

Case Study: Gungahlin Lakes Golf Course - Integration of lakes for water storage, environmental management and golf strategy

The ACT government selected a site for a golf course near Canberra that was floodprone and had the potential to be a long-term maintenance demand on the community. A golf course would provide a community asset, a recreational resource, and self funding maintenance of urban green space.

The golf course site was generally rank grass, flat and open with few notable features. New houses had begun to the south west. In time, over 60,000 people would surround the site to form a new growth centre of Canberra called Gungahlin.

Ted Parslow and Jamie Dawson were engaged in 1993 to jointly undertake the design of the proposed Gungahlin Lakes Golf Course. The 70 hectare golf course site was subject to a number of challenging design constraints: it was divided by an arterial road, two mandatory public crossings, five creek lines or floodways, a 132 kV power line and two trunk sewer mains. It also had over 5 kilometres of proposed residential estate interface.

The area to the south of Gungahlin Drive had the greatest width in either direction enabling greater flexibility in course layout. The land had little elevation change so in effect the lakes could be sited almost anywhere near the creek lines as best suited the course strategy. The eastern and western arms of the golf course are narrow, more incised and separated by the 'Peninsula Estate'. Space in these areas was at a premium and the opportunity for large lakes more difficult. The routing for each Arm needed typically to create a sequence of holes out along the creek and then returning on the other side.



Plan showing course layout and lake locations

The designers placed the estate to the uphill 'hook' side of the holes for safety - but this regularly brings the creeks into play for the more common right hander's slice.

The lakes have been sensitively designed with flowing shapes that blend with the rolling landform created by the course shaping. Eroded creeklines were redirected where necessary for better golf strategy and functional use of the land. The limited natural habitats of native grasses and rock outcrops were retained on the site. Rock shelves were integrated into the creek design to provide natural cascades and riffles.

The 6234 metre course was fortunate to have a large catchment from five separate creeks or floodways entering from many directions. Flow will increase as the catchment becomes more urbanised - but two large water pollution control ponds located upstream on the two main creeks significantly intercept low flows.

This will make the water resource more variable. Water management therefore needed to be flexible and ensure the effective entrapment and use of water from all source

A series of lakes with at least one on each catchment was carefully designed to have an interconnecting network linking to the main irrigation lake known as Lake 1. The water management design utilised gravity feed pipes and channels, deep level connection pipes and pumped water transfer pipes.

The network comprises:

- > Lake 1 located at the lower end of the site on the Eastern Arm of the Course with the irrigation pumphouse intake.
- > A minor urban floodway discharging below Lake 1 with upstream low flows diverted into it by a stormwater pipe.
- > Lakes 2 and 6 are on the Western Arm of the course and are linked by a deep underground pipe making them, in effect, one lake.

The Gungahlin Lakes Golf Course acts both as a green open space and a drainage corridor for the surrounding suburbs of Canberra in addition to providing a valuable community recreation resource

Nutrient stripping ponds are located near the discharge points from the golf course into Gungahlin Pond. These have dense macrophyte growth to assist in absorbing nutrient under flows and discharging to the air by photosynthesis. ACT Environment regularly tests the water quality and are well satisfied with the outcomes.

Apart from supplying necessary irrigation, the lakes undoubtedly provide a key element to the visual and strategic appeal of the course - particularly when allied to the large Gungahlin Pond that comes into play on the closing holes. The Pond is 5 hectares in size and is additional to the 6 lakes within the course lease. The 16th, 17th and 18th provide the challenge of risk and reward at the completion of the round. Gungahlin Lakes opened in 1996 and it will achieve greater recognition as the course matures and fulfils its potential as not only an excellent championship and members course, but as an example of environmental management for the benefit of the community.

*By Jamie Dawson
Enviro Links Design Pty Ltd
and Ted Parslow
E&G Parslow and Associates*



- > Lakes 3 and 4 on the Eastern Arm can be used for storage. If water is required to 'top up' Lake 1 a valve in a pipe on the embankment can be opened. Gravity flow under head will transfer water down to lake 1 in a concrete spoon drain so as to minimise water loss into the ground. The very base of the lake can be accessed in an emergency by a mobile pump to discharge water over the embankment into the channel.
- > Lake 5 on the Western Arm is small and is generally only for visual benefit although it does perform a sediment trapping function. Water can be accessed by mobile pump if necessary.

- > A submersible pump at Lake 2 pumps water on demand to the main irrigation lake, which is at the same elevation but on a different catchment system.
- > Lake 6 was not in the Masterplan concept but was added when select unrippable bedrock at 2 to 5 metres in Lake 2 threatened compliance with the 100ML storage target required by government. Other contingencies were made but this would have made the course even tougher. Creeks or lakes already come into play on 14 of the holes!

The ponding of water and its reuse for irrigation on the golf course assists in environmental management by dispersing any nutrient runoff from the course, the adjacent estate and development areas upstream.