





Cranbrook Fixed Rail Outloading Facility Mitigation and Rehabilitation Plan P1020A-01-00 CBH June 2023



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1 INTRODUCTION AND BACKGROUND

Co-operative Bulk Handling Limited (CBH) are submitting native vegetation clearing permits associated with the redevelopment of grain loading facilities at key sites including Cranbrook in the Great Southern region.

Tranen Revegetation Southwest (Tranen) was commissioned by CBH to prepare a Mitigation and Rehabilitation Plan (the plan) for their Cranbrook site due to the proposed expansion of their Rail Outloading Facility resulting in the clearing of Wheatbelt TEC Eucalypt Woodland. The site is located the southern edge of the Cranbrook townsite, 330 km southeast of Perth (see Appendix 1).

Tranen undertook a detailed desktop and site-wide visual assessment of surrounding parcels of TEC near the proposed development area in March 2023. This assessment identified a total area of 2.79 hectares where mitigation and rehabilitation works could be completed to enhance the existing TEC woodland.

This plan details the strategy and detailed specifications of activities to be undertaken to successfully meet the objectives. It is intended to be a practical document with sufficient detail to provide comprehensive instructions for on-ground site works. The plan is to be implemented over five years; at which time the completion criteria will be consistently achieved. Most activity will be in year one and two with ongoing maintenance and intervention based on regular formal monitoring and reporting.

1.1 Documentation

This plan is based on the following information provided by the Client:

- CBH Cranbrook Rail Outloading Facility NVCP Application Final.
- EndPlan Environmental Native Vegetation Clearing Permit Supporting Document ECO205_01_V3; and
- Ecoscape (Australia) Pty Ltd CBH Cranbrook Environmental Survey 4570-20R.

1.2 Mitigation and Rehabilitation Objectives

The objectives of the plan are:

- To develop a woodland mitigation and rehabilitation plan focussed on regenerating and improving condition of remnant vegetation adjacent to the proposed development footprint at CBH's Cranbrook facility.
- To put in place the mechanisms for native vegetation to become self-sustaining through a comprehensive weed control effort, as well as installing native plants in degraded and cleared patches between woodland remnants, as well as increasing understorey diversity in and around remnant trees.
- The plan also includes an ongoing maintenance schedule based on formal site monitoring until completion criteria are met.



2 ENVIRONMENTAL CONTEXT

The following provides a brief description of general biophysical elements relevant to the site and their likely influence. This does not constitute a detailed analysis of all potential factors, only those most likely to influence on-ground works.

2.1 Climate

Cranbrook has a Mediterranean climate with cool wet winters and warm dry summers. The long term (since 1903) average rainfall is 505 mm but since 1970 is around 475 mm (a decline that has occurred throughout southwest Australia (Commonwealth of Australia 2023). This decline in rainfall has implications for the mitigation and rehabilitation plan, potentially affecting survival of plantings and germinates, especially in the first and second summers, as well as creating a smaller window of activity in the wetter cooler months.

2.2 Landform and Soils

The terrain comprises low relief with areas of grey sandy duplex soil and areas of winter wet soil with shallow groundwater. The main landform constraints to vegetation growth at the Cranbrook site are waterlogging in places, changed surface hydrology associated with railway embankments and uncontrolled vehicle tracks, as well as dryland salinity caused by shallow saline groundwater.

2.3 Dieback Status

No information has been collected or made available on the dieback status of the site. The site is within the 400+ mm zone regarded as the vulnerable zone for Phytophthora dieback (DBCA 2022) but is not a hotspot for the disease compared to the 750+ mm zone or areas such as the nearby Stirling Ranges with many vulnerable species.

2.4 Site Condition

The woodland remnants at the Cranbrook site have been assessed for condition based on EPA guidelines (Ecoscape 2022) and by further site assessment by Tranen staff. All remnants at the site are degraded or significantly altered by obvious signs of multiple disturbances, including partial clearing, fire, and grazing, and the dominance of aggressive weeds. However, all remnants within the site are regarded as retaining enough basic vegetation structure that rehabilitation remains viable.

2.5 Existing Uses

The site proposed for rehabilitation and rehabilitation is on crown reserve land on the south side of the rail line and is criss-crossed by various dirt tracks between woodland remnants.



3 IMPLEMENTATION STRATEGY

The site is separated into four management zones or parcels, each with its own implementation strategy based on remnant vegetation condition and type, site access and constraints, weed coverage, soil characteristics, and surface hydrology (i.e., waterlogged or dryland soils).

Indicative locations for each of the management zones are provided in Appendix 2. The recommended species and their corresponding quantities for the mitigation activities proposed for each zone or parcel are provided in Appendix 3.

The following section provides a summary of management zone specific site conditions, the overarching strategy for each management zone and the primary works activities required. The activities and timing of activities are detailed in the indicative work schedule (Appendix 4).

The zones are summarised as follows:

- Management Zone 1 Infill Yate
- Management Zone 2 Infill Wandoo
- Management Zone 3 Wandoo Open
- Management Zone 4 Closed Canopy

3.1 General

3.1.1 Signage

Signage advising the public, contractors, and employees that rehabilitation works are being progressively undertaken shall be placed at entry points into the site. In addition, rehabilitation areas where there is a direct interface with access tracks and turnarounds shall be clearly delineated with signage installed stating 'rehabilitation works in progress'.

3.1.2 Herbivores

Herbivores have the potential to severely compromise rehabilitation success by grazing on native seedlings and germinants. Rabbits are evident within the surrounding area/s and will have a significant impact on the success of the program if the risk is not controlled / eliminated.

Kangaroos are thought to be less of a risk as there is no visual evidence (i.e., kangaroo scats) visiting the site or surrounding remnant vegetation. This may be due to being close to the Cranbrook townsite and CBH's operational facilities.

Should kangaroo predation have an impact on tubestock survival, as determined by regular programmed monitoring, then additional control methods will be implemented.



3.1.3 Fencing

Due to the presence of rabbits within and surrounding the site, a rabbit proof fence will be installed. Fencing will protect any tubestock from being grazed, encourage natural recruitment, delineate the area from construction works (when being undertaken) and will assist with keeping unauthorised vehicle and foot traffic off the site.

The fence will be a standard 1200mm high rural post and wire fence with 1200mm netting attached (900mm up the fence and 300mm bent at right angles and laid on the surface facing outwards). The fencing will have access gates at suitable locations.

3.1.4 Access Tracks

There is an informal maintenance vehicle track traversing through the site which is used presumably for rail track maintenance and occasionally by surrounding landowners for access to their properties. This track should remain and will assist in the implementation and ongoing maintenance activities. Any minor tracks that are currently not in use, that are duplicate or short cuts, or have not been used for an extended period, will be rehabilitated as part of the mitigation and rehabilitation works.

3.2 Management Zone 1 – Infill Yate



Figure 1 Infill Yate Zone

This zone is the largest at the site with 1.79 ha. It is largely winter wet *Eucalyptus occidentalis* (swamp yate) dominated woodland, with scattered understorey shrubs including *Callitris pyramidalis* (swamp cypress), Melaleuca's and various sedges. There is an outlet from the CBH retention basin that is particularly wet with *Gahnia trifida* (saw sedge) tussocks in the understorey (Figure 1).



The Infill Yate Zone will have three weed control events prior to infill planting, with care being taken to avoid off-target damage to native sedges and any other remnant understorey species.

Hand-held power augers will be used for surface preparation following the effective removal and control of weeds. Augered holes will be 150 mm in diameter and 300 mm in depth. A follow-up weed control event will occur pre-planting as the disturbance will trigger weed growth.

Tubestock will be planted into augered holes at an average density of 1 plant per 4m². However, this density will vary depending on presence of existing trees and native understorey species. Maximum density of planted seedlings in any patch or clearing will be 1 plant per m².

A single 20g native fertiliser tablet will be installed with each seedling (except for species in the Proteaceae family) to provide immediate nutrients to establishing plants.



3.3 Management Zone 2 - Infill Wandoo

Figure 2 Infill Wandoo Zone

Figure 2 shows typical vegetation of Management Zone 2 – Infill Wandoo. This zone is 0.62 ha and comprises scattered *Eucalyptus wandoo* (wandoo) trees with a highly degraded understorey. This zone will have intensive weed control in year one and pre-planting in year two when infill planting of overstorey and understorey species will occur, with a focus on woodland understorey species that are less winter-wet than Management Zone 1 – Infill Yate.

Hand-held powered augers will be used for surface preparation creating planting holes 90 mm wide and 150 mm deep. A follow-up weed control event will occur pre-planting as the disturbance will trigger weed growth.



Tubestock will be planted into augered holes at an average zone density of 1 plant per 4m² which will vary depending on presence of existing trees and native understorey species. Maximum density of planted seedlings in any patch or clearing will be 1 plant per m². A single 20g native fertiliser tablet will be installed with each seedling (except for species in the Proteaceae family) to provide immediate nutrients to establishing plants.

3.4 Management Zone 3 - Wandoo Open



Figure 3 Wandoo Open Zone

Management Zone 3 - Wandoo Open is a strip of 2,254 m² almost fully cleared (Figure 3) but with scattered native understorey species present. It provides an opportunity to install a higher density of plants, with a focus on restoring the overstorey of wandoo and creating a species rich understorey.

Following two weed control events, hand-held power augers will be used to create planting holes 90mm wide x 150mm deep. A follow up weed control event will occur pre-planting. Tubestock will be planted at a density of 1 plant per 2m². A single 20g native fertiliser tablet will be installed with each seedling (except for species in the Proteaceae family) to provide immediate nutrients to establishing plants.



3.5 Management Zone 4 - Closed Canopy



Figure 4 Closed Canopy Zone

Management Zone 4 is a small parcel of 1,588 m² with near-continuous canopy of relatively intact overstorey vegetation so is likely to require fewer infill plants, although some understorey species will be established where possible (Figure 4).

The focus in this zone will be on weed control to create the conditions for the existing vegetation to encourage natural recruitment.

Following two weed control events, hand-held power augers will be used to create planting holes 90mm wide x 150mm deep where possible. A follow up weed control event will occur pre-planting. Tubestock will be planted at a density of 1 plant per 10m², which will vary depending on presence of existing trees and native understorey species. Maximum density of planted seedlings in any patch or clearing will be 1 plant per m².

A single 20g native fertiliser tablet will be installed with each seedling (except for species in the Proteaceae family) to provide immediate nutrients to establishing plants.



4 ADVANCE PLANNING AND MANAGEMENT

4.1 Vegetation Retention

All existing native vegetation will be protected, and operators must have considerable experience in identifying native species which will be integral to spot spraying. Infill planting in degraded remnants will be by hand-held power augers to minimise disturbance to existing tree roots.

4.2 Native Seed, Cutting and Transplant Recovery

All living material to be used in the plan will be sourced from a 100 km radius around Cranbrook. Should the range need to be extended due to the availability of suitable material, approval will be sought through the client from the relevant government authority.

4.3 Dieback Management

A Dieback Management Plan has not been developed for the site, but indicator species both within and surrounding the site do not appear affected by Phytophthora. The site will be treated as dieback uninterpretable, and all personnel, machinery and vehicles are to be cleaned down prior to arriving onsite to prevent any foreign soil or seeds entering the site.



5 IMPLEMENTATION METHODOLGY

The following section outlines the specific methodology for each management action to be implemented as part of the revegetation works.

The recommended techniques below provide cost-effective and practical revegetation industry best management practices, suitable for the site conditions and to meet the required objectives. Variation to these techniques may be required prior to, or during, implementation because of inherent variability of natural systems. This should be undertaken as part of an adaptive management approach, informed through real-time site observations and in close consultation with relevant stakeholders where required.

5.1 Weed Management

Weed management is a crucial element to the success or failure of all revegetation and remnant vegetation rehabilitation projects. Wheatbelt TEC Eucalypt Woodland remnants are typically infested with a variety of aggressive bushland and pasture weeds.

The weed management program will be the focus of year one of the plan, targeting a full-year of the various weed life cycles. Weed control will occur, as a minimum, in autumn and spring each year. Woody weeds can be targeted at any time.

As a priority, any woody weeds will be removed and known aggressive species targeted through a spray program. Some of these priority weeds identified onsite include, but are not limited to:

- Bridal creeper (*Asparagus asparagoides*)
- Eastern states wattles (Acacia longifolia, A. iteaphylla and A. pycnantha)
- Spiny rush (*Juncus acutus*)
- Tagasaste (Chamaecytisus palmensis)
- Watsonia (Watsonia meriana)

The role of the weed control program is not to eradicate, but to manage weeds and allow natives to establish themselves and create a self-sustaining ecological community that can compete effectively, and resist weed encroachment.

The weed control program will:

- Occur for at least one full year prior to seed and tubestock installation across the site, including in areas not requiring in-fill planting or seeding to encourage natural regeneration.
- Include a final weed control event pre-planting following soil disturbance associated with surface preparation as disturbance can trigger rapid weed germination.
- Use herbicides selected for the target species, that consider the surrounding environment and constraints this may present. Where appropriate, selective herbicides (i.e., grass or broadleaf-specific) shall be favoured over general knockdown herbicides to keep off-target damage to a minimum. In some instances, alternative control methods such as manual removal shall be considered where appropriate. Some of the common herbicides likely be used at the site are listed in Table 1.



Table 1 General herbicide groups and applications									
Herbicide	Use								
Glyphosate Biactive	Broadleaf and grasses								
Fluazifop	Grass specific								
Metsulfuron-methyl	Geophytes (e.g., bridle creeper, Watsonia)								

• All herbicide application records are to be kept as required under Department of Health WA regulations. Only herbicides authorised for use in Australia are to be used and all operators will be experienced and accredited.

5.2 Surface Preparation

- Surface preparation activities are to be undertaken by experienced and qualified personnel with suitable equipment for the tasks required. Significant care needs to be exercised when working near mature native vegetation.
- Hand-held power augers will be used throughout the site as ripping or other methods are likely to damage tree roots. The aim of the augering is to break up any subsoil compaction, direct water penetration and infiltration, and allow deep roots to develop before the onset of dry hot weather. Augers will also help to create a well around each individual seedling directing and retaining rainfall.

5.3 Species Selection and Plant Allocations

- The species used in this plan will be based on previously conducted flora surveys by other consultants, DBCA herbarium records, and visual observations made during the on-ground site assessment.
- The proposed species aim to maximise diversity, especially of woodland understorey species, but still be practical in terms of what is likely to be available and likely to succeed.
- The proposed species lists and associated quantities for each of the management zones can be found in Appendix 3. It is expected there will be around 30 species planted / seeded over the site.
- The list in Appendix 3 is based on what is expected to perform well or is readily available based on previous experiences. However, the provenance seed and cutting collection to be undertaken in the early stages of the plan may increase the diversity of species available to propagate.

5.4 Seedling Propagation and Planting

- All seedlings shall be sourced from NIASA certified nurseries, with preference also given to local suppliers where possible.
- All tubestock shall be either forestry tubes or deep cells and propagation material will be collected within 100 km of the site in the early stages of the plan implementation.



• Planting shall be via augers and planting tubes (e.g., Pottiputki's) to ensure safety of operators and provide accurate and effective planting.

5.5 Works Schedule

The implementation program is to commence in summer of year one with provenance seed and cutting collection, rubbish removal, rabbit control, and fencing of the site. The primary installation of seedlings is in winter of year two, followed by a regular cycle of weed control, infill planting, monitoring, and reporting.

An indicative works schedule has been developed for the revegetation works and is detailed in Appendix 4.



6 POST-INSTALLATION MANAGEMENT

6.1 Site Maintenance

This plan has been designed to maximise the chances of success by the early identification of potential issues, allowing timely solutions to be identified and implemented.

There are several factors outside of normal control which may influence the outcome such as adverse weather conditions (i.e., droughts and storms), unauthorised access, and pests and diseases. The monitoring shall identify these issues so that they can be dealt with in an appropriate manner.

- Maintenance activities may include:
 - On-going weed management (spring/summer, autumn/winter);
 - Re-planting in areas of poor response (winter);
 - Fence inspection / repair (quarterly); and
 - Disease and pest control (as required).
- Weeds will almost certainly continue to have an impact on the rehabilitation progress and their management shall be the principal maintenance activity.
- The extent of weed control required for autumn and spring weeds, and outside of these seasons, shall be determined through site monitoring.
- Remedial planting operations will be undertaken if seedlings are not progressing towards the defined success targets.
- In some instances, it may be more cost effective to re-start the revegetation operation rather than continuing in problematic areas.

6.2 Monitoring and Reporting

- Each management zone will be monitored bi-annually (spring and autumn) for the first 3 years, and annually (spring), for the remaining 2 years (or until required) after installation. The timing of these assessments may be adjusted to suit seasonal conditions.
- Each management zone will be monitored separately. The site is long and narrow and planting will vary in density at the patch scale so monitoring design needs to reflect this. The number of 5m x 5m quadrats established in each zone will be determined by relative area as follows:

Rehabilitation Zone	5m x 5m quadrats
MZ 1 (Infill yate)	10
MZ 2 (Infill Wandoo)	4
MZ 3 (Wandoo Open)	2
MZ 4 (Closed Canopy)	1

Table 2 – Number of quadrats per management zone



- Each quadrat shall be clearly marked with fence droppers and an ID tag placed on the • NW corner of the guadrat and will be GPS marked and mapped. A photo of the guadrat shall be taken from the NW corner.
- The following quantitative and qualitative data will be recorded within each quadrat:

rasio o Bata to so resolution at monitoring bittor										
Quantitative Data	Qualitative Data									
Density (stems / m ²) installed plants	The health of native vegetation									
Native species present (species diversity)	Soil movement									
Estimated native foliage cover (% cover)	Fauna and pest activity									
Estimated total weed cover (% cover)	Comparison of quadrats to remainder of site									

Table 3 – Data to be recorded at monitoring sites.

Monitoring of weed cover and installed native cover (when stem counts become problematic as plants grow and spread) will be undertaken using the following cover class estimates:

< 5 %	5 - 10%	11 - 20%	21 - 50%	51 - 80%	> 80%.

- A visual assessment of the entire site through site traverses is to be undertaken as • part of each monitoring event to provide a broader picture of success and identify the progress of areas that are not captured by the quadrat data.
- A summary report is to be provided to CBH for each monitoring event to document the • findings and provide recommendations for any additional or contingency actions required to achieve the completion targets.

6.3 **Completion Criteria**

Table 4 below shows the completion criteria for the mitigation and rehabilitation plan. It is based primarily on the success of weed control and installed plants but will also capture any natural regeneration over the site.

Aspect	Completion Criteria	Primary Assessment Method			
Vegetation – Species Composition	≥60% of species installed represented in each management zone after 5 years	Quadrat / site traverse: Species count			
Vegetation – Density	1,500 stems installed per hectare across the site and/or 70 percent cover of installed plants.	Quadrat: installed stem density count / estimated cover where stem counts difficult			
Vegetation – Condition	Vegetation is self-sustaining (i.e., evidence of plant maturity, flowering and seed set observed).	Observation within quadrats and site traverse			
Weed Management	≤20% weed cover of grassy and pasture weeds. No declared weeds or exotic woody weeds present onsite	Quadrat estimates of cover/ site traverse			
Site Maintenance	Rabbit proof fence intact. No rubbish on site	Site traverse			

Table 4 Completion Criteria



7 CONTINGENCY AND MANAGEMENT ACTIONS

Contingency actions are only required if progress towards completion criteria is not being achieved.

There can sometimes be variable outcomes in revegetation and rehabilitation projects, due to uncontrollable or unpredictable events like extreme weather, droughts, heatwaves and frosts, and differences in landform, soil, or biology.

In addition, if predation (by kangaroos for example) and/or physical disturbance (such as vandalism) occur these factors may impact outcomes.

The primary method of developing contingency actions will be from both formal and informal monitoring. A report is to be provided for each monitoring event to document the findings and provide recommendations for any additional actions or contingency plans required to achieve the project targets. These contingency measures may include:

- On-going weed management,
- Re-planting in areas of poor response.
- Fence repair; and
- Disease and pest control.



8 **REFERENCES**

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Appendix 1 Site Location





Appendix 2 Management Zones and Treatments

			549000	549200	549400	5	49600	549800	550000	550
	3.7								to a cal	
03800		Zone	Description		treatment	area m2	hectares			
62		1	Swamp Yate o	dominant winter wet near basin outlet	infill yate	17857	1.79			
*		2	Wandoo domi	nant infill planting and weeds	infill wandoo	6214	0.62			
		3	Wandoo open	area - higher density of planting	wandoo open	2254	0.23			
0		4	Predominately	/ weed control with minimal planting	closed canopy	1588	0.16			
62036(11				27,913	2.79	. 33/5/	+	
6203400					+		+			
6203200			+				4		+	The second
5202800 6203000	Aeri	ial Ima	+ agery Source: G	toogle		+ * *	+	+	+	
0			549000	549200	549400 0	5	549600	549800 250 5	550000 500 m	550
	t re	ra evegetat	nen ion southwest	Project: Cranbrook Woodland Mitigation Project Number: P1020A Client: CBH				Drawing:Management Zone Drawing Number: P1020A-(Revision: 0	s)1	





Appendix 3 Species Allocations and Quantities



CRANBROOK MITIGATION AND REHABILITATION PLAN SEEDLING SPECIES AND QUANTITIES

Management Zone	Area (m²)	Density (plants / m ²)	Total Tubestock
MZ 1 (Infill yate)	17,857	0.25	4,464
MZ 2 (Infill Wandoo)	6,214	0.25	1,554
MZ 3 (Wandoo Open)	2,255	0.50	1,128
MZ 4 (Closed Canopy)	1,588	0.10	159
TOTAL	27,914		7,304

Species	Form	Seed / Tubestock	MZ 1 (I	nfill Yate)	MZ 2 (Inf	ill Wandoo)	MZ 3 (Wa	ndoo Open)	MZ 4 (Closed Canopy)		
		/ Cuttings	%	Qty	%	Qty	%	Qty	%	Qty	
Allocasuarina lehmanniana subsp. lehmanniana	S	S,T	10	446	10	155	10	113	10	16	
Acacia lullfitziorum	S	S,T	5	223	5	78	3	34	3	5	
Acacia multispicata	S	S,T			5	78	3	34	3	5	
Acacia stenoptera	S	S			3	47	3	34			
Atriplex semibaccata	S	S,T	5	223					10	16	
Billardiera fusiformis	С	S,T			3	47	2	23	2	3	
Callistemon phoeniceus	S	S,T	12	536	5	78	5	56	5	8	
Callitris pyramidalis	S	S,T	8	357	5	78					
Conostylis aculeata subsp. aculeata	н	S,D			5	78	5	56	5	8	
Dianella revoluta	Н	D			5	78	5	56	5	8	
Eucalyptus occidentalis	Т	S,T	6	268	6	93	6	68	6	10	
Eucalyptus wandoo	Т	S,T			10	155	10	113	10	16	
Eutaxia parvifolia	S	S,T	1	45	2	31					
Gahnia trifida	R	D	5	223							
Hakea lissocarpha	S	S,T			4	62	8	90	4	6	
Hakea prostrata	S	S,T	8	357	4	62	8	90	4	6	
Kennedia prostrata	С	S,T	5	223	2	31	2	23			
Kunzea recurva	S	S,T	2	89	1	16	1	11	1	2	
Leptospermum erubescens	S	S,T	4	179	12	186	13	147	15	24	
Machaerina juncea	R	D	8	357							
Melaleuca carrii	S	S,T	1	45			1	11			
Melaleuca cuticularis	Т	S,T	5	223			1	11			
Melaleuca hamata	S	S,T			5	78	5	56	10	16	
Melaleuca viminea subsp.	S	S,T			5	78	5	56	5	8	
Mirbelia ovata	S	S,T	5	223							
Regelia inops	S	S,T	8	357	2	31	1	11	1	2	
Verticordia plumosa	S	С	2	89	1	16	3	34	1	2	
TOTALS			100	4,464	100	1,554	100	1,128	100	159	



Appendix 4 Indicative Works Schedule



CRANBROOK MITIGATION AND REHABILITATION PLAN INDICATIVE IMPLEMENTATION SCHEDULE

A ativity	Year 1				Year 2			Year 3				Year 4				Year 5				
Activity	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum	Aut	Win	Spr	Sum
Fencing																				
Pre-planting weed control																				
Seed and cutting collections																				
Rabbit control																				
Woody weed control																				
Planting																				
Monitoring and reporting																				
Post-planting weed control																				
Infill planting																				
Fence maintenance																				