

*Art in the city*  
*fragmented continuum*



## STATEMENT

The Guggenheim Helsinki must represent a new museum paradigm, just like every Guggenheim museum has been before. Our proposal is an iconic lighthouse, but also a sustainable architecture that is more than a landmark. It is a place which invites and draws together both the visitors and the community of Helsinki to meet with art and architecture.

Tomorrow's museum has to be thought of in terms of horizontality, openness, flexibility and public engagement, "solid, monolithic and vertical museums are probably buildings of the past".<sup>1</sup>

Our museum is a shared ecosystem that enables a conversation between the visitors, the staff, the art and the urban fabric. It is not only a place for display: artistic productions permeate the building and its activities by their presence. The fragmented continuum, articulating heterogeneous activities in a variety of spaces reflects the inhomogeneity of modern and contemporary art. These activities do not take place in confined or hidden rooms but in transparent and open areas, allowing social and surprising discourse to happen in a cultural context.

The museum should establish the conditions of fruitful narratives. It is a place that challenges minds and emotions, a place that creates memories.

<sup>1</sup> Dercon, C. (2014). In: Bechtler, C., Imhof, D. (eds). Museum of the Future. Zürich: JRP Ringier, 71.





## THE MUSEUM IN THE CITY

Helsinki has known different episodes of destruction and reconstruction, but one can argue that the structure of today's city has been shaped by the works of Ehrenström and Engel. They organized the city using a grid as a canvas for its development. The original grid was naturally altered to accommodate economic and political interests, cultural specificities and topographical needs. The spaces resulting from the deformation of the grid have produced complexities, richness and characterize the identity of Helsinki.

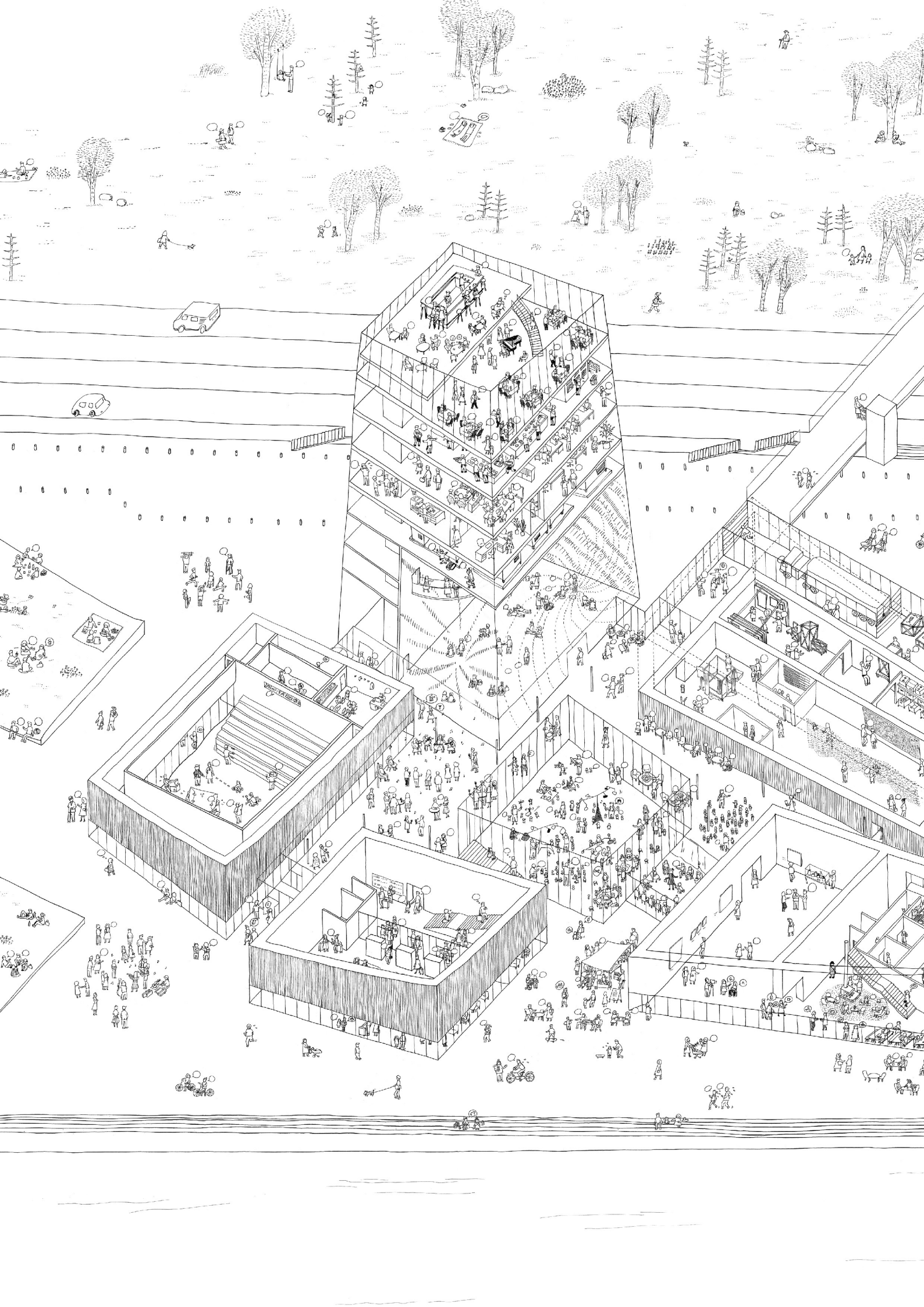
Fragmented Continuum aims at amplifying these idiosyncrasies through a sensitive and sympathetic approach of the site and its immediate surroundings: the park, the sea, the emblematic Palace Hotel and the impressive ferry boats. The project stands as a prolongation of the pre-existing urban condition. The extension of the city grid to the museum's proposal anchors it deeply in its context. The museum intensifies the urban experience.

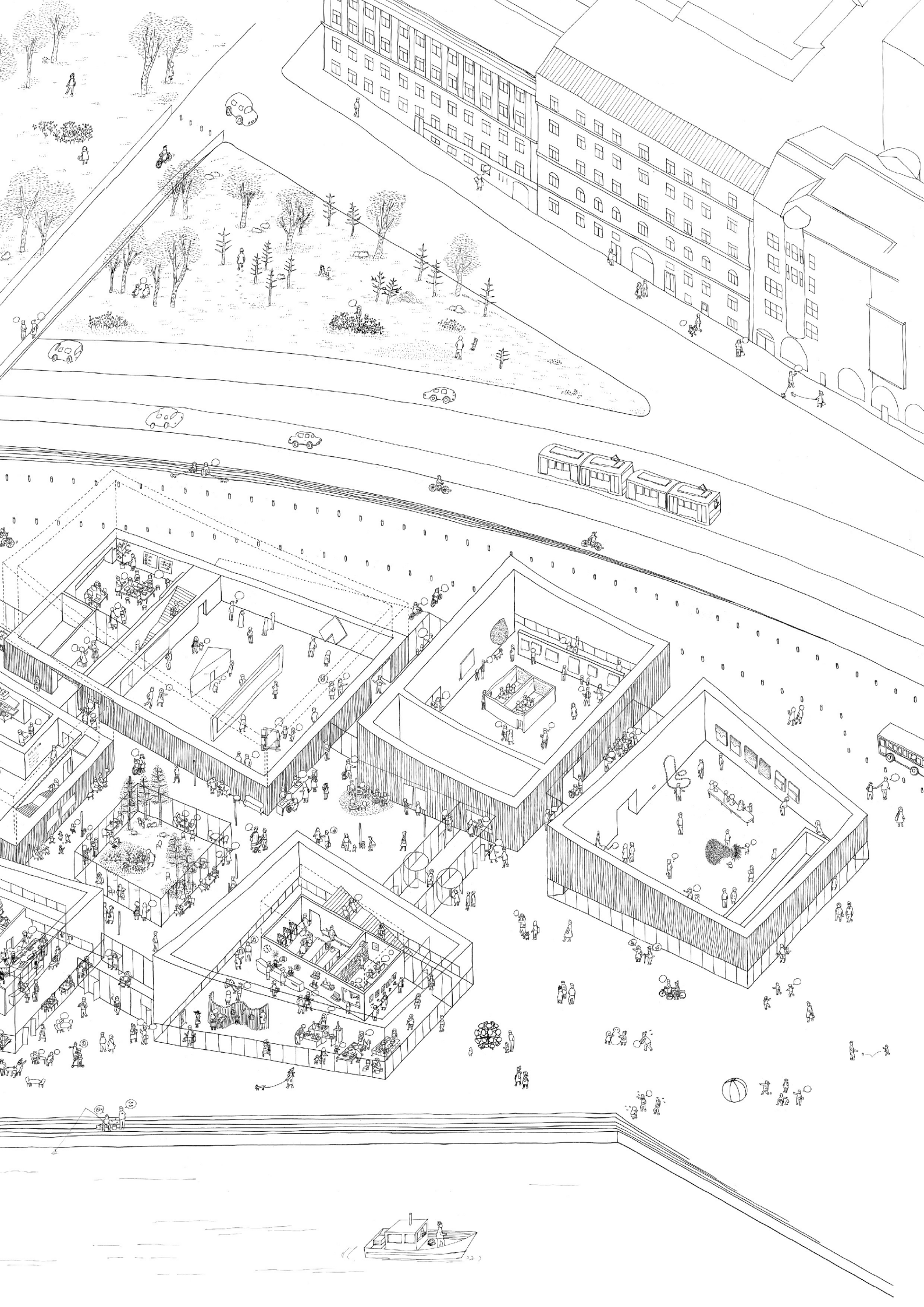
The woven landscape of the proposal encourages people to discover a new cultural core, through the port promenade and the pedestrian footbridge, which connects the Observatory Park to the free and open accessible terrace.

The carefully arranged fragmental volumes create passages to allow natural flow and flexible access in-between both large and intimately scaled spaces. Inner squares and protected streets create new perspectives in its surroundings, and generate a variety of promenades throughout the whole site.

Fragmented Continuum merges naturally with the neighborhood, thus becoming a key destination to the community. It offers a public space suitable for new experiences in continuity with the city. It celebrates openness, encourages public engagement and social activities.

Helsinki's identity comes also from its particular skyline, shaped by the presence of the ferry boats, factories' chimneys and the Assumption and Lutheran Cathedral's bell towers. The iconic tower of the museum echoes with these strong vertical elements. It accommodates the High Gallery and the Lighthouse Restaurant at its top, which rises 35 meters above the sea level. From up here, people can enjoy astonishing views over the city and the unique roof scape of the Guggenheim Museum and reflect on the experience and openness of contemporary Helsinki.





## A DAY IN THE MUSEUM

### Waking up the museum: 6am-9am

It is about six thirty in the morning and the museum is about to awaken. Security employees are those who will open the museum's doors for the staff. From 6 to 9 am, they browse through the empty corridors of the museum, moving from one pavilion to the next. This walk allows them to check the condition of the spaces which make the museum and ends in the security station, located along the main entrance, where one finds a large window overlooking the harbor and the North waterfront of Helsinki.

The tram drops off the first administrative employees around 8 am, while those who cycle, park near the southern entrance accessible by bike paths leading directly to the museum. They join their offices located in the tower enjoying the views from large windows, some towards the East, others towards the West. Glancing in that direction, one can notice the director's car parked in her reserved parking space. Before the day starts the employees meet up in the break room to share a morning coffee, all the while enjoying the sunrise on Suomenlinna islands.

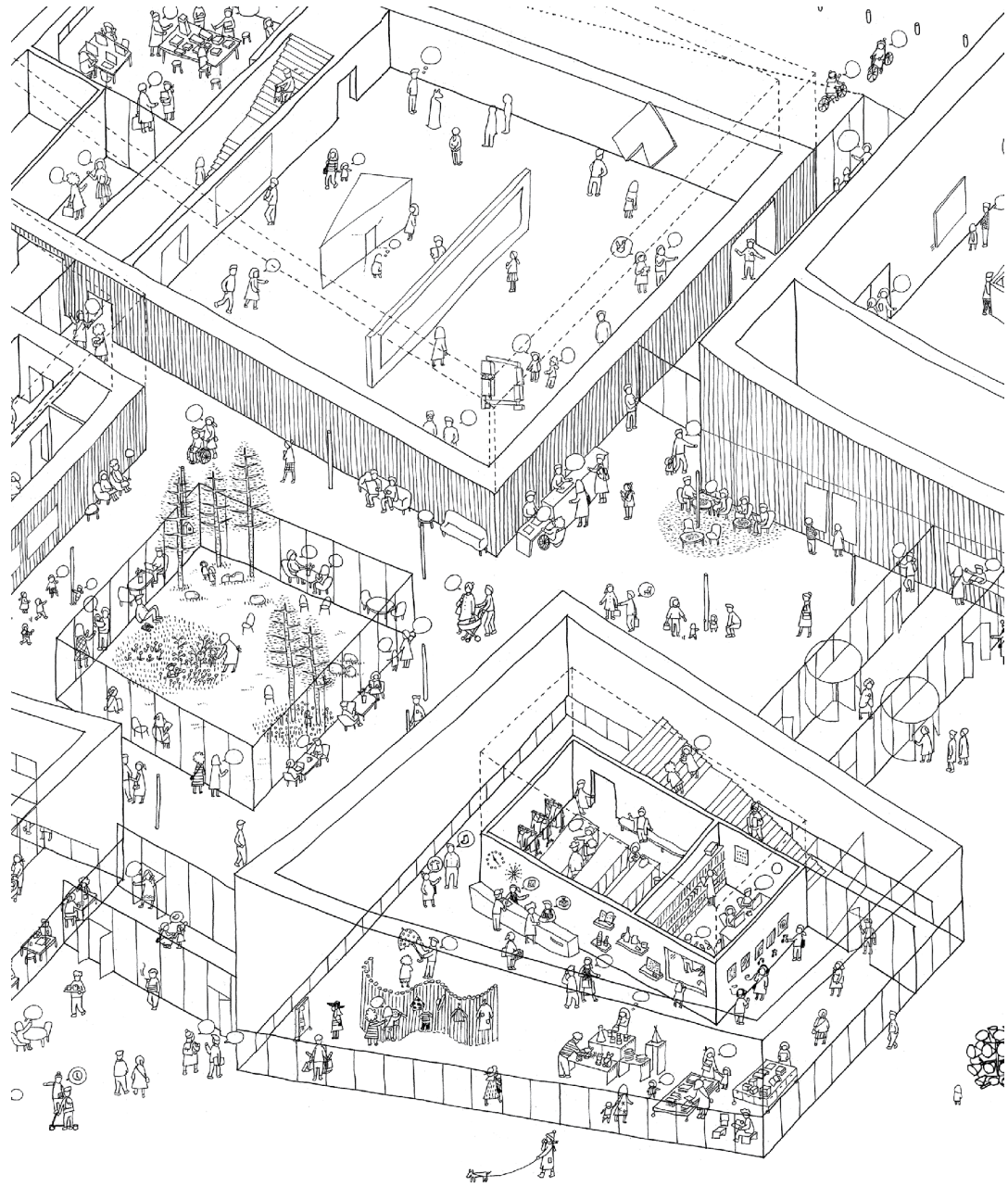
While maintenance crews are operating their daily rounds, they can see the arrival of the Viking Line ferries landing at the Katajanokka terminal. When they are done, they store their equipment in easily accessible premises from the inner street. Close by on the ground floor, technical and museum crews get ready for an important arrival of art works for the next exhibition.

Like every Friday around 8:45, the head chef of the *Lighthouse* restaurant reaches the South entrance. Responsible for supplying the kitchen, he comes straight from the old market to refill the cold rooms on the fifth floor of the tower, thirty five meters above the ground. After a brief inspection of the premises, he checks his menu and welcomes his team, all the while taking advantage of the views over the park, the harbor and the city.





View from the Market Square



The Garden Square

## Visiting the Guggenheim collection: 9am-12am

It is 9am and the first visitors arrive from the city center by the *North square*, which remained animated all night long thanks to a lighting installation situated along the glass front of the first pavilion. It is a welcoming art piece inviting visitors to enter and that highlights the building as a contemporary art place.

Beyond the entryway, once the security controls have been made, the visitor finds himself or herself in the central area. Within a few meters, the temperature has changed dramatically, to reach a comfortable atmosphere. Here clear perspectives guide the visitor towards the reception, the entrance of the first galleries, the restrooms, the shop and the cafe.

The public can walk in the main lobby around the bright *garden square*. This interior street is a completely free and open space that irrigates the museum. It becomes a popular place, where everyone can enjoy his time, some relaxing on armchairs, others having an informal meeting. Going to the South, along the inner street, visitors discover the large variety of animations and displays spread around. Here, a pop up store selling books about on-going exhibitions, there, some movable bleachers where people gather in front of a performer. Before reaching the *event square*, the major pavilions that make up the museum are discovered: exhibition galleries, the multipurpose hall, the auditorium, the terminal and the tower. They are all connected by this *in between* space, which works as an Ariadne's thread. It is a unique place, where livelihood is constantly renewed.

For those who would like to buy an admission ticket, the sale office is immediately accessible from the central *garden square*, complemented by the possibility of purchasing online.

The introductory room is a long and generous space, with glazed windows open on the western historic facades of the waterfront. On the left entrance wall of the gallery, the information panel contrasts with the dark and bright color of burnt wood. Before entering the exhibition, one can glimpse the current preparation in the northern pavilions through a large glass door of over four meters where the artist is working on the latest adjustments. This space is dedicated to the promotion of Finnish artists. The opening of this exhibition will in fact be held later in the evening.

Beyond the large threshold of the gallery introducing the Guggenheim Collection, a huge canvas of Rauschenberg, over nine meter long, welcomes visitors. In this twenty meter wide space, wooden beams and floor give the place a sober yet warm touch. The exhibition showcases pieces by major artists such as Serra, Oldenburg or Lichtenstein.

Behind the moving partition, which balances the space, one finds the *Triangle Room*, an installation by Bruce Nauman, symbol of the spirit of minimalism, which rounds up the first sequence. Continuing the tour, the visitor is naturally led to a generous but unobtrusive staircase that will lead him or her to the second level of the gallery. Atop the stairs, the visitor reaches a place of abundant natural light. The roof is composed of Kerto V-beams that allow for the emergence of North facing sheds, ensuring a consistent overhead light, further diffused through a white acoustic filter.

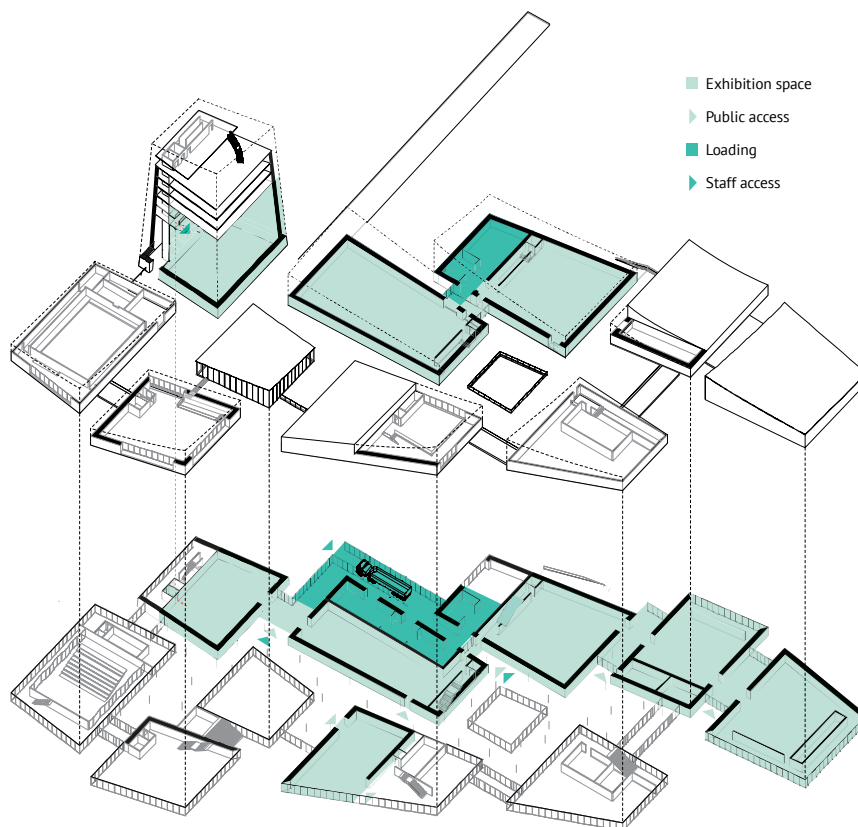
In addition to this system, rails built into the primary structure offer a multitude of hooking and suspension points as well as spotlights to emphasize the staging of works. The above systems are complemented by artificial lighting which is concealed behind tensioned layers that serve to regulate the variable daylight based on data collected by a network of sensors. The quartet of works presented in this gallery is the first climax of the visit. The small number of works given the generous dimensions of space gives Segal, Nauman, Gursky and Mapplethorp a radical setting. Leaving the gallery, the visitor experiences a change in continuum, by crossing a glass corridor overlooking the outdoor terrace. Looking South, one can see the bridge connecting the park. Looking North, the sculpture garden comes into view. This glassed passage is ideal for visitor's orientation and offers comfortable seating for relaxation and in-depth information about the exhibition.



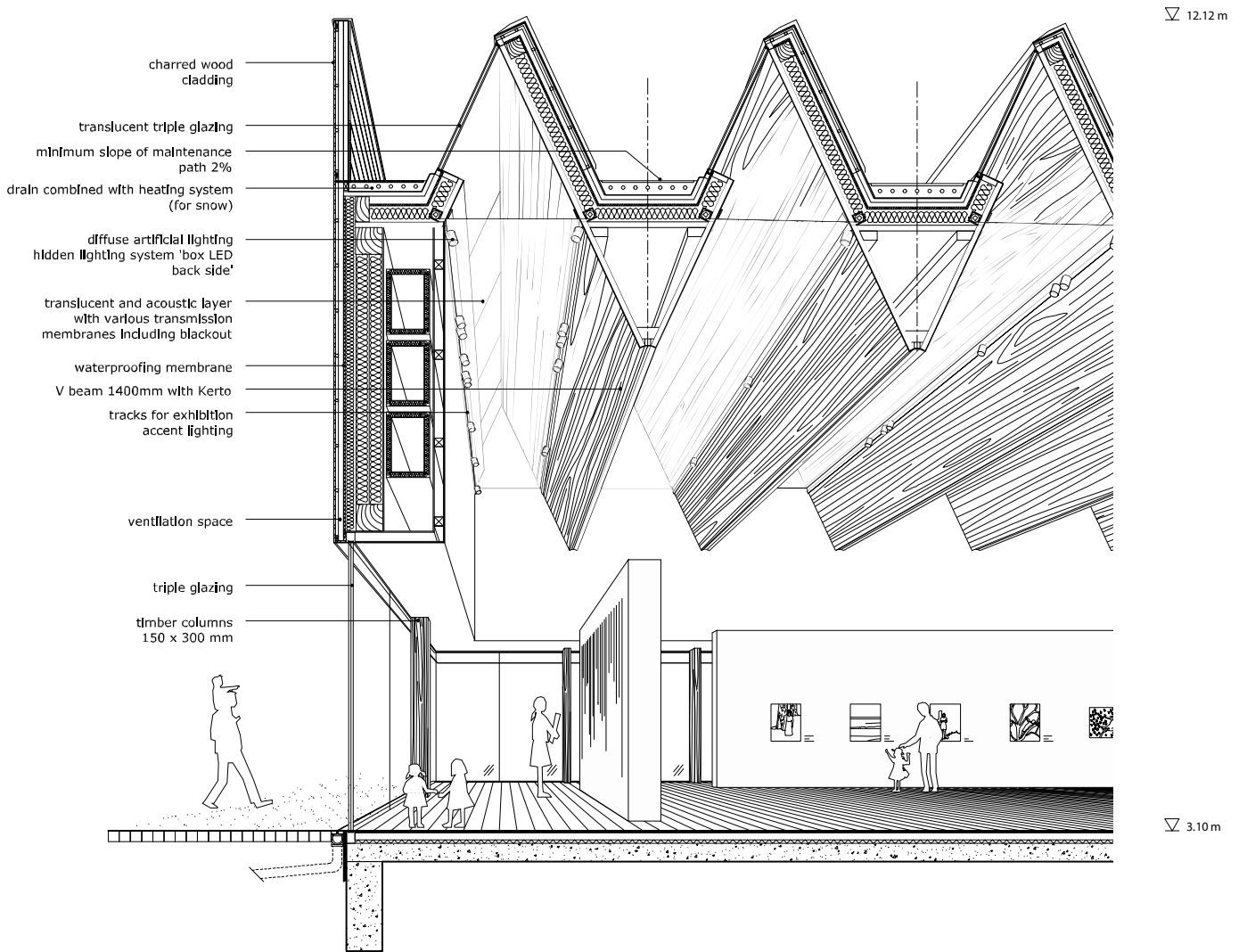
View from the Palace



The following gallery offers similar qualities to the previous space, while offering the new experience of an exceptional depth, noticeable behind Felix Gonzalez-Torres's *«Untitled» (Golden)*. Before crossing this filter of golden gems, Rachel Harrison's sculpture carries visitors along their way. There follows a succession of objects organized around a trio of installations by Mona Hatoum, Anne Hamilton, and John Bock. This third sequence is devoted to the period from the nineties to the present. The pavilion ends on the ground floor when one is lead through an equally long but narrower space. Throughout the gallery, mixed media coexist and the visitor is progressively brought towards the last space of the collection: the vertical gallery.



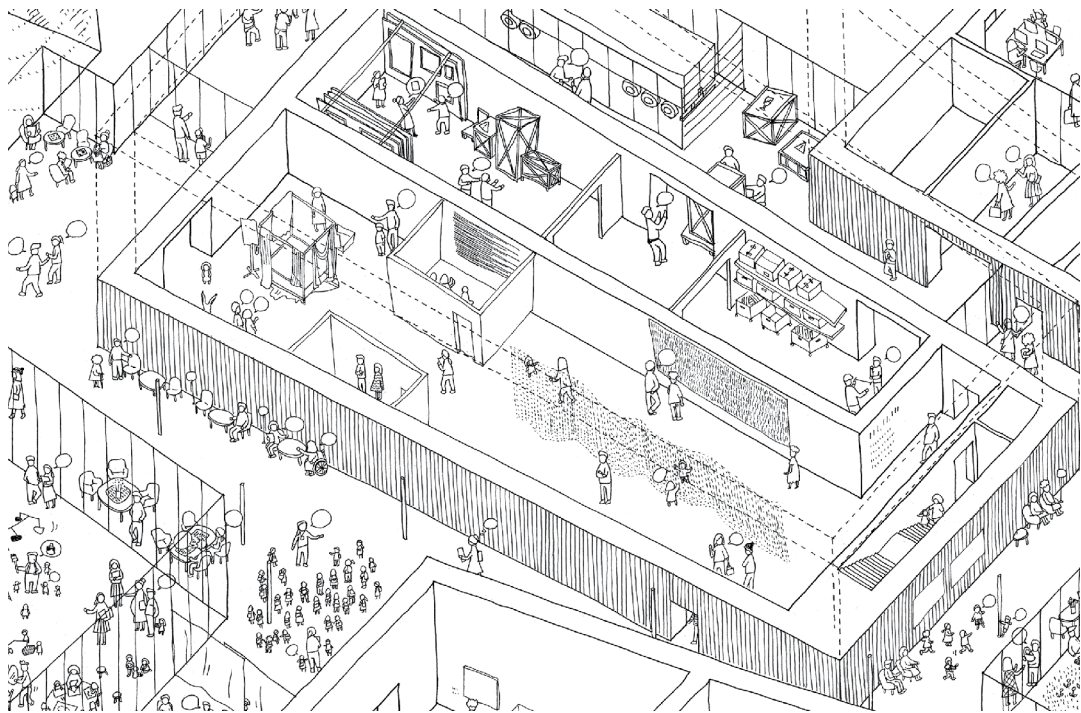
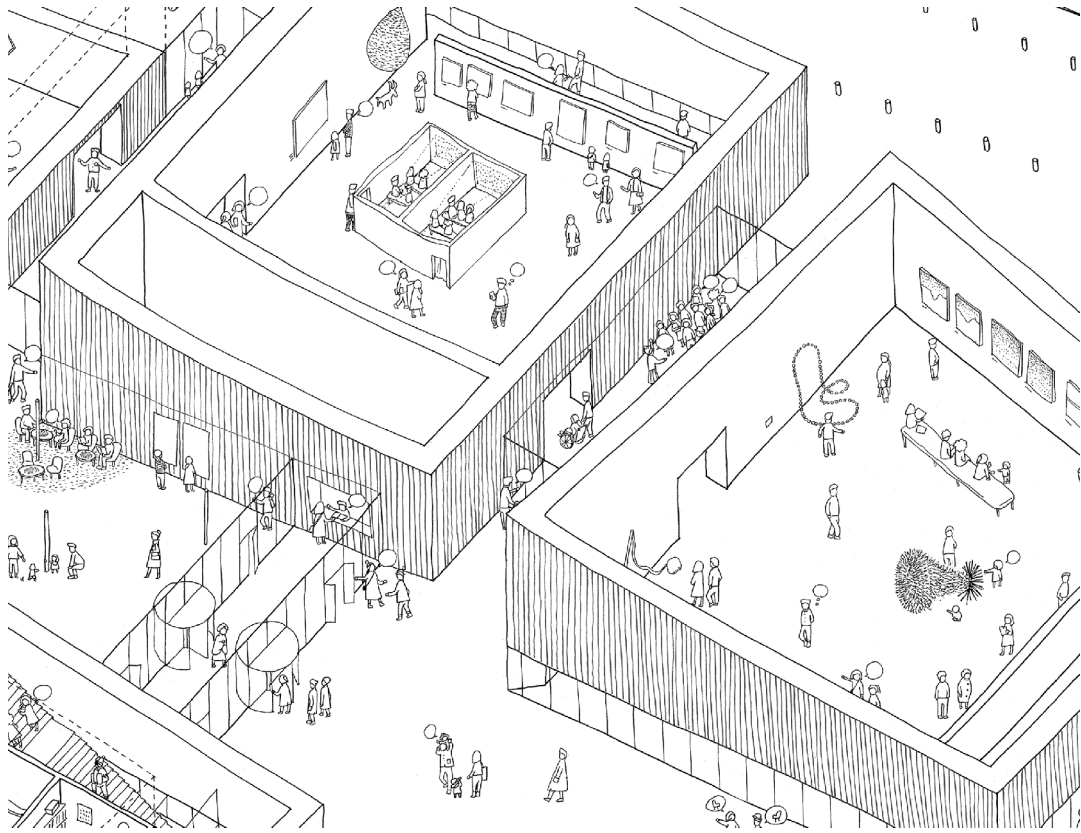
The art preparation and exhibition spaces



Detail of a gallery 1/50



The long gallery, *nineties to present*

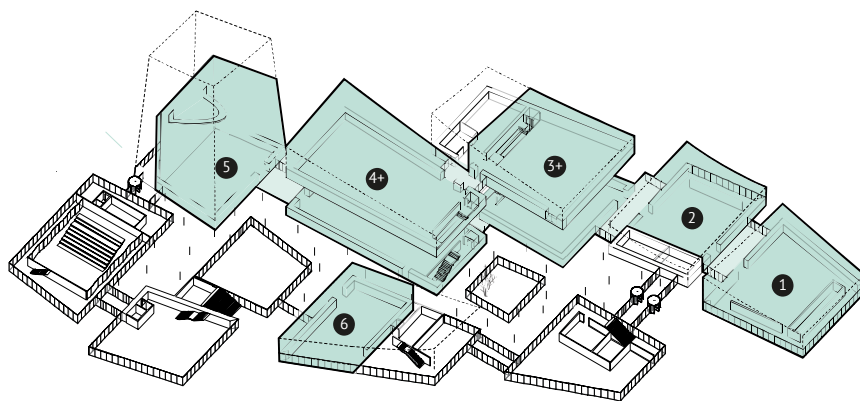


Galleries 1 and 2 & gallery 4



After a quick transition the visitor enters the foot of the tower where the exceptional experience of a monumental gallery awaits him. Indeed, the nave of the tall gallery is an equivalent volume of exhibition space to the atrium of the Guggenheim in New York by Frank Lloyd Wright. A balcony suspended over the massive void, and accessible from the hall, gives opportunity for a new reading of the artworks. Pink Twins' audio and video installations are projected on the large vertical surfaces, bathing in the audience. At this point, the museum offers a spatial and artistic climax. Large installations, lighting, sound and media concepts can fill this space as well as more unique special events. In the case of such an event, the space is opened to the public without ticketing.

The morning ends with the maneuvers of an almost twenty meter long delivery truck, that can be observed through large glass walls, from the south of the in between space. The impressive vehicle docks so that staff can receive, unpack, sort and store the many packages. In the background lays the park bathed in a beautiful natural light. This sequence of operations is carried out under optimal climatic and logistic conditions. The hoist connects the reception with the art preparation teams, located in a space that enjoys the same qualities as the galleries: top light, V-beams and possible suspensions, wood floor and optimal weather conditions. From the loading area, all galleries but the sixth can be reached without crossing general public areas.



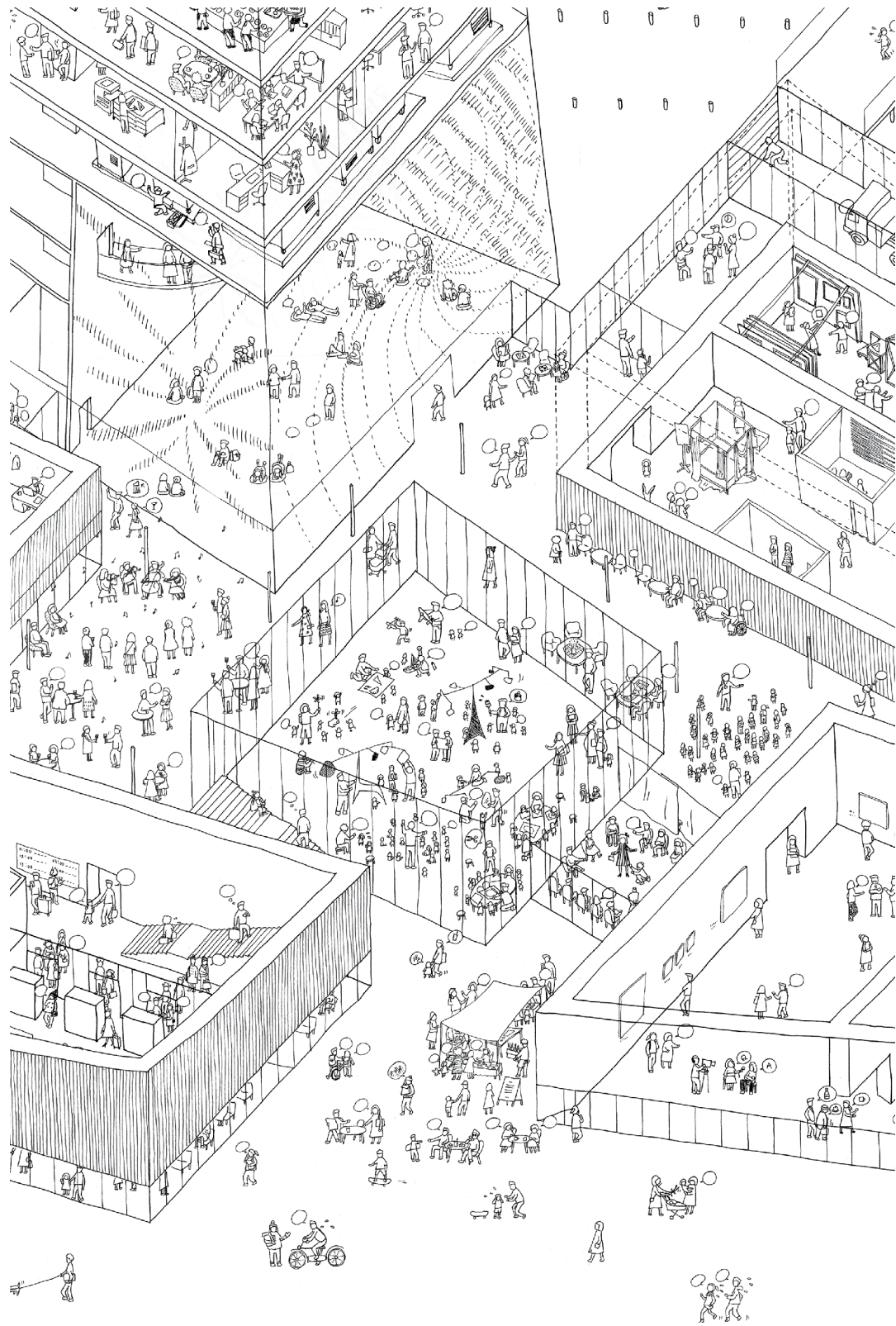
- |                    |                   |                |                                       |
|--------------------|-------------------|----------------|---------------------------------------|
| ■ Exhibition space | ① Project Space   | ③ Wide gallery | ⑤ High gallery                        |
| ■ Connecting space | ② Finnish gallery | ④ Long gallery | ⑥ Emerging Art, Design & Architecture |

The 6 galleries

#### Resting and socializing: 12am-2pm

The end of the Guggenheim collection's tour marks the beginning of a new walk around variable geometries. The unparalleled burned wood walls reduce noise glare and creates a cozy atmosphere. All the spaces, visually or physically connected, follow each other but are never the same. The public path, punctuated here and there by metal poles equipped with lighting, insures a curious walking space that offers infinite possibilities of use. The museum has several entrances from outside to the eventful in-between space. This space is different from the usual museum foyer. It aims at creating a vibrant social atmosphere mixing museum-goers and urban audiences. The refinement of this zone as a social meeting place receives the same attention as the exhibition areas and is therefore not considered as secondary area. It is the anti-hierarchical atmosphere of the zone that makes it unique. This concept is possible because ticket control takes place at the entrance of the exhibition galleries. It is an open and diversified zone for a wide general audience recalling the social spaces on the ground floor of some New York skyscrapers.

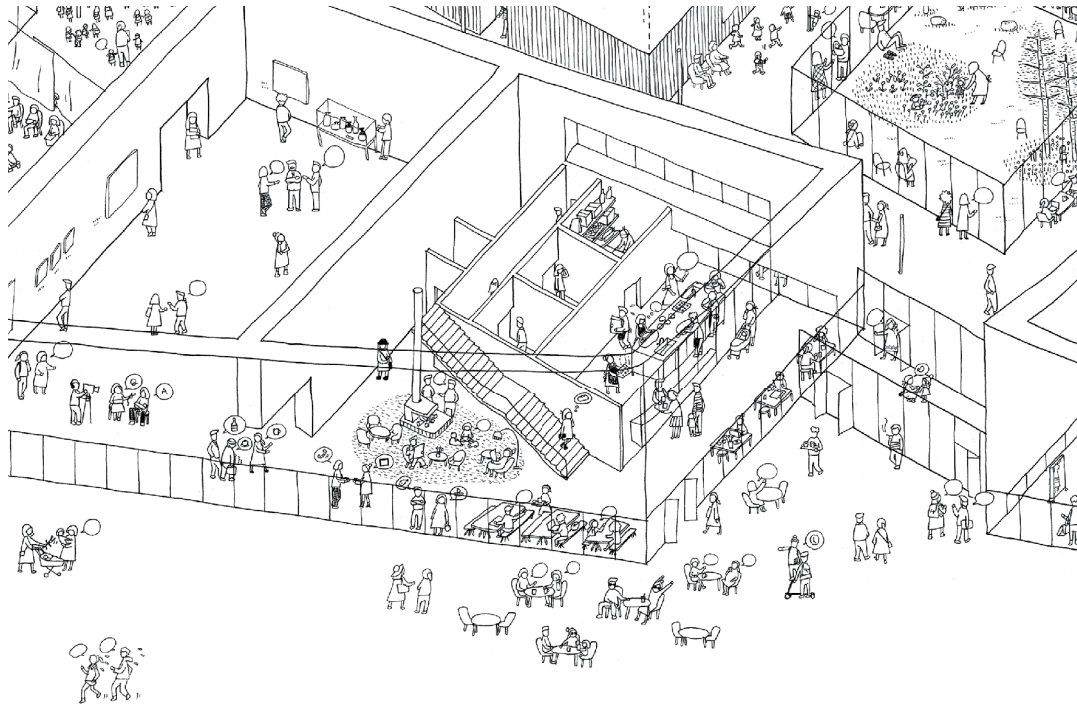
It is 11:30; a workshop dedicated to the advancement of children in the arts begins in the multipurpose hall. This large space is glazed on all four sides, looking out at both indoor and outdoor public spaces, the wharf and the suspended terrace. The convex ceiling is based on a network of wood poles along the windows. These can be enclosed with long curtains, providing flexibility of use. This versatility allows you to organize all kinds of events and interactions for a variety of audiences. A discussion on contemporary art will follow the workshop and offer a participatory access to the museum strategies. The multipurpose space with mobile divisions offers manifold opportunities for interactions with and between visitors. It has been developed with the museum team on the basis of a participatory concept opening the museum for a wide and differentiated public, with activities ranging from lunch lectures to discussion of current urban and social debates.



The event square



The garden square & the cafe





Leaving the multipurpose hall towards the cafe, a large salon offers the opportunity to rest and enjoy stunning views. There you can find Finnish furniture and timeless classics such as Alvar Aalto's Armchair 1932 or Marimekko's fabrics. This parenthesis smoothly introduces the visitor to the East gallery, dedicated to the work of Scandinavian designers and emerging artists. It stresses the importance and ensures the presence of Finnish art, design and architecture in an international context. In connection with the multipurpose space and the cafe, exciting combinations are possible. Although the common language of the museum is expressed in this gallery, it enjoys a particular treatment: specific climatic conditions combined with a small size and pan framing on Katajanokka. The opaque roof is supported by a network of glulam beams. This structure creates a less intimidating and cozier atmosphere. Along the windows overlooking the dock, the visitor is naturally led from the exhibition space to the cafe.

At lunch time, the bistro's activity is in full swing. The life of this space is organized around some key elements such as the bar, the mezzanine, the terraces and the fireplace. Located at the intersection of public and staff routes, connecting the indoor and outdoor spaces, the cafe, with its open kitchen, is at the heart of the museum. It can accommodate a hundred clients in the winter and almost twice as much in the summer. For those looking for other options, it is possible to take advantage of the mobile food services in the in-between space at lunchtime. The *garden square*, with comfortable seating, invites visitors as well as the general public without tickets to hang around: some people take a lunch break after a lecture, others are waiting for friends, have a coffee, go to the shop, read or simply relax.

When the weather gets nice and warm, the doors of the garden open on the *in between* space. This landscape is composed of three strata of vegetation where the northern spleenwort is blooming alongside lady ferns and twin flowers that intermingle with glittering wood moss, growing at the foot of some birches. Flowering arctic berries and bilberries complement the palette of colors depending on the season and will delight birds during the summer.

South of the site, a boat drops passengers at the port terminal adjacent to the museum. Once all paperwork and security checks are done, passengers can go two ways. Some descend directly to the museum, while others choose to go to the city, by the footbridge to the park or walk along the quay. The terminal is a gateway for national and international tourism; it is a hub connecting the museums of the surrounding cities. Moreover, its proximity to the auditorium, the multipurpose space and the tower restaurant makes it particularly attractive. This program reinforces and perpetuates the port activity within the site. The Guggenheim becomes a major waterfront door to the outside.

### Learning from Guggenheim: 2pm-5pm

Today a great art historian is invited as part of a lecture series. He has settled in the backstage lounge, at the auditorium level. Enjoying the view out, he reads his notes one last time. For this presentation, the online reservations have reached one hundred people and organizers anticipate twenty additional listeners. In anticipation the technicians have deployed one of the two units of removable bleachers in the auditorium. In the event square, which is now playing the role of green room, the public gathers before taking their seats in the auditorium. To these viewers one must add the multitude of curious gazers who, walking past the museum, can see the flow of the presentation through the acoustic windows surrounding the room. Indeed, the configuration of a bright room visually opened to its surroundings was preferred this afternoon to the black box, artificial light configuration. Approaching the end of his presentation, the professor simply requests to close the curtains in order to conclude with a video projection. A public debate will follow the conference on the other side of the hall.

After the presentation, the bravest can deepen their knowledge of art by joining a guided tour programmed at 4PM. At the rendezvous point, a mediator is already exchanging with his group introducing his presentation with the «signature art piece» in the foyer.





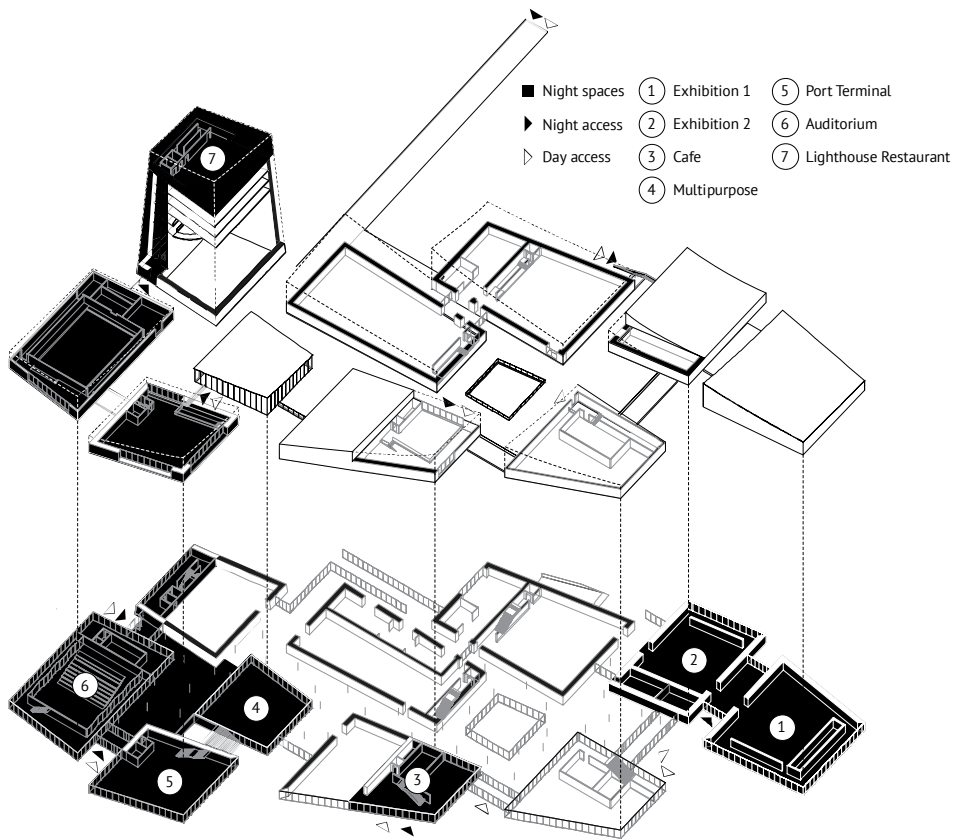
Sunset on a new landscape: 5pm-7pm

As the sun begins its descent, the landscape offered on the roof of the *in between* space by the curves of the pavilions reveal a new and freely accessible experience. This suspended terrace works like a sculpture garden. Its contours grasp the burned timber volumes, creating multiple spatialities and a special intimacy between walkers and artworks. Due to the unique set of frames running through it, the terrace is busy day and night. This path is also animated by the cafe, the terminal, the auditorium and the tower. It echoes the *in between* space.

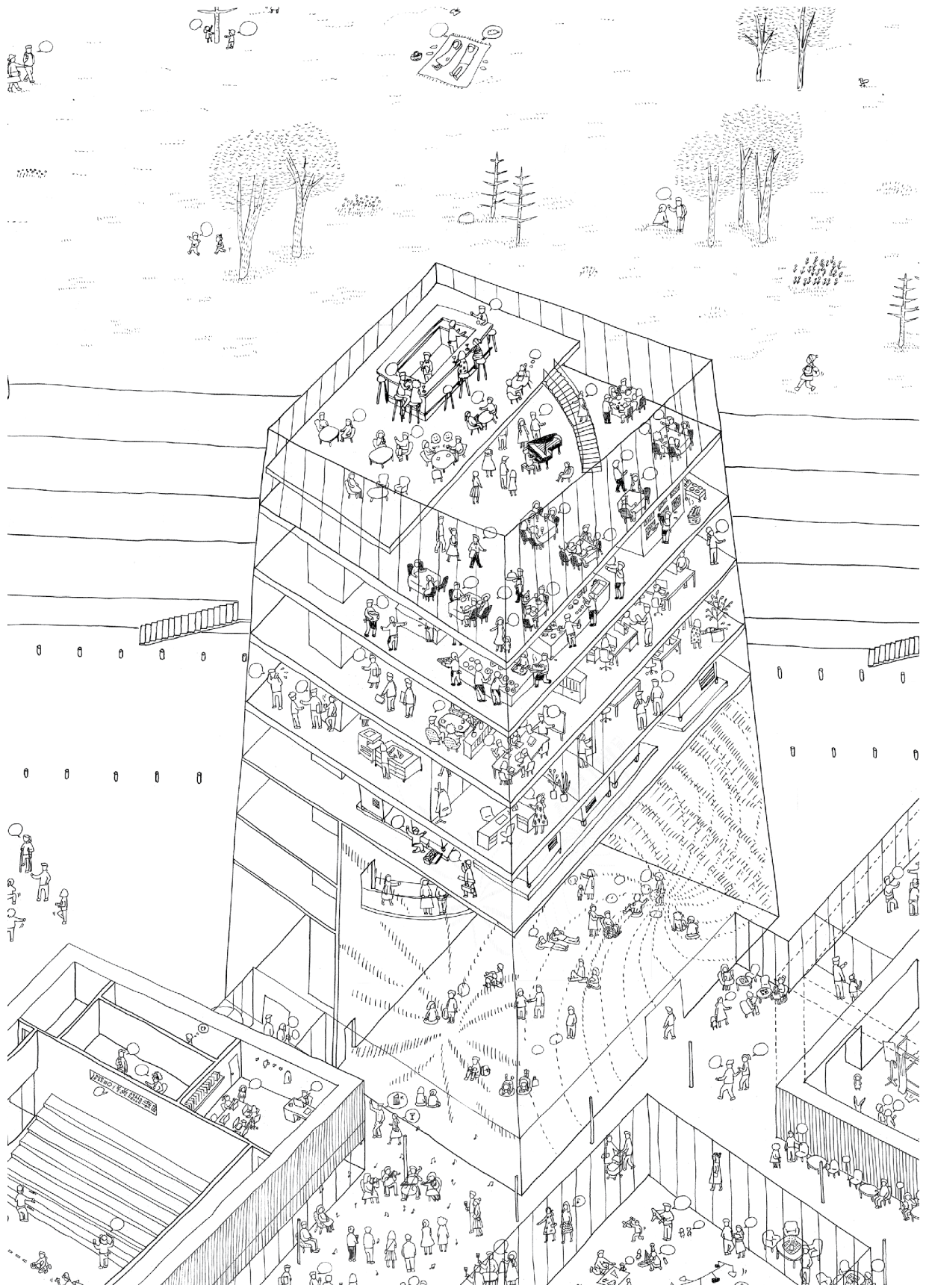
Descending from the terrace through a large exterior staircase, people reach the quay. It is 5.30PM, most of the boats have left the historic port for their destinations. Candelabras arranged on the whole site gradually illuminate, extending the inner space outward. The public space that gives onto the Eteläsatama is lifted to match the floor elevation inside the museum. It's a nice place for a digestive stroll. The humble design of the ground uses slightly pink cobblestones, merging with the existing site. A subtle addition of vegetation to the public spaces creates zones of grass. The gentle slopes on *South square* are still used by groups of people laying back to witness the sunset. Closer to the water, an emmarchement stretches towards the museum creating space for sitting and rest. At the east and north entrances, a walk wraps around the museum store. It is almost 7PM and the museum will soon close its doors. For another hour, the museum shop and the cafe will remain open though. Accessible from inside the museum, from the dock or from the suspended terrace over the public staircase built into its volume, the shop can operate independently. From postcards to pieces of furniture, the Guggenheim's shop is a meeting place for art lovers.

### Night at the museum: 7pm-11pm

At 8PM the vernissage starts in the northern galleries while the main museum has closed to the public. This is made possible by exterior access to the junction of the two pavilions. The project space, at the forefront of the museum building, is dedicated to Finnish artists and sends a clear signal to the city center and the visitors approaching the museum. This is an important factor for the integration of the museum into the contemporary art scene because it can be visited outside the main hours of the museum. Northern galleries can be easily combined to form a unit of around nine hundred square meters. This flexibility illustrates the open and combinatory nature of the project. It is one of the greatest opportunities for the concept to achieve a lively museum day and night. Galleries form a continuous sequence of exhibition spaces totaling more than three thousand square meters. However, as displayed today, several access points allow for a sophisticated combination of spaces and experiences.

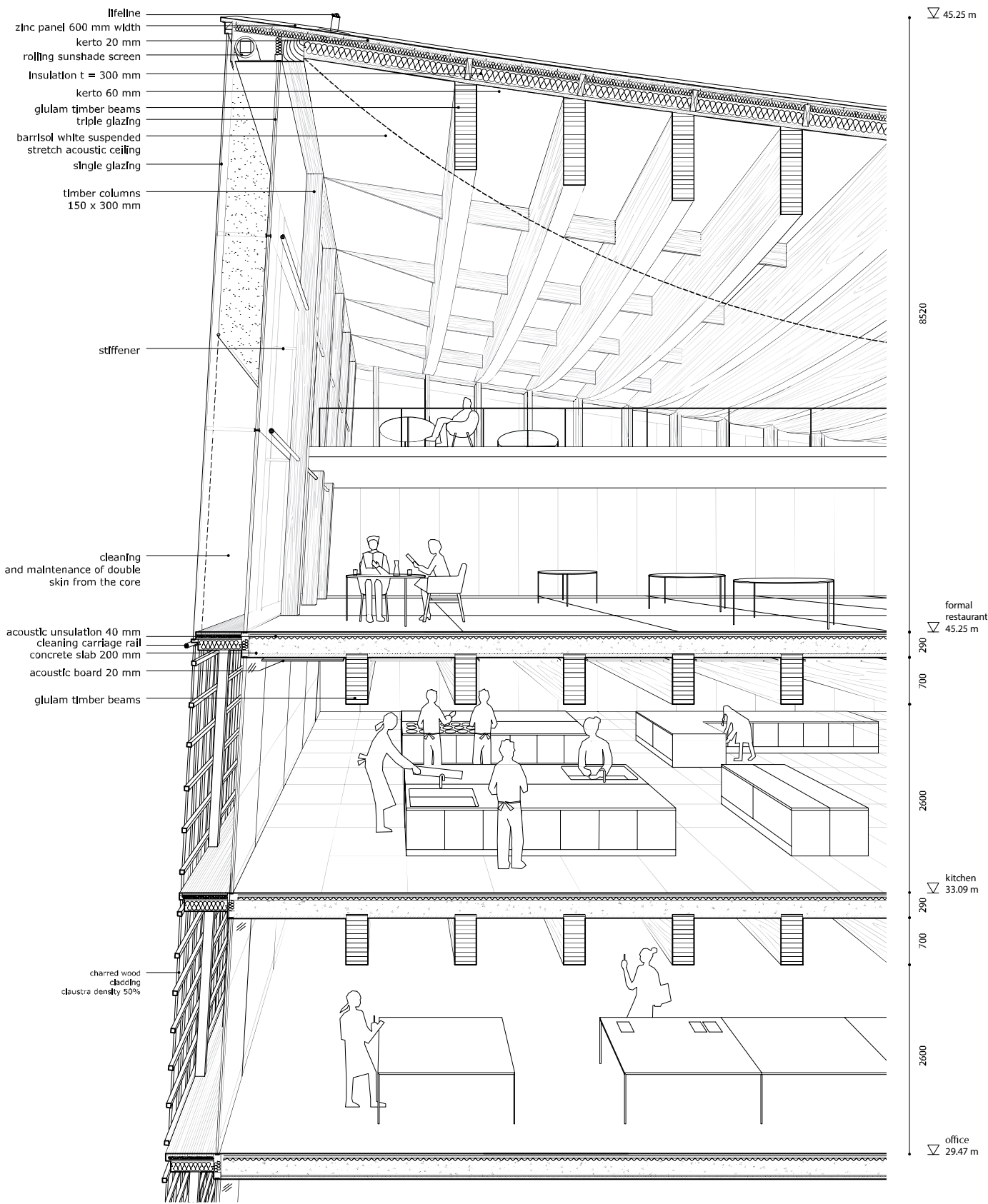


The pavilion's autonomy



The tower and its Lighthouse restaurant





Detail of the tower 1/50

As guests of the vernissage discover the work of the invited Finnish artists, on the South side of the museum, preparations end in the auditorium. Indeed, the room and the lobby were leased tonight for a special performance of a conservatory's quartet. Tonight, the maximum room capacity is reached with two hundred seventy five spectators. The night hall can accommodate the large audience at intermission and at the end of the concert. This space is the articulation that connects major functions of a dynamic museum: the auditorium, the multipurpose hall, the tower and the monumental gallery, the terminal and the restaurant on the top of the building. Combining these elements, large events can be organized around a central « public square » within the museum, while the rest of the galleries are closed at night or cordoned off during opening hours.

For the lucky ones, the evening continues forty meters above the ground, in the panoramic restaurant. From there, people can enjoy the stunning views over the city of Helsinki and the iconic roof scape of the Guggenheim museum. Accessible from the *South square*, with a drop-off zone, as well as from the park via the suspended terrace, the restaurant is located at the top of the tower. This is undoubtedly one of the most remarkable spaces in the museum. From the inside, the sixty guests enjoy breathtaking views of the surroundings. From the city, the restaurant shines like a lighthouse lantern, visible for miles.



The *Lighthouse* restaurant



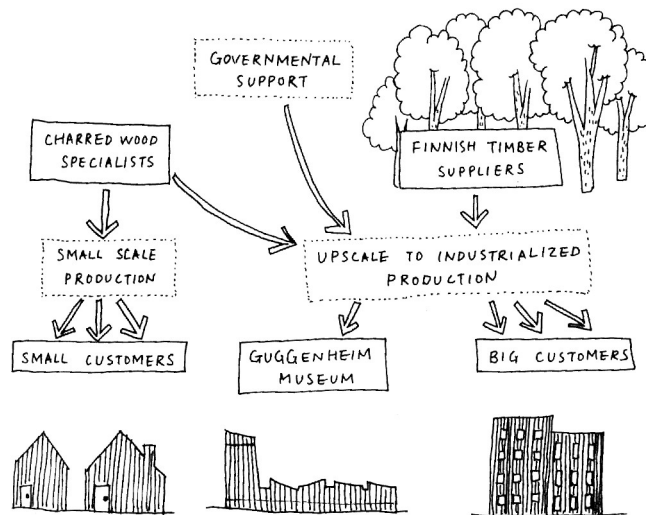


Burned Forest © Aaron Blatt

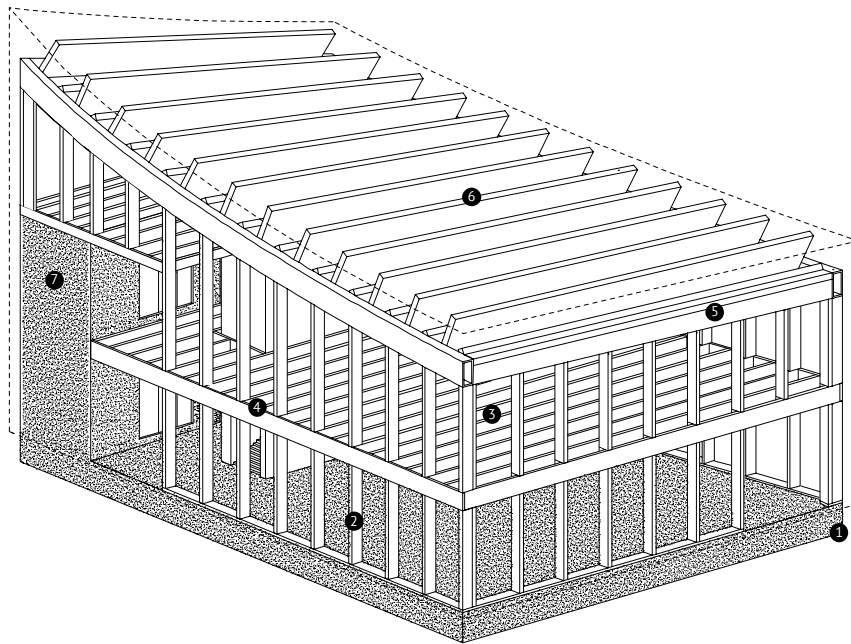
## BUILDING THE MUSEUM

The world is a finite system and the resources and energy needs over the life cycle of the materials we use in our built environment are responsible for significant impacts. It is also important to recognize that materials provide considerable benefit playing a fundamental and important function within the built assets in which we use them. Whether a material is part of a façade, landscaping environment, bridge, or building structure, an approach that examines the full life cycle of the material should be used to minimize overall impact whilst at the same time maximizing the benefits it brings. Delicate materials are relevant in low traffic areas. On the contrary, robust material add their efficiency for heavily used spaces. Within this context, material sustainability is about striking the right balance between performance benefits and the environmental or social impacts of the design solution, material selection and specification.

The proposal pays homage to the great tradition of wood construction in Finland and explores its state of the art technology. Thus, local building techniques are part of the design process. That is why we naturally use Finnish materials when possible in order to limit the transport distances and stimulate local suppliers. A simple design engages the notion of partial or complete deconstruction combined with healthy and safe materials to continue the building through time.

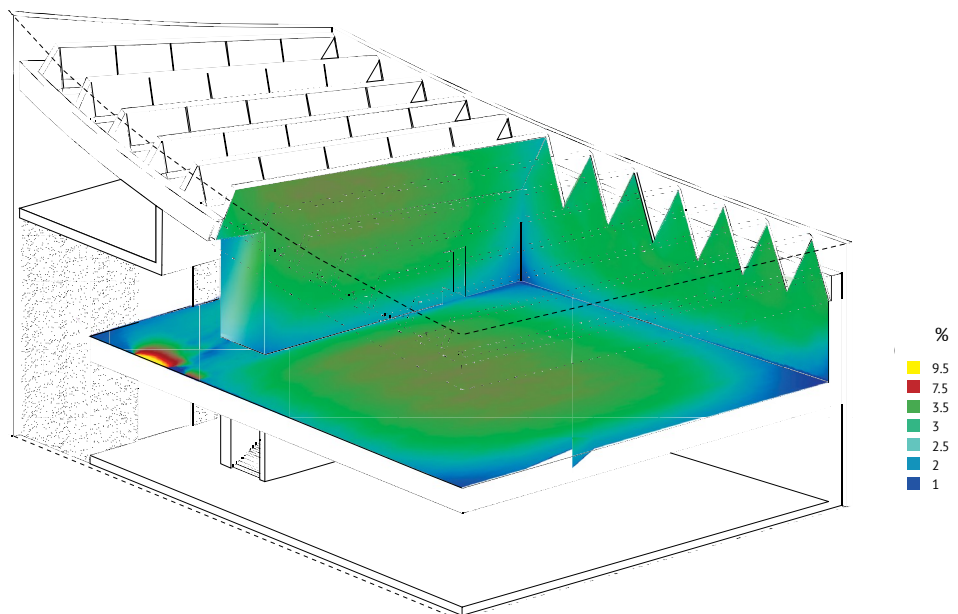


Promoting process for innovative materials



- |  |                                       |
|--|---------------------------------------|
| ① Concrete water tight box                                 | ④ Edge timber beam 1000x160mm         |
| ② Timber columns   | ⑤ Crown timber box 1400x700mm         |
| ③ Network timber glulam beams<br>1000x240mm (1.5m spacing) | ⑥ Shed / Kerto V beams (3m spacing)   |
|  | ⑦ Concrete bracing shaft art elevator |

The pavillon's skeleton



Daylight factors studies



The project's design with its charred timber cladding echoes the process of regeneration that occurs when forests burn and then grow back stronger. The *Shou Sugi Ban*, a technique of charring known for centuries, improves the properties of soft wood. It results in a more stable and durable material with better fire properties and an explicit aesthetic. Wooden profiles are burnt and brushed twice with an oil that invigorates the structure and color of the material. A service life of over fifteen years is then expected. Currently the technique is mastered and industrialized for the building industry by a handful of specialists in Europe. In order to provide the large quantity of product, a partnership between timber suppliers and charred wood experts should establish a solid source for the material with short lead times. The Guggenheim Museum Helsinki will serve as a catalyst by making a large initial order and showcase the material globally. Strategies to support and scale up the production would highlight general ecological commitments.

The timber primary structure is designed to be prefabricated off site, limiting construction times on site and the possibility to have a more suitable production environment. As the Guggenheim Museum is directly located in the harbor, this opens up opportunities to transport in an energy efficient way large elements that cannot be transported over land. This structure has been designed as timber or timber-hybrid construction upon a concrete water-tight box. As buildings height is either one or two floors, except for the tower, the basement of the concrete box can easily deal with vertical loads. The concrete construction is designed for limiting crack width and constructed without joints.

The building facades have been developed to offer a great protection from the continental climate of Helsinki while providing the best conditions for art conservation. Envelopes have a high performance, with low U-values and excellent air tightness to minimize excessive heat losses. It aims at ensuring good inside atmosphere in synergy with day lighting strategy and tying into the design for building services, whilst allowing for surprising and grand views to the harbor and the city.

The project focuses to achieve LEED gold certification with relevant building services and specific sustainable strategies. Zero carbon and low energy sources are considered where appropriate and financially viable to improve our design.

First, the design guarantees robust and efficient technical components in order to reach world class art conservation requirements. In addition, the project affirms a strong environmental commitment by using low energy systems and passive energy strategies supported by environmental control systems. An overall program building consummation provides a global monitoring system for artists' interactions, energy

savings, lifecycle of maintenance components and modularity. This corresponds to both built and run the building in an environmental way.

The air handling units and ventilation distribution systems are generously sized to decrease air system pressure losses, and use variable speed fans to minimize the building's ventilation energy demand. They also include high efficiency thermal wheel heat recovery sections and recirculation chambers linked to carbon dioxide sensors. It assures an optimal amount of fresh air to ventilate the spaces, decreasing the amount of conditioning energy required. The systems have been designed to minimize the building's active heating and cooling loads for as much of the year as possible. However, peak periods still require a heating and cooling supply, particularly to future proof the building against climate change. Heating and cooling water distribution systems are similarly designed for low pressure loss, and circulation pumps are at variable speed to reduce pump energy during part load periods. Electrical lighting is low energy LED fittings controlled by time and occupancy sensors. A full and sophisticated building management system is used to ensure that all services are provided only where and when required.

The central exchangers and distribution equipment circulate heating and cooling water via an underground "services highway" horizontally to each pavilion. Non-gallery spaces are heated via perimeter trench heaters, located at the façade where most heat loss occur. Heating in gallery spaces is via underfloor heating zones, also around the perimeter, providing comfort radiant heating to occupants without creating air currents across art work on the walls.

The building's cooling requirement is expected to be low as most of the year the external air temperature is below the rooms' target. Any additional cooling required to cover peak periods are provided by cooling coils in the air handling units.

Central electrical rooms are located below the slope on the West side, to make servicing and replacement easier. Electrical distribution through the building is also via the underground services highway from the central plant to each pavilion. Electrical small power and IT cabling distribution are also via conduit cast into the floor connected to regularly distributed floor boxes. A generator provides a back-up electrical supply for life-safety and art conservation systems, located close to the loading bay, again for easier maintenance and diesel delivery access.

Domestic hot water is generated from the building's district heating connection and distributed via the underground services highway.

Opportunities for autarkic energy sources were considered such as ground or



The footbridge in the vertical gallery

water sourced heat pumps or biomass combined heat and power units. But the design proposes connecting into the city's district networks as required. Those are considerably cheaper than stand-alone local energy production, both in terms of initial capital cost and long term maintenance and operational costs. The city of Helsinki already incorporates several waste heat, recycled heat, and low carbon energy sources into its energy mix, offering a higher efficiency and much more convenient source of heating and cooling, that can take advantage of longer term goals to decarbonize the city's energy grids.

To reduce the drinkable water demand of the building, rainwater, grey water collection and recycling systems are investigated for façade cleaning and potential irrigation.



The northern gallery

## The galleries

The galleries are designed to appear as individual entities grouped in a village. The signature roofs of the exhibition pavilions have been carefully designed to maximize the penetration of diffuse natural light, whilst avoiding direct daylight that could damage the art works. This will have a significant impact on the amount of energy required for gallery lighting as well as produce the highest quality light conditions for viewing artworks.

The structural beams supporting the skylights are arranged orthogonally in relation to the exhibition walls. The diffuse daylight from the North enters the space and is evenly distributed both in the center as well as on the walls. This shed geometry is based on deep V beams. This structural system is constructed using Laminated Veneer Lumber to carry loads across the wide open floor span. This efficient structure composed of independent elements can handle heavy suspensions for art works, exhibition preparation and maintenance.

The glazing of the skylights is translucent, with high color rendering properties and contains a ultra-violet filter, so that the damaging part of the radiation spectrum does not reach the exhibits. A daylight factor analysis has proven an average daylight factor of around 3.5% on the floor. On the walls an average daylight factor of around 2.5% can be expected. These values can be adjusted by a smart roller blind system to reach the 150 to 250 lux required. It regulates the amount of incident daylight falling into the interior spaces with different light transmission properties including a black out layer. This velum between the structural beams scatters the daylight, acts as an acoustic component and serves as a diffusor for artificial lights.

A set of dimmable LED luminaires mounted behind the horizontal velum provides light to the exhibition spaces. This system is programmed to bridge any change of daylight intensity thanks to sensors spread through galleries. Additional lighting tracks are proposed, mounted at the edges of each velum and supported by structural beams. Those spotlights provide a flexible accent lighting of both exhibits on the walls or in the center of the space. Very high color rendering for both the electric diffuse light and the spot lights is used in order to bring forth the color qualities of the exhibits.

Given the tall open-plan spaces displacement ventilation is a perfectly suited solution that maintains high levels of comfort in the occupied zone with less energy than that required in a conventional mixing system. It is carefully designed to ensure that the temperature gradient does not increase too rapidly within the installation zone for art works.



## The tower

The forty five meters high tower is an iconic architectural feature that hosts a variety of programs. At the bottom, the vertical gallery enjoys the same efficient technical solutions as the rest of the galleries. Up high, a double skin provides shading, views and comfort to users. Indeed, at office level, a set of charred wood claustra is mounted on a translucent build-up. This burn filter block the solar gains in summer while letting it entering in winter to provide passive heating. At the very top, the external skin of the restaurant is flushed with the clad below. Overall, this facade design provides a calming gradient of semi-transparent to transparent as seen from outside, especially at night.

The traditional second skin of the restaurant façade includes flexible blinds integrated in the cavity that can be lowered on demand. The blinds are protected from wind and rain while providing excellent sun shading in front of the triple glazed skin. Glass units comprise of triple glazing with a gas infused cavity, a solar coating and low-iron glass, to increase visual comfort as well as thermal performance. This double skin is well ventilated to ensure the heat absorbed by the system is exhausted naturally via convection through the cavity. The internal façade mullions are mounted to the structural timber columns along the perimeter, to limit visually obstructive elements and for material efficiency. Fires stops are integrated between the storey-high screens to improve the performance of the construction.

The formal restaurant receives a full timber roof. This glulam beams structure carry all loads such as the timber sandwich structure with a decking at the bottom including an acoustical treatment, thermal insulation in the middle and decking with a waterproofing layer on top.

The structure of the floors in the tower is hybrid, combining a concrete floor strengthened with glulam beams. Timber provides strength in tension and reduces the overall weight of the structure. The concrete floor adds mass for acoustic, dynamics, thermal storage and fire compartmentalization.

The suspended ceiling of this frequently crowded space acts like an acoustic veil with a double curvature. A colorful projection on this element highlights the space.

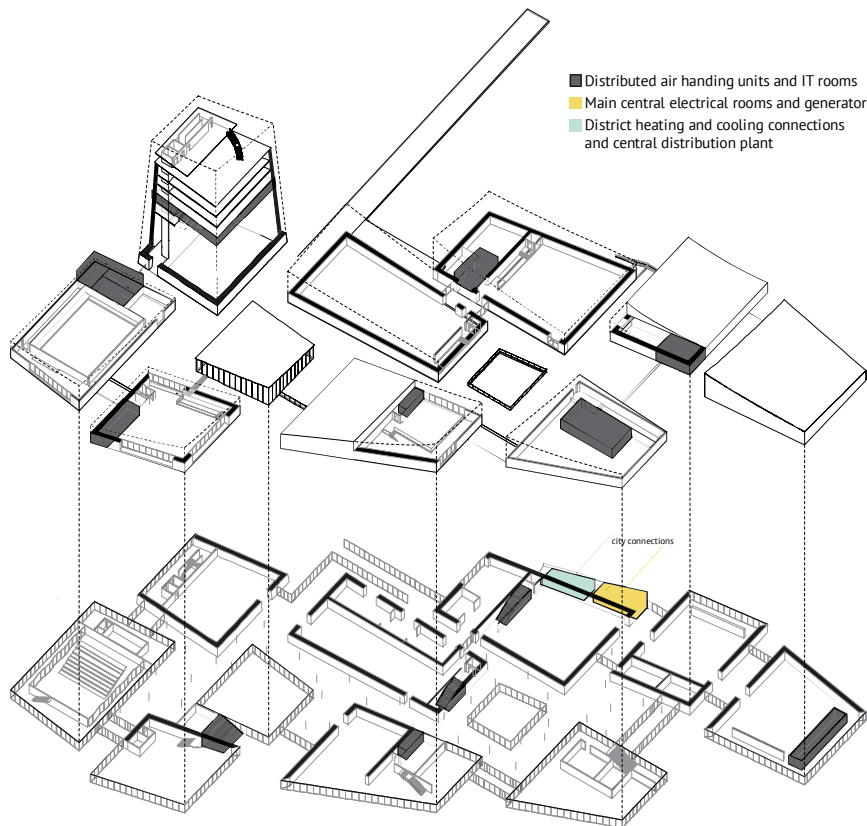


The vertical gallery

## The *in between* space

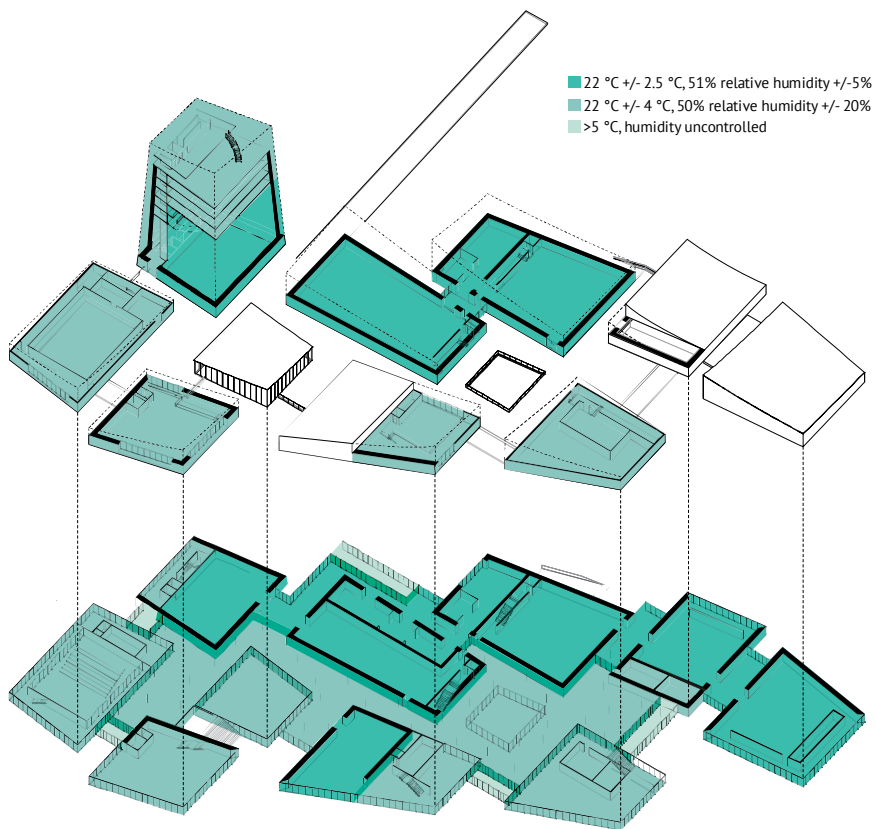
The *in between* space offers two levels for pedestrians to circulate: the inside street on the ground floor and the suspended terrace above. Its structure is based on an irregular pattern of steel columns combined with a concrete flat. Connecting the park to this suspended terrace, the footbridge is constructed as post tensioned concrete flat slab with very slim edges.

The *in between* space converses with pavilions while supporting additional functions. It should provide the visitors a neutral place to contemplate and process the impressions gathered in the exhibitions and offer the possibility to have magnificent views to the harbor. Therefore the façade is designed using the most delicate, though robust, construction so as not to be distracting from the view. A slender fiber reinforced plastic spacer structurally bonded to two monolithic storey-high glass panes ensures an excellent thermal performance and the structural integrity of the façade. The architecture allows daylight and solar radiation to penetrate deeply into the building throughout the year. The acoustic conditions are comfortable thanks to an absorbing continuous white ceiling and additional acoustic elements hidden behind the charred wood inner facades. This is reinforced by unparalleled geometries.

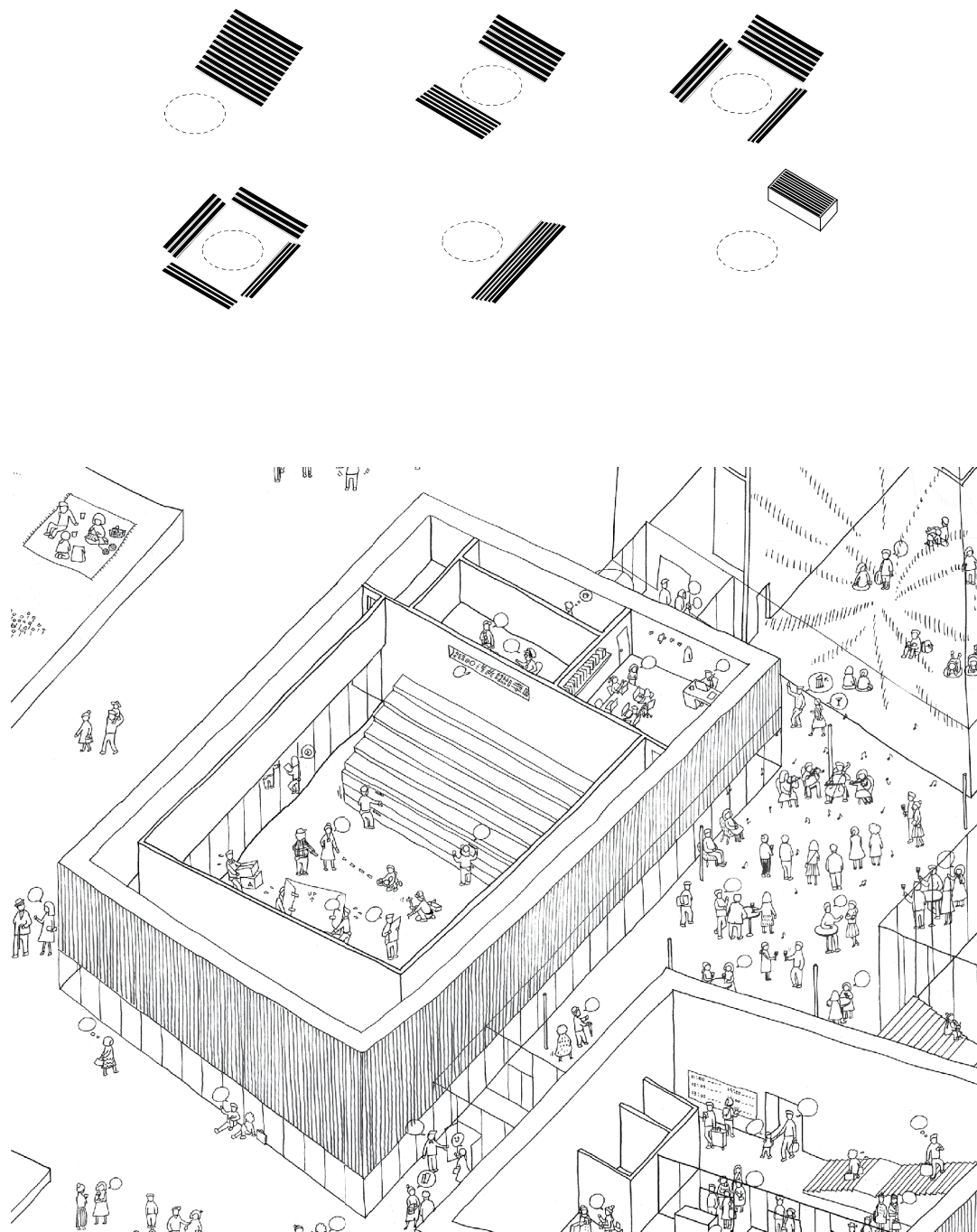


The fragmented technical rooms

In the *in between* space, the closer occupants get to artworks, the more precisely control climate conditions are. This design is like a *thermal cocoon*. Every direct entrance from the outside has a wind lobby, to minimize ingress of cold air, gusts of wind and external noise. This decreases the building's heat load and prevents infiltration of unfiltered air and audio disturbance, thereby acting as the first moderator of the external climate. The internal street is the second moderator, establishing a more constant internal environment with acceptable levels of modulation throughout the year to maintain comfort conditions. Finally the exhibition spaces, which require the strictest climate control, are slightly over pressurized by the ventilation systems to minimize infiltration from the internal street. This way, the fluctuations in the external environment are gradually reduced and brought under control before unconditioned infiltration air reaches the artwork. The internal street is also served by a displacement system via side-wall diffusers integrated into partition walls and fixed furniture.



The *thermal cocoon* concept



The event space & its configurations



## The event spaces

The auditorium hosts a large variety of performances and events which requires variable acoustics. This variability is obtained with the introduction of movable acoustic elements such as moving panels, drapes or acoustic banners. Every acoustic element is totally integrated to the architectural proposal. Acoustic design criteria for the auditorium are set for room acoustics but also for the noise from and to the outside with special intention on internal sound.

The site is located in an urban area with a double-carriage way on its West face. In addition, the important ferries traffic with daily loud noise from fog horns imposes a special care on controlling the noise penetrating the building. To solve it, the auditorium is equipped with a double skin glazed system with a corridor in between.

There are two principal design criteria for room acoustics. First, an appropriate reverberance and clarity. Second, the absence of acoustic faults. The proposal aims at respecting a reverberation time of 0.9 to 1s for programs such as conferences, dramas, cinema or projections. This value is between 1 and 1.2s for amplified music and 1.2 to 1.4s for recitals. Obviously, it respects the NR25 target about the background noise from mechanical services.

The auditorium has a very low background noise allowing dynamic contrasts of the sound levels and dramatic silences. It offers a sound clarity in particular for the voice and good sound coverage across the audience. The room is free of echoes or other acoustic defects and has a good low frequency response.

The choice of wavy glass and acoustic material on room boundary surfaces control reverberance at low frequencies, avoiding boominess of the amplified sound. Intimacy and clarity are assured by arranging the audience so that all the listeners are close to the stage. The modest size ensures that the loudness is good. The wavy glass façade and a reflector above the stage prevent the coloration of sounds by flutter. Natural light can shine through the lateral walls and their wavy geometries act as sound diffusers.

Above the low glassed façade on rear walls, the auditorium is equipped by sound absorbing mineral wool and covered with fabric in order to remove potential slap back echo to the stage area.

The opaque stage wall reflects and diffuses sound. Also, the control room windows will be angled and as small as possible to reduce possible echo issues.



The ground floor of the third gallery, *pop sixties and minimalism*



The ground floor of the third gallery, *pop sixties and minimalism*



The forefront gallery, *project space for Finnish artists*





Models studies



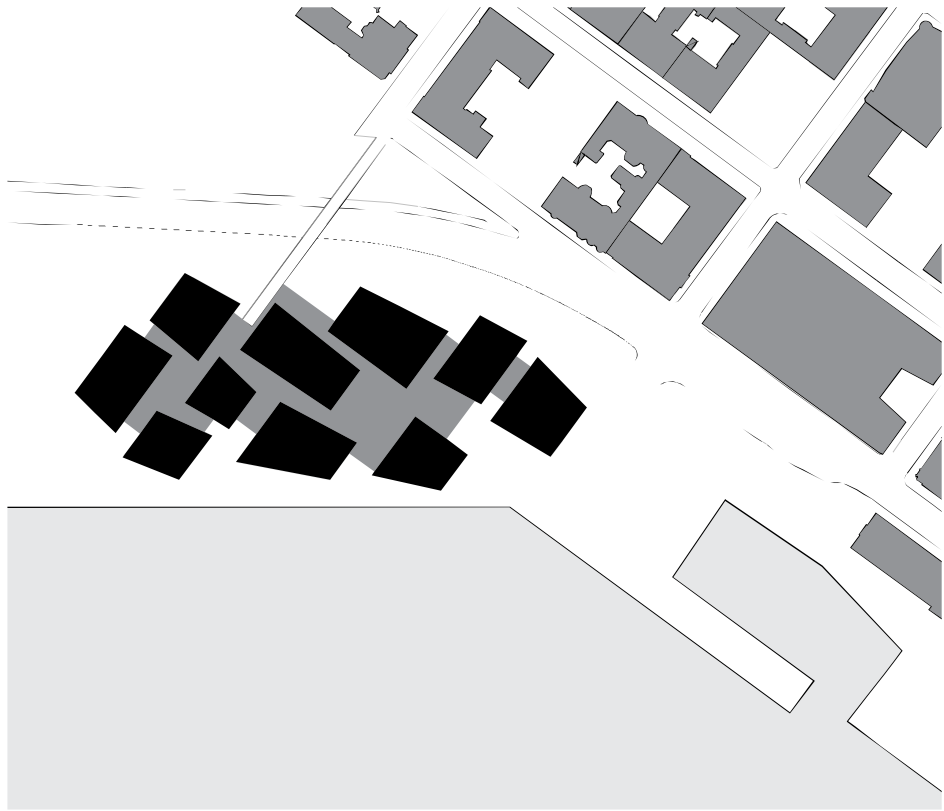




The mind map



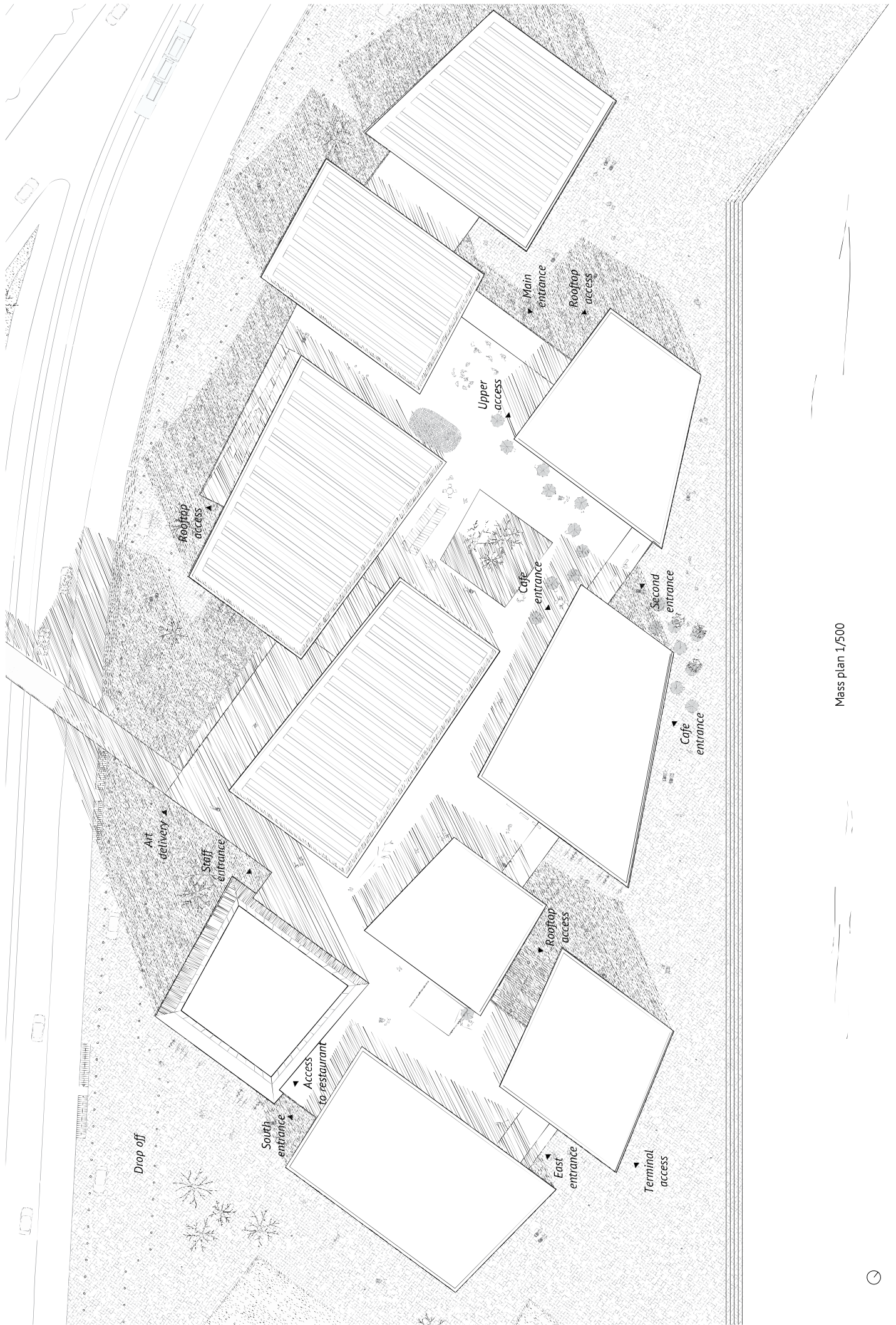
## APPENDICES



Master plan 1/2000



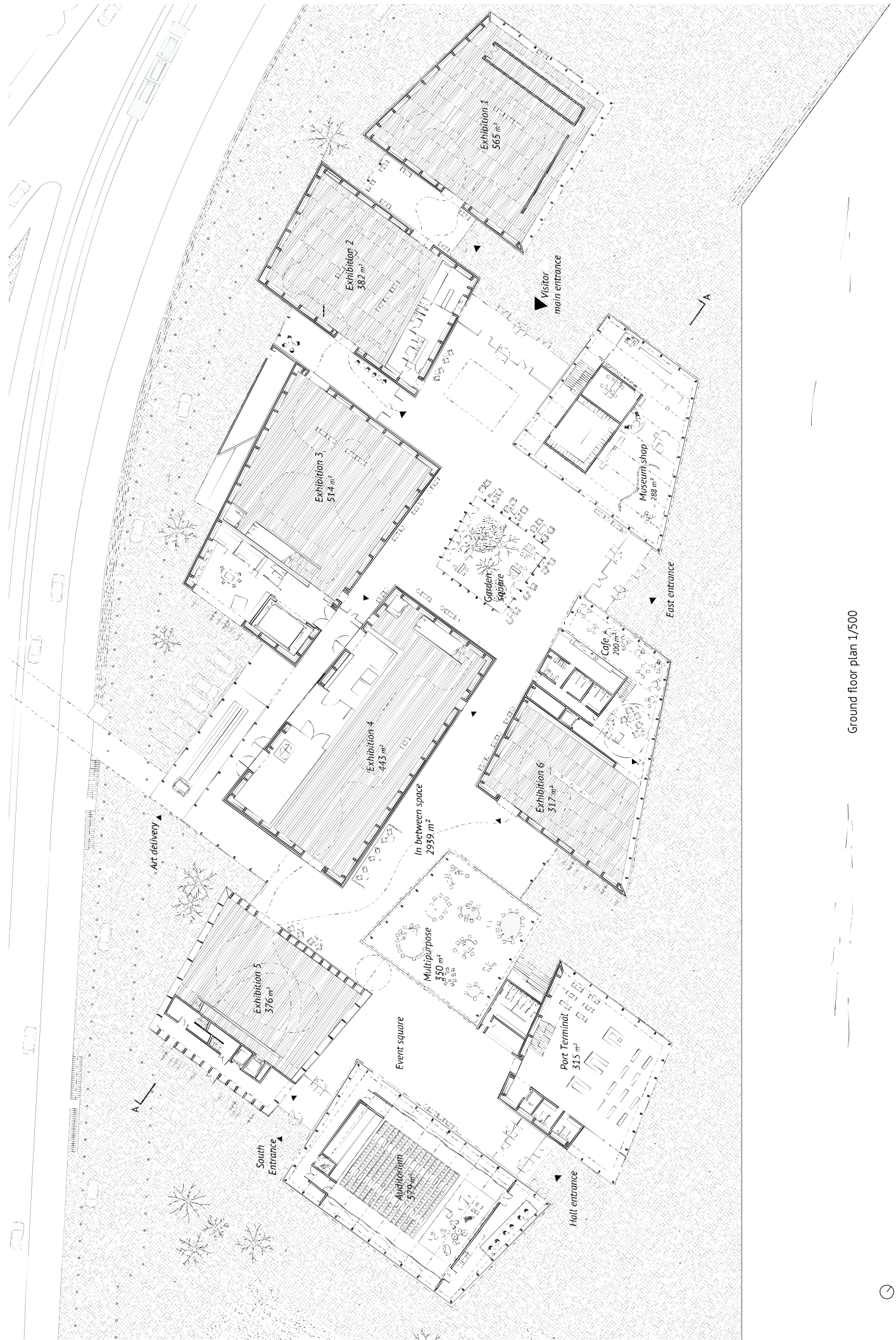




Mass plan 1/500

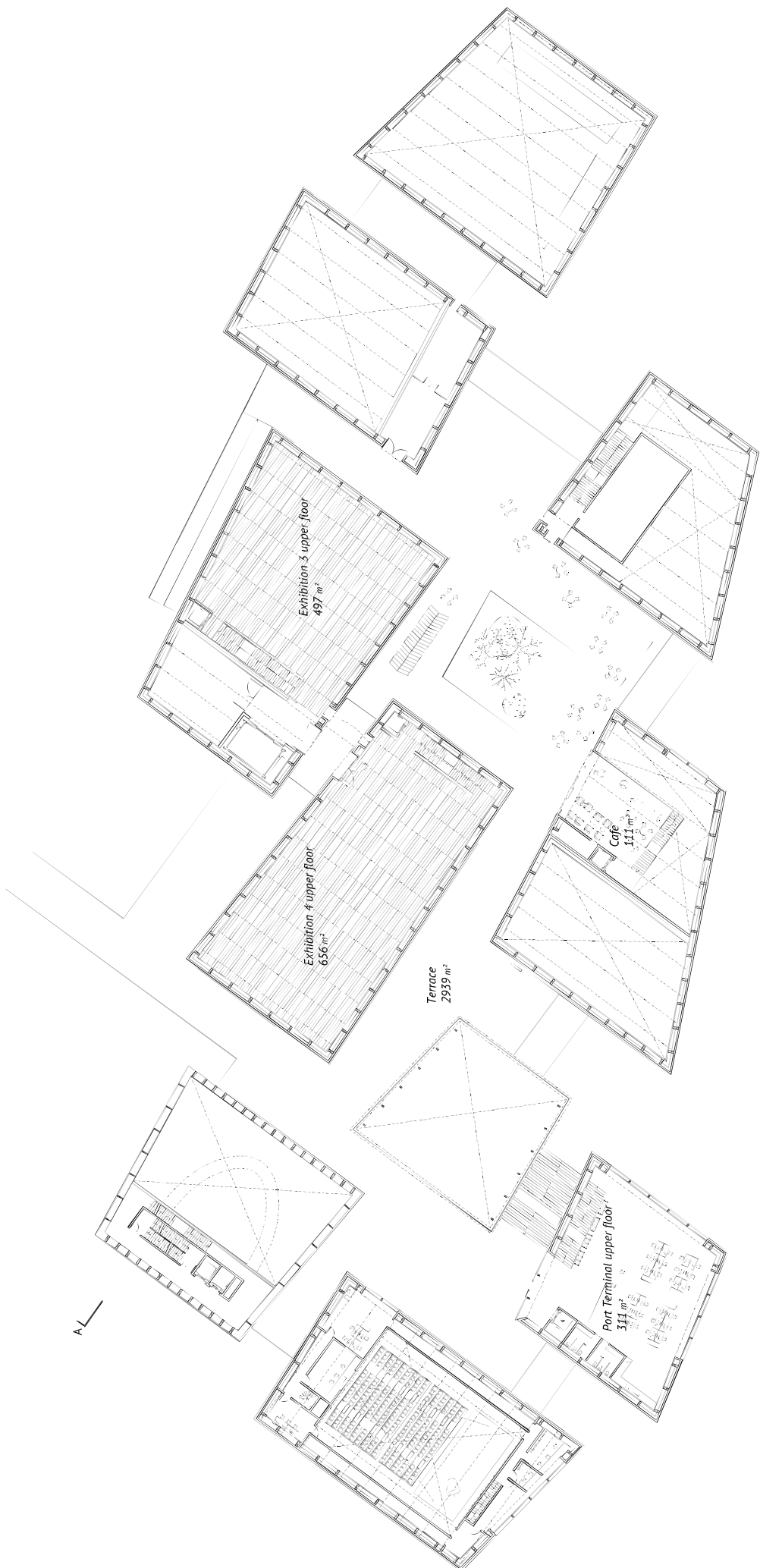






Ground floor plan 1/500

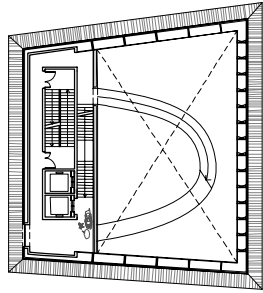




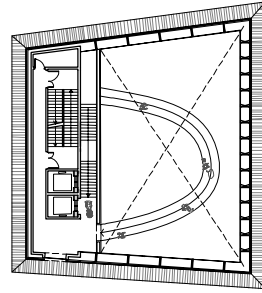
Upper floor plan 1/500



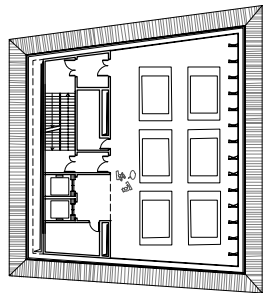




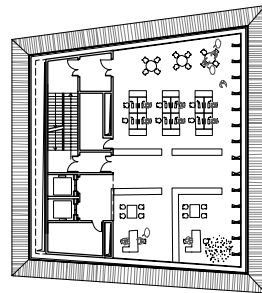
+16.1m Exhibition 5 balcony 1  
34 m<sup>2</sup>



+19.3m Exhibition 5 balcony 2  
34 m<sup>2</sup>

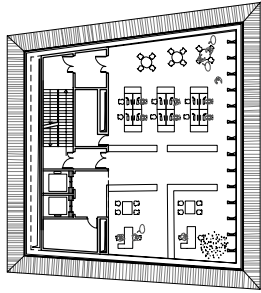


+22.5m AHU / IT  
273 m<sup>2</sup>

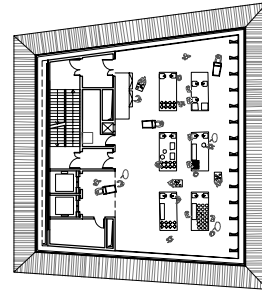


+26.1m Office  
272 m<sup>2</sup>

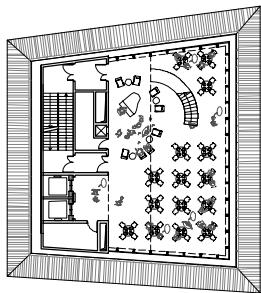




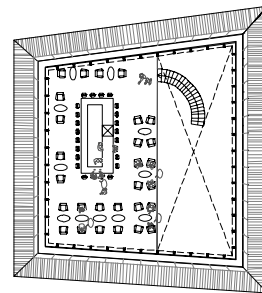
+26.1m Office  
272 m<sup>2</sup>



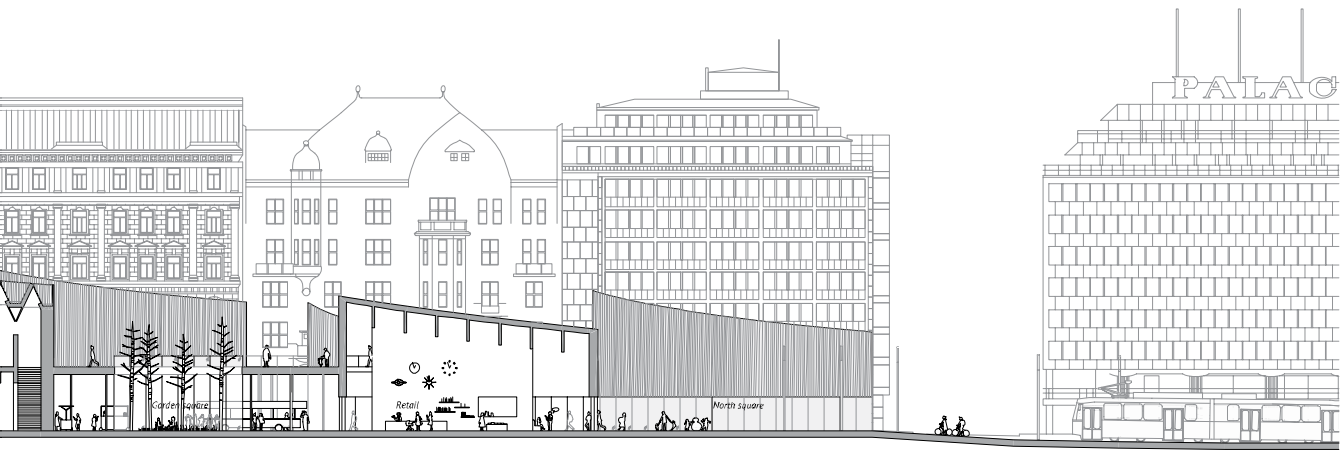
+33.1m Formal restaurant kitchen  
253 m<sup>2</sup>



+36.6m Formal restaurant  
243 m<sup>2</sup>



+40.1m Restaurant mezzanine  
170 m<sup>2</sup>





## COST ESTIMATE

The TAKU® 2015 cost data system operates on the target price method (Tavoitehintamennettely program) for budgeting. It enables calculating budgets for new construction or renovation projects. It can be used as a part of feasibility studies or project planning, for construction or renovation cost assessment and repair debts for already existing or damaged buildings. The system also offers a Rakennusosa valuation method for budgeting the planning phases and evaluating the cost of the plans. [www.hahtela.fi](http://www.hahtela.fi)

### Target price calculation with the TAKU system

The cost level is selected based on the project location and time, in this case Helsinki, march 2015.

The cost category is 85,5 (Hahtela). Thereafter, the target price is calculated based on the following steps:

#### 1/ Creating the room inventory

The user must specify the room inventory. All spaces in the building, including passages and technical spaces, are included in the room inventory. The TAKU system contains readily available room types, which are based on an averaged priced building.

#### 2/ Defining room specifications

The target price calculation is based on the quantity and specifications of the rooms. TAKU's readily available room types are attached with room requirements and specifications, which correspond to the typical design solutions and authority requirements. The user may adjust the requirements and specifications room by room. For example, in unusual projects the specifications must be changed to match the features of the building. The following room specifications may be adjusted: the measurements and shape of the room, indoor climate, sound insulation, lighting, HVAC systems, electrical systems, furniture, equipment, dividing walls, loading, connectivity, and indoor surfaces.

#### 3/ Defining project-specific attributes

The Kustannustieto system requires specifying project-specific attributes, such as areal works, foundations, size, systems, and other extra costs (e.g., unusual windows, glass walls, facades, and elevators). These attributes create extra costs or reservations. The attributes can be changed, added, or removed in later stages of the project. Construction management consultancy, property, furnishing, and financial costs are always treated as project-specific (not included in the Guggenheim valuation).

### Refining the target price based on new design

The target price calculation has been updated and refined based on the latest designs with amended room specifications and project-specific attributes. Figures in the Cost Plan Matrix and Fee Tender have been validated and the allocation of the sums has been updated based on feedback from the Interim Submissionista. Reservations have been relocated to their dedicated row in the matrix.

#### Specifications to the items within the Cost Plan Matrix

Substructure: Piles under the tower building + Foundations + Cut and fill related to the building

Frame: Base floor + Pillars + Beams

Upper Floors: Interim floors + Ceiling + Roof

Rooftop: Eaves + Glass roofs

Lift & Conveyor Installations/Systems:

6 lifts (exhibition, tower, cafe, terminal) + 1 cargo lift + 1 lift bridge reservation

Roads, Paths, Pavings and Surfacing:

Areal works: surfaces, earth works, stairs etc.

Bridge construction over the passage

Court yard structures

Courtyard concrete deck

Building equipment

Other specialist items (to be specified) : only the theatre technology assessment has been included here

Design contingencies @ % on (B): reservations for design changes on later stages

Construction contingencies @ % on (B):

Reservations for additional and change works

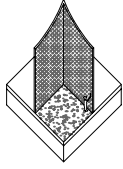
Reservation: extra cost for construction in central location

# Guggenheim Helsinki

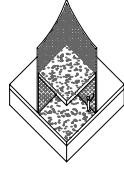
## Order of Cost Estimate

		Port terminal	museum	total		
GROSS INTERNAL AREA = m <sup>2</sup>		794	12437	13 231 m <sup>2</sup>		
REF	ELEMENT	TOTAL COST OF ELEMENT	COST/M <sup>2</sup> GIA	ELEMENT UNIT QUANTITY	ELEMENT UNIT RATE	% OF TOTAL COST
		€	€		€	%
<b>BUILDING WORKS</b>						
1,0	Substructure (including basements)	9 182 000	694			10
2,1	Frame	2 600 000	197			3
2,2	Upper Floors	6 510 000	492			7
2,3	Roof	3 750 000	283			4
2,4	Stairs and ramps	300 000	23			0
2,5	External Walls	6 500 000	491			7
2,6	Windows and External Doors	3 900 000	295			4
2,7	Internal walls, partitions and doors	3 500 000	265			4
3,1	Internal wall finishes	1 641 000	124			2
3,2	Internal floor finishes	2 164 000	164			2
3,3	Internal ceiling finishes	2 070 000	156			2
4,0	Fittings, furnishings and equipment	884 000	67			1
5,1	Sanitary Installations	2 961 000	224			3
5,2	Mechanical Installations	4 845 000	366			5
5,3	Electrical Installations	5 109 000	386			5
5,4	Specialist Installations	500 000	38			1
5,5	Lift and Conveyor Installations/ Systems	2 150 000	162			2
5,6	Builder's Work In Connection with MEP Services	200 000	15			0
6,1	Roads, Paths, Pavings and Surfacing	5 196 000	393			5
6,2	Soft Landscaping, Planting and Irrigation Systems	-	-			-
6,3	Fencing, Railings, Walls and Fittings	-	-			-
6,4	External Drainage	-	-			-
6,5	External Services	-	-			-
7,0	Other specialist items (to be itemised)	1 670 000	126			2
	<b>theatre equipments</b>					
8,00	Facilitating works	-	-			-
	<b>SUB-TOTAL (A)</b>	<b>€ 65 632 000</b>	<b>4 960,47</b>			<b>68,37</b>
9,0	Main contractor's preliminaries	4% 2 625 000	198	0	198	3
10,0	Main contractor's overheads and profit	18,0 % 12 286 000	929	0	929	13
	<b>SUB-TOTAL (B)</b>	<b>€ 80 543 000</b>	<b>6 087,44</b>	<b>0,00</b>	<b>1 126,97</b>	<b>83,90</b>
11,0	Design contingencies @ % on (B)	5% 4 027 000	304	0	304	4
12,0	Construction contingencies @ % on (B)	14% 11 430 000	864	0	864	12
	<b>SUB-TOTAL (C)</b>	<b>€ 96 000 000</b>	<b>7 255,69</b>	<b>0,00</b>	<b>2 295,22</b>	<b>100,00</b>
13,0	Project/design team fees from fee tender (D)	-	-	-	-	-
	<b>TOTAL (E) (E=A+B+C+D)</b>	<b>€ 96 000 000</b>	<b>7 255,69</b>	<b>0,00</b>	<b>2 295,22</b>	<b>100,00</b>
12,0	TAX ASSESSMENT	€ 23 040 000	1 741			24

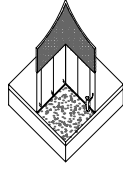
### I BOX INTERIOR



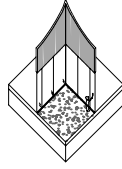
CONCRETE FLOOR  
+ PLASTER BOARDS



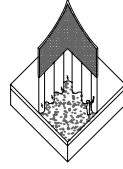
CONCRETE FLOOR  
+ PLASTER BOARDS  
+ UPPER FLOOR



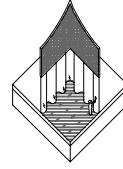
CONCRETE FLOOR  
+ PLASTER BOARDS  
+ TRIPLE GLAZING (H=4.5)



CONCRETE FLOOR  
+ INNER TIMBER CLADDING

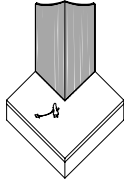


CONCRETE FLOOR  
+ PLASTER BOARDS  
+ ACOUSTIC WAVY  
GLAZING (H=4.5)

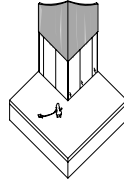


WOODEN FLOOR  
+ PLASTER BOARDS  
+ ACOUSTIC WAVY  
GLAZING (H=4.5)

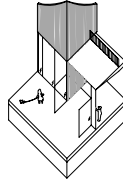
### II BOX EXTERIOR



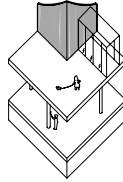
CHARRED WOOD  
CLADDING



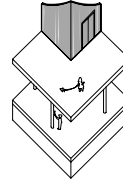
CHARRED WOOD  
CLADDING  
+ TRIPLE GLAZING



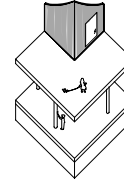
ENTRANCE SITUATION



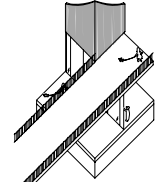
TRIPLE GLASSED TUNNEL  
SITUATION



UPPER DOORS

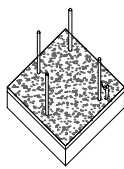


UPPER WINDOWS

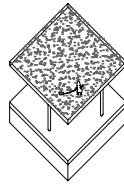


FOOTBRIDGE TO OUTSIDE  
UPPER SPACE

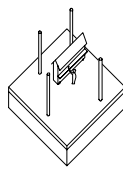
### III INNER SPACE



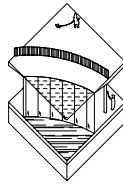
CONCRETE FLOOR  
+  $\phi$  160mm STEEL  
COLUMNS  
+ NO TECHNICAL  
ELEMENTS IN THE CEILING



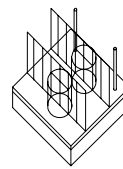
CONCRETE UPPER FLOOR  
+ CONTINUOUS ACOUSTIC  
WHITE CEILING  
(BASWAPHION)



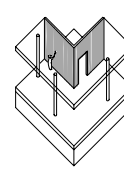
SPECIFIC FURNITURES  
AND MOBILE ELEMENTS  
DESIGNED



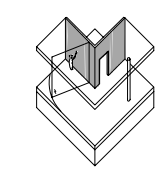
OPENABLE GREENHOUSE



ENTRANCE AS A BUFFER  
ZONE

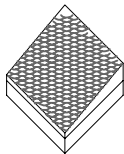


INNER CHARRED WOOD  
FACADE

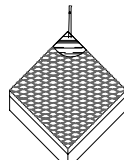


LARGE PIVOT GLASSED  
DOOR FOR ART  
CIRCULATION

### IV LANDSCAPE



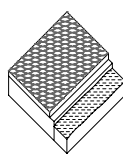
ARCED PAVEMENT



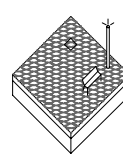
ARC PAVEMENT  
+ VEGETATION



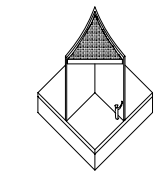
VEGETATION



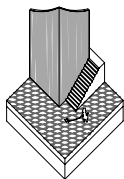
STANDS ALONG THE  
SHORE



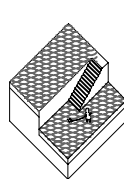
EXTERIOR FURNITURES



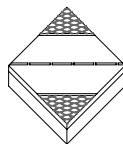
CONCRETE FLOOR  
+ V BEAMS ROOF  
+ OPAQUE INSULATION  
WATERPROOF SURFACE



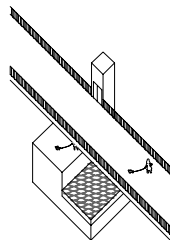
STAIRS ACCES ON INNER  
SPACE



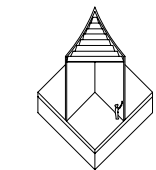
STAIRS ON BACK ACCES



ROAD



URBAN ELEVATOR TO  
FOOTBRIDGE

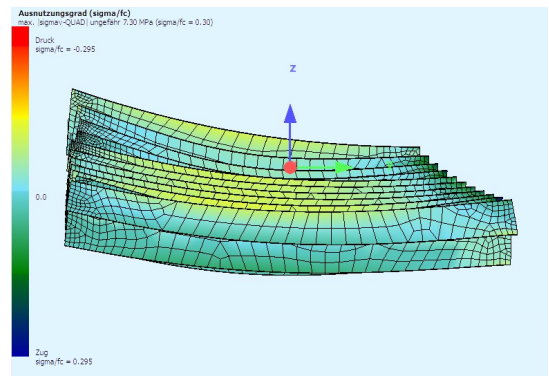
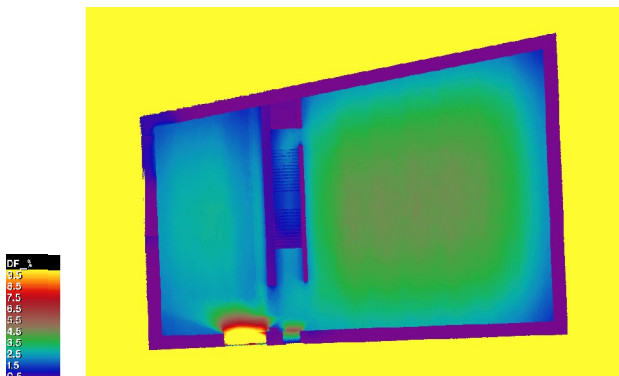
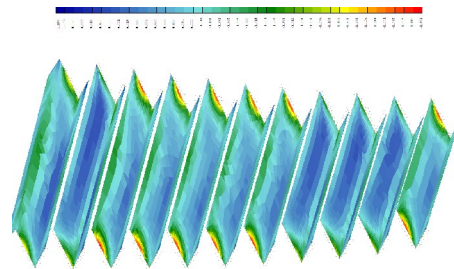
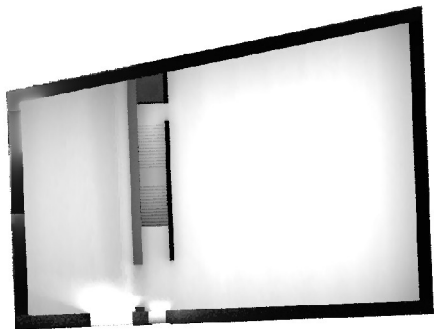


(REINFORCED CONCRETE  
FLOOR)  
+ V BEAMS ROOF  
+ HALF GLAZING SHED  
+ ADDITIONNAL LIGHTING  
+ SUSPENDED CEILING

Guggenheim Helsinki Museum Building				Competition Conditions Requirements				Competitor Provision			
ASSIGNED AREAS											
	Net Square Meters	Net Area	Gross Area	Notes	Net Square Meters	Net Area	Gross Area	Notes			
<b>Exhibition</b>	3 920	56%	32%		4 168	52%	34%				
Exhibition Galleries	3 920			flexible spaces, fully wired	4 168						
<b>Programs and Events</b>	565	8%	5%		870	11%	7%				
Flexible Performance/Conference Hall	500			275 movable seats	564						
Green Room	incl				incl						
Control Room/Projection Booth	incl				75						
Simultaneous Translation Booth	incl				incl						
Movable Stage Platform	incl				43						
Seating, Stage, and Equipment Storage	incl				incl						
Technician Office	incl			2 staff	48						
Dressing Rooms	incl				80						
Multifunction Classroom/Laboratory	65			30+ seats with tables and storage; suitable for all media	60						
<b>Multi-purpose Zone</b>	300	4%	2%		350	4%	3%				
Project Space and / or Atrium	300				350						
<b>Visitor Services</b>	190	3%	2%		191	2%	2%				
Visitor Screening/Bag Check	100			queuing area in unassigned space	97						
Coat Check/Lockers	60			queuing area in unassigned space	63						
Ticketing and Information Desk	20				19						
Storage	10				12						
<b>Retail</b>	300	4%	2%		325	4%	3%				
Museum and Design Store	250			museum-related and design merchandise	288						
Stock Room and Offices	50			including area for 3 staff; assume additional off-site warehouse	37						
<b>Dining</b>	700	10%	6%		987	12%	8%				
Cafe/ Bar	200			120 seats (1.7 square meters/ seat); plus seasonal outdoor seating	313						
Formal Restaurant	130			focus on Finnish food; 55 seats (2.3 square meters/ seat)	383						
Kitchen	370			servicing cafe and restaurant	291						
Catering Prep/Staging Area	incl				incl						
Receiving	incl				incl						
Offices	incl			assume 1 office, 2 workstations	incl						
Trash Room	incl			refrigerated	incl						
Storage	incl				incl						
<b>Offices</b>	500	7%	4%		497	6%	4%				
Administrative Offices	130			10 staff	139						
Curatorial, Exhibition Design, Publications, Archivist Offices	110			9 staff; 3 temp	130						
Education Offices	30			6 staff	41						
Marketing and Development Offices	100			8 staff	97						
Conference Rooms	75			1 room 20 seats; 1 room 10 seats	63						
Shared Work Room/Copy Room/File Storage	55				27						
<b>Collections Storage and Management</b>	350	5%	3%		372	5%	3%				
Art Storage	100			short-term storage only	100						
Shipping/Receiving	50				59						
Crate Storage	50				53						
Uncrating/Staging	50				53						
Shared Art Prep/Conservation Studio and Equipment Storage	70			including 7 staff	74						
Registrar, Conservation, Exhib. Design & Tech Offices	30			5 staff offices	33						
<b>Maintenance and Operations</b>	250	3%	2%		206	3%	2%				
Security Office/Control Room	20			1 staff	21						
Custodial Office	20			1 staff	13						
IT Server, Workroom, and Staff Offices	35			3 staff	33						
Supply, Equipment, and Seasonal Furniture Storage	40				10						
Landscape and Grounds Maintenance Equipment	25			assume outside contractor & off-site storage for large equipment	45						
Staff Lunch Room/Lounge	65			30 seats	61						
Locker Rooms	25			2 rooms; 25 lockers each	23						
<b>Total Assigned Areas</b>	7 055		58%		7 966		64%				
UNASSIGNED AREAS											
	Net Square Meters	Net Area	Gross Area	Notes							
<b>Total</b>	5 045			<b>42% of gross building area</b>	4 471						
Lobbies	incl			assumes generous social/circulation spaces	2 107			in between space + garden			
Circulation	incl				664						
Restrooms	incl				239						
Mechanical/Electrical/Plumbing	incl				259			AHU + IT			
Art Loading Dock	incl				92						
General Loading Dock	incl				incl						
Mechanical/Electrical/Plumbing	incl				incl			already detailed 3 lines above			
Partitions, Structure, Shafts, Stairs, Elevators	incl				1 110						
<b>Total Gross Museum Area</b>	12 100		100%	<b>museum net+ unassigned</b>	12 437			suspended terrace (2980m <sup>2</sup> ) off			
<b>TOTAL BUILDING AREA</b>	12 100		gross sm		12 437		gross sm				

Area schedule





Light & structure studies



GH-04380895

