

The Circle at Zurich Airport

Project development

Multi-step open architectural competition:

3-4/2009	Pre-qualification from 93 applicants
8/2009	Anonymous competition with 15 select participants
12/2009	Project development in workshops with 5 select participants

2012 / 2015	Building application
2015	Start of construction

>11/2020	finish of construction in phases
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Project key data

<i>Location:</i>	Zurich airport, Switzerland https://goo.gl/maps/y5nAtA5rjRqmGJPd9
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<i>Building owner, client:</i>	Flughafen Zurich AG + Swiss Life AG
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<i>Architecture and overall lead design:</i>	<i>Riken Yamamoto & Field Shop, Japan</i>
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Key metrics:

plot of land:	appr. 35,000m ²
Footprint:	appr. 20,000m ²
gross area:	appr. 255,750m ²
net area:	appr. 159,000m ²
gross volume	appr. 1,035,000m ²

<i>building height:</i>	appr. 35m, 9 to 11 storeys above ground, 1 to 2 storeys below ground
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<i>facade area:</i>	appr. 82,000m ²
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Function / use:

Mix used, income from rent and lease

Functional modules:

Module 1: Health & Beauty (day hospital)	appr. 11,000m ²
Module 4: Brands & Dialogue,	appr. 18,550m ²
Module 6: Hotels & Convention Center,	appr. 45,000m ² :
* Hyatt Place, appr. 300 rooms	
* Hyatt Regency, appr. 250 rooms	
* Convention Center (1,500m ² main hall, 17 venue rooms)	
Module 7: Headquarters & Offices,	appr. 75,950m ²

Parking	appr. 520 spots of underground parking
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Planning team, execution phase:

Architecture and overall lead design:

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- Thomas Volstorf
- Taiga Kasai
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- Pablo Alvarez-sala
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- Shunta Fujiki
- Taku Saji
- Ai Kubota
- Beda Faessler
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General contractor

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Architecture and general lead design:

Riken Yamamoto & Field Shop

Architecture / execution planning (per building parts):

Richter Dahl Rocha Architekten, Lausanne
Fischer Architekten, Zürich
RLC Architekten, Rheineck

Structural engineer:

Ribi & Blum AG
wlw Bauingenieure AG
WITO-engineering GmbH

Facade planning:

NM Fassadentechnik AG
Atelier P3 AG

Mechanical engineering / fire protection / electric planning / building automation / LEED

Amstein + Walthert AG, Zurich

Light planning:

Reflexion AG, Zurich

Landscape planning:

Hager Partner AG, Zurich

Building physics:

Kopitsis Bauphysik AG, Zurich

Project abstract by Riken Yamamoto

The Circle is one of the largest building structures in Switzerland.

Since the beginning of the project, we have designed the Circle less as a building and more systemic as a city. We were convinced that our architectural system can change flexibly and adapt to future requirements. We know this from medieval city centers, such as the Niederdorf in Zurich.

The circle between the building parts is criss-crossed by alleys and squares like a traditional city center. Alleys and squares are treated as open outside space, which is partially covered with a glass roof, which protects against the weather, but allows the outside climate to be experienced without any air conditioning.

We use the sustainable, so-called Closed Cavity Facade (CCF) in a modular manner and consistently across all sub-areas of the Circle. So it was possible to let the building complex enter into a dialogue with its surroundings. The architecture appears as a large, glazed form from the direction of the airport. However, towards the green park, the building complex opens up in small volumes and terraces. The cladding of the facade with high-gloss aluminum, in turn, combines the various parts of the building into a large whole.

New technologies can support the sustainability of the architecture. However, the affection of the locals from Zurich for the urban space is the most important aspect for the sustainability of the Circle.

Project description

In the immediate vicinity of Zurich Airport, a multifunctional service center was built at the foot of the Butzenbühl hill. In the form of a small town with alleys and squares, the building complex shows itself to the infrastructural hub of bus and tram station and the highway (Ring street) as a large curved shape, while the building volume opens up to the green space of the Butzenbühl through graduated individual volumes.

Between these two project parts in width and height, publicly accessible alleys meander and connect small and larger squares with the airport and the Butzenbühl, today a green park.

Different environmental factors determine the characteristic floor plan and the building volume of the circle. On the one hand, the area that can be built on is severely limited by the adjacent green space (legally so-called reserve zone) and, on the other hand, by the rules of groundwater protection. Furthermore, the restrictions of flight safety on the maximum building height are to be mentioned.

The circle was conceived as an architectural expression of Swissness. For Riken Yamamoto, Swissness is expressed in the precision of the architecture and planning.

The construction grid of the project is based on the dimension 2,700 mm. The position of statically necessary columns in the facade area is optimised to a multiple of this dimension. For the tenant fit-out, in example the dividers 1,350 mm (office) and, depending on the location in the building ensemble, 675 mm (e.g. hotel, hospital) were decisive. The facade design is based on the static concept of the building and consequently the building dimensions are integrated into the grid of the facade design.

The dimensions of many other construction and material concepts are also designed on the basis of the building grid. Examples are the format of the floor covering (paving) and the substructure of the glass roofs, which were each planned as equal dividers of 2,700 mm.

The concept of coherent dimensioning enabled very flexible, uniform planning without set pieces and inaccuracies in the complex urban and architectural context of the building ensemble. The architecture is characterised by simple details and clear lines in both plans, views and details.

Fundamentally, two areas of the project are distinguished for construction and materialisation. The part of the project that visitors can experience directly is called the "human scale". On the other hand, there are areas of the "urban scale" which are primarily conducive to the formation of the Circle's identity from a distance. These are the facades of the hill and ring sides as well as the roofs as the fifth facade.

The fragmented areas of the hill sides and areas of the "urban scale" are characterised by a high degree of homogeneity in their external appearance. A restrained, but high-quality materialisation is proposed for these

areas. A few selected materials: glass, concrete, metal (aluminum, stainless steel) and natural stone shape the external appearance of the Circle.

Areas of the "human scale" are characterised by a high degree of heterogeneity in their external appearance. This is achieved by giving the tenants of the Brands & Dialogue module the opportunity to stage part of the façades individually. The main task of the design architect in these areas was to maintain a common identity of the circle and to present it to the visitor despite the heterogeneity of the brand façades.

Concepts of alleys and plazas

The alleys (so called "Gasse") and squares (so called "Plazas") are the main traffic zones for visitors to the Circle. Via them, all areas of the project are made accessible to pedestrians. The standard width of the alleys is 7.9 m, which widens up to 30 m on the main square. From the main entrance at ground level in the direction of the airport to the green park, 2 storeys must be traversed with stairs, ramps or lifts.

Due to the differently designed situations in the course of the alleys, in the squares, with or without a glass roof, the different height levels and through interaction with the changing façades, a high degree of diversity of the spaces with different lighting situations is aimed for.

The design of the façades of the Brands & Dialogue module on alleys and squares is left to the tenants. The materialisation of the alleys and squares in the base construction is therefore limited to a few elements, such as the flooring or façades, which are not part of the retail sector.

For these elements, the principle of a restrained design applies as a kind of stage for the presentation of the tenant façades. The selection of structural elements and materials should not compete with the brand façades in terms of design. For this reason, a concept was conceived on the basis of few and high-quality materials and details were simplified.

When designing the flooring, a uniform format was chosen that is used throughout the meandering alleys without any offcuts. Square paving stones with a side length of approx. 110 mm with a minimal amount of joints are laid in a cross bond in all alleys and squares. The laying grid results as the 21st fraction of the construction grid ($2,700 / 21 = 128$ mm). The joint size results from the difference between the laying grid and the stone format and is rather narrow. A natural stone from Switzerland (Gneiss) was used for the paving. The visible surface is cut and flamed, two sides are broken, two are cut and rotated against each other. The paving stones are laid on a slope without diagonal cuts. In the area of the main square, large-format natural stone slabs of approx. 1,350 mm are used, the surface of which has been milled off into a slope.

Stairs in the alleys are planned with a uniform gradient angle. The flooring of the stairs is the conceptual continuation of the flooring of the alleys. However, the format of the natural stone is adapted to the step width and length. Ramps in the alleys are designed to be barrier-free accessible with a uniform incline at 6%. Ramps are planned with natural stone paving in the same way as the alleys.

Concepts of the Facades

The façades consist of the external building face and the building structure at the facade layer. The design of both elements is identity-forming for the exterior view of the circle. The façades planned in the base construction are part of the overall ensemble of the Circle. This means that surfaces and details are designed homogeneously. For the external building facade, the number of surface materials was consistently limited to glass and aluminum.

Two façades of the circle are differentiated by design. The vertical façades of the hill sides, alleys and squares as well as the protruding facade of the ring side.

Vertical façades clad areas with a building stepped in height. A facade with the lowest possible depth of the construction was developed, which accentuates the edges of the building volumes and does not additionally dissect them.

The facade cladding equates the structure of the building statics in the form of filigree columns behind the facade with aluminum sheets. Façade columns are prefabricated from concrete and are basically 200 mm wide with varying depths.

Protruding facades cover the area of the building opposite the airport. They consolidate the building in an architectural gesture as a large form. Here, a facade was developed that traces the curved geometry in the form of a curved glass skin without additional cladding elements.

All the facades of the Circle are characterised by a high level of transparency. The glass of the facade elements is usually floor to ceiling high.

o Facades of the Urban scale, hill side

Facades are designed as a glass skin, which is clad with aluminum sheets. In terms of construction, a double-layer system with integrated sun protection (sun blinds) was chosen (Closed Cavity Facade; CCF). This system is characterised by the fact that the space between the façade layers can be minimised. Leaks or changes in volume, e.g., as a result of temperature fluctuations, are compensated for by the accompanying compressed air line.

The facades are planned with the standard CCF element size of 2700 mm width and completely pre-produced. Central posts are inserted at 1350 mm or 675 mm, depending on the facade module. All facades are basically clad with uniform 2700 mm wide parapet elements. The aluminum sheet of the outer facing is anodised using a "high gloss" process. It is characterised by a very high reflectivity of the surface.

The parapet height of the facade is minimised depending on the girders and joists behind the facade. The maximum height of the girders is the height of the parapet in the facade of the respective storey. In the area of the fragmented building cubature at the hill sides, some of the facades are planned on a curved base line (building boundary line) that is intersected with the building grid. As a result, the width of the facade elements changes locally and differs from the standard widths. The outer layer of the CCF element is cold-bent in these areas (simple bending in one axis).

o Facades of the Urban scale, ring side

In the area of the ring facades, the load-bearing structure is set back behind the facade. Dimensions and spans are generally larger compared to hillside facades. For this reason, the appearance of the facade is fundamentally different. The facades on the sides of the ring are planned as a pure, transparent glass skin. Minimal cladding elements in the area of the window frames are made with narrow aluminum profiles.

In terms of construction, the prefabricated double-layer system with integrated sun protection was also chosen (Closed Cavity Facade; CCF). Due to the overhang, however, no blinds are used, but sun protection glazing.

The facades are planned with standard CCF element sizes of approx. 2700 mm width. Due to the conical geometry of the façade, which results from the round base shape and cantilever of the building between 7 and 13 m, window elements vary in width depending on the storey and the radius of the façade curvature.

Due to the facade geometry, there are different element shapes depending on the location in the facade and depending on the building geometry. Some of the facades were planned with a regular rectangular or trapezoidal shape. Other parts of the facades — mainly in the transition areas between different degrees of cantilevering — are free forms.

The outer glass layer of the CCF element is generally designed as a single glazing with approximate element width and a minimal amount of frame. The outer layer precisely follows the facade geometry and takes up the curvature in the glass element. This was important to counteract any visible segmentation of the facade surface. The ring facade was to remain recognisably as a curved, coherent large form. Some of the curved outer glass panes are bent in one axis, some of the elements are warped. The curvature of the glass pane is created by cold bending.

The inner triple glazing of the CCF element is made flat. Due to the partly warped geometry and in order to standardise the system, a center post with an axis dimension of approx. 1350 mm was inserted.

The guide rail of the facade maintenance system was integrated in the vertical joints between two elements. The technically necessary width of the vertical joint determines the maximum height of the horizontal joint in terms of design.

Due to the overhang of the facade, side entrances on the ground floor are planned as recesses that are covered with metal sheets on the sides.

The prefabricated concrete supports of the building structure, which are set back behind the facade in a 5400 mm grid, follow the inclination of the overhang and are therefore inclined themselves.

o Facades of the Human scale, alleys

Alley facades determine the atmosphere of the so-called "human scale". A large part of the facades adjacent to the alleyways will be finished by the tenant.

Only a limited part of the facades, i.e., facades in the area of vertical access / glass lifts and entrance lobbies, as well as rental areas that do not belong to the Brands & Dialoge module, were designed and implemented in the base construction. These are basically planned according to the rules of the standard facades of the urban scale with CCF. In the space of the "human scale," which is characterised by heterogeneous brands, these facades form a connection through the glass roof to the facades of the "urban scale" and make a significant contribution to the creation of the identity of the entire project.

The so-called brand facades as an important part of the identity of the "human scale" are designed by the tenant. The following guidelines were defined:

- The facade design must be approved by a design committee.
- Elements of the facade design or the branding must not protrude into the alley area. This ensures the visibility of the office entrances and prevents conflicts between neighbouring tenants
- No brand facades are planned on the hill sides. These facades are part of the "urban scale."

A modified standard facade with an axis dimension of 2700 mm was developed as a temporary basis for non-rented areas of the module. This basically consists of a large window element with triple glazing on the entrance floor and an opaque textile cladding on the upper floors.

Concepts of glass roofs at alleys and plazas

The glass roof of the alleys and plazas offers a part of the publicly accessible areas weather protection. The visitor strolls, enters areas with and without glass roofs, narrower areas of the alleys and generous areas of the squares, walks up and down stairs and ramps. Conceptually, the glass roof is just one of the building blocks that make up the experience of the alleys. None of these elements should break the urban planning idea. The alley should be able to be experienced as a space between two buildings and building facades should remain legible as a whole, with or without a glass roof in between.

In this respect, the construction of the glass roof was conceived in such a way that "human and urban scale" are not spatially separated from each other. The roof is designed cautiously and its structural dimensions are minimised in order to allow the greatest possible aperture day and night and thus the continuity of the facade. Construction details aim to let in as much natural light as possible into the alleys.

The substructure is filigree. The grid distance between secondary beams is basically 1,350 mm. Spans of the substructure vary depending on the location in the project, but not greater than 6750 mm. In the area of the main square and main entrance, maximum spans of 8.1 m and 10.8 m respectively were planned. Secondary beams are generally 90 mm wide, the main beams are 250 mm wide. The dimensions of the main girders are locally reduced to 200 mm if they are directly connected to the facade (width of the facade cladding). The lower edge of the girders is always flush with the parapet cladding of the vertical façades that adjoins the glass roof. The substructure and supports of the glass roof are made with steel that is coated in high gloss white paint.

The circumventing main beam of the substructure is invisibly embedded in the facade on the facade side. As a result, the facade alignment can be perceived through the glass roof without interruption. Due to fire protection requirements, but also to ensure a natural climate, glass roofs are separated along the

longitudinal axis and connected to the respective facades at different heights. Both partial areas are connected to one another via tension rods and suspended from the facade with steel cables on only one of the sides of the alleyway.

Supports, i.e., vertical pipes of the glass roof that are visible in the alleys, are not statically necessary elements and are used exclusively for roof drainage. The roof is planned with laminate glass, transparent and without enamelling. It is inclined away from the facade, with the minimum necessary slope of the roof drainage. The frames are set flush with the roof substructure to ensure the greatest possible light transmission into the alley. The size of the windows is basically the same as the substructure, i.e. 1,350 mm wide and, depending on the location, between 2.7 m and 6.75 m long. This means that no joints can be seen from below. On the facades, the support is set back behind the facade line in order to make the facade line perceptible through the glass roof without interruption.

Concepts of public access and distribution

The circle is an ensemble of buildings around a central access zone with alleys and squares. Rental areas that are not directly accessible from the alleys, e.g., the office space on the upper floors, are accessed via elevator lobbies in the regular course of the alleys and squares.

The entrances to the Circle, whether main or building entrances, are integrated into an overarching signage concept, which is characterised by the material aluminum, anodised in copper color.

Building entrances are marked by L-shaped portals. The entrances differ depending on the function and degree of publicity. For example, elevator halls to rental areas are highlighted with illuminated house numbers in large format, which are integrated into the L-shaped, copper-coloured entrance panels.

Other elements of the higher-level signage concept are the functional lighting, which was integrated into a copper-coloured band that is hung from the glass roof, as well as house numbers on the tenant facades, flag signs on the downpipes of the glass roof and interactive copper-coloured information poles that are positioned in central locations and entrances to alleys and squares.

Typical interior of a public elevator hall

In the case of public office entrances with lifts located on the alley facades, these are designed as glass lifts, which should enable visual references from the elevator hall to the alleys. This means that the facade to the lift shaft, the lift cabins and the wall between the lift shaft and the elevator hall are made of glass.

The flooring material is continued in the form of the natural stone of the alley flooring through the entrance. The surface treatment is identical outside and inside (flamed), but the stone format changes. While paving stones are planned in the alleys, stone slabs with a grid size of 150 x 600 mm are used in the interior. Ceilings are suspended with perforated, polished aluminum sheets. All side walls are clad with partially two-storey aluminum "high gloss" sheets. The wall with tenant addresses will be made of copper-coloured aluminum analogous to and vis-a-vis the entrance panel.

Concepts of the landscape design

On the side facing away from the airport, the Circle borders on the natural green area of Butzenbühl. The direct reference to the green park is a distinguishing feature of the architecture of the project. The Butzenbüel itself was developed as a separate project by the client.

The landscape planning as part of the the Circle project takes on the role of mediator between building and (legal) zone boundary, between architecture and landscape on the sometimes very narrow strip along the hill side of floor G2. In order to strengthen the relationship, the green space design was extended to the fifth facade, the roof gardens of the stepped building volume.

In areas of the hillside rental areas in which the use of the outside space is possible, so-called "terraces" are planned, which are assigned to the individual rental areas. This can be, for example, outside seating of the restaurants.

Along the ring-side building facade, between the overhanging ring facade and the cantonal road, a functional outdoor space is designed, which is significantly characterised by the design of the side wall.

o Flooring design

In coordination with the landscape planner, a seamless transition of the flooring surfaces from alleys and squares to the park was planned. A continuation of the floor material is planned through the paving with natural stone in the paths of the landscape planning. However, the type of laying changes from cross bracing to row bracing.

The flooring of the "terraces" directly on the hill-side facades of the G2 is also planned with natural stone, but as large-format (width approx. 1350 mm) slabs. On the roof terraces, on the other hand, elevated 150 mm x 600 mm slabs are used.

Two squares in the Circle play a special role in the interplay between the landscape and the architecture. On the one hand, this is the South plaza, which connects to the landscape at ground level on the G2, and on the other hand, this is the North plaza, whose access is characterised by a strong axial orientation towards the green space.

In the area of the North plaza, the water theme — a reference to the Butzenbühl wetland — is planned in the form of a water feature flush with the floor in the pedestrian path. In the area of the Südplatz, the direct level transition between landscape and urban space is picked up.

o Top roofs, terraces

Roof gardens and terraces are part of the rented module areas. They are also part of the fifth facade and the "urban scale," that is, identity-forming for the circle. For this reason, a master plan of the roof areas was drawn up, which delimits accessible areas and specifies the type of green roof, with or without irrigation (intensive / extensive green).

In principle, large roofs are at least partially walkable. The roofs with intensive greening were distributed in the project in such a way that the hillside view appears balanced green. Accessible areas are designed as an organic round basic shape and laid out with natural stone slabs (grid, 150 x 600 mm), which are raised on the surface without a gradient (grating).

The terrace railings are made with white steel balusters. They are designed in the area of the green roof between the outer edge of the building and walkable areas, but at minimum set back from the outer edge of the building. The baseline is organically rounded like the baseline of the accessible areas.

Intensive green areas are characterised by built up higher soil. The soil height is not the same throughout, but is planned with a relief in order to create an artificial landscape. Between the edge of the roof and the walk-on terrace, the railing follows the course of the artificial landscape.

In the area of the alleys and squares, roof terraces are basically designed according to the rules described above. These are, for example, the roofs of the bridges between the buildings. All the roofs of the alleys and squares are not watered, so they can be walked on with terrace flooring or are extensively greened.

An exception to the design are 4 narrow terraces in the area of the main square as well as in the atria. Due to the small footprint, the balusters are planned here directly on the outer edge of the building and made of glass. The floor covering also extends to the edge of the roof and is planned with natural stone slabs in the format approx. 150x 600 mm.

o Ring side bicycle road

The public cycling path between the external facade and the boundary wall of the cantonal road is largely defined by the design of the cladding of the side wall.

Here, a curtain wall construction with expanded metal sheets made of aluminum is designed along the entire length of the side wall. The height of the cladding of the side wall follows the height of the side wall which decreases towards the South.

Lighting elements are installed along the entire length of the side wall cladding. On the one hand, a functional light for the bicycle path is planned, and on the other hand, a design light that illuminates the cladding of the side wall over the entire height.

The flooring is generally made with asphalt. At the main entrance, the paving of the alleys and squares continues across the Bicycle path to the underpass of the bus station.

Concepts of selected interiors

The majority of the space in the Circle is rental space that has only been finished with structural and technical elements ("core and shell"). The architecturally designed interiors in the basic construction are essentially limited to the necessary building infrastructure. These are designed with a few selected and high-quality materials.

An exception is the large conference hall of the Convention Center, which, due to its size and appeal, has been an integral part of the architecture of the Circle and thus its own appeal since the beginning of the project.

An inclined prefabricated concrete facade is planned as a house in a house construction according to the same rules as the design of the vertical facades in a 675 mm grid, i.e. columns are just 200 mm wide. The concrete was executed as a prefabricated room-high element approx. 2700 mm wide in white concrete and assembled on site. The niches between the inclined levels and the room partition walls conceal the entire mechanical engineering of the hall.

A glass roof was planned over the concrete roof beams to let in natural light.

The hall can hold up to 1500 people, but can also be divided into up to 3 separate smaller rooms with the help of floor-to-ceiling folding walls.