CENTRAL OTAGO DISTRICT COUNCIL

CENTRAL OTAGO
A WORLD OF DIFFERENCE

LONG TERM COUNCIL COMMUNITY PLAN

VOLUME 3

2006/16

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Water and Sanitary Services Assessment

March 2006

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Executive Summary

Central Otago has prepared this Water and Sanitary Services Assessment in accordance with the Local Government Act 2002 (Part 7).

Public Health Risk

The Medical Officer of Health has concluded that the pattern of notified diseases reported from the Central Otago District Council is similar to that experienced in the rest of Otago and also New Zealand in general. It is difficult to highlight any risk particular factors within the district.

Water Services

To meet the requirements of the new Water Quality legislation, Council will have to upgrade almost all of its water supplies in the next 5-10 years.

To minimise the cost of that programme a concurrent determination to reduce water consumption by conservation measures is imperative.

To adequately review the plethora of private water supplies in the district, Council will inspect and report on all these by 30 June 2007.

Wastewater Services

Council will continue to improve effluent quality by upgrading its treatment plants, and in particular to reduce overflow potential. In conjunction, it will continue to progress to land based disposal to meet Otago Regional Council and Iwi objectives.

Stormwater Services

Stormwater is considered by Council to be a discretionary service. The adequacy of stormwater needs to be continually reviewed in respect to commercial and industrial development and in accordance with legislative requirements and environmental best practice.

Public Toilets

The District is well served (in capacity) by public toilets. The recently adopted strategy articulates the future standards to be achieved, and provides an effective means of promoting upgrades, renewals, and new facilities.

Cemeteries

The district is very well served by cemeteries, the majority of which are not Council managed.

Solid Waste

The closed landfills are rigorously monitored, with no evidence of environment effects.

Waste collection, transfer and disposal are well managed. In conjunction with CO Wastebusters significant effort is being put into waste minimisation.

Council will prepare a new Waste Minimisation Plan in 2006.

1. Introduction

The Local Government Act 2002 (Part 7) requires Territorial Local Authorities to assess their water and other related services by 30 June 2005.

"Although New Zealand has some of the best drinking water quality in the world, due to lack of comprehensive industry, there are potential issues with nutrient and biological contamination." (Proposed National Standards for Human Drinking Water Sources, Ministry of Environment, September 2005)

The Public Health Advisory Committee noted New Zealand has one of the highest incidences of water borne diseases in the developed world. (Report to Minister of Health, October 2002)

This assessment covers the following services:

- Water
- Wastewater
- Stormwater
- Solid waste
- Cemeteries
- Public toilets

The assessments not only cover services provided by Council, but cover areas where services are absent or where services are provided by private suppliers.

The assessments cover:

- Public Health
- Environmental influences
- Adequacy for present and future

This is the first time Council has prepared this information, and there are gaps particularly on private services. This will be addressed by an information improvement plan to be actioned over the next two years.

The assessments are being undertaken in conjunction with a significant review of Council's Activity Management Plans as part of the 2006-16 Long Term Council Community Plan development process.

The Medical Officer of Health has been consulted with during the preparation of this plan. Other interested parties such as the Otago Regional Council and Iwi will be consulted with during the submission process.

2. Community Response

2.1 Contact Us

This assessment is an opportunity for the community to have input on water and sanitary services provision and management.

Central Otago District Council may be contacted to discuss or clarify any matters arising from this document.

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2.2 Make a Submission

Interested persons were invited to make a submission.

Submissions could be by letter or on the form available with this document or from any Council service centre.

Submissions closed 4pm Friday, 10 February 2006

Submissions were received from:

- Otago Regional Council
- Public Health South

These are **attached** as Appendix C.

3. Relationship with Council Plans

3.1 Long Term Council Community Plan (LTCCP)

Central Otago District Council has chosen to undertake this assessment as a stand alone process; however, the assessments will dovetail into the 2006-16 LTCCP.

The LTCCP is the process by which communities choose the directions and outcomes they desire and the role Council has in achieving these.

This Water and Sanitary Services Assessment process will provide underpinning information and consultation for the LTCCP.

The three community outcomes for Central Otago are:

1 A Thriving Economy

This would be attractive to both business and residents alike.

Such an economy would:
- *enhance the quality of life for local residents and would be large enough to sustain essential services*
- *generate increased job and training opportunities for all ages*
- *enable tourists and locals alike to enjoy the range of experiences available in Central Otago, namely its natural environment, history, and adventure activities, particularly the Rail Trail*
- *make it easy to do business*

2. A Safe and Healthy Community

This would be a vibrant community with a range of services and facilities.

This community would:
- *be healthy, safe and welcoming and where people experience a sense of place and belonging*
- *incorporate a wide range of quality services and facilities catering to all age groups*
- *be attractive to new residents*
- *have quality and affordable housing to meet the needs of residents, visitors and seasonal workers*
- *have good primary health care services*
- *provide an accessible range of educational services to all the communities of Central Otago*
- *be well connected through its communication and transportation networks*
- *generate, and make accessible, arts, cultural and recreational opportunities throughout the district*
- *have strong advocacy, leadership and service from Council*

- *always consider the needs of the community when planning for the future*

This would also be a community that valued and celebrated its rich heritage.

This would ensure that:
- *heritage was an integral part of Central Otago's identity*
- *a balance was struck between development and heritage preservation so that Central Otago's heritage could be enjoyed and valued by all*

3. A Sustainable Environment

This would be an environment that provides a good quality of life.

This would ensure that:
- *there is sufficient quality and quantity of water for users, while still protecting the environment*
- *access to these resources remains*
- *clean air is protected*
- *natural ecosystems are sustained*
- *there are systems to dispose of waste in a manner acceptable to the community*
- *use of these resources is sustainable for future generations*

The community would also have a healthy balance between its natural and built environment.

Such an environment would ensure that:
- *local values and landowners' rights were recognised and considered during planning and development processes*
- *development would enhance the unique qualities of Central Otago including its colours, space and unique landscapes*
- *there are well-defined areas for development and future growth*
- *unique landscapes are recognised and protected for future generations*

This assessment should be cognisant of all three community outcomes and provide support in achieving them.

3.2 Activity Management Plans (AMP)

Activity Management Plans are a plan for each activity, for example water, solid waste and provision of parks that Council undertakes. Activity plans underpin the LTCCP. AMP's define the operation of each activity. They include levels of service and performance measures, description of assets, demand prediction, operational procedures, capital work programmes, risk management and financial planning.

Central Otago District Council is currently reviewing and updating its AMPs. In future much of the information in this assessment will be referenced to the AMPs. This will enable simplifying of the assessment and allowing eventual incorporation of the WSSA into the LTCCP process.

3.3 Public Health Risk Management Plan (PHRMP)

Public Health Risk Management Plans specifically relate to water supplies. Central Otago District Council is currently preparing these risk management plans. The WSSA will eventually draw on information contained in PHRMPs.

3.4 Waste Management Plan (WMP)

Council is required by the LGA to produce a Waste Management Plan. This plan should cover solid, liquid and gaseous wastes and consider efficient resource use. The reduction, reuse, recycling, recovery, treatment and disposal of residual wastes are to be considered. Part 7 of the LGA covering WSSAs permits Council to not address solid waste matters adequately addressed in the Waste Management Plan.

Council's Waste Management Plan is due for review and this will be undertaken in 2006. Council has chosen to include solid waste in its WSSA to underpin the Waste Management Plan.

4. Services and Communities

4.1 Communities

These assessments are to be community based. For the purposes of this assessment a community is defined as a group of persons either receiving or requiring one or more of the services to be assessed.

There are some specific definitions of communities:

a) where a water supply serves more than 25 persons for more than 60 days per year, or more than 50 persons at any time, then the persons receiving that service are a community irrespective of the fact that the supply is to only one property. In this case the water supply is to be assessed. Central Otago District Council has chosen to group this type of supply into one community in this assessment.

b) Where a wastewater system provides a service as above, and has a potentially significant impact on health and /or the environment then the persons served are a community irrespective of the fact that the supply is to only one property. In this case the wastewater service shall be assessed.

Council intends to apply a broad interpretation of communities. In addition to geographical communities, communities of other common interests or characteristics will also be used. This enables consideration of such groups as rural supplies which have a scattered distribution as one community.

4.2 Services

4.2.1 Water, Wastewater and Stormwater

Council provides water services at:

Alexandra
Clyde
Cromwell, Bannockburn and Lowburn
Lake Roxburgh Village
Roxburgh
Omakau and Ophir
Naseby
Ranfurly
Patearoa

Council provides wastewater services at:

Alexandra
Cromwell, Lowburn, Pisa Moorings

Bannockburn
Lake Roxburgh Village
Roxburgh
Omakau
Naseby
Ranfurly

Council provides stormwater services at:

Alexandra
Clyde
Cromwell
Lake Roxburgh Village
Roxburgh
Omakau and Ophir
Naseby
Ranfurly

Water supplies outside council areas are provided by rural water supplies, irrigation companies and organisations associated with subdivisions. Otherwise individuals provide their own water.

Wastewater outside council serviced areas is largely disposed of via individual septic tank systems.

Stormwater outside council serviced areas is largely natural surface drainage.

4.2.2 Public Toilets

Council provides public toilets at 46 locations. Publicly accessible toilets are also provided by many businesses.

4.2.3 Cemeteries

Council operates cemeteries at:

Alexandra
Clyde
Cromwell
Naseby
Ranfurly

Trusts operate cemeteries are at:

Roxburgh
Millers Flat
Ettrick
Omakau/Blacks
Nevis
Blackstone Hill

Kyeburn/Dansey Pass
Gimmerburn
Swinburn/Kokonga
MoaCreek/Ida Valley
St Bathans

4.2.4 Solid Waste Services

Council currently provides solid waste collection with a weekly wheelie bin service to:

Alexandra
Clyde
Cromwell
Lake Roxburgh Village
Roxburgh
Main roads from Alexandra to Millers Flat
Omakau and Ophir
Oturehua
Naseby
Ranfurly
Ettrick
Millers Flat

Private wheelie bin services are provided by the same operator on routes between serviced areas and at Lowburn and Bannockburn.

Tarras and Patearoa are serviced by small limited access landfills.

Central Otago Wastebusters provides kerb side recycling services at Alexandra, Clyde and Cromwell and operates drop off centres in smaller towns.

Table 4.1
Communities and Water and Sanitary Services
Assessment summary

Community	Water	Wastewater	Stormwater	Public Toilets	Cemeteries	Solid Waste
District Wide	N.A.	N.A.	As one Community	Council Operated + Private Accessible	Considered as one Community	Considered as one Community
Alexandra	Council Scheme	Council Scheme	N.A.	—	N.A.	N.A.
Bannockburn	Serviced from Cromwell	Council Scheme	—	—	—	—
Clyde	Council Scheme	Individual On-Site	—	—	—	—
Cromwell	Council Scheme	Council Scheme	—	—	—	—
Lake Roxburgh Village	Council Scheme	Council Scheme	—	—	—	—
Naseby	Council Scheme	Council Scheme	—	—	—	—
Omakau/Ophir	Council Scheme	Ophir On-Site Omakau Council	—	—	—	—
Patearoa	Council Scheme	Individual On-Site	—	—	—	—
Ranfurly	Council Scheme	Council Scheme	—	—	—	—
Roxburgh	Council Scheme	Council Scheme	—	—	—	—
Rural Areas	Multiple Local Supplies	Individual On-Site	—	—	—	—

5. General

5.1 Introduction

Central Otago covers some 10,000km² with a population of approximately 15,000. It encompasses the towns of Alexandra, Clyde, Cromwell, Bannockburn, Lake Roxburgh Village, Roxburgh, Omakau, Ophir, St Bathans, Oturehua, Lauder, Becks, Naseby, Ranfurly, Patearoa, Waipiata, Millers Flat and Ettrick. It includes large areas of pastoral tussock grassland with little population or infrastructure.

5.2 Climate

The climate of Central Otago is typified by low rainfall with hot summers and cold winters. Extremes of temperature are experienced and extended droughts can occur.

5.3 Geography

Central Otago geography is characterised by flat topped block faulted mountains with intervening broad valleys. It has two significant river systems, the Clutha with its major tributaries the Kawarau and the Manuherikia; and the Taieri River.

Geology provides a basis for understanding water dynamics in Central Otago. Underlying geology provides a sound starting point to identifying likely limitations and problems. Soils and rocks with poor permeability have restricted water yields and waste disposal potential. Free draining structures are more at risk of contamination but are also better prospects for groundwater sources. The depth of structure and their levels relative to rivers is a general indication of the volume potential for water supply.

There are two types of gravels, river borne and glacial derived. The glacial derived gravels tend to be bound with silts and clays and so have a lesser ability to provide substantial water sources. They occasionally have small pockets of water suitable for limited water supplies. River gravels are often open and hold substantial water reserves. They are typically tens of metres deep. River gravels lack impervious layering which would prevent surface water contamination.

5.3.1 Historical Considerations

European settlement was initially an extensive sheep farming economy up to the 1860's when a gold mining boom developed. Once the individual prospector phase of goldmining had passed, companies developed, partly for tunnelling, but more importantly from the present day point of view for developing extensive well engineered water races to supply ground sluicing. These water races still are in use in many areas 100 years later. They are now used for agricultural irrigation and also serve to supply rural houses, particularly to supplement tank water in dry summer months.

Water races can be significant in replenishing of groundwater by soakage from flood irrigation. Many water tables have an annual level fluctuation which strongly reflects the time when flood irrigation is switched on. The onset of irrigation induces rising water table levels. Increasing use of sprinkler irrigation as land use intensifies is reducing this effect.

5.4 Census Data and Growth Predictions

5.4.1 Population Trends

These population statistics are based on 2001 Census data. There has almost certainly been an increase in population to approximately 15,000 since that census.

With 14,466 usually resident population in 2001, Central Otago decreased 3.3% on the census held in 1996. Central Otago has 0.4% of the population of New Zealand and while national population has grown the population of Central Otago has decreased. On average the there are 160 births per year (820 per 5 year period) and an average death rate of 122 per year (610 per 5 year period). Thus there is a natural increase of 38 per year.

Statistics NZ continues to predict that the population of Central Otago will continue to fall to 2021.

Council believes that argument can not be supported by the scale of housing subdivision and building occurring in the District, and it believes the BERL population projection is more realistic, ie:

2001	14,469
2006	16,000
2021	20,000

More recent analysis as part of Council's Economic Development Studies suggests that even these growth figures may be conservative.

5.4.2 Population Distribution and Characteristics

The population of Central Otago is concentrated in Alexandra and Cromwell with these two townships accounting for 49% of the local population. The recent growth areas have been in the rural Cromwell and Earnscleugh areas while the Maniototo and Roxburgh areas have seen populations decrease by nearly 400 in recent years.

Ward resident population figures (2001) are as follows:

Cromwell Ward	3,650	Manuherikia Ward	830
Maniototo Ward	1,660	Earnscleugh	2,410
Alexandra	4,480	Roxburgh	1,730

Private dwelling occupancy indicates the high proportion of holiday homes in Central Otago.

	1991	1996	2001
Occupied dwellings	5,454	5,730	5,928
Unoccupied dwellings	1,425	1,467	1,893
% Unoccupied	26%	26%	31%

It is likely that close to one third of dwellings are occupied occasionally or sporadically. This contributes to seasonal and occasional peaks in service usage, particularly the summer demand for water.

The Central Otago population age profile indicates an increasing aged proportion of the population.

Age Profile per 100 residents	1991	2001
0-14	22	20
15-29	21	15
30-44	23	21
45-59	16	22
60+	18	23

This trend will inevitably continue. An aging population has implications for services. The elderly are more susceptible to water borne diseases and the impact of disease on their health is more severe. In the event of an epidemic they are likely to suffer a higher mortality rate.

The limited discretionary income many older people have can cause reluctance to agree to improvements to services.

5.5 Natural Hazards

Central Otago has seen three major floods in the Clutha Catchment in the past decade. Mitigation engineering works following these have reduced the risk to infrastructure, particularly in Alexandra town. Flood banks have been built, low lying pump stations sealed and electrical controls relocated above flood levels. Nevertheless, major floods have the capacity to contaminate ground waters and interrupt electricity supplies to pumps and must still be considered a hazard.

Tsunamis and volcanic activity have no risk to Central Otago, but the block-faulted nature of Central Otago means earthquakes are a significant possibility. The failure of major engineering works, particularly the major hydroelectric dam at Clyde, is considered unlikely. Irrigation storage dams are more at risk. Of greater concern would be pipe fractures caused by a major earthquake, particularly where pipes cross faults or where ground material variations cause differential movement inducing pipe ruptures.

Fire, while a major hazard in Central Otago, has little impact on water services. However, the need for water supply for fire fighting can be significant. The highest risk season for fires coincides with the time water demand is highest and when low reservoir levels are most frequent. The greatest fire risk areas within reticulated areas which could cause water supply difficulties are in built up areas with a high density of pine trees; Bannockburn Road, Naseby Town, and parts of Bridge Hill in Alexandra fall into this category.

Weather events can impact through disruption of electricity supplies. This can interrupt pumping of water and wastewater.

The dry climate, including long periods of little or no rain, has impact on all water sources. Most aquifers decline during prolonged drought confirming that groundwater is not sufficiently old to be considered secure.

5.6 Economic Trends

The last decade has seen a marked increase in the rate of development of Central Otago. Development of housing stock, stimulated by a more active economy and Central Otago's desirability as a retirement and holiday destination has led to pressure on services. The advent of the wine industry in Central Otago has also contributed to this and has particularly stimulated rural lifestyle type subdivisions with a proliferation of private water and on site wastewater systems.

The horticultural sector has changed rapidly. Orcharding has declined in some areas, often being replaced by vineyards. Generally, the landscape is becoming more intensely used with the decline in relative importance of extensive grazing and the increase of intensive land uses, such as vineyards.

Improved roads and motor vehicles has meant that the area is much more accessible to weekend holiday makers and residents from Dunedin, Invercargill and to a lesser extent Christchurch. This creates a demand for facilities such as public toilets, restaurants, dairies and petrol stations along travel routes.

The summer visitor peak places stress close to the capacity of most services, particularly water supply and public toilets. Tourism Research Council reports 633,000 total visitors for the year 2003, being an average of 1,778 visitors per day.

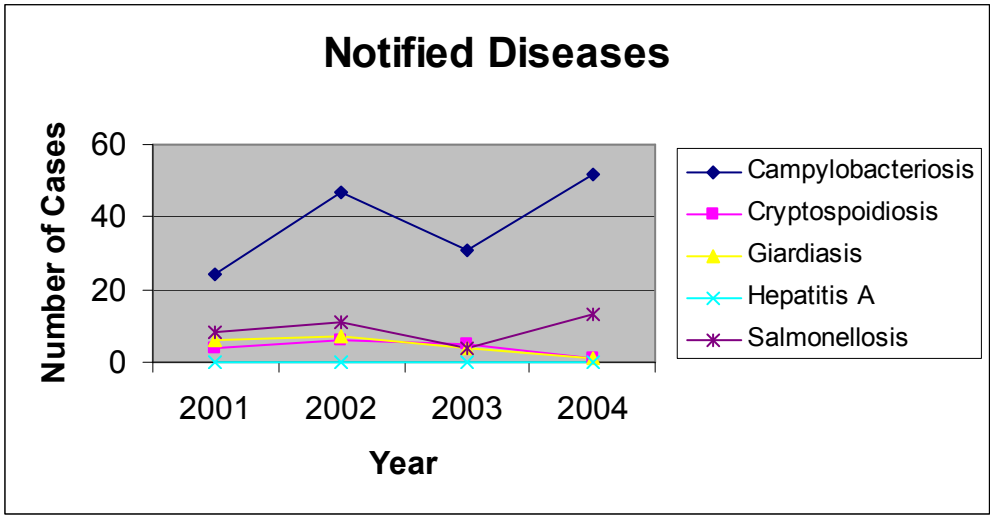
This seasonal population fluctuation is seen in these figures.

Alexandra, Cromwell and Clyde	2001	2001-01	2002-03	2003-04
Usual residents Summer Peak[3]	7,900	12,000	12,700	14,500

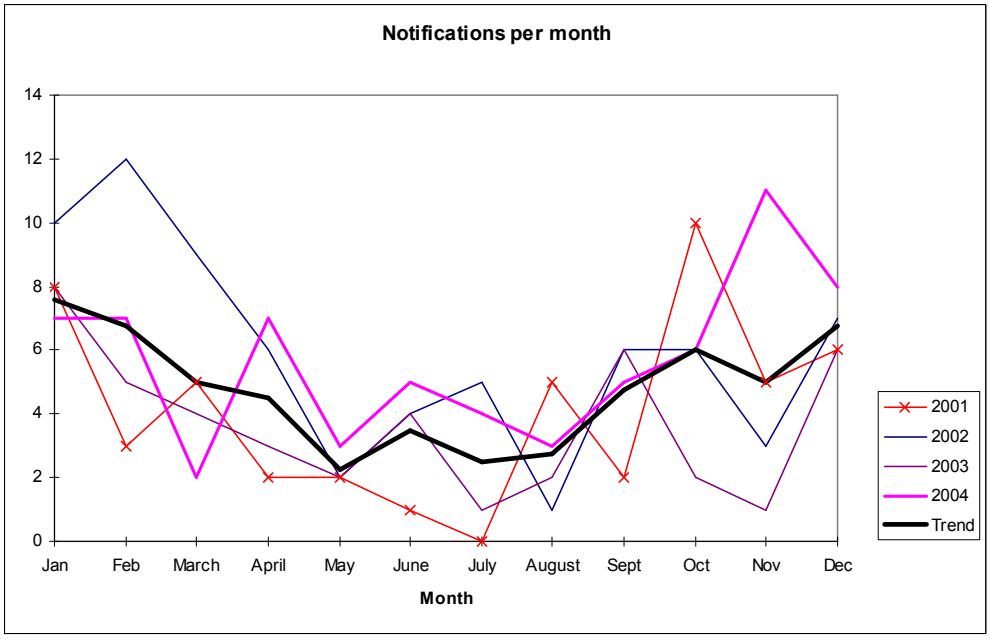
More people closer together, more intensive activity and more travel increases demand for services and increases the risks of disease transmission.

5.7 Notifiable Diseases

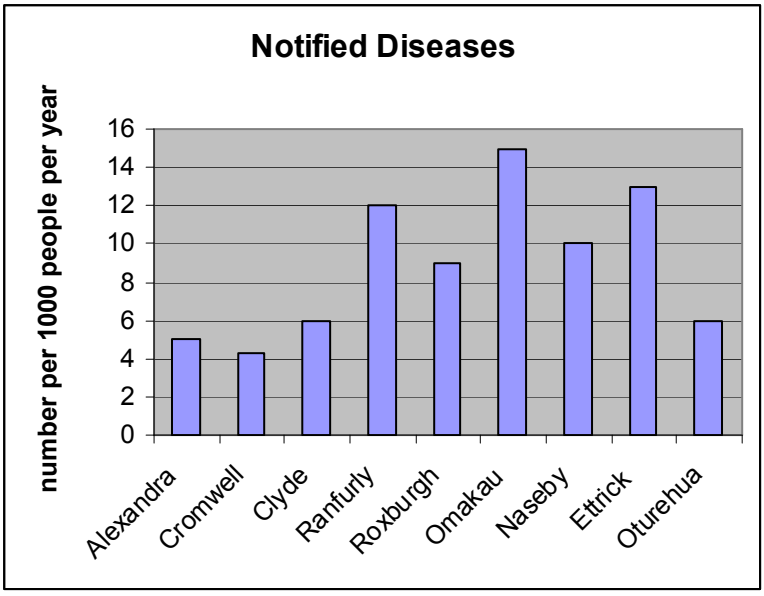
The following graph is of notifiable disease incidents from 2001 to 2004.



The annual pattern is graphed below.



The geographical distribution of incidence rates is shown below.



Incidence of disease is a potential indicator of inadequate water and sanitary services. True incidences are likely to be greater due to under reporting. Under reporting can be due to persons not visiting a doctor, doctors not testing diseases or doctors not notifying diseases.

In Central Otago the incidences reported suggest that larger towns may have better sanitary conditions and that there is a decline in effectiveness of sanitation over the summer months.

The Medical Officer of Health (refer Appendix A) in assessing the Notified Diseases pattern for the period January 1997 to September 2005 concludes that:

"The pattern of notified diseases reported from the Central Otago District Council is similar to that experienced in the rest of Otago and also New Zealand in general. It is difficult to highlight any risk particular factors within the district."

5.8 Council System Management

Central Otago District Council has bylaws, policies and management systems in place to ensure that services the community receives are adequate and meet required standards.

5.8.1 Level of Service

The LTCCP and AMP processes set levels of service. The achievement of these levels of service is monitored in annual reporting. A resident opinion survey confirms public perception and opinion on achievement of satisfactory levels of service.

5.8.2 Demand Management

Central Otago District Council endeavours to manage demand for water and solid waste disposal. Council has a set process with trigger points to introduce water restrictions. Council has plans for increased public education on water conservation. Trial water metering has just been concluded in the RRA6 (Bell Avenue/Robert Drive) area of Cromwell. This showed excessive water usage compared to the normal residential usage. Council has a bylaw which enables metering of properties greater than 1,100m², and in the above case this has been invoked.

Experience in areas which have long had water metering, such as Bannockburn, does suggest that a direct pricing policy encourages more sensible domestic water management, and accordingly lower usage.

The Cromwell Community Board is considering more extensive use of water metering to cover initially all sections of greater than 1,100m².

Council has a policy of waste minimisation to reduce waste to landfill and actively supports Central Otago Wastebusters in their efforts to reduce, reuse and recycle waste.

6. Water Supplies

6.1 Legislation

In order to assess the adequacy of water supplies it is important to understand what is an adequate water supply on a national basis. New Zealand has legislation and standards for the quality of drinking water and methods of monitoring to confirm standards are being achieved.

6.1.1 New Zealand Drinking Water Standards (2000)

The Drinking Water Standards for New Zealand 2000 (DWSNZ2000) are the primary regulation relating to the quality of drinking water. This standard details the quality and safety assurance procedures and lists the maximum concentrations for chemical, radiological and microbiological contaminants. It also specifies sampling protocols that must be observed when confirming drinking water complies with standards.

DWSNZ2000 applies to all water intended for drinking irrespective of its source, treatment, distribution system, where it is used or whether it is a public or private supply.

At present local authorities do not have to comply with DWSNZ2000. Most local authorities aim to comply with the standard and recognise it as the major tool in managing the safety and quality of drinking water.

Central Otago District Council endeavours to work towards complying with DWSNZ2000. Source water test results are compared with the standards. Chlorine testing protocols are designed on the standard.

- Microbiological compliance of Council's public water supplies is reported in the Register of Community Drinking Water Supplies in New Zealand.

- Compliance is generally good; there were issues with sampling frequency due to holiday period population increases but no non-compliances were recorded.

Microbiological Monitoring and Compliance

Zone Code	Zone Name	Pop	Water Supplier	Compliance		Change
Local Authority Supplies						
ALE001AL	Alexandra	5,000	Local Authority	I(fd)	P	☹
CLY001CL	Clyde Township	1,000	Local Authority	I(d)	P	☹
CRO001BA	Bannockburn	400	Local Authority	I(d)	P	☹
CRO001CR	Cromwell	3,000	Local Authority	I(fd)	P	☹
ETT001ET	Ettrick Rural	40	Local Authority	N	P	☹
NAS001NA	Naseby	400	Local Authority	Complied	P	✓
OMA005OM	Omakau	350	Local Authority	I(d)	P	☹
OMA005OP	Ophir	50	Local Authority	N	P	😐
PAT003PA	Patearoa	60	Local Authority	I(d)	P	☹
RAN002RA	Ranfurly	1,000	Local Authority	I(d)	P	☹
ROX001RO	Roxburgh	700	Local Authority	I(d)	P	☹

Key to Symbols and Abbreviations

Compliance codes

A Inadequate corrective action following transgression
E *E. coli* non-compliance
C Chemical transgression
N Not monitored for *E. coli*/P2
L Non-recognised laboratory used for analyses
I Inadequate sampling
(f) Inadequate number of samples
(d) Sampled on too few days of the week
(i) Sampling exceeded the maximum number of days between samples
P No effective protozoan treatment

Change codes

☺ Performance better than last year
😐 Performance the same as last year
☹ Performance worse than last year
✓ Complied in full again
🕮 Newly-registered supply
✂ Zone deregistered

6.1.2 Health Act 1956 and the Proposed Health (Drinking Water) Amendment Bill

The Health Act 1956 encompasses most aspects of legislation relating to protection of public health. In Part 2 of the Act local authorities are directed to provide sanitary works for the benefit of the district. In this instance sanitary works includes water supply, wastewater, drainage, public toilets, cemeteries and waste disposal.

There is currently a proposal to amend the Health Act to incorporate revised water quality standards and management. The likely effect of this is to make drinking water standards mandatory and introduce management requirements to confirm and audit compliance.

6.1.3 Ministry of Health Register and Grading System

The Ministry of Health monitors drinking water in New Zealand. All water systems supplying more than 25 people are required to be registered and information supplied to a central data base. The Ministry also grades water supplies to communities supplying over 500 people and some smaller supplies where appropriate. This allows comparison of each community's water supply relative to DWSNZ2000.

The 2005 Edition of the Ministry Of Health Register of Community Water Supplies requires water supplies that were graded under the 1993 grading rules to be regarded to the 2003 rules or those supplies will be deemed to be ungraded as of 1 January 2006.

Community	Water Supply Grading		Length of Reticulation (Kms)	Depreciated Replacement Value ($000)	Replacement Value[1] ($000)	Number of Connections	Annual Water Production M^3 (2003)	Production per Connection M^3 / Year[3]
	Now	Future Target						
Alexandra	Ed	Bb	39	5563	7699	2548	1,979,783	778
Cromwell	Ed	Bb	72	11541	17102	2333	2,008,160	861
Clyde	Ed	Cc	7.25	1287	1732	687	631,489	919
Omakau/Ophir	Ed	Cc	4.15	419	426	172	120,528	700
Naseby	Ed	Cc	7	911	993	285	71,777	251
Ranfurly	Eb	Cc	15.7	1793	2009	478	263,424	551
Patearoa	U	U	19.9	2097	3966	283	237,622	839
Lake Roxburgh	U	U	3.6	312	649	45	51,053	1134
Roxburgh	Ed	Cc	9.6	918	1656	460	301,801	656
TOTAL			178.2	$24841	$36232	7291	5,665,637	777

[1] For details of how valuations calculated, see Note 4 of the Accounting Policies in Volume 3 of the long-term Council Community Plan.

Council supplies currently have low public health gradings. A report to Council determined that over $5,000,000 was required to bring Council water supply gradings to where the Ministry Of Health indicate they should be.

Council water supplies meet the requirements of the Drinking Water Standards of New Zealand 2000 for Bacteriological and Chemical Categories but fail to provide protection against protozoa.

From 1 January 2006 Council's public water supplies will be monitored to the Drinking Water Standards of New Zealand 2005.

The key changes from the 2000 Standards are:

- A new section specifically dealing with small water suppliers (ie. those serving populations under 500 people)
- A new section specifically covering tankered water suppliers
- A new section dealing with cyanobacteria (previously known as 'blue-green algae')
- Amendments to the compliance criteria for cryptosporidium
- Minor changes to bacteriological compliance
- Inclusion of a section on disinfection using ultra-violet light

The report recommended that Council delays any water supply upgrade work until the soon to be released Water Bill was enacted. The Water Act is to determine the requirements for upgrades.

To improve monitoring accuracy and reliability Council is establishing a district wide Supervisory Control and Data Acquisition System (SCADA) telemetry system. The new telemetry system will take the place of the autodialler, giving Council higher level of monitoring. This project is to be undertaken in the 2005/06 financial year.

6.1.4 The Resource Management Act 1992

The purpose of the Resource Management Act (RMA) 1991 is to promote the sustainable use of natural and physical resources. To utilise resources an activity can either be authorised by a rule in the regional plan or the district plan or through a resource consent. In each case conditions apply that control the way the activity is carried out.

The RMA allows individuals to take water for their own individual domestic, stockwater and fire fighting needs. All other Council and private water supplies require a resource consent.

The RMA also controls discharges to water and air by a similar mechanism. Resource consents are required for the discharge of contaminants, consents are required for waste water disposal outfalls and solid waste facilities. Consent conditions place specific requirements on each consent.

6.1.5 Building Act

The Building Act 2004, G12 provides guidance for buildings to have an adequate supply of potable water. All buildings, including a single dwelling, must demonstrate that an appropriate water system is in place and functioning to comply with the Building Code. Thus a property should not be occupied unless it has a safe clean water supply.

6.1.6 Public Health Risk Management Plans (PHRMP)

Public Health Risk Management Plans specifically relate to water supplies. It is recommended by Ministry of Health that Territorial Local Authorities produce PHRMPs for its water supplies identifying:

- Risks relating to source security
- Risk relating to security of infrastructure
- Inadequacies of monitoring
- Absence of key treatment steps.

Central Otago District Council has produced draft PHRMPs for Alexandra and Cromwell and is in the process of producing plans for other schemes.

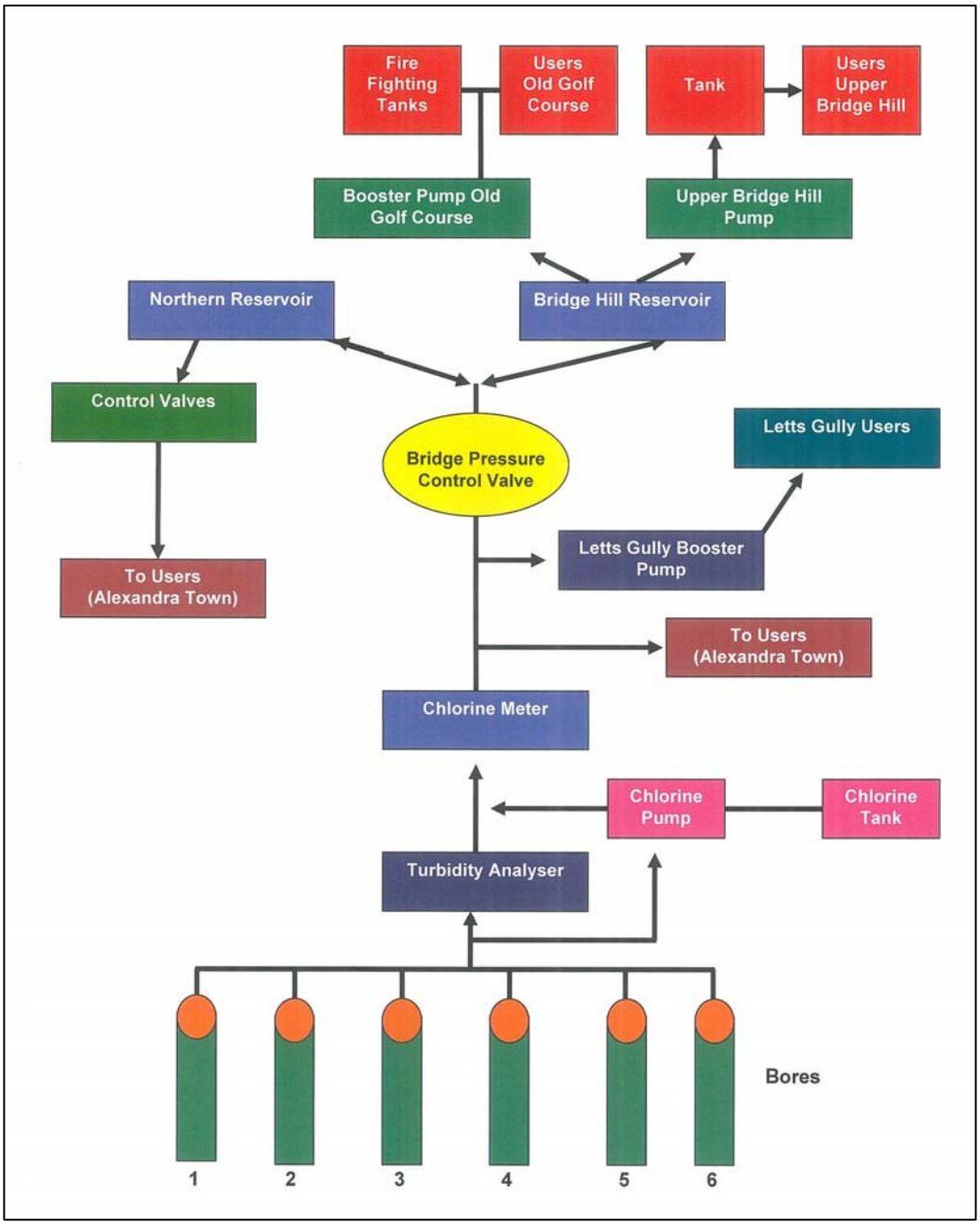
6.2 Alexandra

6.2.1 Description

Alexandra Town water supply community is the area supplied by the town reticulation.

Alexandra Town has a resident population of 4,450 (2001). Over the Christmas holiday period visitors increase this to in excess of 7,000 for several weeks.

System Diagram



6.2.2 Assessment

6.2.2.1 Source

Alexandra water is supplied from 6 bores in alluvial gravels alongside the Clutha river. This groundwater source is insecure from surface contaminants.

The volume of available water in this part of the aquifer is probably very large and water source availability is unlikely to be restricted in the foreseeable future.

As at 2004 the drinking water supply was graded as E (completely unsatisfactory, high level of risk).

Source water quality was tested for 42 characteristics in April 2005. None of these characteristics were of concern or transgressed drinking water standards. Test results are included in Appendix B.

Water hardness is high enough to cause scale problems but at 165 mg/l is well below the drinking water guideline of 200mg/l. Furthermore this is an aesthetic guideline not a health guideline.

The supply bores are in very shallow river gravels and periodic undetected contamination from the town, which is built over the aquifer, is likely[2]. Possible other sources of contamination are stormwater from soak pits, from the nearby closed landfill, from organic material in the underlaying clays and mined coals, and from the surrounding industrial area.

Because of the proximity of the closed Alexandra landfill quarterly testing of groundwater from monitoring wells around the landfill is undertaken. This has not detected any incidents of concern. Council engaged a specialist to assess risks to the borefield from the landfill. The report concluded that landfill contamination of the water supply was unlikely.[3]

Contamination events from uncertain sources are suspected. Sixteen possible sources of contamination were identified,[4] prior to water proofing being undertaken.

Water is a mix of river sourced water and ground water. Groundwater is the dominant source of water. The gravels the water is taken from are highly permeable and the age of the groundwater is likely to be less than one year. Water is 70% recent groundwater[5] derived from natural sources and supplemented seasonally by irrigation water inflows. The other 30% is derived from the Clutha River which is only about 60 metres from the bores.

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[2] Discolouration of the groundwater following flooding in 1999 , and the Simazine detection event and periodic complaints of oily surfaces and foreign matter flecks are indicators.
[3] Mark Milke PhD report December 1999
[4] Pattle Delamore report on behalf of Clyde Power Project 1993.
[5] Based on water hardness proportioning of local groundwater away from the river

Council is mindful of inadequacies of the Alexandra water source and is currently considering other sources and treatment options.

Alexandra Borefield

6.2.2.2 Water Treatment and Reticulation

Bore water is chlorinated prior to entering the reticulation. There are no chlorine contact retention facilities and chlorine may not have had sufficient time to fully disinfect water before it reaches some users.

As at 2004 the treatment was graded as E (completely unsatisfactory, high level of risk). The reticulation was graded as d (unsatisfactory, high level of risk).

The borefield is prone to flooding. The recessed below ground bore heads have been water proofed and electrical controls and chlorinators were relocated to above expected flood levels following the 1999 flood. Public access to the immediate borefield area is not restricted.

There are sufficient pumps to have some pumps available as standby pumps even at time of extreme demand.

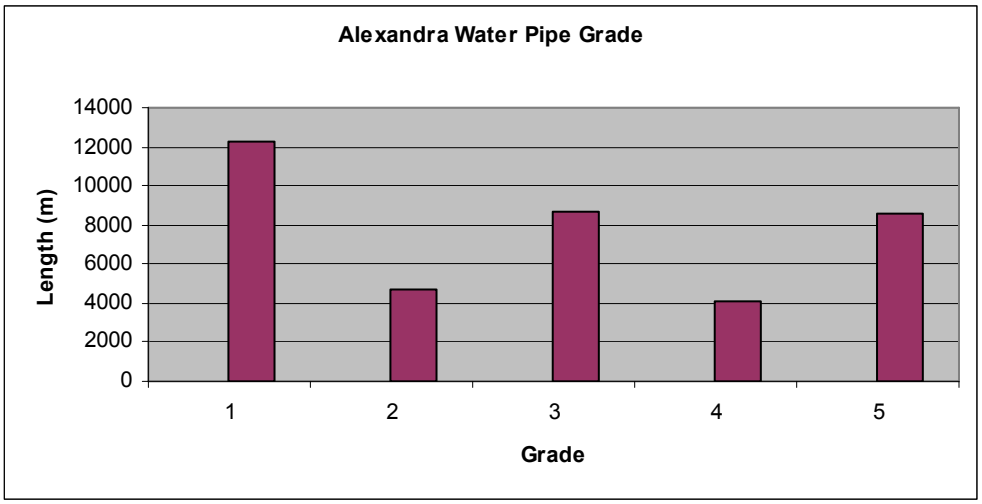
Water reticulation gives adequate service at most times. During summer usage peaks pipe strengths limit the ability to use full pumping capacity and reservoir levels are not always fully recharged on a daily cycle. Water use restrictions are required to manage supply deficits.

Retention time in reservoirs can be long during winter low usage times. Chlorine levels can decline to below guidelines.

The lack of dedicated rising mains results in fluctuating chlorine levels in the reticulation as use patterns, pumping and draw down from reservoirs change water dynamics.

Pipe quality and materials are recorded in the Asset Management System. Softened asbestos cement pipes are being progressively replaced. These are not considered to be health risks, but they do present an increased risk of pipe failure.

Pipe size upgrading frequently occurs in conjunction with renewals.



Alexandra pipe grading is generally good, although there is an amount of Class 5 pipe which has been identified (primarily due to age). Council is to undertake water mains sampling to provide a more accurate condition assessment of remaining life.

The condition grade descriptions used throughout this assessment are in the chart below. These are not repeated in each section.

CONDITION GRADING SERVICE PIPES	
Condition Grade	**General Meaning**
1	**Excellent** Modern pipe material designed to current standards with no evidence of internal or external degradation.
2	**Good** As condition 1 but not designed to current standards. Deterioration causing minimal influence on performance.
3	**Moderate** Service pipes which are generally sound, although with a few failures requiring replacement or repair. Some deterioration beginning to be reflected in performance.
4	**Poor** Service pipes with a significant level of failures requiring replacement or repair or with significant internal or external corrosion and likely to cause a marked deterioration in performance in the medium term. Some asset replacement or rehabilitation needed within the medium term.
5	**Very Poor** Unsound service pipes with high level of failure or significant external or internal degradation, which has failed or about to fail in the near future, causing unacceptable performance. No life expectancy, requiring urgent replacement or rehabilitation.

The condition of pipes does not pose serious supply or health risks. The lengths of condition grade 4 and 5 pipes has the potential to compromise overall supply should catastrophic failure occur during periods of extreme usage. These will undergo further condition assessment.

Backflow protection is not comprehensive. All replacement and new connections now are required to have backflow mechanisms. Old connections including many irrigation connections and industrial connections as well as domestic connections lack any form of backflow protection. This would apply to over 60% of connections.

Pressure variations within the system are managed by reservoir locations, pressure booster pumps and pressure regulator valves. During high use times pressures near the commercial area of town could drop significantly but service interruptions have not been recorded.

Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

Council's supply management is assisted by a rudimentary SCADA system. Council intends to implement a district wide SCADA system which should markedly increase operator ability to provide high quality water supplies.

Storage capacity is adequate for most areas most of the time. Storage for upper Bridge Hill above the main reservoir is not sufficient to assure supply for an extended electricity supply or pumping failure. Storage capacity in the main reservoirs has been recorded as being close to fully expended for several consecutive days during extreme water usage. The average daily demand is 6,900m^3 per day (1,500l/h/d) with peak usage at 16,100m^3 per day (3500l/h/d). The estimated maximum pump capacity is 17,500 m^3 per day (3800l/h/d).[6]

6.2.3 Suitability Statement

The 2005 resident opinion survey identified 67% dissatisfaction with water quality and recognised this as a priority issue. Satisfaction with water supply was 89%.

Alexandra water supply has suitability deficits, ie:

- lacks secure water source
- has contamination risks
- lacks chlorine contact facility
- limited storage for upper levels of Bridge Hill
- lacks dedicated rising main
- hardness creates scale problems
- lacks storage capacity at peak use times
- requires annual extended water restrictions

Council recognises the need for improvement and has set up a working group including staff and elected members to help focus on issues and priorities.

6.2.4 Demand

The water source has ample water available for future needs.

The pump capacity is close to its maximum at peak use times.

Reticulation has limits to increasing service areas without up grading and upsizing.

Storage capacity is fully utilised to smooth daily fluctuations and retain an emergency reserve at peak usage times.

Planned water conservation aims at reduction of water consumption by 10% (over 5 years). This should enable the existing infrastructure to be sufficient for at least ten years.

[6] MWH Alexandra and Clyde Water Supply Review October 1998.

6.2.5 Concerns and Risks

Concerns have been raised on all aspects of the Alexandra water supply during ongoing investigations.

Concern	Level
Peaks approaching capacity limits	4
Seasonal use rates extreme	4
No Chlorine contact facility	4
Reservoir capacity	3
Contamination of supply	3
Backflow protection	3
Seasonal use restrictions	2
Pipes approach end of useful life	2

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Concerns gradings are subjective assessments and not risk analyses.

Level	Concern Statement
5	Serious concern, action required
4	Moderate concern, investigation needed
3	Concern exists, consideration needed
2	Small concern, low priority
1	Negligible concern ,recognize only

6.2.6 Development Possibilities

These are the current plans of the Central Otago District Council to upgrade the Alexandra water supply.

Issue – Alexandra Water Supply	Indicative Cost	Priority
Complete ring mains (Boundary Rd to Molyneux Est)	$322,000	5
District Wide SCADA System	$41,600	5
Leakage Detection Assessments		4
Water Supply Review (Borefield location, Chlorine Contact, Hardness, Demand Management)	$2,000,000*	4
Backflow Prevention Measures (Ongoing)	$20,000	4
Water Conservation (save 10% in 5 years)	$3,000	4
Reticulation Modeling	$30,000	3
New Reservoir (Depending on growth)	$1,100,000	2
Investigate Back up Generation	$7,200	2

* This is an indicative cost, and dependent on the outcome of the Basin Study, and legislative requirements.

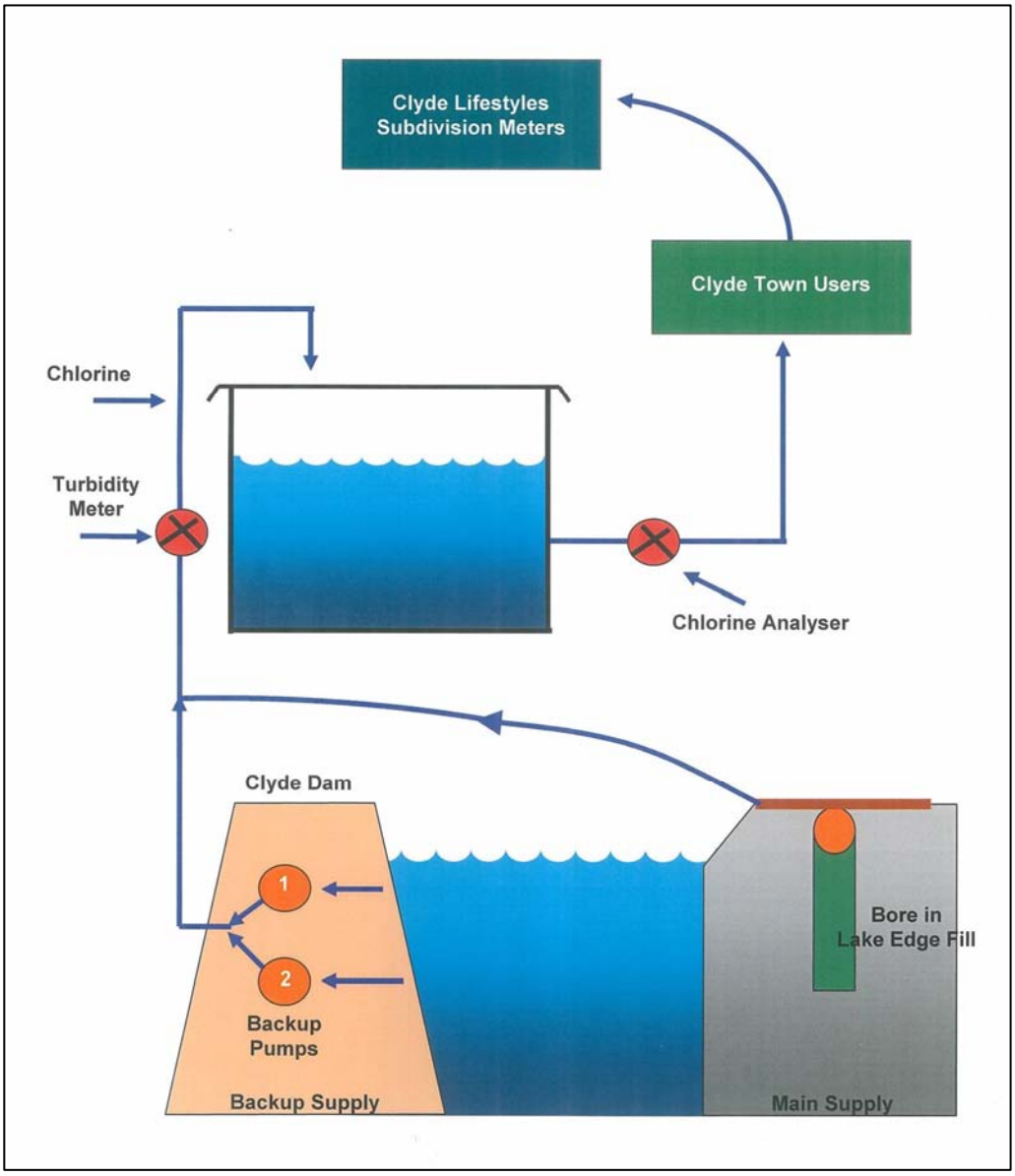
6.3 Clyde

6.3.1 Description

Clyde town water supply services the town of Clyde, Dunstan Hospital and the Clyde Lifestyles subdivision.

Clyde Town has a resident population of 890 (2001). Over the Christmas holiday period visitors increase in excess of 2,500 for several weeks.

System Diagram



6.3.2 Assessment

6.3.2.1 Water Source

Clyde water is supplied by a bore close to the shore of Lake Dunstan. This draws water from Lake Dunstan through broken schist rock dumped as surplus to the construction of the Clyde Dam. This offers limited filtering and reduces the turbidity of the water to a level that enables chlorination.

The bore water is largely lake water. This is considered an insecure source.

An alternative supply is available directly from Lake Dunstan by way of two pumps housed in the Clyde Dam. This supply is also insecure and suffered from extended periods of high turbidity requiring boil water notices when used as the primary source.

The volume of water available is very large, but locations for additional bores to increase supply of lower turbidity water may be limited by suitable locations that do not adversely draw down the existing bore.

As at 2004 the drinking water supply was graded as E (completely unsatisfactory, high level of risk).

Source water quality shows indications of a low level of pollution (coliform indicator). Turbidity can be above the threshold for treatment. Low levels of E.coli detected would be removed by chlorination.

Source water quality was tested for 42 characteristics in April 2005. Other than turbidity none of these characteristics were of concern or transgressed drinking water standards.

6.3.2.2 Water Treatment and Reticulation

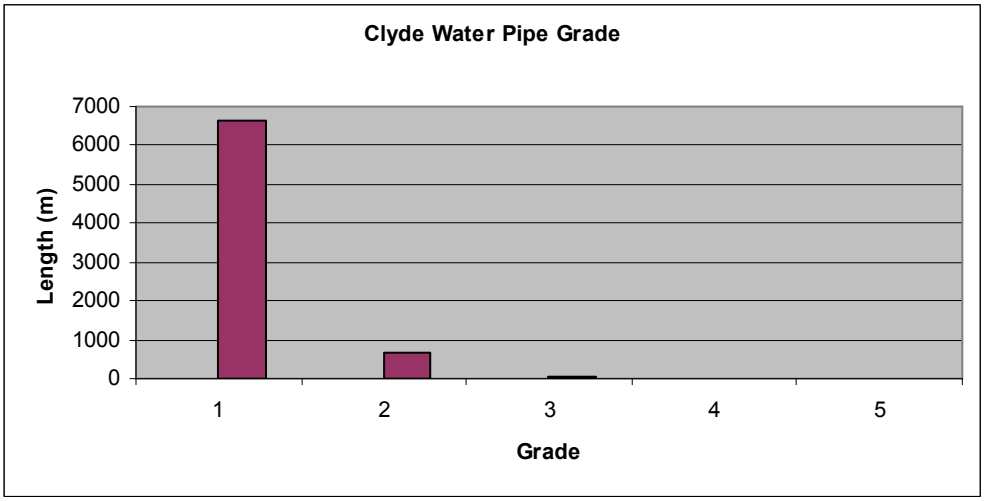
Bore water is chlorinated as it enters the reservoir to ensure chlorine has time to disinfect the water in the reservoir. During high summer usage the reservoir is frequently drawn down to near empty and adequate chlorine contact is not assured.

Water reticulates to all users by gravity from the reservoir. During periods of high usage the reservoir can empty and the supply head reduces as the level in the descending main falls. This results in supply pressure drop, the supply rate available to consumers reduces until an equilibrium situation is reached.

As at 2004 the treatment was graded as E, completely unsatisfactory, high level of risk. The reticulation was graded as d, unsatisfactory, high level of risk.

Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

Reticulation is appropriately sized to give consistency and pressure of supply for most of the year. The only exception is the outlying Clyde Lifestyles subdivision where 6 metered consumers experience reduced supply because of the length of inadequately sized supply pipe.



Pipe condition is good and delivers a satisfactory level of service.

Water supply is undertaken pursuant to an agreement with Contact Energy who pay for the water pumping costs up to an agreed maximum Kw/hr per year. Any substantial increase in the reticulated zone could result in the Contact Energy threshold being exceeded.

6.3.3 Suitability

The 2005 Resident Opinion survey (Earnscleugh/Manuherikia ward) indicated 65% satisfaction with water quality, but water quality was recorded as the most important priority issue.

The groundwater water quality is adequate at present. The rock in which the bore is located provides limited filtering. Should the lake water (backup) source be used it offers no security of quality, especially in view of increasing recreational use of the lake.

The pumping capacity is fully utilised when meeting summer peak demands. Rapid growth of the area serviced as a result of new subdivisions and infill housing means that effective water conservation is needed now to avert the immediate need for more pumping capacity.

The storage reservoir is inadequate for the town requirements, due to chlorine contact and peak demand needs.

6.3.4 Demand

Lake Dunstan offers sufficient source volume for all foreseeable future requirements.

Pumping capacity, reservoir capacity and treatment configuration require updgrading to provide a better assurance of quality standards and to meet demand.

6.3.5 Concerns and Risks

Concern	Level
Inadequate storage	5
Seasonal lack of chlorine contact	4
Peak use at pump capacity	3
Seasonal use rates extreme	3
Backflow protection	2
Contamination of supply	2

6.3.6 Development Possibilities

Issue – Clyde Water Supply	Indicative Cost	Priority
Construct new reservoir	$650,000	5
District Wide SCADA System		5
Prepare Public Health Management Plan	$3,000	4
Water Conservation (save 10% in 5 years)	2,000	4
Water Quality Upgrade	$600,000	2
Investigate Back up Generation	$2,900	2

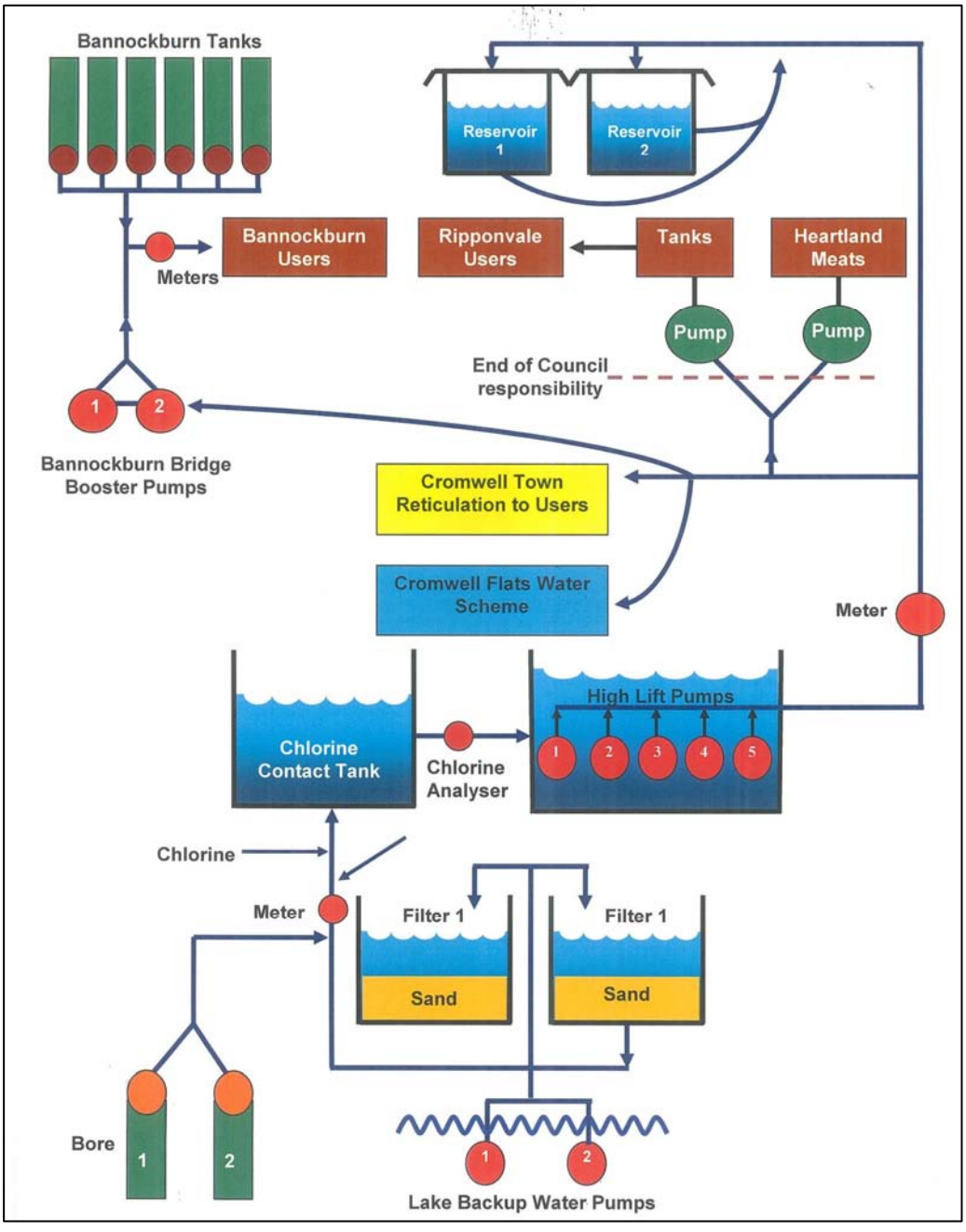
6.4 Cromwell

6.4.1 Description

Cromwell town water supply services Cromwell, Bannockburn and Ripponvale lower Burn Cottage Road, Sarita and Lowburn areas.

Cromwell Town has a resident population of just over 3,000 (2001). Over the Christmas holiday period visitors numbers increase this to in excess of 7,000 for several weeks.

System Diagram



6.4.2 Assessment

6.4.2.1 Water Source

Cromwell water is supplied by two bores close to the shore of Lake Dunstan. Dual intakes directly from the lake are available as back up sources. The groundwater source is insecure from surface sourced contamination. As the groundwater is in fossil river channels of uncertain location that may underlie built up areas and orchards, there is a risk of contamination.

The bore water is a mix of high hardness groundwater and soft lake water. It does not experience the taste and turbidity fluctuations that were experienced using lake water, but it is harder than lake water. The gravels the water is drawn from are highly permeable and it is likely that the water is not old enough to offer quality assurance.

The volume of available groundwater is very large. Locating additional bores in sufficiently deep fossil river channels would require geological investigations. If full treatment was available the lake water source is almost unlimited.

As at 2004 the drinking water supply was graded as E (completely unsatisfactory, high level of risk).

Source water quality was tested for 42 characteristics in April 2005. None of these characteristics were of concern or transgressed drinking water standards.

Water hardness is high enough to cause scale problems but at 93 mg/l is well below the drinking water guideline of 200mg/l. Furthermore this is an aesthetic guideline not a health guideline.

6.4.2.2 Water Treatment and Reticulation

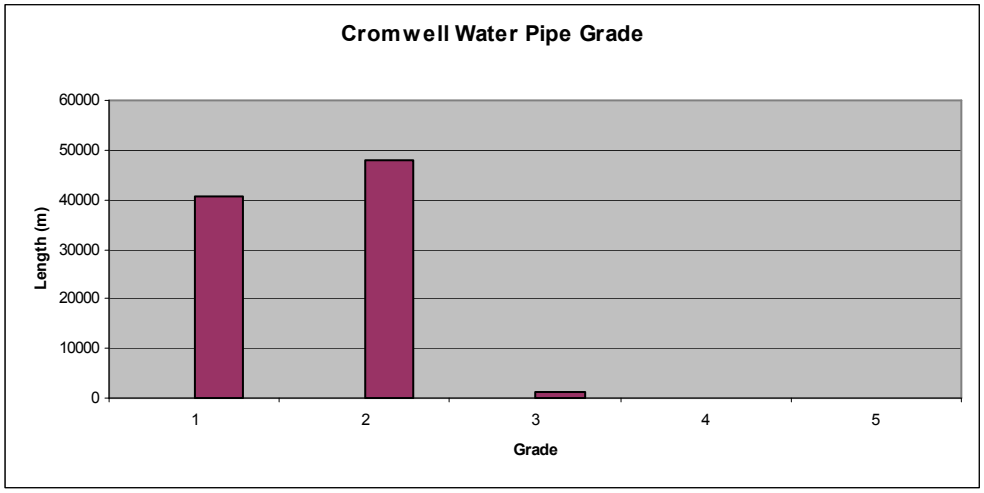
Bore water is chlorinated and held in a contact tank to ensure chlorine has time to disinfect the water. High lift pumps then lift the water to two large reservoirs (capacity 14Mℓ) via the reticulation. There is no dedicated rising main.

In 2004 the treatment was graded as e, (completely unsatisfactory,high level of risk). The reticulation was graded as d, (unsatisfactory, high level of risk).

Should the lake water source (backup) be used, water is passed through one of two automatic backwashing sand filters without a coagulation stage. Water is then chlorinated and passes through the chlorine contact tank. In the past chlorination was prior to the filters and reaction of chlorine with organic matter retained in the filters may have contributed to taste problems.

Raw water is pumped from the two bores by submersible pumps. The back up supply is from two screened lake intakes by submersible pumps in chambers below lake level. Both sources deliver water to a pumping chamber linked at a common level to the chlorine contact tank. Five high lift pumps then pump water to the two main reservoirs. Pumping is via the reticulation, this can cause variations in the chlorine residuals and freshness of water.

Water develops aeration after the high lift pumps, giving a milky appearance which disappears after water is stood for a few minutes. This is a negative aesthetic effect and contributes to a poor public image of water quality.



The condition of pipes does not pose serious supply or health risks. The high proportion of single age pipes could become a replacement burden should they all commence failure mode concurrently. However, a sensible renewal programme will mitigate this.

The outlying zones of Bannockburn, Ripponvale, Burn Cottage, Sarita and Lowburn are extensions of the town reticulation. The Ripponvale and Burn Cottage Scheme's water reticulation are managed by private residents and Council responsibility stops at the metering point. Bannockburn is supplied via booster pumps supported by a tank farm with all consumers metered. Ripponvale is a privately operated extension via a booster pump and tank with all consumers having flow restricted supplies requiring on site tanks. Burn Cottage, Sarita and Lowburn are gravity supplies.

The two main reservoirs at Cromwell provide substantial reserves. Pumping capacity at summer peak is fully utilised with the system configured to use only one single raw water pump. On occasions water restrictions are required. At peak usage any substantial interruption to pumping results in reservoir drawdown which may take some days to recover.

Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

Reticulation is appropriately sized to provide consistent pressure. The Ripponvale private scheme has limited capacity at the far end of the system.

Council's ability to manage the supply is restricted by the information available to operators. A contract is planned to install a comprehensive SCADA monitoring which should markedly increase operator ability to provide a high quality water supply.

6.4.3 Suitability

The 2005 resident opinion survey identified 51% dissatisfaction with water quality, with 48% identifying water quality as a major priority issue. This was the overall most important priority issue.

Satisfaction with water supply reliability is 93%.

The lake water (backup) source offers no security of quality, especially in view of increasing recreational use of the lake. Improvements to the existing filters and further filtration and treatment could make this a viable long term water source.

The pumping configuration is fully utilised meeting summer peak demands. Rapid growth of the area serviced both of new subdivisions and infill housing mean that effective water conservation is needed now to avert the immediate need for more pumping capacity. Planned water conservation aims at reduction of water consumption by 10% and includes metering of large sections. This should enable the existing infrastructure to be sufficient for at least ten years.

Storage reservoirs are adequate for the main town requirements, but the tanks at Bannockburn need extra capacity to cover for short term electricity and pump failures.

6.4.4 Demand

Cromwell is experiencing the strongest sustained growth in Central Otago, and new extensions have been recently constructed north to Lowburn.

6.4.5 Concerns and Risks

Concern	Level
Peak use at pump capacity	4
Seasonal use rates extreme	4
Insufficient Secondary Reservoir Capacity	4
Backflow protection	3
Contamination of supply	2

6.4.6 Development Possibilities

Issue – Cromwell Water Supply	Indicative Cost	Priority
New Reservoir Bannockburn	$350,000	5
District Wide SCADA System		5
Backflow Prevention Measures (Ongoing)	$20,000	4
Water Conservation (save 10% in 5 years)	$3,000	4
Reticulation Modeling	$35,000	3
Water Quality Upgrade	$750,000	2
Investigate Back up Generation	$5,700	2

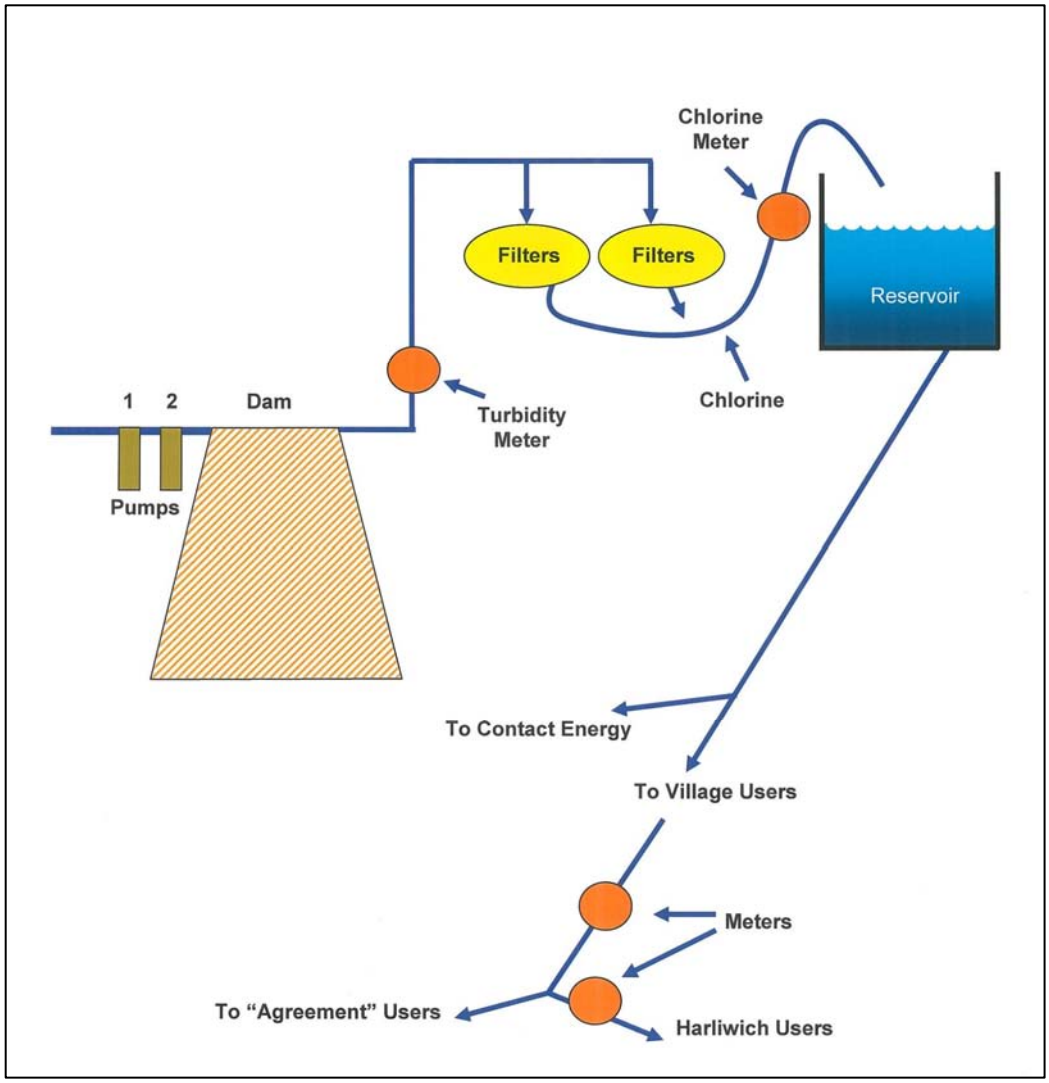
6.5 Lake Roxburgh Village

6.5.1 Description

Lake Roxburgh Village water supply services the village and houses on Tamblyn Road and the Harliwich area on the opposite side of the highway.

The village has a resident population of about 50. Over the Christmas holiday period visitors increase this to close to 200 for several weeks.

System Diagram



6.5.2 Assessment

6.5.2.1 Water Source

The water supply is taken directly from Lake Roxburgh by way of two pumps mounted on the lake side face of the Roxburgh Dam. This supply is insecure and suffers from extended periods of extreme turbidity requiring use of an

alternative private creek supply and boil water notices. During high river flows Contact Energy lowers Lake Roxburgh to flush sediment from the Lake. Extreme turbidity results for the duration of the high flow. Recent consent renewal conditions are likely to continue this problem.

The volume of water available is very large, but supply may be occasionally limited by ability to treat the turbid water or the volume of the private creek alternative supply. As the creek supply has no treatment or storage its use has been discontinued.

Electricity supply for pumping is provided by Contact Energy. Contact Energy is allowed to use bulk water in the event of a failure in its internal dam water supply.

As at 2004 the drinking water supply was graded as E, completely unsatisfactory, high level of risk.

Source water quality was tested for 42 characteristics in April 2005. None of these characteristics were of concern. Low levels of E.coli detected would be removed by chlorination.

6.5.2.2 Water Treatment and Reticulation

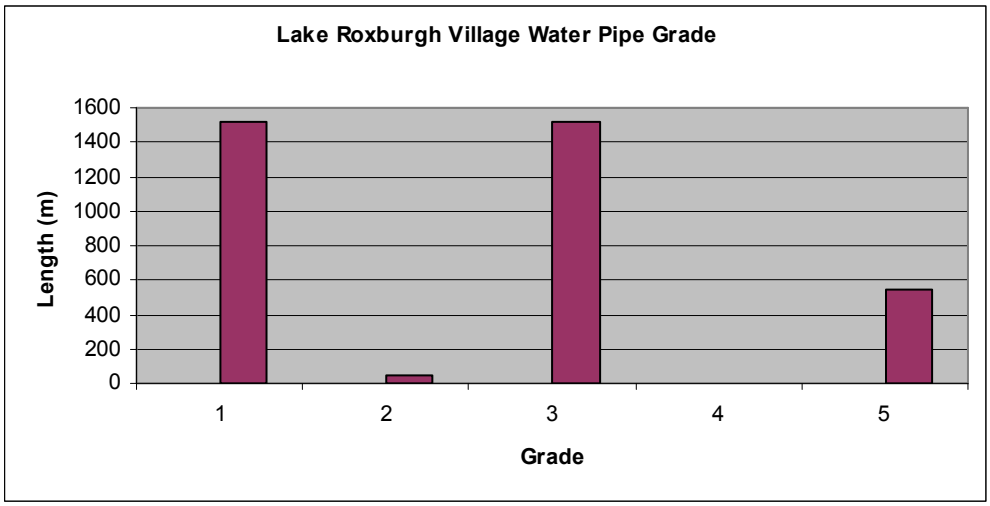
Lake water is filtered through pressure filters. It is chlorinated as it enters the reservoir to ensuring chlorine has time to disinfect the water in the reservoir. The reservoir is of sufficient capacity. Coagulation prior to filtering no longer occurs.

Pressure Sand Filters

Water reticulates to all users by gravity from the reservoir.

The existing 500m³ reinforced concrete reservoir is leaking and will be repaired in the immediate future. A temporary reservoir is to be established to allow repairs of the main reservoir.

Reticulation is based on old lead jointed cast iron pipes. Frequent repairs have resulted in replacement of considerable sections of pipe.



The condition of pipes does not pose serious supply or health risks. The lengths of condition 4 and 5 pipes has the potential to compromise overally supply should catastrophic failure occur during periods of extreme usage. These will undergo further condition assessment.

The 2005 resident opinion survey indicated an over 80% satisfaction with water quality and supply in the wider Roxburgh Area. The population of Lake Roxburgh Village is too small to register the recognised widespread dissatisfaction with water supply disruptions caused by turbidity of the source water. Council representatives regularly have contact with residents to manage boil water events, and dissatisfaction is evident.

6.5.3 Suitability

Lake Roxburgh offers sufficient volume for all foreseeable future requirements. Source water will have periods where extreme turbidity makes the source unsuitable, difficult to filter and disinfect adequately.

6.5.4 Demand

There is no expectation of significant growth of demand at Lake Roxburgh Village.

6.5.5 Concerns and Risks

Concern	Level
Contamination of supply	4
Inability to filter adequately	4
Backflow protection	3
Old pipes with suspect joints	2

6.5.6 Development Possibilities

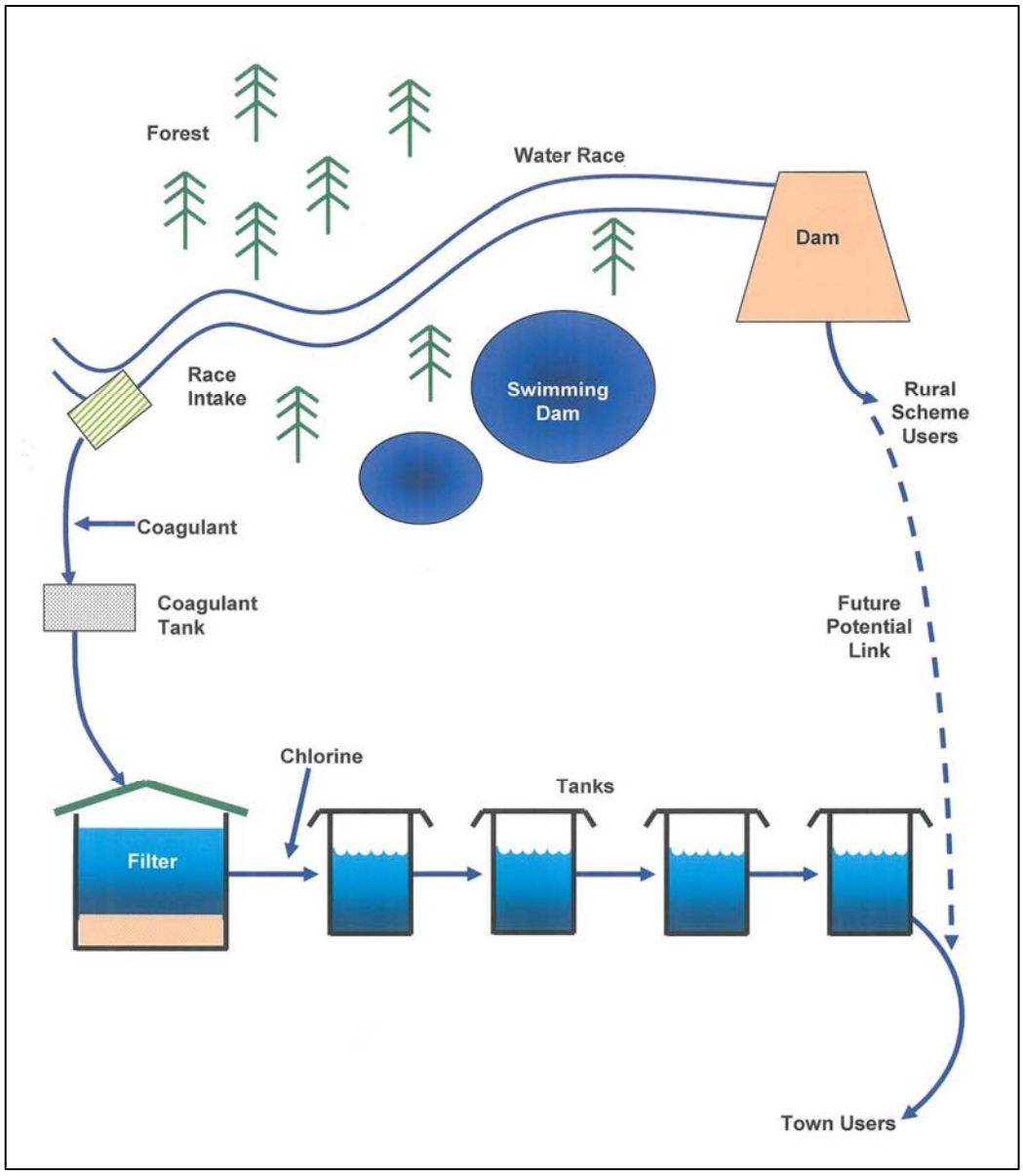
Issue – Lake Roxburgh Village Water Supply	Indicative Cost	Priority
Repair reservoir leakage	$40,000	5
Prepare Public Health Management Plan	$3,500	5
District Wide SCADA System		5
Water Conservation (save 10% in 5 years)		4
Investigate Back up Generation	$450	2

6.6 Naseby Town

6.6.1 Description

The Naseby water supply services the town on the west side of Carrowmore Street.

System Description



6.6.2 Assessment

6.6.2.1 Water Source

Water is sourced from the West Eweburn. Water is purchased from the Hawkdun Irrigation Company and drawn off from a water race through the Naseby forest which passes beside the water treatment plant.

The West Eweburn and the water race are insecure and exposed to stock, other animals and recreational users of the forest.

The supply relies on the integrity of the race and adequate flows in the West Eweburn. As the town water is drawn off before major irrigation users there is preferential security of supply.

Source water has potential to be polluted as identified in source water testing undertaken in April 2005 and requires full treatment. The source water is ungraded.

A backup source is available from the Kyeburn Rural Water Supply should the irrigation race fail. This back up requires several hundred metres of pipe to connect the rural scheme to town.

Naseby watersource

6.6.2.2 Water Treatment and Reticulation

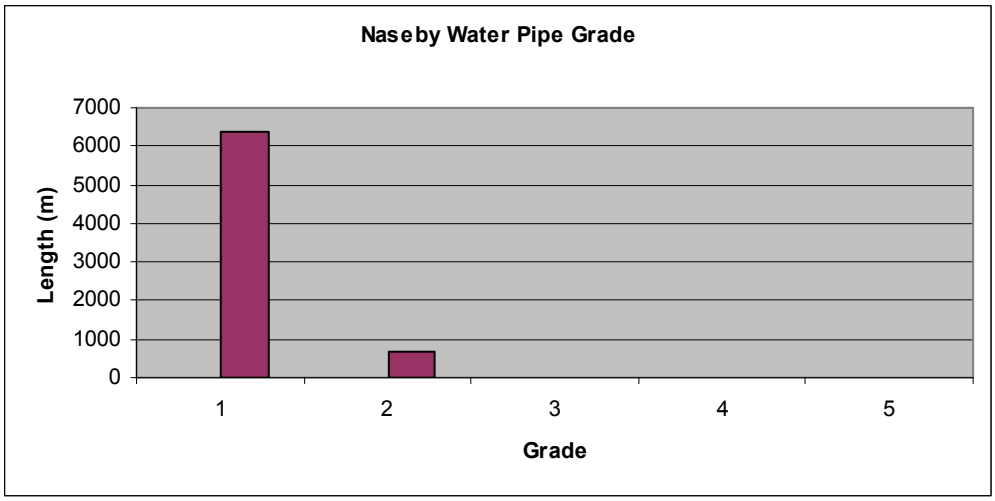
The Naseby water treatment plant and associated tanks are above the town on the edge of the forest.

The water treatment plant includes a sand filter and an alum coagulation facility. The Alum facility is used to remove the high clay and silt load that the source water sometimes has. The plant also chlorinates the water, with the storage tanks acting as chlorine contact tanks. This treatment process is appropriate considering the source characteristics.

The reticulation has the capacity to service the existing town. Naseby is enjoying considerable growth as a holiday destination. This is likely to stress the adequacy of the supply during the height of summer.

The reticulation is gravity fed. Electricity is required for pumps in the treatment plant but not for the supply from the tanks.

The reservoir is adequately sized for the town. Some tanks are in poor condition but a progressive replacement program is underway.



Pipe condition is good and delivers a satisfactory level of service.

6.6.3 Suitability

Apart from the treatment plant the reticulation is all gravity driven and therefore a good level of security of supply remains in the event of an electricity failure.

The risk of contamination of source water is high and treatment is relied on as a barrier to protect public health. Treatment is adequate for many bacteriological diseases and is insufficient to offer protection from viruses.
Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

The water source does not have security from contamination, but is the only practical and economic source available.

6.6.4 Demand

The water source is barely sufficient for the existing size and use pattern of the town. The potential for serious drought in this area rendering the supply inadequate is high. There are no better practical water supplies.

The town is at high risk of major forest fire and the supply is unlikely to be adequate in case of such a disaster.

6.6.5 Concerns

Concern	Level
Contamination by animals and recreational forest users	4
High summer usage rates	4
Poor source water quality	3
Inadequate supply volume during droughts	3

6.6.6 Development Possibilities

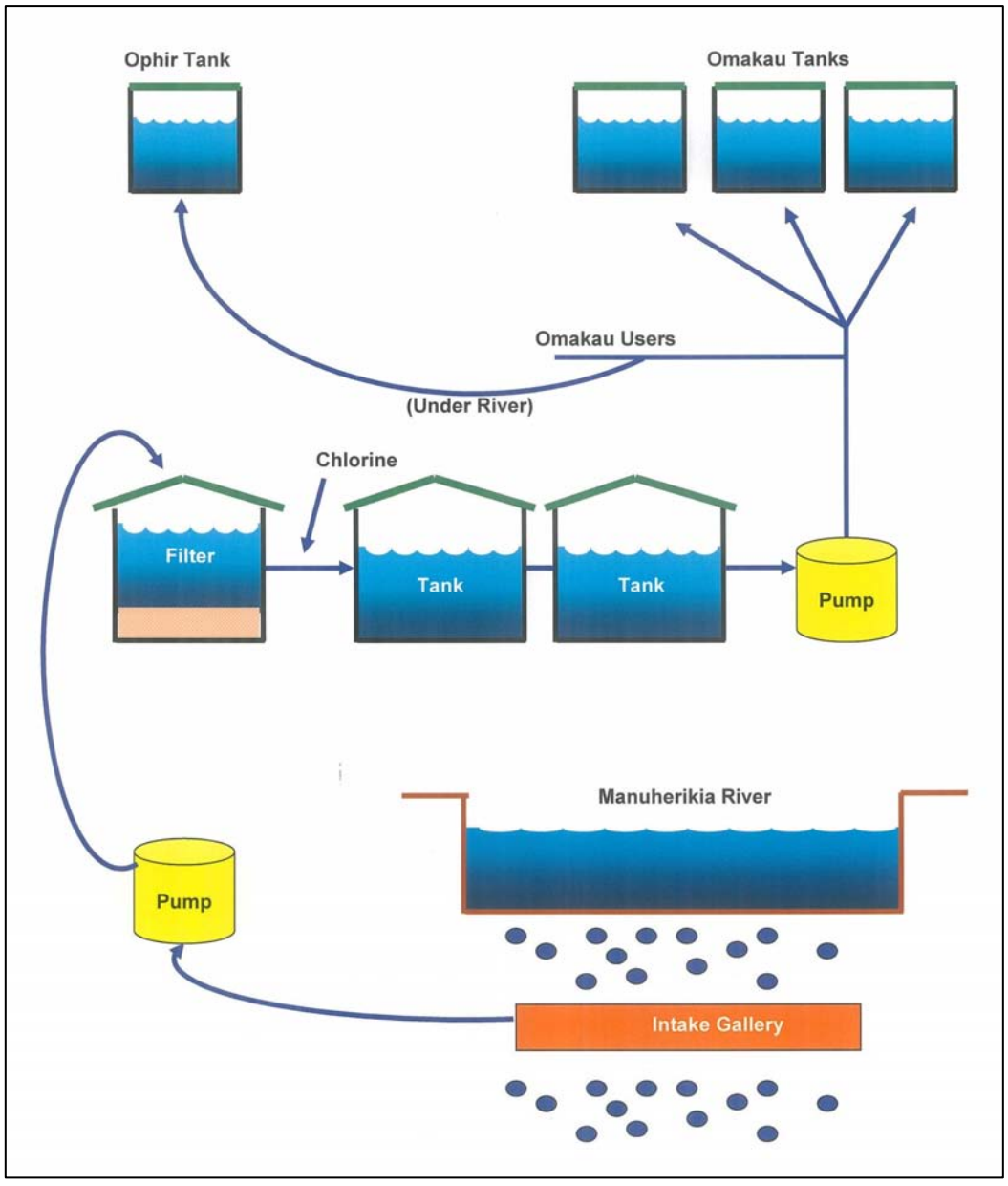
Issue – Naseby Water Supply	Indicative Cost	Priority
District Wide SCADA System		5
Backflow Prevention Measures (Ongoing)	$20,000	4
Prepare Public Health Management Plan	$2,000	4
Water Conservation (save 10% in 5 years)		4
Fire Service Compliance	$20,000	3
Reticulation Modeling	$4,000	3
Water Quality Upgrade	$510,000	2
Water Supply Agreements (Irrigation Company)	$2,500	2

6.7 Omakau and Ophir

6.7.1 Description

The water supply services both Ophir and Omakau.

System Description



6.7.2 Assessment

6.7.2.1 Water Source

Water is sourced from the Manuherikia River. The intake is an infiltration gallery in the river bed gravels.

Source water is insecure and river water quality can be poor especially in summer, when flows are low.

The water source is ungraded.

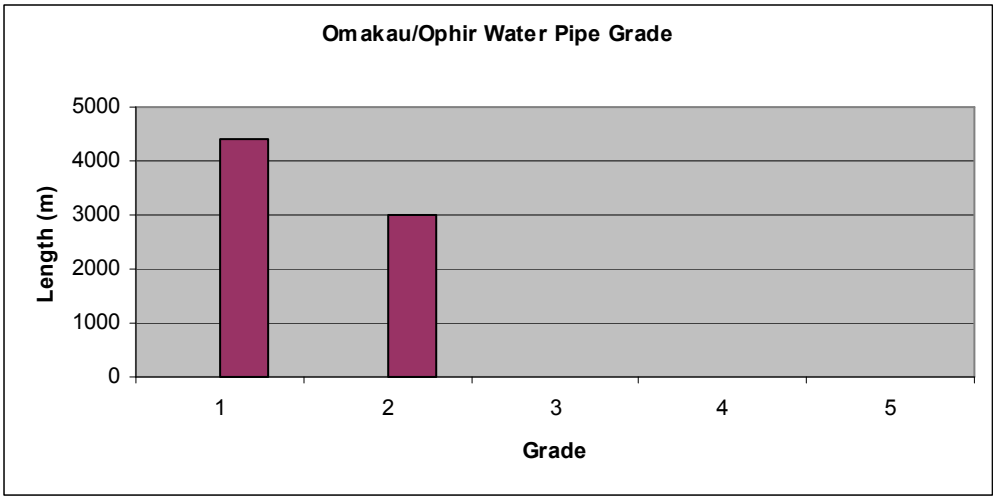
Source water quality was tested for 42 characteristics in April 2005. None of the chemical characteristics were of concern, coliform counts and turbidity identify the need for full treatment.

Very low river flows affect the ability of the intake to function adequately. The gravels surrounding the intake slowly become clogged with silts and excavation and relaying is needed periodically.

6.7.2.2 Water Treatment and Reticulation

The Omakau and Ophir water treatment plant houses the lift pumps that draw water from the gallery, filter water, chlorinate water and pump it to tanks on the terrace above the town. There is no dedicated rising main.

Water is reticulated from the storage tanks by gravity. Storage capacity is inadequate for the summer high use period.



Pipe condition is good and delivers a satisfactory level of service.

6.7.3 Suitability

The risk of contamination of source water is high and treatment is relied on as a barrier to protect public health.

Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

The water source does not have ideal security from contamination, but is the only practical and economic source available.

6.7.4 Demand

The water source is sufficient for the existing size and use pattern of the town. The potential for serious drought rendering the supply marginal is high. There are no known better practical water supply sources available.

Storage capacity is insufficient to cover even minor pumping outages or pipe breaks.

Town growth has been modest and the water supply should be able to provide the existing level of service for the foreseeable future, including the proposed Tiger Hill subdivision.

6.7.5 Concerns and Risks

Concern	Level
Inadequate supply volume during droughts	4
Contamination , poor river water quality	4
Insufficient storage	4
High summer usage rates	3

6.7.6 Development Possibilities

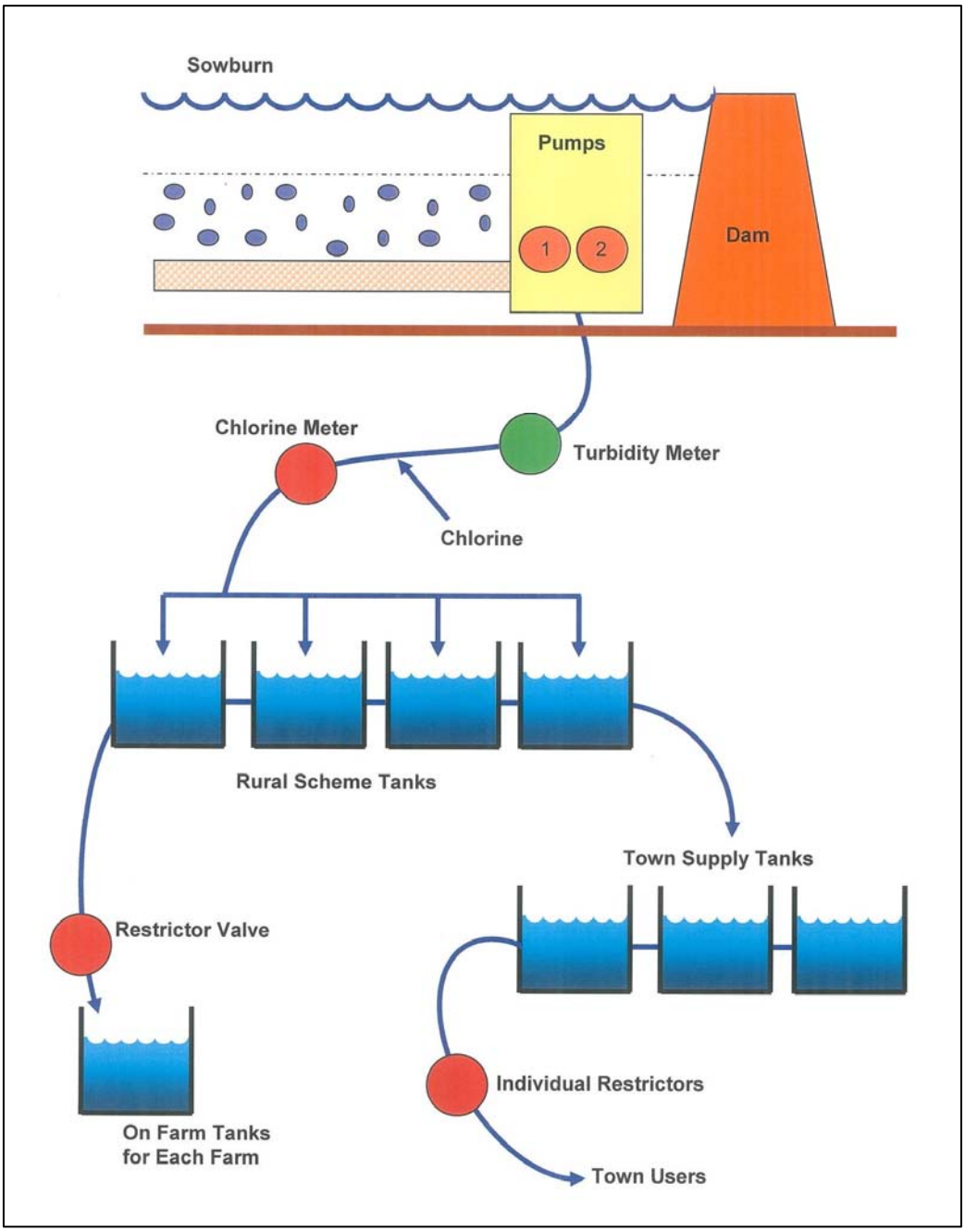
Issue – Omakau/Ophir Water Supply	Indicative Cost	Priority
District Wide SCADA System		5
Upgrade Reservoir Storage	$50,000	4
Backflow Prevention Measures (Ongoing)	$5,000	4
Prepare Public Health Management Plan	$2,000	4
Water Conservation (save 10% in 5 years)		4
Fire Service Compliance	$20,000	3
Reticulation Modeling	$5,000	3
Water Quality Upgrade	$602,000	2
Upgrade Intake due to silting (In conjunction with water quality upgrade)	$40,000	2
Investigate Back up Generation	$2,900	2

6.8 Patearoa

6.8.1 Description

Patearoa water supply services the township of Patearoa and the Patearoa rural water supply scheme. There are 45 users in the town and 283 rural units allocated to about 40 users (farming and residence).

System Diagram



6.8.2 Assessment

6.8.2.1 Water Source

Water is sourced from a gallery in the bed of the Sowburn river, a tributary of the Taieri. The gallery is located behind a concrete weir.

The source water is ungraded.

Source water quality was tested for 42 characteristics in April 2005. None of the chemical characteristics were of concern, coliform counts and turbidity identify the need for full treatment.

The water volume available is sufficient for present requirements. The scheme is designed as a restricted supply. Each property in Patearoa is allocated 1,000 ltr/day which the houses must use efficiently.

6.8.2.2 Water Treatment and Reticulation

The Patearoa water treatment plant houses the lift pump controls for the submersible pumps in the gallery chamber. As water passes through the plant it is chlorinated on its way to tanks on the terrace above the town via a dedicated rising main.

The storage tanks are in two sections, a larger higher level supplying the rural section and the town supply connected at a slightly lower level via a bulk flow restrictor.

Water is reticulated from the storage tanks by gravity. Storage capacity is occasionally depleted during the summer high use period.

Individual rural connections are supplied to on site tanks via flow restrictors and an air gap to give backflow protection. On farm reticulation to stock water and houses is outside council control. Some town connections are via tanks and it is believed some may be direct.

6.8.3 Suitability

The Patearoa water supply provides an adequate service to town residents. The rural section of the scheme provides a better level of bacteriological quality assurance compared with most other rural areas of Central Otago.

6.8.4 Demand

Patearoa town is enjoying some growth as a holiday destination. Demand growth is occurring a result of new residences and as a result of an increasing expectation of the level of service. However the scheme is

designed as a restricted scheme and a higher level of service in terms of flow and pressure is not achievable without significant improvements.

6.8.5 Concerns and Risks

Concern	Level
Inadequate supply volume during droughts	3
Boil Water Notices	3
Contamination , poor river water quality	2

6.8.6 Development Possibilities

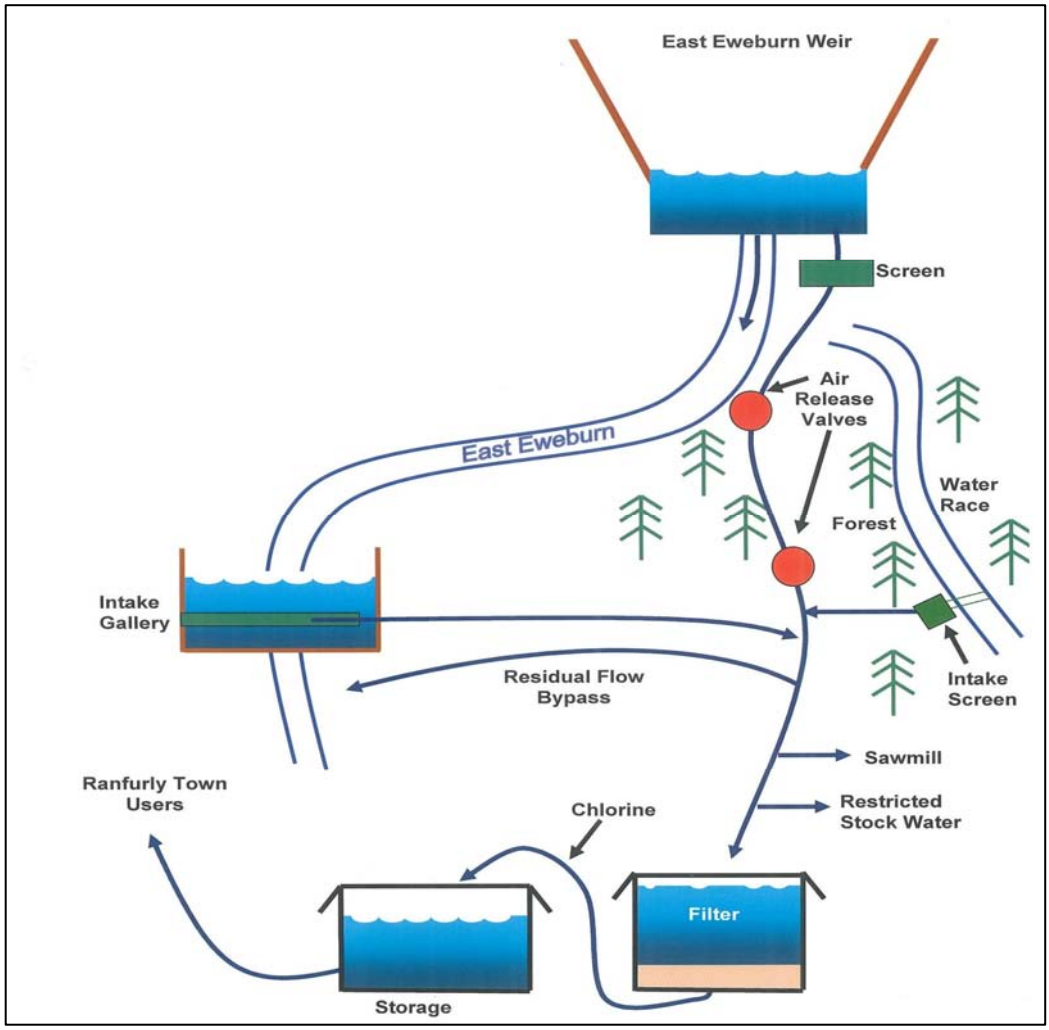
Issue – Patearoa Water Supply	Indicative Cost	Priority
District Wide SCADA System		5
Prepare Public Health Management Plan	$1,000	4
Reticulation Modeling	$1,500	3

6.9 Ranfurly

6.9.1 Description

The Ranfurly water supply services Ranfurly township, provides limited stock water along the supply route, provides a supplementary water source in the event of a fire in the Naseby forest and services the Fennesy Road sawmill.

System Diagram



6.9.2 Assessment

6.9.2.1 Water Source

Water is primarily sourced from the East Eweburn. There are two intake structures, a low concrete dam where the creek leaves the hills and gallery pipes in the creek bed gravels about one kilometer upstream from Smiths Road. A secondary source is water purchased from the Hawkdun Irrigation Company and drawn off from a water race part way through the Naseby forest. The source of this water is the West Eweburn.

The dam intake frequently takes almost all of the flow of the East Eweburn, with only a small residual left for stock water. The Eweburn at the gallery intake is often a subsurface source as the creek dries up.

All three sources of water are insecure surface water. There is generally a low level of pollution but full treatment is required. There is a potential source of contamination from stock during summer.

The source water is graded E (completely unsatisfactory, high level of risk).

The full capacity of the dam and the gallery are insufficient most summers and additional water from the race is required to make up the supply.

Ranfurly intake weir

Source water quality was tested for 42 characteristics in April 2005. None of these characteristics were of concern or transgressed drinking water standards. Test results are included in the appendices.

6.9.2.2 Water Treatment and Reticulation

The Ranfurly water treatment plant and reservoir is on a low hill about 3 kilometers north west of the town.

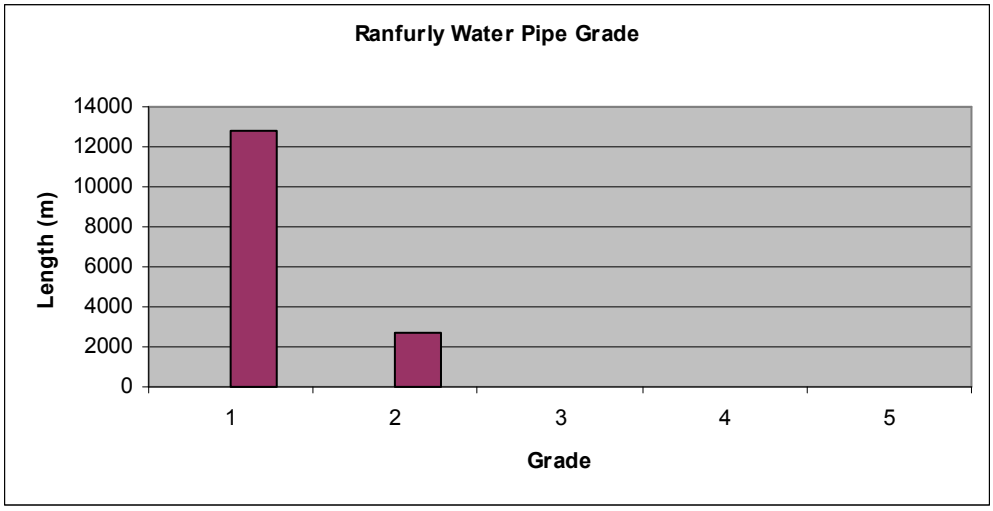
The water treatment plant has a sand filter and an alum coagulation facility. The alum facility was installed to remove the (infrequent) high clay and silt load from the source water. The plant also chlorinates the water.

As at 2004 the treatment was graded as e, completely unsatisfactory, high level of risk.

The reticulation has the capacity to service the existing town and is likely to be adequate for the foreseeable future.

The supply to the treatment plant is about 13 kilometres gravity fed pipline. It would be limited in its ability to handle large increases in volume without pumping, but this requirement is unlikely.

The reservoir is adequately sized for the town. Replenishment can be a problem at peak usage but this is caused by inadequate source water rather than reservoir characteristics.



Pipe condition is good and delivers a satisfactory level of service.

6.9.3 Suitability

Apart from the treatment plant the reticulation is all gravity driven. As there are few pumps there is security of supply in event of electricity failure.

The risk of contamination of source water is high and treatment is relied on as a barrier to protect public health. Treatment is adequate for many bacteriological diseases and is insufficient to offer protection from viruses.

Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

The water source does not have ideal security from contamination, but is the only practical and economic source available.

6.9.4 Demand

The water source is barely sufficient for the summer demand of the town. The potential for serious drought in this area rendering the supply inadequate is high. There are no better practical water supplies. Pumping and treatment of water from the Taieri River could be considered, but would be expensive.

6.9.5 Concerns

Concern	Level
Inadequate supply volume during droughts	4
Treatment inadequacy	3
High summer usage rates	3

6.9.6 Development Possibilities

Issue – Ranfurly Water Supply	Indicative Cost	Priority
District Wide SCADA System		5
Backflow Prevention Measures (Ongoing)	$5,000	4
Prepare Public Health Management Plan	$2,000	4
Water Conservation (save 10% in 5 years)		4
Reticulation Modeling	$2,500	3
Water Quality Upgrade	$700,000	2
Water Supply Agreements (Irrigation Company)	$2,500	2

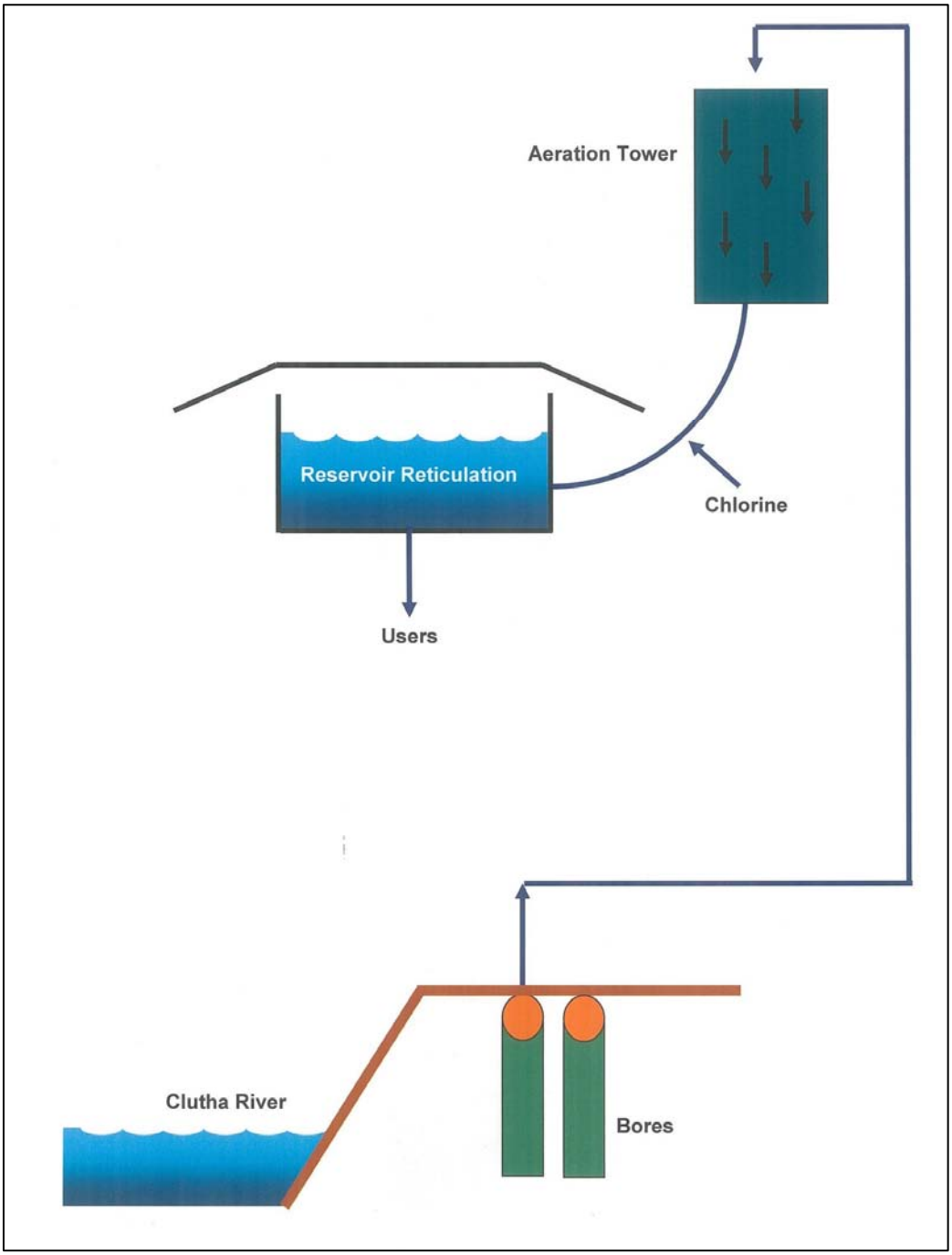
6.10 Roxburgh Town

6.10.1 Description

Roxburgh town water supply services the township of Roxburgh.

Roxburgh town has a resident population of about 900.

System Diagram



6.10.2 Assessment

6.10.2.1 Water Source

Roxburgh water is supplied by bores close to the Clutha River upstream of the town. These bores produce consistently clear water and are not influenced by turbidity in the river. The volume of available groundwater is sufficient for the town in the foreseeable future.

Bore control and bore site

Water is pumped through a dedicated rising main to the water treatment plant on the hill above the town.

As at 2004 the drinking water supply was graded as E, completely unsatisfactory, high level of risk.

Source water quality was tested for 42 characteristics in April 2005. None of these characteristics were of concern or transgressed drinking water standards. Test results are included in the appendices.

6.10.2.2 Water Treatment and Reticulation

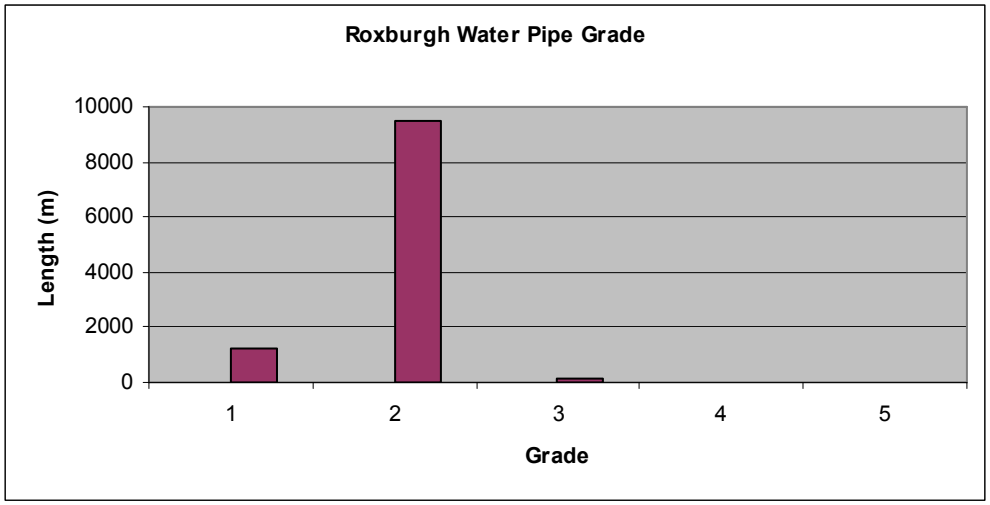
Bore water is aerated then chlorinated and held in a contact and settling reservoir to ensure chlorine has time to disinfect the water.

In 2004 the treatment was graded as e, completely unsatisfactory, high level of risk.

Aeration Tower

Water reticulates to the town by gravity from the treatment plant.

The reticulation was graded as d (unsatisfactory, high level of risk).



Pipe condition is good and delivers a satisfactory level of service.

Public health protection in the reticulation is confirmed by routine bacteriological monitoring undertaken to the requirements of the Drinking Water Standards for New Zealand 2000.

Reticulation is appropriately sized considering the pressure of supply.

Storage capacity is not large. This poses some risk from electricity supply or pump failure.

6.10.3 Suitability

The 2005 resident opinion survey identified more than 80% satisfaction with water quality and supply.

The bore produces good quality raw water and its location has a low risk of contamination.

6.10.4 Demand

The water source is of sufficient volume for all foreseeable needs.

Reservoir and pumping capacity are insufficient to assure supply during pump outages or major pipe breaks.

6.10.5 Concerns and Risks

Concern	Level
Backflow protection	3
No Back Up raw water pump	3
Reservoir Capacity	2

6.10.6 Development Possibilities

Issue – Roxburgh Water Supply	Indicative Cost	Priority
District Wide SCADA System		5
Backflow Prevention Measures (Ongoing)	$5,000	4
Prepare Public Health Management Plan	$3,500	4
Water Conservation (save 10% in 5 years)		4
Reticulation Modeling	$5,000	3
Water Quality Upgrade	$550,000	2
Investigate Back up Generation	$1,500	2

6.11 Community Operated Supplies

6.11.1 Description

As part of this assessment Council contacted private scheme operators and collated scheme details. Responses were not received from all known schemes and Council notes there may be schemes of which it is not aware. Some respondents were reluctant to fully disclose details.

Responses were received from 32 schemes. This enables some conclusions to be reached about the impact of private schemes on public health and the environment. The data is not full and complete but is a reasonable base for estimating the approximate numbers of people involved.

Private Water Schemes Summary

	Number	%
Registration		
Number of schemes likely to fit registration requirement	60	
Number of responses	32	53
Number of schemes registered	15	25
Source		
Bore or well	15	25
Creek or River	6	10
Dam or pond	2	3
Race	1	1
Spring	3	5
Not stated	5	8
Treatment		
Filter	8	13
Ultra Violet	2	3
Ozone (May be not functioning)	1	1
No Treatment	13	21
Not stated	8	13
Testing		
Monthly	3	5
Quarterly	11	18
Biannially	3	5
Annually	1	1
5 Yearly	1	1
Not testing	3	5
Not stated	9	15

There are at least 60 small water supplies throughout Central Otago. These service small settlements (19), rural subdivision created schemes (21), schools (4), camping grounds, homestays and hotels(18).

The number of people serviced by these schemes is difficult to estimate accurately. Small settlements and subdivisions probably service about 900 residents between them. Schools, camping grounds and hotels have

predominant short contact times. They could service more than 5,000 people in the peak of summer.

These schemes have some common characteristics and are being treated as one community for this assessment despite there being considerable diversity in the engineering and physical characteristics of their supplies.

Common characteristics are largely human and management based. They serve small numbers of people, are operated by individuals or groups and are privately funded.

6.11.2 Assessment

6.11.2.1 Water Sources

Community operated supplies have a variety of sources including:

Ground water bores and wells
Creeks and rivers
Springs
Dams and ponds
Water races
Piped Irrigation schemes

Source security and quality is frequently doubtful with resultant risks sometimes not fully appreciated by operators. It is reasonable to conclude that many supplies are occasionally exposed to bacteriological contamination.

Source water is now ungraded for all 17 schemes appearing in the Register of Drinking water supplies. Previously many of these schemes were graded.

6.11.2.2 Water Treatment and Reticulation

Many community operated supplies are untreated, but some are treated. Treatment systems include:

Filtration
Chlorination
Ozone treatment
Ultra violet treatment

The overall level of treatment is low and the bacteriological contamination risk high in all but a very small number of supplies.

Water reticulation is frequently by gravity, but pumping is common.
The raison étre for some schemes is to share the cost of providing a pumped supply.

Many schemes have limited storage capacity or rely on individual users providing their own storage.

It is likely that some schemes supply stock water and irrigation as well as drinking water. No attempt has been made to assess backflow protection.

6.11.2.3 Management

A frequent feature of small drinking water supplies is the difficulties experienced operating and managing schemes. While a few schemes are well run, this would be the exception rather than the rule. Operating these schemes seems to be an onerous chore to many.

Difficulties experienced include:

- Funding: operating an equitable funds collection and management system, estimating funds needed, preparedness to spend, allowing for replacement, accumulating reserves to cover periodic major expenditure.

- Operating: knowing how to operate the system, being available to perform tasks when and where needed, having insufficient funds to purchase materials or pay contractors.

- Human, controlling interference by individual users, interpersonal conflict and suspicion, unwillingness to pay, expectation of “city standards of service for a country scheme”

- Public health, unaware of standards and requirements, failure or unwillingness to register schemes, unaware of operating instructions, unaware of risks and how to manage them.

It is probably reasonable to conclude that the quality of management of these water supplies is highly variable and overall public health management is indifferent.

6.11.2.4 Councils Role

Council has several roles in management of private supplies. Consideration could be given by Council to reviewing ways it could help improve the public health of private water schemes. Some options are:

- Consider taking over and managing schemes
- Introducing inspection and testing of registered schemes
- Identifying schemes that should be registered in conjunction with Public Health South and requiring registration
- Confirming registration and requiring management compliance as part of the Resource Consent and Building Consent processes. There is a

viewpoint that scheme registration cannot be required as a condition of consents. This may be a weakness in legislation.

6.11.3 Current and Potential

Council is active with a number of communities in all aspects of water supply. These include:

6.11.3.1 Ettrick Rural Water Scheme

This was a Council "owned" scheme, where Council rated users, but the funds were passed to a local management committee, who maintained and operated the scheme.

Due to a number of reasons including significant deferred work, the inefficiency of treating significant volumes for stock use, and the desire for local control, Council, under the LGA 2002 requirement, has closed the scheme and transferred the assets to the community.

The community will manage the scheme, but provide treatment at point of use (by UV treatment), rather than at source.

6.11.3.2 Oturehua

In 2002, due to concerns of contamination of bore water, from septic tank disposal, Council undertook a Drinking Water Supply feasibility study. This revealed two options for a communal supply with water sourced from either a spring or the Idaburn.

The local community put the project on hold whilst awaiting the outcome of a potential rural water supply scheme.

With the rural water supply scheme lacking traction, a group of locals is investigating a lower cost communal scheme, with Council providing limited technical assistance.

6.11.3.3 Alexandra-Clyde Basin

Council recently commissioned a Blue Print study to look at development / growth demand in the Alexandra Clyde basin environs.

The report raised a concern re densification of residences in the basin, perhaps causing conflict between bore water supply and septic tank waste disposal.

Council has commissioned a study into drinking water supply options for the Alexandra Clyde basin inclusive of the Springvale and Galloway areas. This study also looks at implications on Alexandra and Clyde township supplies.

It is anticipated that the final report will be completed in early 2006.

6.11.3.4 St Bathans

The St Bathans community is serviced by a water supply managed by the St Bathans Water Board. This scheme was based on an historical "fire fighting" supply, and residents are advised to boil water.

The draft St Bathans area Community Plan identifies water as critical to the development of the community.

The current supply is fully allocated, and there are fears that future development may cause demand to exceed supply.

Any major development of the present scheme is likely to be beyond the management capacity of the Water Board.

6.11.3.5 Pisa Village

The developer of Pisa Village subdivision has built a modern UV treated water system which can supply over 500 lots. This supply is to be vested in Council ownership (probably in early 2006) and can provide for the Pisa Village/ Pisa Vineyard and North Pisa Developments.

There is a possibility it could also be sufficient to provide potable water to adjacent communities who have existing schemes.

6.11.3.6 Action Plan

1. Council will, by June 2007, visit all identified private schemes and collate information on public health risks.

   The information gathered will be provided to scheme management and users.

   Council will recommend drinking water registration where applicable.

2. Council will continue to work with current and potential communities, and developers, to review drinking water needs and options.

7. Wastewater Services

7.1 Legislation

7.1.1 Resource Management Act 1991

The purpose of the Resource Management Act (RMA) 1991 is to promote the sustainability of natural and physical resources. To utilise resources an activity can either be authorised by a rule in the regional plan or the district plan or through a resource consent. Conditions apply that control the way the activity is carried out.

The RMA controls wastewater disposal as wastewaters have the potential to contaminate surface and groundwaters. Resource consents are required for the discharge of contaminants, and consents are required for waste water disposal outfalls. Consent conditions place specific requirements on each consent.

The RMA obliges Council to consider the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga in relation to wastewater discharges. Kai Tahu Ki Otago Ltd prepared a cultural impact assessment of sewerage discharges for Council. Council has been working towards resolving matters identified. These matters are mostly of an aesthetic nature and health and safety are not compromised.

Council is progressively looking to land based disposal for all of its wasterwater services. Currently Lake Roxburgh, Ranfurly and Naseby have land based disposal.

7.1.2 Relevant Planning Documents

The Otago Regional Council Regional Plan: Water sets out permitted, discretionary, restricted and prohibited activities relating to discharges of human waste. Disposal to land is a permitted activity in accordance with clauses 12.6.1.3 and 12.6.1.4 of the ORC Regional Plan Water. Wastewater disposal from Central Otago District Council's Schemes is consented according to The Regional Plan Water and monitored to confirm compliance.

7.1.3 Local Government Act (2002)

The Local Government Act, Section 195 makes Council responsible for discharges to its sewers and drains.

Councils are also charged with the duty "to encourage efficient waste management".

7.1.4 Health Act

The Health Act 1956 requires Councils to ensure safe sanitation through improvement, promotion and protection of public health in their district. Councils are also obliged to inspect their districts to ascertain if conditions exist which are likely to be injurious to health.

7.2 General

Central Otago District Council provides wastewater reticulation and treatment services to protect public health at:

Alexandra
Bannockburn
Cromwell, Lowburn, Pisa
Lake Roxburgh Village
Naseby
Omakau
Ranfurly
Roxburgh

On site disposal of wastewater, septic tanks, is managed under the building act and in accordance with On Site Waste Water Disposal Standards.

The Otago Regional Plan: Water applies to private wastewater discharges.

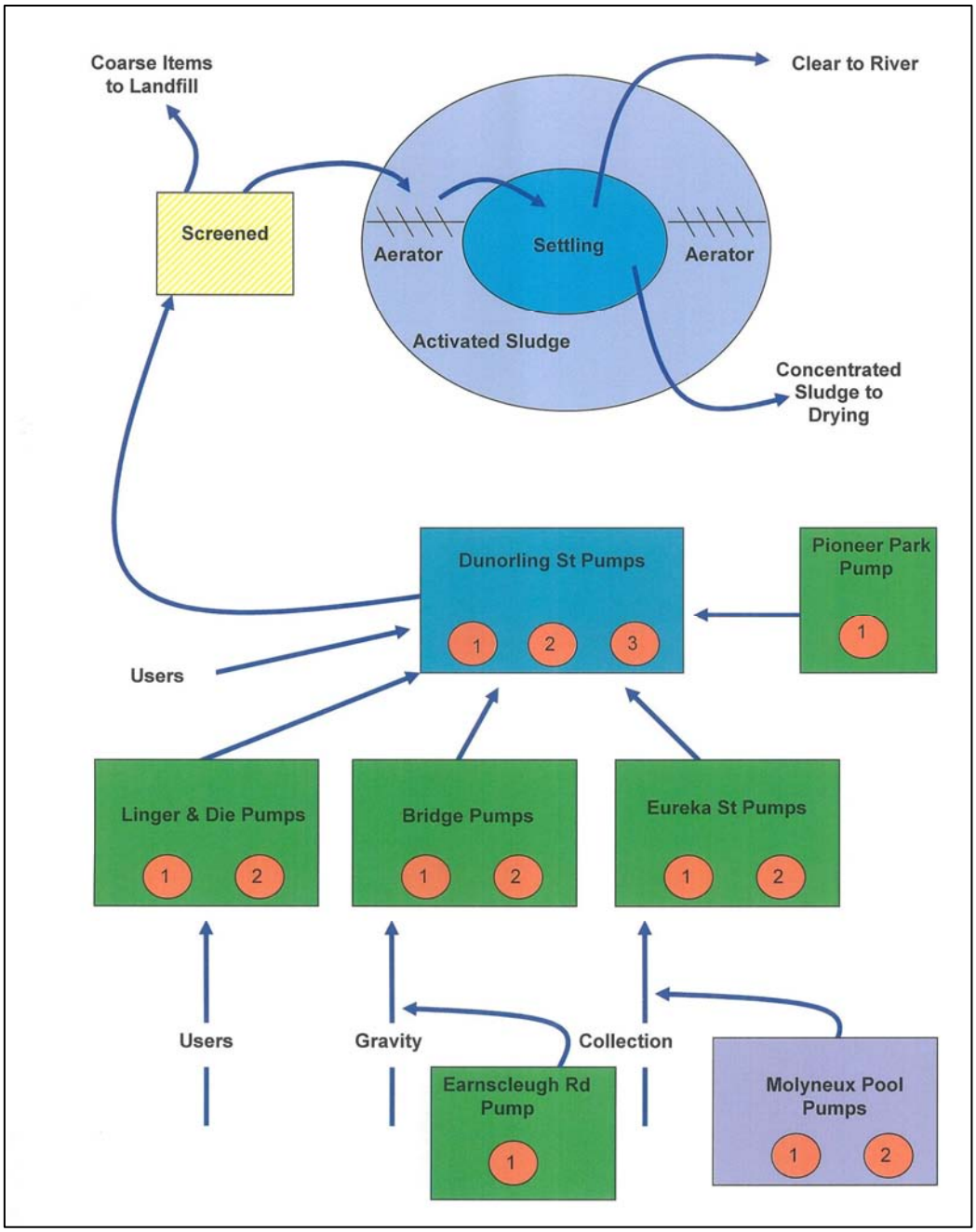
7.3 Alexandra

7.3.1 Description

Alexandra town community is serviced by a reticulated wastewater system.

Wastewater is delivered to a central pumping station by gravity or secondary pump stations at the Linger and Die, the south side of the Clutha bridge ,and in Eureka Street. There are minor pump stations at Earnscleugh Road, Pioneer Park and Molyneux Aquatic Centre. The Dunorling Street central pumping station pumps from the boat ramp area to the activated sludge Treatment Plant in Graveyard Gully via a 300 mm diameter rising main.

System Diagram



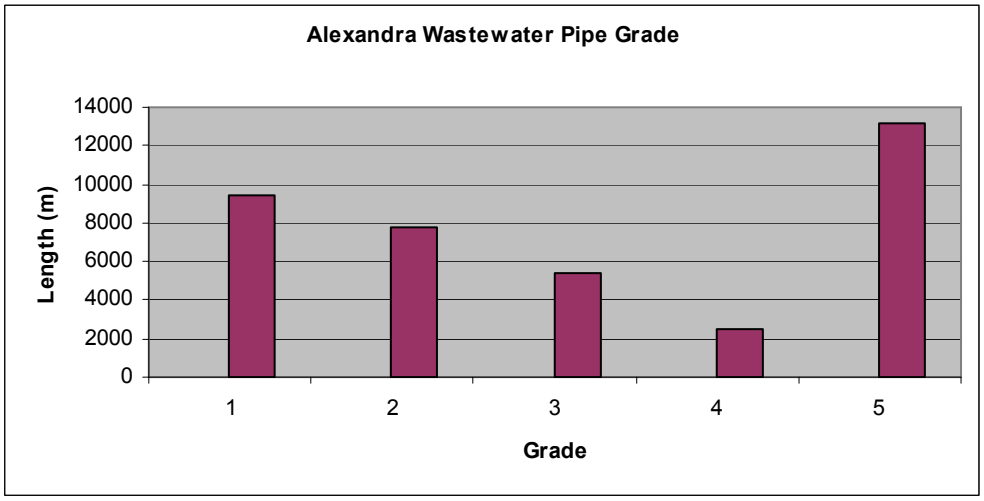
7.3.2 Assessment

7.3.2.1 Wastewater Collection

Alexandra has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced. Industries do not contribute significant wastewater flows or contaminants. A trade waste permit system operates. This sets discharge conditions for service activities such as food premises and processors, hotels, and dentists.

Pipes are mixed age, material and condition. Seven pumping stations deliver untreated wastewater to the treatment plant.

Blockage events have been reduced in recent years by closed circuit television inspection of pipes, targeted replacements, scheduled cleaning of trouble spots and by identification and elimination of sources of materials causing blockages.



Pipe grades and materials are mixed and of average overall quality. Council's Asset Management System has identified an amount of Grade 5 pipe (primarily due to age). Council is to undertake condition sampling to determine more accurately remaining life.

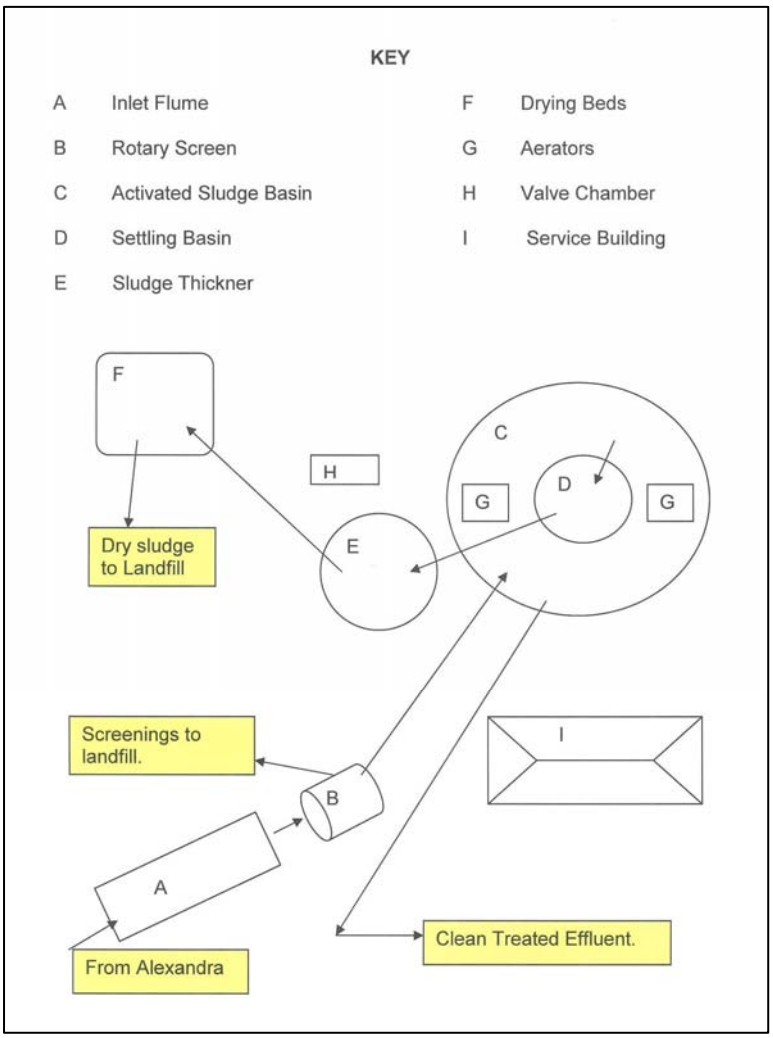
Council has no knowledge of leakage causing groundwater contamination.

7.3.2.2 Wastewater Treatment and Disposal

An activated sludge treatment plant services Alexandra. This is well removed from the community visually and geographically. Odours and health risks to residences from the plant are unlikely.

The plant functions reliably and produces consistently high quality effluent which discharges into the Clutha River. The capacity of the river enables high levels of mixing.

Alexandra wastewater treatment plant



The performance of the wastewater system is excellent. Monitoring indicates that the plant is operated efficiently. However there are issues with faecal coliforms in the discharge water and sludge drying and disposal.

Sludge is dried in beds, and is removed by the Utilities Contractor to an appropriate and consented disposal location at Victoria Flat Landfill.

Improving sludge drying and disposal is being investigated by with an in-bag sludge drying trial is underway. Sludge disposal by worm farming is being trialled at present

Sludge drying beds

Autodiallers at the treatment plant and some pump stations provide alarms that give warnings of failures that may cause potential overflows. There is little long term capacity to store wastewater in the event of a system failure.

Opus International[7] reported no overflows for the 04/05 year in its statement of service performance.

It did note one non compliance in the standard of the treated effluent on one characteristic only. This is considered very minor.

7.3.3 Suitability

The 2005 resident opinion survey identified 92% satisfaction the wastewater system.

[7] Opus International report on service performance for Councils SSP statement.

Alexandra waste water system has suitability deficits, ie:

- There is a lack of storage to cover breakdowns and electricity failures
- There is no ability to shut down the treatment plant for maintenance
- The condition of wetted structures in the treatment plant is unknown

7.3.4 Demand

The wastewater treatment plant is estimated to be sufficient for the daily flows received in a full year. The plant operational review undertaken in 2004 determined plant was well operated producing quality effluent.

Average daily summer flows are 1,560m³ per day, with the peak flow at 2,540m³ per day. There would be capacity to service in the order of a 25% increase in population if inflow/infiltration peaks can be managed.

The reticulation and pumping is adequate for the present population. There are known sections of the gravity reticulation that are close to capacity. Pump capacity is under utilised, running only 2 to 4 hours per day. However, there is evidence of infiltration during infrequent heavy rain events.

Council is to install ultra violet light treatment to the discharge pipework, to provide improved e coli levels in final discharge. Local Iwi have accepted ultra violet disinfection as a surrogate for land based treatment.

7.3.5 Concerns and Risks

Concerns about aspects of the Alexandra wastewater water system are:

Concern	Level
Inability to dry sludge satisfactorily, especially in winter	4
Minimal back up storage capacity at pump stations	3
Failure of electricity to pumps in an extreme flood	3
Peaks approaching capacity limits	2

7.3.6 Development Possibilities

Issue – Alexandra Wastewater	Indicative Cost	Priority
Installation of Ultraviolet Disinfection	$300,000	4
Emergency Conveyance (generators or storage)	$459,000	3
Reticulation Renewals	$210,000	3
Sludge Processing and Disposal (worm farming option)	$120,000	3
Reticulation Modeling	$15,000	2

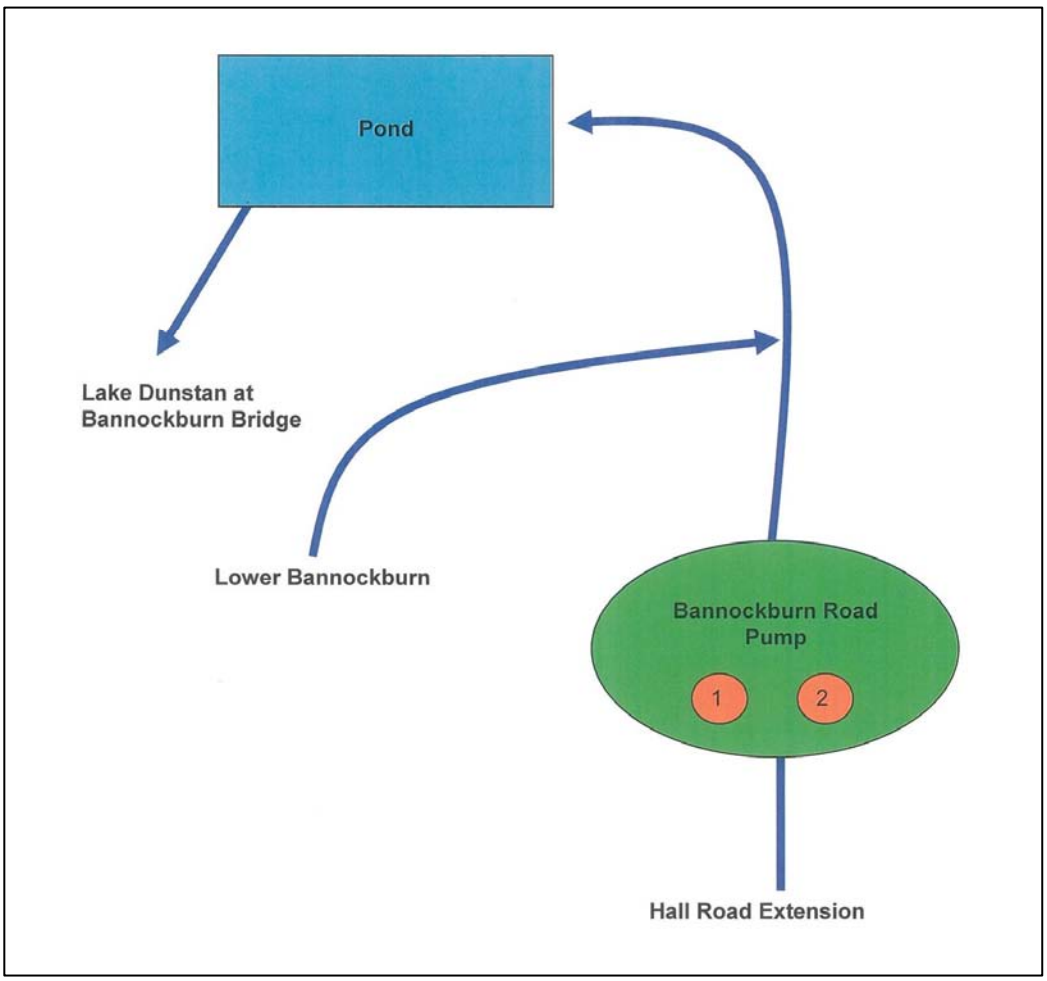
7.4 Bannockburn Town

7.4.1 Description

The Bannockburn Town is serviced by a reticulated wastewater system.

The serviced area has a resident population of 130.

System Diagram



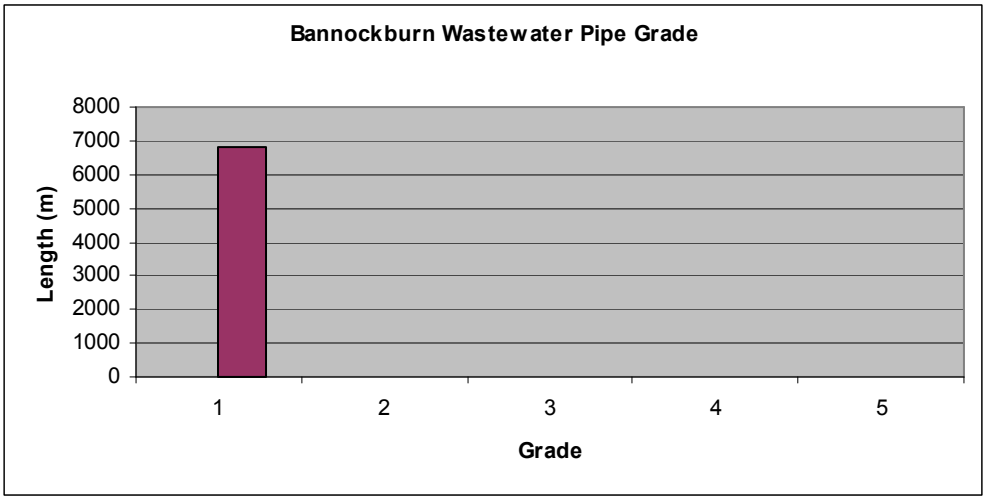
7.4.2 Assessment

7.4.2.1 Wastewater Collection

Bannockburn has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced.

The collection system has one pump station, otherwise it is gravity driven.

Pipes are largely of a similar age, condition and performance.



7.4.2.2 Wastewater Treatment

The treatment plant is distant from residential areas of the town. Treatment is by a single oxidation pond. Effluent discharges to Lake Dunstan by a submerged outlet attached to one of the piers of the Bannockburn bridge. There is moderate water movement at this location as the total flow of the Kawarau river passes this narrowing of the lake. Mixing and dilution should be effective.

Discharge monitoring is limited to resource consent condition.

The performance of the wastewater system is sound.

7.4.3 Suitability

The 2005 resident opinion survey identified 90% satisfaction the wastewater systems in this ward.

This system is of recent construction using modern materials, is in good condition and performs satisfactorily.

7.4.4 Demand

The wastewater treatment plant operates efficiently and well within its capacity. There is significant spare capacity available in the existing pond, with room for another in the pond.

7.4.5 Concerns and Risks

Concerns about aspects of the Bannockburn wastewater water system are:

Concern	Level
Silting in Kawarau Arm effecting outfall	2

7.4.6 Development Possibilities

Issue – Bannockburn Wastewater	Indicative Cost	Priority
Emergency Conveyance Study	$22,000	3
Land Purchase	$10,000	1

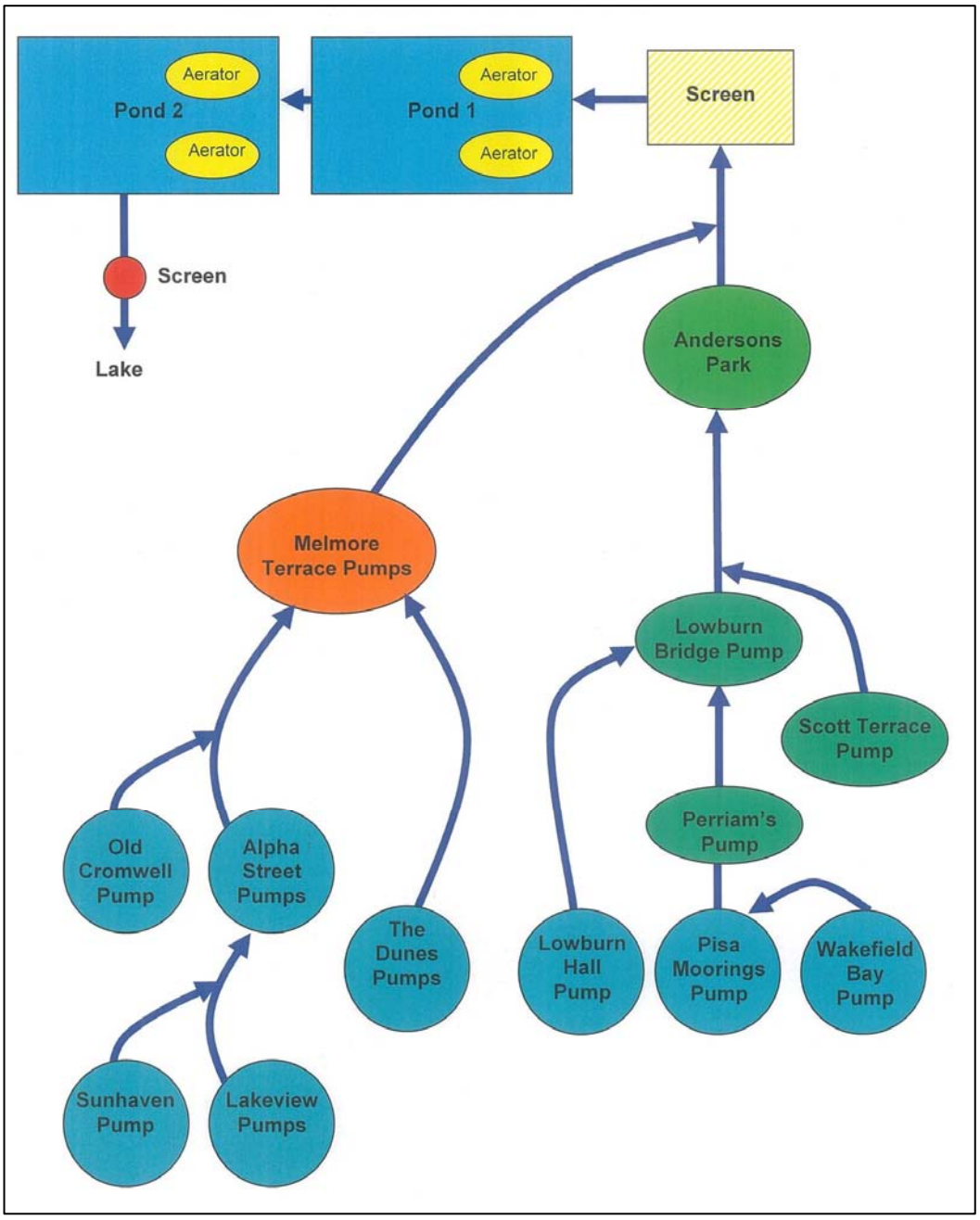
7.5 Cromwell Town

7.5.1 Description

Cromwell town, Lowburn and Pisa Moorings are serviced by a reticulated wastewater system.

The serviced area has a resident population of 4,400; over the Christmas holiday period visitors increase this to over 7,000 for several weeks.

System Diagram



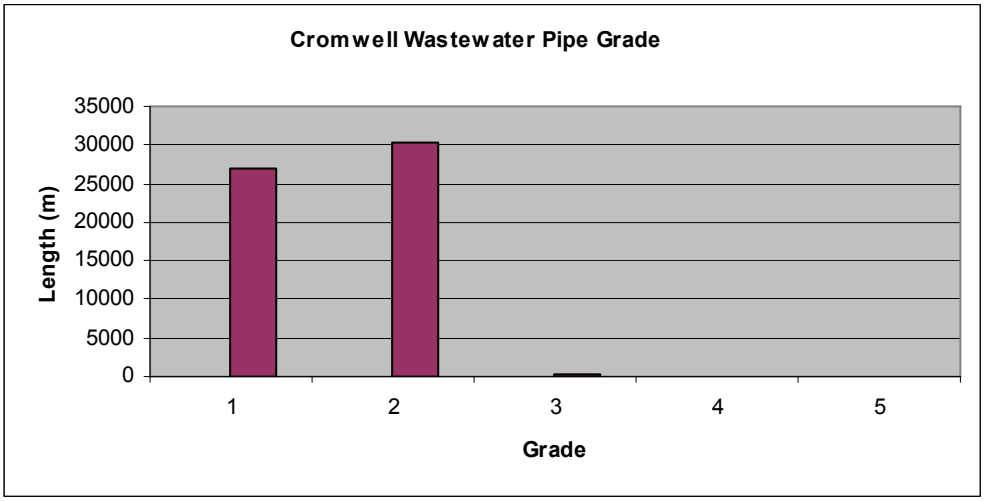
7.5.2 Assessment

7.5.2.1 Wastewater Collection

Cromwell has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced. In the past a meat works (the now closed Heartland Prime Meats) placed considerable extra loading on the treatment system. There are a number of wineries in the area that are connected to the reticulation. A trade waste permit system operates. This controls service activities such as food premises and processors, wineries, hotels, and dentists.

In the past extreme rain events are suspected of causing overloading of pumping and storage capacity. Improved operating procedures and manual operation of pumping during extreme events has mitigated the risk of overflows which could pollute Lake Dunstan.

Pipes are generally of modern materials and construction as a result of upgrading and extension of Cromwell services as part of the Clyde Dam construction. Substantial subdivision has also resulted in additional modern reticulation. There has been an ongoing renewal programme in the older part of Cromwell.



7.5.2.2 Wastewater Treatment

A pair of oxidation ponds with aerators treat effluent. The inflow channel has recently been fitted with a mechanical screen to remove coarse materials.

Sludge levels in one pond are significantly reducing its effective volume. This is being assessed, and desludging of one pond may soon be required. Desludging would extend retention times and improve the quality of discharged water.

The outfalls discharge at depth below the surface of Lake Dunstan. The outfalls are upstream of the high use lakeshore near historic Old Cromwell. Because of its outflow depth, the influence of substantial flows of the Kawarau River in this part of Lake Dunstan adverse effects are unlikely. About 500 metres down stream and opposite the outfall is the water intake that supplies about 10 houses at Cornish Point. The relative flows in the Clutha and Kawarau Arms of Lake Dunstan make it most unlikely that Cromwell Town water supply intakes could ever be affected.

Discharge monitoring indicates non consent conforming suspended solids and flow peaks occur in summer. Coliforms do not follow this trend and there appear to be no associated biological risk associated with these peaks. Improvements in operating have reduced biological oxygen demand and further transgressions are unlikely.

There have been odour problems generally during spring normally lasting 2-4 weeks. This has caused significant concern in the surrounding community.

Aerator operating in Oxidation ponds

Autodiallers at the treatment plant and pump stations provide alarms. These give warnings of failures that may cause potential overflows. There is little long term capacity to store wastewater in the event of a system failure.

The performance of the wastewater system is sound.

7.5.3 Suitability

The 2005 resident opinion survey identified 98% satisfaction with the wastewater system in this ward.

Cromwell's wastewater system fulfills the needs of residents.

7.5.4 Demand

The wastewater treatment plant operation was limited by dissolved oxygen levels[8]. Subsequent installation of aerators should have resolved this problem. As meat works effluent no longer enters the ponds further capacity has been made available to service anticipated growth.

Discharge volumes permitted by resource consents are being approached seasonally. With flow smoothing there is considerable available capacity, however, accuracy of the flow measuring device has been questioned. Actual flows to be determined.

7.5.5 Concerns and Risks

Concerns about aspects of the Cromwell wastewater water system are:

Concern	Level
Sludge Buildup in ponds	4
Peaks approaching pump capacity limits	3
Inflow and infiltration	3
Pond aeration	3
Contamination caused by overflows	2

7.5.6 Development Possibilities

Issue – Cromwell Wastewater	Indicative Cost	Priority
New Aerators	$75,000	5
Sludge Disposal (worm farming option)	$250,000	3
Emergency Conveyance (generators or storage)	$81,000	3
Consider Land Based Treatment	$300,000	2
Ponds Process Upgrade	$100,000	2
Reticulation Modeling	$15,000	2

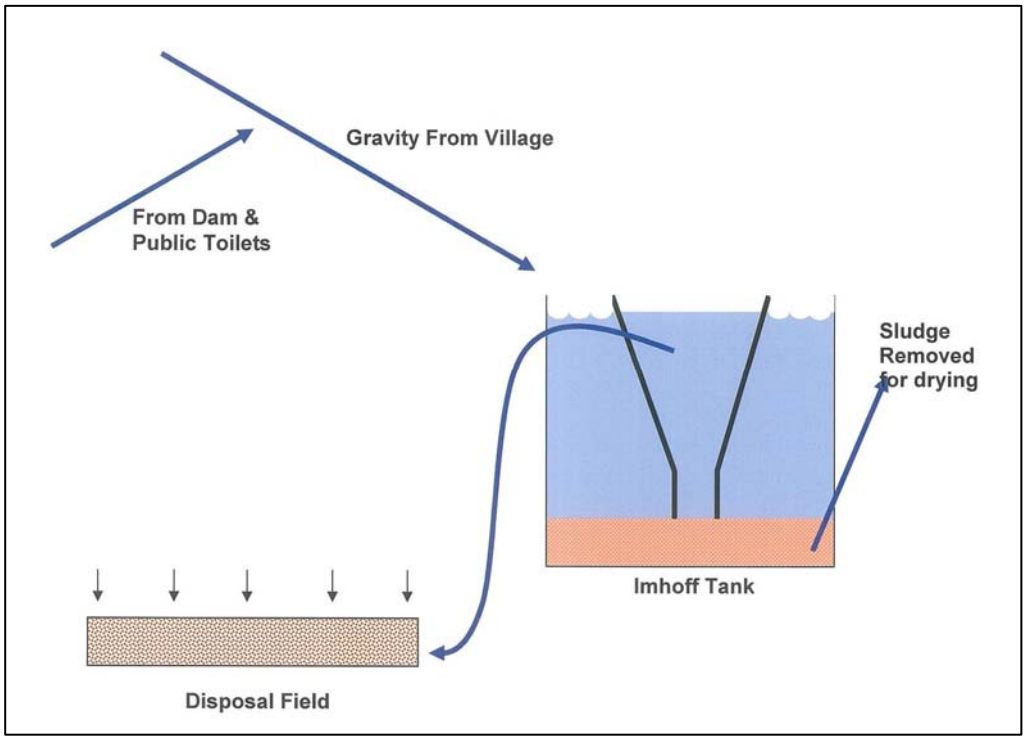
[8] Duffill Watts & King Ltd, Resource consent application report September 1996 p27

7.6 Lake Roxburgh Village (LRV)

7.6.1 Description

Lake Roxburgh Village is serviced by a reticulated wastewater system.

System Diagram

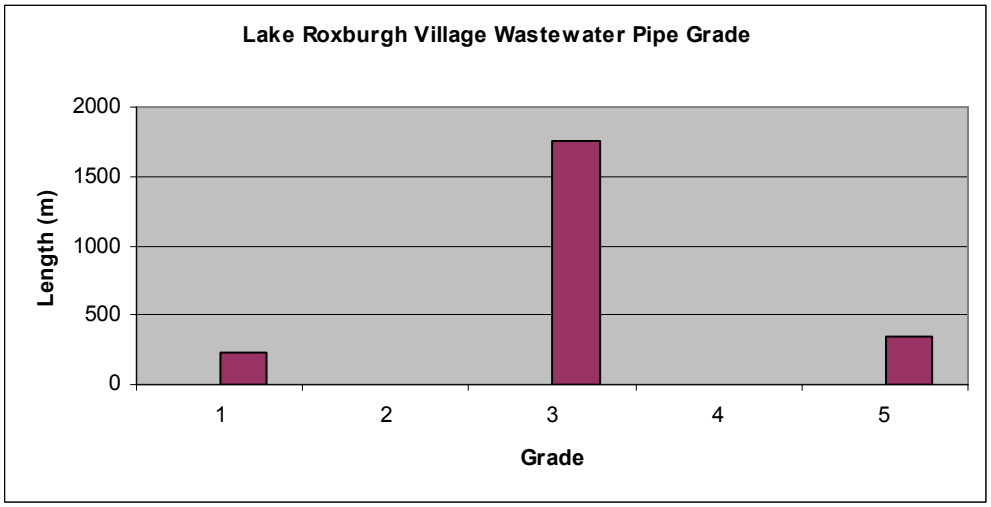


7.6.2 Assessment

7.6.2.1 Wastewater Collection

LRV has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced.

The collection system is entirely gravity driven. It was constructed at the time of construction of the Roxburgh Dam.



Pipes are largely of a similar age. Pipe condition and performance is adequate, though pipes are all close to 50 years old.

7.6.2.2 Treatment

The treatment plant is well removed from residential areas of the town. Treatment is by an Imhoff Tank and effluent is disposed of to land through a recently constructed upstream disposal field.

Discharge monitoring is limited to resource consent condition requirements.

The performance of the wastewater system is sound.

7.6.3 Suitability

The 2005 resident opinion survey identified 100% satisfaction with the wastewater systems in this ward.

Although this system is old it is well constructed and functions satisfactorily.

7.6.4 Demand

The wastewater treatment plant operates efficiently and well within its capacity. The system was designed and has functioned with a fully occupied village, at present the village is about only 60% permanently occupied. As there is minimal development occurring at LRV, the scheme is adequate for the foreseeable future.

7.6.5 Concerns and Risks

Concerns about aspects of the Lake Roxburgh wastewater water system are:

Concern	Level
Aging Pipes	2

7.6.6 Development Possibilities

Issue – Lake Roxburgh Village Wastewater	Indicative Cost	Priority
CCTV Inspections	$5,000	2

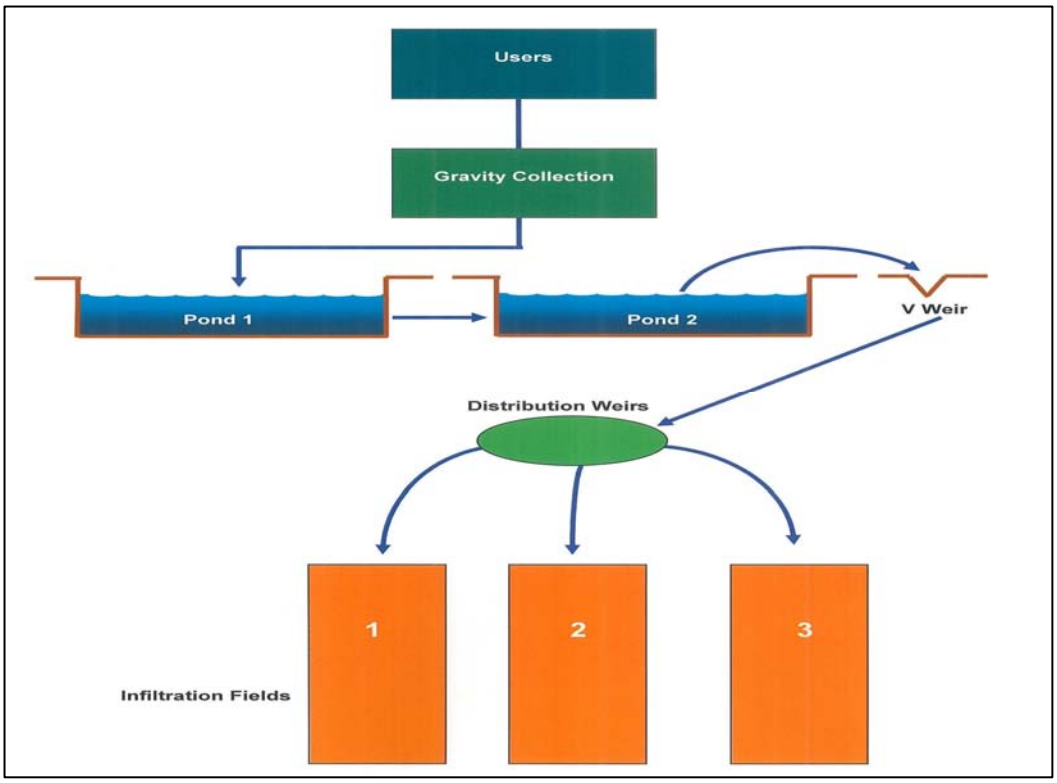
7.7 Naseby Town

7.7.1 Description

Naseby town is serviced by a reticulated wastewater system.

The serviced area has a resident population of 130.

System Diagram

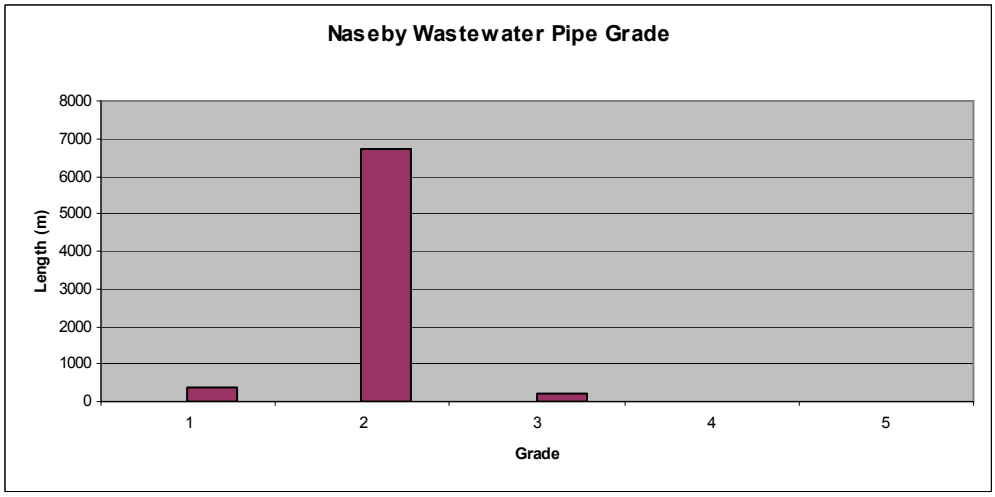


7.7.2 Assessment

7.7.2.1 Collection

Naseby has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced. A trade waste permit system operates. This controls service activities such as food premises and hotels.

The collection system is entirely gravity driven.



Pipes are largely of a similar age. Pipe condition and performance is adequate.

7.7.2.2 Treatment

The treatment plant is well removed from residential areas of the town, treatment is by two oxidation ponds and disposal is through seepage disposal fields to land.

Discharge monitoring indicates discharges conform with consents.

The performance of the wastewater system is sound.

7.7.3 Suitability

The 2005 resident opinion survey identified 100% satisfaction the wastewater systems in this ward.

7.7.4 Demand

The wastewater treatment plant operates efficiently and is well within its capacity. The likely growth of Naseby is as a holiday home destination and the surrounding forest limits expansion.

7.7.5 Concerns and Risks

Concerns about aspects of the Naseby wastewater water system are:

Concern	Level
High short duration seasonal use	2

7.7.6 Development Possibilities

Issue – Naseby Wastewater	Indicative Cost	Priority
CCTV Inspections	$10,000	2

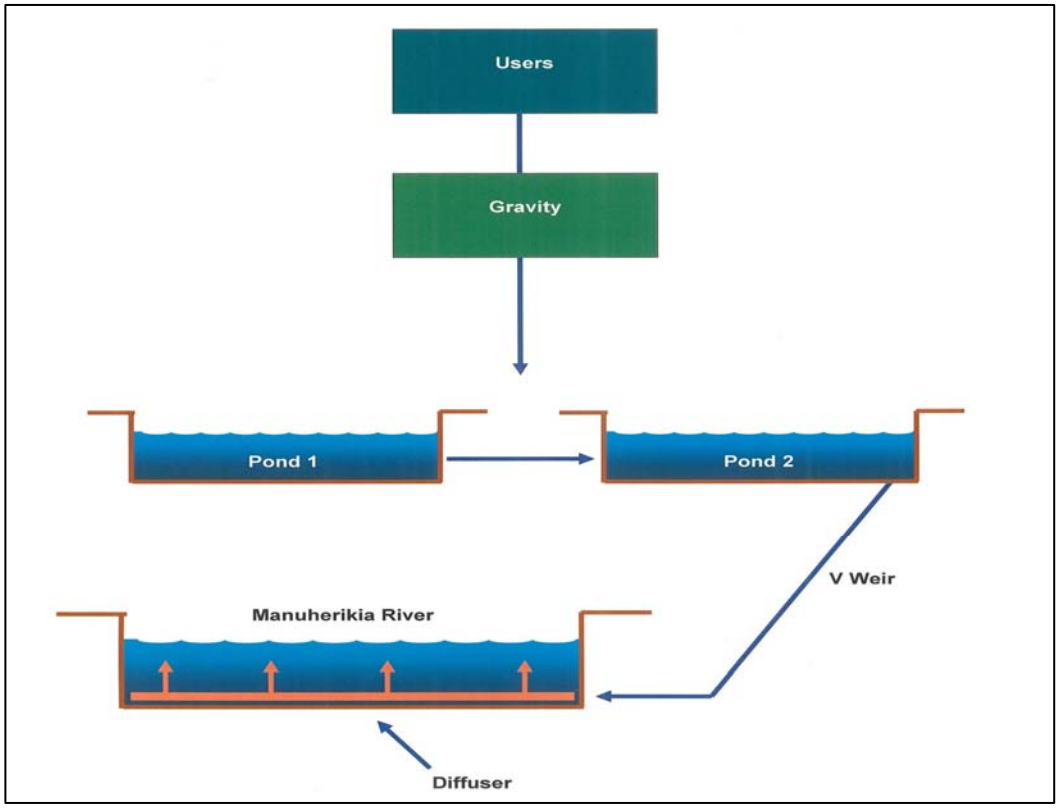
7.8 Omakau Town

7.8.1 Description

Omakau town is serviced by a reticulated wastewater system. Unlike water, Ophir is not serviced by a joint system with Omakau.

The serviced area has a resident population of 350.

System Diagram

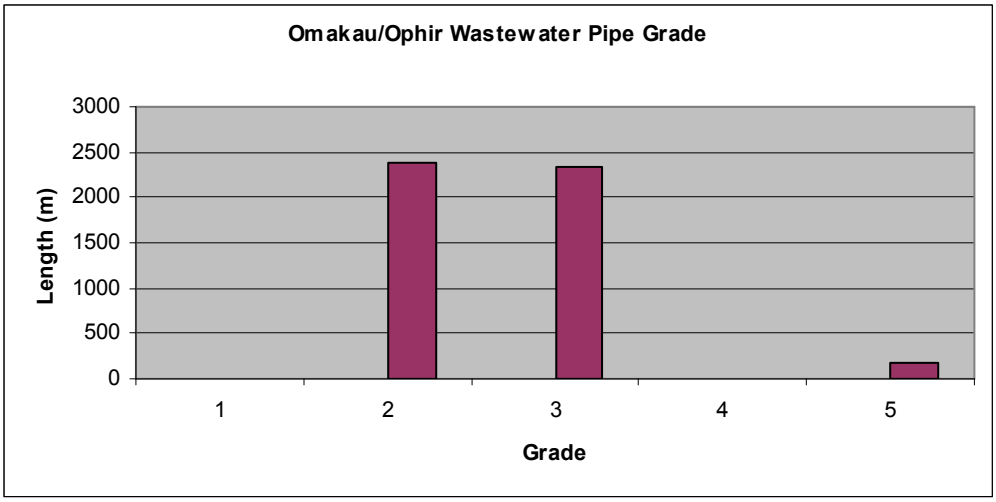


7.8.2 Assessment

7.8.2.1 Collection

Omakau has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced. A trade waste permit system operates. This controls service activities such as food premises and hotels.

The collection system is entirely gravity driven.



Pipes are largely of a similar age. Pipe condition and performance is adequate.

7.8.2.2 Treatment

The treatment plant is well removed from residential areas of the town, treatment is by two oxidation ponds and disposal is through a recently constructed diffuser buried in the Manuherikia River.

Discharge monitoring indicates wide fluctuations in quality and volume. The flow dry weather flow limit is 80m^3 per day and the wet weather 350m^3. The fluctuations on the graph fit within these criteria.

The performance of the wastewater system is sound.

7.8.3 Suitability

The 2005 resident opinion survey identified 75% satisfaction the wastewater systems in this ward (with Clyde being the likely area where dissatisfaction is highest).

The Manuherikia River suffers from agricultural pollution, particularly during summer low flows and so good quality effluent is imperative.

7.8.4 Demand

The wastewater treatment plant operates efficiently and well within its capacity. Growth of Omakau town is modest and flow indications on the compliance graph indicate the existing system is likely to be adequate for some time.

There is a desire from Ophir residents to potentially be connected to the reticulated system. This will be investigated.

7.8.5 Concerns and Risks

Concerns about aspects of the Omakau wastewater water system are:

Concern	Level
Inflow and infiltration	3

7.8.6 Development Possibilities

Issue – Omakau Wastewater	Indicative Cost	Priority
Extensions to Ophir	$200,000	3
Sludge Disposal (worm farming option)	$75,000	3
Emergency Conveyance Study	$12,000	3
New Aerators	$75,000	2

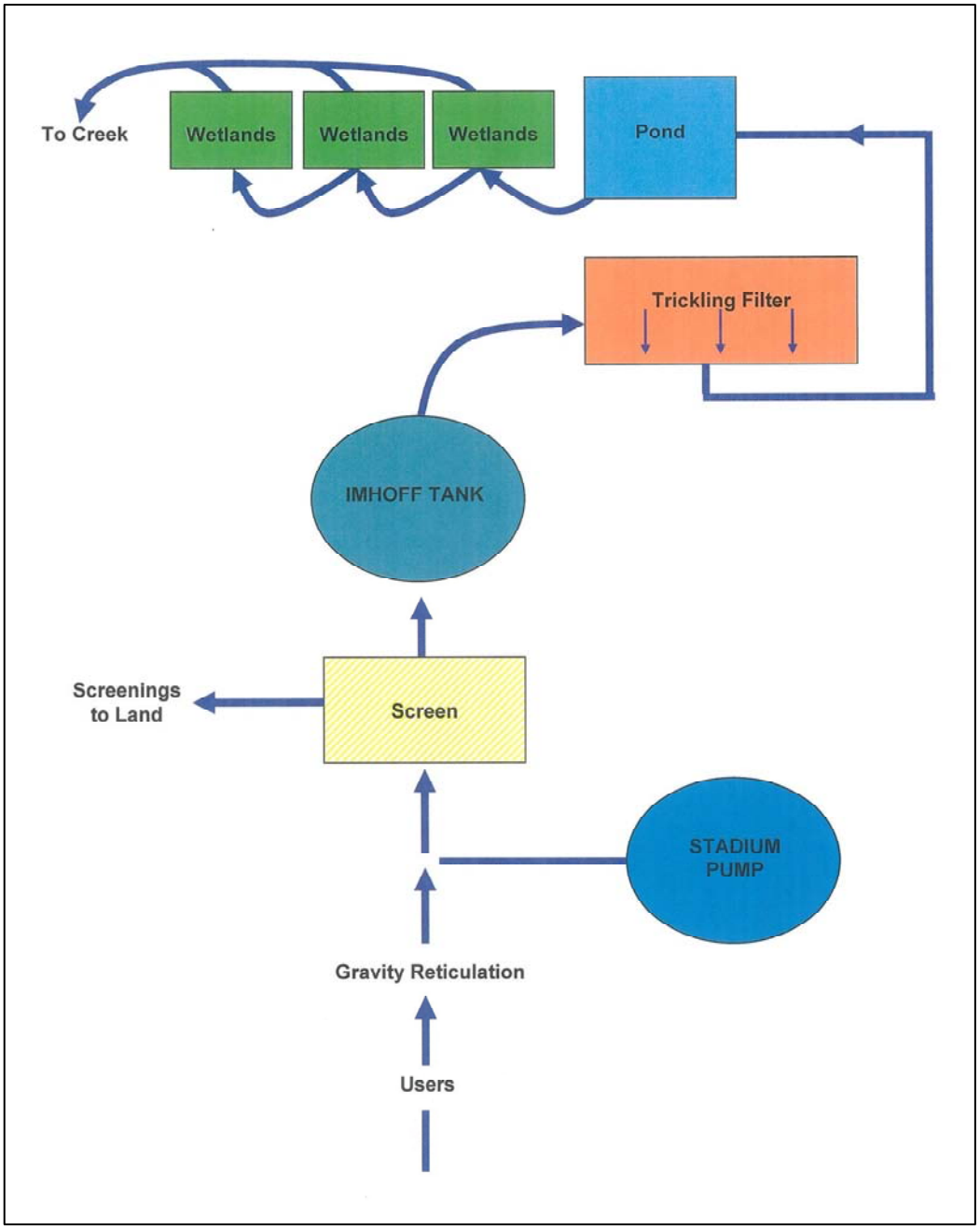
7.9 Ranfurly Town

7.9.1 Description

Ranfurly town is serviced by a reticulated wastewater system.

The serviced area has a resident population of 870.

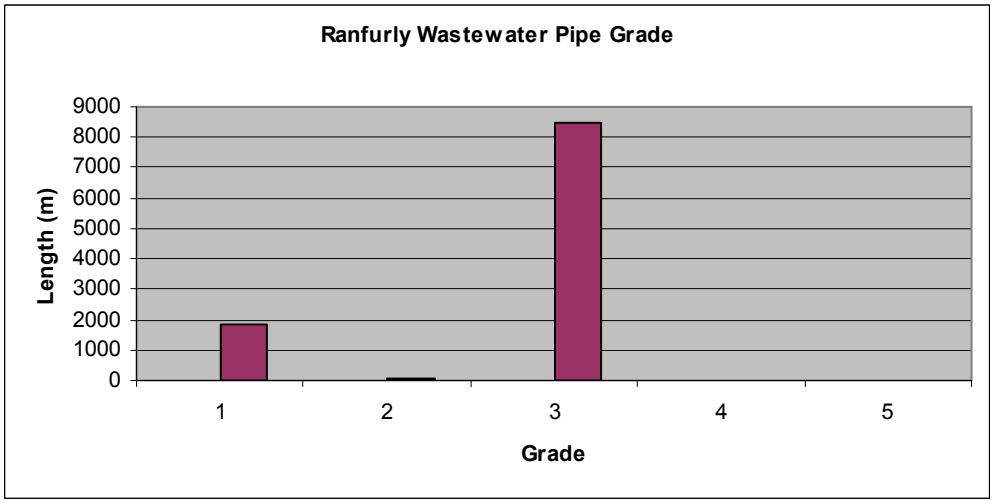
System Diagram



7.9.2.1 Collection

Ranfurly has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced. A trade waste permit system operates. This controls service activities such as food premises, hotels, and dentists.

The collection system is entirely gravity fed. Gradients are relatively flat but the system functions well. The only pump in the system services the sports stadium.



Pipes are largely of rubber ring jointed concrete construction and nearly all of a similar age.

Pipe condition and performance is adequate.

The treatment plant is sited away from residential areas of the town.

The performance of the trickling filter and, to a lesser degree, the Imhoff tank, are affected by solids build up.

Discharge monitoring indicates discharges conform with consents. The wetlands are designed to improve effluent quality to improve environmental health of the small receiving waters they discharge into. Effluent flows often exceed the volume of the stream.

The performance of the wastewater system is sound.

7.9.3 Suitability

The 2005 resident opinion survey identified 100% satisfaction the wastewater system in this ward.

7.9.4 Demand

The wastewater treatment plant operates efficiently and well within its capacity.

There is only slow growth of Ranfurly town and the capacity of the reticulation and treatment is adequate for the foreseeable future.

7.9.5 Concerns and Risks

Concerns about aspects of the Ranfurly wastewater water system are:

Concern	Level
Trickling filter in poor condition	4
Contamination caused by overflows	2
Complex treatment plant	1

7.9.6 Development Possibilities

Issue – Ranfurly Wastewater	Indicative Cost	Priority
Installation of Primary Screen at WWTP	$64,000	5
Remove Trickling Filter	$5,000	5
CCTV Inspections	$10,000	2

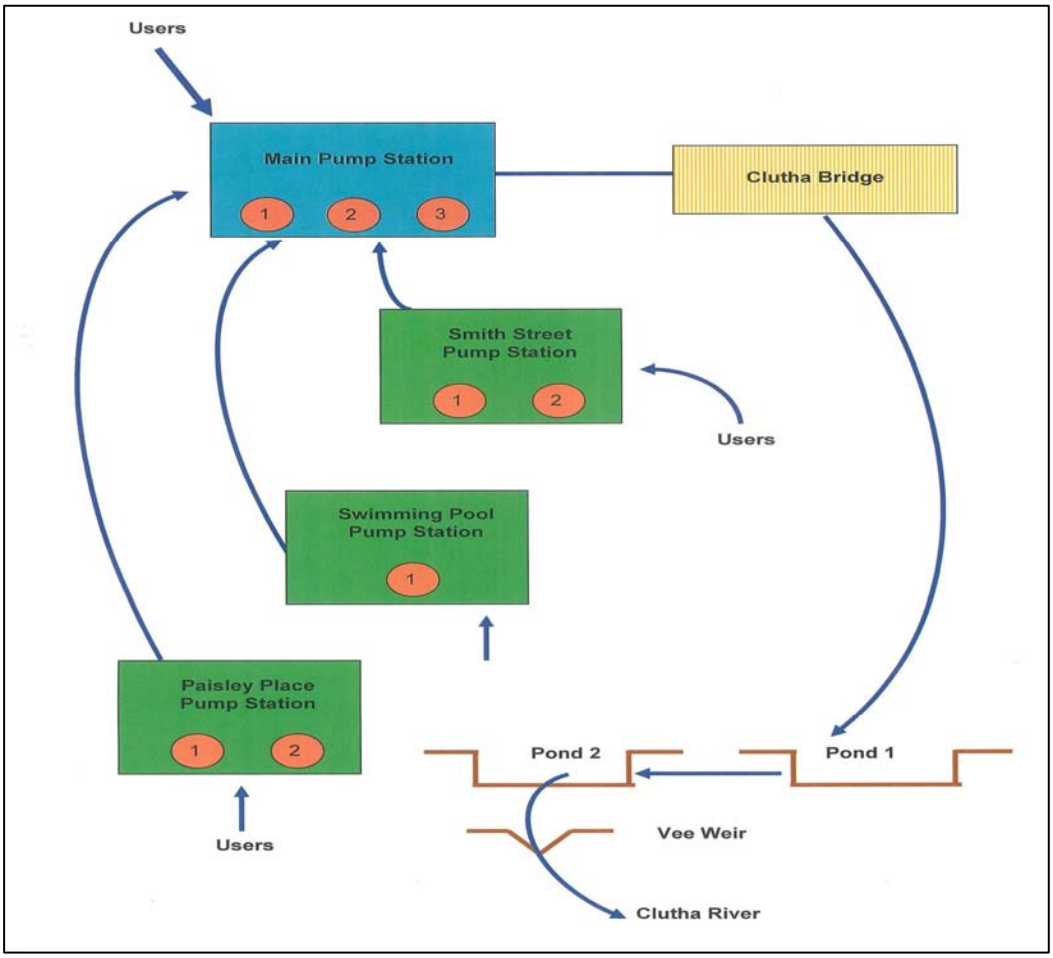
7.10 Roxburgh Town

7.10.1 Description

Roxburgh town is serviced by a reticulated wastewater system.

The serviced area has a resident population of 900.

System Diagram



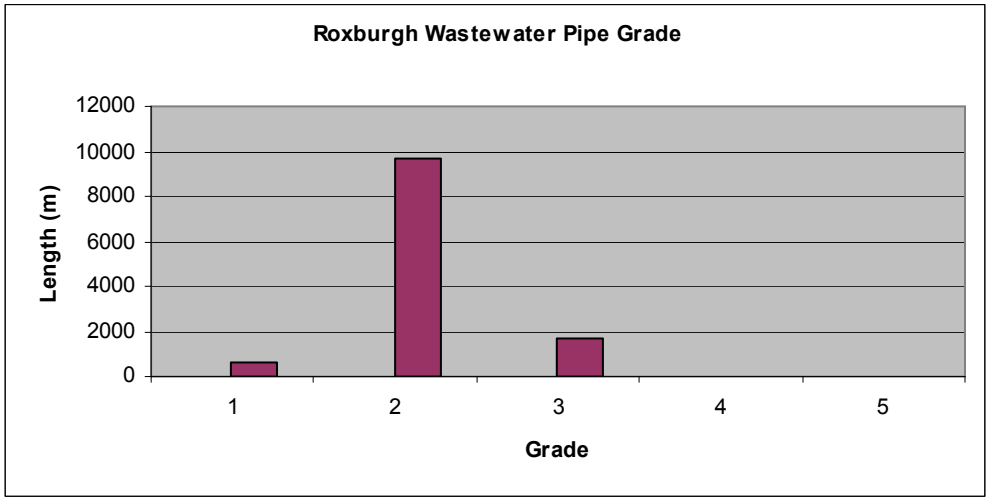
7.10.2 Assessment

7.10.2.1 Wastewater Collection

Roxburgh has a dedicated wastewater collection system. The effluent is almost entirely domestic sourced. There is a childrens' health camp and pie manufacturer, but these do not significantly alter wastewater characteristics. A trade waste permit system operates. This sets discharge conditions for activities such as food premises, hotels, and dentists.

Pumps collect and transfer effluent to the treatment ponds on the opposite side of the Clutha River from the town.

Pipes are generally of modern age and condition.



Pipe performance is adequate.

Risk of environmental contamination during flood events has been reduced by raising electrical controls above expected flood levels and sealing pump chambers so that they can continue to function during floods. Storage capacity to cope with pump and electrical failures is limited.

7.10.2.2 Wastewater Treatment

A pair of oxidation ponds treats effluent. Ponds are well removed from the town and screened by forest. Caution needs to be exercised to ensure that gravel extraction operations do not undercut and cause leakage of the ponds. The outfall is into a rapid flowing section of the Clutha River. Dilution and mixing is very rapid.

Discharge monitoring indicates discharges conform with consents and the absence of large fluctuations indicates a stable operating balance exists.

Autodiallers at pump stations provide alarms. These give warnings of failures that may cause potential overflows. There is little long term capacity to store wastewater in the event of a system failure.

The performance of the wastewater system is sound.

7.10.3 Suitability

The 2005 resident opinion survey identified 100% satisfaction with the wastewater system in this ward.

The Roxburgh waste water system is well matched to the requirements of the town.

7.10.4 Demand

The wastewater treatment plant operates efficiently and well within its capacity. Town growth is slow and there is sufficient capacity for the foreseeable future.

7.10.5 Concerns and Risks

Concerns about aspects of the Roxburgh wastewater water system are:

Concern	Level
Pump station storage capacity	3
Outfall pipe outlet exposed during low river flows	3
Flooding causing pollution	1

7.10.6 Development Possibilities

No significant development is required.

Issue – Roxburgh Wastewater	Indicative Cost	Priority
Extend Discharge Pipe	$4,000	5
Emergency Conveyance (generators or storage)	$50,000	3
CCTV Inspections	$5,000	2

7.11 Private Wastewater Disposal

7.11.1 Description

Wastewater is treated on site in rural areas and in Clyde town. On site treatment is usually by septic tank or similar system. Disposal is by way of drainage fields.

There is a wide range of soil types in Central Otago with extensive areas of very permeable light soils and considerable areas of restricted permeability loess and clay derived soils. The variability of soils impacts on the performance of disposal fields.

7.11.2 Assessment

There are approximately 530 residences in Clyde town serviced by individual on site waste water treatment and disposal systems and there is in in the order of 1,000 other rural residences serviced throughout the district. In addition to these residences there are rural businesses and publicly accessible facilities such as hotels, garages, camping grounds, and schools that are serviced by on site services.

Two private wastewater treatment facilities are known to exist in Central Otago; a small Inhoff treatment plant associated with the Clyde Hotel and an oxidation pond associated with the ex Waipiata Sanatorium. Both have resource consents from the Otago Regional Council who confirm their compliance. Council understands both are adequately managed by owners who have taken professional advice on operating their facilities.

Regulations controlling the quality of construction of on site waste water services is administered under the Building Act. The Resource Management Act provides a basis for requiring specific provisions to address design and management of new systems. Already existing systems do not fall within any compliance or monitoring regime.

In addition Dunstan Hospital has its own wastewater treatment plan. This was upgraded as part of the hospital redevelopment.

The on-site domestic wastewater management standard AS/NZS1547:2000 changed the emphasis for domestic wastewater disposal from permeability focus, (draining away) to absorption in surface soils. Application of this standard should reduce the risk to ground waters, and the management plans required should ensure ongoing quality management. The application and acceptance of this standard is not yet universal in Central Otago. Site assessment methodology set out in the standard should reduce the number of drainage field failures.

Generally systems function to the satisfaction of the residents. It is however likely that the irregular pumping out of sludge and scum periodically compromises the functioning of many septic tanks.

Sludge and scum from septic tanks are removed by private contractors. Council accounts show only a tiny amount of the resultant septage is entering Council treatment plants. An Otago Regional Council ruling on septage disposal allows dispersal on low value agricultural land.

Facilities that experience very large seasonal visitor numbers are likely to have their septic tanks and disposal systems overloaded for short periods. The extent of this and its impact on health and the environment is not known.

7.11.3 Health Impacts

Onsite wastewater systems have the potential to be of significant health impact. There are significant risks to groundwater domestic supplies that are close to disposal fields, particularly on free draining soils.

Surface dissipation disposal, the aim of the present waste water disposal standards may have the potential to provide moist soil breeding grounds for insect pests , such as fungus gnats and cluster flies. The actual health impact of this is largely unknown.

7.11.4 Adequacy

The on-site domestic wastewater management standard AS/NZS1547:2000 provides a sound basis for on site treatment, disposal, design and management that provides reduced risk of environmental pollution and increased levels of public health assurance. If applied in conjunction with the Building Act and the RMA, on-site wastewater systems should be adequate for the foreseeable future.

7.11.5 Clyde

With over 800 permanent residents, Clyde is by far the biggest community in the District without a reticulated wastewater system.

The large section sizes and good subsoil conditions, have meant that there are negligible reported wastewater problems. In addition there is no evidence of public health risk.

Notwithstanding that, Council recently commissioned a study to look at long term waste disposal options.

The Community Board has indicated that long term it would like to consider a centralised reticulation system with standalone treatment and disposal at an indicative cost of between $7-10 million. Timing of this project would rely on success of obtaining part funding from the MOH Sanitary Works Subsidy Scheme (SWSS) and community acceptance.

In the interim Council is monitoring groundwater for indications of pollution, looking to designate Council owned land for waste disposal purposes, and undertaking a preliminary assessment of meeting SWSS criteria.

8. Stormwater Services

8.1 General

Due to the climate and geography of the District being similar, the entire district has been considered as one community.

Council regards stormwater as a discretionary activity.The level of service throughout the district aims to dispose of stormwater in a manner which allows safe movement of inhabitants throughout the district. A low level of infrastructure development is sufficient to achieve this.

8.2 Description

8.2.1 Climate Consideration

Central Otago experiences low rainfalls and so the importance of stormwater from a disposal viewpoint is low. Stormwater systems are used on only a few occasions a year when heavy rainfall occurs. Areas without reticulated stormwater suffer inconvenience for a few hours following rainfall events. There is negligible risk to property, access or the continuation of business where there is absence of reticulation.

The need for stormwater systems is so low and the risk of absence of a stormwater service so small that any significant expenditure on universal reticulation is not justified.

8.2.2 System Descriptions

Stormwater systems have three components in Central Otago:

- limited zones of piped stormwater disposal
- surface drainage disposal largely in street kerbs and channels
- soakage pits and caldwell hole drains

Piped reticulation services do not cover extensive areas of most towns. No town is entirely reticulated. Generally reticulation is in zones in industrial or shopping areas or where located close to rivers and streams. A mapped location of stormwater has not been included in this assessment, but is available at Council.

8.3 Assessment

8.3.1 Collection

Soil and land erosion from stormwater is a significant hazard in Central Otago towns.

Stormwater pipes throughout the district are almost completely Grade one or two (ie. in good condition).

System sizes are indicated by the table below

Town	Metres of pipe	Condition
Alexandra	14,815	1
Clyde	350	3
Cromwell	24,705	2
Lake Roxburgh Village	960	2
Omakau	140	3
Ranfurly	2,242	3
Roxburgh	2,435	2

Points of note on piped reticulation are:

- Cromwell town has the most extensive piped stormwater installed as part of the Clyde Dam upgrade of town services. This drains to Lake Dunstan.
- Alexandra has partial stormwater reticulation draining to the Clutha and Manuherikia rivers. Lower areas of Alexandra are contained within floodbanks, Stormwater normally gravity drains through these. At very high river levels storm water has to be pumped over stop banks, pumps and the supply arrangements for generators have never had to be used. High sewer flows during rainfall suggests direct stormwater connections in non-reticulated areas.
- Clyde has very little piped stormwater.
- Omakau has pipes that clear run-off from farmland inland of the town through the town to the Manuherikia river.
- Naseby is sufficiently hilly for roadside channels to function well albeit causing some issues after cloudbursts, which are currently being investigated.
- Ranfurly has open channels which handle most stormwater adequately considering relatively flat gradients. Small sections of these channels are piped.
- Roxburgh drains well because of its slopes except for a zone inland of the river behind the shopping area – this zone is the only area of significant long duration stormwater nuisances in Central Otago.

8.3.2 Disposal

Surface drainage using kerb and channel functions well and is fit for purpose in Central Otago's climate. Run-off is either piped to natural water courses from kerb mud tanks or disposed of to soakage structures.

Soakage structures are widely used in Central Otago. These dispose of stormwater from kerb mud tanks, individual buildings and hard paved areas. Soakage pits require rebuilding occasionally and performance slowly declines with age. Poorly constructed pits sometimes experience surrounding ground

sinkage. This is significant if pits are located too close to buildings, footpaths and roads.

Most kerb mud tank disposal pits are constructed by filling a Caldwell drill hole some metres deep with coarse stones with a perforated inlet pipe in the centre of the stones. These widely used structures have the potential to introduce pulses of contaminated stormwater directly and rapidly into ground waters. This is of concern. It is also of concern that this design is occasionally copied and used for wastewater disposal because of ease of construction, functionality and out of sight, out of mind. Similarly orchard sprayer mixing and wash down pads sometimes drain to this type of pit.

8.3.3 Stormwater Quality

The infrequent and sporadic functioning of stormwater systems is likely to increase their potential for pollution. Accumulation of contaminants such as oils and exhaust products on pavements for extended periods between rainfalls may mean that first flushes of stormwater are significantly contaminated.

Kerb mudtanks almost universally capture grits and floating debris satisfactorily. A regular maintenance programme is in place.

The disposal of inappropriate and potentially hazardous waste to stormwater is a potential risk. This comes from two sources:

- inappropriate disposal of liquids into kerb mudtanks – incidents known to occur include campervan wastes, used oils and antifreezes and wash rinse waters, both commercial and residential.
- connections from commercial activities – these include connections of commercial and industrial sites where contaminants are rinsed or dumped onto hard paving and thus enter stormwater. Examples known are:
    - petrol station forecourts and tyre companies
    - transport and agricultural service yards and sprayers
    - wineries

Trade waste bylaws are not applied to stormwater connections and so trap structures are not always required or adequate to prevent stormwater contamination.

8.4 Hazards and Risks

Stormwater disposal possibly poses significant risks to the water quality of the receiving environment. There is evidence and parallel examples that point to the possibility of significant public health risk from stormwater contamination to ground water supplies. Alexandra is vulnerable to this hazard. Potential specific hazards of concern in Central Otago are:

- first flush contamination from streets to small streams and rivers
- inappropriate septage disposal from campervans

- antifreezes from tyre and radiator service businesses
- agricultural spray residues from orchards, vineyards and commercial weedspray contractors
- winery flushings, colouring and foaming natural waters

Lower sections of Alexandra contained within the flood banks could be at risk of serious contamination from storm water flooding in an extreme flood event. There is the possible interruption of electrical supply to the pumps and the disruption of transport networks preventing generator transport caused by the same weather event. This may result in upward movement of groundwater inside the flood banks causing structural damage to buildings and services. At the same time waters contaminated with sewage would be contained within the flood banks and not diluted and flushed away by flood water flows as in the past.

8.5 Suitability

Public health and the environment are exposed to risks and hazards from stormwater. Evaluating their impacts is a function of frequency and the impact of an event. Low event frequency and size makes hazards to public health and the environment small. The large size of many receiving water bodies offers rapid dilution should an unforeseen incident occur.

Stormwater disposal services in Central Otago are required at a lower level than in most of New Zealand. Existing services are adequate, economic and appropriate. Public health and the environment are not compromised.

8.6 Concerns and Risks

Concerns about aspects of the storm water systems are:

Concern	Level
First flush contaminations	3
Inappropriate disposal via system	2
Cost of provision in relation to benefit gained	1
Soak pit contamination of groundwater	1

8.7 Development Possibilities

	Cost	Priority
Promote stormwater attenuation and treatment on new development	N/A	4
External piped reticulation to problem areas (Roxburgh)	$100,000	3

9. Public Toilets

9.1 Description of Publicly Accessible Toilets

9.1.1 Council Toilets

There is no direct statutory requirement for Council to provide public toilets, but requirements of the Health Act make provision of public toilets advisable. There is a history of public toilet provision and a public expectation of continued provision in Central Otago.

Provision of public toilets goes some ways to meeting Council's obligations under the Health Act to manage public health by reducing nuisances, offensive matter and matter harmful to health. Provision of public toilets manages the risk to public health from indiscriminate dumping of human excrement.

The obligation to provide publicly accessible toilets does not lie solely with Council. The Building Act places requirements on designers of new buildings used by the public to provide suitable toilets.

Council provides 46 public toilets throughout Central Otago. These toilets are either managed by Council contractors, through Reserves Committees or by other arrangements.

A range of standards and styles

The toilets are of mixed age and condition. A full detailed descriptive list is available in Council's Public Toilet Locality Register and accompanying photo folio.

Summary of Council Public Toilets

NAME	LOCATION	PANS	URINALS	HANDBASINS
Alexandra Library	41-43 Tarbert St	1		1
Tarbert St Building	39-41 Tarbert St	3	1	3
Alex Community Centre	3-15 Skird St	5	2	6
Pioneer Park	Centennial Ave	4	1	2
Golden Block Car Park	19 Brandon St	3	1	2
Molyneux Park	Molyneux Park Stadium	3	1	4
Molyneux Park	Molyneux Park	8	2	4
Molyneux Aquatic Centre	Molyneux Park	3		3
Fulton Hogan Cycle Park	Molyneux Park	2		2
Clyde Camping Ground	Block 1	4	1	2
Clyde Camping Ground	Block 2	4	1	2
Clyde Camping Ground	Ablution Block 1	7	1	10
Clyde Camping Ground	Ablution Block 2	4	1	1
Clyde Camping Ground	Swimming Pool	3	1	2
Masonic Lodge	26 Sunderland St, Clyde	3	1	2
Clyde Historical Museum	Fache St, Clyde	2	1	2
Lake Dunstan Rowing Club	Weatherall Creek	3	1	2
Champagne Gully	Clyde-Cromwell Road	3	1	2
Cromwell Mall	Lode Lane	5	1	2
Cromwell Mall	Cromwell Library	2		2
Cromwell Mall	Information Centre	2		2
Cromwell Swim Centre	Pavillion 3- 7 Barry Ave	4	1	4

NAME	LOCATION	PANS	URINALS	HANDBASINS
Anderson Park Pavilion	3-7 Barry Ave	5	1	4
Alpha St Reserve	Public Toilets	3	1	2
Pavillion	Alpha Street Reserve	2	1	2
Central Lakes Equestrian	Block 1, Ripponvale Rd	15	1	3
Central Lakes Equestrian	Block 2, Ripponvale Rd	3		3
Central Lakes Equestrian	Block 3, Ripponvale Rd	8	1	2
B/Burn Camping Ground	Domain Rd, Bannockburn	4	1	8
B/Burn Camping Ground	Domain Rd, Bannockburn	2		2
Lowburn Hall	Lowburn Valley Road	2		1
Ophir Swimming Pool	Ophir	2	1	
Omakau Reserve	Ablution Block	7	1	9
Wedderburn Hall	Ranfurly-Wedderburn Rd	2	1	2
Ranfurly Swimming Pool	Ranfurly	4	1	2
Naseby Public Toilet	Derwent St, Naseby	4	1	3
Naseby Swimming Dam	Swimming Dam Road	2	1	
Maniototo Stadium	Dungannon Street	3	1	2
Ranfurly Railway Station	Charlemont St East	3	1	2
Waipiata Domain	Waipiata	2	1	2
Patearoa Recreation Reserve	Patearoa Community Hall	3	1	2
Roxburgh Swimming Pool	Cheviot St, Roxburgh	3	1	2
Public Toilets	Scotland St, Roxburgh	4	2	4
Roxburgh Rec. Reserve	Scotland St, Roxburgh	2		2
Ettrick Hall	Roxburgh-Ettrick Road	1		1
Swimming Pool	Millers Flat	4	1	3
Public Toilet	Millers Flat	4	1	2

9.2 Assessment

Toilet locations are a result of response to public demand and as a result are generally in appropriate locations. There is a good geographic spread of toilets throughout the district.

Council has recently adopted a Public Toilet Strategy for Central Otago District. This strategy provides management guidance for Council toilets at three levels:

- A single high standard toilet at each major urban area where there is a tourist, travelling public and community demand. These toilets are funded by the district overall.
- Local toilets provided in response to a regional demand such as sports grounds and parks servicing the wider district. These toilets are funded by the district overall.
- Toilets at local community facilities such as shopping centres and recreational areas servicing local communities. These toilets are funded by Community Boards or other local funding.

The Strategy identifies that Central Otago is rapidly changing. There will be more people, more traffic, a higher level of industrialisation, greater pressure on the environment, more lifestyle housing developments, and a greater spread of choice of houses and localities. There will also be a wider range of social amenities, shops and restaurants. Tourists will be more obvious as will the number of enterprises catering to their needs. Recreational visitors will become more significant. These changes will alter the demand patterns for toilet facilities, the strategy provides a mechanism for managing these changing demands.

9.3 Other Publicly Accessible Toilets

The responsibility for the provision and operation of public toilet facilities does not lie solely with the Council. Other organisations responsible for generating demand in a particular area, where clear linkages can be identified between a development and the number of visitors to that development who may require the use of a public toilet, have a duty to provide toilet facilities. These organisations include Land Information New Zealand, Department of Conservation and Community Groups. There are at least 15 such toilets in Central Otago. These are largely on the Central Otago Rail Trail and the shores of Lake Dunstan.

Old Cromwell Town	Grant provided by the Board to construct on the provision that Old Cromwell Inc. maintains.
Tarras Township	$3,000 annual grant provided by the Board for cleaning costs.
Fraser Domain	Toilet block maintained by Clyde Recreation Reserve Committee.
Sowburn (Patearoa)	Grant has been applied for the siting of a standalone facility on reserve land that is frequented by picnicker's etc.
Oturehua Hall	This building is not a Council owned or maintained asset. A grant has been approved by the Council for the construction of a public toilet block to the building to provide facilities in particular to Rail Trail users.
Wedderburn Hall	Toilets made available for users of the Rail Trail at the request of the Local Community. Issue has now arisen with this that the toilets are being used to such an extent that additional funding has been requested to keep clean. A DoC sign indicates these toilets as open for Public use. This was at the request of the local community.
Omakau Domain	Maintained and cleaned by Omakau Recreation reserve Board
Patearoa Hall	Patearoa Recreational Reserve responsible for cleaning
Dairy Creek, Lake Dunstan Arm	Land Information New Zealand responsibility
Bendigo, Clutha Arm	Land Information New Zealand responsibility
McNulty inlet, Clutha Arm	Land Information New Zealand responsibility
Bannockburn, Kawarau Arm	Land Information New Zealand responsibility
Lowburn	Land Information New Zealand responsibility
Melmore Terrace	Land Information New Zealand responsibility

Private businesses which cater for the public often provide toilet facilities. These include camping grounds, hotels, restaurants, service stations, doctors rooms, hospitals, shops and orchards. It has proved impractical to identify and survey all these facilities, as initial estimates identified well over 60 locations. Provisions of the Building Act ensure that new developments have appropriate publicly accessible toilets.

Several fruit stalls that cater for tourists provide very high quality public toilets. These private operations regard provision of toilets as an essential feature to successful business. Some of these toilets are available to many hundreds of customers daily. These toilets provide a model that other tourist and traveller related businesses could be encouraged to follow.

9.4 Suitability

Day to day operational management of the facilities is managed by Council staff with maintenance issues delegated to appropriate contractors to manage on Council's behalf. Council endeavours to provide clean and hygienic toilets at reasonable cost. The age and condition of toilets impacts on the quality of service achievable. Servicing frequency varies with use rate and season; occasional unexpected heavy usage may cause a temporary decline in service. Council maintains 24 hour telephone services from its offices which can facilitate urgent cleaning and maintenance should the public report incidents.

Vandalism and fouling are sporadic interferences to high quality service. Incidents are repaired or rectified promptly. Vandalism is minimised by providing well lit, quality facilities, constructed of permanent materials. Graffiti proof paints and finishes are used wherever possible. Anecdotal comment suggests the frequency of service disruption in Central Otago is significantly lower than surrounding provinces.

Council's resident opinion survey 2005 identified public toilets as the second highest priority overall. 98.4% of surveyed residents identified public toilets as a Council core activity with 67% more emphasis on funding. Figures for 2002 to 2005 indicate declining satisfaction in all areas, with the Alexandra area experiencing the strongest trend. It is fair to conclude that expectations have increased and the age and serviceability of facilities are likely major contributors to dissatisfaction.

Council funding of operations, maintenance, upgrades and replacements appears to have been inadequate to meet expected levels of service for some time. Council's Toilet Strategy defines improved levels of service. Current budgets do not allow for increasing levels of demand and service expectation identified in the Strategy.

9.5 Demand

Central Otago District Council has a policy designed to provide for changes predicted for the district.

(a) Public toilets be provided and maintained in at least one Council (civic) building (library, information centre) facility, available for public use during the hours of operation of these facilities.

(b) Privately owned major retail stores be encouraged to continue to maintain public toilets during their hours of operation.

(c) A well identified 24-hour public toilet, which includes baby change facilities, be provided in each major urban area to standards that enhance the District's image as a tourist destination.

(d) Public toilets be provided and maintained at all *intermediate* size shopping centres by private owners, by the Community Board, or as joint ventures. In particular:

- The role of the new, all day service stations in providing toilets for the use of the public, be acknowledged.

(e) Where shopping centres are in fragmented ownership and/or multiple lease and no toilets are available for public use, the Council/Community Board will consider:

- Making suitable toilets available within existing civic facilities such as service centres, libraries, or on parks where these are convenient, or
- A joint venture/partnership development with shop owners which may include sharing in the provision of land, capital and maintenance costs, or
- Providing free standing public toilets where the above are not possible.

(f) Where major new Council facilities serving the public such as community centres, libraries, service centres, parking buildings and stadia, are constructed, toilets located and designed to be available for public use during the hours of operation of those facilities, be included in such facilities.

(g) Public toilet facilities continue to be provided on parks where sport is played and at other heavily used recreation and visitor locations, either by the Council/Community Board or in partnership with sports clubs. Toilets within sport clubrooms located on parks, be encouraged to be available for public use while the clubrooms are open.

(h) Consideration be given (in consultation with the appropriate Community Board) to the closure of Council owned public toilets where their location falls outside the above policies.

The guidelines provided by NZS4241:1999 New Zealand Standard for Public Toilets and the Building Code are used for new and redeveloped toilets. These standards have been adapted by Council.

Effluent from toilets is disposed of into public sewers where the area is reticulated. Septic tanks are serviced on an “as required” basis.

9.6 Risks

Risks associated with public toilets in Central Otago are:

- Disease transmission caused by fouling, poor cleaning or poor use practices by members of the public.
- Contamination of groundwaters from disposal fields, particularly where usage peaks overload capacities
- Servicing and compliance costs become a burden on ratepayers to the benefit of travellers and tourists
- Tourist image damaged by insufficient facilities or inadequate standards
- Private enterprise relying on Council services to avoid servicing their clients
- Risks to personal safety of users from facility inadequacy or defects or attack from loiterers
- Inadequate Council investment to maintain, upgrade and replace facilities

9.7 Action Plan

Council has recently commissioned new public toilets at Pioneer Park, Alexandra as part of the “Central Stories” Cultural Centre complex.

Redevelopment of Council facilities will be included in the 2006-16 LTCCP, with current identified priorities being Cromwell (Lode Lane) and Roxburgh.

Council has also offered a grant of $35k to Department of Conservation to install public toilets in St Bathans in 2005/06.

10. Cemeteries

10.1 Legislation

Cemeteries

Legal and Regulatory Considerations

The burial and cremation of human remains is regulated by The Burial and Cremation Act 1964. Local authorities are charged with establishing and maintaining suitable cemeteries. Central Otago District Council discharges these duties by operating cemeteries in major centres. These activities are supplemented by cemeteries operated by Cemetery Trusts. Central Otago maintains a list of Trustees.

10.2 Description

10.2.1 Cemeteries

10.2.1.1 Council Cemeteries

Council operated cemeteries at Alexandra, Clyde, Cromwell, Ranfurly and Naseby. All have sufficient space to service an increased population for in excess of 50 years.

The trend towards cremation suggests that most have the facility to provide a service for much longer than this.

Cemeteries are operated as beam cemeteries, this achieves much more economical use of space than the old style. Monuments are much smaller and much more stable.

10.2.1.2 Trust Cemeteries

Burial rates at trust cemeteries are so low that attempting to predict remaining life on this basis is not reliable. Most trust cemeteries which remain open have sufficient capacity for the foreseeable future. At Roxburgh, which services a bigger population, there is adequate future capacity.

Cemeteries at Alexandra, Clyde, Cromwell, Naseby, Ranfurly and Roxburgh have the capacity to provide the level of service required of Council under the Burials Act without consideration of trust cemeteries.

10.2.1.3 Closed Cemeteries.

Cemeteries at Nevis, Hamiltons, Ida Valley/Moa Creek, Graveyard Gully and Old Cromwell are closed. Most of these have not been used for some decades. There are occasional requests for interment of relatives of those already buried at these cemeteries. The historic nature and location of these cemeteries attract significant numbers of visitors.

Cemetery	**Contact**	**size**	%used	adjoining area	probable life
Alexandra	CODC	4.84 Ha	60%	Town belt 5Ha	100yrs
Clyde	CODC	4.05 Ha	85%	Town Belt 40Ha	50 yrs
Cromwell	CODC	4.04 Ha	85%	Reserve 10.25 Ha	100 yrs
Ranfurly	CODC	6.5 Ha	85%	LINZ	50yrs
Naseby	CODC	1.25 Ha	60%	1.34Ha	100yrs
Roxburgh	Brian McLean	3.58 Ha	35%	Nil	50yrs
Millers Flat	Pam Reichel	1.53 Ha	40%		50yrs
Ettrick	Cliff Parker	1.21 Ha		0.58 Ha	
Nevis	CODC	0.4 Ha			Closed
Omakau/Blacks	P Harris	1.51 Ha	70%		70 yrs
Hamiltons (Closed)	CODC	2.02 Ha			Closed
Tarras	Heather Perriam	0.4 Ha	75%		25 yrs
Blackstone Hill	Ken Gillespie	0.4 Ha	50%		50 yrs
Kyeburn/Dansey Pass	David Crutchley	0.2 Ha	30%	0.3 Ha	50 yrs
Gimmerburn	Max Patterson	0.5 Ha	50%	1.5 Ha	100 yrs
Swinburn/ Kokonga	Maree Jopp	1.4 Ha			
Moa Creek/Ida Valley	Jeff Neville	0.45 Ha			Closed
St Bathans	Earl Harrex	0.4 Ha	60%		50 yrs

10.3 Assessment

10.3.1 Operational Considerations

The sandy and gravelly soils many cemeteries are located on present risk of collapse of graves during burials. Purpose built formwork is widely used to support graves while they are open. Once backfilled the loose and free running nature of the soils provides good security against interference.

Soils are almost all free draining and in dry climates. The likelihood of groundwater contamination is considered insignificant. There is one known exception, a zone of the Naseby cemetery has been prone to waterlogging caused by leakage of an upgradient water race in the past. The cause of this problem is now recognised and managed.

Monuments and furniture in old sections of cemeteries pose a low hazard. There is a risk of toppling masonry and hazards from deteriorating furniture. This risk is considered minimal. Contacting relatives to request grave and monument maintenance is excessively time consuming as often no up to date record exist.

All major active cemeteries and adjoining road reserves have adequate access and sufficient space for vehicle parking. Local firm free draining ground conditions preclude the need for sealed carparks.

Some historic cemeteries such as in the Nevis Valley are very remote and may be only seasonally accessible. This has no influence on the level of service district wide.

Council's 2005 resident opinion survey identified 95% satisfaction with cemeteries. Comments from dissatisfied ratepayers were about grounds and headstone maintenance. No dissatisfaction was expressed with the burial service standards.

10.3.2 Health and Environmental Impacts

The previously noted dry climatic and ground conditions in Central Otago preclude significant risk to the environment.

The local undertaker who conducts the majority of burials in Central Otago was consulted. He is generally satisfied with the service and considers health hazards resulting from burials most unlikely. Embalming processes use products that minimise the risk of groundwater contamination. These products slow the decomposing process and combined with often dry subsoils make it most unlikely that significant breakdown products are released.

10.4 Adequacy

The table of Central Otago cemeteries indicates that adequate cemetery space is available. The spread location of cemeteries enables all areas to be serviced adequately, all ward have cemeteries.

Council believes that:

- Central Otago is adequately serviced with cemeteries
- Cemeteries have sufficient capacity to service predicted populations for at least 50 years
- Cemeteries do not pose a significant security risk
- Cemeteries do not pose a health risk
- Cemeteries do not pose an environmental risk
- The current cemetery availability is adequate for any pandemic affects

10.5 Demand

Demand for burials is expected to increase with increasing district population, and also as the population becomes more weighted to the older end of the age range. The four major town cemeteries in Central Otago have the capacity to service this for at least 50 years.

Cemeteries have sufficient space to cope with a substantial pandemic event. In such a case there may be insufficient beams immediately available for headstones.

Minor cemeteries are an historical adjunct to service provision. Council expects to continue to assist the trust operation of these and has commenced the process of writing service agreements with the trusts.

10.6 Crematoria

There is no crematorium in Central Otago at present. Plans and approvals for a facility at Alexandra to be constructed by private enterprise are being processed.

A crematory could be available in the next year. This will further increase the capacity and life span of Central Otago cemeteries.

11. Solid Waste

11.1 Legislation

Management of landfills and facilities is regulated by the Resource Management Act and the Otago Regional Plans – Waste, Water and Air. Further technical guidance is provided by Landfill Guidelines produced by the Ministry for the Environment, and Centre for Advanced Engineers (CAE) guidelines. Water quality, odour, dust, gasses, air quality, vermin, cultural considerations are considered.

All solid waste facilities have resource consents as required by these regulations. Standards and levels of monitoring are set in the Ministry for the Environment guidelines and are incorporated in the consents. Solid waste operations are managed according to management plans. Regular monitoring is undertaken where there is a risk for contamination and results are reported to the Otago Regional Council.

This process ensures that risk to the environment is appropriately managed and monitored by the Central Otago District Council and checked by the Otago Regional Council.

There is no evidence of discharges of leachate as indicated by monitoring well sampling results. Prior experience of excavating Central Otago landfills suggested there is minimal, if any, downward movement of leachate as evidenced by lack of staining of underlying gravels in relocated landfills. The dry climate of Central Otago also restricts leachate generation. As a consequence of these factors there is no reason to conclude that there is any influence on groundwater quality from any landfill.

The Health Act requires Council to manage its facilities in a manner that promotes public health and safety. It also requires council to manage litter, and fly dumping. Council has by laws for managing these.

11.2 Description

11.2.1 General

Council provides solid waste (refuse) collection and disposal services throughout the Central Otago District. These services have evolved over time to suit local circumstances and consist of:

- Litter collection
- Wheelie bin street collection
- Four refuse transfer stations
- A community operated recycling service
- Green waste disposal facilities

- Cleanfill disposal facilities
- Two limited access remote location landfills

11.2.1.1 Litter Collection

Litter bins are sited throughout the District in shopping areas, parks and reserves, cemeteries and recreation areas. The litter from the bins is collected regularly as a section of the Parks Contracts. The parks contractor also carries out litter inspections and management on areas under the Parks contract. On roadsides and associated public areas litter collection is a duty under the Roading Contract or, on State Highways, by Transit New Zealand.

11.2.1.2 Refuse Collection

Weekly kerbside collection of refuse from properties is carried out in Alexandra, Cromwell, Clyde, Roxburgh, Ranfurly, Naseby, Omakau, Ophir, Ettrick, Millers Flat and on the State Highway between Alexandra and Millers Flat. A contractor provides and picks up 240 Litre wheelie bins and delivers refuse to the transfer station at Alexandra for compaction and transfer to landfill.

The wheelie bin service was designed after wide public consultation. Only areas clearly indicating they wanted a service in a poll have the service.

Wheelie bins offer a high level of control of vermin, insects, odours and scavenging pets. They also significantly reduced street litter problems as compared with the previous bag system. The health and well being of residents in all major towns benefit from the wheelie bin service.

As well as refuse being well contained in wheelie bins, the collection and disposal chain offers a good level of control of litter, dust, vermin, odours and other nuisances.

Areas that do not have Council wheelie bin services dispose of refuse by:

- Use of farm landfills
- Disposal at transfer stations
- Private wheelie bin services
- Use of limited access remote town landfills

Council services 6,486[9] collection points and an additional 748 bins are collected under private contracts. This a total of 7,234 bin services for a population of about 15,000 people, or very close to one bin for every two people. This leaves about 1,480 rural residences without a wheelie bin service. Many unserviced residences are farm houses or remote locations and most have appropriate disposal arrangements in terms of the Otago Regional Council Plan.

[9] Data derived from July 05 Wheelie bin contract data and Rapid numbers

11.2.1.3 Kerbside Recycling and Recycling Centres

Recycled materials are collected in Alexandra, Clyde and Cromwell weekly from kerbsides. Recycling centres are provided at Alexandra, Roxburgh, Ranfurly, Tarras, and Oturehua. The recycled material is collected by Central Otago Wastebusters, a non council organisation. The recycled materials collected are sorted and baled and sold by Wastebusters. Council pays a tonnage rate to Wastebusters for materials that would otherwise cost to go to landfill.

Recycling removes 1,100 tonnes from the wastestream and the remaining 9,800 tonnes goes to landfill. This recycling tonnage does not include substantial amounts of greenwaste and cleanfill which is removed from the waste stream at Council transfer stations. Recycling thus is significantly reducing waste to landfill and lessening the environmental impact of the landfill.

11.2.1.4 Transfer Stations

Transfer stations for the depositing of general refuse are provided at Alexandra, Cromwell, Ranfurly and Roxburgh. These transfer stations are owned and operated by contractors on a BOOT (build, own, operate, transfer) basis. The transfer stations are opened for limited hours and days, and charges are made for the disposal of refuse. The refuse is transported by contractors to the landfill for disposal. Transfer stations also compact refuse from the wheelie bin collections.

Ranfurly rural transfer station

11.2.1.5 Greenwaste

Greenwaste is accepted at transfer stations at Alexandra, Cromwell, Roxburgh. Greenwaste is windrowed on site for bioremediation of adjoining land which is devoid of topsoils. At Ranfurly a community greenwaste is operated outside Council control. At Millers Flat, Council operates a greenwaste landfill in a gravel pit.

11.2.1.6 Main Landfill

Council disposes of refuse on a cost per tonne basis under a 30 year arrangement with Queenstown Lakes District Council at its Victoria Flat Landfill. The landfill was opened in 1999 and is built to high environmental standards. Rubbish disposed of at the landfill is managed by a QLDC engaged contractor. This operation is out of the Central Otago area and not managed by Central Otago District Council and is not within the scope of this assessment.

11.2.1.7 Limited Access Landfills

Council operates two small landfills at Patearoa and Tarras where distance from central facilities and volumes of refuse make other services unaffordable. Council has consents for both landfills ensuring they meet environmental standards. Council intends closing both landfills in the next five years. Alternative services will be provided prior to closure.

Tarras rural limited access landfill

11.3 Satisfaction with Service

The 2005 resident opinion survey identified satisfaction levels with Council services as follows:

Litter Collection	89%
Rubbish Collection	97%
Transfer Station Operations	97%
Kerbside Recycling	85%
Recycling Depots	88%

It needs to be noted that kerbside recycling is only currently available in Alexandra, Clyde and Cromwell.

11.4 Future Capacity

Significant assumptions and uncertainties exist in waste management planning, ie:

- The impact of regional growth
- The level of recycling, reduction and reuse that can be achieved
- The impact of waste stream changes as fossil energy costs escalate
- The availability and location of landfill space
- Consent condition changes and impacts

Transfer stations have the capacity to process many times the present volume of refuse received. This additional capacity, along with the impacts of waste minimisation, result in sufficient capacity for the foreseeable future.

Recycling capacity has limits with the existing plant and equipment. New collection systems, sorting and pressing arrangements are about to be commissioned. This should form the basis to cope with future growth.

11.5 Closed Landfills

Twelve closed rubbish dumps that were operated by Council are monitored by Council for any effects they may have on the environment. This involves sampling surface water or subsurface water adjacent to the dumps to see if any abnormal elements are appearing in the water.

There are no major issues that need to be addressed in the closed landfill operations.

The risk in the closed landfill operation is that adverse environmental effects will be detected. If that happens, Council will address the issue at the time.

11.5.1 Potential Environmental Effects

The Environmental Sensitivity Ranking undertaken by SEM for Central Otago District Council quantified potential environmental risks from Central Otago landfills. This was available prior to many consents being issued and was considered when setting consent conditions.

Monitoring since this ranking was undertaken increases confidence that there is no contamination of groundwater and so reduces sensitivity at all sites. Additionally the increasing age of landfills since closure further contributes to a reduction in sensitivity. It can thus be concluded that the potential risk has reduced significantly since consents were issued.

The Alexandra Closed Landfill remains the greatest potential risk to a sensitive groundwater source. This is reflected in the more frequent monitoring conditions and the greater number of sampling sites and parameters. Monitoring to date indicates no concern and some reduction in monitoring requirements is appropriate.

There is no reason to conclude anything other than that potential risk to groundwater is decreasing with time at all sites.

11.5.2 Future Capacity

The landfill agreement with Queenstown Lakes District Council is to provide a landfilling facility on a per tonne basis at the same cost as Queenstown-Lakes District Council up to July 2029. This agreement also provides for operating

and maintaining Central Otago transfer stations and the transfer of refuse to the Landfill.

After 2029 Central Otago District Council will need to find another landfill for residual waste. Council's zero waste policy and the impact of rising energy costs are likely to have reduced the volume of residual waste going to landfill. Recycling and reuse is likely to be the major disposal stream by this time.

A regional landfill concept is the present thinking for disposal after 2029. Central Otago has attributes for landfill sites that may make it a favoured location for this.

Appendix A Medical Officer of Health

Appendix B Water Source Quality Tests

Appendix C Submissions

SOLID WASTE MANAGEMENT PLAN

Contents

PREFACE:

This document was developed to meet Council's responsibilities under Sections 537 to 544 of the Local Government Act 1974.

This Plan was considered by the Council's Waste Management Committee on 11 October 1999 and recommended for adoption by Council. Council adopted the final draft plan at its 3 November 1999 meeting.

The document was publicly notified under the Special Consultative Procedures of Section 716A of the Local Government Act 1974, on 8 November 1999, following which public submissions were received.

The Council's Waste Management Committee heard submissions to the draft plan on Friday 10 December 1999.

The final Plan was adopted by Council on 15 March 2000.

1.0 Introduction

This Plan was prepared under the auspices of Section 539 of the Local Government Act 1974. Under Section 539 all local authorities were required to adopt a "waste management plan". All such plans are required to: (a) have regard to environmental and economic costs and benefits for the district; and (b) ensure that the management of waste does not cause a nuisance or be injurious to health (Section 538). Waste management plans must (under Section 537) take into consideration, (a) being of the highest priority, the following methods:

(a) Reduction
(b) Reuse
(c) Recycling
(d) Recovery
(e) Treatment
(f) Disposal

Most waste management decisions made by local authorities prior to (and after) the 1996 amendment to the Local Government Act (which introduced the "five R's" of waste management), have been made without consideration of the need to reduce the effect of waste on the environment.

This plan is an attempt to bring waste management policies and practices in Central Otago into line with Section 539 and the Government's 1992 Waste Management Policy and Environment 2010 Strategy which identified the need for the amendment to the Local Government Act 1974.

Various waste management strategy documents have been produced for the Central Otago District Council over the past few years. None of these documents, however, have been designed to meet the Council's wider waste management responsibilities under the Local Government Act 1974. They have instead been aimed at meeting Council's responsibilities under the Resource Management Act 1991, the Otago Regional Council's Regional Plan: Waste, and pragmatic requirements of waste management in the district.

The most recent of these documents was the Central Otago District Council's 1997 Solid Waste Management Strategy. That document was developed because Council was required to apply for resource consents for all Council operated landfill sites, as the Otago Regional Council's Regional Plan: Waste became operative. As the consents for landfills required, amongst other things, that the landfills be environmentally sound and have a landfill management and development plan, Council commissioned Duffil Watts and King to produce the district wide Solid Waste Management Strategy in 1997.

That report addressed the current waste management operations within the district, including waste collection, disposal and landfills, and made recommendations based on estimated cost comparisons as to future solid waste management in the district. The material collected for the Solid Waste

Management Strategy has been used as the basis for the Solid Waste Management Plan.

The Solid Waste Management Plan is a policy document one level higher in the Council's waste management document hierarchy than the Solid Waste Management Strategy, and should be referred to by the Council when making any and all decisions pertaining to the management of solid waste within the district.

The local waste management situation has changed significantly since the development of the Solid Waste Management Strategy in 1997. In particular, Council entered into contracts with Queenstown Lakes District Council and several private operators, which provide for the operation of a joint venture solid waste landfill at Victoria Flats, east of Gibbston in the Queenstown Lakes District. Wheelie bins were introduced to most of the district and less labour intensive collection methods were introduced by the Council's waste collection contractors in late 1998.

The need for Council's smaller landfills to be closed, due to their environmental effects, remains a reality. Public consultation requirements regarding the proposed closure of all of the Council's landfills have been met by way of the statements contained on page 66 of Council's Annual Plan 1999 -2000. The Solid Waste Management Plan provides the public with an opportunity to make comments on Council's intended course of action regarding solid waste management in the district, within the broader waste management requirements of Section 539.

1.1.1 Vision

The long-term objective for this Waste Management Plan is:

To minimise the impact of solid waste on the environment and community of Central Otago, while keeping the cost to ratepayers within the present overall budget in real terms.

1.1.2 Goals

To reduce the rate per person of solid waste going to landfill, taking into account real costs, as follows:

- by 50% by year 2005
- by 75% by year 2010, with a review of these goals at that time, and
- by 100% by year 2015

(Note: The reference to real costs, in the context of zero waste, implies that there is an expectation that a proportion of the waste generated or entering the waste stream in the district will continue to be disposed of, rather than diverted from the waste stream. This will be due to social, environmental or economic factors, which render reuse or recycling inappropriate, on the one hand, and disposal of certain types of waste the best practicable solution, on the other.)

1.2 Policies and Methods

1.2.1 General Issues

1.2.1.1 Policies

i) To adopt and implement a waste minimisation policy in both urban and rural communities by achieving:
- Reduction of waste at source
- Reuse of materials before they enter the waste stream
- Recycling of as much material as possible
- Recovery of as much energy and biomass from the waste stream as possible

ii) To ensure suitable cost effective collection and disposal systems exist which minimise the risks to the environment and community for:
- Collection, handling and transportation of recyclables and other reusable materials
- Collection and/or transport and disposal of non hazardous wastes not able to be recycled, reused or recovered

iii) To achieve responsible and informed decisions on solid waste management by the community by:
- Ensuring the costs of solid waste management are apportioned to those who generate the waste
- Promoting the concepts of waste minimisation and fostering public awareness of issues and benefits
- Encouraging and rewarding community responsibility and active participation in solid waste management

1.2.1.2 Methods

i) Council will allocate resources in its Annual Plan to progressively implement the Solid Waste Management Plan.

ii) The Solid Waste Management Plan will be reviewed by September 2002 and triennially thereafter, to ensure that it continues to be appropriate and effective within the context of changing conditions in the district.

iii) Council will monitor and report on progress in the implementation of the Solid Waste Management Plan on an annual basis through the Annual Plan process.

iv) Council will take a lead in the community by reducing, reusing and recycling and by using products made from recycled materials where appropriate.

1.2.2 Waste Reduction

1.2.2.1 Policies

i) Council will encourage and promote the benefits of reduction in the quantity and toxicity of the solid waste stream.

ii) Council will recover costs for management of refuse through user charges where costs are attributable to specific groups, organisations or individuals.

1.2.2.2 Methods

i) The benefits and means of waste reduction will be promoted in the community by ongoing publicity and educational initiatives including:

- Information signs at transfer stations and other collection points
- Regular newspaper, newsletter and other features
- Resource materials for schools and education programmes
- In class teaching units and public presentations
- Waste reduction and resource recovery seminars
- Telephone helpline

ii) The practice of carrying out waste audits will be promoted to Central Otago businesses and organisations.

iii) Financial incentives and support for businesses and community groups to implement waste reduction measures will be investigated. This may include consideration of suitable funding.

iv) Council will carry out waste audits on its own operations to identify waste, and identify and institute suitable measures to reduce that waste.

v) Council will progressively move to direct user charges as the main cost recovery mechanism for refuse collection and disposal.

vi) Accounting procedures which enable identification of the true costs of any aspect of solid waste management, and which will permit the appropriate cost recovery, will be implemented.

vii) Costs of programmes to promote waste reduction may include a levy on disposal charges.

1.2.3 Recycling and Resource Recovery

1.2.3.1 Policies

i) Council will provide leadership to achieve a higher profile for recycling in the District.

ii) Council will encourage collection, storage and transportation of recyclables.

iii) Council will encourage and promote resource recovery in the District.

1.2.3.2 Methods

The benefits and means of product recycling and resource recovery will be promoted in the community by ongoing public and educational initiatives including:

- Information signs at transfer station and other collection points
- Regular newspaper, newsletter and other features
- Resource materials for schools and education programmes
- In class teaching units and public presentations
- Waste reduction and resource recovery seminars
- Telephone helpline

ii) Council will liaise with the recycling industry and community groups to support and promote recycling.

iii) Council will examine, with the recycling industry, the means to market recyclable plastics, paper and other materials from the District and, where possible, will support industry initiatives in establishing markets for recyclable products.

iv) Accessible waste minimisation facilities will be maintained at all public waste management facilities where appropriate, taking into account all costs.

v) Council will encourage provision of suitable public systems for collection of recyclables.

vi) Costs for recycling operations and initiatives may be recovered partly by means of a levy on disposal charges.

1.2.4 Composting

1.2.4.1 Policies

i) Council will promote and encourage suitable composting systems to achieve significant reductions in the waste stream.

1.2.4.2 Methods

i) Home composting and worm farming will be promoted and encouraged.

ii) Composting operations will be encouraged in all communities, particularly those communities with transfer stations or collection points.

iii) There will be a charge for the disposal of separated compostable material to go towards the costs of the composting/resource recovery operations. The charge will take account of composting costs, value of compost, avoided disposal costs to the Council and environmental benefits of enhancing the capacity of Central Otago to more sustainably support more diverse flora.

iv) Charges for green waste will be lower than residual waste to encourage separation.

1.2.5 Solid Waste Collection

1.2.5.1 Policies

i) Council will ensure that suitable collection services for solid waste exist within the urban and peri-urban communities of Central Otago.

ii) Establishment of any new solid waste collection points will only be undertaken following investigation of suitable locations, assessment of cost-effectiveness, analysis of environmental and economic effects, and consultation with the public.

1.2.5.2 Methods

i) Solid waste collections will be carried out weekly in urban and peri-urban areas. Complementary kerbside or other methods of collection of recyclables may be introduced, in consultation with the respective communities.

ii) Direct user charges for refuse collection will be progressively implemented. (Charging users for collection by weight would encourage users to explore waste minimisation options available to them, such as separating waste for recycling and composting).

iii) Collection services may be extended to rural areas following assessment of cost-effectiveness, analysis of environmental and economic effects, and consultation with the respective communities.

1.2.6 Disposal

1.2.6.1 Policies

i) Council will continue to use sanitary landfilling as the final option of its Solid Waste Management Plan. Incineration is not considered to be a viable option at present.

ii) Transfer stations, other collection points and continuing landfills will be designed and managed so as to enhance waste minimisation and to minimise adverse environmental effects.

iii) Establishment of any new solid waste collection points will only be undertaken following investigation of suitable locations, assessment of cost-effectiveness, analysis of environmental and economic effects, and consultation with the public.

iv) Residual refuse will be transferred to the Victoria Flats landfill without general public access.

1.2.6.2 Methods

i) All transfer stations, other collection points and continuing landfills will be controlled in accordance with management plans that set out the operational guidelines and standards to be attained. Preparation of all management plans will include public input and will implement the policies of the Waste Management Plan for the District.

ii) Recovery of costs for disposal operations will be progressively implemented (by means of direct user charges).

1.2.7 Hazardous Waste

1.2.7.1 Policies

i) Council accepts that it has some responsibility for ensuring the safe management of all hazardous waste arising in the District.

ii) Council will adopt the "polluter pays" principle for recovering any costs involved in managing hazardous waste.

iii) The quantity of any hazardous waste disposed of will be minimised.

1.2.7.2 Methods

i) An ongoing educational programme will be instituted to ensure that the community understands what constitutes hazardous wastes and knows the appropriate ways of safely handling and disposing of hazardous wastes.

ii) Use will be made of suitable hazardous waste facilities outside the District where no suitable facilities are available within the District.

iii) Waste audits will be encouraged to be undertaken by all waste producing industries. If necessary, consideration will be given to introduce bylaws to ensure that this occurs for all producers of hazardous materials and waste.

iv) A reception area will be provided at selected waste facilities within the District for the depositing of specific hazardous wastes such as common presently listed agricultural herbicides and pesticides, household chemicals, batteries, solvent containing materials and waste oil.

v) Improved control measures will be taken at disposal sites to identify and separate hazardous waste for suitable disposal.

vi) Council will actively support regional initiatives for the reuse or disposal of hazardous waste.

vii) Clean up of transport spillages of hazardous wastes will be treated as an emergency matter. After the emergency is past Council will ensure that appropriate measures have been taken to treat and dispose of any hazardous wastes.

viii) Recovery of costs associated with hazardous wastes will be by direct user charges, where appropriate.

1.3 Key Principles

The following key principles will guide all of the Council's waste initiatives:

1.3.1 Integrated Waste Management

- To manage waste effectively using the following prioritised programme:

    (a) Reduction
    (b) Reuse
    (c) Recycling
    (d) Recovery
    (e) Treatment
    (f) Disposal

- It is often most effective to treat individual components of the waste stream separately. Therefore focussing on the largest or most hazardous components within the context of the hierarchy will have the greatest impact on the waste stream.

1.3.2 Tangata Whenua

The Council is committed to using a consultative process to identify and respond to issues of significance to Tangata Whenua which result from implementing this Plan.

The involvement and consultation with Maori in solid waste management must be provided for as Maori have a legitimate basis to be involved in natural resource planning under the Resource Management Act. Claims to the Waitangi Tribunal have highlighted environmental degradation in New Zealand and legal actions have questioned the Crown's right to alienate Maori rights to have meaningful input into the management of natural resources.

The relationship of Maori with their culture, tradition with ancestral lands, water, soils, waahi tapu, and other taonga must be recognised and provided for.

Tangata Whenua in Central Otago are represented by Kai Tahu Ki Otago. Council has established an effective relationship with Kai Tahu Ki Otago and will consult with the runanga throughout the development and eventual adoption and operation of the Solid Waste Management Plan.

1.3.3 Transparency

Council will be open, transparent and accountable in developing this plan, implementing the strategies and achieving the objectives and goals – and will report progress annually.

1.3.4 Real Costs

The real costs of waste management will include social, environmental and economic costs and, where practicable, will be assessed and reported annually.

1.3.5 Charges/Funding

i) The real costs incurred in the implementation of this Plan will be allocated in ways that establish economic incentives to reduce waste, and disincentives for those who generate waste, in order to promote any or all of the objectives on the Plan.

ii) Charges will be transparent and applied to the real costs of implementing the Plan.

iii) When calculating charges for waste management services the following principles will be used unless there are clearly identified reasons why not to do so:

- the generators of waste should pay the real costs of waste services
- those who benefit from the service should pay
- a component of the cost of providing transfer facilities may be met through a District rate

iv) Charges will include a waste minimisation funding component and will aim to avoid cross subsidisation between sectors of the community. (Waste minimisation to include, for example, commercial waste minimisation, composting, recycling drop off centres, resource reuse centres, and other initiatives).

v) Council will encourage private provision of services where viable and contract out services wherever possible.

2.0 OTHER LEGISLATIVE REQUIREMENTS FOR WASTE MANAGEMENT

2.1 Resource Management Act

The Resource Management Act (RMA) 1991 places certain responsibilities on territorial authorities in respect to waste collection and disposal. In particular there is, in effect, a requirement for the District Council to apply for the appropriate resource consents from the Otago Regional Council.

Under the RMA a discharge permit is required for any waste site where the discharge of a contaminant or water into water or onto land occurs in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water. Similarly the discharge of a contaminant from any industrial or trade premises into air or onto or into land must be expressly allowed by a rule of a regional plan, a resource consent or regulations. This means that a resource consent is also required for the landfilling of any industrial or trade waste regardless of whether or not contaminants may enter water.

All of the existing Central Otago District Council landfills fall into the above categories and therefore require the appropriate resource consents.

Section 31 of the Resource Management Act further establishes the functions of the District Council, including:

> *"a) The establishment, implementation, and review of objectives, policies and methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of the district:*
>
> *b) The control of any actual or potential effects of the use, development, or protection of land including for the purpose of avoidance or mitigation of any adverse effects of the storage, use, disposal, or transportation of hazardous substances. Anyone intending to establish a waste management or minimisation activity should first ascertain the status and permissibility of the proposed activity within District and Regional Council resource management documents"*

2.2 Other Legislation

In addition to the Resource Management Act other legislation having relevance to the management of waste includes:

- Local Government Act 1974 – as outlined above
- Health Act 1956
- Litter Act 1979
- Transport Amendment Act 1989
- Dangerous Goods Act 1974
- Explosives Act 1957
- Toxic Substances Act 1979
- Pesticides Act 1979
- Health and Safety in Employment Act 1992
- Hazardous Substances and New Organisms Act 1996

The Litter Act 1979, the Dangerous Goods Act 1974 and the Health and Safety in Employment Act 1992 also significantly influence Council's approach to waste and employment issues, particularly in relation to the operation of transfer stations and landfill sites.

2.3 Regional Government

One of the functions of the regional councils under the Resource Management Act is to manage the effects of discharges from the waste disposal facilities on land, water, coastal and air resources. In order to implement these functions regional councils may prepare regional plans. These plans set out the environmental standards to be achieved by waste disposal facilities and set out the circumstances where resource consents will need to be obtained from the Regional Council.

The Local Government Amendment Act (1992) allows Regional Councils to manage regional disposal of hazardous wastes.

The Otago Regional Council Regional Plan: WASTE includes the following sections:

- Introduction
- Statutory Framework
- Manawhenua Issues
- Contaminated Sites
- Waste Minimisation
- Hazardous Substances and Hazardous Wastes
- Landfills
- Cross Boundary Issues
- Monitoring

The District Councils within the Otago region are legally obliged to comply with the rules in the Regional Plan : WASTE.

2.4 District Councils

Under the Health Act, Local Government Act and Resource Management Act, District Councils must ensure that services are provided, by way of District Plans and By-laws where necessary, to manage solid waste in the district in compliance with regional and national legislation.

2.5 Health Act

District Councils are responsible under the Health Act for the promotion and conservation of public health within their district. This requires the provision of waterworks, sanitary works, works for the collection of waste, control of offensive trades and control of nuisance.

3.0 SOLID WASTE CLASSIFICATION

Knowledge of the composition of solid waste in the district is essential to the process of devising an effective and appropriate Solid Waste Management system for the district.

Using information derived from surveys of waste streams of similar areas taken around New Zealand, the following pie-charts, Figures 3.1 and 3.2, were synthesised to represent a best assumption of the composition of the Central Otago District solid waste.

Figure 3.1 shows the percentage by weight of the various components of waste collected in domestic collections, ie: in rubbish bags or bins left at the gate.

Figure 3.2 shows the percentage by weight of the same components of waste being deposited in landfills. The increase in the organic component in landfill waste is due to people taking their garden waste directly to the landfill.

As can be seen from these figures a large percentage of waste currently being disposed of has the potential for recycling and composting, thereby increasing the life of a landfill and reducing the cost of transport. The economics of these types of operations however usually control their success. Further discussion in recycling and composting appears later in this document.

Figure 3.1 WASTE MANAGEMENT - domestic waste

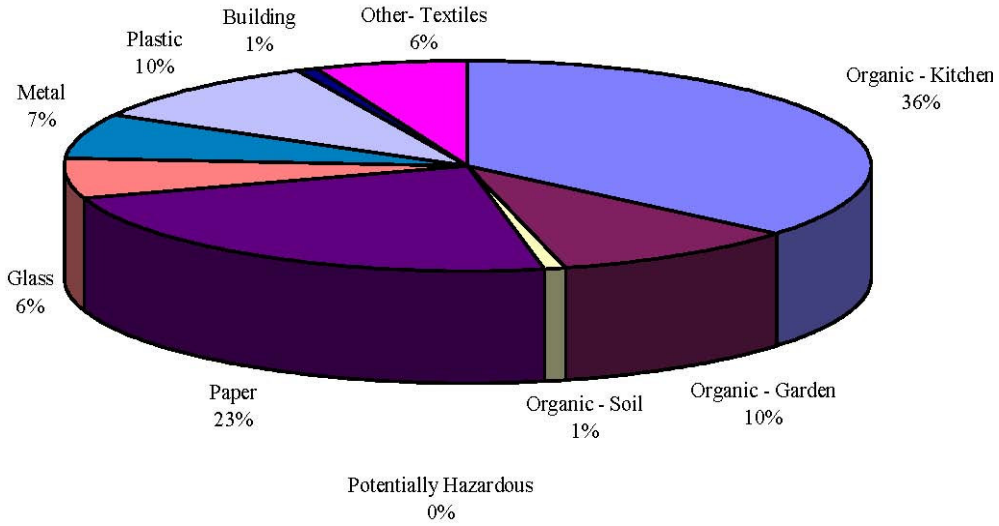
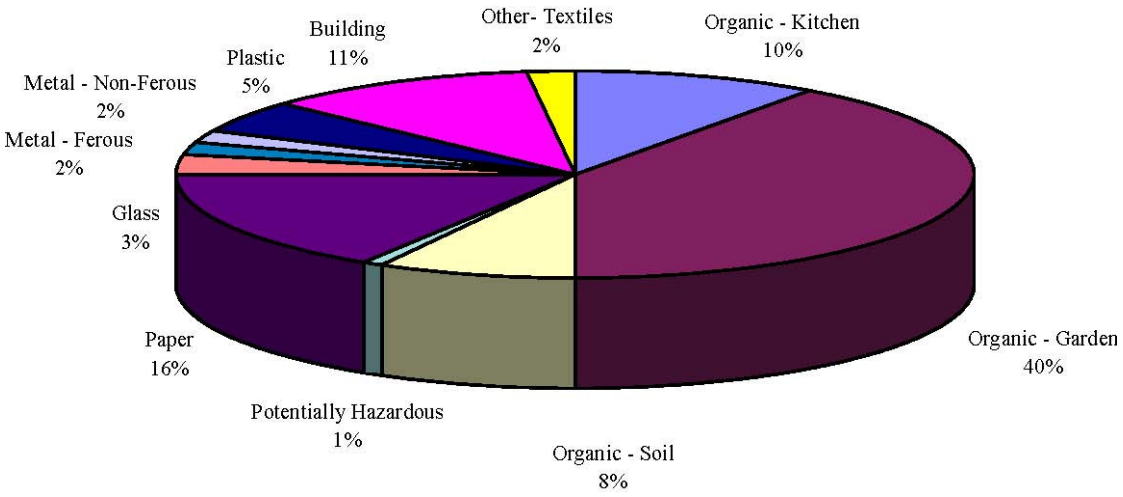


Figure 3.2 WASTE MANAGEMENT - at landfill



4.0 SOLID WASTE GENERATION

4.1 Population Considerations

The quantity of waste produced in any area of the district is dependent on the permanent and seasonal population of that area, as well as the nature of businesses and other waste generators. Using figures from the 1991 Census, Central Otago District Council sources and Johnson Whitney Planners, Table 4.1.1 was produced showing the estimated current population being served by the fourteen existing Council landfills around the district.

Table 4.1.1 Central Otago District Population – 1996 Census

Statistical Area Unit	Normally Resident Population
Teviot	1,173
Roxburgh	741
Ranfurly	846
Maniototo	1,014
Naseby	108
Dunstan (Earnscleugh and Manuherikia and rural Cromwell wards)	2,994
Clyde	849
Alexandra	4,617
Cromwell	2,613
Total	**14,955**

Several Central Otago communities host substantial influxes of visitors for approximately six weeks during the summer vacation period. For example, the populations of Cromwell and Alexandra increase to at least double the normally resident population. The population of Naseby experiences an influx on seasonal residents and visitors approximately five times the size of the normally resident population. Seasonal workers also contribute to population fluctuations in those areas of the district where fruit is grown.

The ability to make waste management planning decisions which take into consideration likely changes in local population statistics would be useful. However, the fluctuations in populations during the 1986 to 1991 and 1991 to 1999 inter-censal periods indicates that any estimate of future population changes would be extremely problematic and unreliable. It is imperative, therefore, that this plan is not dependent on population figures, but is able to meet its objectives largely regardless of population changes.

4.2 Waste Generated Per Person

The amount of waste entering the Victoria Flats landfill from Central Otago is approximately 471 kgs/person/year – based on the August records, the only complete month of operation to date.

To be able to meaningfully estimate the per capita waste production in Central Otago, a more holistic approach than merely measuring waste entering the waste stream must be achieved. Such an analysis should include the waste disposed of on rural properties. For the effectiveness of any waste reduction programs to be measured, the destination of waste removed from or not entering the waste stream must also be identified.

The contracts covering the collection and disposal of waste in Central Otago assume that 10,000 tonnes of waste will be disposed of at the Victoria Flats landfill during the 1999-2000 year. This figure was based on the estimated amount of waste entering the various landfills in Central Otago, prior to the present collection and disposal arrangements being put in place. This equates to 668 kgs of waste disposed of per capita.

So far this year 447 tonnes, 587 tonnes and 720 tonnes have been deposited in the Victoria Flats landfill in July, August and September, respectively. The annualised amount of waste from these three months would equal 7,016 tonnes. This would equate to 469 kgs of waste per/ capita. However, the busier summer months are likely to significantly increase the annual figures.

Solid waste entering the waste stream via the transfer stations, wheelie bins, mini-skips and the Victoria Flats Landfill is now being weighed or estimated on a regular basis by the Council and/or its contractors. These figures will be able to be used as the baseline figures against which the waste reduction targets included in this plan can be measured.

Measurements of progress toward the goals, detailed in Section 1.1.2 of this Plan, will be based on the waste collected during the full 1999-2000 year.

4.3 Waste Quantities in Each Domestic Collection

As at 1999 there were domestic waste collection services in and around the following communities of the Central Otago District:

- Alexandra
- Clyde
- Cromwell
- Ranfurly
- Roxburgh
- Roxburgh Hydro
- Naseby
- Omakau and Ophir

Using the household numbers for each area information obtained from the waste collection contractor, the estimated domestic collection waste tonnages and volumes were able to be measured for the first time in August 1999.

Table 4.3.1 shows the estimated tonnages and volumes of waste collected per week in the existing domestic collections as at August 1999.

Table 4.3.1 Domestic Waste Collection Tonnages and Volumes – August 1999

Town	Households	Tonnage/Week (tonnes)
Alexandra	2,379	18
Clyde	488	4
Cromwell	1,645	12.5
Roxburgh	377	3
Roxburgh Hydro	43	0.5
Ranfurly	436	3.5
Naseby	253	2
Omakau/Ophir	138	1.5

Comments from the domestic collection contractor suggest that the domestic collection waste quantities do not increase during the holiday periods, as motorcamps dispose of their own waste direct to transfer stations and other holiday-makers generally take their waste directly to transfer stations.

5.0 EXISTING WASTE COLLECTION AND DISPOSAL SYSTEMS

5.1 Introduction

The pre-June 1999 collection and disposal system revolved around the presence of fourteen landfills in the district. The landfills were located at:

- Millers Flat
- Cromwell
- Becks
- Alexandra
- Ophir
- Naseby
- Roxburgh
- Ettrick
- Lauder
- Ranfurly
- Oturehua
- Patearoa
- Tarras

All of these landfills, other than those at Patearoa and Tarras, were closed in July 1999.

Existing landfills at Patearoa and Tarras have been retained as an interim measure for two reasons:

- the environmental effects of these landfills are less significant than the other pre-1999 landfills, and
- the communities of Tarras and Patearoa are not presently served by wheelie bin collection and are a considerable distance from the nearest transfer stations

The future of the Tarras and Patearoa landfills will be determined following a cost benefit analysis of the various options available and consideration of assessments of effects carried out in conjunction with future resource consent applications, and with any condition which may be imposed with any such consent.

Domestic wheelie bin waste collection services are presently provided in the following communities:

- Alexandra
- Ranfurly
- Rural Roxburgh
- Cromwell
- Naseby

- (Fruitlands to Millers Flat)
- Roxburgh
- Omakau/Ophir
- Ettrick
- Clyde
- Roxburgh Hydro
- Millers Flat

Mini skips have been provided in the Lauder and Omakau communities on a trial basis to the end of June 2000.

5.2 Collection of Domestic Waste

Urban and some rural domestic waste is placed by householders in plastic 240 litre or 120 litre wheelie bins provided by the Council and funded by rates. In some rural areas not covered by the Council wheelie bin service, wheelie bin supply and solid waste collection arrangements can be made between individuals and private service providers.

Council provides a weekly kerbside wheelie bin domestic waste collection in the eight communities in Section 5.1, above.

5.3 Collection of Commercial Waste

Commercial properties in urban areas of the district presently receive Council's wheelie bin service. A privately operated mini skip service is provided to businesses with significant waste volumes. Food waste and fats are also collected by private operators for reuse, in some communities.

5.4 Waste Disposal

The Central Otago district is now primarily served by one significant landfill, compared with the pre-July 1999 situation when fourteen landfills were managed by the District Council throughout the district.

All of the solid waste collected at transfer station, local skips and from the wheelie bin service is now disposed of at the Victoria Bridge landfill, in the Queenstown Lakes District, between Cromwell and Gibbston. The Victoria Flats landfill has an estimated life of about 70 years, based on present level of waste entering the waste stream. Contracts are in place for the landfill to be operated by Scope Resources Limited for 30 years, after which time the site will be handed back to Queenstown Lakes District Council.

5.5 Waste Disposal Fees and Charges

Council has a Waste Disposal By-Law, which is amended from time to time. Waste disposal fees and charges are set from time to time under the auspices of the By-Law.

The fees set for the 1999-2000 year are:

Waste Management Charge - (All properties are charged for this in their rates.)	**$ 51.00**
Residential Wheelie Bin Collection Charge - (Only properties within the areas where the wheelie bin service is provided are charged for this in their rates.)	**$150.00**
Transfer Station Fees:	
Single Plastic Bag of refuse (less than 6kg) -	**$ 1.00**
Car Boot of refuse -	**$ 5.00**
Van, Ute, Trailer of refuse (load less than 250kg) -	**$ 12.00**
Tandem Axle Trailer (load more than 250kg) -	**$ 20.00**
Per Tonne at gate -	**$ 84.37**
Car Body -	**$ 50.00**
Green Waste dumping at Transfer Stations -	
Car Boot of green waste -	**$ 2.00**
Van, Ute, Trailer of green waste -	**$ 5.00**
Tandem Axle Trailer	**$ 12.00**

6.0 INTEGRATED WASTE MANAGEMENT

6.1 Introduction

The waste stream is made up of a number of different components. Integrated waste management recognises these components and manages them using various techniques. The basis of a system of integrated waste management follows the accepted principal waste management options i.e. the "5 R's" i.e. are listed below from the most to the least preferred:

- Reduction
- Reuse
- Recycling
- Resource Recovery
- Residue Disposal

The Otago Regional Council's Regional Plan: WASTE puts in place policies relating to integrated waste management at the regional level.

"4.4.1 To encourage support and facilitate integrated waste management by, (in order of priority):

(a) Minimising the effects on the environment by reducing the quantity and or toxicity of material entering the waste a stream;
(b) Reusing materials;
(c) Recycling materials, where practicable, that cannot be reused;
(d) Recovering resources from materials in the waste stream; and
(e) Disposing of the residual waste in an environmentally safe manner.

4.4.2 To gather information on the waste stream in the Otago region.

4.4.3 To encourage the composting of appropriate organic waste material."

Council will work co-operatively with the Otago Regional Council to meet the objectives of the Solid Waste Management Plan, consistent with the direction set out in the Regional Plan: Waste.

Liaison with Queenstown Lakes District Council on matters pertaining to regional integration of waste management – including governance of the Victoria Flats joint venture landfill – is essential for the wider objectives of integrated waste management to be realised.

6.2 Reduction of Waste

The most effective way of managing waste is to not produce it. Reduction or avoidance of waste at source is the most cost effective and environmentally friendly waste management option.

By reducing the amount of waste being collected and disposed of at landfills, Council will minimise the costs of collection and disposal operations and extend the life of landfills.

It is recommended the Council implements techniques in conjunction with the Regional Council to educate the public with regard to waste reduction or minimisation.

These could include distribution of leaflets describing methods of waste reduction; for example, the leaflets could include information on:

i) avoiding purchasing "over packaged items"
ii) purchasing of bulk items
iii) purchasing of "refillable" products
iv) encouraging composting of kitchen and garden waste at home

These tasks have been implemented by other Councils throughout New Zealand and there is a wealth of information and examples to draw upon when deriving an approach to take.

Organisations which produce more waste than that of an average household could be encouraged to carry out audits of the solid waste they produce. Waste could be significantly reduced if local organisations communicated with suppliers to reduce unnecessary packaging.

Charging users of transfer stations is another means of encouraging waste reduction, particularly users who produce larger amounts of waste. Charges have been imposed to assist in meeting the costs of providing and managing transfer stations.

There are risks with this approach however, as charging may introduce "fly tipping" into the district, creating more nuisance, environmental affects and clean up costs. This has been recognised in the reduced charge for dumping of green waste at transfer stations and the lesser charges for small amounts of waste.

NOTE: "Fly-tipping" refers to the public disposing of waste in gullies or beside the roads around the district.

6.3 Reuse of Waste

Reuse of waste is the second best option in waste management.

As with waste reduction techniques, ideas on waste reuse could be brought to the public's attention in the form of public education type leaflets. These could include ideas like reuse of containers eg glass, milk bottles or beer flagons, or using both sides of a piece of paper before disposing or recycling it.

By implementing waste reuse policies the Council also saves on waste collection and disposal costs.

6.4 Recycling of Waste

Recycling is third on the waste management hierarchy as this option involves a processing element to produce a recycled product. The processing element generally uses other resources to recycle a product eg. collection of recyclables, energy to melt down glass etc.

The viability of recycling operations is dependent on the market for recycled materials. This is further exacerbated by the cost involved in transporting the products to be recycled to the processing centres. This is particularly relevant to the Central Otago District. Descriptions of current recycling operations in the Central Otago District are noted below.

6.4.1 Large Metal Objects

Sims Pacific Metals owns a crusher operated under contract by Foster Compaction. This baler currently tours the whole of the South Island compacting and baling cars, roofing iron and whiteware, which is then transported to a steel foundry in Auckland.

The crusher visits Central Otago on approximately a nine month cycle. Comments from the operators suggest the collection and storage of large metal objects in the district could be more organised to increase the efficiency of the crushing operation and recycling coverage.

6.4.2 Glass

A.C.I. has recently given notice that it will only pay 20% of transport costs to transport glass from South Island to the factory in the North Island. As a result councils throughout the South Island are assessing glass recycling options.

For example the Dunedin City Council are currently subsidising the collection and transport of glass from the Dunedin area. Christchurch City Council are

investigating, in conjunction with other South Island District and Regional Councils, other possible uses for glass waste.

All glass recycling in Central Otago has now stopped. Glass represents approximately 3% of all waste going into landfills. An indication of the costs involved in previous operations are:

(i) $80-$90/tonne to transport the glass to Dunedin.
(ii) $45/tonne paid to the glass collection agent.

6.4.3 Plastic

The recycled plastic market is currently very unreliable. Plastic recycling no longer occurs in Dunedin. A further complication, related specifically to Central Otago, is that if plastic recycling were to commence, plastic would need to be compacted and baled in Central Otago to make the transport costs to Dunedin economically feasible. Therefore until the recycled plastic market picks up, plastic recycling in the Central Otago District may not be a viable option, although more recent developments in the use of recovered plastics may well prove that a great deal of plastic could be cost effectively removed from the local waste streams.

6.4.4 Aluminium Cans

Comalco still finances the collection of aluminium cans in New Zealand. Can recycling is promoted through schools in the form of financial reimbursement and school competitions. The cans are collected, compacted, baled and shipped overseas for recycling.

Cans are currently collected in Central Otago by the Omakau, Terrace and St Gerrards primary schools and the transfer station in Cromwell and some other private recyclers. Cans are collected and transported to Dunedin by Sims Pacific Metals and Otago Metal Industries.

Council may decide to actively promote the collection of aluminium cans in conjunction with local schools for example.

6.4.5 Paper and Cardboard

Current recycled paper and cardboard prices do not make the collection of paper and cardboard from Central Otago a cost-effective exercise. Otago Paper Recyclers in Dunedin may take “kraft” cardboard, white ledger paper and computer paper from Central Otago for recycling but they would have to be baled in Central Otago to make the transport costs efficient. Under the current situation recycling of paper and cardboard is not considered a viable option unless the operation is to be subsidised.

6.4.6 Waste Oil

Some petrol retailers accept waste oil at garages in the district. Council could bring the location of these garages to the public's attention, in conjunction with the retailers.

Arrangements are being made for collection and storage of waste oil at transfer stations. Charges may be imposed for this service, to at least defray the cost of collection from transfer stations.

6.4.7 Car Batteries

Car batteries are currently being collected at the Alexandra and Cromwell transfer station. These batteries are then collected by scrap metal agents and transported to Dunedin and elsewhere, where most of the lead components are recycled.

It would be in the interests of the environment and community if car battery recycling was provided for and promoted at further sites around the district, to reduce the likelihood of the hazardous substances contained within car batteries entering landfills.

6.4.8 Waste Recycling Summary

As can be appreciated from the subsections above, recycling operations are:

- Heavily dependent upon market conditions.
- Council support for recycling ventures should be seen to be fair to both existing and proposed operations.
- Most successful recycling operations are established with the support of volunteer or subsidised labour, but the objective is usually to provide ongoing employment and work experience.
- Council support for recycling may begin with the promotion of voluntary initiatives; however, preference for such support may be given to those initiatives with broader job creation objectives.
- Council may assist recycling initiatives by way of facilitation of collection receptacles at landfills, transfer stations and elsewhere.
- Centralised recycling of some waste types maybe more effective than recycling by smaller local operations.

6.5 Resource Recovery

6.5.1 General

Resource recovery refers to the recovery of energy or biomass from products entering the waste stream. For example gas can be generated from the anaerobic digestion of waste in landfills.

Another form of resource recovery is the composting of green waste.

These options are further investigated below.

6.5.2 Landfill Gas Generation

Due to the dry climate of Central Otago, the minimal landfill depths and the comparative minimal waste generation of the district, harnessing the production of landfill gas in the district is not considered a viable option.

6.5.3 Waste Incineration

As above, due to the comparative minimal amounts of waste generated in Central Otago environmentally sound waste incineration and energy production is not considered cost effective due to the large cost of establishing an incineration facility and the transport of waste to the facility.

6.5.4 Composting of Waste

As noted earlier in this report there is a substantial component of green waste currently going into landfills, thereby increasing handling costs and reducing landfill life spans.

In order to either compost or dispose of green waste separately an area at landfills or transfer stations needs to be set aside especially for the deposit of garden green waste by the public.

Council then has three options in the handling of this green waste.

i) Council composts the green waste; or
ii) Offer the green waste to a private composting operation; or
iii) Dispose of the green waste.

Composting is a specialised operation, the market for compost requires a high quality product, the capital cost of a shredder is high, and the estimated green waste volumes in Central Otago are limited. Therefore Option i) may not be an economically viable operation in Central Otago, unless the real costs are adequately considered.

Option ii) may be a viable alternative. Following discussions with Queenstown Lakes District Council it has been established that it is also looking at composting operations in the district and has come to the same conclusion as above. However, by combining the two districts and serving them with a private mobile shredder, the economics of the operation look more promising. Composting operations, however, do require resource consents for compost leachate discharge and discharges to air. The environmental impacts of these operations however are generally less than for a landfill.

Option iii) would require the landfill operator to either dry and burn (if allowed by the Regional Council), or separately landfill the green waste depending on the location of the landfill.

Otago Regional Council has recognised the large percentage of green waste in the waste stream and does not require consent for the landfilling of unprocessed green waste. However, landfilling of green waste still takes up valuable land.

6.5.5 Future Options

It is recommended at this stage that the Central Otago District Council discusses possible private composting operations with the Queenstown Lakes District Council, Central Otago Recycling Initiative group, private garden supply operators and other interested parties, including discussion on possible water supply options to help with the green waste decomposition. In the meantime it is recommended Council makes provisions for the separation and storage of green waste at the existing landfill sites and proposed transfer stations.

6.6 Residue Disposal

6.6.1 General

Residue disposal is the final disposal of waste remaining after the other four options have been used.

The most common form of residue disposal in New Zealand and around the world is landfilling.

Although residue disposal is the least preferred option of the “5 R’s” it is the most used by people especially in New Zealand due to the amount of “available open space”.

Other forms of residue disposal include incineration and anaerobic digestion. These options, however, are not considered economically viable in Central Otago.

6.6.2 Incineration of Hospital Waste

Due to the high risk of contamination and the spread of disease posed by some waste generated by Central Otago healthcare facilities, those wastes are most appropriately disposed of by incineration. This service is currently provided by mediwaste in Dunedin, funded by the Health Funding Authority.

This term describes inert materials that have no potential to produce harmful effects on the environment. These materials include brick, concrete, soil and rock usually associated with building demolition or excavations into natural ground.

Hard (clean) fill is not accepted at transfer stations, as it can be disposed off elsewhere without resource consent being required.

The Otago Regional Council does not require a consent for the disposal of clean fill as long as there is no risk of increasing the suspended sediments in adjacent watercourses.

6.6.3 Clean Fill Options

Council is exploring the provision of areas for the disposal of clean fill. Council is eager to hear from any property owner who has an area of property which they would like to have filled with clean fill.

The location of clean fill disposal sites will be collated by the Council and published regularly, so as to ensure clean fill is diverted from waste stream in a socially, economically and environmentally appropriate manner.

7.0 HAZARDOUS WASTES

7.1 General

The term “hazardous waste” covers all waste that may pose a present or future threat to human, animal or plant health and the environment, due to – for example – its toxic, corrosive, infectious, flammable, reactive or explosive nature.

7.2 Agricultural Chemical

Following on from its policies stated in the Regional Plan: “WASTE”, the Otago Regional Council organised a one-off collection of agricultural chemicals in the Otago Region in 1997.

Privately operated agricultural chemical disposal/reuse services are available in Otago. Inquiries regarding disposal of agricultural herbicides and pesticides can be directed to:

Ian Davis
Dunstan Sprayers
Alexandra
Phone: (03) 448 8239

Citilab
Dunedin City Council Wastewater Treatment Plant
Phone: (03) 455 7938
Fax: (03) 455 7940

Contracts and Assets Officer
Central Otago District Council
Alexandra
Phone: (03) 448 6979
Fax: (03) 448 6979

7.3 PCB Removal

PCBs, found predominantly in older fluorescent light fittings, pose a risk to public health because of their potential carcinogenic nature.

Residents and business operators removing or dealing with the older electrical fittings should ask their electrician for advice on the most appropriate means of disposal.

Electrical fittings, such as fluorescent fittings, transformers and heavier switchgear, may only be disposed of to landfill if they have been checked by

an authorised electrician and carry the official Regional Council “PCB free” sticker.

In order for this scheme to work in Central Otago, however, the monitoring of waste entering the waste stream will need to be increased.

Any fluorescent light fittings disposed of at landfills must have a sticker on them to show they have been checked and are “PCB free”.

7.4 Hazardous Waste Collection

Currently the Alexandra and Cromwell transfer stations are the only sites in the Central Otago District with facilities for the temporary storage of hazardous wastes for disposal. Hazardous wastes are not disposed of at locally, they are disposed of elsewhere, for example to companies for reuse or to specific incinerating companies.

In order to meet the Regional Plan Waste requirements, similar hazardous waste storage sheds may be necessary at other transfer stations, with clear instructions to members of the public as to the labelling of containers. The real cost effectiveness of further hazardous waste collection facilities will be assessed before further facilities are established.

Care must be exercised by transfer station operators to ensure potentially explosive materials are not mixed – for example HTH (pool chlorine) mixed with diesel.

Collection and appropriate disposal of the stored hazardous wastes could occur on a regular basis.

7.5 Hazardous Waste Disposal

Schedules of hazardous wastes which may be disposed off, deposited for storage and later disposal, and prohibited wastes are attached to the contracts covering the operation of the district’s transfer stations. These schedules will be published and promoted in due course.

A co-disposal (the disposal of a mixture of certain hazardous wastes with certain municipal wastes) landfill could be set up in the district but it would need to be constructed with an impermeable liner to collect any leachate. There is also an operating cost added to the cost of providing a co-disposal site for assessing the suitability of certain materials to mix with other materials and costs in the physical disposal methods. The Council has access to this information from the Dunedin City Council, which currently employs Chem-

Search at the Otago University to advise on co-disposal options for various hazardous wastes.

No landfills in the district are constructed with an impermeable liner to control any leachate; co-disposal is, however, available at the Victoria Flats Landfill.

7.6 Hazardous Waste in the Future

Assessment of the amount of hazardous wastes apart from agricultural chemicals needs to be made in the district before a decision can be made whether to construct a co-disposal landfill or not.

Council will assist with Regional Council initiatives and provide hazardous waste collection facilities at transfer stations, where appropriate.

8.0 TRANSFER STATIONS

8.1 General

Transfer Stations for the collection of waste have become commonplace in New Zealand over recent years.

Transfer Stations offer the following advantages:

- Safe and clean, if properly maintained.
- Decrease landfill volumes by allowing for separation of wastes for recycling.
- Provide facilities for the separate storage of hazardous wastes.
- Exclude the public from the landfill, thereby enhancing health and safety aspects and allowing more efficient landfilling operations.
- Improve environmental control of landfills by concentrating resources into the running of fewer and improved landfills.

Transfer Stations are designed to suit the community they are serving. Their size and operation is dependent upon the expected amounts of waste arriving at the facility and the frequency of collection.

8.2 Transfer Stations in Central Otago

There has been a transfer station in Cromwell since the late 1980s. The Cromwell transfer station, and examples elsewhere, have provided the Council with valuable lessons in how to establish transfer stations throughout the district.

Neither the Cromwell or Alexandra transfer stations were specifically designed to cater for recycling. However, there is room to accommodate waste separation operations at both stations. Council staff and contractors are now working with local communities to establish the most effective waste management service for each transfer station.

9.0 DOMESTIC WASTE COLLECTION

9.1 Domestic Waste Collection Receptacles

Domestic waste may be collected in a variety of containers, and the type of container used will influence the number of people required to collect the waste.

Table 9.1 shows four alternatives: paper bags, plastic bags, tins and wheelie bins, and notes various matters pertaining to each.

Table 9.1 Domestic Waste Collection Receptacle Comparison

Receptacle	Capacity (litres)	Advantages/Disadvantages	Collection Vehicles and Labour numbers
Multiwall Paper Bags	44	Biodegradable in landfills. - Cheap to supply. - Break easily when wet.	- Truck or ute with cage on the back. - Compactor Truck. - 2 to 3 persons.
Multiwall Plastic Bags	76	- Not biodegradable. - Good in wet areas. - Cheaper to supply than paper bags.	Same as above.
Singlewall Plastic Bags	76	- Cheaper than multiwall bags. - More prone to puncturing and breakage.	Same as above.
Tins	60	- More durable than bags. - Lids can be removed. - Operators exposed to waste when discharging.	- Compactor Truck. - 2 to 3 persons.
Wheelie Bins	120 or 240	- Larger refuse contaminant. - Clean, tidy and efficient. - Durable, - Don't encourage waste Minimisation. - High capital cost. - See notes below.	- Specialised compactor truck. - 1 to 2 persons.

9.2 Wheelie Bins

By July 1999 a domestic wheelie bin solid waste collection service had been introduced to most urban and peri-urban areas of the district. The rationale for the introduction of wheelie bins was the perceived need for an alternative waste collection receptacle to replace free access to landfills.

The service was received very warmly within the towns themselves, but received a mixed reaction in some rural areas which had not previously received a waste collection service.

The present contract for the provision of wheelie bins and weekly collection of waste from them has a life of ten years, to 31 June 2009. However, Council has retained the option of being able to negotiate for the private provision of collection services, with direct charging of users.

The effectiveness of the wheelie bins will be assessed in the review of the Solid Waste Management Plan before September 2001.

The pros and cons of wheelie bins are outlined below:

Advantages:

- Health and safety of the public and collection operators.
- Contain odours.
- Reduces pest problems eg. dogs, cats and rodents.
- Contain more waste - up to 240 litres.
- Waste is compacted in a purpose-built truck thereby reducing visits to the landfill.
- Generally only requires one person to perform the collection.
- Bins are durable with a lifespan of about ten to fifteen years, depending on operator handling.

Disadvantages:

- Do not encourage home composting or waste minimisation therefore increasing landfilling costs. Auckland Regional Council have measured a 30% increase in domestic waste collected following the introduction of wheelie bins.
- People tend to place garden waste and other recyclables into the bins thereby reducing landfill space.
- Not as practicable on steep streets.
- High capital cost.

Land Transport Programme

Central Otago District Council Land Transport Programme

Index

Roading Management Plan

1. Format

The format of this document is:

- Description of activities
- Land transport programme outputs (including long term forecast)
- Safety administration programme outputs
- Demand management considerations
- Expenditure funded by tolling revenue
- Objective of the Activities, how they contribute to the purpose of the LTMA 2003, and an assessment against section 12(3) and 12(5) of the Act.
- Consultation
- Steps for developing options and alternatives
- Central Otago District Council Roading Management Plan

2. Description of Activities

For the purpose of Council's activities, Council considers roading to be a part of the utility activity class. The other activity classes, as defined by section of the Local Government Act 2002 are:

- District Development Services
- Environmental Services
- Utilities Services (including Land Transport)
- Community Services
- Governance and Administration Services

For the purpose of taking into account matters referred to in Sections 12(3) and (5) of the Land Transport Act, the activities, or class of activities which Council undertakes as part of the Land Transport Programme (as defined by Land Transport NZ) are

1. Structural Maintenance
   All maintenance, renewals and new works associated with the existing sealed road, unsealed road, drainage facilities and bridge and networks

2. Corridor Maintenance
   Snow and ice control, vegetation, signs and traffic services, and carriageway lighting

3. Professional Services

4. Construction - Seal extensions

5. Minor safety

3. Programme

Table 2 shows

- the 2005/06 programme, which has payment outstanding
- the 2006/07 programme
- the long term financial forecast

for all activities that Central Otago District Council recommends for inclusion in the Land Transport subsidised Land Transport Programme.

Activity	Proposed start date	Duration
Structural Maintenance	1 July 2006	12 months
Corridor Maintenance	1 July 2006	12 months
Professional Services	1 July 2006	12 months
Seal Extension	1 August 2006	6 months
Minor Safety	1 July 2006	10 months
Administration Support	1 July 2006	12 months

Table 1 – Starting Date and Duration of each Activity

The Central Otago District Council unsubsidised roading programme is outlined on Table 3 and has been included for completeness. This programme is not included in the programme request submitted to Land Transport NZ, and will not receive funding from Land Transport NZ.

Table 2 - Central Otago District Land Transport Programme

Activity	Activity Class	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Structural maintenance	Pavement maintenance	1,391,446	1,014,200	1,064,700	1,086,800	1,042,100	1,007,800	1,026,700	1,044,100	1,059,800	1,073,600	1,087,300
	Area wide pavement treatment	280,000	1,002,000	1,096,600	1,045,900	805,300	930,600	779,600	870,300	1,163,700	1,213,800	928,900
	Major drainage control	0	98,000	24,100	75,900	26,500	27,000	27,500	28,000	28,400	28,800	29,200
	Maintenance chip seals	760,000	784,300	804,700	865,200	884,300	901,900	919,000	934,700	948,700	961,100	973,600
	Thin asphaltic surfacing	85,000	87,700	90,000	96,800	98,900	100,900	102,800	104,500	106,100	107,500	108,900
	Bridge maintenance	90,000	339,250	320,250	170,250	170,250	82,000	83,000	81,000	64,000	60,000	60,000
Total Structural maintenance		**2,606,446**	**3,325,450**	**3,273,850**	**3,214,350**	**2,966,850**	**3,043,700**	**2,932,100**	**3,056,100**	**3,364,200**	**3,438,300**	**3,181,400**
Corridor maintenance	Amenity/safety maintenance	294,300	384,900	395,900	427,200	406,600	415,200	423,700	431,300	438,000	444,100	450,200
	Street cleaning (100% cost)	100,500	80,855	83,281	85,779	88,352	91,003	92,823	94,680	96,573	98,505	100,475
	Traffic services	208,150	218,500	234,100	250,900	232,300	237,000	241,500	245,600	249,300	252,500	255,800
	Carriageway lignting	167,500	178,800	184,164	189,689	195,380	201,241	207,277	213,496	219,902	226,498	233,294
Total Corridor maintenance		**770,450**	**803,055**	**837,445**	**893,568**	**862,632**	**884,444**	**905,300**	**925,076**	**943,775**	**961,603**	**979,769**
Professional Services	Professional Services	643,540	712,200	707,400	737,600	666,800	673,900	770,300	689,400	736,600	832,400	726,800
Total Ouput 1		**4,020,436**	**4,840,705**	**4,818,695**	**4,845,518**	**4,496,282**	**4,602,044**	**4,607,700**	**4,670,576**	**5,044,575**	**5,232,303**	**4,887,969**
Construction	Seal extension	0	1,232,000	0	0	0	0	0	0	0	0	0
Minor safety	Minor safety	321,635	387,256	385,496	387,641	359,703	368,164	368,616	373,646	403,566	418,584	391,038
Total Output 2		**321,635**	**1,619,256**	**385,496**	**387,641**	**359,703**	**368,164**	**368,616**	**373,646**	**403,566**	**418,584**	**391,038**
Territorial	Administration support	97,697	145,349	117,094	117,746	109,260	111,830	111,967	113,495	122,583	127,145	118,778
Total Land Transport Programme		**4,439,767**	**6,605,311**	**5,321,285**	**5,350,906**	**4,965,244**	**5,082,037**	**5,088,283**	**5,157,717**	**5,570,724**	**5,778,032**	**5,397,784**

Table 3 - Unsubsidised Roading Programme

Area	description	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
District	spraying and street cleaning	11,700	51,000	52,200	55,800	57,100	58,100	59,200	60,200	61,000	61,800	62,500
District	signs	3,000	3,000	3,078	3,309	3,382	3,450	3,515	3,575	3,629	3,676	3,724
District	Roading Policy	169,843	76,209	80,049	82,197	84,507	86,726	88,399	72,853	74,180	75,639	76,748
District	Road safety	4,217	5,351	5,351	5,511	5,671	5,822	5,925	6,031	6,139	6,248	6,360
District	non sub seal extension	433,000	819,520	0	0	1,300,000	0	0	1,300,000	0	0	0
Total District		**621,760**	**955,080**	**140,678**	**146,817**	**1,450,660**	**154,098**	**157,039**	**1,442,659**	**144,948**	**147,363**	**149,332**
Alexandra	Footpath maintenance	15,000	16,200	16,600	17,900	18,300	18,600	19,000	19,300	19,600	19,800	20,100
Alexandra	Footpath renewals	57,000	61,600	63,200	67,900	69,400	70,800	72,100	73,400	74,500	75,400	76,400
Alexandra	Shakey bridge	0	0	0	20,000	0	0	0	0	0	0	0
Alexandra	Carpark maintenance	7,000	7,600	7,800	8,034	8,275	8,523	8,694	8,868	9,045	9,226	9,410
Total Alexandra		**79,000**	**85,400**	**87,600**	**113,834**	**95,975**	**97,923**	**99,794**	**101,568**	**103,145**	**104,426**	**105,910**
Cromwell	Footpath maintenance	7,500	41,600	8,300	8,900	9,100	9,300	9,500	9,600	9,800	9,900	10,100
Cromwell	Footpath renewals	119,100	100,200	100,200	100,200	100,200	100,200	100,200	100,200	100,200	100,200	100,200
Cromwell	underground services	225,000	0	0	0	0	0	0	0	0	0	0
Cromwell	Bannockburn Road	0	0	5,000	0	0	960,000	0	0	0	0	0
Cromwell	Carpark maintenance	5,250	5,700	5,800	6,300	6,400	6,500	6,600	6,800	6,900	6,900	7,000
Cromwell	Carpark reseals	0	43,800	50,600	50,800	8,125	0	0	0	57,000	0	15,600
Total Cromwell		**356,850**	**191,300**	**169,900**	**166,200**	**123,825**	**1,076,000**	**116,300**	**116,600**	**173,900**	**117,000**	**132,900**
Manhuerikia	Footpath maintenance	2,900	2,900	3,100	3,200	3,400	3,500	3,600	3,700	3,800	3,800	3,900
Manhuerikia	Footpath renewals	11,500	12,400	12,700	13,700	14,000	14,300	14,500	14,800	15,000	15,200	15,400
Total Manuherikia		**14,400**	**15,300**	**15,800**	**16,900**	**17,400**	**17,800**	**18,100**	**18,500**	**18,800**	**19,000**	**19,300**

Table 3 - Unsubsidised Roading Programme (continued)

Area	description	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Earnscleugh	Footpath maintenance	5,900	6,400	6,592	6,790	6,993	7,203	7,347	7,494	7,644	7,797	7,953
Earnscleugh	Footpath renewals	13,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000
Earnscleugh	Kerb & Channel Clyde	58,100	0	0	0	0	63,000	17,000	73,000	40,000	44,000	48,000
Total Earnscelugh		**77,000**	**20,400**	**20,592**	**20,790**	**20,993**	**84,203**	**38,347**	**94,494**	**61,644**	**65,797**	**69,953**
Maniototo	Footpath maintenance	4,500	4,900	5,000	5,400	5,500	5,600	5,700	5,800	5,900	6,000	6,000
Maniototo	Footpath Renewals	30,000	14,000	14,400	15,400	15,800	16,100	16,400	16,700	16,900	17,200	17,400
Maniototo	New Footpaths	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Maniototo	New Kerb & Channel	0	0	15,000	10,000	0	0	0	0	0	0	0
Maniototo	Carpark resealing	0	46,500	0	0	0	0	0	0	0	0	0
Maniototo	seal widening	0	0	0	0	30,000	0	0	0	0	0	0
Total Maniototo		**44,500**	**75,400**	**44,400**	**40,800**	**61,300**	**31,700**	**32,100**	**32,500**	**32,800**	**33,200**	**33,400**
Roxburgh	Footpath maintenance	3,900	4,200	4,300	4,600	4,700	4,800	4,900	5,000	5,100	5,200	5,200
Roxburgh	Footpath renewals	16,000	17,300	17,700	19,100	19,500	19,900	20,200	20,600	20,900	21,200	21,400
Roxburgh	Horshoe Bend Bridge	0	0	0	0	0	5,000	0	0	0	0	0
Roxburgh	Carpark maintenance	300	300	300	300	300	300	300	300	300	300	300
Total Roxburgh		**20,200**	**21,800**	**22,300**	**24,000**	**24,500**	**30,000**	**25,400**	**25,900**	**26,300**	**26,700**	**26,900**
Total unsubsidised programme		**1,213,710**	**1,364,680**	**501,270**	**529,341**	**1,794,653**	**1,491,724**	**487,080**	**1,832,221**	**561,537**	**513,486**	**537,695**

Table 4 - Safety Administration Outputs

2006/07 Community Road Safety Programme

Project	Value	Proposed Actions
Alcohol	9,600	Distribute existing posters, funding subsidy for school ball after function transport, community based project in conjunction with Wine and Food Festivals, Transport for New Year and Easter events, Billboard campaign
Speed	7,100	Billboard campaign and back to school and School bus passing speed media promotions
Restraints	7,600	Billboard campaign, child restraint installation clinics and awareness campaigns
Fatigue	6,600	Billboard campaign, Drop stop over public holiday periods, media awareness
Driver Practises	14,000	Safe with age, Driver licensing , and defensive driving seminars, crash simulator for Youth forums and Men's day out, mobility scooter workshop and awareness, towing/backing workshops and awareness, intersection awareness campaign, car checks by vehicle inspector
Winter Driving	15,500	Billboard campaign, Winter driving awareness campaigns - CMA, Ice Grit, where to get road condition info, winter festival presence, ice scrapper distribution, winter driving brochures, winter driving information boards, seminars on fitting and driving with chains
Walking and Cycling	13,000	Billboard campaign, developing child road safety sense, walking school bus, back to school editorials, support for external organisations promoting walking and cycling, involvement in bikewise week
Tourists	3,400	Driving in the Scenic South Brochures, and distribution through A-Z Visitor Guide
Community Road Safety Position	40,000	Land Transport New Zealand funding allocation towards position

4. Demand Management

Apart from school buses and intercity bus services, there is no public transportation service operating within the district. Limited taxi services are available within the Cromwell and Alexandra areas.

Council has adopted a walking and cycling strategy which identifies the steps Council will take, working with partner organisations to promote walking and cycling as a mode of transport.

Parking management plans are being undertaken for Cromwell and Alexandra townships, which will identify specific long term parking areas for workers and short term parking for business visitors and shoppers. As a result some worker parking may be moved a short distance away. This may result in greater numbers walking to work rather than driving.

Council has undertaken a blueprint strategic growth planning exercise to develop zoning areas to cater for urban growth. A rural study is underway to consider the impacts of residential subdivision and commercial growth in rural areas, and put in place measures to minimise the visual and environmental impact of these.

5. Expenditure Funded by Tolling Revenue

No expenditure in the 2006-16 LTCCP is to be funded from tolling revenue.

6. Assessment of Activities and Options

This section states the objective to be achieved by each activity or class of activity and how each activity or class of activity contributes to the purpose of the Act.

Structural Maintenance

All maintenance, renewals and new works associated with the existing sealed road, unsealed road, drainage facilities and bridge and networks.

The Community Objective to provide "*A Well Connected and Safe Roading System*" will be achieved by:

- providing a smooth and safe sealed roading network, where all roads with a daily average traffic over 200 vehicles per day are sealed.

- maintaining a hierarchy of gravel roads to provide a smooth safe riding surface, where regular evasive action is not required due to potholes, corrugations and excessive or large loose aggregate. The pavement will be shaped with consistent and adequate camber to shed water.

Structural maintenance includes construction of high country access tracks on legal but unformed roads.

The community objective is to provide "*Access to Lakes and Recreation areas*". This will be achieved by:

- Managing road access to high country and recreation areas to ensure that affordable and appropriate levels of service are provided on all roads Council is responsible for.

Contribution to the Purpose of the LTMA *'to contribute to the aim of achieving an integrated, safe, responsive and sustainable land transport system'*	
Without maintenance and renewals the sealed and unsealed roads, and bridges, would deteriorate and become unsafe and unresponsive to the needs of the communities. Maintenance and renewals is the first step in providing a sustainable network.	
Matters referred to in Sections 12(3) of the Land Transport Management Act	
Assists economic development	By providing a well connected, efficient and safe network
Assists safety and personal security	By providing smooth, well maintained roads
Improves access and mobility	By providing a well connected, efficient and safe network
Protects and promotes public health	By providing a well connected, efficient and safe network which provides access to medical services
Ensures environmental sustainability	By providing optimised maintenance, use of energy and resources are minimised
Matters referred to in Sections 12(5) of the Land Transport Management Act	
Contribution to EECS	Provides a more energy efficient road network by reducing road roughness
Contribution to Road Safety 2010 Strategy	By engineering better roads
Contribution to Regional Land Transport Strategy	Structural maintenance contributes to Policy 1.1 Assist economic development in the Otago region, method 1.1.6

Corridor Maintenance

Snow and ice control, vegetation, signs and traffic services, and carriageway lighting

The Community Objective is to provide "*A Well Connected and Safe Roading System*". This will be achieved by:

- managing activities and maintaining the roading corridor to ensure the road environment is not a contributing cause to crashes.

- providing appropriate facilities to guide and direct road users.

Contribution to the Purpose of the LTMA *'to contribute to the aim of achieving an integrated, safe, responsive and sustainable land transport system'*	
Maintenance of the roading corridor is essential to providing a safe and responsive roading network	
Matters referred to in Sections 12(3) of the Land Transport Management Act	
Assists economic development;,	By providing a well connected, efficient and safe roading network
Assists safety and personal security	Through snow and ice control, vegetation control for visibility, removal of detritus and debris from roads, provision of road delineation and warning signs
Improves access and mobility	By providing a safe and efficient roading network
Protects and promotes public health	
Ensures environmental sustainability	Through reduced spraying, more mowing
Matters referred to in Sections 12(5) of the Land Transport Management Act	
Contribution to EECS	
Contribution to Road Safety 2010 Strategy	By providing safer and better engineered roads
Contribution to Regional Land Transport Strategy	Corridor maintenance contributes to Policy 1.1 Assist economic development in the Otago region, method 1.1.6

Construction - Seal Extensions

Detail of this work is provided in the Roading Management Plan.

The Community Objective is to provide "*A Well Connected and Safe Roading System*". This will be achieved by:

- providing a smooth and safe sealed roading network, where all roads with a daily average traffic over 200 vehicles per day are sealed.

Contribution to the Purpose of the LTMA ***'to contribute to the aim of achieving an integrated, safe, responsive and sustainable land transport system'***	
Council's seal extension strategy was developed in response to the needs of the local community to provide an integrated and safe sealed roading network with a transparent method of prioritising projects based on the local communities values	
Matters referred to in Sections 12(3) of the Land Transport Management Act	
Assists economic development	By reducing dust impact on valuable horticultural crops, opens up EC markets by removing restrictions placed by oil being applied as a dust suppressant, reduces damage to fruit transportation and vehicles from rough roads, by providing a well connected network of sealed roads
Assists safety and personal security	Reduces dust visibility issues, improves safety for cyclists and pedestrians
Improves access and mobility	Reduces travel time
Protects and promotes public health	Reduces dust to workers on adjacent orchards
Ensures environmental sustainability	reduces length of oil application within the District
Matters referred to in Sections 12(5) of the Land Transport Management Act	
Contribution to EECS	Promotes energy efficient modes by making cycling a more attractive option for orchard workers, provides a more energy efficient road network by reducing road roughness
Contribution to Road Safety 2010 Strategy	Improving safety for pedestrians and cyclists, engineering better roads
Contribution to Regional Land Transport Strategy	Seal Extensions contribute to Policy 1.1 Assist economic development in the Otago region, method 1.1.6

Construction – Minor Safety Works

This includes all safety projects undertaken as part of Council's Minor Safety Works programme

Contribution to the Purpose of the LTMA ***'to contribute to the aim of achieving an integrated, safe, responsive and sustainable land transport system'***	
These projects are prioritised and undertaken to improve safety	
Matters referred to in Sections 12(3) of the Land Transport Management Act	
Assists economic development;	By improving the safety of key routes within the district through sight benching and geometric improvements
Assists safety and personal security	By improving lighting, providing safety footpaths, street widening and traffic calming near education facilities, improving intersections
Improves access and mobility	Through construction of safety footpaths, road widening, safer roads.
Protects and promotes public health	By investing in cycle and pedestrian facilities
Ensures environmental sustainability	Energy efficient lighting, improving infrastructure to support walking and cycling
Matters referred to in Sections 12(5) of the Land Transport Management Act	
Contribution to EECS	Energy efficient lighting and promotion of walking and cycling through improved infrastructure contributes to 15% energy efficiency target
Contribution to Road Safety 2010 Strategy	By engineering better roads, improving safety for pedestrians and cyclists
Contribution to Regional Land Transport Strategy	Carriageway Lighting Upgrades contribute to: Policy 3.1 Ensure transport related decision making supports improvement in safety and personal security, methods 3.1.1, 3.1.3, 3.1.4, and 3.1.5

7. Stakeholders and Consultation

Land Transport Programme

Sections 12, 13, 15 and 16 of the Land Transport Management Act 2003 (LTMA) define requirements with regards to preparation of Land Transport Programmes and consultation.

Section 13 of the LTMA states that Councils need not prepare a land transport programme for a financial year if –

- The local authority's long term council community plan or annual plan includes the matters required to be in a land transport programme prepared by a local authority,
- The local authority provides details of those matters as required by section 12 in a form that Land Transport New Zealand are satisfied complies with the provisions of this Act relating to the form of a land transport programme; and
- In preparing the plan, the local authority has taken into account the matters referred to in 12(3) and (5).

Section 15 (3) When preparing a land transport programme a territorial authority must consult –

(a) Land Transport New Zealand
(b) Transit
(c) All regional councils whose jurisdiction includes the district
(d) The adjoining territorial authorities
(e) The district health boards in the district
(f) The Accident Compensation Corporation
(g) Every affected public organisation
(h) The Authority
(i) The Commissioner
(j) New Zealand Historic Places Trust
(k) Land transport users and providers
(l) Affected communities
(m) Maori of the district
(n) The public in the district

Schedule 1, Part 1 states the content required in a land transport programme.

In order to meet the requirements of the LTMA 2003, Council's land transport programme has been presented in Volume 3 of the 2006/16 LTCCP. The content is sufficient to meet the LTMA requirements and is provided in a manner and format which is appropriate for the wider audience. This volume has been provided to the organisations required to be consulted with.

Stakeholders

The stakeholders for the land transport activity include:-

- Land Transport New Zealand
- Transit
- Otago Regional Council
- The adjoining territorial authorities; Clutha District Council, Dunedin City Council, Waitaki District Council, Queenstown Lakes District Council, and Southland District Council
- The Central Otago Health Board
- The Accident Compensation Corporation
- Every affected public organisation
- The Commissioner
- New Zealand Historic Places Trust
- Land transport users and providers
- Affected communities
- Maori of the district
- The public in the district
- The Energy Conservation Authority.
- Various utility operators (power, telephone, drainage, water and gas)
- The Automobile Association
- The Owner Drivers Association
- The Heavy Haulage Association
- The Forestry Owners Association

Consultation requirements in the LTMA 2003 are generally the same principles that are in the Local Government Act, and all consultation must use the special consultative procedure.

8. Steps for Developing Options and Alternatives

Detailed programmes of work are required to be approved by the Roading Sub-Committee for District roading projects, and the Community Boards for ward roading projects.

Council's reporting process to Committees requires information of what is considered to be the appropriate level of analysis based on Council's significance policy. All reasonable options are required to be identified.

Under each of the following well-beings, costs and benefits of each option are evaluated, and the degree to which community outcomes are advanced is provided:

- Economic
- Environment
- Social
- Cultural
- Maori

Known community views about these options and the completeness of this knowledge is also required to be provided.

Central Otago District Council Roading Management Plan

1. Introduction

1.1 The Local Government Act 1974 sections 316 and 317 vests the property in roads and control of roads in the district, excluding state highways, with Council.

As such, Council is required by law to control activities on roads and ensure the unhindered passage of the public along any road. While Council may choose the level at which it will maintain roading assets and provide services, it must take sufficient precautions for the general safety of the public, traffic and workmen on or near any road.

The scope of the roading activity is:

- Management, maintenance, replacement, and new works associated with roads which Council maintains. These roads are listed on Council's Roading Hierarchy.

- Management, maintenance, replacement and new works associated with footpaths, carparks, and any other unsubsidised work that may be undertaken to improve the roading environment or provide for improved transportation opportunities.

- Managing issues which arise on legal roads which are not maintained by Council.

1.2 The roading activity contributes to the following outcomes from Central Prospects to varying extent:

- Transport and Communications
    - Well connected and safe roading system
    - Review regional land transport strategy and consider levels of local transport

- Heritage
    - Redevelopment projects occurring
    - Clear guidelines for managing heritage sites

- Recreation
    - Access to lakes and recreational areas

1.3 The Activity Goal and Principal Objectives are as follows:

A Well Connected and Safe Roading System

The following performance measures have been developed for each component of the roading network to deliver a well connected and safe roading network.

Sealed Roads

A smooth and safe sealed roading network will be provided, where all roads with a daily average traffic over 200 vehicles per day are sealed.

Unsealed Roads

A hierarchy of gravel roads will be maintained to provide a smooth safe riding surface, where regular evasive action is not required due to potholes, corrugations and excessive or large loose aggregate. The pavement will be shaped with consistent and adequate camber to shed water.

Roading Corridor

Activities within the roading corridor are managed and maintained to ensure the road environment is not a contributing cause to crashes.

Appropriate facilities are provided to guide and direct road users.

Footpaths and Cycleways

The role of walking and cycling as transport will be maximised.

A safe, convenient and attractive transport infrastructure which encourages and facilitates walking and cycling will be developed.

Central Otago District Council strategies, policies, plans and practices will support walking and cycling.

Carparks

Carparking areas will be managed to ensure the needs of visitors and workers are provided for.

Recreation - Access to Lakes and Recreation areas

Road access to high country and recreation areas is managed to ensure that affordable and appropriate levels of service are provided on all roads Council is responsible for.

Heritage – Redevelopment Projects Occuring

Council's historic bridges will be maintained and renewed in a manner which is sympathetic to their heritage. Renewals and capital projects on historic sites and townships will include consultation with the Historic Places Trust.

2. Levels of Service, Performance Measures, and Relationship to Community Outcomes

Activity	Level of service	Method of measurement
Sealed Roads	Roughness on sealed roads is maintained or better than 2005 levels Safety – injury and non injury crash reporting is increased Roads with 200 annual average daily traffic volumes are sealed Overall public satisfaction rating static or improving	Biennial NAASRA Roughness survey Crash statistics in annual Land Transport New Zealand report for Central Otago are trending upwards due to improved reporting Annual traffic counting programme on Local and Local Access A roads Annual ratepayer satisfaction survey
Unsealed Roads	Technical levels of service are met Management Plans are provided and implemented for all roads associated with tenure review, and for those which are identified as providing access to rivers and lakes Overall public satisfaction rating static or improving	6 monthly auditing of the unsealed roading network (Consultant auditing, Council Benchmarking) Roading Sub Committee Reports Annual ratepayer satisfaction survey
Roading Corridor	No crash report identifies the following as a contributing factor: • vegetation • street lighting • delineation • snow and ice, where warning signs are not present and/or treatment of the areas has not been undertaken.	Police crash reports

Activity	Level of service	Method of measurement
Cycleways and Footpaths	Maximise the role of walking and cycling as transport Provide infrastructure which encourages and facilitates walking and cycling	The overall % of people using walking or cycling to travel around the area are trending upwards in the ratepayer opinion survey. The overall % satisfaction rating for provisions for cyclists is trending upwards The overall % satisfaction rating for footpaths is trending upwards
carparks	Carpark management plans are in place for Cromwell Alexandra and Clyde commercial areas, and are monitored during peak times	Bylaws current Monitoring undertaken
Serviceability	Access restored by detour within stated time or reopened to single lane for 20 minutes per hour Collector - 4 hours urban, 8 rural Local –8 hours urban, 12 hours rural Local Access A - 48 hours Local Access B - site specific	Monthly activity reports
Customer Service	All customer enquiries entered into the service request system and responded to within allocated time frames. Major works communicated with residents	Service Request system reporting Number of press releases in local newsletters is greater than 6 per annum.
Sensitivity to Heritage	All renewals and capital improvements in heritage areas or on historic bridges undertaken in consultation with Historic Places Trust	Each project file for works on historic bridges, or iconic Central Otago Town or site contains a file note outlining consultation that has occurred with Historic Places Trust.

3. The Existing Situation Described

The Central Otago District Council roading network comprises a number of separate networks within each ward which are connected by a backbone of State Highways. The State Highway network carries traffic through the District, and is used by residents to commute between the various ward networks.

There are some cross range high country tracks which also provide links between the various wards. These are typically dry weather roads which are formed in areas of harsh winter weather conditions and challenging topography. These are used for farm and recreational access.

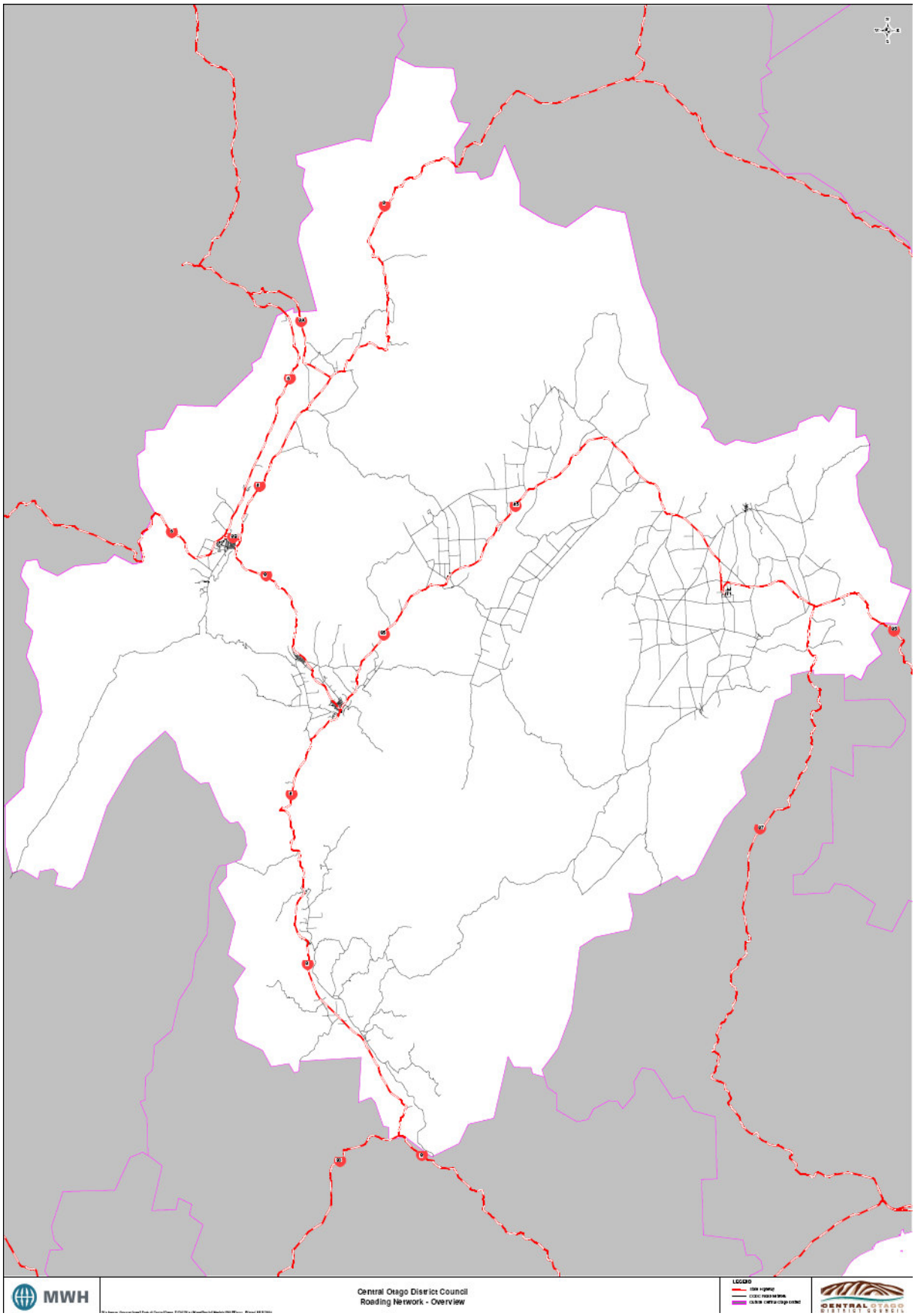
The local networks provide access to property, business, and back country areas. This is typically a low volume roading network, where the majority of roads are unsealed rural roads. Of the 1,725.3 km of rural roads, only 22km carry more than 1,000 vehicles per day.

The Central Otago roading network is growing as a result of subdivision, residential development on existing properties, and greater provision of road access to recreational areas.

Type	**Length in km**	
	March 2005	**March 2006**
Sealed Urban Streets	114.76	117.62
Unsealed Urban Streets	6.03	5.79
Service Lanes	1.26	1.32
Sealed rural Roads	333.04	335.73
Unsealed Rural Roads	1,001.23	998.63
Tracks	388.94	390.94
Total	**1,845.25**	**1,850.04**

The Central Otago District Council maintains 163 bridges.

Type	Cromwell	Earnscleugh/ Alexandra	Manuherikia	Maniototo	Roxburgh	Total
Concrete Structure	3	4	24	21	8	60
Concrete deck on steel superstructure	1	3	3	9	5	21
Steel “Armco” culvert	3	0	1	3	2	9
Concrete culvert	4	7	8	3	3	25
Timber deck on steel superstructure	4	1	2	9	6	22
Timber deck and superstructure	0	1	6	14	1	22
Tmber culvert	0	0	2	1	0	3
Timber footbridge		1	0	0	0	1
Total	15	17	46	60	25	163


MWH
Central Otago District Council
Roading Network - Overview
LEGEND
CENTRAL OTAGO
DISTRICT COUNCIL

4. Maintenance and Operating

4.1 How managed and controlled.

Council has two physical works contracts which cover maintenance and operational work. These are District Road Maintenance, and Pest Plant Spraying. Carriageway Lighting is undertaken by the two lines companies within the District.

As well as employing staff to manage the roading activities, management is undertaken under two separate contracts. These are an external professional services contract and an in house business unit contract.

A Community Road Safety Advisor is also employed to promote road safety within the community as a joint position between Central Otago and Queenstown Lakes District Councils.

A Roading Hierarchy system has been applied to the roading network. The Roading Hierarchy identifies all roads which are maintained by Council, the length of the road maintained and the start and end positions. Each road on the hierarchy has been assigned a classification, which determines the required standard and level of service to be applied.

The Roading Hierarchy has five classifications of road, the top two of which are split into urban and rural.

Collector Rural - In rural areas these roads are sealed roads which are alternative district routes or connect a series of communities within the District. These roads typically have Average Daily Traffic (ADT) greater than 500.

Collector Urban - In urban areas these are sealed roads which provide through routes through townships or form commercial areas. These streets typically have ADT greater than 1,000.

Local Rural - These include all sealed roads in rural areas which are not collector, and gravel roads with ADT greater than 150. These roads connect rural communities to collector roads, service significant horticultural, farming or industrial activities, are higher volume gravel roads in lifestyle block areas, are part of school bus routes, or other activity of importance to the community.

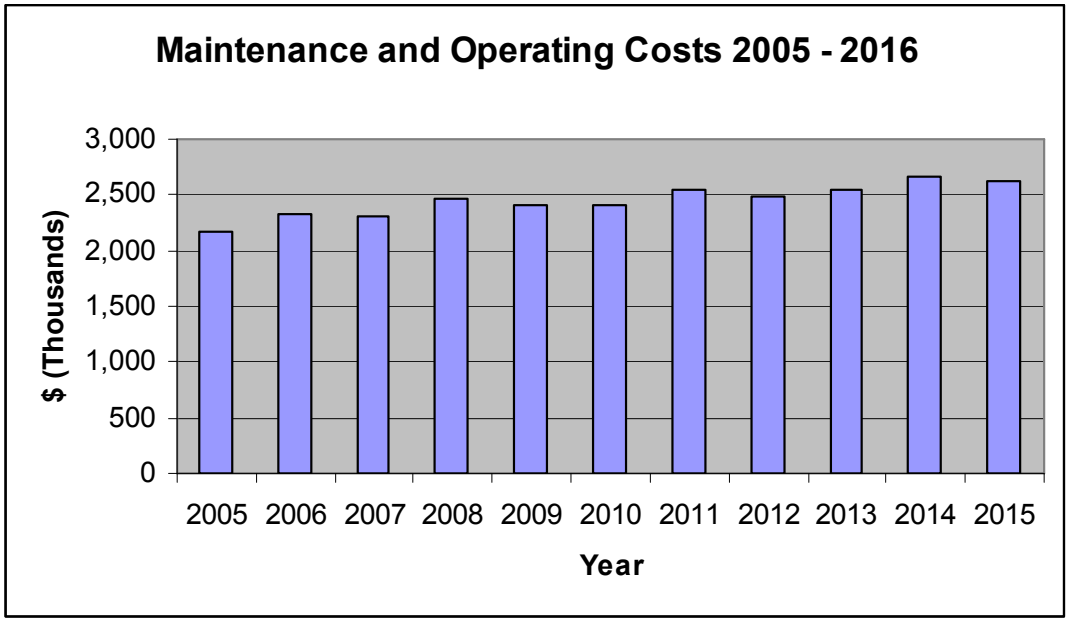
Local Urban - All urban streets which are not classified as collector.

Local Access A - Rural gravel roads with ADT 50 to 150 which service rural residential properties or rural businesses which generate significant traffic.

Local Access B - Rural gravel roads with ADT less than 50 which service isolated farm buildings and rural residential properties.

Tracks - Service land use beyond dwellings and buildings and provide high country access.

4.2 Estimated maintenance and operating costs next ten years



4.3 Maintenance and operating issues.

Sealed Roads

Sealed roads in Central Otago are generally constructed on good foundation materials and have relatively low traffic volumes. The temperature extremes in Central Otago is the factor which has the greatest effect on the sealed road network, causing pavement failure during freeze thaw conditions, and bleeding/flushing as a result of high temperatures in summer.

Gravel Roads

Grading is undertaken as a cyclic activity on an area basis, with priority given to roads based on hierarchy classification and existing condition of the road. While it is preferable to grade in wet conditions, the reality is that all available graders are consistently in operation during these periods, and no additional grading capacity is provided for favourable weather conditions.

Numerous pits are used for supply of gravel across the district. Because the quality of the material is not uniform, this presents particular challenges with regards to maintenance. The material used does impact on the finished quality of the road and the amount of maintenance work required.

In order to meet the required level of service, different pit run materials may require a combination of rolling, manual removal of large material from the road side, grading with the grader bit system, increased frequency of grading, and blending of additional materials.

Bridges

In 2004 Council obtained a 10 year resource consent which covers work on existing bridges. Up until this time many minor works which required specific resource consent had been deferred.

A structural inspection was undertaken of all Council's bridges in October 2005. A backlog of maintenance work has been identified to be addressed over a 4 year period.

A forward programme of bridge painting has also been identified. Where painting is required due to corrosion affecting the structural integrity of the existing structures, this is undertaken as a renewals project. The following table identifies bridge painting which is currently identified as maintenance work.

Bridge No	Cost	Forward Programme	Road	Waterway
153	37,000	2009/10	Puketoi Runs Road	Totara Creek
158	40,000	2009/10	Loganburn Runs Road	Taieri River James Donald
170	40,000	2010/11	Beaumont Station Road	Fruid Burn
178	40,000	2011/12	Timaburn Road	Oven Hill Creek
109	15,000	2012/13	Naseby Kyeburn Diggings Road	Hogburn
151	38,000	2012/13	Mcskimming Road	Sow Burn No. 1
85	7,000	2012/13	St Bathans Loop	Donald Stuart Creek
95	66,500	2013/14	St Bathans Loop Road	Manuherikia River
103	24,500	2014/15	Ida Valley Omakau Road	Idaburn Hayes
174	40,000	2014/15	Craig Flat Road	Minzion Burn
16	60,000	2015/18	Cluden Road	Cluden Stream
116	20,000	2015/18	Dansey Pass Road	German Greek
130	30,000	2015/18	Sharkey Road	Wether Burn Sharkeys No. 2
139	30,000	2015/18	Waipiata Gimmaburn Road	Hogburn

This work has not been included in the 2006 LTCCP. Further work is to be undertaken to determine if the painting of these bridges is required to protect the structural integrity of the bridges, or for aesthetic reasons.

Issues that arise on a periodic basis are removal of debris behind the bridges, particularly those on the Lindis River, and repair of damage caused by oversized farm equipment. Because these bridges tend to be on very low volume roads, it is difficult to prove liability for the damage.

Drainage Facilities

Many of the culverts in the District are unmarked. Marking of these culverts is required to ensure that they are adequately maintained, to reduce damage to the culverts during routine maintenance, and to ensure all culverts are recorded in RAMM.

Blocking of culverts is generally restricted to areas where undersized culverts have been installed. These are typically 150mm or 225mm diameter pipes. These pipes are generally being programmed for replacement under the renewals programme.

There are many accessways which have not been constructed in accordance with District Plan requirements. In some cases no access culvert has been installed, or an inadequately sized culvert has been installed. In kerbed areas property owners have placed material in the kerb rather than construct a dropped crossing.

There are a number of locations in urban areas where residents have connected stormwater from property into the kerb without using a proprietary kerb connection block. These connections are prone to failure, and vegetation grows in the kerb around the pipe.

A process for rectifying existing inadequate stormwater connections and accessways is to be developed.

Roading Corridor

- Snow and Ice

Generally heavy prolonged snow falls are restricted to one or two parts of the District. When this occurs the contractor moves all available equipment to that area. As a result the specified level of service is exceeded and can become the publicly expected level of service. On the rare occasions when snow falls across the district, it is likely that residents in the Maniototo particularly will experience dissatisfaction due to specified levels of service being applied.

Council is moving towards using CMA instead of gritting on ice prone areas. This will begin in 2006/07.

- Vegetation Control

There is currently a backlog of work removing and trimming trees in rural areas. This work is required for safety reasons. Budgets have been increased for three years from 2006/07 to enable the backlog to be addressed. Where possible these trees will be permanently removed.

In some cases it is desirable to remove trees along property boundaries, or shelterbelts of trees within road reserve due to damage occurring to footpaths, the pavement, or because of shading of the road and associated ice problems. A policy with regards to removal of these trees is required.

Council has a policy with regards to verge tree planting in urban areas. This policy requires updating, publicity, and enforcement.

Residents in urban areas are responsible for trimming trees which are causing issues for pedestrians and motorists. This is an area of high public dissatisfaction, and an area identified for improvement.

Carriageway Lighting

Council has continued with historic arrangements for the provision of carriageway lighting which were in place prior to the electricity reforms. The lines companies to whom the ownership of the lines was transferred have by default continued with the provision and maintenance of street lighting.

There are no written contracts in place with these companies. Council does not have an inventory of street lights, and ownership of the lights which are mounted on lines company power poles is unclear.

Council intends to undertake a review of the provision of carriageway lighting services during 2006. This will include the following:

1. review street lighting inventory with recommendations regarding the establishment of a Council owned inventory

2. tendering of maintenance and repairs

3. review of electricity supply for street lighting

4. review of the standard of existing lighting and developing a programme for improvements

5. developing a policy for connection of subdivision street lighting to Council system

Footpaths and Cycleways

In areas where an effective renewals programme is in place, maintenance requirements are minimal.

The exception to this is Cromwell, where there has been a practice of planting trees close to paths, and as a result repairs are routinely required because of roots causing a tripping hazard. Provision has been made in the 2006/07 budgets for footpath repairs in Cromwell to enable tripping hazards from tree roots to be repaired.

4.4 Emergency Management

As part of the District Maintenance Contract the contractor is required to maintain depots at different locations within the district. In addition to these depots, resources can be provided from both Wanaka and Queenstown to service the Tarras and Cromwell areas. Resources are able to be shared with the State Highway Contractor when opportunity prevails.

A list of subcontractors and farmers who are able to provide additional resources is also maintained.

In the event of an emergency, a list of available equipment, and its location, will be provided to Council by the maintenance contractor.

5. Future Demand

5.1 Future demand requirements

The capacity of the existing urban and rural sealed roading networks is generally expected to meet demand requirements for the next 10 years, with the exception of the following:

- heavy vehicle route along Royal Terrace, Alexandra
- widening of Murray Terrace, Cromwell
- sealing of gravel roads in accordance with Council seal extension policy
- widening for pedestrian and cycle safety
- widening of key gravel roads as during maintenance metalling
- geometric improvements on gravel roads
- traffic calming
- extensions to the high country network
- kerb and channel construction at the request of the community
- increased information signage

5.2 The above has been arrived at by

1. considering existing pinch points on the roading network and the impact of growth
2. community feedback via community board requests and prior public consultation

Because many of the above require considerably more investigation, these have not been included in the forward financial programmes, and will be added if required when the LTCCP is reviewed on a three year cycle.

6. New Capital Expenditure

6.1 Ward roading capital works projects are funded through ward rates. District roading capital works projects are subsidised at construction subsidy rates by Land Transport New Zealand where these meet funding criteria, by development contributions, and by district rates.

6.2 Where development does not occur at the rates forecasted, capital works projects may be deferred.

6.3 Future capital works programme next ten years.

New Culverts

Year	Location	Cost
2006/07	Naseby	$34,750
2006/07	Springvale Road (Brandy hill)	$17,000
2007/08	Felton Road	$45,000

LTNZ Subsidised Seal Extensions

The following roads are programmed to be sealed in 2006/07 with Land Transport NZ subsidy from regionally allocated funding:

- Rockview Rd
- McIntosh Rd
- Boulton Rd
- Ord Rd
- Hawley Rd
- Hanning Rd
- Eureka Rd
- Fraser Domain Rd
- Ophir Bridge Road

Fisher Lane is programmed for sealing as an unsubsidised seal extension.

High Country Access Tracks

There is potential for extensions to the track network as a result of the following:

- access to existing heritage sites (e.g the Serpentine)
- formed roads on legal road reserve being identified through tenure review
- recreational access for fishing, tramping, cycling etc.
- high tourist value, such as cross range routes

This will partly be dependent on the outcome of the tenure review process and discussions with Department of Conservation regarding conservation estate access.

The community outcomes have identified access to recreational areas as having a high importance to the community.

This budget is for upgrading high country roads and bringing them onto the roading hierarchy. The budgets allow for construction of watertables, spot metalling on 50% of the length, and installation of culverts. This equates to $8,000 per kilometre of track.

Destination and Route signs

Provision of improved destination signage on secondary routes. This is particularly required in the Maniototo area.

LTNZ Subsidised kerb and channel

This is to construct kerb and channel on Tweed Street, Roxburgh, where scouring of the shoulder is causing seal edgebreak.

New mudtanks

Construction of two new mudtanks in Naseby.

Minor Safety Works

This is a Land Transport New Zealand Work category which is used to programme small safety projects. This funding may be used for the construction of the following types of safety projects:

- Small isolated geometric improvements
- Intersection improvements
- Traffic calming measures
- Lighting improvements
- Provision of guard railing
- Sight benching to improve visibility
- Pedestrian crossings
- Stock underpasses
- Formation of trailer parks
- Safety footpaths which conform to LTNZ policy

The value of individual projects is limited to a maximum value of $150,000.

Council has a database which lists all safety deficiencies identified on the roading network. Projects from this list are prioritised annually in accordance with the Minor Safety prioritisation policy. This uses a matrix system to rank the different projects.

Seal Widening Maniototo

Seal widening on Leven Street between the existing edge of seal and the historic kerbing, to reduce scour of the shoulder and protect the kerb.

Unsubsidised Seal Extensions

2006/07 Fisher Lane between Galloway Road and Shennan Road.

2009/10 Programme to be developed in accordance with Council seal extension strategy.

2012/13 Programme to be developed in accordance with Council seal extension strategy.

Kerb and Channel, Clyde

Year	Street	Start	End	Cost
2010/11	Sunderland St	100km/hr Sign	O'Reilly Ave	$63,000
2011/12	Whitby Street	Blythe Street	Pyke Street	$17,000
2012/13	Seaton Square	Feraud Street	Feraud Street	$73,000
2013/14	Matau Street	Blythe Street	Clyde Bridge	$40,000
2014/15	O'Reilly Ave	Sunderland Street	End of road	$44,000
2015/16	Fache Street	Sunderland Street	Naylor Street	$48,000

Kerb and Channel, Maniototo

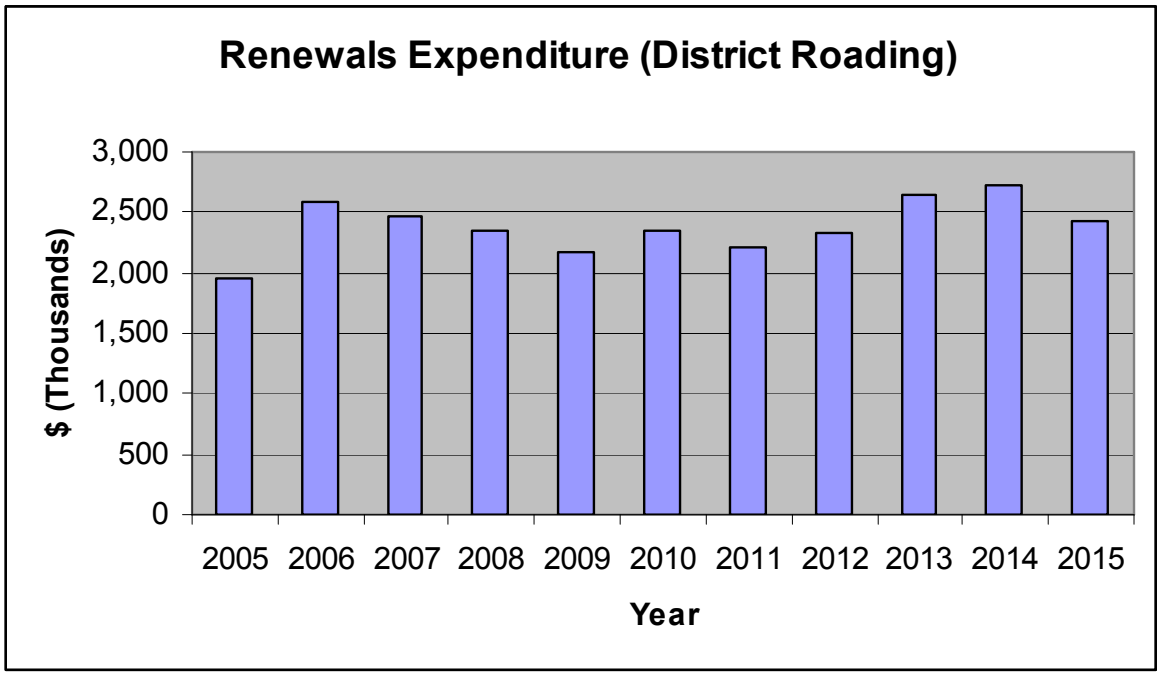
Year	Street	Start	End	Cost
2007/08	Reade Street	Pery Street	Community Arts Building	$15,000
2008/09	Pery Street	Reade Street	End of residential development	$10,000

6.4 Future capital works programme next ten years.

ITEM	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
New Culverts	51.8	45	0	0	0	0	0	0	0	0
LTNZ Subsidised Seal Extensions	1,232	0	0	0	0	0	0	0	0	0
High Country Access Tracks	0	120	120	54	0	0	0	0	0	0
Destination and Route signs	0	10	10	0	0	0	0	0	0	0
LTNZ Subsidised kerb and channel	0	0	25	0	0	0	0	0	0	0
New mudtanks	5	0	0	0	0	0	0	0	0	0
Minor Safety Works	390.7	379	380.3	368.2	377.5	377.5	383.8	413.8	429.2	399.8
Seal Widening Maniototo	0	0	0	30	0	0	0	0	0	0
Unsubsidised Seal Extensions	844	0	0	1,300	0	0	1,300	0	0	0
Kerb and Channel Clyde	0	0	0	0	63	17	73	40	44	48
Kerb and Channel Maniototo	0	15	10	0	0	0	0	0	0	0

7. Renewals Capital Expenditure and Depreciation

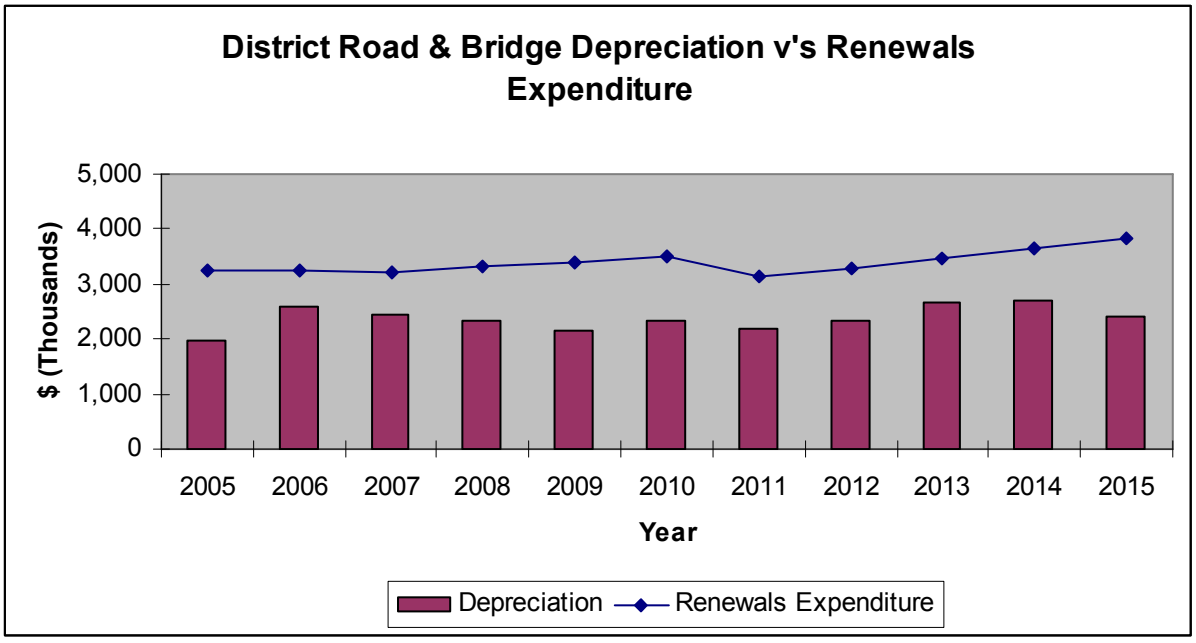
7.1 Future renewals expenditure.



7.2 How renewals funded.

Renewals are funded from depreciation, and where possible, Land Transport NZ subsidy.

7.3 Relationship between renewals needs and the ability of depreciation to fund.



7.4 Particular renewals issues.

Sealed Roads

The sealed network has condition rating undertaken every two years. This information is recorded in RAMM, and Land Transport New Zealand produce information which shows the condition of the Central Otago Network relative to other local authority networks across the country. From this information we know that the condition of the sealed network in Central Otago is very good.

The budgets for sealed maintenance are low relative to other local authorities . This is due in part to the fact that Central Otago has historically undertaken reseals within the recommended birthday period. Seals in Central Otago have a life of between 8 to 15 years.

Sealed roads have the following renewals work undertaken:

1. isolated repairs and reseal
2. isolated repairs and thin asphaltic surfacing
3. area wide pavement treatment

No rehabilitiation work or pavement smoothing, as defined by Land Transport New Zealand , is programmed unless benefit cost ratios can be achieved.

Renewals work programmed on sealed roads over the next 10 years includes:

Reseals and Thin Asphaltic Surfacing

Work is identified from:

- remaining seal life in RAMM
- the RAMM treatment selection analysis
- the engineer's visual inspections
- the contractor's programme

Area Wide Pavement Treatment

Work is identified from the RAMM treatment selection analysis, the engineer's visual inspections, and the contractor's programme. Work is prioritised using the benefit cost calculation, and work with the higher ratio is programmed to be undertaken first.

The strategy used to determine the treatment is that if the existing carriageway can be patched and resealed with an expected lifecycle of 2 years, then the work is programmed as a reseal rather than an area wide pavement treatment. This decision is made based on the engineer's experience and knowledge of the network.

Further work is recommended to establish

- Design life assumptions
- Age of pavements
- Reconstruction criteria

Indicative 10 Year Area Wide Pavement Treatment Programme

Year	Road	Section	BCR	Cost
2006/07	Letts Gully Road (Residential Area)	RP 20 - 1600	1.9	$300,000
2007/08	Moa Flat Road	RP 7330 - 8060	1.1	$125000
2007/08	Moa Flat Road	RP 8100 – 9150	1.1	$165000
2008/09	Patearoa Road (Waipiata to Green Bridge)	RP 20 - 1020	<0.5	$190000
20010/11	Knobby Range Road	RP 1150 – 1750 (RHS only)	<0.5	$80000
2010/11	Ida Valley Omakau Road	RP 29300-29900	<0.5	$85,000
2012/13	Ranfurly – Naseby Road	RP 5500 - 6000	<0.5	$78,000
2013/14	Craig Flat Road	RP 680 - 2683	<0.5	$360,000
2014/15	Ida Valley Omakau Road	RP 22185-23740	<0.5	$400,000
2015/16	Ida Valley Omakau Road	RP 25000-25700	<0.5	$105,000

Ida Valley Omakau Road is being monitored as a severe winter and freeze thaw damage may require this project to be brought forward. The damage on this road is not progressive but immediate during a thaw period.

Unsealed Roads

Central Otago District Council uses pit run material for metalling of gravel roads. This material is applied at sufficient depth to bury larger material and provide a smooth running surface. The depth of material is typically 150mm loose depth. A separate basecourse and wearing course are not constructed.

Because this method of metalling includes construction of basecourse it is to be undertaken under Land Transport NZ area wide pavement treatment work category from 2006-07 onwards. Previously this work was undertaken under the pavement maintenance work category.

The use of some of the pitrun materials is the primary cause of ratepayer dissatisfaction with the gravel road network. Council has become more proactive in advertising for, and investigating, alternative sources of material for gravel road renewals.

With increasing numbers of heavy vehicles using key routes within the Maniototo, the practise of using straight pit run materials instead of constructing a separate basecourse and wearing course for these routes needs to be reconsidered.

A standard cartage distance of 16km has been used to establish budget requirements for remetalling. As sources of gravel become unavailable, this has a significant effect on the cartage distance.

Standard metalling widths for gravel roads are as follows:

Classification	Standard Requirement	Typical Width
Local	5.5 – 6.0	6.0
Local Access A	5.0 – 5.5	5.5
Local Access B	4.0 – 5.5	5
Track	4.0 – 5.5	4

Drainage

Drainage renewals are required to be undertaken under two separate Land Transport NZ work categories. Each work category has a specific definition of work that is included.

Land Transport NZ Pavement Maintenance Work Category.

A programme of side drainage renewals has been allowed for which provides for 50% of the length of reseals and remetalling lengths to have side drainage work undertaken per annum. This is a total of 65 lane km.

Culverts less than 600 diameter are renewed when they are broken or blocked and rootbound and unable to be cleared by waterblasting. The funding required for culvert replacement has been based on a lifecycle analysis, which has been compared to the contractor's forward programme of work as a check.

An annual allowance for renewal of drainage facilities is included, based on replacing 5 soak pits and 4 mudtanks.

A one off allowance of $32,500 in 2006/07 to rock line existing surface water channels in Naseby and replace accessway culverts to reduce scouring.

Land Transport NZ Major Drainage Control Work Category.

Renewals of kerb and channel and culverts greater than 600 diameter are undertaken under the Land Transport NZ major drainage control work category. The forward programme allows for renewal of 100m of kerb per annum, and replacement of one culvert on Ophir Bridge Road, and one on the Nevis Road in 2006/07.

Kerb and channel is renewed where it is broken and this is causing damage to the integrity of the pavement, or a safety issue. Renewals are prioritised to coincide with reseals and footpath renewals, and by damage that is being caused to the adjacent pavement.

Bridges

A 10 year programme of renewals has been prepared from the 2005 structural inspections. This will be updated every three years.

Bridge renewals have been broken down into two subcategories,

Minor structural renewals includes replacement of individual structural components which maintain the bridge at its original capacity. A total of $159,000 of minor structural renewals has been identified to be undertaken in 1 to 3 years, $117,000 for 3 to 6 years, and $119,000 for 7 to 10 years.

Major structural renewals includes replacement of major structural members, or where the combined value of renewals work required is approximately $100,000 or more.

Bridges which have major renewals work required are as follows:

Year	Bridge No	Road	Waterway	Cost
2006/07	145	Maniototo Road	Taieri River Halls Ford	$306,000
2007/08	160	Linnburn Road	Taieri River Loop Bridge	$250,000
2009/10	96	Auripo Road	Poolburn	$250,000
2011/12	92	St Bathans Downs Road	Manuherikia River	$100,000
2012/13	101	Agnew Road	Idaburn Creek	$500,000

The Land Transport NZ decision chart for bridge replacements on low volume roads is used as part of the decision making process for all major renewals work on bridges.

Due to the low volume of traffic which use these bridges, and the high cost of replacement, an options analyis is to be undertaken prior to proceeding with any upgrading work. For this reason none of this work has been included in the 2006/16 LTCCP at this point.

Council undertakes major bridge structural steel painting projects as renewals projects where these are required to extend the life of the bridge. In these cases corrosion is reducing the structural capacity of major structural members. The 10 year programme of bridge painting is as follows:

Bridge No	Cost	Forward Programme	Road	Waterway
191	200,000	2006/07	Little Valley Road	Manuherikia River
140	150,000	2007/08	Waipiata-Patearoa Road	Green Bridge/Taieri River
198	50,000	2007/08	Beaumont Station Rd	End Of Maintained Road

Roading Corridor

Signs, safety railings, and edge marker renewals are identified by the maintenance contractor during cyclic inspections. A lifecycle analysis has been undertaken to determine the value of the annual renewals programme for these items.

Carriageway lighting is replaced on a "replace on failure" policy, and under the minor safety programme. Further work is required in this area, and this has been detailed above under maintenance issues.

Footpaths

Renewals of footpaths is funded within each ward. A lifecycle analysis has been undertaken for footpaths in each ward, and the individual Community Boards all provide funding to this level. Detailed programmes for a three year period are prepared for Community Board approval. The next programmes will be presented to the Boards during 2006. These programmes are established from RAMM condition rating of the footpaths, and from additional inspections by the engineer.

Carparks

Previously there has been no programme for renewals of carpark surfacings, and these have not been included in the valuation, or depreciated for.

Inspections have been made of all carparks and the following recommendations, and provision in the 2006 LTCCP have been made:

Alexandra	**Street**	**Cost**	**Recom. Year**	**LTCCP**
Centrepoint	Limerick St	60,750	07/08	-
Golden Block	Ventry St	49,500	08/09	-
Thompson St Mall	Thompson St	41,000	11/12	-
Molyneux Park	Centennial Ave	125,750	12/13	-
Thompson St (Scout Hall)	Thompson St	15,750	14/15	-
Cromwell				
Fruit Sculpture	Murray Terrace	43,800	06/07	06/07
Melmore Terrace	Melmore Terrace	50,600	08/09	08/09
Anderson Park	Barry Ave	22,300	09/10	09/10
Swimming Pool	Barry Ave	28,500	09/10	09/10
Rose Garden	Waenga Drive	8,125	10/11	10/11
Playground	Alpha Street	57,500	13/14	13/14
Lookout	Alpha Street	15,600	15/16	15/16
Ranfurly				
Ranfurly Stadium	Dungannon Street	46,500	06/07	06/07
Ranfurly Service Centre	Pery Street	23,800	08/09	-
Northland Street Extension	Northland Street	31,250	09/10	-
Charlemont Street	Charlemont Street	3,000	09/10	-

8. Land Transport Programme

8.1 Summary of how the Council has addressed, in this Activity Management Plan, all of the provisions of the Land Transport Act 2002 that require a Land Transport Programme to be prepared and publicly consulted on annually, unless they have been addressed in the LTCCP.

The Land Transport Management Act 2003 requires Council to prepare a land transport programme and provide this in written form. There are a number of requirements as to the content of the programme, and consultation must be undertaken with a number of specific organisations.

After considering the proposed format, and size of the long term council community plan, it was decided that the most appropriate method of meeting the Act requirements was for the Land Transport Programme to be prepared as a separate volume of the LTCCP.

This Central Otago District Council Roading Management Plan is included as an appendix to the LTCCP to provide justification for Land Transport NZ maintenance requests, and detail on the work programmed.

9. Funding the Annual Net Cost – 'Who Pays'

9.1 A statement of financial performance for the next ten years.

DISTRICT ROADING

	2006/07 LTCCP	2007/08 LTCCP	2008/09 LTCCP	2009/10 LTCCP	2010/11 LTCCP	2011/12 LTCCP	2012/13 LTCCP	2013/14 LTCCP	2014/15 LTCCP	2015/16 LTCCP
Rates	3,026,443	3,002,996	3,010,430	2,857,722	2,909,208	2,894,177	2,924,019	3,124,694	3,243,768	3,379,645
Other Income										
Govt grants & subsidies	3,486,886	2,718,820	2,727,492	2,542,103	2,602,089	2,604,373	2,640,413	2,853,465	2,960,259	2,761,642
Interest & Dividends	0	0	0	0	0	0	0	0	0	0
User fees & other	758,856	754,403	760,062	757,466	760,912	763,565	766,040	768,491	771,057	773,526
Total Income	7,272,185	6,476,219	6,497,984	6,157,291	6,272,209	6,262,115	6,330,472	6,746,650	6,975,084	6,914,813
EXPENDITURE										
Pavement Maintenance	2,019,464	1,983,969	2,112,968	2,058,846	2,080,492	2,233,327	2,165,371	2,207,891	2,331,437	2,596,760
Bridge Maintenance	654,574	642,430	608,397	601,881	546,215	546,987	547,756	529,023	529,207	519,213
Safety/Traffic Services	452,040	465,748	483,377	481,416	490,575	499,843	509,229	517,789	526,914	536,301
Pedestrian Services	55,910	57,079	60,747	62,185	63,188	64,426	65,556	66,329	67,200	67,943
Roading Assets and Depreciation	2,964,904	2,886,328	2,945,377	2,953,729	2,991,407	2,527,292	2,677,677	2,850,670	2,959,289	3,046,664
Roading Policy	76,209	80,049	82,197	84,507	86,726	88,399	72,853	74,180	75,639	76,748
Roading Business Unit	39,201	40,100	41,000	41,800	42,600	43,400	44,000	44,600	45,200	45,697
Total Expenditure	6,262,302	6,155,703	6,334,063	6,284,364	6,301,203	6,003,674	6,082,442	6,290,482	6,534,886	6,889,326
Net Surplus/(Deficit)	**1,009,883**	**320,516**	**163,921**	**(127,073)**	**(28,994)**	**258,441**	**248,030**	**456,168**	**440,198**	**25,487**

9.2 An explanation of the Council's funding policy for the activity.

For the purpose of funding, roading activities are split between District assets and activities and Ward assets and activities.

The roading network and the bridges are a District asset, and activities that are subsidised by Land Transport New Zealand are classed as District activities. Funding of these is a joint exercise between the Crown (Land Transport New Zealand) and the Council. For 2006/07 the LTNZ subsidy is 51% for maintenance activities, and 61% for construction activities.

LTNZ also provide funding towards the administration costs associated with developing and managing the District Roading Programme. This funding is the equivalent of 2% of the total subsidised structural and corridor maintenance funding.

District roading assets and activities are funded by a district wide uniform annual charge and a district wide land value rate.

Footpaths and carparks are ward assets. Most activities which do not receive Land Transport New Zealand subsidy are classed as ward activities. Ward assets and activities are set and funded by each ward.

Private developers meet the full cost of new roads in subdivisions. These are vested in Council at completion of the development. Developers are also required to upgrade existing assets where this is required as a direct result of a specific development. In addition roading contributions are paid by developers to fund upgrading of the wider roading network to meet growth demands.

The full costs of processing consents for activities within the road reserve are recovered through fees and charges, with the exception of traffic management plans for non-profit and community events.

Where damage to the roading assets can be attributed to the actions of an individual, costs for repair are recovered from that individual or organisation.

9.3 Schedule of fees and charges.

Charge	2004/14 LTCCP	Current Charge (GST incl)	Recommended Revised Charge (GST incl)		
			2006	2007	2008
Road Opening Notice	145	60	65	70	70
Road Opening Notice – Approved Contractor	290	150	175	180	185
Vehicle Access	65	65	95	95	100
Commercial traffic Management Plan	240	60	80	85	85
Temporary Road Closures	265	265	285	290	300

Charge	2004/14 LTCCP	Current Charge (GST incl)	Recommended Revised Charge (GST incl)		
			2006	2007	2008
License To Occupy	230	180	215	220	225
Deed of Grant for Private Services	230	180	215	220	225
Yard Encroachment	50-145	50-145	55	60	60
Rapid Number	0	0	50	52	53
Commercial fingerboard – no logo (excl post)	255	255	255	260	270
Commercial fingerboard with wine logo (excl post)	255	255	283	290	295
Road Stopping		100	115	115	120
Subsidised Oiling – 100m	185	150	150	150	155
Oiling Non Subsidised					
100m	320	300	300	300	310
200m	640	545	500	500	525
300m	960	780	710	710	740
400m	1,280	1,020	930	930	955
500m	1,600	1,255	1,140	1,140	1,170

10. Resource Consents/Property Designations

10.1 An explanation of all resource consent issues relating to the activity.

Bridges and Culverts.

Council holds a number of resource consents which are associated with bridge and culvert work. These are district wide consents which are valid for a period of 10 years. These consents include reporting requirements to Otago Regional Council, Department Of Conservation, Fish and Game, Historic Places Trust and Kai Tahu Otago Ltd.

Application of Calcium Magnesium Acetate (CMA)

This consent provides for application of CMA de-icing agent. Council is required to report annually to the Otago Regional Council regarding the quantity, application rate, and location of CMA applications.

Quarrying

Removal of 300m^3 or more of aggregate from one source requires resource consent of existing quarry designation in the District Plan.

In order to expedite the sourcing of new materials for gravel road maintenance, Council often prepares and funds resource consent applications for new quarries on behalf of the landowners.

Oiling

Placing of oil as a dust suppression is carried out in accordance with the Otago Regional Council Regional Plan "Waste for Otago", section 6.6.2. A resource consent is not required for this work.

Strategic Approach

When preparing consent applications for activities associated with roading, an initial period of 35 years is considered. Where this is unlikely to be granted, lesser periods are then considered. The location the consent applies to is as broad as possible to ensure it will cover current and future work.

10.2 Schedule of all resource consents

Consent authority	Consent No.	Description	expires
ORC	2003.855	Land use consent To extend, alter, replace, reconstruct, remove or demolish culverts or parts of culverts, that are fixed in, on, under, or over the bed of any waterbody. To disturb the bed of any waterbody during the extension, alteration, replacement, reconstruction, demolition or removal of culverts, or parts of culverts. To disturb the bed of any waterbody for the purpose of removing willow trees.	1 April 2014
ORC	2003.858	Water Permit To temporarily divert water during the extension, alteration, replacement, reconstruction, demolition, or removal of culverts, or parts of culverts.	1 April 2014
ORC	2003:859	Discharge Permit To discharge water and/or contaminants to water during the extension, alteration, replacement, reconstruction, demolition, or removal of culverts, or parts of culverts and the removal of willow trees	1 April 2014
ORC	2003:860	Land use consent To extend, alter, replace, reconstruct, remove or demolish bridges or parts of bridges, that are fixed in, on, under, or over the bed of any waterbody. To disturb the bed of any waterbody during the extension, alteration, replacement, reconstruction, demolition or removal of bridges or parts of bridges. To disturb the bed of any waterbody for the purpose of removing willow trees.	1 April 2014
ORC	2003.863	Water Permit To temporarily divert water during the extension, alteration, replacement, reconstruction, demolition, or removal of bridges, or parts of bridges.	1 April 2014
ORC	2003:864	Discharge Permit To discharge water and/or contaminants to water during the extension, alteration, replacement, reconstruction, demolition, or removal of bridges, or parts of bridges and the removal of willow trees	1 April 2014
ORC	2003.865	Discharge Permit To discharge dust and/or contaminants to water associated with wet and dry abrasive blasting of bridges	1 April 2014
ORC	2003.866	Discharge Permit To discharge dust and/or contaminants to air associated with wet and dry abrasive blasting of bridges	1 April 2014
ORC	2005.122	Application of CMA to Central Otago District Roads Resource consent application lodged.	31 May 2015

10.3 Property Designations.

All legal roads vested in the Council in terms of the Local Government Act 1974 are designated for "Road" purposes and the Council is the requiring authority for all such road designations.

Existing roads which do not fall within legal road boundaries are not designated as roads in the District Plan.

Sufficient legal precedent exists to protect existing use rights on roads which do not fall within legal road reserve, that Council is confident that the lack of road designation in the District Plan for these roads will not be a constraint to the efficient operation of the network.

11. Demand Management

11.1 An explanation of the Council's demand management policies.

Apart from school buses, and intercity bus services, there is no public transportation service operating within the district. Limited taxi services are available within the Cromwell and Alexandra areas.

Council has adopted a walking and cycling strategy which identifies the steps Council will take, working with partner organisations to promote walking and cycling as a mode of transport.

Parking management plans are being undertaken for Cromwell and Alexandra townships, which will identify specific long term parking areas for workers and short term parking for business visitors and shoppers. As a result some worker parking may be moved a short distance away. This may result in greater numbers walking to work rather than driving.

11.2 Sustainable development issues.

Council has undertaken a blueprint strategic growth planning exercise to develop zoning areas to cater for urban growth. A rural study is underway to consider the impacts of residential subdivision and commercial growth in rural areas, and put in place measures to minimise the visual and environmental impact of these.

12. Negative Effects

12.1 Any likely negative effects caused by the activity.

Central Otago District Council's roading network provides people a high degree of mobility and access to recreational areas The local roading network can have negative effects as a result of the following:

1. Dust

This is noticeable on rural gravel roads, and has the greatest impact on horticultural activities and residential amenity value of houses located within 100m of the road. The impact of dust is considered and weighted heavily as part of the seal extension prioritisation process.

2. Oiling

This is applied to mitigate the social and economic effects of dust, and has environmental effects. Council mitigates this by only allowing oil to be applied to roads by Council. This ensures that quality and quantity of oil applied meets the Otago Regional Council requirements. Council is also moving towards phasing out the practice of oiling by providing an alternative of sealing small sections of road adjacent to rural properties.

3. Change in Character

Sealing of roads, and upgrading of high country roads, can promote increased traffic use which can result in a significant change in location character. Council monitors this through consultation with communities, and the development of Community Plans.

4. Damage to sensitive areas

This occurs as a result of indiscriminate use of 4-wheel drive vehicles and motorbikes on high country roads and adjoining land. Council mitigates this where possible by closing roads to vehicle use during winter periods when use would cause damage to the road. Further education is required on the "high country code" to reduce damage to adjoining land, and management plans are to be implemented for roads which are not maintained by council.

5. Noise

Smaller size sealing chips using two coat method and slurry or asphalt surfacing are used in urban areas for reduced noise.

6. Lighting

This is not considered a significant negative effect due to the relatively small size of townships and number of lights in Central Otago.

7. Gravel migration onto adjacent land caused by channeling of stormwater along and off roads.

Increased numbers of drainage cutouts, culverts, and rock lining of at risk open drains is undertaken to minimise stormwater effects.

8. Stormwater runoff

Because of low rainfall, diesel and other petrochemical product emitted from vehicles remain on the road surface longer than would be normal elsewhere. When it rains there is potential for a "slug" of pollution to be discharged through stormwater channels to open land.

9. Visual Impacts on the Landscape

The District Plan includes provision for roading standards and control on environmental impacts of roading on the landscape.

Because of the low traffic volumes, congestion and fumes from vehicles are not considered to be significant negative effects of the Central Otago roading network.

13. Significant Forecasting Assumptions, Uncertainties, and Risk Management

13.1 Assumptions and Uncertainties.

Replacement cost values have been established from recent contract rates. Where there are no recent contract rates available, maintenance contract rates have been used.

Assumptions and uncertainties with regards to capital new works forecasts are:

- Council will continue to fund $1,300,000 of local share funding for seal extensions on a three year cycle.
- Council will receive financial contributions from subdividers and developers at the level shown in this plan. If that is not the case, some of the programmed capital works may not be necessary (because development will not be occurring at the rate, or perhaps in the manner, envisaged) and may be deferred.
- That the Community will proceed with the capital works that have been identified through previous Community Consultation processes, within the timeframes identified in this plan.
- Land Transport New Zealand will continue to provide minor safety project funding at the same levels and subsidy of 61%.

There is a moderate level of certainty associated with the project costs for years 2006/07 to 2008/09. After this the level of certainty associated with the forecasted projects costs is low.

Assumptions and uncertainties with regards to maintenance and operating and renewals forecasts are:

1. No allowance has been made for extensions or reductions to the length of the maintained network.

2. BERL escalation forecasts have been used to forecast changes in contract rates for undertaking work, with an additional allowance of a 5% increase in contract rates following retendering of the District Maintenance Contract in June 2008.

3. No allowance has been made for possible changes to maintenance of street lighting and purchasing of electricity for street lighting.

4. No allowance has been made for changes in levels of service.

5. This plan has been prepared on the assumption that there will be no unforeseen changes in land use which will result in sudden demand changes on the network.

6. No allowance has been made for possible changes to maintenance strategies.

7. Land Transport New Zealand will continue to pay 51% of all maintenance, operating and renewal costs, and 61% of minor safety works.

8. No allowance has been made for extraordinary storm or emergency events.

The lifecycles for renewal of asset components were reviewed by the contractor, consultant and Council staff in the preparation of this plan. Changes were made to some of the lifecycles that were used in the 2004 asset valuation based on the knowledge and experience of the staff involved in this work.

For asset lifecycles less than 20 years, a high degree of certainty exists regarding the lifecycle. For lifecycles greater than 20 years a moderate degree of certainty exists.

Many other assets have had a default construction date assigned with the result that reporting from RAMM indicates a large number of similar assets falling due for renewals at the same date. The level of certainty for this data is moderate to low.

13.2 Risk Management.

The most critical risks are as follows:

Earthquake — If a major earthquake were to strike the District, access to many of the communities would be restricted due to road damage.

Flooding — While the major rivers are generally well contained there is a potential for erosion damage which could threaten some populated areas and cause severe surface flooding, and damage to bridges and culverts could occur.

Heavy Snowfalls — Most of the District can be subjected to snowstorms during winter months. While these may cause disruptions to farming, telephones, power supply, road services and the isolation of residents, there is seldom any real risk to human life, apart from the need to rescue people stranded in motor cars or in isolated back country areas.

Council does not have a Risk Management Strategy prepared for roading assets. It intends to develop a comprehensive strategy covering all assets as part of the improvement plan.

14. Bylaws

14.1 List of Bylaws.

Council has a number of historic bylaws specific to the roading activity. These bylaws require review, and in many cases to be repealed. These are as follows:

Year	Bylaw title	Status
1958	VCC (Galloway Springvale Road Bridge) By Law No. 1	Not required - bridge postings are now managed by notification under form D of Schedule 1 of the Heavy Motor Vehicle Regulations 1974.
1962	VCC Bylaw No. 1 (carparking)	Will be replaced with a District Parking Bylaw with schedules for restrictions in each town
1963	VCC (Bridge restriction) By Law No. 1	Not required as this bridge was replaced as part of Clyde Power project (Kawarau River Suspension Bridge, on Bannockburn road)
1984	Maniototo Stock Droving bylaw	Replaced by CODC General bylaws 2001 section 214 Animals and Stock on Public Places
1985	Cromwell Borough Council (Town Centre) Parking By-law	Will be replaced with a District Parking Bylaw with schedules for restrictions in each town
1991	Alexandra Vehicle Parking Bylaw	Will be replaced with a District Parking Bylaw with schedules for restrictions in each town

The following bylaws are current bylaws which apply to the transportation activity.

Bylaw	Last Reviewed	Comments re any Particular Issues
Central Otago District Speed Limit Bylaw	June 2005	Reviewed on an annual basis. This is a contractural requirement under Council's external professional services contract.

15. Plan Review / Public Consultation

Public consultation regarding the financial information contained in this plan is undertaken through the LTCCP and annual plan special consultative procedures.

Consultation with the Community regarding levels of service is to be undertaken in 2006/07.

15.2 When the Plan is intended to be next reviewed.

The Roading Activity Management Plan will be reviewed at 3 yearly intervals.

16. Conclusion

16.1 Reference to overall implementation and improvement programme.

An extensive list of improvement opportunities has been identified during the development of this plan. The work can be loosely grouped into projects which:

1. Improve process and reduce staff time requirements
   Policy and bylaws

2. Optimise future expenditure
   Disposals, review grading cycles, pit run on heavy vehicle routes, accessway requirements

3. Are level of service projects
   Roading Hierarchy projects, community level of service review

4. Improve information and asset management
   Carparks into RAMM, condition assessment, street lighting inventory

Implementation will be undertaken in accordance with the above priorities.