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CASE STUDY

Walney on-shore sub-station
DONG Energy

Main Contractor	Amey Power Systems
Client	DONG Energy
Building Type	On-Shore Sub-Station
Procurement Route	Negotiated tender
Contract Award	October 2015
Contract Completion	Anticipated completion summer 2016
Anticipated Duration	300 days
Key Milestones	Practical completion of access platform to receive delivery of 2 x 300T transformer. Works completed by January 2016 on programme. Practical completion of Secant Piled Retaining wall to form cable pit. Works complete by May 2016 on programme.
Works Complete	Deep Soil Mixed Column installation, Mass Soil Mixing and Secant Piled Retaining Wall, associated earthworks
Quantities	• 2,000 soil-mixed columns with 1.2m diameter at average depth of 10m • 20,000m^3 mass soil mixing • 110 CFA Piles 10.5m deep, to form Secant Piled Retaining wall. • £250k worth of pre cast concrete structures. (subcontracted) • Excavation and disposal of excavated materials on site 18,000m^3.

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PROJECT DESCRIPTION

We were appointed to provide our expertise in what is one of the largest ground improvement projects in the UK. The Walney on-shore sub-station is a major scheme to build the world's largest on-shore sub-station that will have a footprint of 28,900m2 and will link to 207 off-shore wind turbines that, when running at its maximum capacity, will generate enough energy to power 460,000 homes in the UK.

Our vast experience in deep soil mixing was sought to install Turbojet Deep Soil Mixed columns (DSM) for ground improvement purposes. We have also installed a mass mixed slab platform across the whole site, and we have constructed a cable pit by installing a Secant wall.

We are the first ground improvement specialist to invest in Turbojet Deep Soil Mixing technology in the UK, and we are one of just a handful of companies who can offer this specialist solution in Europe. Turbojet DSM is a highly-efficient deep soil mixing system that combines mechanical mixing and jet grouting which was developed by Soilmec in Italy.

As a key part of the Walney on-shore sub-station project, Turbojet DSM has been used to increase the soil bearing capacity, control settlement and reduce soil permeability.

Turbojet DSM has allowed us to maximise our capabilities and extend our expertise to construct over 2,000 soil-mixed columns, which combined with our solid track record in deep soil mixing, has provided the Walney on-shore sub-station project with a comprehensive solution for the significant ground improvement works that it required for this part of the development.

As the project developed, the requirement for a retaining structure for cables entering the sub-station became apparent. We worked with the client and their engineers to suggest several solutions and completed a number of value engineering exercises including presentations to DONG Energy.

Ultimately a CFA Secant Piled Wall proved the most efficient solution, and we undertook this project along with the appointment of further sub-contractors to complete the installation. Pre-cast concrete structures ensured continuity and comfort for the client and their programme.

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QUALITY REQUIREMENTS

GDL has a Quality Management System accredited by BSI to ISO9001:2008. This, along with a project specific quality plan, has been utilised to ensure that our works comply with the required specifications for this project.

Our quality plan sets out testing procedures and recording procedures which are agreed with the main contractor and client. Our records are submitted periodically for review, and on conclusion of the project we will compile a completion report for the project which will include all testing undertaken and all 'as-built' drawings.

Secant piled retaining wall

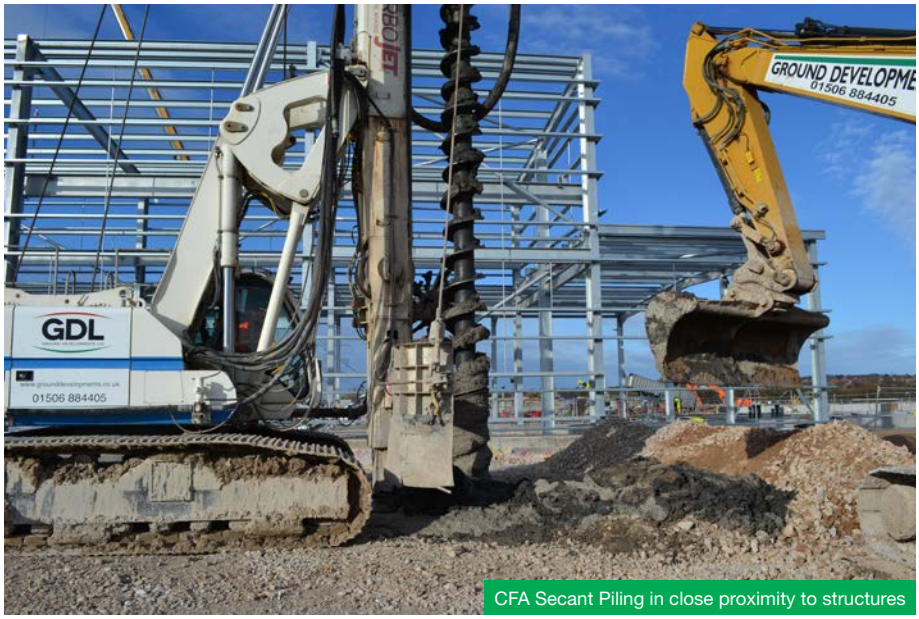
KEY CHALLENGES

We were approached by Amey Utilities when another specialist sub-contractor failed to meet the programme and specification of the works. By working closely with the main contractor and the client, we were able to mobilise quickly and agree the critical path of works that had to be completed to enable the early delivery of vital components of the sub-station including 300T transformer units.

During the initial period of the project when we were assisting the main contractor, the project continued to progress significantly however there were still ground improvement works to be undertaken in some areas.

Our planning and management and close liaison with the main contractor, as well as the client, ensured that we were able to deliver an effective and efficient programme of works around structures and other contractors' works.

When the unforeseen need arose we were able to offer a complete design and building solution for the underground cable pit structure, including a secant piled retaining wall. Delivered using our experienced personal and piling equipment. The sequence of the works required us to pile alongside a building whilst under construction with less than 900mm clearance.



CFA Secant Piling in close proximity to structures