



Case Study

application	Residential MSE / CMU Retaining Walls
location	Dacula, Georgia
product	Miragrid® 2XT

job owner	Bruce A. Lacina, P.E.
engineer	Bruce A. Lacina, P.E.
contractor	Site Creations, Inc.

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

The partially wooded backyard of a home in a suburban Atlanta community was steeply sloped and was difficult for the resident's children and pets to use for recreation. In addition, the native silty sand soils combined with the sloping yard made it extremely difficult to keep vegetation established and resulted in large areas of erosion. The challenge was to create useable areas of the yard for the residents, establish sustainable vegetation to stop soil loss and to keep the partially wooded areas of the yard intact. All these things had to be accomplished on a strict budget and within the guidelines of the communities Home Owner's Association (HOA).

THE DESIGN

Several design options were considered for the residential backyard including: reinforced steepened slopes (RSS); vegetated, basket-faced, mechanically stabilized earth (MSE) walls; landscape timber faced MSE walls; and

concrete masonry unit (CMU) MSE walls. Even though a vegetated steep slope or wall face would be very aesthetically pleasing, they would have been very difficult for a homeowner to maintain and those options were discounted early-on in the design process. The landscape timber wall face would also have been an aesthetically pleasant alternative, but organic (wood) construction products are known to deteriorate over time, so that wall facing option was also eliminated from consideration. The final choice was to use CMU MSE retaining walls to re-grade the sloping backyard into more usable areas.

The homeowner is a Civil Engineer familiar with landscape and RSS / MSE wall design and construction and undertook the project designs himself. The retaining walls were located to maximize the possible useable areas in the yard while keeping the landscaped wooded areas intact. In addition, retaining wall heights had to be limited to three and a half foot (3.5 ft) exposed height to minimize the possible fall height for children or pets playing in the yard. The CMU wall facing as well as the concrete patio pavers were chosen based on outstanding product reputation and aesthetics and had to be approved by the community's HOA. The final

designs called for the installation of approximately two hundred square yards (200 yd²) of Miragrid® 2XT geogrid reinforcement, one thousand face square feet (1,000 ft²) of Belgard® Celtik Wall retaining walls and one thousand square feet (1,000 ft²) of Belgard® Dublin Cobble concrete pavers.

THE CONSTRUCTION

Several contractors were interviewed for construction of the project and all were recommended by Vinny Camiolo of Georgia Masonry Supply, Inc., the local Belgard® and Miragrid® geogrid distributor. Each of the contractors was familiar with the installation of the Celtik wall blocks and Dublin Cobble concrete pavers. The contractor chosen for the project, David Roman of Site Creations, Inc., was well qualified for construction of the project based on previous experience and a portfolio of similar projects completed in the area. Access to the backyard was limited by an existing fence and entry gate facing the adjacent cul-de-sac. Construction materials used for the retaining walls and patio were staged either in areas of the backyard not being re-graded or in the adjacent cul-de-sac.



Initial backyard conditions: Lower retaining wall area.



Initial backyard conditions: Upper retaining wall area.

Construction began in the uppermost, northeast corner of the yard with a three foot (3 ft) tall cut wall. Once construction of the upper wall was completed, construction began on the southeastern, lower tiered retaining walls. The infill soil of tiered three and a half foot (3.5 ft) retaining walls was reinforced Miragrid® 2XT geogrid for stability of both the upper and lower walls due to their close relative proximity (4 ft). When construction of the lower walls was complete, the three foot (3 ft) tall southwestern wall was constructed.

Final grading of the site was performed as each wall was completed due to the limited site access created by the close proximity of the perimeter fence. In addition, construction of the paver patio was completed after the last retaining wall was built. A paver walkway was also created through the largest wooded landscape area of the

yard, creating an aesthetic access way from the upper backyard, to the lower retaining wall steps.

THE PERFORMANCE

TenCate Geosynthetics Miragrid® 2XT geogrid provided the needed soil reinforcement for the lower tiered retaining walls, allowing the tiered walls to be constructed closely together, minimizing site disturbance and the footprint of the walls. The retaining walls for the newly re-graded backyard have created more usable area for the residents, reduced the erosion potential of the native silty sand soil and permitted new vegetation to be established further reducing soil erodability.



Lower retaining wall construction: Miragrid® 2XT and nonwoven filtration and drainage geotextile.



Lower retaining wall construction: Alternate perspective.



Final backyard: Lower tiered retaining walls; middle retaining wall, above-right.



Final backyard: Concrete paver walkway through treed, landscape area.

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