Outside the City Center

Communities depend on "hidden" wastewater systems to work, sometimes for 30 years or more.

By Dennis Hallahan

Cities and townships are facing many complex wastewater treatment issues. Although centralized sewers are seen as the preferred solution to wastewater problems in many places, they are often cost-prohibitive in rural areas without the required density to support them. In these situations, a lack of sufficient wastewater treatment can present a risk to public health. Drought conditions also can be exacerbated as the result of a wastewater management situation where water is drawn out of the aquifer and not replaced. This is not just a residential issue; commercial use of water and lack of proper wastewater treatment and water conservation strategies are critical future challenges.

Decentralized wastewater treatment supports rural community and developer needs

The need for developers to be able to stay competitive and communities' desire to have interactive areas and open space are issues in rural areas as well. Creating and sustaining communities that have a nucleus of space and life in close proximity to clustered commercial services is a desirable, cost-effective, psychologically appealing and eco-friendly approach. Decentralized wastewater treatment is a viable option that allows for this type of lifestyle development.

Gaining Ground

Decentralized wastewater management provides high-quality, cost-effective wastewater management applicable to a wide variety of situations. Each year, decentralized systems discharge billions of gallons of wastewater, and once treated, this wastewater returns to the environment close to its point of origin, replenishing groundwater supplies. Homeowners, regulators and the community at large depend on these systems to do one specific thing for them—work. In fact, everyone involved with these systems depends on the "hidden" workhorses to perform, and to do so for periods of 20 to 30 years or more with routine maintenance and inspection, minimal cost and preferably no expensive repairs or replacement.

The explanations of "working well" and "must perform" do not stop with simply discharging wastewater to the soil for treatment for all those years. These systems must maintain their structural integrity and storage capacity in order to perform for the long term. Companies that engineer and design these systems and those that manufacture integral components for them (e.g., tanks, distribution boxes, leachfield chambers, pumps, piping and treatment systems) design and engineer each component to last numerous years under various conditions for the best possible performance and structural integrity.

Land Preservation & Resource Restoration

Decentralized wastewater treatment technologies that use natural approaches are less land-intensive, provide suitable long-term treatment and are leading to better development practices. Performance data now available makes these systems increasingly popular with local health officials.

Outside the city center, the new onsite wastewater strategies and alternative methods of treatment are often the only solution for engineers, builders, regulators and developers to obtain a code-compliant system. This is particularly true on sites with difficult soils and tough terrain. The same scenario also applies to large recreational and commercial developments in

environmentally sensitive areas where a combination of technologies must be considered.

With decentralized wastewater treatment, it is possible to provide a sustainable water use model where groundwater is extracted, consumed, treated and returned close to its point of origin in order to recharge the aquifer. This results in less energy consumption and a lower carbon footprint than centralized systems. Onsite wastewater treatment also enables water reuse possibilities as irrigation, flushing, fire protection and cooling, thus creating a sustainable system.

Red Hawk Casino

Gaining approval from the U.S. Environmental Protection Agency (EPA) for the proposed Red Hawk Casino in El Dorado County, Calif., required onsite treatment and disposal of all wastewater from the facility. Designated cultural areas, existing structures, residences and facilities limited site flow and access, which posed a significant challenge.

Expected weekday wastewater flows were 175,000 gal per day (gpd), with weekend flows rising to 229,000 gpd. Adding to the site difficulty were rock, fractured rock, silt and clay soils, along with up to 50% sloping terrain, trees, swales and waterways to navigate. It also was planned to provide 80,000 gpd of recycled water for casino and tribal landscape irrigation.

Working with a 1-acre site restriction, HydroScience Engineers designed a compact 200,000-gpd membrane bioreactor treatment plant to produce Title 22-compliant recycled water for landscape irrigation, fire protection and toilet and urinal flushing at the casino. The excess treated wastewater from the system is distributed to 18 acres of fully automated pressure-dosed chamber leachfields that include 10,000 Infiltrator Quick4 standard chambers, a subsurface drip dispersal field, sprayfields and a seasonal storage tank.

Solenoid valves were used to fully automate the pressure disposal zones. The subsurface disposal fields were registered with the EPA as Class-5 injection wells. A 3-million-gal recycled water storage tank was incorporated into the system to provide fire protection, seasonal storage and working volume for casino toilet and urinal and landscape irrigation water reuse. All systems and flows are managed by remote programmable controllers, which can be monitored and controlled through a centralized SCADA system located at the wastewater treatment plant.

Infiltrator chambers were chosen for the disposal field because they offer a large storage capacity, are easy to transport and handle and are ideal for installation on contours and sloping sites. Ease of installation and flexibility were necessary for this site. HydroScience Engineers had previous experience with specifying the chambers, having installed them in two prior casino wastewater treatment projects with great success.

Innovative, compact and efficient, the entire treatment and disposal system meets the demands of the casino while successfully working within the constraints imposed by the site. The project took approximately one year to complete, from site clearing and the initial installation of trench disposal, drip disposal and sprayfields through a complete hydraulic field-testing of disposal systems. The system continues to function effectively and efficiently one year after going online.

Red Hawk Casino was designed to treat and dispose of all its wastewater on site.

All About Balance

Sustainable development through water and wastewater infrastructure design is a means of accomplishing balance. Solutions that enable us to meet human needs of food, water and housing without exhausting or overloading the key resources upon which natural systems depend are critical to the welfare of our world and the people that inhabit it.

Moving way from extractive and disposable methods for wastewater management and toward recycling, closed loops and the restoration of existing systems is a critical step. Preserving rural environments with integrity and sound, effective solutions will continue to be the mandate as we support sustainable residential and commercial development where desirable. WWD

Dennis Hallahan is technical director at Infiltrator Systems. Hallahan can be reached at 800.221.4436 or by e-mail at dhallahan@infiltratorsystems.net.

For more information, write in 1109 on this issue's Reader Service Card.

WEBresources

Related search terms from www.waterinfolink.com: decentralized wastewater treatment, sustainability

For more information related to this article, visit www.wwdmag.com/lm.cfm/wd041009