EUROPEAN CENTRAL BANK

EUROSYSTEM

BUILDING DESCRIPTION OF THE NEW ECB PREMISES

The purpose of this document is to provide an overview of the New ECB Premises project in Frankfurt am Main in the context of the tendering procedure for the construction works. It describes both the scope and basic parameters of the project in accordance with the design specified in the building application, on the basis of which a building permit was granted on 6 May 2008.

(Last updated: February 2009)

The New ECB Premises (on the site of the former Grossmarkthalle) with Frankfurt's financial district in the background; view from the east.

REMARKS:

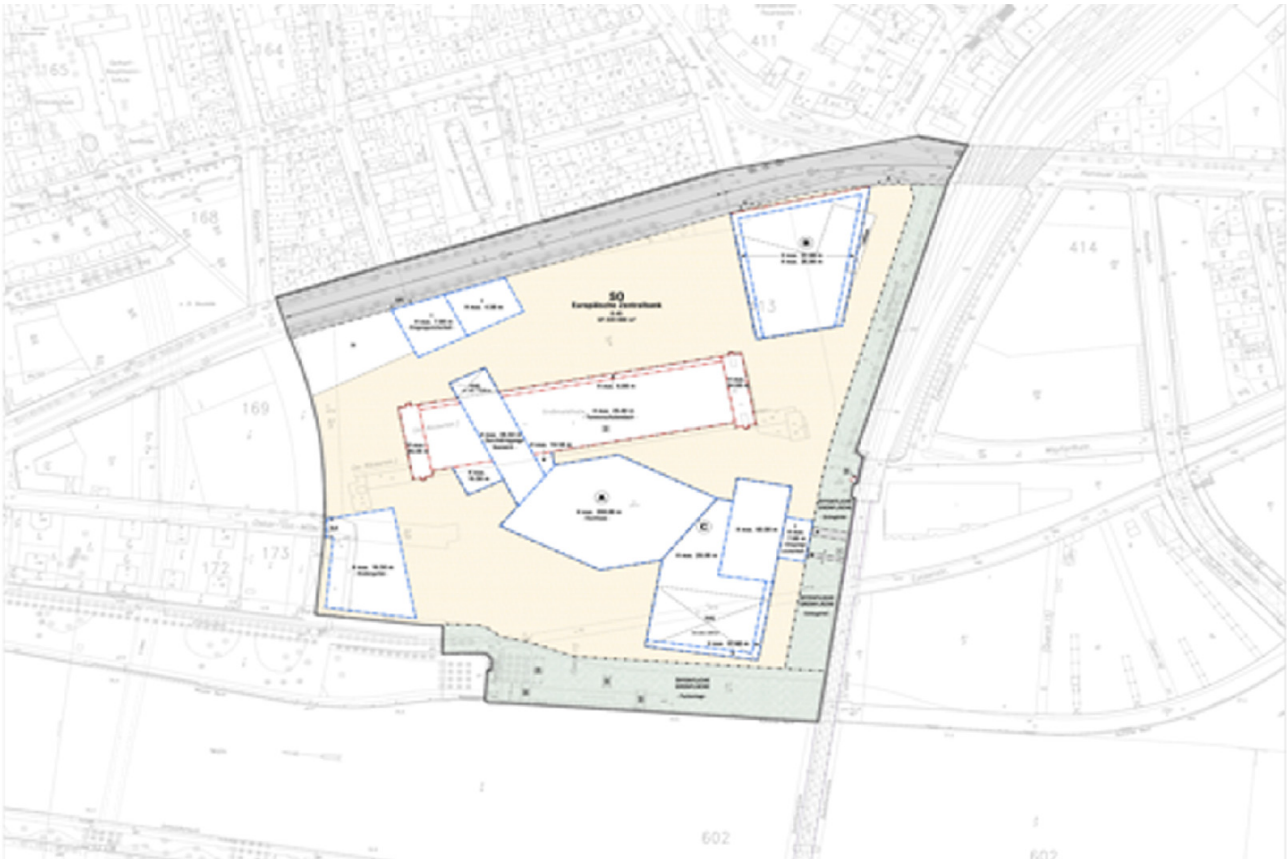
Please note that the images used in this document, particularly the computer-generated views and perspectives, are only examples to illustrate the textual description.

Table of contents

Site

The new premises of the European Central Bank (ECB) will be built on the site of the former Grossmarkthalle (wholesale market hall) in Frankfurt's Ostend. This stretch of land forms an important link between the city and the river. The highly heterogeneous area of the city surrounding the site has been undergoing development since the 1990s, while the building stock and land-use classification in the immediate vicinity are being reorganised: the previously industrial part of the banks of the River Main to the west of the Grossmarkthalle site is gradually evolving into an attractive residential area with green spaces, whereas the Osthafen docks on the other side of the railway tracks are still in use and will remain so.

The site is irregularly shaped, indeed almost trapezoidal, and is bordered by Sonnemannstrasse to the north, a railway embankment to the east, the River Main *(*and Mainuferpark*)* to the south and Rückertstrasse and an adjacent residential area to the west. The total area of the Holzmannstrasse 3-7/Rückertstrasse 2-6 site is approximately 120,000 m^2.



Development plan No 830 of the City of Frankfurt am Main

Urban Development plan

The Urban Development plan No 830, "Southern Sonnemannstrasse – European Central Bank", came into effect with its publication in the Official Gazette of the City of Frankfurt on 13 November 2007, thus confirming that the planning rights for the project had been granted.

Building permit

On 6 May 2008, Petra Roth, Lord Mayor of the City of Frankfurt am Main, handed over the building permit to Jean-Claude Trichet, President of the ECB.

Development measures in the vicinity of the site

As part of the "Ostend Refurbishment" project, the City of Frankfurt started infrastructure improvements in 2008. These works should be completed by 2011.

They will affect the streets around the Grossmarkthalle site, in particular Oskar-von-Miller-Strasse, the southern end of Rückertstrasse and several sections of Sonnemannstrasse. Eyssenstrasse to the south and Ferdinand-Happ-Strasse to the north of Hanauer Landstrasse will also be extended and altered. Finally, the *Honsellbrück*e, the road bridge close to the site, will be widened and modified.

Holzmannstrasse to the east of the Grossmarkthalle site is to become an extension of Frankfurt's green belt, while the Ruhrorter Werft is to be turned into a landscaped recreational area in order to extend the Mainuferpark. A permanent café location will be constructed and the cranes, which are protected by a preservation order, will be restored. A viewing platform will be built on one of them.

Jewish memorial

In 2009, in close cooperation with Frankfurt's Jewish community and the ECB, the City of Frankfurt intends to launch a competition for the design and erection of a memorial to the Jewish citizens who, in the course of their deportation, passed through the Grossmarkthalle site. Building elements associated with the deportation, such as sections of railway track, will, as appropriate, be preserved and/or restored to their original condition on the ECB premises. A basement room in the east wing of the former market hall will be maintained in its original condition. The precise location of the memorial and associated information centre will be decided on the basis of the competition results; one of the options under consideration is public land in the area of the Mainuferpark and/or along the railway line.

Topography

The partially paved site is mainly level with only a gentle slope towards the River Main – within the boundaries of the site, the height of the land varies by approximately two metres.

Subsoil

Various subsoil tests were carried out before and during the planning phase. The results of these tests were taken into account in the planning application. In particular, the following tests should be mentioned:

- Subsoil tests
- Tests for the presence of munitions (in the main areas)
- Environmental tests
- Hydrological tests, groundwater monitoring

Existing structures

The following are already on the site:

- Grossmarkthalle (hall and wing buildings)
- Mock-up (built during the planning phase)

Preliminary site works

The following structures have been demolished or removed in advance of the main construction phase:

- annexe buildings to the east and west of the Grossmarkthalle
- ramp along the southern longitudinal facade of the Grossmarkthalle
- railway tracks

During the demolition of the annexe buildings, material from the original brick facade was saved for future building or repair works.

The excavation of the pit for the high-rise and underground car park including the sheet piling (secant bored pile wall) and the pile foundations for the high-rise were carried out by a separate contractor (Arge Tiefbau Ed. Züblin AG/Züblin Spezialtiefbau GmbH und Weimer KG) during the early phase of the project. A second contractor (Blasius Schuster GmbH) was commissioned to remove and dispose of the excavated soil. This work will continue during the main construction phase.

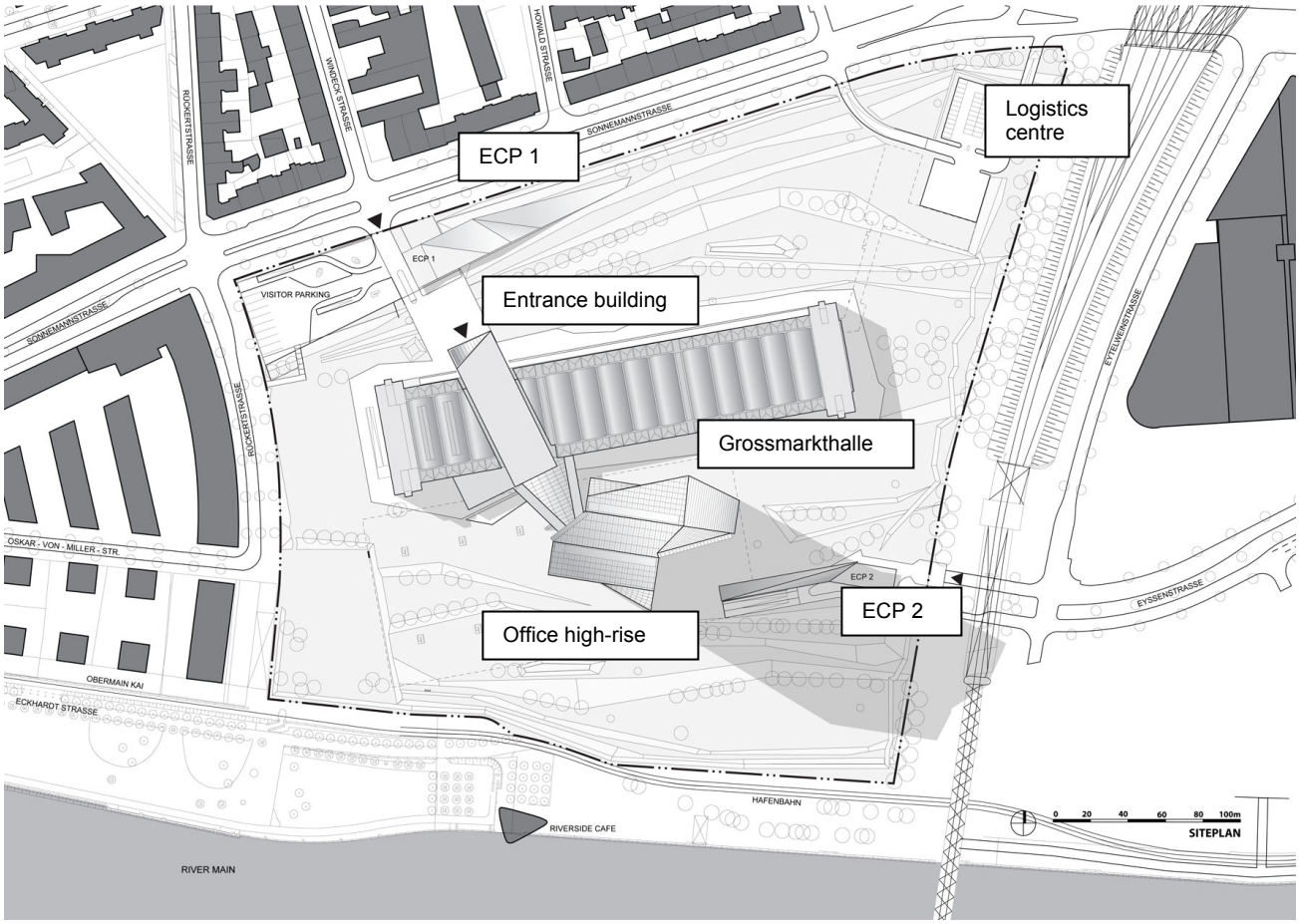
The New ECB Premises – view from the north. © RTT

BUILDING AND SITE DEVELOPMENT

It is the intention of the ECB to build its new premises on the site of the former Grossmarkthalle in Frankfurt am Main, Germany. The design for the New ECB Premises – by the Viennese architects COOP HIMMELB(L)AU – comprises three main elements: the former Grossmarkthalle, with its new internal structures; a high-rise building consisting of two office towers joined by an atrium; and a so-called "entrance building", which links the Grossmarkthalle to the high-rise and provides a clearly identifiable main entrance from the north.

Around 2,300 office workplaces will be provided, mainly in the two towers, and the Grossmarkthalle, which will be renovated, will house the conference area and visitors' centre, staff restaurant, library, lobby and press centre. The gross floor area of the buildings will total approximately 185,000 m^2.

The ancillary buildings to be constructed on the site include two entry control points, various parking facilities and a logistics centre. The construction of a non-denominational chapel and childcare facilities is optional as other solutions may be preferable. They are therefore not shown on the following site plan.



Location of the buildings on the site.

© COOP HIMMELB(L)AU

THE NEW ECB PREMISES

This section describes the various buildings and related elements of the New ECB Premises project.

Site access

The site of the New ECB Premises is connected to the public road network by three access roads.

The main access point for visitors and staff is on Sonnemannstrasse, via the northern entry control point (ECP 1). Suppliers and delivery/waste-collection vehicles may access the site through the logisitics centre entrance. The staff car park is accessed from Eyssenstrasse in the east via the southern entry control point (ECP 2).

The paved roadway for emergency vehicles that encircles the Grossmarkthalle and the high-rise can be accessed from the north and the east, as well as from Rückertstrasse to the west in emergencies. The main access point for emergency vehicles is to the east via the southern entry control point (ECP 2), where the fire-fighting control centre is also located.

During the construction phase, the site is to be accessed from the east in order to minimise the impact on traffic flow along Sonnemannstrasse and into Hanauer Landstrasse.

Frankfurt's dock railway line runs along the southern border of the site. It links the eastern dock to the western dock and is used for goods transport. The dock railway is operated by HFM Managementgesellschaft für Hafen und Markt mbH.

To the south of the site, there is a currently disused wharf on the River Main. This is separated from the site of the New ECB Premises by the dock railway line, a public footpath and open spaces.

View of the Grossmarkthalle from the east in 2002; it includes the existing railway tracks and surrounding halls which have since been demolished.

Grossmarkthalle

The restoration of the Grossmarkthalle, which opened in 1928 having been built according to a design by Professor Martin Elsaesser, Frankfurt's then Director of Town Planning, forms an important part of the building project. Until 4 June 2004, the hall – today a listed building – housed the local wholesale market. After the site had been cleared, it was handed over to the ECB by the City of Frankfurt on 1 January 2005.

The key feature of the Grossmarkthalle is the remarkable 220m-long clear void of its main hall, which is complemented at its eastern and western ends by two huge wing buildings.

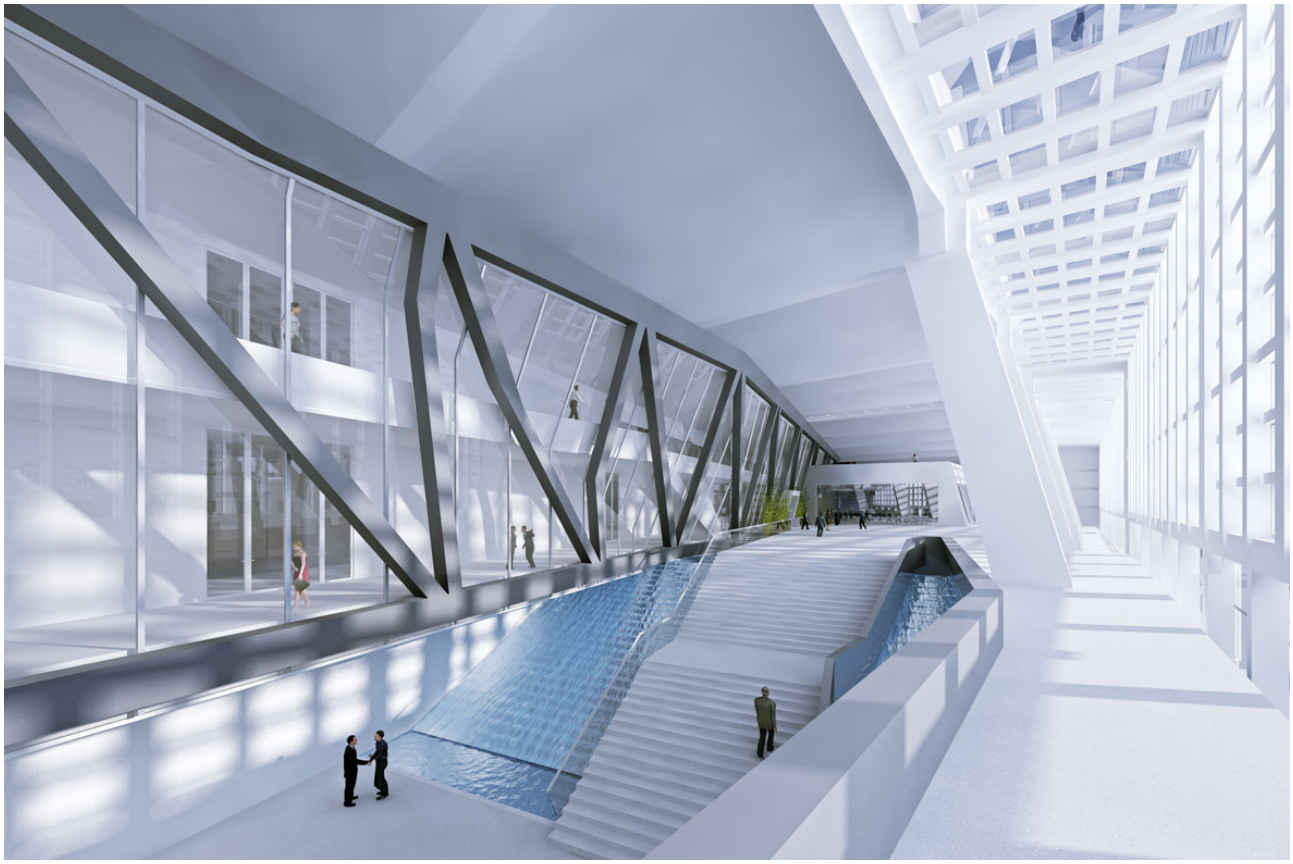
The building's overall dimensions are 245 m x 65 m, with a maximum height of approximately 33 m (the height of the west wing).

The roof structure of the main hall consists of 15 barrel vaults resting on reinforced concrete frames. The barrel vaults, constructed according to the Zeiss-Dywidag method, have a 15 m span and extend for 43.5 m. At their vertex, they are only 7.5 cm thick.

The longitudinal facades of the hall consist mainly of glazed concrete grid structures; the facades at the ground floor level, as well as of the wing buildings, were built in contemporary brick. In the course of the new construction works, the brick infill panels at the ground floor level of the longitudinal sides of the hall will be replaced by glass. The roofs of the wing buildings are of a steel rib and hollow pot construction.

The restoration of the Grossmarkthalle will require close and ongoing cooperation with the relevant conservation authorities. The external and internal facades, as well as parts of the ceilings, roofs and load-bearing structure will be preserved almost in their entirety and carefully restored in line with the requirements of the preservation order. All restoration measures have already been mutually agreed with the conservation authorities and described in detail.

The main hall will house the main entrance to the ECB and lobby area, as well as all semi-public functional facilities, such as the exhibition areas, visitors' centre, staff restaurant, conference rooms and press centre. These new functional facilities will be integrated into the hall based on a "house-in-house" concept and will be constructed as reinforced concrete composite structures.



On the left of the image, the conference area in the Grossmarkthalle (house-in-house concept) can be seen. The southern concrete grid facade of the Grossmarkthalle can be seen on the right.

The basement of the hall will be demolished and rebuilt, which will involve the outer walls being constructed using waterproof concrete.

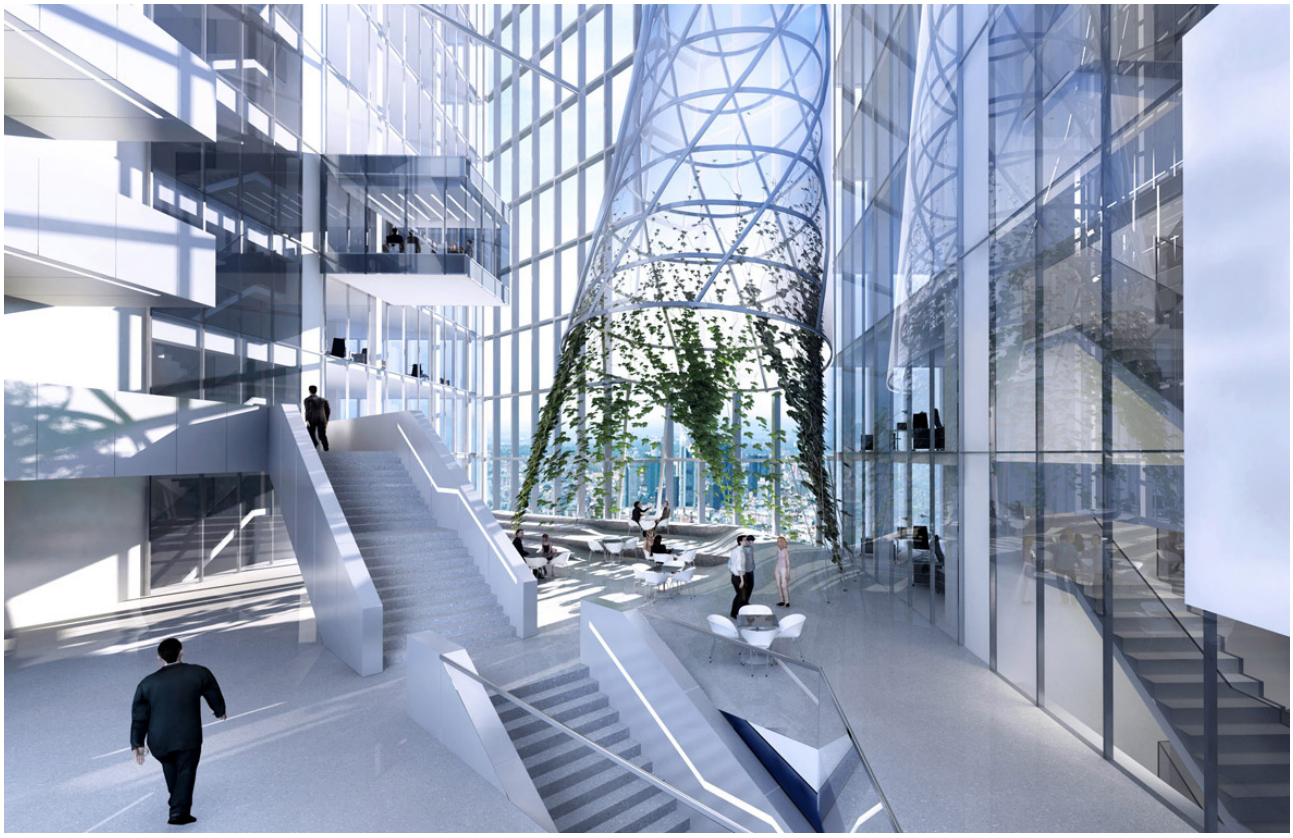
Between 1941 and 1945, the Grossmarkthalle was used as a departure point for the deportation of Jewish citizens. In the basement of the east wing, there is a room which, following consultation with Frankfurt's Jewish community and the City of Frankfurt, is to be preserved in its original condition as an "authentic site".

Under the Building Regulations of the State of Hesse (*Hessische Bauordnung – HBO*), the Grossmarkthalle is categorised as a "special building" (*Sonderbau*). The regulations on places of assembly (*MVStättV*) apply to all areas with the exception of the wing buildings and basements.

High-rise

The double office tower is approximately 185 m high and complements Frankfurt's skyline.

The concept behind the glazed atrium between the two office towers is one of a "vertical city", with connecting platforms and bridges creating the impression of urban streets and squares. The connecting and interchange platforms divide the atrium into three sections of varying heights (between 45 m and 60 m) according to function and temperature. "Hanging gardens" in these three sections provide the finishing touch.



Interchange and connecting platform in the atrium, with the "hanging garden" in the background.

The double office tower houses the vast majority of workplaces, as well as the ECB's internal meeting rooms. To allow for a variety of office configurations, the floors require a high level of flexibility. The structural design concept of the two towers is based on reinforced concrete frame constructions. The floor slabs, some of which are made out of prestressed concrete, have reinforced edges and are supported by composite steel and reinforced concrete columns. The facade columns, as well as some of the internal columns, are angled in such a way as to mirror the twisted shape of the building. The cores are reinforced concrete composite structures. Trusses and suspended platforms in the atrium join the two towers together, creating a single static structural system, an aspect that must be taken into account during construction.

As part of the preliminary construction phase during the summer of 2008, the foundations were constructed partly by a separate contractor using a combined pile-raft foundation system; 97 foundation piles and geothermic devices were inserted into the ground to a maximum depth of 37 m during this phase of the construction works.

The roof structures and other specific areas will be of structural steelwork.

The high-rise of the New ECB Premises is designed to meet the enhanced requirements set out under the Building Regulations of the State of Hesse (*Hessische Bauordnung – HBO*) and the guidelines applicable to high-rise buildings (*Hochhausrichtlinie*). The regulations on places of assembly (*MVStättV*) do not apply.

Facades

The double tower is designed as a monolithic, silver-grey glass structure, with the two towers being joined together by a transparent atrium.

The "shield hybrid facade", consisting of a "triple-glazed" system and aluminium elements, creates the impression that the facade is made of a single sheet of glass. When closed, the louvred sun and anti-glare screens between the facades add to this impression of the building.

This type of facade offers all the energy-related advantages of a conventional double-glazed facade, while allowing for the direct natural ventilation of the rooms by means of vertical, motorised floor-to-ceiling ventilation louvres in every second axis of the facade.

Despite the sculptural shape of the building, the facade can be constructed more or less out of identical, flat (not curved) facade elements, even in the areas of the facade consisting of curved hyperbolic paraboloid surfaces.

The New ECB Premises (view from the north).

Ancillary buildings

Two single-storey **entry control points**, each with an underground level, are to be constructed at the access points to the north-west and south-east of the site, and shall be incorporated into the landscape design.

The **staff car park** is located to the west of the high-rise. This two-storey underground facility consists of 630 parking spaces and is for vehicles entering via the southern entry control point to the south-east of the site.

The **visitors' car park** is located in the north-west corner of the site. It shall be accessed via Sonnemannstrasse and the northern entry control point.

The **logistics centre**, which is a single-storey, partly underground facility, shall be accessed from the north-east corner of the site. It is connected to the Grossmarkthalle by an underground service tunnel.

External works

The site of the New ECB Premises is located at the intersection of two urban green areas, namely the Mainuferpark and Frankfurt's green belt. The final gap in this green belt, i.e. between the Ostpark and the banks of the River Main, is to be closed.

The landscape design is based on a fluid interplay between requisite site access areas and the topographical elements of the landscaped park area. The design for the open areas is such that it brings to mind the natural landscape of the River Main while picking up typical elements of the flood plain and transforming them into a heterogeneous park landscape. A variety of trees and a range of paved paths add the finishing touch. The requisite security measures have been integrated into the landscape design.

BUILDING SERVICES

The requisite technical floors are located throughout the various buildings of the complex. In the Grossmarkthalle, as well as in the double office tower and "entrance building", there is sufficient space for toilet facilities as well as for fire-fighting, heating, ventilation and chilled water systems, and high and low-voltage power distribution and IT systems. The plans also provide sufficient space for recooling systems. Communication systems are also located in the double office tower.

Systems providing access to the facades are recessed into the roof of each high-rise.

Substations for heating, chilled water and sprinkler systems are located on several floors in both towers.

A central bank has specific building services requirements that must be met. In this respect, special priority is being afforded to IT, security and audio-visual systems that are necessary for the operation and functionality of a modern central bank. These shall all be implemented to a high level of quality.

Overall energy design

In order to create a sustainable building, the ECB intends to be conservative in its use of energy and drinking water. The energy-saving design shall include the following features:

- The energy-efficient, "triple-glazed" system of the high-rise

- Highly efficient sun screens
- Efficient insulation of the Grossmarkthalle envelope
- Use of recycled heat
- Natural ventilation of the office areas
- Low-energy office lighting
- Rainwater recycling
- Planned use of geothermal energy for cooling and heating
- Optional installation of a photovoltaic system on the roof of the double office tower.

Generation and supply of heat

The New ECB Premises will be connected to Frankfurt's district heating network in order to provide the entire premises with central heating. Waste heat is to be fed back into the central distribution network of the New ECB Premises.

Ventilation systems

Almost all the functional areas of the New ECB Premises shall be ventilated mechanically by means of a ventilation/air conditioning system. This system shall not only meet fresh air requirements per person, but also comply with the fire and general safety regulations.

Chilled water

Chilled water is supplied to the New ECB Premises by four separate systems. This is in order to meet energy targets, as well as to fulfil safety regulations and availability needs, as well as different cooling requirements. A distinction is made between the cooling requirements for the computer centre on the one hand and those for the ventilation/air conditioning systems and static cooling systems on the other.

Lifts

The movement of persons and goods within the high-rise is facilitated by several groups of lifts located both in the cores of the towers and in the atrium:

- Shuttle lifts connecting the access levels with the interchange platforms
- A “flexible two-car system”, as well as conventional lifts, in the office towers
- One goods lift per tower, which also serves as a passenger lift in the event of fire.

Conventional lifts are also to be installed in the Grossmarkthalle. Like the Grossmarkthalle building, the paternoster located in the west wing is subject to a preservation order and shall be restored and reactivated.

Fire-extinguishing systems

The office towers, Grossmarkthalle, logistics centre and underground car parks are all to be fitted with centrally controlled Category 1 sprinkler systems (in accordance with the German Guidelines for Sprinkler Systems, VdS CEA 4001). Specific areas shall be fitted with gas extinguishing systems.

High-voltage power distribution

The electrical power supply will be provided directly by the supplier by means of two separate grid points. Auxiliary power systems running off diesel generators shall be installed in order to ensure the power supply in cases of emergency.

Low-voltage power distribution

Systems required by the building authorities are to be installed throughout the site. These systems shall include, in particular, fire alarm systems, PA systems and emergency services communication systems. Among other things, there will also be electronic signage in public areas, as well as in the conference and meeting area, and an electronic car park management system. All subsystems shall be networked and compatible with each other.

IT systems

In line with the requirements of a modern central bank, the New ECB Premises shall be equipped with a large-scale, universably usable and highly redundant IT infrastructure.

Building automation systems

The New ECB Premises shall be equipped with a self-contained building services management system based on the three-layer model (management, automation and field).

FUNCTION DESCRIPTION: STANDARD OFFICE

The following section explains the functionality of a standard office.

Heating and cooling ceiling systems in office areas

Each office shall be fitted with a four-pipe heating and cooling ceiling system, enabling individual control over the temperature of the room. The settings can be altered by means of a switch in each office.

Ventilation of office areas

Mechanical ventilation and full air conditioning and humidification are to be standard features. Variable air flow regulators on each floor shall enable the supply air to the offices to be switched off according to zones. The natural ventilation can then be individually controlled by means of facade louvres.

The motorised facade louvres close automatically outside working hours, as well as in the event of rain or storms. In principle, it will be possible to open the facade louvres at night via the building automation system to allow cooling of the building.

Use of daylight and lighting control in office areas

Lighting in the office areas shall be controlled by motion and daylight sensors. If there is sufficient daylight, the lights shall switch off automatically.

Control of solar screening

While the building is cooling down outside of office hours, the solar screening system is to be controlled centrally in order to prevent the inside of the building from warming up.

Electrical power distribution

All offices and workplaces on one floor shall be supplied with electrical power from a distribution room on the same floor. The horizontal power supply on each floor will be supplied by means of cabling laid in the raised floor void.

IT provisions

All workplaces shall be served by "on-floor" IT rooms, each of which is generally allocated two floors. The horizontal power supply will be provided by the corresponding cabling laid in the raised floor void to "consolidation points" that are installed at defined locations throughout the premises. These "consolidation points" shall provide each workplace with the requisite cables and connections. In addition to providing sufficient IT services to each workplace, the aim is to provide a high level of flexibility in terms of office configurations and to avoid visible cabling on the raised floor.

Safety and security installations

Offices shall be fitted with the usual safety installations for high-rise buildings, such as fire alarms and PA systems. Security installations (e.g. to prevent the entry of unauthorised persons) have been planned according to the requirements of the respective business area.

STANDARD OF FIT-OUT

The fit-out of the New ECB Premises shall generally be of a high standard. The various functional areas in the different buildings will be fitted out according to the specified basic conditions.

Grossmarkthalle

As a historic, listed building, the Grossmarkthalle has a special status and thus requires tasteful redevelopment. The areas requiring conversion shall be carefully adapted to their new purpose within the existing building.

New structures within the hall ("house-in-house" concept) shall be treated in the same way as other new buildings. The conference area and press centre have particular requirements in terms of acoustics and room conditioning.

High-rise

The office areas in the towers follow a standardised, flexible office design (every second axis), which in terms of the geometry of the floor plan is nothing unusual. The main design feature of the internal fit-out of the office areas is the floor-to-ceiling glazed panels forming the corridor walls of the offices.

With regard to the standard office areas, extensive research and sampling was carried out during the planning phase. The results have been documented in the sample room and mock-up, which provide a benchmark for the aesthetic and functional quality of the fit-out.

BUILDING SECURITY

For both the planning and the construction phases of the New ECB Premises, the security of the building has been a key issue with a view to ensuring the functioning of a modern central bank. For the various sections and areas of the premises complex, a number of security zones have been defined using a modular model based on the results of risk assessments. During the planning phase, a range of security measures were suggested for each zone. Measures to ensure the security of the building are to be put in place in the external areas, in the building envelope, in the structural system, inside the building and in all important technical building systems.