



LIEPAJA SEA SIDE SAUNA

MSC4 ARK-8, MAY 28TH 2014
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TITLE SHEET

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Whose hospitality and enthusiastic helpfulness
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Liepaja and Latvian culture while, having an enjoy-
able studytrip.

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ABSTRACT

In the frame of tectonic theories, this project aims to achieve a communion between shape, structure, function and context in the architectural realm. The thesis is based in an existing competition which calls for a renovation and expansion of an abandoned Bath House in Liepaja, Latvia. Considerations towards the role of the Bath House in a city context will establish the guidelines for an Architectural intervention in which, a dominating parameter is to respect and enhance the essence of the original building. Special attention to the details in terms of the Tectonic theories of Frascari will be taken, prioritizing an overall coherence in the narrative derived from the encounter of the old building and the new expansion.

SUMMARY

The guidelines of the project come from a current competition in Liepaja, Latvia. The municipality and sponsors calls for a renovation of an abandoned Neoclassical Building: The Bath House.

Beside restrictions in the scale of the intervention, it is requested to maintain the essence of the original building. The original Bath House functions are already provided by the city infrastructure, therefore new functions are introduced. The old Bath House becomes a support for the park and for the expansion, which deals with traditional Latvian rituals.

The proposal addresses the urban scale by introducing a public passage that connects the urbanized spaces with the Sea Side Park, introducing a café as a transition point.

Following the symmetrical layout of the Bath House, two expansion volumes grow to the North and South, creating the space for male and female recreational spaces.

The added constructions intend to keep the balanced nature of the original building with its materiality, proportions and atmosphere.

Each of the expansions is inspired, in terms of construction and functionality in the primitive Latvian Bath House. It is proposed a wooden sauna that grows from a concrete platform as a metaphor of the timber log construction supported on a stone foundation. A new interpretation of the traditional construction system presents a new perspective of the Sauna tradition.

The wooden element works as the envelope of the Sauna and the roof of the temperate zone. A rotation in its wooden stacked constructional principle promotes circulation around it, creating cyclical dynamics coherent with the cooling and heating sequence of the ritual. In the center of the sauna, lies the heat source, gathering space for the users.

The expansion aims to challenge the traditional way of conceiving a sauna space in order to address contemporary functional and aesthetic demands.



TABLE OF CONTENTS

INTRODUCTION	2	PRESENTATION	36
TITLE SHEET	2	SITUATION PLAN	37
ABSTRACT	3	ORGANIZATION	38
SUMMARY	3	PLAN	39
TABLE OF CONTENTS	5	FACADE EAST	40
INTRODUCTION	6	FACADE WEST	41
		FACADE NORTH	42
PROGRAM	7	FACADE SOUTH	43
COMPETITION BRIEF	7	SECTION	44
METHOD	7	RENOVATION INTERVENTIONS	45
TECTONIC ARCHITECTURE	8	PUBLIC SPACES	46
STRATEGIES FOR RENOVATION & RESTORATION	9	STAFF	49
LATVIA	10	SAUNA SPACE	51
THE CITY OF LIEPAJA	12		
SURROUNDINGS OF THE BATH HOUSE	14	TECHNICAL DETAILS	54
CLIMATE	16	DETAIL DRAWINGS	56
SITE LAYOUT	17		
THE BATH HOUSE	18	CALCULATIONS	58
SITE CHARACTERISTICS	20	ROOF LOADS	59
PAUL MAX BERTSCHY (1840-1911)	21	LOAD COMBINATIONS	60
FUNCTION AND DAILY USE	22	TRUSS DIMENSIONING	62
CONSTRUCTION	23	CALCULATION OF SAUNA STRUCTURE	64
BUILDING ANALYSIS	24		
BUILDING ANALYSIS - FORMER RENOVATION	26	CONCLUSION	66
LIGHT	28		
LATVIAN HEALTH TRADITIONS	30	DISCUSSION	67
VISION	32	SOURCES	68
		SOURCES	68
CONCEPT	34	ILLUSTRATION SOURCES	68
URBAN CONCEPT	34	APPENDIX	69
SAUNA CONCEPT	34		
RENOVATION CONCEPT	35		

INTRODUCTION

The following report consist in the Master Thesis, of the 4th semester in the Architecture M.Sc. program at Architecture and Design, Aalborg University. The “Rebirth of the Bath House” is the name of a competition on which this project will be based; it is sponsored by Homemade Desserts in cooperation with Liepaja Municipality. In the city of Liepaja, Latvia, an abandoned Neo classical building stands in between a prestigious neighborhood and a highly utilized seaside park. The assignment relies in the potentials and opportunities of renovating and expanding this building pursuing new dynamics that favors the contemporary city. (homemadedessert 2014: 3)

The assignment demands a critical approach towards the Baltic culture. Latvia has had a convoluted political history from which the country, got its independency from the Soviet Union in 1991. New values comes as well, with a recent alliance with the European Union in 2004 (www.latvia.lv). Questions regarding traditions, heritage and culture in general sets interesting foundations for a projects that thrives to deepen into tectonic methods.

(ILL 3. THE BATH HOUSE, WEST FACADE)

COMPETITION BRIEF

At the beginning of 2014, the organization "Home Made Desserts: Architecture vision competitions" in association with Liepaja City Council, launched an open competition called "The Rebirth of the Bath House". The task consisted in a revitalization and further development of the "Bath House", an emblematic Neo Classical building placed in a historically exclusive retreat area in Liepaja, Latvia.

The design brief is open, modifications to the existing building and improved development strategies can be made. The overall assignment consists in reactivating the iconic Bath House building, as well as adding new functions and structures.

After registering, a data base with 3d models and CAD plans, a document with Proposal requirements, site restrictions and proposal recommendations was received from the organizer committee. (homemadedessert 2014:3,11)

Requirements:

"Recreational baths must be one of the key building complex functions"

Recommendations:

"Present the building complex with historical as well as newly introduced functions that would support the neighboring park areas as an exclusive retreat"

"Provide accommodations for at least 20 families (for example boutiques, hotel or guest-houses). Recreational facilities like restaurants and bars are also encouraged. Participants should also think about parking for the visitors as well as service accesses"

"Existing building interior roomlayout can be modified if a rational justification is present"

(homadessert 2014:11)

Restrictions:

Maximum floor area ratio: 50%

Maximum building height: 8m

No underground construction

METHOD

Following the methodology applied along the Master studies, the guidelines of the Integrated Design Process (Knudstrup, 2004) will be followed. It is wished that constructional, aesthetical and functional aspects sets a cohesive proposal. A sense of unity in the final product is pursued in which, a consequent development of the five phases of the method optimize each design iteration.

Problem/ idea, analysis, sketching, synthesis and presentation are addressed and reconsidered continuously.

The area / limitation of the project is extracted from the competition brief. Afterwards, a data collection serves the analysis phase from where, the conceptual idea evolves.

First hand sources such as photographs, conversation with the locals, sketches were obtained from a field visit. Local traditions were revealed as a rich source of inspiration for the further development of an initial architectural program. Second hand source like bibliography, original plans provided by the Liepaja Museum and other design manuals supported the feasibility of the initial sketches.

Further development of physical models, plans, sections and digital visualizations joint with the intuition that derives from our personal experience of the visits, allows us to reach a vision.

Each iteration considers the challenge of keeping a balance between technique and poetics. Acoustics, material performance, light and safety regulation among other factors, are continuously tested with digital tools.

The focal technical research balanced towards the structural feasibility of a central piece of the design, in which the software Rhinoceros, with the applications of Karamba, Geometry gym and Autodesk Robot played a key role.

The presentation phase brings an overview of the latest design. A set of plans, sections, facades, details, isometric drawings, supporting diagrams and visualizations provides the information necessary to apprehend the project and its narrative.

TECTONIC ARCHITECTURE

The site as a departure point for orientating the design process, is only one of the contextual aspects in which the building rises. Historical, cultural, and climatic conditions outlines the decision making process. The tectonic solution is achieved when an awareness of deeper features of the place is triggered by the interaction of the body and its surrounding. When the concept of site and the principle of settlement are faced, the architectural modification of the environment is a conscious act of knowledge of the context. (Frampton 1995: 8)

By the means of the body, men articulate the world in the active process of inhabiting it. The vivid, lived – in space world appears to men senses, evoking deeper connections with its surrounding. When the mind is impressed by the reconstituted world from a psycho – physical impact, new connections that were not made before are established. (Frampton 1995:10)
The bodily experience has been deeper researched by Juhani Pallasmaa, who states that architecture articulates the experience of our being in the world and strengthens our sense of reality.

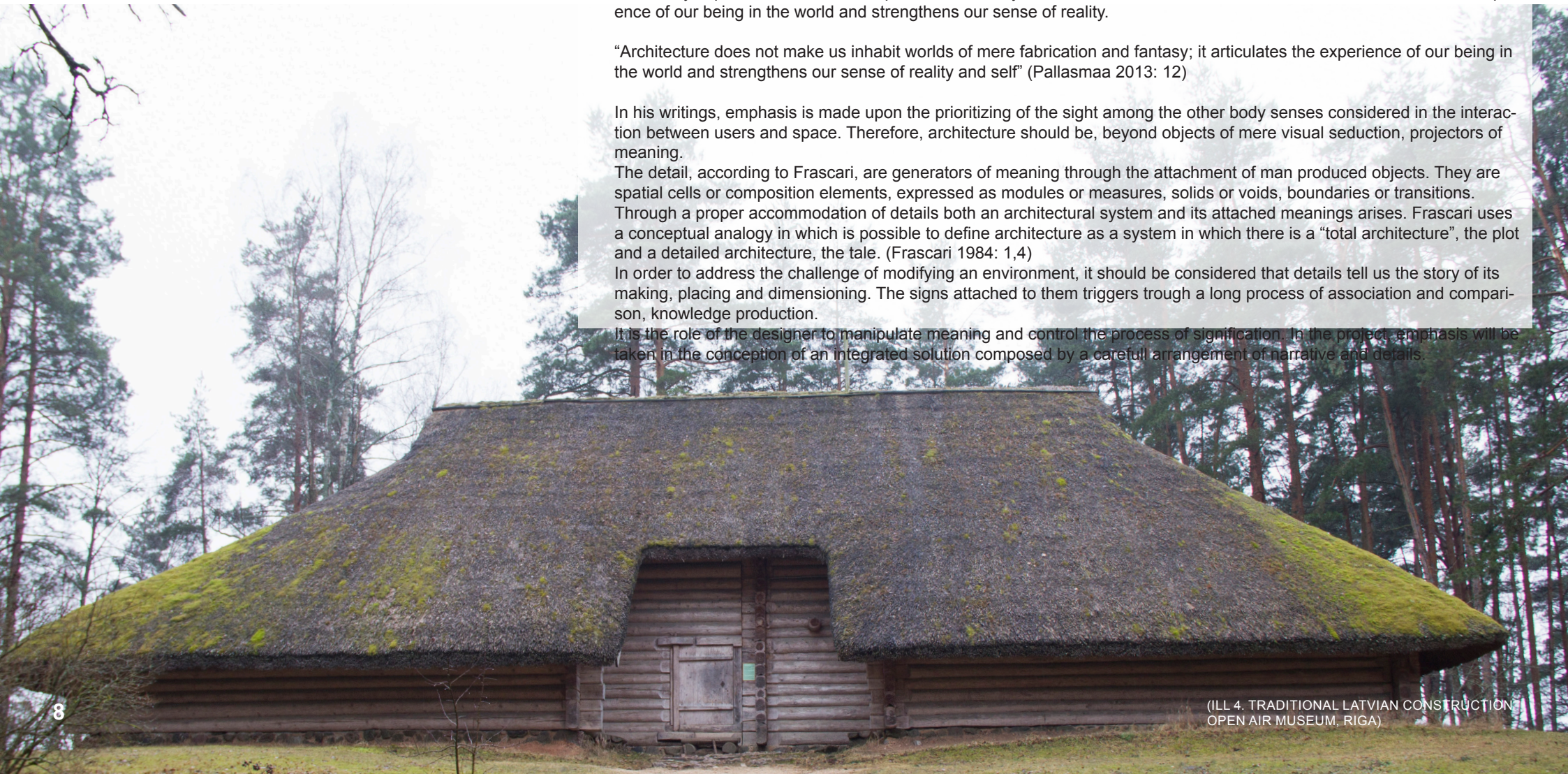
“Architecture does not make us inhabit worlds of mere fabrication and fantasy; it articulates the experience of our being in the world and strengthens our sense of reality and self” (Pallasmaa 2013: 12)

In his writings, emphasis is made upon the prioritizing of the sight among the other body senses considered in the interaction between users and space. Therefore, architecture should be, beyond objects of mere visual seduction, projectors of meaning.

The detail, according to Frascari, are generators of meaning through the attachment of man produced objects. They are spatial cells or composition elements, expressed as modules or measures, solids or voids, boundaries or transitions. Through a proper accommodation of details both an architectural system and its attached meanings arises. Frascari uses a conceptual analogy in which is possible to define architecture as a system in which there is a “total architecture”, the plot and a detailed architecture, the tale. (Frascari 1984: 1,4)

In order to address the challenge of modifying an environment, it should be considered that details tell us the story of its making, placing and dimensioning. The signs attached to them triggers trough a long process of association and comparison, knowledge production.

It is the role of the designer to manipulate meaning and control the process of signification. In the project emphasis will be taken in the conception of an integrated solution composed by a carefull arrangement of narrative and details.



STRATEGIES FOR RENOVATION & RESTORATION

A building has a life-cycle, like people. Buildings are designed by consideration of time period and surrounding environment. It deteriorates as time goes by until the unavailable level. If the building has important historical, regional or cultural character, its property and shape should be preserved.

Two main strategic approaches are used to deal with these challenges; preserving and reusing. According to the degree of the modification, the methods can be divided into two categories; Restoration and Renovation.

Restoration aim to maintain original historical and aesthetic values, for which reason it is mainly used to preserve buildings. Modification must be in as small a scale as possible. It is therefore difficult to choose this solution for the Bathhouse which require the new functionality and energy-efficient demands. (Carbonara: 2012: 4-5)

Renovation is a more active method compared to restoration. It focuses more on utilization than preservation. It's main aim is not only to maintain the building's own values, but also, to extend to its life expectancy and meet the new demands.(Kim: 2000: 1-3)
So it respects the track of the passing time, but it allows adding new structure and new program. This should be done while still respecting the iconic character of the building.

Renovation can be approached i many different ways and degrees. The three main methods can be classified as: Add-on, Inside-out and changing envelope. Add-on contains adding a new structure to the existing building. Inside-out aims to keep the original appearance of the building while fundamentally changing the interior for new utilization. Changing envelope includes transformations of the exterior in various scales. It is good for giving a fresh and revitalized image for the building.(Klanten and Feireiss: 2009: 7, 99, 167)

Through analysis, we will choose and combine several renovation-methods for the new bathhouse to fit the new demand, while keeping its own values.

	Restoration	Renovation
Main aim	Preservation	Utilization
Consideration for evaluate	+ Aesthetic value + Historical, regional values + Structure and construction problem	+ Aesthetic value + Historical, regional values + Structure and construction problem + Old facilities problem + Economic value
The method	+ Preservation + Reuse(with less modification)	+ Add-on + Inside-out + Changing clothes
Target	+ Historical monument	+ All of the building

LATVIA

INTRODUC-

Latvia is a country in the center of the Baltic region and it located in Northeastern Europe. Because of its strategically important location, Latvia has been a place for international trade and commerce since medieval times. Throughout history Latvia has had many different rulers from both Russia, Scandinavia and Europe. After collapse of the Soviet Union, Latvia achieved independence on 1991, and became a member of EU on 2004.(<http://www.historyorb.com>)

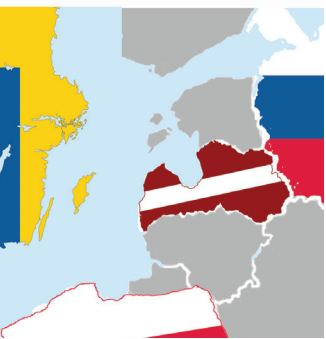
Latvia uses it natural beauty and ressources to attract tourists. Highest point of the country is only 311.6m and the majority of the territory is less than 100m above sea level. Latvia has a vast network of rivers and lakes and 44% of the land is covered by unspoiled alpine forest with a wide variety of wildlife. The western part of its territory is bordered by the Baltic sea and it has beautiful natural sea-shore with dunes and white sand beaches. Because of its geographical position, the average winter temperature is -4.6 C in Latvia and it can have relatively warm winter compared to the inner continent. (www.latvia.lv)

The population is conformed by 57% Latvians and 30% Russians. Latvia has been under Russian domain for many years and during the soviet occupation many workers from sovjet republics came to Latvia. Due to the diverse population Lativa contains many religions. (www.indexmundi.com)



(ILL 5. LATVIAN LANDSCAPE)

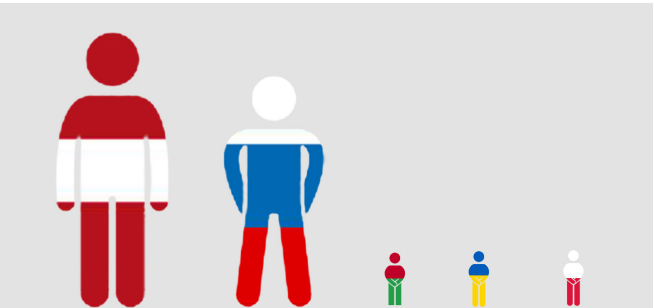
GEOGRAPHY



(ILL 6)

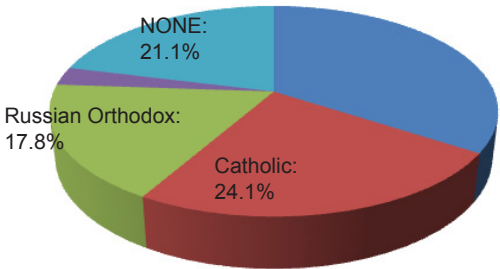
Location	latitude: 56,30,36 N longitude: 21.00.36 E timezone : utc+2 hours
Area	64,589km2
Regions	kurzeme, zemgale, vidzeme, latgale
Language	Latian, Russian
Government	parlimamentary democracy
Population	2,290,237
Average temperature	In summer: 15.8°C In winter: -4.5°C
Average precipitation	In summer: 195mm In winter: 116mm

POPULATION



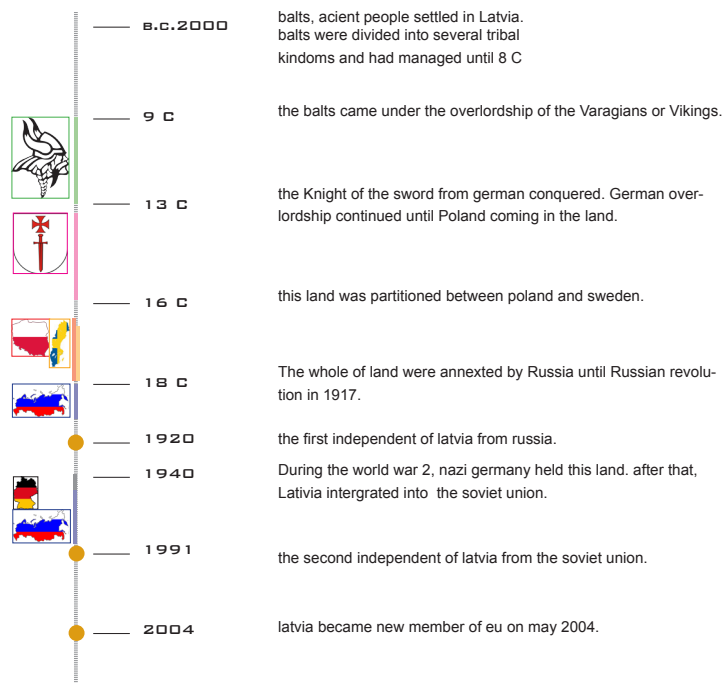
Latvian : 57%
Russian : 30%
Belarusian : 4%
Ukrainian : 3%
Polish : 3%

RELIGION



(ILL 7)

HISTORY



LATVIA

(ILL 8)

Latvia gained its first independence in 1920. Before that, Latvia was ruled by several different countries; German, Sweden, Russia and Poland.

Before over-lordship of the Vikings in the 9th Century, the land was divided by several tribal kingdoms and they actively traded with Sweden, Denmark and Russia by using its geographical advantage. In 1201, German knights of the Teutonic came to the area and converted the citizens to Lutheranism. The Germans settled and claimed the territory. Even though the cities improved, the Latvian people suffered as German's serfs. In the 16th century the land was partitioned between Sweden and Poland because of war. The new intruders were similar to the Germans, so Latvians suffered tyranny without any privileges. The war between the two nations made the land desolated. In the 18th century Russia gained hegemony of the Baltic area through the Great northern war, and the Russian occupation continued until 1920. The independence in 1920 was a result of a growth in the national awareness and of the Russian revolution. Latvia was independence until 1934 where the outbreak WW2 changed the geopolitical scene. The first three years were under Nazi occupation and afterwards Latvia involuntarily became part of the Soviet union. During the Soviet period, lots of Latvians were killed and deportation, the Russian flew into Latvia and charged property and privileges.

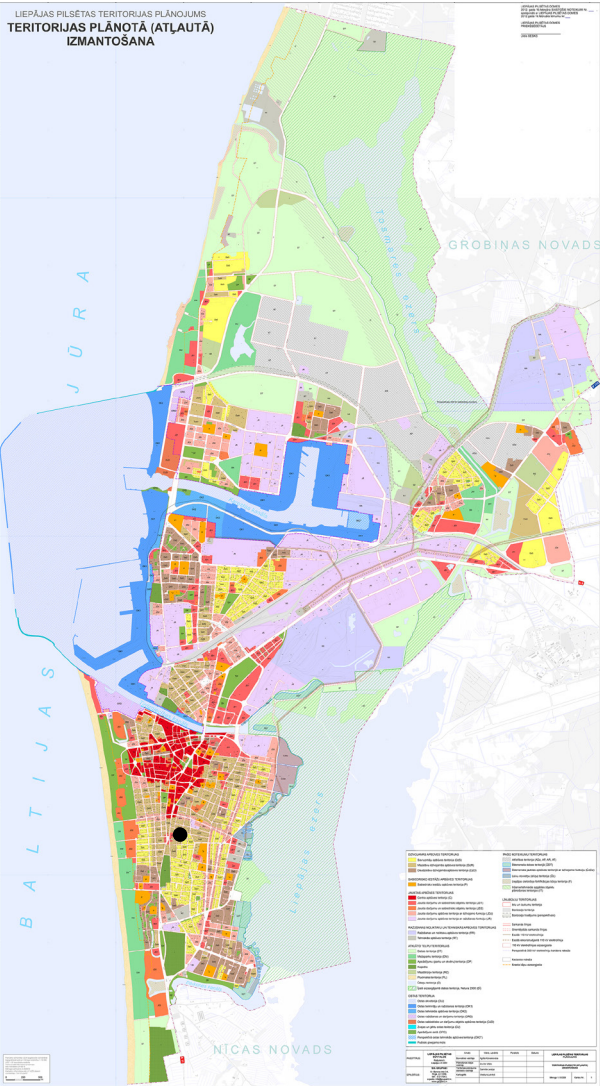
After a history full of struggles and suppression, Latvia gained independence in 1991 and became the group of EU in 2004.

Because of the complex history, Latvia is a multi-cultural state with many different traditions and a unique environment. The rich cultural heritage attracts visitors from all over the world. (<http://www.lonelyplanet.com>)



THE CITY OF LIEPAJA

LIEPAJA



(ILL 10)

POSITION IN LATVIA



(ILL 11)

- Bath house
- Residential - Detatched housing
- Residential - Low rise
- Residential - High rise
- Public Authorities
- Mixed use - city center
- Mixed use - Business and public facilities
- Forest
- Park
- Industrial area
- Industrial harbour

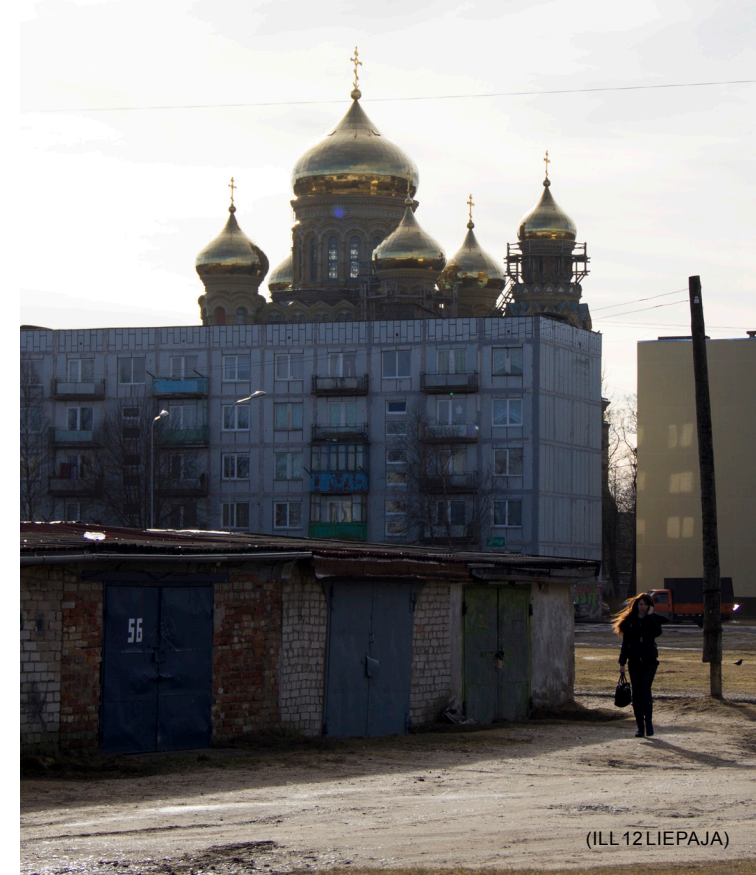
HISTORY

	ANCIENT	The city developed from small fishermen villages.
	1560	the city grew with development of a port with connection from the baltic see to liepaja lake.
	1795	construction of railway, port help the develop-ment of local industry.
	1899	russian empire believe the city as perfect place for fortress. the military town built around it.
	1946	large plants was constructed and soviet military base entered to it. the city close city for local people.
	PRESENT	liepaja makes effort to transform from military city into modern port city. it try ro attract foreign investment for its development.

Liepaja is the third largest city in Latvia and is located on the westcoast facing the Baltic sea. The city evolved from a fishermens village and the ocean has always played an important role in the development of Liepaja. Multiple expansions of the harbour and development of national infrastructure has brought industry and workers to the city. Being the western frontier of Latvia city has played an important role as naval military base and fortress for the Russian and Soviet armies. During Soviet times the military base constituted one third of the city with 26000 personal. After the independence in 1991 the base was closed and the former base area is now characterized by a mix of soviet residential blocks, industry and abandoned industrial and military facilities. (www.Liepaja.lv)

The beach is a significant trademark for Liepaja, attracting both locals and tourists for hundreds of years. In combination with the recreation of the beach, the city has also been known as a health resort, especially around the late 19th century and early 20th century. The city was visited by both, wealthy Europeans as well as Russian royalty and aristocrats. (homemadedessert:5)
With decrease in the industrial sector and the closing of the military base, Beach- and resort tourism are becoming a key element in the future development of the city. Great efforts are made to transform Liepaja from Industrial military city to resort city

The complex history of Latvia and Liepaja can be witnessed allover the city. Buildings from many different historical times are mixed and stand side by side.



(ILL 12 LIEPAJA)



(ILL 13 LIEPAJA)



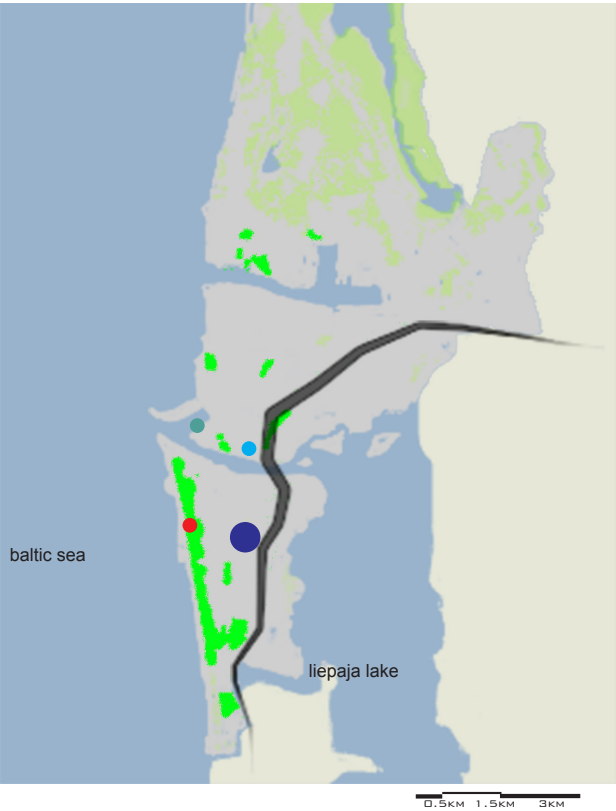
(ILL 14 LIEPAJA)



(ILL 15) LIEPAJA

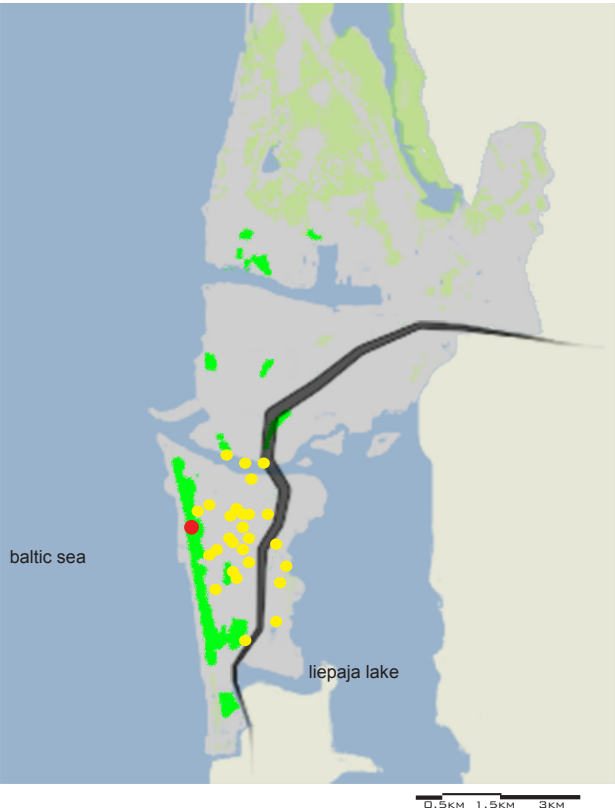
SURROUNDINGS OF THE BATH HOUSE

GENERAL FUNCTIONS



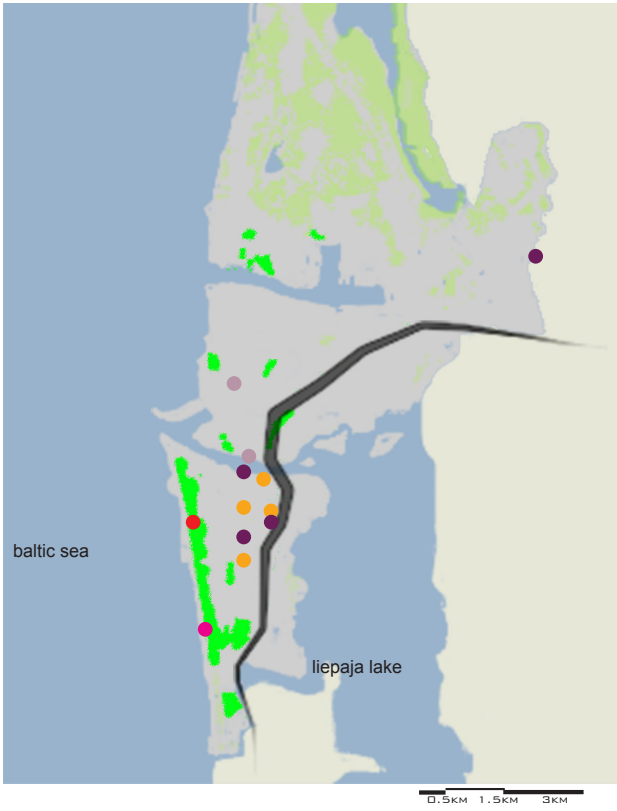
- city boundary
- Park & forest
- the bathhouse
- City Center
- Train & Bus station
- ferry
- highway trough liepaja city

ACOMMODATION



- city boundary
- Park & forest
- the bathhouse
- Accommodation
- highway trough liepaja city

HEALTH AND RECREATION



- city boundary
- Park & forest
- the bathhouse
- highway trough liepaja city
- Spa
- Traditional Sauna (Pirts)
- Future Thermal Bath
- Hospital & sanatorium

(ILL 16)

THE SEA SIDE PARK

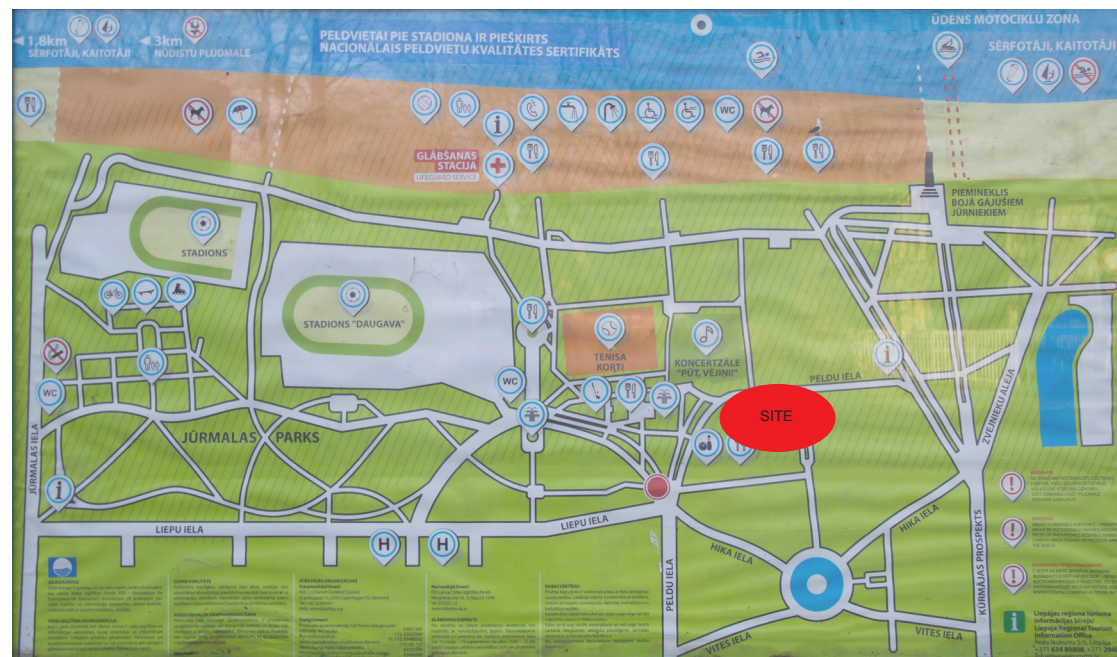
The Bath house is placed in a long green axis with the beach to west, and the sea side park and forest to the east. This area constitutes the main public recreational area of the city and attract locals as well as tourists.

Besides the green areas and the connection to the beach, the sea side park contains many public functions for both recreation, sport and entertainment.

The role of Liepaja as a tourist destination is evident in the large amount of accommodation available compared to the size of the city. While most accommodation is placed near the city center, more coastal options are available as well, which are closer to the Bath House. (www.booking.com)

To investigate possibilities for the municipal strategy of reintroducing Liepaja as a wellness destination, wellness functions are located. Existing spa facilities are located in the Olympic center and at hotels in the city center. Sanatorium functions which were previously placed in the Bath house, are now placed in the city hospital where they utilize the natural local resources of mud and mineral water. (www.liepajslimnica.lv). Further to the south, Future plans of utilizing local water resources exist in the coastal area, where a spa resort with thermal baths is being planned (www.homedessert.org). Traditional saunas can be found mainly in residential areas north of the river.

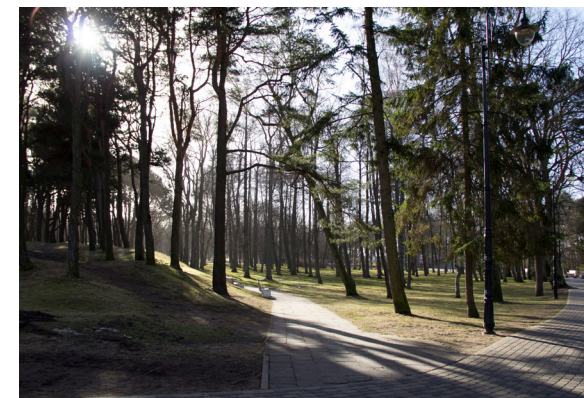
Currently most wellness facilities are placed close to the city center, But with the opening of the bath house and with the opening of a thermal bath, activities are starting to appear along the coast, merging with the main recreational area by the beach.



(ILL 17 SEA SIDE PARK MAP)



(ILL 18)

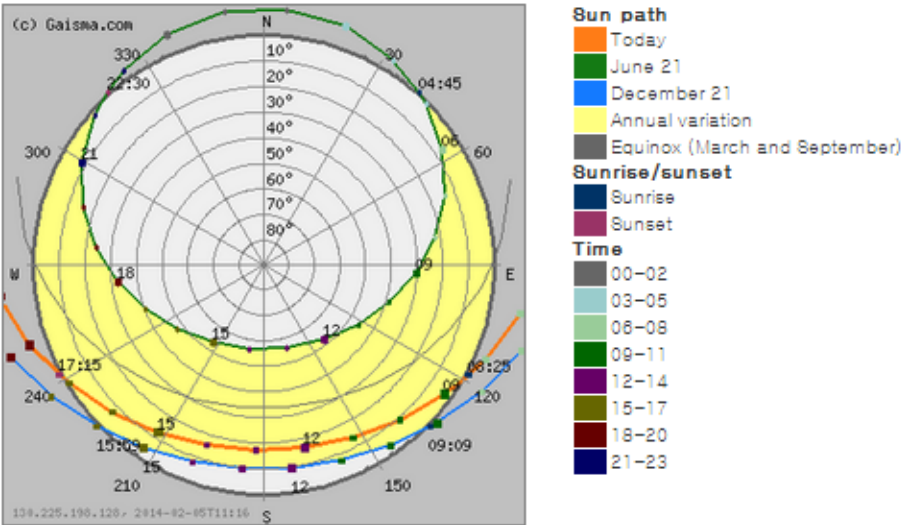


(ILL 19 SEA SIDE PARK)

CLIMATE

The climate and wind conditions are comparable to those found in Aalborg, Denmark, since they are in the same latitude.

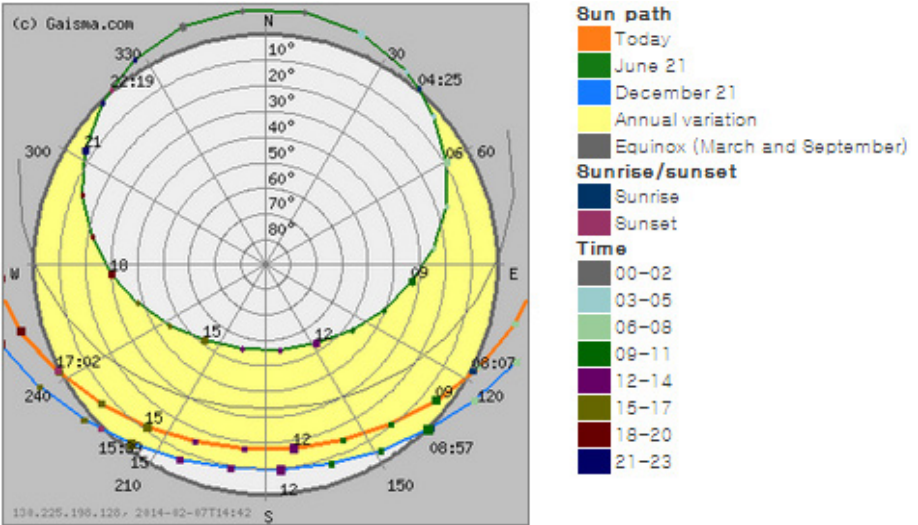
LIEPAJA, LATVIA



Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Insolation, kWh/m²/day	0,45	1,16	2,48	4,33	5,93	6,27	6,07	4,99	3,19	1,54	0,65	0,28
Clearness, 0 – 1	0,34	0,42	0,48	0,54	0,58	0,55	0,56	0,56	0,51	0,42	0,37	0,28
Temperature, °C	-0,57	-1,22	1,13	5,72	10,81	14,59	17,54	17,61	13,29	8,71	3,43	0,44
Wind speed, m/s	7,57	6,59	6,14	5,71	5,28	5,09	4,97	5,12	6,10	6,51	6,56	6,97
Precipitation, mm	47	31	37	36	40	48	74	80	79	74	84	68
Wet days, d	18,0	14,1	14,6	11,9	10,9	10,6	12,8	13,7	15,8	16,5	20,3	19,9

(ILL 20)

AALBORG, DENMARK



Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Insolation, kWh/m²/day	0,44	1,13	2,47	4,03	5,60	5,96	5,92	4,62	3,06	1,51	0,66	0,31
Clearness, 0 – 1	0,33	0,41	0,48	0,51	0,55	0,53	0,55	0,52	0,49	0,41	0,38	0,31
Temperature, °C	1,75	1,42	2,91	6,07	10,88	14,32	16,79	17,03	13,64	9,87	5,61	2,88
Wind speed, m/s	8,17	7,34	7,14	6,35	5,92	5,36	5,69	5,86	6,73	7,36	7,37	7,55
Precipitation, mm	46	30	38	36	45	51	66	62	67	69	67	54
Wet days, d	17,1	12,1	14,0	11,9	12,0	11,8	12,3	13,0	15,4	16,8	18,6	17,5

(ILL 21)

SITE LAYOUT

The site is located in the Seaside Park, two hundred meters from the coastline and six hundred meters to the south from the Pilsetas kanals. The main street towards the east (main façade of the building) is called Peldu iela. Perpendicular to it, in the East-West direction a pedestrian street joints Peldu iela with Hika and Vites iela, both of this surrounds a pond with a roundabout. Peldu iela connects the bath house compound with the city center (to the east), parallel to it, is connected with Kurmajas prospekts, which reach the center as well. The city counts with the first electric tram line in the Baltic states in 1899. In pictures and postal from the begginings of the twentieth century, it can be seen that the train reached the front part of the site. Currently, the segment reaching the site is inexistent. The site is located at less than one kilometer to the west of the city center, so it is easily reachable by walking.

- Movement for pedestrians
- Movement for Bicycle
- Movement for Car



THE BATH HOUSE





SITE CHARACTERISTICS



The site presents a diminished impact of the wind for being surrounded to the West and North by four meter height dunes. Surrounding the building, grass with abundant amount of trees domain the landscape. The “T” shaped building creates, towards the North, in the interior corner a natural cleaning. Towards the South, the building sets a distance with the park with two sags, subdivided by a metallic contention wall in the East – West direction. This irregularity in the terrain worked as a treatment mud depot when the building was functional. A small construction shelters the equipment that pumps the water from a natural underground lake towards the Bath House and other surroundings facilities.

Two service streets connects Peldu iela with the main pathway of the park. The first one, to the south, is meant to be pedestrian and works properly as such. The second one, towards the north, seems to be a service access to the Pumping facilities, then there is a gap without pavement towards the park’s pathway. The site is meant to be addressed from the roundabout with the pond. The symmetry of the Bath House imposes itself in a harmonic façade composition. A sense of monumentality is achieved with the length of the road towards the main entrance and the composition of the façade. Being nearby, it is possible to perceive the complete front of the building. A series of columns on a podium, sets the transition with the street and the porch. When surrounding the building, it is appreciable how its maintenance has been prioritized towards the street. The side and back facades shows abandonment. The density of the trees creates the sense of scale of a mid-scale park, we could assume that in summer most of its surface is covered in the shadows casted by the tree’s branches.

GENIUS LOCI

The smell and the sound of the sea can be perceived, since the beach is only 200 meters towards the west but is not possible to see it due to the protective dune located towards the west of the plot. A tension between the abandoned bath house and the park suggest a missed opportunity for a remarkable public green space. No urban furniture can be found in the immediate surroundings, but those located in the pound, which is a lively used space.

The Bath House imposes itself, with an appealing presence from the urban side of the context, and it seems to be very integrated with the urban grid. From the side of the park, it closes itself and doesn’t relate in anyway with its surroundings. Even though, the density of the trees creates sense of scale, the area lacks definition in terms of how to inhabit it. It does, however, provide the opportunity to connect with nature. It is, in winter, a quiet place. The vehicle transit in the street is almost inexistent and the pedestrians in the park are scarce. In summer the park and beach are full of people who create a different atmosphere of live and sounds.

(ILL 22) THE PARK

PAUL MAX BERTSCHY (1840-1911)

The Bath house in Liepaja was designed in 1902 by the German architect Paul Max Bertschy. (homemadedessert 2014: 3). Bertschy worked as the city architect of Liepaja from 1871 til 1903 and has played an important role in the appearance of the city. Throughout his career in Liepaja, he built more than 163 buildings in Liepaja. (Bertschy 2011:43)

Berstchy was born on January 1st 1840 in Strausberg near Berlin. He was the second oldest in a group of nine children and grew up in an evangelical Lutheran family. The interest for construction and architecture ran in the family where his father, his grandfather and his grand grandfather were all carpenters.

As a young man Bertschy moved to Berlin to attend 'Realschule' (secondary school) and gain experience within the architectural field. It was difficult for Berstchy to find work in Berlin due to the large amount of young workers. So he travelled east to Latvia where they had an increasing demand for a highly educated work force. (Bertschy 2011: 15-16).

Initially Berstchy worked in Riga and then moved on to Daugavpils in 1865, where he worked for both engineers and architects. In order to work as an independent architect in Latvia, which was Russian domain at the time, it was necessary to have an Architectural degree from St. Petersburg Art Academy. Bertschy started his diploma work in 1864 and finished in 1869. (Lancmanis 2011: 40-41). Now possessing the proper degree and experience, Bertschy was offered the job as city architect in Liepaja in March 1871. While working for the city of Liepaja, he started his own architectural office in which he was later accompanied by his sons. Throughout his career in Liepaja, he built numerous buildings in both Liepaja, and other regions of Latvia and Lithuania. His work spanned widely including Villas, industrial buildings, offices, hotels, bathhouses, churches, educational buildings and military facilities. Bertschy remained in Liepaja the rest of his career, his work at the municipality ended in 1903 after which he continued to work with his sons. He died in 1911. (Bertschy, Lancmanis 2011: 17, 43, 51-73).

Architecturally Bertschy grew up in the environment of late Berlin classicism with inspiration from Karl Friedrich Schinkel. He was known for his support to a broad specter of styles which can also be seen in his work. It varies from late classicism, to neoclassicism, to west Prussian inspiration and early art nouveau details. (Lancmanis 2011: 48-49).



(ILL 23)

FUNCTION AND DAILY USE

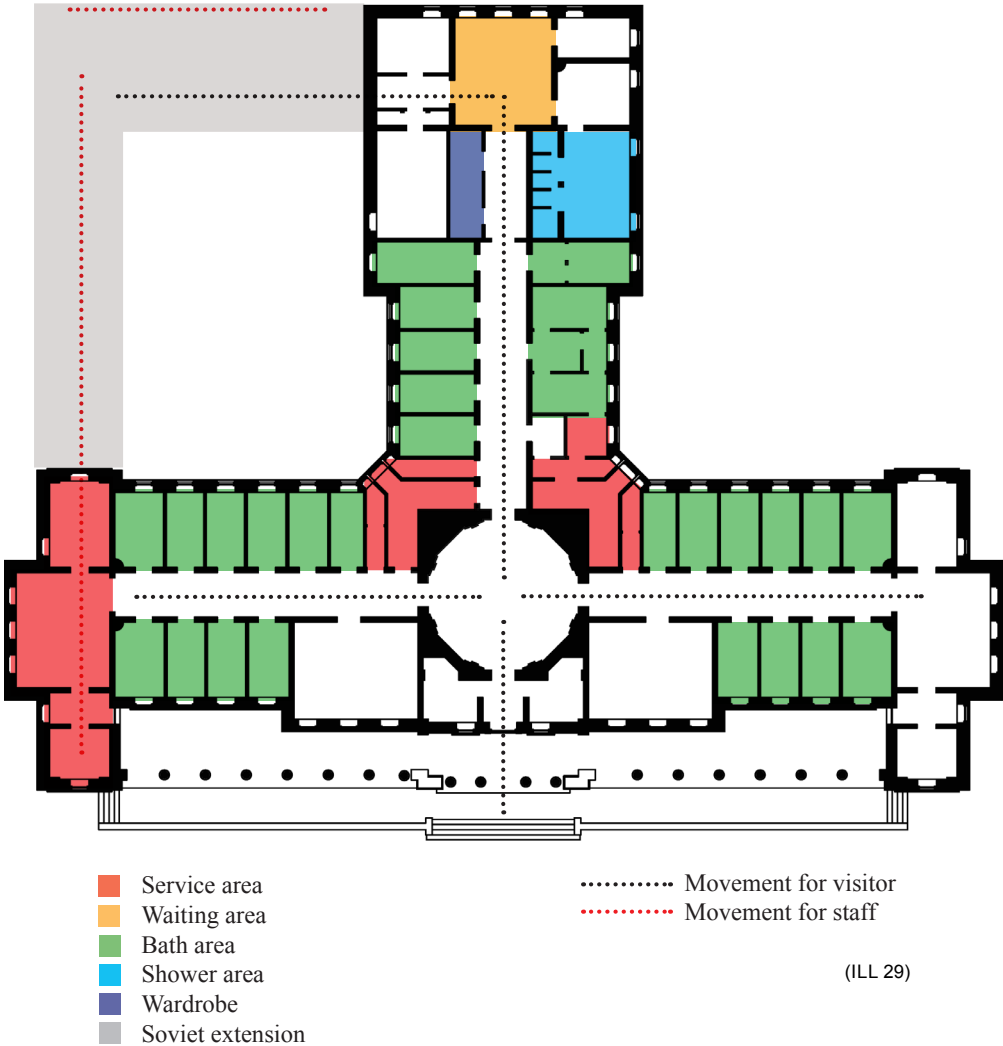
The building was made to provide luxurious bath facilities in Russian period on 1902. It has 30 luxurious rooms for different treatments, ect sea water baths. After the discovery of curative mud on 1925, mud baths were offered. Through the ambitious renovation on 1946, its function converted from bathhouse to sanatorium in the Soviet-union. The curative mineral water from a local underground-lake was discovered, Supporting the new sanatorium functions until 1994. (www.zudusilatvija.lv)

Due to the renovation the buildings contain elements from different periods. There was ambitious modification and extension for new functions in the Soviet era.

Due to a lack of preserved information, it is difficult to obtain knowledge of the precise functions of the different rooms. But most of the original rooms still remain with original tiles as well as new. In some rooms, as the wardrobe, features still remain that reveal the function.

Symmetric corridors with a strong axis clearly point the directions from the dome to the treatment facilities.

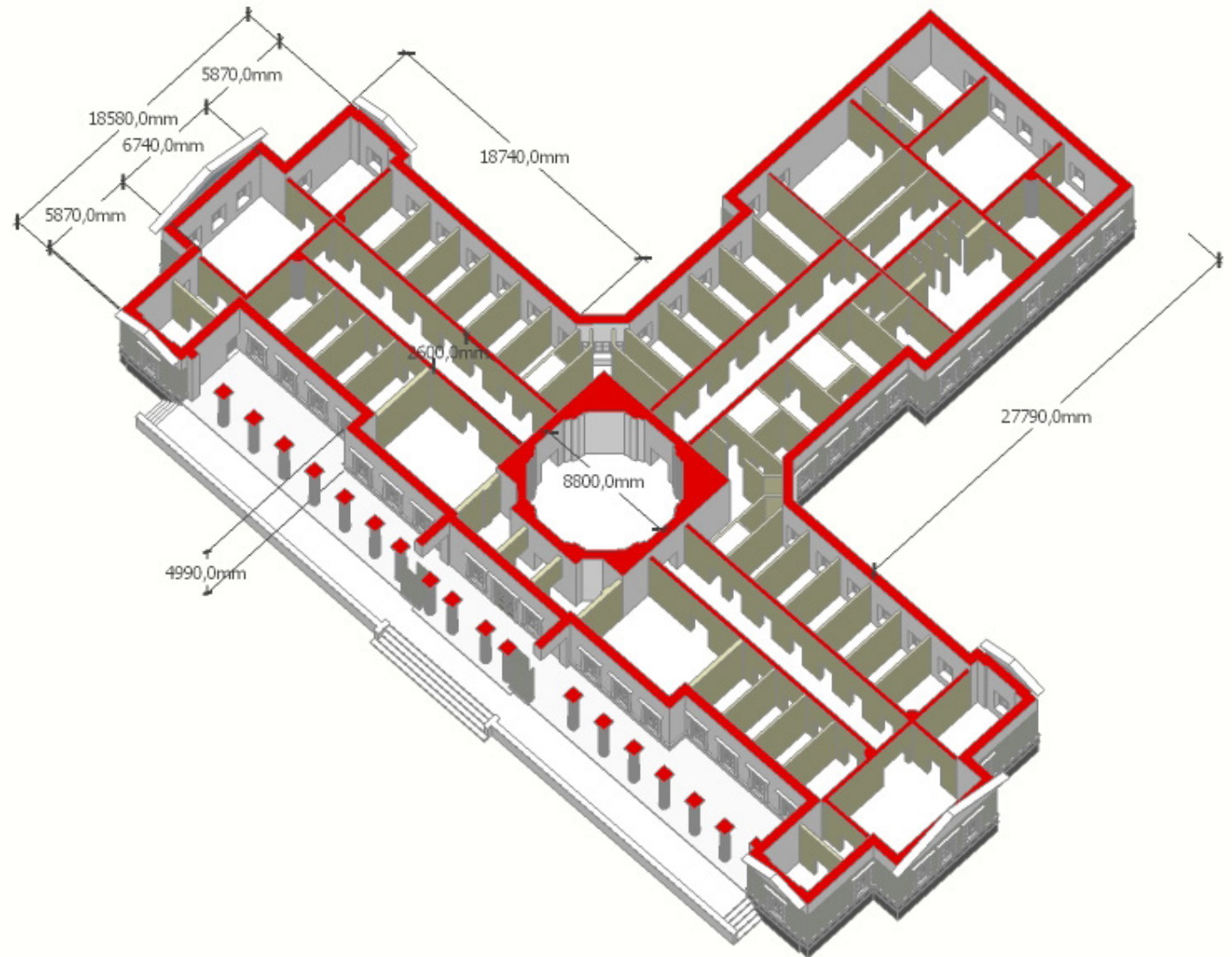
The design processt will be based on both facts and qualified assumptions about function and organisation.



CONSTRUCTION

The main structure is compound by a set of load bearing brick walls. The direction of the support axis follows the main circulation lines of each of the three wings. The walls buckling is controlled by a set of wooden beams in the impost of a series of vaults that shapes the ceiling. Above them, a wooden structure supports the roof.

The span between the walls is under six and a half meters, the interior height of the building is around four meters. In the reception, where the three main wings of the plan intersects, a 9m diameter dome reaches its highest point in the interior with twelve meters.



(ILL 30)

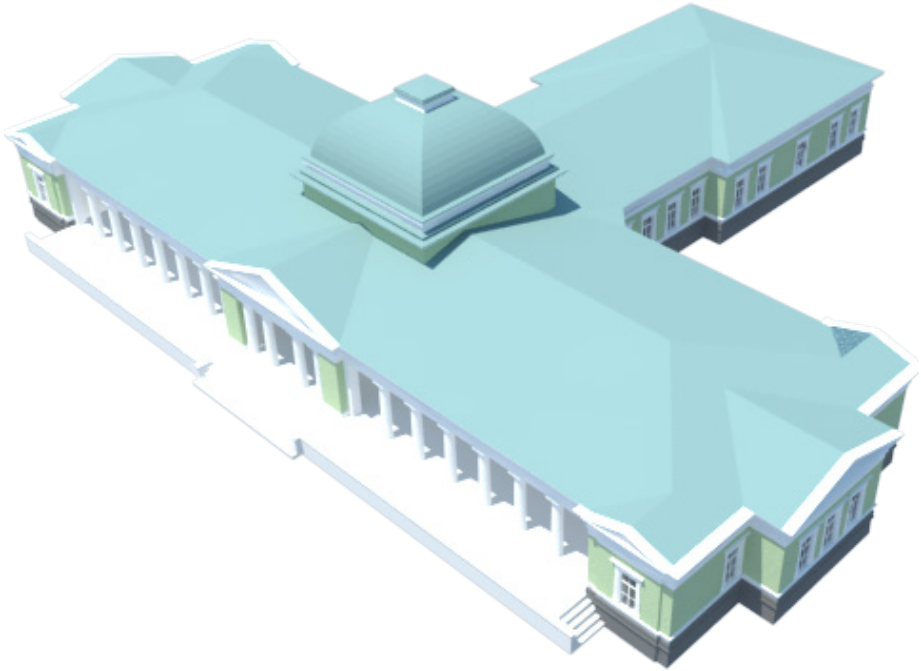
BUILDING ANALYSIS

NEO CLASSICISM

This bathhouse has unique characteristics that draws from a combination of neo-classical style for exterior and art-nouveau style for interior. It was designed by Paul Max Bertschy and built on 1902. It is one of his later works.

Neo classism that predominated the area from mid-18th century to the beginning of the 19th century, manifested to represent classical perfection from Greek and Roman times. This style based on archeological accuracy and rationalistic aesthetic. There are representative architects for this style, but it is principally derived from Palladio and Greek ancient architecture. Because of this, neo-classism has the several remarkable characteristics. Most of them focus on how to restore accurately ancient classical style. (Risebero: 2004: 268-281)

The exterior facade strongly follows this style and it has a impressive front façade with dramatic columns. In accordance to classical values, minimal decoration is applied to the facade. The expression is simple and geometric beauty. Plan and volume is in perfect symmetry. All of the wings of the building are divided by a strong axis from the dome and arranged symmetrically. In the same manner, all side of facades are perfectly symmetric.



(ILL 31)

CHARACTERISTICS OF NEOCLASSICISM

- A. Represent classical perfection: Ancient Greek and Roman style
- B. Symmetry and balance
- C. Emphasis on the form of exterior than interior function
- D. Simplicity in geometry form
- E. Dramatic usage of column
- F. Empty clean interior wall
- G. Flat and horizontal roof
- H. Minimize decoration for exterior wall

<p>Illustration 1</p> <ul style="list-style-type: none">- A. Represent classical perfection- B. Symmetry and balance- C. Emphasis on the exterior form- G. Flat and horizontal roof	<p>Illustration 2</p> <ul style="list-style-type: none">- A. Represent classical perfection- B. Symmetry and balance- D. Simplicity in geometry form
<p>Illustration 3</p> <ul style="list-style-type: none">- A. Represent classical perfection- C. Emphasis on the exterior form- E. Dramatic usage of column- H. Minimize decoration for exterior	<p>Illustration 4</p> <ul style="list-style-type: none">- A. Represent classical perfection- B. Symmetry and balance- D. Simplicity in geometry form- H. Minimize decoration for exterior

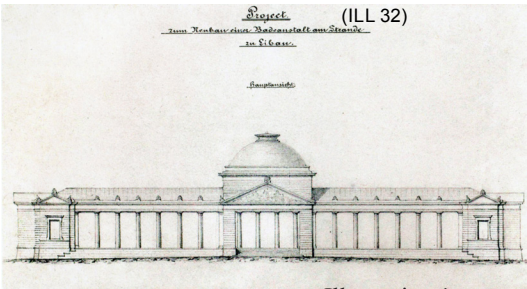


Illustration 1

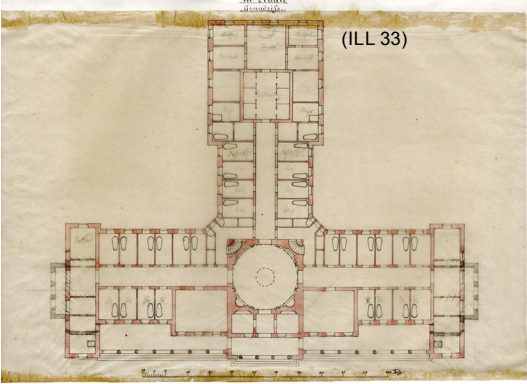


Illustration 2



Illustration 3



(ILL 35)

Illustration 4

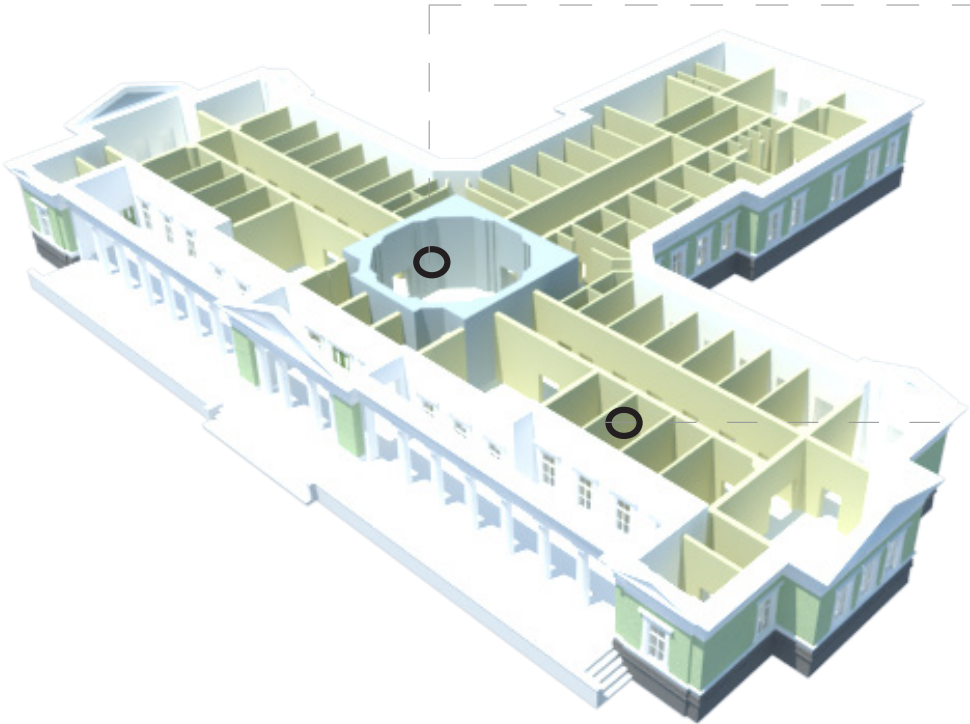
ART NOUVEAU

As a response of rejection towards previous architectural styles and classical values a unique style was developed. Art-nouveau arose from this demand. This style got design motifs from nature. For these reasons, art-nouveau is organic and asymmetric unlike neo-gothic with geometric and strict rules. A characteristic of this style is the use of decorative pattern and stained-glass, with an emphasis on handcrafting. (Risebero: 2004: 333-341)

From this bathhouse, this new architectural style seems to influence on Paul Max Bertschy. Even though neo-classism seeks less decoration for interior there are decorative tile patterns on the wall in the bath rooms. These patterns derive from plants and come in many variations. A decorated window in the top of the central dome disperse the light with diverse colors.

CHARACTERISTICS OF ART NOUVEAU

- A. Rejection from earlier style
- B. Asymmetry and organic form
- C. Usage of curved form and arch
- D. Decorative pattern
- E. Embellishment by using plant's image
- F. Stained-glass
- G. Emphasis on handcrafting



(ILL 36)

<p>Illustration 1</p> <ul style="list-style-type: none">- E. Embellishment of plant's image- F. Stained-glass- G. Emphasis on handcrafting	<p>Illustration 2</p> <ul style="list-style-type: none">- D. Decorative pattern- E. Embellishment of plant's image
<p>Illustration 3</p> <ul style="list-style-type: none">- D. Decorative pattern- E. Embellishment of plant's image	



(ILL 37)

Illustration 1



(ILL 38)

Illustration 2



(ILL 39)

Illustration 3

BUILDING ANALYSIS - FORMER RENOVATION

Because of new demands in Soviet-union, there had been lots of modification in the building .The tract of the time-crashing can be discovered from its elements. But coexistence of different periods for elements seems not to offer aesthetic values and it seems to hide the previous original aesthetics for specific objectives. For these reason, this coexistence only emphasize clearly their difference instead of visual harmony. First Tile in the bathhouse is the good example for this problem and black extra tile is covered up decorative tile with art nouveau. Compare to the tile pattern on the drawing from Bach, simply colored tile may be not from his own design and it effects negatively on bath room's atmosphere. This strange coexistence can be founded in the wall on the corridor and the column in the dome area. On the ceiling on the corridor, there are voids and they can be assumed as roof opening and ventilation to get light and fresh air for the corridor. Roof opening seems to not operate in Soviet-union because there are lots of artificial lights on the wall.

Extra demand for the Bath house in the Soviet-union caused ambitious modifications for the building plan. The part of walls was demolished and the some windows were covered and the building lost its own original feature.

The investigate of comparison for time-difference will be useful for evaluate importance between historical and aesthetic values.

Changes between original building and Soviet union

- A. Modification about plan
- B. Adding extra tile
- C. Modification of roof opening

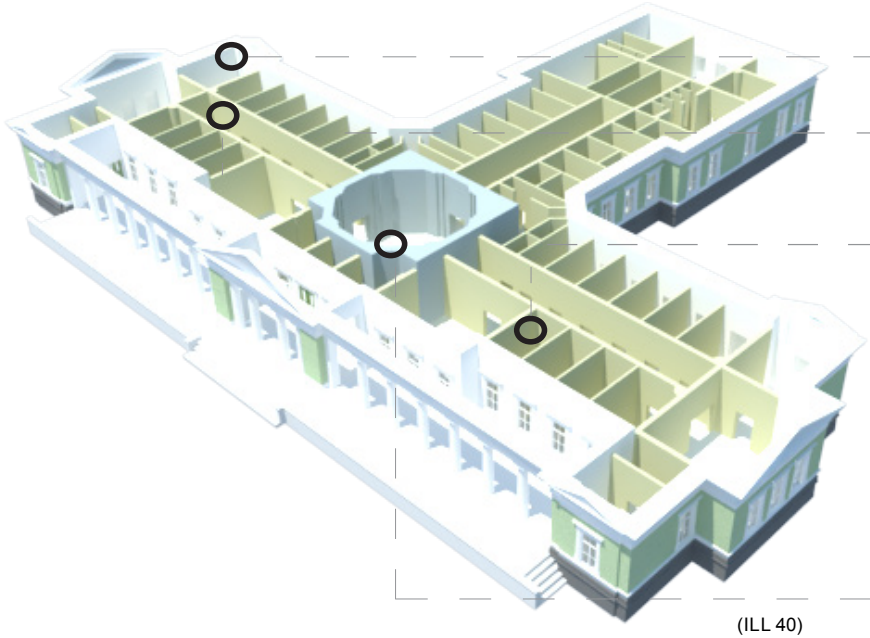


Illustration1 - Bertschy original sketch for decorational ceiling tile (1880's)	Illustration 3 - B. Adding extra tile - C. Modification of roof opening
Illustration 2 - B. Adding extra tile	
Illustration 4 - B. Adding extra tile	Illustration 5 -A. Modification of the plan



Illustration 1



Illustration 2



Illustration 3



Illustration 4



Illustration 5



Gruss aus Libau.

Badeanstalt.

(ILL 46)

Modifications performed in the renovation

1. Deleting facade details in the west wing
2. Extension
3. Deleting side-entrance in the west wing
4. Closing roof openings

The extra functional demands cause the modification for the west wing faced on the seaside. Clear evidences can be discovered on the exterior. Through comparison between the original building's picture and present building situation, there are changes in the façade, chimney and side entrance. Original side entrance and chimney on the roof were deleted and it can show obviously there was functional modification on the plan. Hanging element below windows on the façade also disappeared and different roof material and height of the extension only emphasize the time-crashing.

LIGHT

The light conditions in the building can be divided into two main zones. The zone dominated by artificial light and the zone dominated by daylight.

The central dome and the hallways have little or no daylight and are lit artificially. The artificial lights have a simple industrial expression and are distributed rhythmically along the ceiling of the hallway. The light is mainly distributed forward, creating a differentiated light along the axis. At the end of each hallway there is a room with a window creating a clear direction. Due to changes made with the extension, and the fact that many windows are closed off at the moment it is only possible to see the effect in one of the hallways.

The dome is lit by the same artificial lights as the hallways, distributed around the edge of the circle. The decorated rooflight does not provide much light, partly due to dark color, and partly due to dirt covering the glass.

As previously mentioned, images suggest that the openings in the ceiling have been used for rooflights. This would suggest a very different light experience, where daylight was in fact dominant in the hallways as well.

The rooms distributed along the hallway are all equipped with large windows. variations occur due to orientation and exterior shadow elements, but generally they are well lit by daylight only.



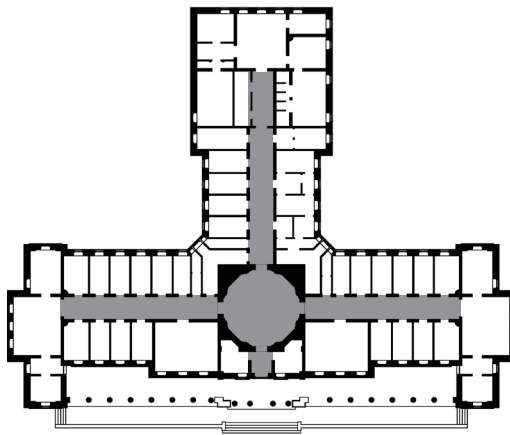
(ILL 47)



(ILL 48)



(ILL 49)



(ILL 52)



(ILL 50)



(ILL 51)



(ILL 53)



(ILL 54)

LATVIAN HEALTH TRADITIONS

Until the mid 19th century, it was common among farms to have a bath house. The bath house was mainly used to wash the body and perform sauna rituals. The sauna rituals were not only about cleaning the body, but also about wellbeing and cleaning the mind. Besides the role in personal hygiene, the Bath house played an important role in the society, both for spiritual activities and for social gathering. The Sauna would mainly be shared with family, but could also be shared in a small community. (www.latviatravel.com)

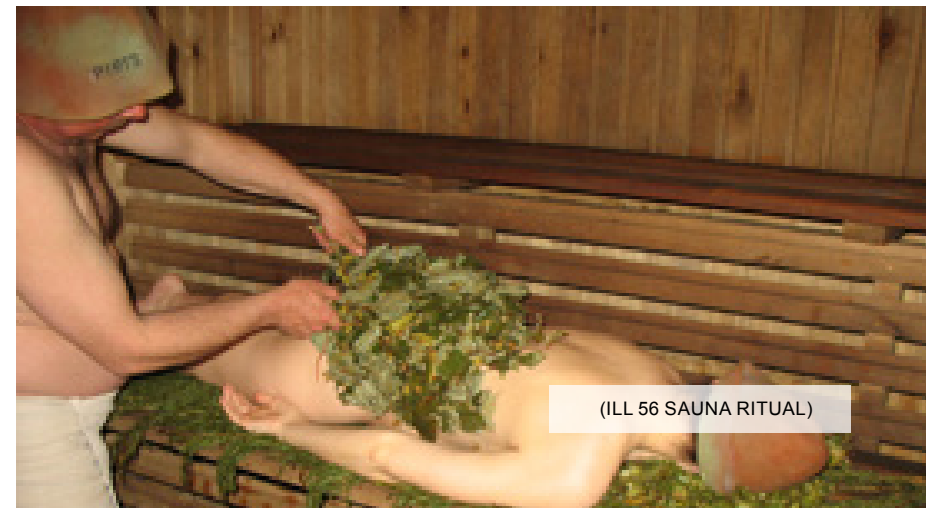
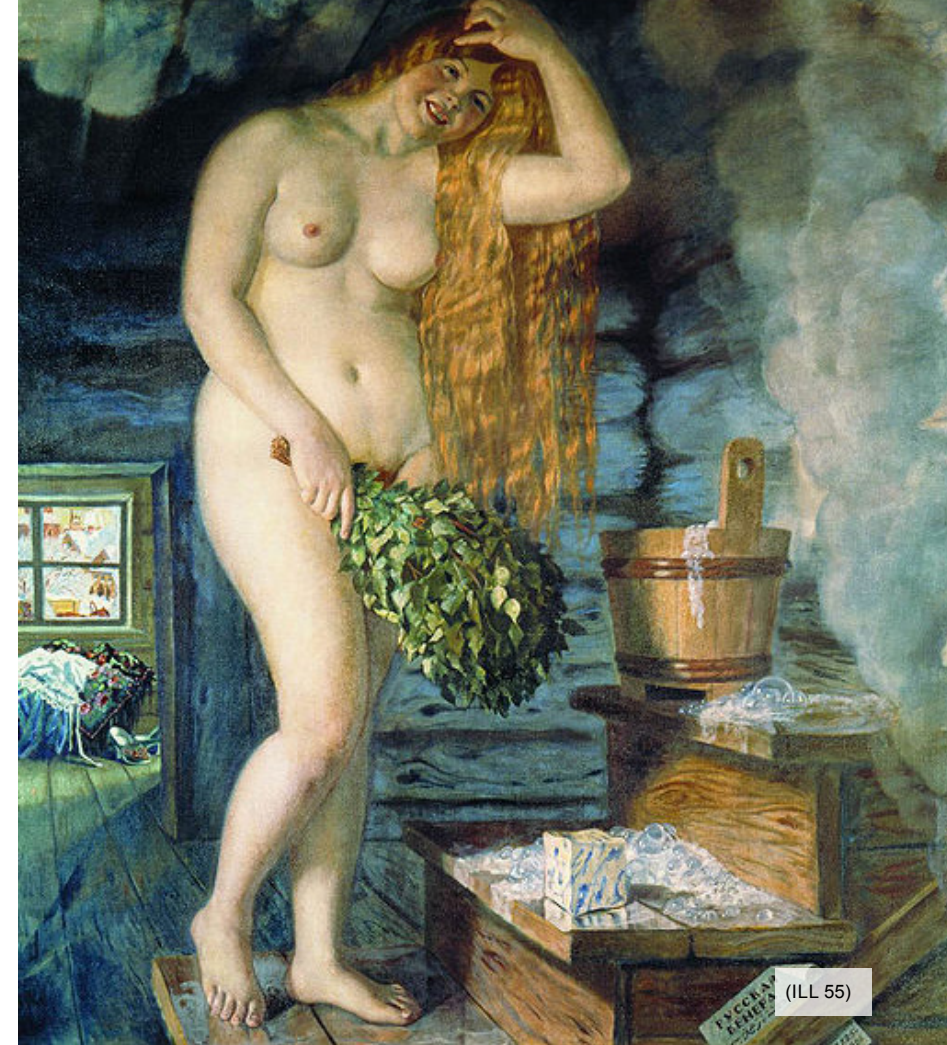
In pre-Christian Baltic countries cultures, birth usually took place in the bath-house, and only the husband was able to enter when a birth was taking place. The bath-house was holier than the church, and it was believed that more than one goddess was there to assist with the birth. Laima, a protective goddess of the home, was accompanied by Mara, who was the protectress of cows. As in Scandinavia, a ceremonial meal was held after the birth. (Taylor & Francis, 253). It is said that in Latvia, the cracks in walls and windows of the bath house were repaired in a party held after the birth. Rituals such as offerings to the help women involved in the birth, creation of amulets and offerings were held in the bath house in the following weeks. The sacred nature of the bath house reveals itself when it is considered that rituals were held before and after the child were born. In the bath house ceremonial meals for the dead also took place. (www.global.britannica.com)

It is reasonable to assume, that a strong cultural background sustains the importance of the current Bath House in Latvian culture as a space for healing and social gathering. With the arrival of domestic hot water, the bath house adapted itself into a space for health and spirituality through intimacy. (www.latvia.travel)

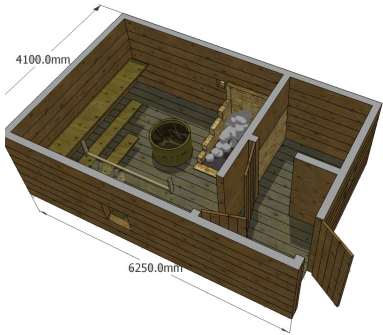
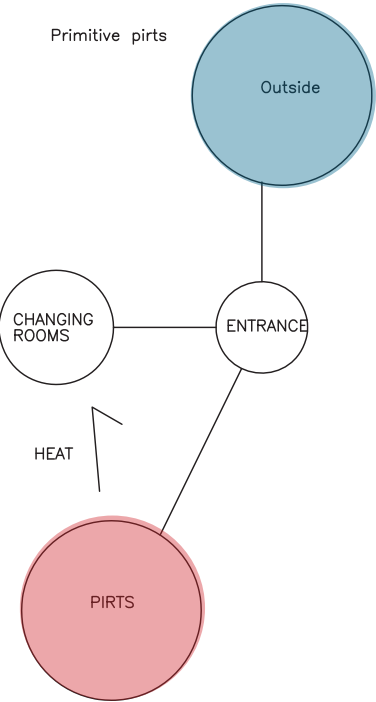
Modern Latvian culture offers places in urban contexts that substitute the traditional family Bath Houses (Pirts). An adaptation of the traditional pirts offers side facilities such as steam rooms, larger changing rooms, sauna spaces, and a cool water pool that replaces the natural pond in which traditionally the body is cooled down after spending time in the sauna. (www.baltapirts.lv)

Latvia is recently turning back to its condition of Wellness tourism destination, which is a general trend in the Baltic States. In the Baltic States there is a long tradition of medical spas with healing waters of their own countries. Medical practitioners are expected to be seen during their consultations, or desire some kind of medical supervision during their stay. However, visitors from Northern and Eastern Europe expect spas for leisure and luxury, therefore, not necessarily want to be attended by medical practitioners.

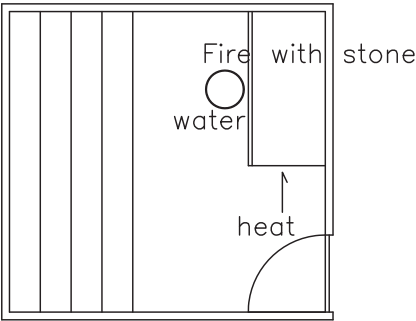
Some key resources for wellness tourism have been identified by Voigt and Pforr in their studies. Natural resources, Cultural, historical and spiritual resources, Community mindset and wellness -related lifestyle and Wellness related events will be taken into consideration as nurturing elements in the program selection for the building. (Voigt, Pforr 2013: 205, 293, 294, 295)



COUNTRY SIDE SAUNA (1862)



Plan

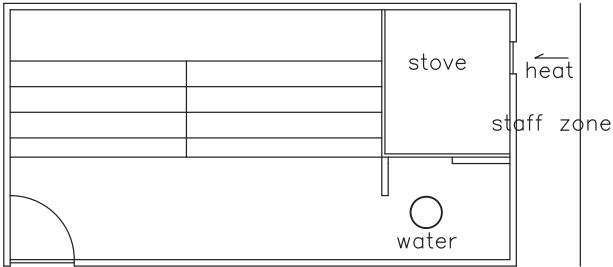
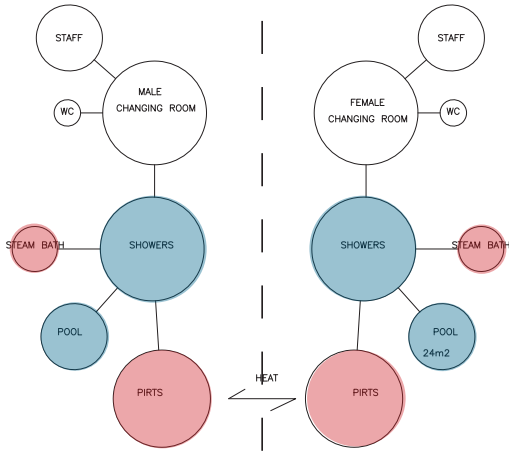


(ILL 57)



(ILL 58)

PUBLIC SAUNA, RIGA (1908)



(ILL 59)



(ILL 60)

VISION





In Liepaja, measures have been taken to restore the city as a Wellness destination. This project aims to contribute to this development by reactivating the former Bath House for the benefit both of locals and tourists.

Since the previous sanatorium functions of the Bath House are already present in the city, we aim to contribute with new Bath House functions to broaden the wellness market of the city. We wish to have an open approach to the surrounding park area, promoting public spaces as a realm for social gathering.

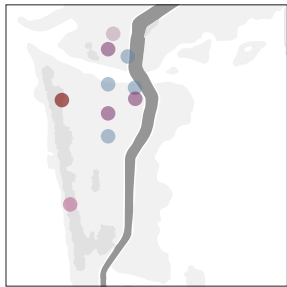
For the Bath House we find inspiration in Latvian culture, utilizing ancient sauna traditions. The aim is to reach a modern interpretation of the authentic experience to attract locals as well as tourists, looking for wellbeing within the frame of cultural heritage.

The existing Bath House building will be preserved and moderated. The implementation of new functions and addition of new elements will be performed with respect for the classical ideals.

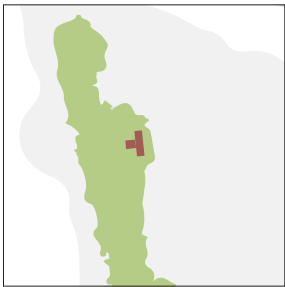
The solution will be based on a narrative relating to context, cultural heritage and phenomenological qualities. Architectural detailing will serve as the key element in this narrative, emphasizing both material and formal joints as presented in the theories of Frascari.

(ILL 61)

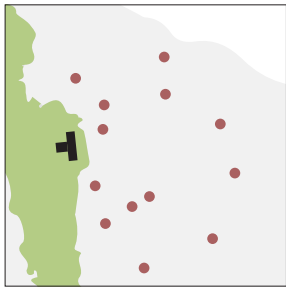
URBAN CONCEPT



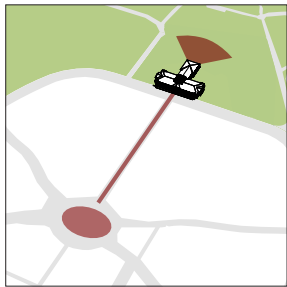
Introducing Public Sauna for both locals and tourists.



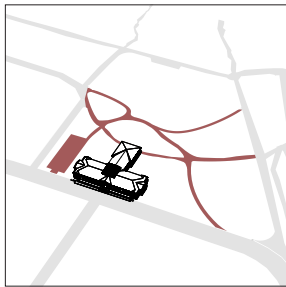
Position in the key public recreational area



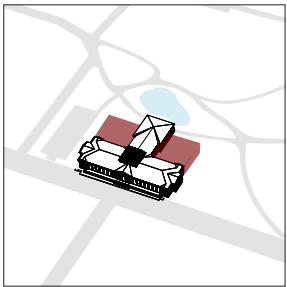
Utilize abandoned building sites for new accomodation



Creating a public urban axis from the city to the



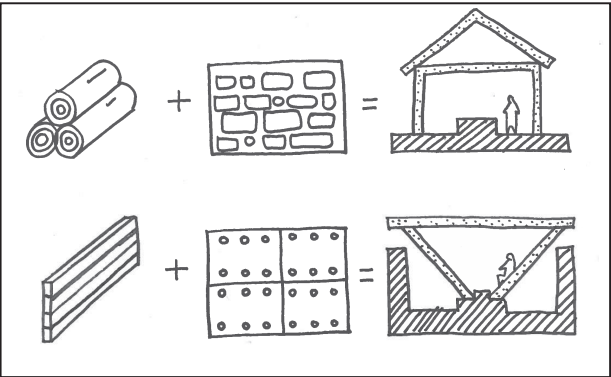
Integrating the site with the public park



Extensions with gender divided saunas

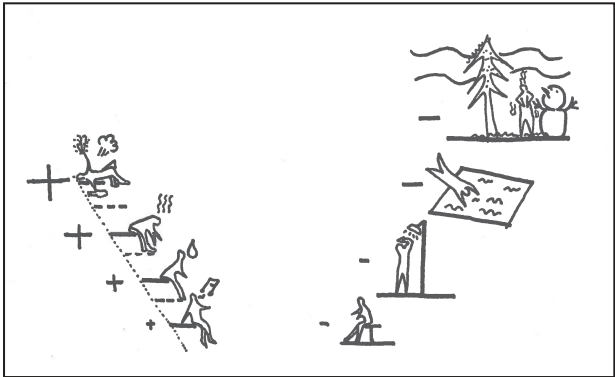
(ILL 62)

SAUNA CONCEPT



Use local heritage of stone and timber for a modern interpretation in glulam and concrete.

(ILL 63)

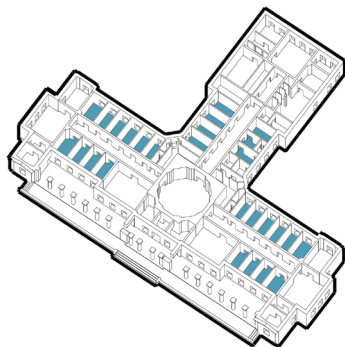


Latvian sauna ritual: Interplay between hot and cold gradually increasing.

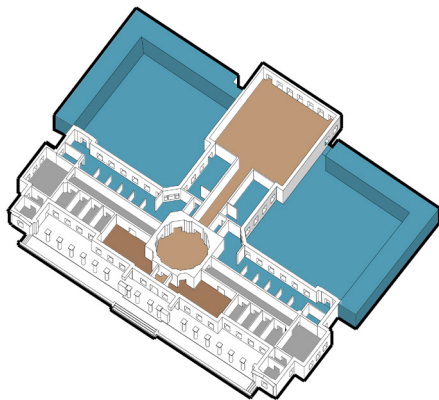
(ILL 64)

RENOVATION CONCEPT

FUNCTIONS

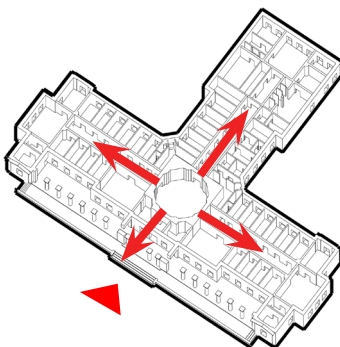


■ Bath rooms Information on other rooms are not available.

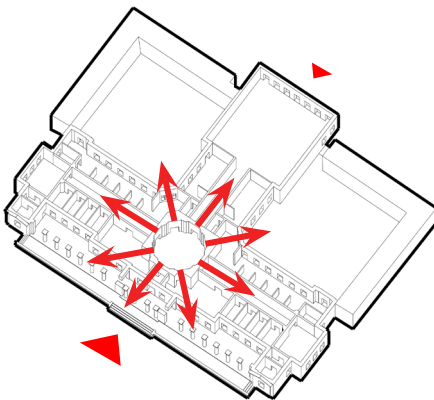


■ Recreational Bath
■ Public area
■ Staff area

DISTRIBUTION

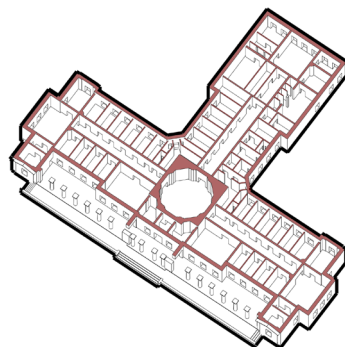


Existing Bath house:
The Dome works as distributional center to the 3 wings.

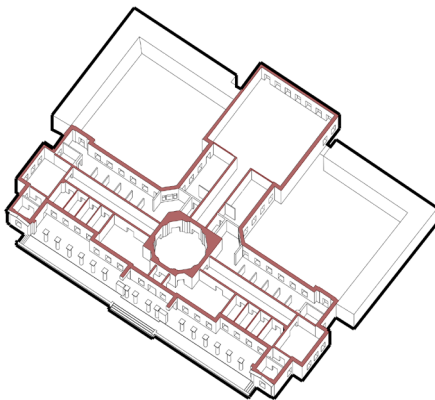


Future:
The dome is opened on all 8 sides for acces to the new functions. The western axis is opened and provides and alternative entrance

LAYOUT



Existing Bath house:
Many small rooms distributed along the hallways (ILL 65)



Future:
In order to create larger rooms for the changing rooms and cafe walls are torn down or modified or removed. (ILL 66)

PRESENTATION

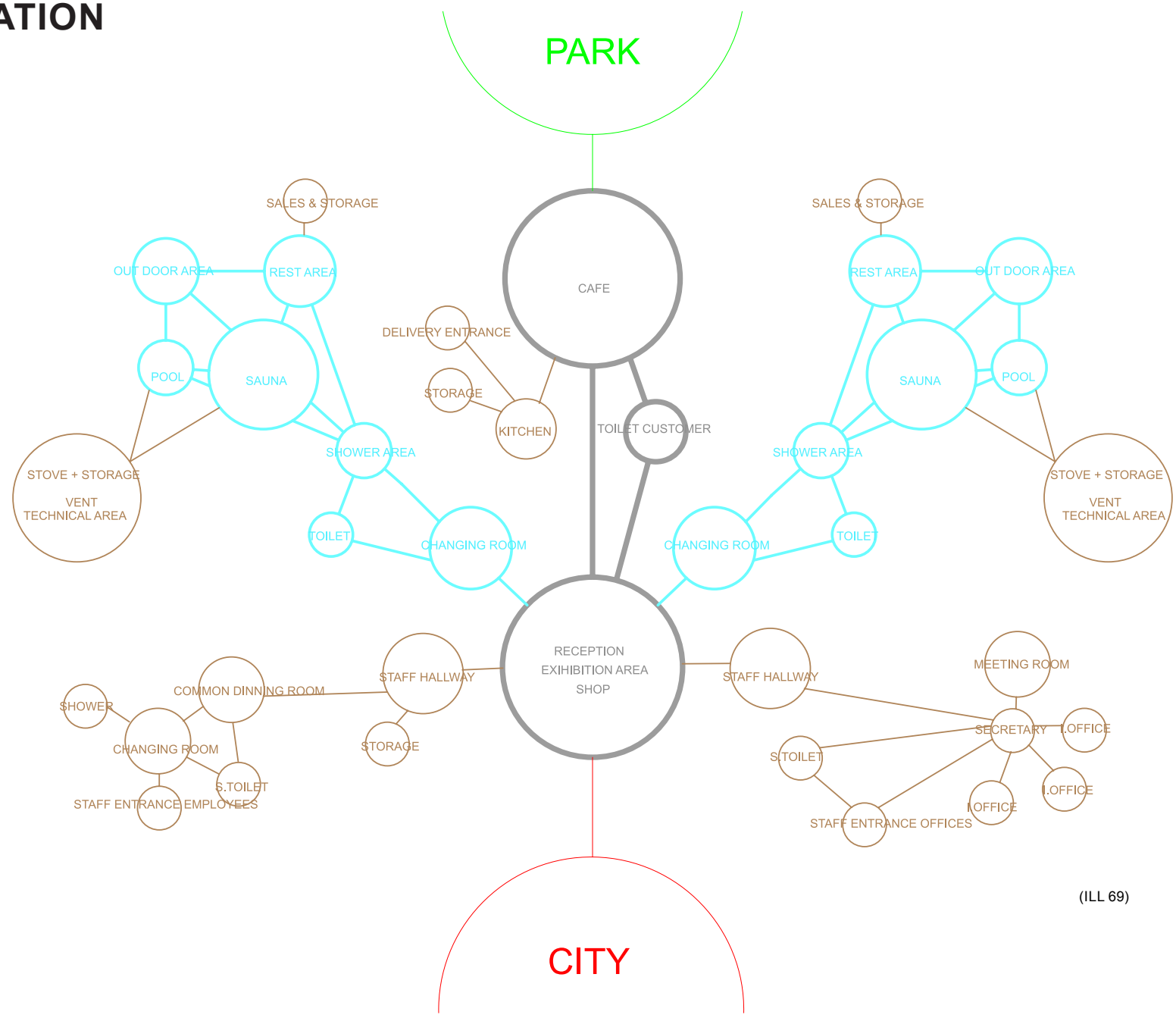
SITUATION PLAN



SITUATION PLAN 1: 2000
(ILL 67)

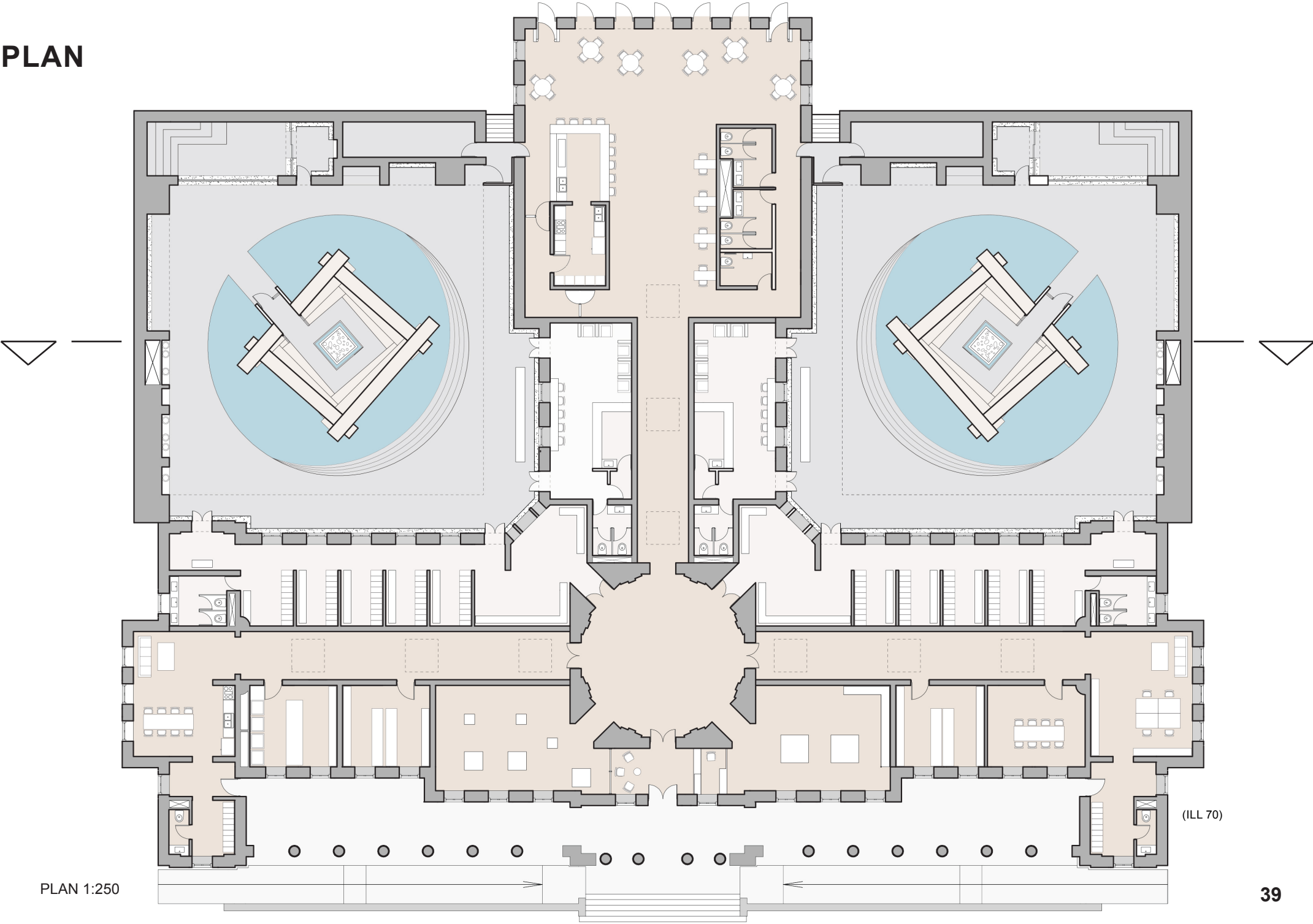


ORGANIZATION



(ILL 69)

PLAN



PLAN 1:250

(ILL 70)

FACADE EAST



(ILL 71) 1:250

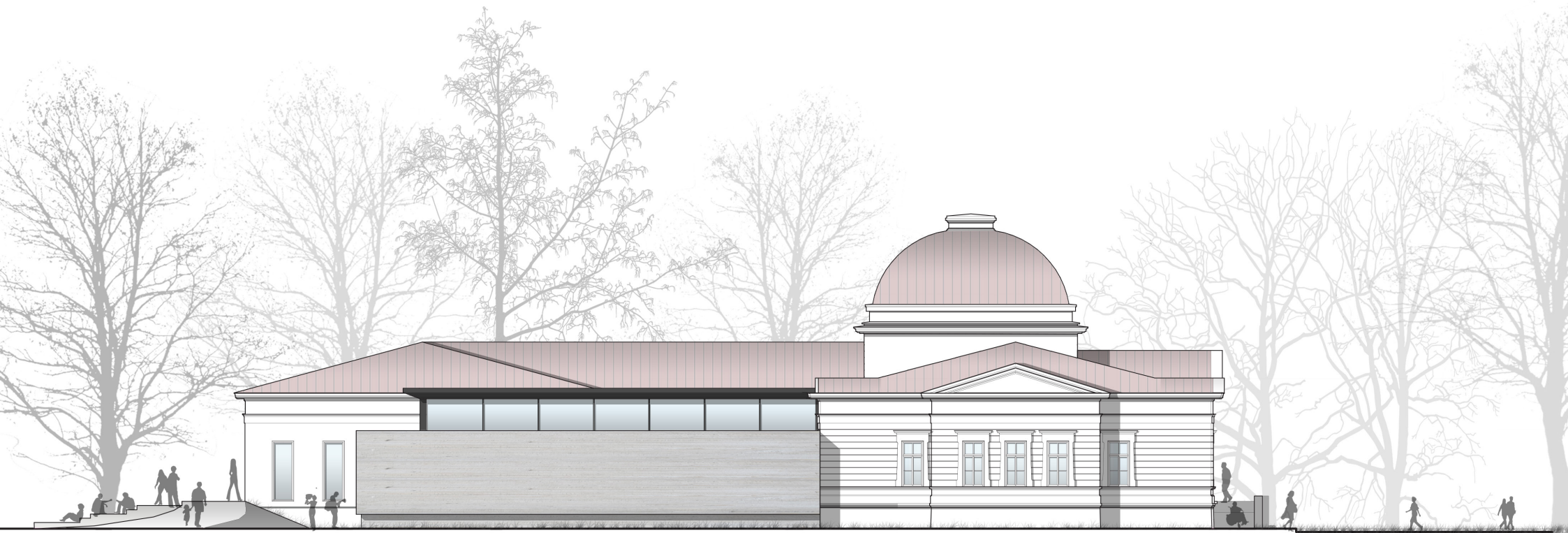
FACADE WEST



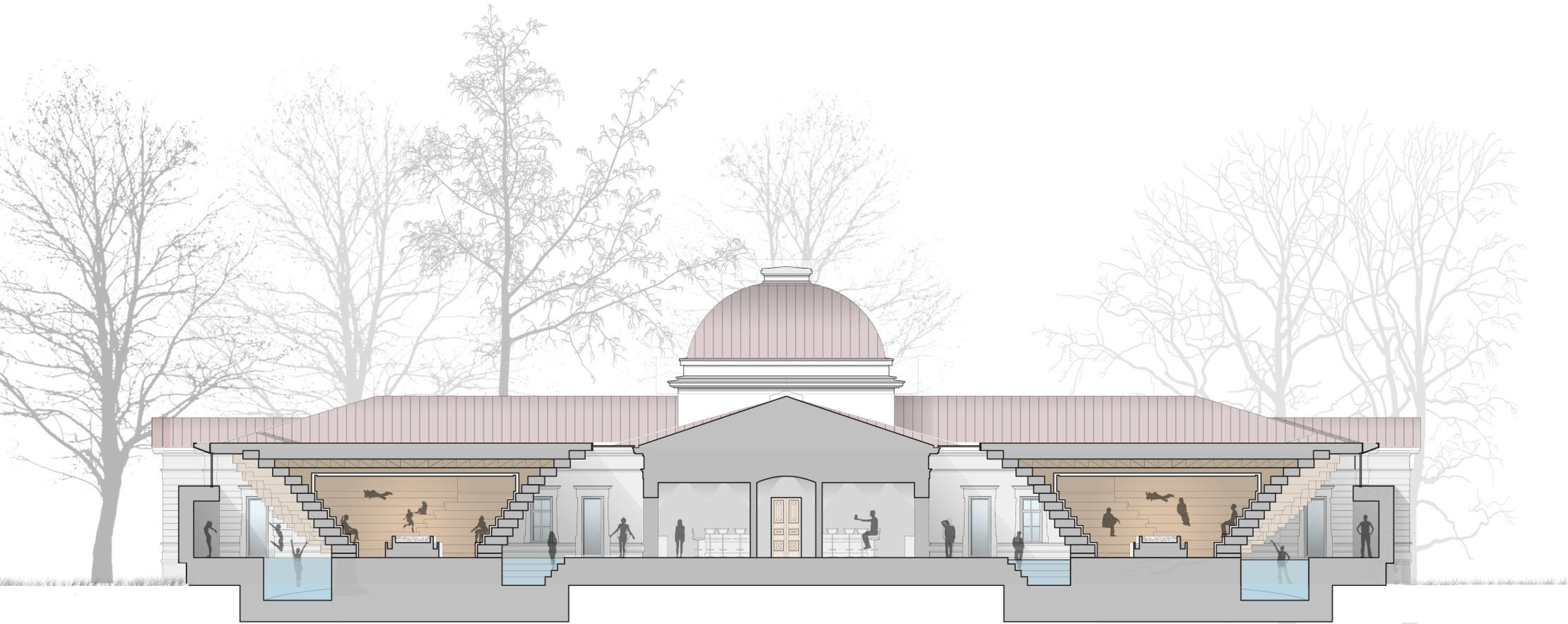
FACADE NORTH



FACADE SOUTH



SECTION



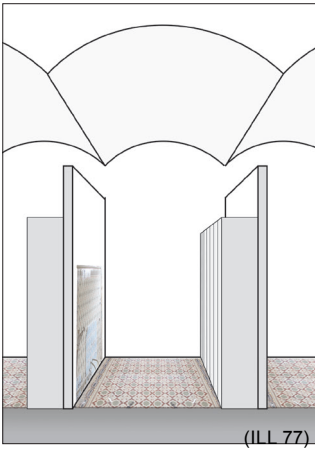
(ILL 75) 1:250

RENOVATION INTERVENTIONS

TILES



Existing bath room with original tiles

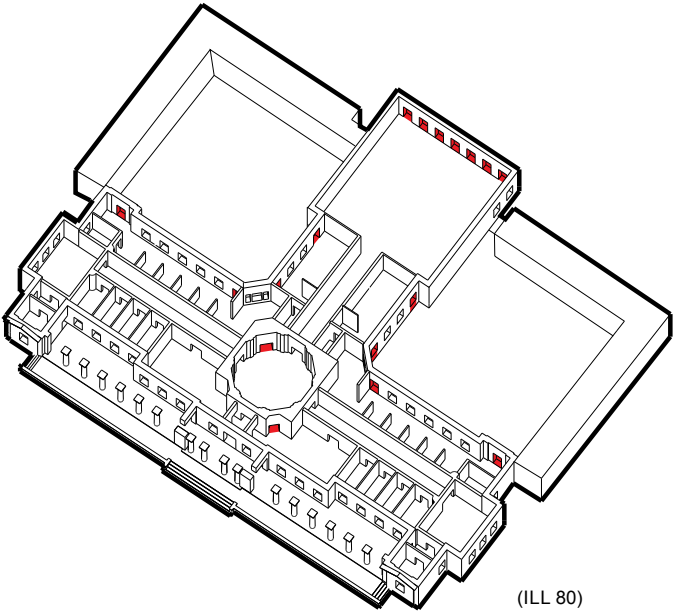


Bath rooms transformed to changing room. Original tiles are maintained in floor and wall

INTERIOR

The interior will be modified to enhance the original classical language. The large tile surfaces added in the former renovation will be removed and only the original art nouveau tiles will be preserved. The tiles will be visible in the future changing rooms on both wall and floor.

In accordance with the white and polished expression, of classical architecture walls and ceiling will be kept white. New openings for doors and daylight will be utilized existing openings to give minimum impact of the original language.

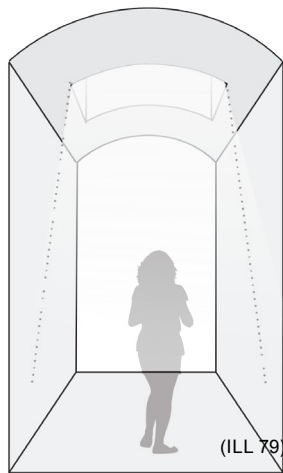


Utilization of existing opening for future doors.

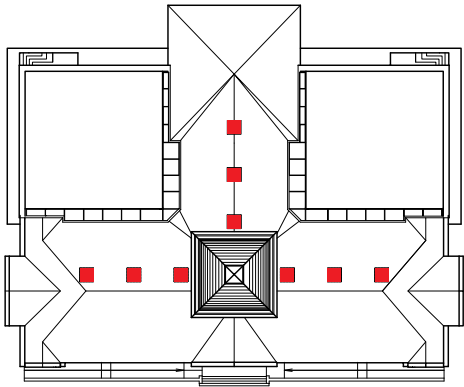
ROOF LIGHTS



Existing ceiling (ILL 78)



Openings are utilized for roof lights, providing daylight for the



Position of rooflights

(ILL 81)

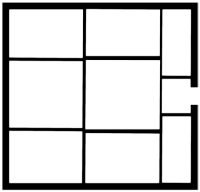
PUBLIC SPACES



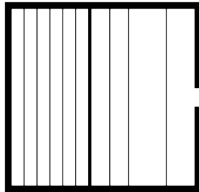
view of the future dome

(ILL 82)

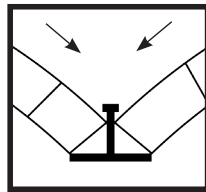
CAFE



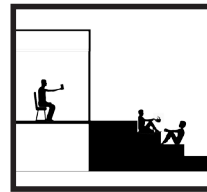
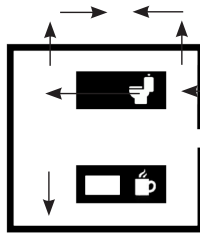
Existing load bearing walls



New Load bearing beams along ceiling vaults



Cross section of load bearing beam



Service counter

RECEPTION AREA



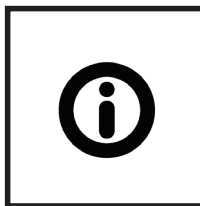
Ticket sale recreational bath



Access for recreational bath



Sale of Sauna items

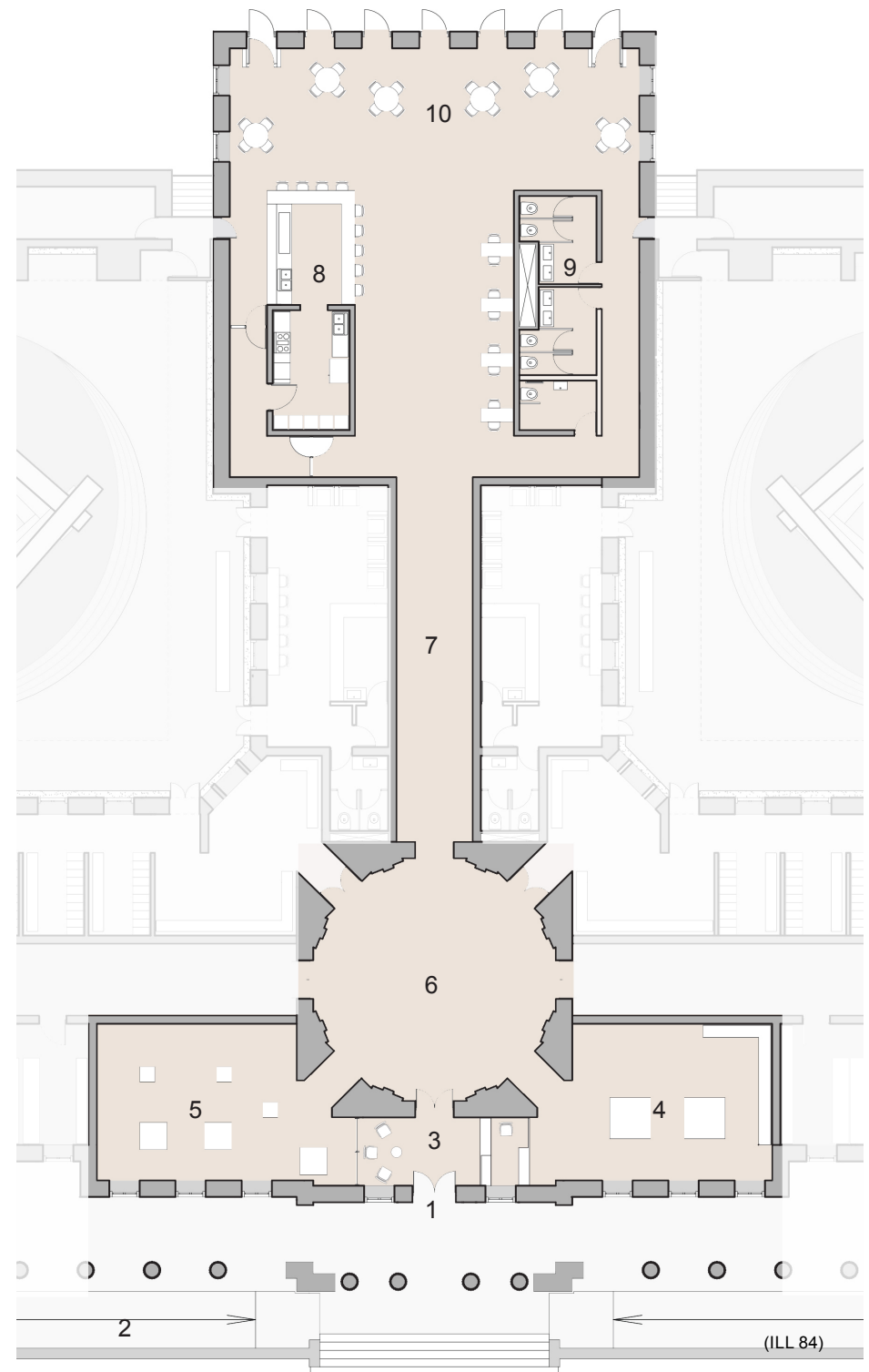


Background knowledge of the sauna ritual



Waiting Area

1. Entrance
2. Ramp for disabled people(1/30)
3. Reception
4. Shop
5. Exhibition area
6. Dome
7. Hallway
8. Kitchen
9. Toilet
10. Cafe



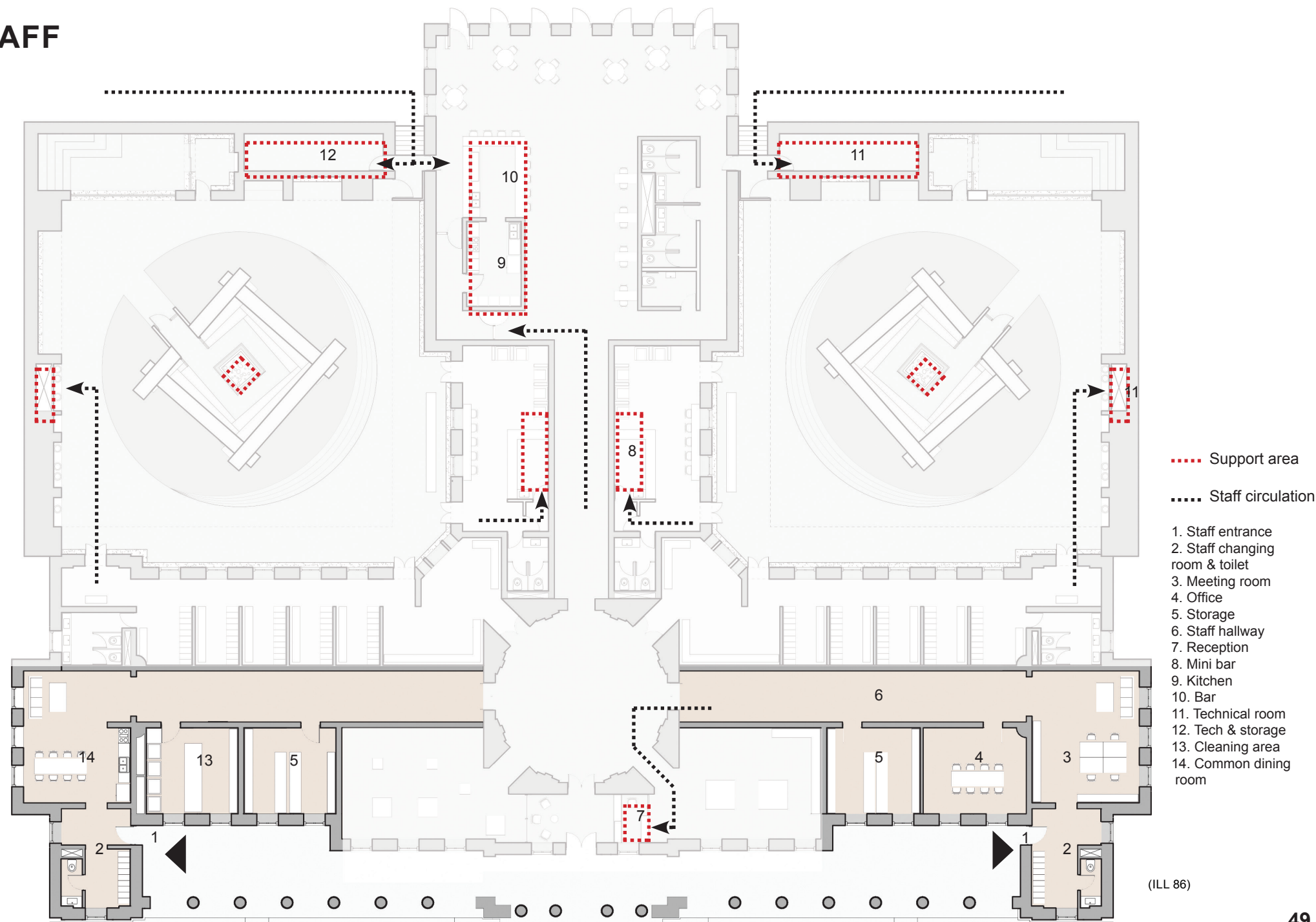
(ILL 83)

(ILL 84)



(ILL 85 WEST FACADE)

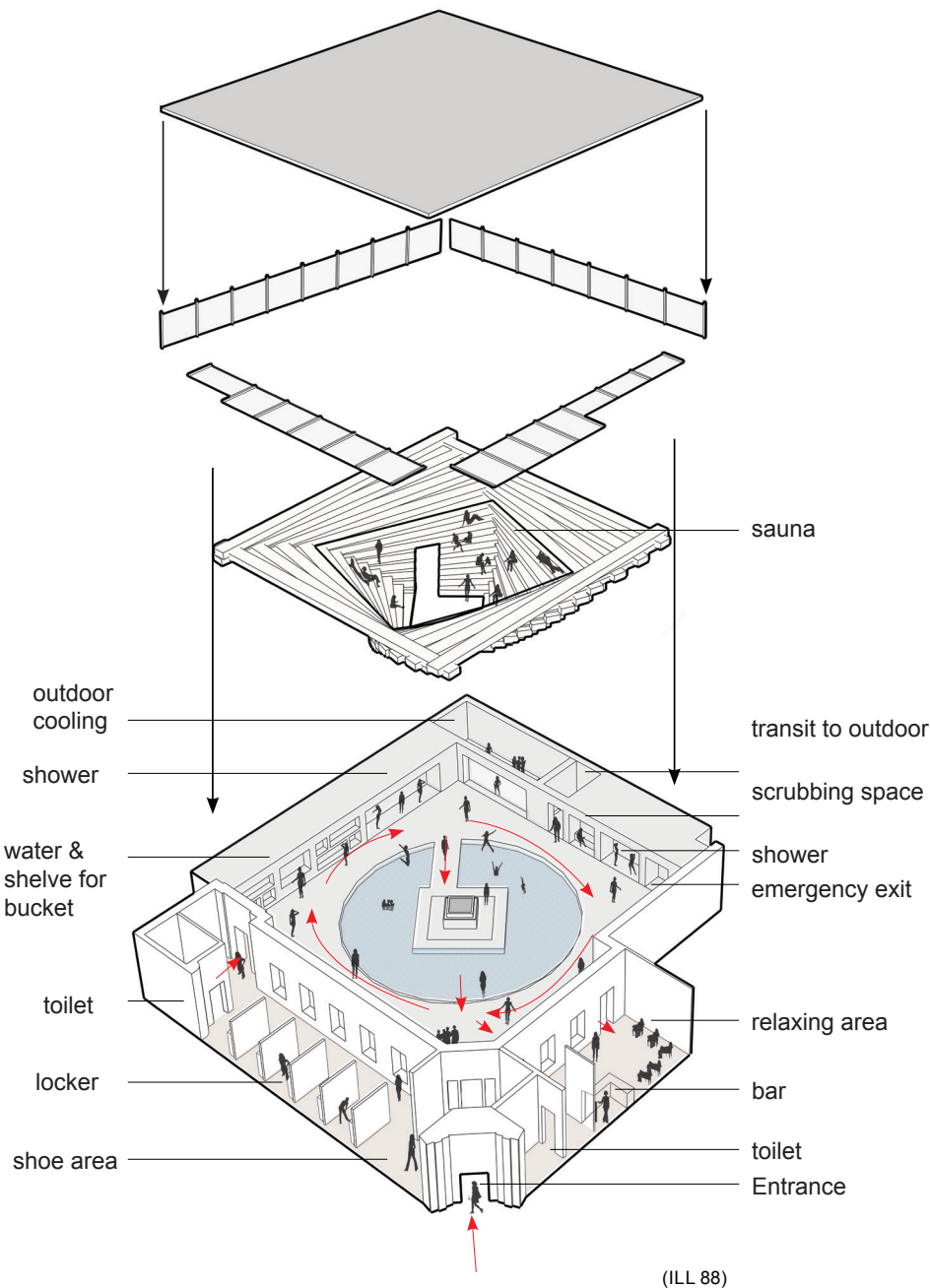
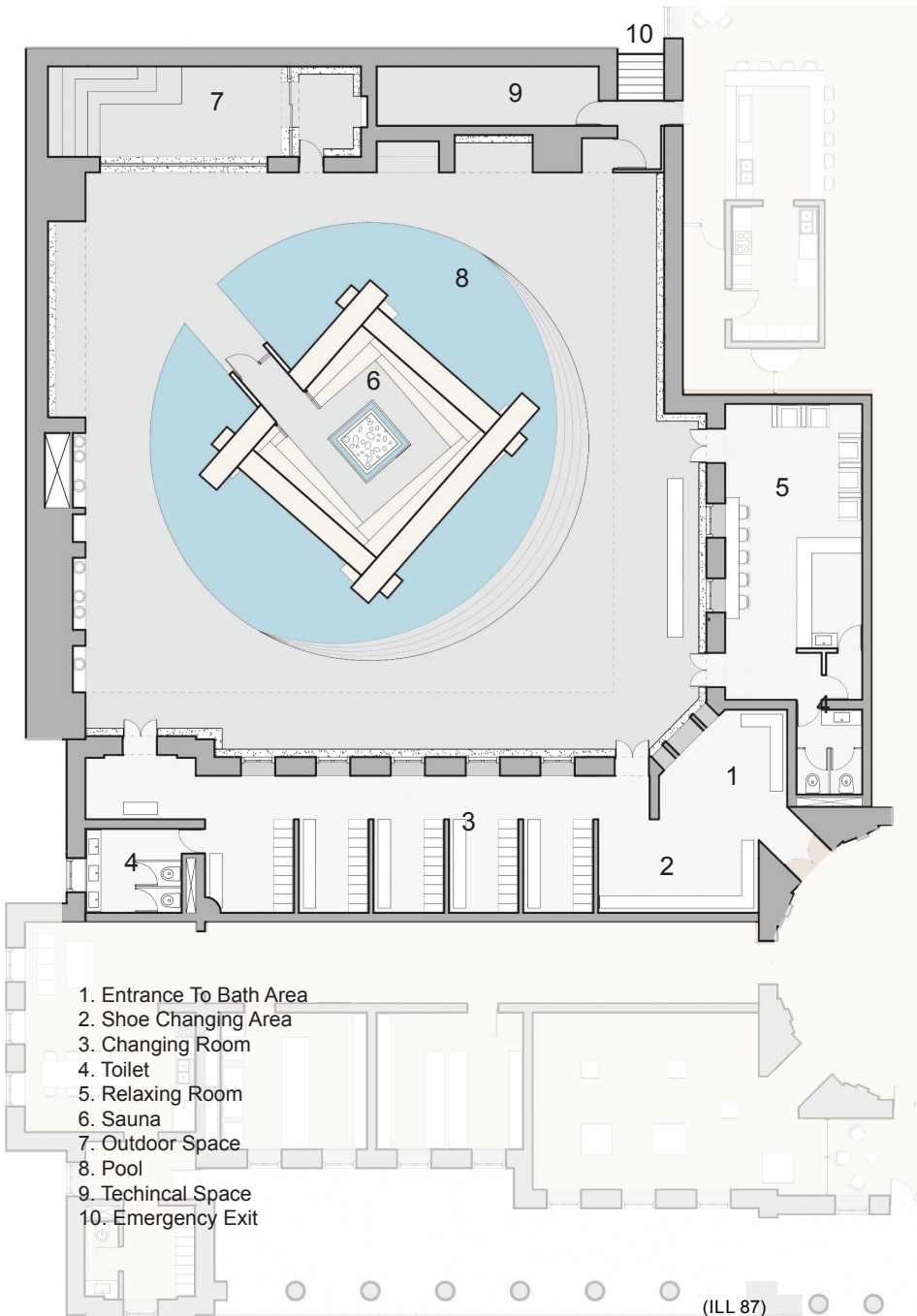
STAFF

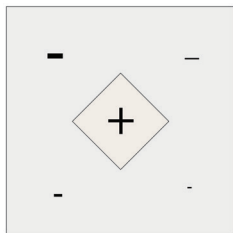


(ILL 86)

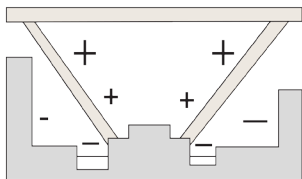


SAUNA SPACE

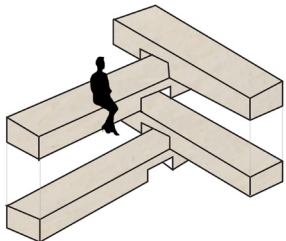




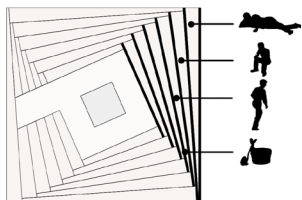
Central heating zone surrounded by cooling (plan)



Central heating zone surrounded by cooling (section)



Interlocking detail, log construction



Plan of sauna space

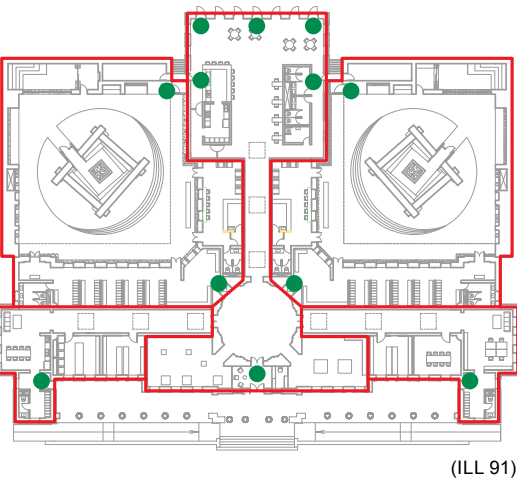
(ILL 89)



(ILL 90)

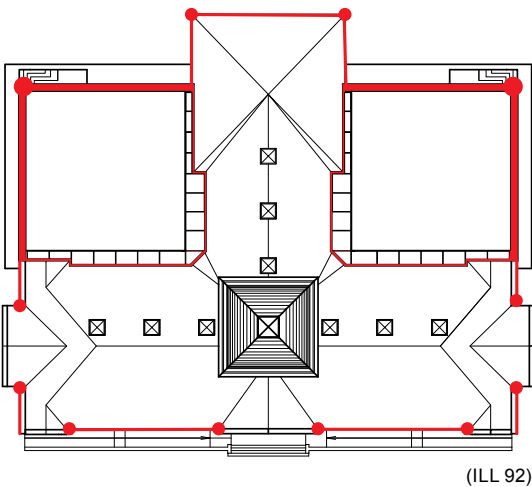
TECHNICAL DETAILS

FIRE



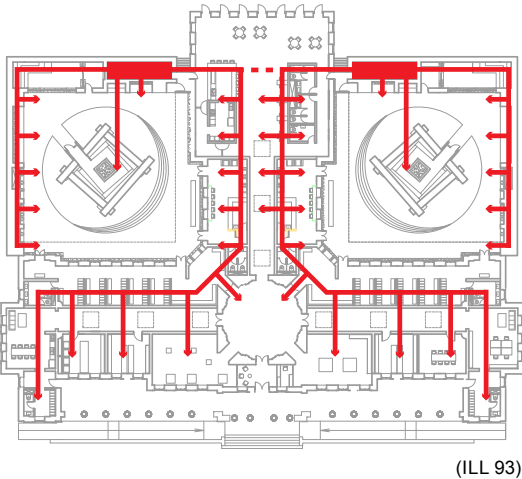
- Emergency exit
- Fire section Boundary

DRAINING



- Drain
- Gutter

ENERGY AND VENTILATION



The building will be supplied with central heating and gas for the sauna stove. Mechanical ventilation will be applied in both new and old building and will use heat exchange. This will utilize the exhaust from the sauna stove and provide a suitable moisture level in the recreational baths.

The extension is provided with thick walls and roof to allow for sufficient insulation. New windows are of low u-value to prevent heat loss and condensation in the recreational bath. For the same reason all main doors to the outside are double .

SAUNA STOVE

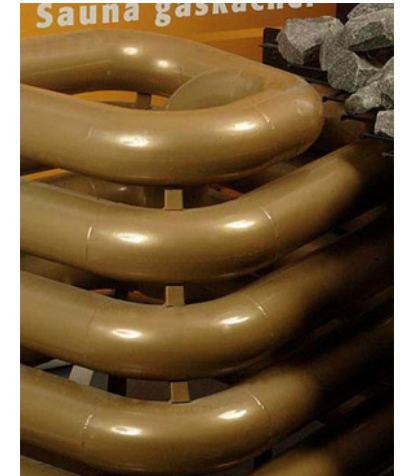
The sauna is heated with gasburners and connected to the local gaspipe. 4 gasburners provide hot air to a spiral in the center of the stove. The stones are placed on a net above the heatspiral and heated indirectly. The exhaust air of the spiral is led to the outside, passing the heat exchanger on the way. The gasstove can be remote controlled and direct acces is only necessary for occasoinal maintenance. (Bagger 2013)

Previous studies were made with traditional-timber fired sauna stoves, but they were found inefficient and to space consuming.



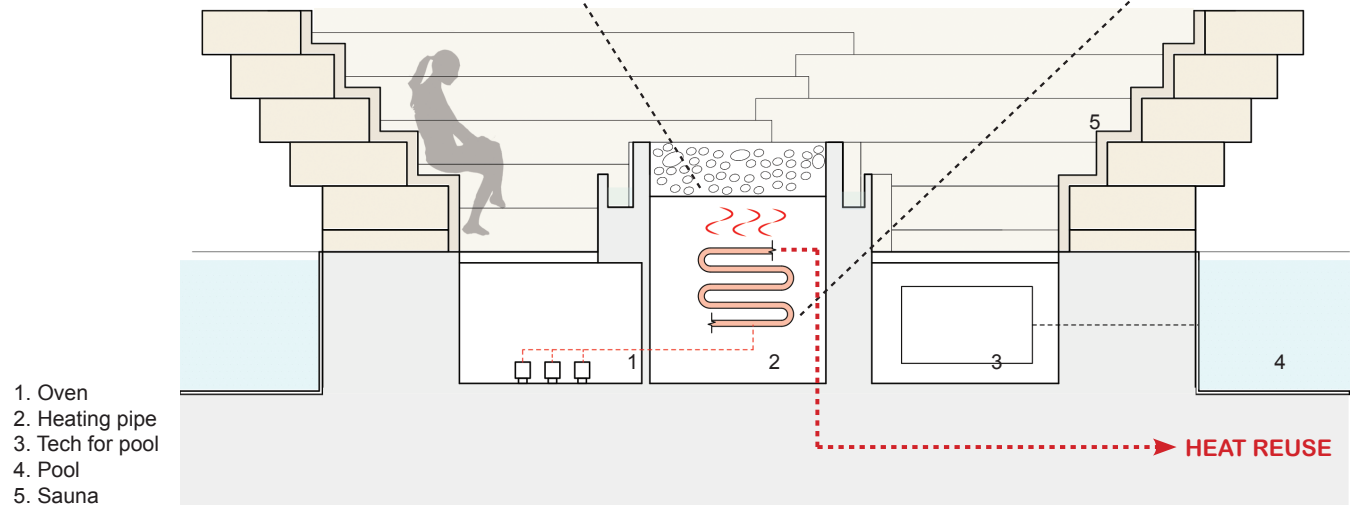
Example of gas stove

(ILL 95)



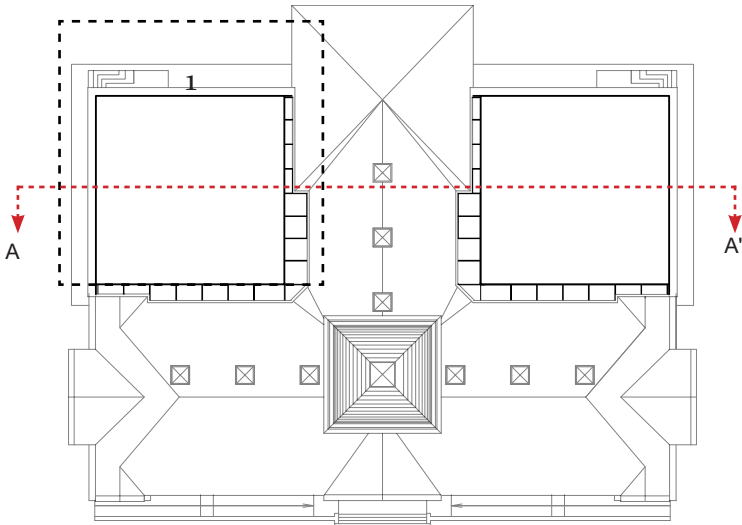
Heat spiral

(ILL 96)

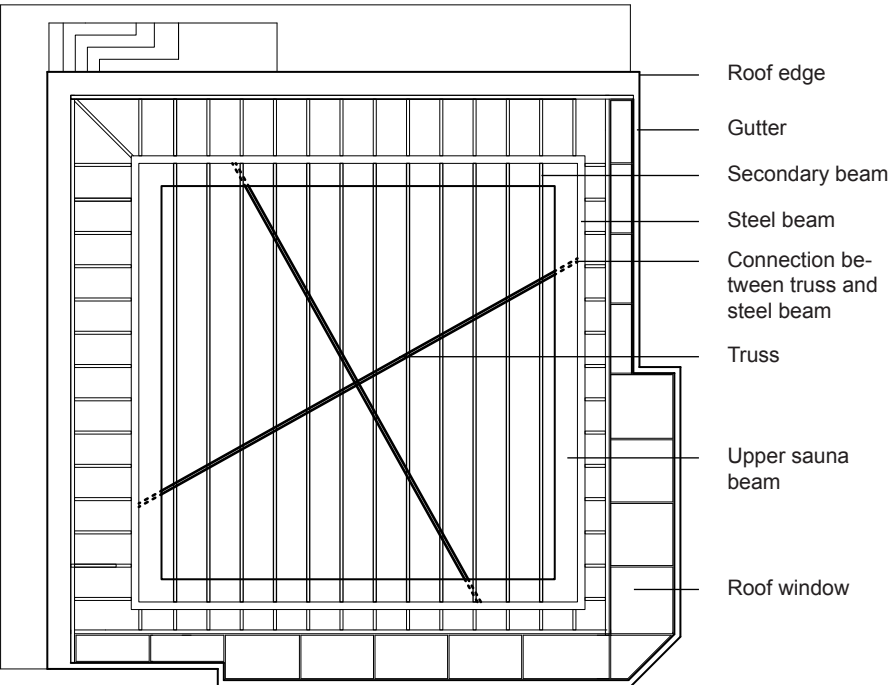
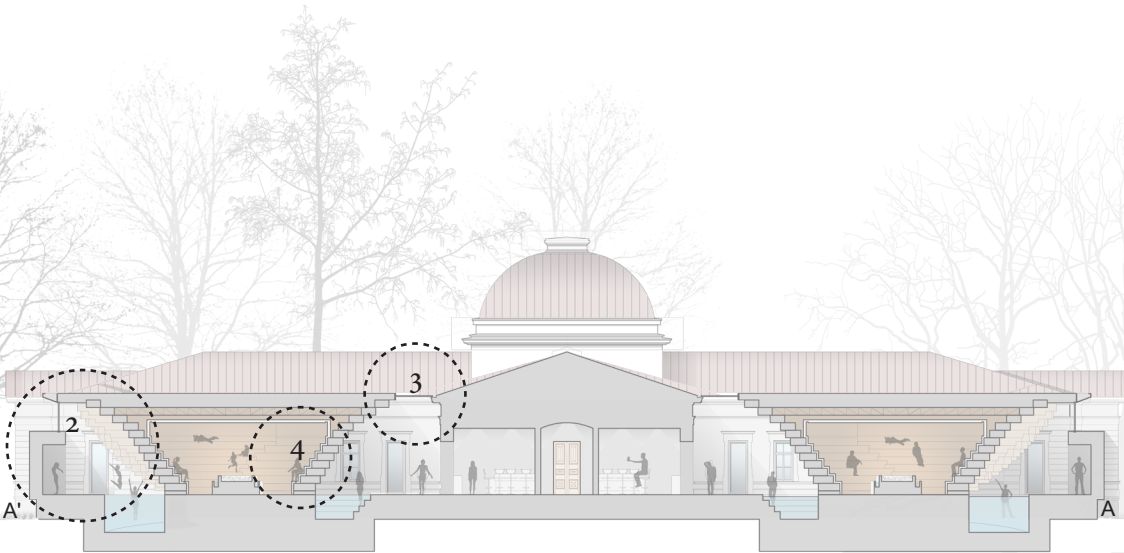


(ILL 94)

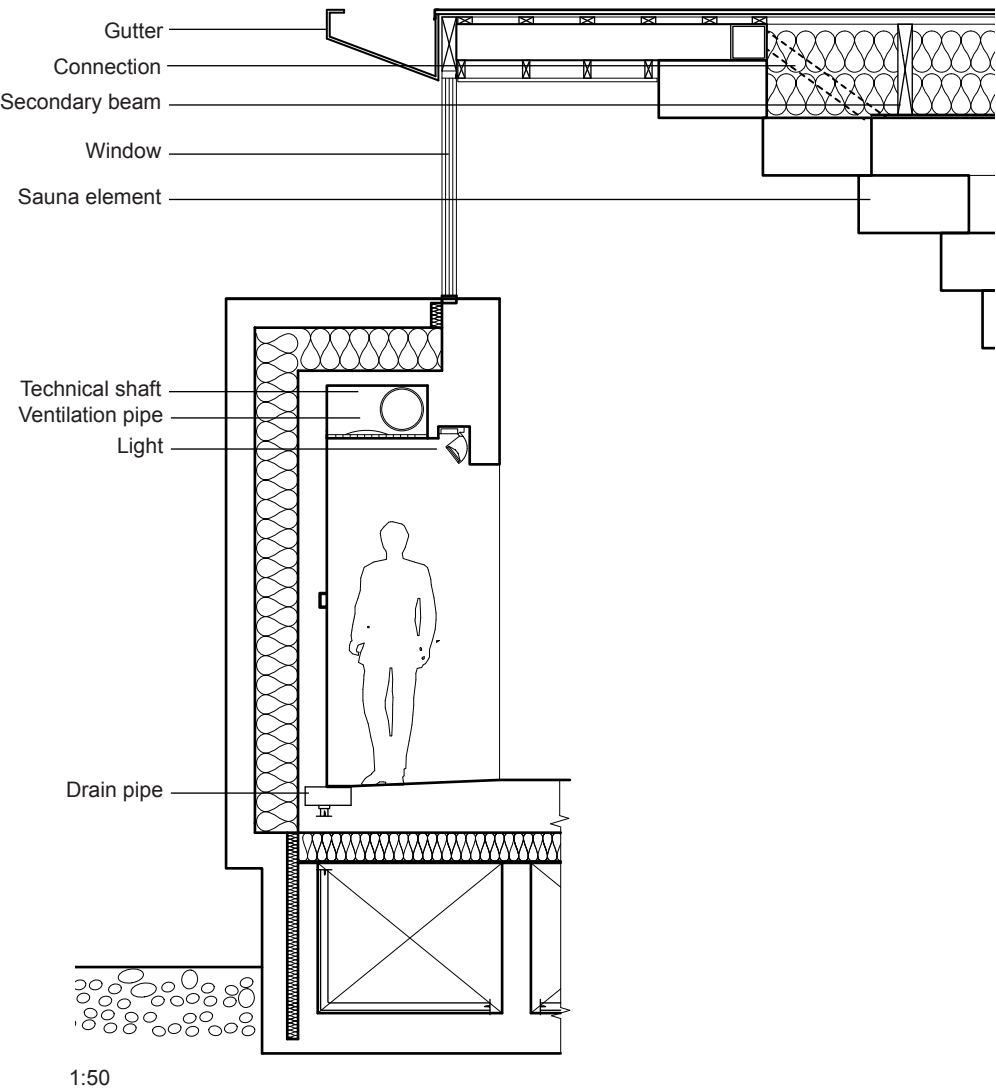
DETAIL DRAWINGS



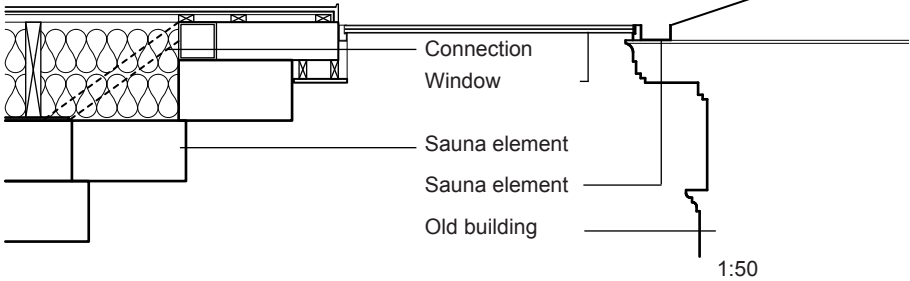
1: ROOF CONSTRUCTION



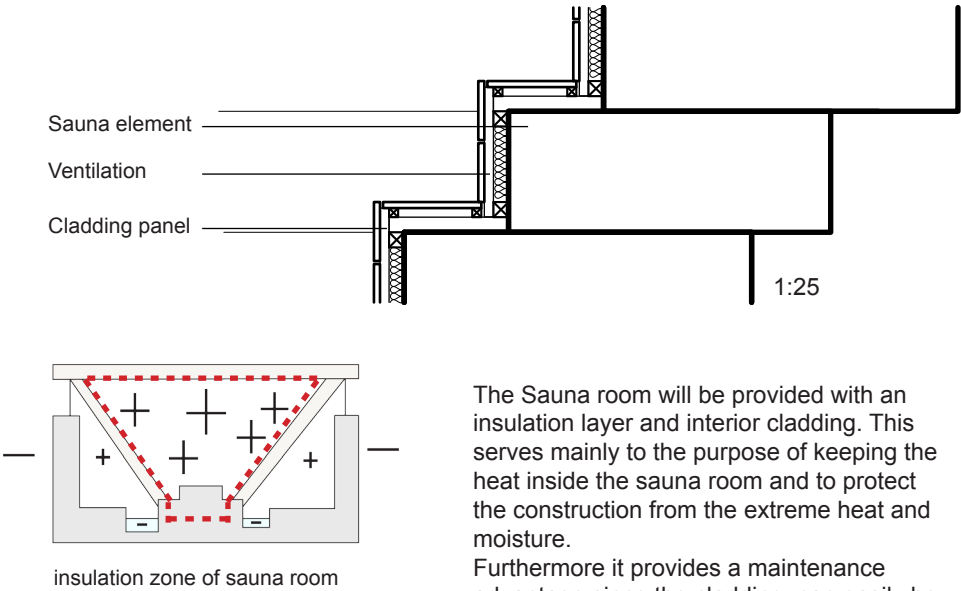
2: ROOF EDGE AND SERVICEWALL



3: ROOF EDGE



4: SAUNA INTERIOR



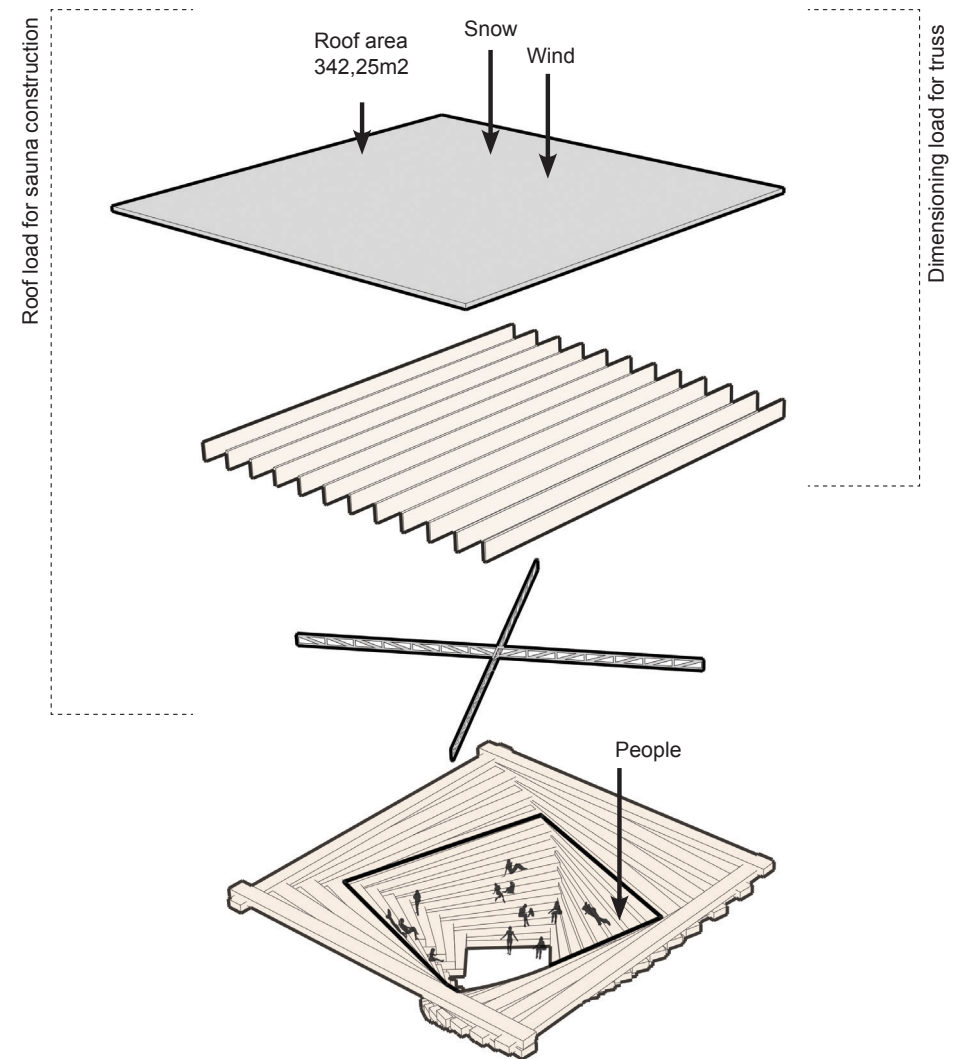
CALCULATIONS

The main construction of calculation is the log construction of the sauna. The sauna serves as a roof bearing structure and will therefor be calculated with the total roof load as well as the sauna loads.

The roof load is found by dimensioning the roof construction and combine it with snow and wind loads. Steel trusses are spanning across the sauna to carry the roof. The trusses are dimensioned with use of Karamba and Robot.

The sauna construction is then calculated with the load of the people and the roof load.

All loads are combined according to teknisk st bi and will be shown below. For further information see excel file on CD.



(III 97)

ROOF LOADS

PERMANENT LOADS

Asphalt roof with timber and 600mm insulation:

$$= 865,4 \text{ kg/m}^2$$

$$= 0,87 \text{ kN/m}^2$$

Total permanent load

$$= 293,11 \text{ kN}$$

SNOW LOADS

$$s = u_i * C_e * C_t * s_k$$

s: Snow load

u_i : Form factor of roof angle

C_e : Form factor of exposure

C_t : Thermal factor

s_k : Characteristic terrain value

$$s = 0,80 * 1,00 * 1,00 * 0,90 \text{ kN/m}^2$$

Total snow load

$$= 72 \text{ kN/m}^2$$

$$= 246,42 \text{ kN/m}^2$$

WIND LOADS:

$$F_w = c_{scd} * c_f * q_p(z_e) * A_{Ref}$$

F_w : Wind force (kN)

c_{scd} : Construction factor

c_f : Force form factor

$q_p(z_e)$: Peak speed pressure for reference height z_e (kN)

A_{Ref} : Area

Zoning for wind loads on a flat roof

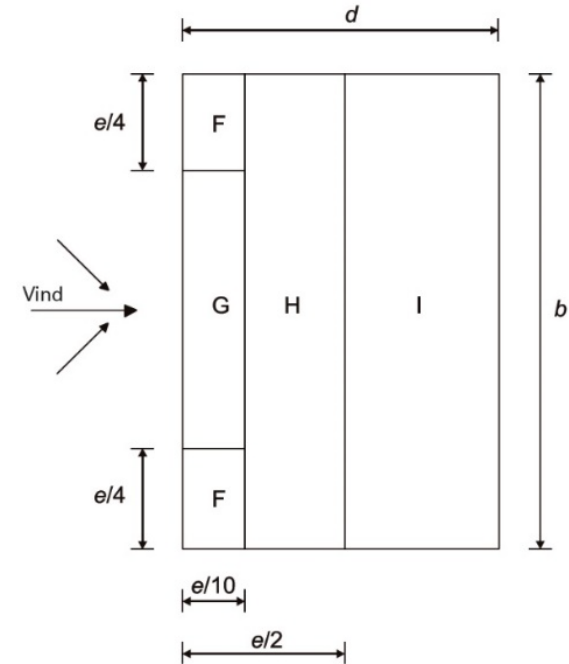
Wind loads are not equally distributed on a flat roof and will be distributed and calculated in the zones F, G, H & I.

Areas (A_{Ref}) and force form factor (c_f) vary from zone to zone.

$F_w(F)$	=	$c_{scd} * c_f(F) * q_p(z_e) * A_{Ref}(F)$	=	$1 * -1,8 * 0,65 \text{ kN/m}^2 * 4,23 \text{ m}^2$	=	- 4,94 kN
$F_w(G)$	=	$c_{scd} * c_f(G) * q_p(z_e) * A_{Ref}(G)$	=	$1 * -1,2 * 0,65 \text{ kN/m}^2 * 15,60 \text{ m}^2$	=	- 12,17 kN
$F_w(H)$	=	$c_{scd} * c_f(H) * q_p(z_e) * A_{Ref}(H)$	=	$1 * -0,7 * 0,65 \text{ kN/m}^2 * 96,20 \text{ m}^2$	=	- 43,77 kN
$F_w(I)$	=	$c_{scd} * c_f(I) * q_p(z_e) * A_{Ref}(I)$	=	$1 * -1,2 * 0,65 \text{ kN/m}^2 * 222,00 \text{ m}^2$	=	- 28,86 kN

Total wind load (for determining dominant variable load)

$$= - 94,69 \text{ kN}$$



III. x Wind load zoning (Eurocode 1)

LOAD COMBINATIONS

The loads are combined for both service limit state and ultimate limit state. The largest load of the two is the dimensioning load

Calculations for Ultimate limit state (ULS), where snow load is dominant

Permanent load

$KFI * YG_{j,sup} * G_k$

+

Dominant variable load

$KFI * YQ_{,snow} * Q_{k,snow}$

+

Other variable load

$KFI * YQ_{,snow} * \Psi_{snow} * Q_{k,snow}$

- KFI:
- Factor based on consequence class 2
- G_k :
- Characteristic permanent load (kN/m²)
- Q_k :
- Characteristic variable load (kN/m²)
- G_t :
- Total permanent load (kN)
- Q_t :
- Total variable load (kN)
- Ψ :
- Load reduction factor
- Y :
- Partialcoefficient

Permanent load

$KFI * YG_{j,sup} * G_t$

+

Snow load

$KFI * YQ_{,snow} * Q_{t,snow}$

+

Wind load

$KFI * YQ_{,wind} * \Psi_{wind} * Q_{t,wind}$

=

1 * 1 * 293,11 kN +

1 * 1,5 * 246,42 kN

+

1 * 1,5 * 0,3 * 94,69 kN

=

293,11 kN

+

369,63 kN

+

28,41 kN

=

567,93 kN

Calculations for Service limit state (SLS), where snow load is dominant

Permanent load

$G_{kj,sup}$

+

Dominant variable load

$Q_{k,snow}$

+

Other variable load

$\Psi_{wind} * Q_{k,wind}$

Permanent load

G_t

+

Snow load

$Q_{t,snow}$

+

Wind load

$\Psi_{wind} * Q_{t,wind}$

=

293,11 kN

+

246,42 kN

+

0,3 * 94,69 kN

=

293,11 kN

+

369,63 kN

+

42,61 kN

=

705,35 kN

Final wind Loads for zones

Wind load zones

The Load combination for Ultimate limit state (ULS) results in the largest load and therefor becomes the dimensioning load.

For use in and Robot, the wind load zones are now calculated individually with coefficients corresponding to the formula for ULS.

Zone F:	$KFI * YQ_{wind} * \Psi_{wind} * Q_{t,wind}(F)$	=	$1 * 1,5 * 0,3 * 4,94 \text{ kN}$	=	2,22 kN
Zone G:	$KFI * YQ_{wind} * \Psi_{wind} * Q_{t,wind}(G)$	=	$1 * 1,5 * 0,3 * 12,17 \text{ kN}$	=	5,48 kN
Zone H:	$KFI * YQ_{wind} * \Psi_{wind} * Q_{t,wind}(H)$	=	$1 * 1,5 * 0,3 * 43,77 \text{ kN}$	=	19,70 kN
Zone I:	$KFI * YQ_{wind} * \Psi_{wind} * Q_{t,wind}(I)$	=	$1 * 1,5 * 0,3 * 28,86 \text{ kN}$	=	12,99 kN

TRUSS DIMENSIONING

KARAMBA STUDIES TRUSS

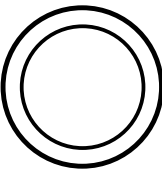
The truss is build in Karamba to perform parametric studies of the truss dimension. Deformation and material utilization are studied to find a final dimension.

The rule of deformation in service limit state is lenght/300

Maximum allowed deformation:

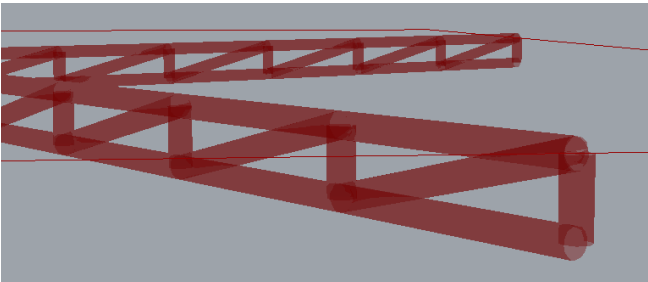
$1500\text{cm}/300 = 5\text{cm}$

Actual maximum deformation = 2,63cm

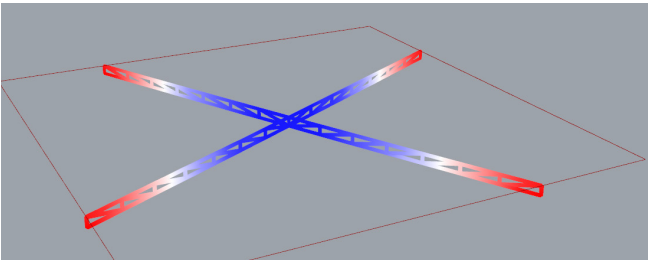


Steel pipe cross section

Diameter: 10cm
Steel thickness: 0,3cm



I98. Karamba model truss

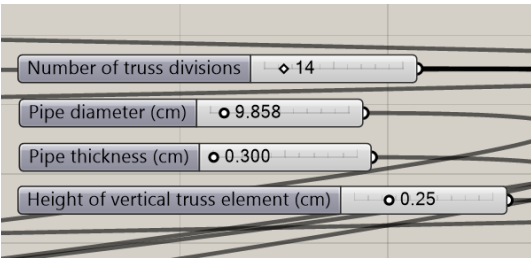


I99. Karamba model showing utilization

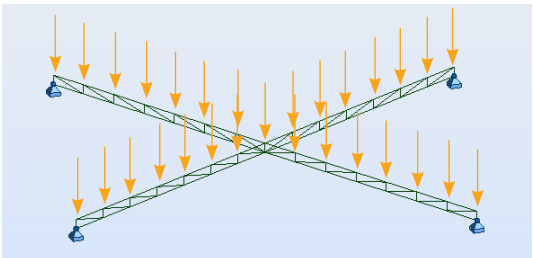
utilization	res.disp.[cm]
-93.3%	2.53e-02
-84.1%	1.56e-01
-75.0%	2.86e-01
-65.8%	4.16e-01
-56.6%	5.47e-01
-47.5%	6.77e-01
-38.3%	8.07e-01
-29.1%	9.38e-01
-20.0%	1.07e+00
-10.8%	1.20e+00
-1.6%	1.33e+00
7.5%	1.46e+00
16.7%	1.59e+00
25.9%	1.72e+00
35.0%	1.85e+00
44.2%	1.98e+00
53.3%	2.11e+00
62.5%	2.24e+00
71.7%	2.37e+00
80.8%	2.50e+00
80.0%	2.63e+00

I100. Utilization of steel potential

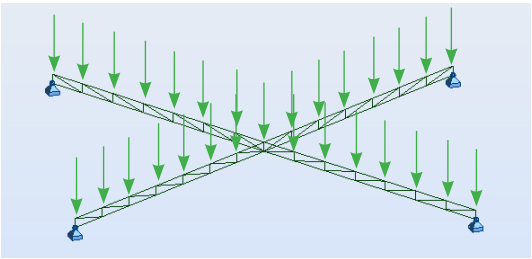
i101. Deformation



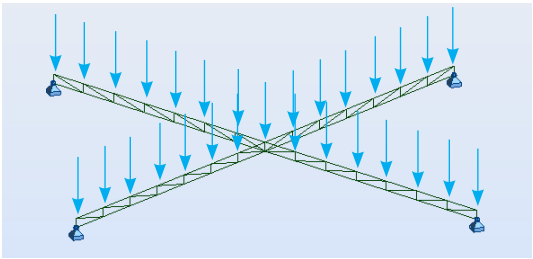
I102. Parameters for truss design



III.103 Distribution of snow loads



III.104 Distribution of Wind loads

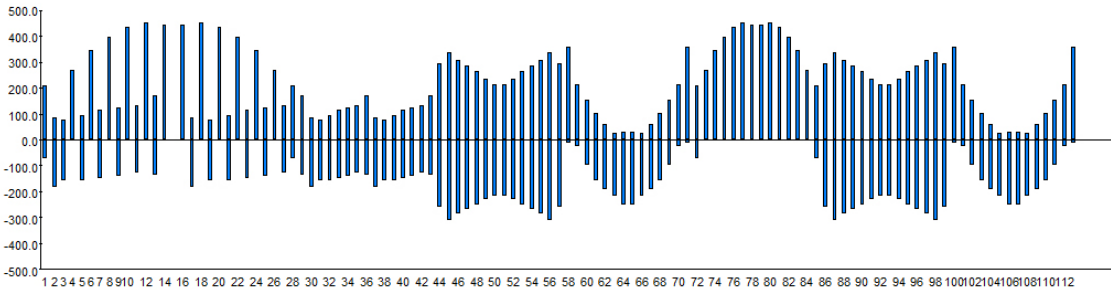


III.105 Distribution of wind loads

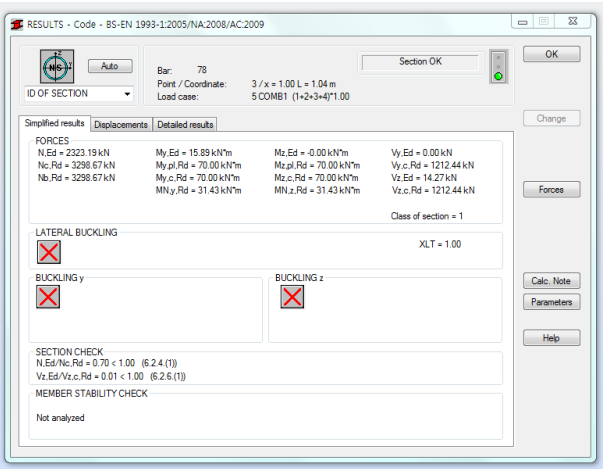
ROBOT STUDIES TRUSS

The long and slender profile of the truss makes it a possible candidate for buckling. To explore this further the truss is imported in Robot. The truss is calculated and the most critical element is found. Buckling is a problem when the member is exposed to larger force than it can absorb.

By using global extremes for forces, member nr 78 is identified as the most critical member. In the detailed information of that member it is visible that the member is able to absorb the forces and does not have buckling problems.



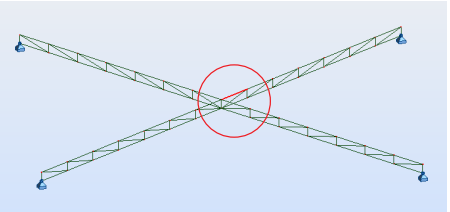
III.106 Utilization of material verified in Robot



III. 107 Detailed information for buckling of most critical member

	FX (kN)	FY (kN)	FZ (kN)
MAX	2323.19	230.96	230.96
Bar	78	87	58
Node	35	30	13
Case	5 (C)	5 (C)	5 (C)
MIN	-882.71	-230.96	-230.96
Bar	65	98	45
Node	51	42	2
Case	5 (C)	5 (C)	5 (C)

ILL. 108 IDENTIFICATION OF MOST CRITICAL ELEMENT FOR BUCKLING



III: 109 Most critical element for buckling

CALCULATION OF SAUNA STRUCTURE

The sauna construction is calculated with total loads of people and roof. The studies are performed in Karamba and Robot, using the previously defined Roof load.

The sauna will be calculated with a maximum number of people in the benches even though the actual number of visitors is smaller.

People load

Standard load 1 person
 = 72 kg
 = 0,71 kN

Load combinations for Ultimate limit state (ULS)

Permanent load Dominant variable load
 $KFI * YG_{j,sup} * G_k$ + $KFI * YQ_{,people} * Q_{k,people}$

KFI: Factor based on consequence class 2
 G_k : Characteristic permanent load (kN/m²)
 Q_k : Characteristic variable load (kN/m²)
 G_t : Total permanent load (kN)
 Q_t : Total variable load (kN)
 Y : Partialcoefficient

Permanent load people load
 $KFI * YG_{j,sup} * G_t$ + $KFI * YQ_{,people} * Q_{t,people}$
 1 * 1 * G_t + 1 * 1,5 * Q_{t,people}

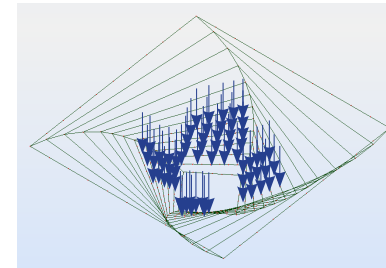
Load pr person with partial coefficient:
 0,71 kN * 1,5 = 1,06 kN

maximum number of people on one side: 34

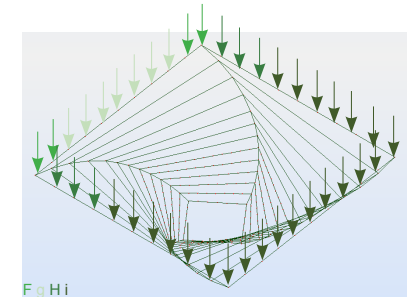
The loads will be distributed as point loads on the construction.

Wind loads:

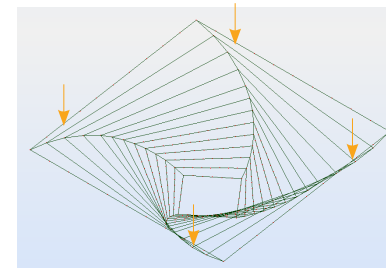
The loads will be ditributed in zones FGHI as defined in the load calculations.



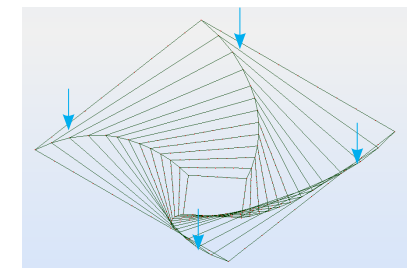
III.110 Distribution of people load



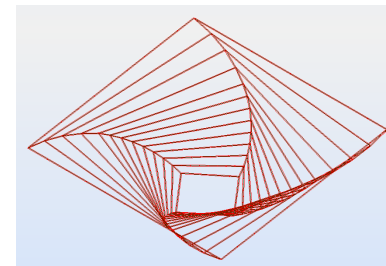
III. 111 Distribution of Wind loads



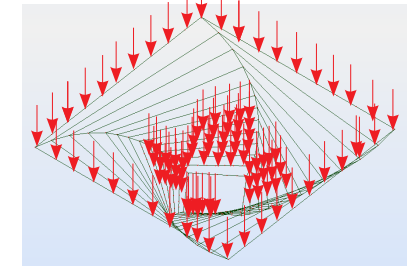
III. 112 Distribution of Roof load



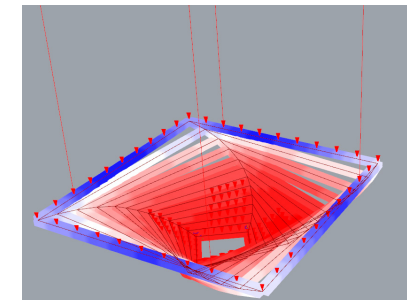
III. 113 Distribution of snow loads



III. 114 Permanent load of construction



III 115. Distribution of Wind loads



III. 116 Distribution of Wind loads

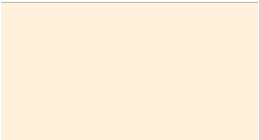
Calculations on the sauna structure has been based mainly on verification rather than parametric studies. The cross section is defined from step size and rotation.
This is evident in the utilization of the timber beams which is very low.

The most critical element is identified in the results for deformation.
The rule of deformation in service limit state is lenght/300

Maximum allowed deformation:
 $1600\text{cm}/300 = 5\text{ cm}$

Actual maximum deformation = 9,3 cm

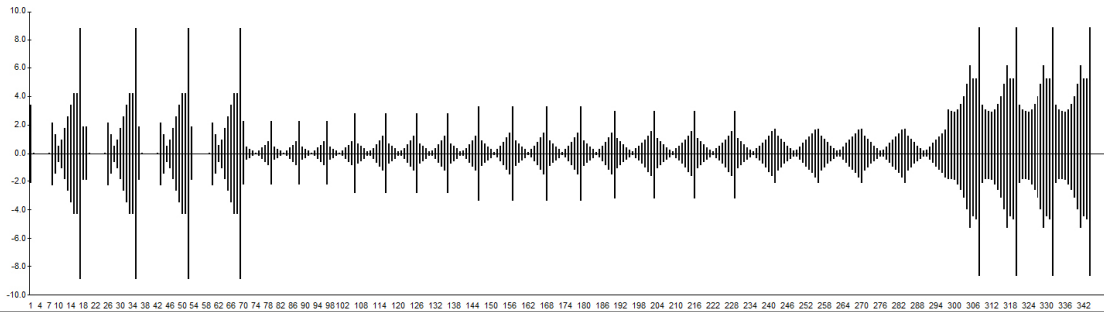
The deformation is larger than the allowed deformation for service limit state.
There are no problems of breaking members as shown in the utilizations results.
The large deformation is due to the simplified calculation model. In the calculation the beams are only supported in the corners. In reality the stacking and overlapping of the beams would support the beams along the span. For a more precise result the calculation model should contain a vertical connection to transfer the loads between the corners as well.



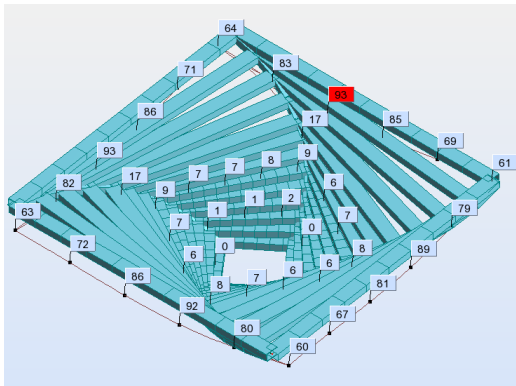
III: Glulaminate Beam
cross section:
Width: 75cm
Height: 40cm



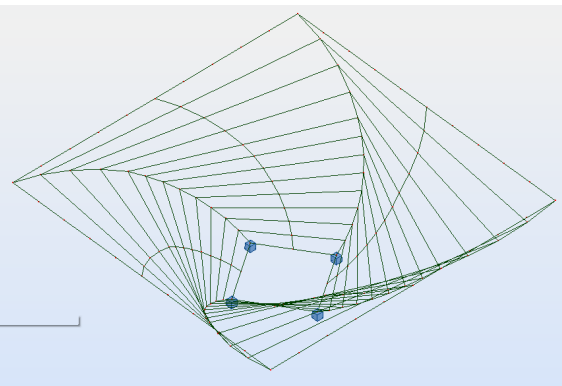
III. Glulaminate



III.117 Utilization of material verified in Robot



III.118 Calculation model
Member of largest deformation, 93mm



III 119. Alternative calculation model with vertical transfer of loads between the corners.

CONCLUSION

The new sea side sauna contributes to the city's revival as a wellness city by introducing traditional Latvian wellness for both locals and tourists. Where the old bath house was of introvert character, the future bath house opens up to the public park and creates a link between city and park. The site offers green spaces rather than private accommodation. By utilizing sites of abandoned buildings for accommodation, the city preserves the green qualities while benefitting the city development. The building is open all year and thereby contribute to life in the area both in and outside the main tourist seasons.

The renovation is performed with respect for the original neoclassical style of the building. All interventions of the existing building are done in relation to original elements. Roof lights and new doors are for example performed in existing openings and the new ceiling supports in the café are implemented using existing vaults. The extensions adds a new scale to the building, accommodating modern facilities for recreational baths. They introduce a new language with visible construction that clearly marks a difference to the polished expression of the existing building. The expansion grows on the sides of the original building, following its main axis and respecting its proportions.

The tectonic approach has been founded mainly in context, detecting and enhancing the identity of the place through a constructional thought. Embracing a traditional and ancient ritual in a modern extension creates a link between Latvian tradition and modern Latvian lifestyle. Latvian sauna has adapted throughout history, the modern interpretation of the public sauna adds another step to this modernization of the tradition. The poetics of having the wooden sauna grow from a massive concrete podium derives from the constructional principle of the primitive sauna. The stone foundation provides both foundation for the wooden structure and sets a thermal barrier between the cold ground and the warm inner spaces.

Overall, this academic exercise aims to approach a tectonic solution through the challenging of the traditional Baltic sauna. An increased scale and a contemporary reinterpretation of its construction method structure a statement, in which functionality and aesthetics do not interfere, but enrich each other

DISCUSSION

In the design process of the renovation and expansion of the Bath House, the search for a unified solution that serves both the urban and the architectural spaces has challenged and compromised the detailing level in the smaller scale.

The concept of maintaining building symmetry, distributing from the dome, and introduction of the urban scale through the building has had a large influence on the design. The symmetric layout provides certain limitations. The recreational baths could for example be more efficiently solved with a direct connection, but the distributional and symmetrical concepts prioritized higher.

Large distributional spaces are another consequence of maintaining the original layout, this is especially evident in the staff areas.

Having the dome as a distributional center, orientating the user presents a challenge. Providing clear hierarchy in an octagonal space while maintaining original proportion and rhythm. The staff doors currently have an almost equal hierarchy to the visitor functions. The scenographic quality is valuable, but it could be conflicting assuming that two of the eight paths are restricted to the common user.

The connection between the Dome and the Cafe is a thirteen meter long hallway. Three skylights were introduced in order to improve the experience, but further explorations could have been developed in order to discover its true potentials in the design.

The combination of public spaces and intimate saunas provides a large contrast. The contrast is a clear part of the final building expression. The classical building opens to the public, while the extensions are introvert and shielding the naked sauna users.

Even though the sauna design has roots in traditional family saunas, it represents a public sauna with a larger scale. Considering that the sauna should satisfy the needs of a large amount of users, the decision of having a single big sauna or several smaller saunas was an important part of the process. The single sauna proved to be convenient with the general strategy, providing a gathering center around the heat. It could be further reflected if a large scale sauna is able to provide a sense of intimacy.

The sauna element is a log construction of glulam beams. It derives from a traditional construction method but has in this case been interpreted. The logs are not just the sauna barrier and the roof support, they also serve as the seat of the sauna. This combined with the rotation has led to beam dimensions where the full potential of the beam strength is not utilized. This has been a priority based on the concept, but

SOURCES

- 1: The Rebirth of the Bath House. Available:
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APPENDIX

23/5/2014 Gmail - Saunavejledning AAU
Anna Clausen <annabclausen@gmail.com>

Saunavejledning AAU

Alex Bagger <ab@sagatrim.dk> 10. apr. 2014 kl. 13.17
Til: Anna Clausen <annabclausen@gmail.com>

Hej Anna,

Her er systemet.

Hver brænder har en effekt på ca 24 kW.

Brændekammeret er et rør lagt rundt i en spiral, som man bygger en mur rundt om i tegl eller sten. Derefter lægger man en bunke sten på en rist over spiralen. Efter spiralen fortsætter røret, som stadig er varmt rundt under bænkene i saunaen – for at udnytte restvarmen, hvorefter røret ender i en ventilator, som suger forbrændingsluften af systemet.

Hvis man har brug for 48 kW (som på tegningen) vil der man to brændere sammen til en dobbeltspiral. Hvis man har brug for 72 kW anvender man tre, og ved 96 kW bruger man fire.

En 24 kW spiral fylder 85 x 85 x 80 cm.

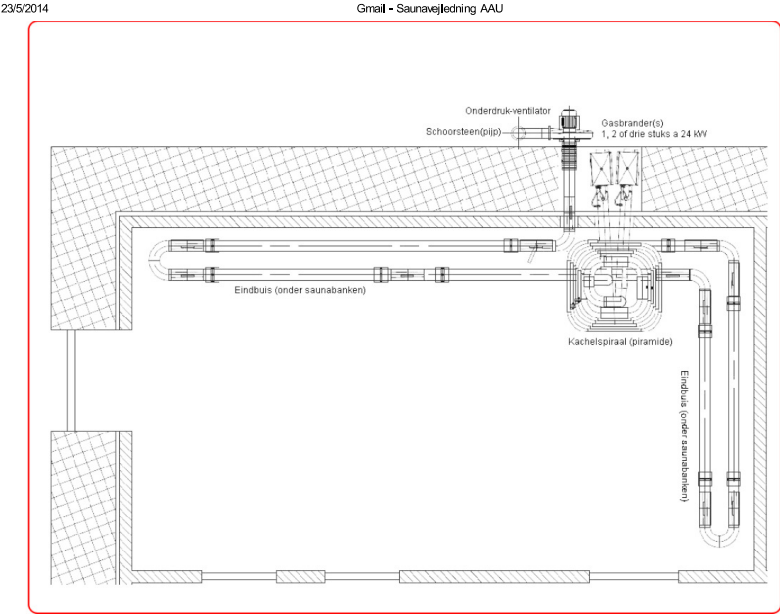
En 48 kW fylder 90 x 90 x 90 cm

Og en 72 kW 100 x 100 x 100 cm.

Hertil kommer muren (regn med 20 cm. tykkelse inkl. luftspalte)

Gasbrænderne skal sidde lige uden for saunaen (eller under) med en væg ind til saunaovnen. Man skal kunne til dem for service ligesom man skal kunne komme til ventilator for service.

Kontrolpanelet med varmestyring skal man til hele tiden, men det kan placeres med ledningers afstand.



Best regards,
Med venlig hilsen,
Alex Bagger

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