

90 Grayston

Gauteng, South Africa

Design and construct a lateral support system for the basement excavation works of an office block in Sandton, South Africa.



The project

The project required the design and construction of a lateral support system to the basement excavation works with 6 No. basement levels to a maximum depth of 18m below natural ground level. This site was underlain by Archean granites, typically found in the Sandton area of Johannesburg Granite Dome.

The challenge

Designing the lateral support system was difficult due to the close proximity of the neighbouring buildings situated 3.4m and 4.5m away on the western and eastern boundaries of the site respectively, both having basement parking not accessible for the use of “dead-man” anchors.

The design proposal was to install a series of soil nails in the upper section of the retained soil wedge, which acted more as a soil improvement system rather than a lateral restraining system, followed by strand anchors below.

A few challenges were encountered during the construction phase of the project. Water from leaking services and neighbouring properties irrigation systems called for the urgent redesign of anchor components. Longer and higher capacity anchors were provided for the Northern face as well as accelerator additives for the guniting mix.

A rock outcrop was encountered at the location of the final access ramp position. This called for restricted blasting operations in order to protect surrounding properties while still adhering to programme constraints.

The solution

Based on the available information, the most viable solution proposed was the Anchored Soldier Pile Lateral Support System. The solution consisted of 600mm diameter straight shaft auger piles installed at 2.5m spacing with a minimum 1.5m toe in level below final excavation level with active strand anchors and 125mm thick reinforced guniting arch spanning the piles.

On-site alternative solutions were applied where required, resulting in an acceptable project completion date.

Project facts

Owner(s)

Redefine Properties

Keller business unit(s)

Keller South Africa

Main contractor(s)

Redefine Properties

Engineer(s)

Sutherland Engineers

Solutions

Excavation support

Markets

Commercial

Techniques

Anchors
Shotcrete / Guniting
Contiguous pile walls
Bored piles

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