Anatomy of a lake: One club's answer to water shortages

By Paul Worster

"Why not put another lake on the course? It'll be a feature, make the course more difficult, and provide water for irrigation." Sounds pretty simple, but as usual – there's more than meets the eye.

In the first instance the terms "feature lake" and "water storage reservoir" may not necessarily be synonymous. To quote the late Fred Hawtree – "the tidal area of such a feature is not necessarily handsome" so any such feature has to be a compromise between aesthetics and function. The answer may be to have a large surface area with a shallow shelf around the edge, which will support some vegetation, and help to buffer or disguise an unsightly edge if water is drawn off.

How big does the lake need to be? Enter the experts. Minchinhampton set out to create sufficient storage capacity to allow 90 days emergency watering on the greens and surrounds should our boreholes be cut off for any reason. Irrigation consultant, Roger Davey, was put in touch with Course Architects Hawtree Ltd, calculations were made as to how much water was actually needed, and the lake sized accordingly. But I'm getting ahead of myself.

In the first instance a plot of land between two fairways was identified as being suitable. Obviously, any proposed new strategic feature on the course, has to fit with the existing course, and Martin Hawtree was brought in to confirm this. Having established that the proposed site was suitable – ie reasonably level (in our case what looked to be a level site actually had a one in a hundred fall. So a lake a hundred metres from end to end will have one end at ground level, and the other contained in a bund a metre high. Or, one end will be at ground level, and the other end a metre below ground level. Complicated? Yes, because a balance had to be struck between not having a too high an artificial structure (ie the bund wall), but not excavating too deep and removing too much ground thus adding to the cost.

A design was finally agreed upon, for a lake of 6000 square metre surface area with an average depth of two metres, which gave 11700 cubic metres of water storage, and which called for 7500 cubic metres of excavation. The design included a bund wall at the lower end of one-and-a-half metres in height, including a freeboard of approx a quarter of a metre (to prevent overflowing). The design also incorporated a safety shelf, which as the term implies, is a shelf a metre deep and two metres wide, around the side of the lake, so that anyone falling in doesn't immediately tumble into water over two metres deep.

Then there was the small matter of Planning Consent. No significant objections were received, but Stroud District Council called for an Archaeology Assessment. I thought it was odd skimming through the Yellow Pages, that there were quite so many Archaeological Contractors listed. I soon found out why. Every single Planning application in this country has an archaeological assessment and reports are compiled for the relevant District Council. In our case, a fee proposal, methodology statement, safety assessment, and site assessment were quickly forthcoming. As soon as the initial payment had been made, the tempo slowed somewhat – eventually a scruffy looking bloke turned up on site, scuffed his feet in the grass and said, "this is a golf course and all this has been dug up before – you won't find much here pal" – and he was right. Over a thousand pounds for about two hours work, plus a report, which was clearly a word-processor copy of someone else's report. (A Dorset caravan site to be precise.) Having cleared that immense hurdle and planning consent gained you might think we were ready to start. Wrong. In removing 7500 cubic metres of ground, one has to consider where this material is going. Back to the drawing board with the architect to design mounding and fill areas to complement the lake, but on a relatively flat site, new mounding cannot be too high, so large areas of fairly low mounding are involved. In fact the maximum height of mounding was only a metre so over ten thousand square metres of areas were needed – not too far from the proposed lake in which to lose the spoil. This involved crossing two fairways so haul routes, with turf and topsoil stripped and stored, had to be established.

The contractor was responsible for marking and setting all outlines and levels to the Architects plan and satisfaction. Digging commenced with rotavating and stripping the topsoil on the lake site – 6000 square metres - and the additional 10,000 square metres for dumping the spoil.
The dig started by digging a long trench down the middle of the lake to the

correct depth. The machine used was a 21 tonne Komatsu 210 Excavator. A 12 tonne 4WD Dumper, and a 12 tonne tractor and dump trailer were used for transport. A 14 tonne Komatsu 140 excavator was also on site for stripping and shaping. The material coming out of the dig was predominately large angular Cotswold Limestone, but a certain amount of small underlying material was salvaged to help line the completed lake – this material was moved to one side and saved. The Cotswold stone was mostly soft enough to dig without significant difficulty and the dig progressed quite rapidly, with the operatives working from 7am until 5.30 pm. As each mound area on the course was filled with rubble, the 21 tonne machine clattered across, tracked the stone in, and shaped to the architects satisfaction. Topsoiling was on-going while further excavation continued. Topsoiling was carried out using a 5 tonne TB 145 digger and 6 tonne dumper. Turfing and seeding commenced straight away as each area was completed. The decision, on budget grounds, was taken to seed the outside of the mounds, and turf the inside slopes to speed up development.

The weather was mainly appalling with torrential and prolonged rain making the ground somewhat tricky in places.

With the lake dig completed and the depth checked by laser, the small material was put back around the sides, safety shelf, and base. A trench was then dug around the top to take the lining fabrics which would be required to waterproof the lake. Enter stage left – GeoTechnical Services to line the lake. The lining consists of three layers which are laid in 4 or 6 metre wide strips. Each strip is welded with a heat gun to its neighbour, as it is laid. An underlay, which is like a very thick felt with a cushion effect, is the first layer. This protects the middle layer, which is the impermeable (waterproof) part. A further layer of felt overlay completes the job. All these materials are tucked into the trench around the top, and backfilled. This took a week with four operatives puffing up and down the slopes towing each strip of material by hand (or by foot in this case). It looked like extremely hard work and I was quite glad not to be involved.

Finally, the topsoil was laid around the lake and down to the bottom of the safety shelf and all haul routes were repaired “on the way out”. Believe you me, I’ve never been so glad to wave goodbye to anyone ever. The relief didn’t last long however, the entire bank which measured 330 metres around and was between five and 15 metres deep had to be prepared and turfed. Enter the MGC greenstaff who deserve medals for their efforts and despite the very worst the weather could throw at them somehow got the job done.

47.5 pallets of turf, some of which were laid in gale-force winds and driving rain, were imported from Teal Turf at Worcester, who responded magnificently lifting and delivering at 24 hours notice during brief windows in the weather. A budget of £160,000 was set, and in the event, this was exceeded by £4000, which was well within contingencies. Having rolled the banks, the lake now looks totally natural, planting with reeds and aquatic plants will be on-going, and the members have applauded the foresight of the committee in sanctioning the project.