

KWAGGAFONTEIN
MPUMALANGA PROVINCE, SOUTH AFRICA

GEOTECHNICAL ENGINEERING, REINFORCED SOIL WALLS, PARTIAL HEIGHT CONCRETE PANELS (MACFORCE)

Product: MacForce, ParaWeb™, MacTex N

Problem

A coalfield needed to be developed from an existing one-dragline operation to a two-seam operation which will also eventually be upgraded to a four-dragline operation. One of the main features of the new extension is a ROM tip area requiring a 25m high double side tipper tip wall.

Solution

A MacForce wall was chosen for this project because of a few reasons which included that, the awarded contractor was very familiar with the system, having built two other similar structures in the past. Secondly is that panel fabrication would be easy because of the use of concrete on many other adjacent developments on the same site, saving time and money on the transportation of panels from a remote casting yard. Thirdly is that a completely vertical system was required because of the proximity of the hopper to the wall. The client also preferred a concrete finish rather than a rock finish as in the case of the Terramesh™ System .

The MacForce system is a mechanically stabilised earth wall system that combines modular concrete panels for the external face of the wall, together with high strength polymeric strips known as ParaWeb™ for soil reinforcing. ParaWeb™ strips of a designed tensile strength and length extend into the soil mass in a horizontal direction at set vertical intervals, thereby stabilising the soil. The ParaWeb™ is connected to the panels by a steel connector system. The connectors are cast into the panel and the soil reinforcement is then continuously looped around the connectors into the soil as construction progresses.

Main Design Features

The wall is founded on a rock layer which dips in the direction away from the wall. In situ conditions were favourable for such a structure. More than one source of material was used for structural fill, so materials varied in physical and shear strength properties. The friction angle recorded from the soil tests was between 32 and 36 degrees, which is acceptable for these structures. One problem with one of the materials was the large particles larger than 200mm. This was overcome by a screening procedure conducted at the stockpile.

Client name:

RBD CONSTRUCTION, OPTIMUM COLLIERY

Main contractor name:

RBD CONSTRUCTION

Consultant:

DECO CONSULTING ENGINEERS, OPTIMUM COLLIERY

Product used:

MACFORCE, PARAWEB™, MACTEX N

Construction info:

Construction date:	FEBRUARY 2011
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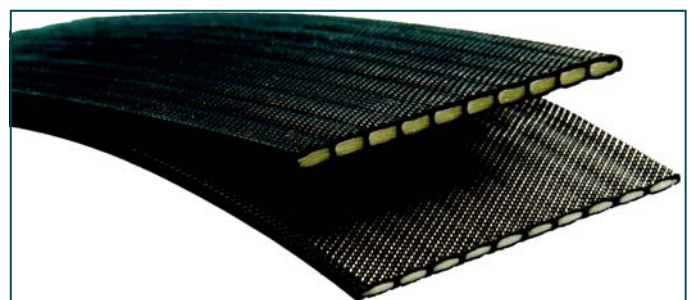
Completion date:	NOVEMBER 2011
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Backfilling and compaction in MacForce construction



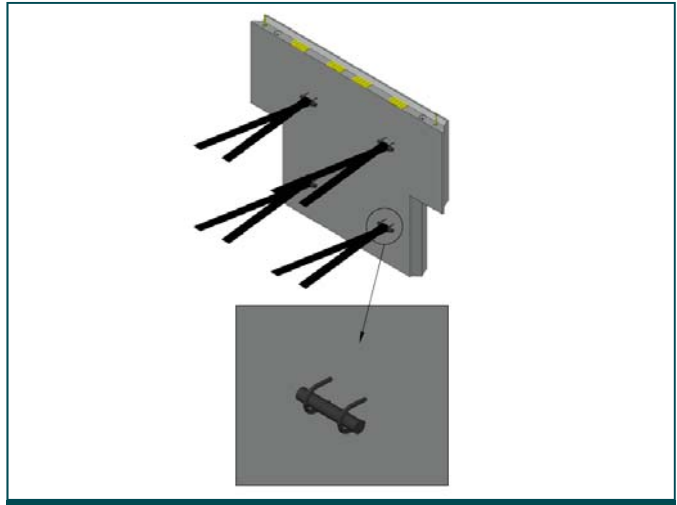
Completed 25m high structure before start of mine operations



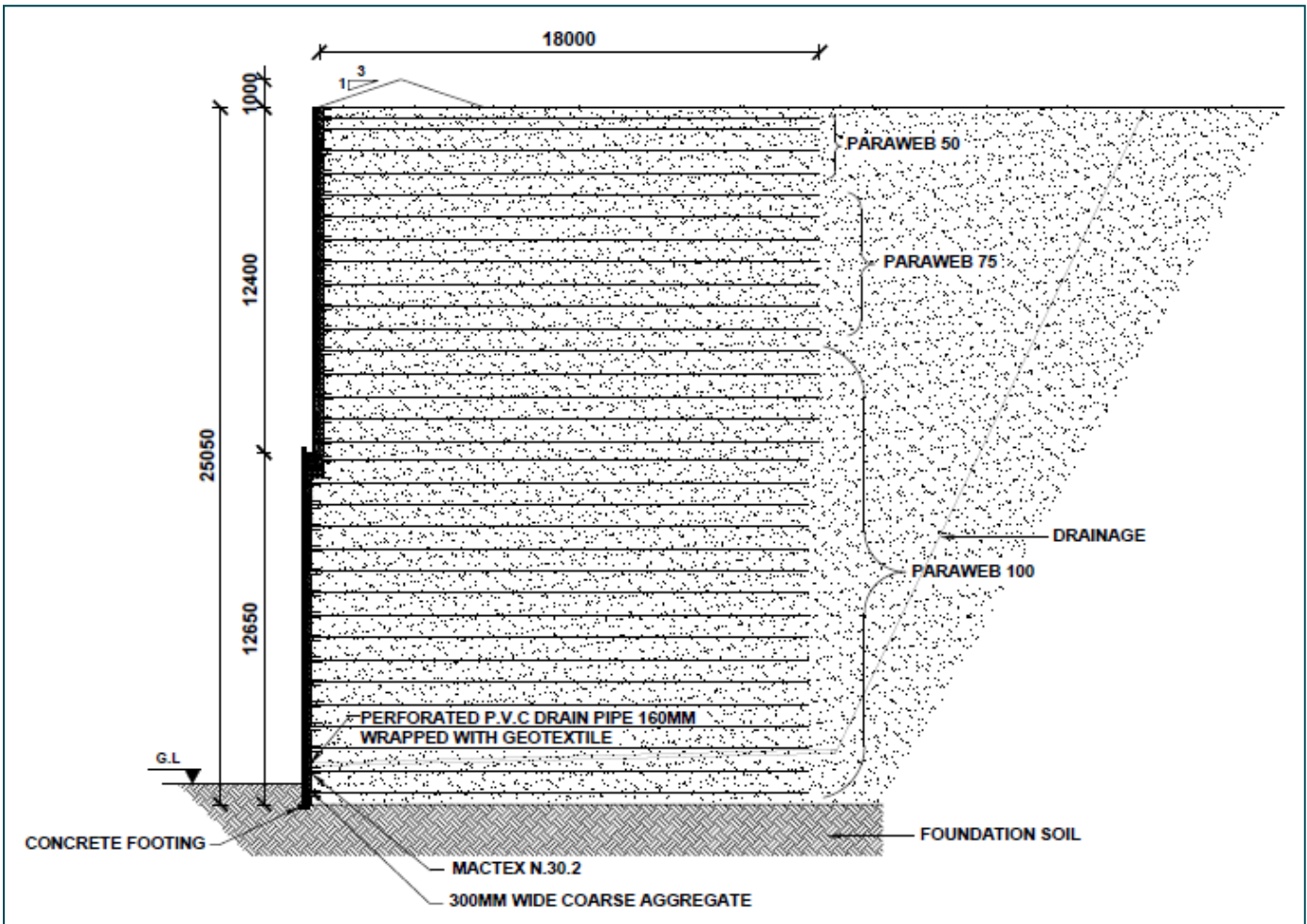
ParaWeb™ high strength soil reinforcing strips



Completed 25m high structure during mine operations



Loop and toggle galvanised steel connector system



Cross-sectional drawing of the built structure

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