

St Modwen Park, Burton

Ground Improvement scheme delivers value-added solution for logistics park

St Modwen Park, Burton is a new 64-acre commercial business park strategically located adjacent to the A38 at the entrance to Burton-upon-Trent. Helping to bolster the East Midlands' already strong position for logistics and distribution, the site has been in development since 2015 with staged phases rolled out over the past decade.

Aarsleff have been heavily involved with St Modwen Park, Burton throughout its development. We installed 1281 driven precast concrete piles in 2019 to found the third phase of development and 2612 driven precast concrete piles in 2023 for the first part of phase four.

Therefore, when we were approached by Winvic Construction to begin discussions on Units B79, B58 and B41 at St Modwen Park, Burton Phase 4 and 5, we were equipped with a wealth of experience in the area and a good understanding of the ground conditions.

Two solutions were proposed, a driven precast concrete pile solution similar to what we had installed previously, and a ground improvement package via the installation of rigid inclusions.

The latter proposed nominal 300mm diameter rigid inclusions installed on a designed grid layout to suit the ground bearing slab specification loadings, delivering ground improvement to meet the project performance specifications, as well as rigid inclusions for the structure pad foundations.

The two solutions were as follows:

	Column Number	Concrete Class	Concrete (m3)	Steel Reinforcement (t)
Driven Precast	2513	CEM1 C50/60 (35% PFA replacement)	957	85.56
Rigid Inclusions	3453	CIIIA+SR C12/15 (45% GGBS replacement)	1847	n/a

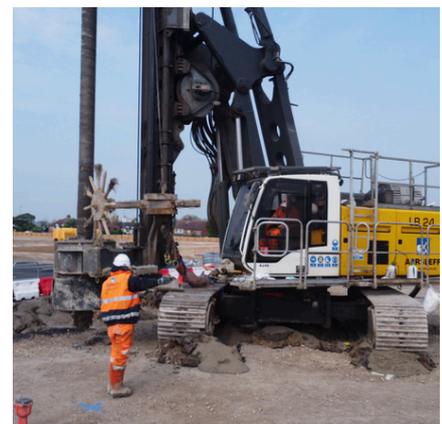


The rigid inclusion solution was chosen and 3453 were installed across the 3 units to depths of up to 8.5m through made ground and PFA fill material. One of the benefits of rigid inclusions is fast production. Over 100 can be installed per day with follow on works to trim and reinstate the load transfer platform below also occurring the same day.

The inclusions were installed using Liebherr piling rigs and a custom made displacement tool from Aarsleff's own plant and fabrication workshop.

The tooling was designed following testing of an off-the-shelf solution which kept blocking, stunting production. So, the plant team set out to design and manufacture a similar auger tool to our specification. They quickly realised when the hard facing goes on the tool, you're currently stopping production just to re-hard face the lead. When the bespoke tooling was designed, the bottom cutting part was made to be detachable so it doesn't stop production at all. All you have to do is remove the lead, put a new one on, and the welder can hard face the old one on site whilst they're still drilling.

Throughout installation, the inclusions were tested via plate loading to confirm the design requirements and ensure consistency with the model generated via Plaxis, coordinated by Aarsleff's in house design engineers. Close control was also maintained over the depth of PFA fill during site works feeding back into the design assumptions to ensure grid spacings were appropriate for the ground conditions encountered. Alongside this, concrete cube testing was undertaken to confirm concrete strength requirements were met in line with specification.



Data

3453 6.5-8.5m Rigid Inclusions

Client

Winvic

Type of contract

Design and build contract

Construction period

March - June 2024



Contact

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