

BEFORE INDEPENDENT HEARING COMMISSIONERS

UNDER the Resource Management Act 1991 and the Environment
Canterbury (Temporary Commissioners and Improved Water
Management) Act 2010

IN THE MATTER OF submissions and further submissions on Proposed Plan
Change 4 (Omnibus) to the partially operative Canterbury Land
and Water Regional Plan

**STATEMENT OF EVIDENCE OF ERROL ALBERT BEGG ON BEHALF OF ERRALYN
FARM LIMITED (SUBMITTER NO. 65926)**

DATED 23 FEBRUARY 2016

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STATEMENT OF EVIDENCE OF ERROL ALBERT BEGG

Introduction

- 1 I am a director of Erralyn Farm Limited (**Erralyn**) along with my wife Marilyn.
- 2 I have been a farmer for 50 years and have been dairying for nearly 18 years. I am a member of Federated Farmers.
- 3 Erralyn owns approximately 270 ha of freehold land located on the southern bank of the Rakaia River, 7km east of Rakaia (**Property**). Erralyn purchased the Property in June 1994 and it is presently run as a dairy unit.
- 4 Approximately 240ha of the Property is presently irrigated and used for intensive grazing of dairy cows. However, Erralyn has the benefit of a resources consent¹ that would enable a further 20ha of freehold land to be irrigated in the future. This area includes land that was cultivated in the past but is presently rough grazed dry land.
- 5 Erralyn also has the benefit of resource consents to discharge dairy shed effluent on the Property² and to carry out flood protection works in the bed of the Rakaia River adjacent to the Property.³

Scope of Evidence

- 6 My evidence focuses on Environment Canterbury's (**ECan's**) proposed changes to the stock exclusion, vegetation clearance and earthworks rules and how those changes would affect Erralyn.
- 7 In preparing my evidence I have reviewed the parts of Plan Change 4 (as notified) (**PC4**) and ECan's section 32 report (**Section 32 Report**) and section 42A report (**Officer's Report**) concerning stock exclusion, vegetation clearance and earthworks.

Definition of "bed"

- 8 I understand ECan's proposal is to include a new definition of "bed" to clarify the meaning of that term for braided rivers in the stock exclusion rules in the Regional Plan (through Rule 5.68A). I support ECan's intentions in this regard. I believe that a practical definition of this term is needed so that those who farm near braided rivers can easily understand how far the "bed" of the river extends

¹ CRC990660.2 (South Rakaia Irrigation Partnership).

² CRC100860.

³ CRC001160.2, CRC992052 and CRC020336.

and therefore where the planning restrictions apply. This would address the uncertainties that presently exist with the Regional Plan's broad definition of "bed" for rivers.

- 9 The uncertainty around the interpretation of the term "bed" in the regional planning documents resulted in Erralyn facing prosecution by ECan four years ago. The prosecution was brought as a result of works that Erralyn had carried out on a 2.5ha section of the Property adjacent to the Rakaia River. This area of land has freehold title and we had always considered it to be land that we had a right to farm.
- 10 The District Court found that the area of land was riverbed because although the river did not extend across the area at the time, it had done so in the past (in 1996 and 2006⁴) and it could be expected that future floods could migrate into the area. The Court held that it was land which would therefore be covered by floodwater at the fullest flow of the river, and consequently fell within the definition of "bed" under the RMA (and therefore the Natural Resources Regional Plan, being the relevant plan in place at the time).
- 11 Now four and a half years on since the original offence there have been several major floods in the Rakaia River. With the flood protection work that Erralyn and ECan have undertaken along the Property's river boundary, it is very unlikely that floodwaters will enter this land area in the future.
- 12 The Court's findings on the extent of the riverbed at this location is, however, now reflected in the "flood protection vegetation boundary" lines in the maps in ECan's Flood Protection and Drainage Bylaw 2013 (**Bylaw**). A copy of the map relevant to the Property (Map 37) is attached as **Annexure A**.⁵
- 13 This line now forms the landward boundary of the "bed" of the Rakaia River for the purpose of the rules in the Regional Plan. This affects approximately 20 ha of the Property, which comprises 9% of the total land area consented to the Property for irrigation under the South Rakaia Irrigation Partnership's consent, CRC990660.2. If we continue to have success with the flood protection works on the Property's boundary with the River, I see no reason why this area of land could not be farmed in the future as the River is very wide at this particular location.
- 14 I understand that ECan does not propose to change the Regional Plan's definition of "bed" under PC4. However, I am concerned about how the definition

⁴ The flows in the Rakaia River during the 2006 event peaked at approximately 5600 cumecs.

⁵ This map is marked up with the Property boundary (black line).

relates to ECan's proposed changes to the vegetation and earthworks rules and the implications those rules would have for the future development of land on the river side of the Bylaw line.

15 In my view the Bylaw line does not accurately reflect the actual boundary of the "bed" of the Rakaia River. In particular, the Bylaw line does not:

15.1 take account of the existing flood protection vegetation that Erralyn has funded and constructed over the years (a matter I will discuss in more detail later in my evidence); or

15.2 recognise that:

(a) recent flood events have not resulted in the area of land that the District Court found to be riverbed being encroached by floodwaters. To demonstrate this point, I have attached to my evidence as **Annexure B** an aerial photo taken in January 2013 showing the second largest flood in the Rakaia River on record (which peaked at 5400 cumecs).

(b) Land lying on the River side of the Bylaw line has ECan soil classifications (i.e. Rakaia deep sand and/or Waimakariri deep fine sandy loam). I have attached a summary of those classifications as **Annexure C**, which was included in a resource consent application that was prepared for Erralyn by Pattle Delamore Partners Ltd in 2007.

Stock Exclusion

16 While I support ECan's intention to provide clarification about the extent of the "bed" as it applies to the stock exclusion rules, I believe the wording proposed by ECan in the new Rule 5.68A would unfairly disadvantage many farmers like myself. That is, farmers who have invested considerable financial resources into flood protection works to protect their land from flooding and erosion and/or to re-establish freehold title of land, and securing resource consents to enable the future development of that land.

17 Since we purchased the Property in 1994, we have carried out river protection works along the boundary of the Property with the Rakaia River. This has been necessary to protect the Property from erosion and flooding as the river braids are active and unpredictable.

- 18 The Property lies within ECan's Lower Rakaia River Rating Area and Erralyn pays a special allocated rate to ECan for river protection works. However, ECan resources have not been sufficient to prevent the River from encroaching into the Property. Erralyn has therefore carried out flood protection works at its own expense along approximately 1.7 km of the Property's 2.5km boundary with the River. I estimate that Erralyn has spent at least \$800,000 (including labour costs and machinery) on river protection works during my time at the Property.
- 19 In the first few years, we used contractors to install and maintain the protection works, but as time has gone on and we have learned more about the River, we have undertaken the work ourselves and have gained experience in what works. After 20 years of trial and error, I believe the results we are now achieving with the flood protection works show that we have a sound approach. In the last few years the works have performed very well under high river flows and have succeeded in stabilising the Property's River boundary.
- 20 Erralyn also accepts support from ECan when it can be provided. In the past this has taken the form of nursery plantings for Erralyn to use along the River boundary, and some capital works (pole planting and groyne installation). The most recent protection works were completed last winter in conjunction with ECan at a total cost of around \$20,000. Those works involved construction of new groynes and willow pole planting. This collaborative approach has worked very well, and it is our preference that the parties continue to work together in the future.
- 21 I have included as **Annexure D** an aerial photograph of the Property marked up with the approximate location of the flood protection works that are presently in place along the River boundary, together with a set of aerial photos that show those works in more detail. In summary, the works include:
- 21.1 Willow pole plantings along two thirds of the Property's River frontage (shown as a red line). These plantings were originally established shortly after we purchased the Property.
 - 21.2 4 tonne concrete block protection works over approximately 1 km distance (shown as a blue line).
 - 21.3 Groynes built in the River using gravel from the bed and incorporating tree material relocated from the farm as part of the groyne structure (shown in orange (ECan/Erralyn works) and in black dotted lines (Erralyn works)). The tree material we use is trimmed off the top two thirds of well-established willows along the riverward boundary of the Property's

established pasture. ECan staff have accepted that this method is very effective.

- 22 The works have been carried out under the various resource consents that Erralyn has held over the years (or otherwise has had the benefit of). Erralyn's current land use consent for river protection works, CRC020336, expires in October 2016. Erralyn's consultants are currently preparing an application for a new land use consent to replace this existing consent, which will enable Erralyn (and ECan) to continue to carry out (and maintain) flood protection works at this location in the future. I am hopeful that the new consent will be granted by ECan on similar terms to the existing consent considering the work that has been undertaken under it has been so successful.
- 23 I note that flood protection works also exist in the 2km stretch upstream of the Property, which includes three major groynes. This work has been completed under the South Rakaia Irrigation Partnership consent CRC001160.2.
- 24 The flood protection works on the Property's River boundary are not "*flood protection vegetation owned or controlled by ECan for flood protection purposes*". ECan's proposed new Rule 5.68A would therefore mean that we (or any future owners of the Property) would be unable to intensively graze any land⁶ within 50m of the outer gravel margin of the River along the entire 2.5km length of the Property's River boundary.
- 25 I believe this is an unnecessary restriction as our flood protection works have been very successful in protecting the Property from erosion and inundation, and the area of freehold land that this restriction applies to is consented for irrigation and dairy effluent disposal.

Vegetation clearance and earthworks

- 26 When PC4 was notified, one of my key concerns with the changes proposed to the vegetation clearance rules was the potential implications they would have for farmers to continue to manage the spread of weeds in the river bed adjacent to their farms, and consequently reduce the potential fuel loading available for river bed fires. However, the Officer's Report confirms that the control of registered 'pest plants' ought not to require a resource consent to manage and is adequately addressed by the definition of vegetation clearance (which I understand excludes registered 'pest plants', such as broom and gorse).⁷ I agree with that approach.

⁶ Not including land that is already intensively grazed, as I understand this is exempt from the Rules.

⁷ Section 42A Report, at H.85.

- 27 ECan has said that the intent of the new Rules for vegetation clearance and earthworks is to limit the occurrence of confining areas of woody vegetation adjacent to braided rivers through conversion into farmland in the future on the basis that this appears to be having cumulative effects on the functioning of the braided river systems.⁸
- 28 For Erralyn, the Rules would preclude the potential future development (i.e. cultivation) of any freehold land on the River side of the Bylaw line. As I have noted earlier in my evidence, this would include up to 20 ha of the Property (i.e. freehold land), which equates to 9% of the total land area consented to the Property for irrigation under the South Rakaia Irrigation Partnership's consent (which Erralyn is a member of).
- 29 The Property is presently sitting in the top bracket of dairy production in New Zealand, producing in the order of 2000 kg milk solids per ha. In my view there is no reason why this land, once it is fully re-established and developed, could not be producing at a similar level to the wider Property. It would be devastating if this land was not available to be developed for dairy production in the future (by Erralyn or any future owner of the Property) given the investment we have made in ensuring that the necessary resource consents are in place for that very purpose.
- 30 Finally, I wish to note my concern that the Section 32 Report (and supporting documents) do not appear to fully acknowledge the potential implications of ECan's decisions about where its resources are used for flood protection works and weed/pest management on the functioning of braided river systems, and consequently freehold land adjacent to them.
- 31 To illustrate this point, I have attached as **Annexure E** to my evidence an extract of ECan's Rakaia River Rating District Asset Management Plan. On pages 23 and 24, ECan provides a summary of the flood protection works that were undertaken between 1920 and 1946. The Report explains the success of that work in reducing the flow of the river into the North Branch, but also the consequential flooding and erosion problems that have occurred as a result of that work on the south bank of the south branch of the River (i.e. by encouraging flow more vigorously towards the south bank).

Errol Albert Begg

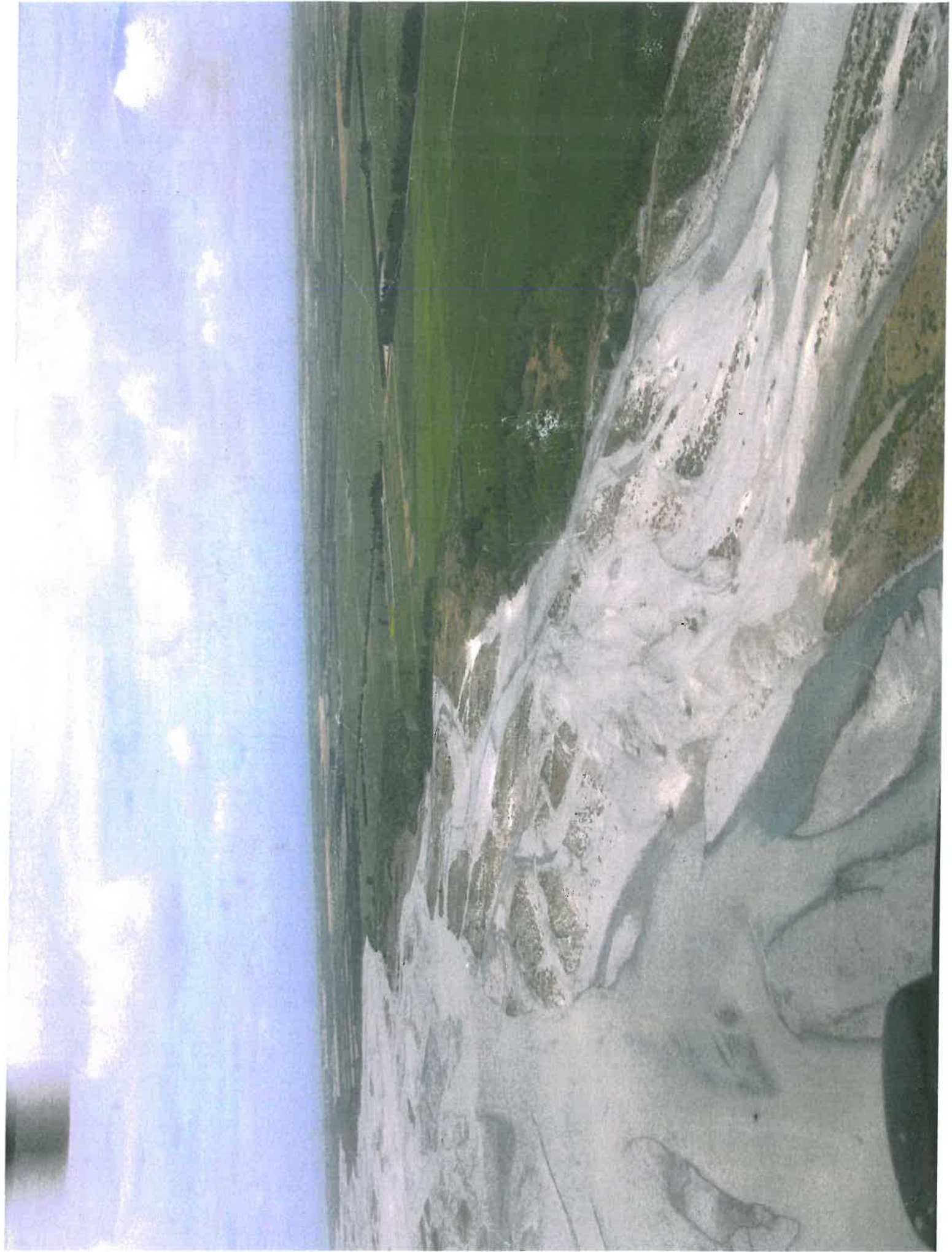
23 February 2016

⁸ Section 42A Report, at H.51.

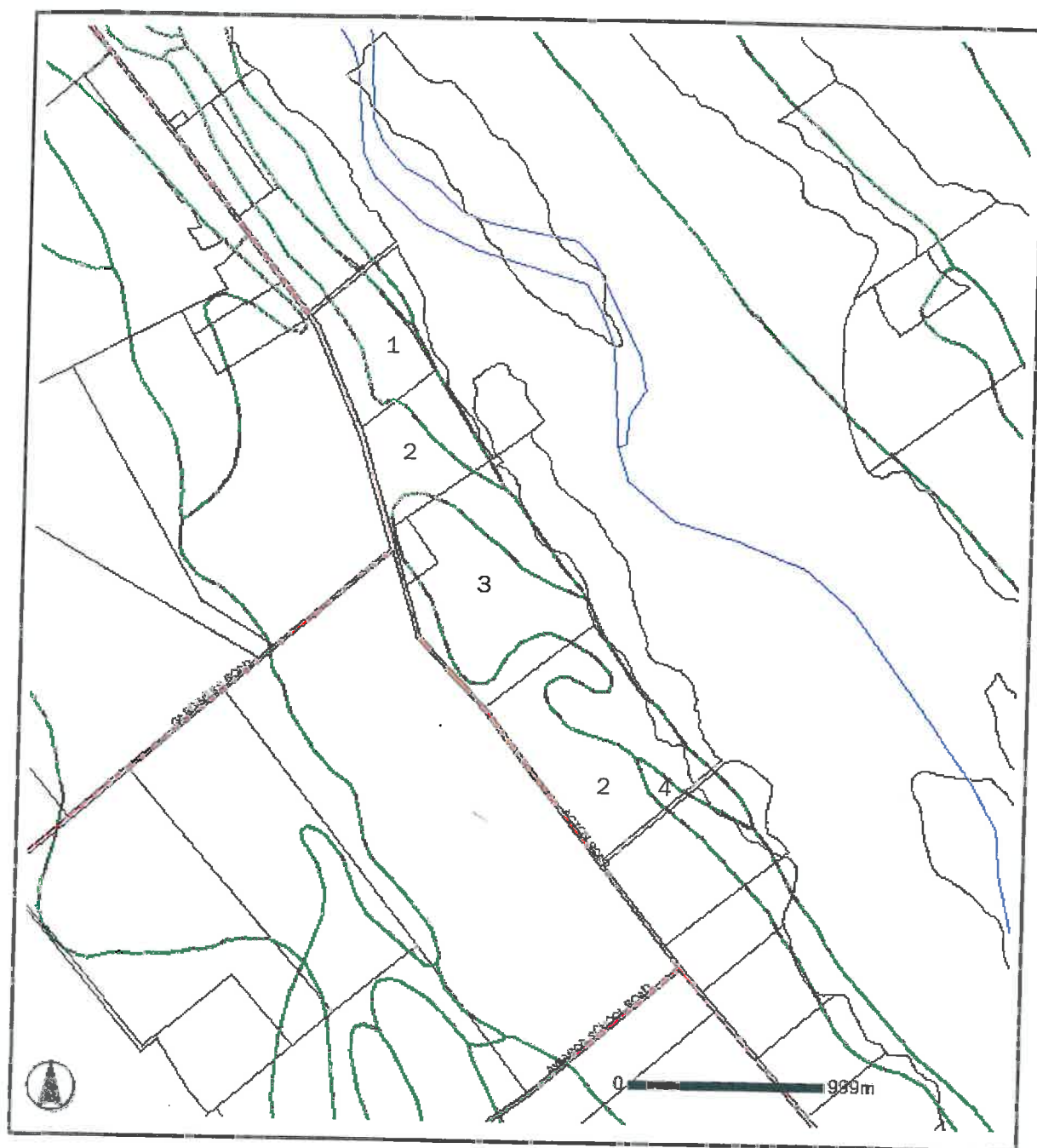
ANNEXURE A – FLOOD PROTECTION AND DRAINAGE BYLAW 2013 – MAP 37

**ANNEXURE B – AERIAL PHOTO OF JANUARY 2013 FLOODING IN THE RAKAIA
RIVER (SOURCE: ECAN)**

Beggs to Criggs Rd 7.1.13



**ANNEXURE C – EXTRACT FROM ERRALYN APPLICATION SUMMARISING ECAN
SOIL CLASSIFICATIONS FOR THE PROPERTY**

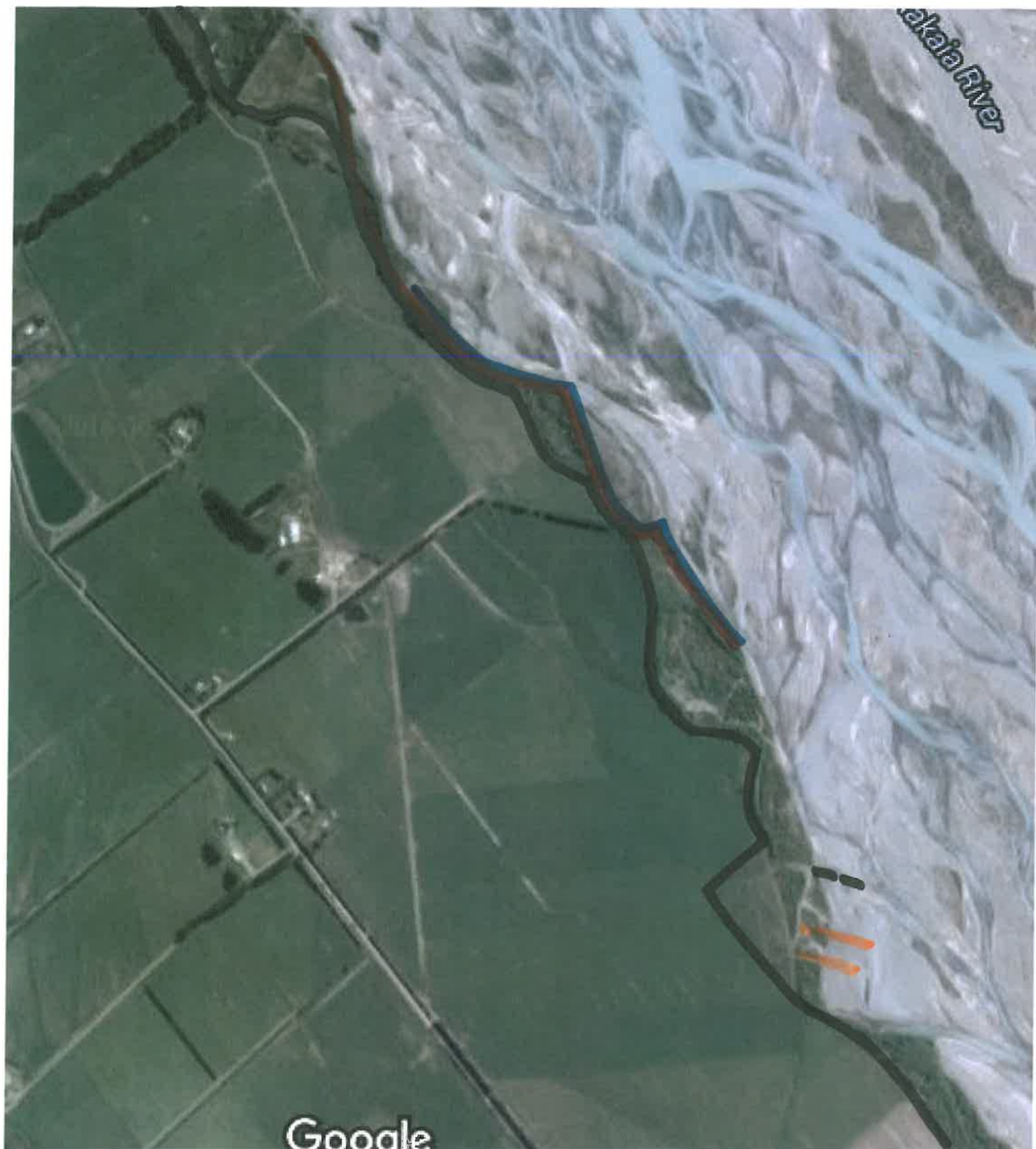


Sourced from ECan online GIS.

Map reference	Soil type	PAW range	PAW average
1	Waimakiriri moderately deep fine sandy loam	90-150	125
2	Waimakiriri shallow silt loam	70-110	90
3	Rakaia deep sand and Waimakiriri deep fine sandy loam	70-150	110
4	Waimakiriri moderately deep fine sandy loam	90-150	125

Figure 3: SOIL TYPES OF ERRALYN FARM (map from ECan online GIS database).

ANNEXURE D – EXISTING FLOOD PROTECTION WORKS



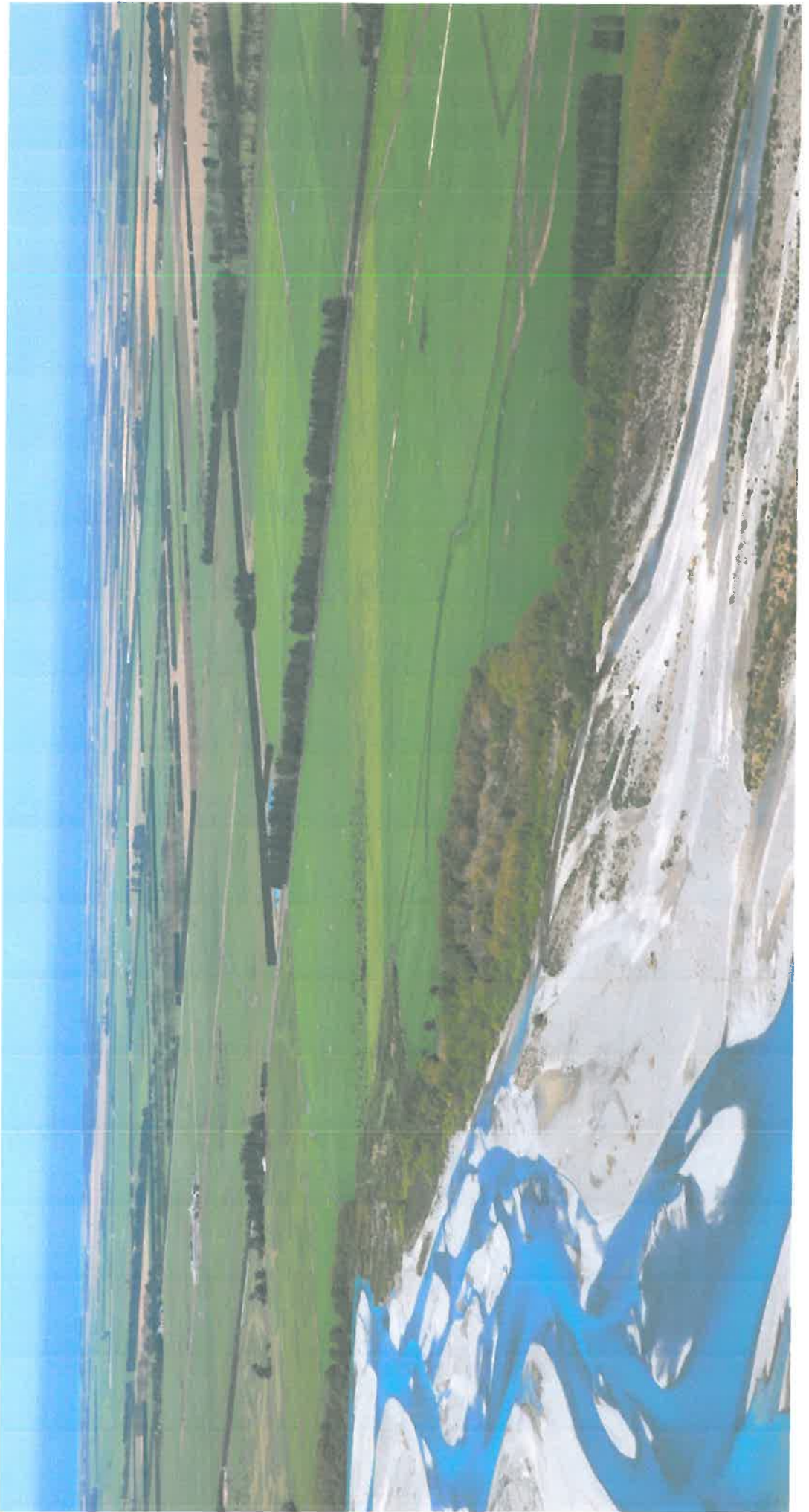
Key

- Willow pole planting (Erralyn)
- 4 tonne concrete block protection works (Erralyn)
- Groynes (ECan/Erralyn)
- Groynes (Erralyn)
- "Flood Protection Vegetation Boundary" under ECan's Flood Protection and Drainage Bylaw 2013





004021-25-23



**ANNEXURE E – EXTRACT FROM ECAN’S RAKAIA RIVER RATING DISTRICT
ASSET MANAGEMENT PLAN**

LOWER RAKAIA RIVER RATING DISTRICT

Summary

Objectives	<ul style="list-style-type: none"> (a) To maintain the existing works constructed in the Lower Rakaia River District to an agreed standard. (b) To maintain the riverbed to a standard adequate to carry flood flows and minimise change due to erosion and flooding. (c) To carry out new protection works as and where required. (d) To establish stocks of trees for use in constructing protection works.
Term	In perpetuity.
Maintenance	Average maintenance level should exceed \$121,000 (2011 indicator) (5 year average \$287,000, 2011)
Reporting	<p>Annually</p> <ul style="list-style-type: none"> - Prepare annual maintenance plan and budget. - Long Term Community Consultation Plan (LTP) - Discuss and agree with rating district (report in LTP) - Report on works undertaken and costs to liaison committee and Council. <p>Three Yearly- Revalue infrastructural assets</p> <p>Six Yearly</p> <ul style="list-style-type: none"> - Assess from aerial photos fairway, berm and fairway edge condition - report to Council. - Review asset management plan. Agreed with liaison committee and adopted by Council. <p>Flood Performance</p> <ul style="list-style-type: none"> - Report to Liaison Committee on performance of scheme for floods where damage repair will exceed annual budget by 10% or more.
Funding	<p>Maintenance funded by:</p> <ul style="list-style-type: none"> Targeted rate, Works & Services rate, General rate, Reserves income <p>in the ratios set in the Council's LTP and Part A, Appendix E</p> <p>Damage repairs funded by:</p> <ul style="list-style-type: none"> Rates (as above) Financial Reserves Reprioritising works Loan
Reserves Income	Income from reserve land associated with the scheme used to fund scheme works
Financial Reserves	<p>Aim to:</p> <ul style="list-style-type: none"> - Maintain at approximately 5yr average annual maintenance level (\$287,000, 2011). - Build up reserves to meet above average planned expenditure. - Draw down reserves to meet unexpected expenditure. - Use to smooth rating
Review of Plan	Review when there is a change in maintenance standards, a change in funding policy, or at 6 yearly intervals.

Section 1: Description

1.1 Purpose Of Asset Management Plan

Asset Management Plans define the objectives and performance standards of the river control and drainage schemes for which the Council has the maintenance responsibility and provide the basis upon which the effectiveness of their maintenance can be measured.

This plan:

- Defines the service level for the Lower Rakaia River Rating District.
- Defines the level of maintenance needed to retain the operating and service capacity of the river control and drainage assets managed by the Council.
- Provides a base against which the Council's performance in maintaining the service capacity of the infrastructural assets can be measured.

1.2 Background

The North Canterbury Catchment Board established the Lower Rakaia River Rating District in 1985 to address the current and future river control problems. Major flooding and erosion on the south bank and the south side of Great Island was the catalyst to the rating district's establishment.

The first recorded river works in the Rakaia River were to reduce the threat of flooding to the accommodation house on the north bank near the Old South Road.

The North Rakaia District was constituted by the Provincial Government under the Canterbury Rivers Act 1870 by a resolution dated 5 January 1872. The 1872 Gazette notice describes the south-western boundary of the district only as "the Rakaia River" with no indication as to whether this meant the north or the south bank of the Rakaia River.

In 1884, the "River Boards Act 1884" was passed. The only changes that appear to have affected the North Rakaia River District was a change of name of the governing body from the North Rakaia River Board of Conservators to North Rakaia River Board. The new Board was an elected body compared with the appointed Board of Conservators.

In March 1946, the Soil Conservation and Rivers Control Act 1941 was gazetted and the responsibilities and assets of the North Rakaia River Board were passed to the North Canterbury Catchment Board (NCCB).

Most of the works constructed by the North Rakaia River Boards were completed prior to 1921. These works included low stopbanks, an extensive system of groynes and willow plantings.

The Press (11.5.1878) reported that 90-100 groynes running back from the river to the nearest high ground had been formed.

The minute books of the North Rakaia River Board show that the Boards were concerned with erosion of the north bank and possible overflows toward Southbridge.

During the period 1900-1921, major stopbanks were constructed at the entrance to Feredays Island, Dobbins Ford and Abbotts.

In 1915, a large embankment with a concrete head was constructed on the north side of Great Island and, in 1916, the Board twice inspected erosion problems on the south side of Great Island. After several inspections in the following years, the Board contributed towards works constructed on the south side of the island by Mr Ford, the owner.

In the period 1921-1946, the Board was mainly concerned with maintenance of the works constructed but this maintenance gradually diminished to a negligible level by 1946.

Records show that the distribution of the river flow was moving south. The shifting of access to Great Island from the south to the north confirms this change.

From 1946, the North Canterbury Catchment Board continued to maintain these works where required. The demand for these works occurred mainly in the area of Dobbins Ford. The Lower Rakaia Account also funded 50% of the unsubsidised share of central government grant assisted works that benefited endowment land on Feredays Island and Great Island in later years.

All works that were constructed on the south bank were funded by the landowners with central government grant assistance only. No funds from the Lower Rakaia Account were spent on the south bank.

In the 1980's, flooding and erosion problems along the river, particularly on the south bank of the south branch, resulted in requests from land owners calling for the establishment of a separate rating district to comprehensively address the river control problems on the lower Rakaia River.

The NCCB at its meeting on 1 March 1985 resolved to establish a special works rating district (i.e. the present rating district) to address the current and future river control issues between SH1 and the mouth. The district does not cover works to protect the South Rakaia Huts.

The objectives of the river control scheme adopted by the Board are:

- (a) To maintain the existing works constructed in the Lower Rakaia River District to a satisfactory standard.
- (b) To maintain the riverbed to a standard adequate to carry flood flows and minimise change due to erosion and flooding.
- (c) To carry out new protection works as and where required.
- (d) To establish stocks of trees for use in constructing protection works.

Endowment lands on Feredays Island and Great Island to fund river control works were vested in the North Rakaia River Board. This land is now managed as pastoral leases or forestry to provide income for the rating district.

The scheme of works is minimal recognising the impact of the costs of such works on the small rating base.

1.3 River Control System

The Lower Rakaia River control works consist of:

Erosion control works:

Trees (protection) 79.4 km

value \$10.63m

Groynes 7

value \$ 1.48m

Total \$12.11m (June 2011)

1.4 Rating Districts Classification

The targeted differential catchment works rate for the Lower Rakaia Rating District comprises six classes and is levied per hectare.

Category of rateable land	Differential relationship between categories
Class A	100
Class B	5
Class C	4
Class D	3
Class E	2
Class F	1

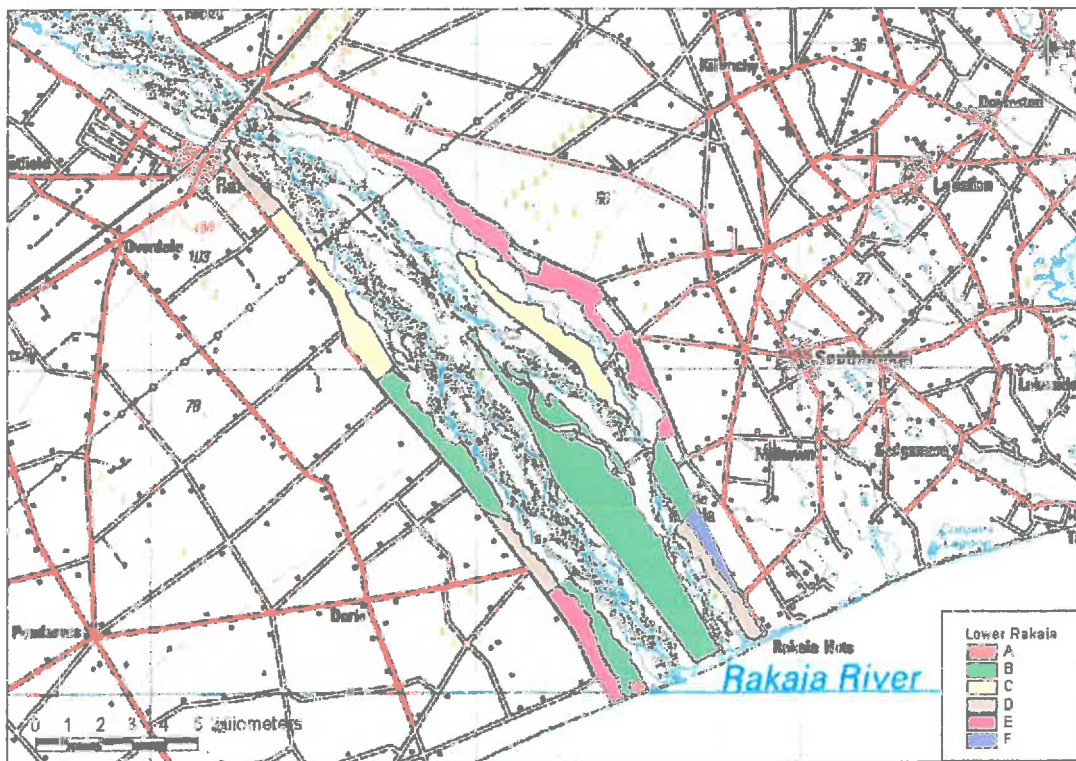


Figure 1: Rating district classification map.

1.5 Assets Being Protected

The area of the rating district is approximately 4112ha.

Community infrastructure such as roads, power and telephone lines all derive benefit from the river control system. Opportunities for recreational access and wildlife habitat

are created as a consequence of some works (i.e. tracks and picnic areas, clear riverbeds for ground nesting birds).

1.6 Maintenance Expenditure

Part A, Appendix F shows expenditure for the years 2007-2011 for the Lower Rakaia Rating District. The average expenditure in this period has been \$287,000. This exceeds the recommended maintenance range (\$121,000 - \$242,000) for a scheme of this type because the annual expenditure includes the establishment of new protection plantings, which increases the value of the rating district's assets, and the Rakaia is a very high energy river.

An annual programme of maintenance will be prepared each year. This programme will be discussed with a liaison committee of ratepayer representatives, prior to adoption by the Council for inclusion in the LTP. The programme will typically be based on a normal maintenance requirement with the asset manager having the authority to rearrange as necessary. Approval will be sought from the liaison committee and the Council for proposed expenditure exceeding the annual budget by more than 10%.

In preparing the annual maintenance programme consideration will be given to:

- Works identified as necessary.
- Works that can be anticipated given a 'normal' season.
- Flexibility to meet unbudgeted damages.
- Affordability.
- Environmental effects.

1.7 Existing Standards

The Lower Rakaia River scheme is a minimal scheme intended to only maintain the existing rating district assets, to maintain a clear fairway to carry a flood flow and minimise the impacts of erosion and flooding, and to establish tree stocks for use in the construction of protection works. The co-operation of landowners is required for the provision of access to the works.

The scheme provides no formal flood control system. Erosion control is limited to that provided by the 7 groyne structures existing at the time of the rating district establishment.

Except for the erosion control described above, erosion control per se is not an objective of this rating district, however some benefits will arise in situations where tree plantings have required erosion protection and where tree plantings, when mature, will confer in-situ erosion control. Tree plantings have been planned at sites which are reasonably secure from the river, but which will be capable of providing an in-situ erosion control benefit when the trees are mature, should the river erode into the site.

Works are undertaken to control vegetation that would tend to deflect braids towards the banks causing erosion and increasing the risk of flood overflows. These works include spraying and removal (snagging) of trees, particularly willow trees. Where viable, these trees are used for anchored tree bank protection and/or are made available to the riparian owner/occupier for erosion control works.

The work is in three categories:

- (a) Maintenance of fairway downstream of SH1:
Removal of restrictions to flow (trees and brushweeds) by snagging debris from the fairway, where that vegetation would tend to deflect river flow into the banks. Limited channel alignment work.
- (b) Maintenance of Existing Structures
A series of 7 groynes with armoured heads exists on the North Branch from Feredays Island downstream to Abbotts Groyne. In addition, live willow tree protection exists from downstream of the Great Island Bridge down to Abbotts Groyne. Other pre-existing groynes are not maintained as part of this rating district. Maintenance includes repair of any scouring or other damage to the groynes and the live tree protection, and ensuring that landowners control stock.
- (c) Tree Planting
The philosophy adopted in tree planting is to ultimately achieve a uniform distribution of trees over the rating district and to prioritise plantings. The planting effort therefore is greatest where there are few or no trees available for protection at sites most likely to come under erosion attack in the foreseeable future.

Planting sites have been selected on the basis that they are reasonably secure from attack by the river so that trees will have time to mature (say 10-15 years). A further criterion is that the trees in-situ will confer an erosion control benefit at the site, i.e. they are not so far away from the active river channel as to not have any in-situ erosion control benefit.

In achieving this balance, there is an element of risk. Some losses to the river may be expected and in some cases some works, e.g. channel realignment and/or lateral bank tree protection, may be required to assist the trees to reach maturity when they will provide the in-situ benefit.

Stock control is an essential element in the successful establishment of those trees and this is achieved by:

- enforcement
- sleeve protection at planting
- ring fencing where there is heavy stock pressure.

Environment Canterbury has the policy of recovering damage repair costs on behalf of the rating district from landowners where that damage is caused by the landowner's action or inaction. Prosecutions can be made under the Soil Conservation and Rivers Control Act.

Best practice for managing infrastructure assets (as required by the 2002 Local Government Act) is being applied and this is starting to identify issues that the district will need to address.

This scheme is still being constructed. The most significant need is to develop a long term plan detailing the zones where works should be established to meet the objectives of the scheme, and to ensure that privately sought works do not have an adverse effect on the scheme.

Section 2: Service Levels

2.1 Objective

The objectives of the Lower Rakaia River Rating District are:

- (a) To maintain the existing works constructed in the Lower Rakaia River District to an agreed standard.
- (b) To maintain the riverbed to a standard adequate to carry flood flows and minimise change due to erosion and flooding.
- (c) To carry out new protection works as and where required.
- (d) To establish stocks of trees for use in constructing protection works.

2.2 Flood History

1979	5477 cumecs at Fighting Hill recorder
24/11/84	3727 cumecs
9/1/94	5595 cumecs
7/11/94	3889 cumecs
9/1/04	3651 cumecs
14/11/06	5096 cumecs
26/11/07	3645 cumecs
24/12/07	3707 cumecs
26/12/07	3815 cumecs
26/1/08	3645 cumecs
28/12/10	5636 cumecs
2/1/13	5246 cumecs

Note that the objectives of the scheme do not relate to a design flow. The aim is to ensure that the riverbed is free from obstructions to flow.

Estimated flood frequencies (2011):

Mean annual flood:	2520 cumecs
10% AEP (10 year) flood:	3850 cumecs
1% AEP (100 year) flood:	5770 cumecs

2.3 Damage Exposure

River control works are constructed in a very high-energy environment with the purpose of resisting and absorbing some of that energy. No matter what the standard of maintenance, damage to such systems is inevitable.

An assessment of maximum damage potential in a single flood event is \$3,94m, June 2011. (Refer to Part A, 3.1.2). This relates only to the works for which the rating district has a responsibility and does not include the cost of damage to assets constructed by riparian owners.

Following planting, willow poles have little ability to resist the erosive forces of the river and so they are usually planted on sites where the risk of erosion is slight. After 10-15 years the trees will be near maturity and be able to resist the erosive force of the river either standing or following layering or bundling to form anchored willow bank protection.

Usually, the potential for damage will not therefore be high, however, occasionally the original margin of land between the active river channel and the plantings will be eroded and this may necessitate the provision of an appropriate protection mechanism to allow the trees to survive. The damage risk is not necessarily proportional to the discharge and may well depend on the distribution of flow in this wide and braided river. Damage may, at worst, include partial or full destruction of the plantings or may, at the other end of the scale, be debris deposited against the poles or sapling trees.

Damage by browsing stock can also be significant and lead to the stunting and/or ultimate demise of the growing tree.

2.4 Reporting On Performance Levels

The monitoring and reporting procedure outlined in Appendix 1 (and Asset Management Plan Part A, Section 6) will be used to assess the standard of maintenance carried out and the performance of the scheme.

Section 3: Reporting

3.1 Annual Asset Management Plan Compliance Report for Lower Rakaia River Rating District

The asset management plan adopted by the community and Environment Canterbury:

- Defines the service level for the Lower Rakaia River Rating District
- Defines the level of maintenance needed to retain the service capacity of the rating district's river control assets managed by Environment Canterbury
- Provides a base against which the Council's performance in maintaining the service capacity of the rating district's river control assets can be measured
- Requires Environment Canterbury to report to the rating district's liaison committee annually.

The matters to be reported to the rating district's liaison committee annually are:

Action required	Report
Prepare maintenance programme and budget.	As presented to liaison committee meeting on..... Copy attached to minutes of the meeting.
Prepare ten-year forward projection of maintenance and funding requirements.	As presented to liaison committee meeting on..... Copy attached to minutes of the meeting.
Report on works undertaken and costs.	As presented to liaison committee meeting on..... Copy attached to minutes of the meeting.
Inspect all groynes for erosion, damage, or active berm erosion. Report on inspection, noting all cases of erosion of live protection works erosion damaging tree plantings and on the programme for dealing with these problems.	No erosion of groynes or berm erosion damaging tree plantings observed, or
Report on condition of system to liaison committee. Report to specifically identify any deferred maintenance that will impact on the performance of the scheme.	The protection system is in condition, (however future issues will be) No maintenance which will impact on the performance of the scheme has been deferred, or Deferred maintenance comprises And the effect on the performance of the scheme is likely to be
Report to liaison committee on the performance of the river control system for floods where damage repair will exceed annual budget by 10%.	No floods where damage repair will exceed annual budget by 10% have occurred over the last 12 months, or: As presented to liaison committee meeting on..... Copy attached to minutes of the meeting.

Prepared by (Area Engineer) Date

3.2 Six Yearly Asset Management Plan Compliance Report for Lower Rakaia River Rating District

The asset management plan adopted by the community and Environment Canterbury:

- Defines the service level for the Lower Rakaia River Rating District
- Defines the level of maintenance needed to retain the service capacity of the rating district's river control assets managed by Environment Canterbury
- Provides a base against which the Council's performance in maintaining the service capacity of the rating district's river control assets can be measured
- Requires Environment Canterbury to report to the rating district's liaison committee six yearly.

The matters to be reported to the rating district's liaison committee at six yearly intervals are:

Action required	Report
Review asset management plan.	As presented to liaison committee meeting on..... Copy attached to minutes of the meeting.
No more than 10% reduction in the total number of trees (planted to date) due to erosion, when compared with previous survey.	The number of trees lost due to erosion is less than 10% of the previous survey, or
No reduction in the number of groynes or the quantity of rock/concrete block armouring on the groyne heads.	No reduction in the number of groynes or the quantity of rock/concrete block armouring on the groyne heads, or
No cross-section where more than 30% of the width of an active braid adjacent to the fairway edge is obstructed by vegetation greater than 1m in height.	No more than 30% of the width of an active braid adjacent to the fairway edge is obstructed by vegetation greater than 1m in height, or
No reduction in quantities of infrastructural assets unless a reduction was identified as intended in the asset management plan.	There has been no reduction in the quantities of infrastructural assets, or Reasons for and the reductions in quantities of infrastructural assets are as presented to liaison committee meeting on..... Copy attached to minutes of the meeting.

Prepared by(Area Engineer) Date