

CASE STUDY

East Anglia ONE offshore wind farm landfall approach and cable crossings, UK



Project scope

Scottish Power Renewables commissioned Structural Soils, an RSK company, to undertake a site investigation for a landfall approach and major horizontal directional drilling (HDD) crossings for the onshore cable route for the East Anglia ONE offshore wind farm project planned for Suffolk.

A challenge of scale and time

Structural Soils acted as principal contractor and had to establish three separate marine spreads to run concurrently and individually tailor each one to the particular physical and environmental constraints of each drilling location: an export cable shore approach and HDD at the landfall; an HDD crossing of the Deben Estuary; and an HDD crossing of Martlesham Creek. As well as the main fieldwork, the project included marine and land geophysics surveys to profile the ground between the exploratory locations and to alleviate the risk of unexploded ordnance at the marine sites.

Various environmental licensing requirements and tidal challenges caused schedule compression and meant the project had to be delivered in about half the planned time. Structural Soils called on its extensive resources to meet the requirements and ensure project delivery on time and on budget.

Geophysical work

The work commenced with geophysical surveys: bathymetry, side-scan sonar, magnetometer and sub-bottom profiling data collection over water. The magnetometer results were post-processed to provide unexploded ordnance cleared locations for the drilling works. Land-based seismic surveys profiled the ground at the riverbanks and at the landfall site.



Geotechnical work

Nearshore

The nearshore open-water work was a combination of continuous cone penetration tests to 20 m below mudline and 6-m vibrocores in water depths between 12 and about 0 m lowest astronomical tide. For this, a dynamically positioned multicat workboat was used with seabed sampling and testing frames. Onshore work at the landfall site comprising cone penetration tests to 20 m below ground level and cable percussion boreholes to 20 m below ground level complemented this nearshore work.

HDD crossing 1: Deben Estuary

The work on the HDD crossing 1 riverbed was from a traditional jackup unit and comprised continuous cone penetration tests (up to 30 m below mudline) and composite geotechnical boreholes (combining sampling or rotary coring and cone penetration tests) to 30 m below mudline. Where chalk was encountered, a minimum of 5-m penetration was required to a minimum penetration depth of 25 m below mudline. Onshore investigations at the riverbanks, four continuous cone penetration tests to 20 m below ground level and four cable percussion boreholes to 20 m below ground level, complemented this work.

HDD crossing 2: Martlesham Creek

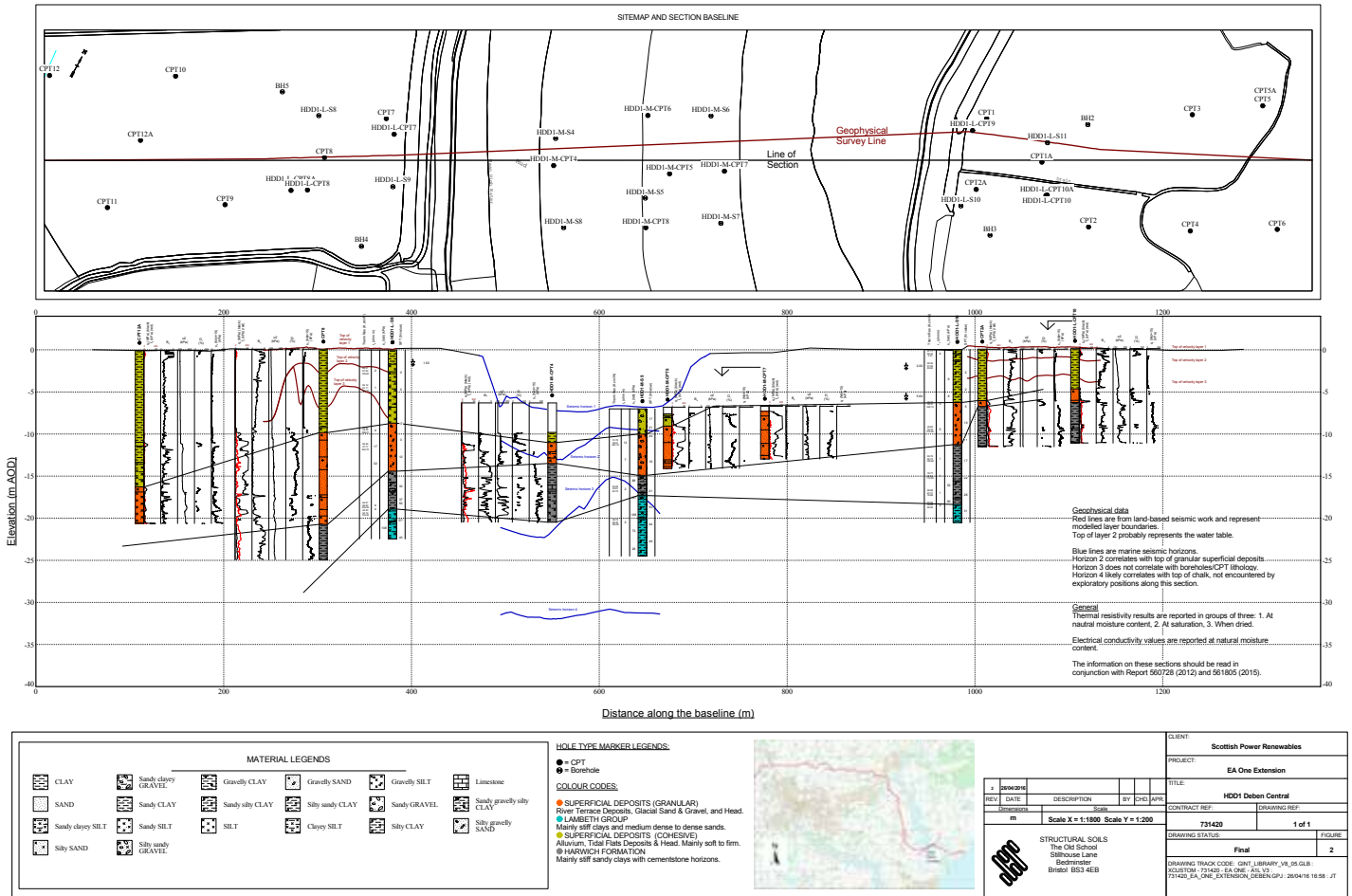
Martlesham Creek posed the greatest challenge to the work, as this tidal creek dries out to a narrow navigable channel that must not be blocked and is bounded by soft mudflats and environmentally protected salt marshes. A bespoke modular pontoon system with emergency access walkways was developed to ensure access while protecting the marshes from activities and equipment.

Again, the work was a combination of continuous cone penetration tests and cable percussion boreholes, both to 30 m below mudline, complemented by an onshore investigation at the riverbanks, four continuous cone penetration tests to 20 m below ground level and four cable percussion boreholes to 20 m below ground level. The tidal range at this site was carefully studied during the planning stage to provide suitable schedules for barge manoeuvres.

The outcome

On completion of the work, the ecologist's report concluded that **"all conditions for salt-marsh monitoring have been fulfilled. No damage to salt-marsh was recorded whatsoever. No further intervention appears to be desirable or necessary."**

Client Scottish Power Renewables commented that **"only a few companies would be able to undertake the full scope"**, which involved working around complex tides and currents in three different water depths for the nearshore marine work, estuary work and tidal mudflats. **"Structural Soils devised innovative, bespoke solutions that maximised the available working windows without compromising technical excellence, safety or the environment."**



For further information, please contact:

Structural Soils: The Old School, Stillhouse Lane, Bedminster, Bristol BS3 4EB, UK
 Tel: +44 (0)117 947 1000 · Contact: Jon Bassett · Email: jon.bassett@soils.co.uk

