

## Pond liner answer for irrigation

PHIL WHYTE

FREQUENT dry summers are part of the deal for farmers on New Zealand's east coast.

And Turley Farms Ltd's land at Rangitata, 30km south-west of Ashburton, is no exception.

The Turleys are in cropping in a big way, specialising in potatoes, cereal production and hybrid vegetable seeds – and required a storage pond to irrigate and future-proof 1000ha.

The result is a 5.3ha, 10 metre deep lined irrigation pond, built by Rooney Earthmoving Ltd of Ashburton. Now filling, it will be able to store over 400,000m<sup>3</sup>.

Murray Turley says he looked at the options.

"We have porous soils so an ordinary two metre deep earth reservoir would have required lining with something like clay, and anyway it would take up over 20ha," he told *Rural News*.

"My own feeling was to go for the lined pond, and this was confirmed when the costings came in. With the reduced land area required for a deeper reservoir, the land that would have been used for a shallow reservoir has offset around half the cost of the liner."

Water loss through evaporation was another factor. On a 20ha reservoir it can equate to 1000m<sup>3</sup> a day in summer. The smaller deeper pond minimizes evaporation loss.

Since water pressure for a 10m wa-



The Turley Farms lined reservoir is now about 25% full. Batter slope is 1:3. Inset, Murray Turley.

ter depth would cause unacceptable loss to seepage, the Turley's were presented with a range of impermeable artificial lining membranes including HDPE and EPDM.

Murray and Margaret Turley selected a 1.14mm EPDM Geomembrane, manufactured by Firestone Building Products. This was due to its durability and Firestone's 20-year material warranty, but it also satisfied the engineers' future-proofing

and building consent requirements by having a life expectancy of over 50 years.

Firestone says its EPDM Geomembranes remain highly flexible even at very low temperatures (down to -45°C), enabling year round installation in a variety of climates and terrain. They can stretch over 300%, enabling the membrane to conform to irregularities in the subgrade.

The company says they offer unmatched resistance to ultraviolet radiation and ozone, require little or no regular maintenance after installation. Membranes are inert with low environmental impact during production and use.

After Rooney Earthmoving completed the excavation, construction and compaction of subgrade a geotextile underliner was installed prior to placing the impermeable Firestone membrane.

This is a vital component, as it drastically increases the puncture resistance and protects the lining membrane against possible damage once pressure is applied when filling, says Vaughan Podbielski of Cosio Industries, exclusive New Zealand distributor of Firestone lining products.

Installation was carried out by

Tim O'Sullivan – Young Farmer of the Year – and his business partner Simon Metcalf of Canterbury Environmental Linings. Due to one of the wettest May's in 35 years for the area, installation of the 62,000m<sup>2</sup> Firestone EPDM liner – the size of eight rugby league fields – took a little longer than expected.

This privately funded infrastructure is part of the region's much publicised Rangitata South Irrigation Scheme, which is planned to irrigate a total of 12,000ha of farmland in the area.

Like many of the existing and planned schemes, the aim is to provide a reliable water supply using storage ponds, which is seen as the key to future growth in the primary sector for this region by Irrigation New Zealand. This belief from INZ is echoed by Federated Farmers chairman Don Nicolson.

Turley Farms has always been an early adopter of new technology and innovative solutions in the farming community. The Turleys were one of the first to import centre pivot irrigation technology, now commonplace for the area.

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The top subgrade layer was 50mm of compacted topsoil. The Firestone 1.14mm EPDM Geomembrane liners are available in lengths up to 61m and widths to 15.25m.

## Lined ponds 'tick all the boxes'

NEIL KEATING

LINED reservoirs offer a sustainable way forward in water 'micro-storage' on farms, as shown by a 400,000m<sup>3</sup> pond now filling in Rangitata, Canterbury.

Turley Farms Ltd, a potato, seed and cereal grower, plans to irrigate at least 1000ha from the pond, which covers 52,900m<sup>2</sup>, including batters (see technical story page 33).

The reservoir is part of the Rangitata South Irrigation Scheme, which serves a total of 12,000ha of farmland.

Turley Farms will catch water from rivers and aquifers flush with winter rain and spring snow melt.

The concept and this project "tick all the boxes", Federated Farmers president Don Nicolson told *Rural News*.

"It gives surety through the dries, it complements the water infrastructure and, although called 'micro-storage', it provides massive quantities of water. My gut feeling about this is if Turley Farms can do it, why can't everyone?"

Nicolson cites the Opuia dam as being known to deliver \$8 to the local community for each \$1 invested in the scheme.

The Feds' view is echoed by Irrigation New Zealand chairman Andrew Curtis: "Such schemes optimise water management. Community water schemes don't fit all areas; that's when smaller ones such as Turley's come into their own."

The genius of a lined reservoir lies in its overcoming the related problems of water loss by seepage and evaporation. Earth dams are not usually deeper than 2m to avoid loss by seepage

(greater depth causes higher pressure therefore more seepage).

This means large volume requires a large surface area, subject to evaporation in hot weather. A 400,000m<sup>3</sup> reservoir only 2m deep would cover 20ha, and be likely to lose 1000m<sup>3</sup>/day through evaporation.

At 10m deep, Turley Farms lined dam covers only 4.5ha, and engineers anticipate evaporation loss will be 264.5m<sup>3</sup> a day.

Cosio Industries, Auckland, the distributor of the Firestone membrane lining Turley's reservoir, says dairy farms, kiwifruit orchards and vineyards are all prospects for lined reservoirs and irrigation canals and races.

Product manager Vaughan Podbielski says with aquifer and canal water flows now monitored, and the latter also subject to loss by seepage, liners become more economically feasible.



Water storage reservoirs like this recently commissioned structure in Canterbury are the way of the future for drought-prone regions.