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GHANA**  
GEOTECHNICAL SOLUTIONS

# Geogrid Reinforced MSE Retaining Wall with Gabion Facing

Case Study



- Application: Geogrid Reinforced MSE Wall with Gabion Facing
- Project title: Ghana National Petroleum Corporation (GNPC) operational headquarters
- Location: Takoradi-Ghana
- Client: GNPC
- Design-Bulid contractor: MESSRS. SIENNA SERVICES LTD
- Soil Reinforcement: Geogrid
- Installation Date: November 2020
- Wall Height: 7-12 m



## Challenge:

- The topography of the site is sloped westward steeply, with an elevation difference of 14m, of elevation of approximately 28m ASL to 14m ASL.
- The site is bounded by Pobee Binney Road in the west, and Ghana Senior High School on the east. Adjacently, to the north of the site lays Bethany Church and a land for future development.
- The site was used as a dump site. Therefore, due to the amount of plastic waste, there is a high risk of consolidation that can harm a rigid retaining wall
- Ghana's weather conditions characterized by heavy rains require a wall facing element through which water can easily drain

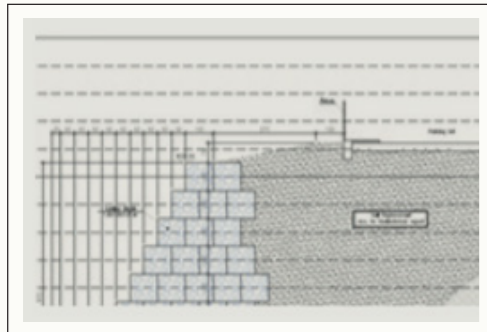
The initial design included two types of retaining walls:

- **Cantilever reinforced concrete wall**
- **Gravity wall from gabions**

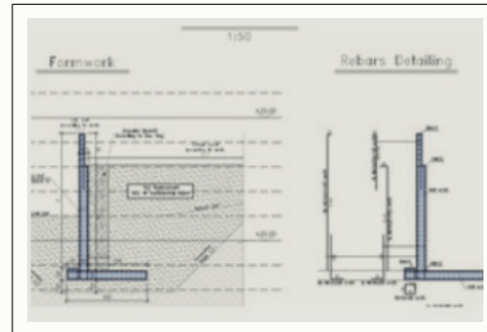
both of them were aborted due to soil conditions, elevation differences and slow installation process.

Initial design cross sections:

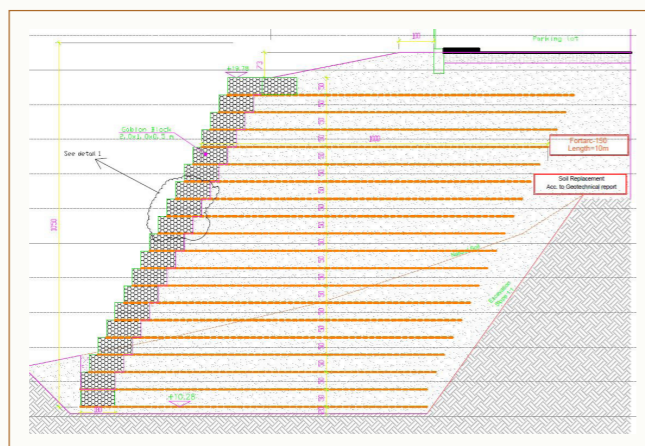
Gravity wall from gabions



Cantilever concrete wall



Admir cost-benefit solution:



## Solution:

### Soil reinforced wall with gabion facing

The wall contains the following materials:

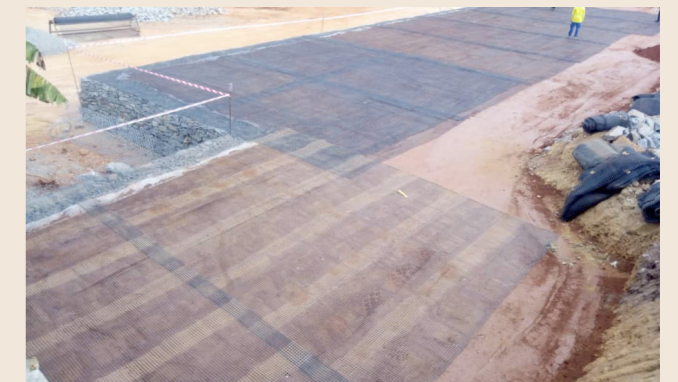
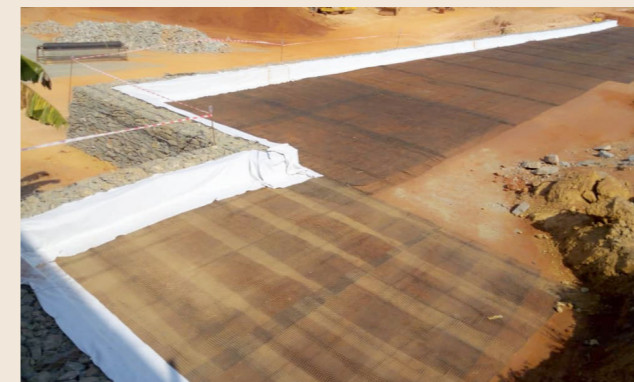
**Reinforcement** - Fortrac® Geogrids with different tensile strengths ranging from 110-150 Kn/m.

**Facing**- using the gabions as decorative element and good drainage solution. The designed slope shall be between 64 degrees to 90 degrees (as shown in the cross sections) due to the building and other considerations presented by the design team.

**Geotextile fabric** - prevents the fill material being washed out from the back of the gabion.

### Solutions advantages

- Easier care and implementation.
- Faster construction.
- Better engineering solution as the wall is designed receive differential displacements without reducing functionality and stability of the wall, as compared to the cantilever wall.
- High permeability (High drainage capacity) as a result of using gabion facing that reduces flow velocity and protects slopes from erosion.







## Construction steps:

1. Excavation and ground preparation



3. Filling the gabions with rocks



2. Placing gabions and laying geogrids



4. First layer of 25 cm thick backfill material







5. Compaction



7. compaction - and back to step 1.



6. Second layer of 25 cm thick backfill material



Final result







## Contact Us:

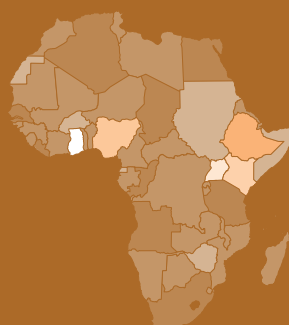
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