

Piling in complex geology

During the construction of the Greenfields Link Interchange, an alternative piling solution proved optimal for the founding of the three bridge structures. Situated in Saldanha, the project was awarded by the Western Cape Provincial Government's Department of Roads and Public Works, with WBHO appointed as the main contractor. Franki Africa was appointed as the piling contractor.

At tender stage, the pile founding solution called for "predrilled, based temporary cased auger piles" for all three bridges. These piles were expected to be around 14 m in length from the underside of the pile cap.

The site geology consists of windblown sands for around 0.5 m to 1.0 m below natural ground level, followed by up to 3 m to 4 m of strongly cemented hardpan calcrete, then varying layers of loose, silty,

clayey sand and calcrete lenses, followed by a dense, greenish-grey-mottled orange and brown sand. A high water table is also present.

While the largest of the three bridge structures was clear of any obstructions, the other two had a water main in close proximity to the piles and pile cap, raising concerns over vibration during pile installations.

After discussion with the engineers and main contractor, Franki proposed that the two bridges with the existing water pipeline obstruction would be more suitable to CFA (continuous flight auger) piles, while the main bridge could be found on DCIS (driven

cast in situ) Franki piles founded at a dense layer, higher up in the soil profile. Franki's proposal was accepted following the installation of test piles.

The main feature of the Franki Pile is the enlarged base formed at the toe. In forming this base, the end-bearing area is increased significantly: the displacement achieved when expelling the plug and forming the enlarged base compacts and preloads the soil. Thus, the end-bearing of a Franki Pile in sands develops at much lower base deflections than that of a bored pile, and was the best founding approach for the Greenfields Link Interchange. **3S**

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The test pile results proved the alternative methodology was correct and working piles were installed