

BY NATHAN BENNETT

Earlier this year The Sands, Torquay become one of the first golf clubs in Australia to install a dedicated reverse osmosis water treatment plant to solve water issues burdening the facility. Superintendent Nathan Bennett outlines the project and what it will mean for one of Victoria's newest championship courses.

RO plant secures future for The Sands

The Sands, Torquay is a 195-hectare, fully integrated resort development located in Torquay on Victoria's Surf Coast. The project boasts a championship golf course, designed by Stuart Appleby along with International Management Design, which has been set up to challenge all golfers.

The land was originally purchased back in the early 1990s by Malaysian developer Dato Hussain Yassuf for the purpose of developing a golf/equestrian complex. The development ran into trouble and stalled after damage was caused to the wetlands through bulldozing native vegetation.



Resin bead filters initially reduce particles in the water down to 50 microns before the water is pumped into the RO unit

This is when the Handbury Group, owned by Paddy Handbury, became involved in 1999 and gained approval for the development in mid-2002. Start date for construction was late 2002 and the course was completed at the end of 2003. The clubhouse was completed by March 2004 and the club was opened four months later.

When developing The Sands, Torquay, Handbury and the designers had the foresight to ensure that the course had a permanent water supply. This was achieved by tapping into the Class C pipeline exiting the Black Rock Sewerage Treatment Plant operated by Barwon Water about four kilometres from the course.

The quality of water supplied varied from average to very poor with the salt readings ranging from 1000ppm to 1700ppm and sodium levels up to 300ppm. This was having a significant effect on turf quality, which was

particularly evident where we had two holes watered with stormwater.

Jazz Water, a company co-owned by Handbury and Wayne Ellery, needed to build a prototype RO plant (reverse osmosis) which they could collect data from. This was needed to satisfy the EPA in regards to building a larger plant in the future.

Such a plant would effectively solve the water issues the course was facing and construction started in earnest last Christmas and finished at the end of March 2007. Once all the finetuning and commissioning had been finalised the plant was up and running by Easter.

TREATMENT PROCESS

Water is first pumped from a large dam situated next to the course into a holding tank. As the water is pumped in it is dosed with sodium hypochlorite which kills off any bacteria and organics. The water is then sucked out of the holding tank and dosed with ferric sulphate, a floccing agent which causes all the matter in the water to stick together creating larger particles.

The water is then pumped through large filters filled with resin beads which are all the same size. These filters are able to collect all the particles in the water now that they are larger due to the floccing agent. The filters are able to reduce particles in the water down to 50 microns.

The clean water is collected in a holding tank ready to be pumped through the RO unit. This clean water is also used for back-washing the resin filters every four hours, with the waste or brine then pumped out into an evaporation dam near the unit.

The clean water is then pumped into the RO unit and again dosed with ferric sulphate. It passes through two more resin filters reducing the particle sizes down to five microns. Once it passes through the filters it is dosed with hydrochloric acid to drop the pH to between 5.5-5.8. It is also treated with Hypersperse (an anti-scaling chemical) which stops scaling of the membranes.

The membranes remove the salt and minerals out of the water. These membranes are like long rolls of toilet paper (about 4m

long), densely wound up fibres with a hollow centre. The water is pumped through the membranes at around 300psi, with the low water pressure in the middle of the membranes drawing the fresh water to the centre (reverse osmosis) leaving the salty water still in the membrane fibres.

There are 12 long membranes broken into two groups of six and as the water passes through the first three of each group the fresh water is collected. The salty water collected is passed back through the next two membranes and once again the fresh water is collected. Finally the salty water is then passed back through the last membrane. The salty water that comes out of this is about 4000ppm which is then pumped into the evaporation dam.

The fresh water from the centre is collected and dosed with sodium hydroxide to raise the pH to 6.5-6.8. After this process has taken place the water is stored in a 38,000-litre tank and once this is full the water is pumped down to the irrigation dam on the course.

The unit puts out between 40,000-50,000l an hour and in a full day of operation can

The Sands, Torquay is looking forward to the coming summer after installing a dedicated reverse osmosis water treatment facility

produce around 0.9M of irrigation water with a salt reading of between 150ppm-200ppm. The sodium levels have dropped from 307ppm to 76ppm, the adjusted SAR down from 13.3 to <2.5 and bicarbonates down from 174 to 78.

From a turf management perspective the new water is less precipitating compared to the old water (i.e.: more available calcium and magnesium). Now we have reduced the issues with the high salt and sodium levels we will have to keep an eye on the nutrient levels in the greens as the water may increase nutrient leaching which in turn may increase the amount of calcium and other amendments we need to apply.

The treated water will be used to irrigate the course from tee to green. As the unit was fully operational by mid-April 2007, we didn't have much of a chance to see a result from the improved water as our watering reduced soon after the supply started. This coming summer will be great, as now we have a full supply of good quality water and, touch wood, we will never have to use Class C water again.

Last summer our stored stormwater that services 16 holes was quite low so we had to water greens with Class C, and even on a normal rainfall year there would be a certain amount of Class C water applied to the greens.

The greens watered with Class C were thinner, the leaf a lot broader and also seemed to be a lot less disease and drought resistant.

Despite the plant's high operating costs, The Sands feels that is outweighed by the fact that the course now has a good quality, permanent water supply



Water is pumped through membranes at around 300psi. The low water pressure in the middle of the membranes draws the fresh water to the centre leaving the salty water still in the membrane fibres

coming into the unit is very poor, but other chemicals required in the process are used in far less quantities. The Sands, Torquay feels that the expense of running the unit is outweighed by the fact that we now have a good quality, permanent water supply.

From a maintenance point of view the groundstaff don't have to touch the unit. Jazz Water has an experienced person come down and service it once a week which includes back-washing of all filters, air scouring of the filter tanks and water tests at each treatment stage.

The installation has attracted a fair bit of interest around the industry with a couple of clubs enquiring and making visits. The nearby Barwon Heads Golf Club is in the process of installing a similar unit and there has been a lot of interest from the local community, sporting bodies and construction companies regarding the possibility of buying water to help out their situation.👏

We had to apply a lot of gypsum to reduce the nutrient lock-up caused by the sodium and we had black layering in low areas due to the large amount of sulphur in the water. Hopefully these issues will now be a thing of the past.

Another main issue when using Class C was the time restrictions in place for watering. We were only allowed to water from 9pm to 2am, but now with the RO plant we can water whenever we like.

One of the drawbacks of the RO unit is that it is not cheap to run. At the moment it is powered by its own generator which uses around 700l of diesel a day (when running at full capacity). A large quantity of sodium hypochlorite is needed as the quality of water

