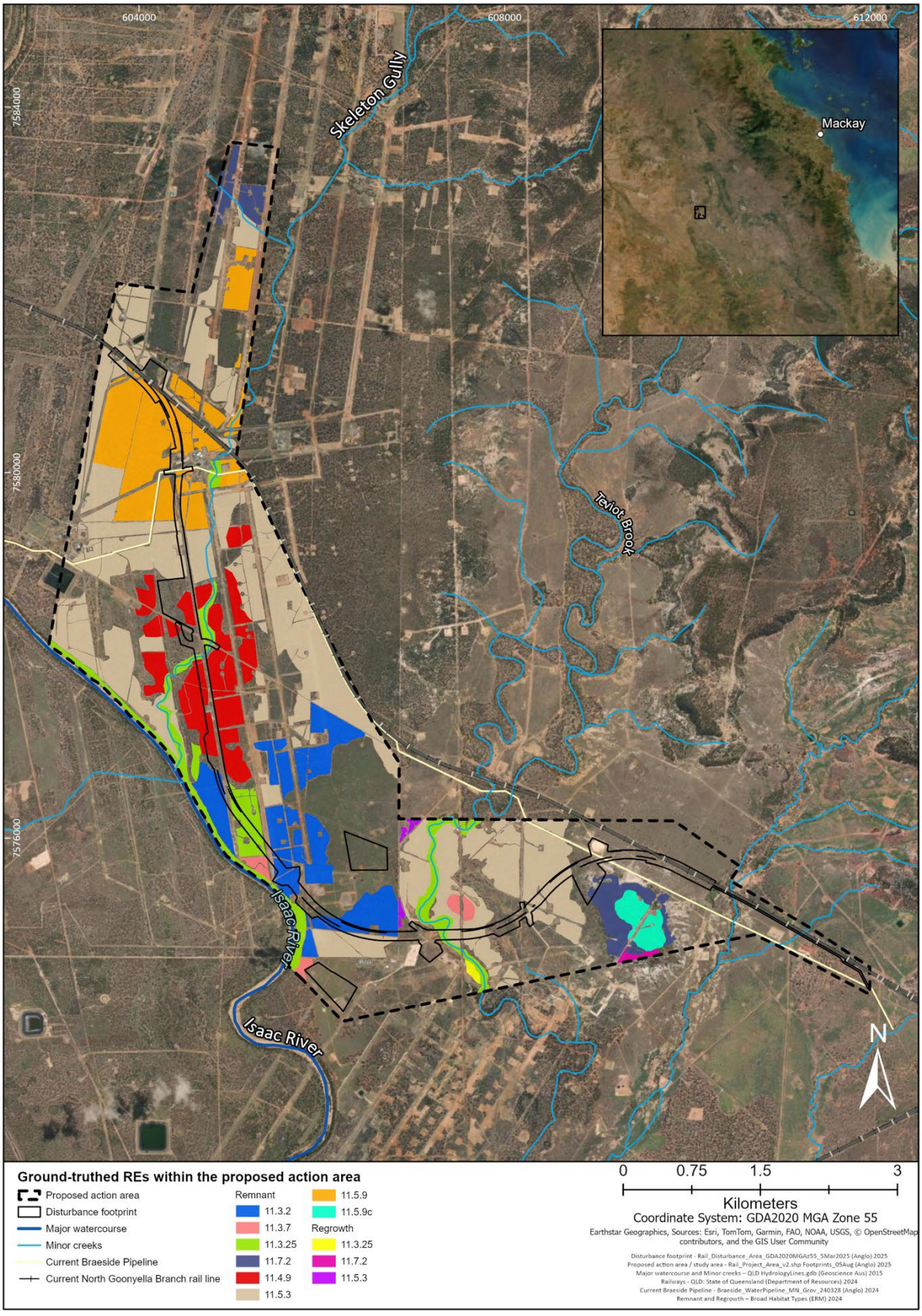

Figure 3-2: Ground-truthed REs within the proposed action area

3.7 Surrounding area and connectivity

The surrounding landscape primarily consists of mosaic remnant and regrowth woodlands and large patches of land that have been historically cleared or disturbed for agriculture, mining, and coal seam gas activities.

The proposed action area lies largely within a state biodiversity corridor, running north-east to south-west between Broadmeadow and Goonyella mines to the north and Moranbah township to the south (Figure 3-3). A state biodiversity corridor bordering the Isaac River intersects the edge of the proposed action area, with a regional biodiversity corridor along Teviot Brook.

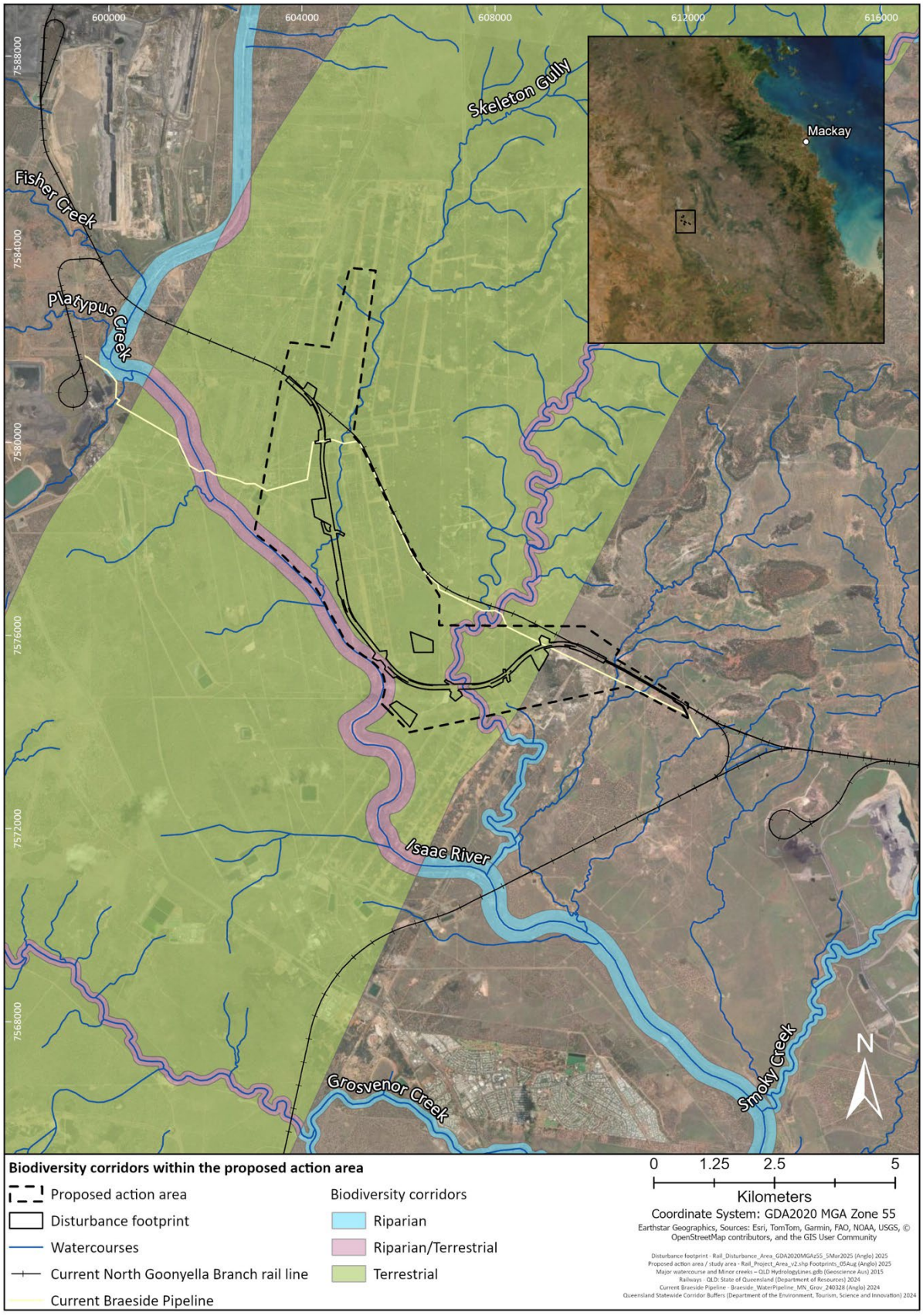

Figure 3-3: Biodiversity corridors within the proposed action area

3.8 Terrestrial fauna habitats

The proposed action area contains habitat for a number of species, with patches of contiguous remnant and regrowth vegetation present. Habitat types which occur in the proposed action area are presented in Table 3-3 and Figure 3-4 below.

In addition, there are also areas of the proposed action area that have been cleared of vegetation – either for agricultural or mining purposes. These areas provide limited habitat value for threatened species (Table 3-3).

The proposed action area does not include values such as high biodiversity, important feeding areas, high endemism, unusual fauna assemblages, or unique habitat types or assemblages.

Table 3-3: Broad habitat types within the proposed action area

Habitat type	Coinciding REs	Description
Acacia woodland	11.7.2	Includes mixed *Acacia* spp. woodland to approximately 8 m, with sparse understorey. Habitat was fragmented with minor disturbance of weeds. Scattered woody debris, cracking soil and a moderate understorey are all microhabitat features that may be of useful habitat value to small animals that require abundant shelter from sun and predators.
Brigalow (*Acacia harpophylla*) woodland	11.4.9	Brigalow (*Acacia harpophylla*) woodland to approximately 8 m, with sparse understorey and dense ground cover of grass. Occasional woody debris present. This habitat type includes field verified Brigalow TEC, where the key diagnostic criteria and condition thresholds for the TEC are met. Dense ground cover, loose bark, woody debris, and cracking soil types are all microhabitat features that may be of useful habitat value to small animals that require abundant shelter from sun and predators.
Eucalypt and Corymbia woodland	11.3.7, 11.5.3, 11.5.9, 11.5.9c	Mixed *Eucalyptus* spp. and *Corymbia* spp. woodland to approximately 18 m. Generally sparse canopy coverage/ tree density. Shrub layer present but sparse, with areas of dense shrub including *Carissa ovata*. Eucalypts (especially and poplar box and pink bloodwood) in this habitat type provide an abundant food resource for eucalyptus specialists (i.e., large gliders and koala). Scattered hollows and tree cavities also provide a limited shelter resource for hollow-dwelling mammals and birds.
Eucalypt woodland associated with	11.3.25	Mixed *Eucalyptus* spp. (*E. tereticornis* & *E. populnea*) along the Isaac River, and ephemeral streams. Large,

Habitat type	Coinciding REs	Description
ephemeral streams and watercourses		mature eucalypts (especially smooth-barked and poplar box) in this habitat type provide an abundant food resource for eucalyptus specialists (i.e., large gliders and koala) as well as large hollows for hollow-dwelling mammals and birds.
Eucalypt woodland dominated by Poplar Box (*Eucalyptus populnea*)	11.3.2, 11.5.3	Mixed *Eucalyptus* spp. dominated by Poplar Box (*E. populnea*) with sporadic Brigalow (*Acacia harpophylla*) understorey, often regrowth. Often associated with woody debris and dense grass. The presence of scarce Eucalypts in this habitat type provides a shelter and foraging resource to birds and the dispersing koala. The openness of this habitat type is also useful for birds of prey, as they can scan and hunt for ground-dwelling prey due to the thin and open tree canopy.
Waterbodies and drainage features	-	Permanent and seasonal natural waterbodies and drainage features, including Teviot Brook, Skeleton Gully, dams and drainage features. These provide suitable habitat for wading birds.
Acacia regrowth	11.7.2	Mixed *Acacia* spp. sparse or scattered regrowth. Offers minimal habitat value to any species as there is limited complexity, shelter, and food sources. This habitat is typically used by generalist species, but on occasion threatened species has potential to use.
Brigalow regrowth	11.4.9	*Acacia harpophylla* sparse or scattered regrowth without the features that would classify it as brigalow TEC. Offers minimal habitat value to any species as there is limited complexity, shelter, and food sources. This habitat is typically used by generalist species, but on occasion threatened species has potential to use.
Mixed eucalyptus regrowth	11.3.25, 11.5.3	Scattered or sparse *Eucalyptus* spp. / *Corymbia* spp. regrowth, low habitat value but may be utilised by species to travel between habitats. Offers minimal habitat value to any species as there is limited complexity, shelter and food sources. This habitat is typically used by generalist species, but on occasion threatened species has potential to use.
Non-remnant areas	-	Managed cleared grasslands and cleared agricultural land with occasional *Acacia* spp. / *Eucalyptus* spp. / *Corymbia* spp. regrowth. This is a very open and homogenous habitat type that offers little value to any species, unless they are a grassland specialist. Birds of prey may take advantage of the minimal canopy cover to hunt for ground dwelling species.

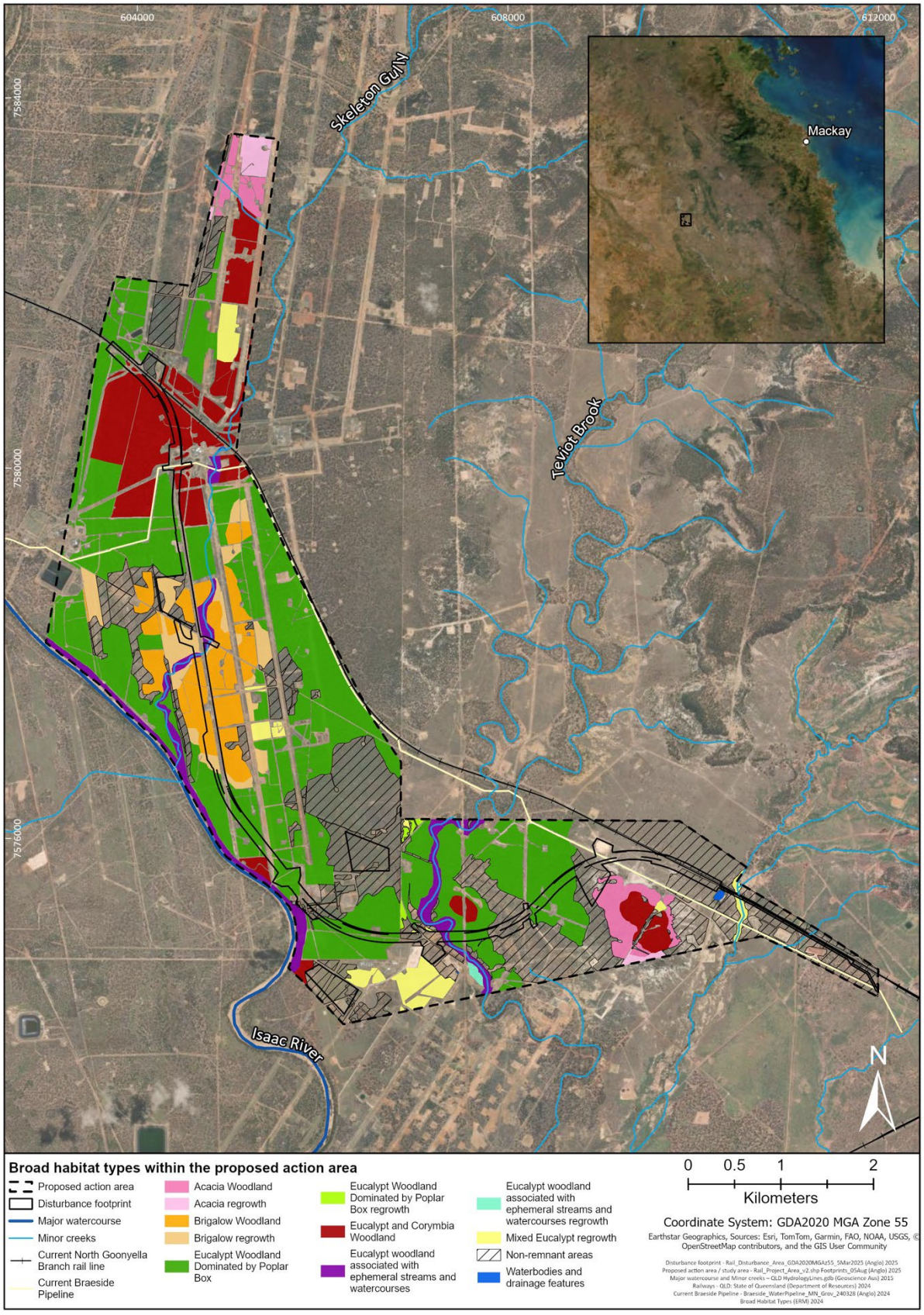

Figure 3-4: Broad habitat types within the proposed action area

3.9 Weeds and Pests

Two introduced flora species listed as a Weed of National Significance (WoNS) and listed under the *Queensland Biosecurity Act 2014* are known to occur within the proposed action area, including rubber vine (*Cryptostegia grandiflora*) and velvety prickly-pear (*Opuntia tomentosa*) (ERM 2024).

A number of pest fauna species were also recorded during field surveys of the proposed action area including (ERM 2024):

- Cane toad (*Rhinella marina*)
- Chital deer (*Axis axis*)
- Dingo (*Canis lupus dingo*)
- Feral cat (*Felis catus*)
- Pig (*Sus scrofa*)
- Rabbit (*Oryctolagus cuniculus*).

4 Ecological investigations

The habitat assessment presented below is a summary of the 'Goonyella Rail Corridor Realignment Project Baseline Ecological Values Report (ERM 2024), which is included in Appendix 3. Habitat assessment was a key component of ecological studies to establish the basis for assessing potential impacts to MNES which may result from the Project.

4.1 Desktop assessment

The desktop assessment involved review of relevant environmental studies, publicly available databases, spatial data and legislation to identify potential ecological values that may occur within or proximal to the proposed action area. Resources that were utilised include:

- Protected Matters Search Tool (PMST) report incorporating a 15 km buffer from the proposed action area boundaries (see Appendix 1)
- Atlas of Living Australia (ALA) database search to retrieve historic records of species previously recorded within proposed action area and surrounds (ALA 2024)
- The Regional Ecosystem Description Database (REDD) (Queensland Herbarium 2024)
- Central Queensland Threatened Species Habitat Descriptions (Kerswell et al. 2020)

Desktop assessments were also undertaken to inform field surveys (see below). A description of desktop assessments undertaken prior to each field survey are described in Appendix 3.

4.2 Field survey

Detailed ecological surveys were undertaken covering the proposed action area in 2023 and 2024 (ERM 2024). An overview of these surveys and survey effort is outlined in Table 4-1. The ecological survey report is provided as Appendix 3.

Table 4-1: Summary of field surveys completed within the proposed action area

Survey timing	Target ecological feature	Survey methodology	Survey effort
Post Dry Season			
4 – 15 September 2023	Vegetation Assessments	• QLD quaternary assessments.	• 3 individual survey locations
	TEC field verification	• Review of vegetation community mapping against the TEC thresholds and criteria • Verifying if areas mapped as potential TEC conform to the TEC thresholds	• Survey undertaken at each potential TEC location
	Fauna habitat features	• Habitat quality assessment.	• 7 individual survey locations
	Targeted species searches	• Reptile searches • Bird surveys • Bat surveys • Camera trapping • Koala SATs • Spotlighting • Call playback • Opportunistic surveys for fauna species while driving and walking	• General meander searches for targeted species took place at habitat and vegetation assessments • 2 individual bird survey locations • 1 Anabat devices recording for 4 consecutive nights • 1 baited camera trap for 4 consecutive trap nights • 4 individual koala SAT locations • 1 individual location for call playback for koala in suitable habitat. • Spotlighting – one team of two people surveying for two hours across three nights; and • Spotlighting – two teams of two people surveying for two hours in one night (totalling in 12 person hours)

Survey timing	Target ecological feature	Survey methodology	Survey effort
27 November – 8 December 2023	Vegetation Assessments	• BioCondition assessments • QLD quaternary assessments	• 5 individual BioCondition assessment survey locations • 2 individual quaternary assessment survey locations
	TEC field verification	• Review of vegetation community mapping against the TEC thresholds and criteria • Verifying if areas mapped as potential TEC conform to the TEC thresholds	• Undertaken at each potential TEC location
	Fauna habitat features	• Habitat quality assessments (including Koala SATs)	• 4 individual survey locations
	Targeted species searches	• Reptile searches • Bird surveys • Opportunistic surveys for fauna species while driving and walking	• General meander searches for targeted species took place at habitat and vegetation assessments • 1 individual bird survey locations
Post Wet Season			
26 February – 8 March 2024	Vegetation Assessments	• BioCondition assessments • QLD quaternary assessments	• 2 individual quaternary assessment survey locations • 2 individual BioCondition assessment survey locations
	TEC field verification	• Review of vegetation community mapping against the TEC thresholds and criterion • Verifying if areas mapped as potential TEC conform to the TEC thresholds	• Surveys undertaken at each potential TEC location
	Fauna habitat features	• Habitat quality assessments	• 2 individual survey locations

Survey timing	Target ecological feature	Survey methodology	Survey effort
	Targeted species searches	• Reptile searches • Bird surveys • Bat surveys • Spotlighting • Koala SATs	• General meander searches for targeted species took place at habitat and vegetation assessments • 1 individual bird survey location • 1 Anabat devices recording for 7 consecutive nights • 4 baited camera traps for 7 consecutive trap nights each • 1 individual location for call playback for koala in suitable habitat • 1 individual koala SAT location
18 – 22 March 2024	Aquatic ecology	• Wetland assessments • Historical Receiving Environment Monitoring Program (REMP) / aquatic surveys	• 1 individual wetland assessment location • 1 individual REMP survey location
2 – 5 April 2024	Vegetation Assessments	• QLD quaternary assessments	• 13 individual survey locations
	Habitat quality assessments	• Habitat quality assessments	• 10 individual survey locations
	Targeted species searches	• Spotlighting	• Spotlighting on Moranbah North Mine, adjacent to the Goonyella Rail Corridor – 1 team of 3 people surveying for 3 hours across 2 nights

4.3 Survey adequacy

A survey adequacy review, combining the survey effort from the November/December 2023 and April 2024 surveys covering the northern portion of the proposed action area, and September 2023 and Match 2024 surveys covering the southern portion of the proposed action area and is presented in Table 4-2. Surveys for all target species were undertaken as per the requirements of relevant guidelines.

Field surveys were undertaken during both the dry and wet season. This meets the adequacy requirements for the Brigalow Belt in the *Terrestrial Vertebrate Fauna Survey Guideline for Queensland* (Eyre et al. 2022a).

Table 4-2: Survey effort adequacy

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
Koala	*Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et al. 2022a) • Two-person, 30-minute spotlight searches of 100 x 100 m survey site • Scat and sign search can coincide with systematic diurnal active searches within 50 x 50 m quadrats *A review of Koala habitat assessment criteria and methods* (Youngentob et al. 2021) Survey effort determined on a case-by-case basis. However, general methods include: • Direct observations should be undertaken between August – January • Transect and point surveys • Nocturnal spotlighting at smaller sites to determine species presence and density • Trained koala detection dogs • Mark-resight or mark-recapture • Thermal detection drones • Radio tracking • Camper trapping in areas where fresh scats and/or scratches have been recorded • Indirect observations • Scats – spot assessment technique (SAT), rapid SAT, koala optimised Rapid Assessment Methodology, balanced koala scat survey, faecal standing crop	September 2023: • Koala Spot Assessment Technique (SAT), 4 individual survey locations • Spotlighting – 1 team of 2 people surveying for 2 hours across 3 nights • Spotlighting – 2 teams of 2 people surveying for 2 hours in 1 night • Call playback at 1 locations • 7 habitat assessments determining presence of any suitable habitat features November - December 2023: • Koala SAT 4 individual survey locations • 4 habitat assessments determining presence of any suitable habitat features February – March 2024: • Koala SAT, 1 individual survey locations • Call playback at 1 locations • 2 habitat assessments determining presence of any suitable habitat features April 2024: • Spotlighting 1 team of 3 people surveying for 3 hours across 2 nights • 10 habitat assessments determining presence of any suitable habitat features	Survey adequacy met. Species was not recorded within the proposed action area during surveys.

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
	method, trained scat detection dogs, genetic sampling from faecal pellets, • Call playback • Passive acoustics • Scratches • Landscape nutritional quality surveys		
Greater glider	*Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et al. 2022a) • Two-person, 30-minute spotlight searches of 100 x 100 m survey site • Scat and sign search can coincide with systematic diurnal active searches within 50 x 50 m quadrats *Survey guidelines for Australia's Threatened Mammals* (DSEWPC 2011a) • Spotlighting should be at least two x 200 m transects per 5 ha site • Recommended 100 m between survey transects • Bright moonlight aids detecting greater glider	September 2023: • Spotlighting – 1 team of 2 people surveying for 2 hours across 3 nights • Spotlighting – 2 teams of 2 people surveying for 2 hours in 1 night • 7 habitat assessments determining presence of any suitable habitat features November - December 2023: • 4 habitat assessments determining presence of any suitable habitat features February – March 2024: • 2 habitat assessments determining presence of any suitable habitat features April 2024: • Spotlighting 1 team of 3 people surveying for 3 hours across 2 nights • 10 habitat assessments determining presence of any suitable habitat features	Survey adequacy met. Spotlighting surveys were conducted in suitable habitat for the species
Squatter pigeon	*Survey Guidelines for Australia's Threatened Birds* (DEWHA 2010) Squatter pigeon (southern) surveys should be conducted by area searches or transect surveys in suitable habitat. Additionally, flushing surveys are considered likely to be useful, however are not the preferable method. Optimal survey conditions are	September 2023: • 2 individual bird survey locations (Bird surveys involved 500 m area searches, point surveys, and resource or habitat target searches) • Roaming bird surveys between survey areas	Survey adequacy met. Both area searches and transect surveys were undertaken in suitable habitat. Surveys were undertaken during optimal survey time, and

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
	likely between May to late October, and juveniles are predominantly detected during June.	• 7 habitat assessments determining the presence of any suitable habitat features November - December 2023: • 1 individual bird survey locations (Bird surveys involved 500 m area searches, point surveys, and resource or habitat target searches) • Roaming bird surveys between survey areas • 4 habitat assessments determining the presence of any suitable habitat features February – March 2024: • 1 individual bird survey locations (Bird surveys involved 500 m area searches, point surveys, and resource or habitat target searches) • Roaming bird surveys between survey areas • 2 habitat assessments determining the presence of any suitable habitat features April 2024: • Roaming bird surveys between survey areas • 10 habitat assessments determining the presence of any suitable habitat features	in both wet and dry seasons.
Australian painted snipe	*Survey Guidelines for Australia's Threatened Birds* (DEWHA 2010) Targeted surveys for Australian painted snipe include area searches or transects through suitable wetlands, with detection methods by sighting and flushing. Additionally, targeted stationary observations at dawn and dusk in suitable wetland habitats is also recommended.	September 2023: • 2 individual bird survey locations (Bird surveys involved 500 m area searches, point surveys, and resource or habitat target searches) • Roaming bird surveys between survey areas	Bird surveys were conducted in primarily wooded and wetland areas and in conjunction with habitat assessments. Wetland areas were assessed during the wet

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
	Brief spotlighting searches shortly after dusk may also detect the species, however this is not the preferable method of detection.	• 7 habitat assessments determining the presence of any suitable habitat features November - December 2023: • 1 individual bird survey locations (Bird surveys involved 500 m area searches, point surveys, and resource or habitat target searches) • Roaming bird surveys between survey areas • 4 habitat assessments determining the presence of any suitable habitat features February – March 2024: • 1 individual bird survey locations (Bird surveys involved 500 m area searches, point surveys, and resource or habitat target searches) • 1 individual wetland assessment location • Roaming bird surveys between survey areas • 2 habitat assessments determining the presence of any suitable habitat features April 2024: • Roaming bird surveys between survey areas • 10 habitat assessments determining the presence of any suitable habitat features	season when water was present. Surveys were undertaken during both early summer and autumn as per the Terrestrial Vertebrate Fauna Survey Guidelines (DESI 2022)
Ornamental snake	*Survey Guidelines for Australia's Threatened Reptiles* (DSEWPC 2011b) • There are no methods to reliably detect ornamental snake during dry season • Species is likely detected by searches in suitable gilgai habitat whilst frogs are active	September 2023 (monthly rainfall total 1.2 mm): • 7 habitat assessments determining the presence of any suitable habitat features • Reptile meanders alongside habitat assessments in appropriate habitat	Survey adequacy met. The ornamental snake was not recorded during either survey event, despite targeted searches.

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy

	• Survey methods should include:
	  ○ Driving roads at night particularly following wet conditions
	  ○ Diurnal searches under shelter sites
	  ○ Pitfall and funnel trapping
	• Surveys likely to yield low returns
		• Spotlighting – 1 team of 2 people surveying for 2 hours across 3 nights
		• Spotlighting – 2 teams of 2 people surveying for 2 hours in 1 night
		November - December 2023 (monthly rainfall total 106.8 mm (Nov) & 80.8 mm (Dec)):
		• 4 habitat assessments determining the presence of any suitable habitat features
		• Reptile meanders alongside habitat assessments in appropriate habitat
		February - March 2024 (monthly rainfall total 92.8 mm (Feb) & 25.6 mm (Mar)):
		• 2 habitat assessments determining the presence of any suitable habitat features
		• Reptile meanders alongside habitat assessments in appropriate habitat
		• 1 individual wetland assessment location
		April 2024 (monthly rainfall total 6.6 mm):
		• 10 habitat assessments determining the presence of any suitable habitat features
		• Reptile meanders alongside habitat assessments in appropriate habitat
		• Spotlighting 1 team of 3 people surveying for 3 hours across 2 nights
			Habitat assessments were conducted noting the presence/absence of suitable habitat (i.e., gilgai and areas with cracking black soils). Surveys were undertaken during both wet and dry seasons, with rainfall experienced during survey events.
			Reptile meanders involved active searches in potential habitat by searching for individuals under ground debris and were undertaken in conjunction with habitat assessments, at all habitat assessment locations within brigalow regrowth and brigalow woodland. Thus, a total of three reptile meanders were conducted, including two within mapped ornamental snake habitat. Reptile meanders were undertaken for a total 20 minutes each (totalling 1 person-hour across the survey period).
			No frog species were identified within brigalow

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
			woodland or brigalow regrowth during the field surveys. Therefore, spotlighting within brigalow woodland with gilgai was not undertaken as gilgai was dry at the time of the survey, and as such, prey species (frogs) were not abundant, and snake activity is assumed lower. Spotlighting involved driving roads at night; however, did not involve targeted spotlighting in brigalow habitats with gilgai. Majority of vehicle spotlighting within the proposed action area was undertaken in eucalypt woodland.
Fitzroy river turtle	*Survey Guidelines for Australia's Threatened Reptiles* (DSEWPC 2011b) Effective survey methods for the species include: • Diving in riffle zones with face mask and snorkel • Collection by seine netting Effectiveness of drum traps is unknown	No suitable habitat for the species was present within the proposed action area to survey	No suitable habitat for the species was present within the proposed action area to survey

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
Dichanthium setosum	No specific guideline[2] Meander surveys within suitable species habitat when species is likely present (i.e. during flowering). Species flowers in summer (DCCEEW 2024). Search must continue until no new plant species has been recorded for 30 minutes, or entire site/habitat has been surveyed.	• Meander surveys undertaken during BioCondition assessments, quaternary assessments, and habitat assessments	Surveys were undertaken during flowering season. Survey effort sufficient to determine species is unlikely to occur.
Dichanthium queenslandicum	No specific guideline[2] Meander surveys within suitable species habitat when species is likely present (i.e. during flowering). Species is known to flower throughout the year but particularly from March (Queensland Herbarium 2011). Search must continue until no new plant species has been recorded for 30 minutes, or entire site/habitat has been surveyed.	• Meander surveys undertaken during BioCondition assessments, quaternary assessments, and habitat assessments	Surveys were undertaken during flowering season. Survey effort sufficient to determine species is unlikely to occur.
Brigalow TEC	*Approved Conservation Advice for the Brigalow (*Acacia harpophylla *dominant and co-dominant) ecological community* (DoE 2013a) Surveys may be undertaken most times of the year, however timing consideration should be given to flowering shrub species and active growth. Timing of surveys should allow for a reasonable interval following a disturbance event.	September 2023: • 3 quaternary vegetation assessments • TEC field verification undertaken at potential TEC locations November – December 2023: • 2 quaternary vegetation assessments • 5 BioCondition assessments • TEC field verification undertaken at potential TEC locations February – March 2024: • 2 quaternary vegetation assessments • 2 BioCondition assessments	Surveys were undertaken in the associated REs for this TEC. Surveys were undertaken in two seasons and considered the diagnostic criteria for the TEC.

[2] There are no specific guidelines for conducting surveys on *Dichanthium setosum* or *Dichanthium queenslandicum* (TERN Australia 2024), however the *Flora Survey Guidelines – Protected Plants NC Act (Flora Survey Guidelines)* (DES 2020a) was used to inform protected plant surveys and *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (Neldner et. al 2022) was used to inform vegetation surveys.

Target species	Survey guidelines and requirements	Survey effort	Comment on survey adequacy
		• TEC field verification undertaken at potential TEC locations April 2024: • 10 quaternary vegetation assessments • TEC field verification undertaken at potential TEC locations	
Poplar box TEC	*Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains* (DoEE 2019). Surveys should be conducted in more than one season to maximise chance of detecting species. In the case of low rainfall, surveys should be carried out over more than one year. Where multiple surveys are not possible, assessment should occur in spring to early summer. Timing of surveys should allow for recovery following a disturbance event.	September 2023: • 3 quaternary vegetation assessments • TEC field verification undertaken at potential TEC locations November – December 2023: • 2 quaternary vegetation assessments • 5 BioCondition assessments • TEC field verification undertaken at potential TEC locations February – March 2024: • 2 quaternary vegetation assessments • 2 BioCondition assessments • TEC field verification undertaken at potential TEC locations April 2024: • 10 quaternary vegetation assessments • TEC field verification undertaken at potential TEC locations	Surveys were undertaken in the associated REs for this TEC. Surveys were undertaken in two seasons and considered the diagnostic criteria for the TEC.

5 Potential impacts

Potential impacts resulting from the Project are related to activities associated with the construction of the Project. Relevant impacts include:

- Vegetation clearance and associated habitat removal
- Habitat disturbance and degradation
- Fragmentation and edge effects including weed and pest animal incursions
- Fauna injury and/or mortality

The following section provides a general description of the impacts above, with additional information within the context of the Project activities.

5.1 Vegetation clearing and habitat removal

Land clearing and removal of native vegetation is directly associated with habitat loss, which is recognised as a significant threat to species and ecosystems. Land clearing is also listed as a key threatening process under the EPBC Act and can adversely affect species by:

- Reducing area available for nesting, denning, roosting or other key shelters
- Fragmenting habitat
- Removing or reducing the availability of food resources
- Increasing competition through resource unavailability
- Changing microclimate.

Removal of vegetation via land clearing can also exacerbate other threatening processes (such as climate change, spread of invasive species, altered fire regimes, and changed hydrology) which limits species resilience to other threats (Neldner et al., 2017). This may be further compounded in species with limited habitat preferences, or isolated/contracted ranges.

Habitat removal in the proposed action area will result from the clearing for the construction of the rail line and pipeline. The estimated habitat loss across each broad habitat type is presented in Table 5-1.

Table 5-1: Extent of broad habitat types and non-remnant areas within disturbance footprint

Broad habitat type	Coinciding REs	Impact area (ha)
Acacia Regrowth	11.7.2	0
Acacia Woodland	11.7.2	1.3
Brigalow Regrowth	11.4.9	5.0
Brigalow (*Acacia harpophylla*) woodland	11.4.9	7.8

Broad habitat type	Coinciding REs	Impact area (ha)
Eucalypt and Corymbia woodland	11.3.7, 11.5.3, 11.5.9	10.3
Eucalypt woodland associated with ephemeral streams and watercourses	11.3.25	1.9
Eucalypt Woodland Dominated by Poplar Box	11.3.2, 11.5.3	35.6
Mixed Eucalypt Regrowth	11.3.25, 11.5.3	0.3
Non-remnant areas	-	133.1

Regional Ecosystems and broad habitat types within the Disturbance Footprint are depicted in Figure 3-2 and Figure 3-4 respectively above.

5.2 Fragmentation and edge effects

The proposed action area contains a mix of remnant and regrowth vegetation, and non-remnant areas. Consequently, there is potential for clearing to disrupt fauna movement across the rail and pipeline corridor. The relevance, extent and severity of impacts from fragmentation (e.g., weeds, fire, increased exposure to wind, barriers to movement of fauna) have been considered for each species and described in the significant impact assessments below.

Edge effects are the various consequences on plants and animals, which occur as a result of one type of habitat adjoining with another, usually a highly disturbed area (Williams et al. 2013). Edge effects can influence communities in numerous ways, but most significantly via:

- Acting as barriers to movement or dispersal (Weston et al. 2011)
- Providing vectors for the introduction of invasive species (weeds and pest fauna and associated degradation and availability of habitat, refer to Section 5.3.1) (Ramp et al. 2005; Clarke et al. 2006)
- Increasing the opportunities for interaction between ecological communities and human disturbance (e.g., increased traffic along roads) (Pickering & Hill 2007; Wolf & Croft 2014).

These mechanisms become significantly more pervasive in fragmented landscapes and when perimeter-to-area ratios of patches are high (i.e., there are long edge interfaces compared with the internal area of a patch) (Wintle et al. 2019).

In most instances, the project will remove small areas of habitat from the edge of already fragmented patches and is unlikely to increase the fragmentation of this habitat, or impact the functionality of these habitat patches.

The Project is unlikely to result in an overall change in the edge-to-area ratio of the landscape, which is already fragmented. The extent of clearing required for the Project

is minor in the in the context of the landscape and is unlikely to result in the creation of new, small patches of habitat. The landscape is already largely modified and the Disturbance Footprint has been designed to avoid and minimise intersection with MNES habitat so that it does not create significant new cleared areas or interfaces with vegetated areas (see Section 6.1).

The Project involves the relocation of a pre-existing rail line and water pipeline. The rail and pipeline alignment runs adjacent to, and within 2 km at the furthest point, the current rail line. As such, the project will not contribute to fragmentation at the landscape scale.

5.3 Habitat disturbance and degradation

Further to direct loss and fragmentation of habitat, other factors that can contribute to degradation and disturbance of habitat within the proposed action area, including:

- Weeds and pest fauna
- Light emissions
- Dust emissions
- Noise
- Changes to the hydrological regime
- Contamination from spills and leaks
- Fauna injury and/or mortality from machinery and vehicle movement, and trenching
- Increased human presence.

The majority of these factors are temporary as they are associated with construction activities. Mitigation measures will be included in the Construction Environmental Management Plan described in Section 6. These mitigation measures will follow industry best practice and will establish suitable controls to reduce the risks to the environment, such that the habitat disturbance and degradation is not anticipated to be a significant risk to MNES.

5.3.1 Weeds and pest fauna

Vegetation clearing and other construction activities have the potential to introduce and / or disperse weeds and pests as per the following:

- Increased infestations of existing weed species in the proposed action area
- Introduction of new weed species in the proposed action area
- Providing vectors for the introduction and dispersal of pest fauna into the proposed action area.

The presence of invasive plants, such as rubber vine (*Cryptostegia grandiflora*) and velvety prickly-pear (*Opuntia tomentosa*) with the surrounding landscape is well documented (see Section 3.9). However, further weed incursion has the potential to impact MNES in the proposed action area through detrimental changes in vegetation

community structure and composition causing degradation and reduction in availability of flora and fauna habitat. Changes in vegetation structure and condition can also result in increased risk of erosion, further degrading and reducing the availability of habitats.

Pest fauna are already present surrounding the proposed action area; however, vegetation clearing can also create new pathways that may facilitate movement of pest fauna into the proposed action area. Pest fauna can degrade MNES habitat through spreading weed vegetation and grazing on native vegetation. Pest fauna may also directly destroy habitat through, for example, trampling and digging (e.g., pigs). Predation by feral predators including cats and wild dogs have the potential to impact MNES fauna through negative pressure on species populations.

Mitigation measures are described in Section 6.2.

5.3.2 Light

Impacts of artificial light can affect both nocturnal and diurnal animals by disrupting behavioural patterns, with quality of light (e.g., wavelength, colour), intensity and duration, potentially evoking different responses. Impacts from increased light levels include disorientation from or attraction toward artificial sources of light; mortality from collisions with structures; and effects on light-sensitive cycles of species (e.g., breeding and migration for fauna and flowering in plants). An increase in artificial lighting can also increase the abundance and efficiency of predators. This could result in fauna avoiding some areas due to an increased perceived risk of predation and/or become more vulnerable to being predated.

Construction activities have the potential to cause short-term light emissions, however, the majority of construction activities are anticipated to be undertaken during daylight hours.

5.3.3 Dust

Construction activities have the potential to generate dust emissions. Dust emissions during construction will be temporary and minimised by regular watering of roads. The main sources of dust will be vegetation clearing and wheel-generated dust from earthworks and unsealed access roads. Excessive deposition of dust on leaves of plants can suppress growth and photosynthesis and result in reduced habitat quality for fauna. High levels of airborne dust particles can irritate the respiratory systems of fauna and potentially result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade water quality, and overall habitat quality for fauna.

There are good opportunities to avoid and reduce impacts from dust. These are described in Section 6.2.

5.3.4 Noise

Noise may impact terrestrial fauna in two general ways, either by masking (i.e., where noise affects communication between individuals of a species) or by eliciting a

reaction, which may range from a mild alert response through to avoidance or abandonment of habitat. Noise thresholds for terrestrial fauna are not well understood although Manci et al. (1988) suggest that sound levels above ~90 dB are likely to be adverse to mammals and are associated with a number of behaviours such as retreat from the sound source, freezing, or a strong startle response. Conversely, sound levels below ~90 dB usually cause much less adverse behaviour. More recent studies on the impact of noise of fauna species in Australia indicate that birds are more likely to be affected and will move away from habitat areas, as opposed to mammal and reptile species (Lindenmayer et al. 2016). While other studies in Europe have shown noise levels up to 60 dBA do not result in negative or adverse response in some terrestrial fauna (Helldin et al. 2012).

Noise levels greater than existing ambient noise levels are expected in the short-term during construction within the proposed action area. Sources are likely to consist of noise on short, intense pulses from mobile plant equipment, and more prolonged noise from generators and pumps, with consistent vibration, pitch and volume, in addition to noise from vehicles. Construction noise impacts will be temporary, lasting for up to 24 months from the beginning of the construction phase through to tie-ins and commissioning. Construction noise will occur within different portions of the proposed action area throughout construction.

5.3.5 Changes to hydrological regimes, erosion and sedimentation

Works that may lead to changes in hydrology and/or erosion include clearing vegetation, excavation, trenching and filling during construction near and within waterway corridors. Impacts may be, for example, short-term from increased sediment during construction, or long-term from altered surface water flows occurring as a consequence of constructing the rail formation and local drainage structures.

Changes to hydrological regimes (e.g., through installation of infrastructure that comprise obstacles to surface flows or additional stormwater run-off) can potentially impact downstream receiving environments including run-off characteristics, intensity of flood flows and stability of waterways. Erosion destabilises vegetation communities resulting in habitat degradation. Elevated levels of erosion and transport of sediments across the proposed action area may result in biodiversity losses to local and downstream environments. Scouring and/or waterlogging can also have deleterious impacts to local environments.

Impacts to local waterways throughout the proposed action area will be minor, with ongoing protection of hydrological regimes though the use of culverts, low level bridges and implementation of sediment and erosion control measures. Flood studies are being undertaken as part of the detailed design to ensure the protection of existing hydrological regimes. These mitigation measures are described in Section 6.2.

5.3.6 Increased risk of fire incursion

Increased risk of fire incursion is more likely to be associated with construction. Construction activities have the potential to increase the risk of fire, causing injury or loss of human life, loss of flora and vegetation, fauna and habitat, and impacting

surface water quality. Aspects of the Project that could lead to increased fire incursion include:

- Introduction of ignition sources including vehicles and machinery and equipment such as generators
- Welding, grinding and other hot works
- Introduction or spread of weed species which can increase fuel load.

The proposed action area is surrounded by an industrial site with existing fire incursion controls. Additionally, the corridor will be cleared of vegetation before construction and the corridor will be watered for dust suppression (see Section 6.2). Potential impacts from fire incursion would be short-term and considered low.

5.4 Fauna injury and/or mortality

Fauna injuries or mortality may result primarily from vegetation clearing, vehicle strike and trenching.

During the construction of the Project there is a short-term risk of injury or mortality to fauna species, from interactions with vehicles, including vehicle strike. Vehicle and machinery movements which cause sustained disturbance to fauna foraging and/or roosting may also deplete energy reserves required for dispersal (particularly in migratory species). However, the proposed action area is not known to contain roosting habitat for any MNES.

There is also a short-term risk of injury or mortality to fauna species, particularly arboreal species, during clearing of vegetation. Any individuals present within vegetation that is being cleared may suffer injury or mortality. Excavation works required for the installation of the pipeline pose a risk of injury or mortality to fauna through entrapment in trenches or pits. These potential impacts are short-term only, with good opportunities to reduce impacts through good practice and mitigation measures presented in Section 6.2.

5.5 Increased human presence

Increased activity by people within the proposed action area and surrounds has the potential to disturb fauna, with fauna that roost or forage in adjacent areas being particularly vulnerable. Impacts can include disruption to foraging and roosting efficiency or deterring animals from using particular areas that may have been used prior to the works beginning (resulting in the effective reduction in habitat availability). This will be an incremental increase due to the pre-existing industrial activities and temporary during construction, therefore low risk.

5.6 Facilitated impacts

A facilitated impact is an indirect impact of a project, that has been made possible or facilitated by the realisation of a project, including impacts that occur outside of the proposed action area.

Following the construction of the relocated rail line, Aurizon will undertake the placement and laydown of the rail infrastructure (tracks, sleepers, etc.) and construction of traction power and signals. This, and the operation of the relocated rail line by Aurizon are facilitated by the project.

Facilitated impacts from the placement and laydown of rail infrastructure include disturbance caused by light and noise, fauna injury/mortality from vehicle strike, and increased human presence. These impacts will not be significant.

The operation of the rail line poses a collision risk to ground-dwelling fauna. However, these facilitated impacts are unlikely to be significant as the rail line is currently in operation. The Project will not facilitate a change in the usage of the rail line, only a change of location within ~ 2 km of the current rail line. The relocated rail line will pass through similar habitat to the existing rail line. There will be no change in operational impacts such fauna mortality or disturbance caused by light or noise.

The removal of the redundant rail line is also facilitated and will not have significant impacts. The existing rail corridor is already cleared, and materials required for removal will be stored within already disturbed areas. Removal of rail, sleepers, ballast, masts, wires and cables is a materials handling activity and unlike construction, will not involve clearing and earthworks. Any levelling of the old formation is expected to be on a localised basis (e.g. “punching through” for access roads and gas pipe installations) until the rehabilitation work to return to a post-mining landform is undertaken on a broader scale.

5.7 Unpredictability or irreversibility of impacts

The potential impacts resulting from the Project include:

- Vegetation clearance and associated habitat removal
- Habitat disturbance and degradation
- Fragmentation and edge effects including weed and pest animal incursions
- Fauna injury and/or mortality

These impacts involve well understood processes. The occurrence of MNES and their habitat within the proposed action area are well understood due to detailed site assessment, including four field-based assessments. As such, the likelihood, magnitude and severity of these impacts on MNES can be predicted with a high level of certainty. No impacts resulting from the Project are likely to be irreversible.

6 Avoidance and mitigation measures

The Project will implement the environmental mitigation hierarchy of avoid, minimise and mitigate impacts to relevant MNES throughout the construction phase of the Project. These measures will be realised through implementing a Construction Environmental Management Plan (CEMP).

6.1 Avoidance measures

Field surveys were undertaken early in the design process such that ecological constraints could be considered as part of design and the direct impact to MNES could be minimised. Results of the field survey, including validated areas of MNES values, were utilised in the planning of the rail and pipeline relocation. This included narrowing the design to the minimum area required to adequately construct the main (and ancillary pipeline) easement and co-locating the rail and pipeline as much as possible. The alignment of the rail and pipeline corridor was also altered after the Project was referred, to further reduce impacts to MNES by minimising the earthworks footprint and avoiding an area of MNES habitat (refer Section 2.4).

Avoidance by design has significantly reduced the areas of habitat to be fragmented by the project (see Section 2.4, Figure 2-1). Some fragmentation of patches of habitat within the proposed action area will occur. However, these patches of habitat are largely already fragmented by linear clearing (up to ~120 m wide). In most instances, the project will remove small areas of habitat (<2 ha) from the edge of already fragmented patches and is unlikely to increase the fragmentation of this habitat, result in patch isolation, or impact the functionality of these habitat patches.

Riparian corridors along the Isaac River, Teviot Brook and Skeleton Gully, which provide potential dispersal corridors and connect habitat within the proposed action area to the broader landscape have been avoided. This will enable species mobility across the proposed action area and connection to habitat in the broader landscape. Necessarily, the rail line crosses both Teviot Brook and Skeleton Gully in one location. However, a bridge crossing will be used across Teviot Brook and culvert crossing across Skeleton Gully to facilitate continued species mobility across the proposed action area.

6.2 Mitigation measures

The proponent has developed comprehensive mitigation strategies, which will be implemented in the Construction Environmental Management Plan (CEMP, Appendix 4) to reduce the risks to the environment. Specific mitigation measures for construction impacts are provided in the sections below.

6.2.1 Vegetation clearing

The potential impacts associated with vegetation clearing will be minimised through the following mitigation measures:

- Clearly demarcating the extent of vegetation clearing and areas to be retained prior to the commencement of clearing activities and throughout construction activities
- Ensuring pre-existing access tracks and non-remnant areas are utilised to prevent additional disturbance
- Implementing sensitive clearing techniques for impacted MNES species
- Salvaging fallen woody debris within proposed clearing areas and relocate to adjacent undisturbed habitats
- Utilising a suitably qualified spotter-catcher with authority to cease work prior to and during all clearing activities.

6.2.2 Construction-related impacts

Indirect impacts associated with construction will be managed through the following mitigation measures:

- Speed limits of 40 km per hour along access tracks to minimise potential for collision with native fauna
- Implementing erosion and sediment control (ESC) measures in accordance with industry standards
- All hazardous materials will be managed in accordance with standard operating procedures for transport, handling and storage as per applicable standards
- Ensure all vehicles and machinery are serviced, maintained and have noise attenuation (i.e. mufflers) to minimise machinery noise and vibration disturbance to species habitat
- Appropriate dust controls to be implemented throughout construction as required to prevent and minimise dust impacts.

The implementation of these measures will ensure that indirect impacts from construction activities do not result in significant impacts to MNES.

6.2.3 Pest and weed management

Weed and feral animal management protocols will include:

- Restriction of vehicle movement to existing tracks and disturbed areas
- Vehicle and equipment hygiene protocols to prevent population establishment and further incursions

Pest and weed management measures are further detailed in the CEMP (Appendix 4).

6.3 Revegetation

Excepting where needed for corrective actions the Project does not propose rehabilitation of cleared remnant vegetation, but rather revegetation / stabilisation of temporarily cleared areas. The objective of revegetation is to:

- Provide a stable surface that is not prone to erosion and/or dispersion; and

- Minimise treatments that require high maintenance (e.g. long grass).

All temporary disturbance areas will be revegetated (refer Figure 2-1). Revegetation will occur progressively, where temporary disturbance areas are no longer in use, and be completed at the completion of the construction phase, prior to operational handover.

Revegetation is the responsibility of the construction contractor to deliver and maintain during construction. This will require consultation with experts to provide revegetation consistent with regional best-practice and engagement of the parties responsible for operation (Aurizon and its contractors) to ensure areas are revegetated consistent with their own standards.

No long-term monitoring of revegetation is proposed as the Project relates only to construction activities. Anglo American has no legal access to the site following completion.

Additional information on the process of revegetation is described within the Construction Environmental Management Plan (CEMP).

6.4 Operation related impacts

The Project does not include the operation or maintenance of the rail line and pipeline. However, the project facilitates impacts from the operation of the rail line. The following section outlines the management measures undertaken by Aurizon Network (who operates the rail). The following information about the operation of the Central Queensland Coal Network (CQCN) has been sourced from Aurizon Network.

6.4.1 Collision risk

There are a range of native and domesticated animals (typically cattle) that could incur into the rail corridor. It is not practical to stop a train to prevent potential collisions as trains on the CQCN typically travel at ~80 km/hr and take approximately 2 km to come to a halt. If an animal is spotted on the rail line, drivers sound the trains horn to disperse the animal. If a collision does occur, and the train driver repots an animal as injured, efforts would be undertaken to recover the animal.

The CQCN is approximately 2,670 km in length. As such, it is not practical to provide and maintain koala exclusion fencing along the rail corridor. Such fencing typically consists of an approximately 1800 mm high chain-mesh fence with a continuous concrete basin plinth, and a 600 mmm continuous anti-climb sheeting component at its top edge.

Wildlife overpasses and overhead crossing structure, such as rope bridges, are also not constructed within the CQCN. This is due to Aurizon Network requirements for the avoidance of risks associated with incursions into the essential clearances of the high-voltage overhead traction power lines.

While collision with trains is a potential risk for koalas, there are limited records of this occurring across the CQCN, strongly indicating this in an extremely rare occurrence. Of the 23,912 data entries regarding collisions with animals across the CQCN since 01/07/2023, only 1 relates to an injured koala however is not confirmed to be caused by train strike. The overall risk to koalas from train collisions on the CQCN is therefore minimal.

Any incidences of collision with an animal will continue to be reported by Aurizon as per the CQCN protocol.

6.4.2 Maintenance

Aurizon Network undertakes routine maintenance of its rail corridor and infrastructure therein to ensure that continued safe operation of the CQCN.

As part of the regular routine maintenance works, full consideration of relevant legislative obligations is implemented through the implementation of various specific measures identified within Aurizon's Environmental Management Principle. Such measures include the preparation of Preliminary Environment and Planning Assessments (PEPAs) as part of works planning and the preparation of Construction Environmental Management Plans (CEMPs) as part of the delivery of actual works.

The preparation of PEPAs and CEMPs provides the opportunity for location-specific assessments of existing fauna to be undertaken, to ensure that proposed maintenance works will not result in any significant impacts to fauna.

Aurizon Network also maintains and implements approved Species Management Programmes (SMPs) for both high and low risk impacts on fauna habitat and breeding places.

7 MNES Occurrence

Remnant vegetation, high-value regrowth and threatened species habitat occur throughout the proposed action area. Ecological values, such as Threatened Ecological Communities (TECs), and threatened and migratory species (and/or their habitat), as listed under the EPBC Act, are present both in remnant and disturbed habitat, and are described below.

An EPBC Act Protected Matters Search Tool (PMST; 5 December 2024) report was generated to assess potential MNES that may occur within 15 km of the proposed action area boundaries. Table 7-1 provides a summary of the outcomes of the PMST search undertaken for the proposed action area and a brief overview of the MNES that have the potential to occur and/or be impacted by the Project. The full PMST is provided in Appendix 1.

The results of the desktop analysis and field assessments refined the PMST results and identified one threatened ecological community known to occur in the proposed action area, five listed threatened species, and three migratory birds known, likely or potentially occurring within the proposed action area (refer Appendix 2 – Likelihood of Occurrence).

Table 7-1: Matters of National Environmental Significance within the proposed action area

MNES	PMST results
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar Sites)	None
Great Barrier Reef Marine Park	None
Commonwealth Marine Areas	None
Listed Threatened Ecological Communities	PMST result – 4 threatened ecological communities Field surveys confirmed the following TEC as known to occur in the proposed action area: • Brigalow (*Acacia harpophylla* dominant and co-dominant) (Brigalow TEC) Field surveys confirmed the absence of the following TEC in the proposed action area: • Poplar Box Grassy Woodland on Alluvial Plains (Poplar Box TEC)
Listed Threatened Species	PMST result – 29 listed threatened species* Field surveys confirmed the following species as known, likely or potentially occurring in the proposed action area. Refer Table 7-2 and Appendix 2 for further analysis. • Known to occur:

MNES	PMST results
	○ Koala (*Phascolarctos cinereus*) ○ Greater glider (central and southern) (*Petauroides volans*) ○ Squatter pigeon (southern) (*Geophaps scripta scripta*) • Likely to occur: ○ Ornamental Snake (*Denisonia maculata*) • Potential to occur: ○ Australian painted snipe (*Rostratula australis*) • Unlikely to occur: ○ Bluegrass (*Dichanthium setosum*) ○ King bluegrass (*Dichanthium queenslandicum*) ○ Fitzroy River Turtle (*Rheodytes leukops*) ○ Latham's snipe (*Gallinago hardwickii*) ○ Star finch (eastern) (*Neochmia ruficauda ruficauda*)
Listed Migratory Species	PMST result – 9 listed migratory species Field surveys confirmed the following species as likely or potentially occurring in the proposed action area. • Likely to occur: ○ Fork-tailed swift (*Apus pacificus*) • Potential to occur: ○ Oriental Cuckoo (*Cuculus optatus*) ○ Glossy Ibis (*Plegadis falcinellus*)[3]

* The PMST returned 30 threatened species or ecological communities, including *Ptilotus uncinellus* as a 'species or species habitat known to occur within area'. This species was first listed on the EPBC Act in Sept 2024, after the section 75 decision which deemed the project a controlled action. Therefore this species is not considered in the Preliminary Documentation per section 158A of the Act. The remaining 29 species/communities are addressed below.

The PD RFI provides a list of species and TECs to be addressed in the assessment of the Project. Migratory species do not require assessment as per the PD RFI and are not a controlling provision for the Project, and consequently are not considered further.

An assessment of whether the Project has potential for impacts on each of the MNES with potential to occur in the proposed action area and if further assessment is required is presented in Table 7-2. Further assessment is required for MNES that have the potential to be significantly impacted by the Project, i.e., in order to understand whether the impacts are likely to be important, notable, or of consequence, having regard to their context or intensity (as per the definition of a 'significant impact'[4]).

[3] Glossy ibis was not identified in the PMST, however the species was recorded at three locations west of the proposed action area during field surveys in 2023/2024

[4] As per the definition in the MNES *Significant impact Guidelines 1.1 EPBC Act 1999* (DoE 2013b)

It was concluded with good confidence that impacts to MNES are unlikely to be significant when one or all of the following criteria were met. For these MNES, detailed assessments were not undertaken.

- Threatened ecological communities
  - No patches of the TEC will be directly impacted by the Project, and
  - Indirect impacts to the TEC are unlikely
- Threatened fauna species
  - No or negligible[5] habitat impacted by the Project, or
  - The Project will not result in loss of critical habitat and the proposed action area is unlikely to support an important population of the species
- Threatened flora species
  - No individuals or populations of the species will be directly impacted by the Project, and
  - Species are not cryptic and are likely to be detected through targeted surveys, and
  - Indirect impacts and/or risk of threatened flora individuals not captured during the baseline ecological surveys is addressed through implementation of mitigation measures described in section 6-2. Where deemed necessary, detailed impact assessment per the EPBC Act Significant Impact Guidelines (DoE 2013b) has been undertaken (refer Section 9).

[5] Habitat loss is defined as negligible when the proportion of habitat to be removed is minor in the context of proposed action area's likelihood to support a population of the species, considering the extent of preferred habitat available in the surrounding area, species reliance on the proposed action area (unlikely), and the species regional context (species and species habitat is found widely through the region, or, proposed action area is located outside the core range of the species).

Table 7-2: MNES species occurrence and impact assessment justification

Species	EPBC Act status	Presence in the proposed action area	Risk of impact	Further assessment required?
Threatened Ecological Communities				
Brigalow TEC	Endangered	**Known to occur** Patches of remnant RE 11.3.1 meeting diagnostic criteria and condition thresholds for Brigalow TEC have been ground-truthed along Skeleton Gully in the proposed action area	Potential	Yes – 7.8 ha of Brigalow TEC intersects the disturbance footprint.
Poplar Box TEC	Endangered	**Not Present** Patches of remnant RE 11.3.2 (associated with Poplar Box TEC) are present within the proposed action area. However, field verification found potential patches did not meet TEC condition thresholds.	Unlikely	No – no Poplar Box TEC is present within the disturbance footprint (refer Section 7.1)
Threatened Species				
Koala (*Phascolarctos cinereus*)	Endangered	**Known to occur** Habitat for the species has been mapped within the proposed action area. One individual was recorded during field surveys. Multiple records of the species within 10 km of the proposed action area.	Potential	Yes – 1.9 ha of breeding and foraging, and 46.2 ha of dispersal habitat intersects the disturbance footprint. Breeding and foraging habitat is considered habitat critical to the survival of the species.
Greater glider (central and southern) (*Petauroides volans*)	Endangered	**Known to occur** Denning/breeding and foraging/dispersal habitat for the species has been mapped within the proposed action area, including habitat critical to the survival of the species. Eight individuals were recorded during field surveys.	Potential	Yes – 1.0 ha of denning and breeding habitat, and 3.0 ha of foraging and dispersal habitat intersects the disturbance footprint. Habitat critical to the survival of the species is present within the proposed action area.

Species	EPBC Act status	Presence in the proposed action area	Risk of impact	Further assessment required?
Squatter pigeon (southern) (*Geophaps scripta scripta*)	Vulnerable	**Known to occur** Breeding and foraging/dispersal habitat for the species has been mapped within the proposed action area, including habitat critical to the survival of the species. Eighteen individuals were recorded during field surveys.	Potential	Yes – 0.05 ha of breeding habitat and 48.2 ha of foraging and dispersal pigeon habitat intersects the disturbance footprint.
Australian painted snipe (*Rostratula australis*)	Endangered	**Potential to occur** Potential foraging habitat for the species occurs within the proposed action area. No breeding habitat is present. The species has not been recorded within the proposed action area, with the closest recent record ~70 km to the south-east	Unlikely	Yes – 1.9 ha of foraging and dispersal habitat intersects the disturbance footprint. Further field surveys and analysis since the referral have downgraded the likelihood of this species from likely to occur to potential to occur. Further assessment of this species however has been requested as part of the RFI.
Ornamental Snake (*Denisonia maculate*)	Vulnerable	**Likely to occur** Suitable habitat, including important habitat for the species occurs within proposed action area. Species not recorded during field surveys, however there are multiple records of the species within 15 km.	Unlikely	Yes – 0.2 ha of ornamental snake habitat intersects the disturbance footprint. Important habitat (surrogate for important population) is present within the proposed action area.
Bluegrass (*Dichanthium setosum*)	Vulnerable	**Unlikely to occur** The proposed action area is not located within the species distribution and there are no records of the species within the proposed action area of within 10 km. The nearest record is located 64 km north-east of the proposed action area.	Unlikely	No – species was not recorded in the proposed action area and the proposed action area is outside of the species distribution (refer Section 7.1).

Species	EPBC Act status	Presence in the proposed action area	Risk of impact	Further assessment required?
King Bluegrass (*Dichanthium queenslandicum*)	Endangered	**Unlikely to occur** Potentially suitable habitat is present within areas mapped as brigalow woodland within the proposed action area. The species has been previously recorded ~15 km south of the proposed action area. However the species was not recorded within the proposed action area during targeted wet and dry season surveys and has been assessed as unlikely to occur within the potentially suitable habitat.	Unlikely	No – species was not recorded in the proposed action area despite targeted searches. Species is unlikely to occur within potentially suitable habitat. Due to the low likelihood of this species utilising habitat within the proposed action area, habitat for this species has not been explicitly mapped.
Fitzroy River Turtle (*Rheodytes leukops*)	Vulnerable	**Unlikely to occur** Species habitat is limited to flowing rivers with large deep pools, which are not present in the proposed action area. The are no records of the species within the proposed action area or within 10 km. The nearest record is located 119 km south-east of the proposed action area.	Unlikely	No – species was not recorded in the proposed action area and the proposed action area lacks suitable habitat for the species (refer Section 7.1).
Latham's snipe (*Gallinago hardwickii*)	Vulnerable, migratory	**Unlikely to occur** Marginal habitat in proposed action area. The rail corridor is largely eucalypt woodland with large areas of open grassland. The rail corridor lacks freshwater wetlands, heathlands, or bogs. Species not recorded during field surveys despite targeted searches. The nearest record is ~45 km from the proposed action area.	Unlikely	No – species was not recorded in the proposed action area and marginal habitat only is available. Due to the low likelihood of this species utilising habitat within the proposed action area, habitat for this species has not been explicitly mapped.

Species	EPBC Act status	Presence in the proposed action area	Risk of impact	Further assessment required?
Star finch (eastern) (*Neochmia ruficauda ruficauda*)	Endangered	**Unlikely to occur** Freshwater sources, cleared areas and grassy woodlands are present. However, overabundance of feral deer trampling habitat make this unsuitable and not preferred habitat. The species was not recorded during field surveys. There are no records of the species in the region in the last 20 years, with the subspecies considered possibly extinct by experts (Garnett and Baker 2021).	Unlikely	No – species was not recorded in the proposed action area and is possibly extinct. Species is unlikely to occur within potential habitat. Potential habitat is of poor quality because of cattle grazing and trampling by feral deer. Due to the low likelihood of this species utilising habitat within the proposed action area, habitat for this species has not been explicitly mapped.

7.1 MNES unlikely to occur and not requiring further assessment

The PD RFI requires consideration of one TEC that is absent from the proposed action area and two species that are not considered likely to occur within the proposed action area. These species are addressed briefly below, however are not subject to further assessment.

7.1.1 Poplar Box TEC

Poplar Box TEC occurs to the west of the Great Dividing Range, typically at less than 300 m above sea level. Its distribution is scattered within the areas south of Charters Towers (QLD), north of Leeton (NSW), west of Ipswich (QLD)/Armidale (NSW), and east of Longreach (QLD)/Hillston (NSW).

Poplar Box TEC is a typically grassy woodland with a canopy dominated by *Eucalyptus populnea* and an understorey of grasses and other herbs (DoEE 2019). The community occurs mostly on flat to gently undulating landscapes, on a wide range of alluvial and depositional soil types (DoEE 2019).

Within QLD, Poplar Box TEC is associated with Land Zone 3 and Land Zone 4. The following REs may comprise Poplar Box TEC if diagnostic criteria and condition thresholds are met:

- RE11.3.2 *Eucalyptus populnea* woodland on alluvial plains
- RE11.3.17 *Eucalyptus populnea* woodland with *Acacia harpophilla* and/ or *Casuarina cristata* on alluvial plains
- RE11.4.7 *Eucalyptus populnea* with Acacia harpophyylla and/or Casuarina cristata open forest to woodland on Cainozoic clay plains
- RE11.4.12 *Eucalyptus populnea* woodland on Cainozoic clay plains
- RE12.3.10 *Eucalyptus populnea* woodland on alluvial plains

Patches of potential Poplar Box TEC within the proposed action area comprised patches of RE 11.3.2. Key diagnostic criteria and condition thresholds set out in the TEC conservation advice (DoEE 2017), are used to identify patches of the TEC and distinguish between patches of different quality. An analysis of the patches of RE 11.3.2 within the proposed action area against key diagnostic criteria and condition thresholds is presented in Table 7-3 and Table 7-4 (ERM 2024). .

No areas meeting the diagnostic criteria and condition thresholds for Poplar Box TEC are present within the proposed action area (Appendix 3 – ERM 2024). The proposed action area has historically been used for grazing and mining activities. These activities have resulted in the clearing and degradation of some areas that would have historically constituted Poplar Box TEC.

Table 7-3: Poplar Box TEC key diagnostic criteria and condition thresholds

Key diagnostic characteristics	Application to the proposed action area
Location and physical environment: • Occurs in the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar Peneplains, Darling Riverine Plains, NSW South Western Slopes, Riverina and Murray Darling Depression IBRA bioregions. • Associated with ancient and recent depositional alluvial plains with clay, clay-loam, loam and sandy loam, typically duplex soils or sodosols. This includes areas that may not be part of currently defined floodplains.	The proposed action area is located within the Brigalow Belt North bioregion. The Geology of the proposed action area is primarily sedimentary and colluvium soils of the Suttor Formation and quaternary alluviums associated with the Isaac River and tributaries. The landform is dominated by sandy loams on flat plains. Poplar Box may be present within areas on land zone 3 and 4 in the proposed action area
AND	

Structure:
• A grassy woodland to grassy open woodland with a tree crown cover of 10% or more at patch scale.
• A tree canopy must be present that shows these features:
  ○ Canopy tree species are capable of reaching 10 m or more in height;
  ○ *Eucalyptus populnea* (Poplar Box) must be present in the canopy and is the dominant tree species;
  ○ Where hybrids of Poplar Box with other *Eucalyptus* spp are present, they should be counted as part of the *Eucalyptus populnea* component of the tree canopy when assessing the previous criterion.
• Mid layer (1-10 m) crown cover of shrubs to small trees is low, about 30% or less.
• A ground layer (<1 m) mostly dominated across a patch by native grasses, other herbs and occasionally chenopods (during extended dry periods), ranging from sparse to thick (in response to canopy development, soil moisture, disturbance and/or management history).
• A list of diagnostic native plant species and some of the key native fauna that make up the ecological community is given at Appendix A; although particular species may be abundant or rare, or not necessarily present, at every location
	Within the proposed action area, the following REs may constitute Poplar Box TEC:
	• Remnant RE 11.3.2

Table 7-4: Assessment of Poplar Box patches against condition thresholds

Category	Condition thresholds	Patch assessment within the proposed action area
Category A1. Little to no perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is ≥10% **AND** ≥ 90% of perennial vegetation cover in the ground layer is native **AND** ≥ 30 native plant species per patch in the ground layer **AND** patch size is ≥ 1 ha	Potential patches lack required ≥ 90% of perennial vegetation cover and ≥ 30 native plant species in ground layer
Category A2. A large patch with low perennial weeds and diverse native understorey	The crown cover of canopy trees in the patch is ≥10% **AND** ≥70% of perennial vegetation cover in the ground layer is native **AND** ≥ 30 native plant spp. per patch in the ground layer **AND** patch size is ≥ 5 ha	Potential patches lack required ≥ 70% of perennial vegetation cover and ≥ 30 native plant species in ground layer
Category B. A large patch with good quality native understorey or with mature trees	The crown cover of canopy trees in the patch is ≥10% **AND** ≥ 50% of perennial vegetation cover in ground layer** is native **AND EITHER** ≥ 20 perennial native plant species per patch in the ground layer **OR** ≥ 10 mature trees+ per ha with ≥ 30cm dbh*** (and/or hollows) **AND** patch size is ≥ 5 ha	Potential patches lack required ≥ 50% of perennial vegetation cover and ≥ 20 native plant species in ground layer
Category C A large patch with low native cover but retains good native understorey diversity and habitat features of mature trees	The crown cover of canopy trees in the patch is ≥10% **AND If** < 50% of perennial vegetation cover in ground layer is native, then the patch **must** have: ≥ 20 native plant spp. per patch in the ground layer **AND** ≥ 10 mature trees+ per ha with ≥ 30cm dbh (and/or hollows) **AND** smaller trees+, saplings or seedlings suggestive of periodic recruitment **AND** patch size is ≥ 5 ha	Potential patches lack required ≥ 20 native plant species in ground layer

7.1.2 Bluegrass (*Dichanthium setosum*)

Dichanthium setosum is listed as Vulnerable under the EPBC Act (DEWHA 2008a). *Dichanthium setosum* occurs mainly on the northern tablelands of NSW in the Saumarez area west of Armidale, and in an area 18-30 km east of Guyra (DEWHA 2008a). Within Queensland *Dichanthium setosum* is known from the Leichhardt, Morton, North Kennedy and Port Curtis regions.

Dichanthium setosum grows on heavy basaltic black soils and red-brown loams with clay subsoil, often in gilgai (DEWHA 2008a). It occurs in woodland or open woodland, usually dominated by brigalow and/or *Eucalyptus* species. It is often found in moderately disturbed areas including cleared woodland, roadsides, and pastures. It is unknown whether the species tolerates, or is promoted by disturbance, or whether it's presence in disturbed areas is an indication of degradation of its depleted of habitat (DEWHA 2008a).

Within the proposed action area, 12.8 ha of Brigalow vegetation (RE 11.4.9) provides potentially suitable habitat for the species. However, the proposed action area is outside of the species known distribution (DCCEEW 2024). The closest publicly available record of the species is 67 km to the north-east of the proposed action area, recorded in 2006 (ALA 2024). The species has not been recorded within the proposed action area or surrounds in field surveys, despite extensive dry and wet season surveys. As such, *D. setosum* is unlikely to occur within the proposed action area and unlikely to be impacted by the project.

7.1.3 Fitzroy River Turtle (*Rheodytes leukops*)

Fitzroy River Turtle is listed as Vulnerable under the EPBC Act (DEWHA 2008b). The Fitzroy River Turtle occurs only within the Fitzroy River and its tributaries (DEWHA 2008b). The species inhabits flowing rivers with large deep pools connected by shallow riffles and rocky, gravelly, or sandy substrates (DEWHA 2008b). They prefer areas with high water clarity, often associated with Ribbonweed beds.

Species habitat is limited to flowing rivers with large deep pools, which are not present in the proposed action area. The proposed action area contains ephemeral waterways only; Teviot Brook (stream order 4) and Skeleton Gully (stream order 3), both of which lack large deep pools and consistent flow. The Isaac River immediately to the west of the proposed action area also lacks sufficient flow to provide habitat for the species. The Fitzroy River turtle has not been recorded in the Isaac River (ALA 2024). The nearest record is located 119 km south-east of the proposed action area. As such, the Fitzroy River Turtle is unlikely to occur within the proposed action area and unlikely to be impacted by the project.

8 Guidance relevant to the impact assessment

In addition to the statutory requirements of the EPBC Act, the following guidance has been considered in assessing the significance of potential impacts to MNES associated with the proposed action area.

8.1 Significant impact guidelines

The *MNES Significant Impact Guidelines 1.1* (DoE 2013b) provide overarching guidance on determining whether an action is likely to have a significant impact on a matter protected under the EPBC Act and whether a referral is required for a decision by the Australian Government Minister for the Environment on whether assessment and approval is required.

The analysis has largely been formulated based on the approach to impact assessment under the EPBC Act. It brings together an understanding of environmental values and types of potential impacts in order to analyse the effect on MNES. There are a number of concepts which are commonly applied under the EPBC Act to assess the significance of impacts to MNES. These are defined in *MNES Significant Impact Guidelines* (DoE 2013b). In accordance with these guidelines, the assessment in this PD is presented within the context of the following key concepts:

- Habitat critical to the survival of a species
- A population – this relates particularly to groups of Endangered or Critically Endangered listed species under the EPBC Act
- An important population – this relates particularly to species listed as Vulnerable under the EPBC Act.

The meaning of these concepts is defined in the text box below.

WHAT IS HABITAT CRITICAL TO THE SURVIVAL OF A SPECIES?

Habitat critical to the survival of a species refers to areas that are necessary:

- For activities such as foraging, breeding, roosting or dispersal;
- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or
- to maintain genetic diversity and long term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a Recovery Plan for the species or ecological community as habitat critical for the species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act.

WHAT IS A POPULATION OF A SPECIES?

A 'population' is an occurrence of the species in a particular area. In relation to critically endangered, endangered, or vulnerable threated 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

WHAT IS AN IMPORTANT POPULATION OF A SPECIES?

An 'important population' is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in Recovery Plans and/or that are:

- key source population either for breeding or dispersal;
- population that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range

Source: DoE 2013b

8.2 Approved Conservation Advice and Recovery Plans

Approved Conservation Advice and Recovery Plans are in place for the MNES considered for detailed impact assessment in the sections below. These guidance documents can identify overall conservation objectives, critical habitat, important populations, key threats and priority management actions. They are also relevant to the assessment process as the Minister must consider the content of approved

Conservation Advices and must not act inconsistently with a Recovery Plan when considering whether to approve a Project.

Relevant guidance for species under impact assessment is noted in the below tables (note that other guidance and species objectives may exist but are not considered relevant for this PD).

Table 8-1: Koala guidance

Guidance	Objectives or priorities
Conservation Advice for koala (*Phascolarctos cinereus*) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE 2022a)	The updated Conservation Advice for koala provides direction on the conservation and recovery for the species and informs and supports the National Recovery Plan for koala. Objectives and priorities of the Conservation Advice for koala are reflected in the National Recovery Plan, refer below.

National Recovery Plan for koala (DAWE 2022b)	Recovery objectives:
	• Stabilise and increase the area of occupancy and estimated size of populations that are declining, suspected to be declining, or are predicted to decline
	• Maintain or increase the area of occupancy and estimated size of populations that are suspected and predicted to be stable
	• Maintain or improve metapopulation processes. Performance criteria include:
	  ○ Indicators of population health (genetic and disease)
	  ○ Indicators of ecosystem health
	  ○ Increase the role and capabilities of partners, communities and individuals in koala monitoring, conservation and management

Table 8-2: Greater glider (southern and central) guidance

Guidance	Objectives or priorities
Conservation Advice for *Petauroides volans* (greater glider (southern and central)) (DCCEEW 2022a)	Habitat loss, disturbance and modification (including fire) • Ensure that eucalypt forests and the impacts of disturbance (including fire) are managed to prevent them transitioning to less nutritious, hotter, and/or more fire-prone plant communities, and to ensure that food tree species preferred by the greater glider (southern and central) continue to be the dominant canopy trees. • Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat

Guidance	Objectives or priorities
	connectivity, to sustain viable subpopulations throughout the species' range. • Protect hollow-bearing trees on private property, roadside reserves, and along the edges of roads/tracks. • Revise mitigation and offset guidelines for development and linear infrastructure (e.g. pipelines, transport corridors) to reflect the limited effectiveness of artificial structures (nest boxes, glide poles) as mitigation actions for loss, degradation or fragmentation of greater glider habitat. Climate change • Protect all habitat likely to be climate change refuges, including sites buffered against desiccating conditions (e.g. sheltered and/or on south-facing aspects), under future climate change scenarios. Where possible, maintain or establish connectivity with other habitat in order to facilitate movement. Stakeholder engagement • Seek stakeholder input into assessment and planning processes that include protections for the greater glider (southern and central) and its habitat

Table 8-3: Squatter Pigeon (southern) Guidance relevant to the Project

Guidance	Objectives or priorities
Conservation Advice for squatter pigeon (southern) (*Geophaps scripta scripta*) (TSSC 2015)	Conservation and Management Actions: • Identify sub-populations of high conservation priority, especially in the southern part of the squatter pigeon's (southern) range. • Protect and rehabilitate areas of vegetation that support important sub-populations. • Protect sub-populations of the listed subspecies through the development of covenants, conservation agreements or inclusion in reserve tenure. • Develop and implement a stock management plan for key sites. • Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the squatter pigeon (southern). • Raise awareness of the squatter pigeon (southern) within the local community, particularly among land managers.

Table 8-4: Australian Painted Snipe Guidance relevant to the Project

Guidance	Objectives or priorities
Conservation Advice for *Rostratula*	Habitat loss, disturbance, and modification:

Guidance	Objectives or priorities
australis (Australian painted snipe) (DSEWPC 2013)	• Ensure there is no disturbance in areas where the species is known to breed, excluding necessary actions to manage the conservation of the species. • Minimise adverse impacts from land use at known sites. • Manage any changes to hydrology that may result in changes to water table levels, run-off, salinity, algal blooms, sedimentation or pollution. • Manage any disruptions to water flows. Invasive Weeds • Implement the Parkinsonia (Parkinsonia aculeata) Strategic Plan (Commonwealth of Australia 2000) for the control of this species within the range of the Australian painted snipe. • Identify and remove weeds in wetland areas that could become a threat to the Australian painted snipe, using appropriate methods. • Ensure chemicals or other mechanisms used to eradicate weeds do not have a significant adverse impact on the Australian painted snipe. Fire • Develop and implement a suitable fire management strategy for the habitat of the Australian painted snipe.
National recovery plan for the Australian Painted Snipe (*Rostratula australis*) (DCCEEW 2022b)	Recovery objective: • By 2032, sustain a positive population trend (compared to 2020 baseline counts) in the number of mature individuals of the Australian Painted Snipe Strategies to achieve objective: • Manage and protect known Australian Painted Snipe habitat at the landscape scale • Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions • Reduce or eliminate threats at breeding and non-breeding habitats • Undertake research to improve knowledge of the habitat requirements, biology and behaviour of Australian Painted Snipe • Engage community stakeholders to improve awareness of the conservation of Australian Painted Snipe • Coordinate, review and report on recovery process

Table 8-5: Ornamental Snake Guidance relevant to the Project

Guidance	Objectives or priorities
Conservation Advice for *Denisonia maculata* (Ornamental Snake) (DoE 2014)	Habitat Loss, Disturbance and Modification • Identify populations of high conservation priority. • Investigate formal conservation arrangements, management agreements and covenants on private land, and for crown and private land investigate inclusion in reserve tenure if possible. • Minimise adverse impacts from land use at known sites. Animal Impacts • Control introduced pests such as pigs to manage threats at known sites. • Develop and implement a management plan for the control of Cane Toads in the region.

Table 8-6: Brigalow TEC Guidance relevant to the Project

Guidance	Priority recovery and threat abatement actions
Conservation Advice for the Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community (DoE 2013a)	• Threat reduction/control, including protection from clearing, and managing threats including fire, weeds, foxes and cats, and noisy miners. • Land management, including stock management, regeneration and revegetation, reservation of high quality patches, water management, sediment, erosion and pollution control • Management for wildlife, including retention of microhabitat features, regeneration close to areas of existing woodland, and retention of regrowth. • Develop and propagate conservation information

Table 8-7: Poplar Box TEC Guidance relevant to the Project

Guidance	Objectives or priorities
Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains (DoEE 2019)	Protect • Preventing vegetation clearance and direct habitat degradation • Preventing weeds, feral animals, tree dieback and other diseases • Fire management • Preventing grazing damage • Enhance resilience to climate change Restore • Restoration of patches, corridors, and linkages using optimal restoration strategies • Control and eradicate invasive species and diseases

8.3 Threat abatement plans

Threat abatement plans (TAPs) establish national frameworks to guide and coordinate Australia's response to threats to biodiversity. These documents identify research, management and other priority actions required to ensure the protection of threatened species and ecological communities. The Australian Government develops and facilitates the implementation of the plans through the establishment of partnerships and cooperative programs. When considering the approval of the Project, the Minister must not act inconsistently with a TAP.

TAPs and their relevance to the Project are presented in Table 8-8.

Table 8-8: Threat abatement plans relevant to the Project

TAP	Objectives	Project consistency
Threat abatement plan for predation by feral cats (DoE 2015)	1. Effectively control cats in different landscapes	Not directly applicable to the Project.
	2. Improve effectiveness of existing control options for feral cats	Not directly applicable to the Project
	3. Develop or maintain alternative strategies for threatened species recovery	Not directly applicable to the Project
	4. Increase public support for feral cat management and promote responsible cat ownership	Not directly applicable to the Project
Threat abatement plan for competition and land degradation by rabbits (DoEE 2016)	1. Strategically manage rabbits at the landscape scale and suppress rabbit populations to densities below threshold levels in identified priority areas	Not directly applicable to the Project
	2. Improve knowledge and understanding of the impact of rabbits and their interactions with other species and ecological processes	Not directly applicable to the Project
	3. Improve the effectiveness of rabbit control programs	Not directly applicable to the Project
	4. Increase engagement of, and awareness by, the community of the environmental impacts of rabbits and the need for integrated control	Not directly applicable to the Project
Threat abatement plan for predation by the European red fox (DEWHA 2008b)	1. Prevent foxes occupying new areas in Australia and eradicate foxes from high-conservation-value 'islands'	Not directly applicable to the Project
	2. Promote the maintenance and recovery of native species and ecological communities that are affected by fox predation	Not directly applicable to the Project
	3. Improve knowledge and understanding of fox impacts and interactions with other species and other ecological processes	Not directly applicable to the Project
	4. Improve the effectiveness, target specificity, integration and humaneness of control options for foxes	Not directly applicable to the Project

TAP	Objectives	Project consistency
	5. Increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage foxes.	Not directly applicable to the Project
Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (DSEWPC 2011c)	1. to identify priority native species and ecological communities (including those that are protected matters under the EPBC Act) at risk from the impact of cane toads.	Not directly applicable to the Project
	2. to reduce the impact of cane toads on populations of priority native species and ecological communities.	Not directly applicable to the Project
	3. to communicate information about cane toads, their impacts and the TAP.	Not directly applicable to the Project
Threat abatement plan for competition and land degradation by unmanaged goats (DEWHA 2008c)	1. prevent unmanaged goats occupying new areas in Australia and eradicate them from high conservation-value 'islands'	Not directly applicable to the Project
	2. promote the maintenance and recovery of native species and ecological communities that are affected by competition and land degradation by unmanaged goats	Not directly applicable to the Project
	3. improve knowledge and understanding of unmanaged goat impacts and interactions with other species and other ecological processes	Not directly applicable to the Project
	4. improve the effectiveness, target specificity and humaneness of control options for unmanaged goats, and	Not directly applicable to the Project
	5. increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control unmanaged goats.	Not directly applicable to the Project
Threat abatement plan for disease in natural ecosystems caused by *Phytophthora*	1. Identify and prioritise for protection biodiversity assets that are, or may be, impacted by Phytophthora.	Not directly applicable to the Project
	2. Reduce the spread and mitigate the impacts of Phytophthora to protect priority biodiversity assets and susceptible landscapes priority biodiversity assets	Not directly applicable to the Project, however weed management will be

TAP	Objectives	Project consistency
cinnamomi (DoEE 2018)		implemented in accordance with the mitigation measures in section 6-2.
	3. Inform and engage the community by promoting information about Phytophthora, its impacts on biodiversity and actions to mitigate these impacts.	Not directly applicable to the Project
	4. Encourage research on Phytophthora species and options to manage infestations and protect biodiversity assets.	Not directly applicable to the Project
Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (DoEE 2017)	1. Prioritise key species, ecological communities, ecosystems and locations across Australia for strategic feral pig management	Not directly applicable to the Project
	2. Encourage the integration of feral pig management into land management activities at regional, state and territory, and national levels	Not directly applicable to the Project
	3. Encourage further scientific research into feral pig impacts on nationally threatened species and ecological communities, and feral pig ecology and control	Not directly applicable to the Project
	4. Record and monitor feral pig control programs, so their effectiveness can be evaluated	Not directly applicable to the Project
	5. Build capacity for feral pig management and raise feral pig awareness amongst landholders and land managers, and	Not directly applicable to the Project
	6. Improve public awareness about feral pigs and the environmental damage and problems they cause, and the need for the feral pig control.	Not directly applicable to the Project
Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five	1. develop an understanding of the extent and spread pathways of infestation by the five listed grasses	Not directly applicable to the Project, however weed mapping has been undertaken as part of baseline surveys
	2. support and facilitate coordinated management strategies through the design of tools, systems and guidelines	Not directly applicable to the Project

TAP	Objectives	Project consistency
listed grasses (DSEWPC 2012)	3. identify and prioritise key assets and areas for strategic management	Not directly applicable to the Project
	4. build capacity and raise awareness among stakeholders	Not directly applicable to the Project
	5. implement coordinated, cost-effective on-ground management strategies in high-priority areas	Not directly applicable to the Project
	6. monitor, evaluate and report on the effectiveness of management programs.	Not directly applicable to the Project

8.4 International Obligations

8.4.1 Convention on Biological Diversity

The Convention on Biological Diversity (CBD) is a convention signed by 150 government leaders at the 1992 Rio Earth Summit and is dedicated to promoting sustainable development. The convention has three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. Under the convention, governments are required to develop national biodiversity strategies and action plans, which are to be integrated into broader national plans for environment and development.

Australia released their latest CBD strategy and action plan in 2019 – Australia's Strategy for Nature 2019 – 2030. This strategy is the overarching framework for all national, state and territory, and local biodiversity related policies, legislation, and actions. The strategy has three goals which are underpinned by twelve objectives. These goals and objectives were designed to meet Australia's international commitments under the Convention on Biological Diversity (Aichi biodiversity targets), and the sustainable development goals.

In December 2019, the Kunming-Montreal Global Biodiversity Framework replaced the CBD's Strategic Plan for Biodiversity and it's Aichi Targets. The framework comprises 4 global 2050 goals and 23 global 2030 targets which area broken up into 4 broad topics aligning with the goals.

As part of this, Australia has committed to:

- Protect and conserve 30 per cent of land and 30 per cent of oceans by 2030 (30 by 30).
- Zero new extinctions, including through the $224 million Saving Native Species program.
- Real and significant climate action, including support for private investment in natural capital and nature-based solutions for climate adaptation.
- Working to establish a Nature Repair Market, supporting landholders in Australia to conserve, protect and restore nature.

Actions to implement these commitments are included in the *2022-2032 Threatened Species Action Plan* (DCCEEW 2022c).

The Project will require the removal of 78.4 ha of remnant and regrowth vegetation, including habitat for threatened species and ecological communities. Application of the mitigation hierarchy (refer Section 6) will ensure that impacts from the Project are minimised.

Overall, the Project is considered consistent with Australia's obligations under the CBD.

8.4.2 Convention on Conservation of Nature in the South Pacific (Apia Convention)

The Apia Convention is a multilateral environmental agreement which was signed in Apia on 12 July 1976, and entered into force on 26 June 1990. The Convention commits the signing parties, including Australia, to take action for the conservation, utilisation and development of the natural resources of the South Pacific region. Commitments under the Convention include:

- Undertake to create protected areas to safeguard representative samples of natural ecosystems, superlative scenery, striking geological formations and regions and objects of aesthetic, historic, cultural or scientific value (art.2);
- Commit to not alter national parks so as to reduce their area except after the fullest investigation; their resources are not to be subject to commercial exploitation; hunting and collection of species are to be prohibited and provision is to be made for visitors (art. 3);
- Agree to maintain lists of indigenous fauna and flora in danger of extinction and to give such species as complete protection as possible (art. 5); and
- Provision may be made as appropriate for customary use of areas and species in accordance with traditional cultural practices (art. 6).

Many of these commitments have been superseded by commitments under the CBD.

As above, the Project is considered consistent with Australia's obligations under the Apia Convention.

8.4.3 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement aimed to protect wild populations of plants and animals from threat caused by international trade. Australia is a signatory of CITES. Approximately 5,600 species of animals and 30,000 species of plants are listed under CITES.

The project does not involve the trading of species of plants or animals and will not facilitate the illegal trade of any plants or animals.

9 Threatened Species impact assessment

9.1 Summary of impact assessment

The Project is unlikely to have a significant residual impact to MNES.

The Project has the potential to impact a number of threatened species and ecological communities listed under the EPBC Act. A preliminary assessment of which species may be impacted by the Project is presented in Section 7. A detailed impact assessment using relevant policy guidance has been undertaken for two mammals, two birds, one reptile, and one TEC in the following sections. Table 9-1 below presents a summary of the residual impact assessment for each MNES.

Table 9-1: Summary of predicted residual impacts to MNES

MNES	Presence in proposed action area	Area of impact	Significant residual impact outcomes
Species			
Koala	Known	1.9 ha of breeding and foraging habitat 46.2 ha of dispersal habitat	Unlikely
Greater glider	Known	1.0 ha of denning and breeding habitat 3.0 ha of foraging and dispersal habitat	Unlikely
Squatter pigeon	Known	0.05 ha of breeding habitat 48.2 ha of foraging and dispersal habitat	Unlikely
Australian painted snipe	Potential	1.9 ha of habitat	Unlikely
Ornamental snake	Potential	0.2 ha of habitat	Unlikely
TEC			
Brigalow TEC	Known	7.8 ha	Unlikely

9.2 Koala (*Phascolarctos cinereus*)

Koala (*Phascolarctos cinereus*) is listed as endangered under the EPBC Act.

9.2.1 Key outcomes of the assessment

- Koala is known to occur, with the species recorded in 2023 in woodland adjacent to the proposed action are boundary.
- The proposed action area includes both foraging and breeding habitat, and dispersal habitat for koala, with the vast majority of habitat present being dispersal habitat.
- The Project will result in the removal of 1.9 ha of breeding and foraging habitat, and 46.2 ha of dispersal habitat.
- An assessment against EPBC Act significant impact criteria concludes that significant residual impacts to koala are unlikely.

9.2.2 Ecology and distribution

Koala occurs in predominantly *Eucalyptus* species-dominated forests and woodlands of eastern Australia (DAWE 2022a). Its distribution is fragmented across Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia (DAWE 2022a). The endangered population of koalas spans inland and coastal areas from the Herberton area in northern Queensland, westwards into central Queensland and down into New South Wales and the Australian Capital Territory. The species includes populations not listed as threatened under the EPBC Act in Victoria and South Australia where it is more widespread (DAWE 2022a).

The species is dependent on *Eucalyptus* and closely related genera dominated forests and woodlands for breeding, foraging and shelter (DAWE 2022a). In semi-arid environments, in the western parts of the species' range, koalas inhabit eucalypt-dominated forests and woodlands primarily in association with, or proximal to, riparian communities and/or groundwater dependent ecosystems (GDEs) (Kerswell et al. 2020).

Koalas are a mobile species, however, move little under most conditions, spending up to 20 hours a day inactive (Ellis et al. 2009; Ryan et al. 2013). Koalas will sometimes remain in the same tree from one day to the next, however will usually move between trees (Matthews 2016; Ellis et al. 2002). Daily movements typically range between a few meters and a few hundred meters as individuals move across the ground between different foraging and shelter trees (Matthews et al. 2016; Ellis et al. 2009).

Juvenile koalas are known to disperse over distances of typically 1 to 3 kilometres but sometimes up to 10 km or more from their natal area (where they were born) (White 1999; Dique et al. 2003; Matthews et al. 2016). Most koalas disperse between the ages of 20 and 36 months old, and dispersal occurs only between June and December (Dique et al. 2003). This dispersal takes place over a period of weeks to months as individuals move between different areas or patches of habitat to their breeding home range (Dique et al. 2003; Matthews et al. 2016).

Koalas have specialist food, habitat, and environmental requirements which determine their natural range (DAWE 2022a). Their habitats are typically characterised by eucalypt-dominated forests and woodlands, but they have a diverse range of habitat associations across the different bioregions of their range (DAWE 2022a). Key habitat requirements for koalas include:

- Presence of one or more palatable tree species (not always as the dominant species) occurring in a landscape that provides reliable leaf moisture
- Complexity of habitat structure allowing koalas to avoid predators, and/or mitigate the stresses of high temperature or high humidity
- A landscape of sufficient extent to allow a widespread population to persist and interact.

Habitat for koala can be considered the total set of resources required by koalas to meet the needs of individual survival and reproduction (DAWE 2022b). At the individual scale, habitat can be considered as what is required for individual koalas to meet their food and shelter requirements.

Primarily, within the species distribution, habitat for koala may be determined by the presence of suitable foraging trees (DAWE 2022b; Youngentob et al. 2021). Locally important koala trees (LIKT) are defined as trees from a species that is regularly browsed by koalas in a particular koala management bioregion, such that it could be considered a substantial portion of the koala's diet (Youngentob et al. 2021). The presence of LIKT can be used in conjunction with appropriate koala assessment methods, to determine whether an area is likely to be koala habitat.

Ancillary habitat elements such as shelter vegetation are also important aspects of koala habitat (Youngentob et al. 2021). Many suitable foraging trees are also used for shelter by the species. However, there are a number of trees which koala rarely or never feed on, which may provide valuable shelter due to structural attributes that provide shade or thermoregulation (Youngentob et al. 2021). These ancillary habitat trees (those not commonly recognised as important food) should be considered alongside palatable feed trees (though with less weight) when determining habitat for koala, as both provide essential habitat resources for koala (Youngentob et al 2021). It is important to note, that a forest/woodland in which all trees generally have low palatability (even if commonly used shelter trees), is unlikely to sustain a population of koalas. As such, ancillary habitat trees do not provide habitat for koala in the absence of LIKT (Youngentob et al. 2021).

In fragmented landscapes, koalas are able to move across areas of non-habitat (cleared areas) to reach new patches of habitat (Ramsay 1999; White 1999; Rus et al. 2021). While the lack of intervening vegetation does not directly pose a barrier to movement to koala (White 1999), crossing large open areas likely has a significant cost, with increased energetic costs and increased predation risk (Crowther et al. 2022; Dique et al. 2003).

The use of scattered habitat trees (such as paddock trees, or habitat trees within peri-urban areas) as stepping stones between patches of habitat is well documented (Barth et al. 2020; Youngentob et al. 2021). The use of these trees reduces the cost (energetic and predation risk) of crossing open areas between habitat patches, and effectively extends the area that may be used by a koala with its home range, allowing them to persist in highly fragmented landscapes (DAWE 2022b; Youngentob et al. 2021). These scattered trees may contribute to the suite of trees that forms a koala's habitat within each individual's home range in some landscapes, and can also provide shelter and food resources allowing for greater dispersal distances across the landscape (Youngentob et al. 2021).

It is important to note that individual koala food trees in a landscape do not constitute habitat for the species as they are insufficient to support a koala, let alone a population of koala (Youngentob et al. 2021). The density of scattered trees is also likely important for encouraging their use (Barth et al. 2020), with koalas only moving up to a couple of hundred meters each day. The inclusion of scattered habitat trees as habitat for koala should be considered in the context of connectivity with areas of habitat providing adequate foraging and shelter resources.

9.2.3 Presence in the proposed action area

No koalas or koala scats were recorded within the proposed action area during field surveys. However, the species was observed in open eucalyptus woodland adjacent to the proposed action area boundary in 2023.

One individual was also recorded in RE 11.5.3 along a tributary of the Isaac River, approximately 9 km to the south of the proposed action area in 2024. Scats were also recorded at two locations in remnant RE 11.5.3 and RE 11.4.8, approximately 3.5 km west of the proposed action area. Extensive survey effort yielded low return of direct and indirect observations, indicating koala density within the area is likely to be very low (ERM 2024).

An additional 12 publicly available records of the species since 1980 exist within 15 km of the proposed action area boundary (ALA 2024) (Table 9-2, Figure 9-1).

Table 9-2: Publicly available records of koala within 15 km of the proposed action area

Year	No. records	Habitat	Source
2015	1	Unknown	ALA
2018	3	Unknown	ALA
2019	5	Unknown	ALA
2020	1	Unknown	ALA
2023	2	Unknown	ALA

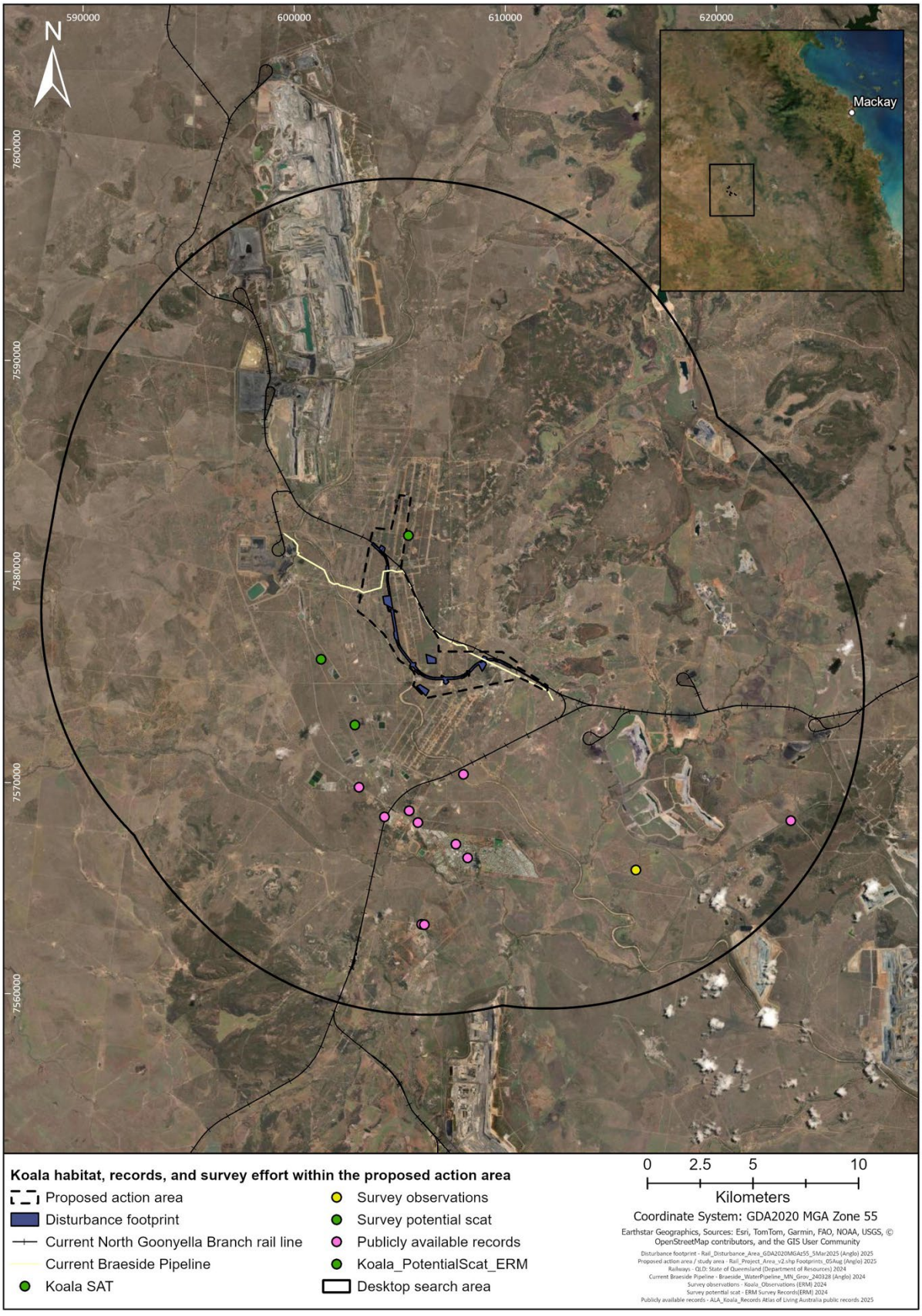

Figure 9-1: koala records within the broader region

Habitat for koala has been mapped within the proposed action area using definitions provided in the species' Conservation Advice (DAWE 2022a), recovery plan (DAWE 2022b), *A review of koala habitat assessment criteria and methods* (Youngentob et al. 2021), and other relevant literature. Habitat assessments were undertaken in the field, recording:

- Present tree species
- Tree height and tree DBH
- Connectivity to other habitat areas
- Koala habitat trees within 30 m of one another.

In total, 1,049.5 ha of habitat for koala comprising 75.5 ha foraging and breeding habitat, and 974 ha dispersal habitat has been mapped within the proposed action area (Figure 9-2) (Table 9-4).

Table 9-3: Habitat requirements and presence of habitat within the proposed action area – Koala

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area
Breeding and foraging habitat	• Contiguous remnant and high-value regrowth Eucalyptus open forest to woodlands on alluvial and/or cracked rock groundwater where LIKT species occur frequently (and are usually dominant); • Remnant and regrowth Eucalyptus open forest to woodlands with more variable aquifers (often seasonal) and that have connectivity to other areas of breeding/shelter. Must incorporate one or more LIKT species of relative abundance; and • Presence of LIKT (Youngentob et al. 2021) *	Remnant 11.3.25 along Skeleton Gully, Teviot Brook and the Isaac River where preferred habitat trees were generally observed. LIKT observed within the proposed action area include *Eucalyptus brownii*, *E. camaldulensis*, *E. coolabah*, *E. crebra*, *E. dura*, *E. exserta*, *E. longirostrata*, *E. melanophloia*, *E. moluccana*, *E. populnea*, *E. saligna* and *E. tereticornis*.
Dispersal habitat	• Continuous corridors of native vegetation with koala habitat trees between koala habitat areas. • Ideally where the trees are 30 m apart but no more than 200 m apart and in small clumps to provide versatility to meet koala's habitat needs (DES 2020b); and • Presence of ancillary habitat trees (Youngentob et al. 2021)** • Continuous corridors of non-native vegetation with scattered koala habitat trees between koala habitat areas. • Cleared land that contains scattered koala habitat trees between koala habitat areas.	Woodland habitat including: • Eucalypt and Corymbia woodland (RE 11.3.7, RE 11.5.3, RE 11.5.9) • Eucalypt woodland dominated by poplar box (RE 11.3.2, RE 11.5.3) • mixed eucalypt regrowth (11.3.25, 11.5.3) Ancillary habitat trees observed within the proposed action area include *Corymbia citriodora*, *C. dallachiana*, *C. intermedia*, *C. tessellaris*, and/or *Eucalyptus cambageana*. Average canopy cover (including habitat and non-habitat trees) of dispersal habitat within the proposed action area is 25%[6]. No cleared areas have been mapped as dispersal habitat for the species (these areas did not meet requirements for dispersal habitat, see below).

[6] Area-weighted average calculated from mean tree canopy cover biocondition score for each of the REs mapped as dispersal habitat for koala

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area
Not habitat	Areas lacking the required species, structure, and/or connectivity described above to provide habitat for the species	The remaining areas within the proposed action area do not constitute habitat for the species. This includes: • Brigalow woodland and regrowth - *Acacia harpophylla* may provide important ancillary habitat features (e.g. shelter), where they co-occur with LIKT (Youngentob et al. 2021). Areas of brigalow woodland and brigalow regrowth within the proposed action area lack LIKT and are therefore not considered to provide habitat for koala. • Acacia woodland and regrowth – these areas lack LIKT and are not considered to provide habitat for koala • Non-remnant areas – these areas are very open (generally >200 m between tress). Occasional regrowth Eucalyptus spp. / Corymbia spp. are insufficient to provide habitat for the species in themselves and are not located in areas that may provide dispersal between breeding and foraging habitat patches. These trees are further apart than the average distance travelled by a koala in a day (Matthews et al. 2016; Ellis et al. 2009; DES 2020b). While individuals could potentially traverse the distance between isolated trees in these areas, the use of this area for dispersal would be much more costly to koala than areas mapped as dispersal habitat that have greater density of trees providing shelter and foraging resources. As the majority of the proposed action area is covered with either breeding / foraging habitat, or dispersal habitat providing ample opportunities for dispersal, koalas are unlikely to attempt to disperse across these areas of non-habitat.

*Brigalow Belt Locally important koala trees: *Eucalyptus brownii*, *E. camaldulensis*, *E. chloroclada*, *E. conica*, *E. coolabah*, *E. crebra*, *E. drepanophylla*, *E. dura*, *E. exserta*, *E. fibrosa*, *E. laevopinea*, *E. largiflorens*, *E. longirostrata*, *E. major*, *E. melanophloia*, *E. macrocarpa*, *E. moluccana*, *E. ochrophloia*, *E. orgadophila*, *E. populnea*, *E. punctate*, *E. saligna*, *E. sideroxylon*, *E. tereticornis*

**Brigalow Belt ancillary habitat trees: *Acacia harpophylla*, *A. salicina*, *A. tephrina*, *Corymbia citriodora*, *C. dallachiana*, *C. erythrophloia*, *C. intermedia*, *C. tessellaris*, *Eucalyptus acmenoides*, *E. baileyana*, *E. cambageana*, *E. decorticans*, *E. platyphylla*, *E. thozetiana*, Melaleuca bracteata

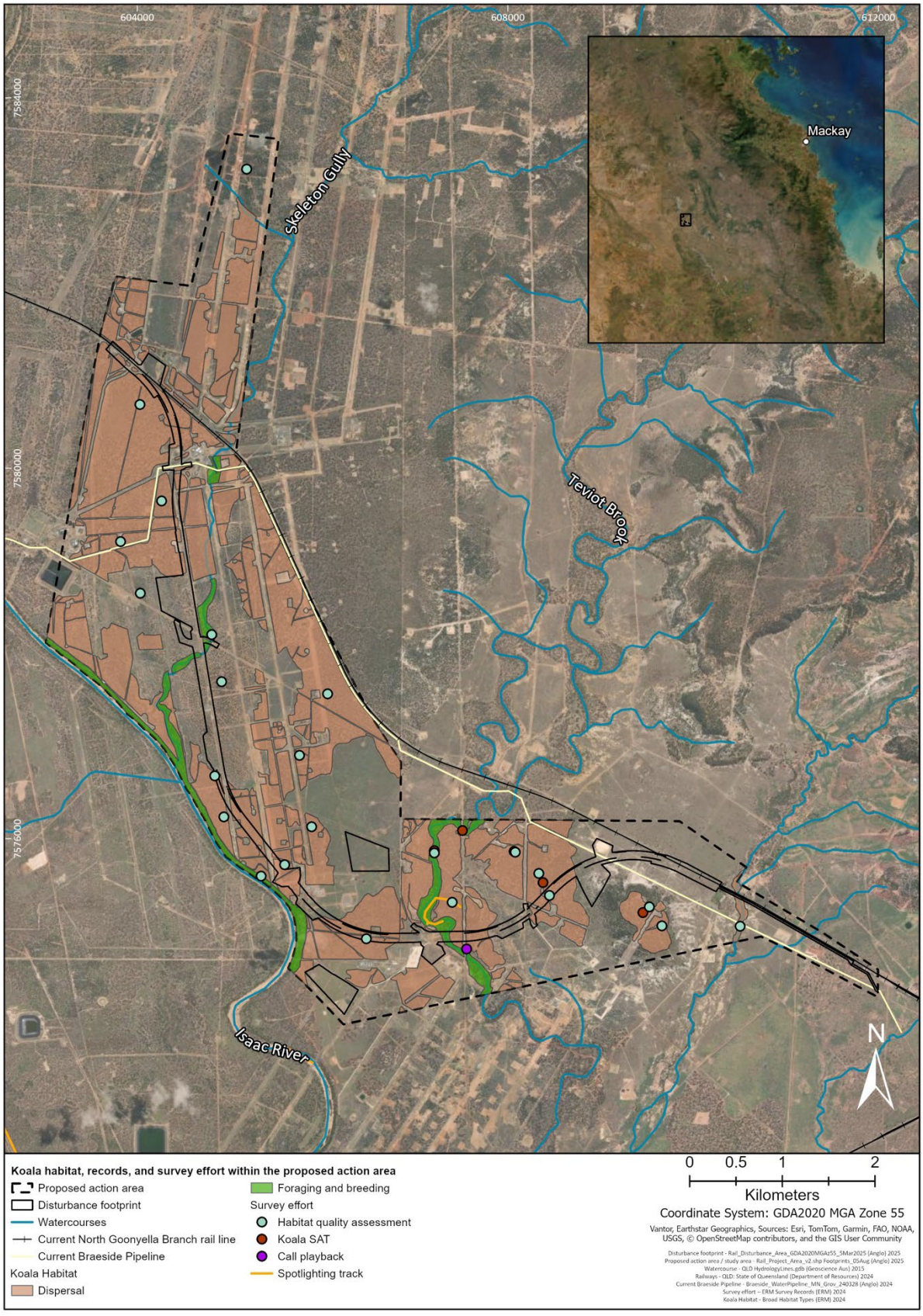

Figure 9-2: koala habitat, records, and survey effort within the proposed action area

Habitat critical

The Conservation Advice for koala (DAWE 2022a) and National Recovery Plan for koala (DAWE 2022b) lists the following crucial habitat elements as identifiers for habitat critical to the survival of the species:

- Koala food and shelter tree species
- Patches and corridors of suitable habitat required for dispersal and gene flow
- Climate refugia such as drainage lines, riparian zones and other patches resilient to drying.

Based on this definition, breeding and foraging habitat for koala within the proposed action area is considered habitat critical to the survival of the species as:

- Suitable koala food and shelter tree species are present
- Koala habitat in the proposed action area is connected with koala habitat in the broader landscape, and is concentrated along riparian areas, providing opportunities for dispersal and providing climate refugia.

Dispersal habitat (which does not contain breeding and foraging resources) is not considered habitat critical to the survival of the species as this habitat:

- Lacks an abundance of mature koala food trees
- Does not provide climate refugia
- Is not used to meet essential life cycle requirements (e.g. foraging, breeding)
- Is not essential for the movement of koala throughout the landscape. Dispersal habitat is used by koala to move between areas of breeding and foraging habitat. In the context of the proposed action area, breeding and foraging habitat is situated along Isaac River, Skeleton Gully, and Teviot Brook. These riparian areas provide corridors for koala to disperse directly to areas of breeding and foraging habitat beyond the proposed action area. Areas mapped as dispersal habitat only (without breeding and foraging resources) do not provide unique opportunities for dispersal to areas that are not already connected via breeding and foraging habitats. The removal of these areas would not inhibit movement of koala between areas of foraging and breeding habitat within or beyond the proposed action area. These areas are therefore not considered critical to the survival of the species.

It is important to note that while the proposed action area is largely within a mapped terrestrial biodiversity corridor, the scale at which this corridor has been mapped indicates broad linkages in the landscape to assist in landscape-level planning (DERM 2010). It does not identify specific on-ground areas important for conservation or providing corridors for dispersal. Habitat within the proposed action area has been ground-truthed during field surveys, providing high resolution evaluation of values present for the species. The greatest opportunities for dispersal for koala within the

proposed action area are provided by habitat mapped as breeding and foraging habitat, which is considered habitat critical to the survival of the species.

9.2.4 Significant residual impact

The Project will result in the loss of 1.9 ha of breeding and foraging habitat, and 46.2 ha of dispersal habitat. Breeding and foraging habitat is considered to meet the definition of habitat critical to the survival of the species.

Indirect impacts to the koala are considered unlikely to occur given the implementation of appropriate mitigation measures, including clear demarcation of sensitive vegetation, implementation of sensitive clearing techniques (i.e. sequential clearing) and the use of a spotter-catcher prior to and during clearing and construction (see Section 6).

The Project has the potential for facilitated impacts through operation of the rail line, noting that operation is excluded from the proposed action description. The operation of the rail line poses a collision risk to koala. However, these facilitated impacts are unlikely to be significant as the rail line is currently in operation. The Project will not facilitate a change in the usage of the rail line, only a change of location within ~ 2 km of the current rail line. The relocated rail line will pass through similar habitat to the existing rail line. There will be no change in operational impacts such fauna mortality or disturbance caused by light or noise, with the same operational controls in place for the relocated alignment as those that are currently in place (refer Section 6.4).

An assessment against EPBC Act significant impact criteria is provided in Table 9-4 and concludes that significant residual impacts to koala are unlikely.

Table 9-4: Significant impact assessment – koala

Significant impact criteria	Significant impact?	Response to criteria
Lead to a long-term decrease in the size of a population	Unlikely	Koala is known to occur within the proposed action area, and habitat for the species has been mapped throughout the proposed action area. A long-term decline may occur in the population if mortality rates increase and/or breeding rates decrease beyond that required to sustain the population. It is considered unlikely that the Project would result in either of these scenarios, given: • Extensive survey effort yielded low return of direct and indirect observations, indicating koala density within the area is likely to be very low and the study area is unlikely to support a population of the species. • The Project is unlikely to result in an increase in mortality rates due to the implementation of good practice mitigation measures. • Vegetation clearing will be linear, which allows for ongoing movement of the population. • Riparian vegetation along the Isaac River is part of a state biodiversity corridor, providing connectivity with other areas of habitat within the landscape and will not be impacted. • Riparian vegetation along Teviot Brook is part of a regional biodiversity corridor, also providing connectivity with other areas of habitat. The disturbance footprint intersects Teviot Brook in one place, however a bridge crossing will be used, ensuring connectivity is not lost. • Riparian vegetation along Skeleton Gully also provides connectivity with other areas of habitat. The disturbance footprint crosses Skeleton Gully in one place, however a culvert crossing will be in place across Skeleton Gully to ensure connectivity is retained.

Significant impact criteria	Significant impact?	Response to criteria
Reduce the area of occupancy of the species	Unlikely	The area of occupancy (AOO) of koala is estimated to be at least 19,428 km^2 (DAWE 2022a). The proposed action area is located within the centre of the koala's Queensland geographic distribution. The Project will result in the loss of 1.9 ha of breeding and foraging habitat, and 46.2 ha of dispersal habitat. This habitat will be removed in a mosaic across the extent of known habitat for the species, resulting in very local scale habitat loss, that will not affect the overall AOO. Food and shelter trees be retained across the proposed action area, and will continue to remain available to individuals.
Fragment an existing population into two or more populations	Unlikely	Extensive survey effort yielded low return of direct and indirect observations, indicating koala density within the area is likely to be very low and the study area is unlikely to support a population of the species. The Project involves the relocation of the current rail line and water pipeline. The rail and pipeline alignment runs adjacent to, and within 2 km at the furthest point, the current rail line. This has the potential to create a barrier to movement of individuals in to and out of the area between the current and proposed rail and pipeline (see Figure 9-2). Within the proposed action area, riparian habitat along the Isaac River and Teviot Brook provides potential dispersal corridors for koala. Following impact, all areas of breeding a foraging habitat within the proposed action area will remain accessible to koala. Habitat along the Isaac River, which provides north-south connectivity throughout the landscape, will not be impacted. The disturbance footprint crosses Teviot Brook and Skeleton Gully. However, a bridge crossing will be in place over Teviot Brook and a culvert crossing in place across Skeleton Gully to ensure connectivity is retained. The patches of habitat to be impacted are largely already fragmented by linear clearing. Koalas tend to move little under most conditions, changing trees only a few

Significant impact criteria	Significant impact?	Response to criteria
		times each day, although males may move across the landscape during breeding season (DAWE 2022a). As such, individuals are likely to be using the smaller pockets throughout the proposed action area already and not dispersing widely across the landscape, which reduces the effects of internal fragmentation across the proposed action area. The Project will not remove habitat that is disproportionately important for koalas, and dispersal pathways will be maintained, allowing koalas to move throughout the proposed action area and beyond. While some fragmentation of habitat within the proposed action area will occur, this is unlikely to significantly hinder the dispersal of koala within the proposed action area or beyond, or to fragment a population of koala.
Adversely affect habitat critical to the survival of the species	Unlikely	Breeding and foraging habitat within the proposed action area is considered habitat critical to the survival of the species (see Section 9.2.3). The Project will result in the loss of 1.9 ha of habitat critical to the survival of koala. This habitat will be impacted in two areas: riparian habitat along Skeleton Gully and Teviot Brook. Habitat along Skeleton Gully is already fragmented by existing clearing. The project will remove small areas of habitat from the edge of already fragmented patches and is unlikely to increase the fragmentation of this habitat, or impact the functionality of these habitat patches. A bridge crossing will be in place over Teviot Brook and a culvert crossing in place across Skeleton Gully to ensure habitat connectivity is retained.
Disrupt the breeding cycle of a population	Unlikely	Koalas do not have specific breeding resources, however habitat connectivity to allow males to move and seek out females is important. Shelter habitat is likely also important for females and their young.

Significant impact criteria	Significant impact?	Response to criteria
		Riparian habitat along the Isaac River and Teviot Brook provides potential dispersal corridors for koala. Habitat along the Isaac River will not be impacted. The disturbance footprint crosses Teviot Brook and Skeleton Gully. However, a bridge crossing will be in place over Teviot Brook and a culvert crossing in place across Skeleton Gully to ensure connectivity is retained. The Project will result in the loss of 1.9 ha breeding and foraging habitat, and 46.2 ha dispersal habitat. Dispersal habitat is unlikely to be important for breeding. Large areas of breeding and foraging habitat will be retained within the proposed action area and surrounding landscape. It is considered unlikely that the Project would disrupt the breeding cycle of the population given: • Extensive survey effort yielded low return of direct and indirect observations, indicating koala density within the area is likely to be very low and the study area is unlikely to support a population of the species. • Connectivity of breeding and foraging habitat along the Isaac River and Teviot brook will be retained, allowing males and females to still traverse the proposed action area during breeding seasons. • Large areas of critical habitat including food and shelter trees will remain present throughout the proposed action area and will continue to be available to support the long-term persistence of the species. • Controls will be in place to prevent injury or mortality of individuals during construction. However, if injury or mortality should occur, the loss of a limited number of individuals is unlikely to significantly disrupt the breeding cycle. • The Project is unlikely to introduce or increase the occurrence of feral predators.
Modify, destroy, remove, isolate or decrease the availability or quality	Unlikely	The Project will result in the loss of 1.9 ha breeding and foraging habitat, and 46.2 ha dispersal habitat. Indirect impacts are considered unlikely to occur given the implementation of appropriate mitigation measures.

Significant impact criteria	Significant impact?	Response to criteria
of habitat to the extent that the species is likely to decline		Impacts to koala habitat are unlikely to be to an extent that the species is likely to decline because: • Connectivity of riparian habitat along the Isaac River, Teviot Brook, and Skeleton Gully will be retained, providing opportunities for movement and dispersal within the proposed action area and surrounding landscape • Large areas of breeding and foraging habitat will be retained within the proposed action area and will remain available for koala.
Result in invasive species that are harmful to the species becoming established in the species' habitat	Unlikely	Feral dogs pose a threat to koalas in central Queensland. Feral dogs were not recorded during field surveys, however are likely to already be present in the landscape. The Project is unlikely to increase the occurrence of these species within the proposed action area.
Introduce disease that may cause the species to decline	Unlikely	Koala retrovirus and *Chlamydia* pose threats to koalas. Activities to occur as part of the Project are unlikely to facilitate the spread of these diseases (as they are typically either genetic or passed on through animal to animal contact) or introduce additional disease. Strict procedures for washdown of equipment and vehicles are in place to reduce the likelihood of introduction or spread of these diseases.
Interfere with the recovery of the species	Unlikely	The National Recovery Plan for koala lists the following conservation and recovery actions (DAWE 2022b): • Build and share knowledge • Strong community engagement and partnerships targeted at koala conservation • Increase habitat protection • Koala conservation is integrated into policy, and statutory and land-use plans • Strategic habitat restoration • Active metapopulation management. The Project will not negatively impact any of these actions. It is unlikely that the Project will interfere with the recovery of the species.

9.3 Greater glider (southern and central) (*Petauroides volans*)

Greater glider (southern and central) (*Petauroides volans*) is listed as endangered under the EPBC Act.

9.3.1 Key outcomes of the assessment

- Greater glider is known to occur, with the species recorded in 2024 surveys, in riparian vegetation along Isaac River and Teviot Brook.
- The proposed action area includes both denning and breeding habitat, and foraging and dispersal habitat for greater glider.
- The Project will result in the removal of 1.0 ha of ha of denning and breeding habitat, and 3.0 ha foraging and dispersal habitat.
- An assessment against EPBC Act significant impact criteria concludes that significant residual impacts to greater glider are unlikely.

9.3.2 Ecology and distribution

Greater glider (southern and central) is restricted to eastern Australia but have an extensive distribution north to south from the Windsor Tableland in north Queensland to central Victoria (Wombat State Forest). While the distribution range of the greater glider is unlikely to have changed significantly since European settlement, their area of occupancy has decreased substantially in response to land clearing and altered fire regimes (DCCEEW 2022a).

Greater glider is arboreal and largely restricted to eucalypt forests and woodlands occurring across an elevational range of 0–1,200 m (Kavanagh 2004). They are more commonly found in montane, moist eucalypt forests with abundant hollows. Greater gliders use large tree hollows to shelter in during the day with older and taller forests providing more suitable hollows (Eyre et al. 2022b). They are primarily folivores, consuming eucalypt leaves and occasionally buds and flowers. The species favour forests which are moist relative to the vegetation present in the region presumably as their water intake occurs primarily via consumption of foliage (DCCEEW 2022a).

The species is most abundant in tall mature moist eucalypt forest with numerous hollows on fertile soils (Eyre et al. 2022b), but the species may be found in a variety of forests and woodland types across the elevational range of 0–1,200 m above sea level (Wormington 2003; Kavanagh 2004).

A large contiguous area of several thousand hectares is required to support a viable population of the species (Possingham et al. 1994) with the species typically requiring feed trees to exceed 30 cm diameter at breast height (DBH) and denning and breeding trees to exceed 50 cm DBH (DCCEEW 2022a; Kerswell et al. 2020). Greater gliders have a small home range without the ability to move great distances in response to seasonal variation. They do not disperse easily across non-native vegetation (Possingham et al. 1994) and are sensitive to fragmentation and fire, as well as habitat loss from clearing, and the impacts of climate change.

9.3.3 Presence in the proposed action area

Greater glider is known to occur within the proposed action area, with three individuals recorded during field surveys in RE 11.3.25 along Teviot Brook (ERM 2024). There are also 20 records of the species from 2023 and 2024 within 3 km of the proposed action area. These records are all from riparian vegetation along the Isaac River and Teviot Brook.

An additional three publicly available records of the species since 1980 exist within 15 km of the proposed action area boundary (ALA 2024) (Table 9-5, Figure 9-3).

Table 9-5: Publicly available records of greater glider within 15 km of the proposed action area

Year	No. records	Habitat	Source
1991	1	Unknown	ALA
1994	1	Unknown	ALA
2014	1	Unknown	ALA

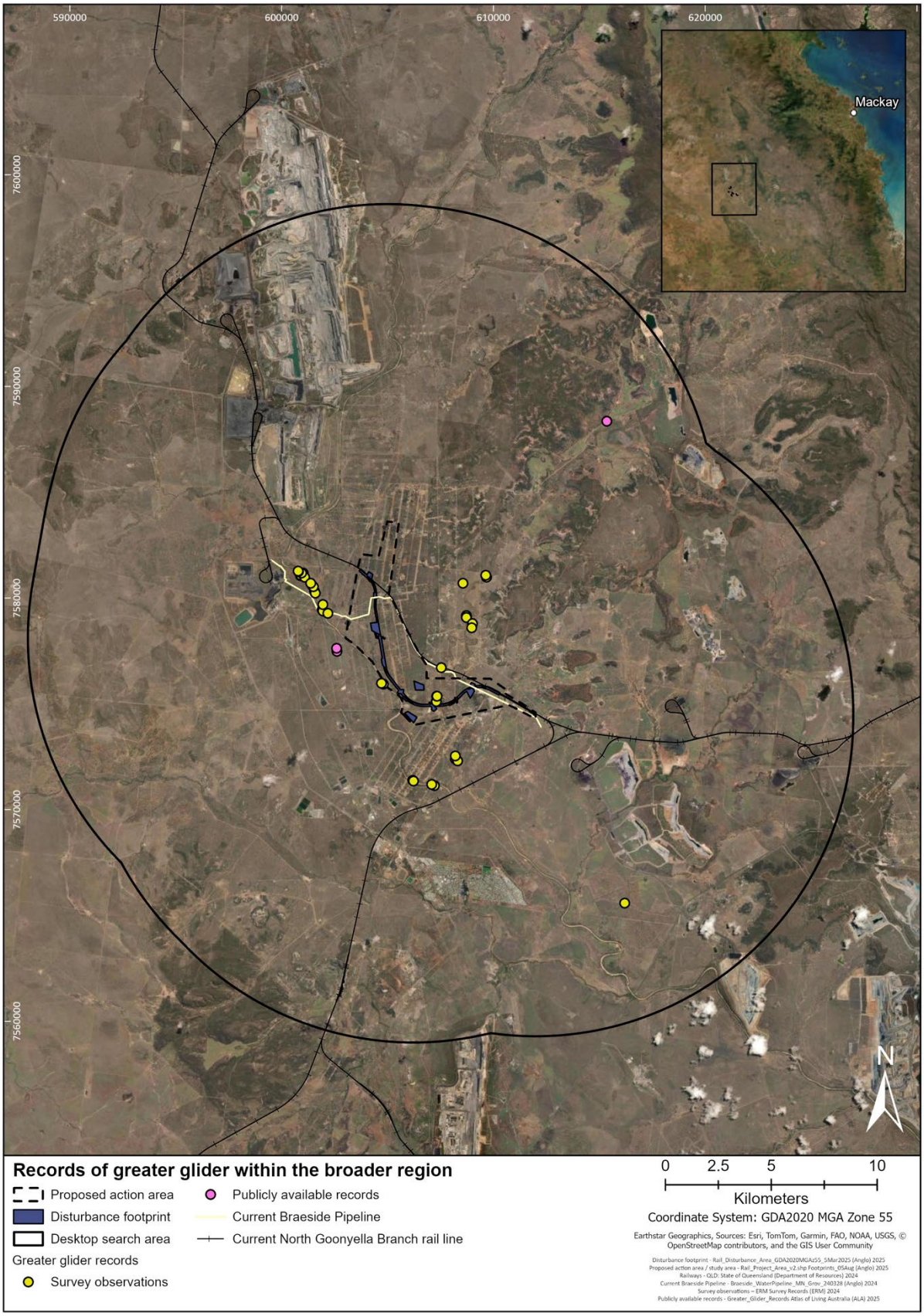

Figure 9-3: Records of greater glider within the broader region

Habitat for greater glider has been mapped within the proposed action area using definitions provided in the species' Conservation Advice (DCCEEW 2022a), *A guide to greater glider habitat in Queensland* (Eyre et al., 2022), *Characteristics of tree hollows used by Australian arboreal and scansorial mammals* (Goldingay, 2011), and other relevant literature. Habitat assessments were undertaken in the field, recording:

- Present tree species
- Tree height and tree DBH
- Number of live den trees per 2 ha
- Habitat patch sizes
- Connectivity to other habitat areas.

Areas of eucalypt woodlands containing more than 2 hollow bearing trees per 2 ha (with hollow entrances greater than 10 cm diameter) and preferred denning tree species are considered denning habitat for greater glider (southern and central). Trees with > 50 cm DBH are more likely to contain suitable hollows for the species (Eyre et al. 2022). As such, DBH is used as a measure of a tree's suitability for denning. Trees with > 30 cm DBH are considered to provide foraging habitat for greater glider (Eyre et al. 2022).

Within the proposed action area, greater glider habitat is largely restricted to riparian areas surrounding the Isaac River, Teviot Brook, and Skeleton Gully. A few large connecting patches of forest with suitable hollow-bearing trees also constitute habitat for the species. Habitat requirements used to map habitat for the species, and description of the presence of habitat within the proposed action area are presented in Table 9-6. Outside of the proposed action area, eucalypt woodland containing hollow-bearing trees is present along the Isaac River, where the majority of greater glider records occur (Figure 9-3).

In total, 97.4 ha of habitat for greater glider comprising 42.2 ha of denning and breeding habitat, and 55.2 ha of foraging and dispersal habitat has been mapped within the proposed action area (Table 9-6, Figure 9-4).

Table 9-6: Habitat requirements and presence of habitat within the proposed action area – greater glider

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area

Denning and breeding	Eucalypt woodland containing appropriate habitat attributes:
	• 2 – 4 live den trees for every 2 ha of suitable habitat;
	• Tree species including but not limited to*:
	  ○ Forest red gum (*E. tereticornis*)
	  ○ Lemon-scented spotted gum (*Corymbia citriodora*)
	  ○ Pink bloodwood (*Corymbia intermedia*);
	• Live and dead stags containing hollows;
	• Hollows typically > 10 cm diameter; and
	• Appropriate trees > 50 cm DBH.
		Within the proposed action area, the following REs may contain greater glider habitat trees:
		• RE 11.3.2
		• RE 11.3.7
		• RE 11.3.25
		• RE 11.5.3
		• RE 11.5.9/11.5.9c
		Due to the presence of preferred denning and breeding trees including *Eucalyptus tereticornis* and *C. intermedia* and sufficient hollow density, denning and breeding habitat has been mapped as:
		• Areas of remnant RE 11.3.25 fringing the Issac River, along Teviot Brook, and Skeleton Gully.

Foraging and dispersal	• Preferred trees with DBH 30 – 50 cm DBH; • Eucalyptus woodland connected to denning and breeding habitat with appropriate den trees*; and • Live and dead stags containing hollows.	Due to the presence of preferred trees but lack of sufficient habitat features to constitute denning and breeding habitat, foraging and dispersal habitat has been mapped within the proposed action area: • Patches of remnant RE 11.3.25 fringing the Isaac River and along Skeleton Gully which lack denning and breeding features. • Remnant 11.3.7 adjacent to the Issac River. • Two patches of remnant 11.3.2 in the central portion of the proposed action area.
Not habitat	Areas lacking the above features required to constitute habitat for the species	Due to the lack of essential habitat features (sufficient maturity, tree hollows, and/or appropriate species) the remaining areas within the proposed action area do not constitute habitat for the species. This includes areas of RE 11.3.2, RE

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area
		11.3.7, RE 11.3.25, RE 11.5.3 and RE 11.5.9/11.5.9c which have been assessed in the field via targeted surveys to not contain sufficient habitat features for greater glider.

*See *Guide to greater glider habitat in Queensland* (Eyre et al. 2022) for the full list of tree species characterising greater glider habitat in the brigalow belt bioregion

Figure 9-4: Greater glider habitat and records within the proposed action area

Habitat critical

The Conservation Advice for greater glider (southern and central) (DCCEEW 2022a) broadly defines habitat critical to survival of the species as:

- large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; and
- smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization; and
- cool microclimate forest/woodland areas
- areas identified as refuges under future climate changes scenarios; and
- short-term or long-term post-fire refuges that allow the species to persist, recover and recolonise burnt areas.

Based on this definition, all habitat for greater glider within the proposed action area is considered to habitat critical to the survival of the species as:

- A range of preferred food and shelter tree species, including large (mature) hollow-bearing trees, are present within the proposed action area
- Greater glider habitat in the proposed action area is concentrated along riparian areas, providing opportunities for dispersal and providing climate refugia.

9.3.4 Significant residual impact

The Project will result in the loss of 1.0 ha of denning and breeding habitat, and 3.0 ha foraging and dispersal habitat.

Indirect impacts to the greater glider are considered unlikely to occur given the implementation of appropriate mitigation measures, including clear demarcation of sensitive vegetation, implementation of sensitive clearing techniques (i.e. sequential clearing) and the use of a spotter-catcher prior to and during clearing and construction (see Section 6).

The Project has the potential for facilitated impacts through operation of the rail line, noting that operation is excluded from the proposed action description. Facilitated impacts are unlikely to be significant as the rail line is currently in operation and the Project will not facilitate a change in the usage of the rail line, only a change of location within ~ 2 km of the current rail line. There will be no change in operational impacts such fauna mortality or disturbance caused by light or noise.

An assessment against EPBC Act significant impact criteria is provided in Table 9-7 and concludes that significant residual impacts to greater glider are unlikely.

Table 9-7: Significant impact assessment – greater glider

Significant impact criteria	Significant impact?	Response to criteria
Lead to a long-term decrease in the size of a population	Unlikely	Greater glider is known to occur within the proposed action area, and habitat for the species has been mapped along the Isaac River, Skeleton Gully, and Teviot Brook in the proposed action area. A long-term decline may occur in the population if mortality rates increase and/or breeding rates decrease beyond that required to sustain the population. It is considered unlikely that the Project would result in either of these scenarios, given: • The Project is unlikely to result in an increase in mortality rates • Vegetation clearing will largely impact already fragmented patches of habitat. One patch of denning and breeding habitat will be impacted by the Project, however connectivity with the remaining habitat will be retained. • Riparian vegetation along the Isaac River is part of a state biodiversity corridor, providing connectivity with other areas of habitat within the landscape and will not be impacted. • Riparian vegetation along Teviot Brook is part of a regional biodiversity corridor, also providing connectivity with other areas of habitat. The disturbance footprint intersects Teviot Brook in one place, however a bridge crossing will be used, with the underside of the bridge up to 6 m above stream bed level at the maximum height. The bridge deck is approx 8 m above stream bed level down the 3 m above ground level at either end. The dimensions of the bridge crossing help to ensure connectivity is not lost.
Reduce the area of occupancy of the species	Unlikely	The greater glider (southern and central) has an estimated area of occupancy of 15,316 km^2, however this is likely to be an underestimate due to limited sampling across the species range (DCCEEW 2022a). Vegetation clearing will be linear, will largely impact already fragmented patches of habitat and will occur in corridors, resulting in local scale habitat loss, that will not affect the overall AOO. Critical habitat (including riparian dispersal corridors) will be retained across the proposed action area. No entire patches of habitat will be removed. One patch of denning and breeding habitat will be impacted by the Project, however connectivity with the remaining habitat in the proposed action area will be retained.

Significant impact criteria	Significant impact?	Response to criteria
		The loss of 4.0 ha of greater glider habitat within the proposed action area is unlikely to reduce the area of occupancy of greater glider.
Fragment an existing population into two or more populations	Unlikely	Greater gliders are sensitive to fragmentation, and construction of the rail and pipeline will involve linear clearing of 4.0 ha of greater glider habitat within the disturbance footprint, comprising 1.0 ha denning and breeding habitat, and 3.0 ha foraging and dispersal habitat. However, this clearing is unlikely to fragment a population because: • Riparian habitat along the Isaac River and Teviot Brook provides potential dispersal corridors for greater glider. Habitat along the Isaac River will not be impacted. The disturbance footprint crosses Teviot Brook, however a bridge crossing will be in place to ensure connectivity is retained. • The patches of habitat to be impacted are largely already fragmented by linear clearing, and as such new barriers to dispersal are unlikely to be created. One patch of denning and breeding habitat will be impacted by the Project, however connectivity with the remaining denning and breeding habitat in the proposed action area will be retained. • Two patches of foraging and dispersal habitat for greater glider will be impacted, one along Skeleton Gully, and one in the centre of the proposed action area. Loss of habitat from these patches potentially creates a barrier to movement of greater glider into these patches. However, these patches do not connect with habitat to the east and do not provide dispersal pathways for greater glider. Movement of greater glider into these patches is already restricted, as gaps between these patches of habitat and habitat to the west already exist (~50 m and ~100 m respectively) where they are intersected by the disturbance footprint. The Project is unlikely to fragment a population of greater glider.
Adversely affect habitat critical to the survival of the species	Unlikely	The proposed action area is considered to contain habitat critical to the survival of the species (see Section 9.3.3). The Project will result in the loss of 4.0 ha of greater glider habitat, comprising 1.0 ha denning and breeding habitat, and 3.0 ha foraging and dispersal habitat. The project is unlikely to adversely affect habitat critical to the survival of the species as: • Vegetation clearing will largely impact already fragmented patches of habitat.

Significant impact criteria	Significant impact?	Response to criteria
		• Riparian vegetation along the Isaac River is part of a state biodiversity corridor, providing connectivity with other areas of habitat within the landscape and will not be impacted. • Riparian vegetation along Teviot Brook is part of a regional biodiversity corridor, also providing connectivity with other areas of habitat. The disturbance footprint intersects Teviot Brook in one place, however a bridge crossing will be used, ensuring connectivity is not lost.
Disrupt the breeding cycle of a population	Unlikely	Breeding habitat requirements for greater glider include large tree hollows for denning, which are present in areas of denning and breeding habitat within the proposed action area. The project will result in the loss of 1.0 ha of denning and breeding habitat. However, large areas of denning/breeding habitat, and foraging/dispersal habitat will be retained within the proposed action area and surrounding landscape. Riparian habitat along the Isaac River and Teviot Brook provides potential dispersal corridors. Habitat along the Isaac River will not be impacted. The disturbance footprint crosses Teviot Brook, however a bridge crossing will be in place to ensure connectivity is retained. Controls will be in place to prevent injury or mortality of individuals during construction. However, if injury or mortality should occur, the loss of a limited number of individuals is unlikely to significantly disrupt the breeding cycle. The project is unlikely to introduce or increase the occurrence of feral predators.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The Project will result in the loss of 4.0 ha of greater glider habitat. Indirect impacts are considered unlikely to occur given the implementation of appropriate mitigation measures. Impacts to greater glider habitat are unlikely to be to an extent that the species is likely to decline because: • Connectivity of riparian habitat along the Isaac River and Teviot Brook will be retained, providing opportunities for movement and dispersal within the proposed action area and surrounding landscape • Large areas of both denning/breeding, and foraging/dispersal habitat will be retained within the proposed action area and will remain available for greater glider.

Significant impact criteria	Significant impact?	Response to criteria
Result in invasive species that are harmful to the species becoming established in the species' habitat	Unlikely	Predation by feral cats and foxes is identified as a threat to greater glider with minor consequence (DCCEEW 2022a). Over-abundant native species also pose a threat to greater glider, including hyper-predation by owls and competition from Sulphur-crested Cockatoos for hollows. The Project is unlikely to increase the occurrence of these species within the proposed action area.
Introduce disease that may cause the species to decline	Unlikely	Disease is not listed in the Conservation Advice as a threat to the species. There is no evidence to suggest that the Project would introduce disease that may cause the species to decline.
Interfere with the recovery of the species	Unlikely	There is no Recovery Plan for greater glider (southern and central). In the absence of a Recovery Plan, the Conservation Advice for greater glider (southern and central) (DCCEEW 2022a) lists the following relevant conservation and management priorities: • Ensure that eucalypt forests and the impacts of disturbance (including fire) are managed to prevent them transitioning to less nutritious, hotter, and/or more fire-prone plant communities, and to ensure that food tree species preferred by the greater glider (southern and central) continue to be the dominant canopy trees. • Protect and maintain sufficient areas of suitable habitat, including denning and foraging resources and habitat connectivity, to sustain viable subpopulations throughout the species' range. • Protect hollow-bearing trees • Revise mitigation and offset guidelines for development and linear infrastructure (e.g. pipelines, transport corridors) to reflect the limited effectiveness of artificial structures (nest boxes, glide poles) as mitigation actions for loss, degradation or fragmentation of greater glider habitat. • Protect all habitat likely to be climate change refuges

Significant impact criteria	Significant impact?	Response to criteria
		The Project does not involve prescribed burns and is unlikely to alter the species composition of greater glider habitat. Riparian vegetation along the Isaac River and Teviot Brook provides potential climate refugia and connectivity, and will be largely retained. The project will result in the loss of 4.0 ha of greater glider habitat. However, large areas of both denning/breeding and foraging/dispersal habitat will be retained within the proposed action area and will remain available for greater glider.

9.4 Squatter pigeon (*Geophaps scripta scripta*)

Squatter pigeon (southern) (*Geophaps scripta scripta*) is listed as vulnerable under the EPBC Act.

9.4.1 Key outcomes of the assessment

- Squatter pigeon is known to occur, with 10 individuals recorded within the proposed action area during November/December 2023 surveys.
- The proposed action area includes breeding, and foraging and dispersal habitat for the species, with the vast majority of habitat present being foraging and dispersal habitat.
- The Project will result in the removal of 0.05 ha of breeding habitat and 48.2 ha of foraging and dispersal habitat.
- An assessment against EPBC Act significant impact criteria concludes that significant residual impacts to squatter pigeon are unlikely.

9.4.2 Distribution and ecology

Squatter pigeon (southern) is found from the Burdekin-Lynd Divide in central Queensland south as far as 29° S into New South Wales. Their distribution is significantly reduced, and squatter pigeons are now rarely sighted in NSW where they were once abundant (TSSC 2015).

Squatter pigeon commonly inhabits the sparse grassy understory of open eucalypt woodland and occasionally savannas (TSSC 2015). The species is almost always found near permanent water and prefers areas which are open and have a ground cover which does not exceed 33% (Kerswell et al. 2020). The species is rarely observed on heavier soils and/or with dense grass (TSSC 2015). Squatter pigeon has also been observed foraging in modified landscapes including burnt areas, roadsides, stockyards and around rural homes (DCCEEW 2024).

Foraging habitat is typically:

- Composed of an overstorey dominated by *Eucalyptus, Corymbia, Acacia* or *Callitris* species
- Within 3 km of a waterbody
- On low, gently sloping, flat to undulating plains and foothills
- On well-draining, gravelly, sandy or loamy soils.

Breeding habitat is confined to areas within 1 km of a suitable, permanent waterbody, and occurs on stony rises on sandy or gravely soils (DCCEEW 2024).

9.4.3 Presence in the proposed action area

Squatter pigeon is known to occur within the proposed action area, with 10 individuals recorded within the proposed action area during November/December 2023 survey (Figure 9-5).

Individuals were observed along dirt tracks adjacent to Eucalypt and Corymbia woodland (remnant 11.5.9), and Eucalypt woodland dominated by Poplar Box (remnant 11.3.2 and 11.5.3).

An additional 32 observations of squatter pigeon were made surrounding the proposed action area during surveys undertaken for Anglo in 2023/2024. The majority of observations were made within or on roads/dirt tracks adjacent to:

- Eucalypt Woodland Dominated by Poplar Box (RE11.3.2, RE11.5.3, RE11.5.9)
- Eucalypt and Corymbia Woodland (RE11.5.9, RE11.5.9c)
- Eucalypt woodland associated with ephemeral streams and watercourses (RE11.3.25)
- Mixed eucalypt regrowth

Two observations were made within cleared agricultural land and other disturbed areas.

An additional 21 publicly available records of the species since 1980 exist within 15 km of the proposed action area boundary in unknown habitat (ALA 2024) (Table 9-8, Figure 9-5).

Table 9-8: Publicly available records of squatter pigeon within 15 km of the proposed action area

Year	No. records	Habitat	Source
1991	1	Unknown	ALA
1994	1	Unknown	ALA
2004	2	Unknown	ALA
2011	1	Unknown	ALA
2012	6	Unknown	ALA
2014	3	Unknown	ALA
2015	4	Unknown	ALA
2022	1	Unknown	ALA
2023	1	Unknown	ALA

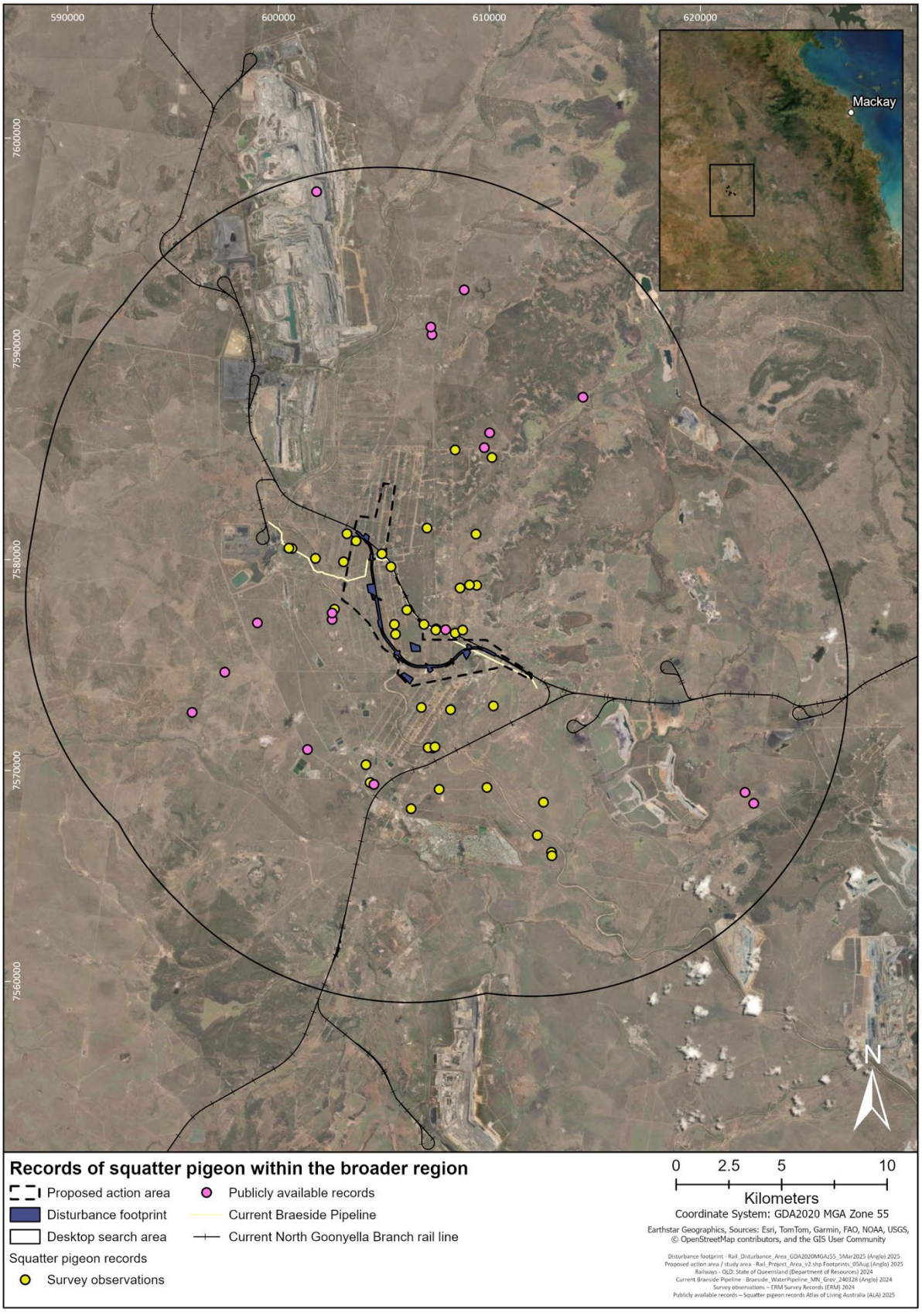

Figure 9-5: Records of squatter pigeon within the broader region

Habitat for squatter pigeon has been mapped within the proposed action area using definitions provided in the species' Conservation Advice (TSSC 2015), Species Profile and Threats Database (DCCEEW 2024), and other relevant literature.

Habitat requirements used to map habitat for the species, and description of the presence of habitat within the proposed action area are presented in Table 9-9.

In total, 1047.0 ha of habitat for squatter pigeon has been mapped within the proposed action area, comprising 22.8 ha breeding habitat, and 1024.2 ha foraging and dispersal habitat (Table 9-10, Figure 9-6).

Table 9-9: Habitat requirements and presence of habitat within the proposed action area – squatter pigeon

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area
Breeding habitat	Areas within 1 km of a permanent water source: • Open forest to woodland communities with bare ground visible. Patchy native tussock grass understory or mix of perennial tussock grasses and low shrubs/forbs • Dominated overstorey of *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp. or *Callitris* spp. • Ground vegetation of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs rarely exceeding 33% of the ground area, with the remaining consisting of gravelly/dusty soil and lightly covered in leaf litter and coarse woody debris	Acacia woodland (remnant 11.7.2) on Mitchell's mountain in the south of the proposed action area.
Foraging and dispersal habitat	Areas within 3 km of a permanent water source: • Open forest to woodland communities with bare ground visible. Patchy native tussock grass understory or mix of perennial tussock grasses and low shrubs/forbs. • Dominated overstory of *Eucalyptus* spp., *Corymbia* spp., *Acacia* spp. or *Callitris* spp. • Ground vegetation of native, perennial tussock grasses or a mix of perennial tussock grasses and low shrubs or forbs rarely exceeding 33% of the ground area, with the remaining consisting of gravelly/dusty soil and lightly covered in leaf litter and coarse woody debris	Within 3 km of permanent water sources: • Acacia woodland (remnant 11.7.2) • Eucalypt and Corymbia woodland (remnant 11.3.7, 11.5.3, 11.5.9, and 11.5.9c) • Eucalypt woodland associated with ephemeral streams and watercourses (remnant/regrowth 11.3.25) • Eucalypt woodland dominated by Poplar Box (remnant/regrowth 11.3.2, 11.5.3, and 11.5.9)
Not habitat	Areas lacking the above features required to constitute habitat for the species	The remaining areas within the proposed action area do not constitute habitat for the species. This includes areas mapped as

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area
		brigalow woodland and regrowth which meet some of the listed habitat requirements, however, are not within the appropriate land zone to be considered habitat for squatter pigeon. Brigalow woodland within the proposed action area has a dense understory, lacking the ~30% bare ground required by squatter pigeon. Brigalow regrowth has been ground truthed to have limited complexity, shelter, and food resources such as seeding native grasses.

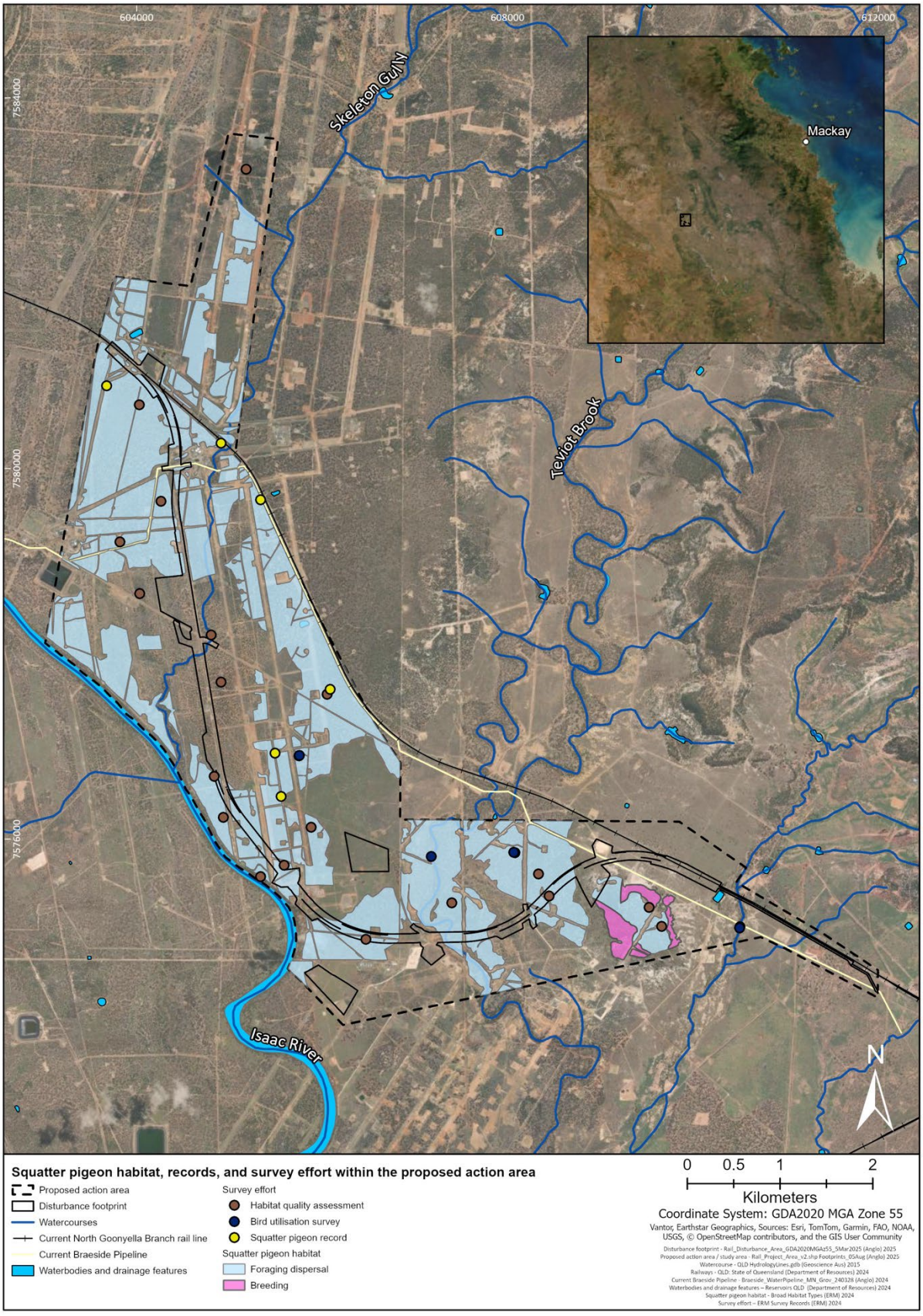

Figure 9-6: Squatter pigeon habitat, records, and survey effort within the proposed action area

Important populations

As the southern edge of their distribution is contracting northwards, all sub-populations of squatter pigeons occurring south of the Carnarvon Ranges in Central Queensland are considered to be important subpopulations (TSSC 2015).

As the proposed action area is located north of the Carnarvon Ranges, the occurrences of squatter pigeon within the proposed action area are not considered to be part of an important population.

Habitat critical

Habitat critical for the survival of the squatter pigeon has not been formally defined. However, under the *EPBC Act Significant Impact Guidelines* (DoE 2013b), habitat critical to the survival of the squatter pigeon would include areas that are necessary for:

- Activities such as foraging, breeding, roosting, or dispersal important for the long-term maintenance of the species
- Maintaining genetic diversity and long-term evolutionary development, or
- The reintroduction of populations or recovery of the species.

Based on this definition, no habitat within the proposed action area is considering habitat critical to the survival of the species. This is because:

- Foraging and dispersal habitat is widespread both within the proposed action area and the wider region. While it is utilised, it is not unique, restricted, or isolated and therefore unlikely to be a critical resource for maintaining the population.
- The breeding habitat within the proposed action area is small and disconnected from the larger patches of foraging and dispersal habitat, and other areas of breeding habitat in the region and therefore unlikely to be critical for breeding success of the local or regional population.
- As the proposed action area does not contain an important population of the species it would not be habitat to support the reintroduction of populations to assist in the recovery of the species.

9.4.4 Significant residual impact

The Project will result in the loss of 0.05 ha of breeding habitat and 48.2 ha of foraging and dispersal habitat.

Indirect impacts to the squatter pigeon are considered unlikely to occur given the implementation of appropriate mitigation measures, including clear demarcation of sensitive vegetation, implementation of sensitive clearing techniques (i.e. sequential clearing) and the use of a spotter-catcher prior to and during clearing and construction (see Section 6).

The Project has the potential for facilitated impacts through operation of the rail line, noting that operation is excluded from the proposed action description. Facilitated impacts are unlikely to be significant as the rail line is currently in operation and the Project will not facilitate a change in the usage of the rail line, only a change of location within ~ 2 km of the current rail line. There will be no change in operational impacts such fauna mortality or disturbance caused by light or noise.

An assessment against EPBC Act significant impact criteria is provided in Table 9-10 and concludes that significant residual impacts to squatter pigeon are unlikely to be significant.

Table 9-10: Significant impact assessment – squatter pigeon

Significant impact criteria	Significant impact?	Response to criteria
Lead to a long-term decrease in the size of an important population	Unlikely	The proposed action area does not support and important population of squatter pigeon (see Section 9.4.3).
Reduce the area of occupancy of an important population	Unlikely	The proposed action area does not support and important population of squatter pigeon (see Section 9.4.3).
Fragment an existing important population into two or more populations	Unlikely	The proposed action area does not support and important population of squatter pigeon (see Section 9.4.3).
Adversely affect habitat critical to the survival of the species	Unlikely	The proposed action area does not contain habitat critical to the survival of the species (see Section 9.4.3). The Project will result in the loss of 0.05 ha of breeding habitat and 48.2 ha of foraging and dispersal habitat. However, habitat to be cleared is dominated by exotic grass species which reduce the quality of habitat for the species. A negligible area (0.05 ha) of mapped breeding habitat for the species will be lost. Habitat loss will be primarily linear, and will not result in the complete removal of habitat patches. Habitat for the species will remain widely available within the proposed action area and surrounds. The project is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Unlikely	The proposed action area does not support an important population of squatter pigeon (see Section 9.4.3).
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	The Project will result in the removal of 48.2 ha of foraging and dispersal habitat and a negligible area (0.05 ha) of breeding habitat. Habitat loss will be primarily linear, and will not result in the complete removal of habitat patches. Habitat for the species will remain widely available within the proposed action area and surrounds. Indirect impacts to squatter pigeon habitat are not anticipated to be significant. The breeding, foraging and dispersal habitat within the proposed action area is not unique within the proposed action area or the wider landscape and therefore not

Significant impact criteria	Significant impact?	Response to criteria
		considered to play a role in the long-term maintenance of the species or the maintenance of genetic diversity and long-term evolutionary development. The Project is unlikely to impact habitat for squatter pigeon to the extent that the species is likely to decline.
Result in invasive species that are harmful to the species becoming established in the species' habitat	Unlikely	Invasive weeds such as Buffel grass are also known to pose a threat to squatter pigeon, causing habitat degradation by increasing groundcover density (DCCEEW 2024). Weeds including Buffel grass are known to be present within the proposed action area, with groundcover within squatter pigeon habitat dominated by exotic grass and forb species. Strict procedures for washdown of equipment and vehicles will be in place to reduce the likelihood of introduction or spread of any weeds. Overgrazing of habitat by rabbits and predation by feral cats and foxes also pose a threat to squatter pigeon (TSSC, 2015). The Project is unlikely to introduce or increase the occurrence of these species or their impacts throughout the proposed action area.
Introduce disease that may cause the species to decline	Unlikely	No diseases are noted to be a threat to the species. Strict procedures for washdown of equipment and vehicles will be in place to reduce the likelihood of introduction of any disease.
Interfere substantially with the recovery of the species	Unlikely	The Conservation Advice for squatter pigeon (TSSC 2015) lists conservation and management actions for the species. These are relevant only to southern sub-populations of squatter pigeon, which are not present in the proposed action area. The main threats to squatter pigeon are: • Habitat loss/fragmentation • Overgrazing • Weed incursion and predation by feral cats and foxes • Inappropriate fire regimes • Thickening of understory vegetation • Illegal shooting.

Significant impact criteria	Significant impact?	Response to criteria
		The Project will result in the loss of 0.05 ha of breeding habitat and 48.2 ha of foraging and dispersal habitat for squatter pigeon, however a large amount of habitat will remain in the surrounding area. No other threats to squatter pigeon are likely to be exacerbated by the Project. The Project is unlikely to interfere substantially with the recovery of the species.

9.5 Australian painted snipe (*Rostratula australis*)

Australian painted snipe (*Rostratula australis*) is listed as endangered under the EPBC Act.

9.5.1 Key outcomes of the assessment

- Australian painted snipe has not been recorded within the proposed action area.
- The proposed action area includes foraging and dispersal habitat for the Australian painted snipe. No breeding habitat is present.
- The Project will result in the removal of 1.9 ha of foraging and dispersal habitat.
- An assessment against EPBC Act significant impact criteria concludes that significant residual impacts to Australian painted snipe are unlikely.

9.5.2 Distribution and ecology

Australian painted snipe has been recorded in all Australian states, however is most common in eastern Australia (DSEWPC 2013). The species is most commonly recorded in the Murray-Darling region, with a scattered distribution throughout QLD, NSW, Victoria, and south-eastern South Australia (DCCEEW 2024). The species extent of occurrence is not thought to have changed, however both area of occupancy (due to loss of wetlands) and population size have declined substantially since the 1950s (DSEWPC 2013). Australian Painted Snipe is considered to occur in a single, contiguous breeding population, estimated at 340 breeding individuals (Garnett and Baker 2021).

The species inhabits shallow freshwater and occasionally brackish wetlands that may be permanent or ephemeral, including lakes, swamps, claypans, inundated or waterlogged grassland and saltmarsh, dams, rice crops, sewage farms, and bore drains (DSEWPC 2013). They prefer wetlands with a good cover of grasses, rushes, reeds, low scrub, lignum or samphire (DSEWPC 2013). Australian painted snipe breed in shallow ephemeral wetlands following flooding, preferring complex shorelines with sufficient cover (Garnett and Baker 2021; DCCEEW 2024). Almost all nest records are from or near small islands in freshwater wetlands with shallow water, exposed mud, and low dense cover (DCCEEW 2024). Nesting has also been recorded in and near swamps and other flooded areas with ground cover vegetation (DCCEEW 2024).

The species undergoes partial migration, with the capacity to travel long distances to use seasonally or episodically inundated wetlands (Garnett and Baker 2021). As breeding timing is dictated by wetland conditions, it varies cross the species range. In central QLD, breeding typically occurs between December and May.

9.5.3 Presence in the proposed action area

Australian painted snipe has not been recorded within the proposed action area. A number of shallow freshwater wetlands in the surrounding area provide potential habitat for the species. However, there is a single publicly available record of the species within the desktop search area, approximately 5.6 km to the north of the proposed action area (Figure 9-7).

Figure 9-7: Records of Australian painted snipe within the broader region

Habitat for Australian painted snipe has been mapped within the proposed action area using definitions provided in the species' Conservation Advice (DSEWPC 2013), the *National recovery plan for the Australian Painted Snipe (*Rostratula australis*)* (DCCEEW 2022b), Profile and Threats Database (DCCEEW 2024), and other relevant literature.

Habitat requirements used to map habitat for the species, and description of the presence of habitat within the proposed action area are presented in (Table 9-11).

In total, 73.9 ha of foraging and dispersal habitat for the species has been mapped within the proposed action area (Figure 9-8) (Table 9-11). No breeding habitat is present within the proposed action area.

Table 9-11: Habitat requirements and presence of habitat within the proposed action area – Australian painted snipe

Habitat category	Habitat requirements and mapping rules	Presence in proposed action area
Breeding habitat	• Shallow wetland with areas of bare mud with upper and canopy cover nearby • Islands in freshwater wetlands – shallow water, exposed mud and dense low cover	Breeding habitat features were not present within the proposed action area. The Recovery Plan for Australian painted snipe (DCCEEW 2022b) notes that gilgai provide suitable breeding habitat for the species. However, gilgai mapped within the proposed action area lack the microhabitat features (adjacent upper and canopy cover, and/or dense low cover) required for breeding habitat and have therefore not been mapped as breeding habitat.
Foraging and dispersal habitat	• Shallow freshwater wetlands, temporary and permanent lakes, swamps and claypans • Rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum muehlenbeckia or canegrass or sometimes tea-tree (*Melaleuca* spp.) • Areas that are lined with trees, or that have some scattered fallen or washed-up timber.	Foraging and dispersal habitat for the species has been mapped within the proposed action area in RE 11.3.25 fringing the Isaac River, along Skeleton Gully, and along Teviot Brook (Figure 9-8). These ephemeral waterways are lined with trees, contain rank tussock vegetation and may seasonally provide habitat for the species following rain.

Figure 9-8: Australian painted snipe habitat and survey effort within the proposed action area

Habitat critical

Habitat critical for the survival of Australian painted snipe is described in the species Recovery Plan (DCCEEW 2022b) and can be considered to include:

- Any natural wetland habitat where the species is known or likely to occur (especially with suitable breeding habitat) within the indicative distribution map
- Any location outside the above area that may be periodically occupied by Australian Painted Snipe when wetland conditions are favourable.

Using the above definition, all mapped habitat within the proposed action area is considered habitat critical to the survival of the species. However, it should be noted:

- There is no breeding habitat present
- The species has not been recorded within the proposed action area
- The species has potential to use the habitat within the proposed action area when conditions are seasonally favourable but is unlikely to rely on the habitat at any stage of its lifecycle.

9.5.4 Significant residual impact

The Project will result in the loss of 1.9 ha of Australian painted snipe habitat.

Indirect impacts to the species or species habitat are considered unlikely to occur given the implementation of appropriate mitigation measures, as described in Section 6.

The Project has the potential for facilitated impacts through operation of the rail line, noting that operation is excluded from the proposed action description. Facilitated impacts are unlikely to be significant as the rail line is currently in operation and the Project will not facilitate a change in the usage of the rail line, only a change of location within ~ 2 km of the current rail line. There will be no change in operational impacts such fauna mortality or disturbance caused by light or noise.

An assessment against EPBC Act significant impact criteria is provided in Table 9-12 and concludes that significant residual impacts to Australian painted snipe are unlikely.

Table 9-12: Significant impact assessment – Australian painted snipe

Significant impact criteria	Significant impact?	Response to criteria
Lead to a long-term decrease in the size of a population	No	The species has not been recorded within the proposed action area. The species has potential to use the habitat within the proposed action area when conditions are seasonally favourable but is unlikely to rely on the habitat at any stage of its lifecycle. Clearing 1.9 ha of foraging and dispersal habitat will have a negligible impact on the population.
Reduce the area of occupancy of the species	No	The 1.9 ha of habitat for the species that will be cleared represents a fractional amount of the habitat available to the species within the proposed action area, and its removal would not reduce the AOO of the species.
Fragment an existing population into two or more populations	No	The species occurs as one continuous breeding population and is known to travel vast distances between habitats. Clearing 1.9 ha of foraging and dispersal habitat within the proposed action area is unlikely to fragment the population.
Adversely affect habitat critical to the survival of the species	No	The proposed action area is considered to contain habitat critical to the survival of the species. Clearing of 1.9 ha of foraging and dispersal habitat is unlikely to adversely affect habitat critical to the survival of the species particularly in consideration of the large amounts of habitat that will remain available for the species. The species is mobile and will be able to continue to access habitat within the proposed action area.
Disrupt the breeding cycle of a population	No	The proposed action area does not contain breeding habitat. The species has potential to use the foraging and dispersal habitat within the proposed action area when conditions are seasonally favourable but is unlikely to rely on the habitat at any stage of its lifecycle.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	The species has not been recorded within the proposed action area. The species has potential to use the habitat within the proposed action area when conditions are seasonally favourable but is unlikely to rely on the habitat at any stage of its lifecycle. Clearing 1.9 ha of foraging and dispersal habitat will have a negligible impact on the species.

Significant impact criteria	Significant impact?	Response to criteria
Result in invasive species that are harmful to the species becoming established in the species' habitat	No	Potential threats to the species include the replacement of native wetland vegetation by invasive weeds, and predation by foxes and cats (DCCEEW 2022b). Invasive weeds and pest fauna are already present within the proposed action area. Weed management practices will be implemented to ensure the risk of introduction and spread of invasive species is minimised. These include strict vehicle and equipment washdown procedures.
Introduce disease that may cause the species to decline	No	There are no diseases of note which threaten Australian painted snipe (DCCEEW 2022b). Strict procedures for washdown of equipment and vehicles are in place to reduce the likelihood of introduction of any disease.
Interfere with the recovery of the species	No	The Recovery Plan for Australian painted snipe (DCCEEW 2022b) lists strategies and objectives for the recovery of the species. These include actions to: • Manage and protect known Australian Painted Snipe habitat at the landscape scale • Develop and apply techniques to measure changes in population trajectory in order to measure the success of recovery actions • Reduce, or eliminate threats at breeding and non-breeding habitats • Undertake research to improve knowledge of the habitat requirements, biology and behaviour of Australian Painted Snipe • Engage community stakeholders to improve awareness of the conservation of Australian Painted Snipe • Coordinate, review and report on recovery progress The Project will result in the loss of 1.9 ha of habitat for the species, which will have a negligible impact on the species. No other threats to the species are likely to be exacerbated by the Project. The Project is unlikely to interfere with the recovery of the species.

9.6 Ornamental snake (*Denisonia maculate*)

Ornamental snake (*Denisonia maculate*) is listed as vulnerable under the EPBC Act.

9.6.1 Key outcomes of the assessment

- Ornamental snake has not been recorded in the proposed action area.
- The proposed action area includes foraging and dispersal habitat for the ornamental snake.
- The Project will result in the removal of 0.2 ha of foraging and dispersal habitat.
- An assessment against EPBC Act significant impact criteria concludes that significant residual impacts to ornamental snake are unlikely.

9.6.2 Distribution and ecology

Ornamental snake has a restricted distribution, occurring within the Brigalow Belt North and Brigalow Belt South bioregions in Central Queensland where they are only known from the drainage system of the Fitzroy and Dawson rivers (DoE 2014). The species is sparsely distributed within this range and their population size is not known.

Ornamental snakes inhabit woodland and open forest habitats in moist areas (DCCEEW 2024). This includes floodplains, undulating clay pans, near waterbodies such as swamps and lakes, and along watercourses (DoE 2014). They have also been recorded in adjoining areas of elevated ground such as coolabah, poplar box, and brigalow woodlands or open woodlands, and in fringing vegetation along watercourses (DoE 2014). The species feeds almost exclusively on frogs, which dictates their habitat preferences (DCCEEW 2024). Ornamental snakes are habitat specialists and depend closely on gilgais for foraging and refuge habitat. Their preferred habitat is woodland or open forest associated with gilgai mounds and depressions on clay plains (QLD RE land zone 4). Ornamental snakes are often associated with brigalow dominated communities, including Brigalow TEC.

Habitat features for ornamental snake include (DCCEEW 2024):

- Areas in the lowest part of the catchment, subject to flooding and frequent inundation
- A diversity of gilgai size and depth
- Deep cracking clay soils with high water retention capacity
- Logs, coarse woody debris and ground litter for shelter
- Abundance of burrowing frogs
- Habitat patches larger than 10 ha, within or with good connectivity to larger patches of remnant vegetation

9.6.3 Presence in the proposed action area

No ornamental snakes were recorded during field surveys of the proposed action area. However, the species is considered likely to occur due to the presence of habitat for the species and an historical record of the species from 2003 (ALA 2024).

In total, 21 publicly available records of the species since 1980 exist within 15 km of the proposed action area boundary (ALA 2024) (Table 9-13, Figure 9-9).

Table 9-13: Publicly available records of ornamental snake within 15 km of the proposed action area

Year	No. records	Habitat	Source
2003	1	Unknown	ALA
2004	10	Unknown	ALA
2012	9	Unknown	ALA
2013	1	Unknown	ALA

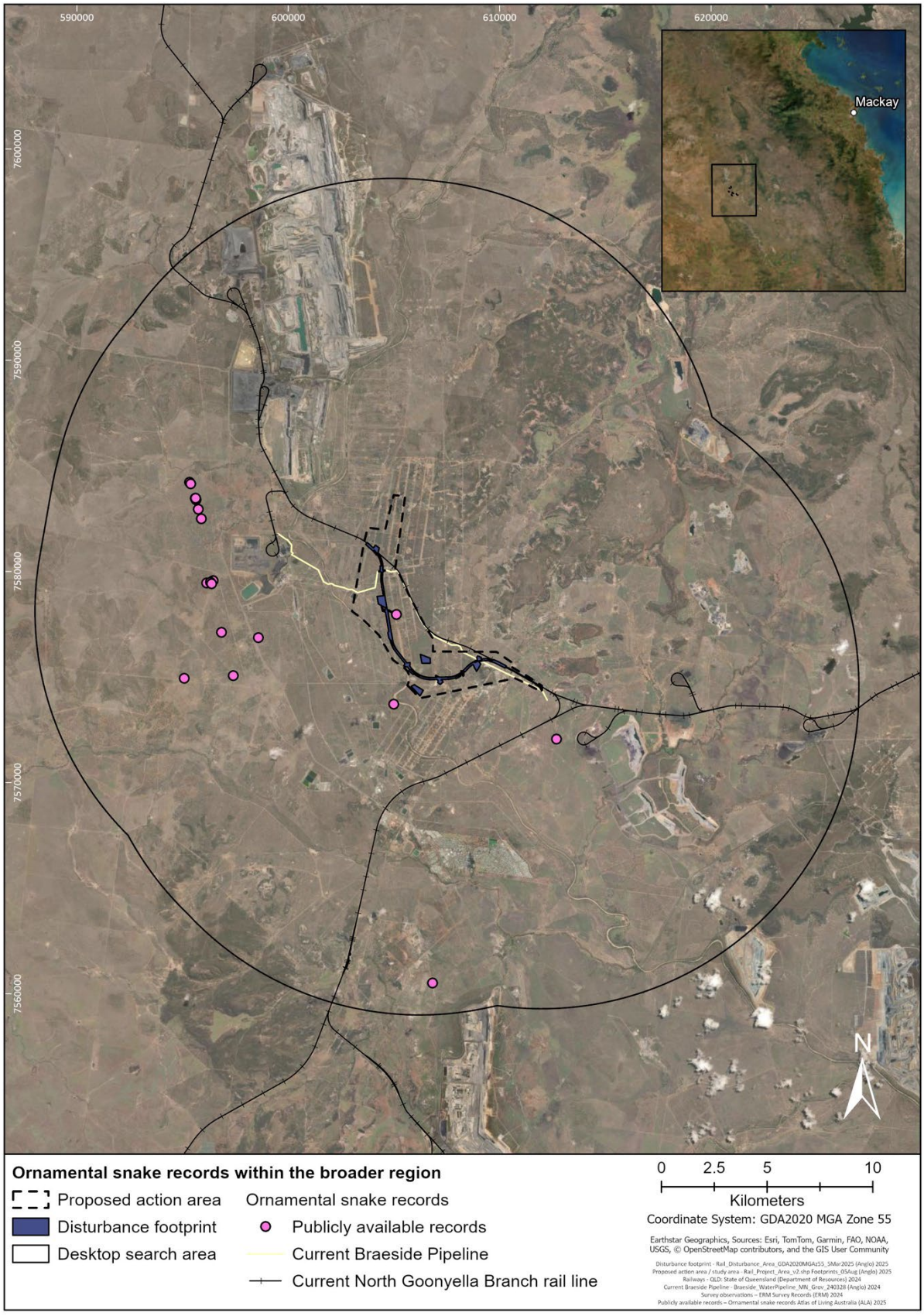

Figure 9-9: Ornamental snake records within the broader region

Habitat for ornamental snake has been mapped within the proposed action area using definitions provided in the species' Conservation Advice (DoE 2014), *Draft referral guidelines for the nationally listed Brigalow Belt reptiles* (DCCEEW 2023), and other relevant literature. Habitat assessments were undertaken in the field, recording microhabitat features:

- Evidence of gilgai mounds and depressions
- Abundance of woody debris
- Presence/absence of soil cracks and depth of cracks
- Whether habitat location is prone to seasonal flooding.

Habitat requirements used to map habitat for the species, and description of the presence of habitat within the proposed action area are presented in Table 9-14.

In total, 16.3 ha of habitat for ornamental snake has been mapped within the proposed action area, comprising preferred foraging and dispersal habitat containing refuge features (Table 9-14, Figure 9-10). These habitat types include representation of areas capable of providing food sources for the species (i.e. frog species).

Table 9-14: Habitat requirements and presence of habitat within the proposed action area – Ornamental snake

Habitat category	Habitat class	Habitat requirements and mapping rules	Presence in proposed action area
Refuge habitat	Preferred/high quality habitat	• Within soil cracks on gilgai mounds in ground truthed REs 11.4.3, 11.4.6, 11.4.8, 11.4.9. • Within soil cracks on gilgai mounds in Brigalow (*Acacia harpophylla*), Gidgee (*Acacia cambagei*), Blackwood (*Acacia argyrodendron*), Coolibah (*Eucalyptus coolabah*).	Refuge features occur within patches of preferred foraging and dispersal habitat mapped within the proposed action area due to the presence of gilgai mounds and depressions, woody debris, soil cracks, and seasonal flooding.
Foraging and dispersal habitat	Preferred/high quality habitat	• Open forests and woodlands in moist areas, particularly gilgai mounds and depressions (considered important habitat) (LZ 4). • Lake margins and wetlands. • Gilgai formations where deep-cracking alluvial soils with high clay content occur. • Ground truthed REs 11.4.3, 11.4.6, 11.4.8, 11.4.9. • Brigalow (*Acacia harpophylla*) dominated vegetation communities. • Gidgee (*Acacia cambagei*) dominated vegetation communities. • Blackwood (*Acacia argyrodendron*) dominated vegetation communities. • Coolibah (*Eucalyptus coolabah*) dominated vegetation communities. • Pure grassland associated with gilgais. • Habitat patches are typically greater than 10 hectares in area and are within, or	One patch of Eucalypt woodland (remnant 11.3.25) along Skeleton Gully, and two patches of Brigalow woodland (remnant and regrowth RE 11.4.9) in the northern half of the proposed action area. This habitat has been mapped as foraging and dispersal habitat containing refuge features, due to the presence of gilgai mounds and depressions, woody debris, soil cracks, and seasonal flooding. Gilai were dry at the time of survey (ERM 2024). No frog species were identified within brigalow woodland or brigalow regrowth during the field surveys, however, the presence of gilgai and areas of seasonal flooding suggest they are likely to occur.

Habitat category	Habitat class	Habitat requirements and mapping rules	Presence in proposed action area
		connected, to larger areas of remnant vegetation.	
Foraging and dispersal habitat	General/low quality habitat	• Ground truthed REs 11.3.3, 11.5.16. • Gilgai mounds and depressions in non-acacia or brigalow woodlands.	No low quality foraging and dispersal habitat has been mapped within the proposed action area.
Not habitat		Areas lacking the above features required to constitute habitat for the species	The remaining areas within the proposed action area do not constitute habitat for the species. Within the proposed action area, some patches of Brigalow woodland have a sparse understory and dense cover of grasses. These areas lack microhabitat features such as gilgai, cracking soils or woody debris, and thus do not provide habitat for the species.

Figure 9-10: Ornamental snake habitat, records, and survey effort within the proposed action area

Important populations

Important populations of ornamental snake have not been identified because population information is limited (DCCEEW 2023). The *Draft Referral guidelines for the nationally listed Brigalow Belt reptiles* (DCCEEW 2023) state that important habitat is to be used as a surrogate for important populations of ornamental snake. Gilgai mounds and depressions are listed as known important habitat for the species, with habitat connectivity between gilgais and other suitable habitats also important.

As the proposed action area is known to contain gilgai mounds and depressions, it can be considered that the proposed action area contains important habitat and therefore an important population.

Habitat critical

Habitat critical for the survival of the ornamental snake has not been formally defined. However, under the *EPBC Act Significant Impact Guidelines* (DoE 2013b), habitat critical to the survival of the ornamental snake would include areas that are necessary for:

- Activities such as foraging, breeding, roosting, or dispersal important for the long-term maintenance of the species
- Maintaining genetic diversity and long-term evolutionary development, or
- The reintroduction of populations or recovery of the species.

Based on this definition, habitat for ornamental snake within the proposed action area is considered habitat critical to the survival of the species as:

- Refuge features including gilgai mounds and depressions, woody debris, soil cracks, and seasonal flooding are present within habitat
- Suitable food species are present

9.6.4 Significant residual impact

The Project will result in the loss of 0.2 ha of ornamental snake habitat.

Indirect impacts to the species or species habitat are considered unlikely to occur given the implementation of appropriate mitigation measures, as described in Section 6.

The Project has the potential for facilitated impacts through operation of the rail line. Facilitated impacts are unlikely to be significant as the rail line in currently in operation. The Project will not facilitate a change in the usage of the rail line, only a change of location within ~ 2 km of the current rail line. There will be no change in operational impacts such fauna mortality or disturbance caused by light or noise.

An assessment against EPBC Act significant impact criteria is provided in Table 9-15 and concludes that significant residual impacts to ornamental snake are unlikely.

Table 9-15: Significant impact assessment – ornamental snake

Significant impact criteria	Significant impact?	Response to criteria
Lead to a long-term decrease in the size of an important population	No	Important habitat is regarded as a surrogate for important populations of ornamental snake as the species is cryptic (DCCEEW 2023). The proposed action area contains important habitat for the ornamental snake due to the presence of gilgai. The project will remove of 0.2 ha of habitat for ornamental snake from the edge of a single habitat patch. This will have negligible impact on any population present in the proposed action area.
Reduce the area of occupancy of an important population	No	The 0.2 ha of habitat for the species that will be cleared represents a fractional amount of the habitat available to the species within the proposed action area, and its removal would not reduce the AOO of the species.
Fragment an existing important population into two or more populations	No	The disturbance footprint intersects the edge of one patch of ornamental snake habitat. This patch is already disconnected from other patches of ornamental snake habitat in the proposed action area. No patches of ornamental snake habitat will be internally fragmented by the Project. Clearing 0.2 ha of ornamental snake habitat within the proposed action area is unlikely to provide significant barriers to the movement of ornamental snake or fragment the population if present within the proposed action area.
Adversely affect habitat critical to the survival of the species	No	Ornamental snake habitat within the proposed action area is considered habitat critical to the survival of the species. The Project will result in the loss of 0.2 ha of this habitat, which is a fraction of the habitat available to the species within the proposed action area. Clearing 0.2 ha of habitat from the edge of a single habitat patch will have negligible impact on habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	No	Breeding habitat requirements are not known for ornamental snake; however, they are likely to be similar to foraging requirements. The loss of 0.2 ha of habitat for

Significant impact criteria	Significant impact?	Response to criteria
		ornamental snake is unlikely to disrupt the breeding cycle of any ornamental snake population present within the proposed action area.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No	The 0.2 ha of habitat for the species that will be cleared represents a fractional amount of the habitat available to the species within the proposed action area. No indirect impacts to species habitat are anticipated.
Result in invasive species that are harmful to the species becoming established in the species' habitat	No	Feral pigs are known to threaten ornamental snake through the destruction of habitat. The Project is unlikely to increase the occurrence of feral pigs, which already occur within the proposed action area. Cane toads also pose a threat to ornamental snake through ingestion. The occurrence of cane toads is unlikely to increase as a result of the Project.
Introduce disease that may cause the species to decline	No	No diseases are noted to be a threat to the species. Strict procedures for washdown of equipment and vehicles are in place to reduce the likelihood of introduction of any disease.
Interfere with the recovery of the species	No	The Conservation Advice for ornamental snake (DoE 2014) lists threat abatement and recovery priority actions. These include actions to avoid and minimise habitat loss, disturbance, and modification, control and manage introduced pests, and raise awareness of ornamental snake. The Project will result in the loss of 0.2 ha of habitat for the species, which will have a negligible impact on the species. No other threats to the species are likely to be exacerbated by the Project. The Project is unlikely to interfere with the recovery of the species.

9.7 Brigalow (*Acacia harpophylla* dominant and codominant)

Brigalow (*Acacia harpophylla* dominant and codominant) (Brigalow TEC) is listed as endangered under the EPBC Act.

9.7.1 Key outcomes of the assessment

- Brigalow TEC has been confirmed within the proposed action area, comprising patches of remnant RE 11.3.1.
- The Project will result in the removal of 7.8 ha of Brigalow TEC, with the loss occurring from the edge of one patch of the TEC.
- No patches will split in two and no total patches will be lost or reduced down below 0.5 ha (i.e. below functionality limits for the TEC).
- An assessment against EPBC Act significant impact criteria concludes that significant residual impacts to Brigalow TEC are unlikely.

9.7.2 Distribution and ecology

The Brigalow TEC occurs in semi-arid areas mostly west of the Great Dividing Range, in New South Wales and Queensland. It is known to occur across a large geographic range, extending west as far as Bourke and Blackall, north almost to Townsville, QLD, and south to Narrabri, NSW. However, Brigalow TEC has undergone a severe decline in extent due to clearing since the 1950s, and now covers less than 10% of its former area (DoE 2013a).

Brigalow TEC is an open forest to open woodland, characterised by the presence of Brigalow (*Acacia harpophylla*) as one of the most abundant tree species (DoE 2013a). Brigalow may be dominant, or co-dominant with species including *Casuarina cristata* (Belah), *Acacia* spp., or *Eucalyptus* spp. There is usually a prominent shrub layer. The height of the tree layer varies with rainfall from 9 m in low rainfall areas to 25 m in higher rainfall areas.

Within the Brigalow Belt Bioregion, Brigalow TEC comprises 12 regional ecosystems, across six land zones (DoE 2013a). For inclusion as part of the EPBC listed community, patches of these 12 REs must meet key diagnostic criteria and thresholds:

- Brigalow (*Acacia harpophylla*) is either dominant or co-dominant in the tree-layer
- Patch size is ≥ 0.5 ha
- Exotic perennial species comprise < 50% of total vegetation cover.

Patches of regrowth vegetation which resemble the identified RE may be considered part of Brigalow TEC providing they have not been comprehensively cleared in the last 15 years (not just thinned).

9.7.3 Presence in the proposed action area

Brigalow TEC has been confirmed within the proposed action area, comprising patches of remnant RE 11.3.1. The disturbance footprint intersects Brigalow TEC in

one location: a single patch of remnant RE 11.3.1 along Skeleton Gully (Figure 9-11).

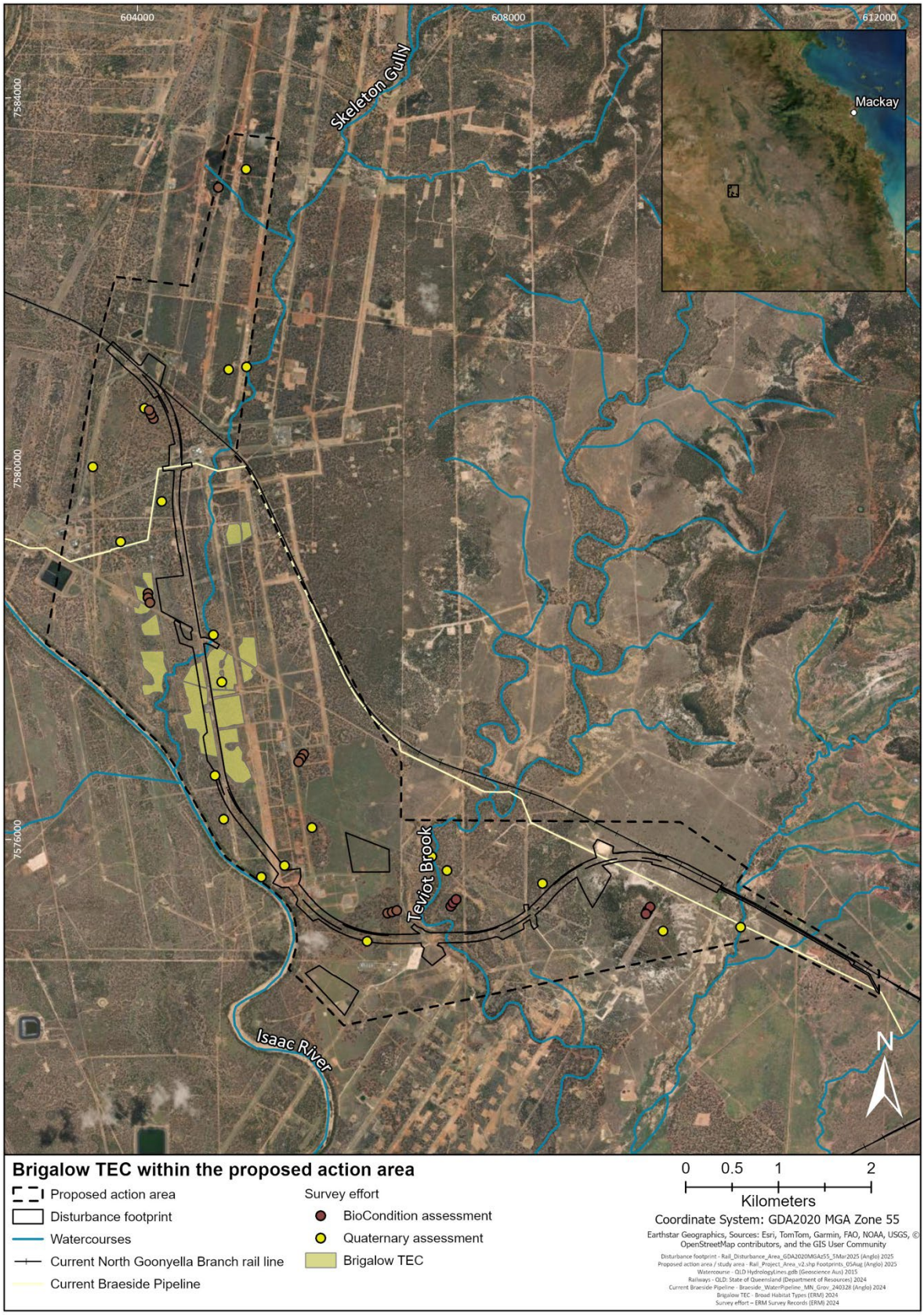

Figure 9-11: Brigalow TEC within the proposed action area

An analysis of potential patches of Brigalow TEC within the proposed action area against key diagnostic criteria and condition thresholds is presented in Table 9-16.

Table 9-16: Brigalow TEC key diagnostic criteria and condition thresholds

Key diagnostic characteristics	Application to the proposed action area
The presence of *Acacia harpophylla* as one of the most abundant tree species in the patch. *A. harpophylla* is either dominant in the tree layer, or co-dominant with other species (notably Casuarina cristata, other species of *Acacia*, or species of *Eucalyptus*).	Within the proposed action area, *Acacia harpophylla* is one of the most abundant trees within areas mapped as: • Remnant RE 11.4.9 • Brigalow regrowth
AND	
In Queensland - the patch is in one of the following Qld bioregions (including outliers) and it meets the description of one of 16 Qld REs determined at the time of the national listing of the Brigalow ecological community under the EPBC Act. The 16 REs are, as described by the Queensland Herbarium (2013): • In the Qld Brigalow Belt Bioregion – REs 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.14 and 11.12.21; • In the Qld Southeast Queensland Bioregion – REs 12.8.23, 12.9-10.6 and 12.12.26; or, • In the Qld Mulga Lands Bioregion – RE 6.4.2.	The proposed action area is located within the Brigalow Belt Bioregion. The following remnant REs within the proposed action area may constitute Brigalow TEC: • RE 11.4.9
AND/OR	
The vegetation in the patch is brigalow regrowth with species composition and structural elements broadly typical of one of the identified Qld REs or NSW vegetation communities (although species density may be reduced). This can be assumed to be the case where it has been at least 15 years since it was last comprehensively cleared (not just thinned); unless direct evidence proves otherwise.	During field verification, areas mapped as brigalow regrowth were found to have low canopy cover, short height, and low diameter indicating they are unlikely to be older than 15 years.
Condition thresholds	
The patch is 0.5 ha or more in size	All patches of RE 11.4.9 within the proposed action area are larger than 0.5 ha
AND	
Exotic perennial plants comprise less than 50% of the total vegetation cover of the patch, as assessed over a minimum sample area of 0.5 ha (100 m by 50 m), that is representative of the patch.	Patches of RE 11.4.9 were assessed to meet weed cover condition threshold during field verification.
Note: Vegetation that has been comprehensively cleared (not just thinned) within the last 15 years	During field verification, areas mapped as brigalow regrowth

Key diagnostic characteristics	Application to the proposed action area
should be excluded from the listed Brigalow ecological community	were found to have low canopy cover, short height, and low diameter indicating they are unlikely to be older than 15 years.

The proposed action area has historically been used for grazing and mining activities. These activities have resulted in the clearing of some areas that would have historically constituted Brigalow TEC.

Within the proposed action area, 85.3 ha of remnant RE11.4.9 has been ground-truthed as Brigalow TEC (as per Table 9-16 above). Areas of brigalow regrowth do not meet the condition thresholds required to be considered part of the TEC.

Habitat critical

All areas which meet the key diagnostic characteristics and condition thresholds for Brigalow TEC, plus the buffer zone surrounding these areas, are considered critical to the survival of the community (DoE 2013a).

All patches of Brigalow TEC and the adjacent vegetation are considered areas critical to the survival of the ecological community (DoE 2013a).

9.7.4 Significant impact assessment

The Project will result in the loss of 7.8 ha of Brigalow TEC.

Indirect impacts to the Brigalow TEC are considered unlikely to occur given the implementation of appropriate mitigation measures, as described in Section 6.

An assessment against EPBC Act significant impact criteria is provided in Table 9-17 and concludes that significant residual impacts to Brigalow TEC are unlikely.

Table 9-17: Significant impact assessment – Brigalow TEC

Significant impact criteria	Significant impact	Response to criteria
Reduce the extent of an ecological community	Unlikely	The Project will result in the loss of 7.8 ha of Brigalow TEC. Habitat will be lost from the edge of one patch of the TEC. No patches will split in two and no total patches will be lost or reduced down below 0.5 ha (i.e. below functionality limits for the TEC). The TEC already exists in fragmented patches through the extent of its occurrence.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Unlikely	The Project will result in the loss of 7.8 ha of Brigalow TEC. Habitat loss will be linear along the edge of one habitat patch, and is adjacent to an already cleared area. No patches of Brigalow TEC will be internally fragmented. The TEC already exists in fragmented patches through the extent of its occurrence. The Project is unlikely to fragment or increase fragmentation of Brigalow TEC.
Adversely affect habitat critical to the survival of an ecological community	Unlikely	Any patch of vegetation that meets the criteria for Brigalow TEC is considered habitat critical to the survival of the TEC. The Project will result in the loss of 7.8 ha from the edge of one patch of Brigalow TEC. This patch will remain large enough to maintain ecological function, and no other patches will be impacted. Adjacent to Brigalow TEC, the disturbance footprint intersects areas that are primarily already cleared. The TEC already exists in fragmented patches through the extent of its occurrence and maintains ecological functionality in this state. The Project is unlikely to adversely affect habitat critical to the survival of Brigalow TEC.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Unlikely	Disturbance to abiotic factors will be minimal, as erosion and sediment control measures will be in place to ensure impacts to soil and water quality are negligible. The disturbance footprint crosses two waterways: Skeleton Gully (stream order 3) and Teviot Brook (stream order 4), which flow into the Isaac River. Appropriate crossings will be in place to ensure that the hydrology of these waterways is not significantly impacted. The

Significant impact criteria	Significant impact	Response to criteria
		Project is unlikely to alter groundwater levels or substantially alter surface water drainage patterns.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Unlikely	The Project will result in the loss of 7.8 ha of Brigalow TEC. Habitat loss will be linear along the edge of one habitat patch, and is adjacent to an already cleared area. Indirect impacts are unlikely. Weed management practices will be implemented to ensure the risk of introduction and spread of invasive species is minimised. These include strict vehicle and equipment washdown procedures. No activities such as regular burning or flora and fauna harvesting will occur.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community	Unlikely	The Project will result in the loss of 7.8 ha of Brigalow TEC. Habitat loss will be linear along the edge of one habitat patch, and is adjacent to an already cleared area. Indirect impacts are unlikely. Weed management practices will be implemented to ensure the risk of introduction and spread of invasive species is minimised. These include strict vehicle and equipment washdown procedures.
Interfere with the recovery of an ecological community.	Unlikely	The conservation advice for Brigalow TEC lists priority recovery and threat abatement actions for the community. These include threat reduction and control, land management, management for wildlife. The Project will result in the loss of 7.8 ha of Brigalow TEC. Indirect impacts to the TEC are considered unlikely to occur given the implementation of appropriate mitigation measures. The minimal loss of habitat is unlikely to interfere with the recovery of the TEC.

10 Cumulative impact Assessment

10.1 Values considered

The values considered in this assessment are threatened and migratory species considered to be at risk of impact from the Project. A Project-specific assessment of these species and TECs is presented above in Section 9. These MNES are considered here with respect to cumulative impacts and include:

- Koala
- Greater glider (central and southern)
- Squatter pigeon (southern)
- Australian painted snipe
- Ornamental snake
- Brigalow TEC

10.2 Actions included in assessment

Cumulative impacts were assessed for all proposed actions within the Northern Bowen Basin IBRA subregion that have been referred under the EPBC Act since 2014. This approach assumes that actions, which have not been referred to the DCCEEW would not have a significant impact to MNES and would make a negligible contribution to cumulative impacts. The level of uncertainty for any action not yet referred was considered unreasonably high for consideration in the cumulative impact assessment.

A further analysis of the list of referred proposed actions was undertaken to determine their likely contribution to cumulative impacts on the species of interest for this assessment. Proposed actions were excluded from further consideration if their activities were temporary impacts which do not overlap with the Project timeline, if their disturbance footprint was substantially outside of the Northern Bowen Basin, or if the proposed action is unlikely to go ahead (referral withdrawn).

Proposed actions that were taken forward for analysis of cumulative impacts are described in Table 10-1 as those with potential cumulative impacts. Proposed actions that were not included in the analysis of cumulative impacts are also listed in Table 10-1. These proposed actions include those unlikely to impact the species of interest, and proposed actions that were assessed as not relevant to the cumulative impact assessment (largely due to their location, or likelihood of going ahead).

Table 10-1: Proposed actions investigated in cumulative impact assessment

Reference Number	Title of referral	Stage	Referral Outcome	Species present	Notes
Potential cumulative impacts					
2024/09791	Barada Barna Road upgrade	Undergoing Assessment	Controlled Action	Squatter pigeon, koala, greater glider, Australian painted snipe, ornamental snake	Proposed disturbance of 32.65 ha of squatter pigeon habitat, 28.75 ha of koala habitat, 13.74 ha of greater glider and 5.14 ha of ornamental snake habitat
2023/09757	Saraji Mine Grevillea Pit Continuation Project	Undergoing Assessment	Controlled Action	Ornamental snake, squatter pigeon, greater glider, koala, Brigalow TEC	Proposed disturbance of 14.2 ha of ornamental snake, 39 ha of squatter pigeon habitat, 9.7 ha of greater glider habitat, 9.7 ha of koala habitat and 3.1 ha of Brigalow TEC
2023/09723	Blackwater Mine – North Extension Project	Undergoing Assessment	Controlled Action	Australian painted snipe, ornamental snake, squatter pigeon, koala, Brigalow TEC	Proposed disturbance of 94.3 ha of Australian painted snipe habitat, 85.7 ha of ornamental snake habitat , 36.2 ha of squatter pigeon habitat and 26.9 ha of koala habitat Brigalow TEC present but not impacted
2023/09689	Comet Ridge Mahalo North Coal Seam Gas Project	Undergoing Assessment	Controlled Action	Brigalow TEC, squatter pigeon, ornamental snake, Australian painted snipe, koala	Proposed disturbance of 1.17 ha of koala and squatter pigeon habitat Proposed disturbance of 0.89 ha of ornamental snake and Australian painted snipe habitat Brigalow TEC present but not impacted
2023/09708	Vulcan South Coal Mine	Undergoing Assessment	Controlled Action	Brigalow TEC, squatter pigeon, koala, greater glider, ornamental snake	Proposed disturbance of 71.2 ha of Brigalow TEC, 1,470 ha of squatter pigeon habitat, 833 ha of koala habitat, 50.7 ha of greater glider habitat and 100.5 ha of ornamental snake habitat
2023/09627	Capricornia Energy Hub (CEH) Transmission Project	Referral Decision	Controlled Action	Koala, greater glider, squatter pigeon	Proposed disturbance footprint of 215 ha
2022/09361	Vulcan Coal Mine – Matilda Pit and Ancillary Infrastructure	Undergoing Assessment	Controlled Action	Koala, greater glider, squatter pigeon	Proposed disturbance footprint of 93.3 ha
2022/09350	Peak Downs Mine Continuation Project	Undergoing Assessment	Controlled Action	Koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake, Brigalow TEC	Proposed clearing within a 4,062 ha proposed action area – footprint to be determined following detailed planning. Likely a significant impact.

Reference Number	Title of referral	Stage	Referral Outcome	Species present	Notes
2022/09329	Queensland Pacific Metals (QPM) Energy Project, high-pressure gas pipeline and gas compression facility	Post-Approval	Controlled Action	Koala, greater glider, squatter pigeon, ornamental snake, Brigalow TEC	Approved clearance of 31.68 ha of squatter pigeon habitat and 55.67 ha of ornamental snake habitat. No significant impacts for koala, greater glider, Brigalow TEC.
2021/9031	Caval Ridge Mine Horse Pit Extension, Bowen Basin	Undergoing Assessment	Controlled Action	Squatter pigeon, Australian painted snipe, ornamental snake	Proposed disturbance footprint of 911 ha
2021/8980	Isaac River Coal Mine Project	Post-Approval	Controlled Action	Ornamental snake	Approved clearance of 25 ha ornamental snake habitat. Brigalow TEC, greater glider, squatter pigeon also present but no impacts to habitat.
2020/8778	New Lenton Coal Project, 65kms north of Moranbah, QLD	Assessment Approach	Controlled Action	Koala, greater glider	Proposed disturbance area of 658 ha. Brigalow TEC, squatter pigeon, ornamental snake present but not impacted.
2020/8676	Vulcan Complex Project	Post-Approval	Controlled Action	Koala, squatter pigeon	Approved clearance of 203.5 ha koala habitat, 170 ha of squatter pigeon breeding habitat and 209.8 ha squatter pigeon foraging habitat.
2019/8576	Spring Creek to Phillips Creek Diversion	Post-Approval	Controlled Action	Koala, Squatter Pigeon, ornamental snake, Brigalow TEC	Approved clearance of 74 ha koala habitat. Impacts to squatter pigeon, ornamental snake, Brigalow TEC not significant.
2019/8504	Vulcan Bulk Sample Project	Completed	Not Controlled Action	Koala, squatter pigeon	12.9 ha of koala habitat and 18.2 ha squatter pigeon habitat within disturbance footprint. No significant impacts
2019/8460	Winchester South Project Mine Site and Access Road, near Moranbah, Qld	Assessment	Controlled Action	Koala, greater glider, squatter pigeon, ornamental snake	Proposed impacts to 168.9 ha koala habitat, 132.8 ha greater glider habitat, 115.5 ha squatter pigeon, 1,834.2 ha ornamental snake habitat. Brigalow TEC also present but not impacted. Australian painted snipe likely present but unlikely to be impacted
2019/8459	Winchester South Project Water Pipeline, near Moranbah, Qld	Assessment Approach	Controlled Action	Koala, greater glider, squatter pigeon, ornamental snake	Covered by same EIS as 2019/8460. Part of larger project

Reference Number	Title of referral	Stage	Referral Outcome	Species present	Notes
2019/8458	Winchester South Project Electricity Transmission Line, near Moranbah, Qld	Assessment Approach	Controlled Action	Koala, greater glider, squatter pigeon, ornamental snake	Covered by same EIS as 2019/8461. Part of larger project
2019/8413	Isaac Downs coal mine project, near Moranbah, Qld	Post-Approval	Controlled Action	Koala, greater glider, squatter pigeon, ornamental snake	Approved clearance of 131.9 ha koala habitat, 120.9 ha greater glider habitat, 122.1 ha squatter pigeon habitat, 1735. Ha ornamental snake habitat. Brigalow TEC present but only 0.5 ha impacted
2018/8338	Moranbah North Extension Project, Moranbah, Qld	Post-Approval	Controlled Action	Koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake, Brigalow TEC	Approved clearance of 530 ha koala habitat, 530 ha greater glider habitat, 535 ha squatter pigeon habitat, 41 ha Brigalow TEC habitat. Impacts to Australian painted snipe unlikely to be significant.
2017/7957	MRA2C Project, South Walker Creek Operations	Post-Approval	Controlled Action	Koala, greater glider, squatter pigeon, ornamental snake, Brigalow TEC	Approved clearance of 670.9 ha koala habitat, 151 ha greater glider habitat 301.8 ha squatter pigeon habitat, 33.7 ha ornamental snake habitat, 32.7 ha Brigalow TEC
2017/7870	Olive Downs Project Rail Spur	Post-Approval	Controlled Action	koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake	Approved clearance of 43.5 ha koala habitat, 43.5 ha greater glider habitat, 40.5 ha squatter pigeon habitat, 6.5 ha Australian painted snipe habitat, 33 ha ornamental snake habitat. Part of larger Olive Downs project
2017/7869	Olive Downs Project Electricity Transmission Line	Post-Approval	Controlled Action	koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake	Approved clearance of 22 ha koala habitat, 20.5 ha greater glider habitat, 86.5 ha squatter pigeon habitat, 0.5 ha Australian painted snipe habitat, 10.5 ha ornamental snake habitat. Part of larger Olive Downs project.
2017/7868	Olive Downs Project Water Pipeline	Post-Approval	Controlled Action	koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake	Approved clearance of 28 ha koala habitat, 28 ha greater glider habitat, 21.5 ha squatter pigeon habitat, 1 ha Australian painted snipe habitat, 8 ha ornamental snake habitat. Part of larger Olive Downs project
2017/7867	Olive Downs Project Mine Site and Access Road	Post-Approval	Controlled Action	koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake, Brigalow TEC	Approved clearance of 5,758.97 ha koala habitat, 5,595.56 ha greater glider habitat, 5,345.79 ha squatter pigeon habitat, 114 ha Australian painted

Reference Number	Title of referral	Stage	Referral Outcome	Species present	Notes
					snipe habitat, 7,742.75 ha ornamental snake habitat, and 13 ha Brigalow TEC. Part of larger Olive Downs project
2016/7827	Extension to the existing Isaac Plains Mine, near Moranbah, Qld	Post-Approval	Controlled Action	Koala, squatter pigeon, ornamental snake	Approved clearance of 125 ha koala habitat, 74 ha squatter pigeon habitat, 1.4 ha ornamental snake habitat.
2016/7796	Construction and operation of an extension to the existing underground coal mine, Grosvenor Mine, ne	Post-Approval	Controlled Action	Koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake, Brigalow TEC	Approved clearance of 137.3 ha koala habitat, 17.2 ha greater glider habitat, 43.7 ha squatter pigeon habitat, 3.9 ha ornamental snake habitat, 18.1 ha Brigalow TEC. No significant impact to Australian painted snipe
2016/7791	Saraji East Mining Lease Project, Qld	Assessment	Controlled Action	Koala, greater glider, squatter pigeon, Australian painted snipe, ornamental snake, Brigalow TEC	Proposed clearing of 136.3 ha Koala habitat, 38.6 ha greater glider habitat, 113.6 ha squatter pigeon habitat, 386.2 ha ornamental snake habitat, 192 ha Brigalow TEC.
2016/7788	Goonyella Riverside Mine to South Walker Creek Mine Dragline Move	Completed	Controlled Action	Ornamental snake, Brigalow TEC	Approved clearing of 52.44 ha ornamental snake habitat, 9.73 ha Brigalow TEC.
2014/7272	South Walker Creek Mulgrave Pit mine extension, Nebo, QLD	Post-Approval	Controlled Action	Squatter pigeon, Ornamental snake, Brigalow TEC	Approved clearing of 17.5 ha ornamental snake habitat, 59 ha Brigalow TEC. No significant impact to squatter pigeon
2014/7240	Hail Creek coal mine extension transition project, Bowen Basin, Qld	Post-Approval	Controlled Action	Koala, squatter pigeon, Australian painted snipe, ornamental snake, Brigalow TEC	State approved clearing of 3,896.8 ha koala habitat, 13.07 ha greater glider habitat, 3,896.8 ha squatter pigeon habitat, 24.5 ha Australian painted sniped habitat, 1.1 ha ornamental snake habitat. No significant impact to ornamental snake.
Proposed actions assessed to have no impacts					
2015/7522	Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	Completed	Not Controlled Action	NA	Rabbit control – no impacts to species
2014/7396	Lilyvale Solar Farm Development, Emerald, QLD	Completed	Not Controlled Action	Squatter pigeon, Brigalow TEC	Negligible impacts to species

Reference Number	Title of referral	Stage	Referral Outcome	Species present	Notes
2014/7256	Mining exploration on Wards Well West Project, Bowen Basin, Qld	Completed	Not Controlled Action	Ornamental snake, Brigalow TEC	Negligible impacts to species
Proposed actions not included					
2023/09626	Capricornia Energy Hub (CEH) Pumped Hydro-electric Energy Storage (PHES) Project	Referral Decision	Controlled Action	NA	Project lies largely outside region
2021/9076	Valeria Project Rail Line from the mine site to Aurizon Goonyella Coal Chain	Completed	Controlled Action	NA	Withdrawn
2021/9075	Valeria Project Water Supply Pipeline Infrastructure from the mine site to the Oaky Creek Coal Mine	Assessment Approach	Controlled Action	NA	Withdrawn
2020/8708	Urannah Dam and Pipelines Project	Completed	Controlled Action	NA	Withdrawn
2017/8098	Gregory Solar Farm, north-east of Emerald, Qld	Completed	Not Controlled Action	NA	Footprint outside of subregion
2014/7132	The Broughton Coal Mine Project, Bowen Basin, QLD	Completed	Controlled Action	NA	Withdrawn

10.3 Assessment of cumulative impacts

Collectively, the proposed actions listed in Table 10-1 above have the following impacts on species and TECs of interest for this Project (Table 10-2).

Table 10-2: Cumulative impact areas - MNES of interest

Species	Cumulative impact
Koala	13,300 ha
Greater glider	6,856 ha
Squatter pigeon	13,012 ha
Australian painted snipe	259 ha
Ornamental snake	10,797 ha
Brigalow TEC	415 ha

The above impact totals do not include impacts from Peak Downs Mine Continuation Project (EPBC 2022/09350) which will result in the loss of habitat for all MNES listed above, within a proposed action area of 4,062 ha with disturbance to be determined after detailed planning.

The Project will result in the following loss of habitat for MNES (Table 10-3).

Table 10-3: Impacts to MNES habitat from the Project

Species	Impact Area
Koala	1.9 ha of breeding and foraging habitat 46.2 ha of dispersal habitat
Greater glider	1.0 ha of denning and breeding habitat 3.0 ha of foraging and dispersal habitat
Squatter pigeon	0.05 ha of breeding habitat 48.2 ha of foraging and dispersal habitat
Australian painted snipe	1.9 ha of habitat
Ornamental snake	0.2 ha of habitat
Brigalow TEC	7.8 ha

Indirect impacts to MNES are considered unlikely to occur as a result of the Project, given the implementation of appropriate mitigation measures, as described in Section 6. The loss of the above listed habitat for MNES is negligible in the context of the habitat that has already been lost, and is proposed to be lost within the Northern Bowen Basin subregion. The Project is unlikely to contribute significantly to cumulative impacts to MNES.

11 Environmental Offsets

Offsets are the final step in the mitigation hierarchy and must be provided to account for significant residual impacts to MNES. If significant impacts occur, the impacts would need to be compensated as per the EPBC Act Offset Policy.

Although the project impact assessment concluded that there will be no significant residual impacts on MNES, the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) has determined that environmental offsets are required. To meet this requirement, an Offset Management Plan (OMP) has been prepared, providing offsets for Brigalow TEC (Appendix 5).

The offset for Brigalow TEC is proposed to be a full land-based delivery. Habitat within the offset area will be managed to deliver a conservation gain for Brigalow TEC, improving the habitat quality by 1 point over a 20 year time period. This conservation gain will be achieved via improvement in existing habitat and reduction of threats. Key management actions include:

- Limiting vegetation clearing to only those areas required for maintaining fencing and fire control lines or ecological thinning upon recommendation from an ecologist
- Prohibiting alternate, incompatible land use and activities (e.g. timber harvesting, cropping)
- Restricting unauthorised access
- Excluding domestic livestock from the offset area except for the controlled grazing associated with fuel reduction in specified dry periods
- Controlling feral animals
- Managing fire
- Controlling weeds

Further detail on the offset and achieving conservation gain is provided in the OMP.

12 Consultation

The project is deemed to be of limited public interest as it is occurring on existing mining leases and is not an expansion or alteration of existing approved mining operations, or an expansion of existing approved infrastructure.

Anglo Coal has not undertaken, and does not intend to undertake, any formal public consultation for the Project in addition to the EPBC Act process other than as required for the Ministerial infrastructure designation process under the *Planning Act 2016* (Qld) for the water pipeline. The public consultation for the Ministerial infrastructure designation has not yet commenced and therefore there are no outcomes of this process yet.

Consultation is underway with Aurizon Network, Whitehaven, landholders, farming lease holders and agistees, overlapping tenement holders and infrastructure owners, local indigenous groups, the Department of Transport and Main Roads and the Isaac Regional Council.

Anglo American has a long-standing relationship with the Barada Barna People who are the recognised Traditional Owners of the land. A pre-existing Cultural Heritage Management Agreement (CHMA) and a number of Native Title agreements are in place with the Barada Barna Aboriginal Corporation and these agreements for the basis for ongoing consultation and engagement across the Moranbah North and Grosvenor mining leases.

In accordance with the CHMA, the Barada Barna People, as the Traditional Owners of the land, have completed an Aboriginal cultural heritage assessment of the proposed action area. Outcomes of the assessment are confidential however Anglo Coal can confirm that:

- The Barada Barna People have undertaken a survey for Aboriginal cultural heritage of the proposed action area in accordance with the CHMA. Engagement on the Project occurred as part of the survey process. The survey process is complete.
- Anglo Coal and the Barada Barna People agree to manage any conditions imposed or mitigation required for the Project as a result of the outcomes of the survey. The reporting process for the survey is complete. The specific outcomes of the survey and management actions are confidential.
- Any conditions imposed, or mitigation required, for the Project as a result of the survey will be formally managed through the processes under the CHMA.
- The Barada Barna People are a key stakeholder for Anglo Coal's mining operations. Engagement with the Barada Barna People is structured and regular. A formal committee made up of both Anglo Coal and Barada Barna People representatives implements the CHMA. This committee covers all projects activities under the CHMA, including the Project. Therefore, engagement on the Project will be ongoing through the committee.

- Specifically, Anglo Coal will engage with the Barada Barna People when implementing the outcomes of the survey, including with the Barada Barna People’s involvement.

13 Social and Economic Matters

The closest township to the proposed action area is the mining township of Moranbah, approximately 8 km to the south. The Project involves the relocation of the existing the North Goonyella Branch rail line (owned by DTMR and operated by Aurizon) and a water pipeline owned and operated by Whitehaven Coal (Braeside Pipeline) to maximise mining of the coal resource underneath. The rail line to be relocated is part of the Central Queensland Coal Network, which services the Bowen Basin coal region and is used for hauling coal.

The social and economic impacts of the action are outlined in the Table 13-1 below.

Table 13-1: Social and economic impacts

Element	Impact
Construction Workforce – Estimated 200 people	The temporary fluctuation in workforce accommodated in and around Moranbah due to the action is well within the range of background/business as usual fluctuations from regional industrial activities such as FIFO & DIDO rosters, dragline shutdowns, coal processing plant shutdowns and longwall moves. Any impacts will be managed through utilisation of FIFO and DIDO workforce where appropriate, with use of existing accommodation camps.
Traffic	The temporary fluctuations in road transport movements due to the action are within the background/business as usual fluctuations from regional industrial activities such as FIFO/DIDO rosters, over-sized loads, dragline shutdowns, coal processing plant shutdowns and longwall moves and are expected to have no net impact on road congestion. Management of any impacts will be done through relevant authorities i.e. escorts at specified times to minimise impacts
Extension of existing Moranbah North Mine by five (5) years	Increased term of employment for Moranbah North Employees and Contractors (estimated $2B of income for the FTE workforce of 1200 and support roles). Associated economic contribution to local and regional community. Continued payment of royalties to QLD Government (estimated $1.5B). Continued Tax contributions to State and Commonwealth Government (estimated $0.45B).

14 Ecologically Sustainable Development

The Project has been designed in consideration of the five principles of ecologically sustainable development (ESD) listed under Chapter 1, part 1, and Clause 3A of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Table 14-1 outlines the principles of ESD along with assessment outlining how the Project is consistent with these principles.

Table 14-1: Project consistency with principles of Ecologically Sustainable Development

Principle	Assessment
Decision-making processes should effectively integrate both long-term and short term economic, environmental, social and equitable considerations	Project planning has included detailed consideration of environmental matters through the referral and PD process, with the potential for social and economic issues also addressed through the associated public consultation program. Section 2.4 – Design approach and feasible alternatives, Section 12 – Consultation, and Section 13 – Social and Economic matters, outline long and short-term considerations of the Project.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation	The impact assessment undertaken for the Project indicates that serious or irreversible environmental damage is considered unlikely. Nonetheless, a suite of measures will be implemented to manage the potential for adverse impacts (refer to Section 6 – Avoidance and Mitigation).
The principle of intergenerational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations	The Project is required to enable access to the available resource of steel-making coal at the Moranbah North Mine, a critical resource for infrastructure development. One of the key considerations during project development was the minimisation of potential impacts to the environment. This is to ensure that the project can go ahead, with minimal impact to the health, diversity, and productivity of the environment, ensuring its maintenance for future generations.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making	Ecological assessments have been undertaken for the Project to assess potential impacts on threatened ecological communities, species, habitats and native vegetation, in consideration of impacts to biological diversity. Avoidance through design has been the primary guiding principle to reduce impacts on protected values. Impacts will be further avoided, minimised and reduced through the implementation of avoidance and mitigation measures (refer Section 6).
Improved valuation, pricing and incentive mechanisms should be promoted	The implementation of avoidance and mitigation measures will reduce potential adverse impacts to the environment and potentially result in fewer economic costs in the

Principle	Assessment
	construction and operation of the Project. For example, clearing and / or excavation more than required would result in additional expense.

15 Conclusion

Anglo Coal are proposing to relocation an 11 km section of the North Goonyella Branch rail line, Braeside Pipeline, and associated infrastructure to enable full utilisation of the identified coal resource and avoid sterilisation of coal reserves by the overlying infrastructure.

Detailed site assessment has been undertaken over the course of four field-based ecology assessments, with the results confirming the presence and potential for a number of MNES, including TECs, threatened and migratory species. The project design process involved avoiding and minimising impacts to MNES, however removal of habitat will be required for the construction of the Project.

An impact assessment has been undertaken to identify the types and potential severity of impacts from the Project on MNES, including direct impacts from construction, facilitated impacts the operation of the relocated rail line, and cumulative impacts. On the basis of the above information and assessment it is considered that the project is unlikely to have a significant residual impact on any MNES.

16 References

Atlas of Living Australia [ALA] (2024). Atlas of Living Australia website [online]. Available at: http://www.ala.org.au

Barth, B. J., FitzGibbon, S. I., Gillett, A., Wilson, R. S., Moffitt, B., Pye, G. W., ... & Ellis, W. A. (2019). Scattered paddock trees and roadside vegetation can provide important habitat for koalas (Phascolarctos cinereus) in an agricultural landscape. *Australian Mammalogy*, *42*(2), 194-203.

Bureau of Meteorology [BoM] (2024). *Climate Data Online*. Available at: http://www.bom.gov.au/climate/data/

Clarke, D. J., Pearce, K. A. and White, J. G. (2006). Powerline corridors: degraded ecosystems or wildlife havens? *Wildlife research* (East Melbourne), 33(8), pp.615–626.

Commonwealth of Australia (2000). *Weeds of National Significance: Parkinsonia (*Parkinsonia aculeata*) Strategic Plan*. Commonwealth of Australia and the National Weeds Strategy Executive Committee, 2000

Crowther, M. S., Rus, A. I., Mella, V. S., Krockenberger, M. B., Lindsay, J., Moore, B. D., & McArthur, C. (2022). Patch quality and habitat fragmentation shape the foraging patterns of a specialist folivore. *Behavioral Ecology*, *33*(5), 1007-1017.

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*. http://www.environment.gov.au/biodiversity/threatened/species/pubs/85104-conservation-advice-12022022.pdf

Department of Agriculture, Water and the Environment [DAWE] (2022b). *National Recovery plan for the Koala:* Phascolarctos cinereus *(combined populations of Queensland, New South Wales and the Australian Capital Territory)*. https://www.dcceew.gov.au/sites/default/files/documents/recovery-plan-koala-2022.pdf

Department of Climate Change, Energy, the Environment and Water [DCCEEW] (2022a). *Conservation Advice for* Petauroides volans *(greater glider (southern and central))*. Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Climate Change, Energy, the Environment and Water [DCCEEW] (2022b). *National recovery plan for the Australian Painted Snipe (*Rostratula australis*)*. Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Climate Change, Energy, the Environment and Water [DCCEEW], (2022c). *Threatened Species Strategy Action Plan 2022–2032*. Department of Climate Change, Energy, the Environment and Water, Canberra.

Department of Climate Change, Energy, the Environment and Water [DCCEEW] (2023). *Draft Referral guidelines for the nationally listed Brigalow Belt reptiles v1.1*. Department of Climate Change, Energy, the Environment and Water, Canberra

Department of Climate Change, Energy, the Environment and Water [DCCEEW] (2024). *Species Profile and Threats Database*. Available at: https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Department of Environment and Resource Management [DERM] (2010). *Building Nature's RESILIENCE. A Draft Biodiversity Strategy for Queensland*. State of Queensland.

Department of Environment and Science [DES] (2020a). *Flora Survey Guidelines – Protected Plants*. State of Queensland.

Department of Environment and Science [DES] (2020b). *State Code 25: Development in South East Queensland koala habitat areas*. State of Queensland.

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] (2011a). *Survey guidelines for Australia's Threatened Mammals*. Commonwealth of Australia, Canberra.

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] (2011b). *Survey guidelines for Australia's Threatened Reptiles*. Commonwealth of Australia, Canberra.

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] (2011c). *Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads*. Commonwealth of Australia.

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] (2012). *Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses*. Commonwealth of Australia.

Department of Sustainability, Environment, Water, Population and Communities [DSEWPC] (2013). *Approved Conservation Advice for* Rostratula australis *(Australian painted snipe)*. Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/77037-conservation-advice.pdf.

Department of the Environment, Water, Heritage and the Arts [DEWHA] (2008a). *Approved Conservation Advice for* Dichanthium setosum. Department of the Environment, Water, Heritage and the Arts, Canberra.

Department of the Environment, Water, Heritage and the Arts [DEWHA] (2008b). *Threat abatement plan for predation by the European red fox*. DEWHA, Canberra.

Department of the Environment, Water, Heritage and the Arts [DEWHA] (2008c). *Threat abatement plan for competition and land degradation by unmanaged goats*. DEWHA, Canberra.

Department of the Environment, Water, Heritage and the Arts [DEWHA] (2010). *Survey Guidelines for Australia's Threatened Birds: Guidelines for detecting birds listed as threatened under the EPBC Act*. Commonwealth of Australia, Canberra.

Department of the Environment [DoE] (2013a). *Approved Conservation Advice for the Brigalow (*Acacia harpophylla *dominant and co-dominant) ecological community.* Department of the Environment, Canberra.

Department of the Environment [DoE] (2013b). *Matters of National Environmental Significance – Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999.* Commonwealth of Australia.

Department of the Environment [DoE] (2014). *Approved Conservation Advice for* Denisonia maculata *(Ornamental Snake).* Department of the Environment, Canberra.

Department of the Environment [DoE] (2015). *Threat abatement plan for predation by feral cats*. Commonwealth of Australia.

Department of the Environment and Energy [DoEE] (2016). *Threat abatement plan for competition and land degradation by rabbits*. Commonwealth of Australia.

Department of the Environment and Energy [DoEE] (2017). *Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)*. Commonwealth of Australia.

Department of the Environment and Energy [DoEE] (2018). *Threat abatement plan for disease in natural ecosystems caused by* Phytophthora cinnamomi. Commonwealth of Australia.

Department of the Environment and Energy [DoEE] (2019). *Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains*. Department of the Environment and Energy, Canberra.

Dique, D. S., Thompson, J., Preece, H. J., de Villiers, D. L., & Carrick, F. N. (2003). Dispersal patterns in a regional koala population in south-east Queensland. *Wildlife Research*, *30*(3), 281-290.

Ellis, W. A. H., Melzer, A., Carrick, F. N., & Hasegawa, M. (2002). Tree use, diet and home range of the koala (Phascolarctos cinereus) at Blair Athol, central Queensland. *Wildlife Research*, *29*(3), 303-311.

Ellis, W. A., Melzer, A., & Bercovitch, F. B. (2009). Spatiotemporal dynamics of habitat use by koalas: the checkerboard model. *Behavioral Ecology and Sociobiology*, *63*, 1181-1188.

ERM (2024). *Grosvenor Coal Mine – Baseline Ecological Values Report*. Prepared for Anglo American plc. March 2024.

Eyre TJ, Ferguson DJ, Smith GC, Mathieson MT, Venz MF, Hogan, LD, Hourigan CL, Kelly, AL & Rowland, J. (2022a). Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Version 4.0. 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., Winter, J. & McDonald, K. (2022b). *Guide to greater glider habitat in Queensland*. Prepared for the Department of Agriculture, Water and the Environment, Canberra. Department of Environment and Science, Queensland Government, Brisbane.

Garnett, S. T., and Baker, G. B., (2021). The Action Plan for Australian Birds 2020. CSIRO publishing.

Helldin, J. O., Jung, J., Neumann, W., Olsson, M., Skarin, A. & Widemo, F. (2012). *The impact of wind power on terrestrial mammals. A synthesis.* The Swedish Environmental Protection Agency, Stockholm.

Kavanagh, R. P. (2004). *Distribution and conservation status of possums and gliders in New South Wales.* In R. L. Goldingay & S. M. Jackson (eds) *The Biology of Australian Possums and Gliders.* Surrey Beatty and Sons, Chipping Norton. pp. 130–148.

Kerswell, A., Kaveney, T., Evans, C. and Appleby, L. (2020). *Habitat descriptions for 12 threatened species, specific to central Queensland*. Report commissioned by BMA.

Kleinfelder (2023). *MG Rail and Powerline Realignment Ecology Survey*. Prepared for Anglo American Moranbah North Pty Ltd. February 2023.

Lindenmayer, D. B., MacGregor, C., Wood, J., Westgate, M. J., Ikin, K., Foster, C., Ford, F. and Zentelis, R. (2016). Bombs, fire and biodiversity: Vertebrate fauna occurrence in areas subject to military training. *Biological Conservation.* 204(B): 276-283.

Manci, K. M., Gladwin, D. N., Villella, R. and Cavendish, M. G. (1988). Effects of aircraft noise and sonic booms on domestic animals and wildlife: a literature synthesis. *U.S. Fish and Wildlife Servive National Ecology Research Center*, Ft. Collins, CO.

Matthews, A., Lunney, D., Gresser, S., & Maitz, W. (2016). Movement patterns of koalas in remnant forest after fire. *Australian Mammalogy*, *38*(1), 91-104.

Neldner, V. J., Laidlaw, M. J., McDonald, K. R., Mathieson, M. T., Melzer, R. I., Seaton, R., McDonald, W. J. F., Hobson, R. and Limpus, C. J. (2017). *Scientific review of the impacts of land clearing on threatened species in Queensland*. Queensland Government, Brisbane.

Neldner, V. J., Wilson, B. A., Dillewaard, H. A., Ryan, T. S., Butler, D. W., McDonald, W. J. F, Richter, D., Addicott, E. P. and Appelman, C. N. (2023). *Methodology for survey and*

mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0. Updated December 2023. Queensland Herbarium, Queensland Department of Environment, Science and Innovation, Brisbane.

Pickering, C. M. and Hill, W. (2007). Impacts of recreation and tourism on plant biodiversity and vegetation in protected areas in Australia. *Journal of environmental management*, 85(4), pp.791–800.

Possingham, H. P., Lindenmayer, D. B., Norton, T. W. and Davies, I. (1994). Metapopulation viability analysis of the greater glider *Petauroides volans* in a wood production area. *Biol. Conserv.* 70, 227–236.

Queensland Herbarium. (2011) *Species label information, Queensland herbarium*, in R Booth (ed.), *Species profile—Dichanthium queenslandicum*, Queensland Government Queensland.

Queensland Herbarium. (2023). *Regional Ecosystem Description Database*. Brisbane, Australia [online]. Available at: https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions

Ramp, D., Wilson V. K. and Croft D. B., (2005). *Assessing the impacts of roads in peri-urban reserves: road-based fatalities and road usage by wildlife in the Royal National Park, New South Wales, Australia. Biological conservation*, 129, p. 348-359

Ramsay, S. (1999). *The ecology and dispersal patterns of juvenile koalas, Phascolarctos cinereus, in fragmented habitat*. PhD thesis. University of Sydney, Kensington, NSW.

Rus, A. I., McArthur, C., Mella, V. S., & Crowther, M. S. (2021). Habitat fragmentation affects movement and space use of a specialist folivore, the koala. *Animal Conservation*, *24*(1), 26-37.

Ryan, M. A., Whisson, D. A., Holland, G. J., & Arnould, J. P. (2013). Activity patterns of free-ranging koalas (Phascolarctos cinereus) revealed by accelerometry. *PloS one*, *8*(11), e80366.

TERN Australia. (2024) *Monitoring Priority Threatened Species: A review of monitoring methods for the King Blue-grass (*Dichanthium queenslandicum*) Version 1*. Report to the Department of Climate Change, Energy the Environment and Water. TERN, Adelaide.

Threatened Species Scientific Committee [TSSC] 2015. *Conservation Advice* Geophaps scripta scripta *squatter pigeon (southern)*. Canberra: Department of the Environment.

Williams, E. R., Adams-Hosking, C., Seabrooke, L., Schoettker, B., Erskine, P., and McAlpine, C. (2013). *The potential impacts of coal seam gas on biodiversity in*

Australia: Identification of knowledge gaps and research priorities. A study prepared for the University of Queensland – Centre for Coal Seam Gas.

Weston, N., Goosem, M., Marsh, H., Cohen, M. and Wilson, R. (2011). Using canopy bridges to link habitat for arboreal mammals: successful trails in the Wet Tropics of Queensland. *Australian mammalogy*, 33(1), 93-105.

White, N. A. (1999). Ecology of the koala (Phascolarctos cinereus) in rural south-east Queensland, Australia. *Wildlife Research*, *26*(6), 731-744.

Wintle, B. A., Kujala, H., Whitehead, A. and Bekessy, S. A. (2019). Global synthesis of conservation studies reveals the importance of small habitat patches for biodiversity. *Proceedings of the National Academy of Sciences* (PNAS), 116(3), 909–914.

Wolf, I. D. and Croft, D. B. (2014). Impacts of tourism hotspots on vegetation communities show a higher potential for self-propagation along roads than hiking trails*. Journal of environmental management,* 143, pp.173–185.

Wormington, K. (2003). *The habitat requirements of arboreal marsupials in dry sclerophyll forests of south-east Queensland, Australia*. PhD Thesis, School of Biological Sciences, University of Queensland.

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

Appendix 1: Protected Matters Search Tool (PMST)

Appendix 2: Likelihood of Occurrence (LoO)

The following criteria was used to assess the likelihood of threatened and migratory species occurring within the proposed action area:

- Known – species has previously been recorded in the proposed action area within the last five years
- Likely – species has previously been recorded in the nearby surrounding area (i.e., within 15 km) and preferred habitat is abundant and/or good condition suitable habitat is present within the proposed action area
- Potential – species has not been recorded in the proposed action area or the nearby surrounding area (i.e., within 15 km), however limited and/or moderate condition general habitat is present within the proposed action area
- Unlikely – species has not been recorded within the last 10 years in the nearby surrounding area (i.e., within 15 km), suitable general habitat for the species is not present in the proposed action area and/or is highly disturbed or degraded, the current known distribution does not include the proposed action area

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
TECs					
Brigalow (*Acacia harpophylla* dominant and co-dominant)	Brigalow TEC	E	Brigalow TEC is known to occur across a large geographic distribution in semi-arid Queensland and NSW. The community is most frequently found west of the Great Dividing Range, reaching as far as Bourke and Blackall, north almost to Townsville, and south to Narrabri, NSW (DoE 2013a). Brigalow TEC is characterised by the presence of brigalow (*Acacia harpophylla*) as a dominant or co-dominant tree-layer. Other dominant species often include belah (*Casuarina cristata*) and other species of *Acacia* and/or *Eucalyptus*. The Brigalow TEC has a considerable range of vegetation structures and composition that tend to occur on deep cracking acidic and salty clay soils, with gilgai microrelief which intermittently fill with water following flood and rain events (DoE 2013a).	Known	Patches of Brigalow TEC meeting diagnostic criteria and condition thresholds have been mapped within the proposed action area
Natural grasslands of the Queensland Central Highlands and northern Fitzroy Basin	Natural Grasslands TEC	E	Natural Grasslands is endemic to QLD and occurs between Collinsville in the north to Carnarvon National Park in the South in the Brigalow Belt North and Brigalow Belt South IBRA bioregions. The TEC are native tussock grasslands typically composed of native perennial grasses and found on fine textured, often cracking clay soils. In the Queensland Central Highlands, these communities are often dominated by *Dichanthium spp*. with *Aristida spp*. and *Panicum spp*. also common. Shrub cover and tree canopy is typically absent with occasional scattered individuals.	Unlikely	No REs associated with Natural grasslands TEC were observed during field studies.

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
Poplar box grassy woodland on alluvial plains	Poplar Box TEC	E	Poplar Box TEC occurs west of the Great Dividing Range typically at altitudes less than 300 m above sea level. The limits to its range in Queensland are understood to be south of Charters Towers, down to the NSW border, west of Ipswich and east of Longreach (DoEE 2019). The community is dominated by poplar box (*Eucalyptus populnea*) in the canopy, has an understory dominated primarily by grasses and herbs, and if present at all, may occasionally exhibit a midstory comprising a low density of shrubs. Poplar Box TEC occurs on flat to gently undulating topographies on various soils of alluvial and depositional origins.	Unlikely	One RE associated with this TEC (RE 11.3.2) is present within the proposed action area. However, potential patches failed to meet TEC condition thresholds during field verification.
Semi-evergreen vine thickets of the Brigalow Belt (North & South) and Nandewar Bioregions	SEVT TEC	E	SEVT TEC occurs in eastern Queensland and northern NSW. Often referred to as bottle tree scrub or vine scrub, the community is an extreme form of dry seasonal subtropical rainforest. It is generally characterised by the presence of trees with microphyll sized leaves and *Brachychiton* spp. occurring on soils of medium to high fertility in subtropical and seasonally dry climates.	Unlikely	No REs associated with SEVT TEC are mapped within the proposed action area.
Flora*					
Large-fruited Denhamia	*Denhamia megacarpa*	Endangered	Small to medium tree, growing to 8 m tall. Restricted distribution, occurring in a few sites on sandy or gravelly soils supporting open eucalypt woodland or acacia forests. Known from three sub-populations in eastern central QLD.	Unlikely	Species has not been recorded nearby (closest record ~ 80 km north), proposed action area is outside of species known range.
King Blue-grass	*Dichanthium queenslandicum*	Endangered	Perennial grass growing to 80 cm tall. Occurs on black cracking clay in tussock grassland mainly in association with other blue grass species. Know to occur as part of the Natural Grasslands of the	Unlikely	Potentially suitable habitat within proposed action area and the species has been previously recorded ~ 15 km south of the proposed action area. However,

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
			Queensland Central Highlands and the northern Fitzroy Basin TECs		the species was not recorded within the proposed action area during targeted wet and dry season surveys.
Bluegrass	*Dichanthium setosum*	Vulnerable	An upright bluegrass less than 1 m tall. Associated with heavy basalt, black soils or alluvial soils, often gilgaied, in grassland, brigalow or eucalypt communities. Also found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. In Queensland, its distribution includes the Leichhardt, Moreton, North Kennedy and Port Curtis regions.	Unlikely	Proposed action area is outside species known range. Species was not observed during field surveys. Potential degraded habitat within the proposed action area.
Black Ironbox	*Eucalyptus raveretiana*	Vulnerable	Small to medium sized tree growing to 30 m tall. Grows along watercourses and occasionally river flats. Distributed in scattered populations across central coastal and sub-coastal Queensland.	Unlikely	Suitable habitat mapped within the proposed action area, however the species was not recorded despite targeted surveys. Closest record of the species is ~ 45 km to the east of the proposed action area
	Polianthion minutiflorum	Vulnerable	Shrub growing to 1 m high. Grows in forest and woodland on sandstone slopes and gullies with skeletal soils, and also in deeper soils adjacent to deeply weathered laterite. Known from five areas in east QLD; from Redcliffe Vale west of Mackay, to Kingaroy.	Unlikely	Species is only known from 5 locations which do not overlap the proposed action area. Closest record ~ 70 km north of the proposed action area. Not detected during surveys.
Quassia	*Samadera bidwillii*	Vulnerable	Small tree or shrub growing to 6 m tall, endemic to QLD. Occurs commonly in lowland rainforest or along rainforest margins. Can also be found in other forest types e.g. open forest and woodland. Commonly found in areas adjacent to temporary or permanent watercourses up to 510 m in altitude. Distribution ranges from Scawfell inland in the North	Unlikely	Species has not previously been recorded in proximity to the site. No preferred habitat present.

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
			to Biloela in the West and Bauple in the South.		
Birds					
Sharp-tailed Sandpiper	*Calidris acuminata*	Vulnerable	The sharp-tailed sandpiper is found in the muddy edges of shallow fresh or brackish wetlands with low emergent vegetation. They occur across Australia. They are widespread in coastal areas of QLD and sparsely scattered inland.	Unlikely	No nearby records; no suitable foraging habitat.
Curlew Sandpiper	*Calidris ferruginea*	Critically Endangered	Curlew Sandpipers occur on intertidal mudflats in sheltered coastal areas and non-tidal wetlands near the coast. Widespread records along the coast south of Cairns. Scattered records in the Gulf of Carpentaria and sparsely scattered records inland. Breeds in Northern Hemisphere.	Unlikely	Predominantly a coastal species; no suitable foraging habitat.
Red Goshawk	*Erythrotriorchis radiatus*	Endangered	Red Goshawks inhabit tall open forests and woodlands of coastal and sub-coastal areas. Distribution is patchy but widespread across coastal and sub-coastal regions of northern and eastern Australia. They rarely breed in areas with fragmented native vegetation.	Unlikely	Not recorded during field surveys, closest ALA record ~ 50 km from proposed action area. Limited suitable habitat in proposed action area during wet season only.
Grey Falcon	*Falco hypoleucos*	Vulnerable	Grey Falcons occur at low densities across inland Australia in timbered lowland plains. Their distribution spans arid and semi-arid Australia including the Murray-Darling and Eyre basins. Nests in tall trees along watercourses, particularly Red River Gum and Coolibah. They mainly occur in areas with an annual rainfall of less than 500 mm.	Unlikely	Not recorded during field surveys, closest ALA record ~ 60 km from proposed action area. Limited suitable habitat in proposed action area.
Latham's Snipe, Japanese Snipe	*Gallinago hardwickii*	Vulnerable	Latham's snipe inhabits open freshwater wetlands with low dense vegetation, up to 2000 m above sea level. They can also inhabit saline and brackish wetlands.	Unlikely	Not recorded during field surveys despite targeted searches, closest ALA record ~ 45 km from

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
			They occur in south-eastern Australia during non-breeding season and migrate through northern Australia.		proposed action area. Marginal habitat in proposed action area.
Squatter Pigeon (southern)	*Geophaps scripta scripta*	Vulnerable	Squatter pigeons commonly inhabit the grassy understory of open eucalypt woodland and occasionally savannas. They are almost always found near permanent water and prefers areas which have open and short grass cover. They occur on the inland slopes of the Great Dividing Range extending from the Burdekin-Lynd Divide in central Queensland down to NSW.	Known	Species recorded within proposed action area during field surveys. Suitable habitat within proposed action area.
Painted Honeyeater	*Grantiella picta*	Vulnerable	Painted honeyeaters inhabit dry, open forests and woodlands. They usually occur in areas with flowering and fruiting mistletoe and eucalypts. They are sparsely distributed from north-western QLD and the eastern NT to south eastern Australia.	Unlikely	Suitable habitat within proposed action area, however the proposed action area is outside the species known range. The species was not recorded during field surveys.
Star Finch (eastern), Star Finch (southern)	*Neochmia ruficauda ruficauda*	Endangered	Star Finches occur in grasslands and grassy woodlands near reliable fresh water sources. They have also been recorded in disturbed habitat and suburban areas. They have a limited distribution across central QLD.	Unlikely	Suitable habitat within proposed action area, however the species was not recorded during field surveys and there are no records of the species in the region in the last 20 years.
Southern Black-throated Finch	*Poephila cincta cincta*	Endangered	Southern black-throated finches inhabit woodland savannah and riverine vegetation. They occur in coastal northern QLD and inland central QLD. Their range extends from the northern end of the Brigalow belt west into the Einasleigh Uplands.	Unlikely	Limited low quality habitat within the proposed action area. The species has a scattered distribution in central QLD, with the closes ALA record ~ 150 km from the proposed action area.
Australian Painted Snipe	*Rostratula australis*	Endangered	Australian painted snipes inhabit ephemeral to permanent shallow freshwater wetlands. It generally occupies areas with a good cover of dense vegetation such as grasses and	Potential	Suitable habitat within proposed action area, however the species has not been recorded within the proposed action area, with the

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
			reeds. Queensland Channel Country and the Fitzroy Basin of Central QLD have been identified as important areas for this species along with areas in NSW and Victoria.		closest recent record ~70 km to the south-east
Diamond Firetail	*Stagonopleura guttata*	Vulnerable	Diamond firetails inhabit eucalypt, acacia, and Casuarina woodland and open forests, as well as other lightly treed areas such as farmland and grassland with scattered trees. The species occur along south-eastern Australia from south-east QLD to the Eyre Peninsula in SA.	Unlikely	Suitable habitat within proposed action area. However, proposed action area is outside species usual range. No records within 150 km.
Common Greenshank, Greenshank	*Tringa nebularia*	Endangered	The common greenshank occurs in all types of wetlands across Australia. It is widespread in coastal QLD with inland records between Dalby and Mt Guide and scattered records elsewhere.	Unlikely	Marginal habitat within proposed action area. Historic records from the surrounding area, however the species was not recorded during field surveys despite targeted searches.
Mammals					
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]	*Dasyurus hallucatus*	Endangered	Northern quolls inhabit a range of habitats from dry sclerophyll forest to urban areas and are most abundant in hilly or rocky areas close to permanent water. Their current distribution is in fragmented populations mostly across Cape York, the Atherton Tablelands, and the Mackay-Whitsundays area.	Unlikely	No suitable habitat within the proposed action area. No records within 50 km of the proposed action area.
Ghost Bat	*Macroderma gigas*	Vulnerable	Ghost bats are habitat generalists, occupying arid Pilbara, tropical savanna woodlands, rainforests. They roost in caves, rock crevices, and old mine. They have a discontinuous range with geographically disjunct colonies in areas across the North of Australia.	Unlikely	No roosting habitat within the proposed action area. No records within 50 km.
Corben's Long-eared Bat, South-eastern Long-eared Bat	*Nyctophilus corbeni*	Vulnerable	Corben's long-eared bat inhabits a wide range of vegetation types but are more common in box, ironbark and cypress-	Unlikely	Proposed action area outside species core range. Closest

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
			pine vegetation. They are uncommon across their distribution and occur mostly in the Murry Darling Basin with a range extending from southern central QLD to central western NSW, north-western VIC and eastern SA.		record ~ 230 km to the south of the proposed action area
Greater Glider (southern and central)	*Petauroides volans*	Endangered	Greater gliders occur in remnant eucalypt woodlands and forests with abundant tree hollows for sheltering. They have a restricted range in eastern Australia from the Windsor Tableland in QLD down to central VIC.	Known	Species recorded during field surveys. Suitable denning and foraging habitat within the proposed action area.
Koala	*Phascolarctos cinereus*	Endangered	Koalas inhabit coastal and inland areas of Eucalypt forests and woodlands. They are distributed over a non-continuous area of eastern Australia from the Heberton area in QLD, south to VIC, and west into central QLD, NSW and ACT.	Known	Species recorded during field surveys. Suitable habitat within the proposed action area.
Reptiles					
Ornamental Snake	*Denisonia maculata*	Vulnerable	Ornamental snakes inhabit floodplains, undulating clay pans, and along the margins of swamps, lakes, and watercourses. They also occur in surrounding areas including coolabah, poplar box, and brigalow woodlands, and fringing vegetation along watercourses. This species only occurs within the drainage system of the Fitzroy and Dawson rivers in QLD.	Likely	Species not recorded during field surveys, however there are multiple ALA records of the species within 15 km. Suitable habitat present within proposed action area.
Yakka Skink	*Egernia rugosa*	Vulnerable	Yakka skinks occur in open dry sclerophyll forest or woodland. They commonly utilise dense ground vegetation, large hollow logs, and soil cavities for refuge. They have a patchy distribution with isolated populations throughout subhumid areas in inland QLD.	Unlikely	No suitable habitat. Species not recorded during field surveys. Closest record ~150km south of the proposed action area.

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
Southern Snapping Turtle, White-throated Snapping Turtle	*Elseya albagula*	Critically Endangered	Snapping turtles are restricted to the Fitzroy, Mary, and Burnett Rivers and associated smaller drainages in south eastern QLD.	Unlikely	No suitable habitat
Dunmall's Snake	*Furina dunmalli*	Vulnerable	Dunmall's snake inhabits open forest and woodland, particularly brigalow, growing on floodplains of deep-cracking black clay and loam soils. They occur in central and south-central QLD potentially extending into north NSW.	Unlikely	Proposed action area is north of the northern-most record of the species. Closest record ~ 100 km south-west of the proposed action area. Limited suitable habitat within proposed action area.
Allan's Lerista, Retro Slider	*Lerista allanae*	Endangered	Allan's Leristas inhabit the root systems of grass trussocks on black soils within the central Brigalow Belt region. They are restricted to three localities; Retro, Logan Downs, and Clermont.	Unlikely	No suitable habitat
Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver	*Rheodytes leukops*	Vulnerable	Fitzroy river turtles inhabit flowing rivers with deep, rocky, gravelly, or sandy substrates. They are only found in the Fitzroy River and its tributaries, QLD.	Unlikely	No suitable habitat
Migratory Species					
Common Sandpiper	*Actitis hypoleucos*	Mi	The common sandpiper occurs in a wide range of coastal and inland wetlands and is mostly found around the rocky or muddy margins, rarely on mudflats. It is found along all coastlines in Australia and many inland areas.	Unlikely	Marginal habitat within proposed action area. Not recorded during field surveys. Species prefers coastal habitats with scattered records inland. No records within 100 km of proposed action area.
Fork-tailed Swift	*Apus pacificus*	Mi	The fork tailed swift is almost exclusively arial. It flies from less than 1 m above ground to 300 m or more in altitude. They occur over a range of habitats over inland plains, above foothills or in coastal areas. They are often found over dry and open areas of riparian woodland, tea-tree swamps, low scrub, heathland of saltmarsh. They are distributed Australia wide but breed in the Northern hemisphere.	Likely	Potential to fly over proposed action area. Species recorded ~ 10 km west of the proposed action area.

Scientific Name	Common Name	EPBC Act Status	Habitat and Distribution	Likelihood	Justification
Pectoral Sandpiper	*Calidris melanotos*	Mi	The pectoral sandpiper inhabits shallow fresh to saline wetlands including coastal lagoons, estuaries, and bays through to inundated grasslands, creeks, floodplains, and artificial water bodies. They occur across Australia with the QLD distribution concentrated around cairns. Breeds in Russia and North America.	Unlikely	Marginal habitat within proposed action area. Not recorded during field surveys, closest record ~ 115 km to the north east.
Oriental Cuckoo, Horsfield's Cuckoo	*Cuculus optatus*	Mi	The oriental cuckoo inhabits monsoonal rainforest, vine thickets, wet sclerophyll forest or open woodlands.	Potential	Suitable habitat within the proposed action area, however not recorded during field surveys. Closest record ~ 30 km south of the proposed action area.
Yellow Wagtail	*Motacilla flava*	Mi	The yellow wagtail occurs in a variety of damp or wet habitats with low vegetation, including damp meadows, marshes, waterside pastures, sewage farms and bogs. Records in Australia are mostly coastal.	Unlikely	No suitable habitat, no nearby records
Glossy Ibis	*Plegadis falcinellus*	Mi	The glossy ibis inhabits freshwater marshes along the edge of rivers, lakes, lagoons, floodplains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and irrigated areas. They occur along the eastern part of Australia, from the Kimberly in WA to the Eyre Peninsula in SA, with a patchy distribution in the rest of WA.	Potential	The species was recorded during field surveys in subsistence waterways ~ 4 km west of the proposed action area. Marginal habitat within the proposed action area.

* Note - *Ptilotus uncinellus* was returned on the PMST as a 'species or species habitat known to occur within area'. This species was first listed on the EPBC Act in Sept 2024, after the section 75 decision which deemed the project a controlled action. Therefore this species is not considered in the Preliminary Documentation per section 158A of the Act.

Appendix 3: Ecology report

Appendix 4: Construction Environmental Management Plan (CEMP)

Appendix 5: Offset Management Plan (OMP)