



## **TO THE MAYOR AND COUNCILLORS OF THE MACKENZIE DISTRICT COUNCIL**

### **MEMBERSHIP OF THE PROJECTS AND STRATEGIES COMMITTEE**

Graeme Page (Chairman)

Claire Barlow (Mayor)

John Bishop

Peter Maxwell

Annette Money

Graham Smith

Evan Williams

*Notice is given of a meeting of the Projects and Strategies Committee  
to be held on Tuesday 12 April 2011  
following the Finance Committee meeting*

**VENUE:** Council Chambers, Fairlie

**BUSINESS:** As per Agenda attached

**GLEN INNES  
CHIEF EXECUTIVE OFFICER**

8 April 2011



## PROJECTS AND STRATEGIES COMMITTEE

Agenda for Tuesday 12 April 2011

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### I APOLOGIES

### II DECLARATIONS OF INTEREST

### III MINUTES

1. Confirm and adopt as the correct record the Minutes of the meeting of the Projects and Strategies Committee held on 1 February 2011, including such parts as were taken with the Public Excluded.
2. Confirm and adopt as the correct record the Minutes of the meeting of the Solid Waste Subcommittee held on 29 March 2011, including such parts as were taken with the Public Excluded (to be circulated).

#### ACTION POINTS

### IV REPORTS:

1. Asset Manager's Report
2. Bridges
3. Twizel Water Supply
4. Establishment of a Roding Subcommittee (**verbal report from Cr Page**)

### V GENERAL:

- 1 Capital Works Programme – Timing (**Cr Page**)
2. Policy on Banking, Depreciation and Payment of Loans (**Cr Page**)
3. Review of Council Cost Centre Charges (**Cr Page**)

### VI PUBLIC EXCLUDED:

That the public be excluded from the following part of the proceedings of this meeting namely:

1. Waimate/Mackenzie Shared Service Meeting (**Verbal Report from Cr Page**)

<b>General subject of each matter to be considered</b>	<b>Reason for passing this resolution in relation to each matter</b>	<b>Ground(s) under Section 48(1) for the passing of this resolution</b>
Waimate/Mackenzie - Shared Services Meeting	Commercial Sensitivity	48(1)(a)(i)

This resolution is made in reliance on Section 48(1)(a)(i) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act, which would be prejudiced by the holding of the whole or the relevant part of the proceedings of the meeting in public are as follows: *Waimate/Mackenzie Shared Services Meeting* Section 7(2)(b)(ii)

# **MACKENZIE DISTRICT COUNCIL**

## **MINUTES OF A MEETING OF THE PROJECTS AND STRATEGIES COMMITTEE HELD IN THE COUNCIL CHAMBERS, FAIRLIE, ON TUESDAY 1 MARCH 2011 AT 11.25 AM**

### **PRESENT:**

Graeme Page (Chairman)  
Claire Barlow (Mayor)  
Crs John Bishop  
Peter Maxwell  
Annette Money  
Graham Smith  
Evan Williams

### **IN ATTENDANCE:**

Glen Innes (Chief Executive Officer)  
Bernie Haar (Asset Manager)  
Carl MacKay (Solid Waste Manager) for part of the meeting  
John O'Connor (Utilities Engineer) for part of the meeting  
Rosemary Moran (Committee Clerk)

### **I APOLOGY:**

There were no apologies.

### **II DECLARATIONS OF INTEREST:**

There were no declarations of interest.

### **III MINUTES:**

The Minutes of the meeting of the Projects and Strategies Committee held on 1 February 2011 were confirmed and adopted as the correct record of the meeting.

**Claire Barlow/Peter Maxwell**

### **MATTERS UNDER ACTION**

#### **1. Minor Safety Improvements**

The Asset Manager advised that the Safety Footpath in Fairlie through the Reserve had been added to the list of Minor Improvements Projects.

#### **2. Solid Waste Education**

The Asset Manager advised that a report would be presented on an education programme regarding the use of green bags for the collection of residual waste.

## IV **REPORTS:**

### 1. **ASSET MANAGER'S MONTHLY REPORT:**

This report from the Asset Manager referred to the Christchurch Earthquake, Project Progress – Council Priority List, Project Progress – Staff List, Civil Defence, Roothing, Essential Services and Solid Waste.

The Asset Manager spoke to the report.

#### **Twizel Water Supply**

Annette Money undertook to obtain details and figures from the Twizel Medical Centre on the incidence of gastro- enteritis in the Township.

#### **Local Government New Zealand Roothing Forum**

Evan Williams reported on the forum which he had attended in Wellington. He referred to the following issues which had been among those discussed at the forum:

- The need for LGNZ personnel and staff to develop solution-based arguments to support submissions to central government.
- A task force had been set up by Local Government New Zealand to look at transport patterns for New Zealand for the next thirty years including a long term strategy, and potential funding sources other than rates.
- An approach to him by Central Otago representatives for the development of a joint approach to local members of parliament regarding the need for entities such as the Department of Conservation and NZ Defence Force to pay rates which would assist with the funding rural roading costs.

#### **Sealing Past Houses Policy**

In response to a concern from Annette Money, the Asset Manager advised that he had not received a response to the Council's proposal regarding the request to seal past a house on Clayton Road. He acknowledged the need to review the policy and suggested it would be included in the bundle of policies which Council was required to review every five years.

#### **Waste Assessment:**

The Solid Waste Manager referred to the development of the Waste Assessment which was being done in conjunction with the Timaru District Council and Waimate District Council. It was a requirement of the Waste Minimisation Act 2008 and had to be undertaken as a prerequisite to a new Waste Management and Minimisation Plan to be completed by 1 July 2012. The Solid Waste Manager said that Brian Gallagher had been engaged to provide guidance in the process.

Resolved the Committee notes the joint production of a Waste Assessment Plan by the South Canterbury councils and authorises Council's share of the cost of external advice (Brian Gallagher) to be funded from the Council's Waste Levy Funding

**Graham Smith/John Bishop**



## 2. SOLID WASTE SUBCOMMITTEE:

This report from the Asset Manager sought a change in the status of the Solid Waste Working Group as a sub-committee of the Projects and Strategies Committee.

Resolved that the report be received.

**Graham Smith/Annette Money**

Resolved:

1. That the Solid Waste Working Group be established as a Sub-Committee of the Projects and Strategies Committee with the membership and delegations as follows:

- Membership
  - Mayor Claire Barlow
  - Crs Graeme Page and John Bishop
  - Asset Manager
  - Solid Waste Manager
  - Community Facilities Manager
  - Chief Executive Officer
  - Manager – Finance and Administration
  - Manager – Planning and Regulations
- Delegated Powers: -
  - All the general powers needed to negotiate the terms of a new solid waste contract with one of the shortlisted respondents to Council's Request for Proposal to the stage where a report and recommendation can be made to Council for formal approval.
  - Specifically to determine:
    - Whether or not to reactivate the vertical composting unit
    - The capacity of "wheelie bins" to be used
    - The days for township collections.
  - To devise and oversee a suitable programme of public consultation on what Council is proposing and why.

**Graham Smith/Claire Barlow**

## V PUBLIC EXCLUDED:

Resolved that the public, be excluded from the following part of the proceedings of this meeting namely:

1. Solid Waste Requests for Proposals

<b>General subject of each matter to be considered</b>	<b>Reason for passing this resolution in relation to each matter</b>	<b>Ground(s) under Section 48(1) for the passing of this resolution</b>
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Solid Waste RFP

Commercial Sensitivity

48(1)(a)(i)

This resolution is made in reliance on Section 48(1)(a)(i) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act, which would be prejudiced by the holding of the whole or the relevant part of the proceedings of the meeting in public are as follows: *Solid Waste RFP* - section 7(2)(b)(ii)

**Peter Maxwell /Annette Money**

**THERE BEING NO FURTHER BUSINESS  
THE CHAIRMAN DECLARED THE MEETING CLOSED AT  
1.45 PM**

\_\_\_\_\_  
**CHAIRMAN**

\_\_\_\_\_  
**DATE**

## MATTERS UNDER ACTION – PROJECTS AND STRATEGIES COMMITTEE

### Solid Waste

1. Green bags no longer used to collect putrescible waste, to be used for the collection of residual waste.
2. Undertake an appropriate education programme be undertaken regarding the use of the green bags for collection of residual waste. ***Report to be developed.***

## **MACKENZIE DISTRICT COUNCIL**

**REPORT TO:** PROJECTS AND STRATEGY COMMITTEE

**FROM:** ASSET MANAGER

**SUBJECT:** ASSET MANAGER'S MONTHLY REPORT

**DATE:** 1 MARCH 2011

**REF:** WAS 1/1

### **ASSET MANAGEMENT**

This month we have been heavily involved with budgets and getting projects underway. These projects are reported on latter. I also had two meetings with staff from Timaru District Council on the possibility of sharing resources in the Asset Management area. We already do this with solid waste and road safety. Roding services was the focus of the initial meetings with further discussions are to be had around the 3 waters delivery.

In the roading area, the timing of contracts and services were discussed along with their respective delivery models. Dates have been determined when the respective services are due for renewal so that synergies can be determined for joint acquisition of those services.

I also attended a two day seminar on the Long Term Plan preparation along with Paul Morris. This was very enlightening and showed that we all have a very busy time ahead preparing this document. Paul will prepare a presentation for the full Council when it next meets.

### **Project Progress - Council Priority List**

#### **Clayton Rd Seal Widening.**

Six tenders were received for the seal widening and the sub-committee accepted the tender from Sicon Contracting Ltd for \$103045.00. Tender Prices ranged from \$103,045.00 to \$205,410.00.

The tender is below the original estimate by \$80,000 and we have discussed with Sicon the possibility of a variation to the contract to utilise the full budget. This will give a total length of approximately 5km of seal widening.

#### **Twizel water supply, including disinfection.**

We have agreed on the proposed consent conditions and have sent them back to Ecan for review.

John O'Connor is still working on a temporary disinfection system for the existing supply to address the MoH concerns.

The report on the lifecycle costs for upgrading the existing supply to meet the Drinking Water Standards and a new supply further to the west is due but caught as note above.

#### **Fairlie Water Supply Trunkmain Replacement.**

Council accepted the Tender from Meyer Construction Ltd. The Contractor has been notified and the first site meeting has already been completed.

### **Solid Waste Review**

This process continues and the minutes of the sub-committee will be available for adoption at the meeting and detail the progress to date.

### **Project Progress - Staff List**

#### **Lake Alexandrina Bridge Replacement**

Four tenders were received for the Lake Alexandrina Bridge Replacement and the sub-committee accepted the tender from Fulton Hogan Ltd. The tender is below the original estimate of \$84,000. Tender Prices ranged from \$53,690.80 to \$92,440.00

#### **Clayton Settlement Rd Bridge Deck Replacement**

Tenders have been received for this work and staff are evaluating these at the moment. The prices fall within the delegated authority of the CEO so will make our recommendations to him.

#### **Twizel Oxidation Pond Upgrade**

The Resource Consent requires specific work to be completed by August this year:

- Block disposal trench- Completed
- Block old pipe heading to Twizel River- Completed
- Install new pipe into Pond 2 – Tasked to Whitestone
- Install bund in Pond 2 – Design has been received and will be sent to local contractors for pricing.

I obtained three prices for installing the bund in Pond number 2. The prices received were \$24,896.00, \$42,730.00 and \$44,150. The price from Downer EDI Works for \$24,896.00 has been accepted.

The budget allowed for this work is \$150,000.

#### **Civil Defence**

Ray Gardener has started in the role as Civil Defence Officer and I am sure he will be a real asset to our organisation to ensure Council is as well prepared as it can be for any future event.

### **ROADING**

#### **Road Issues**

Most roads are generally in very good condition, with on-going rainfall helping to alleviate the normal dry weather problems experienced at this time of year on unsealed roads. There has been some scour and flooding issues following localised heavy rain.

#### **Lake Alexandrina Bridge Replacement**

The contract for this new bridge replacement has been let to Fulton Hogan Ltd., for the sum of \$53,690.80, and is due for completion in early May.

## **Bridge Repairs**

Tenders for the contract for a new deck and handrails for the Clayton Settlement Bridge have been received and are currently being evaluated.

## **Minor Improvements**

The short trial section of seal widening (240 metres), to establish the best approach, the design requirements, and the costs involved was completed by Whitestone. Tenders were called for the balance of the work, and the Contract was awarded to Sicon. The very favourable rates received mean the contract may be extended further from 3 to 5 km.

## **Footpath Reseals**

The contract for the resealing of chip seal footpaths in Twizel and Tekapo has been let to Fulton Hogan Ltd. and work will be commencing soon.

## **Unsealed Road Metalling**

Maintenance metalling is now in full swing to apply the required metal to our roads before winter. The new Road Maintenance Contract 1186 provides for an annual volume of metal applied to the unsealed roads of 18,667 cubic metres.

The total volume applied for the first nine months of the financial year to 31 March under the old and new contracts was 7910 cubic metres.

Because of Maintenance Contract changeover, there was less than usual applied to the roads in spring, and the balance is mainly being applied in the March to May period.

## **Unsealed Road Grading**

The new Road Maintenance Contract 1186 provides for an annual length of road grading of 4,100km (342 km/month average).

The total length of District roads graded for the nine months to 31 March was 3079 km, on target for the year at 342 km/month average.

## **Reseals**

The reduced Contract for 18.3km of reseals in the current financial year was let to Blacktop Construction Ltd. The contractor has now completed all of the sealing work required.

## **ESSENTIAL SERVICES**

### **General**

The March invoices had not been received at the time of preparing this report.

The computer that receives information from water meters and sewerage pump stations malfunctioned and full monthly records for March are not available.

## **Fairlie**

### **Fairlie Water Supply**

We are continuing to have a good run on leaks, and expenditure is tracking well under budget at this stage.

Ducts were installed across Alloway St at likely crossings for next year's pipe renewals prior to it being re-sealed.

### **Fairlie Waste Water**

In February, expenditure was running close to budget. However, during March a section of sewer main on the boundary between 29 and 31 School Road had to be replaced due to root intrusion. The replacement pressure transducer on the discharge controls of the oxidation ponds was installed. One of the sewage pumps at the camping ground failed. A new pump is being purchased.

## **Tekapo**

### **Tekapo Water Supply**

The scheme is running well with expenditure tracking under budget.

### **Tekapo Waste Water**

The blown surge protectors at the east pump station have been replaced. Additional surge protection is required for other electronic equipment at both the East and West Pump Stations.

The extended irrigation system for disposal of the discharge from the oxidation ponds is operating well at present.

## **Twizel**

### **Twizel Water Supply**

Expenditure is tracking under budget. Electricity costs are also currently within budget. However, the contract with Contact Energy Ltd to supply the secondary pumps expired on 31 March and the new contract offered for the next three years involves a big jump in energy costs. As costs are based on 'time of use', and there are 144 separate rates which makes it difficult to compare costs.

The electricity costs based on the contract offered for February 2012 were compared with the actual costs for February 2011.

The increases are as follows:-

Line charges	2.35%
Energy	43.15%
ETS Price Adjustment	0%
Other Charges	9.23%
Overall increase	26.66%

Meridian Energy have been approached for a competitive offer but it is expected to be difficult to get a fair comparison.

Councillors and Twizel Community Board members have been sent a brief overview of the Twizel Water Supply from a water quality perspective to assist them when consulting with the community on the proposal to install temporary chlorination of the scheme.

Opus International Consultants Ltd have delivered their report 'Twizel Water Supply Options Upgrade'.

## **Ashwick Opuha Stock Water Race**

The fish barriers have been installed at both intake sites as required by the new resource consents.

## **SOLID WASTE**

The February earthquake resulted in an influx of people to the Mackenzie, particularly Twizel. This coincided with some major rowing events, the result being an extra truck of rubbish a week was being carted out. We are now back to near normal.

As discussed at the last finance meeting I propose to increase most of the charges. This will be detailed in a report to the next finance committee meeting.

The Fairlie staff are well through the back log of plastic that has been there a long time. Most of this is baled and will be sold to either Rooneys or to Comspecs in Christchurch. Even though we are now getting reasonable money for two of the plastics and the paper and cardboard it is still barely economic to bale these products. There is still soft plastic which has been there for so many years it has broken down. I sent a load of this out to Redruth using Barwoods recently. There is probably another two loads of this at Fairlie, one at Tekapo and a large pile at Twizel that is difficult to work out how much is there.

At Twizel I dug out the back of the grass clipping pile and found about 150m<sup>3</sup> of very good black compost. Some of this has already been used at Twizel where trees have been removed. I do not propose to screen this or spend any money on it but instead keep it solely for council use. The same could be done with the pile at Fairlie. At the same time I pushed up the glass pile at Twizel and tidied up the tip face at the hardfill.

## **RECOMMENDATIONS:**

- (a) The report be received.
- (b) That the Committee confirm that Sicon Ltd be awarded Contract 119 the Seal Widening Contract
- (c) That the Committee confirm that Fulton Hogan Ltd be awarded Contract 1195 - Bridge Replacement Contract for Lake Alexandrina Bridge

**BERNIE HAAR**  
**ASSET MANAGER**

***Endorsed by:***  
**GLEN INNES**  
**CHIEF EXECUTIVE OFFICER**



## **MACKENZIE DISTRICT COUNCIL**

**REPORT TO:** PROJECTS AND STRATEGY COMMITTEE

**SUBJECT:** BRIDGE REPLACEMENT PROGRAMME

**DATE:** 14 APRIL 2011

**REF:** WAS 2/2

### **REASON FOR REPORT**

To review the attached Bridge Replacement Strategy and determine if the various structures should be replaced, removed or handed back to the benefiting land owner.

### **RECOMMENDATIONS:**

1. That the report be received.
2. That recommendations for each bridge contained within the report be confirmed.

**BERNIE HAAR**  
**ASSET MANAGER**

**GLEN INNES**  
**CHIEF EXECUTIVE OFFICER**

## **BACKGROUND**

As part of the annual bridge inspections a number of structures were identified as coming to the end of their useful life. GHD Consultants determined a replacement programme and that information has been collated into an extensive report and presented here for consideration.

## **ATTACHEMENTS**

The report from Asset Management on the proposed Bridge Replacement Strategy is attached for consideration. It details the bridge, where it fits in the network and a recommendation as to its replacement or not.

Each bridge should be considered separately and then factored into the Council's Funding Strategy to ensure the overall affordability of the strategy.

## **CONCLUSIONS**

The Strategy contains my recommendations as to whether each bridge should be replaced or not. Those recommendations, once confirmed will be included into the Council's Long Term Plan (LTP).

# Mackenzie District Council



## Bridge Replacement Strategy 2010 - 2050

## Contents

1	INTRODUCTION.....	4
1.1	Annual Bridge Inspection .....	4
1.2	The GHD Report.....	4
1.3	Bridge Replacement.....	4
2	Strategy.....	5
2.1	General.....	5
2.2	Council Decision.....	5
3	CURRENT POLICY – MAINTENANCE OF ROADS PAST THE LAST HOUSE WITH MORE THAN ONE LANDOWNER .....	7
4	BRIDGE REPLACEMENT STRATEGY AS PROPOSED – 2010 .....	8
5	RESOURCE CONSENT AND OTHER APPROVALS .....	9
5.1	Resource Consent (for other than temporary diversion).....	9
5.2	Specific Consent Issues for the Various Options.....	9
5.2.1	Box Culvert.....	9
5.2.2	Pipe Culvert .....	10
5.2.3	Wash Over Ford.....	10
5.2.4	Precast Bridge .....	10
6	LOCATION MAP OF BRIDGES DUE FOR REPLACEMENT .....	11
7	INDIVIDUAL BRIDGE DETAILS.....	12
7.1	Bridge No 1 Otama Stream Bridge.....	12
7.2	Bridge No 7 Long Gully Bridge .....	14
7.3	Bridge No 9 Fraser Road #2 Bridge .....	16
7.4	Bridge No 13 Coal Pit #2 Bridge.....	18
7.5	Bridge No 19 Pioneer Park Bridge .....	20
7.6	Bridge No 26 Goodmans Bridge.....	22
7.7	Bridge No 28 Oldfields Rd Bridge .....	24

7.8 Bridge No 33 Morris Road Bridge.....	26
7.9 Bridge No 41 Clayton Settlement Rd Bridge .....	28
7.10 Bridge No 58 Single Hill Bridge .....	30
7.11 Bridge No 70 The Grampians Bridge .....	32
7.12 Bridge No 73 Stoney River Bridge .....	34
7.13 Bridge No 78 Cass River Bridge .....	36
7.14 Bridge No 79 Lake Alexandrina Bridge .....	38
7.15 Bridge No 87 Black Birch Stream Bridge .....	40
7.16 Bridge No 89 Mowbray Stream Bridge .....	42
7.17 Bridge No 92 Stoney River Bridge .....	44
7.18 Bridge No 93 Fox Peak Road Bridge .....	46

# 1 INTRODUCTION

## 1.1 Annual Bridge Inspection

Council's structural engineers GHD Consultants Ltd carries out our annual bridge inspection surveys. This is the ninth consecutive year that GHD has been responsible for this work and this has led to a good understanding of the Districts' bridging stock and its deterioration profiles.

These inspections are generally carried out in accordance with the Transit New Zealand (now NZTA) Bridge Inspection and Maintenance Manual requirements for a Detailed Inspection. A Detailed Inspection is defined as a close quarter inspection of all elements of a bridge.

These inspections separate our bridge inventory into three and completes a detailed inspection of each bridge on a three yearly cycle.

## 1.2 The GHD Report

The report produced provides

- Prioritised maintenance schedules. This is generally passed onto Whitestone Ltd for action.
- Posting recommendations for bridges that are restricted to less than Class 1 capacity.
- Comments on Seismic Assessments of bridges that would most benefit from a seismic retrofit.
- River Training – Identify where bridge security can be enhanced by designed river training.
- Recommended Bridge replacement programme

## 1.3 Bridge Replacement

A section of the reports in recent years has recommended a bridge replacement programme over a 15 year horizon. This programme has its focus on timber bridges as these are in the most urgent need of removal and replacement. The report notes, some bridges are of dubious purpose and appear to be removable without detriment to the community.

There are eighteen (18) bridges identified that should be replaced within the next fifteen years. They range in size from quite small structures such as the bridge over the Stoney Stream, with a span of 5.3 metres, on Stoney River Rd to the Cass River

Bridge with a span of 130 metres. On completion of this programme Council will only have four weight restricted bridges left to deal with in the future.

Those are:

<b>Bridge No</b>	<b>Name</b>
5	Rocky Gully
53	Lockharts
72	Stoney River
75	Washdyke

## **2 Strategy**

### **2.1 General**

I agree with the recommendations in the GHD report, that generally in each case there needs to be a structure in place but what it is replaced with may need some future discussion.

The options are in each case could be, if to be replaced are:

- Replace with a bridge
- Replace with a culvert (box or circular)
- Replace with “wash over” ford.

There are different costs associated with each type of structure but recent work shows that either a simple bridge and a box culvert will cost about the same due to the culvert requiring a resource consent and the bridge does not require a consent.

### **2.2 Council Decision**

My recommendation here is that we don't determine the type of structure that the bridge is replaced with but I suggest the most important issue is shall we replace or not.

I would bring to Council at an appropriate report with an estimate for each replacement structure closer to the proposed replacement date.

Whilst there are replacement dates in the programme, we would maintain each structure to get the maximum life out of the bridge. Council would programme its replacement or removal when it becomes uneconomic to maintain the bridge in a safe condition with a weight restriction of no less than 2500kg.

If the Council determines that a bridge is ultimately to be removed and not replaced then there will need to be some consultation with the affected land owners, past that bridge.





### **3 CURRENT POLICY – MAINTENANCE OF ROADS PAST THE LAST HOUSE WITH MORE THAN ONE LANDOWNER**

This policy was confirmed by the Operations Committee on 17 May 1995 and it is still the current policy we work to in determining what sections of road to maintain.

*Policy relating to maintenance of roads beyond the last house where there is more than one landowner:*

1. *That roads will be maintained at their existing standard, except when an event causes significant damage in which case the standard of access will be reviewed.*
2. *That the structures on the road will be maintained and upgraded if necessary for safety reasons, at the expense of the Council.*
3. *That if upgrading of the standard of access is required, then the local share will be paid for by the local landowners, with the sharing of costs to be determined by them.*

The Roding Activity Plan also notes the following:

*Roads are maintained to a two-wheel drive vehicle standard to the last permanently inhabited dwelling and there-after at an appropriate standard to the front boundary of the last property served by the road.*

## 4 BRIDGE REPLACEMENT STRATEGY AS PROPOSED – 2010

Bridge No	Name	Span	Width	Replacement Date	Estimated Cost	Replacement Bridge Description
1	Otama Road	5.9	5	2020	95875	Steel Beams, substructures, Precast deck
7	Long Gully	8.1	5	2012	131625	Steel Beams, substructures, Precast deck
9	Fraser Rd #2	6.8	5	2016	110500	Steel Beams, substructures, Precast deck
13	Coal Pit #2	11.5	5	2021	186875	Steel Beams, substructures, Precast deck
19	Pioneer Park	8.2	5	2012	133250	Steel Beams, substructures, Precast deck
26	Goodmans	16.3	5	2009	264875	Steel Beams, substructures, Precast deck
28	Oldfields Rd	6.9	5	2013	112125	Steel Beams, substructures, Precast deck
33	Morris Rd	8.4	5	2011	136500	RRJ Concrete Pipe 1600 dia
41	Cayton Settlement Rd	60	5	2050	--	Steel Beams, substructures, Precast deck
58	Single Hill	11.2	5	2014	182000	Steel Beams, substructures, Precast deck
70	Crampians	5.8	5	2010	94250	Steel Beams, substructures, Precast deck
73	Stoney River	6.8	5	2011	110500	Steel Beams, substructures, Precast deck
78	Cass River	130	5	2018	2112500	Steel Beams, substructures, Precast deck
79	Lake Alexandrina	7.5	5	2010	84375	Steel Beams, substructures, Precast deck
87	Black Birch St	5.8	5	2025	94250	Steel Beams, substructures, Precast deck
89	Mowbray Rd	5.8	5	2016	94250	Steel Beams, substructures, Precast deck
92	Stoney Rv	5.3	5	2011	86125	Do Not Replace?
	Fox Peak Road	5.4	2.8	2014	49140	Steel Beams, substructures, Precast deck

## 5 RESOURCE CONSENT AND OTHER APPROVALS

### 5.1 Resource Consent (for other than temporary diversion)

Under the Natural Resources Regional Plan, a replacement structure will not require a resource consent for the permanent works if the area of the replacement structure in contact with the bed is no more than the existing structure. If this rule is met, it is considered reconstruction of an established structure and not subject to the restrictions placed on new structures. Environment Canterbury have confirmed that they will allow some optimisation of bridge length (shortening) under this rule, so long as the structure does not increase existing water levels.

In this case, as the culvert options have more base area in contact with the bed than the existing bridge, they will be considered a new structure.

Any new structure that is constructed in a stream bed that is wider than 5 m does not meet the criteria to be a permitted activity, and therefore will require a resource consent for the permanent works.

An agreement for the non-enforcement of consent requirements for a temporary diversion must be obtained before applying for resource consent for the structure. If the application for resource consent for a culvert is lodged without agreed provisions for diversion in place, it will be rejected as a prohibited activity. The cost of obtaining the Resource Consent is estimated to be \$10,000.

Under the Mackenzie District Plan, none of the replacement options considered exceeds the thresholds for earthworks and vegetation clearance, therefore all are permitted activities.

The following options are considered as part of the replacement strategy:

- Box Culvert
- Pipe Culvert
- Wash Over Ford
- Precast Bridge

### 5.2 Specific Consent Issues for the Various Options

#### 5.2.1 Box Culvert

This will require a temporary stream diversion outside of the channel as discussed above, and dewatering to enable construction. The construction will be fairly straight forward however the temporary diversion and dewatering works can be significant and contain risk of increasing costs.

It is classed by Environment Canterbury as a new structure so Resource Consent is required for the permanent works as discussed above and will also require a non-enforcement agreement for the temporary diversion to dewater the site.

### **5.2.2 Pipe Culvert**

This will require a temporary stream diversion outside of the channel as discussed above, and dewatering to enable construction. The construction will be fairly straight forward however the temporary diversion and dewatering works can be significant and contain risk of increasing costs.

It is classed by Environment Canterbury as a new structure so Resource Consent is required for the permanent works as discussed above and will also require a non-enforcement agreement for the temporary diversion to dewater the site.

This option will result in significant disturbance of the existing flow characteristics through the site. Other options are feasible and have less impact on the nature of the stream, therefore there is a risk that an application for Resource Consent may not be successful.

### **5.2.3 Wash Over Ford**

This will require a temporary stream diversion outside of the channel as discussed above, and dewatering to enable construction. The construction will be fairly straight forward however the temporary diversion and dewatering works can be significant and contain risk of increasing costs.

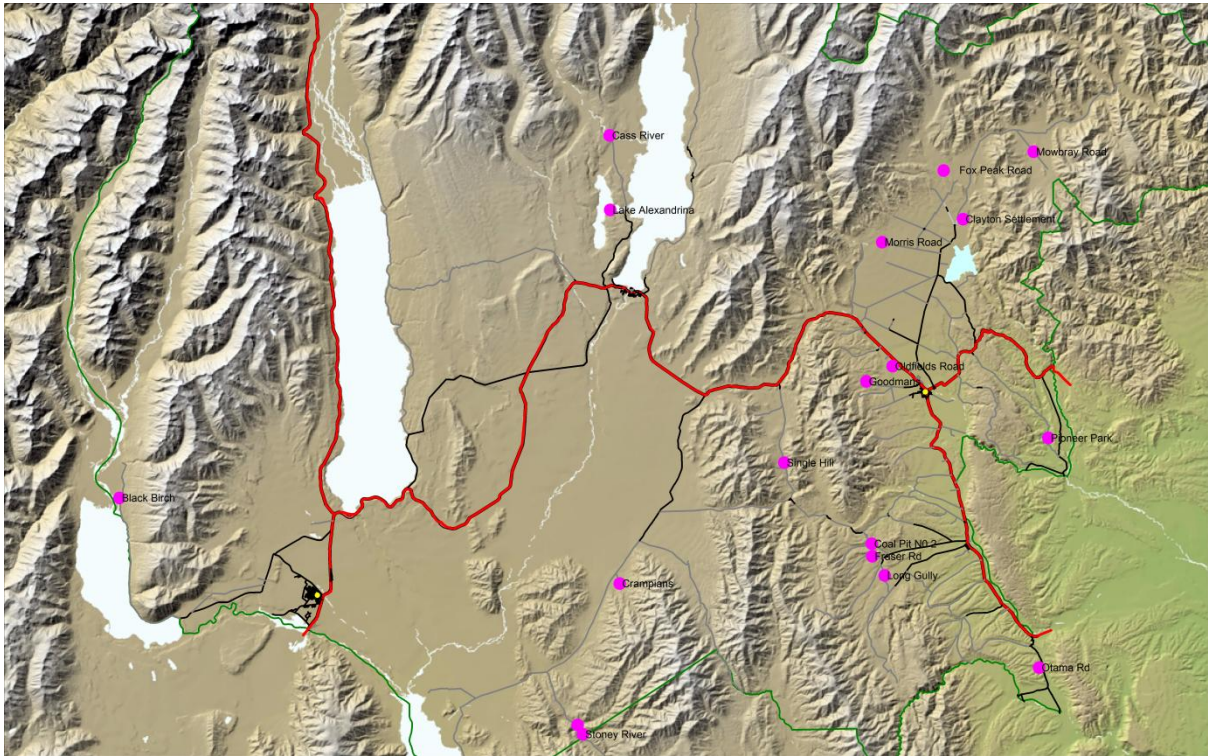
It is classed by Environment Canterbury as a new structure so Resource Consent is required for the permanent works as discussed above and will also require a non-enforcement agreement for the temporary diversion to dewater the site.

This option will result in significant disturbance of the existing flow characteristics through the site. Other options are feasible and have less impact on the nature of the stream, therefore there is a risk that an application for Resource Consent may not be successful. It will however be the most economic option.

### **5.2.4 Precast Bridge**

The Bridge replacement on the same location is classed by Environment Canterbury as a reconstruction of the existing bridge so Resource Consent is not required for the permanent works. No temporary diversion is required so the temporary works are permitted activities. As no consents are required the construction timeframes are more certain.

## 6 LOCATION MAP OF BRIDGES DUE FOR REPLACEMENT



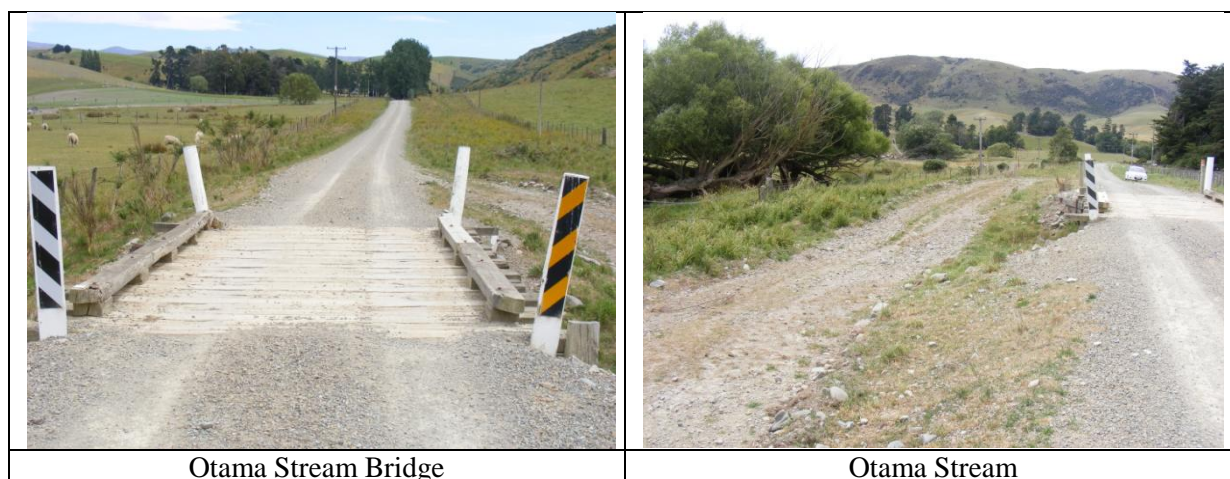
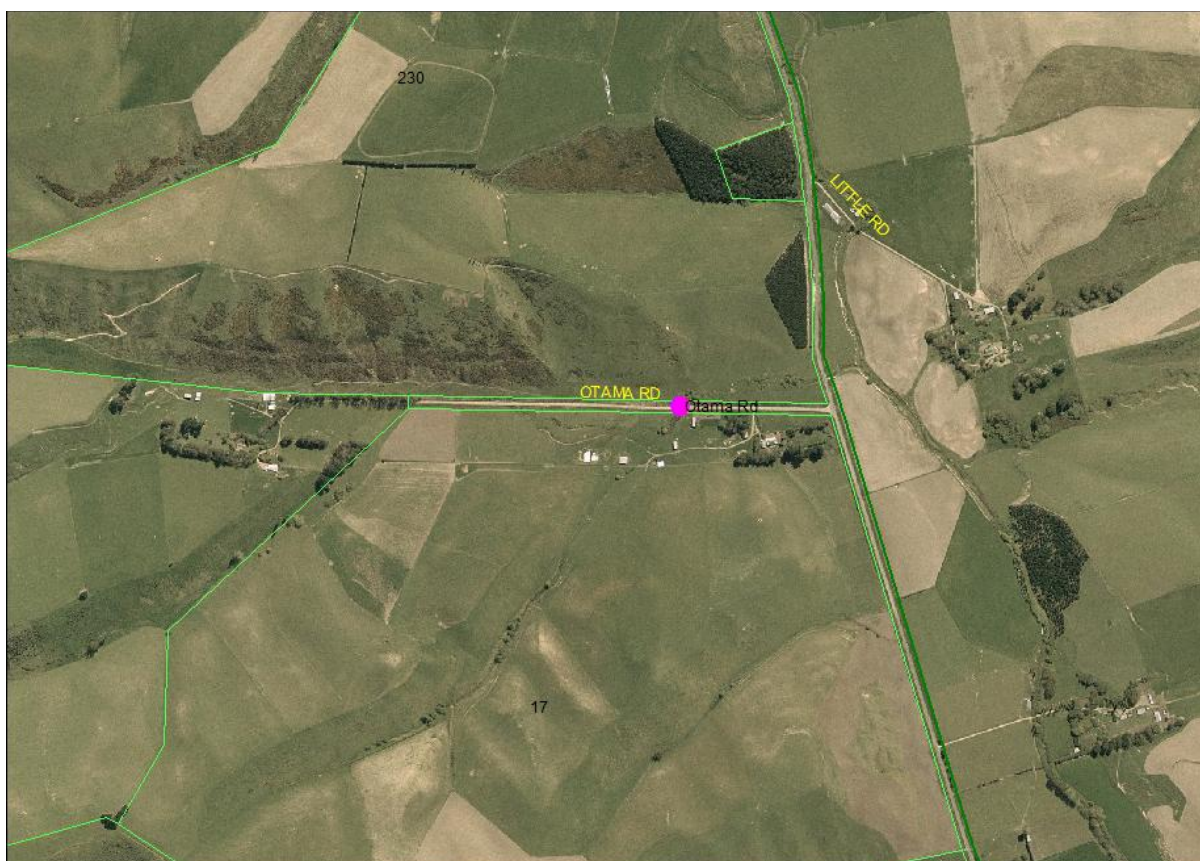


## 7 INDIVIDUAL BRIDGE DETAILS

### 7.1 Bridge No 1 Otama Stream Bridge

WATERWAY NAME - Otama Stream

LOCATION



Road Name	Otama Rd
Traffic Count	<30 vpd
Ford	Yes
Number of Properties Served	1
Area Served	192Ha
Does it fit with Council Policy?	Yes
Weight Restriction	10 kph speed restriction
Replacement Date	2020

### Comments

There are two occupied houses past this bridge and a ford beside it. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation.

### Recommendation

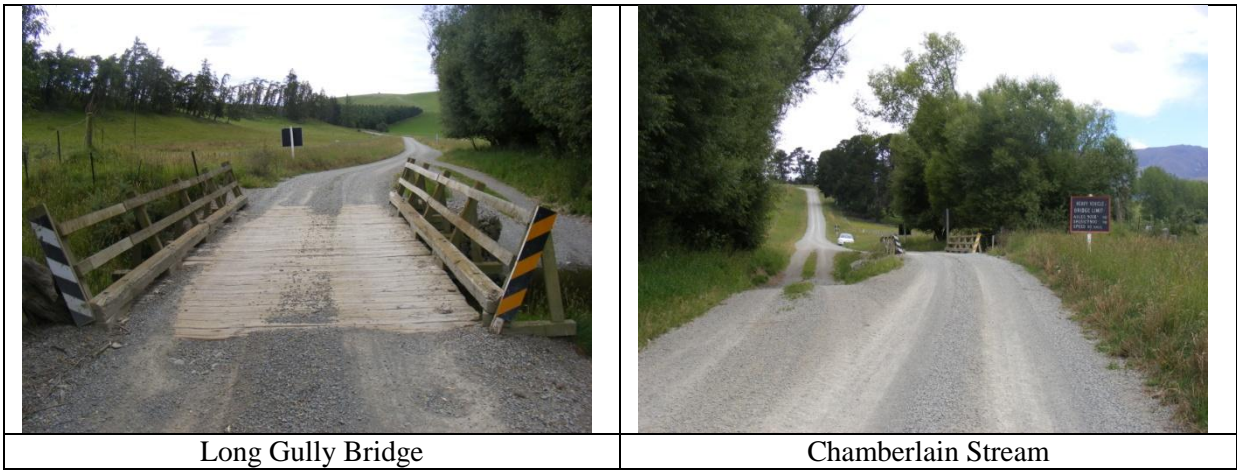
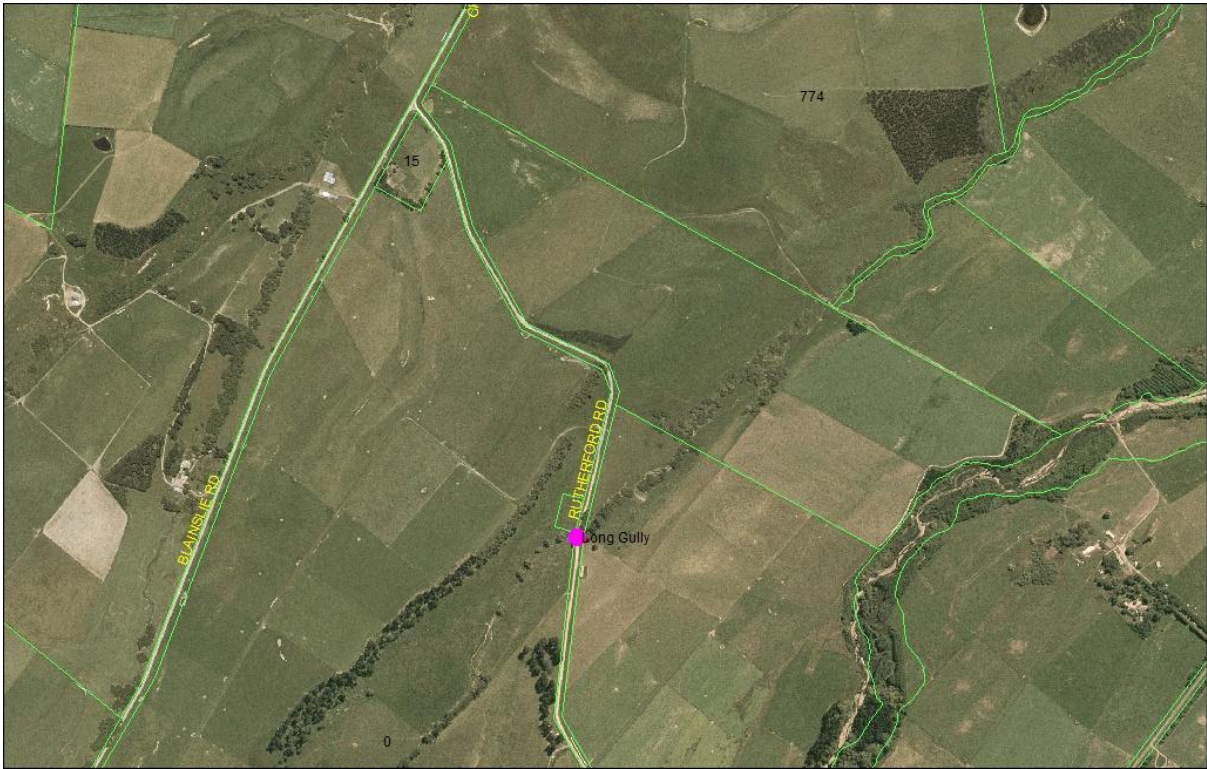
That Bridge No 1 is replaced.



7.2 Bridge No 7 Long Gully Bridge

WATERWAY NAME - Chamberlain Stream

LOCATION



Road Name	Rutherford Rd
Traffic Count	35 vpd
Ford	Yes
Number of Properties Served	Through road
Area Served	(Ha)



Does it fit with Council Policy?	Yes
Weight Restriction	3000GVW, 2000kg axle load, 10kph speed restriction
Replacement Date	2012

### Comments

This bridge is on a through road with a steep ford beside for over weight vehicles. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation. This provides full access to all traffic and will remove the weight restriction which will be a benefit to the rural community.

### Recommendation

That Bridge No 7 is replaced.

### 7.3 Bridge No 9 Fraser Road #2 Bridge

WATERWAY NAME - Delamain Stream

LOCATION



Road Name	Fraser Rd
Traffic Count	<20 vpd
Ford	No
Number of Properties Served	7
Area Served	3200 Ha
Does it fit with Council Policy?	Yes

Weight Restriction	10kph speed restriction
Replacement Date	2016

### Comments

This bridge serves seven properties with three occupied houses on those properties. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation. This provides full access to all traffic and will remove the weight restriction which will be a benefit to the rural community.

### Recommendation

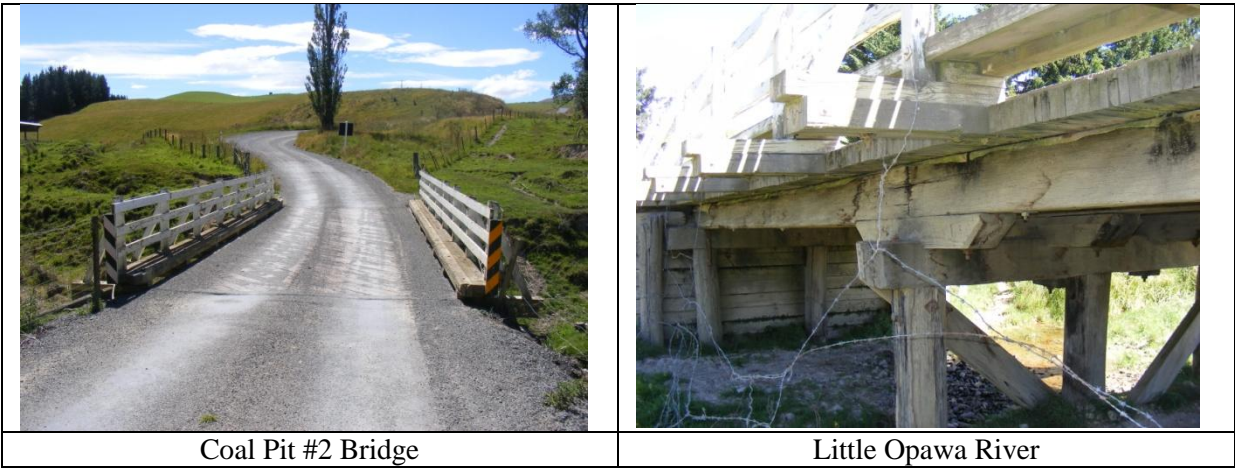
That Bridge No 9 is replaced.



7.4 Bridge No 13 Coal Pit #2 Bridge

WATERWAY NAME Little Opawa River

LOCATION



Road Name	Coal Pit Rd
Traffic Count	30 vpd
Ford	No
Number of Properties Served	Through road
Area Served	(Ha)

Does it fit with Council Policy?	Yes
Weight Restriction	700kg axle load
Replacement Date	2021

### Comments

The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation. This provides full access to all traffic and will remove the weight restriction which will be a benefit to the rural community.

### Recommendation

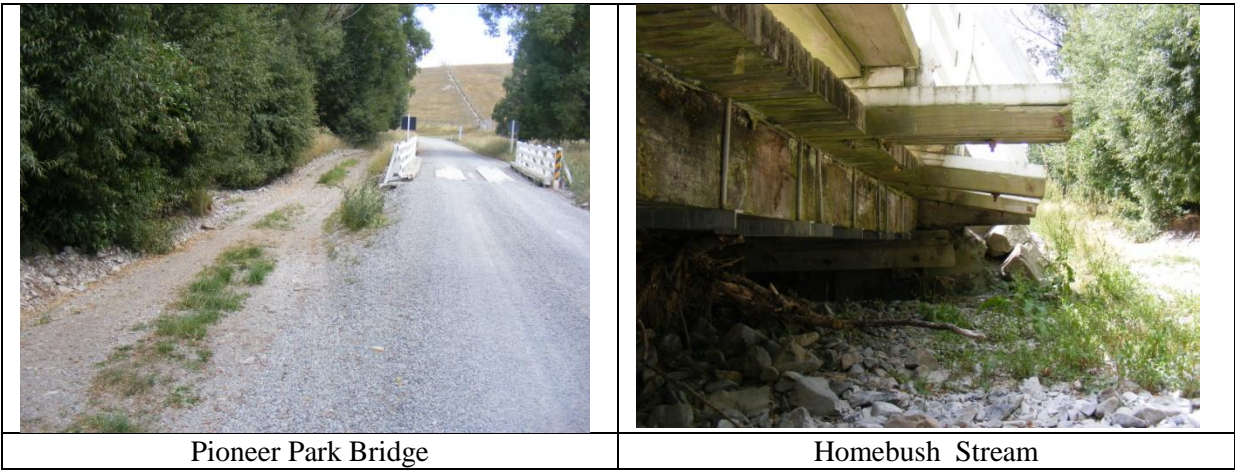
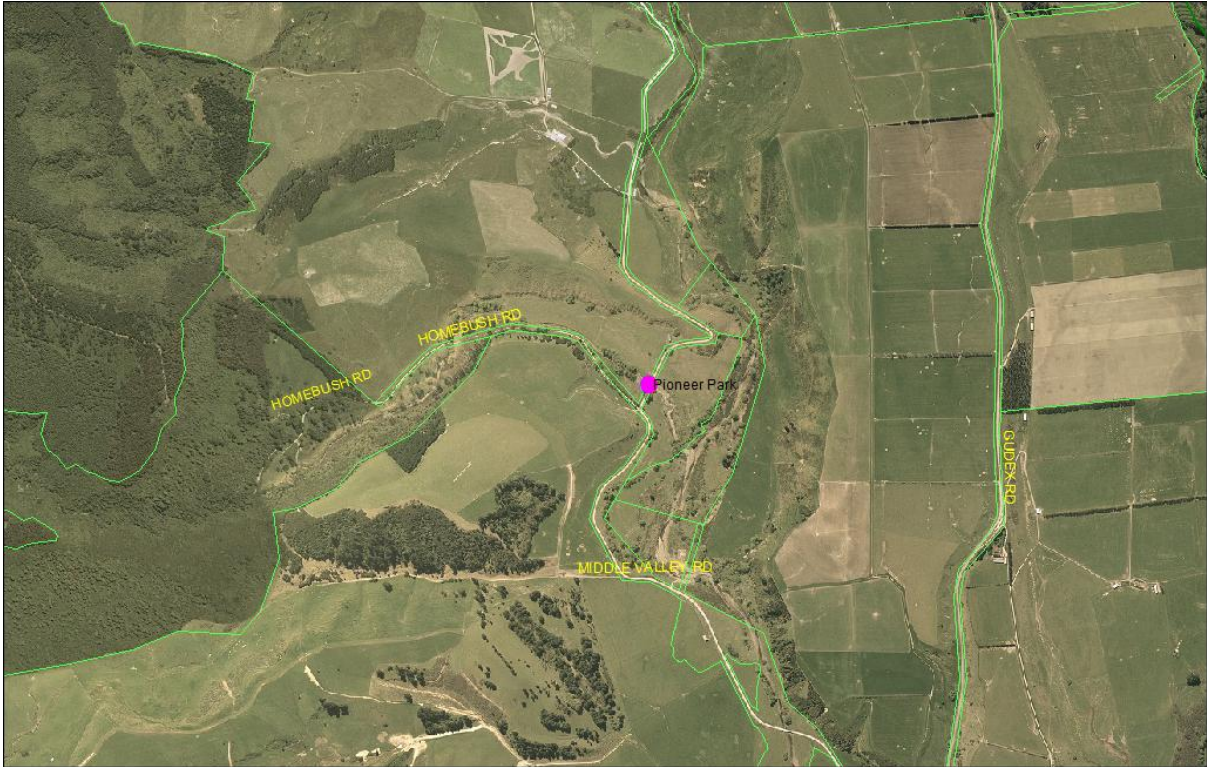
That Bridge No 13 is replaced.



7.5 Bridge No 19 Pioneer Park Bridge

WATERWAY NAME - Homebush Stream

LOCATION



Road Name	Middle Valley Rd
Traffic Count	30 vpd
Ford	Yes/no
Number of Properties Served	Through road
Area Served	(Ha)
Does it fit with Council Policy?	Yes

Weight Restriction	70% Class 1, 10kph speed restriction
Replacement Date	2012

### Comments

The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation. This provides full access to all traffic and will remove the weight restriction which will be a significant benefit to the rural community.

### Recommendation

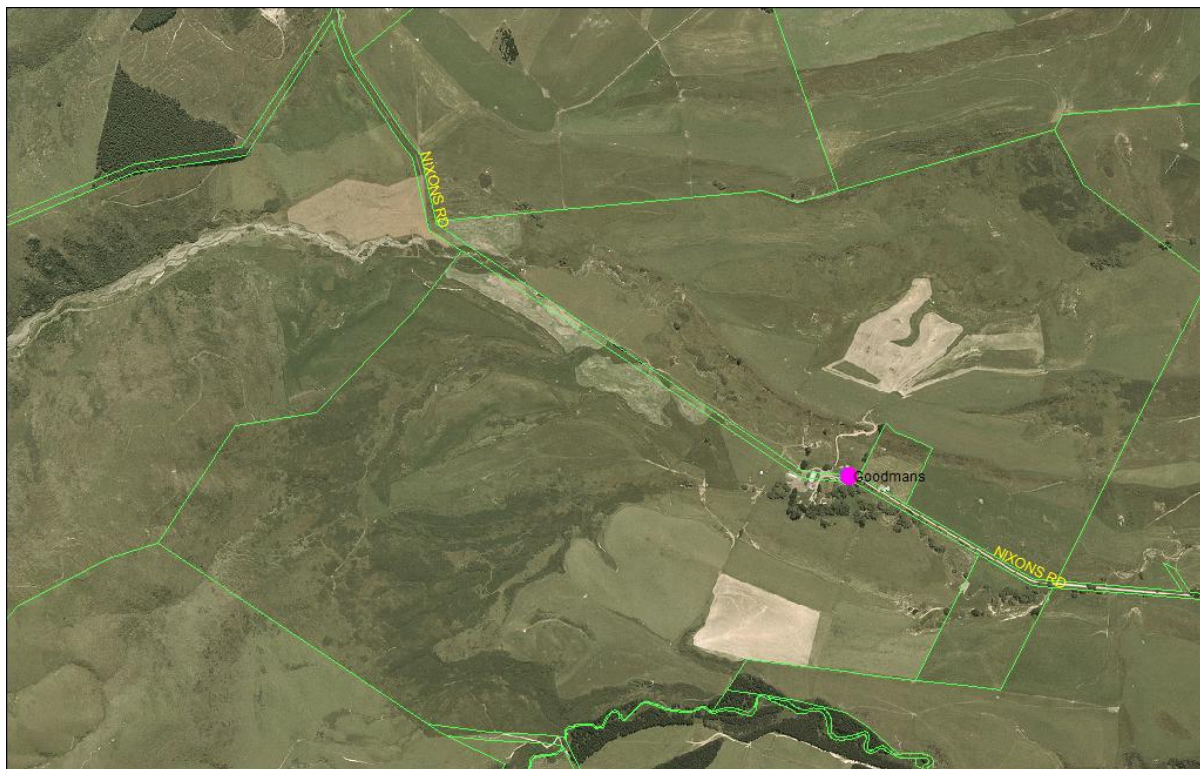
That Bridge No 19 is replaced.



## 7.6 Bridge No 26 Goodmans Bridge

WATERWAY NAME - Wellshot Stream

LOCATION



Goodmans Bridge

Wellshot Stream

Road Name	Nixons Rd
Traffic Count	<10 vpd
Ford	Yes
Number of Properties Served	1
Area Served	311 Ha



Distance to end of Road	At road end
Does it fit with Council Policy?	Yes
Weight Restriction	300gvw, 200kg axle load, 10kph speed restriction
Replacement Date	Not Replaced?

### Comments

There is only one farm served by this bridge and no dwellings. There is a stable ford beside the bridge. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I find it difficult to support its retention and would recommend that we maintain the structure as long as possible then remove it. Also we do not replace it with any other structure.

### Recommendation

That Bridge No 26 is not replaced when it can no longer be maintained in a safe condition for light vehicles.

## 7.7 Bridge No 28 Oldfields Rd Bridge

WATERWAY NAME - Wellshot Stream North Branch

LOCATION



Oldfields Rd Bridge

Wellshot Stream North Branch

Road Name	Oldfields Rd
Traffic Count	<10 vpd
Ford	Yes
Number of Properties Served	2
Area Served	276 Ha
Distance to end of Road	At road end

Does it fit with Council Policy?	Yes
Weight Restriction	90% class 1, 10kph speed restriction
Replacement Date	2013

### Comments

At the moment this bridge and the adjacent ford serve four properties and three dwellings. There is a new subdivision that has created further sections. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation. . This provides full access to all traffic and will remove the weight restriction which will be a benefit to the rural community.

### Recommendation

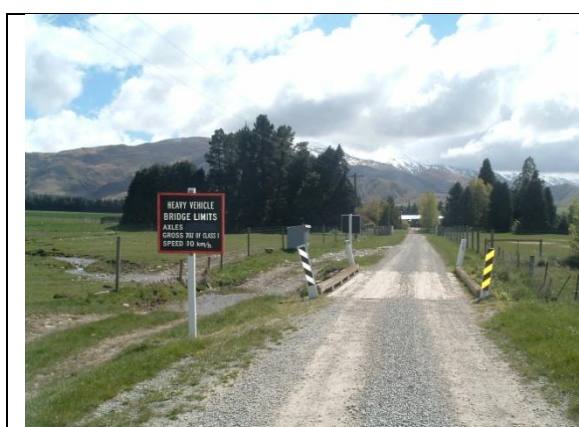
That Bridge No 28 is replaced.



## 7.8 Bridge No 33 Morris Road Bridge

WATERWAY NAME - Un-named Stream

LOCATION



Morris Road Bridge



Un-named Stream

Road Name	Morris Rd
Traffic Count	<10 vpd
Ford	Yes
Number of Properties Served	1
Area Served	1245 Ha

Does it fit with Council Policy?	Yes
Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	2012

### Comments

This bridge provides access to one property, Grant Brothers farm and includes an occupied dwelling. **It is built on private land** and provides access to the farm from Morris Rd. It crosses a stream which is normally very low flow. Alongside the bridge there is a ford which is in reasonable condition.



Council has a choice about the future of this bridge. The image above clearly shows that the bridge is built on private property, even though it has been maintained by Council for many years. We have also maintained the road over the bridge for a further one hundred metres.

The bridge is of timber construction with hardwood bearers and deck.

The consultant has recommended replacing this bridge. On reviewing the site and the number and type of properties served I would concur with his recommendation but would suggest the it would be more appropriate to replace the bridge with a Culvert at an estimated price of \$20,000 . However the first decision required is whether Council should continue to own the bridge.

### Recommendation

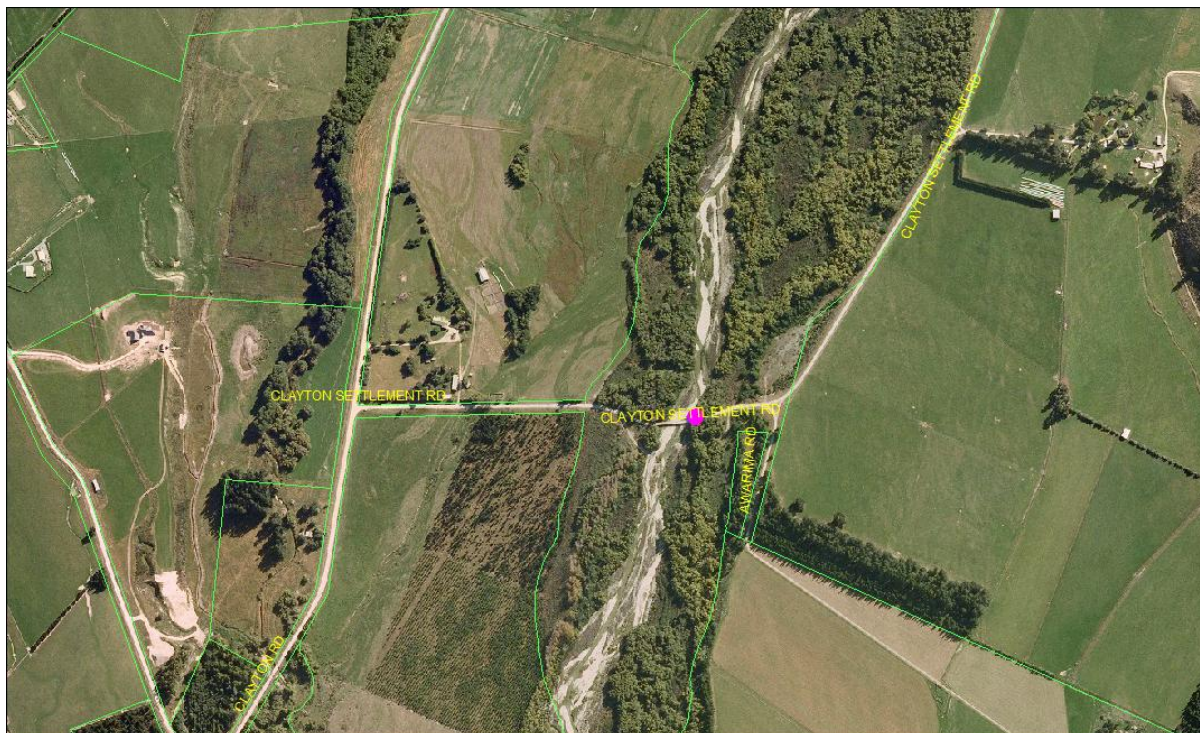
That Council negotiate the handing back the bridge to the land owner on whose land it is placed.



## 7.9 Bridge No 41 Clayton Settlement Rd Bridge

WATERWAY NAME – North Opuha River

LOCATION



Road Name	Clayton Settlement Rd
Traffic Count	<20 vpd
Ford	Yes
Number of Properties Served	3
Area Served	3200 Ha
Does it fit with Council Policy?	Yes
Weight Restriction	20kph speed restriction

**Comments**

The existing bridge is a single lane structure with steel beams on Concrete piles and abutments. Generally the piles and beams are in good condition but the deck is at the end of its life. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the structure I believe that when the time comes that we can no longer maintain the bridge economically it gets replaced due to its importance in the network and the size of the stream it crosses.

In the mean time we are putting a complete new deck on it that will see its life extended significantly, to approximately 2050.

**Recommendation**

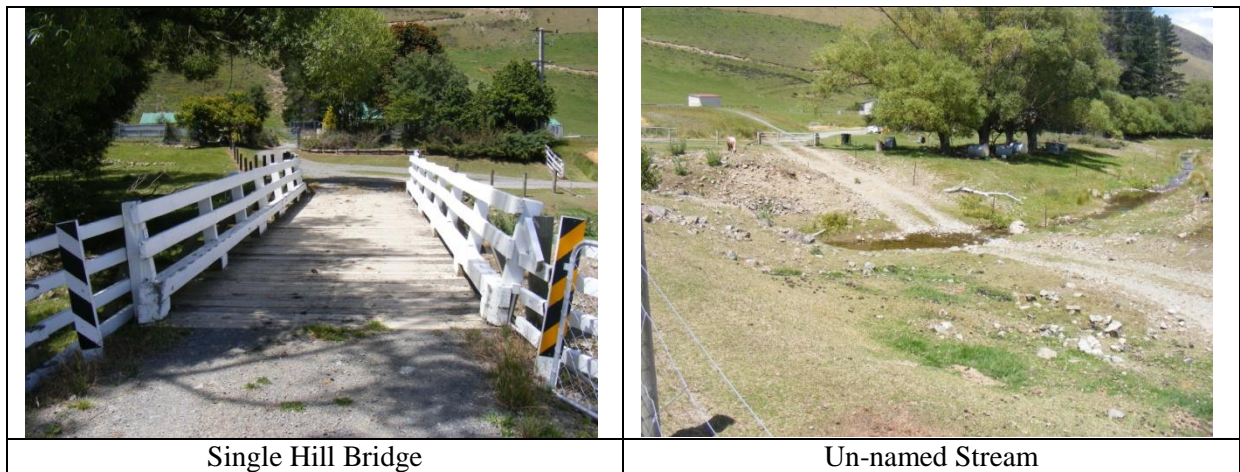
That Bridge No 41 is replaced when required.



## 7.10 Bridge No 58 Single Hill Bridge

WATERWAY NAME - Un-named Stream

LOCATION



Road Name	Single Hill Rd
Traffic Count	<10 vpd
Ford	Yes
Number of Properties Served	1
Area Served	1183 Ha



Area Served	Name (Ha)
Does it fit with Council Policy?	Yes
Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	2014

### Comments

This bridge serves one property with one occupied dwelling. There is a stable ford alongside the bridge. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation. This provides full access to all traffic and will remove the weight restriction which will be a benefit to the rural community.

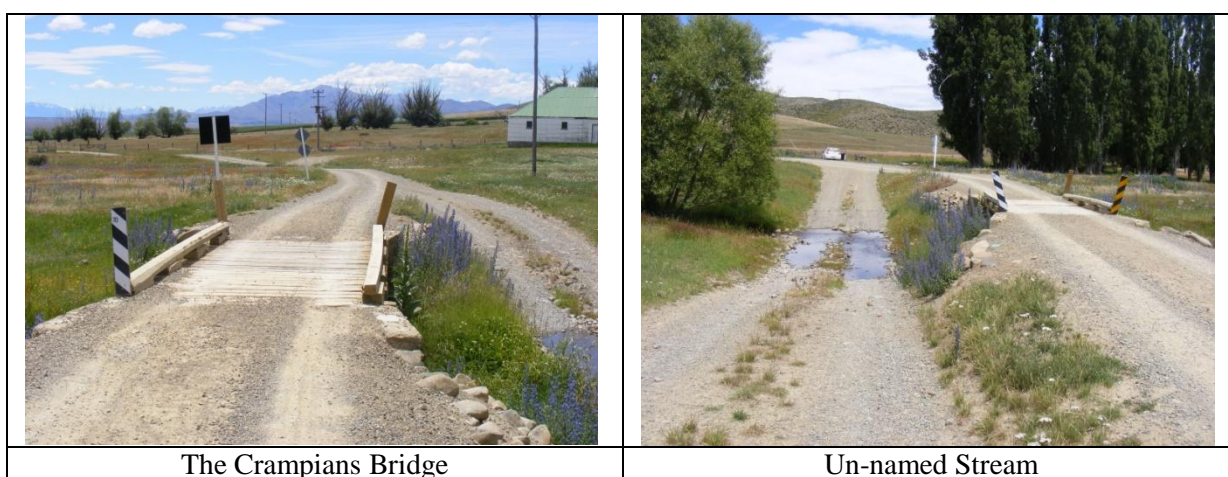
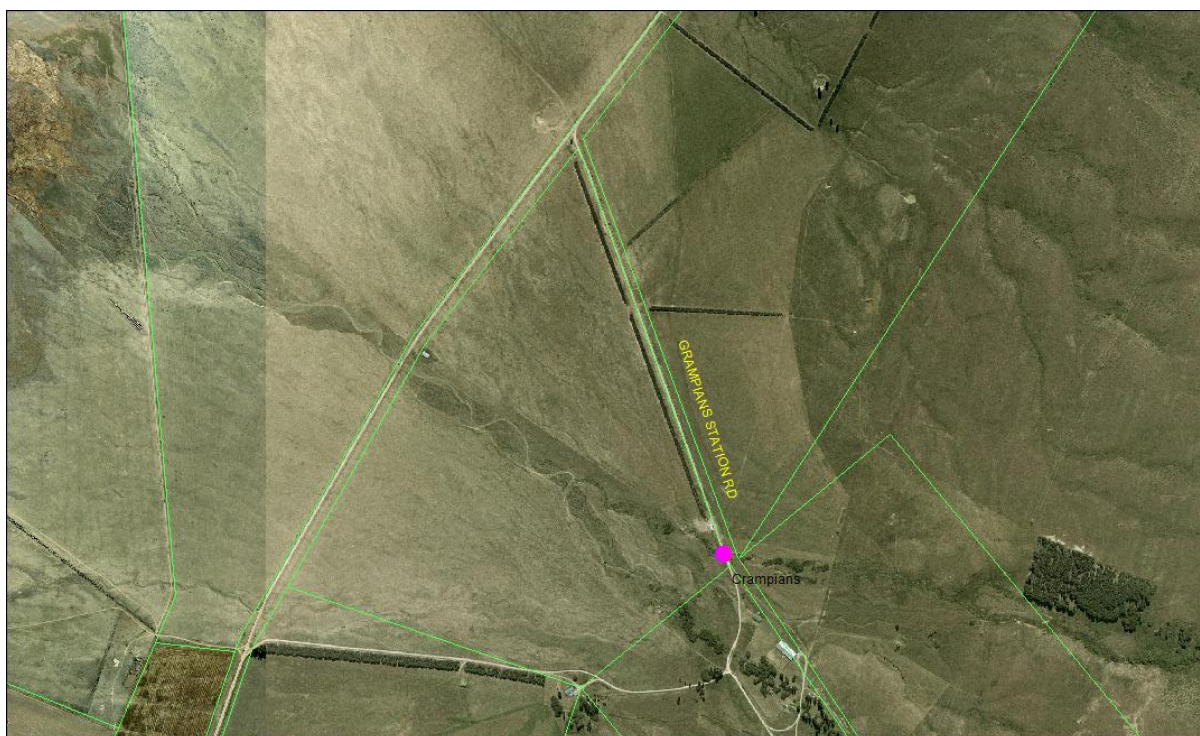
### Recommendation

That Bridge No 58 is replaced.

## 7.11 Bridge No 70 The Grampians Bridge

WATERWAY NAME - Un-named Stream

LOCATION



Road Name	Crampians Rd
Traffic Count	No data
Ford	Yes
Number of Properties Served	1
Area Served	1130 Ha
Does it fit with Council Policy?	Yes

Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	Not Replaced?

### Comments

This bridge serves one property with an occupied dwelling. It is on a shorter route out to Haldon Road and State Highway 8. The alternate route out to Haldon Rd and north is 1.3km longer than using this route. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served and the available alternative access I can see no justification for retaining it would recommend that we only carry out minimum maintenance on it and then remove it when no longer economically viable to maintain. Also we do not replace it with any other structure.

### Recommendation

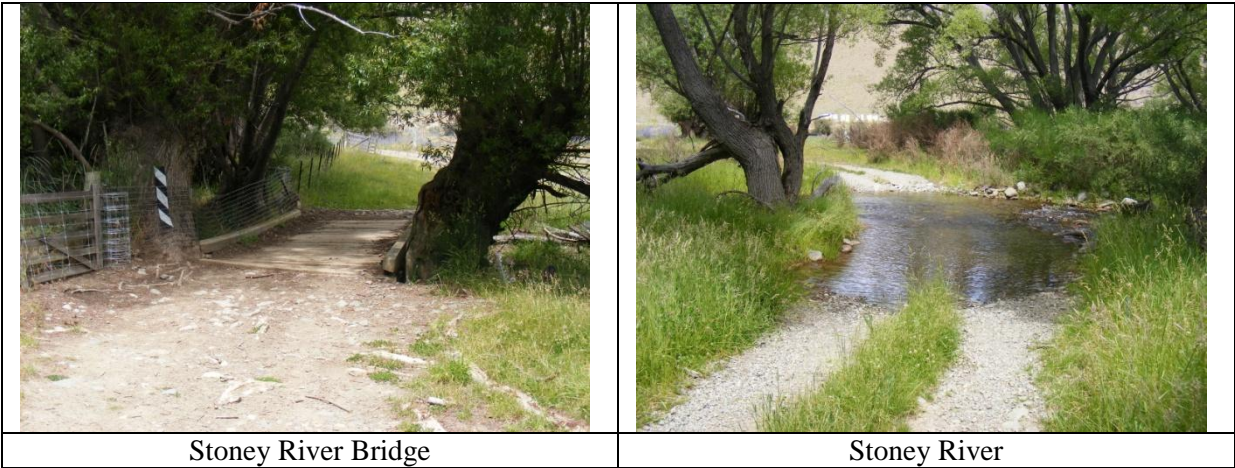
That Bridge No 70 is not replaced.



7.12 Bridge No 73 Stoney River Bridge

WATERWAY NAME - Stoney River

LOCATION



Road Name	Stoney River Rd
Traffic Count	<10 vpd
Ford	Yes
Number of Properties Served	1+
Area Served	2832+ Ha

Does it fit with Council Policy?	Yes
Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	Not Replaced?

### Comments

The bridge serves the back blocks of The Grampions and is on a No Exit Road. It is there to provide flood access only and can only be used by light traffic. There is a stable ford alongside the structure and is used for the main access. The consultant has also questioned the need for this structure. On reviewing the site I also can see no justification for retaining it would recommend that we remove the structure as soon as possible and advise those affected landowners accordingly. Also we do not replace it with any other structure.

### Recommendation

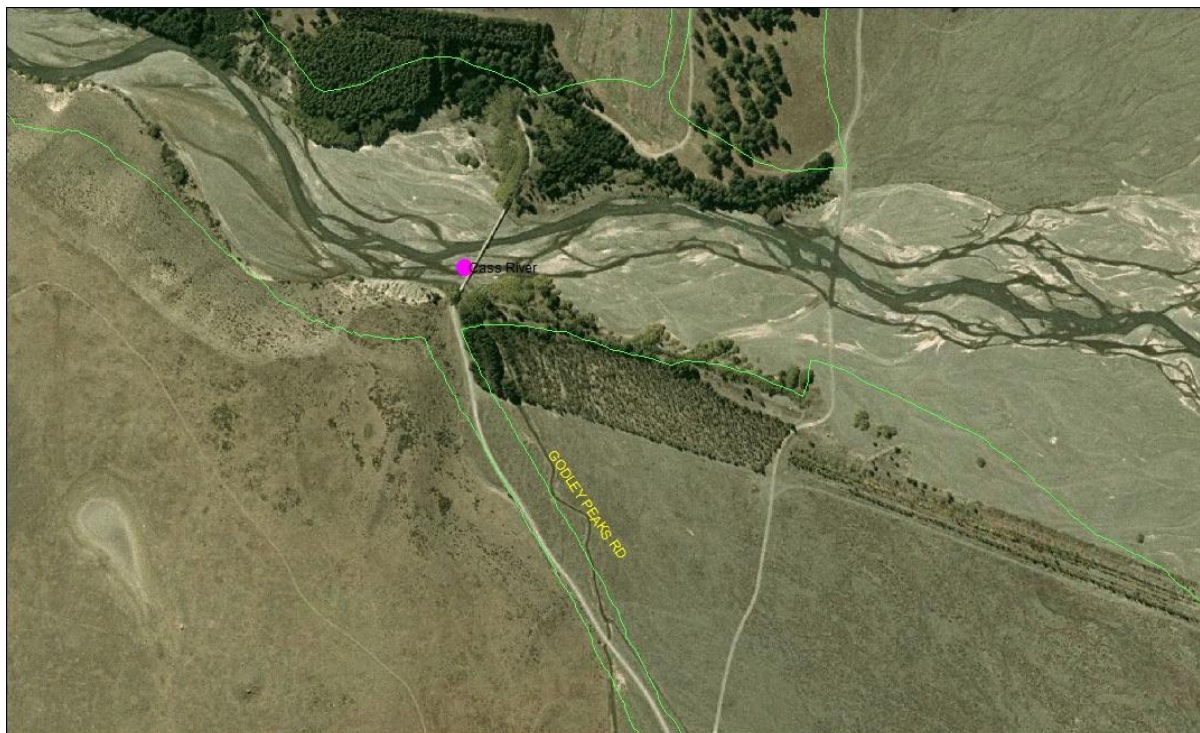
That Bridge No 73 is removed as soon as possible and not replaced, subject to consultation.



### 7.13 Bridge No 78 Cass River Bridge

WATERWAY NAME – Cass River

LOCATION



Cass River Bridge



Cass River

Road Name	Godley Peaks Rd
Traffic Count	<30 vpd
Ford	Ford available during normal river flows for HCVs only
Number of Properties Served	1

Area Served	14493 Ha
Does it fit with Council Policy?	Yes
Weight Restriction	6400gvw, 5000kg axle load and 10kph speed restriction
Replacement Date	2018

### Comments

This bridge serves one high country station with associated dwellings and also the John Scott Lodge which is used by various school groups and others. It also spans the Cass River that is generally not able to be forded with light traffic due to the soft and shifting nature of the bed. The normal discolouration of the river makes it difficult to read the river. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure.

Whilst I understand the politics around the provision of this bridge and a replacement structure there is no doubt that the condition of the bridge cannot be ignored. It is weight restricted to a 5000 kg axle load. The Station has been diligent in ensuring that the heavy vehicles serving the property use the ford so deterioration of the existing bridge by overweight loads is eliminated. Eventually the bridge will have to be removed or replaced

The estimated cost of replacement is \$2,112,500. This would remove the weight restriction and provide access to the property and the Godley River valley.

Perhaps the smart way to address the eventual replacement of the bridge is too investigate cost effective ways of bridging the Cass River and also discussing with the owner of Godley Peaks Station a cost sharing option for funding its replacement. This process needs to be started soon as the programmed replacement date is 2018.

### Recommendation

That Bridge No 78 is replaced.



7.14 Bridge No 79 Lake Alexandrina Bridge

WATERWAY NAME – Lake Alexandrina Outlet

LOCATION



Lake Alexandrina Bridge



Lake Alexandrina Outlet

Road Name	Lake Alexandrina Rd
Traffic Count	100 vpd
Ford	No
Number of Properties Served	59
Area Served	4.73 Ha



Area Served	Name (Ha)
Does it fit with Council Policy?	Yes
Weight Restriction	80% class 1 and 10kph speed restriction
Replacement Date	2011

### Comments

This Bridge has just about to be replaced.

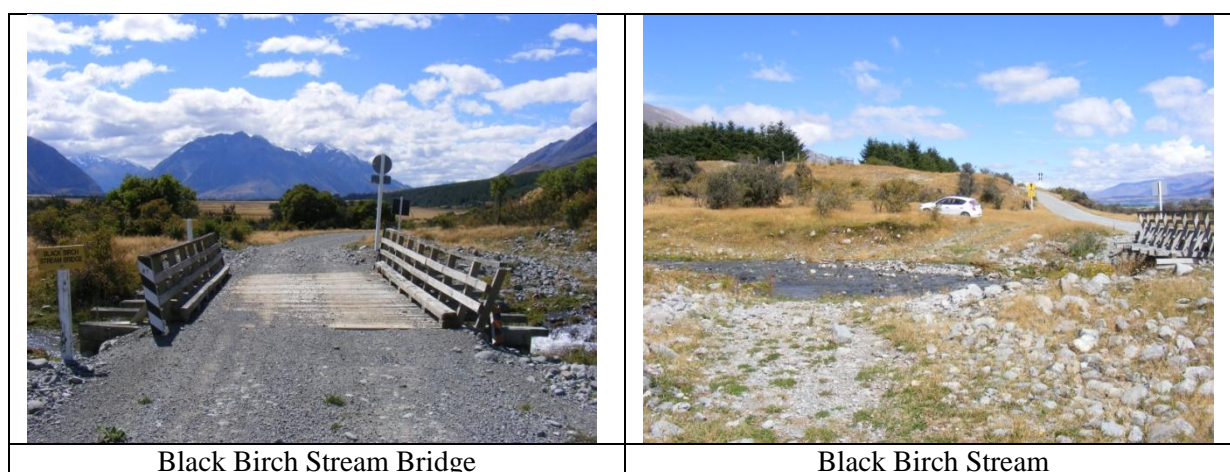
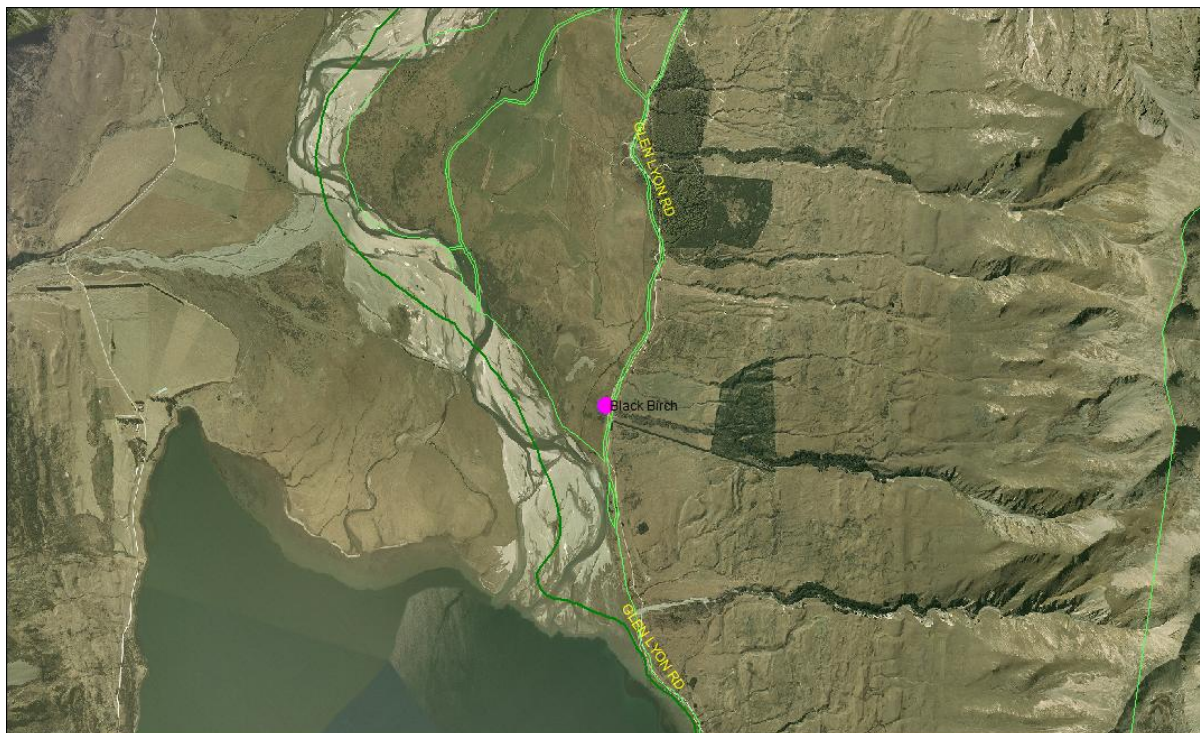
### Recommendation

That Bridge No 79 is replaced.

## 7.15 Bridge No 87 Black Birch Stream Bridge

WATERWAY NAME – Black Birch Stream

LOCATION



Black Birch Stream Bridge

Black Birch Stream

Road Name	Glen Lyon Rd
Traffic Count	<20 vpd
Ford	Yes
Number of Properties Served	1
Area Served	31,800 Ha
Does it fit with Council Policy?	Yes

Weight Restriction	50% class1, 5000kg axle load and 10kph speed restriction
Replacement Date	2025

### Comments

This bridge provides access to Glen Lyon station and the Dobson River Valley The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. On reviewing the site and the number and type of properties served I would concur with his recommendation that this structure be replaced. This will remove the weight restriction and provide full access to the station and the Dobson River valley that is used by the public.

### Recommendation

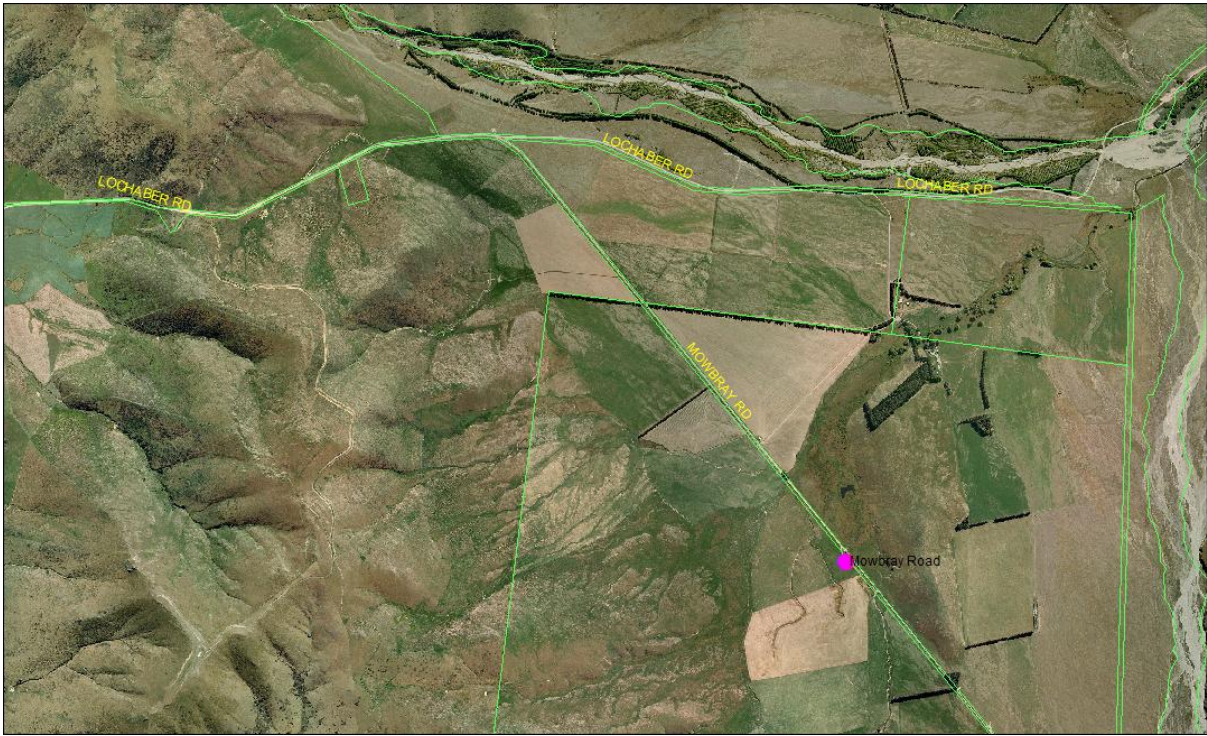
That Bridge No 78 is replaced.



7.16 Bridge No 89 Mowbray Stream Bridge

WATERWAY NAME - Un-named Stream

LOCATION



Road Name	Mowbray Rd
Traffic Count	<20 vpd
Ford	Yes
Number of Properties Served	2
Area Served	2441 Ha

Does it fit with Council Policy?	Yes
Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	2016

### Comments

This bridge provides access to the two properties for farming purposes and also a tourist venture over Four Peaks. The consultant has recommended replacing the Bridge with another Steel Beam, Precast deck structure. I concur with that recommendation.

Events have overtaken us a little as the original bridge has been washed away and is not able to be salvaged. So to regain the important access we have planned to shift the old Lake Alexandrina Bridge, with suitable refurbishment, onto the site which will extend the life by another 10 years at least. This will happen within the next two months.

### Recommendation

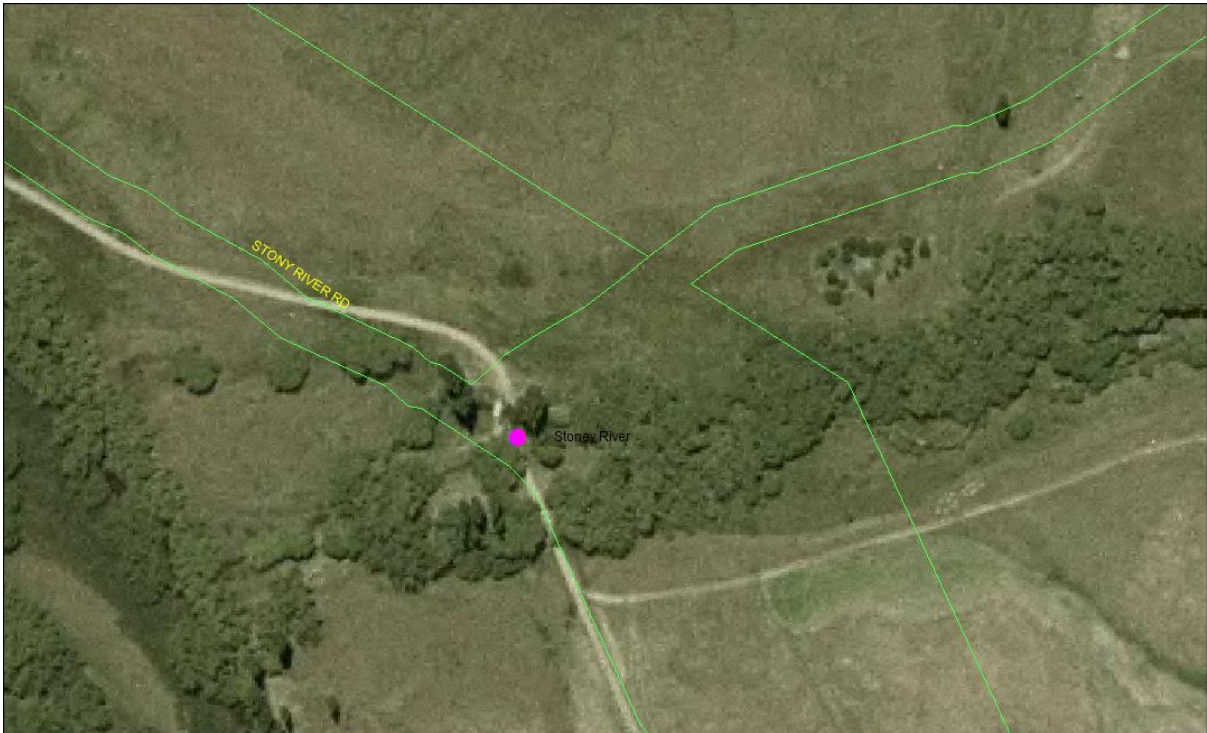
That Bridge No 89 is replaced when eventually required.



7.17 Bridge No 92 Stoney River Bridge

WATERWAY NAME - Moffat Stream

LOCATION



Otama Stream Bridge



Moffat Stream

Road Name	Stoney River Rd
Traffic Count	<10 vpd
Ford	Yes
Number of Properties Served	1+

Area Served	2832+ Ha
Does it fit with Council Policy?	Yes
Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	Not Replaced?

### Comments

The bridge serves the back blocks of The Grampions and is on a No Exit Road. It is there to provide flood access only and can only be used by light traffic. There is a stable ford alongside the structure and is used for the main access. The consultant has also questioned the need for this structure. On reviewing the site I also can see no justification for retaining it would recommend that we remove the structure as soon as possible and advise those affected landowners accordingly. Also we do not replace it with any other structure.

### Recommendation

That Bridge No 92 is removed as soon as possible and not replaced.



7.18 Bridge No 93 Fox Peak Road Bridge

WATERWAY NAME – Un Named Stream

LOCATION



Fox Peak Road Bridge



Un Named Stream

Road Name	Fox Peak Road Rd
Traffic Count	10 vpd
Ford	Yes
Number of Properties Served	1



Area Served	2832 Ha
Does it fit with Council Policy?	Yes
Weight Restriction	3000gvw, 2000kg axle load and 10kph speed restriction
Replacement Date	2014

### Comments

The consultant has recommended replacing the Bridge and it fits within Council policy for replacement. Council, by accepting the one off payment from Dept of Conservation, have I believe also recognised that the road has to be maintained in a safe condition.

The condition of the bridge is such that it is likely to be unsafe to use within three years and will have to be replaced or removed.

### Recommendation

That Bridge is replaced.

Bridge No	ROADWAY	ROAD ID	BRIDGE NAME	WATERWAY	DISPL (m)	TYPE	RESTRICTED	NO. OF LANES	SPAN LENGTH	DECK WIDTH	BRIDGE AREA
1	OTAMA ROAD	166	Otama Road Bridge	Otama Road	296	TMB		1	6	2.7	16.2
2	MONAVALLE ROAD	150	Coal Creek Bridge or Monavale Bridge	Coal Creek	4260	SBS		1	12	4.3	51.6
3	WILFRED ROAD LINK	203	Wilfreds Road Bridge	Opawa River	65	HC		1	12	4.5	54
4	MOUNT NESSING ROAD	157	McConnells Bridge		16048	HC		1	12	4.5	54
5	MOUNT NESSING ROAD	157	Rocky Gully Bridge	Rocky Gully	17057	CBS	SPEED	1	24.6	4	98.4
6	OPAWA ROAD	163	Opawa Stream Bridge	Opawa Stream	2163	CBS		1	15.2	4.35	66.12
7	OPAWA ROAD	163	Long Gully Bridge	Chaimberlain Stream	1225	TMB	WEIGHT	1	8	3.25	26
8	FRASER ROAD	123	Frasers Road Bridge No 1	Opawa River	65	SBS		1	12	4.4	52.8
9	FRASER ROAD	123	Frasers Road Bridge No 2	Delamain Stream	1044	TMB	SPEED	1	7	3	21
10	CAMP VALLEY ROAD	113	Camp Valley Road Bridge	Little Opawa River	400	CBS		2	24	7.25	174
11	CHAMBERLAIN ROAD	115	Deepdale Bridge	Little Opawa River	6600	HC		1	24	3.58	85.92
12	COAL PIT ROAD	119	Coal Pit Road No 1	Blainslie Street	3540	SBS		1	12	4.4	52.8
13	COAL PIT ROAD	119	Coal Pit Road No 2	Little Opawa Stream	1730	TMB	WEIGHT	1	12	4.59	55.08
14	LIMESTONE VALLEY ROAD	142	Limestone Valley Road Bridge		3550	HC		2	6	8.3	49.8
15	CRICKLEWOOD ROAD	121	Upper Tengawai Bridge	Tengawai	4915	SBS		1	72	4.25	306
16	CRICKLEWOOD ROAD	121	Cricklewood Road Bridge		5100	SBS		1	12	4.25	51
17	WATTS ROAD	199	Watts Bridge		131	HC		1	16	3	48
18	TONDROS ROAD	193	Allandale Stream Bridge	Allandale Stream	437	SLB		1	4.8	5.15	24.72
19	MIDDLE VALLEY ROAD	149	Pioneer Park Bridge		4620	TMB	WEIGHT	1	8.8	4.55	40.04
20	MIDDLE VALLEY ROAD	149	Raincliff Station Bridge	Raincliff Stream	308	SBS		1	40	4.25	170
21	MIDDLE VALLEY ROAD	149	McHaffies Bridge	Raincliff Stream	421	SBS		1	30	4.45	133.5
22	HAMILTON ROAD	134	Allandale Station Bridge	Allandale Stream	240	HC		1	15.6	4.5	70.2
23	NIXONS ROAD	159	Fairlie Stream Bridge	Fairlie Stream	780	SBS		1	8	3.75	30
24	NIXONS ROAD	159	Gillinghams Bridge	Halls Stream	1670	HC		1	16	4.5	72
25	NIXONS ROAD	159	Wellshot Stream Bridge	Wellshot Stream	4400	SBS		1	7.5	3.3	24.75
26	NIXONS ROAD	159	Goodmans Bridge	Wellshot Stream	5200	TMB	WEIGHT	1	17	2.05	34.85
27	TE PUKE ROAD	191	Te Puke Rd Bridge	Halls Stream	820	HC		1	16.6	4.5	74.7
28	OLDFIELD ROAD	162	Oldfields Road Bridge	Wellshot Stream North Branch	560	TMB	WEIGHT	1	7.5	2.85	21.375
29	TROTTERS ROAD	195	Trotters Road Bridge	Wellshot Stream North Branch	430	SLB		1	6	4.15	24.9
30	THREE SPRINGS ROAD	192	Three Springs Road Bridge	Wellshot Stream North Branch	410	SLB		1	5.3	4.05	21.465
31	STANTON ROAD	185	Stanton Road Bridge		740	SLB		1	6.5	4.35	28.275
32	TRENTAM ROAD	194	Trentham Road Bridge		115	HC		1	12	4.5	54

33	MORRIS ROAD	152	Morris Road Bridge		5590	TMB	WEIGHT	1	8.8	3.5	30.8
34	PLANTATION ROAD	171	Ribbonwood Bridge	Ribbonwood Stream	107	HC		1	22.5	4.35	97.875
35	PLANTATION ROAD	171	Station Stream Bridge No 1	Station Stream	3290	HC		1	22.5	4.35	97.875
36	PLANTATION ROAD	171	Moorehead Bridge	Raines Stream	3880	SBS		1	12.75	4.25	54.1875
37	CLAYTON ROAD	116	South Opuha Bridge	South Branch Opuha River	12150	CB		1	85.3	5.15	439.295
38	CLAYTON ROAD	116	Ribbinwood Bridge	Ribbinwood Stream	14940	CA		1	21.7	4.5	97.65
39	CLAYTON ROAD	116	Station Stream Bridge	Station Stream	15120	HL		1	18.2	3.85	70.07
40	CLAYTON ROAD	116	Cuthbertson's Bridge	Deep Creek	16900	SBS		1	12	4.45	53.4
41	CLAYTON SETTLEMENT ROAD	117	Clayton Settlement Bridge	North Opuha	502	JBT	SPEED	1	66	3.15	207.9
42	CLAYTON ROAD	116	North Opuha Bridge	North Opuha	20530	CBS		1	41	4.25	174.25
43	LOCHABER ROAD	143	Clayton No 1 Bridge	Ross Stream	2600	HC		1	10.2	4.25	43.35
44	LOCHABER ROAD	143	Stockyard Creek Bridge	Stockyard Creek	4470	HL		1	8.2	4.25	34.85
45	LOCHABER ROAD	143	Orari River Bridge	Orari River	11480	HC		1	42.6	4.45	189.57
46	LOCHABER ROAD	143	Jacks Creek Bridge	Jacks Creek	12070	HL		1	12.2	4.2	51.24
47	LOCHABER ROAD	143	Dry Creek Bridge	Dry Creek	15330	HC		1	12.2	4.5	54.9
48	BLUE MOUNTAIN ROAD	106	Blue Mountain Bridge	Blue Mountain	210	SC		1	32.4	3	97.2
49	LOCHABER ROAD	143	Phantom River Bridge	Phantom River	19600	HL		1	35.3	4.5	158.85
50	LOCHABER ROAD	143	Hewson River Bridge	Hewson River	20870	CB		1	42	4.35	182.7
51	WARATAH ROAD	196	Exe Stream Bridge	Exe Stream	3660	SBS		1	15.6	4.2	65.52
52	WARATAH ROAD	196	Trap Stream Bridge	Trap Stream	5700	CCS		2	3.5	8	28
53	MACKENZIE PASS ROAD	144	Lockharts Stream Bridge	Lockharts Stream	530	SBS	WEIGHT	1	14	2.9	40.6
54	MACKENZIE PASS ROAD	144	Hayter Stream Bridge	Hayter Stream	4230	SBS		1	12	2.9	34.8
55	MACKENZIE PASS ROAD	144	Mackenzie Stream Bridge	Mackenzie Stream	7590	SBS		1	7.6	2.9	22.04
56	ROLLESBY VALLEY ROAD	177	Mount Dalgety Bridge	Hayter Stream	11220	HC		1	27.5	4.55	125.125
57	ROLLESBY VALLEY ROAD	177	Avalanche Bridge	Avalanche Creek	9035	CBS		1	10	4.45	44.5
58	SINGLE HILL STATION ROAD	181	Single Hill Bridge		200	TMB	WEIGHT	1	12	2.75	33
59	ROLLESBY VALLEY ROAD	177	Rollesby Valley Bridge No 2		6870	CBS		1	9	4.45	40.05
60	ROLLESBY VALLEY ROAD	177	Rollesby Valley Bridge No 1		394	SLB		1	6	4.15	24.9
61	ROLLESBY VALLEY ROAD	177	Opihi River	Opihi River	115	CA		1	20	4.7	94
62	CLOUDY PEAKS ROAD		Opihi River	Opihi River	40	SBS		1	36	3.65	131.4
63	STONELIEGH ROAD	186	O'Connors Bridge	Opiuhi River	193	CCS		1	14	3.7	51.8
64	STONELIEGH ROAD	186	Tiffens Bridge		3540	HC		1	18.2	3.9	70.98
65	MONUMENT ROAD	151	Monument Road Bridge		8270	SBS		1	12	4.45	53.4
66	HALDON ROAD	132	Bullosky Creek Bridge	Grays Stream	4380	SBS		1	12	4.25	51

67	HALDON ROAD	132	Red Hut Creek Bridge	Grays Stream	7870	SBS		1	12	4.35	52.2
68	HALDON ROAD	132	Mackenzie Stream Bridge	Mackenzie Stream	11380	SBS		1	36.6	4.25	155.55
69	HALDON ROAD GRAMPIANS STATION ROAD	132	Snowy River Bridge	Snowy River	16148	SBS		1	62.5	4.25	265.625
70		128	Grampians Bridge		1375	TMB	WEIGHT	1	5.6	2.25	12.6
71	HALDON ROAD	132	Station Creek Bridge	Station Creek	21040	CBS		1	14.2	4.25	60.35
72	HALDON ROAD	132	Stoney Creek Bridge	Stoney Creek	41340	SBS	WEIGHT	1	20.6	3.25	66.95
73	STONEY RIVER ROAD	187	Stoney River Road Bridge	Stoney River	7360	TMB	WEIGHT	1	5	2.3	11.5
74	LILYBANK ROAD	141	Boundary Stream Bridge	Boundary Stream	14020	DA		1	28.8	3	86.4
75	LILYBANK ROAD	141	Washdyke Stream Bridge	Washdyke Stream	17175	SBS	WEIGHT	1	11	3.7	40.7
76	LILYBANK ROAD	141	Coal River Bridge	Coal River	29290	SBS		1	36.6	3.75	137.25
77	AIRES STATION ROAD		Aires Station bridge	Opihi River	200	HC		1	29.4	4.55	133.77
78	GODLEY PEAKS ROAD	126	Cass River Bridge	Cass River Lake Alexandrina Outlet	16560	TMB	WEIGHT	1	124	3	372
79	LAKE ALEXANDRINA ROAD	139	Lake Alexandrina Road Bridge		1550	TMB	WEIGHT	1	8.2	2.7	22.14
80	BRAEMAR ROAD	109	Forks Stream Bridge	Forks Stream	2069	SBS		1	36.6	4.4	161.04
81	BRAEMAR ROAD	109	Irishman Creek Bridge	Irishman Creek	9116	SBS		1	37	4.4	162.8
82	BRAEMAR ROAD MOUNT COOK STATION ROAD	109	Maryburn Bridge	Maryburn Stream	14490	HC		1	12	3.38	40.56
83	MOUNT COOK STATION ROAD	154	Landslip Creek Bridge	Landslip Creek	7667	SBS		1	18.2	4.85	88.27
84		154	Jollie River Bridge	Jollie River	15520	SBS	WEIGHT	1	78	4.2	327.6
85	GLEN LYON ROAD	124	Greta Stream Bridge	Greta Stream	25380	HC		1	14.2	3.07	43.594
86	GLEN LYON ROAD	124	Dorcy's Bridge	Dorcy Stream	30240	HC		1	8.2	3.35	27.47
87	GLEN LYON ROAD	124	Black Birch Stream Bridge	Black Birch Stream	34630	TMB		1	6	3.6	21.6
88	GLEN LYON ROAD	124	Harris Stream Bridge	Harris Stream	38093	SBS		1	18.5	4.4	81.4
89	MOWBRAY ROAD	153	Mowbray Road Bridge	unknown	2670	TMB	WEIGHT	1	6.3	3.12	19.656
90	MT-NESSING ROAD		Farmers Bridge								
91	RHOBORO ROAD RURAL	172	Rhoboro Road Bridge	Twizel River	1803			1	36	4.6	165.6
92	STONEY RIVER ROAD	187	Stoney River Road Ford Bridge	Moffat Stream	6280	TMB	WEIGHT	1	5.8	2.28	13.224



## **MACKENZIE DISTRICT COUNCIL**

**REPORT TO:** PROJECTS AND STRATEGY COMMITTEE

**SUBJECT:** TWIZEL WATER SUPPLY PROPOSALS

**DATE:** 14 APRIL 2011

**REF:** WAS 16/11

### **REASON FOR REPORT**

To receive the report for Opus International Consultants Ltd for the upgrade of the Twizel water supply and determine the way forward.

### **RECOMMENDATIONS:**

1. That the report be received.
2. That staff meet with the report writer to get a clear understanding of all the issues in the report.
3. That a combined workshop with Council and the Twizel Community Board to discuss the findings of the report be held.
4. That funding and affordability of this upgrade be considered along with all the other major capital projects to ensure the sustainability of the projects.

**BERNIE HAAR**  
**ASSET MANAGER**

**GLEN INNES**  
**CHIEF EXECUTIVE OFFICER**

## **BACKGROUND**

For some years the Council and Community Board have been reviewing the delivery of water supply to Twizel township and in particular reviewing the relocation of the source to a more desirable location.

## **ATTACHEMENTS**

The report from Opus International Consultants Ltd is attached that contains all the necessary detail.

## **CONSIDERATIONS**

On reviewing the report it is not clear as to the preferred option, either Option3 (ii) or Option 5. Option 3(ii) is the most economic but there are some significant unknowns with it as there are with Option 5, being can we get the volume of and quality of water required.

The other really pressing consideration to be considered is the affordability of this work when considered with all the other major capital projects that are likely to be required in the next ten years.

## **CONCLUSIONS**

This is a very important decision to get right and I don't believe that we should rush this. The economics of the scheme and the affordability of all other projects needs to be considered along with the level of treatment.

My recommendation is that we workshop the proposals with Council and the Community Board so that we all have clear understanding of the various solutions, before Council makes any firm commitment to proceed with either option.





## **Twizel Water Supply Options Update**



*Mackenzie District Council  
February 2011*

## **Twizel Water Supply Options Update**

Prepared By

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## Contents

<b>1</b>	<b>Executive Summary .....</b>	<b>1</b>
<b>2</b>	<b>Introduction .....</b>	<b>2</b>
<b>3</b>	<b>Twizel Water Supply .....</b>	<b>3</b>
	3.1 Background .....	3
	3.2 Recent Developments .....	4
<b>4</b>	<b>Twizel Water Demand .....</b>	<b>5</b>
	4.1 Levels of Service .....	5
	4.2 Current Demand .....	5
	4.3 Future Demand – Combined Existing and New Development.....	6
<b>5</b>	<b>Update of Source &amp; Treatment Options .....</b>	<b>9</b>
	5.1 Option 3 – Extend and Improve Existing .....	9
	5.2 Option 5 – New Source & Ben Ohau Reservoir.....	10
<b>6</b>	<b>Cost Comparison .....</b>	<b>13</b>
	6.1 Capital Costs .....	13
	6.2 Annual Costs .....	14
	6.3 Lifecycle Cost .....	14
	6.4 Funding .....	15
	6.5 Cost Summary table .....	15
	6.6 Other Factors .....	16
<b>7</b>	<b>Conclusion .....</b>	<b>17</b>
<b>8</b>	<b>Recommendations .....</b>	<b>18</b>
	<b>Appendix A - Capital Cost Estimates .....</b>	<b>19</b>
	Option 3(i) Capital Costs.....	19
	Option 3(ii) Capital Costs.....	20
	Option 5(i) Capital Costs.....	21
	Option 5(ii) Capital Costs.....	22
	<b>Appendix B – Preliminary Scheme Layout Plans .....</b>	<b>23</b>

## 1 Executive Summary

The purpose of this report is to review and update aspects of water supply upgrade options investigated in previous Opus reports prepared relating to the Twizel water supply.

The following two options for the supply of water to meet the existing and future needs of Twizel were reconsidered:

- Option 3 – Extend and improve the existing Twizel water supply, previously reported by Opus in 2007 (*Twizel Water Supply Issues and Options*)
- Option 5 – New source and reservoir, northwest of Twizel near the Ben Ohau homestead, reported by Opus in 2009 (*Twizel & Manuka Terrace Water Supplies*).

The option to supply the existing township and additional development from the existing borefield by constructing an additional bore, pumping & treatment infrastructure remains feasible. A new bore would be constructed adjacent to the existing bores to provide the additional pumping capacity. This water would be pumped into the existing headworks to enable a common booster pumping & treatment facility to be used.

Option 5 considers building a new water supply system to service all of Twizel. The key advantages that this offers are reducing the pumping lift required to service the whole township and future developments, and allowing the source to be close to a potential reservoir site which will provide a better form of pressure control and backup supply. Five new bores would be constructed to the northwest of the proposed development area, as close as reasonably possible to the proposed reservoir site. Other recent bores in this area have shown promising yields (50 L/s) so it seems likely that a successful source can be effected.

Option 5, which provides elevated storage above the town with a more stable gravity supply, is clearly a more attractive long-term solution; however this is reliant on the availability of groundwater of suitable yield and quality in the vicinity to keep the scheme economically feasible. A suitable source seems likely given that other successful bores have been constructed in the post-glacial deposits in the area.

Option 3 is less satisfactory as it will continue to be reliant on continuous pumping to provide service to the town. It will have the lowest capital costs but higher risks. It is also likely to have the highest operating costs.

If the resource proves sufficient, the option of a new source and reservoir servicing the whole of the Twizel (Option 5) appears to offer the best solution in terms of benefits.

It is recommended that investigations proceed to confirm the best location for a new groundwater supply bores. It is also recommended that Council undertake some random assessments of AC pipelines in Twizel to ascertain their condition and whether pH correction is justified as a means of extending the life of the AC pipelines.

## 2 Introduction

The purpose of this report is to review and update aspects of water supply upgrade options investigated in previous Opus reports prepared relating to the Twizel water supply.

Specifically, the following two options are reconsidered:

- Option 3 – Extend and improve the existing Twizel water supply, previously reported by Opus in 2007 (*Twizel Water Supply Issues and Options*)
- Option 5 – New source and reservoir, northwest of Twizel near the Ben Ohau homestead, reported by Opus in 2009 (*Twizel & Manuka Terrace Water Supplies*)

For other options investigated, refer to previous Opus reports (Opus, 2007: *Twizel Water Supply Issues and Options*, Opus, 2008: *Addendum* & Opus, 2009: *Twizel & Manuka Terrace Water Supplies*).



### 3 Twizel Water Supply

#### 3.1 Background

A previous report (Opus, 2007: *Twizel Water Supply Issues and Options*) included an option to service new development in the Twizel area involving extending and improving the existing water supply scheme (Option 3).

Option 3 involved the following works:

- A new bore constructed adjacent to the existing bores in Twizel to provide additional pumping capacity (pumped into the existing headworks to enable a common booster pumping & treatment facility to be used);
- UV treatment for protozoal and bacterial treatment;
- Booster Pumps;
- Rising main for the new development;
- M&E improvements to some of the existing plant in the short-medium term;
- Standby generator to enable the system to operate during a power failure;
- Repair and cover existing reservoir to meet the Drinking Water Standards.

The estimated capital cost of Option 3 was approximately \$2.1M, with annual operating costs of \$202k and whole life costs of \$5.5M (in 2007 dollars) based on a 100 year lifecycle at 6% discount rate. The provision of filtration plant resulted in capital costs in the order of \$3.4M.

A major disadvantage identified with Option 3 was that the entire supply would remain fully reliant on continuous pumping to maintain system pressure and service.

Another report (Opus, 2009: *Twizel & Manuka Terrace Water Supplies*) investigated a further option (Option 5) to construct a new water supply system to the northwest of the township to supply all of Twizel.

Option 5 included the following works:

- A new groundwater source in the vicinity of Ben Ohau Station consisting of five new bores and pumps;
- A rising main from the new borefield to a new treatment plant and reservoir located on the high ground behind Ben Ohau station;
- UV treatment for new supply;
- Treatment/control building and controls;

- A falling main from the reservoir to Twizel, traversing the northwest development area along the way.

The previously estimated preliminary capital cost of Option 5 was approximately \$4.3M (in 2009 dollars).

The previous reports had worked on the basis of providing for a future 1,000 lots to be developed (in the medium term) as although the Long Term Council Community Plan (LTCCP) had only identified an additional 525 sections to be developed by 2016, this was less than one-eighth of what could potentially occur if all rezoning proposals at that time eventuated to their maximum extent.

In order to adhere to current legislation and ensure the most appropriate option is selected to proceed, this review document takes into account all available relevant information as of February 2011.

### 3.2 Recent Developments

It was previously reported that Twizel would need to comply with the Heath (Drinking Water) Amendment Act 2007 by July 2011. The new compliance date as announced by the Government on 24 June 2009 for a Minor Drinking-Water Supplier (such as Twizel) is now 1 July 2014.

Growth and development in Twizel over recent years has been strong. Council has recognised the potential for further growth and has prepared 'Proposed Plan Change 15' (refer to Figure 1) with the primary purpose to control and manage growth through rezoning of specific areas of land in and adjacent to the township and by changes to objectives, policies, rules, methods and maps in the District Plan.

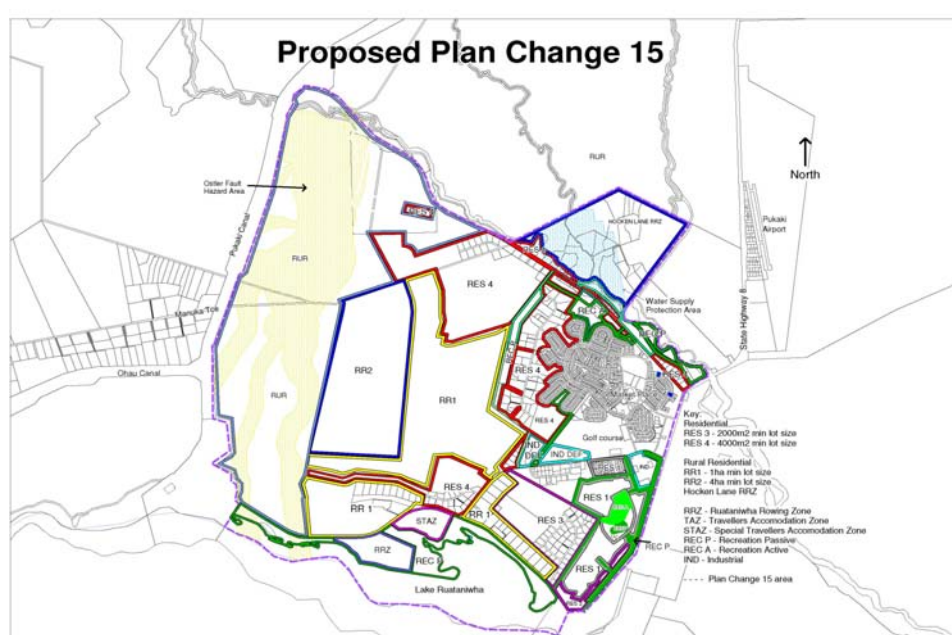


Figure 1: Proposed Plan Change 15

## 4 Twizel Water Demand

### 4.1 Levels of Service

The Twizel water supply is an urban water supply, with water supply being continuous apart from programmed shutdowns and unexpected disruptions.

From the 2009-2019 LTCCP, Council policy relating to secondary levels of service for water supplies are as follows:

- On-demand water supplies will comply with water supply classification W3\* as defined in SNZ PAS 4509:2003 fire fighting requirements in “on demand” schemes;
- Flow at point of supply 25 L/min;
- Pressure at point of supply 250 kPa;
- Ministry of Health requirements are met.

\*FW2 is the equivalent of W3 in the updated New Zealand Fire Service Firefighting Water Supplies Code of Practice - SNZ PAS 4509:2008.

### 4.2 Current Demand

The key statistics in 2010 for the Twizel water system are as follows:

- Number of connections: 1,291 (1,243 not metered, 48 metered);
- Annual water consumption: 925,381 m<sup>3</sup>/year;
- Average daily demand: 2,535 m<sup>3</sup>/day.

Council have urged caution over using the 2010 statistics as the annual water consumption during this period has been less than in previous years. The lighter consumption could be considered to be partially due to leak detection work Council have undertaken in recent years. A slight reduction in the number of connections has also contributed.

From the Opus 2007 Twizel Water Supply Investigation Report:

- Annual water consumption: 1,070,000 m<sup>3</sup>/year;
- Average daily demand: 2,930 m<sup>3</sup>/day;
- Peak-day demand: 7,000 - 9,940 m<sup>3</sup>/day (highest recorded);
- Peak-hour flow: 130-145 L/s.

For the purposes of this report, we have used the higher demand as reported in 2007.

An estimated breakdown of demand type (based on average demand – taken from the 2007 Twizel report) is shown in Table 1 below.

<b>Table 1: Estimated Twizel Water Usage Type</b>	
<b>Usage</b>	<b>%</b>
Commercial	14
Irrigation	27
Leakage	27
Domestic	32

As evident above, irrigation usage is a significant proportion. This water is used on Council parks and reserves, as well as on the golf course. The proportion of leakage is estimated from the minimum night flows recorded by the supply flowmeter.

Twizel has a high average per-connection usage, of approximately 2,080 L/connection/day. The peak day per-connection demand is very high at around 7,000 L/connection/day, but this is partially due to the amount of irrigation and significant short-term increases in population during holiday periods and/or sporting events. This peak demand places Twizel in a similar water consumption league to Cromwell and Alexandra which have similar climatic and soil-type influences.

#### 4.3 Future Demand – Combined Existing and New Development

Future demand has been based on the scenario that future resource consent conditions will require a significant reduction in water usage. ECan's 'reasonable use' policy in its Natural Resources Regional Plan (NRRP) for domestic consumption is 300 L/person /day, which is significantly lower than the current demand.

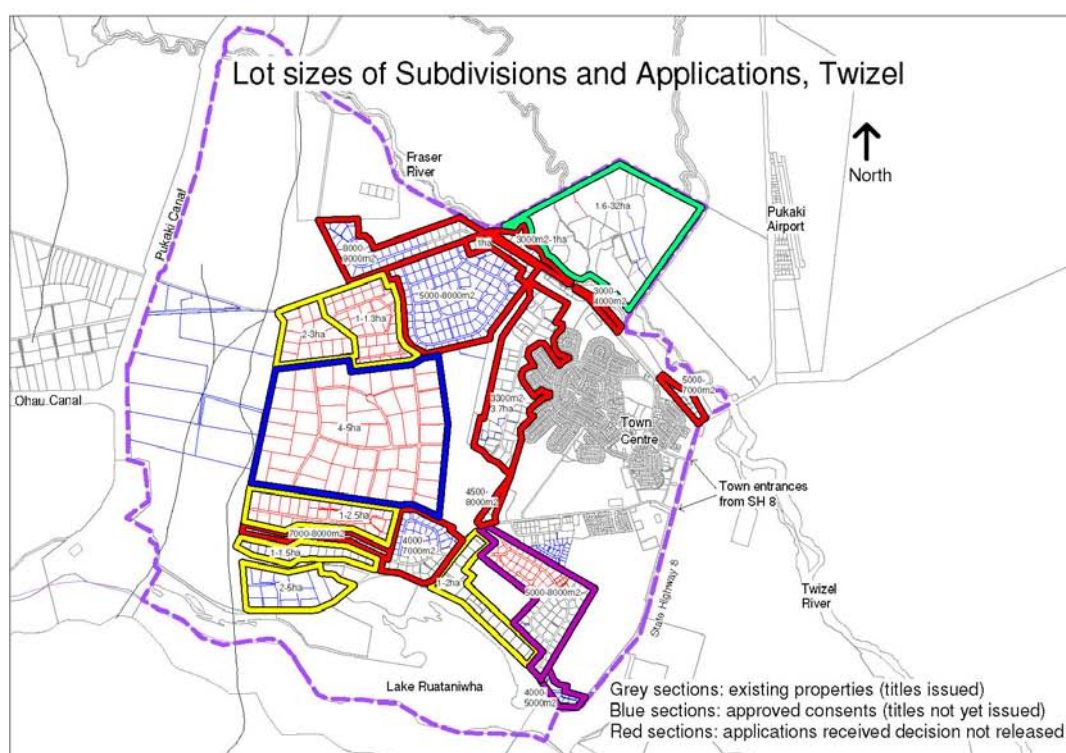
Demand figures have been developed as follows for the potential new development associated with the proposed rezoning options:

<b>Table 2: Greenfields' Design Basis</b>	
<b>Parameter</b>	<b>Value</b>
Per-capita Domestic Consumption	300 L/person/day
Occupancy	3 persons/lot
Peak-Day Irrigation allowance	1,500 L/lot/day
System Losses	15%
Total Peak Day Flow	2,760 L/lot/day

This is considered to be a justifiable level of consumption that reflects the local context and current ECan policies.

The next issue considered is the likely rate and location of development. The 2006 LTCCP identified an additional 525 sections to be developed until 2016. This is significantly less than what could potentially occur if all rezoning proposals eventuate to their maximum extent.

Existing lots, subdivisions and applications are provided in Figure 2, which takes into account the rezoning in Proposed Plan Change 15. The Council mapping show that 472 applications for new sections have been approved or applications have been received by Council Planners and decisions are pending. Remaining zones assigned for residential development (in conjunction with min lot sizes) and industry within the Twizel area equate to a potential further 1,267 lots. At the time of writing, of the existing sections (coloured grey on the plan) 389 properties have not been connected to the water supply system but are able to do so. The potential number of future additional properties connecting to the public water supply is thus 2,128.



**Figure 2: Lot Sizes and Applications**

Based on the Proposed Plan Change 15 in conjunction with the section applications, a reasonable medium term allowance would be to expect another 1,000 lots to be developed (i.e. future allowance similar to the 2007 Twizel report). This would cater for the existing 389 properties that are able to be connected to the water supply and also for the 472 lot applications already received by Council. This would provide the capacity to meet the demand of an additional 139 lots should the need arise in the medium term.



Design parameters for a water supply to service this level of new development are summarised below:

- Peak Day Demand: 2,760 m<sup>3</sup>/day;
- Average Daily Demand (assuming 25 % irrigation average): 1,470 m<sup>3</sup>/day;
- Peak hour demand: 95 L/s.

Note that the reticulation capacity is provided for fire-fighting in the new development, but is not the worst case as this has been assessed as 88 L/s (2/3 PHF + 25 L/s). This assumes that a FW2 level of service to PAS 4509:2008 would be appropriate for an urban development such as this (i.e. 25 L/s from up to two hydrants, plus 45m<sup>3</sup> storage). In order to identify the worst case instantaneous flow required 2/3 peak hour flow plus fire flow (25 L/s) has been used.

Council's target level of service for fire-fighting throughout the District in the LTCCP is W3, (FW2 in PAS4509:2008), but we have assumed a level of FW3 (W4) for the central Twizel area to allow for future development intensity in the CBD area. This requires a fire flow of 50 L/s, plus 180m<sup>3</sup> of storage.

For the purposes of this report, the existing water consumption in Twizel combined with the above assessment for new development has been used.

Table 3 summarises the figures used for the purposes for preliminary design of a supply to the existing township and the potential medium term development identified in the PC 15 plans. This assumes that some reduction will be made in the current usage (by removing irrigation components and/or reducing per-capita demand).

<b>Table 3: Preliminary Design Parameters</b>			
<b>Parameter</b>	<b>Existing</b>	<b>Development</b>	<b>Combined</b>
Average Day	2,930 m <sup>3</sup> /day	1,470 m <sup>3</sup> /day	4,400 m <sup>3</sup> /day
Peak Day	8,000 m <sup>3</sup> /day	2,760 m <sup>3</sup> /day	10,760 m <sup>3</sup> /day
Peak Hour	135 L/s	95 L/s	235 L/s (worse case)
2/3 peak plus Fire	140 L/s	88 L/s	

As the higher existing demand figures previously reported in the 2007 Twizel report have been used, in conjunction with a similar allowance for medium term growth, there has been no change to the design parameters to those previously presented in the earlier report.

## **5 Update of Source & Treatment Options**

### **5.1 Option 3 – Extend and Improve Existing**

The option to supply the existing township and additional development from the existing borefield by constructing additional bores, pumping & treatment infrastructure remains feasible.

A new bore would be constructed adjacent to the existing bores to provide the additional pumping capacity. This water would be pumped into the existing headworks to enable a common booster pumping & treatment facility to be used.

The existing headworks are approximately 45 years old and the mechanical and electrical components are either at or near the end of their reliable, useful lives. The structural elements however can be reasonably expected to have several decades of remaining life (assuming that they are maintained).

The existing bores have been CCTV surveyed with no major issues identified, but previous inspections of the boreheads indicates that some of the pipework above ground will require renewal in the short-medium term. This should be completed as part of the works to improve borehead security and reduce the risk of stormwater entry into the bores during wet weather.

Some (if not all) of the existing pumping plant is now obsolescent, and pump replacement will probably require modification of pipework to accommodate replacement pumps (which are now usually manufactured to ISO dimensional standards). Notwithstanding this, the existing pumps should be able to be maintained for a few years to come, and can be replaced on an 'as-required' basis.

Much of the switchgear in the pumping station is original equipment, and it would be necessary to replace this if this system is to be retained. This may be moderately expensive (in the order of \$150,000), but would also allow the control system to be improved to reduce pressure surges and potentially extend the life of the reticulation network, as well as reduce energy costs and improve reliability.

The existing bores draw water from less than 10m deep and are treated as requiring the same log credit as the surface water in the overlying catchment - thus requiring 4 or 5 log credit treatment, with 4 log credit more likely. The bores may be able to get 0.5 or 1 log credit from having a 15m setback distance (the ground level could also be built up around the bores). If a 1 log credit reduction is achieved then UV disinfection would only be required, otherwise both filtration and UV plant will need to be installed.

As a cost comparison exercise for bringing water supply into production, two scenarios have been considered.

### **5.1.1 Scenario 1 - Option 3(i)**

This scenario is based on log credit requirements such that the bore water will require both filtration and UV disinfection treatment. Note: this could be provided downstream of the open reservoir which would eliminate the need to cover it, but the reservoir needs some serious work in any case and covering would be a good idea to eliminate the blood worms etc.

### **5.1.2 Scenario 2 - Option 3(ii)**

This scenario assumes that the bore water will require 3 log credit treatment and includes for installing UV disinfection plant only.

Option 3 assumes that the water for additional development will be pumped from the existing headworks to the developing areas using a constant-pressure pumpset in a similar fashion to the existing network. Standby capacity will be provided in the form of a generator to enable the system to operate during a power failure.

A scheme layout plan has been included in Appendix B.

## **5.2 Option 5 – New Source & Ben Ohau Reservoir**

Option 5 considers building a new water supply system to service all of Twizel. The key advantages that this offers are reducing the pumping lift required to service the whole township and future developments, and allowing the source to be close to a potential reservoir site which will provide a better form of pressure control and backup supply.

Five new bores (to provide some standby capacity) would be constructed to the northwest of the proposed development area, as close as reasonably possible to the proposed reservoir site. Other recent bores in this area have shown promising yields (50 L/s) so it seems likely that a successful source can be effected.

It is expected that these new bores would produce water of relatively good quality, but it is unlikely to be considered secure groundwater due to a lack of confining layers in the local geology. It is most likely that some additional treatment would be required to meet DWS (particularly UV or ozone), and possibly also for pH correction and/or iron removal.

As with Option 3, two scenarios have been considered to assess the cost impact of bringing water supply into production. Both scenarios are based on encountering groundwater of a suitable yield to meet all of Twizel current and medium term demand east of the Ben Ohau homestead, although it is not certain if the groundwater resource in this area would support the demand required. Site investigations are currently underway which will confirm if this option is feasible.

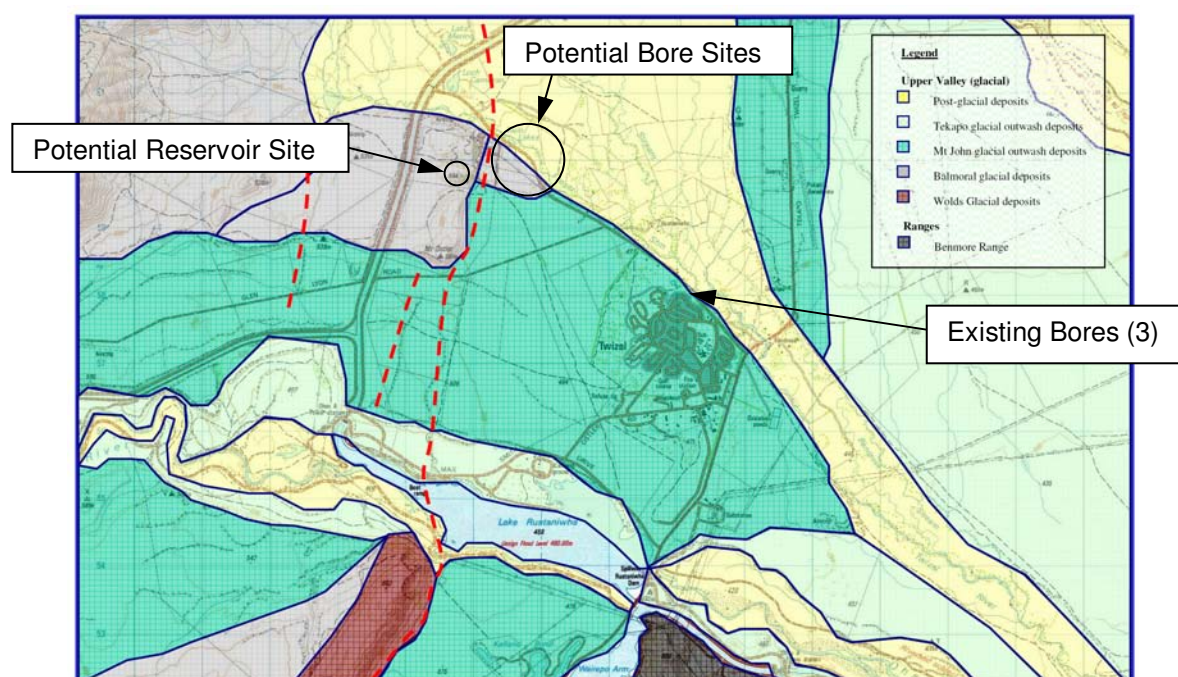
### 5.2.1 Scenario 1 – Option 5(i)

This scenario includes an estimate of treatment costs that would likely be required for groundwater from a deeper bore achieving bank infiltration credit and an overall log credit rating of 3. In this instance we have included costs for deeper bores and UV treatment only.

### 5.2.2 Scenario 2 – Option 5(ii)

The second scenario involves a less optimistic approach on the depth of groundwater encountered and assumes that the bores will be shallow and require worst case 4 log credit treatment. Costs for this scenario include for both filtration and UV treatment.

In Option 5, water would be pumped up from the bores through treatment plant (remaining under pressure) to a new reservoir located on high ground behind Ben Ohau station. This will provide emergency storage in the event that work is required on the supply main, and will also provide fire and operating storage for the town. Water would then be supplied by gravity to the township. Refer to Figure 3 below detailing locations.



**Figure 3: Twizel Geological Map**

It is not recommended that pressures are increased in the existing Twizel reticulation as this will increase leakage rates and shorten the remaining life of the predominantly asbestos-cement reticulation network.

Some water storage would be required with this option to provide fire-fighting reserves, peak-hour demand, and emergency storage in case of main failure.

For the purposes of preliminary design, we have used the following criteria to size the reservoir:

- Operating Storage: 8 hours' Average Daily Flow (ADF);
- Emergency Storage: 8 hours' ADF;
- Fire Storage: 180 m<sup>3</sup>.

For an ADF of 4,400 m<sup>3</sup>/day, these criteria require a reservoir capacity of about 3,000 m<sup>3</sup>.

A layout plan for Option 5 is included in Appendix B.



## 6 Cost Comparison

Cost estimates have been prepared in order to compare Option 3 and Option 5 for Twizel's water supply.

We have not allowed for any pH correction in our cost estimates. Although this would be a 'nice' addition, it is not strictly required to comply with the DWS. Note: Several water suppliers have changed their water source and this has contributed to hot water cylinder failures. Should the water require pH correction, then this could be added at some future date should Council feel there is a need for it.

### 6.1 Capital Costs

Our preliminary capital cost estimates are summarised in the following table.

Table 4: Capital Cost Comparison				
Item	Option 3: Extend & Improve Existing		Option 5: New Source & Ben Ohau Reservoir	
	Option 3(i)	Option 3(ii)	Option 5(i)	Option 5(ii)
Source	\$400,300	\$403,500	\$916,300	\$914,100
Treatment & Storage	\$2,585,300	\$1,283,000	\$1,871,700	\$3,173,300
Distribution	\$393,700	\$396,800	\$1,486,900	\$1,483,500
<b>TOTAL</b>	<b>\$3,379,300</b>	<b>\$2,083,300</b>	<b>\$4,274,900</b>	<b>\$5,570,900</b>

Our costs include provisional sums for consent (\$25,000) and land issues (\$10,000), but it should be noted that a protracted consent process and /or difficulties in securing access rights may easily exceed these sums. Note that these estimates allow for trunk reticulation only – reticulation within the development area is not included.

A detailed breakdown of the capital costs are included in Appendix A

## 6.2 Annual Costs

We have also made an estimate of the annual operating costs of the schemes for the purposes of comparison. These are summarised in Table 5.

Table 5: Annual Cost Comparison				
Item	Option 3: Extend & Improve Existing		Option 5: New Source & Ben Ohau Reservoir	
	Option 3(i)	Option 3(ii)	Option 5(i)	Option 5(ii)
Energy	\$111,700	\$105,700	\$69,200	\$75,200
Depreciation	\$136,900	\$66,900	\$62,660	\$102,660
Operating & Compliance	\$50,000	\$20,000	\$20,000	\$50,000
<b>TOTAL</b>	<b>\$298,600</b>	<b>\$192,600</b>	<b>\$151,860</b>	<b>\$227,860</b>

This shows that the new source and new reservoir at Ben Ohau scenario with favourable water source conditions will have significantly lower operating costs than the other scenarios.

## 6.3 Lifecycle Cost

We have made an estimate of the lifecycle costs of the schemes for the purposes of comparison. The intent of this is to identify the true economic costs of operating schemes with different operating costs over their lifetimes. This lifecycle comparison is made using the following parameters:

- Assessment Period: 100 years;
- Discount rate: 6 %.

The estimated lifecycle costs are shown in the table below.

Table 6: Annual Cost Comparison				
Item	Option 3: Extend & Improve Existing		Option 5: New Source & Ben Ohau Reservoir	
	Option 3(i)	Option 3(ii)	Option 5(i)	Option 5(ii)
Lifecycle Cost	\$8,341,300	\$5,283,900	\$6,798,500	\$9,357,400

## 6.4 Funding

We have prepared a costing model to give an indication of the potential impact on rates of the two options. This is summarised in Table 7 below, and assumes the following:

- 100 %, 25-year loan for capital works at 8% interest;
- 1,500 rateable properties.

Table 7: Annual Cost Comparison				
Item	Option 3: Extend & Improve Existing		Option 5: New Source & Ben Ohau Reservoir	
	Option 3(i)	Option 3(ii)	Option 5(i)	Option 5(ii)
Indicative Annual Rate	\$410	\$259	\$368	\$500

## 6.5 Cost Summary table

The updated costs are summarised below:

Table 8: Cost Comparison				
Item	Option 3: Extend & Improve Existing		Option 5: New Source & Ben Ohau Reservoir	
	Option 3(i)	Option 3(ii)	Option 5(i)	Option 5(ii)
Capital Cost	\$3,379,300	\$2,083,300	\$4,274,900	\$5,570,900
Operating Cost	\$298,600	\$192,600	\$151,860	\$227,860
Lifecycle Cost	\$8,341,300	\$5,283,900	\$6,798,500	\$9,357,400

## 6.6 Other Factors

There are also a number of other factors and risks that need to be considered. We have summarised these factors in Table 9.

Table 9: Risks and Other Factors		
Factor	Option 3: Extend & Improve Existing	Option 5: New Source & Ben Ohau Reservoir
Energy cost risk	System totally reliant on electricity for service and exposed to future price increases. Standby operation requires ongoing maintenance of diesel pump and/or generator	System ultimately reliant on electricity, but some elevated storage to provide continuous service during outages
Natural Hazards	Compact system minimises exposure to natural hazards	Relatively compact, but pipeline(s) will need to cross fault line
Network Stability	Pumping systems more likely to cause instability & pressure surges (will cause more breakages)	Gravity system for extended area would provide better stability
Mechanical failure	Pumped system reliant on machines, redundancy is provided to mitigate this risk	Scheme provides additional redundancy and possibility of emergency backup

This comparison shows that there are a number of advantages and lower risk involved in Option 5 over Option 3.

Note that the option to extend and improve the existing system is heavily reliant on electricity and is exposed to price increases. Over the past 10 years Council energy costs for the existing works have almost doubled from approximately \$35,000 in 2000 to \$67,000 in 2010.

## **7 Conclusion**

The two options (3 & 5) previously considered remain viable solutions for the supply of water to meet the existing and future needs of Twizel. Option 5, which provides elevated storage above the town with a more stable gravity supply, is clearly a more attractive long-term solution; however this is reliant on the availability of groundwater of suitable yield and quality in the vicinity to keep the scheme economically feasible. A suitable source seems likely given that other successful bores have been constructed in the post-glacial deposits in the area.

Option 3 is less satisfactory as it will continue to be reliant on continuous pumping to provide service to the town. It will have the lowest capital costs but higher risks. It is also likely to have the highest operating costs.

If the resource proves sufficient, the option of a new source and reservoir servicing the whole of the Twizel appears to offer the best solution in terms of benefits.



## **8 Recommendations**

It is recommended that:

1. Investigations proceed to confirm the best location for a new groundwater supply bores.
2. Council undertake some random assessments of AC pipelines in Twizel to ascertain their condition and whether pH correction is justified as a means of extending the life of the AC pipelines.

## Appendix A - Capital Cost Estimates

### Option 3(i) Capital Costs

Preliminary Capital Cost Estimate - Option 3(i): Improve & Extend Existing Supply - Filtration & UV Disinfection					
Item	Description	Unit	Qty	Rate	Total
<b>1</b>	<b>Supply Headworks</b>				
1.1	Improve existing boreheads	ea	3	\$ 15,000	\$ 45,000
1.2	Additional bore, pump & pipeline	LS	1	\$ 160,000	\$ 160,000
1.3	Repair & Cover reservoir	LS	1	\$ 100,000	\$ 100,000
<b>2</b>	<b>Treatment &amp; pumping</b>				
2.1	UV treatment	LS	1	\$ 400,000	\$ 400,000
2.2	Filtration	LS	1	\$ 1,000,000	\$ 1,000,000
2.3	Booster Pumps (for new development)	LS	1	\$ 200,000	\$ 200,000
2.4	Existing M&E Improvements	LS	1	\$ 250,000	\$ 250,000
2.5	Standby generator	LS	1	\$ 120,000	\$ 120,000
<b>3</b>	<b>Trunk Distribution</b>				
3.1	DN300 pipeline in seal/berm	m	1500	\$ 200	\$ 300,000
	<i>Works' Total</i>				\$ 2,575,000
4.1	Resource Consents	PS	1	\$ 25,000	\$ 25,000
4.2	Land issues	PS	1	\$ 10,000	\$ 10,000
4.3	Engineering	%	2,575,000	8%	\$ 206,000
4.4	Contingency	%	2,816,000	20%	\$ 563,200
	<b>TOTAL</b>				<b>\$ 3,379,200</b>

## Option 3(ii) Capital Costs

Preliminary Capital Cost Estimate - Option 3(ii): Improve & Extend Existing Supply - UV Disinfection					
Item	Description	Unit	Qty	Rate	Total
<b>1</b>	<b>Supply Headworks</b>				
1.1	Improve existing boreheads	ea	3	\$ 15,000	\$ 45,000
1.2	Additional bore, pump & pipeline	LS	1	\$ 160,000	\$ 160,000
1.3	Repair & Cover reservoir	LS	1	\$ 100,000	\$ 100,000
<b>2</b>	<b>Treatment &amp; pumping</b>				
2.1	UV treatment	LS	1	\$ 400,000	\$ 400,000
2.2	Filtration	LS	1	\$ -	\$ -
2.3	Booster Pumps (for new development)	LS	1	\$ 200,000	\$ 200,000
2.4	Existing M&E Improvements	LS	1	\$ 250,000	\$ 250,000
2.5	Standby generator	LS	1	\$ 120,000	\$ 120,000
<b>3</b>	<b>Trunk Distribution</b>				
3.1	DN300 pipeline in seal/berm	m	1500	\$ 200	\$ 300,000
	<i>Works' Total</i>				\$ 1,575,000
4.1	Resource Consents	PS	1	\$ 25,000	\$ 25,000
4.2	Land issues	PS	1	\$ 10,000	\$ 10,000
4.3	Engineering	%	1,575,000	8%	\$ 126,000
4.4	Contingency	%	1,736,000	20%	\$ 347,200
	<b>TOTAL</b>				<b>\$ 2,083,200</b>

## Option 5(i) Capital Costs

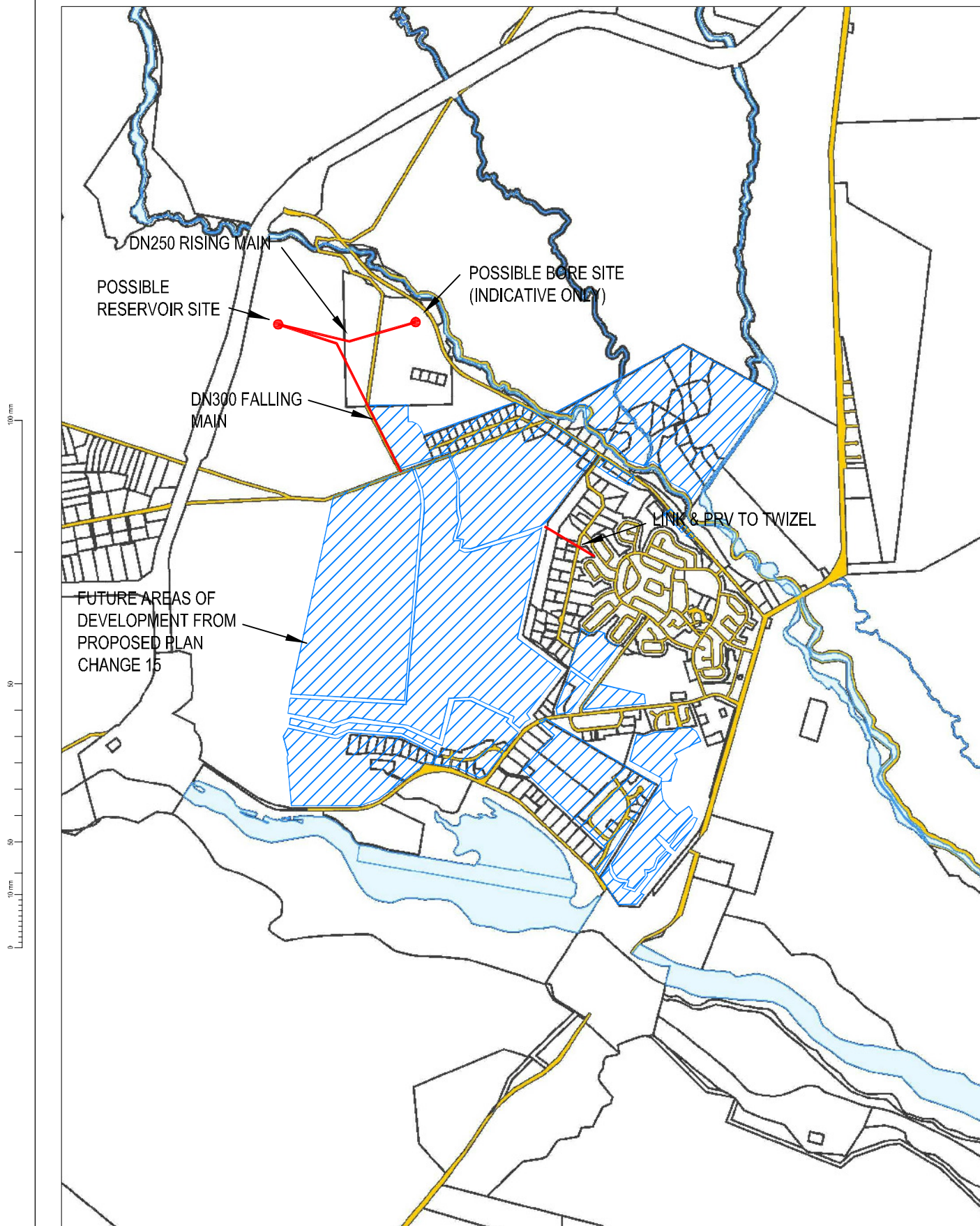
Twizel Preliminary Capital Cost Estimate - Option 5(i): New Source & Ben Ohau Reservoir - UV Disinfection					
Item	Description	Unit	Qty	Rate	Total
<b>1</b>	<b>Supply Headworks</b>				
1.1	New Bores	ea	5	\$ 75,000	\$ 375,000
1.2	Pumps and risers installed	ea	5	\$ 35,000	\$ 175,000
1.3	Electrical	LS	1	\$ 150,000	\$ 150,000
<b>2</b>	<b>Treatment &amp; Reservoir</b>				
2.1	UV for new supply	LS	1	\$ 400,000	\$ 400,000
2.2	Filtration	LS	1	\$ -	\$ -
2.3	Building & controls	LS	1	\$ 150,000	\$ 150,000
2.4	Reservoir & site	m3	2200	\$ 400	\$ 880,000
<b>3</b>	<b>Trunk Pipelines</b>				
3.1	DN300 rising main	m	1200	\$ 190	\$ 228,000
3.2	DN300 falling main	m	1700	\$ 190	\$ 323,000
	DN375 falling main	m	2500	\$ 220	\$ 550,000
3.3	Link to existing Twizel township	LS	1	\$ 35,000	\$ 35,000
	<i>Works' Total</i>				\$ 3,266,000
4.1	Resource Consents	PS	1	\$ 25,000	\$ 25,000
4.2	Land issues	PS	1	\$ 10,000	\$ 10,000
4.3	Engineering	%	\$ 3,266,000	8%	\$ 261,280
4.4	Contingency	%	\$ 3,562,280	20%	\$ 712,456
	<b>TOTAL (Rounded)</b>				<b>\$ 4,275,000</b>


## Option 5(ii) Capital Costs

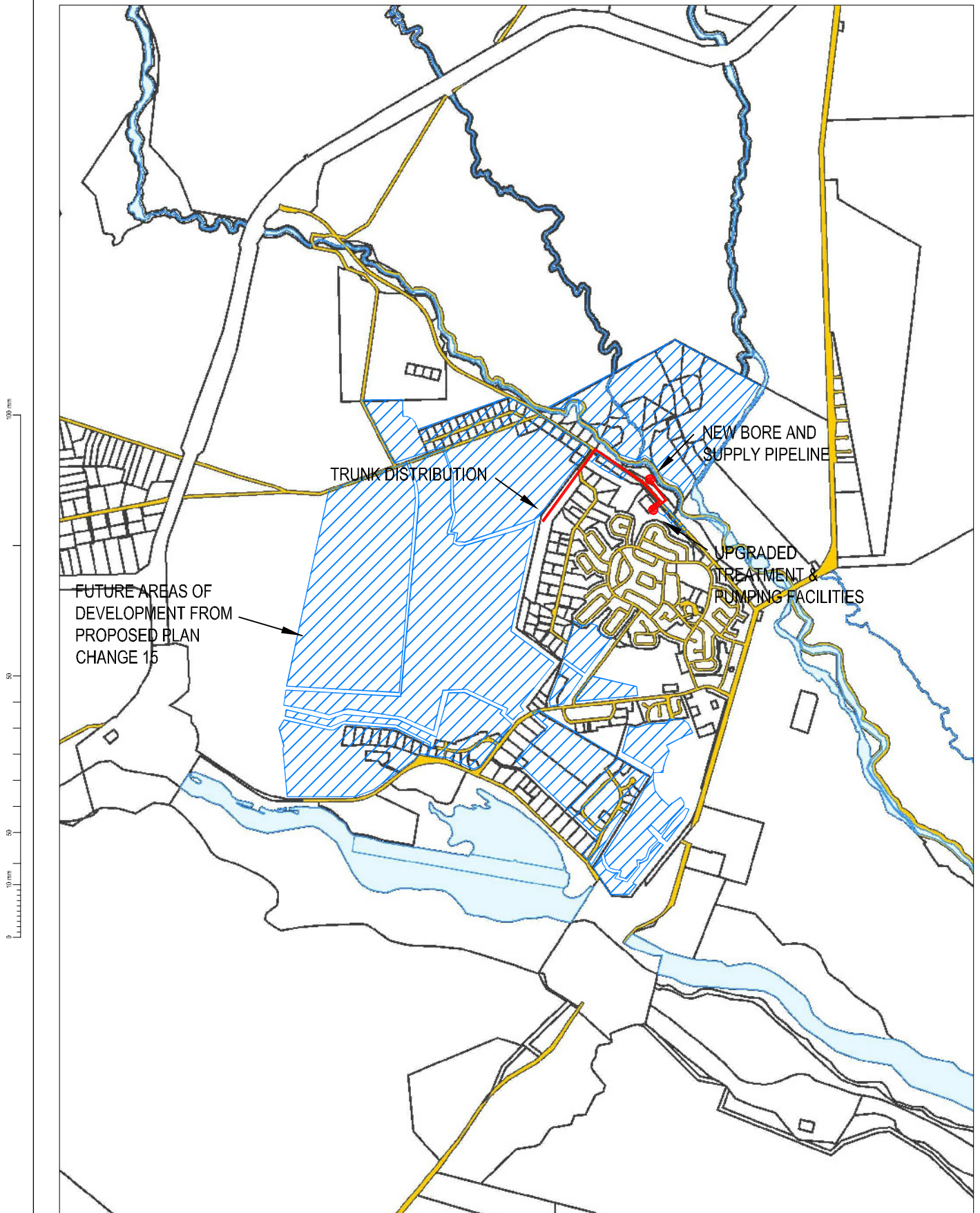
Twizel Preliminary Capital Cost Estimate - Option 5(ii): New Source & Ben Ohau Reservoir - Filtration & UV Disinfection					
Item	Description	Unit	Qty	Rate	Total
<b>1</b>	<b>Supply Headworks</b>				
1.1	New Bores	ea	5	\$ 75,000	\$ 375,000
1.2	Pumps and risers installed	ea	5	\$ 35,000	\$ 175,000
1.3	Electrical	LS	1	\$ 150,000	\$ 150,000
<b>2</b>	<b>Treatment &amp; Reservoir</b>				
2.1	UV for new supply	LS	1	\$ 400,000	\$ 400,000
2.2	Filtration	LS	1	\$ 1,000,000	\$ 1,000,000
2.3	Building & controls	LS	1	\$ 150,000	\$ 150,000
2.4	Reservoir & site	m3	2200	\$ 400	\$ 880,000
<b>3</b>	<b>Trunk Pipelines</b>				
3.1	DN300 rising main	m	1200	\$ 190	\$ 228,000
3.2	DN300 falling main	m	1700	\$ 190	\$ 323,000
	DN375 falling main	m	2500	\$ 220	\$ 550,000
3.3	Link to existing Twizel township	LS	1	\$ 35,000	\$ 35,000
	<i>Works' Total</i>				\$ 4,266,000
4.1	Resource Consents	PS	1	\$ 25,000	\$ 25,000
4.2	Land issues	PS	1	\$ 10,000	\$ 10,000
4.3	Engineering	%	\$ 4,266,000	8%	\$ 341,280
4.4	Contingency	%	\$ 4,642,280	20%	\$ 928,456
	<b>TOTAL (Rounded)</b>				<b>\$ 5,571,000</b>

## **Appendix B – Preliminary Scheme Layout Plans**





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Revision				Amendment		Approved		Date	
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				 <div>Dunedin Office Private Bag 1913 Dunedin 9016, New Zealand + 64 3 4715500</div>				Project MACKENZIE DISTRICT COUNCIL TWIZEL WATER SUPPLY INVESTIGATIONS											
								Sheet OPTION 3 - EXTEND EXISTING GENERAL LAYOUT											
Revision		Amendment		Approved		Date		Drawn		Designed		Approved		Revision		Date			
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