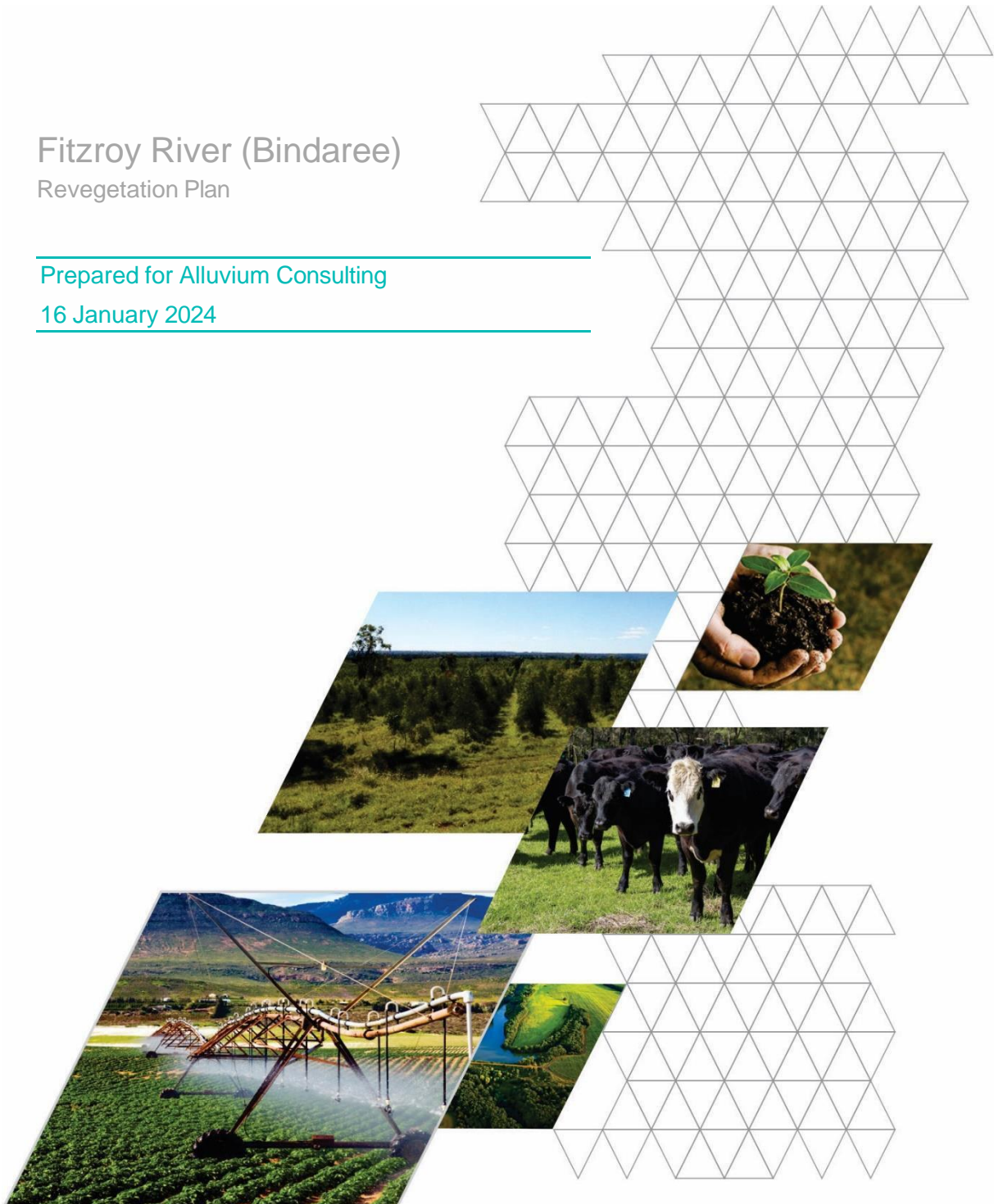


Fitzroy River (Bindaree) Revegetation Plan

Prepared for Alluvium Consulting
16 January 2024



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Table of contents

ABBREVIATIONS	VIII
ABBREVIATION UNITS.....	VIII
FITZROY RIVER (BINDAREE) SITE WORKS SUMMARY.....	1
1. INTRODUCTION	3
1.1 BACKGROUND.....	3
1.2 SCOPE	6
2. STABILISATION DESIGN OVERVIEW.....	7
2.1 OVERVIEW	7
2.2 REVEGETATION ZONE CHARACTERISTICS	8
3. SOIL MANAGEMENT	10
3.1 SOIL ANALYSIS.....	10
3.1.1 Topsoil	10
3.1.2 Subsoil	10
3.2 TOPSOIL MANAGEMENT	10
3.2.1 Amelioration	10
3.2.2 Topsoil demand	12
3.2.3 Recovery and treatment	12
3.2.4 Topsoil balance	12
3.3 SUBSOIL MANAGEMENT.....	12
4. REVEGETATION STRATEGY.....	13
4.1 OBJECTIVES FOR THE VEGETATION COMMUNITY	13
4.2 REGIONAL ECOSYSTEM TYPES.....	13
5. REVEGETATION ESTABLISHMENT.....	14
5.1 ESTABLISHMENT PERIOD	14
5.2 MULCH AVAILABILITY AND DEMAND	14
5.3 REVEGETATION APPROACH BY ZONE.....	14
6. REVEGETATION PALETTE.....	18
6.1 SPECIES	18
6.2 SEED AND TUBESTOCK DEMAND	18
6.3 TUBESTOCK MANAGEMENT	19
6.3.1 Tubestock Procurement.....	19
6.3.2 Tubestock Container Type	19
6.3.3 Tubestock contingency	20
6.3.4 Tubestock specification.....	20
6.3.5 Field nursery management	20
6.3.6 Seedling planting technique.....	20
6.4 DIRECT SEEDING	22
6.4.1 Seed Sowing and Depth	22
6.4.2 Direct seeding sowing time.....	22

7. IRRIGATION SYSTEM.....	23
7.1 CONCEPT DESIGN	23
7.2 IRRIGATION RATE.....	23
7.3 IRRIGATION FREQUENCY	24
7.3.1 Supplementary watering events.....	24
8. MAINTENANCE PROGRAM	25
8.1 ESTABLISHMENT MAINTENANCE	25
8.1.1 Weed control	25
8.1.2 Supplementary watering (as directed).....	25
8.1.3 Re-sow / Refill	25
8.1.4 Irrigation maintenance	26
8.1.5 Minor erosion rectification	26
8.2 REVEGETATION MAINTENANCE	26
9. MONITORING AND PERFORMANCE	29
9.1 MONITORING	29
9.1.1 Performance Criteria.....	29
9.1.2 Sampling narrow linear zones	30
9.1.3 Sampling the Over Bank.....	32
9.1.4 Alternate approach	32
9.2 MONITORING SCHEDULE AND REPORT.....	32
10. REFERENCES	34
10.1 GENERAL REFERENCES	34
10.2 ONLINE REFERENCES	34
10.2.1 Erosion control.....	34
10.2.2 Seed collection and storage.....	34
10.2.3 Chemicals to control grasses in revegetation.....	34
10.2.4 Biosecurity	34
APPENDIX 1: REVEGETATION ZONES AND AREAS.....	35
APPENDIX 2: SOIL ANALYSIS.....	36
APPENDIX 3: REVEGETATION RISK ASSESSMENT	39
APPENDIX 4: HOLD POINTS AND QUALITY ASSURANCE.....	41
APPENDIX 5: REGIONAL ECOSYSTEMS.....	44
APPENDIX 6: FLORA SURVEY	48
APPENDIX 7: SEED AND TUBESTOCK REQUIREMENTS	49
APPENDIX 8: TUBESTOCK SPECIFICATIONS	52
APPENDIX 9: IRRIGATION CONCEPT PLAN DRAWINGS	54

List of Tables

TABLE 1: REVEGETATION WORKS SUMMARY	2
TABLE 2: REVEGETATION ZONES	8
TABLE 3: APPROXIMATE FERTILISER DEMAND BY REVEGETATION ZONE	11
TABLE 4: TOTAL FERTILISER REQUIREMENTS.....	11
TABLE 5: TOPSOIL DEMAND	12
TABLE 6: ESTIMATE STRIPPING DEPTHS AND VOLUMES.....	12
TABLE 7: REGIONAL ECOSYSTEM TYPES	13
TABLE 8: REVEGETATION APPROACH FOR EACH ZONE.....	15
TABLE 9: SUITE OF SUITABLE REVEGETATION SPECIES	18
TABLE 10: SEED REQUIREMENTS BY ZONE.....	19
TABLE 11: TUBESTOCK REQUIREMENTS BY ZONE	19
TABLE 12: PLANTING TECHNIQUE.....	21
TABLE 13: WATER DEMAND BY ZONE	23
TABLE 14: IRRIGATION FREQUENCY	24
TABLE 15: ESTABLISHMENT MAINTENANCE TASK FREQUENCY.....	25
TABLE 16: REVEGETATION MAINTENANCE TASK FREQUENCY	26
TABLE 17: MONITORING TERMS.....	29
TABLE 18: PERFORMANCE CRITERIA	30
TABLE 19: GROUND COVER PERCENTAGE (EXAMPLE SHOWN).....	31
TABLE 20: MILESTONE MONITORING REPORTING	32
TABLE 21: FITZROY RIVER (BINDAREE) - SOIL ANALYSIS & SAMPLE RESULTS – RESULTS OF SOIL TESTING 0-20CM, 20-60CM AND 60-120CM DEPTHS.....	38
TABLE 22: REVEGETATION RISK ASSESSMENT	39
TABLE 23: HOLD POINTS AND QUALITY ASSURANCE	41
TABLE 24: REGIONAL ECOSYSTEM DETAILED DESCRIPTIONS.....	44
TABLE 25: PLANT SPECIES (RESULTS OF FLORA SURVEY CONDUCTED 26 OCTOBER 2023).....	48
TABLE 26: SEED DEMAND FOR ALL ZONES (1.732HA) AT 20KG/HA	49
TABLE 27: TUBESTOCK DEMAND FOR ALL ZONES	50
TABLE 28: TUBESTOCK ACCEPTANCE SPECIFICATIONS.....	52

List of Figures

FIGURE 1: FITZROY RIVER (BINDAREE) WORKS AREA	3
FIGURE 2: FITZROY RIVER (BINDAREE) LOCALITY MAP	5
FIGURE 3: ACTIVE BANK - LOOKING UPSTREAM.....	7
FIGURE 4: ACTIVE BANK– LOOKING DOWNSTREAM	7
FIGURE 5: STABILISATION DESIGN PLAN VIEW (PROVIDED BY ALLUVIUM).....	8
FIGURE 6: REVEGETATION ZONES PLAN VIEW	9
FIGURE 7: LINEAR SAMPLE DESIGN	31
FIGURE 8: REVEGETATION ZONES.....	35
FIGURE 9: SOIL SAMPLING SITES	37
FIGURE 10: REGULATED VEGETATION MANAGEMENT MAP.....	45
FIGURE 11: PRE-CLEARING REGIONAL ECOSYSTEMS	46
FIGURE 12: REMNANT REGIONAL ECOSYSTEMS.....	47
FIGURE 13: INDICATIVE IRRIGATION MAP.....	55
FIGURE 14: TYPICAL IRRIGATION DESIGN	56

Abbreviations

Abbreviations used in this document.

DAF	Department of Agriculture and Fisheries
ET	Evapotranspiration
FBA	Fitzroy Basin Association
IECA	International Erosion Control Association
MNES	Matter of National Environmental Significance
MSES	Matter of State Environmental Significance
RE	Regional Ecosystem
REDD	Regional Ecosystems Descriptions Database
RET	Regional Ecosystem Type
VMA	Vegetation Management Act (1999)

Abbreviation Units

kilometre	km
metre	m
square metre	m ²
cubic metre	m ³
hectare	ha
stems per hectare	sph
kilogram	kg

Fitzroy River (Bindaree) Site Works Summary

At the completion of civil works, the Fitzroy River (Bindaree) Site will consist of a North facing main batter approximately 270m long, with a bench and smaller batter running along the toe of the main batter. Along the bench, timber pile fields will be installed supported by rock toe protection and large dead wood placed strategically.

Revegetation works will cover the lower and upper banks of the main batter. Additionally, a facilitated revegetation area will extend along the overbank of the main batter.

The Revegetation Plan aims to achieve the rapid establishment of a vegetation community that will:

- Stabilise the bank and provide a buffer to the river's erosive forces; and
- Contribute to local native species diversity representative of the surrounding ecosystem.

The revegetation works are planned in a series of zones with specific treatments and species for each zone. An irrigation option, site maintenance and monitoring approach is also provided.

References to a number of key elements of the plan are included below:

- Table 1 summarises zone work requirements and material quantities for works delivery.
- Section 3 details soil management.
- Section 4 details the revegetation approach.
- Section 7 details the irrigation design.
- Appendix 7 details seed and tubestock requirements.
- Appendix 9 details the irrigation concept plan.

Table 1: Revegetation works summary

Aspect	Lower Bank	Upper Bank	Overbank	Reference
Length (m)	255	285	325	Table 2
Width (m)	21 ^[1]	25 ^[1]	15	
Area (m²)	5,238 ^[1]	7,204 ^[1]	4,873	
Grade (assumed)	1V:3H	1V:3H	Natural ground level	
Soil Management				
Mineral Fertiliser (kg)	61	84	96	Table 3
Compost (kg)	2,344	3,221	-	
Seed Demand				
Tree	-	-	-	Table 10
Grass	3.14	4.32	2.92	
Sedge	0.79	1.08	0.73	
Legume	1.31	1.80	1.22	
Cover crop	5.24	7.20	4.87	
Total Seed (kg)	10.48	14.40	9.74	
Tubestock Demand				
Tree	524	540	366	Table 11
Sedge-Rush	1,048	720	487	
Total Tubes (stems)	1,572	1,260	853	
Approach				
Ground preparation	Strip topsoil. Dozer rip subsoil along the contour to 200mm.		Opportunistically dozer rip to 200mm. Do not disturb existing tree cover.	Table 8
Topsoil application	Spread topsoil to 200mm.		N/A	Table 5
Fertiliser application	Spread fertiliser at prescribed rates. Incorporate to 200mm with offsets / harrows.			Table 3
Seed application	Sow seed mix at prescribed rate. Incorporate to 10mm depth.			Table 10
Water-in sown seed	Water, but avoid runoff.			
Tubestock planting	Plant tubestock at prescribed rate.			Table 11
Fertiliser application	Incorporate 150g of organic fertiliser per seedling (75g in the bottom of the planting hole, 75g around the base of the planted tubestock).			Table 12
Water-in tubestock	Water within four hours, avoid runoff.			
Irrigation	As per irrigation schedule.			Table 14

^[1] Reprofiled zone widths and areas are based on estimated batter surface areas calculated from assumed slope grade.

1. Introduction

1.1 Background

The Fitzroy River is a major Queensland catchment that flows to the Coral Sea and Great Barrier Reef. Fine sediment and accompanying nutrient loads from the Fitzroy and its tributaries pose potential problems for reef health. The site on the property Bindaree shows signs of streambank erosion (Figure 1) and is located approximately 40km North-West of Rockhampton.

Figure 1: Fitzroy River (Bindaree) works area



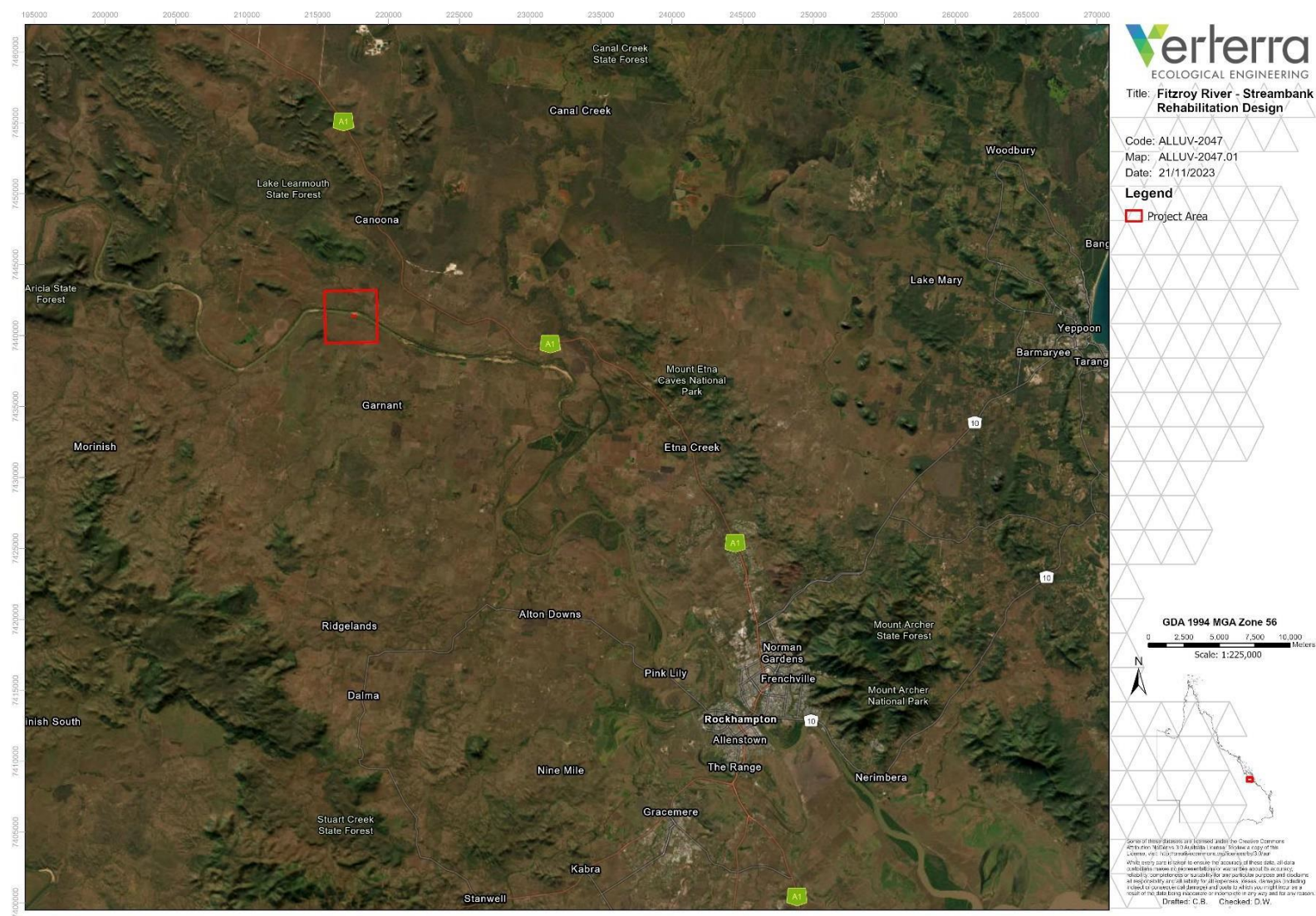
Proposed works include:

- Reprofilng eroded embankment to a gradient of 1V:3H.
- Construction of a bench and small batter at the toe of the main batter.
- Installation of timber pile fields and rock toe protection at upstream interface.
- Establishment of riparian vegetation along the reprofiled main batter.
- A facilitated vegetation¹ zone upslope of the proposed earthworks area.
- Installation of stock exclusion fencing.

Verterra has been engaged by Alluvium to prepare a Revegetation Plan to assist with re-establishment of a riparian zone on reprofiled banks, and the adjacent facilitated revegetation zones, to improve long-term stability of the planned works and bolster existing vulnerable areas of riparian vegetation. The Plan includes maintenance and monitoring programs to ensure key performance indicators are met. This Plan provides direction on the management of vegetation and topsoil during early works, and the revegetation requirements on completed civil works and existing riparian areas, to ensure a stable landscape that can tolerate River flows and periodic inundation from the River and overland flows.

¹ Facilitated revegetation is assisting vegetation establishment through soil amelioration, seeding, and installation of tubestock but without the use of machinery to reprofile the bank.

Figure 2: Fitzroy River (Bindaree) locality map



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1.2 Scope

This Plan outlines the requirements for the revegetation of the Fitzroy River (Bindaree) Streambank Stabilisation project.

The Plan will:

- Provide a brief design overview.
- Describe site characteristics.
- Identify soil properties and amelioration requirements.
- Detail the revegetation strategy and objectives.
- Outline revegetation approach for each zone.
- Identify species to be used and their management.
- Outline an irrigation strategy and design.
- Establish a maintenance program.
- Define KPIs and monitoring approach.

The resultant soil amelioration and revegetation works will:

- Contribute to bank stability.
- Reflect local regional ecosystem types and existing species identified on-site.
- Be appropriate for defined zones.

Planned work areas and defined revegetation zones are outlined in Section 2.2.

As part of the on-site field work, and to inform the development of this plan, Verterra undertook the following:

- Soil sampling and laboratory analysis (Appendix 2).
- Informal flora survey of the dominant plant species (Appendix 6).

2. Stabilisation design overview

2.1 Overview

The Fitzroy River (Bindaree) site is a 270m long section of the southern bank of the river, 1.244 ha of which is the focus of the civil works, with an additional 0.487 ha of facilitated revegetation along the overbank. The southern bank, is near-vertical with evidence of recent mass slumping having occurred. Downstream of the site, the bank tapers down where the erosion is less evident.

Figure 3: Active Bank - looking upstream



Figure 4: Active Bank– looking downstream



Soil samples were collected to identify the physical, chemical, and nutritional properties of the topsoil and subsoil that will be encountered in the work area. Based on laboratory results, soils appear to be homogenous across the site, consisting of brown/grey sandy loam soils with a consistently low clay percentage throughout the profile. The soils are not sodic or saline but show deficiencies in certain nutrients. More details on soil characteristics are contained in Section 3. Fitzroy River (Bindaree) Stabilisation Design includes:

- Site design layout.
- Removal of standing vegetation.
- Stripping and stockpiling of topsoil for re-use.
- Civil works and progressive removal of subsoil balance excess to establish batters.
- Installation of upstream rock toe protection.
- Respreading of topsoil on targeted areas.
- Revegetation of ground cover and terrestrial vegetation.
- Optional consideration of irrigation to accelerate site stabilisation on high risk zones.

2.2 Revegetation Zone Characteristics

The bank stabilisation design has works and revegetation zones stratified by their relative bank position. Civil work zones for the bench, pile fields and rock protection are not included in the revegetation approach. The civil work zones and stabilisation design are shown in Figure 5.

Figure 5: Stabilisation design plan view (provided by Alluvium)

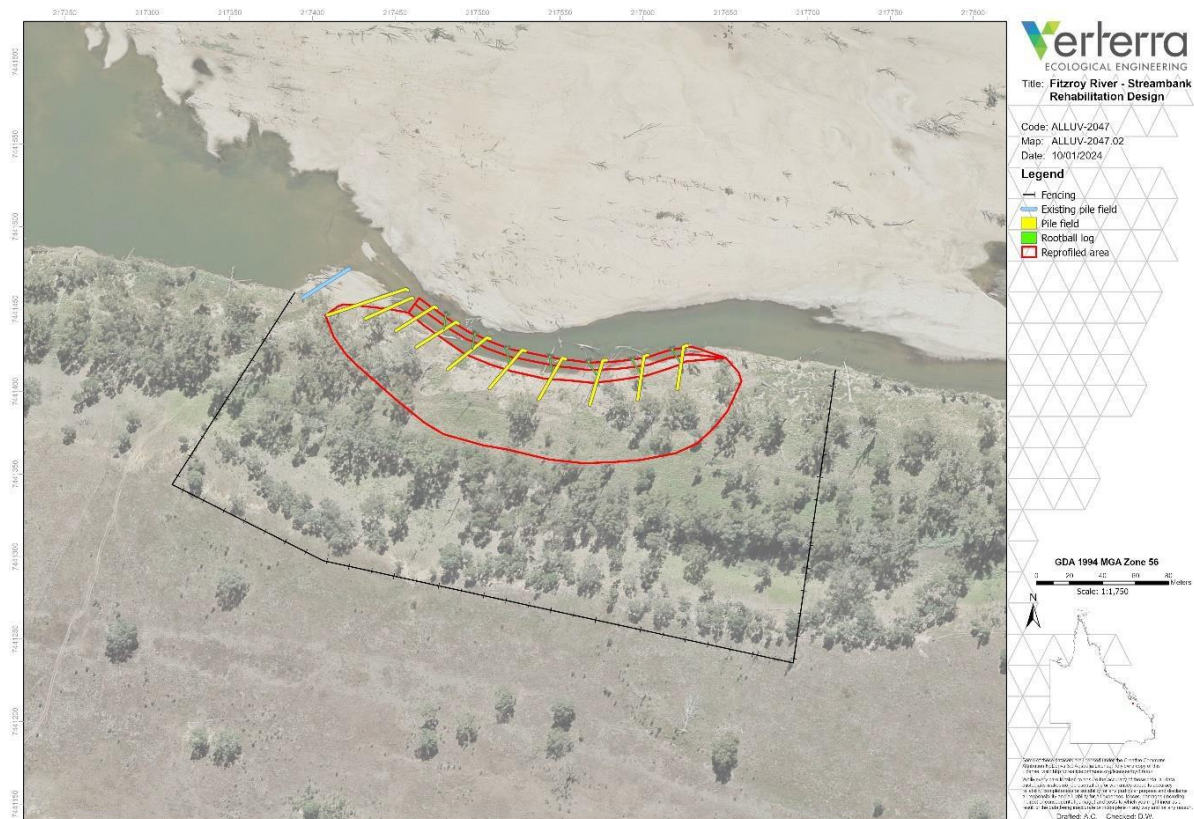


Table 2 designates unique zone numbers to each of the revegetation zones, and clearly identifies their location, gradient and treatment area. The upper bank and lower bank are contained within the planned reprofiling area, whereas the overbank is outside. Revegetation zones are shown in Figure 6.

Table 2: Revegetation Zones

Zone Location	Grade	Treatment Area (m ²)
Lower Bank	1v:3h	5,238 ^[1]
Upper Bank	1v:3h	7,204 ^[1]
Overbank	Natural ground level	4,873

^[1] Reprofiling zone treatment areas are based on estimated batter surface areas calculated from assumed slope grade.

Figure 6: Revegetation zones plan view



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3. Soil Management

3.1 Soil analysis

The site's soils have been broken into three management units:

- Lower Bank;
- Upper Bank; and
- Overbank.

A summary of the topsoil and subsoil analysis is in the following sections (3.1.1-3.1.2). Full laboratory analyses are presented in Appendix 2.

3.1.1 Topsoil

The topsoil has a light texture, ranging from sandy loams to clay loam. The pH levels are generally neutral, with an average pH of 7.1. The topsoil is non-saline, with an average electrical conductivity (EC_{SE}) of 0.4 dS/m.

The cation exchange capacity (CEC) ranges from low to moderate (10.5–14.1 cmol/kg), averaging 12.1 cmol/kg. This indicates a weak to moderate buffering effect to changes in pH, available nutrients, and soil structure. Exchangeable cations are generally balanced and the topsoil is non-sodic with an average ESP of 0.8%.

Organic carbon ranges from low in the lower bank (0.4%) to moderate in the upper bank (1.3%), averaging 0.9%. Plant-available macronutrients phosphorous and potassium are present at adequate levels, however nitrogen and sulphur are deficient throughout the site and will require the addition of fertiliser to optimise growth conditions and stimulate early vegetation establishment. The plant-available micronutrient boron is also deficient.

3.1.2 Subsoil

The subsoil also varies from sandy loams to clay loams, and is neutral to slightly alkaline (7.4–7.6). All of the subsoil is non-sodic (<6.0% ESP) and non-saline (<2.0 dS/m).

As per the topsoil, the generally balanced cations and low clay content of the subsoil suggests limited erosion risk through dispersion and indicates no gypsum treatment will be required for stabilisation works.

3.2 Topsoil management

3.2.1 Amelioration

The topsoil amelioration strategy aims to address deficiencies in nitrogen, sulphur, boron, and organic matter to assist revegetation of the disturbed area of works. Due to the proximity of the site to a watercourse, a well incorporated compost is recommended to address half of the nitrogen requirement and organic matter deficiencies as it is less susceptible to leaching compared to common fertilisers. Mineral fertilisers are recommended to meet the remaining requirements to assist the beginning of the revegetation process and promote early growth and subsequent uptake of the nutrients stored in the compost.

To address the topsoil nutrient deficiencies, the following fertiliser blends are recommended in addition to organic matter:

- Fertiliser blend for Lower and Upper bank:
 - Nitrogen + Sulphur product with approximately 35 : 0 : 0 : 10 (e.g., Urea Double S);
 - Product with approximately 14.3% boron content (e.g., Granubor); plus
 - Millmud or compost product equivalent to supply 50% of the nitrogen requirement and organic matter. Rates calculated using a product with approximately 0.84% total N, 0.19% total P, 0.6% total K, 0.12 total S, and 13.3 % total organic carbon content.
- Fertiliser blend for Overbank:
 - Nitrogen + Sulphur product with approximately 41: 0 : 0 : 5 (e.g., Urea S)
 - Product with approximately 14.3% boron content (e.g., Granubor); plus

Table 3 summarises the fertiliser application rates and demand per zone.

Table 3: Approximate fertiliser demand by revegetation zone

Revegetation Zone	Area (ha)	Fertiliser Blend	Fertiliser Rate (kg/ha)	Fertiliser Demand (kg)
Lower Bank				
	0.524	Urea Double S	105	55
		Granubor	11	6
		Compost	4,473	2,344
Upper Bank				
	0.720	Urea Double S	105	76
		Granubor	11	8
		Compost	4,473	3,221
Overbank				
	0.487	Urea S	178	87
		Granubor	11	5

^[1] Reprofiled zone areas will have soil recovered from the upper bank spread over exposed subsoil. Therefore, the upper and lower bank will receive the same fertiliser application rate.

Table 4: Total fertiliser requirements

Product	Total (kg)
Urea Double S	131
Urea S	87
Granubor	19
Compost	5,565

3.2.2 Topsoil demand

All available topsoil will be returned to the project area. All reprofiled zones (Lower Bank and Upper Bank) require topsoil spreading to a minimum of 200mm. Topsoil demand is summarised in Table 5. Noting, this is subject to detailed construction design.

Table 5: Topsoil demand

Revegetation Zone	Area (m ²)	Topsoil demand for 200mm depth (m ³)
Lower Bank	5,238	1,048
Upper Bank	7,204	1,441
Overbank	N/A	N/A
Total	12,442	2,489

3.2.3 Recovery and treatment

Topsoil stripping, stockpiling and re-spreading will be considered as part of the civil earthworks work package and is not discussed in detail here as a Schedule of Quantities is yet to be developed. The Lower bank appears to have inadequate topsoil supply. This will be compensated for by increasing the stripping depth of topsoil in the upper bank.

A summary of estimated stripping depths and volumes is in Table 6.

Table 6: Estimate stripping depths and volumes

Revegetation Zone	Area of intact topsoil (m ²)	Volume from 200mm strip (m ³)	Volume from 300mm strip (m ³)
Lower Bank	2,113	423	634
Upper Bank	6,448	1,290	1,934
Overbank	N/A	N/A	N/A
Total	8,561	1,713	2,568

3.2.4 Topsoil balance

Based on the above estimates there is a topsoil deficit of 776m³ if stripping is done at 200mm depth (the depth of assumed topsoil). The balance of the material should be sourced by stripping the upper 100mm of subsoil (total stripping depth of 300mm) and ameliorating at the rates indicated in Table 3.

3.3 Subsoil management

The soil analysis shows low rates of subsoil sodicity (ESP ranges from 0.7%-1.6%), indicating the soil is non-sodic. Coupled with the low clay content and absence of tunnel erosion, it is not recommended that the subsoil be ameliorated with gypsum at any location in the bank profile.

4. Revegetation Strategy

The revegetation strategy comprises the following components for each zone:

- Determination of regional ecosystem types.
- Site soil sampling and analysis.
- Soil amelioration and site preparation.
- Revegetation establishment.
- Established vegetation maintenance (including irrigation option).
- Monitoring.

4.1 Objectives for the vegetation community

Revegetation aims to encourage the rapid establishment of a vegetation community that contributes to bank stability, and a stable landscape that can tolerate river flows and periodic inundation from Fitzroy River (Bindaree) and is representative of the surrounding riparian community.

Revegetation works, particularly topsoil placement and soil treatments, should proceed as soon as practical after civil works are completed.

4.2 Regional ecosystem types

Vegetation community Regional Ecosystem Types (RET) are summarised in Table 7 and a detailed description of each RET is provided in Appendix 5.

Verterra conducted an informal flora survey of the site to determine what species are present in the area. A list of species is summarised in Appendix 6. The flora survey was undertaken to determine how closely the species in the area are matched to those found within each mapped RET.

The species associated with the RET's, coupled with the field survey, will inform revegetation species selection.

Table 7: Regional Ecosystem Types

Regional Ecosystem	Conservation Status	REDD Short Description
Within works area		
11.3.4	Vegetation Management Act Class (VMA) Class: Of concern. Biodiversity Status: Of concern.	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains.
11.3.25	VMA Class: Least concern. Biodiversity Status: Of concern.	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines
Adjacent to works area		
11.3.2	VMA Class: Of concern. Biodiversity Status: Of concern.	<i>Eucalyptus populnea</i> woodland on alluvial plains.
11.11.15	VMA Class: Least Concern Biodiversity Status: No concern at present	<i>Eucalyptus crebra</i> woodland to open woodland on deformed and metamorphosed sediments and interbedded volcanics.

5. Revegetation establishment

5.1 Establishment period

The revegetation establishment period includes installation and the 12-week period after work task completion.

Performance criteria will be established for success at 12 weeks. Table 8 details the establishment revegetation approach.

5.2 Mulch availability and demand

In the concept design shapefiles provided by Alluvium, there is no mention of onsite clearing or mulching. Should this be undertaken at the site, it is expected that any mulch deployed on the site will be based on tub grind processed material from standing trees.

Based on site assessments, it is estimated that there would not be sufficient mulch available to cover the site. If mulch is available, it is recommended that it be spread across the Upper & Overbanks of the reprofiled areas at a depth not exceeding 100mm. Any excess vegetation not mulched should be placed throughout the site to assist in rehabilitation of the site and to provide habitat.

5.3 Revegetation approach by zone

Subsoil amelioration, topsoil management and revegetation will follow completion of civil earthworks, which includes bank reprofiling and rock toe protection at the upstream interface.

A summary of the revegetation task sequence for each Zone is presented in Table 8.

The detail provided below includes the irrigation option for watering areas considered essential for rapid early establishment. The irrigation approach is outlined in more detail in Section 7.

Revegetation risks and controls are detailed in Appendix 3. Hold points and quality assurance steps are detailed in Appendix 4.

Table 8: Revegetation approach for each Zone

Zone(s)	Task	Description	Rate/ Frequency/ Ref
Reprofiled			
Lower Bank Area: 5,238 m ² Upper Bank Area: 7,204 m ² Slope: 1v:3h (18.4°) (assumed)	Ground preparation	<p>Following re-shaping work. Dozer rip subsoil to 200mm. Rip to a maximum of 1m separation and leave surface rough-textured.</p> <p>Water subsoil surface, ensure that surface runoff is avoided.</p> <p>Spread treated topsoil to a minimum 200mm, or as per Detailed Design or Schedule of Quantities.</p> <p>NOTE: Ripping will be along the contour.</p> <p>NOTE: Rock toe protection will be installed prior to revegetation works.</p>	200mm depth 2mm/ha (20,000L/ha). Once. 200mm (min)
	Fertilising	<p>Apply fertiliser blend at prescribed rate using appropriate machinery (e.g., centrifugal/belt spreader or in smaller/sensitive areas, a handheld spreader). Care should be taken when spreading fertiliser to ensure full incorporation and prevent drift. Where possible on streambank rehabilitation sites, ameliorants may be incorporated into the stripped topsoil to minimise the risk of spreading drift into sensitive areas.</p> <p>Incorporate fertiliser to 200mm with harrows or offsets.</p>	Table 3 200mm depth
	Seeding	<p>Sow grass-pasture-legume mix at prescribed rate using appropriate machinery.</p> <p>Incorporate seed mix to 10mm depth.</p> <p>Note, different species mix for each zone.</p>	Table 10 Appendix 7
	Watering	<p>Water-in sown seed.</p> <p>Avoid surface runoff during watering events.</p>	6mm/ha (60,000L/ha) at sowing, then water per irrgrn schedule.
	Planting	<p>Manually plant tubestock (seedlings) at prescribed stocking densities as per recommended palette.</p> <p>Plant sedge species along the waterline edge of the Lower Bank.</p> <p>Incorporate nitrogen-rich organic fertiliser into each tubestock planting hole and surrounds.</p>	Table 11 Appendix 7 150g per seedling

Zone(s)	Task	Description	Rate/ Frequency/ Ref
	Watering	Water-in tubestock within 4 hrs of planting.	6 litres per tubestock once, then water per irrigation schedule.
		Install irrigation as per irrigation design in Section 7 and Appendix 9.	Section 7.2 Section 7.3
		Establishment follow-up watering.	Per irrgrn schedule.
Natural surface			
Overbank Area: 4,873 m ² Slope: Natural Ground Level	Ground preparation	<p>This zone is the intact floodplain woodland beyond and beside the re-profiled zones.</p> <p>Improving water infiltration rates and encouraging ground cover on these Zones will reduce pressure on the adjacent banks and batters.</p> <p>Opportunistically dozer rip (tines max 1m separation) to 200mm. Observe ripping set-back distance from standing mature trees to minimise lateral root damage (e.g., beyond the canopy drip line).</p>	200mm depth (max).
	Fertilising	<p>Apply fertiliser blend at prescribed rate using appropriate machinery (e.g., centrifugal/belt spreader).</p> <p>Incorporate fertiliser to 200mm with harrows or offsets.</p>	Table 3 200mm depth.
	Seeding	<p>Sow grass-pasture-legume mix at prescribed rate using appropriate machinery.</p> <p>Incorporate seed mix to 10mm depth.</p>	Table 10 Appendix 7
	Watering	<p>Water-in sowed seed.</p> <p>Avoid surface runoff during watering events.</p>	6mm/ha (60,000L/ha) at sowing, then water per irrigation schedule.
	Planting	<p>Manually plant tubestock (seedlings) at prescribed stocking densities as per recommended palate.</p> <p>Plant sedge species along the waterline edge of the Lower Bank where applicable.</p> <p>Incorporate nitrogen-rich organic fertiliser into each tubestock planting hole and surrounds.</p>	Table 11 Appendix 7 150g per seedling

Zone(s)	Task	Description	Rate/ Frequency/ Ref
	Watering	Water-in tubestock within 4 hrs of planting. Establishment follow-up watering.	6 litres per seedling once, then water per irrigation schedule. Per irrigation schedule. Section 7.3

6. Revegetation palette

6.1 Species

The proposed rehabilitation species align with the pre-clear RET's of the work zones (Appendix 5) as well as the flora survey of the site (Appendix 6). The proposed species suitable for revegetation at the Fitzroy River (Bindaree) site (Table 9) have been selected to provide a successional species establishment designed to quickly stabilise the soil with a short-lived cover crop species, and slower establishing stoloniferous species with high capacity to bind the soil, plus deep-rooted legumes to contribute nitrogen and soil shear strength.

Table 9: Suite of suitable revegetation species

<p>Trees species:</p> <ul style="list-style-type: none"> • <i>Erythrina vespertilio</i> • <i>Eucalyptus camaldulensis</i> • <i>Eucalyptus teriticornis</i> • <i>Ficus opposita</i> • <i>Geijera salicifolia</i> • <i>Lophostemon suaveolens</i> • <i>Macaranga tanaruis</i> • <i>Melaleuca bracteata</i> • <i>Melaleuca viminalis</i> • <i>Melia azedarch</i> <p>Sedge species:</p> <ul style="list-style-type: none"> • <i>Cyperus gracilis</i> • <i>Lomandra longifolia</i> <p>Cover crop species:</p> <ul style="list-style-type: none"> • <i>Echinochloa esculenta</i> • <i>Panicum miliaceum</i> 	<p>Native grass species:</p> <ul style="list-style-type: none"> • <i>Aristida latifolia</i> • <i>Aristida leptopoda</i> • <i>Aristida personata</i> • <i>Heteropogon contortus</i>^[1] • <i>Bothriochloa bladhii</i> • <i>Imperata cylindrica</i> • <i>Dichanthium sericeum</i> • <i>Themeda triandra</i> <p>Nitrogen-fixing species:</p> <ul style="list-style-type: none"> • <i>Acacia salicina</i> • <i>Acacia stenophylla</i> • <i>Cassia brewsteri</i> • <i>Crotalaria mitchellii</i> • <i>Glycine tabacina</i> • <i>Hovea longipes</i> • <i>Indigofera australis</i> • <i>Stylosanthes scarba</i>
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^[1] If included in a seed mix, must be threshed (or similarly processed) to facilitate mixing and spreading (due to barbed nature of the seed)

6.2 Seed and tubestock demand

The objective is to achieve site stabilisation in the shortest practical timeframe. A combination of native grass seed, native sedge, short-lived cover crop, and nitrogen-fixing seed and tubestock will be deployed. The seed mix does not include tree species, as they will be installed using tubestock. Seed and tubestock application rates and stocking rates by revegetation zone are presented in Table 10 and Table 11, with species details in Appendix 7.

Native seed procurement is a long lead time item, given the variabilities of nature. Seed ordering or collection and storage should begin immediately after contract award. Placing a priority on seed acquisition will guarantee supply quantities. Table 10 summarises the seed quantity required for each Zone.

Table 10: Seed requirements by zone

Stratum	Rate (kg/ha)	Fitzroy River (Bindaree)			Total by stratum
		Lower Bank	Upper Bank	Overbank	
		0.524ha	0.720ha	0.487ha	
Tree	-	-	-	-	-
Cover Crop	10	5.24	7.20	4.87	17.31
N-fixer	2.5	1.31	1.80	1.22	4.33
Grass	6	3.14	4.32	2.92	10.39
Sedge	1.5	0.79	1.08	0.73	2.60
Seed Demand	20kg/ha	10.48	14.40	9.74	34.62

Table 11 summarises the number of seedlings required for each Zone.

Table 11: Tubestock requirements by zone

Stratum	Fitzroy River (Bindaree)						Tube Demand
	Lower Bank 0.524ha		Upper Bank 0.720ha		Overbank 0.487ha		
	Rate	Tubes	Rate	Tubes	Rate	Tubes	
Tree	1,000	524	750	540	750	366	1,430
Sedge	2,000	1,048	1,000	720	1,000	487	2,255
Stems/ha	3,000	-	1,750	-	1,750	-	-
No. of Tubes	-	1,572	-	1,260	-	853	3,685

Seeds should be sourced from, or provided to, an industry accredited nursery for germination to supply Project seedlings. As far as practical all seed and seedlings will be sourced from known local provenances.

6.3 Tubestock management

6.3.1 Tubestock Procurement

Tubestock (seedlings) will be procured from Nursery Industry Accreditation Scheme Australia (NIASA) registered nurseries using Central Queensland region species provenances where available and practical. Seedlings are a long-lead time item and will need to be ordered well in advance of the required planting date. The typical nursery production time for Eucalypts is 4 months. Where Central Queensland seed provenances cannot be sourced, suitable substitutions may be approved.

6.3.2 Tubestock Container Type

Tubestock pot type options include:

- Hyco V93 tray (40 cells) with root trainers and provision for air-pruning; or
- 50 mm x 50 mm Queensland native tubes.

Tubestock will be dispatched in nursery trays.

6.3.3 Tubestock contingency

An allowance should be made for a 15% contingency for refills.

6.3.4 Tubestock specification

Appendix 8: Tubestock specifications details the acceptable tubestock specification.

6.3.5 Field nursery management

A secure temporary holding area should be established at Fitzroy River (Bindaree) or nearby (if appropriate). The site should be located under available tree canopy shade and an irrigation sprinkler system installed. Sufficient seedlings for one weeks' planting can be held onsite. Seedlings should not be carried over on temporary holding arrangements for more than two weeks.

Seedling trays should be stored above ground level and watered three times per day. Watering duration should be until run-off is observed.

6.3.6 Seedling planting technique

Seedlings should be procured as container stock and maintained in a field holding area.

All seedlings should be manually planted with an individual tree fertiliser application.

The stocking rates will vary by lifeform for each revegetation zone (refer to Table 11).

Appendix 8: Tubestock specifications details the approach to seedling establishment.

Table 12: Planting technique

Step	Task	Specification
Planting spots	<p>If grass or weed germination is present, spot spray a planting spot 2wks prior to planting.</p> <p>This is particularly important for the facilitated revegetation area. Once sprayed, any dead grass or weeds should be removed from around the tubestock. This will increase sunlight and decrease fire danger to the seedling.</p>	0.3m diameter with glyphosate or approved herbicide at label rates.
Seedling plug watering	<p>All seedling plugs to be dipped into a reputable water.</p> <p>Liquid fertiliser can be included at this step and mixed in with the water.</p>	Plugs saturated before deployment to field.
Row & Seedling spacing	<p>Seedlings should be planted in a row-line format unless directed by the Site Manager.</p> <p>The row-line formation facilitates subsequent maintenance works.</p>	<p><i>Lower Bank:</i> 3,000sph (~2m x 1.6m spacing)</p> <p><i>Upper & Overbank:</i> 1,750 sph (~2m x 2.8m spacing)</p> <p>Refer to Table 11 (tree and sedge combined stocking rate).</p>
Planting depth	<p>Manual excavation of planting hole. It is recommended that seedlings are planted at a depth that ensures sufficient soil cover over the plugs (<i>minimum</i> of 10cm for trees and 5cm for sedges).</p>	To be advised on site by rehabilitation ecologist.
Nutrition	<p>Place 50% fertiliser into planting hole base.</p> <p>Balance will be placed at ground level following planting.</p>	150g organic fertiliser.
Planting	Place seedling into hole and backfill.	-
Compression	Lightly compact the soil around the seedling by stepping either side of the seedling, leaving a depression.	-
Establishment watering	Use a water spear or similar to inject 6 litres of water into the soil adjacent to the seedling plug.	6 litres water per seedling.

6.4 Direct Seeding

For the risk assessment to be applied to direct seeding see Appendix 3.

6.4.1 Seed Sowing and Depth

6.4.1.1 Mechanical seeding

A range of tractor drawn, and dozer mounted seeding equipment is available to sow seed.

Site slope and roughness will determine the final site preparation and equipment configuration.

Prepared beds that have become crusted must have the surface broken up by scarifiers, coulter discs, or equivalent.

Seed sowing delivery options include:

- Direct drill air-seeders.
- Drum seeders.
- Surface spreaders.

All options should be integrated with scarifiers, harrows or tracking chains, which will assist with seed incorporation.

Equipment will be capable of adjustment to:

- Place seed within 1 cm depth increments; and
- Achieve required application rate (kg/ha).

6.4.1.2 Manual seeding

Where infrastructure such as rock toe protection limit the use of machinery, manual seeding may be required.

- To apply seed manually, ensure the receiving surface has been roughened.
- Apply seed mix at prescribed rate (Table 10), noting that the rate per square metre (1m²) is equivalent to kg/ha/10,000.
- Broadcast seed over site.
- Rake the receiving surface to incorporate seed to 1cm.
- Water at 6mm per hectare ensuring surface runoff does not occur.

6.4.2 Direct seeding sowing time

To provide a maximum chance of germination and plant survival, consider the following:

- As a guide direct seeding should be avoided when soil temperature exceeds 40°C in the upper 10mm to 30mm.
- Ideally seed is best sown immediately in advance of a period when reliable rain and mild temperatures can be expected.
- Sowing should ensure that vegetation is established to protect soil from erosion prior to the onset of heavy seasonal rainfalls (wet season). The preferred windows for direct seeding are:
 - Late February / Early March
 - September / October.

7. Irrigation system

7.1 Concept design

Typical concept irrigation designs for the site are included in Appendix 9. Irrigation is generally required to achieve rapid establishment on higher risk zones.

Zones considered to be at high risk include:

- Lower bank
- Upper bank crest
- Facilitated revegetation.

However, given the relatively small scale of the site, it is recommended that all zones within the project area be irrigated. The typical concept design adopts a least-cost approach to equipment and materials.

In brief, the irrigation design adopts multiple parallel rows (2m spacing between rows) of irrigation drip lines on both the reprofiled areas and on the facilitated revegetation areas. Irrigated areas will be serviced by a number of water tanks connected to 50mm internal diameter (ID) sub-mains and control valves. The tanks should be located above the overbank zones (above flood lines) and where possible have a minimum of 10 metres elevation above the Lower Bank. Local circumstances including source of water, height above Lower Bank, and affordability/practicality of a tank stand (if required), will dictate tank configuration.

A portable pump set is required to provide sufficient pressure to the system to deliver water to the most distant drippers located up to ~200m from the submain. A 19mm drip line will be surface laid with emitters as per the specification in the plan:

- 1.6m tree spacing in the lower bank zone
- 2.8m tree spacing in the upper and over bank zones
- 2.0m row spacing in all zones.

Given the irregular shapes of zone areas to be irrigated a specific layout of irrigation pipe has not been provided. However, based on a 2m row spacing it can be assumed that 5,000m of 19mm polypipe will be required per hectare of irrigation. At a total irrigated area of 1.732 ha, this equates to 8,660m of 19mm polypipe and emitters.

7.2 Irrigation rate

Rockhampton average daily evapotranspiration (ET) rate is 5.8mm per day with summer maximums up to 8.9mm per day. Each dripper emitter should provide a minimum of 2.5litres/hour. A 2.4 hour irrigation event will be required to deliver 6 litres per event (equivalent to 6mm/m²).

Table 13: Water demand by Zone

	Fitzroy River (Bindaree)			Total
	Lower Bank 0.524ha	Upper Bank 0.720ha	Overbank 0.487ha	
No. of Tubes	2,738	540	365	3,643
Water Req. (Litres per event)	16,428	3,240	2,190	21,858

It is always important to have the tanks centrally located within each zone to maintain consistent pressure and use appropriately sized sub-main poly pipe to deliver adequate water flows. The 50mm submain polypipe should also be centrally located within each zone, with 19mm drip line extending laterally along the contour, both up and downslope for an equal distance. Refer to the Indicative Irrigation Maps (Figure 13) for an indicative irrigation layout, and Figure 14 for a typical irrigation design .

Based on the water demand shown in Table 13, and to achieve the three times per week watering events, it is recommended that water tanks of the following size are installed:

- 70,000 L (Total) – 2 x 30,000L tanks, and 1 x 10,000L tank

The water demand for the site will be approximately 66,000 L/week for the first four weeks, then approximately 44,000 L/week up until week 12, then approximately 44,000 L/month up until 6 months, then approximately 22,000 L/month for the remaining 6 months of the maintenance schedule. The total water demand for the 12 month maintenance period is 880,000 litres (0.88ML). The use of irrigation beyond the 12 month establishment phase is at the discretion of the Site Manager and may depend on monitoring results.

7.3 Irrigation frequency

Table 14 proposes an irrigation schedule to achieve rapid early establishment.

Table 14: Irrigation Frequency

Establishment Irrigation	Week											
	1	2	3	4	5	6	7	8	9	10	11	12
Frequency (events/week)	3	3	3	3	2	2	2	2	2	2	2	2
Maintenance Irrigation	Month											
	4	5	6	7	8	9	10	11	12	13	-	-
Frequency (events/month)	2	2	2	1	1	1	1	1	1	Review	'	-

Irrigation is planned for the 12 week establishment period and follow-on maintenance until 12 months. Irrigation frequency may be adjusted, by the Project Manager, to fit prevailing drought and moisture conditions.

7.3.1 Supplementary watering events

The irrigation design and schedule address a portion of the revegetation zones that are considered higher risk. Seasonal conditions may dictate that underperforming areas within the project may require supplementary watering events.

8. Maintenance program

8.1 Establishment maintenance

The establishment maintenance period is generally assumed to be 12 weeks from installation. However, the Contractor will cover the post-construction period of establishment maintenance for 7 years post-construction (assumed) to ensure that revegetation does not fail.

During the post establishment maintenance period the Contractor will be responsible for the site maintenance tasks and task frequencies detailed in Table 15. If the establishment maintenance period extends beyond the nominal 12-week period, the contractor will continue with the tasks, and at the frequencies specified, in Table 15.

Table 15: Establishment maintenance task frequency

All Zone Establishment maintenance (12 weeks)	Week											
	1	2	3	4	5	6	7	8	9	10	11	12
Weed Control			X			X			X			X
Supplementary Watering	<i>As directed</i>											
Minor erosion rectification	<i>As directed</i>											
Infill/Refill												X
Irrigation Schedule	Refer to Section 7.3											
Irrigation Maintenance	X	X	X	X	X	X	X	X	X	X	X	X

8.1.1 Weed control

There are a range of declared invasive and environmental weed species present on the Site (Appendix 6) and surrounds that may frustrate revegetation establishment. Emerging weeds should be monitored, and spot sprayed or mechanically removed at the earliest opportunity.

Provision has been made for four site treatments during establishment maintenance. Agreed selective herbicides should be used to undertake manual spot spraying with the aim of controlling weeds while avoiding preferred sown germinants and seedlings.

8.1.2 Supplementary watering (as directed)

Supplementary water events may be directed, by the Project Manager. The Contractor should monitor the drought tolerance condition of emerging grasses, pasture, legumes, and tubestock and apply water via a truck mounted water cannon, or similar, to deliver at least 6mm per ha at each event. Caution should be exercised to ensure overland flow does not occur.

8.1.3 Re-sow / Refill

A monitoring program is detailed in Table 16 below. Prior to the commencement of Week 12 the Contractor shall (where necessary):

- Apply and incorporate additional seed mix; and
- Plant additional seedlings.

This is to ensure that the Week 12 required ground cover percentage and planted seedling stocktake rates for each Zone are achieved. The monitoring program specifies re-sowing and refilling triggers.

8.1.4 Irrigation maintenance

The Contractor shall provide a suitable pump for irrigation water delivery, ensure that tank water levels are maintained, and the irrigation system is operational (i.e., the drippers are functional).

8.1.5 Minor erosion rectification

During the establishment maintenance phase, the Contractor will undertake minor erosion rectification works by employing the following strategies:

- Controlling the source of the erosion (e.g., concentrated flows)
- Adding topsoil, and (if necessary) mulch.
- Straw mulch bales
- Additional seed sowing or fertilisers
- Erosion control geofabrics (if necessary).

The Contractor shall adopt the approaches outlined in the IECA Best Practice Erosion and Sediment Control Guidelines when implementing any temporary or permanent erosion and sediment controls. Major soil loss arising from flooding or major storm events will be dealt with separately.

8.2 Revegetation maintenance

The Contractor will maintain the site for a further 81 months after Establishment Maintenance completion. (Aggregate seven years).

During the 7-year post establishment maintenance period the Contractor is responsible for the site maintenance tasks and task frequencies detailed in Table 16.

Table 16: Revegetation maintenance task frequency

All Zone Revegetation maintenance	Month								
	4	5	6	7	8	9	10	11	12
Weed Control		X		X		X			X
Supplementary Watering	<i>As directed</i>								
Minor erosion rectification	<i>As directed</i>								
Infill/Refill									X
Irrigation Schedule	Refer to Section 7.3								
Irrigation Maintenance	X	X	X	X	X	X	X	X	X

Table Continued

All Zone Revegetation maintenance	Month											
	13	14	15	16	17	18	19	20	21	22	23	24
Weed Control		X		X				X				X
Supplementary Watering	<i>As directed</i>											

All Zone Revegetation maintenance	Month											
	13	14	15	16	17	18	19	20	21	22	23	24
Minor erosion rectification	<i>As directed</i>											
Infill/Refill	<i>As directed</i>											
Irrigation Schedule	<i>As directed</i>											
Irrigation Maintenance		X		X		X		X		X		X

Table Continued

All Zone Revegetation Maintenance		Month											
	Yr 3:	25	26	27	28	29	30	31	32	33	34	35	36
	Yr 4:	37	38	39	40	41	42	43	44	45	46	47	48
	Yr 5:	49	50	51	52	53	54	55	56	57	58	59	60
Weed Control			X		X				X				X
Supplementary Watering		As directed/required											
Minor erosion rectification		As directed/required											
Infill/Refill		Not recommended											
Irrigation Schedule		As directed/required											
Irrigation Maintenance		As required/appropriate											

Table Continued

All Zone Revegetation Maintenance		Month											
	Yr 6:	61	62	63	64	65	66	67	68	69	70	71	72
	Yr 7:	73	74	75	76	77	78	79	80	81	82	83	84
Weed Control					X								X
Supplementary Watering		As directed/required											
Minor erosion rectification		As directed/required											
Infill/Refill		Not recommended											
Irrigation Schedule		As directed/required											
Irrigation Maintenance		As required/appropriate											

The maintenance program is dependent on the success of the direct seeding and tubestock planting programs, and their resulting density and complexity. The better the initial germination/survival, the less the impact that introduced weeds will have.

If grasses or weeds become a problem within the planted trees and shrubs, the use of the herbicides such as Verdict or Fusilade™ is recommended as a spot spray (1m radial) to remove grass competition. Verdict can be applied over the top of seedlings if necessary. Note that herbicide should be used sparingly to minimise consequential impacts on ground cover.

Other woody weeds should be controlled on a regular basis. Control should be aimed at occurring prior to the emergent weeds setting seed.

9. Monitoring and performance

9.1 Monitoring

The monitoring program is designed to quantify success and identify actions to be implemented for the maintenance period of five years to track revegetation progress and inform timely mitigation interventions.

Table 17 defines the following monitoring terms.

Table 17: Monitoring Terms

Term	Definition
Groundcover	All grass, shrub, legume, and pasture less than 1m height.
Seedlings	Planted native tree and shrub species 0–6m.
Regeneration	Native tree species naturally regrowing (0–6m).
Trees	Native species greater than 6m.
Weeds	All species listed in the <i>Biosecurity Act 2014</i> plus local environmental weeds.
Litter	Any dead “on-ground” vegetation matter (including spread mulch).
Rock	Observed surface stone, gravel, or rock.
Bare ground	Land that is free of live vegetation and includes Rock and Litter.

Monitoring will consider each Zone independently.

Different monitoring plot configurations may be implemented to accommodate the zone configurations and planting geometry of the different zones.

Independent of any monitoring survey outcomes, seedling refill and seed re-sow will be required on all planted areas up to the end of Revegetation Maintenance Year 1 (M1 to M12) within any Zone when the following conditions exist:

- Any bare area greater than 10m².
- Any contiguous area of 20m² with less than 50% groundcover.
- Any row length of planted seedlings greater than 15m where seedlings have failed.

If these requirements are not met, it will be considered failed, and should undergo remedial revegetation to achieve:

- A minimum ground cover of 50%; and/or
- A minimum tree survival in line with Table 18.

The above thresholds provide guidance for vegetation management on all Zones.

9.1.1 Performance Criteria

Performance Assessments will occur at:

- Week 1 (establishment maintenance)
- Week 12 (establishment maintenance)
- Month 12 (Revegetation maintenance)
- Any time after 12 months is at the discretion of the Site Manager

The following Criteria need must be achieved for satisfactory completion.

Table 18: Performance Criteria

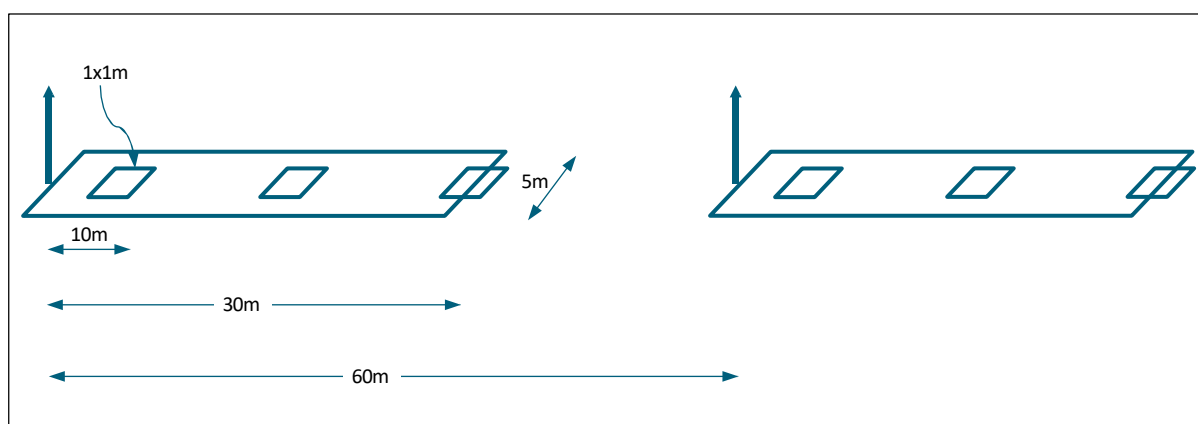
Zone ID	Milestone	Ground Cover	Seedling Survival
Lower Bank	Week 1	Sowing completed	Seedlings planted at prescribed rate 1,000 sph trees 2,000 sph sedges
	Week 12	70%	95% survival
	Month 12	85%	85% survival Average tree height 0.8m.
Upper Bank	Week 1	Sowing completed	Seedlings planted at prescribed rate 750 sph trees 1,000 sph sedges
	Week 12	70%	95% survival
	Month 12	85%	85% survival Average tree height 0.8m.
Overbank	Week 1	Sowing completed	Seedlings planted at prescribed rate 750 sph trees 1,000 sph sedges
	Week 12	70%	95% survival
	Month 12	85%	85% survival Average tree height 0.8m.

9.1.2 Sampling narrow linear zones

All revegetation zones are narrow linear shapes by design. A transect sampling approach can be adopted for these zones.

Timber pickets will be installed every 60m along the Zone's central axis and a GPS location recorded for each picket. Commencing from the picket at 0m, walk 10m recording each planted seedling 2.5m either side of the centreline. At 10m install a temporary 1m x 1m sample and assess ground cover percentage for all vegetation <1m high. Repeat the process for successive 10m sectors until 30m is completed. Step up to the next timber picket and repeat the procedure until the zone has been traversed. Figure 7 demonstrates the linear sample format.

Figure 7: Linear sample design



The following parameters should be captured in the two subplots:

1. 5m x 30m transect plot
 - Seedling survival
 - Seedling species
 - Seedling height
 - Regeneration (natural regrowth of tree species)
2. Three 1x1m quadrats
 - Reported ground cover percentage will be the average of:
 - Grass & Pasture%
 - Legume%
 - Litter%.

Table 19: Ground Cover Percentage (example shown)

	Quadrat1	Quadrat2	Quadrat3	Average%
Grass & Pasture%	55%	75%	60%	63%
Legume%	10%	5%	0%	5%
Litter%	10%	5%	10%	8%
Weeds%	5%	5%	20%	10%
Rock%	5%	0%	0%	2%
Bare ground%	15%	10%	10%	12%
Ground Cover%	100%	100%	100%	
				Average%
	75%	85%	70%	76%

Seedling Stocking rate for each 30m transect plot is (Seedling Count x 66.6) = stocking per ha.

A photo should be taken along the axis of the plot at each timber picket. A picket reference number should be included in the photo centre.

9.1.3 Sampling the Over Bank

As the Overbank zone will include areas of non-cleared vegetation and large individual trees, linear sampling is less likely to be appropriate. It is suggested that a traverse would be a useful method for gathering vegetation performance data. This method allows for meandering amongst remnant vegetation, surveying 5m either side of the traverse centreline. It is recommended that a marked traverse (GPS recorded) be set up to delineate the most appropriate route, and to aid in repeatability over the 7 year maintenance period. The traverse is to be delineated by the Site Manager.

It is suggested that two traverses running for the full length of the Overbank zone be undertaken, with quadrats surveyed at 25m intervals. Groundcover below 1m height will be recorded as a percentage in 1 x 1m quadrats (as for Section 9.1.2). Photos should be taken in North, East, South and West directions at the centre of each quadrat. Seedling survival, seedling species, seedling height and regeneration (natural regrowth of tree species) will be recorded along the full length of the traverse.

9.1.4 Alternate approach

Contractors may have an alternate approach to sampling. Application of satellite data, UAV (Drone) NDVI and UAV photogrammetry are potential approaches. These methods have many advantages, including:

- comprehensive, repeatable, and accurate measurement of the site
- removal of sampling bias
- increased safety and cost savings
- measurable, geo-located data

The Project Manager may approve an alternate approach where the method can demonstrate that it meets the performance criteria.

9.2 Monitoring Schedule and Report

In addition to Contractual work performance requirements the Revegetation component will require the reports detailed in Table 20.

Table 20: Milestone Monitoring Reporting

Milestone	Report
Revegetation works progress	Weekly brief on progress against target deliverables/issues/constraints
Revegetation works completion	Revegetation delivery outcome: <ul style="list-style-type: none"> • Zone area map. • Seed mixes sown x zone. • Seedling count x zone. • Ameliorants applied (fertiliser). • Established sampling points. • Initial photo images. • Issues identification. • Planned future monitoring milestones & KPI's agreed.

Milestone	Report
Week 12	<p>Week 12 KPI's for ground cover and seedling survival.</p> <p>Sample data outcomes from on-ground sampling.</p> <ul style="list-style-type: none"> • Week 12 KPI delivery outcomes. • Photo records. • Changes observed. • Species diversity. • Species abundance. • Seedling/Tree Height. • Management risk issues (Soil, Water, Irrigation, Weeds, Vegetation). • Recommended remediation actions.
Month 12	<p>As above for Week 12.</p> <p>Irrigation review recommendations.</p>
Year 2	<p>As above for Week 12.</p> <p>Irrigation review recommendations.</p>
Year 3	As above for Week 12.
Year 4	As above for Week 12.
Year 5	As above for Week 12.
Year 6	As above for Week 12.
Year 7	As above for Week 12.

10. References

10.1 General references

- ANZECC (Australian and New Zealand Environment and Conservation Council) (2000) *Australian and New Zealand guidelines for fresh and marine water quality*. ANZECC, Canberra
- DNR (Department of Natural Resources, Queensland) (1997) *Salinity Management Handbook*. Scientific Publishing, Resource Sciences Centre #222.
- Northcote, K.H. and Skene, J.K.M. (1972). *Australian soils with saline and sodic properties*. CSIRO Publication No. 27. CSIRO, Melbourne, Australia
- Quirk JP and Schofield RK (1955) *The effect of electrolyte concentration on soil permeability*. Australian Journal of Soil Research 6: 163-178
- Sumner ME (1993) *Sodic soils: a new perspective*. Australia Journal of Soil Research 31: 683-750

10.2 Online references

10.2.1 Erosion control

International Erosion Control Association (Australia)

Best Practice Erosion and Sediment Control (BPESC)

<https://www.austieca.com.au/publications/best-practice-erosion-and-sediment-control-bpesc-document>

10.2.2 Seed collection and storage

Commander LE (Ed) (2021) 'Florabank Guidelines – best practice guidelines for native seed collection and use (2nd edn)' (Florabank Consortium Australia).

<https://www.florabank.org.au/guidelines/>

Seed collection: <https://www.florabank.org.au/guidelines/?link=Module6>

Seed storage: <https://www.florabank.org.au/guidelines?link=Module9>

10.2.3 Chemicals to control grasses in revegetation

Fusilade Forte™

http://www.herbiguide.com.au/Labels/FLU128_58521-0806.PDF

10.2.4 Biosecurity

Biosecurity Queensland (2013) (DAF) Vehicle Machinery Inspection Procedure.

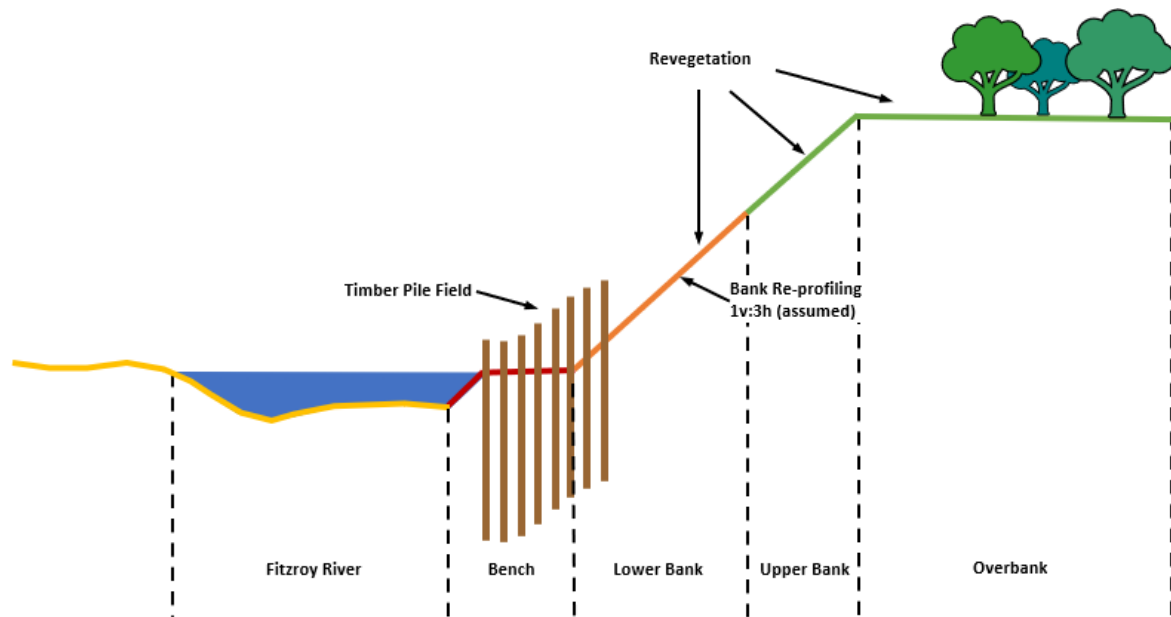
https://www.daf.qld.gov.au/_data/assets/pdf_file/0016/64006/IPA-Inspection-Procedures.pdf

Biosecurity Queensland (2019) (DAF) Vehicle and machinery cleandown procedures.

https://www.daf.qld.gov.au/_data/assets/pdf_file/0011/58178/cleandown-procedures.pdf

Appendix 1: Revegetation Zones and Areas

Figure 8: Revegetation Zones



Appendix 2: Soil analysis

Sampling approach

Verterra collected soil samples from nine locations. Three soil sample were taken in each of the Lower bank, Upper bank and Overbank zones and composited within each zone. Soil samples were collected down the profile within the rootzone, at 0-20cm (topsoil), 20-60cm and 60cm-120cm (subsoil).

Noting, since concept planning was undertaken, the position of the vertical erosion face (lower bank area) had encroached further into the mid bank area.

Vehicle access to the lower bank areas was difficult due to the vertical embankment, therefore, to ensure safe access four samples were taken by hand, on the vertical embankment, while staying near to planned sites. Regardless of soil sample position, results indicate fairly homogenous soil characteristics across the Sites. The final locations of soil samples are shown in Figure 9.

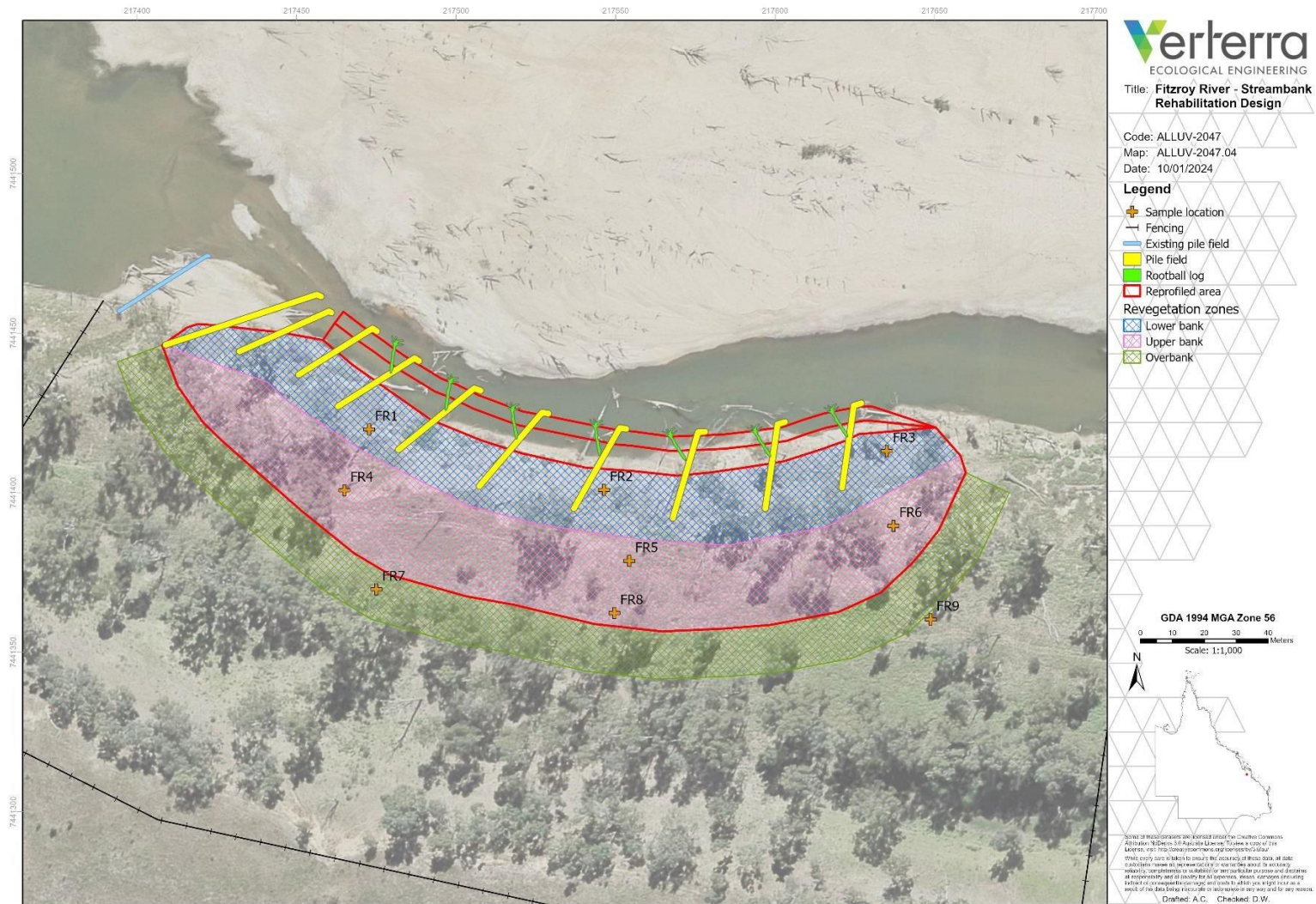
Soil characteristics

The physical and geochemical characteristics are comparable throughout the bank profile and between each zone. The texture is predominantly sandy loam throughout the profile. The soil pH is neutral on the surface, increasing to slight alkalinity with depth. The soil electrical conductivity (EC) indicates that both the topsoil and the subsoil are non-saline ($<2.0\text{dS/m}$).

The exchangeable cations are generally balanced and have sufficient concentrations to support plant growth, however total nitrogen, sulphur and boron are low. The exchangeable sodium is sufficiently low in the topsoil and subsoil to be considered not harmful to plant growth. The cation exchange capacity is low to moderate throughout the profile and indicates low to moderate fertility and buffering to changes in pH and nutrient levels. The exchangeable sodium percentage (ESP) at both the surface and subsurface throughout the bank profile is very low, indicating that the soil is non-sodic, and that dispersion is unlikely.

Organic carbon ranges from low in the lower bank (0.4%) to moderate in the upper bank (1.3%), averaging 0.9%. Plant-available macronutrients phosphorous and potassium are present at adequate levels, however nitrogen and sulphur are deficient throughout the site and will require the addition of fertiliser to optimise growth conditions and stimulate early vegetation establishment. Plant-available micronutrient Boron is also deficient.

Figure 9: Soil Sampling Sites



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ALLUV-2047 Fitzroy River (Bindaree) Revegetation Plan – Appendix 2

Date: 16 January 2024

Page 37

Table 21: Fitzroy River (Bindaree) - Soil Analysis & Sample Results – Results of soil testing 0-20cm, 20-60cm and 60-120cm depths.

Soil Test	Method	Units	Very Low	Low	Moderate	High	Very High	Bindaree					
								Overbank		Upper bank		Lower bank	
								Topsoil	Subsoil	Topsoil	Subsoil	Topsoil	Subsoil
1. Salinity, pH and texture													
Field Texture	Field	na	-	-	-	-	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Clay Loam	Clay Loam
pH (water)	R&L 4A1	pH	0 to 5.0	5.0 to 6.5	6.5 to 7.5	7.5 to 8.6	>8.6	6.9	7.4	6.9	7.4	7.4	7.6
pH (CaCl)	R&L 4B4	pH	0 to 4.0	4.0 to 5.5	5.5 to 6.5	6.5 to 7.6	>7.6	6.0	6.4	6.0	6.2	6.3	6.4
Conductivity EC _{1:5}	R&L 3A1	dS/m	See ECe results below					0.05	0.03	0.06	0.06	0.1	0.0
Texture Factor	Calc	Nil	-	-	-	-	-	14.0	14.0	14.0	11.3	8.6	8.6
Conductivity ECe	Calc	dS/m	0 to 2	2 to 4	4 to 8	8 to 16	>16	0.8	0.4	0.6	0.3	0.3	0.3
% Sand	Hydrometer	%	-	-	-	-	-	13%	13%	13%	23%	0.3	0.4
% Silt	Hydrometer	%	-	-	-	-	-	0.6	0.3	0.4	0.3	0.3	0.3
% Clay	Hydrometer	%	-	-	-	-	-	74%	76%	77%	73%	69%	58%
Mineralogy	Calc	Nil	-	-	-	-	-	MM+M	MM+M	MM+M	MM+M	MM	MM
2. Exchangeable Cations													
Sodium (Na)	R&L 15E2	meq/100g	0 to 0.1	0.1 to 0.3	0.3 to 0.7	0.7 to 2	>2	0.07	0.08	0.07	0.11	0.17	0.27
Potassium (K)	R&L 15E2	meq/100g	0 to 0.2	0.2 to 0.3	0.3 to 0.7	0.7 to 2	>2	0.6	0.3	0.4	0.3	0.4	0.4
Magnesium (Mg)	R&L 15E2	meq/100g	0 to 0.3	0.3 to 1	1 to 3	3 to 8	>8	4.2	4.3	4.3	5.3	6.4	8.9
Calcium (Ca)	R&L 15E2	meq/100g	0 to 2	2 to 5	5 to 10	10 to 20	>20	6.7	6.1	5.6	6.5	7.0	8.4
Aluminium (Al)	R&L 15G1	meq/100g	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1
Cation Exchange Capacity (CEC)	R&L 15E2	meq/100g	0 to 6	6 to 12	12 to 25	25 to 40	>40	11.7	10.9	10.5	12.3	14.1	17.9
ESP	Calc	%	-	-	<6	6 to 14	>14	0.6%	0.7%	0.7%	0.9%	1.2%	1.5%
Ca:Mg ratio	Calc	ratio	0 to 1	1 to 4	4 to 6	6 to 10	>10	1.6	1.4	1.3	1.2	1.1	1.0
CEC to Clay Ratio	Calc	ratio	-	-	-	-	-	1.1	1.0	0.8	1.1	0.8	1.1
3. Anions													
Chloride	-	mg/kg	-	-	<200	200 to 300	>300	13.0	-	10.0	-	10.0	-
4. Organic Carbon													
Organic Carbon	R&L 6A1	%	0 to 0.6	0.6 to 1	1 to 1.74	1.74 to 3	>3	1.3	-	0.9	-	0.4	-
Organic Matter (OM)	Calc	%	0 to 1	1 to 1.7	1.7 to 3	3 to 5.15	>5.15	2.2	-	1.5	-	0.7	-
5. Major Nutrients													
Ammonium	R&L 7C2b	mg/kg	0 to 0.8	0.8 to 3	3 to 5	5 to 10	>10	2.9	-	2.8	-	2.4	-
Nitrate Nitrogen	R&L 7B1/7C2b	mg/kg	0 to 8	8 to 30	30 to 50	50 to 100	>100	2.0	-	1.1	-	0.9	-
Total Nitrogen	R&L 7A5	mg/kg	0 to 500	500 to 1500	1500 to 2500	2500 to 5000	>5000	1,300	-	800	-	500	-
Available Nitrogen	Calc	mg/kg	0 to 133	133 to 406	406 to 676	676 to 1352	>1352	326	-	201	-	126	-
Available Phosphorous	R&L 19A1	mg/kg	0 to 14	14 to 20	20 to 40	40 to 80	>80	59.0	-	31.0	-	33.0	-
Available Potassium	R&L 18A1	mg/kg	0 to 78	78 to 117	117 to 273	273 to 780	>780	390	-	270	-	210	-
Available Sulphur	R&L 10D1/10B3	mg/kg	0 to 4	4 to 8	8 to 12	12 to 20	>20	4.0	-	2.0	-	2.0	-
C:N Ratio	Calc	ratio	0 to 10	10 to 12	12 to 15	15 to 25	>25	10.0	-	11.3	-	8.0	-
6. Trace Elements													
Boron (B)	R&L 12C1/C2	mg/kg	0 to 0.5	0.5 to 1	1 to 2	2 to 5	>5	0.4	-	0.4	-	0.3	-
Zinc (Zn)	R&L 12A1	mg/kg	0 to 0.3	0.3 to 0.8	0.8 to 5	5 to 15	>15	1.2	-	0.5	-	0.4	-
Iron (Fe)	R&L 12A1	mg/kg	-	-	-	-	-	100.0	-	73.0	-	41.0	-
Copper (Cu)	R&L 12A1	mg/kg	0 to 0.1	0.1 to 0.3	0.3 to 5	5 to 15	>15	1.4	-	1.2	-	1.6	-
Manganese (Mn)	R&L 12A1	mg/kg	0 to 1	1 to 2	2 to 50	50 to 500	>500	9	-	10	-	16	-

Appendix 3: Revegetation Risk Assessment

Table 22: Revegetation Risk Assessment

Item	Risk Issue	Mitigation	Responsible agent
Initial establishment			
Site preparation	Topsoil not available to cover to desired depth.	Review most important zones requiring stability and apply to these areas first. If available, use a mulch to cover sites without topsoil. Modify species seeding rates for sites with little soil cover.	Project / Site Manager.
	Site is infested with invasive weeds prior to seeding.	Chemically control weeds. Repeat, if necessary, after 2-3 weeks.	Project / Site Manager.
	Water erosion has occurred pre seeding.	Reworking soil / re-ripping and / or mechanical replacement of soils required. Remediate source of the erosion.	Project / Site Manager.
Seed quality / quantity	Introduction of weeds.	Seed certificates to be provided with supplied seed. Purity testing must show no presence of weeds. Consult with Verterra on seed requirements.	Contractor.
	Not all seeds are available.	Maintain seed review process from the start of the project. Review seed list of species and quantities. Purchase seeds from alternate sources. Reduce risk by engaging more than one seed collection group. Use only species from within the approved species groups. Consult with Verterra on seed requirements.	Contractor following approval to amend from the Project Manager.
	Viability.	Manage seed on a just in time basis to avoid prolonged field storage. Review seed storage site so it meets with Australian guidelines. Ensure experienced seed collectors are engaged.	Project Manager.

Item	Risk Issue	Mitigation	Responsible agent
Initial cover crop	Drought conditions.	Consider either pressurised line irrigation, or watering trucks for watering seeded areas until germination occurs, and natural rainfall is sufficient for ongoing growth.	Project Manager.
	Seed did not germinate.	Native seed germination testing for nominated species.	Contractor to provide test certificates.
	Soil erosion hazard	Consider adding additional mulches sample risk areas. Modify soil treatment. Identify and remediate source.	Site Manager.
	Grazing.	Ensure new fencing is erected prior to seeding / planting. Remove all stock from the area.	Site Manager.
Refill areas (Hand seeding)			
Site preparation	High level of weeds on refill site.	Use a low persistent / aggressive cover crop species. Spot spray areas 2 weeks prior to seeding by hand. Use strip sprays for machine seeding.	Site Manager.
Seeding	Drought conditions	Water-treat seeds prior to hand seeding. Increase seeding depth of large-coated seeds.	Site Manager.
	Seed did not germinate.	Native seed germination testing is essential. Review seed storage processes. Review seed treatment methods. Seed at correct depths. Use equipment designed for native seed establishment. Review controls of weeds prior to seeding. Re seed when conditions are more favourable.	Project Manager.
	Slow growth of seed.	Add additional fertiliser to site. Review soil tests and apply additional materials if required.	Site Manager.

Appendix 4: Hold Points and Quality Assurance

Table 23: Hold Points and Quality Assurance

Hold Points	Hold Point	Quality Assurance
Revegetation Delivery Plan		
Plan review and acceptance.	Prestart. Company representative approval required. Zone areas may be varied in final design resulting in adjustments to materials outlined in plan.	
Site Clearing		
Vegetation clearing limits marked.	Prior to clearing work start. Project Manager / Site Manager area verification of site limits and VMA approvals / release.	Site limits marked / Pegging in place.
Fauna Species management	Fauna Spotter preclearance inspection report accepted. Project Manager approval to start Clear & Grub. Onsite fauna spot.	Fauna observations / recovery / relocations records maintained.
Vegetation clearing.		Per zone (e.g., Zone 1 Northern Bank, Zone 1 Southern Bank) completion to ensure the correct clearing process is followed and remain within the approved disturbance footprint.
Site layout showing temporary and permanent erosion and sediment controls (if required).		Pegging in place.
Soil treatment and Stripping		
Topsoil stripping depth.		Topsoil recovery is maximised. Nominal depth to be determined during final design to enable 200mm to be spread back across site. Site Manager to check depth optimisation daily during stripping.

Hold Points	Hold Point	Quality Assurance
Subsoil rip depth / strip.		Minimum ripping depth check is one daily check. For each zone, i.e., Subsoil rip and aggregated topsoil/subsoil deep rip.
Seed		
Seed, germination / viability, and purity test certificates for nominated species.		Supplied by seed supplier to Contractor prior to dispatch. Copies provided to the Project Manager.
Seedling nursery inspection QA reports (where sowing is required).		Immediately after germination, at 6 weeks, 12 weeks and prior to dispatch.
Seedling dispatch documents.		Dispatch / receipt docs retained, and copies provided to the Project Manager.
Revegetation		
Treated topsoil spread depth.		Once daily per zone following spreading.
Fertiliser Application and amelioration including deep ripping depth.		Once daily per zone following spreading/ripping depth.
Direct seed application (rate and planting depth) x zone.		Machinery calibration record. Once daily per treatment Zone following seed sow.
Seedling stocking x zone.		Daily seedling stocking rate check aligns with Appendix 7.
Mulch Spread depth (Where mulch is surface applied).		Daily depth check. Depth complies with specification.
Revegetation (grass cover, seedling survival) at scheduled success monitoring dates.		At the scheduled dates detailed in Table 18 following sowing, planting.
Irrigation		
Materials BoQ (pumps, tanks, pipe types, joinery).	Pre purchase. Submit BoQ (Specifications) to the Project Manager to ensure alignment with design.	

Hold Points	Hold Point	Quality Assurance
Irrigation system test and rectification.		Pressure test irrigation system after installation. Rectification as required.
Irrigation Unit Install completion.	Site Manager acceptance for each installed unit: Physical check of each completed tank, mains, submains, and laterals.	Check to ensure emitters are working correctly during irrigation events. Rectification as required.

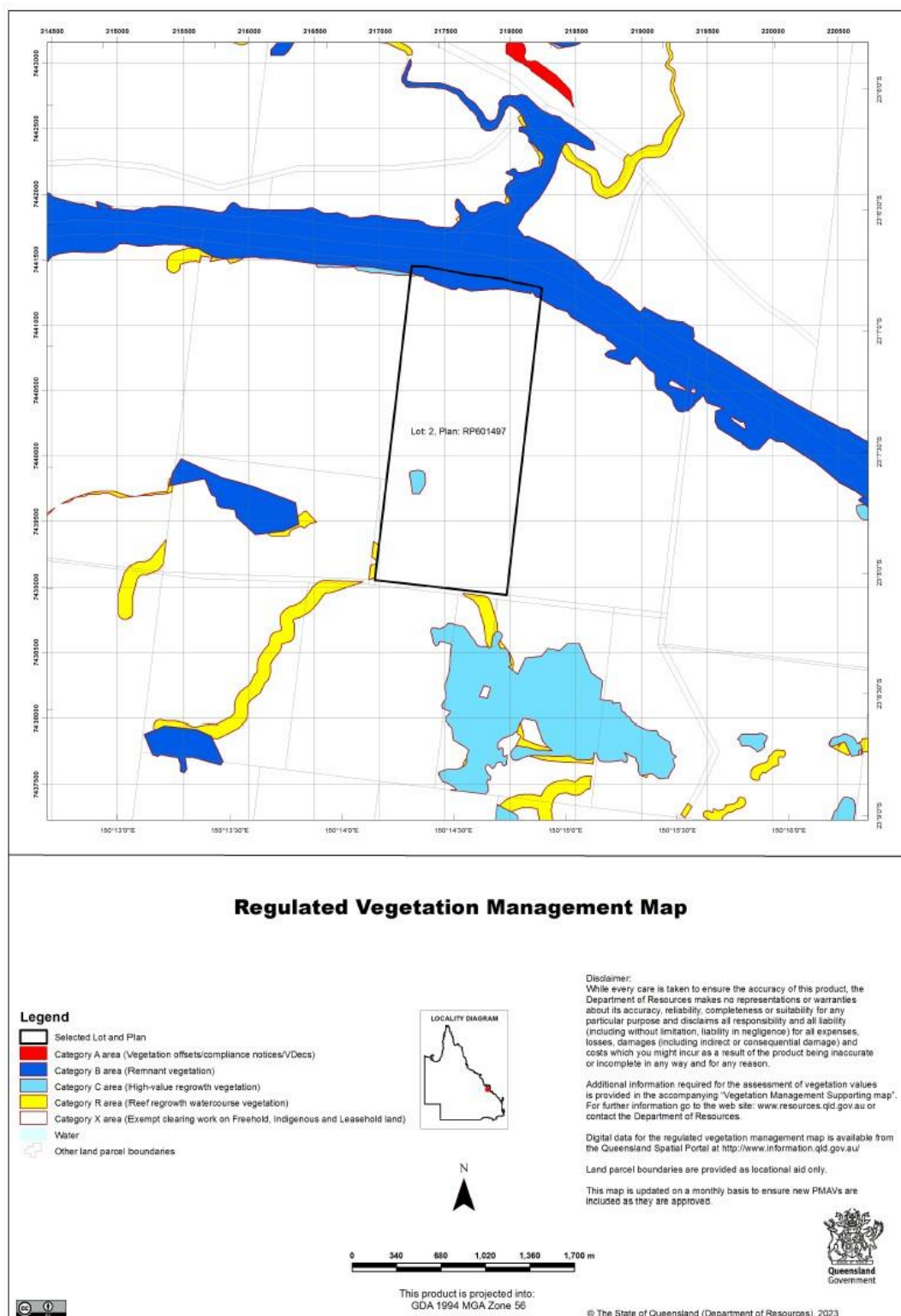
Appendix 5: Regional Ecosystems

Table 24: Regional Ecosystem Detailed Descriptions

Regional Ecosystem Type ID	REDD Description
11.3.3	
<p><i>Eucalyptus coolabah</i> woodland on alluvial plains</p> <p>VMA Class: Of concern</p> <p>Biodiversity Status: Of concern</p>	<p><i>Eucalyptus coolabah</i> woodland to open woodland. A secondary tree or shrub layer may occur, including <i>E. populnea</i>, <i>Melaleuca bracteata</i>, <i>Acacia stenophylla</i>, <i>Alectryon oleifolius</i>, <i>Terminalia oblongata</i> (in the north), <i>Acacia pendula</i>, <i>A. cambagei</i> and <i>Duma florulenta</i>. The ground layer is dominated by a range of grass and forb species depending on season. Occurs on Cainozoic alluvial plains or levees with clay or sometimes texture contrast soils. Not a Wetland. (BVG1M: 16c).</p>
Special Values	<p>Mature trees provide hollows for fauna especially nesting birds. Associated with a high number of fauna species (Dick 1992, Venz et al. 2002).</p>
11.3.25f	
<p><i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines.</p> <p>VMA Class: Least Concern</p> <p>Biodiversity Status: Of concern</p>	<p>11.3.25 <i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland to open forest. Other tree species, including <i>Casuarina Cunninghamiana</i>, <i>E. coolabah</i>, <i>Melaleuca bracteata</i>, <i>Melaleuca viminalis</i>, <i>Livistona</i> spp. (in north), <i>Melaleuca</i> spp. and <i>Angophora floribunda</i>, may occur. A tall shrub layer may occur, including <i>Acacia salicina</i>, <i>A. stenophylla</i> and <i>Lysiphyllum carronii</i>. Low shrubs are present, but rarely form a conspicuous layer. The ground layer is open to sparse and dominated by perennial grasses, sedges or forbs. Occurs on fringing levees and banks of major rivers and drainage lines of alluvial plains throughout the region. Soils are very deep, alluvial, grey and brown cracking clays with or without some texture contrast. These are usually moderately deep to deep, soft or firm, acid, neutral or alkaline brown sands, loams or black cracking or non-cracking clays, and may be sodic at depth. (BVG1M: 16a)</p> <p>11.3.25f: Main river channels. Open water or exposed stream beds and bars. Usually devoid of emergent vegetation although scattered trees and shrubs such as <i>Melaleuca viminalis</i> or <i>Melaleuca</i> spp. May be present and aquatic species may be abundant particularly in water holes and lagoons. Occurs in river channels. Riverine. (BVG1M: 16d).</p>
Special Values	<p>Shown to be associated with a high fauna species richness in the Taroom area. Within parts of the Fitzroy catchment, this RE is known habitat for the threatened freshwater turtle <i>Rheodytes leukops</i>. Known to be important habitat for other riparian freshwater turtle species. This ecosystem is also known to provide suitable habitat for koalas (<i>Phascolarctos cinereus</i>).</p>

Figure 10: Regulated Vegetation Management map

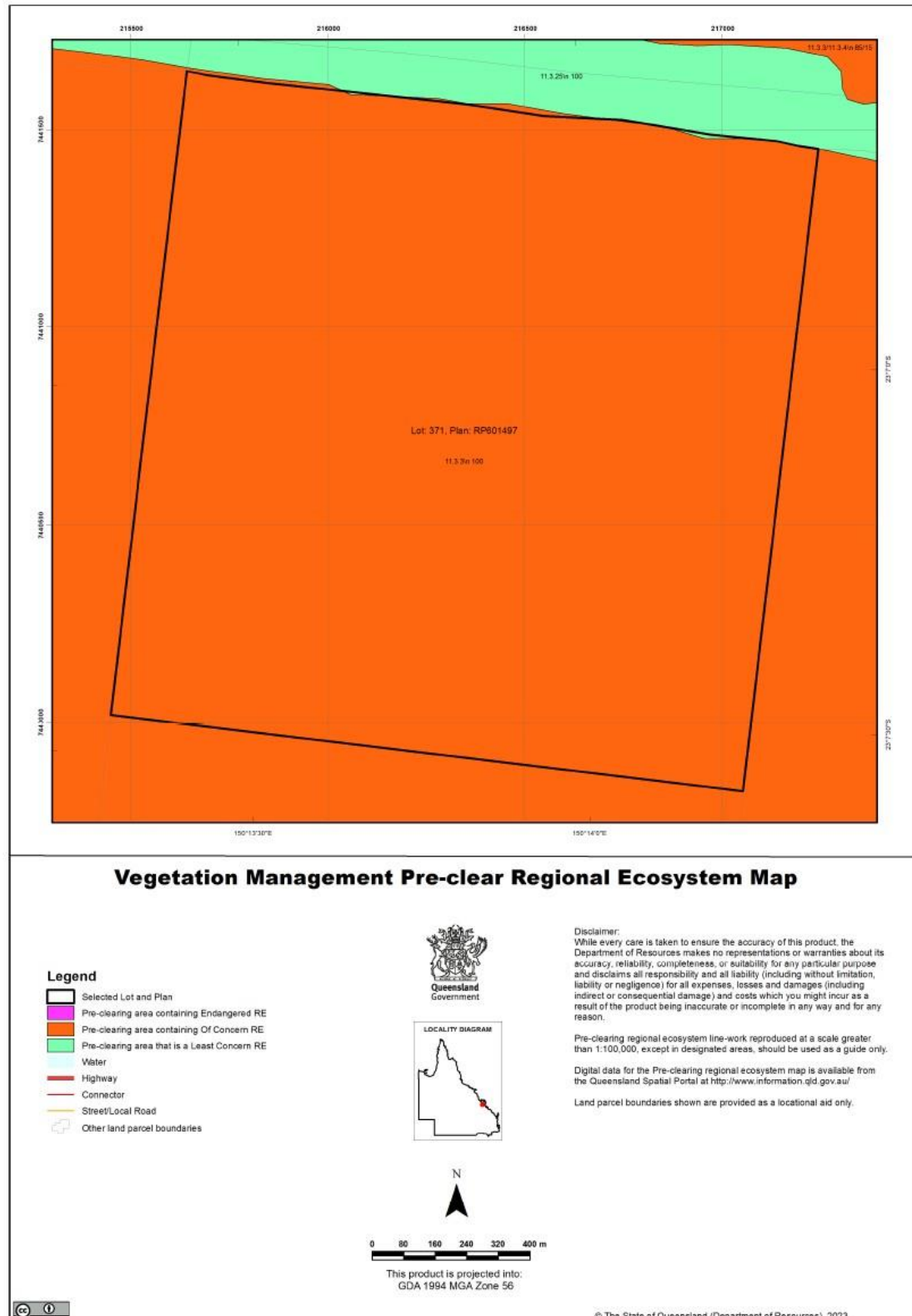
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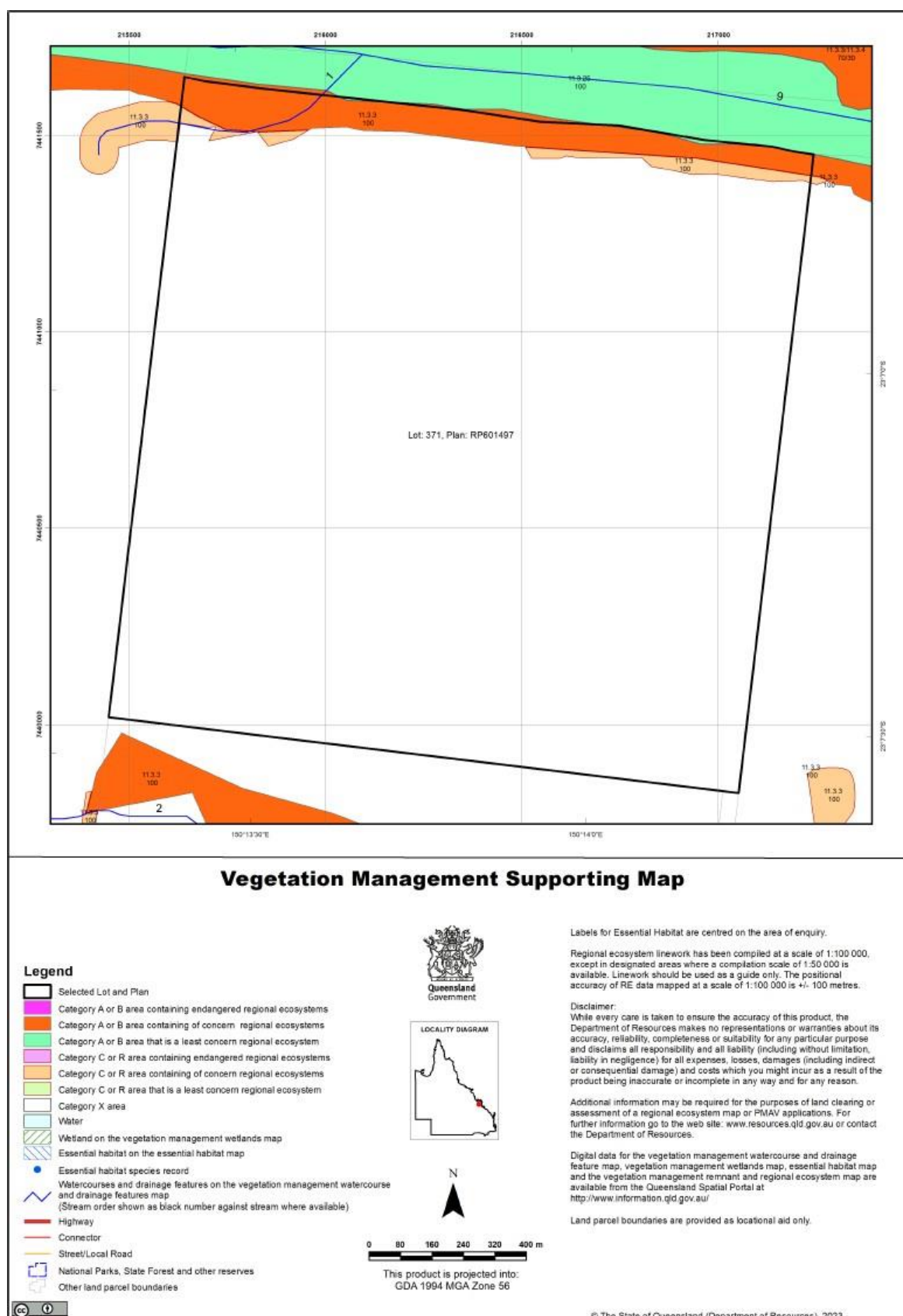
Figure 11: Pre-clearing Regional Ecosystems

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Figure 12: Remnant Regional Ecosystems



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Appendix 6: Flora survey

Table 25: Plant Species (Results of flora survey conducted 26 October 2023)

Scientific Name	Common Name
Upper Bank	
<i>Eucalyptus tessellaris</i>	Moreton Bay Ash
<i>Eucalyptus tereticornis</i>	Forest Red Gum
<i>Acacia holosericea</i>	Strap Wattle
<i>Ficus opposita</i>	Sandpaper Fig
<i>Diospyros humilis</i>	Australian Ebony
<i>Casuarina cunninghamiana</i>	River oak
<i>Cymbidium canaliculatum</i>	Black orchid
Middle Bank	
<i>Eucalyptus tessellaris</i>	Moreton Bay Ash
<i>Eucalyptus tereticornis</i>	Forest Red Gum
<i>Acacia holosericea</i>	Strap Wattle
<i>Ficus opposita</i>	Sandpaper Fig
<i>Diospyros humilis</i>	Australian Ebony
<i>Eucalyptus coolabah</i>	Coolabah
Lower Bank	
<i>Melaleuca fluviatilis</i>	Paper-barked tea-tree
<i>Ficus opposita</i>	Sandpaper Fig
<i>Callistemon viminalis</i>	Weeping Bottle Brush
Native Grass and Sedge Species	
<i>Panicum decoppositum</i>	Native millet
<i>Eriochloa crebra</i>	Cup grass
<i>Sporobolus virginicus</i>	Marine couch
<i>Dichanthium sericeum</i>	Queensland bluegrass
<i>Bothriochloa bladhii</i>	Forest bluegrass
Weed and Naturalised Species	
<i>Themeda quadrivalvis</i>	Grader grass
<i>Stylosanthes scabra</i>	Shrubby stylo
<i>Xanthium occidentale</i>	Noogoora burr
<i>Stachytarpheta jamaicensis</i>	Snakeweed
<i>Cirsium vulgare</i>	Spear thistle
<i>Ageratum houstonianum</i>	Billygoat weed
<i>Crotalaria pallida</i>	Streaked rattelpod
<i>Sida cordifolia</i>	Flannel Weed
<i>Bidens pilosa</i>	Cobblers Peg

Appendix 7: Seed and tubestock requirements

- Direct Seed requirements by zone.
- Tubestock requirements by zone.

Suitable species (Table 9) and seed requirements (Table 10) yield the recommended weight by stratum for all zones and sites in Table 26.

Table 26: Seed demand for all zones (1.732ha) at 20kg/ha

Scientific Name	Common Name	Recommended application (kg/ha)	Recommended weight (kg)	Target number of species
All zones and sites (1.732ha) at 20kg/ha				
Native Grasses				
<i>Aristida leptopoda</i>	White spear grass	6.0	10.39	1 – 3 species
<i>Bothriochloa bladhii</i>	Forest bluegrass			
<i>Dichanthium sericeum</i>	Queensland bluegrass			
<i>Heteropogon contortus</i>	Black spear grass			
<i>Panicum decompositum</i>	Native Millet			
<i>Themeda triandra</i>	Kangaroo grass			
Sedges				
<i>Cyperus gracilis</i>	Slender flat sedge	1.5	2.60	1 species
<i>Lomandra longifolia</i>	Spiny-head Mat-rush			
Nitrogen-fixing				
<i>Crotalaria mitchellii</i>	Yellow rattlepod	2.5	4.33	1 species
<i>Glycine tabacina</i>	Glycine pea			
<i>Stylosanthes scarba</i>	Shrubby Stylo			
Cover crops				
<i>Echinochloa esculenta</i>	Japanese millet	10.0	17.32	1 species
<i>Panicum miliaceum</i>	White millet			

Suitable species (Table 9) and seedling requirements (Table 11) yield the recommended tubestock for all zones and sites in Table 27.

Table 27: Tubestock demand for all zones

Scientific Name	Common Name	Recommended stocking	Recommended stems	Target species
Lower Bank 0.524ha 3,000sph				
Trees				
Lophostemon suaveolens	Swamp Mahogany	1,000sph	524	2–4 species
Melaleuca fluviatilis	Paper-barked tea tree			
Melaleuca viminalis	Weeping Bottle Brush			
Melia azedarach	White Cedar			
Sedges				
Cyperus gracilis	Slender flat sedge	2,000sph	1,048	1–2 species
Lomandra longifolia	Spiny-head mat-rush			
Upper Bank 0.720ha 1,750sph				
Canopy trees				
Angophora floribunda	Rough-barked apple	550sph	396	1 - 2 species
Eucalyptus camaldulensis	Red river gum			
Eucalyptus coolabah	Coolabah			
Eucalyptus populnea	Poplar box			
Eucalyptus tereticornis	Forest Red Gum			
Melaleuca fluviatilis	Paper-barked Tea-tree			
Ficus opposita	Sandpaper fig			
Subcanopy trees/Shrubs				
Acacia salicina	Sally Wattle	200sph	144	5 - 7 species
Carissa ovata	Current Bush			
Geijera salicifolia	Brush Wilga			
Macaranga tanarius	Macaranga			
Mallotus philippensis	Red Kamala			
Melaleuca bracteata	Black Tea Tree			
Sedges				
Cyperus gracilis	Slender flat sedge	1,000sph	720	1–2 species
Lomandra longifolia	Spiny-head mat-rush			
Overbank 0.487ha 1,750sph				
Canopy trees				
Angophora floribunda	Rough-barked apple	550sph	268	1 - 2 species

Scientific Name	Common Name	Recommended stocking	Recommended stems	Target species
<i>Eucalyptus camaldulensis</i>	Red river gum			
<i>Eucalyptus coolabah</i>	Coolabah			
<i>Eucalyptus populnea</i>	Poplar box			
<i>Eucalyptus tereticornis</i>	Forest Red Gum			
<i>Melaleuca fluviatilis</i>	Paper-barked Tea-tree			
Subcanopy trees/Shrubs				
<i>Acacia salicina</i>	Sally Wattle	200sph	98	5 - 7 species
<i>Carissa ovata</i>	Current Bush			
<i>Geijera salicifolia</i>	Brush Wilga			
<i>Macaranga tanarius</i>	Macaranga			
<i>Mallotus philippensis</i>	Red Kamala			
<i>Melaleuca bracteata</i>	Black Tea Tree			
<i>Ficus opposita</i>	Sandpaper fig			
Sedges				
<i>Cyperus gracilis</i>	Slender flat sedge	1,000sph	487	1–2 species
<i>Lomandra longifolia</i>	Spiny-head mat-rush			

Appendix 8: Tubestock specifications

Table 28: Tubestock Acceptance Specifications

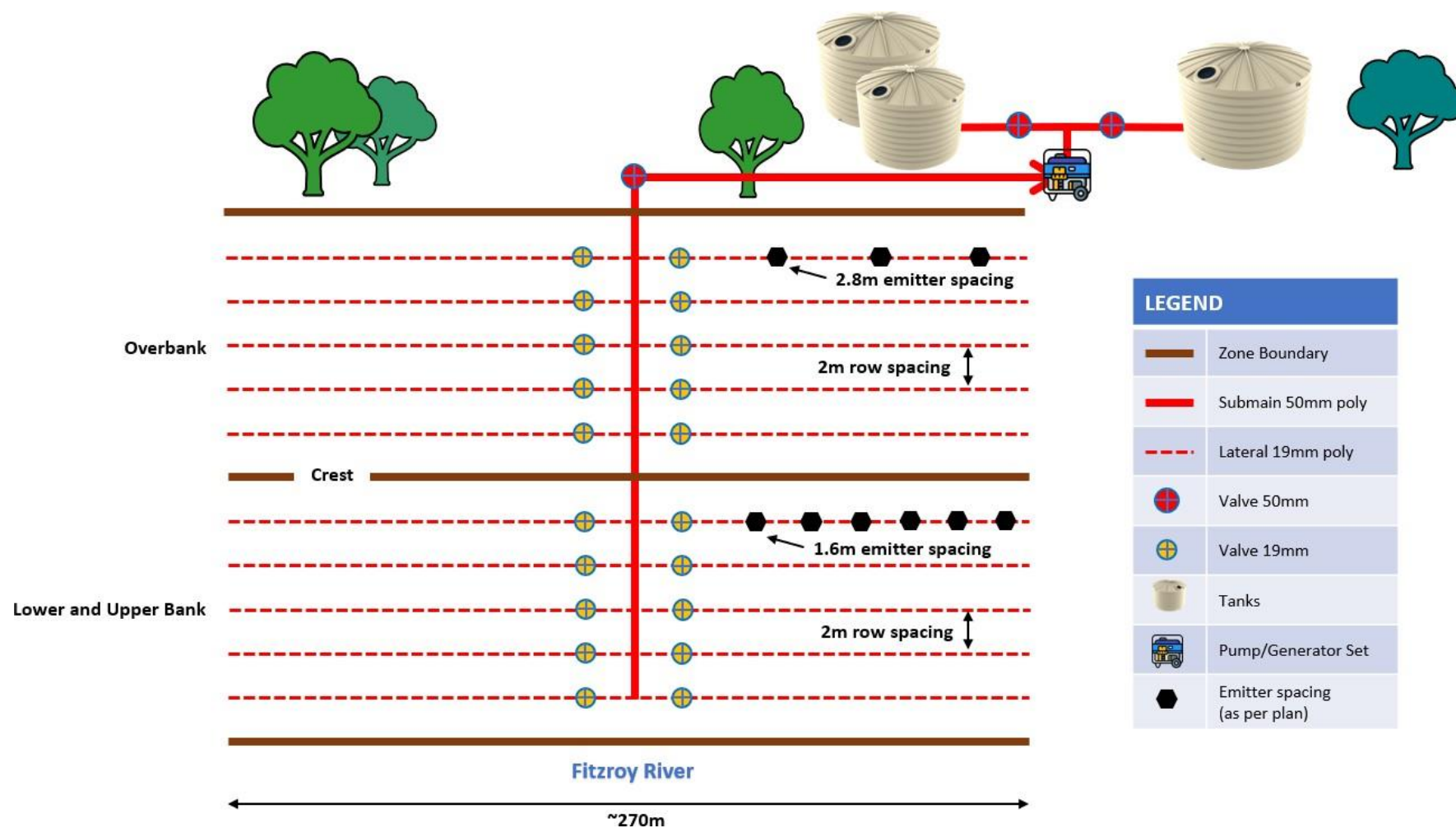
Attribute	Seedling Nursery Acceptance Specification
Stem Height and Collar Diameter	Min 200 mm, > 2 mm collar. Max 350 mm, > 3.5 mm collar.
Stem Straightness	One vertical single leader with max one bend over length of stem.
Growing media	Non-soil potting media incorporating a base peat-vermiculite mix.
Germination	Seed will preferably be sown directly into the final grow-out tray to avoid the risk of J-rooting. Alternatively, seed may be germinated in a plug tray and effective plugs transplanted into agreed seedling grow out trays.
Dibbling	Dibbling bare root germinates into seedling grow out trays is not permitted.
Container type	Hyco V93 trays with root trainers and open base providing air-pruning are preferred. Alternatively, 50 mm x 50 mm native tubes may be accepted.
Air pruning	Seedlings are to be grown in containers on raised nursery benches to promote air-pruning and avoid direct contact with soil.
Root Plug Condition	Roots will: <ul style="list-style-type: none"> • Not be J-rooted • Fill and bind the plug volume. • Display actively growing white roots at dispatch.
Disease	Seedlings will be maintained free of disease and insect pests, in particular myrtle rust <i>Puccinia psidii</i> . A hygiene declaration may be required at the point of dispatch for seedlings grown in known myrtle rust zones. Affected seedlings will not be dispatched.
Drought Tolerance	Nursery irrigation will be managed to encourage a cycle of induced drought stress and rejuvenation. Drought stress will be applied after Week 10 of the grow out period. Seedlings will be drought tolerant and fully sun-hardened at dispatch.
Physical Damage	Seedlings will not be damaged, and the growing tip will be intact at dispatch.
Dispatch	Containers will be bulked up so that at least 95% of cells in each tray have seedlings meeting specification.

Attribute	Seedling Nursery Acceptance Specification
Communication	The Nursery will contact the Contractor when any crop losses, setbacks or delays are experienced.
Inspection	The Contactors representative will inspect the seedling batch at four points in the production cycle: immediately after germination, at 6 weeks, twelve (12) weeks and immediately prior to dispatch.
Delivery acceptance	Plants not meeting specifications at the point of delivery will not be accepted.
Field nursery	<p>Delivered seedlings will be held in a field nursery until required for planting. Minimum field nursery conditions include:</p> <p>Capacity to hold trays on raised benches or wires to prevent roots growing into the soil.</p> <p>Capacity to provide daily watering.</p> <p>Protection from desiccating winds and cattle.</p>

Appendix 9: Irrigation concept plan drawings



Figure 14: Typical Irrigation Design



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ALLUV-2047

Final Audit Report

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