

AMERICAN COUNCIL OF ENGINEERING COMPANIES of ILLINOIS

HONOR AWARD

CITY OF PLANO

2004 WASTEWATER TREATMENT PLANT IMPROVEMENTS PROJECT

Walter E. Deuchler Associates, Inc. - Consulting Engineers

ORIGINAL OR INNOVATIVE APPLICATION OF NEW OR EXISTING TECHNIQUE

The improvements included five "Selector" tanks for biological nutrient removal. The tanks are operated in series and can be configured to operate anaerobically for Bio-P removal, anoxically for denitrification, or aerobically for carbonaceous removal and nitrification. A key element of the design is operator flexibility. A jet aeration system was utilized in the selectors tanks because of the systems excellent ability to mix, and the ease of adding air. By simply turning a few valves, the operator can change the process and the biology in the tanks.

A new secondary control building houses the mixed liquor flow distribution valves to the final clarifiers, the non-potable water reuse pumps, the plant drainage/scum pumps, and the internal return pumps which pump mixed liquor at a rate up to 300% of the influent flow to the anoxic selectors for denitrification.

Disinfection is accomplished using ultraviolet light. The treated water is conveyed through a 30" pipe under a roadway to the Cedar Dell Golf Course irrigation pond, where it is land applied to keep the course looking green—even in the hot summer months.



FUTURE VALUE TO THE ENGINEERING PROFESSION AND PERCEPTION BY THE PUBLIC

The Mayor of the City of Plano stated that he wanted to work together with the citizens of the City and with the Environmental Groups represented by the Sierra Club, the Big Rock Watershed Committee, and the Prairie Rivers Networks to build a plant that was both economical and state of the art. The result was a project that was technically successful, and one in which the City officials and citizens could be proud of as evidenced by a very well attended open house this spring.

The innovative design of the selector tanks for biological nutrient removal and the success of the mixing system and tank configuration will serve as a model for how tanks, channels, and piping may be arranged to provide for operational flexibility.

EFFLUENT WATERS USED TO IRRIGATE THE CEDAR-DELL GOLF COURSE

Our readers' opinions

Big Rock Creek...

Congratulations to the City of Plano, John McGinnis, Darrin Boyer, Cedardell Golf Club and Walter E. Deuchler Associates, Inc. It is so refreshing to see a community work together and use their creative minds to help preserve the natural waters in the Big Rock Creek and Fox River. As this city grows, I feel that by diverting the additional effluent from the treatment facility to Cedardell Golf Club, this community is not only showing a strong desire to work together to preserve and protect the natural waters in our creeks and rivers, they are showing that they respect the communities and wildlife down creek/river from the city. I can only hope that other rapidly growing cities in this area take notice of the wonderful idea these individuals have implemented and show similar respect to our natural resources and to wildlife and communities down creek/river from their city with the disposal of their additional effluent (clear water that is discharged from the treatment facility).

ROBIN KLEPPER
Little Rock Township

SOCIAL, ECONOMIC AND SUSTAINABLE DESIGN CONSIDERATIONS

Early in the process of planning, the City Officials decided to take a proactive approach to meeting existing regulations while also preparing for future regulations and future growth of the community. In light of this, the City elected to prepare the plant infrastructure for doubling the capacity of the plant to 4.88 MGD. For example, the bar screen building was designed to add another fine screen; the blower building was designed to add a fourth 150 HP centrifugal blower; the secondary control building was designed to add a fourth internal recycle pump; and the UV system was designed with a parallel channel for the addition of two future banks of UV bulbs.

COMPLEXITY

One of the greatest challenges was keeping the existing treatment system in operation when improvements were being constructed simultaneously. WEDA prepared a detailed sequence of construction which was provided to the contractor and was very successful as evidenced by the fact that during the period of construction no Provisional Variances were requested of IEPA, and no effluent violations occurred. This was accomplished while more than doubling the capacity of the existing treatment plant.

Structural tie-ins had to be made at the existing grit tanks, and wet connections made to bring the new grit tank and new headworks facility on-line. The new aeration gallery, selector tanks, and aeration tanks were built around the three existing aeration tanks, requiring numerous structural and process piping tie-ins.

The existing plant had very little instrumentation for process control. The new facility has a state of the art SCADA system using Rockwell Automations Control-Logix platform. The SCADA system controls the mixed liquor split to the final clarifiers to maintain a balance, the RAS rate to pace by the influent flow, and wasting on a schedule to meet a target volume calculated by the SCADA system. Oxidation Reduction Potential (ORP) is used as a measure of the anaerobic/anoxic condition of the selectors, and dissolved oxygen probes are used to monitor the viability of the biomass in the aeration tanks. Historical trending and data logging was also included as part of the SCADA system and is a valuable tool in the hands of the operations staff.



EXCEEDING CLIENT/ OWNER NEEDS

Walter E. Deuchler Associates, Inc. (WEDA) had three main goals during the planning, design and construction of the 2004 Improvement Project for the City of Plano: budget, schedule and technical reliability. The existing treatment plant was nearing capacity, developers were knocking at the City's door and funds were in short supply.

WEDA worked with the City and the developers while considering the overarching environmental considerations in preparing a plan for the improvements to the treatment plant that met the budget constraints of the City and the interested developers while meeting an ambitious schedule. In order for the home builders developments to be successful they need to sell a number of units—these units could not be sold and closed without having ample capacity. The plan prepared by WEDA insured that the City would not be faced with a scenario of being put on IEPA Critical Review or Restricted Status. The negotiation by the City with WEDA's assistance insured that the existing citizenry was not financing the developers—the developers were required to 'pay their own way.'

The treatment plant has now been operational for approximately one year. All of the new processes were commissioned with a minimum of difficulty. There have been no effluent violations since the plant was brought on line, and the plant has been able to maintain its existing staff while more than doubling in capacity.

\$13.6 MILLION OF
CONSTRUCTION WAS
COMPLETED WITH LESS
THAN 0.5 % CHANGE
ORDERS.



SUBCONSULTANTS:

- CORDOGAN CLARK ASSOCIATES- ARCHITECTS
- IDCS, LLC- ELECTRICAL AND INSTRUMENTATION AND CONTROL

