

# VLT

## VLT® leading irrigation technology in New Zealand

**The Dry Landscape of South Island in New Zealand has put great demand on Water Resources.**

**Recent Boom in the property market and Booming property prices in North Island resulted in many farmers moving down south buying cheaper land and installing irrigation systems . Primary produce being Dairy Feeds.**

Glenroy Irrigation Scheme is located 70 KM south of Christchurch to irrigate around 1100 Hectares of land. Water flows from the Rakaia River into Three separate tanks containing three lift pumps to lift the water to the suction of the main pumps.

The project is owned by a cooperative and the user is billed on Water usage. In total there are 24 irrigators including 6 centre pivots. The system runs at a pressure of



11— 12 bars to enable the water to flow up to the irrigators. The flow requirements can vary from 42 l/ sec to 540 l/sec.

This will increase the harmonic distortion on primary side of the transformer and will also make the pump shed vulnerable to voltage spikes.



### Need for automation

The challenge was to install a completely automatic system to meet these demands with optimum utilisation of water and energy resources. To make things even more difficult the pump station is located around 20 km's away from the sub-station, bringing down the short circuit rating of the transformer to 500 Amps.

### Prevent large harmonic distortions

The total load on the 1500 KVA transformer could create large distortions on the supply mains. The main load on the transformer was 1200 kW of AC drives. Calculation on MCT 31 harmonic simulation **software showed the distortion level of more than 15% on 11 kV side of the transformer.**

### VLT® filters did the job

After discussing various options with the electric company the customer Nairn

Electrical Ltd decided to go with Danfoss AHF 010 filters.

### PLC control redundant

Various combinations of these pumps are switched on and modulated based on the demand by utilising the features of VLT® 8000 Aqua with the cascade control card. Most of the controls are done inside the drives making the use of big PLC and programming redundant.

On the main pumps the impellers were trimmed to a diameter of 602 mm. Power requirement at 50 Hz at the design flow of 320 l/sec for each of main pump was only 424 kW.

Two VLT® 8652 Aqua drives are used on 500 kW pumps together with one VLT® 8302, two VLT® 8072 and a VLT® 8052 on smaller pumps.

### Maintains constant pressure at varying flow

The system is running in closed loop pressure control maintaining a constant pressure at varying flow.

### A few additional benefits:

- Filling the long pipe lines with pressure ramp.
- Built in sleep mode on power calculations was a big selling point to make the pumps to go to sleep in case of no flow situation.
- Built in Dry Run protection optimally designed for Variable speed pumps.
- Two set point PID is used to maintain the suction level of the water while controlling the pressure. Which slows the drive in case of falling suction level.



### Benefits and trust

The Electrical contractor Nairn Electricals have selected Danfoss, appreciating the features and benefits and trust in the company to be able to provide local support and engineering expertise in variable speed pumping technology.

“It is very easy to wire power and motor cables with ample space and easy access in the new design of VLT® 8000 Aqua” says, Lincoln Teale (Sr. Electrician at Nairn Electrical).

According to Gary Roxburgh, the owner of Nairn Electrical, “The Danfoss VLT® 8000 Aqua is generations ahead of any competitor both in terms of hardware design and software features. It offers the best protection against weak power supplies and very high grade Radio Frequency Interference and harmonic filtration”.

### Factory tested

The complete package is offered in a factory tested metal enclosure reducing commissioning and designing time to a great extent. Danfoss Harmonic solution has produced the best results by reducing the harmonic



distortion at the primary of the transformer to the committed levels. MCT 31 simulation was used prior to the offer and results were slightly better than predicted.

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