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REPORT

Allan Block Segmental Retaining Wall with

Fortrac® Geogrids

In 1999, an NCAA Track and Field / Football facility was constructed on the campus of Johnson C. Smith University, located in Charlotte, NC. The project included an 87,000 square foot (8000 m^2) NCAA synthetic track surface, NCAA regulation football field, 4,000-seat grandstand, press box and classroom facility. The retaining walls for this athletic facility were designed for Mecklenburg County and Johnson C. Smith University by Barrier Engineering. The General Contractor charged with facility construction was Crowder Construction Company.

The fill retaining wall on the south side of the property was constructed to support the track and football field. This fill area was built over existing saturated alluvium mixed with loosely dumped boulder and debris. The poor condition of existing soil coupled with the existence of wetlands around a creek created a need for a large retaining wall. The land north of the proposed facility contained an existing road that must remain. The limited space from the existing road resulted in the proposal and construction of a large three tiered cut retaining wall. Contrasting the south wall, the tiered retaining wall system was constructed on soil providing adequate bearing capacity. A third wall, which supports a pedestrian bridge that provides access to the grandstands, was constructed on the east side of the property.

The total length of the wall was approximately 1800 feet (549 m), ranging in height from 2 to 20 feet (0.6 m - 6.0 m) and accounting for approximately 25,000 square feet (2320 m^2) of wall face. Soil behind the retaining walls was reinforced with roughly 8,600 square yards (7190 m^2) of **Fortrac® 80/30-20** and 11,000 square yards (9200 m^2) of **Fortrac® 35/20-20** geogrids by Huesker, Inc. Geogrid reinforcement embedment lengths ranged from 6.5 to 20 feet (2.0 m - 6.0 m).

Design

Geotechnical evaluation of the site soils were used along with proposed wall heights and surcharge loadings to determine the extent of reinforcement required to construct the Allan Block faced segmental retaining walls. In addition, water table and one hundred-year flood elevations were considered during the design process. Using these parameters, the walls were analyzed for external, internal and global stability. The analyses indicated that the soil behind the block face would require reinforcement lengths up to 20 feet (6.0 m) and design strengths reaching 2800 pounds per foot (41kN/m). Following examination of the results, the retaining wall system selected to meet these design conditions was the Allan Block facia with **Fortrac® 80/30-20** and **Fortrac® 35/20-20** geogrids.

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Construction

Construction of the south fill wall required that foundation soils be reinforced with a stone column capped mat that provided overall strength and stability. After the foundation soils were stabilized, wall construction began. The wall facia and reinforced soil were placed in two course lifts (appox. 1.33 feet = 0.4 m) and compacted to 95 percent of Standard Proctor Density. During the construction of the wall, Fortrac reinforcement was placed at the designed elevations.

Before constructing the cut tiered wall system at the north side of the project, sheet piles were driven to support the existing road. A shear cut was made to allow room for adequate reinforcement lengths. After the sheet piles were installed and the cuts were complete, the remaining walls were installed using standard segmental retaining wall construction techniques.

Conclusions

This project demonstrates the flexibility of an Allan Block/Fortrac geogrid reinforced retaining wall. Within this project, construction of an athletic field and access road was accomplished due to the geogrid reinforced segmental retaining wall. Once again, the Allan Block/Fortrac system proved cost effective and easy to construct.

HUESKER Synthetic GmbH
Fabrikstraße 13-15 • D-48712 Gescher
Phone: +49 (0)25 42 701-0 • Fax: +49 (0) 25 42 701-499
Internet: www.huesker.com • E-mail: info@huesker.de