from wholly water . . . to water hole

FLOODPLAIN GOLF COURSES

Making profitable use of wet land

by Michael J. Hurdzan, Ph.D.

The dangers of land development in a floodplain are well recognized, and as a result most communities have written floodplain zoning legislation to control development. A particular problem in floodplain development is that they must continue to function as temporary reservoirs for flood waters. The Corps of Army Engineers will not allow movement of fill material into a floodplain, so construction is limited to using the resources already in the floodplain, or removing a volume equal to the imported material. Therefore, floodplains have found their best use as farms, fallow ground, or recreational areas — including golf courses. But even building a recreational area on a site with a potential for flooding requires the golf course architect to do special planning and engineering which sometimes make recreational development economically unfeasible. However, a golf course can produce revenue and so reasonable development

ABOVE: The clubhouse is built on high ground where the least amount of damage could occur during a heavy rain. RIGHT: This green is designed to flood. There are built-in water surface swales and no sand traps.

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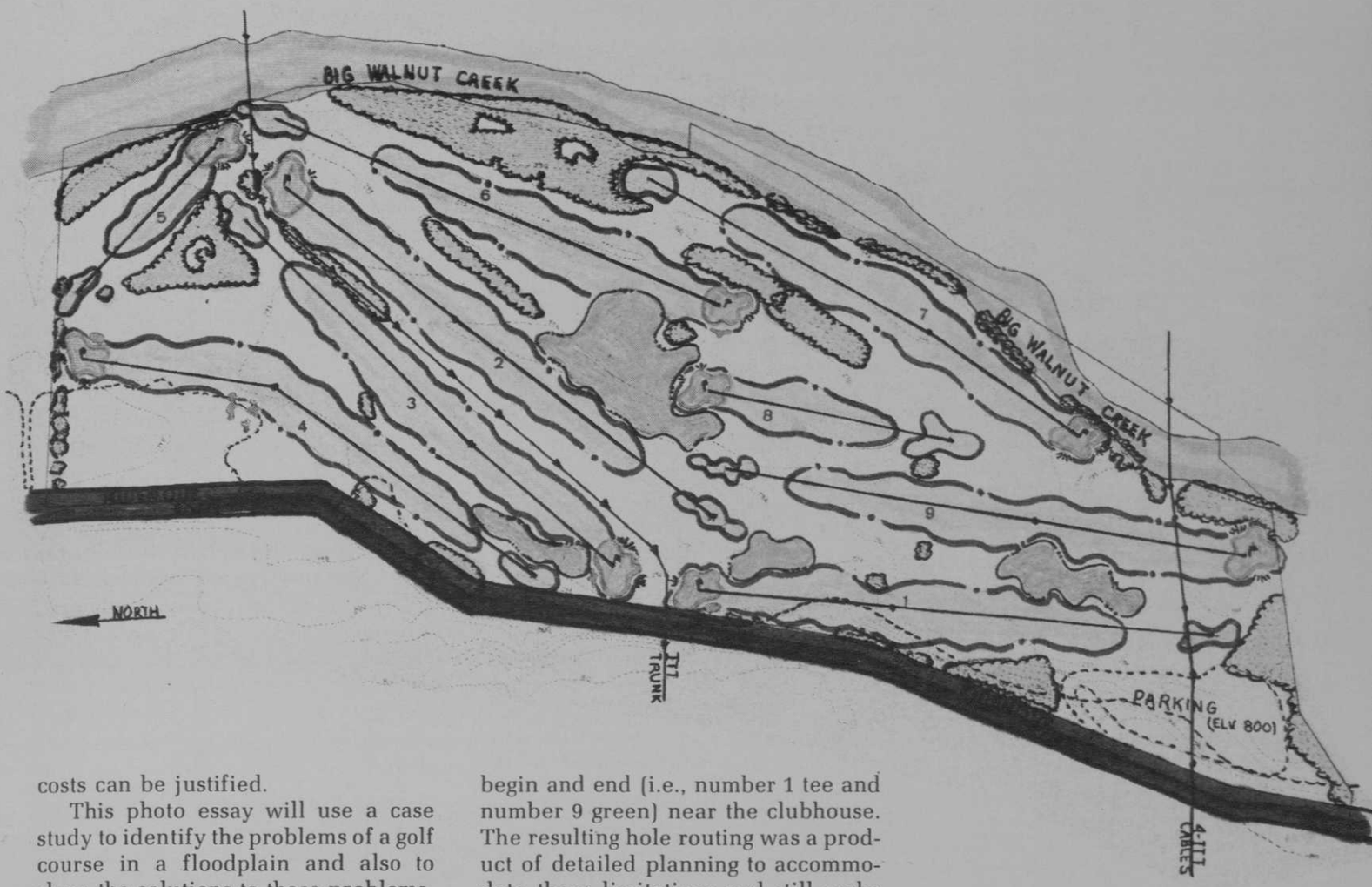

The Gahanna municipal golf course has nine holes: seven par 4's and two par 3's. It measures 2,845 yards. The course, completed in August 1975, averages 150 players on weekdays and 230 on weekends and holidays, said pro manager Steve Gray. He said the course required a small government subsidy to operate last year, but is "more than self-sustaining" this season.

costs can be justified.

This photo essay will use a case study to identify the problems of a golf course in a floodplain and also to show the solutions to those problems.

The big flood

The city of Gahanna, Ohio, owned 51 acres of floodplain ground along Big Walnut Creek, and wished to use it to expand the park and recreation system. In 1959, this area experienced a 100-year flood and much of this ground was covered by 8 feet of water, except for a high plateau along the southwest property line. The land was studied and it was concluded that only a golf course could be economically justified on the site. The high plateau area would be used as a clubhouse site and the low land for the course, but it required extensive drainage systems and special planning.

The special planning of the course began with the basic design which had to allow for certain physical features. The area was bordered by a well-travelled road on the west, the Big Walnut Creek on the east, and proposed road extension on the north. In addition, there were two large aerial telephone trunk lines bisecting the property perpendicular to the long axis of the land. As well as working around these physical features, the course had to begin and end (i.e., number 1 tee and number 9 green) near the clubhouse. The resulting hole routing was a product of detailed planning to accommodate these limitations and still make the golf course safe and easy to maintain.

Also a sewer contractor had earlier installed a large line across the property and left in his trail piles of soil, a ravaged woodland, and 30 acres of swamp caused by destroying tile and surface drainage.

First, a system of surface waterways, storm sewers, sanitary sewers, a drain tile was planned to handle water running onto the property and to allow water falling on the site to be quickly removed. An extensive system of 4-inch tile was planned for subsurface drainage of major play areas such as greens and fairways. Including lake overflow, over 16,000 linear feet, or 3 miles, of tile was installed.

A land developer had bought the high ground to the west of the golf course and was intending to develop it into houses and streets. This would have increased the speed and amount of water flowing onto the course, so a 48-inch storm sewer line was installed across the golf course to handle the anticipated runoff. In addition, a side-opening catch basin in the 48-inch tile was constructed to accept

surface water directed to the tile by a grass waterway developed from a second developer's tile.

This 48-inch tile contained several drop inlets and also served as a discharge point for some of the 4-inch tile lines. Because there was so little difference in elevation on the site, the 48-inch tile is very near the surface in some places and had to be planned to miss the lakes, tees, and greens of the proposed golf course. To accelerate the movement of water into the tile, some areas were gravel backfilled or gravel drops were installed over the 4-inch tile.

Fill material to build the tees and greens was excavated from pond sites within the floodplain, so that one earthmoving operation built the golf course and pond at the same time. (Also, no fill material had to be imported into the floodplain). The ponds serve as not only safety dividers and aesthetic installations, but also water storage facilities and terminal points for tile lines.

One large pond serves as a source of irrigation water for the golf course. Because of the danger of strong flood currents, possible damage to electric motors, and a limited construction budget, the irrigation pumping system required some original thought. The main irrigation pump is a 40-horsepower submersible pump placed on a frame with wheels and rolled into the large lake on surplus aircraft landing mats. The controls for the pump and irrigation valves and clocks were located at the lake's edge on a mound built up out of the floodplain. The pressure relief valves, electrical connections, and isolation valves are housed in a drained pit at the base of the controls. Not only is this system functional; it does not destroy the aesthetics of the lake.

To fill the irrigation pond from Big Walnut Creek requires a 5-horsepower centrifugal pump mounted on wheels and a tow bar with a quick-disconnect 4-inch aluminum pipe connection and an electric four-prong plug. In only a couple of minutes, the golf course superintendent can remove the filler pump when a flood threatens. The main electric service was located above the floodplain elevation.

To minimize flood damage to tees and greens, they were elevated and placed in areas of expected low flood current.

Greens were designed to receive flood waters in that it was planned for water to flow onto the greens and then back off at a uniform rate. This was to minimize siltation from slowing water and to prevent cutting from currents.

Sand traps were not used in areas likely to flood often. They were confined to higher areas and were also tile drained.

Trees and natural vegetation along creek banks were not disturbed, in order to reduce erosion potential. Lower limbs of the trees were trimmed to expose the view of the creek and to permit execution of golf shots on the creek bank, but few or no trees were removed. Although this area requires some hand maintenance, it looks pleasing and the creek banks are intact.

Not all floodplains are suitable for use as golf courses because of the different types of flooding, soil limitations, water quality factors, and money available. A qualified golf course architect or golf course designer should analyze each particular case as to its special problems. Currently, many floodplains are being treated as waste ground when, with proper professional planning, they have the potential to become a recreational asset.

"Many floodplains are being treated as waste ground, but they have the potential to become a recreational asset."

A grass path helps water from a nearby housing development run into a 48-inch catch basin.

Sand traps near this green were built in an area unlikely to flood. All were tile-drained.

One of several drop inlets located on the Gahanna course.

Surface water directed by a grass waterway will flow into this side-opening catch basin.

This mound was built out of the floodplain to house pump controls and irrigation clocks.

Below is the pit with electrical connection to submersible pump and clayton and isolation valves. Also shown are the pump controls and irrigation clocks.

The refill pump, main disconnect, and electrical pump plug are placed above flood potential's elevation.