OPALESCENCIA
Grössling experience

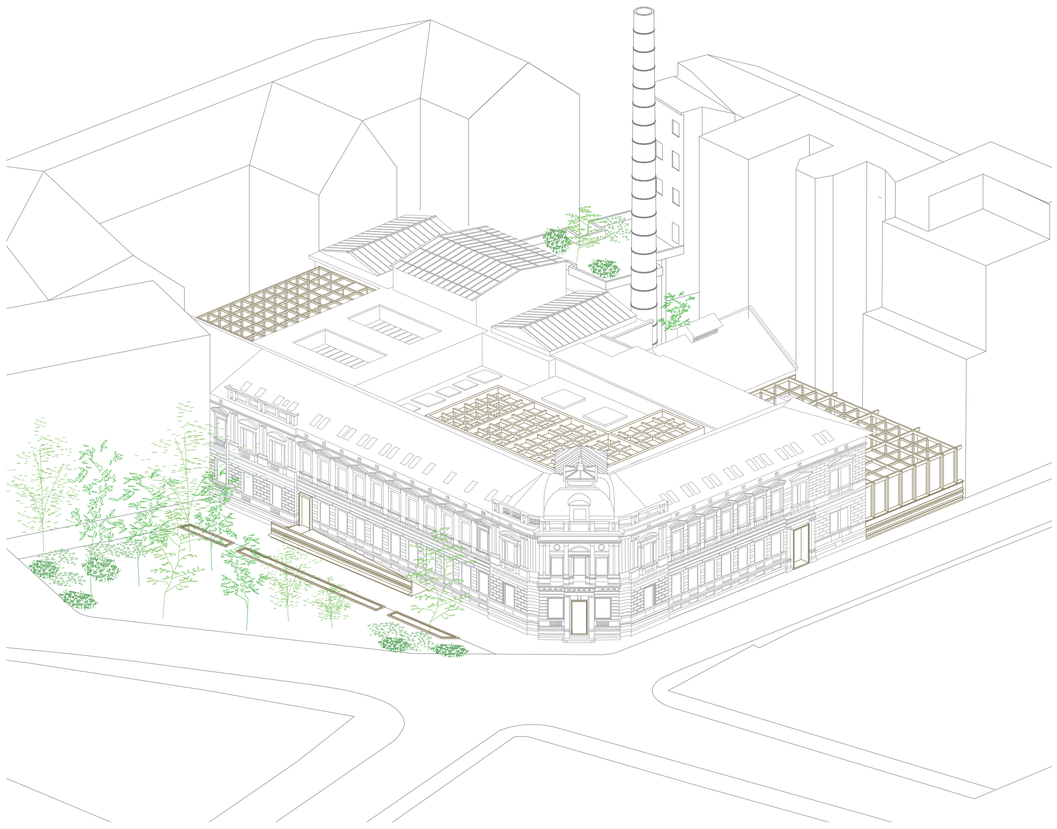
Konštantín Bauer , 1927.

sharpness variation, 2018.

The opportunity to bring the entire Grössling City complex back to life has made it possible not only to enhance its architectural importance, but also to re-emerge the ancient social and cultural value that it has within the city of Bratislava. The vision that provides for the aggregation of functions relating to the Baths, the Municipal Library and the " House for Literature " allows for the implementation of a contemporary model of a complex building that benefits from the multiplicity of functions. The proposal echoes the suggestion of Konštantín Bauer's 1927 painting which sees green lungs emerging within the urban fabric.
Added to this is the idea of making spaces interact through different levels of focus, capable of suggesting users by recovering the ethereal sensation of spas and the suspended atmosphere of a place of meditation.

Interfacing with the city
The pedestrian area redesigned as a park on Medená Street is a public space between the inhabitants of the city and the users of Grössling, constituting the premise for the continuous contamination that will take place inside.
The majestic existing trees and the mainly permeable vocation of this space are maintained. The intervention focuses on an expansion of the paved area close to the buildings. The nearby presence of the café makes the outdoor space the natural extension of the sitting area towards the city during the summer season. Inside the park there is an informal area between the grass and a long stretch of water that exhibits the soul of the building on the outside.
Attention is paid to the ramp (with an 8% gradient) that leads visitors to the entrance to the café and the library. In addition to breaking down architectural barriers also for the users of the City Bath, this device becomes a long outdoor seat with which the project wants to interact further with the city.
The shape of this metal element recovers the existing facade of the building, with the intention of tracing its section. This cast is moved from the position of the original facade to accommodate the ramp.

The treatment of the elevations reflects the design choice aimed at preserving the urban layout and its original value, with the only exception of the entrance portals and the redesigned portion in Kúpeľňa Street. This part of the prospectus externally denounces the essence of contemporary intervention that takes shape inside: the winter gardens.
The façade, however, has a variation with respect to the internal dynamics: the steel and glass facade rests on a base that follows the existing profile with the same principle described above for the ramp, making old and new dialogue.
The entrance on Kúpeľná ulica street acts as a service flow from which there is also direct access to the basement. The one in Vajanského Nábrežie is for the exclusive use of the residences.

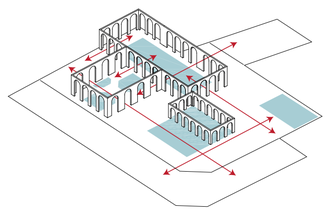


general axonometry | external configuration

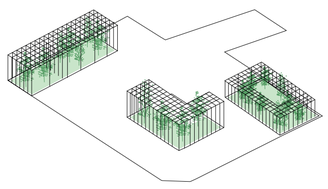
		rough floor area (including structures)	built-up volume without foundation structures
		m2	m3
City Bath:		5.485	20.283
	basement - reconstruction	1.880	5.076
	basement - new building	0	0
	above ground part - reconstruction	3.380	13.564
	above ground part - new building	225	1.643
City Bath:		2.794	12.369
	City Bath - interactive zone:	2.019	10.117
	pool area (water area)	482	-
	entrance hall	86	301
	changing rooms and sanitary facilities	426	1.278
	part with pools	954	6.777
	refreshment area	30	117
	massages and other therapeutic procedures	161	511
	administrative premises and facilities	212	609
	City Bath - resting zone	775	2251,4
	changing rooms and sanitary facilities	grouped together with interactive zone	
	part with saunas	716	2074,4
library:		2.050	8.099
	basement - reconstruction	240	624
	basement - new building	0	0
	above ground part - reconstruction	1.715	6.781
	above ground part - new building	95	694
library:		1.506	5.798
	library:	962	3.498
	entrance	60	240
	open access shelves	567	2.271
	study facilities - workshop room	45	149
	administrative premises and facilities	190	538
	café:	544	2.301
	premises of the café	135	351
	open space	409	1.950
apartments:		474	1.422
	apartments - reconstruction	474	1.422
	apartments - new building	0	0
technological background:		1.150	3.105
	basement - reconstruction	1.150	3.105
	basement - new building	0	0
	above ground part - reconstruction	0	0
	above ground part - new building	0	0
other:	city bath buffer zone (common atrium between interactive zone, resting zone and outside pool).	116	587
park:		1.165	
	paved surfaces	465	
	entrance ramps, stairs, terraces	45	
	greenery, waterbound pathways, gravel sidewalks	655	
courtyards and roofs:		806	
	paved areas - terraces, residential roof, courtyard	456	
	on the ground - greenery, waterbound pathways, gravel sidewalks	310	
	outdoor pool (water surface area)	40	
	classic sloping roof	existing situation	
	green roof	0	

OVEERALL SUMMARY - OBJECT	rough floor area (including structures)	built-up volume without foundation structures
	m2	m3
reconstruction	8.955	31.159
new building (extension)	320	2.336

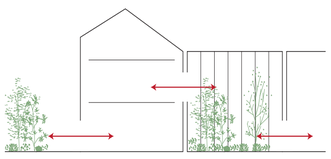
Grössling - simple statement of the planar and spatial balances of the design



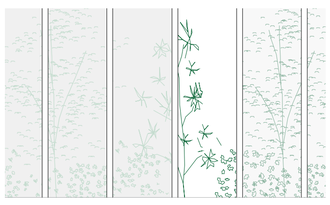
*visual permeability*_the restoration of the original arches guarantees visual and physical permeability between the new and existing pools, enhancing the identity and fluidity of the spaces.



*the Greenhouses*_episodes of vegetation integrate with the rhythm of the building thanks to three winter gardens that allow natural light to reach the center of the complex.



*contamination*_both the rooms of the library and those of the Baths find views on the internal and external green episodes of the building, thus underlining and strengthening their catalyzing function.



*porosity*_two levels of visual permeability characterize the new graft according to the environment of being: opal glass to filter the eyes and transparent glass to expand the spaces.

concept diagrams

Ground floor | scale 1:300 | q.+0.00m |

1. atrium | **CITY BATH**_ 2. entrance hall, 3. public toilet, 4. employees facilities, 5. service passage to the pools, 6. therapeutic procedures changing room, 7. therapeutic room, 8. reduced mobility changing rooms, 9. hygienic filter, 10. buffer zone, 11. first-AID station | INTERACTIVE ZONE_ 12. Arches Greenhouse, A recreational pool 13. sanitary facilities, 14. refreshment area,15. sitting relaxation pools, B. hot pool, C. warm pool, D.whirpoo 16. steam bath, F.plunge pool, 17. cooling area, 18.Convivial Greenhouse (outdoor portion) 19. swimming pool, E. swimming pool, 20. finnish sauna, 21. cooler showers, 22. Whispers Greenhouse (outdoor),G.outdoor pool | RESTING ZONE_ 23. boiler room, H. Kneipp path, J. cold pool, I. hot pool, 24. steam bath , 25. cooling area, 26. resting space, 27.sanitary facilities | **CITY LIBRARY** | RESIDENCY ZONE_28. lobby | CAFÈ_29. restaurant area, 30. sanitary facilities, 31. employees facilities, 32. facilities for the preparation of meals, 33. storage, 34. open space area, 35.storage, 36.Convivial Greenhouse (indoor events area) | LIBRARY_37.central counter, 38. self check and selfservice machine, 39.sanitary facilities | **PARK**_ 40. outdoor public space, 41. green area, 42. stretch of water.

Grössling | view from the main entrance

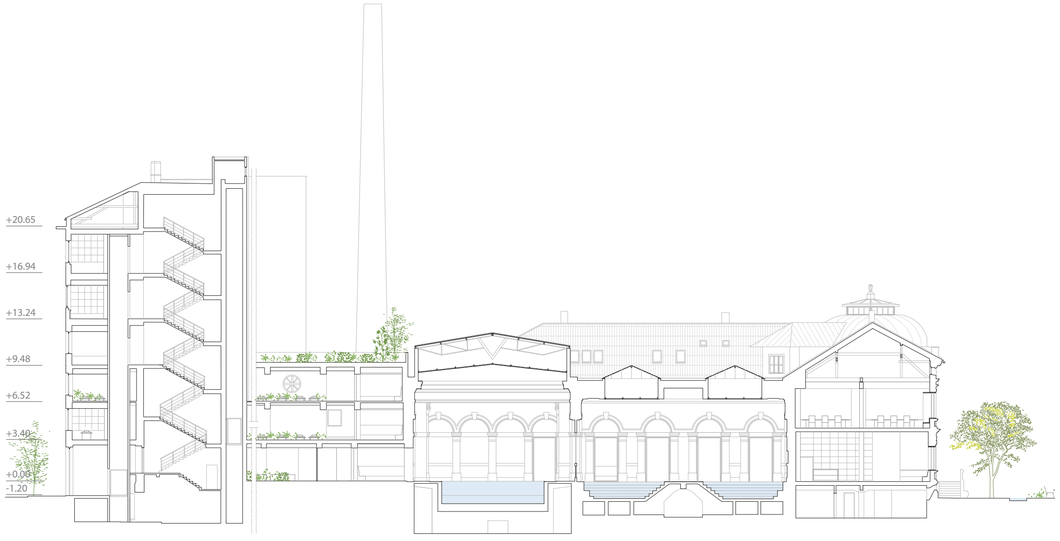
Grössling | view from the exterior spaces of the Café

Contamination and isolation
The mixture and integration of the different functions is characterized by different levels of contact: physical connection, visual permeability (opalescent, transparent or filtered by green) or complete isolation. Characteristic element of the whole intervention is represented by the winter gardens which, from the first reception rooms to the public, represent both the visual anticipation of the Bath premises, and a light structure that allows the dialogue between green and built.

The City Bath
The visitor reception areas of the City Bath, located on the ground floor of the west wing, interact with the flexible area dedicated to events through the open spaces of the café.
The main flow of bathers is designed in a linear way so as not to overlap the paths. From check-in, the visitor can reach the Bath area through a changing room for users with reduced mobility (disabled people, the elderly, pregnant women or with small children) located on the same ground floor or go up to the changing rooms on the first floor. Both routes end in the buffer zone in the center of the complex. This double barycentric volume is able to independently access the interactive zone, the resting zone, and the outdoor pool contained in the Whispers Greenhouse. This atrium presents itself as a device capable of directing all the flows and potentially isolating the different areas of the Bath, orienting visitors in an optimal way.The demolition of some of the original arches supports the design will of a transversal permeability to the different rooms of the entire organism .
These expansions are enriched by episodes of vegetation that characterize the new relaxation areas located in the winter gardens.
In addition to the Whespers Greenhouse, the project is completed with the Arches Greenhouse and the Convivial Greenhouse. The first, with an L shape, contains the new recreational pool and acts as a large interior space full of light in dialogue with the surroundings. The second relates to the existing sitting pools and swimming pools. It works as an external decompression space for the rest of the users. The closed portion of this greenhouse contains an independent space for large events in continuity with the Café and the library.
The most intimate area of the resting zone is accessed by passing through the boiler room which is kept intact and surrounded by accessory tanks for short dives. From here you can access the remaining part of the saunas which also develop on the first and second floors with large relaxation areas and a massage room for use by bathers.
Physiotherapy and massages are located on the ground floor and second floor of the west wing in order to be totally independent from the use of the pools.

The City Library & Café
The café is located in a barycentric position on the ground floor between the City Bath reception and the informal area for mixed use between the café and bookshop. This space can expand (and isolate itself) towards the closed portion of the convivial greenhouse which generates a large container that can be used for special events.
The café is accessible both from the main entrance on the corner and from the one on via Medená. The latter can be considered as a dedicated entrance for library users, with a reception and book return point. The heart of the study and reading functions is placed on the first and second floors for the benefit of isolation and concentration. The interactive zone and the resting zone, which can be compartmentalized and independent of each other, overlook the convivial greenhouse and the arch house respectively, thus establishing continuous dialogues between the Bath, light and vegetation.
The volume of the room dedicated to interaction rediscovers the wooden structure of the existing roof through the demolition of the last floor. This operation allows to reach a double height that qualifies the space. The interactive zone can be isolated in an independent nucleus (with stairs, lift and services) that can be opened to the city even at night.
The other control points are merged with the office functions and are positioned near the stairwells of the upper floors.
The reception function for writers and related to creative professions is located in the building with the entrance from Vajanského nábrežie, such as to guarantee an independent logic of flows and privacy.

Functional independence and Milestones
The configuration of the accesses allows the independent use of the various portions of Grössling with consequent energy and management autonomy. It is also possible to note how the project pays particular attention to the separation of flows between the parts (Bath, Library, Cafè, Residences) and between the types (Users, Staff, technicians and maintenance paths). For the specific analysis of all flows, see the plans and the axonometric exploded view of panel 4.
The attention paid to the dynamics of use also favors the evolution of the construction site by parts. On a preliminary basis, we can indicate four milestones as the path to the recovery of the entire complex that allow it to be opened to the public incrementally without interfering with work and use.
1. basement and facilities, West wing with reception, changing rooms, interactive areas of the City baths with Arches Greenhouse and Convivial Greenhose).
2. City Bath resting zone with Whispers Greenhouse and outdoor pool.
3. City library, Grössling café and outdoor park.
4. Guest residences.

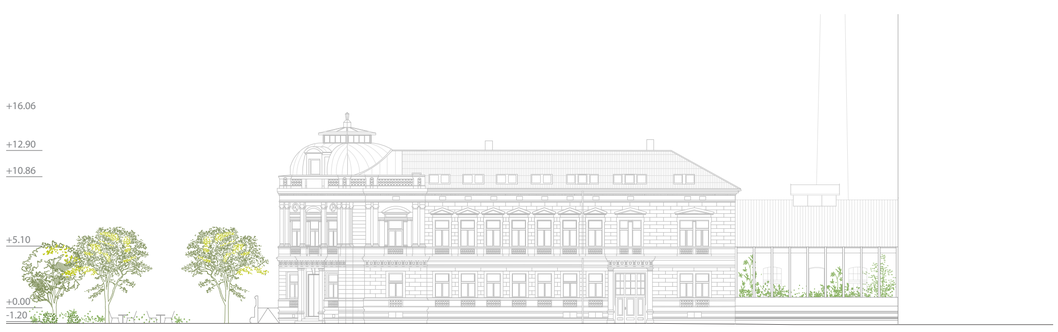


section AA | scale 1:300

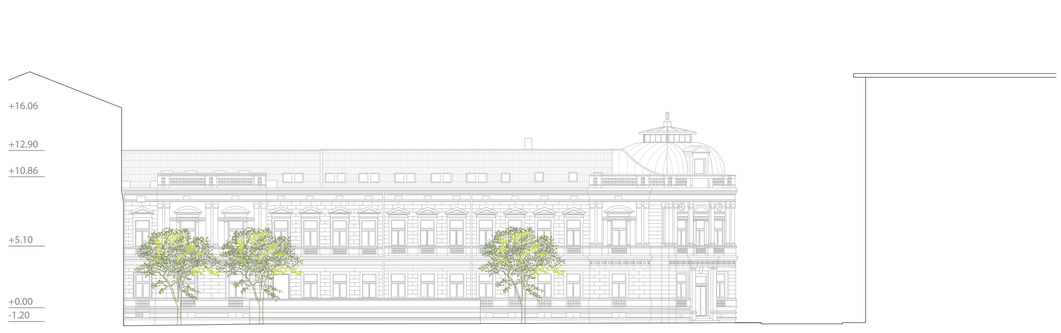
section BB | scale 1:300

section DD | scale 1:300

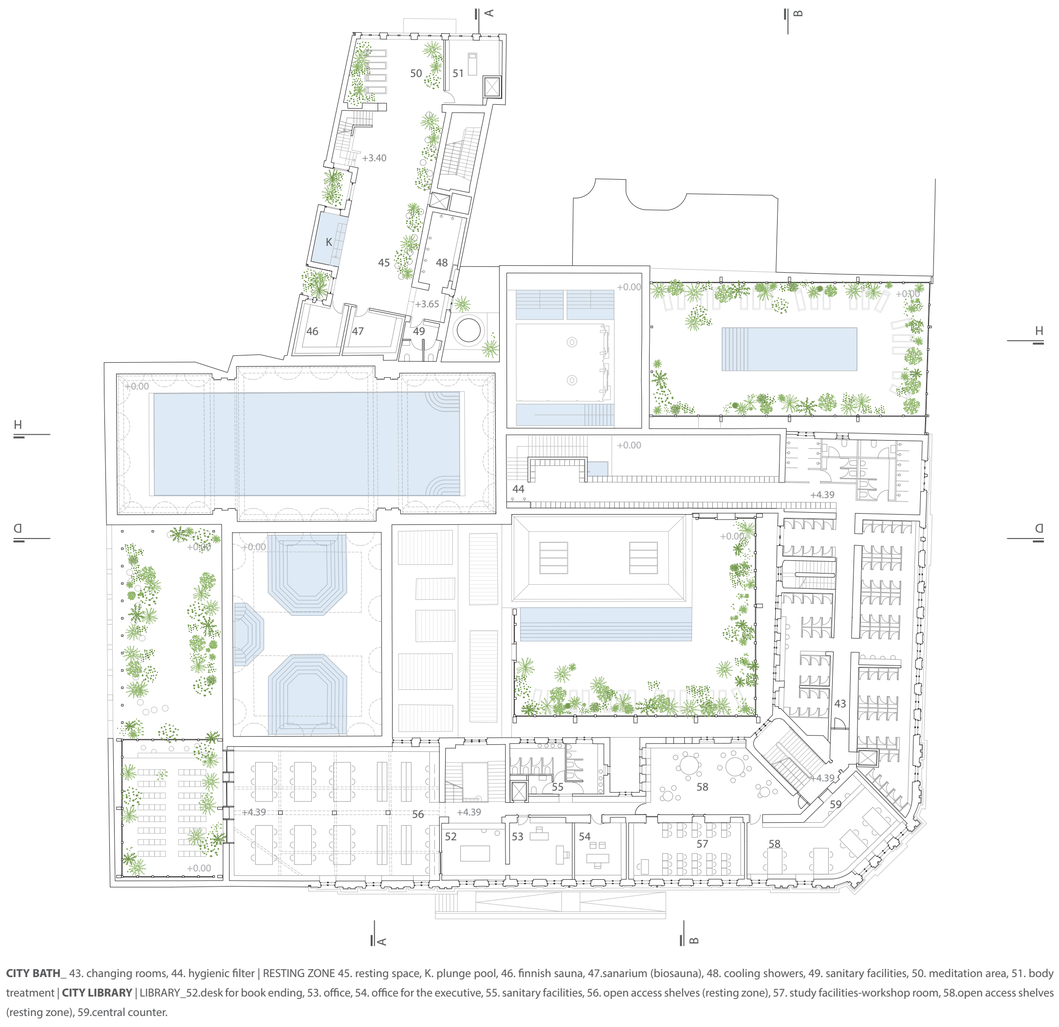
section HH | scale 1:300



elevation on Kúpeľná St | scale 1:300



elevation on Medená St | scale 1:300



First floor | scale 1:300 | q.+4.39m |

Second floor | scale 1:300 | q.+8.26m |

CITY LIBRARY | RESIDENCY ZONE_apartment A_ 74.living, 75.bathroom, 76.storage, 77. bedroom, 78 studio, 79. terrace.

Third floor | scale 1:300 | q.+9.48m |

CITY LIBRARY | RESIDENCY ZONE_apartment B_ 80.living, 81. bedroom, 82.bathroom.

Fourth floor | scale 1:300 | q.+13.24m |

CITY LIBRARY | RESIDENCY ZONE_apartment B_ 83. individual studio, 84.open studio, 85.bathoom.

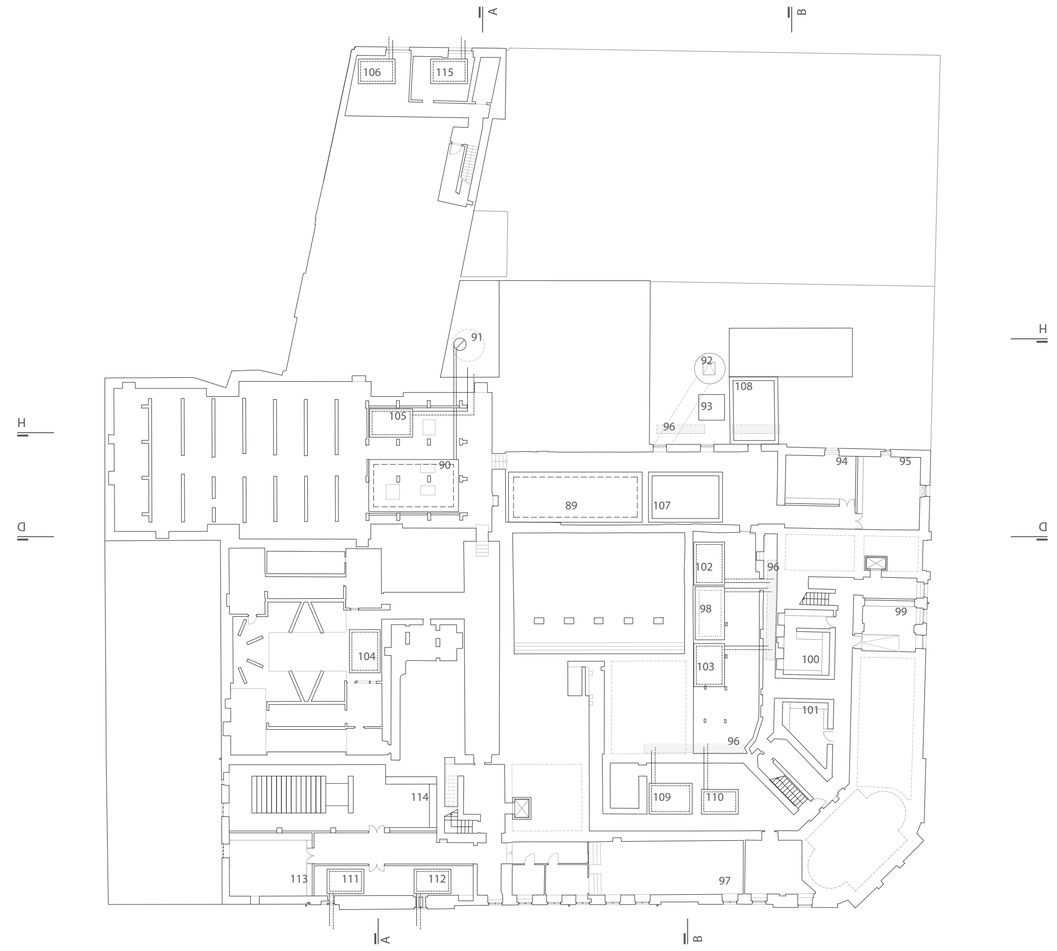
Fifth floor | scale 1:300 | q.+16.94m |

CITY LIBRARY | RESIDENCY ZONE_ 86. open atelier, 87. bathroom 88.storage

Attic floor | scale 1:300 | q.+20.65m |

CITY BATH_ 43. changing rooms, 44. hygienic filter | RESTING ZONE 45. resting space, K. plunge pool, 46. finnish sauna, 47.sanarium (biosauna), 48. cooling showers, 49. sanitary facilities, 50. meditation area, 51. body treatment | **CITY LIBRARY** | LIBRARY_52.desk for book ending, 53. office, 54. office for the executive, 55. sanitary facilities, 56. open access shelves (resting zone), 57. study facilities-workshop room, 58.open access shelves (resting zone), 59.central counter.

CITY LIBRARY | LIBRARY_ 60. office and control point, 61. sanitary facilities, 62. open acces shelves (resting zone)| **CITY BATH** | INTERACTIVE ZONE_ 63. offices waiting room, 64. office, 65. massages changing room, 66. massage for individuals, 67. massage for couples. RESTING ZONE_ 68.resting space, 69. cooling showers, 70.tearoom, 71.light sauna, 72. aroma sauna, 73.sanitary facilities.

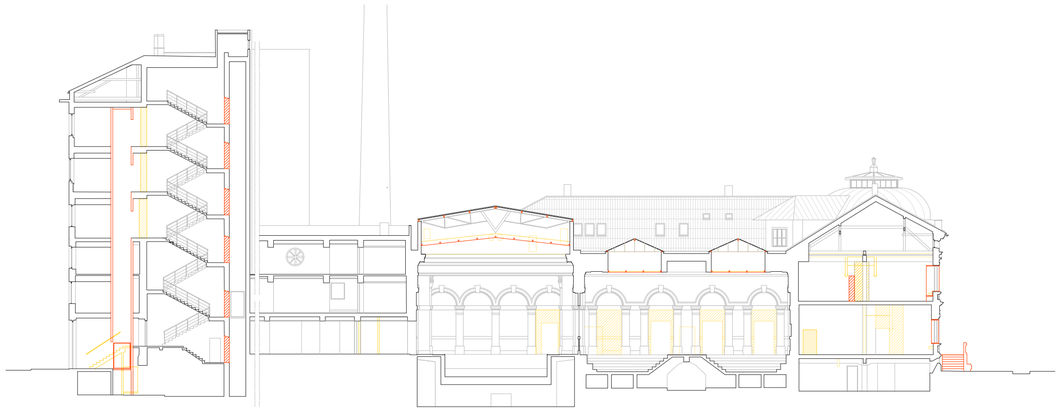


89. heat pomp, 90. gas room, 91. chimney, 92. existing well, 93. new well, 94. workshop, 95.chemical storage, 96. aeration grid, 97. existing transformer station, 98.chiller **CITY BATH**_ 99. storage for dirty facilities, 100. storage for cleaning facilities, 101. laundry room, 102. HVAC Arches Greenhouse, 103. HVAC dressing-massages-offices, 104. HVAC sitting pools, 105. HVAC swimming pool, 106. HVAC resting zone, 107. pool A machine room, 108. pool G machine room | **CITY LIBRARY**_ 109.HVAC library, 110.HVAC cafè, 111.HVAC Convivial greenhouse (indoor portion), 112.HVAC libray interactive zone (h24), 113.café storage, 114.library store room for books, 115.HVAC residency.

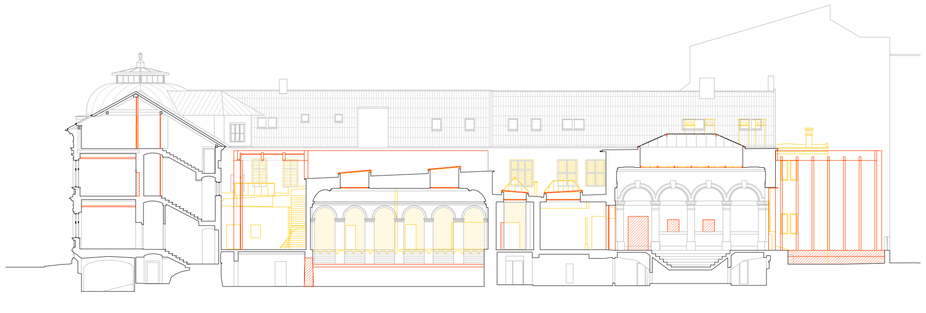
Basement | scale 1:300 | q.-2.98m

Intervention methodology
The project develops starting from the structural analysis provided by the competition documentation. The demolitions carried out refer to three strategies:
1. elimination of the additions accumulated over the years which have contributed to confusing the quality of the existing spaces.
2. opening of some of the arches of the pools in order to connect the entire system transversely and towards the new spaces of the greenhouses.
3. demolitions aimed at increasing the quality of the spaces (Library interactive zone floor, City Bath buffer zone floor).
Most of the existing structures are kept unaltered. The facades, the boiler room and the chimney are kept intact in historical memory and only subjected to conservative restoration.

Given the delicate nature of the context and the generosity of the spaces available, the new buildings are limited to a few episodes capable of introducing the contemporary style of the new Grössling. The greenhouse system presents itself as a light and permeable intervention that tries to enhance by contrast the massive and plastic presence of the existing situation.



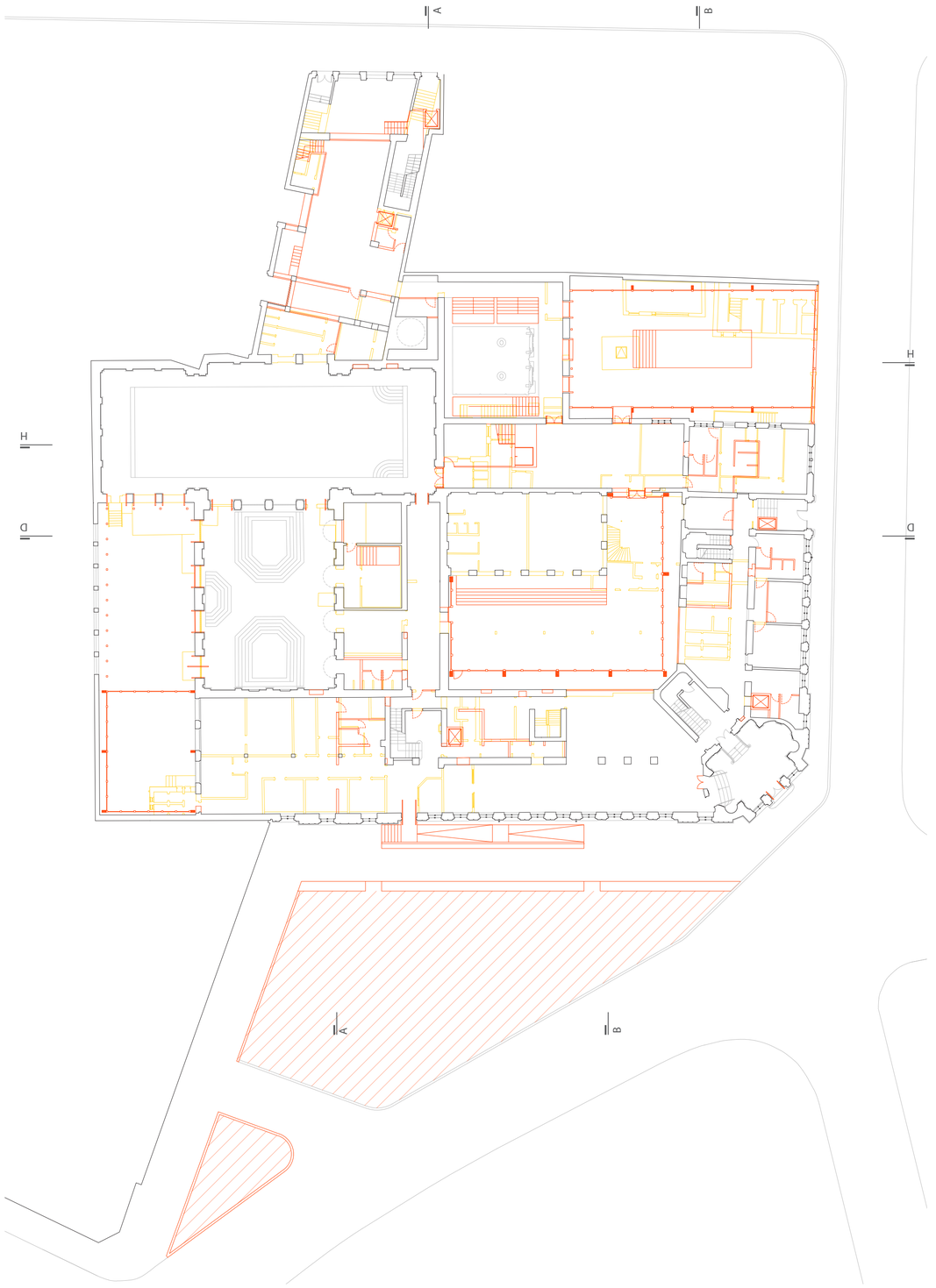
section AA | scale 1:300



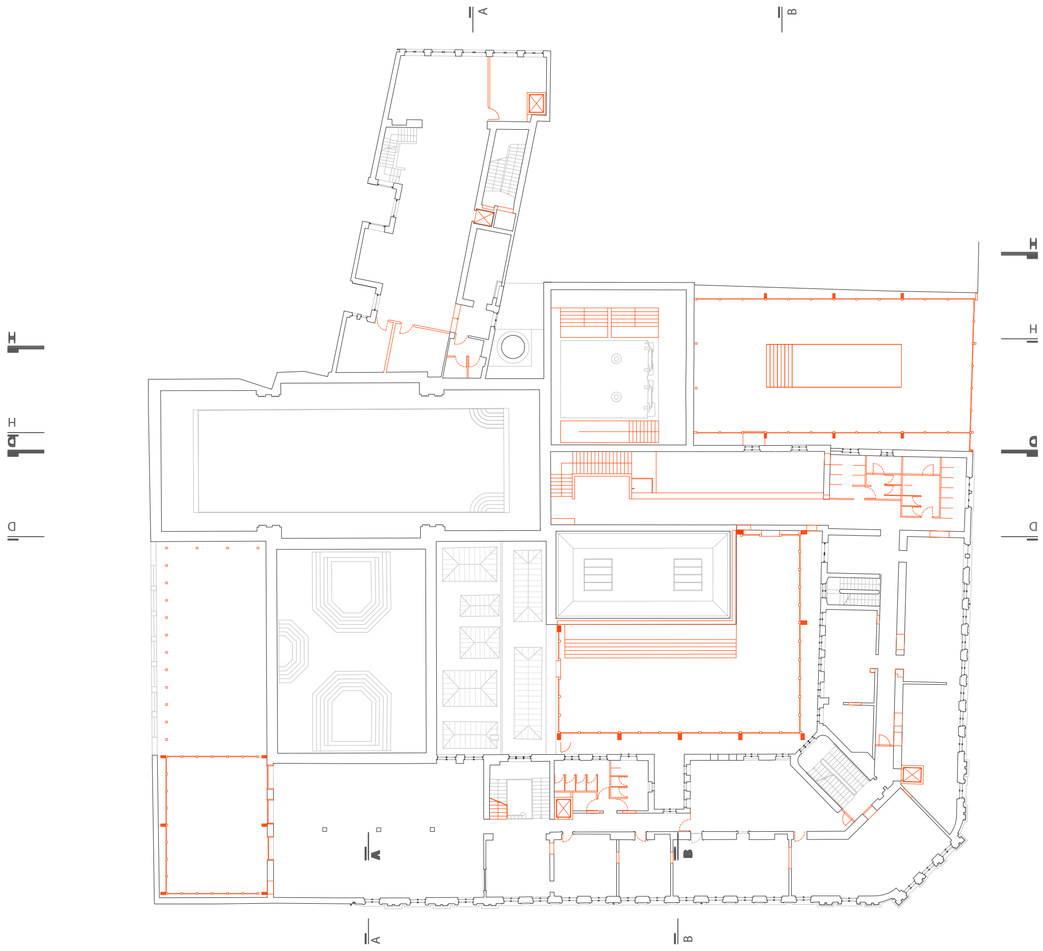
section BB | scale 1:300

section DD | scale 1:300

section HH | scale 1:300

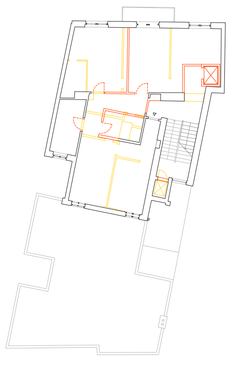


Ground floor | scale 1:300 | q.+0.00m |

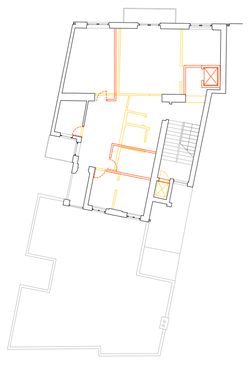


First floor | scale 1:300 | q.+4.39m |

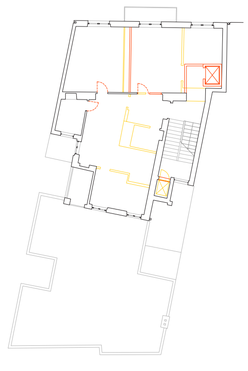
Second floor | scale 1:300 | q.+8.26m |



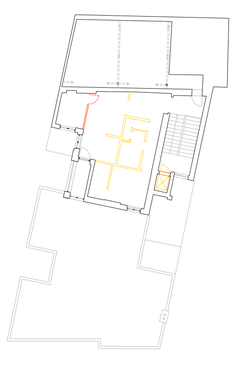
Third floor | scale 1:300 | q.+9.48m |



Fourth floor | scale 1:300 | q.+13.24m |



Fifth floor | scale 1:300 | q.+16.94m |

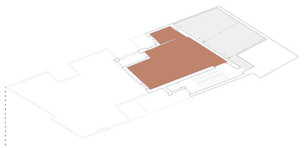


Attic floor | scale 1:300 | q.+20.65m |

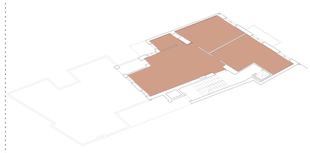
Basement | scale 1:300 |

OPALESCENCIA
Grössling experience

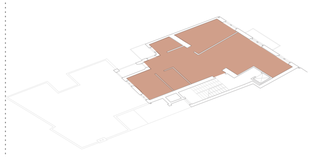
main entrance
service entrance
residence entrance
original stone steps
gentle entrance (8%)
lifting platform
checkpoints



Attic floor (+20.65)
City Library
atelier - studio
technological facilities

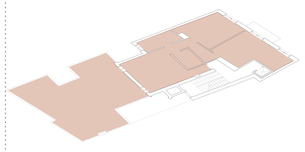


Five floor (+16.94)
City Library
residency 2



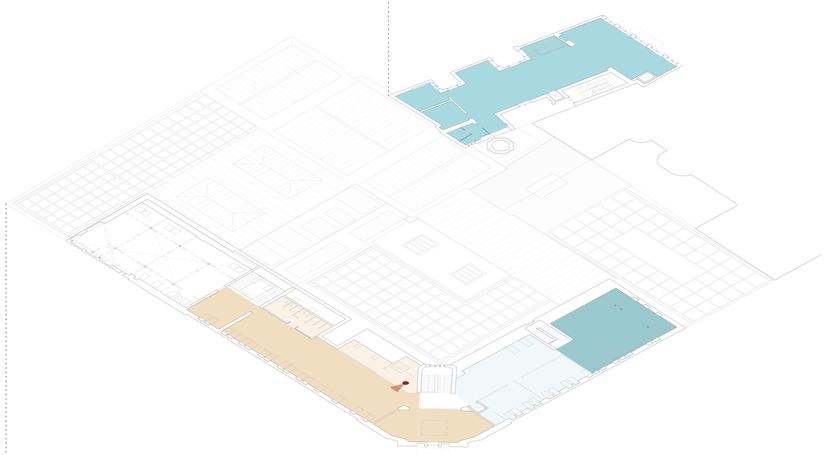
Fourth floor (+13.24)
City Library
residency 2

Third floor (+9.48)
City Library
residency 1



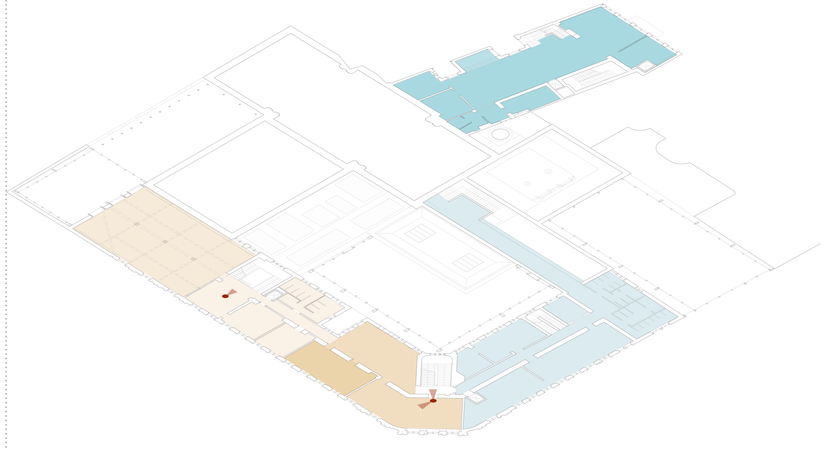
Second floor (+8.26)
City Bath
administrative permises and facilities
resting zone
massages and therapeutic procedures

City Library
Library
administrative permises and facilities
resting zone



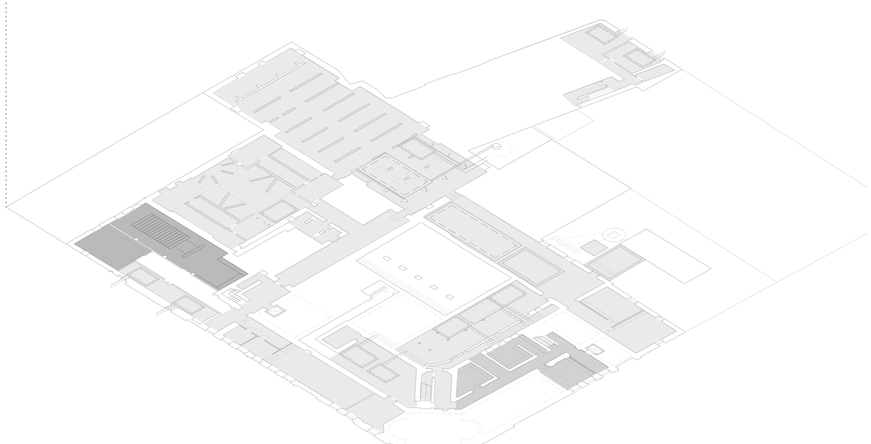
First floor (+4.39)
City Bath
changing room
resting zone

City Library
Library
administrative permises and facilities
interactive zone
resting zone
study facilities-workshop room



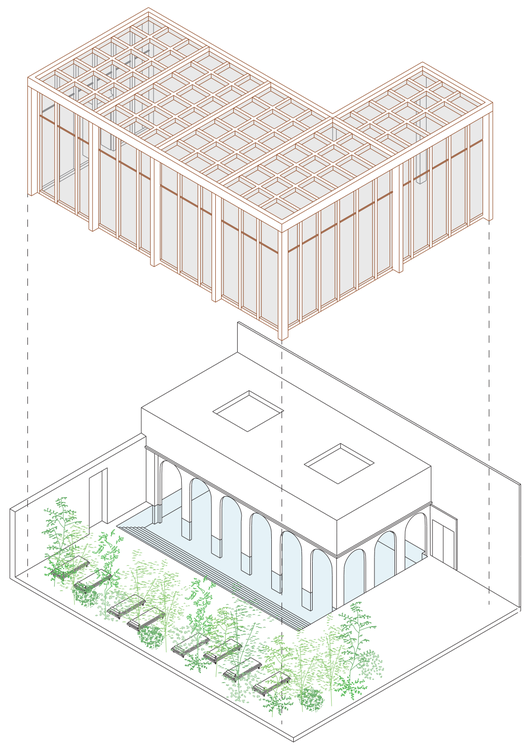
Ground Floor (±0.00)
atrium
City Bath
administrative permises and facilities
changing room
interactive zone
resting zone
massages and therapeutic procedures

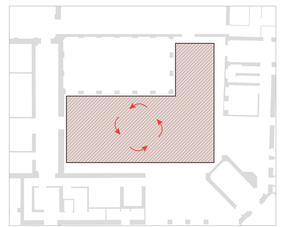
City Library
Library
administrative permises and facilities
Café
restaurant area
permises of the café
open space
events area
Residency zone
lobby



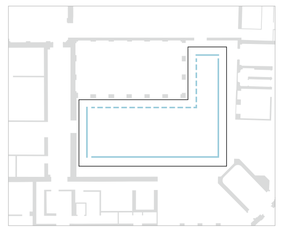
Basement (-2.98)
technological facilities
City Bath
storage
City Library
storage and storeroom

Grössling | exploded axonometric

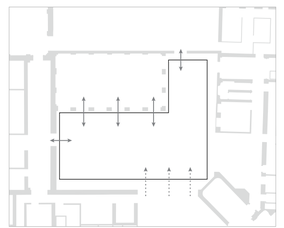




heated



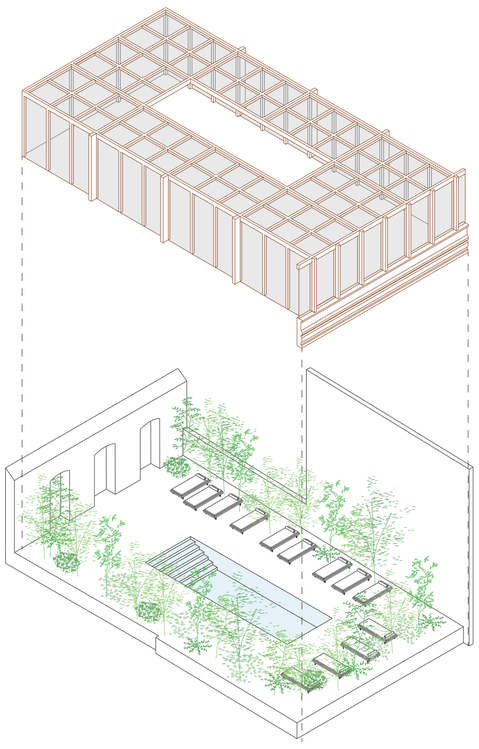
opal glass
no glass
enammelled glass

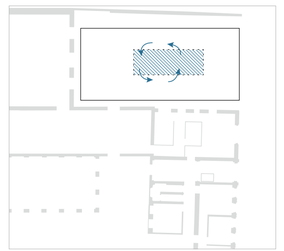


physical connection
visual connection

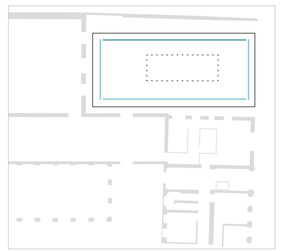
shrubby essences
tree species

City Bath | Arches Greenhouse





cold|covered
not covered



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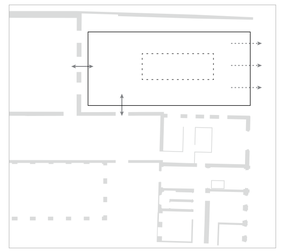
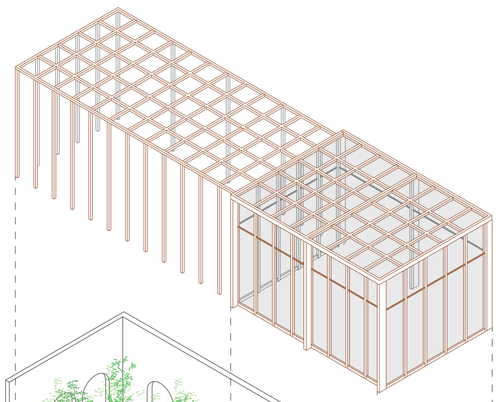
enamelled glass

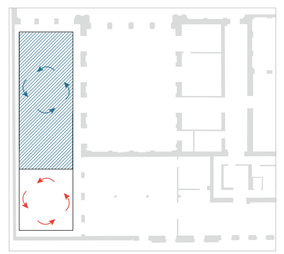


physical connection
visual connection

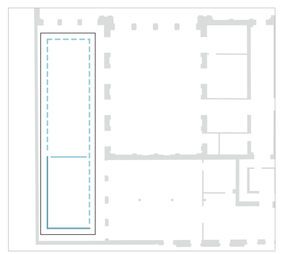
shrubby essences
tree species

City Bath | Whispers Greenhouse

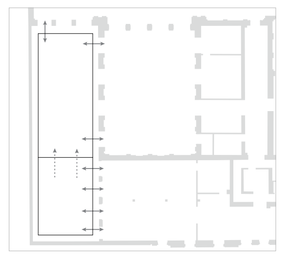




heated
cold|not covered



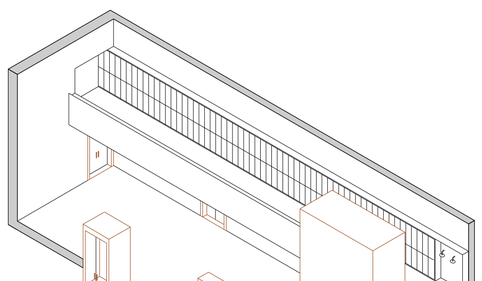
opal glass
no glass
enamelled glass

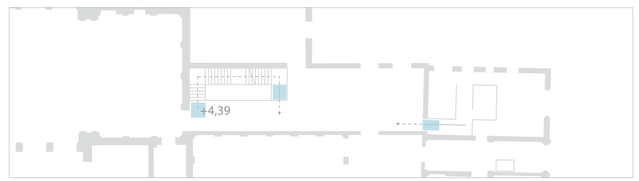


physical connection
visual connection

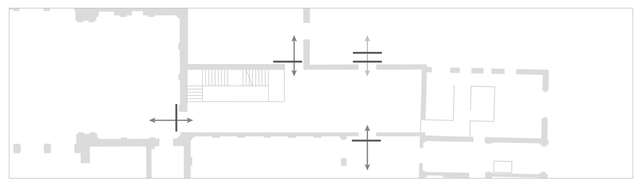
shrubby essences
tree species

City Bath | Convivial Greenhouse



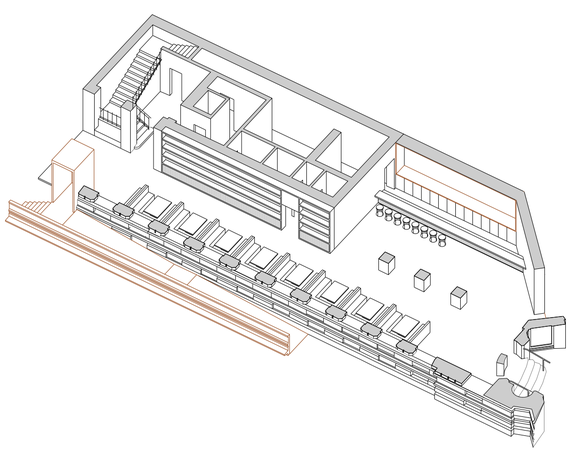


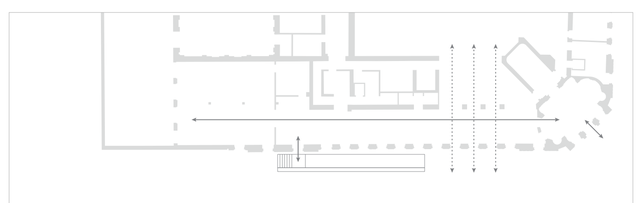
not sanitized way
sanitized way



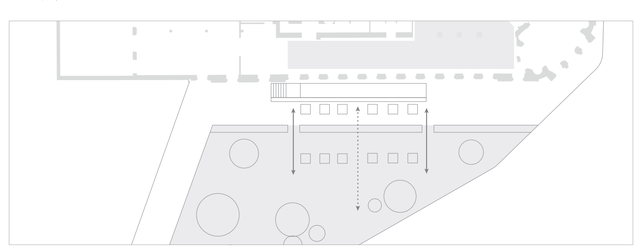
entrance. cold area
entrance. warm area
double filter
compartment curtain

City bath | the buffer zone



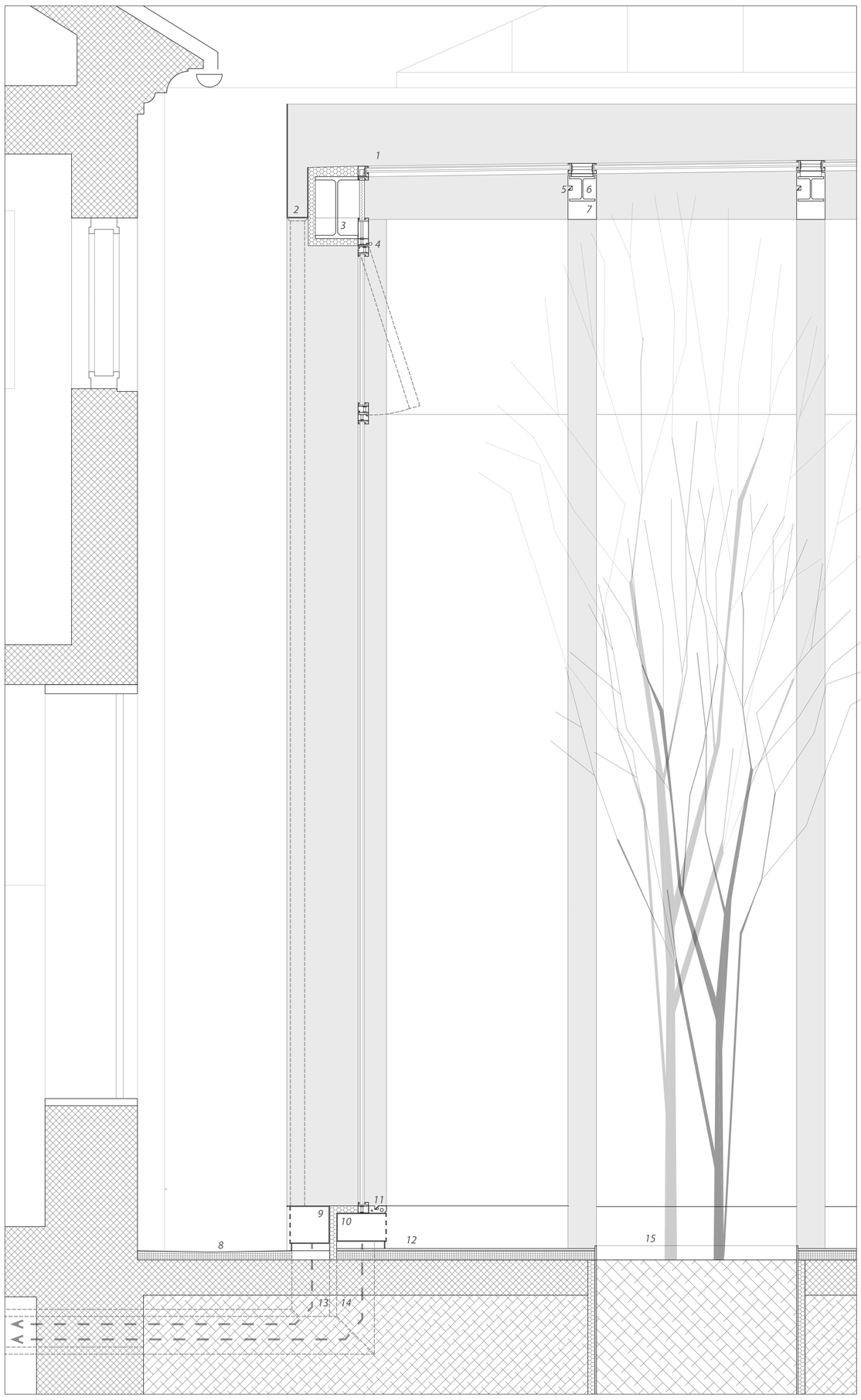


physical connection
visual connection



City library | café restaurant

O P A L E S C E N C I A
Grössling experience



detail index

.1 roofing system
_thermal break aluminum
_ triple glazing, selective
.2 metal gutter d. 2mm
.3 structural steel HEB 450
.4 window system
_thermal break aluminum
_triple glazing, selective
.5 lighting | strip led
.6 structural steel HEA 180
.7 metal casing d. 2mm
.8 flooring | concrete paving
.9 snorkel
.10 air intake vent
.11 lighting strip led | electrical
.12 flooring | drowned tiles
.13 snorkel duct
.14 air intake duct
.15 vegetation

Interactive zone - pools

Indoor pools

Type of pool	surface area	average depth	pool water temperature	room temperature	water surface overlap	surface of the indoor-to-outdoor pool (area opening on the facade towards the exterior)
	m2	m	°C	°C	yes/no	m2
A | recreational pool	140	1,4	30	28	no	see notes
B | hot pool	38	1,4	38	30	yes	40
C | warm pool	35	1,4	35	30	yes	
D | whirpool	10	1,4	36	30	yes	
E | swimming pool	210	2	28	28	no	30
F | plunge pool	7	1,4	15	30	no	-

Notes
This swimming pool is located within the main courtyard of the complex, occupied by the greenhouse of the arches. The new glazing system tries to make this area perceive as an outdoor area that is habitable all year round. The greenhouse can be partially opened to be naturally ventilated during the summer.
These pools derive from the adaptation of the existing seating pools. The internal opening of the existing arches is aimed directly at the new convivial greenhouse (a real outdoor space subject to rain and vegetation).
The same operation of opening the arches is carried out as for the seating pool. The convivial greenhouse is a space for relaxation and external decompression in common with these two areas of the interactive zone.
the plunge pool (F) is located nearby the steam bath (16).

Outdoor pools

Type of pool	surface area	average depth	pool water temperature	water surface overlap
	m2	m	°C	yes/no
G | recreational-warm pool	40	1,6	28-32	yes

Notes
the outdoor pool is used during the winter season as a warm pool at 35 ° C. During the summer season it is kept at outdoor temperature.

Saunas

Sauna type	floor area	power
	m2	kW
16 | steam bath	20	6
20 | Finnish sauna	14	2,5

Notes
the plunge pool (F) is located nearby the steam bath (16).
A cooling shower area is located nearby the finnish sauna (numero).

Resting zone - saunas

Sauna type	floor area	power
	m2	kW
(numero) | steam bath	25	4
(numero) | Finnish sauna	16	4
(numero) | Sanarium (biosauna)	16	3
(numero) | Light sauna	16	2
(numero) | Aroma Sauna	11	2,5

Notes
ground floor_The first area of the resting zone is placed in the boiler room inside which there are small suggestive spaces such as the Kneipp path (H_14m2) and two tanks (J| cold pool_9m2_15 ° C, I| hot pool_9m2_42 ° C) for short dives serving both the steam bath (numero) and the outdoor pool (H) visitors who have access to the resting area.
first floor_the cool off area includes an enclosed cooling pool (K | 9.5m2_15 ° C) and cooling showers.
second floor_ the cool off area includes cooling showers.

Heating and Ventilation

Total functional area	floor area	heated floor area	indoor heating temperature	forced ventilation	ventilated volume of space
	m2	m2	°C	yes/no	m3
City Bath | interactive zone	1710	1290	28	yes	7740
City Bath |Resting zone	830	830	28	yes	2241
City Bath | reception, changing rooms, sanitary facilities,massages, therapeutic procedures, bath offices	875	875	20-25	yes	2625
Grössling Cafè | restaurant-bar-informal space	400	400	20-22	yes	1600
Grössling library |resting area, interactive area, offices	300	300	20-22	yes	1455
Convivial Greenhouse | events portion	100	100	20-22	yes	750

Notes
The Whispers greenhouse and the external portion of the convivial greenhouse represent the unheated spaces belonging to the interactive zone.
The healthcare and changing room facilities are unique for the resting zone and the interactive zone in order to optimize the overall management by dividing the flows only after the change. The massage and therapy area can be reached without entering the pools for independent external users. Two other massage rooms are located on the first and second floor of the resting zone for the benefit of users who want to enjoy both the spa and the treatments.
The informal space is a hybrid place for the benefit of both the café and the bookshop. The space is isolable so that it can host independent events or not be heated during periods of inactivity
The main reading room on the first floor is designed to be able to remain open independently from other spaces (for example at night).
It represents the heated and closed part of the convivial greenhouse. It benefits from an all-air conditioning system that is independent from the other areas of the café and library in order to optimize the use of energy only during events.

Cooling

Total functional area	floor area	cooled floor area	indoor cooling temperature	forced ventilation	ventilated volume of space
	m2	m2	°C	yes/no	m3
City Bath | interactive zone	1710	1290	28	yes	7740
City Bath |Resting zone	830	830	28	yes	2241
City Bath | reception, changing rooms, sanitary facilities,massages, therapeutic procedures, bath offices	875	875	20-25	yes	2625
Grössling Cafè | restaurant-bar-informal space	400	400	20-22	yes	1600
Grössling library |resting area, interactive area, offices	300	300	20-22	yes	1455
Convivial Greenhouse | events portion	100	100	20-22	yes	750

Notes
The vegetation inside the greenhouses represents an important element of thermoregulation and cooling, especially in the summer season. The Arches greenhouse is equipped with a vasistas system that allows natural ventilation.
during the summer season the café will be able to expand outside towards the city, benefiting from the natural external ventilation, the ample shade caused by the existing trees and from the evaporation of the new external linear fountain.
This portion of the convivial greenhouse can be naturally ventilated thanks to a system of vasistas openings.

Heat source for heating, hot water preparation and pool water heating

Source of heat	Short description
geothermal	Water-to-water heat pump (HP). Production for air conditioning, DHW, swimming pool water. Use of two wells for taking and re-placing them in the water table. it is important to balance the loads between summer / winter in order not to thermally load the subsoil in the long term.
natural gas (methane)	This is the energy carrier serving the combustion boiler. Production for: air conditioning, DHW, swimming pool water. Priority production for: HT (radiators), back-up production for: air conditioning, DHW, swimming pool water
HVAC heat recovery	Each HVAC will be equipped with cross-flow heat recovery on the primary air (fresh air). A heat recovery efficiency (η) is estimated in the order of 75%.
heat recovery Centrifugal chiller	Considering that the chiller for the production of the cold will be of the centrifugal type, the hot air in expulsion will be used for a pre-heating of the swimming pool water. A heat recovery efficiency (η) is estimated in the order of 50%

detail of the Arches Greenhouse | | scale 1:20

The Greenhouses |*Structural analysis*

The new volumes are designed to be independent from the existing structures. The position of the greenhouses allows local foundation interventions without interfering with existing foundations and functions within the basement.

The structures have been designed in S275 steel, in order to minimize the loads on the existing slabs. The structural checks were carried out according to the Eurocodes, considering all the vertical permanent loads, snow load and horizontal loads such as wind and earthquake. In order to not apply bending moment actions on the existing slabs it was decided to design the new structures with hinge constraints at the base of the pillars.

It was decided to analyze the two most problematic structural configurations (*Arches greenhouse* and *Whispers Greenhouse*). The *Convivial Greenhouse* represents a simpler variation of these models also due to the fact that in the portion facing the existing pools it does not support load on the roof as it is a loggia permeable to atmospheric agents. All the new structures will be treated to guarantee R60 fire protection and then coated with metal sheet.

For analysis and design of steel frameworks structural models were created in MidasGen 2020 and FEM ansalysis of the structures were carried out.

elements

.pillars
RHS 30x50

.edge beams
HEB 450,HEB 800

.main beams
180x800mm

.secondary beams
HEA 180

Structural model
All the elements have D/C ratio less than 0.36 and the deflections are within the limits.

D/C Ratios (combined ULS and SEISMIC)

Vertical deflections (serviceability limit state)

Bending moment My diagram (ultimate limit state

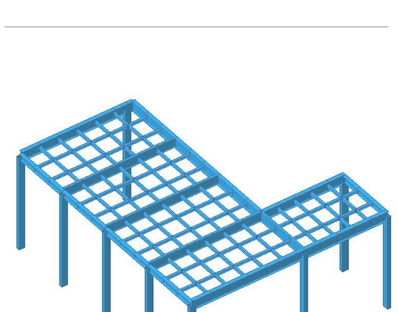
Whispers Greenhouse | structural analysis

The Greenhouses |*Lighting analysis*

In the existing external areas, the project intervenes through the inclusion of light greenhouses that remain below what is indicated by the analysis provided by the competition (03_svetlotechnika_ light engeneering.dwg).
With reference to the measurement system adopted in the file, 140.56 is considered as control point.

The Whisper Greenhouse maintains a constant section with a maximum height of 145.56 (less than the reachable height of 146.39).

The Convivial Greenhouse is divided into a heated evens area with a constant section and a maximum height of 148.56 (less than the achievable height of 154.97). The remaining part of the greenhouse is an open and uncovered structure that guarantees irradiation to the relative portion of the facing houses with the aim of shielding the different buildings ensuring their privacy.



elements

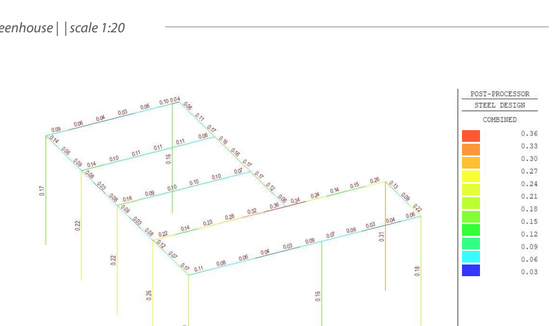
.pillars
RHS 20X40
SHS 15x15

.edge beams
IPE 300

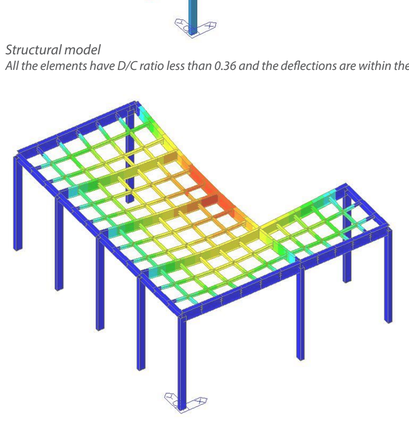
.main beams
IPE 500

.secondary beams
IPE 300

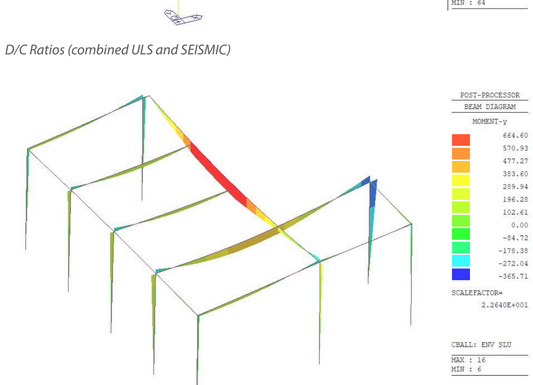
Structural model
All the elements have D/C ratio less than 0.36 and the deflections are within the limits.



D/C Ratios (combined ULS and SEISMIC)



Vertical deflections (serviceability limit state)



Bending moment My diagram (ultimate limit state

Arches Greenhouse | structural analysis

Questionnaire for energy assessment_spa Grössling

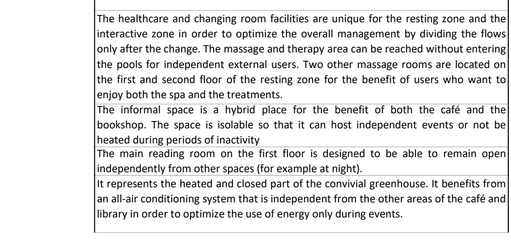
Energy strategies
In accordance with the requirements, the design idea provides for a multi-generator thermo-refrigeration unit consisting of: 1. HP - geothermal heat pump (groundwater); 2. combustion boiler (methane gas); 3. air / water chiller.
In addition to the existing radiator circuit, the emission systems will be divided into four distinct groups according to the various uses of the property. The division allows flexible and heterogeneous energy management. The meta-design scheme shown in the graphic drawings and the planimetric arrangement of the equipment in the basement helps to contextualize the following concepts and understand their location.

Heat production
Generators 1 and 2 are used to produce heat. In accordance with the most current energy strategies, the HP (1) will be sized to cover approximately 50% of the required power. The source of heat is groundwater which will be withdrawn and reintroduced from the subsoil thanks to two intake wells (one new and the other existing). The combustion generator (methane gas) will serve as a back-up for the priority generator. Its function will be back-up for power peaks and to manage high temperature circuits (radiators, DHW). The meta-design diagram graphically highlights the subdivision of the winter energy coverage between the two generators (boiler for high powers but for a short duration of the season / HP for lower powers but for the entire duration of winter).

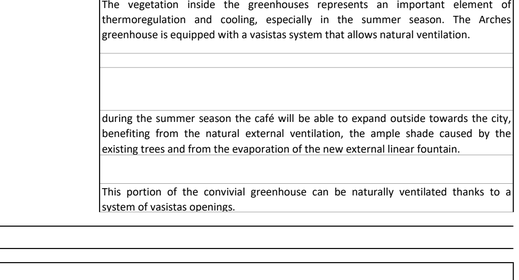
Cold production
Considering its high performance, the geothermal HP (1) is also used for the production of cooling energy in the summer. This is accompanied by an air / water centrifugal chiller which allows to cover the power peaks. The exchange with the energy source (air) takes place thanks to gratings located in accessory areas (see plan). To optimize the energy efficiency of the system, the overheated exhaust air, necessary for the production of cooling energy, will be used for pre-heating of the swimming pool water.

Emission systems (ventilation)
The HVACs will be divided into four functionally independent groups (see diagram). If for resting zones and bath facilities a single HVAC is suitable to satisfy the comfort of the relevant environments, for the interactive zone and for the library / café it is considered right to propose a higher number. The closed rooms that host the indoor pools need special ventilation both from the aeraulic and hygrometric point of view.
The optimal solution provides three distinct units, one for each indoor pool, which can vary the set points dynamically and independently.
The library cafe area includes heterogeneous areas for use and energy characteristics. For this reason, it is considered necessary to equip the area with four ventilating units which will serve respectively: library, library interactive zone (24h), café, special events. All HVACs include heat recovery systems for energy optimization of air conditioning. Among these, the three HVACs serving the pools stand out, as well as including the increased adiabatic recovery section, these are equipped with integrated low-consumption dehumidification technologies that do not burden the energy production systems.

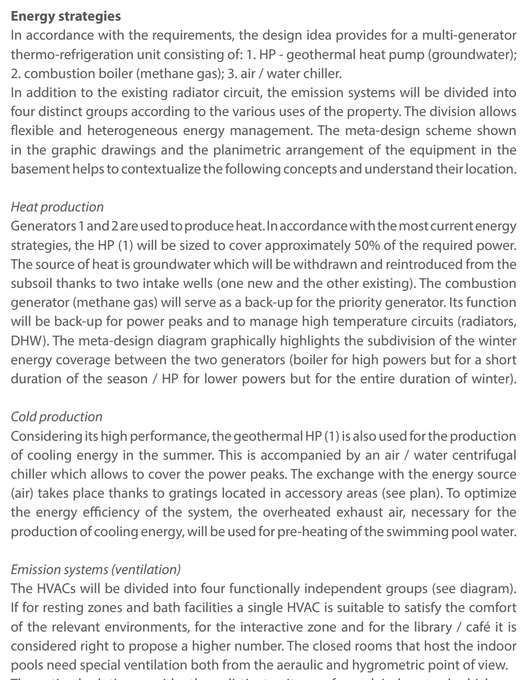
The Greenhouses | *bioclimatic*
The winter gardens perform the function of bioclimatic greenhouses obtaining various advantages both during the cold and hot seasons.
In winter, the greenhouse effect is exploited with the result of having a strong heat gain while also maximizing the amount of natural light that relates the new light and bright spaces with the rarefied atmosphere of the existing ones.
In summer, natural vertical ventilation is expected to be exploited through the opening of the facades. The presence of vegetation that acts as a shading and thermoregulation element of the space.

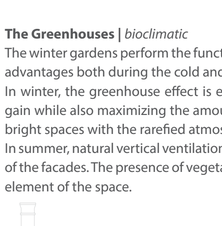


Cold season | a.selective galss, b.air inlet vent, c.air inlet duct, d.air intake vent, e.air intacke duct, f. water isolation

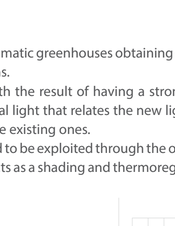


Hot season | a.selective galss, b.window natural air vent, c.nozzle natural air vent, d.vegetation contribution, e.water mass contribution.

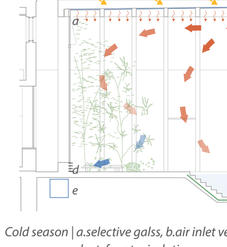




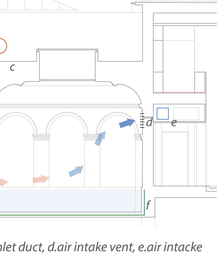
Second floor



Third | Forurth | Fifth | Attic floor



Ground floor



Frist floor

Zone		HVAC	existing radiators
.1	city library event	A	no
.2	city library cafè	B	no
.3	city bath interactive _1	C	no
.4	city bath interactive_2	D	no
.5	city bath facilities_1	E	no
.6	city bath interactive_3	F	no

Zone		HVAC	existing radiators
.7	city bath resting	G	no
.8	residency	L	no
.9	city library h24	I	yes
.10	city library	H	yes
.11	city bath facilities_2	E	yes

Energy strategies

Materiality
The visual permeability between environments with different users and between inside and outside the complex is attenuated by the opalescent connotation of the closing glass of the winter gardens, also recalling the steam condition typical of the wetlands of the Bath. Bronzed etched steel is used for all the new detail interventions and to cover the greenhouse structures.
The design proposal envisages a modern reworking of the historic floors through the design of a new tiling, which guarantees the healthiness necessary for the recovery of the bathrooms. The chromatic differentiation of the same flooring unifies the perception of the project through only the color variation of the mortar of the tiles. The materials of the library find a dialogue with the atmosphere of the City Bath through the use of the same metallic details. The flamed beech furnishings recall the wooden deck of the existing roof in search of a warm and domestic atmosphere for dining and studying.

Green design
The plant component plays a central role within the project both for the visual and perceptive importance of nature and for the contribution to environmental comfort.Specially studied tree and shrub species have been selected in accordance with the particular climatic conditions of the place and with the filtering properties of the various species. In this way, oxygenation and indoor air quality are obtained thanks to the ability to absorb and degrade atmospheric pollutants. The trees used maintain growth and a contained root system that does not interfere with the built structure.All species require limited maintenance, creating minimal disruption in the leaf replacement season.

Kúpeľňa Street | the relationship between old and new front

The Café | permeability towards the greenhouse

The external device (top view) | sculpture, bench, ramp

The City library | The Interactive Zone

Materials

plaster

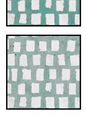
glass (tempered,opal,enamelled)

bronzed treated sheet

flamed beech

drowned tiles_01

drowned tiles_02



drowned tiles_03

drowned tiles_04

drowned tiles_05

gravel

The city bath buffer zone

The swimming Pool and the Convivial Greenhouse

Vegetation

Hedera helix

Sansevieria trifasciata

Warneckii

Aloe vera

Dracaena marginata

Kentia

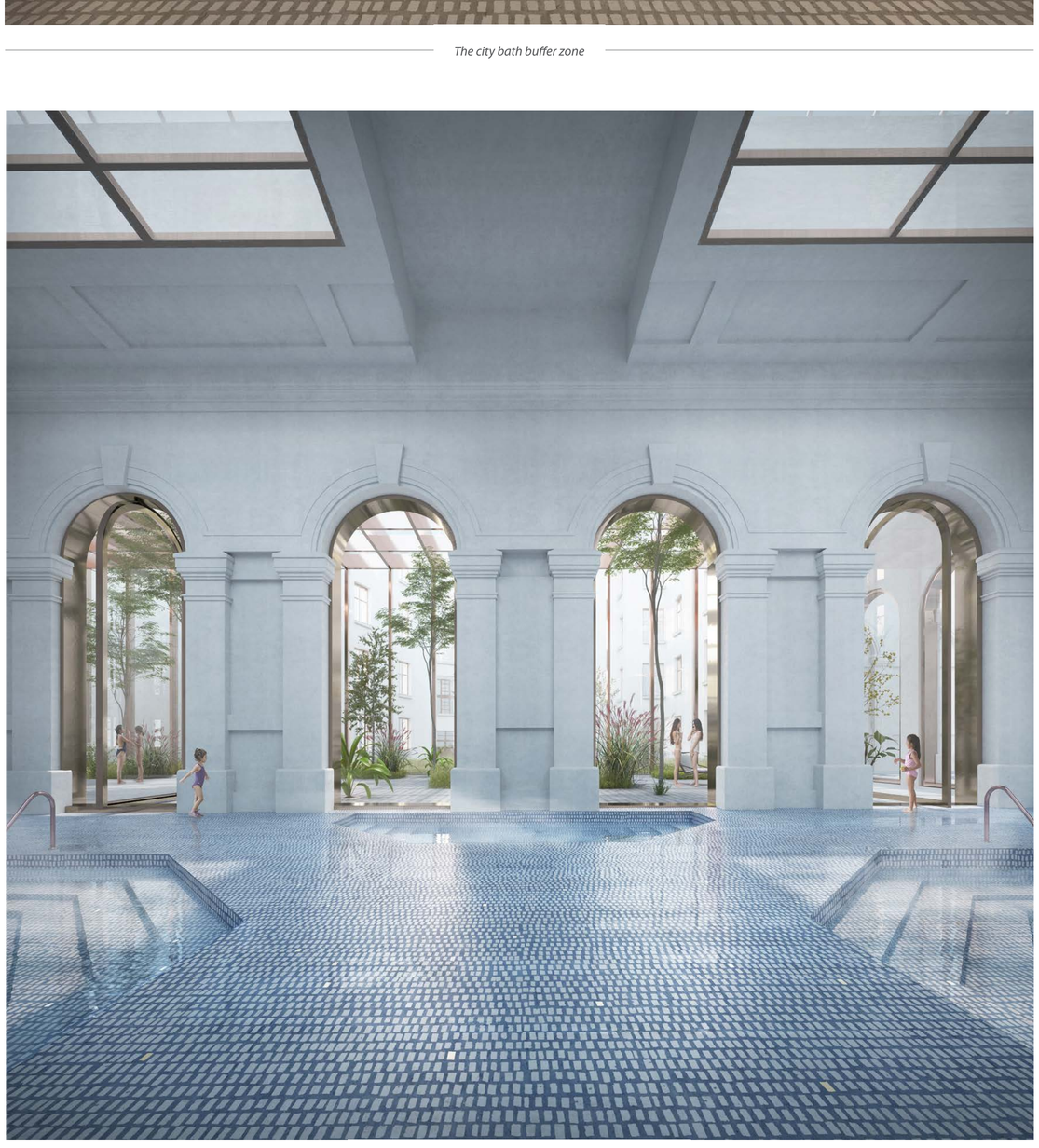
Chamaedorea

Cortaderia Selloana

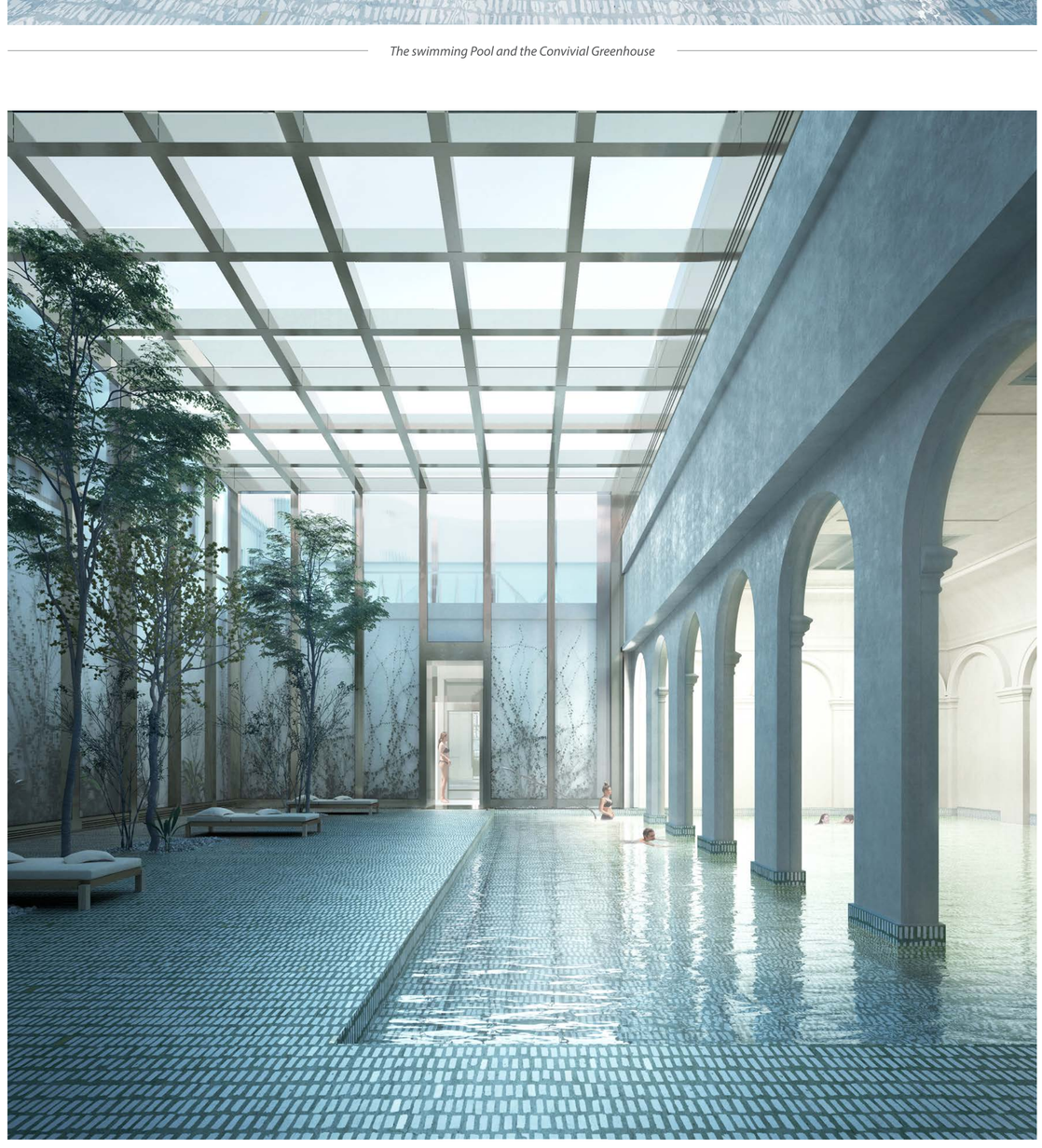
Spathiphyllum Mauna Loa

Ficus benjamina

Acer palmatum



The sitting relaxation pools and the Convivial Greenhouse



The Arches Greenhouse