

DONNYBROOK POLICE STATION
SOUTH AFRICA, KZN, DONNYBROOK

GEOTECHNICAL ENGINEERING/ MECHANICALLY STABILISED EARTH WALLS
Product: MacForce® , Paraweb® & MacDrain®

Problem

Donnybrook is a settlement in the Sisonke District Municipality, about 110km South-West of Pietermaritzburg. Proposed repair, renovation, and construction of additional service buildings and accommodation units were designed by our client for the Donnybrook Police Station.

The site fell moderately steep from a reservoir tower upslope, and the main road in Donnybrook downslope. Before the upgrade the site comprised of numerous judicial buildings, generator rooms, accommodation units and a sewerage system within the enclosed fenced plot of land.

Solution

The MacForce® system was used, which generally consists of granular structural backfilling, reinforced with horizontal layers of high strength polymeric reinforcing strips known as Paraweb®. A drainage composite called Macdrain® was installed behind the Paraweb® straps to free the structural fill from water.

The Mechanically Stabilised Earth Walls (MSEW) are typically used in multilevel interchange construction projects. The client, due to the aesthetic finish, opted to use the MacForce® wall in a building project.

The design comprised of a 93m long MacForce® wall with a maximum height of 11m as given by the client. The MacForce® wall was constructed in a cut situation, with a slope of 1:2 behind the structure with varying heights, supporting a driveway pavement. The panels were supplied by Cobro Concrete, utilising Maccaferri moulds, and the connection type used were steel loops and toggles to keep the structural fill free of water.

A total of 184 panels were supplied including rectangular, T-shaped and cruciform shaped panels. Due to the amount of corners required within the wall length, it became necessary to include special shaped panels to accommodate joints. The wall layout can be seen in figure 1 below.

The appointed contractor had no experience in constructing a MSEW before, and with specialised assistance from Maccaferri, they were able to produce a suitable wall.



Figure 1 - Aerial View Before Construction



Figure 2 - Excavation in progress

Client name:

NATIONAL PUBLIC WORKS/ SAPS

Main contractor name:

RAMBROS CONSTRUCTION CC

Consultant:

PREBEN NAIDOO & ASSOCIATES

Product used:

MACFORCE® PARAWEB® & MACDRAIN®

Construction info:

Construction date: APRIL 2013

Completion date: FEB 2014

Benefits

The low cost of the elements and the simple efficient means of erection realise significant cost savings when compared with traditional forms of retaining walls.

The speed of construction is much faster with reinforced concrete structure.

Only three main components are required. These are panels, polymeric reinforcing strips, and soil. Construction may be carried out with largely unskilled (not entirely) labour and light plant.

The distinctive pre-formed facing unit can be cast with a variety of attractive patterns, and in a number of colours to blend in with the surroundings.

The flexible nature of a polymeric reinforced structure ensures that structures can be constructed successfully on soils with low bearing capacity on which conventional rigid structures would require expensive foundations or ground treatment.

A major advantage of using polymeric reinforcements is that the danger of corrosion, which is of paramount importance in structures, is eliminated.



Placing of MacForce® Panels



Paraweb® Reinforcement Layer



MSEW During Construction

<p>Maccaferri SA (Pty) Ltd t/a Maccaferri Africa Head Office Durban</p> <p>Branches: Cape Town East London Johannesburg Madagascar Tongaat (Factory)</p>	<p>P O Box 815 New Germany 3620</p> <p>National Tel: 087 742 2710 International Tel: + 27 (0) 31 705 0500 Fax No: 087 742 2734 www.maccaferri.co.za</p>	<p>Engineering a Better Solution</p>
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