

# Downlands Water Scheme

*Waimate 2020*

**Refer to section 4.10.**

**The following is the assessment of the Downlands Water Scheme generated by the Timaru District Council of which the Section south of the Pareora River services the Northern part of the Waimate District.**

**All operational matters for this scheme including the creation and review of the following assessment is delegated to Timaru District Council.**

**Note: This report was released for public consultation in late 2005, and does not yet contain updates since recommended.**

**TIMARU DISTRICT**

**WATER SERVICES ASSESSMENT**

**DOWNLANDS WATER  
SUPPLY COMMUNITY**

# Waimate 2020

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## EXECUTIVE SUMMARY

Community Water and Sanitary Services Assessments are required to be prepared by Territorial Authorities in accordance with Part 7 of the Local Government Act 2002. Water services are composed of drinking-water supply, wastewater (sewer) and stormwater. Sanitary services include public toilets, cemeteries and crematoria. These assessments also cover any community water and sanitary services that are not owned or operated by the Timaru District Council.

The core focus of these Water and Sanitary Services Assessments is to assess the existing and predicted future demands for these services within communities and state the Councils intended role in meeting these identified demands.

This assessment for the Downlands Water Supply Scheme only covers water services. The sanitary services assessments have been done on a district-wide basis, and are contained in a companion document.

The Extent of Information in These Assessments: These assessments were completed by Timaru District Council staff. All reasonable means were used to obtain information through various methods of community consultation. The extent of Council's resources, and some difficulty experienced in obtaining an adequate degree of information, meant that the assessments took longer to complete than originally anticipated. This later completion date was necessary to achieve a more thorough degree of assessment.

## IDENTIFIED CURRENT AND FUTURE ISSUES AND DEMANDS FOR WATER SERVICES

- **Water Supply Quality** - The Downlands Water Supply Scheme water supply does not meet the Drinking Water Standards for New Zealand 2000. No significant demand was identified for an increase in service level.
- **Unaccounted for Water** - It appears that there is a substantial degree of unaccounted for water, which contributes to supply problems during periods of high demand.
- **Water Supply Adequacy** – Concern over the increasing demand for additional allocations due to rural lifestyle living and changes in land use practices.
- **Wastewater System** – The area covered by the Downlands Water Supply

Scheme is not reticulated for wastewater. It is not practical to install wastewater reticulation for the Downlands area.

- **Stormwater System** - The area covered by the Downlands Water Supply Scheme does not have a managed stormwater system. No demand for a stormwater management system has been noted.
- **Growth Projections** – The Timaru District population is not expected to substantially increase over the next twenty years. The Stats NZ high projection forecasts a total increase in population until 2026 of around 4.2%. Other growth factors are also likely to have an impact such as an increasing number of dwellings, changes in tourist numbers and an ageing population.
- **Proposed Regional Plan Issues** – Environment Canterbury's Proposed Natural Resources Regional Plan will have a number of impacts.
- **Natural Hazards** – Earthquake and flooding.
- **Climate Change** – Prediction is for a change in annual rainfall for 2030 of -10% to +1%.

## STATEMENT OF OPTIONS AND THEIR SUITABILITY TO MEET CURRENT AND FUTURE DEMANDS

### Drinking Water Supply

- 1 Maintain current drinking water quality. This will not meet the DWSNZ 2005 once they are confirmed and future legislation is likely to require compliance to these standards. Not considered to be the most suitable option.
- 2 Upgrade treatment over a two to five year period to meet the proposed DWSNZ 2005 once they are confirmed. Estimated capital cost is not yet available as further water quality data is required in order to assess treatment options. Considered to be the most suitable option at present subject to further investigation of the implications.
- 3 Maintain existing level of service with regards to adequacy of drinking water supply. Not considered to be the most suitable option.
- 4 Investigate alternative source augmentation to improve adequacy of supply.

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This is ongoing.

- 5 Investigate and model the impact of boundary alterations of the Pleasant Point and Timaru Water Supplies and the demand for additional drinking water supply. Most suitable.
- 6 Pricing (metering): A jet inspection survey and leak detection programme would be more effective than compulsory metering, therefore currently unsuitable.
- 7 Regulation: A bylaw is considered to be ineffective at significantly reducing water use. A review of bylaws, required under the Local Government Act, is programmed to be carried out.
- 8 On-site rainwater collection: Prohibitive cost if done on a community-wide scale, therefore only suitable on an individual basis. All new dwellings within the scheme should be required to collect rainwater for garden purposes.
- 9 Greywater reuse: Prohibitive costs and resource consent requirements if done on a community-wide scale, therefore currently unsuitable except on an individual basis.
- 10 Full range of water-reduction technologies: High cost and low water pressure would mean that most of this technology would be ineffective in reducing significant demand, and therefore is unsuitable except on an individual basis.

## Wastewater (sewer)

- 11 Leave as unserved for wastewater. Considered to be the most suitable at present.
- 12 Increase level of service to provide a reticulated wastewater system. Not considered to be suitable.
- 13 Greywater reuse: Prohibitive costs and resource consent requirements if done on a community-wide scale, therefore only suitable on an individual basis.
- 14 Pricing (metering): Very limited benefit to the wastewater system, therefore considered unsuitable.
- 15 Regulation: A bylaw is considered to be ineffective at significantly reducing

wastewater volumes. A review of bylaws, required under the Local Government Act, is programmed to be carried out.

- 16 Full range of technologies: High cost and low water pressure would mean that most of this technology would be ineffective in significantly reducing wastewater production, and is therefore unsuitable except on an individual basis.

## Stormwater

- 17 Leave as unserved stormwater system. Most suitable option at present.
- 18 Install a managed stormwater system that is designed to accommodate rainfall events up to and including, a one in five year return period. Not considered suitable.
- 19 Regulation: A drainage bylaw which covers stormwater reticulation currently exists and is due for review. Education, rather than further regulation is considered to be more effective.

## STATEMENT OF TIMARU DISTRICT COUNCIL'S INTENDED ROLE IN MEETING CURRENT AND FUTURE DEMANDS

- a Water Supply – Quality: The Timaru District Council's intention is to meet the Drinking Water Standards for New Zealand. This may be timed to occur over the next two to five years once the Standards are confirmed. If significant community demand for a more immediate improvement to drinking water quality is identified, Council will further investigate the associated costs and benefits of upgrading the treatment and reticulation system subject to further investigation of the implications.
- b Water Supply – Adequacy: Continue with investigations for augmentation of the Downlands Water Supply.
- c Wastewater and Stormwater: The Council's intention is not to reticulate for wastewater or stormwater. If significant community demand to reticulate wastewater or stormwater is identified, and/or public health and environmental issues are established, the Council will further investigate the associated costs and benefits of a range of options.

- d Funding – Development Contributions Policy: Timaru District Council will establish a Development Contributions Policy to clarify the allocation of costs for any additional treatment and extension that may occur to the drinking water supply, the wastewater system, and the stormwater network. The existing Downlands Water Supply capital contributions will be reassessed.
- e Activity Management Plans: Timaru District Council is currently reviewing Activity Management Plans for its water services. Within these Activity Management Plans, a leak detection programme will be developed and implemented in an effort to reduce water loss within the reticulation network. Allied with this leak detection programme, demand reduction will be further encouraged by the development of a water-use, wastewater and stormwater education programme for the district. Also within the Water Services Activity Management Plans, a lifelines risk assessment for the district’s water services will be undertaken as well as implementing any foreseeable consequences of climate change into any asset renewal planning. Public Health Risk Management Plans for drinking water supply are also being prepared and reviewed.
- f Natural Resources Regional Plan: The Timaru District Council will continue to be involved in the submissions to, and the development of, Environment Canterbury’s Natural Resources Regional Plan. The implications of the policies and rules in this plan will be constantly monitored and evaluated.

- To enable democratic local decision-making and action, by and on behalf of communities;
- To promote the social, economic, environmental and cultural well being of communities in the present and for the future

Under Part 7 of the Act, the assessments are required to cover:

- Water Services:
  - drinking water supply
  - wastewater (sewer) treatment and disposal
  - stormwater
- Sanitary Services:
  - public toilets
  - cemeteries
  - crematoria

Sections 126 and 127 of the Act outline the information that is required in a water services and sanitary services assessment, and section 128 provides the process to be followed in making the assessments. Section 129 indicates the extent of information required for such assessment.

## 1.0 INTRODUCTION

### 1.1 What is a Water & Sanitary Services Assessment?

Under the Local Government Act 2002 (the Act), territorial authorities are required to prepare water and sanitary services assessments. The core focus is to assess the impact that water and sanitary services currently have, or may have in the future, on public health and the environment.

The Act has a new focus, and this is reflected in its purpose, as defined in section 10 of the Act as:

### 1.2 The Structure of this Report

This report will cover the water services assessment for the Downlands Water Supply Community.

Executive Summary

Section 1: Introduction

Section 2: Description of the Downlands Water Supply community

Section 3: Water supply

Section 4: Wastewater

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Section 5: Stormwater.

Section 2 will summarise the available information in order to set-the-scene for the formal water services assessment. Part of section 2 involves an estimate of the future growth and development patterns that may occur within the Downlands Water Supply community.

Sections 3 to 5, coverage is devoted to the following (in sequence) so as to meet the scope of sections 126 – 128 of the Act:

- Description of the current situation and system(s)
- An assessment of the risks relating to the absence of water.
- An analysis of the future demands
- Options available for meeting identified demands, including their respective environmental and public health impacts.

## 1.3 Community Consultation

A meeting of the Downlands Water Supply Management Committee was held on 24 June 2005 to discuss and identify any issues that they may be aware of.

A notice was also placed in “The Courier” advising people of the assessment process and asking for their feedback.

## 1.4 Legislative Requirements, Policies and Strategies

There are a number of existing and proposed statutes and policies that have, and will have, an influence on the Timaru District Council’s provision of water and sanitary services

### 1.4.1 Existing and Proposed Legislation that will have an Influence on Timaru District Council’s Provision of Water and Sanitary Services:

- The Local Government Act 2002 – Outlines the purpose of local government and the roles of local authorities. Also describes the requirement for Water and Sanitary Services Assessments, decision-making and consultation processes, planning requirements (Long-Term Council Community Plan, Annual Plan, Annual Report), offences relating to water and the power to make bylaws.

The relevant bylaws (all due to be reviewed) are:

- Water Supply Bylaw – Chapter 7
- Cemeteries Bylaw – Chapter 14
- The Drainage Services Bylaw (Reticulated Areas Only) – Chapter 20
- Trade Waste Bylaw No.19 – 1986
- Downlands Water Supply Bylaw 1988.
- The Resource Management Act 1991 – Legislation that promotes the sustainable management of natural and physical resources. Also describes the functions of Regional Councils and Territorial Authorities under this Act. Other planning documents that result from this Act are:
  - Timaru District Plan: Operative, this plan covers the issues, objectives, policies, methods and rules that involve land use, subdivisions, liquid waste management and management of hazardous substances.
  - Transitional Regional Plan (1991): Covers stormwater discharges from reticulated areas.

- Opihi River Regional Plan (2000) (ORRP): Partially operative. The water allocation and discharge of water to water bodies within the Opihi Catchment is operative. The quality requirements for discharge of stormwater to water bodies increase when the general authorisation is superseded by the NRRP.
- Regional Coastal Environment Plan (2003): Almost operative.
- Proposed Natural Resources Regional Plan (NRRP): Potentially, this regional plan may have a large impact upon water allocations as well as setting discharge requirements to land from stormwater and septic tanks.
- Proposed National Environmental Standards for Raw Drinking-Water Sources: These proposed standards may impact on suitability of catchment areas as drinking water sources.
- The proposed Public Health (Drinking Water) Bill: This proposed legislation is intended to require drinking water supplies to comply with DWSNZ and to make Public Health Risk Management Plans mandatory.
- The Health Act 1956
- Water Supplies Protection Regulations 1961
- The Building Act 1991
- Health and Safety in Employment Act 1991
- Hazardous Substances and New Organisms Act 1996
- Public Audit Act 2001
- The Civil Defence Emergency Management Act 2002
- The Local Government (Rating) Act 2002
- The Resource Management (Energy and Climate Change) Amendment Act 2004
- Land Drainage Act 1908

## 1.4.2 Existing and Proposed Codes of Practice and Strategies

- Drinking Water Standards for New Zealand (2000)
- Drinking Water Standards for New Zealand (2005) in draft, not yet published.
- Ministry of Health Grading of Water Supplies
- The Fire Service Fire Fighting Water Supplies Code of Practice
- Water Meter Code of Practice – New Zealand Water and Wastes Association
- Backflow Prevention for Drinking Water Suppliers – Code of Practice – New Zealand Water and Wastes Association
- The New Zealand Waste Strategy 2002 – The Ministry for the Environment.
- Sustainable Development New Zealand Programme of Action and the Water Programme of Action – Ministry for the Environment.
- New Zealand Infrastructure Asset Management Manual (IIMM) 2002
- Climate Change Effects and Impact Assessment: A guidance manual for Local Government New Zealand
- Preparing for Climate Change: A guide for local government in New Zealand
- Timaru District Community Plan – 2004/2014

## 1.5 Glossary of Terms

BOD5 or BOD:	Biochemical Oxygen demand – incubated for 5 days. A laboratory test that can give an indication of the “strength” of effluent.
BRANZ:	Building Research Association of New Zealand.
DWSNZ:	Drinking Water Standards for New Zealand.
E. Coli:	Escherichia coli – A type of bacteria that can create illness in people. It is used as an indicator organism that shows faecal contamination has occurred and therefore pathogens may be present.
LOS:	Level of Service - The defined quality for a particular activity or service area against which performance may be measured. “Level of service” usually relate to quantity, reliability, responsiveness, environmental acceptability and cost.
MM:	Modified Mercalli Intensity Scale: Categorises non-instrumental observations of the effects on an earthquake on people, fittings, structures and the environment.
ORRP:	Opihi River Regional Plan – Environment Canterbury.
NRRP:	Natural Resources Regional Plan – Environment Canterbury.
NZWETF:	New Zealand Water Environment Research Foundation.
NZWWA:	New Zealand Water and Wastes Association.
UV:	Ultra Violet.

## 2 DESCRIPTION OF COMMUNITY

### 2.1 Overview of the Downlands Water Supply Community

The Downlands Water Supply supplies water to areas within the Timaru District Council, Waimate District Council and Mackenzie District Council.

The Downlands Water Supply scheme is approximately 76,000 hectares and consists of mainly rural and minor urban development. Since there is no direct census information for just the Downlands Water Scheme area itself, Table 1 contains a summary of census data from the Levels Area Unit, which encompasses most of the area of the Downlands Water Scheme.

**Table 1 - Relevant Information from the 2001 Census**

	Levels Area Unit	Timaru District	New Zealand
Under the age of 15	22.7%	21.0%	22.7%
Over the age of 65	8.6%	17.6%	12.1%
Post school qualification (15 years & over)	29.5%	26.5%	32.2%
Ethnic groups (European)	98.5%	96.1%	80.1%
Median income	\$20,500	\$15,700	\$18,500
Unemployment rate	3.7%	6.3%	7.5%
Number of dwellings			
Number of households	1,173		
Average household size	2.7	2.4	2.7
Average annual household spending	\$45,993	\$37,091	\$43,683

## 2.2 Climate, Geology and Land Use

The climate of the Timaru District is dominated by the influence of the mountains on the prevailing westerly winds, (Meteorological Hazard Assessment Report: Timaru District Engineering Lifelines (2001) ). The Downlands Water Supply community is located within the Eastern South Island Climate zone, (NIWA Website). In this zone, mean annual rainfall is low, and long dry periods can occur, especially during summer. Typical summer maximum daytime air temperatures range from 18C to 26C. Water deficits are common. The mean annual rainfall, (Summary of climate observations 1969-1998 - Timaru Aero - Met service Website) is 541mm, while the annual average potential evapotranspiration, (Combined Winchmore site with Timaru Aero - Canterbury Strategic Water Study, MAF, ECan, MfE Report No. 4557/1(2002)) is 985mm.

Downlands is underlain with Late Pleistocene and Holocene fluvial gravels, sands and silts, (Earthquake Hazard Assessment - ECan Report No.UO1/96(2001)) which are part of an unconfined aquifer, (Chapter 5 Proposed NRRP (2004)) system.

The land use of the area within the Downlands scheme is typical of the Timaru District. In fact, nearly 60% of the total land cover within the Timaru District is pastoral or arable. (Canterbury Profile 2003 - Future Path Canterbury Report No. R03/11). Within the Downlands water supply catchment, the land use is predominately pastoral, with less than 10% in horticulture use.

The assessment for water supply covers the entire area supplied by the Downlands Water Supply excluding Pareora, which has an independent water source. For sewer and stormwater the assessment excludes Pareora and the areas outside Timaru District Council.

The following area have also been assessed separately:-

Cave, Normanby

## 2.3 Growth Projections and Future Development Patterns

### Overview

The Timaru District population is not expected to substantially increase over the next twenty years. The Stats NZ high projection is being used for this project, which forecasts a total increase in population until 2026 of around 4.2% (around 1,800 people). Even with this increase, it is not anticipated that this will adversely impact on the level of service being provided. Other growth factors are also likely to have an impact on demand for these services, such as an increasing number of dwellings, changes in tourist numbers, an ageing population and less people per dwelling. Some communities (e.g. Milford Huts) are restricted in the amount of people they can cater for.

While recent trends indicate that the population has been growing in Timaru District, all projections point to a slowing of Timaru District's population growth. This is due to two main factors:

- **A decline in the rate of natural increase (i.e. less births than deaths).** Less births are expected due to the combined effect of fewer women in the childbearing ages and the decreasing average number of births per woman. In contrast, the number of deaths is expected to increase, despite continued increases in life expectancy. This is because of the increasing number of people born after World War II reaching the older ages. By 2016, Timaru district's population will be affected by this trend.
- **A lower level of net migration.** More people are expected to leave the district than come to live here. This is subject to a number of influences, both domestically within New Zealand (e.g. jobs and industry development) and internationally (e.g. terrorist attacks, changing export markets, cheaper labour).

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## 3 DRINKING WATER SUPPLY

### 3.1 Current Situation

**Table 2 – Summary of Drinking Water Supply Information for Downlands Reticulated Community (including Pareora)**

Community:	Downlands
<i>Reticulated population:</i>	4560
<i>Number of connections</i>	2304
<i>Number of dwellings:</i>	1852
<i>Type of service:</i>	Jointly owned by Timaru District Council (82%), Waimate District Council (14%) and Mackenzie District Council (4%). Operated by Timaru District Council. Some private bores also exist.
<i>Water supply type:</i>	Restricted
<i>Fire fighting supply:</i>	No
<i>Length of reticulation:</i>	Approximately 600km
<i>Raw water source:</i>	Tengawai River intake – surface water Waitohi intake (Opihi River) – surface water Springbrook (St Andrews) intake – groundwater Pareora intake – groundwater Hadlow – from Timaru urban (treated) Camerons – from Timaru urban (raw).

<i>Water take m<sup>3</sup>/Year (2003) &amp; resource consent information:</i>	Tengawai River intake 1,410,000m <sup>3</sup> Maximum abstraction as per consent CRC012184 not exceeding 79 L/s. Expires: Oct 2030. Waitohi intake – 300,000m <sup>3</sup> . Maximum abstraction, as per resource consent CRC012183 not exceeding 1,300m <sup>3</sup> /day or 22 L/s. Expires: Oct 2030 Springbrook intake – 56,000m <sup>3</sup> (2002). Maximum abstraction, as per resource consent CRC010393 not exceeding 2,660m <sup>3</sup> in any 7-day period or 9.4 L/s. Expires Oct 2035 Pareora intake- 45,000m <sup>3</sup> (average 125m <sup>3</sup> /day). Maximum abstraction as per resource consent CRC010392 not exceeding 2,100m <sup>3</sup> per 7-day period or 4.0 L/s. Expires Oct 2035 Hadlow – 62,009m <sup>3</sup> (22/01/03 – 22/1/04) supplied from Timaru urban (Gleniti Reservoir). Camerons – 30,000m <sup>3</sup> supplied from Timaru urban (Pareora Pipeline)
<i>Reservoir:</i>	The Downlands water scheme has six concrete in ground reservoirs, one above ground reservoir, five break pressure tanks and a number of storage tanks.
<i>Treatment provided:</i>	Tengawai headworks – V100 chlorinator Waitohi intake – V100 chlorinator & aerator Springbrook headworks – V100 chlorinator & aerator Pareora headworks - V100 chorinator Hadlow – Timaru urban water Camerons – V100 chlorinator
<i>MoH Grading (2003 – These grading are due to be reviewed in December 2004):</i>	Tengawai: Ungraded Waitohi: Ungraded Springbrook: Ungraded Pareora: Ungraded Hadlow & Camerons – from Timaru urban
<i>Health issues:</i>	None reported

## 3.1.1 Description of How Drinking Water is Obtained

The Downlands Water Supply Scheme was originally installed in the period 1938-1940, with the section south of the Pareora River installed after 1945 and a further extension from the Totara Valley Reservoir into Hazelburn in 1998. In the 1960s independent water sources were installed for the townships of Pareora, Pleasant Point and St Andrews. The Tengawai pump station was installed in 1966 after the failure of the original dam in the Tengawai.

In the 1970s the scheme was struggling to supply its existing consumers, and there were increasing requests to supply additional houses and troughs. Between 1982 and 1989 a comprehensive upgrade of the scheme was undertaken. From 1990, the scheme was unable to sell additional water on several occasions. This resulted in the installation of another two sources – Hadlow pump station and Cameron's pump station. In 1998 a further ban on the sale of additional water was imposed.

The Downlands Water Supply Scheme has six sources of water. Four produce water while the other two purchase water from the Timaru urban supply.

**Tengawai River Intake:** The Tengawai headworks are situated on the Tengawai River at Albury Park and were installed in 1966. These headworks consist of a gallery, pump house, two pumps and a V100 chlorinator.

**Waitohi Intake:** The Waitohi pump station is sited on the Opihi River approximately 4km from Pleasant Point. It was installed in 1978 and upgraded in 1986. The pump station consists of an infiltration gallery, two submersible pumps, a pump shed, aerator, 90m<sup>3</sup> storage reservoir, two booster pumps and a V100 chlorinator.

**Springbrook (St Andrews) Headworks:** The Springbrook headworks is on the Pareora River Road near SH1 and installed in 1966. It consists of a well pump and shallow well, an aerator, a pump shed, a storage reservoir of 122m<sup>3</sup> and two booster pumps and a V100 chlorinator.

**Pareora Township Headworks:** The Pareora Township headworks is sited on King Street Pareora and installed in 1963. It consists of a well pump, booster pump, 8 x 22m<sup>3</sup> storage tanks, an aerator and a V100 chlorinator.

**Hadlow Pumps:** The Hadlow headworks was installed in 1991 and consists of a pump drawing from the Timaru urban water supply at the Gleniti Reservoir. This pumped water is purchased from Timaru urban supply and has been treated at the Claremont Reservoir.

**Camerons Pump Station:** The Camerons pump station is sited on Pareora River Road near the Little Pareora River. It was installed in 1995 and consists of a connection to the Timaru Urban Pareora trunk main, a 22m<sup>3</sup> storage tank, a booster pump, pump shed, and a V100 chlorinator.

The Downlands Water Supply Scheme has a number of various storage facilities sited throughout the entire network. However 12% of consumers are supplied prior to any scheme storage.

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## Storage Facilities:

Type of Storage	Name of Storage Facility	Capacity m <sup>3</sup>	Date Installed
In Ground Reservoirs	Taiko Reservoir	5700	1938
	Clellands Reservoir	1800	1938
	Waitohi Reservoir	2800	1938
	Sutherlands	1100	1938
	Pleasant Point (redundant in 1999)	1100	1938
	Camerons	2800	1946
Above Ground Reservoir	Springbrook	122	
Storage Tanks	Hart's Tanks	3 x 22	1977 & 1992
	Holme Station Tanks	2 x 22	1974
	Pareora Tanks	8 x 22	1975
	Taiko Pump Tank	36	1998
Break Pressure Tanks	Rolling Ridges Road	13.5	1991
	Earl Road	22	1984
	Pareora West	22	1987
	Talbot (Whalebones)	22	1999
	Millers Road	22	1999
	Cairds	1	1945

Even though the Downlands water supply is the predominate source of both stock and drinking-water for the Downlands reticulated community, there are a number of private bores. The exact number and contribution from these bores is unknown. The collection, storage and use of roof rainwater by residents is believed to be uncommon, but for some households is the only source of domestic water.

The cost of supplying water supply services is recovered from those ratepayers who receive the service in the form of a targeted annual water charge. The 2005/06 rates for Downlands Water Supply are \$210 (Domestic charge), \$150 (Service charge) and \$60 (Unit charge), all inclusive of GST.

## 3.1.2 Assessment of Quality and Adequacy of Current Supply of Drinking Water

### Quality:

The Downlands water supply scheme does not meet the Drinking Water Standards for New Zealand (DWSNZ) 2000.

The Downlands Water Supply has a number of zones that are independently monitored for water quality.

Zone	Population	Water Source
DOW001ST	3,300	Te Ngawai Intake
DOW001WT	700	Te Ngawai Intake or Waitohi Intake
DOW001HG	540	Hadlow pumps
PAR002 PA	480	Pareora Township Pump Station
STA004 ST	240	Springbrook Pump Station

The zones with population greater than 500 are required to be sampled weekly for the bacteria E-coli.

The zones with population less than 500 are required to be sampled monthly for the bacteria E-coli.

All zones are monitored at 150% of the frequency required by the DWSNZ (2000). Provided the water meets the bacterial requirements of the DWSNZ (2000) this reduces the number of demerit points for the grading system.

No zones met the bacterial requirements in 2004.

There is no zone that recognises the differing water quality from Cameron's pump station and this will need to be reviewed if the pump station is used more regularly.

A backflow prevention programme is also being developed for this community by the TDC to lessen the risk of contamination of the reticulated water supply

## **Adequacy:**

As noted in section 3.1, the resource consent conditions that apply to each of the takes, limits the daily total abstraction from all the Downlands public water supply sources.

Excluding Pareora, a total of 5685 units have been allocated and the consented maximum take is 8305 m<sup>3</sup>/day (excluding Hadlow and Cameron's supplementary sources)

The Hadlow pump supplies 262.5 of these sold units and averaged 169m<sup>3</sup>/day in 2003.

It is not possible to fully utilise the consents with the existing infrastructure.

Also 508m<sup>3</sup> is classified as a "B" permit in the ORRP and can only be utilised at high river flows.

The scheme is a restricted scheme with water allocated on the basis of 56L/ha plus 900L/day where approved.

This volume of water is sufficient for traditional mixed farming but insufficient when the property is predominantly cattle or dairy farming.

The volume of water supplied to each property requires inspection approximately every five years to ensure that jets are delivering the correct allocation.

The Camerons Pump station is only used in high demand periods. In 2003 it operated for 90 full days and 15 part days. This was much higher than the norm reflecting the need to inspect the flow to all tanks, and weather conditions.

In 2004 it operated for 25 full days and 5 part days. The annual average demand for the eleven years is 15,000m<sup>3</sup>/per annum.

In January 2004 when major water shortages occurred a total hosing ban was implemented. This reduced consumption considerably allowing delivery of water to high properties.

The Downlands Water Supply has had no additional water available for sale since

2 March 1998 except in St Andrews, Pareora and for a short time the Hadlow subzone.

New tanks have only been approved where there has been sufficient allocation to redistribute the water when a subdivision occurs.

Many titles have been created with a consent notice stating water is the responsibility of the property owner and houses have been built with no domestic allocation.

The actual demand for additional water is difficult to predict as no waiting list has been kept and applications were discouraged as the application fee was not refundable for a declined application.

## **3.2 Current and Future Demand and Issues Relating to Drinking Water**

The Downlands Water Supply Management Committee was consulted on 24 June 2005. The appropriate asset management plans and records held by the Timaru District Council were also reviewed. In order to assess the relative importance of any identified issues, as well as to help generate some options to meet any identified current and future demands, a risk analysis approach was used.

### **3.2.1 Current Demand and Identified Issues**

Significant demand has been identified for additional water quantity. Determination of unaccounted for water and leak detection is of priority.

### **3.2.2 Estimated Future Demand and Issues**

Estimating the future demand is difficult. The rate of applications for additional units and new connections over the past 15 years has been fairly erratic.

This would reflect the changes to the District Plan allowing lifestyle blocks, and the periods when water was not available for sale (1990 until the Hadlow pump was installed, 1994 until the Camerons pump station was installed and 1998 to the present time).

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**Table showing number of new connections per 5-year period from 1989 to 2004**

Period	Number of New Connections
1999 to 2004	138
1994 to 1999	284
1989 to 1994	582

The number of new dwellings constructed within the area enclosed by the Downlands Water Scheme since 1996 has also been variable

Table showing number of new dwellings per year from 1996 to 2003 within Timaru District only

Period	Number of New Dwellings
2003	37
2002	27
2001	22
2000	17
1999	25
1998	31
1997	4
1996	1

## Future Demand Forecast

Statistics suggest there is unlikely to be large significant increase in future demand on the water systems. However with the demand on rural lifestyle living and the shift to more intensive farming practices demand will continue to increase.

## Drinking Water Standards NZ

The DWSNZ(2005) are due to be published in September 2005. The proposed public health (Drinking Water) Bill is likely to make it mandatory to take all practicable steps to comply.

Regional Plan Issues: Water allocation is controlled by the rules within the Opihi River Regional Plan for the headworks that are located within the catchment area of the Opihi River. For the water sources that are located outside the Opihi River catchment, rules regarding water allocation will become controlled by the Canterbury Natural Resources Regional Plan, Chapter 5, once this plan becomes operative. Some conditions will also apply to any discharges that may occur within the area of a Community Drinking Water Supply Protection Zone for example septic tanks and stormwater discharges from roads.

## Natural Hazards:

Earthquake: An earthquake of a 150-year return period is predicated to produce a shaking intensity of MM7 – Predicted damage: Little damage to reservoir & treatment building; little mains damage.

An earthquake of a 475-return period is predicted to produce a shaking intensity of MM8 – Predicted damage: Probable damage to reservoir & treatment building; some mains damage.

## Climate Change Predictions for the Canterbury Region:

Annual rainfall for 2030: -10% to +1%

Annual rainfall for 2080: -17% to +4 %

Some issues, which have been identified, are integral to the management and operation of a water supply and associated options have not been included in this assessment. These options such as leak detection, and water use reduction will progress as part of Council's normal work programme. For example a leak detection programme is currently being developed in an effort to reduce unaccounted for water to an acceptable level.

## 3.3 Options to Mitigate Risks and Manage Current and Future Demands

Any significant issues, and any other issues arising from current and future demands that have been identified in sections 3.1 and 3.2 were assessed, using a risk assessment process. From these assessments, a number of options were developed. The cost and benefit for each of these options were then identified, as given in Appendix B.

It should be noted that the Proposed Public Health (Drinking Water) Bill intends to make the preparation of Public Health Risk Management Plans a mandatory requirement. These risk management plans will be technical documents that are prepared by the relevant water supply utility operators, and will cover the entire network from the water source area to the consumers tap. They also have to be undertaken before any network upgrades and additional maintenance programmes are considered once proposed legislation is passed.

### 3.3.1 Water Quality Options

There is some difficulty determining the best option for upgrade as this scheme is likely to require four log (99.99%) removal for protozoa within the DWSNZ (2005) currently in draft form for at least two intakes.

- Maintain Current Drinking Water Quality
  - This does not meet requirements of DWSNZ. Ultimately legislation may require compliance with these standards. Cost: No change.
- Meet the proposed DWSNZ 2005 over a two to five year period
  - Treatment costs and options have yet to be determined subject to further investigation of the implications.

### 3.3.1 Water Quantity Options

The following water quantity options have been considered.

- Maintain existing level of service regarding water quantity:
  - Water shortages will continue.
  - No additional water is available. New dwellings will require private source of water.Cost: No change.
- Find new or additional source of water:
  - The Downlands Water Supply Management Committee has been investigating this for five years. No source has yet been found.
- Scheme Boundary
  - Investigation and modelling of the Pleasant Point and Timaru reticulation will determine if extension of the scheme to the surrounding rural area is viable. Consideration will also take into account existing natural hazards, community outcomes, District Plan provisions, land availability and associated costs. Establishing a Development Contributions Policy will clarify the allocation of costs for any scheme extension. This would impact on the Downlands Water Supply which surrounds these communities and should also be monitored.
- Pricing (Metering)
  - The installation of water will not significantly impact on consumption for a restricted water supply. Cost: \$400 per connection.
  - A jet inspection survey would be more effective than metering.

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- Regulation (Bylaws)
  - Regulation: A bylaw is considered to be ineffective at significantly reducing water use. A review of bylaws, required under the Local Government Act, is programmed to be carried out.
- On Site Collection
  - Community wide installation of rainwater collection tanks for irrigation and outdoor use is not considered viable but there is potential for this on an individual basis. Cost: \$3000 per dwelling.
  - Consideration should be given to requiring all new dwellings within the scheme to collect rainwater for garden purposes.
- Greywater Reuse
  - Community wide Greywater reuse is not considered viable but there is potential for this on an individual basis and for new dwellings. Cost: Up to \$6,000 per dwelling. Consents from Ecan may be necessary.
- Technologies
  - Technologies to reduce water consumption; eg dual flush toilets, low flow shower. Low water pressure would result in most of these technologies being ineffective. Cost: \$1,600 per dwelling.

On-site collection of rainwater, grey water reuse and installation of water efficient technologies can be promoted and encouraged through a district wide water use education programme.

## 3.4 Statement Of Timaru District Council's Intended Role In Meeting Current And Future Demands

- *Water Supply – Quality:* The Timaru District Council's intention is to meet the *Drinking Water Standards for New Zealand*. This may be timed to occur over the next two to five years once the Standards are confirmed. If significant community demand for a more immediate improvement to drinking water quality is identified, Council will further investigate the associated costs and

benefits of upgrading the treatment and reticulation system. subject to further investigation of the implications.

- *Water Supply – Adequacy:* Continue with investigations for augmentation of the Downlands Water Supply.
- *Activity Management Plans:* Timaru District Council is currently reviewing Activity Management Plans for its water services. Within these Activity Management Plans, a leak detection programme will be developed and implemented in an effort to reduce water loss within the reticulation network. Allied with this leak detection programme, demand reduction will be further encouraged by the development of a water-use, education programme for the district. Also within the Water Services Activity Management Plans, a lifelines risk assessment for the district's water services will be undertaken as well as implementing any foreseeable consequences of climate change into any asset renewal planning. Public Health Risk Management Plans for drinking water supply are also being prepared and reviewed.
- *Natural Resources Regional Plan:* The Timaru District Council will continue to be involved in the submissions to, and the development of, Environment Canterbury's Natural Resources Regional Plan. The implications of the policies and rules in this plan will be constantly monitored and evaluated.
- *Funding – Development Contributions Policy:* Timaru District Council will establish a Development Contributions Policy to clarify the allocation of costs for any additional treatment and extension that may occur to the drinking water supply. The existing Downlands Water Supply capital contributions will be reassessed.

## 4 APPENDICES

### 4.1 Appendix K-A - Information Sources

Information Issue	Document Title or Information Source
<i>Drinking water quality</i>	<ul style="list-style-type: none"> <li>Registers of Community Drinking-water Supplies in New Zealand</li> <li>Annual Review of the Microbiological Quality of Drinking-Water in New Zealand</li> <li>WINZ Database</li> <li>Environment Canterbury - NRRP Chapter 4</li> </ul>
<i>Drinking water quantity</i>	<ul style="list-style-type: none"> <li>Headworks telemetry data</li> <li>TDC Resource Consents – Environment Canterbury</li> <li>Environment Canterbury - NRRP Chapter 5</li> <li>Benchmarking of Water Losses in New Zealand NZWWA</li> <li>Opihi River Regional Plan (ORRP)</li> <li>Environment Canterbury – Groundwater Allocation Limits:</li> </ul>
<i>Climate</i>	<ul style="list-style-type: none"> <li>Summary of Climate Observations 1969-1998</li> <li>Canterbury Strategic Water Study – Report No. 4557/1. 2002.</li> </ul>
<i>Climate change</i>	<ul style="list-style-type: none"> <li>Climate Change Effects and Impact Assessment: A guidance manual for Local Government New Zealand</li> <li>Preparing for Climate Change: A guide for local Government in New Zealand</li> </ul>
<i>Estimated future demands</i>	<ul style="list-style-type: none"> <li>Timaru District Plan</li> <li>2001 Census data</li> <li>Canterbury Profile 2003 – Future Path Canterbury</li> <li>Statistics New Zealand future trends</li> </ul>
<i>Land use</i>	<ul style="list-style-type: none"> <li>ECan resource consents data base</li> <li>Corporate Vision – TDC</li> </ul>

<i>Natural hazards</i>	<ul style="list-style-type: none"> <li>Earthquake Hazard Assessment: Timaru District Engineering Lifelines Project – U01/96 - 2001</li> <li>Flooding: CRC Flood Plain Management Plan Issues &amp; Options - Levels Plain – Report No. R92/7 - 1992.</li> </ul>
<i>Asset descriptions</i>	<ul style="list-style-type: none"> <li>Timaru District Community Plan – 2004/2014</li> <li>Water Supply Activity Management Plan</li> <li>Water Supply Systems Asset Management Plan</li> <li>Stormwater Activity Management Plan</li> <li>Sewer Asset Management Plan</li> <li>Sewer Activity Management Plan</li> <li>Review of Inland Towns Wastewater Conveyance to Ocean Report – Beca’s 2001</li> </ul>
<i>Risk analysis</i>	<ul style="list-style-type: none"> <li>AS/NZS 4360:1999 Risk Management</li> <li>Guidelines for an Environmental Risk Management Plan – Adelaide City Council</li> <li>Ingenium Risk Management Seminars – August 2004</li> <li>Public Health Risk Management Plan – Pleasant Point Water Supply</li> </ul>
<i>Community satisfaction and requested works</i>	<ul style="list-style-type: none"> <li>Timaru District Council Community Survey – January 2001</li> <li>TDC Service Request System</li> </ul>
<i>Reuse options</i>	<ul style="list-style-type: none"> <li>Sustainable Wastewater Management: A handbook for smaller communities. Ministry for the Environment - 2003</li> </ul>
<i>On-site stormwater management</i>	<ul style="list-style-type: none"> <li>On-site Stormwater Management Guideline – NZWERF 2004</li> </ul>

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## 4.2 APPENDIX K-B – OPTIONS FOR CURRENT AND FUTURE DEMANDS AND ISSUES

### Drinking Water Supply - Options for Current and Future Demands and Issues and their Respective Cost and Benefit Impacts

Description of Options	Public Health – Social/cultural		Economic		Environmental	
	Costs	Benefits	Costs	Benefits	Costs	Benefits
<b>Maintain current drinking water quality</b>	Moderate and possibly increasing risk to health	Low operational costs	O & M Costs: No change	No additional rate increase	None	None
<b>Meet the proposed 2005 drinking water standards:</b>	Higher capital & operational costs, so some social cost involved	Very low risk to public health.	Capital Costs: To be determined	None	None	None
<b>Maintain existing level of service with regards to water quantity</b>	Moderate to high risk of continuing water shortages during times of peak demand or during pump outages.	Low operational costs	Capital Costs: nil	None	Chance of exceeding consented take, but would have a minimal environmental effect	None
<b>Install an new or additional source</b>	Higher capital & operational costs, so some social cost involved	Less risk of water shortages or restrictions.	Unknown	A more reliable water supply, so greater certainty for businesses.	None	None
<b>Scheme Boundary Change – Reduction in size</b>	None	Lower risk to public health.	Paid for by those receiving direct benefit and also recovered from future developers	Land available for development	None	None
<b>Pricing (metering)</b>	Some social cost due to high capital & operational costs.	Lower water treatment & reticulation costs so lower social costs. Greater certainty of supply.	To install manifold & meters \$400 per connection	Reduction of consumption	None	Some environmental benefit due to less demand.
<b>Regulation (Bylaws)</b>	Some possible public resistance to regulation.	Lower water treatment & reticulation costs so lower social costs. Greater certainty of supply.	Costs required to write bylaw and enforce are unknown	Probably limited benefit	None	Some environmental benefit due to less demand.

Description of Options	Public Health – Social/cultural		Economic		Environmental	
	Costs	Benefits	Costs	Benefits	Costs	Benefits
<b>On-site collection, ie installation of rain tanks to collect stormwater</b>	None because collected water not used for human consumption. High capital & operational costs, so some social cost.	Lower water treatment & reticulation costs so lower social costs. Greater certainty of supply.	To install a rain tank (\$3,000) for each private dwelling	Reduction of consumption	Due to the large size of rain tanks, a large area is required on each property section, so there would be a high cost on the urban environment	Some environmental benefit due to less demand on community water supply.
<b>Grey-water reuse or recycling</b>	None because collected water not used for human consumption, but low risk due to possible soil contamination. High capital & operational costs, so some social cost..	Lower water treatment & reticulation costs so lower social costs. Greater certainty of supply.	To install grey water reuse system (non-BRANZ) for each house. (\$2,000) BRANZ system (\$6,000) for each house.	Reduction of consumption	Moderate risk of soil and groundwater contamination. A resource consent would also be required.	Some environmental benefit due to less demand on community water supply.
<b>Full range of technologies to reduce water consumption</b>	Some social cost due to high capital costs.	Lower water treatment & reticulation costs so lower social costs. Greater certainty of supply.	\$1,600 to install water efficient devices in each new dwelling	Reduction of consumption	None	Some environmental benefit due to less consumption.

## Explanatory Notes;

**On-site Collection:** If all stormwater runoff from an average house and garage roof (approx. 200m<sup>2</sup>) was collected, the total potential volume (average rainfall of 541mm), would be 108m<sup>3</sup> per year. If every private dwelling used half of this for outdoor use, this would represent a reticulated water usage saving of about 10% of the average current total usage. A 30,000 litre tank is about \$2,800 (including GST & installation).

**Grey Water Reuse or Recycling:** A grey water reuse system (WaterSmart non-BRANZ certified) retro-fitted to a private dwelling that could be used for irrigation would cost about \$2,000 and would reduce water usage by approximately 10-15%. Another grey water reuse system is the ECO Wastewater Recycling System (BRANZ certified) could potentially reduce water use by 20-30%. This system costs about \$3,000, plus about \$3,000 to retrofit, and requires chemical dosing.

**Pricing (metering):** Price to install manifold (\$220) and a water meter (\$180) for every private dwelling. Water usage reductions after meters have been fitted are typically up to 20%.

**Other Technologies:** Technologies that can be used to reduce water consumption include the installation of dual-flush toilets (6/3L compared to 15L conventional toilet), front-load washing machine (13 litres/person/day compared to 22L), low-flow shower head (45 litres/person/day compared to 90L) and aerator faucets (15 litres/person/day compared to 30L). If all these water-saving technologies were put together, these would reduce water usage to a house by 20-30% as compared to conventional appliances. Approximately \$1,600 per household to install these devices over and above installation of conventional ones.

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# **Appendix K - Downlands Water Scheme**

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**Appendix K**

**Timaru District Council Downlands Water Scheme**

**Overview Map**

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