



**MATAMATA PIAKO DISTRICT COUNCIL**

**TE AROHA WATER  
TREATMENT PLANT UPGRADE  
SEPTEMBER 2004**



**Filtration Technology Ltd**

36 Sir William Avenue, East Tamaki, Auckland  
PO Box 58853, Greenmount, Auckland  
New Zealand

Phone: ++64-9-274-4223  
Facsimile: ++64-9-274-4224  
E-mail: [info@filtec.co.nz](mailto:info@filtec.co.nz)  
Web Site: [www.filtec.co.nz](http://www.filtec.co.nz)

## Background

Over the past couple of years there has been an increase in the consumption of treated water drawn from the Te Aroha Water Treatment Plant.

Concurrently Inghams Chicken Poultry Processing Plant, on the Hauraki Plains, have increased their business significantly and now require additional water. As a consequence MPDC has undertaken to supply Inghams with potable water. This has resulted in the Te Aroha Water Treatment Plant being upgraded and capacity increased from 4000 to 8000m<sup>3</sup>/day.

The project was funded by MPDC with a significant contribution from Inghams Chickens. The upgrade had to be carried out while the plant remained in operation, and in fact during the latter part of the project increased production was required.

The process selection for the upgrade involved;

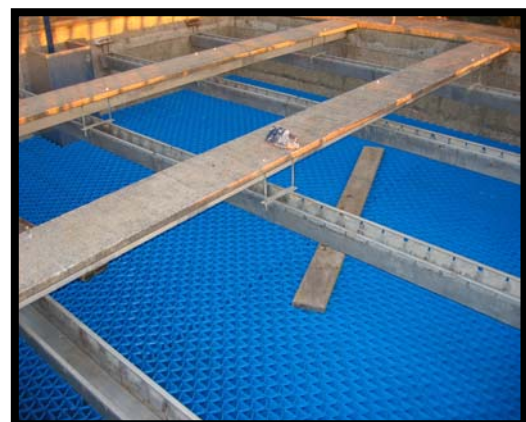
- Changing the coagulant from Aluminium Sulphate to Poly Aluminium Chloride
- Doubling the number of filters and then automation
- Retrofitting Tube Settlers to the two existing Clarifiers
- Upgrading chemical storage and dosing
- Installation of Turbidity Meters



The plant maintenance and operations provider is Kaimai Valley Services (KVS). Work was allotted with civil and building components being contracted to KVS with Filtration Technology carrying out the mechanical and plant controls.

## Change of Coagulant

The raw water is supplied from up to five sources that are blended in a balance tank that then discharges to the treatment plant. Of the source three are gravity fed, low turbidity, low alkalinity streams, whilst the other two are pumped, one of which is the Waihou River. Gravity sources are the preferred supplies. With such varied raw water sources, we determined that Poly Aluminium Chloride would produce a faster forming floc and have less dependence on raw water alkalinity. A further advantage of the Poly Aluminium Chloride is its greater tolerance to changes in raw water. By changing the coagulant the plant capacity increased.





## **F**ilters/Automation

The existing filters were very much in an 'as built' condition, largely unchanged since construction in 1967. Their control had been modified however, with discharge flow controlling the filtered water valve. The filter inlet channel water depth controlled the plant inlet flow.

To relieve production pressure, two epoxy coated steel filters constructed and installed adjacent to the existing plant. Although round these filters have the same surface area and operation depth as the original filters.

A new control system was installed on all the filters with ultrasound level sensors adjusting the filter outlet valves to maintain a constant filter water level. Backwashes are initiated when the level begins to rise. Raw Water Mag Flow Meter now has direct control of the raw water inlet valve. There is a secondary pressure sensor in the filter inlet channel as a failsafe to plant flooding.

## **R**etrofitting Clarifiers with Tube Settlers

By installing Tube Settlers into a Clarifier the rise rate can be doubled from typically  $2\text{m}^3/\text{m}^2/\text{hr}$  to  $4.5\text{m}^3/\text{m}^2/\text{hr}$ . We have thereby been able to double the clarifier's capacity without needing to add civil structures. This has shown good cost saving on alternative options. Installed the Tube Settlers have required some changes in the way the plant is operated. There is no longer a clarified water blanket for the operator to visually inspect and desludging cones are no longer used. Jar test, sludge index test and clarified water turbidity have become chief operating tools.

## **U**pggrading of Chemical Storage and Dosing

With the increased water production, the chemical storage and dosing systems were too small. In order to make plant operation easier, larger storage vessels for Chlorine and LiquiPAC have been installed. Dosing Pumps have been re-sized.

## **I**nstallation of Turbidity Meters

To meet requirements of both DWSNZ and contract supply, online turbidity monitoring has been added to all filter output.

# Specification

Previous Plant Capacity 4000m<sup>3</sup>/day  
 Upgraded Plant Capacity 8000m<sup>3</sup>/day  
 Required Treated Water Quality DWSNZ2000/2005

## FILTERS:

Quantity 2 (new) / 2 (existing)  
 Material of Construction Epoxy Coated Steel  
 Dimensions 4100mm dia x 4400mm high  
 Filter Floor Plate 4090mm dia x 10mm thick  
 Internal Weir 840mm OD  
 Filtration Area 12.64m<sup>2</sup>  
 Filtration Rate 6.6m<sup>3</sup>/m<sup>2</sup>/hr (4 duty filters)  
 Filtration Rate During B/Wash 8.8m<sup>3</sup>/m<sup>2</sup>/hr (3 duty filters)

## FILTER NOZZLES:

Make Altek KSH  
 Model C1  
 Quantity 196/Filter  
 Slot Width 0.2mm

## FILTER MEDIA:

Type Sand  
 Effective Size 0.6-1.2mm  
 Depth 600mm

## BACKWASH:

Type Separate Air Scour/Wash  
 Control Ultrasonic Operation on Headloss  
 Control Valves Air Actuated Keystone

## TUBE SETTLERS:

Make Brentwood  
 Model AccuPac 6000 Series  
 Pack Depth 600mm (IFR-6024)  
 Surface Area 43.6 m<sup>2</sup> (per Clarifier)  
 Effective Surface Area 41.6m<sup>2</sup> (per Clarifier)  
 Effective Rise Rate 4.1m<sup>3</sup>/m<sup>2</sup>/hr @  
 plant flow 333m<sup>3</sup>/m<sup>2</sup>/hr

## EQUIPMENT:

Dosing Pumps Wallace and Tiernan  
 Turbidity Hach 1720E  
 Chlorination Wallace and Tiernan  
 Analysers Wallace and Tiernan





# **P**roject Summary

CLIENT : MATAMATA PIAKO DISTRICT COUNCIL

DESIGN RESPONSIBILITY : FILTRATION TECHNOLOGY LTD

SCOPE : DESIGN/BUILD WATER TREATMENT PLANT UPGRADE

CONSULTANTS : MONTGOMERY WATSON HARZA (REVIEW ONLY)

FABRICATORS : SERVICE ENGINEERS (FILTER VESSELS)  
BOB WHITE LTD (PIPE WORK)

SUBCONTRACTORS : FRED HANSFORD ELECTRICAL (PLANT CONTROLS)  
  
KAIMAI VALLEY SERVICES (CIVIL CONSTRUCTION)

PROJECT AWARD : DECEMBER 2003

COMMISSIONING : FILTERS - MAY 2004  
TUBE SETTLERS - AUGUST 2004