

CASE STUDY

A14 Improvement Scheme - Amey (for Highways England) / Central Alliance

Bespoke ground investigations using specialist slope climbing rigs mark a significant step forwards in the quality of information that can now be provided to designers.

December 2016



Project Background

The £1.5 billion A14 improvement scheme includes the widening of the A1 over approx 3½ miles, from 2 lane dual carriageway to 3 lane dual carriageway. Between Brampton and Brampton Hut a new road will be also constructed to the west of the existing A1. The scheme involves the remediation of two embankment slopes adjacent to the northbound and southbound carriageways of the A1 as it passes over the A14 at Brampton.

Project Scope

The scheme incorporates the use of Electrokinetic Geosynthetics (EKG) over two embankment slopes. The purpose of this intervention is to prevent potential future failure of the embankment slopes that have shown signs of instability. Remediation of the slopes is proposed to start later in 2017 using the Electrokinetic method combining shear strength improvement, slope reinforcement and drainage. Bespoke ground investigation work using Central Alliance slope climbing rigs was required to ensure undisturbed samples could be obtained from the same orientation and locations as the proposed Electrokinetic stabilisation methods.

Project Deliverables

Central Alliance completed bespoke ground investigation work including inclined CPTu holes, undisturbed direct push and dynamic sampling, inspection pits and trial anode installations on the junction slip road embankments which were suffering from stability problems.



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GEO CONSTRUCTION



Project Benefits

Specialist rigs overcome challenging access scenarios - Central Alliance has developed a range of drilling rigs that can access restricted sites and provide the high quality geotechnical data required by design engineers. We have used our experience of current drilling technology and projects on 'difficult access locations' to design rigs that are true 'geotechnical investigation' rigs. Our clients have been impressed by our ability to access difficult areas, quality of data capture and high quality instrument installation capabilities that require no scaffolding and no possessions.

Vast improvement in data capture and modelling capability - The slope climbing rig with CPT Mast used on this project has full body and mast rotation enabling us to carry out ground investigation holes in the same orientation and locations as the proposed remedial works reducing the risk of encountering unforeseen ground conditions during construction. The ability to measure in-situ pore water pressure on slopes, often critical in slope stability analysis, marks a significant step forwards in the quality of the investigative information that can now be provided to designers, with data emailed directly from the drilling rig.

Reduced health and safety risks - by minimising on site personnel and heavy plant during construction works. Lane closures and traffic management was also eliminated on this project.

Reduced congestion and environmental impact - for the construction phase, the Electrokinetic method of stabilising slopes eliminates the requirement for complete vegetation and tree clearance, topsoil removal and extensive soil excavation. In addition, the smaller construction plant required for the works (the same slope climbing rigs used for the GI) allow for easy access and preservation of trees, topsoil and habitat. Overall, the project will benefit from a significant reduction in construction costs compared to conventional methods of slope stabilisation, in addition to a reduction in fuel consumption and embedded energy during construction.

"With the challenges of acquiring data on difficult to access slopes that pose a safety risk, gathering the right geotechnical data becomes invaluable, particularly for complex slope stabilisation works. Central Alliance provided a very professional, reliable and bespoke ground investigation programme and deployed their slope climbing rigs quickly to site, enabling us to progress confidently with our works. We have been very impressed with the quality of the data gathered".

Tim Wright, Principal Engineering Manager, Amey.

