The Town of Babylon Landfill, located in Suffolk County, Long Island, New York, contains a much needed ash disposal area for the adjacent Resource Recovery Facility as well as for ash hauled from nearby towns. Unfortunately, the initial design capacity of 650,000 cubic yards was expected to be exhausted by July of 2000. As a result, the Town of Babylon called upon GeoSyntec consultants of Tampa, Florida, to find a way to increase the capacity of the ashfill without exceeding the permitted boundaries of the site. By an innovative application of geotechnology, they were able to increase the capacity of the ashfill by 390,000 cubic yards, extending the life of the facility by three years.

Meeting a Series of Challenges

The existing Southern Ashfill extended almost to the edge of the permitted area. Additionally, the maximum elevation of the ashfill and the final cover slope geometry could not be altered due to permitting constraints imposed by the New York State Department of Environmental Conservation. Further complicating the geotechnical situation, any structure built within the existing ashfill lining system could not damage the liner and would have to provide a link between the liner and the final cover system.

With these concerns in mind, Ken Cargill, the project engineer, realized that the only practical solution was to construct a wall at the toe of the existing ashfill, allowing it to be vertically expanded by the height of the wall in the lower areas of the fill. The vertical expansion could be carried up the slope of the ashfill until the maximum height limitation was reached. After examining the various options and performing thorough stability analyses, he chose a reinforced segmental retaining wall system for four reasons:

- The less restrictive foundation requirement
- The simple construction techniques
- The structural flexibility of the wall system
- The ability to function as a component of the final cover system

The structural integrity of the wall after differential settlement was also a consideration. The wall was expected to settle differentially and there was concern about the resulting connection strength – particularly if the wall incorporated a frictional connection. Simply put, frictional systems have been known to lose their connection integrity under such circumstances with catastrophic results. Appearance was also an issue since the edge of the ashfill extends to within fifty feet of a well-traveled public road. The segmental facing unit would actually result in an improved appearance when compared to the existing ashfill.

Expanding Capacity

The wall would be constructed in two segments. The lower segment would be a maximum of twenty-five feet high, with geogrid reinforcement extending into the backfill. The upper section would be a maximum of twenty feet high and set back fifteen feet from the lower wall. It would be similarly reinforced, and would be constructed for easy integration into the final cover system for the expanded ashfill.

"We looked at many different wall systems. The Mesa System offered the most complete package. The unit and the reinforcement were designed to work together."

Matt O'Neill
Project Engineer
Galvin Brothers Incorporated
The design increased the capacity of the ashfill from 650,000 to 1,040,000 cubic yards. The cost of the wall was estimated at $2.3 million. However, the value of the newly created ashfill would be approximately $23.4 million, based on current tipping fees. As these fees are likely to increase, the market value of the new volume is likely to increase as well. In today’s terms, the benefit-to-cost ratio is 10.2.

Choosing the Right System

Galvin Brothers Incorporated was chosen to build the wall system. They, too, had to make choices about the project. After examining the various segmental retaining wall systems available, they chose to use the Mesa® System from Tensar Earth Technologies, Inc. The Mesa System provided the most cost-effective solution and met the stringent requirements of the engineering specification. Because the Mesa System provides a true, high-strength mechanical connection between the wall face and the reinforcement, it was one of the few systems available that easily exceeded the connection strength requirement. Not only was the Mesa System simple to install, the Tensar® structural geogrid removed any concerns about deterioration of the reinforcement from alkaline, acidic, or saline conditions.

The Right Solution

As a result of careful design and construction, the Town of Babylon has extended the life of the ashfill for three years. The result has been a more attractive, structurally stable solution with an outstanding cost-benefit ratio. The Mesa System was the right choice for the job.

"The support provided by both Tensar Earth Technologies, Inc. and Northeast Mesa was great. They provided answers to the owners concerns, even when the questions weren't directly related to the wall itself."

Matt O’Neill
Project Engineer
Galvin Brothers Incorporated