

## CASE STUDY

# Detailed onshore ground investigation – New nuclear power station, Wylfa Newydd, UK



### Project background

Structural Soils Ltd worked in partnership with client Horizon Nuclear Power and supervising engineer Atkins to carry out the UK's largest ground investigation in 2014 on the site of a proposed nuclear power station at Wylfa Newydd, UK. The work included 282 vertical and 32 inclined, rotary cored boreholes up to 188 m deep, many started using cable percussion drilling techniques. In total, 17,000 m of drilling was completed, which produced 16,000 m of rock core and involved 18 drilling rigs on-site at the peak of activity.

### Client collaboration

Pragmatic and frank openness between all parties ensured a considered and careful approach to the work. This successful strategy continued and developed into a collaborative working relationship. As the project was under keen scrutiny from stakeholders at local through to national level, it was imperative to maintain this balance for the efficiency and safety of the project and the perceptions of stakeholders within the Anglesey community. This open, clear and honest communication led to an excellent working culture that gave the contract the modern approach it required to succeed.

### Health and safety

The site was run with a strong overarching health and safety philosophy. Early in the contract the site was stood down for a day's training in behavioural safety. This training was mandatory for all site staff, the client and the consulting engineers. It incorporated team-building exercises and encouraged personnel to remember health and safety issues. Good practices learned on previous contracts were reaffirmed and implemented, including encouraging personnel to report potential hazards, open communication and use of the company's STAR policy: stop, think, act, review.

A dedicated health and safety manager was responsible for inductions, liaising with the client's CDM coordinator, rolling out health and safety information, random tests for drugs and alcohol, investigating incidents and producing method statements and risk assessments.

All staff attended a daily morning briefing covering health and safety matters, the day's work schedule and other relevant information and site news. Representatives from Horizon, the consultants and the site security team also attended. Weekly toolbox talks were also held during the morning briefing to discuss pertinent subjects, including environmental, archaeological, ecological and health and safety issues.

### Data handling

The hundreds of exploratory holes created a significant amount of data, all of which was collected on time and to a very high standard. This was managed and compiled via bespoke batch processing using the industry-leading gINT Professional software suite.

The extensive scope of work also resulted in multiple data streams that required reporting, including exploratory hole logs, laboratory testing schedules, in situ physical testing, geophysical surveys, laboratory test results and monitoring results. A well planned and maintained integrated data management system utilising newly developed, bespoke software and stringent auditable progress-tracking processes achieved good data management.

Structural Soils implemented mobile data capture using Android Toughpad tablets tailored to meet Horizon's technical content and British Standards requirements that enabled the engineers to log boreholes and trial pits uniformly and to a high standard. Structural Soils' integration of this data capture technique with the gINT software meant that geological descriptions produced by the engineers could be imported directly into the database.

A secure, auditable file sharing collaboration tool for issuing exploratory logs, schedules, laboratory results and reports ensured controlled, transparent information transfer between Structural Soils and Horizon Nuclear Power.

Summary and detailed logs for all the exploratory hole positions were issued as part of an integrated, fully bookmarked PDF report, with internal links from the site maps. Automated reporting scripts were programmed to generate facets of the report, thereby saving days of administrative time and ensuring reporting deadlines were met.



## Community engagement

Structural Soils embraced sourcing local plant, labour and materials from the start. A working relationship with a local contractor developed during previous work at Wylfa was reaffirmed and staff from the local communities were employed. About one-third of the workforce was from Anglesey and elsewhere in North Wales.

Staff from further away were housed in local accommodation and shared vehicles during journeys to and from the site. This avoided long commutes and reduced expenditure, overall resource consumption and the work's carbon footprint. Structural Soils secured a long-term block accommodation booking for cottages, chalets and caravans less than 2 km from the site where up to 18 people stayed and supported local businesses.

During the site works, the Structural Soils site agent briefed the leaders of the Anglesey business community on the ground investigation work and the successful engagement of local businesses to work on the contract.

## Mitigating environmental impact

Throughout the project, Structural Soils had a geoenvironmental engineer on-site dedicated to the environmental issues encountered. This work involved liaising with the client and environmental stakeholders on the project. The client provided ecologists to oversee any potentially sensitive work, including any affecting sites of special scientific interest and Wylfa Head. During the project, Natural Resources Wales was kept fully informed.

The site is agricultural land, generally pasture divided by drystone walls, and includes many sensitive ecosystems, for example, sites of special scientific interest. Consequently, the investigation had to be undertaken extremely carefully to avoid environmental damage. To access the various exploratory hole locations, a network of gravel haul roads was used. Where exploratory holes were located away from these tracks, plastic matting protected temporary access routes, preserved the integrity of the ground surface and minimised silt runoff.

Each exploratory hole was surveyed by an ecologist, an environmental engineer and an archaeologist before Structural Soils carried out intrusive work. Where necessary, exploratory holes were moved or mitigation measures such as silt fences and hay bales were put in place for the proposed works. Rotary boreholes close to watercourses were given particular attention. Recirculation drilling techniques were used and no water was discharged to ground to avoid silting of adjacent watercourses. Drilling flush fluid was contained and transported to a secure holding tank for appropriate disposal after chemical testing and analysis.

## Industry recognition

At the 2015 Ground Engineering Awards, this investigation won Ground Investigation Project of the Year. Industry judges commented that they were very impressed by the project management and data handling for a contract of this size.



For further information, please contact:

Structural Soils: The Old School, Stillhouse Lane, Bedminster, Bristol BS3 4EB, UK  
Tel: +44 (0)117 947 1000 · Contact: Adrian Barby-Moule · Email: ask@soils.co.uk