HIGH-RISE BUILDING QUARTER "MOSCOW CITY", PLOT 17-18

Client: Renaissance Construction AG
Development Period: 4/2013 to 5/2014

THE PROJECT

At the western edge of the Moscow centre district, a new urban area is currently emerging with numerous prominent skyscrapers along the banks of the *Moskwa River*. In the course of this urban expansion, an office tower and a residential tower with heights of 280 m each are built on "Plot 17-18", an area of 2.4 ha. The towers arise from a five-storey base building which covers a great part of the plot area. Below terrain, four underground levels are planned. The building pit therefore holds a depth of up to 20 m. The floor space amounts to 350,000 m², the parking area covers 115,000 m².
The column loads transferred into the underground are 75 MN to 90 MN.

OUR FUNCTION

BGG Consult has been commissioned by the project developer and the general contractor with the evaluation of the geotechnical fundamentals and the earth statical analysis as well as with the optimization of the concepts for the foundation and for the building pit support system. For this, the geotechnical and hydrogeological expert's reports of the Russian designers had to be assessed, and numerous results of underground investigations and laboratory tests had to be reviewed and analysed. Due to discrepancies between the in-situ tests and the laboratory results, an additional series of explorations and in-situ tests were carried out and evaluated.

Optimization of Foundation and Building Pit Support System:
The underground at the construction site consists - below a few metres of artificial deposits - of sequences of well-bearable lime and marl. Ground water exists in four storeys, each within karstified lime layers. The marl layers form relative aquicludes. The ground water level is situated only a few metres below the surface.
The foundation concept has been optimized by BGG Consult from a pile foundation to a combined pile-slab foundation. With regard to the building pit support system (diaphragm wall), the number of anchor horizons could be reduced from five to three. In this context, the calculations were carried out by the method of finite elements, since analytical programs proved to be inappropriate for the given underground situation. The sealing of the structure was done, according to our suggestion, by the principle of a waterproof concrete tub, thus without damageable and cost-intensive sealing membranes.

Computer graphic of the project