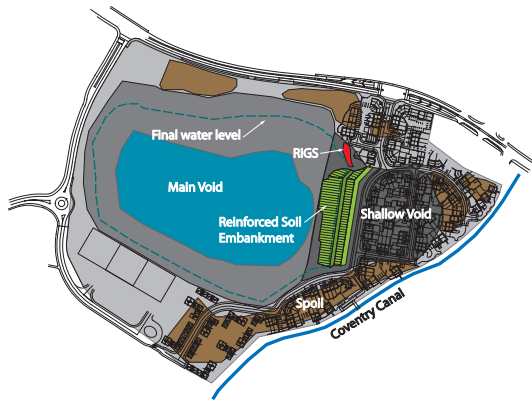
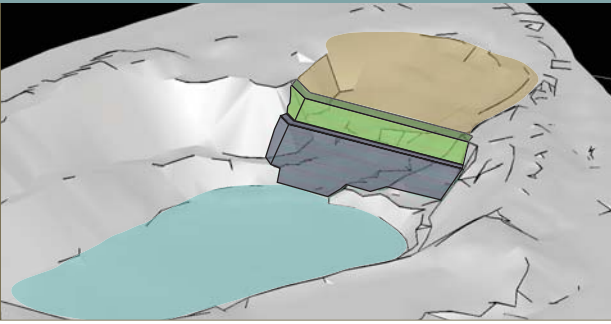


# 35m HIGH REINFORCED SOIL EMBANKMENT SUPPORTS MIDLAND QUARRY REDEVELOPMENT

PAUL THURLWELL Eurlng BSc CEng MICE  
P&S Consulting Engineers Ltd (PaSCoE)



A former sandstone and diorite quarry on a 16hectare site, to be redeveloped for residential housing.

Comprising a partially flooded Main Void and a smaller Shallow Void, both surrounded by spoil heaps.

Shallow Void in-filled to provide a development platform; Main Void left as open body of water.

35m high reinforced soil embankment was constructed along the boundary between the Voids, using site available fill materials and recycled foundry sand.

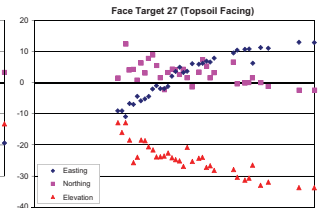
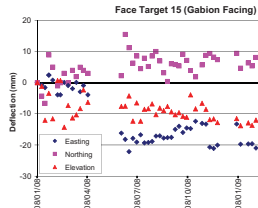
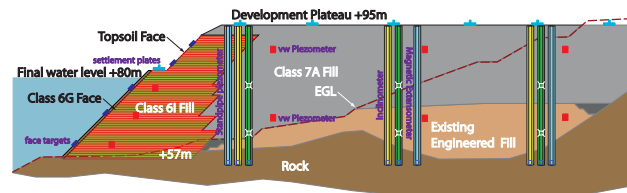
Designed in accordance with BS8006 using high strength low strain polymer geosynthetics placed in horizontal layers to stabilise the embankment and provide a serviceable structure.

Value engineering of the tie-in with the existing quarry walls resulted in considerable cost and time savings and preserved a regionally important geological feature within the quarry.

The Main Void water is now rising to its natural level, some 25m above the base of the reinforced soil embankment, which may cause additional inundation settlement.

Continuing monitoring of the structure is in place, through the installation of geotechnical instrumentation including magnetic extensometers, inclinometers, surface settlement markers, and piezometers.

- 24,000m<sup>3</sup> Imported Foundry Sand
- 52,000m<sup>3</sup> Site won and processed Class 6I Granular Fill
- 6,000m<sup>3</sup> Site won and processed Class 6G Gabion Stone
- 230,000m<sup>3</sup> Site won and lime treated Class 7A Cohesive Fill
- 30,000m<sup>3</sup> Imported Class 7A Cohesive Fill
- 170,000m<sup>2</sup> Fortrac Geogrids



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"A project of immense scale and ambition, with due credit to its 'waste not want not' attitude"

ice | west midlands

Geotechnical Award 2009  
Construction Award 2009



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**2009 JUBILEE SYMPOSIUM ON POLYMER GEOGRID REINFORCEMENT**  
Tuesday 8th September 2009  
One Great George Street, London