CASE STUDY

Park Mains High School Extension

COMMERCIAL

CLIENT

Morrison Construction

TECHNIQUES

Driven Steel Tubular Piles

ACHIEVEMENTS

Accelerated programme due to efficienty installation of Driven Steel Tubular Piles.

Works completed within an active school environment with minimal disruption.

Project Brief

Roger Bullivant Limited (RBL) was approached to provide a piling solution for the Park Mains High School extension project, supporting the construction of new teaching and PE facilities to expand the school's capacity. Delivered by Morrison Construction, the development forms part of a wider investment in educational infrastructure, creating high-quality, modern learning environments and enhanced sports provision for the local community.

The extension is scheduled to open for the 2027 academic year. The new three storey teaching annex will include new classrooms and learning spaces, designed to increase teaching capacity located adjacent to the west wing of the existing building. The new PE annex will include additional indoor sports and physical education facilities, including 2 new sports halls, located adjacent to the east wing of the existing building.

RBL provided early technical input to assess the site's ground conditions, which was previously used as a recreational green space and the associated constraints of working within a live school environment. Following discussions with the client and scheme engineer, RBL proposed the use of Driven Steel Tubular Piles to address the site's high boulder content and shallow bedrock. This displacement solution utilised repurposed steel from the oil and gas industry, offering enhanced installation performance alongside measurable sustainability benefits, including a reduction of 2.163kg of CO^2 per tonne.

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Key Issues & Requirements

- The ground conditions on site comprised an upper covering of made ground overlying initially soft to firm, becoming stiff sandy clays. Localised bandings of granular material are recorded to overlay bedrock with varying degrees of density and high boulder content. The bedrock deposits are described as moderately weak to medium strong sandstones.
- To adhere to construction programme, logistics and sequencing had to be planned carefully, to ensure piling adjacent to the active school was done out of restricted hours, as well as ensuring these restricted area piles could be captured in the scope of the dynamic testing.

In order to ensure all stakeholders were satisfied with proposals, RBL verified the pile design by means of static and dynamic load test on working piles. Due to the bedrock depth, a kentledge test had to be used, which can be more challenging logistically. A lateral load test was also required to verify lateral capacity of the pile.

Solutions

- RBL worked closely with Morrison Construction to develop a sequence of works that addressed the complex logistical constraints of the site.
- To manage the restricted areas located in close proximity to the live school environment, the teaching annex was prioritised, as it contained the highest concentration of piles within the restricted zone. This approach enabled the full programme of dynamic testing to be completed efficiently within a single visit.
- A lateral load test was carried out to verify the lateral load capacity of the steel tubular piles at Morrison Construction's request. Kentledge blocks were used to provide the reaction system, with load applied via a hydraulic jack. The pile was subjected to a maximum lateral load of 25kN, with deflection monitored throughout the test to assess performance. In addition, six dynamic tests were completed on each block, ensuring that testing was evenly distributed and representative of site-wide conditions.
- Opting for a Driven Steel Tubular Pile, allowed RBL to pitch different lengths depending on the ground conditions which kept pile wastage to a minimum.

Piles were designed in accordance with British Standards with maximum design loads of 600kN compression and 25kN lateral. The design was validated by a static load test on a working pile during the main works. The pile test demonstrated compliance with the project specification.

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