BIODIVERSITY MANAGEMENT PLAN

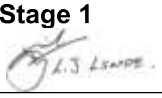
Maragle 330kV Switching Station and 330kV Transmission Line Connections

DECLARATION OF ACCURACY

In relation to S3.1 of the commonwealth document '*Environmental Management Plan Guidelines, Commonwealth of Australia, 2014*' please find the following signed declaration for the Biodiversity Management Plan (Stage 1 reference 3200-0645-PLN-017-CEMP-BMP and Stage 2 reference HLW-HLJV-PRW-ENM-PLN-000024) in relation to approval EPBC 2018/8363.

Declaration of Accuracy,

In making this declaration, I am aware that section 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

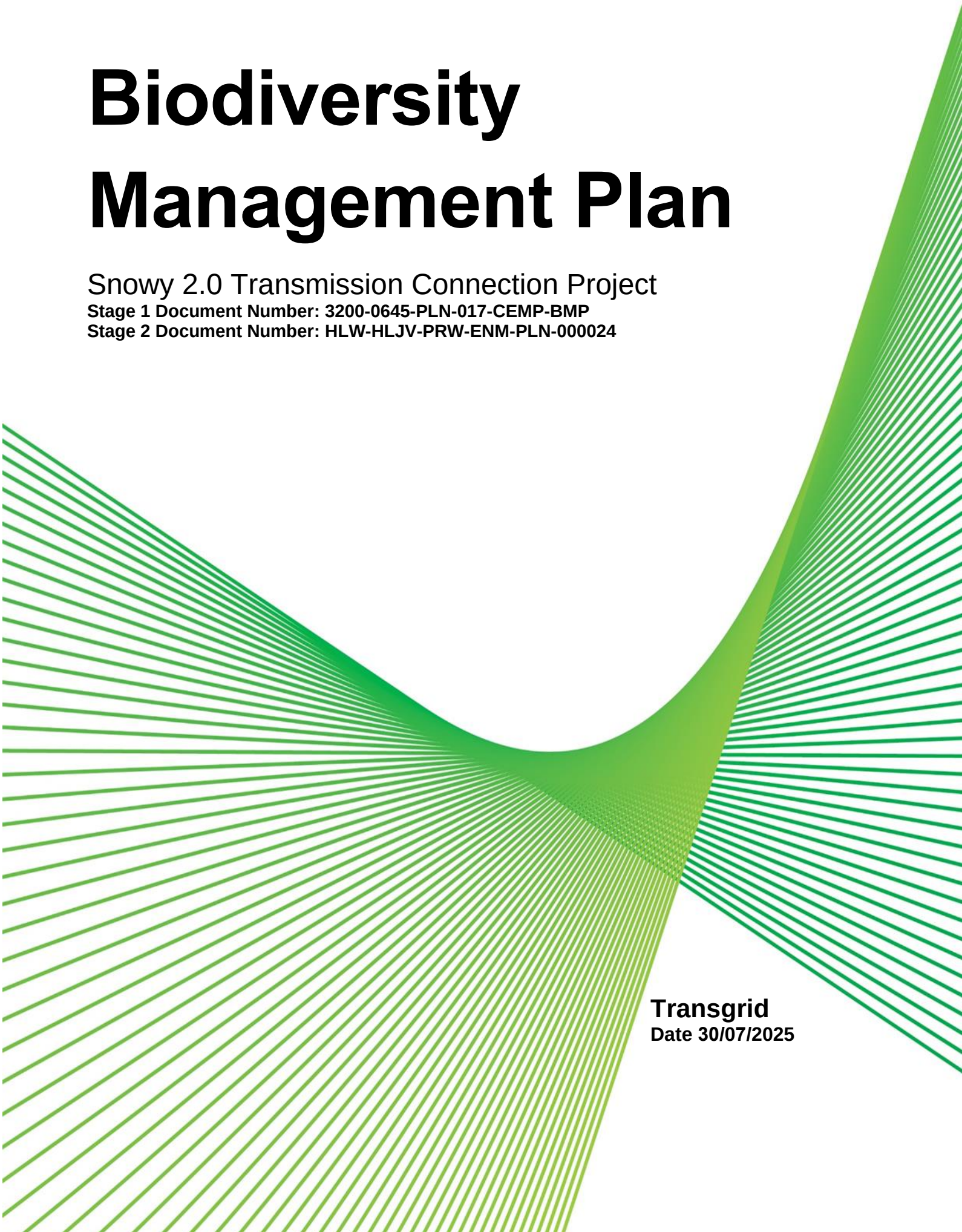
	Stage 1		**Stage 2**
Signed:		Signed:	
Full name (please print):	Louis Linde	Full name (please print):	Tim Burns
Position:	Project Manager	Position:	Project Director
Organisation:	UGL Engineering Pty Ltd	Organisation:	UGL/CPB Joint Venture
Date:	28/04/2025	Date:	24/04/2025
Signed:		Signed:	
Full name (please print):	Oliver King	Full name (please print):	Jeremy Roberts
Position:	Project Director	Position:	Project Director
Organisation:	Transgrid	Organisation:	Transgrid
Date:	30/04/2025	Date:	30/04/2025

Official

Biodiversity Management Plan

Snowy 2.0 Transmission Connection Project

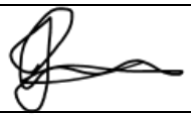
Stage 1 Document Number: 3200-0645-PLN-017-CEMP-BMP
Stage 2 Document Number: HLW-HLJV-PRW-ENM-PLN-000024



Transgrid
Date 30/07/2025

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Biodiversity Management Plan
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Mark Perry
Signed	
Dated	30/04/2025
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	30/04/2025
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	28/04/2025
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	24/4/2025

Version Control

Revision	Date	Description	Author	Reviewer	Approver
0.01	26/09/2021	Initial issue for review	Jane Love	Kim Lembke	Trevor Noble
0.02	09/11/2022	Required plan review	Dimity Bambrick Joshua Smart	Michelle Patrick Jane Love	Trevor Noble
0.03	24/11/2022	Addressing TG comments	Jane Love	Kim Lembke	Trevor Noble
0.04	27/03/2023	Addressing NPWS comments	Olivia Merrick Jane Love	Kim Lembke	Trevor Noble
0.05	18/04/2023	Addressing TG comments	Jane Love	Kim Lembke	Trevor Noble
0.06	04/05/2023	Addressing TG comments	Jane Love	Kim Lembke	Trevor Noble
0.07	07/09/2023	Addressing RDD comments	Jane Love Whitney Heiniger	Kim Lembke	Tim McCarthy
0.08	11/09/2023	Addressing TG comments	Whitney Heiniger	Kim Lembke	Tim McCarthy
0.09	20/10/2023	Addressing RDD comments	Whitney Heiniger	Kim Lembke	Tim McCarthy
0.10	27/10/2023	Addressing RDD Comments	Brendan Toohey	Kim Lembke	Tim McCarthy
0.11	31/10/2023	Addressing NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.12	22/11/2023	Addressing NPWS and BCS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.13	30/10/2024	Update to include Stage 2	Nicholas Mok	Ian Irwin / Brendan Toohey	Louis Linde / Tim Burns
0.14	30/07/2025	Updated to address revised OVMP timeframe	Jason Snape	Camille Palmer / Chris Millar	Louis Linde / Tim Burns

Distribution of controlled copies

This Biodiversity Management Plan (BMP) is available to all personnel and sub-contractors via the Project document control management system. An electronic copy can be found on the Snowy 2.0 TCP website.
The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

Copy number	Issued to	Version

Table of Contents

Document Control 2
Approvals 2
Version Control 3
Distribution of controlled copies 4
List of Tables 7
List of Figures 7
Definitions 8
Acronyms and Abbreviations 10

1 Introduction 12
1.1 Context 12
1.2 Environmental Management System 12
1.3 Purpose and Objectives 13
1.4 Authorship 14
1.5 Consultation 15
1.5.1 National Parks and Wildlife Services 15
1.5.2 Regional Delivery Division of Conservation, Programs, Heritage and Regulation NSW 16
1.5.3 Forestry Corporation of NSW 18
1.5.4 Australian Government Department of Climate Change, Energy, The Environment, and Water 18

2 Environmental Assurance 20
2.1 Relevant Legislation and Guidelines 20
2.1.1 Legislation 20
2.1.2 Guidelines, Policies, Regulations & Plans 20
2.2 Permits and Licences 20
2.3 Project Conditions of Consent 21

3 Existing Environment 52
3.1 Bioregion 52
3.2 Bushfire History 54
3.3 Native Vegetation 54
3.3.1 Biodiversity Offset Package 54
3.3.2 Plant Community Types (PCTS) 54
3.3.3 Threatened Ecological Communities (TECs) 55
3.3.4 Threatened Flora 58
3.4 Fauna Habitat 62
3.5 Threatened Fauna 62
3.6 Aquatic Habitat 64
3.6.1 Booroolong Frog Habitat 69
3.6.2 Groundwater Dependent Ecosystems 69
3.6.3 Threatened Aquatic Species 69
3.7 Weeds and Pathogens 70
3.8 Predator and Pest Species 71

4 Environmental Aspects and Impacts 72

4.1 Construction Activities 72
4.2 Ecological Impacts 72

5 Environmental Mitigation and Management Measures 74
5.1 Flora and Fauna Management Strategies 74
5.2 Biodiversity Offset Package 74
5.3 Detailed Design 75
5.4 Project Boundary and Exclusion Zones 78
5.5 Clearing Protocols and Habitat Protection 79
5.6 Fauna Rescue and Release Procedure 79
5.7 Unexpected Threatened Species Finds 79
5.8 Soil and Water Management 79
5.9 Booroolong Frog Monitoring Program 82
5.10 Weed and Pathogen Control and Monitoring Procedure 82
5.11 Predator and Pest Monitoring Program 83
5.12 Glider Connectivity Strategy 83
5.13 Bird and Bat Management Plan 83
5.14 Biodiversity Mitigation Measures 84

6 Compliance Management 107
6.1 Roles and Responsibilities 107
6.2 Training 107
6.3 Monitoring and Inspections 109
6.4 Reporting and Incidents 110
6.5 Auditing 111

7 Review and Improvement 112
7.1 Continuous Improvement 112
7.2 BMP Update and Amendment 112

8 References 114

APPENDIX A Detailed Design 116

APPENDIX B Clearing Procedure 143

APPENDIX B.2 Pre-clearing Checklist 167

APPENDIX B.3 Post-clearing Checklist 170

APPENDIX B.4 Clearing Zone Maps 171

APPENDIX B.5 PCT Mapping 198

APPENDIX B.6 Threatened Species Maps 202

APPENDIX B.7 Clearing Permit 206

APPENDIX B.8 No-go Access Permit 214

APPENDIX B.9 Environmental Permit Register 218

APPENDIX C Fauna Rescue and Release Procedure 219

APPENDIX D Unexpected Threatened Species Procedure 223

APPENDIX E Seed Collection Methodology 241

APPENDIX F BMP Monitoring Program 242

Official

APPENDIX G Booroolong Frog Monitoring Program 243

APPENDIX H Weed and Pathogen Monitoring Program 244

APPENDIX I Pest and Predator Monitoring Program 245

APPENDIX J Yellow Bellied Glider Connectivity Strategy 246

APPENDIX K Bird and Bat Management Plan 247

List of Tables

Table 1-1 Consultation summary with NPWS 15
Table 1-2 Consultation summary with RDD 16
Table 1-3 Consultation summary with FCNSW 18
Table 1-4 Consultation summary with AG DCCEEW 19
Table 2-1 Project conditions of consent relevant to the BMP 21
Table 2-2 Project BDAR mitigation measures 29
Table 3-1 PCTs located within the Project area 55
Table 3-2 Threatened flora likely to occur within the Project area 58
Table 3-3 Fauna habitat types within Project area 62
Table 3-4 Threatened fauna likely to occur within the Project area 63
Table 3-5 Aquatic assessment of named waterways within the Project area. 65
Table 5-1 Overview of fauna and flora mitigation strategies 74
Table 5-2 Clearing Zones 76
Table 5-3 Biodiversity management and mitigation measures 84

List of Figures

Figure 3-1 Bioregions and land tenure 53
Figure 3-2 TECs identified within the survey area (Jacobs, Rev 7, Aug 2022) 57
Figure 3-3 Threatened species habitat occurring within the Project site (Map 1 of 3) 59
Figure 3-4 Threatened species habitat occurring within the Project site (Map 2 of 3) 60
Figure 3-5 Threatened species habitat occurring within the Project site (Map 3 of 3) 61
Figure 3-6 Aquatic habitat located within the Project area and surrounds 68

Definitions

Term	Definition
Aboriginal Object	Any deposit, object, or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains
Compliance audit	Verification of how implementation is proceeding with respect to a Construction Environmental Management Plan (CEMP) (which incorporates the relevant approval conditions).
Contractor or Principal Contractor	Stage 1 of the scope of works for design and construction the Contractor or Principal Contractor is UGL Pty Ltd Stage 2 of the scope of works for design and construction the Contractor or Principal Contractor is UGL/CPB Joint Venture. Any reference to the 'Contractor' relates to the activities of both appointed Contractors (UGL and UGL/CPB Joint Venture), but only as is relevant to the appointed stage of works.
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly, or partially resulting from an organisation's environmental aspects.
Environmental incident	An unexpected event that has, or has the potential to, cause harm to the environment and requires some action to minimise the impact or restore the environment.
Environmental objective	Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental policy	Statement by an organisation of its intention and principles for environmental performance.
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
Environmental Representative	A suitably qualified and experienced person independent of Snowy 2.0 Transmission Line Project design and construction personnel employed for

Term	Definition
	the duration of construction. The principal point of advice in relation to all questions and complaints concerning environmental performance.
Snowy 2.0 Transmission Line Approvals	Snowy 2.0 Transmission Line approvals include: Snowy 2.0 Transmission Line Infrastructure Approval NSW SSI 9717 Snowy 2.0 Transmission Line EPBC Approval Cth EPBC 2018/8363
Non-compliance	Failure to comply with the requirements of the HumeLink Approvals or any applicable licence, permit or legal requirements.
Non-conformance	Failure to conform to the requirements of HLW system documentation including this CEMP or supporting documentation.
Planning Approval Documentation	The NSW planning approval documents, as they relate to the Snowy 2.0 Transmission Line and as listed in CoA A2 of the NSW Infrastructure Approval for HumeLink (SSI 9717)
Principal, the	Transgrid
Synergy	UGL-CMS incident management software program to manage, report, record and take action on emergency and incidents.

Acronyms and Abbreviations

Abbreviation	Explanation
AG DCCEEW	**Australian Government Department of Climate Change, Energy, the Environment and Water**
ATZ	Access Track Zone
BMP	Biodiversity Management Plan
BBMP	Bird and Bat Management Plan
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BFMP	Booroolong Frog Monitoring Program
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
CM	Construction Managers
CSSI	Critical State Significant Infrastructure
DCCEEW – NSW	Department of Climate Change, Energy, the Environment and Water (NSW) (formerly DPE)
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
DPI	Department of Primary Industries
ECZ	Easement Clearing Zone
EIS	Environmental Impact Statement
EMStrategy	Environmental Management Strategy
EMSystem	Environmental Management System
EP&A	*Environmental Planning and Assessment Act 1979*
EPA	Environmental Protection Authority
EPL	Environmental Protection Licence
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statement
EWP	Elevated Work Platform
FCNSW	Forestry Corporation NSW
FM Act	*Fisheries Management Act 1994*
GDE	Groundwater dependent ecosystems
HCZ	Hand-clearing zone
HTZ	Hazard Tree Zone
IVM	Integrated Vegetation Management

Abbreviation	Explanation
KNP	Kosciuszko National Park
kV	Kilovolts
Km	Kilometres
m	Metres
MNES	Matters of National Environmental Significance
MW	Megawatts
MWh	Megawatt hours
NEM	National Electricity Market
NPWS	National Parks and Wildlife Service
NVMP	Noise and Vibration Management Plan
OVMP	Operational Vegetation Management Plan
PC	Principal Contractor or Contractor as defined in this management plan
PCT	Plant Community Type
PESCP	Progressive Erosion and Sediment Control Plan
POM	Plan of Management
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
RDD	Regional Delivery Division (previous NSW Biodiversity, Conservation and Science Division [BCD])
SDD	Substantial Detailed Design
SEA	Site Environmental Advisor
SEP	Site Environmental Plan
SWMP	Soil and Water Management Plan
SZ	Substation Zone
TARP	Trigger Action Response Plan
TEC	Threatened Ecological Community
TG	Transgrid
TTMP	Traffic and Transport Management Plan
TSZ	Transmission Structure Zone
UGL	UGL Engineering Pty Ltd
VI	Vegetation integrity
VMP	Vegetation Management Plan
WEIC	Weekly Environmental Inspection Checklist
WPCMP	Weed and Pathogen Control Monitoring Program
YBG	Yellow-bellied Glider

1 Introduction

1.1 Context

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received state development consent on 2 September 2022 to construct a 500 kiloVolt (kV) substation and 330kV switching station at Maragle (Maragle Substation) and overhead transmission lines ('the Project') to facilitate the connection of Snowy2.0 to the existing electrical transmission network, approximately 27 kilometers (km) east of Tumbarumba, New South Wales (NSW).

The Project has also been subject to approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Approval was granted by the Australian Government Department of Climate Change, Energy, the Environment and Water (AG DCCEEW) on 21st October 2022 (EPBC 2018/8363).

An Environment Protection Licence (EPL) for the Project premises was issued to Transgrid by the NSW Environment Protection Authority (EPA) on 23rd December 2022 under the *Protection of the Environment Operations Act 1997* (POEO Act). This EPL requirement was triggered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 2022 due to extractive activities required during construction.

Relevant to state development consent, a Staging Approval Request was submitted and approved by the Planning Secretary on 18 November 2022 in accordance with COA C3 of SSI-9717 for the delivery of relevant plans and strategies for the Project in two stages:

- Stage 1 – All activities associated with the construction and operation of infrastructure related to the 330kV grid connection; and
- Stage 2 – All activities associated with the construction and operation of infrastructure related to the 500kV component of the substation.

Transgrid (the Proponent) has engaged UGL Projects Division (UGL) as the Principal Contractor (PC) to construct Stage 1 of the works and UGL / CPB Contractors Joint Venture (HLWJV) as the PC to construct Stage 2 of the Works.

The BMP describes anticipated hazards during construction to flora and fauna and the management and mitigation measures to identify and manage potential impacts that may occur.

1.2 Environmental Management System

The Environmental Management System for the Project is described in the Project Construction Environmental Management Plan (or CEMP), which is presented as an appendix of the Project Environmental Management Strategy. The Environmental Management System is representative of UGLs Management System (UGLMS) accredited to AS/NZS/ISO 14001:2016, which is comprised of various procedures, forms and checklists for the responsible management of health, safety and environmental matters. This BMP is a subset of the Environmental Management Strategy and is aligned with the framework of the UGLMS and CEMP. It is applicable to all staff, contractors and sub-contractors associated with the construction of the Project.

The UGLMS incorporates the following for the management of biodiversity impacts on the Project:

- All the measures required to mitigate direct, indirect, partial and prescribed impacts as listed in the Snowy 2.0 Transmission Connection Project – Biodiversity Development Assessment Report (Project BDAR) (Jacobs, Rev 7, Aug 2022) (refer to Table 2-2)
- Project Conditions of Approval (refer to Table 2-1)
- UGLMS-131-807 Contractor HSEQ Requirements
- UGLMS-4-1549 Environmental Inspection Weekly Checklist
- UGLMS-4-2138 Site Environmental Plan Template
- 3200-0645-PLN-017-CEMP-BMP- Appendix B– Clearing Permit These documents will support the implementation of the BMP.

1.3 Purpose and Objectives

The purpose of this Plan is to address the environmental management requirements for biodiversity during construction. The following documents have been referenced:

- Project BDAR (Jacobs, Rev 7, Aug 2022)
- Snowy 2.0 Transmission Connection Project – Amendment Report (Transgrid, Dec 2021)
- Infrastructure Approval SSI 9717 (02 September 2022)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Approval 2018/8363 (21 October 2022).

The key objective of the BMP is to ensure that all avoidance, mitigation and management measures relevant to the protection of native flora and fauna, including threatened species and threatened ecological communities, referred to in the environmental assessment documents and relevant permits and approvals are addressed. To achieve this objective, the following will be undertaken:

- Identify the key biodiversity issues that require control measures
- Develop strategies to manage impacts on biodiversity and implementing those strategies and provide the necessary details, timeframes and responsibilities for implementing those strategies
- Assigning responsibilities for impact monitoring and management
- Providing sufficient information to assist with auditing the implementation of the BMP
- Establishing a biodiversity monitoring program and management measures to evaluate and report against performance criteria
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 5 of this plan

This BMP applies specifically to proposed activities carried out within the Project area.

This plan should be considered to be a live document that is amended as learnings are experienced during its implementation. All future revisions of the BMP will be prepared by a suitably qualified and experienced expert, in consultation with the NSW National Parks and Wildlife Service (NPWS), Region Delivery Division (RDD) of Conservation, Programs, Heritage and Regulation NSW (previously Biodiversity Conservation and Science Directorate [BCD]), Forestry Corporation NSW (FCNSW) and the Australian Government Department of Climate

Change, Energy, the Environment and Water (AG DCCEEW). However, and as per Condition C3 of the Conditions of Approval, if the Planning Secretary agrees, this BMP may be updated without consultation being undertaken with the abovementioned parties. Further information about the nature of works to be completed and details on the Project can be found in the CEMP.

The Operational Vegetation Management Plan (OVMP) required by BIO9 (Section 2.3) will be developed in consultation with RDD and NPWS within 22 months of the commencement of construction. A monitoring program relevant to the requirements of this OVMP will be developed in consultation with RDD and NPWS within two months of the approval of this Plan.

1.4 Authorship

This BMP has been prepared by Jane Love (NGH Technical Lead - Environmental Management), Whitney Heiniger (NGH Senior Environmental Management Consultant), Dimity Bambrick (NGH Ecologist), Michelle Patrick (NGH Technical Lead – Biodiversity) and Olivia Merrick (Principal Environmental Compliance).

Jane Love holds a Bachelor of Environmental Science, Master of Environmental Management and over 13 years professional experience in environmental science and management, including extensive experience in construction biodiversity management.

Whitney Heiniger holds a Bachelor of Marine Biology, Honours in Environmental Science and Graduate Certificate in Environmental Management and over 5 years professional experience in construction environmental management, including biodiversity management.

Dimity holds a Bachelor of Science, double major Ecology & Conservation, Zoology and has over 6 years professional experience in the ecology field and 3 years professional experience in consulting, including in construction biodiversity management.

Michelle Patrick holds a Bachelor of Natural Resource Management and Masters of Environment (Land, Conservation and Ecological Restoration) with 15 years professional experience in biodiversity and natural resource management, including experience in construction biodiversity management.

Olivia Merrick holds a Bachelor of Science (Environmental Science) and Honours and is currently studying Law Master's in Construction. She has over 20 years professional experience in environmental and compliance management and auditing.

CVs for these qualified and experienced authors will be provided to Department of Planning, Housing and Infrastructure with submission of this plan. If CVs have not been provided, please contact:

- Transgrid Senior Project Manager - Andrew Buttigieg (Andrew.Buttigieg@Transgrid.com.au)
- UGL Project Manager - Louis Linde (louis.linde@ugllimited.com)

Review of this BMP has been undertaken by the Stage 1 Project Environmental Team and supporting consultants, including;

- Brendan Toohey – Environmental Manager
- Alozie Agomoh – Senior Environmental Advisor
- Camille Palmer – Senior Environmental Advisor

- Lauren Logue – Environmental Advisor
- Lachlan Whiteford – Environmental Graduate
- Peter Monsted – Director (Leneco Environmental Management)

Review of this BMP has been undertaken by the Stage 2 Project Environmental Team and supporting consultants, including;

- Ian Irwin – Environmental Approvals Manager
- Jeremy Slattery – Environmental Manager
- Greg Appleby – Sustainability Manager
- Polina Irwin – Project Ecologist (RPS)

A summary of consultation is provided in Section 1.5.

1.5 Consultation

1.5.1 National Parks and Wildlife Services

Table 1-1 outlines consultation undertaken to date with NPWS in the preparation of this BMP.

Table 1-1 Consultation summary with NPWS

Date	Consultation undertaken	Outcomes
11/10/2022	Transgrid provided BMP for comment to NPWS	NA
25/11/2022	Transgrid provided BMP for comment to NPWS	NA
15/12/2022	NPWS reviewed and provided comments on current revision (0.03) of the BMP	Comments received were addressed in this revision of the BMP.
24/01/2023	Meeting with BCS, NPWS, DPE, Transgrid and UGL to discuss the current revision (0.03) of the BMP	Further consultation to be undertaken with BCS, NPWS and species experts to inform the BMP.
08/02/2023	Meeting with BCS (and species specialists), NPWS, Transgrid and UGL to work through BDAR mitigation measures. The point was to ensure the BMP is based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and focuses on monitoring the performance of proposed measures and informing an adaptive management approach based on performance triggers for remedial action or additional offsets where further impacts are identified.	BMP updated based on the results of consultation. Further discussion required with NPWS for rehabilitation, weed and pathogen and pests and predator management.

Date	Consultation undertaken	Outcomes
24/02/2023	Meeting with NPWS, Transgrid and UGL to work through the Project requirements for rehabilitation, weed and pathogen and pests and predator management.	BMP updated based on the results of consultation.
12/09/2023	Weed and Pathogen Control Monitoring Program (Appendix H) and Pest and Predator Monitoring Program (Appendix I) provided by Transgrid to NPWS for comment and endorsement.	No comment received.
12/09/2023	BMP Rev 0.08 provided to NPWS for comment and endorsement.	BMP Rev 0.11 updated based on the results of the consultation.

1.5.2 Regional Delivery Division of Conservation, Programs, Heritage and Regulation NSW

Table 1-2 outlines consultation undertaken to date with RDD in the preparation of this BMP.

Table 1-2 Consultation summary with RDD

Date	Consultation undertaken	Outcomes
27/09/2022	Meeting with RDD and Transgrid to discuss the current revision (0.01) of the BMP, dated 26/09/2022	BMP updated based on the results of consultation.
11/10/2022	Transgrid provided BMP for comment to RDD	NA
14/10/2022	Initial comments on this BMP were received from RDD.	BMP updated based on the results of consultation.
17/10/2022 15/11/2022	RDD request for meeting with BMP authors and project ecologists	NA
25/11/2022	Transgrid provided BMP for comment to RDD	NA
9/12/2022	RDD response to Transgrid including key issues with request for meeting	NA
24/01/2023	Meeting with RDD, NPWS, DPE, Transgrid and UGL to discuss the current revision (0.03) of the BMP	Further consultation was required with RDD, NPWS and species experts to inform the BMP.
08/02/2023	Meeting with RDD (and species specialists), NPWS, Transgrid and UGL to work through BDAR mitigation measures. Objectives: Step through technical aspects of each measure/action/strategy in the BDAR,	BMP updated based on the results of consultation. Further discussion required with: • Species expert of

Date	Consultation undertaken	Outcomes
	including (but not limited to): • Any initial questions about partial vegetation retention requirements and implications of for construction impacts • Approach to species-specific issues, including updated expert advice (eg no nest boxes or hollow creation required for Yellow-bellied Gliders – YBG not typically constrained by lack of hollows) • Context for importance of soil and water management for Booroolong frog population Ensure the BMP is based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and focuses on monitoring the performance of proposed measures and informing an adaptive management approach based on performance triggers for remedial action or additional offsets where further impacts are identified. It was identified that due this meeting, that a number BDAR mitigation measures were no longer required for the Project including: • The placement of nest boxes as per BIO4 and BIO29 • Orchid Translocation for the *Caladenia montana* as per BIO4	Booroolong Frog management and monitoring • Species expert of Yellow-bellied Glider and site inspection to develop strategy • RDD for Bird and Bat Management Plan. Remove references to Orchid Translocation Procedure. Provide evidence that Nest Boxes are not suitable or preferred for the Project threatened species.
22/02/2023	Meeting with RDD, Booroolong Frog species experts, EMM, Transgrid and UGL to discuss the mitigation measures and monitoring requirements for the Booroolong Frog.	BMP and Soil and Water Management Plan (SWMP) updated based on the results of consultation.

Date	Consultation undertaken	Outcomes
06/03/2023	Site inspection of the Project area with RDD, Yellow-bellied Glider (YBG) species expert, Transgrid and UGL to discuss the YBG Connectivity Strategy	BMP updated based on site inspection and results of consultation.
09/06/2023	Meeting with RDD, Transgrid and UGL to discuss the current revision (0.06) of the BMP.	Further consultation was required with RDD, and species experts to inform the BMP. BMP updated based on the results on consultation.
03/08/2023	Workshop with RDD, Yellow-bellied Glider species expert, Transgrid and UGL to discuss the YBG Connectivity Strategy.	YBG Connectivity Strategy updated based on workshop.
08/08/2023	Workshop with RDD, Transgrid and UGL to discuss the Project's Clearing Procedure.	Project's Clearing Procedure updated based on workshop.
11/08/2023	Workshop with RDD, Booroolong Frog species experts, Transgrid and UGL to discuss the Booroolong Frog Monitoring Program.	Booroolong Frog Monitoring Program updated based on workshop.
16/08/2023	Workshop with RDD, bird and bat species experts, Transgrid and UGL to discuss the Bird and Bat Management Plan.	Bird and Bat Management Plan updated based on workshop.

1.5.3 Forestry Corporation of NSW

Table 1-3 outlines consultation undertaken to date with FCNSW in the preparation of this BMP.

Table 1-3 Consultation summary with FCNSW

Date	Consultation undertaken	Outcomes
11/10/2022	Transgrid provided BMP to FCNSW for comment	No response received
25/11/2022	Transgrid provided BMP to FCNSW for comment	No response received
1/02/2023	Transgrid provided BMP Rev 0.03 for comment	Correspondence received from FCNSW on 13/03/2023. BMP updated based on comments received.

1.5.4 Australian Government Department of Climate Change, Energy, The Environment, and Water

Table 1-4 outlines consultation undertaken to date with AG DCCEEW in the preparation of this BMP.

Table 1-4 Consultation summary with AG DCCEEW

Date	Consultation undertaken	Outcomes
10/10/2022	Meeting with AG DCCEEW and Transgrid to discuss the BMP and EPBC approval. AG DCCEEW stated they do not wish to see any plans until the EPBC Approval has been granted	Transgrid will provide BMP following workshops and close out meetings with RDD and NPWS.
08/08/2023	Email correspondence from AG DCCEEW, outlining the BMP should be provided to AG DCCEEW for review prior to NSW Planning Secretary's approval as per condition 5 of the EPBC Approval.	Transgrid will provide BMP prior to NSW Planning Secretary's approval.
12/10/2023	Email correspondence from AG DCCEEW to Transgrid, indicating some inconsistencies in mapping and requirement for EMS to be consistent with *Environmental Management Plan Guidelines* (DoE, 2014).	Plans updated as per feedback.

2 Environmental Assurance

2.1 Relevant Legislation and Guidelines

2.1.1 Legislation

This BMP has been prepared within the following legislative framework:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- Biodiversity Conservation Act 2016 (BC Act)
- Fisheries Management Act 1994 (FM Act)
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Biosecurity Act 2015
- National Parks and Wildlife Act 1974

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C (Legal Register) of the CEMP.

2.1.2 Guidelines, Policies, Regulations & Plans

The main guidelines, specifications, and policy documents relevant to this Plan include:

- Policy and Guidelines for Fish Conservation and Management (DPI 2013)
- Department of Primary Industries - New South Wales Weed Control Handbook – A Guide to weed control in non-crop, aquatic and Bushland situations (DPI 2018)
- Kosciuszko National Park Plan of Management (PoM, DEC 2006) (NSW)
- FCNSW Fire Management Plan (FCNSW, 2019)
- Environmental Management Plan Guidelines (Department of the Environment [now AG DCCEEW], 2014).

2.2 Permits and Licences

The permits and licences relevant to this Plan include:

- Ecologists will hold a Scientific Licence under Part 2 of the BC Act (including Animal Ethics Approval under the *Animal Research Act 1985*) for fauna handling/rescue and survey work. Where rescued fauna requires rehabilitation and care, only wildlife rehabilitation organisations authorised under Part 2 of the BC Act may be used.

Additionally, clearing will be managed and monitored with the internal PC Clearing Permit included in Appendix B Clearing Procedure.

Further details are provided in Appendix C (Legal Register) of the CEMP.

2.3 Project Conditions of Consent

The Conditions of Approval and mitigation measures relevant to this Plan, inclusive of consultation undertaken with relevant stakeholders detailed in Section 1.5, are listed in Table 2-1 and Table 2-2 below. A cross reference is also included to indicate where the requirement is addressed in this Plan or other Project management documents.

Table 2-1 Project conditions of consent relevant to the BMP

Reference number	Requirement	Document Reference
Infrastructure Conditions of Approval		
A1	In meeting the specific performance measures and criteria of this approval, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction, operation, rehabilitation, upgrading or decommissioning of the development.	Project CEMP and subplans
A2	The development must be carried out: (a) in compliance with the conditions of this approval; (b) in accordance with all written directions of the Planning Secretary; (c) generally in accordance with the EIS; and (d) generally in accordance with the Development Layout in Appendix 2	Project CEMP and subplans EMS Fig 1-1 Project location and footprint
B17	Unless otherwise agreed with the Planning Secretary, the Proponent must: a) Ensure that no more than: • 9.35 ha of *Caladenia montana* species habitat • 89.06 ha of Gang-gang Cockatoo (breeding) species habitat • 10.86 ha of Masked Owl (breeding) species habitat • 117.29 ha of Eastern Pygmy-possum species habitat • 59.03 ha of Yellow-bellied Glider species habitat; and • 1.67 ha of Booroolong Frog species. is cleared for the development; and	BMP Section 5.5 BMP Appendix A Detailed Design BMP Appendix B Clearing Procedure

Reference number	Requirement	Document Reference
	b) Minimise: • The impacts of the development on hollow bearing trees. • The impacts of the development on threatened species; and • The clearing of native vegetation and key habitat.	
B18	Prior to carrying out any development that would impact on biodiversity values outside Kosciuszko National Park, the Proponent must prepare a Biodiversity Offset Package (Package) that is consistent with the EIS, in consultation with RDD, to the satisfaction of the Planning Secretary in writing. The Package must include, but not necessarily be limited to: a) Details of the specific biodiversity offset measures to be implemented and delivered in accordance with the EIS. b) The cost for each specific biodiversity offset measures, which would be required to be paid into the Biodiversity Conservation Fund if the relevant measures is not implemented and delivered (as calculated in accordance with Division 6 of the Biodiversity Conservation Act 2016 (NSW)) and the offset payment calculator that was established as of 9 August 2021; c) The timing and responsibilities for the implementation and delivery of measures required in the Package; and d) Confirmation that the biodiversity offset measures will have been implemented and delivered by no later than 1 September 2024. Following approval, the Proponent must implement and deliver the Biodiversity Offset Package.	BMP Section 5.2 BMP Section 5.1
B19	Prior to carrying out any development outside of the Kosciuszko National Park that could impact the biodiversity values requiring offset, the Proponent or its nominee must lodge a bank guarantee with a total value of $24,869,236, in accordance with the Deed of Agreement with the Planning Secretary executed on 1 September 2022. The Proponent must comply with the terms of the Deed. *Note: this condition provides security to the Minister for the performance of the Proponent's obligations under this approval in relation to biodiversity offsets and release funds for payment into the Biodiversity Conservation Trust in the event that the biodiversity offsets (either in whole or part) are not delivered in accordance with the Package by the Proponent*.	BMP Section 5.2

Reference number	Requirement	Document Reference
B20	Prior to carrying out any development that could impact the biodiversity values inside Kosciuszko National Park, the Proponent or its nominee must pay $10,586,027 to the NPWS to offset the residual biodiversity impacts. Notes: • The NPWS will use these funds and any interest generated by these funds to enhance the biodiversity values of the Kosciuszko National Park. However, in limited circumstances where it is not possible to address all of the residual impacts of the development within Kosciuszko National Park, the NPWS may use some of these funds to ensure suitable conservation actions are carried outside the park. • To ensure accountability, the NPWS will: ○ Develop and implement a detailed program for the allocation of these funds to specific projects, focusing on the ecosystems and species affected by the development; and ○ Monitor, evaluate and publicly report on the progress of the implementation of the detailed program and the effectiveness of the specific projects; • The NPWS will develop and implement a specific program in consultation with DCCEEW and RDD to carry out conservation actions to address the residual biodiversity impacts of the development on the following Commonwealth listed species and communities: • Booroolong Frog.	BMP Section 5.2
B21	Prior to carrying out any development that could impact biodiversity values, unless the Planning Secretary agrees otherwise, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: a) Be prepared by a suitably qualified and experienced biodiversity expert/s in consultation with NPWS, RDD, FCNSW and DCCEEW. b) Be prepared in accordance with the Biodiversity Development Assessment Report (Revision 7, dated 22 August 2022); c) Include a description of the measures that would be implemented to: i) Ensure the development does not adversely affect the native vegetation and habitat outside the disturbance footprint; ii) Minimise the clearing of native vegetation and habitat within the disturbance area; iii) Minimise the impacts of the development on threatened flora and fauna species within the disturbance area and its surrounds, including the: • *Caladenia montana*.	This plan BMP Section 1.4 BMP Section 2 BMP Section 5 BMP Section 5.5 BMP Appendix C Fauna Rescue and

Reference number	Requirement	Document Reference
	• Gang-gang Cockatoo. • Masked Owl. • Eastern Pygmy-possum. • Yellow-belied Glider; and • Booroolong Frog iv) Minimise the potential indirect impacts on threatened flora and fauna species, migratory species and 'at risk' species. v) Minimise potential fauna strike in sensitive habitat areas on the road network within the site, including reducing speed limits between sunset and sunrise. vi) Minimise the impacts on fauna on site, including undertaking pre-clearance surveys. vii) Protect native vegetation and key fauna habitat outside the approved disturbance area. viii) Monitor the areas of partial clearance within three months of the commencement of construction and provision of a verification report to confirm if any changes are required to the construction vegetation clearing protocols. ix) Maximise the salvage of resources within the disturbance area for reuse in the restoration of vegetation and habitat on site, including native vegetative material, hollow logs, ground timber, and topsoil containing vegetative matter and native seed bank. x) Collect seeds within the approved disturbance area for use in the ecological rehabilitation of the site. xi) Minimise the spread of weeds, pathogens and feral pests on site, and import or export of these matters to or from the site. xii) Minimise the generation and dispersion of sediment to watercourses, particularly the Sheep Station Creek, Lick Hole Gully, Cave Gully, Wallaces Creek and Yarrangobilly River; xiii) Minimise the light spill from night works, including using directional and LED lighting; and xiv) Minimise bushfire risk. d) Include construction clearing and operation vegetation management protocols; e) Include a strategy to address: i) Management of activities within the 50 m Exclusion Zone of the Yarrangobilly River and its tributaries; ii) A trigger action response plan identifying actions to be implemented should any water quality criteria be exceeded focusing on the extent to which exceedances might affect the Booroolong Frog; and	Release Procedure BMP Appendix B Clearing Procedure BMP Appendix E Seed Collection Methodology BMP Appendix H Weed & Pest Control Monitoring Program BMP Appendix I Pest and Predator Monitoring Program SWMP Includes ESCPs BMP Table 5-3 BMP Appendix B Clearing Procedure & Bushfire Plan BMP Appendix G Booroolong Frog Monitoring Program BMP Section 6.3

Reference number	Requirement	Document Reference
	f) Include a program to monitor, evaluate and publicly report on the effectiveness of these measures. x) Following the Planning Secretary's approval, the Proponent must implement the Biodiversity Management Plan.	
C3	With the approval of the Planning Secretary, the Proponent may: a) prepare and submit any strategy, plan or program required by this approval on a staged basis (if a clear description is provided as to the specific stage and scope of the development to which the strategy, plan or program applies, the relationship of the stage to any future stages and the trigger for updating the strategy, plan or program); b) combine any strategy, plan or program required by this approval (if a clear relationship is demonstrated between the strategies, plans or programs that are proposed to be combined); and c) update any strategy, plan or program required by this approval (to ensure the strategies, plans and programs required under this approval are updated on a regular basis and incorporate additional measures or amendments to improve the environmental performance of the development). If the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition in this approval. If approved by the Planning Secretary, updated strategies, plans or programs supersede the previous versions of them and must be implemented in accordance with the condition that requires the strategy, plan or program. If the Planning Secretary agrees, a strategy, plan or program may be staged without addressing particular requirements of the relevant condition of this approval if those requirements are not applicable to the particular stage	EMS Sect 1.1 & 1.4 TTMP Sect 9.2 TTMP Appendix L Project Staging Approval
C7	The Department and the NPWS must be notified via the Major Projects website portal immediately after the Proponent becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one), and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 5.	EMS Sect 3.12 CEMP Sect 8.0
C8	The Planning Secretary and the NPWS must be notified in writing via the Major Projects website portal within seven days after the Proponent becomes aware of any non-compliance.	EMS Sect 3.12 CEMP Sect 8.0

Reference number	Requirement	Document Reference
C9	A non-compliance notification must identify the development and the application number for it, set out the condition of approval that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. *Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance*	EMS Sect 3.9 CEMP Sect 9.5
C10	Independent Audits of the development must be conducted and carried out at the frequency described and in accordance with the *Independent Audit Post Approval Requirements* (2020), unless otherwise agreed or directed by the Planning Secretary.	EMS Sect 3.8 CEMP Sect 9.3
EPBC Conditions of Approval		
1	To minimise the impacts of the action on protected matters, the approval holder must: a) Not clear more than: i) 1.67 ha of habitat for Booroolong Frog; and ii) 118.34 ha of habitat for Spot-tailed Quoll; and b) Minimise the impacts of the Action on hollow-bearing trees.	BMP Section 5
2	The approval holder must not clear outside the Project area.	BMP Table 5-3
3	To mitigate impacts on protected matters, the approval holder must implement conditions B21, B41 and C1 of the State Infrastructure Approval, in so far as they relate to monitoring, mitigating and avoiding impacts to protected matters.	BMP Table 2-1, Table 5-3

Reference number	Requirement	Document Reference
4	The Biodiversity Management Plan required under condition B21 of the State Infrastructure Approval must: a) Be consistent with relevant statutory documents; b) Demonstrate how the approval holder will minimise erosion and control sediment generation; c) Demonstrate how the approval holder will take all reasonable and feasible measures to prevent any discharge to waters; d) In respect of all watercourses which contain habitat for Booroolong Frog, as indicated by the areas within the yellow polygons designated 'Booroolong Frog' within the designated 'Study area' in the map at Attachment B, specify: i) What and how detailed baseline data on surface water flows and quality will be collected prior to the commencement of the Action; and ii) A program to augment data regarding surface water flows and quality data over time; e) Specify detailed criteria for determining surface water impacts (in respect of flows, quality and flooding) of the Action on the Booroolong Frog, including criteria for triggering remedial action (if necessary); f) Specify a monitoring program capable of detecting any specified criteria for triggering remedial action, if they occur; and	This plan BMP Section 2.1, BMP Section 5.8 & BMP Section 4.2 of BMP Appendix G Booroolong Frog Monitoring Program
	g) Include a description of the measures that will be implemented to minimise the surface water impacts of the Action on the Booroolong Frog.	
5	The approval holder must submit the Biodiversity Management Plan and Environmental Management Strategy required by conditions B21 and C1 of the State Infrastructure Approval to the department for the Minister's approval before they are approved by the NSW Planning Secretary.	Transgrid Responsibility
6	The approval holder must implement the Biodiversity Management Plan and Environmental Management Strategy approved by the Minister until the end date of this approval, unless otherwise agreed by the Minister in writing.	Transgrid Responsibility
7	To offset the impacts of the Action on protected matters, the approval holder must implement conditions B18, B19 and B20 of the State Infrastructure Approval.	BMP Table 2-1, Table 5-3

Reference number	Requirement	Document Reference
8	The approval holder must notify the department in writing within 10 business days of making a biodiversity offset payment to the NSW National Parks and Wildlife Service. Each notification must state the date of payment, the amount paid, and the component of the biodiversity offset obligations in respect of which the payment is made.	Transgrid Responsibility

Table 2-2 Project BDAR mitigation measures

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO1	Detailed design of the project will focus on the retention of managed shrub and groundcover vegetation zones, within ECZ, HCZ and HTZ to avoid and minimize the loss of vegetation and habitat and movement of fauna across the landscape and minimise the impact of predation on displaced fauna. The location of nest tree habitat buffers for Gang-gang Cockatoo and Masked Owl are shown in Figure 6-4 and habitat buffers for *Caladenia montana* in Figure 6-8 of the BDAR. These locations should be used to identify areas to avoid or minimise impacts in the partial clearing zones, and can be used to inform the induction of construction teams as required for future construction and operational management plans. Final design for permanent creek crossing structures on access roads will implement a design option to ensure stream flow is unaffected. Design and micro-siting of access tracks will avoid and minimise impacts to rock outcrops, large boulders, piled rock, and rock features that provide potential sheltering and breeding habitat for fauna including threatened species and avoid mapped habitat trees. Locations of rock for micro siting are shown in Figure 4-4 of the BDAR. This map should be used to identify areas to avoid or minimise impacts to rock outcrops and inform the induction of construction teams as required for future construction and operational management plans. Access track corridors will be established with consideration to terrain (e.g., utilisation of the ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing.	Disturbance footprint	Detailed design & survey Pre-clearing	Design/ Engineering Manager Environment Manager	Impacts to groundcover and scrubs and threatened species habitat has been reduced throughout the design iteration process Access tracks have been routed in consideration of “Design for Access Roads” elements	Review design iterations to evidence a reduction in clearing (ha). Review of Substantial Detailed Design (SDD) drawings to confirm: • Shrub and groundcover vegetation within the Easement Clearing Zone, Hand Clearing Zone and Hazard Tree Zone are clearly marked for retention to avoid and minimise the loss of vegetation and habitat • Access routes avoid habitat trees, rock outcrops, large boulders, piled rock, and rock features. • Have been sited to minimise cut/ fill and vegetation clearing • Creek crossings have been designed to maintain stream flow	At completion of SDD <u>Internal</u>: initial audit within three (3) months of commencing work onsite and then at least every six (6) months after that <u>Independent External Audit</u>: within three (3) months of commencing work onsite, then within 26 weeks from the previous audit, for the duration of construction	Project Manager, at completion of SDD	Design iterations do not show a reduction in clearing area (ha). SDD does not show shrub and groundcover vegetation within the ECZ, HCZ and HTZ are clearly marked for retention. SDD does not show habitat tree exclusion zones. SDD does not show design for Access Roads elements.	Update design prior to progressing to Final Detailed Design Design revisions will be kept in a register outlining revision number, dates and description of revisions made.	BMP Section 5.3 and 5.4 BMP Appendix A Detailed Design Habitat mapping (Figure 3-3 to Figure 3-5 of BMP)

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO2	A Biodiversity Management Plan (BMP) will be prepared and approved prior to construction. The BMP will be prepared by a qualified ecologist in consultation with RDD and NPWS and include a plan for implementing, evaluating and reporting on	All of Project	Prior to works commencing on site Ongoing	Construction Manager Environment Manager	Approved BMP available prior to works commencing Approved BMP being implemented with	Weekly Environmental Inspections	Weekly <u>Internal</u>: initial audit within three (3) months of	Project Manager (weekly) Audit results/ report 2	Measures identified in BMP are being implemented, Corrective Actions identified	Implement inspection and audit corrective actions	This plan Consultation is provided in BMP Section 1.5
	the effectiveness of all mitigation measures outlined in the BDAR, but not be limited to these measures. The overarching framework of the BMP will be based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and will focus on monitoring the performance of proposed measures and informing an adaptive management approach based on performance triggers for remedial action or additional offsets where further impacts are identified. The BMP will detail required mitigation actions for the Project for all biodiversity, including indirect, prescribed and uncertain impacts. The actions are to be prepared in consultation with RDD and NPWS and endorsed by RDD and NPWS. The BMP will include a program to monitor, evaluate and publicly report on the outcomes of a biodiversity monitoring program (refer BDAR Section 11.3). The BMP must stipulate objectives for monitoring, and how baseline data will be captured and represented. An Operational Management Plan for biodiversity will be prepared in consultation with RDD and NPWS and approved prior to clearing. The CEMP will replicate the requirements detailed in the BMP for all safeguards /mitigation measures particularly pre-clearing and clearing during construction (including B104-B108).			Site Supervisor Site Environmental Advisor	detailed mitigation actions for the project for all biodiversity.	BMP Audits	commencing work onsite and then at least every six (6) months after that <u>Independent External Audit</u>: within three (3) months of commencing work onsite, then within 26 weeks from the previous audit, for the duration of construction.	weeks following completion of audit, to: • Project Manager • HSE Manager Audit report within 2 months of completion: Planning Secretary	Audit observations/ Corrective Actions identified		Mitigation measures are provided in BMP Section 5 Monitoring is outlined in BMP Section 6.3, BMP Appendix F BMP Monitoring Program and relevant subplans provided in appendices

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO3	A Rehabilitation Plan (RP) will be prepared and approved prior to clearing in consultation with RDD, NPWS and FCNSW. The Rehabilitation Plan will inform the implementation of rehabilitation within the lease/licence area. Such areas will be identified in the final detailed design and will also include areas disturbed during construction that are not required to be maintained or cleared for the operation of the project. • The plan will focus on the implementation of soil erosion prevention, re- establishment of local expression of the original/adjacent plant community type, use local native plant species and habitat and outline the details of rehabilitation objectives and how their outcomes for success will be measured, locations, target landforms and plant community types • Restoration of riparian vegetation (i.e., weed control) will be implemented to protect and improve key habitat areas of the Booroolong Frog • The plan will include a program for adaptive monitoring of specific success measures and reporting and include a Trigger Action Response Plan (TARP). The TARP will include notification to NPWS and RDD that remedial actions have been triggered and agreement about the response • Revegetation of slopes will be undertaken in accordance with the rehabilitation plan • Landscaping of pervious surfaces using native indigenous species only. • Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g., use of Jute mesh and/or soil binder) • Ongoing maintenance of the	All of Project	Plan approval within 12 months from the start of construction	Transgrid	Approved RP available within 12 months of commencement of construction	BMP Audits	To be determined during development of RP	To be determined during development of RP	To be determined during development of RP	To be determined during development of RP	N/A

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	rehabilitation work will be required, including management of weeds and pathogens. Topsoil and subsoil generated during construction will be stockpiled separately on-site to be used for rehabilitation. Stockpiles will be managed according to best management practices (Managing Urban Stormwater: Soils and Construction).										
BIO4	Pre-clearing Process: the BMP will provide detail with necessary mitigation measures for harm to live animals and threatened hollow dependent fauna during/all pre-clearing survey and translocation activities. This includes, but is not limited to: • Pre-clearing surveys to be conducted with a suitably qualified and licenced wildlife handler to rescue and re-locate fauna • Protocol for the removal of hollow bearing trees - hollow inspection / lowering limbs to the ground using an EWP • Protocol to mitigate harm to hollow dependant threatened fauna known or with potential to be utilising breeding habitat in the project area and disturbance footprint, e.g., Gang-gang Cockatoo, Eastern Pygmy-possum, Yellow-bellied Glider and Masked Owl. Further detail on mitigation measures during pre-clearing process is provided below. The pre-clearing process will include two stages. Stage 1 will include survey and translocation of any fauna from the disturbance area into areas of retained vegetation prior to the development of the project. This may include detailed markup of threatened species locations and their translocation such as *Caladenia montana*. All work must be carried out by qualified ecologist. The next pre- clearing stage will include final inspections of the disturbance area immediately before the construction	Disturbance footprint	Prior to clearing works	Construction Manager Site Supervisor Environment Manager Site Environmental Advisor Project Ecologist	Vegetation clearing is being undertaken in accordance with the Pre-clearing process/ procedure	Weekly Environmental inspections to check and record whether pre and post clearance checklists and permits are completed and are up to date	Before clearing commences Ongoing (weekly inspections)	Project Manager (monthly) Report incidents immediately verbally and within 24 hours in writing	No preclearance checks undertaken Staged clearing procedure not followed Injured native fauna/ hollow dependent fauna form clearing process Lack of Environmental Incident notification where required	Review the BMP, updated as required Corrective actions from Incident investigation process: • Re-survey exclusion zones and project boundary • Reinstall exclusion zone fencing/ flagging and signage • Retrain staff as necessary	Pre-clearing and clearing is addressed in BMP Section 5.5 and Appendix B Clearing Procedure As per consultation with RDD (Section 1.5), translocation of *Caladenia montana* or the use of nest boxes is no longer required for the Project.

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	activity commences to check and physically mark any important habitat features that need to be considered when identifying exclusion zones and conducting the staged habitat removal process within the full and partial clearing zones. Document, mark and record the location of: • Large stick nests • Any rock features • Habitat/hollow-bearing trees • Threatened flora. • Report the outcomes of the pre-clearing inspections to RDD/NPWS prior to the commencement of vegetation clearing. The report will include any fauna relocated or euthanised, including name of qualified/licensed handler, species, location notes, and release location and method. Specific measures to mitigate the impact to individual Masked Owl adults, chicks and eggs will be specified in CEMP and BMP. The pre-clearing protocol of breeding habitat for Masked Owl needs to comprise: • Hollow-bearing potential nest tree(s) is to be clearly identified on construction planning maps • Hollow bearing tree(s) are to be removed outside the breeding season. Breeding is in winter, owls may also be nesting in autumn or spring (The TBDC specifies breeding in May to August, however Masked Owls can have a variable breeding season depending on prey resources) • A pre-clearing protocol will include inspection of the tree to determine if live owls are present and potentially nesting. Absence will be demonstrated by placing a songmeter underneath the tree for several weeks before planned clearing. Stag watching will not be as reliable for this purpose										

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	• If nesting owls are present, the tree is to be clearly marked as a no-go zone and removal of the tree must be delayed until the chicks have fledged. There is to be no disturbance within 50 m of the tree, and disturbance between 50 - 100 m is to be minimised. The removal of the tree must allow time for fauna to vacate the habitat as outlined in BIO7. • Alternative nest box sites are t o be provided in adjacent habitat that will be assessed in a nest box strategy and comprise effective methods to reduce the risk to threatened birds. Specific measures to mitigate the impact to individual Yellow-bellied Glider will be specified in CEMP and BMP. The pre-clearing protocol of breeding habitat for Yellow-bellied Glider needs to comprise: • Den trees and sap trees are to be clearly identified on construction planning maps • A pre-clearing protocol will include inspection of the tree to determine if live gliders are present and potentially nesting or is a core feeding tree. • If gliders are present or likely to be present, the tree is to be clearly marked as a no-go zone. The removal of the tree must allow time for fauna to vacate the habitat as outlined in BIO7. Alternative nest box sites are to be provided in adjacent habitat that will be assessed in a nest box strategy and comprise effective methods to reduce the risk to threatened gliders. Specific measures to mitigate the impact to Gang-Gang Cockatoo will be specified in CEMP and BMP. The pre-clearing protocol of breeding habitat for Gang-gang Cockatoo needs to comprise: • Hollow-bearing potential nest tree(s) is to be clearly identified on construction										

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	planning maps • Hollow-bearing tree(s) are to be removed outside the breeding season. Breeding occurs in October to January, birds may also be roosting in hollows all year. • A pre-clearing protocol will include inspection of the tree to determine if live birds are present and potentially nesting. Absence will be demonstrated by placing a songmeter underneath the tree for several weeks before planned clearing. Stag watching will not be as reliable for this purpose • If nesting birds are present, the tree is to be clearly marked as a no-go zone and removal of the tree must be delayed until the chicks have fledged. There is to be no disturbance within 100 m of the tree, and disturbance between 100- 200 m is to be minimised. The removal of the tree must allow time for fauna to vacate the habitat as outlined in BIO7. Alternative nest box sites are to be provided in adjacent habitat that will be assessed in a nest box strategy and comprise effective methods to reduce the risk to threatened birds. Measures to mitigate the impact to other threatened species such as Eastern Pygmy Possum, Booroolong Frog and *Caladenia montana* will follow the BIO4 and BIO7. • Mitigation actions for Booroolong Frog also need to follow BIO5 and BIO10.										

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO5	Exclusion Zones: The boundary of the clearing limits for each disturbance zone will be clearly marked on site by a surveyor before vegetation clearing commences: • Exclusion zones, or 'No-Go' zones, will be clearly marked at the edge of the full clearing zones and ECZ to protect the vegetation to be retained outside the project from inadvertent direct impacts. These will be in place for pre- clearing, construction and remain in place until rehabilitation objectives for areas above/upstream of the zones have been met and slopes have been stabilised • Exclusion zones and the edge of the clearing boundary will be marked with high visibility fencing and signage • Booroolong Frog: A 50 m exclusion zone (refer to Figure 11-1 of the BDAR) will be marked and clearly delineated from other survey markers with signage also placed around the tributaries that flow downhill into the Yarrangobilly Creek, this includes the limits of clearing on the lower end of Sheep Station Creek, Cave Gully, Lick Hole Gully and Wallace Creek that are crossed by the project to protect the downstream habitat of Booroolong Frog by clearly identifying exclusion zones. Parts of the 50 m exclusion zone along Lick Hole Gully and Cave Gully occur within the ECZ and will require clearing of trees and shrubs, However, the introduction of the partial clearing zones are likely to reduce the risk of erosion and sedimentation from the project to downstream waterways where parts of the groundcover in the ECZ, HCZ and HTZ will remain partially intact or intact, and reduce soil disturbance. There will be no use of heavy machinery in the riparian zones. Due to the risk of indirect impacts from	Disturbance footprint	Detailed design phase Pre-clearing Ongoing (weekly inspections) Post clearing (As-builts for cleared areas)	Design/ Engineering Manager and Surveyor Environmental Manager/ Site Environmental Advisor Site Supervisor	Project boundary and exclusion zones are accurately installed No over clearing incidents	Site Environmental Plans display exclusion zones and clearing limits Pre-clearance checklists Surveyors to capture "as-built" data for all cleared areas	Pre-clearing Ongoing (weekly) Post construction (As-builts)	Project Manager (monthly)	Boundary demarcated identified as incorrect Over clearing incident	Re-survey exclusion zones and project boundary Reinstall exclusion zone fencing/ flagging and signage Retrain staff as necessary	BMP Section 5.4 and BMP Appendix B Clearing Procedure Booroolong Frog is further addressed in BMP Appendix G Booroolong Frog exclusion zone mapping is shown in Figure 3-3 to Figure 3-5 of BMP Monitoring is outlined in BMP Section 6.3, BMP Appendix F, BMP Monitoring Program and relevant subplans provided in appendices.

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	increased runoff at these locations, strict sediment control measures will be implemented and outlined in a Soil and Water Management Plan (SWMP). The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek • Booroolong Frog: The 50m exclusion zone adopted for the Main Works project on Yarrangobilly Creek, will be retained for construction of the transmission line. This will remain in place until rehabilitation objectives for areas upstream have been met and slopes have been stabilised • Hazard trees identified from the LiDAR assessment will be flagged for removal, and any other adjacent and important habitat trees and features, also identified for retention and to avoid disturbance during the felling activity will be clearly marked and included in maps within the CEMP.										

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BIO6	Vegetation clearing plan: A vegetation clearing methodology has been developed (provided as Appendix K of the BDAR), the methods described focus on the removal of vegetation in full and partial clearing zones. These methods will be incorporated as a vegetation clearing plan within the BMP designed to document the methods of vegetation and habitat clearing within each zone, including soil protection measures, mechanical and non-mechanical approaches, removal of habitat, protection of retained vegetation, and appropriate storage and re-use of mulch and timber to avoid disturbance of retained vegetation. Hollows logs and limbs encountered during clearing will be retained for placement within adjacent vegetation or on the maintained easement within shrub retention areas. The plan will include a requirement to prepare a post clearing report that records the final clearing extent using GPS to demonstrate whether clearing is within the approved disturbance area, and if exceeded, recalculate additional offset obligations.	Disturbance footprint	Prior to works commencing on site	Construction Manager Environmental Manager	Vegetation cleared only from approved areas, via approved methods as per clearing zone category Vegetation cleared via approved methods per clearing zone Pre and post clearance surveys completed	Pre-clearing checklists Post-construction checklists Weekly environmental inspections checklist Induction records Toolbox records	Weekly At time of clearing	Project Manager (weekly) HSE Manager Report incidents immediately verbally and within 24 hours in writing to Transgrid	Near Miss / environmental incident notification	Review the vegetation clearing plan, updated as required Corrective actions identified from Incident investigation process: • Re-survey exclusion zones and project boundary • Reinstall exclusion zone fencing/ flagging and signage • Retrain staff as necessary	BMP Section 5.5 and BMP Appendix B Clearing Procedure Monitoring is outlined in BMP Section 6.3, BMP Appendix F, BMP Monitoring Program and relevant subplans provided in appendices.
BIO7	Staged Habitat Removal: the staged habitat removal process is required for removal of habitat (hollow-bearing trees, habitat trees, and bushrock) Staged habitat removal minimises direct impacts on fauna by providing them with an opportunity to vacate hollows and relocate naturally. The process includes: • Avoiding clearing during times when hollow-dependent fauna is breeding • Contact vets and wildlife carers before works commence • Ensure that licensed wildlife carers and/or ecologists are on site during habitat removal • Adopt two staged removal clearing non-habitat first (e.g., shrubs, regrowth, ground cover and non- habitat trees). Allow at least 24 hours for fauna to	Disturbance footprint	Prior to clearing works During construction and operation	Construction Manager Site Supervisor Environment Manager Site Environmental Advisor Project Ecologist	Vegetation clearing is being undertaken in accordance with the Pre-clearing process/ procedure	Weekly Environmental inspections to check and record whether pre and post clearance checklists and permits area completed and are up to date	Before clearing commences Ongoing (weekly inspections)	Project Manager (monthly) Report incidents immediately verbally and within 24 hours in writing.	No preclearance checks undertaken. Stage clearing procedure not followed. Injured native fauna/ hollow dependent fauna form clearing process. Lack of Environmental Incident notification where required	Review the vegetation clearing plan, updated as required Corrective actions from Incident investigation process: • Re-survey exclusion zones and project boundary • Reinstall exclusion zone fencing/ flagging and signage • Retrain staff as	BMP Section 5.5 and BMP Appendix B Clearing Procedure Fauna Rescue and Release Procedure is addressed in BMP Section 5.6 and BMP Appendix C Unexpected Threatened Species Find Procedure is addressed in BMP Section 5.7 and

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	vacate habitat before removing habitat trees • Ensure wildlife carers and/or ecologists are present during removal of habitat trees, and that habitat trees are felled carefully, using equipment that allows habitat trees to be lowered to the ground with minimal impact • A procedure for the ethical handling of injured or displaced fauna is to be documented in the BMP • Record the effort and outcomes of the habitat removal process • Save and reuse cleared material for rehab and habitat • Preparation of an 'Unexpected threatened species finds procedure' to be implemented during construction and operation. Applies to all activities that have potential to impact upon threatened flora and fauna species which have not already been assessed and approved. Any threatened entities found in a location previously unknown during construction or operation must be immediately notified to NPWS Preparation of a Fauna handling and rescue procedure to be implemented during • construction and operation.									necessary	BMP Appendix D Monitoring is outlined in BMP Section 6.3, BMP Appendix F, BMP Monitoring Program and relevant subplans provided in appendices

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BIO8	Clearance of construction areas prior to commencement of daily construction to ensure there is no wildlife present. This will involve an on-foot pre-clearing survey by a suitably qualified ecologist. This will also involve a regular drive through sweep of areas planned for construction, by the contractors environmental representatives. If an animal is located within the construction area during works, the Delivery Manager and Project Management Site Representative are to be notified immediately. All work must immediately cease within the immediate area of the find and a local wildlife rescue or an ecologist will be required for assistance where necessary.	Construction zones	Construction	Site Supervisor Team Leader or Leading Hand	No wildlife present in construction zones	Site supervisor daily diary Weekly Environmental Inspection Checklist (to ratify the daily Site Supervisor Checklists have been undertaken)	Daily, all construction zones Weekly, EIC confirmation	Construction Manager Environmental Manager	Checklist not completed Fauna observed as present / injured / killed in a construction zone (environmental incident)	Corrective actions from Incident investigation process	BMP Section 5.5 and BMP Appendix B Clearing Procedure addresses clearing BMP Table 5-3 Fauna Rescue and Release Procedure is addressed in BMP Section 5.6 and BMP Appendix C Monitoring is outlined in BMP Section 6.3, BMP Appendix F, BMP Monitoring Program and relevant subplans provided in appendices
BIO9	An operational Vegetation Management Plan (VMP) will be prepared by an experienced ecologist prior to commencement of project operation. The plan will focus on vegetation management within the ECZ and HTZ with the aim of maintaining long-term Vegetation Integrity targets. The VMP will interpret the vegetation integrity scores into feasible actions to maintain vegetation condition, and outline project specific ongoing vegetation clearing requirements and methodology. The VMP will include a strategy for maintaining the expected vegetation outcomes for all partial impact zones assessed in the BDAR. The strategy will: • Translate the vegetation integrity • (VI) scores into management actions to be applied during construction and operation of the project Include triggers for corrective actions • Include details for review and reporting by a qualified ecologist in consultation	All zones (focusing on ECZ and HTZ)	Construction Operation	Environment Manager Site Environmental Advisor Project Ecologist	Vegetation integrity scores / targets	Weekly environmental inspections checklist Environmental Audits	Weekly	Project Manager (monthly)	Long-term vegetation scores / targets not being met	To be determined after development of operational VMP	VMP will be developed within 22 months of commencement of construction, as per Secretary Approval

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	with NPWS and RDD. Details of a framework for the VMP is provided in Appendix K [of the Project BDAR]. • The VMP will be guided by Transgrid's vegetation risk model and operational vegetation clearance requirements, in addition to the principles for Integrated Vegetation Management (IVM) which will aim to preserve future Vegetation Integrity scores within the ECZ • Long-term monitoring will be conducted to measure the effectiveness of the VMP (see BDAR Section 11.3). The methods and timing of the monitoring will be documented in the VMP and will include a responsibility to report the results to RDD and NPWS.										
BIO10	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP in consultation with NPWS and RDD. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the project area during construction and operation. Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek. this is particularly important for the lower reaches of Sheep Station Creek and Wallace Creek where the exclusion zone is encroached (refer Figure 11-1). An assessment of the current sediment basin design for the Main Works project will occur prior to vegetation clearing, to assess if the basin design specifications and design capacity are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins	All zones	Prior to construction commencement Ongoing (until site stabilisation is achieved)	Construction Manager Environmental Manager Site Supervisor Site Environmental Advisor	Mitigation measures identified in the SWMP are implemented Runoff and sediment transfer from the project area during construction is controlled Protection of aquatic habitat in the tributaries crossed by the project, particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly River	Pre and Post Rainfall Inspection Checklists Environmental Audits	Weekly Inspect ESC measures within 24 hours of the start of rainfall event (pre) and within 24 hours of rainfall event occurring (post)	Project Manager (weekly)	Controls identified in the SWMP / Erosion and Sediment Control Plans not installed/ not function Signs of visible erosion Evidence of notable erosion or sedimentation, particularly beyond the project boundary or into sensitive areas Raise Environmental Incident	Review the SWMP updated as required Corrective actions identified from Incident investigation process	SWMP a summary is provided in Section 5.8 of this BMP CEMP, Section 9.5 Non-conformity, corrective and preventative actions Monitoring and TARPs for the Booroolong Frog is addressed in BMP Appendix G Booroolong Frog Monitoring Program

	will be increased in size to cope with any additional expected sediment load. Sedimentation will be managed through implementation of effective sediment control management plans will be implemented to ensure that sediment does not enter the waterways and result in changes to the habitat structure of riparian areas or areas downstream of the project area. Effective control measures will include: • Erosion and sediment control plans for all stages of construction • The implementation of sediment control measures across the project area - sediment control ponds and sediment basins, coir logs and sediment fencing to control sediment run-off, catch drains and perimeter bunds and diversion drains • A schedule will be included in the SWMP for cleaning and maintenance of sediment basins / controls with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours. A Trigger Action Response Plan will be documented in the SWMP, with management actions in place to address risk of sediment loads detrimental to Booroolong Frog entering the system. The triggers for response will be informed by evaluation of the construction monitoring results from Main Works. Immediate reporting to NPWS will occur in the event of any failure of sediment or stormwater mitigation measures, including overtopping of sediment basins. Indirect impacts are uncertain during high rainfall Additional or supplementary control measures (i.e., sediment fencing, diversions, and detention ponds) will be implemented at high-risk areas such as the creek crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at tower structures site ad access roads on the slopes around Yarrangobilly Creek and										

	associated tributaries • Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and RDD, which are downhill of the construction footprint and upstream of Booroolong Frog habitat. • An adaptive management plan as part of the monitoring program will be included in the SWMP to address risk of increased sedimentation/run off to the identified breeding habitat and population extent of the Booroolong Frog downhill and downstream of the project area. The plan will be designed to estimate any residual impact if sediment mitigation measures fail. • Runoff from spoil piles will be managed through the above listed control measures to ensure that there is no contamination or sediment entering waterways or adjacent areas • Accidental spills will be reported to the contractor's environmental representative as soon as the incident is observed so that the site can be remediated rapidly • Implementation of tannin leachate management controls may be required as determined by the monitoring program • Sediment traps or filters (targeting removal of coarse sediment) will be maintained at all discharge locations and will be monitored and maintained as per the scheduled requirements • Other source controls, such as mulching, matting and sediment fences may be used in consultation with RDD and NPWS and need to be approved in the CEMP and any deviation from measures by DPIE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate										

	• Disturbed areas will be stabilised and rehabilitated to reduce erosion potential (i.e. exposure period of bare earth). This will be particularly important for revegetation of slopes as soon as possible, in accordance with the rehabilitation plan. Landscaping of pervious surfaces using native indigenous species only. Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder) • Any imported fill will be certified at • source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material) • An induction protocol will be mandatory for all personnel involved in construction and operation works There needs to be acknowledgement of imported material e.g. road base being washed off tracks etc in the surrounding environment and how that will be dealt with.										

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BIO11	Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of the SWMP and in consultation with RDD and NPWS and any deviation from measures approved by DPIE are to be raised and approved. Additional monitoring and control measures for introduced plant introduction and spread should be implemented at and around locations used for sediment control structures. Monitoring of exotic plants with waterborne propagules and a Trigger Action Response Plan for control must be undertaken along drainage lines outside the project area in locations where runoff drains from the construction site, and from locations where sediment control has failed. The program will include adaptive management strategies for priority weed species during construction, and early operational phase. The details of the monitoring program will be determined during the preparation of the BMP and follow the principles outlined in Section 11.3 of the BDAR.	All disturbed construction zones.	Pre-construction Construction Operations	Environmental Manager Site Environmental Advisor	Weeds controlled in accordance with the Weed and Pathogen Control and Monitoring Program (WPCMP)	Monitoring for weed in accordance with WPCMP e.g.: • Surveys and mapping of weed species for presence / absence • Transects to determine weed cover	Initiated prior to clearing, then biannually for a period of two years following cessation of construction works.	Project Manager (monthly) Annual reporting made available to RDD, FCNSW, NPWS.	New occurrence of weeds where previously not recorded Project facilitated weed growth in disturbed areas	Weed control actions, including but not limited to • Chemical treatment; • Mechanical removal	Section 5.10 and BMP Appendix H WPCMP
BIO12	Identify all weed species in KNP in consultation with NPWS. Priority weeds species in Bago State Forest are consistent with high threat weeds.	Kosciuszko National Park (KNP)	Pre-construction Construction.	Environmental Manager Site Environmental Advisor	Weed species from KNP included in the WPCMP, to inform weed management practices and identify potential weed threats.	Review WPCMP to ensure KNP weed species are current	WPCMP document review will follow that of the Audit schedule (refer MON03)	Reporting to Transgrid in accordance with the WPCMP	Weed species for KNP not included in WPCMP	Review the WPCMP, updated as required	Section 5.10 and Section 3 of Appendix H WPCMP
BIO13	Identify, map, and remove all weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs.	All disturbed construction zones	Pre-construction, and construction	Environmental Manager Project Ecologist	Weed mapping undertaken Weeds removed prior to or during construction, as access permits Weed control areas recorded	Weed monitoring in accordance with WPCMP Weekly Environmental Inspection Checklist	As described in WPCMP Weekly Annual reports to RDD, FCNSW, NPWS.	Project Manager (monthly)	Weed identification incomplete Weed and sprayed area maps incomplete or not undertaken Weed control activities incomplete or not undertaken	Additional weed surveys Weed removal program	Section 5.10 and BMP Appendix H WPCMP

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO14	Prepare a vehicle and machinery hygiene strategy and implement during construction and operation. The strategy will include specific locations, timing and methods for removing soil and plant matter from vehicles and machinery. Ensure vehicle and machinery hygiene measures in the strategy are applied during construction and operation.	All disturbed construction zones	Construction Operation	Environmental Manager SEA	Plant and equipment mobilised to site clean and free of weeds Vehicle and machinery weed hygiene controls in place and utilised on site	Pre-clearing checklist Weekly Environmental Inspection Checklist	Weekly	Project Manager (monthly)	Strategy unimplemented (e.g. Hygiene declarations absent, equipment not cleaned sufficiently)	Implement vehicle and machinery weed hygiene controls Review vehicle and machinery weed hygiene strategy and updated as necessary Environmental awareness training and incorporate into toolbox talks	Section 5.10 and BMP Appendix H WPCMP
BIO15	During the clearing works, weeds will be disposed and managed appropriately to stop the spread of weed species.	All disturbed construction zones	Construction	Site Supervisor SEA	Weed disposed of appropriately in accordance with WPCMP	Weekly Environmental Inspection Checklist	Weekly	Project Manager (monthly) Annual reporting to RDD, FCNSW, NPWS	Weeds not disposed of appropriately	Remove weeds and dispose of them according to the WPCMP Environmental awareness training and incorporate into toolbox talks. Raise an environmental incident, corrective actions identified from Incident investigation process	Section 5.10 and Section 5.4 of BMP Appendix H WPCMP
BIO16	Wash down stations will be constructed at suitable locations to wash down vehicles and employee shoes to stop the spread of weeds, pathogens (including amphibian chytrid fungus, *Phytophthora cinnamomi* and exotic rust fungi) and the introduction of new species.	All of Project	Construction Operation	HSE Manager SEA Environmental Officers Project supervisors and leading hands.	Washdown stations constructed and operating Pathogen disinfections	Weed and pathogen logbook Weekly Environmental Inspection Checklist Incident reports Compliance tracking.	At least Weekly	Project Manager (monthly) Annual reporting to RDD, FCNSW, NPWS.	Soil sampling detects pathogen Washdown stations not constructed, not operational or not being utilised be very machine / vehicle passing the washdown station Environmental Incident	Install and operate additional hygiene stations Environmental awareness training and incorporate into toolbox talks. Implement corrective actions from the incident investigation process.	Section 5.10 and Section 5.5 of BMP Appendix H WPCMP

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									notification		
BIO17	Personal waste / refuse generated during construction will be stored appropriately in inaccessible bins and disposed at appropriate waste disposal facilities off-site. Any personal waste generated during operation will be removed from the site (including substation) and disposed in an appropriate waste facility.	All of Project	Construction Operation	Construction Manager Site Supervisor SEA	Bin locations evident on Site Plans Adequate number and placement of bins that close securely actively visible on site, as per Site Plan	Site inspection checklist Weekly Environmental Inspection Checklist	Weekly	Project Manager (monthly) 6 monthly Compliance Tracking Report Annual reporting made available to RDD, FCNSW, NPWS.	Pest animal increase attributable to project construction activities Visible rubbish in work areas/ surrounding vegetation Site Environmental Plans does not show bin locations Environmental Incident (non-conformance) notification	Install adequate number of bins that close securely. Update Site Environmental Plans with bin locations Environmental awareness training and incorporate into toolbox talks. Implement corrective actions from the incident investigation process.	Section 5.11 and Section 5 of BMP Appendix I Pest and Predator Management Plan (PPMP)
BIO18	A feral animal monitoring program will be developed and implemented as described in BDAR Section 11.3 based on performance triggers for adaptive management. It will be important to share data with NPWs and State Forests. Increased predator activity will trigger the need for predator control based on performance measures to be outlined in the BMP. Control will be done in consultation with NPWS and (DPIE - State Forests).	All of Project	Prior to works commencing on site Construction	Environmental Manager	PPMP available and up to date Pest and predator species abundance	Weekly Environmental Inspection Checklist Presence/ absence of species on site and population monitoring (as per PPMP)	Weekly As described in PPMP	Project Manager (monthly) Annual reporting made available to RDD, FCNSW, NPWS	Observed presence / increased abundance of pest or predator species attributable to Project construction Recorded pest / predator abundance increase	Review and amend PPMP Review and assess control methods	Section 5.11 and BMP Appendix I PPMP
BIO19	Utilise the survey data for this project, and the Main Works EIS to identify specific bird and bat species that are at risk of collision with power lines and electrocution. For higher risk species a strategy will be developed in consultation with RDD focused on identifying key sections of the transmission line where mitigation is required and will include deploying bird divertors, with	Easement Clearing Zone	Construction and Operations	Operations Environmental Manger	Bird and Bat Management Plan developed and approved Bird / bat diverters deployed in the ECZ (once ECZ is constructed)	Construction and operations inspections as detailed in Appendix K Bird and Bat Management Plan	Nest searches annually along the whole transmission line Carcass monitoring four times per year at five locations	Transgrid	Bird divertors with day/night reflectors within approved buffer distance, appropriate for diurnal and nocturnal birds are not installed	Install bird divertors with day/night reflectors within approved buffer distance, appropriate for diurnal and nocturnal birds	Section 5.13 and BMP Appendix K Bird and Bat Management Plan

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
	day/night reflectors within approved buffer distance. This will be appropriate for diurnal and nocturnal birds The strategy will be developed as part of the BMP and include adaptive management for high-risk bird and bat species as outlined below with intervals and strategies to be determined in consultation with NPWS: • Regular monitoring in transmission line easements for evidence of bird / bat collision with transmission lines (intervals to be determined in consultation with NPWS) • Monitoring of taller structures for evidence of raptor nest building • Develop target trigger for number of high-risk species incidents Deploy species specific bird / bat divertors / flappers / reflectors in areas where a defined number of incidents have occurred. The BMP will identify locations for specific measures and the monitoring method for testing effectiveness						Flight observations four times per year at four locations		Injury / mortality of birds/bats, as described in Appendix K Bird and Bat Management Plan		
BIO20	Directional lighting will be used for any permanent lighting required (i.e., substation) to minimise light spill as much as possible.	Substation	Design, construction and operations	Design / Engineering Manager Environmental Manager	Light spill is not being directed into vegetation or light spill is sufficiently shrouded from spillage	Review of Substantial Detailed Design (SDD) drawings for lighting design detail Weekly Environmental Inspection checklist	Prior to SDD finalisation Weekly EICs	Project Manager	Light spill is observed shining into vegetation	Review lighting design as needed Utilise light shields Reposition lighting away from vegetation	BMP Table 5-3
BIO21	Artificial lighting required during construction in the early morning and late afternoon in winter will be limited to within approved construction hours.	Whole of Project	Construction	Construction Manager Site Supervisor Site Environmental Advisor	Lighting operating only during approved hours of construction	Site Supervisor daily diary Weekly Environmental Inspection checklist	Daily Weekly	Project Manager (monthly)	Lighting directed into vegetation Light shields no being used	Redirect lighting away from vegetation Install light shields	BMP Table 5-3
BIO22	The requirements of the Australian Standard AS2436-2010 Guide to noise and vibration control on construction, demolition, and maintenance sites to be integrated in design.	Whole of Project	Design phase	Design/ Engineering Manager	The requirements of AS2436-2010 is integrated in design	Design review	Prior to SDD	Project Manager	The requirements of AS2436-2010 have not been integrated in design	Integrate the requirements of AS2436-2010 into design	Noise and Vibration Management Plan

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO23	Minimise noise from equipment through measures such as keeping both stationary and mobile plant and equipment in good working condition (including mufflers, enclosures etc), and avoid leaving engines running on standby when machinery is not being used.	Whole of Project	Construction Operation	All personnel onsite	Stationary and mobile plant and equipment in good working condition. Engines are turned off / running on standby when machinery/ equipment is not being used	Vehicle pre-start checks Weekly Environmental Inspection checklist	Daily Weekly	Project Manager (monthly)	Identified concern Complaint.	HSE Manager, Project Manager or SEA to: Implement relevant corrective actions. Environmental non-conformances will be dealt with through the Incident Management Procedures detailed in Section 6.5 of the CEMP	NVMP
BIO24	Select equipment with the lowest noise rating that meets task requirements and minimise operating loud machinery conjunctively. For example, operating a jackhammer and concrete saw.	Whole of Project	Construction Operation	Construction Manager Site Supervisor	Equipment on site that has a demonstrated low noise rating Low noise machinery on site	Weekly Environmental Inspection checklist	Weekly	Project Manager (monthly)	Equipment / machinery is reported to be on site that does not have low noise rating for the task at hand Environmental Incident (non-conformance) notification	Remove non-compliant equipment / machinery form site	NVMP
BIO25	Dust management and monitoring programs using industry best practices and standards to control air quality will be implemented. • No dust generating works will be conducted during high winds • Keep stockpiles covered with material to prevent the generation of dust. Apply water dust suppression techniques during dust generating activities.	Disturbance footprint	Construction	Construction Manager Site Supervisor Site Environmental Advisor	No visible dust plumes from disturbance footprint / construction zone No at-risk areas of exposed / bare ground Stockpiles and material covered / secured	Site Supervisor daily diary Weekly Environmental Inspection checklist Audits	Daily Weekly	Project Manager (monthly) HSE Manager	Dust mitigation measures ineffective Excessive dust plumes observed Environmental Incident notification	Review and update where required, dust mitigation practices Corrective Actions identified form the incident investigation process Environmental awareness training and incorporate into toolbox talks	SWMP, a summary is provided in Section 5.8 of this BMP

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO26	Provide sediment and erosion controls to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways, vegetation, and fauna habitat. Control measures will include: • Clearly identify stockpile and storage locations and provide erosion and sediment controls around stockpiles (documented in Vegetation Clearing Plan) • Source controls, such as mulching, matting and sediment fences will only be used where approved in the CEMP • Sediment traps or filters (targeting removal of sediment) will be maintained at all discharge locations and will be regularly monitored and maintained • Disturbed areas will be stabilised and rehabilitated as soon as the event has been reported to reduce erosion potential (i.e., exposure period of bare earth) (as per Rehabilitation Plan) • Accidental spills will be immediately reported and remediated • Contaminated water will be separated from stormwater and will be managed in a process water system • Provide on-site signage to identify contaminated topsoils	Disturbance Footprint	Construction	Construction Manager Site Supervisor Site Environmental Advisor	ESC measures in place as per ESCP No visible at-risk areas of erosion or sedimentation No visible turbid water discharge offsite or into sensitive areas	Erosion and Sediment Control inspections Weekly Environmental Inspection checklist Audits	Daily Site Supervisor Checklists Weekly Inspect ESC measures within 24 hours of the start of rainfall event (pre) and within 24 hours of rainfall event occurring (post)	Project Manager (monthly) In the event of any failure of sediment or stormwater mitigation measures immediate reporting to EPA is required	ESC measures ineffective Notable erosion or sedimentation Over-capacity or damaged ESC devices Sediment loss Environmental Incident notification	Review and update ESCPs as needed Environmental awareness training and incorporate into toolbox talks Corrective Actions identified by the incident investigation process Repair, maintain, desilt or upgrade ESC device(s)	BMP Table 5-3 SWMP , a summary is provided in Section 5.8 of this BMP
BIO27	The barbed wire/razor wire fencing installed around the substation switchyard will have improved visibility measures installed, such as adding visible objects to the fence, for example metal tags, tapping or cloth material on the existing barb wire to increase visibility and act as a deterrence technique for in flight fauna.	Substation switchyard	Construction	Environmental Manager Site Supervisor	Visible objects to the substation switch yard fence are present if barbed wire is applied	Site Supervisor daily diary Weekly Environmental Inspection checklist Audits	Daily Weekly	Project Manager (monthly)	Visible objects on the substation switch yard fence are not present	Add visible objects to the substation switch yard fence to increase visibility and act as a deterrence technique for in flight fauna.	BMP Section 5.13 and BMP Appendix K Bird and Bat Management Plan BMP Section 5.12 and BMP Appendix J YBG Connectivity Strategy

Action ID	Biodiversity mitigation action	Location	Timing (Project phase)	Responsibility	Performance Measure	Monitoring method	Monitoring timing and frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	Relevant BMP Section
BIO29	A number of measures to mitigate and monitor the impact of the project on Yellow-bellied Glider during construction and operation of the project are required and include: • A targeted connectivity strategy • The provision of arboreal crossing structures • Targeted surveys Yellow-bellied Glider to refine crossing structures • Nest box strategy • A staged habitat removal process consistent with Action BIO4 and the Biodiversity Management Plan • The minimum design and locations of crossing structures for Yellow-bellied Glider will be based on the process for managing connectivity requirements described in a Yellow-bellied Glider Connectivity Strategy • Implementation of a comprehensive monitoring program before, during and after construction with performance targets and adaptive management actions The proposed approach to management of potential impacts to the Yellow- bellied Glider population throughout the pre-construction, construction and operational will be documented in the Biodiversity Management Plan.	All zones	Construction Operation	Construction Manager Environmental Manager	As defined within YBG Connectivity Strategy	Stag watching Camera traps Mortality monitoring	Three times annually for five years (5) years or until the poles have been deemed unsuccessful and translocations are deemed necessary	Annually to Transgrid	Monitoring not being undertaken Fauna not observed crossing easement	Commence monitoring as per YBG Connectivity Strategy Translocation of individuals, in consultation with RDD and under the guidance of a Translocation Plan	BMP Section 5.12 and BMP Appendix J YBG Connectivity Strategy As per consultation with RDD (Section 1.5), the use of nest boxes is no longer required for the Project.
BIO30	Vehicle movements on newly formed access tracks will be limited to 20km/h speed limit implemented to reduce the risk of vehicle strike to fauna.	Access tracks	Construction Operation	All site personnel	Speed limit adhered to.	In-vehicle monitoring system (when available)	Continuous.	HSE Manager (weekly)	Vehicle travelling over speed limit. Fauna injury or death from vehicle fauna strike	Incident notification submitted Corrective actions identified from Incident investigation process Environmental awareness training and incorporate into toolbox talks	BMP Table 5-3 Traffic and Transport Management Plan

3 Existing Environment

This section summarises existing terrestrial flora and fauna within and adjacent to the Project including species, communities and habitats based on the information contained within the BDAR. There are no areas of outstanding biodiversity value, as defined in Part 3 of the BC Act within the Project area.

3.1 Bioregion

The Project traverses two bioregions, which approximately correspond to the Kosciuszko National Park (KNP) park and forestry boundaries: South Eastern Highlands Bioregion (KNP) and Australian Alps Bioregion (Bago State Forest), refer to Figure 3-1.

The majority of the Project is located in the Bondo sub-region of the South Eastern Highlands Bioregion. The South Eastern Highlands Bioregion covers the dissected ranges and plateau of the Great Dividing Range that are topographically lower in elevation than the Australian Alps, which lie to the southwest. The highlands are part of the Lachlan fold belt that runs through the eastern states as a complex series of metamorphosed Ordovician to Devonian sandstones, shales and volcanic rocks intruded by numerous granite bodies.

In NSW, the Australian Alps Bioregion is entirely surrounded by the South Eastern Highlands Bioregion. The alpine area comprises granites that have formed and faulted, stepped ranges at the point where the South Eastern Highlands in NSW turn west into Victoria. More recent volcanic activity produced basalts and, in the Pleistocene, the cold climate superimposed glacial features on the landscape. The bioregion was the only part of the mainland to have been affected by Pleistocene glaciation and contains a variety of unique glacial and periglacial landforms above 1,100 m altitude.

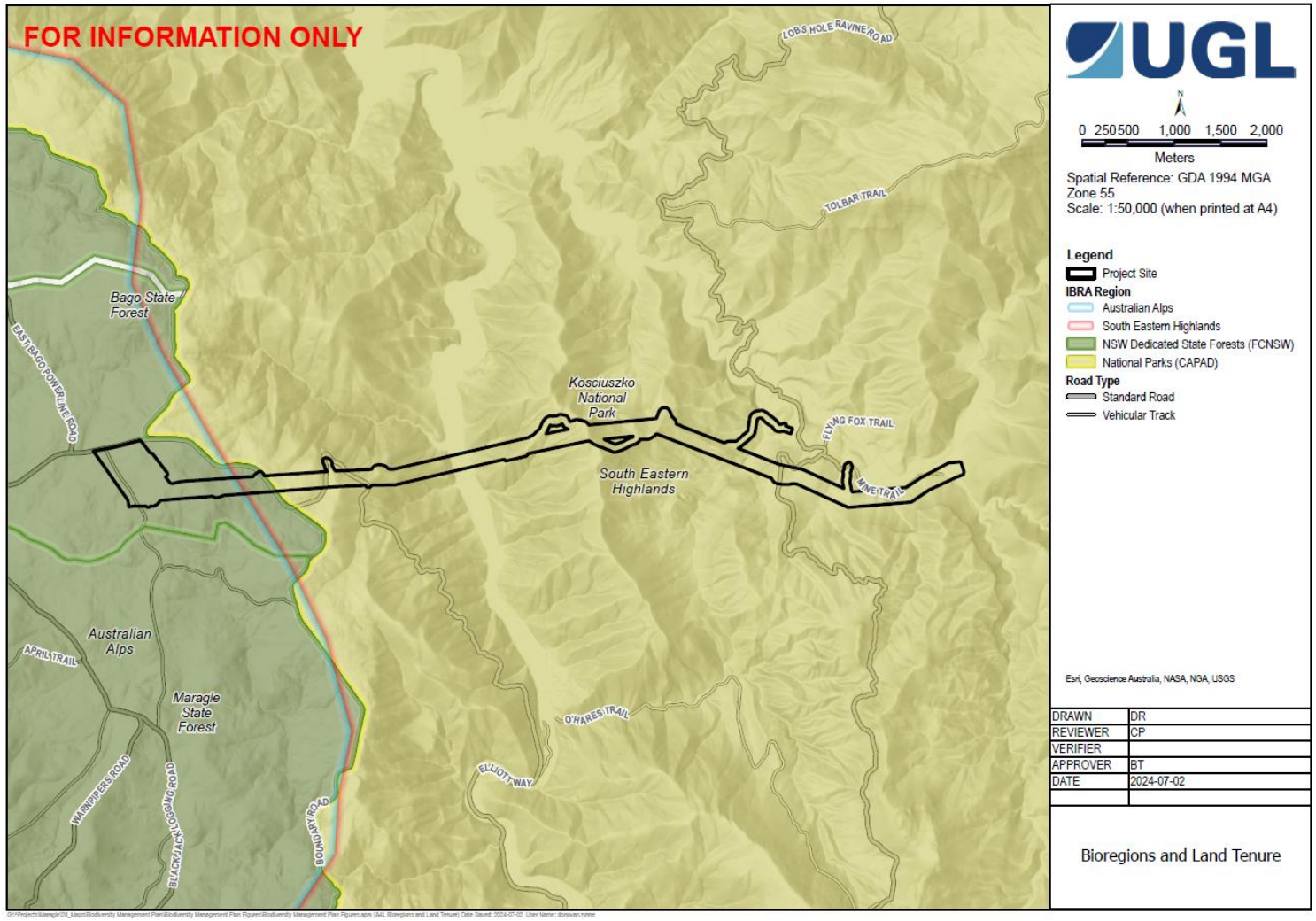


Figure 3-1 Bioregions and land tenure

3.2 Bushfire History

The Dunns Road bushfire that impacted the Project area started on 27 December 2019 from a lightning strike in a private pine plantation near Adelong, as outlined within the Project Emergency Response Plan (3200-0645-PLN-027-ERP Appendix H). The fire covered a total area of 333,980 ha (NPWS 2020). The severity of this fire across the Project area was classed as the top two classes: "Extreme – full canopy consumption'' and 'High – full canopy scorch / partial consumption''. In the Project area and broader locality, lower fire intensity is mapped in Bago and Maragle State Forests compared to KNP, the area between the proposed substation and east to Elliott Way is mapped as 'Low – burnt understory with unburnt canopy'.

It is noted that most of the fieldwork for the BDAR and EIS was completed prior to the 2019-2020 bushfires, therefore the Guideline for applying the Biodiversity Assessment Method at severely burnt sites' (Department of Planning, Industry and Environment, 2020c) largely didn't apply to the assessment.

However, in line with the guideline, the assessment identified likely sites of resource flows and sinks within the Project area. These are potential locations where moisture and nutrients are likely to accumulate and support more rapid regeneration of vegetation and a higher carrying capacity. Within the Project area and study area, likely sites of resource flows and sinks are assumed to be:

- Low lying areas containing swampy and riparian vegetation. These are mapped in Figure 4-4 using the distribution of Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion (PCT 285) and Riparian Blakely's Red Gum – Broad-leaved Sally woodland – tea-tree – bottlebrush – wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion (PCT 302) identified during surveys; and
- Mapped waterways, as these are likely to transport and accumulate nutrients.

3.3 Native Vegetation

There is approximately 118.27ha of native vegetation within the disturbance area of the Project, including 38.27ha in the Australian Alps Bioregion, and 80.00ha in the South-eastern Highlands Bioregion.

3.3.1 Biodiversity Offset Package

All consultation, planning and implementation required for the Biodiversity Offset Package designated for the Project will be undertaken by Transgrid (the Proponent). Where information arising from Project works is available and relevant to the Biodiversity Offset Package, PC will provide this information upon request or at Project completion.

3.3.2 Plant Community Types (PCTS)

Seven PCTs were identified within the Project area, refer to Table 3-1.

Table 3-1 PCTs located within the Project area

PCT description	Full loss (ha)	Partial loss (ha)	Total impact (ha)
PCT 285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	2.2	-	2.2
PCT 296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	8.13	10.89	19.02
PCT 300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	14.86	17.14	32.01
PCT 302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	0.58	1.75	2.34
PCT 729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	14.06	12.89	26.94
PCT 999: Norton's Box - Broad-leaved Peppermint open forest on foot slopes, central and southern South Eastern Highlands Bioregion	6.13	2.46	8.60
PCT 1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion.	24.93	2.31	27.24
TOTAL	**70.90**	**47.45**	**118.35**

PCT mapping is provided in Appendix B.

3.3.3 Threatened Ecological Communities (TECs)

There are no PCTs identified within the Project Area that are listed TECs under the NSW BC Act or Commonwealth EPBC Act.

A small patch of potential TEC (not verified during surveys), Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps Bioregions, occurs north of the substation site, along Yorkers Creek, refer to Figure 3-2 (Jacobs, Rev 7, Aug 2022). This potential TEC does not occur within the Project area and is 500m downstream of the second order stream that flows from the substation site. The potential for indirect impacts to this potential TEC will be managed by standard

erosion control measures and drainage design around the substation site.

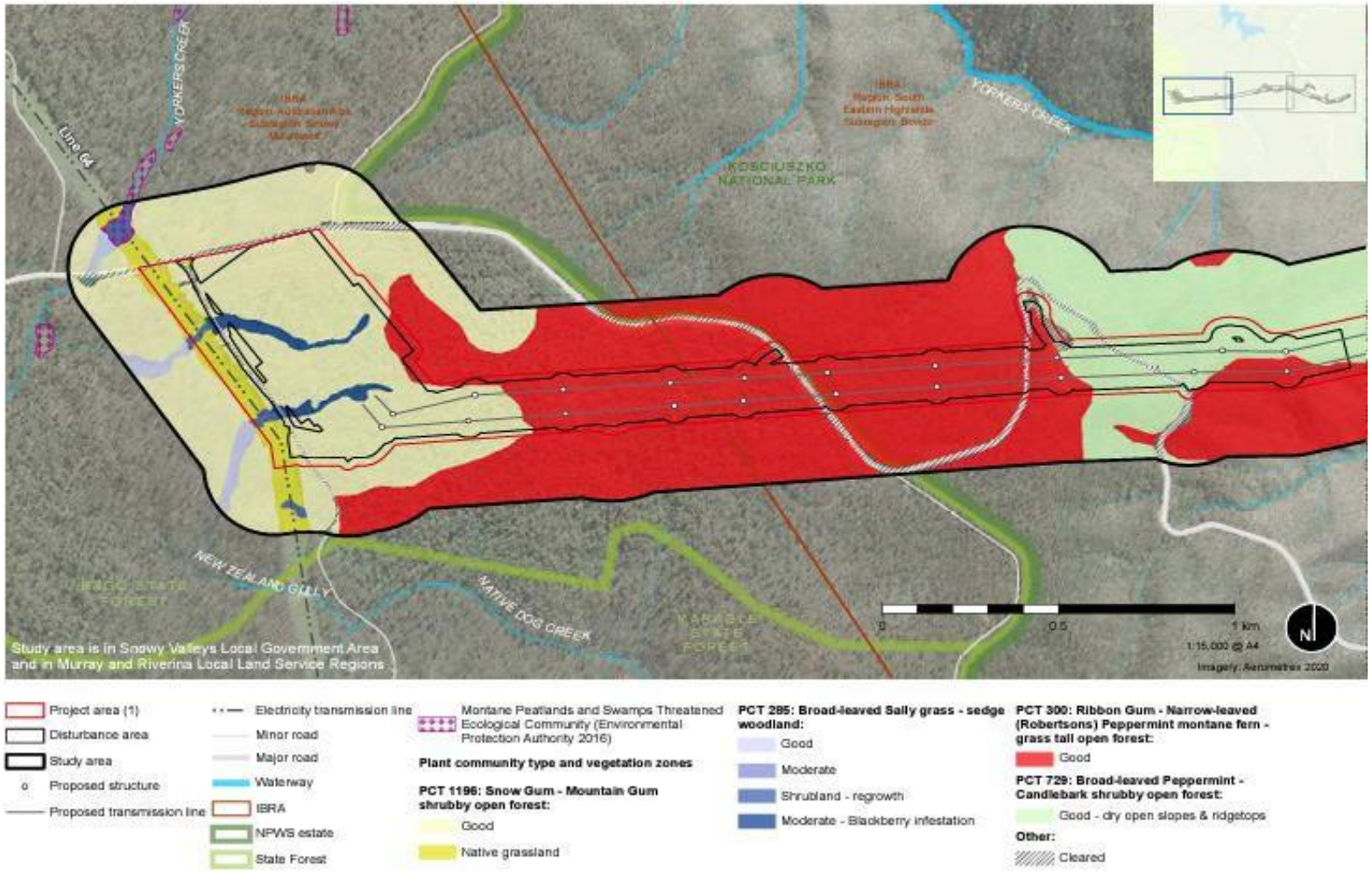


Figure 3-2 TECs identified within the survey area (Jacobs, Rev 7, Aug 2022)

3.3.4 Threatened Flora

One threatened flora species was identified onsite from targeted surveys, *Caladenia montana* (refer to Figure 3-5, Figure 3-5 and Figure 3-5). An expert was able to determine that the Black-hooded Sun Orchid (*Thelymitra atronitida*) was unlikely to occur onsite (refer to section 6.4.4.1 of the Project BDAR (Jacobs, Rev 7, Aug 2022)). No additional threatened flora species are assumed to be present.

Threatened flora species with the potential to occur within the Project area are provided in Table 3-2.

Table 3-2 Threatened flora likely to occur within the Project area

Species name	Common name	EPBC Act	BC Act	Occurrence likelihood
Caladenia montana		-	V	Present – recorded onsite
Calotis glandulosa	Mauve Burr-daisy	V	V	Low – no habitat onsite and not recorded onsite
Leucochrysum albicans var. tricolor	Hoary Sunray	E	-	Low – no habitat onsite and not recorded onsite
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	E	Low – not recorded onsite
Pterostylis alpina	Alpine Greenhood	-	V	Moderate – habitat present but not recorded onsite
Pterostylis foliata	Slender Greenhood	-	V	Moderate – habitat present but not recorded onsite
Pterostylis oreophila	Blue-tongued Greenhood	CE	CE	Moderate – habitat present but not recorded onsite
Thelymitra alpicola	Alpine Sun Orchid	-	V	Moderate – habitat present but not recorded onsite
Thelymitra atronitida	Black-hooded Sun Orchid	-	CE	Low - not recorded onsite and based on experts
Thesium australe	Austral Toadflax	V	V	Moderate – habitat present but not recorded onsite

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered

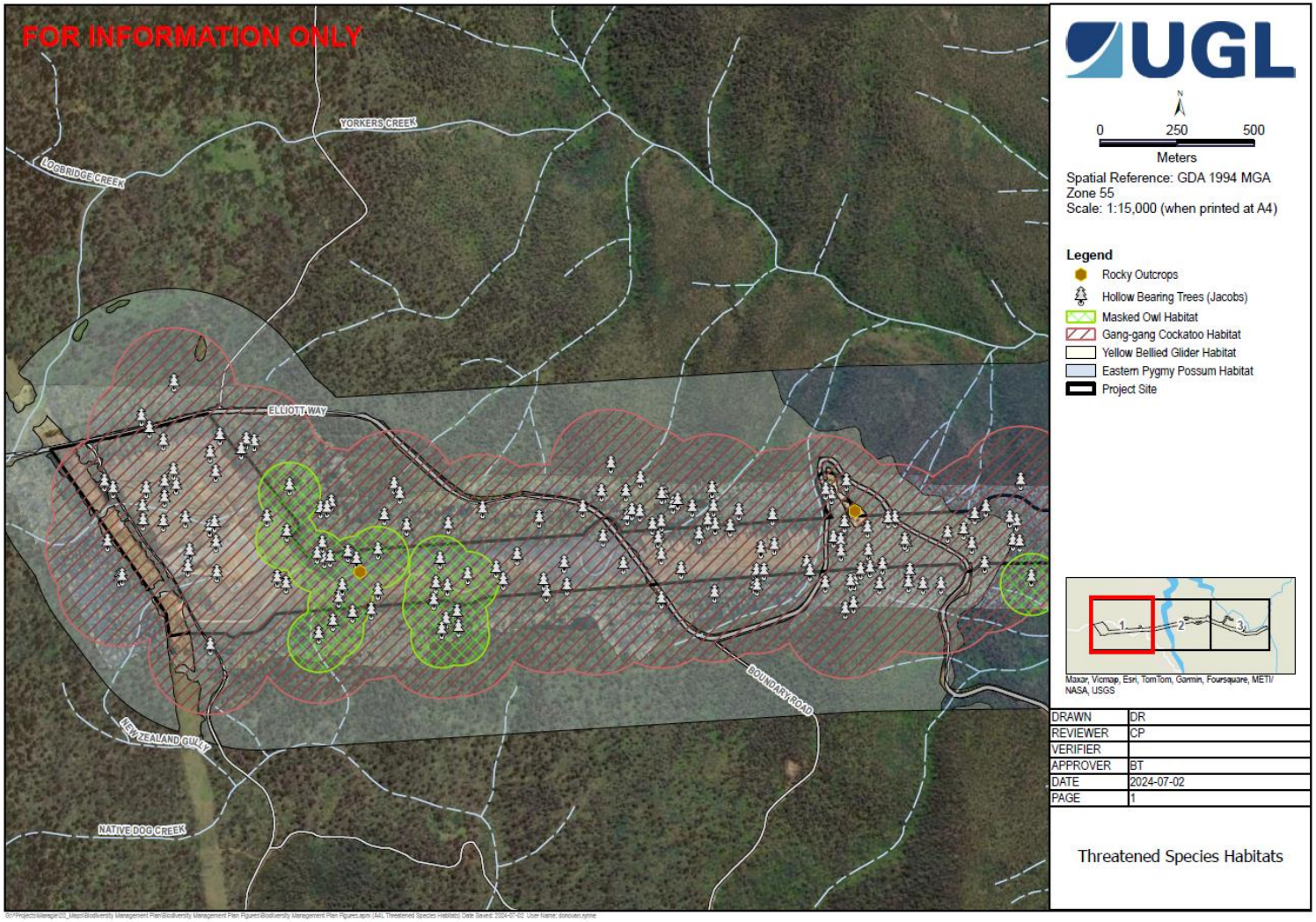


Figure 3-3 Threatened species habitat occurring within the Project site (Map 1 of 3)

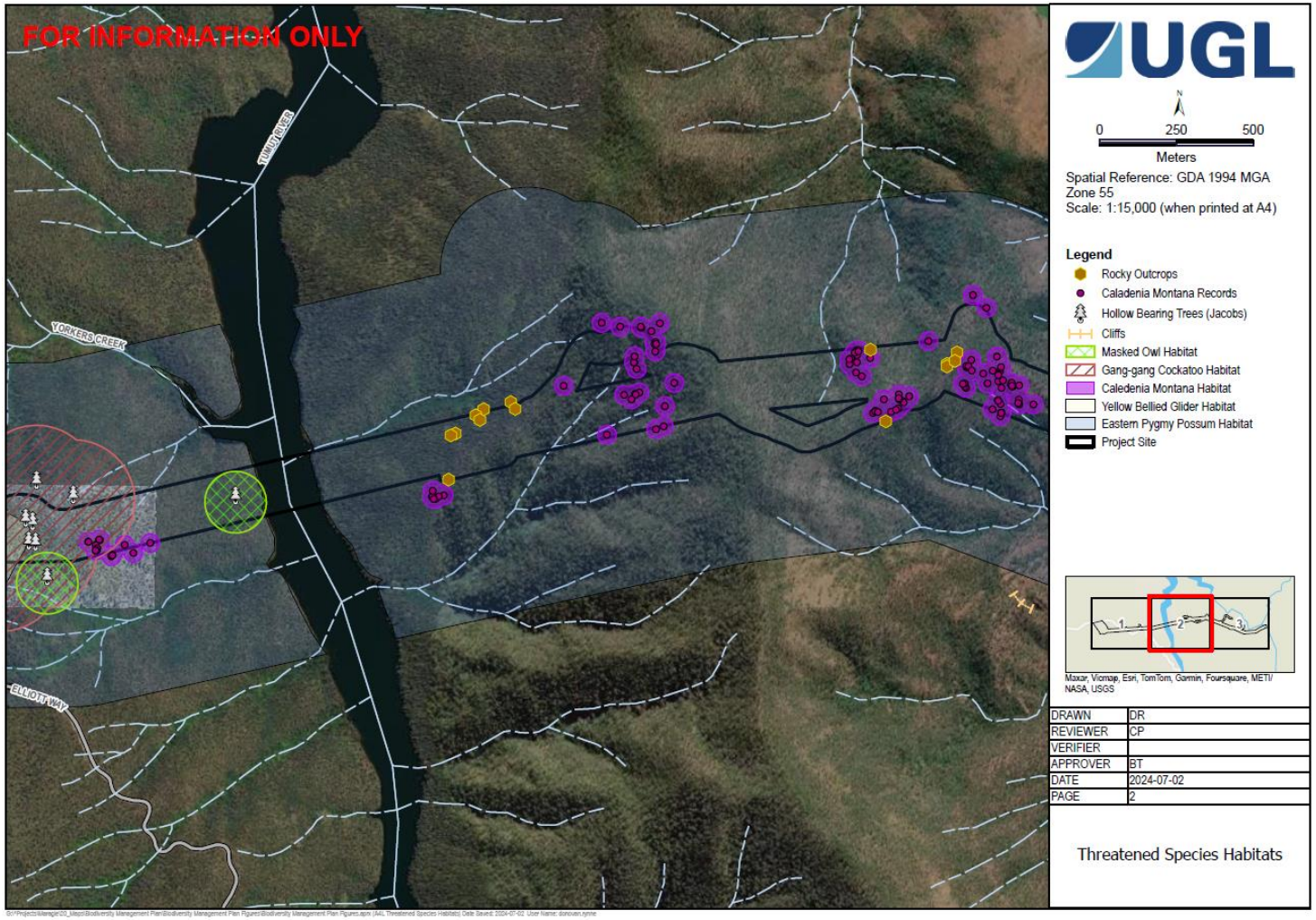


Figure 3-4 Threatened species habitat occurring within the Project site (Map 2 of 3)

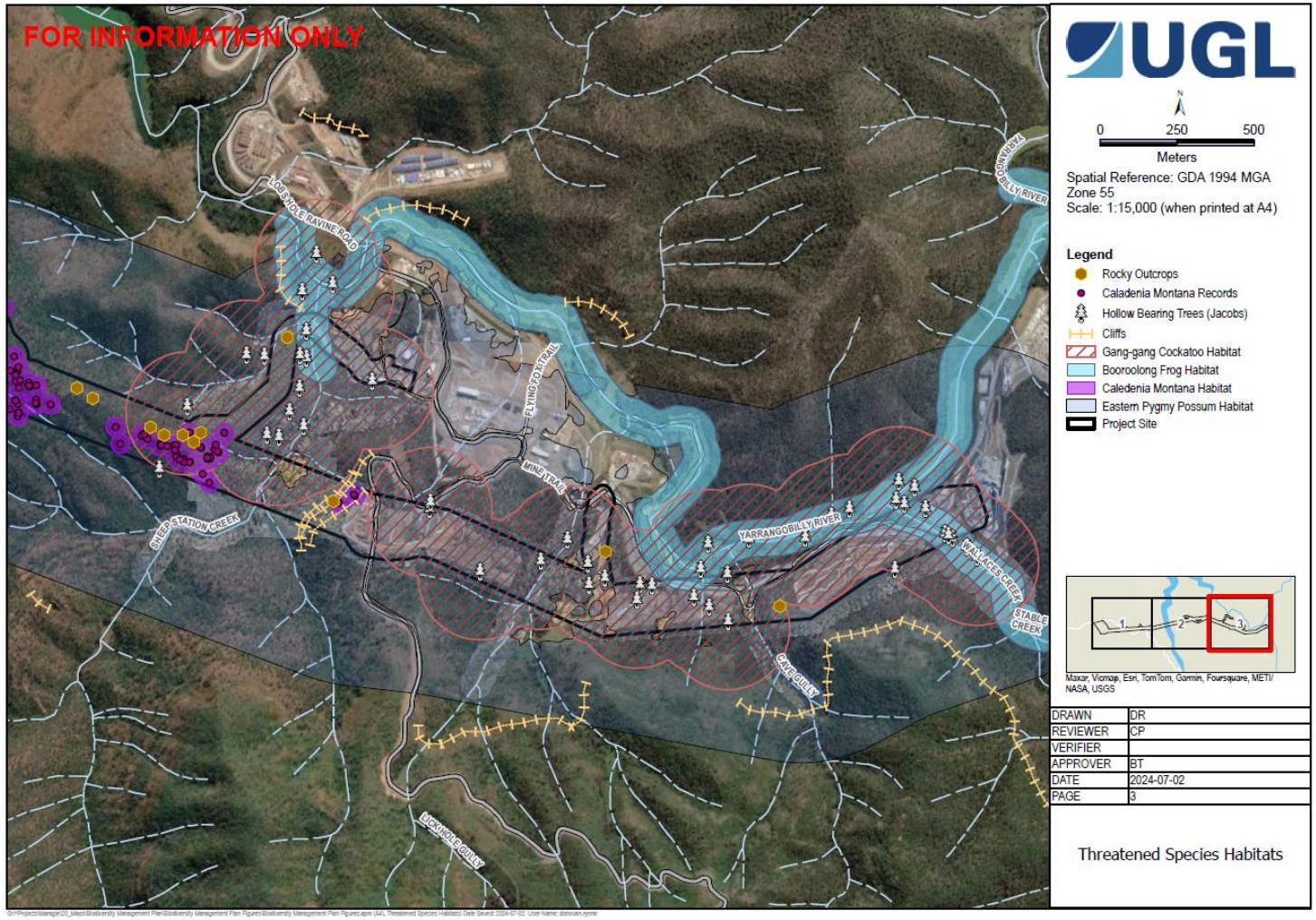


Figure 3-5 Threatened species habitat occurring within the Project site (Map 3 of 3)

3.4 Fauna Habitat

Four broad habitat types were identified within the Project area. These habitat types are described below in Table 3-3, along with their corresponding PCT.

Key fauna habitat features identified within the Project area include:

- Hollow-bearing trees
- Watercourses – these provide higher value habitat (riparian and aquatic)
- Coarse woody debris
- Rocky outcrops.

Table 3-3 Fauna habitat types within Project area

Habitat type	Associated PCT	Description
Upper Riverina Dry Sclerophyll Forests	PCT 285 & 302	This habitat is typically an open dry sclerophyll forest (shrub/grass sub-formation) with an open sclerophyllous shrub stratum and a patchy groundcover of grasses. This habitat occurs on the drier areas of undulating terrain or steep rocky slopes on soils of moderate fertility. The riparian vegetation along the Yarrangobilly River and tributaries also falls into this habitat type.
Southern Tableland Dry Sclerophyll Forests	PCT 729, 296 & 999	This habitat is an open dry sclerophyll forest (shrubby sub-formation) with a forest or woodland structure and an open to sparse sclerophyll shrub stratum and open groundcover of grasses. The forests are stunted on exposed stony hills and taller on deeper soils in undulating terrain. This habitat occurs on stony ridges and exposed slopes on infertile soils.
Southern Tableland Wet Sclerophyll	PCT 300	This habitat type is a wet sclerophyll forest (grassy sub-formation) with a tall open canopy and a variable density of shrubs (a mixture of sclerophyllous and monophyllous species). There is a diverse, relatively continuous herbaceous-grassy groundcover. It occurs on sloping hills and valleys, and occasionally on the steeper slopes of gorges and scarps.
Subalpine Woodlands Forests	PCT 1196	This habitat type is a grassy woodland with an open canopy. The understorey includes a variable sclerophyll shrub stratum and ground cover dominated by tussock grasses and a variety of herbs. This habitat type occurs at the higher elevations of 1000-1800 m in frost-hollows on the tablelands. This habitat receives moderate rainfall, frequent frosts and occasional snow.

3.5 Threatened Fauna

Threatened fauna species with the potential to occur within the Project area are provided in

Table 3-4. Refer to Figure 3-5, Figure 3-5 and Figure 3-5 for threatened fauna habitat identified within the Project area.

Table 3-4 Threatened fauna likely to occur within the Project area

Species name	Common name	EPBC Act	BC Act	Occurrence likelihood
Birds				
Artamus cyanopterus	Dusky Woodswallow	-	V	Present – habitat onsite and recorded onsite
Callocephalon fimbriatum	Gang-gang Cockatoo	E	E	Present – habitat onsite and recorded onsite
Daphoenositta chrysoptera	Varied Sittella	-	V	Present – habitat onsite and recorded onsite
Haliaeetus leucogaster	White-bellied Sea-Eagle	-	V	Moderate - No breeding habitat Foraging habitat present
Hieraaetus morphnoides	Little Eagle	-	V	Moderate - No breeding habitat Foraging habitat present
Lophoictinia isura	Square-tailed Kite	-	V	Unlikely – no records nearby or breeding habitat
Ninox connivens	Barking Owl	-	V	Unlikely – no records and edge of habitat
Ninox strenua	Powerful Owl	-	V	Moderate – no records but breeding habitat present
Petroica boodang	Scarlet Robin	-	V	Present – habitat onsite and recorded onsite
Petroica phoenicea	Flame Robin	-	V	Present – habitat onsite and recorded onsite
Petroica rodinogaster	Pink Robin	-	V	Present – habitat onsite and recorded onsite
Stagonopleura guttata	Diamond Firetail	V	V	Present – habitat onsite and recorded onsite
Tyto novaehollandiae	Masked Owl	-	V	Present – habitat onsite and recorded onsite
Tyto tenebricosa	Sooty Owl	-	V	Unlikely – no records nearby or suotable habitat onsite.
Mammals				
Cercartetus nanus	Eastern Pygmy Possum	-	V	Present – habitat onsite and recorded onsite
Dasyurus maculatus	Spotted-tailed Quoll	E	V	High – not recorded onsite but extensive areas of habitat
Falsistrellus tasmaniensis	Eastern False Pipistrelle	-	V	Present – habitat onsite and recorded onsite

Species name	Common name	EPBC Act	BC Act	Occurrence likelihood
Miniopterus orianae oceanensis	Large Bent-winged Bat	-	V	Present – habitat onsite and recorded onsite
Myotis macropus	Southern Myotis	-	V	Unlikely – lack of records nearby or suitable habitat onsite
Petaurus australis	Yellow-bellied Glider	-	V	Present – habitat onsite and recorded onsite
Phascolarctos cinereus	Koala	E	E	Moderate – limited records but extensive habitat present
Pseudomys fumeus	Smoky Mouse	E	CE	Likely – records within the area and extensive habitat present
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	-	V	Present –recorded onsite
Scoteanax rueppellii	Greater Broad-nosed Bat	-	V	Likely – records within the area
Reptiles				
Varanus rosenbergi	Rosenberg's Goanna	-	V	Moderate – known to occur and habitat present
Amphibians				
Litoria booroolongensis	Booroolong Frog	E	E	Present – habitat onsite and recorded onsite
Litoria verreauxii alpina	Alpine Tree Frog	V	E	Unlikely – habitat unsuitable

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered

To achieve compliance with the *Environmental Management Plan Guidelines* (DoE, 2014) as requested by AG DCCEEW, risks to both the Booroolong Frog and Spotted-tailed Quoll are required to be identified within the broader Project EMS. For detail regarding Project impacts to the Booroolong Frog, refer to Appendix G of this BMP. No specific details regarding Project impacts to the Spotted-tailed Quoll are provided in the Matters of National Environmental Significance (MNES) assessment in Section 8.5 of the Project BDAR. It is identified that approximately 135.6 ha of potential habitat for the Spotted-tailed Quoll occurs within the disturbance area, of which approximately 39.26 ha comprises surrounding vegetation that will be indirectly impacted by edge effects. As described in Section 6.7.2.18 of the Project BDAR, it is noted that the Spotted-tailed Quoll was not recorded within the Project area during site surveys and was not identified during surveys undertaken for Snowy Exploratory or Main Works. From this information, it can be determined that potential Spotted-tailed Quoll habitat will be impacted by Project works, which will be mitigated as far as practicable through the implementation of this BMP and the employment of offsets associated with the Project.

3.6 Aquatic Habitat

The Project area is located within the Murrumbidgee catchment. Twenty-nine waterways or

unnamed drainage lines are crossed by the Project area (i.e., not all will be directly impacted). Six of these waterways are stream order three or greater. Wallaces Creek, Tumut River and Yarrangobilly River are major waterways. The aquatic assessment of the waterways onsite that are mapped as Key Fish Habitat is outlined in Table 3-5 and Figure 3-6. Eighteen generally unnamed gullies/drainage lines also occur within the Project area, these gullies are first order, ephemeral and most have little to no channel definition.

Table 3-5 Aquatic assessment of named waterways within the Project area.

Waterway	Stream order	Key fish habitat	Description
Tributary of Yorkers Creek	1St	Yes	The tributary of Yorkers Creek is a moderately disturbed first order tributary of the Tumut River which flows adjacent to the Project. Access by hooved animals (horses, pigs) has created bank erosion and affected water quality at this site. The creek contains unstable mud substrate and aquatic habitat including refuge pools and large instream woody snags. The creek is mapped as key fish habitat. Threatened fish are not predicted to occur, however Murray Crayfish are likely to be present downstream approximately 4 km in the Tumut River. Yorkers Creek is assessed as Type 3 moderately sensitive key fish habitat due to the variety of habitat present. With respect to fish passage, the creek is identified as Class 3, minimal key fish habitat. Yorkers Creek has not been identified as a sensitive receiving environment.
Talbingo Reservoir and Tumut River	6th	Yes	Talbingo Reservoir is a large waterbody which connects Tumut River and Yarrangobilly River approximately 2.5 km downstream of the Project. A variety of aquatic habitat is present including gravel beds, undercut banks, aquatic macrophytes and overhanging vegetation. Two threatened fish are predicted to occur in the Talbingo Reservoir including Murray Crayfish and Macquarie Perch. Threatened Trout Cod have also been stocked in the reservoir as recently as 2016 (Cardno, 2018). Talbingo reservoir has been assessed as Type 1 - highly sensitive key fish habitat due to the likelihood of containing threatened fish. With respect to fish passage, the reservoir has been classified Class 1, major key fish habitat. The Talbingo Reservoir has been identified as a sensitive receiving environment. Tumut River is a permanently flowing, sixth order stream which drains to Talbingo reservoir. The waterway contains fish habitat including dense overhanging vegetation, instream riffles and undercut banks. The river is mapped as key fish habitat. Murray Crayfish are predicted to occur within this section of the Tumut River. Tumut River is assessed as Type 1 - highly sensitive key fish habitat due to the likelihood of containing threatened fish. With respect to fish passage, it is classified Class 1 - major key fish habitat. Tumut River has been identified as a sensitive receiving environment.

Waterway	Stream order	Key fish habitat	Description
Sheep Station Creek	3rd	Yes	Sheep Station Creek is an ephemeral third order stream which flows under a section of the Project area not directly impacted, then under an access track and drains to the Yarrangobilly River. Sheep Station Creek was dry during site inspections, however when flowing, the aquatic habitat includes gravel beds and undercut banks. The creek ismapped as key fish habitat. Threatened fish are likely to occur in the Yarrangobilly River which is located approximately 100m downstream. Threatened species include Murray Crayfish and Macquarie Perch. Sheep Station Creek is assessed as Type 3 - minimally sensitive key fish habitat. While it contains important habitat characteristics such as instream gravel beds and is connected to nearby threatened fish distributions, it is ephemeral. With respect to fish passage, the creek has been assessed as Class 3 - minimal key fish habitat due to its ephemeral nature and sporadic refuge. Sheep Station Creek has been identified as a sensitive receiving environment.
Lick Hole Gully	3rd	Yes	Lick Hole Gully is an ephemeral third order tributary of Yarrangobilly River which flows under the Project area and is parallel to an access track. The tributary is mapped as key fish habitat. Threatened fish are not predicted to occur however, Macquarie Perch are predicted to occur approximately 450m downstream in the Yarrangobilly River. In the absence of field surveys and visible fish habitat, the tributary is assessed as Type 3 - minimal key fish habitat. With respect to fish passage, the tributary is considered Class 3 - minimally sensitive key fish habitat. Lick Hole Gully is not considered a sensitive receiving environment.
Cave Gully	3rd	Yes	Cave Gully is an ephemeral third order tributary of the Yarrangobilly River which flows under a portion of the disturbance area near Mine Trail. It was dry at the time of inspection. When the tributary is flowing, aquatic habitat including gravel beds and undercut banks are present. The tributary is mapped as key fish habitat. Threatened fish are not predicted to occur in the creek however, Macquarie Perch are predicted to occur approximately 100m downstream in the Yarrangobilly River. Cave Gully is assessed as Type 3 - minimally sensitive key fish habitat due to apparently ephemeral flow and absence of aquatic macrophytes in the Project area inspected. With respect to fish passage, the tributary is considered Class 3 - minimally sensitive key fish habitat. Cave Gully is not considered a sensitive receiving environment.

Waterway	Stream order	Key fish habitat	Description
Yarrangobilly River	6th	Yes	Yarrangobilly River is a permanently flowing sixth order stream that runs parallel to the northern boundary of the Project in Lobs Hole. The Yarrangobilly River has a number of tributaries that occur within the Project area including Lick Hole Gully, Cave Gully, Wallaces Creek and Sheep Station Creek. A variety of aquatic habitat was present including woody debris, gravel beds, riffle-pool sequences, and overhanging vegetation. Macquarie Perch are predicated to occur within this section of the river. The waterway is also mapped as key fish habitat. Vulnerable Murray Crayfish have also been observed in Yarrangobilly River during field assessments (Cardno, 2018). Yarrangobilly River has been assessed as Type 1 - highly sensitive key fish habitat (DPI, 2013). With respect to fish passage, it is identified as Class 1 - major key habitat. Yarrangobilly River has been identified as a sensitive receiving environment.
Wallaces Creek	6th	Yes	Wallaces Creek is a sixth order tributary of the Yarrangobilly River that flows under the most eastern end of the Project area near the Snowy 2.0 cable yard. A variety of aquatic habitat was present including gravel beds, rocks greater than 500mm in size, woody debris, instream macrophytes and overhanging vegetation. Wallaces Creek is mapped as key fish habitat and is within 500m of predicted threatened fish occurrence - Macquarie Perch. Additionally, vulnerable Murray Crayfish have been observed in Wallaces Creek during field assessments (Cardno, 2018). The waterway has been assessed as Type 1 - highly sensitive key fish habitat with respect to fish passage. Wallaces Creek has been identified as Class 1 - major key fish habitat. Wallaces Creek is considered a sensitive receiving environment.

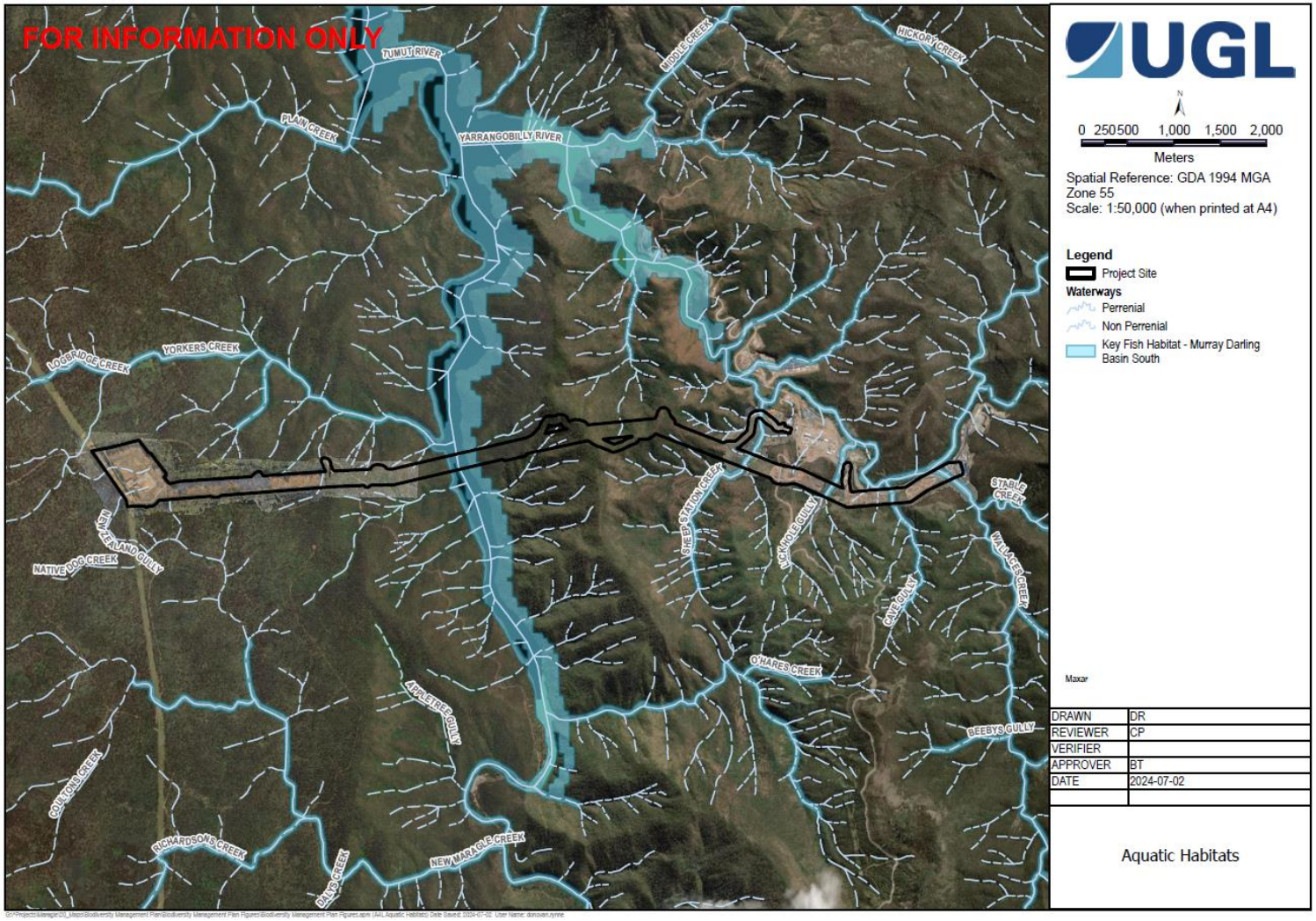


Figure 3-6 Aquatic habitat located within the Project area and surrounds

3.6.1 Booroolong Frog Habitat

During targeted surveys undertaken for the Snowy 2.0 Exploratory Works and Main Works BDARs (EMM Consulting, 2020), the Booroolong Frog was observed up to 130 m from the Yarrangobilly River during a high rainfall event that saw key breeding habitat flooded. During this period, most frogs were observed within the riparian zone (i.e. within 50 m of the river (EMM Consulting, 2020). Based on that information, the Yarrangobilly River and lower end of Wallaces Creek and Sheep Station Creek have been identified as Booroolong Frog breeding habitat, while areas within 50 m of this breeding habitat has been identified as potential dispersal and refuge habitat. These criteria were used to develop the species polygon for the Main Works BDAR, and this same species polygon has been adopted for the connecting Transmission Line Project, given the proximity of the habitat for the current Project. Refer to the Booroolong Frog Monitoring Program for more information on Booroolong Frogs.

3.6.2 Groundwater Dependent Ecosystems

It was determined that none of the PCTs onsite are likely to be fully reliant on groundwater. However, PCT 285, 296, 300 and 302 are likely to be facultative GDEs that depend on the subsurface presence of groundwater (often accessed via the capillary fringe – subsurface water just above the water table) in some locations but not in others, particularly where an alternative source of water (i.e., rainfall) cannot be accessed to maintain ecological function. These may use groundwater during periods of low flow or drought. The level of groundwater dependency will likely change between the PCTs in different areas, i.e., proportional to opportunistic depending on the current groundwater level. Within the Project area, PCT 285 and 302 are likely to have the highest groundwater dependency as they are located on alluvial and colluvial soils along the Yarrangobilly River and tributaries. Base flow (that part of stream flow derived from groundwater discharge and bank storage) may contribute year-round to flows in the Yarrangobilly River that supports the riparian vegetation, but it is likely that this vegetation can also exist without the input of groundwater, as long as there is no prolonged drought.

The location of GDEs within the construction envelope can be determined by cross-referencing the PCTs listed in Section 3.3.2 with the mapping provided in Appendix B. The Project is considered unlikely to affect groundwater to an extent that facultative GDEs would be detrimentally impacted.

One TEC, *Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps Bioregions* occurs to the north and west of the substation, refer to Figure 3-2 above. This TEC is a facultative GDE. Measures to protect this TEC are provided in Section 5.8 below.

3.6.3 Threatened Aquatic Species

The following threatened aquatic species (under the *Fisheries Management Act 1994*) are known to occur in the Tumut River, Talbingo Reservoir (or have been previously stocked) and Yarrangobilly River:

- Macquarie Perch (Macquaria australasica)
- Silver Perch (Bidyanus bidyanus)
- Trout Cod (Maccullochella macquariensis)
- Murray Cod (Maccullochella peelii)

- Murray Crayfish (Euastacus armatus)

3.7 Weeds and Pathogens

Key weeds identified within the Project area include:

- Blackberry (Rubus fruticosus sp. agg.)
- Sweet Briar (Rosa rubiginosa)
- Yorkshire Fog (Holcus lanatus)
- St John's Wort (Hypericum perforatum)
- Red Sorrel (Rumex acetosella)
- Velvet Grass (Holcus lanatus),
- Sheep Sorrel (Acetosella vulgaris)

Weeds of National Significance (WoNS) (CISS, 2021) and weeds listed on the NSW WeedWise website (DPI, 2022), that have the potential to occur within KNP, Bago State Forest and surrounding areas are detailed in the WPCMP (Appendix H).

Prior to the commencement of clearing activities, mapped weed infestations will be reviewed (BDAR, Jacobs 2022) in conjunction with the data collected during pre-clear weed surveys.

The KNP POM has identified diseases, such as canid mange in wombats and chytridiomycosis in frogs, which have been recorded in the park (NPWS, 2006). The latter disease, caused by a fungus, has been detected in a number of threatened frog species though it remains unclear whether it constitutes the primary cause of recent frog population declines.

Infection of native plants by *Phytophthora cinnamomi* is listed as a key threatening process under the BC Act and EPBC Act. *Phytophthora cinnamomi* is a water-borne mould that infects the roots of plants and can lead to death of trees and shrubs, resulting in devastation of native ecosystems (OEH, 2022). Infection of susceptible communities with *Phytophthora cinnamomi* leads to:

- Changes in the structure and composition of the native plant communities.
- A significant reduction in primary productivity and functionality; and
- Habitat loss and degradation for dependent flora and fauna.

As per the Snowy 2.0 Main Works BMP (FGJV, 2020), Snowy 2.0 has been undertaking annual monitoring for the presence of *Phytophthora* within the Main Works Project area. The monitoring has included the bottom of Lobs Hole Ravine Road, which is adjacent to this Project (Connection Project). *Phytophthora cryptogea / pseudocryptogea* has previously been identified in two samples at Lobs Hole. *Phytophthora cryptogea / pseudocryptogea* is noted to be common in KNP and has been suspected to impact specific species of native vegetation. Recent consultation with Snowy 2.0 and NPWS, has highlighted the need for additional *Phytophthora* investigations prior to the start of these Project activities to determine presence / absence in work areas and associated access, and the potential need for disinfection mitigations. All *Phytophthora spp.* found or suspected on the Project will be considered high risk until otherwise confirmed. Additional sampling at Lobs Hole will be undertaken as part of this Project.

3.8 Predator and Pest Species

Predator and pest species refers to foxes, dogs, cats, deer, feral horses and rabbits; all of these species have been reported in the Project area.

4 Environmental Aspects and Impacts

4.1 Construction Activities

Key aspects of the Project that could result in impacts to terrestrial and aquatic flora and fauna include:

- Clearing of native vegetation and habitat.
- Works around and within the waterways.
- Noise generating works.
- General earthworks near vegetation and waterways / drainage lines, resulting in disturbance of soils, consequential erosion and the mobilisation of sediment.
- Open excavations presenting risk to terrestrial animal populations (native and non-native species).
- Use of chemicals / fuels (potential for spills and contamination of waterways and habitats).
- Increased heavy vehicles and numbers of vehicles in the area presenting increased collision risk with terrestrial fauna.
- Introduction and/or transport of weeds and pathogens through vehicle movements and importation of materials.
- Light spill from temporary and permanent lighting installed.

4.2 Ecological Impacts

Likely and / or potential impacts associated with Project are discussed in the BDAR and highlighted in the Project COAs. These potential impacts include:

- Full and partial loss of approximately 118.35 ha of native vegetation (refer to Table 3-1)
- Direct loss of approximately 9.35 ha or 166 plant clusters of *Caladenia montana*
- Direct loss of the following threatened fauna habitat:
    - Gang-gang Cockatoo – 89.06 ha of breeding habitat (over both bioregions)
        - Masked Owl – 10.86 ha of breeding habitat (over both bioregions)
        - Booroolong Frog – 1.67 ha (confined to South Eastern Highlands Bioregion)
        - Eastern Pygmy-possum – 117.29 ha (over both bioregions)
        - Yellow-bellied Glider population on the Bago Plateau – 59.03 ha (over both bioregions).
        - Spot-tailed Quoll – 118.34 ha (over both bioregions)
- Direct impacts to three waterways mapped as key fish habitat, Sheep Station Creek, Cave Gully and Wallace's Creek. There is also potential for indirect impacts to surrounding aquatic habitat from unmitigated erosion and contaminated (e.g., hydraulic fluids, oils, drilling fluids) run-off from construction and operation. The implementation of mitigation measures (i.e., track design, erosion and sediment control, spill control) will be implemented to control sediment and pollutants from any

runoff events.

- Direct and indirect impacts to fauna including injury and mortality or increased predation
- Loss of shade and shelter
- Fragmentation of habitats and wildlife corridors
- Spread of plant diseases
- Edge effects (such as weed invasion, pests and disease)
- Disturbance to facultative groundwater dependent ecosystems
- Noise and vibration.
- Bird and bat collision risk
- Loss of Hollow-bearing Trees (HBTs)

Refer also to the Aspects and Impacts Register included in Appendix E of the CEMP.

5 Environmental Mitigation and Management Measures

5.1 Flora and Fauna Management Strategies

Condition of Consent B21 requires the implementation of this BMP and the strategies, mitigations and management measures it contains. Transgrid and PC acknowledge and support this requirement and provide commitment to achieving all requirements stated within this plan. Unless otherwise specified or on the grounds of safety, the following environmental controls apply to the Project area and will be carried out during the pre-construction, construction, post-construction and throughout the operational phases of the Project. The flora and fauna management strategies are designed to ameliorate impacts on flora and fauna and are based on the mitigation measures listed in Section 2.3 of this report. An overview of fauna and flora mitigation strategies are listed in Table 5-1.

Table 5-1 Overview of fauna and flora mitigation strategies

Pre-Construction Activities	During Construction Activities	Post-Construction and Operations Activities
• Biodiversity Offset Package document to mitigate direct impacts to threatened species and habitat • Detailed final designs that minimise impacts on vegetation and fauna habitat (Appendix A) • Definition of the site boundary, including the different types of clearing zones (Appendix B) • Demarcation of habitat and vegetation protection (Appendix B) • Pre-clearing flora and fauna surveys (Appendix B) • Baseline weed mapping (Appendix H) • Baseline soil sampling for Pathogens (*Phytophthora*) (Appendix H)	• Vegetation management and salvaging of resources (Appendix B) • Habitat relocation (Appendix B) • Use of clearing permit and vegetation tracking (Appendix B) • Fauna recovery and relocation procedures (Appendix C) • Unexpected finds procedures (Appendix D) • Ecologist supervision (Appendix B) • Weed and pathogen monitoring, prevention and control (Appendix H) • Pest and predator monitoring and control (Appendix I) • Environmental monitoring (Appendix F, Appendix G, Appendix J and Appendix K) • Works management	• Rehabilitation Plan • Habitat rehabilitation • Operational-phase environmental monitoring (Transgrid)

5.2 Biodiversity Offset Package

To ensure the security of the required biodiversity offsets and confirm the performance of the obligations in relation to biodiversity offsets, Snowy Hydro intends to provide and implement a Biodiversity Offset Package document that will:

- Detail the specific biodiversity offset measures to be implemented and delivered in accordance with the Project BDAR (Jacobs, Rev 7, Aug 2022);
- Identify the cost for each specific biodiversity offset measure, which would be required to be paid into the Biodiversity Conservation Fund if the relevant measure is not implemented and
- delivered (as calculated in accordance with Division 6 of the Biodiversity Conservation Act 2016 (NSW)) and the offset payment calculator that was established as of 9 August 2021;
- Describe the timing and responsibilities for the implementation and delivery of measures required in the Package; and
- Confirm that the biodiversity offset measures will have been implemented and delivered by no later than 1 September 2024.

Snowy Hydro shall also lodge a bank guarantee with a total value of $24,869,236, in accordance with the Deed of Agreement with the Planning Secretary (executed on 1 September 2022). Additionally, Snowy Hydro will pay $10,586,027 to the NPWS to offset the residual biodiversity impacts to Kosciuszko National Park.

5.3 Detailed Design

Detailed design of the Project prepared by PC and NGH on 25 August 2023 is provided in Appendix A of this BMP. In accordance with the project BDAR (Jacobs, Rev 7, Aug 2022) definition for the Project Area and SSI-9717 Part A Condition A2 (d), detail design has been carried out generally in accordance with the Development Layout in Appendix 2 of SSI-9717. Consistency assessment/s will be applied to the detail design project component elements to confirm there is no exceedance of the approved Total and Partial Clearing Areas and associated offset obligations.

Once a consistency assessment is finalised, mapped clearing zones and clearing methodology mapping will be updated in accordance with Section 7 of this BMP. This will be redistributed to the relevant stakeholders for visibility, inclusive of RDD and NPWS.

The BDAR (Jacobs, Rev 7, Aug 2022) allocated seven distinct clearing zones across the Project's disturbance or clearing zones. These clearing zones have been applied to the detailed design and will be implemented onsite during clearing and construction, as outlined in the Clearing Procedure (Appendix B). Each of these zones was attributed specific clearing requirements to minimise either indirect or direct impacts to surrounding vegetation, and habitat, as a result of the clearing. These zones to be implemented are described in Table 5-2 below. The clearing methodology for each zone, and how they will be implemented i.e. flagging, mulching is described in detail within the Clearing Procedure (Appendix B).

As outlined in the clearing zones below (Table 5-2), there are areas of partial and total clearing. Partial clearing is the removal of trees and shrubs with growth potential above 4m tall and retaining all vegetation with growth potential less than 4m tall. These are areas that don't need to be full impacted by construction but need vegetation maintained during operation (i.e. under

the transmission line). Partial clearing is required in ECZ, HCZ, HTZ and TSZ (outside of civil works areas). Specific measures outlined in this clearing procedure (Appendix B) are to be implemented to minimise the impact on the vegetation to be retained within the partial clearing zones (i.e. shrubs and groundcover). Total clearing is the removal of all vegetation in the zone to make way for new infrastructure, or for safety reason. They have been assessed and direct impacts have been offset. Total clearing is required in zones TSZ (within civil works areas), ATZ and SZ.

Table 5-2 Clearing Zones

Clearing zone name	Partial clearing	Total clearing	Description
Transmission Structure Zone (TSZ) – within Civil Works Areas/Construction Benches		X	Complete vegetation clearing (clearing to bare earth) to facilitate the formation of level crane / construction benches, machine / vehicle access and tower foundations (Civil Works Areas) and expedite the safe construction of the transmission structures.
Transmission Structure Zone (TSZ) – outside Civil Works Areas/Construction Benches/Access Tracks	X		This is the 50m radius of the TSZ Civil Works Areas / Construction Benches outlined above, it comprises of an assumed 50 m radius surrounding each individual transmission structure along the extent of the transmission line connection.
Access Track Zone (ATZ)		X	This area is the corridor that will be cleared to make access tracks to the transmission structure locations. A maximum (worst case) 30m width has been assumed, including the required cuts / fill along the steep sections of the access track route. Only the vegetation required to be cleared to construct the access track will be undertaken.
Easement Clearing Zone (ECZ) – machine accessible	X		Is defined as the vegetation zones along the transmission line easement which will require clearing and ongoing maintenance of tall growing vegetation which may intrude on the Vegetation Clearance Requirements at Maximum Line Operating Conditions (maximum conductor sag and maximum conductor blowout) at that location now or at any time in the future. To minimise impacts on biodiversity and ground stability within this zone, ground cover vegetation will be retained, with partial midstory removal required along with complete removal of the canopy layer (as per Transgrid's Maintenance Plan – Easement and Access Tracks, December 2020).

Clearing zone name	Partial clearing	Total clearing	Description
Hand clearing zones (HCZ) (referred to as ECZ – Steep/constrained areas in BDAR (2022)	X		This zone is defined sections of the ECZ (described above) that are not safely or practicable accessible for machine clearing during construction. The removal / management of vegetation will be undertaken by hand clearing / felling.
Substation Zone (SZ)		X	This zone will be cleared and permanently modified by surface hardenings (concrete, bitumen, crushed rock or similar, built structures etc.) to support construction and installation of the 500/330 kV switchyard. This area incorporates the Substation access road and Substation Asset Protection Zone also.
Hazard Tree Zone (HTZ)	X		Areas external to the ECZ but within the Project area which contain trees of a sufficient height which, if they were to fall, will strike the overhead conductors or the transmission structures (referred to as Hazard Trees). Hazard trees pose a considerable bushfire risk and risk to the asset, therefore require management / removed as part of the initial construction of the line and during ongoing operation.

The access track corridors have been designed with consideration to terrain (e.g., utilisation of the ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing. The detailed design (Appendix A) has also undertaken micro-siting to reduce impacts on rocky outcrops, large boulders, piled rock, and rock features. During construction, further micro-siting of access tracks to avoid or minimise impacts to rocky outcrops, large boulders, piled rock, and rock features will be considered where possible. Transgrid will maintain a revision register of the detailed design to ensure the design is still meeting offset obligations (i.e., vegetation and habitat impact areas) as outlined in Section 5.2. The procedure for updating the BMP is outlined in Section 7 of this BMP.

The final design of access tracks and micro siting of towers was an iterative process involving a range of workshops, and process, including:

- Design Risk Workshops, such as Safety in Design, HazCon, etc
- Design reviews by third parties, and
- Assessment against GIS constraint mapping.

The final design of temporary and permanent creek crossing structures, including the permanent structure over Sheep Station Creek are outlined in Section 5 of the SWMP. They have been designed to minimise impacts on fish passage and aquatic habitat by ensuring stream flow is unaffected. They will be designed and constructed to comply with the relevant

requirements of:

- Relevant Austroads Standards
- Guidelines for Controlled Activities on Waterfront Land (NRAR, 2018)
- Policy and Guidelines for Fish Habitat Conservation (DPI, 2013) and Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003).

The importance of the clearing zones and requirements of micro-siting will be presented to all personnel during the site induction and during construction and operation through toolbox talks.

5.4 Project Boundary and Exclusion Zones

The following boundaries and no-go zones will be established before vegetation clearing commences:

- The boundary of the Project area will be clearly marked on site by a surveyor to protect the vegetation outside the approved development footprint from inadvertent direct impacts. Outside of the approved development footprint is a no-go zone.
- The boundaries for each clearing zone (as outlined in Table 5-2) will be clearly marked on site by a surveyor to protect the partial clearing zones from inadvertent direct impacts.
- No-go zones, clearing zones and the edge of the Project area will be marked with high visibility fencing, markers and / or signage. These will be in place for pre-clearing and construction and will remain in place until rehabilitation objectives for areas above / upstream of the zones have been met and slopes have been stabilised. Flagging protocol is outlined in the clearing procedure (Appendix B).
- A 50m Booroolong Frog Exclusion Zone (refer to Figure 3-5) will be marked and clearly delineated from other survey markers during site boundary markup by a surveyor with signage also placed around the tributaries that flow downhill into the Yarrangobilly River (refer to flagging protocol in Appendix B). This also includes the 50m Exclusion Zone adopted for the Main Works Project on Yarrangobilly River. The Booroolong Frog Exclusion Zone is identified Booroolong Frog habitat not approved to be impacted (i.e. not offset) by the Project that will be a no-go zone. This exclusion zone will remain in place until rehabilitation objectives for areas upstream have been met, and slopes have been stabilised.

Note, there are portions of vegetation removal that are required within the Booroolong Frog habitat areas to enable the construction of the Project. These areas have been approved for works, and the impacts to the Booroolong Frog have been offset. These are not part of the Exclusion Zone (Figure 3-5) and are described further in the clearing procedure (Appendix B).

- Hazard trees identified from the LiDAR assessment will be flagged for removal, and any other adjacent and important habitat trees and features, also identified for retention and to avoid disturbance during the felling activity will be clearly marked and included in maps (refer to Appendix B hazard tree locations and the Project's CEMP site-specific plans in Appendix F for more detail).

5.5 Clearing Protocols and Habitat Protection

In order to ensure that vegetation and habitat is not accidentally cleared or damaged within or outside of the Project area, a Clearing Permit process shall be followed. This permit process will ensure that PCT clearing limits (refer to Table 3-1) and total native vegetation clearing limits are adhered to and that no more than the approved amount of habitat is cleared for the development. This includes;

- 287.26 ha total of various Species Habitats
- 118.35 ha total of various PCT types; and
- 125 ha total of Native Vegetation Clearing

Specific detail on the clearing permit process, including the identification and demarcation of the authorised areas of vegetation and habitat clearing, recording and tracking clearance totals for each habitat and PCT type and providing a mechanism to prevent over clearing against allowable clearance limits, is described in more detail in the clearing procedure in Appendix B.

5.6 Fauna Rescue and Release Procedure

A Fauna Rescue and Release Procedure has been developed and is included in Appendix C of this BMP. The Fauna Rescue and Release Procedure must be implemented whenever fauna is encountered on the site, and which require rescuing or relocation. Fauna rescue and/or relocation will be carried out by an experienced ecologist or licenced wildlife handler/carer. Details for wildlife groups: Looking after our Kosciuszko Orphans (LAOKO) and Saving our Native Animals (SONA) are provided in Appendix C.

5.7 Unexpected Threatened Species Finds

An Unexpected Threatened Species Find Procedure has been developed and is included in Appendix D of this BMP. The procedure is to be implemented following the discovery of any known or suspected threatened flora or fauna within the Project area.

5.8 Soil and Water Management

Soil and water management including Erosion and Sediment Control Plans (ESCPs) are outlined in the SWMP (Appendix D and Appendix E,) for the Project. It has been identified that a high level of control is required for soil and water - to ensure the protection of local waterways, aquatic habitat and Booroolong Frog populations. There is a key link between this BMP, the SWMP, the water quality monitoring program and Booroolong Frog Monitoring Program (BFMP) for the adaptive management of soil and water onsite. The overarching Environmental Management Strategy for the Project describes the interaction between these plans, and the interaction between the SWMP, and the protection of the Booroolong Frog (which is described in detail in Section 4.2 of the BFMP).

The SWMP and ESCPs have been developed with consideration of the lessons learnt from current Snowy 2.0 Projects in regard to the effectiveness and efficiency of soil and water controls onsite (refer to Section 3.5 of the SWMP). Specifically in the preparation of the SWMP, the publicly available audit, incident and non-compliance reports, as well as EPL monitoring reports, for the Snowy 2.0 Project were reviewed and any learnings from those reports were considered in the SWMP (BIO10). Based on the review UGL have added the following to the

SWMP:

- Application of 'better than Blue Book' erosion and sediment controls within the primary and progressive erosion and sediment control plans (Refer to Table 1-1 of the Primary ESCP). This includes focusing on mulch for erosion control and breaking the site into smaller catchments to reduce point loading, adding additional sediment traps & sumps, increasing basin size to a 90th%ile, and increasing bund heights.
- Increased inspection frequency and definition to ensure erosion and sediment controls are working and that ESC devices are being maintained for functionality and capacity.
- The ESCPs have been prepared in accordance with both the 'Blue Book' (Landcom, 2004), and the White Book (IECA, 2012), as well as relevant best practice guidelines and Transport for NSW (TfNSW) guidelines, and industry best practice where applicable. These plans include site-specific erosion and sedimentation controls, staging advice and stabilisation measures as well as technical notes to guide the installation, function and maintenance of ESC devices. The plans include the following controls:
- **Drainage control** – is the managed conveyance of stormwater through a construction site. Drainage controls to be implemented include:
    - Establishment of 'clean' water (upslope) diversions, such that upslope catchments don't increase volumes of water on site;
    - Conveyance of run-off in a managed way, such as to prevent scouring and further sediment generation;
    - As best practicable, direct 'dirty' water (sediment laden) run-off through a sequence of controls prior to discharge; and
    - Minimise the potential for point loading of dirty water and subsequent device failure; and /or allow the collection of run-off at nominated locations for further treatment or reapplication to site
- **Erosion control** - is the primary approach for the prevention of sediment generation via the application of protective measures (such as mulching) to exposed ground surfaces. Likewise, construction activities can be undertaken to keep the existing cover intact, thus reducing the extent and duration of soil exposure to erosive forces (i.e. partial clearing). Erosion control measures to be adopted include construction practices, structural controls and vegetative measures aimed at managing runoff at a non-erosive velocity, and the protection of disturbed soil surfaces. Controls to be implemented include:
    - Progressive management of the works to reduce overall exposed area as far as practical;
    - Disturbance minimisation via partial clearing (ECZ & HCZ) to keep existing ground covers intact;
    - Promptly stabilising exposed areas once activities have been completed, either via the distribution of generated mulch, or via the application of nominated rehabilitation measures such as hydromulching
    - Protection of soil surface (temporary and permanent) including placement of

hardstand surfaces, use of soil binder, vegetation establishment (including landscaping), and protection with mats & blankets (e.g., jute, geotextile)

- For high-risk areas during construction, prior to forecast rainfall of > 50 % chance of 10 mm or more in 24 hours, all exposed batters (excluding rock faces) are to be temporarily ground-covered using fabric, polymer or similar
- Dust suppression by wetting of exposed surfaces, application of soil binder, and/or application of soil cover.

- **Sediment control** measures will be installed in combination with drainage and erosion control measures to provide effective pollution management. The Project will adopt a 'treatment train' approach, where various control measures are utilised in sequence. Sediment control measures include systems, procedures and materials to filter, trap and / or settle sediment from sediment laden waters. In addition to adopting measures as per the *Blue Book* and IECA (2008) standard drawings, variations to these may be implemented where it can be demonstrated that they are equally as effective and meet the intent of best practice guidelines. The use of site-won materials will be prioritised in the establishment of sediment controls, including the use of topsoil windrows, mulch as groundcover and rock checks in drainage lines. Types of sediment controls used on site and their placements are detailed within the Project ESCP. Currently only one sediment basin is proposed onsite at the Switching Yard.

The SWMP additionally includes measures and monitoring requirements for:

- Stockpile and tannin management
- Spoil management
- Waterway crossings
- Dewatering and discharge
- Water extraction and reuse
- Flooding
- Air quality including dust
- Spill response.

A Pre-construction Water Quality Monitoring (WQM) Program (NGH, 2022) has been developed for the Project. The Pre-construction WQM Program outlines sampling points upstream and downstream of the Project site, which will assist in determining the effectiveness of soil and water management measures implemented onsite during construction. A Construction WQM Program will also be implemented to fulfil the requirement of the Project's Environment Protection Licence (EPL). Water quality monitoring locations can be found in Figure 4-1 of the Water Quality Monitoring Program (Appendix F of the SWMP). Results from pre-construction baseline sampling will establish the water quality objectives for the Project, and will set the triggers for adaptive management during construction and operation. The triggers have informed the Trigger Action Response Plans outlined in the:

- SWMP (Appendix C) for water quality exceedances in receiving waters and discharge waters
- Booroolong Frog for habitat monitoring, stochastic event (>50 mm of rainfall in 24

hours)

Further management and monitoring for the Booroolong Frog is discussed below and in Appendix G of this Plan.

5.9 Booroolong Frog Monitoring Program

A Booroolong Frog Monitoring Program (BFMP) has been developed and is included in Appendix G of this plan. The plan focuses on monitoring and management of the Booroolong Frog during construction. The plan contains procedures for:

- Monitoring of Booroolong Frog habitat within tributaries of the Yarrangobilly River that have the potential to be impacted by Project works
- Implementation of mitigation measures outlined for the Booroolong Frog
- A Trigger Action Response Plan (TARP) that includes notification to NPWS and RDD.

Management of Booroolong Frog populations throughout the Construction phase of the Project would follow the mitigation measures in BFMP, and will be subject to consultation with subject matter experts in accordance with requirements from RDD and NPWS. The BFMP will be reviewed and updated as required, prior to the initiation of the Operational phase (and again at regular intervals for the duration of operations as dictated by Transgrid's management review system).

5.10 Weed and Pathogen Control and Monitoring Procedure

A Weed and Pathogen Control and Monitoring Procedure (WPCMP) has been developed and is included in Appendix H. The plans contain procedures for the following:

- Weed identification across the Project area (KNP and Bago State Forest)
- Map, and removal of all weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs
- Weed hygiene protocols for all vehicles and machinery to ensure no weeds are transported to or from the site
- Methods for undertaking weed control and treatment
- Requirements for monitoring of weeds
- Requirements for transportation and disposal of weeds
- Monitoring, control and reporting of pathogens such as chytridiomycosis and *Phytophthora cinnamomi*
- Reporting of any biosecurity issues to FCNSW and NPWS immediately
- A TARP that includes notification to NPWS and RDD.

Weed and pathogen control and management for the Operational phase of development will follow the mitigation measures identified in the WPCMP and will be subject to consultation with subject matter experts in accordance with requirements from RDD and NPWS. The WPCMP will be reviewed and updated as required, prior to the initiation of the Operational phase and in accordance with Section 7 of this BMP.

5.11 Predator and Pest Monitoring Program

A Pest and Predator Monitoring Program has been developed and is included at Appendix I of this plan. The plan utilises adaptive management, with a focus on visual (camera) monitoring by PC during construction. An increase in abundance of predator activity recorded from the presence / absence assessment methodology, may trigger the need for predator control in consultation with Transgrid, NPWS and FCNSW.

5.12 Glider Connectivity Strategy

A Yellow-bellied Glider connectivity strategy has been developed and is included in Appendix J of this plan. This Connectivity Strategy has been produced by NGH to ensure habitat connectivity will be maintained and managed for the Yellow-bellied Glider (YBG) (*Petaurus australis*) Bago Plateau endangered population during the Project's Construction and Operational stages.

The Connectivity Strategy includes:

- The information required to design, construct, and place glider poles and arrays in suitable areas within the transmission easement (location ns are subject to refinement during detailed design and consultation with RDD)
- A plan to maintain connectivity in the landscape for Yellow-bellied Glider, as well as enhance movement where feasible and reasonable near the transmission easement
- The method to complete an ongoing Yellow-bellied Glider monitoring program during and after construction
- Performance thresholds to measure the effectiveness of management goals
- Corrective actions to improve mitigation if required.

5.13 Bird and Bat Management Plan

A Bird and Bat Management Plan (Collision Strategy) has been developed and is included in Appendix K of this Plan. The plan has been built onto the bird and bat risk assessment prepared for the BDAR. The strategy includes adaptive management for high-risk bird and bat species including:

- Regular monitoring in transmission line easements for evidence of bird / bat collision with transmission lines
- Monitoring of taller structures for evidence of raptor nest building
- A target trigger for number of high-risk species incidents
- Placement of fit-for-purpose bird / bat divertors in areas where a defined number of incidents have occurred for flight paths have been identified

5.14 Biodiversity Mitigation Measures

Table 5-3 Biodiversity management and mitigation measures

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
General					
BMP1	Training will be provided to all Project personnel, including relevant sub-contractors on the requirements from this plan through inductions, toolboxes and targeted training. The training will outline key environmental features and threatened species to be protected and measures to be implemented. Site inductions must inform all personnel working in the Project area what the limit of works and Exclusion Zones, are and where they occur.	Induction materials	Pre-construction Construction Operation	Construction Managers Site Environmental Advisor (SEA)	BIO1
BMP2	No clearing will occur outside the approved project footprint / disturbance area without prior approval from DPHI, in consultation with RDD and NPWS.	Clearing procedure (Appendix B)	Pre-construction Construction	SEA	BIO2
BMP3	If clearing of vegetation is required outside the Project area these areas would need further assessment, approval and recalculation of offset requirements in accordance with the CEMP.	Personnel Approved documents CEMP	Pre-construction Construction	Transgrid	Best practice EPBC COA2

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
Design					
BMP4	Detailed design will focus on the retention of managed shrub and groundcover vegetation zones, within the ECZ, HCZ and HTZ to avoid and minimise the loss of vegetation and habitat and movements of fauna across the landscape and to minimise the impact of predation on displaced fauna. This will be undertaken by the PC applying the clearing methodology and clearing zones presented in Appendix K of the Project BDAR (Jacobs, Rev 7, Aug 2022) to their detailed design.	Detailed design (Appendix A) Project BDAR (Jacobs, Rev 7, Aug 2022)	Design	Contractor Manager Engineer	BIO1
BMP5	Final design for permanent creek crossing structures on access roads will implement a design option to ensure stream flow is unaffected (e.g., single span to minimise stream disturbance and flow). These designs will be endorsed by NPWS, prior to the commencement of work.	Detailed design SWMP	Design	Contractor Manager Engineer	BIO1

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP6	Design and micro-siting of access tracks will avoid and minimise impacts to rock outcrops, large boulders, piled rock, and rock features that provide potential sheltering and breeding habitat for fauna including threatened species and avoid mapped habitat trees. Access track corridors will be established with consideration to terrain (e.g., utilisation of the ridgelines to navigate to the higher elevations) to minimise cut / fill and vegetation clearing.	Detailed design (Appendix A) Clearing Procedure (Appendix B)	Design	Contractor Manager Engineer	BIO1
BMP7	Directional lighting will be used for any permanent lighting required (i.e., substation) to minimise light spill. Ensure lighting is not directed into vegetation and shields are used.	Detailed design	Design	Contractor Manager Engineer	BIO20
Pre-construction					
BMP8	A Project Ecologist/s will be appointed prior to the commencement of construction.	Personnel	Pre-construction	Construction Managers Site Environmental Advisor (SEA)	Best practice
BMP9	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP in consultation with NPWS and RDD. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the Project area during construction and operation. Control measures will remain in-situ until site stabilisation completion criteria	SWMP ESCP OMP CEMP	Pre-construction	Construction Managers SEA	BIO10 BIO2

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the Project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly River. An Operational Management Plan for biodiversity will be prepared in consultation with RDD and NPWS and approved within 22 months of the commencement of construction. The CEMP will replicate the requirements detailed in the BMP for all safeguards/mitigation measures, particularly pre- clearing and clearing during construction (including B104-B108).				
BMP10	A seed collection methodology will be developed and implemented to assist with rehabilitation post construction. The methodology will include early collection of seeds onsite prior to clearing and other appropriate areas.	Seed Collection Methodology (Appendix E)	Pre-construction	Construction Managers SEA	B47
Vegetation clearing, protection and management					
BMP11	The boundary of the clearing limits for each clearing zone will be clearly marked on site by a surveyor in accordance with the Clearing Procedure, before vegetation clearing commences. The edge of the clearing boundary will be marked with high visibility fencing and signage.	SEPs Fencing / flagging equipment Surveyor Clearing procedure (Appendix B)	Pre-construction Construction	SEA	BIO5

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP12	Exclusion Zones, or 'No-Go' zones, will be clearly marked at the edge of the total clearing zones and ECZs to protect the vegetation to be retained outside the Project from inadvertent direct impacts. Exclusion Zones will be marked by surveyor with high visibility fencing and signage.	SEPs Fencing / flagging equipment Surveyor Clearing Procedure (Appendix B)	Pre-construction Construction	SEA	BIO5
BMP13	A 50 metre Exclusion Zone for the Booroolong Frog will be marked and clearly delineated from other survey markers with signage placed around the tributaries that flow downhill into the Yarrangobilly River, this includes the limits of clearing on the lower end of Sheep Station Creek, Cave Gully, Lick Hole Gully and Wallace Creek that are crossed by the Project to protect the downstream habitat of Booroolong Frog.	Clearing Procedure (Appendix B) SEPs Fencing / flagging equipment Surveyor	Pre-construction Construction Operation	SEA	BIO5
BMP14	The 50 metre Exclusion Zone adopted for the Main Works Project for the Booroolong Frog on Yarrangobilly River, will be retained for construction of the transmission line.	Clearing Procedure (Appendix B) SEPs Fencing / flagging equipment Surveyor	Pre-construction Construction	SEA	BIO5
BMP15	Identified Hazard trees are to be flagged for removal, and any other adjacent and important habitat trees and features, also identified for retention and to avoid disturbance during the felling activity should also be clearly marked, in accordance with the Clearing Procedure, and included in SEPs.	Clearing Procedure (Appendix B) SEPs Fencing / flagging equipment Surveyor	Pre-construction Construction	SEA	BIO5

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP16	Implement clearing in accordance with the clearing protocol provided in Appendix B.	Clearing Procedure (Appendix B)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO4
BMP17	A qualified Project Ecologist will undertake the following at least 28 days prior to clearing: • Assessment of HBTS for Owls including: ○ Songmeters will be placed underneath a tree within the centre of an identified cluster of potential Masked Owl nest trees for a period of four weeks before planned clearing. The songmeters will be placed a maximum of 200 m apart within the Masked Owl threatened species habitat of the Project area. ○ Within the last two weeks of the songmeters monitoring, stagwatching will be undertaken targeting potential nest trees based on the results of the first two weeks of songmeters. Stagwatching will be undertaken an hour before dawn and an hour before and after dusk. ○ If nesting owls are present, the tree is to be clearly marked as an Environmental Protection: No Go Zone (Exclusion Zone) and removal of the tree must be	Clearing Procedure (Appendix B)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO4

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	delayed until the chicks have fledged (10-12 weeks). There is to be no disturbance within 50 m of the tree, and fencing/ flagging will be established to demarcate this buffer. Disturbance between 50 – 100 m is to be minimised a far as reasonably practicable also. • Assessment of HBTS for Gang-gang Cockatoo including: ○ Songmeters will be placed underneath a tree within the centre of an identified cluster of potential Gang-gang Cockatoo nest trees for a period of four weeks before planned clearing. The songmeters will be placed a maximum of 200m apart within the Gang-gang Cockatoo threatened species habitat of the Project area ○ Within the last two weeks of the songmeters monitoring, stagwatching will be undertaken targeting potential nest trees based on the results of the first two weeks of songmeters. Stagwatching will be undertaken during the day for cockatoo activity. ○ If nesting birds are present, the tree is to be clearly marked an Exclusion Zone				

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	buffer 100m of the tree) will be established, using high visibility fencing/ flagging removal of the tree must be delayed until the chicks have fledged (10-12 weeks). Disturbance up to 200m from the tree is to be minimised as far as reasonably practicable.				

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP18	A qualified Ecologist will undertake the following at least 14 days prior to clearing: • Delineation of clearing zones and Exclusion Zones. • Ensure any trees from the Transmission Structure Zone clearing area authorised for removal, that occur within proximity to the clearing limit boundary, are felled so they fall into the cleared zone. No vegetation felling or associated damage to vegetation from felling activities is to occur within Exclusion Zones. • Place Exclusion Zone high visibility fencing outside tree protection zones (see below "14 days before clearing" section for more detail). If the tree protection zone cannot be avoided during works, the Structural Root Zones (SRZ) of trees will be retained. • Installation of Booroolong Frog Buffer • Delineation of Rocky Outcrop Avoidance Zones The SEA and Project ecologist will commence the clearing permit process.	Clearing Procedure (Appendix B)	Pre-construction Construction	Construction Managers SEA Ecologist Surveyor	BIO4

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP19	• A qualified Ecologist will undertake a pre-clearing inspection of the Project area at least 14 days prior to clearing. The ecologist will: • Physically mark any important habitat features with flagging/non-permanent spray paint suspected to be utilised by significant species in the area and record GPS coordinates of each biodiversity feature. Important habitat features include: • Large active stick nests • Hollow-bearing trees • HBTs with a diameter at breast height (DBH1) of >130cm that also contain dead wood / old branch stubs in the canopy shall be marked for 'limb by limb' (spray-painted 'LxL' or similar) removal treatment • HBTs that are smaller (trunk <130cm DBH, and / or do not contain dead wood / old branch stubs / or inaccessible by EWP in the canopy) shall be marked as 'Hollow Bearing' (spray-painted 'HBT' or similar) • If hollows are active at the time of inspection • Yellow-bellied Glider den trees and sap trees	Personnel SEPs Clearing Procedure (Appendix B) Fauna Rescue and Release procedure (Appendix C) Unexpected Threatened Species Procedure (Appendix D)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO4

[1] This value has been determined to represent the DBH value for trees considered of appropriate age to support hollow bearing limbs of suitable size for species known to occur within the Project Area as identified in the BDAR (Jacobs, Rev 7, Aug 2022) and in accordance with relevant guidance material (Land for Wildlife, 2023; NPWS, 1999; Wormington & Lamb, 1999)

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	(i.e. presence of a v-notch) • Active nesting/breeding sites (dens, drays, nests etc.) • Threatened species habitat (as evidenced by scratchings, scats etc) • Unexpected threatened flora (in accordance with the Unexpected Threatened Species Finds Procedure). • Targeted searches will also be undertaken for weed species, to ground truth the extent of weed occurrences within the Project area. • Identify suitable fauna release locations outside the Project area. • Identify and surround trees for protection with exclusion fencing. This consists of flagging, bunting nightline or other similarly robust and durable material with reflective strips. • Contact will be made with the local vet and/or wildlife carer (contact details outlined in Appendix C) prior to the commencement of clearing works to ensure they are available in case fauna is found.				

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	Within Booroolong Frog habitat: • Any aquatic habitat features (rocks, logs) that are required to be removed will be salvaged for rehabilitation within riparian areas. *Within Yellow-bellied Glider habitat:* • Inspect den/sap trees to determine if live gliders are present ○ If gliders are present or likely to be present, the tree is to be clearly marked as an exclusion/ no-go zone and demarcated with fencing/ flagging. The removal of the tree must allow time for fauna to vacate of its own accord (as outlined in more detail below, i.e., a two staged process, clearing non-habitat vegetation first). The removal of the tree must allow time for fauna to vacate of its own accord (as outlined in more detail below, i.e., a two staged process, clearing non-habitat vegetation first).				
BMP20	No more than 24 hours before clearing using the checklist attached as Appendix B, the following will occur: • Boundaries for construction, clearing and Exclusion Zones will be confirmed. • The Ecologist will check marked habitat trees and features within the works area are correctly marked. • Fauna relocation will take place, refer to Appendix C. • Booroolong Frog:	Personnel SEPs Clearing Procedure (Appendix B) Signed-off Clearing Permit (Appendix B.7) Fauna Rescue and Release Procedure	Pre-construction Construction	Construction Managers SEA Ecologist	BIO4

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	○ Any aquatic habitat features (rocks, logs) that are required to be removed will be salvaged for rehabilitation within riparian areas. • Yellow-bellied Glider habitat: ○ Inspect den/sap tress to determine if live gliders are present ▪ If gliders are present or likely to be present, the tree is to be clearly marked as an exclusion/no-go zone and demarcated with fencing/flagging. The removal of the tree must allow time for fauna to vacate of its own accord (as outlined in more detail below, i.e., a two staged process, clearing nonhabitat vegetation first).	(Appendix C)			
BMP21	At the completion of the pre-clearing surveys a report will be compiled of all the data and activities completed during the pre-clearance surveys. The outcomes of the pre-clearing inspections will be reported to RDD, NPWS, FCNSW and AG DCCEEW prior to the commencement of vegetation clearing. The report will include any recorded habitat features (including GPS data), fauna relocated or euthanised, including name of qualified/licensed handler, species, location notes, and release location and method.	Results of pre-clearing inspections	Pre-construction Construction	Construction Managers SEA Ecologist	BIO4
BMP22	The vegetation and habitat clearing methods within each zone of the Project area will be undertaken in accordance with the Clearing Procedure provided in Appendix B.	Clearing Procedure (Appendix B)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO6

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP23	Clearing will be undertaken as part of a single or two stage process: • Stage 1 clearing of non-habitat vegetation e.g., shrubs, regrowth, ground cover and non-habitat trees). Allow at least 24 hours for fauna to vacate habitat before removing habitat trees. • Stage 2 clearing of habitat vegetation (hollow-bearing trees, habitat trees, and bushrock) supervised by a qualified ecologist. ○ Habitat features marked as "HBT" will be mechanically shaken or 'nudged' prior to soft felling to encourage any remaining animals to either leave, or at least attempt to leave and therefore become visible, at which point observed by the Project Ecologist/a suitably qualified ecologist and safely captured and released elsewhere in accordance with the Fauna Rescue and Relocation Procedure (Appendix C). ○ Subsequent to felling, habitat trees marked as "HBT" will be systematically checked for any remaining fauna. If fauna is encountered, the Project Ecologist/a suitably qualified ecologist with experience in fauna handling should capture any animal that emerges, inspect for injuries and, if uninjured, relocate to	Clearing Procedure (Appendix B) Fauna Rescue and Release Procedure (Appendix C)	Construction	SEA Ecologist	BIO7 BIO4

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	predetermined fauna release area or if injured, referred to a vet or wildlife carer for treatment in accordance with the Rescue and Release Procedure (Appendix C of the BMP). ○ Trees marked for limb-by-limb 'LxL', to demarcate i.e. those trees which have multiple hollows and potential hollows in limbs, would be inspected by the Project Ecologist/ a suitably qualified ecologist via an elevated work platform (EWP) where possible. ○ Soft felling techniques are to be used for the sectional removal of habitat trees >130cm DBH. A range of measures can be applied, including the use of a mulching head and/or shears on an excavator to remove non-habitat limbs on standing trees. Such activity will be mindful that hollows and resident fauna will not be directly impacted by the operation. This will help minimise tracking in partially cleared areas, aide a safe clearing methodology, and create room for EWP access to hollow limbs for subsequent fauna detection and removal. ○ Felled habitat trees will be left for a short time (1 – 2 hours) to allow any				

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
	undetected fauna further opportunity to escape ○ Nests and on ground logs will be carefully inspected by the Project Ecologist or a suitably qualified ecologist. Logs should be carefully rolled and inspected beneath the log. Any fauna species are to be relocated to habitat identified during the preclearing process or, if injured, transported to a veterinarian or wildlife carer. If nest boxes are deemed an appropriate mitigation measure by the Project Ecologist to utilise during fauna relocations, these will be established in consultation with Transgrid and RDD.				
BMP24	As far as possible, clearing will be planned to avoid times when hollow-dependent fauna is breeding, including: • Gang-gang Cockatoo – October to January • Masked Owl – May to August • Eastern Pygmy-possum – Spring to Autumn • Yellow-bellied Glider – November to May		Pre-construction Construction	Construction Managers SEA	BIO4

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP25	Hand clearing only will be used in *Caladenia montana* Habitat.	Clearing Procedure (Appendix B)	Pre-construction Construction	Construction Managers SEA Ecologist	Best practice
BMP26	A qualified ecologist will be present during all clearing operations to record any tree hollows not identified during the pre-clearing survey, and to rescue any animals disturbed by clearing.	Fauna Rescue and Release Procedure (Appendix C)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO4 BIO7
BMP27	Records are to be kept of all fauna rescue events including locations to where fauna have been relocated. Provide GPS coordinates for such events.	Fauna Rescue and Release Procedure (Appendix C)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO6
BMP28	Hollows logs and limbs encountered during clearing will be retained (not piled) for placement within adjacent vegetation or on the maintained easement within shrub retention areas.	Clearing Procedure (Appendix B)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO6
BMP29	Any felled timber within Bago State Forest that FCNSW determine can be repurposed will be removed off-site by FCNSW.	Clearing Procedure (Appendix B)	Pre-construction Construction	SEA FCNSW	BIO6

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP30	Post clearing report will be prepared outlining the process of habitat removal, records of fauna that had to be handled or relocated, final clearing extent using GPS.	Clearing Procedure (Appendix B) Fauna Rescue and Release Procedure (Appendix C)	Pre-construction Construction	Construction Managers SEA Ecologist	BIO6
BMP31	No stockpiling or storage of equipment and machinery will occur: • Within dripline of any mature trees • Within 50m of riparian buffers or vegetation • Outside of the total clearing zone	Construction drawings / specifications Flagging	Construction	Construction Managers SEA	Best practice
BMP32	Pruning of mature trees is to be in accordance with Part 5 of the *Australian Standard 4373-2007 Pruning of amenity trees*.	*Australian Standard 4373-2007 Pruning of amenity trees*.	Construction	Construction Managers SEA	Best practice
BMP33	Use existing tracks where possible and previously cleared and disturbed areas for access purposes.	Construction	Pre-construction Construction	Construction Managers SEA	BIO1, Best practice
BMP34	All machinery will be free from any fuel and other pollutant residues, with connections and hoses inspected regularly.	Inspection records	Construction	Construction Managers SEA	BIO14
Wildlife protection					

Official

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP35	Where fauna is encountered that requires handling or rescue, follow the Fauna Rescue and Release Procedure in Appendix C.	Fauna Rescue and Release Procedure (Appendix C)	Construction	Construction Managers SEA Ecologist	BIO7
BMP36	Clearance of construction areas prior to commencement of daily clearing activities will occur to ensure there is no wildlife present. This will involve an on-foot pre-clearing survey by a suitably qualified ecologist.	Daily diary	Clearing	Ecologist	BIO8
BMP37	A daily drive through sweep of areas planned for construction, by the contractors' environmental representatives, will occur during general construction activities. If an animal is located within the construction area during works, the Delivery Manager and Project Management Site Representative are to be notified immediately. All work must immediately cease within the immediate area of the find and a local wildlife rescue, or an ecologist will be required for assistance where necessary.	Daily diary	Construction	Construction Managers SEA	BIO8
BMP38	Vehicle movements on newly formed access tracks will be limited to a 20 km/h speed limit implemented to reduce the risk of vehicle strike to fauna.	Signage Traffic and Transport Management Plan	Construction	Construction Managers SEA	BIO30

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP39	Artificial lighting required during construction in the early morning and late afternoon in winter will be limited to within approved construction hours.	Daily diary Environmental Inspection Weekly Checklist	Construction	Construction Managers SEA	BIO21
BMP40	Fauna strike space – when towers are standing, monitoring in the form of weekly inspections will occur via walked tower to tower transects to identify collision issues and identify any collision occurrences. Where collisions are identified, this would trigger installation of additional control measures including increased monitoring and installation of additional reflectors.	Bird and Bat management Plan (Appendix K) Environmental Inspection Weekly Checklist Site diary	Construction	Construction Managers SEA	BIO21
Aquatic habitats					
BMP41	Watercourse crossings will be designed to minimise impacts on hydrology, aquatic habitat and fauna by: • Maintaining low-flow conditions and not blocking fish passage • Being designed with consideration of the potential for flooding during construction • Be removed and the area rehabilitated following completion of construction.	SWMP	Pre-construction Construction	Construction Managers SEA	BIO1

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP42	Retain stumps in riparian zones and aquatic habitats where practicable to reduce the potential for bank erosion. Even dead stumps and root systems may act to reduce erosion during construction and operation periods. If stump treatment with poison is required, appropriate treatment will be determined in consultation with NPWS or FCNSW (dependent on location).	SEPs	Construction	Construction Managers SEA	Best practice
BMP43	Activities in aquatic habitats and riparian zones will be avoided, excluding approved works at Sheep Station Creek.	SEPs	Construction	Construction Managers SEA	Best practice
BMP44	Keeping vehicles and machinery away from the banks of a waterway where possible. Where machinery must enter the waterway ensure that they are cleaned, degreased and serviced prior to entering.	SEPs	Construction	Construction Managers SEA	Best practice
BMP45	Removal of all temporary works, flow diversion barriers and sediment control barriers within aquatic habitats as soon as practicable and in a manner that does not promote future channel erosion.	ESCP SWMP	Construction	Construction Managers SEA	Best practice
Unexpected threatened species					
BMP46	Where threatened species are unexpectedly identified during pre-construction, or construction, follow the Unexpected Threatened Species Procedure in Appendix D.	Unexpected Threatened Species Procedure in Appendix D	Pre-construction Construction	Construction Managers SEA	BIO4 BIO7

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
Weeds, pathogens and pests					
BMP47	Follow the Weed and Pathogen Control and Monitoring Procedure in Appendix H to prevent or minimise spread of weeds and pathogens.	Weed and Pathogen Control and Monitoring Procedure (Appendix H)	Pre-construction Construction Operation	Construction Managers SEA	BIO11
BMP48	All plant and equipment arriving to site will be clean of weed and seed material and be accompanied by a Weed Hygiene Declaration as included in Appendix H.	Weed and Pathogen Control and Monitoring Procedure (Appendix H)	Pre-construction Construction	Construction Managers SEA	BIO10 BIO14
BMP49	Implement Pest and Predator Monitoring Program in Appendix I.	Pest and Predator Monitoring Program (Appendix I)	Pre-construction Construction Operation	Construction Managers SEA	BIO18
BMP50	Personal waste / refuse generated during construction will be stored appropriately in inaccessible bins and disposed at appropriate waste disposal facilities off-site.	Waste Management Plan Pest and Predator Monitoring Program (Appendix I)	Pre-construction Construction Operation	Construction Managers SEA	BIO17
Rehabilitation					
BMP51	Disturbed areas are to be progressively stabilised to prevent erosion and weed establishment	SWMP	Construction Post-construction	Construction Managers SEA	BIO26

ID	Measure/Requirement	Resources needed	When to implement	Responsibility	Reference
BMP52	Implement Rehabilitation Plan	Rehabilitation Plan	Construction Post-construction	Construction Managers SEA	BIO3

6 Compliance Management

6.1 Roles and Responsibilities

The Project's organisational structure and overall roles and responsibilities will be outlined in Section 4.11 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Table 5-3 of this plan.

6.2 Training

All staff attending site will be required to attend a health and safety, quality and environment induction prior to starting work on the Project. The environment section covers core issues, including but not limited to:

- Relevant details of the CEMP including purpose and objectives
- Requirements of due diligence and duty of care
- Conditions of environmental licences, permits and approvals
- Potential environmental emergencies on site and the emergency response procedures
- Reporting and notification requirements for pollution and other environmental incidents or reportable events, including identification of contaminated land and damage and maintenance to environmental controls
- High risk activities (that could lead to an environmental incident) and associated safeguards
- Procedures to be followed when working in or near environmentally sensitive areas
- Specific environmental management requirements and responsibilities
- Mitigation measures for the control of environmental issues
- Incident response and reporting requirements
- The existence of EWMS for high-risk activities
- Information relating to the location of environmental constraints
- Site specific issues including:
    - Site flagging protocols, including the identification, marking and mapping of biodiversity habitat features to be retained and protected
    - Boundaries for the different clearing zones
    - The clearing methodology to be implemented
    - Erosion and sediment controls, water quality controls and sediment basin management
    - Management of contaminated material
    - Groundwater and surface water management and controls
    - Obligations under the *Biosecurity Act 2015* to prevent the spread of weeds during construction
    - Responsibilities under the following legislation and permits:
        - *National Parks and Wildlife Act 1974*
        - *Protection of the Environment Operations Act 1997*

        - *Contaminated Land Management Act 1997*
        - *Fisheries Management Act 1994.*
        - *Water Management Act 2000.*
    - Noise, vibration and air quality management controls
    - Requirement to maintain surrounding property access for residences, business owners, and their visitors, and to minimise disruptions to these properties for the duration of construction
    - Location of refuse bins, washing, refuelling and maintenance of vehicles, plant and equipment
    - Waste minimisation and disposal
    - Boundaries for vegetation clearing, fauna and fauna habitat management, including awareness of threatened fauna species and fauna rescue
    - Incident management processes
    - Environmental emergencies including pollution incidents, floods and bushfires.
- Key environmental issues including but not limited to:
    - Clearing of native vegetation and habitat
    - Works around and within the waterways
    - Noise generating works
    - General earthworks near vegetation and waterways/drainage lines, resulting in disturbance of soils, consequential erosion and the mobilisation of sediment
    - Open excavations presenting risk to terrestrial animal populations (native and non-native species)
    - Use of chemicals / fuels (potential for spills and contamination of waterways and habitats)
    - Increased heavy vehicles and numbers of vehicles in the area presenting increased collision risk with terrestrial fauna
    - Introduction and/or transport of weeds and pathogens through vehicle movements and importation of materials
    - Light spill from permanent and temporary lighting to be installed for the Project.
- Site-specific training will be provided to personnel engaged in activities or areas of higher risk, including but not limited to:
    - Working in and near waterways, including risks associated with sedimentation
    - Areas of Aboriginal and historic heritage sensitivity
    - Areas that support nest tree habitat buffers for Gang-gang Cockatoo and Masked Owl
    - Habitat buffer areas for *Caladenia montana*
    - Areas of partial clearing

The site induction will also include communications training including:

- How to respond to community queries
- Awareness of the requirements for the release of information

- Understanding the identity of the community

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in biodiversity management. Examples of training topics include:

Toolbox talks will include, but not be limited to:

- A description of the activity and the area, including clearing limits and the limits of partial clearing
- Identification of the environmental issues and risks for the area
- Outline the mitigation measures for the works and the area
- Details of EWMSs for relevant personnel.

Relevant environmental issues include but are not limited to:

- Exclusion areas
- Erosion and sedimentation controls
- Spoil management.
- Hours of work and noise controls
- Emergency and spill response including location of emergency spill kits and training in their use
- Emergency response
- Aboriginal and historic heritage
- Threatened species, endangered ecological communities, clearing controls and vegetation protection
- Weed management
- Working in or near waterways
- Waste storage and segregation
- Dust control
- Contamination management and unexpected finds including Naturally Occurring Asbestos (NOA).

Further details regarding staff induction and training are outlined in Section 6 of the CEMP.

6.3 Monitoring and Inspections

A Biodiversity Monitoring Program has been developed and is provided in Appendix F of this Plan. The monitoring program will be implemented before, during and after construction, and for the duration of operations, to monitor the effectiveness of the mitigation measures and provide adaptive management where performance measures are not met. Monitoring will be conducted until such time as the mitigation measures have been proven to be effective.

The monitoring data collected will provide robust information to draw sound conclusions around the effectiveness of mitigation measures for the target species and groups and inform adaptive management actions. The Biodiversity Monitoring Program additionally outlines the annual reporting requirements of monitoring results. Reporting requirements is discussed below. As the program will focus on performance indicators and provide an adaptive management framework the outcomes of these will be reported in the monitoring program annual reports.

6.4 Reporting and Incidents

Environmental incidents are defined within Section 8.3 of the CEMP, whilst required notifications are detailed in Section 3.12 of the EMS and Section 8.4 of the CEMP. Reporting requirements and responsibilities are documented in Section 9.4 the CEMP. A summary of reporting requirements specific to the BMP is provided in Appendix F. Non-compliance management and notification is detailed in Section 3.9 of the EMS and Section 9.5 of the CEMP.

PC are dedicated to ensuring full compliance with Statutory Approvals and Infrastructure Approval. However, where there is an incident which results in a non-compliance the reporting of the incident is outlined in Section 8 of the CEMP. Environmental incidents relating to biodiversity may include but not be limited to:

- Unauthorised clearing or clearing beyond the extent of the Project boundary or premises
- Unauthorised damage or interference to threatened species, endangered ecological communities (EEC) or critical habitat
- Unauthorised death or injury of native fauna
- Any potential breach of legislation, including a potential breach of a safeguard
- Breaches of hygiene management requirements.

Incident Notification

The protocol for managing and reporting incidents will be in accordance with the Infrastructure Approval, the PC and Transgrid Management Systems, and the Contract specification. Transgrid will notify the Department via the Major Projects website immediately after becoming aware that an incident has occurred. A written notification will then be provided to the Department via the Major Projects website within seven days after becoming aware of the incident. PC will provide the appropriate details to assist Transgrid.

The written notification will include the following details:

- identify the development and application number;
- provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- identify how the incident was detected;
- identify when the Proponent became aware of the incident;
- identify any actual or potential non-compliance with conditions of consent;
- describe what immediate steps were taken in relation to the incident;
    - Identify further action(s) that will be taken in relation to the incident; and
    - identify a development contact for further communication regarding the incident. Within 30 days of the date on which the incident occurred, or as otherwise agreed by the Planning Secretary, Transgrid will provide the Department and any relevant public authorities with a detailed report on the incident addressing the following requirements, and any further reports that may be requested: a summary of the incident;
    - outcomes of an incident investigation, including identification of the cause of the incident;

- details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
- Details of any communication with other stakeholders regarding the incident.

Non-compliance Notification

The protocol for managing and reporting non-compliances will be in accordance with the Infrastructure Approval, the PC and Transgrid Management Systems, and the Contract specification. Transgrid will notify the Department via the Major Projects website within seven days after becoming aware that a non-compliance has occurred.

The notification will include;

- Identification of the development and the application number for it,
- set out the condition of approval that the development is non-compliant with,
- the way in which it does not comply and the reasons for the non-compliance (if known), and what actions have been, or will be, undertaken to address the non-compliance.

Public Reporting

Monitoring reports relating to flora & fauna (as per Appendix F) are to be prepared annually by the Project Ecologist, issued to Transgrid, AG DCCEEW, RDD, FCNSW and NPWS, and made publicly available. At a minimum, such reports will include:

- The name and qualifications of the Ecologist or wildlife carer present during clearing
- An assessment of the habitat and handling of fauna
- Information on clearing operations, dates, procedures, areas
- Including the number of trees and hollows cleared
- Live animal sightings, captures, any releases or injured / shocked wildlife
- Any dead animals located
- Photographs of rescued fauna.

6.5 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, infrastructure approval and other relevant approvals, licenses, and guidelines. Internal audit requirements are detailed in Section 9.3.1 of the CEMP. External audit requirements are detailed in Section 9.3.2 of the CEMP.

Relevant to Independent (External) Audits the described frequency is in accordance with the *Independent Audit Post Approval Requirements* (2020), will include as a minimum independent compliance audits to the CSSI (C10) and EPBC (Part B 28-31). The frequency is indicated as;

- CSSI Audit within 3 months of commencing construction, then at 6 monthly intervals from the initial audit or otherwise agreed by the Secretary.
- CSSI Audit within 3 months of commencement of operations, then at 3-year intervals or otherwise agreed by the Secretary.
- EPBC Audit every five-year period following the commencement of the Action until the approval expires.

7 Review and Improvement

7.1 Continuous Improvement

Continuous improvement of this Plan will be achieved when opportunities for improvement are identified. Any proposed improvement and / or changes to this Plan are required to be approved by the Planning Secretary prior to implementation except with exception of COA C3 *if the Planning Secretary agrees, a strategy, plan or program may be staged or updated without consultation being undertaken with all parties required to be consulted in the relevant condition.* If approved by the Planning Secretary, updated plans supersede the previous versions of them and must be implemented in accordance with the condition that requires the plan. Prior to any actions to this plan occurring in line with COA C3, this must be approved for implementation in writing by the Planning Secretary.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non- conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

7.2 BMP Update and Amendment

During the Project, a hard copy (or immediately and fully accessible electronic copy) of the most recent version of this Plan will be kept at the main site compounds. It is the responsibility of the SEA to ensure the most recent version of the document is accessible, and to remove older versions of the plan once they are superseded at the main site compound.

The processes and plans described in the CEMP may result in the need to update or revise this Plan. Any revision of the BMP is to ensure it incorporates any recommended measures to improve the environmental performance of the Project. Any proposed changes to this Plan are required to be approved by the Planning Secretary prior to implementation unless approvals in line with COA C3 are approved for implementation in writing by the Planning Secretary for this Plan.

A copy of the updated BMP with any changes, will be distributed to all relevant stakeholders in accordance with the approved document control procedure (refer to the CEMP) unless this is not required, in line with COA C3.

As a minimum the BMP should be updated within three (3) months following the completion of the long- term management measures and / or the final design.

In the instance of any modification to the COA, or issue of direction from the Planning Secretary the BMP would be reviewed, and if revisions of the plan are required the plan would be submitted to the Planning Secretary for approval within 3 months of that change.

In the instance of an incident report or an audit report which notes non-compliance for biodiversity

Official

related matters, the BMP will be reviewed within 1 month. If revisions to the BMP are required, the plan will be submitted to the Planning Secretary for approval and comply with the COA C2 (Revision of Strategies, Plans and Programs) and COA C3 (Updating and Staging of Strategies, Plans and Programs).

Official

8 References

Birdlife Australia. (2022). Retrieved from Species profiles: https://www.birdlife.org.au/?gclid=EAIaIQobChMIg4KO0YLd9QIVhwVyCh3YGA7jEAAYASAAEgK2PvD_BwE

BMCC. (2022). *Radiata Pine*. Retrieved from Weeds of the Blue Mountains: https://weedsbluemountains.org.au/weeds/radiata-pine/

CISS. (2021). *Weeds of National Significance*. Retrieved from Centre for Invasive Species Solutions: https://weeds.org.au/weeds-profiles/?botanical=Verbascum%20thapsus

DEC. (2006). *Kosciuszko National Park Plan of Management.* Department of Planning, Industry and Environment

DPI. (2008). *Weeds of National Significance: National Best Practice Management Manual - Serrated Tussock.* Department of Primary Industries.

DPI. (2012). *NSW Aquifer Interference Policy.* Department of Primary Industries - Office of Water. DPI. (2013). *Policy and Guidelines for Fish Conservation and Management*. NSW Department of

Primary Industries, a part of the Department of Trade and Investment, Regional Infrastructure and Services

DPI. (2018). *NSW Weed Control Handbook*. Retrieved from NSW Department of Primary Industries: https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control/management-guides/noxious- enviro-weed-control

DPI. (2022). *NSW Department of Industries*. Retrieved from NSW WeedWise: https://weeds.dpi.nsw.gov.au/Weeds/OxeyeDaisy#control

DPIE. (2007). *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park.* NSW Department of Planning, Industry and Environment. Retrieved from https://www.environment.nsw.gov.au/research-and-publications/publications- search/rehabilitation-guidelines-for-the-resort-areas-of-kosciuszko-national-park

DPIE. (2020). *Saving our Species: Hygiene Guidelines.* NSW Department of Planning, Industry and Environment.

EMM Consulting. (2020). *Snowy 2.0 Main Works Biodiversity Development Assessment Report (Revised), prepared for Snowy Hydro Ltd.* EMM Consulting.

FCNSW. (2019). *Fire Management Plan.* Forestry Corporation New South Wales.

FGJV. (2020). *Snowy 2.0 Main Works – Biodiversity Management Plan (Revision I)*. Future Generation Joint Venture.

Jacobs. (2020). *Snowy 2.0 Transmission Connection Project EIS v.1.* Jacobs Pty Ltd.

Jacobs. (Rev 7, Aug 2022). *Snowy 2.0 Transmission Connection Project - Biodiversity Development Assessment Report.* Jacobs Group (Australia) Pty Ltd.

Land for Wildlife. *How to Age Trees*. Retrieved from Land for Wildlife SEQ: https://www.lfwseq.org.au/how-to-age-trees/

NGH. (2022). *Pre-construction Water Quality Monitoring Program and Methodology - Snowy 2.0 Transmission Connection Project.*

NHT. (n.d.). *Natural Heritage Trust*. Retrieved from Introductory Weed Management Manual: https://wildlife.lowecol.com.au/wp-content/uploads/sites/25/Weed-Manual.pdf

NPWS. (1999). *Natural Tree Hollows Fact Shee*t. National Parks and Wildlife Service. https://www.environment.nsw.gov.au/resources/nature/Factsheet5Treehollows.pdf

NPWS. (2006). *Kosciuszko National Park - Plan of Management.* National Parks and Wildlife Service. NPWS. (2020). *National Parks & Wildlife Service*. Retrieved from Kosciuszko National Park 2020 Fire

Recovery, NSW: https://fnpw.org.au/project/kosciuszko-national-park-2020-fire-recovery/ NSW EES. (2022). *NSW Environment, Energy & Science*. Retrieved from Threatened Species

Profiles: https://www.environment.nsw.gov.au/threatenedspeciesapp

OEH. (2012). *Regional Pest Management Strategy 2012–17, Southern Ranges Region: a new approach for reducing impacts on native species and park neighbours.* Office of Environment and Heritage. Retrieved from https://www.environment.nsw.gov.au/-/media/OEH/Corporate- Site/Documents/Parks-reserves-and-protected-areas/Pest-management-strategies/regional- pest-management-strategy-southern-ranges-region-120374.pdf

OEH. (2022). *Saving our Species Strategy*. Retrieved from Infection of native plants by Phytophthora cinnamomi : https://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=20026

PlantNET. (2022). Retrieved from National Herbarium of NSW: https://plantnet.rbgsyd.nsw.gov.au/ TransGrid. (2021). *Appendix B Biodiversity Development Assessment.*

TransGrid. (2021, February). *Environmental Impact Statement: Snowy 2.0 Transmission Connection Project - Volume 2.*

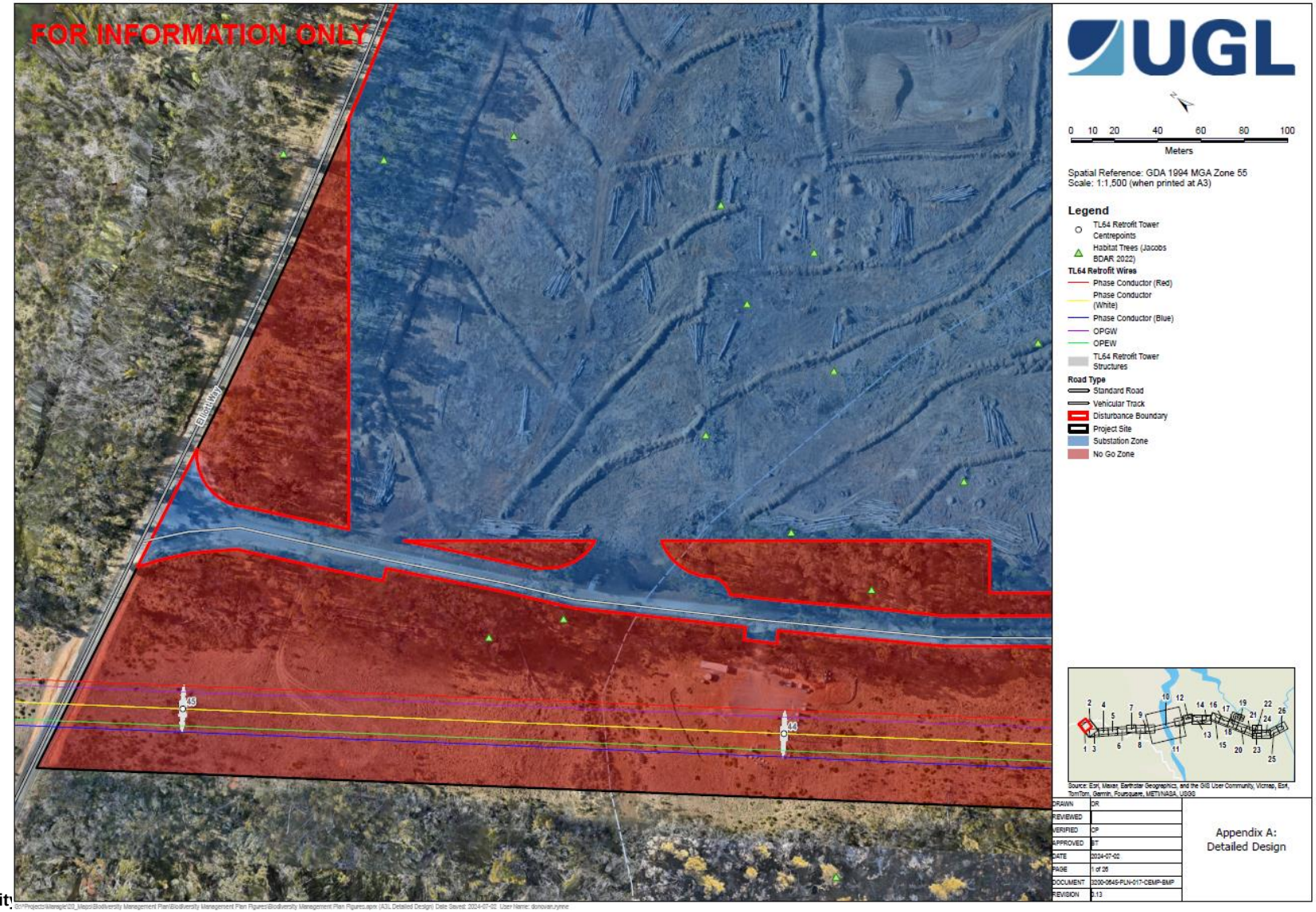
Wildlife Trust. (2022). *Yorkshire Fog*. Retrieved from The Wildlife Trust: https://www.wildlifetrusts.org/wildlife-explorer/grasses-sedges-and-rushes/yorkshire-fog

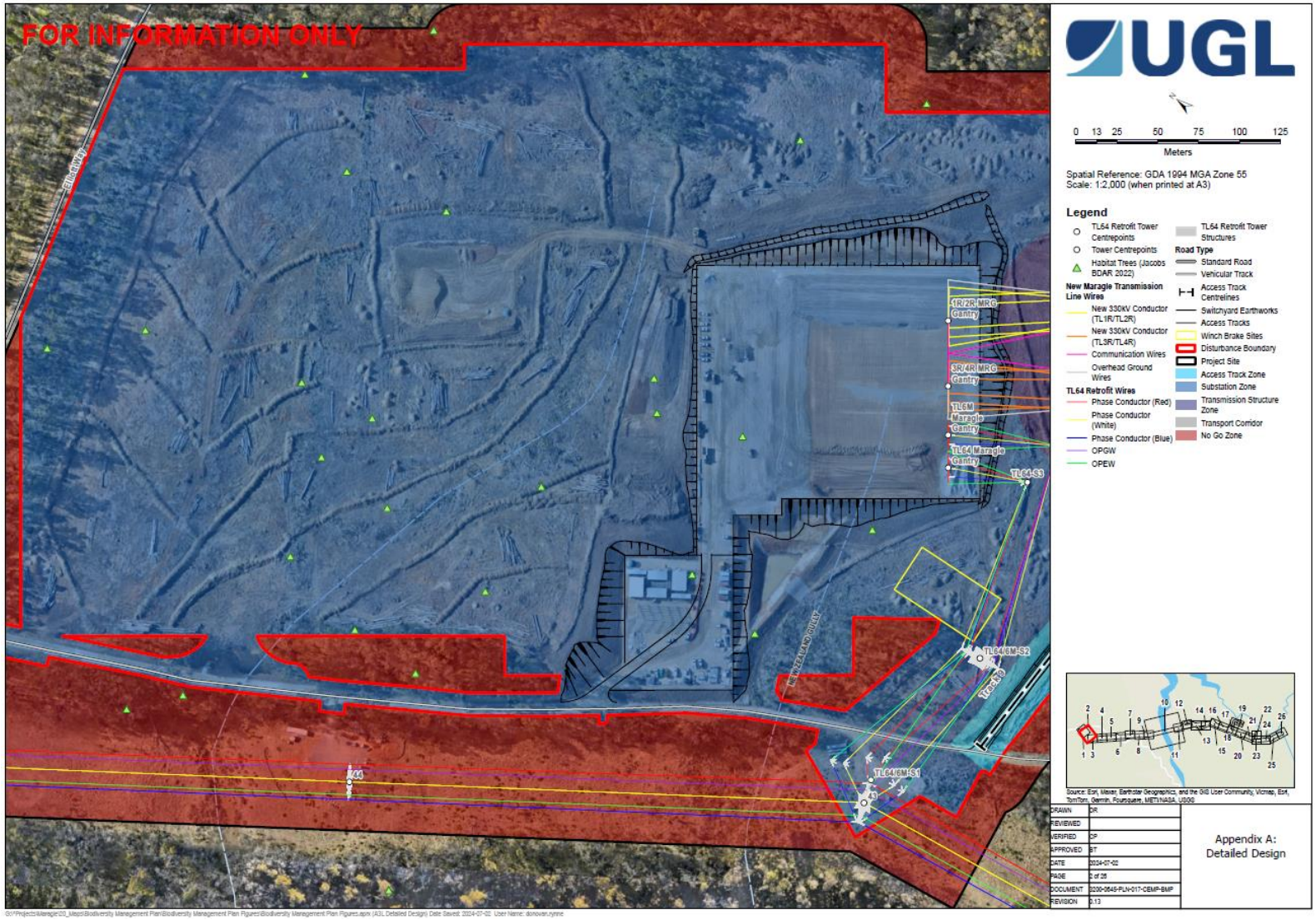
Wormington, Kevin & Lamb, David. (1999). *Tree hollow development in wet and dry sclerophyll eucalypt forest in south-east Queensland, Australia*. Australian Forestry. 62.

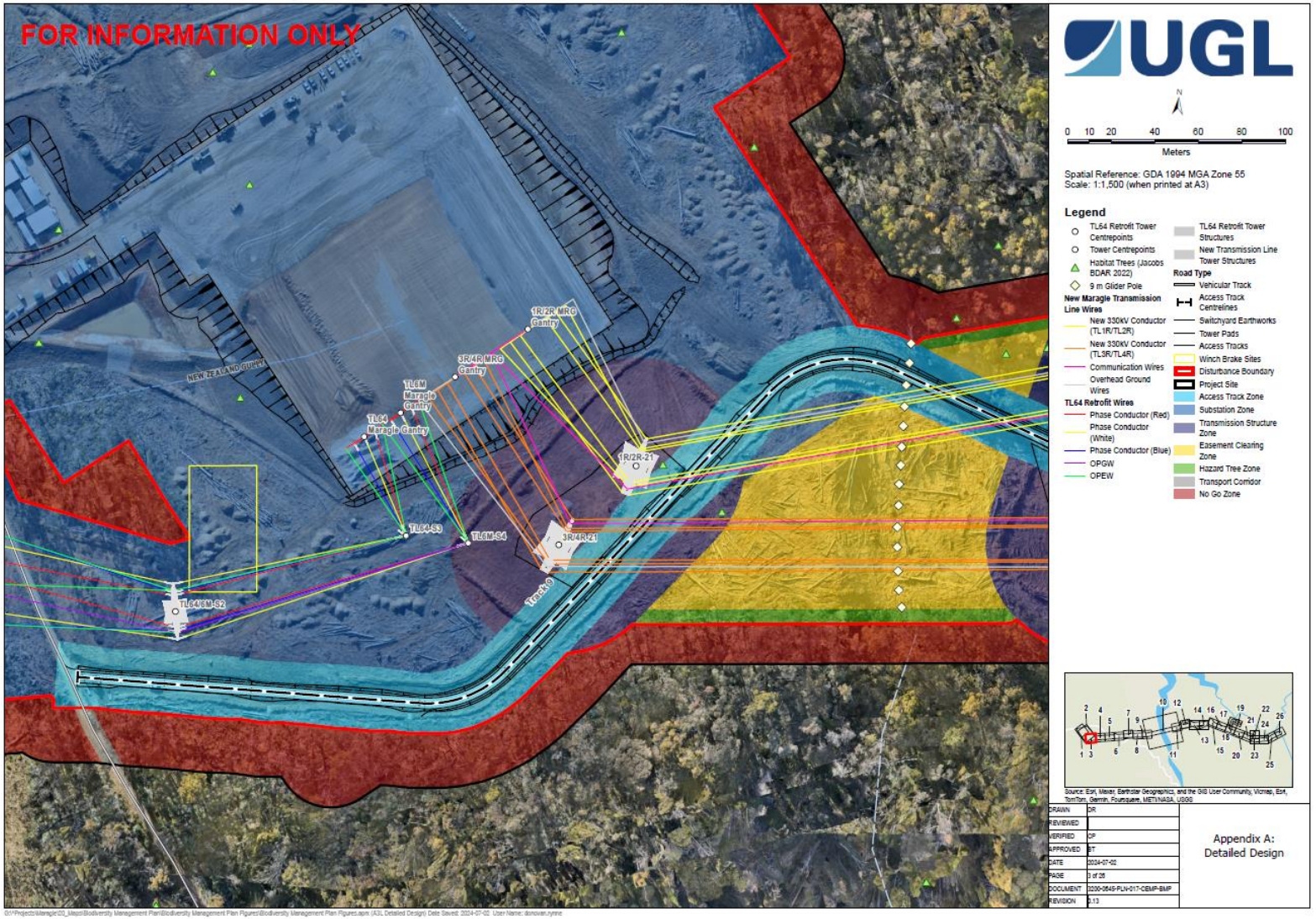
WWF. (2021). *World Wildlife Fund Australia*. Retrieved from Greater Glider: https://www.wwf.org.au/news/blogs/6-facts-about-the-greater-glider#gs.o9fu2t

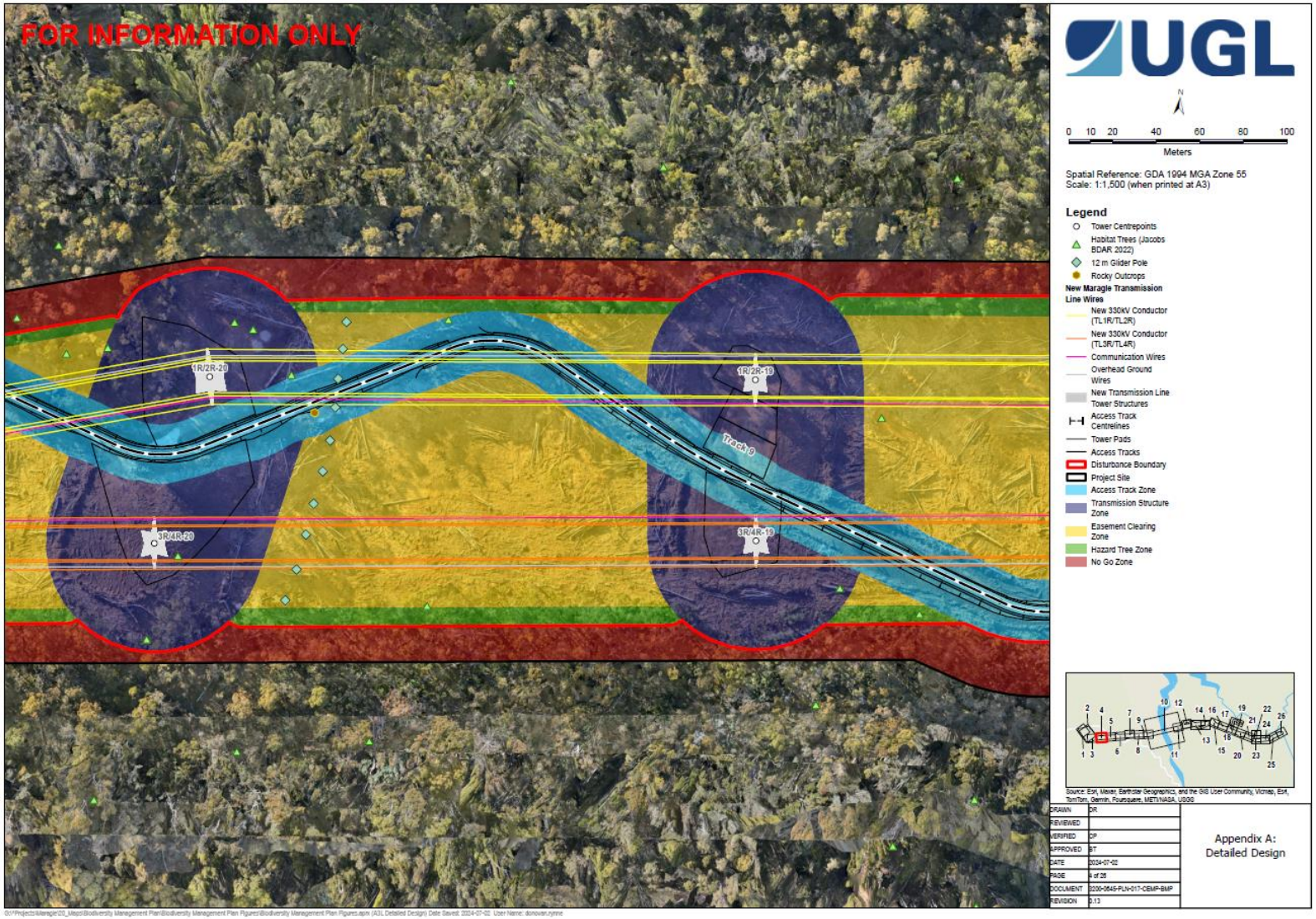
APPENDIX A Detailed Design

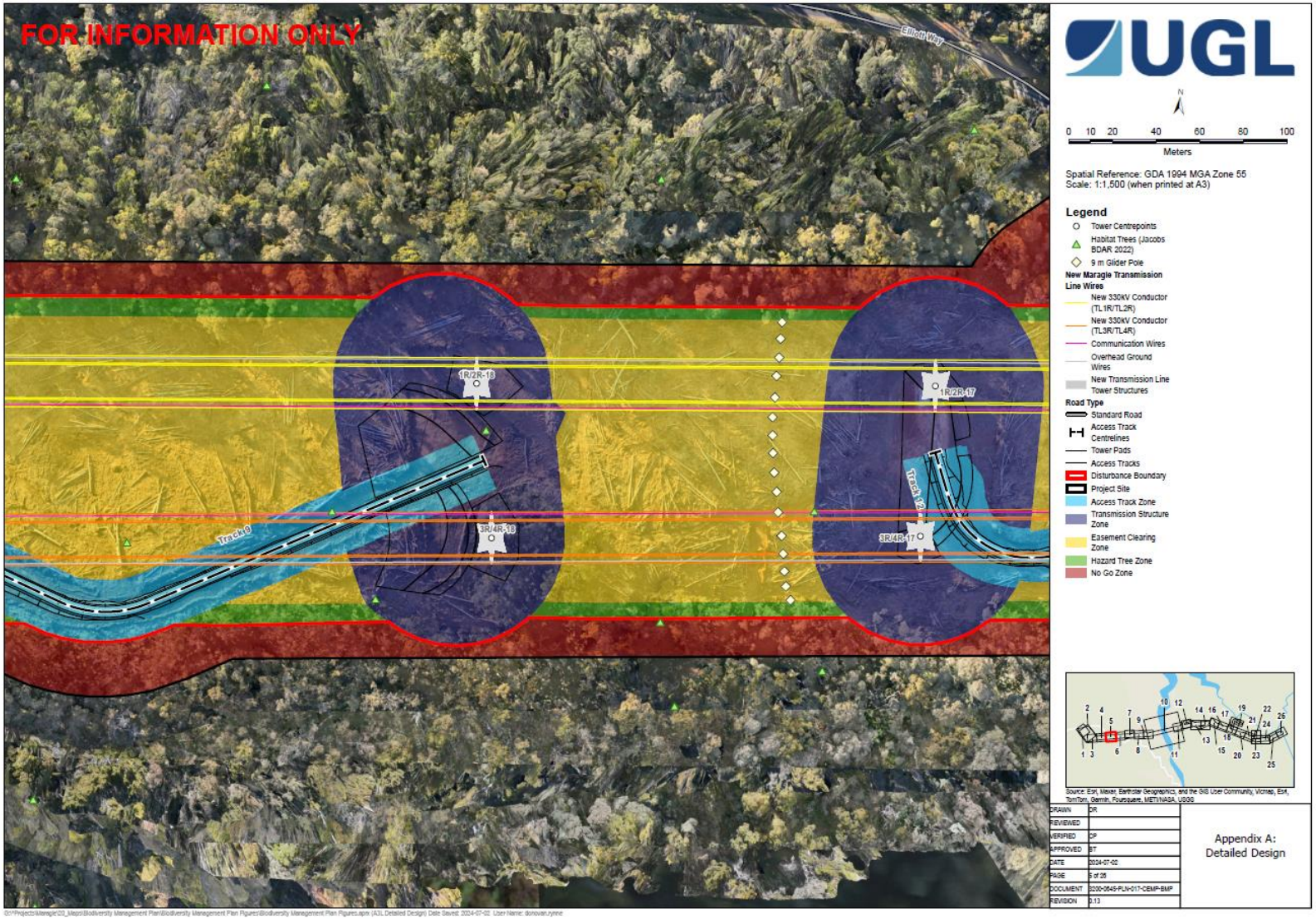
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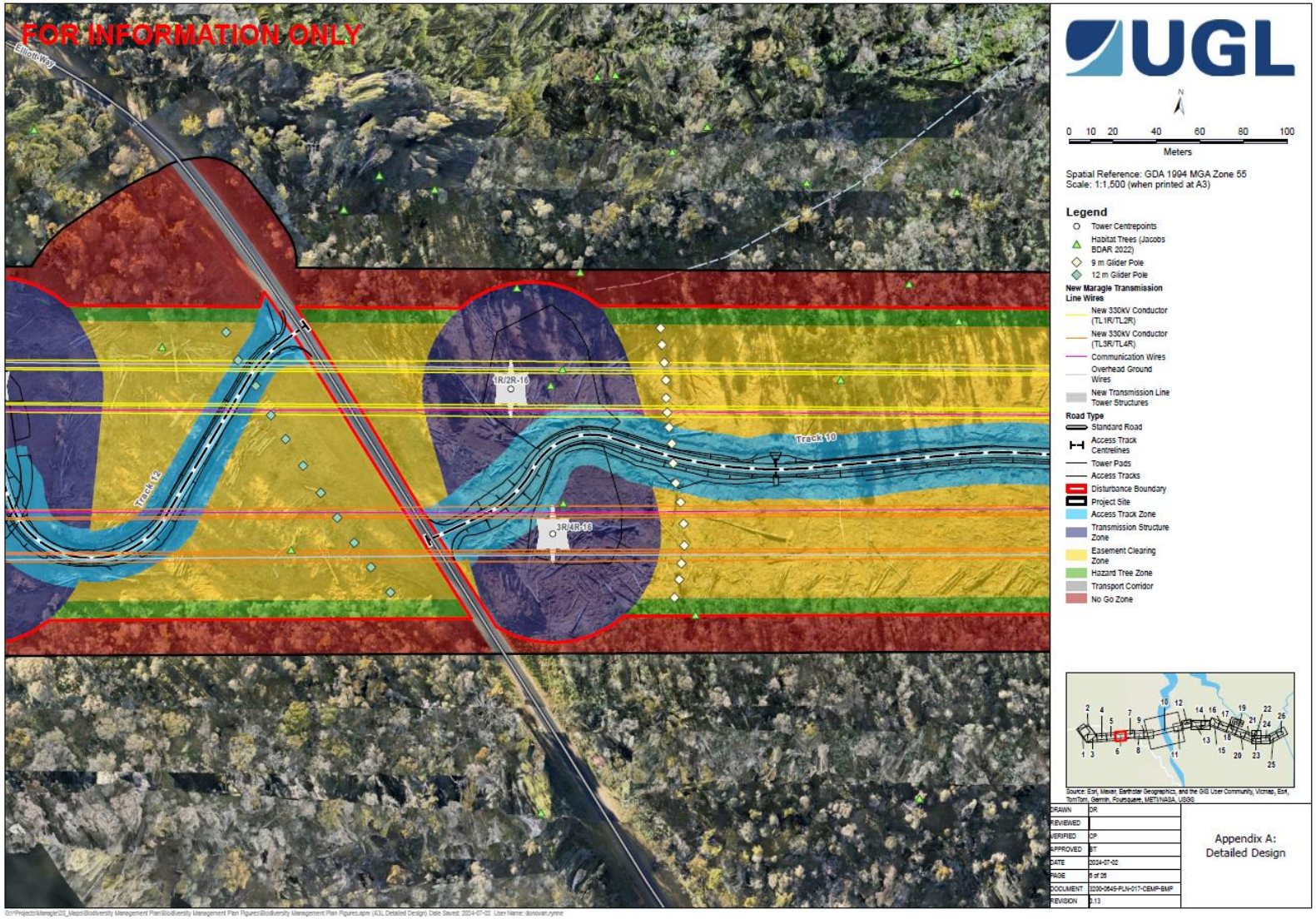

FOR INFORMATION ONLY
Bluehole
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Meters
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Legend
TL64 Retrofit Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
TL64 Retrofit Wires
Phase Conductor (Red)
Phase Conductor (White)
Phase Conductor (Blue)
OPGW
OPEW
TL64 Retrofit Tower Structures
Road Type
Standard Road
Vehicular Track
Disturbance Boundary
Project Site
Substation Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED ST
DATE 2024-07-02
PAGE 1 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
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Appendix A:
Detailed Design

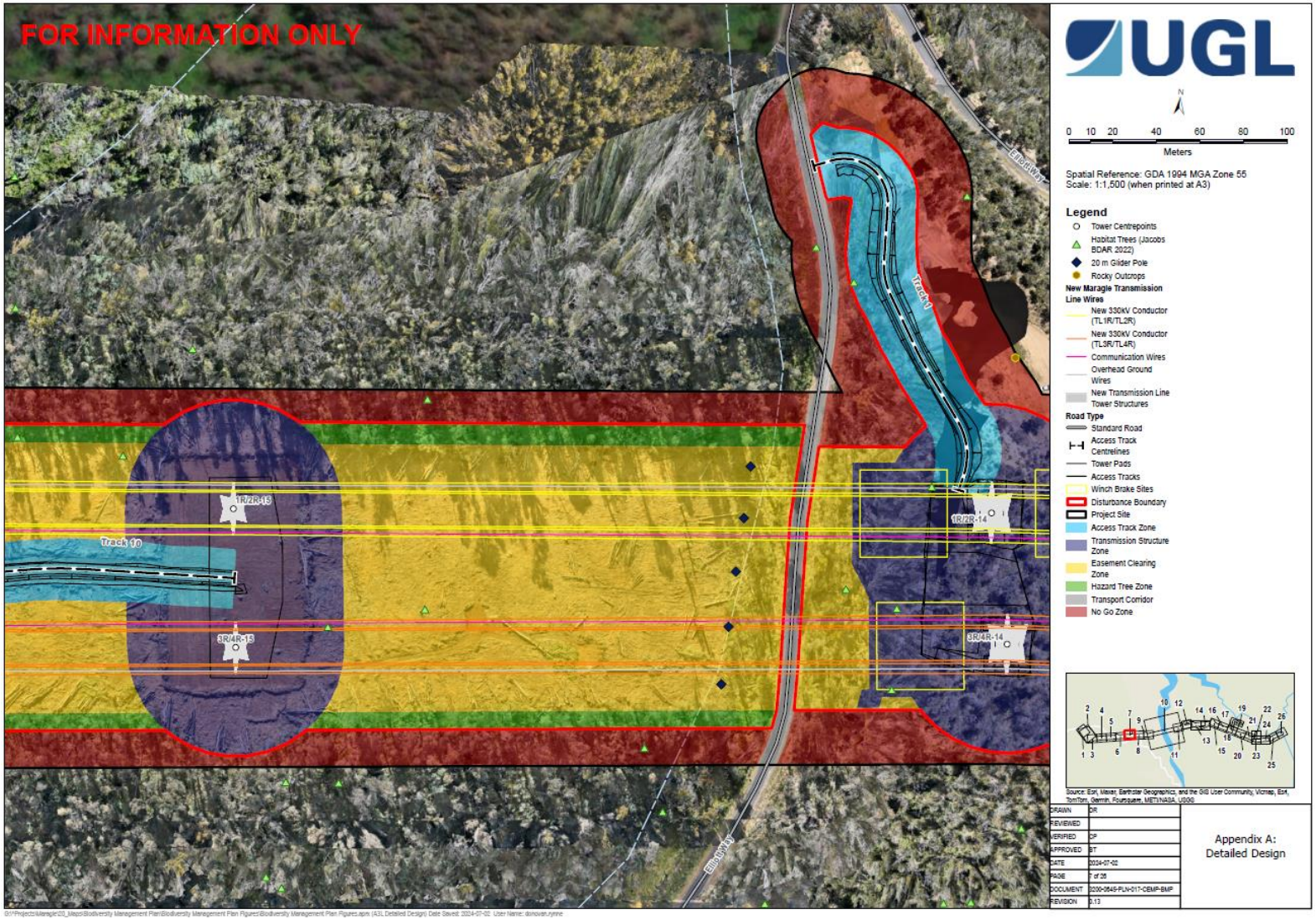

FOR INFORMATION ONLY
1R/2R MRC Gantry
3R/4R MRC Gantry
TL6M Maraglo Gantry
TL64 Maraglo Gantry
TL64-S3
TL64/6M-S2
TL64/6M-S1
Track 3
Track 4
Access Track
Legend
TL64 Retrofit Tower Centrepoints
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
New Maraglo Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
TL64 Retrofit Wires
Phase Conductor (Red)
Phase Conductor (White)
Phase Conductor (Blue)
OPGW
OPEW
TL64 Retrofit Tower Structures
Road Type
Standard Road
Vehicular Track
Access Track Centrelines
Switchyard Earthworks
Access Tracks
Winch Brake Sites
Disturbance Boundary
Project Site
Access Track Zone
Substation Zone
Transmission Structure Zone
Transport Corridor
No Go Zone
0 13 25 50 75 100 125
Meters
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DRAWN DR
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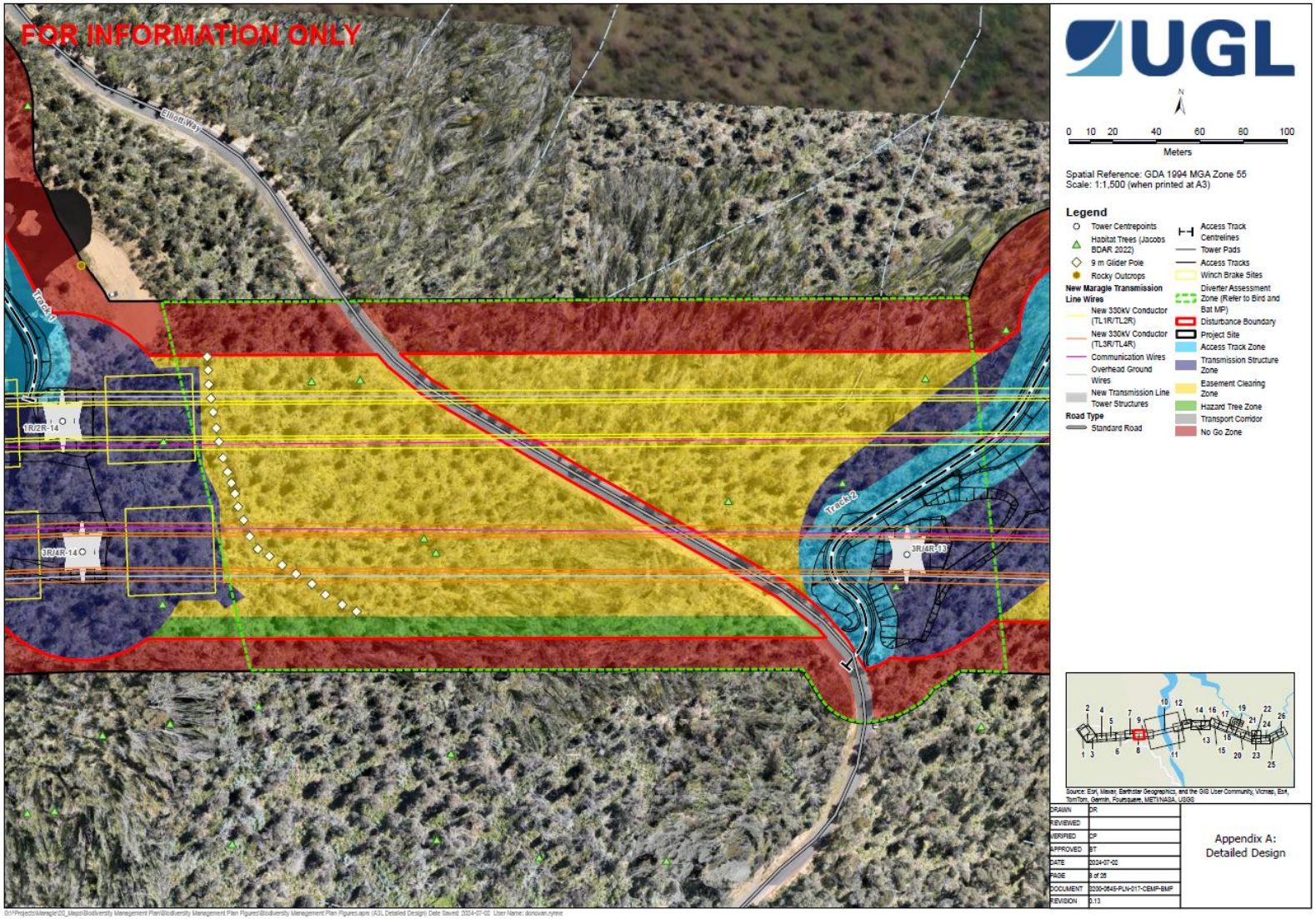

FOR INFORMATION ONLY
1R/2R MRG Gantry
3R/4R MRG Gantry
TL6M Maragle Gantry
TL64 Maragle Gantry
NEW ZEALAND GULLY
1R/2R-21
3R/4R-21
TL64-S3
TL6M-S4
TL64/6M-S2
Track-9
UGL
N
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
TL64 Retrofit Tower Centrepoints
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
9 m Glider Pole
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
TL64 Retrofit Wires
Phase Conductor (Red)
Phase Conductor (White)
Phase Conductor (Blue)
OPGW
OPEW
TL64 Retrofit Tower Structures
New Transmission Line Tower Structures
Road Type
Vehicular Track
Access Track Centrelines
Switchyard Earthworks
Tower Pads
Access Tracks
Winch Brake Sites
Disturbance Boundary
Project Site
Access Track Zone
Substation Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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VERIFIED DP
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PAGE 3 of 26
DOCUMENT 3530-9645-PLN-017-CBMP-BMP
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Appendix A:
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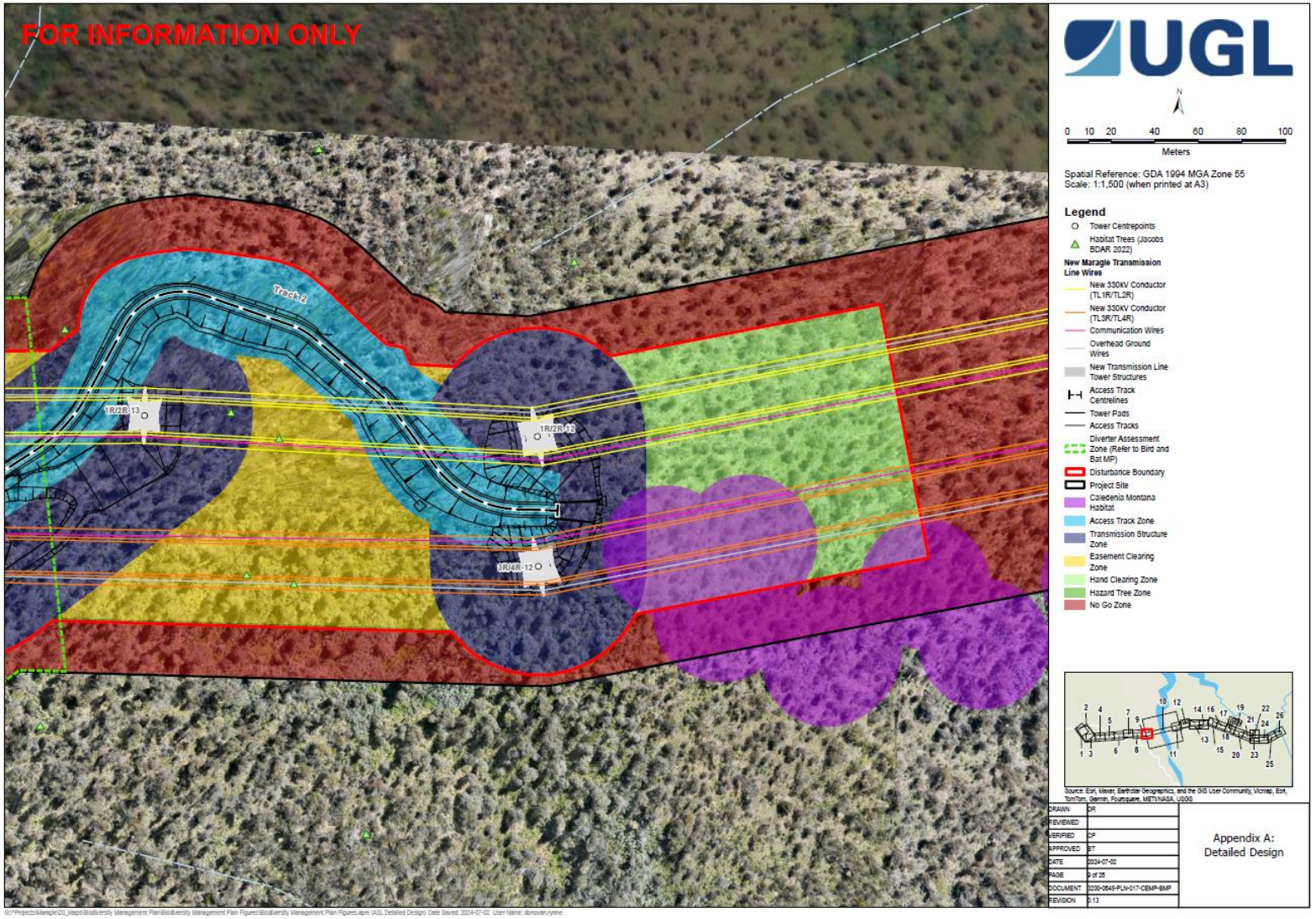

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1R/2R-20
1R/2R-19
3R/4R-20
3R/4R-19
Track 9
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Meters
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Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
12 m Glider Pole
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
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Tower Pads
Access Tracks
Disturbance Boundary
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Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
No Go Zone
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REVIEWED
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DATE 2024-07-02
PAGE 4 of 26
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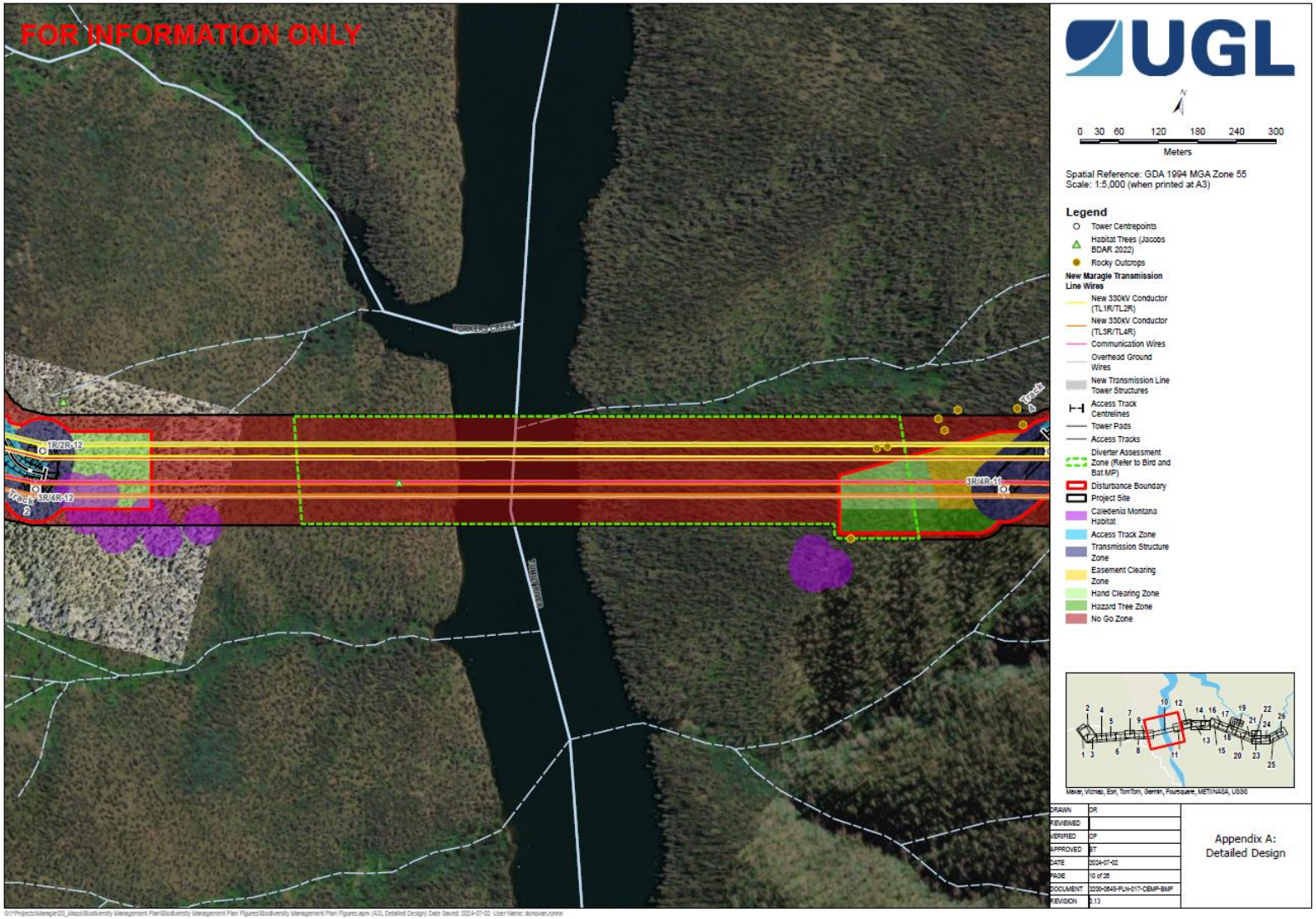

FOR INFORMATION ONLY
Elliott Way
1R/2R-18
1R/2R-17
3R/4R-18
3R/4R-17
Track 9
Track 12
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
9 m Glider Pole
New Maragle Tranamission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Access Track Centrelines
Tower Pads
Access Tracks
Disturbance Boundary
Project Site
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
No Go Zone
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DATE 2024-07-02
PAGE 5 of 26
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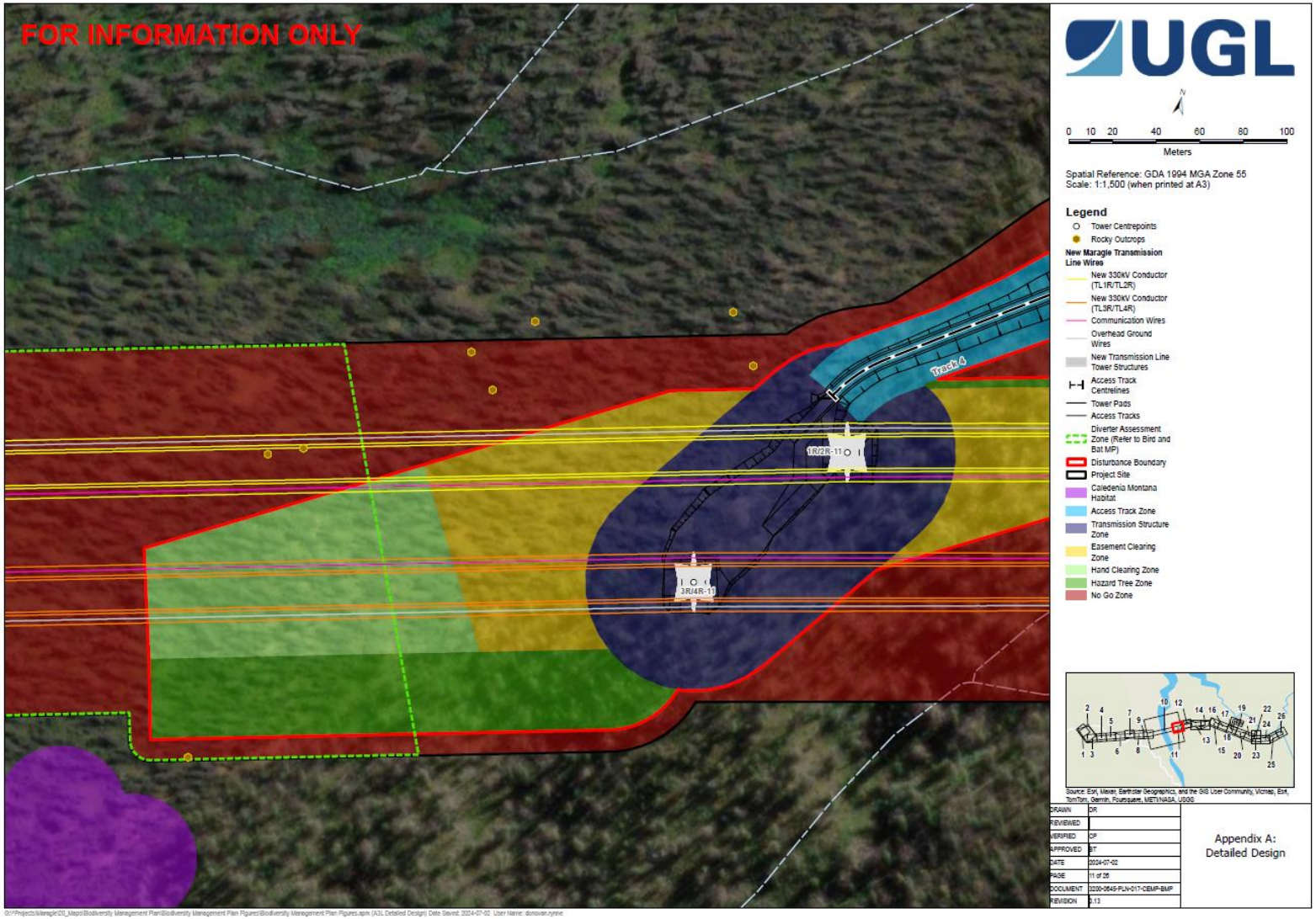

FOR INFORMATION ONLY
Elliott Way
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3R/4R-16
Track 10
Track 12
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
9 m Glider Pole
12 m Glider Pole
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Access Track Centrelines
Tower Pads
Access Tracks
Disturbance Boundary
Project Site
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
DRAWN DR
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DATE 2024-07-02
PAGE 6 of 26
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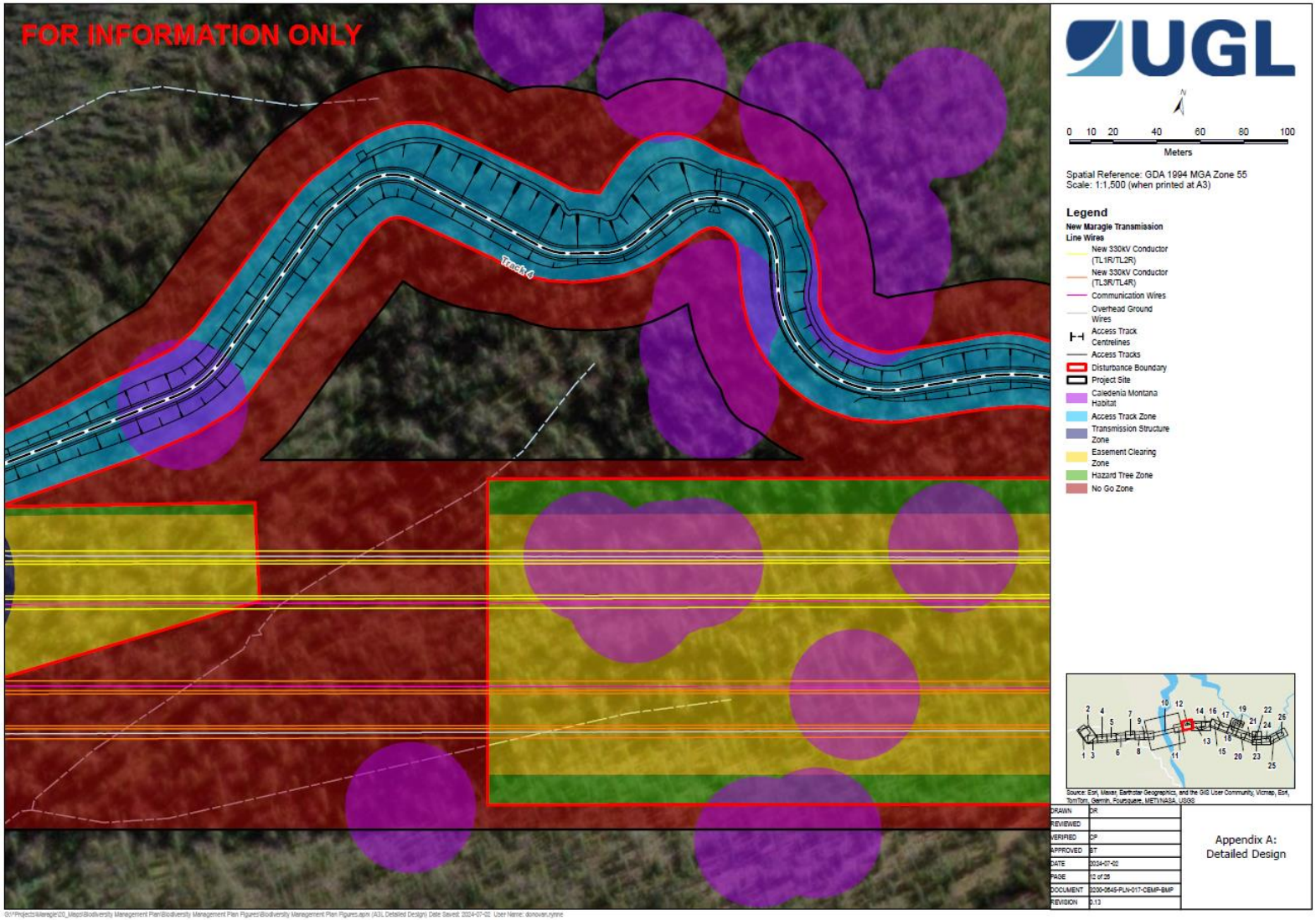

FOR INFORMATION ONLY
Track 1
Track 10
1R/2R-13
1R/2R-14
3R/4R-13
3R/4R-14
Eingartah Rd
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
20 m Glider Pole
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Access Track Centrelines
Tower Pads
Access Tracks
Winch Brake Sites
Disturbance Boundary
Project Site
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
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REVIEWED
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DATE 2024-07-02
PAGE 7 of 26
DOCUMENT 2200-0645-PLN-017-CEMP-BMP
REVISION 0.13
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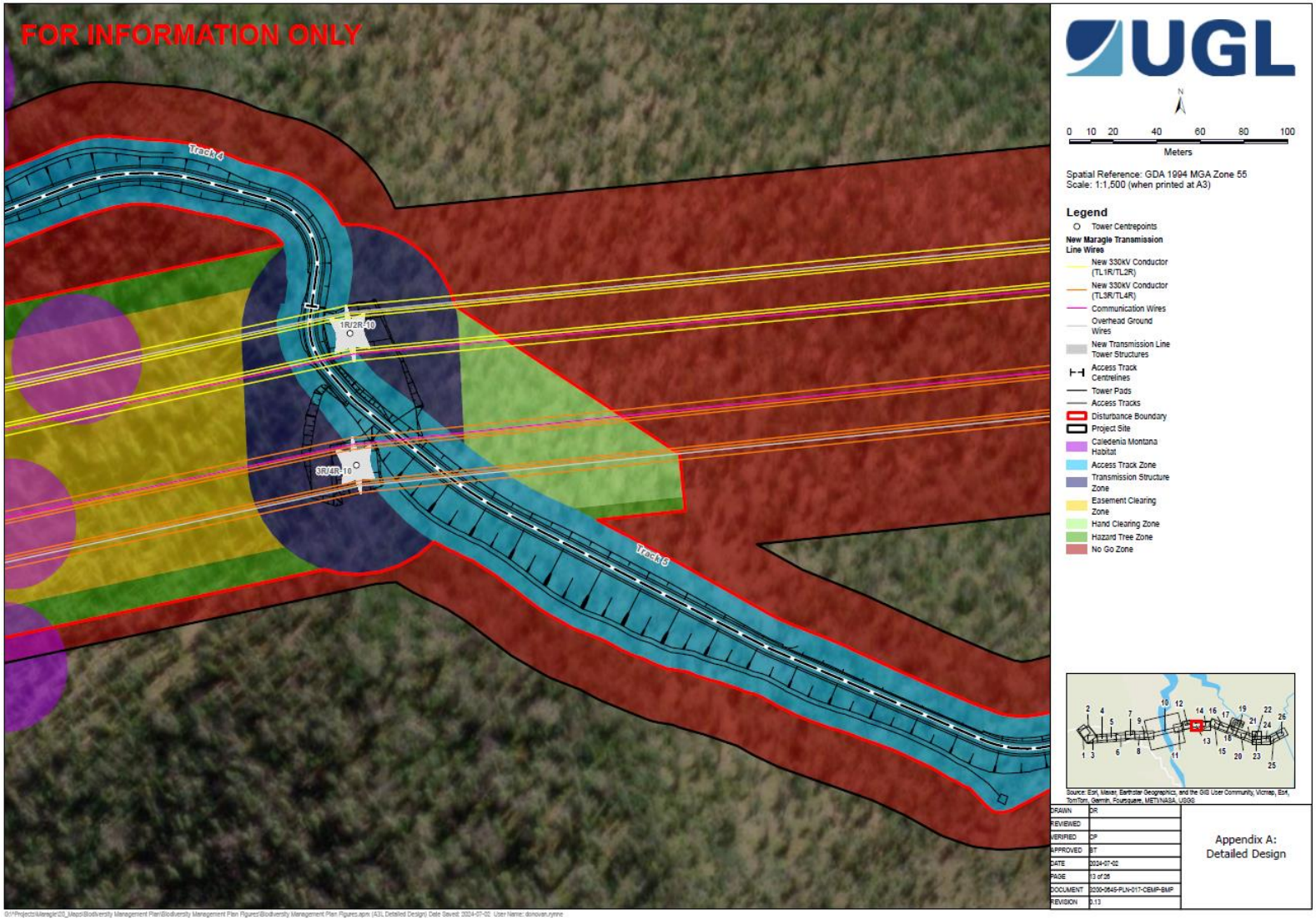

FOR INFORMATION ONLY
Ellerton Way
Track 1
Track 2
1R/2R-14
3R/4R-14
3R/4R-13
UGL
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
9 m Glider Pole
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1/R/TL2/R)
New 330kV Conductor (TL3/R/TL4/R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Access Track Centrelines
Tower Pads
Access Tracks
Winch Brake Sites
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
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PAGE 8 of 26
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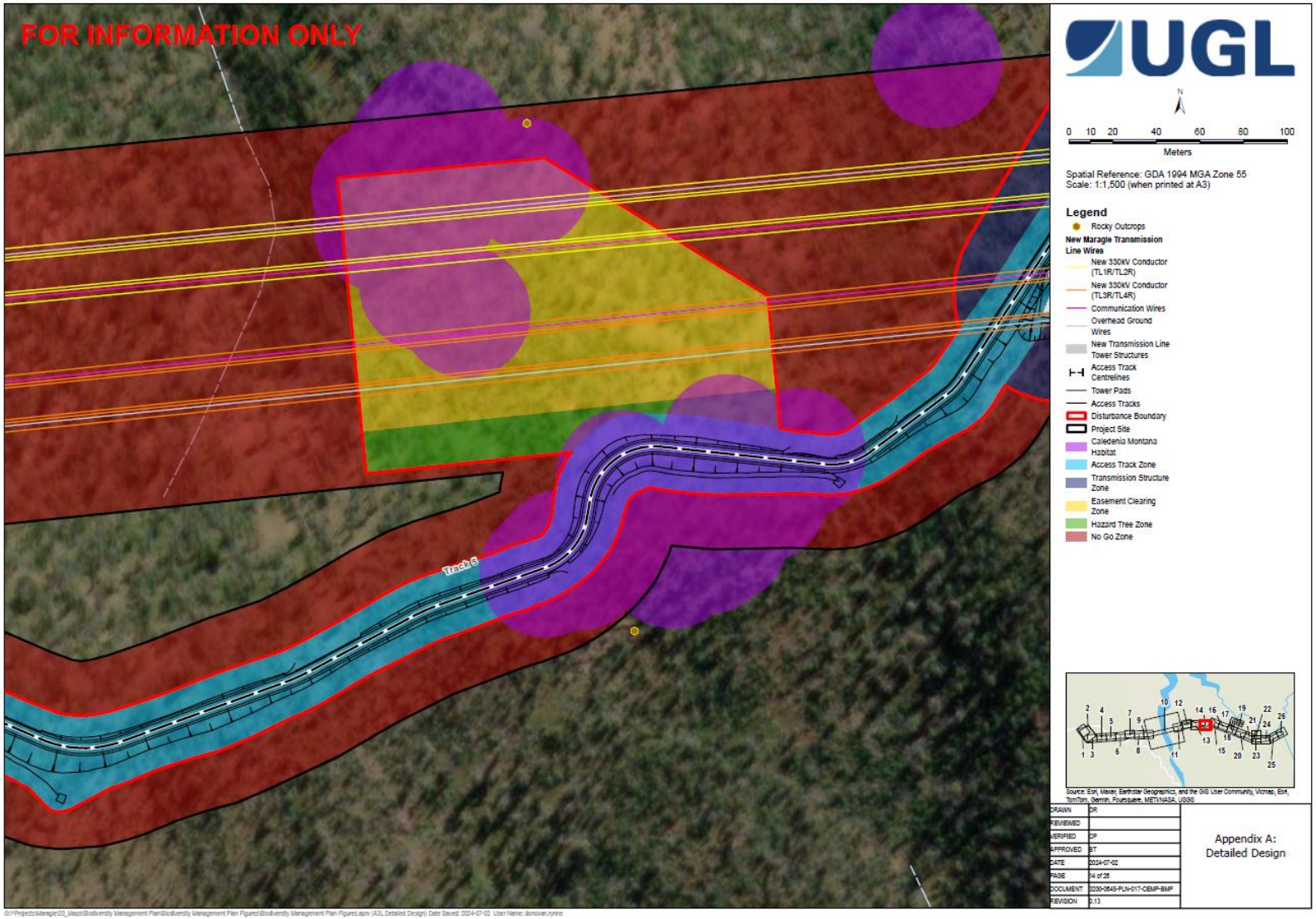

FOR INFORMATION ONLY
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Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
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Access Track Centrelines
Tower Pads
Access Tracks
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
No Go Zone
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REVISION 3.13
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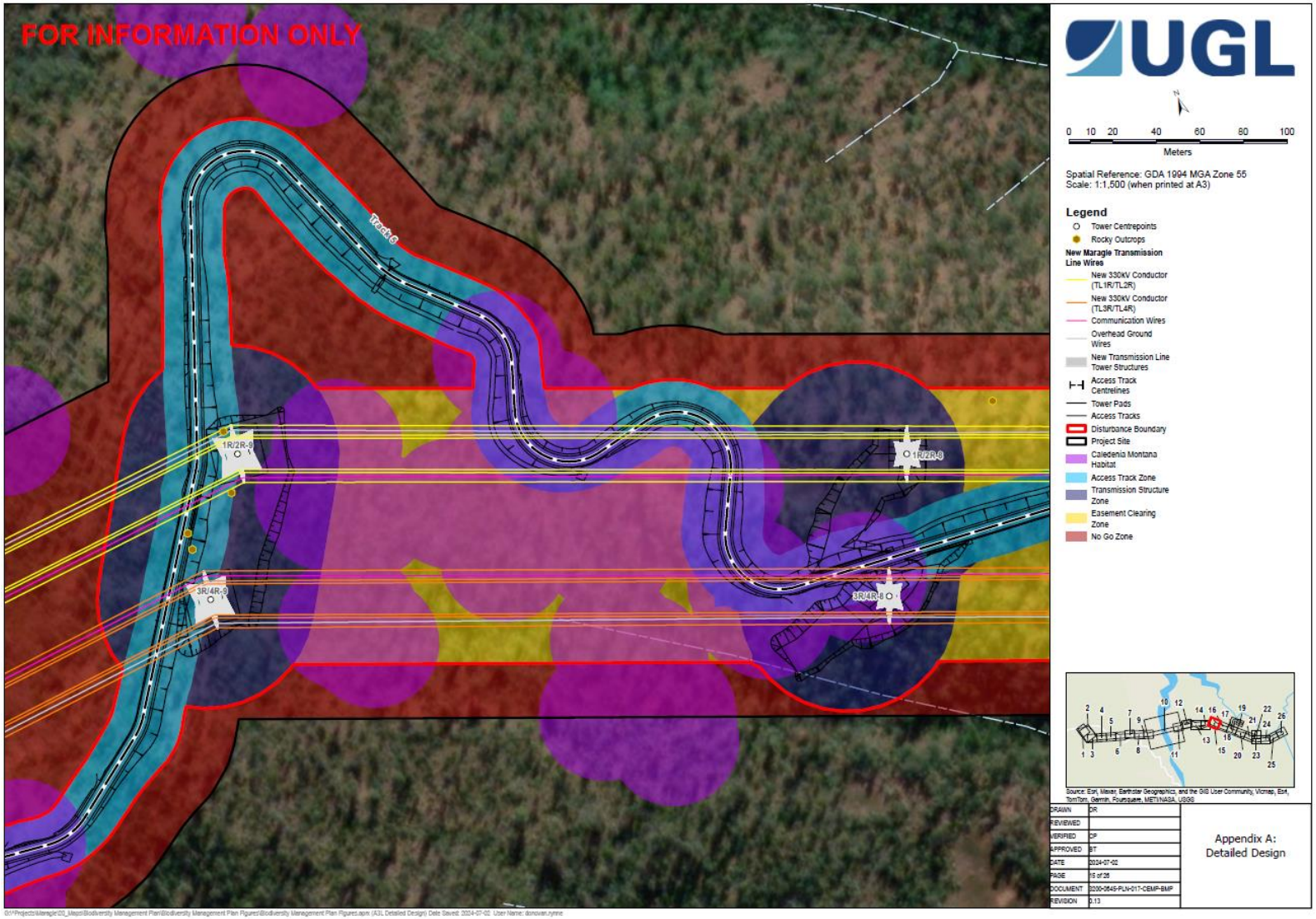

FOR INFORMATION ONLY
TOWERS CREEK
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Meters
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Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Access Track Centrelines
Tower Pads
Access Tracks
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Cziedenia Montana Habitat
Access Track Zone
Transmission Structure Zone
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DATE 2024-07-02
PAGE 10 of 26
DOCUMENT 3330-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

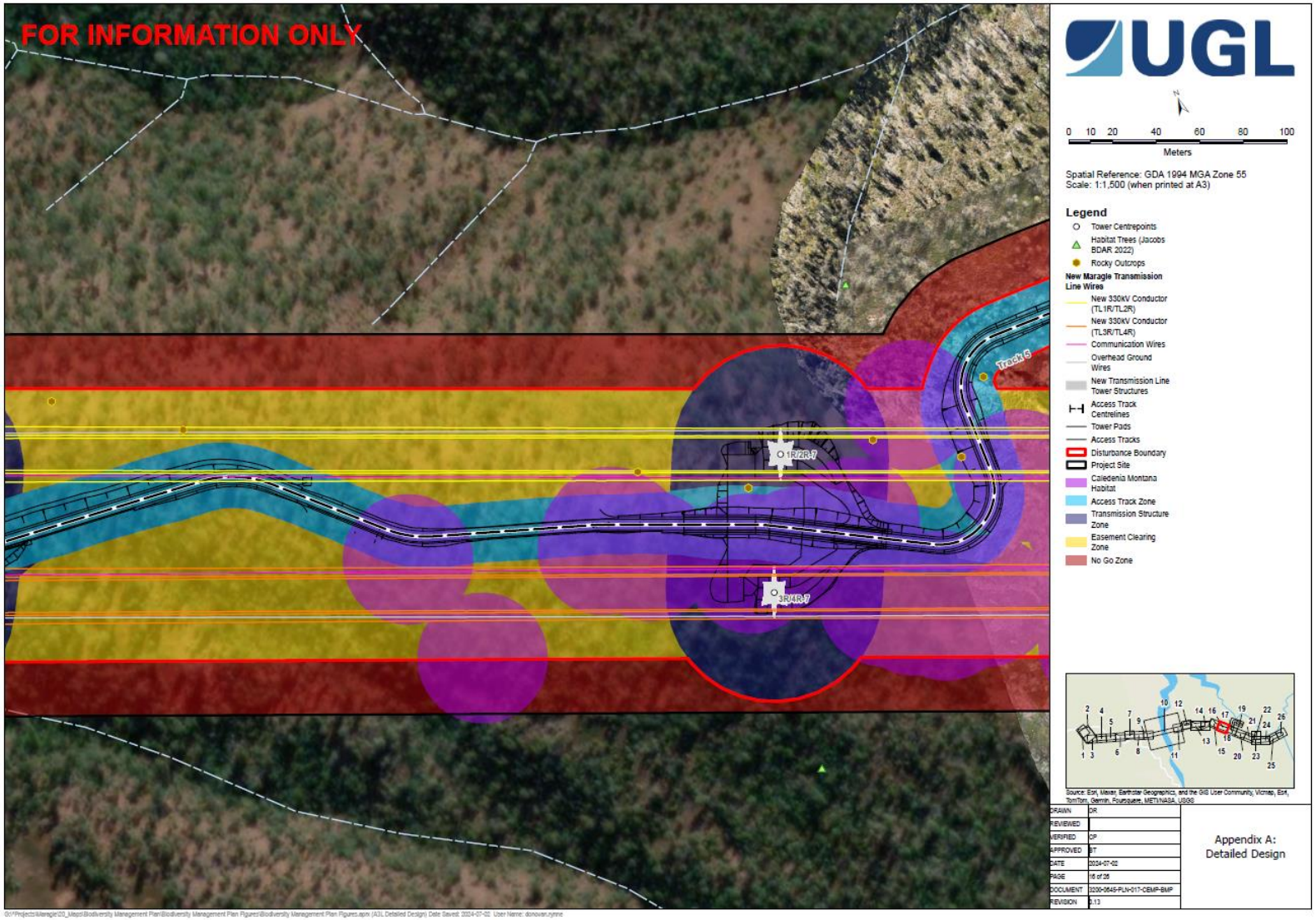

FOR INFORMATION ONLY
Track 4
1R/2R-11
3R/4R-11
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Access Track Centrelines
Tower Pads
Access Tracks
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED BT
DATE 2024-07-02
PAGE 11 of 25
DOCUMENT 3230-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

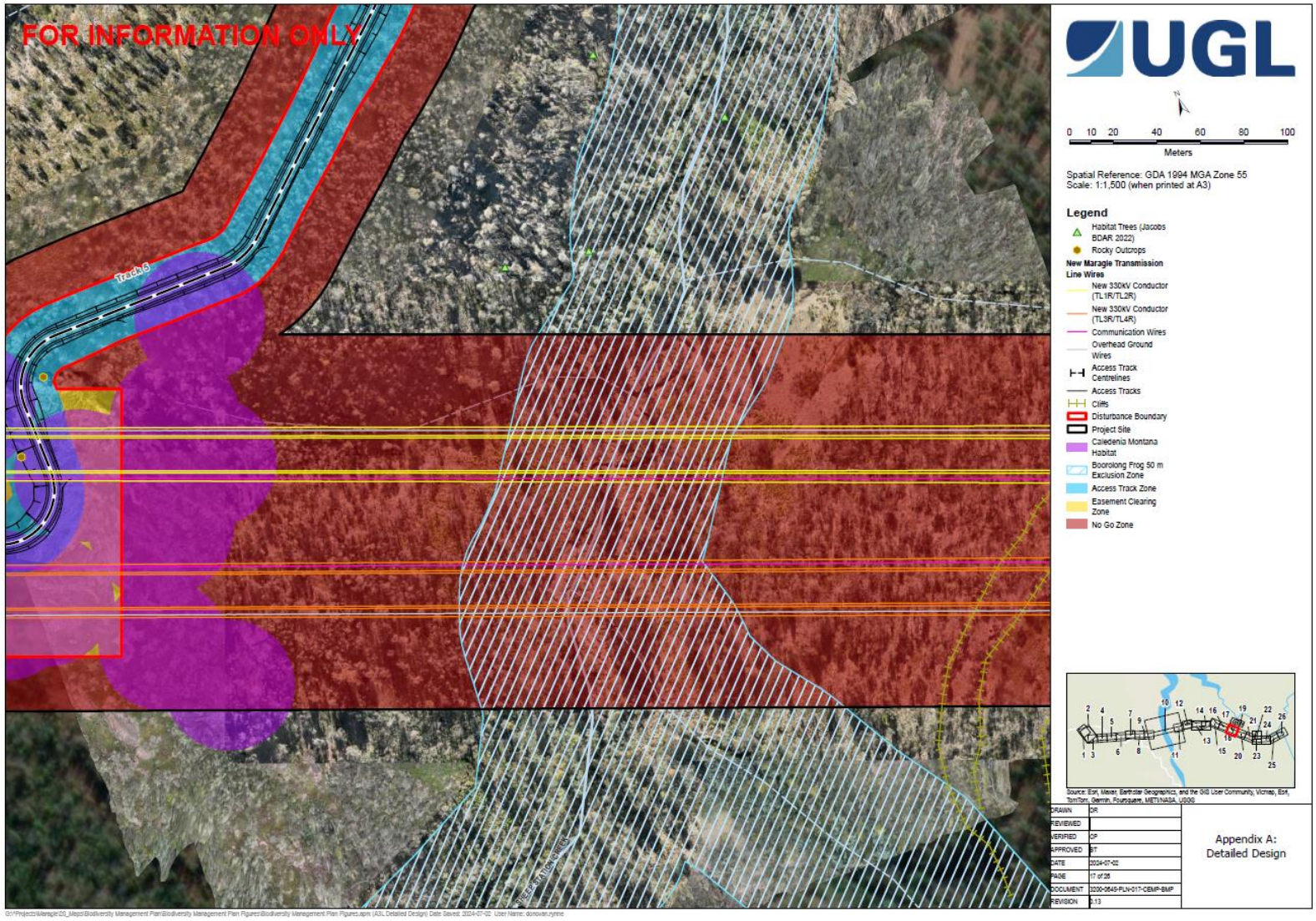

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New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
Access Track Centrelines
Access Tracks
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 12 of 26
DOCUMENT 2030-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

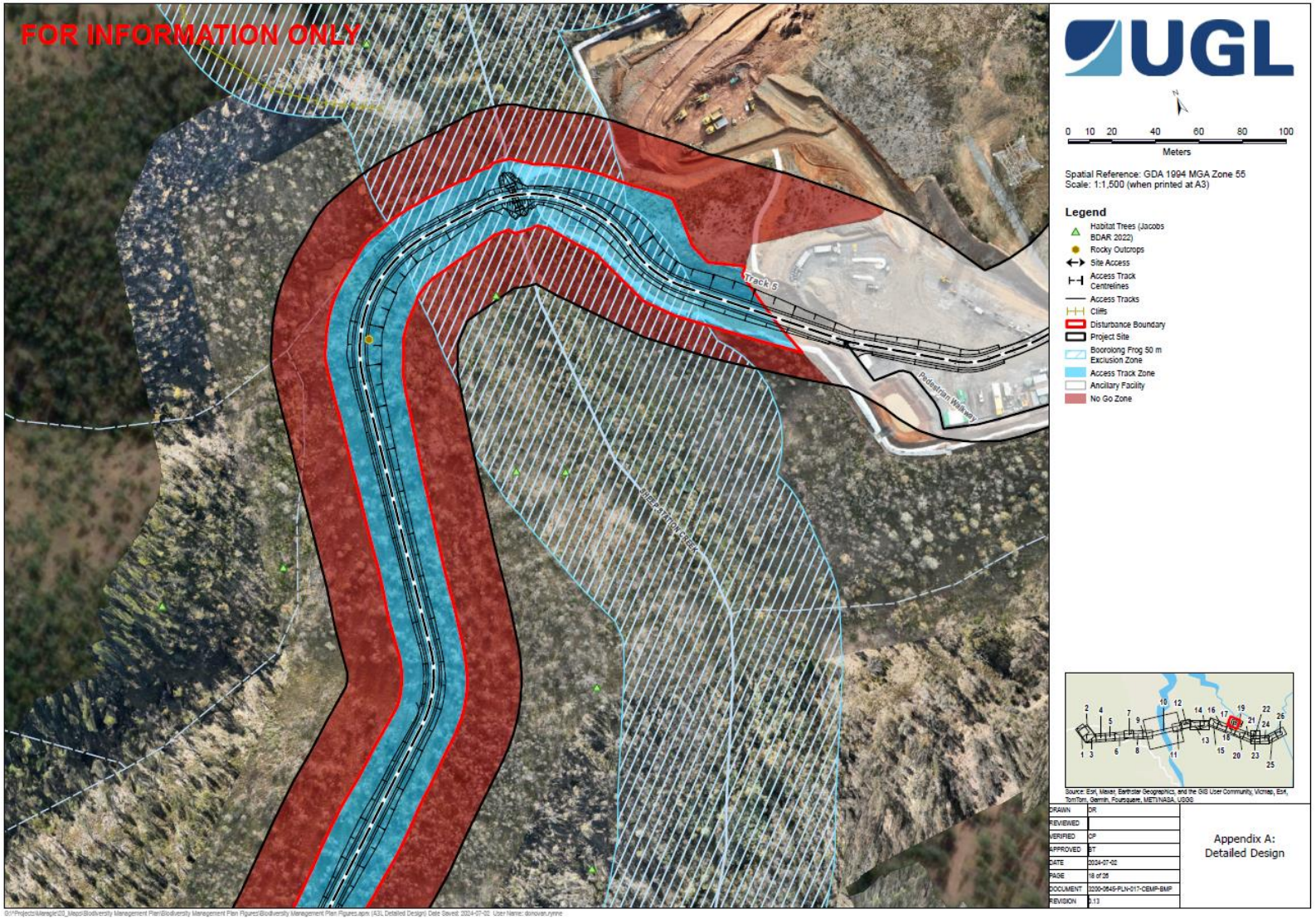

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3R/4R:10
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Meters
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Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
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Tower Pads
Access Tracks
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 13 of 26
DOCUMENT 2200-0845-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

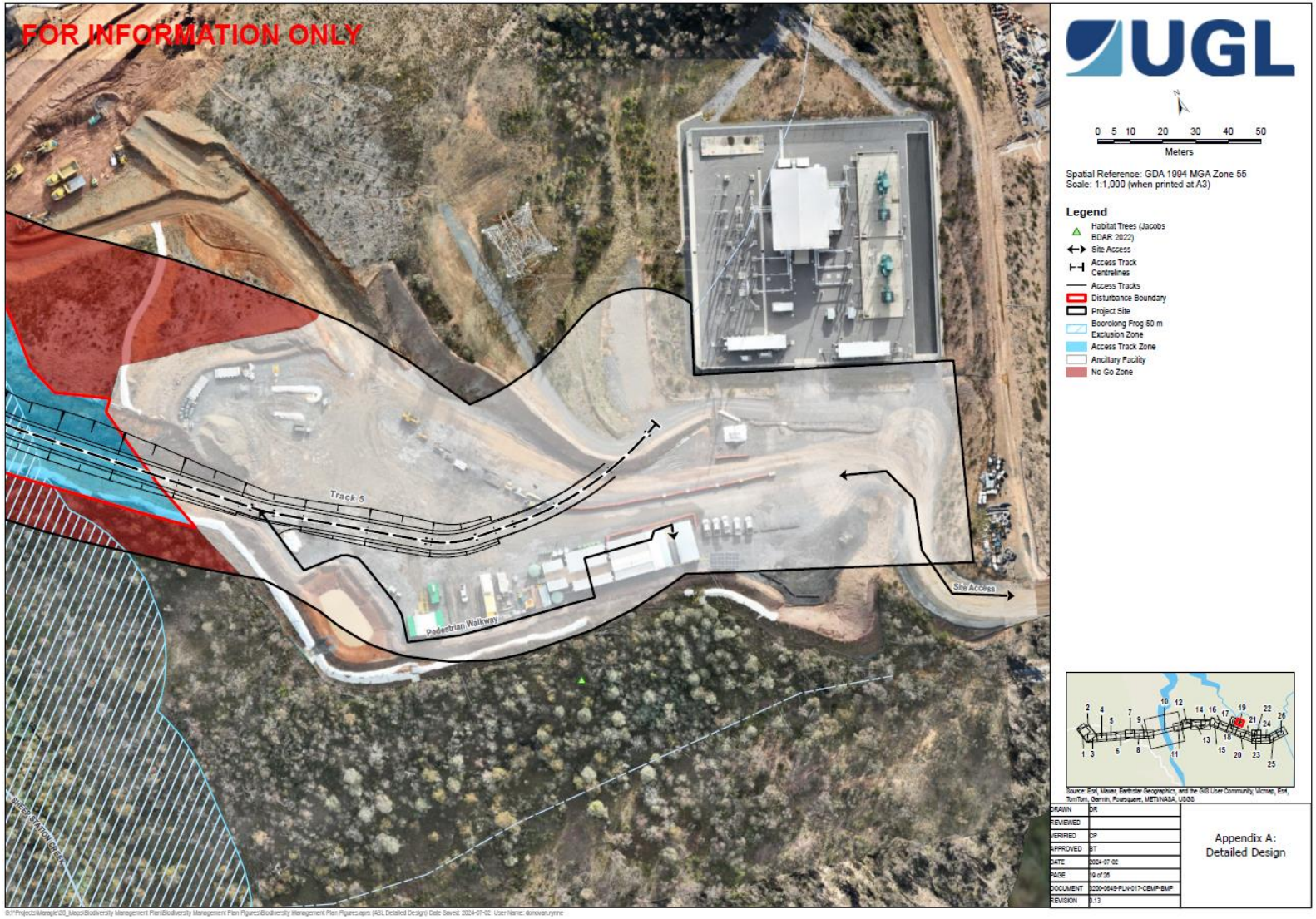

FOR INFORMATION ONLY
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Legend
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Access Track Centrelines
Tower Pads
Access Tracks
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
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DRAWN
REVIEWED
VERIFIED
APPROVED
DATE
PAGE
DOCUMENT
REVISION
Appendix A:
Detailed Design

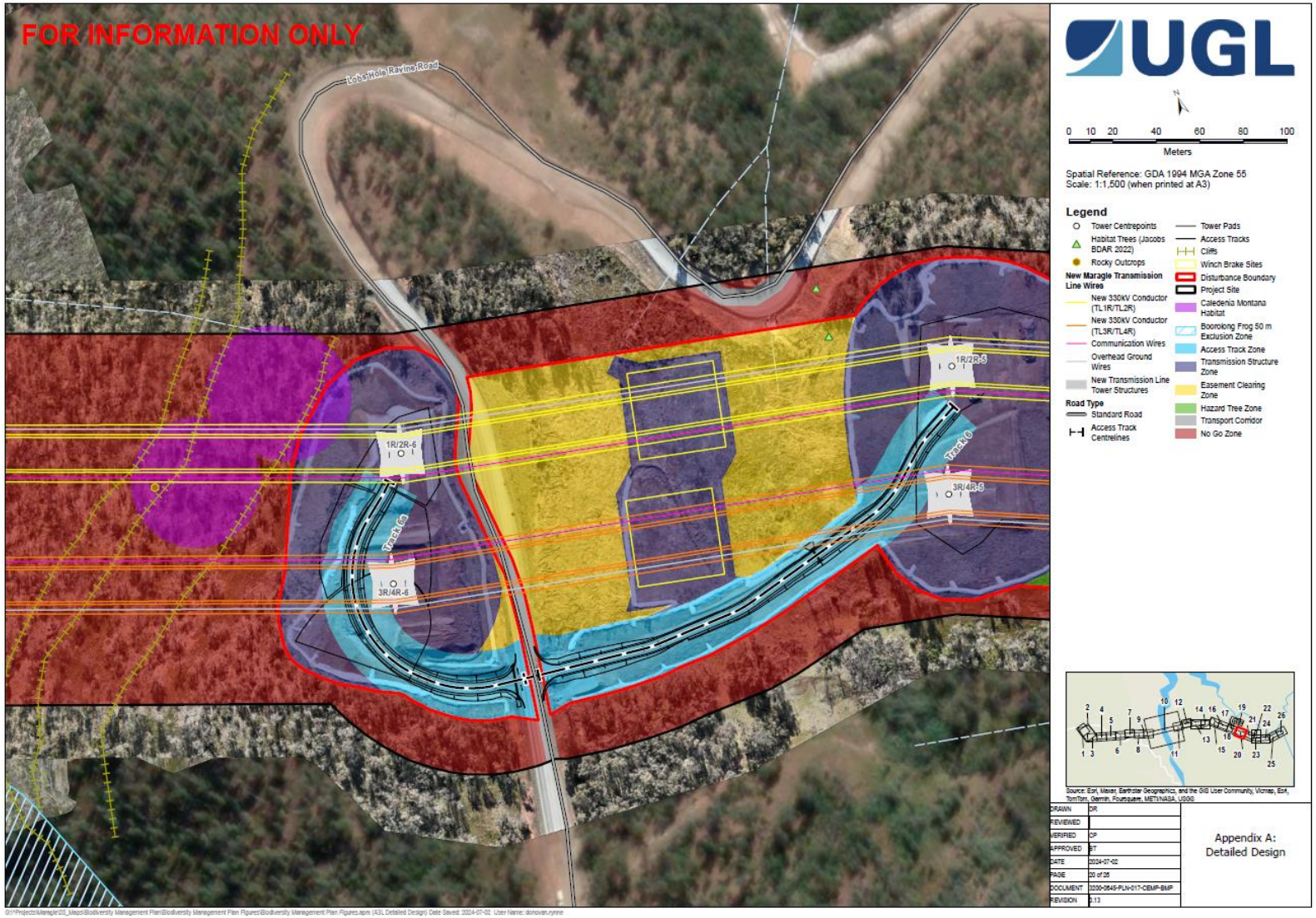

FOR INFORMATION ONLY
Track 3
1R/2R-9
1R/2R-8
3R/4R-9
3R/4R-8
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
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Tower Pads
Access Tracks
Disturbance Boundary
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Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 15 of 26
DOCUMENT 2200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

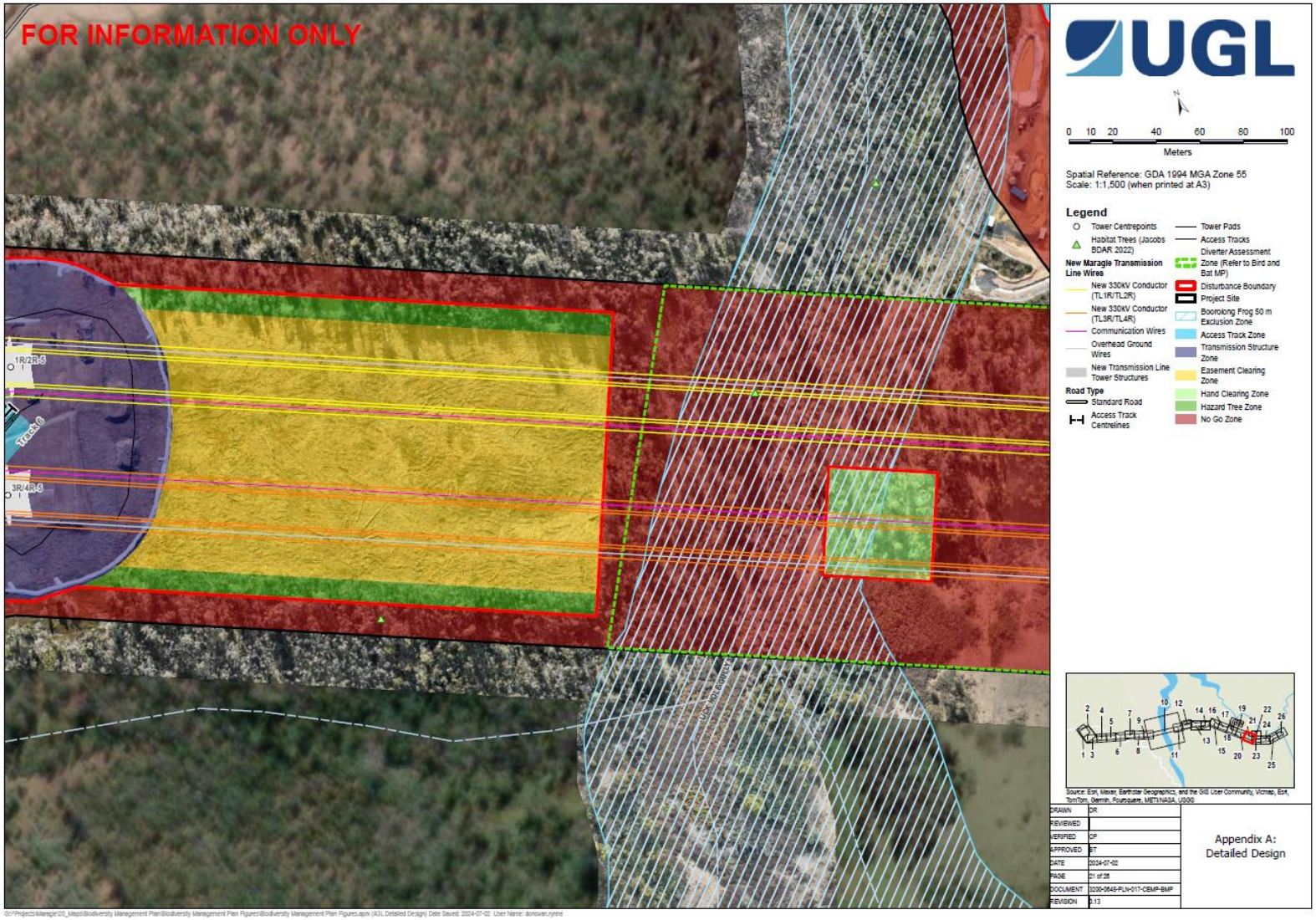

FOR INFORMATION ONLY
Track 6
1R/2R-7
3R/4R-7
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Access Track Centrelines
Tower Pads
Access Tracks
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 16 of 26
DOCUMENT 2200-3645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

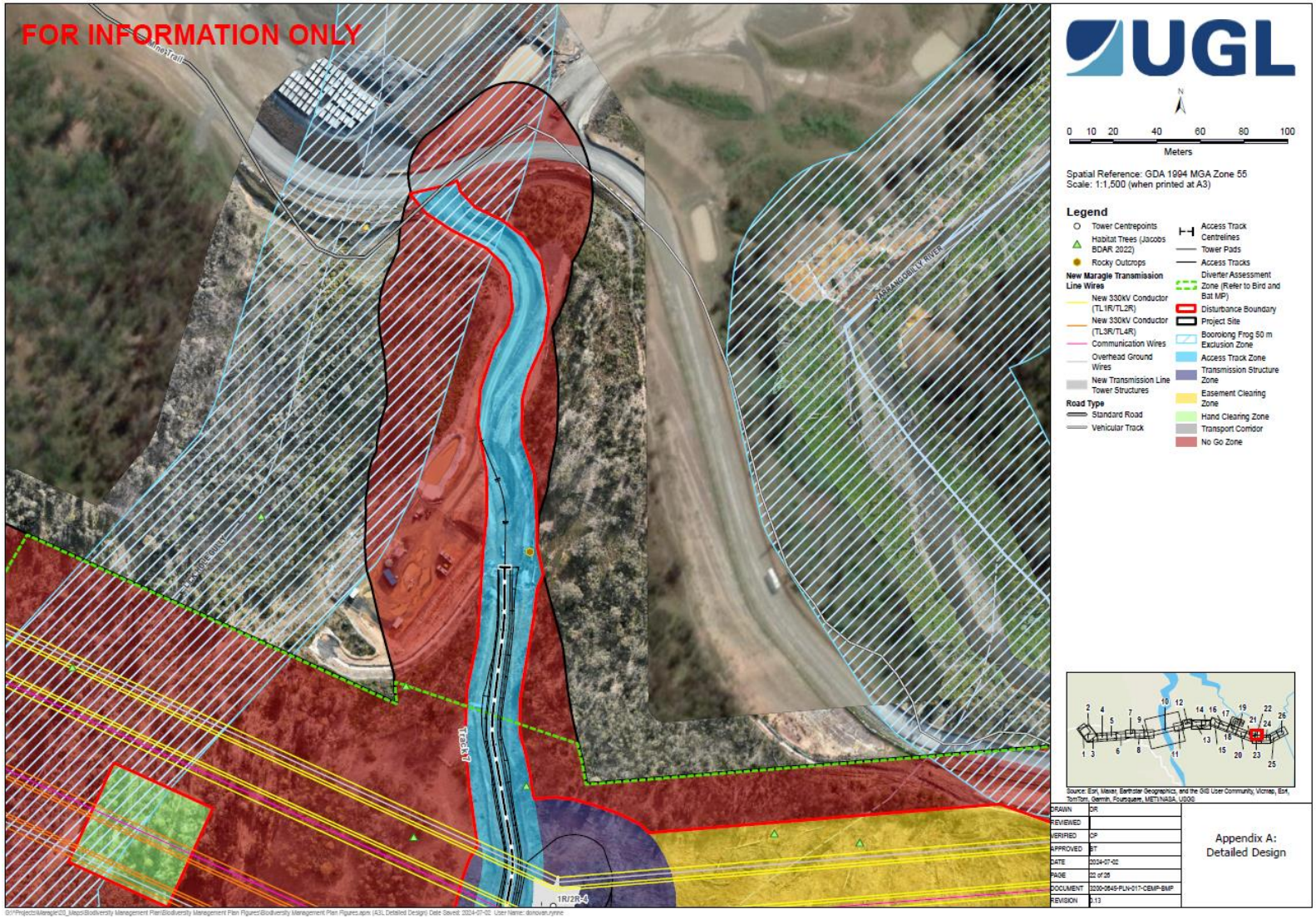

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Meters
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Legend
Habitat Trees (Jacobs BDAR 2022)
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
Access Track Centrelines
Access Tracks
Cliffs
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Easement Clearing Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED BT
DATE 2024-07-02
PAGE 17 of 26
DOCUMENT 3330-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

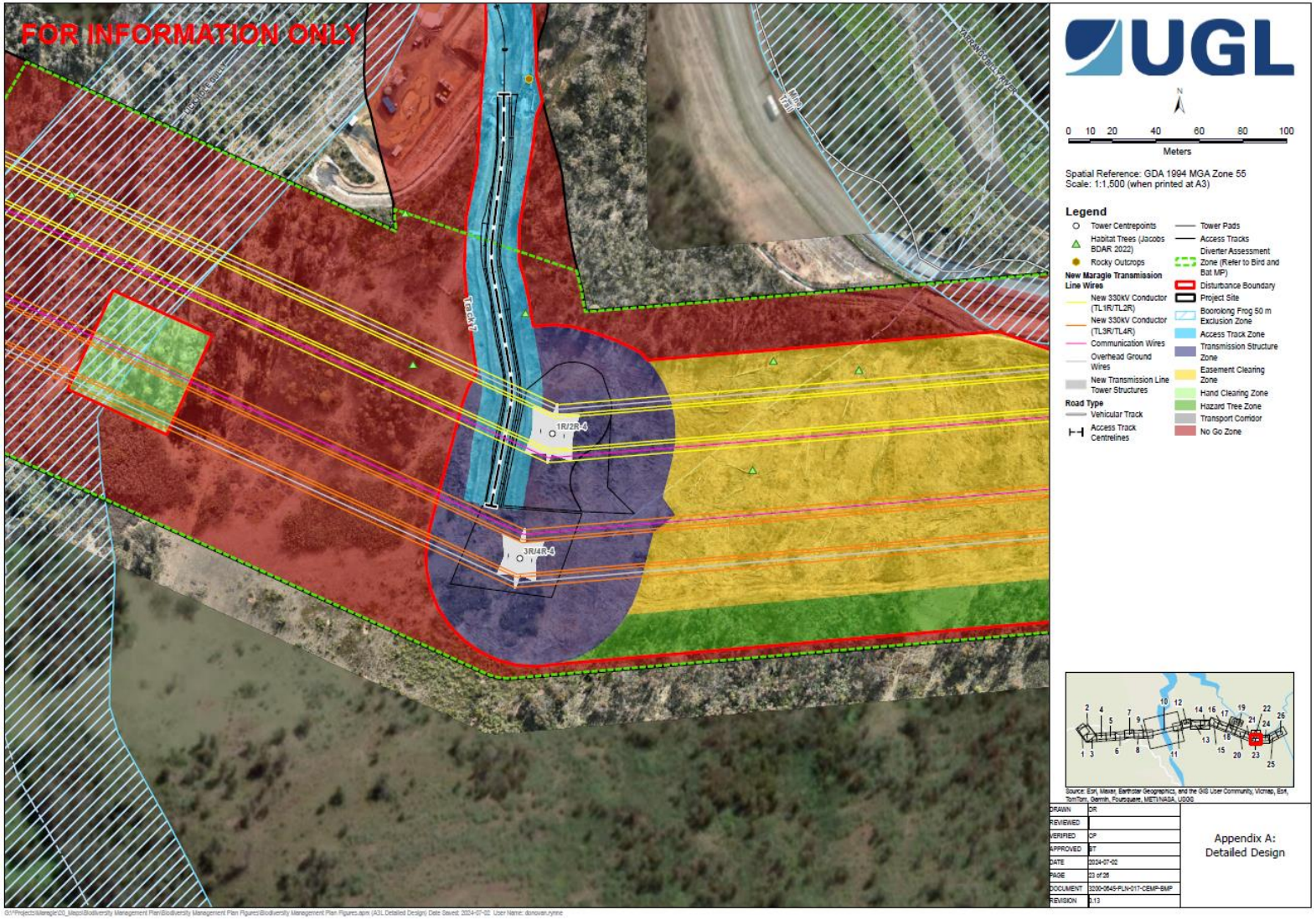

FOR INFORMATION ONLY
Track 6
Pedestrian Walkway
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Habitat Trees (Jacobs BDAR 2022)
Rocky Outcrops
Site Access
Access Track Centrelines
Access Tracks
Cliffs
Disturbance Boundary
Project Site
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Ancillary Facility
No Go Zone
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED ST
DATE 2024-07-02
PAGE 18 of 26
DOCUMENT 3290-0845-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

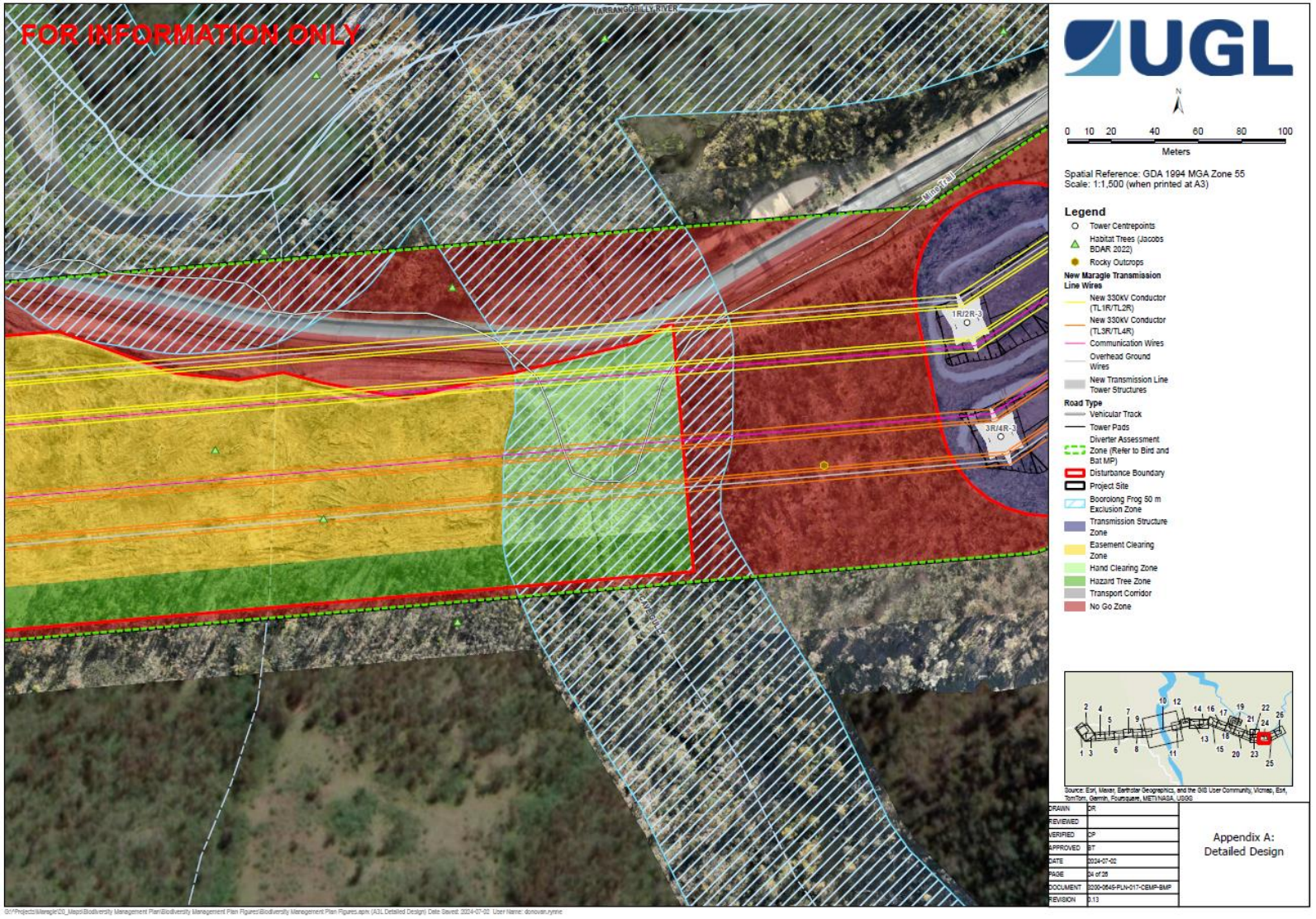

FOR INFORMATION ONLY
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Pedestrian Walkway
Site Access
0 5 10 20 30 40 50
Meters
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Scale: 1:1,000 (when printed at A3)
Legend
Habitat Trees (Jacobs BDAR 2022)
Site Access
Access Track Centrelines
Access Tracks
Disturbance Boundary
Project Site
Boorolong Frog 50 m Exclusion Zone
Access Track Zone
Ancillary Facility
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 19 of 26
DOCUMENT 0200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

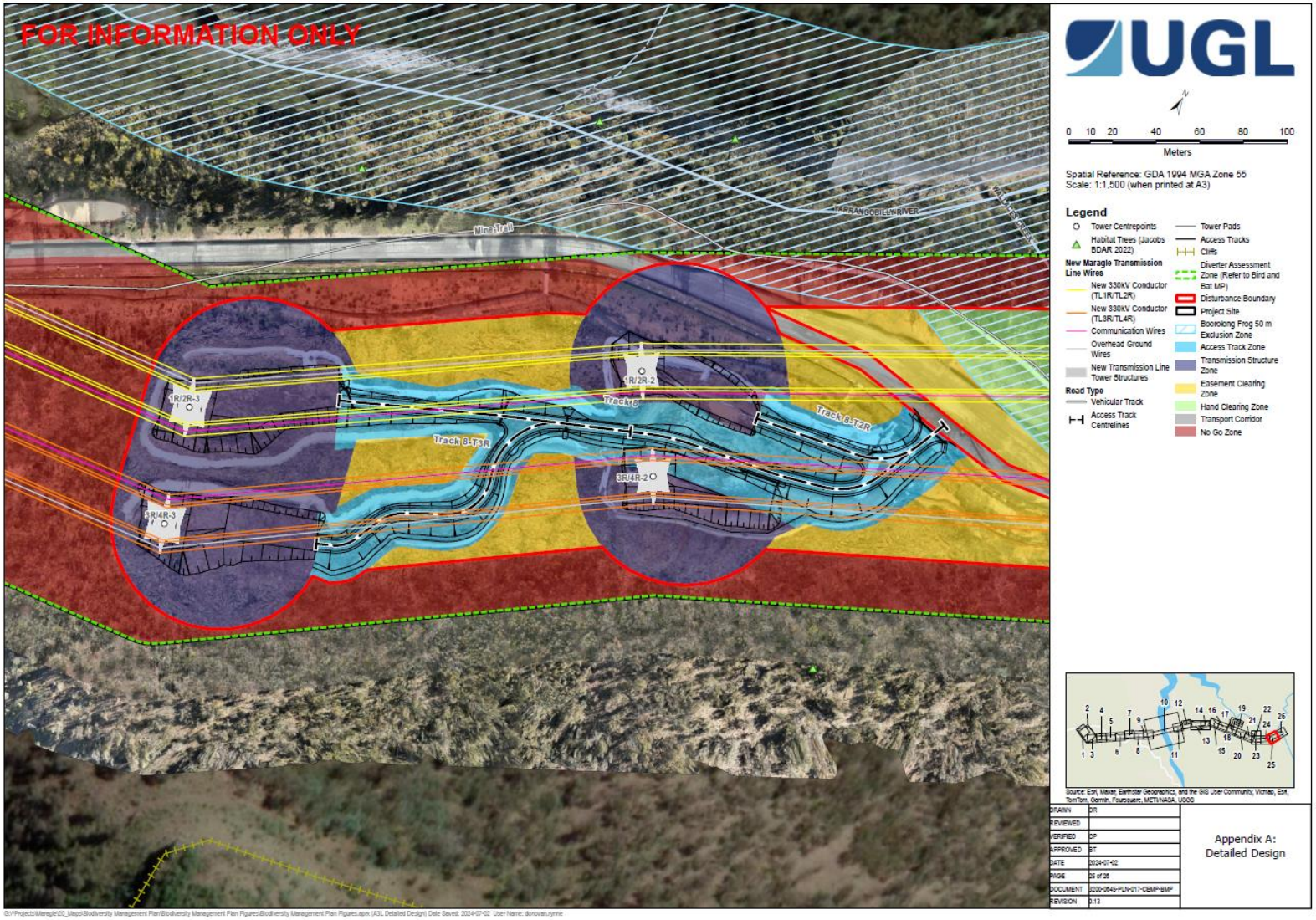

FOR INFORMATION ONLY
Lobs Hole Ravine Road
1R/2R-5
1R/2R-6
3R/4R-6
3R/4R-5
Track C
Track C
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
Rocky Outcrops
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Access Track Centrelines
Tower Pads
Access Tracks
Cliffs
Winch Brake Sites
Disturbance Boundary
Project Site
Caledenia Montana Habitat
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 20 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

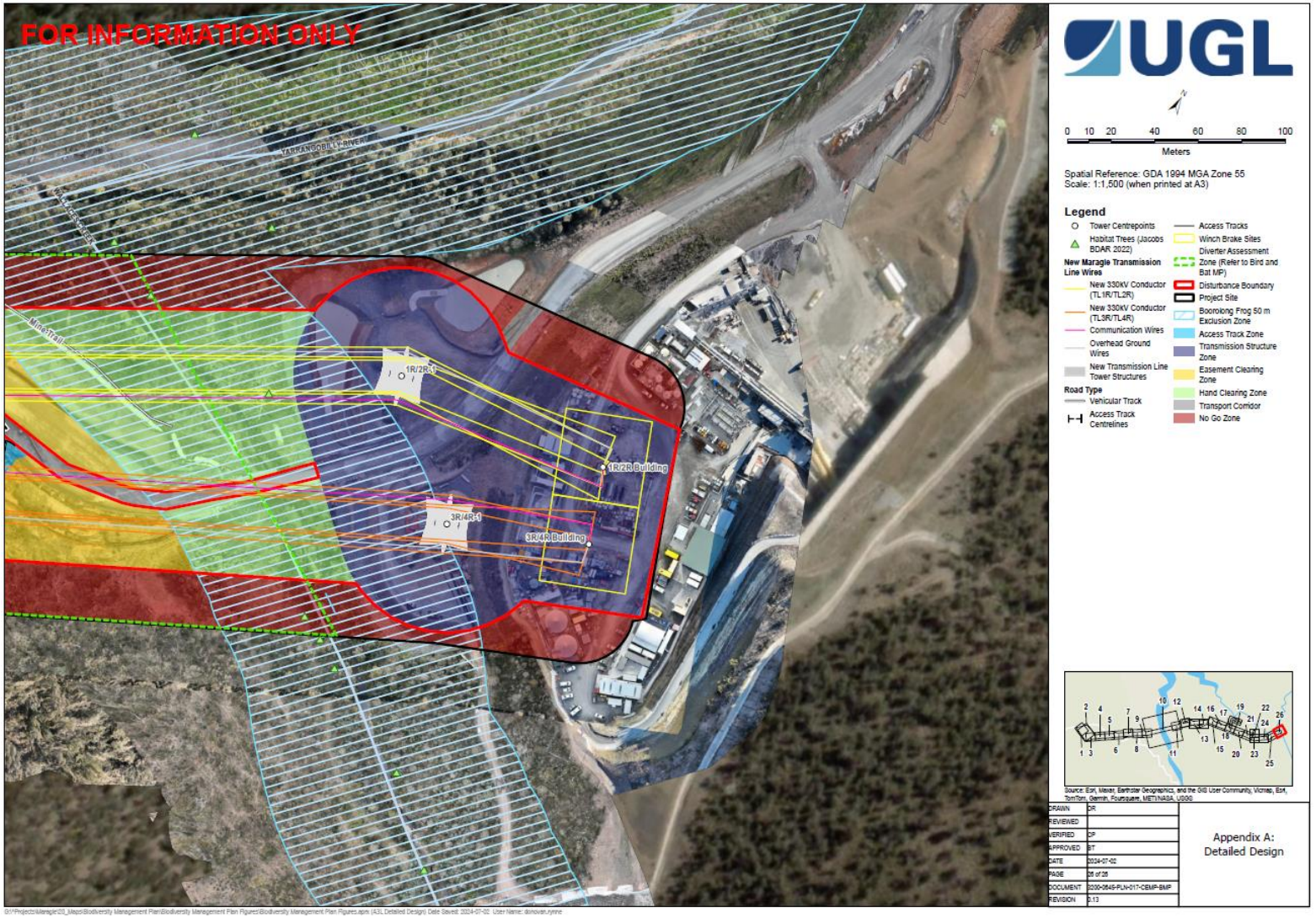

FOR INFORMATION ONLY
1R/2R-S
Track 6
3R/4R-S
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
New Maragle Transmission Line Wires
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New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Access Track Centrelines
Tower Pads
Access Tracks
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 21 of 26
DOCUMENT 3330-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design


FOR INFORMATION ONLY
Track 1
1R/2R-4
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
Rocky Outcrops
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New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Standard Road
Vehicular Track
Access Track Centrelines
Tower Pads
Access Tracks
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED BT
DATE 2024-07-02
PAGE 22 of 26
DOCUMENT 3330-0845-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design


FOR INFORMATION ONLY
Track 1
1R/2R-4
3R/4R-4
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
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Rocky Outcrops
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New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Vehicular Track
Access Track Centrelines
Tower Pads
Access Tracks
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
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Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 23 of 25
DOCUMENT 3200-0645-PLN-217-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design


FOR INFORMATION ONLY
1R/2R-3
3R/4R-3
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
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Communication Wires
Overhead Ground Wires
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Road Type
Vehicular Track
Tower Pads
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Booroolong Frog 50 m Exclusion Zone
Transmission Structure Zone
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Hand Clearing Zone
Hazard Tree Zone
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 24 of 28
DOCUMENT 2200-0545-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design


FOR INFORMATION ONLY
Mine Trail
TARRAN GOBILLY RIVER
1R/2R-3
1R/2R-2
Track 8
Track 8-T2R
Track 8-T3R
3R/4R-2
3R/4R-3
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
New Maragle Transmission Line Wires
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Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Vehicular Track
Access Track Centrelines
Tower Pads
Access Tracks
Cliffs
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 25 of 26
DOCUMENT 2230-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design


FOR INFORMATION ONLY
YARRANGOBILLY RIVER
Mine Trail
1R/2R-1
1R/2R Building
3R/4R-1
3R/4R Building
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Habitat Trees (Jacobs BDAR 2022)
New Maragle Transmission Line Wires
New 330kV Conductor (TL1R/TL2R)
New 330kV Conductor (TL3R/TL4R)
Communication Wires
Overhead Ground Wires
New Transmission Line Tower Structures
Road Type
Vehicular Track
Access Track Centrelines
Access Tracks
Winch Brake Sites
Diverter Assessment Zone (Refer to Bird and Bat MP)
Disturbance Boundary
Project Site
Booroolong Frog 50 m Exclusion Zone
Access Track Zone
Transmission Structure Zone
Easement Clearing Zone
Hand Clearing Zone
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED BT
DATE 2024-07-02
PAGE 26 of 26
DOCUMENT 0200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Appendix A:
Detailed Design

APPENDIX B Clearing Procedure

Purpose

The purpose of this plan is to describe how PC will manage clearing activities, to minimise impacts on biodiversity during the construction phase, and through to ongoing vegetation maintenance requirements performed by Transgrid.

Approach

The Biodiversity Development Assessment Report (BDAR, Jacobs 2022) allocated seven distinct clearing zones across the Project's disturbance area. Each of these zones was attributed specific clearing requirements to minimise either indirect or direct impacts to surrounding vegetation and habitat as a result of clearing. These zones, and the corresponding clearing methodologies, are summarised below.

This clearing procedure has been prepared for construction. Operational vegetation maintenance will be detailed in an Operational Vegetation Management Plan (OVMP) prepared by Transgrid. The OVMP will specify the vegetation clearing requirements and methodology to enable retention of Vegetation Integrity scores, with a periodical management cycle expected to be each four to six years. This category of vegetation management is not discussed any further in this document (refer to the OVMP, once available).

All other native vegetation within the Project area is prohibited from being cleared and is represented by 'No Go Zones'. Additionally, no works are to occur outside the Project area.

As outlined in the clearing methodology, there are areas of partial and total clearing. Partial clearing is the removal of trees and shrubs with the potential to grow above 4m tall and allowing regeneration of vegetation less than 4m tall. These are areas that do not need to be fully impacted by construction but require vegetation to be maintained during operation (i.e. under the transmission line). Partial clearing is required in areas defined by ECZ, HCZ, HTZ and TSZ (outside of civil work areas). Specific measures outlined in this clearing procedure are to be implemented to minimise the impact on the vegetation that is to be retained within the partial clearing zones (i.e. shrubs and groundcovers). Total clearing is the removal of all vegetation within an area required to make way for new infrastructure, tensioning purposes, laydown or for safety reasons. They have been assessed and direct impacts have been offset. Total clearing is required in zones TSZ (within civil works areas), ATZ and SZ. The clearing zones including partial and total clearing zones will be distinguished onsite by different coloured visibility flagging (refer to flagging protocol below).

Clearing Zone Methodologies

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
Transmission Structure Zone (TSZ) – within Civil Works Areas/Construction Benches		X	Complete vegetation clearing (clearing to bare earth) to facilitate the formation of level crane/construction benches, machine/vehicle access and tower foundations (Civil Works Areas) and expedite the safe construction of the transmission structures.	Due to the variable terrain, the majority of TSZs will require complete removal of vegetation (including root balls). Vegetation will be removed by either being 'pushed' out, or removed by forest harvester, and stumps grubbed out (where required). Trees will only be pushed out where there will be negligible impacts to areas outside the TSZ civil works areas. Root ball removal must not impact areas outside the TSZ. Root balls/stumps can be left in situ should this align better with construction objectives. Felled vegetation will generally be mulched onsite (such as with a tub grinder) and mulched material will be used for erosion and sediment control (i.e., mulch berms or a mulch blanket - refer to the Erosion and Sediment Control Plans for more detail). Mulch utilisation in this manner will aide immediate site stabilisation and enhance site rehabilitation: • Mulched material will be evenly spread on bare, or disturbed ground, at a maximum 50mm thickness. Excess mulch will be spread onsite or temporarily stored within the Substation Zone. No mulch will be stockpiled outside of the total clearing zones. Excess mulch will be subject to movement limitations in accordance with weed and pathogen restrictions, and relevant waste regulations

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
				• Where grasses or ground cover exists, care will be taken to avoid mulch from smothering existing plants Any salvaged weed free topsoil will be stockpiled where it is generated, for later use in site rehabilitation. Stockpiles will be located within total clearing zones only. The Project Ecologist will identify tree barrels with habitat features (such as hollows) will be removed and retained. Tree barrels that include hollows will be removed and retained. Tree barrels will be relocated to the edge of the easement and suitably placed. A seed collection program will be developed and implemented prior to vegetation clearing, to ensure native (and endemic) seed stock is salvaged for revegetation. Any areas in the TSZ not required for a safe work / construction bench / access track, will be cleared and managed as ECZ (refer to below).
Transmission Structure Zone (TSZ) – outside Civil Works Areas/Construction Benches/Access Tracks	X		This is the 50m radius around the TSZ Civil Works Areas / Construction Pads outlined above, it comprises of an assumed 50m radius surrounding each individual transmission structure, for the extent of the transmission line connection.	These areas will be cleared as per the ECZ clearing methodology (refer to below)

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
Access Track Zone (ATZ)		X	This area is the corridor that will be cleared to make access tracks to the transmission structure locations. A maximum (worst case) 30m width has been assumed, including the required cuts/fill along the steep sections of the access track route. Only the vegetation required to be cleared to construct the access track will be undertaken.	Vegetation clearing for the access tracks will utilise similar methods as for the TSZ. Construction of the access tracks will be progressively staged, such that clearing areas can be tailored, and mulch generated for erosion and sediment control. Manual felling of trees may be carried out in the steeper sections of the access track route, where the safety risks associated with using machines is too high. Whilst a 30m wide fully cleared corridor has been assumed, this is the worst-case disturbance to construct the tracks. The 'as built' access track width will be 4m to mineral earth i.e., trafficable surface (minimum) with 1-2m either side cleared to facilitated safe access/egress. Refer to Appendix A for the Project detailed design. Mulch and topsoil management and salvaged habitat features will be undertaken as per the TSZ within Civil Works Areas (1a). As such, the areas external to the operational access tracks (including the batters where practicable) will be stabilised and revegetated in accordance with an approved Rehabilitation Management Plan.

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
Easement Clearing Zone (ECZ) – machine accessible	X		Is defined as the vegetation zones along the transmission line easement which will require clearing and ongoing maintenance of tall growing vegetation which may intrude on the Vegetation Clearance Requirements at Maximum Line Operating Conditions (i.e. maximum conductor sag and maximum conductor blowout) at that location now, or at any time in the future. To minimise impacts on biodiversity and ground stability within this zone, ground cover vegetation will be retained, with partial mid-story removal required, along with complete removal of the canopy layer (as per Transgrid's Maintenance Plan – Easement and Access Tracks, December 2020).	ECZ vegetation will be removed and managed by a variety of methods, which will primarily be determined by: • Vegetation type and structure • Slope and terrain and/or • Environmental and ecological constraints. In areas of the ECZ that cannot be accessed safely or practically for machine clearing (i.e. unable to manoeuvre and operate machinery on steep slopes / terrain etc), the removal and management of vegetation will be undertaken by hand clearing (felling) - refer to HCZ below. In areas safely accessible to a machine, smaller trees (or other tall growing vegetation) <200 mm DBH will be removed using an excavator-mulcher to mulch from the top down (or an equivalent methodology). Vegetation over 200 mm DBH will be removed using a forest harvester type machine (or similar), noting that tree branches or the canopy may be mulched in-situ. The tree trunks will either be: • Mulched for erosion or sediment control, and rehabilitation • Relocated to the edge of the easement (where it is operationally safe to do so) and retained as fauna habitat. Coarse woody debris (like felled timber or habitat trees) will not be placed under the

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
				conductors, or near towers due to the safety and bushfire risks associated with the operation of the transmission line. Where practicable, felled trees will be moved into adjoining retained vegetation or placed strategically within the easement to provide connected habitat for ground-dwelling fauna. • Re-used by FCNSW/NPWS (pending negotiations prior to clearing) Shrubs and vegetation with growth potential to below 4m will be left intact, and unimpacted as best as practicable. The use of machine clearing is likely to cause disturbance to shrubs and ground cover, however careful management and supervision of these operations will be undertaken to minimise such impacts, like utilising the same route in and out of the area (refer to BMP and clearing procedure below for mitigation measures). It is noted that whilst some impacts to all vegetation strata may occur (due to the densely forested nature of the Project area), natural regeneration is expected to occur rapidly. In addition, the heavily impacted areas will be rehabilitated in accordance with the Rehabilitation Management Plan.

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
Hand clearing zones (HCZ) (referred to as ECZ – Steep / constrained areas in BDAR (2022)	X		This zone is defined by areas of the ECZ (described above) that are not safe or reasonably accessible for machine clearing during construction. The removal or management of vegetation in this zone will be undertaken by hand clearing / felling.	In areas of the ECZ that are not safe or reasonably accessible for machine clearing during construction, removal or management of vegetation will be undertaken by hand clearing / felling. Felled trees will remain where they fall with the crowns / heads intact so far as to prevent rolling.
Substation Zone (SZ)		X	This zone will be cleared and permanently modified by surface stabilisations (such as concrete, bitumen, crushed rock or similar) to support construction and installation of the 500/330 kV switchyard and associated buildings. This area also incorporates the Substation access road and Substation Asset Protection Zone.	Vegetation clearing within these areas will utilise similar methods as for the TSZ Felled vegetation will generally be mulched onsite (such as with a tub grinder for stockpiled mulch, or with a grooming head for distribution across the Asset Protection Zone). Mulched material will be used for erosion and sediment control (refer to the Erosion and Sediment Control Plans for more detail). Applied mulch will also benefit stabilisation of disturbed areas, and enhance rehabilitation outcomes: • Mulched material will be evenly spread on bare, disturbed or exposed areas to a maximum 50mm

Clearing zone name	Partial clearing	Total clearing	Description	Clearing methodology
				thickness. Excess mulch will be spread onsite or used within the Substation Zone. No mulch will be stockpiled outside of the total clearing zones. • Where grasses or ground cover exists, care will be taken to avoid mulch from smothering existing plants (refer to separate Rehabilitation Plan for more detail). Any salvaged weed free topsoil will be stockpiled for later use in accordance with the approved Rehabilitation Management Plan. Stockpiles will be located within total clearing zones only. Large felled trees / habitat trees suitable for re-use as habitat features, will be placed at the edge of the Asset Protection Zone or easement (refer to the OVMP, when available).
Hazard Tree Zone (HTZ)	X		Areas external to the ECZ, but within the Project area which contain trees of a sufficient height which, if they were to fall, would strike the overhead conductors or the transmission structures (referred to as Hazard Trees). Hazard trees pose a considerable bushfire risk, and risk to the asset, therefore require management or removal as part of the initial construction of the line, and during ongoing operation.	During construction the identified hazard trees will be individually felled or pruned by hand due to the assumed safety risks of utilising machinery in these sections (steep slopes/ terrain). Pruning may occur by climbing, or by use of an EWP with all safety requirements adequately addressed. Careful consideration must be given to ensure that only hazard trees within the permitted disturbance area are impacted by clearing activities.

Threatened Species Breeding Habitat

Based on the Project's clearing timeframe (October 2023 to November 2024), the following hollow- dependent fauna breeding periods can be avoided:

- Masked Owl – outside May to August

However, pre-clearance surveys for the Masked Owl will need to be undertaken to identify any nest trees within the site and ensure all fledglings have left the nest trees.

It is identified that the breeding periods for the following won't be able to be avoided. Pre-clearance surveys, nest tree buffers and staged clearing measures will reduce the potential risk on these species:

- Gang-gang Cockatoo – outside October to January
- Eastern Pygmy-possum – outside Spring to Autumn
- Yellow-bellied Glider – outside November to May.

Surveys and clearing measures are detailed in the clearing procedure below. Also refer to the Yellow- Bellied Glider Management Strategy of the BMP.

Booroolong Frog habitat and riparian areas

There are portions of Booroolong Frog habitat that require vegetation removal to enable construction of the Project. These areas are known as the Booroolong Frog 50m exclusion zones, but have been approved for works with impacts to the Booroolong Frog having been offset. These areas specifically include:

- **Areas of partial clearing** required along Lick Hole Gully, Cave Gully and Wallace Creek. These areas will follow the steps described under the ECZ as HCZ
- **Areas of total clearing** (clearing to bare earth) are required near Sheep Station Creek and Wallace's Creek. The total clearing near Sheep Station Creek is to enable the development of an access track (refer Appendix B.4 Clearing zone maps). Vegetation clearing in this zone will follow that described for the ATZ. The other area of total clearing is required to the east of Wallace's Creek (refer Appendix B.4 Clearing zone maps). Vegetation clearing in this zone will follow that described for the TSZ.

Due to the risk of direct and indirect impacts from sedimentation at these locations, improved sediment control measures will be applied and are outlined in a Soil and Water Management Plan (Progressive ESCPs). The SWMP will ensure protection of aquatic habitat in the tributaries the Project intersects, with particular focus on protecting the habitat for the Booroolong Frog known to inhabit these riparian areas.

Opportunity for salvage of resources and features relevant to these areas (as driven by COA B21 and BMP19) will be strategically applied, and mindful of not causing adverse impacts to these sensitive receiving environments. Criteria for salvage and application in and around Booroolong Frog 50m Buffer Zones will be;

- No salvage or placement of resources from or within non-impacted Booroolong Frog Zones
- No salvage or placement of resources that has the potential to impact stream flow

characteristics or flow rates

- Retention and ecologist supported placement of selected tree hollows to the boundary of impacted Booroolong Frog Zones
- Ecologist supported replacement of any large rocks to the boundary of impacted areas (and not within the stream bed); and
- Species targeted seed salvage to support rehabilitation of impacted Booroolong Frog Zones

The remaining riparian areas including the Booroolong Frog 50m Buffer Exclusion Zones are not to be impacted by the Project and are identified as No-Go Zones.

Rocky Outcrop Avoidance Zone

The BDAR (Jacobs, 2022) identified the requirement to avoid damage to sections of rocky outcrops, large boulders, piled rock, and rock features through micro-aligning the Project's disturbance footprint around these habitat structures. These structures are generally situated towards the edge of the Project boundary or underneath proposed transmission lines, and therefore avoiding ground disturbance in these areas is considered in the most part to be achievable. Some areas have already been avoided during the detailed design process (refer to Appendix A). Further areas of avoidance will be identified during the pre-clearance surveys by the Project ecologist and advised to the clearing Supervisor for attention.

Flagging protocol

Different coloured marker posts and/or flagging will be used onsite to identify boundaries including the clearing boundaries, clearing zones and No-Go Zones. Boundaries will be marked by a qualified surveyor. The following marker protocol is proposed by PC for use on the Project:

- Red – clearing limit boundary
- White – daily clearing limit
- Blue – heritage exclusion zones
- Green – biodiversity No-Go zones or features

In addition to the flagging, operators and on-ground staff will utilise GPS information to confirm boundaries.

Clearing procedure

The Project's construction clearing procedure, including the clearing methodology, is outlined in the flowchart and table below. The clearing procedure refers to the following items provided in the appendices for implementation:

- Pre-clearing checklist (Appendix B.2) – to be completed by the Project Ecologist prior to clearing, and will inform the pre-clearing reports
- Post-clearing checklist (Appendix B.3) – to be completed by the Project Ecologist during clearing, and will inform the post-clearing reports
- Clearing zone maps (Appendix B.4) – specifies the clearing zones outlined in this Procedure
- Plant Community Type (PCT) Mapping (Appendix B.5) – mapped PCTs onsite,

required for the clearing permit, and to keep track of cleared areas against approved clearing areas.

- Threatened Species Maps (Appendix B.6) – mapped threatened species habitat to assist with pre-clearing surveys, and application of targeted species mitigation measures
- Clearing Permit (Appendix B.7) – checklist to be completed by the SEA, prior to clearing to ensure all measures have been implemented
- No-Go Zone Access Permit (Appendix B.8) – permit to be prepared by onsite staff to enter No- Go zones to undertake approved work.
- Permit register (Appendix B.8) – register of clearing permits
- Unexpected Threatened Species Procedure (Appendix D of the BMP) – to be implemented if unexpected threatened species are found at any stage during clearing activities
- Fauna Rescue and Relocation Procedure (Appendix C of the BMP) – to be implemented for the handling of fauna during clearing

Staged clearing

During the two-staged clearing process, as described in this Procedure, a number of options exist for the removal of trees, dependent on their size and the presence of habitat features such as hollows. The below table summarises these options and the removal and mulching treatments to be applied in each situation.

Staged clearing summary

Growth potential (m)	Habitat-bearing?	DBH (cm)	Removal stage	Other requirements
<4 (Partial Clear Zone)	No	-	N/A	
<4 (Full Clear Zone)	No	-	Stage 1 – to be mulched	-
>4 (Partial and Full Clear Zones)	No	-	Stage 1 – to be mulched	-
>4 (Partial and Full Clear Zones)	Yes	<130	Stage 2 – mark as ‘HBT’	Stage 2 clearing requirements apply but not necessarily limb by Limb.

Growth potential (m)	Habitat-bearing?	DBH (cm)	Removal stage	Other requirements
>4 (Partial and Full Clear Zones)	Yes	>130	Stage 2 – mark as 'LxL'	Stage 2 clearing requirements. Limb by limb removal required unless unsafe. Ecologist support required.

The use of a mulching head will only be permitted on non-habitat limbs, regardless of vegetation classification.

Clearing Permit process

Prior to clearing, a Clearing Permit will be prepared and approved for a dedicated portion of the Project. The Clearing Permit is provided in Appendix B.7. The purpose of the Clearing Permit is to ensure that all required pre-clearance surveys, mitigation measures, SEPs, toolboxes and inductions have been fulfilled prior to clearing. The permit is prepared by the SEA and Project Ecologist signed off by the Clearing Supervisor, then submitted to Transgrid for approval.

It is during the clearing process that areas of clearing will be surveyed and recorded, this includes the total area to be cleared, and a breakdown of the zones (i.e. partial and total), the impact disturbance on PCTs, and threatened species habitats. These areas will be then used to check against the approved clearing areas as described below. This will assist with the post-clearing check of cleared area vegetation integrity scores.

Approved clearing limits

Species Habitat	Full loss (ha)	Partial loss (ha)	Total impact (ha)
Caladenia montana species habitat	NA	NA	9.35
Gang-gang Cockatoo (breeding) species habitat	NA	NA	89.06
Masked Owl (breeding) species habitat	NA	NA	10.86
Eastern Pygmy-possum species habitat	NA	NA	117.29
Yellow-bellied Glider species habitat	NA	NA	59.03
Booroolong Frog species habitat	NA	NA	1.67
SPECIES HABITAT TOTAL	NA	NA	287.26

PCT Type	Full loss (ha)	Partial loss (ha)	Total impact (ha)
PCT 285: Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	2.2	-	2.2
PCT 296: Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	8.13	10.89	19.02
PCT 300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	14.86	17.14	32.01
PCT 302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	0.58	1.75	2.34
PCT 729: Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	14.06	12.89	26.94
PCT 999: Norton's Box - Broad-leaved Peppermint open forest on foot slopes, central and southern South Eastern Highlands Bioregion	6.13	2.46	8.60
PCT 1196: Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion.	24.93	2.31	27.24
PCT TOTAL	70.90	47.45	118.35

Disturbance Area and Native Vegetation	Kosciuszko National Park (ha)	Bago State Forest (ha)	Total impact (ha)
Maximum Disturbance Area	81	44	**125**
Maximum Native Vegetation Full Clearing	37	34	**71**
Maximum Native Vegetation Partial Clearing	38	9.2	**47.2**

Training

All on-site personnel shall be informed through the site-specific induction, prestart briefing or other targeted training of the set clearing limits and the significance of the surrounding environment. Site Environmental Plans (SEPs) will be referred to during all vegetation clearing activities and presented and discussed as part of the induction process.

All personnel involved in the clearing activities will be subject to toolbox training, which discusses the following;

- areas authorised for clearing,
- the different zone types of clearing,
- the Clearing and Grubbing Environmental Work Method Statement (EWMS),
- the intended clearing plan for the day (which zone, the methods approved, and prohibited activities),
- limits of clearing,
- known or potentially occurring threatened species, and a brief explanation of applicable threatened species, and
- No-Go Zones within and adjacent to the construction areas.

Reporting

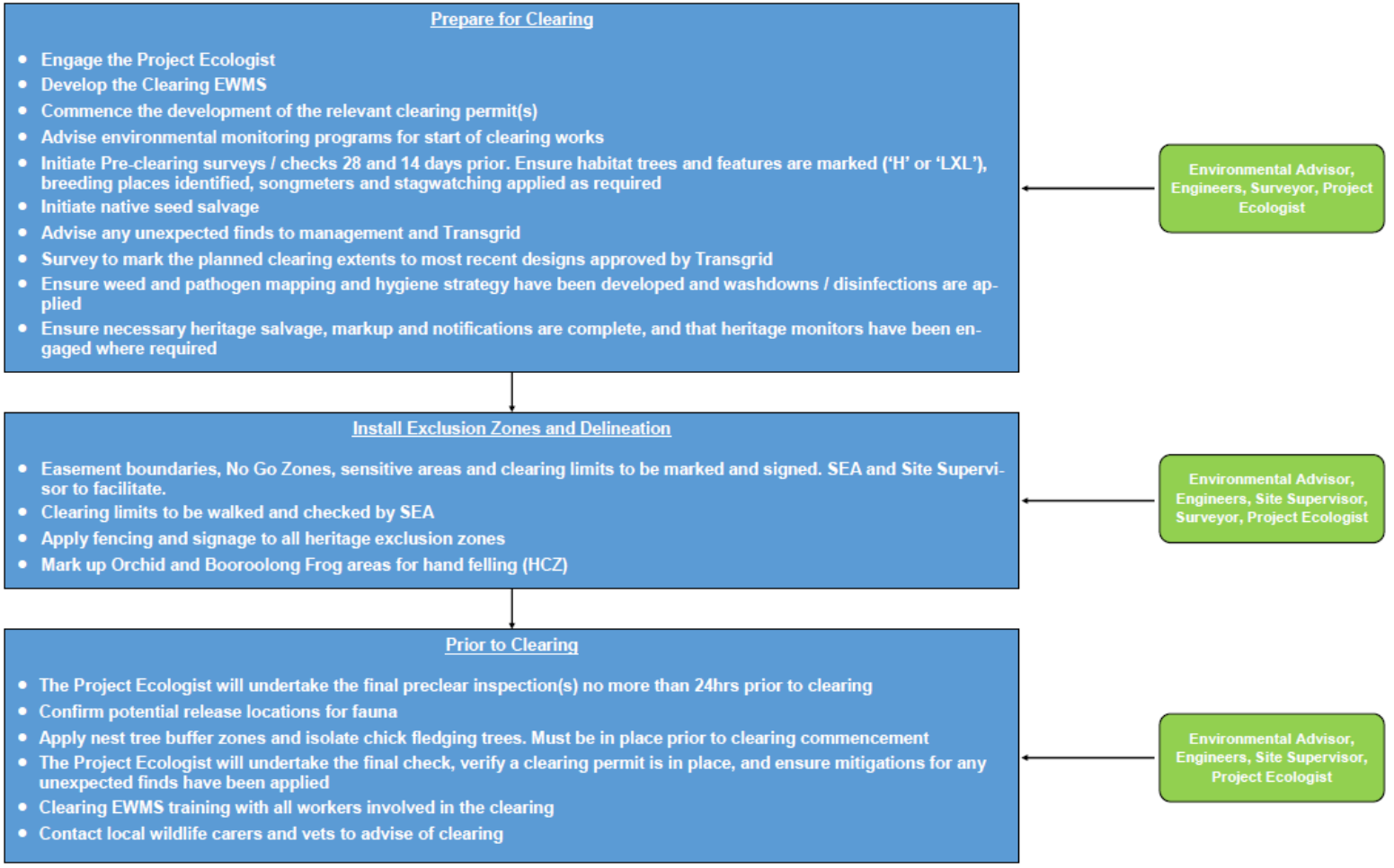
The following reporting requirements will be undertaken for clearing:

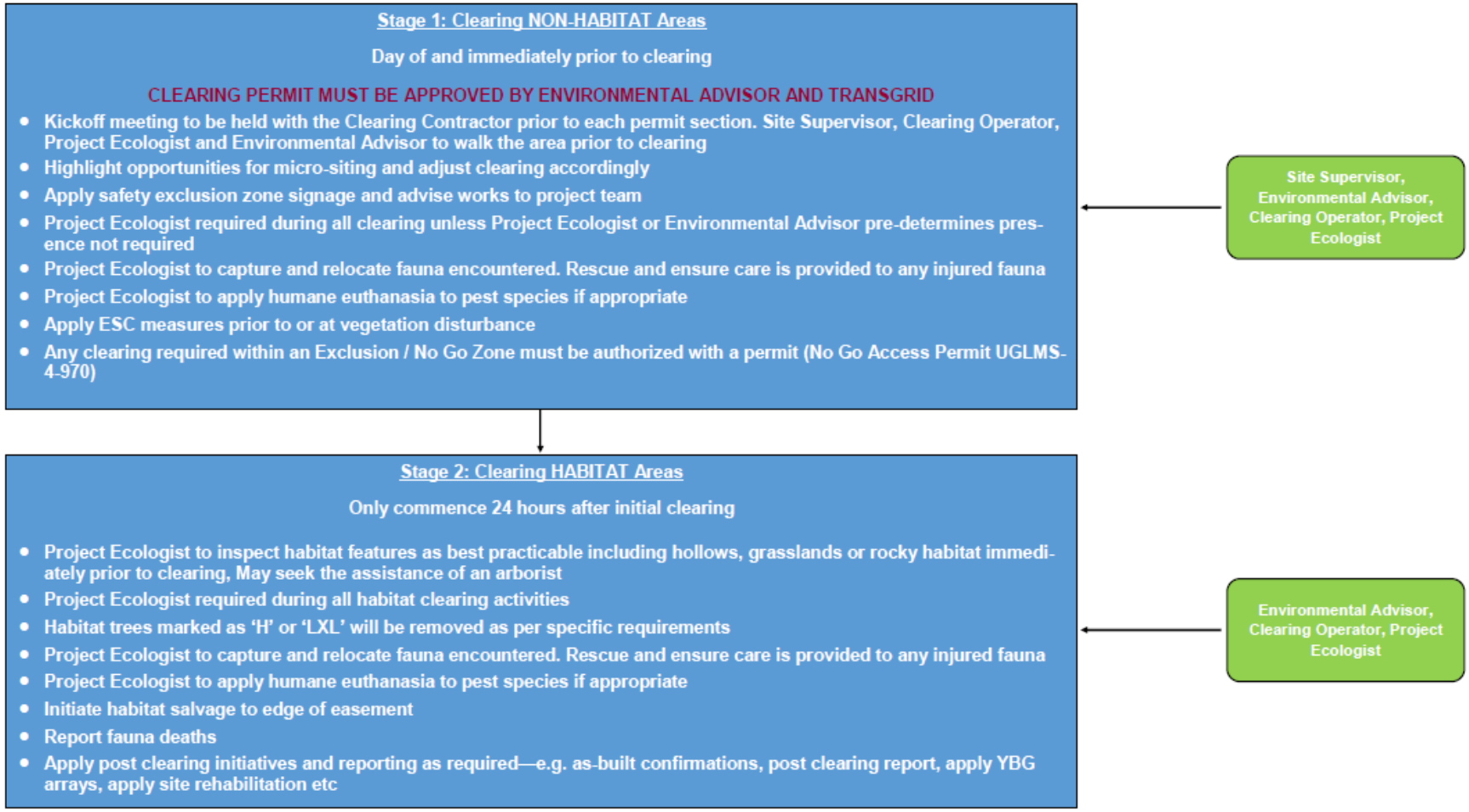
- Pre-Clearing Report - At the completion of the pre-clearing surveys, a report will be compiled of all the data and activities completed during the survey. The report will utilise the data collected via the pre-clearing checklist (Appendix B.2)
- Post-Clearing Report - Project Ecologist (BAM accredited) will survey the cleared area using the checklist attached (Appendix B.3) and compile a post-clearing survey report.

Both reports will be provided to RDD, NPWS, FCNSW and AG DCCEEW, as soon as possible when complete.

Clearing Procedure summary

The below outlines the Project clearing procedure for construction to be implemented by PC.




Stage 1: Clearing NON-HABITAT Areas
Day of and immediately prior to clearing
CLEARING PERMIT MUST BE APPROVED BY ENVIRONMENTAL ADVISOR AND TRANSGRID
Kickoff meeting to be held with the Clearing Contractor prior to each permit section. Site Supervisor, Clearing Operator, Project Ecologist and Environmental Advisor to walk the area prior to clearing
Highlight opportunities for micro-siting and adjust clearing accordingly
Apply safety exclusion zone signage and advise works to project team
Project Ecologist required during all clearing unless Project Ecologist or Environmental Advisor pre-determines presence not required
Project Ecologist to capture and relocate fauna encountered. Rescue and ensure care is provided to any injured fauna
Project Ecologist to apply humane euthanasia to pest species if appropriate
Apply ESC measures prior to or at vegetation disturbance
Any clearing required within an Exclusion / No Go Zone must be authorized with a permit (No Go Access Permit UGLMS-4-970)
Site Supervisor, Environmental Advisor, Clearing Operator, Project Ecologist
Stage 2: Clearing HABITAT Areas
Only commence 24 hours after initial clearing
Project Ecologist to inspect habitat features as best practicable including hollows, grasslands or rocky habitat immediately prior to clearing, May seek the assistance of an arborist
Project Ecologist required during all habitat clearing activities
Habitat trees marked as 'H' or 'LXL' will be removed as per specific requirements
Project Ecologist to capture and relocate fauna encountered. Rescue and ensure care is provided to any injured fauna
Project Ecologist to apply humane euthanasia to pest species if appropriate
Initiate habitat salvage to edge of easement
Report fauna deaths
Apply post clearing initiatives and reporting as required—e.g. as-built confirmations, post clearing report, apply YBG arrays, apply site rehabilitation etc
Environmental Advisor, Clearing Operator, Project Ecologist

Official

Clearing Procedure

Timing	Procedure
Pre-construction	• A Project Ecologist will be engaged for vegetation clearing. • A clearing EWMS will be developed for each of the clearing zones identified above. • A seed collection program will be developed and implemented prior to vegetation clearing, to ensure native (and endemic) seed stock is salvaged for revegetation.
28 days (4 weeks) prior to clearing	**Assessment of HBTS for Owls** • Songmeters will be placed underneath a tree within the centre of an identified cluster of potential Masked Owl nest trees for a period of four weeks before planned clearing. The songmeters will be placed a maximum of 200 m apart within the Masked Owl threatened species habitat of the Project area (as defined by the species polygon defined in the BDAR). • Within the last two weeks of the songmeters monitoring, stagwatching will be undertaken targeting potential nest trees based on the results of the first two weeks of songmeters, or other physical signs of tree use. Stagwatching will be undertaken an hour before dawn and an hour before and after dusk for a minimum or two nights. • Stagwatching is not required for Masked Owl in the absence of potential nest trees as determined by the results of the songmeters monitoring or other physical signs of tree use. • If nesting owls are present, the tree is to be clearly marked as an Environmental Protection: No Go Zone (Exclusion Zone) and removal of the tree must be delayed until the chicks have fledged (10-12 weeks). There is to be no disturbance within 50 m of the tree, and fencing/ flagging will be established to demarcate this buffer. Disturbance between 50 – 100 m is to be minimised a far as reasonably practicable also. • Where site conditions prevent safe access for the ecologists to access a potential Masked Owl nest tree at night, a 50m No Go Zone (Exclusion Zone) will be established around the potential Masked Owl nest tree. The dawn and dusk survey will then be completed once safe access to the exclusion zone (i.e. vehicle access) has been established for the nocturnal surveys.

Timing	Procedure
	Assessment of HBTs for Gang-gang Cockatoos • Songmeters will be placed underneath a tree within the centre of an identified cluster of potential Gang-gang Cockatoo nest trees for a period of four weeks before planned clearing. The songmeters will be placed a maximum of 200m apart within the Gang-gang Cockatoo threatened species habitat of the Project area (as defined by the species polygon defined in the BDAR). • Within the last two weeks of the songmeters monitoring, stagwatching will be undertaken targeting potential nest trees based on the results of the first two weeks of songmeters. Stagwatching will be undertaken during the day for cockatoo activity • If nesting birds are present, the tree is to be clearly marked an Exclusion Zone (buffer 100m of the tree) will be established, using high visibility fencing/ flagging removal of the tree must be delayed until the chicks have fledged (10-12 weeks). Disturbance up to 200m from the tree is to be minimised as far as reasonably practicable.
14 days (2 weeks) prior to clearing	**Delineation of Clearing Permit Zone** Install the site boundary to demarcate the clearing permit zone with fencing and signage to restrict access and protect vegetation to be retained. Specifically: • The clearing limit boundary and clearing zones (partial and total clearing) will be marked on site by a surveyor before vegetation clearing commences. • The edge of the clearing limit boundary will be demarcated with marker posts and / or rope, flagging, bunting or other similarly robust and durable material • No-Go Zones will be established at the edge of the clearing zones, prohibiting access and any damage to vegetation retained on the other side of the boundary. • Highly visible fencing will constitute rope, flagging, bunting or other similarly robust and durable material • Signage shall be clear and simple in nature, for example 'No-Go Zones', and adequately sized so it can be seen from a distance of at least 20m • Place No-Go Zones high visibility fencing outside tree protection zones If the tree protection zone cannot be avoided during works, the Structural Root Zones (SRZ) of trees will be suitably managed. • Ensure such fencing is maintained (inspected as part of the weekly environmental inspection and repaired as needed). • Ensure No-Go Zones are marked on a SEPs and listed in the EWMS.

Timing	Procedure
	Installation of Booroolong Frog Exclusion Zone • The Booroolong Frog Exclusion Zones will be marked by a surveyor (refer Booroolong Frog Monitoring Program for Exclusion Zone maps and Appendix B.6 Threatened species maps). • The Booroolong Frog Exclusion Zones will be fenced / flagged by the Project Ecologist and demarcated uniquely to distinguish it from other fencing / flagging • The 50m frog Exclusion Zone will be retained (and maintained) for the construction of the transmission line. This will remain in place until rehabilitation objectives for areas upstream have been met, and slopes have been stabilised. **Delineation of Rocky Outcrop Avoidance Zones** • The occurrences of rock outcrops, large boulders, piled rock, and rock features within the disturbance area will be demarcated by the Project Ecologist. • A site inspection with the PC Construction Manager, SEA, Clearing Supervisor or delegated other will be carried out, and areas within this zone shall be discussed for retention. • Where disturbance is unavoidable, the area will be minimised and demarcated with non-permanent spray paint to clearly identify the areas authorised to be disturbed. • The rocky features spray painted for disturbance will then be checked to ensure any fauna species have vacated the area of their own accord. This will be undertaken, subject to the pre-clearance steps detailed in the sections below. **Delineation of *Caladenia montana* patches** • Patches of the orchid *Caladenia montana* (Appendix B.6) located within the partial clearing zones (ECZ, HCZ, HTZ and TSZ (outside of civil works areas)) will be demarcated onsite by the Project Ecologist. • Hand clearing will be undertaken in the demarcated *Caladenia montana* areas, to reduce impacts on the individuals. **Undertake Targeted species searches** The Project Ecologist(s) shall conduct pre- clearing surveys based on predicted species to occur in the Project area. • Physically mark any important habitat features with flagging/non-permanent spray paint suspected to be utilised by significant species in the area and record GPS coordinates of each biodiversity feature. Important habitat features include: ○ Large active stick nests

Timing	Procedure
	○ Hollow-bearing trees ▪ HBTs with a diameter at breast height (DBH1) of >130cm that also contain dead wood / old branch stubs in the canopy shall be marked for 'limb by limb' (spray-painted 'LxL' or similar) removal treatment ▪ HBTs that are smaller (trunk <130cm DBH, and / or do not contain dead wood / old branch stubs / or inaccessible by EWP in the canopy) shall be marked as 'Hollow Bearing' (spray-painted 'H' or similar) ▪ If hollows are active at the time of inspection ○ Yellow-bellied Glider den trees and sap trees (i.e. presence of a v-notch) ○ Active nesting/breeding sites (dens, drays, nests etc.) ○ Threatened species habitat (as evidenced by scratchings, scats etc) ○ Unexpected threatened species habitat (in accordance with the Unexpected Threatened Species Finds Procedure). • Targeted searches will also be undertaken for weed species, to ground truth the extent of weed occurrences within the Project area. **Establishment of biodiversity controls** The Project Ecologist will: • Identify suitable fauna release locations that occur outside the Project area, in accordance with the Fauna Rescue and Release Procedure (Appendix C of the BMP) and in consultation with NPWS if required. • Make contact with the local vet and / or wildlife carer to ensure wildlife carers are available in the event native fauna are found and require capture (contact details outlined in the Fauna Rescue and Release Procedure, Appendix C of the BMP). • Identify trees that will be retained that require protection from damage. Establish Tree Protection Zones around these trees in accordance with Protection of trees on development sites (AS4970 2009) **Clearing permit** • The SEA will commence the clearing permit process (Appendix B.7). This includes way pointing and producing a map that displays the start and end point of the clearing permit and any clearing zone boundaries within the permit area (i.e. total or partial clearing zones). The map is to be attached to the clearing permit.

Timing	Procedure

No more than 24 hours before planned clearing	**Pre-clearance surveys**
	No more than 24 hours before clearing using the checklist attached as Appendix B, the following will occur:
	• Boundaries for construction, clearing and Exclusion Zones will be confirmed.
	• The Ecologist will check marked habitat trees and features within the works area are correctly marked.
	• Fauna relocation will take place, refer to Appendix C.
	• Booroolong Frog:
	  ○ Any aquatic habitat features (rocks, logs) that are required to be removed will be salvaged for rehabilitation within riparian areas.
	• Yellow-bellied Glider and Greater Glider habitat:
	  ○ Inspect potential glider den/sap trees during limb-by-limb clearing are to determine if live gliders are present.
	  ○ If gliders are determined to be present, or likely to be present, clearing must cease to allow time for fauna to vacate of its own accord (as outlined in more detail below, i.e., a two staged process, clearing nonhabitat vegetation first). The tree is to be clearly marked as an exclusion/no-go zone and demarcated with flagging.
	At the completion of the pre-clearing surveys a report will be compiled of all the data and activities completed during the survey. The outcomes of the pre-clearing inspections will be reported to RDD, NPWS, FCNSW and DCCEEW as soon as it is available. The report will include any recorded habitat features, fauna relocated or euthanised, including the name of qualified / licensed handler, species, location notes, and release location and method.

Clearing	Clearing will be undertaken in accordance with clearing zone methodologies. Additionally, only hand clearing will be permitted within the Booroolong Frog habitat and mapped *Caladenia montana* habitat (Appendix B.6 Threatened species maps). The Project Ecologist will complete Appendix B.2 Pre - Clearing Checklist. Vegetation removal shall be undertaken in a three-phased process: 1) Clearing of non-habitat vegetation 2) Intermittent 24hr “wait” period 3) Clearing of habitat All clearing activities shall follow the Vegetation Clearing Protocol steps, detailed below. Daily on-foot pre-clearing surveys by a Project Ecologist will be undertaken prior to commencement of daily construction, to ensure there is no wildlife present.

Timing	Procedure
	The following additional measures are to be implemented within the partial clearing areas (ECZ, HCZ, HTZ and TSZ (outside of civil works areas)) to minimise impacts on groundcover and shrubs: • Limit the number of machines and equipment required to access the zone • Machines are to track in and out along the same route • Bog mats are to be used in wet areas and removed at the end of each of day.

Staged Vegetation Clearing Protocol

Clearing stage	Details
Stage 1	**Non habitat vegetation removal** The following steps shall be undertaken: • Erosion and sediment controls shall be in place at the time of clearing where possible, or prior to each section being cleared where possible, and then installed progressively. • A Project Ecologist shall be present at all times for vegetation clearing activities, unless the Project Ecologist or SEA pre-determines their presence is not required. • Non-habitat vegetation can then be cleared. • All vegetation shall be positioned to be felled into the clearing zone. No vegetation disturbance shall occur to any No-Go Zones as a result of vegetation clearing. • Weed free felled vegetation shall be retained and mulched on site for use as either a groundcover, as erosion and sediment controls and / or stockpiled for later use in rehabilitation activities (refer to separate Rehabilitation Plan for further detail).
24hr "wait" period	Following the above steps, respite of at least 24 hours shall be provided between the initial disturbance and the final removal of habitat. The changed environment (removal of all non-habitat vegetation) along with the noise and vibration as a result of vegetation clearing will encourage resident fauna to relocate of their own accord. The timing should allow resident fauna at least 24hours after removal of non-habitat trees to vacate remaining habitat trees. Any species that require passive relocation will have appropriate procedures implemented in the event of their discovery onsite.

Clearing stage	Details
Stage 2	**Stage 2 – Habitat vegetation / tree removal** Marked habitat trees and other identified biodiversity features (as listed above in "Clearing Procedure" table) will be carefully removed i.e., habitat trees shall be carefully felled using a method that allows the trees to be brought to the ground with minimal impact: • Habitat features marked as "H" will be mechanically shaken or 'nudged' prior to felling to encourage any remaining animals to either leave, or at least attempt to leave and therefore become visible, to the Project Ecologist and be safely captured and released elsewhere in accordance with the Fauna Rescue and Relocation Procedure (Appendix C of the BMP). • Felled habitat trees will be systematically checked for any remaining fauna. If fauna is encountered, a Project Ecologist with experience in fauna handling should capture any animal that emerges, inspect it for injuries and, if uninjured, relocate it to predetermined fauna release areas; or if injured, refer it to a vet or wildlife carer for treatment in accordance with the Rescue and Release Procedure (Appendix C of the BMP). • Trees marked as 'LxL' (to demarcate those trees which have multiple hollows and potential hollows in limbs) will be inspected by the Project Ecologist via an elevated work platform (EWP) where possible. • Soft felling techniques are to be used for the sectional removal of habitat trees >130cm DBH. A range of measures can be applied, including the use of a mulching head and/or shears on an excavator to remove non-habitat limbs on standing trees. Such activity will be mindful that hollows and resident fauna will not be directly impacted by the operation. • Felled habitat trees will be left overnight to allow any undetected fauna further opportunity to escape. • Nests and on-ground logs will be carefully inspected by the Project Ecologist. Existing logs should be carefully rolled and inspected beneath the log for any fauna. Nest will also be inspected for any eggs and / or young with appropriate actions taken if encountered.

Clearing stage	Details
Post-completion of clearing	Post-clearing, a Project Ecologist (BAM accredited) will survey the cleared area using the checklist attached (Appendix B.3 Post - Clearing Checklist). A post- clearing survey report will be compiled, including: • The name and qualifications of the Project Ecologist present during clearing. • Records are to be kept of all fauna rescue events, including locations to where fauna have been relocated. GPS coordinates will be provided for such events. • An assessment of the habitat and handling of fauna. • Information on clearing operations, dates, procedures, areas. • Live animal sightings, captures, any releases (including GPS coordinates) or injured / shocked wildlife. • Any dead animals located. • Residual vegetation integrity scores. • Photographs of rescued fauna. The post clearing reports will be provided to RDD, NPWS, FCNSW and DCCEEW.

APPENDIX B.2 Pre-clearing Checklist

Inspection Date:	**Time:**
Project Ecologist:	

#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action	Verification/ Records
1	Boundary of clearing zone fenced / demarcated?			
2	Has the Project Ecologist completed Pre-clearing surveys for Threatened Species (including Masked Owl, Gang-gang Cockatoo, Eastern Pygmy-possum Yellow-bellied Glider)?			
3	Has the pre-clearance site check been completed in the morning prior to the commencement of the day's planned clearing?			
4	Has all fauna encountered been relocated outside the proposed impact footprint?			
5	Have all workers been shown the limit of clearing, advised of fauna handling procedures, and any other controls?			
6	Has the Project Ecologist marked habitats to be disturbed using the recognised colour coding protocol?			
7	Has protective fencing and appropriate signage been installed for No-Go Zones?			

#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action	Verification/ Records
8	Have hollow bearing trees been identified?			
9	Have hollow bearing trees been checked for resident animals? Record any species found and action taken.			
10	Has vegetation to be salvaged for re-use, been identified?			
11	Has all equipment been inspected for weed hygiene and cleaned to remove materials and debris prior to entering site?			
12	Are environmental control measures, including erosion and sediment controls, in place to prevent down- stream biodiversity impacts?			
13	Is a suitably qualified person present when necessary to supervise clearing works and relocate or rescue fauna as required?			

#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action	Verification/ Records
14	Hollows are to be felled 24 hours after the non-habitat vegetation has been cleared, then felled in a controlled manner and inspected by a suitably qualified ecologist or for the presence of fauna that needs to be relocated and / or has any potential injuries. All hollows that have the potential to support fauna and should be placed in adjacent habitat until the following day for further inspection by a suitably qualified ecologist to verify that no fauna is present. If possible, the hollows could be permanently relocated in adjacent areas. Has this been done?			
15	Retained logs outside of construction area to be checked for native fauna; any animals impacted by clearing works are to be relocated in accordance with the Project Fauna Rescue and Release Procedure within the BMP			
16	Any other comments or issues?			
Name (Environmental Advisor)			Signature	Date
Name (Project Ecologist)			Signature	Date

Official

APPENDIX B.3 Post-clearing Checklist

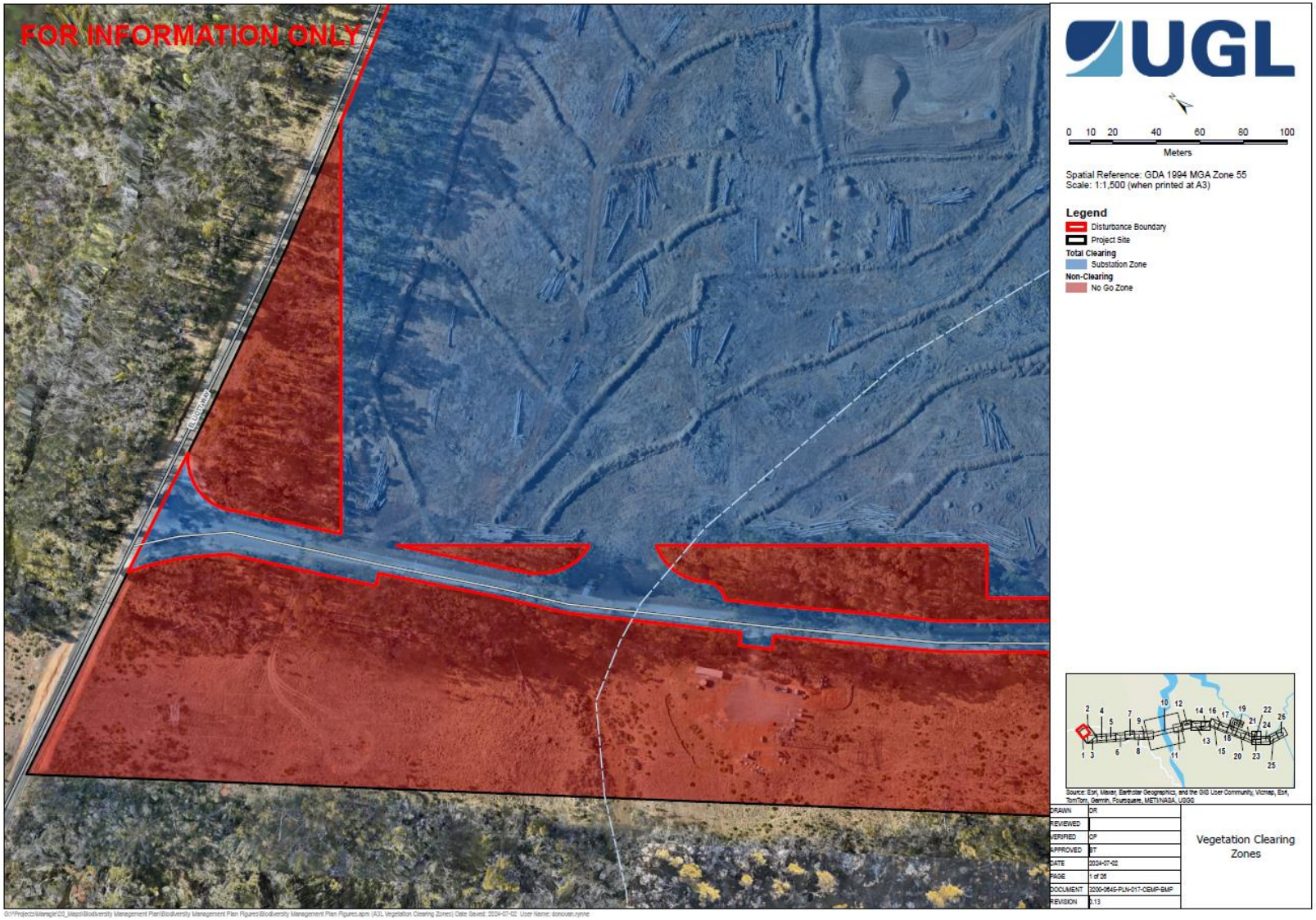
Inspection Date:	**Time:**
Project Ecologist:	

#	Control Measure	Status (Yes/ No/ NA)	Comments/ Corrective Action	Verification/ Records
1	Was clearing of vegetation within the boundaries?			
2	Were any hollow-bearing trees, hollow logs and / or rocky habitat impacted?			
3	Were any fauna, nests or other fauna features impacted? Record details including species and type and size of features			
4	Were any animals shocked, injured or killed as a result of the clearing works? Refer to Fauna Rescue Event Form			
5	Were the fauna recovery procedures followed? If yes, what actions were taken?			
6	Any other comments or issues?			

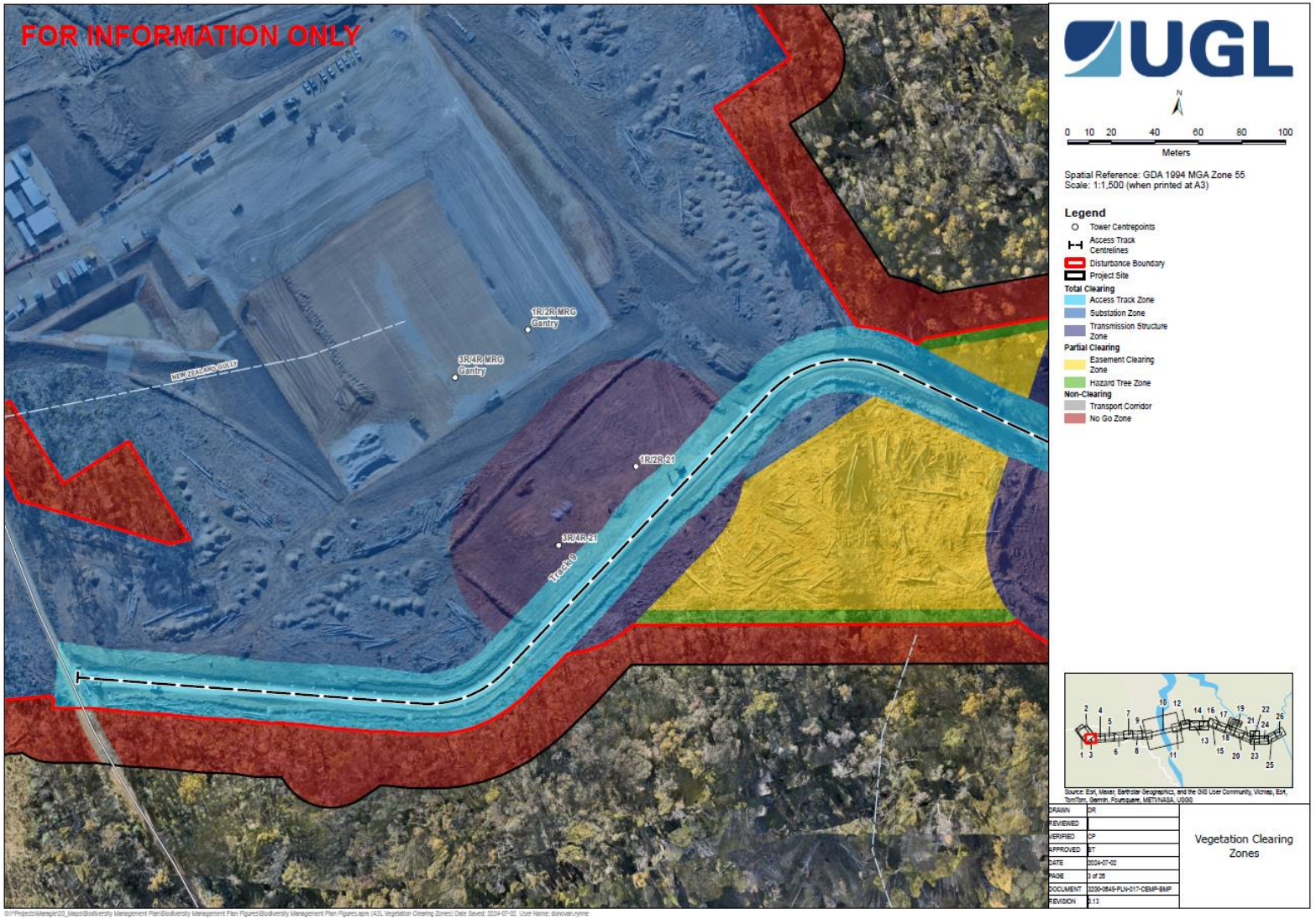
Name (Environmental Advisor)	Signature	Date
Name (Project Ecologist (BAM Accredited))	Signature	Date

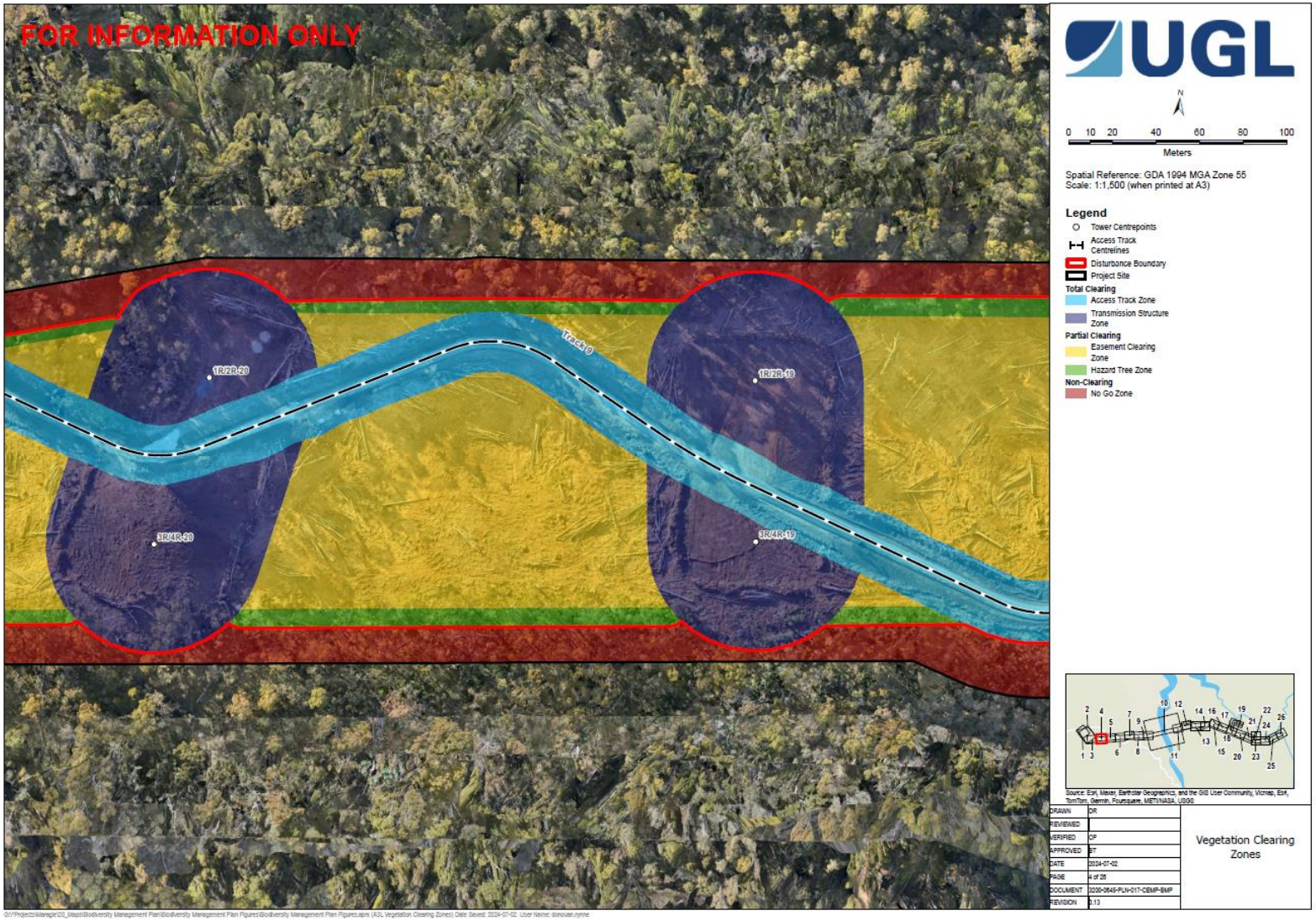
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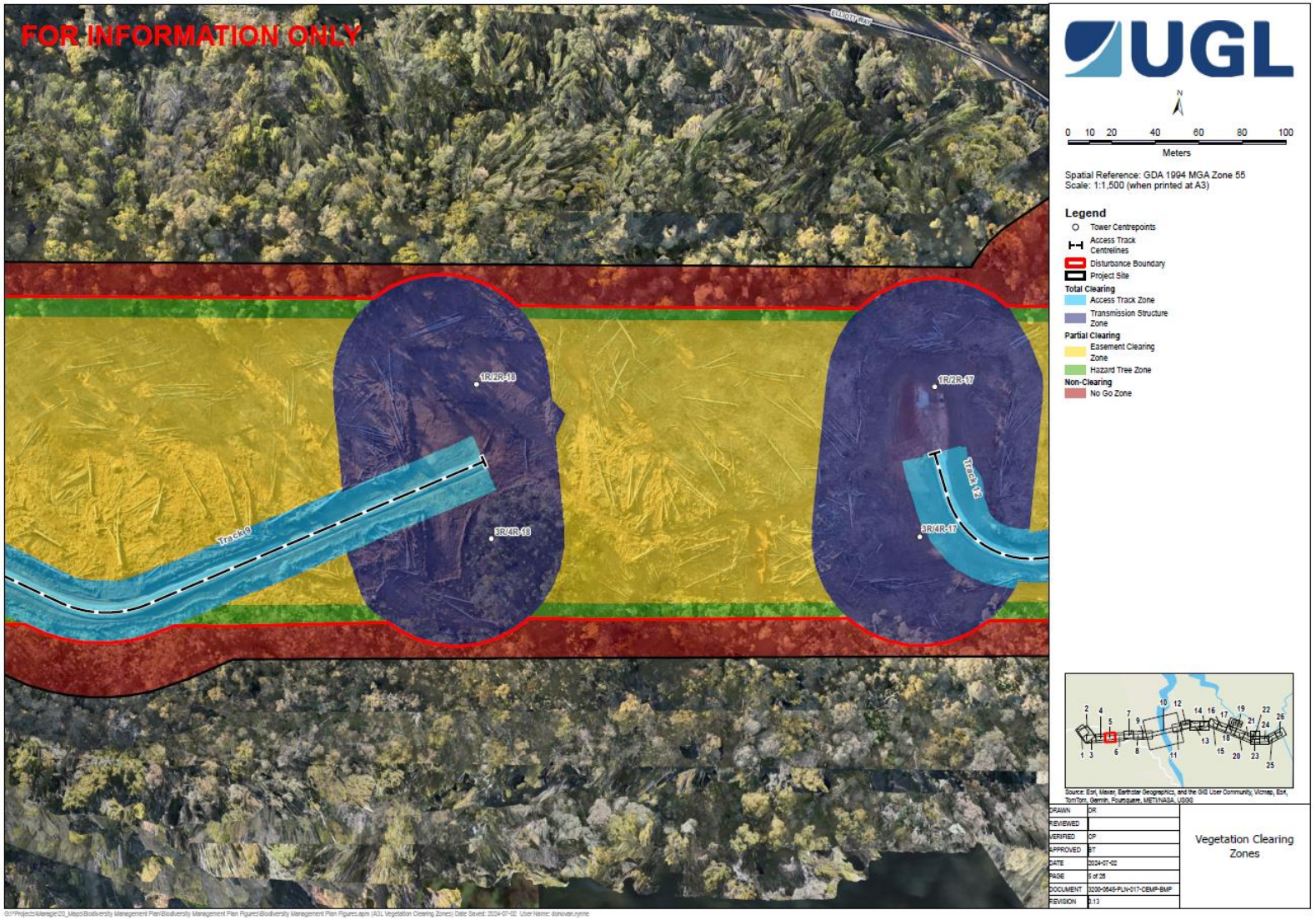
APPENDIX B.4 Clearing Zone Maps


FOR INFORMATION ONLY
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Disturbance Boundary
Project Site
Total Clearing
Substation Zone
Non-Clearing
No Go Zone
Vegetation Clearing Zones

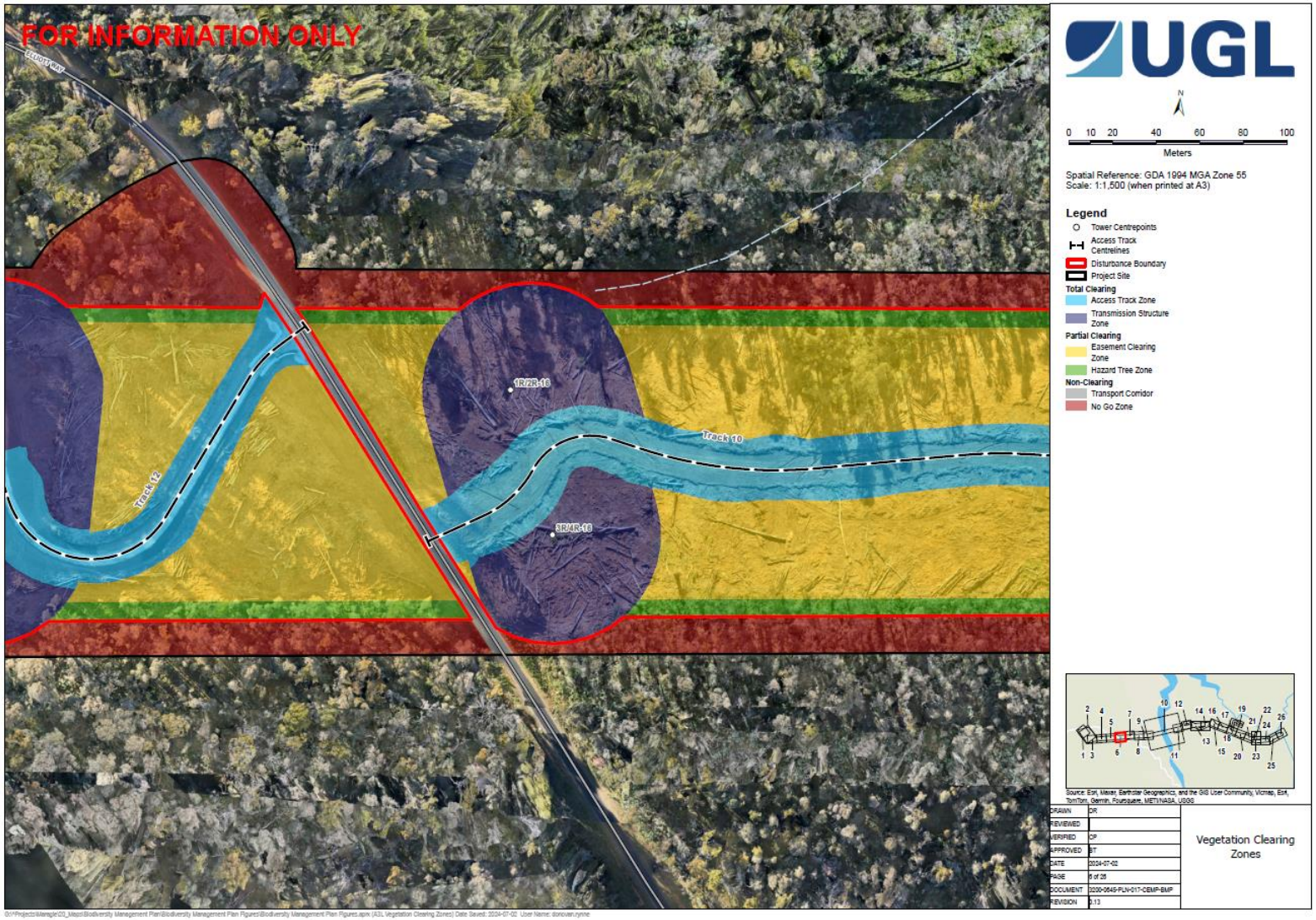

FOR INFORMATION ONLY
1R/2R MRG Gantry
3R/4R MRG Gantry
Track 3.0
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Meters
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Scale: 1:2,000 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Substation Zone
Transmission Structure Zone
Non-Clearing
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 2 of 26
DOCUMENT 3330-0545-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

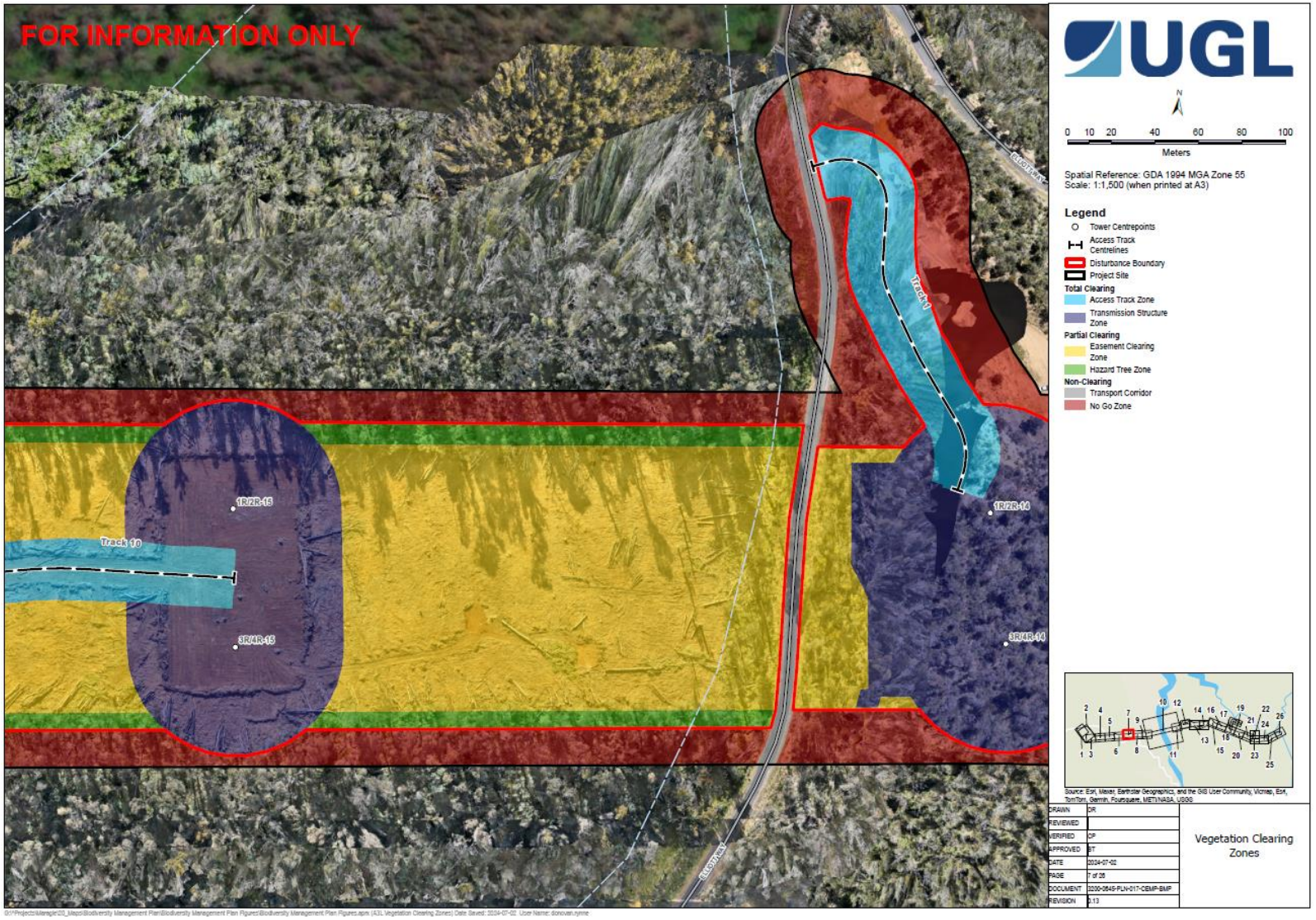

FOR INFORMATION ONLY
1R/2R MRG Gantry
3R/4R MRG Gantry
NEW ZEALAND GULLY
1R/2R-21
3R/4R-21
Track 0
N
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Substation Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hazard Tree Zone
Non-Clearing
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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VERIFIED CP
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PAGE 3 of 26
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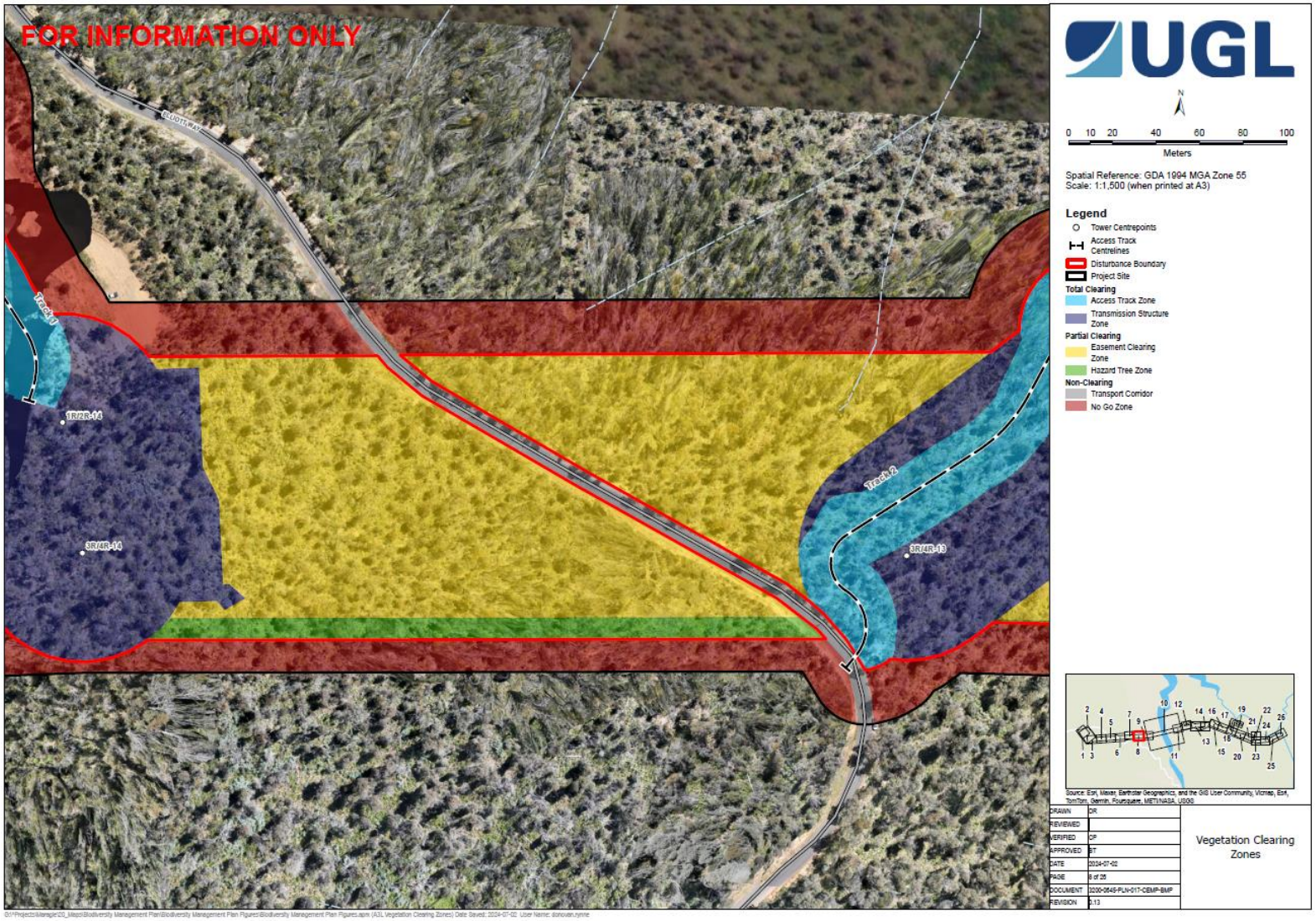

FOR INFORMATION ONLY
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3R/4R-20
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Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
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Hazard Tree Zone
Non-Clearing
No Go Zone
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PAGE 4 of 26
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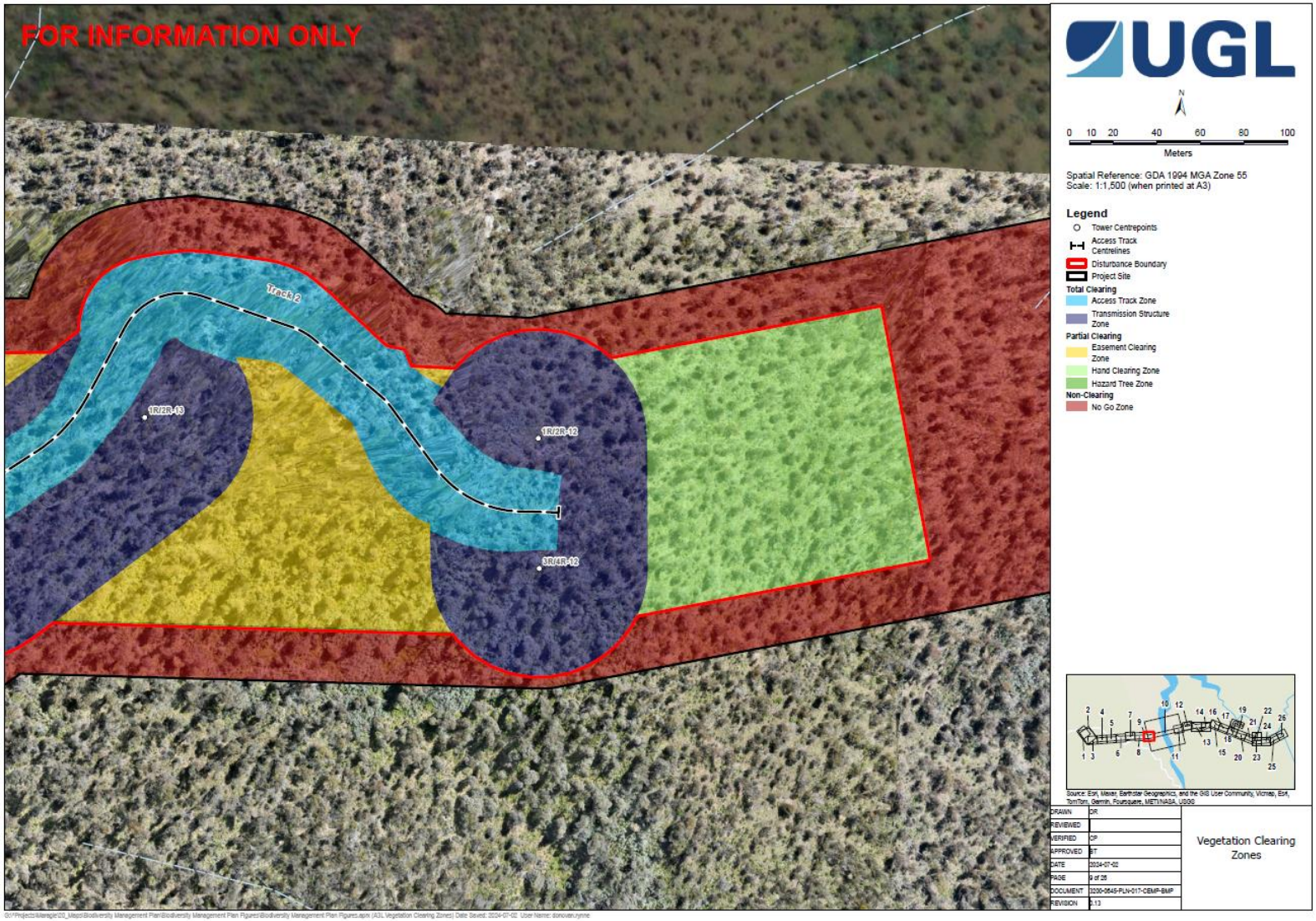

FOR INFORMATION ONLY
1R/2R-18
1R/2R-17
Track 9
Track 12
3R/4R-18
3R/4R-17
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hazard Tree Zone
Non-Clearing
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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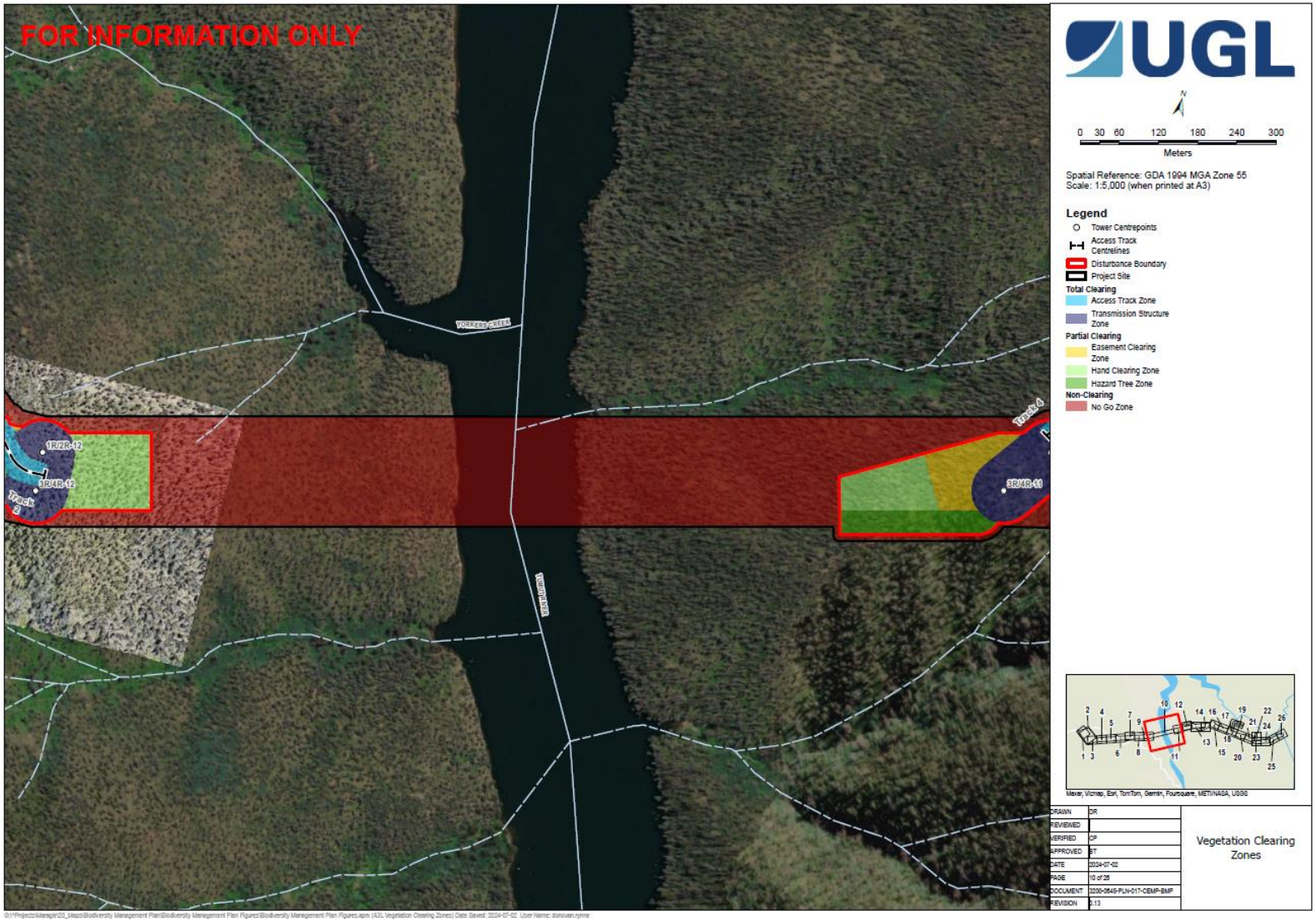
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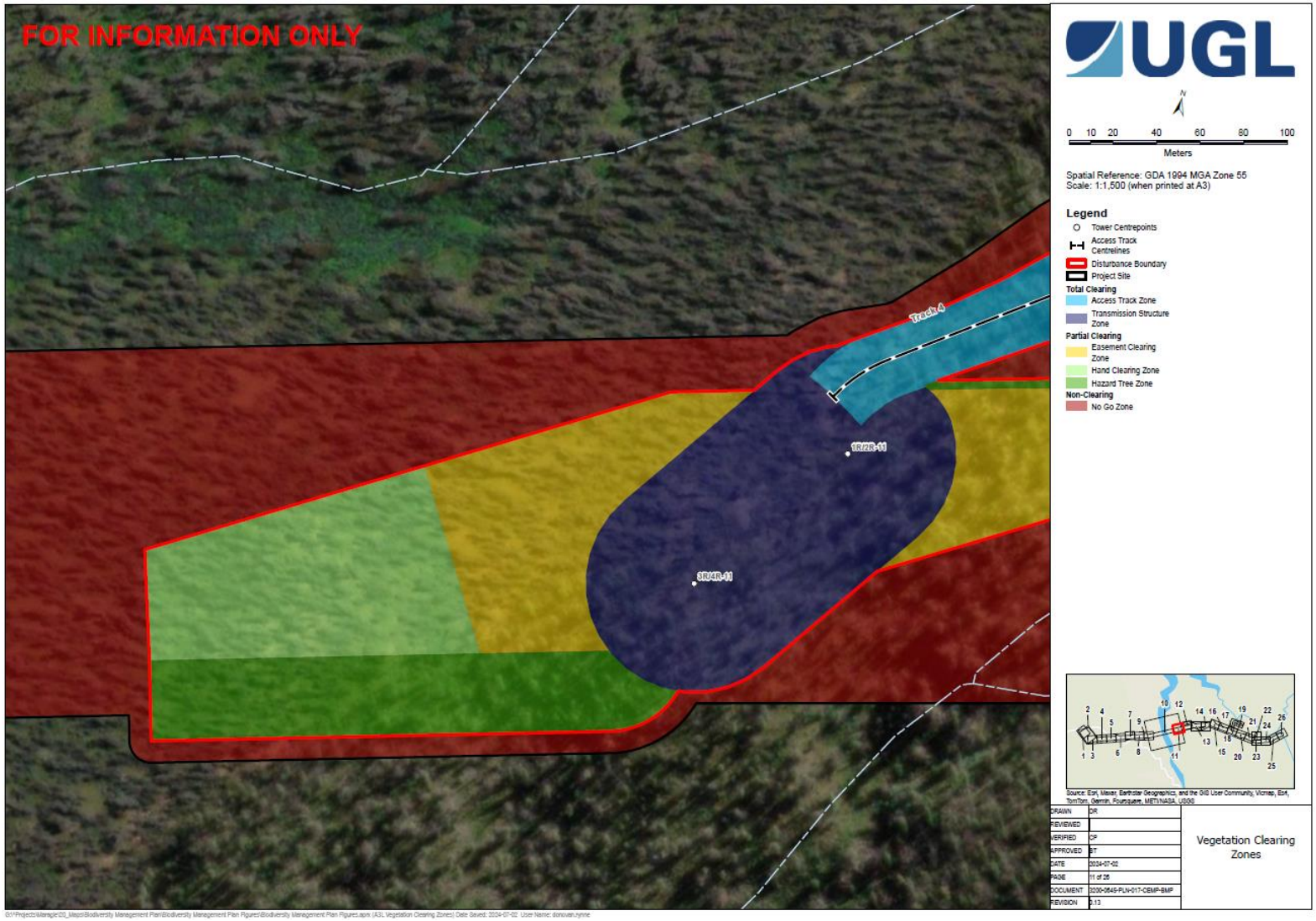

FOR INFORMATION ONLY
Track 12
Track 10
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3R/4R-16
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Meters
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Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
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No Go Zone
Vegetation Clearing Zones

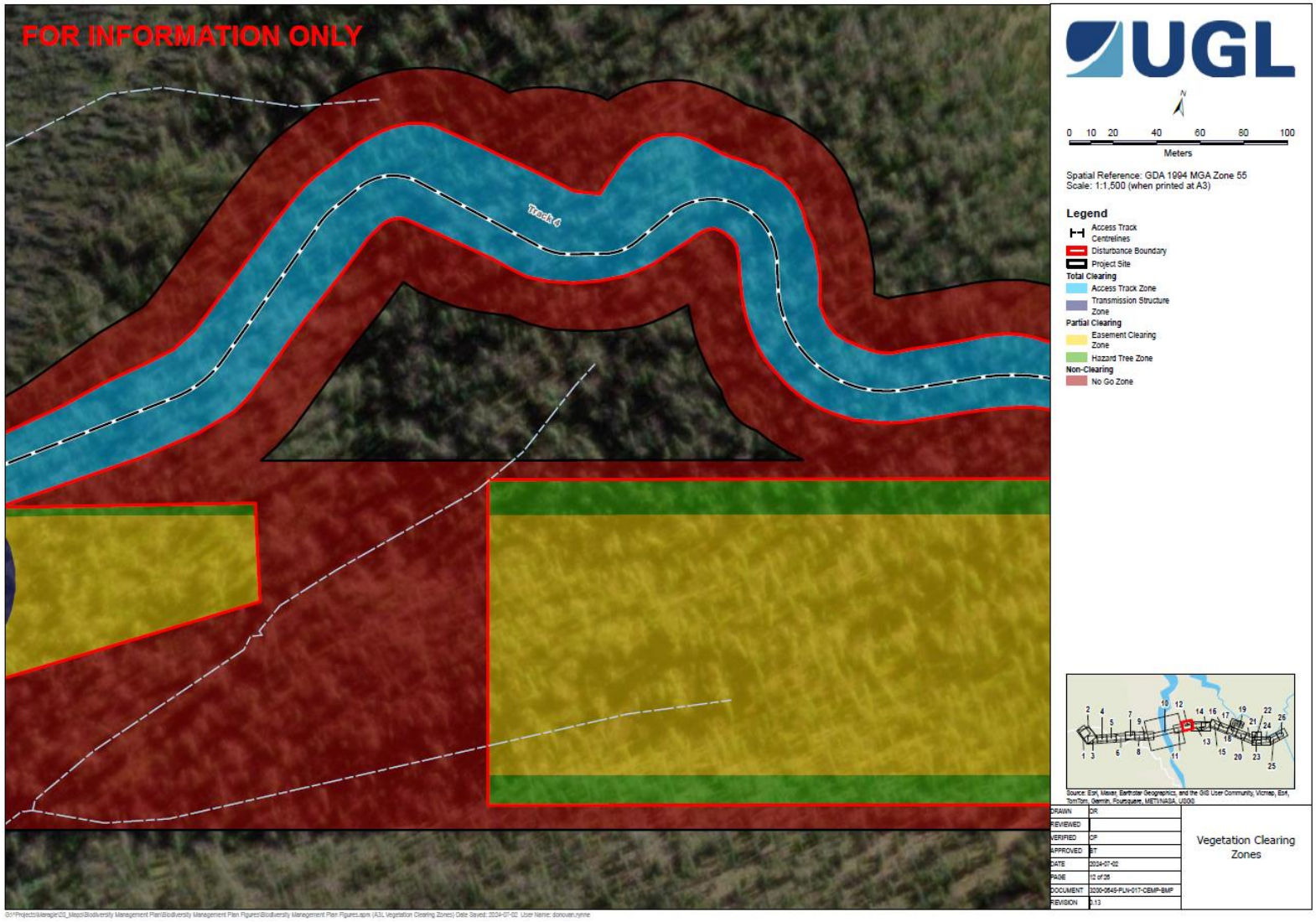

FOR INFORMATION ONLY
1R/2R-15
Track 10
3R/4R-15
1R/2R-14
3R/4R-14
Track 1
Track 2
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Meters
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Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
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Vegetation Clearing Zones

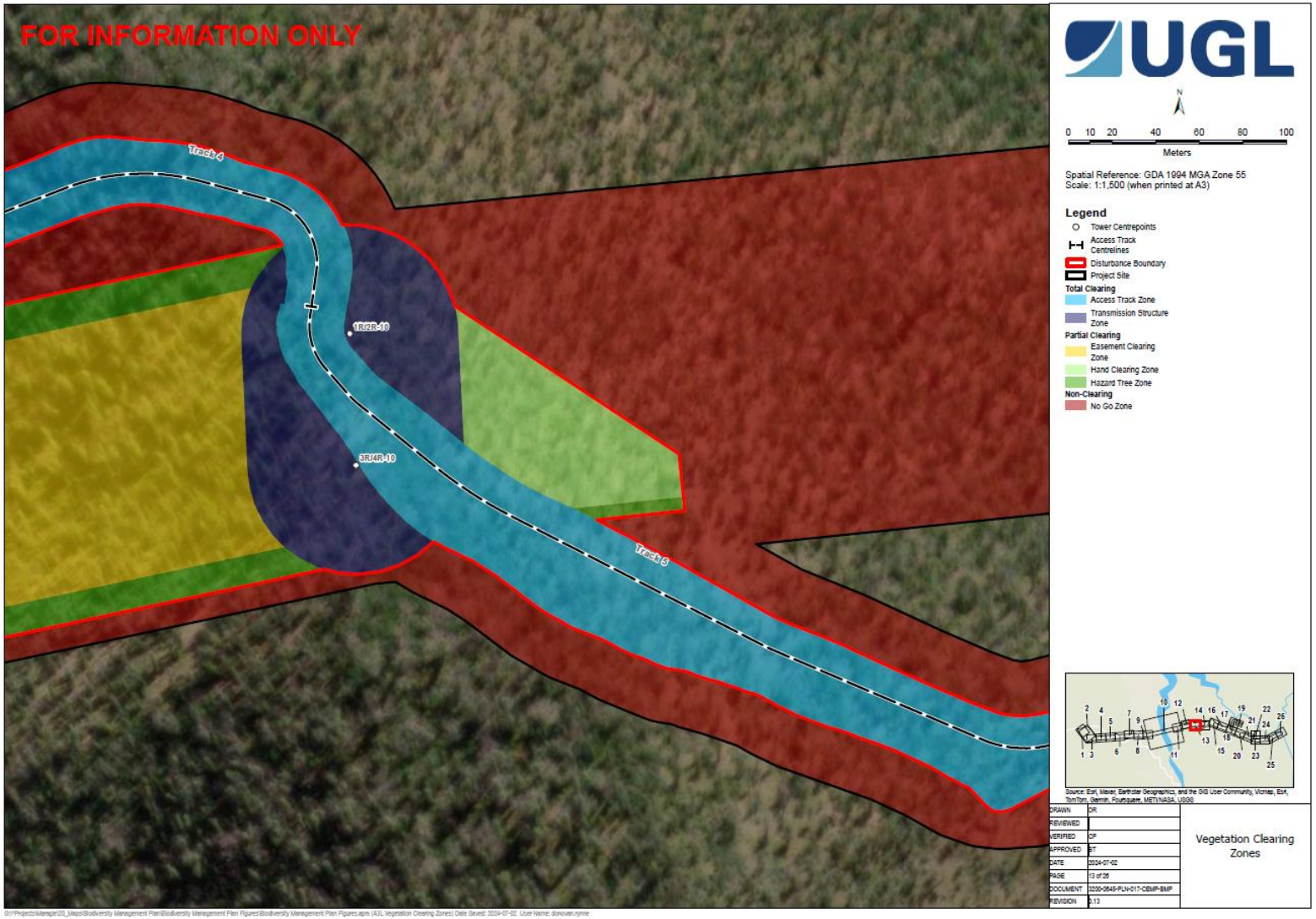

FOR INFORMATION ONLY
ELLIOTT WAY
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1R/ZR-14
3R/AR-14
Track 2
3R/AR-13
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Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
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Easement Clearing Zone
Hazard Tree Zone
Non-Clearing
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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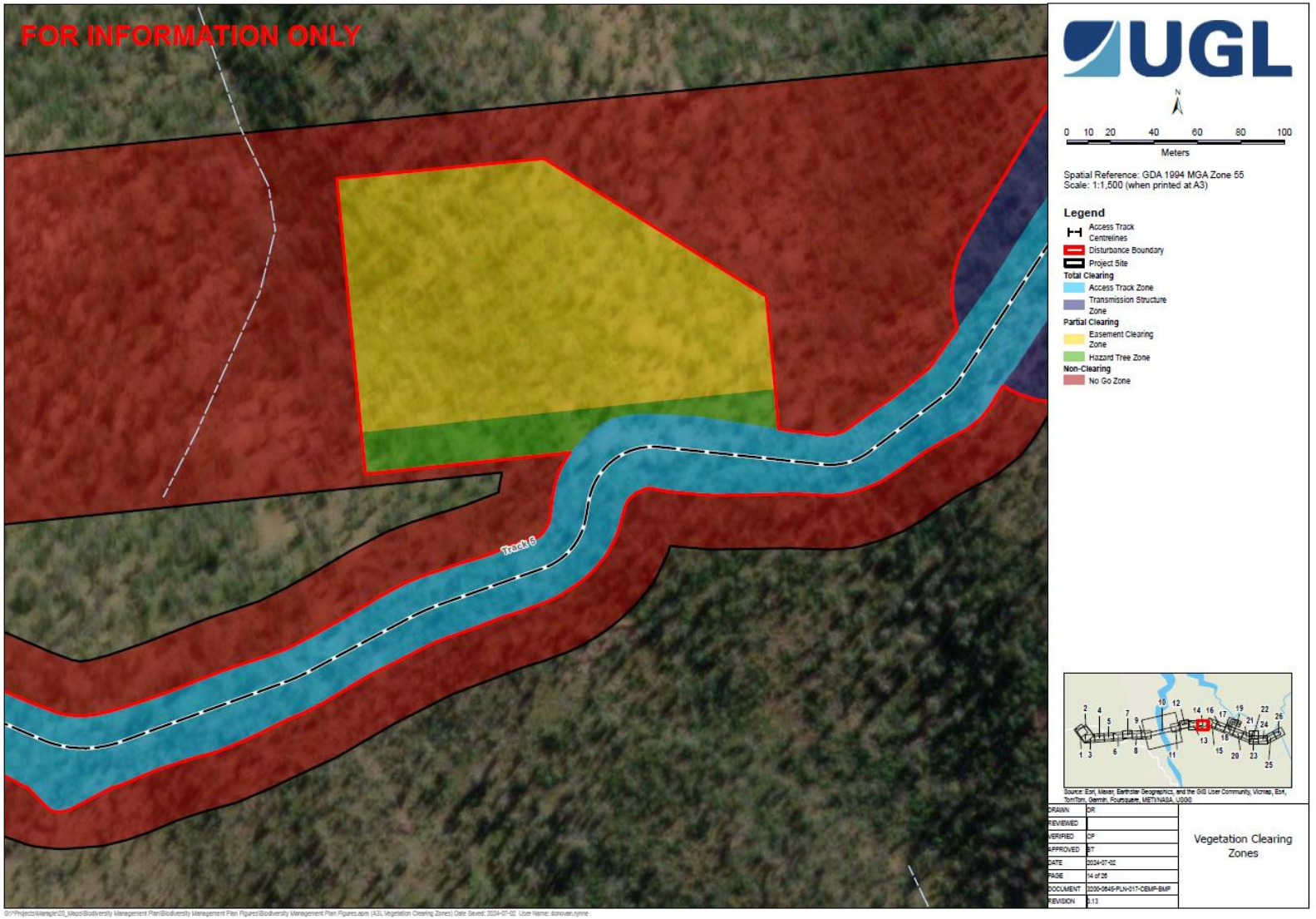

FOR INFORMATION ONLY
Track 2
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1R/2R-12
3R/4R-12
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VERIFIED DP
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PAGE 9 of 26
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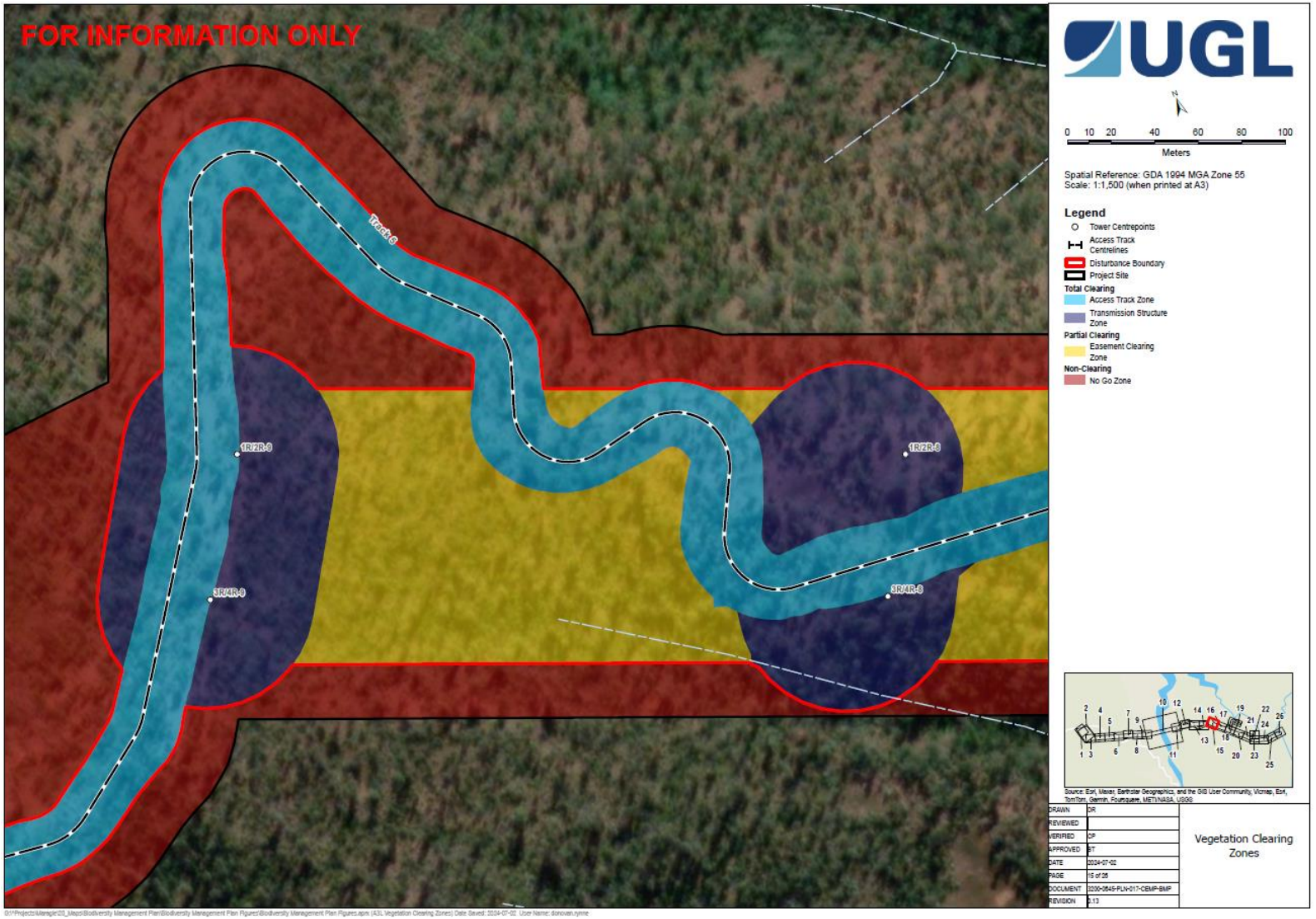

FOR INFORMATION ONLY
YORKEYS CREEK
TUMUT RIVER
1R/2R-12
3R/4R-12
3R/4R-11
Track 2
Track 4
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Meters
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Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
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No Go Zone
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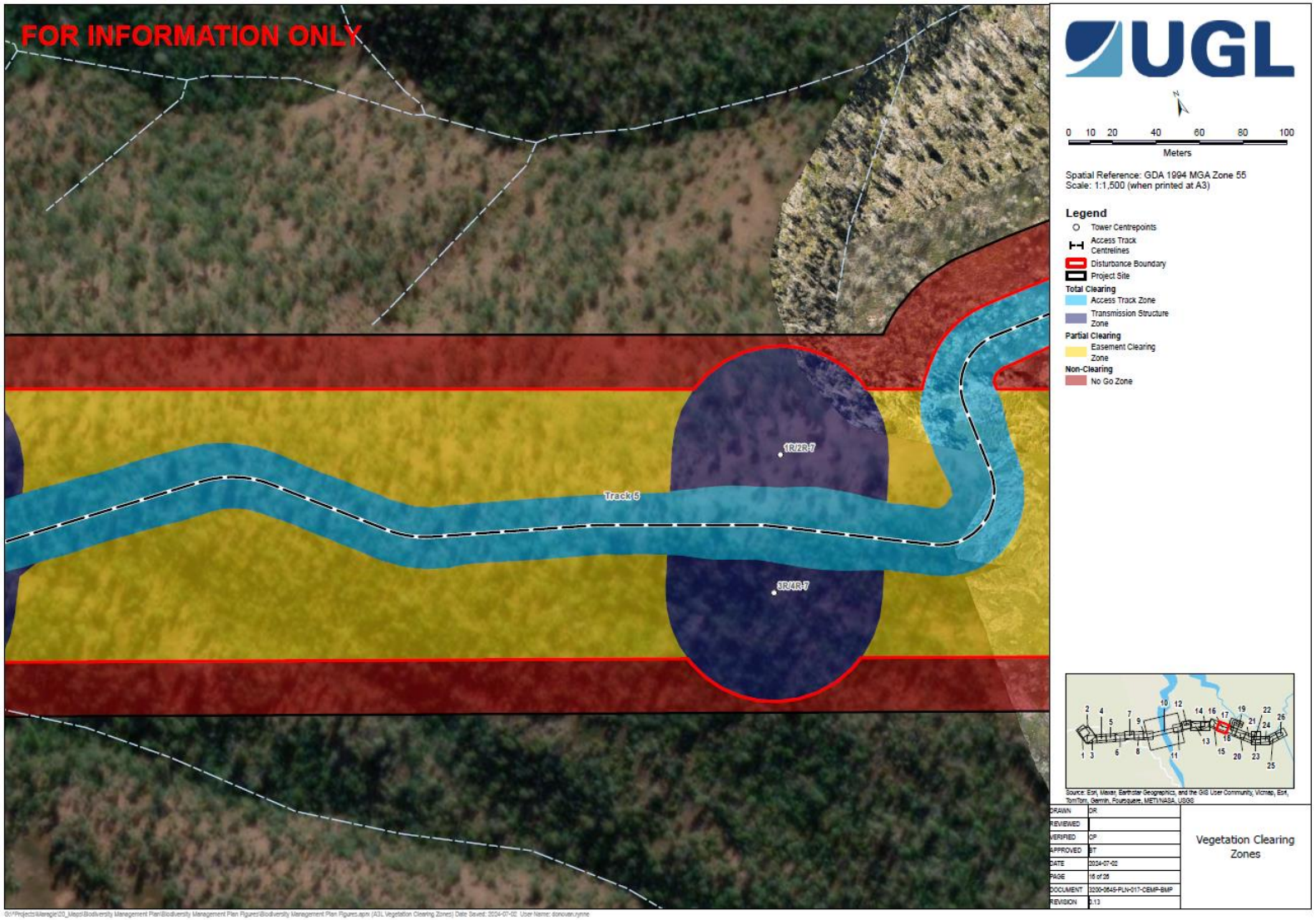

FOR INFORMATION ONLY
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PAGE 11 of 26
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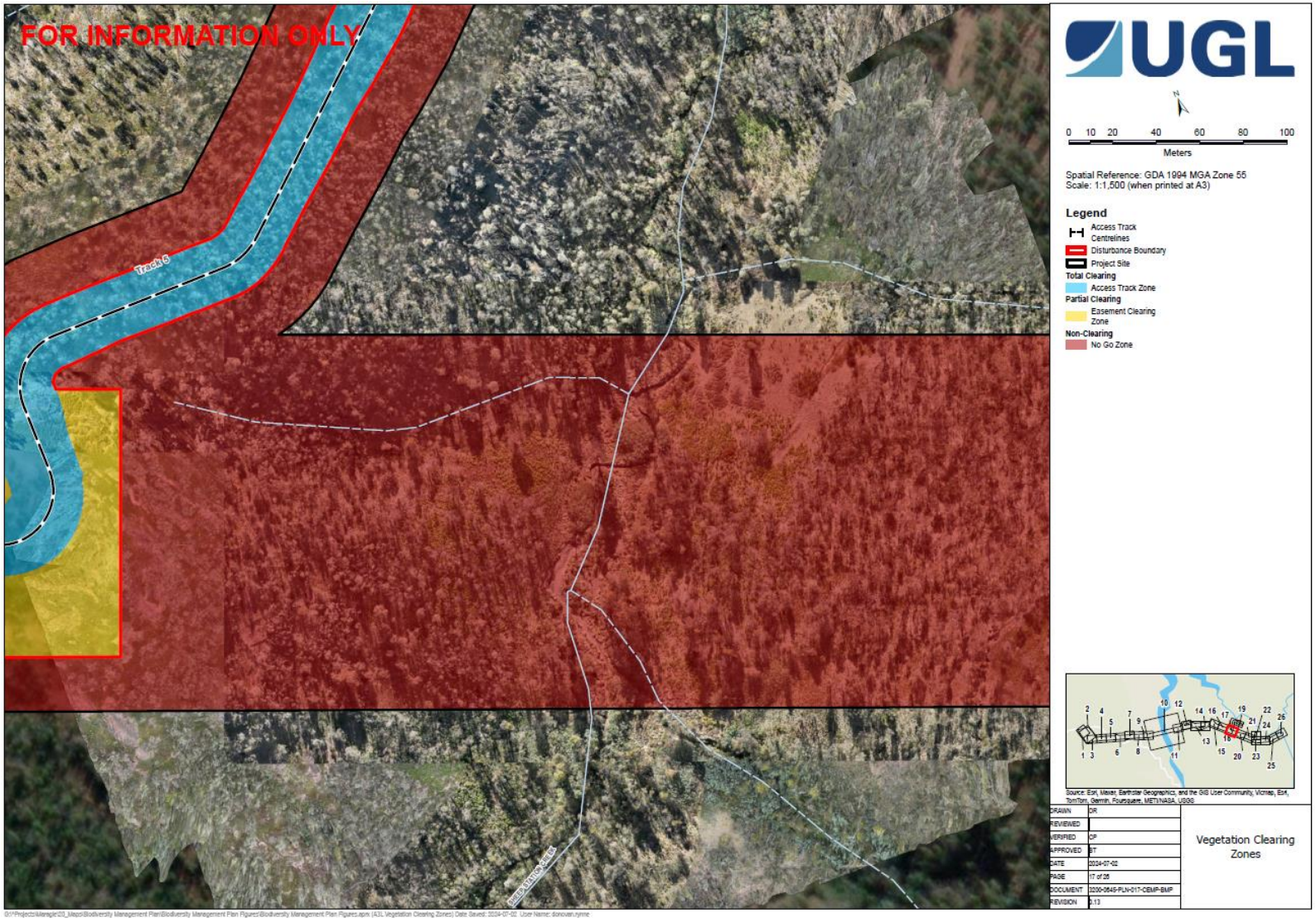

FOR INFORMATION ONLY
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Access Track Centrelines
Disturbance Boundary
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No Go Zone
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Vegetation Clearing Zones

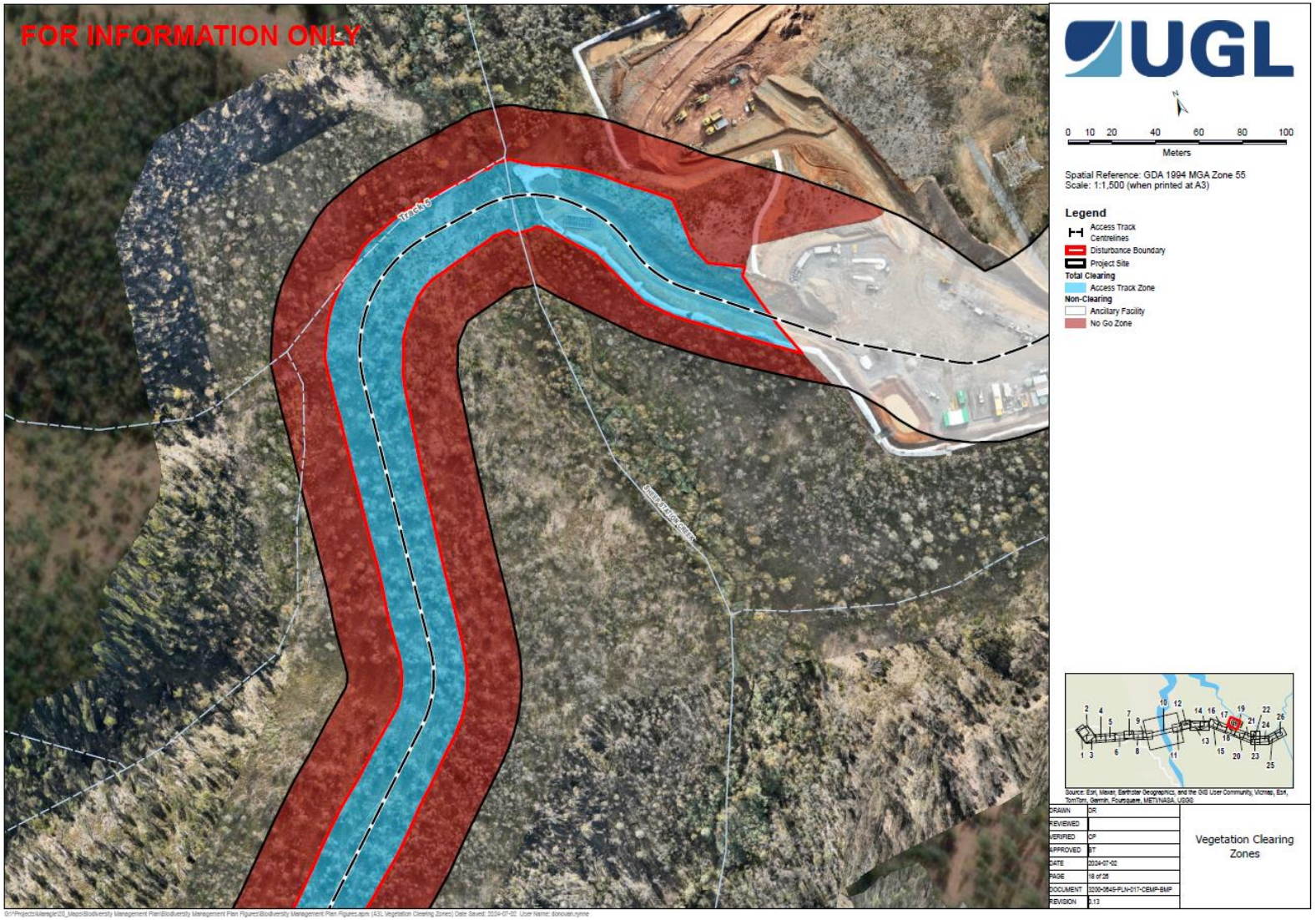

FOR INFORMATION ONLY
Track 4
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3R/4R-10
Track 6
UGL
N
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Tower Centrepoints
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Access Track Zone
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Hazard Tree Zone
Non-Clearing
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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Vegetation Clearing Zones

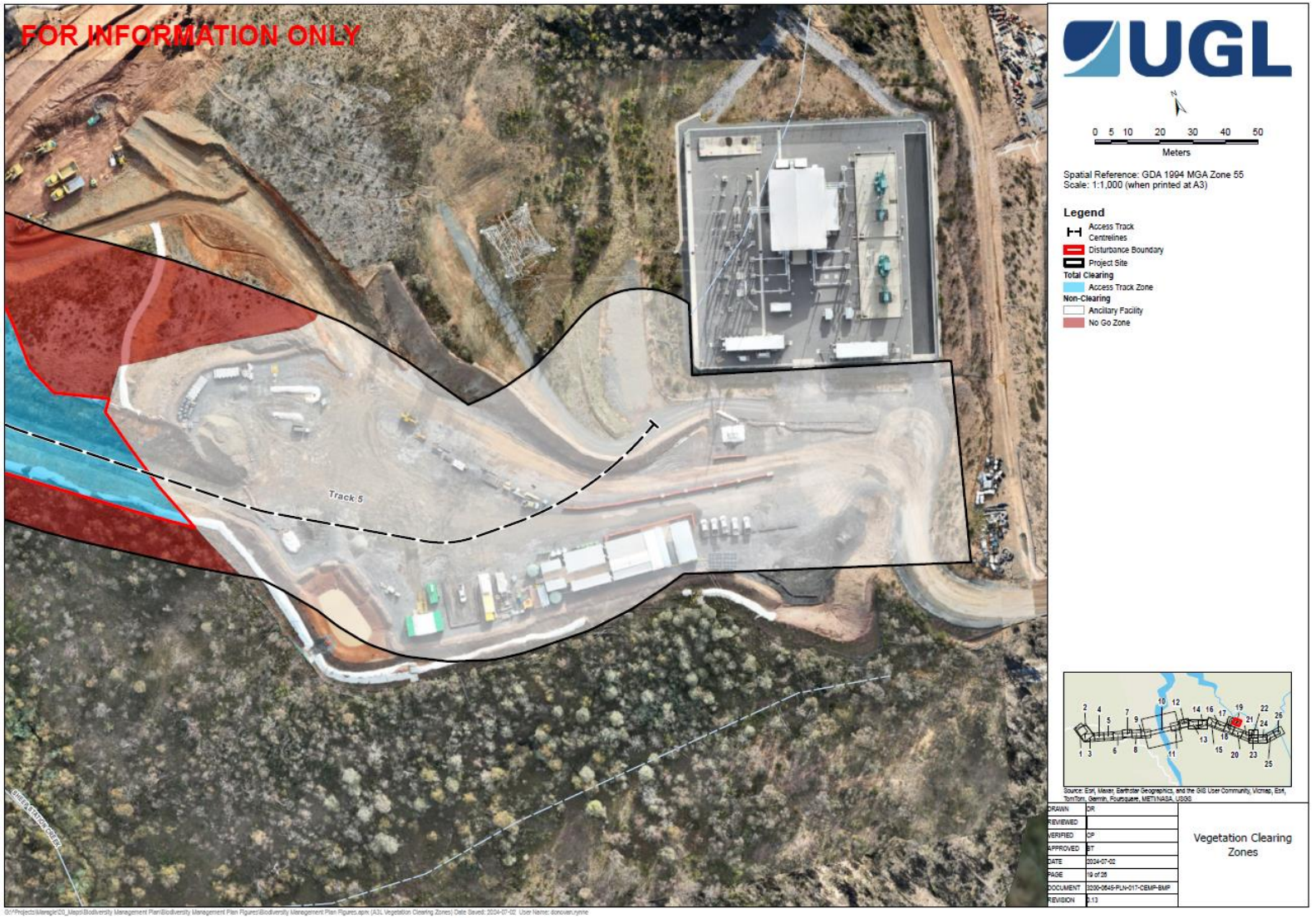

FOR INFORMATION ONLY
Track 6
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Meters
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Legend
Access Track Centrelines
Disturbance Boundary
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Access Track Zone
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Hazard Tree Zone
Non-Clearing
No Go Zone
Vegetation Clearing Zones

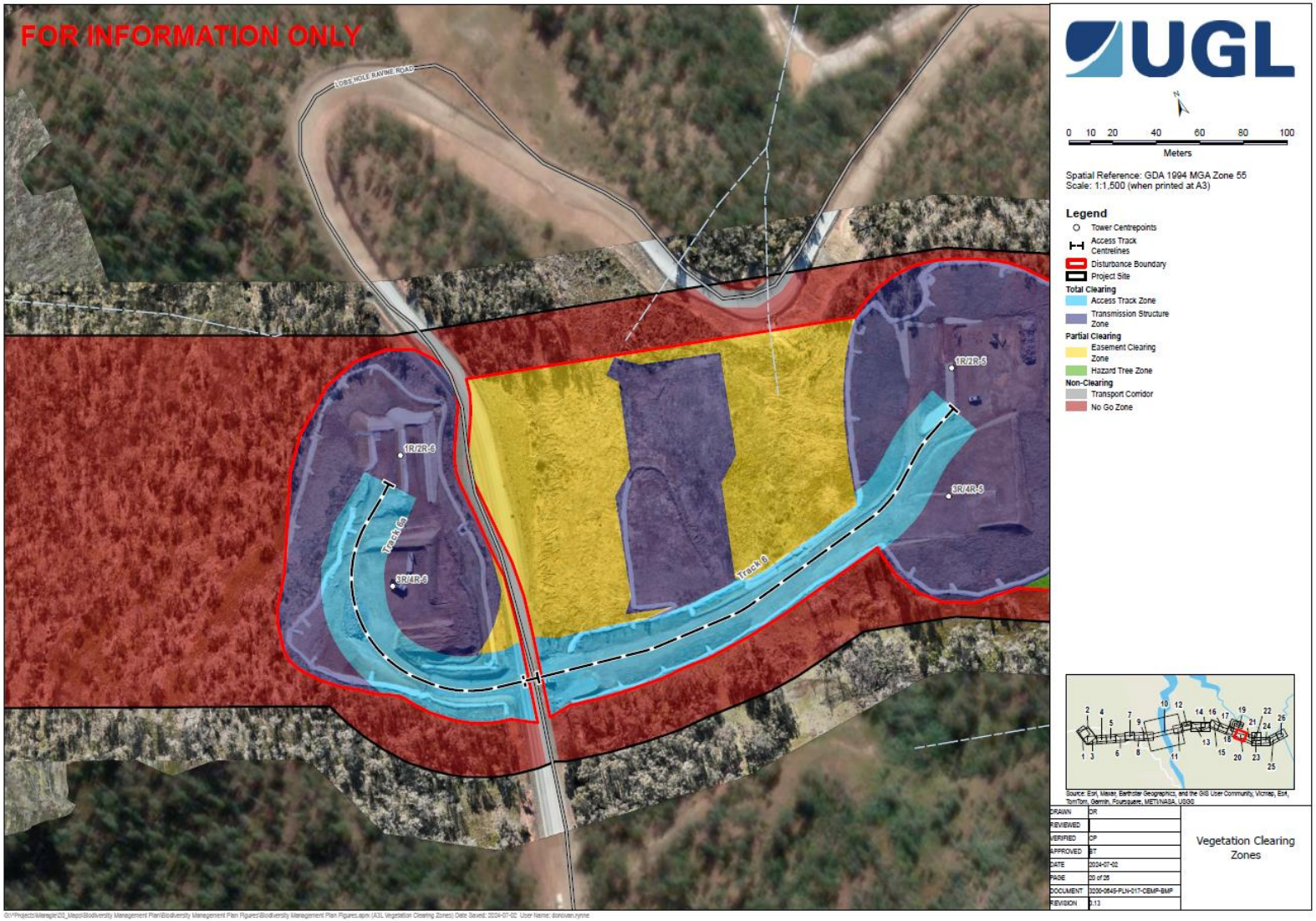

FOR INFORMATION ONLY
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1R/2R-9
3R/4R-9
3R/4R-9
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Meters
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Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Non-Clearing
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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PAGE 15 of 25
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

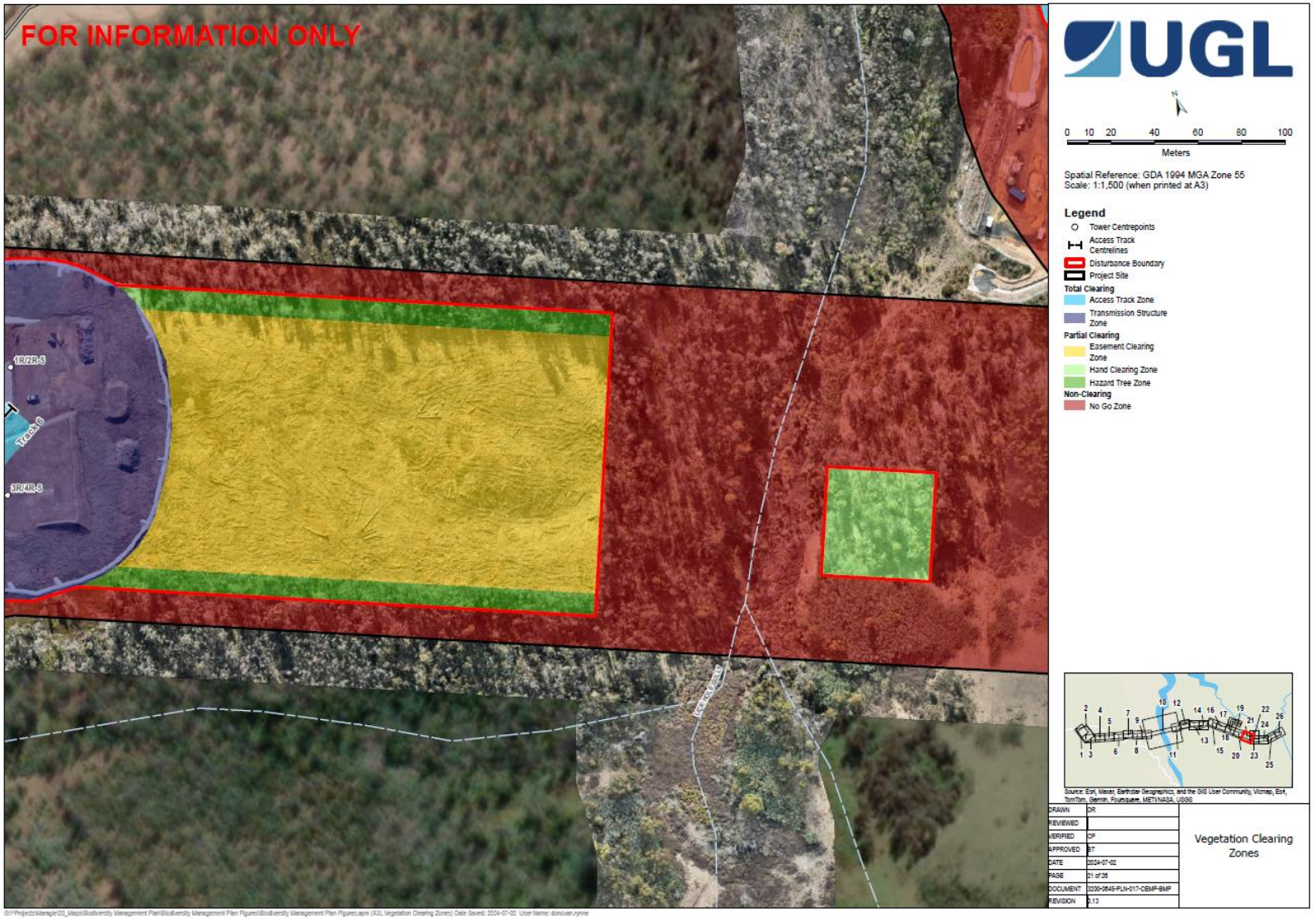

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Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Non-Clearing
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 16 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

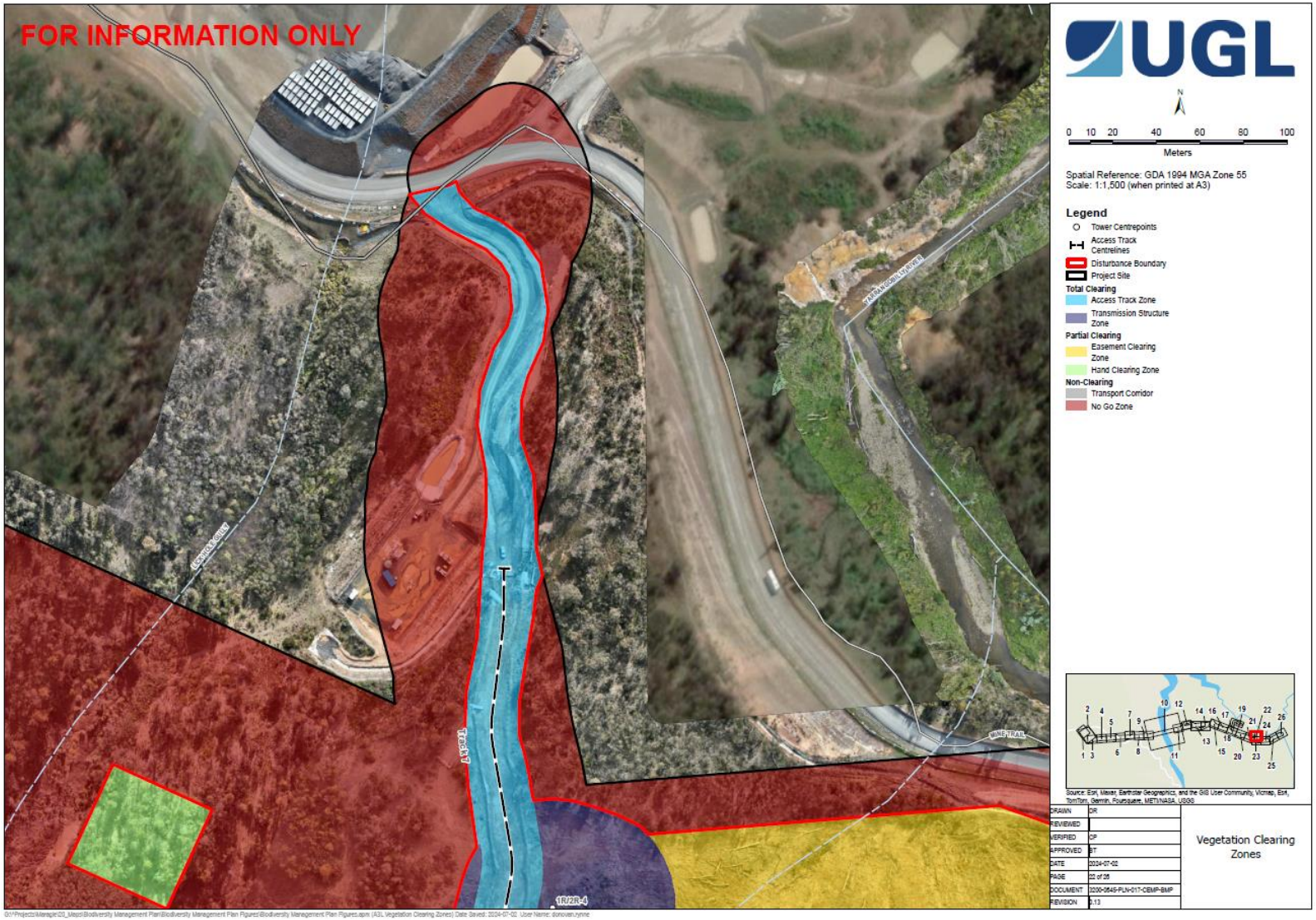

FOR INFORMATION ONLY
Track 5
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
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Legend
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Partial Clearing
Easement Clearing Zone
Non-Clearing
No Go Zone
Vegetation Clearing Zones

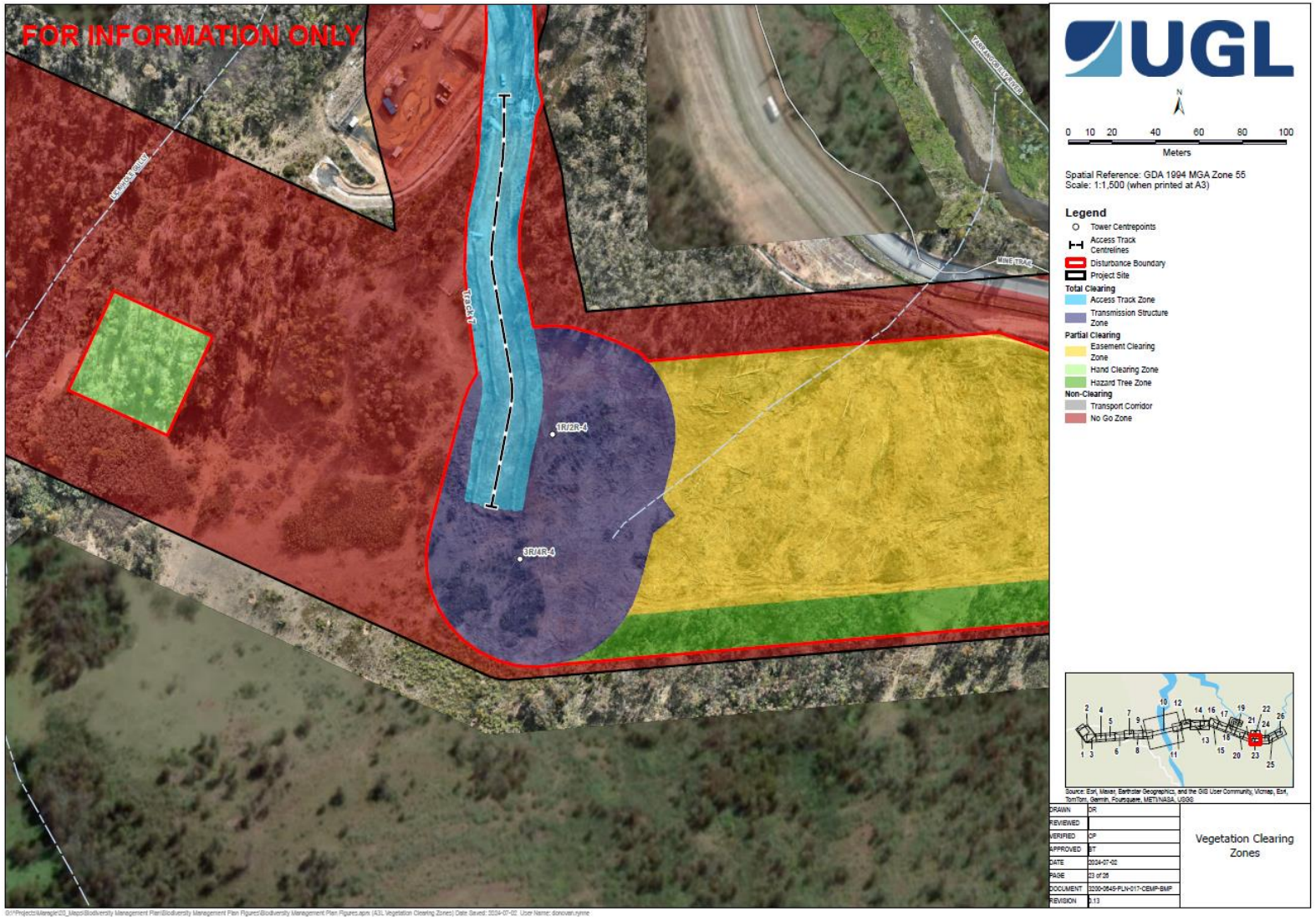

FOR INFORMATION ONLY
Track 6
Queretaro Creek
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Meters
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Legend
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Non-Clearing
Ancillary Facility
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED ST
DATE 2024-07-02
PAGE 16 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

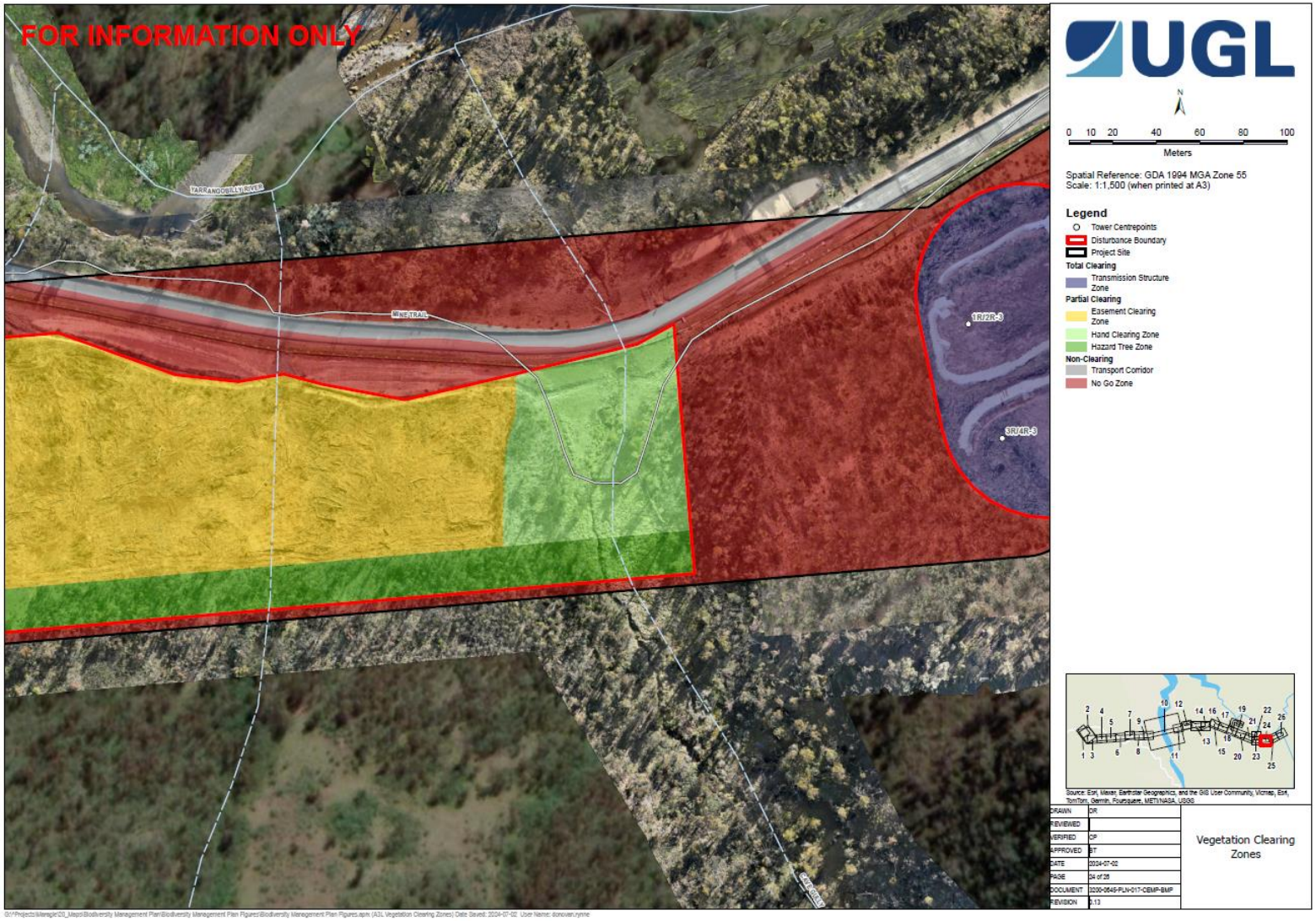

FOR INFORMATION ONLY
Track 5
0 5 10 20 30 40 50
Meters
Spatial Reference: GDA 1994 MGA Zone 55
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Legend
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Non-Clearing
Ancillary Facility
No Go Zone
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED ST
DATE 2024-07-02
PAGE 19 of 25
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

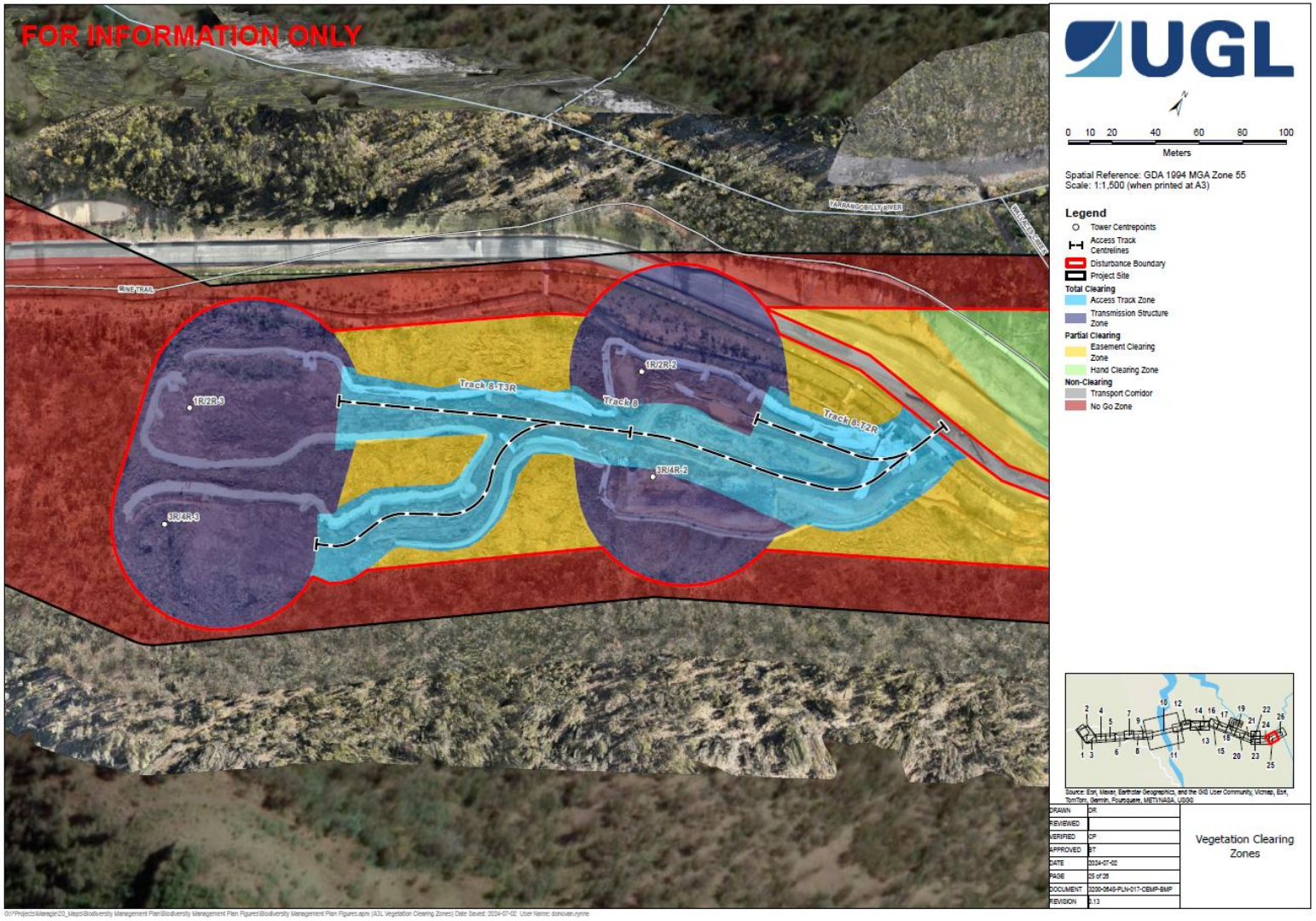

FOR INFORMATION ONLY
LOBS HOLE RAVINE ROAD
1R/2R-5
1R/2R-6
3R/4R-5
3R/4R-6
Track 6
Track 6a
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hazard Tree Zone
Non-Clearing
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 20 of 26
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REVISION 0.13
Vegetation Clearing Zones

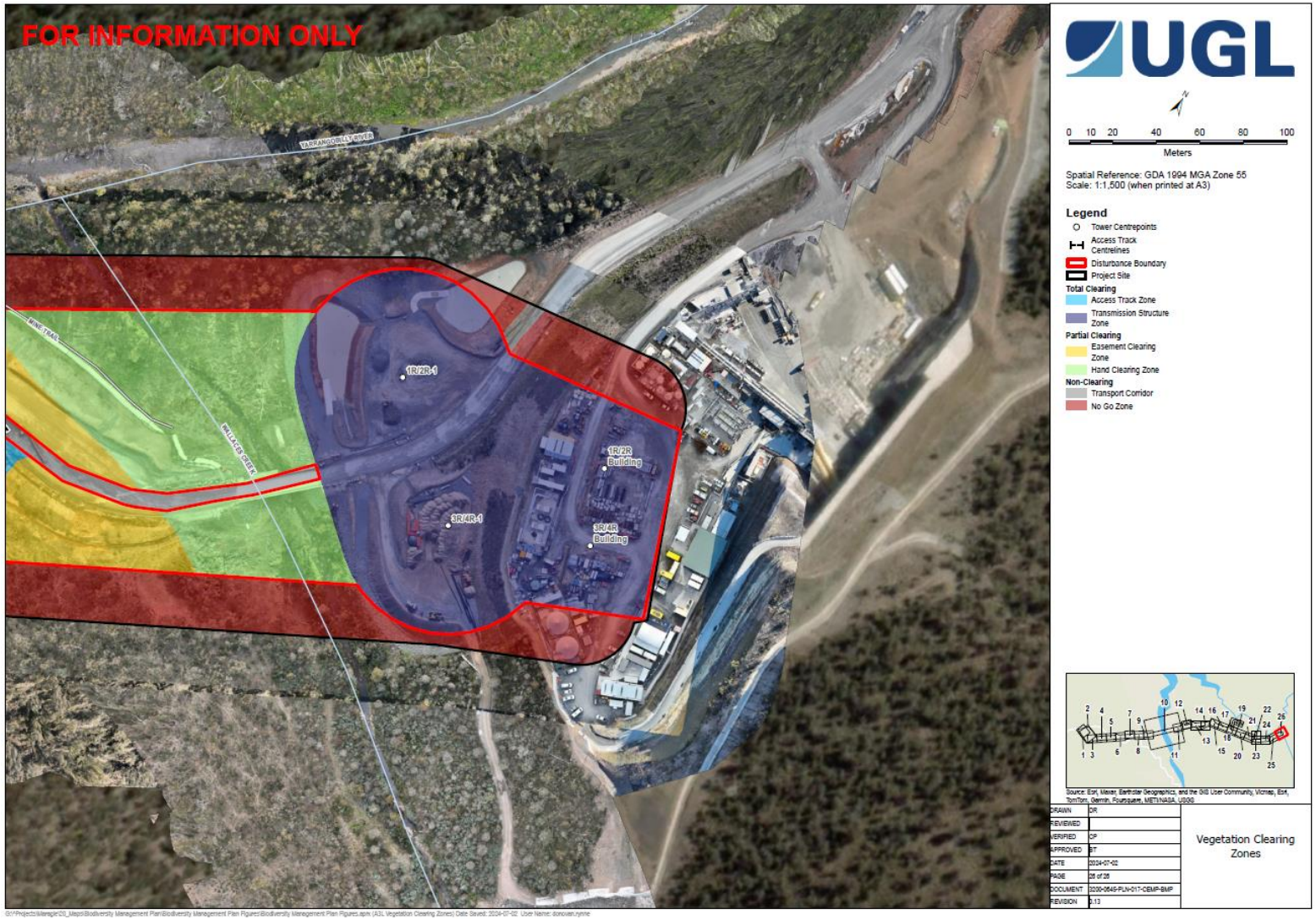

FOR INFORMATION ONLY
1R/2R-S
Track 0
3R/4R-S
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
Non-Clearing
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED ST
DATE 2024-07-02
PAGE 21 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones


FOR INFORMATION ONLY
UGL
N
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hand Clearing Zone
Non-Clearing
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 22 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones
ACCESS TRACK
1R/2R-4


FOR INFORMATION ONLY
Track 1
1R/2R-4
3R/4R-4
MINE TRACK
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
Non-Clearing
Transport Corridor
No Go Zone
DRAWN OR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 23 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

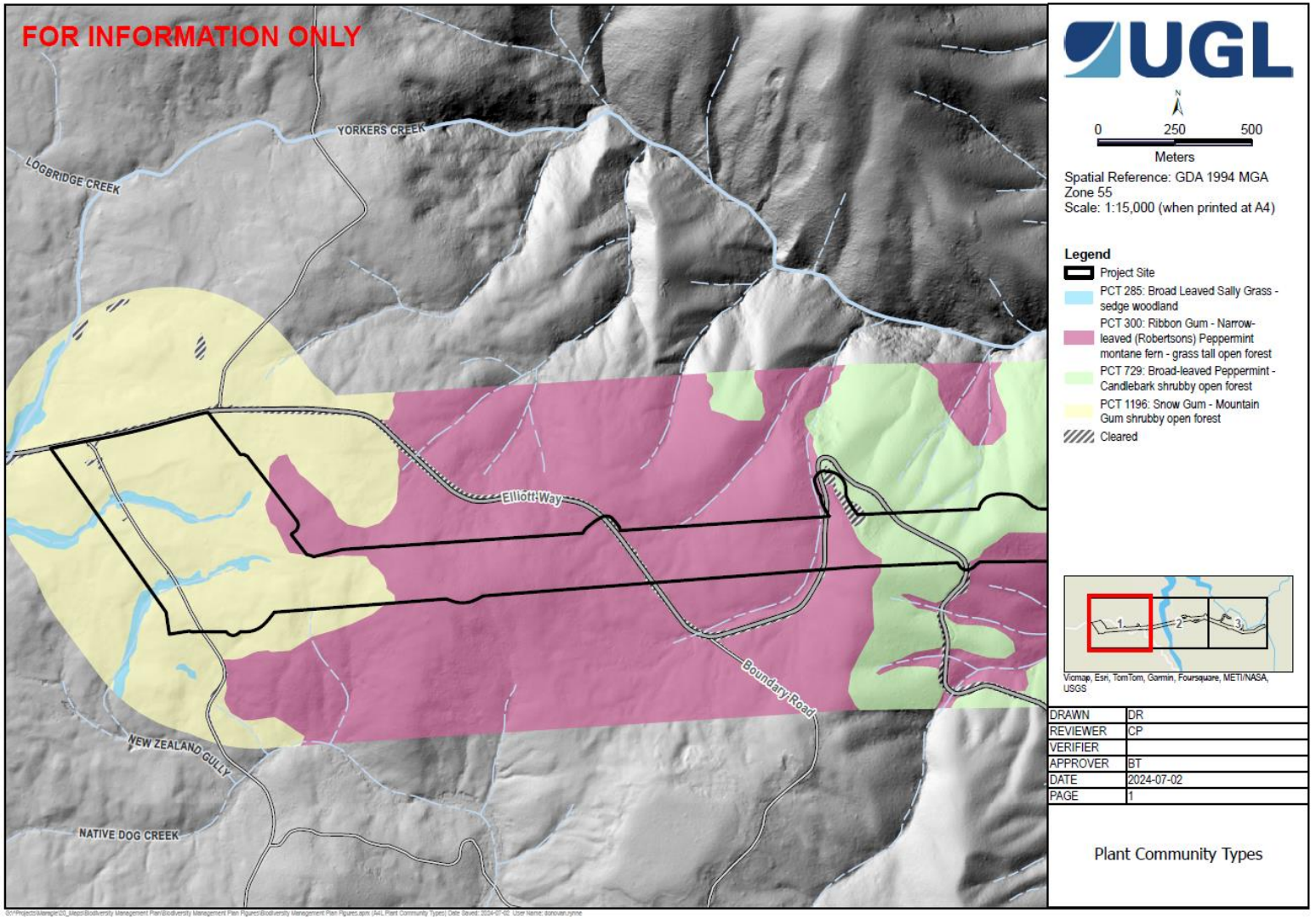

FOR INFORMATION ONLY
TARRANGOBILLY RIVER
MINE TRAIL
1RJ2R-3
3RJ4R-3
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Disturbance Boundary
Project Site
Total Clearing
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hand Clearing Zone
Hazard Tree Zone
Non-Clearing
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 24 of 25
DOCUMENT 3290-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

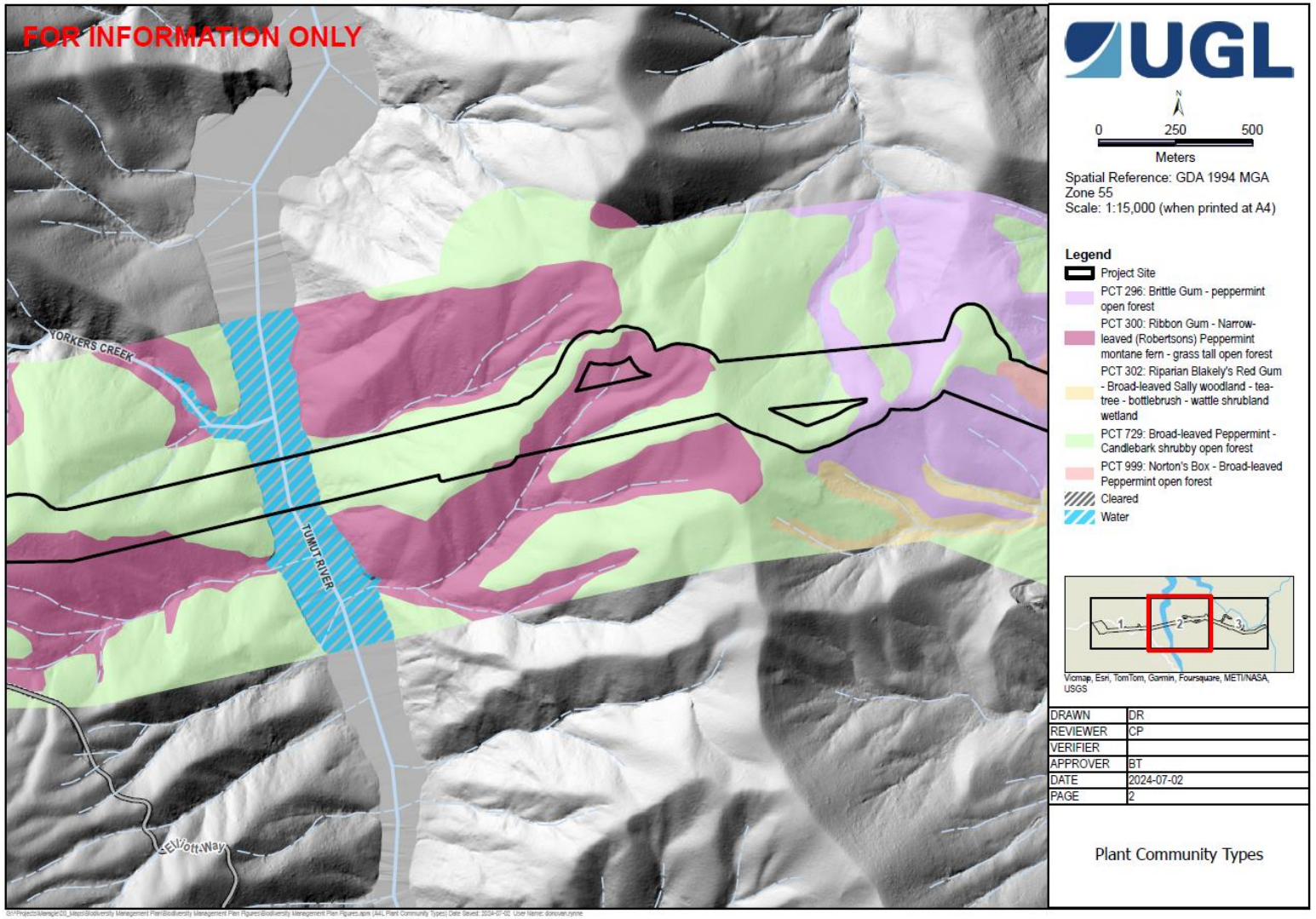

FOR INFORMATION ONLY
YARRANGOBILLY RIVER
MINE TRAIL
1R/2R-3
Track 8-T3R
1R/2R-2
Track 8
Track 8-T2R
3R/4R-2
3R/4R-3
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hand Clearing Zone
Non-Clearing
Transport Corridor
No Go Zone
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWED
VERIFIED DP
APPROVED BT
DATE 2024-07-02
PAGE 25 of 26
DOCUMENT 3200-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

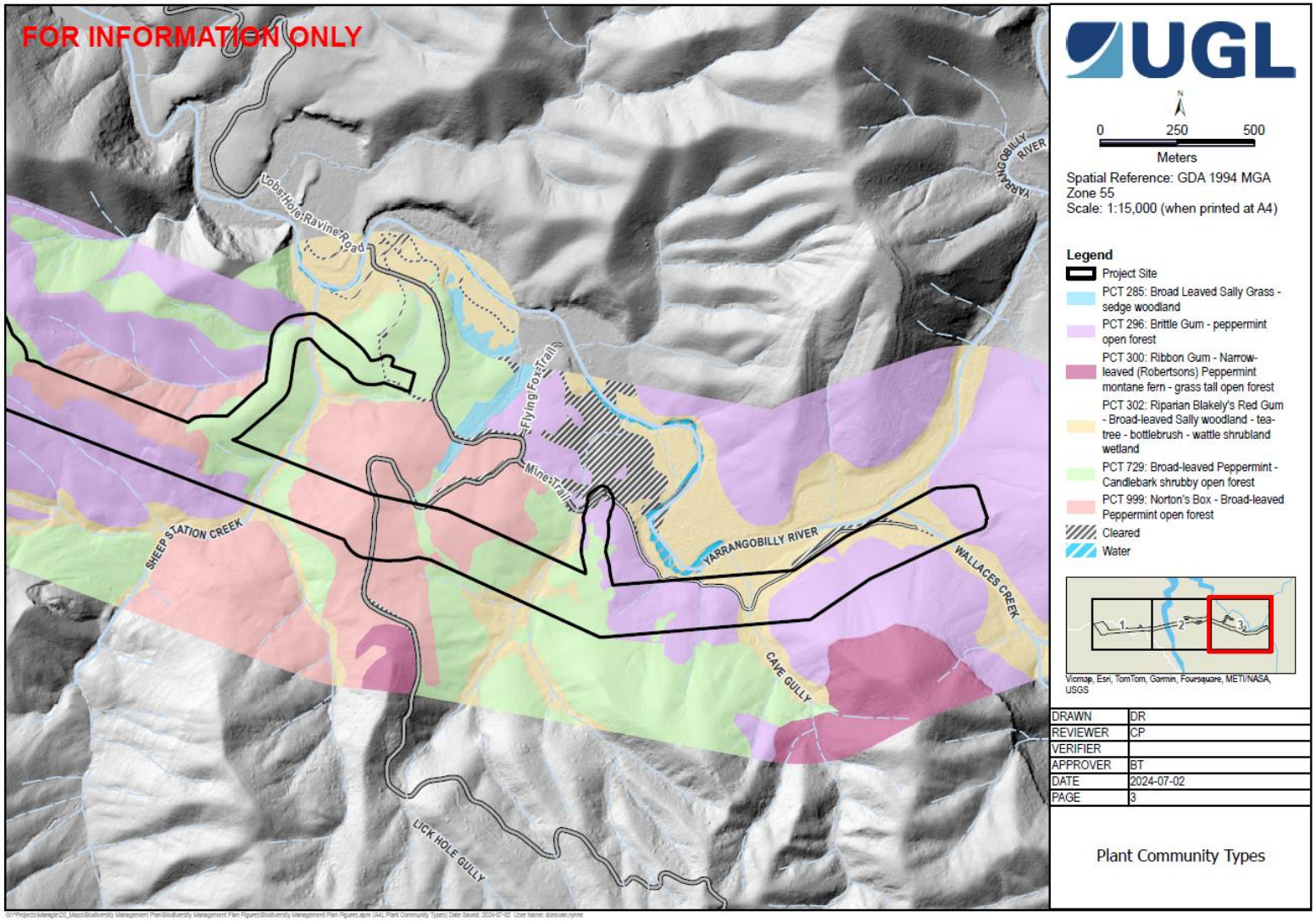

FOR INFORMATION ONLY
TARRANGOBILLY RIVER
MINE TRAIL
WALLACES CREEK
1R/2R-1
1R/2R Building
3R/4R-1
3R/4R Building
UGL
0 10 20 40 60 80 100
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:1,500 (when printed at A3)
Legend
Tower Centrepoints
Access Track Centrelines
Disturbance Boundary
Project Site
Total Clearing
Access Track Zone
Transmission Structure Zone
Partial Clearing
Easement Clearing Zone
Hand Clearing Zone
Non-Clearing
Transport Corridor
No Go Zone
DRAWN DR
REVIEWED
VERIFIED CP
APPROVED BT
DATE 2024-07-02
PAGE 25 of 26
DOCUMENT 3230-0645-PLN-017-CEMP-BMP
REVISION 0.13
Vegetation Clearing Zones

APPENDIX B.5 PCT Mapping

Official

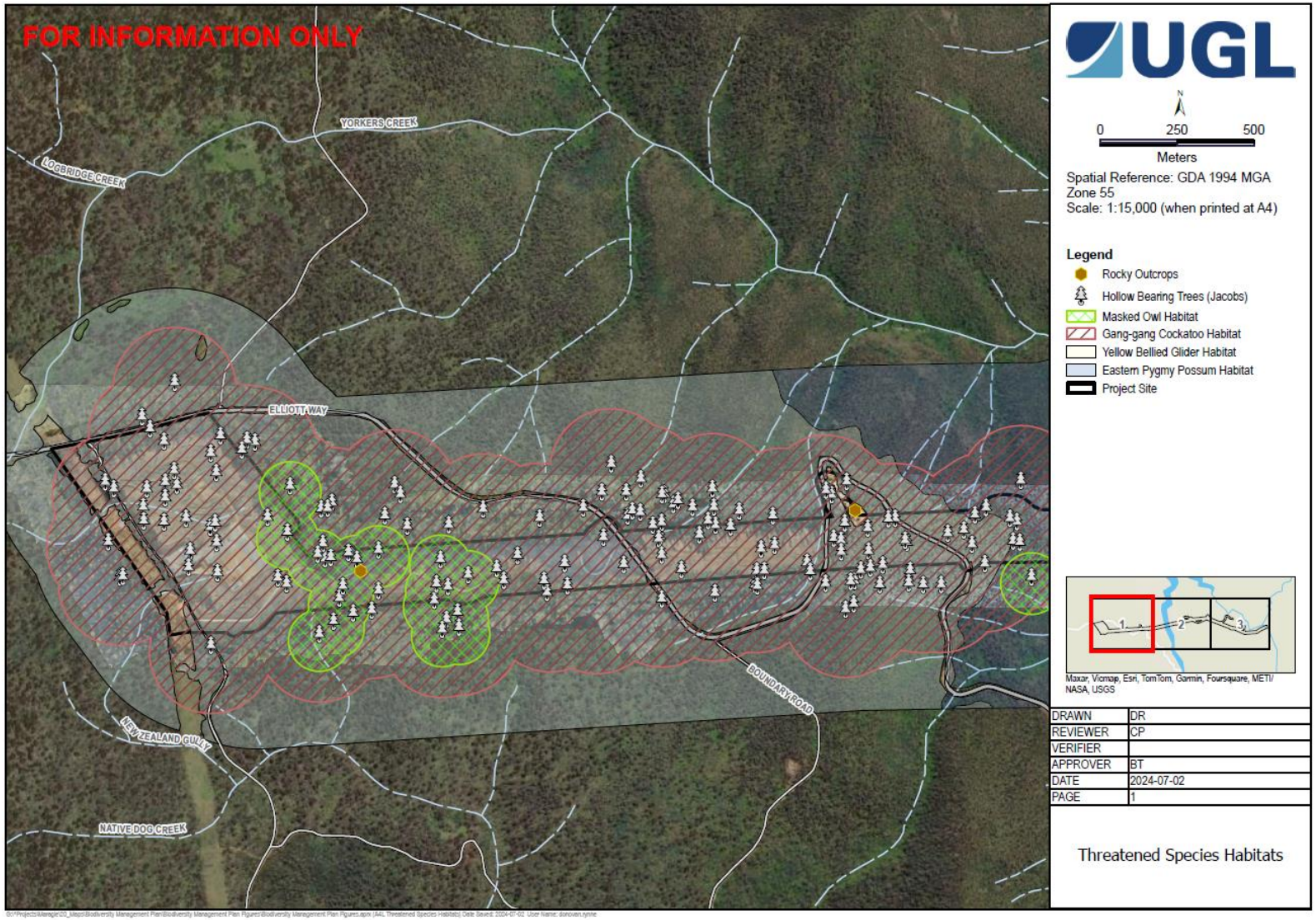

FOR INFORMATION ONLY
YORKERS CREEK
LOGBRIDGE CREEK
Elliott Way
Boundary Road
NEW ZEALAND GULLY
NATIVE DOG CREEK
0 250 500
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:15,000 (when printed at A4)
Legend
Project Site
PCT 285: Broad Leaved Sally Grass - sedge woodland
PCT 300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest
PCT 729: Broad-leaved Peppermint - Candlebark shrubby open forest
PCT 1196: Snow Gum - Mountain Gum shrubby open forest
Cleared
Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWER CP
VERIFIER
APPROVER BT
DATE 2024-07-02
PAGE 1
Plant Community Types

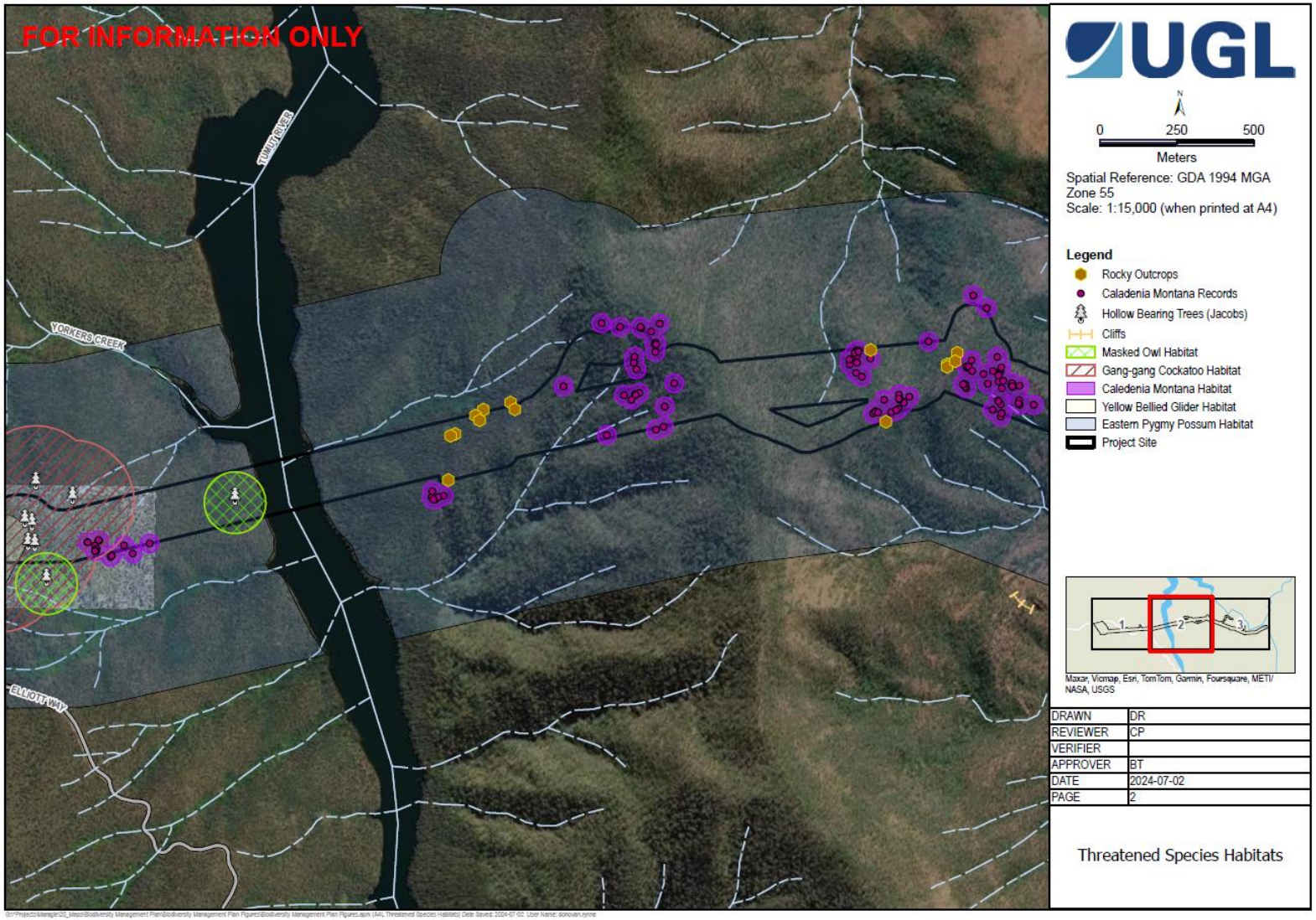

FOR INFORMATION ONLY
YORKERS CREEK
TUMUT RIVER
Elliott Way
UGL
N
0
250
500
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:15,000 (when printed at A4)
Legend
Project Site
PCT 296: Brittle Gum - peppermint open forest
PCT 300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest
PCT 302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland
PCT 729: Broad-leaved Peppermint - Candlebark shrubby open forest
PCT 999: Norton's Box - Broad-leaved Peppermint open forest
Cleared
Water
1
2
3
Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWER CP
VERIFIER
APPROVER BT
DATE 2024-07-02
PAGE 2
Plant Community Types

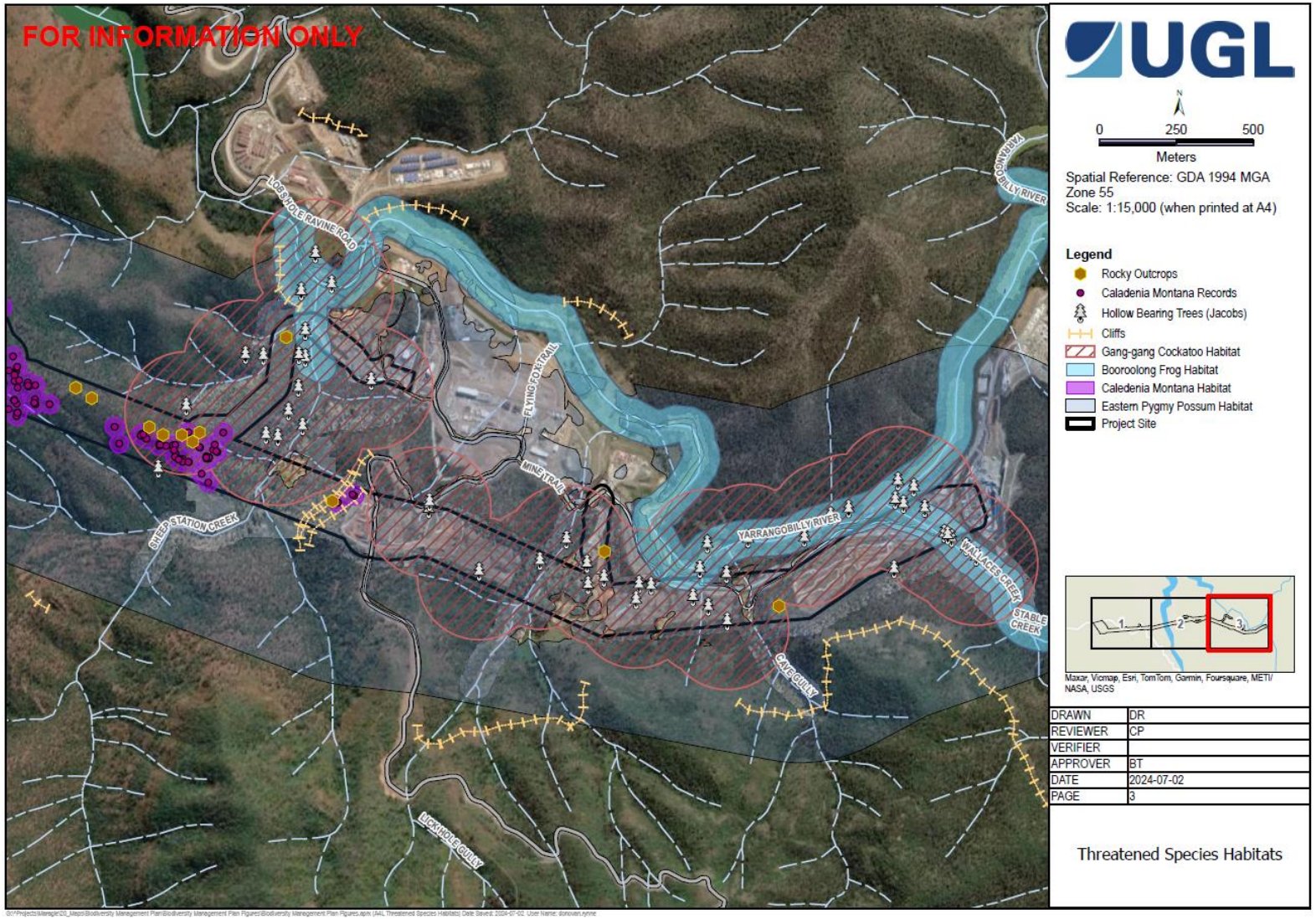

FOR INFORMATION ONLY
Lobs Hole Ravine Road
YARRANGOBILLY RIVER
Flying Fox Trail
Mine Trail
SHEEP STATION CREEK
YARRANGOBILLY RIVER
WALLACES CREEK
CAVE GULLY
LICK HOLE GULLY
0 250 500
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:15,000 (when printed at A4)
Legend
Project Site
PCT 285: Broad Leaved Sally Grass - sedge woodland
PCT 296: Brittle Gum - peppermint open forest
PCT 300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest
PCT 302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland
PCT 729: Broad-leaved Peppermint - Candlebark shrubby open forest
PCT 999: Norton's Box - Broad-leaved Peppermint open forest
Cleared
Water
1
2
3
Vicmap, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
DRAWN DR
REVIEWER CP
VERIFIER
APPROVER BT
DATE 2024-07-02
PAGE 3
Plant Community Types

APPENDIX B.6 Threatened Species Maps

Official


FOR INFORMATION ONLY
YORKERS CREEK
LOGBRIDGE CREEK
ELLIOTT WAY
BOUNDARY ROAD
NEW ZEALAND GULLY
NATIVE DOG CREEK
UGL
N
0
250
500
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:15,000 (when printed at A4)
Legend
Rocky Outcrops
Hollow Bearing Trees (Jacobs)
Masked Owl Habitat
Gang-gang Cockatoo Habitat
Yellow Bellied Glider Habitat
Eastern Pygmy Possum Habitat
Project Site
1
2
3
Maxar, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/ NASA, USGS
DRAWN DR
REVIEWER CP
VERIFIER
APPROVER BT
DATE 2024-07-02
PAGE 1
Threatened Species Habitats


FOR INFORMATION ONLY
TUMUT RIVER
YORKERS CREEK
ELLIOTT WAY
UGL
N
0
250
500
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:15,000 (when printed at A4)
Legend
Rocky Outcrops
Caladenia Montana Records
Hollow Bearing Trees (Jacobs)
Cliffs
Masked Owl Habitat
Gang-gang Cockatoo Habitat
Caledenia Montana Habitat
Yellow Bellied Glider Habitat
Eastern Pygmy Possum Habitat
Project Site
1
2
3
Maxar, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/ NASA, USGS
DRAWN DR
REVIEWER CP
VERIFIER
APPROVER BT
DATE 2024-07-02
PAGE 2
Threatened Species Habitats


FOR INFORMATION ONLY
LOCKYOKE RAVINE ROAD
FLYING FOX TRAIL
MINE TRACK
STEEP STATION CREEK
YARRANGOBILLY RIVER
HAMILTONS CREEK
STABLE CREEK
CAVE GULLY
BUCKHOLE GULLY
0
250
500
Meters
Spatial Reference: GDA 1994 MGA Zone 55
Scale: 1:15,000 (when printed at A4)
Legend
Rocky Outcrops
Caladenia Montana Records
Hollow Bearing Trees (Jacobs)
Cliffs
Gang-gang Cockatoo Habitat
Booroolong Frog Habitat
Caledenia Montana Habitat
Eastern Pygmy Possum Habitat
Project Site
Maxar, Vicmap, Esri, TomTom, Garmin, Foursquare, METI/ NASA, USGS
DRAWN DR
REVIEWER CP
VERIFIER
APPROVER BT
DATE 2024-07-02
PAGE 3
Threatened Species Habitats

APPENDIX B.7 Clearing Permit

Part A – Permit Information						
Permit Number:						
Site to be Cleared:						
Clearing required and proposed ha						
Total clearing zones			**Partial clearing zones**			
TSZ (within Civil works) (ha)	**ATZ (ha)**	**SZ (ha)**	**TSZ (outside Civil areas) (ha)**	**ECZ (ha)**	**HCZ (ha)**	**HTZ (ha)**
Permit Start Date: ***Permit valid for 4 weeks from date of issue***						
Has the IFC drawing been approved by Transgrid for construction? Yes / No / NA **Specify IFC drawing No.**						
If no drawing is required, describe activities being undertaken and provide justification for use of non-IFC drawings:						

Part B – Quality				
Testing Criteria	**Yes**	**No**	**N/A**	**Comments**
Has location to be cleared been clearly identified on documentation to be attached to ITP and/or ITC? **HOLD POINT**	☐	☐	☐	
Attach IFC drawings highlighting areas to be cleared, nominating hectare volumes of PCTS and habitat features.				
Total area to be cleared under this permit (m^3)				
Name (Engineer)	**Signature**	**Date**		
Comments:				

Indicative PCT and PCT to be cleared for reportable limits				
Actual area(s) cleared to be determined during post-clear survey and survey pickup				
CLEARING AREA BREAKDOWN				**INDICATIVE DISTURBANCE AREA (m^3)**
PCTs				
PCT 285: Broad-leaved Sally grass				
PCT 296: Brittle Gum				
PCT 300: Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern				
PCT 302: Riparian Blakely's Red Gum - Broad-leaved Sally woodland				
PCT 729: Broad-leaved Peppermint - Candlebark				
PCT 999: Norton's Box - Broad-leaved Peppermint				
PCT 1196: Snow Gum - Mountain Gum				
Native vegetation (total)				
Threatened Species Habitat Types				
Caladenia montana species habitat				
Gang-gang Cockatoo (breeding) species habitat				
Masked Owl (breeding) species habitat				
Eastern Pygmy-possum species habitat				
Yellow-bellied Glider species habitat				
Booroolong Frog species habitat				
Part C – Surveyor orSite Supervisor				
Requirement	**Yes**	**No**	**N/A**	**Comments**
Has the clearing extent and clearing zone boundaries been set out by the surveyor?	☐	☐	☐	Date: Model used:

Official

Has No Go Zone and disturbance footprint flagging been installed? Describe flagging.	☐	☐	☐	
Have heritage item Exclusion Zones been installed? Describe flagging.	☐	☐	☐	
Has Cultural Heritage Monitor (Elder) attendance been requested? (where required)	☐	☐	☐	
Has Project boundary limit flagging been installed? Describe flagging.	☐	☐	☐	
Has No Go Zone signage been installed? Describe signage.	☐	☐	☐	
Name (Surveyor)	**Signature**			**Date**

Part D – Project Ecologist				
Requirement	**Yes**	**No**	**N/A**	**Comments**
Has a pre-clear inspection been completed? **HOLD POINT**	☐	☐	☐	
Have habitat trees and habitat features been identified, GPS-mapped and marked? **HOLD POINT**	☐	☐	☐	
Have fauna release location/s been identified prior to clearing? Note locations.	☐	☐	☐	
Have any fauna been relocated at this time?	☐	☐	☐	
Have weeds been identified, GPS-mapped and marked?	☐	☐	☐	
Have weed hygiene protocols and controls been established?'	☐	☐	☐	
Have all No Go Zones and specific methodologies been clearly communicated to the relevant operator?	☐	☐	☐	
Has a final inspection been completed within 24hrs prior to clearing?	☐	☐	☐	
Name (Suitably Qualified Project Ecologist)	**Signature**			**Date**

Comments:

Part E – PC Environmental Team				
Requirement	**Yes**	**No**	**N/A**	**Comments**
Has a Progressive Erosion and Sediment Control Plan (PESCP) for the clearing area been prepared?	☐	☐	☐	
Is a modified clearing methodology required for the works?	☐	☐	☐	
Have Site Environmental Plans (SEPs) been prepared for the clearing area?	☐	☐	☐	
Has seed collection been completed as necessary in the location to be cleared? **HOLD POINT**	☐	☐	☐	
Have relevant stakeholders been notified of clearing works?	☐	☐	☐	
Has a final Transgrid clearing inspection been completed?	☐	☐	☐	
Have LAOKO, SONA and the local vet been notified of clearing?	☐	☐	☐	
Have areas for stockpiling weeds and impacted topsoil been identified in total clearing zones?	☐	☐	☐	
Have areas for stockpiling vegetation, topsoil and natural resources in total clearing zones?	☐	☐	☐	
Have clearance certificates for heritage impact been received?	☐	☐	☐	
Has a kick-off meeting been undertaken with operators and supervisors from clearing subcontractor team?	☐	☐	☐	

Official

Name (Environmental Advisor)	Signature	Date
Comments:		

Part F – Approval and Acceptance of Conditions		
Approval has been granted to clear the area and vegetation described in Section A and B and outlined in attached map(s). All conditions to be discussed at kick-off meeting prior to works commencing.		
Plant Operator acceptance of permit conditions		
Name:	**Signature:**	**Date:**
Name:	**Signature:**	**Date:**
Name:	**Signature:**	**Date:**
Name:	**Signature:**	**Date:**
Name:	**Signature:**	**Date:**
PC Site Supervisor acceptance of permit conditions, understood and communicated to site staff		
Name (Supervisor)	**Signature**	**Date**
Transgrid Approval to clear		
Name (Environmental Staff)	**Signature**	**Date**
PC Environmental Approval to clear		
Name (Environmental Advisor)	**Signature**	**Date**

Comments:

Daily sign off					
Date	**Project Ecologist signature**	**Supervisor Signature**	**Date**	**Project Ecologist signature**	**Supervisor Signature**

Permit Revalidation			
Reason for Extension	**Revision Expiry**	**Env. Advisor Signature**	**Supervisor Signature**

Part G – Clearing Close Out				
Requirement	**Yes**	**No**	**N/A**	**Comments**
Has a post clear survey of the works area been completed?	☐	☐	☐	
Has post clear as-built data been submitted to the engineering team for capture in GIS and clearing calculation confirmation?	☐	☐	☐	
Have any necessary habitat feature relocations been recorded and mapped?	☐	☐	☐	
Have any fauna injuries or deaths been appropriately reported within legislated timeframes?	☐	☐	☐	
Have any unexpected threatened species finds been reported?	☐	☐	☐	
Has a post clear ecology report been received from the Project Ecologist (a suitably qualified ecologist)	☐	☐	☐	
Have ESC measures been installed as per the PESCP?	☐	☐	☐	
Have ITPs related to cleared areas been closed out and filed?	☐	☐	☐	
Has clearing data been reported to Transgrid for biodiversity offset credit calculations and reporting purposes?	☐	☐	☐	
Have any necessary department notifications been completed and communicated to Transgrid?	☐	☐	☐	
Name (Environmental Advisor)	**Signature**			**Date**
Comments:				

APPENDIX B.8 No-go Access Permit

Information (TO BE COMPLETED BY PERSON REQUESTING ACCESS)			
Name:		Company:	
Position:		Permit No.:	
Start Date		Finish Date	

PROTECTED AREA LOCATION/S (ATTACH DRAWINGS/SKETCHES IF NECESSARY)			
Ch. From	**Ch. To**	**Location**	**Comments**

PART A: NOTIFICATION (TO BE COMPLETED BY ENVIRONMENTAL TEAM)						
Description of Works:						
Justification as to why entry is required:						
Protected Area:						
Booroolong Frog (50 m Exclusion Zone)*	☐	Habitat Trees, Habitat Area or nest tree buffer	☐			
Partial clearing zones (ECZ, HCZ and HTZ)	☐	Outside Clearing Limit	☐			
Heritage Sites *please circle* Aboriginal / Historic / Natural	☐	Outside Project Boundary	☐			
Tree Protection Zone	☐	Other, specify	☐			
Map included with approximate location marked?				Yes	☐	No ☒

Specify plant to be used, number of workers and whether any vegetation or ground disturbance is proposed:

PART B: NOTIFICATION (TO BE COMPLETED BY ENVIRONMENTAL TEAM)			
Items	**YES**	**NO**	**COMMENTS**
Is entry into the protected area absolutely necessary to complete construction works? Consider other methods that reduce the need to enter the protected areas.	☐	☐	
Do the works form part of the approved project?	☐	☐	
Will the works require additional approvals to be obtained – i.e. the preparation of a Consistency Assessment, a Modification or amendment to the Work Access Licence?	☐	☐	
Will the works impact on any of the areas outside of the Project boundary in any way?	☐	☐	
Will the works impact on any no-go protected areas in any way?	☐	☐	
Is a pre-entry assessment required to determine the condition of the habitat? Are photos required to compare with post-entry condition?	☐	☐	
Have relevant authorities been consulted? (e.g. NPWS) (if required)	☐	☐	
Is approval required from an authority prior to entry?	☐	☐	
Are special conditions or instructions for entry required?	☐	☐	
Process Permit Entry Request Further?	**No**	☐	**ENTRY NOT PERMITTED**
	Yes	☐	**CONTINUE TO PROCESS FORM**

PART C: PERMIT INDUCTION				
NAME	SIGNATURE	DATE	POSITION	COMPANY

PART C: PERMIT INDUCTION				
NAME	SIGNATURE	DATE	POSITION	COMPANY

PART D: SPECIAL CONDITIONS OR INSTRUCTIONS FOR ENTRY

PART D: APPROVAL TO ENTER NO-GO ZONE(S) (Signed by Environment Manager or delegated representative only)			
Approval has been granted to enter the no go zone(s) above for the purposes identified above (Part A), for those inducted above (Part C) and with consideration of the conditions (Part D).			
Name	Signature	Approval Date	Expiry Date

APPENDIX B.9 Environmental Permit Register

Date/time	Permit number	Permit type	Relevant location on site	Date permit commenced	Date permit ceased	Approved by

APPENDIX C Fauna Rescue and Release Procedure

Purpose

This procedure explains the actions to be undertaken in the event that fauna (including injured, shocked, juvenile or other animals) are discovered in the Project area that require handling or rescue during vegetation, soil disturbance, and construction activities.

Scope

This procedure is applicable to all native, and non-native fauna species found within the Project area.

Where a threatened fauna species is unexpectedly encountered during Project activities, refer to the Unexpected Threatened Species Finds Procedure (Appendix D).

Induction and Training

All site personnel and subcontractors will be made aware of the actions to be taken in the event that fauna is discovered on the Project. Additionally, Project personnel will be made aware of measures to mitigate fauna injury and death during construction and operation, such as adhering to speed limits, engaging Project Ecologist or a suitably qualified ecologist support during clearing, covering excavations to prevent fauna ingress, and securing waste in bins. Such training will occur on site during the Project Induction and as required in Toolbox Talks.

Rescue Procedure

If wildlife is discovered in the Project area during construction **that may harm the animal** or **pose risk to site personnel**, the following steps will be taken.

1. Stop all work in the vicinity of the animal and immediately notify the Site Supervisor who is then to notify the Project Ecologist and/or SEA.

2. Preferably allow the animal to leave the area without intervention, particularly if it is not injured or in shock, and if safe to do so for the animal (i.e., no machinery in the immediate vicinity). Passive relocation techniques can be used for this, such as isolating the area overnight, apply an egress feature such as a plank, or using diversion or exclusion features to isolate the animal from the works.

3. Use a qualified ecologist or wildlife carer with specific animal handling experience to carry out any fauna handling.

4. Where necessary to minimise stress to the animal and/or remove the risk of further injury before the Project Ecologist or wildlife handler arrives on site, the SEA may implement the Handling Procedure detailed below.

5. If the animal cannot be handled (i.e., venomous reptiles, raptors, bats):

    a) Exclude all personnel from the vicinity with barricading and/or signage; and

    b) Record the exact location of the animal(s) to be provided to the Project Ecologist or appropriate wildlife handler.

6. Call the Project Ecologist or appropriate wildlife handler, refer to contact details provided

in table below, and follow any advice provided. Once the Project Ecologist or wildlife handler arrives on site, they are responsible for the animal and any decisions regarding the care of the animal will be made by that person.

7. In the event that wildlife carers, and/or local veterinary services cannot be contacted, the injured animal shall be kept in a quiet, warm and dark place in accordance with the below Handling Procedure, until it can be transferred to a wildlife carer or vet.
8. If any fauna is to be euthanised, it will be undertaken using a suitable technique (e.g., cervical dislocation for small mammals) by a trained and competent person(s) (i.e., suitably qualified Project Ecologist or wildlife handler); or will be taken to a veterinarian for euthanasia. Identified pest species onsite will also be humanely euthanised. The Project Ecologist will consider methods that are humane, painless and rapid.
9. If the fauna is to be released, suitable fauna release locations within or near the Project area will be used, the locations for which are best identified during pre-clearance surveys. Suitable release locations should be identified before commencement of activities that may displace fauna (such as for habitat removal like hollow logs or rocky outcrops).
10. Details of captured and relocated fauna (including injury or death) must be recorded on the Fauna Rescue Event Record, refer to Reporting Requirements below.

Handling Procedure

The Handling Procedure will be implemented only if intervention is necessary (i.e., where fauna is injured or otherwise unable to leave the site, or to minimise stress to the animal, and/or to remove the risk of further injury). The Project Ecologist will implement the following procedures:

1. Gently cover larger animals (including their head) with a towel or blanket and, if feasible, place in a cardboard box or cloth/hessian bag.
2. Place smaller animals (like mammals, birds, reptiles) separately in a cotton bag, and tied at the top.
3. Live frogs and/or tadpoles are **NOT** to be handled.
4. Dead frogs would be handled only using single-use gloves and buried in-situ to avoid movement of pathogens.
5. Fish and other aquatic life (like turtles) should be placed in plastic aquaria or plastic container(s) with sufficient water.
6. For terrestrial fauna, keep the animal in a quiet, warm, ventilated and dark place away from noisy activities.
7. For aquatic fauna, ensure a sufficient amount of water and adequate ventilation at the water interface
8. Gloves will be worn when handling mammals to protect against scratches and bites.

9. Snake handling must be as follows:

    a) Handling of snakes must only be undertaken by a qualified ecologist or wildlife handler with experience in snake handling

    b) No contact handling techniques should be used (i.e., use a snake hook and bag as opposed to manually handling the snake)

10. All handling of bats must be as follows:

    a) Bats must only be handled by a qualified ecologist or wildlife handler experienced in bat handling, and vaccinated against the Australian Bat Lyssavirus (ABL)

    b) Gloves must be worn when handling bats

    c) Larger bats would be wrapped in a large towel and handled while wearing elbow length puncture proof gloves

11. Refer to Appendix J for any translocation requirements regarding the Yellow-Bellied Glider.

Pest and predators will be controlled in accordance with the Pest and Predator Monitoring Plan (Appendix I) of the BMP.

Vehicle Strike Procedure

If during construction any wildlife within the Project area is struck by a vehicle, while ensuring personal safety, the rescue and handling procedures outlined above will be implemented.

If fauna strike occurs along the broader road network outside the Project area, while ensuring personal safety, drivers are to contact the local wildlife carers directly (contact details are provided below).

Details of struck fauna must be recorded on the Fauna Rescue Event Record, refer to reporting requirements below.

Wildlife Carer Contact Details

The ecologist, SEA, or Environmental Manager must contact the two local wildlife carer organisations, LAOKO and SONA, prior to commencement of each stage of works to determine availability to assist with caring of injured native wildlife if required.

In the event that local wildlife carers are not available, the national WIRES contact number can be used to identify other local qualified wildlife carers.

The ecologist, SEA or Environmental Manager will also contact veterinary clinics prior to commencement of each stage, to confirm if they have the capabilities to attend site to euthanise an injured wild horse or large animal. NPWS may also assist in this situation if the situation pertains to KNP and must be kept advised of such events.

Role	Organisation	Location	Contact Details
Local Wildlife Carers	Looking after our Kosciuszko Orphans (LAOKO)	Southern NSW, around Jindabyne to Victorian border	6456 1313
Wildlife Carers	Saving our Native Animals (SONA)	Southern NSW, around the areas of Batlow and Tumbarumba	6946 2222
Wildlife Carers	WIRES	National	1300 094 734
Veterinary Clinic	Tumut Veterinary Clinic	78 Adelong Road, Tumut NSW	6947 3122
Veterinary Clinic	Monaro Veterinary Clinic	3 Massie Street, Cooma NSW	6452 2292
Veterinary Clinic	Tumburumba Veterinary Clinic	3 The Parade, Tumbarumba NSW 2653	6948 2100
NPWS	National Parks and Wildlife Service	Statewide	Call current NPWS Snowy 2.0 team members

Reporting Requirements

Details of captured and relocated fauna (including injury or death) will be recorded on the Fauna Rescue Event Record, including:

- Species
- Location and time captured
- Location and time released
- Behaviour and condition on capture
- Behaviour and condition on on release
- Contact details of wildlife carer or vet if the animal was transferred into their care

In the event of a protected fauna species death or injury during construction works, an environmental incident will be recorded and reported to Transgrid as per agreed contractual timeframes. Transgrid will maintain an environmental incident register including any fauna deaths/injuries which will be provided monthly to DPHI, RDD and NPWS.

During asset operation, Transgrid will handle the reporting of any fauna death or injury in accordance with their internal environmental incident reporting and investigation procedures.

APPENDIX D Unexpected Threatened Species Procedure

Purpose

This procedure details the actions to be taken when a threatened species (flora or fauna) is unexpectedly encountered during construction activities.

Scope

This procedure is applicable to all activities conducted by personnel that have the potential to come into contact with threatened species.

Where threatened fauna is unexpectedly encountered and requires handling or rescue, refer to the Fauna Handling and Rescue Procedure (Appendix C of this BMP).

Where threatened flora is unexpectedly encountered and requires removal or relocation, refer to the procedure below.

Refer to below for a guide to identifying potential threatened species onsite.

Induction/Training

Where required, personnel will be inducted on the identification of threatened species known to occur within or surrounding the Project area, outlined below. Actions 1a and 1b of the unexpected threatened species finds procedure detailed below will be discussed during the Project Induction, Site Inductions and regular Toolbox Talks.

Qualified ecologists will be engaged to undertake ecological preliminary activities prior to clearing. As part of this engagement, ecologists will be required to check for unexpected finds and report where encountered. Ecologists engaged will be made familiar with threatened and unexpected species identification.

Procedure

1. Threatened species/ EEC is unexpectantly encountered during clearing/construction and operation activities:	Responsible Authority
a) **STOP ALL WORK** in the vicinity of the find b) Immediately notify Transgrid's Representative. Transgrid's Representative will then contact the Project Ecologist and immediately notify NPWS if located within for KNP; or FCNSW if within State Forest. For contact details, refer to the Contacts list in the CEMP. c) PC SEA, Project Ecologist or delegated other will establish a no-go zone around the threatened species. For the unexpected encounter of breeding Masked Owls and Gang-Gang Cockatoos, the following no-go zones buffers will be applied: ○ Masked Owl 50m ○ Gang-Gang Cockatoo 100m For the unexpected encounter of all other threatened species, the Project Ecologist will establish a no-go zone on a case-by-case basis.	• PC to notify Transgrid • Transgrid to engage ecologist and notify NPWS or FCNSW • PC SEA or Project Ecologist to establish no go zone
2. Assessment of Impact	
An assessment is to be undertaken by a suitably qualified individual to identify the plant, animal (to species level) or community and the likely impact to the threatened species/EEC. The assessment will outline appropriate management options such as relocation measures or minimal impact, developed in consultation with Transgrid, RDD, NPWS, FCNSW and DCCEEW. The assessment will also determine if any further approvals or changes to Project offsets are required	• Qualified and experienced consultant/ecologist • Transgrid to notify required departments
3. Approvals	
If required, obtain any relevant license, permits or approvals to impact the threatened species/EEC.	Transgrid
4. Recommencement of works	
Construction or operation works may recommence once Transgrid has informed PC (during construction) that the following has occurred: • Approvals are obtained as required, and it is confirmed that all corrective actions and additional mitigation measures have been implemented. • Ensured that the threatened species/EEC is included in subsequent Site Environmental Plans, Project Inductions and Toolbox Talks • Information has been provided to Transgrid and relevant stakeholders to ensure ecological monitoring requirements are updated and/or biodiversity offsets are taken into account.	Transgrid

Threatened Species Identification Guide

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Dusky Woodswallow *Artamus cyanopterus*	Not listed	Vulnerable	**Description:** Is a medium-sized bird (16-19.5 cm, 35 g), with a longish tail. Mostly dark grey, brown, merging to blackish on the tail, with a small black-brown mask. Bluish bill with a black tip. Upper-wings are a dark blue-grey with a white leading edge. Conspicuous white corners on the tail. In flight the dark grey-brown under-body contrasts with the whitish under-wing. Juveniles may be distinguished by white streaking on the body and whitish tips on wing feathers. Immature individuals are similar to adults but retain pale-tipped wing feathers. No seasonal variation in appearance is evident, and sexes are alike. **Habitat:** Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. **Foraging:** Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed.		Present
Gang-gang Cockatoo *Callocephalon fimbriatum*	Endangered	Endangered	**Description:** These birds are primarily slate-grey, with the males easily identified by their scarlet head and wispy crest, while females have a grey head and crest and feathers edged with salmon pink on the underbelly. They range in length from 32 to 37 cm, with a wingspan of 62 to 76 cm. **Habitat:** In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground.		Present

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	Vulnerable	Vulnerable	**Description:** A grey-brown bird (approx. 16cm tall with 25 cm wingspan) with black streaking on the lower breast and belly and black bars on the undertail. Pale buff bands across the flight feathers are obvious in flight. The face is pale, with a dark line through the eye, and a dark crown. Sexes differ slightly in all plumages, with small patches of black and white streaking on the centre of the uppermost breast on males, while the females exhibit a rufous and white streaking. Juveniles differ from adults mainly by the pattern of the under-body, and by a pale bill and gape. **Habitat:** Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Hollows in standing dead or live trees and tree stumps are essential for nesting. **Foraging:** When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches; up to 80% of the diet is comprised of ants; other invertebrates (including spiders, insect larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings) make up the remaining percentage.		Present
Varied Sittella *Daphoenositta chrysoptera*	Not listed	Vulnerable	**Description:** Is a small (10 cm) songbird with a sharp, slightly upturned bill, short tail, barred undertail, and yellow eyes and feet. In flight the orange wing-bar and white rump are prominent. In NSW most individuals have a grey head and are streaked with dark brown, but in the extreme north-east they have a white head, and in the extreme south-west a black cap. **Habitat:** Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. **Foraging:** Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.		Present

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Scarlet Robin *Petroica boodang*	Not listed	Vulnerable	**Description:** The Scarlet Robin is a small Australian robin that reaches 13 cm in length. The male has a black head and upperparts, with a conspicuous white forehead patch, white wing stripes and white tail-edges. The male has a bright scarlet-red chest and a white belly. The female is pale brown, darker above, and has a dull reddish breast and whitish throat. The whitish mark on the female's forehead is smaller than the males. The female Scarlet Robin also has white wing and tail markings. Immature males resemble females. **Habitat:** The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. **Foraging:** Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer.		Present
Hooded Robin (south-eastern form) Melanodryas *cucullata cucullata*	Endangered	Endangered	**Description:** Large robin reaching 17 cm in length. The male is strikingly marked in black and white, with a bold black hood extending down a white breast. The back is black with distinct white shoulder and wing-bar. The tail is black, with prominent white side-panels. Females and immatures are duller, with light brownish-grey upperparts, but the same striking black and white wings. Flight is short and swiftly undulating. The call is a series of descending, fading, mellow notes. **Habitat:** Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or opens areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. **Foraging:** Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey.		Moderate

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Flame Robin *Petroica phoenicea*	Not listed	Vulnerable	**Description:** Is a small Australian robin that reaches 14 cm in length. The male has a dark grey head and upperparts, a small white forehead patch, and white wing stripes and white tail-edges. The male has a bright orange-red throat, breast and upper-belly. The lower belly is white. The female is brown, darker above, and has a whitish throat and lower belly. The whitish mark on the female's forehead is inconspicuous. Female Flame Robins also have white and buffish marked wings and tail. Immature males resemble females. **Habitat:** Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. **Foraging:** Birds forage from low perches, from which they sally or pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris. Flying insects are often taken in the air and sometimes gleans for invertebrates from foliage and bark.		Present
Pink Robin *Petroica rodinogaster*	Not listed	Vulnerable	**Description:** The male Pink Robin has a sooty black throat and upperparts. The wings have faint, tan-buff wing-bars. The breast and belly are deep lilac-pink, and there is a small white patch on the forehead. The tail is plain, making this species the only 'red' robin with no white markings on the tail. It differs from the similar, and more common Rose Robin *Petroica rosea*, which is dark grey above, with a deeper rose-pink breast and white belly, and white outer tail feathers. The female has warm olive-brown upperparts and cinnamon-buff underparts, a buff forehead spot, and may have a slight pink wash on the breast. The chestnut-buff wings and the absence of white in the tail, distinguishes the female from all other female robins. **Habitat:** Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. Breeds between October and January and can produce two clutches in a season. The nest is a deep, spherical cup made of green moss bound with cobweb and adorned with camouflaging lichen, and is lined with fur and plant down. It is situated in an upright or oblique fork, from 30cm to 6m above the ground, in deep undergrowth. **Foraging:** Catches prey by the perch-and-pounce method, foraging more on the ground than the more flycatcher-like Rose Robin. Insects and spiders are the main dietary items.		Present
Diamond Firetail *Stagonopleura guttata*	Vulnerable	Vulnerable	**Description:** The Diamond Firetail is a large (length 10 to 12 cm, weight 17 grams), striking finch with a bright red bill, and red eyes and rump. The white throat and lower breast are separated by a broad black breast-band that extends into the strongly white-spotted, black flanks. It has a grey back and head, and ashy-brown wings. The call is a plaintive, drawn-out, nasal 'twoo-wheee'. **Habitat:** Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. **Foraging:** Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects.		Present

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Olive Whistler *Pachycephala olivacea*	Not listed	Vulnerable	**Description:** Small, stocky bird with a large head and strong sharp bill. It grows up to 22 cm long, including the 10 cm tail. It has a dark grey head, olive-brown upperparts, a grey throat and buff-brown underparts. The female is duller in colour than the male. The Olive Whistler has perhaps the most rich and melodious array of calls of any of the whistlers. **Habitat:** Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. Forage in trees and shrubs and on the ground, feeding on berries and insects. Make nests of twigs and grass in low forks of shrubs. Lay two or three eggs between September and January.		High
Barking Owl *Ninox connivens*	Not listed	Vulnerable	**Description:** Medium-sized owl (42 cm, 650 g), smaller than the similar Powerful Owl and larger than the Southern Boobook. It has bright yellow eyes and no facial-disc. Upperparts are brown or greyish-brown, and the white breast is vertically streaked with brown. The large talons are yellow. Males are typically larger than their mate and have a squarer crown. The quick, dog-like 'wook-wook' territorial call is diagnostic, but the yapping of foxes, dogs and even Sugar Gliders is sometimes attributed to this species. **Habitat:** Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Nesting occurs during mid-winter and spring, being variable between pairs and among years. **Foraging:** Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch.		Moderate

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Powerful Owl *Ninox strenua*	Not listed	Vulnerable	**Description:** A typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. Juvenile Powerful Owls have a white crown and underparts that contrasts with its small, dark streaks and dark eye patches. **Habitat:** inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest and requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.		High
Sooty Owl *Tyto tenebricosa*	Not listed	Vulnerable	**Description:** Medium-sized owl to 45 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc. Dark sooty-grey in colour, with large eyes in a grey face, fine white spotting above and below, and a pale belly. The plumage of the fledglings is similar to the adult but has tufts of down on the head and underparts. **Habitat:** Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (*Pseudocheirus peregrinus*) or Sugar Glider (*Petaurus breviceps*). Nests in very large tree-hollows.		Moderate
Masked Owl *Tyto novaehollandiae*	Not listed	Vulnerable	**Description:** A medium-sized owl to 40 - 50 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc that is encircled by a dark border. The feet are large and powerful, with fully feathered legs down to the toes. The owl exists in several colour forms, with wide variation in plumage. The upperparts are grey to dark brown with buff to rufous mottling and fine, pale spots. The wings and tail are well barred. The underparts are white to rufous-brown with variable dark spotting. The palest birds have a white face with a brown patch around each eye; the darkest birds have a chestnut face. **Habitat:** Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 1000 hectares or more, depending on prey availability. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.		Present

Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022); (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022), (WWF, 2021))	**Occurrence likelihood**
White-bellied Sea Eagle *Haliaeetus leucogaster*	Not listed	Vulnerable	**Description:** Large eagle that has long broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length, and has a wingspan of 180–220 cm. Adults are predominantly white and grey. The head, breast and belly, and the feathering on the legs, are white. The back and upper surfaces of the wings are grey, and the undersides are greyish-black with a smaller area of white along the leading edge. The tail is grey at the base and has a white tip. **Habitat:** Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.		Moderate
Little Eagle *Hieraaetus morphnoides*	Not listed	Vulnerable	**Description:** Medium-sized bird of prey that occurs in two colour forms: either pale brown with an obscure underwing pattern, or dark brown on the upper parts and pale underneath, with a rusty head and a distinctive underwing pattern of rufous leading edge, pale 'M' marking and black-barred wingtips. **Habitat:** Occupies open eucalypt forest, woodland or open woodland. She-oak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. **Foraging:** Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.		Moderate
Square-tailed Kite *Lophoictinia isura*	Not listed	Vulnerable	**Description:** A reddish, medium-sized, long-winged raptor, about the size of a Little Eagle or harrier. As with most raptors, there is sexual dimorphism in morphology with females being larger than males. Males weigh approximately 500 g while females weigh 650 g. The Square-tailed Kite has a length of 50-56 cm and wingspan of 130-145 cm. Adults have a white face with thick black streaks on the crown and finer streaks elsewhere. The saddle, rump and central upper tail coverts are blackish with grey-brown barring. The underparts are predominantly grey-brown with black tips on the grey, square-tipped tail and wing edges. There are no differences in colour between males and females. **Habitat:** Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Appears to occupy large hunting ranges of more than 100 square km. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. **Foraging:** Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage.		Moderate

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Eastern Pygmy-possum *Cercartetus nanus*	Not listed	Vulnerable	**Description:** Tiny (15 to 43 grams) active climbers, with almost bare, prehensile (capable of curling and gripping) tails, and big, forward-pointing ears. They are light brown above and white below. Adults have a head and body length between 70 - 110 mm and a tail length between 75 - 105 mm. **Habitat:** Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. They may occupy small patches of vegetation in fragmented landscapes and although the species prefers habitat with a rich shrub understory, they are known to occur in grassy woodlands and the presence of Eucalypts alone is sufficient to support populations in low densities. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests. **Foraging:** Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.		Present
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Not listed	Vulnerable	**Description:** Is relatively large with a head-body length of about 65 mm. It weighs up to 28 grams. It is dark to reddish-brown above and paler grey on its underside. It has long slender ears set well back on the head and some sparse hair on the nose. **Habitat:** Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hibernates in winter. Females are pregnant in late spring to early summer. **Foraging:** Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy.		Present
Southern Myotis *Myotis macropus (Myotis adversus)*	Not listed	Vulnerable	**Description:** Disproportionately large feet; more than 8 mm long, with widely spaced toes which are distinctly hairy and with long, curved claws. It has dark grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm. **Habitat:** Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. In NSW females have one young each year usually in November or December. Local records from Tumut River and Yarrangobilly River. **Foraging:** Forage over streams and pools catching insects and small fish by raking their feet across the water surface.		High

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Large Bent-winged Bat *Miniopterus orianae oceanensis*	Not listed	Vulnerable	**Description:** Has chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the "bent wing" appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm. **Habitat:** Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. **Foraging:** Hunt in forested areas, catching moths and other flying insects above the tree tops.		Present
Yellow-bellied Glider *Petaurus australis*	Vulnerable	Vulnerable	**Description:** Is a large, active, sociable and vocal glider. Adults weigh 450 - 700 grams, have a head and body length of about 30 cm and a large bushy tail that is about 45 cm long. It has grey to brown fur above with a cream to yellow belly, which is paler in young animals. The dark stripe down the back is characteristic of the group. It has a large gliding membrane that extends from the wrist to the ankle. **Habitat:** Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources. **Foraging:** Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive ‘V’-shaped scar.		Present
Squirrel Glider *Petaurus norfolcensis*	Not listed	Vulnerable	**Description:** Adult Squirrel Gliders have a head and body length of about 20 cm. They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length. Squirrel Gliders are up to twice the size of Sugar Gliders, their facial markings are more distinct and they nest in bowl-shaped, leaf lined nests in tree hollows. Squirrel Gliders are also less vocal than Sugar Gliders. **Habitat:** Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. **Foraging:** Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.		Moderate

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Greater Glider *Petauroides volans*	Endangered	Endangered	**Description:** Largest gliding possum in eastern Australia. It has a weight range of 900-1700 g. Females are larger than males. It has a head and body length of 350-450mm and a long furry tail measuring 450-600mm. The Southern Greater Glider has thick fur that increases its apparent size. Fur colour is white or cream below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has large ears with hair that projects past the outer ear edge. It has strongly reflective eyeshine in the beam of a spotlight making it easy to detect. **Habitat:** Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age. **Foraging:** Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe.		Moderate
Spotted-tailed Quoll *Dasyurus maculatus*	Endangered	Vulnerable	**Description:** About the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. The average weight of an adult male is about 3500 grams and an adult female about 2000 grams. It has rich-rust to dark-brown fur above, with irregular white spots on the back and tail, and a pale belly. The spotted tail distinguishes it from all other Australian mammals, including other quoll species. However, the spots may be indistinct on juvenile animals. **Habitat:** Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Are known to traverse their home ranges along densely vegetated creek lines. **Foraging:** A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl.		High

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Brush-tailed Phascogale *Phascogale tapoatafa*	Not listed	Vulnerable	**Description:** The Brush-tailed Phascogale is tree-dwelling marsupial carnivore. It has a characteristic, black, bushy 'bottlebrush' tail, with hairs up to 4 cm long. Its fur is grey above and pale cream below and it has conspicuous black eyes and large naked ears. Adults have a head and body length of about 20 cm, a tail length of about 20 cm and weigh 110 - 235 grams. **Habitat:** Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest, and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter. **Foraging:** Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates.		Moderate
Koala *Phascolarctos cinereus*	Endangered	Endangered	**Description:** Arboreal marsupial with fur ranging from grey to brown above, and white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows. **Habitat:** Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. Spend most of their time in trees, but will descend and traverse open ground to move between trees.		Moderate
Smoky Mouse *Pseudomys fumeus*	Endangered	Critically Endangered	**Description:** Similar in size to a small rat, with a head and body length averaging about 90 mm and a tail averaging 140 mm. The average adult weight is 52 grams (ranging between 38 - 68 grams). The fur is fine, soft, pale-grey to bluish-grey above, with a grey to white belly and a ring of dark hairs around the eye. The tail is long, narrow and sparsely furred, mostly pale to pinkish, with a narrow, dark stripe along the upper surface. **Habitat:** The Smoky Mouse appears to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies. Nesting burrows have been found in rocky localities among tree roots and under the skirts of Grass Trees Xanthorrhoea spp. **Species has been recorded along Lob's Hole Ravine Road and above 1,100 m a.s.l.** **Foraging:** Seeds and fruits from leguminous shrubs form the main summer and autumn diet, with some invertebrates, e.g., Bogong Moths in the high country. Hypogeal (truffle-like) fungi predominate in winter and spring, with some flowers, seeds and soil invertebrates.		High

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Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	Not listed	Vulnerable	**Description:** Is a very distinctive, large, insectivorous bat up to 87 mm long. It has long, narrow wings, a glossy, jet-black back, and a white to yellow belly extending to the shoulders and just behind the ear. Characteristically, it has a flattened head and a sharply-pointed muzzle. The tail is covered with an extremely elastic sheath that allows variation in the tail-membrane area. Males have a prominent throat pouch; females have a patch of bare skin in the same place. **Habitat:** Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn. **Foraging:** When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.		Present
Booroolong Frog *Litoria booroolongensis*	Endangered	Endangered	**Description:** The Booroolong Frog is a medium sized tree frog, with adults growing to about 5 cm. Their body-colour may be grey, olive or brown with indistinct black markings. The abdomen is white. The skin usually has a slightly warty appearance. The fingers and toes have well developed discs, and the toes are strongly webbed. The call is a soft, purring ‘craww’. **Habitat:** Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins. Shelter under rocks or amongst vegetation near the ground on the stream edge. Sometimes bask in the sun on exposed rocks near flowing water during summer. Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools.		Assumed present
Alpine Tree Frog *Litoria verreauxii alpina*	Vulnerable	Endangered	**Description:** Relatively small tree frog, growing to about 3 cm long. Colouration is highly variable; there are green, brown and grey forms. They have a black stripe from the nostrils, through the eyes, to the top of the foreleg, and a (usually divided) broad brown stripe from the eyes and down the back. The distinguishing feature of the Alpine Tree Frog is its warty back, whereas the lowland Whistling Tree Frog is generally smooth. The call is a "trilled whistle ‘cree…cree…cree…’", heard in late spring and summer. **Habitat:** Found in a wide variety of habitats including woodland, heath, grassland and herb fields. Breed in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are still or slow flowing. It does not climb well, and spends most of its time on the ground. Eats beetles, flies, spiders and moth larvae. Breeding occurs in December. Males call from the water at the edges of the pools, and eggs are attached to submerged vegetation. Tadpoles metamorphose into froglets in late summer. Non-breeding habitat and overwintering refuges are poorly known but are likely to include flat rocks, fallen logs, leaf litter and other ground debris.		High

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Rosenberg's Goanna, Heath Monitor *Varanus rosenbergi*	Not listed	Vulnerable	**Description:** Reaches up to 1.5 metres in length. It is dark grey above, finely spotted with yellow or white, and with paired, blackish cross-bands from the neck to the end of the tail. The pairs of narrow, regular bands around the entire length of the tail is a distinguishing feature, separating it from the more common Lace Monitor *V. varius*, which has very wide, light and dark bands towards the tip of the tail. Rosenberg's Goanna also has distinct, finely barred "lips", whereas the Lace Monitor has far broader bands around the snout. A pale-edged black stripe runs from the eyes, across the ears and onto the neck. Juveniles are brighter in colour, having an orange wash on the sides of the face and body. **Habitat:** Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in; termite mounds are a critical habitat component. Individuals require large areas of habitat. Feeds on carrion, birds, eggs, reptiles and small mammals. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens. Runs along the ground when pursued (as opposed to the Lace Monitor, which climbs trees). Lays up to 14 eggs in a termite mound; the hatchlings dig themselves out of the mounds. Generally slow moving; on the tablelands likely only to be seen on the hottest days.		Moderate
Mountain Spider Orchid *Caladenia montana*	Not listed	Vulnerable	**Description:** *Caladenia montana* is a terrestrial orchid with a leaf 80–120 mm long and 8–12 mm wide. The flower stem is 100–250 mm tall, with one flower which is 40–60 mm across, greenish cream or cream, sometimes with reddish markings. The sepals have thickened club-like tips that are dark red or brownish and 8–15 mm long. The labellum is 10–12 mm long by 7–9 mm wide, mostly maroon, with a paler base and margins with 6–8 pairs of red teeth to 1.5 mm long. **Habitat:** Restricted to high montane areas 700–1000 m a.s.l. where it grows in well-drained loam on slopes and ridges of montane forest among an understorey of shrubs. **Flowering:** Flowering occurs from October to January. Flowers are pollinated by a wasp from the genus *Phymatothynnus.*		Observed onsite
Mauve Burr-daisy *Calotis glandulosa*	Vulnerable	Vulnerable	**Description:** The Mauve Burr-daisy is a sprawling, branched herb that grows to 20 cm tall and up to 1 m wide. The soft, bright green, hairy leaves have indented edges. They are up to 3 cm long and 9 mm wide. The 2 cm wide flower-heads are solitary, mauve, and have a yellow centre. Flowers may also be white, blue or pink. They appear in spring and summer. Flowers are followed by a head of brown burrs that may stick to clothing and animals' coats. **Habitat:** Found in montane and subalpine grasslands in the Australian Alps. Found in subalpine grassland (dominated by *Poa spp*.), and montane or natural temperate grassland dominated by Kangaroo Grass (*Themeda australis*) and Snow Gum (*Eucalyptus pauciflora*) Woodlands on the Monaro and Shoalhaven area. Appears to be a coloniser of bare patches, which explains why it often occurs on roadsides. **Flowering:** Spring and summer.		Moderate

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Hoary Sunray *Leucochrysum albicans var. tricolor*	Endangered	Endangered	**Description:** A perennial everlasting daisy. Stems are 10–15 cm tall, with narrow leaves 2–10 cm long, covered in White cottony hairs. Yellowish flowerheads are 2–5 cm in diameter, surrounded by numerous papery, white, overlapping ovate-oblong bracts, with the outer layers tinged red, pink, purple or brown. Fruits are brown, ovoid, 2–3 mm long, with 14–20 pappus bristles **Habitat:** Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Can occur in modified habitats such as semi-urban areas and roadsides. Highly dependent on the presence of bare ground for germination. In some areas, disturbance is required for successful establishment. **Flowering:** August to March.		Low
Cotoneaster Pomaderris *Pomaderris cotoneaster*	Endangered	Endangered	**Description:** Cotoneaster Pomaderris is a shrub growing to 4 m tall. Its young stems have a covering of short, white, star-shaped hairs. Its leaves are elliptical, to 30 mm long and 15 mm wide with a tip that is sometimes indented (thus resembling the horticultural Cotoneaster, to which it is not related). The upper surface of the leaf is bristly, and the lower surface has a fine white mat of star-shaped hairs. Its petal-less flowers are cream-coloured. Flowering occurs between October and November. **Habitat:** Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs. **Flowering:** October and November.		Moderate
Alpine Greenhood *Pterostylis alpina*	Not listed	Vulnerable	**Description:** *Pterostylis alpina* is a greenhood orchid. There is a rosette of 3-5 basal leaves, ovate to obovate, 2–6 cm long, 10–15 mm wide. The flowering stem is rough and to 30 cm tall. The flower is about 3 cm long, erect, dark green and white. The apex of galea is flat or slightly decurved, with the dorsal sepal acute to subacute. The lateral sepals loosely embrace the galea leaving a lateral gap; sinus broadly notched when viewed from the front, protruding prominently in an abrupt curve when viewed from the side; free points linear-tapered, c. 20 mm long, reflexed behind the galea. The labellum narrow-ovate to lanceolate, 13–18 mm long, c. 3mm wide, brown, curved forwards above the middle, subacute, with about one third protruding from the sinus. **Habitat:** The Alpine greenhood is often found on sheltered southern slopes near streams in rich loam. **Flowering:** The species flowers from August to October.		Moderate

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Slender Greenhood *Pterostylis foliata*	Not listed	Vulnerable	**Description:** *Pterostylis foliata* is a greenhood orchid with 3-6 roughly ovate leaves 2–5 cm long, 8–16 mm wide. The flowering stem is up to 30 cm high and is smooth. The flower is about 2 cm long, dark green and white with brown in the galea. The lateral sepals tightly embrace the galea; sinus broadly to deeply V-shaped when viewed from the front, protruding in a shallow curve when viewed from the side; free points linear-tapered, about 15 mm long, erect, divergent. The labellum oblong, 9–12 mm long, and about 3 mm wide, brown, obtuse, distal third protruding from the sinus. **Habitat:** In NSW, *Pterostylis foliata* grows in eucalypt forest amongst an understorey of shrubs, ferns and grasses. It grows on loam or clay loam soils found on sheltered sloping to steep ground and populations may be found in localised open seepage areas. **Flowering:** occurs from August to January.		Moderate
Blue-tongued Greenhood *Pterostylis oreophila*	Critically Endangered	Critically Endangered	**Description:** The Blue-tongued Greenhood is a terrestrial orchid, with up to five leaves in a basal rosette before flowering. The leaves are later arranged loosely along the 20 cm tall flowering stems. The leaves are oval in shape, to 70 mm long and 20 mm wide. The flower is solitary, erect, predominantly white with narrow green stripes, somewhat bulky (the hood-like structure being about 2.5 cm long). Flowers have a curved lip of a distinctive bluish or blue-green (aqua) colour. Its flowers from November to January. **Habitat:** Grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water. Less commonly grows in peaty soils and sphagnum mounds. While more frequently found in low-light conditions it appears to also be able to tolerate full sun. **Flowering:** November to January		Moderate
Alpine Sun Orchid *Thelmymitra alpicola*	Not listed	Vulnerable	**Description:** Glabrous terrestrial herb. Leaf linear to linear-lanceolate, 6–25 cm long, 4–13 mm wide, erect, dark green with purplish base. Scape 15–50 cm tall, 1–3.7 mm diam., straw-coloured to purplish. Pedicels 3–18 mm long, slender. Flowers 1–6, 15–34 mm across, deep purplish blue with darker longitudinal striations, opening freely in warm weather. Labellum obovate to oblanceolate, often slightly broader than petals, acute to obtuse. Capsules obovoid, 10–18 mm long, 4–8 mm wide, erect, ribbed. **Habitat:** In Kosciuszko National Park and the Bago plateau the species occurs in wet heaths and adjacent to Sphagnum bogs between 1000-1500 metres. Associated species include *Hakea microcarpa, Leptospermum myrtifolium, Baeckea utilis, Baeckia gunniana, Epacris breviflora, Epacris paludosa, Baloskion austra*l and *Empodisma minus*. Apparently, the species does not occur in Sphagnum where *Thelymitra cyanea* is more likely to occur. **Flowering:** November to Mid-December		Moderate

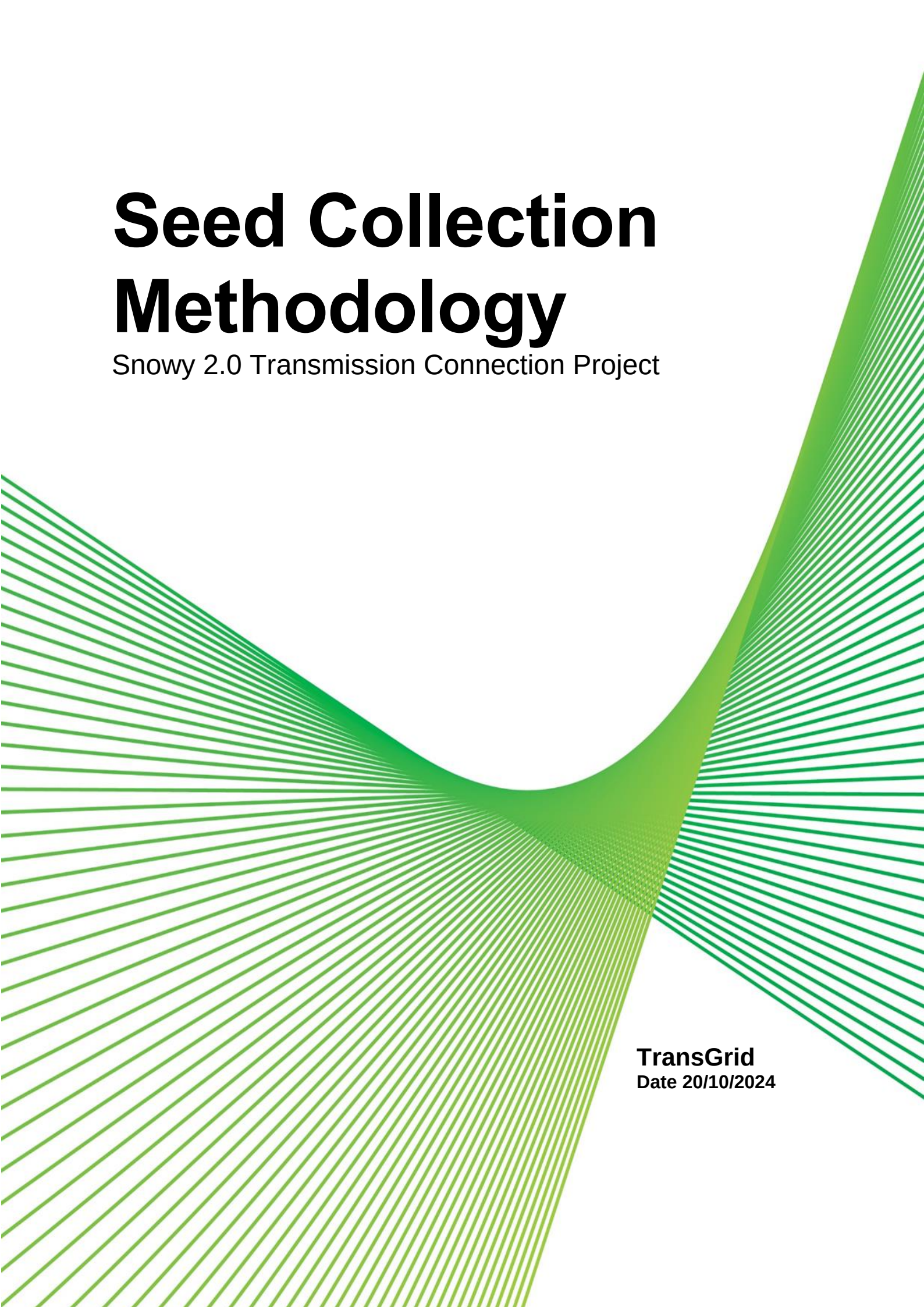
Common name ***Scientific name***	**EPBC Act**	**BC Act**	**Identification** (Source: (NSW EES, 2022)**;** (Birdlife Australia, 2022))	**Photo** (Source: (NSW EES, 2022)**,** (WWF, 2021))	**Occurrence likelihood**
Austral Toadflax *Thesium australe*	Vulnerable	Vulnerable	**Description:** Austral Toadflax is a small, straggling herb to 40 cm tall. Leaves are pale green to yellow green, somewhat succulent, 1 - 4 cm long and 0.5 - 1.5 mm wide. Flowers are minute and white, emerging where the leaves meet the stems and appearing in spring. The fruit is small and nut-like, developing in summer. This species is often hidden amongst grasses and herbs. **Habitat:** Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass. **Flowering:** Spring		Moderate

APPENDIX E Seed Collection Methodology

Official

Seed Collection Methodology

Snowy 2.0 Transmission Connection Project

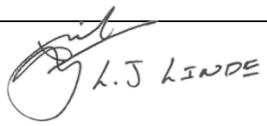


TransGrid

Date 20/10/2024

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Seed Collection Methodology
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
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Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	01 Nov 2024

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Revision	Date	Description	Approver
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0.02	22/03/2023	Address NPWS comments	Trevor Noble
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0.06	20/10/2024	Inclusion of Stage 2 works	Louis Linde / Tim Burns

Distribution of controlled copies

This Methodology is available to all personnel and sub-contractors via the Project document control management system. An electronic copy can be found on the Snowy 2.0 TCP website.

The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

Copy number	Issued to	Version

Contents

1 Introduction **8**

2 Plant Community Types **8**

3 Seed Collection **9**

4 Seed Collection Methodology **10**

4.1 Timing for Seed Collection 11

5 Seed Cleaning and Storage **14**

5.1 Seed Cleaning 14

5.2 Seed Storage 15

6 Sowing Rates **16**

7 Specifications for Seed Picking Contractors **16**

References **18**

Appendix A – Species Lists of Target PCTs **19**

Appendix B – Seed to be Collected for the Snowy 2.0 Transmission Connection Project **36**

Appendix C – Change of Custody Form **45**

Appendix D – Project site maps **46**

Appendix E – Seed Collection consultation with NPWS **49**

Figures

Figure 4-1 9
Figure 4-2 9
Figure 4-3 10
Figure 4-4 10

Official

Definitions

Term	Definition
Compliance audit	Verification of how implementation is proceeding with respect to a Construction Environmental Management Plan (CEMP) (which incorporates the relevant approval conditions).
Contractor or Principal Contractor	Stage 1 of the scope of works for design and construction the Contractor or Principal Contractor is UGL Pty Ltd Stage 2 of the scope of works for design and construction the Contractor or Principal Contractor is UGL/CPB Joint Venture. Any reference to the 'Contractor' relates to the activities of both appointed Contractors (UGL and UGL/CPB Joint Venture), but only as is relevant to the appointed stage of works.
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly, or partially resulting from an organisation's environmental aspects.
Environmental incident	An unexpected event that has, or has the potential to, cause harm to the environment and requires some action to minimise the impact or restore the environment.
Environmental objective	Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental policy	Statement by an organisation of its intention and principles for environmental performance.
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
Environmental Representative	A suitably qualified and experienced person independent of Snowy 2.0 Transmission Line Project design and construction personnel employed for the duration of construction. The principal point of advice in relation to all questions and complaints concerning environmental performance.
Snowy 2.0 Transmission Line Approvals	Snowy 2.0 Transmission Line approvals include: Snowy 2.0 Transmission Line Infrastructure Approval NSW SSI 9717 Snowy 2.0 Transmission Line EPBC Approval Cth EPBC 2018/8363

Term	Definition
Non-compliance	Failure to comply with the requirements of the HumeLink Approvals or any applicable licence, permit or legal requirements.
Non-conformance	Failure to conform to the requirements of HLW system documentation including this CEMP or supporting documentation.
Planning Approval Documentation	The NSW planning approval documents, as they relate to the Snowy 2.0 Transmission Line and as listed in CoA A2 of the NSW Infrastructure Approval for HumeLink (SSI 9717)
Principal, the	Transgrid
Synergy	UGLMS incident management software program to manage, report, record and take action on emergency and incidents.

Abbreviations

Abbreviation	Expanded text
CEMP	Construction Environmental Management Plan
CM	Construction Manager
COA	Condition of Approval
Code of Practice	Code of Practice for Archaeological investigation of Aboriginal Objects in NSW (DECCW 2010)
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
KNP	Kosciuszko National Park
kV	Kilovolts
m	Metres
NPWS	National Parks and Wildlife Service
PC	Principal Contractor or Contractor as defined in this management plan
POM	Plan of Management
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
PTE	Permit to Excavate
SEA	Senior Environmental Advisor
SEP	Site Environmental Plan
UGLMS	UGL Management System

1 Introduction

As part of the Snowy 2.0 project, transmission lines will be constructed to carry the generated power to substations, which will distribute the electricity into the power grid of eastern Australia. Some of the transmission lines will be constructed within the Kosciuszko National Park (KNP) and the South East Highlands Bioregion. As part of the approval conditions, the disturbed areas under the transmission lines in these areas will require ecological rehabilitation.

Part of the rehabilitation will involve the sowing of native seed in the areas of disturbed land (refer to Appendix D). The following document will outline the species suitable to use in rehabilitation for the identified Plant Community Types (PCTs) that occur within the proposed transmission line footprint. Seed collection for the Snowy 2.0 Transmission Connection project will align with the goals and objectives of the Rehabilitation Management Plan (RMP). The RMP will be finalised as soon as practicable but no later than 12 months from the commencement of construction. Site-specific areas identified for rehabilitation will be detailed and mapped within the RMP utilising information gained during initial works on site.

The RMP will also outline:

- The collection times for the target species with an approved seed picking methodology.
- How the seed can be stored for maximum viability.
- The sowing rates for the selected species.
- Standards to be followed by contracted seed pickers.

The objective of this Seed Collection Methodology is to describe how native seed will be collected prior to and during clearing activities in accordance with best practice guidelines and relevant PCTs. The RMP will describe site-specific measures for rehabilitating various clearing zones, including details on growth forms, seed application techniques and the relationship between rehabilitation goals and vegetation structure and function within disturbed areas.

2 Plant Community Types

The following PCTs have been identified to occur in the proposed disturbance areas of the transmission lines for Snowy 2.0. PCT maps can be referenced in the Snowy 2 Connection Biodiversity Management Plan, Section 3.3.1, Figures 1- 3.

PCT 285: Broad-leaved Sally grass – sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion.

PCT 296: Brittle Gum – peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion.

PCT 300: Ribbon Gum – Narrow-leaved (Robertsons) Peppermint montane fern – grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment.

PCT 302: Riparian Blakely's Red Gum – Broad-leaved Sally woodland - tea-tree - bottlebrush – wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion.

PCT 729: Broad-leaved Peppermint – Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion.

PCT 999: Nortons Box - Broad-leaved Peppermint open forest on foot slopes, central and southern South Eastern Highlands Bioregion.

PCT: 1196 Snow Gum – Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion.

All PCTs have been identified as non-threatened PCTs. A full species list for each PCT and which species are suitable for collection and use in the rehabilitation can be found in Appendix A.

3 Seed Collection

Snowy 2.0 Transmission Connection project is declared a Critical State Significant Infrastructure (CSSI) project under the *State Environmental Planning Policy (State and Regional Development) 2011,* and approved under Part 5 Division 5.2 of the *Environmental Planning and Assessment Act 1979.* Condition of Approval B48 (f) (ii) states seed collection in Kosciuszko National Park is to occur 'with the approval of the NPWS'. NPWS consultation with Transgrid on the 14 June 2023 confirmed that no licence or permit is required for this approval' (see Appendix E), and Transgrid has since provided NPWS details of the proposed seed collection, as requested in their consultation.

Seed collection along the western alignment is subject to FCNSW requirements, and Transgrid have advised the need to have a Forest Permit (under *NSW Forestry Act 2012* (s.60)) in place for seed collection. PC will abide with this requirement.

In general, it must be noted that not all native species identified in the Plant Community Types for this project, are viable for collection and/or use in rehabilitation due to the following reasons:

- Species too sensitive for seed collection/propagation
- Species that are semi parasitic, and have no contemporary knowledge of how best to grow them; and
- Species which are very hard to grow, or unknown how to grow from seed with limited chance of success.

In addition, due to the need for low vegetation under transmission lines, only suitable herbaceous species, grasses, sedges, rushes and shrubs will be collected for use in the rehabilitation required under the Snowy 2.0 Transmission Connection project. The aim of the seed collection, which will align with the project RMP, is to replicate the biodiversity of the corridor prior to disturbance.

Appendix B lists the species required for collection for each PCT, the time of year the species can be collected and a recommended sowing rate.

As far as practicable, any seed present on target species within the total clearing zones prior to clearing will be collected. Residual seed requirements will be determined during preparation of the site rehabilitation plans when the extent of disturbed areas is known.

4 Seed Collection Methodology

The standard for seed collection in wild ecosystems (FloraBank, 1999a, FloraBank, 1999b) is as follows:

- Don't collect more than 10% of the seed from any one plant. If plants have only a few seeds each, don't collect from more than 1% of the population.
- If possible, return plant material such as twigs and discarded capsules to the collection site.
- Note the provenance of the seed source. Provenance is the origin of a seed source and refers to the genetic adaptation to local environmental conditions. Provenance of seed collection will be recorded in the Seed Collection Field Data Sheet. Approval and validation of seed provenance will be gained from a qualified, independent ecologist.
- Relevant biosecurity controls will be followed during the collection of seed. Details of biosecurity measures will be outlined in the Safe Work method Statement for all contracted seed collectors.
- When collecting seed, good genetic quality can be had by:
    - Choosing from large, healthy natural populations (of at least 200 plants).
    - Collecting from widely spaced, healthy parents (at least 10 – 20 plants, preferably more).
    - Avoiding neighbouring plants (they are related).
    - Avoiding isolated plants (they can't cross-pollinate so are likely to have inbred, unhealthy seed).
    - Getting the taxonomy right. Make sure the species is properly identified.
    - Choosing a site with similar climate, altitude and soils as to where you want to use the seed in rehabilitation.
    - Choosing a site where there is a healthy, large population of the species for collection (most important).

The equipment needed for seed collection will depend on the species being collected whether they are trees, shrubs, forbs or grasses. In general, most herbaceous species (which are targeted for this project) can be collected by hand or by cutting the seed heads off with secateurs. Other tools for consideration include: long and short handled hand saws, hedge clippers, sturdy gloves for stripping seed heads, large bags to shake around plants and buckets.

As a note to seed collection for this project, some seed may be collected in areas that have been cleared for the infrastructure development and the 10% collection rule and damage to existing vegetation is not relevant.

In fully intact vegetation, some aspects of seed collecting can harm the collection site:

- Plant species could be damaged by trampling.
- Vehicles could damage the site.
- Vehicles and plant material from other places could bring in weeds.
- Be aware of local fauna.

Unidentified seed that has no collection records can't be used and should be discarded.

At a minimum, record the date, location and species collected. It is recommended to print out field recording datasheets before you start collecting for use in the field. The Greening Australia Seed Collection Field Data Sheet should be used for each batch of seed. An example is provided in Appendix C.

4.1 Timing for Seed Collection

Seed will be collected from Project disturbance areas prior to construction commencing, to 'maximise the collection and use' of native seed resources in accordance with Condition of Approval B48 (f)(i). Seed collected within the Easement Clearing Zone (ECZ) will be capped at 50% of available seed to maximise regeneration potential. The following general guidance will be taken into consideration prior to the collection of native seed.

As a general guide, seed is ready for collection in montane and subalpine areas of south eastern Australia between December through to April. Acacia seed is usually ready for picking from mid-December to mid-January. Grasses (Poaceae family) are commonly ready from mid-February to late March. Forbs and Asteraceae shrubs are ready for seed collection from March through to early May. Myrtaceae and Proteaceae species (Eucalyptus, Callistemon, Leptospermum, Hakea, Protea etc) often hold onto the seed for long periods and can be collected over a wide time period. Often, late May to late June are suitable times for woody seed collection. In addition, timing of seed collection will be aligned with the RMP goals and objectives for the Snowy 2.0 Transmission Connection project.

The readiness of seed for collection is highly variable however and seed must be monitored for its readiness. Seed ripeness is dictated by aspect, altitude, local weather, droughts, aberrant frosts, predation, the general health of stands of species and the biodiversity of pollinators. A seed readiness assessment is recommended prior to salvage and would identify species and areas likely to produce the most successful results.

In general, seed is ready for collection when it falls easily from the plant and when handled seed falls into the hand or when a seed pod is just opening. The following pictures are examples of seed ready for collection. All photos have been taken in the Kosciuszko National Park.



Figure 4-1 Xerochrysum viscosum seed ready to collect.



Figure 4-2 Olearia seed ready for collection

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Figure 4-3 Cassinia seed ready to collect. Note the 'fluffy' seed head



Figure 4-4 Microlaena stipoides seed ready to pick

5 Seed Cleaning and Storage

5.1 Seed Cleaning

Immediately after collection, the seed is particularly susceptible to damage from adverse environmental conditions. Drying the seed, especially for fleshy fruits is the most important step of seed collection as damp seed will go mouldy and will not germinate.

Once the seed is extracted from the plant, inspect for pests and remove if possible. Adding naphthalene pellets to seed bags will also repel or exterminate any insects that may have inadvertently been collected. Where possible, impurities such as twigs and leaves should be removed to assist in the cleaning process. Leaves and small twigs dry out and become brittle, they break into small pieces which can be very difficult to separate from the seed.

Allergies from the dust that is produced when seeds are extracted is a common problem, so wearing a good quality dust masks or respirators, and working in an open area with good ventilation is advised when cleaning seed.

Seed drying and extraction involves the removal of seed from the seed head or fruit following collection. These processes should be carried out as soon as possible after collection, and care must be taken to avoid any damage to the seed, which may reduce viability and longevity. Seed is rarely fit for immediate storage following collection, requiring either drying or de-pulping, extraction from the fruit and further cleaning.

The methods for drying and extraction are many and varied, and depend very much on the type of fruit, seed and equipment available.

Dry fruit drying, with some form of mild heat is required as part of processing some seed types. Examples include woody capsules of eucalyptus, melaleuca, callistemon, cones of casuarina, Callitris, pods of acacia, Daviesia, follicles of grevillea, and hakea. Placing seed in paper bags in a warm area (between 15°to 20°C) will promote seed pods/cones to open and release the seed. This may take a few weeks.

For large quantities, seed can be spread out on sheets or tarpaulins but it should be turned regularly to avoid uneven drying. It should be spread out where there is shelter from adverse weather conditions or packed away when necessary. Rodents eating the seed can also be a problem and must be monitored and addressed, if required.

The above method can be used for the drying of grass seed. Sieving grass seed to remove any impurities is recommended before storage.

Collected fruit generally has a high moisture content and is susceptible to mould if stored inappropriately for even a few days. Fleshy fruits are normally de-pulped but if the fleshy coverings are thin, removal may not be required.

De-pulping may need some or all of the following:

- Storing the fruit in a plastic bag under cool conditions

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- Soaking in water until the flesh becomes soft (changing the water regularly to avoid fermentation)
- Manual de-pulping using high pressure water stream or maceration.

Fruit with a hard nut surrounded by flesh can be put into a blender set at low speed and filled with water, although the blades may need to be padded. After the pulp is removed, seed can be separated by flotation in water or sieving. Fruit that does not split open when dry, can be stored as they are.

Once the seed is separated from the seed head or fruit, it is ready for final cleaning before storage. The aim of cleaning is to separate the full, viable seed from impurities, which may include empty seed and fruit, sticks, leaves, dirt, and so on. Impurities can affect storage volume and seed viability (sowing rates) and may harbour harmful pests and pathogens. Complete cleaning of a seed lot may not always be possible or necessary, as in the case of eucalyptus or native grass seed that comprises fertile seed and chaff. The level of cleanliness adopted is usually a compromise between time, effort and loss of viable seed.

There are a number of methods for achieving clean seed including manual cleaning, sieving, blowing, winnowing and flotation. The ease of germination and purity of cleaned seed is influenced by the amount of care taken in the removal of impurities following collection and prior to drying.

Screens or sieves are frequently used where the seed is either smaller or larger than most of the impurities. Sieves range from kitchen sieves to pieces of domestic flywire to purpose-built, mechanised screens. A combination of different screen sizes is often used to progressively remove the rubbish. Different screen shapes (round, oblong or square) and materials (mesh or perforated plate) suit different species and some trial and error is required to identify what works best on a particular species. A set of screen and sieve sizes and configurations are essential tools for seed extraction. Winnowing and vacuums are used where there are weight or shape differences between the seed and impurities. These methods are particularly useful for separating full from empty seed.

A simple method to separate good seed from empty seed is to pour the material in front of a regulated air current (such as a domestic fan) located on a clean floor. If the method works properly, the good seed falls in one area and impurities in another. A vacuum cleaner or garden vacuum/blower with some form of suction control is effective in separating light fluffy seed. Screens can be used to control what is sucked into the vacuum. The same basic principles are adapted and developed in a range of different ways in machines built for seed extraction. Sometimes the air column/vacuum is combined with vibrating sieves in a single-pass cleaning machine. A quick immersion in water is an effective treatment for cleaning species with hard seed coats. Impurities tend to float to the surface while good seed sinks. After removal of the impurities, the water is drained off and the seed thoroughly dried before storage.

5.2 Seed Storage

It is important to use containers that allow air circulation, particularly when the material is enclosed. Plastic bags or sheeting should be avoided as they encourage condensation,

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which may initiate seed germination or reduce its storage life. Vacuum sealed plastic bags can be used, however, for long term storage of seed. Ensure the containers are in a position where the seed lots cannot be knocked over or contaminated. Labelling of seed lots is imperative, with species name, time of collection and location of collection required.

Cleaned seed is best stored in a cool store or fridge as this slows down the metabolic processes of the seed and prolongs viability. It is also essential that the temperature that seed is stored remains steady with little diurnal variation. Storage of seed at temperatures between 8 to 15C is recommended if a cool store is not used.

6 Sowing Rates

Sowing rates for seed are highly variable and can be confounded by seed dormancy and unknown seed viability. It is recommended that a seed viability test is done for each seed batch (either a basic germination test or a Tetrazolium test) to know how much viable seed you have per unit of weight per species before using in rehabilitation.

Appendix B lists the sowing rates for each of the PCTs selected species for use in the Snowy 2.0 Transmission Connection project. Any known dormancies or particular requirements for successful seed sowing are noted in Appendix B. Please refer to the Rehabilitation Management Plan for additional considerations regarding revegetation, and that native seed application will be suitable using a hydro-seeding methodology with or without a cover crop.

7 Specifications for Seed Picking Contractors

The following details key requirements for contracted seed pickers. It's essential that contracted pickers be provided all relevant information included in this plan. Team issued work packs will be the main conduit for this information exchange with Site Environmental Plans defining limitations and requirements on site. Such information will be kept current as the works progress.

Requirements include;

1. A formal contract that identifies the contractor as part of the Snowy 2.0 Transmission Connection project. As noted, the Snowy 2.0 Transmission Connection project is CSSI project under the *State Environmental Planning Policy (State and Regional Development) 2011,* and approved under Part 5 Division 5.2 of the *Environmental Planning and Assessment Act 1979* therefore specific regulatory exemptions are afforded to seed collectors. Seed collectors do not require a permit or scientific licence to collect seed within the Kosciuszko National Park. A Forest Permit will be raised by PC for seed collection within FCNSW areas.
2. Seed collectors will satisfy PC's Environmental Advisor as to the evidentiary requirements needed to adequately prove the goals and objectives of the Rehabilitation Management Plan have been achieved. This verification can then be used to demonstrate contractual compliance and sign-off before the asset is returned to Transgrid.

3. The amounts of seed required to be picked from each target species for collection.
4. General areas for seed collection.

What the contracted seed pickers will need to provide to the client (PC/Transgrid).

1. An appropriate Safe Work Method Statement for seed picking.
2. Current Public Liability and Workers Compensation insurances.
3. Proven skills in plant identification and seed collection.
4. A seed collection recording system that identifies the species, the area collected from (GPS points) and the general condition of the collection areas; i.e number of species in an area, weed percentage and health of the target collection species.
5. Proof of appropriate seed drying and storage areas for the amounts of seed required.

Additional requirements, but not essential are:

1. An understanding of the South East Highlands Bioregion and where the target PCTs may occur.
2. A seed testing facility or ability to provide seed with known viability.
3. Ecologist engagement or consultation to occur if required to assist in species identification.

References

1. Jacobs (2022). Appendix C – Biodiversity Development Assessment Report - Snowy 2.0 Transmission Connection Project Environmental Impact Assessment (Revision 7). https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-47216713%2120220825T224513.048%20GMT
2. FloraBank (1999a). *Guideline 6: Native seed collection methods*. https://www.greeningaustralia.org.au/wp-content/uploads/2017/11/FLORABANK-GUIDELINES_collection-methods.pdf
3. FloraBank (1999b). *Guideline 2: Basic methods for drying, extraction and cleaning of native plant seed.* https://www.florabank.org.au/static/098bf6c1e1b89bbe7e62e39fd236382d/5df7da8f37c92eae489dc3ab847a88f5.pdf
4. FloraBank (1998). *Guidelines: Native seed storage for revegetation.* https://www.greeningaustralia.org.au/wp-content/uploads/2017/11/FLORABANK-GUIDELINES_native-seed-storage.pdf
5. Rivers of Carbon (n.d.). *Collecting and caring for seed from Australian Native Plants.* https://riversofcarbon.org.au/handy-how-to-guide-collecting-and-caring-for-seed-from-australian-native-plants/

Appendix A – Species Lists of Target PCTs

Note: Species listed below are indicative only and do not preclude collection of other PCT species that will help to meet the goals and objectives of the RMP.

PCT 285 Species List	Seed to be Collected
Acacia melanoxylon	
Acacia pravissima	
Acaena novae-zelandiae	Yes
Acaena ovina	Yes
Calytrix tetragona	
Carex appressa	Yes
Carex breviculmis	Yes
Carex gaudichaudiana	Yes
Carex incomitata	Yes
Carex inversa	Yes
Cassytha glabella	
Dianella revoluta	Yes
Dillwynia sericea	
Eucalyptus camphora	
Eucalyptus camphora subsp. humeana	
Eucalyptus mannifera	
Eucalyptus rubida	
Exocarpos strictus	
Geranium solanderi	Yes
Hibbertia obtusifolia	Yes
Juncus filicaulis	Yes
Leucopogon fletcheri subsp. brevisepalus	
Lomandra filiformis	Yes
Lomandra longifolia	Yes
Lomandra multiflora subsp. Multiflora	Yes
Microlaena stipoides	Yes
Pimelea pauciflora	
Poa sieberiana	Yes
Podolobium procumbens	Yes
Rubus parvifolius	
Rytidosperma penicillatum	Yes
Themeda triandra	Yes
Veronica subtilis	Yes

PCT 296 Species List	Seed to be Collected
Acacia dealbata	
Acacia gunnii	Yes
Acacia melanoxylon	
Acacia obliquinervia	
Acacia pravissima	
Acacia saliciformis	
Acacia siculiformis	Yes

PCT 296 Species List	Seed to be Collected
Acaena novae-zelandiae	Yes
Acaena ovina	Yes
Acrothamnus hookeri	
Aristida ramosa	
Asperula scoparia	Yes
Asplenium flabellifolium	
Austrostipa scabra	Yes
Banksia canei	
Billardiera scandens	
Boronia nana var. hyssopifolia	
Brachyloma daphnoides	
Brachyscome decipiens	Yes
Brachyscome spathulata	Yes
Bursaria spinosa	
Calytrix tetragona	
Carex appressa	Yes
Cassinia longifolia	Yes
Cassinia monticola	Yes
Cassytha glabella	
Cheilanthes austrotenuifolia	
Chrysocephalum semipapposum	Yes
Coronidium monticola	Yes
Daviesia leptophylla	
Daviesia mimosoides	
Daviesia ulicifolia	Yes
Deyeuxia quadriseta	Yes
Dianella revoluta	Yes
Dillwynia phylicoides	
Dillwynia rudis	
Dillwynia sieberi	
Dodonaea viscosa subsp. angustissima	Yes
Entolasia stricta	Yes
Epacris celata	
Eucalyptus dives	
Eucalyptus macrorhyncha	
Eucalyptus mannifera	
Eucalyptus mannifera subsp. mannifera	
Eucalyptus pauciflora	
Eucalyptus robertsonii	
Eucalyptus rubida	
Euchiton japonicus	Yes
Exocarpos strictus	
Galium binifolium	
Geranium solanderi	Yes
Geranium solanderi var. solanderi	Yes
Glycine clandestina	
Glycine tabacina	
Gonocarpus tetragynus	
Goodenia hederacea subsp. alpestris	Yes

PCT 296 Species List	Seed to be Collected
Hackelia suaveolens	
Hardenbergia violacea	Yes
Hibbertia linearis	Yes
Hibbertia obtusifolia	Yes
Hovea heterophylla	Yes
Hovea montana	Yes
Hypericum gramineum	Yes
Hypericum japonicum	Yes
Indigofera australis	Yes
Juncus usitatus	Yes
Leptospermum brevipes	
Leptospermum continentale	
Leucopogon attenuatus	
Leucopogon ericoides	
Leucopogon fletcheri subsp. brevisepalus	
Leucopogon virgatus	
Leucopogon virgatus var. virgatus	
Lobelia pedunculata	Yes
Lomandra bracteata	Yes
Lomandra filiformis	Yes
Lomandra filiformis subsp. filiformis	Yes
Lomandra longifolia	Yes
Luzula flaccida	Yes
Melicytus dentatus	
Microseris lanceolata	Yes
Mirbelia oxylobioides	Yes
Monotoca scoparia	
Olearia myrsinoides	Yes
Olearia tenuifolia	Yes
Persoonia chamaepeuce	
Pimelea curviflora	
Pimelea linifolia	
Pimelea linifolia subsp. caesia	
Plantago gaudichaudii	Yes
Platylobium montanum	Yes
Poa sieberiana var. cyanophylla	Yes
Poa sieberiana var. sieberiana	Yes
Poranthera microphylla	
Ranunculus lappaceus	Yes
Rytidosperma pallidum	Yes
Schoenus apogon	
Scleranthus biflorus	Yes
Senecio gunnii	Yes
Senecio quadridentatus	Yes
Stellaria pungens	Yes
Stylidium graminifolium	Yes
Tetratheca bauerifolia	Yes
Tetratheca thymifolia	Yes
Themeda triandra	Yes
Viola betonicifolia	Yes

PCT 296 Species List	Seed to be Collected
Wahlenbergia stricta	Yes
Xerochrysum bracteatum	Yes

PCT 300 Species List	Seed to be Collected
Acacia dealbata	
Acacia dealbata subsp. subalpina	
Acacia floribunda	
Acacia melanoxylon	
Acacia obliquinervia	
Acacia pravissima	
Acaena novae-zelandiae	Yes
Acaena ovina	Yes
Acrotriche serrulata	
Adiantum aethiopicum	
Ajuga australis	Yes
Anthosachne scabra	Yes
Arthropodium milleflorum	Yes
Asperula conferta	Yes
Asperula scoparia	Yes
Asplenium flabellifolium	
Austrostipa mollis	Yes
Banksia canei	
Billardiera scandens	
Boronia nana var. hyssopifolia	
Bossiaea buxifolia	Yes
Brachyloma daphnoides	
Brachyscome decipiens	Yes
Bursaria spinosa	
Calytrix tetragona	
Carex appressa	Yes
Carex breviculmis	Yes
Carex incomitata	Yes
Cassinia aculeata	Yes
Cassinia arcuata	Yes
Cassinia longifolia	Yes
Cassytha pubescens	
Cheilanthes sieberi subsp. sieberi	
Chrysocephalum semipapposum	Yes
Clematis aristata	Yes
Clematis glycinoides	Yes
Coprosma hirtella	Yes
Coprosma quadrifida	Yes
Craspedia jamesii	Yes
Cryptandra amara	
Cymbonotus lawsonianus	Yes
Cymbonotus preissianus	Yes
Daucus glochidiatus	
Daviesia latifolia	
Daviesia mimosoides	
Daviesia ulicifolia subsp. ruscifolia	Yes

Official

PCT 300 Species List	Seed to be Collected
Desmodium varians	Yes
Dianella longifolia	Yes
Dianella revoluta	Yes
Dianella revoluta var. revoluta	Yes
Dichelachne crinita	Yes
Dichelachne hirtella	Yes
Dichelachne inaequiglumis	Yes
Dichelachne rara	Yes
Dichondra repens	Yes
Dillwynia phylicoides	
Dodonaea viscosa subsp. angustissima	Yes
Echinopogon cheelii	Yes
Echinopogon ovatus	Yes
Entolasia stricta var. hirsuta	Yes
Epacris celata	
Erigeron conyzoides	Yes
Eucalyptus dalrympleana	
Eucalyptus delegatensis subsp. Delegatensis	
Eucalyptus dives	
Eucalyptus mannifera	
Eucalyptus mannifera subsp. mannifera	
Eucalyptus pauciflora	
Eucalyptus robertsonii	
Eucalyptus robertsonii subsp. robertsonii	
Eucalyptus rubida	
Eucalyptus rubida x viminalis	
Eucalyptus viminalis	
Euchiton involucratus	Yes
Euchiton japonicus	Yes
Euphrasia collina	
Exocarpos strictus	
Galium gaudichaudii	
Geranium neglectum	Yes
Geranium retrorsum	Yes
Geranium solanderi	Yes
Geranium solanderi var. solanderi	Yes
Glycine clandestina	
Glycine microphylla	
Glycine tabacina	
Gompholobium huegelii	Yes
Gonocarpus tetragynus	Yes
Gonocarpus teucrioides	Yes
Grevillea arenaria subsp. canescens	
Grevillea rosmarinifolia subsp. rosmarinifolia	
Gynatrix pulchella	
Hardenbergia violacea	Yes

Official

PCT 300 Species List	Seed to be Collected
Hibbertia obtusifolia	Yes
Hovea heterophylla	Yes
Hydrocotyle laxiflora	Yes
Hydrocotyle sibthorpioides	Yes
Hypericum gramineum	Yes
Indigofera australis	Yes
Lachnagrostis filiformis	Yes
Lagenifera stipitata	
Lagenophora stipitata	
Leptospermum brevipes	
Leucopogon ericoides	
Leucopogon fletcheri	
Leucopogon fletcheri subsp. brevisepalus	
Leucopogon lanceolatus var. lanceolatus	
Leucopogon virgatus	
Lobelia gibbosa	Yes
Lomandra bracteata	Yes
Lomandra filiformis	Yes
Lomandra filiformis subsp. coriacea	Yes
Lomandra filiformis subsp. filiformis	Yes
Lomandra longifolia	Yes
Lomandra multiflora subsp. Multiflora	Yes
Lomatia myricoides	Yes
Luzula densiflora	Yes
Luzula flaccida	Yes
Melichrus urceolatus	
Melicytus dentatus	
Microlaena stipoides	Yes
Mirbelia oxylobioides	Yes
Monotoca scoparia	
Olearia myrsinoides	Yes
Olearia phlogopappa	Yes
Olearia phlogopappa var. flavescens	Yes
Omphacomeria acerba	
Oxalis perennans	
Persoonia chamaepeuce	
Pimelea curviflora	
Pimelea curviflora var. gracilis	
Pimelea curviflora var. sericea	
Pimelea linifolia	
Pimelea linifolia subsp. caesia	
Pimelea linifolia subsp. linifolia	
Plantago gaudichaudii	Yes
Plantago varia	Yes
Platylobium formosum	Yes
Platylobium formosum subsp. formosum	Yes
Poa helmsii	Yes
Poa induta	Yes

PCT 300 Species List	Seed to be Collected
Poa labillardierei var. labillardierei	Yes
Poa phillipsiana	Yes
Poa sieberiana	Yes
Poa sieberiana var. cyanophylla	Yes
Poa sieberiana var. hirtella	Yes
Poa sieberiana var. sieberiana	Yes
Podolobium procumbens	Yes
Polyscias sambucifolia	Yes
Pomaderris angustifolia	
Pomaderris aspera	
Poranthera microphylla	
Pteridium esculentum	
Pultenaea subspicata	Yes
Ranunculus collinus	Yes
Rubus parvifolius	
Rytidosperma erianthum	Yes
Rytidosperma penicillatum	Yes
Rytidosperma pilosum	Yes
Senecio gunnii	Yes
Senecio prenanthoides	Yes
Senecio quadridentatus	Yes
Stackhousia monogyna	Yes
Stellaria pungens	Yes
Stylidium graminifolium	Yes
Tetratheca bauerifolia	Yes
Tetratheca ericifolia	Yes
Tetratheca thymifolia	Yes
Themeda triandra	Yes
Veronica calycina	Yes
Veronica derwentiana subsp. maideniana	Yes
Viola betonicifolia	Yes
Wahlenbergia communis	Yes
Wahlenbergia stricta	Yes
Wahlenbergia stricta subsp. stricta	Yes

PCT 302 Species List	Seed to be Collected
Acacia dealbata	
Acacia obliquinervia	
Acacia pravissima	
Acacia siculiformis	Yes
Acaena agnipila	Yes
Acaena novae-zelandiae	Yes
Acaena ovina	Yes
Anthosachne scabra	Yes
Aristida ramosa	
Asperula conferta	Yes
Asperula scoparia	Yes
Banksia canei	
Brachyloma daphnoides	

Official

PCT 302 Species List	Seed to be Collected
Bursaria spinosa	
Calytrix tetragona	
Carex appressa	Yes
Carex breviculmis	Yes
Carex inversa	Yes
Carex iynx	Yes
Cassinia aculeata	Yes
Cassinia longifolia	Yes
Cassytha pubescens	
Cheilanthes sieberi subsp. sieberi	
Chrysocephalum semipapposum	Yes
Daucus glochidiatus	
Dianella revoluta var. revoluta	Yes
Dichelachne crinita	Yes
Dichelachne inaequiglumis	Yes
Dichelachne rara	Yes
Dichondra repens	Yes
Dodonaea viscosa subsp. angustissima	Yes
Epilobium billardierianum subsp. Cinereum	Yes
Eucalyptus camphora subsp. humeana	
Eucalyptus dives	
Eucalyptus macrorhyncha	
Eucalyptus mannifera	
Eucalyptus nortonii	
Eucalyptus robertsonii	
Eucalyptus robertsonii subsp. robertsonii	
Eucalyptus stellulata	
Eucalyptus viminalis	
Exocarpos strictus	
Geranium solanderi	Yes
Geranium solanderi var. solanderi	Yes
Glycine clandestina	
Gonocarpus tetragynus	
Grevillea arenaria subsp. canescens	
Grevillea rosmarinifolia	
Grevillea rosmarinifolia subsp. rosmarinifolia	
Gynatrix pulchella	
Hibbertia obtusifolia	Yes
Hydrocotyle laxiflora	Yes
Indigofera australis	Yes
Juncus sarophorus	Yes
Lachnagrostis filiformis	
Leptospermum grandifolium	
Leptospermum polygalifolium subsp. polygalifolium	Yes
Leucopogon attenuatus	
Lomandra filiformis	Yes

Official

PCT 302 Species List	Seed to be Collected
Lomandra filiformis subsp. coriacea	Yes
Lomandra longifolia	Yes
Lomandra multiflora subsp. Multiflora	Yes
Lomatia myricoides	Yes
Luzula flaccida	Yes
Microlaena stipoides	Yes
Microlaena stipoides var. stipoides	Yes
Microtis unifolia	
Mirbelia oxylobioides	Yes
Monotoca scoparia	
Olearia myrsinoides	Yes
Olearia phlogopappa	Yes
Oxalis perennans	
Phragmites australis	
Pimelea curviflora var. sericea	
Pimelea linifolia subsp. caesia	
Pimelea pauciflora	
Platylobium formosum	Yes
Poa helmsii	Yes
Poa labillardierei var. labillardierei	Yes
Poa sieberiana	Yes
Poa sieberiana var. cyanophylla	Yes
Poa sieberiana var. hirtella	Yes
Poa sieberiana var. sieberiana	Yes
Pomaderris angustifolia	
Pomaderris aspera	
Pomaderris subcapitata	
Poranthera microphylla	
Prostanthera lasianthos variant 'typical'	
Pteridium esculentum	
Rubus parvifolius	
Rumex brownii	Yes
Rytidosperma penicillatum	Yes
Senecio quadridentatus	Yes
Stellaria pungens	Yes
Themeda triandra	Yes
Veronica derwentiana subsp. derwentiana	Yes
Viola betonicifolia	Yes
Wahlenbergia communis	Yes
Wahlenbergia stricta subsp. stricta	Yes

PCT 729 Species List	Seed to be Collected
Acacia dealbata	
Acacia pravissima	
Acacia siculiformis	Yes
Acaena ovina	Yes
Acrothamnus hookeri	
Acrotriche serrulata	Yes
Ajuga australis	Yes

PCT 729 Species List	Seed to be Collected
Anthosachne scabra	Yes
Austrostipa scabra	Yes
Banksia canei	
Bossiaea foliosa	
Brachyloma daphnoides	
Brachyscome spathulata	Yes
Bursaria spinosa	
Calytrix tetragona	
Carex appressa	Yes
Carex breviculmis	Yes
Cassinia aculeata	Yes
Cassinia longifolia	Yes
Cassytha glabella	
Cassytha melantha	
Cassytha pubescens	
Cheilanthes sieberi	
Cheilanthes sieberi subsp. sieberi	
Chrysocephalum semipapposum	Yes
Corybas hispidus	
Cryptandra amara	
Daucus glochidiatus	
Daviesia latifolia	
Desmodium varians	Yes
Dianella longifolia	Yes
Dianella revoluta	Yes
Dichelachne crinita	Yes
Dichelachne inaequiglumis	Yes
Dichelachne micrantha	Yes
Dichelachne rara	Yes
Dichelachne spp A	
Dillwynia phylicoides	
Dillwynia rudis	
Dillwynia sericea	
Dodonaea viscosa subsp. angustifolia	Yes
Dodonaea viscosa subsp. angustissima	Yes
Drosera auriculata	
Epacris celata	
Erigeron conyzoides	Yes
Eriochilus cucullatus	
Eucalyptus dalrympleana	
Eucalyptus dives	
Eucalyptus pauciflora	
Eucalyptus robertsonii	
Eucalyptus robertsonii subsp. robertsonii	
Eucalyptus rubida	
Euchiton involucratus	Yes
Exocarpos cupressiformis	
Exocarpos strictus	
Geranium solanderi	Yes

Official

PCT 729 Species List	Seed to be Collected
Geranium solanderi var. solanderi	Yes
Glycine canescens	
Glycine clandestina	
Gompholobium huegelii	
Gonocarpus tetragynus	Yes
Gonocarpus teucrioides	Yes
Grevillea arenaria subsp. canescens	
Grevillea neurophylla	
Hardenbergia violacea	Yes
Hibbertia obtusifolia	Yes
Hovea heterophylla	Yes
Hydrocotyle laxiflora	Yes
Hypericum gramineum	Yes
Indigofera australis	Yes
Leucopogon attenuatus	
Leucopogon ericoides	
Leucopogon fletcheri	
Leucopogon fletcheri subsp. brevisepalus	
Leucopogon virgatus	
Lomandra filiformis	Yes
Lomandra longifolia	Yes
Lomandra multiflora subsp. Multiflora	Yes
Luzula atrata	Yes
Luzula densiflora	Yes
Luzula flaccida	Yes
Melichrus urceolatus	
Mirbelia oxylobioides	Yes
Olearia erubescens	Yes
Orchidaceae indeterminate	
Oxalis perennans	
Persoonia chamaepeuce	
Pimelea curviflora var. gracilis	
Pimelea curviflora var. sericea	
Pimelea linifolia	
Platylobium formosum	Yes
Platylobium formosum subsp. formosum	Yes
Poa induta	Yes
Poa labillardierei	Yes
Poa phillipsiana	Yes
Poa sieberiana	Yes
Poa sieberiana var. cyanophylla	Yes
Rytidosperma erianthum	Yes
Rytidosperma penicillatum	Yes
Rytidosperma pilosum	
Schoenus apogon	Yes
Senecio diaschides	Yes
Senecio quadridentatus	Yes
Stackhousia monogyna	Yes
Stellaria pungens	Yes

Official

PCT 729 Species List	Seed to be Collected
Stylidium graminifolium	Yes
Tetratheca bauerifolia	Yes
Themeda triandra	Yes
Unidentified seedling	
Veronica subtilis	Yes
Viola betonicifolia	Yes
Vittadinia cuneata var. cuneata	
Wahlenbergia communis	Yes
Wahlenbergia stricta subsp. stricta	Yes

PCT 999 Species List	Seed to be Collected
Acacia buxifolia	
Acacia buxifolia subsp. buxifolia	
Acacia dealbata	
Acacia gunnii	Yes
Acacia melanoxylon	
Acacia obliquinervia	
Acacia penninervis var. penninervis	
Acacia siculiformis	Yes
Acaena ovina	Yes
Acrotriche serrulata	Yes
Anthosachne scabra	Yes
Asplenium flabellifolium	
Astrotricha ledifolia	
Austrostipa scabra subsp. falcata	Yes
Banksia canei	
Billardiera scandens	
Boronia nana var. hyssopifolia	
Brachyloma daphnoides	
Bursaria spinosa	
Calytrix tetragona	
Carex appressa	Yes
Carex breviculmis	Yes
Cassinia aculeata	Yes
Cassinia longifolia	Yes
Cassytha glabella	
Cassytha pubescens	
Cheilanthes sieberi	
Cheilanthes sieberi subsp. sieberi	
Chrysocephalum semipapposum	Yes
Clematis aristata	Yes
Crassula sieberiana	
Daucus glochidiatus	Yes
Daviesia ulicifolia	Yes
Desmodium varians	Yes
Dianella longifolia	Yes
Dianella revoluta	Yes
Dianella revoluta var. revoluta	Yes
Dichelachne hirtella	Yes
Dichelachne rara	Yes

Official

PCT 999 Species List	Seed to be Collected
Dichelachne spp A	Yes
Dillwynia phylicoides	
Dillwynia rudis	
Dillwynia sericea	
Dodonaea viscosa	Yes
Dodonaea viscosa subsp. angustissima	Yes
Eriochilus cucullatus	
Eucalyptus dives	
Eucalyptus macrorhyncha	
Eucalyptus nortonii	
Eucalyptus robertsonii	
Eucalyptus viminalis	
Euchiton involucratus	Yes
Exocarpos cupressiformis	
Exocarpos strictus	
Galium gaudichaudii	
Glycine clandestina	
Gonocarpus tetragynus	
Gonocarpus teucrioides	
Grevillea arenaria	
Grevillea arenaria subsp. canescens	
Grevillea neurophylla	
Grevillea neurophylla subsp. neurophylla	
Hardenbergia violacea	Yes
Hibbertia obtusifolia	Yes
Hovea heterophylla	Yes
Hydrocotyle laxiflora	Yes
Hypericum gramineum	Yes
Indigofera australis	Yes
Kunzea parvifolia	Yes
Lepidosperma cf. laterale	
Lepidosperma laterale	
Leptorhynchos squamatus	Yes
Leucochrysum albicans subsp. albicans	Yes
Leucopogon attenuatus	
Leucopogon ericoides	
Leucopogon fletcheri	
Leucopogon fletcheri subsp. brevisepalus	
Leucopogon fraseri	
Leucopogon virgatus	
Lobelia gibbosa	Yes
Lomandra filiformis	Yes
Lomandra filiformis subsp. coriacea	Yes
Lomandra longifolia	Yes
Lomandra multiflora subsp. Multiflora	Yes
Melichrus urceolatus	
Mirbelia oxylobioides	Yes

PCT 999 Species List	Seed to be Collected
Monotoca scoparia	
Olearia myrsinoides	Yes
Olearia ramulosa	Yes
Omphacomeria acerba	
Persoonia chamaepeuce	
Pimelea biflora	
Pimelea linifolia	
Pimelea linifolia subsp. caesia	
Plantago hispida	Yes
Platylobium formosum	Yes
Pleurosorus rutifolius	
Poa induta	Yes
Poa sieberiana	Yes
Poa sieberiana var. sieberiana	Yes
Podolobium procumbens	Yes
Pultenaea fasciculata	Yes
Rubus parvifolius	
Rytidosperma erianthum	Yes
Rytidosperma pallidum	Yes
Rytidosperma pilosum	Yes
Senecio quadridentatus	Yes
Spyridium parvifolium	
Stellaria pungens	Yes
Stylidium graminifolium	Yes
Tetratheca bauerifolia	Yes
Tetratheca ericifolia	Yes
Tetratheca thymifolia	Yes
Themeda triandra	Yes
Vittadinia cuneata	Yes
Vittadinia cuneata var. cuneata	Yes
Wahlenbergia stricta subsp. stricta	Yes
Xerochrysum viscosum	Yes

PCT 1196 Species List	Seed to be Collected
Acacia dealbata subsp. subalpina	
Acacia melanoxylon	
Acacia obliquinervia	
Acacia pravissima	
Acaena agnipila	Yes
Acaena novae-zelandiae	Yes
Acaena ovina	Yes
Acrothamnus hookeri	
Anthosachne scabra	Yes
Arthropodium milleflorum	Yes
Asperula conferta	Yes
Asperula scoparia	Yes
Asteraceae indeterminate	
Bossiaea foliosa	
Brachyloma daphnoides	
Brachyscome aculeata	Yes

Official

PCT 1196 Species List	Seed to be Collected
Brachyscome decipiens	Yes
Brachyscome spathulata	Yes
Brachyscome tenuiscapa	Yes
Bulbine bulbosa	Yes
Caladenia alpina	
Caladenia carnea	
Caladenia gracilis	
Calotis glandulosa (threatened species)	
Calotis scabiosifolia var. integrifolia	
Carex breviculmis	Yes
Carex incomitata	Yes
Carex inversa	Yes
Cassinia aculeata	Yes
Cassinia longifolia	Yes
Clematis aristata	Yes
Clematis glycinoides	Yes
Coprosma hirtella	Yes
Coronidium monticola	Yes
Coronidium rutidolepis	Yes
Coronidium scorpioides	Yes
Cotula alpina	Yes
Craspedia costiniana	Yes
Craspedia jamesii	Yes
Craspedia variabilis	Yes
Cullen microcephalum	
Cymbonotus preissianus	Yes
Cynoglossum australe	
Daviesia latifolia	
Daviesia mimosoides	
Daviesia mimosoides subsp. mimosoides	
Daviesia ulicifolia	Yes
Daviesia ulicifolia subsp. ruscifolia	Yes
Deyeuxia monticola	Yes
Dianella tasmanica	Yes
Dichelachne hirtella	Yes
Dichelachne inaequiglumis	Yes
Dichelachne rara	Yes
Dichelachne sieberiana	Yes
Dichondra repens	Yes
Epilobium billardierianum subsp. Cinereum	Yes
Eriochilus cucullatus	
Eriochilus magneteus	
Eucalyptus dalrympleana	
Eucalyptus dalrympleana subsp. dalrympleana	
Eucalyptus delegatensis subsp. Delegatensis	
Eucalyptus dives	

Official

PCT 1196 Species List	Seed to be Collected
Eucalyptus paniculata	
Eucalyptus pauciflora	
Eucalyptus robertsonii subsp. robertsonii	
Eucalyptus rubida	
Eucalyptus stellulata	
Euchiton involucratus	Yes
Euchiton sphaericus	Yes
Euphrasia collina subsp. paludosa	
Exocarpos strictus	
Geranium antrorsum	Yes
Geranium potentilloides	Yes
Geranium potentilloides var. abditum	Yes
Geranium solanderi	Yes
Geranium solanderi var. solanderi	Yes
Glycine clandestina	
Glycine tabacina	
Gonocarpus montanus	Yes
Gonocarpus tetragynus	Yes
Goodenia hederacea	Yes
Goodenia hederacea subsp. alpestris	Yes
Grevillea lanigera	
Hakea microcarpa	Yes
Hibbertia obtusifolia	Yes
Hovea heterophylla	Yes
Hovea linearis	Yes
Hydrocotyle laxiflora	Yes
Hypericum gramineum	Yes
Lagenophora stipitata	
Leptorhynchos squamatus	Yes
Leptorhynchos squamatus subsp. Alpinus	Yes
Leptospermum myrtifolium	
Leucopogon fletcheri subsp. brevisepalus	
Leucopogon gelidus	
Leucopogon lanceolatus	
Lobelia gibbosa	Yes
Lobelia pedunculata	Yes
Lomandra filiformis	Yes
Lomandra filiformis subsp. coriacea	Yes
Lomandra filiformis subsp. filiformis	Yes
Lomandra longifolia	Yes
Lomandra multiflora subsp. Multiflora	Yes
Lomatia fraseri	Yes
Lomatia myricoides	Yes
Luzula flaccida	Yes
Microlaena stipoides var. stipoides	Yes
Native forb	
Native lilly	
Olearia erubescens	Yes

Official

PCT 1196 Species List	Seed to be Collected
Olearia phlogopappa	Yes
Orchidaceae indeterminate	
Oreomyrrhis argentea	Yes
Oreomyrrhis eriopoda	Yes
Ozothamnus thyrsoideus	Yes
Persoonia chamaepeuce	
Picris angustifolia	Yes
Picris angustifolia subsp. merxmuelleri	
Pimelea biflora	
Pimelea curviflora	
Pimelea linifolia	
Pimelea linifolia subsp. caesia	
Pimelea linifolia subsp. linifolia	
Plantago varia	Yes
Platylobium formosum	Yes
Poa induta	Yes
Poa labillardierei var. labillardierei	Yes
Poa sieberiana	Yes
Poa sieberiana var. cyanophylla	Yes
Poa sieberiana var. sieberiana	Yes
Podolepis jaceoides	Yes
Podolepis laciniata	Yes
Podolobium alpestre	Yes
Polyscias sambucifolia	Yes
Poranthera microphylla	
Pterostylis decurva	
Pterostylis foliata	
Ranunculus graniticola	Yes
Ranunculus lappaceus	Yes
Rhodanthe anthemoides	Yes
Rubus parvifolius	
Rumex brownii	Yes
Rytidosperma penicillatum	Yes
Rytidosperma pilosum	Yes
Schoenus apogon	Yes
Scleranthus biflorus	Yes
Senecio gunnii	Yes
Senecio pinnatifolius var. alpinus	Yes
Senecio prenanthoides	Yes
Senecio quadridentatus	Yes
Stackhousia monogyna	Yes
Stellaria pungens	Yes
Stylidium graminifolium	Yes
Tasmannia lanceolata	Yes
Tetratheca bauerifolia	Yes
Thelymitra pauciflora	
Themeda triandra	Yes
Veronica calycina	Yes
Veronica derwentiana	Yes
Veronica derwentiana subsp. maideniana	Yes

Official

PCT 1196 Species List	Seed to be Collected
Veronica gracilis	Yes
Veronica plebeia	Yes
Veronica subtilis	Yes
Viola betonicifolia	Yes
Wahlenbergia ceracea	Yes
Wahlenbergia gloriosa	Yes
Wahlenbergia gracilis	Yes
Wahlenbergia stricta	Yes
Wahlenbergia stricta subsp. stricta	Yes

Appendix B – Seed to be Collected for the Snowy 2.0 Transmission Connection Project

Note: The Sowing rates listed in Appendix B are to be treated as indicative only and do not preclude application rates that may be required in order to meet the goals and objectives of the RMP.

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
296, 999	Acacia gunnii	5g	Decumbent shrub. Acacia species have a hard seed and will require a hot water scarification prior to sowing.
296, 302, 729, 999	Acacia siculiformis	5g	Decumbent shrub
302,1196	Acaena agnipila	2g	All Acaena species are hard to clean as seed sticks to itself. May need separation prior to sowing.
285, 296, 300, 302, 1196	Acaena novae-zelandiae	2g	
285, 296, 300, 302, 729, 999, 1196	Acaena ovina	2g	
729, 999	Acrotriche serrulata	2g	
300, 729	Ajuga australis	2g	
300, 302, 729, 999, 1196	Anthosachne scabra	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
			depend on the number of seed available.
300, 1196	Arthropodium milleflorum	2g	
300, 302, 1196	Asperula conferta	2g	
296, 300, 302, 1196	Asperula scoparia	2g	
300	Austrostipa mollis	5 to 10g	
296, 729	Austrostipa scabra	5 to 10g	
999	Austrostipa scabra subsp. falcata	5 to 10g	
300	Bossiaea buxifolia	5g	Hard seeded species, will require hot water stratification prior to sowing.
1196	Brachyscome aculeata	2g	Many Asteraceae species will have low viability. Needs testing.
296, 300, 1196	Brachyscome decipiens	2g	
296, 729, 1196	Brachyscome spathulata	2g	
1196	Brachyscome tenuiscapa	2g	
1196	Bulbine bulbosa	2g	
285, 296,300, 302, 729, 999	Carex appressa	3g	Carex species best sown in areas with year-round soil moisture.
285, 300, 302, 729, 999, 1196	Carex breviculmis	3g	
285	Carex gaudichaudiana	3g	
285, 300, 1196	Carex incomitata	3g	
285, 300, 302, 1196	Carex inversa	3g	
302	Carex iynx	3g	
300, 302, 729, 999, 1196	Cassinia aculeata	5 to 10g	Cassinia seed is very light and can have low viability. Best to sow at the higher rate if seed is available.
300	Cassinia arcuata	5 to 10g	
296, 300, 302, 729, 999, 1196	Cassinia longifolia	5 to 10g	
296	Cassinia monticola	5 to 10g	
296, 300, 302, 729, 999	Chrysocephalum semipapposum	2g	Many Asteraceae species will have low viability. Needs testing.

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
300, 999, 1196	Clematis aristata	2g	
300, 1196	Clematis glycinoides	2g	
300, 1196	Coprosma hirtella	5g	
300	Coprosma quadrifida	5g	
296, 1196	Coronidium monticola	2g	
1196	Coronidium rutidolepis	2g	
1196	Coronidium scorpioides	2g	
300, 1196	Craspedia jamesii	2g	
1196	Craspedia variabilis	2g	
300	Cymbonotus lawsonianus	2g	
300, 1196	Cymbonotus preissianus	2g	
999	Daucus glochidiatus	2g	
296, 999, 1196	Daviesia ulicifolia	5g	Hard seeded species, will require hot water stratification prior to sowing.
300, 1196	Daviesia ulicifolia subsp. ruscifolia	5g	
300, 729, 999	Desmodium varians	5g	Hard seeded species, will require hot water stratification prior to sowing.
1196	Deyeuxia monticola	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available.
296	Deyeuxia quadriseta	5 to 10g	
300, 729, 999	Dianella longifolia	2g	A fleshy fruit, will require removal of pulp and soaked in water prior to sowing.
285, 296, 300, 729, 999	Dianella revoluta	2g	As above.
300, 302, 999	Dianella revoluta var. revoluta	2g	As above.
1196	Dianella tasmanica	2g	As above.
300, 302, 729	Dichelachne crinita	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available.
300, 999, 1196	Dichelachne hirtella	5 to 10g	
300, 302, 729, 1196	Dichelachne inaequiglumis	5 to 10g	
729	Dichelachne micrantha	5 to 10g	

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
300, 302, 729, 999, 1196	Dichelachne rara	5 to 10g	
300, 302, 1196	Dichondra repens	2g	
999	Dodonaea viscosa	5g	Papery seed, very light.
729	Dodonaea viscosa subsp.angustifolia	5g	Papery seed, very light.
296, 300, 302, 729	Dodonaea viscosa subsp. angustissima	5g	Papery seed, very light.
300	Echinopogon cheelii	5 to 10g	
300	Echinopogon ovatus	5 to 10g	
296	Entolasia stricta	5 to 10g	Hard to collect as very straggly plant.
300	Entolasia stricta var. hirsuta	5 to 10g	
302, 1196	Epilobium billardierianum subsp.Cinerum	2g	Seed prone to 'popping' from plant when seed is ready.
300, 729	Erigeron conyzoides	2g	
300, 729, 999, 1196	Euchiton involucratus	2g	
296, 300	Euchiton japonicus	2g	
1196	Euchiton sphaericus	2g	
1196	Geranium antrorsum	2g	
300	Geranium neglectum	2g	
1196	Geranium potentillioides	2g	
300	Geranium retrorsum	2g	
285,296, 300, 302, 729, 1196	Geranium solanderi	2g	
296, 300, 302, 729, 1196	Geranium solanderi var. solanderi	2g	
300	Gompholobium huegelii	5g	Hard seeded species, will require hot water stratification prior to sowing.
1196	Gonocarpus montanus	2g	
300, 729, 1196	Gonocarpus tetragynus	2g	
300, 729	Gonocarpus teucrioides	2g	
296, 1196	Goodenia hederacea subsp. alpestris	5g	
1196	Hakea microcarpa	5g	Seed follicle needs a heat treatment to remove seed.
296, 300, 729, 999	Hardenbergia violacea	5g	Hard seeded species, will require hot water stratification prior to sowing.

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
285, 296	Hibbertia linearis	5g	
296, 300, 302, 729, 999, 1196	Hibbertia obtusifolia	5g	
296, 300, 729, 999, 1196	Hovea heterophylla	5g	Hard seeded species, will require hot water stratification prior to sowing.
296	Hovea montana	5g	Hard seeded species, will require hot water stratification prior to sowing. Also needs cold treatment to germinate.
300, 302, 729, 999, 1196	Hydrocotyle laxiflora	2g	
300	Hydrocotyle sibthorpioides	2g	
296, 300, 729, 999, 1196	Hypericum gramineum	2g	
296	Hypericum japonicum	2g	
296, 300, 302, 729, 999	Indigofera australis	5g	Hard seeded species, will require hot water stratification prior to sowing.
285	Juncus filicaulis	2g	
302	Juncus sarophorus	2g	
296	Juncus usitatus	2g	
999	Kunzea parvifolia	5g	
300	Lachnagrostis filiformis	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available.
999, 1196	Leptorhynchos squamatus	2g	Many Asteraceae species will have low viability. Needs testing.
1196	Leptorhynchos squamatus subsp. alpinus	2g	
999	Leuchochrysum albicans subsp. albicans	2g	
302	Leptospermum polygalifolium subsp. polygalifolium	5g	
999, 1196	Lobelia gibbosa	2g	
296, 1196	Lobelia pedunculata	2g	
296, 300	Lomandra bracteata	2g	
285, 296, 300, 302,	Lomandra filiformis	2g	

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
729, 999, 1196			
300, 302, 999, 1196	Lomandra filiformis subsp. coriacea	2g	
285, 296, 300, 1196	Lomandra filiformis subsp. filiformis	2g	
285, 296, 300, 302, 729, 999, 1196	Lomandra longifolia	2g	
300, 302, 729, 999, 1196	Lomandra multiflora subsp. Multiflora	2g	
1196	Lomatia fraseri	5g	Seed follicle needs a heat treatment to remove seed.
300, 302, 1196	Lomatia myricoides	5g	Seed follicle needs a heat treatment to remove seed.
729, 999	Luzula atrata	2g	Luzula species best sown in areas with year-round soil moisture.
300, 729	Luzula densiflora	2g	
296, 302, 729, 1196	Luzula flaccida	2g	
285, 300	Microlaena stipoides	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available.
302, 1196	Microlaena stipoides var. stipoides	5 to 10g	
296	Microseris lanceolata	2g	Many Asteraceae species will have low viability. Needs testing.
296, 300, 302, 729, 999	Mirbelia oxylobioides	5g	Hard seeded species, will require hot water stratification prior to sowing
729, 1196	Olearia erubescens	5g	Olearia seed viability does not last very long. Best use seed within 2 yrs.
296, 300, 302, 999	Olearia myrsinoides	5g	As above
300, 302, 1196	Olearia phlogopappa	5g	As above
300	Olearia phlogopappa var. flavescens	5g	As above

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
999	Olearia ramulosa	5g	As above
296	Olearia tenuifolia	5g	As above
1196	Oreomyrrhis eriopoda	2g	
1196	Ozothamnus thyrsoideus	5g	Many Asteraceae species will have low viability. Needs testing.
1196	Picris angustifolia	2g	
296, 300	Plantago gaudichaudii	2g	
999	Plantago hispida	2g	
300, 1196	Plantago varia	2g	
300, 302, 729, 999, 1196	Platylobium formosum	2g	Hard seeded species, will require hot water stratification prior to sowing.
300, 729	Platylobium formosum subsp. formosum	2g	As above
296	Platylobium montanum	2g	As above
300, 302	Poa helmsii	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available.
300, 729, 999, 1196	Poa induta	5 to 10g	
729	Poa labillardierei	5 to 10g	
300, 1196	Poa labillardierei var. labillardierei	5 to 10g	
300, 729	Poa phillipsiana	5 to 10g	
285, 300, 729, 1196	Poa sieberiana	5 to 10g	
296, 300, 302, 729, 1196	Poa sieberiana var. cyanophylla	5 to 10g	
300, 302	Poa sieberiana var. hirtella	5 to 10g	
296, 300, 302, 999, 1196	Poa sieberiana var. sieberiana	5 to 10g	
1196	Podolepis jaceoides	2g	Many Asteraceae species will have low viability. Needs testing.
1196	Podolepis laciniata	2g	
1196	Podolobium alpestre	5g	Hard seeded species, will require hot water stratification prior to sowing. May also require a cold treatment.
285, 300, 999	Podolobium procumbens	5g	
300, 1196	Polyscias sambucifolia	5g	

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
999	Pultanea fasciculata	5g	Hard seeded species, will require hot water stratification prior to sowing
300	Pultenaea subspicata	5g	
300	Ranunculus collinus	2g	
1196	Ranunculus graniticola	2g	
296, 1196	Ranunculus lappaceus	2g	
1196	Rhodanthe anthemoides	2g	Many Asteraceae species will have low viability. Needs testing.
302, 1196	Rumex brownii	2g	
300, 729, 999	Rytidosperma erianthum	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available.
296, 999	Rytidosperma pallidum	5 to 10g	
285, 300, 302, 729, 1196	Rytidosperma penicillatum	5 to 10g	
300, 999, 1196	Rytidosperma pilosum	5 to 10g	
729, 1196	Schoenus apogon	2g	
285, 296, 1196	Scleranthus biflorus	2g	Seed is hard to collect, often no seed on plant
729	Senecio diaschides	2g	Many Asteraceae species will have low viability. Needs testing.
296, 300, 1196	Senecio gunnii	2g	
1196	Senecio pinnatifolus var. alpinus	2g	
300, 1196	Senecio prenanthoides	2g	
296, 300, 302, 729, 999, 1196	Senecio quadridentatus	2g	
300, 729, 1196	Stackhousia monogyna	2g	Very small seed, hard to collect
296, 300, 302, 729, 999	Stellaria pungens	2g	
296, 300, 729, 999, 1196	Stylidium graminifolium	2g	
1196	Tasmannia lanceolata	5g	
296, 300, 729, 999, 1196	Tetratheca bauerifolia	2g	
300, 999	Tetratheca ericifolia	2g	

PCT #	Species for Collection	Sowing Rate (per m2)	Notes
296, 300, 999	Tetratheca thymifolia	2g	
285,296, 300, 729, 999, 1196	Themeda triandra	5 to 10g	Higher seeding rates are effective with Poaceae species, but sowing rates will depend on the number of seed available. Themeda often has a dormancy and may take up to a year to germinate.
300, 1196	Veronica calycina	2g	
1196	Veronica derwentiana	2g	
300, 302, 1196	Veronica derwentiana subsp. maideniana	2g	
1196	Veronica gracialis	2g	
1196	Veronica plebeia	2g	
285, 729, 1196	Veronica subtilis	2g	
296, 300, 302, 729, 1196	Viola betonicifolia	2g	
999	Vittadinia cuneata var. cuneata	2g	
1196	Wahlenbergia ceracea	2g	Wahlenbergia has very small seed, hard to collect.
300, 302, 729	Wahlenbergia communis	2g	
1196	Wahlenbergia gloriosa	2g	
1196	Wahlenbergia gracialis	2g	
296, 300, 1196	Wahlenbergia stricta	2g	
300, 302, 729, 999, 1196	Wahlenbergia stricta subsp. stricta	2g	
999	Xerochrysum viscosum	2g	Many Asteraceae species will have low viability. Needs testing.

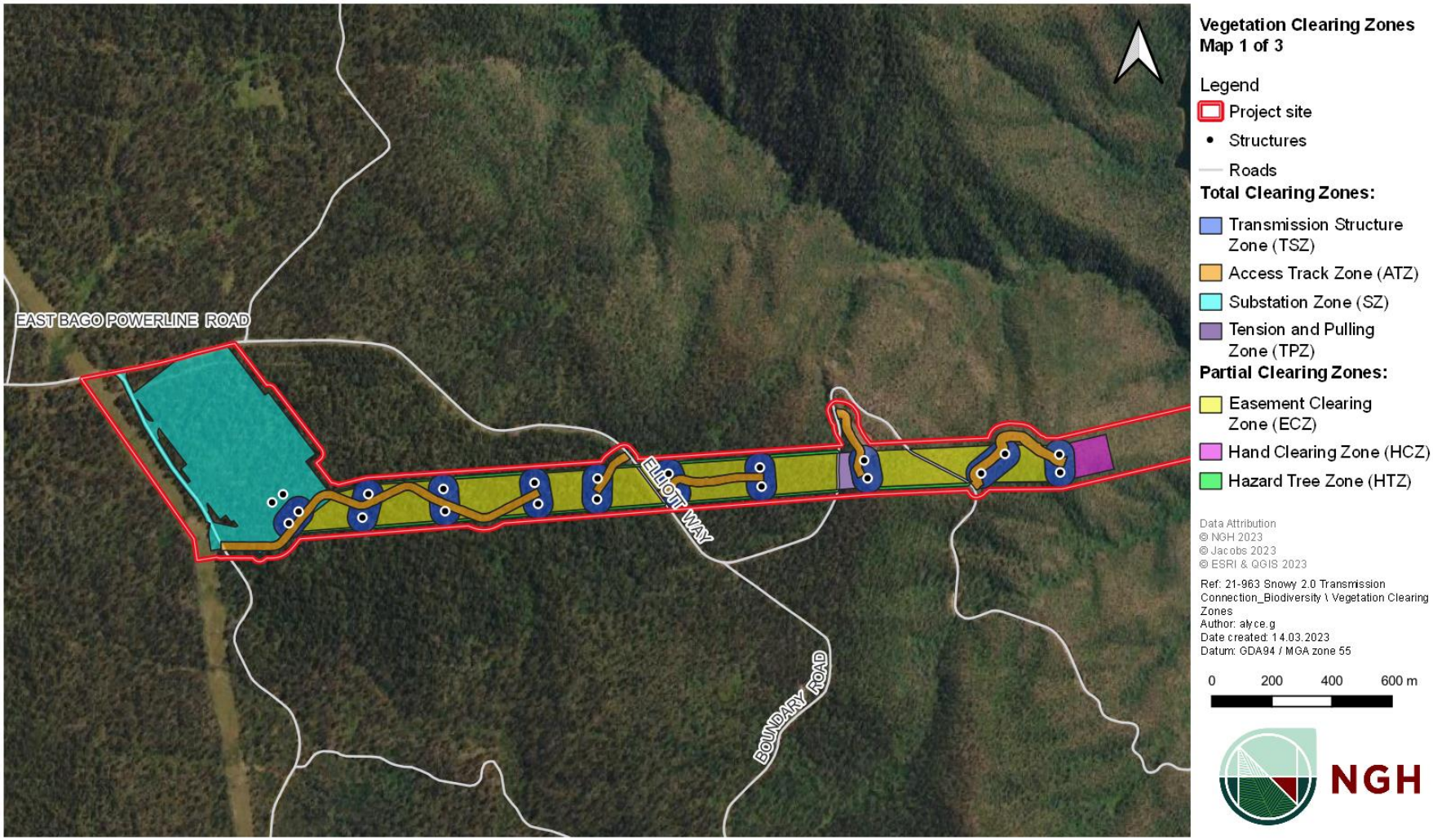
Appendix C – Change of Custody Form

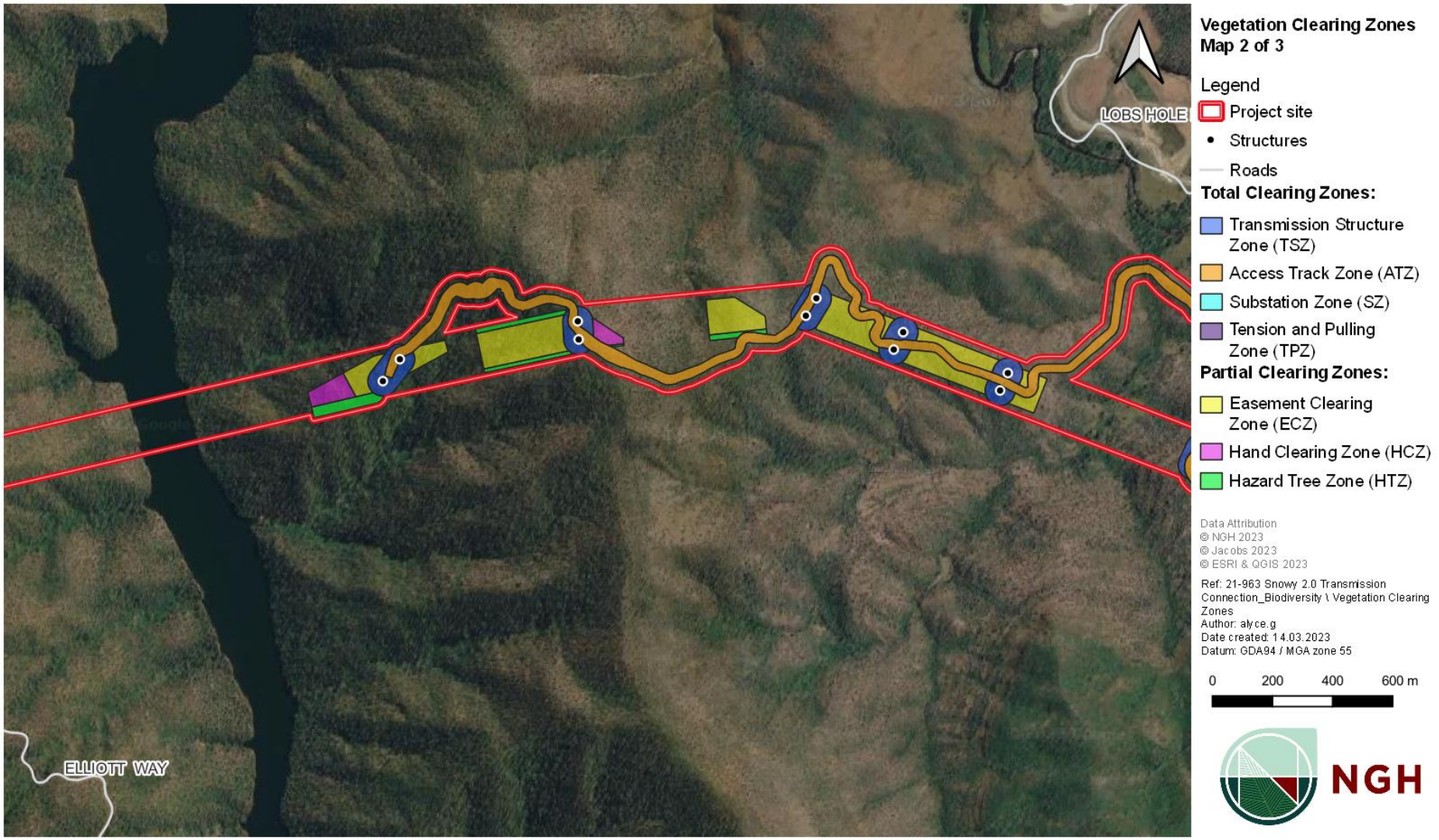
Note: This form is to be considered the minimum and indicative of a proper record-keeping process to prove the objective and goals of the RMP have been met.

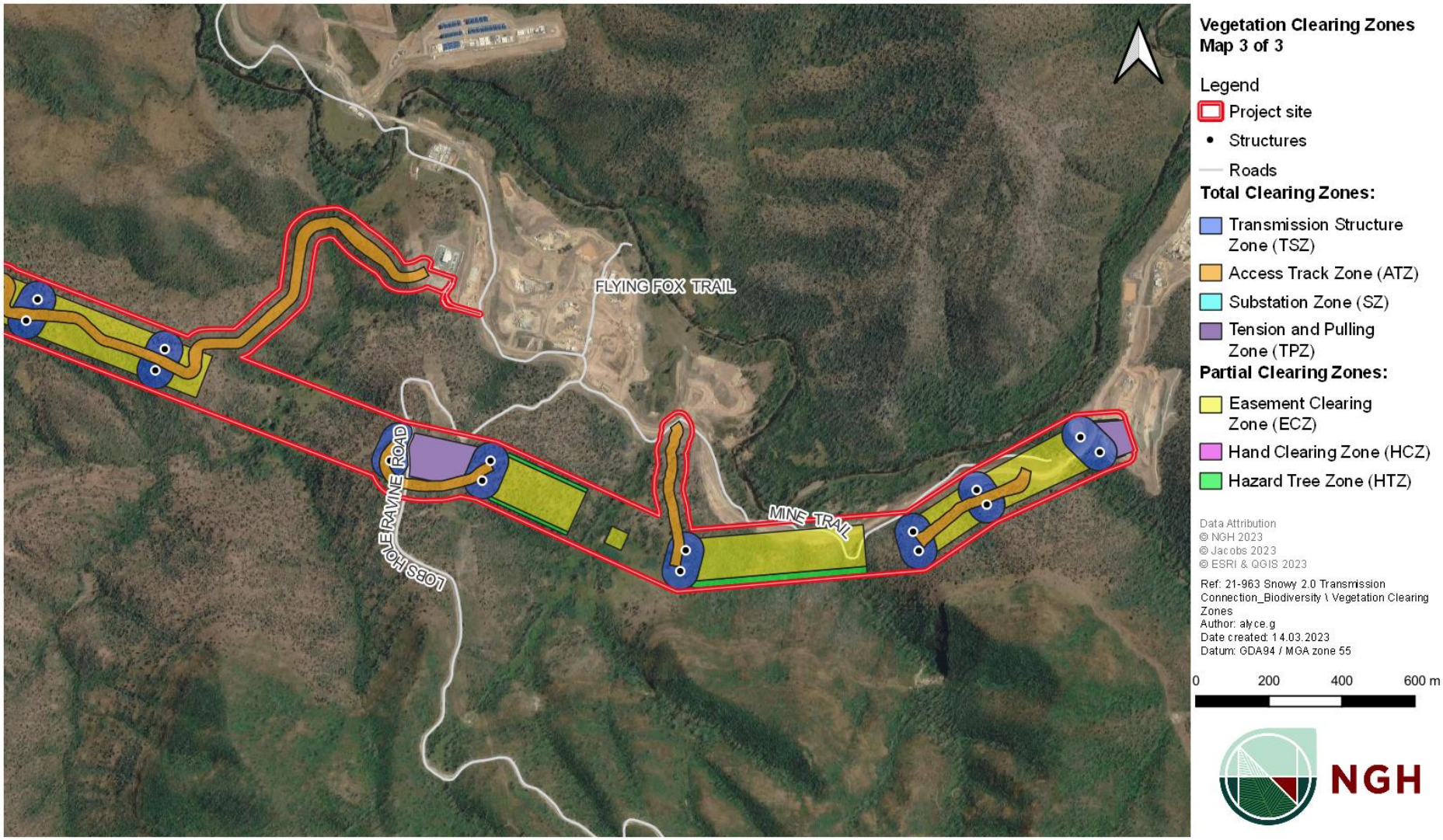
Seed Collection Inventory / Change of Custody

Project						
Change of Custody: Handed over by						
Change of Custody: Handed over to						
Collection ID	**Species**	**Collection Location**	**Collected Date**	**Collected By**	**Raw Yield (g) (seed and reproductive structure, i.e capsules)**	**Total seed extracted from raw yield**

Appendix D – Project site maps




LOBS HOLE
ELLIOTT WAY
Vegetation Clearing Zones
Map 2 of 3
Legend
Project site
Structures
Roads
Total Clearing Zones:
Transmission Structure Zone (TSZ)
Access Track Zone (ATZ)
Substation Zone (SZ)
Tension and Pulling Zone (TPZ)
Partial Clearing Zones:
Easement Clearing Zone (ECZ)
Hand Clearing Zone (HCZ)
Hazard Tree Zone (HTZ)
Data Attribution
© NGH 2023
© Jacobs 2023
© ESRI & QGIS 2023
Ref: 21-963 Snowy 2.0 Transmission Connection_Biodiversity \ Vegetation Clearing Zones
Author: alyce.g
Date created: 14.03.2023
Datum: GDA94 / MGA zone 55
0
200
400
600 m
NGH


FLYING FOX TRAIL
LOBS HOLE RAVINE ROAD
MINE TRAIL
Vegetation Clearing Zones
Map 3 of 3
Legend
Project site
Structures
Roads
Total Clearing Zones:
Transmission Structure Zone (TSZ)
Access Track Zone (ATZ)
Substation Zone (SZ)
Tension and Pulling Zone (TPZ)
Partial Clearing Zones:
Easement Clearing Zone (ECZ)
Hand Clearing Zone (HCZ)
Hazard Tree Zone (HTZ)
Data Attribution
© NGH 2023
© Jacobs 2023
© ESRI & QGIS 2023
Ref: 21-963 Snowy 2.0 Transmission Connection_Biodiversity \ Vegetation Clearing Zones
Author: alyce.g
Date created: 14.03.2023
Datum: GDA94 / MGA zone 55
0
200
400
600 m
NGH

Appendix E – Seed Collection consultation with NPWS

Jason Snape

From: Nicole Shotter <Nicole.Shotter@environment.nsw.gov.au>
Sent: Wednesday, 14 June 2023 12:19 PM
To: Jason Snape
Cc: Andrew Buttigieg; Rod Peel
Subject: RE: Snowy 2.0 Transmission Connection SSI-9717 - NPWS Seed Collection Permit [Official]

Hi Jason,

As per the Infrastructure Approval and specifically condition B48(f), Transgrid is to (i) maximise the collection of native seed from the site prior to disturbance and (ii) may collect seed from surrounding areas of Kosciuszko NP with the approval of NPWS.

I note your attached approval from Planning (dated 17/2/23) to commence seed collection prior to the approval of the EMS and other relevant management plans.

On that basis I confirm you do not require (and you have not requested) further approval from NPWS to collect seed from within the disturbance area.

With respect to NPWS approval to collect seed from the surrounding area, I confirm you do not need to complete the *"Application for a Seed Harvester Licence – Whole Protected Plants"* form. Please email me maps with your proposed collection areas identified, as well as a list of targeted species. Please also confirm that the people undertaking the collection are suitably experienced to identify the required species.

Once I receive this information and confirm with the local Area staff I will provide approval as appropriate.

Regards
Nic

Nicole Shotter
Manager Snowy 2.0
Southern Ranges Branch
NSW National Parks and Wildlife Service

Kosciuszko Road Jindabyne
T 02 6450 5535
M 0419 400 550
W nationalparks.nsw.gov.au

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

APPENDIX F BMP Monitoring Program

Official

Biodiversity Monitoring Program

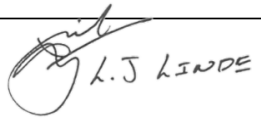
Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-017-CEMP-BMP-Appendix F
Stage 2 Document Number: HLW-HLJV-PRW-ENM-PLN-000024.F

TransGrid
Date 29/10/2024

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Biodiversity Monitoring Program
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	**05 Nov 2024**
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	**01 Nov 2024**

Version Control

Revision	Date	Description	Author	Reviewer	Approver
0.01	28/03/2023	Initial issue for review	Django Van Tholen Olivia Merrick	Kim Lembke	Trevor Noble
0.02	18/04/2023	Addressing Transgrid comments	Whitney Heiniger	Jane Love	Trevor Noble
0.03	04/05/2023	Addressing Transgrid comments	Jane Love	Kim Lembke	Trevor Noble
0.04	07/09/2023	Addressing BCS comments	Whitney Heiniger	Kim Lembke	Tim McCarthy
0.05	11/09/2023	Addressing Transgrid comments	Whitney Heiniger	Kim Lembke	Tim McCarthy
0.06	31/10/2023	Addressing NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.07	22/11/2023	Addressing NPWS and BCS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.08	29/10/2024	Inclusion of Stage 2 works	Nicholas Mok	Ian Irwin / Brendan Toohey	Louis Linde / Tim Burns

Distribution of controlled copies

This Monitoring Program is available to all personnel and sub-contractors via the Project document control management system. An electronic copy can be found on the Snowy 2.0 TCP website.
The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

Copy number	Issued to	Version

Biodiversity monitoring requirements as outlined in both the Project Biodiversity Assessment Report (BDAR) and the Project Conditions of Approval (CoA) have been summarised in Table 1. Table 1 Biodiversity Monitoring Program

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON1	Detailed design to focus on avoiding and minimising the loss of high value vegetation and habitat (shrub and groundcover vegetation within the Easement Clearing Zone, Hand Clearing Zone and Hazard Tree Zone are clearly marked for retention to avoid and minimise the loss of vegetation and habitat) The location of nest tree habitat buffers for Gang-gang Cockatoo and Masked Owl will be identified and limited from disturbance Design for Access Roads will consider: • creek crossings to ensure stream flow is unaffected. • placement to avoid habitat trees, rock outcrops, large boulders, piled rock, and rock features. • Placement in consideration of terrain (e.g., utilisation of the ridgelines to navigate to the higher elevations) to minimise cut/fill and vegetation clearing.	Disturbance footprint	Detailed design & survey Pre-clearing	Design/ Engineering Manager Environment Manager	Impact to high value vegetation and habitat has been reduced throughout the design iteration process Nest trees + buffer zones are present as Exclusion Zones on Site Environmental Plans Access tracks have been routed in consideration of "Design for Access Roads" elements	Spatial datasets	Review design iterations to evidence a reduction in clearing (ha). Review of Substantial Detailed Design (SDD) drawings to confirm: • shrub and groundcover vegetation within the Easement Clearing Zone, Hand Clearing Zone and Hazard Tree Zone are clearly marked for retention to avoid and minimise the loss of vegetation and habitat • Habitat tree exclusion zones are clearly visible • access routes avoid habitat trees, rock outcrops, large	At completion of SDD	Project Manager, at completion of SDD	Design iterations do not show a reduction in clearing area (ha). SDD does not show shrub and groundcover vegetation within the ECZ, HCA and HTZ are clearly marked for retention. SDD does not show habitat tree exclusion zones. SDD does not show Design for Access Roads elements.	Update design prior to progressing to Final Detailed Design	BIO1 BMP4 BMP5 BMP6	B17	BMP Section 5.4 Project boundary and exclusion zones.

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
							boulders, piled rock, and rock features. • have been sited to minimise cut/ fill and vegetation clearing • creek crossings have been designed to maintain stream flow							
MON2	Biodiversity management measures will be included in site environmental documents: Environmental Work Method Statements (EWMS) Site Environmental Plans (SEPs), Work packs and/or Environmental Management Plans (EMPs)	All of Project	Prior to mobilisation As new packages of work open up (new clearing phases etc)	Construction Manager Environmental Manager	No environmental incidents involving: damage, injury or death to biodiversity features, and/ or a breach of biodiversity mitigation measures	Spatial datasets	Incident reporting system	Prior to new package of works commencing	Project Manager (monthly)	Environmental Incident Notification	Corrective actions form Incident investigation process	BMP2	B17	CEMP Section 8.3 CEMP Section 8.4 CEMP Section 8.5
MON3	If vegetation disturbance is required during construction that differs from the clearing zones represented in the Detailed Design and Clearing Procedure, these areas must have further assessments conducted and submitted for approval, with a recalculation of offset requirements in accordance with the CEMP. Such additional vegetation must be within the approved disturbance footprint, or within the determination of a valid Consistency Assessment.	All of Project	All of Project	Design/ Engineering Manager Environmental Manager	Only areas approved and offset, as well as being within the limits of full or partial clearing for each PCT, are permitted to be disturbed	Spatial datasets Ecologist reports	Post-clearing checklist As-built survey pickup	As relevant	Project Manager (monthly) Transgrid to distribute updated detailed design and spatial datasets to NPWS, BCS, FCNSW, DCCEEW and DPHI	Identification of additional areas of vegetation disturbance are required to construct the Project	Further assessments conducted and submitted for approval, with a recalculation of offset requirements in accordance with the CEMP	BMP3	B17 EPBC 2	BMP Section 5.5 Clearing Protocols and habitat protection, BMP Appendix B - Clearing Procedure BMP Section 5.14 Mitigation Measures BMP3

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON4	Training provided to all Project personnel (inc. sub-contractors) on the requirements of the BMP. Site inductions must inform all personnel working in the Project area what the limit of works and exclusion zones, are and where they occur.	All of Project	Prior to mobilisation, During works as required – toolbox talks	HSE Manager Training Coordinator	Inductions completed for all staff	N/A	Review inductions register showing it is up to date for all site personnel (Audit program)	Refer BMP Audit Section below (MON5)	Refer BMP Audit Section below (MON5)	BMP/ associated Appendices breached by site activities (e.g. activity within an exclusion zone)	Re-train individuals on requirements of BMP, i.e. Specific Toolbox talk to that activity group (amongst other corrective actions, identified by the Incident Investigation process)	BMP1	B17 EPBC 2	BMP Section 6.2 Training
MON5	A BMP will be prepared and approved prior to construction.	All of Project	Prior to works commencing on site	Construction Manager Environment Manager.	Approved BMP available prior to works commencing Approved BMP being implemented with detailed mitigation actions for the project for all biodiversity.	N/A	BMP Audits	Internal: initial audit within three (3) months of commencing work onsite and then at least every six (6) months after that Independent External Audit: within three (3) months of commencing work onsite, then within 26 weeks from the previous audit, for the duration of construction.	Audit results/ report 2 weeks following completion of audit, to: Project Manager HSE Manager Audit report within 2 months of completion: Planning Secretary	Audit observations/ Corrective Actions identified	Implement audit corrective actions	BIO2	B21 C10	CEMP Section 9.3 Audits
MON6	Pre-clearing procedure (minimum two-staged clearing process) developed and implemented	Disturbance footprint	Prior to clearing works	Construction Manager Site Supervisor Environment Manager Site Environmental Advisor Project Ecologist	Vegetation clearing is being undertaken in accordance with the Pre-clearing process/ procedure	N/A	Weekly Environmental inspections to check and record whether pre and post clearance checklists and permits are completed and are up to date	Before clearing commences Ongoing (weekly inspections)	Project Manager (monthly) Report incidents immediately verbally and within 24 hours in writing. Transgrid must notify DPHI and NPWS via the Major Projects Website immediately after becoming aware of an incident	No preclearance checks undertaken Staged clearing procedure not followed Injured native fauna/ hollow dependent fauna form clearing process Lack of Environmental Incident notification where required	Review the VMP, updated as required Corrective actions from Incident investigation process: Re-survey exclusion zones and project boundary Reinstall exclusion zone fencing/ flagging and signage Retrain staff as necessary	BIO4 BMP3 BIO7 BMP10 BMP11 BMP12 BMP13 BMP14 BMP15 BMP16 BMP17 BMP18 BMP19 BMP20 BMP21	B17 B21	BMP Section 5.1 Flora and fauna management strategies, Section 5.5 Clearing Protocols and habitat protection, Section 6.3 Monitoring and inspections, Section 6.4 Reporting and Incidents . BMP Appendix B - Clearing Procedure

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON7	Directional lighting will be used for permanent lighting (i.e., substation) to minimise light spill.	Substation	Design, construction and operation	Design/ Engineering Manager Environmental Manager	Light spill is not being directed into vegetation or light spill is sufficiently shrouded from spillage	N/A	Review of Substantial Detailed Design (SDD) drawings for lighting design detail Weekly Environmental Inspection checklist	Prior to SDD finalisation WEICs	Project Manager	Light spill is observed shining into vegetation	Review lighting design as needed Utilise light shields Reposition lighting away from vegetation	BIO20 BMP8	n/a	BMP Section 5.1 Flora and fauna management strategies
MON8	Project boundary, exclusion and clearing zone demarcation will be undertaken.	Disturbance footprint	Detailed design phase Pre-clearing Ongoing (weekly inspections) Post clearing (As- builts for cleared areas)	Design/ Engineering Manager and Surveyor Environmental Manager/ Site Environmental Advisor Site Supervisor	Project boundary, exclusion zones and clearing zone boundary demarcations are accurately installed No over clearing incidents	Spatial datasets	Site Environmental Plans display exclusion zones, clearing zones and clearing limits Pre-clearance checklists Surveyors to capture "as-built" data for all cleared areas	Pre-clearing Ongoing (weekly) Post construction (As-builts)	Project Manager (monthly)	Boundary demarcated identified as incorrect Over clearing incident	Re-survey exclusion zones, clearing zones and project boundary Reinstall exclusion and clearing zone fencing/ flagging and signage Retrain staff as necessary	BIO5 BIO11 BIO12 BIO13 BMP11 BMP12 BMP13 BMP14	B17 B21	BMP Section 5.4 Project boundary and exclusion zones Section 6.3 Monitoring and inspections Appendix B Clearing Procedure
MON9	A Clearing Procedure will be developed and implemented.	Disturbance footprint	Prior to works commencing on site	Construction Manager Environmental Manager	Vegetation cleared only from approved areas, via approved methods as per disturbance zone category Vegetation cleared via approved methods per Disturbance Zone Pre and post clearance surveys completed.	N/A	Pre-clearing checklists Post-construction checklists. Weekly environmental inspections checklist (WEIC) Induction records Toolbox records.	Weekly At time of clearing	Project Director (weekly) HSE Manager Report incidents immediately verbally and within 24 hours in writing to Transgrid. Transgrid must notify DPHI and NPWS via the Major	Near Miss/ environmental incident notification	Review the CP, updated as required Corrective actions identified from Incident investigation process: Re-survey exclusion zones and project boundary Reinstall exclusion zone fencing/ flagging and signage Retrain staff as necessary	BIO6 BMP6	B17 B21	BMP Section 5.4 Project boundary and exclusion zones Section 6.3 Monitoring and inspections, Section 6.4 Reporting and Incidents

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
									Projects Website immediately after becoming aware of an incident.					
MON10	Prior to the commencement of works each shift, a check shall be done to ensure there is no wildlife present in the construction zone.	Construction zones.	Construction	Site Supervisor, Team Leader or Leading Hand	No wildlife present in construction zones.	N/A	Site Supervisor daily diary Weekly Environmental Inspection Checklist (to ratify the daily Site Supervisor Checklists have been undertaken)	Daily, all construction zones Weekly, EIC confirmation	Construction Manager Environmental Manager	Checklist not completed Fauna observed as present / injured/ killed in a construction zone (environmental incident)	Corrective actions from Incident investigation process	BIO8 BMP36	B17 B21	BMP Section 5.14 Biodiversity mitigation measures
MON11	Soil and Water Management Plan is prepared and implemented	All zones	Prior to construction commencement Ongoing (until site stabilisation is achieved)	Construction Manager Environmental Manager Site Supervisor Site Environmental Advisor	Mitigation measures identified in the SWMP are implemented Runoff and sediment transfer from the project area during construction is controlled Protection of aquatic habitat in the tributaries crossed by the project, particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly River.	N/A	Pre & Post Rainfall Inspection Checklists Environmental Audits	WEIC Inspect ESC measures within 24 hours of the start of rainfall event (pre) and within 24 hours of rainfall event occurring (post)	Project Manager (weekly)	Controls identified in the SWMP/ Erosion and Sediment Control Plans not installed/ not functional Signs of visible erosion Evidence of notable erosion or sedimentation, particularly beyond the project boundary or into sensitive areas Raise ESC Incident	Review the SWMP, updated as required Corrective actions identified from Incident investigation process	BIO2 BIO10 BMP10 BMP14	B7 B8 B10 B13 B14	SWMP CEMP, Section 9.5 Non conformity, corrective and preventative actions

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON12	Weed monitoring and control program developed in consultation with BCS and NPWS.	All disturbed construction zones	Pre-construction Construction Operations	Environmental Manager Site Environmental Advisor	Weeds controlled in accordance with the WPCMP	Weed surveys	Monitoring for weed in accordance with WPCMP e.g.: Surveys and mapping of weed species Line-point intercept method for cover	Initiated prior to clearing, then biannually for a period of two years following cessation of construction works.	Project Manager (monthly) Annual reporting made available to BCS, FCNSW, NPWS.	New occurrence of weeds where previously not recorded Project facilitated weed growth in disturbed areas	Weed control actions, including but not limited to chemical treatment; Mechanical removal	BIO11 BMP46	B17 B21	Weed and Pathogen Control Monitoring Program (WPCMP)
MON13	Identify weed species in KNP, in consultation with NPWS.	Kosciuszko National Park (KNP)	Pre-construction Construction.	Environmental Manager Site Environmental Advisor	Weed species from KNP included in the WPCMP, to inform weed management practices and identify potential weed threats.	Weed surveys	Review WPCMP to ensure KNP weed species are current	WPCMP document review will follow that of the Audit schedule (refer MON03)	Reporting to Transgrid in accordance with the WPCMP	Weed species for KNP not included in WPCMP	Review the WPCMP, updated as required	BIO12 BMP19 BMP46	B17 B21	BMP Section 3.7, Section 5.10 WPCMP
MON14	Identify, map, and remove weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs.	All disturbed construction zones	Pre- construction, and construction	Environmental Manager Project Ecologist	Weed mapping undertaken Weeds removed prior to or during construction, as access permits Weed control areas recorded	Weed surveys Spatial data	Weed monitoring in accordance with WPCMP WEIC	As described in WPCMP WEIC	Project Manager (monthly) Annual reports to BCS, FCNSW, NPWS.	Weed identification incomplete Weed and sprayed area maps incomplete or not undertaken Weed control activities incomplete or not undertaken.	Additional weed surveys Weed removal program	BIO13 BMP19 BMP46	B17 B21	BMP Section 3.7 Weeds and pathogens WPCMP
MON15	Prepare a vehicle and machinery weed hygiene strategy and implement during construction and operation.	Construction zones	Construction Operation	Environmental Manager Site Environmental Advisor	Plant and equipment mobilised to site clean and free of weeds Vehicle and machinery weed hygiene controls in place and utilised on site	Weed surveys	Pre-clearing checklist WEIC	Weekly	Project Manager (monthly)	Strategy unimplemented (e.g. Hygiene declarations absent, equipment not cleaned sufficiently)	Implement vehicle and machinery weed hygiene controls Review vehicle and machinery weed hygiene strategy and updated as necessary Environmental awareness training and incorporate into toolbox talks.	BIO14 BMP47	A13 B21	WPCMP

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON16	During clearing works, weed disposal shall be managed appropriately.	All zones.	Construction	Site Supervisor Site Environmental Advisor	Weed disposed of appropriately in accordance with WPCMP	Weed surveys	WEIC.	Weekly	Project Manager (monthly) Annual reporting to BCS, FCNSW, NPWS.	Weeds not disposed of appropriately	Remove weeds and dispose of them according to the WPCMP. Environmental awareness training and incorporate into toolbox talks. Raise an environmental incident, corrective actions identified from Incident investigation process	BMP46 BIO15	A13 B21	BMP Section 3.7 Weeds and pathogens Section 5.7 Weed and pathogen control monitoring procedure
MON17	Construct and operate washdown stations capable to prevent amphibian chytrid fungus, *Phytophthora cinnamomi* and exotic rust fungi, at suitable locations.	All of Project	Construction Operation	HSE Manager SITE ENVIRONMENTAL ADVISOR Environmental Officers Project supervisors and leading hands.	Washdown stations constructed and operating	Soil surveys	Weed and pathogen log-book Regular inspections of active work sites WEIC Incident reports Compliance tracking.	At least weekly	Project Manager (monthly) Annual reporting to BCS, FCNSW, NPWS.	Washdown stations not constructed, not operational or not being utilised be very machine/ vehicle passing the washdown station Environmental Incident notification	Install and operate additional hygiene stations Environmental awareness training and incorporate into toolbox talks. Implement corrective actions from the incident investigation process.	BMP46 BIO16	B17 B21	CEMP Section 6.4 Appendix G
MON18	Store and dispose of personal waste/ refuse generated during construction appropriately Reduce introduced pests to the construction area	All of Project	Construction Operation	Construction Manager Site Supervisor Site Environmental Advisor	Bin locations evident on Site Environmental Plans Adequate number and placement of bins that close securely actively visible on site, as per Site Environmental Plans	N/A	Site inspection checklist Regular inspections of active work sites WEIC	Weekly	Project Manager (monthly) 6 monthly Compliance Tracking Report Annual reporting made available to BCS, FCNSW, NPWS.	Pest animal increase attributable to project construction activities Visible rubbish in work areas/ surrounding vegetation Site Environmental Plans do not show bin locations Environmental Incident (non-	Install adequate number of bins that close securely. Update Site Environmental Plans with bin locations Environmental awareness training and incorporate into toolbox talks. Implement corrective actions from the incident	BIO17 BMP49	B44	BMP Section 5.11, Section 9

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
										conformance) notification	investigation process.			
MON19	Prepare and implement feral animal monitoring program (Pest and Predator Monitoring Program PPMP), that minimises attracting introduced predators and pests to the construction areas.	All of Project	Prior to works commencing on site Construction	Environmental Manager	PPMP available and up to date Pest and predator species abundance	Pest and predator monitoring	WEIC Presence/ absence of species on site and population monitoring (as per PPMP).	Weekly As described in PPMP	Project Manager (monthly) Annual reporting made available to BCS, FCNSW, NPWS including provision of raw data.	Observed presence of pest or predator species Recorded pest/ predator abundance increase (Relative Abundance Rating of species increases an Abundance level over three consecutive monitoring periods)	Review and amend PPMP. Review and assess control methods	BIO18 BMP48	B17 B21	BMP Section 5.11
MON20	Develop a Bird and Bat Management Plan (BBMP) that identifies species at risk of collision with power lines and electrocution. The strategy will include deploying bird diverters, with day/night reflectors within approved buffer distance, appropriate for diurnal and nocturnal birds	Easement Clearing Zone	Prior to works commencing on site	Operations Environmental Manger	Bird and Bat Management Plan developed and approved Bird / bat diverters deployed in the ECZ (once lines are installed)	Ecologist reports as stipulated by the BBMP	Nest searches annually along the whole transmission line Carcass monitoring four times per year at five locations Flight observations four times per year at four locations	Weekly during construction (once lines have been installed) Annually during operation for a period of five years following cessation of construction works.	Transgrid Annual reporting to BCS and NPWS or as required by Trigger for action, including provision of raw data.	Diverters are not installed in locations designated by the BBMP Presence of active nests on the transmission line Presence of bird or bat carcasses within proximity of the lines or towers	Install bird divertors with day/night reflectors along buffers and at locations with repeated bird strike or feather spots Additional diverters installed Additional mitigation measures installed as required for specific species or location	BIO19 BMP39		Bird and Bat Management Plan
MON21	Artificial lighting required during construction in the early morning and late afternoon in winter will be limited to within approved construction hours.	Whole of Project	Construction	Construction Manager Site Supervisor Site Environmental Advisor	Lighting operating only during approved hours of construction	N/A	Site Supervisor daily diary WEIC	Daily Weekly	Project Manager (monthly)	Lighting directed into vegetation Light shields not being used.	Redirect lighting away from vegetation Install light shields.	BIO21 BMP38	B36	BMP Section 5.14
MON22	The Australian Standard AS2436-2010 Guide to noise and vibration control on construction, demolition, and maintenance sites to be integrated in design.	Whole of Project	Design phase	Design/ Engineering Manager	The requirements of AS2436-2010 is integrated in design.	N/A	Design review	Prior to SDD	Project Manager	The requirements of AS2436-2010 have not been integrated in design.	Integrate the requirements of AS2436-2010 into design.	BIO22	B1 B2 B3	CEMP (NVMP)

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MON23	Minimise noise from equipment through measures such as keeping both stationary and mobile plant and equipment in good working condition (including mufflers, enclosures etc), and avoid leaving engines running on standby when machinery is not being used.	Whole of Project	Construction Operation	All personnel onsite	Stationary and mobile plant and equipment in good working condition. Engines are turned off/ running on standby when machinery/ equipment is not being used.	N/A	Vehicle pre-start checks WEIC	Daily Weekly	Project Manager (monthly)	Identified concern Complaint.	HSE Manager, Project Manager or SITE ENVIRONMENTAL ADVISOR to: Implement relevant corrective actions. Environmental non-conformances will be dealt with through the Incident Management Procedures detailed in Section 6.5 of the CEMP.	BIO23	B1 B2 B3	CEMP (NVMP)
MON24	Select equipment with the lowest noise rating that meets task requirements and minimise operating loud machinery conjunctively.	Whole of Project	Construction Operation	Construction Manager Site Supervisor	Equipment on site that has a demonstrated low noise rating. Low noise machinery on site	N/A	Inspections	WEIC	Project Manager (monthly)	Equipment/ machinery is reported to be on site that does not have low noise rating for the task at hand Environmental Incident (non-conformance) notification	Remove non-compliant equipment/ machinery from site	BIO24	B1 B2 B3	CEMP (NVMP) Section 6 Noise and vibration mitigation
MON25	Dust management and monitoring programs using industry best practices and standards to control air quality will be implemented: No dust generating works will be conducted during high winds Stockpiles kept covered with material to prevent the generation of dust. Apply water dust suppression techniques during dust generating activities.	Total clearing zone	Construction	Construction Manager Site Supervisor Site Environmental Advisor	No visible dust plumes from disturbance footprint/ construction zone No at risk areas of exposed/ bare ground Stockpiles and material covered/ secured	N/A	Site Supervisor daily diary WEIC Audits	Daily WEIC	Project Manager (monthly) HSE Manager.	Dust mitigation measures ineffective Excessive dust plumes observed Environmental Incident notification	Review and update where required, dust mitigation practices Corrective Actions identified form the incident investigation process Environmental awareness training and incorporate into toolbox talks	BIO25	B6	BMP Section 6

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON26	Provide sediment and erosion controls to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways, vegetation, and fauna habitat.	Disturbance Footprint	Construction	Construction Manager Site Supervisor Site Environmental Advisor	ESC measures in place as per ESCP No visible at-risk areas of erosion or sedimentation No visible turbid water discharge outside the total clearing zone or into sensitive areas (i.e. steep / highly erodible land or riparian areas and waterways)	N/A	Erosion and Sediment Control inspections WEIC Audits	Daily Site Supervisor Checklists WEIC Inspect ESC measures within 24 hours of the start of rainfall event (pre) and within 24 hours of rainfall event occurring (post)	Project Manager (monthly) In the event of any failure of sediment or stormwater mitigation measures immediate reporting to the EPA is required. Initiation of a Stochastic Event Monitoring TARP will occur with regard to Booroolong Frog protection. Refer to Appendix A, page 21 of the Booroolong Frog Monitoring Program (BFMP).	ESC measures ineffective Notable erosion or sedimentation Over-capacity or damaged ESC devices Sediment loss Environmental Incident notification	Review and update ESCPs as needed Environmental awareness training and incorporate into toolbox talks Corrective Actions identified by the incident investigation process Repair, maintain, desilt or upgrade ESC device(s)	BIO26 BMP10	B10 B11 B21	BMP Section 4.2 Ecological impacts Section 5.4 Project boundary and exclusion zones Section 5.14 Biodiversity mitigation measures Booroolong Frog Monitoring Program.
MON27	Add visible objects to any barbed wire fencing installed at the Switching Yard as required to increase visibility and act as a deterrence technique for in flight fauna.	Substation switchyard	Construction	Environmental Manager Site Supervisor	Visible objects to the substation switch yard fence are present if barbed wire is applied	Ecologist reports	Site Supervisor daily diary WEIC	Daily Weekly	Project Manager (monthly)	Records of fauna entanglement on barbed wire fences around the substation	Add visible objects to the substation switch yard fence to increase visibility or remove barbed wire and consider other fencing options if repeated fauna entanglement recorded.	BIO27	-	Yellow-bellied Glider Connectivity Strategy

MON ID #	Action	Location	Timing (Project phase)	Responsibility	Performance Measure	Baseline Data	Monitoring method	Monitoring timing, frequency	Reporting (to who, when)	Trigger for action	Response & adaptive management (corrective action)	BDAR/ BMP ID	CoA	Relevant EMP Section
MON28	Measures to mitigate and monitor the impact of the project on Yellow-bellied Glider (YBG) during construction and operation of the project.	All zones.	Construction Operation	Construction Manager Environmental Manager	Captured movement across the easement by YBG individuals	Songmeter data GPS locations of den trees Camera trap data BDAR data and pre-construction Ecologist monitoring reports	Camera traps Songmeters Mortality monitoring	As per the monitoring requirements set out in Section 4.1 and 4.2 of the Yellow-bellied Glider Connectivity Strategy, pp. 23-25. This includes pre-construction monitoring and baseline data collection. Three times annually for five years (5) years or until the poles have been deemed unsuccessful and translocations are deemed necessary	Annually to Transgrid Annual reporting to BCS and NPWS or as required by Trigger for action, including provision of raw data.	Monitoring not being undertaken Fauna not observed crossing easement	Commence monitoring as per YBG Strategy Translocation of individuals, in consultation with BCS and under the guidance of a Translocation Plan	BIO29	B21	BMP Section 5.12 Yellow- bellied Glider Connectivity Strategy
MON29	20km/h speed limit applied to vehicle movements on newly formed access tracks to reduce the risk of vehicle strike to fauna.	Access tracks	Construction Operation	All site personnel	Speed limits adhered to	N/A	In-vehicle monitoring system (when available)	Continuous	HSE Manager (weekly)	Vehicle travelling over speed limit Fauna injury or death from vehicle fauna strike	Incident notification submitted Corrective actions identified from Incident investigation process Environmental awareness training and incorporate into toolbox talks	BIO30 BMP37	B21	BMP Section 5.14

Table 2 Summary of BMP Reporting Requirements

Item	Trigger	Detail Required	Responsible Authority	Stakeholders to be Notified	Notification Timeframe
Incident Notification - Immediate Notification	Incident as defined under SSI-9717: An occurrence or set of circumstances that causes, or threatens to cause material harm and which may or may not be or cause a non-compliance. Material harm is harm that: • involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or • results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment). This definition excludes “harm” that is authorised under either this approval or any other statutory approval. Environmental incidents relating to biodiversity may include but not be limited to: • Unauthorised clearing or clearing beyond the extent of the Project boundary or premises • Unauthorised damage or interference to threatened species, endangered ecological communities (EEC) or critical habitat • Unauthorised death or injury of native fauna • Any potential breach of legislation, including a potential breach of a safeguard • Breaches of hygiene management requirements.	The Department and the NPWS must be notified via the Major Projects website portal immediately after the Proponent (Transgrid) becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one), and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 5 of SSI-9717.	Transgrid	DHIE, NPWS, DCCEEW	Immediately after becoming aware of an incident
Incident Notification - Written Report	Incident as defined under SSI-9717: An occurrence or set of circumstances that causes, or threatens to cause material harm and which may or may not be or cause a non-compliance.	Written notification of an incident must:(a) identify the development and application number;(b) provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);(c) identify how the incident was detected;(d) identify when the Proponent became aware of the incident;(e) identify any actual or potential non-compliance with conditions of approval;(f) describe what immediate steps were taken in relation to the incident;(g) identify further action(s) that will be taken in relation to the incident; and(h) identify a project contact for further communication regarding the incident.	Transgrid	DPHI	Within seven days after the Proponent (Transgrid) becomes aware of an incident
Incident Notification - Incident Report	Incident as defined under SSI-9717: An occurrence or set of circumstances that causes, or threatens to cause material harm and which may or may not be or cause a non-compliance	Detailed report on the incident addressing all requirements below, and such further reports as may be requested. The Incident Report must include: (a) a summary of the incident; (b) outcomes of an incident investigation, including identification of the cause of the incident; (c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and (d) details of any communication with other stakeholders regarding the incident	Transgrid	DPHI	Within 30 days of the date on which the incident occurred or as otherwise agreed to be the Planning Secretary

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Item	Trigger	Detail Required	Responsible Authority	Stakeholders to be Notified	Notification Timeframe
Non-compliance Notification	Proponent (Transgrid) becomes aware of any non-compliance.Note: In accordance with SSI-9717 Condition C9 A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.	A non-compliance notification must identify the development and the application number for it, set out the condition of approval that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.	Transgrid	DPHI, NPWS	Within seven days after the Proponent (Transgrid) becomes aware of any non-compliance
Unexpected Threatened Species Procedure	Threatened species/ EEC is unexpectantly encountered during clearing/construction and operation activities	Immediately notify NPWS if located within for KNP; or FCNSW if within State Forest	Transgrid	NPWS, FCNSW	Immediately after becoming aware of unexpected threatened species
Annual Monitoring Report	Recurring annual biodiversity reporting	• The name and qualifications of the Ecologist or wildlife carer present during clearing • An assessment of the habitat and handling of fauna • Information on clearing operations, dates, procedures, areas • Including the number of trees and hollows cleared • Live animal sightings, captures, any releases or injured / shocked wildlife • Any dead animals located • Photographs of rescued fauna.	Transgrid	BCS, NPWS, FCNSW, DPHI, DCCEEW	Annually
Pre-clearing Report	At the completion of the pre-clearing surveys	All the data and activities completed during the survey. The report will utilise the data the collected via the pre-clearing checklist (Appendix B.2). The report will include any recorded habitat features, fauna relocated or euthanised, including the name of qualified / licensed handler, species, location notes, and release location and method.	Transgrid	BCS, NPWS, FCNSW, DCCEEW	Following completion of report/s
Post-clearing Report	At the completion of clearing	Project Ecologist (BAM accredited) will survey the cleared area using the checklist attached (Appendix B.3) and compile a post-clearing survey report including: • The name and qualifications of the Project Ecologist or a suitably qualified ecologist present during clearing. • Records are to be kept of all fauna rescue events, including locations to where fauna have been relocated. GPS coordinates will be provided for such events. • An assessment of the habitat and handling of fauna. • Information on clearing operations, dates, procedures, areas. • Live animal sightings, captures, any releases (including GPS coordinates) or injured / shocked wildlife. • Any dead animals located. • Residual vegetation integrity scores. • Photographs of rescued fauna.	Transgrid	BCS, NPWS, FCNSW, DCCEEW	Following completion of report/s
Environmental Incident Register	As required	Environmental incidents recorded during construction works inclusive of death of injury to protected fauna species.	Transgrid	DPHI, BCS, NPWS	Montlhy
Booroolong Frog Monitoring Data	Provided as part of Annual Monitoring Report	Booroolong Frog monitoring data including raw data as detailed in Section 4 of Appendix G Booroolong Frog Monitoring Program	Transgrid	BCS, NPWS, FCNSW, DPHI, DCCEEW	Annually

Item	Trigger	Detail Required	Responsible Authority	Stakeholders to be Notified	Notification Timeframe
Weed and Pathogen Control Monitoring Program Data	Provided as part of Annual Monitoring Report	Weed and pathogen monitoring data as detailed in Section 6 of Appendix H Weed and Pathogen Control Monitoring Program	Transgrid	BCS, NPWS, FCNSW, DPHI, DCCEEW	Annually
Weed Monitoring Program - New Weed Species	Potential new weed species identified within the Project footprint. Refer to Trigger Action Response Plan provided in Appendix E of Appendix H Weed and Pathogen Control Monitoring Program	Species identification and location including classification (e.g. Weed of National Significance, High-threat Exotici or Priority Weeds)	Transgrid	BCS, NPWS, FCNSW	Immediately on receipt of report of identified new weed species from Project Ecologist
Weed Monitoring Program - Weed Coverage (%) Increase	Weed coverage (%) increase identified within the Project footprint. Refer to Trigger Action Response Plan provided in Appendix E of Appendix H Weed and Pathogen Control Monitoring Program	Species identification including classification (e.g. Weed of National Significance, High-threat Exotici or Priority Weeds), location and coverage (%)	Transgrid	BCS, NPWS, FCNSW	Immediately on receipt of report of weed coverage (%) increase from Project Ecologist
Pathogen Monitoring - Positive *Phytophthora R*esult	Positive result for *Phytophthora* species from soil sampling	Notification of positive *Phytophthora* result including location and extent of known presence	Transgrid	BCS, NPWS, FCNSW	Immediately following positive result for *Phytophthora* species from soil sampling
Pest and Predator Monitoring Data	Provided as part of Annual Monitoring Report	As detailed in Section 6 and Section 7 of Appendix I Pest and Predator Monitoring Program • Pest and predator monitoring results • Details on the pest and predator control actions undertaken since the last report including: o A list of the control activities undertaken o A map of areas where control activities were undertaken • The efficacy of the control measures in relation to the objective of minimising pest distribution and/or abundance in the Project area • Recommendations for future control activities • A summary of the efficacy of other control measures outlined in this plan and recommendations for revisions to controls.	Transgrid	BCS, NPWS, FCNSW, DPHI, DCCEEW	Annually
Yellow-bellied Glider Monitoring	Provided as part of Annual Monitoring Report	As detailed in Section 4.6 of Appendix J Yellow-bellied Glider Strategy including: • Results of monitoring • Assessment of the overall success of the mitigation measures installed • Identification of gaps or limitations to the biodiversity monitoring methodology. This includes monitoring components, method of data collection (frequency and location), method of data, analysis and reporting requirements. • Provision of recommendations for adjustments to monitoring techniques, timing and locations. Monitoring data (including raw data) will be provided to NPWS and BCS as part of annual reporting	Transgrid	BCHI, NPWS, FCNSW, DPHI, DCCEEW	Annually

Item	Trigger	Detail Required	Responsible Authority	Stakeholders to be Notified	Notification Timeframe
Bird and Bat Management Monitoring	Provided as part of Annual Monitoring Report	Summary of quarterly reporting including: • Results: raw data results for nest monitoring, carcass monitoring, and flight observations. • Discussion: adaptive management triggers, analysis and recommended responsive mitigation, if required. Monitoring data (including raw data) will be provided to NPWS and BCS as part of annual reporting	Transgrid	BCS, NPWS, FCNSW, DPHI, DCCEEW	Annually

APPENDIX G Booroolong Frog Monitoring Program

Official

Booroolong Frog Monitoring Program

Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-017-CEMP-BMP-Appendix G

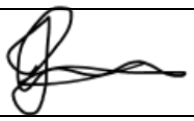
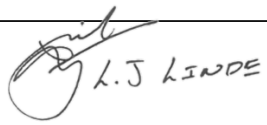
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TransGrid

Date 20/09/2024

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Booroolong Frog Monitoring Program
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Dated	22/11/2024
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Dated	20/11/2024
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Distribution of controlled copies

This Monitoring Program is available to all personnel and sub-contractors via the Project document control management system. An electronic copy can be found on the Snowy 2.0 TCP website. The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

Copy number	Issued to	Version

Table of Contents

1 Introduction 6

1.1 Context 6
1.2 Purpose and Objectives 6

2 Environmental Assurance 7

2.1 Legislation 7
2.2 Guidelines, Policies, Regulations & Plans 7
2.3 Project Conditions of Consent 7

3 Impacted Species 9

3.1 Species Habitat and Ecology 9
3.2 Potential for Impact 10

4 Management and Monitoring 13

4.1 Management of Exclusion Zones 13
4.2 Soil and Water Management 13
4.3 Monitoring Survey Design 17
4.4 Reporting 22

5 References 23

Appendix A Trigger Action Response Plans 24

List of Figures

Figure 3-1 Booroolong Frog Litoria booroolongensis (EMM Consulting, 2020a) 10
Figure 3-2 Yarrangobilly River riffle habitat (Jacobs, 2022) 12
Figure 3-3 Wallaces Creek riffle habitat (Jacobs, 2022) 12
Figure 3-4 Yarrangobilly River pool habitat (Jacobs, 2022) 12
Figure 3-5 Wallaces Creek pool habitat (Jacobs, 2022) 12
Figure 4-1 Proposed Booroolong Frog habitat monitoring locations 18

List of Tables

Table 2-1 Mitigation measures (Source: Jacobs 2022) 7
Table 4-1 Mitigation measures from the Primary ESCP specific to Booroolong Frog protection 13
Table 4-2 Frog Habitat monitoring 19
Table 4-3 Stochastic event monitoring 21

Acronyms and Abbreviations

Abbreviation	Explanation
BC Act	*Biodiversity Conservation Act 2016*
BCD	Biodiversity Conservation & Science Directorate
BDAR	Biodiversity Development Assessment Report
BF	Booroolong Frog
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
DCCEEW-Cth	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
EP&A	*Environmental Planning and Assessment Act 1979*
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and Sediment Control Plan
FM Act	*Fisheries Management Act 1994*
km	kilometres
m	metres
NPWS	National Parks and Wildlife Service
PC	Principal Contractor or Contractor as defined in this management plan
POM	Plan of Management
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
SHL	Snowy Hydro Limited
SWMP	Soil and Water Management Plan
TARP	Trigger Action Response Plan

1 Introduction

1.1 Context

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received development approval on 2 September 2022 to construct a switching station and overhead transmission lines ('the Project') to facilitate the connection of Snowy 2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW).

This plan has been prepared to respond to the mitigation measures BIO5 and BIO10 detailed within the Project BDAR (Jacobs, 2022), which relate to the implementation of exclusion zones for the Booroolong Frog *Litoria booroolongensis*, implementation of a soil and water management plan, and implementation of monitoring of frog occupancy and habitat availability, and changes to these as a result of the Project.

This Booroolong Frog Monitoring Program forms part of the Biodiversity Management Plan (BMP) for the Project.

1.2 Purpose And Objectives

The key objective of the Booroolong Frog Monitoring Program is to ensure that all avoidance, mitigation and management measures relevant to the protection of the Booroolong Frog *Litoria booroolongensis* populations and their habitats, referred to in the environmental assessment documents and relevant permits and approvals are addressed. To achieve this objective, the following will be undertaken:

- Provide context of the species
- Discuss potential for impact as a result of the Project
- Detail strategies to monitor for impacts to the frog population
- Detail strategies to monitor for impact to the species' habitat
- Detail strategies to identify and manage unforeseen environmental incidents (stochastic events)
- Provide Trigger Action Response Plans in the event that targets are not met
- Align with Snowy 2.0 Exploratory / Main Works Booroolong Frog management and monitoring actions to facilitate cumulative risk and impact management
- Ensure appropriate measures are implemented to comply with all relevant legislation and other requirements as described in Section 2 of this plan.

2 Environmental Assurance

2.1 Legislation

Legislation relevant to this program includes:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Fisheries Management Act 1994* (FM Act)
- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *National Parks and Wildlife Act 1974.*

2.2 Guidelines, policies, regulations & plans

The main guidelines, specifications, and policy documents relevant to this Plan include:

- Saving our Species Strategy – *Litoria booroolongensis* (NSW Government, n.d.)
- Policy and Guidelines for Fish Conservation and Management (DPI 2013)
- Noxious and environmental weed control handbook – A guide to weed control in non-crop, aquatic and bushland situations (DPI, 2018)
- Regional Pest Management Strategy 2012 – 2017
- Kosciuszko National Park Plan of Management (PoM, DEC 2006) (NSW)
- Snowy 2.0 Main Works Biodiversity Development Assessment Report (EMM Consulting, 2020)
- Snowy 2.0 Main Works Biodiversity Management Plan, Revision I (EMM Consulting, 2020).

2.3 Project conditions of consent

The Project Biodiversity Development Assessment Report (BDAR) and Project conditions of approval relevant to this strategy are listed in Table 2-1 below.

Table 2-1 Mitigation measures (Source: Jacobs 2022)

Reference number	Requirement	Document reference
Mitigation Measures – BDAR		
BIO10	A schedule will be included in the SWMP for cleaning and maintenance of sediment basins / controls with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of: • >50 mm in 24 hours. A Trigger Action Response Plan will be documented in the SWMP, with management actions in place to address risk of sediment loads detrimental to Booroolong Frog entering the system. The triggers for response will be informed by evaluation of the construction monitoring results from Main Works. Immediate reporting to NPWS will occur in the event of any failure of sediment or stormwater mitigation measures, including overtopping of sediment basins. Indirect impacts are uncertain during high rainfall events during and/or after clearing. If mitigation measures and sedimentation controls fail, this could	SWMP – Appendix D BMP – Section 5.8 SWMP – Appendix C (TARPs) BFMP – Section 0

Reference number	Requirement	Document reference
	lead to a substantial loss or adverse impact to Booroolong Frog breeding and dispersal habitat. An adaptive management plan will be prepared in consultation with NPWS and BCD to address risk of increased sedimentation/run off to the identified breeding habitat and population extent downhill and downstream of the Project area. • An adaptive management plan as part of the monitoring program will be included in the SWMP to address risk of increased sedimentation/run off to the identified breeding habitat and population extent of the Booroolong Frog downhill and downstream of the Project area. The plan will be designed to estimate any residual impact if sediment mitigation measures fail.	BFMP Appendix A (TARP) BFMP Appendix A (TARP)
Conditions of Approval – State Infrastructure		
B21	Prior to carrying out any development that could impact biodiversity values, unless the Planning Secretary agrees otherwise, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: (a) be prepared by a suitably qualified and experienced biodiversity expert/s in consultation with NPWS, BCD, FCNSW and DCCEEW; (b) be prepared in accordance with the Biodiversity Development Assessment Report (Revision 7, dated 22 August 2022); (e) include a strategy to address: (i) management activities within the 50 m exclusion zone of the Yarrangobilly River and its tributaries; (ii) a trigger action response plan identifying actions to be implemented should any water quality criteria be exceeded focusing on the extent to which exceedances might affect the Booroolong Frog; and (f) include a program to monitor, evaluate and publicly report on the effectiveness of these measures. Following the Planning Secretary's approval, the Proponent must implement the Biodiversity Management Plan.	BMP BFMP BFMP Appendix A (TARP) BFMP – Section 4.4
Conditions of Approval - EPBC		
4	The Biodiversity Management Plan required under condition B21 of the State Infrastructure Approval must: • In respect of all watercourses which contain habitat for Booroolong Frog, as indicated by the areas within the yellow polygons designated 'Booroolong Frog' within the designated 'Study area' in the map at Attachment B, specify: ○ What and how detailed baseline data on surface water flows and quality will be collected prior to the commencement of the Action; ○ A program to augment data regarding surface water flows and quality data over time; • Specify detailed criteria for determining surface water impacts (in respect of flows, quality and flooding) of the Action on the Booroolong Frog, including criteria for triggering remedial action (if necessary);	BMP SWMP – Appendix F (Water Quality Monitoring Program) BFMP

Reference number	Requirement	Document reference
	• Specify a monitoring program capable of detecting any specified criteria for triggering remedial action, if they occur; and • Include a description of the measures that will be implemented to minimise the surface water impacts of the Action on the Booroolong Frog.	SWMP – Appendix E (ESCP)

3 Impacted Species

3.1 Species habitat and ecology

The National Recovery Plan for the Booroolong Frog *Litoria booroolongensis* (NSW Office of Environment and Heritage, 2012) identifies the following habitat requirement for the species, and an example of the species is shown in Figure 3-1 below:

The Booroolong Frog is generally associated with permanent streams in wet and dry forest, woodland, and cleared grazing land (Anstis et al. 1998, Gillespie 1999, Hunter 2007). The species occurs in dissected mountainous country, tablelands, foothills and lowland plains (Anstis et al. 1998, Gillespie 1999). Adults tend to occur on or near cobble banks, or bedrock structures within stream margins, or near slow-flowing connected or isolated pools that contain suitable rock habitats. By day, frogs shelter under rocks or amongst vegetation near the ground along the edge of the stream. Several individuals may be found sheltering together. During the summer months individuals may bask in the sun on exposed rocks near flowing water. During the breeding season at night, males call from exposed rocks or rock crevices, near shallow pools or runs. Juveniles and adults have also been observed under rocks within the riparian zone during winter (Anstis et al. 1998, D. Hunter pers. obs.).

Egg deposition sites are typically in shallow, slow-flowing sections of stream or isolated rock pools along the stream margins (Anstis et al. 1998). The egg clutch is a rigid gelatinous clump, adhered to rock in crevices (Anstis et al. 1998). Tadpoles have been observed in slow-flowing sections of streams, or in pools (Anstis et al. 1998, Gillespie 1999). The tadpoles are benthic and have been found occupying rocks and detritus on the streambed (Anstis et al. 1998).

The primary habitat requirements for the Booroolong Frog are coarse cobble stone beds and extensive rock bank structures found along permanent rivers (Gillespie 1999, Hunter and Smith 2006). The Booroolong Frog has also been observed using artificial man-made structures, such as weirs (P. Spark pers. comm.). The key feature of these rock structures are rock crevices in relatively shallow, slow to medium-flowing sections of stream (Hunter 2007). Given the high abundance of Booroolong Frog tadpoles in streams and stream side pools subject to intensive agricultural practises (Hunter 2007), it appears that this species is robust to a range of water quality parameters. Failure to locate the Booroolong Frog along ephemeral streams, and the decline of this species from streams that dried during recent severe droughts, demonstrates the reliance of this species on permanent water (Hunter and Smith 2006, D. Hunter unpub. data). Hence, habitat critical to the survival of the Booroolong Frog is rocky sections of permanent streams occupied by the species. Any action that reduces stream permanency (e.g. pumping water) or results in loss of rock crevices (e.g. smothering by weeds or sedimentation), is likely to threaten the persistence of local populations of this species.



Figure 3-1 Booroolong Frog Litoria booroolongensis (EMM Consulting, 2020a)

3.2 Potential for impact

The Biodiversity Development Assessment Report (BDAR) prepared for the transmission construction (Jacobs, 2022) identified the presence of this species and its habitat within (and adjacent to) the Project area. Examples of these habitats are shown in Figure 3-2 to Figure 3-5, with locations of proposed monitoring locations and exclusion zones provided in Figure 4-1.

The Booroolong Frog is known to inhabit the Yarrangobilly River, and Wallaces Creek and the lower section of Sheep Station Creek, close to its confluence with the Yarrangobilly River. This is based on confirmed records reported in the Snowy 2.0 Exploratory Works and Main Works BDARs (EMM Consulting 2020a). The Yarrangobilly River was identified as providing optimal breeding habitat for the Booroolong Frog, with a series of cobble banks and bedrock structures along stream margins, with slow flowing water connected by larger, slow flowing pools (EMM Consulting 2020a). The breeding habitat in Wallaces Creek is considered to be more limited, with only small sections providing suitable breeding habitat and it is likely this area provides sub-optimal breeding habitat as well as connective and dispersal habitat (EMM Consulting 2020a). Sheep Station Creek is also likely to be sub-optimal as breeding habitat for the Booroolong Frog and may only be used during peak flow events, as this drainage line is dry the remainder of the time. No individuals were recorded along Lick-Hole Gully or Cave Gully.

During targeted surveys undertaken for the Snowy 2.0 Exploratory Works and Main Works BDARs (EMM Consulting, 2020a), the Booroolong Frog was observed up to 130 m from the Yarrangobilly River during a high rainfall event that saw key breeding habitat flooded. During this period, most frogs were observed within the riparian zone (i.e. within 50 m of the River (EMM Consulting, 2020a). Based on that information, the Yarrangobilly River and lower end of Wallaces Creek and Sheep Station Creek have been identified as Booroolong Frog breeding habitat, while areas within 50 m of this breeding habitat has been identified as potential dispersal and refuge habitat. These criteria were used to develop the species polygon for the Main Works BDAR, and this same species polygon has been adopted for the connecting Transmission Line Project, given the proximity of the habitat for the current Project.

The Project has the potential to show increased risks above that assessed for the Main Works of indirect impacts from sedimentation due to the location of steep ridges and the proximity to mapped Booroolong frog breeding habitat. A 50-metre buffer has been identified as the appropriate distance to protect the Booroolong frog habitat from the impacts of the Project. However, the potential for an encroachment of the 50-metre buffer, as a result of the Project, has been identified to be of a higher risk than the Main Works Project. The impacts are likely to increase due to the risk of steep slopes surrounding catchment causing movement of sediment from erosion and runoff from the Project into waterways, particularly after large rain events from Wallaces Creek and Sheep Station Creek. These effects exceed those of the Main Works Project.

The Project may have impacts on water quality, water bodies and hydrological processes that sustain the Booroolong Frog in the following ways:

- There is potential for release of poor-quality sediment laden water into watercourses within and adjacent to the disturbance area when there are rainfall events during construction
- There is potential for a reduction in stream bank stability following vegetation removal for construction of bridges or clearances for power lines, resulting in bank erosion and sedimentation of watercourses
- There is potential for increased water flow into the waterways resulting from vegetation removal and access track construction (channelling of water) and increased erosion
- There is potential for accidental release of contaminants during construction and maintenance (i.e. chemicals, fuel, oil, hydraulic fluid) that could result in the release of hydrocarbons and metal contaminants into watercourses
- There is potential for release of pesticides and/or herbicides into watercourses which may have detrimental effects.

Examples of Booroolong Frog riffle habitat within the greater Project area are provided in Figure 3-2 – Figure 3-5 below.



Figure 3-2 Yarrangobilly River riffle habitat (Jacobs, 2022)



Figure 3-3 Wallaces Creek riffle habitat (Jacobs, 2022)



Figure 3-4 Yarrangobilly River pool habitat (Jacobs, 2022)



Figure 3-5 Wallaces Creek pool habitat (Jacobs, 2022)

4 Management and Monitoring

4.1 Management of exclusion zones

A 50 m exclusion zone will be established along watercourses and identified with high visibility fencing and signage. This exclusion zone will ensure that no works occur within these areas, with the exception of some areas of unavoidable impact, which have been adequately offset (refer to BMP Appendix B for clearing zone details and methodologies). All clearing would be supervised by the Project Ecologist, and salvage of aquatic habitat features would be undertaken. A Clearing Procedure provides further detail of this methodology within Appendix B of this BMP.

4.2 Soil and water management

Soil and water management in relation to the potential for erosion and sedimentation to impact critical Booroolong Frog habitat will be carried out in accordance with the Project's Soil and Water Management Plan (3200-0645-PLN-021-CEMP-SWMP). This Monitoring Program should be read in conjunction with the SWMP, with particular focus on the Erosion and Sediment Control Plans (ESCPs) and water quality exceedance TARPs, both included as appendices to the SWMP.

The prevention of erosion will be prioritised at all times during soil management onsite, to reduce reliance on sedimentation controls and the risk of potential impacts on both Booroolong Frog individuals and habitat features. Any discrepancies in habitat monitoring results will assess the potential for impact from sedimentation and water quality in accordance with the TARPs provided in Appendix A of this Program.

The Primary ESCP (Appendix D of the SWMP) has been designed to cater for protection of the Booroolong Frog through specific mitigation measures relating to erosion and sediment control. These mitigation measures, as they are represented in Table 5-1 of the Primary ESCP, are outlined in Table 4-1.

Table 4-1 Mitigation measures from the Primary ESCP specific to Booroolong Frog protection

Item	Mitigation measure	Responsibility	Timing
ESC1	Progressive ESCPs will be prepared for each specific stage or parcel of work prior to commencing construction in consultation with construction staff. These will be prepared in accordance with this table of safeguards.	Site Environmental Advisor (SEA), Construction Manager (CM) & Project Engineer (PE)	Prior to construction
ESC6	All erosion and sediment controls will be designed and installed in accordance with best-practice guidelines such as with the Blue Book Volumes 1 and 2 (Landcom, 2004 and DECC, 2008), or, if those documents are insufficient, IECA (2008).	SEA, CM & PE	During construction
ESC7	Prior to or immediately following vegetation or soil disturbance, ESCMs will be implemented. These measures will remain in place for the duration of works unless revegetation or stabilisation has occurred in accordance with the requirements of this Primary ESCP.	SEA, CM & PE	During construction
ESC8	Weather forecasts will be monitored daily and relevant information passed onto construction personnel to allow for adequate planning for significant rain events.	SEA	During construction
ESC11	Environmental events where pollution is caused or threatened will be managed in accordance with the relevant TARP. Refer to the CEMP for details.	SEA & CM	During construction
ESC12	Environmental performance will be monitored and this Primary ESCP (and subsequent Progressive ESCPs and	SEA	During construction

Item	Mitigation measure	Responsibility	Timing
	procedures) will be reviewed, updated and amended in accordance with the Primary ESCP.		
ESC13	Detailed design specifications for relevant erosion and sediment control devices are to be contained within the Progressive ESCPs and must be distributed to site crews before starting works	SEA & CM	During construction
ESC17	Disturbance will be minimised to only that necessary for the upcoming works. Any exposed surfaces not required for construction will be progressively stabilised or revegetated.	SEA, CM & PE	During construction
ESC21	Maximise the diversion of sediment-laden construction runoff into sediment controls. Use berms, bunds, sandbags, drains, pipes etc to achieve this.	SEA & CM	During construction
ESC24	Adequate erosion controls (such as scour protection) will be applied to areas of concentrated flow to minimise erosion potential.	SEA & CM	During construction
ESC27	Site generated mulch from clearing activities will be used as bunds wherever reasonable and practicable to minimise sediment loss.	SEA & CM	During construction
ESC35	Clearly delineate access tracks, boundaries, exclusion zones using flagging, tape or similar.	SEA& CM	Prior to and during construction
ESC38	Progressive ESCPs and / or Environmental Work Method Statements (EWMSs) are to indicate the specific controls to be used when working in and around natural or constructed drainage lines. These are to include (but are not limited to): • Monitoring weather forecasts and taking appropriate action prior. • Scheduling works to occur during no-flow or low-flow conditions. • Monitoring flows to aid with access. • Minimising the extent of work and the amount of time of disturbance. • Using clean rock, sheeting, steel plates, sheet piling or similar measures to isolate work areas from natural flows. • Wherever practical, use of temporary ground covers to minimise erosion of exposed soils during rainfall or high flows. Permanent scour protection and stabilisation measures required for the operational phase will be installed early, where practical.	SEA, CM & PE	Prior to and during construction
ESC39	EWMSs will be prepared in accordance with *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018) and *Policy and Guidelines for Fish Habitat Conservation* (DPI, 2013) and *Why do Fish Need to Cross the Road?*	SEA	Prior to and during construction

Item	Mitigation measure	Responsibility	Timing
	Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003).		
ESC40	In-stream sediment controls must be fit for purpose and installed and maintained as per the manufacturer's recommendations.	SEA, CM & PE	Prior to construction
ESC41	Clean rock will be used in drainage lines as required to form dissipaters, piling platforms, create crossing points or line channels. Work platforms or access tracks required in the vicinity of drainage lines will be constructed of large clean rock material wrapped or underlain with geofabric.	SEA, CM & PE	Prior to and during construction
ESC44	Stockpiles of soil material will only be placed in low-hazard areas, at least 10m away from drainage lines, in total clear zones and away from the dripline of any retained trees.	SEA & CM	During construction
ESC52	Short-term (<30 days) stockpiles of mulch will be positioned at least 20m from waterways and will be bunded or have a ditch drain excavated around their base to detain any tannin-rich runoff. Long-term (>30 days) stockpiles of mulch will be positioned at least 50m from watercourses or sensitive areas and will be bunded or have a ditch drain excavated around their base to detain any tannin-rich runoff.	CM	During construction
ESC58	Clearing limits and work boundaries will be established and clearly defined prior to any construction, clearing or stripping works commencing.	SEA, CM & PE	During construction
ESC59	All vegetation that is to be maintained will be clearly delineated.	SEA & CM	During construction
ESC60	Land clearing will occur progressively and for the areas associated with the current section/stage of works only.	SEA, CM & PE	During construction
ESC61	Tree removal in waterways and in between tower structures will involve cut stump method, leaving grasses and small understory species undisturbed as much as possible.	SEA, CM & PE	During construction
ESC62	Wherever possible, cleared vegetation will be mulched onsite as left *in situ* as a ground cover (erosion control). However, mulch will not be used within 20m of a waterway if it is likely to produce excess tannins.	SEA & CM	During construction
ESC64	Dewatering is to be conducted in accordance with the SWMP and the relevant UGLMS.	SEA & CM	During construction
ESC67	Prior to forecast rainfall events of 10mm or more, end-of-day controls will be considered to help reduce erosion and control sediment. These might include one or more of the following: • Check dams • Slope breaks • Batter chutes • Fill windrows	SEA & CM	During construction

Item	Mitigation measure	Responsibility	Timing
	• Temporary ground covers. This will be detailed on Progressive ESCPs.		
ESC68	Prior to forecast heavy rainfall (more than 20mm), the Environment manager or their representative will inspect active work areas and note any areas requiring additional management measures.	SEA	During construction
ESC69	Earthworks will cease during heavy rainfall events where a risk of sediment loss from site is apparent.	SEA & CM	During construction
ESC70	The Environment Manager (or their representative) will inspect erosion and sediment controls measures across the site: • at least weekly; and • prior to forecast rainfall of 20mm; and • if safe to do so, following rainfall of 20mm or more. Inspections will include checks of drainage, erosion and sediment controls and site discharge points to determine effectiveness and maintenance requirements. Inspections will consider issues such as: - Sediment transport and or deposition either on or off site; - Evidence of excessive erosion; - Erosion & sediment control device maintenance & loading (including basins) - Any additional controls required; - Any updates required to Progressive ESCPs; - Maintenance, treatment and or de-watering requirements; and - Stability of reinstatement, rehabilitation and revegetation works.	SEA	During construction
ESC71	Corrective maintenance to address any damage to erosion and sediment controls is to be scheduled and completed as necessary (i.e. prior to rainfall events).	SEA & CM	During construction
ESC72	Sediment controls will be cleaned out as required no more than 5 days after rainfall to ensure at least 60% capacity in all sediment controls. Sediment will be taken to a stockpile or added to general fill.	SEA & CM	During construction
ESC74	Undertake progressive stabilisation of ground surfaces as they are completed rather than at the end of the works program (where practical to do so).	SEA & CM	During construction
ESC76	Stabilise and/or rehabilitate lands within 20 days of works being completed or if an area will be left inactive for more than 20 days.	SEA, CM & PE	During construction

4.3 Monitoring Survey design

Monitoring for this species will be undertaken utilising the Before / After – Control / Impact (BACI) methodology identified by Underwood (1992). This methodology is particularly effective in aquatic environments, where variables of anthropogenic impact are able to be isolated from natural background environmental fluctuations. The method of monitoring involves the following:

- Establishment or re-survey of control sites, typically upstream of a potential impact but with similar habitat conditions
- Establishment of impact sites, which are strategic locations downstream or in proximity to potential impact areas
- Commencement of survey before the initial impact, to provide a baseline against which post-impact surveys could be compared
- Ongoing monitoring during and after the completion of works, to monitor for changes against natural levels within the control sites following works.

The detection of significant changes to habitat extent within impact areas, following works, could indicate an impact resulting from the Project.

Table 4-2 to Table 4-3 below detail the objectives, sampling units, methods, location, effort and frequency of surveys, and identify proposed data analysis methods to detect change, targets for monitoring, triggers for implementation of adaptive management, and proposed adaptive management strategies. These methodologies have been developed in accordance with the approved monitoring methodologies outlined in Sections 6.2 and 6.3 of the Snowy 2.0 Main Works Biodiversity Monitoring Program, presented as Appendix B of the overarching Main Works Biodiversity Management Plan (EMM, 2020b).

The TARPs are provided in Appendix A of this plan.

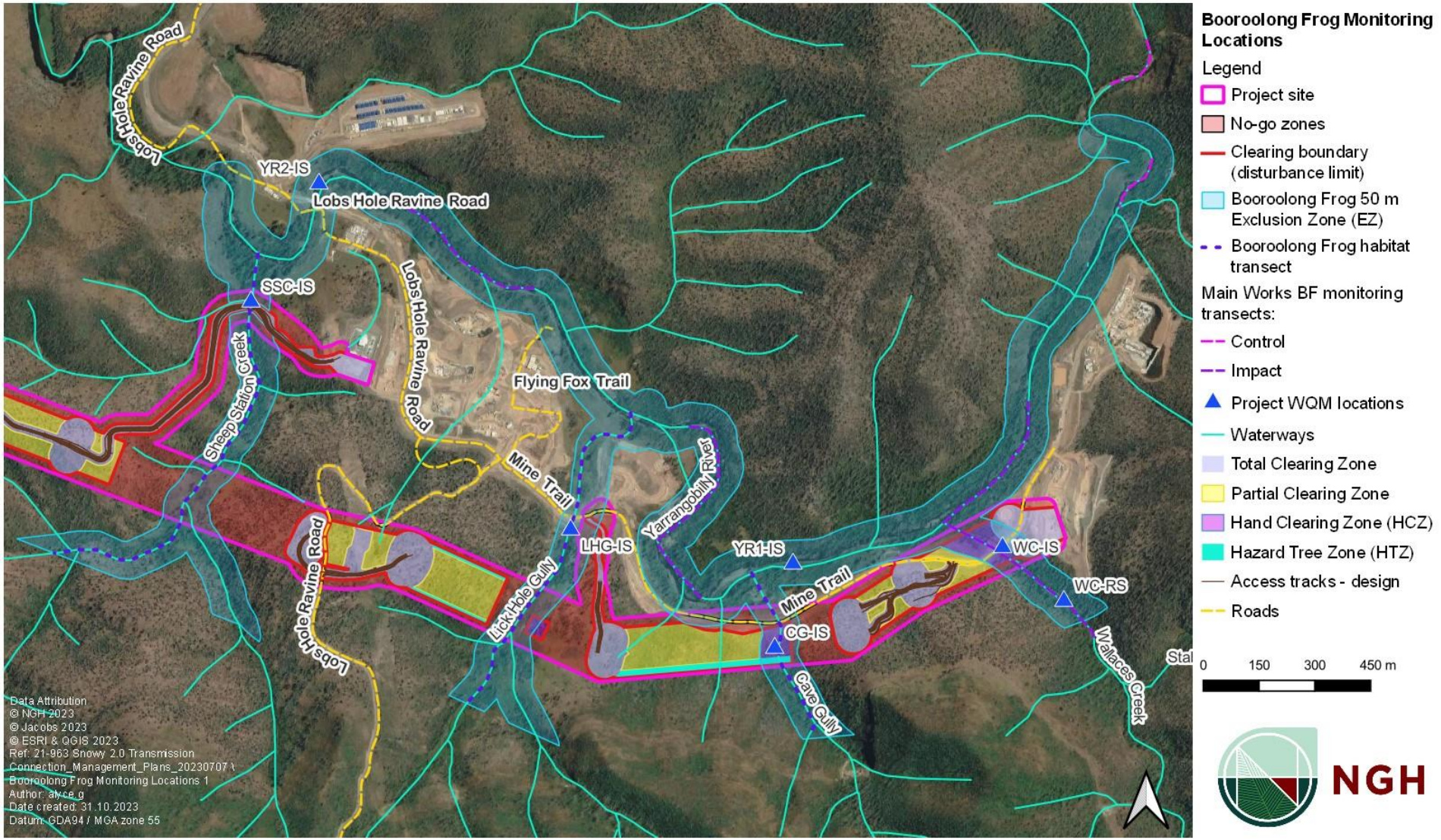


Figure 4-1 Proposed Booroolong Frog habitat monitoring locations

Table 4-2 Frog Habitat monitoring

Objective
To monitor rocky breeding habitat and depth of pools that occur within and adjacent to the Project area and document any changes arising from the Project. Specific objectives are: To compare shifts in availability and condition of rocky breeding habitat between treatment downstream of the Project impact area) and control sections (upstream of the Project impact area) of Sheep-station Creek, Lick-Hole Gully, and Cave Gully
Sampling units
Sections of stream bank comprised of course cobble stone beds or rock bank structure (breeding habitat) in treatment and control sections.
Methods
Habitat characteristic monitoring Monitoring methodology would be to remain consistent with the Snowy 2.0 main works, however would also include a physical inspection of the tributaries to identify Booroolong Frog habitat, flow rate and potential sedimentation issues. On the ground, habitat surveys of the three tributary creeks Sheep-Station Creek, Lick-Hole Gully, Cave Gully, will be conducted prior to the onset of project works. A team of two ecologists will record the availability of potential Booroolong Frog habitat within these systems, measuring the presence and extent of breeding habitat in the form of cobble stone beds or rocky outcroppings. Other potentially important habitats and river structures including, riparian vegetation, pools, riffles, runs, and bank substrate will be recorded to act as a direct comparison with monitoring efforts conducted by Snowy 2.0 main works along the Yarrangobilly River and Wallaces Creek. Habitat surveys will occur above and below the point of impact from project works, and will initially be used as a baseline to assess the condition of breeding habitat within the system. Subsequent surveys will use this baseline to assess whether sedimentation by course particulate infill behind rocks has occurred downstream of project works, impacting Booroolong Frog breeding habitat. Visual observation of BF habitat along tributaries will be supported by subsequent aerial imagery where tree cover permits. Aerial imagery can be collected using unmanned aerial vehicles (drones) operated by a licenced pilot utilising the following methodology: • Drone flown just above the canopy at approximately 20m above the Yarrangobilly River • Flights to be conducted between 10am and 2pm to reduce shadows. • Flights to include two runs of each transect / waterway, with 80% front and 65% side overlap in each path, reducing the warping and gaps. Dependent on width, a third run may be necessary for wider stream sections. • Ground control points (should be permanently installed along each transect to register imagery, improve data quality, and remove warp. An alternative methodology will be determined where vegetative cover prohibits the use of drones. Data will be processed using software and classified into (shared with on-the-ground surveys); • Cobble banks – a section of stream bank greater than 2 m in length with a continuous cover of loose rock. • Bedrock banks – defined as a section of stream bank greater than 2 m in length with a continuous cover of solid rock that is embedded in the ground.

- Riparian vegetation – areas of dense vegetation located along stream edges.
- Water – areas of pools, riffles or runs.
- Banks – muddy, rocky.

Data will be imported into a Geographic Information System database to digitally map the identified habitat.

Flow rate is to be measured by two ecologists, and undertaken by measuring the time taken by a standardised small floating object (e.g. rubber duck) to travel down a transect of 10 metres in length, within an open water body at both the control and impact sites. The rate should be measured no less than five times to identify a mean flow rate in metres per second.

Location

Habitat surveys, on-the-ground and aerial, will be conducted along both banks of the three impacted watercourses Sheep-station Creek, Lick-Hole Gully, and Cave Gully. Habitat monitoring will occur above and below project works. Stream velocity monitoring locations should be established with permanent markers to allow consistent measurement during future monitoring events.

Timing, effort and frequency

Booroolong Frog habitat characteristic monitoring will be undertaken annually during the late Spring and summer season (October to mid-December) during construction and for a period of two years following cessation of construction.

One survey to be undertaken per season, unless the TARP is triggered.

Data analysis

- Processing of drone captured data will be undertaken using suitable software.
- Outputs will include high-resolution imagery, 3D model of the transects, and a point cloud to assist in change detection data comparison.
- Line graphics of each transect will be produced for quick visual comparison and used in reports.
- This will allow detection of any changes in rocky breeding habitat, and pool depth along the treatment sections.
- The monitoring of control sections upstream of the Project area will help to determine if any identified changes within the treatment streams are a result of the Project, or as otherwise like abiotic factors (i.e. if the same changes are also observed in the control section upstream of the Project).
- Stream velocity monitoring data to be included within annual monitoring reports, to allow for detection of statistically significant changes in flow rate within the impact sites following construction.

Targets

No change in the availability of suitable breeding habitat within impact sites compared with control sites.

Triggers for adaptive management

>10% decline in total proportion of cobble banks or riparian vegetation within impact sites compared with control sites before and after impact.

Refer to Appendix A.

Adaptive management

- Initial investigation to document potential causation between changes and Project related impacts (e.g. sedimentation events).
- If the result of a Project related event, corrective actions to address further impacts, and an assessment of whether remediation of the waterway is required, will be undertaken in consultation with BCD and DCCEEW-Cth.
- Ongoing monitoring to determine if corrective actions have addressed the impact, and avoided long-term effects.
- If this is ineffective, additional offsets may be required.

Table 4-3 Stochastic event monitoring

Objective
To monitor for changes to Booroolong frog habitat following stochastic events, including: • Clearing adjacent to habitat or exclusion zones • High rainfall events (>50 mm within 24 hours) • Breaches of erosion and sediment controls • Release of chemicals from spills
Sampling units
Within established monitoring transects, or in proximity to a potential impact area. Sampling should assess the type of impact and extent (e.g. release of petrochemicals, potential impacts in immediate vicinity in addition to downstream waterways). If no relevant baseline data exists for the specific location in which the event occurs, data will be extrapolated from surrounding habitat and water quality monitoring locations, as far as practicable.
Methods
Investigation of potential impacts are to be undertaken by site environmental representatives and / or ecologists, to determine the potential for and extent of any impact. In the instance that clearing is occurring within exclusion zones, ecologists will supervise the clearing, and inspect habitat surrounding the clearing area to ensure that no tree fall or sedimentation was exiting the works area. Additionally, construction and clearing staff are to be briefed on the sensitivity of the sites, and hand clearing would seek to maintain as much plant root structure within the soil as possible. Where high rainfall events occur, or where breaches in erosion and sediment control measures occur, visual inspection should be undertaken by ecologists to determine the extent of impact and assist with the design of any remedial measures so as to minimise further impact. Due to the variable nature of these events, no set methodology could be applied, however notes, photographic evidence and the preparation of a report on findings are to be undertaken and provided to regulators.
Location
• As required based on event location • Within established monitoring transects (Figure 4-1).
Timing, effort and frequency
As required based on event location and time
Data analysis
As required based on event type
Targets
No impact to Booroolong frog habitat as a result of stochastic events.
Triggers for adaptive management
• Clearing adjacent to habitat or exclusion zones • High rainfall events (>50 mm within 24 hours) • Breaches of erosion and sediment controls Refer to Appendix A.
Adaptive management
• Initial investigation to document potential for impact to habitat from event • If the result of a Project related event, corrective actions to address further impacts, and an assessment of whether remediation of the waterway is required, will be undertaken in consultation with BCD and DCCEEW-Cth. • Ongoing monitoring to determine if corrective actions have addressed the impact, and avoided long-term impacts. If this is ineffective, additional offsets may be required.

4.4 Reporting

Reporting of Booroolong Frog monitoring data to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW-Cth) will be undertaken by Transgrid as part of their compliance report obligations under approval EPBC 2018/8363. Monitoring data will be submitted as part of a compliance report for each 12 month period following the date of the approval, 21 October 2022. A copy of Booroolong Frog monitoring data will be provided to NPWS on each submission to DCCEEW-Cth.

As outlined in the Project SWMP, reporting to NPWS will occur within two hours in the event of the failure of any sediment or stormwater mitigation measures, including overtopping of sediment basins, prior to a beyond bluebook 'design' rainfall event being achieved i.e 90th percentile – 41.1mm

Transgrid will establish a data access agreement with Snowy Hydro Ltd (SHL) prior to commencement of construction to ensure ongoing access to relevant Booroolong Frog monitoring data, and capacity to append Transmission Connection data for stakeholder interpretation.

Toolbox talks outlining Booroolong Frog management and mitigation measures will be delivered during construction, particularly for works at Sheep Station Creek or during times of elevated erosion risk.

5 References

Anstis, M., Alford, R. A. and Gillespie, G. R. (1998). *Breeding biology of Litoria booroolongensis Moore and* L. lesueuri *Dumeril and Bibron (Anura: Hylidae)*. Trans Roy. Soc. S. A., 122: 33-43.

EMM Consulting (2020a) Snowy 2.0 Main Works Biodiversity Development Assessment Report (Revised) Prepared for Snowy Hydro Ltd February 2020 <https://www.snowyhydro.com.au/snowy-20/documents/>

EMM Consulting (2020b) Snowy 2.0 Main Works Biodiversity Management Plan (Revision I) Prepared for Future Generation October 2020 <https://www.snowyhydro.com.au/snowy-20/documents/>

EMM Consulting (2022) Snowy 2.0 Main Works Biodiversity Monitoring Program: Year 1 Annual Monitoring Report (2020/2021) Prepared for Snowy Hydro Ltd March 2022 <https://www.snowyhydro.com.au/snowy-20/documents/>

EMM Consulting (2023) Snowy 2.0 Main Works Biodiversity Monitoring Program: Year 2 Annual Monitoring Report (2021/2022) Prepared for Snowy Hydro Ltd April 2023 <https://www.snowyhydro.com.au/snowy-20/documents/>

Gillespie, G. R. (1999). *Survey of the Distribution and Habitat of the Booroolong frog Litoria booroolongensis on the South-western Slopes of the Great Dividing Range in New South Wales*. Report to the NSW National Parks and Wildlife Service, Queanbeyan. Arthur Rylah Institute, Department of Natural Resources and Environment, Victoria.

Hunter, D. and Smith, M. J. (2006). *Survey, habitat assessment and management recommendations for the endangered Booroolong Frog* (*Litoria booroolongensis*) *in the Murray Catchment Management area of New South Wales*. Report to the Murray Catchment Management Authority.

Hunter, D. (2007). *Conservation management of two threatened frog species in south-eastern New South Wales, Australia*. PhD thesis, University of Canberra.

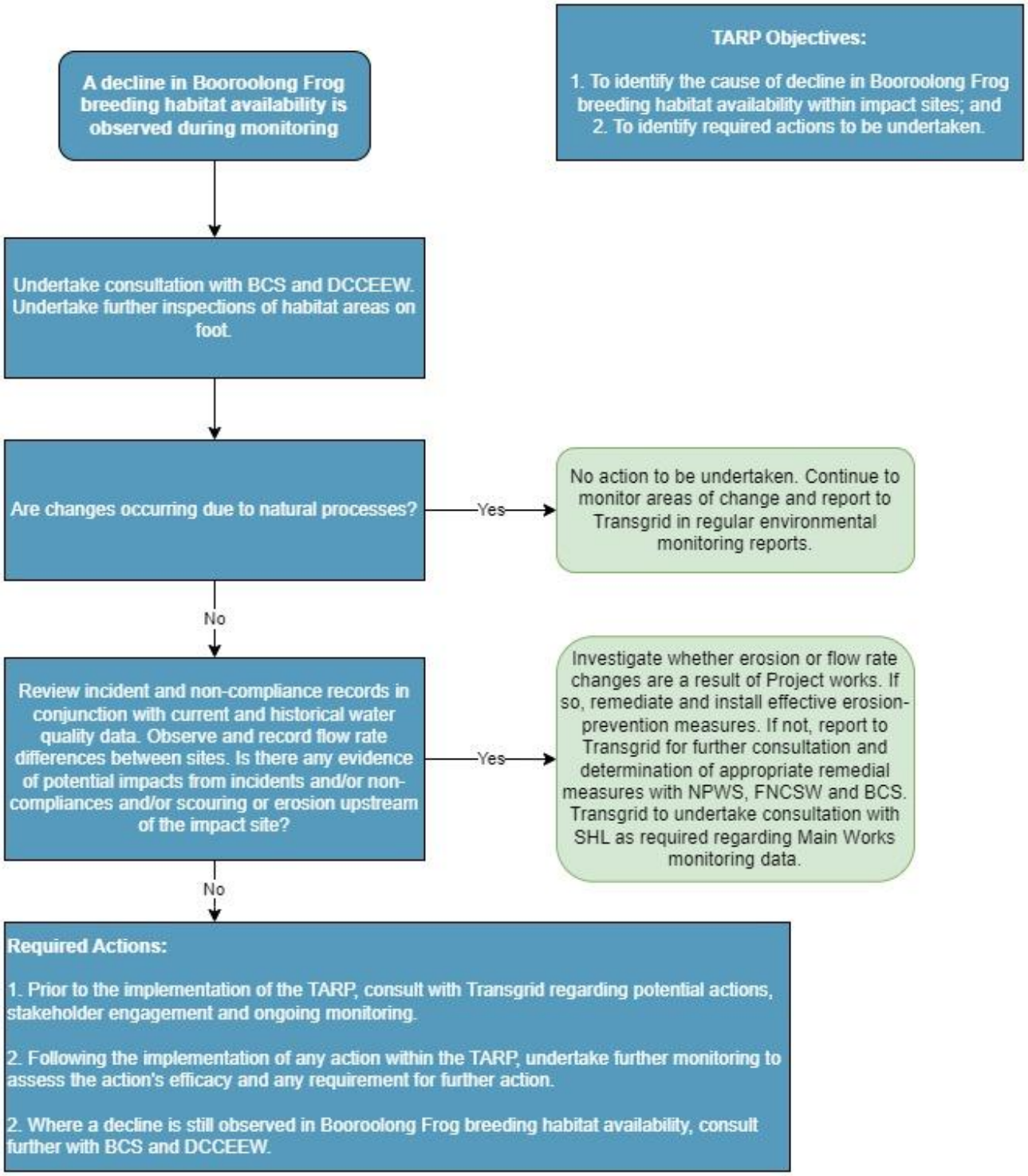
Jacobs (2022) *Snowy 2.0 Transmission Connection Project Biodiversity Development Assessment Report Rev 7* Prepared for Transgrid August 2022

NSW Office of Environment and Heritage (2012). *National Recovery Plan for Booroolong Frog* (*Litoria booroolongensis*) Office of Environment and Heritage (NSW), Hurstville.

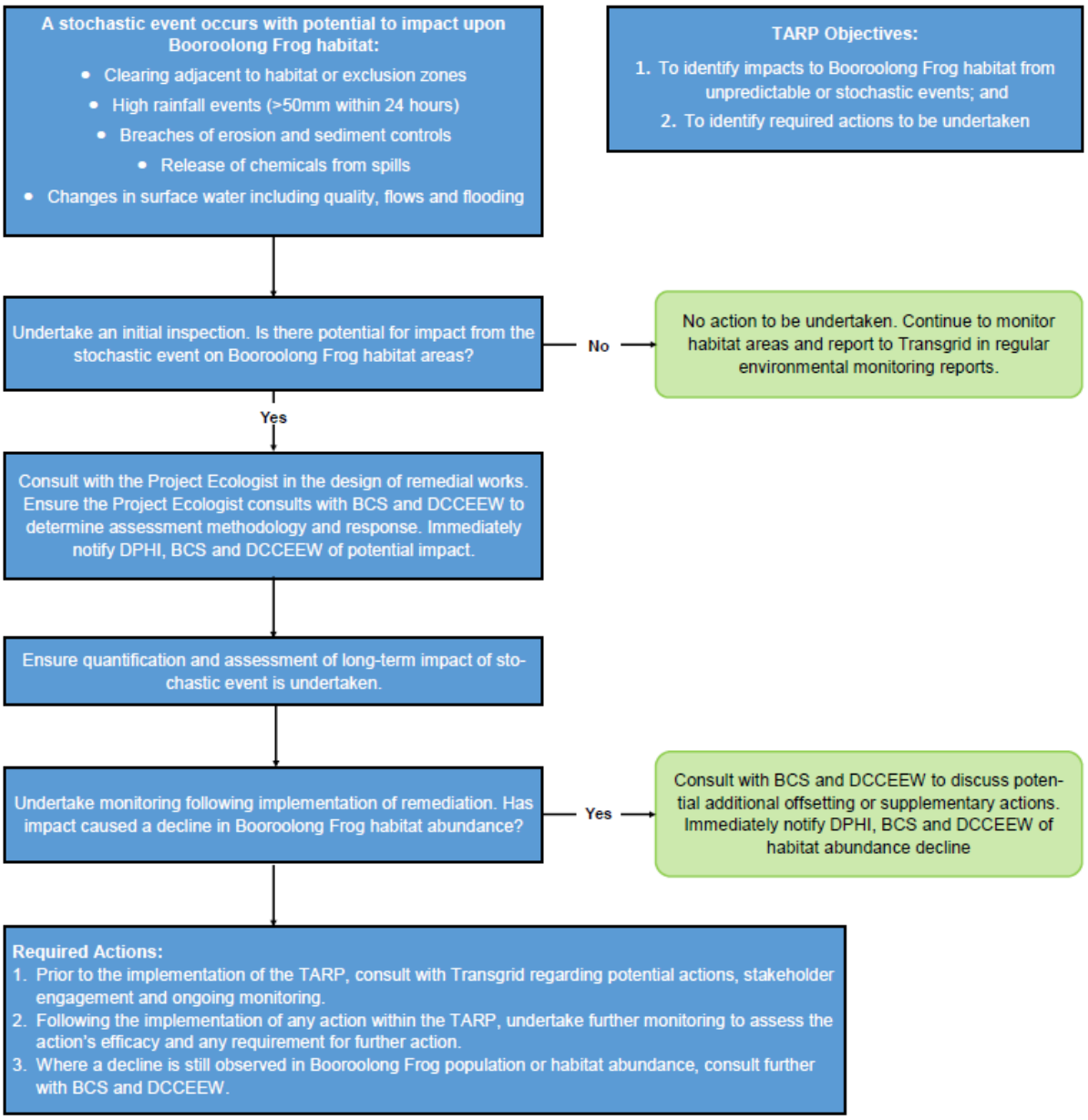
Underwood, A. J. (1992) *Beyond BACI: the detection of environmental impacts on populations in the real, but variable, world*. J. Exp. Mar. Biol. Ecol., 161: 145-178

APPENDIX A TRIGGER ACTION RESPONSE PLANS

Frog Habitat Monitoring



Stochastic event monitoring (Adaptive Management Plan)



APPENDIX H Weed and Pathogen Monitoring Program

Weed and Pathogen Control Monitoring Program

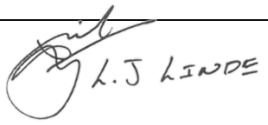
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The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

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Table of Contents

1 Introduction 8
1.1 Context 8
1.2 Purpose and Objectives 8

2 Environmental Assurance 9
2.1 Legislation 9
2.2 Guidelines 9
2.3 Project Mitigation Measures 9

3 Existing Environment 10
3.1 Weeds 11
3.2 Pathogens of Concern 25

4 Environmental Aspects and Impacts 28
4.1 Impact Summary 28

5 Environmental Mitigation and Management Measures 29
5.1 Baseline Surveys and Weed Survey Report 29
5.2 Prevention 29
5.3 Controls 34
5.4 Disposal 38

6 Monitoring 39
6.1 Monitoring Objectives 39
6.2 Weed Presence/Absence Monitoring Procedure 39
6.3 Weed Cover Monitoring Procedure 40
6.4 Pathogen Monitoring Procedure 41
6.5 Other Monitoring – Dieback 43

7 Reporting and Review 44
7.1 Reporting Schedule 44
7.2 Training 44
7.3 Review and Improvement 44

8 References 45

APPENDIX A Weed and Pathogen Hygiene Declaration Record 46

APPENDIX B Priority Weeds for the South East LLS (DPI, 2022) 51

APPENDIX C Monitoring Template – Weeds 68

APPENDIX D Monitoring Template – Pathogens 69

APPENDIX E Trigger Action Response Plans – Weeds 70

APPENDIX F Trigger Action Response Plan – Pathogens 72

APPENDIX G Suitable Chemicals and Dilution Factors for Disinfection 74

List of Tables

Table 2-1 BDAR and Amendment Report mitigation measures relevant to this Plan 8
Table 3-1 Weeds of concern recorded within the southern ranges and KNP 10
Table 4-1 Weed and pathogen impacts and environmental factors 26
Table 5-1 General washdown procedure 29
Table 5.2 Weed control and management measures in NPWS Southern Ranges Regional Pest Management Strategy 32
Table 6-1 Weed presence/absence monitoring 37
Table 6-2 Weed cover monitoring 38
Table 6-3 Presence/absence of Phytophthora monitoring 39

List of Figures

Figure 3-1 Example of Canadian Pondweed (CISS, 2021) 21
Figure 3-2 Recorded areas of Phytophthora as part of Snowy 2.0 Main Work, near Kellys Plan Creek (FGJV, 2020) 23
Figure 3-3 Additional recorded areas of Phytophthora cryptogea/pseudocryptogea (P. cryptogea), tested in 2021, as part of Snowy 2.0 Main Works near Track 6 and 6a, as well as the main office laydown area (NSW NPWS, 2024 Pers Comms) 24
Figure 3-4 Year 1 annual monitoring for the presence of Phytophthora within the Main Works Project area (EMM, 2022) 25
Figure 5-1 Washdown Station locations (Map 1 of 2) 30
Figure 5-2 Washdown Station locations (Map 2 of 2) 31

Acronyms & Abbreviations

Term	Definitions
BCS	Biodiversity Conservation and Science Directorate
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
CM	Construction Managers
CSSI	Critical State Significant Infrastructure
DPI	Department of Primary Industries
EIS	Environmental Impact Statement
EMS	Environmental Management System
FCNSW	Forestry Corporation NSW
FM Act	*Fisheries Management Act 1994*
KNP	Kosciuszko National Park
kV	Kilovolts
m	Metres
MW	Megawatts
MWh	Megawatt hours
NEM	National Electricity Market
NPWS	National Parks and Wildlife Service
PC	Principal Contractor or Contractor as defined in this management plan
POM	Plan of Management
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
SEA	Site Environmental Advisor
TARP	Trigger Action Response Plan
TG	Transgrid

1 Introduction

1.1 Context

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received development approval on 2 September 2022 to construct a switching station and overhead transmission lines ('the Project') to facilitate the connection of Snowy.

2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW).

This Weed and Pathogen Control and Monitoring Program (WPCMP) forms part of the Biodiversity Management Plan (BMP) for the Project.

1.2 Purpose and Objectives

The key objective of the Weed and Pathogen Control and Monitoring Program (this Program) is to describe the management measures that will be implemented to ensure that the introduction and spread of weeds and pathogens are minimised onsite during all phases of the Project.

To achieve this, Transgrid and PC will:

- Ensure appropriate measures are implemented to address the conditions of approval.
- Detail the weeds and pathogens identified within the Project area during the assessment, including any weeds and pathogens of concern not already within the Project area.
- Ensure practical measures are implemented prior to and during construction to avoid the introduction of new weeds and pathogens, and to control/minimise the spread of existing weeds and pathogens.
- Ensure practical measures are implemented during operation to avoid the introduction of new weeds and pathogens and to control/minimise the spread of existing weeds and pathogens.
- Establish procedures to prevent the introduction of new weeds and pathogens.
- Ensure that adequate monitoring for weeds and pathogens is undertaken within the Project area.

2 Environmental Assurance

2.1 Legislation

Legislation relevant to weed management includes:

- National Parks and Wildlife Act 1974 (NPW Act)
- Fisheries Management Act 1994 (FM Act)
- Biosecurity Act 2015
- Pesticides Act 1999.

2.2 Guidelines

The following guidelines were considered in the development and implementation of this plan:

- Regional Pest Management Strategy 2012-2017: Southern Ranges Region (OEH, 2012)
- Noxious and Environmental Weed Control Handbook and website (DPI, 2018)
- Natural Heritage Trust (NHT) Introductory Weed Management Manual (NHT, n.d.)
- Saving our Species Hygiene Guidelines (DPIE, 2020)
- Management of *Phytophthora cinnamomi* for Biodiversity Conservation in Australia: Part 2 – National best Practice Guidelines

2.3 Project Mitigation Measures

The Project Biodiversity Development Assessment Report (BDAR) and Amendment Report measures relevant to this Plan are listed in Table 2-1 below.

Table 2-1 BDAR and Amendment Report mitigation measures relevant to this Plan

Reference number	Requirement	Document reference
Mitigation Measures – Amendment Report		
B12	To prevent an increase in weeds and disease pathogens in adjacent vegetation the following will be carried out: • A Weed control and monitoring programs will be developed and documented in the BMP in consultation with BCS and NPWS and any deviation from measures approved by DPIE are to be raised and approved. The program will include adaptive management strategies for priority weed species during construction, and early operational phase. The details of the monitoring program will be determined during the preparation of the BMP and follow the principles outlined in Section 11.2 of the revised BDAR (Appendix C) • Identify all weed species in KNP in consultation with NPWS. Priority weeds species in Bago State Forest are consistent with high threat weeds. • Identify, map, and remove all weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs. • Prepare a vehicle and machinery hygiene strategy and implement during construction and operation. The strategy will include specific locations, timing and methods for removing soil and plant matter from vehicles and machinery. Ensure vehicle and machinery hygiene measures in the strategy are applied during construction and operation • During the clearing works, weeds will be disposed and managed appropriately to stop the spread of weed species • Wash down stations, or portable disinfection stations for pathogen mitigation, will be constructed at suitable locations to wash down vehicles and employee shoes to stop the spread of weeds, pathogens (including amphibian chytrid fungus, *Phytophthora cinnamomi* and exotic rust fungi) and the introduction of new species During construction, any biosecurity issues identified are to be reported to FCNSW and NPWS immediately.	This plan Section 5 Appendix B Section 5.1 Section 5.2 and Appendix A Section 5.4 Section 5.2 and 5.3.2 Section 7.1
Mitigation Measures - BDAR		
BIO11	Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of the SWMP and in consultation with BCS and NPWS and any deviation from measures approved by DPIE are to be raised and approved. Additional monitoring and control measures for introduced plant introduction and spread should be implemented at and around locations used for sediment control structures. Monitoring of exotic plants with waterborne propagules and a Trigger Action Response Plan for control must be undertaken along drainage lines outside the Project area in locations where runoff drains from the construction site, and from locations where sediment control has failed. The program will include adaptive management strategies for priority weed species during construction, and early operational phase. The details of the monitoring program will be determined during the preparation of the BMP and follow the principles outlined in Section 11.2.	This plan Appendix E and Appendix F Section 6

3 Existing Environment

The following section summarises existing known weed and pathogen species within and adjacent to the Project including species, communities and habitats based on the information contained in the Project BDAR.

3.1 Weeds

Terrestrial Weeds

Past activities and land usage within KNP and Bago State Forest have resulted in significant amounts of clearing and disturbance of vegetation. Native vegetation has been modified by past disturbances associated with land clearing, livestock grazing, mining, forestry operations, public recreation and weed invasion.

Key weed species identified during flora surveys for this Project included:

- Blackberry (*Rubus sp.)* – an identified weed of national significance
- Sheep Sorrel (Rumex acetosella)
- St John's Wort (Hypericum perforatum)
- Sweet Briar (Rosa rubiginosa)
- Yorkshire Fog Grass or Velvet Grass (*Holcus lanatus*)
- Red Sorrel (Rumex acetosella)

Weeds of Concern

Table 3-1 lists Weeds of National Significance (WONS) (CISS, 2021) and weeds listed on the NSW WeedWise website (DPI, 2022), that have the potential to occur within KNP, Bago State Forest and surrounding areas. These weeds are currently subject to control programs under the Southern Ranges Regional Pest Management Strategy (2012-2017) (OEH, 2012).

A complete list of weeds that occur within the South East Local Land Services (LLS) region is provided in Appendix B.

Table 3-1 Weeds of concern recorded within the southern ranges and KNP

Name	Duty under *Biosecurity Act 2015 (For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Blackberry *Rubus fruticosus agg.* **Known in the Project area**	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal** • Biological control • Spot spraying • Stem injection • Cut stump	Yes	 
Cape Broom *Genista monspessulana*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure** (Eradication) Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. **NPWS control methods:** • Physical removal** • Spot spraying • Stem injection • Cut stump	Yes	 

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Chilean Needlegrass *Nassella neesiana*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure** (Eradication) Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. **NPWS control methods:** • Physical removal* • Spot spraying • Boom spraying	Yes	
Spiny Burr-grass *Cenchrus spinifex*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Spot spraying • Boom spraying	No	

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
African Lovegrass *Eragrostis curvula*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Spot spraying • Boom spraying	No	 

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Orange hawkweed *Hieracium aurantiacum*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Prohibited Matter** A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries. All species in the genera *Pilosella* and *Hieracium* are Prohibited Matter except for *Hieracium murorum.* **NPWS control methods:** • Physical removal* • Biological removal • Spot spraying • Boom spraying	No	 

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Ox-eye Daisy *Leucanthemum vulgare* **Known in the Project area**	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure** (Containment) Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. **NPWS control methods:** • Physical removal* • Spot spraying • Boom spraying	No	  
Paterson's Curse *Echium plantagineum*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Biological control • Spot spraying • Boom spraying	No	 

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Pine *Pinus radiata*	**Biosecurity Act 2015:** N/A **NPWS control methods:** • Physical removal* • Spot spraying • Stem injection • Basal bark • Cut stump	No	
Scotch Broom *Cytisus scoparius*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure** (Containment)Land managers should mitigate the risk of new weeds being introduced to their land. Land managers should mitigate spread from their land. **NPWS control methods:** • Physical removal* • Spot spraying • Stem injection • Basal bark • Cut stump	Yes	

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Serrated Tussock *Nasella trichotoma*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure** (Eradication) Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Control methods would be consistent with the Serrated Tussock National Best Practice Management Manual (DPI, 2008) and NPWS and include: • Physical removal* • Spot spraying • Boom spraying	Yes	

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Sheep Sorel *Rumex acetosella* **Known in the Project area**	**N/A**	No	
St Johns Wort *Hypericum perforatum* **Known in the Project area**	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Biological control • Spot spraying • Boom spraying	No	 

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Sweet Briar *Rosa rubiginosa* **Known in the Project area**	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Spot spraying • Stem injection • Basal bark • Cut stump	No	 
Thistles *Cirsium sp.* *Onopordum sp.*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Biological control • Spot spraying • Boom spraying	No	  

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Thistles *Sonchus sp.*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Biological control • Spot spraying • Boom spraying	No	 
Viper's Bugloss *Echium vulgare*	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **NPWS control methods:** • Physical removal* • Biological control • Spot spraying • Boom spraying	No	 

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Willows *Salix sp*. **Known in the Project area**	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure** (Eradication) Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. **NPWS control methods:** • Physical removal* • Spot spraying • Stem injection • Basal bark • Cut stump	Yes **All Willows except:** • Weeping Willow • Pussy Willow • Sterile Pussy Willow	

Name	Duty under *Biosecurity Act 2015* *(For further information on controls see Section 5.3.1)*	Weed of National Significance?	Images (Source: (DPI, 2022) (PlantNET, 2022) (BMCC, 2022) (Wildlife Trust, 2022)
Yorkshire Fog *Holcus lanatus* **Known in the Project area**	**NA**	No	

*Physical removal = when occurring within the clearing footprint. Otherwise, weed spraying programs may be implemented.

Aquatic Weeds

The Tumut River, which feeds into Talbingo Reservoir, intersects a portion of the Project area under the Transmission Line corridor. Canadian Pondweed (Elodea canadensis) (Figure 3-1) is known to occur throughout Talbingo reservoir. Canadian Pondweed is often associated with slow-moving and stationary water bodies, coastal rivers and creeks, especially in colder areas of NSW. It grows and spreads via fragmentation, and as stems readily break into pieces, these are easily transported in water. Canadian Pondweed is classified as a water weed which is known to potentially:

- Alter dissolved oxygen levels reducing the water quality.
- Restrict navigation and recreational activities on waterways.
- Pose a drowning hazard for livestock and recreational swimmers.

Across NSW, the general biosecurity duty applicable to this weed is to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable. No application of aquatic herbicides will occur during construction works.



Figure 3-1 Example of Canadian Pondweed (CISS, 2021)

3.2 Pathogens of Concern

The KNP Plan of Management (POM) has identified diseases, such as canid mange in wombats and chytridiomycosis in frogs, which have been recorded in the park (NPWS, 2006). The latter disease, caused by chytrid fungus, has been detected in a number of threatened frog species, though it remains unclear whether it constitutes the primary cause of recent frog population declines.

Infection of native plants by *Phytophthora cinnamomi* is listed as a key threatening process under the BC Act and EPBC Act. *Phytophthora cinnamomi* can lead to death of trees and shrubs, resulting in devastation of native ecosystems (NPWS, 2006). Infection of susceptible communities with *Phytophthora cinnamomi* leads to:

- Changes in the structure and composition of the native plant communities
- A significant reduction in primary productivity and functionality
- Habitat loss and degradation for dependent flora and fauna.

Phytophthora cinnamomi has not been confirmed in KNP or the Project area, however if it was to occur it has the potential to affect some vegetation species within the area. The Snowy 2.0 Main Works BMP (FGJV, 2020) outlines consultation undertaken with Keith McDougall from the former Office of Environment and Heritage (OEH, now BCD) that the *Phytophthora* species of concern in KNP is *Phytophthora gregata*, which has previously resulted in the mortality of the threatened flora species *Pimelea bracteate*. *Phytophthora gregata* has been recorded near Kellys Plain Creek, west of Tantantgara Road and south of Tantangara Reservoir (Figure 3-2). This area is outside of the Project area, additionally *Pimelea bracteate* has not been recorded within the Project area.

As per the Snowy 2.0 Main Works BMP (FGJV, 2020), Snowy 2.0 has been undertaking annual monitoring for the presence of *Phytophthora* within the Main Works Project area (refer to Figure 3-3). The monitoring has included the bottom of Lobs Hole Ravine Road, which is adjacent to this program's Project area (Connection Project). *Phytophthora cryptogea/pseudocryptogea* has previously been identified in two samples at Lobs Hole. Phytophthora *cryptogea/pseudocryptogea* is noted to be common in KNP and has been suspected to impact specific species of native vegetation. Recent consultation with Snowy 2.0 and NPWS, has highlighted the need for additional Phytophthora investigations prior to the start of these Project activities to determine presence/absence in work areas and associated access, and the potential need for disinfection mitigations. All *Phytophthora* spp. found or suspected on the Project will be considered high risk until otherwise confirmed. Additional sampling at Lobs Hole will be undertaken as part of this Project.

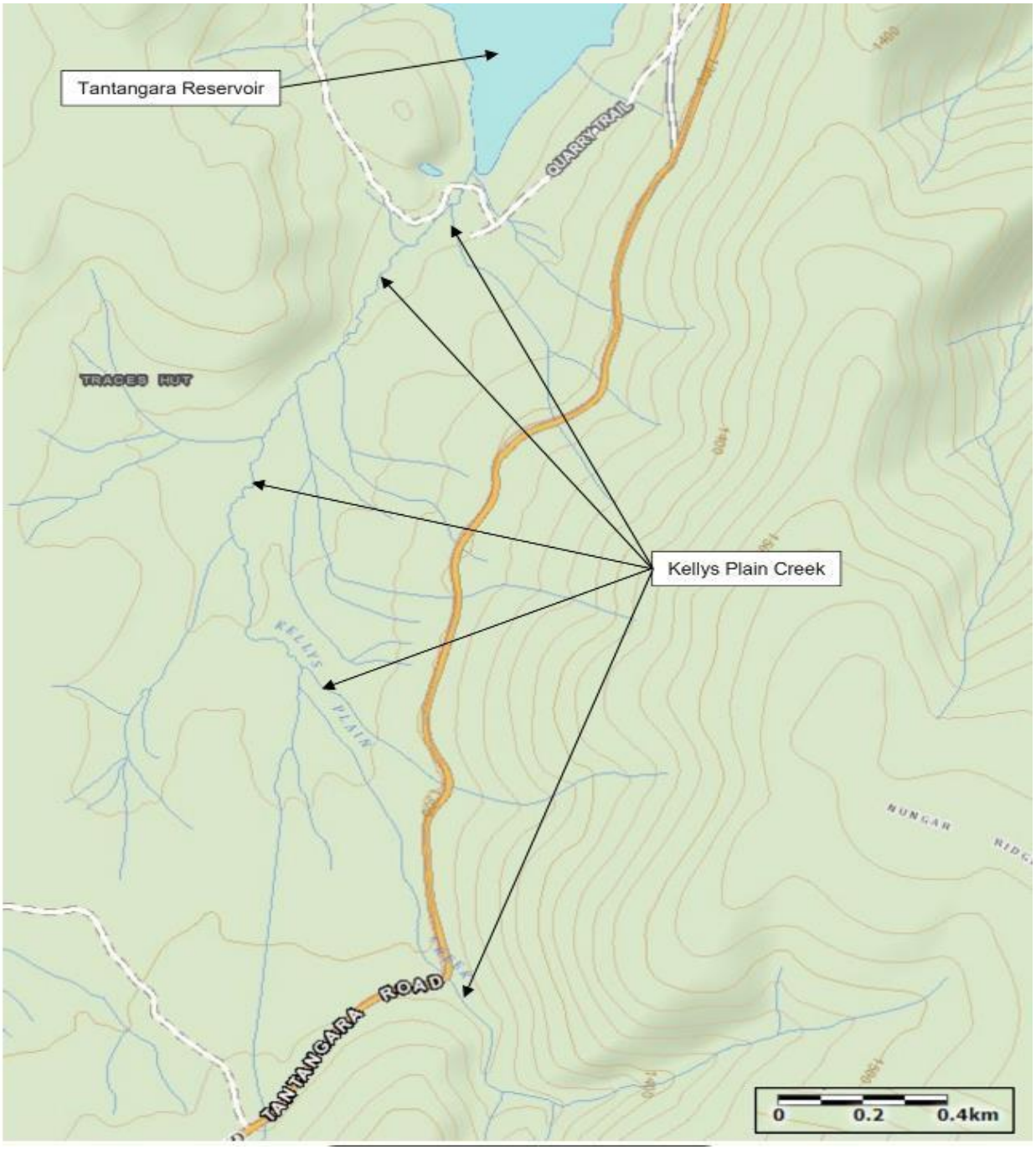


Figure 3-2 Recorded areas of Phytophthora as part of Snowy 2.0 Main Work, near Kellys Plan Creek (FGJV, 2020)

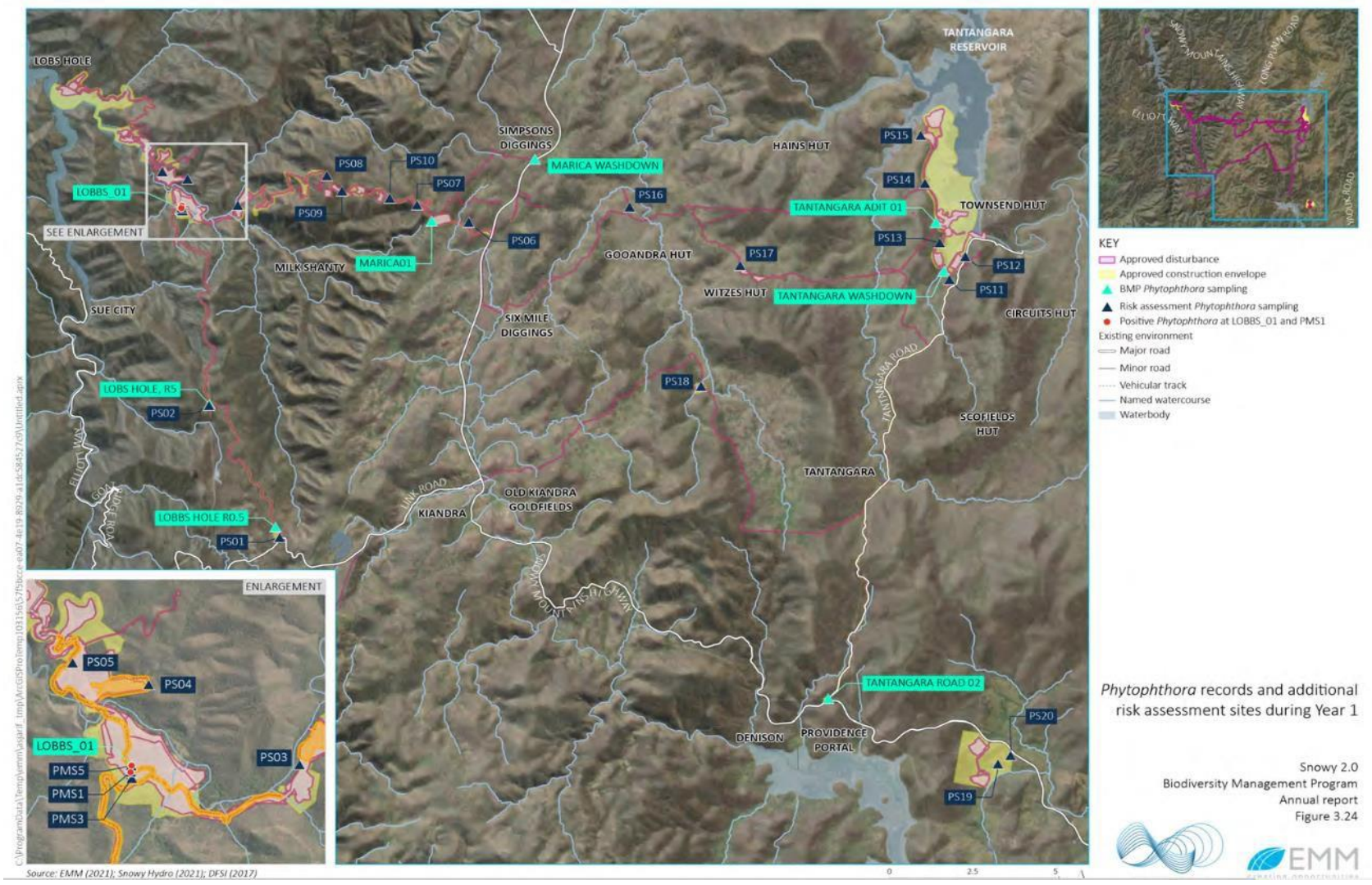


Figure 3-3 Year 1 annual monitoring for the presence of Phytophthora within the Main Works Project area (EMM, 2022)

4 Environmental Aspects and Impacts

4.1 Impact Summary

An environmental aspect is an element of an organisation's activities, products, or services that has, or may have, an impact on the environment (ISO 14001 Environmental management systems). The relationship of aspects and impacts is one of cause and effect.

Key aspects of the Project that could result in weed impacts are identified in Table 4-1. The extent of these impacts will depend on the nature, extent and magnitude of construction activities and their interaction with the natural environment.

Table 4-1 Weed and pathogen impacts and environmental factors

Environmental Aspects (Construction activities that may impact biodiversity)	Environmental Impacts	Environmental Factors (Conditions)
• Movement of vehicles, vessels and machinery • Clearing native vegetation • Topsoil stripping • Bulk earthworks • Soil movement and transfer • Construction of waterway crossings • Operation of compounds • Imported materials	• Introduction of weeds and pathogens • Spread of weeds and pathogens, resulting in degradation of retained native vegetation and habitat • Increase in weed species, resulting in increased competition and a consequent reduction in populations of native species • Impacts on the efficacy of rehabilitation works for the Project	• Presence of existing weeds and pathogens within the Project area • The presence of weeds and pathogens adjacent to the Project area

5 Environmental Mitigation and Management Measures

A range of environmental requirements and control measures are identified in the Amendment Report, BDAR and the conditions of approval. Safeguards and management measures will be implemented to avoid, minimise or manage impacts from the introduction and spread of weeds and pathogens.

Management measures for the control of weeds and pathogens will take four forms:

- Prevention
- Control
- Monitoring (Section 6)
- Disposal.

5.1 Baseline Surveys and Weed Survey Report

Prior to the commencement of clearing, the location of weeds within the Project area will be mapped. The surveys should be undertaken during spring to early summer. This will assist with providing a baseline for monitoring during construction and operation. It will also assist with developing “restricted areas” and updated hygiene protocols for the works by the Project ecologist. These “restricted areas” will be areas of dominant weed infestation and will have specific measures as outlined in Section 5.2.3 below. When weed infestation/restricted areas are known, areas will be translated to the Project Site Environmental Plans, with washdown areas clearly represented.

The Weed Survey Report will be prepared by an ecologist, outlining a survey method and results, and confirm applicable weed control methods.

Additionally, a soil sampling program will be undertaken prior to construction by a suitably qualified person(s) to test for presence/absence of *Phytophthora* within the Project area. The sampling and monitoring will follow the methodology outlined in Section 6.4. Similar to the weed surveys, this sampling will assist in identifying any required restricted areas, with pathogens and form a baseline for the ongoing monitoring. Likewise as for weeds, Project Site Environmental Plans will represent pathogen restricted areas with disinfection points clearly represented.

5.2 Prevention

Transgrid and PC will implement the following measures to prevent the introduction or spread of weeds/pathogens on site:

- Hygiene inspections and completed Weed Hygiene Declarations of vehicles, vessels, plant and equipment being transported to site
- Application of washdown locations and/or disinfection points at key locations onsite supported by hygiene/disinfection records
- Restricted access to areas of known weed/pathogen infestation.

Hygiene Declaration and Inspections

All suppliers of plant and equipment, Transgrid, PC and contractors will be informed of their general obligation under the *Biosecurity Act 2015* to prevent the introduction and spread of diseases, weeds and contaminants. The suppliers will be expected to present their materials and equipment clean and free of dirt, mud, seed and biological materials including weeds, seeds, pathogen and other organisms. The supplier will complete the Hygiene Declaration Form (Appendix A) prior to entry to site.

PC will establish a checkpoint to carry out visual inspections of plant and equipment to ensure compliance with the Hygiene Declaration Form (provided in Appendix A of this document). Checkpoints will be located at or prior to access points to site. Where cleanliness standards are not met, site entry will be refused, and thorough off-site wash down at an appropriate facility will be required prior to site access being granted. Commercial car-wash facilities should be used where possible. Council facilities and/or existing facilities may also be used where permission has been granted. Commercial car-wash facilities are available at Cooma (80km south east), Tumbarumba (30km west) and Tumut (55km north). Onsite wash down or brush down locations may accompany restricted areas. Such facilities will be contained, Transgrid approved, and away from production and other sensitive areas and not drain into waterways.

Completed forms will be kept in the Project office (or accessible electronically) for audit and compliance tracking purposes. The completed Hygiene Declaration Form will be:

- Kept in the relevant vehicle during transportation
- Presented at the Project access point.

A summary of hygiene declaration and inspection outcomes including an evaluation of biosecurity measure effectiveness will be provided in annual reporting, published publicly by Transgrid.

Washdown Stations

Where incoming and outgoing vehicles, vessels, machinery and equipment do not satisfy the cleanliness requirements of the Hygiene Declaration Form, washdown will be required. Only relevant equipment that is cleaned to the specified standard will be accepted to site. No incoming rejected plant and equipment will be permitted to washdown using an onsite facility.

Washdown areas will be located at site access points and the compound site, refer Figure 5-1 and Figure 5-2[1]. Site access for the Switching Yard and western transmission line section is via Elliot Way. The eastern section of the Project will be accessed via Lobs Hole Ravine Road and Link Road.

Access for the eastern section overlaps the FGJV Main Works Project area.

In locations of key weed or pathogen outbreaks (restricted areas) vehicle and machinery inspection and washdown will be required upon entering the Project area from outside and when leaving restricted areas (refer to Section 5.2.3 of this report).

The general washdown procedure is detailed in Table 5-1 below. When equipment has been used in a known or suspected site containing a die-back variety of *Phytophthora* (as determined by soil sampling) additional disinfecting procedures will be applied. Disinfection may occur by utilising portable pump packs onsite, not necessarily at a specific washdown station. Once equipment satisfies the project nominated disinfection standard and records the action, the equipment will be free to move within the Project area with the exception of restricted areas (refer to Section 5.2.3 of this report). Appendix G outlines suitable chemicals and dilution factors to address pathogen disinfections.

[1] Represented washdown / disinfection sites are subject to modification based on pest and pathogen survey data and safety

Table 5-1 General washdown procedure

Step	Description
1. Check	• Check the exterior and interior of vehicles and machinery for soil, plant material and other debris. Refer to Appendix A for a guide for where to focus attention.
2. Clean	• Remove clods of dirt and soil using a high pressure or high flow water spray or stiff brush or crowbar • Wash vehicle, plant and machinery at site exit points before leaving site or known infestations or weed affected area of concern and/or leaving a restricted area. • When leaving restricted areas spray tyres thoroughly with a disinfectant

Restricted Areas

Weed or pathogen dominated areas identified during the baseline weed survey and soil sampling (Section 5.1) will be demarcated and signposted by the Project ecologist during pre-clearing surveys, or the Project SEA. Weed or pathogen infested areas and weed/pathogen topsoil stockpiles will be demarked as restricted areas. Vehicles or plant that are required to enter the restricted areas will be cleaned at in-situ mobile washdown stations prior to moving to other areas of the site. Temporary washdown stations will be established in weed and pathogen restricted areas as they are identified. Once vehicles or items of mobile plant or equipment are assessed as clean and/or disinfected to the satisfaction of the Weed Hygiene Declaration and/or disinfection record, they will be free to move about the Project area.

The demarcated restricted areas will be inspected as part of the weekly environmental inspection by PC to ensure the flagging, signage and washdown area are in place and functioning.



Figure 5-1 Washdown Station locations (Map 1 of 2)



Figure 5-2 Washdown Station locations (Map 2 of 2)

5.3 Controls

As outlined in Section 5.1, baseline weed surveys and soil sampling for potential pathogens will be undertaken prior to the commencement of clearing. With this baseline data, weed and pathogen controls will be outlined for specific locations within the Project area and translate to the Site Environmental Plans. The following sections discuss aspects of the relevant controls that will be implemented for the Project

Weed Control

Prior to the commencement of clearing, the Weed Survey Report will outline the location of all weeds and weeds to be controlled, with details of spray treatments and species recorded for use in ongoing weed monitoring and management. Weeds will be controlled by a suitably qualified and experienced contractor in accordance with the following:

- Best Practice Weed Management Guide for Environmental Weeds (Cooperative Research Centre for Australian Weed Management [CRC], 2002)
- New South Wales Weed Control Handbook – A guide to weed control in non-crop, aquatic and bushland situations 7th Edition (DPI, 2018)
- Pesticides Act 1999
- Pesticides Regulation 2017.

The Project will implement the recommended controls outlined in the Regional Pest Management Strategy 2012-2017: Southern Ranges Region (OEH, 2012) as per below in Table 5-2. The NPWS Regional Pest Management Strategy and this plan will subsequently be reviewed, and if necessary revised, where changes or additions are warranted.

Table 5-2 Weed control and management measures in NPWS Southern Ranges Regional Pest Management Strategy

Weed	Priority for control	Recommended Control*	Weed controls to be adopted on the Project
Ox-eye Daisy	Critical	• Physical removal • Spot spraying • Boom spraying (not generally used by NPWS)	• Control access and minimise disturbance in areas of known infestation • Impose strict hygiene and washdown protocols on equipment and plant used in areas of infestation • Isolate and dispose of topsoil stripped from infested areas • Weed spraying program

Weed	Priority for control	Recommended Control*	Weed controls to be adopted on the Project
Orange Hawkweed	Critical Declared prohibited matter – notify NPWS and NSW Department of Primary Industries immediately for advice before control	• Spot spraying • Boom spraying (not generally used by NPWS)	• Control access and minimise disturbance in areas of known infestation • Impose strict hygiene and washdown protocols on equipment and plant used in areas of infestation • Isolate and dispose of topsoil stripped from infested areas • Weed spraying program (if found in Project area)
Blackberry	Medium to lower Critical (where impact is on threatened species)	• Physical removal • Biological control • Stem injection/cut • Stump/basal bark and spot • spraying • Control methods are • documented in the WoNS • Blackberry Control Manual	• Physical removal when occurring within the clearing footprint • Removal along the Yarrangobilly River within the Project area • Stockpiles will be buried or disposed of at a local landfill site in consultation with a Council Weed Officer • Weed spraying program
St Johns Wort	Medium to lower Critical (where impact is on threatened species)	• Physical removal • Biological control • Spot or boom spraying	• Physical removal when occurring within the clearing footprint • Weed spraying program
Sweet Briar	Medium to lower Critical (where impact is on threatened species)	• Physical removal • Stem injection or cut stump • Basal bark • Spot spraying	• Physical removal when occurring within the clearing footprint • Weed spraying program

Physical Weed Control

Where an area is identified as a weed infested area (restricted area), signage will be installed to identify the extent of the weed infested area at both ends. Prevention Controls (as outlined in Section 5.2) and signage will be placed on the entry and exit of vehicles into that area while it is being cleared. Controls will be monitored as part of the environmental weekly inspection by PC and more often by the site supervisors.

During clearing of Project areas, topsoil from areas identified as dominated by weeds will be stockpiled separately from ‘clean’ topsoil from non-weedy areas. Weed topsoil stockpiles will be stored in either the area which it came from or within an area which has the same assemblage of weed species. Weed topsoil stockpiles with differing weed species

assemblages must not be stored in the same area. The weed topsoil stockpile will be signposted and erosion and sediment controls will be implemented to assist with preventing the spread of weed propagules by water (run-off). PC will determine if this topsoil can be reused. If not usable, weed topsoil will be disposed of at an appropriate licenced waste management facility in accordance with the *Biosecurity Act 2015* and *Protection of the Environment Operations Act 1997*, or with Transgrid approval buried on site.

Vegetation cleared from within an identified weed dominated area (restricted area) is to be removed as per Table 5-2 and disposed of at a licenced waste management facility, or destroyed in a manner to mitigate against weed spread in accordance with:

- Best Practice Weed Management Guide for Environmental Weeds (CRC, 2002)
- New South Wales Weed Control Handbook – A guide to weed control in non-crop, aquatic and bushland situations 7th Edition (DPI, 2018)
- Biosecurity Act 2015
- Protection of the Environment Operations Act 1997.

All other non-weed materials excavated within a weed risk area can be moved within the boundaries of that same weed risk area but cannot be taken to an area with a different weed risk.

Topsoil, mulch and spoil stockpiles will be inspected for evidence of weeds on a regular basis as part of routine weekly environmental site inspections. Chemical weed control will be undertaken to eradicate weeds on stockpiles and limit seed and propagule proliferation (discussed further below).

Chemical Weed Control

A weed control contractor will be employed to implement chemical weed control across the Project area as the primary means of eradicating or mitigating against the spread of weeds. The weed control contractor will be suitably qualified and experienced in the management and control of weeds, particularly those known to occur in the Project area.

At minimum, a twice-annual weed control program will take place throughout the construction of the Project. This will generally involve a spring and summer round of weed spraying, the timing of which will be adapted each season to maximise efficacy by targeting the most appropriate life stage of the target species. The precise timing and locations for weed spraying will be determined by the weed control contractor.

Prior to spring, the weed contractor will prepare a tailored weed spraying program which considers items such as the following:

- The specific weeds present on the site including areas for priority control
- The seasonal and climatic factors for that year
- Weed monitoring results
- Areas soon to be disturbed for clearing and construction (weeds in these areas should be controlled as a priority to avoid dispersal of weed plant material within the site)
- The location of existing or emerging weed infestations within and adjacent to the disturbance area
- Recent bushfire activity

- Necessity for follow-up spraying
- NPWS current spraying activities in the wider locality and existing programs (see Section 5.3.3)
- Opportunity to manage the surrounding 50m buffer of the disturbance area
- Previous spraying activities on the site
- The time and resources available to carry out the proposed program.

The weed spraying program will be developed via an integrated weed management approach in consultation with NPWS, FCNSW and Snowy 2.0 to ensure optimal utilisation of resources and the prioritisation of target weed species and infestations. Current NPWS and FCNSW practices are outlined in Section 5.3.3. Onsite areas subject to traffic and disturbance will have weeds sprayed to a 50m buffer. This may include access roads, spoil emplacement areas, topsoil areas, drainage lines, areas that support sediment control structures, and other areas where the weed contractor recommends it. This will be done to reduce the presence of weeds around the disturbance area (personnel safety on steep terrain and legal Project boundaries will be limiting factors for spraying activities beyond the disturbance area).

Coloured dye will be used in weed spraying units to allow the sprayers, NPWS, members of the public and PC to identify which areas have been sprayed.

For all weed species there is a range of herbicide and treatment options available. Broad spectrum non- specific weed treatments are potentially problematic in areas where weed species occur in conjunction with native plants. Where available, herbicide treatments should be selective or at least partially selective. The NSW Weed Wise database will be consulted when determining chemical control options for the treatment of select weed species. For spraying weeds within KNP, chemical use will be consistent with NPWS requirements, which may prohibit the use of certain herbicides. Due consideration and restricted herbicide use will also occur where spraying activity has the potential to affect protected flora and fauna individuals or communities, such as Booroolong Frogs. Consultation between the weed control contractor and SEA must occur to avoid such impacts.

Pathogen Control

As outlined in Section 5.1, baseline soil sampling for potential pathogens will be undertaken prior to the commencement of clearing. Based on the findings of the sampling, specific pathogen controls including restricted areas will be outlined for specific locations within the Project area.

Based on the existing pathogen monitoring undertaken for Snowy 2.0, there have been positive detections of Phytophthora at Lobs Hole, which is adjacent to the Project area (refer to Figure 3-3). There has been known cases of Phytophthora infections at Kellys Plain Creek, adjacent to Tantangara Road, which is not a transport route for the Project (refer to Figure 3-2).

There is also potential for other pathogens to occur onsite, including chytrid fungus and exotic rust fungi No other pathogens have been identified onsite to date. Testing for chytrid fungus and exotic rust fungi will be undertaken if concerns are raised regarding their potential presence onsite such as unwell amphibians or lesions on Myrtaceae.

The prevention measures outlined in Section 5.2 will prevent the spread of any pathogens to site from these known and potential pathogen infected areas.

Primary control methods for *Phytophthora* and other pathogens (if applicable) is the prevention

(outlined in Section 5.2), monitoring (outlined in Section 6.4) and adaptive management. If an infestation is identified, onsite controls are to be put in place to prevent its spread. Controls will be based on site- specific risk exposure and may include, but not be limited to, the following:

- SEA or Project Ecologist demarcates and signposts the restricted area to reduce disturbance and control access
- Establishment of washdown and/or disinfection stations at the access and exit points of the restricted area
- Utilisation of mobile disinfectant pump packs to address pathogen risk where required
- Toolbox on the restricted area to communicate the risks and new controls in place
- Transgrid and PC will review site activities in the area to determine if activities can be modified to prevent further disturbance to the restricted area. Modification of activities will include rerouted access around the restricted area within the Project area
- If works are required in the restricted area, works are to be undertaken during periods of dry soil conditions, wherever practicable.

Establishment and monitoring of restricted areas are outlined in Section 5.2.3.

Current NPWS and FCNSW Practices

During consultation with NPWS (March 2023), it was confirmed that the weed control programs listed below have been undertaken:

- **Spraying of road verges:** NPWS approach has been to target specific weeds that may spread primarily through traffic movement. This has involved annual spraying of all weed species along
- road verges. NPWS recommend that the Project maintains this activity irrespective of weed abundance to ensure continuity of the program.
- **Powerline easements:** NPWS has also recently conducted a targeted weed control for St John's Wort, briar, fruit trees and blackberry along the power line easements as well as a program of ongoing monitoring for any new weeds.
- **False Acacia control:** False Acacia stands have been subject to a significant control program as a result of Snowy 2.0. Construction associated with these works may cause them to re- sprout.

Transgrid and PC will adopt these practices for the management and control of weeds for the duration of the Transmission Connection Project lifecycle, as appropriate.

5.4 Disposal

Weeds removed during clearing, as well as weedy vegetative material and weed seed collected in washdown facilities, will be disposed of at a licenced waste management facility in accordance with the *Biosecurity Act 2015* and *Protection of the Environment Operations Act 1997*.

6 Monitoring

6.1 Monitoring Objectives

The key objective of the WPCMP is to ensure that the spread of weeds and pathogens are minimised. To achieve this, Transgrid and the PC will:

- Determine weed presence/absence for the Project area
- Determine changes in weed presence/absence for the Project area
- Undertake soil sampling in order to detect and monitor pathogens for all disturbed areas of the Project.

Currently, there are no feasible methods for monitoring/eradicating canid mange in wombats or Chytrid fungus in amphibians. Therefore, the objective for these pathogens will be to prevent further spread and infection within and outside of the Project area. Prevention and control of pathogens is detailed in Section 5 of this report.

6.2 Weed Presence/Absence Monitoring Procedure

The monitoring of weed presence/absence will be undertaken by suitably qualified ecologist(s). The proposed methodology is provided in Table 6-1.

Table 6-1 Weed presence/absence monitoring

Objective
To determine weed presence/absence for the Project area, to inform the location and extent of controls, and to monitor cycles of weed growth and novel weed establishment
Sampling units
Weed species diversity and spatial distribution.
Method
Weed mapping • Surveys will be undertaken within and adjacent to (within a 50m buffer of) the Project area, including drainage lines and will record weed species, location and comments • Mapping will be produced that identifies weed species composition and spatial distribution to allow comparison between monitoring periods • Mapping will be updated each monitoring period (including new areas, and revisitation of mapped areas to record growth and/or the effectiveness of management measures applied).
Location
• Within and adjacent to (within a 50m buffer of) the Project area. • Along drainage lines
Timing, effort and frequency
Weed monitoring will be undertaken during initial pre-clearance surveys and bi-annually within and adjacent to (with a 50m buffer of) the Project area during construction. Where data supports the likely presence of weeds, the preferred method will be to remove the infested topsoil for disposal. Prior to the commencement of Operations, Transgrid will review this plan and update their plans and systems as necessary to ensure adequate capture of Operational activities and associated controls. This review will be initiated by Transgrid and is subject to consultation with subject matter experts in

accordance with requirements from BCS and DPE.
Data analysis
Transect data to be kept in a spreadsheet to determine any changes in the cover (%) of weeds at each transect location between bi-annual monitoring periods.
Triggers for adaptive management
A TARP has been developed for weeds which includes response measures for both weed species composition and new occurrences of weeds (refer Appendix E)

6.3 Weed Cover Monitoring Procedure

The monitoring of weed cover (%) will be undertaken by a suitably qualified ecologist. A proposed methodology is provided in Table 6-2.

Table 6-2 Weed cover monitoring

Objective
To determine weed cover for the Project area, to inform the location and extent of controls and to monitor cycles of weed growth and novel weed establishment.
Sampling units
Weed cover (%)
Methods
Option 1 - Transects • A series of transects (100m) are undertaken within and adjacent to (within a 50m buffer of) the Project area. The line-point intercept method will be used along each transect • At each interval, the cover of weed species will be measured, using a straight rod. Any intercepts or “hits” of a weed species on the rod will be recorded as present (with one being the upper limit for each stratum at each point). No intercepts of weed species at each stratum records a zero • As data is collected along each transect, the cover (%) of weeds for each ground stratum (exotic shrubs <1 m, exotic grasses and exotic ground cover) is calculated by dividing the number of hits by the number of transects, then multiplying it by 100 • An estimate of weed cover (% see Specht) for exotic canopy species and exotic mid storey species is to be calculated along each transect • As data is collected along each transect, the cover (%) of mid storey and canopy weeds is calculated by determining the average cover at each interval • For the baseline monitoring event, it is necessary to install permanent markers (e.g., star picket marked/flagged with monitoring location name) and to also record the coordinates of each monitoring location, in order to relocate for subsequent monitoring events.
Location
Within and adjacent to (within a 50m buffer of) the Project area.
Timing, effort and frequency

Frequency will comprise two monitoring events per year (spring and autumn) during construction, commencing in 2023. Prior to the commencement of Operations, Transgrid will review this plan and update their plans and systems as necessary to ensure adequate capture of Operational activities and associated controls. This review will be initiated by Transgrid and is subject to consultation with subject matter experts in accordance with requirements from BCS, DPE and NPWS.

Data analysis
Data to be kept in a spreadsheet to determine any changes in the cover (%) of weeds at each surveyed location between monitoring periods.
Triggers for adaptive management
A TARP has been developed for weeds which includes response measures for both weed species composition and new occurrences of weeds (refer Appendix E).

6.4 Pathogen Monitoring Procedure

Soil monitoring, to test for presence/absence of Phytophthora, will be undertaken by a suitably qualified person(s) during the pre-construction assessment phase. The proposed methodology is provided in Table 6-3.

Table 6-3 Presence/absence of Phytophthora monitoring

Objective
To undertake soil sampling in order to monitor for pathogens within and adjacent to (within a 50m buffer of) the Project area to inform the location and extent of controls.
Sampling units
Soil sampling
Method

Soil sampling will be undertaken within and adjacent to (within a 50m buffer of) the Project area. This includes key areas such as at vehicle washdown (to ensure that hygiene measures are effective) and around key infrastructure areas and roads where there is movement of vehicles, vessels, plant and machinery. For each monitoring location, several small sub-samples should be collected and combined into a single representative sample for that location. The collection of each sub sample will involve:

- Use a sterile garden trowel to scrape away surface leaf litter
- Dig a small hole, collect a small amount of soil and living plant roots (the hole does not need to be any deeper than 10 cm and you only need 100-250 grams of soil)
- Place them into a new, thick zip-lock plastic bag
- Label the bag with date, monitoring site code and sample number e.g. 19/12/23, Washdown01, East
- Place into a second bag to prevent cross contamination and as a safeguard against breakage
- Store soil samples in a cool, dark place and dispatch for analysis as practicable after sampling
- After each sample, scrub your hands and the trowel thoroughly with methylated spirits to disinfect them and prevent cross-contamination of samples
- Send samples to a suitable laboratory to analyse for Phytophthora. The samples are to be stored in temperatures below 24 degree Celsius, and with ice bricks that do not directly have contact with the samples.

Location

Within and adjacent to (within a 50m buffer of) the Project area including:

- Vehicle washdown stations
- Construction compound areas
- Transmission switching station; and
- Known high-risk areas

Timing, effort and frequency

Initial sampling to occur during the pre-construction to compile baseline data and generate occurrence maps (as determined by results) and thereafter annual monitoring events during construction.
Prior to the commencement of Operations, Transgrid will review this plan and update their plans and systems as necessary to ensure adequate capture of Operational activities and associated controls. This review will be initiated by Transgrid and is subject to consultation with subject matter experts in accordance with requirements from BCS, DPE and NPWS.

Data analysis

Monitoring data (laboratory results) for each monitoring location is to be kept in a spreadsheet with additional results added after each monitoring period.

Triggers for adaptive management

A soil sample returns a positive result for a detrimental; variety of *Phytophthora*; or *Phytophthora cinnamomi*

Adaptive management

Conduct additional soil sample testing within suspected infection area to document extent. Ensure anthropogenic spread from infected areas is eliminated by modifying site activities in the vicinity, controlling access, and revising hygiene procedures. Refer to Appendix F.

6.5 Other Monitoring – Dieback

If dieback is noted during weed monitoring periods (the proformas in Appendix C) include prompts to record any dieback noted), management measures described above in Section 5.3.2 would be implemented in the first instance (i.e. restricting access and implementing hygiene measures) to control the spread of the observed occurrence. Stakeholders (NPWS, BCS and FCNSW) would be notified and consulted regarding follow up soil testing and mapping, and adaptive management steps identified above in Table 6-3 would be implemented (i.e. investigation of the spread, prohibiting access, and revising hygiene strategies) to confirm the presence of the pathogen. If pathogen presence is confirmed the steps outlined in the Pathogen TARP (Appendix F) would be enacted.

7 Reporting and Review

7.1 Reporting Schedule

As stated in the Biodiversity Management Plan, an annual report will be prepared to report on the variety of biodiversity matters addressed in the plan. This report, which will be made publicly available and issued to Transgrid, BCS, FCNSW and NPWS, would include the following matters of relevance to weed and pathogen management.

- Details on the weed control actions undertaken since the last report, including:
- A list of the control activities undertaken
- A map of areas where control activities were undertaken
- A comparative analysis of baseline data
- The efficacy of the control measures in relation to the objective of minimising weed and pathogen distribution and/or abundance in the Project area
- Recommendations for future control activities
- A summary of the efficacy of other control measures outlined in this plan and recommendations for revisions to controls.

During construction, any biosecurity issues will be reported to FCNSW and NPWS immediately.

7.2 Training

All site personnel will undergo site induction training. Training of relevance to biodiversity management is outlined in the Biodiversity Management Plan. Items of relevance to weed and pathogens that will be covered in this training include:

- Identification of key weeds
- Washdown procedures and hygiene standards
- Any disinfection requirements; and
- Identification of weed and pathogen restricted areas and relevant washdown requirements.

7.3 Review and Improvement

This WPCMP will undergo reviews, updates and continuous improvement as outlined in Section 7 of the BMP.

8 References

BMCC. (2022). *Radiata Pine*. Von Weeds of the Blue Mountains: https://weedsbluemountains.org.au/weeds/radiata-pine/ abgerufen

CISS. (2021). *Weeds of National Significance*. Von Centre for Invasive Species Solutions: https://weeds.org.au/weeds-profiles/?botanical=Verbascum%20thapsus abgerufen

DPI. (2008). *Weeds of National Significance: National Best Practice Management Manual - Serrated Tussock.* Department of Primary Industries.

DPI. (2018). *NSW Weed Control Handbook*. Von NSW Department of Primary Industries: https://www.dpi.nsw.gov.au/biosecurity/weeds/weed-control/management-guides/noxious- enviro-weed-control abgerufen

DPI. (2022). *NSW WeedWise*. Von NSW Department of Industries: https://weeds.dpi.nsw.gov.au/Weeds/OxeyeDaisy#control abgerufen

DPIE. (2007). *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park.* NSW Department of Planning, Industry and Environment. Von https://www.environment.nsw.gov.au/research-and-publications/publications- search/rehabilitation-guidelines-for-the-resort-areas-of-kosciuszko-national-park abgerufen

DPIE. (2020). *Saving our Species: Hygiene Guidelines.* NSW Department of Planning, Industry and Environment.

EMM. (2019). *Biodiversity Management Plan Snowy 2.0 - Exploratory Works.* EMM Conslting. EMM. (2019). *Environmental Impact Statement: Snowy 2.0 Main Works EIS. Prepared for Snowy.*

EMM Consulting.

EMM. (2022. *Snowy 2.0 Main Works Biodiversity Monitoring Program: Year 1 Annual Monitoring Report (2020/2021)*. Report prepared for Snowy Hydro Limited.

FGJV. (2020). *Biodiversity Management Plan Snowy 2.0 - Main Works.* FGJV.

Jacobs. (Rev 7, Aug 2022). *Snowy 2.0 Transmission Connection Project - Biodiversity Development Assessment Report.* Jacobs Group (Australia) Pty Ltd.

NHT. (n.d.). *Natural Heritage Trust*. Von Introductory Weed Management Manual: https://wildlife.lowecol.com.au/wp-content/uploads/sites/25/Weed-Manual.pdf abgerufen

NPWS. (2006). *Kosciuszko National Park - Plan of Management.* National Parks and Wildlife Service.

OEH. (2012). *Regional Pest Management Strategy 2012–17, Southern Ranges Region: a new approach for reducing impacts on native species and park neighbours.* Office of Environment and Heritage. Von https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Pest-management-strategies/regional- pest-management-strategy-southern-ranges-region-120374.pdf

PlantNET. (2022). Von National Herbarium of NSW: https://plantnet.rbgsyd.nsw.gov.au/ abgerufen Wildlife Trust. (2022). *Yorkshire Fog*. Von The Wildlife Trust: https://www.wildlifetrusts.org/wildlife-explorer/grasses-sedges-and-rushes/yorkshire-fog abgerufen

APPENDIX A Weed and Pathogen Hygiene Declaration Record

Part A: Information			
Date			
Time			
Description of Equipment / vessel/ Building / Container ID			
Make / Model / Building Type			
Registration No.			
Vehicle / Plant Number			
Hull markings / Vessel Unique Identifier			
Vessel Class			
Name of Operator / Driver			
Travelling / Delivered From			
Travelling / Delivered To			
Part B: Washdown Log			
Location of Washdown and Inspection			
Is the equipment, vessel or building clean (i.e. free of all mud, seed, vegetative material, bio-security risks such as insects, animals, nests, etc.)?	☐ Yes	☐ No	☐ N/A
If travelling / delivered from outside KNP and/or Bago State Forest to the inside of KNP and/or Bago State Forest, has the vehicle, vessel, plant, equipment and/or building been washed?	☐ Yes	☐ No	☐ N/A
Part C: Disinfection Log			
Have you been to an area considered a high risk for Pathogens? (refer to SEPS).	☐ Yes If yes, disinfection is required and this section completed	☐ No	☐ N/A
Location of disinfection and Inspection			

Is the equipment, vessel or building clean (i.e. free of all mud, seed, vegetative material, bio-security risks	☐ Yes	☐ No	☐ N/A
such as insects, animals, nests, etc.)?			
If travelling / delivered from outside KNP and/or Bago State Forest to the inside of KNP and/or Bago State Forest, has the vehicle, vessel, plant, equipment and/or building been disinfected? If so, with what?" **……..**	☐ Yes	☐ No	☐ N/A
Part D: Declaration (I, the undersigned declare that the information that I have provided in this declaration is true and correct)			
Name			
Signature			
Date			
Part D: Check at Entry to Site (to confirm the above)			
Is the equipment / building clean?	☐ Yes	☐ No	
Is the equipment / building disinfected (if applicable)?	☐ Yes	☐ No	
Name			
Signature			
Date			
If no, what remedial action is required? **e.g. return to supplier, washdown offsite or disinfection offset**			
Part E: Check at Entry to Site to Have Remedial Actions Completed (only complete is answered no to Part D)			
Have the remedial actions been completed?	☐ Yes	☐ No	
Name			
Signature			
Date			

Part D: Attached Photos of inspection (if required)	
Date	

Official

Hygiene Checklist

Light vehicles / Trucks							
Interior	☐ Yes	☐ No	☐ N/A	**Tyre Rims**	☐ Yes	☐ No	☐ N/A
Engine Bay	☐ Yes	☐ No	☐ N/A	**Side Steps**	☐ Yes	☐ No	☐ N/A
Grill	☐ Yes	☐ No	☐ N/A	**Chassis**	☐ Yes	☐ No	☐ N/A
Radiator	☐ Yes	☐ No	☐ N/A	**Axels/Diffs**	☐ Yes	☐ No	☐ N/A
Wiper Recess	☐ Yes	☐ No	☐ N/A	**Suspension**	☐ Yes	☐ No	☐ N/A
Wheels/Spares	☐ Yes	☐ No	☐ N/A	**Fuel Tank Guard**	☐ Yes	☐ No	☐ N/A
Wheel Arches	☐ Yes	☐ No	☐ N/A	**Draw Bar**	☐ Yes	☐ No	☐ N/A
Mud Flaps	☐ Yes	☐ No	☐ N/A	**Toolboxes**	☐ Yes	☐ No	☐ N/A
Tray	☐ Yes	☐ No	☐ N/A	**Air Filters**	☐ Yes	☐ No	☐ N/A
Earthmoving Equipment (Excavators, Rollers, Loaders, Graders, etc.)							
Interior							
Pedal Covers	☐ Yes	☐ No	☐ N/A	**Seat (including rubber shroud)**	☐ Yes	☐ No	☐ N/A
Joystick Control Housing	☐ Yes	☐ No	☐ N/A	**Ladder**	☐ Yes	☐ No	☐ N/A
Cabin Roof	☐ Yes	☐ No	☐ N/A	**Footsteps**	☐ Yes	☐ No	☐ N/A
Cabin Walls	☐ Yes	☐ No	☐ N/A	**Floor and Floor Mats**	☐ Yes	☐ No	☐ N/A
Air Conditioning Vents and Filter	☐ Yes	☐ No	☐ N/A	**Cabin Housing**	☐ Yes	☐ No	☐ N/A
Body and Engine Bay							
Air Filter / Air Filter Pre-Cleaner	☐ Yes	☐ No	☐ N/A	**Engine Cover Rubbers**	☐ Yes	☐ No	☐ N/A
Engine Block	☐ Yes	☐ No	☐ N/A	**Engine Cover**	☐ Yes	☐ No	☐ N/A
Counterweights	☐ Yes	☐ No	☐ N/A	**Wiring Harnesses**	☐ Yes	☐ No	☐ N/A
Radiator	☐ Yes	☐ No	☐ N/A	**Hollow Support Structure / Rails**	☐ Yes	☐ No	☐ N/A
Radiator Shroud	☐ Yes	☐ No	☐ N/A	**Hydraulic Rams**	☐ Yes	☐ No	☐ N/A
Oil Cooler	☐ Yes	☐ No	☐ N/A	**Lights / Cavities**	☐ Yes	☐ No	☐ N/A
Belly Plates	☐ Yes	☐ No	☐ N/A	**Rear Plates**	☐ Yes	☐ No	☐ N/A
Tracks, Rollers, Drums, Tyres and Frames							
Rock Guards	☐ Yes	☐ No	☐ N/A	**Track Frames**	☐ Yes	☐ No	☐ N/A
Tracks	☐ Yes	☐ No	☐ N/A	**Wheel Arches**	☐ Yes	☐ No	☐ N/A

Rollers	☐ Yes	☐ No	☐ N/A	**Wheels / Tyres**	☐ Yes	☐ No	☐ N/A
Drive Motor	☐ Yes	☐ No	☐ N/A	**Roller Frames**	☐ Yes	☐ No	☐ N/A
Booms, Bucket, Blades, Rippers, Augers							
Blades	☐ Yes	☐ No	☐ N/A	**Boots**	☐ Yes	☐ No	☐ N/A
Ripper Support Frame	☐ Yes	☐ No	☐ N/A	**Teeth**	☐ Yes	☐ No	☐ N/A
Tines	☐ Yes	☐ No	☐ N/A	**Brooms**	☐ Yes	☐ No	☐ N/A
Augers	☐ Yes	☐ No	☐ N/A	**Other**	☐ Yes	☐ No	☐ N/A
Buildings							
Internal Floors	☐ Yes	☐ No	☐ N/A	**Shelves**	☐ Yes	☐ No	☐ N/A
Windows	☐ Yes	☐ No	☐ N/A	**Air Conditioning Units**	☐ Yes	☐ No	☐ N/A
Doors	☐ Yes	☐ No	☐ N/A	**Others (list below)**	☐ Yes	☐ No	☐ N/A
Walls	☐ Yes	☐ No	☐ N/A	**1)**	☐ Yes	☐ No	☐ N/A
Roof	☐ Yes	☐ No	☐ N/A	**2)**	☐ Yes	☐ No	☐ N/A
External Base (opposite side of the floor)	☐ Yes	☐ No	☐ N/A	**3)**	☐ Yes	☐ No	☐ N/A
Compartments / Cubicles	☐ Yes	☐ No	☐ N/A	**4)**	☐ Yes	☐ No	☐ N/A
Vessels							
Interior							
Internal floor/ floor mats	☐	☐ No	☐ N/A	**Seats/ Galley**	☐ Yes	☐ No	☐ N/A
Counter	☐ Yes	☐ No	☐ N/A	**Ladder/ steps**	☐ Yes	☐ No	☐ N/A
Cabin Roof	☐ Yes	☐ No	☐ N/A	**Hull interior**	☐ Yes	☐ No	☐ N/A
Deck							
Deck floor, steps	☐ Yes	☐ No	☐ N/A	**Bulk heads**	☐ Yes	☐ No	☐ N/A
Door sills/ guard rails	☐ Yes	☐ No	☐ N/A	**Scupper/ exhaust**	☐ Yes	☐ No	☐ N/A
External (hull)							
Propellers/ rudder	☐	☐ No	☐ N/A	**Hull surface**	☐ Yes	☐ No	☐ N/A
Engine bay	☐ Yes	☐ No	☐ N/A	**Ladder**	☐ Yes	☐ No	☐ N/A

Attach Photographs:

APPENDIX B Priority Weeds for the South East LLS (DPI, 2022)

Weed	Duty
All plants	General Biosecurity Duty All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.
Aaron's beard prickly pear *Opuntia leucotricha*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
African boxthorn *Lycium ferocissimum*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
African lovegrass *Eragrostis curvula*	Regional Recommended Measure Land managers reduce impacts from the plant on priority assets.
Alligator weed *Alternanthera philoxeroides*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Alligator weed *Alternanthera philoxeroides*	Biosecurity Zone The Alligator Weed Biosecurity Zone is established for all land within the state except land in the following regions: Greater Sydney; Hunter (but only in the local government areas of City of Lake Macquarie, City of Maitland, City of Newcastle or Port Stephens). Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone
Anchored water hyacinth *Eichhornia azurea*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Athel pine *Tamarix aphylla*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Weed	Duty
Bellyache bush *Jatropha gossypiifolia*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Bitou bush *Chrysanthemoides monilifera subsp. rotundata*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Bitou bush *Chrysanthemoides monilifera subsp. rotundata*	Biosecurity Zone The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south. Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone
Black knapweed *Centaurea x moncktonii*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Black willow *Salix nigra*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Blackberry *Rubus fruticosus species aggregate*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Rubus fruiticosus species aggregate have this requirement, except for the varietals Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree
Blind cactus *Opuntia rufida*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Blue hound's tongue *Cynoglossum creticum*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Weed	Duty
Boneseed *Chrysanthemoides monilifera subsp. monilifera*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Boneseed *Chrysanthemoides monilifera subsp. monilifera*	Control Order Bonseed Control Zone: Whole of NSW Boneseed Control Zone (Whole of NSW): Owners and occupiers of land on which there is boneseed must notify the local control authority of new infestations; immediately destroy the plants; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of boneseed must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant.
Boxing glove cactus *Cylindropuntia fulgida var. ma millata*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Bridal creeper *Asparagus asparagoides*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. *this requirement also applies to the Western Cape form of bridal creeper
Bridal veil creeper *Asparagus declinatus*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Broomrapes *Orobanche species*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species of Orobanche are Prohibited Matter in NSW, except Clover broomrape, Orobanche minor and Australian broomrape, Orobanche cernua var. australiana.
Bunny ears cactus *Opuntia microdasys*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Weed	Duty
Cabomba *Cabomba caroliniana*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Cabomba *Cabomba caroliniana*	Regional Recommended Measure Exclusion zone: whole of region except the core infestation area of Wollongong, Shellharbour and Kiama councils. Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Cane cactus *Austrocylindropuntia cylindrica*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Austrocylindropuntia genus have this requirement
Cane needle grass *Nassella hyalina*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Cape broom *Genista monspessulana*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Cape broom *Genista monspessulana*	Regional Recommended Measure Core infestation: whole region except for the exclusion zone of Bega and Wingecarribee councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Cat's claw creeper *Dolichandra unguis-cati*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Cat's claw creeper *Dolichandra unguis-cati*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

Weed	Duty
Chicken dance cactus *Opuntia schickendantzii*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Chilean needle grass *Nassella neesiana*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Chinese violet *Asystasia gangetica subsp. mi crantha*	Control Order Owners and occupiers of land on which there is Chinese violet must notify the local control authority for the area if the Chinese violet is part of a new infestation on the land, destroy all Chinese violet on the land ensuring that subsequent generations of Chinese violet are destroyed; and keep the land free of Chinese violet. A person who deals with a carrier of Chinese violet must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant on the land, or on or in a carrier.
Climbing asparagus *Asparagus africanus*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Climbing asparagus fern *Asparagus plumosus*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Common pear *Opuntia stricta*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Coolatai grass *Hyparrhenia hirta*	Regional Recommended Measure Exclusion zone: whole region except the core infestation area of Bigga, Crooked Corner and Narrawa in the Upper Lachlan local government area, and Wollongong local government area Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Eurasian water milfoil *Myriophyllum spicatum*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Weed	Duty
Eve's needle cactus *Austrocylindropuntia subulata*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Austrocylindropuntia genus have this requirement
Fireweed *Senecio madagascariensis*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. Regional Recommended Measure Exclusion zone: whole of region except the core infestation area of Wollongong, Kiama, Shellharbour, Eurobodalla, Shoalhaven, Bega Valley and Wingecaribee councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Flax-leaf broom *Genista linifolia*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Flax-leaf broom *Genista linifolia*	Regional Recommended Measure Exclusion zone: whole region except for the core infestation areas of Wollongong, Shellharbour, Kiama, Shoalhaven and Eurobodalla councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Foxtail fern *Asparagus densiflorus*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Frogbit *Limnobium laevigatum*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species of Limnobium are Prohibited Matter

Weed	Duty
Gamba grass *Andropogon gayanus*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Giant devil's fig *Solanum chrysotrichum*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Giant Parramatta grass *Sporobolus fertilis*	Regional Recommended Measure Exclusion zone: whole of region except core infestation area of Wollongong, Kiama, Shellharbour, Eurobodalla, and Shoalhaven councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Giant rat's tail grass *Sporobolus pyramidalis*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Gorse *Ulex europaeus*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Gorse *Ulex europaeus*	Regional Recommended Measure Exclusion zone: whole of region except the core infestation area of Upper Lachlan, Wollongong, Shellharbour, Kiama, Shoalhaven, Eurobodalla, Yass Valley and Bega Valley councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Grey sallow *Salix cinerea*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Weed	Duty
Ground asparagus *Asparagus aethiopicus*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Groundsel bush *Baccharis halimifolia*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Hawkweeds *Pilosella species*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species in the genera Pilosella and Hieracium are Prohibited Matter except for Hieracium murorum.
Holly leaved senecio *Senecio glastifolius*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Horsetails *Equisetum species*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Hudson pear *Cylindropuntia pallida*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Hydrocotyl *Hydrocotyle ranunculoides*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Weed	Duty
Hygrophila *Hygrophila costata*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Hymenachne *Hymenachne amplexicaulis & hybrids*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Karoo acacia *Vachellia karroo*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Kidney-leaf mud plantain *Heteranthera reniformis*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Kochia *Bassia scoparia*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries Excluding the subspecies trichophylla
Koster's curse *Clidemia hirta*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Lagarosiphon *Lagarosiphon major*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Lantana *Lantana camara*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Weed	Duty
Lantana *Lantana camara*	Regional Recommended Measure Exclusion zone: whole region excluding the core infestation area of Eurobodalla, Kiama, Shellharbour, Wollongong and the Shoalhaven local government area north of the Lantana Containment Line at 35'11"42 S Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Long-leaf willow primrose *Ludwigia longifolia*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Ludwigia *Ludwigia peruviana*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Madeira vine *Anredera cordifolia*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Mesquite *Prosopis species*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the genus Prosopis have this requirement
Mexican feather grass *Nassella tenuissima*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Miconia *Miconia species*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species of Miconia are Prohibited Matter in NSW

Weed	Duty
Mikania vine *Mikania micrantha*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries *all species in the genus Mikania are Prohibited Matter in NSW
Mimosa *Mimosa pigra*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Ming asparagus fern *Asparagus macowanii*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Mysore thorn *Caesalpinia decapetala*	Regional Recommended Measure Exclusion zone: whole region except the core infestation area of Wollongong Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Pampas grass *Cortaderia species*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found. This Regional Recommended Measure applies to Cortaderia jubata (pink pampas grass)
Parkinsonia *Parkinsonia aculeata*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Weed	Duty
Parkinsonia *Parkinsonia aculeata*	Control Order Parkinsonia Control Zone: Whole of NSW Parkinsonia Control Zone (Whole of NSW): Owners and occupiers of land on which there is parkinsonia must notify the local control authority of new infestations; immediately destroy the plants; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of parkinsonia must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant.
Parthenium weed *Parthenium hysterophorus*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Parthenium weed *Parthenium hysterophorus*	Prohibition on certain dealings The following equipment must not be imported into NSW from Queensland: grain harvesters (including the comb or front), comb trailers (including the comb or front), bins used for holding grain during harvest operations, augers or similar for moving grain, vehicles used to transport grain harvesters, support vehicles driven in paddocks during harvest operations, mineral exploration drilling rigs and vehicles used to transport those rigs, unless set out as an exception in Division 5, Part 2 of the Biosecurity Order (Permitted Activities) 2017
Pond apple *Annona glabra*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Prickly acacia *Vachellia nilotica*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Prickly pears - *Austrocylindropuntia species*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Austrocylindropuntia genus have this requirement
Prickly pears - Cylindropuntias *Cylindropuntia species*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Cylindropuntia genus have this requirement

Weed	Duty
Prickly pears - Opuntias *Opuntia species*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. For all Opuntia species except for Opuntia ficus-indica (Indian fig).
Rope pear *Cylindropuntia imbricata*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Cylindropuntia genus have this requirement
Rubber vine *Cryptostegia grandiflora*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Sagittaria *Sagittaria platyphylla*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Salvinia *Salvinia molesta*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Salvinia *Salvinia molesta*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Scotch broom *Cytisus scoparius subsp. scoparius*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Scotch broom *Cytisus scoparius subsp. scoparius*	Regional Recommended Measure Core infestation area: whole region except exclusion zone of : Bega council Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.

Weed	Duty
Sea spurge *Euphorbia paralias*	Regional Recommended Measure Exclusion zone: whole region except for the core infestation area of Eurobodalla and Bega Valley councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. Plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core area: Land managers reduce impacts from the plant on priority assets.
Senegal tea plant *Gymnocoronis spilanthoides*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Serrated tussock *Nassella trichotoma*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Serrated tussock *Nassella trichotoma*	Regional Recommended Measure Core infestation: whole region except the exclusion zone of Shoalhaven, Eurobodalla, Kiama, Wollongong, Bega Valley and Shellharbour councils Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant should not be bought, sold, grown, carried or released into the environment. Exclusion zone: Land managers should mitigate spread from their land. Core area: Land managers reduce impacts from the plant on priority assets.
Siam weed *Chromolaena odorata*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Sicklethorn *Asparagus falcatus*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Silverleaf nightshade *Solanum elaeagnifolium*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Weed	Duty
Smooth tree pear *Opuntia monacantha*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Snakefeather *Asparagus scandens*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Spanish broom *Spartium junceum*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Spanish heath *Erica lusitanica*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Spongeplant *Limnobium spongia*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species of Limnobium are Prohibited Matter
Spotted knapweed *Centaurea stoebe subsp. micr anthos*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries
Tiger pear *Opuntia aurantiaca*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Tropical soda apple *Solanum viarum*	Control Order Tropical Soda Apple Control Zone: Whole of NSW Tropical Soda Apple Control Zone (Whole of NSW): Owners and occupiers of land on which there is tropical soda apple must notify the local control authority of new infestations; destroy the plants including the fruit; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of tropical soda apple must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant on

Weed	Duty
	the land, or on or in a carrier.
Velvety tree pear *Opuntia tomentosa*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Water caltrop *Trapa species*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species in the Trapa genus are Prohibited Matter in NSW
Water hyacinth *Eichhornia crassipes*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Water hyacinth *Eichhornia crassipes*	Biosecurity Zone The Water Hyacinth Biosecurity Zone applies to all land within the State, except for the following regions: Greater Sydney or North Coast, North West (but only the local government area of Moree Plains), Hunter (but only in the local government areas of City of Cessnock, City of Lake Macquarie, MidCoast, City of Maitland, City of Newcastle or Port Stephens), South East (but only in the local government areas of Eurobodalla, Kiama, City of Shellharbour, City of Shoalhaven or City of Wollongong). Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone
Water lettuce *Pistia stratiotes*	Regional Recommended Measure Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.
Water soldier *Stratiotes aloides*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

Weed	Duty
Wheel cactus *Opuntia robusta*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
Willows *Salix species*	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale. All species in the Salix genus have this requirement, except Salix babylonica (weeping willows), Salix x calodendron (pussy willow) and Salix x reichardtii (sterile pussy willow)
Witchweeds *Striga species*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries All species in the Striga genus are Prohibited Matter in NSW, except the native Striga parviflora
Yellow burrhead *Limnocharis flava*	Prohibited Matter A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries

APPENDIX C Monitoring Template – Weeds

Aim:	To determine weed presence/absence within proximity to Project roads and key Project infrastructure	**Timing:**	Bi-annually
Date:		**Location:**	**Collectors:**

Weed Species	Coordinates		Time	Project Phase*	No. individuals	Size (m^2)	Cover	Age Class	Notable Features*
	East	North							

*Project Phase = Pre-construction, construction, post-construction, Notable features = observed new occurrence, weather, dieback, etc.

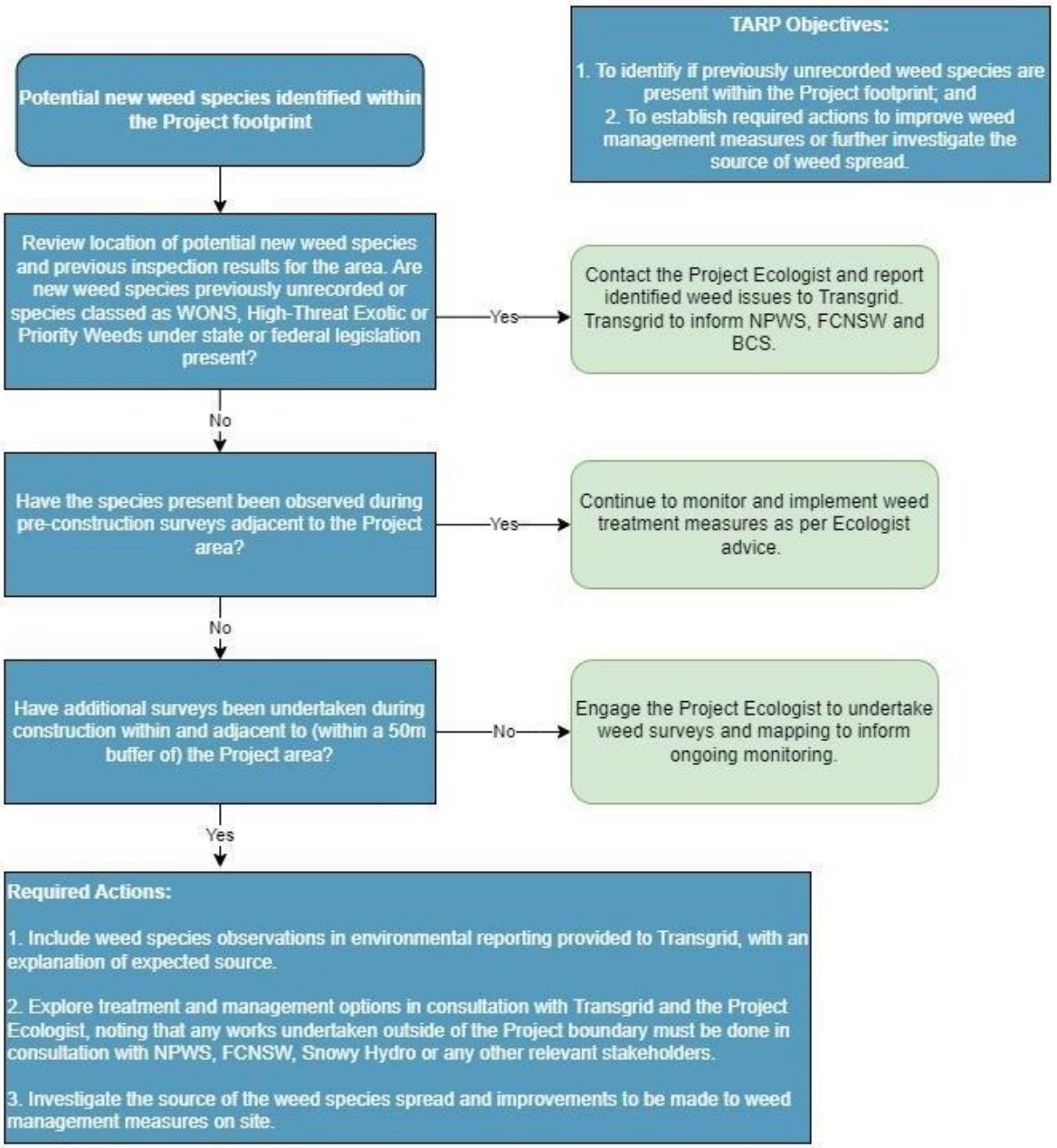
APPENDIX D Monitoring Template – Pathogens

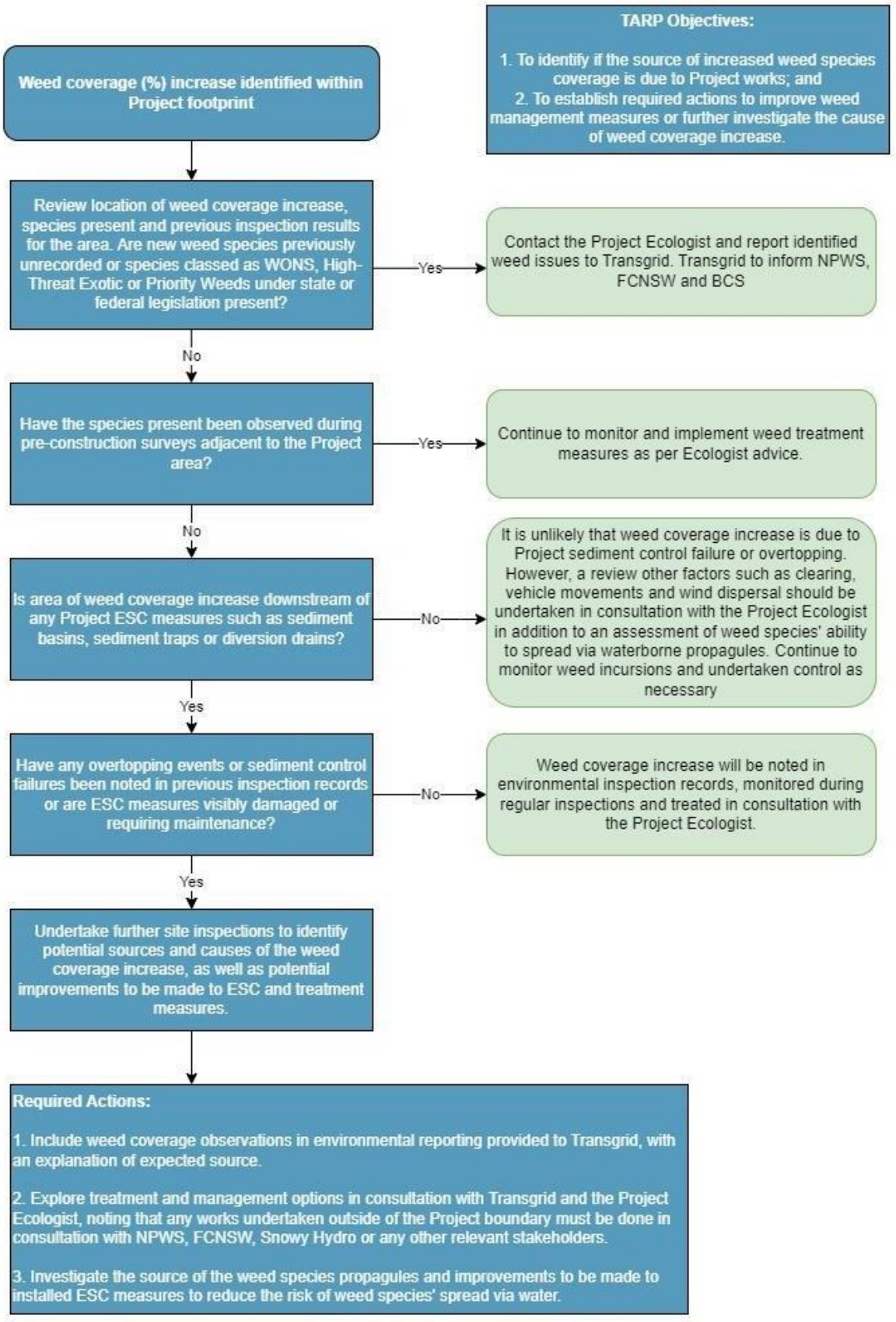
Aim:	To determine *Phytophthora* presence/absence within proximity to Project roads and key Project infrastructure			**Timing:**	Quarterly
Date:		**Location:**		**Collectors:**	

# Sample	Coordinates		Time	Project Phase*	Presence/Absence	% Pathogens	Notable Features*
	East	North					

*Project Phase = Pre-construction, construction, post-construction, Notable features = presence of Xanthorrhoea glauca, etc

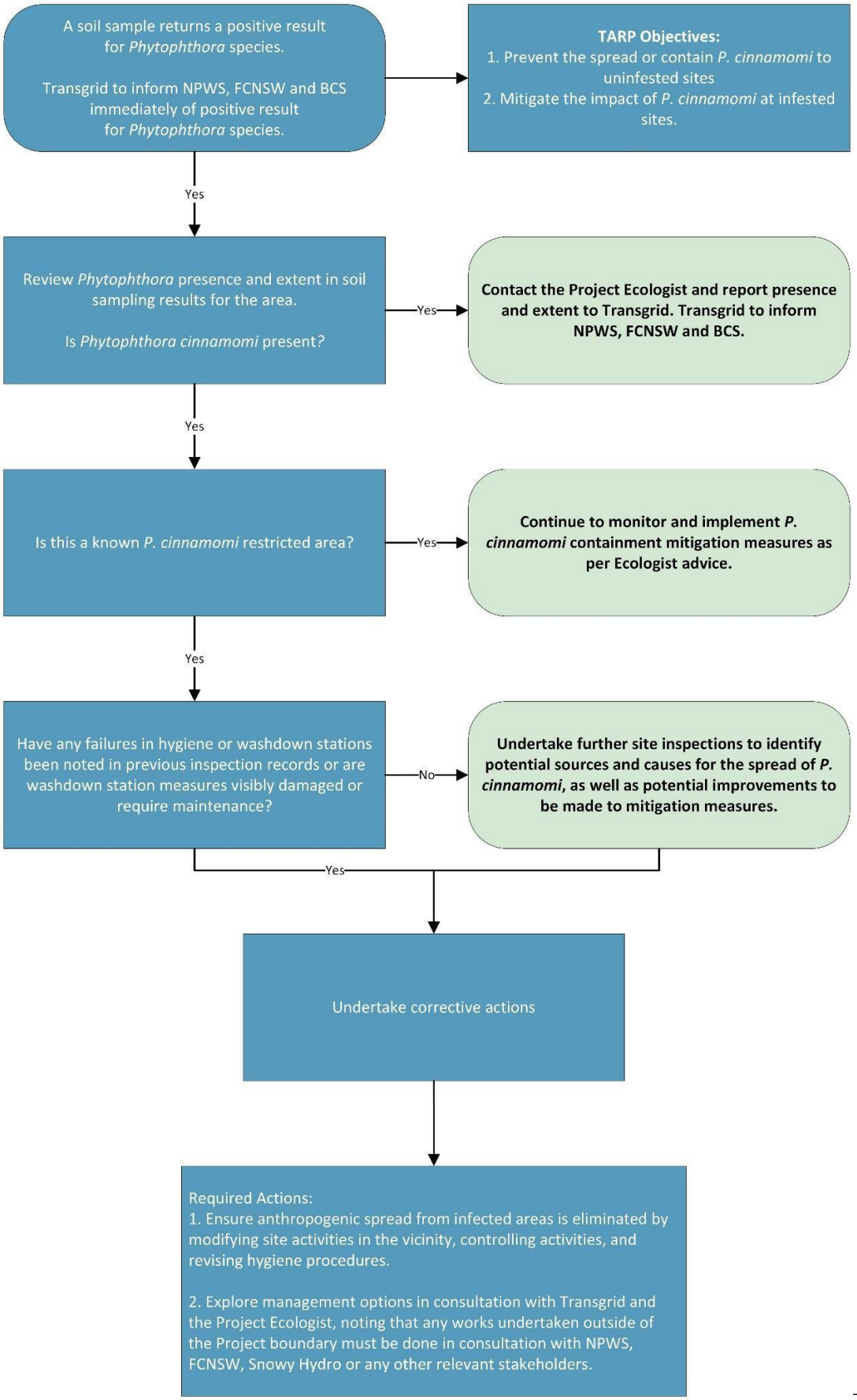
APPENDIX E Trigger Action Response Plans – Weeds




TARP Objectives:
1. To identify if the source of increased weed species coverage is due to Project works; and
2. To establish required actions to improve weed management measures or further investigate the cause of weed coverage increase.
Weed coverage (%) increase identified within Project footprint
Review location of weed coverage increase, species present and previous inspection results for the area. Are new weed species previously unrecorded or species classed as WONS, High-Threat Exotic or Priority Weeds under state or federal legislation present?
Yes
Contact the Project Ecologist and report identified weed issues to Transgrid. Transgrid to inform NPWS, FCNSW and BCS
No
Have the species present been observed during pre-construction surveys adjacent to the Project area?
Yes
Continue to monitor and implement weed treatment measures as per Ecologist advice.
No
Is area of weed coverage increase downstream of any Project ESC measures such as sediment basins, sediment traps or diversion drains?
No
It is unlikely that weed coverage increase is due to Project sediment control failure or overtopping. However, a review other factors such as clearing, vehicle movements and wind dispersal should be undertaken in consultation with the Project Ecologist in addition to an assessment of weed species' ability to spread via waterborne propagules. Continue to monitor weed incursions and undertaken control as necessary
Yes
Have any overtopping events or sediment control failures been noted in previous inspection records or are ESC measures visibly damaged or requiring maintenance?
No
Weed coverage increase will be noted in environmental inspection records, monitored during regular inspections and treated in consultation with the Project Ecologist.
Yes
Undertake further site inspections to identify potential sources and causes of the weed coverage increase, as well as potential improvements to be made to ESC and treatment measures.
Required Actions:
1. Include weed coverage observations in environmental reporting provided to Transgrid, with an explanation of expected source.
2. Explore treatment and management options in consultation with Transgrid and the Project Ecologist, noting that any works undertaken outside of the Project boundary must be done in consultation with NPWS, FCNSW, Snowy Hydro or any other relevant stakeholders.
3. Investigate the source of the weed species propagules and improvements to be made to installed ESC measures to reduce the risk of weed species' spread via water.

APPENDIX F Trigger Action Response Plan – Pathogens

Official


A soil sample returns a positive result for *Phytophthora* species.
Transgrid to inform NPWS, FCNSW and BCS immediately of positive result for *Phytophthora* species.
TARP Objectives:
1. Prevent the spread or contain *P. cinnamomi* to uninfested sites
2. Mitigate the impact of *P. cinnamomi* at infested sites.
Yes
Review *Phytophthora* presence and extent in soil sampling results for the area.
Is *Phytophthora cinnamomi* present?
Yes
Contact the Project Ecologist and report presence and extent to Transgrid. Transgrid to inform NPWS, FCNSW and BCS.
Yes
Is this a known *P. cinnamomi* restricted area?
Yes
Continue to monitor and implement *P. cinnamomi* containment mitigation measures as per Ecologist advice.
Yes
Have any failures in hygiene or washdown stations been noted in previous inspection records or are washdown station measures visibly damaged or require maintenance?
No
Undertake further site inspections to identify potential sources and causes for the spread of *P. cinnamomi*, as well as potential improvements to be made to mitigation measures.
Yes
Undertake corrective actions
Required Actions:
1. Ensure anthropogenic spread from infected areas is eliminated by modifying site activities in the vicinity, controlling activities, and revising hygiene procedures.
2. Explore management options in consultation with Transgrid and the Project Ecologist, noting that any works undertaken outside of the Project boundary must be done in consultation with NPWS, FCNSW, Snowy Hydro or any other relevant stakeholders.

APPENDIX G Suitable Chemicals and Dilution Factors for Disinfection

Source: Department of Biodiversity, Conservation and Attractions (Western Australia), 2019, Machinery and Vehicle Hygiene inspection checklist.

Disinfectant	Examples of appropriate use	Application rate
Methylated spirit	After complete removal of soil, spray small items such as footwear or tools liberally Disinfecting tools between taking soil/tissue samples is imperative to prevent cross-contamination	70 per cent in water
Phytoclean® (sold as 10% active ingredient)	Foot-bath for footwear, or dip small equipment/tools after removal of soil	1:10 dilution (i.e. 100mL in 1L water)
	Disinfecting machinery/vehicles or recycled culverts after complete removal of soil	1:50 dilution (i.e. 200mL in 10L water)
Chlorine dioxide tablets	This method may be used to treat large volumes of potentially infested water such as effluent collected and contained in a washdown facility	3 ppm in water left for a minimum of 4 minutes before use

APPENDIX I Pest and Predator Monitoring Program

Pest and Predator Monitoring Program

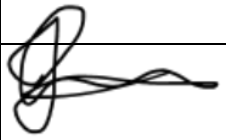
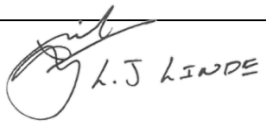
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TransGrid
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The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

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Table of Contents

1 Introduction 6
1.1 Context 6
1.2 Purpose and Objectives 6

2 Environmental Assurance 7
2.1 Legislation 7
2.2 Permits and Licences 7
2.3 Guidelines 7
2.4 Project Mitigation Measures 7

3 Existing Environment 9
3.1 Monitoring Results to Date 14

4 Environmental Aspects and Impacts 16

5 Environmental Mitigation and Management Measures 17
5.1 Prevention 17
5.2 Control 17

6 Monitoring 18
6.1 Monitoring Objectives 18
6.2 Pest and Predator Monitoring 18

7 Reporting and Review 20
7.1 Reporting Schedule 20
7.2 Training 20
7.3 Review and Improvement 20

8 References 21

List of Tables

Table 2-1 BDAR and Amendment Report mitigation measures relevant to this Plan 8
Table 3-1 Fauna pest species recorded within the Project area 10
Table 3-2 Feral animal abundance monitoring 14
Table 4-1 Pest and predator aspects, impacts and environmental factors 16
Table 6-1 Pest and predator presence/absence monitoring 18

Abbreviation & Explanation

Abbreviation	Explanation
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
CM	Construction Managers
CSSI	Critical State Significant Infrastructure
DAFF	Department of Agriculture Fisheries and Forestry (Cth)
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
DPI	Department of Primary Industries
EIS	Environmental Impact Statement
EMS	Environmental Management System
FCNSW	Forestry Corporation NSW
FM Act	*Fisheries Management Act 1994*
KNP	Kosciuszko National Park
kV	Kilovolts
LLS	Local Land Services
m	Metres
MW	Megawatts
MWh	Megawatt hours
NEM	National Electricity Market
NPWS	National Parks and Wildlife Service
PC	Principal Contractor or Contractor as defined in this management plan
POM	Plan of Management
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
TARP	Trigger Action Response Plan
TG	Transgrid

1 Introduction

1.1 Context

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received development approval on 2 September 2022 to construct a switching station and overhead transmission lines ('the Project') to facilitate the connection of Snowy.

2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW).

This Pest and Predator Monitoring Program forms part of the Biodiversity Management Plan (BMP) for the Project.

1.2 Purpose and Objectives

The key objective of the Pest and Predator Monitoring Program (this Program) is to describe the management measures that will be implemented to ensure that predators and pest species activity doesn't increase onsite during all phases of the Project.

To achieve this, Transgrid and PC will:

- Ensure appropriate measures are implemented to address the conditions of approval
- Detail the predator and pest animals identified within the Project area
- Ensure practical measures are implemented prior to and during construction to avoid the introduction of new predator or pest animals, and to control/minimise their abundance
- Ensure practical measures are implemented during operation to avoid the introduction of new predator or pest animals, and to control/minimise their abundance
- Ensure that adequate visual monitoring is undertaken within the Project area.

2 Environmental Assurance

2.1 Legislation

Legislation relevant to pest and predator management includes:

- Game and Feral Animal Control Act 2002
- Biosecurity Act 2015
- National Parks and Wildlife Act 1974 (NPW Act)
- Fisheries Management Act 1994 (FM Act)
- Pesticides Act 1999.

2.2 Permits And Licences

All work carried out as a consequence of pest and predator management will be undertaken in accordance with animal ethics guidance, and any necessary permits and/ or licenses obtained prior to the works occurring.

In regard to firearms and baiting permit and licence requirements, these works would be only undertaken by qualified and experienced professionals that hold up to date licences and permits with the required agencies.

2.3 Guidelines

The following guidelines were considered in the development and implementation of this plan:

- Riverina Regional Strategic Pest Animal Management Plan 2018-2023 (Local Land Services (LLS), 2018b)
- Murray Regional Strategic Pest Animal Management Plan 2018-2023 (Local Land Services, 2018a)
- Guidelines for the Preparation and Implementation of Wild Dog Management Plans in NSW (DPI, 2016)
- Australian Pest Animal Management Program (DPIE, 2010)
- General methods of Euthanasia under field conditions (DAFF, 2021)
- Monitoring, Evaluation, Reporting and Improvement (MERI) framework for pest animal management in NSW (May 2020)

2.4 Project Mitigation Measures

The Project Biodiversity Development Assessment Report (BDAR) provides measures relevant to this Plan and are listed in Table 2-1 below. Additional information regarding the anticipated impacts of the Project on predator and pest animal populations is included in Section 10.2.4 of the BDAR.

Table 2-1 BDAR and Amendment Report mitigation measures relevant to this Plan

Reference number	Requirement	Document reference
Mitigation Measures - BDAR		
BIO17	Personal waste / refuse generated during construction will be stored appropriately in inaccessible bins and disposed at appropriate waste disposal facilities off-site. Any personal waste generated during operation will be removed from the site (including substation) and disposed in an appropriate waste facility.	Section 5
BIO18	A feral animal monitoring program will be developed and implemented as described in Section 11.2[1] based on performance triggers for adaptive management. It will be important to share data with NPWs and State Forests. Increased predator activity will trigger the need for predator control based on performance measures to be outlined in the BMP. Control will be done in consultation with NPWS and (DPIE - State Forests).	Section 6

[1] Incorrectly referenced in BIO18 of the Project BDAR. Should reference BDAR Table 11-2.

3 Existing Environment

The following section summarises known pest and predator species within and adjacent to the Project area, based on information contained in the BDAR.

Live trapping, baited remote sensor camera traps, call broadcasting, spotlighting and timed area searches were undertaken during the BDAR.

The following pest species were recorded within the Project area:

- Horse (Equus caballus)
- Deer (Damas sp., Cervus sp., Axis sp.)
- Rabbit (Oryctolagus cuniculus)
- Pig (Sus scrofa).

The following predator pest species were recorded within the Project area:

- Cat (Felis catus)
- Wild Dog (*Canis lupus*)
- Red Fox (Vulpes vulpes).

Observations of these species were not limited to any one habitat type; therefore, it is possible that they occur throughout the Project area.

Fauna pest species recorded during surveys of the Project Area are detailed in Table 3-1. Other fauna pest species known to occur in KNP and Bago State Forest have been detailed in Appendix A.

Table 3-1 Fauna pest species recorded within the Project area

Name	Priorities for Control (LLS, 2018 a & b)	Image (Source: (DPIE, 2021) (LLS, 2018) (PestSmart, 2014)
Deer *Dama sp.* *Cervus sp.* *Axis sp.* **Known in the Project area**	**Asset based protection** The impacts of wild deer through grazing competition are considerable, together with the emergence of public safety issues for road users. Their impact on key land types including conservation lands and plantation forest is increasing. **Control methods:** Opportunistic / specific shooting operations. Control methods will be managed in consultation FCNSW and NPWS and comply with the Standard Operating Procedures for the Ground Shooting of Feral Deer (DPI, 2022).	
Horse *Equus caballus* **Known in the Project area**	**Asset based protection and containment** Wild horses have negative impacts on sensitive environments and pose significant risks to road user **Control methods:** Control methods will be managed in consultation with FCNSW and NPWS. Within KNP they will comply with the KNP Wild Horse Management Plan (DPE, 2021).	

Name	Priorities for Control (LLS, 2018 a & b)	Image (Source: (DPIE, 2021) (LLS, 2018) (PestSmart, 2014)
Rabbit *Oryctolagus cuniculus* **Known in the Project area**	**Asset based protection** Feral rabbit populations that have potential impact on threatened species or communities as well as cultural heritage sites. **Control methods:** Control methods will comply with NPWS and FCNSW standards, the NSW Vertebrate Pest Control Manual (DPI, 2021), the Code of Practice for the Humane Control Rabbits (Sharp & Saunders, 2012) and related standard operating procedures. Subject to the outcomes of pest monitoring, the following methods may be utilised for rabbit control in consultation with NPWS and FCNSW: • Baiting (1080 or Pindone) • Warren fumigation (phosphine or CO2) • Opportunistic shooting • Warren destruction • Direct infection of a population with a biological control (such as rabbit calicivirus disease or myxomatosis).	
Cat *Felis catus* **Known in the Project area**	**Asset based protection** Feral cats are a common and elusive predator that colonise a wide range of habitats, eat a wide range of prey, and can survive with limited access to water. Feral cats are free living, have limited or no reliance on humans for their ecological requirements, survive and reproduce in self-perpetuating populations, and occur in virtually all terrestrial habitats in Australia (NSW Scientific Committee 2000). They impact on threatened and other native fauna across a wide range of natural and modified environments including regional towns and built up areas. The lack of effective control methods severely limits the ability to manage this species impact. **Control methods:** Control methods will comply with the Model Code of Practice for the Humane Control of Feral Cats (Sharp, 2012). Subject to the outcomes of	

Name	Priorities for Control (LLS, 2018 a & b)	Image (Source: (DPIE, 2021) (LLS, 2018) (PestSmart, 2014)
	pest monitoring, the following methods may be utilised for feral cat control in consultation with NPWS and FCNSW: • Opportunistic shooting • Cage trapping • Soft-jaw trapping	
Wild Dog *Eragrostis curvula* **Known in the Project area**	**Asset based protection and eradicate** Wild dogs have been assessed as having negative economic, environmental and social impacts. **Note:** Dingoes were introduced into Australia from Asia prior to European settlement and hence are eligible for listing as a threatened species under the NSW BC Act. Although the dingo has not been listed as a threatened species, predation and hybridisation by feral dogs has been listed as a key threatening process (KTP) under the BC Act. As such, Dingoes would not be targeted for control as a part of this management plan. **Control methods:** Control methods will comply with the NPWS Wild Dog Policy (DPIE, 2021), the NSW Vertebrate Pest Control Manual (DPI, 2021) and the DEH and DPI Model Code of Practice for the Humane Control of Wild Dogs (Sharp; Saunders, 2012) and related Standard Operating Procedures. Subject to the outcomes of pest monitoring, the following methods may be utilised for wild dog control in consultation with NPWS and FCNSW: • Opportunistic shooting • 1080 baiting • Soft-jaw trapping	

Name	Priorities for Control (LLS, 2018 a & b)	Image (Source: (DPIE, 2021) (LLS, 2018) (PestSmart, 2014)
Red Fox *Vulpes vulpes* **Known in the Project area**	**Asset based protection** Predation by the European red fox is a KTP under the BC Act and the EPBC Act. Predation by foxes is a major threat to the survival of native fauna, with non-flying mammals weighing 35–5500 g and ground-nesting birds at greatest risk. **Control methods:** The Predation by the Red Fox TAP (DAWE, 2008) provides a strategy for fox control to aid the conservation of native fauna. Control methods will comply with the NSW Vertebrate Pest Control Manual (DPI, 2021) and the DEH Model Code of Practice for the Humane Control of Foxes (PestSmart, n.d.). Subject to the outcomes of pest monitoring, the following methods may be utilised for red fox control in consultation with NPWS and FCNSW: • Exclusion fencing • Opportunistic shooting • 1080 baiting • Soft-jaw trapping • M44 ejectors • Cage trapping	

3.1 Monitoring Results to Date

Snowy 2.0 as part of the Main Works Monitoring Program, has been monitoring pests and predators within the Snowy 2.0 Main Works Project area. The Snowy 2.0 Main Works Project area overlaps our Project area at Lobs Hole. Records were collected with remote cameras during the 2020-21 and 2021- 22 annual monitoring programs. The following table (Table 3-2) shows observations as reported in Snowy 2.0 Main Works Biodiversity Monitoring Program Year 1 Annual Monitoring Report 2020 – 2021 and Year 2 Annual Monitoring Report 2021 – 2022 along Lobs Hole Ravine Road.

Table 3-2 Feral animal abundance monitoring

Year	Monitoring events with average abundance for each road/key infrastructure area:			
	1st	2nd	3rd	4th
Year 1	• Lobs Hole Ravine Road Bottom (LHRR Bottom) = 0.20 animals/km (Rabbit) • Lobs Hole Ravine Road North (LHRR North) = 0.28 animals/km (Rabbit) • Lobs Hole Ravine Road South (LHRR South) = 0.28 animals/km (Rabbit and Feral Cat).	• LHRR Bottom = 0.52 animals/km (Rabbit and European Hare) • LHRR North = 0.23 animals/km (Rabbit).	• LHRR Bottom = 1.56 animals/km (Rabbit) • LHRR North = 0.69 animals/km (Rabbit) • LHRR South = 0.14 animals/km;	• LHRR Bottom = 0.73 animals/km (Rabbit) • LHRR South = 0.21 animals/km (Rabbit).

Year	Monitoring events with average abundance for each road/key infrastructure area:			
	1st	2nd	3rd	4th
Year 2	• Lobs Hole Ravine Road Bottom (LHRR Bottom) = 0.10 animals/km (European Hare) and 0.20 animals/km (Red Fox) • Lobs Hole Ravine Road North (LHRR North) = 0.87 animals/km (Red Fox)	• Lobs Hole Ravine Road Bottom (LHRR Bottom) = 0.88 animals/km (European Rabbit), 0.06 animals/km (Red Fox) and 0.06 animals/km (Red Deer) • Lobs Hole Ravine Road North (LHRR North) = 0.89 animals/km (European Rabbit)	• Lobs Hole Ravine Road Bottom (LHRR Bottom) = 0.97 animals/km (European Rabbit) and 0.06 animals/km (Red Fox). • Lobs Hole Ravine Road North (LHRR North) = 0.27 animals/km (European Rabbit) • Lobs Hole Ravine Road South (LHRR South) = 0.27 animals/km (European Rabbit).	• Lobs Hole Ravine Road Bottom (LHRR Bottom) = 0.15 animals/km (European Rabbit) • Lobs Hole Ravine Road North (LHRR North) = 0.45 animals/km (European Rabbit) and 0.23 animals/km (Red Fox). • Lobs Hole Ravine Road South (LHRR South) = 0.07 animals/km (European Rabbit) and 0.07 animals/km (Red Fox).

4 Environmental Aspects and Impacts

Key aspects of the Project that could result in pest and predator impacts are identified in Table 4-1. The range of these impacts will depend on the nature, extent and magnitude of construction and operation activities and their interaction with the natural environment.

Table 4-1 Pest and predator aspects, impacts and environmental factors

Environmental Aspects	Environmental Impacts	Environmental Factors (Conditions)
• Operation of compounds • Waste management • Human presence and activity • Clearing of vegetation and habitat • Works around and within waterways • General earthworks	• Increase in pest and predator species, resulting in increased competition and a consequent reduction in populations of native species	• The presence of pest animals within and adjacent to the Project area

5 Environmental Mitigation and Management Measures

A range of environmental requirements and control measures are identified in the Amendment Report, BDAR and the Conditions of Approval as summarised in Table 3-1 of this report. Safeguards and management measures will be implemented to avoid, minimise or manage impacts from the pest and predator species within KNP and Bago State Forest.

Management measures for the control of predators and pests will take three forms:

- Prevention
- Monitoring (discussed in Section 6)
- Control

Subject to the outcome of preventative measures and monitoring, control measures will be implemented in consultation with Transgrid, NPWS and FCNSW. All control methods will be humane and designed and implemented by an appropriately qualified person.

5.1 Prevention

Transgrid and PC will implement the following measures to prevent the increase of pest and predator species on site, through the implementation of the following measures:

- Barrier exclusions and covers will be implemented within and surrounding construction compounds and work sites in conjunction with construction fencing, particularly where monitoring has identified the incursion of pest and/or predator species
- Materials or practices that may improve pest species habitat will be avoided
- Waste will be appropriately stored in a manner that is inaccessible to animals including pest and predator species and disposed off-site.

5.2 Control

Where required, by Transgrid or other Authority, PC will implement a pest and/or predator control program in consultation with relevant parties. Such activities should, as far as practicable, be coordinated with annual control programs.

Annual control programs and control methods that NPWS and FCNSW carries out within the Project area are detailed in Table 3-1 of this report. As some control programs, including trapping and baiting, have the potential to impact native species, approval from stakeholders may be required. Such requests will first be submitted to Transgrid prior to implementation.

6 Monitoring

6.1 Monitoring Objectives

The key objective of the Pest and Predator Monitoring Program is to determine if there are any changes in occupation and abundance of pest and predators onsite, and areas surrounding the Project site arising from increased human activity associated with the Project. Additionally, monitoring will be used to determine if mitigation measures put in place are effective and to inform the location and extent of further pest and predator management required.

To achieve this, Transgrid and PC will:

- Implement remote camera monitoring, to be conducted by suitably qualified persons, to visually determine pest and predator species presence and abundance within and surrounding (within a 50m buffer of) the Project area
- Adapt and amend this monitoring program in response to changes in pest abundance within and surrounding the Project area, in consultation with NPWS, FCNSW and Transgrid.

Monitoring techniques will primarily utilise remote camera monitoring due to the cryptic nature of many pest and predator species, with monitoring for secondary indicators such as scats, disturbance, nests and scavenging to be undertaken in the event of pest and predator species sightings. Results of this monitoring will be consolidated after six months and assessed by a PC-appointed ecologist to determine occupancy and whether further pest and predator management is required. The recommendation will be provided to Transgrid in the form of a report. Transgrid, in consultation with NPWS and/or FCNSW, will then advise if further monitoring is required.

6.2 Pest and Predator Monitoring

The monitoring of pest and predator activity will be undertaken by a suitably qualified ecologist(s). The proposed methodology for recording pest and predator monitoring is provided in Table 6-1.

Table 6-1 Pest and predator presence/absence monitoring

Objective
To determine pest and predator presence/absence within and surrounding (within a 50m buffer of) the Project area, document any changes arising from increased activity associated with the Project, and to inform the location and extent of controls in consultation with NPWS, FCNSW and Transgrid.
Sampling units
Remote camera monitoring within and adjacent to (within a 50m buffer of) the Project area, particularly construction compounds and the Switching Yard.
Method

Remote camera monitoring: • Cameras will be placed at each construction compound area, the Switching Yard and any other locations deemed to have high potential for pest/predator species • Cameras to be attached to a tree or stake and positioned approximately 1m above ground • The cameras are to be unbaited, as this is more suitable for long term monitoring • Cameras are placed out for one month (30 days) per monitoring period • Coordinates to be recorded at each camera location, in order to repeat the method during each subsequent monitoring event. • Field staff will also note secondary pest indicators such as scats, disturbance, nests and scavenging to be undertaken in the event of pest species sightings.
Location
• Adjacent to construction compounds and within a 50m buffer • Adjacent to Switching Yard and within a 50m buffer
Timing, effort and frequency
• A monitoring event is defined as one month (30 days) deployment of all camera traps as per the layout explained in methods • Frequency will comprise four monitoring events per year (or every three months), during construction, commencing in 2024. • Operational phase of development subject to consultation with subject matter experts in accordance with requirements from NPWS and DPHI.
Data analysis
• Data to be kept in a spreadsheet to determine presence/absence at monitoring locations between monitoring periods • Camera footage and data trends are to be analysed by a suitably qualified ecologist in order to determine occupancy.
Triggers for adaptive management
A recorded increase in abundance for a given species. Adaptive management measures will be determined in consultation with Transgrid, FCNSW and NPWS.

7 Reporting and Review

7.1 Reporting Schedule

As stated in the BMP, an annual report will be prepared to report on the variety of biodiversity matters addressed in the plan. This report, which will be made publicly available and issued to NPWS, FCNSW and Transgrid, will include the following matters of relevance to pest and predator management:

- Pest and predator monitoring results.
- Details on the pest and predator control actions undertaken since the last report including:
  - A list of the control activities undertaken.
  - A map of areas where control activities were undertaken.
- The efficacy of the control measures in relation to the objective of minimising pest distribution and/or abundance in the Project area.
- Recommendations for future control activities.
- A summary of the efficacy of other control measures outlined in this plan and recommendations for revisions to controls.

During construction and operation, any biosecurity issues will be reported to FCNSW and NPWS immediately.

7.2 Training

All site personnel will undergo site induction training. Training of relevance to biodiversity management is outlined in the BMP. Items of relevance to pest and predator management that will be covered in this training include:

- Identification of key pest and predator species
- Identification of secondary pest and predator species indicators, including scats, disturbance, nests and scavenging, where relevant
- Waste management.

7.3 Review and Improvement

This PPMP will undergo reviews, updates and continuous improvement as outlined in Section 7 of the BMP.

8 References

DAWE. (2008). *Threat Abatement Plan for Predation by European Red Fox* . Von Department of Agriculture, Water and the Environment: https://www.awe.gov.au/environment/biodiversity/threatened/publications/tap/predation- european-red-fox abgerufen

DPI. (2016). *Guidelines for the Preparation and Implementation of Wild Dog Management Plans in NSW.* Department of Primary Industry.

DPI. (2021). *Vertebrate Pesticide Manual.* Department of Primary Industries.

DPI. (2022). NSWDEER SOP1

https://www.dpi.nsw.gov.au/____data/assets/pdf_file/0006/1396761/NSWDEER-SOP1-Ground-shooting-of-feral-deer.pdf

DPE. (2010). *Australian Pest Animal Management Program: Improved Implementation of Regional Fox Management Programs .* Department of Industry and Environment.

DPE. (2021). *Feral Deer*. Von Department of Planning and Environment: https://www.environment.nsw.gov.au/topics/animals-and-plants/pest-animals-and-weeds/pest-animals/feral-deer abgerufen

DPE. (2021). *Wild Dog Policy*. Von Department of Planning, Industry and Environment: https://www.environment.nsw.gov.au/topics/parks-reserves-and-protected-areas/park-policies/wild-dogs#:~:text=NPWS%20aims%20to%20achieve%20effective,wild%20dogs%2C%20to%20allow%20dingoes abgerufen

DPE. (2021). *Wild Horse Management Plan: Kosciuszko National Park.*

EMM. (2019). *Biodiversity Management Plan Snowy 2.0 - Exploratory Works.* EMM Consulting. EMM. (2019). *Environmental Impact Statement: Snowy 2.0 Main Works EIS. Prepared for Snowy.*

EMM Consulting.

Jacobs. (Rev 7, Aug 2022). *Snowy 2.0 Transmission Connection Project - Biodiversity Development Assessment Report.* Jacobs Group (Australia) Pty Ltd.

LLS. (2018b) Riverina Regional Strategic Pest Animal Management Plan 2018-2023 .

LLS. (2018a) Murray Regional Strategic Pest Animal Management Plan 2018-2023.

NPWS. (2006). *Kosciuszko National Park - Plan of Management.* National Parks and Wildlife Service. PestSmart. (2014). *Wild dogs and transmission of Neospora caninum in Australia*. Von PestSmart:

https://pestsmart.org.au/case_studies/wild-dogs-and-transmission-of-neospora-caninum-in-australia/ abgerufen

PestSmart. (n.d.). *Model Code of Practice for the Humane Control of Foxes*. Von PestSmart: https://pestsmart.org.au/toolkit-resource/code-of-practice-fox/ abgerufen

PlantNET. (2022). Von National Herbarium of NSW: https://plantnet.rbgsyd.nsw.gov.au/ abgerufen Sharp. (2012). *Model code of practice for the humane control of feral cats. Code of Practice.* Von

PestSmart Website: https://pestsmart.org.au/toolkit-resource/code-of-practice-feral-cats abgerufen

Sharp. (2012). *The Model Code of Practice for the Human Control of Feral Pigs.* . Von PetSmart:

https://pestsmart.org.au/toolkit-resource/code-of-practice-feral-pigs/ abgerufen

Sharp. (2012). *The Model Code of Practice for the Humane Control of Feral Goats*. Von PestSmart: https://pestsmart.org.au/toolkit-resource/code-of-practice-feral-goats/#:~:text=Introduction,effective%20and%20efficacious%20techniques%20available. abgerufen

Sharp, T., & Saunders, G. (2012). *Code of Practice for the Humane Control of Rabbits.*

Sharp; Saunders. (2012). *Code of practice for the humane control of wild dogs. Model code of practice.* Von PestSmart Website: https://pestsmart.org.au/toolkit-resource/code-of-practice-wild- dogs/ abgerufen

APPENDIX A Other Pest Species Known to Occur In KNP, Bago State Forest And Surrounding Regions

Name	**Control Method** (OEH, 2012)	**Image** (Source: (DPI, 2021))
European Wasp *Vespula germanica*	Critical priority control programs for European wasps are centred around recreational or work locations in order to reduce the risk to human health. Control methods include: • Bait stations (containing fipronil) • Treatment of nests by a qualified pest control operator	
Feral Goat *Capra hircus*	Cooperative control programs are essential for the control of feral goats. Control methods include: • Aerial shooting • Opportunistic shooting / trapping Control methods will comply with NPWS standards, the NSW Vertebrate Pest Control Manual (DPI, 2021), the Feral Animal Aerial Shooting Team Guidelines and the Model Code of Practice for the Humane Control of Feral Goats (Sharp, 2012).	
Feral Pigs *Sus scrofa*	Cooperative control is essential for effective feral pig control across the landscape. Control methods include: • Aerial shooting • Opportunistic shooting / cage trapping • 1080 baiting Control methods will comply with NPWS standards, the Vertebrate Pest Control Manual (DPI, 2021), the Feral Animal Aerial Shooting Team Guidelines and the Model Code of Practice for the Humane Control of Feral Pigs (Sharp, 2012).	

APPENDIX B MONITORING TEMPLATE – PEST AND PREDATOR PRESENCE/ABSENCE MONITORING

Method:	Remote camera monitoring		**Timing:**	Quarterly
Date:		**Location:**	**Data Collectors:**	

# Camera	Coordinates		Time	Project Phase*	Species recorded	Presence/absence	Notable Features*
	East	North					

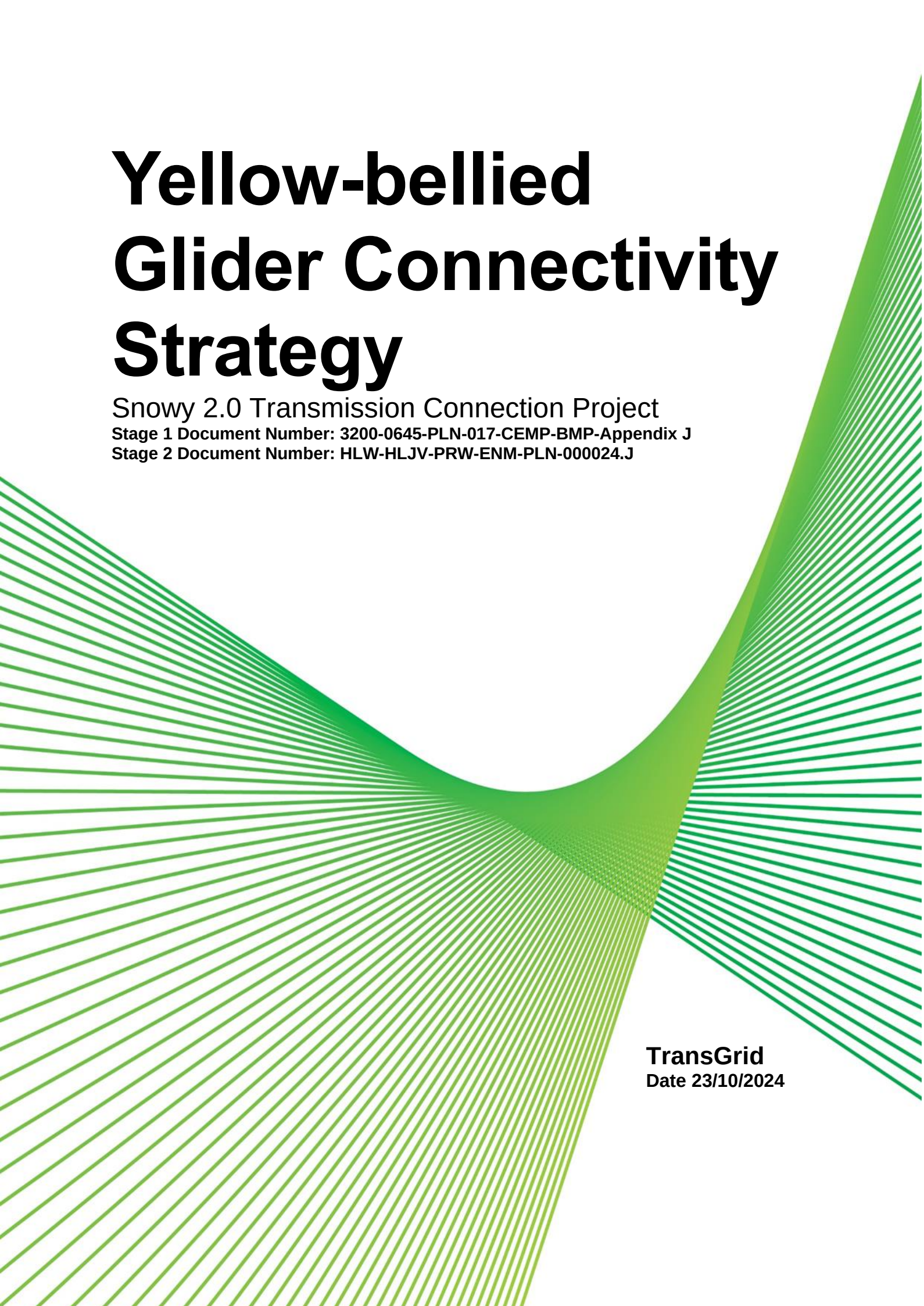
*Project Phase = Pre-construction, construction, post-construction, Notable features = significant increase in occurrence of feral herbivores observed, etc.

APPENDIX J Yellow Bellied Glider Connectivity Strategy

Yellow-bellied Glider Connectivity Strategy

Snowy 2.0 Transmission Connection Project

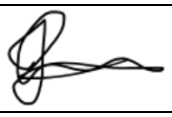
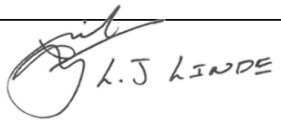
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TransGrid
Date 23/10/2024

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Yellow-bellied Glider Connectivity Strategy
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Dated	22/11/2024
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Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	01 Nov 2024

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Revision	Date	Description	Author	Reviewer	Approver
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0.02	04/05/2023	Addressing Transgrid comments	Jane Love Whitney Heiniger	Kim Lembke	Trevor Noble
0.03	7/09/2023	Addressing BCS comments	Jacqui Coughlan Whitney Heiniger	Kim Lembke	Tim McCarthy
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0.07	23/10/2024	Update to include Stage 2 works	Ian Irwin	Brendan Toohey	Louis Linde / Tim Burns

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The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website Snowy 2.0 Transmission Connection | Transgrid).

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Table of Contents

1 Introduction 7
1.1 Context 7
1.2 Purpose and Objectives 7
1.3 Consultation 7
1.3.1 Species Experts Consultation 7
1.3.2 BCS Consultation 8

2 Background and Impacts 9
2.1 Existing Environment 9
2.2 Yellow-bellied Glider 9
2.3 Yellow-bellied Glider Habitat Within the Project Site 10
2.4 Impacts on Yellow-bellied Glider 13
2.5 Clearing Protocol 13

3 Mitigation Measures 16
3.1 BDAR Mitigation Measures 16
3.2 Switching Station Fencing 16
3.3 Tower Anti-climb Deterrents 17
3.4 Nestbox Strategy 17
3.5 Arboreal Crossing Structures 18
3.6 Design Considerations 18
3.7 Glide Pole Locations 20
3.8 Limitations 26

4 Monitoring Program 27
4.1 Monitoring Requirements 27
4.2 Pre-construction Phase 27
4.2.1 Pre-clearing Monitoring and Baseline Data Collection 27
4.2.2 Translocation Plan 27
4.2.3 Immediately Prior to Construction 28
4.3 During Operation 28
4.4 Monitoring Summary 28
4.5 Adaptive Management 29
4.6 Reporting 29

References 30

List of Figures

Figure 2-1 Biodiversity values and Yellow-bellied Glider records in the approved Project footprint . 12
Figure 2-2 Native vegetation clearing zones (Jacobs 2022) 15
Figure 3-1 Example glider pole installation and composition (for reference only) (Source Goldingay et al. 2011) 22
Figure 3-2 Approximate location of proposed glider poles and crossing locations, noting exact locations to be determined on site - West 23
Figure 3-3 Approximate location of proposed glider poles and crossing locations, noting exact locations to be determined on site - Central 24
Figure 3-4 Approximate location of proposed glider poles and crossing locations, noting exact locations to be determined on site - East 25

List of Tables

Table 1-1 Summary of species expert consultation 7
Table 1-2 Summary of BCS consultation 8
Table 3-1 BDAR mitigation measures relevant to the Yellow-bellied Glider 16
Table 3-2 Glide performance of the Yellow-bellied Glider 19
Table 3-3 Parameters to be considered based on the installation of a 9 m pole 20
Table 3-4 Site arrays and recommended pole heights and quantities 21
Table 4-1 Summary of monitoring requirements to be undertaken during construction and operation activities 28

Acronyms and Abbreviations

Abbreviation	Explanation
BCS	NSW Biodiversity Conservation Division (formerly BCD)
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
CEMP	Construction Environmental Management Plan
COA	Condition of Approval
DBH	Diameter at breast height
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
EIS	Environmental Impact Statement
EP&A	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ha	hectare
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometres
KNP	Kosciuszko National Park
m	metre
PC	Principal Contractor or Contractor as defined in this management plan
PCT	Plant community type
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
NEM	National Electricity Market
NPWS	National Parks and Wildlife Services
NSW	New South Wales
YBG	Yellow-bellied Glider

1 Introduction

1.1 Context

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd, as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received development approval on 2 September 2022 to construct a switching station and overhead transmission lines ('the Project') to facilitate the connection of Snowy

2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW).

This Yellow-bellied Glider Connectivity Strategy forms part of the Biodiversity Management Plan (BMP) for the Project.

1.2 Purpose and Objectives

The aim of this connectivity strategy is to create and retain arboreal fauna connections over the gap created by the transmission line that will lower the potential for decreased genetic exchange within the Yellow-bellied Glider population. The scope of this strategy reflects the distribution of Yellow-bellied Gliders within the project area and responds to mitigation measures BIO27 and BIO29 of the BDAR.

The strategy's approach is to design the implementation of the mitigation measures to ensure the Yellow-bellied Glider's ongoing movement across the transmission easement, and to monitor the success of the strategy post construction. The strategy includes ongoing monitoring during the first five years of operation of the transmission line to monitor the success of the mitigation measures. The strategy includes ongoing consultation between PC, Transgrid and glider experts.

1.3 Consultation

This strategy has been developed following extensive literature review, consultation with glider experts Ross Goldingay and NSW Biodiversity Conservation Division (now BCS), and discussions during the site visit on 6th March 2023.

1.3.1 Species Experts Consultation

Consultation undertaken during the development of this connectivity strategy by engaging species experts is outlined in Table 1-1.

Table 1-1 Summary of species expert consultation

Date	Consultation undertaken	Outcomes
5/04/2023	Phone conversation between Jacqui Coughlan (JC) (Principal Ecologist) and Ross Goldingay (RG)	Clarification on key aspects of YBG glide ability and key glide parameters. Gliders are extremely difficult to trap. Best approach is to monitor glider poles with cameras.
20/04/2023	Emails between JC and RG.	Clarifying certain aspects of Glider ecology in relation to trapping, further advice on pole height.

Date	Consultation undertaken	Outcomes
27/7/2023	Phone call between Rohan Bilney and Jacqui Coughlan	Discussion regarding trapping of Gliders – confirmed that Gliders are extremely difficult to trap and methodology should be adjusted accordingly.
31/08/2023	Email discussions between Jacqui Coughlan and Andrew Weeks of EnviroDNA	Discussion regarding genetic diversity – confirmed that only 1-2 effective (breeding) immigrants required in each generation to homogenise genetic diversity. This is consistent with advice from Rohan Bilney and Ross Goldingay.

1.3.2 BCS Consultation

Consultation undertaken with BCS (formerly BCD) during the development of this connectivity strategy is outlined in Table 1-2.

Table 1-2 Summary of BCS consultation

Date	Consultation undertaken	Outcomes
08/02/2023	Meeting with BCS (and species specialists), NPWS, Transgrid and UGL, to work through BDAR mitigation measures. The objective was to ensure the BMP is based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and focuses on monitoring the performance of proposed measures and informing an adaptive management approach based on performance triggers for remedial action, or additional offsets where further impacts are identified.	Update BMP based on results of consultation. • Further discussion required with species expert of Yellow-bellied Glider and site inspection to develop strategy It was identified at this meeting that a number of BDAR mitigation measures were no longer required for the Project including: The placement of nest boxes as per BIO4 and BIO29
06/03/2023	Site inspection of the Project area with BCS, Yellow-bellied Glider species expert, Transgrid and UGL to discuss the Glider Connectivity Strategy	Update BMP based on site inspection and results of consultation.
03/08/2023	Workshop between BCS species experts, NGH, Transgrid and UGL to work through BCS feedback on the Strategy. The objective of this workshop was to both address BCS feedback and collaborate on the best methodology for monitoring Glider movement across the planned Project easement.	Update BMP based on results of consultation. During this workshop, preferred method of monitoring for genetic diversity was discussed, the preferred form of anti-climb deterrents to be installed was discussed and monitoring methodology was discussed.

2 Background and Impacts

2.1 Existing Environment

The majority of the Project Site (transmission line easement) is located within the Kosciuszko National Park (KNP) with the western most 1.2 km and the switching station located in the Bago State Forest. The approved transmission line route extends for approximately 9.4 km to the west from the main cable yard over Sheep Station Ridge and Talbingo Reservoir, where it then crosses Elliot Way and enters the Bago State Forest where it will connect to the approved new switching station. The site is characterised by montane vegetation on steep slopes with the forming of rocky outcrops. The majority of the surrounding bushland remains intact with minimal disturbance (Project alignment is shown in Figure 2-1).

This Connectivity Strategy relates only to the westernmost section of the transmission easement which starts west of the Tumut River, heading in a westerly direction for 3km to the switching station. According to the results of targeted surveys for the Yellow-bellied Glider (Jacobs 2022) this is the area the species was recorded. The previous surveys were completed in summer of 2018-2019 and winter of 2021. A species polygon for the Yellow-bellied Glider was developed from these surveys.

The vegetation within the project area is located in the South Eastern Highlands and Australian Alps Interim Biogeographic Regionalisation for Australia (IBRA) regions. The plant community types include:

- PCT 300 Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment
- PCT1196 Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion
- PCT 729 Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion
- PCT 285 Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion.

These forests contain tall Eucalypt trees with multiple hollows, or areas with younger trees yet to develop hollows. The glider array locations must consider the Yellow-bellied Glider habitat requirements of trees with hollows and where the species has been recorded.

2.2 Yellow-bellied Glider

The Yellow-bellied Glider is a large, active, sociable and vocal glider that relies on tall eucalypt forest habitat to allow it to glide from tree-to-tree whilst foraging (NSW Office of Environment & Heritage 2022). The gliders utilise hollows in large old trees (usually more than 1m diameter at breast height (DBH) for shelter and breeding (denning). Gliders have been recorded using nest boxes, but where hollows are not a limiting resource in the environment, they are unlikely to use them (Goldingay *pers. comm*.).

All studies of the Yellow-bellied Glider have found that groups occupy exclusive home ranges of approximately 30-65 ha, with little overlap occurring between adjacent groups, making home

ranges virtually exclusive to a family group (Goldingay and Kavanagh 1991). It is presumed that the Yellow- bellied Glider requires a large home range to ensure that a continuity of dispersal and variable food resources remains available throughout the year (Goldingay and Kavanagh 1991). Therefore, the home range of a family group is effectively a territory, and the loud vocalisations common to the species appear to advertise and maintain these territories (Goldingay 1994). Usually less than five den trees and less than 10 sap trees are utilised per social group per year with only two sap trees used at any one time (Goldingay and Quin 2004).

The distinctive V shaped incision created to extract sap from trees, as well as the regular loud vocalisations, are reliable indicators of the presence of Yellow-bellied Gliders. Owl call playback can elicit a call response from the gliders in reaction to the presence of a predator.

Estimates on the glide capability of Yellow-bellied Gliders vary (see below). This is likely because surveys and observations are undertaken within different forest canopy heights, and on different age and sized individuals. There is a risk that this information can be misinterpreted when assessing whether gliders can cross particular gaps and designing related mitigation structures.

- 120m - Kambouris *et al.* (citing Kavanagh 1990, 1993 and Goldingay)
- 140m - NSW Government July 2018
- 25.2m +/-1.5m; range of 19–45m Goldingay (2014)
- 144m – longest glide recorded (Ros Goldingay *pers. comm.*).

The population of Yellow-bellied Gliders within the project area are part of the Yellow-bellied Glider population on the Bago Plateau, which is listed as an endangered population under the BC Act. The population is disjunct owing to the region's steep valleys and terrain limiting suitable habitat surrounding the Bago Plateau. The Plateau is also surrounded by cleared agricultural land to the west and the Tumut River and Talbingo Reservoir to the east (NSW Office of Environment & Heritage 2022) which limits the population's ability to migrate out of the Plateau.

For the purposes of the Endangered population listing, the Bago Plateau population is defined as occurring above the 900 m asl elevation contour and north of a line coinciding with the southern boundary of Maragle State Forest. The *Petaurus australis* - endangered population (Yellow-bellied Glider population on the Bago Plateau) was recorded during the surveys within the Bago State Forest in the Australian Alps portion of the project area. Yellow-bellied Gliders were found within PCT 1196 and PCT 300 (Jacobs 2022). Kambouris *et al.* (2013) summarise the known and historical occurrence of the Yellow-bellied Glider on the Bago Plateau, including extensive survey conducted in 1995 and 2010. Kavanagh and Stanton (1998) also recorded the species at 33 sites on the Bago Plateau.

Yellow-bellied Gliders live in small social groups (2–6 individuals) that occupy exclusive territories of 25 to 84 hectares (ha) in New South Wales. As such, it is likely that the project area crosses through the territories of several social groups from the population. Yellow-bellied Glider records from the BDAR and BioNet are shown in Figure 2-1.

2.3 YELLOW-BELLIED GLIDER HABITAT WITHIN THE PROJECT SITE

The Yellow-bellied Glider requires the habitat to contain hollow bearing trees, and the hollows need to be >25cm in diameter (Jacobs 2022). The habitats within the project area in the South Eastern Highlands and Australian Alps Bioregions contain these features. An estimate of 296 HBTs was provided in the BDAR (Jacobs 2022).

Yellow-bellied gliders were detected during the targeted surveys for threatened arboreal mammal species, undertaken as a part of the BDAR between December 2018 and August 2021 (Jacobs 2022). The species was detected in the following PCTs (Jacobs 2022):

- PCT 300 – 5 occurrences (additional occurrence adjacent outside of the development footprint)
- PCT 1196 – 4 occurrences

Utilising the species occurrence locations and habitat requirements for the Yellow-bellied Glider, a species polygon was developed as part of the BDAR which includes PCT 285, 300, 729 and 1196 in the westernmost section of the transmission easement.

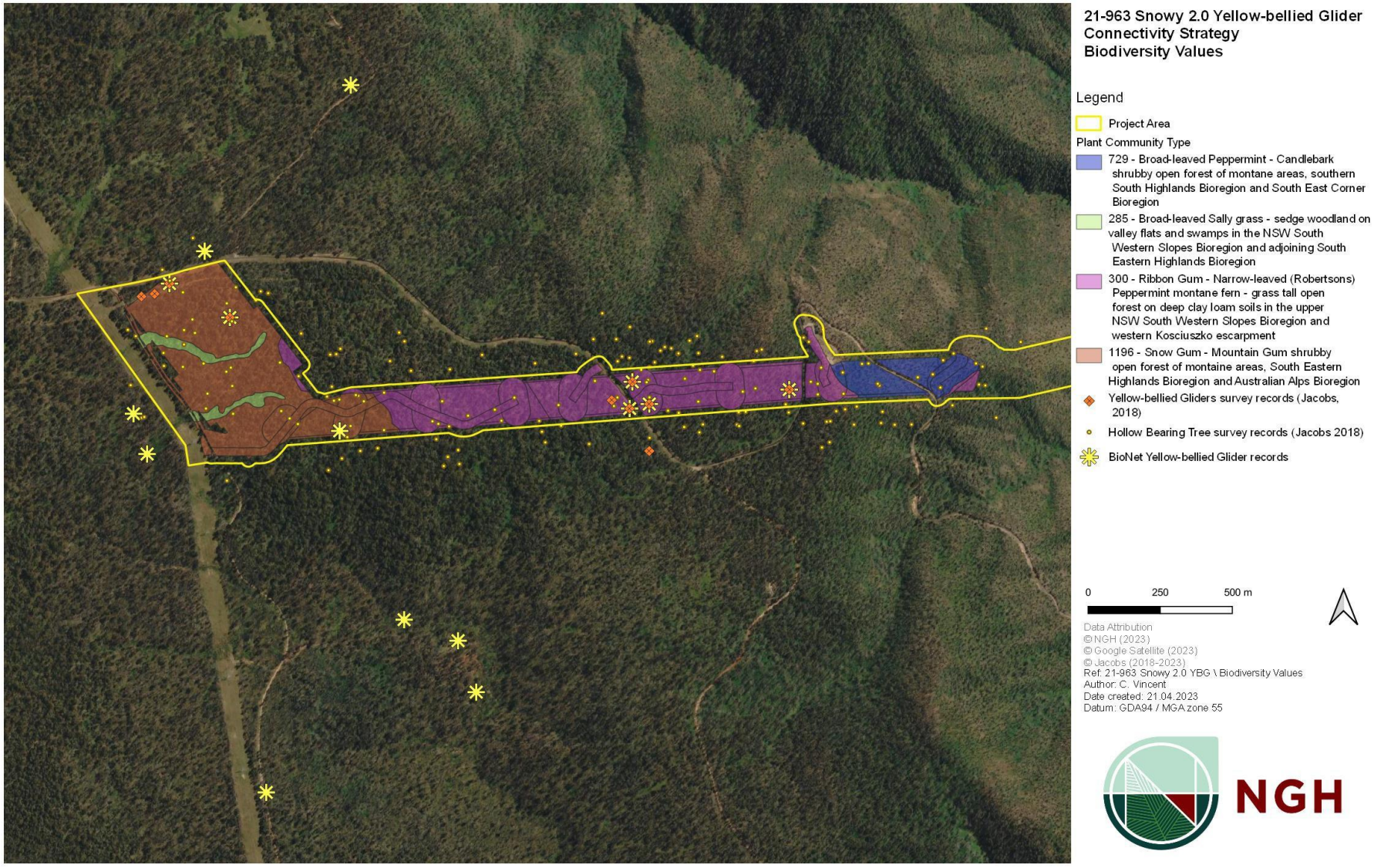


Figure 2-1 Biodiversity values and Yellow-bellied Glider records in the approved Project footprint

2.4 Impacts on Yellow-Bellied Glider

The project will involve the loss of 59.03 ha of habitat within the disturbance area for the Yellow-bellied Glider (*Petaurus australis*) which belong to the Yellow-bellied Glider population on the Bago Plateau, a listed endangered population (Jacobs 2022) and will require the removal of hollow-bearing trees that have been indicated as potential den trees for this species.

The native vegetation clearing required for the transmission line easement is anticipated to create a barrier to movement for arboreal mammals, in particular the Yellow-bellied Glider. The transmission line runs east-west and so will create a 120m wide barrier to north-south movement. This barrier to movement could result in the fragmentation of habitat for the Yellow-bellied Glider population. Restriction of movement will result in reduced genetic exchange at the population level which in the long term may result in reduced genetic variability and increased risk of extinction of the subdivided population. This is of particular concern since the Yellow-bellied Glider population of the Bago Plateau is already listed as endangered, due to its isolation and occurrence at the edge of the species range (Bilney 2022).

Furthermore, the electrical switching station will require complete clearing of vegetation and security fencing around the switching station where Yellow-bellied Gliders are known to occur. The switching station footprint is 230m wide by 530m long. The Asset Protection Zone (APZ) will clear mid and upper storey vegetation for a length of 80-100m wide around the switching station. The clearing of upper storey vegetation will limit the Yellow-bellied Gliders ability to glide into the switching station grounds, however the switching station will require security fencing around its perimeter, which Transgrid have advised must be barbed wire. Yellow-bellied Gliders were recorded within the proposed switching station footprint in the Jacobs (2018) targeted surveys. As such, this connectivity strategy considers the proposal for barbed wire strands on switching station fencing and impacts on the species during clearing of vegetation as well as post construction.

2.5 Clearing Protocol

The BDAR (Jacobs 2022) allocated five distinct clearing zones across the Project's disturbance zones (Figure 2-2). An additional Hazard Tree Zone was also developed to minimise bushfire risk from fallen trees / branches on the live asset. Each of these zones was attributed specific clearing requirements in order to minimise either indirect or direct impacts to surrounding vegetation and habitat as a result of the clearing. These zones are summarised below:

Transmission Structure Zone (TSZ): complete vegetation clearing (clearing to bare earth). The TSZ will comprise an assumed 50 metre radius surrounding each individual transmission structure along the extent of the transmission line connection.

Access Track Zone (ATZ); this area is the corridor that would be cleared to make access tracks to the transmission structure locations. A maximum (worst case) 30 metre width has been assumed, including the required cuts / fill along the steep sections of the access track route.

Maragle Substation Zone (SZ): this zone will be cleared and permanently modified by surface hardenings (concrete, bitumen, crushed rock / similar, built structures etc) to support construction and installation of the 500/330 kV switchyard and 500 kV substation (Maragle Substation). This area incorporates the Maragle Substation access road and Asset Protection Zone.

Easement Clearing Zone (ECZ): tall growing vegetation within 3m of the overhead conductors plus a regrowth allowance over a given maintenance and inspection cycle. To minimise impacts on biodiversity and ground stability within this zone, ground cover vegetation would be retained, with partial midstory removal required along with complete removal of the canopy layer (as per Transgrid's Maintenance Plan – Easement and Access Tracks, December 2020).

Hand Clearing Zone (HCZ): this zone is defined sections of the ECZ (described above) that are not safely or practically accessible for machine clearing during construction. The removal / management of vegetation will be undertaken by hand clearing / felling.

Off Easement Hazard Tree Zone (HTZ): areas external to the ECZ which contain trees of a sufficient height which, if they were to fall, would strike the overhead conductors or the transmission structures (referred to as Hazard Trees). Hazard trees pose a considerable bushfire risk and risk to the asset, therefore require management and / or removal as part of the initial construction of the line and during ongoing operation.

Partial clearing will occur in areas that are safe to retain low growing vegetation within the operational limits of the asset. This includes large sections of the project area (see Figure 2-2). The resulting modified vegetation will be maintained in this state for the life of the project, thereby retaining some of the original biodiversity values in the lower stratum and preserving the surface soil structure.

Access Track Zone (ATZ):

Vegetation clearing for the access tracks will utilise similar methods as for the TSZ. Construction of the access tracks would be staged to progressively complete discrete sections of track and install required erosion and sediment controls and utilise mulch to stabilise batter slopes and other non-operational areas, pending permanent rehabilitation / revegetation of these areas.

Manual felling of trees may be carried out in the steeper sections of the access track route, where the safety risks associated with using machines is too high. Whilst a 30 metre wide fully cleared corridor has been assumed, this is the worst-case disturbance to construct the tracks. The 'as built' access track width would be 4 m to bare earth i.e. trafficable surface (minimum) with 1-2 m either side cleared to facilitate safe access /egress.

As such, the areas external to the operational access tracks including the batters would be stabilised and revegetated in accordance with an approved Rehabilitation Plan.

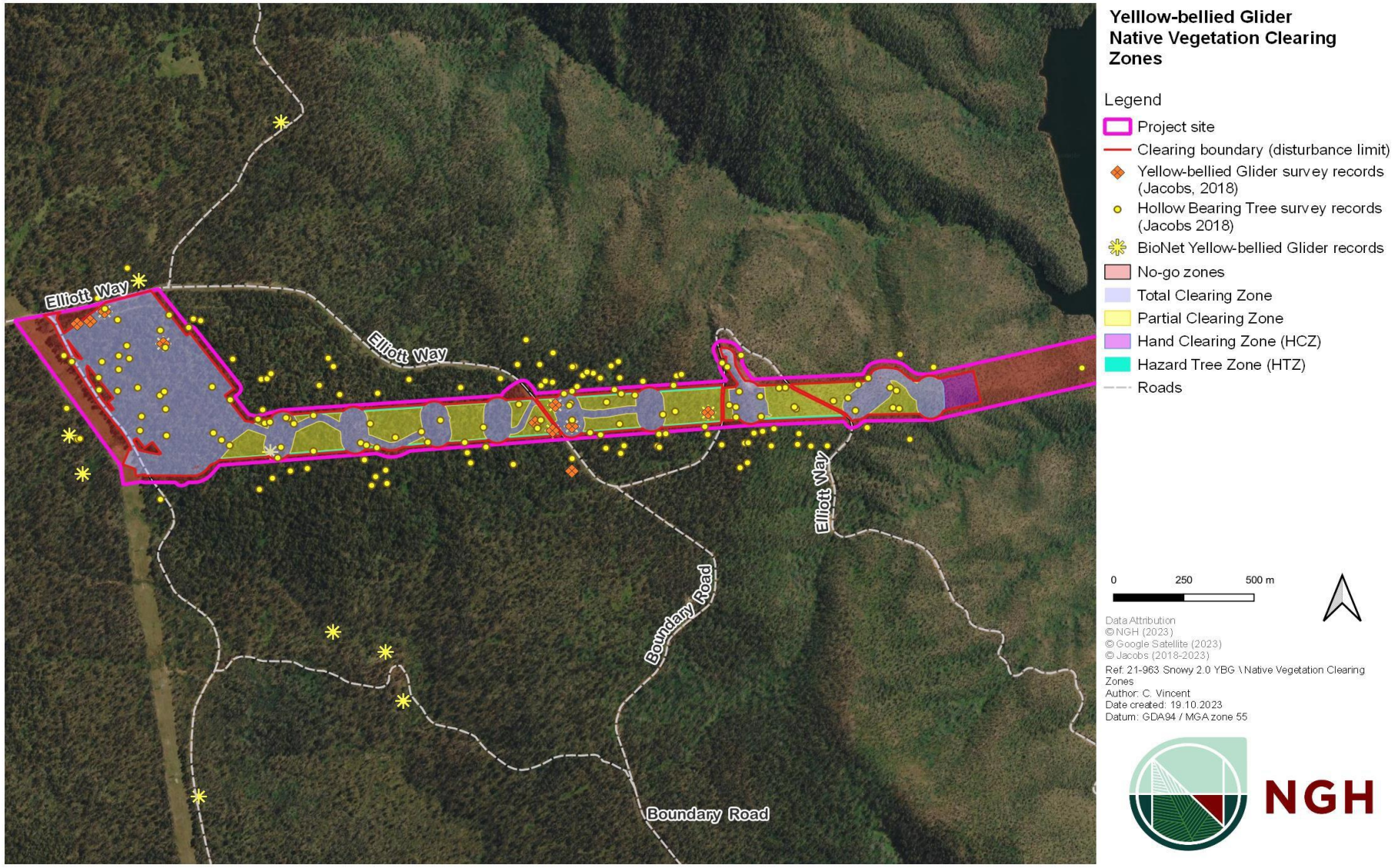


Figure 2-2 Native vegetation clearing zones (Jacobs 2022)

3 Mitigation Measures

3.1 BDAR Mitigation Measures

This strategy must address the requirements of the mitigation measures in the BMP. The relevant mitigation measures are BIO27 and BIO 29 outlined in Table 3-1.

Table 3-1 BDAR mitigation measures relevant to the Yellow-bellied Glider

Reference number	Requirement	Document reference
BDAR Mitigation measures		
BIO27	The barbed wire/razor wire fencing installed around the substation switchyard will have improved visibility measures installed, such as adding visible objects to the fence, for example metal tags, tapping or cloth material on the existing barb wire to increase visibility and act as a deterrence technique for in flight fauna.	Section 3.2
BIO29	A number of measures to mitigate and monitor the impact of the project on Yellow-bellied Glider during construction and operation of the project are required and include: • A targeted connectivity strategy • The provision of arboreal crossing structures • Targeted surveys of Yellow-bellied Glider to refine crossing structures • Nest box strategy • A staged habitat removal process consistent with Action BIO4 and the Biodiversity Management Plan • The minimum design and locations of crossing structures for Yellow-bellied Glider will be based on the process for managing connectivity requirements described in a Yellow-bellied Glider Connectivity Strategy • Implementation of a comprehensive monitoring program before, during and after construction with performance targets and adaptive management actions • The proposed approach to management of potential impacts to the Yellow- bellied Glider population throughout the pre-construction, construction and operational will be documented in the Biodiversity Management Plan.	This plan Section 3.5 Section 4.2.1 Section 3.4 Section 2.5 Section 3.7 Section 4 Section 3

3.2 Switching Station Fencing

The installation of barbed wire along the top strands of the security fence could pose a significant threat to any arboreal mammals that may be caught and become entangled. Barbed wire can tear the patagium (gliding membrane) so even if the animal survives, its ability to glide, and thus forage, may be adversely impacted. Although the Asset Protection Zone will clear trees and shrubs around the switching station, there is a risk for Yellow-bellied Gliders to become entangled on the barbed wire when gliding in the vicinity of the switching station.

However Transgrid have advised that:

- The alternatively proposed electric topping system has a high failure rate mainly due to poor reliability of pulse generators and electrical cable degradation. This data is based on historical deployments of electrical topping.
- Inoperability and high defect rates of the electric topping reduces its effectiveness as an intruder deterrence measure and is no longer deployed in our network.
- Transgrid must comply with the Security of Critical Infrastructure (SOCI) Act which aims to strengthen the security and resilience of our assets.
- Maragle Substation (as well as other substations associated with the Snowy 2.0 project) has been assessed as a high criticality site and therefore require the highest level of security measure to safeguard the operation of the site. An intruder gaining unauthorised access has the potential of interfering with the operation of the electricity network and cause widespread, state- wide impact.
- The Work Health and Safety (WHS) Regulation 2011 considers Transgrid as a PCBU (person conducting a business or undertaking) and imposes multiple obligations on it to manage risk to the health and safety of workers as well as members of the public. Ineffective security measures could result in unauthorised access to our high voltage assets which can lead to significant personal injury.

Mitigation measure BIO27 refers to the barbed wire / razor wire fencing to be installed around the Maragle Substation as part of the security perimeter fencing. Mitigation measure BIO27 requires *'improved visibility measures installed, such as adding visible objects to the fence, for example metal tags, tapping or cloth material on the existing barb wire to increase visibility and act as a deterrence technique for in flight fauna.'* Any visibility measures will be assessed by Transgrid for suitability in consultation with an ecologist to determine efficacy, as required.

Transgrid's Standards and Compliance team will continue to assess alternative options to barbed wire during the construction phase of the development. Any alternative options which may pose viable to mitigate potential entanglement impacts, including umbrella fencing above barbed wire suggested by BCS, subject to the outcome of monitoring activities, will be provided to BCS for further consultation prior to implementation and other stakeholders as necessary in accordance with the Conditions of Consent.

3.3 Tower Anti-climb Deterrents

Transgrid are committed to installing fauna-friendly anti-climb deterrents on towers installed as part of the development. At the time of Plan development, this fauna-friendly design will involve the use of grid mesh material to deter members of the public from climbing towers, however modification to the specific fauna-friendly design may be made in consultation with BCS during Project construction.

3.4 Nestbox Strategy

Based on consultation with BCS and species experts during a consultation meeting on 8th April 2023, there is no further requirement for a nest box strategy as part of BIO29. This is because:

Whilst Yellow-bellied Gliders do use nest boxes, they are unlikely to if hollows are not a limiting resource in the landscape (Ross Goldingay *pers. Comm*.).

- Multiple hollows are available in in Kosciuszko National Park and Bago State Forest so it is unlikely nest box uptake will be successful.

3.5 Arboreal Crossing Structures

The primary mitigation measure to be implemented for the Yellow-bellied Glider, is the use of glide poles to facilitate crossings of the gap created by the transmission line corridor.

There are numerous Australian examples in the literature of gliders, including Yellow-bellied Gliders, using glide poles. However, there are no examples of gliders crossing a gap as large as 120m, which would be required in this case. For this reason, it is important that a baseline of data is established, and monitoring is implemented for a minimum of five years to assess the efficacy of the glide poles.

Successful crossings are necessary to maintain gene flow within the metapopulation and avoid the reduction in genetic variability and heightened risk of extinction that comes with fragmentation and barrier effects. Cameras mounted on the glide poles will provide information on the frequency of completed crossings.

The hypothesis being tested is that the barrier to movement posed by the cleared transmission line corridor is mitigated by the placement of glide poles and animals captured on one side of the corridor, will be detected on the other side.

The proposed survey design and monitoring strategy is outlined in the following sections.

3.6 Design Considerations

The glide ability of the Yellow-bellied Glider, along with other species-specific behavioural considerations, need to be taken into account when designing these crossings.

Yellow-bellied Gliders maintain family groups within exclusive territories of 30 – 65ha (Goldingay and Kavanagh 1991). Family groups den in hollows. Home range size depends on resource availability – specifically preferred feed trees and availability of denning hollows. Individuals are unlikely to need to disperse if sufficient denning (hollow bearing trees) and foraging (sap trees) habitat is available. At Bago, foraging resources and hollows are not a limiting resource (Kambouris *et al.* 2013).

Therefore, it is subadult males that are the most likely to be dispersing to establish new home ranges and need to cross gaps in the landscape (Goldingay *pers. Comm.*). This needs to be considered when using glide distance to inform crossing design, in particular, distance between poles. Maximum recorded or known glide distance should not be used, as it is unlikely to be achievable on all glide / crossing attempts, and even less likely to be achievable by the smaller body sized subadults (than the adults that published glide distances are possibly based on).

For Yellow-bellied Gliders the evidence for pole use outweighs that for rope bridges (Ross Goldingay*pers. Comm*.), and subsequently the use of rope bridges is not recommended.

Goldingay (2014) described aspects of the glide performance of the Yellow-bellied Glider based on 22 glides of 17 individuals within 20–30m high open forest in western Victoria. The results are presented in Table 3-2. These values are similar to those reported for other gliding petaurids in low canopy forest.

Table 3-2 Glide performance of the Yellow-bellied Glider

Glide parameter	Glide measures
Mean horizontal glide distance	25.2 +/-1.5m (s.e.)
Range of glide distances	19 – 45m
Glide ratio (horizontal distance/ height dropped)	2.0
Glide angle	27.3
Landing height above ground on the trunks of trees.	5.8m
Launch height	On average, 2.8m below the top of a tree, from a horizontal branch 18.5m above the ground. 5.2m out from the main trunk.

The glide ratio shows that a Yellow-bellied Glider can travel 2m for every metre of descent for a given height of pole or tree. However, gliders do not land on the ground so the height of landing must be subtracted from the possible glide distance achievable based on just the height of the pole. So, if a glider launched from the top of a 9m pole to land at the bottom of the next pole it could glide a distance of approximately 18m. However, gliders are known to land approximately 4-5m above ground (Goldingay *pers comm*, Goldingay 2014, Jackson 1999) so at maximum can achieve a glide of 10m. For this reason, a large number of poles would be required to bridge the transmission line gap.

Based on a launch height of 8m, and a landing height of approximately 4 to 5m above ground, pole placing will need to be no more than 10m apart (Table 3-3). There are no examples in the literature of a gap this wide being bridged by glide poles, nor that many poles being used by a glider to cross a gap. The expanse of open ground along with potential wind effects may deter gliders from using the poles. As such, the use of the glide poles by the gliders is not guaranteed, and the monitoring program defined in Section 4, will help determine the efficacy of the arrays.

Regarding glide pole arrays intersecting access tracks, clearing to a width of 25m may occur, however discussions with PC have determined that a minimum gap of 8-10m is required for vehicle traversability. This suggests glide pole spacing can be accommodated, however in the event that site constraints determine otherwise, advice from BCS will be sought as to whether moving the array, or applying a rope bridge, for use in conjunction with poles, is the preferred option. It is also recommended that on site ecology support be engaged at the time of glide pole application such that the installation process is professionally supported.

The proposed location of crossings has been chosen following an assessment of the above factors in combination with locations of Yellow-bellied Glider records.

The height of trees at the edges of the easement will allow a greater glide distance to be achieved from forest edge to first pole but will need to be determined with detailed field measurements at the proposed crossing locations, and conversely, crossing locations may need to be adjusted to better align with the location of taller trees to maximise the gap that can be crossed, and thereby minimise the number of poles required.

Table 3-3 Parameters to be considered based on the installation of a 9 m pole

Consideration	Height	Notes
Height of glide pole	9m	9m maximum pole height specified by Transgrid
Height of launch	8m	Launch pad is 1 m below top of pole
Height of landing	4-5m above ground	Based on literature and Ross Goldingay *pers. Comm.*
Approximate glide distance achievable.	10m	Poles to be placed no more than 10m apart. Downhill slope required*

*Note: Pole spacing next to the high side vegetation can be greater if the adjacent vegetation is 9m+.

3.7 Glide Pole Locations

Preliminary glide pole locations have been suggested based on criteria listed below. The number of poles required to bridge the crossing is dependent on the height of the poles which is in turn dependent on both the topography at the crossing location and the allowable height in relation to the low sway height of the wires.

Glider pole location criteria include the following parameters:

- Evidence of gliders prior to clearing at these locations
- Sufficient adjoining glider habitat in near proximity to the crossing points
- Statistics on glide angles, distances, heights
- Areas where glider records / detections occur
- Zig zag / offset pole placement not considered a particular advantage, but may facilitate placement in uneven topography at crossing point, to maximise launch heights
- Being located outside tower pad clear zones, and within ECZ zones, crossing ATZ
- Avoiding the low sway areas
- Slope and aspect. Note that gliders can only glide downslope
- Avoiding the switching station area (to minimise collision with security fencing)
- Height of trees to adjacent vegetation should be maximised, and taken into account when choosing location of the first pole in each array.
- Pole locations may be selected to fill in gaps across the easement, such as creeks and roads.
- Glide poles need to be located along the easement where the pole height is suitable for the species to reach the other side. i.e. Ability to glide to the next pole and launch from a suitable height.

Additional requirements include:

- Launch pad to be located 1m below top of pole

- Pole heights to be maximised such that number of poles required can be minimised, but not to the extent where it prohibits usage
- Launch apparatus should be a cross configuration (North South / East West orientation) to provide Yellow-bellied Glider options for launch direction.
- Motion detect cameras to be installed on top of selected poles to monitor / confirm glider traversability.
- Suggested glider pole locations on site are included in Figure 3-2, Figure 3-3, Figure 3-4 and an example of a glider pole setup has been provided in Figure 3-1.

A summary of the height and number of poles at each suggested array location is provided below.

Table 3-4 Site arrays and recommended pole heights and quantities

Array	Recommended pole height (m)	Number of poles	Glide direction
1	9	14	N – S
2	12	10	N – S
3	Unsuitable		
4	9	16	S – N
5	12	11	N – S
6	9	16	S – N
7	20	5	S – N
8	9	22	N – S

Suggested location 3 could not accommodate a pole due the low sway of wires at that location. Micro- siting of poles will need to be finalised on site with the assistance of ecologists and site construction personnel.



Figure 3-1 Example glider pole installation and composition (for reference only) (Source Goldingay et al. 2011)

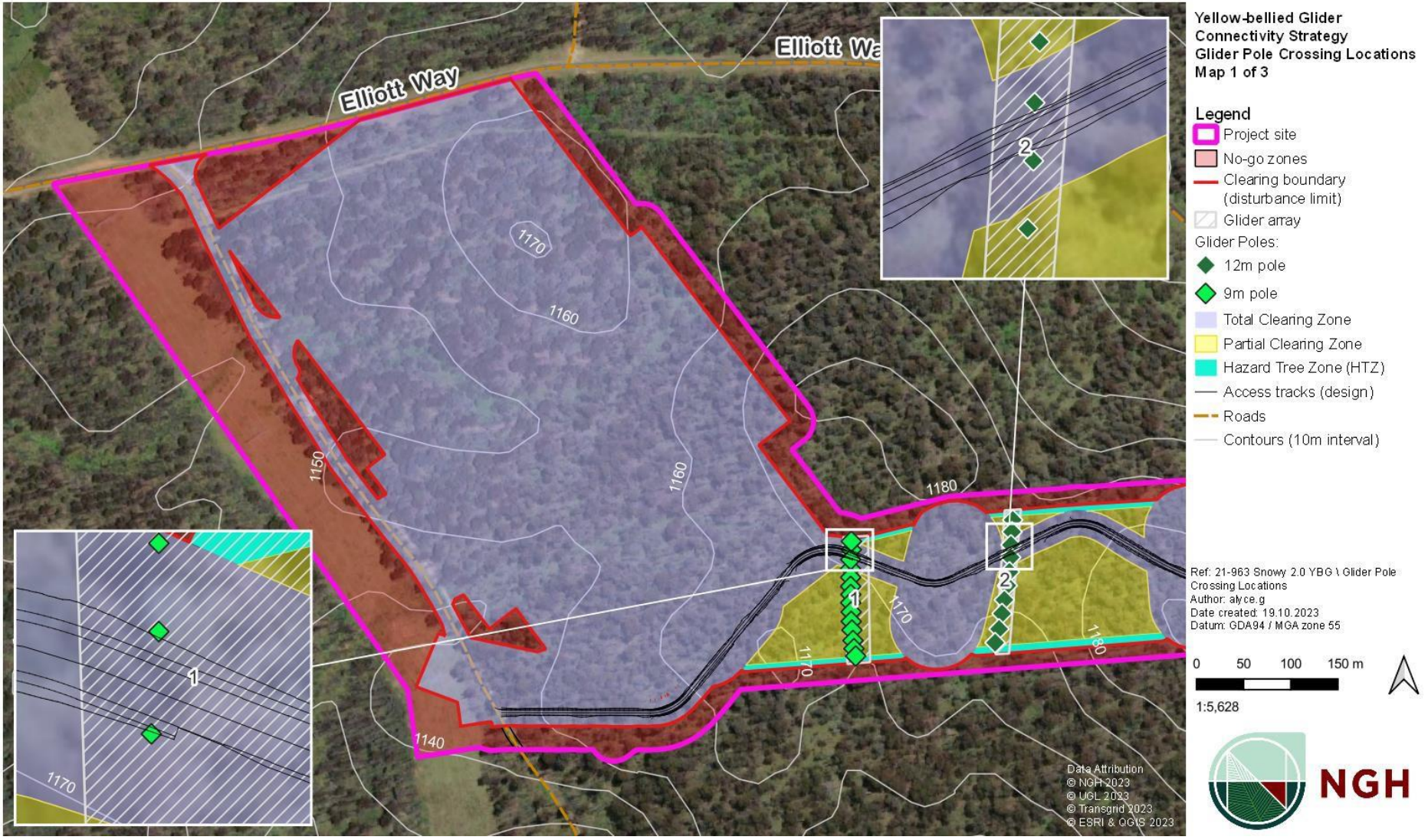


Figure 3-2 Approximate location of proposed glider poles and crossing locations, noting exact locations to be determined on site - West

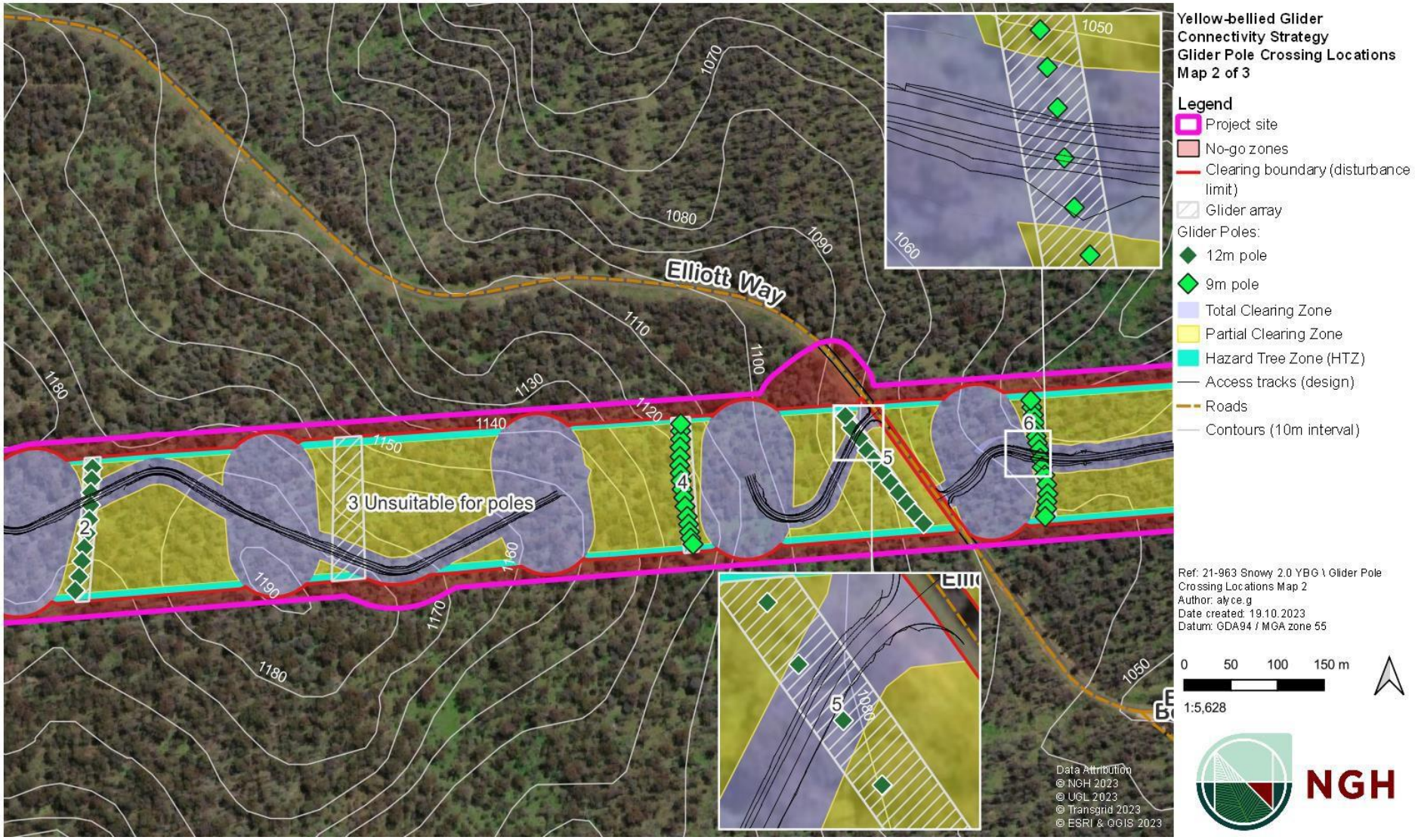


Figure 3-3 Approximate location of proposed glider poles and crossing locations, noting exact locations to be determined on site - Central

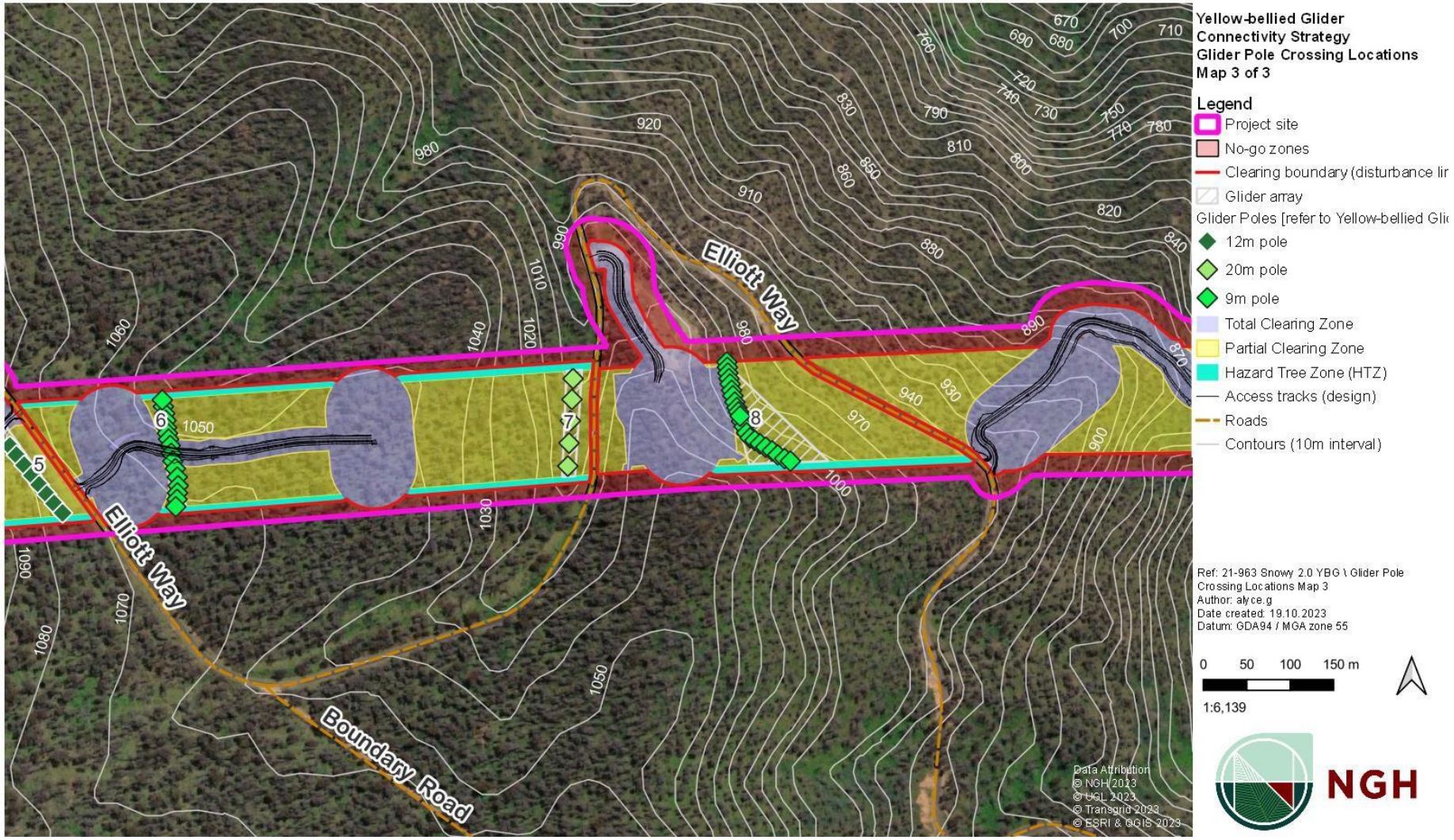


Figure 3-4 Approximate location of proposed glider poles and crossing locations, noting exact locations to be determined on site - East

3.8 Limitations

It is highly possible that Yellow-bellied Gliders will be reluctant to cross such a large gap, even if they have the ability to do so with the assistance of the poles. The effect of wind in the exposed corridor may impact the ability and motivation to cross the gap using multiple poles. Jackson (2000) noted that in windy conditions the Mahogany Glider (smaller than the Yellow-bellied Glider at 360–410g), clearly found it more difficult to glide and is much more hesitant in windy conditions. Hence the reason for monitoring array usage, detailed in section 4.0 below.

As discussed on site during BCS consultation in March 2023, the potential implementation of a pilot program was considered to determine the efficacy of glider poles in this location prior to site-wide installation. It has been determined that it is not feasible to establish a pilot program to test the efficacy of the approach described in this Strategy. Yellow -bellied Gliders (and the similar Mahogany Glider) use poles to cross gaps – there are numerous examples in the literature (Asari *et al*. 2010, Goldingay *et al.* 2011) – but it is not possible to create a gap that reflects the proposed transmission line corridor in order to test whether Yellow-bellied Gliders on the Bago Plateau will use multiple poles to cross a large gap. For this reason, as discussed with BCS species experts during consultation on 03/08/2023, a pilot program will not be employed on this Project site.

4 Monitoring Program

4.1 Monitoring Requirements

Monitoring must be conducted three times annually for five years (5) years following pole installation or until the poles have been deemed either successful, or unsuccessful, in which case translocations would be deemed necessary. If translocations are conducted a separate monitoring program will be devised to track translocated individuals. The success of the poles will be determined by the Project Ecologist in consultation with BCS.

Monitoring will involve the use of pole mounted cameras to ascertain the movement of individuals and identify any successful crossings. To monitor any potential crossings within uncleared areas adjacent to the Tumut River, song meters will be deployed during monitoring events once poles have been installed. Successful glider movement may occur here instead of on pole arrays which may eliminate the need for translocations.

The primary purpose of the monitoring program is to determine whether the glide poles are working as intended to facilitate YBG crossings from one side of the transmission line easement to the other. If successful crossings by several individuals per year are recorded, then it can be inferred that the transmission line is not acting as a barrier to genetic exchange (Goldingay *pers. comm.*).

4.2 Pre-construction Phase

Details of the vegetation clearing process are provided in the Biodiversity Management Plan Appendix B – Clearing Procedure.

4.2.1 Pre-clearing Monitoring and Baseline Data Collection

During the pre-construction phase, a range of techniques will be used in combination to build a baseline dataset on the Yellow-bellied Glider population against which to assess movements, and use of the glider poles post construction.

The following techniques may be used in combination to locate and track individuals during both the pre-construction and construction phases of the Project:

- deploy song meters to assist in locating family groups
- assess level of occupancy in areas adjacent to the route to identify release locations
- identify den trees – GPS locate all den trees within the transmission line corridor to inform the pre-clearing process
- install glider poles with motion detect cameras mounted
- den trees and sap trees will need to be identified on construction planning maps and should be specified in the CEMP and BMP (Action ID BIO4, BDAR Table 11-1).

4.2.2 Translocation Plan

A Translocation Plan will be required to address the translocation of individuals that will be required during clearing. If glide poles are not found to be effective, translocation of individuals will be required post-construction. Transgrid will update the Translocation Plan, in consultation with BCS, if this was to occur.

The Plan will draw on information of group home ranges gathered during pre-construction monitoring and will identify locations for translocating individuals during pre-clearing. The Plan

will be prepared by a Project-appointed ecologist with relevant glider experience.

4.2.3 Immediately Prior to Construction

Prior to the commencement of ground disturbing activities, pre-clearance surveys will be undertaken in accordance with the BMP. Any Yellow-bellied Gliders requiring translocation will be translocated to locations identified during the development of the Translocation Plan.

Any animals relocated will be assessed for opportunistic genetic material collection through sampling of an ear snip, scat or hair and released where appropriate.

4.3 During Operation

Monitoring will continue for a period of five years following cessation of construction through the use of pole-mounted camera footage. Song meters will also be used to confirm the continued occupation of areas occupied prior to construction.

The ability to identify the number of individuals crossing, rather than a number of crossings, will give an indication as to the functional connection the poles are providing. This will then provide information as to whether genetic exchange is occurring, and whether the risk of genetic isolation has been mitigated.

Glider DNA material will not be collected unless camera data shows that full crossings of the corridor are not being made. Consultation with YBG experts Rohan Bilney and Ross Goldingay and genetics expert Andrew Weeks of EnviroDNA confirmed that only one or two effective (breeding) immigrants are needed per generation to homogenise genetic diversity.

A program of genetic sampling will be designed in consultation with BCS should there be no evidence of successful crossings following the poles and cameras being in place for 6 months.

4.4 Monitoring Summary

A summary of monitoring actions to be undertaken during construction activities is provided in Table 4-1.

Table 4-1 Summary of monitoring requirements to be undertaken during construction and operation activities

Method	Timing and duration	Location	Purpose
Stag watch	Prior to site establishment or any vegetation removal	In and within 200m of corridor	Identify den trees and overall occupancy
Identify active feed trees	Preconstruction phase	In and within 200m of corridor	Identify likely locations for monitoring and genetic sampling
Cameras	Once poles are installed	On a minimum of three (3) poles per crossing point / array.	Detect successful crossings
Mortality recording	Ongoing	Switching station; and Corridor during and corridor post construction. During all vegetation removal	Provide evidence of predation in corridor, failures to cross, fencing related mortalities.

Monitoring of the perimeter fence and the switching station should be part of the post-construction monitoring for Yellow-bellied Gliders to ensure the preferred fencing mitigation measure outlined in Section 3.2 is effective. The trigger for seeking alternative mitigation measures will be individuals found in the switching station area or individuals impaled on the security fence. The Asset Protection Zone clearing of canopy trees and shrubs for 80-100 metres from the switching station fence should reduce the risk of individuals gliding into the security fence and relocation of individuals during vegetation clearance and not installing any glider poles in the area reduces the risk of Yellow-bellied Glider being impaled on the security fence. Additionally, visible markers, including metal tags, will be installed on the switching station fence to reduce the possibility of collision.

Monitoring needs to be conducted daily, preferably in the early morning so that any injured animals can be rescued with minimum delay.

4.5 Adaptive Management

If there is no indication of successful crossings after 6 months (from camera data) then animals may need to be translocated (Goldingay *pers. comm*., Goldingay and Kavanagh 1991) and a Translocation Plan may be required as per Section 4.2.2.

If fauna entanglement on the barbed wire at the switching station is observed, Transgrid will consult with BCS to determine appropriate mitigation measures to be employed.

4.6 Reporting

During construction, monitoring data will be provided to Transgrid as part of regular environmental reports. Monitoring data (including raw data) will be provided to NPWS and BCS by Transgrid as part of annual reporting. Reports will be compiled by Project engaged ecologists that outline the following:

- Results of monitoring
- Assessment of the overall success of the mitigation measures installed
- Identification of gaps or limitations to the biodiversity monitoring methodology. This includes monitoring components, method of data collection (frequency and location), method of data, analysis and reporting requirements.
- Provision of recommendations for adjustments to monitoring techniques, timing and locations.

References

Asari Y, Johnson CN, Parsons M and Larson J (2010). Gap-crossing in fragmented habitats by Mahogany Gliders (*Petaurus gracilis*). Do they cross roads and powerline corridors? *Australian Mammalogy* 32:10-15.

Bilney R, Kambouris PJ, Peterie J, Dunne C, Makeham K, Kavanagh R, Gonsalves L and Law B (2022). Long term monitoring of an endangered population of Yellow -bellied Glider *Petaurus australis* on the Bago Plateau, New South Sales, and its response to wildfires and timber harvesting. *Australian Zoologist* 42(2).

Goldingay RL and Kavanagh RP (1991). The Yellow-bellied Glider: a review of its ecology, and management considerations. Pp. 365 to 375 *in* Conservation of Australia's Forest Fauna ed Daniel Lunney. Royal Zoological Society of NSW.

Goldingay RL and Quin D (2004). Components of the habitat of the Yellow-bellied Glider in north Queensland. pp 369 -375 *in* The Biology of Australian Possums and Gliders. (Eds. RL Goldingay and SM Jackson.) Surrey Beatty and Sons, Sydney.

Goldingay, R. L. (2014). Gliding performance in the yellow-bellied glider in low-canopy forest. *Australian Mammalogy* 36(2), 254-258.

Goldingay R L., Taylor B. D., & Parkyn J. L (2019). Use of tall wooden poles by four species of gliding mammal provides further proof of concept for habitat restoration. *Australian Mammalogy*, 41, 255-261.

Goldingay RL, Taylor, BD and Ball T (2011). Wooden poles can provide habitat connectivity for a gliding mammal. *Australian Mammalogy* 33:36-43.

Jackson, S.J. (2000). Glide angle in the genus *Petaurus* and a review of gliding in mammals. *Mammal Review*. Volume 30, 9–30.

Jacobs (2022). Appendix C Biodiversity Development Assessment Report Revision 7. Snowy2.0 Transmission Connection Project. Report prepared for Transgrid.

Kambouris PJ, Kavanagh RP and Rowley KA (2013). Distribution, habitat preferences and management of the Yellow-bellied Glider, *Petaurus australis* on the Bago Plateau, New South Wales: a reassessment of the population and its status. *Wildlife Research* 40: 599-614.

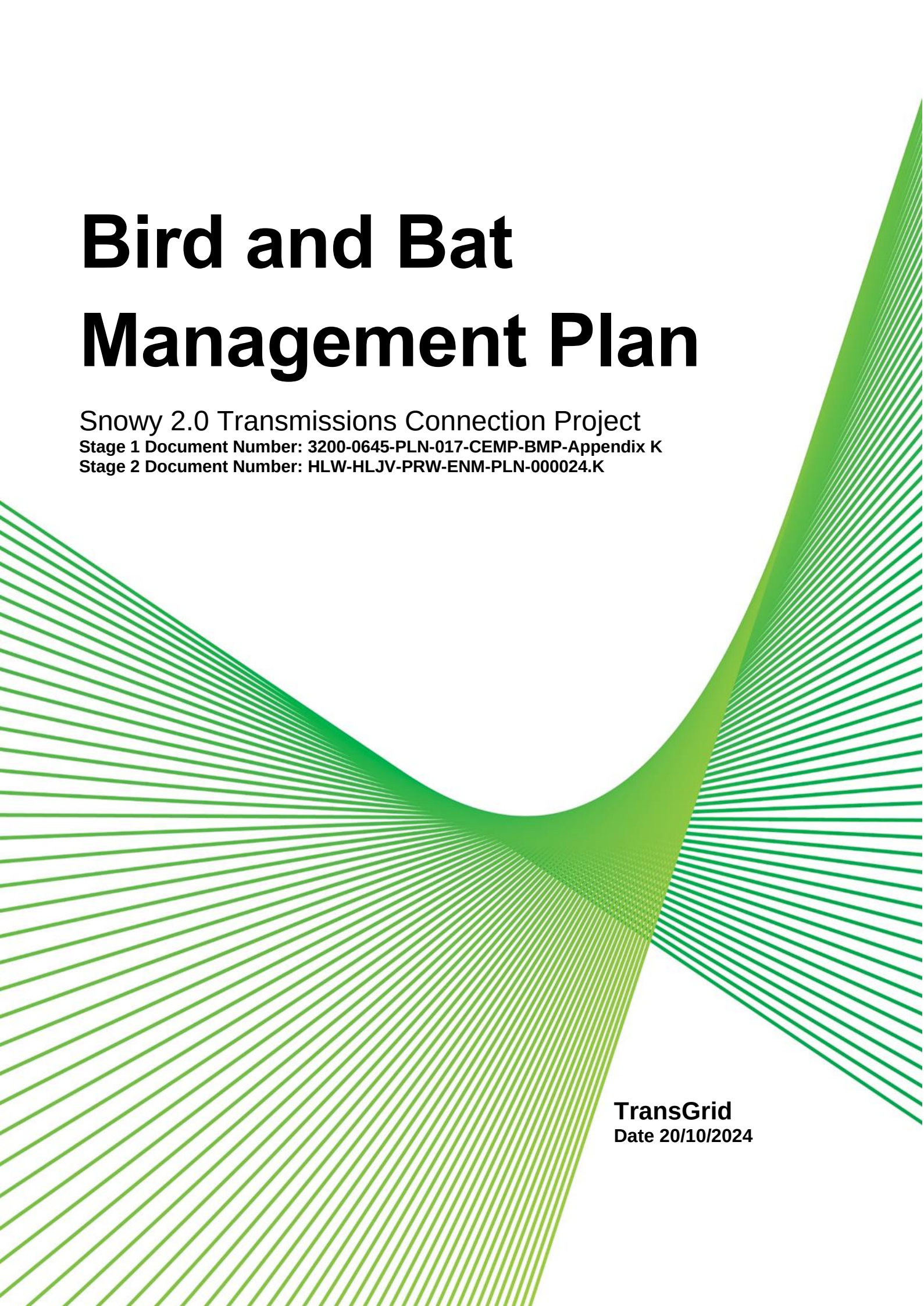
APPENDIX K Bird and Bat Management Plan

Official

Bird and Bat Management Plan

Snowy 2.0 Transmissions Connection Project

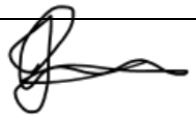
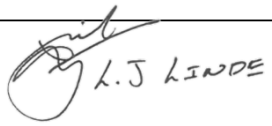
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TransGrid
Date 20/10/2024

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Table of Contents

1 Introduction 7
1.1 Aims and Objectives 7
1.2 Existing Environment 8
1.3 Consultation And Guidelines 8
1.4 Terminology 9

2 Species Risk Assessment 10
2.1 Approach 10
2.2 Assessment 10
2.3 Proactive Mitigation 10

3 Habitat Hazard Analysis 12
3.1 Electrocution 12
3.2 Collision 12
3.3 Proactive Mitigation 16
3.4 Electrocutions 16

4 Monitoring Plan 18
4.1 Nest Searches 18
4.1.1 Rationale 18
4.1.2 Method 20
4.1.3 Management 20
4.2 Carcass Monitoring 22
4.2.1 Rationale 22
4.2.2 Field Methods 22
4.2.3 Ongoing Remote Data Collection 24
4.3 Diurnal Bird Flight Observations 24
4.3.1 Rationale 24
4.3.2 Field Methods 25
4.4 Statistical Analysis 25
4.5 Monitoring Plan Summary 26

5 Adaptive Management and Responsive Mitigation 28
5.1 Adaptive Management Triggers 28
5.2 Responsive Mitigation 31

6 Reporting And Review 33
6.1 Plan Updates 33
6.2 Quarterly Results and Discussion Report 33
6.3 Final Report 33

7 References 34

APPENDIX A Technical Report 36
Appendix A Data specifications for bird diverters 66

List of Tables

Table 1-1 BIO19 measures relevant to this plan and location addressed 7
Table 4-1 Summary of monitoring requirements under the Plan 26
Table 5-1 Triggers for adaptive management: these events would automatically trigger an adaptive management response 28
Table 5-2 Responsive mitigation options in response to site-specific issues 31

List of Figures

Figure 2-3 FireFly™ 11
Figure 2-2 Afterglow™ 11
Figure 2-1 ROTAMARKA™ 11
Figure 3-1 Span across small valley (collision hazard #1) 13
Figure 3-2 Bird and Bat Electrocution Hazard Areas 14
Figure 3-3 Bird and Bat Collision Hazard Areas 15
Figure 3-4 Common components of transmission line towers (Source: (ElectraNet, 2023) 16
Figure 4-2 White-bellied Eagle nest on transmission tower, India (The News Minute, 2022) 19
Figure 4-1 Bald Eagle nest on transmission tower, USA (Advance Local Media, 2015) 19
Figure 4-3 Nest management procedure, adapted from (APLIC and USFWS, 2005) 21
Figure 4-4 Proposed carcass monitoring and flight observation locations (subject to change depending on field circumstances) 27
Figure 5-1 Protocol for threatened species carcass find 30

Acronyms and Abbreviations

Abbreviation	Explanation
AM	Adaptive management
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	Biodiversity and Conservation Division of DPE (formerly BCD)
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
BOM	Australian Bureau of Meteorology
CE	Critically endangered
CEMP	Construction Environmental Management Plan
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
E	Endangered
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
GIS	Geographic information system
ha	hectares
km	kilometres
KNP	Kosciuszko National Park
m	metres
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPWS	National Parks and Wildlife Service
PC	Principal Contractor or Contractor as defined in this management plan
PCT	Plant Community Type
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
Sp/spp	Species/multiple species
UNESCO	United Nations Educational, Scientific and Cultural Organisation
V	Vulnerable

1 Introduction

The Snowy 2.0 Transmission Connection Project ('the Project') is an approximately nine kilometre (km) overhead high voltage (330 kilovolt) transmission line. The Project consists of four 330kV high voltage circuits consisting of two sets of parallel transmission lines and steel lattice towers. The Project begins at Snowy 2.0 cable yard at Lobs Hole in Kosciuszko National Park (KNP), and spans west across Talbingo Reservoir to Transgrid's existing Transmission Line 64 in Bago State Forest.

This Bird and Bat Management Plan is required as part of the conditions of approval and forms part of the Biodiversity Management Plan (BMP) for the Project.

Documented evidence of risks to birds from electricity infrastructure is relatively limited in Australia (Jacobs 2022). However, bird interactions with powerlines has been well documented overseas, particularly in Europe and North America, for decades (RPS, 2021). The key issues are collision (flying into the conductors causing injury or death) and; electrocution (due to bridging live components either during flight, perching, nesting or interacting)[1][1].

1.1 Aims and Objectives

The overall aim of the Bird and Bat Management Plan (the Plan) is to identify the bird and bat species at risk from the operational phase of the Project, along with the source and location of that risk, and to minimise injury and death of birds and bats through the application of both proactive and responsive mitigations.

The condition of Approval B21 outlines "prior to carrying out any development that could impact biodiversity values, unless the Planning Secretary agrees otherwise, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: be prepared in accordance with the Biodiversity Development Assessment Report [BDAR]" (Revision 7, dated 22 August 2022).

The objectives of this Plan are therefore informed by the BIO19 mitigation measure in the BDAR (Jacobs, August 2022). The components of this measure are listed below along with the section of this Plan when the measure is addressed (Table 1-1).

Table 1-1 BIO19 measures relevant to this plan and location addressed

Measure / Objective	Section addressed
Utilise the survey data for this Project, and the Main Works EIS to identify specific bird and bat species that are at risk of collision with power lines and electrocution.	Appendix A
For higher risk species a strategy [this Plan] will be developed in consultation with Biodiversity and Science Conservation (BCS) focused on identifying key sections of the transmission line where mitigation is required and will include deploying bird diverters, with day/night reflectors within approved buffer distance. This will be appropriate for diurnal and nocturnal birds	Section 2.3 and 3.3

[1] This plan does not address EMF exposure

Measure / Objective	Section addressed
The strategy will be developed as part of the BMP and include adaptive management for high risk bird and bat species as outlined below with intervals and strategies to be determined in consultation with NPWS: • Regular monitoring in transmission line easements for evidence of bird / bat collision with transmission lines (intervals to be determined in consultation with NPWS) • Monitoring of taller structures for evidence of raptor nest building • Develop target trigger for number of high-risk species incidents	Section 5 Section 1.3 Section 4.2 Section 4.1 Section 5.1
Deploy species specific bird / bat divertors / flappers / reflectors in areas where a defined number of incidents have occurred. The BMP will identify locations for specific measures and the monitoring method for testing effectiveness.	Section 3.3, 4.3, 5

1.2 Existing Environment

The Project is located within a predominately natural landscape containing a diversity of habitats with high biodiversity value in the temperate and sub-alpine regions of NSW. The terrain is a mix of steep, mountainous and hilly areas and forested valleys with limited human disturbance. The Project crosses one major waterway, Tumut River (at the base of the Talbingo Reservoir), along with numerous first and second order creeks and streams. The vegetation along the transmission corridor is made up of good condition grassy open woodland, dry open forest and wet sclerophyll forest. Habitat along the corridor is suitable for numerous fauna species including threatened birds, bats and mammals. A number of potential nest trees for Gang-gang Cockatoo and Masked Owl were recorded along the easement. These nest trees have been considered in the habitat hazard assessment.

1.3 Consultation And Guidelines

Australia does not yet routinely assess or monitor bird interactions (namely electrocutions and collisions) with powerlines, with notable exceptions in Tasmania (threatened raptors) and Victoria (brolgas) (Mooney, Webb, & Mott, 2022). During the early consultation process with BCS, it was their recommendation that the NSW wind farm bird and bat management plan framework would be an appropriate model to use to monitor the collision and potential electrocution impacts of birds and bats interacting with the transmission line. At the time of writing, there are no published wind farm monitoring guidelines, however publicly available wind farm Bird and Bat Management Plans were referred to in the compilation of this Plan.

North America and Europe has recognised and managed bird and bat interactions with powerlines for several decades (RPS, 2021). Thus, the best practice guidelines referred to for the compilation of this document are mostly from overseas:

- Suggested Practices for Avian Protection on Power Lines 2006 (United States), (APLIC, 2006)
- Reducing Avian Collisions with Power Lines 2012 (United States), (APLIC, 2012)
- Avian Protection Plan Guidelines 2005 (United States), (APLIC and USFWS, 2005)
- Electrocutions & Collisions… Best Practice for Mitigation 2021 (Europe), (RPS, 2021)

- Wedge-tailed Eagle: Best Practice Approach for Electricity Transmission Infrastructure Development (Australia), (Energy Grid Alliance, 2021).

1.4 Terminology

The following terminology is used throughout this document:

- **Distribution line**: line or system distribution power from transmission system to consumer
- **Transmission line**: used for transmission of power from generating substation to various distribution units
- **Powerline**: term used when discussing both distribution and transmission lines generally
- **Bats**: this plan is concerned with flying-foxes or fruit bats rather than microbats
- **Risk**: the potential for harm (e.g., injury or mortality) to occur
- **Hazard**: a potential source of harm, such as dangerous wiring. Hazard identification is a component of risk assessment.

2 Species Risk Assessment

2.1 Approach

The risk assessment presented in the Technical Report (Appendix A) considers the inherent electrocution and/or collision risk of different species based on local presence, physiological and behavioural attributes, based on a qualitative consequence and likelihood risk matrix (the 'species risk assessment').

The full assessment is provided in Appendix A, and a summary is given below.

2.2 Assessment

The outcomes of the qualitative risk assessment for species analysed in the BDAR (plus Large Bent-winged Bat and Grey-headed Flying-fox) are listed below. Proactive mitigation is targeted towards these species.

High risk species are:

- Musk Duck
- White-bellied Sea-eagle
- Sooty Owl
- Powerful Owl
- Grey-headed Flying-fox. Moderate risk species are:
- White-faced Heron
- Masked Lapwing
- Swamp Harrier
- Peregrine Falcon
- Little Eagle
- Wedge-tailed Eagle
- Whistling Kite.

2.3 Proactive Mitigation

As around 90% of bird and bat electrocutions in Australia occur on distribution lines rather than transmission lines (McGoldrick, 2022), collision is seen to be the key operational threat for the species above. In Australia, the focus presently is to increase the visibility of power lines by line marking. Line marking involves the installation of highly visible markers to divert bird flight away from the lines. These markers are also known as bird diverters. Studies show that line marking reduces bird mortality by 55–94%, although long-term monitoring of the effectiveness of markers has not been systematically undertaken (RPS, 2021).

A discussion is provided on the effectiveness of various bird diverter designs, based on bird and bat vision, in Appendix A. The moderate and high risk species comprise:

- Diurnal raptors with high acuity and wide fields of binocular vision, but poor vision in low light conditions
- Nocturnal raptors (i.e., owls) with wide fields of binocular but monochromatic vision (Orlowski, Harmening, & Wagner, 2012).

- Waterbirds with relatively low acuity, narrow binocular, trichromatic vision (Martin G. F., 2022)
- Flying-foxes with wide binocular field but dichromatic vision ('colour-blindness') (EcoSure, 2021)

By managing for the lowest common denominator between the above species suites, the use of bird diverters is proposed with the following attributes as a minimum:

- High contrast (black/white) to address monochromatic, dichromatic vision and low light conditions
- Reflective or glowing to address low light and nocturnal flying conditions
- Three-dimensional and/or spinning to allow for narrow binocular vision.

In order to attach and service bird diverters responsively, the product choice should be able to be retrofitted using drones. Several market products meet these requirements, and have been field tested overseas with monitoring programs:

- ROTAMARKATM Bird Diverters (black/white, reflective, spinning, 3-dimensional, retrofitting available) – refer to Figure 2-1[2]
- AfterglowTM Bird Diverters (reflective, glowing, spinning, white) - Figure 2-2
- FireFlyTM Bird Diverters (reflective, spinning, white)– Figure 2-3

ROTAMARKATM best meets all of the attributes listed above. The manufacturer has provided additional information regarding specifications and instructions for installation.



Figure 2-3 ROTAMARKA™



Figure 2-2 Afterglow™



Figure 2-1 FireFly™

[2] Images from: ROTAMARKA™ https://balmoralengineering.com/rotamarka-mini-bird-diverter/, Afterglow™https://www.clydesdale.net/clydesdale-products/overhead-line-construction/product/afterglow-bird-flight-diverter , FireFly™ https://pr-tech.com/wp-content/uploads/2019/11/Bird-Diverters-brochure.pdf

3 Habitat Hazard Analysis

The hazard analysis presented in the Technical Report (Appendix A) considers hazards inherent in the location of the transmission line in relation to habitat features (the 'habitat hazard analysis').

3.1 Electrocution

As large raptors and flying-foxes are moderate and high risk species, electrocution hazards have been considered in this habitat hazard analysis despite client perceptions that electrocution hazards are very low due to the configuration of the infrastructure (i.e., large separation distances between conductors along with insulated components). The main hazard is where transmission towers are located with elevated exposures and provide useful perches for raptors. Within the Project site, such high hazard areas for electrocution have been identified at four points along the transmission line:

1. Isolated peak near Elliott Way west of Boundary Road
2. Near where the transmission line crosses Elliott Way, east of Boundary Road
3. Near where the transmission line crosses Elliott Way again, east of Boundary Road
4. The ridge directly west of Tumut River where towers will be located.

These are shown on Figure 3-2. These areas will be included in carcass monitoring searches to establish whether the low perceived electrocution risk of high voltage transmission lines is accurate.

3.2 Collision

Regarding the transmission line components, it is the earthwire that is the highest risk for collision, as it is the highest and thinnest wire (refer to Table J-2). The conductors are thick and considered visible to birds and bats. Certain habitat locations would render transmission lines a higher collision hazard for birds and bats than

others. This is discussed in Appendix A. Based on analysis, the transmission line (specifically the earthwire) is likely to be hazardous to birds and bats (due to collision) in three locations, shown on Figure 3-3:

1. The span across a small valley located at approximately 2,200 and 2,800 as shown on plan TL- 902725-01.J (a distance of around 400 metres; shown Figure 3-1)
2. The span across Tumut River between tower located at approximately 4,900 and 6,200 distance as shown on plan TL-902725-02.J (a distance of approximately 1300 m)
3. Proximity to potential Gang-gang Cockatoo / Masked Owl nest trees near Mine Trail (approximately 1400 m).

The above locations should be targeted areas for installation of bird diverters.

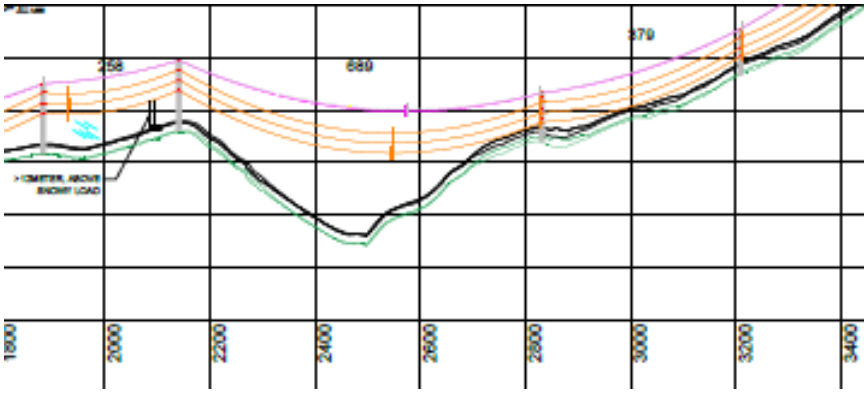


Figure 3-1 Span across small valley (collision hazard #1)

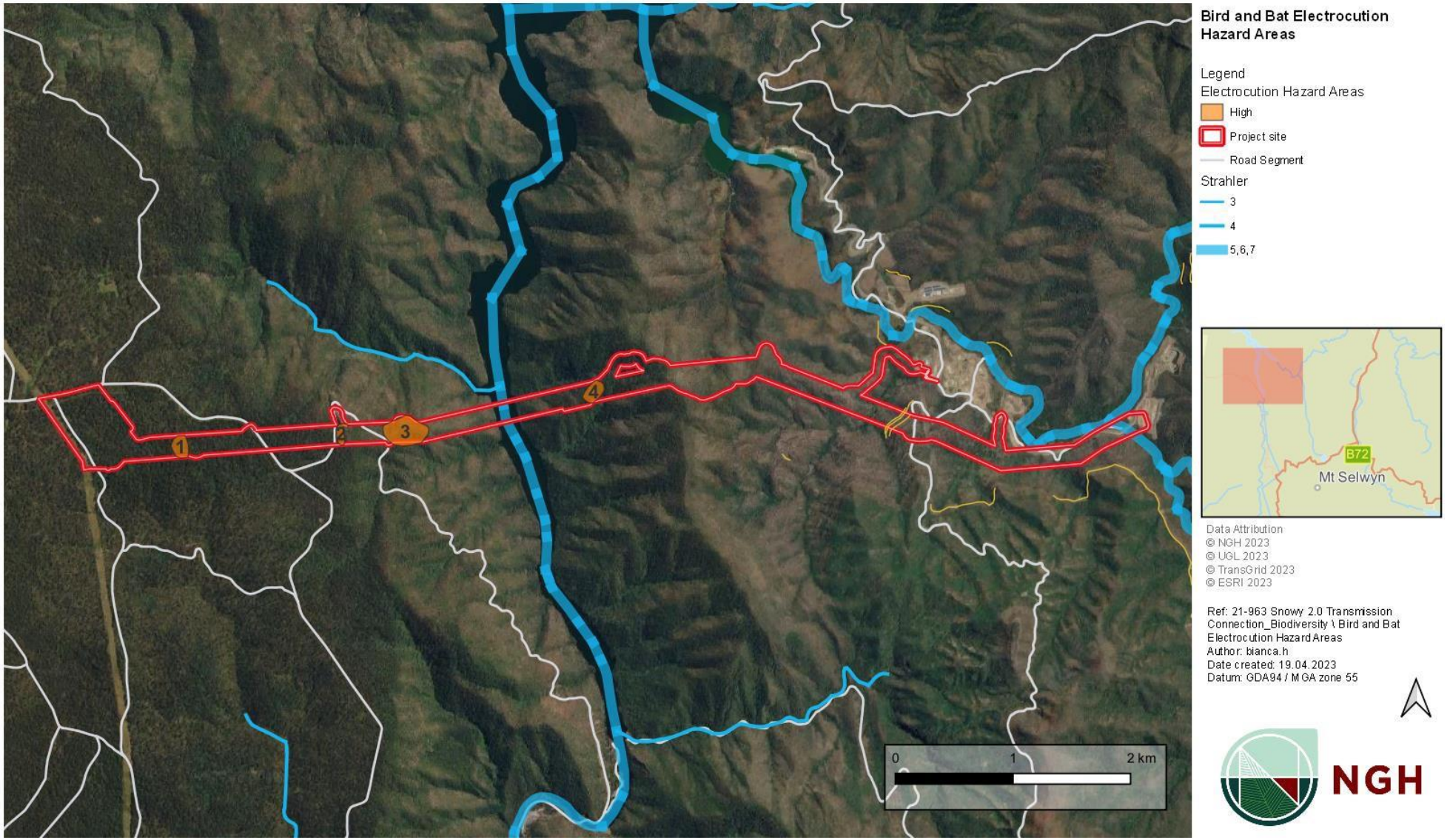


Figure 3-2 Bird and Bat Electrocution Hazard Areas

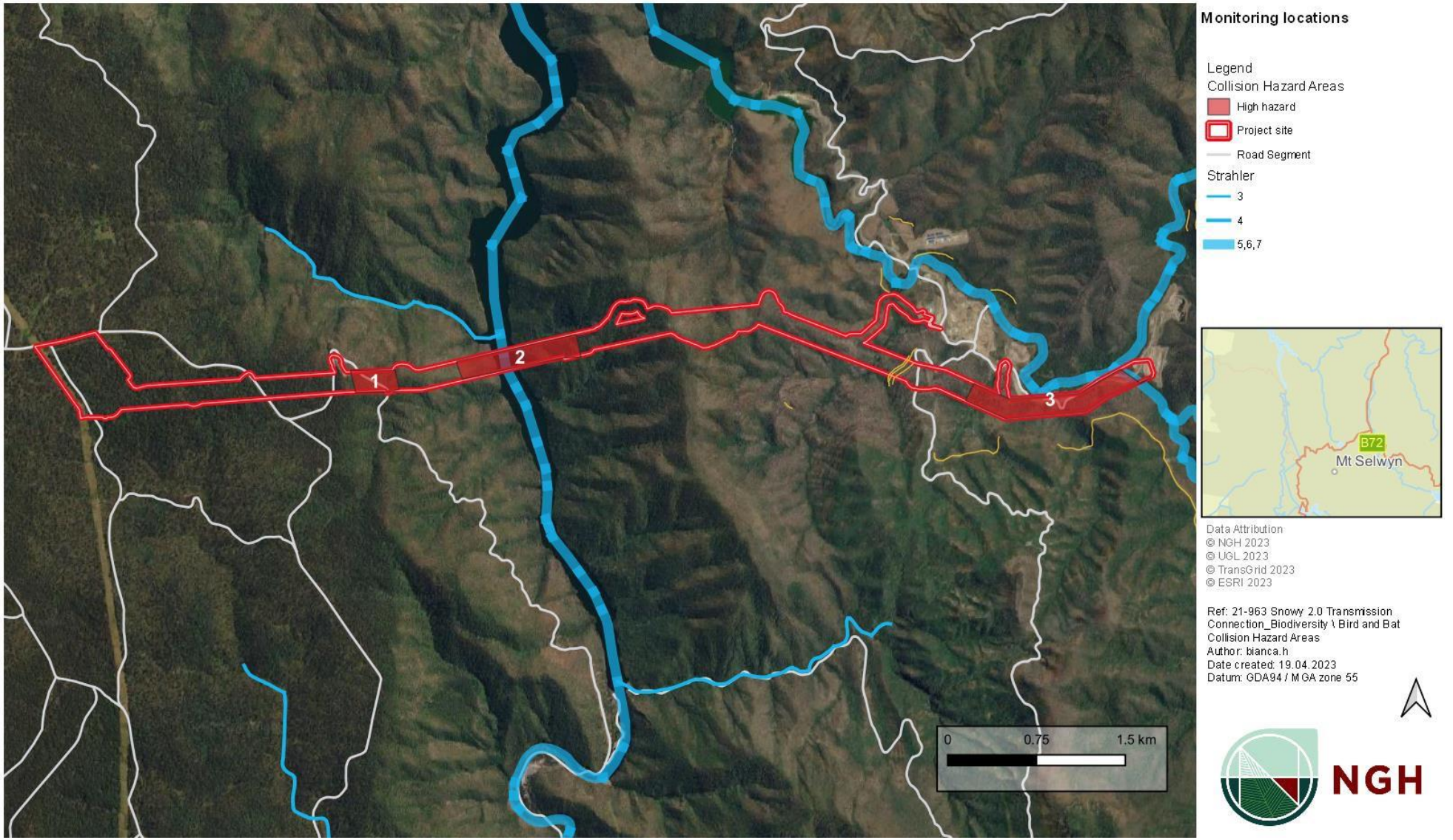


Figure 3-3 Bird and Bat Collision Hazard Areas

3.3 Proactive Mitigation

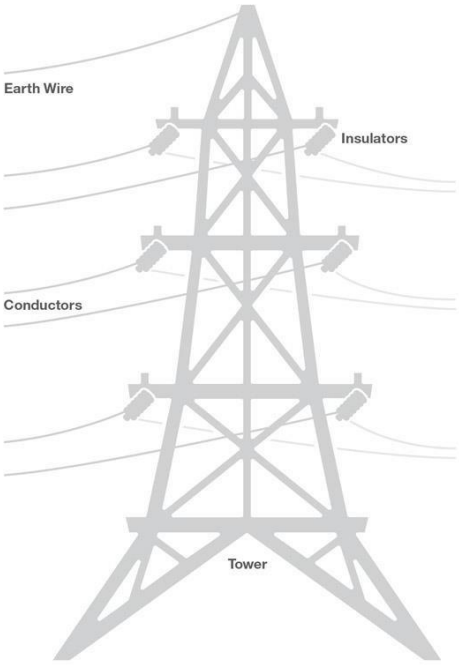


Figure 3-4 Common components of transmission line towers (Source: (ElectraNet, 2023)

ROTAMARKATM or other recommended bird diverters, will be installed between towers for the entire 1500m span at the three identified collision hazards areas in Section 3.2 and shown in Figure 3-3:. Up to 80% of collisions are thought to occur with the earth wire (Figure 3-4) which is the thinnest wire and extends between the tops of the tower (RPS, 2021).

PC have advised that bird diverters will be installed on the upper earth wire only. Balmoral Engineering (manufacturers of ROTAMARKATM) recommend spacing at 10-30m. Based on this, we recommend:

- 20m spacings
- First diverter installed within ten metres of each tower.

It is noted, the Bird/bat diverter placement and subsequent spacing may need to be considerate of aircraft marker sphere placement. In such instances diverters will be placed supplementary to marker sphere placement to the spacings outlined above.

Following discussions with PC and Transgrid, it has been agreed that bird diverters will be installed pre- emptively during construction, for practical reasons, rather than only in response to impacts (as outlined in the BIO19 measure). However, if monitoring reveals further areas requiring diverters, they can be retrofitted at a later date using drones. The ability to be retrofitted using drones has influenced the choice of recommended product.

3.4 Electrocutions

The primary method of reducing electrocutions is to incorporate bird-safe design into the towers and adjoining components. This includes:

- Insulation of energised parts

- Minimum safe distance where possible
- Downward facing cross-bars to discourage perching.

Such aspects have been incorporated into the tower design. Further proactive mitigation is not necessary.

4 Monitoring Plan

This section outlines the rationale and field methods for operational monitoring of birds and bats along the Snowy 2.0 transmission line. The monitoring plan incorporates:

- Nest searches – searching for nests on transmission towers
- Carcass monitoring – searching for dead bird and bat carcasses along sections of transmission line
- Flight observations – watching bird (and possibly flying-fox) interactions with transmission lines.

At this stage it is intended that monitoring will be undertaken for a period of five years to allow sufficient data to be collected for statistical analysis. However the plan will be review by biometricians, Symbolix, and duration and frequency of monitoring may change. Monitoring will likely commence when the transmission line is commissioned, viz there is no requirement to monitor prior to commissioning. To be effective, monitoring must be frequent, systematic, labour intensive and properly focused (EDM International, 2019). The forecast challenges to monitoring in the Project area are:

- Access
- Thick vegetation (hindering visibility)
- Scavenging
- Water
- Snow
- Ice.

4.1 Nest Searches

4.1.1 Rationale

Large tree-nesting birds such as raptors and pelicans may be attracted to the transmission line for nest building, potentially increasing the risk of collision and electrocution for those individuals (EDM International, 2019; APLIC and USFWS, 2005; Galis & Sevcik, 2019; EirGrid, 2016). Birds nesting on transmission structures can also be problematic for the following operational reasons (EDM International, 2019):

- Large nests can add significant weight to the structures
- Nest protection behaviour e.g., eagles, prevents maintenance access
- Debris associated with nests has potential to cause fires
- Nests can hinder access for maintenance activities and repairs.



Figure 4-2 Bald Eagle nest on transmission tower, USA (Advance Local Media, 2015)



Figure 4-1 White-bellied Eagle nest on transmission tower, India (The News Minute, 2022)

4.1.2 Method

All the towers along the transmission line would be searched annually for large bird nests for a period of five years following cessation of construction (e.g., eagle nests) either by persons on foot, in vehicles or by drones where access cannot be gained otherwise. Nest searches will be undertaken by ecologists during carcass monitoring or flight observations. If using drones, searches should be taken outside of raptor breeding season (generally winter to summer for large raptors) to avoid disturbing nesting birds, or colliding with eagles (FPA, 2015).

4.1.3 Management

If a nest is found on a transmission tower, an assessment will be made as to whether:

a). The nest is active

b). The nest may be a hazard to the eagles due to electrocution risk.

The latter would be determined by nest size and placement, with photos taken of the nest and shared with Transgrid. Transgrid would provide an opinion on the likelihood of electrocution based on their technical understanding on the tower components.

If the nest is active and considered a hazard, it would be left for the season and disturbance minimised, unless tower access needs for continuity of electricity supply were immediate (i.e. fault rectification).

Following fledging, nests should be removed by Transgrid staff. Below is the approvals procedure where nest removal is required (Figure 4-3), as a permit to harm or take native species will be required from BCS under the *National Parks and Wildlife Act 1975* or *Biodiversity Conservation Act 2016*.

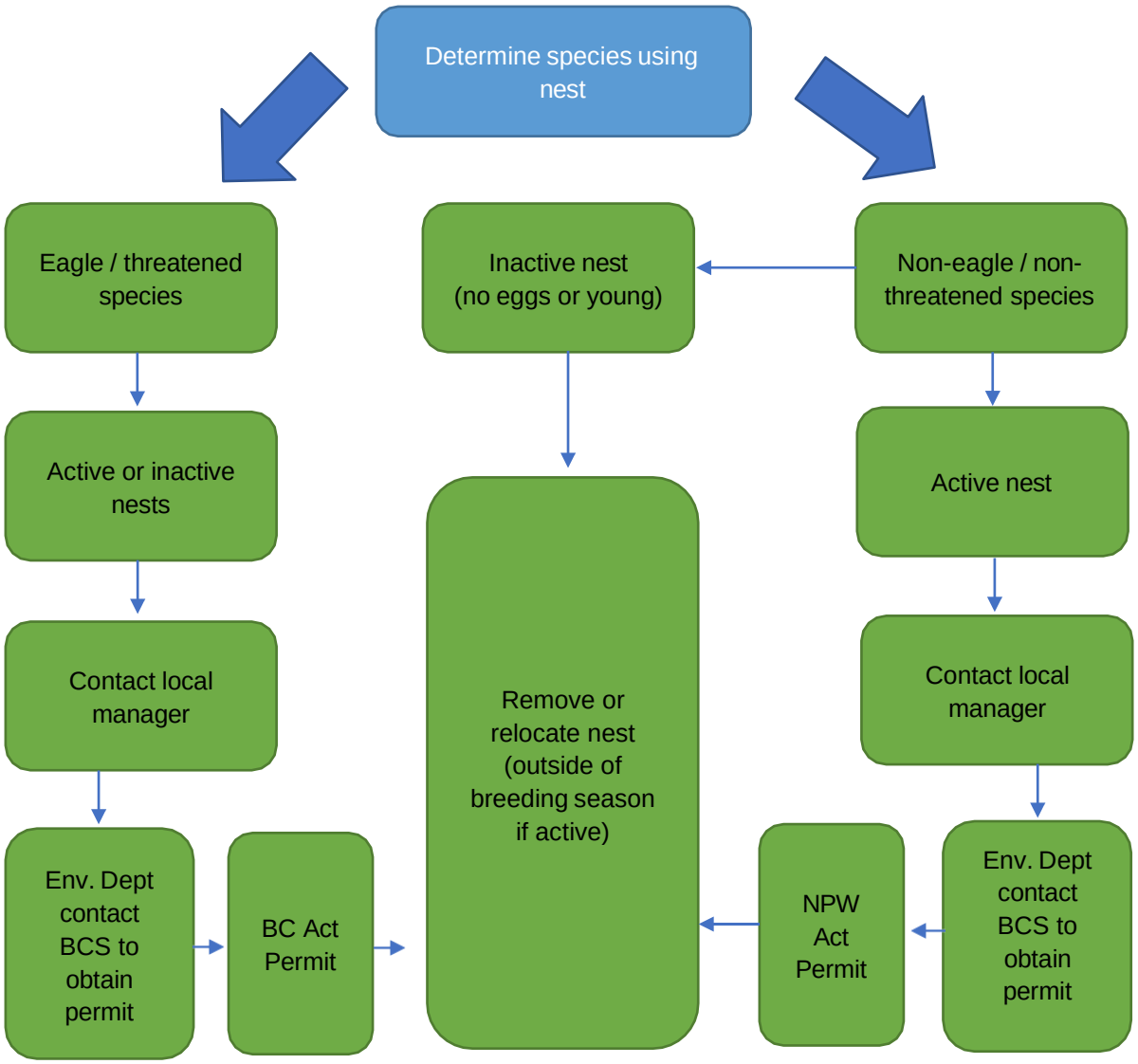


Figure 4-3 Nest management procedure, adapted from (APLIC and USFWS, 2005)

4.2 Carcass Monitoring

4.2.1 Rationale

In order to effectively mitigate and manage risk of electrocution and collisions for birds and bats, it is necessary to know which Australian species are most susceptible along with the magnitude of the problem, at this specific location. Additionally, there is a question as to whether sedentary birds and bats would acclimatise to the presence of the transmission line in their environment. If this is the case, we would expect to see declining mortality over time. To this end, regular monitoring will be undertaken along the transmission lines for carcasses as evidence of collision or electrocutions.

4.2.2 Field Methods

4.2.2.1 Carcass Searches

Depending on availability and permit approvals, carcass searches may be undertaken by either human searchers using primarily visual cues to find carcasses or a human handler-dog team[3] using primarily scent detection to find carcasses. The method described below is for human searchers (and is informed by (Costantini, Gustin, Ferrarini, & Dell'Omo, 2016). The method would be modified for a handler-dog team:

- Two searchers walk in parallel at a slow speed, separately on the two sides of the transmission line at a distance of about 25m from the centreline, and about 50m from each other. They search for carcasses or remains (feathers, bones) along the lines and at the base of pylons. Searchers may need to walk in a zig-zag pattern in more densely vegetated areas.
- Search areas are one-km long stretches at five locations of mixed habitat hazard ranking (Figure 4-4)
- Searches will be undertaken quarterly, at approximately three-month intervals, with a total of four surveys per year for a period of five years following cessation of construction. Searches should be undertaken in the same month each year (e.g., February, May, August, November) for comparative data analysis
- All remains are photographed and identified where possible. Carcasses searched for cause of death (electrocution, collision or uncertain; descriptions below) and signs of predation. Carcasses removed to avoid attracting scavengers and recounting in subsequent visits. The following parameters are to be recorded:
    - Location (recorded with GPS device)
    - Species (or closest taxonomic category possible)
    - Sex
    - Age (if possible)
    - Cause of death (electrocution, collision, other or unknown)
    - Distance and direction to tower and wires
    - Presence of bird diverters (yes - spacing, no)
    - Description of visible injury
    - Stage of carcass decomposition

[3] Handler-dog teams are frequently used for carcass searches at wind farm sites, however, the necessary permissions and permits would need to be obtained for use in a national park

- Effect of scavengers

Signs of electrocutions burns to feathers and legs, claws held in a convulsive pose, large necrotic areas on the limbs and skull fractures (RPS, 2021)

- Signs of collision impact (although sometimes both occur): broken bones, wings, legs and shoulder bones, wounds vary widely and are similar to collision with cars (RPS, 2021)
- Where it is not possible to inspect injuries (e.g., due to predation or decomposition), birds within a five metre radius of tower are considered electrocuted. Birds found under conductors are assumed to have collided
- Any dead bird or bat found outside of the monitoring survey by field ecologists or Transgrid staff would also be recorded and removed from site.

4.2.2.2 Bias corrections

There are a number of biasing factors relating to data collecting procedures, which additional surveys or calculations on raw survey data can help to overcome to some extent (Bevanger, 1995; Borner, et al., 2017):

- Search bias: the 'detectability' of carcasses differs for individual searchers, whether dog or human.
- Each search will have their own 'searcher efficiency' rate. This is calculated by undertaking detectability trials and utilising consistent staff for searches.
- Scavenger removal: a proportion of all carcasses will be removed by scavengers. A rate if removal is calculated by undertaking scavenger trials.
- Risk bias: if all monitoring is targeted in areas or toward species perceived to be high risk, the extrapolated rate of collision and electrocution death is likely to be an overestimate. To overcome this bias, monitoring will aim to detect any species (small or large bodied) and be undertaken in low, moderate and high risk areas.
- Crippling bias: some birds receive injuries which are not immediately fatal and fly some distance.
- from transmission line prior to dying. To gain an idea of the extent of such incidences, a 'crippling trial' would be undertaken.

Data from the trials outlined below would be analysed to determine correction factors for raw carcass monitoring results, providing a more realistic snapshot of the number of birds and bats likely to have been killed through interaction with the transmission line.

Generally, carcass detection rates decrease with smaller carcass size and with higher vegetation density (Borner, et al., 2017). The use of handler-dog teams would reduce such detection issues and would be preferable given the difficult terrain of the study area.

4.2.2.3 Detectability trials

Purpose: To calculate a rate at which observers are able to detect carcasses and establish a searcher efficiency estimate.

- Detectability trials as a 'one-off' survey.
- Two trials will be conducted during the monitoring program within the first two years. The trial can be undertaken any time in the construction or commissioning period. One survey in winter in lower biomass conditions, and the other in summer in higher biomass conditions.

- 20 carcasses will be placed randomly along the transmission line monitoring areas and surveyed for during a routine carcass monitoring survey. The carcass placement will be undertaken by a trial controller (a person not involved in monthly surveys) by tossing carcasses to simulate the natural landing and ruffling that would be associated with falling from the air. All carcasses would be marked with GPS.
- Upon completion, carcasses from detectability trials would be collected and stored in freezer for use in scavenger trials.

4.2.2.4 Scavenger trials

Purpose: To calculate a rate at which natural scavengers remove carcasses from under the transmission lines.

- Scavenger trials are a 'one-off survey'.
- Two trials will be conducted to take advantage of different seasonal conditions within the first two years. It is assumed that scavengers would be most active in late winter/early spring and least active in the height of an abundant summer; therefore these are the times for scavenger trials.
- carcasses will be placed randomly along the transmission line monitoring areas for a period of 30 days and motion sensor cameras will be used to monitoring scavenging activity. The placement of carcasses will be spread out over several months so as not to saturate the site with availability and bias scavenging results. It will also reduce the chance of attracting additional scavengers. Camera captures will be reviewed after 30 days to determine the time to scavenge.

4.2.2.5 Crippling trials

Purpose: to calculate a rate at which fatally injured birds move outside the carcass search area before dying. Crippling trials will consist of a 500m carcass search transect undertaken outside of the search area undertaken once per survey event for four survey events.

4.2.3 Ongoing Remote Data Collection

Following collection of data for a period of five years following cessation of construction regarding which

species are struck and where, a remote data collection device should be used in an ongoing way. The purpose of ongoing data collection is to inform both the operator and BCS about the frequency of bird and bat strike. Technologies exist to allow for remote data collection, such as the Bird Strike Indicator (BSI), which will provide ongoing information about the frequency and location of strikes (although not species).

BSI is an automated vibration-sensing and recording tool designed to detect bird strikes on aerial cables such as power lines and guy wires (EDM International, 2023). Sensors installed on transmission wires transmit strike activity (detected by vibration) to a base station and can be used to evaluate the effectiveness of line markers and other mitigation measures. Transgrid will investigate whether such technology is compatible with their infrastructure asset, advise BCS, and apply as required.

4.3 Diurnal Bird Flight Observations

4.3.1 Rationale

Bird diverters are a significant investment and a key strategy to reduce bird collisions. The effectiveness of bird diverters is monitored generally by either of two methods:

1. Collecting collision carcass data for sites before and after bird diverters are installed, and comparing the results (a 'BACI' monitoring design) e.g., (Ferrer, et al., 2020)
2. Observing bird flights where diverters are installed and recording reactions to, and distance from, power lines e.g., (Galis & Sevcik, 2019).

It is the preference of the operator (via the principal contractor) to install bird diverters during construction of the transmission line, therefore efficacy monitoring will be undertaken using the second method. The hypothesis is that when a bird detects the diverter, its' behaviour should change, i.e., flight path redirected (hopefully to avoid collision) (Martin G. F., 2022). The more effective the diverter, the greater the distance from the powerlines the bird should react. Thresholds for behavioural change have been developed for overseas monitoring programs. Those used here as based on (Galis & Sevcik, 2019), a peer-reviewed study monitoring the effectiveness of bird diverters along 77km of power lines in Europe over three years.

4.3.2 Field Methods

The method described below is informed by (Galis & Sevcik, 2019; Yee, 2008):

- Observers each monitor approximately 500m sections of the transmission line (or shorter sections where the visual path is not clear) for two hours in the morning and two hours in the evening, when bird activity is highest and lighting is poor (thus the likelihood of collision is greater). Total monitoring time is four hours per day during the survey period.
- Flight observations will be undertaken at four locations: two sections of line where diverters are installed and two sections without diverters. Monitoring will be undertaken for three consecutive days on a quarterly basis for a period of five years following cessation of construction, as for carcass monitoring.
- Occurrence of individual birds and flocks is observed and recorded. Flocks are two or more individual birds of the same species. The response to individual birds to the transmission line and a reaction distance is recorded. The following data is recorded:
    - Location
    - Date and time of monitoring
    - Sunset and sunrise time
    - Vegetation type adjacent to transmission line section being monitored
    - Weather, wind direction and speed
    - Response: no reaction, bird flew through lines with no reaction, bird change course and flew through lines, bird flew up and over the line, bird flew down and under the line, bird changed course and flew away from or along the line, bird collided but continued in flight, bird collided but fell dead or injured, or bird landed on the line.
    - Reaction: where a response has been detected, reaction distance is recorded in three categories: 0-5m from line, 6-25m from line, >25m from line.

4.4 Statistical Analysis

In order to fully utilise carcass data and flight observations, statistical analysis will need to be undertaken.Statistical analysis will yield estimates of total bird and bat mortality per annum and provide a quantitative method for spatial and temporal comparisons. Statistical analysis methods have not been described here and would be best undertaken by a specialist

environmental data analyst such as Symbolix Pty Ltd. Symbolix or another company providing statistical analysis would need to verify that proposed field methods herein would meet statistical requirements (i.e., that methods would allow for robust statistical analysis). Symbolix have experience with analysing carcass monitoring results at wind farms all across Australia and have developed the appropriate statistical models for this type of analysis. The requirement to update this Plan following statistical review is described in Section 6.1.

4.5 Monitoring Plan Summary

Table 4-1 Summary of monitoring requirements under the Plan

Method	Timing	Effort	Location
Nest searches	Annually (1 survey per year)	Whole transmission line	Whole transmission line
Carcass monitoring	Quarterly (4 surveys per year)	One-km by 25m stretches x 5 locations with 2 observers (5 ha per quarter 20 ha per year)	Five locations in Figure 4-4
Flight observations	Quarterly (4 surveys per year)	2 hours in morning, 2 hours evening, 3 consecutive days (12 hours per quarter 36 hours per year)	Four locations in Figure 4-4

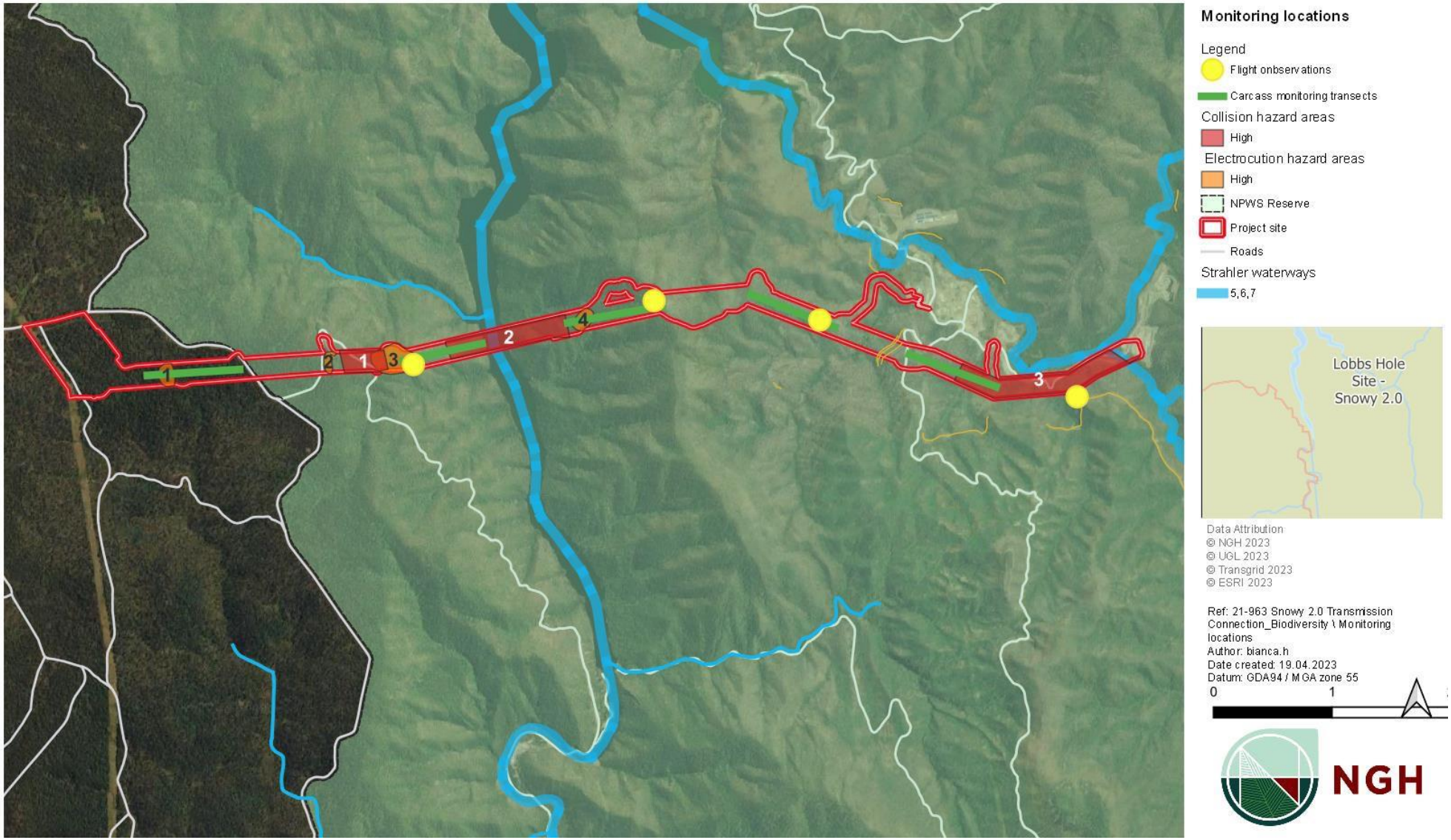


Figure 4-4 Proposed carcass monitoring and flight observation locations (subject to change depending on field circumstances)

5 Adaptive Management and Responsive Mitigation

5.1 Adaptive Management Triggers

The section outlines the events that lead to 'adaptive management triggers'. Adaptive management triggers (AM Triggers) trigger an adaptive management response which may include notification, further investigation and responsive mitigation for birds and bats (Table 5-1).

For repeated mortalities of threatened species, AM Triggers and management responses would be negotiated with BCS and tailored depending on the circumstances particular to the affected species. These outcomes would be added to the Plan. A flow chart is provided for the AM response for threatened species in Figure 5-1.

Table 5-1 Triggers for adaptive management: these events would automatically trigger an adaptive management response

Events	Trigger for AM	Adaptive Management Response
Threatened species mortality	Carcass of any threatened species detected.	Field staff to immediately notify Operator and seek permission to extend the survey, as below. Field staff to extend monitoring and/or survey during the survey event the carcass is found, to determine whether another event is likely in the short term. This may include nest searches, additional carcass searches (spatially or temporally), additional flight monitoring, etc., depending on the species and circumstances. Operator to notify BCS via email or the threatened species find form (in the BMP) of carcass find and management response within five (5) working days of identification. If another event is a high likelihood in the short-term, Operator to take appropriate responsive mitigation as advised by Ecologist (Table 5-2 for a list of potential mitigation measures). Analysis to determine the likely cause of fatality and recommend any responsive mitigation to reduce the likelihood of further threatened species mortality over the long-term.
Threatened species mortality	If more than one carcass of a threatened species is found in a 12-month period	Ecologist / statistician to determine quantified 'impact triggers' (i.e., xx number of carcasses), based on estimated population and predicted annual mortality rates, that may lead to a significant impact based on species (DoE, 2015). This is particular to a species. Management response to 'impact trigger' would be negotiated with BCS on a species-by-species basis.
Mortality of high or moderate risk species	Carcass of moderate or high risk species detected.	Ecologist to analyse flight observations, nest monitoring and carcass monitoring to determine circumstances that may have lead to mortality, including whether through collision or electrocution. If any unforeseen risks are identified, the ecologist is to consult with the Operator for an appropriate and practical responsive mitigation. Otherwise, a watch and act approach is to be adopted, to differentiate one-off events and trends.

Events	Trigger for AM	Adaptive Management Response
Multiple species mortality	Multiple mortalities (> five) of a native species in a single survey event.	Ecologist to analyse flight observations, nest monitoring and carcass monitoring to determine circumstances that may have lead to mortality, including whether through collision or electrocution. A watch and act approach is to be adopted, to differentiate one-off events and trends.
Multiple species mortality	Multiple mortalities (>20) of a native species in 12 months or less of surveys.	Ecologist to analyse flight observations, nest monitoring and carcass monitoring to determine circumstances that may have lead to mortality, including whether through collision or electrocution. Risk assessment would be updated and responsive mitigation to be undertaken if appropriate and practical.
Cluster electrocutions	Structures in areas where clusters of electrocutions have occurred (e.g., three or more electrocutions per quarter, or two or more electrocutions per circuit)	These structures should be examined for retrofitting.
Birds not avoiding transmission lines	Repeat (>3) surveys identify that birds are not taking evasive action to effectively avoid transmission lines, resulting in injury (or death)	Ecologist to analyse flight observations and other site information to determine circumstances that may have lead to collision. Responsive mitigation (Section 5.2) to be undertaken if appropriate and practical.

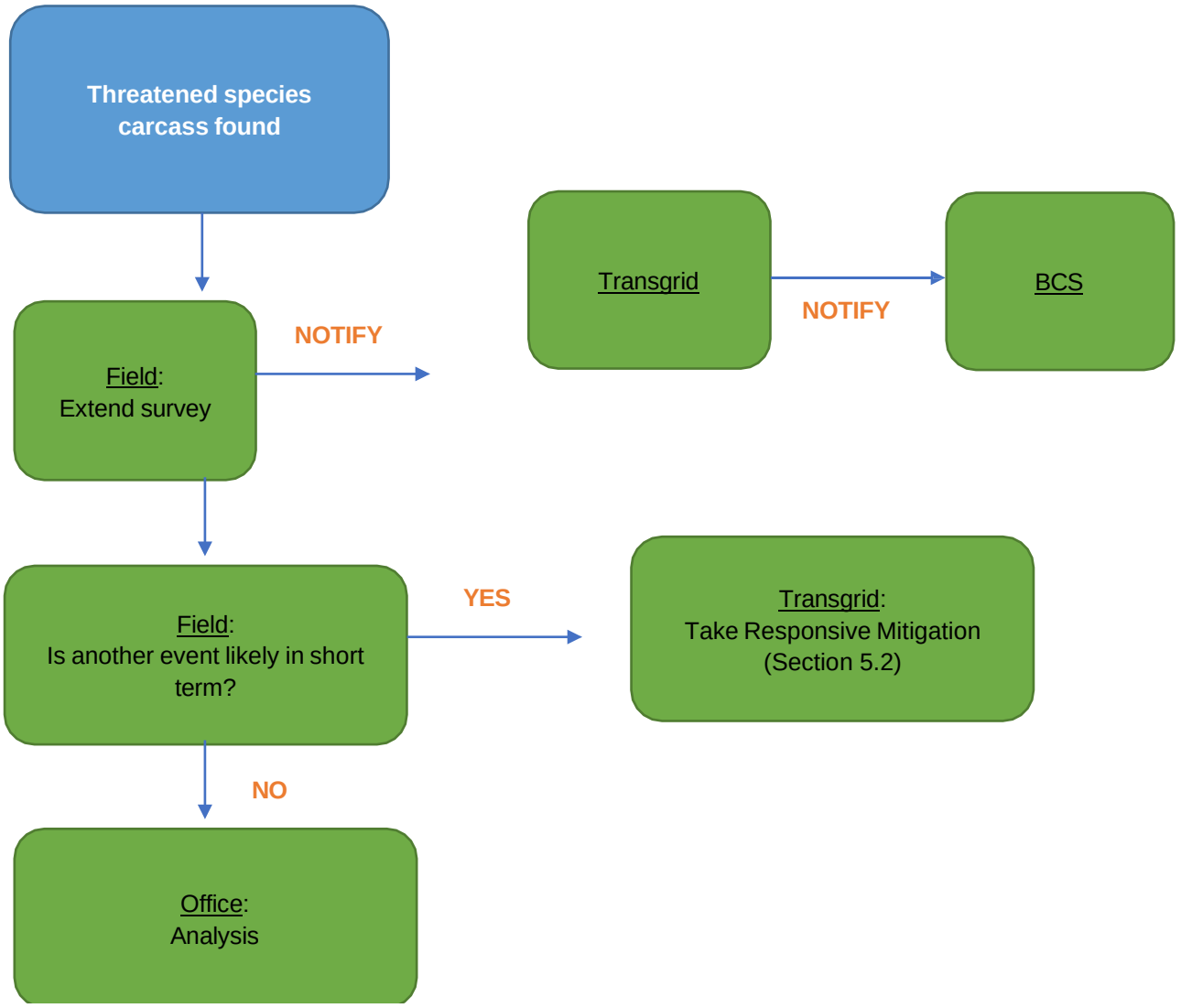


Figure 5-1 Protocol for threatened species carcass find

5.2 Responsive Mitigation

This section outlines options for mitigation measures in response to issues that may arise during monitoring, including AM triggers.

The issues that have been considered here include birds failing to avoid transmission lines; high numbers of birds colliding with earth wires; birds nesting and perching on towers leading to electrocution; reduced carcass monitoring efficacy due to difficulties with terrain or vegetation, and finally, there may be issues inherent with the design and location of the transmission line which cannot be mitigated. The issues and responsive mitigation options listed in Table 5-2 are neither exhaustive nor prescriptive, rather provide a basis for developing suitable ameliorative measures.

Table 5-2 Responsive mitigation options in response to site-specific issues

Issue	Collision	Electrocution	Responsive mitigation options
Birds not avoiding transmission lines	✓		Install bird diverters. Decrease distance between bird diverters (i.e., install more). Assess whether alternative diverter types may be more effective. Maintain diverters, including reflectivity / glow-in-the-dark surfaces. Install ACAS on high-risk sections of transmission line.
Bird nests on transmission towers	✓	✓	Remove nest when safe to do so (e.g., outside of breeding season). If location means nests are likely (e.g., commanding positions of territory or few other nesting opportunities nearby, birds repeatedly attempt to nest on towers), constructing nesting platforms away from towers should be considered.
Birds colliding with transmission wires	✓		Retrofit bird diverters onto the earthwire.
Electrocution frequent cause of death (>50% carcasses)		✓	Provide safe artificial perches at a safe distance from energised parts. Manage perching by covering (insulating) energised parts and hardware – note plastic caps, plastic belt covers, insulating tape, etc, all need to be maintained.
After 3 years, bird collisions usually affect common species and are relatively infrequent.	✓		Install Bird Strike IndicatorsTM to monitor and record bird strikes.
Mortality monitoring efficacy decreases significantly (detectability <20%) due to	✓	✓	Investigate the use of handler-dog teams if not already using.

Issue	Collision	Electrocution	Responsive mitigation options
access, thick vegetation, scavenging, etc.			Install Bird Strike Indicators™ to monitor and record bird strikes. Investigate other remote sensing techniques, such as drones.
Unacceptable level of impact to native species which cannot be mitigated.	✓	✓	If practical mitigation measures fail to alleviate a high level of impact to a particular species, most notably threatened species, an indirect offset in accordance with the *EPBC Act 1999 Environmental Offsets Policy* (SEWPAC, 2012) would be provided. This may include other compensatory measures such as funding research or habitat protection in other areas. The appropriate indirect offset would be determined in consultation with NSW Department of Planning, Housing and Infrastructure (DPHI).

6 Reporting And Review

Reporting would be undertaken at the completion of quarterly field work, annually and a summary report at the completion of five years of monitoring. Monitoring data (including raw data) will be provided to NPWS and BCS by Transgrid as part of annual reporting.

6.1 Plan Updates

This Plan will be updated following a statistical analysis of the proposed monitoring methodology as described in Section 4.4. This update will be undertaken in consultation with BCS and involve a test of the statistical power of the proposed monitoring methodologies described in the Plan. This update will occur prior to the commencement of operation.

6.2 Quarterly Results and Discussion Report

A brief results and discussion report would be provided to Transgrid following quarterly field surveys. This would provide:

- Results: raw data results for nest monitoring, carcass monitoring, and flight observations.
- Discussion: adaptive management triggers, analysis and recommended responsive mitigation, if required.

6.3 Final Report

It is anticipated the monitoring program will run for five years following cessation of construction. After the completion of the second year of monitoring, a Final Report would be prepared, providing:

- Compilation of all annual results to date.
- Statistical analysis of results in line with the rationale, including an estimate of annual mortality rates for birds (and bats if appropriate).
- Identification of any trends in terms of species at risk.
- Discussion of the effectiveness of proactive and responsive mitigation measures.
- Recommendations specific to the Snowy Hydro transmission line and for Transgrid's operations generally (e.g., in terms of tower or conductor configuration for bird and bat safety).
- The Final Report would be provided to DPHI and published on Transgrid's website, within six months of the final survey.

7 References

APLIC. (2006). *Suggested Practices for Avian Protection on Power Lines.* Washington DC: Edison Electric Institute, APLIC and California Energy Commission.

APLIC. (2012). *Reducing Avian Collisions with Power Lines: the State of the Art in 2012.* Washington DC: Edison Electric Institute and APLIC.

APLIC and USFWS. (2005). *Avian Protection Plan (APP) Guidelines.* United States: The Edison's Electric Institute's Avian Power Line Interaction Committee and U.S. Fish & Wildlife Service.

BCRQ Inc. (2019, Accessed 20/03/2023). *Electrocution on overhead powerlines*. Retrieved from Bat Conservation & Rescue Qld: https://bats.org.au/about/threats/electrocution-on-overhead-powerlines/

Bevanger, K. (1995). Estimates and populations conequences of tetranoid mortality caused by collisions with high tension power lines in Norway. *The Journal of Applied Ecology*, 32: 4: 745-753.

Borner, L., Duriez, O., Besnard, A., Robert, A., Carrere, V., & Jiguet, F. (2017). Bird collision with power lines: estimating carcass persistence and detection associated with ground search surveys.
Ecosphere, 8:11:1-13.

Costantini, D., Gustin, M., Ferrarini, A., & Dell'Omo, G. (2016). Estimates of avian collision with power lines and carcass disappearance across different environments. *Animal Conservation*. doi:doi:10.1111/acv.12303

DELWP. (2018). *Our Wildlife Fact Sheet: Wedge-tailed Eagle.* Melbourne, Victoria: Department of Environment, Land, Water and Planning.

DoE. (2015). *Referral guideline for 14 birds listed as migratory.* Canberra: Department of the Environment, Australian Government.

EcoSure. (2021). *A review of noise, light and dust impacts on grey-headed flying-fox camps.* Fortitude Valley, Brisbane QLD: EcoSure Pty Ltd.

EDM International. (2019). Avian-friendly Design & Planning: impacts prevention for high performing energy projects. Washington: International Association for Impact Assessment.

EDM International. (2023). *Bird Strike Indicator*. Retrieved from EDM International: https://edmlink.com/products/other-distribution-transmission-tools/bsi-bird-strike-indicator

ElectraNet. (2023). *Transmission lines*. Retrieved from ElectraNet: https://www.electranet.com.au/our- approach/safety/transmission-lines/

Energy Grid Alliance. (2021). *Wedge-tailed Eagle: Best Practice for Electricity Transmission Infrastructure Development.* Energy Grid Alliance. Retrieved from https://www.energygridalliance.com.au/reports- and-submissions/

Ferrer, M., Morandini, V., Baumbusch, R., Muriel, R., De Lucas, M., & Calabuig, C. (2020). Efficacy of different types of "bird flight diverter" in reducing bird mortality due to collision with transmission power lines. *Global Ecology and Conservation*, 23. doi:doi.org/10.1016/j.gecco.2020.e01130

FPA. (2015). *Fauna technical note no.1: eagle nest searching, activity checking and nest management.*Tasmania: Forest Practices Authority. Retrieved from https://fpa.tas.gov.au/Documents/Fauna_Tech_Note_1_Eagle_nest_management_May_2015.pdf

Galis, M., & Sevcik, M. (2019). Monitoring the effectiveness of bird flight diverters in preventing

bird mortality from powerline collisions in Slovakia. *Raptor Journal*, 45-49.

Haas, D., Nipkow, M., Fiedler, G., Schneider, R., Haas, W., & Schurenberg, B. (undated). *Protecting birds on powerlines: a practical guide on the risks to birds from electricity transmission facilities and how to minimise any such adverse effects.* Bonn, Germany: NABU - German Society for Nature Conservation.

Harness, R., Dwyer, J., & Pandey, A. (2019). Near-ultraviolet light reduced Sandhill Crane collisions with a powerline by 98%. *The Condor*, 121:2:. doi:DOI:10.1093/condor/duz008

Jacobs. (August 2022). *Appendix C Biodiversity Development Assessment Report.* Transgrid.

Martin, G. F. (2022). Vision-based design and deployment criteria for power line bird diverters. *Birds*, 3: 410-422. doi:doi.org/10.3390/

Martin, J. M. (2022). *Wildlife and Powerlines: s. Guidelines for preventing and mitigating wildlife mortality associated with electricty distribution networks.* Gland, Switzerland: IUCN.

McGoldrick. (2022, December 2). Transcript of Question time in Tasmanian parliament. (R. Woodruff, Interviewer) Retrieved from https://tasmps.greens.org.au/parliament/tasnetworks-threatened-birds

Mooney, N., Webb, C., & Mott, B. (2022). Managing bird interactions with power distribution assets in Australia. In J. Martin, G. J. Lopez, C. H. Sousa, & V. Barrios, *Wildlife and power lines: Guidelinesfor preventing and mitigating wildlife mortality associated with electricity distribution networks* (pp. 227-230). IUCN.

Orlowski, J., Harmening, W., & Wagner, H. (2012). Night vision in barn owls: Visual acuity and contrast sensitivity under dark adaptation. *Journal of Vision*, 12:3:1-8.

RPS. (2021). *Electrocutions & Collisions of Birds in EU Countries: The Negative Impact & Best Practices for Mitigation.* Germany: Raptor Protection of Slovakia, Nature and Biodiversity Union.

SCC. (2023, April). *The truth about flying fox vision*. Retrieved from Sunshine Coast Council: https://www.sunshinecoast.qld.gov.au/Environment/Education-Resources-and-Events/Environment- Resources-and-Publications/Native-Animals/truth-about-flying-fox-vision

SEWPAC. (2012). *EPBC Act 1999 Environmental Offsets Policy.* Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities, Australian Government.

TasNetworks. (2022). *TasNetworks Threatened Bird Strategy 2022-2032.* TasNetworks Threatened Bird Working Group.

TSSC. (2019). *Conservation Advice Hirundapus caudacutus White-throated Needletail.* Canberra, ACT: THREATENED SPECIES SCIENTIFIC COMMITTEE Established under the Environment Protection and Biodiversity Conservation Act 1999.

Yee, M. (2008). *Testing the effectiveness of an avian flight diverter for reducing avian collisions with distribution power lines in the Sacramento Valley, California.* California, USA: California Energy Commission

APPENDIX A Technical Report

Technical Report

Snowy 2.0 Transmission Line Bird and Bat Management Plan

May 2023

Project Number: 21-963



Document verification

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Table of contents

1. Introduction 34

2. Species risk assessment 34

2.1. Approach 34

2.2. Likelihood and consequence analysis 34

2.2.1. Factors considered 34

2.2.2. Overall classifications per species 38

2.3. Risk 44

3. Hazard analysis 47

3.1. Configuration hazard analysis 47

3.2. Habitat hazard analysis 48

4. Proactive mitigation options 51

4.1. Recommended products for line marking 52

5. References 53

Tables

Table 2-1 Summary of factors for birds species with higher potential to occur in the vicinity of transmission lines (from (Jacobs, August 2022)) 36

Table 2-2 Likelihood classification for each species assessed in BDAR 38

Table 2-3 Likelihood factors and score for Large Bent-winged Bat and Grey-headed Flying-fox 40

Table 2-4 Consequence factors and score for Large Bent-winged Bat 43

Table 2-5 Qualitative bird risk assessment Part 1 – species assessed in BDAR 44

Table 3-1 Design components that affect the electrocution hazard posed by configuration of poles and towers 48

Table 3-2 Known hazards along the transmission line 49

Table 4-1 Effectiveness of different aspects of style, colour, movement, spacing, and shape of line markers based on (RPS, 2021; EDM International, 2019) 51

Table 4-2 Characteristics of effective bird diverter products 52

Appendices

Appendix A Data specifications for bird diverters ..... A-I 54

1. Introduction

This technical report provides supplementary technical information for the Snowy Hydro 2 Transmission Line Bird and Bat Management Plan. The two documents are intended for use together. This is not intended as a stand-alone report.

2. Species risk assessment

The risk assessment considers the electrocution and/or collision risk of different bird and bat species based on local presence, physiological and behavioural attributes.

2.1. Approach

A detailed likelihood and consequence analysis for collision with transmission lines was undertaken for the BDAR and is presented in Appendix J of that document (Jacobs, August 2022). The results of that analysis are reproduced here in the following sub-section. In Section 2.2.2, we then apply the likelihood and consequence ratings to a standard risk matrix to determine overall risk for each assessed species.

We use a risk analysis framework adapted from the AS/NZS 4360 to develop a qualitative risk matrix with three levels: low, moderate, high.

Likelihood	**Consequence**			
	Insignificant	Minor	Moderate	Significant
Rare	Low	Low	Moderate	High
Unlikely	Low	Low	Moderate	High
Possible	Low	Moderate	High	High
Probable	Moderate	High	High	High

Risk is determined by the interaction of likelihood and consequence. The BDAR analysis provides an analysis for each likelihood and consequence factor, thus it was first necessary to synthesis the BDAR analysis to obtain an overall likelihood and consequence classification per species.

2.2. Likelihood and consequence analysis

2.2.1. Factors considered

The section below is taken from the BDAR (Jacobs, August 2022).

Table J-4 below provides a summary of a number of the key likelihood and consequence variables (where data is available) for species that occur are known to occur at or near the project area (based on desktop habitat assessments, field surveys and bird lists from the KNP). These species

represent a subset of species ever reported in the study area. In reality those which have been regularly recorded during the ongoing surveys in the study area, would have increased potential for occurrence and hence for impacts, it is likely that a number of these species only occur very occasionally.

Classification of data and justification for likelihood categories are as follows:

- Higher likelihoods are colour coded as red and bold, moderate likelihoods are orange and italics, and low likelihoods are green. Where there is no likelihood considered, or data is unavailable, the likelihood has no colour code.
- Size data is based on wing length (not wingspan) and as per Menkhorst et al. 2017, acknowledging that there is some overlap, particularly for heavy bodied species like ducks. Categories are defined in footnote 3 of Table J-4 in the BDAR. Species are considered to have a higher likelihood of collision if their size is large or above. If they are medium / large (usually based on weight, e.g. ducks), they are considered to have a moderate risk of collision.
- Timing of dispersal (or hunting) data is limited for most species, but is based on information broadly provided in Carpenter 2002 and Menkhorst et al. 2017. Species are considered to have a higher likelihood of collision if they disperse at night or when visibility is lower. It is noted thought that bird vision is adapted to behaviour, particularly for predators, hence these night dispersing species may respond positively to reflective markers (a mitigation measure being used in European countries) (SNH 2016).
- Flight type is based on general information in Menkhorst et al. 2017, fact sheets or information in Carpenter 2002. Species are considered to have a higher likelihood of collision if they are considered or known to be non-agile fliers, heavy bodied, fly in tight flocks. Likelihood is considered to be higher if they exhibit all of these factors, low if they only exhibit one of these factors or only occasionally fly in a flock.
- Likelihood of occurrence is as described in (Jacobs, August 2022) , and / or known to occur as per Kosciuszko National Park Bird list (cited online at https://avibase.bsc-eoc.org/checklist.jsp?region=AUns0119).
- Historical evidence of collision with powerlines is based on ABBBS data 1995-2020 (DAWE 2021). Species with historical records of death attributed to powerlines are considered to have a higher likelihood of collision. Data not obtained for all species, some species not banded.

Classification of data and justification for risk consequence categories are as follows:

- Higher consequence categories are coded red, moderate consequences are coded orange, low / no consequence has no colour.
- Conservation status based on EPBC Act (excluding Listed Marine) and NPW Act. Species with conservation status are considered to have a higher consequence from impacts as they generally have lower local population numbers and they are considered to be threatened or protected.
- Global populations estimates are based on minimum estimates of mature individuals of a species as per IUCN categories (Birdlife International (2019-2021), see footnote 4 of Table 13 below). Consequences are considered to be higher for species with small global population and lower for species with large to extremely large global populations.

Table 2-1 Summary of factors for birds species with higher potential to occur in the vicinity of transmission lines (from (Jacobs, August 2022))

Common name	Likelihood factors					Consequence Factors		
	Size (determined by wing length / weight) [1]	Dispersal timing[2]	Flight type[2]	Likelihood [3]	Recorded deaths attributed to power lines[4] Aus	EPBC status[5]	NSW status[6]	Global Population Estimate [7]
Waterbirds								
Dusky Moorhen	*M*	Night	*Non-agile, heavy*	Known		None	None	
Lewin's Rail	S	Night	*Non-agile*	Known		None	None	
White-faced Heron	M / L	Daylight[2]	*Non-agile*	Known	0	None	None	Small to Large
Pacific Heron / White-necked Heron	L		*Non-agile*	Known	0	None	None	Large
Rufous Night Heron	*M*		*Non-agile*	Known	0	LM	None	
Australasian Grebe	S	Night[2]	*Fast*	Known	0	None	None	Small to Very Large
Little Black Cormorant	M	Daylight[2]	*Flock*	Known	0	None	None	Very large
Great (Black) Cormorant	L	Daylight[2]	Flock or single	Known	0	None	None	Extremely Large
Australian White Ibis	L	Daylight[2]	*Flock / non-agile*	Known	2	LM	None	Very large
Straw-necked Ibis	L	Daylight[2]	*Flock / non-agile*	Known	0	LM	None	Extremely large
Little Pied Cormorant	M	Daylight[2]	Single	Known	0	None	None	Very large
Australian Wood Duck / Maned Duck	*M/L*	Night[2]	Fast / flock / heavy	*Known*	0	None	None	Very large
Pacific Black Duck	*M / L*	Night[2]	Fast / flock / heavy	*Known*	*1*	None	None	Very large
Black Swan	VL	Night[2]	*Pairs / Flocks when wetlands dry*[2]	*Known*	5	None	None	Very large
Musk Duck	M/L	Night	*unknown*	*Known*	*1*	LM	None	*decreasing*
Australian Pelican	VL	Daylight[2]	Soar over floodplain permanent water / will flock to inland salt lakes	Known	9	LM	None	Very large
Hoary-headed Grebe	S	Night[2]	*Fast / Non-agile*	Known	0	None	None	Moderate to Very Large
Hardhead	*M / L*	Night[2]	Fast / flock / heavy	Known	0	None	None	Very large

Common name	Likelihood factors					Consequence Factors		
	Size (determined by wing length / weight) [1]	Dispersal timing[2]	Flight type[2]	Likelihood [3]	Recorded deaths attributed to power lines[4] Aus	EPBC status[5]	NSW status[6]	Global Population Estimate [7]
Eurasian Coot	*M*	Night[2]	Fast / flock / heavy	Known	0	None	None	Extremely large
Grey Teal	*M*	Night[2]	Fast / flock / heavy	Known	0	None	None	Extremely large
Migratory Shorebirds								
Latham's Snipe	*S/M*	Night	Small flock	*Known*	0			
Resident Shorebirds								
Black-fronted Dotterel	S	Night[2]	Small flocks during non-breeding	*Known*	0	None	None	Moderate to large
Masked Lapwing	*M*	Night[2]	Can form aggregations non-breeding	*Known*	0	None	None	Moderate
Marine / Migratory								
Silver Gull	*M*	Daylight[2]	*Flocks*	Known	*2*	LM	None	Very large
White-throated Needletail	*M*	*Daylight*	*Flocks*	*Known*	*0*	*LM, Vu*	*None*	*Large*
Raptors								
White-bellied Sea-eagle	VL	Daylight	*Non-agile*	*Known*	0	LM	E	*Small to Mod*
Swamp Harrier	L	Daylight	*Non-agile*	*Known*	0	LM	-	Mod to large
Peregrine Falcon	M / L	Daylight	*Agile, but fast*	*Known*	5	None	*R*	Very Large
Black Shouldered Kite	*M*	Daylight	agile	Known		None	None	increasing
Little Eagle	L	Daylight	*Fast, agile*	Known	6	None	*Vu*	Large
Wedge-tailed Eagle	VL	Daylight	*Heavy, non agile*	*Known*		None	None	increasing
Grey Goshawk	*M*	Daylight	agile	*Known*		None	None	*Small*
Brown Goshawk	*M*	Daylight	agile	*Known*		None	None	*decreasing*
Collared Sparrowhawk	*S/M*	Daylight	agile	*Known*		None	None	*decreasing*
Whistling Kite	L	Daylight	*Non-agile*	*Known*		None	None	*decreasing*
Australian Kestrel	*S/M*	Daylight	agile	*Known*		None	None	increasing
Brown Falcon	*M*	Daylight	*Non-agile*	*Known*		None	None	*decreasing*
Australian Hobby	*S/M*	*Diurnal / predator*	agile	*Known*		None	None	increasing
Nocturnal								
Tawny Frogmouth	*S/M*	*Nocturnal / predator*	agile	*Known*		None	None	stable

2.2.2. Overall classifications per species

To obtain an overall likelihood and consequence classification for all species, a semi-quantitative method has been used. For each factor considered, a score of 0-3 is allocated, with zero used for no likelihood/consequence, one for low, two for moderate and three for high. The sum of each factor determines the classification as below.

Appendix J of BDAR considers the potential for threatened species with potential to occur in the study area to fly at transmission line height. Species with a low potential were not considered further (Table J-1 in Appendix J, BDAR). This table was reviewed in preparation for the BBMP. Two species considered to have low likelihood for collision have been identified as requiring further review:

- Large Bent-winged Bat.
- Grey-headed Flying-fox (*Pteropus poliocephalus*).

The BDAR states the potential is low for Large Bent-winged Bat as the species flies “fast .. between shrub and canopy” and therefore low potential to fly at the height of transmission lines. However, Large Bent-winged Bat has been found during mortality surveys at NSW wind farms and recorded on Anabats placed at nacelle height, indicating that the species flies at least at ~100m above ground level (NGH, in-preparation). On this basis, the species has been added to the assessment, below.

The BDAR states the Grey-headed Flying-fox has a low likelihood for occurring in the study area given the closest known camp is more than 130 km distant. However, given this is a migratory species, records do occur (albeit few) in the locality and the species is known to be susceptible to powerline electrocution, Grey-headed Flying-fox has been added to the assessment below. Risk assessment and mitigation for this species are taken to be a surrogate for other flying-fox species.

Likelihood

The overall likelihood factor is:

- Rare: total score 0-3
- Unlikely: total score 4-7
- Possible: total score 8-11
- Probable: total score 12-15

Table 2-2 Likelihood classification for each species assessed in BDAR

Common name	Likelihood sum	Likelihood score	Likelihood classification
Dusky Moorhen	2+3+2+2+0	9	Possible
Lewin’s Rail	0+3+2+2+0	7	Unlikely
White-faced Heron	3+1+2+2+0	8	Possible
White-necked Heron	3+1+2+2+0	8	Possible
Rufous Night Heron	2+1+2+2+0	7	Unlikely
Australasian Grebe	0+3+2+2+0	7	Unlikely

Common name	Likelihood sum	Likelihood score	Likelihood classification
Little Black Cormorant	0+1+2+2+0	5	Unlikely
Great Cormorant	3+1+1+2+0	7	Unlikely
Australian White Ibis	3+1+2+2+2	10	Possible
Straw-necked Ibis	3+1+2+2+0	8	Possible
Little Pied Cormorant	0+1+0+2+0	3	Rare
Australian Wood Duck	2+3+3+2+0	10	Possible
Pacific Black Duck	2+3+3+1+2	11	Possible
Black Swan	3+3+2+2+3	13	Probable
Musk Duck	3+3+2+2+2	12	Probable
Australian Pelican	3+1+1+2+3	10	Possible
Hoary-headed Grebe	0+3+2+2+0	7	Unlikely
Hardhead	0+3+3+2+0	8	Possible
Eurasian Coot	2+3+3+2+0	10	Possible
Grey Teal	2+3+3+2+0	10	Possible
Latham's Snipe	2+3+0+2+0	7	Unlikely
Black-fronted Dotterel	0+3+1+2+0	6	Unlikely
Masked Lapwing	2+3+1+2+0	8	Possible
Silver Gull	2+1+1+1+1	6	Unlikely
White-throated Needletail	2+1+2+2+0	7	Unlikely
White-bellied Sea-eagle	3+1+2+2+0	8	Possible
Swamp Harrier	3+1+2+2+0	8	Possible
Peregrine Falcon	3+1+2+2+3	11	Possible
Black-shouldered Kite	2+1+0+2+0	5	Unlikely
Little Eagle	3+1+2+2+3	11	Possible
Wedge-tailed Eagle	3+1+2+2+0	8	Possible
Grey Goshawk	2+1+0+2+0	5	Unlikely
Brown Goshawk	2+1+0+2+0	5	Unlikely

Common name	Likelihood sum	Likelihood score	Likelihood classification
Collared Sparrowhawk	2+1+0+2+0	5	Unlikely
Whistling Kite	3+1+2+2+0	8	Possible
Australian Kestrel	2+1+0+2+0	5	Unlikely
Brown Falcon	2+1+2+2+0	7	Unlikely
Australian Hobby	2+2+0+2+0	6	Unlikely
Tawny Frogmouth	2+2+0+2+0	6	Unlikely
White-throated Nightjar	0+2+0+2+0	4	Unlikely
Australian Owlet-Nightjar	0+2+0+2+0	4	Unlikely
Sooty Owl	3+2+2+2+0	9	Possible
Masked Owl	2+2+0+3+0	7	Unlikely
Barn Owl	2+2+0+2+0	6	Unlikely
Powerful Owl	3+2+2+2+0	9	Possible
Southern Boobook	2+2+0+3+0	7	Unlikely
Gang-gang Cockatoo	2+1+0+2+0	5	Unlikely
Yellow-tailed Black-cockatoo	2+1+0+2+0	5	Unlikely
Sulphur-crested Cockatoo	2+1+0+2+0	5	Unlikely

Additional species

The likelihood score for Large Bent-winged Bat is 7, and the classification is unlikely (Table 2-3). The likelihood score for Grey-headed Flying-fox is 13 and the classification is probable.

Table 2-3 Likelihood factors and score for Large Bent-winged Bat and Grey-headed Flying-fox

Likelihood						
Species	**Size**	**Dispersal timing**	**Flight type**	**Presence**	**Recorded deaths by powerlines**	**Score**
Large Bent-winged Bat	S	Night	Fast, direct	Known	0	

Large Bent-	0	3	2	2	0	**7**

Likelihood						
winged Bat						
Grey-headed Flying-fox	L	Night	Fast, flock, heavy	Possible	Y	
Grey-headed Flying-fox	3	3	3	1	3	**13**

Consequence

The overall consequence factor is:

- Insignificant: total score 0-3
- Minor: total score 4-7
- Moderate: total score 8-11
- Significant: total score 12-15

Common name	Consequence sum	Consequence score	Consequence classification
Dusky Moorhen	0+0+0+1	1	Insignificant
Lewin's Rail	0+0+0+1	1	Insignificant
White-faced Heron	0+0+3+1	4	Minor
White-necked Heron	0+0+2+1	3	Insignificant
Rufous Night Heron	1+0+0+1	2	Insignificant
Australasian Grebe	0+0+2+1	3	Insignificant
Little Black Cormorant	0+0+1+1	2	Insignificant
Great Cormorant	0+0+0+1	1	Insignificant
Australian White Ibis	1+0+1+1	3	Insignificant
Straw-necked Ibis	1+0+0+1	2	Insignificant
Little Pied Cormorant	0+0+0+1	1	Insignificant
Australian Wood Duck	0+0+1+1	2	Insignificant
Pacific Black Duck	0+0+1+1	2	Insignificant
Black Swan	0+0+1+1	2	Insignificant

Common name	Consequence sum	Consequence score	Consequence classification
Musk Duck	1+0+2+1	4	Minor
Australian Pelican	1+0+1+1	3	Insignificant
Hoary-headed Grebe	0+0+2+1	3	Insignificant
Hardhead	0+0+1+1	2	Insignificant
Eurasian Coot	0+0+0+1	1	Insignificant
Grey Teal	0+0+0+1	1	Insignificant
Latham's Snipe	1+0+0+2	3	Insignificant
Black-fronted Dotterel	0+0+2+1	3	Insignificant
Masked Lapwing	0+0+3+1	4	Minor
Silver Gull	1+0+1+1	3	Insignificant
White-throated Needletail	2+0+2+2	6	Minor
White-bellied Sea-eagle	1+2+3+3	9	Moderate
Swamp Harrier	1+0+3+3	7	Moderate
Peregrine Falcon	0+1+1+2	4	Minor
Black-shouldered Kite	0+0+1+2	3	Insignificant
Little Eagle	0+2+2+3	7	Moderate
Wedge-tailed Eagle	0+0+1+3	4	Minor
Grey Goshawk	0+0+3+2	5	Minor
Brown Goshawk	0+0+2+2	4	Minor
Collared Sparrowhawk	0+0+2+2	4	Minor
Whistling Kite	0+0+2+3	5	Minor
Australian Kestrel	0+0+1+2	3	Insignificant
Brown Falcon	0+0+2+2	4	Minor
Australian Hobby	0+0+1+2	3	Insignificant
Tawny Frogmouth	0+0+1+1	2	Insignificant

Common name	Consequence sum	Consequence score	Consequence classification
White-throated Nightjar	0+0+2+2	4	Minor
Australian Owlet-Nightjar	0+0+1+2	3	Insignificant
Sooty Owl	0+2+3+3	8	Moderate
Masked Owl	0+2+2+2	6	Minor
Barn Owl	0+0+1+1	2	Insignificant
Powerful Owl	0+2+3+3	8	Moderate
Southern Boobook	0+0+2+2	4	Minor
Gang-gang Cockatoo	0+2+2+2	6	Minor
Yellow-tailed Black-cockatoo	0+0+2+2	4	Minor
Sulphur-crested Cockatoo	0+0+1+2	3	Insignificant

Additional species

The consequence score for Large Bent-winged Bat is 6, and the classification is minor. The consequence score for Grey-headed Flying-fox is 7, and the classification is moderate.

Table 2-4 Consequence factors and score for Large Bent-winged Bat

Consequence					
Species	**EPBC status**	**NSW status**	**Global population estimate**	**Fecundity**	**Score**
Large Bent-winged Bat	None	Vulnerable	Very large	Low	
Large Bent-winged Bat	0	2	1	3	**6**
Grey-headed Flying-fox	Vulnerable	Vulnerable	Extremely large	Low	
Grey-headed	2	2	0	3	**7**
Flying-fox					

2.3. Risk

The qualitative risk assessment for species analysed in the BDAR (plus Large Bent-winged Bat and Grey-headed Flying-fox) is given in Table 2-5 below, based on likelihood and consequence.

High risk species are:

- Musk Duck
- White-bellied Sea-eagle
- Sooty Owl
- Powerful Owl
- Grey-headed Flying-fox

Moderate risk species are:

- White-faced Heron
- Masked Lapwing
- Swamp Harrier
- Peregrine Falcon
- Little Eagle
- Wedge-tailed Eagle
- Whistling Kite

Table 2-5 Qualitative bird risk assessment Part 1 – species assessed in BDAR

Common name	Likelihood	Consequence	Risk
Dusky Moorhen	Possible	Insignificant	Low
Lewin's Rail	Unlikely	Insignificant	Low
White-faced Heron	Possible	Minor	Moderate
White-necked Heron	Possible	Insignificant	Low
Rufous Night Heron	Unlikely	Insignificant	Low
Australasian Grebe	Unlikely	Insignificant	Low
Little Black Cormorant	Unlikely	Insignificant	Low
Great Cormorant	Unlikely	Insignificant	Low
Australian White Ibis	Possible	Insignificant	Low
Straw-necked Ibis	Possible	Insignificant	Low

Common name	Likelihood	Consequence	Risk
Little Pied Cormorant	Rare	Insignificant	Low
Australian Wood Duck	Possible	Insignificant	Low
Pacific Black Duck	Possible	Insignificant	Low
Black Swan	Probable	Insignificant	Low
Musk Duck	Probable	Minor	High
Australian Pelican	Possible	Insignificant	Low
Hoary-headed Grebe	Unlikely	Insignificant	Low
Hardhead	Possible	Insignificant	Low
Eurasian Coot	Possible	Insignificant	Low
Grey Teal	Possible	Insignificant	Low
Latham's Snipe	Unlikely	Insignificant	Low
Black-fronted Dotterel	Unlikely	Insignificant	Low
Masked Lapwing	Possible	Minor	Moderate
Silver Gull	Unlikely	Insignificant	Low
White-throated Needletail	Unlikely	Minor	Low
White-bellied Sea-eagle	Possible	Moderate	High
Swamp Harrier	Possible	Moderate	High
Peregrine Falcon	Possible	Minor	Moderate
Black-shouldered Kite	Unlikely	Insignificant	Low
Little Eagle	Possible	Moderate	High
Wedge-tailed Eagle	Possible	Minor	Moderate
Grey Goshawk	Unlikely	Minor	Low
Brown Goshawk	Unlikely	Minor	Low
Collared Sparrowhawk	Unlikely	Minor	Low
Whistling Kite	Possible	Minor	Moderate
Australian Kestrel	Unlikely	Insignificant	Low

Common name	Likelihood	Consequence	Risk
Brown Falcon	Unlikely	Minor	Low
Australian Hobby	Unlikely	Insignificant	Low
Tawny Frogmouth	Unlikely	Insignificant	Low
White-throated Nightjar	Unlikely	Minor	Low
Australian Owlet-Nightjar	Unlikely	Insignificant	Low
Sooty Owl	Possible	Moderate	High
Masked Owl	Unlikely	Minor	Low
Barn Owl	Unlikely	Insignificant	Low
Powerful Owl	Possible	Moderate	High
Southern Boobook	Unlikely	Minor	Low
Gang-gang Cockatoo	Unlikely	Minor	Low
Yellow-tailed Black-cockatoo	Unlikely	Minor	Low
Sulphur-crested Cockatoo	Unlikely	Insignificant	Low
Large Bent-winged Bat	Unlikely	Minor	Low
Grey-headed Flying-fox	Probable	Moderate	High

3. Hazard analysis

The hazards that may cause the transmission line to be harmful (i.e. via collisions and electrocutions) to birds and bats are:

- The inherent hazards present in the configuration of infrastructure components.
- The quality of the habitat (that is, high quality habitat, higher concentration of bird and bat activity, greater hazard the transmission lines pose).

3.1. Configuration hazard analysis

This configuration analysis considers the hazards present for collision and electrocution of birds and bats due to the configuration of the transmission towers and lines used in this project.

The design configuration of the transmission towers and lines will have a direct effect on the incidence of bird and bat collision and electrocution. The approach of this assessment has been to compare the design components of the transmission towers and conductors to be installed against known hazardous or best practice designs in order to highlight 'risk' areas or mitigation opportunities. Hazardous and best practices are discussed below.

For electrocution hazards, safe structures for birds and fruit bats are those that provide:

- Sufficient clearance between energised conductors or energised conductors and grounded hardware.
- Insulation at energised and/or grounded junction points.
- Reduced opportunity for use as habitat by birds.

Sufficient clearance is enough to allow the fleshy parts (rather than the dry feathers) through and thus for birds, the wrist-to-wrist distance is used. The standard recommended in the US to allow large eagles clearance is 60 inches or 150cm separation between energised and/or grounded parts for large birds to fly through (APLIC, 2006). This would also be sufficient to provide clearance for Grey-headed Flying-fox (with a wingspan of around one metre). Vertical separation between components should be sufficient to accommodation a large bird from feet to top of head when perching; although Wedge-tailed Eagles can stand as high as one metre (DELWP, 2018), vertical separation of 100cm should be sufficient in most instances. The larger design of transmission towers makes them inherently safer than distribution poles. In Tasmania, the majority of bird electrocutions (>90%) occur on the distribution network rather than the transmission lines (McGoldrick, 2022)

For collision hazards, the location of the lines in relation to other structures or topographic features as well as the visibility of the conductors and other components e.g. the overhead earth or static wire. Additionally, the number of planes or pylon levels lowers the collision hazard due to an 'aerial net' effect (EDM International, 2019; RPS, 2021).

Table 3-1 lists design components that affect the electrocution hazard along with the best practice design and the project design, and has been informed by the best practice guidelines listed in Section 4 as well as (Haas, et al., undated). A hazard level for each component is assigned (low, moderate, high) based on how the design conforms with best practice. A low overall configuration hazard level has assigned for this project based on each design component.

Table 3-1 Design components that affect the electrocution hazard posed by configuration of poles and towers

Design component	Best practice	Project design	Hazard level
Number of planes – each layer of wires presents a hazard.	Reduce the number of planes by having more horizontal rather than vertical configurations.	Four planes or pylon levels	High - collision
Horizontal separation between conductors	Horizontal separation of 150cm would ensure safety of largest Australian birds. Minimum separation of 100cm would facilitate most birds and bats.	Minimum of 15.38 metres	Low
Vertical separation between pylon levels	Vertical separation of 80cm	Minimum of 8.15 metres	Low
Conductors	Bundled conductors to reduce 'aerial net' effect	50mm thick conductor wires are thought to be highly visible, bundled not required.	Low
Insulators	Insulated conductors where join towers	Insulators to be installed near conductor attachment plate	Low
Earth wire	Underslung or marked	Marked earth wires	Low
Insulators	Suspended	Suspended	Low
Position of cross-arms	Downward slanting	Downward slanting	Low
Overall			Low

3.2. Habitat hazard analysis

The habitat analysis considers the hazards inherent in the location of the transmission line in relation to habitat features.

Available research shows a strong correlation between the threat to birds of powerlines and proximity to bird habitat or main movement corridors (RPS, 2021). This correlation is likely to hold

true for bats particularly flying-foxes also. The transmission line location is assessed using GIS against prominent landscape features, known nest sites, important waterways, peak habitat areas (e.g. updraught zones for raptors) for high risk species. Known hazards are listed in Table 3-2 and mapping is provided in the main report. Although transmission lines through high quality habitat are known to be a hazard, all the habitat around the footprint is high quality. Therefore, this feature has not been used to identify key areas for mitigation.

Table 3-2 Known hazards along the transmission line

Hazard level	Electrocution	Collision
High	Transmission lines through high quality habitat Transmission poles and towers with elevated exposures – provide useful perches for predators	Transmission lines perpendicular to major movement corridors or landscape features Transmission lines within 100m of large bird nests (e.g. owls, eagles) Within 100m of significant waterways (Strahler Level 5 and above) Transmission lines through high quality habitat Transmission lines at flight altitude

Electrocution

As large raptors and flying-foxes are moderate and high risk species, electrocution hazards have been considered in this habitat hazard analysis despite client perceptions that electrocution hazards are very low due to the configuration of the infrastructure (i.e., large separation distances between conductors along with insulated components). The main hazard is where transmission towers are located with elevated exposures and provide useful perches for raptors. Within the project site, such high hazard areas for electrocution have been identified at four points along the transmission line:

1. Isolated peak near Elliott Way west of Boundary Road.
2. Near where the transmission line crosses Elliott Way, east of Boundary Road.
3. Near where the transmission line crosses Elliott Way again, east of Boundary Road.
4. The ridge directly west of Tumut River where towers will be located.

These are shown on figures in the main report. These areas should be included in carcass monitoring searches to establish whether the low perceived electrocution risk of high voltage transmission lines is accurate.

Collision

Certain habitat locations would render transmission lines a higher collision hazard for birds and bats than others. Based on analysis, the transmission line is likely to be hazardous to birds and bats (due to collision) in two locations, shown on figures in the main report:

1. The span across a small valley located at approximately 2,200 and 2,800 as shown on plan TL-902725-01.J (a distance of around 400 metres).
2. The span across Tumut River between tower located at approximately 4,900 and 6,200 distance as shown on plan TL-902725-02.J (a distance of approximately 1300 m).
3. Proximity to potential Gang-gang Cockatoo / Masked Owl nest trees near Mine Trail (approximately 1400 m).

The above locations should be targeted areas for installation of bird diverters.

4. Proactive mitigation options

The main approach to preventing and mitigation collisions are:

- Installing powerline in low hazard habitat areas.
- Making aspects of configuration inherently 'bird safe'.
- Marking lines using bird diverters.

In Australia, the focus presently is to increase the visibility of powerlines by line marking. The most effective form and colour for line marking depends on a range of factors including target species, location, environmental conditions (e.g. weather) and ambient light levels (RPS, 2021; Martin, 2022). Of note, the best line markers are based on what is known about bird perceptions rather than human (Martin, 2022). As birds flying high (e.g. above the canopy) would generally be expecting few obstacles and therefore may be operating on a form of 'cruise control', highly obvious markers are most likely to be observable at sufficient distance for the bird to alter its' flight path (Martin, 2022). Although it differs significantly between species (e.g. eagles versus ducks), the region of binocular vision is relatively narrow for birds compared to humans; birds have greater spatial resolution in their lateral field of vision than in front (Martin, 2022). Flying-foxes have dichromatic vision (see fewer colours) and fewer colour-detecting cones in their eyes than people, thus also see colours less intensely. Instead, flying-foxes have well-developed night vision and navigate using contrast (SCC, 2023).

Monitoring at Australian sites appears not to have been undertaken, thus we must lean on results from overseas. Studies around the world have varied results but some understanding has emerged (Table 4-1). In short, high contrast (black/white) are most likely to be effective over the greatest range of light levels and background (sunny/cloud/trees) (Martin, 2022; RPS, 2021). Ideally, the white would be highly reflective and the black highly absorptive (Martin, 2022).

Coloured markers (red, orange, etc) are of low effectiveness because colour not visible in low light conditions and fails to stand out against varied backgrounds. Static markers do not attract attention, flappers are still in low wind and not visible from oblique angles. Spinning 3-D markers perform best because they are moving (i.e. noticeable) and visible from all angles. Glowing and reflective patches are important for birds flying in low light or dark conditions.

Table 4-1 Effectiveness of different aspects of style, colour, movement, spacing, and shape of line markers based on (RPS, 2021; EDM International, 2019)

Aspect	Low effectiveness	Higher effectiveness
Style	Static markers (Germany) Static spirals, coils pigtails or small markers (Germany, Portugal)	FireFly Bird Diverters (Germany, Spain) Black and white flapping RIBE diverters (Germany, Hungary, Slovakia)
Colour	Static orange, yellow and red diverters (Germany)	Black and white aviation marker balls and marker plates (Austria) High contrast black and white flapping

Aspect	Low effectiveness	Higher effectiveness
	Grey and red/white diverters (Portugal)	diverters (Germany) Large reflective patches and glowing reflectors
Movement	Static	Flapping Spinning
Spacing	>30 m intervals	5 – 30 m intervals
Shape	2-dimensional	3-dimensional

4.1. Recommended products for line marking

Three effective trademarked products have been identified based on the information above:

- BirdMark Afterglow™
- ROTAMARKA™
- FireFly™

Following discussions with Transgrid and the PC, the following information (Table 4-2) has been compiled regarding the characteristics of the three effective bird diverter products listed above. The manufacturer's website and datasheets have been the source of the information; data specifications for each product in the table are appended to this report. Note that ROTAMARKA™ bests provides the attributes required for the species identified as moderate and high risk. This is discussed in detail in the main report.

Table 4-2 Characteristics of effective bird diverter products

Known effective brands/designs	BirdMark Afterglow™	ROTAMARKA™	FireFly™
Weight	200g	800g	200g
Spacing	3-5 m?	20m[1]	9m
Drone installation	Yes	Yes	Yes

[1] 5-30m is manufacturer's recommendation; our recommendation is 20m – refer to main report.

Known effective brands/designs	BirdMark Afterglow™	ROTAMARKA™	FireFly™
Material	UV resistant plastic	UV stable Nylon 6	Acrylic plastic
Wind resistance	Perforated disc design allows wind to pass through	Hinged joint mechanism helps dissipate wind loadings	Spinning model not recommended in high winds

5. References

APLIC. (2006). *Suggested Practices for Avian Protection on Power Lines.* Washington DC: Edison Electric Institute, APLIC and California Energy Commission.

DELWP. (2018). *Our Wildlife Fact Sheet: Wedge-tailed Eagle.* Melbourne, Victoria: Department of Environment, Land, Water and Planning.

EDM International. (2019). Avian-friendly Design & Planning: impacts prevention for high performing energy projects. Washington: International Association for Impact Assessment.

Haas, D., Nipkow, M., Fiedler, G., Schneider, R., Haas, W., & Schurenberg, B. (undated). *Protecting birds on powerlines: a practical guide on the risks to birds from electricity transmission facilities and how to minimise any such adverse effects.* Bonn, Germany: NABU - German Society for Nature Conservation.

Jacobs. (August 2022). *Appendix C Biodiversity Development Assessment Report.* Transgrid.

Martin, G. F. (2022). Vision-based design and deployment criteria for power line bird diverters. *Birds*, 3: 410-422. doi:doi.org/10.3390/

McGoldrick. (2022, December 2). Transcript of Question time in Tasmanian parliament. (R. Woodruff, Interviewer) Retrieved from https://tasmps.greens.org.au/parliament/tasnetworks-threatened-birds

RPS. (2021). *Electrocutions & Collisions of Birds in EU Countries: The Negative Impact & Best Practices for Mitigation.* Germany: Raptor Protection of Slovakia, Nature and Biodiversity Union.

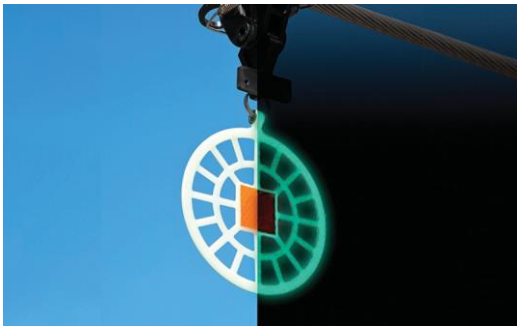
SCC. (2023, April). *The truth about flying fox vision*. Retrieved from Sunshine Coast Council: https://www.sunshinecoast.qld.gov.au/Environment/Education-Resources-and-Events/Environment-Resources-and-Publications/Native-Animals/truth-about-flying-fox-vision

Appendix A Data specifications for bird diverters

BirdMark® Bird Diverter



Recommended by the U.S. Fish and Wildlife Service, budget-friendly BirdMark bird diverters are compa- rable to our highly effective FireFly® bird diverters in preventing bird strikes on power lines.



Day and night visibility

BirdMark bird diverter



BirdMark front and back

Millions of birds and bats are killed each year in collisions with power lines, guy wires, and other thin profile obstructions. Bird strikes also cause power outages.

Incorporating motion, reflectivity, and glowing light, BirdMark bird diverters are a highly effective and proven solution for protecting birds in flight from such collisions.

BirdMark is also our most affordable bird diverter and a cost effective choice, with a lower installed cost than coils. Furthermore, coils can entangle birds and are less effective diverters, especially in low light at dawn and dusk.

1.1.1.1.1.1.1 BirdMark Makes Hazards Visible to Birds

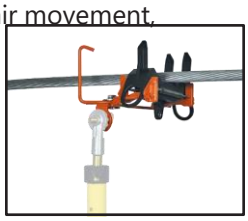
- Developed and fully tested by avian biologists.
- Flutters and sways with air movement, increasing visibility for migrating birds and bats. Circular pattern of holes works well in a wide range of winds. 5-3⁄8" diameter white disk. 11-1/2" total length.
- Diamond bar material refracts sunlight and provides a "sparkle effect" visible to birds up to a quarter mile away.
- Luminescent material emits visible light for up to 12 hours after dusk, and in low light or fog conditions, when birds are most vulnerable.

7.1.1.1.1.1.1.2 Fast and Simple Installation

- BirdMark installs in seconds on live lines up to 115 kV by hand, hot stick, or helicopter. Also safe to use on OPGW lines.
- BirdMark is easy to remove and install as bird activity changes with the season.
- Recommended spacing is 15 feet between BirdMark diverters.
- Patented and rugged SnapFast mounting clamp prevents line slippage on single or bundled cables. Choose from two sizes: 10–70 mm (0.39"–2.75") P/N #BM-AG-SF10-70 4–16 mm (0.16"– 0.63") P/N #BM-AG-SF4-16

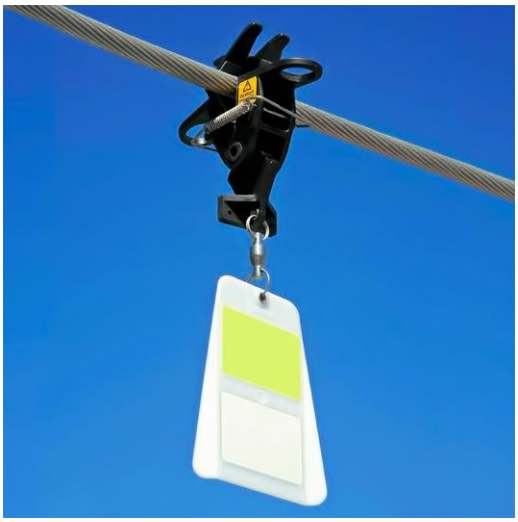


Opening the SnapFast clamp



Push to snap closed (tool sold separately)

FireFly® FF Bird Diverter



Recommended by the U.S. Fish and Wildlife Service, patented FireFly bird diverters have been shown in independent studies to be the most effective bird diverters in preventing bird strikes on power lines.

Incorporating motion, reflectivity, and glowing light, FireFly FF bird diverters are a highly effective and proven solution for protecting birds in flight from collisions with overhead power lines, guy wires, communications towers, and other thin profile obstructions. FireFly FF can also be used to haze birds within a 30 foot radius from buildings and structures.

FireFly FF is also cost effective, with a lower installed cost than coils. Furthermore, coils can entangle birds and are less effective diverters, especially in low light at dawn and dusk.

7.1.1.1.1.1.1.3 FireFly FF Makes Hazards Visible to Birds

- Developed by an avian biologist and based on avian research.
- Spins in 3+ mph winds, increasing visibility for migrating birds and bats. Uses a heavy duty, stainless steel ball bearing swivel that is resistant to salt spray and adverse weather conditions.

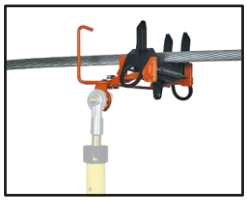
  NOTE: For very high sustained winds, FireFly HW with no moving parts (no swivel) should be used.
- Research at Cornell University shows that birds can see both visible and ultraviolet light. FireFly is highly visible to birds in both the parts of the spectrum.
- Diamond bar material refracts sunlight and provides a "sparkle effect" visible to birds up to a quarter mile away.
- Luminescent material emits visible light for up to 12 hours after dusk, and in low light or fog conditions, when birds are most vulnerable.
- Impact resistant and UV-stablized acrylic "flapper" is 3.5" x 6",

FireFly FF bird diverter



FireFly FF front and back





Opening the SnapFast clamp

Push to snap closed (tool sold separately)



FireFly FF can be installed by helicopter

1/8" thick, and rated for temperatures from –30 F to 160 F.

1.4 Fast and Simple Installation

- FireFly installs in seconds on live lines up to 115 kV by hand, hot stick, or helicopter. Also safe to use on OPGW lines.
- FireFly is easy to remove and install as bird activity changes with the season.
- Recommended spacing is 30 feet between FireFly diverters.
- Patented and rugged SnapFast mounting clamp prevents line slippage on single or bundled cables. Choose from two sizes: 10–70 mm (0.39"–2.75") P/N #FF-SF10-70

4–16 mm (0.16"– 0.63") P/N #FF-SF4-16



Additional Questions / Answers

ROTAMARKA™

This sheet is designed to be read in conjunction with the applicable ROTAMARKA data sheet.

Q. Where is the Rotamarka manufactured?
A The Rotamarka is designed & manufactured in Sydney Australia.

Q. Where was the Rotamarka tested?
A. The Rotamarka testing was carried out by a variety of 3rd party testing facilities & specialist organisations for example:
- Snow & Ice loading - Winter in Hokkaido Japan.
- Wind Tunnel testing - Leading Sydney Universities.
- Fatigue Analysis - Aerospace Engineers.

Q. What is the best colour to use?
A. This depends on what the primary intended application is.

If the Rotamarka is primarily used for Birds, the best colours are black and white as it offers the greatest contrast in low light conditions such as dawn or dusk.

If the Rotamarka is used for aviation, then we recommend red and white which is in line with AS3897 - Air navigation—Cables and their supporting structures—Marking and safety requirements. – Part 2. – Low level aviation operations.

For construction sites, power line warning, black and yellow is an option in keeping with warning hazard sign colours.

Red and white is our most popular colour when used as an all-round marker to mitigate power line strikes.

Q. Can I install the Rotamarka with the standard hot stick eye/ring fitting?
A. The eye-ring version of the Rotamarka works well with industry standard Shotgun or Grip-all Sticks. However, for use with telescopic sticks, we have a purpose designed hot stick tool that provides for a secure and efficient method of installation and uninstallation.

Q. Will the clamp damage the conductor?
A. All clamping components are manufactured in high strength Nylon 6 (not metal) and the clamp jaws are lined with rubber which will mould around the conductor to help prevent any conductor deformation.

Q. How often should I clean the Rotamarka?
A. As per normal power line components, no cleaning is required, however, if desired, the Rotamarka can be

cleaned with mild detergent and water (No chemical solvents).

Q. Is the Rotamarka UV stabilised?

A. All the Rotamarka plastic components are manufactured in Nylon 6 which has been used in the electrical industry for over 30 years in various outdoor components and clamps. It includes UV stabilisers and has been proven to be very stable in outdoor conditions. Fins are tested and complies with EN ISO 4892-2 (2013).

Q. What do the corrosion testing values mean?

A. This is a rating as per AS1247 - Metallic coatings—Rating of test specimens and manufactured articles subject to corrosion tests. A rating of 9 represents corrosion of 0.1% of the total area.
The salt spray corrosion tests carried out were done with 5% salt spray fog, which is higher than sea spray concentration. No indication of any material corrosion has been found over a 3-year field service life.

Q. What is the estimated bearing service life of the Rotamarka?

A. Fatigue analysis research has been conducted using a combination of wind data from key Australian and global locations. Test results and analysis by aerospace engineering has yielded a bearing service life of 15 years.

Q. What warranty comes with this product?

A. Balmoral engineering offers a 3-year warranty on item number series: WM-CS-E-1H-(X). Please refer to our Warranty Table available on our website for further details.

Q. What is meant by coefficient of drag?

A. Drag coefficient is a dimensionless quantity that is used to quantify the drag or resistance of an object in a fluid environment, such as air. A lower drag coefficient indicates the object will have less aerodynamic drag.

Q. What do you mean by corona discharge and inception and extinction voltage?

A. Corona is a luminous, audible discharge that occurs when there is an excessive localised electric field gradient upon an object that causes the ionisation and possible electrical breakdown of the air adjacent to this point.

Corona Inception Voltage – The voltage at which corona is first detected as the voltage is gradually increased.
Corona extinction Voltage –The voltage at which corona ceases to exist as the voltage is gradually decreased.

Q: Why is the recommended torque set at 4Nm (2.9ft·lb)?

A: This is the recommended tightening torque for a firm clamp hold onto the conductor.

Q: What is meant by line loads?

A: Amount of force imparted on the line at varying wind speeds.

Q: What is AS 3891.2?

A: Australian Standard AS 3891.2: 2018 Air Navigation - Cables and their Supporting Structures - Marking and Safety Requirements - Marking of Overhead Cables for Planned Low-Level Flying Operations.

For more product information please visit our website:

www.balmoralengineering.com

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