Appendix M

Cycas Megacarpa Translocation Management Plan

umwelt








Ecologica Consulting

Cycas megacarpa Translocation Management Plan

Calvale to Calliope River Transmission Line Reinforcement Project

prepared for Powerlink Queensland

Document prepared by:

Ecologica Consulting
ABN 51 730 022 102
PO Box 12502 George Street
Brisbane Queensland 4000 Australia

T: +61 7 3374 1803
E: pricem@ecologicaconsulting.com.au

Document Control

Document No.	Rev No	Date	Revision details	Author	Reviewer
2025001_002_001	0	November 2025	Rev 0 for comment	AW	MP
2025001_002_001	1	December 2025	Rev 1	AW	MP
2025001_002_001	2	December 2025	Rev 2	AW	NW
2025001_002_001	3	January 2026	Rev 3	AW	MP
2025001_002_001	4	February 2026	Rev 4	AW	MP
2025001_002_001	4a	February 2026	Rev 4	AW	MP

Table of Contents

Abbreviations

Abbreviation	Details
EMP	Environmental Management Plan
C2C	Calvale to Calliope River Transmission Line Reinforcement Project
cm	Centimetre
CTMP	Cycas megacarpa Translocation Management Plan
Cth	Commonwealth
Cycas	*Cycas megacarpa* or *C. megacarpa*
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DES	Department of Environment and Science (now DETSI)
DETSI	Department of Environment, Tourism, Science and Innovation
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EWP	Environmental Work Plan
ha	Hectare
km	Kilometre
kV	Kilovolts
L	Litre
m	Metre
mgt	Management
ml	Millilitre
MNES	Matter of National Environmental Significance
MW	Megawatts
NC Act	*Nature Conservation Act 1992* (Qld)
OMP	Offset Management Plan
PLQ EMP	Powerlink Queensland Environmental Management Plan
PER	Public Environment Report
Qld	Queensland
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
sp. / spp.	Species (singular); Species (plural)
SP8	Subpopulation number 8 (*Cycas megacarpa*)
STMP	Supplementary Translocation Management Plan
The Project	Calvale to Calliope River Transmission Line Reinforcement Project
UIC	Unique Identification Code

Abbreviation	Details
~	Approximately

Definitions

Item	Definition
Powerlink EPBC Referral	EPBC 2024/10044
Completion criteria	Completion criteria are outcomes that will be met at the end of translocation programme to achieve a conservation gain. Completion criteria are prescribed in Section 15.
Cycad Salvage Footprint	The Cycad Salvage Footprint is within the Disturbance Footprint and is the maximum extent to which complete vegetative clearing is required within this species' habitat. Cycads present within the Cycad Salvage Footprint will require translocation.
Data Management Tool	The data management tool will be collated spreadsheets and spatial data managed by the Specialist Ecologist. The data will track information on translocation, results of monitoring, horticultural management, nursery propagation, and plantings to allow for completion criteria to be tracked. It will also assist to identify where corrective actions are needed.
Disturbance Footprint	The Disturbance Footprint within known Cycad habitat is the area encompassing all required infrastructure, vegetation clearing and ground disturbance for the construction and operation of The Project. The Disturbance Footprint represents the maximum extent of direct impacts associated with the development within the Field Survey Extent (subject to micro-siting). The Disturbance Footprint is shown in Figure 1 and contains the following two (2) impact types for *Cycas megacarpa* and associated habitat values: - - Is present and may remain in-situ. However, associated habitat may be selectively cleared and/or routinely managed over the operational life of the transmission line; - Is present and requires translocation.
Nursery	A suitable nursery that is used to: - Manage salvaged seedlings and juveniles before they are planted into the recipient site; - store seed collected for the programme; - propagate and manage germinated individuals before they are planted into recipient site.
Offset area	Specific habitat secured and managed to compensate for significant environmental impacts on protected matters that cannot be avoided or mitigated as a consequence of The Project. It compensates for harm to nationally significant species, ecological communities, and places by providing a conservation benefit elsewhere.
Project proponent	The company that is responsible for construction and implementation of the Calvale to Calliope River Transmission Line Reinforcement Project and compliance with approval conditions including under EPBC Act and NC Act. At the time of document preparation, this is Powerlink Queensland.
Recipient site	Refers to the site where salvaged and propagated *Cycas megacarpa* individuals will be transplanted to. The recipient site will be located within The Project's offset area.
Reference Site	The reference site is a representative sample of the naturally occurring population(s) and will comprise of similar age classes, topography and aspect to those translocated as part of project works. To support measuring the success of the translocation programme, the establishment of a reference site will be required so that the temporal variation between the recipient, retained in-situ and reference site specimens can be analysed and compared.

Item	Definition
Viable and significant population	3,500 to 4,500 adult individuals are considered to be a viable population (Queensland Herbarium 2007)

Declaration of Accuracy

Powerlink Queensland is developing the Calvale to Calliope River Transmission Line Reinforcement Project (The Project). The Project includes the development of a new double circuit, 87 kilometre (km) 275 kilovolt (kV) transmission line between the existing Calvale Substation (approximately 10 km east of Biloela) and the Calliope River Substation in Central Queensland. The Project will also include the expansion of the Calliope River Substation and grid connection of the new transmission line to the Calvale and Calliope River Substations.

In making this declaration, I:

am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (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 (EPBC Regulations). The offence is punishable on conviction imprisonment or a fine, or both.

I am authorised to bind Powerlink Queensland to this declaration and have no knowledge of that authorisation being revoked at the time of making this declaration.

Signature

Full name

Organisation

Date

1. Introduction

1.1 Background

Powerlink Queensland (Powerlink) is proposing to construct and operate a new transmission line located between the Calvale Substation and the Calliope River Substation in Queensland. This project, known as the Calvale to Calliope River Transmission Line Reinforcement Project, extends from 10 kilometres (km) east of Biloela to 2 km north of Clinton, near Gladstone (refer Figure 1).

The Proposed Action comprises of the following components:

- A new double circuit, 87 km 275 kilovolt (kV) transmission line between the existing Calvale Substation and the Calliope River Substation within a 60 metre (m) wide easement. The transmission line is split into five sections (Sections A, B, C, D & E);
- Expansion of the Calliope River Substation (Section E); and
- Grid connection of the new transmission line to the Calvale and Calliope River Substations.

The primary purpose of the proposed project is to reinforce electricity supply to the Gladstone region and increase network capacity and reliability to service the growing renewable energy industry in this area. In turn, the proposed project will support heavy industry to decarbonise and transition to clean energy and ensures renewable energy to flow into the wider Gladstone region.

The Project will allow for up to 1,800 megawatts (MW) of renewable hosting capacity in the region and increase network capacity and reliability to service the growing renewable energy industry in this area.

In preparation for transitioning the electricity network to renewable energy supply, Powerlink has identified future projects for the Gladstone transmission grid, collectively known as the 'Gladstone Project'. The Proposed Action is the foundational transmission infrastructure project.

Powerlink seeks to commence construction of The Project by June 2026, with a view to conclude construction and commence operations by the end of 2028, to ensure continued supply to the Gladstone region, with the scheduled closure of the coal fired Gladstone Power Station by 2028.

1.2 *Cycas megacarpa* in the Disturbance Footprint

As shown in Figures 2a to 2f the proposed infrastructure extends through habitat known to contain *Cycas megacarpa,* a species listed as Endangered under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland's *Nature Conservation Act 1992* (NC Act).

All *Cycas megacarpa* within the Disturbance Footprint form part of Subpopulation No. 8 (SP8), which is considered significant and viable in the long term.

The survey effort to date has recorded the presence of 1,032 *C. megacarpa* within the Disturbance Footprint. Avoidance measures such as micro siting and proposed selective clearing (where safe to do so under the powerlines) have been considered during the detailed design phase. Consequently, it is estimated that 632 individuals can be avoided and remain in-situ; and 400 individuals will require salvage due to unavoidable clearing requirements. It is anticipated that the Project will impact 53.5 hectares (ha) of known *Cycas megacarpa* habitat and 0.5 ha of suspected habitat.

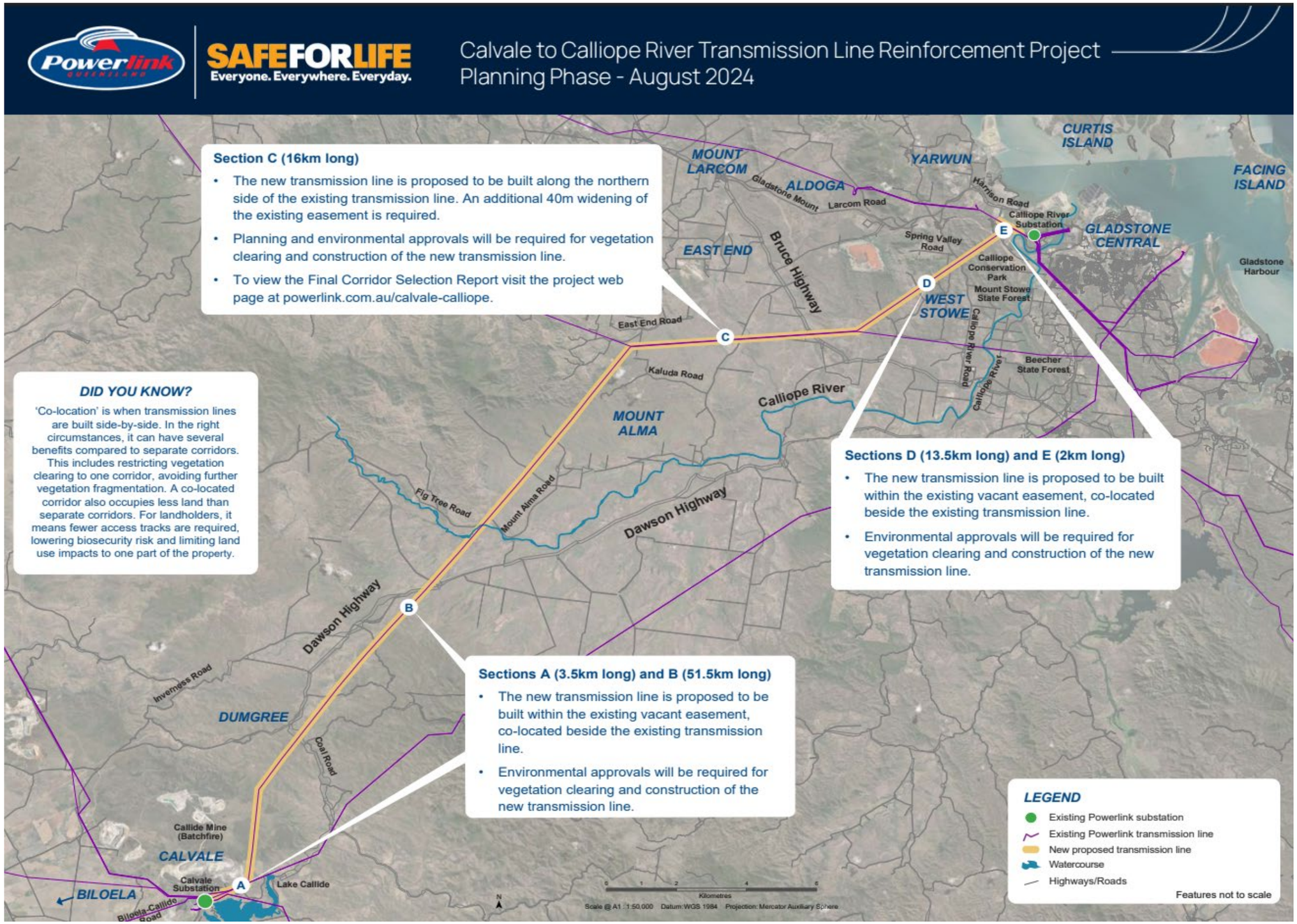


Figure 1: Project overview

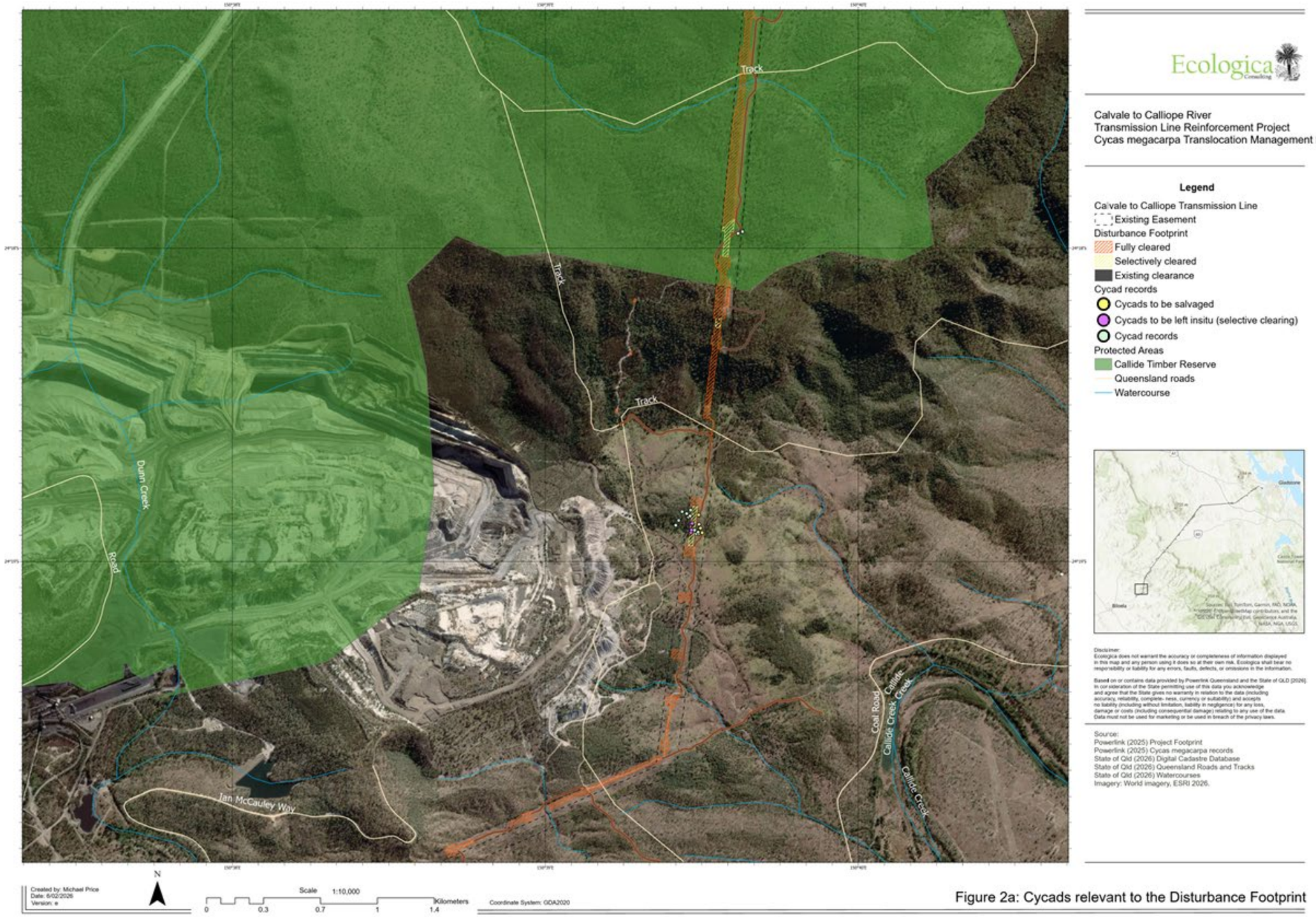
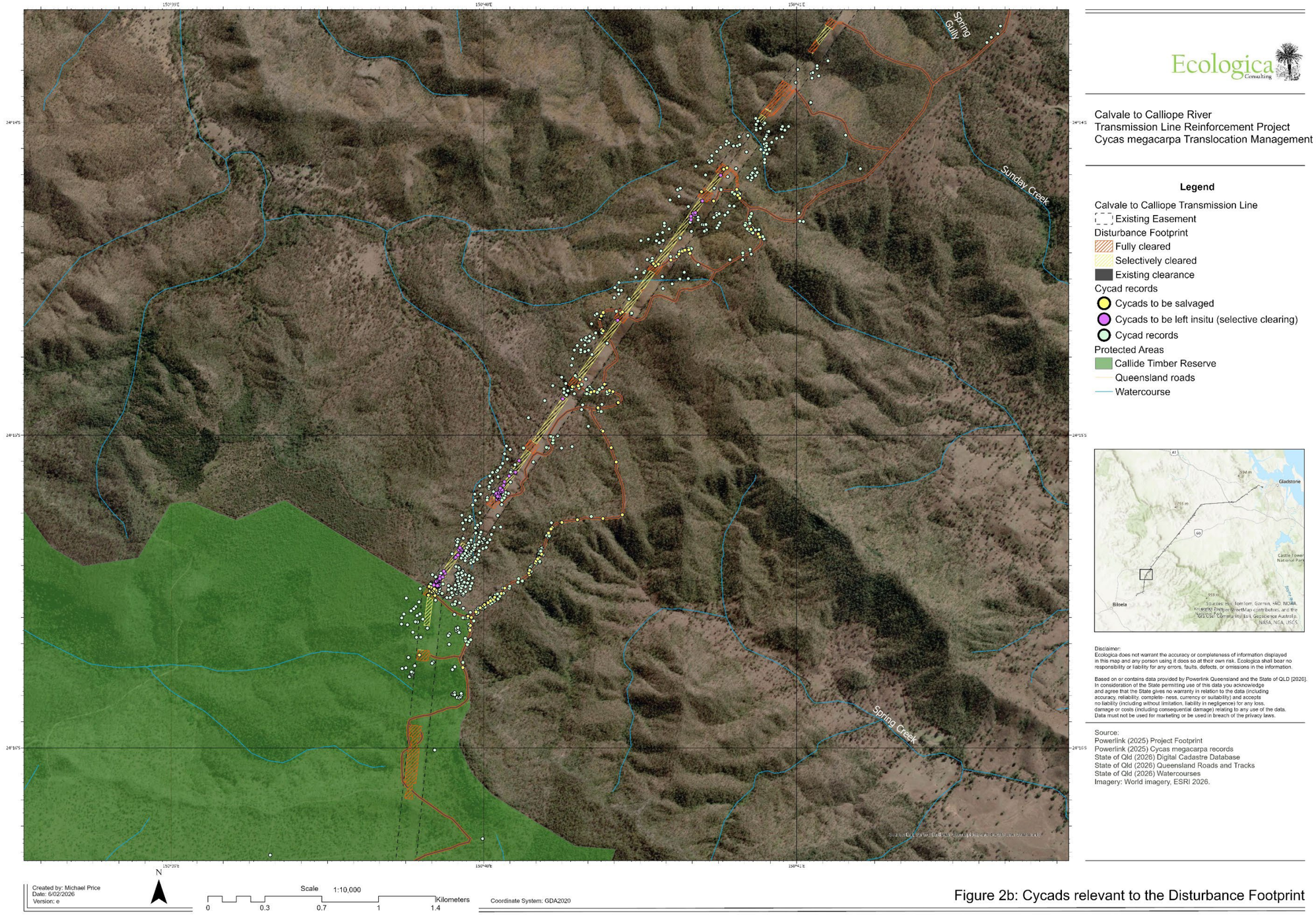


Figure 2a: Cycads relevant to the Disturbance Footprint



Ecologica Consulting

Calvale to Calliope River
Transmission Line Reinforcement Project
Cycas megacarpa Translocation Management Plan

Legend

Calvale to Calliope Transmission Line
- Existing Easement

Disturbance Footprint
- Fully cleared
- Selectively cleared
- Existing clearance

Cycad records
- Cycads to be salvaged
- Cycads to be left insitu (selective clearing)
- Cycad records

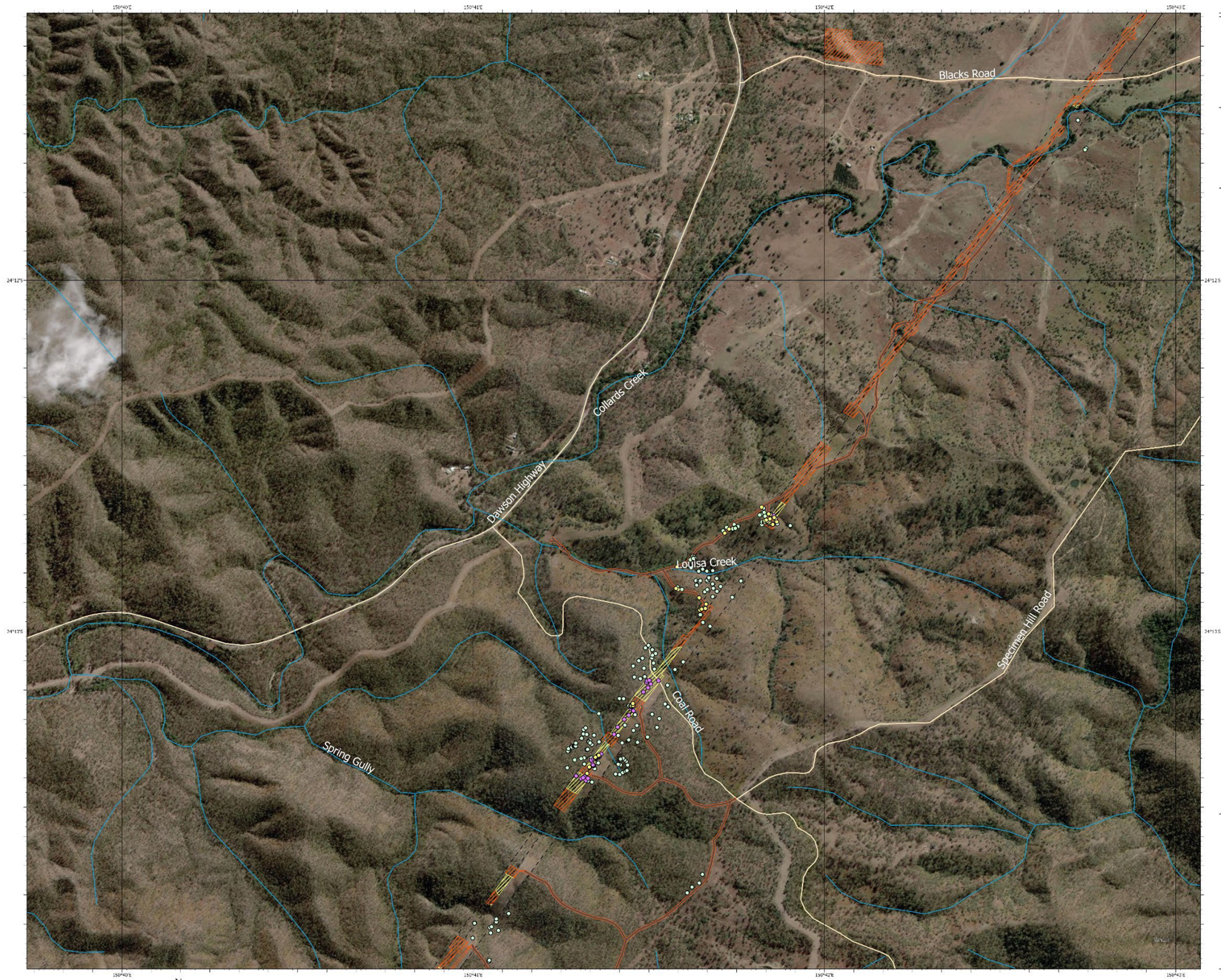
Protected Areas
- Callide Timber Reserve
- Queensland roads
- Watercourse

Disclaimer:
Ecologica does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. Ecologica shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.

Based on or contains data provided by Powerlink Queensland and the State of QLD [2026]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, complete- ness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

Source:
Powerlink (2025) Project Footprint
Powerlink (2025) Cycas megacarpa records
State of Qld (2026) Digital Cadastre Database
State of Qld (2026) Queensland Roads and Tracks
State of Qld (2026) Watercourses
Imagery: World imagery, ESRI 2026.

Figure 2b: Cycads relevant to the Disturbance Footprint



Ecologica Consulting

Calvale to Calliope River
Transmission Line Reinforcement Project
Cycas megacarpa Translocation Management Plan

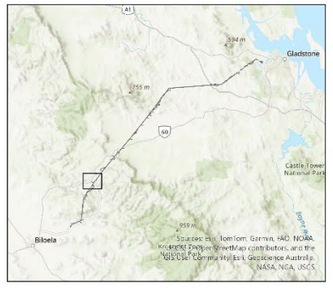
Legend

Calvale to Calliope Transmission Line
- Existing Easement

Disturbance Footprint
- Fully cleared
- Selectively cleared
- Existing clearance

Cycad records
- Cycads to be salvaged
- Cycads to be left insitu (selective clearing)
- Cycad records

- Queensland roads
- Watercourse



Source:
Powerlink (2025) Project Footprint
Powerlink (2025) Cycas megacarpa records
State of Qld (2026) Digital Cadastre Database
State of Qld (2026) Queensland Roads and Tracks
State of Qld (2026) Watercourses
Imagery: World imagery, ESRI 2026.

Created by: Michael Price
Date: 6/02/2026
Version: e

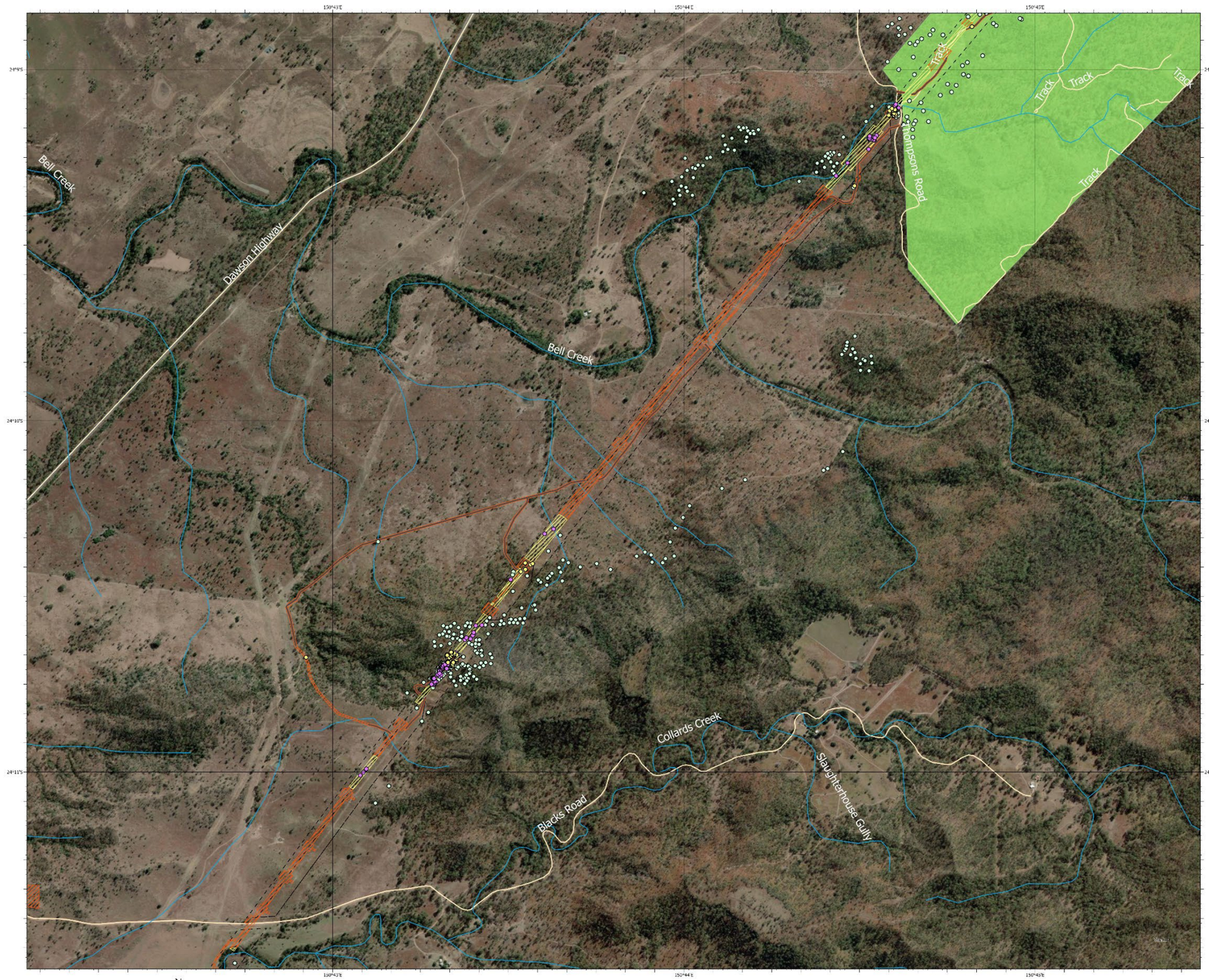
N

Scale 1:10,000

0 0.3 0.7 1 1.4 Kilometers

Coordinate System: GDA2020

Figure 2c: Cycads relevant to the Disturbance Footprint



Ecologica Consulting

Calvale to Calliope River
Transmission Line Reinforcement Project
Cycas megacarpa Translocation Management Plan

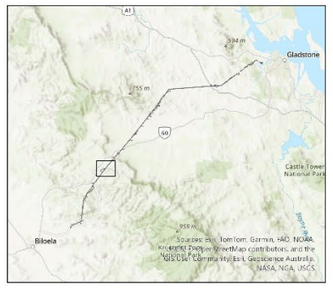
Legend

Calvale to Calliope Transmission Line
- Existing Easement

Disturbance Footprint
- Fully cleared
- Selectively cleared
- Existing clearance

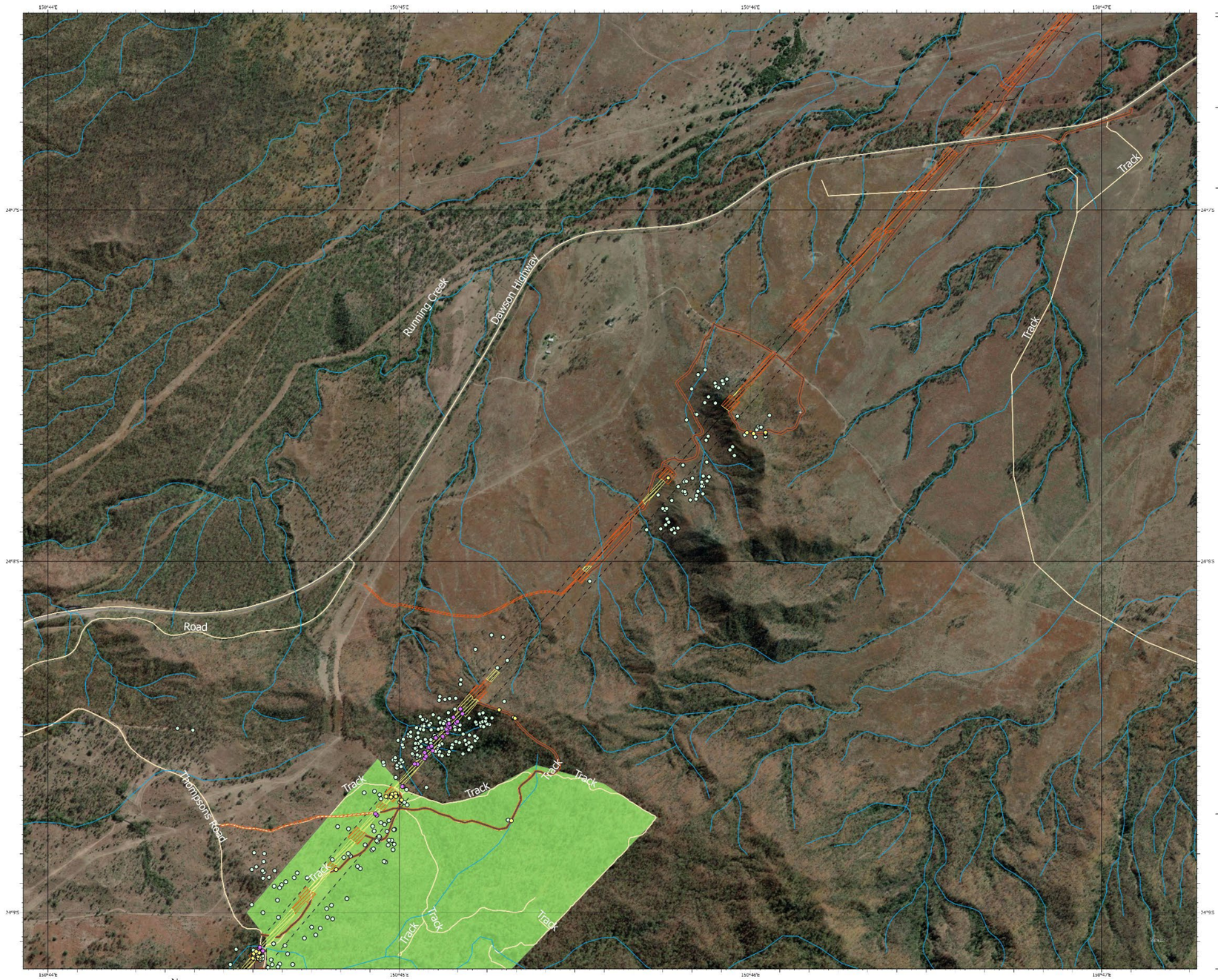
Cycad records
- Cycads to be salvaged
- Cycads to be left insitu (selective clearing)
- Cycad records

Protected Area
- Calliope Range State Forest
- Queensland roads
- Watercourse



Source:
Powerlink (2025) Project Footprint
Powerlink (2025) Cycas megacarpa records
State of Qld (2026) Digital Cadastre Database
State of Qld (2026) Queensland Roads and Tracks
State of Qld (2026) Watercourses
Imagery: World imagery, ESRI 2026.

Figure 2d: Cycads relevant to the Disturbance Footprint



Ecologica Consulting

Calvale to Calliope River
Transmission Line Reinforcement Project
Cycas megacarpa Translocation Management Plan

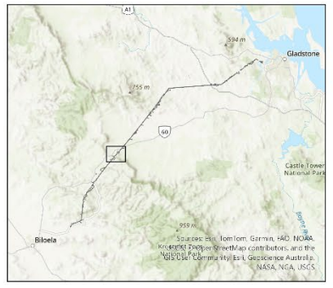
Legend

Calvale to Calliope Transmission Line
- Existing Easement

Disturbance Footprint
- Fully cleared
- Selectively cleared
- Existing clearance

Cycad records
- Cycads to be salvaged
- Cycads to be left insitu (selective clearing)
- Cycad records

Protected Area
- Calliope Range State Forest
- Queensland roads
- Watercourse



Disclaimer:
Ecologica does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. Ecologica shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.

Based on or contains data provided by Powerlink Queensland and the State of QLD [2026]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, complete- ness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

Source:
Powerlink (2025) Project Footprint
Powerlink (2025) Cycas megacarpa records
State of Qld (2026) Digital Cadastre Database
State of Qld (2026) Queensland Roads and Tracks
State of Qld (2026) Watercourses
Imagery: World imagery, ESRI 2026.

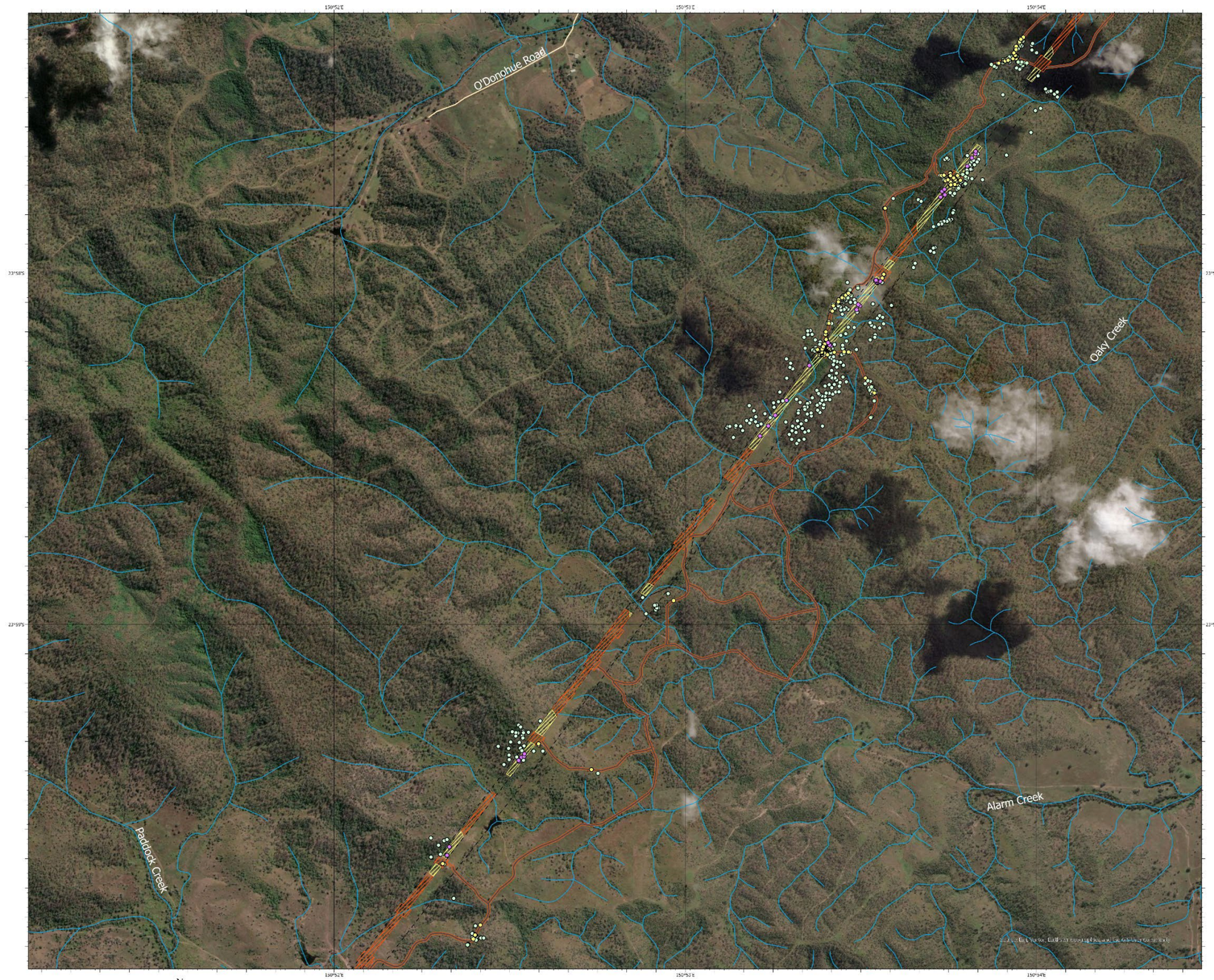
Created by: Michael Price
Date: 6/02/2026
Version: e

Scale 1:10,000

0 0.3 0.7 1 1.4 Kilometers

Coordinate System: GDA2020

Figure 2e: Cycads relevant to the Disturbance Footprint

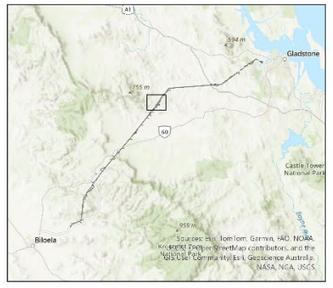


Ecologica Consulting

Calvale to Calliope River
Transmission Line Reinforcement Project
Cycas megacarpa Translocation Management Plan

Legend

Calvale to Calliope Transmission Line
Existing Easement
Disturbance Footprint
Fully cleared
Selectively cleared
Existing clearance
Cycad records
Cycads to be salvaged
Cycads to be left insitu (selective clearing)
Cycad records
Queensland roads
Watercourse



Disclaimer:
Ecologica does not warrant the accuracy or completeness of information displayed in this map and any person using it does so at their own risk. Ecologica shall bear no responsibility or liability for any errors, faults, defects, or omissions in the information.

Based on or contains data provided by Powerlink Queensland and the State of QLD [2026]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, complete- ness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

Source:
Powerlink (2025) Project Footprint
Powerlink (2025) Cycas megacarpa records
State of Qld (2026) Digital Cadastre Database
State of Qld (2026) Queensland Roads and Tracks
State of Qld (2026) Watercourses
Imagery: World imagery, ESRI 2026.

Created by: Michael Price
Date: 6/02/2026
Version: e

N

Scale 1:10,000

0 0.3 0.7 1 1.4 Kilometers

Coordinate System: GDA2020

Figure 2f: Cycads relevant to the Disturbance Footprint

1.3 Regulatory Requirements

The Project was deemed a controlled action by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC *Act* on 4 February 2025 (EPBC 2024/10044). An assessment process notice has been issued and should approval be granted, will be subject to a series of environmental conditions including the provision of a *Cycas megacarpa* Translocation Management Plan (CTMP).

This CTMP has been developed in accordance with the Guidelines for the Translocation of Threatened Plants in Australia ('The Guidelines') Commander et al, 2018), the National Multi-species Recovery Plan for Cycads (Queensland Herbarium, 2007), anticipated approval conditions, learnings from other cycad translocation programmes and advice from the Queensland Herbarium. The genetic study by James et al (2018) supports the translocation methodology developed by Ecologica Consulting and outlined in this CTMP.

1.3.1 Guidelines for Translocation of Threatened Plants in Australia

The Guidelines provide best practice guidelines for conservation translocations and acknowledge variance across translocation plans, depending on the species, landscapes and the objectives of the translocation programme. Whilst translocation in this instance is considered a mitigation measure and has some differences, this CTMP aligns with the objectives of the Guidelines and outlines in detail the different steps of the programme including methodologies to be adopted for each component.

This CTMP has clear objectives, methodologies, success criteria and metrics to be considered during all stages of the programme, along with management measures and corrective actions. These are all fundamentals outlined in the Guideline when considering a translocation programme.

With regards to the species specifically, the following knowns align with the core principles for a successful translocation programme:

- The taxonomy, distribution, ecology and genetics of the species is well understood (refer Section 3 but also throughout the document);
- Appropriate recipient sites are available and can be effectively managed and if required secured (refer Section 4); and
- Powerlink are committed to the maintenance and monitoring of the plants as per likely approval conditions (refer Sections 10, 11 and 13). There are also clear metrics for the monitoring.

Whilst not a requirement of the Guideline, it is important to note that translocations have been successfully used in the past to mitigate impacts to this species. This includes the direct salvage of plants, along with propagation of individuals.

1.3.2 Suitably Qualified Cycad Expert

The directors of Ecologica are considered suitably qualified Cycad experts by the Commonwealth and have been developing and implementing translocation plans for Cycads for numerous projects since 2009. In 2010, Ecologica established a working group of key specialists and Government representatives in the fields of biology, conservation genetics, ecology, salvage and horticulture to develop a set of robust and now standardised methodologies for Cycad translocation programmes. These methodologies were developed from existing knowledge and concepts and were subsequently rolled out for LNG pipeline and main roads projects across Central Queensland.

These methods are now adopted for Cycad programmes worldwide.

More recently Ecologica have developed plans for the Boulder Creek, Specimen Hill and Mount Hopeful wind farm projects.

1.3.3 DCCEEW Calculation Tool

The DCCEEW calculation tool provided in Table 1 has been used to provide an estimation of values associated with salvage numbers, seed collection and propagation requirements for conservation gain, and anticipated survival rates upon completion of the programme.

Table 1: Overview of the translocation calculations (DCCEEW calculation tool)

Represented by	Formula	Description	Number	Justification for number
		Total Number of Individuals within the Disturbance Footprint.	~1,032	
		No. of individuals expected to remain in-situ within the Disturbance Footprint.	~632	
A		No. of individuals to which salvage will be unavoidable (Cycad Salvage Footprint within the Disturbance Footprint).	~400	Justification provided in Section 3.4.
B		No. of individuals which cannot be salvaged (i.e. OHS constraints) (approx. 1% of the total in the Cycad Salvage Footprint).	4	Justification provided in Section 3.4.2.
C	A – B	No. of individuals that can be translocated.	~396	Total count of individuals estimated in Salvage Footprint minus number that cannot be salvaged.
D	P * C	No. of individuals unlikely to survive translocation.	~119	
E	C – D	No. of salvaged individuals that survive translocation (post seven years since translocation).	~277	
P		Expected % of translocated individuals that will not survive translocation.	0.3	
S		Expected survival rate of translocated individuals.	0.7	
N	N	Total no. of seeds to be collected (need to be ripe at time of collection).	716	Explained in Section 9.
T	N * S	Estimated no. of seeds that germinate (taking into account seed viability).	501	Explained in Section 9.
U	T * P	Estimated no. of propagated individuals that do not survive to planting stage (e.g. viability issues / attrition in nursery).	150	Explained in Section 9.
Z	T * S	Estimated no. of propagated individuals, managed in the nursery that survive to planting stage (sustained germination into next age class) (accounting for attrition in nursery).	351	Explained in Section 9.
Y		Propagated individuals to be planted into the recipient site.	351	

Represented by	Formula	Description	Number	Justification for number
X	Y * S	No. of propagated individuals alive at the end of the programme (required to achieve a 1:2 replacement and a conservation gain for *C. megacarpa* (2(B+D).	At least 246	Explained in Section 9.
W	X + E	Final no. of individuals alive at the end of the monitoring programme (salvaged and propagated). This will be measured in Year 15 (current estimate based on individuals to be salvaged).	523	

1.4 Purpose

The goal of a translocation programme is to enable the re-establishment of translocated individuals back into the wild and ultimately thrive without ongoing management.

The purpose of this CTMP is to identify the management actions and completion criteria that support the successful salvage, propagation, and translocation of *Cycas megacarpa*. This CTMP provides specific assessment, management, monitoring and reporting measures to be implemented prior to, during and after translocation activities. Key CTMP actions include methodologies for:

- The salvage and relocation of Cycas individuals from the Cycad Salvage Footprint to the permanent recipient site;
- Seed collection;
- Propagation and management of individuals under nursery conditions;
- Planting out of propagated individuals;
- Horticultural management of translocated and propagated individuals; and
- Monitoring and reporting.

This CTMP provides clarity around the Disturbance Footprint in which Cycads are present but may be retained in-situ; as well as the Cycad Salvage Footprint in which salvage will be unavoidable.

Impacts to Cycads outside of The Project's Cycad Salvage Footprint, as a result of the construction activities, will be managed in accordance with the MNES Management Plan.

The broader management of the recipient site area(s) will be undertaken in accordance with the Offset Management Plan (OMP) and Powerlink Queensland's Environmental Management Plan (PLQ EMP) to ensure consistency with approval conditions, comply with interim milestones and reduce unnecessary duplication of reporting.

2. Legislative framework

The legislation applicable to this CTMP is outlined below.

2.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act provides that any action (i.e. a Project, development, undertaking, activity or series of activities) that has, will have, or is likely to have a significant impact on a Matter of National Environmental Significance (MNES), or other matters protected under the EPBC Act such as the environment of Commonwealth land, requires approval from the Australian Government Minister for the Environment.

The Project was referred under the EPBC Act and, on 4 February 2025, determined to be a controlled action (2024/10044) action due to the potential for significant residual impacts to occur to threatened species including *Cycas megacarpa*.

This CTMP aligns with the Translocation of Listed Threatened Species – Assessment under Chapter 4 of the EPBC Act Policy Statement (2013). The translocation activities are a salvage translocation under this policy. As noted, the management and monitoring measures outlined in this CTMP have been successfully implemented on other *Cycas megacarpa* translocation activities. This includes consideration of potential issues regarding genetic diversity, pest populations and competition with other individuals, along with the identification of appropriate mitigation and management measures.

This CTMP also identifies key performance criteria to support the translocation activities both in the short and longer term. It is envisaged that the program will retain long term value, 50 or 100 years without management input, if implemented.

2.2 *Nature Conservation Act 1992*

The NC Act provides for the conservation of nature through protection of all native plants and animals in Queensland. Protection is provided under the NC Act through conservation of land as protected areas and wildlife protection outside of protected areas. Actions impacting on protected native flora and fauna are regulated under the NC Act.

The NC Act provides that a person must not take, use or keep a protected plant other than under a conservation plan applicable to the plant, a licence, permit or authority issued or given under a regulation or an exemption under a regulation. Take is defined under the NC Act as “gather, pluck, cut, pull up, destroy, dig up, fell, remove or injure the plant or any part of the plant”. Seeds are considered plant parts under the NC Act.

Permits for disturbance to native flora can be administered under the NC Act and a clearing permit under NC Act will be sought by Powerlink. The clearing permit is required to be issued prior to works or vegetation clearing commencing in areas where Cycads occur, and prior to any translocation or seed collection occurring.

The clearing permit approval under NC Act will allow for the seeds to be collected from the Disturbance Footprint. As part of the clearing permit approval permission will also be sought for the collection of seeds outside of the Disturbance Footprint. Alternatively, approval may be sought under a protected plant growing licence to harvest whole restricted plants or plant parts for propagation.

3. Disturbance Footprint

As shown in Figures 2a to 2f the Project extends through habitat known to contain *Cycas megacarpa.* All *Cycas megacarpa* in the Disturbance Footprint forms part of Subpopulation No. 8 (SP8), which is considered significant and viable in the long term.

Once thought to be seven (7) separate subpopulations (SPs 8, 10, 11, 12, 14, 15 and 18, Qld Herbarium, 2007), connectivity surveys undertaken by Ecologica between 2008 and 2025 confirm this subpopulation extends from the Callide Range in the west, to the Don River State Forest in the north, to Kroombit Tops National Park in the south, and to the Mt Alma Range in the east.

The survey effort for this Project to date has recorded the presence of 1,032 *C. megacarpa* within the Disturbance Footprint. Avoidance measures such as micro siting and proposed selective clearing (where safe to do so under the powerlines), have been considered during the detailed design phase. Consequently, it is estimated that 632 individuals can be avoided and remain in-situ; and 400 individuals will require salvage due to unavoidable clearing requirements.

It is anticipated that the Project will impact 53.5 hectares (ha) of known *Cycas megacarpa* habitat and 0.5 ha of suspected habitat.

3.1 Current Survey Effort

Since 2009, Ecologica has undertaken direct counts as well as connectivity and presence/absence surveys for numerous projects in the region in order to understand the local population size and characteristics. This information has been used to inform measures to avoid and minimise impacts through the siting of infrastructure during the detail design and construction phases of projects.

Genetic analysis was also undertaken by the University of the Sunshine Coast in 2012 to determine the relationship of this population to other known populations and what the potential impacts of this may be for translocation activities. In particular, was there likely to be any negative genetic impacts from the translocation of plants from the newly discovered and potentially impacted population if they are translocated to join existing *Cycas megacarpa* in nearby populations.

Within their distribution range, *Cycas megacarpa* is known to exist in distinct clusters throughout the landscape, and the findings of James *et al.* (2018) demonstrated that genetic connectivity for the species exists to around 8.5km. Clusters beyond this distance tend to diverge.

During October 2025, direct count surveys for a sample set[1] were undertaken to assess individuals present both within and adjacent to the Disturbance Footprint. The primary aim of these surveys was to:

- Confirm the number of *C. megacarpa* being impacted;
- Document the age classes (refer Appendix C), reproductive status and condition of individuals;
- Assess the translocation suitability of individuals in the Disturbance Footprint; and
- Collect a range of data to support translocation and future monitoring requirements.

These surveys captured the following data:

- Co-ordinates;
- Height;
- Stem condition;
- Frond development stage and condition;
- Sex (if known);
- The presence and developmental stage of fruiting material including number of seeds and degree of ripeness; and
- Other relevant observations.

[1] Direct count surveys and baseline data capture for all individuals within the disturbance footprint will be undertaken during the 2nd Quarter of 2026, prior to the commencement of salvage and clearing activities.

The degree of connectivity between impacted clusters to previously recorded clusters; and the proposed recipient site was also documented during this survey period.

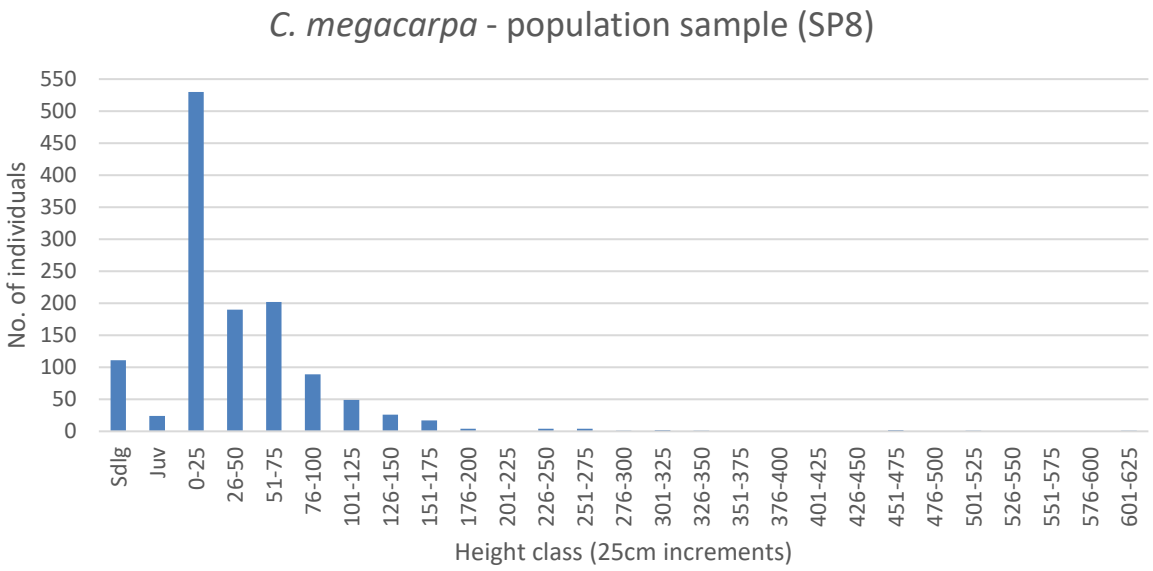
Cycas individuals occurred within and adjacent the Disturbance Footprint as seven (7) distinct clusters across Section B. Clustering is typical for the species due to its limited dispersal ability, and typically ranges between a few individuals to several hundred.

Population structure in terms of size/age class is a reliable indicator of levels of attrition and natural recruitment in a population. Where there is progression of size/age classes with fewer, older individuals, up to many juveniles, the population can be considered to be adequately replacing itself (Qld Herbarium 2007).

The October 2025 survey period recorded metrics for 1,258 individuals within and directly adjacent the Disturbance Footprint. They ranged from seedlings (0 cm) through to approximately 6.25 m in height. From the sample set, 32% were considered adults, 57% sub-adults, 2.5% juveniles, and 8% were seedlings[2].

Of those recorded in the adult age class, approximately 49 could be identified as female (12%) and 53 as male (13%). Cumulatively the ratio of identifiable females to males is almost equal. This is not an uncommon trait and reflects the fact that not all plants reproduce each year and that the level of reproductive dormancy is not currently predictable.

As shown in Graph 1, some recruitment was observed but not at the desired rate (clusters assessed are experiencing some recruitment constraints).



Graph 1: Height class structure in centimetres (from sample dataset) within and adjacent the Disturbance Footprint.

Similar population demographics have been observed across other *Cycas megacarpa* populations with James *et al* (2018) suggesting the possibility of a demographic Allee Effect (a positive relationship between population size and/or density and per capita population growth rate). Within the Central Queensland populations, ecological observations recorded over a 15-year period by Wain (unpublished) indicate the low levels of recruitment are likely due to a culmination of several factors including: the timing of reproduction events are not wholly synchronous; feral pig predation on seeds (active on site); too frequent fire regimes (active on site); drought (active on site); and land clearing (active within this population). Sustained recruitment into the next age class is also an

[2] The population structure (particularly height classes) within the Cycad Salvage Footprint is anticipated to resemble that recorded for the sample set provided in Graph 1. This will be confirmed during the baseline surveys scheduled to completed prior to the commencement of salvage and clearing works (as per Section 6).

issue for this species particularly if seed germinates too close to the maternal parent plant. Unpublished data indicates >80% mortality rates within two (2) years.

The presence of 'pups', often multiple of, was observed on ~14% of the sample set indicating both historical and current stress to the plants. Evidence of stem deterioration (generally due to fire damage) was also observed with a number of these individuals shifting from adults back to the sub adult age class[3] (refer Images 1, 2 & 3).

Image 1: Loss of main stem and rot in the base (Ecologica, 2025).

Image 2: Fire damage and rot has led to the loss of the main stem's crown with multiple pups forming along the remaining stem (which is continuing to deteriorate) (Ecologica, 2025).

Image 3: Total loss of stem due to fire. Has 'pupped' from subterranean base (Ecologica, 2025).

3.2 Habitat Values

Within a subpopulation, *Cycas megacarpa* typically persist as distinct clusters scattered across their habitat. The boundaries of these clusters can be quite sharp, with no apparent change in habitat (Primack and Miao 1992) and can range in size from very sparse to locally dense.

Cycas megacarpa is known to occur at altitudes between 40-680m, typically in undulating, high-relief terrain on well-drained rocky substrates or clay soils. Preferred habitats consist of open eucalypt woodlands dominated by Ironbarks (*Eucalyptus crebra* and *E. melanophloia*) or Spotted gum (*Corymbia citriodora*). Within these eucalypt woodlands, Cycas populations are generally most dense on steep slopes and within drainage lines which act as the primary dispersal means for the species (Queensland Herbarium, 2007). However, this is considered likely due historical land management practices within their habitat (i.e. targeted poisoning and clearing) and current land use (i.e. pastoral).

Cycads have also been observed within dry rainforest and vine thicket communities, particularly those communities with emergents of eucalypt species such as *E. crebra* and/or *C. erythrophloia*.

As shown in Images 4 and 5, habitat consistent with these values is present within the Disturbance Footprint.

[3] *Cycas* spp. require a minimum desired surface height to be reproductively active. If the crown and stem deteriorate below that minimum surface height, reproductive material does not appear to develop again until the pup(s) achieve that height requirement. For *Cycas megacarpa* this has been observed to be 50 cm.

Image 4: *Cycas megacarpa* habitat within and adjacent the Disturbance Footprint (Ecologica, 2025).

Image 5: *Eucalyptus crebra* dominated woodland (RE11.11.15) containing *Cycas megacarpa* within the Disturbance Footprint (Ecologica, 2025).

Vegetatively, *Cycas megacarpa* has been recorded within one or more combinations of the following mapped Regional Ecosystems (REs) (i.e. suitable habitat) within the Disturbance Footprint:

- RE11.3.4 - *Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains;
- RE11.3.25 - *Eucalyptus tereticornis* or *E. camaldulensis* woodland to open forest fringing levees and banks of major rivers and drainage lines of alluvial plains;
- RE11.11.3 - *Corymbia citriodora, Eucalyptus crebra, E. acmenoides* open forest on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges;
- RE11.11.4 - *Eucalyptus crebra* woodland on old sedimentary rocks with varying degrees of metamorphism and folding. Coastal ranges;
- RE11.11.5a – Vine thicket, usually with no *Araucaria cunninghamii* emergents on hilly terrain with steep slopes formed from moderately to strongly deformed and metamorphosed sediments and interbedded volcanics;
- RE11.11.15 - *Eucalyptus crebra* woodland to open woodland. Often with a shrubby layer. Occurs on deformed and metamorphosed sediments and interbedded volcanics;
- RE11.12.1 - *Eucalyptus crebra* shrubby woodland on ranges on igneous rocks;
- RE11.12.3 - *Eucalyptus crebra, E. tereticornis, Angophora leiocarpa* woodland on igneous rocks especially granite; and
- RE 11.12.6 - *Corymbia citriodora* woodland to open forest on igneous rocks (granite).

Cycads occur in habitats that are subjected to periodic fires of varying intensities. As with other Cycads, *Cycas megacarpa* have evolved to tolerate a degree of resistance however this appears largely dependent upon their frequency and intensity. Too frequent and too high of intensity fires inhibits recruitment through both mortality of seedlings and juveniles (and in some instances, mature plants) as well as loss of stems in reproductively active individuals.

Cycas spp. require a minimum desired surface height to be reproductively active. If the crown and stem deteriorate below that minimum surface height, reproductive material does not appear to develop again until the pup(s) achieve that height requirement. For *Cycas megacarpa* this has been observed to be 50 cm which takes an estimated 50 years to achieve. Images 6 and 7 provide examples of impacts from high frequency and intensity fires.

Evidence of recent fire activity (<12mths) was observed within the Disturbance Footprint during the October 2025 survey period (refer Images 1, 2 and 3).

Image 6: Frequent, high intensity fires impacting the reproductive capacity of a *Cycas megacarpa* cluster. Fire damage has led to deterioration of the stems, followed by 'pups' developing from the subterranean base. These individuals will not become reproductively active again for approximately 50 years (Ecologica, 2025).

Image 7: High intensity fire that reached the canopy, killed seedlings; burnt all seed in the crown (no longer viable), and severely burnt the adult stem of the 7m+ female (stem actively deteriorating) (Ecologica, 2025).

3.3 Constraints and limitations

The Disturbance Footprint has been defined based on the current design, application of the mitigation hierarchy and ground-truthing undertaken up until the point of Public Environment Report (PER) submission.

Minor areas of known habitat were unable to be surveyed during the October 2025 survey period due to land access constraints (~1.3 ha). Based on previous survey effort by Umwelt, there are 12 individuals present in these areas. These areas and any other approved changes to the Disturbance Footprint will be surveyed prior to clearing in accordance with relevant State survey guidelines, approval conditions and Section 6 of this CTMP.

Cycad data recorded within the Disturbance Footprint, including population and health data, will be provided in Appendix E prior to the commencement of salvage activities.

Due to the confidentiality associated with Cycas records in Queensland, locational data has been removed. This information can be provided to assessment agencies upon request.

It is acknowledged that this CTMP is limited to the current Disturbance Footprint of the Project; and that any adjusted footprint areas are not addressed within it (refer Section 3.4.1). Additionally, *C. megacarpa* counts and habitat conditions are not static and are liable to change due to environmental conditions. Therefore, this document may require revision in consultation with the regulator and in accordance with relevant approval conditions.

3.4 Impacts

The project team have designed the infrastructure to avoid and minimise impacts to *Cycas megacarpa* to the extent practicable. For example, where safety allows, individuals underneath powerline corridors have been considered in the design, and the position of other infrastructure (such as towers, and associated pads and access tracks) have been located to avoid cycad clusters as much as practicable.

However, there will be an unavoidable impact through the establishment of tower pads, access tracks and supporting infrastructure. Consequently, the degree of impact will vary and can be further defined through the use of two distinct footprints which are discussed below.

The impacts and associated mitigation measures for Cycads on this Project is provided in Appendix A.

3.4.1 Disturbance Footprint

The Disturbance Footprint within known Cycad habitat is the area encompassing all required infrastructure, vegetation clearing and ground disturbance for the construction and operation of The Project. The Disturbance Footprint represents the maximum extent of direct impacts associated with the development within the Field Survey Extent (subject to micro-siting).

The Disturbance Footprint has been defined based on the current design, application of the mitigation hierarchy and ground-truthing undertaken up until point of PER submission. However, flexibility within the disturbance footprint remains essential to allow for additional micro-siting requirements[4]. This ensures (for example) the flexibility to accommodate design and construction refinements, avoid sensitive areas, respond to landowner requests, address unexpected finds, manage safety concerns, and mitigate potential impacts arising from ground conditions.

Any amendments to the disturbance footprint will be assessed by a suitably qualified and experienced person; and remain within the field survey extent area. Any impacts to *Cycas megacarpa* will remain within the limits defined within the approval conditions.

The Disturbance Footprint is shown in Figures 2a to 2f, and contains the following two (2) impact types for *Cycas megacarpa* and associated habitat values:

- *Cycas megacarpa* is present and may remain in-situ. However, associated habitat may be selectively cleared and/or routinely managed over the operational life of the transmission line;
- *Cycas megacarpa* is present where full clearing is proposed. Translocation is planned.

It is anticipated that 29.7 ha of known habitat; and 0 ha of suspected habitat will be modified through the selective removal of incompatible species (i.e. species that are not within safe electrical distance to the infrastructure or have potential to grow into infrastructure). *Cycas megacarpa* individuals in these locations will be retained in-situ.

The Disturbance Footprint contains approximately 1,032 *Cycas megacarpa*. Approximately 632 Individuals that remain in-situ will be monitored and reported on as part of this CTMP.

[4] **Micro-siting process** (definition – changes to the disturbance footprint that remain within the field survey extent to accommodate design and construction refinements, avoid sensitive areas, respond to landowner requests, address unexpected finds, manage safety concerns, and mitigate impacts that arise from ground conditions).
Need for micro-siting is identified by project team.

1. Proposed change is spatially mapped to enable assessment by a suitably qualified person.
2. Assessment of change must:
   a. Identify any additional areas to existing disturbance that will be impacted and also any areas that will no longer be required to be disturbed within the disturbance footprint;
   b. Determine if impacts to MNES remain within the limits identified within the approval conditions and also within the assessment;
   c. Determine if direct and indirect impacts to MNES are consistent with those identified within the assessment;
   d. Determine if changes are within the field survey extent.
3. The proposed change may proceed where the following conditions are met:
   a. Does not result in an increase to disturbance of MNES habitat as defined within the approvals conditions and also within the assessment;
   b. Does not result in any additional direct or indirect impacts to MNES as identified within the assessment; and
   c. Is within the field survey extent.

   Actions: The disturbance footprint must be updated and the change communicated to the project team.
4. The proposed change must not proceed where the change:
   a. Results in an increase to disturbance of MNES habitat as defined within the approval conditions and also within the assessment; or
   b. Results in additional direct or indirect impacts to MNES as identified within the assessment; or
   c. Results in disturbance outside the field survey extent.

   Actions: Further consultation with the project team to understand if proposed changes can be amended or if changes are required, seek variation to approval.

3.4.2 Cycad Salvage Footprint

The Cycad Salvage Footprint is within the Disturbance Footprint and is the maximum extent to which complete vegetative clearing is required within this species' habitat (refer Figures 2a to 2f). *Cycas megacarpa* occurring within the Cycad Salvage Footprint will require translocation to, and management and monitoring in, an appropriate recipient site in accordance with this CTMP.

It is anticipated that 23.8 ha of known habitat; and 0.5 ha of suspected habitat will be cleared.

The Cycad Salvage Footprint contains approximately 400 *Cycas megacarpa.* At this time, it is estimated that approximately 1% of those individuals will not be salvaged[5]. Factors for this include:

- The Cycad is considered to be dead – it is noted that Cycads can be dormant for a period and may in some instances develop a 'pup' (in time may become the new stem). However, this is not possible for all Cycads and some plants may be determined to be dead by the Specialist Ecologist during tagging and baseline activities. These plants will not be salvaged and will not be replaced as part of the programme.
- The Cycad is considered to be in poor health and unlikely to survive the translocation. This will be determined by the Specialist Ecologist during tagging and baseline activities. These plants will not be salvaged; and will be replaced at a ratio of 1:2.
- The slope is too steep to safely extract either mechanically or by hand. This decision will be made by the Salvage specialist during salvage works. These plants will not be salvaged; and will be replaced at a ratio of 1:2.

[5] This is estimated based on current design. Inputs from the salvage specialist in conjunction with the final design may cause this figure to be revised.

4. Recipient Site Suitability

Appropriate translocation efforts should aim to focus on conserving networks of subpopulations, establishing new sub-populations representing the full genetic diversity of the species, and building connectivity to maintain gene flow within the currently recommended 8.5 km to 20 km range.

Since 2012, two genetic studies have been undertaken by the University of Sunshine Coast for *Cycas megacarpa.* Whilst the first study did analyse genetic material across the entire distribution range, each study was particularly focussed on subpopulations being impacted by development (SP8 and SP3). Due to both subpopulations being significant and viable, both studies concluded that the translocation of plants within their respective subpopulation is unlikely to result in an outbreed depression. However, the addition of new plants from other subpopulations under careful parameters is likely to enhance the genetic diversity of receiver populations.

Additionally, propagated individuals added to any potential offset planting (in this instance, collected from within SP8) are unlikely to lead to an outbreeding depression. However, seed collection should ideally be sourced from multiple locations to reduce the chances of genetic swamping by particular allelic variants.

Suitable translocation recipient sites were investigated during targeted Cycas surveys and broad site suitability assessments undertaken in October and November 2025.

Core attributes for suitability include but are not limited to the following:

- Vehicle accessibility;
- Water availability;
- Proximity to Disturbance Footprint;
- Located within the same subpopulation being impacted;
- Support suitable habitat features;
- Reasonable to good condition (i.e. low weed abundance);
- Good connectivity; and
- Have appropriate carrying capacity to support additional individuals.

Two (2) recipient sites have been identified through this process and their overall suitability is summarised in this section, the Primary Recipient Site and the Secondary Recipient Site, which will be retained as a secondary option should it be required.

Both recipient sites are located within the broader offset properties identified as suitable under the Offset Package in the PER (refer Section 12.3 of the PER). Both recipient sites are intended to be legally secured (e.g. covenant).

4.1 Results

Each site has been scored in relation to how well it meets the suitability criteria and scored out of 78. Copies of these scorecards are provided in Appendix B. The property details along with their suitability scores are provided in Table 2 below.

Table 2: Proposed Cycas recipient sites

Tenure	Paddock Name	Suitability Score
Freehold	Primary Recipient Site	75 out of 78
Freehold	Secondary Recipient Site	73 out of 78

Both sites are within close proximity to the proposed Disturbance Footprint, and are considered viable due to the following:

- Both sites are within the range extent of SP8 and contain *Cycas megacarpa* (i.e. the sites are in habitat contiguous with the Disturbance Footprint and in some cases the same Cycad clusters are being impacted);Both sites enable connectivity to existing clusters forming part of SP8 (< 500m away);
- The habitat is known or suitable for Cycads, noting that it is not uncommon for this species to have clear geographical breaks despite the presence of suitable habitat. Key considerations include the presence of suitable crown cover to protect the plants, especially younger individuals and proximity to known Cycads which is important for genetic variability, linkage and pollinators;
- Both sites are accessible for translocation machinery and do not pose a significant safety risk;
- Threats such as weeds and fires can be mitigated within the recipient sites and adjacent areas; and
- The vegetation structure across both sites is open enough to support the establishment of the recipient site without disturbing the canopy and most of the understorey.

4.1.1 Location and Size

Whilst clear of The Project's Disturbance Footprint, the Primary Recipient Site is located less than 500 m from an existing powerline easement track (on an adjacent property) and directly accessed from a Council road to the East. The Secondary Recipient Site is approximately 8 km from the proposed Project on a property accessed from a Council road to the North.

Based on the calculations provided within this CTMP, the minimum area required for planting will be approximately 2.2 ha. This calculation accounts for a minimum spacing of 6 m apart but doesn't account for site conditions.

Considerations such as canopy cover (can be patchy), rocky outcrops, topography, existing in-situ plants (stem density), aspect, firebreaks and track locations must all be factored into the planting layout. Additionally, the preparation and planting stages should seek to avoid disturbance to other habitat values (vegetative, canopy, certain ground habitat, etc) and should support overlapping offset values associated with the site (e.g. koalas, gliders, etc).

Therefore, the final planting layout is likely to be around 4 ha to 6 ha in extent.

Both properties contain more suitable area than is required and as summarised in Table 3 each tentative polygon currently exceeds the required amount of area for planting.

Table 3: Proposed Cycas recipient sites (size)

Paddock Name	Tentative Polygon Area (ha)
Primary Recipient Site	22 ha
Secondary Recipient Site	38 ha

4.1.2 Primary Recipient Site

Topography and catchment

The Primary Recipient Site is located on a combination of gently sloped and undulating areas; and steep gullies and drainage lines. These features currently support dispersal via overland flow for in-situ Cycads throughout the area.

Soils and geology

Preliminary observations indicate the soils are a brown silty clay loam with scattered, loose, conglomerate rock and pockets of rocky outcrops. Some rocky outcrops were observed during the survey period; however, it is expected that these pockets will be avoided as part of the planting layout.

The surface geology in this area is mapped as Three Moon Conglomerate which is a mixture of volcanic and sedimentary rock typically comprised of granule to cobble andesitic to basaltic polymictic conglomerate, lithofeldspathic to feldspatholithic sandstone, siltstone, mudstone, andesite, minor felsic tuff, fossiliferous limestone; rare basaltic pillow lava and hyaloclastite (Queensland Government, 2025).

Habitat and condition

The Primary Recipient Site is consistent with Regional Ecosystem mapping and comprises of remnant *Eucalyptus crebra* dominated woodland on undulating rises on sediment and interbedded volcanics (refer Images 8 and 9). The canopy is up to 25 m in height and provides at least 50% cover in the sparser locations. A T2 layer between 8 m and 15m in height is present and dominated by *E. crebra* and *C. erythrophloia.* The T2 cover is approximately 2.5%. A sparse, T3 layer to 3m high is present and provides an average cover of 1.8%. It is anticipated that the planting design can avoid impacting the regenerating understorey whilst still supporting the objectives of the planting programme.

This ecological community is consistent with *C. megacarpa* habitat.

Images 8 and 9: Primary Recipient Site, site features (Ecologica, 2025).

In terms of habitat condition for *C. megacarpa*, the Primary Recipient Site is in moderate ecological condition containing open woodland vegetation and native grassy groundcover with trees large enough to provide suitable canopy cover. Some epicormic growth in the canopy as well as some dieback has been recorded. This is considered due to previous droughts and fires in the region.

Lantana montevidensis (Creeping lantana) is the dominant weed species across the site but is considered manageable. Small pockets of *Lantana camara* (Lantana) and *Opuntia tomentosa* (Prickly pear) were also observed in the general area. Weed management to reduce Lantana and Prickly pear coverage will occur prior to translocation commencing (as part of recipient site preparation works) and will likely continue as part of the OMP and PLQ EMP.

No feral animals were observed within the site during the preliminary surveys, however Feral pigs (*Sus scrofa)* have been observed on the property itself and it is expected that they may move through the area seasonally. It is anticipated that feral animals could be feasibly managed to prevent detrimental effects on plantings, and it is anticipated that these species will be managed on an ongoing basis as part of the OMP and PLQ EMP.

Cycas megacarpa presence

The Primary Recipient Site is located within the distribution range of SP8 and preliminary surveys have confirmed the presence of *C. megacarpa* both within and adjacent the Primary Recipient Site; as well as the presence of both reproductive material and active recruitment. Consequently, pollinators are presumed to be present within this site.

Additionally, connectivity between the Disturbance Footprint and the proposed recipient site has been established with at least one (1) of the Cycad clusters within the Disturbance Footprint extending into the Primary Recipient Site.

Other conservation values

The Primary Recipient Site is considered likely to provide suitable habitat for Koalas (*Phascolarctos cinereus) and* Glider species which have been observed in the local area.

The site is also within an area containing Matters of State Environmental Significance (MSES) and is overlaid as:

- A State significant biodiversity corridor;
- An area of biodiversity significance (State level) under the Biodiversity Planning Assessments; and
- Essential habitat for *C. megacarpa* (northeastern extent of the Primary Recipient Site).

Current and future land use

The current land use for this site is primarily low intensity cattle grazing. It is considered likely that appropriate fencing will exclude cattle from the area, particularly during critical post translocation periods when plants are establishing onsite. However, it is acknowledged that some low-level grazing during other periods is likely to support fuel load reduction efforts across the site.

An exploration permit currently exists over the majority of the site, noting that this permit was due to expire in July 2024, with a renewal currently under assessment (Qld Government, 2025).

An exploration permit currently exists over a small portion in the western extent of the site. This permit was applied for in October 2024 and is currently active (Qld Government, 2025). If applicable, this permit area can be avoided in the planting strategy.

A pipeline license currently traverses through a linear (30 m) section of the site. Whilst this license does not expire until 2060, the pipeline is no longer going ahead and consequently the permit status was amended to 'non-current' in 2019. If applicable, this area can be avoided in the planting strategy.

Access, water and fire

The Primary Recipient Site is considered secure. The locations of the translocated individuals will not be visible from public roads and access to the sites will be restricted by a locked gate.

Due to the proximity of an existing easement track on the adjacent property, it is possible for 2WD access to the site with 4WD access available via an existing farm track.

In terms of water availability, there is an active dam available adjacent to the site and the landholder has confirmed the potential for bore water to be extracted and used for horticultural management. Should it be needed, water cartage could access the site if an additional track is created from the existing easement track across to the site. There are also suitable locations for water storage tanks to be established.

Based on fire scar mapping, several large-scale fires have occurred in the local area over the past 20 years. However, the last time the site was completely burnt was 1987. Several fires since then appear to have burnt the periphery only, occurring in 2006, 2011 and 2014 (Qld Government, 2025). It is considered feasible that fire risk could be managed with low level burns within the vicinity of the recipient site for the duration of the translocation and offset programme.

4.1.3 Secondary Recipient Site

Topography and catchment

The Secondary Recipient Site located on a combination of gently sloped and undulating areas with gullies and drainage lines. These features currently support dispersal via overland flow for in-situ Cycads throughout the area.

Soils and geology

Preliminary observations indicate the soils are a brown sandy clay loam with scattered, loose, rock and pockets of rocky outcrops. Some rocky outcrops were observed during the survey period; however, it is expected that these pockets will be avoided as part of the planting layout.

The surface geology in this area is mapped as Youlambie Conglomerate which is typically comprised of granule to boulder polymictic conglomerate commonly with abundant granite and rhyolite clasts, felsic volcaniclastic sandstone, tuffaceous and carbonaceous siltstone and mudstone, dacitic to rhyolitic ignimbrite, breccia, minor coal (Queensland Globe, 2025).

It is likely that some alluvium is also present, particularly along the active stream channels and low terraces.

Habitat and condition

The Secondary Recipient Site comprises of remnant and regrowth *Eucalyptus crebra* dominated woodland on undulating rises and footslopes (refer Images 10 and 11). The canopy is up to 25 m in height and provides up to 66% cover. A sparse T2 layer between 6 m and 12 m in height is present and dominated by *E. crebra.* The T2 cover is approximately 4%. A sparse, T3 layer to 4 m high is present and provides an average cover of 2%. It is anticipated that the planting design can avoid impacting the regenerating understorey whilst still supporting the objectives of the planting programme.

This ecological community is consistent with *C. megacarpa* habitat.

Images 8 and 11 Secondary Recipient Site, site features (Ecologica, 2025).

In terms of habitat condition for *C. megacarpa*, the Secondary Recipient Site is in moderate ecological condition containing open woodland vegetation and native grassy groundcover, with trees large enough to provide suitable canopy cover. Some dieback has been recorded and is considered likely due to the 2023 fire followed by drought conditions.

Lantana montevidensis is the dominant weed species across the site but is considered manageable. Small pockets of *Lantana camara* were also observed in the general area. Weed management to reduce Lantana coverage will occur prior to translocation commencing and will be managed as required as part of the OMP and PLQ EMP.

No feral animals have been observed within the site during the preliminary surveys, however it is expected that feral pigs may move through the area seasonally. It is anticipated that feral animals could be feasibly managed to prevent detrimental effects on plantings, and it is anticipated that these species will be managed on an ongoing basis as part of the OMP and PLQ EMP.

Cycas megacarpa presence

The Secondary Recipient Site is located within the distribution range of SP8 and preliminary surveys have confirmed the presence of *C. megacarpa* in adjacent areas (<500 m away). This proximity is considered acceptable for connectivity with the existing subpopulation.

The presence of pollinators could not be confirmed at the time of the November 2025 survey period. However, it is expected that the proximity of the site to several Cycad clusters supports the likelihood for pollinators to be present.

Other conservation values

The Secondary Recipient Site is likely to provide suitable habitat for Koalas and Gliders which have been observed in the local area.

The site is also within an area containing MSES and is overlaid as an area of biodiversity significance (State level) under the Biodiversity Planning Assessments.

Current and future land use

The current land use for this site is primarily low to moderate intensity cattle grazing. It is considered likely that appropriate fencing will exclude cattle from the area, particularly during critical post translocation periods when plants are establishing onsite. However, it is acknowledged that some low-level grazing during other periods is likely to support fuel load reduction efforts across the site.

An exploration permit currently exists over the northwestern corner of the site, noting that this permit was due to expire in July 2024, with a renewal currently under assessment (Qld Government, 2025). If applicable, this permit area can be avoided in the planting strategy.

Access, water and fire

The Secondary Recipient Site is considered secure. The locations of the translocated individuals will not be visible from public roads and access to the sites will be restricted by a locked gate. 4WD access is available via an existing farm track.

In terms of water availability, there is an active dam available within the site that could be used for horticultural management. Should it be needed, water cartage could access the site if the existing farm track is upgraded. There are also suitable locations for water storage tanks to be established.

Based on fire scar mapping, several large-scale fires have occurred in the local area over the past 20 years. The last time the site was completely burnt was 2023. Before that, several fires appear to have burnt the periphery only, in 1992, 1997, and 2007 (Qld Government, 2025). It is considered feasible that fire risk could be managed with low level burns within the vicinity of the recipient site for the duration of the translocation and offset programme.

5. Roles and Responsibilities

The translocation team is comprised of experienced ecological, horticultural and salvage specialists with demonstrated experience implementing components of translocation programmes and achieving successful outcomes. This section outlines the roles and responsibilities within the translocation programme.

Over the life of the programme, appropriate training for certain programme components will also be undertaken to build the internal capacity of Powerlink's skilled workforce. Whilst external oversight will continue for the life of the programme, this opportunity will support greater autonomy for Powerlink in fulfilling the programmes requirements and reduce contractual risk.

Role	Responsibilities
Powerlink representative	They are responsible for: • Engaging the translocation team[6]; • Overseeing delivery of this CTMP; • Ensuring continuous legal security of the recipient site; • Approve and where applicable, implement corrective actions under the guidance of the Specialist Ecologist; • Submit Annual Compliance Reports to DCCEEW and DETSI; • Submit Completion Report to DCCEEW.
Specialist Ecologist	The Specialist Ecologist is responsible for: • Maintaining the Data Management Tool, including collation and input of data from personnel for all aspects of the programme, and all relevant spatial data, for the duration of the programme. This includes: o input of all relevant data from proforma documentation; o extrapolation of datasets for reporting and mapping purposes; o ensuring that data collected is consistent with the outlined methodologies; is adequately captured; and is able to be utilised for comparative analysis during future monitoring activities, during propagation activities, and within the final recipient site(s). • Development and finalisation of outstanding methodologies (i.e. propagation) and proforma documentation for all stages of the programme (for use by all personnel) in accordance with the CTMP; • All updates and amendments to methodologies in accordance with CTMP and approval conditions; • Oversight of the entire translocation programme. This includes (but is not limited to): o onsite presence during the salvage and planting components of the programme; o providing advice (as needed) to the translocation team (salvage and supplementary planting fronts); o oversight of the horticultural team and associated management activities (as needed); o oversight of the nursery team(s) and association management; o oversight of the ecological monitoring programme (incl. salvaged, retained in-situ, nursery grown and reference set); o reviewing reporting provided for all relevant components of the programme; o ongoing consultation with the horticultural and nursery teams to ensure: - any issues around seed or propagation issues, or plant condition is addressed in a timely manner; - transfer and receipt of collected seed into the nursery is undertaken in a timely manner; - relevant seed collection data pertaining is forwarded to the nursery for incorporation into their own database tool;

[6] In the instance the clearing and construction contractor becomes responsible for the engagement of the translocation team, Powerlink will be responsible for approving the members nominated by the Contractor prior to the commencement of translocation works.

Role	Responsibilities
	- horticultural management undertaken by the nursery and onsite horticultural teams are collated in their proforma format in accordance with the CTMP and provided to the Specialist Ecologist for incorporation into the data management tool. • Planning out recipient sites to receive salvaged and propagated individuals (including layout design) whilst accommodating existing in-situ individuals and habitat values; • Determining which plants are classified as dead and/or not salvageable (not salvageable is in consultation with Salvage Team and Powerlink Representative); • Establishing the reference set, tagging each individual and capturing all relevant baseline information (actual no. is to be determined by the final salvage number); • Identification of suitable seed collection locations outside the Disturbance Footprint to meet the seed collection requirements and undertaking seed collection in these locations; • Determining if corrective actions are required and liaising with Powerlink regarding their implemented (incl. implementation of safeguard measures). This includes interim milestone/management triggers; • Regular positive communication with Powerlink (representative and offset manager), programme teams appointed offset manager to support continuity of ongoing management within the recipient site and offset area (particularly around fire, pest and weed management); • Annual auditing of Nursery and data management and processes (external to data mgt tool). Results form part of annual reporting to support programme compliance (and confirm programme is on track for success); • Annual monitoring of the recipient site, reference site, retained in-situ individuals; • Reviewing and compiling the salvage, horticultural, nursery and monitoring reports for submission to Powerlink; • Preparation and submission of annual reporting; • Preparation and submission of Completion Report before submission to DCCEEW and DETSI.
Salvage Team	The Salvage Team will be responsible for: • Preparation works within the recipient site; • The extraction of all *C. megacarpa* individuals from the Cycad Salvage Footprint (Section 7); • Planting salvaged individuals (adult and sub-adult) into the recipient site (Section 7.3); • Transporting salvaged seedlings and juveniles to the nursery and potting them up; • Potting up seeds whose shell has cracked with radicle protruding; • Collecting *C. megacarpa* seed under direction from Specialist Ecologist (Section 9); • Horticultural management within the recipient site until salvage works are completed (then handed over to Horticultural Team) (Section 10); • Completing proforma documentation associated with salvage activities (Section 7); • Data management and reporting in accordance with Section 7.4.1 (and 10.2 until the completion of salvage works). The Salvage Team will submit data and reporting to the Specialist Ecologist as required under this CTMP.
Horticultural Team	The Horticultural Team will be responsible for: • Undertaking horticultural management and reporting activities in accordance with Section 10. The Horticultural Team will submit data and reporting to the Monitoring Ecologist and Specialist Ecologist as required under this CTMP.
Nursery Team	The Nursery Team are responsible for: • Providing methodology inputs relevant to their scope for incorporation into the CMTP; • Managing and storing seed (Section 9);

Role	Responsibilities
	• Propagating seed and managing them under nursery conditions until they are planted into the recipient site (Section 9); • Managing salvaged seedlings and juveniles under nursery conditions until they are planted into the recipient site (Section 10); • Data management and reporting in accordance with Sections 9.3, 11.3 and 10.1; The Nursery Team will submit data and reporting to the Specialist Ecologist as required under this CTMP.
Monitoring Ecologist	The Monitoring Ecologist will provide independent monitoring of translocated individuals in accordance with Section 11.1. The Monitoring Ecologist will submit data and reporting to the Specialist Ecologist as required under this CTMP.

5.1 Powerlink Representative

The Powerlink Representative will be the programme co-ordinator and be responsible for overseeing compliance with and delivery of, the CTMP in accordance with Commonwealth and State approval conditions.

The Powerlink Representative will facilitate information exchange between relevant parties as necessary to ensure implementation of the CTMP can occur.

5.2 Specialist Ecologist

The Specialist Ecologist will lead the translocation and propagation programme providing advice as required to other teams and managing data to ensure completion criteria are met. The Specialist Ecologist will oversee all stages of the programme including on-ground maintenance of recipient sites, ecological monitoring and reporting due to their expertise and experience. The Specialist Ecologist is independent of the Salvage Team and the Horticultural Team.

The Specialist Ecologist will have demonstrated experience in leading successful Cycad translocation programmes (>70% survival overall). This demonstrated experience will include involvement in all stages of the programmes (planning, salvage and propagation, management of translocated individuals, monitoring and reporting).

Suitably qualified field ecologist means a person who has relevant professional qualifications and at least three (3) years of work experience designing and implementing surveys for Cycas megacarpa and can give an authoritative assessment and advice on the presence of Cycas megacarpa using relevant protocols, standards, methods and/or literature. If the person does not have appropriate professional qualifications, the person must have at least five (5) years of work experience designing and implementing surveys for Cycas megacarpa.

The above requirements are considered the minimum required; however, it is recommended the Specialist Ecologist has over 10 years of experience in environmental management and has managed at least two translocation projects with a preference for experience in Cycads.

5.3 Salvage Team

The Salvage Team will comprise of at least one (1) salvage contractor and at least one (1) suitably qualified and experienced horticulturalist.

The salvage contractor will have an appropriate level of experience in salvage works, have demonstrated experience working in sensitive environs, have demonstrated experience salvaging and planting *Cycas megacarpa* with a high success rate post two years of the translocation works; and have worked on a minimum of two (2) Cycad translocation programmes.

The suitably qualified and experienced Horticulturalist will have demonstrated experience in planting and maintaining Cycas species as part of translocation and/or recovery programmes; can demonstrate greater than 70% survival under their care; has worked on a minimum of two (2) Cycad translocation programmes.

The Salvage Team will hold appropriate qualifications in horticultural and machinery licences and will work under Powerlink's NC Act Clearing Permit to translocate Cycads and collect seed. The planting works will be led by the suitably qualified and experienced Horticulturalist who will oversee their horticultural management until the completion of salvage works.

The recipient site will then be handed over to the Horticultural Team for ongoing horticultural management in accordance with Section 10. The Nursery will be handed over to the Nursery Team upon completing of salvage works.

Good hygiene standards required to work within sensitive environs are required including but is not limited to weed and weed seed free; pathogen free (particularly for Phytophthora and *Austropuccinia psidii* (Myrtle rust)). Machinery is to be provided by the Salvage Team and kept in good working order.

5.4 Horticultural Team

The Horticultural Team will consist of a Lead Horticulturalist and other horticultural and labour roles for undertaking maintenance actions post salvage activities in accordance with Section 10.

The Lead Horticulturalist will be suitably qualified and experienced with horticultural qualifications, will have demonstrated experience in maintaining Cycas species as part of translocation and/or recovery programmes; can demonstrate greater than 70% survival under their care; and has worked on a minimum of two (2) Cycad translocation programmes.

Other members of the Horticultural Team will be appropriately experienced within the horticultural industry and hold necessary certificates, permits and licences. Team members will have experience working on sites containing sensitive environs and have experience managing and undertaking salvage works.

Due to frequency of maintenance, it is recommended that the Horticultural Team be based locally in the region.

5.5 Nursery Team

A suitable nursery and/or location for establishment will be identified by Powerlink (with support from the Specialist Ecologist) and used to manage and store seed, propagate and manage plants grown from seed; and manage salvaged seedlings and juveniles.

This work will be led by a suitably qualified and experienced horticulturist with appropriate horticultural qualifications. The lead Horticulturalist will have demonstrated experience in maintaining Cycas species as part of translocation and/or recovery programmes; can demonstrate greater than 70% survival under their care; and has worked on a minimum of two (2) Cycad translocation programmes.

Other members of the Nursery Team will be appropriately experienced within the horticultural industry and hold necessary certificates, permits and licences.

The location of the nursery will be local to the recipient site. Due to the day to day management requirements, it is recommended that the Nursery Team be based locally in the region.

The Lead Horticulturalist will provide the inputs necessary to finalise methodologies associated with their scope of work for CTMP incorporation.

5.6 Monitoring Ecologist

The suitably qualified and experienced Monitoring Ecologist will have appropriate professional qualifications and relevant experience in conducting surveys of threatened flora species (with a preference for experience in *Cycas megacarpa*); demonstrated experience monitoring as part of threatened species translocation and/or recovery programmes; and demonstrated competency in field data collection and preparing ecological monitoring reports.

6. Translocation Preparation

The field team undertaking the tasks outlined in Section 6 will be led by the Specialist Ecologist. This ensures that the tasks and data collection is consistent with the outlined methodology; adequately captured; and able to be utilised for comparative analysis during future monitoring activities in the recipient site.

6.1 Timing

The salvage activities are tentatively scheduled to commence in the 3rd Quarter of 2026 (between June and September)[7]. This section outlines the tasks needing to be undertaken in preparation for this activity with their tentative timing shown in Table 4.

This tentative timeline is subject to approvals being in place; Powerlink's timeline for construction being finalised; the engagement of suitably experienced contractors; and preparations being underway within the recipient site.

With the exception of the surveyors requirements (pegging out the footprint), the methodologies associated with each of these tasks is provided in the Sections 6.2 to 6.7 of this CTMP.

Table 4: Timeline for translocation preparation tasks

Task	Q1 (2026)	Q2 (2026)	Q3 (2026)
Surveyors to mark out (survey peg) the Cycad Disturbance Footprint and Salvage Footprint			
Baseline Surveys - Cycad Disturbance Footprint			
Baseline surveys & tagging - Cycad Salvage Footprint			
Baseline surveys & tagging - reference set			
Recipient site preparation			
Nursery setup/engagement of personnel			
Recipient site layout finalisation			

Table Notes:
Q - Quarter

6.2 Disturbance Footprint

A condition assessment will be undertaken for all *Cycas megacarpa* to be left in-situ within the Disturbance Footprint. The following baseline information will be recorded for each plant:

- Co-ordinates;
- Height (cm);
- Stem condition;
- No. of active and dead pups;
- Foliage development stage and any deformities;
- The presence of invertebrates including potential pollinators;
- The presence and degree of insect attack, along with the predator species present;
- The presence and developmental stage of fruiting material including number of seeds and degree of ripeness;
- Current height and crown condition recorded, and photo logged (reference position north);
- Age class[8]; and

[7] This date is contingent upon approval. Should the commencement date be later, all relevant schedules and timelines will be adjusted accordingly.
[8] Age class definition is provided in Appendix C.

- Overall condition and other relevant observations (e.g. pig attack, fire damage).

High visibility survey markers will be used to assist in re-locating seedlings/juveniles during the monitoring period. This includes seedlings observed without fronds but with a radicle fixed in the ground (i.e. very young seedlings).

At least eight (8) permanent photo points will be established to visually record any changes to community composition and structure over the life of the monitoring programme.

All baseline data will be input into the data management tool for future analysis and reporting purposes. Additional data for monitoring purposes (e.g. accidental damage during selective clearing works) will also be managed by the Specialist Ecologist during the construction phase.

A spatial dataset of individuals to be retained within the Disturbance Footprint will be provided by the Specialist Ecologist to the Salvage Team and the Powerlink Representative. It is anticipated that Powerlink will issue the construction clearing contractor a copy of this dataset once available.

6.3 Cycad Salvage Footprint (tagging)

Prior to the commencement of tagging activities, Powerlink's appointed construction clearing contractor will clearly define and peg the clearing boundary in preparation for works.

Once completed, the *C. megacarpa* individuals within the Salvage Footprint will be assessed and tagged as part of the translocation preparations. This task will include tagging individuals with a unique identification code[9] (UIC) (fireproof/resistant aluminium tag); marking them with hi-visibility paint (nontoxic) and/or high visibility tape; and recording the following baseline information against their new ID:

- Co-ordinates;
- Height (in cm);
- Age class (as per definition in Appendix C);
- Firmness in ground (root development indicator);
- Stem condition (stress indicator);
- No. of active and dead pups (stress indicator);
- Foliage development stage and any deformities (indicator for root development and stress);
- Presence and severity of herbivory (growth inhibition indicator);
- Where applicable, the severity of an invertebrate attack (other than foliar) will also be noted (visual only), along with the presence of predator species such as *Theclinesthes onycha* and *Lilioceris nigripes*;
- The presence of other invertebrates including putative pollinators;
- Presence and developmental stage of megasporophylls (females) and number of seeds present;
- Presence and developmental stage of pollen cones (male) including notable shedding;
- Measurements of recruitment including germination rates around maternal parent plant; developmental stage and survival rates;
- The presence of vertebrates (e.g. frogs and birds);
- The presence of any growth abnormalities;
- Overall condition (incl. crown) and other relevant observations; and
- Photo logged (reference position north).

As shown in Image 12, the UIC will comprise the entity name/Project and their number in sequence (e.g. C2C 0001, C2C 0002, etc).

Due to high mortality rates in the wild, seedlings and juveniles will be associated with the ID code of their maternal parent (only if certain). For example, the seedlings/juveniles of C2C 001, will be tagged as C2C 001a, C2C 001b, etc. High visibility survey markers will also be used to assist in re-locating the plants during the salvage activities (refer Image 13).

[9] Tagging with a UIC allows individual health and location to be traced over the life of the monitoring programme.

This includes seedlings observed without fronds but with a radicle fixed in the ground (i.e. very young seedlings)[10].

Image 9: *Cycas megacarpa* with a fireproof tag containing a UIC.

Image 103: Juvenile of unconfirmable origin being marked with survey flag and UIC attached.

The field team undertaking the tagging and in-situ condition assessment will be led by the Specialist Ecologist. This ensures that the data collection is consistent with the outlined methodology; adequately captured; and able to be utilised for comparative analysis during future monitoring activities in the recipient site.

All baseline data will be input into the data management tool for future analysis and reporting purposes. Additional baseline data for monitoring purposes (e.g. presence/absence of coralloid roots (Cycads) as well as damage during translocation) will also be managed by the Specialist Ecologist during translocation activities.

A spatial dataset of individuals to be salvaged from the Cycad Salvage Footprint will be provided by the Specialist Ecologist to the Salvage Team and the Powerlink Representative. This dataset will be utilised by the Salvage Team to confirm which individuals to transplant.

6.4 Reference Site (tagging)

The establishment of the reference site will be undertaken prior to the commencement any salvage works occurring.

To support measuring the success of the translocation programme, the establishment of a reference site will be required so that the temporal variation between the recipient, retained in-situ and reference site specimens can be analysed and compared.

The reference site will be in an area nearby to (or within) the recipient site, an appropriate distance from The Project's Disturbance Footprint, and accessible during the life of the monitoring programme. The reference site will also be in an area not subject to future development.

The number of individuals established as part of the reference set will comprise of similar age classes and similar topography and aspect to those translocated; and will be at least 50% of the total number directly impacted within the Salvage Footprint (i.e. 400 Cycads being directly impacted will result in the establishment of a minimum of 200 individuals across all age classes being used as a reference site).

[10] Should any additional seedlings that meet this criterion be located during salvage activities, all relevant data will be captured for them.

All reference site individuals will be tagged with a UIC[11] (fireproof/resistant aluminium tag) and have the following baseline information recorded against their ID.

- Co-ordinates;
- Height (in cm);
- Age class (as per definition in Appendix C);
- Firmness in ground (root development indicator);
- Stem condition (stress indicator);
- No. of active and dead pups (stress indicator);
- Foliage development stage and any deformities (indicator for root development and stress);
- Presence and severity of herbivory (growth inhibition indicator);
- Where applicable, the severity of an invertebrate attack (other than foliar) will also be noted (visual only), along with the presence of predator species such as *Theclinesthes onycha* and *Lilioceris nigripes*;
- The presence of other invertebrates including putative pollinators;
- Presence and developmental stage of megasporophylls (females) and number of seeds present;
- Presence and developmental stage of pollen cones (male) including notable shedding;
- Measurements of recruitment including germination rates around maternal parent plant; developmental stage and survival rates;
- The presence of vertebrates (e.g. frogs and birds);
- The presence of any growth abnormalities;
- Overall condition (incl. crown) and other relevant observations; and
- Photo logged (reference position north).

The UIC ideally will be comprised of the year they were first tagged and assessed; and their number in sequence (e.g. C2CR26-1, C2CR26-2, etc). Where applicable these tags may be placed on fireproof stakes next to the plants.

Due to high mortality rates in the wild, seedlings and juveniles will be associated with the ID code of their maternal parent (only if certain). For example, the seedlings/juveniles of C2CR26-1, will be tagged as C2CR26-1a, C2CR26-1b, etc. High visibility survey markers will also be used to assist in re-locating the plants throughout the life of the monitoring programme.

At least two (2) permanent photo points will be established in the reference site to visually record any changes to community composition and structure over the life of the monitoring programme. These points will aim to capture as much of the reference site area as possible.

All baseline data will be input into the data management tool for future analysis and reporting purposes. Additional data for monitoring purposes (e.g. accidental damage during selective clearing works) will also be managed by the Specialist Ecologist during the construction phase.

6.5 Recipient Site Planting Design

The findings of the recipient site field assessments will be used to confirm its overall carrying capacity and inform the planting layout/design.

To support a more 'natural' planting design, the planting layout will adhere to a randomised approach (not in rows) and will allow for future plantings of younger individuals (salvaged seedlings/juveniles and propagated individuals) to be planted amongst older salvaged and in-situ individuals across the recipient site.

The minimum spacing between salvaged, propagated and in-situ Cycas individuals is considered to be 6 m, which importantly appears likely to support future recruitment[12].

[11] Tagging with a unique code allows their health and location to be traced over the life of the monitoring programme.
[12] Unpublished data recorded by the Author over a 15 year period indicates seedlings that germinate too close to the maternal parent plant have a low likelihood of survival beyond 2 years (<20%).

The layout/design includes the following key attributes:

- Location of existing Cycads and other values in the area;
- Location of access tracks and fire breaks;
- Location of essential infrastructure (e.g. water tanks, site office/shed, etc);
- Location of any threats;
- Locations for salvaged plantings;
- Locations for salvaged seedlings/juveniles; and
- Locations for propagated specimens.

6.6 Recipient Site Preparation

The recipient site preparation will be undertaken by Powerlink or the appointed contractor. This will occur in consultation with the Specialist Ecologist, the Salvage Team, Horticultural Team and the Powerlink Representative to ensure access and planting areas are suitable, livestock have been excluded and there is access to water, etc.

Commander *et al* (2018) recommends several actions that will be undertaken prior to the translocation of individuals into the recipient site including:

- Establishment and/or maintenance of fire breaks and access tracks across the wider offset area and within or adjacent to recipient site;
- Any hazard reduction burns (if applicable) will be undertaken in accordance with the relevant legislation and where applicable the OMP and PLQ EMP[13], along with other key stakeholders;
- Weed management to occur prior to translocation where required;
- The weeds found and managed in this initial timeframe will act as a baseline for management and annual monitoring of these threats;
- The exclusion of livestock for the first two years post planting; and
- Establishment of temporary and permanent erosion and sediment controls (where applicable) as detailed in the PLQ EMP and Section 8.2 of this CTMP.

Due to the timing of salvage works, any infrastructure required for the horticultural activities, such as water tank(s) and storage area(s) for chemicals may not yet be in place. Temporary measures may be put in place until such time as more permanent infrastructure can be installed.

The following additional actions will be undertaken prior to the commencement of each round of planting activities:

- If applicable, Powerlink will establish appropriate fencing around planting areas (this should only be done prior to if it does not impede movement of machinery during transplant activities);
- The marking out of planting locations within the recipient site. This will be done in a randomised and natural design (not rows) that aligns with the planting layout and will be undertaken to ensure appropriate spacing within the understorey (undertaken by the Specialist Ecologist);
- Commence digging holes of appropriate sizes in marked out locations in accordance with planting design/layouts (note that holes will vary in size according to the salvaged individuals they will be receiving).

[13] Refer to OMP and PLQ EMP for information regarding specific fire management details including fire breaks and fuel load management within the offset and recipient site areas.

6.7 Nursery Establishment

An onsite nursery will be established prior to the commencement of salvage works. This nursery will be appropriately sized to ensure appropriate airflow, that all individuals are off the ground on stable shelves; and that the shade cloth is of an appropriate percentage for optimal growth.

The nursery will adhere to industry standards for phytosanitary conditions as well as occupational health and safety.

The nursery will be positioned to support sufficient water access.

Appropriate supplies required for potting and seed storage activities during salvage works will be ordered and received prior to the commencement works (i.e. variable sized deep pots/bags, weed, pathogen and fire ant free potting medium (including sand), appropriate seed storage, etc).

N.B. In the event that a nursery cannot be established onsite, an offsite nursery that meets the outlined requirements will be utilised.

7. Translocation Methodology

7.1 Timing

It is expected that translocation activities into the recipient site will occur on at least two separate occasions throughout the life of the programme. The first occasion being the salvage activities which are tentatively scheduled to commence during the 3rd Quarter of 2026. The second occasion will be a supplementary planting of nursery grown and salvaged[14] individuals tentatively scheduled for the 2nd Quarter or 2029 (refer Table 5). However, this timeline is contingent on the number of seed collected and successfully germinated in 2026.

A contingency planting has also been considered as part of this programme. However, it is a corrective action measure triggered only if the mortality rate threshold is reached within the nominated timeframe (refer Section 14). Should a contingency planting be required, it has been tentatively scheduled to commence in the 2nd Quarter of 2031 and CTMP will be updated to reflect methods and requirements associated with this task.

The schedule is subject to change due to commencement of Project stage activities, suitable seed collection and planting conditions, and growth rates of viable seedlings and planting. All of which may impact on the commencement and or duration of the staged requirements. In some circumstances adaptive management may be required and regular updates will be provided. The CTMP will be updated to reflect the changes either as part of the annual review or in response to key stages of works.

Table 5: Timeline for translocation tasks

Task	Q3 (2026)	Q2 (2029)	Q2 (2031)
S7. Translocation			
Salvage works			
Supplementary planting (salvaged and propagated)			
Contingency planting (if required)			

The optimal salvage period for *Cycas megacarpa* is May through September. Salvage and translocation throughout the wet season is not recommended due to higher susceptibility to transplant shock, root and stem rot and pathogen attack.

Salvage activities will start in the western extent of Section B (Callide Range) and progress in a north easterly direction to Mount Alma (refer Figure 1). Due to the topography, a combination of mechanical extraction and hand digging will be required.

There are several factors influencing the time it will take to salvage the required individuals. This includes but is not limited to: access (existing tracks verse needing to create access), distances between salvage areas, terrain (particularly if an area is rocky) and topography, land access protocols (e.g. weed washdown requirements) and salvage method (mechanical verse hand).

Based on the height and age classes recorded during the October 2025 survey period, mechanical extraction may average 18-20 individuals per day. At this time, it is estimated that salvage works may take between 20–30 days to complete using a skilled salvage contractor[15].

7.2 Cycad Salvage Footprint

Sub-adults and adults will be moved from the Cycad Salvage Footprint (i.e. Disturbance Footprint) directly to the recipient site for immediate planting. No temporary storage is proposed. This will greatly benefit the survival ability of the Cycads being salvaged, as was demonstrated by previous translocations done this way for Department of Transport and Main Roads (DTMR)[16].

[14] The supplementary planting will include salvaged individuals that were seedlings/juveniles during the 2026 translocation activities and have been grown under nursery conditions until robust enough to plant out.
[15] This timeframe should be confirmed with a skilled salvage contractor during the engagement process.
[16] Direct translocations (straight into the recipient site) of Cycad species were undertaken for the Calliope Range Deviation Project (Qld) and the Bruce Highway Overtaking Lane Project at Princhester, Qld.

Individuals recorded as seedlings and juveniles (during translocation prep stage), will be moved from the Cycad Salvage Footprint (i.e. Disturbance Footprint) to the nursery and potted up for optimal growing conditions. They will remain under nursery conditions until they are planted out during the supplementary planting stage (tentatively scheduled for May 2029).

The translocation methodology outlined in CTMP is based upon the original 20 step process developed by Dr Paul Forster of the Queensland Herbarium (DoE 2014). This methodology[17] has since been refined for consistency with Commander *et al* (2018) and as a result of successful Cycas translocations that occurred for both DTMR and liquefied natural gas (LNG) projects between 2009 and 2015 led by Ecologica Consulting.

1. Each plant will be marked on one side with marker paint to ensure they are replanted with a similar north-south orientation and to discourage poaching from the new locality;
2. Tags will be retained on the plant, including where the plant is a multi-stemmed and has more than one tag. Where the plant is not tagged, a temporary tag or equivalent identifier will be allocated to it (permanent tag can be allocated once in recipient site). The plant will be GPS located and relevant data collected on the plant as per tagging and condition assessment methodology (e.g. height, stem condition, photo etc);
3. With careful consideration of the coralloid root, the area around individuals will be cleared by hand or with machinery (e.g. bobcat or front-end loader) (refer Images 14 and 15);
4. With the exception of new growth, up to 50% of fronds may be trimmed back on stemmed specimens to where the rachis is attached to the stem(s). All fertile material including seeds and pollen cones will also be removed at this time. Where applicable, these items will be appropriately stored and recorded against the unique identification code in the database. Noted information should include number of seeds and stage of development;
5. To reduce the risk of plants drying out, the stems and crown areas (though not the crown itself) should be sprayed with an anti-transpirant (e.g. Envy®);
6. Soil around each individual will be loosened using a trenching pattern (either by hand, or ideally with an excavator or backhoe);
7. Each individual will be removed whilst attempting to retain as much soil around the plant as possible. This will either be done by hand or with an excavator or backhoe bucket. Care will be taken in retaining soil without damaging the rootball from the weight;
8. Where applicable, damaged roots will be trimmed with clean/sterile secateurs and a fungicide applied (e.g. Banrot®, Formula 20®) to prevent infection. ***NB. Where possible at least 1/3 of the root shall be retained***;
9. All other individuals will be treated with a systemic fungicide to be applied around each rootball;
10. Vitamin B, Seaweed or an appropriate alternative may also be applied to stimulate root growth;
11. An assessment of the subterranean trunk will be undertaken once the plant is removed;
12. Plants will be either wrapped in hessian or placed into an appropriately sized bag with handles for transport to the recipient site. Care will be taken to avoid damaging the coralloid root which can be taped to the side of the plant if achievable;
13. During vehicle transport, care will be taken to minimise bruising of plant stems. Heavy plants will be loaded using a soft sling that is slung on a backhoe or excavator bucket and packed using rolls of hessian sacking or similar to protect the stem; and
14. Upon excavation the plants will be immediately transported to the pre-prepared recipient site. If there is a delay, the hessian sacking, or alternative will be sprayed with water so the rootball(s) remains moist.

Should any additional plants (including seedlings without foliage developed) located during salvage activities, they will have in-situ assessments and tagging activities undertaken and will be carefully removed and prepared for transport to either the recipient site or nursery.

[17] The methodology has been developed by Ecologica Consulting in consultation with the Queensland Herbarium, the Tondoon Botanic Gardens and Australian Natives (transplant specialist).


Images 11 and 12: Time must be taken to carefully remove soil from around base of plants.

7.3 Recipient Site

This methodology applies to both salvage and supplementary plantings. Should a contingency planting be required, this methodology will be applied.

1. Holes at the recipient site will be dug by hand or with an excavator or backhoe. The soil will be loosened, and the hole will not be much deeper than the rootball of the plants being transplanted. Each hole must be at least 1.5 times the size of the plant's subterranean trunk;
2. The hessian sacking (or pots) should be removed from each plant as they are placed into the ground. Any roots which have sustained further damage during transit should be trimmed and sprayed with the fungicide powder;
3. Salvaged plants will be positioned in new holes to ensure that the north-south orientation from the old locality is maintained;
4. Washed river sand or sandy loam will be packed around the roots and rootball where required. This will provide a suitable substrate for production of new roots, reduce the risk of new root breakage in heavy soils and promote drainage of excess moisture which can lead to rot. This introduced soil will be free from weed seed;
5. Backfilling will use the original topsoil removed from the recipient site hole. Where necessary, plants will be staked/strapped to assist with stabilisation (with multiple stakes or surrounding trees where needed). If applicable, rocks can be placed around the base of the stem to aid in stability, to provide protection from fires and to insulate roots from hot weather conditions. Where possible, plants will be placed in a vertical alignment;
6. The stems of salvaged plants may be sprayed a second time with an anti-transpirant to prevent them losing too much moisture;
7. The crown of each plant will be sprayed with an insecticide (such as Confidor® at a rate of application of 10 mL per 9 L of water or application of Crown® at a rate of application of 5 mL per 9 L of water) after transplant;
8. A systemic fungicide such as Banrot® should be applied at the recommended rate around each rootball area;
9. Depending on local weather conditions, each plant may be watered thoroughly (in addition to that received through systemic treatments);
10. Without damaging the roots, a star picket will be driven into the north side of the ground beside each plant so that its' unique identification tag can be attached with high tensile wire. This will reduce the risk associated with losing the tags over time as well as reduce its likelihood of fire damage and reduce safety risks (e.g. spider bites etc);
11. Any damage incurred to the plant through the transplant process will be recorded and photo-logged by the Salvage Team for input into the database. This will assist in identifying any future horticultural requirements and inform monitoring analysis when tracking the progress of a plant (particularly if transplant failure occurs);

12. Once transplant is complete, each plant will be photo-logged, and height measured. The new co-ordinates for each transplanted individual will also be recorded at this time. All data will be input into the database for future monitoring and tracking purposes.
13. The input data will be sent to the Specialist Ecologist at the end of each week during the planting activities.

7.3.1 Nursery (salvaged seedlings and juveniles)

During salvage activities, the salvage team will transport salvaged seedlings and juveniles to the nursery and pot them up in preparation for ongoing management until they are mature enough for planting out. As a minimum, the following methodology will be applied.

1. Each plant will be potted into an appropriately sized pot/bag using an appropriate soil medium that includes washed sand. This soil medium will provide a suitable substrate for production of new roots, reduce the risk of new root breakage in heavy soils and promote drainage of excess moisture which can lead to rot. This introduced soil will be free from weed seed;
2. A systemic fungicide such as Banrot® should be applied at the recommended rate around each rootball area;
3. Plants shall be given an appropriate growth stimulant to encourage development;
4. If deemed appropriate, the crown of each plant will be sprayed with an insecticide (such as Confidor® at a rate of application of 10 mL per 9 L of water or application of Crown® at a rate of application of 5 mL per 9 L of water);
5. Each plant will be watered thoroughly (in consideration to that received through systemic treatments);
6. Each plants unique identification code will be written in weatherproof ink/paint onto its pot/bag. This will reduce the risk associated with losing the tags over time and reduce safety risks (e.g. spider bites etc);
7. Any damage incurred to the plant through the transplant process will be recorded and photo-logged by the Salvage Team for input into the database. This will assist in identifying any future horticultural requirements and inform monitoring analysis when tracking the progress of a plant (particularly if transplant failure occurs);
8. Once transplant is complete, each plant will be photo-logged and recorded as being in the nursery. All captured data will be input into the database for future monitoring and tracking purposes.
9. The input data will be sent to the Specialist Ecologist at the end of each week during the planting activities.

7.4 Reporting

7.4.1 Salvage Works

During translocation works, progress reporting will be undertaken by the Salvage Team and provided to the Specialist Ecologist and Powerlink Representative on a fortnightly basis. It is anticipated that no more than two (2) fortnightly reports will be required as part of this component. Each report will summarise the following information:

- Progress of salvage;
- No. of seed collected (if applicable);
- Numbers salvaged as well as those not able to be salvaged (and why);
- How many plants have been planted out into recipient sites (SA/A) verses nursery (sdlg/juv)[18];
- Any damage incurred or issues to note and be addressed (incl. to the coralloid roots);
- Summary of process implemented (if applicable).

[18] As defined in Appendix C.

The accompanying dataset (including photos and co-ordinates of where plants were collected from and planted to) for each fortnight will be submitted to the Specialist Ecologist for incorporation into the data management tool.

A final salvage report will be completed by the Salvage Team and provided to the Specialist Ecologist and Powerlink Representative within two (2) weeks of completing the salvage works. The report will summarise the following information:

- Total salvage number;
- Total number of plants that could not be salvaged;
- Overall health of specimens transplanted;
- Any damage incurred or issues to note and be addressed (incl. to the coralloid roots);
- Any damage (other) or dead individuals;
- Incidents or corrective actions;
- Total number of seeds collected and transported to the nursery.

The accompanying dataset (including photos and co-ordinates of where plants were collected from and planted to) for the final translocated individuals will be submitted to the Specialist Ecologist for incorporation into the data management tool.

7.4.2 Supplementary Planting

A report summarising the outcomes of the supplementary planting will be undertaken by the Horticultural Team and submitted to the Specialist Ecologist and Powerlink Representative within two (2) weeks of completing the planting works. The report will summarise the following information:

- Total number of individuals planted;
- Overall health of specimens transplanted (particularly subterranean);
- Any damage incurred or issues to note and be addressed (incl. to the coralloid roots);
- Any damage (other);
- Issues and/or corrective actions to be addressed and/or implemented.

The accompanying dataset (incl. photos and co-ordinates of where they were planted to) will be submitted to the Specialist Ecologist for incorporation into the data management tool.

8. Disturbance Footprint Management

8.1 Salvage Works

In undertaking the salvage works, the Salvage Team is required to comply with the relevant environmental management plans, policies and approval conditions applicable to The Project.

To protect in-situ *C. megacarpa* and the ecological values within and adjacent the broader Disturbance Footprint, the Cycad Salvage Footprint will be left in a stable and self-sustaining state following the removal of Cycads. Where appropriate, the following measures will be progressively undertaken upon completion of salvage works in each location.

- Reinstatement of the disturbed area. Topsoil and subsoil to be re-instated in the same order as extracted to minimise inversion of sub and topsoils. Topsoil to be replaced to match surrounding ground levels;
- Reinstatement shall not be undertaken in wet conditions;
- Land access protocols will be adhered to during salvage works to ensure no weed species are introduced;
- No areas will be left in an unstable condition;
- Drainage patterns will be reinstated correctly, and drainage lines will be restored as appropriate;
- Access tracks in existence prior to construction are not to be blocked in anyway; and
- All waste materials and equipment to be removed from the disturbance footprint once salvage works are completed.

8.2 Project Life

It is anticipated that a combination of widescale clearing as well as selective clearing will occur with the relevant footprints during the construction phase of The Project. Follow up clearing and/or vegetation management may also be required from time to time during the operational life of The Project, with this works to be restricted to the disturbance footprint and limits specified in approvals.

Where Cycads are to be retained in-situ, the Clearing Contractor in both instances shall utilise hand-clearing and/or controlled felling clearing techniques to remove only hazardous vegetation from within the restricted buffer areas delineated around protected plants and ensure impacts to threatened plants are avoided.

All clearing works are required to comply with the relevant environmental management plans, policies and approval conditions applicable to The Project. This will include the requirement to clearly mark out 'no go' zones prior to the commencement of clearing works, as well as the locations of Cycads to be retained 'in situ' within selective clearing areas.

To protect in-situ *C. megacarpa* and the ecological values within and adjacent the broader Disturbance Footprint, disturbed and/or cleared areas will be left in a stable and self-sustaining state following clearing and/or management activities. Where applicable, the following measures will be progressively undertaken for each clearing and/or vegetation management event within Cycad habitat over the life of The Project.

- Reinstatement of the disturbed area. Topsoil and subsoil to be re-instated in the same order as extracted to minimise inversion of sub and topsoils. Topsoil to be replaced to match surrounding ground levels;
- Re-profiling of natural contours and drainage lines to their original profile with topsoil spread across the project footprint to minimise erosion and promote vegetation regrowth;
- Spreading of any fallen woody debris or rocks across disturbed area to protect the topsoil and provide additional seed stock and fauna habitat. When re-spreading on slopes, tree trunks should be along the line of the contour;
- Reinstatement shall not be undertaken in wet conditions;
- Rock may be stockpiled within the Disturbance Footprint to a depth of 1.5 m (as fauna habitat);
- Land access protocols will be adhered to minimise the risk of declared weed species being introduced or spread;
- No areas will be left in an unstable condition;
- Drainage patterns will be reinstated correctly, and drainage lines will be restored as appropriate;

- Access tracks are not to be blocked in anyway; and
- All waste materials and equipment to be removed from the disturbance footprint.

Powerlink's EMP outlines erosion and sediment control measures to be complied with for the life of The Project, with the Erosion and Sediment Control Plan detailing the relevant requirements for the construction phase of the Project. Specific measures relating to Cycad habitat during construction works are outlined in Table 6.

Table 6: Outline of erosion and sediment control measures

Construction activity & potential impact	Mitigation and management measure	Timing
General site activities – erosion control	Minimise disturbing ground to maintain the groundcover and reduce risk of soil runoff.	Duration of construction
	Vegetation and topsoil clearing is to be staged and undertaken directly prior to construction works to minimise exposure.	Prior to and throughout construction
	Exposed soil is to be stabilised with appropriate cover material as soon as practicable.	Duration of construction
General site activities – sediment control	Appropriate sediment controls, based on the estimated annual soil loss at the site, are to be implemented.	Prior to commencement of ground disturbance works
	Where exposed soils cannot be stabilised, water tankers shall be deployed to suppress dust.	Construction phase
	On-site stockpiles are to be located above flood extents, placed away from any watercourses and covered, if appropriate.	Construction phase
	Works on site that fall within waterways will be undertaken in accordance with the 'State Development Assessment Provisions guideline, State code 18: *Constructing or raising waterway barrier works in fish habitats'* (DAF 2022). Construction methods will adhere to this guideline and its standard requirements and recommendations to minimise impacts to fish habitat.	Construction phase
	Water quality monitoring may be required at the site discharge locations to ensure excess sediment-laden runoff is not released off site.	Construction phase
Stormwater runoff from disturbed surfaces and construction and laydown areas	Divert upslope clean water flows around the construction areas towards site discharge locations.	Preconstruction / Construction phase
	Diversion drains to be constructed to direct on-site sediment-laden runoff towards sediment control devices.	
	Appropriate drainage controls be placed on exposed surfaces, to reduce velocities and minimise soil erosion.	

Construction activity & potential impact	Mitigation and management measure	Timing
	Stormwater management is to be undertaken in accordance with the relevant management plans.	

9. Seed Collection, Propagation & Management

This section outlines the methodologies associated with collecting, storing, propagating and managing *Cycas megacarpa* seed. Genetic fitness and variation have been considered in the methodologies applied to this programme.

To meet the completion criteria of a conservation gain of *C. megacarpa* individuals, the number of seeds to be collected, propagated, and eventually planted into the recipient site are set out in Section 1.3, Table 1. The calculations are based on a 1:2 replacement ratio for expected fail rates through salvage activities (30%); as well as anticipated seedling survival in terms of seed viability, estimated strike rate (and sustained survival under nursery conditions) and estimated survival once planted into the recipient site (70%). This is considered a reasonable ratio based on success rates of other projects and minimises impacts on the wild population[19].

It is anticipated that approximately 716 seeds will need to be collected from both within the Disturbance Footprint as well as from the wider population (SP8) to support at least 351 being planted into the recipient site; and at least 246 propagated individuals alive at the end of the programme.

These numbers have been derived from preliminary survey data. The data will continue to be reviewed by the Specialist Ecologist in response to actual numbers impacted, actual deaths in the translocated Cycads, along with seed viability and strike rates.

9.1 Timing

The priority will be to collect 100% of any ripe seed available within the Disturbance Footprint either prior to, or during salvage efforts, and then if needed from the wider population.

It is anticipated that any additional collection requirements beyond the Disturbance Footprint will be undertaken in 2026 during the peak fruiting period (March to August). With extent of the collection in the wider population to be determined following the collection of the seeds within the Disturbance Footprint and the final number of plants salvaged. The timing for seed collection is outlined in Table 7.

Table 7: Timeline for seed collection

Task	Q2 (2026)	Q3 (202026)
S8. Seed Collection, Propagation & Planting		
Seed collection - Cycad Disturbance Footprint		
Seed collection - wider population		

It should be noted that the timing of reproduction for *Cycas* spp. is not wholly synchronous and does not appear to occur annually. Therefore, not all adults within the broader population will produce reproductive material at the same time. This is particularly relevant when considering seed collection requirements.

Seed dormancy, along with strike and survival rates under nursery conditions will influence the length of time the plants are managed under nursery conditions; as well as the timing of the supplementary planting into the recipient site. Once robust enough for planting, propagated individuals will be planted into the recipient site. This date has been tentatively set for May 2029 but may be delayed 1-2 years if required.

The dates for the supplementary planting will be confirmed by the Specialist Ecologist (in consultation with Powerlink) at least six (6) months in advance. This will be communicated to the Nursery Team so that appropriate preparatory measures for hardening off can be undertaken.

[19] Based on previous experience we apply a conservative estimation for all stages. For example, of those salvaged we anticipate that 70% of individuals will survive in the long term. Of the ripe seed collected, ~70% will be viable and therefore germinate. Of those that germinate, ~70% will survive to the planting out stage (e.g. some may germinate and then die which is quite common and some may germinate but not be genetically robust (plants germinate exhibiting mutations). Of the propagated individuals that are planted out, ~70% will survive to the end of the programme.

9.2 Seed Collection Methodology

To meet the requirements of the programme, it is anticipated that approximately 716 seeds will need to be collected from both within the Disturbance Footprint as well as from the wider population.

Genetic analysis undertaken by the University of Sunshine Coast (Shapcott & Lamont 2021, James et al 2018) for two (2) *Cycas megacarpa* subpopulations (SP3 and SP8) between 2012 and 2021 concluded that the collection of seed should ideally be sourced from multiple locations across a subpopulations distribution extent to reduce the chances of genetic swamping by particular allelic variants.

Seed collection will be undertaken within SP8, which is considered significant and viable in the long term, and extends from the Callide Range in the west, to the Don River State Forest in the north, to Kroombit Tops National Park in the south, and to the Mount Alma Range in the east.

As noted in Section 9.1, the timing of reproduction for *Cycas* spp. is not wholly synchronous and is likely to impact the amount of ripe seed within the Disturbance Footprint, irrespective of how many adult females are present.

Based on data captured during the October 2025 survey period, 32% (403) of individuals recorded were of sufficient height to develop reproductive material (50cm+). Only 25% of those individuals were observed with reproductive material; and only 12% (49) confirmed as female (13% were confirmed as male). Within the Disturbance Footprint, 19 were laden with approximately 300 fruit of varying degrees of ripeness (newly developing to fully ripe).

Seed from both within and outside the Disturbance Footprint will be collected in accordance with the methodologies outlined in this Section. For the purposes of this CTMP, the definition of a seed is provided in Appendix C.

The Specialist Ecologist will liaise with both the Powerlink Representative and Nursery Team on the outcomes of any ripe seed collection that occurs at commencement of translocation. The Specialist Ecologist will liaise with the Nursery Team to organise for transportation and receipt of the seed into the nursery. The relevant data pertaining to these individuals will also be forwarded to the Nursery Team for incorporation into their database tool.

Seed collection, where applicable, will be undertaken in accordance with the Code of Practice for the Taking and Use of Protected Plants (Code of Practice) (DES 2020b), and the *National Multi-species Recovery Plan for the Cycads* (Queensland Herbarium 2007). The Code of Practice provides standards for the conduct of people involved in the taking, keeping and use of protected plants in Queensland. The National Recovery Plan for the Cycads details recovery actions, objectives, and performance criteria for *C. megacarpa*, as well as *C. ophiolitica*, and four species of *Macrozamia* (Qld Herbarium 2007). Seed collection will also occur in compliance with the NC Act clearing permit.

The standards relevant to the taking of seed for propagation of *Cycas megacarpa* include the following:

- A person who intends to take protected plants must obtain the permission of the landholder of the land where collecting is to be undertaken;
- The harvester must contact the landholder before starting any activity and must comply with any reasonable request or direction in relation to the use of weapons and vehicles;
- As *C. megacarpa* seeds become ripe from March onwards, when they drop from the megasporophylls (Qld Herbarium 2007), they are to be collected post-wet season, in the transition season, from March onwards;
- Seeds are not ready to germinate for at least nine months due to the delayed fertilisation unique to Cycads (Norstog and Nicholls 1997). Following collection, a suitable nursery will be engaged and used to store and propagate seed, and grow up seedlings before they are planted into recipient sites;
- Only interfere with or damage understorey plants to access and/or remove the plant and only to the minimum extent necessary to take the plant;
- Clean tools to be used for harvesting the plant with detergent and water or disinfecting agent prior to commencing collection on a property;
- Remove soil from boots and shoes and remove propagules from clothing before leaving a property on which a plant was to be taken;

- Inspect vehicles and remove any plant propagules and excess soil from tyre tread prior to leaving a property on which a plant was to be taken;
- Comply with any harvest period notice declared and in effect for the plant;
- Ensure the harvesting of the plant part does not result in the death of the plant from which the part is taken;
- Ensure enough of the plant remains to allow for reproduction of the plant and provide habitat or food for other wildlife;
- Taking of seed and other propagating material — standards;
  - In order to maximise biological diversity in the harvested material, seed is (where possible) to be taken from five or more plants of the same species at least 100 m apart;
  - Take only as much seed as is required and ensure all cuts are judicious;
  - No more than 20%[20] of the fruits or other propagating material from any one plant is to be collected in any 12-month period unless that individual is to be lost from the impact footprint where all seeds could be taken;
  - Where possible, take only fully ripe seed. All Cycad seed harvested must be ripe and shed from the plant or be on the point of being shed;
  - Because proof of origin of seed might be required, at collection all containers should be labelled clearly with the species of plant, date and place of collection, harvester's name and address and any licence number; and
  - All collected seed should be transported and kept in containers under conditions suitable for its maximum viability.

9.2.1 Inside Disturbance Footprint

All fully ripe Cycad seeds within the Disturbance Footprint will be collected in accordance with relevant approvals[21]. Collection will occur prior to and during the salvage activities and subject to approval, are tentatively scheduled to commence in the 2nd Quarter of 2026 (refer Table 5).

Seeds will be collected and bagged according to either their parent plants unique ID or the cluster in which they are located[22]. The following information recorded for each bag collected:

- Bag No.;
- No. of seeds in bag;
- Parent ID no. or cluster no. (whichever is applicable);
- Date collected;
- GPS co-ordinates; and
- Presence of predation (eaten by fauna).

If the origin of those collected from the ground is not certain, do not place them in the same bag with seeds of known origin.

The Specialist Ecologist and/or the Salvage Team undertaking the seed collection will ensure that:

- All ripe seeds are collected; and
- The data collection is consistent with the outlined methodology, is adequately captured and is able to be utilised for comparative analysis during future monitoring activities during propagation activities and within the final recipient site(s).

For the purposes of this CTMP, the definition of a seed is provided in Appendix C.

[20] The rate of 20% applies for seed collected outside of the project's Disturbance Footprint. Refer to Sections 9.2.1 and 9.2.2 for collection rates both within and outside of the Disturbance Footprint respectively.

[21] It is intended that all ripe seed within the project's Disturbance Footprint will be collected. If the seed laden plant is within the Disturbance Footprint but not in the Cycad Salvage Footprint, and the seed is not yet ripe, it will be left in-situ, with recruitment monitored as part of the long-term monitoring strategy (for those that remain in-situ). No further collections within the Disturbance Footprint will be undertaken post salvage activities.

[22] In rare instances, seed found on the ground away from the parent plant may occur. Where there is uncertainty regarding which female the seed belongs to, the cluster ID is acceptable.

All data associated with the seed collection activities will be input into the data management tool by the Specialist Ecologist for analysis and reporting purposes. Where confirmable, this data will be linked to the plant to which the seed was collected from. This will support the tracking of seed and plant fitness over the life of the programme.

A short report summarising the seed collection outcomes will be undertaken by the Specialist Ecologist and submitted to the nursery team within one (1) week following the completion of the collection activities. This report will also be made available to the Powerlink Representative.

9.2.2 Outside Disturbance Footprint

Seed collection may be required outside of the Disturbance Footprint. The final number will be confirmed upon completion of seed collection activities within the Disturbance Footprint, and early indications of the success of salvaged individuals. For example, if 300 seed can be collected within the Disturbance Footprint, then approximately 416 seed will need to be collected from the wider population.

With consideration to the estimated size of SP8 (>10,000), and the low number of seed anticipated to be collected, it is not expected that seed collection outside the Disturbance Footprint will adversely affect the population. This is particularly the case if collection occurs within the offset area (which will support its future planting).

In accordance with relevant permitting conditions, no more than 20% of ripe seed from an individual plant will be collected during the 2026 collection period. Additionally, each seed collection trip will harvest fully ripe Cycad seeds from the approved habitat areas. The plants harvested from will be tagged with a fireproof tag containing a unique ID code to track the viability of her seed and assist with determining future collection options (if applicable). Using proforma (hard copy or electronic), each plant in which seed is harvested from will have the following data captured:

- Co-ordinates;
- Height (cm);
- Stem condition incl. if it's a single or multi-stemmed specimen;
- No. of active and dead pups;
- Foliage development stage and any deformities;
- The presence of invertebrates including potential pollinators;
- The presence and degree of insect attack, along with the predator species present;
- The developmental stage of fruiting material including number of seeds and degree of ripeness;
- Overall condition and other relevant observations; and
- A photo log showing stem and crown condition.

Using proforma (hard copy or electronic), the following information will be recorded for each bag collected:

- Bag No.;
- No. of seeds in bag;
- Parent ID no. (tag no.);
- Date collected;
- GPS co-ordinates; and
- Presence of predation (eaten by fauna).

If the origin of those collected from the ground is not certain, do not place them in the same bag with seeds of known origin.

The suitably qualified and experienced person undertaking the seed collection will ensure that:

- Seeds are only collected when fully ripe and either ready to drop from the parent plant or have already dropped from the parent plant; and
- The data collection is consistent with the outlined methodology, is adequately captured and is able to be utilised for comparative analysis during future monitoring activities during propagation activities and within the final recipient site(s).

Seed collection proforma(s) and/or data will be provided to the Specialist Ecologist for incorporation into the data management tool.

All data associated with the seed collection activities will be input into the data management tool by the Specialist Ecologist for analysis and reporting purposes. Where confirmable, this data will be linked to the plant to which the seed was collected from. This will support the tracking of seed and plant fitness over the life of the programme.

A short report summarising the seed collection outcomes will be undertaken by the Specialist Ecologist and submitted to the nursery team within one (1) week following the completion of the collection activities. This report will also be made available to the Powerlink Representative.

9.3 Seed Storage, Propagation and Management.

This section includes methodologies associated with the storage, propagation, management and reporting requirements associated with propagated plants.

The management and reporting for seedlings and juveniles salvaged from the Cycad Salvage Footprint and maintained to the nursery will be undertaken in accordance with the methodology outlined in Section 10.2.

9.3.1 Seed Viability and Storage

The Specialist Ecologist will liaise with the Nursery Team to organise for the transfer and receipt of all collected seed into the nursery. The relevant data pertaining to these individuals will also be forwarded to the Nursery Team for incorporation into their database tool.

Seed viability tests as well as assessments of readiness for propagation will be undertaken as soon as practicable.

Seed viability can be tested by placing seed in water. Seeds that sink are likely to be viable, while those that float are unlikely to contain a viable embryo (P. Forster pers. comm.).

Readiness for propagation will be assessed by a suitably qualified and experienced horticulturalist with demonstrated experience propagating *Cycas* spp. Those deemed ready will progress in accordance with Section 9.3.2. Those requiring storage will be managed in accordance with the methodology outlined below.

It is important to note that *Cycas* seed is subject to both physiological and morphological dormancy (Lima and Oliveira (2024) meaning that not all seed will be ready for propagation following its collection. The specific dormancy period for *Cycas megacarpa* is not currently known but likely to last up to 12 months.

An appropriate seed storage methodology will be developed in consultation with the Nursery Team (upon their engagement) and be included in this CTMP prior to the commencement of seed collection activities. The methodology will be consistent with the Australian Florabank Guidelines (Commander, 2021) and in accordance with relevant approval conditions.

As a minimum, this methodology will specify the way in which seed will be stored as well as the frequency in which it will be checked for ongoing viability and propagation readiness.

9.3.2 Propagation, Management and Reporting

This section addresses individuals grown from seed under nursery conditions. The management of reporting methods for salvaged seedlings and juveniles grown under nursery conditions is outlined in Section 10.2.

The optimal season to propagating *Cycas megacarpa* is from the dry season in winter (June – August) and transition season in early spring (September) (Queensland Herbarium 2007). Planting in the cooler, drier months allows the seeds time to continue the fertilization process, following nursery germination, before the arrival of the wet season, which could potentially rot the seeds if planted too early (Qld Herbarium 2007).

Germination rates of *C. megacarpa* seed can be greater than 50% provided seeds are viable (P. Forster pers. comm.).

Methodologies associated with propagation and horticultural management whilst under nursery conditions will be developed in consultation with the Nursery Team (upon their engagement) and included in this CMTP prior to the commencement of seed collective activities.

As a minimum, these methods will detail how the seeds will be propagated and managed in nursery conditions. The Nursery Team will ensure that the seeds and any treatments applied can be tracked from collection; through the propagation process; and until they are transported to the recipient sites for planting out.

As a minimum, the propagation and management methodologies will include tasks such as those below:

- Seeds may initially be placed in a suitable seed raising mix in trays and kept in a secure seed raising propagation unit and irrigated as required until germination;
- When the germinants are sufficiently developed (i.e. 8-10 cm tap root & 5 strong healthy - fronds) they will be potted into individual 200 mm diameter pots;
- All pots will be individually 'barcoded' using a purposely developed cycad tracking system using discrete codes for each plant to allow a 'chain of custody' approach. The barcoding system ensures the integrity of the material and the traceability to the seed from collection to planting;
- Daily/weekly inspections for insect or fungal attack and watering requirements;
- Monthly treatments (as required) of fungicide, growth stimulants, pre-emergent weed control (using granular materials) and general tending;
- Annual soil replenishment and re-fertilising, and if required, repotting with minimal plant disturbance;
- Using proforma (hard copy or electronic), the application rates of any treatments (incl. watering), outcomes of daily/weekly inspections, potting/repotting activities, issues noticed with specific plants, etc will be recorded;
- This information will be summarised, and form part of the quarterly reporting submitted to the Specialist Ecologist. The Specialist Ecologist will review and determine if any corrective actions are required. This information will be collated and included as part of their reporting to Powerlink.

Prior to planting out, nursery grown specimens will undergo a hardening off period in order to prepare them for local conditions at the recipient site. This is particularly relevant for watering rates, humidity levels and sun/shade tolerances under nursery conditions. This hardening off should commence at least six (6) months prior to scheduled planting activities.

Once ready for planting out, the pots/bags of nursery grown individuals will be marked with hi-visibility paint (nontoxic) on their north facing side and have the following baseline information recorded against their ID:

- Crown condition;
- Foliage development stage and any deformities;
- The presence of invertebrates;
- The presence and degree of insect attack; and
- Overall condition and other relevant observations.

It is recommended that a photolog be taken to confirm the condition of the plants prior to leaving the nursery.

If it does not already have one, each plant will be individually tagged with a unique identification code (fireproof/resistant aluminium tag)[8].

Care will be taken in the transportation of plants from the nursery to the recipient site, and to ensure that the plants are kept cool during transportation.

The planting of nursery grown individuals will follow the methods outlined in Section 8 (recipient site), with management and monitoring as per Sections 10 and 11 respectively.

10. Horticultural Management and Reporting

A core goal of this CMTP is to enable the re-establishment of translocated individuals back into the wild, in a way that supports their viability in the long term, without ongoing management. The horticultural management methods outlined in this section aim to support this re-establishment, and following a period of assistance, ultimately enable the plants to grow without direct management for a minimum of five years.

The project design will allow for the retainment of some *Cycas megacarpa* within the Disturbance Footprint. No horticultural management is proposed for individuals retained within the Disturbance Footprint.

10.1 Nursery (salvaged seedlings/juveniles)

This section addresses salvaged seedlings and juveniles grown under nursery conditions. The management and reporting methods for individuals grown from seed is outlined in Section 9.3.2.

A methodology for the horticultural management of salvaged seedlings and juveniles (from the Cycad Salvage Footprint) whilst under nursery conditions will be developed in consultation with the Nursery Team (upon their engagement) and included in this CMTP prior to the commencement translocation activities.

As a minimum, this methodology will detail how the salvaged individuals will be managed under nursery conditions. The Nursery Team will ensure that any treatments applied can be tracked from receipt of the plants into the nursery until they are transported to the recipient sites for planting out.

As a minimum, the methodology will include tasks such as those below:

- All salvaged seedlings and juveniles will be potted into appropriately sized pots that do not detrimentally impact their current root development;
- All pots will be individually 'barcoded' using a purposely developed cycad tracking system using discrete codes for each plant to allow a 'chain of custody' approach. The barcoding system ensures the integrity of the material and the traceability to the seed from collection to planting;
- Weekly inspections for insect or fungal attack and watering requirements;
- Monthly treatments (as required) of fungicide, growth stimulants, pre-emergent weed control (using granular materials) and general tending;
- Annual soil replenishment and re-fertilising, with minimal plant disturbance;
- Using proforma (hard copy or electronic), the application rates of any treatments (incl. watering), outcomes of weekly inspections, potting/repotting activities, issues noticed with specific plants, etc will be recorded;
- This information will be summarised, and form part of the quarterly reporting submitted to the Specialist Ecologist. The Specialist Ecologist will review and determine if any corrective actions are required. This information will be collated and included as part of their reporting to Powerlink.

Prior to planting out, the plants will undergo a hardening off period in order to prepare them for local conditions at the recipient site. This is particularly relevant for watering rates, humidity levels and sun/shade tolerances under nursery conditions. This hardening off should commence at least six (6) months prior to scheduled planting activities.

Once ready for planting out, the pots/bags of nursery grown individuals will be marked with hi-visibility paint (nontoxic) on their north facing side and have the following baseline information recorded against their ID:

- Crown condition;
- Foliage development stage and any deformities;
- The presence of invertebrates;
- The presence and degree of insect attack; and
- Overall condition and other relevant observations.

It is recommended that a photolog be taken to confirm the condition of the plants prior to leaving the nursery.

If it does not already have one, each plant will be individually tagged with a unique identification code (fireproof/resistant aluminium tag)[8].

Care will be taken in the transportation of plants from the nursery to the recipient site, and to ensure that the plants are kept cool during transportation.

The planting of these individuals will follow the methods outlined in Section 8 (recipient site) with monitoring and reporting as per Section 11.

10.2 Recipient Site (salvaged and supplementary plantings)

A significant milestone of this CMTP will be that all translocated Cycads (both salvaged and propagated) grow without direct management (no horticultural intervention) for a minimum of five (5) years post construction clearing.

Outlined below are specific measures relating to the management of translocated individuals within the recipient site. It is expected that the horticultural management of these individuals will occur for a maximum period of two (2) years following each planting event and will apply to both directly salvaged and supplementary plantings.

The duration of the management and maintenance requirements for *C. megacarpa* are based on both the guidelines outlined by Commander *et al* (2018) and horticultural management programmes previously undertaken for *C. megacarpa* translocations in Central Queensland. As a minimum, the following shall occur:

- Depending on rainfall and soil moisture, each plant shall be given up to 15 litres of water once per month for the first 12 months post translocation; or as appropriate (higher frequency may be required in drier periods and lower in the wet season). The watering regime should be staggered down over months 13 to 24 so that plants are sufficiently hardened off to local conditions at the end of a two (2) year period;
- A soil moisture meter should be used to determine water requirements within the recipient site;
- Plants shall be given an appropriate growth stimulant at least monthly until new signs of growth are clearly visible;
- When Cycads begin to show signs of growth, they should be sprayed thoroughly with a systemic insecticide (e.g. Crown or Confidor) to reduce insect attack. These systemic insecticides should be applied at a high concentration (e.g. 5ml Crown per 9L of water; 10ml Confidor per 9 litres of water)[23];
- Plants will be checked for insect attack at least fortnightly for the first six (6) months[10] of the post translocation programme and then as required (min. monthly inspections). If pest attack is observed, particularly on new growth, plants will be managed accordingly;
- Plants will be checked within 1-2 weeks following a high rainfall event to mitigate against severe insect attack (particularly around the Cycad base)[24];
- Plants should be treated with an appropriate fungicide;
- Plants will be checked for signs of rot and/or pest intrusion into the base and subterranean base at least fortnightly for the first six months of the post translocation programme and then as required (min. monthly inspections). If rot or pest intrusion is observed, plants will be managed with appropriate fungicides and insecticides accordingly;
- The pH levels around a sample of salvaged Cycads will be checked at least monthly for the first six (6) months to ensure soil chemistry is optimal;
- Using proforma (hard copy or electronic), the application rates of all horticultural treatments (including watering), as well as any observations such as rot and/or additional ameliorative measures undertaken on specific plants will be recorded; and
- The proforma information will be sent to the Specialist Ecologist within one (1) week following each horticultural management event along with a summary memorandum of the outcomes of each event. This will allow for data migration into the programme's data management tool maintained by the Specialist Ecologist.

[23] This is particularly relevant for the first flush post translocation where frond development is critical to support root development. After this, insecticides should be scaled back to support the re-establishment of pollinators and beneficial invertebrates around translocated individuals.

[24] Often severe insect attacks, particularly by blow flies on the root systems of the Cycads, coincides with high rainfall events. If a high rainfall event occurs (e.g. spring rains) outside the fortnightly maintenance checks, it is recommended that the contractor undertake a maintenance check 1-2 weeks following the event.

The Specialist Ecologist will review the submitted data and determine if any corrective actions are required. This information will be collated and included as part of their reporting to Powerlink.

A maintenance schedule for salvaged individuals is provided in Table 8 below. The supplementary planting anticipated to commence in May 2029 and will adhere to the same horticultural management schedule post planting.

Table 8: Horticultural management schedule following each planting event.

Date	Maintenance
0-6 months	Fortnightly
6-12 months	Monthly
12-18 months	Bi-monthly
18-24 months	Quarterly

At the end of this period the results along with any corrective actions undertaken, will be compiled into a final management report, will be reviewed and signed off by the Specialist Ecologist, and submitted to the Powerlink Representative.

10.3 Recipient Site (general)

Specific measures relating to the general management of the recipient site and offset area will be outlined in the OMP and agreements between Powerlink and the landholder(s) (if applicable). Activities are likely to include:

- Fire breaks will be maintained around the recipient site and greater offset area. Fire breaks will be inspected and managed at the beginning of each dry season. Fuel loads around translocated plants will be removed or reduced to manage risk;
- Track management to and from the recipient site; within the recipient site and across greater offset area;
- Weeds within the recipient site will be managed. A particular focus will be on their reduction and where possible eradication, will be in areas containing *Cycas megacarpa*;
- Pest species, particularly Pigs (*Sus scrofa*) will be managed across the offset area;
- Site fencing will be established (if required) around the recipient site to exclude cattle for at least two (2) years post planting. The site fencing will be inspected and monitored annually or as necessary.

Any reporting associated with such management will be outlined in the OMP.

Within the recipient site, photo points established upon completion of salvage works and will be revisited during each annual monitoring event to capture any changes to community composition and structure over the life of the monitoring programme. These photo points will be captured by the Monitoring and Specialist Ecologists in accordance with Section 11.2

11. Monitoring and Reporting

The ongoing care, management and monitoring of translocated individuals is vital to the success of any translocation programme. Past approvals for similar programmes, indicate monitoring and reporting requirements will need to be undertaken for a minimum of 15 years post salvage.

Additionally, changes within the recipient site and/or those retained within the Disturbance Footprint over time will need to be recorded so that any problems or threats to these individuals can be detected and responded to early, minimising impacts to the individuals.

This section outlines the requirements associated with monitoring and reporting which is critical for evaluating the programme's success, prompting the implementation of any corrective actions that may be required, and ensuring the programme remains compliant with approval conditions.

To measure the success of the translocation programme, ecological monitoring and reporting will be undertaken for all salvaged, propagated, retained in-situ and reference site individuals. Specific methodologies associated of these locations is provided below.

Any revisions to the monitoring requirements, including frequency, shall be undertaken in consultation with relevant government agencies and approved prior to implementation.

11.1 Recipient Site

All translocated *Cycas megacarpa* within the recipient site will be subject to monitoring and reporting requirements.

The first two years post translocation are typically when the greatest risk to programme success and compliance occurs. To manage this risk, more intensive monitoring will be undertaken for at least two (2) years following each planting event, and then will stagger down in frequency as the individuals become more stabilised.

These activities will be critical for evaluating the programme's success, prompting the implementation of any corrective actions that may be required, and ensuring the programme remains compliant with approval conditions.

These activities will also support the requirement to analyse and compare the temporal variation between the recipient, retained in-situ and reference site individuals over the life of the programme to meet part of the CTMPs success criteria.

Monitoring and reporting activities will be split between the Monitoring Ecologist and the Specialist Ecologist. The Monitoring Ecologist will focus on the more frequent monitoring requirements within the recipient site, whilst the Specialist Ecologist will focus on Annual Monitoring (which will coincide with the monitoring of reference site, retained in-situ and nursery grown individuals).

Table 9 outlines the monitoring frequency for both the salvage and supplementary plantings to year 15 (2041)[25]. The frequency of monitoring will be monthly for the first-year post transplant, then quarterly for a further 18 months; then annually until Year 6. A final round will occur in Year 7 which will form part of the close out reporting.

[25] The commencement of this schedule will be based on commencement of the salvage works which is currently anticipated for June 2026. Should commencement start later, the schedule will be updated to reflect this.

Table 9: Recipient site monitoring schedule

Programme Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
Salvage (2026)							ME	ME	ME	ME	ME	ME
Year 1 (2027)	ME	ME	ME	ME	ME	SE			ME			ME
Year 2 (2028)			ME			SE			ME			ME
Year 3 (2029) Supplementary Planting						SE	ME	ME	ME	ME	ME	ME
Year 4 (2030)	ME	ME	ME	ME	ME	SE			ME			ME
Year 5 (2031)			ME			SE			ME			ME
Year 6 (2032)						SE						ME
Year 7 (2033)						SE						ME
Year 8 (2034)						SE						
Year 9 (2035)						SE						
Year 10 (2036)												
Year 11 (2037)						SE						
Year 12 (2038)												
Year 13 (2039)						SE						
Year 14 (2040)												
Year 15 (2041)						SE						

Table Notes:
ME – Monitoring Ecologist
SE – Specialist Ecologist

At least two (2) permanent photo points will be established in the recipient site to visually record any changes to community composition and structure over the life of the monitoring programme. These points will aim to capture as much of the site area as possible and will be established during the first round of monitoring post salvage.

Observation data for each translocated individual will be recorded against its unique identification code on proforma (hard copy or electronic). By matching the species to the sequentially listed codes, the margin for error can be reduced and all species can be accounted for and located straight away (the absence of data against a code on the data tool will identify the need to locate it before the end of the monitoring event).

The following observations will be made during each scheduled monitoring event:

- Firmness in ground (root development indicator);
- Stem condition (stress indicator);
- No. of active and dead pups (stress indicator);
- Frond development stage and any deformities (indicator for root development and stress);
- Presence and severity of herbivory (growth inhibition indicator);
- The presence of invertebrates including putative pollinators;
- Where applicable, the severity of an invertebrate attack (other than foliar) will also be noted (visual only), along with the presence of predator species such as *Theclinesthes onycha* and *Lilioceris nigripes*;
- The presence of vertebrates (e.g. frogs and birds);

- The presence of any growth abnormalities; and
- Weather data from an onsite weather station or similar.

The following additional observations will be made by the Specialist Ecologist during each annual monitoring event:

- Height (cm);
- Survival status (dead/alive). *NB. If a plant appears to have died (spongy appearance or bark falls off and crumbles), a photograph of the individual will be taken (where possible) for final analysis and close out purposes;*
- Presence and developmental stage of megasporophylls (females) and number of seeds present;
- Presence and developmental stage of pollen cones (male) including notable shedding;
- Measurements of recruitment including germination rates around maternal parent plant; developmental stage and survival rates; and
- Photologs.

A subset of translocated individuals will be photo-logged on an annual basis[26]. This subset will be representative of age and condition classes for all groupings and be at least 20% of each grouping by age class. Once identified, the subset will not change from year to year, in that the initial subset will be photographically tracked for the life of the programme.

If a fire (prescribed or wildfire) travels through the recipient site during the life of the monitoring programme, the following additionally information will be collected during the first event post fire, for each individual noticeably impacted:

- Level of impact to foliage and trunk or stems;
- If fruiting, the number of seeds burnt and stage of ripeness at time of being burnt (if able to tell);
- Level of observable stress to plant as a whole (i.e. has the plant died back, broken off, only partially burnt, etc); and
- Rate of recovery (new growth).

The permanent photo points will be revisited during each annual monitoring event to capture any changes to community composition and structure over the life of the monitoring programme. These points will continue to capture as much of the site as possible.

The Monitoring Ecologist will prepare summary reports and submit it to the Specialist Ecologist and the Powerlink Representative within two (2) weeks following each of their monitoring events. The data from each event will accompany each report.

Where applicable, each annual report will be issued to the Powerlink Representative within four (4) weeks following the monitoring event for submission DCCEEW and DETSI as part of the broader annual reporting.

All data will be input into the data management tool by the Specialist Ecologist for analysis and reporting purposes.

11.2 Retained In-situ

As shown in Figures 2a to 2f, there will be locations within the Disturbance Footprint that *Cycas megacarpa* will remain in-situ but be subject to selective vegetation clearing to ensure the safe operation of the powerline.

No horticultural management is proposed for individuals that remain in-situ. However, monitoring will be undertaken to evaluate the success of the mitigation measure and alert the Powerlink Representative to any decline in condition. This will support decision making around the implementation of any minor vegetation management adjustments associated with post construction management should they be required, and ensure the programme remains compliant with approval conditions[27].

[26] For consistency, this should be carried out on the same individuals during the same time each year.
[27] These actions are not intended as formal corrective actions and are instead associated with minor adjustments that could benefit the plants. Examples include: altering proximity to plants when using chemical treatments, not positioning heavy machinery/equipment near plants to reduce risk of knocking/bruising/compaction, etc.

Monitoring and reporting for individuals retained in-situ will be undertaken by the Specialist Ecologist on an annual basis for the first five (5) years post construction clearing (to 2031) and then every second year until 15 years post salvage (2041) (refer Table 10).

Table 10: Retained in-situ (Disturbance Footprint) monitoring schedule.

Programme Year	Year	Monitoring and Reporting Frequency
Year 0	2026	Baseline data captured
Year 1	2027	1 Event
Year 2	2028	1 Event
Year 3	2029	1 Event
Year 4	2030	1 Event
Year 5	2031	1 Event
Year 6	2032	
Year 7	2033	1 Event
Year 8	2034	
Year 9	2035	1 Event
Year 10	2036	
Year 11	2037	1 Event
Year 12	2038	
Year 13	2039	1 Event
Year 14	2040	
Year 15	2041	1 Event

Observation data for each retained in-situ specimen will be recorded on proforma (hard copy or electronic).

The following observations will be made during each scheduled monitoring event:

- Co-ordinates;
- Firmness in ground (root development indicator);
- Stem condition (stress indicator);
- No. of active and dead pups (stress indicator);
- Frond development stage and any deformities (indicator for root development and stress);
- Presence and developmental stage of megasporophylls (females) and number of seeds present;
- Presence and developmental stage of pollen cones (male) including notable shedding;
- Presence and severity of herbivory (growth inhibition indicator);
- The presence of invertebrates including putative pollinators;
- Where applicable, the severity of an invertebrate attack (other than foliar) will also be noted (visual only), along with the presence of predator species such as *Theclinesthes onycha* and *Lilioceris nigripes*;
- The presence of vertebrates (e.g. frogs and birds);
- The presence of any growth abnormalities;
- Survival status (dead/alive). *NB. If a plant appears to have died (spongy appearance or bark falls off and crumbles), a photograph of the individual will be taken (where possible) for final analysis and close out purposes;*
- Measurements of recruitment including germination rates around maternal parent plant; developmental stage and survival rates; and
- Weather data from an onsite weather station or similar.

A subset of retained in-situ individuals will be photo-logged during each monitoring event[28]. This subset will be representative of age and condition classes for all groupings; be at least 20% of each grouping by age class; and be representative of retained habitat conditions within the Disturbance Footprint (i.e. in-situ with undisturbed

[28] For consistency, this should be carried out on the same individuals during the same time each year.

habitat as well as in-situ with disturbed habitat, etc). Once identified, the subset will not change from year to year, in that the initial subset will be photographically tracked for the life of the programme.

If a fire (prescribed or wildfire) travels through the Disturbance Footprint during the life of the monitoring programme, the following additionally information will be collected during the first event post fire, for each individual noticeably impacted:

- Level of impact to foliage and trunk or stems;
- If fruiting, the number of seeds burnt and stage of ripeness at time of being burnt (if able to tell);
- Level of observable stress to plant as a whole (i.e. has the plant died back, broken off, only partially burnt, etc); and
- Rate of recovery (new growth).

The permanent photo points will be revisited during each monitoring event to capture any changes to community composition and structure over the life of the monitoring programme. These points will continue to capture as much of the reference site area as possible.

All data will be input into the data management tool for analysis and reporting purposes.

A report accompanied by the dataset, will be submitted to the Powerlink Representative within four (4) weeks following the completion of each monitoring event for submission DCCEEW and DETSI as part of the annual reporting.

11.3 Nursery

Propagated individuals as well as salvaged seedlings and juveniles will be grown under nursery conditions until they are ready for planting into the recipient site.

Monitoring these individuals will be critical in ensuring that seed collection and propagation rates remain sufficient; plant growth remains within optimal limits; the planting (and future monitoring) schedule remains accurate; and the programme remains compliant with approval conditions and the CTMPs success criteria.

Monitoring within the nursery environment will be undertaken by the Nursery Team[29]. Whilst under these controlled conditions, the following information will be captured quarterly and provided to the Specialist Ecologist for collation and input into the data management tool and reporting requirements.

Propagated individuals:

- Strike rates from each seed batch (linked to parent IDs);
- Mortality rates post germination (linked parent IDs) and a list of IDs for those individuals;
- Any developmental issues/growth abnormalities (i.e. mutated growth, etc);
- Frond growth against the photo log (Photo log will include the different stages of frond growth on Cycads from spikes (S) to advanced growth (ADG);
- Horticultural treatments given including but not limited to fertiliser rates, watering rates, insecticide rates, growth stimulant rates, insecticides rates;
- Presence / absence of insect attack; and
- No. of individuals ready to be planted out.

Salvaged individuals (seedlings/juveniles):

- Mortality rates (linked parent IDs) and a list of IDs for those individuals;
- Any developmental issues/growth abnormalities (i.e. mutated growth, etc);
- Frond growth against the photo log (Photo log will include the different stages of frond growth on Cycads from spikes (S) to advanced growth (ADG);
- Horticultural treatments given including but not limited to fertiliser rates, watering rates, insecticide rates, growth stimulant rates, insecticides rates;
- Presence / absence of insect attack; and

[29] Once planted into the recipient site, the monitoring methodology outlined in Section 11.2 will be adopted.

- No. of individuals ready to be planted out.

The monitoring and reporting schedule is provided in Table 11.

Table 11: Nursery monitoring schedule

Programme Year	Year	Monitoring and Reporting Frequency
Year 0	2026	Quarterly commencing June 2026
Year 1	2027	Quarterly
Year 2	2028	Quarterly
Year 3	2029	Quarterly to May 2029 (final prior to planting)

Table Notes:
* Contingency only

A subset of salvaged and propagated individuals will be photo-logged on a 12-monthly basis[30]. Each subset will be representative of growth stages, condition classes and collection locations and be at least 20% of each grouping in size. Tags, barcodes or identifying features must be clearly visible in the photo logs.

Whilst under these controlled conditions, the following information will be captured quarterly and provided to the Specialist Ecologist for collation and input into the data management tool and reporting requirements.

In preparation for the supplementary planting, a final monitoring event within the nursery environment will be undertaken by the Nursery Team. This data will input into the data management tool and summarised into a report by the Specialist Ecologist for submission to the Powerlink Representative and the Horticultural Team. This data will become the baseline for individuals translocated as part of the supplementary planting.

11.3.1 Nursery Audits

The nursery will be visited and audited by the Specialist Ecologist on an annual basis. The audit report will form part of the annual reporting and be issued to the Powerlink Representative within four (4) weeks following audit completion for submission DCCEEW and DETSI as part of the annual reporting.

11.4 Reference Site

The reference site will be a representative sample of the naturally occurring population(s) and will comprise of similar age classes and similar topography and aspect to those translocated as part of the project works.

Monitoring and reporting within the reference site is required so that the temporal variation between the recipient, retained in-situ and reference site specimens can be analysed and compared.

It is expected that the findings at the end of the monitoring period will assist in determining the level of translocation success.

Monitoring and reporting within the reference site will be undertaken by the Specialist Ecologist on an annual basis for the first seven (7) years post salvage (to 2033) and then every second year until 15 years post salvage (2041) (refer Table 12).

Table 12: Reference site monitoring schedule

Programme Year	Year	Monitoring and Reporting Frequency
Year 0	2026	Reference site establishment
Year 1	2027	1 Event
Year 2	2028	1 Event
Year 3	2029	1 Event
Year 4	2030	1 Event

[30] For consistency, this should be carried out on the same individuals during the same time each year.

Programme Year	Year	Monitoring and Reporting Frequency
Year 5	2031	1 Event
Year 6	2032	1 Event
Year 7	2033	1 Event
Year 8	2034	
Year 9	2035	1 Event
Year 10	2036	
Year 11	2037	1 Event
Year 12	2038	
Year 13	2039	1 Event
Year 14	2040	
Year 15	2041	1 Event

Observation data for each reference specimen will be recorded against its unique identification code on proforma (hard copy or electronic). By matching the species to the sequentially listed codes, the margin for error can be reduced and all species can be accounted for and located straight away (the absence of data against a code on the data tool will identify the need to locate it before the end of the monitoring event).

The following observations will be made during each scheduled monitoring event:

- Firmness in ground (root development indicator);
- Stem condition (stress indicator);
- No. of active and dead pups (stress indicator);
- Frond development stage and any deformities (indicator for root development and stress);
- Presence and developmental stage of megasporophylls (females) and number of seeds present;
- Presence and developmental stage of pollen cones (male) including notable shedding;
- Presence and severity of herbivory (growth inhibition indicator);
- The presence of invertebrates including putative pollinators;
- Where applicable, the severity of an invertebrate attack (other than foliar) will also be noted (visual only), along with the presence of predator species such as *Theclinesthes onycha* and *Lilioceris nigripes*;
- The presence of vertebrates (e.g. frogs and birds);
- The presence of any growth abnormalities;
- Survival status (dead/alive). *NB. If a plant appears to have died (spongy appearance or bark falls off and crumbles), a photograph of the individual will be taken (where possible) for final analysis and close out purposes;*
- Measurements of recruitment including germination rates around maternal parent plant; developmental stage and survival rates; and
- Weather data from an onsite weather station or similar.

A subset of reference site individuals will be photo-logged during each monitoring event[31]. This subset will be representative of age and condition classes for all groupings and be at least 20% of each grouping by age class. Once identified, the subset will not change from year to year, in that the initial subset will be photographically tracked for the life of the programme.

If a fire (prescribed or wildfire) travels through the reference site during the life of the monitoring programme, the following additionally information will be collected during the first event post fire, for each individual noticeably impacted:

- Level of impact to foliage and trunk or stems;
- If fruiting, the number of seeds burnt and stage of ripeness at time of being burnt (if able to tell);
- Level of observable stress to plant as a whole (i.e. has the plant died back, broken off, only partially burnt, etc); and

[31] For consistency, this should be carried out on the same individuals during the same time each year.

- Rate of recovery (new growth).

The permanent photo points will be revisited during each monitoring event to capture any changes to community composition and structure over the life of the monitoring programme. These points will continue to capture as much of the reference site area as possible.

All data will be input into the data management tool for analysis and reporting purposes.

A report accompanied by the dataset, will be submitted to the Powerlink Representative within four (4) weeks following the completion of each monitoring event for submission DCCEEW and DETSI as part of the annual reporting.

12. Risk Assessment

This section performs both a risk analysis and a risk management and mitigation strategy for the successful implementation of the CTMP; and timely achievement of the offset management outcomes. It includes a rating of all initial and post-mitigation residual risks in accordance with the risk assessment matrix provided by DCCEEW.

The key risks have been assessed using qualitative likelihood (refer Table 13) and qualitative consequence ratings (refer Table 14) with the interaction of likelihood and consequence determining the overall resultant risk. The risk assessment matrix is presented as Table 15.

Table 13: Qualitative measure of likelihood

Score	Definition / rationale
Highly Likely (L5)	Is expected to occur in most circumstances
Likely (L4)	Will probably occur during the life of The Project
Possible (L3)	Might occur during the life of The Project
Unlikely (L2)	Could occur but considered unlikely or doubtful
Rare (L1)	May occur in exceptional circumstances

Table 14: Qualitative measure of consequence

Score	Definition / rationale
Minor (C1)	Minor risk of failure to achieve the plan's objectives. Minor incident of environmental damage that can be reversed. Results in short-term delays to achieving plan objectives, implementing low-cost, well-characterised corrective actions.
Moderate (C2)	Moderate risk of failure to achieve the plan's objectives. Isolated but substantial instances of environmental damage that could be reversed with intensive efforts. Results in short-term delays to achieving plan objectives, implementing well-characterised, high cost/effort corrective actions.
High (C3)	High risk of failure to achieve the plan's objectives. Substantial instances of environmental damage that could be reversed with intensive efforts. Results in medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions.
Major (C4)	The plan's objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies. Major loss of environmental amenity and real danger of continuing.
Critical (C5)	The plan's objectives are unable to be achieved, with no evidenced mitigation strategies. Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table 15: Risk assessment matrix

Risk Assessment		Consequence				
		Minor (C1)	Moderate (C2)	High (C3)	Major (C4)	Critical (C5)
Likelihood	Highly likely (L5)	Medium	High	High	Severe	Severe
	Likely (L4)	Low	Medium	High	High	Severe
	Possible (L3)	Low	Medium	Medium	High	Severe
	Unlikely (L2)	Low	Low	Medium	High	High
	Rare (L1)	Low	Low	Low	Medium	High

Table 16 outlines the:

- Key identified risks that will influence the ability of the CTMP to achieve the final completion criteria;
- The likelihood of the identified management actions achieving the set management objectives; and
- The feasible mitigation measures to reduce the overall risk and failure of the CTMP.

The initial ratings assume that the risks are untreated, i.e. have not been addressed by specific risk mitigation measures other than routine design and operational practice. The residual risk resulting from corrective actions applied to each risk event is then applied.

Table 16: Risk assessment

Management objective/desired outcome	Event or circumstances	Relevant management actions/measures	Initial risk			Trigger detection and monitoring activities	Feasible/effective corrective actions	Residual risk		
			L	C	RL			L	C	RL
Unauthorised access	Impacts to *Cycas megacarpa* from unauthorised access, including illegal collection. Unauthorised access of vehicles or activities have potential to negatively impact on individuals and their habitat. These activities could include: • 4WD access - degrade vegetation and impact individuals, erode tracks particularly after rain, introduce weed species and/or spread weeds; • Shooting/hunting; • Timber harvesting; • Release of cattle/horses for grazing.	The Disturbance Footprint and offset area will have monitored access points and gates installed to limit unauthorised access. Recipient sites will be appropriately fenced to keep out livestock. Entry will be permitted for the landowner, Powerlink and any approved contractors. No timber harvesting is permitted to occur within the offset area. Access tracks will be maintained, and use of tracks minimised during and immediately after rainfall events.	L3	C2	Medium	Disturbance Footprint and offset area regularly monitored and patrolled for unauthorised access. Triggers for detection include: • Broken/tampered fences, gates or locks; • Evidence of damage to tracks and vegetation; • Identified unauthorised activities.	Corrective actions and adaptive management will be applied such as: • Implementation of additional fencing or locked gates to prevent unauthorised access; • Camera monitoring to identify perpetrators; • Remediation of damaged tracks; • Notification to police and DCCEEW if suspected/ substantiated unlawful access and damage to MNES.	L2	C2	Low
Weed management	Introduction, establishment and spread of weeds as a result of access to Disturbance Footprint and offset area by vehicles. Weed populations increase or do not reduce. Weeds carried on vehicles, plant, machinery and equipment may be	The following actions will be undertaken to reduce risks associated with weeds and increase effectiveness of management: • Access only to authorised personnel;	L4	C3	High	Monitoring will occur annually throughout offset area where recipient sites are located to evaluate effectiveness of management actions, and track progress of weed populations and reduction in distribution.	Corrective actions and adaptive management will be applied including: • Alter weed management strategy to target problematic species and/or outbreaks; • Increase frequency of weed management events;	L2	C2	Medium

Management objective/desired outcome	Event or circumstances	Relevant management actions/measures	Initial risk			Trigger detection and monitoring activities	Feasible/effective corrective actions	Residual risk		
			L	C	RL			L	C	RL
	introduced/further spread and subsequently colonise disturbed ground, leading to increased risk of competition with regenerating native plants / increased biomass resulting in heightened bushfire risk. Weeds may outcompete *Cycas megacarpa* and kill plants	• All access subject to Powerlink's property specific land access protocols; • Identifying larger weed infestations and high-risk weeds in footprint and controlling these prior to clearing; • Weed treatment schedule addressing method of control, insecticides, location and timing of treatments to be developed and implemented; • Any introduced mulch, soil or plants are to be weed free and disease free; • Weed control to be implemented by suitably qualified and experienced personnel; • Ongoing monitoring conducted for weed species and location.				Weed monitoring will also occur within project footprint areas. Trigger detection includes: • New areas of weed outbreaks have been noted from baseline surveys; • Increase in weed abundance within offset area; • New weed species identified; • Weeds confirmed to be impacting *Cycas megacarpa* population.	• Assess weed control methods and change methods if required; • Review hygiene protocols to ensure they are effective in preventing vehicles and people from introducing and spreading weeds.			

Management objective/desired outcome	Event or circumstances	Relevant management actions/measures	Initial risk			Trigger detection and monitoring activities	Feasible/effective corrective actions	Residual risk		
			L	C	RL			L	C	RL
Biomass control	Biomass increases, thus increasing likelihood of destructive, hot fires occurring. Hot fires can kill *Cycas megacarpa*. Too frequent fires increase certain weed species which can impact on *C. megacarpa* ability to survive, grow and reproduce.	Biomass (i.e. fuel load) is proposed to be managed through a combination of control methods, such as grazing, slashing of open grassed areas, cool/mosaic burns, and weed control. In areas where grazing isn't appropriate cool burns or manual slashing can be used to reduce fuel load. Fire breaks will also be put in place and maintained to reduce likelihood of uncontrolled fires spreading and improve access for fire management activities. Powerlink will implement the Bushfire Management Plan to reduce likelihood of wildfires occurring and negatively impacting on biodiversity.	L4	C4	High	Biomass will be monitored annually at the end of the growing season (wet season). Fire will also be managed by regularly monitoring and maintaining fire breaks and fuel load reduction zones. Trigger detection includes: • Fuel loads exceed specified thresholds; • Tracks become overgrown or damaged; • Unplanned fire event occurs.	Corrective actions and adaptive management will be applied including: • Increase fuel reduction activities if fuel load is too high; • Increase frequency of weed management events, if weeds are contributing to fuel loads in key areas; • Increase manual fuel reduction in high bushfire seasons; • Increase maintenance of access tracks and firebreaks; • Evaluate cause and effectiveness of fire management actions if fire does occur within the Disturbance Footprint and /or offset area.	L2	C3	Medium
Pest animal management	Uncontrolled or increasing feral pig activity which predate on *Cycas megacarpa* seed and degrade habitats.	Feral pig control to be undertaken annually to reduce feral pig numbers and ecological impacts. If monitoring is showing feral pig populations are	L4	C3	High	A formal annual monitoring program will be completed to evaluate effectiveness of management actions, and track reduction in feral pig	Corrective actions and adaptive management will be applied over the life of the offset including:	L2	C2	Low

Management objective/desired outcome	Event or circumstances	Relevant management actions/measures	Initial risk			Trigger detection and monitoring activities	Feasible/effective corrective actions	Residual risk		
			L	C	RL			L	C	RL
		not decreasing, feral pig control will be increased. Where possible, support feral pig control in adjacent properties. Management must consider humane measures to destroy pigs, and in the case of poisoned baits, consider poisoning of target animal.				populations as part of the OMP and PLQ EMP. Trigger detection includes: • Observed increase in incidental sightings of feral pigs; • Increase in 10% of feral animal abundance from previous monitoring event; • Evidence of pest animal disturbance and/or predation on Cycad seeds.	• Increase frequency of feral pig control events; • Review and alter pest control methods; • Adopt pest control across a broader area if it is likely pest animals are breeding in adjacent areas.			
Watering of translocated and propagated individuals is at a suitable level to ensure successful establishment.	Horticultural infrastructure is not established, maintained, or adequate, lowering the chance translocation success. Insufficient watering of translocated, planted or propagated individuals can lead to failure to thrive. Overwatering of Cycads can lead to root rot and loss of plants.	Ensure horticultural infrastructure is installed, including; a large water storage tank and/or watering equipment. Controlled watering throughout establishment, adjusted as required for climatic conditions. Test soil moisture before watering to avoid over watering. Water available on site to allow for sufficient watering. Monitor water delivery to propagated individuals.	L3	C4	High	Trigger detection includes: • Horticultural infrastructure is not established, maintained, or adequate; • Individuals are observed to be desiccated or drought stressed; • Evidence of fungus and/or root rot; • Death of any individual *C. megacarpa*.	Corrective actions and adaptive management will be applied including: • Establish or maintain any equipment or infrastructure required, as soon as practical, prior to translocations; • Increase watering to year 1 levels until recovery observed. Contractor to monitor; • Use of different soil matrices during planting; • Treatment with suitable fungicide; • Alter watering regime; • Inspect roots more frequently until control achieved;	L2	C2	Low

Management objective/desired outcome	Event or circumstances	Relevant management actions/measures	Initial risk			Trigger detection and monitoring activities	Feasible/effective corrective actions	Residual risk		
			L	C	RL			L	C	RL
		Inspect roots for signs of fungus or rot and treat as required.					• Replace lost individuals with propagated plants as per CTMP.			
Insect attack and fungal infections	A range of insects have potential to attack Cycads and can cause significant damage to the plants.	Periodic inspections will be conducted as per the monitoring program outlined in this CTMP to identify if significant insects are present and check for other issues including fungi.	L3	C4	High	Detection of fungal infections and/or insect attack likely to cause death during scheduled monitoring events.	Corrective actions and adaptive management will be applied including: • Treat fungal infections with a fungicide powder (e.g. Banrot®, Formula 20®); • Where insect damage occurs apply an insecticide if the insect damage is considered likely to cause death to the cycad individual, (e.g. Crown, Confidor); • Ensure that the insecticides use does not impact pollinators.	L2	C2	Medium

13. Reporting and Compliance

This CTMP is an adaptive document that will be reviewed and updated where learnings result from monitoring and reporting outcomes. Additional reviews will occur if there is a significant change to the project schedule or Disturbance Footprint, or a change in legislation or best practice methodology for species management.

13.1 Auditing and Compliance Reporting

The reports outlined in Table 17 will be for external issue to DCCEEW and DETSI and will track the progress of the translocation works against completion criteria for auditing and compliance purposes. These reports will be submitted to government agencies by Powerlink.

Table 17: External reporting

Report name	Frequency	Details it includes	Prepared by	Prepared for
CTMP Annual Compliance Report	Annually until 2041[32]	• Outcomes of translocation management programme for the period. • Includes details such as numbers translocated, numbers planted, health of plants, any observed stress factors and follow up treatments, any temporal variation between the transplanted, retained in-situ and reference site individuals including attrition and recruitment rates; and the current level of translocation success against the completion criteria.	Specialist Ecologist	DCCEEW DETSI
CTMP Completion Report	Once Year 15 (2041)	• Report on the success or failure of certain horticultural treatments; the rate of propagation success or failure; any temporal variation between the transplanted and reference site specimens including attrition and recruitment rates; the level of translocation success against the completion criteria. • Demonstrate completion criteria are met.	Specialist Ecologist	DCCEEW DETSI

Should a non-compliance event occur the following actions will be taken:

- A determination by the Powerlink Representative will be made as to whether a non-compliance event under this CTMP has occurred and if it requires further action;
- If required, the Powerlink Representative will liaise with the Specialist Ecologist to identify appropriate corrective action/s and oversee implementation;
- Corrective actions for translocated individuals will be implemented as per Section 14:
  - These corrective actions will potentially include treatment with relevant insecticides, growth stimulants and where necessary the potential quarantining of the plant;
  - If health cannot be restored within a six (6) month period, the numbers of individuals lost will be calculated and a proposal to replace them with propagated individuals at a 1:2 ratio;
- If it constitutes an 'incident' under the EPBC Act approval the relevant actions stipulated under the conditions will be implemented.

Non-compliance events may not constitute an 'incident' rather they may be events that are not consistent with the plan such as livestock gain access to the recipient area, monitoring is overdue, Cycads are damaged accidentally, etc.

[32] No monitoring will occur in years 10, 12 and 14.

An accurate record of data relating to the CTMP, such as that gathered during monitoring in Section 11, will be retained with the data management tool to be maintained by the Specialist Ecologist. All data will be made available to the Powerlink and the relevant Departments or an independent auditor upon request.

13.2 CTMP Progress Reporting

Reports and data summarised in Table 18 will be prepared to inform management and identify if any corrective actions required to be made. They are also to assist in capturing information and tracking the programmes progress by Powerlink. With the exception of annual and final reporting, these reports are for internal assessment purposes only.

Table 18: Reporting

Report name	Frequency	Key details included	Prepared by	Prepared for
Translocation (salvage) progress reports	Fortnightly	• Progress of salvage; • No. of seed collected; • Numbers salvaged; • How many plants have been planted out into recipient sites (SA/A) vs nursery (sdlg/juv); • Any damage occurring during process or issues to note and be addressed; • Summary of process implemented (if applicable); • Relevant data (Excel spreadsheet and GPS coordinates of where plants were collected from and planted to).	Salvage Team	Specialist Ecologist Powerlink
Final salvage report	Once	• Total salvage number incl. a summary of the age classes; • Total number of plants that could not be salvaged; • Overall health of specimens transplanted, and any remediation actions taken; • Any damaged or dead individuals; • Incidents or corrective actions; • Photologs; • Total number of seeds collected and transported to nursery; • Relevant data (Excel spreadsheet and GPS coordinates of where plants were collected from and planted to).	Salvage Team and Specialist Ecologist	Powerlink
Seed collection report	Following collection finalisation within the Disturbance Footprint[33]. After each seed collection event outside the Disturbance Footprint.	• Reporting as per the approval conditions and Section 9.2; • Number of seeds collected; • Location of the collection; • Number of seeds likely still required; • Whether the collection site is viable for future use. • Relevant data (excel).	Specialist Ecologist	Nursery Team Powerlink

[33] To streamline information flow, seed collection reporting may be combined with fortnightly reporting during salvage activities. Separate reports should be provided for collections that occur both prior to and post salvage activities.

Report name	Frequency	Key details included	Prepared by	Prepared for
Nursery progress reports	Quarterly	Salvaged seedlings/juveniles • Overall health (incl. survival rates); • Number of individuals ready to be planted out; • Relevant data (excel spreadsheet). Propagated individuals • Summary of strike rates, mortality rates (post germination), overall growth development and horticultural treatments administered (incl. watering); • Number of individuals ready to be planted out; • Relevant data (excel spreadsheet).	Nursery	Specialist Ecologist
Annual nursery audit	Annually	• Audit findings	Specialist Ecologist	Powerlink
Final nursery report	Once	• A final report summarizing the germination rates, strike rates, treatments and mortality rates; • Number of individuals ready to be planted out.	Specialist Ecologist	Powerlink
Supplementary planting report	After each planting event[34]	• How many plants have been planted into the recipient site; • Overall health of individuals; • Any damage that may have occurred during planting process; • Relevant data (Excel spreadsheet and GPS coordinates of where plants were planted to).	Horticultural Team and Specialist Ecologist	Powerlink
Horticultural Management Reporting	After each scheduled management event	• Horticultural treatments carried out over that reporting period; • Any changes to the horticultural treatments or programme schedule; • Any health issues or observed stress factors (incl. ID for specific plant issues); • Any corrective actions implemented; • Relevant data (e.g. Excel spreadsheet).	Horticultural Team	Specialist Ecologist
Monitoring reports (non-annual)	As per Section 11.2, Table 10	Recipient site • Survival rates, any observed stress factors, recruitment; • Any recommended changes to the horticultural treatments or the monitoring program; • Monitoring data.	Monitoring Ecologist	Specialist Ecologist
Monitoring reports (annual)	Annual until 2041[35]	Recipient site • Survival rates and condition incl. success / failure rate for each age class; • Any observed stress factors impacting their recovery;	Specialist Ecologist	Powerlink DCCEEW DETSI

[34] Should a contingency planting be required, a subsequent report will occur.
[35] No monitoring will occur in years 10, 12 and 14.

Report name	Frequency	Key details included	Prepared by	Prepared for
		• Any recommendations and/or changes to the horticultural treatments or schedule that have occurred/proposed; • Any corrective actions recommended and/or implemented; • The development of reproductive material and if applicable, the rate of recruitment; • Progress towards completion criteria; • Monitoring data (where applicable, incl. photologs). Nursery • Seed strike rates; • Ongoing survival rates and condition for all individuals in the nursery; • Any observed stress/genetic factors impacting growth; • No. of individuals ready to be planted out; • Any recommendations and/or changes to the horticultural treatments; • Any corrective actions recommended and/or implemented; • Progress towards completion criteria; • If additional seed collection and management is required; • Treatment and monitoring data (where applicable, incl. photologs). Retained in-situ • Survival rates and condition; • Any corrective actions recommended and/or implemented; • The development of reproductive material and if applicable, the rate of recruitment; • Progress towards completion criteria; • Monitoring data (where applicable, incl. photologs). Reference Site • Survival rates and condition; • The development of reproductive material and if applicable, the rate of recruitment; • Progress towards completion criteria; • Any corrective actions recommended and/or implemented (i.e. fire impacts tags); • Monitoring data (where applicable, incl. photologs).		
Final Report	2041	All monitoring locations • Final no. of surviving plants, their age/height class and condition;	Specialist Ecologist	Powerlink DCCEEW DETSI

Report name	Frequency	Key details included	Prepared by	Prepared for
		• Any uncontrollable events that occurred (i.e. cyclone, wildfire, drought, etc); • Any changes to horticultural treatments or schedule of life of programme; • Any corrective actions implemented over life of programme; • The rate of recruitment observed; • The strike rate of seeds under nursery conditions and % of genetically unfit/mutated individuals; • How the programme meets the completion criteria; • Lessons learnt; • Monitoring data (where applicable, incl. photologs).		

13.3 CTMP Review

This CTMP is an adaptive document that will be reviewed by the Specialist Ecologist at key milestones (e.g. end of salvage works) and updated where learnings result from monitoring, reporting and auditing outcomes. Additional reviews will occur if there is a significant change to the project schedule or Disturbance Footprint, or a change in legislation or best practice methodology for species management.

Any updates to this CTMP will be undertaken in consultation DCCEEW and DETSI and in accordance with approval conditions.

In the event that the evaluation process identifies non-compliance with this plan, or new performance requirements, timely corrective action as detailed in Section 14 will be undertaken. Any changes to the CTMP, including corrective actions, will be recorded as part of CTMP Annual Compliance Reports and the Internal Progress Reporting, and submitted to DCCEEW and DETSI.

14. Correction and Prevention

It is expected that where practically possible, relevant parties will either commission or undertake the necessary maintenance and management requirements to maintain individuals in a healthy condition.

14.1 Disturbance Footprint

In order to minimise the risk of accidental clearing of Cycads that are to be retained in-situ, the extent of clearing works will be clearly delineated both prior to and during vegetation clearing activities associated with salvage works, construction clearing and vegetation management during the operational life of The Project.

For salvage works and the construction clearing phase, this will be undertaken by a Powerlink Environmental Advisor who will also regularly inspect the clearing extent to ensure retained individuals are not disturbed during clearing or construction activities.

Although the risk is considered low, the Clearing Contractor will ensure the Translocation Team is available during the clearing activities to salvage any Cycads missed during the initial translocation activities (i.e. there is a risk given the local topography, weed prevalence and grass height present).

Should any unauthorised clearing of or damage to Cycads occur during the construction phase, the onsite Environmental Advisor will record the nature of the breach including its GPS location and provide the information to the Powerlink Representative within 24 hours of occurrence. The Powerlink Representative will forward this information to the Specialist Ecologist as soon as practicable for incorporation into the data management tool.

If damaged, the individual will be monitored as part of the annual monitoring event. If accidentally killed, and replacement ratio of 1:2 will be applied and the relevant components of this CTMP will be revised to account for the additions to the programme.

No unauthorised clearing of *C. megacarpa* will occur once the Powerline becomes operational.

For vegetation management activities undertaken throughout the life of The Project, the Powerlink environment team will work closely with vegetation maintenance staff and contractors to ensure compliance with the EWP is maintained. The establishment of relevant site boundaries and inspections will be undertaken by a Powerlink Environmental Representative.

Should any unauthorised clearing of or damage to Cycads occur during the operational phase, the Powerlink Environmental Representative will record the nature of the breach including its GPS location and provide the information to the Powerlink Representative within 24 hours of occurrence. The Powerlink Representative will forward this information to the Specialist Ecologist as soon as practicable for incorporation into the data management tool.

If damaged, the individual will be monitored as part of the annual monitoring event. If accidentally killed, the individual will be recorded as such in the data management tool.

14.2 Translocated Individuals

It is reasonable to expect a degree of translocation failure and acceptable limits have been outlined in Section 1.3, Table 1. To support translocation success, Sections 7 and 10 outline measures that should reduce the risk of stress on the translocated individuals.

Over the course of the programme, the Specialist Ecologist will regularly review current and projected survival rates. Should mortality rates exceed 10% in the first 12 months post translocation, the Specialist Ecologist may commence safeguard measures which could include additional seed collection and propagation actions.

The Specialist Ecologist may seek to reduce or increase monitoring requirements including the number of individuals being assessed and the frequency of the monitoring. Any recommended changes to monitoring will be presented in the Annual Compliance Report.

Should any of the following be observed by either the Specialist Ecologist, Monitoring Ecologist, Horticultural Team or Nursery Team within the horticultural management periods, a series of measures will be undertaken.

- Severe stress/death of a plant (incl. stem deterioration) on >10% of transplanted individuals; and/or
- Severe pest attack on >10% of transplanted individuals; and/or
- The presence of significant numbers of insects on >30% of transplanted individuals.

The Lead Horticulturalist (recipient site and/or nursery environs), Specialist Ecologist and/or the Powerlink Representative will be made aware of the issue within 48 hours, and they will determine if corrective actions need to be implemented.

For severe stress or potential for plant(s) fatality, the Horticultural Team will have a list of impacted individuals using their UIC for tracking and it is expected that where practical, the Horticultural Team will begin measures to try and restore the health of the impacted individuals within two (2) weeks of notification. These corrective actions may include treatment with relevant insecticides, growth stimulants, the removal of rot, and where necessary the removal of the affected stem back to the base.

For high numbers of invertebrates and/or severe pest attack, the Horticultural Team and the Specialist Ecologist will promptly review prior health of the individual to determine treatment options. If applicable, the Horticultural Team will then commence measures to try and restore the health of the impacted individual(s) within two (2) weeks of notification. These corrective actions will potentially include treatment with insecticides; removal of infected areas and application of relevant treatments.

If their health cannot be restored within a six (6) month period, the Horticultural Team and/or Nursery Team will provide a summary report to the Specialist Ecologist outlining measures attempted and the individual(s) still affected (using their UIC).

The Specialist Ecologist will evaluate (calculate) the number of individuals lost against the pre-determined rate of acceptable loss, and the current survival rate of individuals in the nursery.

A second (2nd) supplementary seed collection, propagation, management and planting requirement will be required if the following triggers occur:

- If the rate of loss within the recipient site exceeds the rate outlined in Table 1; and
- Individuals in the nursery are not exceeding anticipated survival rates; and
- Completion criteria outlined in Section 15.3 is unlikely to be met.

14.3 Fire

Cycad habitat is typically prone to bushfire activity, and it is recognised that fire contributes to the lifecycle of Cycads[36] and therefore should not be completely excluded.

To reduce the risk of high mortality rates amongst seedlings, juveniles and propagated individuals, no prescribed burns as part of the offset management will occur within 500 m of recipient site plantings for the first five (5) years post translocation. Where feasible, firebreaks may also be created and maintained around the recipient site. This requirement will be included in the OMP and PLQ EMP and is not anticipated to place constraints on offset management.

Additional risk reduction measures such as firebreaks, fuel load reduction and hazard reduction burns will be implemented for the broader offset area and as part of the OMP and PLQ EMP. The intent is to ensure a hot wildfire does not occur in the offset area due to the impacts it would have on biodiversity values, assets and people's safety. However, wildfires are uncontrollable factors that cannot be completely removed as a risk (refer Image 16).

If a wildfire appears to negatively impact on individuals present within the recipient site, retained in-situ and/or reference site individuals, additional parameters will be monitored for a period of 12 months post impact. If individuals planted into the recipient site do not recover within this period (i.e. no indication of growth) the project proponent will consult DCCEEW and DETSI regarding potential corrective action implications on the translocation and monitoring programme and an appropriate course of action.

[36] It is recognised that whilst fire is beneficial, it is also detrimental to seedlings, juveniles, seed on plants and pollinators.

The overall risk to the success of the programme is considered moderate if the measures outlined in the CTMP, the OMP and the PLQ EMP are implemented. As noted, the intent of the programme is to have translocated individuals positively persist into the long-term.

Image 13: Example of wildfire damage one week prior to planned salvage activities (Ecologica, 2012).

14.4 Seedlings

Based on a need to plant out 351 seedlings it is estimated 716 seeds will need to be collected. The planting of propagated individuals into the recipient site are tentatively scheduled to occur in May 2029. The timing of the planting takes into consideration the seed collection timeline, seed dormancy, germination, growth and survival rates, and the robustness of the plants prior to the planting out date.

Over the course of the programme, the Specialist Ecologist will regularly review current and projected survival rates for propagated individuals. If necessary, the supplementary planting schedule may be delayed by up to two (2) years.

Regular consultation with the Nursery Team will ensure targets and milestones are being met. Should low propagation rates in the nursery and/or low survival rates of transplanted individuals in the recipient site (once planted) be experienced, the Specialist Ecologist will recommend safeguard measures to ensure minimum survival rates are maintained. Such measures may include but not be limited to additional collection and propagation actions.

The overall risk to the success of the programme is considered low if the measures outlined in the CTMP are implemented. Furthermore, additional seeds can be collected if required.

14.5 Pollinators

The presence of recruitment within the recipient site will be a key indicator that CTMP activities have supported the sustainability and survival of the transplanted individuals into the long term. A key factor in influencing this outcome is the presence of pollinators within the recipient site.

Chemical treatments will be required immediately post translocation to assist the plants in establishing themselves within the recipient site. However, to support the longer-term presence of pollinators, beneficial invertebrates and potential symbiotic invertebrate/Cycad relationships, certain treatments will be stopped once the first new flush of foliage reaches maturity on a plant (rachis and leaflets become hardened), which is typically within the first six (6) months post planting.

The exception to this will be individuals deemed to be in poor condition or those who have delayed their first flush of foliage post translocation. Additional treatment may be required, and the Horticultural Team will closely monitor these individuals.

The overall risk to the success of the programme is considered low if the measures outlined in the CTMP are implemented.

14.6 Weed and Pest Management

The recipient site will form part of the final offset portfolio, legally secured and managed by Powerlink. The CTMP outlines that the general management of the recipient site is to be undertaken in accordance with the OMP and the PLQ EMP. Therefore, it is expected that the overall weed and pest management plan for the offset area will apply to and/or complement the management of weeds in the recipient sites. Some of the proposed actions include:

- Weed hygiene protocols specific to cycad removal works and seed collection will be implemented;
- Pest species, particularly pigs (*Sus scrofa*) will be managed within the recipient sites and larger offset area;
- Site fencing will be established around the recipient site(s) to exclude cattle for at least two (2) years post translocation.

Other measures outlined in the CTMP relevant to the offset area are:

- The transplant specialist will hold all appropriate permits and licences to undertake such activities and will ensure all machinery and equipment used is maintained to a maintenance and hygiene standard required to work within sensitive environs. This includes but is not limited to weed and weed seed free; pathogen free (particularly for Phytophthora and *Austropuccinia psidii* (Myrtle rust)); and in good working order with no leaks; and
- Seed collection must take precautions to prevent themselves, their vehicles and equipment spreading weed seeds, unwanted plants and pathogens into and out of seed collection areas.

The overall risk to the success of the program is considered to be low if the above-mentioned measures are implemented. However, it is noted that the intent of the program is for a self-sustaining population and thus in the long-term weeds and pest will be a natural risk.

14.7 Milestones and Management Triggers

Interim milestones and management triggers are provided in Table 19. Corrective actions will be initiated within 6 to 12 months if milestones aren't met, and/or managed triggers occur. The 6 to 12 month timing allows for flexibility, due to the annual cycle of *C. megacarpa* plants, such as timing for seed collection, and planting during the dry season, prior to the wet season.

Table 19: Interim milestone/management triggers

Interim milestone/ Management trigger	Monitoring method	Corrective action	Timing	Responsibility
Salvaged individuals				
The number of plants to be propagated as a result of the clearing works is confirmed.	The number of plants that could and could not be salvaged from the Disturbance Footprint is confirmed, including the number to be left in-situ. The number of seeds collected from the Disturbance Footprint is confirmed.	Final survey of The Project's disturbance to confirm all the plants requiring salvage have been accounted for. Amendments to the final count to reflect the changes in the numbers. The final numbers to be reported to DCCEEW and DETSI as per relevant approval conditions.	Within 1 month post translocation	Salvage Team Specialist Ecologist
At least 85% of the salvaged individuals are alive, by the end of the first year from translocation occurring.	Monitoring as outlined in Section 11. Horticultural reporting outlined in Section 10.	Adjust the frequency and intensity of the maintenance actions outlined Section 10. Quarantine of sick Cycads where other treatments may be considered (e.g. cutting the stem to promote pups forming). If health cannot be restored within a six (6) month period, the corrective actions outlined in Section 14.2 will occur.	Year 1	Specialist Ecologist Horticultural Team Nursery Team
At least 80% of the salvaged individuals are alive, by the end of the third year from translocation occurring. Maintenance activities can be completed as plants are established.	Monitoring as outlined in Section 11. Horticultural reporting outlined in Section 10.	If less than 80% are alive review the site conditions, potential causes of mortality, and maintenance actions. These are discussed in Section 13. Adjust maintenance actions if required. This may include extending maintenance actions which are planned to end at the of Year 2 such as insecticide application, weed control, growth stimulant, watering, etc. If health cannot be restored within a six (6) month period, the corrective actions outlined in Section 14.2 will occur.	Year 3	Specialist Ecologist Horticultural Team Nursery Team

Interim milestone/ Management trigger	Monitoring method	Corrective action	Timing	Responsibility
At least 70% of the salvaged individuals are alive by the end of the fifth year from translocation occurring. Noting that plants are required to grow without direct management for a minimum of five (5) years.	Monitoring as outlined in Section 11.	If less than 70% are alive review the site conditions, potential causes of mortality, and maintenance actions. These are discussed in Section 14. Determine what percentage of individuals are impacted and whether any maintenance is required; and if so, if it is a one-off event. Actions may include insecticide application, weed control, growth stimulant, watering, partial stem removal (to encourage pupping), etc. If health cannot be restored within a six (6) month period, the corrective actions outlined in Section 14.2 will occur. If the mortality is a result of an uncontrollable event (e.g. wildfire, cyclone, etc) and affects the wider population (beyond translocated individuals), no action may be taken. The loss of individuals in this circumstance will not result in a non-compliance. Consultation with DCCEEW/DETSI may be undertaken.	Year 5	Specialist Ecologist Horticultural Team
>50% of salvaged specimens have their overall health of equal to or better than those within the reference site within seven years from translocation.	Annual Monitoring set out in Section 11.2. Reference site monitoring set out in Section 11.5.	If >50% of Cycads aren't at the same health level as reference site individuals following the completion of annual monitoring events, identify the issues. If required, adjust maintenance actions in the recipient site during the horticultural management period (Section 10). As an outcome no action may be undertaken if the loss is attributed to a natural event also observed in the wider population, or the loss of the individuals will not result in non-compliance. Consultation with DCCEEW/DETSI may be undertaken.	Annually to Year 15 (except years 10, 12, 14).	Specialist Ecologist

Interim milestone/ Management trigger	Monitoring method	Corrective action	Timing	Responsibility
Fruiting is recorded on at least 2% of salvaged female individuals (of reproductive height) or comparable to the percentage fruiting occurring within the reference sites (whichever is less) within seven years from translocation occurring. Pollen cones are recorded on at least 5% of salvaged male individuals (of reproductive height) or comparable to the percentage fruiting occurring within the reference site (whichever is less) within seven years from translocation occurring.	Monitoring set out in Section 11.2. Reference site monitoring set out in Section 11.5.	Likely no corrective actions possible as species is not wholly synchronous, and individuals will take time to re-establish post translocation. However, the following actions can occur: • Assess potential issues with female Cycads and why fruiting may not be occurring. Threats such as predation by pest animals or insects may be occurring; • Adjust maintenance actions if required. This may include more frequent insecticide application, weed control, growth stimulants, watering, etc.	Annually to year 15 (except years 10, 12, 14).	Specialist Ecologist
Propagated and nursery grown individuals				
More than 70% of required seeds have been collected by end of 2026.	Reporting set out in Section 9.2 (seed collection). Monitoring and auditing set out in Section 11.4.	If the required number of seed to be collected hasn't been achieved by December 2026, continue collection activities in 2027. This may require broadening the seed collection area, but still remaining within SP8.	December 2026	Specialist Ecologist

Interim milestone/ Management trigger	Monitoring method	Corrective action	Timing	Responsibility
Seeds yield a germination rate of 70% or better by the end of year 1 (2027).	Monitoring and auditing set out in Section 11.4.	Review germination rates from seeds collected during 2026. If strike rates are deemed sub optimal and unlikely to support the required completion criteria: • Amend the seed collection parameters to target more viable seeds based on initial propagation trials; • Revise the seed collection requirements and continue with seed collection activities (to achieve the revised value). This may require broadening the seed collection area, but still remaining with SP8. • Consider amending the prescribed propagation methods including the duration the seeds are stored for before propagation commences.	Year 1	Specialist Ecologist Nursery Team
All seeds are collected.	Reporting set out in Section 9.2 (seed collection). Monitoring and auditing set out in Section 11.4.	Review germination rates from seeds collected during 2026 in conjunction with survival rates of salvaged individuals. If higher than anticipated mortality rates occur within the recipient site and strike rates in the nursery are deemed sub optimal and unlikely to support the required completion criteria, the following will occur: • Amend the seed collection parameters to target more viable seeds based on initial propagation trials; • Revise the seed collection requirements and continue with seed collection activities (to achieve the revised value). This may require broadening the seed collection area, but still remaining with SP8. • Consider amending the prescribed propagation methods including the duration the seeds are stored for before propagation commences; • Consider the implementation of contingency planting.	Annually to June 2028	Specialist Ecologist Horticultural Team Nursery Team Powerlink
Nursery grown individuals are planted out in before December 2029.	Monitoring and reporting set out in Sections 9. Monitoring and auditing set out in Section 11.3.	If growth rates are deemed sub optimal and unlikely to support the required completion criteria: • Delay planting until they are sufficiently robust to survive planting into the recipient site; • Review treatment methodology and identify potential opportunities to improve growth rates;	Year 2 Year 3	Nursery Team Specialist Ecologist Powerlink

Interim milestone/ Management trigger	Monitoring method	Corrective action	Timing	Responsibility
90% of the nursery grown individuals are alive, by the end of the first year from planting out.	Monitoring as outlined in Section 11. Horticultural reporting outlined in Section 10.	If less than 90% are alive, the following will occur: • Review the site conditions, potential causes of mortality, and maintenance actions; • If applicable, adjust the frequency and intensity of the maintenance actions outlined Section 10; • Quarantine of sick Cycads where other treatments may be considered; • If health cannot be restored within a six (6) month period, the corrective actions outlined in Section 14.2 will occur; • Consider the implementation of contingency planting.	Year 4 (2030)	Specialist Ecologist Horticultural Team Powerlink
80% of the nursery grown individuals are alive, by the end of the second year from planting out. Maintenance activities can be completed as plants are established.	Monitoring as outlined in Section 11. Horticultural reporting outlined in Section 10.	If less than 80% are alive, the following will occur: • Review the site conditions, potential causes of mortality, and maintenance actions; • If applicable, adjust the frequency and intensity of the maintenance actions outlined Section 10 to extend beyond year 2; • Quarantine of sick Cycads where other treatments may be considered; • If health cannot be restored within a six (6) month period, the corrective actions outlined in Section 14.2 will occur; • Consider the implementation of a contingency planting.	Year 5 (2031)	Specialist Ecologist Horticultural Team Powerlink
At least 70% of nursery grown plants are alive by the end of the fifth year from planting out.	Monitoring as outlined in Section 11. Horticultural reporting outlined in Section 10.	If less than 70% are alive, the following will occur: • Review the site conditions, potential causes of mortality, and maintenance actions that may be required; • If applicable, determine whether the maintenance required is a one-off event and what percentage of individuals require horticultural management; • Consider the implementation of contingency planting. As an outcome no action may be undertaken if the loss is attributed to a natural event also observed in the wider population or the loss of the individuals will not result in the non-compliance. Consultation with DETSI/DCCEEW may be undertaken.	Year 6 (2032)	Specialist Ecologist Powerlink

15. Completion Criteria

Outlined below are the desired completion criteria for translocation success for *C. megacarpa*.

The criteria for translocation success excludes uncontrollable factors such as wildfires, significant weather events (e.g. cyclones) and drought which may occur from time to time over the course of programme.

15.1 Completion Criteria (salvaged individuals)

Outlined below are the desired completion criteria for translocation success for salvaged *C. megacarpa*.

- 70% of the salvaged (and directly planted) individuals are alive 15 years after planting[37];
- 70% of the salvaged and nursery grown individuals are alive ten (10) years after planting;
- Fruiting is recorded on at least 5% of salvaged individuals (of reproductive height) or comparable to the percentage fruiting occurring within the reference sites (whichever is less) upon the completion of the monitoring programme[38];
- Pollen cones are recorded on at least 5% of salvaged male individuals or comparable to the percentage fruiting occurring within the reference sites (whichever is less) upon the completion of the monitoring programme[16];
- Sustained recruitment is occurring from salvaged individuals (of reproductive height) upon the completion the program (i.e. 15 years after planting);
- The plants are established and grow without the need for horticultural support or direct management for a minimum of five (5) years;
- The overall health of directly translocated specimens is equal to or better than those within the reference set upon the completion of the monitoring programme. This may for example include: crown health; stem condition; degree of invertebrate attack and reproductive capacity.

15.2 Completion Criteria (propagated individuals)

Outlined below are the desired completion criteria for translocation success for propagated *C. megacarpa*.

Propagation success:

- At least 70% of propagated individuals are alive, healthy and able to be planted out during the scheduled timeframes.

Translocation success (once planted out):

- 70% of the propagated individuals are alive ten (10) years after planting[15];
- The overall health of propagated individuals is equal to or better than those of similar age class within the reference set upon the completion of the monitoring programme. This may for example include: crown health and degree of invertebrate attack;
- Nursery grown plants are established within the recipient site and grow without the need for horticultural support or direct management for a minimum of five (5) years.

15.3 Overall Performance Success

The completion criteria for overall success and achieving a conservation gain for *C. megacarpa*, compliant with EPBC approval conditions are as follows (these need to be achieved within 15 years from date of commencing translocation):

- There are at least 523 salvaged and propagated *C. megacarpa* surviving in the recipient site upon the completion of the programme (i.e. after 15 years).

Should the completion criteria not be achieved, Powerlink will notify DCCEEW and DETSI within 40 days of the 15th anniversary of the commencement of the action, that the outcome has not been met. Furthermore, a

[37] This survival rate has been achieved for at least four (4) Queensland Cycad translocation programmes under the same methodology and core Salvage Team members over the past 12 years.
[38] This measure will also assist in confirming the presence of pollinators across the recipient site areas.

Supplementary Translocation Management Plan (STMP) for *Cycas megacarpa* will be submitted to both agencies which will detail the additional and/or revised management measures that will be implemented to compensate for the difference between actual outcomes for *Cycas megacarpa* and the outcomes required under relevant approval conditions.

16. References

Commander, L.E., Coates, D.J, Broadhurst, L., Offord, C.A., Makinson, R.O. and Mathes, D. (2018) *Guidelines for the Translocation of Threatened Plants in Australia* (3rd Ed), Australian Network for Plant Conservation, Canberra, Australia.

Commander, L.E. (Ed.) (2021) ''*Florabank Guidelines – best practice guidelines for native seed collection and use'* 2nd Ed, Florabank Consortium: Australia, Available at: https://www.anpc.asn.au/florabank/

Department of Agriculture and Fisheries (DAF) 2022, *State Development Assessment Provisions guideline, State code 18: Constructing or raising waterway barrier works in fish habitats*, Accessed October 2025, Available at: https://www.planning.qld.gov.au/__data/assets/pdf_file/0020/102197/sdap-v3.3-state-code-18-constructing-or-raising-waterway-barrier-works-in-fish-habitats.pdf

DES (2020b) Code of Practice – For the harvest and use of protected plants under an authority (Nature Conservation Act 1992)

Department of Environment (DoE) (2014) *Translocation Compliance Report for Macrozamia pauli-guilielmi and Acacia attenuata* department of Transport and Main roads, Brisbane.

Forster, P. (2007). *Recovery Plans for Endangered Cycads: A Model Set of Objectives and Actions Using the Example of Cycas megacarpa from Queensland Australia*, Memoirs of the New York Botanic Garden, vol. 97, pp. 3–29.

James, HE, Forster, PI, Lamont, RW & Shapcott, A (2018), *Conservation genetics and demographic analysis of the endangered cycad species Cycas megacarpa* and the impacts of past habitat fragmentation, Australian Journal of Botany, vol. 66, pp 173-189.

Lima, Juliana Maria & Oliveira, João. (2024) Breaking dormancy in Cycas revoluta: A study of seed morphological characterization and dormancy mechanisms, Journal of Seed Science, 46. 10.1590/2317-1545v46289799.

Norstog, K.J. and Nicholls, T.J. (1997) The Biology of the Cycads. Cornell University Press, Ithaca and London Primack, R.B and S.L. Miao (1992) Effects of seed dispersal on the distribution of rare plant species. Conservation Biology 4:513-519.

Queensland Herbarium (2007) National Multi-species Recovery Plan for the Cycads, *Cycas megacarpa, Cycas ophiolitica, Macrozamia cranei, Macrozamia lomandroides, Macrozamia pauli-guilielmi* and *Macrozamia platyrachis*, Report to the Environment and Water Resources, Canberra, Queensland Parks and Wildlife Service, Brisbane

Queensland Government (2025) Queensland Globe, Accessed: November 2025, Available at: https://qldglobe.information.qld.gov.au/

Shapcott, A & Lamont, R (2021), *Project; Are newly discovered populations of Cycas megacarpa genetically distinct*, University of Sunshine Coast, School of Science Technology and Engineering, Queensland. Prepared for Ecologica Consulting

Umwelt (2025) Calvale to Calliope River Transmission Line Reinforcement Project – Construction Environmental Management Plan. Prepared for Powerlink Queensland.

Umwelt (2025a) Calvale to Calliope River Transmission Line Reinforcement Project – Draft Public Environment Report (PER). Prepared for Powerlink Queensland.

Legislation

Environmental Protection and Biodiversity Conservation Act. 1999 (Commonwealth)

Nature Conservation Act. 1992 (State of Queensland)

Nature Conservation (Wildlife) Regulation 2006 (State of Queensland)

Nature Conservation (Wildlife Management) Regulation 2006 (State of Queensland)

Appendix A: Impact Management Summary

Management of impacts from The Project on retained and translocated Cycads

Impact	Timing	Residual Impact	Mitigation and management
Direct Impacts			
Habitat clearing	• Construction • Operation	The Project will result in the clearing of 23.8 ha of known *C. megacarpa* habitat and 0.5 ha of suspected habitat. The project will result in the modification of 29.7 ha of known habitat; and 0 ha of suspected habitat via selective clearing and ongoing routine management. Approximately 1,032 *C. megacarpa* individuals are expected to be alive in the Disturbance Footprint at the time of translocation (refer Section 1.4). Is it anticipated that approx. 632 individuals can be retained in-situ, and approximately 400 individuals will be salvaged. A final, direct count pre-clearance survey will be undertaken prior to vegetation clearing, with all individuals tagged and assessed for viable translocation.	*Avoidance and micro-siting* *C. megacarpa* populations will be avoided where practical, with micro-siting activities undertaken to avoid individuals to the greatest practical extent, e.g. by retaining individuals under powerlines or altering the location of access infrastructure. *Translocation* All live *C. megacarpa* which cannot be avoided and are considered sufficiently healthy and robust will be translocated to suitable habitat in approved recipient sites. Recipient sites are discussed in Section 4, and preparation for and the methodology of translocation is discussed in Sections 6 to 7. *Seed propagation and planting* *C. megacarpa* individuals which cannot be avoided or translocated, die during the process of translocation, or fail to thrive in the recipient sites will be replaced by an ongoing program of seed collection, propagation and planting. This program will aim to establish a 1:2 replacement of the *C. megacarpa* individuals impacted in the Cycad Salvage Footprint and ensure a conservation gain is achieved for the species. Calculations of the necessary numbers of seeds and propagated individuals is provided in Table 1, and the methodology of seed collection, propagation and ongoing monitoring of translocated and propagated individuals is discussed in Sections 9 and 11.3.

Impact	Timing	Residual Impact	Mitigation and management
Species mortality – vehicles and trampling	• Construction • Operation • Decommissioning and rehabilitation	There is potential for vehicular and personnel movement around The Project area to lead to direct destruction of plants through vehicle strike or trampling.	Personnel working on the site are to be made aware of the presence of this species and its identification prior to entering site, in the induction material. As per general measures, Project vehicles and personnel are to stay on approved tracks to reduce the risk of impacting areas of retained habitat and individuals. Where *C. megacarpa* individuals occur near work areas such as construction compounds, substation etc. exclusion zones will be established to ensure they are not indirectly impacted by vehicles or personnel. This may be through installation of temporary fencing to clearly demarcate the boundary and ensure individuals are protected from indirect impacts.
Indirect Impacts			
Fragmentation	• Construction	The Project will result in the clearing of 23.8 ha of known *C. megacarpa* habitat and 0.5 ha of suspected habitat. Much of this clearing is linear in nature.	Clearing of habitat will generally be linear in nature and is not expected to seriously fragment the species population. A number of mature females will be planted into the recipient site and retained in-situ, which will provide ongoing sources of seed dispersal for recruitment throughout both locations.
Bushfire Risk	• Construction • Operation • Decommissioning and rehabilitation	The increased presence of construction personnel, vehicles and machinery in The Project area during Project construction and operation could lead to elevated bushfire risk unless adequately mitigated. Periodic fires of different intensities are a natural part of the ecology for the species. Mature individuals are able to survive most fires except those of high intensity or repeated, frequent moderate to high intensity. However, fire will kill seedlings and juveniles and too frequent fires detrimentally impact ongoing recruitment.	General mitigation measures to manage bushfire risk will be implemented as part of The Project and documented in the PLQ EMP and the OMP, including: • No prescribed burns within the recipient site within first 5 years post-translocation; • Daily monitoring of fire danger status, and ongoing engagement with the Rural Fire Service to manage fire risk during the construction phase; • Various controls on activities with potential to cause fire, e.g. 'hot-work' activities, vehicle travel through long grass; and • Ban on smoking outside of designated safe zones. In addition to general measures, any occurrence of wildfire in areas containing *C. megacarpa* will trigger one year of post-impact monitoring and, if low recovery amongst the populations is observed, mandatory reporting to DCCEEW.

Impact	Timing	Residual Impact	Mitigation and management
Sediment, erosion and water quality	• Construction • Operation • Decommissioning and rehabilitation	Throughout The Project's construction, operation, decommissioning and rehabilitation, there is potential for reduced water quality to impact on the health of the species in both retained and translocated sites, unless adequately mitigated. Spills, increased erosion and sedimentation may all affect the quality of retained habitat and translocation sites.	An overarching Erosion and Sediment Control Plan (ESCP) will be prepared and implemented during construction, operation and decommissioning of The Project. Site-specific supplementary plans will progressively be developed based on detailed project design and will be reviewed and certified prior to construction commencing in that part of the Disturbance Footprint. Controls will be undertaken in both retained areas of *C. megacarpa* within the Disturbance Footprint and the recipient site where required, and will include (amongst other measures): • Planting of translocated *C. megacarpa* with sufficient buffer from Project features to reduce erosion and sediment impacts to recipient sites. Final siting of translocated *C. megacarpa* will be undertaken by the Salvage Team[39] and will consider optimal planting locations based on factors including proximity to nearby infrastructure; • Utilisation of suitable soil covers to limit erosion from rain and water flow (e.g. gravel and rock, timber debris); • Construction of sediment basins to store and trap sediment and debris; • Creek crossing locations will seek to take advantage of existing gaps in the riparian corridors as far as practicable. Work in creek crossings will be carried out in periods of no flow; • Constructed access tracks (e.g. culverts or splash through crossings) must be provided with a scour apron and cut off wall on the downstream side sufficient to prevent bed erosion; • Spill control materials such as booms and absorbent materials will be maintained on site, commensurate with the types and volumes of materials in use, and in place where hazardous materials are stored or used; • All refueling facilities, or storage facilities for hydrocarbons and chemicals will be in appropriately designed sites and comply with Australian Standards (e.g. AS 1940: The storage and handling of flammable and combustible liquids). Materials will be stored within bunded areas with a storage capacity of 110% of the storage vessel. Bunding will have floors and walls lined with impermeable material. These areas must be adequately protected from rainfall and stormwater.

[39] This will be undertaken in consultation with the Specialist Ecologist to ensure a positive conservation outcome.

Impact	Timing	Residual Impact	Mitigation and management
Noise and lighting	• Construction • Operation • Decommissioning and rehabilitation	There is limited projected impact to the species from noise and lighting during all phases of The Project.	N/A
Reduced air quality	• Construction • Operation • Decommissioning and rehabilitation	There is potential for dust from vehicles and construction activities to spread into areas of retained and translocated *C. megacarpa.*	General dust management protocols are prescribed in the EMP, and include: • Regular dust suppression activities to occur on unsealed roads as required (e.g. watering trucks); • Maximum 40km/h speed limits on all access roads and tracks; • All stockpiles to be located appropriately and covered to prevent wind erosion; • Staged vegetation clearing to reduce the quantity of bare soil exposed, and rehabilitation of temporary construction areas. Additionally, the translocation of *C. megacarpa* will ensure that sufficient buffers exist between translocated individuals and project infrastructure such that potential interaction with dust from vehicles and construction activities is limited. Final siting of translocated *C. megacarpa* will be undertaken by the Salvage Team[40].

[40] This will be undertaken in consultation with the Specialist Ecologist to ensure a positive conservation outcome.

Impact	Timing	Residual Impact	Mitigation and management
Weeds and pests	• Construction • Operation • Decommissioning and rehabilitation	No invasive fauna or flora species are listed as a known threat to this species. However, weeds such as lantana may compete with and smother individual Cycads.	All works will be undertaken in accordance with relevant management plans which prescribe actions and controls considered relevant to managing weeds and pests in retained and translocated *C. megacarpa* populations. Specific controls will include (amongst other measures): • Strict hygiene controls, including wash down and inspection of all vehicles entering the project area and travelling between landholdings; • Transplant specialists and seed harvesters will be appropriately licensed, experienced in working in sensitive environments, and will take sufficient precautions to ensure vehicles and equipment are clean of potential weeds and pathogens (particularly Phytophthora and *Austropuccinia psidii* (Myrtle rust); • Vehicles required to stay on designated access tracks; • Ongoing inspection, monitoring and management will be undertaken of weed and pest outbreaks, especially of wild pigs in retained and translocated areas of *C. megacarpa.*

Appendix B: Recipient Site Assessment Scorecard

Recipient Site Assessment Scorecard Primary Recipient Site	Score
Property size: • The proposed offset area contains a minimum of 6 ha of land suitable for a Cycad recipient site and is considered available for use by the landholder.	3
Tenure and zoning: • The tenure is freehold; • The area is mapped with the appropriate local government zoning.	6 (3+3)
Topography and catchment area: • Topography will aid natural dispersal, particularly through drainage lines and overland flow but is not too steep for planting (<30% gradient); • It is within a catchment area known to contain *Cycas megacarpa;* and is preferably within the same catchment as those from the Calvale to Calliope (C2C) Project impact area.	5 (3+2)
Soils and geology: • Soils and geologies that are known to be suitable for *Cycas megacarpa* are present.	3
Vegetative habitat and condition: • The vegetative communities and structure in which this species is commonly found is present as either high value regrowth or remnant vegetation; • The canopy cover within the proposed offset area is typically >40%; • Management of pests and weeds pursuant to the *Biosecurity Act 2014* are considered feasible/manageable and achievable in time for planting of salvaged Cycads.	9 (3+3+3)
Presence of *Cycas megacarpa* and **site carrying capacity:** Based on initial observations: • *Cycas megacarpa* are present within the proposed offset area; • The proposed offset area appears large enough to support a self-sustaining population (3,500 individuals); or appears large enough to receive at least 1,000 individuals.	6 (3+3)
Population connectivity and proximity of proposed offset area to a viable population: • Contains a significant and viable population (recorded/unrecorded); or is likely to contain a portion of a significant and viable populations (recorded/unrecorded); • Contains connectivity to a recorded significant and viable populations (including clusters <600m apart); or contains connectivity to an area likely to contain a significant and viable population.	6 (3+3)
Proximity of property to protected areas and biodiversity corridors: • A state significant biodiversity corridor runs through or directly adjacent the proposed offset area; • The Option borders a protected area pursuant to either the *Nature Conservation Act 1992* or *Forestry Act 1959.*	4 (3+1)
Pollinators: • Recruitment in the form of seedlings was present within the local area; • Pollinators for the species were observed within the proposed offset area.	6 (3+3)
Potential values for other threatened species: • The area is likely to contain habitat values for other threatened species; • Threatened species (other than *Cycas megacarpa*) have been located within the proposed area and translocation activities will not impact its core habitat quality and availability.	6 (3+3)
Land Use: • Current and future land uses are likely to be compatible with the objectives of the translocation and offset programme.	3
Potential threats: • Site is secure and accessible by 4WD (preferably 2WD); • Water is available onsite or can be secured through infrastructure without excessive and ongoing cost; • Weed management is considered manageable and unlikely to delay the transplanting process; • Domestic and feral animals can be excluded or feasibly managed to prevent detrimental effects on plantings; • The risk of pathogen introduction and insect attack is considered manageable and feasibly achievable; • Fire can be excluded or managed with low level burns within the proposed offset area for the duration of the translocation and offset programme.	18 (3+3+3+3+3+3)
Total	**75 out of 78**

Scoring parameter
1 = Does not meet the criteria
2 = Partially meets the criteria
3 = Fully meets the criteria

Recipient Site Assessment Scorecard Secondary Recipient Site	Score
Property size: • The proposed offset area contains a minimum of 6 ha of land suitable for a Cycad recipient site and is considered available for use by the landholder.	3
Tenure and zoning: • The tenure is freehold; • The area is mapped with the appropriate local government zoning.	6 (3+3)
Topography and catchment area: • Topography will aid natural dispersal, particularly through drainage lines and overland flow but is not too steep for planting (<30% gradient); • It is within a catchment area known to contain *Cycas megacarpa;* and is preferably within the same catchment as those from the Calvale to Calliope (C2C) Project impact area.	5 (3+2)
Soils and geology: • Soils and geologies that are known to be suitable for *Cycas megacarpa* are present.	3
Vegetative habitat and condition: • The vegetative communities and structure in which this species is commonly found is present as either high value regrowth or remnant vegetation; • The canopy cover within the proposed offset area is typically >40%; • Management of pests and weeds pursuant to the *Biosecurity Act 2014* are considered feasible/manageable and achievable in time for planting of salvaged Cycads.	9 (3+3+3)
Presence of *Cycas megacarpa* **and site carrying capacity:** Based on initial observations: • *Cycas megacarpa* are present within the proposed offset area; • The proposed offset area appears large enough to support a self-sustaining population (3,500 individuals); or appears large enough to receive at least 1,000 individuals.	6 (3+3)
Population connectivity and proximity of proposed offset area to a viable population: • Contains a significant and viable population (recorded/unrecorded); or is likely to contain a portion of a significant and viable populations (recorded/unrecorded); • Contains connectivity to a recorded significant and viable populations (including clusters <600m apart); or contains connectivity to an area likely to contain a significant and viable population.	6 (3+3)
Proximity of property to protected areas and biodiversity corridors: • A state significant biodiversity corridor runs through or directly adjacent the proposed offset area; • The Option borders a protected area pursuant to either the *Nature Conservation Act 1992* or *Forestry Act 1959.*	2 (1+1)
Pollinators: • Recruitment in the form of seedlings was present within the local area; • Pollinators for the species were observed within the proposed offset area.	6 (3+3)
Potential values for other threatened species: • The area is likely to contain habitat values for other threatened species; • Threatened species (other than *Cycas megacarpa*) have been located within the proposed area and translocation activities will not impact its core habitat quality and availability.	6 (3+3)
Land Use: • Current and future land uses are likely to be compatible with the objectives of the translocation and offset programme.	3
Potential threats: • Site is secure and accessible by 4WD (preferably 2WD); • Water is available onsite or can be secured through infrastructure without excessive and ongoing cost; • Weed management is considered manageable and unlikely to delay the transplanting process; • Domestic and feral animals can be excluded or feasibly managed to prevent detrimental effects on plantings; • The risk of pathogen introduction and insect attack is considered manageable and feasibly achievable; • Fire can be excluded or managed with low level burns within the proposed offset area for the duration of the translocation and offset programme.	18 (3+3+3+3+3+3)
Total	**73 out of 78**

Scoring parameter
1 = Does not meet the criteria
2 = Partially meets the criteria
3 = Fully meets the criteria

Appendix C: Age Class Definition

Age class definition

Age class	Description
Seed	• Sarcotesta may be intact or removed; • The radicle has started to protrude from the cracked sclerotesta. However, it is above the soil surface; not anchored in the ground; and has no rachis or leaflet development. •
Seedling	• A newly formed plant that is not attached to an older individual (i.e. is not a 'pup'); • The radicle is anchored firm in the ground; • The subterranean trunk is less than 5 cm in length; • Does not have an above-ground stem or a formed crown; and • Has up to two (2) active fronds which are usually less than 20 cm in length (total rachis length).
Juvenile	• Is a singular plant that is not attached to an older individual (i.e. is not a 'pup'); • Does not have an above-ground stem[41] or a formed crown; • The subsurface stem and subterranean trunk are usually 5-25cm in length; and • The plant has up to 5 active fronds which are usually less than 40 cm in length (total rachis length).
Sub-adult	• Is a singular plant not attached to an older individual (i.e. is not a 'pup'); • The plant has a surface height between 0 and 49 cm (from ground to crown base); • Has 5 or more active fronds of full length. Or: • Is a pup or multitude of pups attached to an older individual (usually at or near the base); • Fronds (total rachis length) may be stunted or full developed[42]; and • The tallest active stem has a surface height of 0 – 49 cm (from soil surface to crown base).
Adult	• Is a singular plant not attached to an older specimen/individual (i.e. is not a 'pup'); • The plant has a surface height of 50 cm or greater (from soil surface to crown base). Or: • Is a pup or multitude of pups attached to an older individual; and / or • The tallest active stem has a surface height 50 cm or greater (from soil surface to crown base); • Fronds (total rachis length) may be stunted or full developed[4].

Table notes:
A 'pup' is the growth of a new Cycad, they are genetic clones of their parent plant, and typically develop around and attach to the parent plant near or just below the soil level. Both male and female plants can produce pups.

[41] In some instances, a narrow, above ground stem may be observed if the plant is positioned within an area subject to erosion or digging (e.g. pigs, bandicoots).
[42] In some instances, new pups may be developing with fronds not yet developed.

Appendix D: Population and Direct Count Data