

# DEALING WITH WATER SHORTAGES: BORE VERSES RIVER

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## ABSTRACT

A dry summer on the Kapiti Coast can give staff interesting challenges to keep demand at a level that is within our consent limits. With the completion of a supplementary bore field in 2005 the control measures have become less restrictive, but have also presented some new unforeseen consumer problems.

The Kapiti Coast has been one of the fastest growing districts in New Zealand, this has increased demand on water resources in the central area of the coast. The water supply for this area has been taken from the Waikanae River and in the last four years supplemented from a deep aquifer in Waikanae.

## KEYWORDS

**Conservation, Supplementary Supply, River Flow, Water Quality, Consumer Expectations.**

## 1 INTRODUCTION

Water supply in dry summers on the Kapiti Coast can be a balancing act between river level and consumer demand. In past years there have been times when restrictions required demand to be reduced to below winter flow levels. As demand increased and the river became stressed in dry summers, Council looked for alternative sources.

Many options were investigated with a lot of interest shown by local residents. A preferred option was a supplementary supply piped from infiltration galleries beside the Otaki River. Unfortunately this did not proceed for various reasons and other alternatives had to be looked at. Council after much debate made a decision to proceed with a supplementary bore field to be located in Waikanae. The new supply would be designed to supply a total 23,000 cubic metres per day and be able to supply this flow rate for 90 days in a 12 month period. Construction started in 2004 and the system was commissioned in the following year.

Water quality test indicated that the only two constituents exceeded the Drinking Water Standards, these were Iron and Manganese. An extra stage was added to the treatment process at the Waikanae plant and this reduced both to an acceptable level.

After the extended use of the bores in 2005 it was evident that changing the hardness of the water had created many complaints from our customers. Complaints including its taste and affects on appliances started to be received by our customer services department. Some of the taste issues were the result of low flows in the river and high algae levels.

Council are now looking at long term water supply solutions for the Coast which range from dams to storage ponds and new river sources.

## **2 HISTORY**

### **2.1 THE BEGINNINGS**

The Coasts residents in the past sourced their water from roof tanks or from low level bores. Parts of Waikanae had the benefit of a small treatment plant on the Waikanae River which feed a reservoir in the bush above the township. I can remember when I started my training as an apprentice electrician working on the low level alarm for the reservoir which consisted of a float switch and a bank of 1.5 volt cells providing 50 volts down a phone line to the local volunteer fire station to activate the siren. How times have changed with modern SCADA systems.

### **2.2 NEW STATE OF THE ART TREATMENT PLANT**

The then Regional Water Board built the current Treatment plant to supply water to the Waikanae, Paraparaumu and Raumati communities and it was opened in 1977. When the Kapiti Coast District Council was formed they then took over its operation. The population at this time was lower than now and the plant was only run during normal working hours.

### **2.3 EMERGENCY BORES**

When demand increases and summer shortages forced Council to look at alternatives they decided to install three emergency bores in Paraparaumu and Waikanae. The water from the bores only had Chlorine dosing and no removal of Iron and Manganese. In times of water restriction the bores were used for road work tankers and domestic garden watering. Two of the bore sights were fitted with treatment to remove Iron and Manganese so they could be used as a supplementary supply until a permanent solution was found to summer water shortages.

### **2.4 NEW SUPPLEMENTARY BORE FIELD**

A new supplementary bore field was commissioned in 2005 to supply water to the Waikanae Water Treatment Plant as a source of water in times of low river flow or if the river intake pumps failed. The bores are located in Waikanae and are at a depth of 80 metres. Tests indicate water taken from this aquifer is approximately 400 years old. Total abstraction rate with all pumps at maximum is 23,000 cubic metres per day.

## **3 WATER CONSERVATION INITIATIVES**

### **3.1 THE GREEN PLUMBER**

This Council initiative is designed to give locals advice on efficient plumbing fittings and installing water saving devices. He is also able to replace leaking tap washes at no cost to the customer, this excludes the new ceramic fittings.

### **3.2 THE GREEN GARDENER**

The green gardener gives advice to residents on the best type of trees and shrubs to plant that will withstand long dry spells. They can also give advice on the type of lawn that is the best suited for local conditions

### **3.3 YEARLY GARDEN SHOW**

The yearly garden show is run by Council and is an event that local suppliers can demonstrate water storage and conservation devices. Local garden centres also display plants that are drought resistant and efficient watering systems. This information is also available on the Council Web Site.

### **3.4 SIGN WRITING ON COUNCIL SERVICE VEHICLES**

This keeps the water conservation message in full view as staff move around the district. It also asks to report all water leaks immediately.

### **3.5 LEAK DETECTION TEAM**

Council has an active leak detection team with sophisticated detection equipment. Staff also monitor reticulation flows using our SCADA system.

### 3.6 PLAN CHANGE 75

This plan change requires new homes to be fitted with a rain water collection system to supply water to outside taps and to feed the toilet flushing systems. The home owner can also opt for a grey water recovery system that can be used for garden irrigation. The water collection system will reduce load on water supply systems and also reduce flow into the storm water drains.

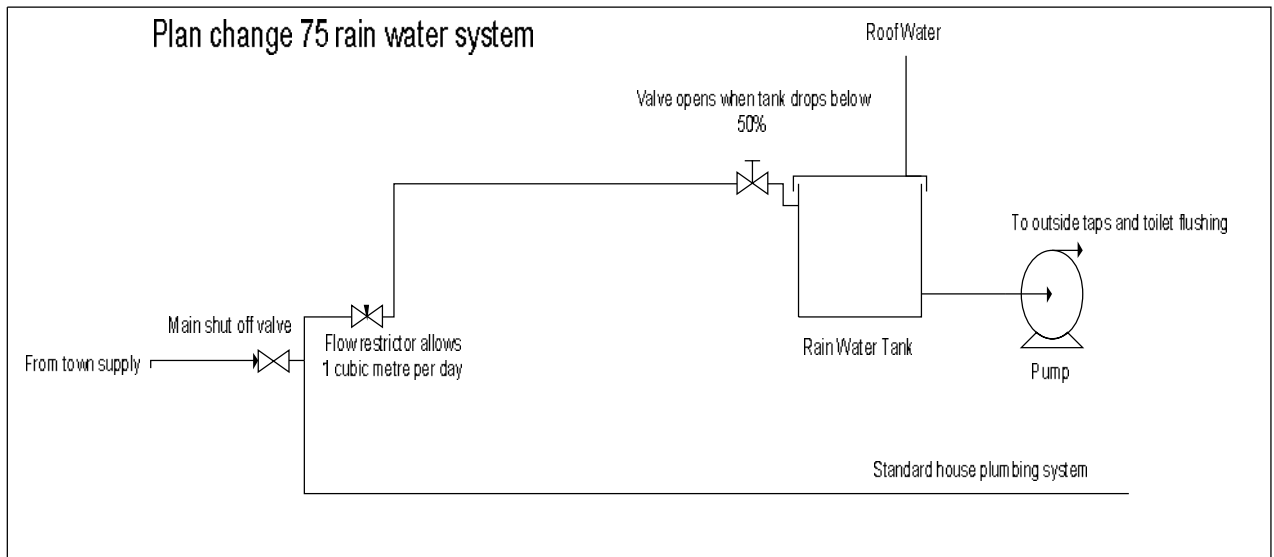


Diagram of plumbing for rain water collection system

## 4 MANAGING THE WATER PRODUCTION SYSTEM

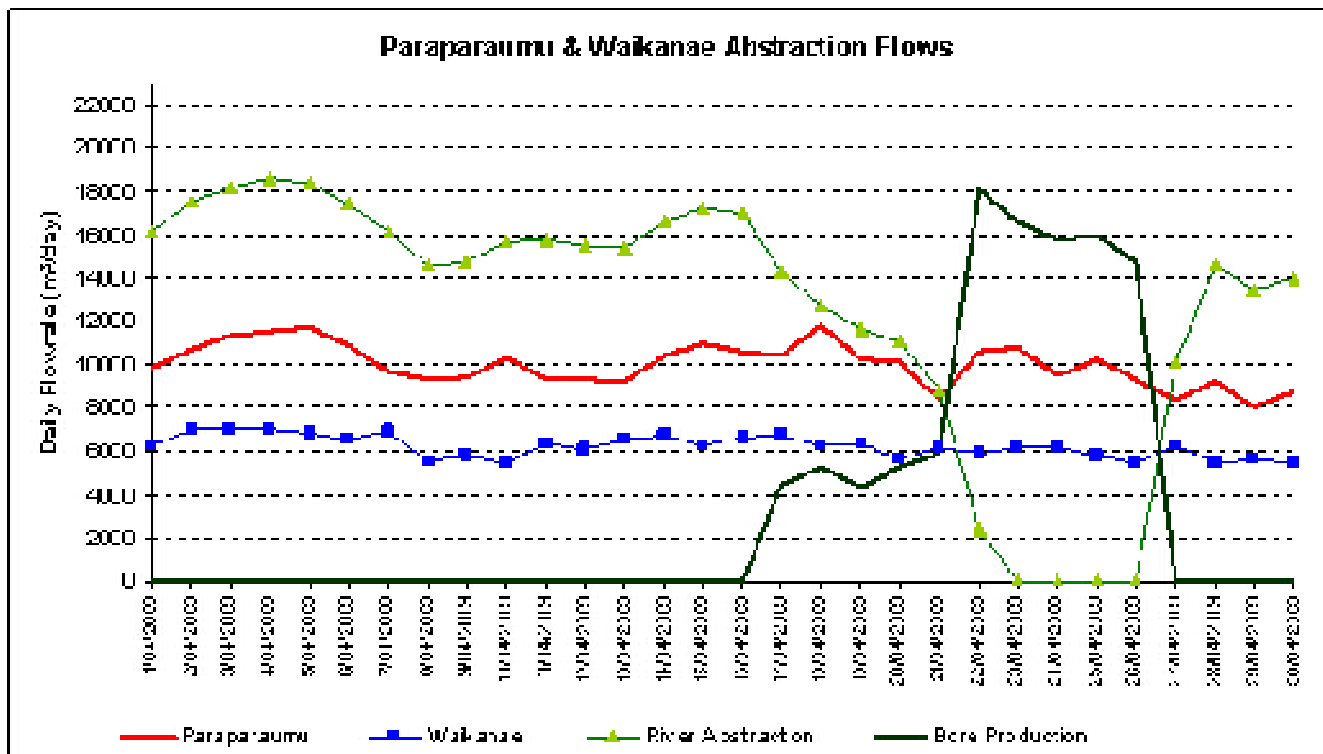
### 4.1 THE USE OF RIVER WATER

The river is our normal source for the Waikanae Plant. Flow rate of raw water pumps is calculated on the previous days consumption from the supply reservoirs with some margin for weather conditions and the day of the week. This allows the plant to be set at a consistent flow rate which helps with process control.

Our consent allows for an abstraction of 23,000 cubic metres per day but requires us to maintain a residual flow of 850 litres per second in the river. At this point we are required to stop abstraction from the river and use our supplementary supply. As we move toward the minimum flow level we would normally blend with bore water but this tends to be for a short period.

## 4.2 THE USE OF BORE WATER

The cost of water supplied from the Bore Field carries with it a high power cost as water has to overcome a extra 60 metres of head. The bore water also requires the addition of Potassium Permanganate to remove Iron and Manganese. Flow from the bore is set in the same way as the water supplied from the river. The requirement to correct for pH is not required as the bore water has a natural high level.



River versus Bore abstraction in April this year.

## 4.3 THE EFFECTS OF BORE WATER HARDNESS

The bore water has more minerals than the river water which is naturally soft. Some residents notice the change in taste and also notice a change in the sound their electric jug makes when heating the water. Council have also received complaints of water heater elements failing. Consultants have investigated this problem and have recommended changing to an element that is better suited to harder waters.

## 4.4 USING ACTIVATED CARBON TO REDUCE TASTE AND ODOUR

With the addition of activated carbon to the treatment process staff are better able to manage taste and odour in the river and bore water. Customer complaints have reduced since installing this process.

## 5 CONCLUSION

The general public have an expectation that water that comes from their taps will always taste the same. When the source of water supplying the treatment plant is changed some customers notice a difference almost immediately. Many of these customers think that the water is now unsafe to drink. This perception can be very hard to change when so called local experts write letters to the editor warning of the dangers of minerals in the water supply.

As soon as people are notified that the bores are in use, complaints increase dramatically even if rainfall has meant that bore water is not required.

We now notify residents in advance that we will be moving to bore water allowing them to store river water for drinking if they don't like the taste of the bore water.

If you intend making changes to your treatment processes or sources of raw water advise the public well in advance to avoid negative responses. Just because your new source complies with the Drinking Water Standards doesn't mean your customers will be happy with the quality.