Transport for New South Wales

Coffs Harbour Bypass

Pittosporum sp. Coffs Harbour & [redacted] Exclusion Zone Management Plan

281967-0-DC-EN-MPL-0001

Final | 26 October 2022

Job number 281967

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Document verification

ARUP

Job title		Coffs Harbour Bypass		Job number 281967
Document title		Pittosporum sp. Coffs Harbour & [redacted] Exclusion Zone Management Plan		File reference 281967-0-DC-EN-MPL-0001
Document ref		281967-0-DC-EN-MPL-0001		
Revision	**Date**	**Filename**	281967-0-DC-EN-MPL-0001	
1	07/02/22	Description	Draft for TfNSW comment	
			Prepared by	Checked by	Approved by
		Name	Colin Vaughan Andrew Benwell	Sophie St John	Kayleigh Speed
		Signature			
2	11/02/22	Filename	281967-0-DC-EN-MPL-0001	
		Description	TfNSW comments addressed	
			Prepared by	Checked by	Approved by
		Name	Colin Vaughan Andrew Benwell	Sophie St John	Kayleigh Speed
		Signature			
3	15/03/22	Filename	281967-0-DC-EN-MPL-0001	
		Description	EESG comments addressed	
			Prepared by	Checked by	Approved by
		Name	Colin Vaughan Andrew Benwell	Sophie St John	Kayleigh Speed
		Signature			
4	26/05/22	Filename	281967-0-DC-EN-MPL-0001 Pittosporum sp. Coffs Harbour & [redacted] Exclusion Zone Management Plan	
		Description	DPE feedback addressed	
			Prepared by	Checked by	Approved by
		Name	Andrew Cook	Scott Lawrence Colin Vaughan	Scott Lawrence
		Signature			
5	20/10/22	Filename	281967-0-DC-EN-MPL-0001 Pittosporum sp. Coffs Harbour & [redacted] Exclusion Zone Management Plan	
		Description	BCD (DPE) feedback addressed	
			Prepared by	Checked by	Approved by
		Name	Andrew Cook	Scott Lawrence	Scott Lawrence
		Signature			
Final	26/10/22	Filename	281967-0-DC-EN-MPL-0001 Pittosporum sp. Coffs Harbour & [redacted] Exclusion Zone Management Plan	

		Description	BCD (DPE) feedback on monitoring program addressed and finalised		
			Prepared by	Checked by	Approved by
		Name	Andrew Cook	Scott Lawrence	Scott Lawrence
		Signature			
			Issue Document verification with document		✓

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Appendices

Appendix A |

Compliance with translocation guidelines (Commander et al., 2018)

Appendix B |

Description of the Recipient Sites

Definition of Terms and Glossary

Term	Definition
BC Act	*Biodiversity Conservation Act 2016*
BCD	Biodiversity and Conservation Division (BCD) of the Biodiversity, Conservation and Science Directorate in the Environment and Heritage Group of the Department of Planning and Environment.
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Exclusion Zone	The [redacted] Exclusion Zone within which no construction works are to be undertaken and within which *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are to be retained *in-situ* with select translocation and propagation as required.
Fontainea Expert	A suitably qualified person with direct experience with the ecology of *Fontainea* sp. Coffs Harbour.
Initial Maintenance Period	A 180 day period following the salvage translocation and planting of *Pittosporum* sp. Coffs Harbour during which maintenance and monitoring works are undertaken.
Monitoring Period	A five year period following the Initial Maintenance Period during which maintenance and monitoring works are undertaken.
Pittosporum Expert	A suitably qualified person with direct experience with the ecology of *Pittosporum* sp. Coffs Harbour.
Planting Area	The area(s) within the Recipient Sites within which the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour are to be planted and within which maintenance works are to be undertaken.
The Project	The Coffs Harbour Bypass Project.
Project Boundary	The area within which all works associated with the Coffs Harbour Bypass will be undertaken.
Project Ecologist	The suitably qualified person acting on behalf of TfNSW responsible for all the ecological matters associated with the delivery of the Project.
Project Footprint	The area directly impacted by the Project including for physical road infrastructure and ancillary activities including laydown areas.
Recipient Sites	The sites nominated to receive the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour.
Revegetation Contractor	A qualified and appropriately experienced person(s) with direct experience in native rainforest plant salvage translocation, propagation, planting, and monitoring and maintenance.
Species Expert	The Fontainea Expert and/or Pittosporum Expert.
TfNSW	Transport for New South Wales
TSMP	Threatened Species Management Plan
USC	University of the Sunshine Coast

PART A – INTRODUCTION

1 Introduction

1.1 Project background

Transport for New South Wales (TfNSW) received approval to construct the Coffs Harbour Bypass (the Project) under the *Environmental Planning and Assessment Act 1979* on 2 November 2020 and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 8 December 2020. The Project is situated in the Coffs Harbour local government area and located to the west of the Coffs Harbour urban area in northern New South Wales (Figure 1).

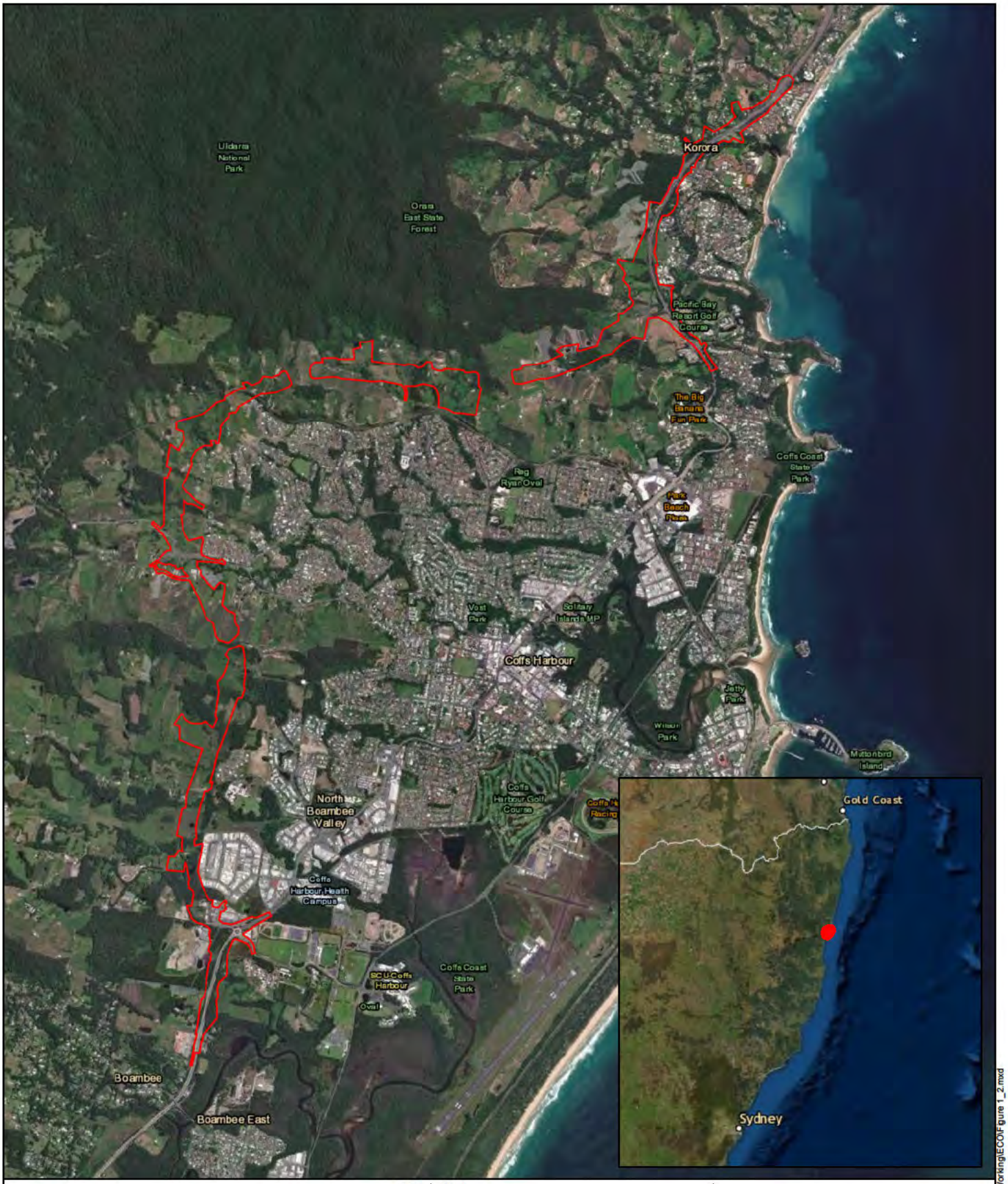
The Project complements the Pacific Highway upgrade program which, when complete, will provide free flowing dual carriageway conditions for the Pacific Highway between Hexham and the Queensland border. The principal objectives of the Pacific Highway upgrade program are to:

- Improve traffic safety
- Reduce travel times and freight costs
- Engage the community and consider their issues
- Support economic development
- Support Ecologically Sustainable Development principles
- Provide a safe workplace
- Achieve value for money

The Pacific Highway upgrade program seeks to create public value and ensure the safety of its workers and the travelling public.

An environmental impact statement (EIS) was prepared for the Project in 2019 which (along with an Amendment Report) provides a detailed assessment of impacts to terrestrial and aquatic biodiversity associated with the Project and strategies to avoid, mitigate and manage these impacts during each Project phase.

As part of the EIS process, a Threatened Species Management Plan (TSMP) was prepared for the Project which provides an overarching management framework for all parts of the Project. The TSMP was developed to inform site-specific and species-specific mitigation measures and management protocols to be implemented during the Project. As part of the approval conditions for the Project (approval condition E15), the TSMP is required to be updated during the life of the Project and included an Unexpected Threatened Species Finds procedure to address any impacts to threatened species and ecological communities not addressed by the EIS.



Legend

Project Boundary

Client
Transport for NSW

Job Title
Coffs Harbour Bypass

Map Title
Project location

Kilometers
0 0.25 0.5 1 1.5 2

Issue	Date	By	Chkd	Appd
D1	17/01/2022	JV	CV	SSJ

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Scale at A4	Map Status
1:51,586	Final

Coordinate System
GDA2020 MGA Zone 56

Job No	Figure
281967	1

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1.2 Discovery of two new species

Surveys undertaken during the EIS phase of the Project, and to support the Amendment Report identified the following threatened flora species:

- Rusty plum (*Niemeyera white*), listed as 'vulnerable' under the *Biodiversity Conservation Act 2016* (BC Act)
- Scrub turpentine (*Rhodamnia rubescens*), listed as 'critically endangered' under the BC Act and the EPBC Act

In January 2021, slender marsdenia (*Marsdenia longiloba*), which is listed as 'endangered' under the BC Act and 'vulnerable' under the EPBC Act, was identified by Ecos Environmental whilst mapping the location of the rusty plum (*Niemeyera white*) within the Project Boundary.

In addition to the slender marsdenia, a *Fontainea* species and *Pittosporum* species were discovered (during the January 2021 flora surveys) that did not conform to the descriptions of any known species and were identified as potentially new species. Upon identification of the new species, the Project's unexpected threatened species finds procedure (as documented in the TSMP) was applied to guide the management and assessment of these species.

To confirm the taxonomic classification of the plants, samples of the two species were sent to the Queensland Herbarium and the NSW Herbarium which identified the two species as new to science and described as:

- *Fontainea* sp. Coffs Harbour (A.S. Benwell 341, NSW1102027) (Photograph 1)
- *Pittosporum* sp. Coffs Harbour (A.S. Benwell 342, NSW1102028) (Photograph 2)

Both species have been included in the Census of Australian Plants.

Photograph 1 Fruit and leaves of *Fontainea* sp. Coffs Harbour at [redacted] and flower at [redacted]

Photograph 2 *Pittosporum* sp. Coffs Harbour patch of stems (left) and leaves, fruits and seeds (right)

To further confirm the taxonomical classification of the species, genetic analysis was undertaken in October 2021, which confirmed that both the *Fontainea* sp. Coffs Harbour and the *Pittosporum* sp. Coffs Harbour are new species (refer to Section 1.4).

In October 2021, *Fontainea* sp. Coffs Harbour was provisionally listed as 'critically endangered' under the BC Act; however, is not currently listed under the EPBC Act.

Pittosporum sp. Coffs Harbour was provisionally listed as 'critically endangered' under the BC Act in January 2022 and is not currently listed under the EPBC Act.

1.3 Surveys completed

Following identification of the two new species, three rounds of targeted flora surveys for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour were undertaken in April, August, and November 2021. The aim of the surveys was to acquire more detailed information on the distribution, habitat, and size of populations, inside and outside the Project Boundary, for impact assessment and to inform the development of appropriate management measures of the two new species.

The targeted surveys for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour were carried out over 20 days by a team of three botanists familiar with the flora of the Mid North Coast New South Wales. A total of 56 areas of mature and secondary regrowth forest were surveyed in the Coffs Harbour and Kororo Basins, consisting of 21 ha of potential habitat within the Project Boundary and 140 ha outside the Project Boundary.

The areas selected for the surveys were assessed as supporting habitat (i.e. vegetation, geology and landform) similar to the sites at which the original *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour were identified. Potential habitat for the two new species was identified broadly as wet sclerophyll forest with a well-developed rainforest mid-stratum, particularly Brush Box (*Lophostemon confertus*) dominated forest along lower slopes, gullies and creeks, similar to the initial sites.

[redacted]

The surveys were undertaken as per the meander traverse survey method (Cropper 1993) with sufficient coverage of each area so there was a high likelihood of the species being detected if present.

The results of the targeted surveys for *Fontainea* sp. Coffs Harbour and the *Pittosporum* sp. Coffs Harbour are discussed in the following sections and in Section 4.1.

1.3.1 *Fontainea* sp. Coffs Harbour

Fontainea sp. Coffs Harbour has been identified in the following two areas (approximately 1 km apart) within the Project Boundary:

[redacted]

The [redacted] is located within the Project Footprint and consists of a single mature tree to 4.5 m in height which was observed to have produced approximately 50 fruits between January 2021 and April 2021. A total of 31 seedlings were observed to have germinated under the single mature tree at [redacted]. However, subsequent visits to the [redacted] tree in June 2021 identified that approximately half of these seedlings had died of natural causes or were severely desiccated and likely to die of natural causes. The seedlings that remained alive were removed from site to a nursery under the advice of the Project Ecologist for growing-on in pots and monitoring.

The [redacted] is located outside of the Project Footprint and consists of a single mature tree to 4 m in height, with a total of two seedlings (cotyledons present) and 36 juvenile and sapling plants ranging in height from 0.3 m to 3 m.

The location of all *Fontainea* sp. Coffs Harbour identified during the field surveys are show in Figure 2.

1.3.2 *Pittosporum* sp. Coffs Harbour

Surveys for *Pittosporum* sp. Coffs Harbour have identified patches of the species at the following locations (refer to Figure 2):

[redacted]

Pittosporum sp. Coffs Harbour was observed to generally occur in patches of stems, that grow as suckers from the root system (which is a form of vegetative reproduction). Several stems were excavated and found to be growing from horizontal, rhizome-like roots 5 – 10 cm underground. The patches of stems appear to be clones and may be genetically identical. A few single, isolated plants were recorded which may represent recruitment from dispersed seed, although observations over the course of 2021 indicate that very few fruits and seeds are produced, despite reasonable numbers of flowers. Fruit have only been recorded in one small area within the [redacted] 'Exclusion Zone' (refer to Section 4.3.1 for further detail on the Exclusion Zone).

Table 1 details the location of all *Pittosporum* sp. Coffs Harbour identified during the surveys, and the location of all *Pittosporum* sp. Coffs Harbour are show in Figure 2.

Table 1: Locations of *Pittosporum* sp. Coffs Harbour, number of patches and number of stems at each location

Location	No. of Patches	No. stems per Patch	Total number of stems
Inside Project Boundary			
[redacted]	22*	4 to 580	3,420
Total	**22***		**3,420**
Outside Project Boundary			
[redacted]	1	66	66
[redacted]	3	Estimated average 100 per patch	300

Location	No. of Patches	No. stems per Patch	Total number of stems
[redacted]	4	Estimated average 200 per patch	800
[redacted]	29	1 to 110	1,100
[redacted]	1	1	1
[redacted]	3	Estimated average 40 per patch	120
[redacted]	2	2 to 5	7
[redacted]	2	2 to 21	23
Total	**45**		**2,417**

* Whilst 22 patches are located within the Project Boundary, only 10 patches will be directly impacted by the works. The other 12 patches remaining within the Project Boundary are outside the Project Footprint (and within the Exclusion Zone) and will not be cleared as a result of the Project.

1.4 Genetic analysis

1.4.1 *Fontainea* sp. Coffs Harbour

TfNSW have engaged Dr Steven Ogbourne of the University of the Sunshine Coast (USC) to conduct a genetic analysis of *Fontainea* sp. Coffs Harbour to determine if the initial taxonomic findings (of the species being new to science) could be confirmed by genetic analysis and to outline the conservation implications of the findings.

USC have investigated the genetic profile and features of *Fontainea* sp. Coffs Harbour individuals and populations to determine if the recently described 'new species' is a distinct species from a genetic perspective.

Using reduced-representation genotype sequencing, the analyses showed that *Fontainea* sp. Coffs Harbour is a genetically distinct species from other recorded *Fontainea* species. This outcome was supported by taxonomic findings by the Queensland Herbarium and NSW Herbariums based on physical metrics and suggests a formal delineation as *Fontainea* sp. Coffs Harbour (A.S. Benwell).

USC identified that *Fontainea* sp. Coffs Harbour populations have been isolated from other *Fontainea* species and are characterised by relatively low levels of genetic diversity, and high levels of inbreeding. However, given the small number of individuals identified and that low levels of genetic diversity are characteristic of other species of the *Fontainea* genus, this finding was not unexpected. USC

found that the two identified populations of *Fontainea* sp. Coffs Harbour are also potentially genetically distinct from each other. However, the analysis of the [redacted] was based on the single tree, and therefore a robust statistical analysis was not possible. A future assessment of 20 – 30 progeny off the parent tree would assist to verify this conclusion.

1.4.2 *Pittosporum* sp. Coffs Harbour

The Royal Botanic Garden Sydney undertook a pilot conservation genomic study of the newly discovered *Pittosporum* sp. Coffs Harbour to verify the taxonomic status as a new species and to estimate the potential for hybridisation with co-occurring congeneric species.

The preliminary results indicate the following:

- *Pittosporum* sp. Coffs Harbour is genetically distinct from all congeneric species studied.
- There were no sign of hybridisation and introgression detected between *Pittosporum* sp. Coffs Harbour, and sympatric populations of *Pittosporum revolutum* and *Pittosporum undulatum*, which confirms *Pittosporum* sp. Coffs Harbour as a new, previously undescribed and highly localised *Pittosporum* species.
- Preliminary kinship analyses for the *Pittosporum* sp. Coffs Harbour individuals detected high levels of relatedness and clonality within each of the eight populations studied.
- The high levels of relatedness suggest that the population diversity includes high levels of inbreeding, which identifies greater rarity than expected (i.e. not all plants represent genetically distinct individuals), and high levels of inbreeding.

An expanded Stage 2 genetic study has been completed by the Royal Botanical Gardens (Sydney) which included the collection and analysis of 282 samples of *Pittosporum* sp. Coffs Harbour from the majority of the known locations and patches, which included all 22 patches within the Project Boundary. The outcomes of this genetic study will be used to help guide the translocation distribution of the salvaged and propagated *Pittosporum* sp. Coffs Harbour to maximise genetic diversity at the receival sites. A Research Initiative is proposed as part of the translocation to mix clones with the aim of stimulating cross-pollination, increasing seed production, and increasing genetic diversity (refer to Section 3.9).

1.5 Purpose of this report

This *Pittosporum* sp. Coffs Harbour & [redacted] Exclusion Zone Management Plan has been developed to provide the following:

- Description of the Project
- Background to the discovery of two new species

- Description of the impacts and mitigation measures to *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour
- A translocation plan for *Pittosporum* sp. Coffs Harbour, which includes:
  - Translocation objectives
  - Translocation strategy
  - Pre-translocation assessment
  - Translocation actions
  - Post-translocation actions
- Translocation objectives, outcomes, and performance requirements for *Pittosporum* sp. Coffs Harbour
- *In-situ* management actions of the retained individuals at the [redacted] Exclusion Zone, including the following:
  - *In-situ* management actions
  - In-situ management objectives, outcomes, and performance requirements
- Additional management actions for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour, including:
  - Habitat restoration
  - *Ex-situ* conservation actions
  - Biodiversity Stewardship Agreements (BSA)
  - Habitat modelling
  - Further surveys

This management plan has been divided into the following four sections, which reflect the different management approaches to the conservation of the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour:

- Part A – Introduction
- Part B – *Pittosporum* sp. Coffs Harbour Translocation Plan
- Part C – [redacted] Exclusion Zone *In-situ* Management
- Part D – Additional Management Actions

This management plan has been prepared to be consistent with the translocation principles contained within the Australian Network for Plant Conservation's *Guidelines for the Translocation of Threatened Plants in Australia* (Commander *et al*., 2018) and the Department of Planning, Industry & Environment's *Translocation Operational Policy* (DPIE, 2019).

A checklist against the requirements of the Australian Network for Plant Conservation's *Guidelines for the Translocation of Threatened Plants in Australia* (Commander *et al*., 2018) is provided in Appendix A.

Please note a separate management plan, *Fontainea* sp. Coffs Harbour Management Plan, has been prepared to document the translocation and propagation actions to address impacts to *Fontainea* sp. Coffs Harbour. Whilst separate management plans have been developed for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour, it is acknowledged that there are significant

similarities between the two management plans, and they are not mutually exclusive. In this regard, whilst this management plan has been developed for *Pittosporum* sp. Coffs Harbour, the actions contained within this plan are likely relevant to *Fontainea* sp. Coffs Harbour.

2 Nature of impacts

2.1 Attempts to avoid and minimise impacts

Following identification of the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour as new species, TfNSW developed six design options with the specific aim of avoiding and minimising impacts to the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour individuals and their supporting habitat. This included four options for the [redacted] area and two options for the [redacted] to avoid and minimise impacts on the individual mature *Fontainea* sp. Coffs Harbour at this location.

The design options were developed in consultation with Dr Andrew Benwell (Ecos Environmental), the Project Ecologist and other key environmental advisors. The design options were presented to BCD and the Project's Environmental Representative on 17 November 2021 to gain their feedback and advice as to the most appropriate option to avoid and minimise impacts.

Following the options assessment and comparative analysis and feedback from the key stakeholders, the '[redacted] – Central Option' was considered the preferred option for the Project and outperformed the other options for [redacted] in the evaluation criteria (including environment, social, functional and cost).

The benefits of the '[redacted] – Central Option' option include the following:

- Avoiding the entire [redacted] of *Fontainea* sp. Coffs Harbour (i.e. the one mature *Fontainea* sp. Coffs Harbour, two seedlings, and 36 juveniles).
- Avoiding 12 patches of *Pittosporum* sp. Coffs Harbour (comprising 1,770 individual stems) within the Project Boundary.
- Preserving approximately 2 ha of wet sclerophyll-rainforest habitat within the Project Boundary
- Restoring approximately 3 ha of blueberry farm as wet sclerophyll-rainforest to provide suitable future habitat for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour, as well as linking existing koala habitat at [redacted]eek.
- Minimising impacts to the hydrology of [redacted] by constructing a bridge over the tributary where the *Fontainea* sp. Coffs Harbour are present. The bridge structure will replace the 3 m x 3 m reinforced concrete box culverts included in the EIS design. The bridge structure reduces earthworks, maintains natural drainage, and negates the need for outlet scour protection works; all of which have avoided impacts to the retained *Fontainea sp.* and *Pittosporum* sp. Coffs Harbour and minimised impacts to their supporting habitat at this location.

- Retention of approximately 1.3 ha of the identified supporting habitat for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Project Boundary.
- Minimising impacts to 26 individual Rusty Plums (*Niemeyera whitei*) when compared to the EIS design.
- Minimising impacts to [redacted] riparian vegetation.

In addition to the above, the [redacted] – Central Option' provides further opportunity to protect more than 12 ha of wet sclerophyll-rainforest, which includes several patches of *Pittosporum* sp. Coffs Harbour through the use of a BSA on private land outside the Project Boundary (refer to Section 11.4).

The options for the [redacted] to avoid/minimise impacts on the one individual mature *Fontainea* sp. Coffs Harbour were considered not to be feasible as the alternative design options considered at this location would result in significant additional impacts to the adjacent environment and adjacent community when compared to the EIS design. In addition, the options would result in significant program delays and increased capital cost. A detailed options assessment report was developed which analysed the feasibility of the design changes through this area.

The retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour individuals and supporting habitat at the [redacted] Exclusion Zone will be subject to the management measures described in Part C, Section 9 of this report.

As the design option development was unable to completely avoid impacts to *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour and their supporting habitat, the impacts of the [redacted] – Central Option' have been minimised to the greatest extent possible. Additional mitigation measures have been developed to further minimise potential direct and indirect impacts to these species and their supporting habitat.

The direct and indirect impacts to *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour and their supporting habitat are discussed in the following sections.

2.2 Direct impacts

2.2.1 Direct impact to individuals

Following all attempts to avoid direct impacts, the Project is anticipated to result in the following direct impacts to individual *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour:

- Direct impacts to one mature *Fontainea* sp. Coffs Harbour individual at [redacted]
- Direct impacts to 10 discrete patches of *Pittosporum* sp. Coffs Harbour (within which 1,650 individual stems are present) at [redacted].

The impacted and retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are shown in Figure 3.

A cohort of *Fontainea* sp. Coffs Harbour seedlings that geminated in summer/autumn 2021 from the mature *Fontainea* sp. Coffs Harbour have either died or have been removed from site by Dr Andrew Benwell (Ecos Environmental) as part of a propagation and translocation trial. Due to wet spring-early summer conditions in 2021 – 2022 another cohort of approximately 20 seedlings were present in January 2022, which will be salvaged along with any others present at the time of translocation. Refer to the *Fontainea* sp. Coffs Harbour Management Plan for further detail.

2.2.2 Direct impact to supporting habitat

The Project is anticipated to result in the following direct impacts to the supporting habitat of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour:

- Direct impacts to the tall Brush Box (*Lophostemon confertus*) dominated forest with a well-developed rainforest mid-stratum, within which the individuals have been recorded and which provides suitable habitat for both *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.
- Direct impacts to the tall moist eucalypt forest (*Eucalyptus pilularis*, *Eucalyptus microcorys*, *Eucalyptus siderophloia*, *Eucalyptus grandis*, *Eucalyptus propinqua*, *Eucalyptus saligna*) with a rainforest understorey structure, which provides suitable habitat for *Pittosporum* sp. Coffs Harbour and may provide suitable habitat for *Fontainea* sp. Coffs Harbour.

With respect to the extent of suitable habitat being impacted by the Project, the USC has been engaged by TfNSW to develop a predictive model of suitable habitat for *Fontainea* sp. Coffs Harbour in the Coffs Harbour and Bellingen region (refer to Section 11.6 for details regarding the habitat modelling). The modelling will be used to further refine and locate areas of potential habitat for the species. The modelling will be used in conjunction with the knowledge and predictions of the Species Experts and botanists familiar with the habitat and distribution patterns of the local flora.

As *Pittosporum* sp. Coffs Harbour share similar habitat requirements with *Fontainea* sp. Coffs Harbour, the additional surveys are also likely to identify any additional *Pittosporum* sp. Coffs Harbour.

2.3 Indirect impacts to individuals retained *in-situ*

The Project has the potential to indirectly impact individual *Fontainea* sp. Coffs Harbour and patches of *Pittosporum* sp. Coffs Harbour which are located outside of the Project Footprint, but in close proximity (e.g. 2 m – 10 m) to the edge of the Project Footprint. These individuals and patches will be retained *in-situ* within the [redacted] Exclusion Zone.

The Project has the potential to result in the following indirect impacts to the retained *in-situ Fontainea* sp. Coffs Harbour and patches of *Pittosporum* sp. Coffs Harbour:

- The clearing of vegetation adjacent to retained individuals has the potential to alter micro-climactic conditions which would lead to:
  - Changes to plant life cycle processes including recruitment from seed, which was observed in the *Fontainea* sp. Coffs Harbour population at [redacted], where seedlings died out in the smaller patch of vegetation but have survived and established in the larger patch of vegetation at [redacted] Evidence of feral deer and horse are present at the [redacted] site. Hence the potential for these feral species to impact on the germination of the plant by grazing on the seedlings.
  - Individual plant stress and/or mortality, reduced health, and/or reduced reproduction.
- Increased weed intrusion into the vegetation communities (via edge effects) reducing the suitability of habitat for the threatened plants and which has the potential to lead to reduced plant health, reduced reproduction and/or individual tree mortality.
- Introducing cleared areas adjacent to the new highway has the potential to facilitate increased pest fauna movement in the locality which has the potential of increasing grazing on individual threatened plants and/or predation of seeds as well as introducing/spreading pathogens and disease.
- Increased dust accumulation on individual plants which has the potential to cause individual plant stress and/or mortality.

2.4 Summary of impacts to the currently known population

The flora surveys undertaken for the Project identified the following populations of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour:

- A total of 40 *Fontainea* sp. Coffs Harbour at two locations, comprised of:
  - one location with one mature adult
  - one location with one mature adult, two seedlings and 36 juvenile plants
- *Pittosporum* sp. Coffs Harbour
  - 67 discrete patches
  - 5,547 individual stems
  - At approximately 10 locations

Table 2 identifies the proportion of the currently known population of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour proposed to be impacted by the Project and does not include the seedlings which have died at the [redacted].

Table 2: Impacts to the currently known total population

Species		Total currently known population	Number of individuals/patches impacted	Percentage of currently known population impacted
Fontainea sp. Coffs Harbour (Two locations)	Adult	2	1	50%
	Seedling	2	0	0%
	Juveniles	36	0	0%
Pittosporum sp. Coffs Harbour (Approximately 10 locations)	Patches	67	10	15%
	Individual Stems	5,547	1,650	30%

As both of these species are newly described to science and surveys for both species only commenced in 2021, care should be taken in interpreting the results presented in Table 2, as this may over-estimate impacts to a poorly understood population. To assist with understanding the area of occupancy and extent of occurrence of these species, and to understand the total number of individuals within the population, USC has been engaged by TfNSW to undertake predicative habitat modelling (Section 11.6) which will inform future targeted surveys for the species (Section 11.7).

The calculations presented in Table 2 exclude the *Fontainea* sp. Coffs Harbour seedlings which recent surveys have identified are no longer present.

PART B – *PITTOSPORUM* SP. COFFS HARBOUR TRANSLOCATION PLAN

3 Translocation strategy

3.1 Translocation objectives

The overall translocation objective for *Pittosporum* sp. Coffs Harbour is to establish a viable and self-sustaining population to mitigate the impacts of the Project on this species.

More specific objectives include:

- To translocate and successfully re-establish impacted individuals within suitable Recipient Sites with vegetation, soil type and topography closely matching the impact site.
- To promote the long-term sustainability of the translocated population by enhancing population size through propagation and introduction of additional individuals.
- To promote long-term sustainability by undertaking habitat restoration.
- To retain individuals *in-situ* where possible and limit translocation to individuals directly impacted by construction.

The types of translocations most commonly used and those appropriate to the Project are discussed in the following sections.

3.2 Types of translocations

Translocation is defined as the "deliberate transfer of plants or regenerative plant material from one place to another, including existing or new sites or those where the taxon is now extinct" (Commander *et al*. 2018). Translocation is generally carried out in the following two main contexts (Falk *et al*. 1996, Commander *et al*. 2018):

- **Conservation purposes** – being a research or conservation measure to assist in the recovery of threatened or rare species.
- **Developmental translocation** – being a mitigation measure to ameliorate the adverse impact of a development activity.

Translocation in both these contexts has the same general conservation purpose, which is to avoid losing populations of threatened species and decreasing the risk of population extinction (Pavlik 1996). Both types of translocation contexts are proposed for the Project.

Under Developmental translocation, the following three types of translocations are described:

- **Salvage translocation:**
  - The translocation of mature plants to an area not affected by a development. Also referred to as transplantation or rescue dig. Transplanting is usually combined with propagation when aiming to

achieve a self-sustaining population by increasing the initial number of individuals. In some instances, transplanting may be the only available translocation method, as appears to be the case for the *Pittosporum* sp. Coffs Harbour.
    - Salvage translocation is proposed as part of this Project.
- **Ameliorative(population) enhancement:**
    - An attempt to increase population size by adding propagated individuals to an existing population to ameliorate the loss of part of that population due to development.
    - Ameliorative enhancement is proposed as part of this Project.
- **Compensatory introduction:**
    - The establishment of a population to compensate for the impact of a development. In the majority of cases such translocations will meet the definition of introduction as described above.
    - Compensatory introduction is proposed as part of this Project.

The translocation proposed for the Project involves the following three complementary types of translocations:

- **Salvage translocation:**
    - This aims to save and re-establish individuals directly impacted by the Project.
- **Population enhancement**
    - This aims to improve the prospective viability of translocated and *in-situ* populations by propagating the impacted species and introducing additional individuals to the population.
- **Research initiative**
    - This aims to increase understanding of species ecology and the underlying genetic factors.

The three approaches are described in the following sections and are consistent with Commander *et al*. (2018), which recommends that salvage translocations are combined with population enhancement to improve translocation outcomes. Additionally, the proposed Research Initiatives will increase the understanding of both of the newly described species.

3.3 General approach

The following strategies are proposed to translocate the *Pittosporum* sp. Coffs Harbour:

- Salvage translocation of discrete patches of *Pittosporum* sp. Coffs Harbour located along [redacted].
- Propagation of *Pittosporum* sp. Coffs Harbour individuals from locally collected seed (where available).

- Propagation of *Pittosporum* sp. Coffs Harbour from cuttings.
- A research initiative to increase the currently limited understanding of *Pittosporum* sp. Coffs Harbour.

A summary of the translocation strategies for *Pittosporum* sp. Coffs Harbour is provided in Table 3.

Table 3: Summary of salvaged and propagated *Pittosporum* sp. Coffs Harbour proposed to be translocated

	***Pittosporum* sp. Coffs Harbour**
No. of plants to be salvaged	10 patches / 1,650 individual stems
No. of plants to be propagated	500
No. of plants to be planted	250
No. of Recipient Sites	4
Research into propagation	Yes

The salvage translocation and propagation are further discussed in the following sections.

3.4 Salvage translocation of impacted individuals

All discrete clumps of *Pittosporum* sp. Coffs Harbour within the Project Footprint are to be salvaged using mostly manual excavation. The option to use slab removal with a bobcat or similar machine was assessed; however, was considered likely to cause significant soil disturbance and damage to the root system.

In this regard, small clumps of stems (e.g. 50 cm x 50 cm) are to be dug out by hand, placed in transportation trays/tubs, and taken directly to the Recipient Site for planting. Further details of the translocation methods and actions are provided in Section 5.3.

3.5 Propagation trial

An interim management strategy was developed following the identification of the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour. The strategy identified that propagation trials would be beneficial in informing a translocation management plan, as the success of propagation (of the two novel species) has implications regarding the success of the translocation efforts. In this regard, a small-scale informal propagation trial was carried out by Ecos Environmental in 2021.

With regard to *Pittosporum* sp. Coffs Harbour, the cuttings were collected by Ecos Environmental on 22 June 2021 and delivered to the following two

nurseries, both of which specialise in cutting propagation of native rainforest plants:

- Cutting Edge Nursery received 53 *Pittosporum* sp. Coffs Harbour
- Limpinwood Gardens received 51 *Pittosporum* sp. Coffs Harbour.

The cuttings of *Pittosporum* sp. Coffs Harbour for the propagation trial were taken from three patches at [redacted]. The cuttings all failed to strike at both nurseries; however, 15 cuttings have retained their leaves and have callused indicating they may produce roots. These preliminary results indicate that *Pittosporum* sp. Coffs Harbour will likely be difficult to propagate in large numbers from cuttings.

The cuttings which were used in the propagation trial were collected in winter and from mature stems, which is not ideal. To maximise the potential success rate, cuttings should be taken from new shoot growth in the warmer months. However, this species has been observed to be a slow growing species that produces minimal new shoot growth throughout the year.

Propagation of *Pittosporum* sp. Coffs Harbour from seed is likely to be impractical as very few fruits have been observed to be produced. As such no propagation trial using seeds has been progressed.

3.6 Propagation proposal

A total of 500 *Pittosporum* sp. Coffs Harbour individuals are proposed to be propagated via cuttings and seed collection (where available). The propagative material will be selected from patches within the know population which will yield the most genetic diversity and will be informed by the results of the genetic analysis currently being undertaken (refer to Section 3.9).

During the collection of propagative material, the secateurs used to collect cuttings must be thoroughly sterilised before use on each plant. Transfer of viral pathogens with secateurs and other pruning tools is a significant risk to wild and translocated populations.

All propagated *Pittosporum* sp. Coffs Harbour plants are to be labelled with the parent donor unique identifier code to ensure that the propagated plants are allocated to the correct Recipient Sites (each Recipient Site will aim to support a population of plants which captures the range of genetic variability with the aim of enhancing genetic variability). Materials used for labelling should be durable and of high quality to avoid degradation over time.

All propagated plants will be propagated by the Pittosporum Expert and/or a suitably qualified and appropriately experienced native plant nursery with direct experience in native and threatened plant propagation. The propagated plants are to be held until the plants have reached “super tube” size (unless otherwise agreed between BCD and the Species Expert) to ensure appropriate root development and health of the plant for planting. The length of time the plants are held in the nursery is at the discretion of the Pittosporum Expert, the nursery, the Revegetation Contractor, and TfNSW. Propagative material is to be collected prior to translocation.

Where the native plant nursery is located outside of the Coffs Harbour area, the plants will be well hardened off to local conditions prior to planting.

As the propagation success rate of *Pittosporum sp. Coffs Harbour* appears from the propagation trial to be low, a Propagation Strategy (or similar) will be developed to investigate various propagation strategies and methods. The propagation trial will be developed by the Pittosporum Expert and/or a suitably qualified and appropriately experienced native plant nursery in consultation with TfNSW. The propagation trial will aim to establish the propagation technique which yields the greatest number of successfully propagated individuals.

Whilst a total of 500 individuals are proposed to be propagated, given the uncertainty surrounding the propagation and strike rate, the propagation effort will aim to produce 250 individuals for potting on and planting within the Recipient Sites.

In the event more than 250 individuals are successfully propagated, all additional individuals will be potted on and either:

- Planted within the Recipient Sites
- Retained at the nursery to be used for replacement planting (should propagated plants fail to establish in the Recipient Sites and additional plants are required to be re-installed (refer to Section 6.6 and Section 7.6))
- Used in a combination of the above.

In the event *Pittosporum* sp. Coffs Harbour is unable to be successfully propagated, TfNSW will publish the propagation techniques/methodology employed and success rates which will aid in the future management of the species.

3.7 Translocation feasibility

Salvage translocation appears to be feasible for *Pittosporum* sp. Coffs Harbour. A small scale, informal salvage translocation trial by Ecos Environmental early in 2021 was undertaken, which examined the root system of the plants, which were dug up and placed in pots. All of these plants have survived to date, indicating that they are resilient to disturbance. However, how the discrete patches will respond to the salvage translocation is currently unknown. As with any translocation, there is uncertainty regarding the long-term health of the translocated individuals.

The current success rate of propagation of *Pittosporum* sp. Coffs Harbour from cuttings is very low with only a limited small-scale trial progressed with mature cuttings collected in winter. Propagation from seed is not practical as this species produces very few fruits. However, propagation of other species of *Pittosporum*, including *Pittosporum undulatum, Pittosporum revolutum, Pittosporum angustifolium, Pittosporum multiflorum* have been successful from cuttings and seed collection which indicates that the *Pittosporum* genus responds well to propagation.

3.8 Translocation benefits and risks

3.8.1 Salvage translocation and propagation benefits

The combination of salvage translocation and propagation of *Pittosporum* sp. Coffs Harbour is anticipated to have the following benefits:

- A no-net loss and, where possible, net gain of *Pittosporum* sp. Coffs Harbour as a result of the Project.
- Plants that would have been lost to clearing are rescued by carrying out salvage translocation.
- The translocation program provides opportunities for increasing the understanding of the ecology and genetics.
- Increased knowledge of the species and experience gained with translocation methods will assist future conservation efforts.
- The propagation and planting of additional individuals will increase the local population size, mitigate against species' decline, and assist with the conservation of the species.
- A greater species-wide resilience given the planting of additional individuals in various locations reduces the potential of a localised stochastic event impacting all individuals and causing species decline and/or extinction.

3.8.2 Salvage translocation and propagation risks

The overarching risks associated with salvage translocation and propagation is that the translocated and propagated individuals fail to establish over the short or long-term.

Specific risks to the salvage translocated and propagated individuals include the following:

- Mortality of salvaged individuals during the translocation process.
- Salvage translocated individuals fail to establish at the Recipient Sites.
- Propagation is not successful.
- Propagated plants fail to establish at the Recipient Sites.
- Weeds becoming established or dominant at the Recipient Sites and outcompeting the planted individuals, causing the death or reduced growth of the planted individuals.
- Due to the uniqueness of the species, there is a risk the individuals are poached from the Recipient Sites.
- Drought and bushfire have the potential to impact the Recipient Site and cause individual tree or vegetation community mortality.
- A flood event has the potential to affect the Recipient Sites and cause individual or vegetation community mortality.

- A localised insect outbreak in the Planting Areas and Exclusion Zone has the potential to reduce plant growth and/or cause plant mortality via complete or partial plant defoliation or plant stress.
- The health of the planted treatments may be influenced by various phytopathogens which could cause reduced growth, plant stress, and/or plant mortality on an individual or community level.

Mitigation measures proposed to reduce these risks are provided in Section 8.2.

3.9 Research initiatives

Translocation of *Pittosporum* sp. Coffs Harbour provides an opportunity to conduct research on the population ecology and genetics of the plant species, and to acquire more knowledge and experience with the application of translocation methods. This information is likely to be of equal use in a conservation or species recovery translocation context as in the current mitigative context.

A Stage 2 genetic analysis has been undertaken by the Royal Botanic Garden Sydney for *Pittosporum* sp. Coffs Harbour. This detailed genetic study of *Pittosporum* sp. Coffs Harbour was identified as being beneficial due to the clonality and low recruitment detected by the preliminary analysis which implied that this species may be more threatened than suggested by stem counts alone, and that management actions will need to rely on an understanding of genetic diversity species wide. In this regard, a more thorough distribution-wide genetic study was suggested by the Royal Botanic Garden Sydney to provide additional information and guidance on long-term recovery efforts on *Pittosporum* sp. Coffs Harbour. The Stage 2 genetic studies commenced in December 2021 with the collection of 282 samples from known locations and patches, this included all 22 patches within the Project Boundary.

The aims of the Stage 2 genetic studies Research Initiative are to investigate the following:

1. What is the extent of genetic diversity at all known patches of *Pittosporum* sp. Coffs Harbour? Sampling should include sites that were not previously sampled in the Stage 1 study, i.e., other sites within and surrounding [redacted] area.
2. What is the extent of clonality within each patch? In addition to studying the new sites, previously sampled patches that are to be salvage translocated will be sampled more intensively.
3. Are sites/patches that produce fruit less clonal, and are the patches generally smaller in size/area? Patches where fruit have been observed are proposed to be sampled more intensively to determine genetic variability.
4. Which, and what proportion of, genets are needed in future translocation events to maximize genetic diversity?

The findings of the Stage 2 genetic studies will be used to help guide the translocation of salvaged and propagated *Pittosporum sp.* Coffs Harbour.

An additional Research Initiative is proposed as part of the salvage translocation program an includes the following:

- The salvaged and propagated individuals are planted at the Recipient Site such that genetic diversity is maximised in an attempt to stimulate cross-pollination and seed production.
- The integrity of clonal patches to be salvage translocated will be kept intact during translocation with a minimum of 50% of the stems in a patch to be retained as a discrete patch

Additional Research Initiatives are detailed in Section 11.

4 Pre-translocation assessment

4.1 Species ecology

Pittosporum sp. Coffs Harbour has been observed to be present across approximately 4 km² at the eastern end of the Kororo Range where the Coffs Harbour and Kororo Basins meet near the coast. *Pittosporum* sp. Coffs Harbour occurs in discrete patches of stems ranging from 0.8 m to 1.2 m high with patches varying from 2 m – 6 m wide. The stems grow as suckers from the root system, which is a form of vegetative reproduction. Several stems were excavated and found to be growing from horizontal, rhizome-like roots 5 cm – 10 cm underground. The patches of stems therefore appear to be clones. A few single, isolated plants were also recorded which may represent recruitment from dispersed seed.

Preliminary genetic analysis found that most patches consist of one or a few identical clones. The largest patch of over 500 stems appears to consist of a single clone of genetically identical stems. The overall number of genetic individuals or genets is very low as most of the stems represent ramets or vegetative offshoots. Genetic diversity overall is very low, and the species strongly inbred, which may account for the lack of seed production (see below).

The majority of the plants were identified in the Brush Box – rainforest remnant vegetation community along [redacted] where 22 discrete patches were recorded within the Project Boundary over a distance of approximately 300 m. The number of stems per patch at this location varied from 4 to 580 with a total count of 3,420 stems within the Project Boundary. Elsewhere there was some extension into Eucalyptus dominated wet sclerophyll forest in slightly more upslope and less protected habitat.

During site visits undertaken between January and June 2021, a small number of fruits of the *Pittosporum* sp. Coffs Harbour were recorded only in April. There were approximately 15 fruits observed in two patches at [redacted]. Flowers of the *Pittosporum* sp. Coffs Harbour were first recorded in August and were assessed as common on plants, but not in great abundance. A survey of the number of fruits forming was carried out in December 2021, inspecting nearly all know patches. Approximately the same number of fruits were recorded in December 2021 as in the previous April 2020 and were only observed in the same patches.

When the fruit opens, seeds with a red fleshy aril are displayed on a bright yellow background formed by the inside of the open fruit valves. This is a known bird attracting strategy, indicating the seeds are adapted for bird dispersal.

The habitat indicators for *Pittosporum* sp. Coffs Harbour include the following:

- A tall (>30 m) Brush Box and/or *Eucalyptus* spp. dominated canopy (e.g. *E. pilularis, E. microcorys, E. grandis, E. propinqua, E. siderophloia*).
- An understorey dominated by a moderate to high diversity of rainforest species.

- An undisturbed ground layer which supports native species including ferns (e.g. *Blechnum indicum*, *Doodia aspera*, *Doodia caudata*, *Adiantum spp.* and/or *Lastreopsis spp.*), sedges (e.g. *Cyperus filipes*), herbs and grasses.
- Southerly aspect (South-East to South-West).
- Variable slope potions including lower, mid and top of slope topographic position in hilly terrain.
- 1 km – 3 km from the coast.

4.2 Description of the impact site

4.2.1 Vegetation

[redacted]

The Brush Box – rainforest community was observed to be dominated by mature Brush Box (*Lophostemon confertus*) to 30 m – 40 m high with occasional Tallowwood (*Eucalyptus microcorys*), Pink Bloodwood (*Corymbia intermedia*), Blackbutt (*Eucalyptus pilularis*) and Flooded Gum (*Eucalyptus grandis*). The understorey was dominated by small to medium sized rainforest trees 5 m – 15 m high, including Red Bean (*Dysoxylum mollissimum*), Murrogun (*Cryptocarya microneura*), Forest Maple (*Cryptocarya rigida*), Blue-berry Ash (*Elaeocarpus reticulatus*), Domatia Tree (*Endiandra discolor*), Scentless Rosewood (*Synoum glandulosum*), Rusty Plum (*Niemeyera whitei*), Bangalow Palm (*Archontophoenix cunninghamiana*), and Strangler Fig (*Ficus watkinsiana*). Vines, herbs and ferns were typically observed in the ground layer.

The Brush Box – rainforest community occurs locally in narrow zones along drainage lines and gullies and can be broadly classed as a type of wet sclerophyll forest, transitional between wet sclerophyll dominated by *Eucalyptus* and subtropical rainforest.

4.2.2 Geology, soils, and topography

[redacted]

The soil is a medium fertility, red-yellow clay podzol formed on metasediment. Soil characteristics vary depending on the underlying geology of the area and the geomorphological processes to which they have been exposed. The Coffs Harbour 1:100,000 scale Soil Landscape Sheet and Report (Milford 1999) indicates the soils at the impact sites consist of well drained and strongly acidic structured red and brown earths.

4.2.3 Hydrology

[redacted]

4.3 Translocation Recipient Sites

There are currently four Recipient Sites nominated to receive the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour. The Recipient Sites were selected primarily based on matching habitat in terms of topography, soil/geology and vegetation, and suitability of tenure for long-term conservation management.

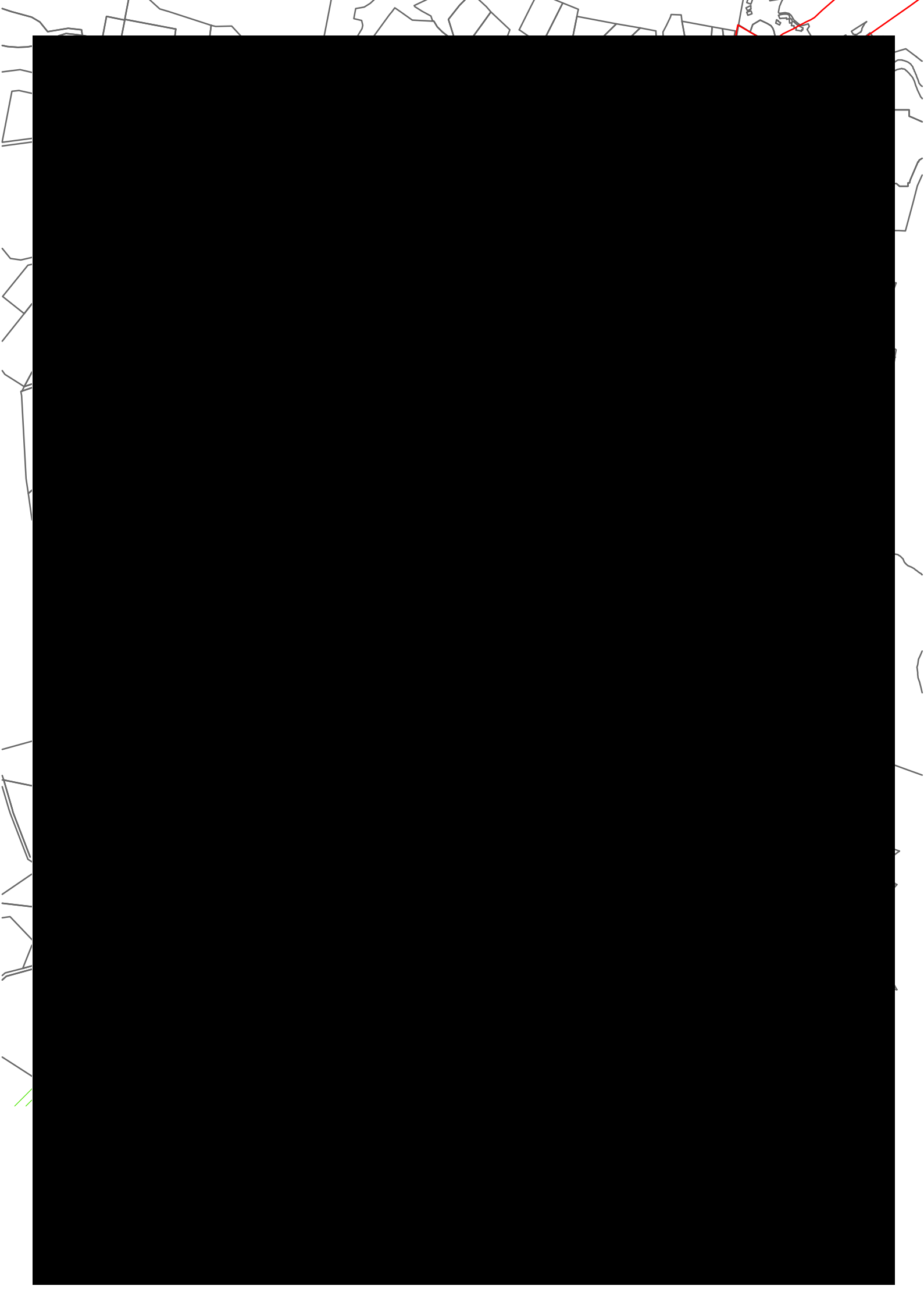
The Recipient Sites are as follows:

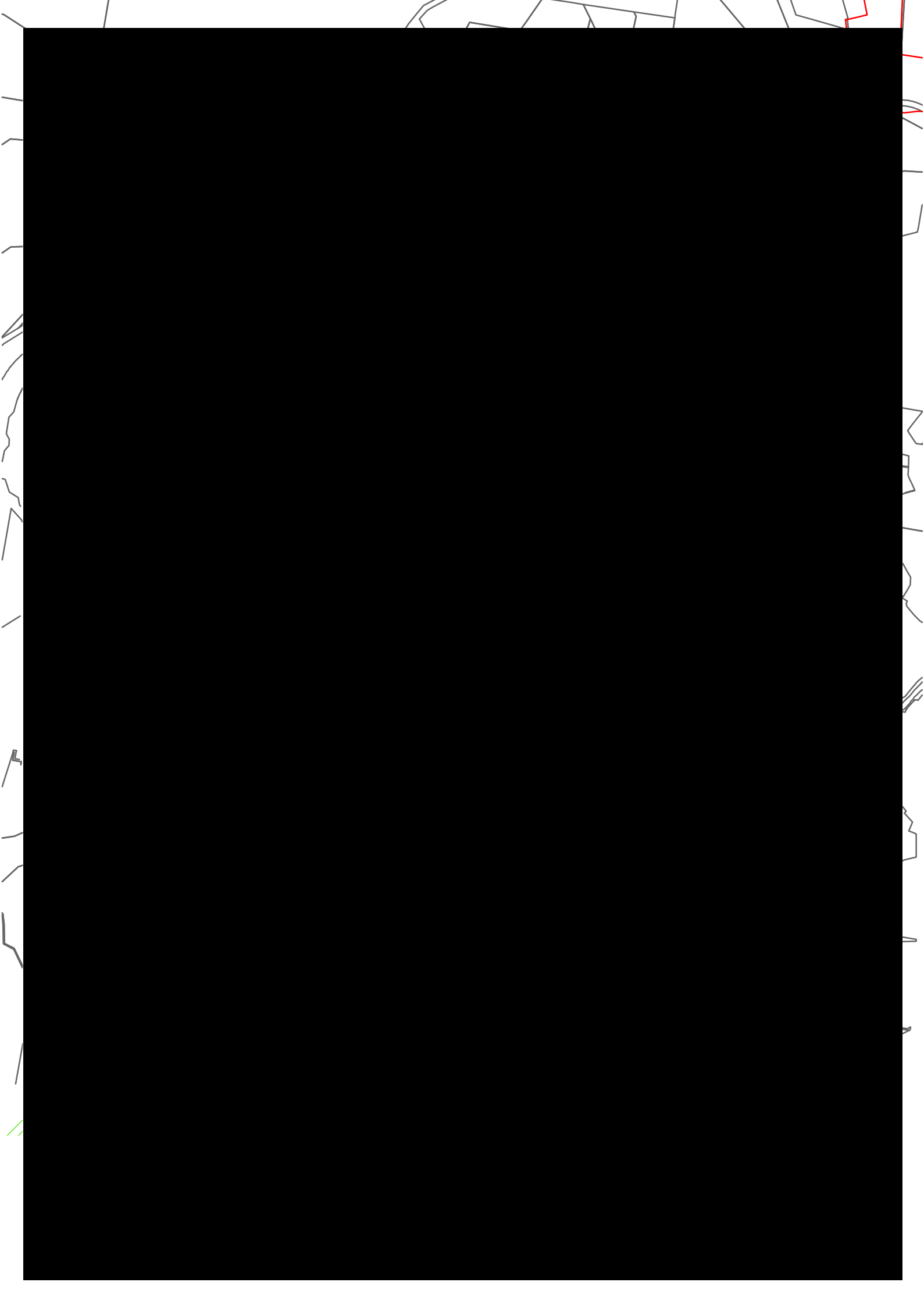
- [redacted]
- [redacted]
- [redacted]
- [redacted]

The Recipient Sites are described in the following sections, shown on Figure 4, and a summary of the number of individuals to be salvage translocated and propagated within each Recipient Site is provided in Section 4.4.

The Recipient Sites will also include translocated and propagated individuals of *Fontainea* sp. Coffs Harbour. Further information is provided in the *Fontainea* sp. Coffs Harbour Management Plan.

A detailed description of each site is provided in Appendix B.





In the event addition Recipient Site are required, additional sites will be selected by the Species Experts and TfNSW based on their suitability for *Pittosporum* sp. Coffs Harbour and in consultation with Department of Planning, Industry and Environment's Environment, Energy and Science Group.

Propagated material will also be provided to and the Australian Botanic Garden Mount Annan for *ex-situ* conservation as well as appropriate distribution of Pittosporum plants to the Australian Botanic Garden's network of Botanical Gardens across eastern NSW. These include for example Lismore Rainforest Botanic Gardens, Hunter Region Botanic Gardens and the North Coast Botanical Gardens, Coffs Harbour (refer to Section 11.3).

[redacted]

[redacted]

4.4 Summary of Recipient Sites

Table 4 provides a summary of the Recipient Sites and the total number of *Pittosporum* sp. Coffs Harbour proposed for each site. The total number of *Pittosporum* sp. Coffs Harbour is based on a total of 250 propagated individuals. As described in Section 3.6, where the propagation effort is successful in propagating more than 250 of either species, additional individuals may be allocated to Recipient Sites based on the recommendations of the Revegetation Contractor and the Species Expert.

Table 4: Summary of the Recipient Sites and preliminary numbers of *Pittosporum* sp. Coffs Harbour proposed for each site

Recipient Site Name	***Pittosporum* sp. Coffs Harbour**	
	Salvage Translocation	**Propagation Planting**
[redacted]	4 discrete patches	-
[redacted]	3 discrete patches	125 propagated plants
[redacted]	3 discrete patches	-
[redacted]	-	125 propagated plants

The exact number of salvaged and propagated *Pittosporum* sp. Coffs Harbour to be planted at each Recipient Site will be determined following genetic analysis, which will distribute the salvaged and propagated plants such that genetic diversity at each Recipient Site is maximised.

5 Translocation actions – Installation of salvaged and propagated plants

5.1 General

This section details the following management measures:

- Requirements for each plant nominated for translocation to have a unique identifier code
- Preparation of the Recipient Sites and Planting Areas
- Planting the salvaged individual
- Planting the propagated individuals
- Mulching requirements
- Reporting requirements
- Completion of planting requirements

A schedule of works and responsibilities for all translocation actions is provided in Section 8.3.

A number of other translocation activities are proposed as part of the project, including those for *Fontainea* sp. Coffs Harbour, rusty plum (*Niemeyera white*) and slender marsdenia (*Marsdenia longiloba*). Prior to commencing any work associated with this plan, the Revegetation Contactor will review the associated management plans and translocations proposals for other species to ensure any works carried out by the Revegetation Contractor are not inconsistent with the other management plans and translocations proposals.

5.1.1 Unique identifier code

Prior to transplanting any plants, all plants nominated for transplanting are to be tagged with a unique identifier code to allow for each individual plant and/or discrete patch/clump to be tracked during the translocation process. The patches/clumps removed will be planted in a linear-grid pattern, enabling each patch/clump to be readily tracked during monitoring.

A figure is to be created which identifies each plant's unique identifier code to show the original spatial distribution of the plants and the proposed planting location within the Receiving Sites.

5.1.2 Soil sampling and comparative analysis

Prior to translocation, soil samples are to be collected and soil profiles recorded from the impact sites and Recipient Sites for analysis to allow the soil properties (including soil chemistry, texture and soil profile) each site to be compared. The following soil properties (as a minimum) are to be analysed:

- Nutrients

- Organic material
- pH
- Soil horizons and depth of each horizon (i.e. the soil profile)
- Soil type classification
- Soil profile
- Soil toxicity
- Any other indicators that are likely to impact revegetation

The identification of the above will enable a more detailed analysis of the equivalence of soil conditions (i.e. matching habitat) at the impact sites and Recipient Sites in addition to determining any soil amelioration requirements.

5.1.3 Pre-translocation and propagation planting report

A report is to be prepared by the Revegetation Contractor and provided to TfNSW for approval prior translocation and planting of the propagated plants. The report is to include information on how the Revegetation Contractor will meet the requirements of Section 5.2, Section 5.3, and Section 5.4 of this management plan.

The pre-translocation and propagation planting report must be informed by the Stage 2 genetic analysis undertaken by Royal Botanic Garden Sydney (refer to Section 3.9).

5.2 Preparation of the Recipient Sites

5.2.1 Timing of translocation/planting

The Revegetation Contractor, in consultation with TfNSW and Species Expert, is to determine the most appropriate time of year for transplanting the impacted *Pittosporum* sp. Coffs Harbour patches at [redacted].

The following requirements are to be followed when to planting of the propagated individuals:

- Planting must be staggered across several weeks and undertaken in consideration of seasonal rainfall patterns with planting to occur in the wetter months of the year or in autumn when soil moisture is high.
- Planting must be avoided when there is a risk of flooding.
- Planting must be avoided in the colder and drier month of the year, particularly when there is a risk of frost.
- Planting must allow for a few months of warm, moist conditions before the onset of cold, dry, and windy conditions in winter-spring.

5.2.2 Surveying and pegging of the Planting Areas

The Planting Areas within each Recipient Site, and the entirety of the Exclusion Zone are to be surveyed (by a surveyor) with each vertex of the Planting Areas and Exclusion Zone pegged. Each vertex/peg shall be marked to be clearly visible in order to allow for ease of visibility when preparing the Planting Areas and Exclusion Zone, and when undertaking future works and/or monitoring.

5.2.3 Weed control measures

Prior to the commencement of planting, the Revegetation Contractor is required to undertake a weed survey within the Planting Areas and within the entirety of the Exclusion Zone. All weeds that have the potential to impact the translocated, propagated, and *in-situ* threatened plants are required to be removed/treated. Weed control adjacent to any threatened plant is to be undertaken manually and no herbicide is to be used within 2 m of a threatened plant. All weed management works shall be conducted by suitably qualified and appropriately experienced Revegetation Contractors proficient in both native and weed species identification.

A period of two to three weeks is typically required between herbicide application and planting. Only herbicides suitable for application adjacent to waterways (as detailed on the manufacturer's specifications) are to be used. Only frog friendly herbicides are permitted to be used and herbicides are not to be used within 10 m of the high banks of waterways and drainage lines which discharge directly into waterways.

To minimise incidental poisoning of native species, the Revegetation Contractor will walk over the treatment area and mark all small native juveniles and seedlings to minimize spray contact. Herbicide sprays should not be applied on days of forecasted rainfall or in windy conditions. Herbicide application is not to impact on soil quality.

All weed control works are to be conducted using best practise techniques. Where herbicides are used, the handling and application of herbicides shall:

- Only be carried out by a licensed Revegetation Contractor who possesses qualifications and licences relevant to the products being applied.
- Be in accordance with relevant legislation and policies.
- Be in accordance with the manufacturer's instructions.
- Be applied with biodegradable, non-toxic tracer dye to highlight areas sprayed.

The Revegetation Contractor shall maintain records of all herbicide application including type, dates and volumes sprayed, and areas where applied (noting that herbicides are not to be used within 2 m of any threatened plant).

To minimise the potential to introduce and/or spread weeds and myrtle rust to the Planting Areas, the following weed hygiene strategies are required:

- All vehicles and machinery are to be weed free and cleaned prior to commencing work within the Recipient Sites.
- All clothing, shoes and other equipment are to be cleaned regularly between activities, especially when leaving an area known to support high priority weeds and entering the Recipient Sites.
- All soil, gravel or fill imported into the Recipient Sites is to be declared weed free.
- Training and inductions detailing the importance of weed control are to be provided for contractors and workers.
- All staff are required to be trained in the identification of myrtle rust.

5.2.4 Plant set-out locations

The Revegetation Contractor shall determine the locations and extent of the following within the Recipient Sites (as relevant to the Planting Areas and Exclusion Zone) prior to setting-out plants:

- Existing (*in-situ*) and proposed translocated threatened plants
- Services
- Services easements
- Overhead powerlines
- Roads/tracks
- Allotment boundaries
- Flooding levels
- Planting Areas of other translocated or propagated species

Planting Areas will be set out so as not to limit the ability of planting additional areas in the future (i.e. access to all areas of the Recipient Sites shall be maintained) and no translocated and/or propagated plants are to be located within 5 m of any allotment boundary.

The following is to be undertaken (under the direction of the Species Expert) to maintain genetic integrity and enhance genetic diversity of the local population:

- The number of propagated plants introduced from any one *Pittosporum* sp. Coffs Harbour patch/individual will be limited to a maximum of 20% of the total number of propagated plants at each Recipient Site (i.e. no more than 20% of the total number of planted *Pittosporum* sp. Coffs Harbour at any one Recipient Site will be from the same parent plant).
- Plants propagated from the same parent plant are not to be planted adjacent to each other (where possible).
- Translocated and planted individuals are to be clustered together within the Recipient Sites to increase the likelihood of crosspollination.

Within the Planting Areas of the Recipient Sites, the Revegetation Contractor shall:

- Identify the location where all plants/clumps/slabs are to be planted and label the locations with the unique identifying number of each plant or clump/slab that is to be planted at the location. Materials used for labelling should be durable and of high quality to avoid degradation over time.
- The planting locations for propagated plants are to be set out at 2 m centres; however, are able to be adjusted, as required, in accordance with on-ground vegetation and micro-habitat features.
- The planting hole should be excavated the day before the salvage translocation, and when there is minimal chance of rain, and following all weed control.
- At the salvage planting sites, the planting holes are to be excavated progressively as the *Pittosporum* sp. Coffs Harbour patches are delivered to the Recipient Site. This will likely involve a team of people excavating the planting holes concurrent to a team excavating the salvaged individuals.
- Identify areas where the salvaged topsoil from the impact site (which may contain *Pittosporum* sp. Coffs Harbour seeds in the seed bank) is able to be spread out.

5.2.5 Fencing and signage

Following the salvage translocation, a temporary star picket fence (without barbed wire) will be placed along the length of the Exclusion Zone to assist with protecting the area and define the limits of the Exclusion Zone.

During the Construction Phase of the Project, high visibility temporary exclusion fencing (which will be in addition the temporary star picket fence described above) is required to be placed along the Project Boundary and the Exclusion Zone to protect the retained vegetation from incidental clearing during the Construction Phase (refer to Section 9.4).

Following completion of construction, a permanent fence (without barbed wire) is to be installed along the road-side boundary of the Exclusion Zone.

Signs are to be hung from the temporary and permanent fence indicating the vegetation as an ‘Environmental Protection Area’ (or similar) which contains high biodiversity significance and that unauthorised entry and/or clearing of vegetation within the area is strictly prohibited.

5.3 Planting of salvaged patches/clumps

The salvage transplanting of *Pittosporum* sp. Coffs Harbour is to be undertaken by a suitably qualified and appropriately experienced Revegetation Contractor.

Prior to the salvage translocation, the Revegetation Contactor is required to confirm with TfNSW that all propagative material has been collected prior to the salvage translocation being undertaken.

The salvage translocation is to be undertaken as follows:

- Prior to translocation, an exploratory dig will be carried out to determine the characteristics of the root system (including the depth and form of the root system), which will then inform suitable excavation techniques/methods.
- All clumps/slabs are to be thoroughly watered for 2 – 3 days prior to the salvage excavation. The watering requirement will be reduced in the event of heavy rainfall.
- Where required, access to the site will be cleared and surrounding trees removed to create space to work.
- Clumps and slabs will be dug manually ensuring that sufficient depth and width of soil is dug to minimise impacts to the root system. The clumps/slabs are to be placed in tubs or trays for transportation.
- Prior to translocation, soil around the base of the clumps/slabs is to be recovered and used at the Recipient Sites to assist habitat restoration by utilising any soil seedbank present in the topsoil. This will be spread around the site or used as part of revegetation works on the day of translocation.
- The clumps/slabs are to be kept moist by watering, covering with wet newspaper (or similar) and covered with a tarpaulin during transport.
- The clumps/slabs are to be planted at the Recipient Site on the same day as excavation.
- The clumps/slabs are to be gently placed in the pre-excavated holes such that impacts to the root system are minimised.
- Where required, the planting holes at the Recipient Site will be carefully backfilled with a shovel or similar so there are no large air cavities.
- Once the clumps/slabs have been planted and soil is backfilled, additional watering (so the soil around the clumps/slabs is saturated) is to be undertaken.
- Following completion of planting, the perimeter of each clump/slab is to be surveyed by a surveyor to confirm the location and extent/area of each clump/slab.

5.4 Planting of propagated individuals

The planting of all propagated plants is to be undertaken by a suitably qualified and appropriately experience Revegetation Contractor with input from the Species Expert, as follows:

- Prior to installing the plants, the planting points shall be set out in accordance with Section 5.2.4.
- Prior to installing the plants, all plants shall be inspected for any signs of pathogen and/or viral infection.
- All plants shall be:
    - ”Super tube” size (unless otherwise agreed between BCD and the Species Expert) and well hardened off with no signs of disease.

- Identified with a unique identifier code.
- Thoroughly watered 1 – 2 hours prior to planting.
- Planted with 12-month controlled/slow-release organic fertiliser for native plants (as deemed required by the Revegetation Contractor).
- Watered, on the day of installation, with a solution of water and seaweed solution, and wetting agent (as deemed required by the Revegetation Contractor) until the topsoil layer is moist. Watering shall be applied in multiple applications to ensure surface erosion does not occur.

- Planting holes are to be dug at an appropriate depth (e.g. four times the pot size).
- The soil around each planted plant is to be compacted by hand to remove large air pockets and ensure plant stem is straight and not damaged.
- A minimum of 20 mm of weed free grass/hay mulch is to be applied to the base of the plants.

5.5 Tree guards

Tree guards (or similar, including chicken wire) are to be installed around each plant and are to be 1.2 m high with a hardwood stake(s).

5.6 Mulching

Where mulch is deemed to be required by the Revegetation Contractor, the mulch shall be a grass or hay mulch, weed free, and installed as follows:

- Within one day of the completion of planting.
- Spread to 20 mm depth and is to be installed at the base of plants identified as requiring mulch.

5.7 Installation of salvaged and propagated plants reporting requirements

A report is to be prepared by the Revegetation Contractor for the Planting Areas and the entirety of the Exclusion Zone and is to be submitted to TfNSW following:

- The completion of the salvage translocations.
- Upon completion of planting the propagated plants.

The report shall include, as a minimum, the following:

- Dates of site inspections and works.
- Works undertaken to prepare the Recipient Sites.
- All weeds identified within the Planting Areas and within the entirety of the Exclusion Zone and method of treatment.

- Weed, pest and disease management measures undertaken within the Planting Areas and within the entirety of the Exclusion Zone.
- Description of salvage translocation and propagated planting works undertaken.
- Issues encountered during the salvage translocations and propagated planting and actions undertaken and / or required to remedy the issues.
- Watering application dates and volumes.
- Damage to plants during salvage translocation and propagated planting and actions undertaken and / or required to remedy the damage.
- Any proposed adaptive management measures (to be identified and developed by the Revegetation Contractor if required).
- Recommendations for additional/further works required.

This report is required to include a figure showing:

- Upon completion of the salvage translocation – the original location of the salvage translocated patches/clumps (with unique identifier code) and the translocated location (with unique identifier code).
- Upon completion of the propagation planting – the planting location of the propagated plants and their unique identifier code.

5.8 Completion of planting

The installation of salvaged and propagated plants shall be deemed completed when the Planting Areas and Exclusion Zone have met the following completion criteria:

- The Planting Areas and the entirety of the Exclusion Zone has been surveyed and each vertex has been pegged to be highly visible.
- All weeds have been treated and are not hindering (or likely to hinder) the growth rates of the plants.
- For salvage translocation, translocation has been undertaken in accordance with Section 5.3.
- For propagated plants, the required number of plants have been planted in accordance with Section 5.2.4.
- For propagated plants, the planted individuals:
    - Show no signs of nutrient deficiency.
    - Show no signs of water deficiency.
    - Show no signs of pest impacts.
    - Have been treated appropriately where there is a risk of disease.
    - Are established and well formed, showing evidence of growth typical of the species.
    - Have a 20 mm mulch depth (as applicable).

Upon completion of the salvage translocation and/or the planting of all propagated individuals, the Planting Areas and Exclusion Zone shall be inspected by TfNSW and/or their representative.

Where TfNSW and/or their representative deem the salvage translocation and/or planting to be compliant with the completion criteria, a Certificate of the Commencement of the Initial Maintenance Period will be issued to the Revegetation Contractor by TfNSW.

6 Post-translocation actions – Initial Maintenance Period

6.1 General

The Initial Maintenance Period shall commence when the installation of salvaged patches/clumps and propagated plants is deemed compliant, and a Certificate of Commencement of the Initial Maintenance Period has been issued by TfNSW.

The Initial Maintenance Period shall be a minimum of 180 days. During the Initial Maintenance Period, the Revegetation Contractor shall care for the salvaged and propagated plants to ensure their long-term viability and to meet the completion criteria detailed in Section 6.9.

The following sections detail the works required as part of the Initial Maintenance Period.

6.2 Initial Maintenance Period monitoring schedule

The Revegetation Contractor, with advice provided by the Species Expert, is to prepare a monitoring schedule of works for the duration of the Initial Maintenance Period, which is required to be approved by TfNSW. The monitoring schedule and requirements are to be developed to be consistent with any requirements of a BSA and the Biodiversity Conservation Trust.

The monitoring schedule shall be developed to allow, as a minimum, the following:

- Identification of watering requirements to satisfy Section 6.3.
- Identification of fertiliser and soil ameliorant requirements to satisfy Section 6.4.
- Identification of weed, pest and disease control requirements to satisfy Section 6.5.
- Identification of repairing or re-installing of failed treatments requirements to satisfy Section 6.6.
- Identification of mulching requirements to satisfy Section 6.7.

The person(s) undertaking the monitoring are to be suitably qualified and appropriately experienced and able to confidently identify plant health characteristics including (as a minimum) water and nutrient deficiencies, impacts from pest and disease, and irregular growth issues. The suitability of the persons(s) undertaking the monitoring is to be supplied to TfNSW for approval.

6.3 Watering

The watering requirements are to be determined by the Revegetation Contractor and approved by TfNSW. However, the following is to be used as a guide for determining minimum watering requirements:

- Watering is required to be undertaken every day for the first two weeks.
- Watering is required once every second day for the following five weeks.
- Watering once a week until the completion of the Initial Maintenance Period.

Where sufficient rainfall has been received or is forecasted at the Planting Area, the above watering requirements can be revised by the Revegetation Contractor in consultation with TfNSW to ensure plants are not overwatered.

During the Initial Maintenance Period, watering shall be 'misted' or conducted in a manner that does not cause damage to the treatments, run-off, erosion or displacement of the Planting Areas and Exclusion Zone.

6.4 Fertilising and soil ameliorants

The fertilising and soil ameliorant requirements are to be determined by the Revegetation Contractor and approved by TfNSW.

Where required, fertiliser and soil ameliorants are to be applied to ensure plant health and to achieve the Initial Maintenance Period completion criteria.

6.5 Weed, pest and disease control

All weeds within the Planting Areas and the Exclusion Zone with the potential of impacting the translocated and/or propagated *Pittosporum* sp. Coffs Harbour are to be treated in accordance with Section 5.2.3 to ensure weeds are not hindering the growth of the translocated, existing *in-situ* threatened plants, and the propagated plants.

Where pest and diseases are identified, all plants are to be treated appropriately by the Revegetation Contractor to ensure the continued health and growth of the translocated and/or propagated *Pittosporum* sp. Coffs Harbour.

6.6 Repair or re-installation of treatments

A total of 500 *Pittosporum sp. Coffs Harbour* individuals are proposed to be propagated, with a minimum of 250 proposed to be planted across the Recipient Sites (the total number will be informed by the success of the propagation and will be determined in consultation with the Species Expert, the Revegetation Contractor, and TfNSW, refer to Section 3.6). TfNSW has assumed there will be 20% mortality of propagated individuals across the Recipient Sites following planting which would result in 200 propagated individuals.

Where less than 200 propagated individuals have survived at the completion of the 180-day Initial Maintenance Period, the Revegetation Contractor is required to

notify TfNSW who, to re-instate a minimum of 200 across the Recipient Sites, will either:

- Commence the process of propagating additional individuals to re-instate a minimum of 200 across the Recipient Sites.
- Where additional propagated plants are available, plant these individuals.

Where propagated individuals are proposed to reinstate the required number of individuals, the propagated individuals are to be re-installed as soon as is reasonably practical upon identification of the failed or damaged plants; noting that the time between propagation and planting could be up to two years.

When considering propagation of additional individuals, the previous propagation success rate is to be considered. Where the previous propagation success rate was low and therefore unlikely to yield sufficient results to re-establish 200 individuals, TfNSW will seek alternative mitigation strategies.

Prior to re-installation, the Revegetation Contractor shall investigate the failed treatment to determine the cause of the poor performance, damage, or failure and take any corrective actions necessary.

The monitoring and maintenance requirements of the re-installed plants are to be developed by the Revegetation Contractor in consultation with the Species Expert, TfNSW, and BCD.

Where plants have failed, and additional propagative material and/or seeds are required, the Revegetation Contractor is to source the propagative material and/or seeds from individuals which appear to be the healthiest.

6.7 Topping up of mulch

Thirty days before the completion of the Initial Maintenance Period, where mulch has been applied to plants, the mulch shall be topped up to achieve the originally specified depths (20 mm).

6.8 Initial Maintenance Period reporting requirements

A report is to be prepared by the Revegetation Contractor for the Planting Areas and Exclusion Zone and is to be submitted to TfNSW and the BCD Senior Team Leader Planning, North East Branch monthly from the commencement of the Initial Maintenance Period.

The report shall include, as a minimum, the following:

- Monthly program of maintenance works.
- Dates of maintenance visits and inspections.
- Average height and general health of the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour.
- Evidence of recruitment, including number and height of seedlings.

- Surrounding vegetation characteristics including:
  - Dominant canopy species
  - Canopy height (m)
  - Canopy cover (%)
- Maintenance works undertaken.
- Maintenance works in progress.
- Watering application dates and volumes.
- Weed, pest and disease management measures undertaken.
- Failed or failing plants and suspected cause of failure.
- All weeds identified and method of treatment.
- Issues identified during inspections and actions required to remedy the issues.
- Damage to plants including damage caused by vandalism and/or theft.
- Proposed adaptive management measures (if required).
- Recommendations for further works required.

All vandalism and theft claims shall be supported by photographic evidence and / or a police report.

Where the health of the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour is considered in jeopardy (eg failed or failing plants, evidence of pest or disease impact, etc), the BCD Senior Team Leader Planning, North East Branch is to be notified within 24 hours of detection. Following the initial notification, suggested remedial actions for the consideration and written agreement of the BCD Senior Team Leader Planning, North East Branch must be provided within 7 days.

6.9 Completion of the Initial Maintenance period

The Initial Maintenance Period shall be completed when the Planting Areas and Exclusion Zone have met the following completion criteria:

- The Revegetation Contractor has identified all failed *Pittosporum* sp. Coffs Harbour within the Planting Areas and the Exclusion Zone.
- The Revegetation Contractor has reported to TfNSW the total number of *Pittosporum* sp. Coffs Harbour that are required to be propagated to achieve a minimum of 200 individuals within the Planting Areas and/or the Exclusion Zone.
- All weeds within the Planting Areas and the entirety of the Exclusion Zone have been treated and are not hindering (or likely to hinder) the growth rates or successful establishment of the translocated and propagated plants.
- The salvage translocated patches/clumps and propagated plants:
  - Show no signs of nutrient deficiency.
  - Show no signs of water deficiency.

- Show no signs of pest impacts.
- Have been treated appropriately where impacted by pests and/or disease.
- Are established and well formed, showing evidence of growth typical of the species.
- Have a 20 mm mulch depth (as applicable).

- The Planting Areas and Exclusion Zone have been established for a minimum 180-day duration.

Upon completion of the Initial Maintenance Period, the Planting Areas and Exclusion Zone shall be inspected by TfNSW and/or their representative.

Where TfNSW and/or their representative deem the Planting Areas and Exclusion Zone to be compliant with the completion criteria, a Certificate of Completion of the Initial Maintenance Period shall be issued to the Revegetation Contractor by TfNSW.

7 Post-translocation actions – Monitoring period

7.1 Monitoring period

The Monitoring Period shall commence with the issuing of the Certificate of Commencement of the Monitoring Period by TfNSW.

The Monitoring Period shall be a minimum duration of ten years, from the date of the Certificate of the Commencement of the Monitoring Period.

The monitoring program may be reviewed by the species expert five years after issuing of the Certificate of Commencement of the Monitoring Period by TfNSW. Outcomes of the review may be used to inform a variation of the monitoring program during years six to 10.

Any variation of the monitoring program must be approved in writing by the BCD Senior Team Leader Planning North East Branch before commencement.

The following sections detail the works required as part of the Monitoring Period.

7.2 Monitoring period schedule

The Revegetation Contractor is to prepare a monitoring schedule for the duration of the Monitoring Period, which is required to be approved by TfNSW. The monitoring schedule and requirements are to be developed to be consistent with any requirements of a BSA and the Biodiversity Conservation Trust.

Based on a minimum duration of ten years for the Monitoring Period, the monitoring schedule developed by the Revegetation Contractor is to include (as a minimum) the following:

- Monitoring every three months for Year 1 and Year 2.
- Monitoring every six months for Year 3 to Year 5.
- Monitoring every 12 months for Year 6 to Year 10.

Should the review referred to in Section 7.1 indicate a need to vary the monitoring program, any variation must be approved in writing by the BCD Senior Team Leader Planning, North East Branch, before commencement.

The monitoring schedule shall be developed to allow, as a minimum, the following:

- Identification of watering requirements to satisfy Section 7.3.
- Identification of fertiliser and soil ameliorant requirements to satisfy Section 7.4.
- Identification of weed, pest and disease control requirements to satisfy Section 7.5.

- Identification of repairing or re-installing of failed treatments requirements to satisfy Section 7.6.
- Identification of mulching requirements to satisfy Section 7.7.

The person(s) undertaking the monitoring are to be suitably qualified and appropriately experienced and able to confidently identify plant health characteristics including (as a minimum), water and nutrient deficiencies, impacts from pest and disease, and irregular growth issues. The suitability of the persons(s) undertaking the monitoring is to be supplied to TfNSW for approval.

7.3 Watering

During the Monitoring Period, watering shall:

- Be undertaken as deemed to be required by the Revegetation Contractor to achieve the completion criteria.
- Be conducted in a manner that does not cause damage, run-off or subsequent erosion or displacement of Planting Areas and the Exclusion Zone.

7.4 Fertilising and soil ameliorants

Fertiliser and soil ameliorants are to be applied (as deemed to be required by the Revegetation Contractor) to ensure plant growth, plant health and to ensure the treatments achieve the Monitoring Period completion criteria.

7.5 Weed, pest and disease control

All weeds within the Planting Areas and the Exclusion Zone with the potential of impacting the translocated patches/clumps and/or propagated *Pittosporum* sp. Coffs Harbour are to be treated in accordance with Section 5.2.3 to ensure weeds are not hindering the growth of the translocated, existing *in-situ* threatened plants, and the propagated plants.

Where pest and diseases are identified, all plants are to be treated appropriately by the Revegetation Contractor to ensure the continued health and growth of the translocated patches/clumps and/or propagated *Pittosporum* sp. Coffs Harbour.

7.6 Repair or re-installation of treatments

A total of 500 *Pittosporum* sp. Coffs Harbour individuals are proposed to be propagated, with a minimum of 250 individuals proposed to be planted across the Recipient Sites (the total number to be planted will be informed by the success of the propagation and will be determined in consultation with the Species Expert, the Revegetation Contractor, and TfNSW – refer to Section 3.6). TfNSW has assumed there will be 20% mortality of propagated individuals across the Recipient Sites, which would result in 200 propagated individuals.

The Revegetation Contractor is required to include in their reporting requirements the number of failed translocated or propagated plants. Where the loss of individuals will result in less than 200 propagated plants, TfNSW will either:

- Commence the process of propagating additional individuals to re-instate a minimum of 200 across the Recipient Sites.
- Where additional propagated plants are available, plant these individuals.

Where propagated individuals are proposed to reinstate the required number of individuals, the propagated individuals are to be re-installed as soon as is reasonably practical upon identification of the failed or damaged plants; noting that the time between propagation and planting could be up to two years.

When considering propagation of additional individuals, the previous propagation success rate is to be considered. Where the previous propagation success rate was low and therefore unlikely to yield sufficient results to re-establish 200 individuals of either species, TfNSW will seek alternative mitigation strategies.

The monitoring and maintenance requirements of the re-installed plants are to be developed by the Revegetation Contractor in consultation with the Species Expert, TfNSW, and BCD.

Prior to re-installation, the Revegetation Contractor shall investigate the failed treatment to determine the cause of the poor performance, damage, or failure and take any corrective actions necessary.

Where plants have failed, and additional propagative material and/or seeds are required, the Revegetation Contractor is to source the propagative material and/or seeds from individuals which appear to be the healthiest.

7.7 Topping up of mulch

Mulched shall be topped up as deemed required by the Revegetation Contractor required to achieve the originally specified depths (20 mm).

7.8 Monitoring period reporting requirements

A report is to be prepared by the Revegetation Contractor for the Planting Areas and the Exclusion Zone and is to be submitted to TfNSW and the BCD Senior Team Leader Planning, North East Branch following each monitoring event from the commencement of the Monitoring Period.

The report shall include, as a minimum:

- Dates of maintenance visits and inspections.
- Maintenance works undertaken.
- Maintenance works in progress.
- Average height and general health of salvage translocated and propagated *Pittosporum* sp. Coffs Harbour.

- Evidence of recruitment, including number and height of seedlings.
- Surrounding vegetation characteristics including:
  - Dominant species in the canopy, subcanopy, shrub layer and ground cover.
  - Canopy height (m).
  - Canopy cover (%).
- Watering application dates and volumes.
- Weed, pest, and disease management measures undertaken.
- Failed or failing vegetation treatments and suspected cause of failure.
- Repair or re-installation of failed plants.
- Weeds identified and method of treatment.
- Issues identified during inspections and actions required to remedy these.
- Damage to vegetation caused by vandalism or theft of vegetation.
- Proposed adaptive management measures (if required).
- Recommendations for further works required.

All vandalism and theft claims shall be supported by photographic evidence and/or police report.

Where the health of the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour is considered in jeopardy (eg failed or failing plants, evidence of pest or disease impact, etc), the BCD Senior Team Leader Planning, North East Branch is to be notified within 24 hours of detection. Following the initial notification, suggested remedial actions for the consideration and written agreement of the BCD Senior Team Leader Planning, North East Branch must be provided within 7 days.

7.9 Completion of the monitoring period

The Monitoring Period shall be completed when the Planting Areas and Exclusion Zone have met the following completion criteria:

- The Revegetation Contractor has identified all failed *Pittosporum* sp. Coffs Harbour within the Planting Areas and the Exclusion Zone.
- The Revegetation Contractor has reported to TfNSW the total number of *Pittosporum* sp. Coffs Harbour that are required to be propagated to achieve a minimum of 200 *Pittosporum* sp. Coffs Harbour within the Planting Areas and/or the Exclusion Zone (in consideration of the propagation success rate and alternative mitigation strategies discussed in Section 7.6).
- All weeds within the Planting Areas and the entirety of the Exclusion Zone that are hindering (or likely to hinder) the growth rates or on-going health of the translocated and/or propagated plants have been treated.
- The translocated patches/clumps and/or propagated plants:
  - Show no signs of nutrient deficiency.

- Show no signs of water deficiency.
- Show no signs of pests impacts which are likely to cause individual plant mortality.
- Have been treated appropriately where impacted by disease.
- Are established and well formed, showing evidence of growth typical of the species.
- Are reasonably likely to survive in the wild without anthropogenic assistance.
- Have a 20 mm mulch depth (as applicable).

Upon completion of the Monitoring Period, the Planting Areas and Exclusion Zone shall be inspected by TfNSW and/or their representative.

Where TfNSW and/or their representative deem the Planting Areas and Exclusion Zone to be compliant with the completion criteria, a Certificate of Completion of the Monitoring Period shall be issued by TfNSW.

Upon the successful completion of the Monitoring Period, no further work will be undertaken by TfNSW or the Revegetation Contractor.

8 Translocation objectives, outcomes, performance criteria, and risks

8.1 Objectives, outcomes, and performance criteria

The overall management objective for the Planting Areas and the Exclusion Zone is to establish ecologically functional and self-sustaining populations of *Pittosporum* sp. Coffs Harbour and provide a net gain of individuals where possible, to compensate for the loss of wild plants and their habitat.

The management objectives are to be achieved by successfully undertaking the following:

- Salvage translocating all directly impacted *Pittosporum* sp. Coffs Harbour patches/clumps.
- Planting an additional 250 *Pittosporum* sp. Coffs Harbour.
- Managing the translocated patches/clumps and planted individuals to maximise their ability to survive in the wild without anthropogenic assistance.

The objectives, outcomes, and performance criteria relevant to the Planting Areas and the entirety of the Exclusion Zone are detailed in Table 5.

Table 5: Objectives, outcomes, and performance criteria

Objective	Outcome	Performance Criteria
Translocation actions – Installation of salvaged and propagated plants		
Minimise inconsistency with other translocation works for the project.	Translocation works for *Fontainea* sp. Coffs Harbour, rusty plum (*Niemeyera white*) and slender marsdenia (*Marsdenia longiloba*) are not affected.	Translocation and propagation of *Pittosporum* sp. Coffs Harbour at the Recipient Sites does affect any translocation and/or propagation works associated with *Fontainea* sp. Coffs Harbour, rusty plum (*Niemeyera white*) and slender marsdenia (*Marsdenia longiloba*).
Plants nominated for translocation are able to be uniquely identified.	All plants nominated for translocation have been assigned a unique identifier code.	A unique identifier code has been assigned to each plant nominated for translocation.
Analyse the soil at the impact site and Recipient Site to allow for soil characteristics to be compared.	Any soil amelioration requirements at the Recipient Sites are identified. Soil samples collected from the impact sites and Recipient Sites have undergone analysis and any soil amelioration	Soil samples collected from the impact sites and Recipient Sites have undergone analysis and any soil amelioration requirements have been identified. Soil profile and soil chemistry and textural analysis

Objective	Outcome	Performance Criteria
	requirements have been identified.	correspond closely at the impact and Recipient sites.
The original location of each plant nominated for salvage translocation is recorded and spatially displayed.	The original location of all plants nominated for translocation is recorded and easily identifiable.	A figure showing the unique identifier code and original location of all plants nominated for translocation has been developed.
Recipient Sites have been suitably prepared to accommodate the translocated and propagated individuals.	The Planting Areas have been surveyed and pegged.	The Planting Area has been surveyed and pegged in accordance with Section 5.2.2.
	Weed control has been undertaken.	Weed control has been undertaken in accordance with Section 5.2.3.
	Planting locations have been identified and numbered.	Planting locations have been identified, set out, and numbered in accordance with Section 5.2.4.
	Translocated and propagated plants are protected from grazing and seed predation	Fencing has been installed in accordance with Section 5.2.5.
Mitigate the direct impact to *Pittosporum* sp. Coffs Harbour plants by translocating the plants to areas of suitable habitat.	All *Pittosporum* sp. Coffs Harbour directly impacted by the Project are translocated to areas of suitable habitat outside the Project Footprint.	All *Pittosporum* sp. Coffs Harbour directly impacted by the Project are translocated to areas of suitable habitat outside the Project Footprint as per Section 5.3 and Section 5.4.
Translocation Actions – Initial Maintenance Period		
Maximise the survival for all translocated and propagated *Pittosporum* sp. Coffs Harbour.	Manage translocated and propagated plants in accordance with the requirements of the Initial Maintenance Period.	Certificate of Commencement of the Initial Maintenance Period has been issued to the Revegetation Contractor by TfNSW.
All translocated and propagated *Pittosporum* sp. Coffs Harbour establish within the Recipient Sites.	Watering has been undertaken to facilitate the successful establishment of the translocated and propagated *Pittosporum* sp. Coffs Harbour.	Watering has been undertaken in accordance with Section 6.3.

Objective	Outcome	Performance Criteria
	Fertilising and soil ameliorants have been applied to facilitate the successful establishment of the translocated and propagated *Pittosporum* sp. Coffs Harbour.	Fertilising and soil ameliorants have been applied as per Section 6.4.
	Weed, pest and disease control has been undertaken to facilitate the successful establishment of the translocated and propagated *Pittosporum* sp. Coffs Harbour.	Weed, pest and disease control has been undertaken in accordance with Section 6.5.
	Mulch has been reapplied to facilitate the successful establishment of the translocated and propagated *Pittosporum* sp. Coffs Harbour.	Mulch has been reapplied as per Section 6.7.
The propagated and planted *Pittosporum* sp. Coffs Harbour survive to the completion of the Initial Maintenance Period.	Where less than 200 *Pittosporum* sp. Coffs Harbour are present across the Planting Areas and/or Exclusion Zone, TfNSW has been notified and is in the process of propagating additional individuals to achieve a minimum of 200 individuals. .	All failed *Pittosporum* sp. Coffs Harbour have been reported to TfNSW as per Section 6.6 to allow (where necessary) the propagation of additional individuals to be undertaken or the planting of existing propagated individuals to be progressed to achieve 200 *Pittosporum* sp. Coffs Harbour.
Reporting of the translocated and propagated plants is undertaken.	Reporting is prepared by the Revegetation Contractor and is submitted to TfNSW as per Section 6.8.	Reporting is undertaken as per Section 6.8.
Translocation Actions – Monitoring Period		
Commence the Monitoring Period to monitor the translocated and planted *Pittosporum* sp. Coffs Harbour.	Certificate of Commencement of the Monitoring Period is issued to the Revegetation Contractor by TfNSW.	Completion criteria (Section 6.9) successfully completed and Certificate of Commencement of the Monitoring Period has been issued by TfNSW.
Translocated and planted *Pittosporum* sp. Coffs Harbour are in good condition and exhibit growth within the Recipient Sites.	Watering has been undertaken as required to facilitate the continued survival of the translocated and planted *Pittosporum* sp. Coffs Harbour.	Watering has been undertaken in accordance with Section 7.3.

Objective	Outcome	Performance Criteria
	Fertilising and soil ameliorants have been applied as required to facilitate the continued survival of the translocated and planted *Pittosporum* sp. Coffs Harbour.	Fertilising and soil ameliorants have been applied as per Section 7.4.
	Weed, pest and disease control has been undertaken as required to facilitate the continued survival of the translocated and planted *Pittosporum* sp. Coffs Harbour.	Weed, pest and disease control has been undertaken in accordance with Section 7.5.
	Mulch has been reapplied as required to facilitate the continued survival of the translocated and planted *Pittosporum* sp. Coffs Harbour.	Mulch has been reapplied as per Section 7.7.
The required number of *Pittosporum* sp. Coffs Harbour survive to the completion of the Monitoring Period.	Where less than 200 *Pittosporum* sp. Coffs Harbour are present across the Planting Areas and/or Exclusion Zone, TfNSW has been notified and has (where required) initiated the propagating additional individuals to achieve a minimum of 200 individuals.	All failed *Pittosporum* sp. Coffs Harbour have been reported to TfNSW as per Section 7.6 to allow (where necessary) the propagation of additional individuals to be undertaken or the planting of existing propagated individuals to achieve 200 *Pittosporum* sp. Coffs Harbour.
Reporting of the translocated and propagated plants is undertaken.	Reporting is prepared by the Revegetation Contractor and is submitted to TfNSW.	Reporting is undertaken as per Section 7.8.

8.2 Risk analysis

The risks, mitigation measures, and remedial actions identified that may impact upon the successful salvage translocation, propagation, and on-going survival of *Pittosporum* sp. Coffs Harbour are discussed in Table 6.

In addition to the mitigation measures detailed in Table 6, a suite of management measures are proposed (refer to Section 11) which will assist with mitigating the overall risks associated with impacting threatened plants.

Table 6: Risks, mitigation measures, and remedial actions

Risk	Mitigation Measure	Remedial Action
Salvage translocation		
Mortality of salvaged plants during translocation.	The mitigation measures developed to minimise the risk of the salvage translocated plants dying during translocation are contained within this report and include the following: • Engagement of a suitably qualified and appropriately experienced Revegetation Contractor and/or Species Expert. • Applying best practices/ industry standard salvage translocation procedures which have previously been successful • Modifying the salvage translocation methods based on the ecology/habitat of the species.	Where any mortality is identified, stop works to assess the cause of mortality and discontinue salvage methodology until such time as a more appropriate salvage translocation methodology has been developed. Alternate salvage methodologies are to be developed in consultation with: • The Species Expert; and/or • Revegetation Contractors with direct experience in salvage translocation methodologies; and/or • Revegetation Contractors with direct experience in salvage translocation of the genus.
The salvage translocated plants fail to establish at the Recipient Sites.	The mitigation measures developed to minimise the risk of the salvage translocated plants failing to establish at the Recipient Sites are contained within this report and include the following: • Translocation strategy. • Pre-translocation assessment. • Translocation actions. • Post-translocation actions in the Initial Maintenance Period. • Post-translocation actions in the Monitoring Period.	Determine potential cause of poor performance of plants and amend management measures as required in consultation with: • The Species Experts; and/or • Revegetation Contractors with direct experience in salvage translocation methodologies; and/or • Revegetation Contractors with direct experience in salvage translocation of the genus.

Risk	Mitigation Measure	Remedial Action
Propagation		
Propagation is not successful.	Engaging the Species Expert and/or a suitably qualified and appropriately experienced native plant nursery who have direct experience with propagation of the genus.	N/A
	Propagate using standard industry practice, understanding of the species, and previous propagation methodologies.	Propagation Strategy (or similar) is to be developed for *Pittosporum* sp. Coffs Harbour to investigate various propagation strategies and methods. The propagation trial will be developed by the Species Expert and/or a suitably qualified and appropriately experienced native plant nursery in consultation with TfNSW to establish the propagation technique which yields the greatest number of successfully propagated individuals.
Propagated plants fail to establish at the Recipient Sites.	The mitigation measures developed to minimise the risk of the salvage translocated plants failing to establish at the Recipient Sites are contained within this report and include the following: • Translocation strategy. • Pre-translocation assessment. • Translocation actions. • Post-translocation actions in the Initial Maintenance Period. • Post-translocation actions in the Monitoring Period.	Investigate potential cause of failure, including potential threats and causes. Consider augmentation from seed propagated plants from alternative donor sites. Evaluate options for sourcing propagative material from propagated plants that are successfully growing to supplement the Recipient Sites. Evaluate options for sourcing additional seeds from the *in-situ* population to supplement the Recipient Sites.

Risk	Mitigation Measure	Remedial Action
Survival of the translocated and propagated plants within the Recipient Sites		
Weeds becoming established or dominant in the Planting Areas and Exclusion Zone and outcompeting the planted treatments, causing the death or reduced growth of the planted treatments.	Undertake weed control and maintenance as per the provisions detailed in this Management Plan.	Assess the performance of weed control measures and apply adaptive management measures to increase weed control efficiency. Where required, implement additional weed control measures to effectively control weeds impacting the planted treatments.
Plant die off for unknown reasons	Monitoring and maintenance works are to be undertaken as per this management plan.	Seek to understand the cause of die off. Survey adjacent populations in protected areas (e.g. Bruxner Park Flora Reserve) to compare the mortality of the planted individuals to the mortality observed in the natural population.
Due to the uniqueness of the species, there is a risk the individuals are poached from the Recipient Sites.	TfNSW should not release the exact location of the *Pittosporum* sp. Coffs Harbour within the Recipient Sites. Fencing around the perimeter of the site should assist in discouraging poaching. In addition, signs should be included for TfNSW owned Recipient Sites indicting that the site is subject to surveillance (i.e. hidden cameras).	Where individuals are identified as missing and there are obvious signs the plants have removed, TfNSW should investigate the incident with the local police and, if the problem is on-going seek to increase the security of the site or seek another site within which to plant the species.
Bushfire has the potential to severely impact the Recipient Sites and cause individual tree or vegetation community mortality. Bushfire has the potential to alter the species composition of the Planting Area which could ultimately lead to a change in vegetation community composition. Bushfire also has the potential to increase the time to completion.	Bushfire should be excluded from the Recipient Sites for the duration of the Establishment and Monitoring Period. TfNSW is to adopt an appropriate fire management strategy for the Planting Areas and Exclusion Zone to prevent bushfire from damaging the Planting Areas and Exclusion Zone and incorporate sufficient fire breaks within the revegetation design (where appropriate).	Following any disturbance caused by bushfire, a site assessment should be undertaken to quantify the impacts to the planted treatments. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance. Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).

Risk	Mitigation Measure	Remedial Action
A flood event has the potential to impact the Recipient Sites and cause individual or vegetation community mortality. A flood event has the potential to destroy the planted treatments and existing vegetation potentially altering the species composition of an area and ultimately leading to a change in community composition and/or increase the time to completion.	Treatments are not to be planted in an area mapped on local or State government mapping as a flood prone area.	Following any disturbance caused by a flood event, a site assessment should be undertaken to quantify the impacts to planted treatments and the broader vegetation community. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance. Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).
A localised insect outbreak in the Planting Areas and Exclusion Zone has the potential to reduce plant growth and/or cause plant mortality via complete or partial plant defoliation or plant stress. Insect outbreaks could alter the species composition of the area and ultimately lead to a change in vegetation community or increase the time to Monitoring Period completion.	Regular surveillance during the Establishment and Monitoring Periods for signs of insect attack (e.g. plant stress, leaf predation). Standard treatment is considered an appropriate measure to be implemented to minimise the spread of insects across and within the Planting Areas and Exclusion Zone.	Upon identification of an insect attack or following an outbreak which is, or has the potential to impact the planted treatments, a site visit should be undertaken to assess the extent of impact. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance. Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).
The health of the planted treatments and the surrounding vegetation community may be influenced by various phytopathogens (such as myrtle rust) which could cause reduced growth, plant stress, and/or plant mortality on an individual or community level. A disease outbreak could alter the species composition of the area and ultimately lead to a change in the vegetation community.	Ensuring disease free planting stock is used, limiting site access, and regular surveillance for symptoms of disease (e.g. plant stress, leaf discolouration, signs of myrtle rust) are considered appropriate measures to be implemented to minimise the introduction, establishment and spread of disease across the site. Plants are only to be propagated and stored in a nursery which does not have myrtle rust.	Upon identification of disease or following an outbreak, a site visit should be undertaken to assess site impacts. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance. Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).
Design changes or unforeseen design requirements have the	All design changes in the vicinity of the Planting Areas	The Exclusion Zone and all Planting Areas adjacent to the

Risk	Mitigation Measure	Remedial Action
potential to impact the Planting Areas and/or Exclusion Zone.	and/or Exclusion Zone are to be reviewed the by the Project Ecologist to ensure they do not impact upon the Planting Areas and/or Exclusion Zone.	Project Boundary are to be shown on all design drawings and labelled as Exclusion Zones. Design changes are to avoid the Planting Areas and Exclusion Zone. Design is to consider future maintenance and clearing requirements when locating infrastructure along the boundary of the Exclusion Zone.
[redacted]	[redacted]	[redacted]

8.3 Schedule of works and responsibilities

The activities, indicative timeframes, and responsible entities for all activities associated with this management plan are provided in Table 7.

Table 7: The activities, indicative timeframes, and responsible entities for all activities associated with this management plan

Activity	Indicative Timeframe	Responsible Entities
Pre-translocation assessment		
Recipient Site identification	Prior to salvage translocation	TfNSW
[redacted]	[redacted]	[redacted]
Translocation actions – Installation of salvaged and propagated plants		
Review management plans and translocations proposals for *Fontainea* sp. Coffs Harbour, rusty plum (*Niemeyera white*) and	Prior to salvage translocation	Revegetation Contractor

Activity	Indicative Timeframe	Responsible Entities
slender marsdenia (*Marsdenia longiloba*).		
Unique identifier codes assigned to all patches/clumps proposed for salvage translocation	Prior to salvage translocation	Revegetation Contractor
A figure is to be created which identifies each plant's unique identifier code to show the original spatial distribution of the plants.	Prior to salvage translocation	Revegetation Contractor
Soil samples are to be collected from the impact sites and Recipient Sites for analysis	Prior to salvage translocation	TfNSW/Revegetation Contractor
A report is to be prepared by the Revegetation Contractor which address how the Revegetation Contractor will meet the requirements of Section 5.2, Section 5.3, and Section 5.4.	Prior to salvage translocation	Revegetation Contractor
Propagative material has been collected prior to salvage translocation	Minimum of one month prior to translocation Propagative material is best collected in warmer months in November – April (inclusive) Where practicable, collection of propagative material is to be carried out at different times within the warmer months.	Suitably qualified and appropriately experienced native plant nursery /Species Expert – Collection and care of *Pittosporum* sp. Coffs Harbour material Royal Botanic Garden Sydney – Sampling plan for *Pittosporum* sp. Coffs Harbour material
Surveying and pegging of the Planting Area	Prior to salvage translocation	TfNSW – Management Revegetation Contractor – Implementation
Weed control	Maximum of two weeks prior to the salvage translocation	Revegetation Contractor

Activity	Indicative Timeframe	Responsible Entities
Plant set-out locations	Prior to salvage translocation	Revegetation Contractor
Temporary star picket fence to be installed along Exclusion Zone.	After salvage translocation	TfNSW
High visibility temporary fencing installation at the interface of the Exclusion Zone and Project Boundary	Prior to construction	Construction Contractor
Permanent fence to be installed along boundary of Exclusion Zone	Following construction works	Construction Contractor
Installation of tree-guards	Following planting	Revegetation Contractor
Fencing installation at Recipient Sites	Prior to salvage translocation	TfNSW – Management Revegetation Contractor – Implementation
Excavation of planting holes for the salvage translocated *Pittosporum* sp. Coffs Harbour	Progressively as the *Pittosporum* sp. Coffs Harbour patches are delivered to the Recipient Site	Revegetation Contractor
Salvage translocation of *Pittosporum* sp. Coffs Harbour	Planned to commence in May 2022 subject to ideal weather conditions.	Species Expert – Advice Revegetation Contractor – Implementation Royal Botanic Garden Sydney – Planting allocation of salvaged *Pittosporum* sp. Coffs Harbour
Planting propagated individuals	Once plants have reached "super tube" size (unless otherwise agreed between BCD and the Species Expert) to ensure appropriate root development and health of the plant for planting. Timeframe for planting is to be in accordance with the requirements provided in	[redacted] Revegetation Contractor – Planting all propagated individuals Royal Botanic Garden Sydney – Planting schedule

Activity	Indicative Timeframe	Responsible Entities
	Section 5.2.1 and be confirmed with Revegetation Contractor, Species Expert and TfNSW. Where the suitably qualified and appropriately experienced native plant nursery used in propagation is located outside of the Coffs Harbour area, plants are to be well hardened off to local conditions prior to planting.	for propagated *Pittosporum* sp. Coffs Harbour
Fencing and signage	Prior to vegetation clearing works during the Construction Phase of the project.	Construction Contractor
Reporting	As per the requirements of this management plan. Refer to Section 5.7.	Project Ecologist – Management of reporting requirements Revegetation Contractor – Provision of reporting
Post-translocation actions – Initial Maintenance Period		
Watering	As per the requirements of this management plan. Refer to Section 6.3.	Revegetation Contractor
Fertilising and soil ameliorants	As per the requirements of this management plan. Refer to Section 6.4.	Revegetation Contractor
Weed, pest and disease control	As per the requirements of this management plan. Refer to Section 6.5.	Revegetation Contractor
Repair or re-installation of treatments	As per the requirements of this management plan. Refer to Section 6.6.	Revegetation Contractor – Identification of all failed treatments within the Planting Areas and Exclusion Zone TfNSW – Engagement with Revegetation Contractor

Activity	Indicative Timeframe	Responsible Entities
		and/or Species Expert to commence additional propagation.
Topping up of mulch	As per the requirements of this management plan. Refer to Section 6.7.	Revegetation Contractor
Initial Maintenance Period reporting	As per the requirements of this management plan. Refer to Section 6.8.	Project Ecologist – Management of reporting requirements Revegetation Contractor – Provision of reporting
Post-translocation actions – Monitoring period		
Watering	As per the requirements of this management plan. Refer to Section 7.3.	Revegetation Contractor
Fertilising and soil ameliorants	As per the requirements of this management plan. Refer to Section 7.4.	Revegetation Contractor
Weed, pest and disease control	As per the requirements of this management plan. Refer to Section 7.5.	Revegetation Contractor
Repair or re-installation of treatments	As per the requirements of this management plan. Refer to Section 7.6.	Revegetation Contractor – Identification of all failed treatments within the Planting Areas and Exclusion Zone TfNSW – Engagement with Revegetation Contractor and/or Species Expert to commence additional propagation.
Topping up of mulch	As per the requirements of this management plan. Refer to Section 7.7.	Revegetation Contractor

Activity	Indicative Timeframe	Responsible Entities
Monitoring period reporting	As per the requirements of this management plan. Refer to Section 7.8.	Project Ecologist – Management of reporting requirements Revegetation Contractor – Provision of reporting

PART C – [redacted] EXCLUSION ZONE *IN-SITU* MANAGEMENT

9 *In-situ* management of retained individuals

9.1 General

Surveys have identified the following *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the [redacted] Exclusion Zone, which is directly adjacent to the Project Footprint:

- *Fontainea* sp. Coffs Harbour – One mature adult, two seedlings, and 36 juvenile plants.
- *Pittosporum* sp. Coffs Harbour – 10 discrete patches.

The Project has been designed to avoid these individuals, which are proposed to be retained *in-situ*. The retained individuals are shown on Figure 3.

The management measures proposed to minimise the potential impacts to the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the [redacted] Exclusion Zone during the Construction Phase of the Project are detailed in the following sections.

9.2 Pre-works survey to identify/confirm extent of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour

Following the on-ground delineation of the clearing extents (which marks the edge of the Project Footprint and Clearing Limits), a survey is to be undertaken within the Exclusion Zone to identify all retained individual *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.

The location of each *Fontainea* sp. Coffs Harbour and the extents of each *Pittosporum* sp. Coffs Harbour patch is to be surveyed (by a surveyor) and clearly marked with flagging tape to be highly visible.

9.3 Unique identifier code

Each individual *Fontainea* sp. Coffs Harbour and each discrete *Pittosporum* sp. Coffs Harbour patch/individual is to be assigned a unique identifier code to allow the individuals/patch(es) to be tracked for the purposes of on-going monitoring.

A map/figure of the Exclusion Zone is to be developed showing the location of all individuals using their unique identifier code.

9.4 Fencing and signage

As detailed in Section 5.2.5, Following the salvage translocation, a temporary star picket fence (without barbed wire) will be placed along the length of the Exclusion Zone to assist with protecting the area and define the limits of the Exclusion Zone.

During the Construction Phase of the Project, high visibility temporary exclusion fencing is required to be placed along the Project Boundary and the Exclusion Zone to protect the retained vegetation from incidental clearing during the Construction Phase. Signage is to be attached to the temporary exclusion fencing at regular intervals to identify the retained vegetation as an 'Environmental Protection Area' (or similar).

Following completion of construction, a permanent fence (without barbed wire) is to be installed along the boundary of the Exclusion Zone. A gate is to be provided to enable access for monitoring and maintenance activities.

Permanent signs are to be hung from the permanent fence indicating the vegetation as an 'Environmental Protection Area' (or similar) which contains high biodiversity significance and that unauthorised entry and/or clearing of vegetation within the area is strictly prohibited.

Star picket and wire (not barbed wire) fencing is to be placed around the retained *Fontainea* sp. Coffs Harbour to protect these individuals from soil compaction, trampling of seedlings, seed predation, and grazing of seedlings. The location of the fence is to be determined by the Fontainea Expert and TfNSW.

9.5 Erosion and sediment and dust controls

Erosion and sediment controls are to be installed upstream of the Exclusion Zone and retained vegetation and are not to encroach into the Exclusion Zone or impact the retained vegetation.

Erosion and sediment controls are to be installed prior to any works being undertaken on site and are to be monitored regularly and repaired if damaged or filled with sediment.

There is potential for adverse dust impacts on the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour and the vegetation within the Exclusion Zone during the Construction Phase. In addition to the standard dust control measures that will be implemented for the Project, there may be the need to include site-specific measures adjacent to the Exclusion Zone to further minimise dust impacts. This may include additional dust suppression (e.g. watering) and/ or temporary dust screens. The requirement for temporary dust screens will be determined in consultation with the Project Ecologist, and (where deemed required) the relevant Species Experts and Revegetation Contractor.

9.6 Landscaping and artificial screening

A targeted Landscaping Plan (or similar) is to be developed in consultation with the Project Ecologist and (where deemed required) the Species Experts, for the interface between the Project Boundary and the Exclusion Zone.

The Landscaping Plan is to focus on plantings which will minimise edge effects, including light, dust, and weed intrusion, and should include (as a minimum) the following:

- Native species appropriate to the adjacent vegetation community.
- Large stock should be planted (e.g. >10 L preferred over tubestock) to allow for rapid establishment.
- A lineal area of high-density screening plants is to be installed along the Project Boundary (but within the Exclusion Zone) to minimise light and dust intrusion into the Exclusion Zone.
- High density groundcovers plants are to be installed to minimise the potential for weed establishment along the road corridor.

The Landscaping Plan (or similar) is to be implemented as soon as practicable during the Construction Phase of the Project to provide the greatest benefit in reducing potential edge effects. The effectiveness of the Landscaping Plan is to be reviewed by the Project Ecologist following vegetation clearing works and amended as required.

Artificial screening may be installed where individuals are identified as suffering mortality and/or poor performance due to edge effects such as dust accumulation on plants during construction activities and/or increased light exposure as a result of vegetation clearing. The artificial screening is be installed within the Project Boundary and outside the Exclusion Zone. The need for artificial screening will be identified by either the Project Ecologist, the Revegetation Contractor, or the Species Expert during the Installation Period, Initial Maintenance Period, and/or the Monitoring Period.

9.7 Weed control

The Exclusion Zone has been nominated to receive translocated and propagated plants and is currently host to other threatened plants. As such, weed control is proposed to be undertaken as per Section 5.2.3, Section 6.5, and Section 7.5 of this report and as detailed in the *Fontainea* sp. Coffs Harbour Management Plan.

9.8 Project induction and toolbox sessions

During the Construction Phase of the Project, the Construction Contractor is to ensure all personnel are to be informed about the strict clearing limitations associated with the Exclusion Zone, the importance of the retained vegetation to as an Environmental Protection Area, and the consequences of any damage to the retained vegetation and/or threatened plants. The above will be included in the Project induction and at daily toolbox sessions.

9.9 Monitoring

Monitoring of the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour is to be undertaken to determine the effectiveness of the *in-situ* management measures and to identify any corrective measures that may be required.

Monitoring within the Exclusion Zone will also be undertaken for the salvage translocated and propagated individuals (refer to Section 5.8 and Section 6.9 and the *Fontainea* sp. Coffs Harbour Management Plan). As such, the monitoring requirements contained in this section relate only to the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour and have been designed to minimise overlapping monitoring and reporting requirements.

Monitoring is to be undertaken by suitably qualified persons. The following data (as a minimum) is to be recorded for each *in-situ Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Exclusion Zone:

Identification

- Identifier – unique identifier code
- Genus and species.

Plant condition

- Plant height (m)
- General health condition – score on a scale of 0 to 5, where 0 is dead and 5 is excellent.
- Leaf condition – healthy/unhealthy, colour, vigour, new growth
- Presence of flowers and/or fruits
- Length of new shoots – average length of new shoots and abundance of shoots (many/few).
- Disease symptoms – evidence of disease impacting the *in-situ* threatened plants and disease impacting other plants within the Exclusion Zone (e.g. myrtle rust impacts to myrtaceous plants).

Population

- Evidence of recruitment – number and height of seedlings or changes to patch size.

9.9.1 Timing/frequency

Monitoring of the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour is recommended to be undertaken as follows:

- Following initial vegetation clearing adjacent to the Exclusion Zone – Once per week for one month (total of four monitoring events).
- Where there are no obvious signs of impact to the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour plants and surrounding vegetation community – Fortnightly until the salvage translocated plants are installed, after which monitoring is to be undertaken as per the monitoring requirements detailed in Section 6.2 and Section 7.2.
- Where the retained plants are showing obvious signs of being impacted – Weekly until the plants' health is returned, after which monitoring is to be

undertaken as per the monitoring requirements detailed in Section 6.2 and Section 7.2.

9.9.2 Reporting requirements

A report is to be prepared for the Exclusion Zone and is to be submitted to TfNSW and the BCD Senior Team Leader Planning, North East Branch following each monitoring event (refer to Section 9.9.1). The report shall include, as a minimum, the following:

- Dates of visits and inspections.
- Works undertaken within the Exclusion Zone including those associated with Section 9.4, Section 9.5, and Section 9.6.
- Works currently in progress.
- Outcomes of all monitoring criteria as detailed in Section 9.9.
- Weed, pest, and disease management measures undertaken.
- Failed or failing retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour and suspected cause of failure.
- Weeds identified and method of treatment.
- Issues identified during inspections and actions required to remedy these.
- Proposed adaptive management measures (if required).
- Recommendations for further works required.
- A figure showing the location of the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Exclusion Zone and each plant's unique identifier code.

Where the health of the of the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour is considered in jeopardy (eg failed or failing plants, evidence of pest or disease impact, etc), the BCD Senior Team Leader Planning, North East Branch is to be notified within 24 hours of detection. Following the initial notification, suggested remedial actions for the consideration and written agreement of the BCD Senior Team Leader Planning, North East Branch must be provided within 7 days.

10 *In-situ* management objectives, outcomes, and performance criteria

10.1 Objectives, outcomes, and performance criteria

The overall management objective for the Exclusion Zone and the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour proposed to be retained *in-situ* is to avoid direct impacts and minimise indirect impacts during the Construction Phase of the Project. The management objectives are to be achieved by implementing appropriate management measures as detailed in this report to maximise the ability of the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour to survive in the wild without anthropogenic assistance.

The objectives, outcomes, and performance criteria are detailed in Table 8.

Table 8: Objectives, outcomes, and performance criteria

Objective	Outcome	Performance Criteria
Confirm the extent and location and number of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour retained *in-situ*.	Undertake pre-works survey to identify and confirm the location/extent of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.	Prior to any works being undertaken, all *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are identified and surveyed (by a surveyor) to confirm their extent and location.
Track the progress of each individual *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.	Label each individual *Fontainea* sp. Coffs Harbour and patch/clump of *Pittosporum* sp. Coffs Harbour with a unique identifier code.	Prior to any works being undertaken on site, each individual *Fontainea* sp. Coffs Harbour and patch/clump of *Pittosporum* sp. Coffs Harbour to be labelled with a unique identifier code.
The retained vegetation is protected from accidental clearing during the Construction Phase of the Project.	Highly visible temporary fencing is erected along the boundary of the Exclusion Zone.	Prior to any vegetation clearing works, highly visible temporary fencing has been erected along the boundary of the Exclusion Zone.
		The vegetation within the Exclusion Zone is retained for the duration of the Project.
Protect retained *Fontainea* sp. Coffs Harbour individuals from soil compaction, trampling of seedlings, seed predation, and grazing of seedlings.	Star picket and wire (not barbed wire) fencing is to be placed around the retained *Fontainea* sp. Coffs Harbour	The retained individuals have star picket fencing installed around their perimeter.

Objective	Outcome	Performance Criteria
The retained vegetation and *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are not impacted by erosion and sediment or dust.	Erosion and sediment and dust controls are installed prior to works being undertaken.	The retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are not impacted by erosion and sediment or dust.
	Erosion and sediment and dust controls are installed outside of the Exclusion Zone.	The retained vegetation is not impacted by erosion and sediment or dust controls.
Minimise edge effects to the retained vegetation and *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.	Develop Landscaping Plan (or similar) to provide protective vegetated screening along the length of Exclusion Zone.	Landscape Plan (or similar) has been implemented to minimise edge effects into the retained vegetation.
Minimise the proliferation and/or establishment of weeds within the Exclusion Zone.	Weeds which have the potential of impacting the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Exclusion Zone have been treated appropriately.	The retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are not impacted by weeds.
Introduction of pathogens into the Exclusion Zone is minimised.	Number of site visits is limited to only those strictly necessary to implement this management plan. All visitors are to disinfect footwear and hands, wear clean cloths and minimise time on site.	A protocol to minimise the introduction of pathogens to the Exclusion Zone during monitoring and maintenance has been developed and is implemented.
Raise awareness of the importance of the Exclusion Zone.	All persons working in the vicinity of the Exclusion Zone are informed of the high ecological significance of the vegetation within the Exclusion Zone.	Information regarding the importance of the Exclusion Zone and penalties for impacting the Exclusion Zone are incorporated into daily Toolbox talks.
The suitability of the management measures is assessed and confirmed.	Monitoring is undertaken to identify impacts to the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.	Monitoring is undertaken to identify impacts to the retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.

10.2 Risk analysis

The risks to the retained vegetation and *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Exclusion Zone are similar to the risks to the salvage translocated and propagated *Pittosporum* sp. Coffs Harbour within the Planting Areas and Exclusion Zone. These risks are discussed in Section 8.2, and include the following:

- Impacts from weed intrusion and/or proliferation.
- Poaching of individual plants.
- Bushfire impacts.
- Flood impacts.
- Insect and disease outbreaks.
- Design changes impacting the Exclusion Zone.

Refer to Table 6 for details of the risks, mitigation measures, and remedial actions.

10.3 Schedule of works and responsibilities

The indicative schedule for the *in-situ* management of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Exclusion Zone is provided in Table 9.

Table 9: Schedule of all activities associated with the *in-situ* management of threatened species within the Exclusion Zone

Activity	Timeframe	Responsible entities
Pre-works survey to identify/confirm extent of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.	After on-ground delineation of the clearing extents and prior to any vegetation clearing being undertaken.	Project Ecologist
Plants labelled with unique identifier code and location mapped. Materials used for labelling should be durable and of high quality to avoid degradation over time.	After on-ground delineation of the clearing extents and prior to any vegetation clearing works being undertaken.	Project Ecologist
Fencing and Signage installed	Temporary fencing is required to be erected prior to any clearing works being undertaken.	Construction Contractor

Activity	Timeframe	Responsible entities
Erosion and sediment and dust controls installed	Prior to any clearing or earthworks being undertaken on site	Construction Contractor
Adjacent revegetation between exclusion zone and construction footprint.	Landscaping Plan (or similar) for the interface between the Project Boundary and the Exclusion Zone is to be developed prior to construction activities occurring adjacent to exclusion zone	Construction Contractor
	The Landscaping Plan (or similar) is to be implemented as soon as practicable during Construction Phase of the Project to enable earlier possible establishment of vegetation adjacent to exclusion zone	Construction Contractor
	The effectiveness of the Landscaping Plan is to be reviewed following vegetation clearing works and amended as required.	Project Ecologist
Artificial screening	The need for artificial screening will be identified during the Installation Period, Initial Maintenance Period, and/or the Monitoring Period.	Revegetation Contractor, Project Ecologist, or Species Expert
Weed control	As per Section 9.7.	Revegetation Contractor
Toolbox sessions	During the Construction Phase of the Project.	Construction Contractor
Monitoring	Following initial vegetation clearing adjacent to the Exclusion Zone and as per Section 9.9	Project Ecologist or Species Expert

PART D – ADDITIONAL MANAGEMENT ACTIONS

11 Additional management actions and research

11.1 Overview

This section details additional management actions proposed to assist with the conservation of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour, including:

- General management actions that apply to both *Pittosporum* sp. Coffs Harbour and *Fontainea* sp. Coffs Harbour
- Additional species-specific management actions for *Pittosporum* sp. Coffs Harbour

Further species-specific management actions for *Fontainea* sp. Coffs Harbour are provided in the *Fontainea* sp. Coffs Harbour Management Plan.

11.2 Habitat restoration

Habitat restoration works are proposed to be undertaken within [redacted] and will include restoring approximately 3 ha of existing blueberry farm to a wet sclerophyll-rainforest vegetation community, which is anticipated to be to provide additional suitable habitat for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour. TfNSW will investigate the option of progressing habitat restoration within the balance of the Recipient Sites.

The habitat restoration will also aim to provide koala habitat as well as provide ecological linkages and habitat connectivity along [redacted].

11.3 *Ex-situ* conservation

TfNSW will provide the Australian Botanic Garden Mount Annan propagated *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour for *ex-situ* conservation purposes. It is also proposed that the Australian Botanic Garden's network of botanical gardens across eastern NSW will also be provided propagated *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour. These include for example Lismore Rainforest Botanic Gardens, Hunter Region Botanic Gardens and the North Coast Botanical Gardens, Coffs Harbour.

TfNSW will confirm with the Australian Botanic Garden Mount Annan the number of propagated individuals to be provided.

11.4 Biodiversity Stewardship Agreements

A BSA is a legal agreement between a property owner and the NSW Minister for Environment and Heritage to establish a biodiversity stewardship site for the purpose of protecting and managing land to achieve a gain in biodiversity values

and generating biodiversity credits under the Biodiversity Offset Scheme. A BSA identifies the land to which the agreement applies and the BSA is registered on the title of the land in-perpetuity.

As discussed in Section 4.3, the Recipient Sites owned by TfNSW are proposed to be protected in-perpetuity by establishing the Planting Areas as biodiversity stewardship sites under a BSA. The sites will have specific management plans (including monitoring and report requirements to the Biodiversity Conservation Trust) to which all future landholders are required to adhere and will have on-going. The management plans are effective in perpetuity and are attached to the title of the land. The on-sale of the TfNSW owned Recipient Sites are expected not to occur for at least five years following initial translocation works and the salvage translocated and planted individuals will be established to minimising risk of future loss of plants.

In addition to the TfNSW owned Recipient Sites, TfNSW will investigate opportunities to establish additional biodiversity stewardship sites for areas outside of the Project Boundary that contain *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour, and which are located on private property during further targeted surveys proposed (refer to Section 11.7). TfNSW will aim to establish a BSA in consultation with the private property owner and in accordance with the TfNSW guideline *Selling biodiversity credits to Transport* (TfNSW, 2020).

11.5 Research initiative – species ecology

The following preliminary research proposals have been developed by Dr Andrew Benwell (Ecos Environmental) for delivery by suitable suppliers with funding supplied in whole or part by TfNSW. The following preliminary research proposals are proposed and will be refined with input from the Species Expert and the Royal Botanic Gardens Sydney's geneticist.

The Research Initiatives proposed for *Pittosporum* sp. Coffs Harbour are detailed in Table 10.

Table 10: Research Initiatives proposed for *Pittosporum* sp. Coffs Harbour

No.	Preliminary Description of Experiment	Rationale/Justification
1	Evolution/seed production experiment. • 10 patches to be salvage translocated at [redacted]. • Transfer portions from 10 patches into a single patch to see if this stimulates seed production (presumably by cross pollination).	Test theory that inbred, clonal species can be stimulated to start cross-pollination and seed set again by bringing together two distinct populations to increase the genetic diversity in pollen and ovules.

No.	Preliminary Description of Experiment	Rationale/Justification
	• Replicate at least six times at different Recipient Sites. • Keep other portions of patches to be salvage translocated intact to act as controls in the experiment, but also as a mitigation measure in the event that is the best survival strategy for the species. • Stems to be tagged and monitored for survival, flowering, and seed production. • Any fruit produced to be analysed genetically to determine if genetic variation has been enhanced, or new genetic individuals created.	
2	Phenology and population dynamics experiment. • Tag and monitor stems – record number of new shoot initiation events in three years. • Time monitoring to also record flowering and fruit/seed production over three years.	Aims and outcomes of this experiment include: • Understanding how populations persist over time. • Understanding the population dynamics of this species as there do not appear to be any old or senescent stems in patches. • Understand growth rates as there is very little apical or axillary shoot growth. • Understand population dynamics as current estimates of rate of growth indicate that mature stems may be 50-100 years old by counting leaf whorl scars and assuming only one or two are produced each year on average. • Understanding the cycle of re-current dieback events, which then leads to reshooting from the base of stem.

11.6 Research initiative – habitat modelling

TfNSW has engaged USC to undertake habitat modelling to refine the currently understood habitat of *Fontainea* sp. Coffs Harbour in the Coffs Harbour and Bellingen local government areas. The model will aim to identify additional areas of potential habitat beyond that which that has already been surveyed and will provide additional tools to assist with targeting future surveys for *Fontainea* sp. Coffs Harbour.

As *Pittosporum* sp. Coffs Harbour shares similar habitat requirements with *Fontainea* sp. Coffs Harbour, the habitat modelling is likely to also assist in the identification of additional *Pittosporum* sp. Coffs Harbour.

11.7 Research initiative – further targeted surveys

Following completion of the habitat modelling undertaken by USC (which will identify areas of suitable habitat for *Fontainea* sp. Coffs Harbour in the Coffs Harbour and Bellingen local government areas) TfNSW will engage a botanist(s) to undertake targeted surveys for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour in the areas identified by USC as providing suitable habitat for *Fontainea* sp. Coffs Harbour.

The total survey effort will be determined by TfNSW and will aim to survey areas with the highest likelihood of encountering *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.

As *Pittosporum* sp. Coffs Harbour share similar habitat requirements with *Fontainea* sp. Coffs Harbour, the additional surveys are also likely to identify any additional *Pittosporum* sp. Coffs Harbour.

During the surveys, the following will be recorded:

- A GPS location and photograph of all *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.
- All existing and potential threats to the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.
- Tenure of the land upon which the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour are present to assist in prioritising future conservation efforts.

Additionally, samples of all *Fontainea sp. Coffs Harbour and Pittosporum sp. Coffs Harbour* identified will be collected for genetic analysis.

A report will be developed and provided to TfNSW which details the methodology and outcomes of the further targeted surveys.

12 Works Cited

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Pavlick, B. M. (1996). Defining and measuring success. In D.A. Falk, C.I. Millar and M. Olwell (eds) Restoring Biodiversity pp. 208-234. Island Press, Washington.

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Appendix A |

Compliance with translocation guidelines (Commander et al., 2018)

An assessment against the checklist for translocation guidelines (Commander *et al.*, 2018) has been undertaken in Table 11.

Table 11: Assessment for compliance with the translocation guidelines

Translocation Guidelines Criteria	Response
Have all alternative management options been attempted or considered?	Alternative route options were investigated with the aim of completely avoiding impacts to *Pittosporum* sp. Coffs Harbour and its habitat. However, complete avoidance was assessed as not being feasible. Further design alterations and refinements have minimized impacts to the greatest extent possible.
Is the taxonomic status of the taxon certain?	*Pittosporum* sp. Coffs Harbour has been determined by the NSW Herbarium as a newly discovered species and its status is considered certain.
Is the distribution of the taxon adequately understood?	Three rounds of targeted surveys have been carried out in the broader locality to determine the distribution of *Pittosporum* sp. Coffs Harbour. The targeted surveys have focused on areas of habitat similar to the habitat within the individuals have been identified. As the species has been newly discovered, the distribution in the Coffs Harbour local government area (and surrounds) is currently uncertain. However, their distribution within the Project Boundary is well understood. Further targeted surveys are proposed to confirm the distribution of *Pittosporum* sp. Coffs Harbour in other areas of Coffs Harbour and Bellingen local government area.
Are threatening processes understood and can they be controlled?	Impacts from vegetation clearing is likely to be the main historical and current threat to *Pittosporum* sp. Coffs Harbour. Other threatening processes are likely to include seed predation which limits recruitment, habitat degradation from weeds, debarking by feral deer and loss of suitable habitat as a result of climate change. Weed control measures, exclusion fencing, salvage translocation, propagation and planting are included in the suite of management measures proposed to assist with the long-term survival of *Pittosporum* sp. Coffs Harbour.
Have potential suitable Recipient Sites been identified?	Several suitable Recipient Sites have been identified for the translocated patches/clumps and for the

Translocation Guidelines Criteria	Response
	propagated individuals. Additional Recipient Sites will be selected as required.
If considering population enhancement, do you have evidence of population decline and have you considered or attempted alternative means of increasing population size?	The population of *Pittosporum* sp. Coffs Harbour is likely to have historically declined due to vegetation clearing. The population of *Pittosporum* sp. Coffs Harbour shows evidence of natural regeneration in the last decade via natural recruitment. The Project has the potential to contribute towards the species decline (in the absence of mitigation measures). Population enhancement is being proposed along with salvage translocations. Population enhancement of *Pittosporum* sp. Coffs Harbour is proposed in conjunction with salvage translocation and habitat management to increase the local population size.
Have you considered the success of any previous translocation programs?	*Pittosporum* sp. Coffs Harbour has not previously been salvage translocated, however, other *Pittosporum* spp. have successfully been propagated and planted. In this regard, the genera has a demonstrated history of successful propagation.
Have you determined the cost of implementing the translocation program including post translocation monitoring and management and have sufficient funds been secured?	TfNSW have allocated sufficient budget to implement the translocation program, post translocation monitoring and management measures

Appendix B |

Description of the Recipient Sites

A description of the proposed Recipient Sites for salvage translocated and propagated *Pittosporum* sp. Coffs Harbour including area (ha) and present owner, vegetation, topography and microclimate.

Recipient Sites	Area (ha)	Owner	Vegetation	Topography and Microclimate
[redacted]				