THE NILOMETER

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U+A/DL-studio 2014/15
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THE NILOMETER

CONTENT

INTRO

ANALYSES

CONCEPT

DESIGN PROPOSAL

SOURCES

INTRO

There are few places in the world today where people do not need to be concerned about changing water levels. Most vulnerable are cities on estuaries or cities with canals like Venice, Belgium, Amsterdam, Copenhagen and Gothenburg – to just mention a few. Because of its geographical location Gothenburg is prone to flooding. On two occasions in 2011, water in the narrow Göta River estuary rose 1.7 metres above the normal sea level – the same level during the storm Gudrun in 2005. This is enough to flood many central parts of the city - and it will further escalate. It is estimated that future extreme weather conditions will cause the water to rise at least 2.7 m above the current sea level. Historically, Gothenburg has always had a close connection to the sea, because of its ocean trade and maritime industry, but now it is time to acclimatise and connect the city to its water filled future.

01

DYSTOPIA

Movie: ‘Flood’ released in 2007

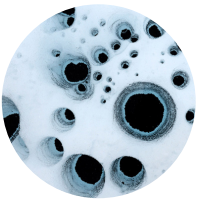
DYSTOPIA

Movie: ‘Metropolis’ released in 1927

MAIN FACTORS

Thermal expansion:

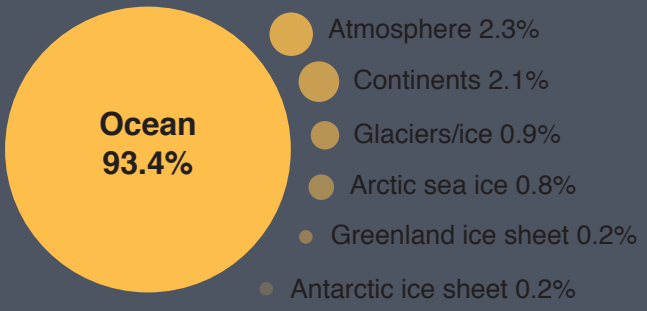
When the water heats up, it expands and thus occupies more space.



03

Melting of glaciers, polar ice caps and ice sheets:

Recently higher temperatures have led to an acceleration of ice loss. The melting can not be balanced through snowfall anymore. Thus water is being added to the world's oceans and the sea levels rise.



DESTINATION

Where is global warming going?

04 source: Union of Concerned Scientists 2013

05

2100

global average sea level rise

source: Union of Concerned Scientists 2013

SWEDEN

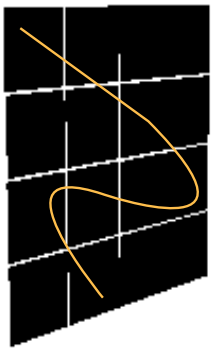
Gothenburg

ZOOM IN
flood scenarios

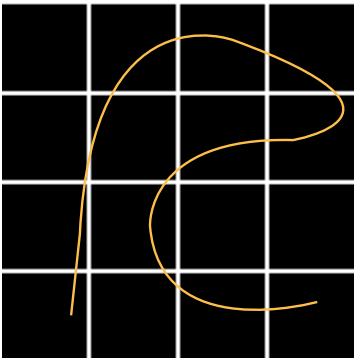
LOCATION
The Nilometer
06

THE IDEA OF
SHIFTET PUBLIC SPACE

vertical

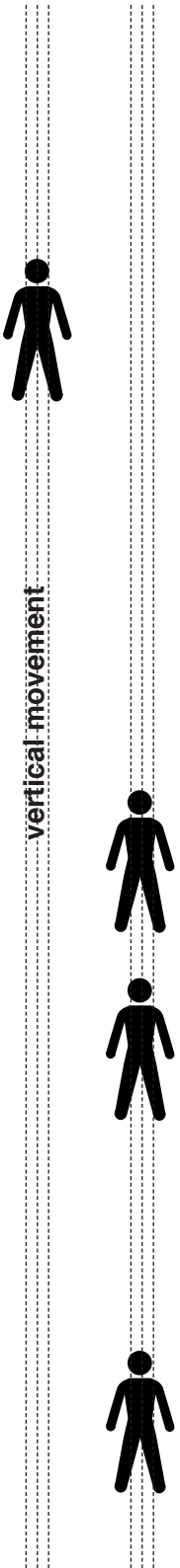


90°
flipped



horizontal

THE IDEA OF
using the verticality



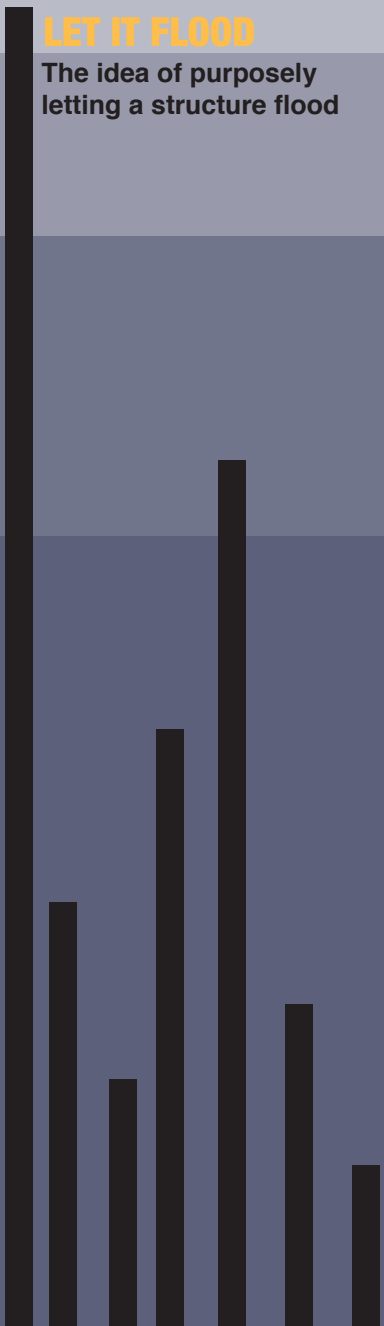
THE IDEA OF
using the verticality

gravity

natural water flow

LET IT FLOOD

The idea of purposely letting a structure flood



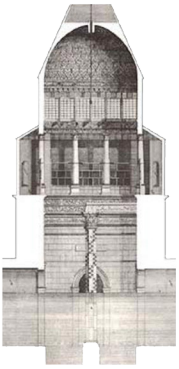
07

THE NILOMETER IN CAIRO

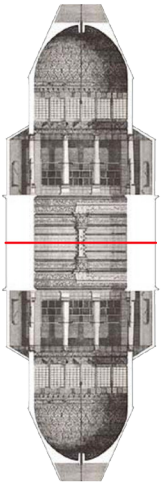
built_ 715 AD
It can measure water levels up to 9.5 meters.

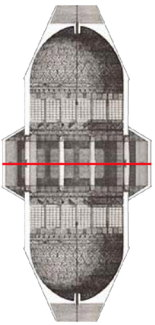
Since the Nile River has been of critical economic importance to both ancient and modern civilizations alike, officials have gauged its water levels for more than 5,000 years, writing them down for more than 13 centuries.

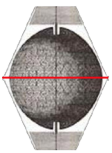
true section of the nilometer in Cairo

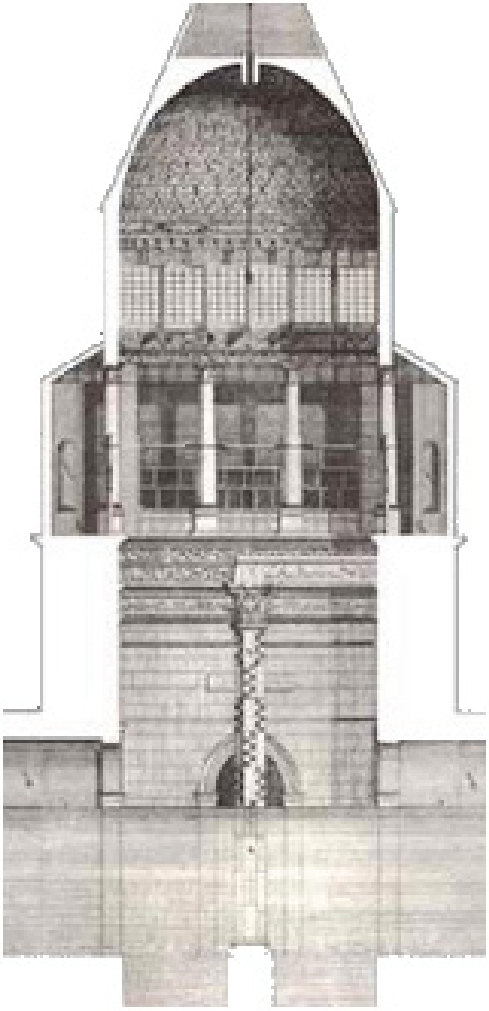


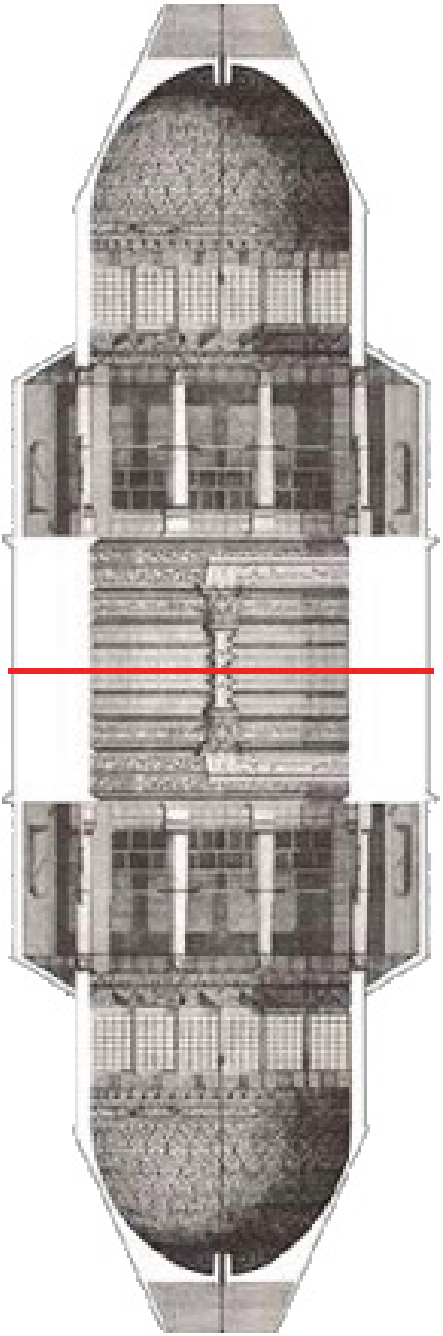
idea: measuring water level by reflection, by the changing perception of the room

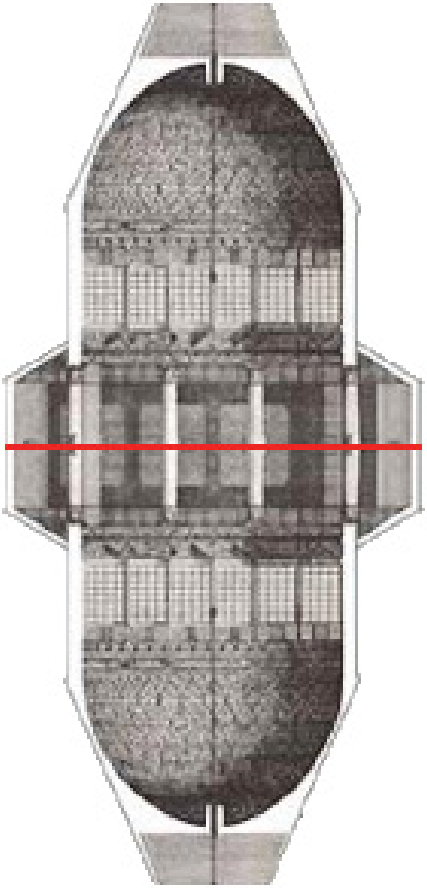


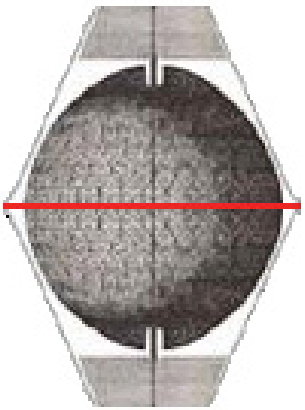










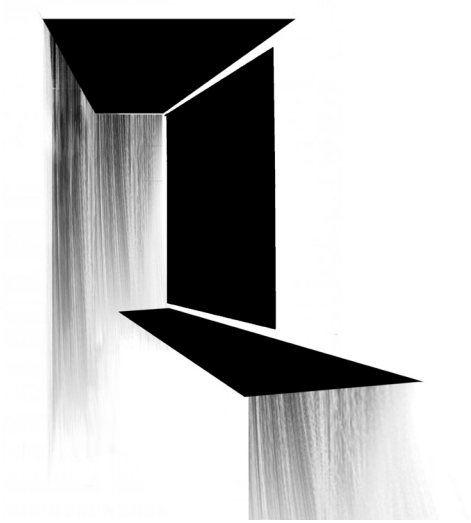


Consequence of the Nil River's water level 09

measuring waterlevel by
traces at the material surface

INTENTION

There are many examples of constructions that have been built in order to protect a large area of land in a single sweep. Most of these examples work against the water, not with it. In my opinion it is wasted potential seeing the rising water level as a threat only. Since it will have a big impact on our everyday life, mostly on the public spaces, I believe in a system, which is more than just a protection from water. My intention is to develop a structure that is framing the water and making it even more present - showing its beauty and diversity. Today many public spaces are horizontal and will easily become unusable when flooded. Since public spaces might become more and more relevant it seems important to me to provide new platforms for people to meet up.



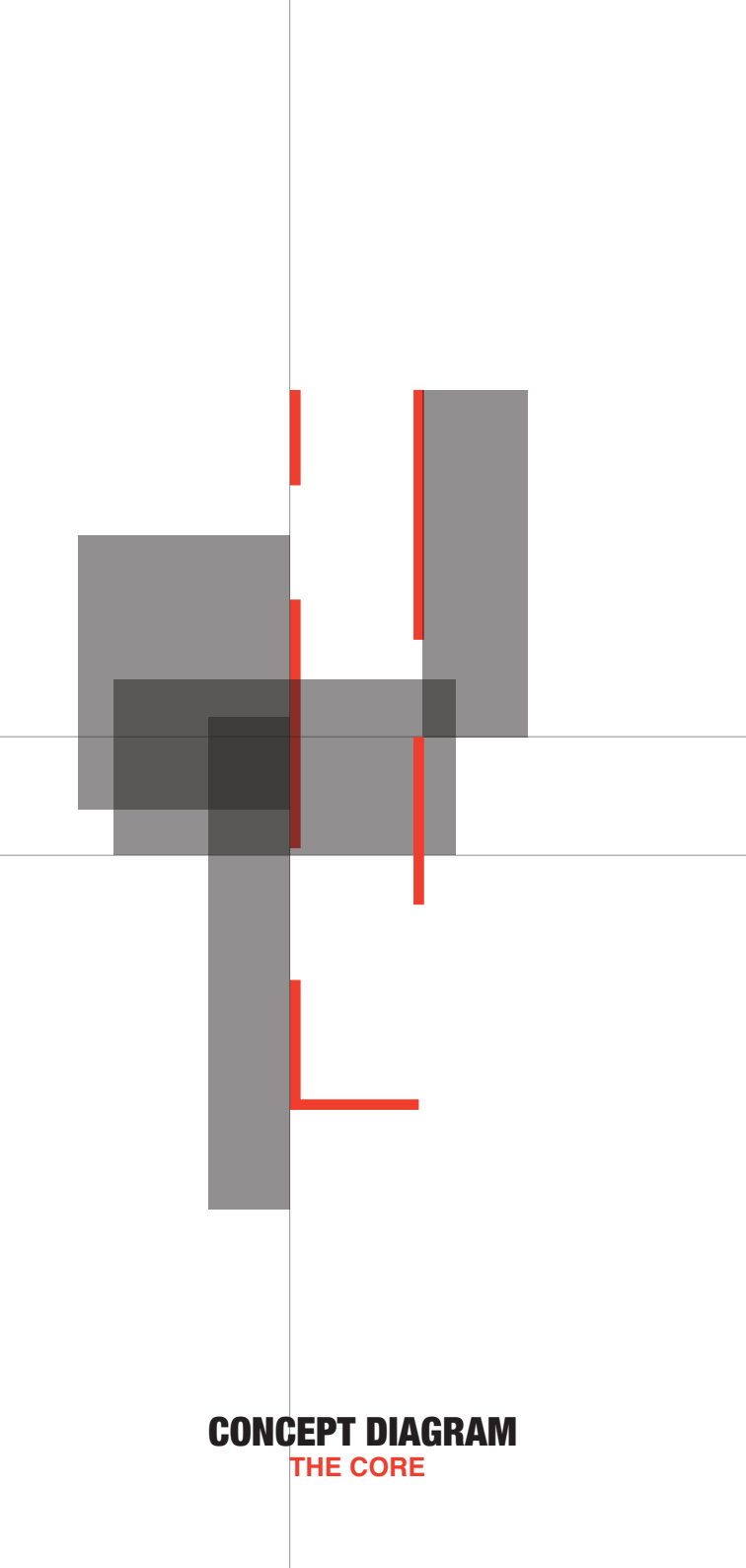
STRUCTURAL COMPONENTS

CONCEPT

Nowadays, the most commonly built vertical structures are high- rise. Most of them have nothing to do with public space. They represent a symbolic function in the city as a result of structural limitations and economic consideration. The only space that could be concidered as some sort of “public space” is the elevator service core and the circulation space around it, which is supposed to be as small and economy efficient as possible. Even though these spaces are not private, they are no collective spaces either. They seem to be nothing more than the inevitable way to get to your apartment.

My idea is to create vertically orientated, collective space.

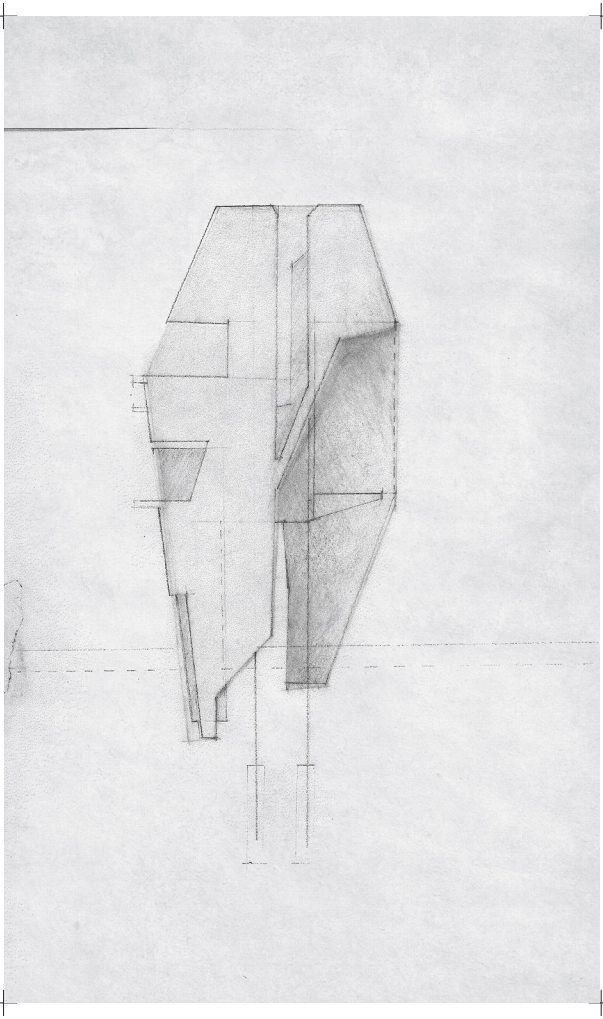
The core of “The Nilometer” is not meant to be a circulation space only. It is the main measure device within the structure - an open space where people meet and share their thoughts and knowlage about the rising water level in oder to become more conscious about the situation we all face in our near future.



CONCEPT DIAGRAM

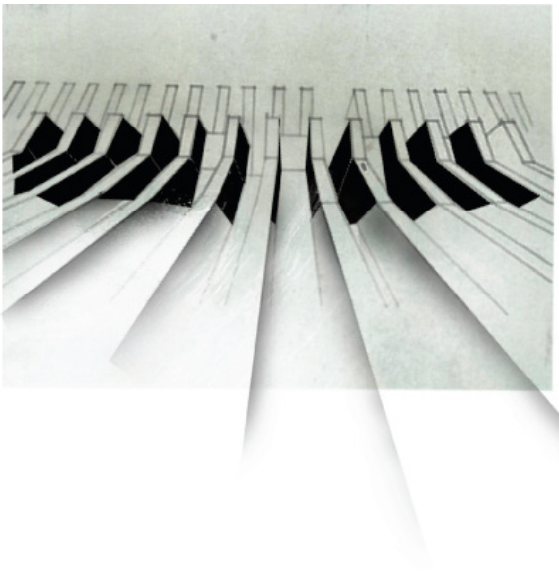
THE CORE

THE DESIGN



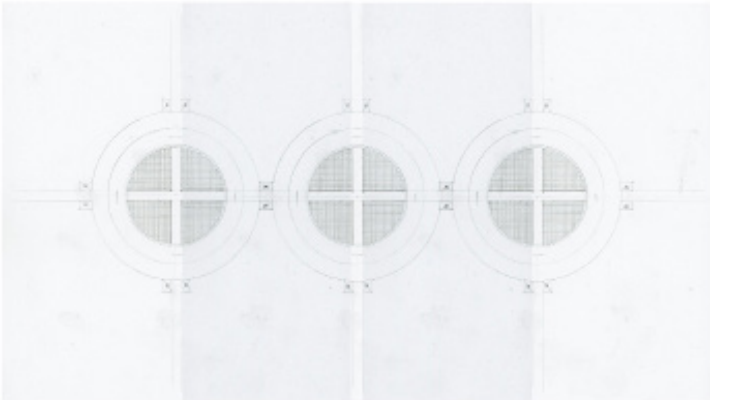
SKETCH

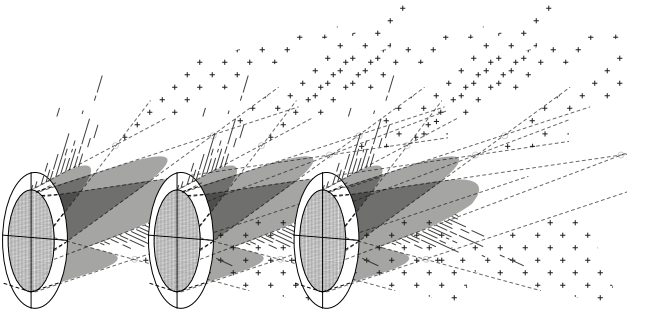
MECHANISMS



DAM

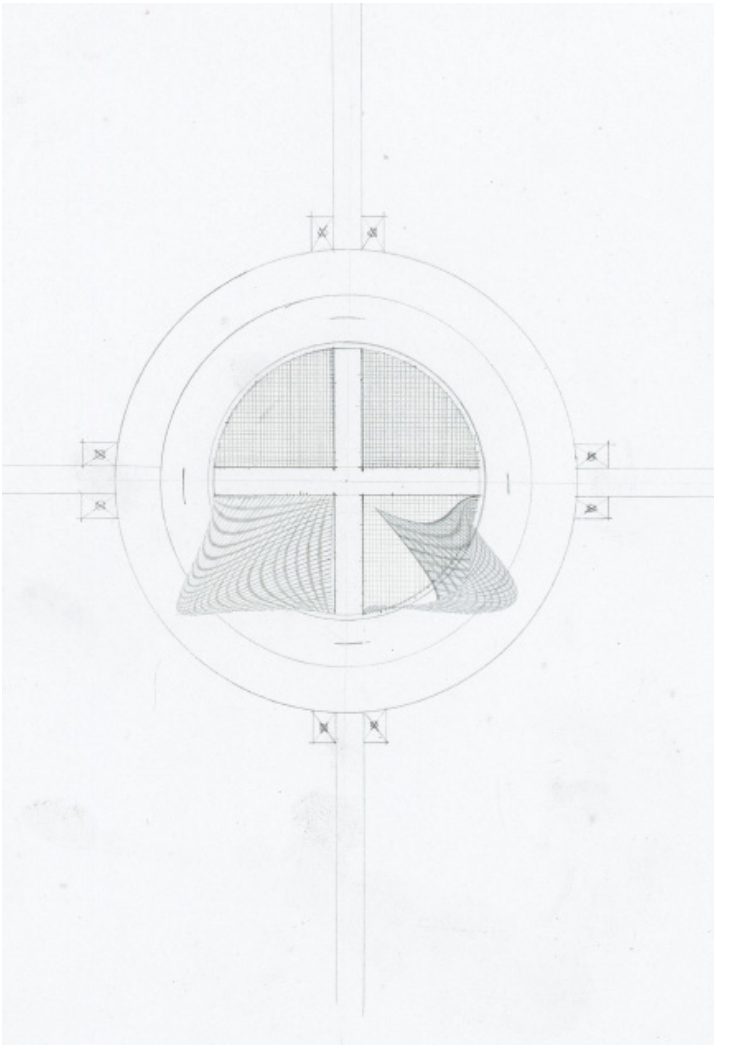
The idea of the first mechanism derives from the functional principle of a water dam. It controls the water flow and is consequently the essential condition for the following mechanism - the membran





MEMBRAN

This mechanism is functionally based on the idea of a semi- permeable membran. It only opens up and lets water pass through if it comes straight, bundled from one direction. A raising sea level consequently leads to a closure of the membran.

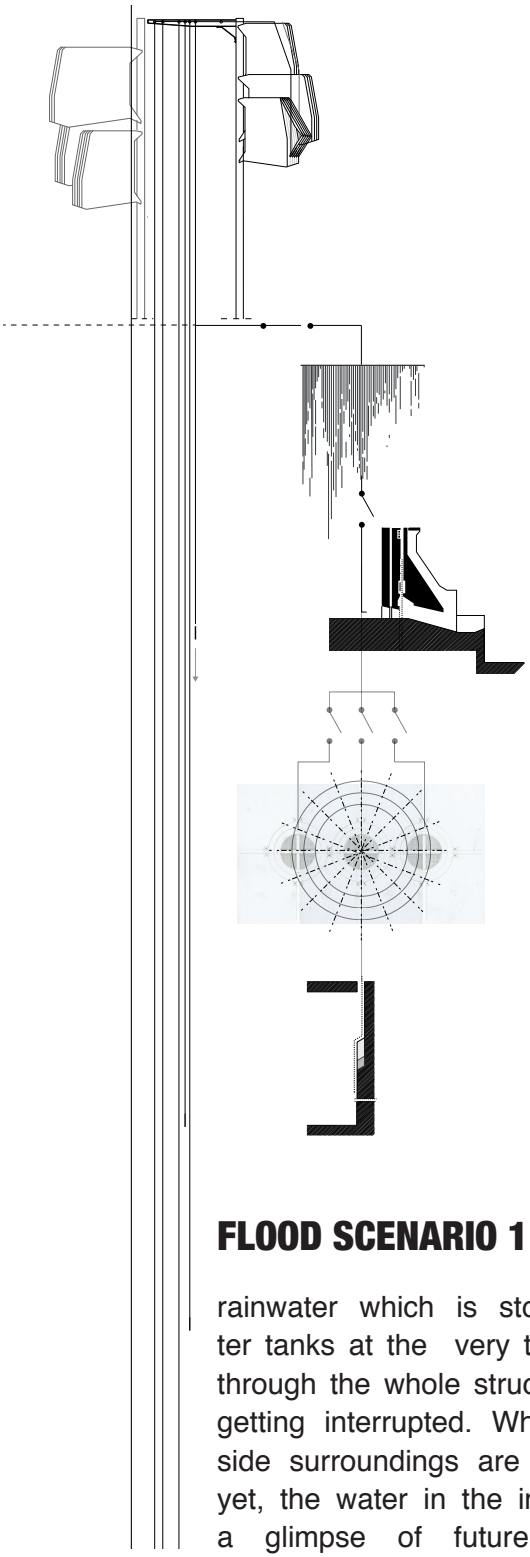


MEMBRAN

NRRATIVE SECTIONS

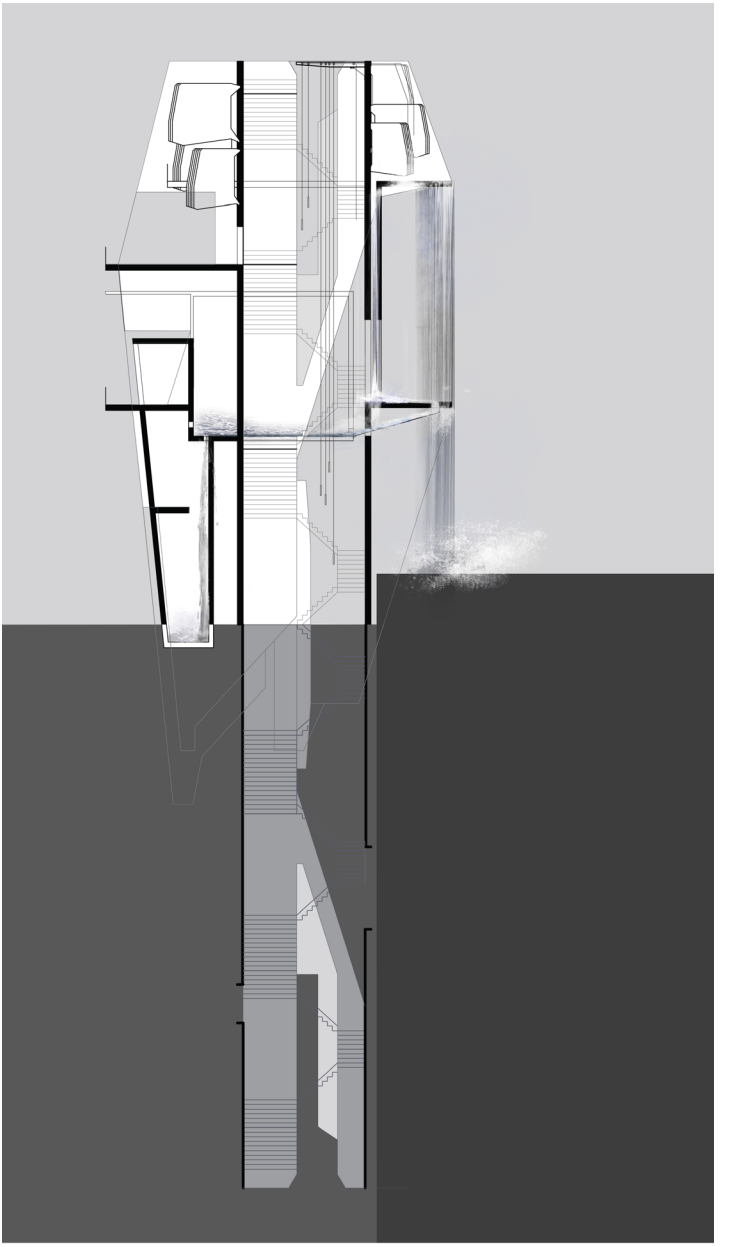
FUNCTION

Water tanks, which are located at the top of the structure, can manually be opened from the staircase. The water starts floating from the top to the bottom, along the outer shell and through the three main spaces of the structure where it creates different atmospheres. It shows the power and strength of water, creating a feeling of standing behind a waterfall, perceiving the world behind it in a different way, listening to the sound that is reinforced by the empty, vertical space. Further down, in another space, it just covers the floor without moving much, calms one down. When the water level rises the rainwater flow gets interrupted at certain points. As a consequence the technical details and thus the rooms start transforming. Some of them drain, offering a safe place within the flooded Gothenburg.



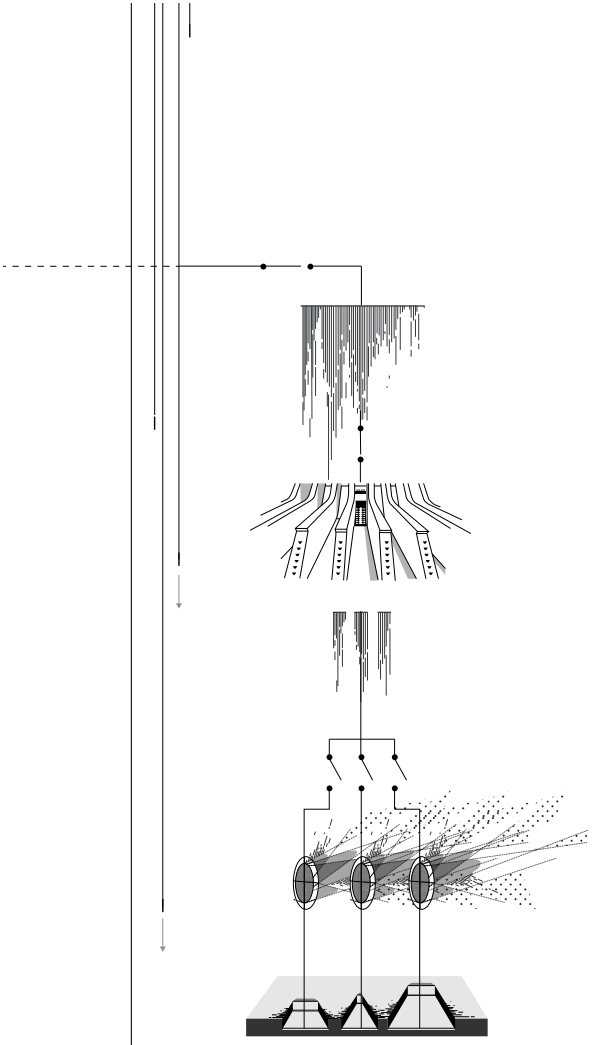
FLOOD SCENARIO 1

rainwater which is stored in water tanks at the very top can float through the whole structure without getting interrupted. While the outside surroundings are not flooded yet, the water in the inside gives a glimpse of future scenarios.



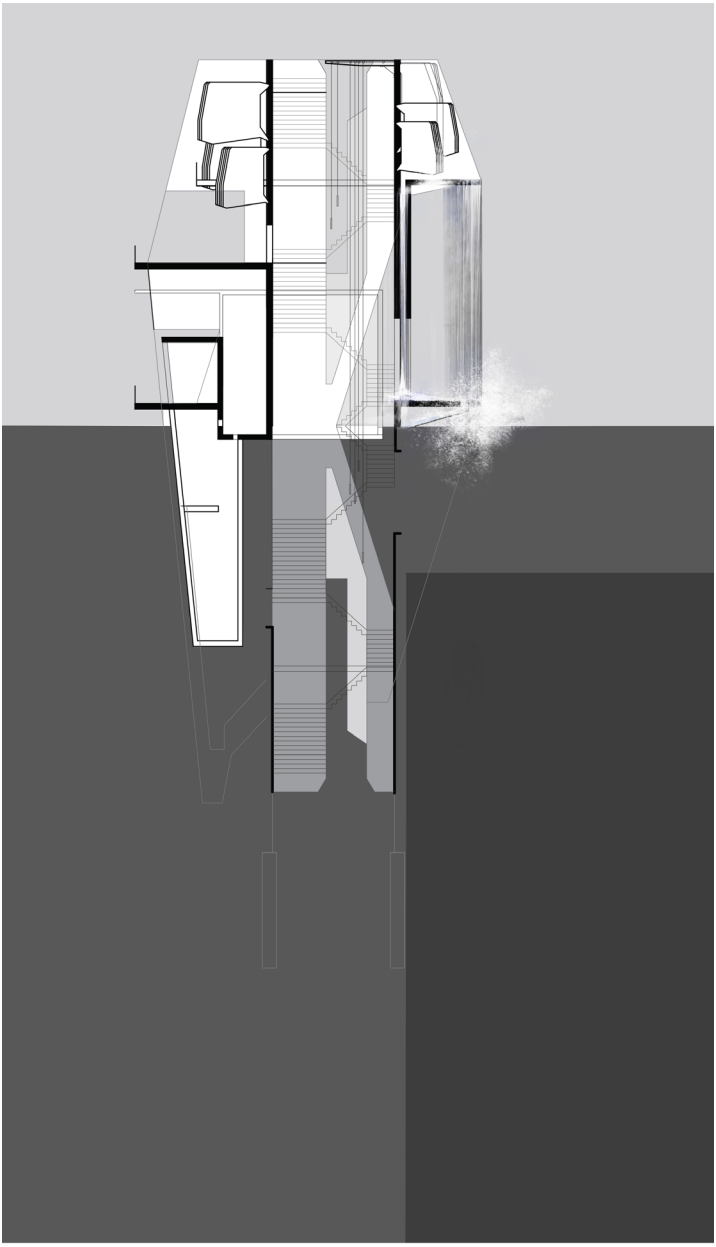
FLOOD SCENARIO 1

lowest water level
mirroring ▸ biggest room perception



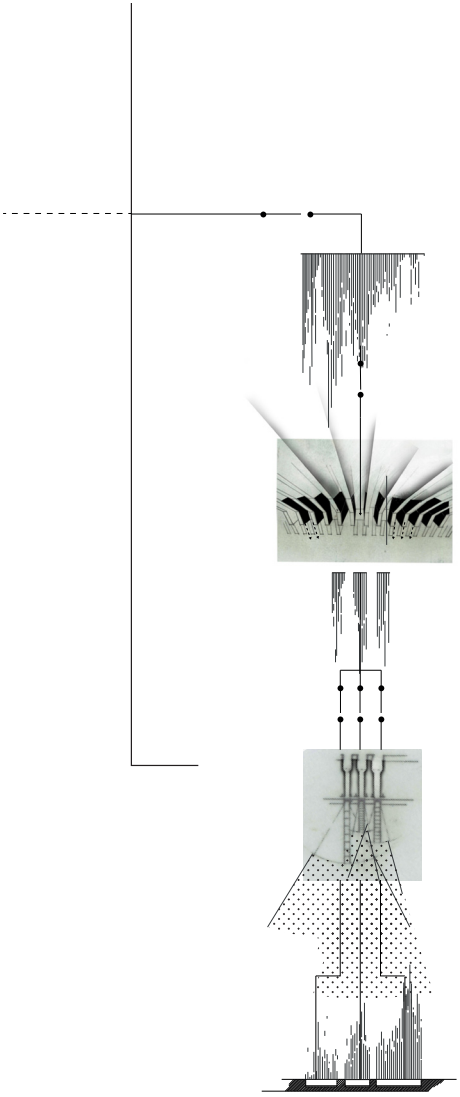
FLOOD SCENARIO 2

The rising sea level stops the rainwater-flow by interrupting the second last mechanism. While the surrounding slowly gets flooded the inner rooms of the structure start to drain.



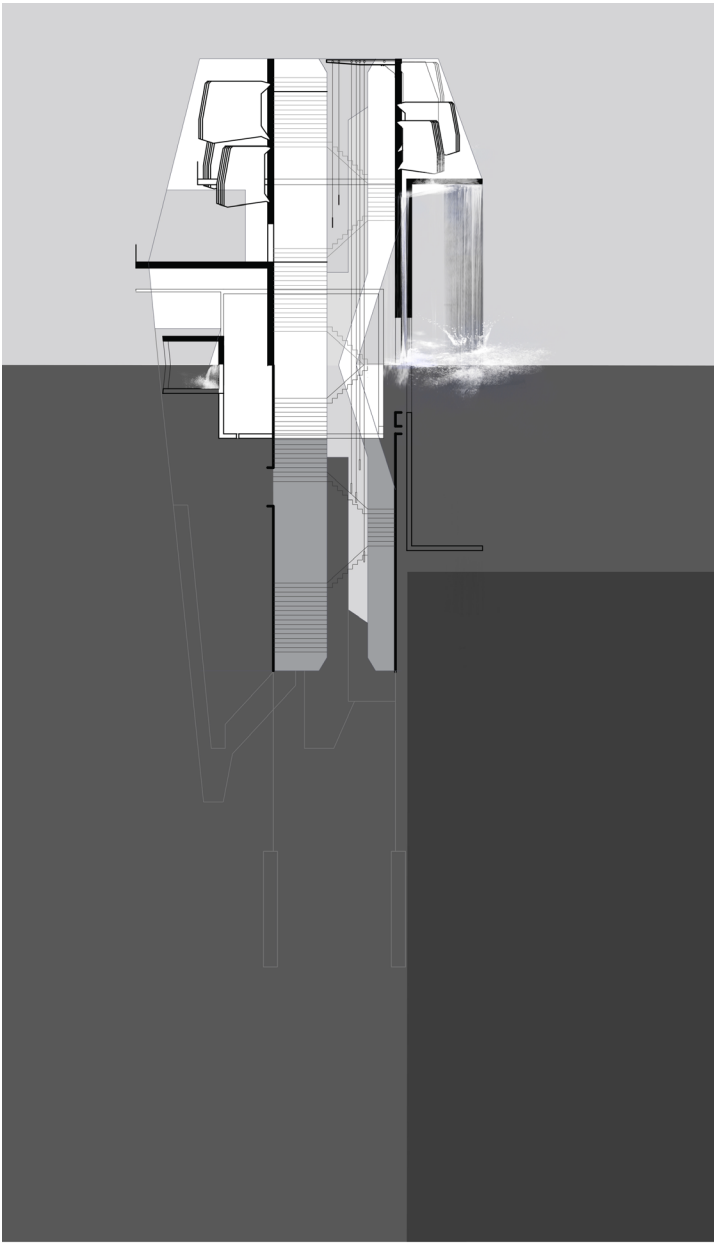
FLOOD SCENARIO 2

middle high water level
mirroring ▸ realistic perception of actual room size



FLOOD SCENARIO 3

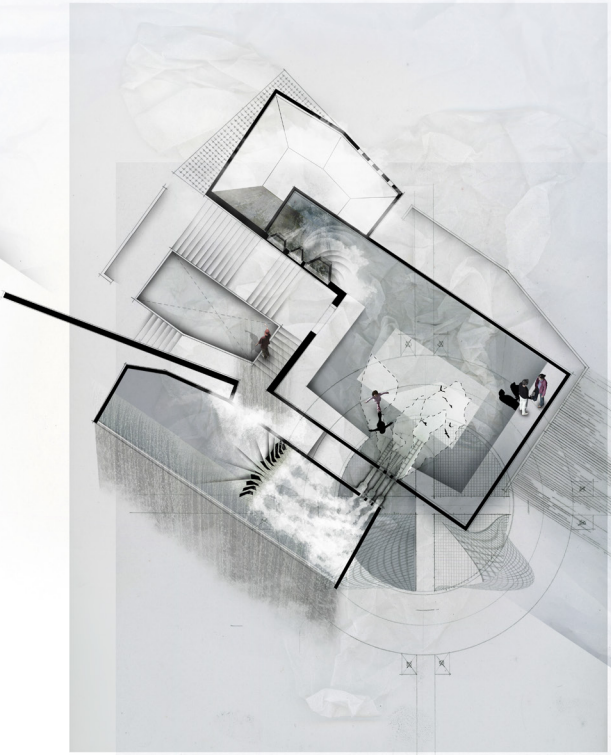
The rising sea level stops the rainwaterflow at the first mechanism and consequently all following. While the surrounding slowly gets flooded the inner rooms of the structure start to drain - offering a safe place within the flooded Gothenburg.



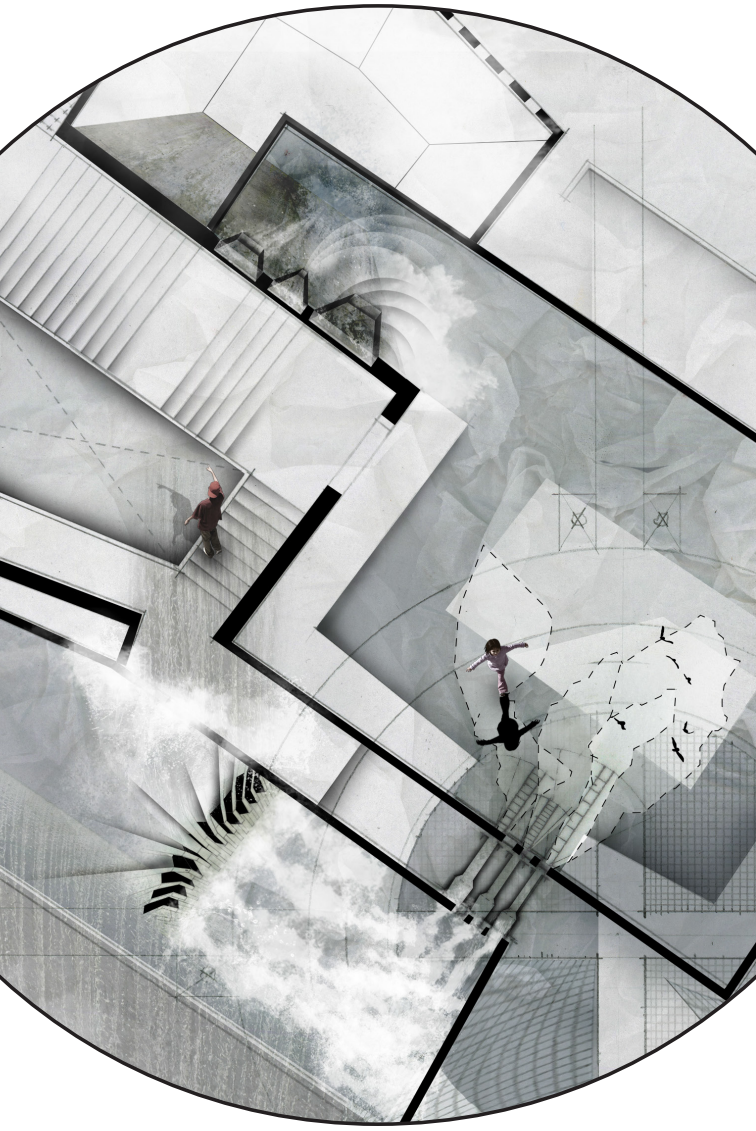
FLOOD SCENARIO 3

highest expected water level

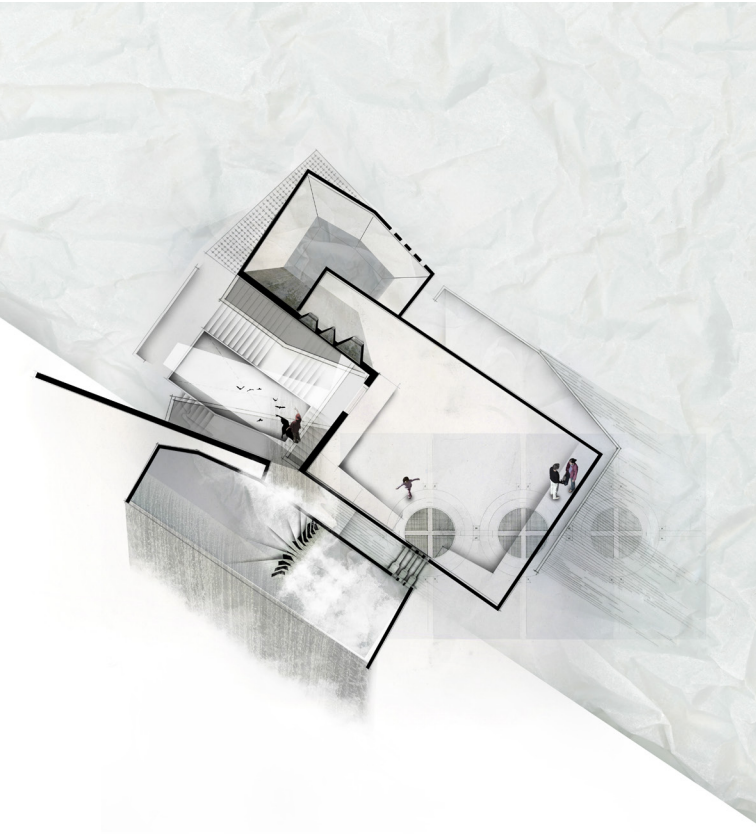
PLANS



FLOOD SCENARIO 1

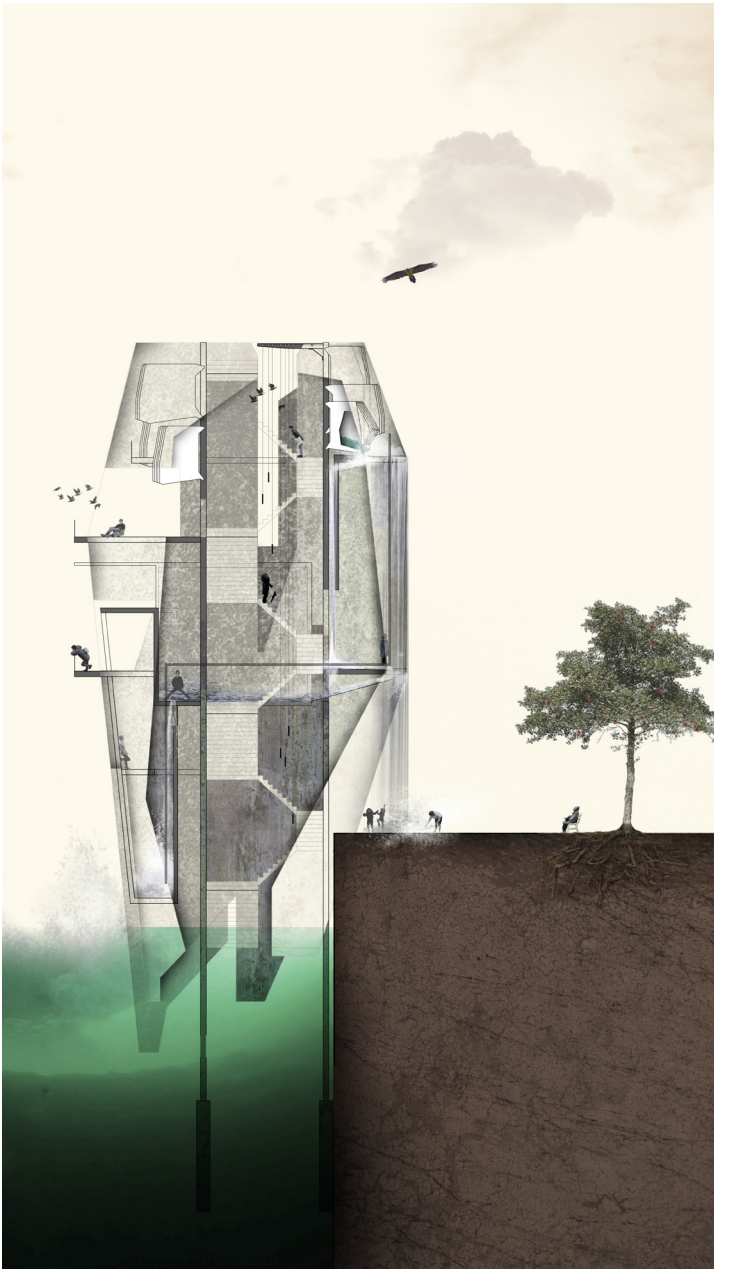


ZOOM IN

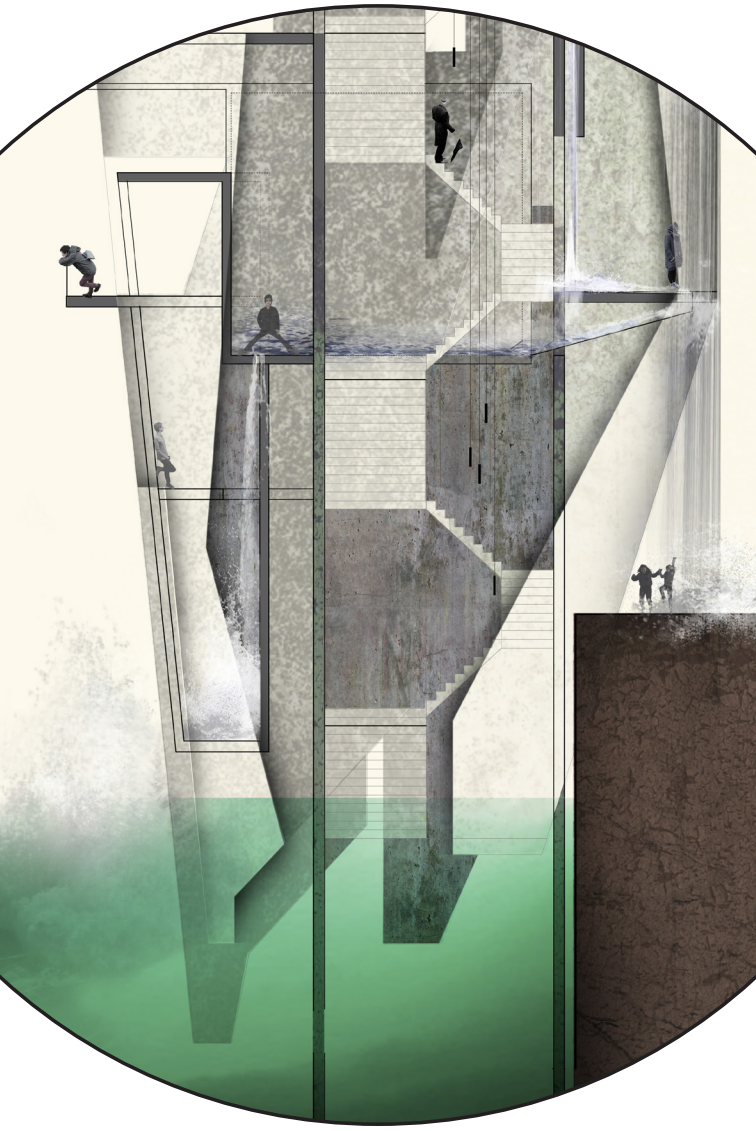


FLOOD SCENARIO 2

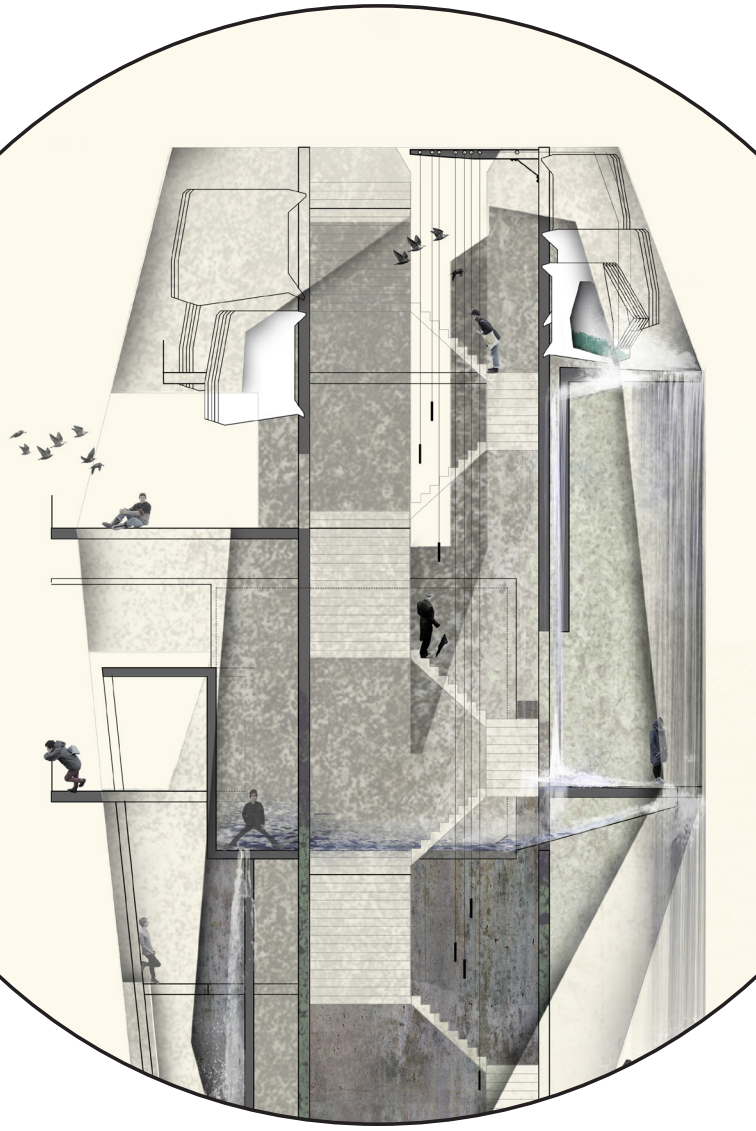
FLOOD SCENARIO 3



SECTION



ZOOM IN 1



ZOOM IN 2

WRITTEN SOURCES

1 Union of Concerned Scientists 2013
http://www.ucsusa.org/global_warming/science_and_impacts/impacts/causes-of-sea-level-rise.html#.VM5P18YS5d0

2 THE HEAT IS ON If ‚s Annual Report, 2014 by Thomas Heldmark
http://www.if-insurance.com

3 Master program project
Laura Freiling, Anna Heikkila, Anni Stockeld, Annina Lehikoinen, Jessica Kos´, Petrus Torstenson, Veronika Mikolasevic // U+A/DL Chalmers 2013
Examiner: Ana Betancour

4 The Nilometer on Rawda (Roda) Island in Cairo by Jimmy Dunn writing as Ismail Abaza
http://www.touregypt.net/featurestories/nilometerroda.htm

IMAGE SOURCES

Flood - Movie directed by Tony Mitchell **01**
http://static.ibnlive.in.com/pix/slideshow/03-2011/movies-that-portray/flood_160311.jpg

Metropolis - Movie directed by Fritz Lang **02**
http://i.ytimg.com/vi/QE2y89ShUIE/maxresdefault.jpg

Greenland Ice Sheet, Greenland, 10 July, 2008 © James Balog **03**
http://cdn.theatlantic.com/static/mt/assets/science/GL-7-08-001796-615.jpg

Master program project **06**
Laura Freiling, Anna Heikkila, Anni Stockeld, Annina Lehikoinen, Jessica Kos´, Petrus Torstenson, Veronika Mikolasevic // U+A/DL Chalmers 2013
Examiner: Ana Betancour

Photograph 2. Interior of the Nilometer (Photographed by Bill Hocker) **07**
http://www.google.de/imgres?imgurl=http%3A%2F%2Fwww.waterhistory.org%2Fhistories%2Fcairo%2Fcairo2.jpg&imgrefurl=http%3A%2F%2Fwww.waterhistory.org%2Fhistories%2Fcairo%2F&h=768&w=512&tbnid=5mivDa528zYVJM%3A&zoom=1&docid=0r9Q4jam1QFg-M&ei=D6bQVJvwDMT3UKfMgugM&tbm=isch&client=safari&iact=rc&uact=3&dur=244&page=1&start=0&ndsp=19&ved=0CCsQrQMwAw

A cross section of the Nilometer from Norden‘s Views **08**
http://www.touregypt.net/images/touregypt/nilometer13.jpg

FACT SOURCES

04 facts from
Union of Concerned Scientists 2013
http://blog.ucsusa.org/wp-content/uploads/2014/03/640px-WhereIsTheHeatOfGlobalWarm

05 facts from
http://www.ucsusa.org/sites/default/files/legacy/assets/images/gw/infographic-sea-level-rise-and-global-warming/Sea-Level-Rise-and-Global-Warming-Infographic-Fact4_Full-Size.jpg

09 facts from
The so-called real world interpretation of the Nilometer readings (Hansen, 2008).
http://www.waterhistory.org/histories/cairo/cairo7.png