

Urban excavation

Diaphragm wall - Barrettes - Ground anchors

OXYGENE TOWER

LYON - FRANCE



Foundations in an urban environment for a high-rise building



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Artist's impression of the project

The 115m high Tour Oxygène building backs on to the Part Dieu shopping centre in the heart of the business quarter of Lyon. A second building, the Cours Oxygène, links the Tour Oxygène with the shopping centre and forming an extension to it. The site also includes four levels of underground parking. Solétanche Bachy was appointed as the specialist foundations subcontractor

The site is located in an extremely densely populated

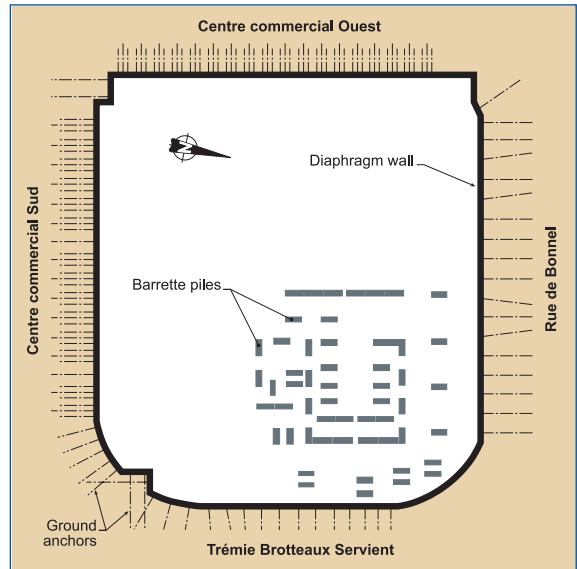
CLIENT:	SOGELYM STEINER/EUROPEQUIPEMENT
ARCHITECT:	ARTE CHARPENTIER
EXTERNAL CHECKER:	SOCOTEC
STRUCTURAL ENGINEER:	KHEPHREN INGENIERIE
MAIN CONTRACTORS:	GFC CONSTRUCTION (MAIN CONTRACTOR) BOUYGUES BATIMENT IDF
SPECIAL FOUNDATIONS:	SOLETANCHE BACHY
PERIOD OF THE WORKS:	MAY 2007 TO FEBRUARY 2008

MAIN QUANTITIES:

- 7,500 m² of diaphragm walls
- 4,500 m² of barrettes
- 191 temporary anchors block measuring an average of 17.50 m



Hydraulic grabs KS2



Plan view of the site with the diaphragm wall, barrettes and anchors

area where access is difficult: the site is close to bus, tramway and trolley-bus routes; access is by the Bonnel open cut with a height limit of 4.10m. A single access served for both site ingress and egress.

In addition, working space was limited since there was little available area outside the confines of the 5000m² site. Furthermore, the site is located in the immediate vicinity of sensitive shared boundaries: the La Part Dieu shopping centre on the South and West (at a distance of 30cm), the Brotteaux Servient open

cut to the East (at a distance of 20cm) and the Bonnel open cut to the North. Below ground, the metro B line is only a few tens of metres away.

Preliminary works such as a campaign of percussive investigation, grouting, the demolition of a technical gallery and overhanging foundation had to be carried out. The diaphragm wall and barrette works were then carried out with two KS2 hydraulic grabs.

The diaphragm wall

Outside the area of the tower the wall was constructed to a depth of 27m. In this area the reinforcement was discontinued at a depth of 21m with the remaining 6m being required for the hydraulic cut off. In the tower area, the reinforcement was continued to the bottom of the wall (27 or 30m). The cut-off level of the diaphragm wall was -2.10m for the area outside the tower and -3.25m for the tower zone. The water table is -1m below working platform level.

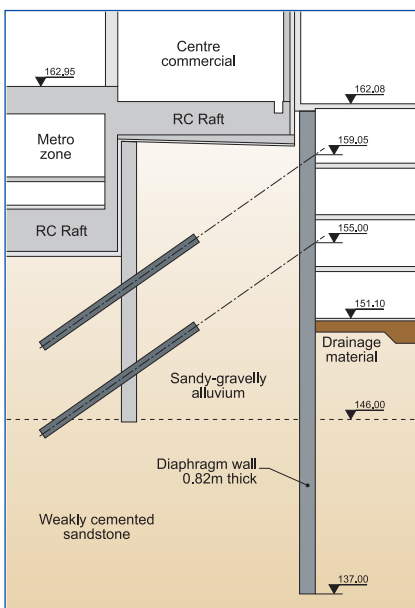
The barrettes

The barrettes were installed under a certain number of constraints: a very congested layout, low cut-off (-15m), different lengths (2.8m to 10m) and

thicknesses (820mm and 1020mm). In addition, the working platform was close to the water table.,

Ground Anchors

In general, the diaphragm walls were stabilised by 2 levels of temporary ground anchors though the curved section was designed as an arch and salient corners were stabilised by oblique struts. The ground anchors were installed through blow out preventers.



Cross section of the South facade



Installation of the reinforcement cages