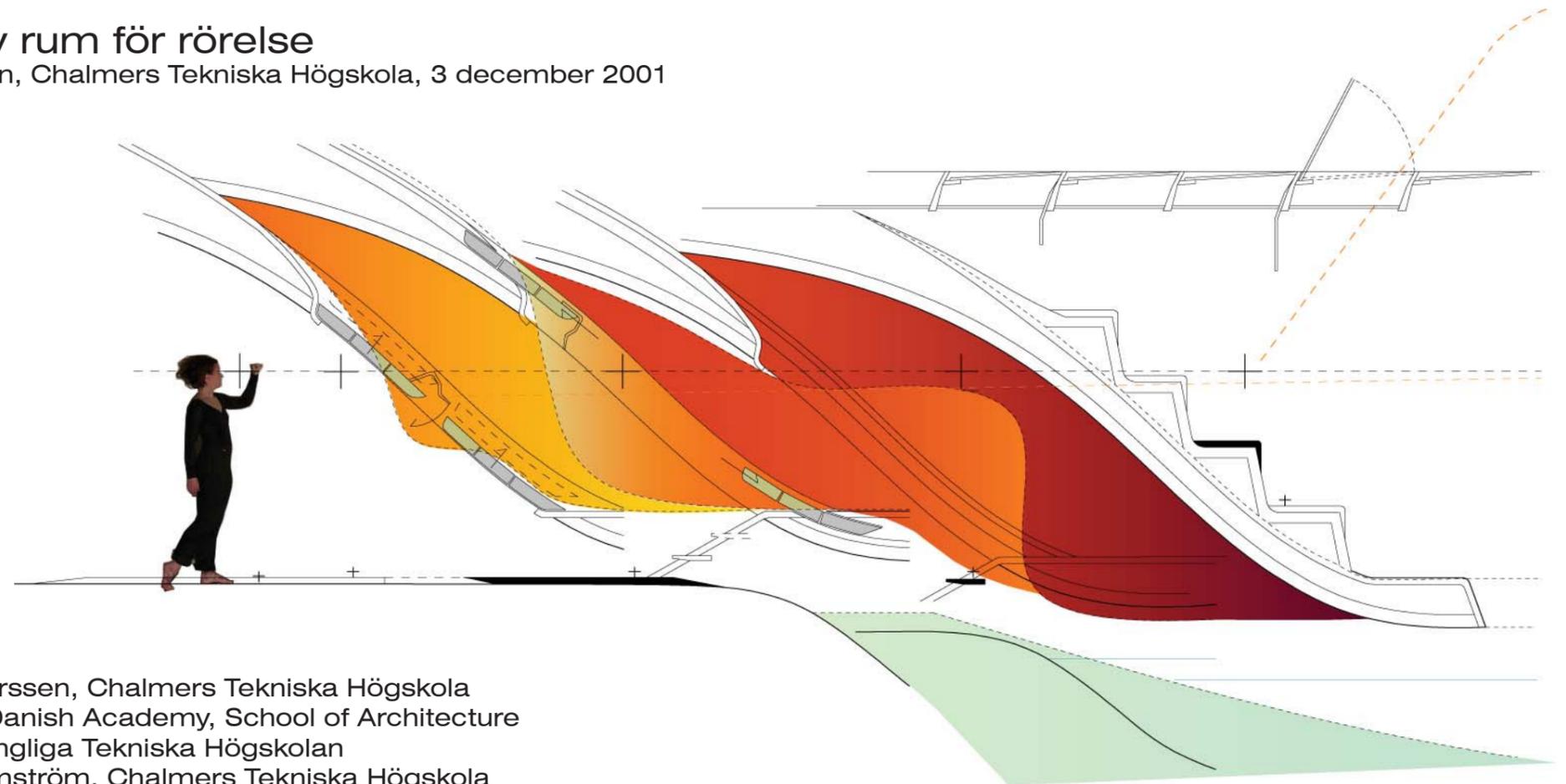


Submerging bodies - en studie av rum för rörelse

Examensarbete Katja Hillström, Arkitektursektionen, Chalmers Tekniska Högskola, 3 december 2001



Examinator:

Assistant professor, Catharina Dyrssen, Chalmers Tekniska Högskola

Jury:

Professor Nat Chard, The Royal Danish Academy, School of Architecture

Lecturer Weronica Ronnefalk, Kungliga Tekniska Högskolan

Assistant professor, Christer Malmström, Chalmers Tekniska Högskola

Introduction and background

This final thesis, *examensarbete*, at Chalmers School of Architecture has its origin in a project done the previous year at University of North London, during which I developed certain interests that I have continued to investigate in this project. The issue of spatial transformations in an intermediary zone between private and public space being one and the use of mediated transparencies through body specific, interactive membranes being another. The project in London ended up producing an architecture that was somewhere between clothing and built space. Working exclusively in the scale of 1:20 and 1:1, the final piece was an double membrane wall that generated a continuous transitional passage between the public space of the street and the private interior of a tailor shop, using projections to generate alternative transparencies and relay information from one side to the other.

This work and the research method being used was the starting point for my diploma work here at Chalmers. My intention was to concentrate on investigations of the spatial issues in question and to keep on working mainly with models and photographic studies, trying to find techniques and ways of developing the project that were specific to my interests.

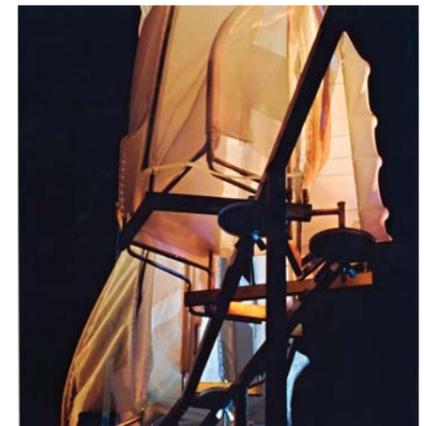
I wanted to continue to investigate the edge condition between private and public by means of body specific spaces. The previously developed interest in using light to edit transparencies, gave the initial idea that the project should be situated partly underground. This would give a starting point where I could work with the changes in natural and artificial light to control the interaction between different levels in the building through a vertical sequence, starting at the public street level and sinking down into subterranean spaces.

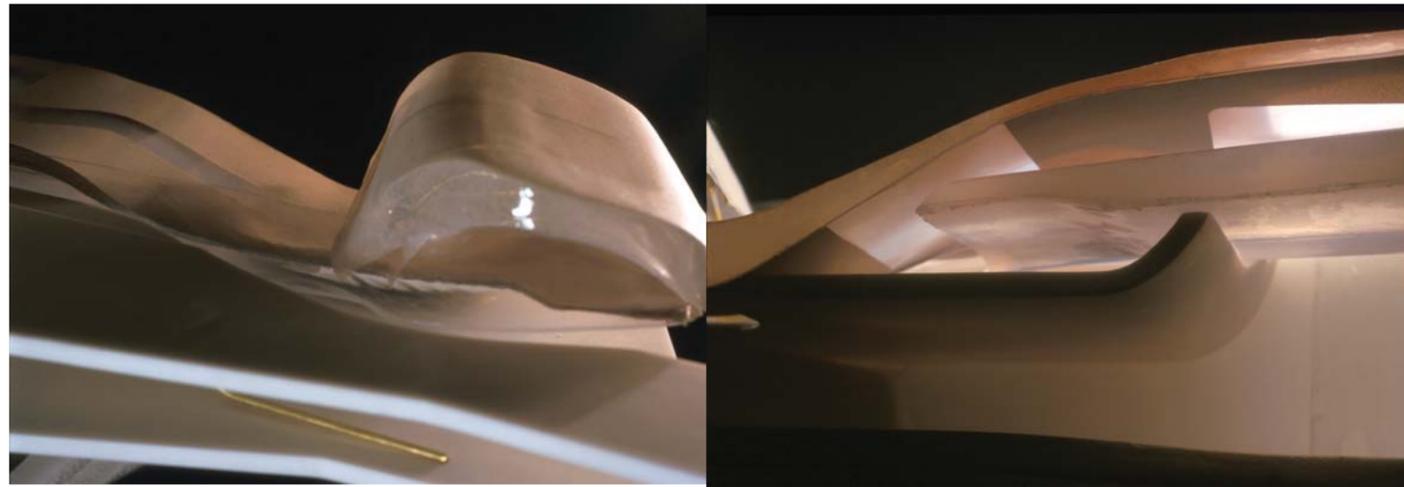
After having established that, the program of a public bath or spa was introduced into the project. It was an easy choice of program, given the interest in the body specific. But it was also appropriate because of its inherent tension between private and public spaces, dealing with issues of intimacy, nakedness and exposure.

I was interested in the idea of a subterranean bath placed in a dense urban situation where the contrasts between site and program would create some intense interference and friction. Vasaplatsen was chosen as site based on its location, size and topography, but the specifics of the site itself was not of that much interest to me. I rather wanted to be able to use it as a framework, taking it to consideration when it was relevant for my spatial interests and not worrying about its appropriateness.

From this point, I began, photographing, drawing, modelling and bathing my way towards an idea of what an urban bath experience could be about...

Katja Hillström, Göteborg, December 2001





Multi layered space

sub·merge

pronunciation: (s&b-'m&rj)

transitive senses:

1 : to put under water

2 : to cover or overflow with water

3 : to make obscure or subordinate

intransitive senses : to go under water

Etymology: Latin submergere, from sub- + mergere
to plunge

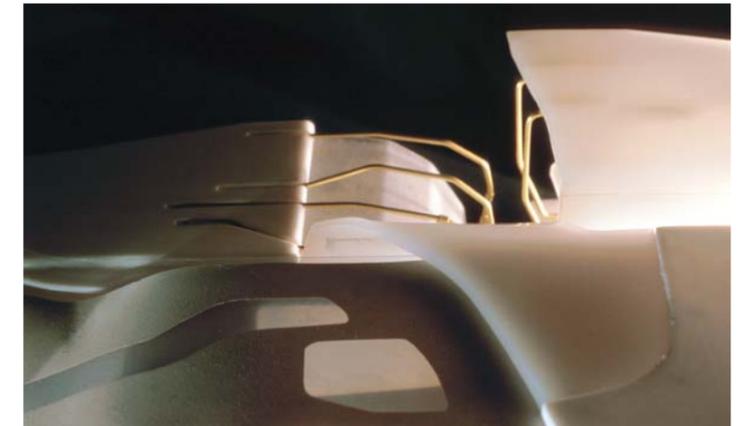
The building is conceived as a multitude of layering elements whose in-between spaces are occupied by body and water. The experience of space is fluctuating and transforming with the movement through the submerging section – a continuous transition from air to water, gravitating towards a state of weightlessness. The building fabric is an epidermis; breathing, wrinkling, transporting fluids, responding to pressure, controlling body temperature and protecting it from light. It's an active membrane that responds to the changing conditions of its interior and exterior, mediating and filtering signals from one state to another. The performances embedded in these composite layers relate to:

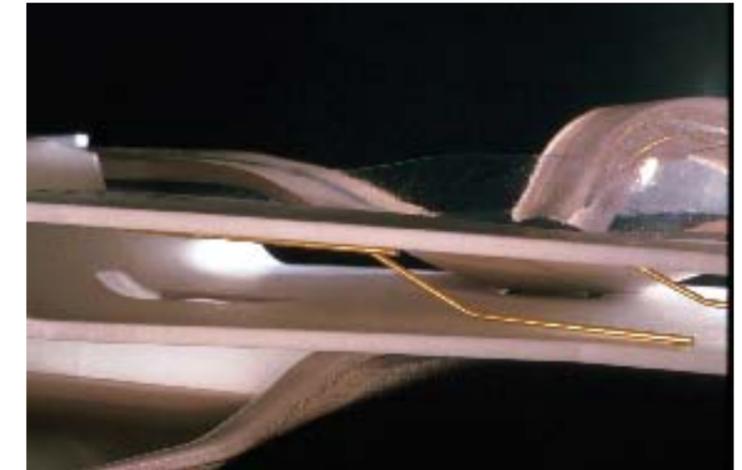
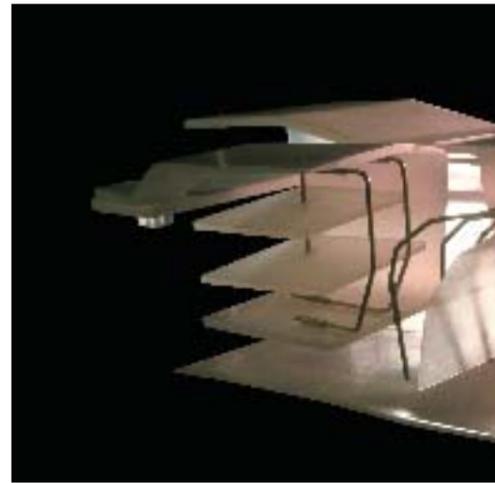
climate –	controlling the exposure to climate, amplifying or counterbalancing the seasonal and daily changes in weather.
light –	editing and directing sunlight and artificial light into the building
water –	containing, heating, lighting, circulating water
acoustics –	creating and controlling the soundscape of the building
body –	malleable materials and intersecting the moving body

The overlapping of these layers creates specific conditions in which the different programmatic spaces of the bath are inhabited. Each situation has its own unique qualities and amalgam of performances.

Ambiguity of exterior and interior space

The spaces are structured to create an ambiguity of interior and exterior as the layers seamlessly fold from one condition to the other. The occupant is sliding between these two conditions, through continuously changing temperature and light. Properties inherent to exterior conditions are introduced into interior space and vice versa. Resulting in a blurred distinction of one from the other.





Redirection of light

The context of underground space offers an opportunity to work with light in a similar manner. A vertical movement down into the ground does not result in gradually darkening and more secluded private spaces, but instead there are situations where moving from a dark space at ground level down into a sunlit space further underground denies this most obvious reading of the given spatial sequence. The direction of light, which is instrumental for our orientation in space, is also used to question the conditions of the underground. Natural light from above and artificial light from within are inverted through reflections, projections and light editing layers.

Transparencies

The concept of transparency refers to both direct visual transparencies and other forms of mediated transparency, for example media projections relayed through the building or material deformations that communicates what lays beyond. These transparencies are effected by changing light conditions. Media transparency gives possibilities to create connections between spaces beyond spatial or time relationships.

Non-chronological understanding – memory, sequence and space

A non-chronological understanding of the building, where initial traces and glimpses of spaces that lies beyond, later is made comprehensive as more information is gathered by moving through the building. There is not a continuous sequence to be understood but rather a series of implied and delayed relationships. The visitor gradually unfolds the understanding of space, through linking the present experience with both proprioceptive and visual memory. Catching a glimpse of a body floating above or diving bellow and then when having moved into the building, being able to reconstruct the space bellow as I'm the one floating above.

Edge conditions and body - intersections

"Is not the most erotic portion of a body where the garment gapes? In perversion (which is the realm of textual pleasure) there are no "erogenous zones" (a foolish expression, besides); it is intermittence, as psychoanalysis has so rightly stated, which is erotic: the intermittence of skin flashing between two articles of clothing (trousers and sweater), between two edges (the open-necked shirt, the glove and the sleeve); it is this flash itself which seduces, or rather: the staging of an appearance as disappearance."

R. Barthes

The main focus of interest is where the layers meet, the gaps, the pockets, the sliding intersections. The spatial experience is of a continuous intermediary condition, as you move from one space to another through these gaps. The body is intersecting built space and performs a transitional movement while being suspended between two spaces of different lighting conditions, temperatures and programs. All passages in the structure, all doorways, stairways and places where you penetrate from one layer to another are created to enforce this experience. And this transitional space is where the tension and suspension between body and architecture is concentrated.

Submerging – body and water

Transferring a body gradually from air to water, into a state of weightless floating. As you move through the building, the different water levels constitute absolute horizontal lines of reference, but the movement never runs along or parallel to this level. It is constantly diving into, stepping down towards or moving up out of the water. The water level also makes a continuous sectional registration of the moving body and it can be considered as equivalent transitional situations to moving through the layering fabric of the building.

A water surface can also be set in motion, ripple, flow, flood or evaporate. It's a malleable edge condition with an interactive surface that can be used for varying reflections and transmissions of light.



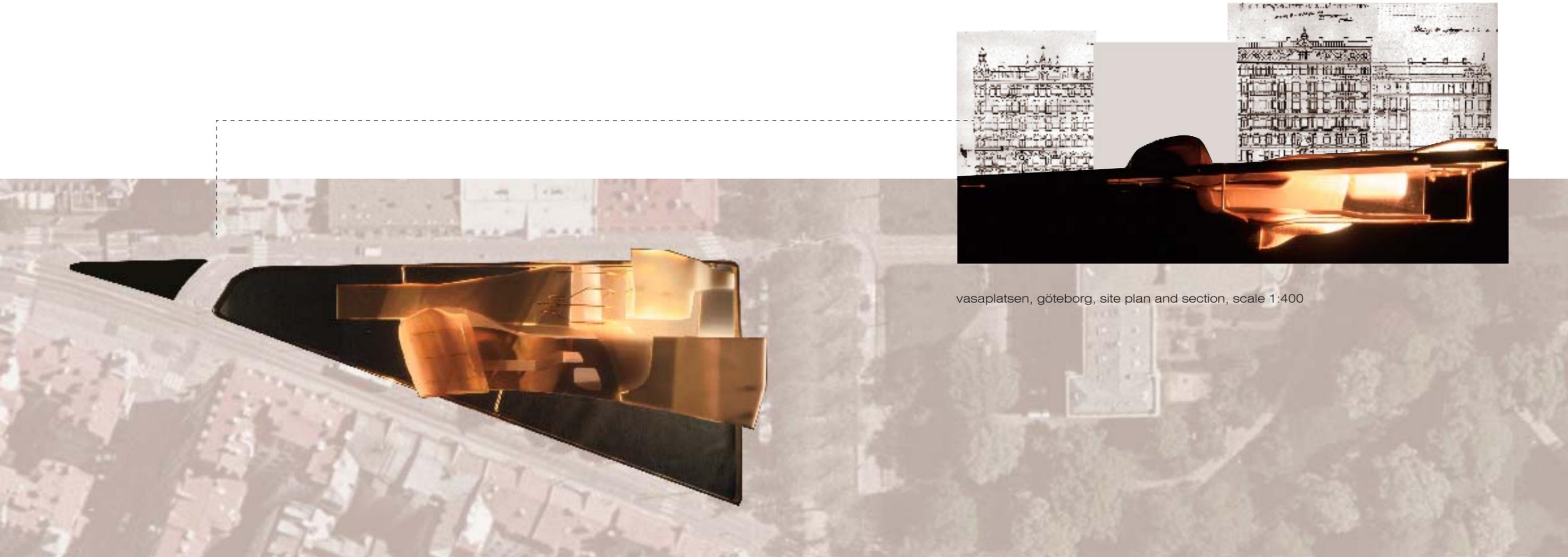


Initial photographic study of a submerging body

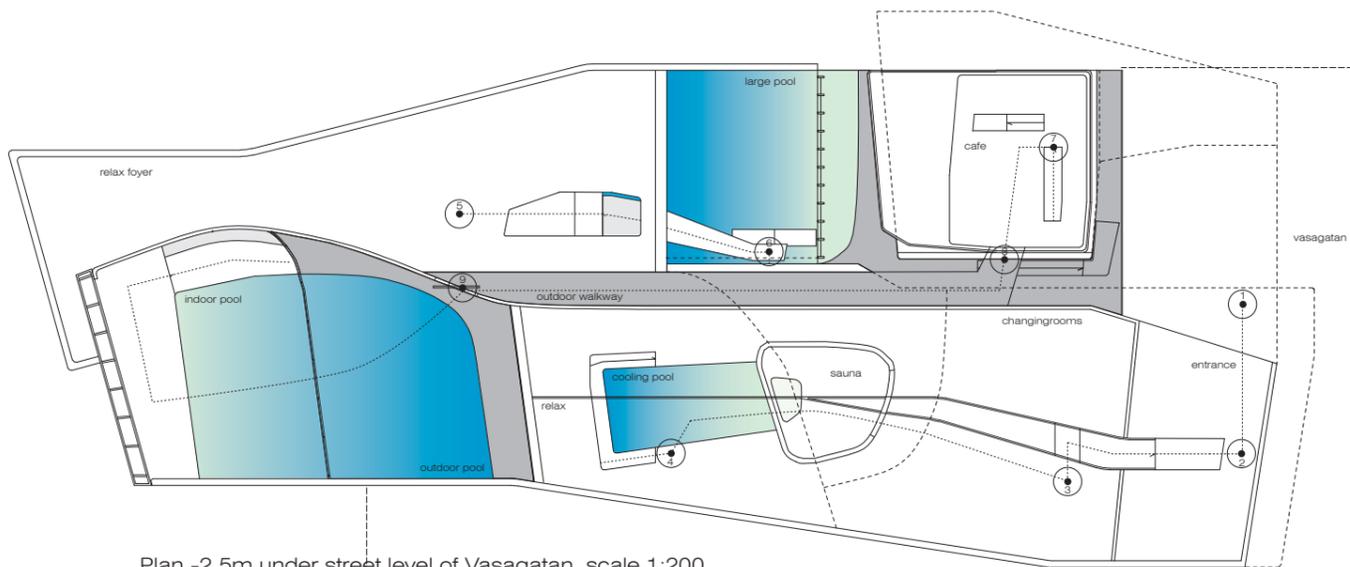
The section of the head shows the intense changes in perception that takes place when lowering ones position by only 30 centimeters. One by one all senses are subject to a change in function, first taste, then hearing, then all respiration and finally sight.

The foot makes the initial tactile encounter, measuring temperature and texture. The water level is marked as a continuous sectional registration of the body part.

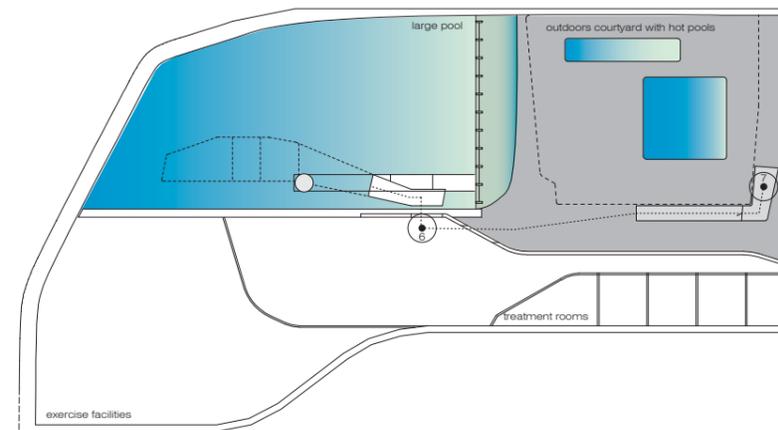
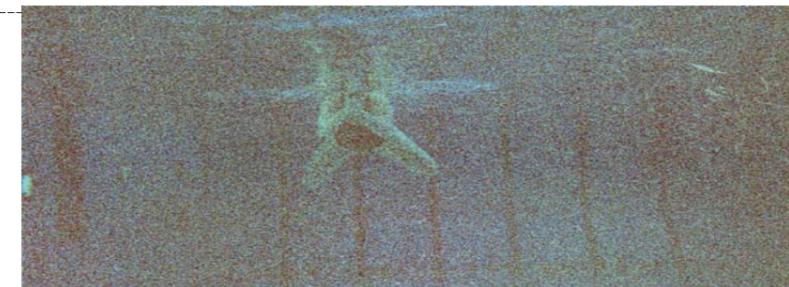




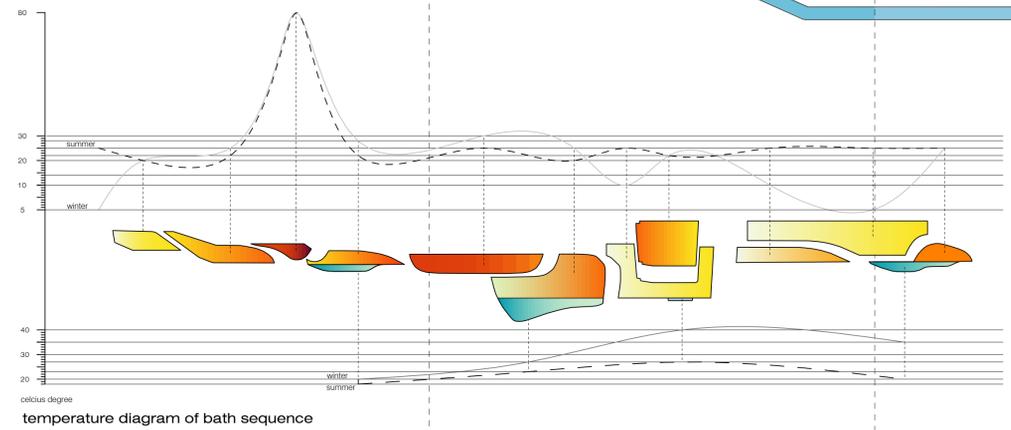
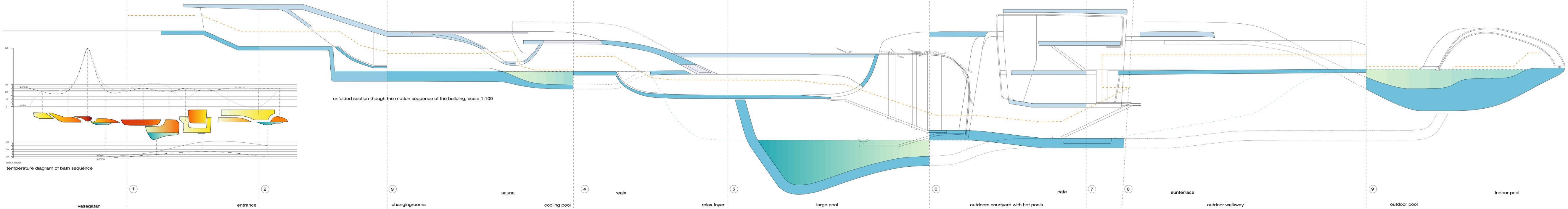
vasaplatsen, göteborg, site plan and section, scale 1:400



Plan -2.5m under street level of Vasagatan, scale 1:200



Plan -10 m under street level of Vasagatan, scale 1:200





vasagatan

①

entrance

②



sauna

③

changingrooms

cooling pool

④

relax

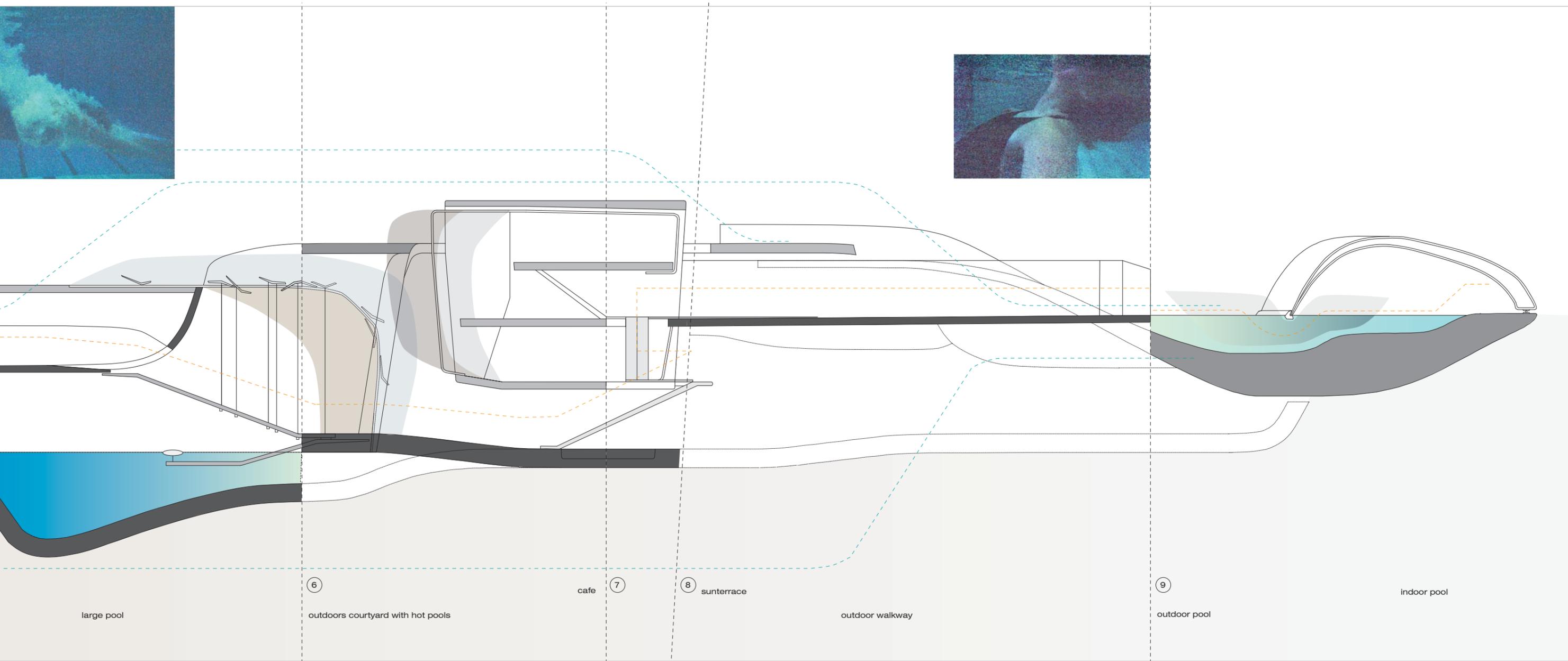
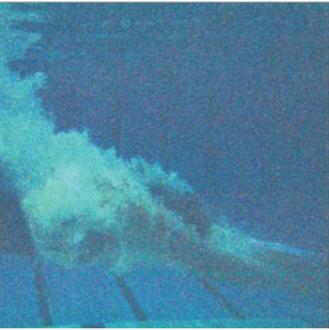
relax foyer

⑤

unfolded section through the motion sequence of the building, scale 1:100

--- implied and relayed connections

--- movement



large pool

⑥

outdoors courtyard with hot pools

cafe

⑦

⑧

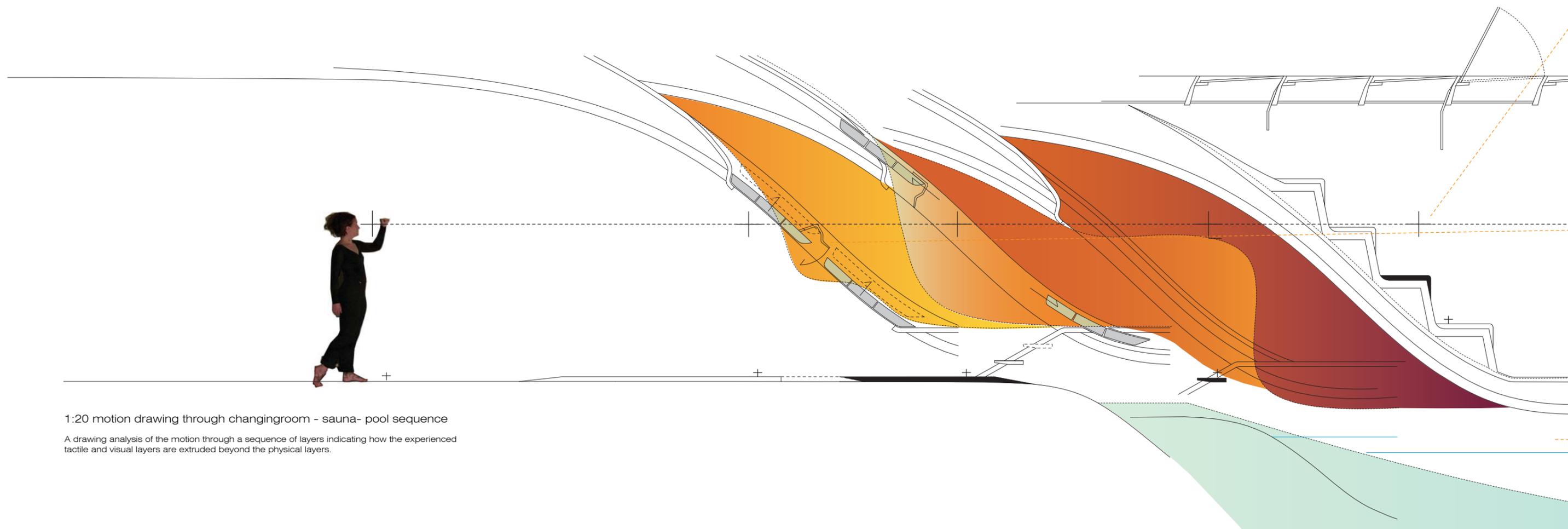
sunterrace

outdoor walkway

⑨

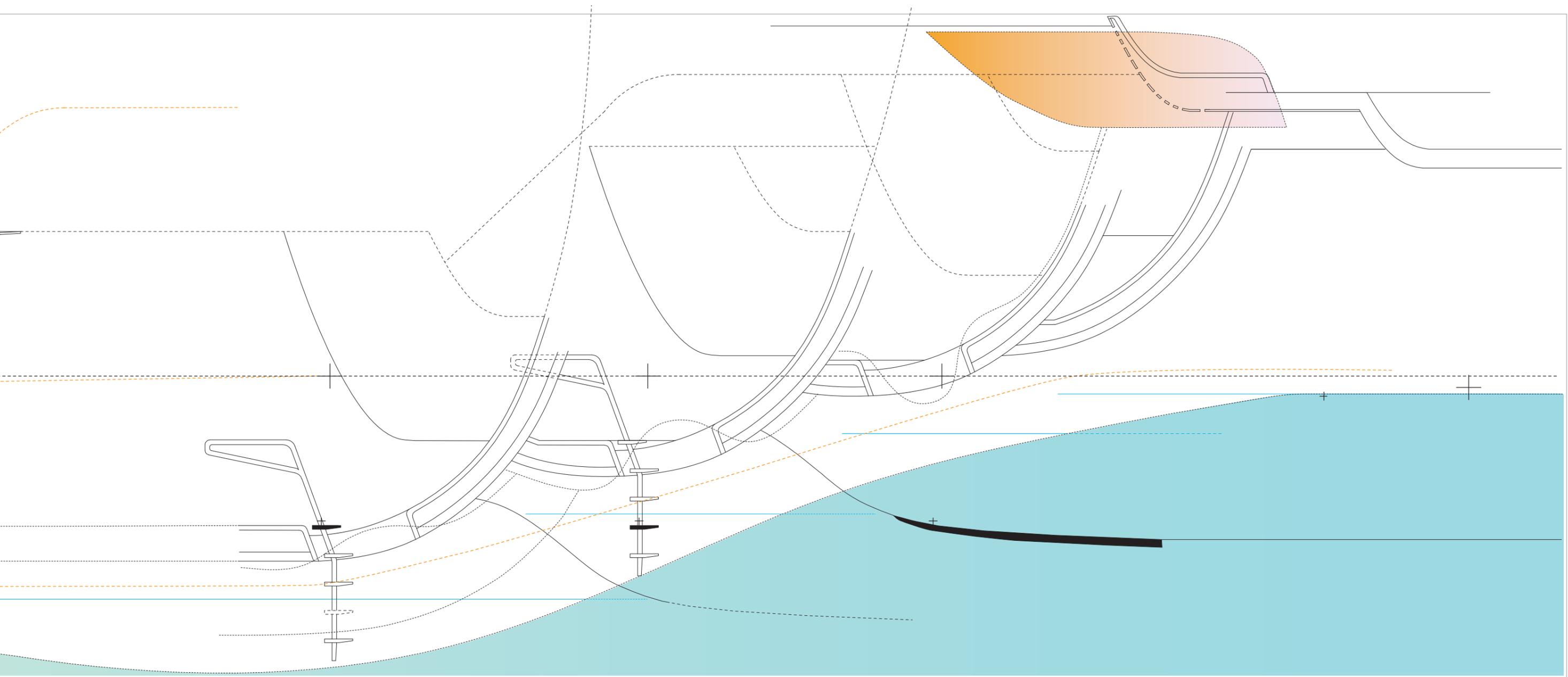
outdoor pool

indoor pool

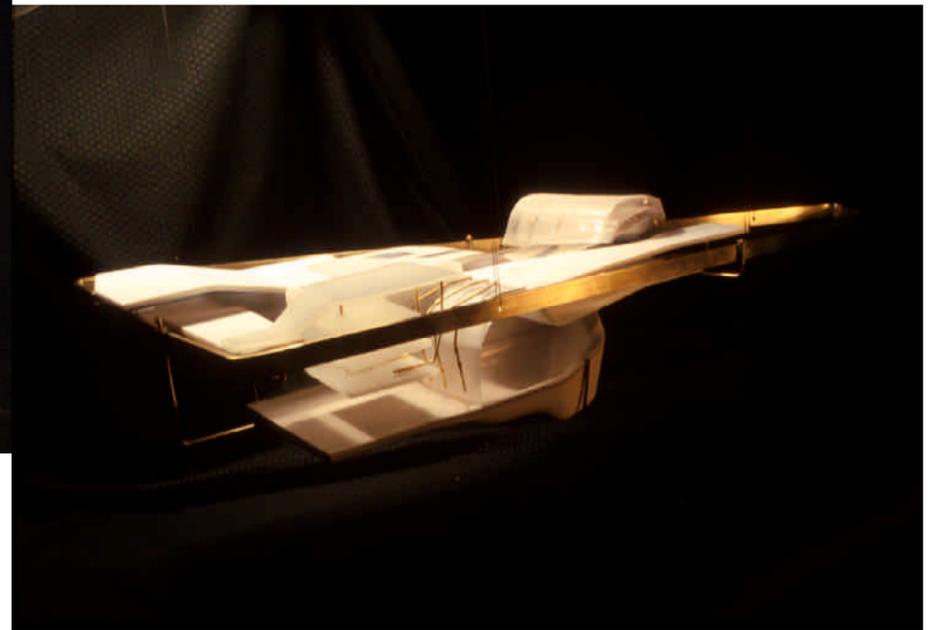
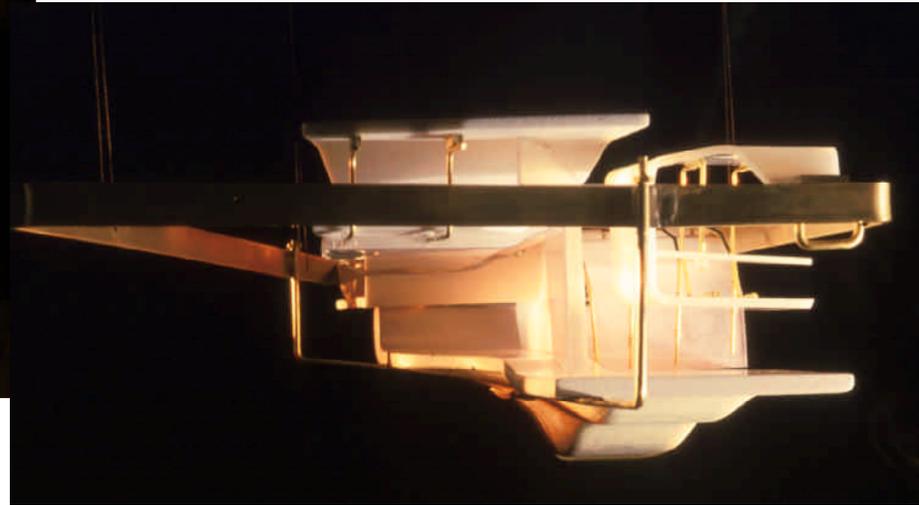
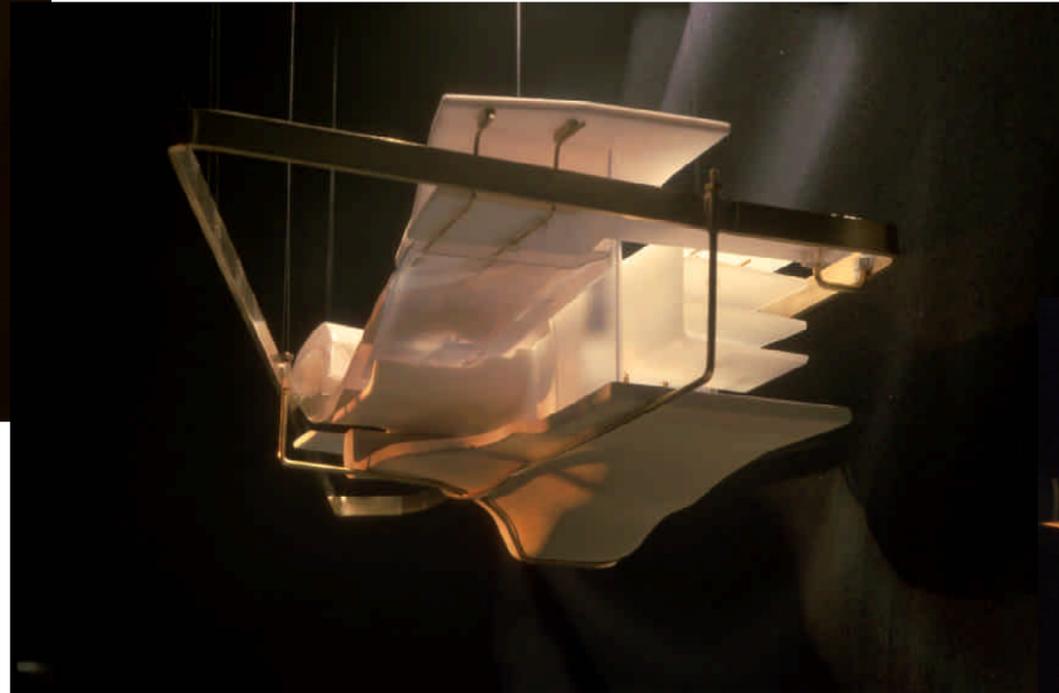


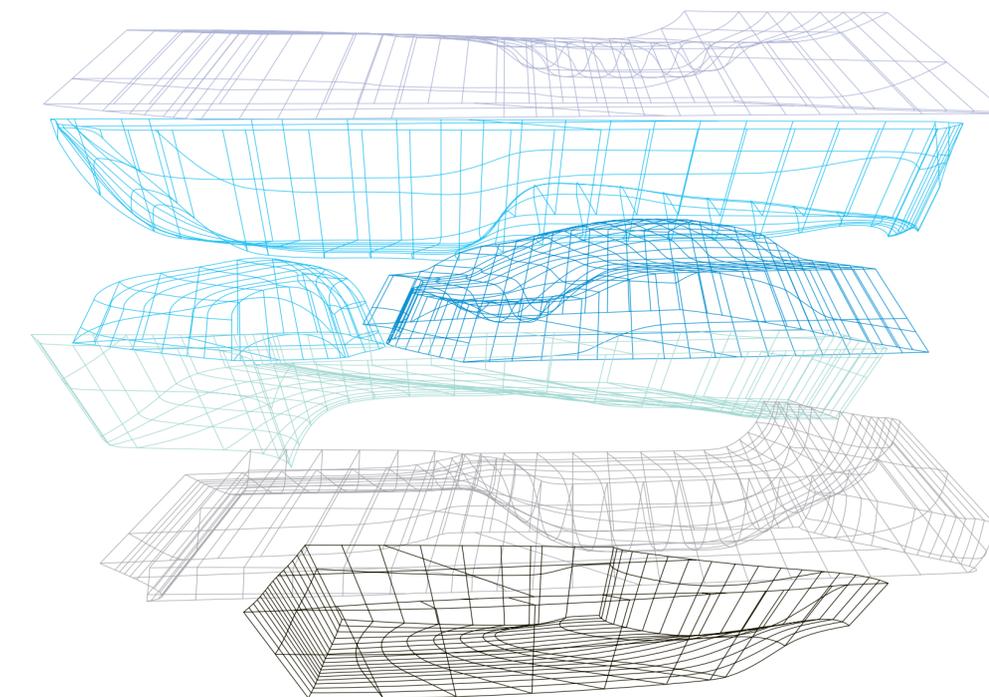
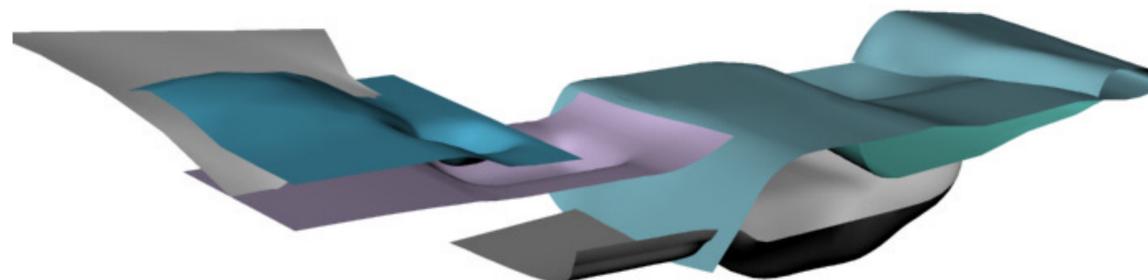
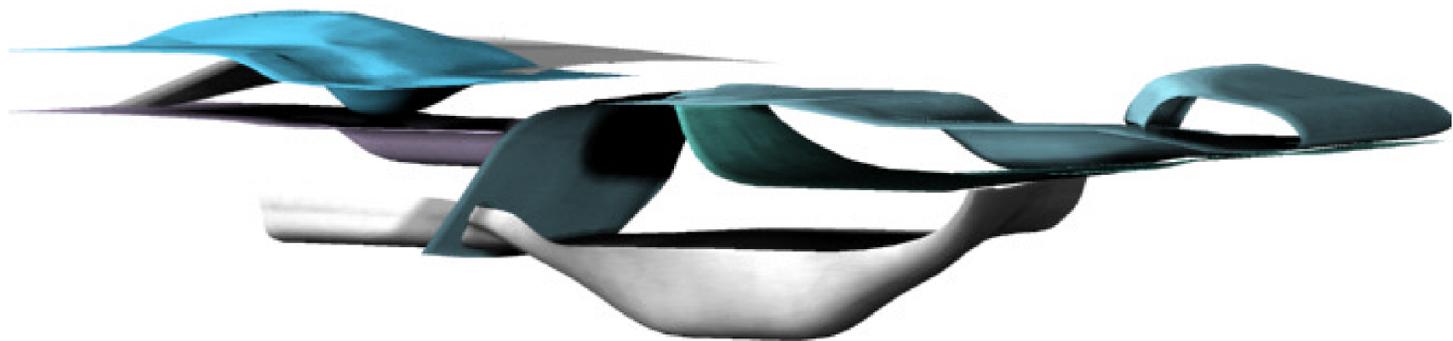
1:20 motion drawing through changingroom - sauna- pool sequence

A drawing analysis of the motion through a sequence of layers indicating how the experienced tactile and visual layers are extruded beyond the physical layers.



" we were to apply a little pressure to the surface of our world in various places, creating recessions in that surface with architecture. That is, we can activate that basic characteristic of architecture of turning exterior to interior...| But above all else, we can witness the phenomenon when architecture presses into the surface of the world, a vivid tactile sensation, a carnal instant where we accidentally pass by images that capture our vision and keep it confined. At that moment, our physical bodies are open to become expression, bursting forth with vigour on occasion, or flowing, unrestricted, or gradually seeping into each other. When architecture creates a hollow, the overexposure of light which flattens all in its reach slowly fades away into the hollow's depth." Hiroshi Nakao .



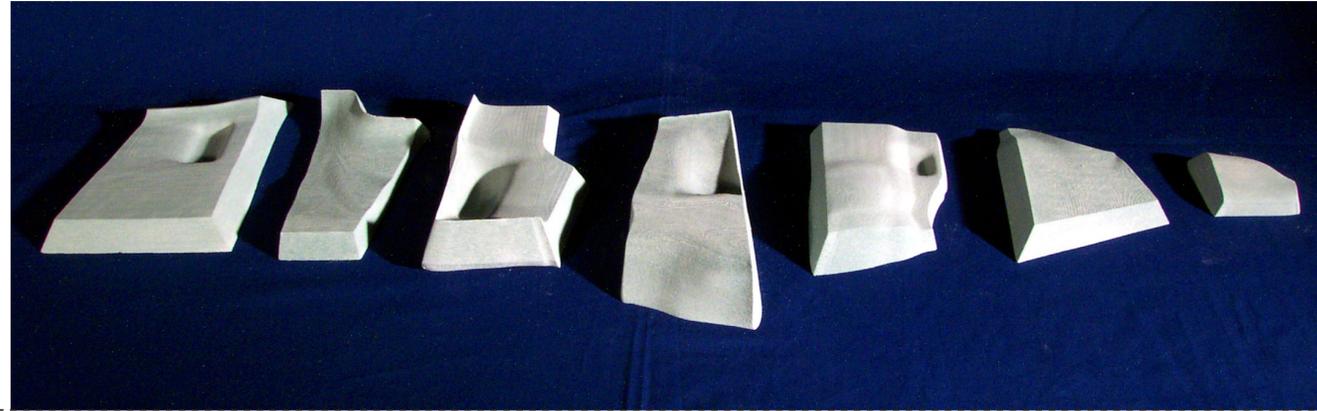


Technical notes – from digital modelling to physical touch

It was important to find a technique that was specific and really helpful in developing my concept of layered space. Digital modelling seemed to be an interesting option but I was not interested in working only with digital space. After having contacted the department of Innovative Design at Chalmers, I was able to get access to

a 3d printer that enabled me to work with crossover techniques between digital and analogue, transforming computer models into 3d objects. Using the 3d modelling software of Rhinoceros I started by doing initial sketches, structuring the layers in a rather intuitive way. The idea was to use the software to explore the possibilities free form geometry and see how the layers could be formed to suggested a movement through a





series of transforming edge conditions. I generated these spaces by creating curves that was converted into nurb surfaces and then edited further by vertex control points. These surfaces were then extruded into solid object moulds and converted into sfx-files, which is the solid object file format required by the 3d plotter. The plotter used is of a powder-layering type (Z-corporation 400 3d printer), that builds up the modelled volume

with a starch-based powder that is hardened by a binder fluid. The plotter first spreads out a 0.1 mm thick layer of powder and then a printing head covers the surface of that particular cross section of the volume with a binder fluid. After that a new powder layer is spread on top and the next 0.1mm cross-section is hardened with fluid. In this way the model is built up though multiple layers with a tolerance that equals the thickness of each layer, in this case 0.1mm.

When finished plotting, the model piece lays embedded in loose powder and can be carefully dug out and cleaned. These moulds were then used in a vacuum-forming machine to create plastic surfaces that were exactly the same as the initial digitally generated layer structure.



In working with nurb modelling tools I discovered the inherent problems with controlling this very complex kind of geometry and the shapes that were generated ended up being rather imprecise. I therefore continued developing the layer structure by very basic modelling techniques in cardboard and plastic and then transferred these back into the digital model. In the end I had a finished model that were a combination of both nurbs modelling and surfaces

generated by a simple folding geometry, some pieces shaped by hand, working with the malleability of heated plastic and others modelled digitally, plotted and formed in a vacuum machine. The combination of techniques gave a precision in the finished piece. The model pieces being generated in the scale of 1:200, turned out to embody the aspect of physical touch on a one to one scale.

