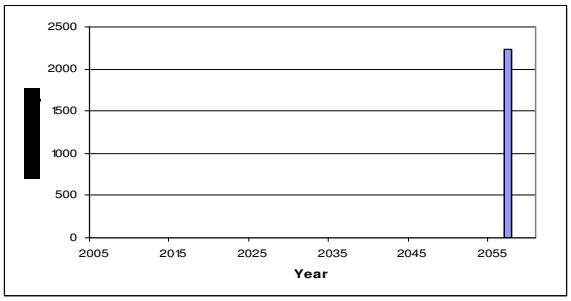
1.0 Castle Hill Sewage Scheme

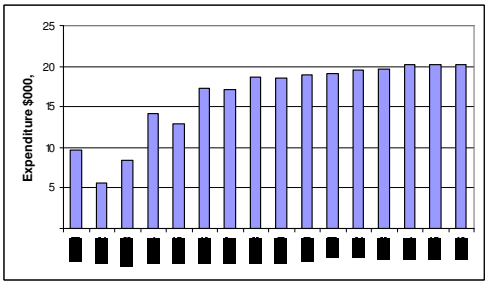
1.1 Executive Summary

Description		Quantity
Population Served		Up to 220 (estimate)
Deprivation Index		NA
Physical Statistics	Reticulation Length (km)	2.24
	Manholes	36
	Pump Stations	Nil
Value ($)	Replacement	$1,305,536
	Depreciated Replacement	$862,275
Flows	Annual average over last 4 years	20,100 m^3/yr – based on water meter data
	Average daily	38.5 m^3/day – based on water meter data
	Peak daily	385.6 m^3/day – based on water meter data
	Minimum daily	? m^3/day
Treatment	Oxidation Pond	
Disposal	Land treatment	
Infiltration		Unknown
Properties	Connected	68
	Not connected	10

Pipework Replacement Dates



Operating and Maintenance Financial Requirements



Renewals Financial Requirements

No renewals foreseen (Resource consent conditions will drive any renewal requirements)

New Capital Financial Requirements

Connection to SCADA/Telemetry
Installation of partial flow meter(s)

The key issues relating to the management of the Castle Hill sewerage scheme are:

- The wastewater disposal consent has expired, an application is still under discussion with Environment Canterbury
- Purchase of land on which oxidation pond and land disposal area is located has still to be resolved. Discussions with LINZ and pastoral lease owner have been initiated.

1.2 Introduction

1.2.1 Overview and History

Castle Hill Township is located 30km from Springfield on State Highway 73. The township was developed to utilise the high country tourist attractions within the area i.e. skiing and tramping.

The township was to develop in stages (7 in all) but to date only Stage 1 and 2 have gone ahead. Stage 3 is now in the later design phase, with a resource consent already issued by Council

The sewer system was designed by Steven Fitzmaurice and Partners in 1981/82 and the scheme was commissioned in late 1982. The scheme was designed so that it could be easily extended in stages as the town developed. This scheme is entirely gravity reticulated, taking advantage of the steep natural gradient across the block.

Wastewater Map

1.2.2 Knowledge of Assets

Table 2.1 details the confidence in information for facilities and reticulation.

Table 1-1: Data Confidence

	Treatment				Disposal				Reticulation			
	Age	Condition	Performance	Location	Age	Condition	Performance	Location	Age	Condition	Performance	Location
Highly Reliable												
Reliable												
Uncertain												
Very Uncertain												

1.2.3 Criticality

The following is a preliminary assessment of the critical assets within the scheme.

Table 1-2 Critical Assets

Main	Location	Reason
Gravity main	From township to WWTP	Located under SH73

1.2.4 Design

The design population for Castle Hill Village is 1,220 with a 30% occupancy rate. This gives a design population of 366. The pond is designed to have storage of 10,600m³ (sufficient for non-irrigation period of 6 months).

A typical value for effluent per person per day of 260 litres has been used. The maximum volume that could be expected to enter the oxidation pond is 34,733m³/year. This figure does not take into account rainfall and evaporation out of the pond which could result in a net loss.

1.3 Treatment and Disposal

1.3.1 Overview

Treatment is via a single stage oxidation pond followed by land irrigation using border dykes. Effluent flows from the township to date have been low and subsequently no irrigation has been required.

1.3.2 Treatment and Disposal

The following table is an overview of the treatment and disposal components.

Table 1-3: Overview of Treatment and Disposal Components

Treatment Area	Description	Year installed	Condition	Performance	Criticality
Oxidation Pond	10,600m^3 pond	1982	3	3	Medium
Land disposal	4.25Ha of border dykes with pop up outlets for flow control	1982	4	Unknown	Low

1 = Very Good (Industry Standard) 2 = Good 3 =Moderate 4 =Poor 5 =Very Poor

1.3.3 Treatment and Disposal Issues

Issues are:

- Obtaining discharge consent from Environment Canterbury
- Land ownership resolved for area of land disposal

1.4 Supply Reticulation

1.4.1 Overview

A schedule of the pipe asset statistics is shown in Table 2.3 below.

Table 1-4 Schedule of Pipework Length mm

Diameter mm	AC	Total (m)
150	1,349	1,349
200	889	889
Total	**2,238**	**2,238**

1.4.2 Condition

The condition of mains installed in 1980's is thought to be very good. In the future, a video (CCTV) of the network will be completed to confirm the condition. This will be scored and monitored in Council pipe asset management database for future reference.

1.4.3 Performance

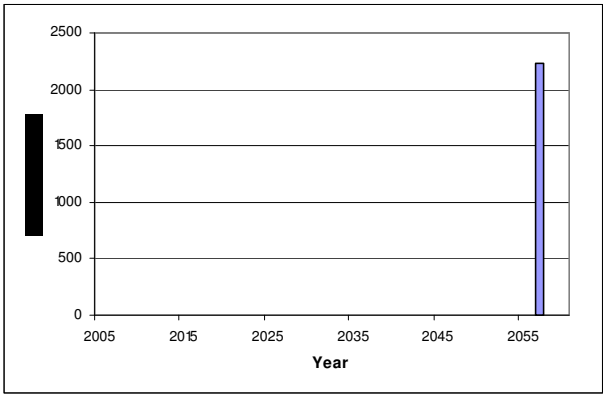
Performance of reticulation is considered by Council engineers to be moderate[1]. Laterals can be affected by tree roots with up to 1-2 blockages per year occurring in the laterals.

1.4.4 Pipe Network Replacement Date

Table 1-5 details the expected year of mains replacement.

[1] Infrastructure Asset Guidelines 1999

Table 1-5 Pipework Replacement Dates



1.4.5 Infiltration

The extent of infiltration is unknown due to no flow measuring carried out. Infiltration presently has no known effect on the treatment and disposal.

Installation of flow meter will be carried out in 2006/07. This will enable Council to confirm the level of infiltration / inflow. No comment can therefore currently be made regarding the level of infiltration.

1.4.6 Property Inspections

No property inspections have been carried out to date but are programmed for 2006/07.

1.4.7 CCTV

No CCTV has been carried out as the reticulation is only 23 years old. CCTV has been programmed for 2009/10 to investigate the condition of individual properties laterals.

1.5 Environmental Management

1.5.1 Rights to Take and Discharge Permits

Table 1-6: Schedule of Resource Consents

Consent Number	Description	Date Issued	Expiry Date	Quantities	Compliance (last 12 months)	Comments
				Daily (m^3/day)		
CRC916772	To discharge oxidation pond sewage effluent onto the ground via border dyke irrigation	27-Feb-92	30-Apr-99	785		Continuation of consent until renewed
CRC991052	To discharge up to 785 m^3/day of oxidation pond sewage effluent onto the ground via boarder dyke irrigation between 1 Sept and 30 April	30 Oct -98	19-Mar-99	785		Continuation of consent until renewed

Environment Canterbury has in their system two consents, both awaiting further information. It appears that this is an unnecessary duplication. Further review and discussion with Environment Canterbury will occur once presentation of the monitoring data has been provided.

1.5.2 Consenting Issues

The resource consent application has been delayed, awaiting a data gathering and analysis exercise. In particular

- Council's water quality monitoring consultants have confirmed the nitrate treatment ability of the pond.

An assessment of the effects under PNRRP and contamination plume from land disposal area will be required for the consent application.

The above are being completed by mid 2006. In any case the consents renewal for Castle Hill was applied for 6 months prior to their expiry date. This allows the existing consents to be used until the applications have been processed by Environment Canterbury (and any subsequent appeals).

Comments from Environment Canterbury

The following is comments from Environment Canterbury[2] regarding compliance of wastewater disposal resource consents are provided.

"SDC generally has an acceptable level of compliance with the consents it holds to operate its community wastewater treatment plants. The council usually provides monitoring information within the required timeframes and SDC staff are responsive to requests for further information or clarification. Information provided is in a useful and clear format."

1.6 Maintenance and Operating

1.6.1 Maintenance Contract

Maintenance of the reticulation and general work around the treatment plant is carried out by SICON Ltd under Maintenance Contract 849. The Castle Hill sewerage system has no Operation Manual. Instigation of a manual is programmed for 2006/07.

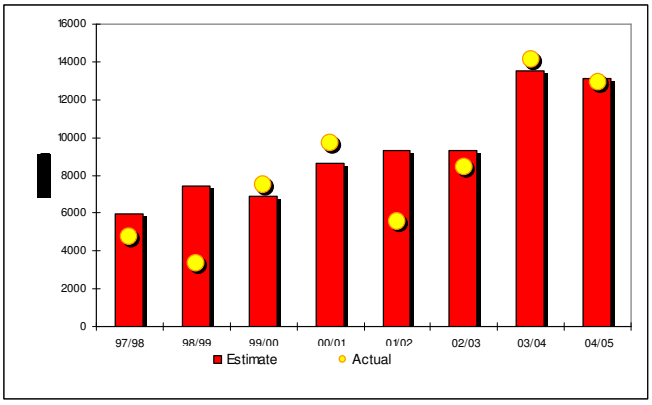
1.6.2 Maintenance Issues

There are no issues for the maintenance of the Castle Hill wastewater scheme.

1.6.3 Actual Operating versus Estimated Costs

Table 1-7 details the comparison between annual estimates and actual annual costs.

Table 1-7: Actual Costs versus Estimates 1997/98 – 2004/05



[2] CRC Memorandum of 20th October 2005

1.6.4 Future Maintenance Financial Programme

Table 1-8 details the maintenance and operating costs (excluding depreciation).

1.7 Renewals Capital Expenditure

The renewals programme is for renewal of disposal area facilities that will be brought foreword from previous years.

Table 1-8: Future Operating and Maintenance Financial Requirements 2006/15

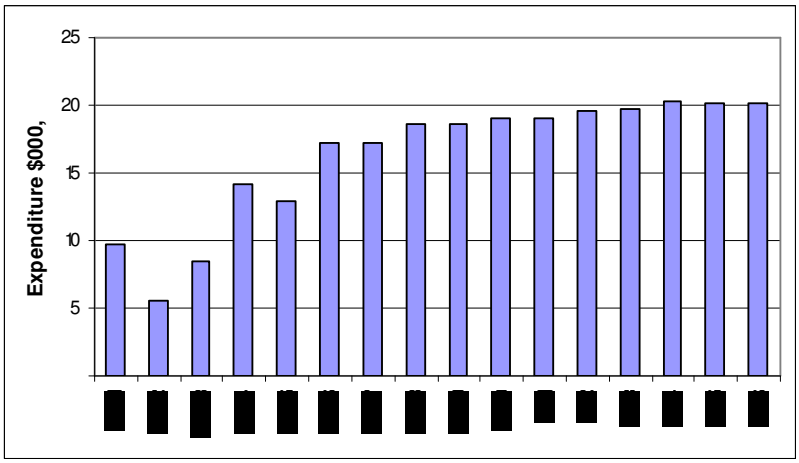
Excluding: Depreciation and Loan Interest

	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16
Expenses										
Support Services	3397	4332	4259	4340	4362	4523	4637	4811	4773	4783
Consultants Fees	3000	3151	3151	3302	3302	3458	3458	3615	3615	3615
Consultants Fees - other	350	368	368	385	385	403	403	422	422	422
Insurance and Rates	3462	3462	3462	3462	3462	3462	3462	3462	3462	3462
Maint - Reticulation	2500	2626	2626	2752	2752	2882	2882	3012	3012	3012
Mtce - treatment	750	1038	1038	1087	1087	1139	1139	1191	1191	1191
Routine Checks	500	500	500	500	500	500	500	500	500	500
Monitoring Water Quality	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Regional Consent Compliance/Reporting	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Total Expenses	17159	18676	18603	19028	19050	19568	19682	20212	20174	20184

Scheme Improvements

Resource Consent Renewal	5000									
Operations Manuals & Procedures	3500									
Improvement Plan items	7385									
IP I1 CCTV		10000								10000
IP3 Pipe Performance/Condition Rating	5000									
Property Inspections	1500					1500				
Total Scheme Improvements	22385	10000	0	0	0	1500	0	0	0	10000

Table 1-9: Future Operating, Maintenance Forecasted Cost Trends
Excluding: Depreciation and Loan Interest



1.8 Annual Wastewater Quantities

There is no data available for wastewater quantities for the Castle Hill sewerage scheme.

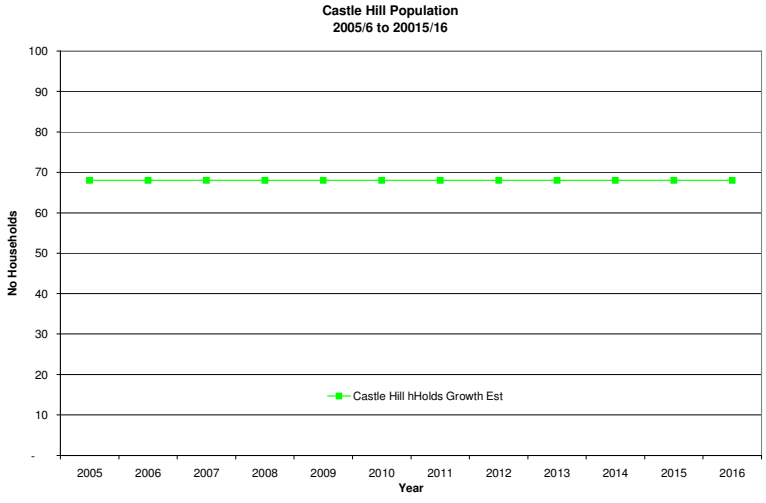
1.9 Future Demand and New Capital Expenditure

1.9.1 Population Projections

Population forecasts for all towns and selected rural-residential areas were developed by Max Barber (Planning Consultant) for the Asset Management Department in late 2005. These population predictions were adopted by Council in early 2006 as the official population predictions (high growth rate) for the period 30th June 2005 to 30th June 2016. Annual review is required to confirm the validity of the population predictions.

The following table details the population predictions for Castle Hill.

Table 1-10 Normal Resident Population Projections 2005/2016



1.9.2 Future Demand

The original treatment and disposal system was designed for population of 1220 with 30% occupancy rate. Existing connections (including half charges) and the proposed subdivision (26 lots) amount to 148 connections. This is significantly lower than the original design.

1.10 Disposal Programme

No disposal of assets is considered necessary over the next 10 years.