PROGRESS: 100% - COMPLETED
SWITZERLAND/ZÜRICHER SEEFELD/2015-17

EXCLUSIVE RESIDENTIAL COMPLEX

Dufourstrasse housing development

Text: Andreas Gruber

PORR SUISSE AG constructed a collection of eight apartment buildings in Zurich's Seefeld within the space of 22 months.

The new constructions replaced a perimeter block from 1911. 83 rental apartments, commercial spaces and an underground garage were built. All the buildings are certified according to the Swiss Minergie standard for low-energy construction.

Project data

Employer	Zürich Lebensversicherungs-Gesellschaft AG
Contractor	PORR SUISSE AG
Order type	Totalunternehmer
Project type	Building construction, Residential building, Retail
Project scope	Full service general contracting works for the demolition of the existing perimeter block development and construction of a new residential complex, including refurbishment and expansion of the existing underground car park
Construction start	10/2015
Construction end	07/2017

General

The Seefeld district in Zurich, the largest city in Switzerland, lies on the right bank of Lake Zurich. This new residential complex lies in the centre of the exclusive neighbourhood with its picturesque lakeside esplanade. The property, located between the Dufourstrasse, Florastrasse and Färberstrasse in Zurich's Seefeld district, is owned by the Zürich Lebensversicherungs-Gesellschaft (Zurich Life Insurance Company). The more than 100-year-old building was beginning to show a lack of functionality in terms of floor-plan layout, building physics and structural engineering. The tender waiver form stipulated two planning variations - for the renovation of the existing building and for a complete replacement. The decision in favour of a new construction was heavily influenced by the poor condition of the old building and the target long investment period of Zürich Versicherung. PORR SUISSE AG was the full service general contractor responsible for the project. Contracted works included the demolition of the existing building as well as the planning and new construction of the residential complex and refurbishment and expansion of the existing underground car park.

WE HAVE PRESENTED TWO PLANNING OPTIONS: REFURBISHMENT OF THE EXISTING BUILDING AS WELL AS REPLACEMENT CONSTRUCTION.

Andreas Gruber
Project manager PORR SUISSE AG

New project in the classic style

The new perimeter block development replaced one constructed in 1911, and therefore still needed to blend in with the prevailing building style of the district. Just as the urban development style of the Wilhelminian period had to be preserved, so too did the spacious inner courtyard. Even the internal layout of the just 12m-deep building structure was based on Wilhelminian archetypes. All apartments in the eight buildings have a direct connection to the inner courtyard via windows and balconies. The ground floor consists of commercial spaces, which make use of the direct access to the public life of the street.

Execution details

The construction site is located in the area of a non-load-bearing lake deposit, which presented certain challenges for foundation works. In addition, the shallow foundations of the old building had caused significant settlement damage to the area. These factors contributed strongly to the client's decision in favour of a new construction.

A bird's-eye view of the construction site. Image: PORR AG

Clean demolition works

The high quality standards required for this project were particularly appreciable during the demolition works, where particular attention was paid to construction site emissions. Noise emission, dust and pollution of the surrounding streets by heavy vehicle traffic had to be strictly limited. Accordingly, demolition works were carried out behind dust-protection curtains and the inevitable dust was settled by water-misting. All heavy vehicles used passed through a wheel-wash system.

Difficult foundation works

The tract of land contained an ice-age glacial lake deposit at a depth of 17m, which had good load-bearing capabilities and was not greatly prone to settlement. The foundations of the new construction were established on this soil layer by means of 225 extruded drilled piles with diameters of up to 65cm. Extensive groundwater reduction measures could not be implemented, owing to the risk of endangering the timber piles of the neighbouring buildings. For this reason, a thick sheet piling box was driven down to the load-bearing layer.

The building base is situated at around 2.6m below the level of the lake water, depending on the adjacent water level. These considerations led to construction of the basement floors as a load-bearing white tank system.

Foundation works to a depth of 17m: because of the construction site's location in the area of non-load-bearing lake deposits, the client decided against comprehensive refurbishment and in favour of a complete replacement of the building. Image: PORR AG

Structural works and refurbishment

Construction comprised 83 rental apartments in the upper sections with apartment areas between 75 and 110m², eight commercial units in the ground floor and an underground parking garage with spaces for 72 private vehicles. To ensure buoyancy safety during structural works in the basement floor, the pile foundation of the building construction was also assessed for tensile strength. In the event of a hundred-year lake high water event, flood waters would be diverted into the excavation pit and the basement floors to protect the property from flood damage. The flood openings were integrated into the closed sheet piling box. Along with the difficult foundation situation and construction within the area of the waters of Lake Zurich, the inner courtyard of the perimeter block construction also boasted an underground garage dating back to the 1980s, which was in need of preservation and expansion. The settlement-sensitive soil layers in the area made it necessary, at the front end of construction activities, for any damage to surrounding buildings to be thoroughly documented and for this to be monitored in real time throughout the entire process of demolition, sheeting and deep foundation works. The building plinth was completely executed with thermally insulated glass fibre-reinforced concrete elements with a corrugated three-dimensional outer surface in relief.

In the upper storeys, construction was carried out in a mixture of conventional load-bearing outer wall constructions in brick, and reinforced concrete for the earthquake-resistant shear walls.

The windows in the compact facade of the upper floors were composed in vertical groups with fibre-reinforced concrete window frames. This contrast with the horizontal layout of the plinth added to the central architectural aspects of the construction scheme. All the windows were fitted with

external sun-protection louvres to protect the living areas from overheating in the summer. The top storey is an attic floor and includes spacious terrace areas outside each apartment. The rooftops were constructed as flat spaces with internal drainage.

PORR employed a mixture of traditional load-bearing outer wall construction techniques for the upper floors. Image: PORR AG

Technical data

45.000m³
Building volume

Certification	Minergie
Plot area	5.500m²
Gross surface area	14.000m²
Bored piles	225
Heating	Seewasserwärmepumpe
Cooling	Freecooling

Certified new construction

The new construction has been certified according to Swiss Minergie standards for low-energy construction. Thermal insulation is a key requirement of the Minergie standards. Care had to be taken during planning and execution that energy reference surfaces were enclosed by a thermal-bridge-free continually insulated shell into which windows, roof and floor insulation were completely and consistently integrated. These measures were expanded by a controlled air-conditioning system which reduces heat loss through ventilation. A hydroextractor makes use of the waters of Lake Zurich as an energy source for heat production, and this service is provided by energy contractor EWZ. The lake water system enables the residential spaces to be cooled in summer by "freecooling" via the under-floor heating system.

The project was completed in compliance with Swiss Minergie standards and therefore boasts higher energy efficiency than that mandated by law. Image: PORR AG

Summary

With this new construction, PORR has made an important contribution to preserving the high quality of life in the city of Zurich. Despite the challenges presented by the limited space on the inner-city site, construction site conditions and groundwater levels, this challenging construction scheme was completed by PORR within the tight deadline prescribed.

This was the second project in Zurich that the company has completed to the full satisfaction of client Zürich Lebensversicherungs-Gesellschaft.

The orientation of the building allows a partial view of the lake from the upper floors. Image: PORR AG