

Case Study

application	Geogrid Reinforcement for MSE Wall
location	San Antonio, TX
product	Miragrid® 3XT, 5XT & 8XT Geogrids

job owner	Patrinely Group, LLC
engineer	Rich Jenkins, P.E.
contractor	Kribley Construction

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

Tesoro Corporation has called San Antonio, TX home since 1968. Busting at the seams in their current facility, Tesoro decided to relocate their corporate headquarters to the intersection of U.S. Highway 281 and Redland Road, just north of Loop 1604 at Ridgewood Park. This is owned by Patrinely Group, LLC, and is being constructed on 122 acres of land and will include 618,000 square feet of leased office space slated to be completed in the summer of 2009.

San Antonio's topography consists of rolling hills and occasional steep cliffs with exposed limestone rock. The Ridgewood Park location is no exception. Significant elevation changes are prominent throughout the site. Reportedly, approximately 300,000 cubic yards of mass grading was necessary for the building locations and two engineered bridges are planned to access the site.

The developer needed access to the site from the south and decided on an access road coming off of Sonterra Boulevard. The challenge with this location for an access road is that there is about 75 feet elevation differential from the top of the street down to the existing grades on the property. There is a limited amount of space in this specific area, so a constructed steepened slope was out of the question and a retaining wall was necessary on the east side of the access road. More specifically, a Keystone engineered wall system utilizing Miragrid® geogrid was decidedly the most economical and architecturally attractive alternative.

THE DESIGN

The engineers for the project worked with the owner to decide what type of MSE wall would meet their goal of constructing an aesthetically pleasing structure capable of supporting loading conditions of the planned access road. Inevitably, the Keystone engineered wall system was chosen not only because of the wall's visual aesthetics, but also because the height-to-depth ratio delivers a structurally sound, engineered wall system with superior construction stability, durability, and strength.

Geogrids are a key reinforcing component in the Keystone engineered wall system. Miragrid® 3XT, 5XT, and 8XT geogrids were designed into this system because of their high long term and creep reduced design strengths, as well as the compatibility of the connection characteristics of the Miragrid® products to the Keystone wall blocks. Use of high tensile strength Miragrid® geogrids in the Keystone engineered wall system enhances the wall design by creating a stable soil mass behind the wall. By utilizing the

Miragrid® products in the wall system and obtaining the internal stability needed, the soil exerts less pressure on the back of the wall blocks, greatly minimizing bulging and other stability problems.



Compaction of aggregate on Miragrid® geogrid.



Construction of Keystone wall with Tesoro Corporation in the background.

THE CONSTRUCTION

The terrain of the site provided unique challenges for the construction of the engineered wall system and the access road. Due to such extreme elevation changes, the Keystone engineered wall system was designed and constructed into a three tiered system with the tallest part of the wall at a height of 43 feet. The construction of the foundation of the wall system included compacting a TXDOT type aggregate to a level grade.

The contractor installed Miragrid® 3XT, 5XT, and 8XT at designed elevations to reinforce the soil structure. Due to Miragrid® XT geogrids' flexible construction, the contractor was able to maneuver and connect the geogrid between the individual Keystone blocks more easily than with stiffer reinforcement grids. Also, the Miragrid® XT geogrids' high tensile strength properties aided compaction of the backfill material, allowing the contractor to achieve specified density requirements more easily.

THE PERFORMANCE

The outcome of the project was a success. The contractor finished the Keystone engineered wall system on time. The entire system achieved the developer's goal of creating an aesthetically pleasing system, which provided a solution to constructing a critical access road into the property. Everyone involved with the design, construction and final result of the wall was completely satisfied.



Installed Miragrid® XT Geogrid with Keystone Block.



Keystone wall looking south to Sonterro Boulevard.

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