Lake Baroon Catchment Care Group

Working with our community...for our waterways

Projects 2021-22

Falls Creek Revegetation Stage 2

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Sunshine Coast COUNCIL

PROJECT PLAN

Project No. 2122-003

This Project Plan has been prepared by, and all enquiries to be directed to:

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Disclaimer

While every effort has been made to ensure the accuracy of this Project Plan, Lake Baroon Catchment Care Group makes no representations about the accuracy, reliability, completeness or suitability for any particular purpose and disclaims all liability for all expenses, losses, damages and costs which may be incurred as a result of the Plan being inaccurate or incomplete.

How to read this Plan

This Plan has been developed to provided a brief description of the project and includes summarised details of the stakeholders, budgets, outputs and outcomes. The attached appendices provide further useful information relating to Project Plan Budget, Lake Baroon and its catchment, and outlines various implementation activities of the project.

Previous Plans

1718 – 003 Upper Falls Creek Riparian Fencing (Willims).

Confidentiality

Much of the information contained herein is confidential and must not be reproduced or passed on to any person outside Seqwater without prior written permission from Lake Baroon Catchment Care Group.

DOCUMENT VERSIONS & APPROVALS

Version	*Date*	*Version/Description*	*Result*
1.0	November 2021	Draft LBCCG Project Proposal completed. Project emailed to LBCCG Committee for comments.	n/a
1.0	November 2021	Project Plan presented at November Management Committee meeting for approval	Approved
1.0			

AUTHORISATIONS

Name	*Signature*	*Date*
Prepared by: Luke Ferguson - Project Manager, LBCCG		8/11/2021
Approved by: LBCCG Management Committee (signed by Peter Stevens – President)		11/11/2021
Approved by (Seqwater):		

Cover: Falls Creek running through the Willims property, Lake Baroon in the background.

Contents

Introduction

Falls Creek Revegetation, Stage 2, will be implemented in a high priority area, owned by Greg Willims, located along Falls Creek. The project focuses on the revegetation of Falls Creek and continues on from riparian fencing, off-stream watering and revegetation completed in Stage 1 (2017-18) on the property.

The installation of riparian fencing and off-stream watering, allows the landholder to manage livestock in the riparian zone. The exclusion of livestock from the riparian zone, enables the revegetation of the riparian zone of Falls Creek and will result in a vegetation buffer and wildlife habitat corridor of over 400 m along Falls Creek.

Revegetation of Falls Creek combined with riparian fencing and an off-stream watering system will provide the best reduction of risk to water quality. Healthy, vegetated riparian buffers assist in the filtering of runoff, contaminated with nutrients and pathogens, before it enters Falls Creek.

The Willims property was identified as a high priority property in the 2021-26 Implementation Plan for the Lake Baroon catchment[1], based on its distance to Baroon Pocket Dam off take tower, land use, riparian health, readiness to implement projects and the likelihood of gaining additional funding. The Falls Creek catchment is characterised by relatively un-intensive beef grazing, considerable areas of rural residential and minimal vegetation, particularly along the watercourses. Historically the upper Falls Creek catchment supported dairy grazing which, along with the rural residential areas, likely yielded poor water quality results - high levels of nutrients (and likely pathogens).

Maintaining water quality is critical to providing safe bulk drinking water for the population of South east Queensland. All of the raw water storages managed by Seqwater are located in catchments which are developed to varying extents and support active and growing communities, including important industrial and rural economic activity. To provide a multi-barrier approach to the supply of drinking water, Seqwater must influence the management of land not owned by, but which exert an influence on Seqwater's core business.

Background

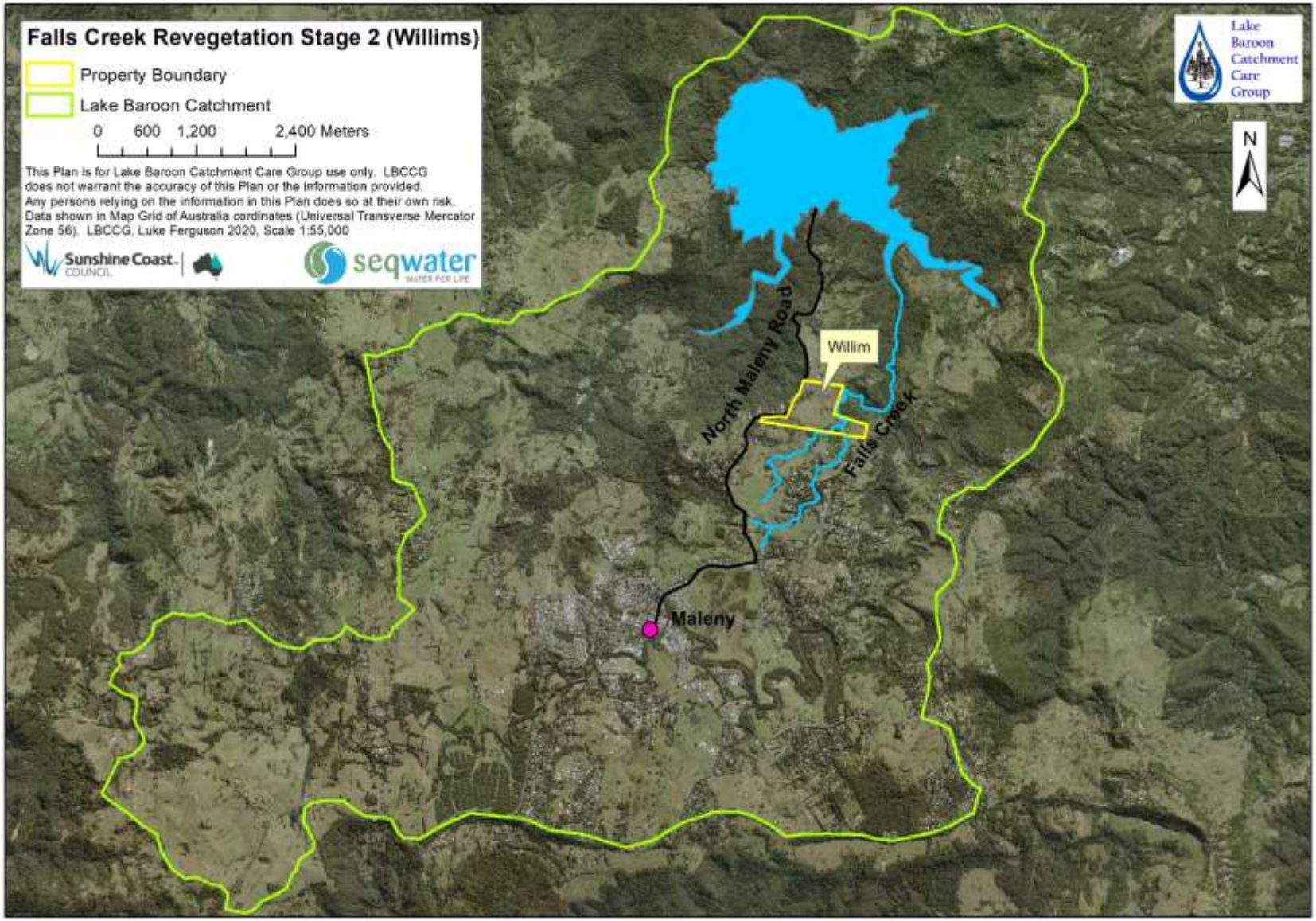
Greg Willims purchased the property in 2017 and has developed his property to run moderate to high numbers of beef cattle in an intensive rotational grazing system. Currently he has 50 cow and calf units on the property. With Falls Creek being primarily a grazing region, the priority action is to reduce livestock contact with natural water through riparian fencing, revegetation, alternative watering and stream crossings.

In 2017/18, Stage 1 was completed, with riparian fencing installed along Falls Creek and the properties existing off stream watering system was expanded, with two troughs installed. A concrete crossing was also installed on Falls Creek. Then in 2020/21, a $3,500 surplus from Stage 1 was used to revegetate sections of Falls Creek that were protected from the riparian fencing, with 400 trees planted.

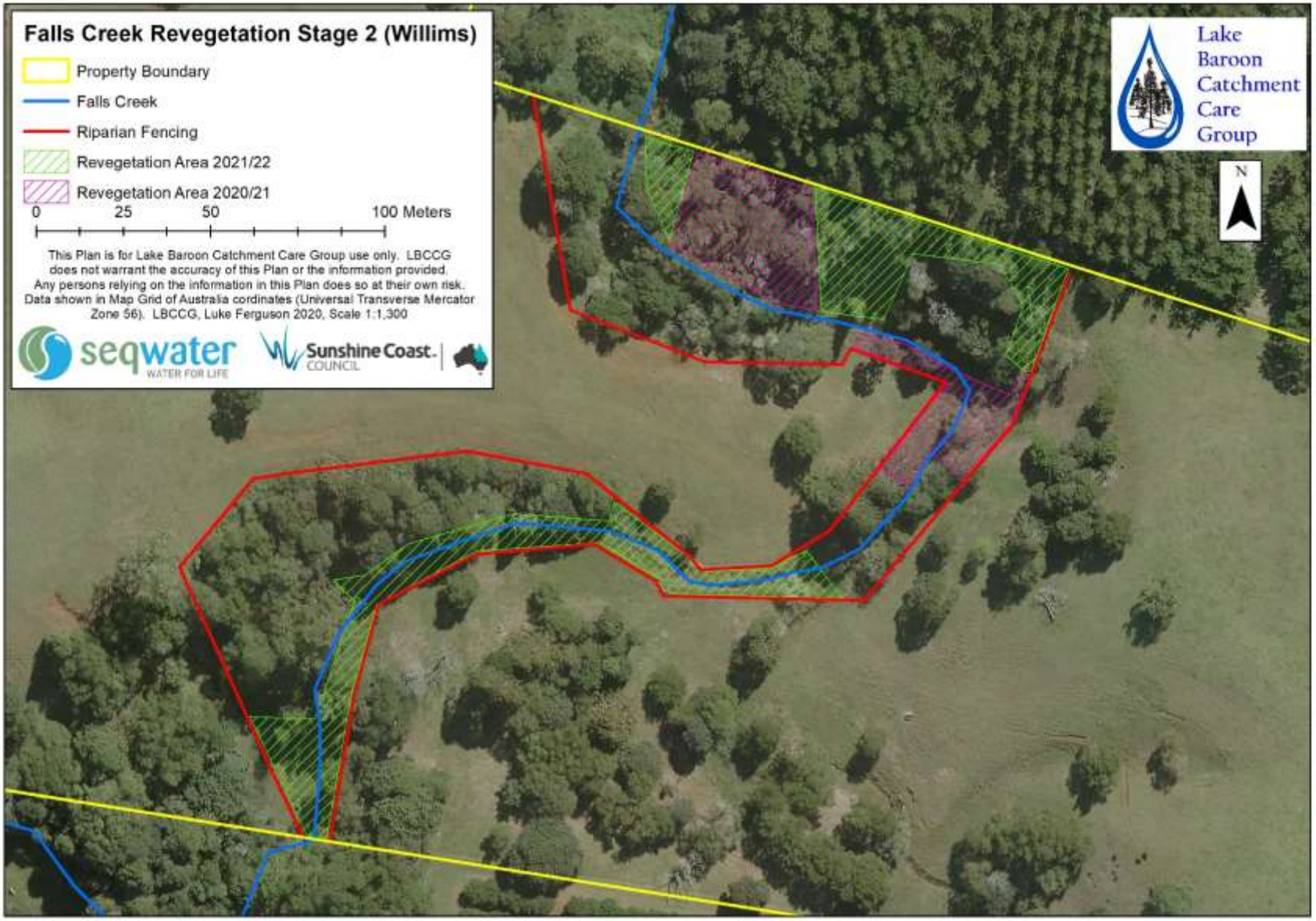
Stage 2, 2021/22, will follow on from the revegetation of Falls Creek commenced in 2020/21, and will result in all areas inside the riparian fencing being planted. These plantings will connect existing remnant and regrowth vegetation along the creek, creating a vegetative buffer and wildlife corridor of over 400 m.

[1] Lake Baroon Catchment Care Group, (2020), 2021-26 Implementation Plan for the Lake Baroon catchment, Maleny, Queensland

Project Location



Project Map


Falls Creek Revegetation Stage 2 (Willims)
Property Boundary
Falls Creek
Riparian Fencing
Revegetation Area 2021/22
Revegetation Area 2020/21
0
25
50
100 Meters
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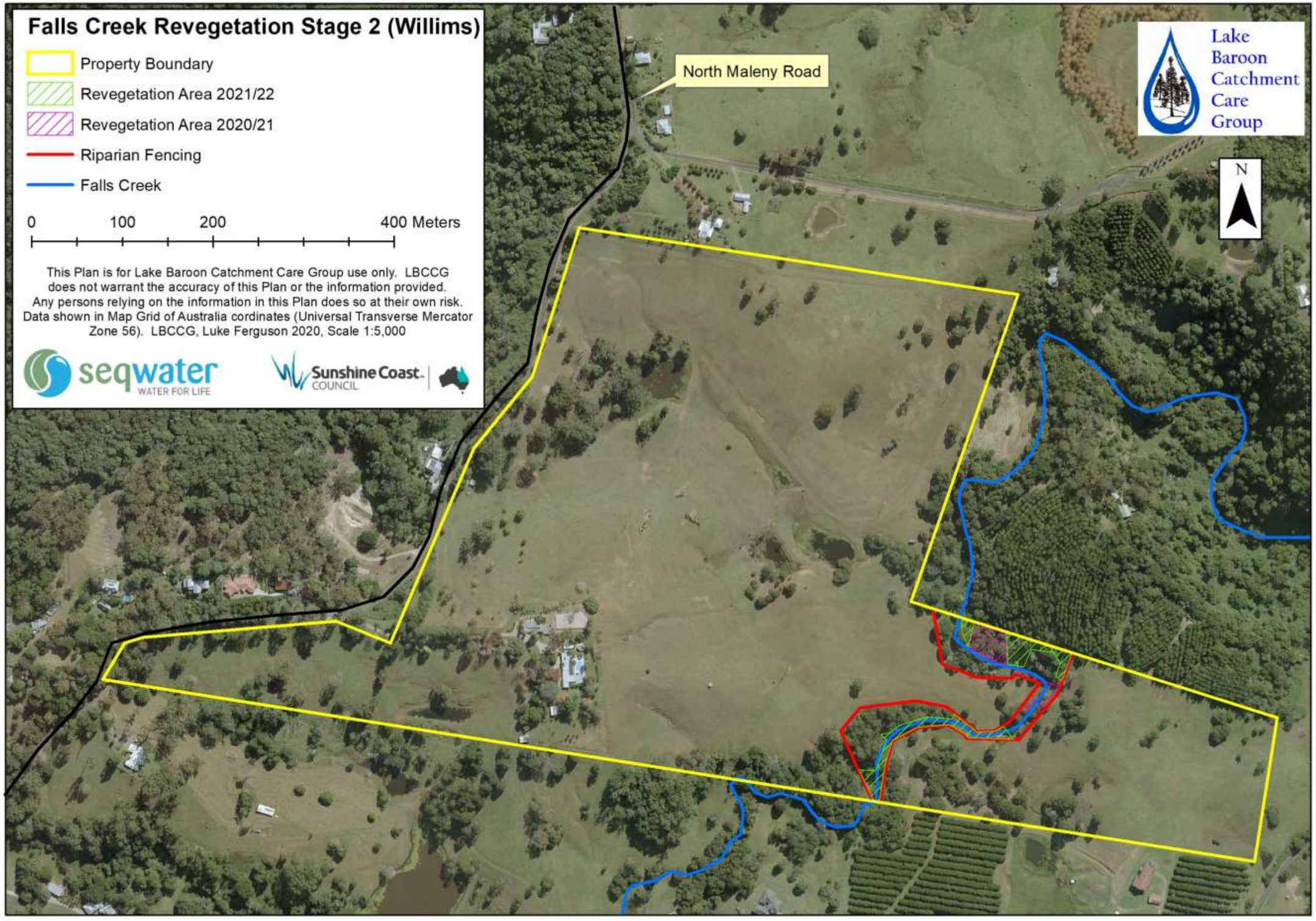
Project Map


Falls Creek Revegetation Stage 2 (Willims)
Property Boundary
Revegetation Area 2021/22
Revegetation Area 2020/21
Riparian Fencing
Falls Creek
0
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400 Meters
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Project Plan

Project Plan Name	**Falls Creek Revegetation Stage 2 (Willims)**	
Site	342 North Maleny Road, Maleny, QLD, 4552	
Project Start Date	October 2021	
Project End Date	June 2022	
Landholder details	**Property owner / Manager**	[redacted]
	Contact Details	
	Real Property description	
	Property Size	39 hectares
	Land use	Cattle grazing
	Stock carried	70
	Latitude/longitude	-26.734606 152.871791
	Water quality hazards present	1) Poor riparian vegetation & groundcover 2) Moderate stream bank instability 3) Damage to existing native vegetation 4) Moderate to heavy weed coverage

Water Quality Risk (assessed according to *2021-26 Implementation Plan for the Lake Baroon catchment)*		
Distance from Baroon Dam off take	High Priority	Property is 2.6 km from off take.
Prioritisation of land use	Moderate to High	Intensive beef grazing.
Riparian condition	High Priority	Poor riparian health – Falls Creek fenced and off stream watering installed in Stage 1 of the project.
Landholder readiness & willingness	High Confidence	High confidence – Stage 1 completed successfully.
Complimentary funding availability	Moderate Priority	Likely to receive funding from 2022 Landholder Environment Grants (SCC).
Land management weightings	Moderate Priority	Intensive grazing, riparian fencing and off-stream water in place.
OVERALL PROJECT PRIORITY	**HIGH PRIORITY**	

Cash & in-kind contributions		
Project Funding	Seqwater 2021-22 Riparian Condition Improvement (Water Quality)	$ 11,250
Project Management	Seqwater 2021-22 Riparian Condition Improvement (Water Quality)	$ 12,394
Landholder contribution	Cash & In-kind	$ 12,875
TOTAL		**$ 36,519**

Project Plan & Scope of Works			
Description of hazards on site and how they are to be addressed	Very limited vegetative buffer between Falls Creek and grazed paddocks	Revegetation with a diverse range of species along Falls Creek, linking existing regrowth and remnant vegetation.	
	Lack of vegetation diversity in riparian zone – dominated by annual, perennial and woody weeds		
	Minimal stream shading contributing to deoxygenation and other impacts		
	Lack of diverse native vegetation to provide complex root systems and mechanical bank stability benefits		
	Lack of wildlife habitat / corridor		
Activities to be delivered as part of project & Schedule of works	1. Revegetation	750 stems	December 2021
	2. Weed management	1 hectare	June 2022
Future maintenance requirements	Maintenance of revegetation will be required between 3 – 5 years. Likely $3.00 per stem in first year and reducing to $0 by year 5. Other on-going costs will be borne by the landholder.		

Project Outcomes		
Improve water quality *Improve water quality of:* *a. source water in Falls Creek; and* *b. raw water intake at Lake Baroon*	Improved riparian buffer in the Falls Creek Catchment	Revegetation of riparian zone improves ability of buffer to trap and/or process sediment, nutrients and faecal material.
	Reduced erosion of the bed and banks of Falls Creek reducing turbidity and sedimentation	Revegetation combined with riparian fencing and an off-stream watering system excludes livestock from waterway.
	Reduce pathogen delivery to waterways	Riparian fencing and livestock management along Falls Creek will prevent the direct faecal deposition (nutrients and pathogens) into Falls Creek.

Increase catchment biodiversity	Improved aquatic habitats	A reduction in turbidity, sediments, nutrients and pathogens will improve water quality and contribute to maintaining in-stream biodiversity.
	Improved land management	Support Willims to improve management of livestock in riparian zones and environmentally sensitive areas.
	Increased awareness of water quality issues and causes	Utilise the Willims property as a demonstration site that displays the practical tools that landholders can incorporate on their land to help improve water quality.
	Development of wildlife habitat corridors and sanctuary areas	Use revegetation plantings to provide wildlife corridors and habitat for native animals along Falls Creek. Plantings to link remnant and growth areas. The establishment of corridors and habitat area enhances the likelihood of attracting additional funding from other sources, especially Sunshine Coast Council.

Monitoring

Monitoring of rehabilitation activities, will be split into periodic and episodic monitoring. Periodic monitoring is important to measure the effectiveness of the activities over time and will occur at various times throughout the project, but will be generally be undertaken on an annual basis by LBCCG (refer to below table for more detailed monitoring information). Episodic monitoring will occur following significant storm/rainfall events (or extended dry periods). This may, depending on the severity of the event, be achieved by a phone call to the landholders.

Data will be collected at the beginning of the project to establish a baseline that will allow for future monitoring of the project. Photo point monitoring and mapping will be carried out at the beginning and completion of the project. Photo point and mapping will then be undertaken annually for 3 years. Footage will provide valuable evidence of works completion, a record of changes over time, and provide an important assessment tool to evaluate the project.

Water quality testing will be also be undertaken at the beginning of the project and then annually for 3 years. This testing will involve water sampling that will look at faecal levels, nutrients, pH, dissolved oxygen, toxicants and water clarity.

Following revegetation, the monitoring will report on tree planting numbers and survival rates, shade cover, weed coverage. Groundcover monitoring both within the fenced riparian zones and in the adjacent grazed paddocks will assist with evaluation of the effectiveness of riparian zone fencing and revegetation providing a buffer to overland flows.

Whilst undertaking annual inspections after project completion, outputs such as riparian fencing, stream crossings, off-stream watering will be monitored.

Project updates will be provided at monthly LBCCG meetings. Project will be reported on in the LBCCG Annual Work Plan (to Seqwater and Sunshine Coast Council) and Annual Reports (LBCCG members and placed on LBCCG website).

Figure 1. An example of the mapping of Falls Creek using the drone which will be used for monitoring the project.

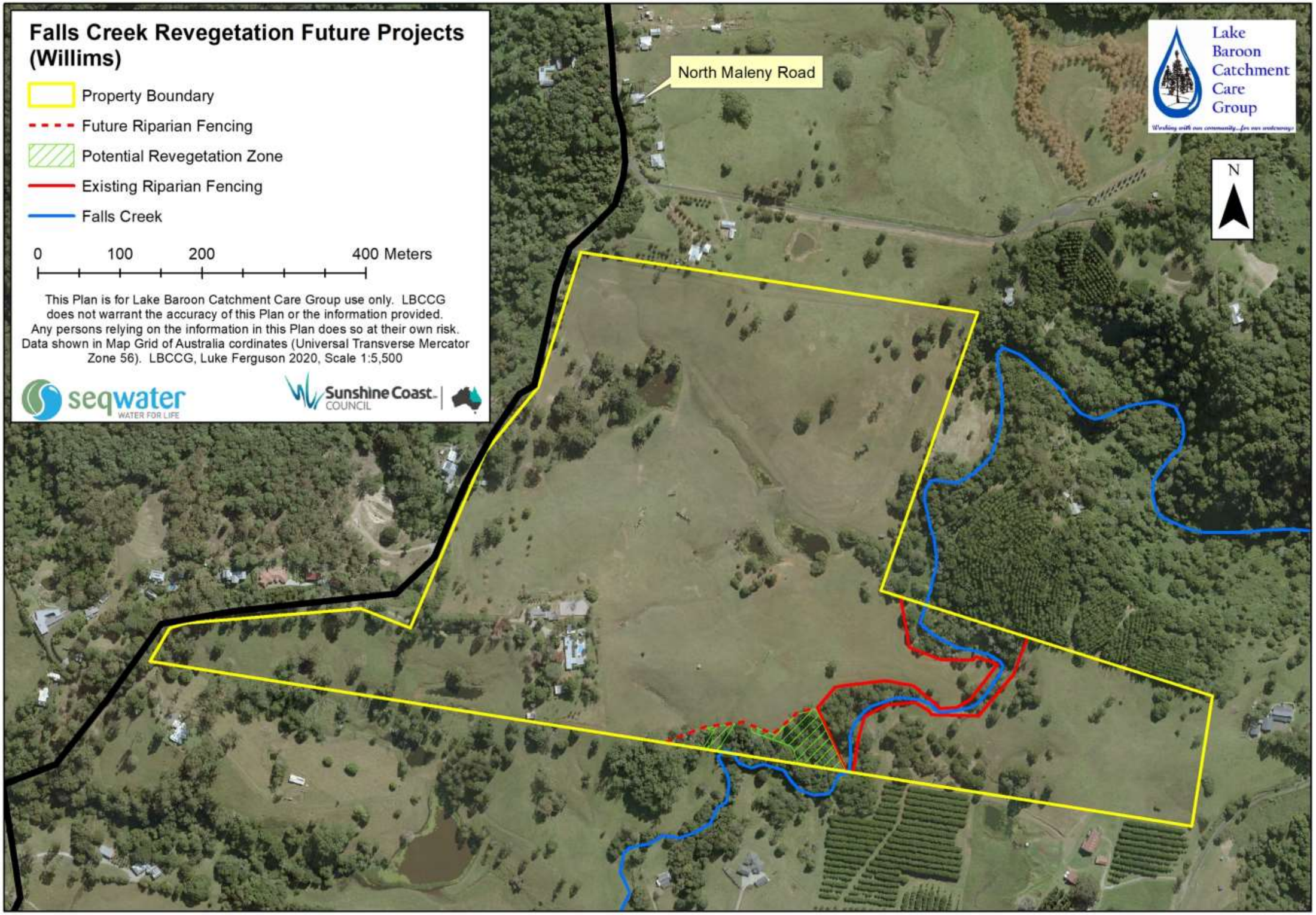
Figure 2. Photo monitoring points established for the project on Willims property.

Output/Outcome	What will be monitored	How will it be monitored	Monitoring Frequency
Off-stream watering	Troughs, header tanks, poly pipe, solar pump	In good condition and providing water to trough network.	Annually for three years
	Visual Inspection	No significant erosion around base of trough, no leaks and road base in good condition.	Annually for three years
Stream crossings	Visual inspection	In good condition and preventing erosion	Annually for three years
Revegetation	Stems planted (number)	Numbers actually planted against planned	Once after planting
	Stem survival	% survival	At 6 and 12 months, then annually for 3 years
	Overall plant condition	General overview of the plantings condition.	At 6 and 12 months, then annually for 3 years
	Shade cover	% coverage	Annually for three years
	Priority weeds (madeira and cats claw vines, celtis)	% after each maintenance run	At 6 and 12 months, then annually for 3 years
	Woody weed coverage (large leaf privet, camphour and lantana)	% after each maintenance run	At 6 and 12 months, then annually for 3 years
	Other weed cover (herbaceous annual and perennial weeds)	% after each maintenance run	At 6 and 12 months, then annually for 3 years
Water quality	Faecal Indicators	Water sampling	At commencement of project and then annually for 3 years
	Water Temperature	Thermometer, temperature logger	At commencement of project and then annually for 3 years
	Nutrients - Nitrates, Phosphates	Water sampling	At commencement of project and then annually for 3 years
	Dissolved oxygen	Dissolved oxygen probe	At commencement of project and then annually for 3 years
	Water clarity	Clarity tube	At commencement of project and then annually for 3 years
	Rubbish	Visual Assessment	At commencement of project and then annually for 3 years
	pH	pH meter	At commencement of project and then annually for 3 years
	Toxicants	Water sampling	At commencement of project and then annually for 3 years
Groundcover	Stock grazing pressure	Evidence of grazing (High, medium, low, nil)	At commencement of project and then annually for 3 years
Riparian Fencing	Metres installed	Metres installed against planned	At completion of project

	Visual inspection	Is the fencing stock proof, excluding livestock form the riparian zone, photo monitoring.	Annually for 3 years
	Impact on wildlife	Wildlife deaths due to fence	Annually for 3 years

Future Investment Options

Location	Future Work Options	Priority	Indicative Cost
Falls Creek	300 m riparian fencing	Moderate	$ 7,500
Falls Creek	0.5 Ha revegetation	Moderate	$15,000


Falls Creek Revegetation Future Projects (Willims)
Property Boundary
Future Riparian Fencing
Potential Revegetation Zone
Existing Riparian Fencing
Falls Creek
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400 Meters
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References

Seqwater (2020), *Scope of Works: Development of an implementation plan for the Baroon Pocket Catchment Water Quality Improvement Program*, Seqwater, Ipswich.

Lake Baroon Catchment Care Group (2020), *2020-21 Annual Work Plan*, Lake Baroon Catchment Care Group, Maleny.

Lake Baroon Catchment Care Group (2020), *1920-001 Upper Falls Creek Riparian Fencing and Revegetation (Warner)*, Lake Baroon Catchment Care Group, Maleny.

Appendices

Appendix 1: Budget

LBCCG has a policy of keeping Project Budgets confidential as individual project costings vary and can give misleading information. Detailed Budgets can be supplied on request. Please contact the LBCCG Project Manager on info@lbccg.org.au for further information.

Appendix 2: Background Information

Lake Baroon Catchment Care Group

Lake Baroon Catchment Care Group (LBCCG) is a not for profit community group focussed on reducing the risks to water quality in the Lake Baroon catchment - primarily through the implementation of on-ground remediation projects. This aim is consistent with Seqwater's objectives of producing high quality, competitively priced potable water for the Sunshine Coast (and greater South east Queensland) region.

LBCCG reduces risk to water quality by working with private landholders in the catchment. Supporting landholders to improve land management provides multiple beneficial outcomes; water quality improvements and broader environmental benefits while enhancing property management and productivity. Catchment activities not only benefit the raw water flowing into one of south east Queensland's most important water storages (hence Seqwater's significant support) but by providing a range of other environmental outcomes generates support from other funding providers.

Reducing risk to water quality is critical to providing safe bulk drinking water for the population of south east Queensland. All of the storages managed by Seqwater involve catchments that are developed to varying extents and support active and growing communities, along with important industrial and rural economic activity. (Murton 2012[2]).

The activities of LBCCG are supported by Seqwater as they align with Seqwater's commitment to the NHMRC Framework and to environmental stewardship by supporting catchment planning and targeted remediation for reduction of catchment-based risks to water quality (Smolders 2011[3]).

As this project is consistent with the shared aim of reducing risks to water quality from erosion, nutrients and pathogens, and impacts on native vegetation from livestock and invasive species, the activities to fence and revegetate riparian zones, enhancing the ability of watercourses to trap and process water contaminants, are considered beneficial to support.

Catchment Land Use and Associated Impacts

An estimated 80% of sediment and 35% of nitrogen in the waterways in south east Queensland comes from non-urban diffuse loads; sources such as unmanaged livestock grazing. Reduction of these loads clearly represents a major target for action if significant improvements in water quality are to be achieved in South East Queensland (DERM 2010[4]).

Despite the extensive clearing, 17% of the Lake Baroon catchment is still moderately forested; a significant proportion in the immediate area around the dam, although much of this is degraded by environmental weeds. Today, the catchment is susceptible to impacts associated with an increasing diversity of land use (Keys 20095).

[2] Murton, S. & Keys, S. 2012, Seqwater Natural Asset Management Plan – Lake Baroon, Sinclair Knight Merz, Brisbane

[3] Smolders, A. 2011, Project Briefing Note: Water Quality Project – Cork's Dairy Restoration, Seqwater

[4] Department of Environment and Resource Management, Development of a water quality metric for south east Queensland, 2010

[5] Keys, S., Murton, S., Costanzo, S. & Thompson, A. 2009, Catchment and In-Storage Risk Assessment for Water Quality – Baroon Pocket Dam, Sinclair Knight Merz, South Brisbane.

The area closest to the dam is popular with “tree changers” and has seen land use change from intensive grazing to smaller rural residential properties. This has resulted in the fragmentation of larger tracts of agricultural land into smaller parcels with a large increase in the number of on-site wastewater treatment systems in the catchment (Keys 2009).

Presently the catchment is susceptible to a number of land use impacts (Traill, 2007[6]; Dunstan, 2007[7]) including:

- poorly managed dairying and cattle grazing;
- new developments and increased stormwater runoff;
- runoff from impervious surfaces of existing developed areas;
- irrigation of treated effluent associated with the Maleny Sewage Treatment plant;
- uncontrolled stock access to the lake and its tributaries;
- lack of riparian vegetation and integrity – a result of extensive vegetation clearing;
- abundance of weeds – shift in land ownership from land managers (e.g. farmers) to inexperienced residents has potentially led to the spread and proliferation of weeds (including emerging weeds); *and*
- varying pollution sources related to increased population.

Maintaining a healthy riparian system is essential for a productive landscape. When a riparian area is healthy it contains lush, thick vegetation, providing habitat for wildlife and aquatic species, maintains stream bank stability, influences morphology and provides shade which in turn lowers water temperatures and increases the oxygen carrying capacity of the stream. Additionally, riparian vegetation filters, utilizes and stores nutrients, thus preventing them from entering major watercourses. Weed invasion is an indicator that the riparian system is in decline and has the potential to alter the vegetation structure to such an extent that habitat and water quality outcomes are threatened.

Falls Creek Sub-Catchment

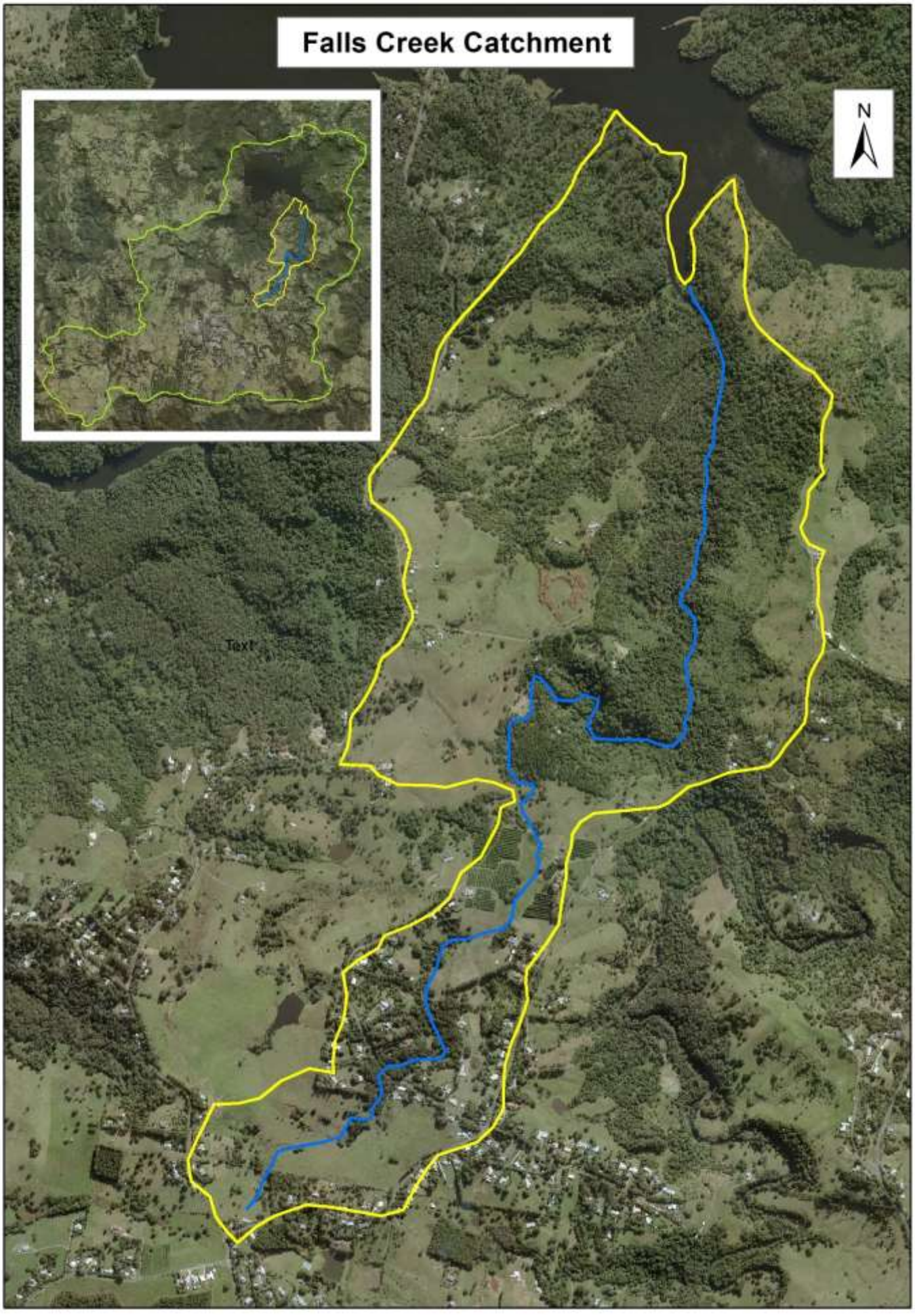
Falls Creek is a relatively small sub catchment covering 391 Ha, representing approximately 5.5% of the Baroon Pocket Dam Catchment area. The Falls Creek catchment is characterised by relatively un-intensive beef grazing (39%), considerable areas of rural residential (32%) and minimal vegetation, particularly along the watercourses.

Beef grazing has replaced dairying as the dominant land use (the Warner property was previously owned by the Newsham family who ceased dairying around 2013). The gentle slopes are stable despite having little vegetation cover. The lower reaches however are steep with large areas uncleared or permitted to return to regrowth vegetation. The slopes closest to the Dam are generally very unstable with many large landslips which impact the water storage.

The Lake Baroon Implementation Plan (2020/21) considers this part of the catchment as a high priority property based on its distance to Baroon Pocket Dam off take tower, land use, riparian health, readiness to implement projects and the likelihood of gaining additional funding. Historically the upper Falls Creek catchment supported dairy grazing which, along with the rural residential, likely yielded poor water quality results - high levels of nutrients (and likely pathogens).

[6] Traill, C.B. 2007, State of the Lake Baroon Catchment, Volume 2: Appendices, AquaGen Water and Renewable Energy, Palmwoods

[7] Dunstan, M 2007, Lake Baroon Catchment Implementation Plan, AquaGen Water & Renewable Energy, Palmwoods


Falls Creek Catchment
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Appendix 3: Project Activities

Riparian revegetation

Riparian vegetation provides a buffer between water and agricultural activities. Buffers trap sediment, nutrients and faecal material before it reaches a flowing watercourse. Additionally, any contaminants that do reach the flowing water are more likely to be processed by in-stream vegetation if present. A combination of both native woody vegetation (trees) and grasses are ideal for buffers to utilise a wider range of nutrients so 'messy' riparian zones are likely more efficient despite possibly being viewed as 'ugly'.

Riparian zones due to their nature of being the most productive with good soils and moisture tend to grow thick stands of weeds (along with grass) and require either heavy management or require revegetation with native vegetation to out compete and shade most weed species. Revegetation therefore is a long-term management solution for fenced riparian zones.

Riparian buffers comprising grassed buffer strips are effective at trapping sediments and nutrients adsorbed to sediments (such as phosphorus), but tend to be relatively poor at trapping dissolved nutrients, or for the provision of shade, food sources, in-stream structure or corridors for many species. Riparian buffers comprising taller, woody vegetation are typically good at providing shade, as a source of food and woody habitats, as a screen for light and noise, as corridors for terrestrial fauna (to a varying extent depending on species composition), and as a means for reducing soluble nutrient inputs.

Designed riparian buffers usually incorporate multi-tiered systems of both native woody vegetation to enhance ecological function, and vegetated filter strips for the management of water quality. In essence, this approach seeks to mimic the complexity and effectiveness of a natural riparian buffer system, and often the best approach is to provide the required buffer width to enable a self-sustaining buffer of native vegetation (Barwick et al, 2009[8]).

Revegetation will occur inside the riparian fencing along Falls Creek on Greg Willims property, resulting in the revegetation of approximately 400 m of the creek. This planting will provide a buffer to Falls Creek with 700 trees being planted, and will not only have a positive impact by improving water quality, but will also provide a significant wildlife habitat corridor, linking with remnant and regrowth forests.

Left: A section of the proposed planting site along Falls Creek. The tree planting inside the riparian fencing will improve the health of the riparian buffer and will link in with existing remnant and regrowth vegetation present along the creek.

[8] Barwick, M, Wassman, D & Pitman, K. 2009, *Maleny Community Precinct Environmental Management Scoping Document*, Australian Wetlands Pty Ltd, Caloundra, Qld

Weed management

Normally LBCCG does not actively manage woody weeds in riparian zones as any vegetation in riparian zones is better than none (except for a few key species that have a detrimental impact on water quality). Weed management is only completed where:

- Priority weeds are present (Chinese elm, Madeira vine, Cats claw creeper);
- There is a long-term plan to ensure the weeds do not return (revegetation);
- Weedy vegetation is affecting water quality (blocking flows, causing erosion, diverting flows etc).

Several methods of weed control are utilised:

- Initial knock down with excavator or tractor mounted mulcher;
- Follow up spot spraying of re-shooting weeds;
- Cut and paste of larger weeds that cannot be mulched or sprayed (particularly important within and adjacent to remnant or good quality regrowth vegetation);
- Regular follow up over several years (as part of revegetation maintenance).

Riparian vegetation along Falls Creek is impacted by woody weeds (primarily lantana, privet, camphour laurel, yellowberry and blackberry). Mulching of the lantana, yellowberry and blackberry, will be undertaken by the landholder. This will then be followed up with spraying once the weeds reshoot, this is the most cost-effective way to control the weeds on the site.

Greg Willims has continued controlling the weeds inside the fenced riparian zone, assisting the preparations for planting along Falls Creek. The devils fig has been cut and pasted, opening up the planting area.

Appendix 4: Stage 1

Stage	Output		Completed
Stage 1 (2017/18)	Riparian Fencing	1.14 Km wood split post, 4 barbs	August 2018
	Off stream watering system	2 troughs 600 m poly pipe	October 2018
	Stream crossings	1 x low level concrete	October 2018
	Revegetation	400	October 2020

Above: Riparian fencing along Falls Creek was completed in Stage 1 2017/18. The fencing has allowed the landholders to exclude livestock from the riparian zone, strengthening the riparian buffer.

Below: Falls Creek riparian zone fenced with high quality materials will provide protection of the riparian zone for 30 plus years.

Above: Two troughs and 600 m of poly pipe were installed and connected to the existing off stream watering system. With the installation of riparian fencing excluding livestock from the waterways, the off stream watering system removes the reliance of accessing water from the creeks.

Above: The concrete crossing installed as part of Stage 1, 2017/18. Formalised crossings protect livestock and watercourses from the issues associated with unrestricted access, they improve water quality by limiting sedimentation and nutrient enrichment.

Above: The revegetation of Upper Falls Creek, was successfully completed in October 2020. 400 trees were planted in the fenced riparian zone.

Below: After less than a year the trees are very well established, with some species well over 2 m tall. The soil along the creek is very fertile, and will provide perfect conditions for tree establishment and growth, ultimately leading to a healthy vegetated riparian buffer which will improve the water quality of Falls Creek quality by limiting sedimentation and nutrient enrichment.