Anchor Vertica® Project Profile

Railway Embankment Stabilisation

Hainault, Essex

Vertica®

LOCATION:

Hainault, Essex, England

MAIN CONTRACTOR:

Cementation Foundations Skanska Ltd.

PRODUCTS USED:

Anchor Vertica®, Paragrid

DESIGNER

Mott MacDonald Ltd.

CONSTRUCTION DATE:

September 2004

THE CHALLENGE

The London Underground Central Line at Hainault was opened in 1948, although the line dates back to 1903, when the 'Fairlop Loop' was part of the Great Eastern Railway.

At Hainault the Central Line runs above-ground on an embankment. The embankment crest was to be widened to provide access alongside the tracks. In order to maintain the embankment slopes at a stable 2:1 angle, the toe of the slope would have to move outward. The operator of the Central Line, Metronet BCV Ltd, wanted to explore alternatives to avoid having to purchase the additional land at the foot of the slope.

THE SOLUTION

Cementation Foundations Skanska Ltd and their geotechnical design partner, Mott Macdonald Ltd, approached Maccaferri Ltd for assistance to identify a possible solution.

The proximity to residential areas and the confined working area restricting access to heavy lifting plant, were key considerations. Furthermore, the solution had to be installed whilst the track above remained operational.

Ultimately, the reinforced soil segmental block retaining wall, Anchor Vertica® was selected. Manufactured by Acheson & Glover Ltd of Co. Tyrone, and distributed by Maccaferri Ltd, Vertica® consists of pre-cast concrete block facing units in combination with polymeric geogrid soil reinforcement. The geogrids are sandwiched between courses of the concrete facing blocks and extend horizontally towards the slope to be retained. Structural backfill is then compacted upon the geogrids. This reinforced soil block acts to retain the embankment slope and railway line above it.

Anchor Vertica® units have an attractive split-face finish, and are available in numerous colours.

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Compaction immediately behind the structure is carried out with vibrating plates only, to limit movement of the block fascia

Placing backfill onto the Paragrid™ geogrids. The grids are sandwiched between the Vertica™ blocks.

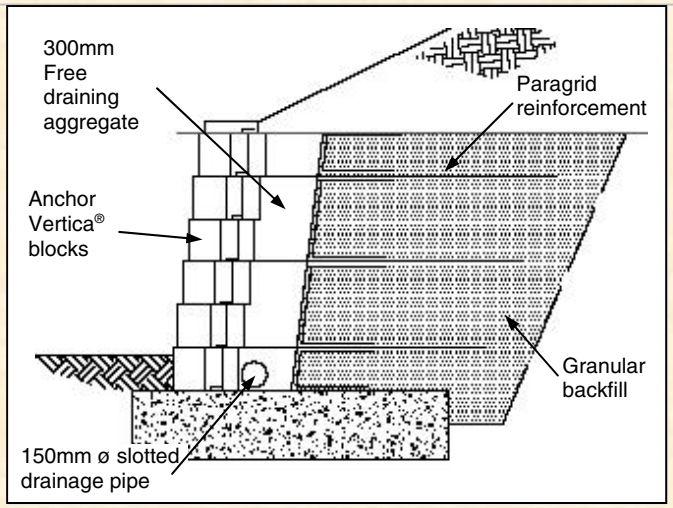
In order to construct the segmental retaining wall, the railway embankment was locally steepened to 45° to provide space for the construction and a horizontal work-area was constructed into the embankment slope.

The 2:1 slope was 5m high and required a 1400 mm high Vertica™ wall to support it. Four layers of Paragrid™ 30/15 geogrid were used as the soil reinforcement elements. This geogrid, manufactured by Linear Composites consists of a polyester core, with a tough polyethylene protective sheathing and has an ultimate tensile strength of 30kN/m.

Consistent position of the Vertica™ blocks is achieved by the lug and cams cast into the block surface.

Once a layer of Paragrid™ was installed between courses of the Vertica concrete blocks, an imported granular backfill was placed on the geogrid 'tail'. This was then compacted with suitable plant. To limit movement of the facing blocks, compaction immediately behind the face of the wall was carried out using vibrating plate compactors.

The 200m long structure provided a rapid to install, robust and aesthetically pleasing engineered solution to the satisfaction of the project team.



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