Residential Developments On Closed Landfills

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Not so long ago, closed landfill sites were redeveloped, if at all, for recreation and park uses. "You can't build a building on a closed landfill," was the catchphrase of the day. As more commercial and institutional buildings were successfully constructed on closed landfill sites over the last 25 years, that phrase changed to, "You can't build residential units on a closed landfill." This perception also is changing.

Upscale apartment buildings and condominiums, townhouses and even single-family homes have been safely constructed on closed landfills. Closed landfills are often ideally located near major transportation routes and other infrastructure, and residential or mixed-use development of these sites can be the epitome of Smart Growth. However, there are several engineering challenges and various other factors that must be met to successfully develop a closed landfill for residential use.

Engineering challenges for any landfill redevelopment include proper foundation design and mitigation of decomposition gases containing potentially-explosive methane. Depending on the nature of the fill material, it is also important to maintain a physical barrier between buried waste materials and users of the site. For relatively intensive land uses (e.g., commercial, retail and multi-family residential), the physical barrier (i.e., the landfill cap) can include the buildings themselves and the surrounding parking areas.

Relatively intense land uses also lend themselves to more elaborate (and expensive) foundation structures and methane mitigation systems. Since these kinds of land uses often come with a property management company to manage the development following construction, the institutional infrastructure is in place to make sure that parking areas are maintained, that gas control systems are monitored and operated properly, and that renovations do not inadvertently disturb any methane control system.

A recent trend in development combines retail uses on the ground level, with residential and office uses over the retail level. A variation of this approach puts parking structures on the ground level, with residential over the parking. In 2003, the New Jersey Business & Industry Association gave an Environmental Award for Excellence to a residential condominium-over-parking project now called the Tides at Seaboard in North Wildwood, New Jersey. Constructed over a closed municipal landfill, dredged materials were used to help cap the site. Similar condominium projects are under construction, or have been proposed elsewhere in New Jersey, Virginia and California.

A major high-end apartment developer in Dallas is in the process of evaluating construction of a 258-unit apartment/condominium project on the site of a 1930s landfill in the rapidly expanding West End area of Dallas. Initial methane evaluations and foundation design have been completed on this highly attractive piece of land. Groundwater contamination will be addressed under an agreement between the City of Dallas and the Texas Commission on Environmental Quality (TCEQ) utilizing the TCEQ's Municipal Settings Designation (MSD) Program.

Although less common, single-family and low-density residential developments also have been constructed on closed landfills. In 2005, the U.S. Environmental Protection Agency awarded a Brownfields Cleanup grant to the town of Woodfin, North Carolina, to install a passive gas collection system at the Elk Mountain Landfill. One of the first such grants of its kind, the money will be used for a system to control landfill gas and enable the safe development of about 300 single- and multi-family homes in close proximity to buried wastes. At the Lake Archway subdivision in Virginia Beach, Virginia, 70 single-family homes were constructed over an inert landfill using special methane venting layers. And there are hundreds of homes similarly built on or near landfills from Maryland and Virginia to Oregon and California.

The nature of the closed landfill is critical to successful redevelopment for residential or any other land use. Deep, fresh municipal solid waste will produce large quantities of landfill gas while presenting significant geotechnical settlement issues. Relatively thin, relatively inert fill produces less gas and settlement. The challenge is to match the needs of the land use with the nature of the fill.

Some closed landfills hold the potential to be safe, smart sites for residential development, provided that appropriate control systems are designed, constructed, operated, and maintained. **BFN**

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