



# DELTA INTERVENTIONS

## P5 REPORT IN ARCHITECTURE

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### CONTENT:

#### I CURRENT CONTEXT

SCOPE OF THE DELTA  
THE MARKERMEER  
THE BIGGER PICTURE  
WATER LEVELS  
SCENARIOS  
THE HOUTRIBDIJK

#### II MARKERWADDEN

INTRO  
PLANS  
PROSPECTIVE SURROUNDINGS  
INVOLVED INSTITUTIONS

#### III NECESSARY INTERVENTION

ISSUES TO ADDRESS

#### IV PLANNED DESIGN

OVERALL RESEARCH FOCUS

#### V LOCATION

SCETCH BIRD FLIGHT  
LOCATION IN PLAN DELTA, HOUTRIBDIJK  
HOUTRIBDIJK, A CLOSER LOOK  
1500

#### VI THE ARCHITECTURE

INITIAL VISION  
PROCESS  
PROGRAM  
CONCEPT  
ORDINATION  
MONITORING  
AUTARO  
STRUCTURES  
STRUCTURE PRINCIPLE  
FUNCTIONS AND ROUTING  
PLANS 1:100  
SECTIONS TO 1:50  
ELEVATIONS 1:100  
SUSTAINABLE MATERIALISATION  
WATER LEVELS

#### VII BUILDING TECHNOLOGY

STRUCTURAL DESIGN  
CLIMATE DESIGN  
BUILDING TECHNOLOGY PRINCIPLES  
SECTIONS 1:50  
1:20  
15 DETAILS

# INTRODUCTION

## P4 report

### Introduction.

This report aims to portray an insight in the design process that took place for my graduation project WaddenRitme, situated in the future MarkenWadden. Through research by design, an architectural intervention is composed and proposed, that aimed to answer the following research question:

' In what manner can an architectural intervention alongside the MarkerWadden enhance the spatial quality, attractiveness and the current ecological situation of the Markermeer? '

In the concerning context of:

'The current ecological situation in the Markermeer is not optimal. The lake comprises of non-transparent water on a sludge base with a shortage of phosphates, it is enclosed as a bathtub, and has steep edges due to bordering dikes. These causes result in bad ecological conditions for algae, fish, birds and vegetation.

The planned island group MarkerWadden is a project alongside the Houtribdijk, that aims for nature recovery in the Markermeer.'

Some critical moments in the process of designing are highlighted: events or gained insights that made me as a designer, change the direction of the proposition and the overall project design.

I aimed to create a project that would be able to unlock people's curiosity, to invite people, and eventually to evoke awareness of the enervating development of the MarkerWadden. By proposing a research and visitors center program, an open ecological monitoring zone, and an architectural composition with routing principle that enriches the Wadden landscape, I strived to reach my initial aim.

This P4 report contains mainly sketches, drawings, visuals of build 3D models and references. Through these architectural tools, a story comes into shape that started at the initial research proposal of P1, up until this P4 moment. Furthermore, the report includes the 'Reflection' section according to Appendix 3 of the Graduation Manual. Lastly, a paper that I wrote about the fields of architecture, landscape and ecology in a deltaic context, is added.

WaddenRitme – the MarkerWadden center, is set to enhance the future MarkerWadden, both on an ecological as a spatial level.

# REFLECTION REPORT



**Reflection report** – Delta Interventions graduation lab

Project 'Wadden Ritme'



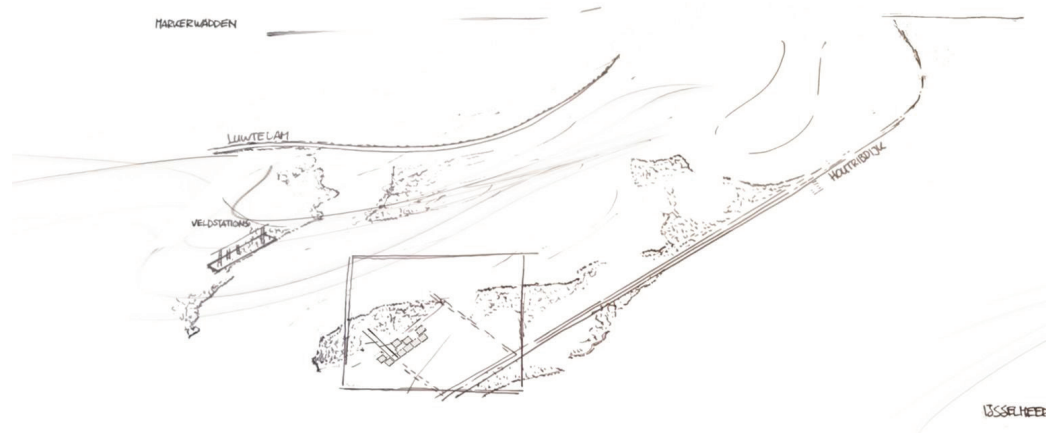
## Reflection report for P4.

*According to Appendix 3 of the Graduation Manual*

### 1. The relationship between research and design.

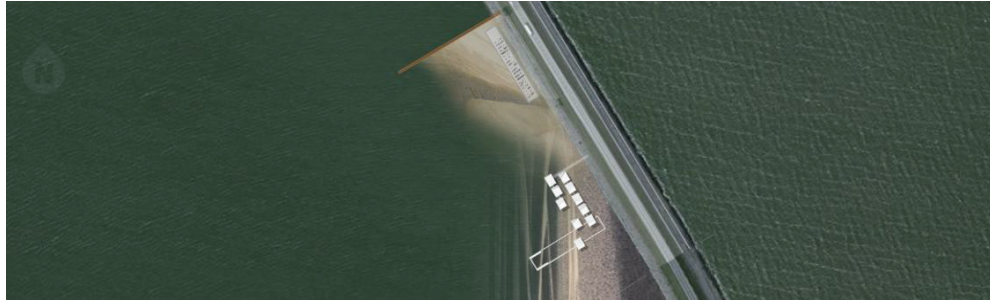
For my graduation project as a part of the Delta Interventions studio, research on various interdisciplinary fields and on different levels needed to be performed in order to get a thorough understanding of the context my project is placed in. This research turned out to be an essential asset in the process and final product. The approach of looking into different aspects that deltas world wide have to offer, started meaningfully with the structure and planning of the graduation lab, where in the first period, time was given to conduct analysis on a chosen delta. My chosen focus area was the IJsselmeer area, as a part of the European Rhine-Meuse Delta, which has its estuary in The Netherlands. What used to be inner sea, the Zuiderzee, is since the creation of the Afsluitdijk in 1932 a large fresh water lake; the IJsselmeer. Through time, the Markermeer came into existence, a lake closed off from the IJsselmeer by the Houtribdijk in 1976 and mainly bordering the provinces North Holland and Flevoland. What used to be the start of another creation of land - the Markerwaard - eventually stayed a closed of lake, with all its environmental and ecological consequences.

The description above is but a small introduction into the complex context the Dutch Delta has to offer. Water levels, climate change, storm surge, flooding, drought, ecological diversity and systems, economic benefits are only a few topics that touch upon the overall footprint of the IJsselmeer area, and in specific the Markermeer. The first quarter of the graduation lab was therefore also intended to analyze and to be aware of the water context our projects were placed in. This meant the research started on a very large scope - that of the European Rhine-Meuse Delta - and was performed on several periods in time. Basic themes such as the evolvement of infrastructure, green patterns and urban development were set out against historic milestones that eventually shaped the IJsselmeer area.



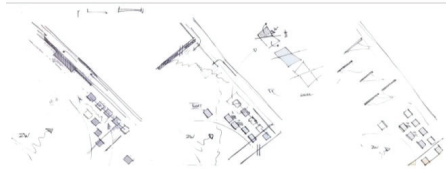
For the closing part of the first quarter the researched knowledge of the IJsselmeer was used to define a meaningful case study; the first proposal of a project to develop during the graduation. It was in this stage, the first setup for a design was indicated. The following quarter could be used to sharpen the research performed earlier, but also to take the research to the more specific context of the chosen site - the Markermeer- and the chosen case study project - a research and visitor centre. For a more in depth research that focused on a smaller scale, several reports of reknown organizations were studied, as well as previous or future interventions on the site. From this second quarter on, research became directly involved with the creation of an architectural intervention. It was a critical review of the earlier performed site analysis, that finally led to a definite change of site location, from the nature area Oostvaardersplassen to the Houtribdijk. This change automatically meant a shift in the overall outlook of the proposed project, which directly translated into a different design approach. Namely the case study had at this stage a new, direct connection with one of the set future development plans for the Markermeer on a large scale - the MarkerWadden. This apparent change of site, gave me the opportunity to spatially analyze the planned MarkenWadden proposal, in order to shape my own design project.

# REFLECTION REPORT

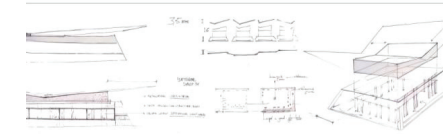
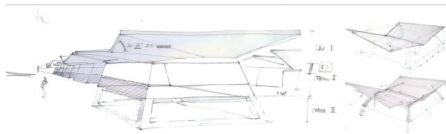


Researching the site specific context, gave me insights in distinct features of the landscape of the Houtribdijk and Markermeer: openness, horizontality, serene layered landscapes, influence of the dynamic water body, the linearity of the dijk and the ever changing movements of white seabirds and sails. All features that led to determination of the design approach and its overall theme of 'rhythm'. This approach was then conducted in the architectural intervention in such a way that the proposed program would gain most benefit from it.

Regarding the composing of the design, the method of 'research through design' was adopted. This meant that for the chosen site, several design compositions within the theme rhythm were explored. Once a set configuration was chosen - based on the on program elements as the outside monitoring zone, the Promenade Architecturale, overall enclosure of the outside space and embedding in the waterscape - another step in the research could be taken, namely which architectural movement and architects explored and practiced themes similar to my approach. Structuralism, constructivism and architectural projects of architects such as Van Eyck, Sanaa, Kahn were analyzed, conclusions were drawn and projected on my own design, dealing with construction, structure and interior routing.



Also in the phase of composing the structural principle, construction and detailing of my project, relevant existing plans were consulted and analyzed in order to elaborate and refine my design approach. This research of related projects combined with the expertise of my mentors, provided me with the knowledge to design and construct my own, distinct project.



Furthermore, the interrelated approach in research and design I adopted during my graduation project, helped me building a relevant design on multiple scales. This was explicitly the case in the elaboration phase of the design: new insights revealed that final design interventions needed to take place in order to meet with the desired result of spatial quality. These experiences formed for me a direct awareness of the value of an iterative design – and research process.

## **2. The relation between theme of the graduation lab and the chosen subject/case study, related to object and location.**

The Delta Interventions graduation lab deals with delta areas worldwide, with an interdisciplinary approach, it aims to research and subsequently intervene spatially in these waterscapes. Delta areas form often a paradox; being a centre for urban and economic prosper, while dealing with water related issues and direct influence of climate change. This academic year, the studio touched upon the Galveston Bay near Houston in Texas, USA, and the IJsselmeer area, in The Netherlands.

The Markermeer can be seen as part of the Dutch delta, and the lake definitely belongs to the IJsselmeer area. My project is located alongside the dike, or actually dam, called the Houtribdijk which can be seen as the infrastructural intervention that separates the Markermeer and the IJsselmeer from each other. Even when the Markermeer is fully closed off, the lake is still under heavy influence by water dynamics, such as water level fluctuations and storm surge, and water- ecological richness. My architectural intervention – the 'object' in this manner, its program and function in the landscape, is directly related to these water related properties of the Markermeer. As an ecological restoration hub, research and visitors centre, the design project aims to provide a relevant addition to the waterscape of the Markermeer and to the future MarkerWadden development.

## **3. The relation between methodical line of approach of the graduation lab and the method chosen for the case study.**

In order to get a full grip on the complex notion of designing in a waterscape, the first period of the graduation lab provided the necessary time to perform research and various spatial analyses. Through this method, a meaningful understanding of the chosen delta could be developed, making the process of initiating a design proposal thriving. Thus, the process of composing an individual project based on analyses performed in an earlier stage was very beneficial. Further on in the process of shaping, creating and designing my project, the methodology of analyzing, concluding and incorporating the meaningful elements into the design project turned out to be a rich method of studying. I chose to adopt an iterative design approach, that was supported through research of references and reports dealing with the context of my chosen site. This methodology worked for me, while it provided me through different periods of my design process with useful background information and knowledge which I could adopt in order to improve my project.

## **4. The relation between the project and wider social context.**

The social context of my graduation project lies mainly in its program functionality, while the intervention is in fact an ecological research centre, a visitors centre aiming to evoke awareness and knowledge about the direct context the project is placed in – the MarkerWadden. The research program can provide social value through gaining and sharing scientific knowledge about the comprehensive characteristics that the MarkenWadden will offer in the near future. At the same time, the visitors program can offer educational value to the ones interested in the large waterscape development the MarkenWadden will initiate. Therefore, the project aims to propose an educational procedure strongly based on experience. People that eventually use the design project, will immediately be confronted with the strong bounds that the architecture has with its water related location through the Promenade Architecturale, the offered views, routing and framed landscapes.



# REFLECTION REPORT

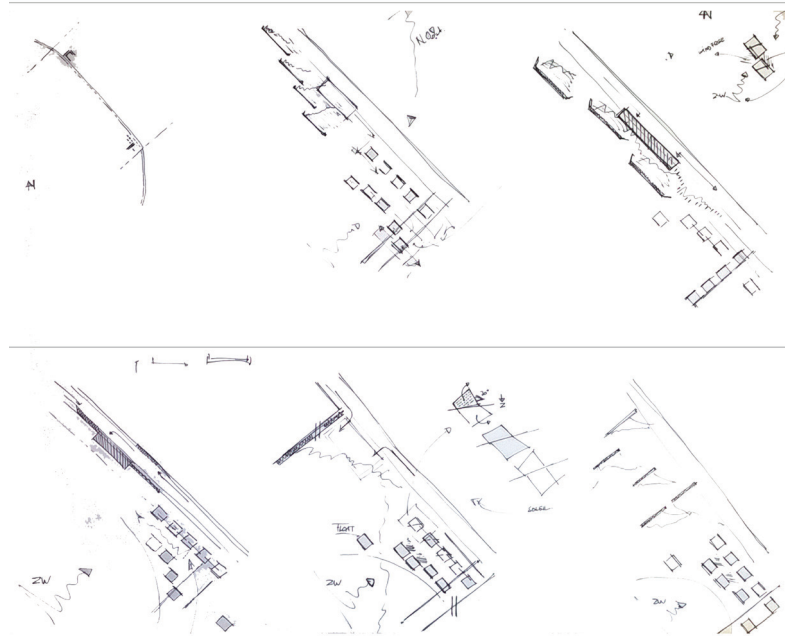
The mentors that guided me through the design process of my graduation project, the structure of the studio, its interdisciplinary research character and theme, the experts from the field, my fellow students – all those aspects provided me a challenging and rich context that helped me shape my graduation project. I can state that the methodology and topics of the Delta Interventions studio, inspired me to design an architectural intervention in such a way that it can carry out a relevant awareness, related to real life developments in the Dutch delta.

# PROCESS MOMENTS

The composing of the design process was initially set out to be a 'linear' one, regarding matters of scale. Though, through the development of the design it proved to be necessary to iteratively operate and intervene in various scale levels simultaneously.

For instance, regarding the main routing principle, it was needed to reconsider the overall principle on a 1:500 site scale, in the same phase the routing for the buildings was designed. Practical aspects of car approach on the overall terrain, the relationship with the dike and road, and positioning of the access zones of the building should be seen as an interrelated design assignment.

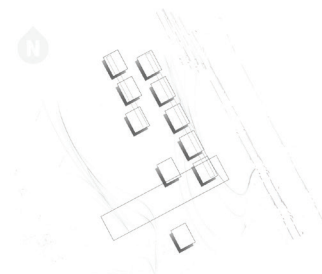
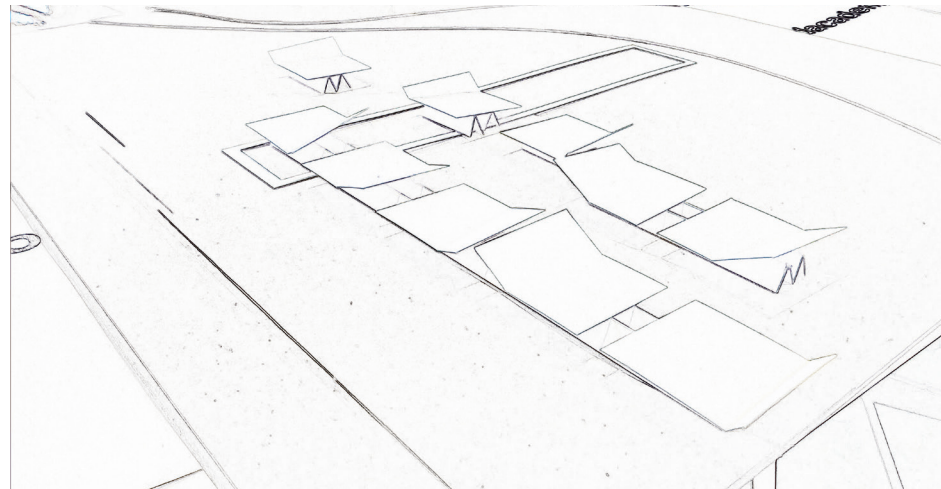
moment 1. The iterative process described above, resulted in an additional intervention alongside the architectural one, namely a 'damwand' placement in order to create an additional sandy shore alongside the Houtribdijk. As can be seen in the following site plans.



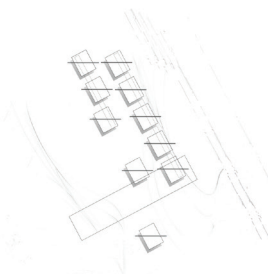
# PROCESS MOMENTS

## moment 2.

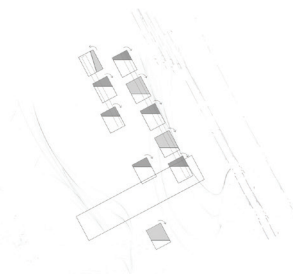
Roof approach. One of the themes chosen to elaborate on the design project, was the notion of 'rhythm'. Through several 'layers' of the project, this notion is touched upon, namely overall composition, structure and construction, and internal and external experience. Accompanied with the latter aspect, the design, placement and orientation of the roofs is an important element, cause these elements strive to challenge and enhance the 'grounded' and set rhythm of the overall building composition. Therefore, the initial sketches layed out a rather random roof pattern. This approach lost its value while another important aspect of the project was further elaborated: the autarc functioning of the building. In order to level the autarc requirements - power generation and water storage - the roofs could be designed is such a way that there structure would be beneficial for the autarc approach. Thus, the roofs could be aligned to and angled towards the South. Furthermore, the water drainage of the roof should concentrate on one main point.



**I.** PROVIDING SHADE ON SOUTH WEST ORIENTATION



**II.** ORIENTATION ON THE EXACT SOUTH FOR OPTIMAL SOLAR ENERGY

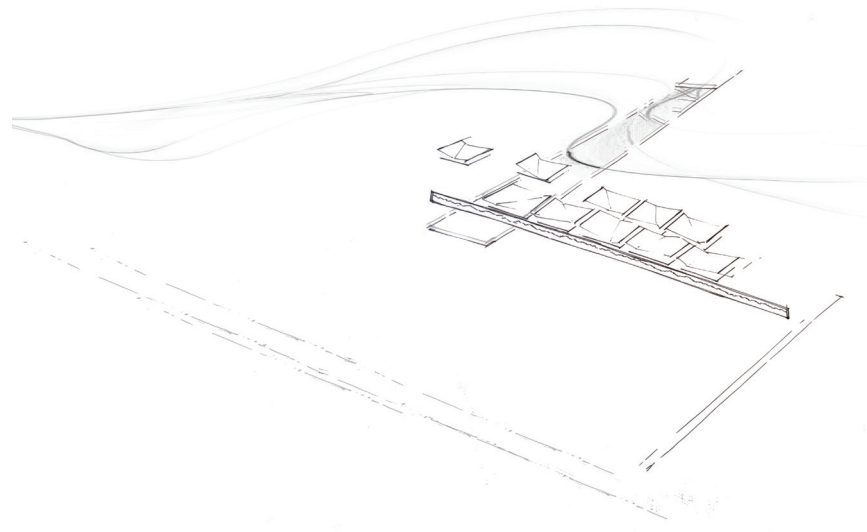
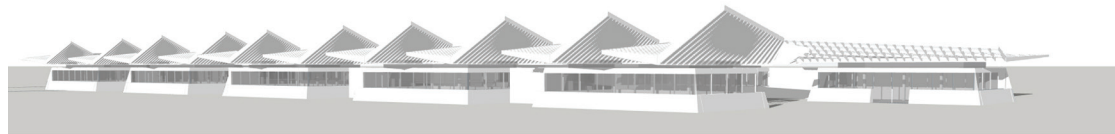
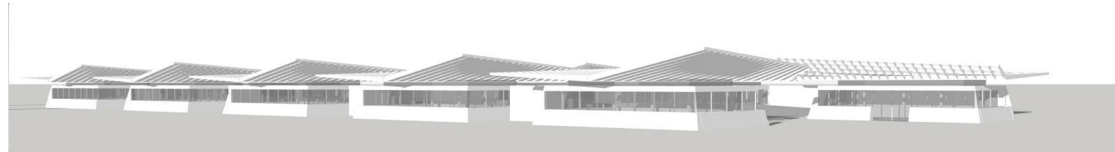


**III.** ANGLE / SLOPES BETWEEN 10 AND 30 DEGREES TOWARDS THE SOUTH

# PROCESS MOMENTS

## moment 3.

Roof elaboration. Once the roof structure of the design got its value, it was needed to research shape and dimension in order to obtain the right balance with respect to the entire building. In search for the best fitting alternative, several options were considered, varying from size, proportion and amount. Also here, the theme of rhythm found its importance; which roof compositions would fit, and which would distort the overall design. Sketching on paper accompanied with building a 3D study model, resulted in the chosen design.



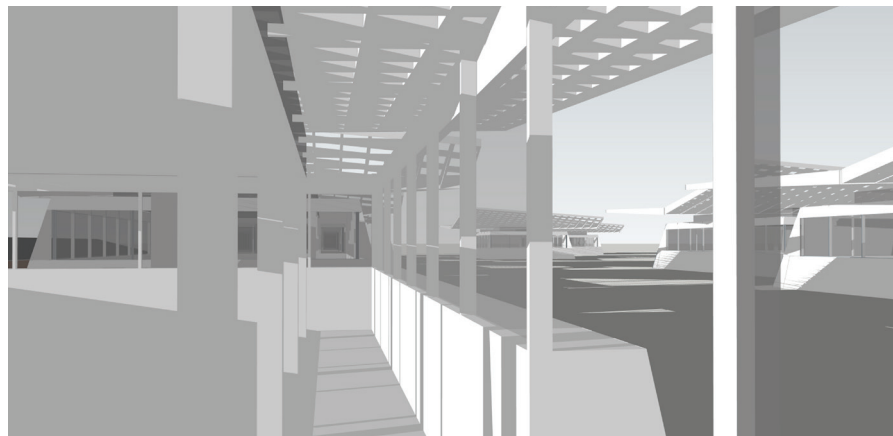
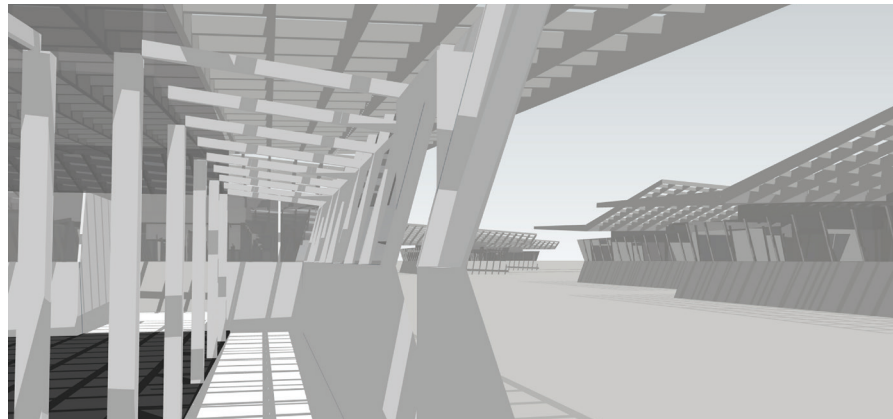
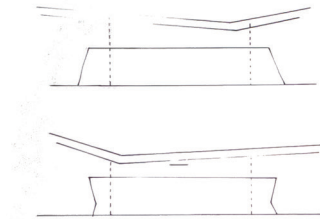


# PROCESS MOMENTS

## moment 4.

Shape/silhouette of the building. The initial attitude of the a building unit, was set to portray its strength and resistance against the possible threat of the water. However, through the design process this apparent silhouette was altered in order to (i) offer the best possible view, while (ii) maintaining the resistance look. In the elaboration phase, this new silhouette would perhaps have functional benefits, more important was that its necessary construction principle would distort the interior atmosphere; to many oblique elements formed a somehow chaotic overall look. Therefore, it was decide to adopt and elaborate the initial building silhouette, however adjusted to proper proportions in order to elaborate the structure and construction in a sound manner.

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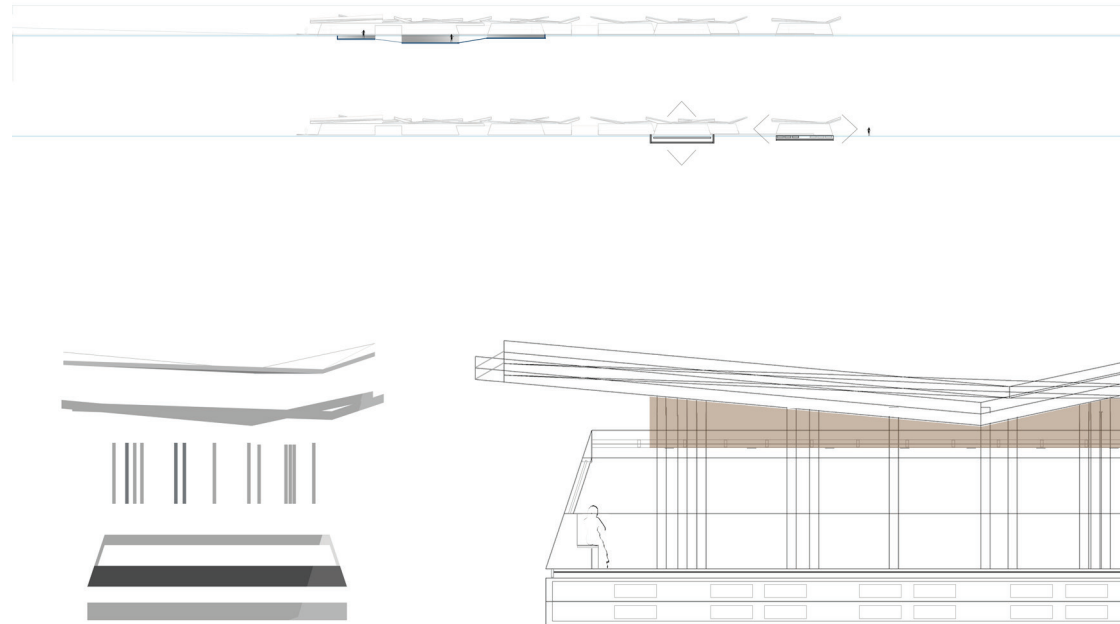




# PROCESS MOMENTS

## moment 5.

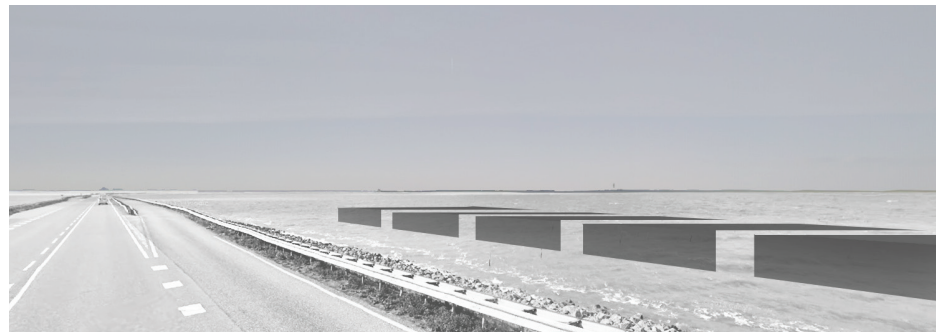
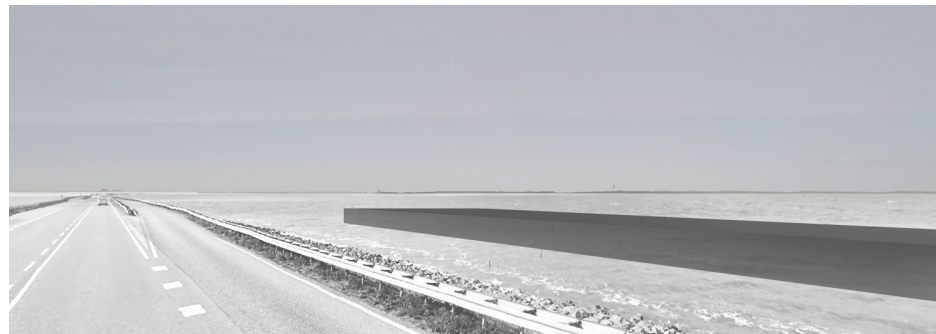
Floating building. In a water rich area such as the future MarkerWadden, a floating structure could be a thorough option for the foundation and base of a building. This option was researched and touched upon, though finally a traditional foundation principle was adopted for multiple reasons. One reason is the proposed fact that the building parts of the MarkerWadden centre are actually built once a (part of) a Wadden island is realized, meaning no wet feet there. Through current and wind it might occur that water levels rise high, then the concrete ground structure of the building should be able to resist and protect. The solid base principle also ensures the steadiness of the overall building functioning and composition. With respect to the program - research - and its building climate demands - e.g. a heat pump system - a fixed positioning of the building was preferred. Although, the framed on-poles wooden path alongside the monitoring area is meant to catch and touch the flow of the waters.



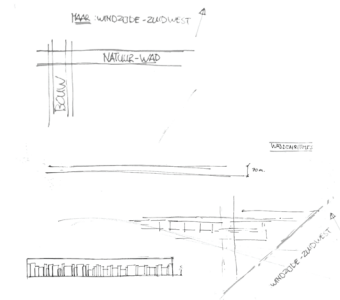
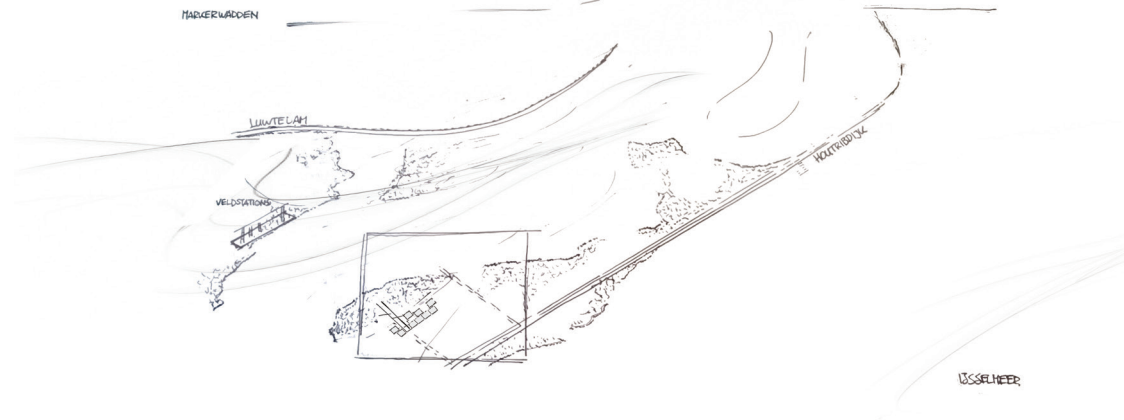
# RHYTHM ALONG THE HOUTRIBDIJK



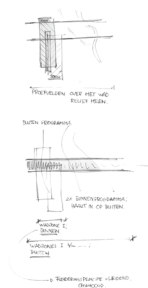
Gebaseerd op: Dr.ir. P.J. Visser, maart 2003, Faculteit Civiele Techniek en Geowetenschappen, TU Delft



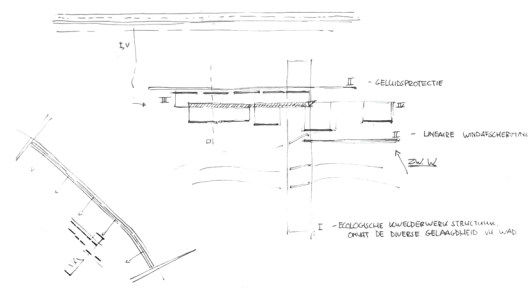
# DESIGN THROUGH SKETCHES



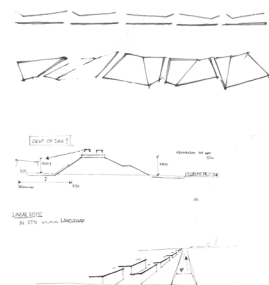
SITE COMPOSITION



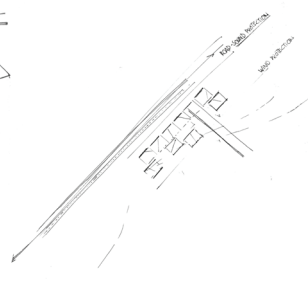
VOLUME STUDY



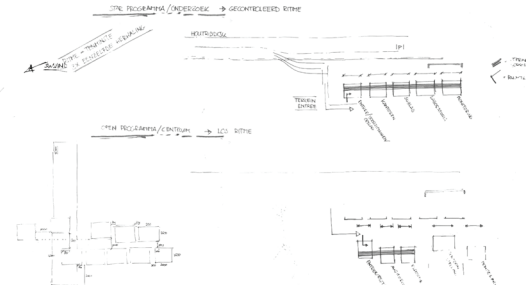
PLAN PROPOSITION



ROOF DESIGN

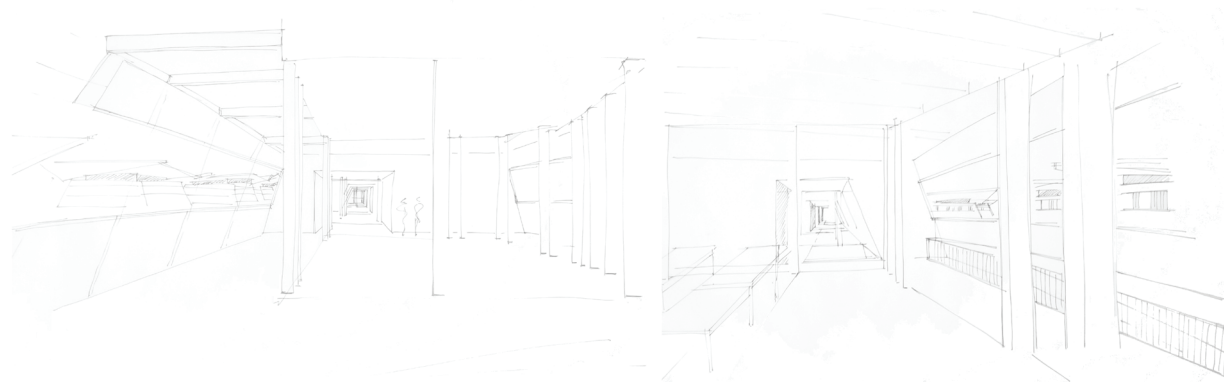
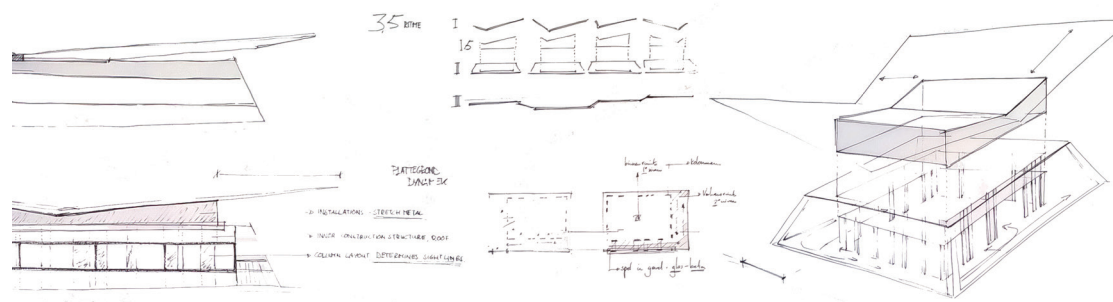
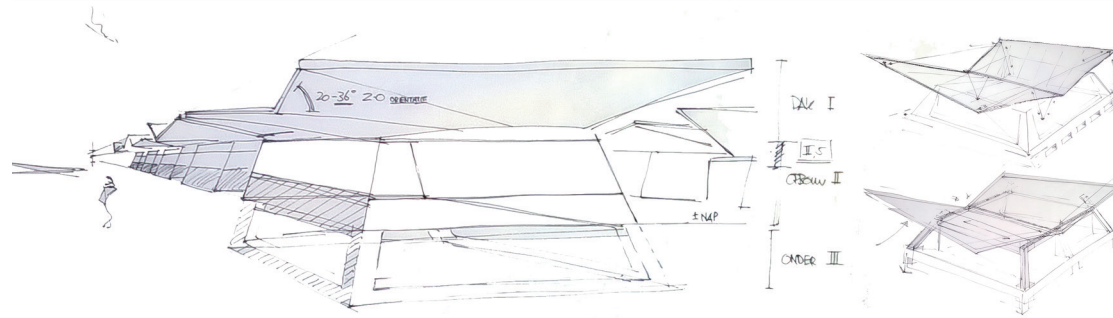


SITE STUDY



ROUTING, PROGRAM

# DESIGN THROUGH SKETCHES



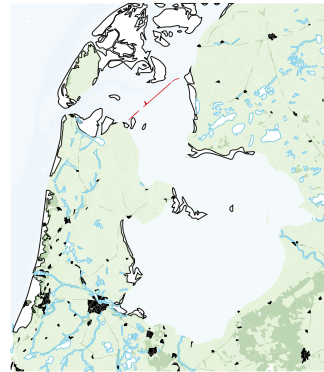
# 3X3 ANALYSES

3x3 analyses performed on the IJsselmeer Area. In the following sections, the aspects 'Nature', and 'Water and Infrastructure' are dealt with through 3 distinct periods time - in the order of magnitude of centuries centuries. Both themes were significantly influenced through time as the open Zuiderzee, became the IJsselmeer, with accompanied the Markermeer. Both lakes were created through dikes. The introduction of these hard spatial lines, are the starting point of the third analyses performed, that of the lines bordering IJsselmeer area. It can be regarded that historic interventions still leave there spatial and ecological footprint nowadays.

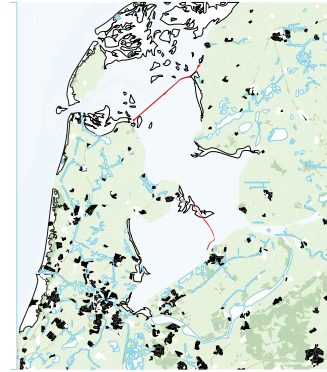
1200



1935



PRESENT



1200



1935



PRESENT



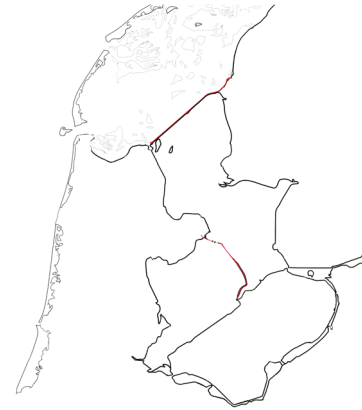
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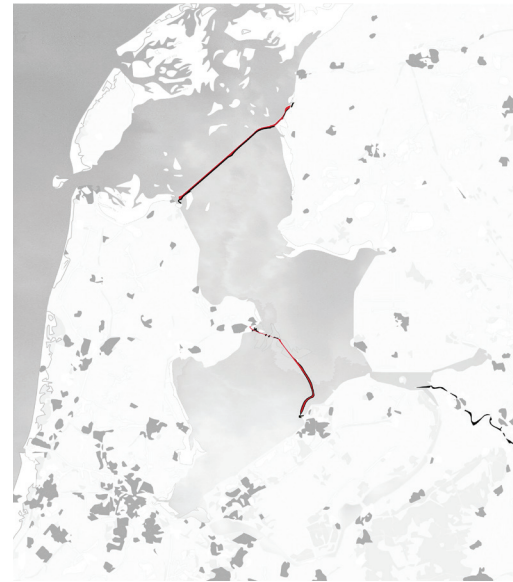


PRESENT





P4 PRODUCTS  
I. CURRENT CONTEXT  
SCOPE OF THE DELTA





700 KM<sup>2</sup>, 70.000 HA

EARLIER PART OF THE ZUIDERZEE

A CLOSED OFF LAKE  
THROUGH THE AFSLUITDIJK IN 1932 AND THE HOUTRIJDYK

SMALL OF DEPTH: 2 TO 6 M<sup>2</sup>

WATER DRAINAGE VIA IJSSELMEER AND  
VELUWERANDMEREN,  
OCCASIONALLY VIA THE NOORDZEEKANAAL

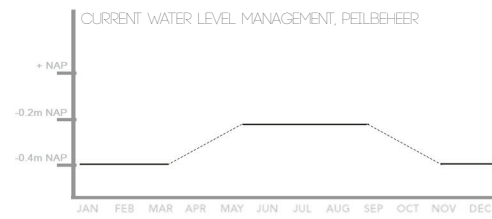
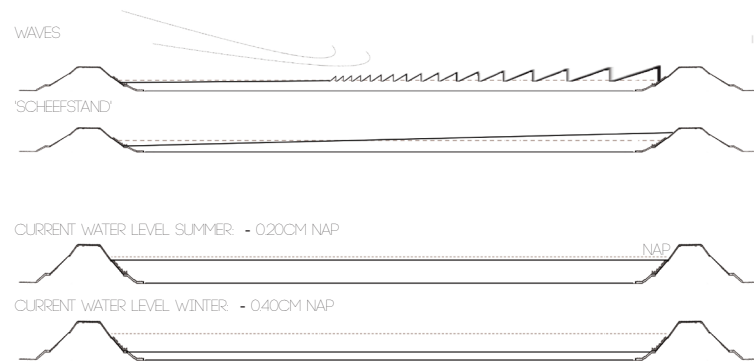
### THE SITUATION OF THE MARKERMEER:

PROLONGED DECLINING NUTRIENT INFLUX;  
SHORTAGE OF PHOSPHATES

EXCESSIVE SLUDGE PROBLEM, CAUSING;  
NONTRANSPARENT WATER

STEEP LAKE BOUNDARIES, DIKES, CAUSING;  
NO FRUITFUL GRADIENT FROM LAND TO WATER

# I CURRENT CONTEXT WATER LEVELS



SPRING



SUMMER



AUTUMN



WINTER



**ORIGINALLY:**

REALISATION IN 1976, 26 KILOMETRE

BETWEEN LELYSTAD AND ENKHUIZEN

A DAM TO CREATE THE MARKERWAARD 'INPOLDERING'

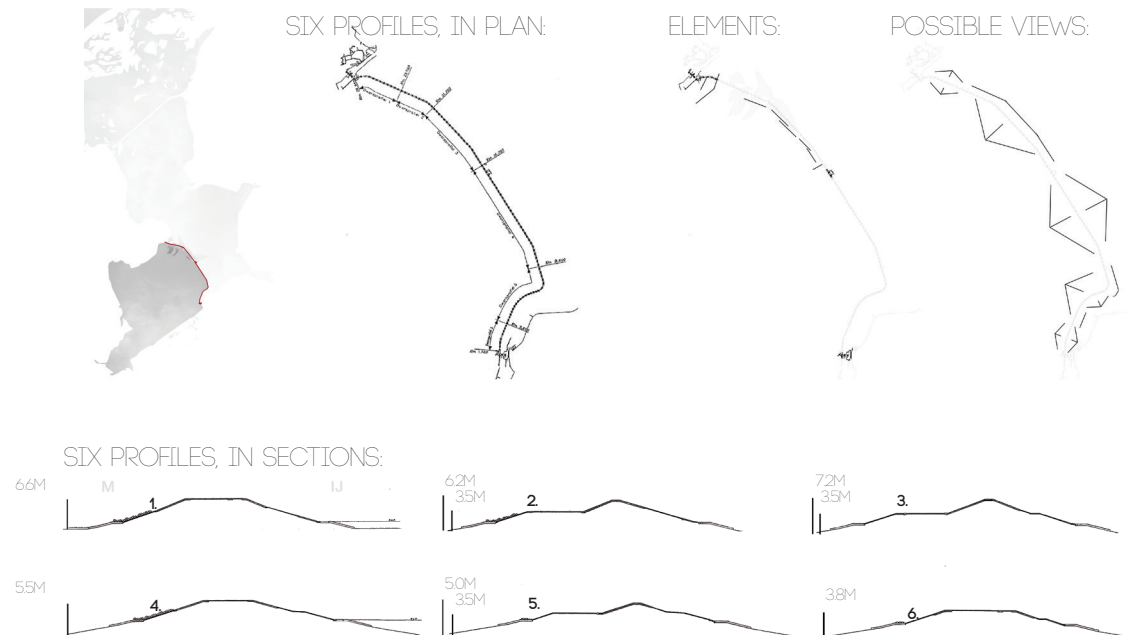
**ITS CURRENT RELEVANCE:**

A ROAD AS IMPORTANT CONNECTOR

NOW LOWER WATER LEVELS IJSSELMEER

HOUTRIBDIJK AS A LARGE BREAKWATER

SECOND DEFENSE LINE, IF AFSLUITDIJK FAILS



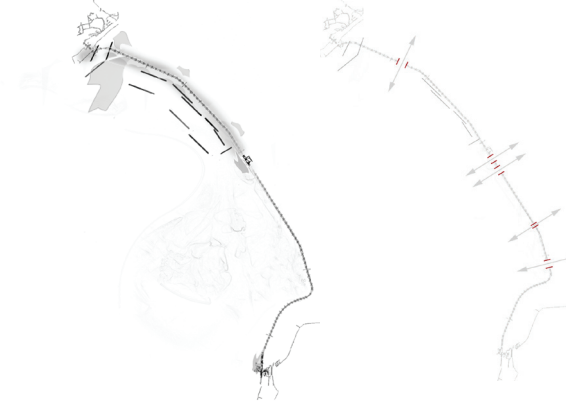
## THE HOUTRIBDIJK, DIKE REINFORCEMENT

CURRENT SITUATION:



- 'LUWTEDAMMEN' IN THE NORTH
- 'VOOROEVERS' ECOSHAPE

THE NEAR FUTURE:



- ADDITIONAL 'LUWTEDAMMEN'
- ADDING SAND IN THE NORTH
- CLADDING WITH STONE AND ASPHALT IN THE SOUTH
- POSSIBLE FUTURE PASSAGES

## II. MARKERWADDEN INTRO

### A LARGE NATURE RECOVERY PROJECT

ISLAND GROUP BUILT ON THE BASE OF SLUDGE

FIRST PHASE: FROM 2016: 500 HA UP, 500 HA UNDER

**EVENTUALLY: 10.000 HA**

### IMPORTANCE SURPASSES NATIONAL INTEREST:

ECOLOGICAL EUROPEAN CONNECTOR; EU ECO MONITORING FUND

## II. MARKERWADDEN INTRO

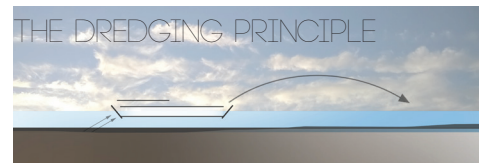
**FD.NL 26-08-14:**

'NATUURMONUMENTEN ZIET IN MARKER WADDEN EXPORTICOON.'

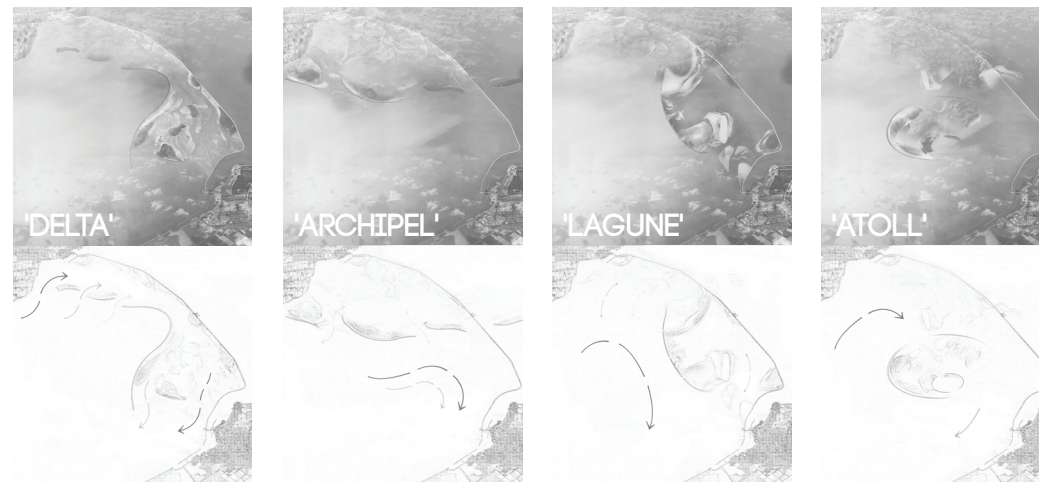
**VNO NCW, FOREMAN, 25 OCT. '14:**

'THIS PROJECT IS GOOD FOR THE ECONOMIC CLIMATE  
IN THE NETHERLANDS'

LOCATED NEAR THE RANDSTAD , ATTRACTIVE INTERNATIONALLY  
SUSTAINABLE ECONOMIC GROWTH AND TOURISM

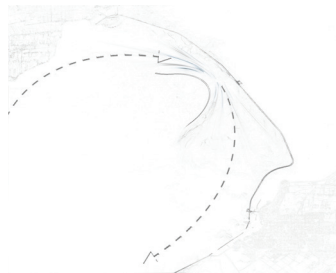


## II. MARKERWADDEN PLANS

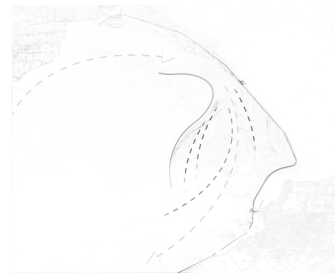




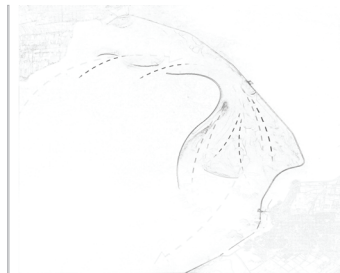
IT MARKERWADDEN  
PLANS, HYDROLOGICAL PRINCIPLE



FIRST DAM TO OPTIMIZE  
THE EXISTING WATERFLOW



DAM EXTENTION TO  
GENERATE A SEDIMENTATION  
PROCESS



THE AIMED SEDIMENTATION  
PROCESS OF THE  
MARKERWADDEN

IT MARKERWADDEN  
PROSPECTIVE SURROUNDINGS



IT MARKERWADDEN  
PROSPECTIVE SURROUNDINGS





## II. MARKERWADDEN





IT MARKERWADDEN  
INVOLVED INSTITUTIONS

NATUURMONUMENTEN  
RIJKSWATERSTAAT

AMONG OTHERS:  
DELTARES, DELFT  
ECOSHAPE, DORDRECHT  
IMARES, WAGENINGEN  
ALTERRA, WAGENINGEN

AND VARIOUS:  
DREDGING AND ENGINEERING COMPANIES

PLUS:  
LANDSCAPE AND ARCHITECTURE FIRMS

**13-07-15 'GUNNINGSBESLISSING'**

DELTARES, TENDER EU PROPOSITION OF MEASUREMENT STATIONS  
AND OBSERVATORIES

IN ORDER TO SHARE DATA , WITHIN THE EU, REGARDING:

- WATER QUALITY
- WATER QUANTITY
- WATER ECOLOGY

**IMPROVE THE ECOLOGICAL VALUE, NATURE.**

**WHILE OFFERING A DESIGNATED PLACE FOR INVITEES, PEOPLE.**  
SHARING DATA, INFO AND KNOWLEDGE ABOUT THE MARKERMEER AND  
WADDEN

ACTIVATE PARTICIPATION AND THE ECONOMIC OPPORTUNITIES

**NEED FOR RESEARCH:**  
METEOROLOGY AND HYDRODYNAMICS  
MORPHODYNAMICS  
VEGETATION DEVELOPMENT  
DIVISION IN ON SITE PLOTS, ECOSHAPE

\*FROM: DR. IR. H.J. DE LANGE, ALTERRA, WAGENINGEN UR, EMAIL: 19 DEC '14

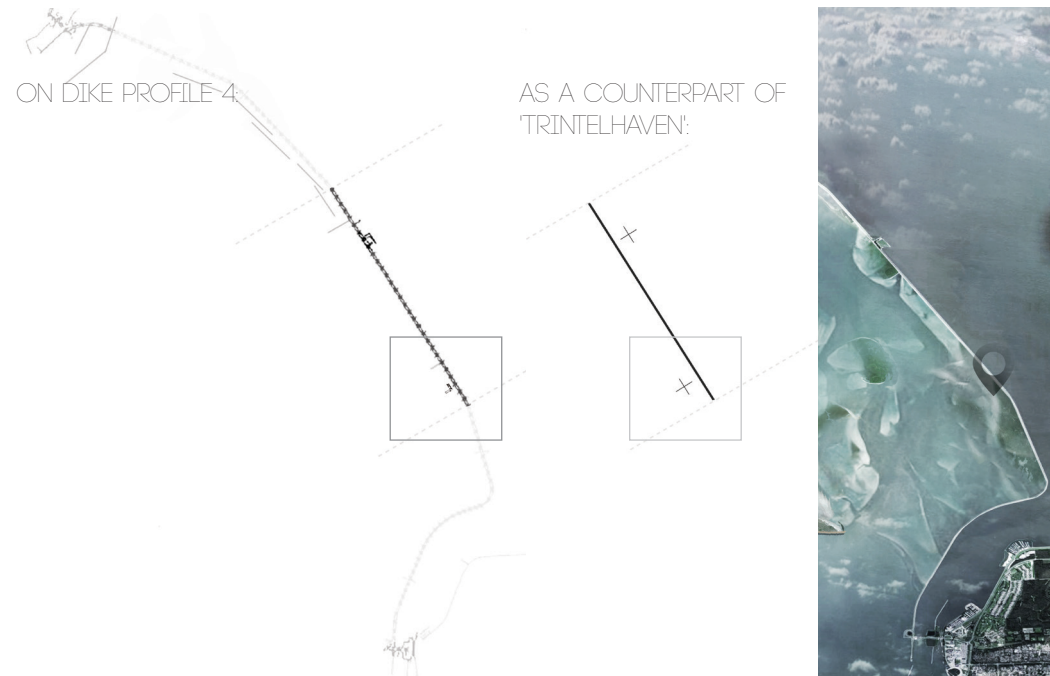
CLAUS EN KAAAN - 2011 - NIOO KNAW THE NETHERLANDS INSTITUTE OF  
ECOLOGY - WAGENINGEN:

'WE TRY TO REGAIN THE BIODIVERSITY,  
THAT WE DESTROYED BY BUILDING. WE WANT TO GET IT BACK AROUND  
AND ON TOP OF THE BUILDING.'

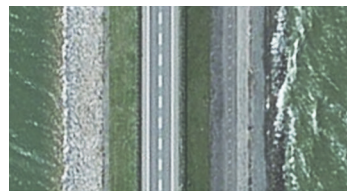
**'BRING PEOPLE INTO CONTACT WITH WHAT IS HAPPENING.'**  
BY VISTA

**'ARCHITECTURAL PUNCTUATIONS ARE MEANINGFUL.'**  
BY VAN PARIDON EN DE GROOT

## V. LOCATION LOCATION IN PLAN DELTA, HOUTRIBDIJK



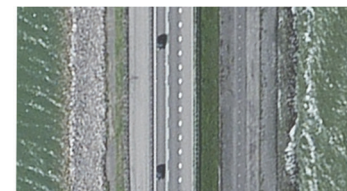
## V. LOCATION HOUTRIBDIJK, A CLOSER LOOK



DIKE PROFILE 4,  
ROAD PROFILE 1,  
SMALLEST ROAD WIDTH

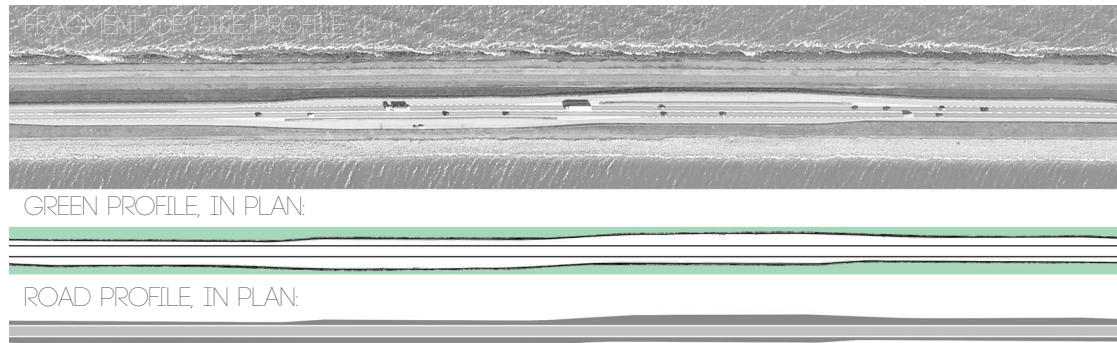


DIKE PROFILE 4,  
ROAD PROFILE 2  
MEDIUM ROAD WIDTH



DIKE PROFILE 4,  
ROAD PROFILE 3  
LARGEST ROAD WIDTH

# V LOCATION HOUTRIBDIJK, A CLOSER LOOK



## V LOCATION 1:500

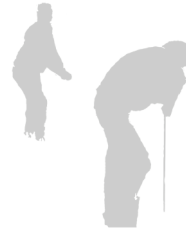


## ABOUT THE ARCHITECTURE PROGRAM

HANDS-ON EDUCATION



MONITORING ZONE



LABORATORY RESEARCH



**THE ARCHITECTURE** IS A RESEARCH AND INNOVATION CENTRE,  
WITH A MONITORING FACILITY FOR INVOLVED INSTITUTIONS,

AND A VISITORS CENTRE.

**REFERENCE AND PROGRAM ANALYSIS DONE ON:**  
THE NETHERLANDS ECOLOGICAL INSTITUTE,  
NIOO-KNAW, WAGENINGEN

VI. THE ARCHITECTURE  
PROGRAM

**'RIGID' RESEARCH PROGRAM:**

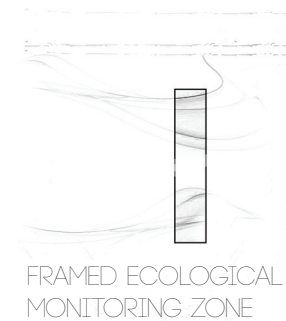
LABORATORIES, 250 M<sup>2</sup>  
SUPPORT LAB, 100 M<sup>2</sup>  
OFFICES, 100 M<sup>2</sup>  
AUDITORIUM 150 M<sup>2</sup>  
ENTRANCE HALL, 50 M<sup>2</sup>  
FACILITIES AND STORAGE, 50 M<sup>2</sup>  
TOTAL: 700 M<sup>2</sup>

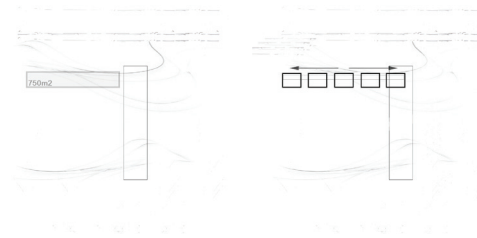
MONITORING:  
TEST PLOTS, 15000 M<sup>2</sup>  
AQUA CULTURE, GREEN HOUSE, 150 M<sup>2</sup>

**'FREE' VISITORS PROGRAM:**

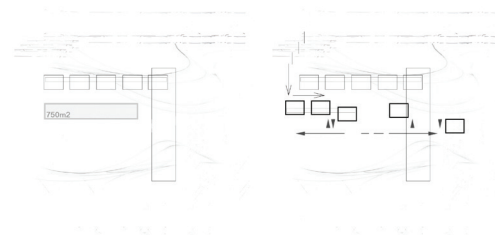
EXPOSITION, 250 M<sup>2</sup>  
TEMPORARY EXPO, 100 M<sup>2</sup>  
ENTRANCE HALL, 50 M<sup>2</sup>  
RESTAURANT, 150 M<sup>2</sup>  
TOTAL 550 M<sup>2</sup>

VI. THE ARCHITECTURE  
CONCEPTUAL

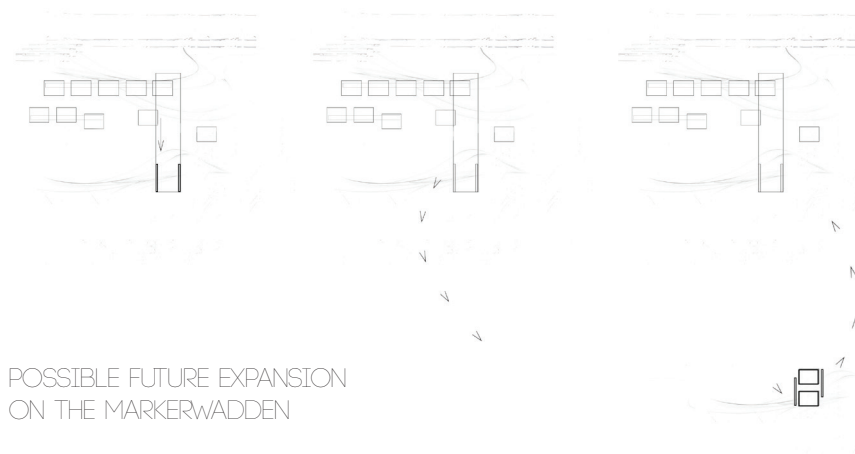




**II. ECOLOGICAL RESEARCH CENTRE**  
VARIOUS INSTITUTIONS,  
RIGID RHYTHM

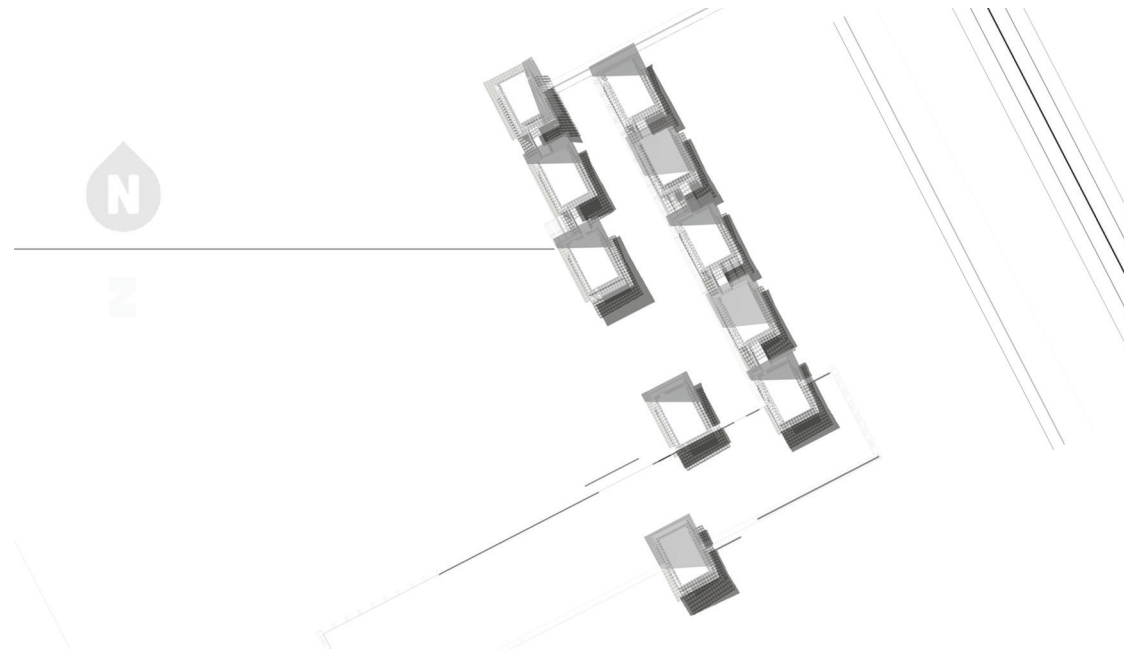


**III. VISITORS CENTRE: EXPO, KNOWLEDGE,**  
RESTAURANT  
FREE RHYTHM



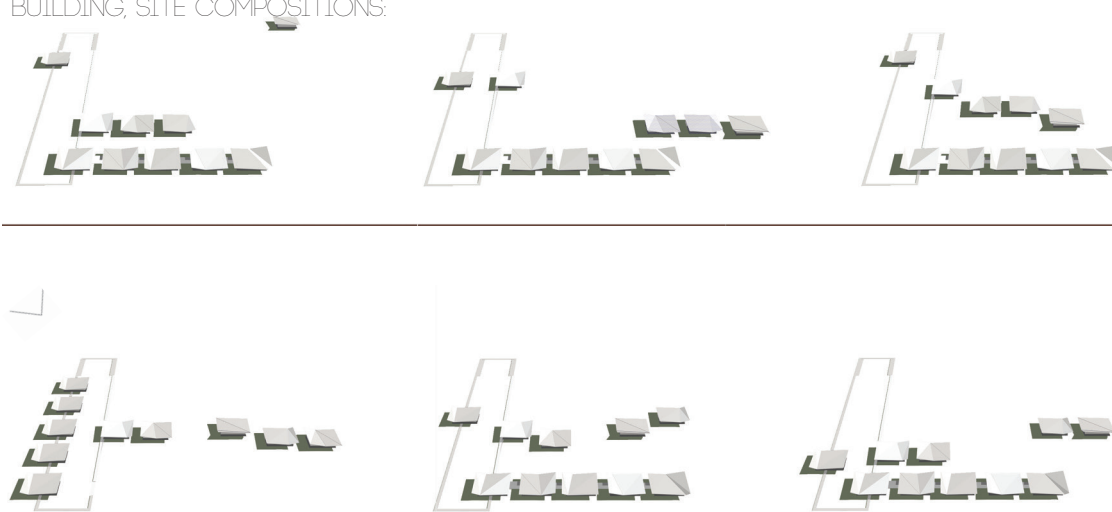
POSSIBLE FUTURE EXPANSION  
ON THE MARKERWADDEN

VT THE ARCHITECTURE  
CONCEPTUAL IMPLEMENTATION



VT THE ARCHITECTURE  
PROCESS, ALTERNATIVES

BUILDING, SITE COMPOSITIONS:







THE PILOT PROJECT IS DIVIDED INTO PLOTS, THREE FACTORS WHICH ARE TESTED.

- 1 DIFFERENCE IN SLOPE 1:25 AND 1:30;
- 2 ADDITIONAL ORGANIC MATERIAL IN THE TOP LAYER, AND,
- 3. PLANTING VEGETATION OR DEVELOP IT SPONTANEOUSLY

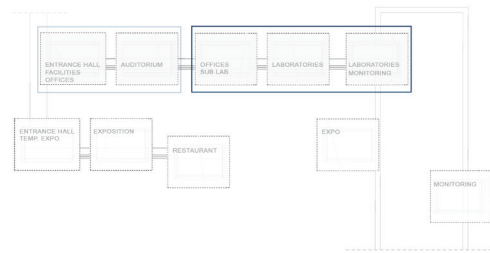
\*DERIVED FROM DR. IR. H.J. DE LANGE, ALTERRA, WAGENINGEN UR, EMAIL: 19 DEC'14



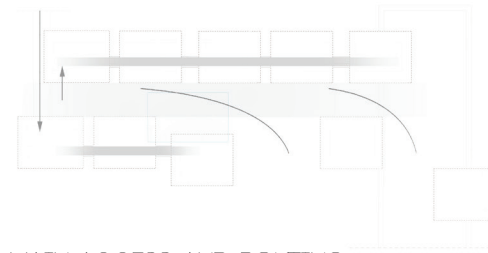
CATCHMENT OF FIVE DIFFERENT ECOLOGICAL ZONES

EVOLVING ZONES, THROUGH THE 'KWELDERWERKEN' PRINCIPLE

VT THE ARCHITECTURE  
FUNCTIONS AND ROUTING

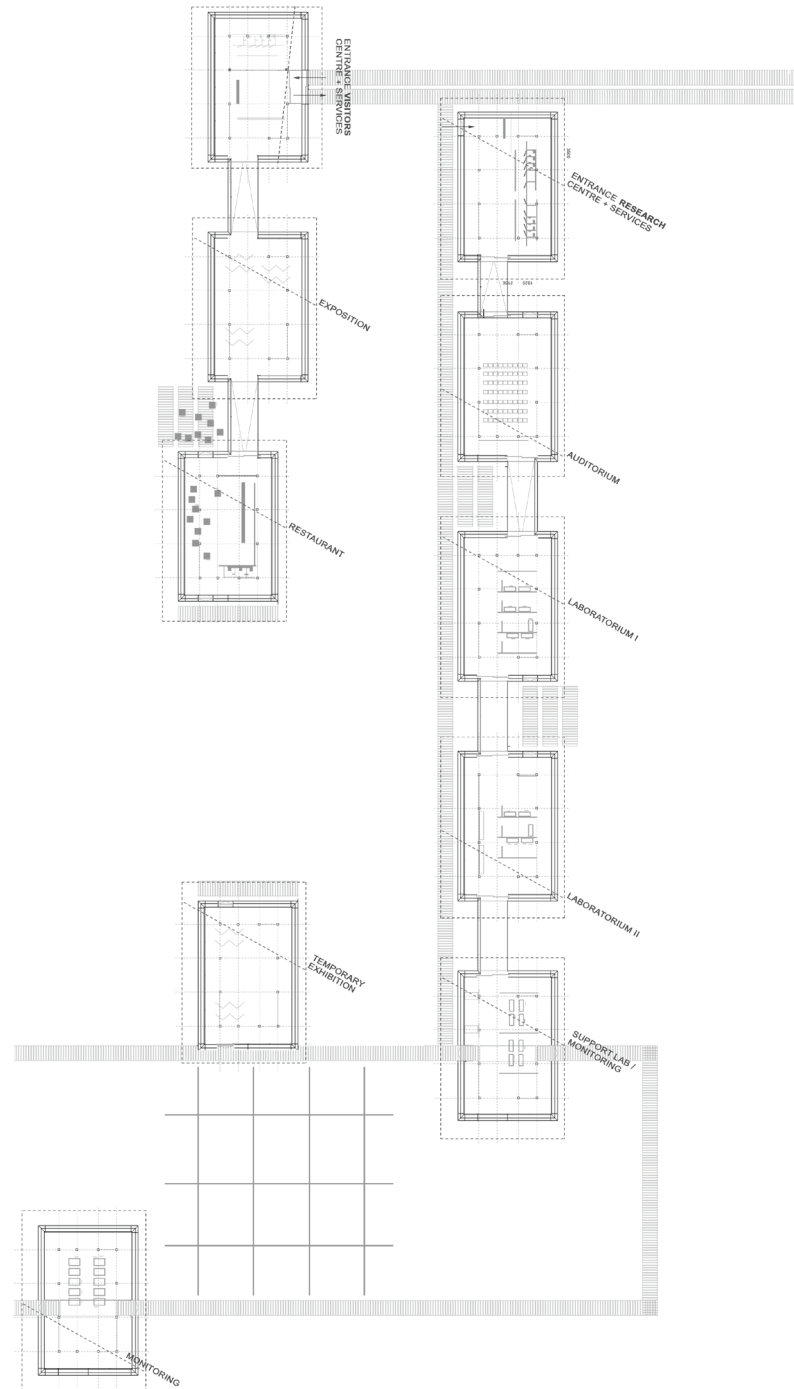


FUNCTIONS PLACED IN PLAN

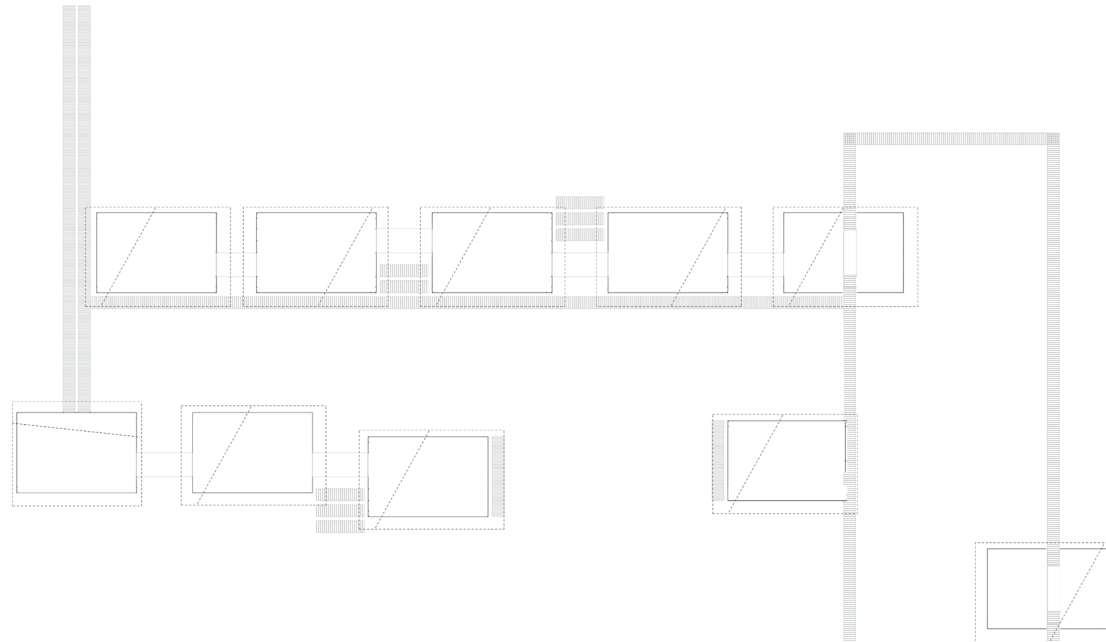


MAIN ACCESS AND ROUTING

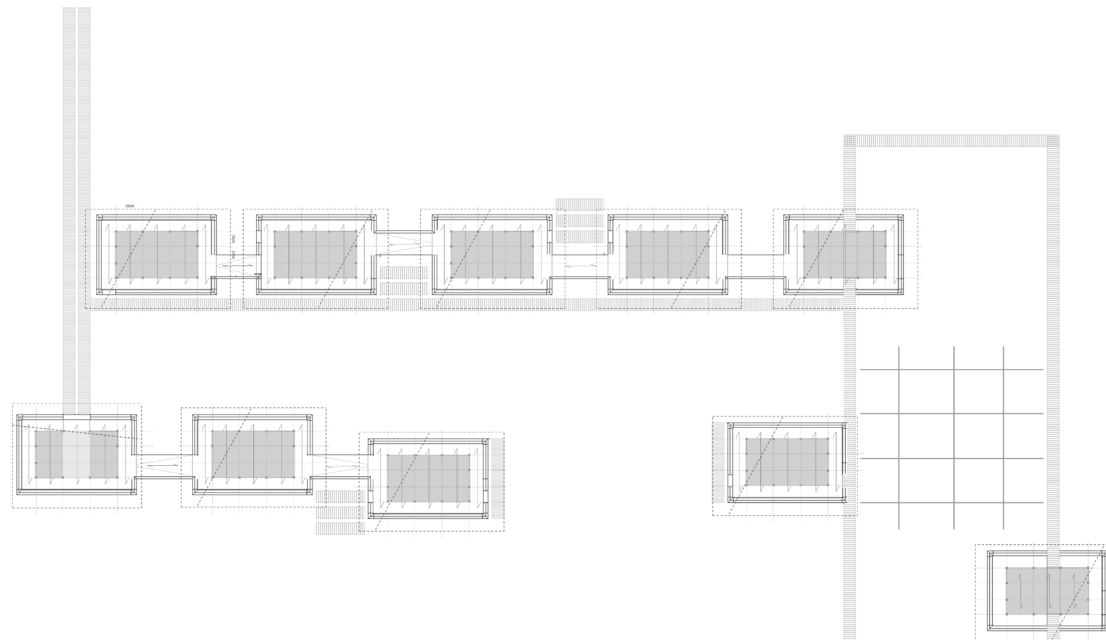
AT THE ARCHITECTURE  
PLAN 1:100



VI. THE ARCHITECTURE  
PLAN, WOODEN PATHS

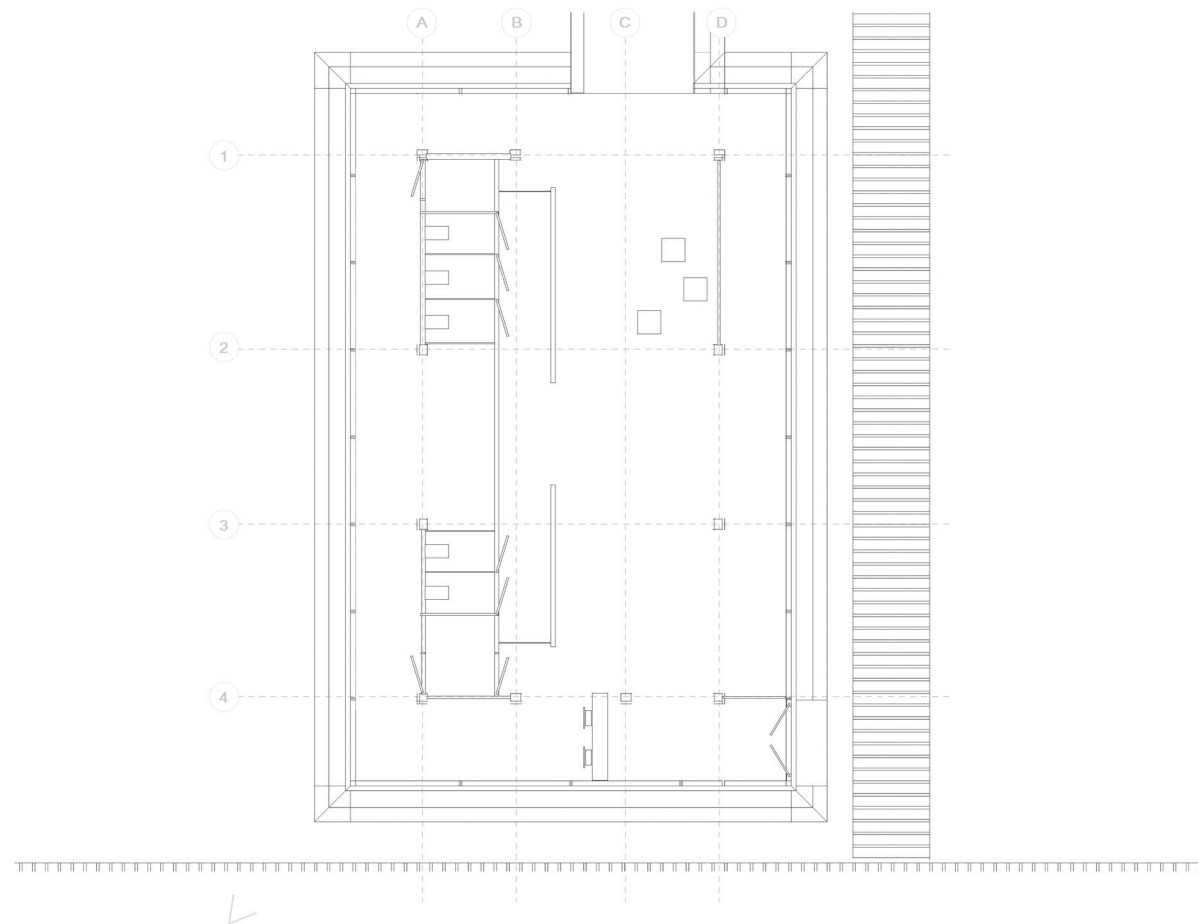


VI. THE ARCHITECTURE  
PLAN, SPATIAL PRINCIPLE

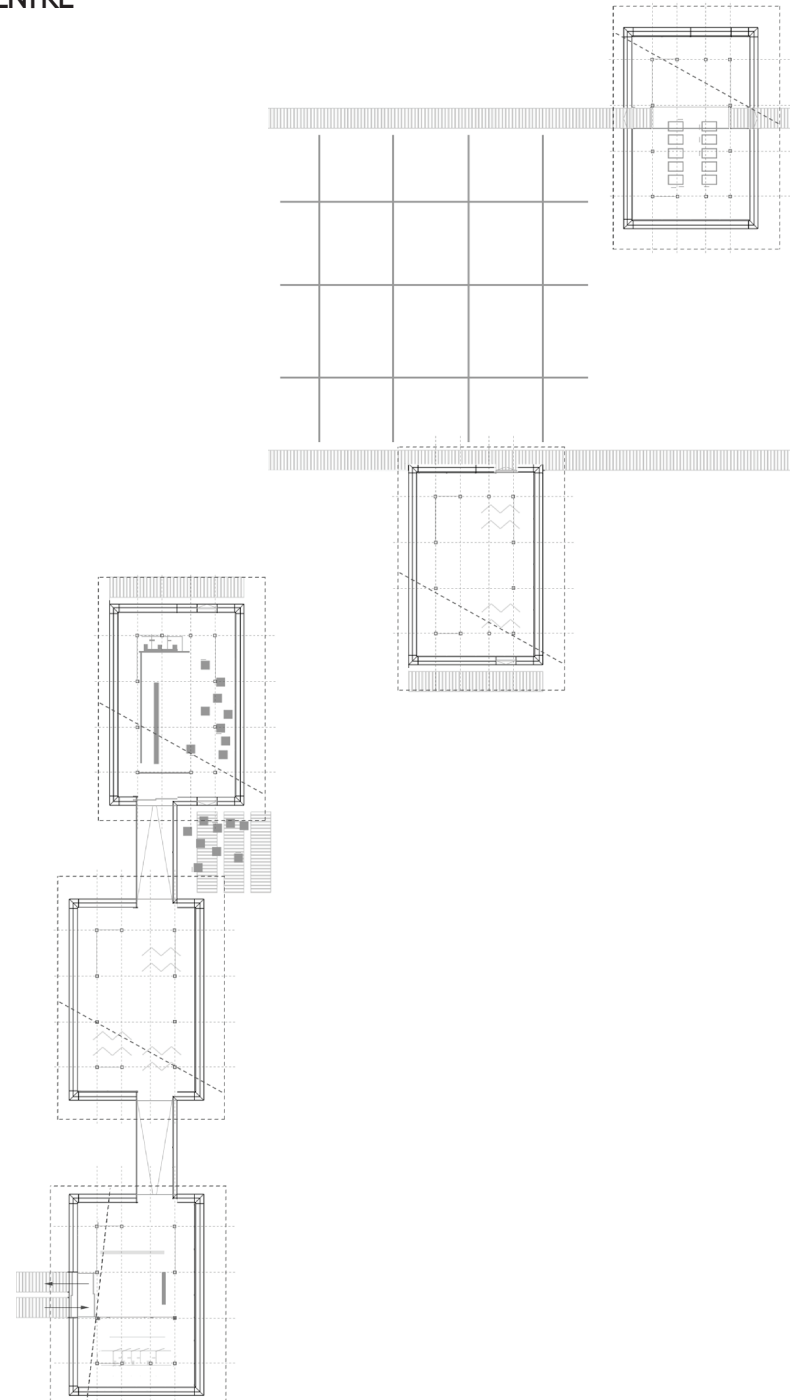




VI THE ARCHITECTURE  
PLAN RESEARCH CENTRE, ENTRANCE HALL



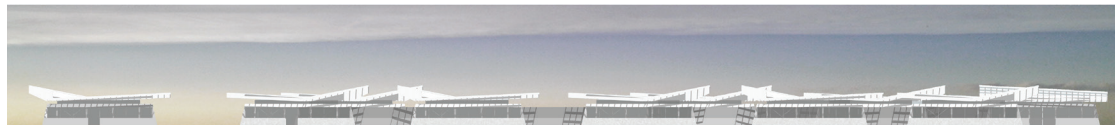
VI THE ARCHITECTURE  
PLAN VISITORS CENTRE



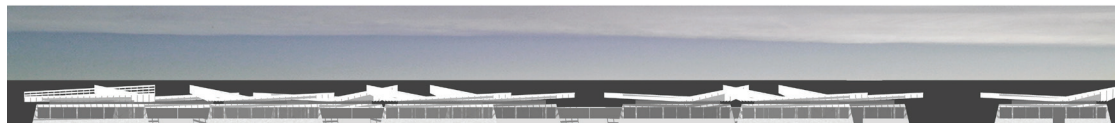
VI. THE ARCHITECTURE  
MATERIALISATION



VI. THE ARCHITECTURE  
ELEVATIONS EAST



VI. THE ARCHITECTURE  
ELEVATIONS WEST





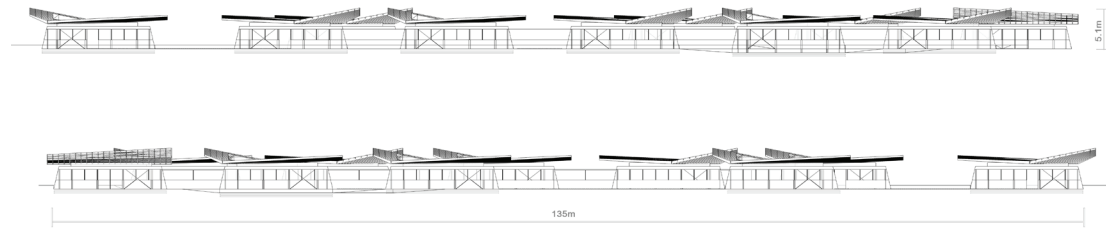
VT THE ARCHITECTURE  
ELEVATIONS NORTH



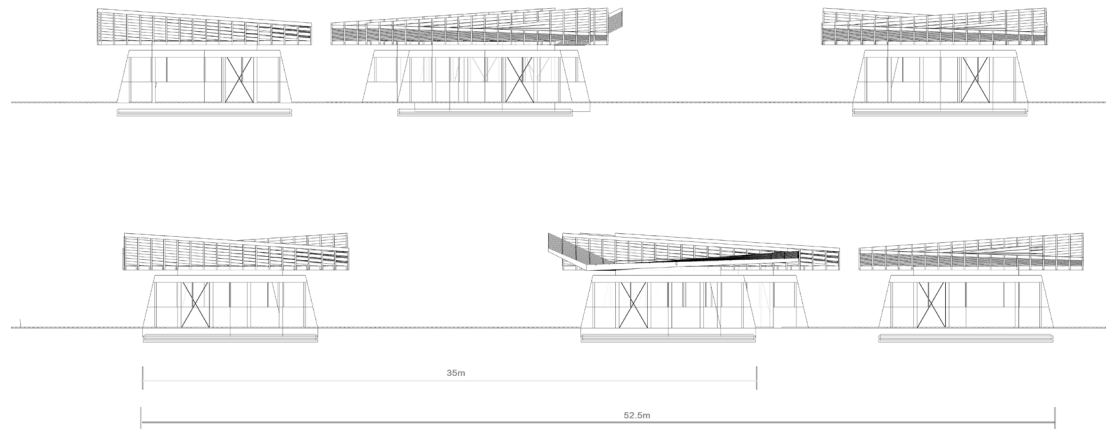
VT THE ARCHITECTURE  
ELEVATIONS SOUTH



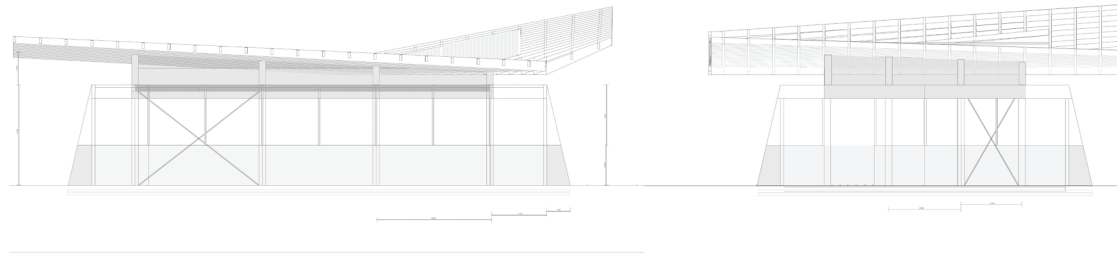
VI. THE ARCHITECTURE  
LONG SECTION 1:100



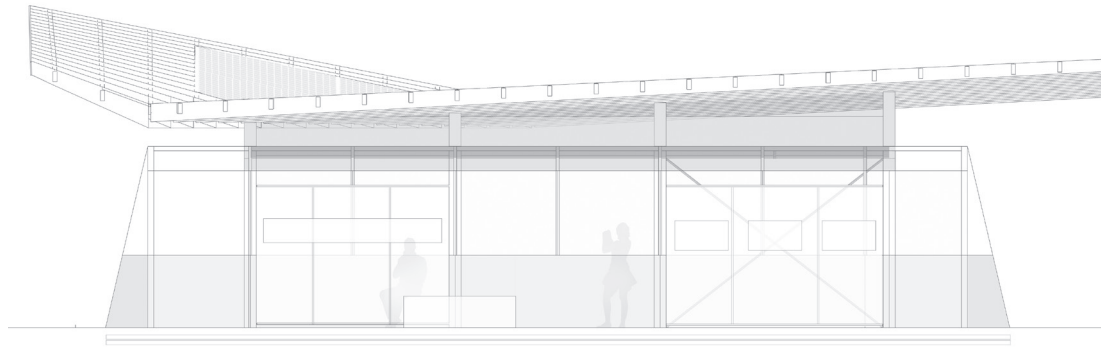
VI. THE ARCHITECTURE  
CROSS SECTION 1:100



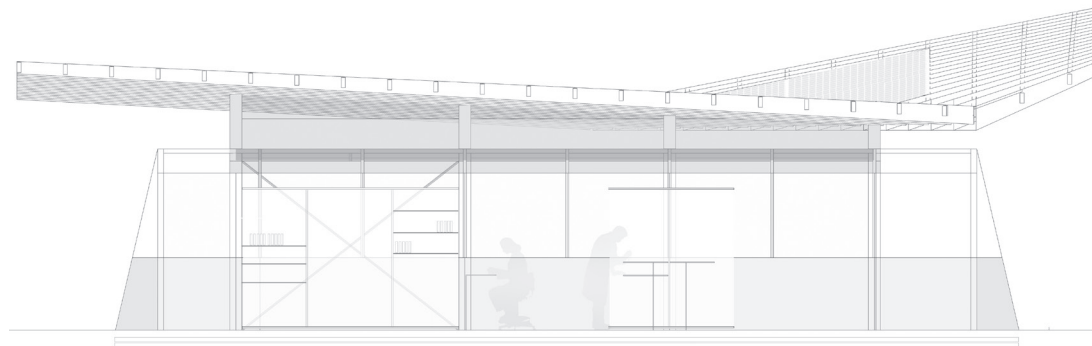
VI. THE ARCHITECTURE  
SECTION 1:50



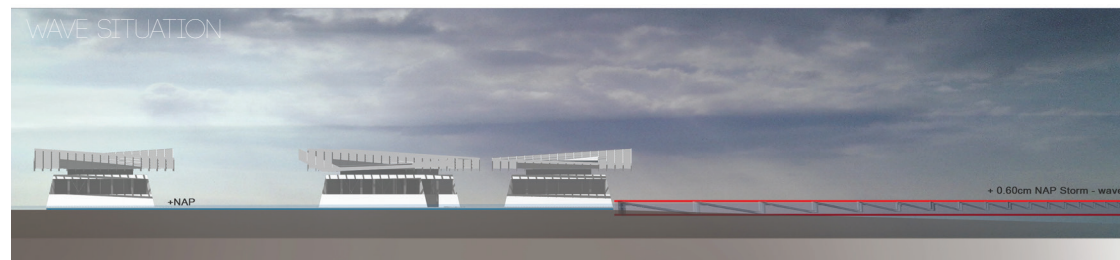
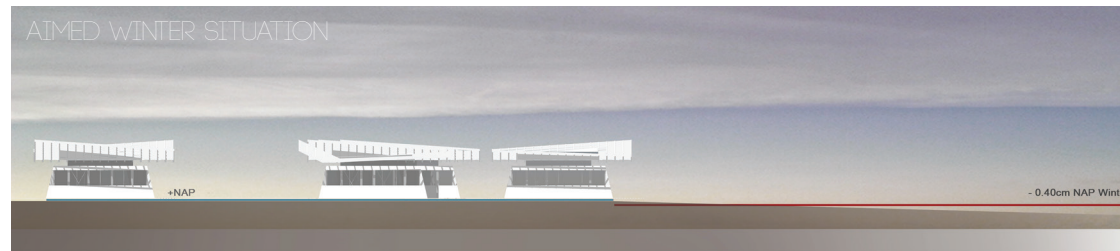
VT THE ARCHITECTURE  
FUNCTIONAL SECTION EXPOSITION



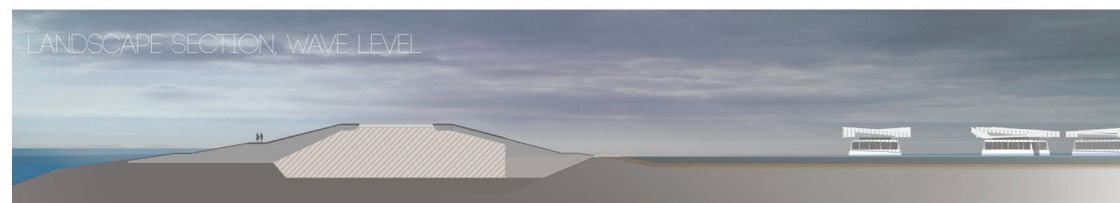
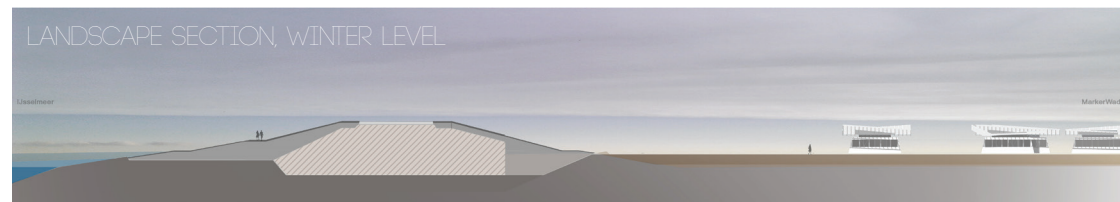
VT THE ARCHITECTURE  
FUNCTIONAL SECTION LABORATORY



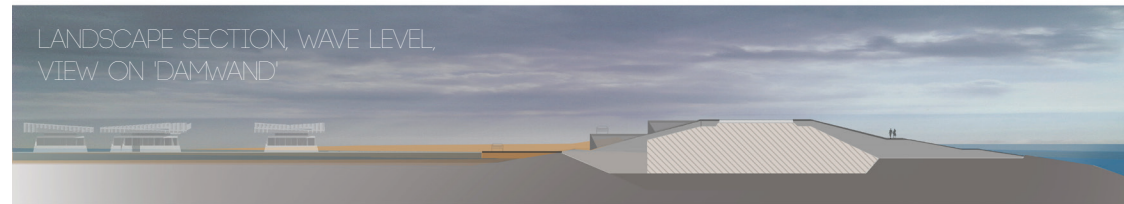
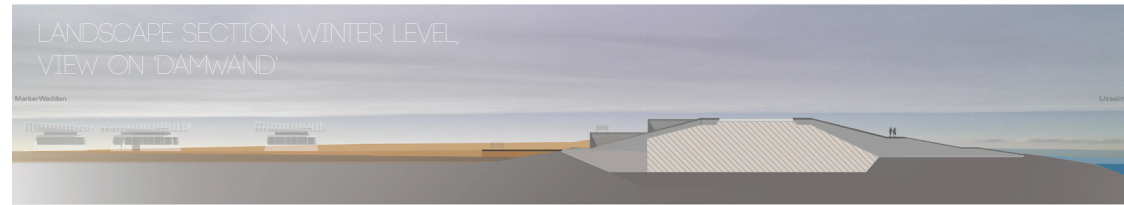
## VI. THE ARCHITECTURE WATERLEVELS I



## VI. THE ARCHITECTURE WATERLEVELS II

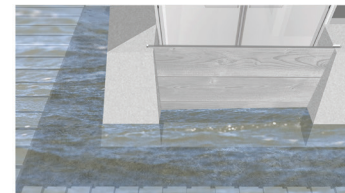
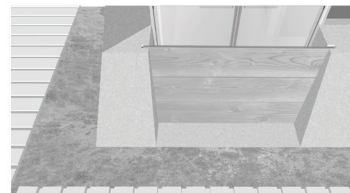
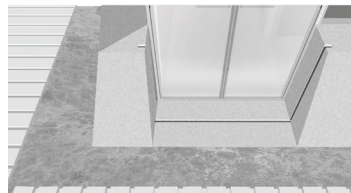


## VI. THE ARCHITECTURE WATERLEVELS III

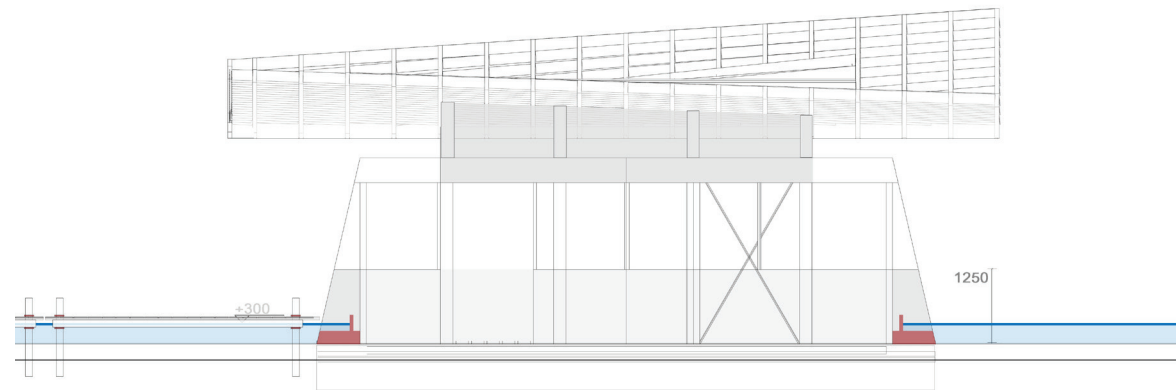
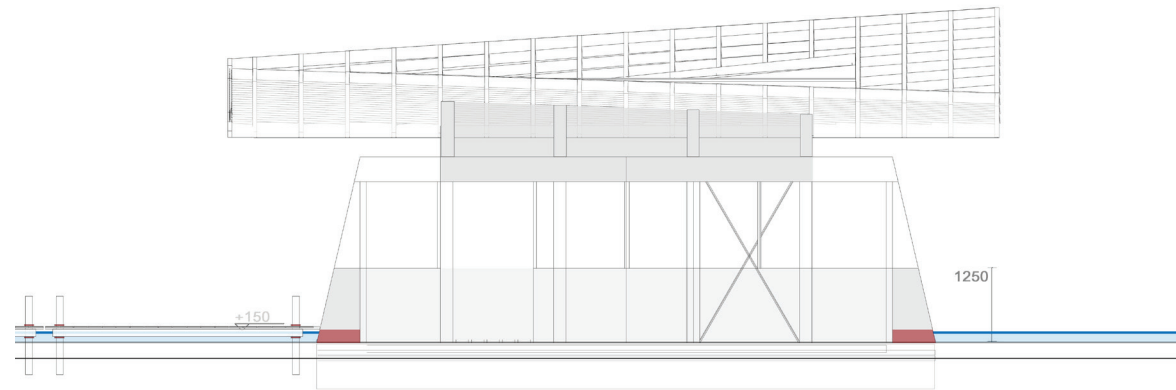


## VI. THE ARCHITECTURE WATERLEVELS IV

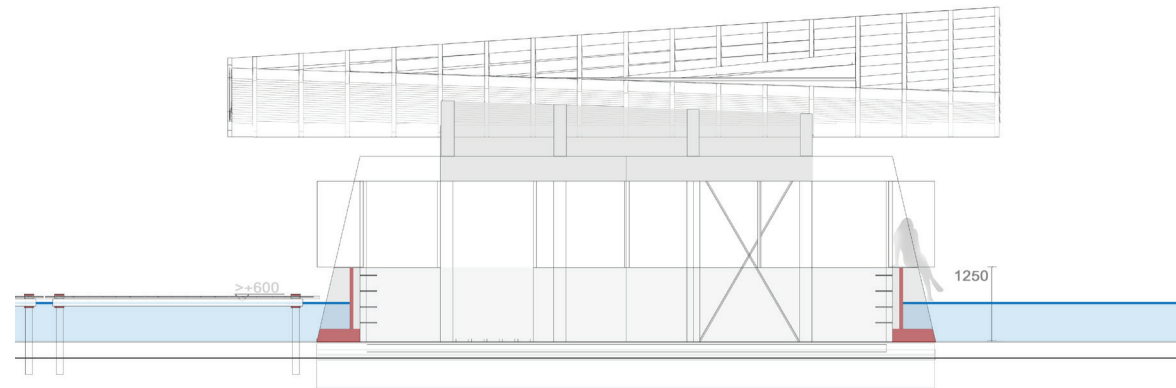
RARE WATER LEVEL RISE,  
ABOVE PEIL NIVEAU



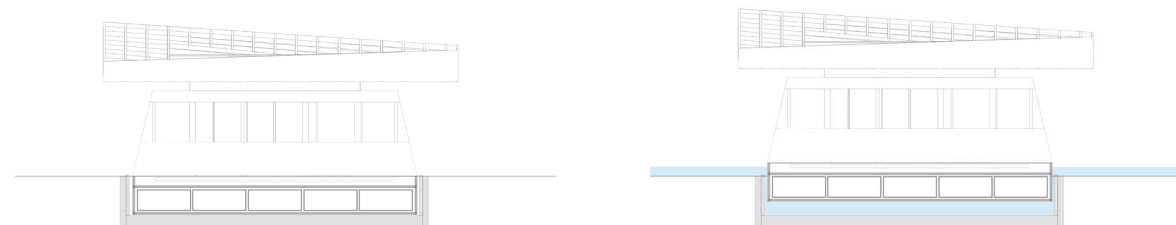
AT THE ARCHITECTURE  
WATERLEVELS V



VI. THE ARCHITECTURE  
WATERLEVELS V

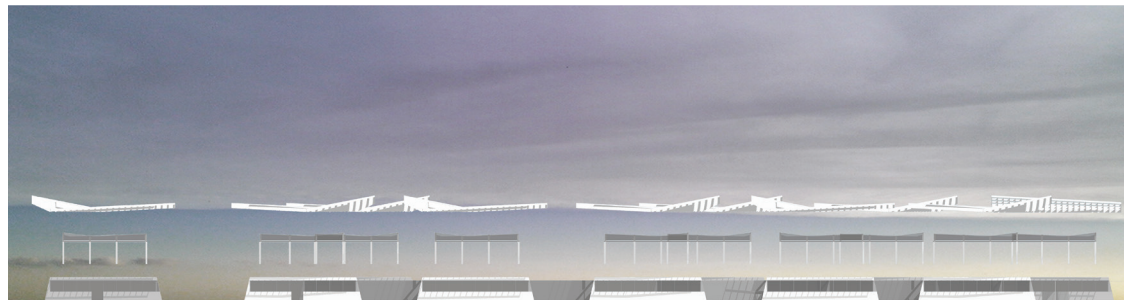


VI. THE ARCHITECTURE  
FLOATING PRINCIPLE









# MIT BUILDING TECHNOLOGY

## STRUCTURE PRINCIPLE

PV PANELS / POLYCARBON ROOF COVER

LAMINATED WOODEN ROOF STRUCTURE

STRETCH METAL/ GLASS FACADE PANELS

WOODEN-BEAM-FLOOR 'ZWALUW'

BEAMS WOOD-STEEL

ALUMINIUM WINDOW FRAMES

WOODEN COLUMNS

STEEL STABILITY FRAME

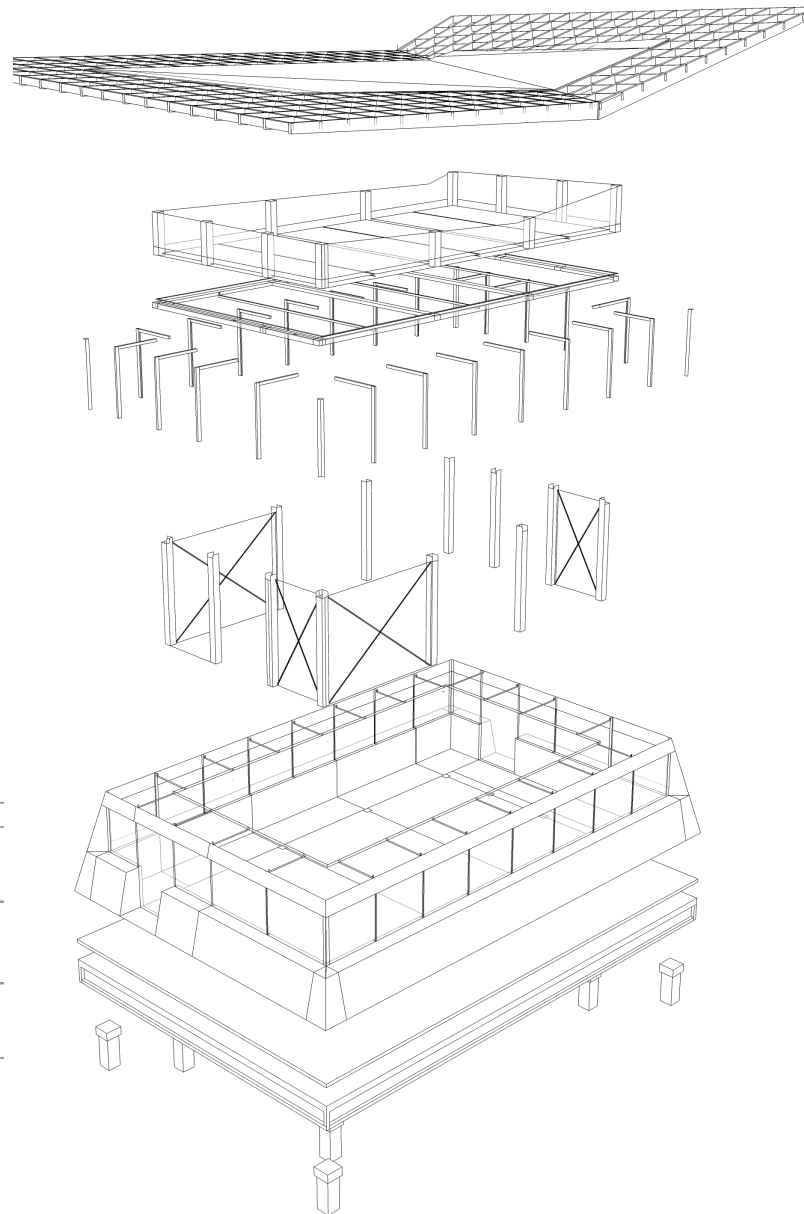
WOODEN - ROBINIA - FACADE BEAMS

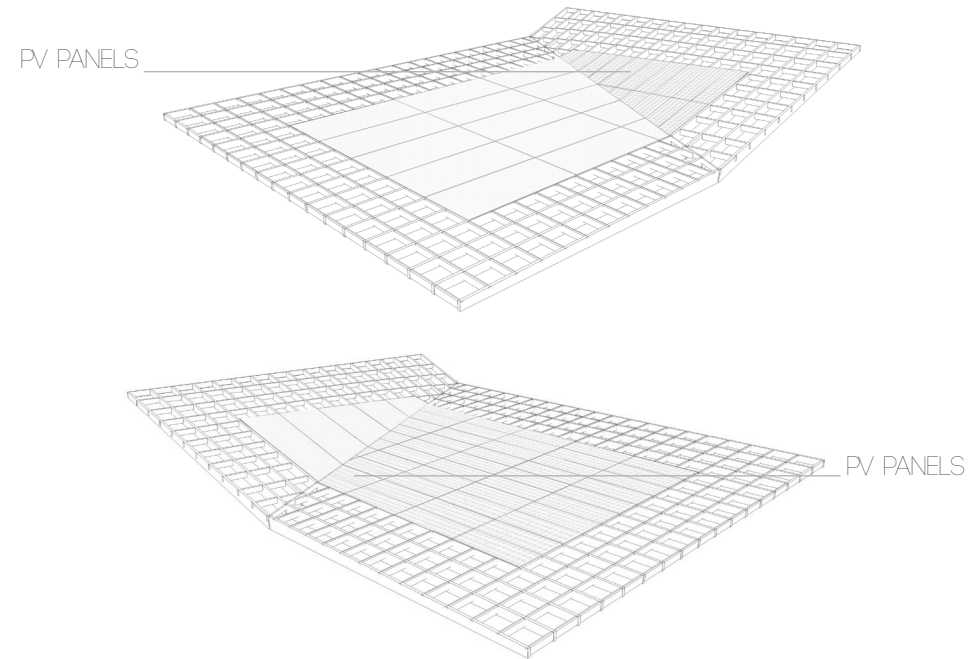
HR++ GLASS

FACADE PANELS, CONCRETE PREFAB

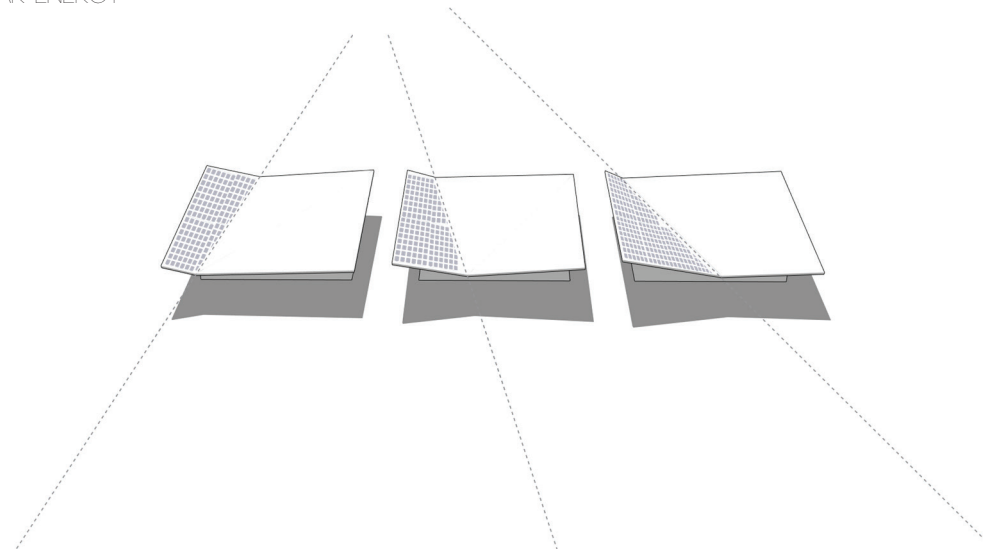
BASE, CONCRETE FLOOR (+ HEATING)

CONCRETE FOUNDATIONS

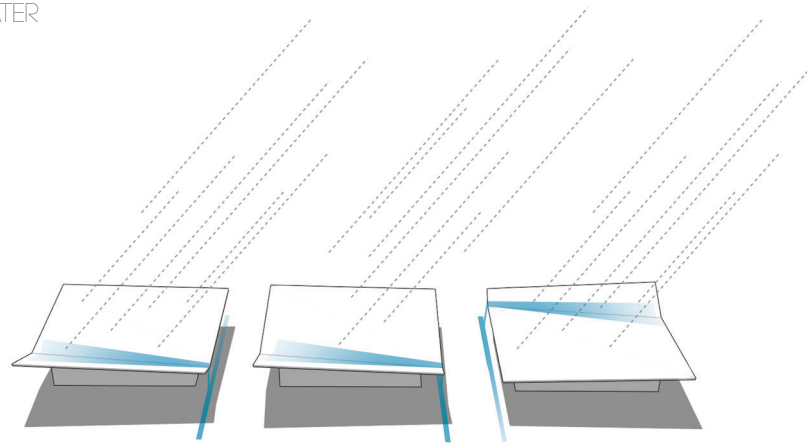


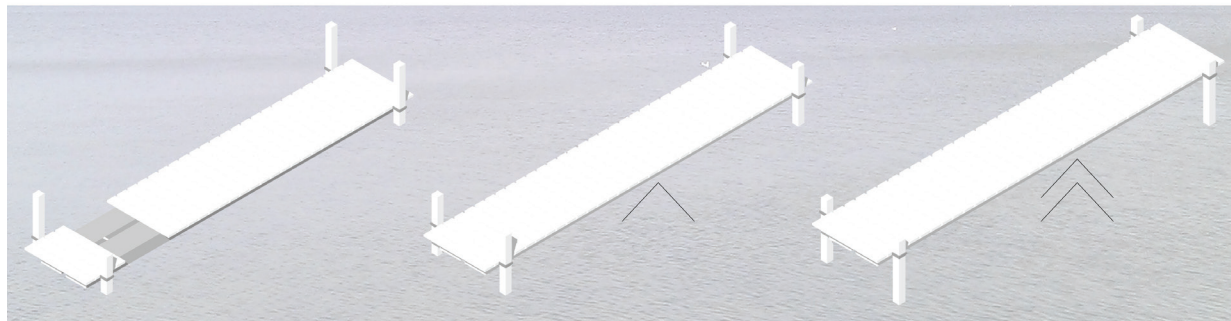


SOLAR ENERGY

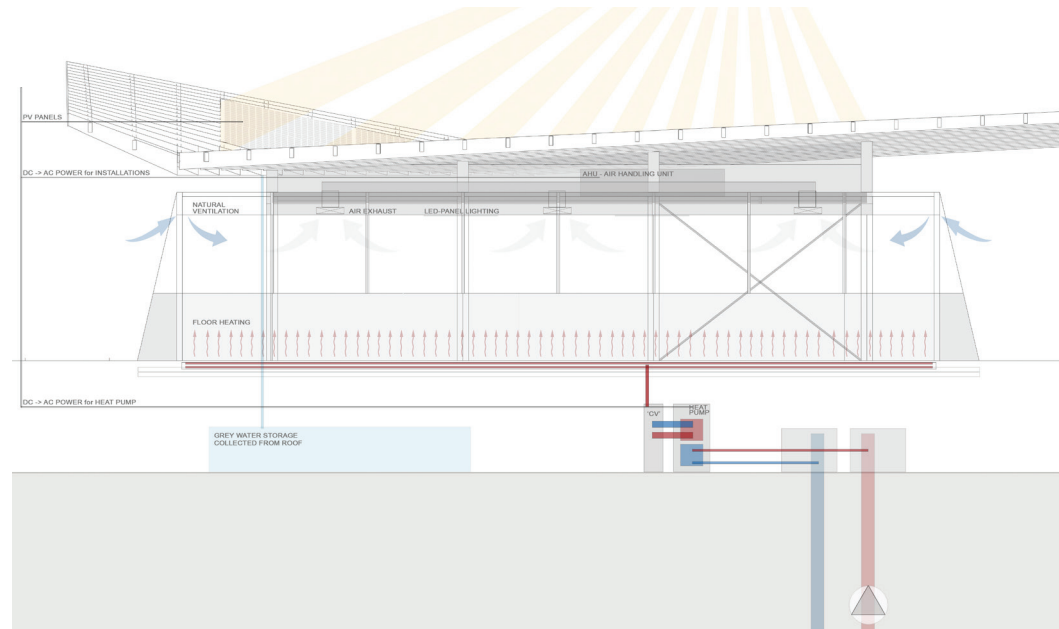


USE OF GREY WATER

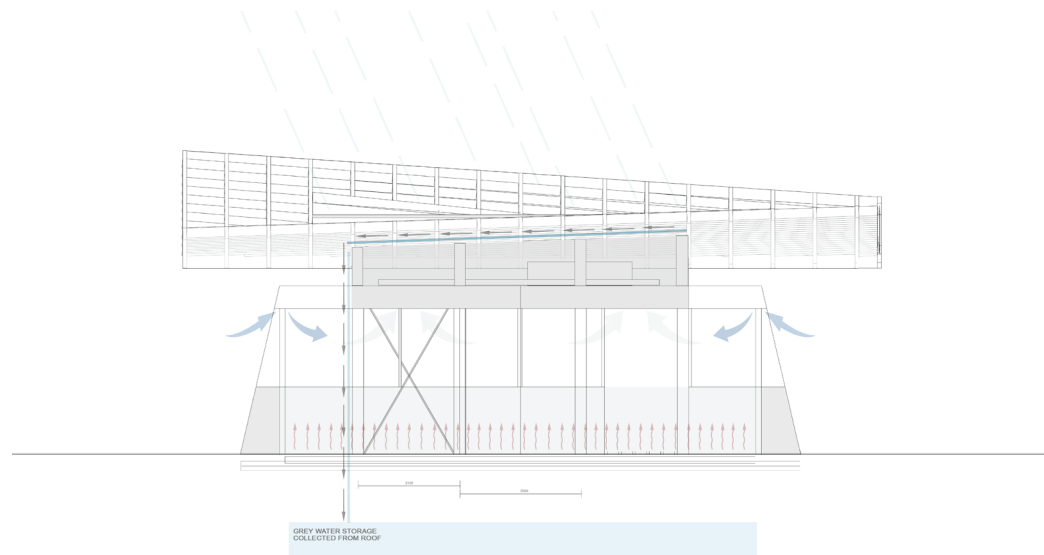




# MIT BUILDING TECHNOLOGY CLIMATE SCHEME 1

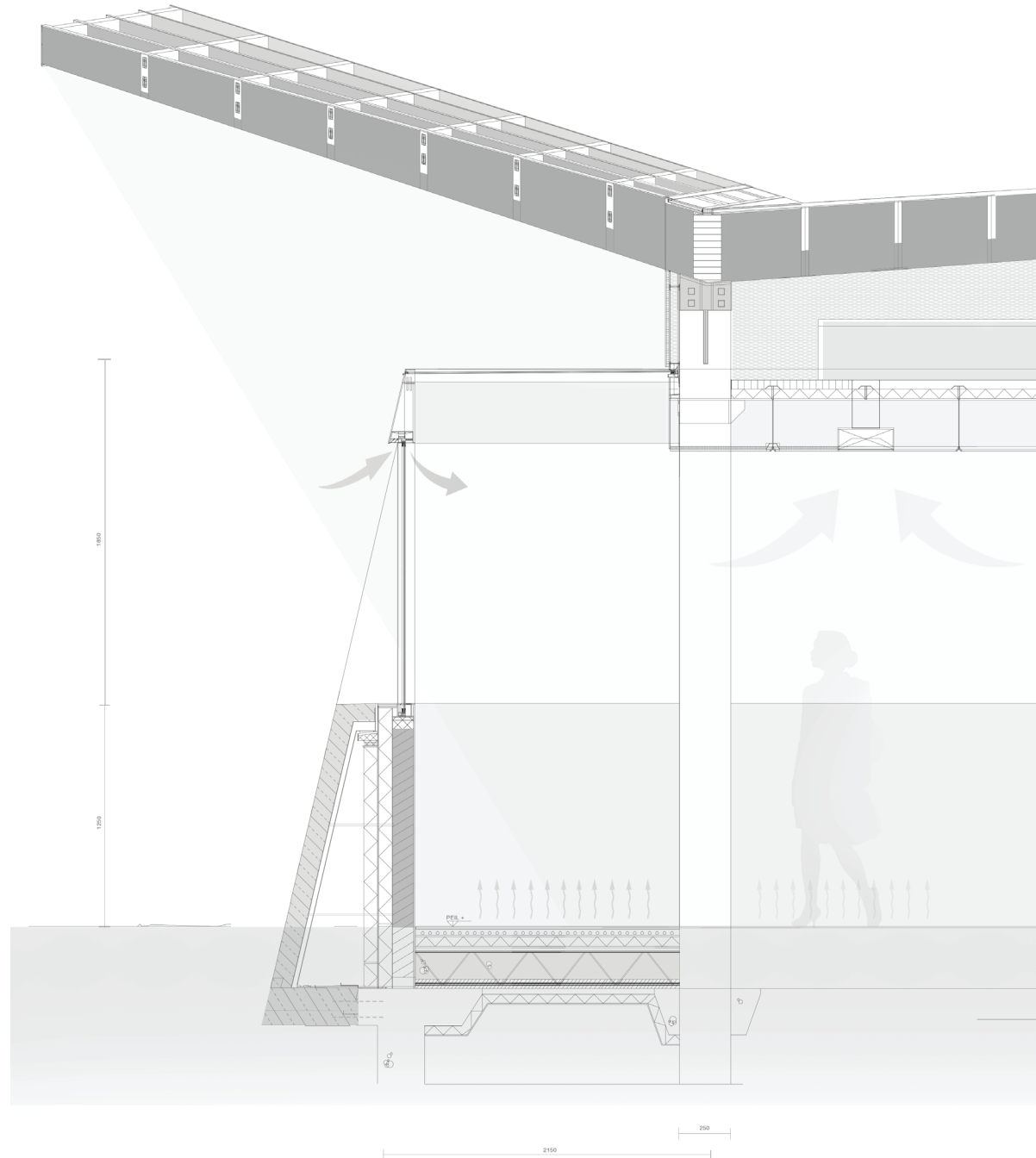


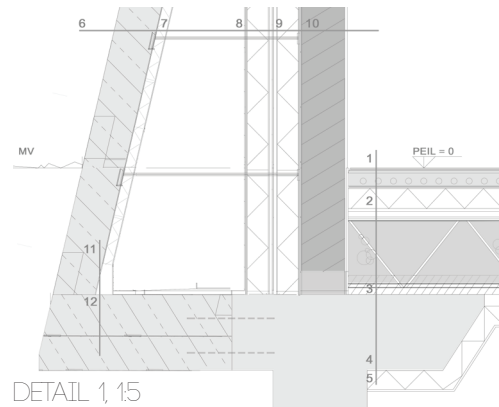
# MIT BUILDING TECHNOLOGY CLIMATE SCHEME 2





VIT BUILDING TECHNOLOGY  
SECTION 1:20





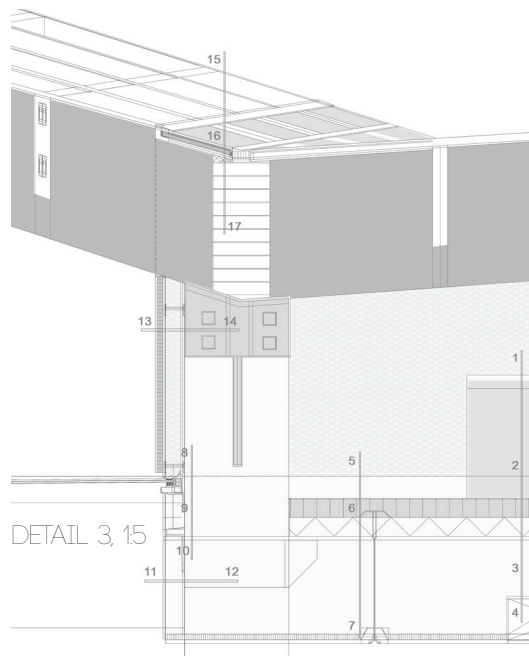
**DETAIL 1**

1. UPPER FLOOR SURFACE
2. FLOOR HEATING SYSTEM - INSULATION LAYER
3. CONCRETE FLOOR - BREEDPLAAT
4. BASE - CONCRETE FOUNDATION
5. BASE INSULATION
6. FACADE PANEL - CONCRETE
7. OUTER INSULATION LAYER
8. BRICKWORK KALKZANDSTEEN
9. WATERPROOF INSULATION LAYER
10. BRICKWORK KALKZANDSTEEN
11. CONCRETE, AERATED
12. BASE - CONCRETE

**DETAIL 2**

1. UPPER FLOOR SURFACE
2. FLOOR HEATING SYSTEM - INSULATION LAYER
3. CONCRETE FLOOR - BREEDPLAAT
4. BASE - CONCRETE FOUNDATION
5. BASE INSULATION

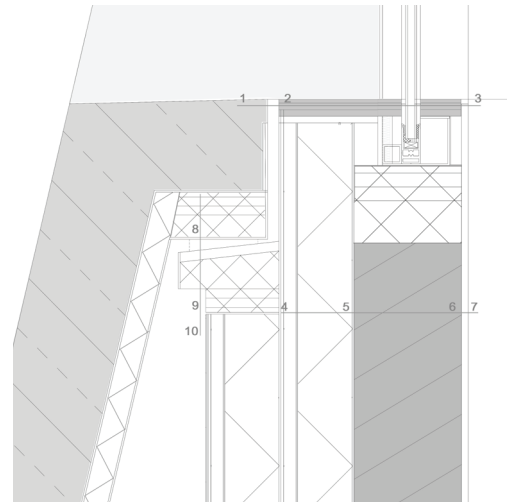
DETAIL 2, 1:5



**DETAIL 3**

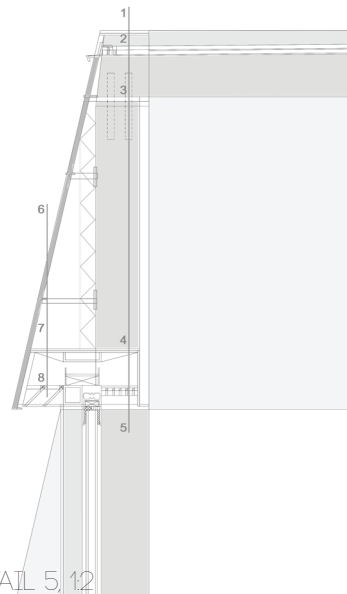
1. STRETCH METAL-GLASS FACADE PANEL, INSTALLATIONS ZONE
2. INSTALLATIONS, AIR HANDLING UNIT, EXHAUST PART
3. LOWERED CEILING - ZONE FOR LIGHTING / INSTALLATION PIPES
4. AIR EXHAUST
5. WOODEN BEAM FLOOR
6. ZWALUWSTAART PANELS/ INSULATION
7. CEILING PANELS - POLYCARBON, TRANSLUCENT
8. ALUMINIUM FRAME
9. THIN STEEL BEAM
10. STEEL FIXATION FRAME
11. INNER FINISHING PANEL
12. WOODEN COLUMN, MAIN CONSTRUCTION
13. STRETCH METAL-GLASS FACADE PANEL
14. STEEL BEAM TO BEAM CONNECTION
15. WOODEN BASKETWARE ROOF STRUCTURE
16. PV PANELS/ POLYCARBON PANELS, ROOF COVERING
17. LAMINATED WOODEN BEAM

DETAIL 3, 1:5



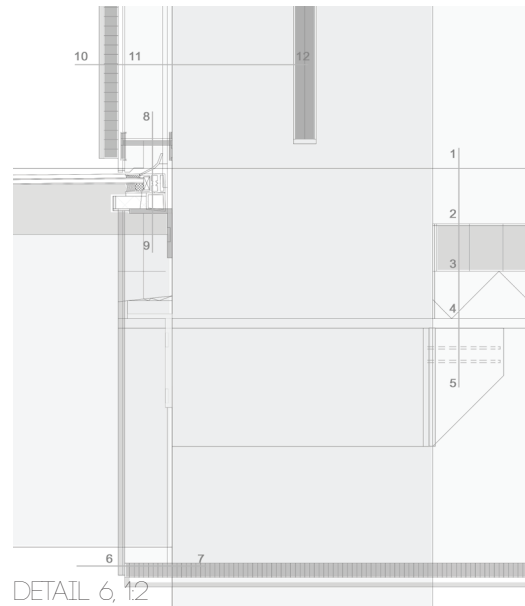
**DETAIL 4**  
1. FACADE PANEL - CONCRETE  
2. FINISHING ONLY PIECE  
3. ALUMINUM WINDOW (HR++ GLASS) FRAME  
4. ADDITIONAL FIXATION CAVITY  
5. WATERPROOF, INSULATION LAYER  
6. BRICKWORK KALKZANDSTEEN  
7. THIN PLASTER FINISHING  
8. CONCRETE, AERATED  
9. FIXATION PROFILE, AERATED CONCRETE  
10. BRICKWORK KALKZANDSTEEN

DETAIL 4, 1:2

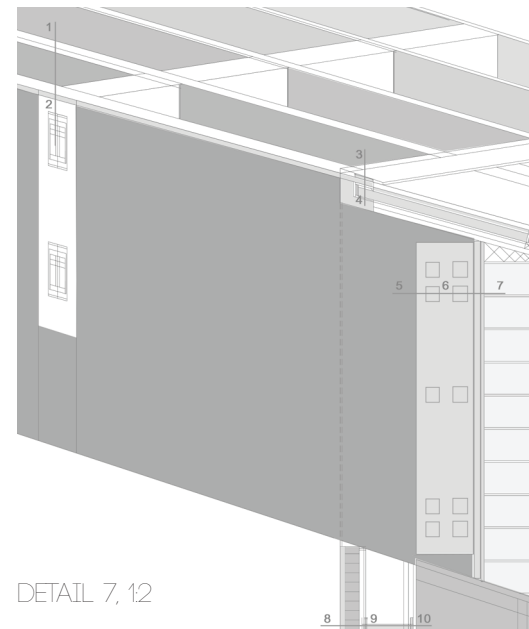


**DETAIL 5**  
1. GLASS CEILING PRINCIPLE  
2. WATERPROOF FIXATION + RUBBER  
3. ALUMINUM PROFILES, FIXATION PIN  
4. STEEL BEAM  
5. ALUMINUM WINDOW FRAME, STEEL BEAM  
6. THIN ROBINIA WOODEN FACADE PANELS  
7. FIXATION PROFILES  
8. NATURAL VENTILATION SYSTEM

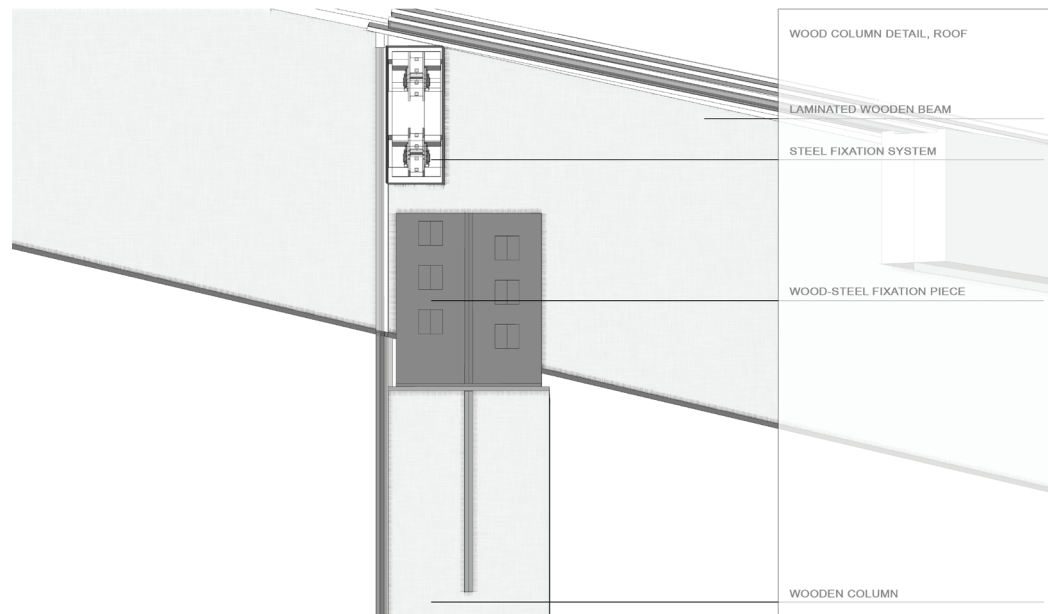
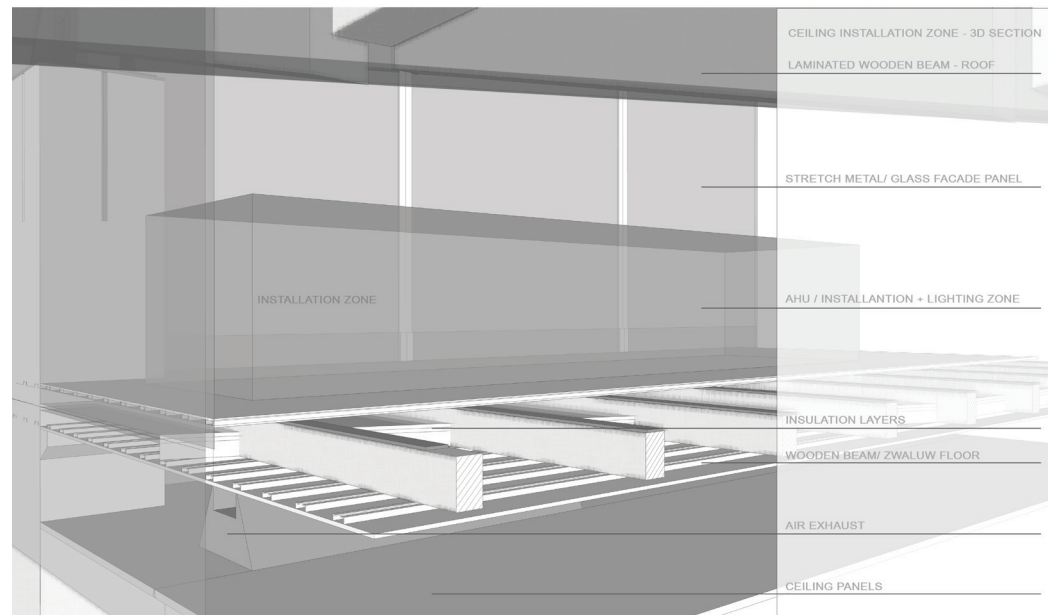
DETAIL 5, 1:2

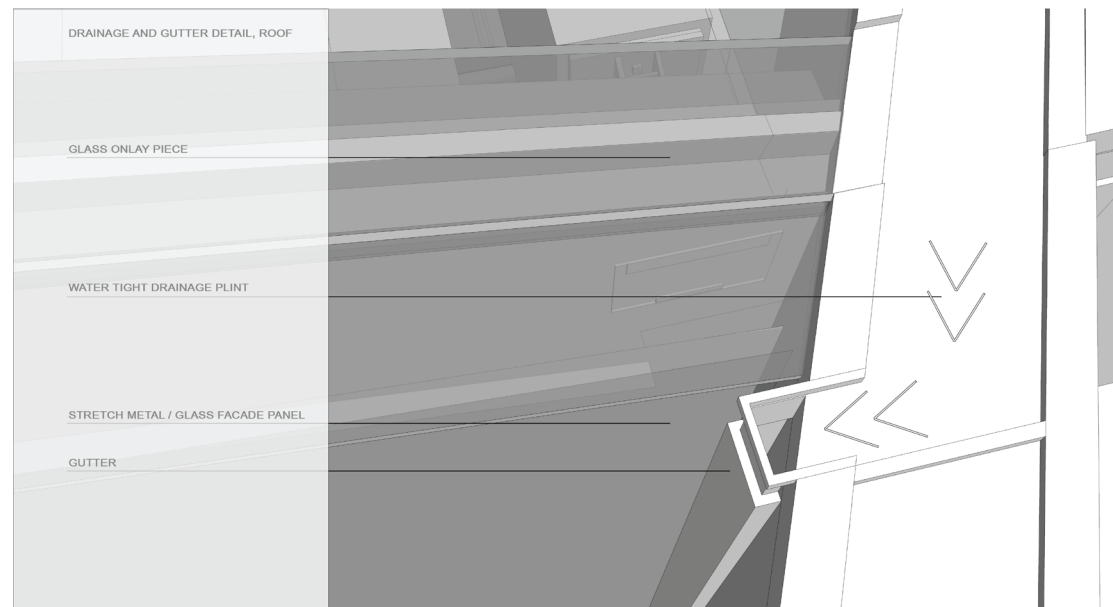


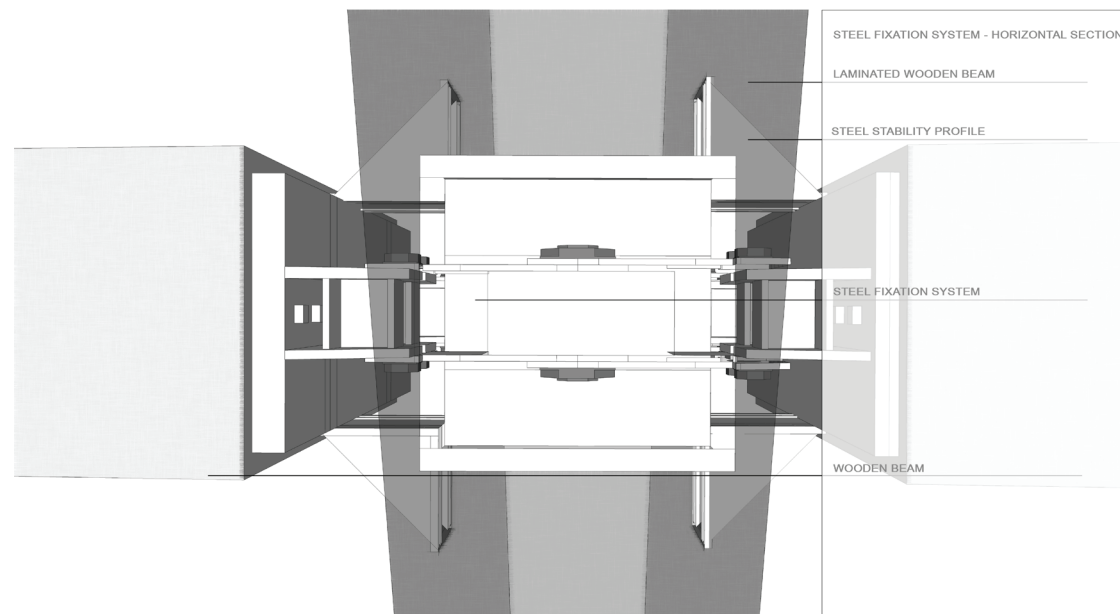
- DETAIL 6**
1. WOODEN BEAM FLOOR
  2. ZWALUWSTAART PANELS
  3. INSULATION CEILING
  4. THIN WOODEN PANEL FINISHING
  5. FIXATION ONLY PROFILE
  6. INNER TRANSLUCENT FINISHING PANEL
  7. CEILING PANELS - POLYCARBON, TRANSLUCENT
  8. FIXATION CAVITY
  9. STEEL FIXATION FRAME
  10. STRETCH METAL PANEL
  11. FACADE PANEL CAVITY
  12. STEEL BEAM-TO-BEAM CONNECTION



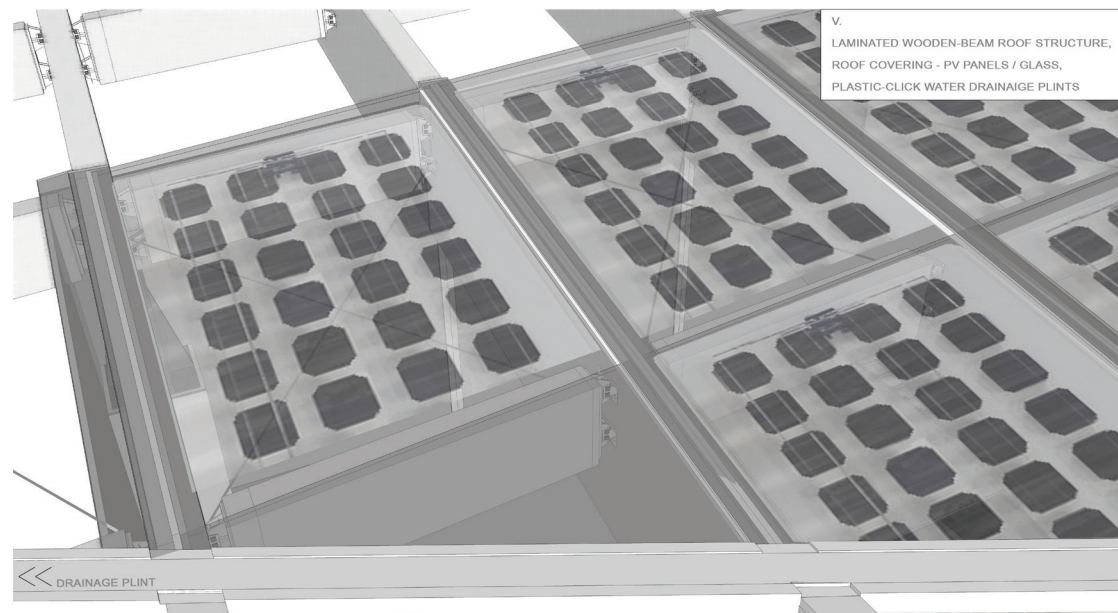
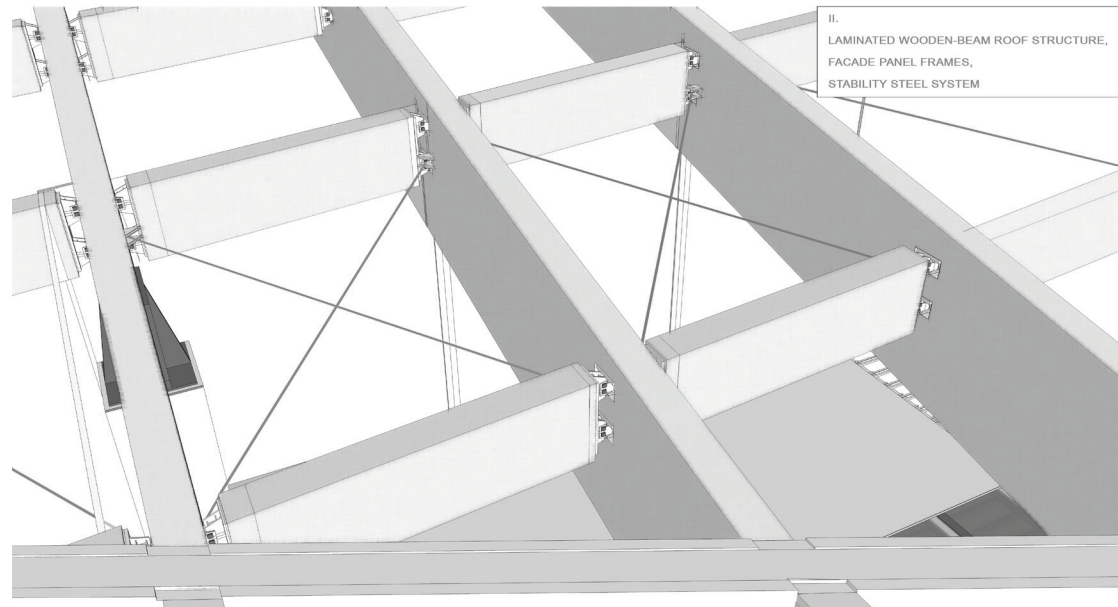
- DETAIL 7**
1. WOODEN LAMINATED BEAM ROOF STRUCTURE
  2. STEEL CONNECTION PROFILES
  3. CLIP PLASTIC FIXATION FRAMES
  4. PV PANELS/ POLYCARBON PANELS, ROOF COVERING
  5. LAMINATED WOODEN BEAM
  6. STEEL FIXATION PROFILE
  7. LAMINATED WOODEN BEAM
  8. STRETCH METAL-GLASS FACADE PANEL
  9. FACADE PANEL CAVITY
  10. STEEL BEAM-TO-BEAM CONNECTION

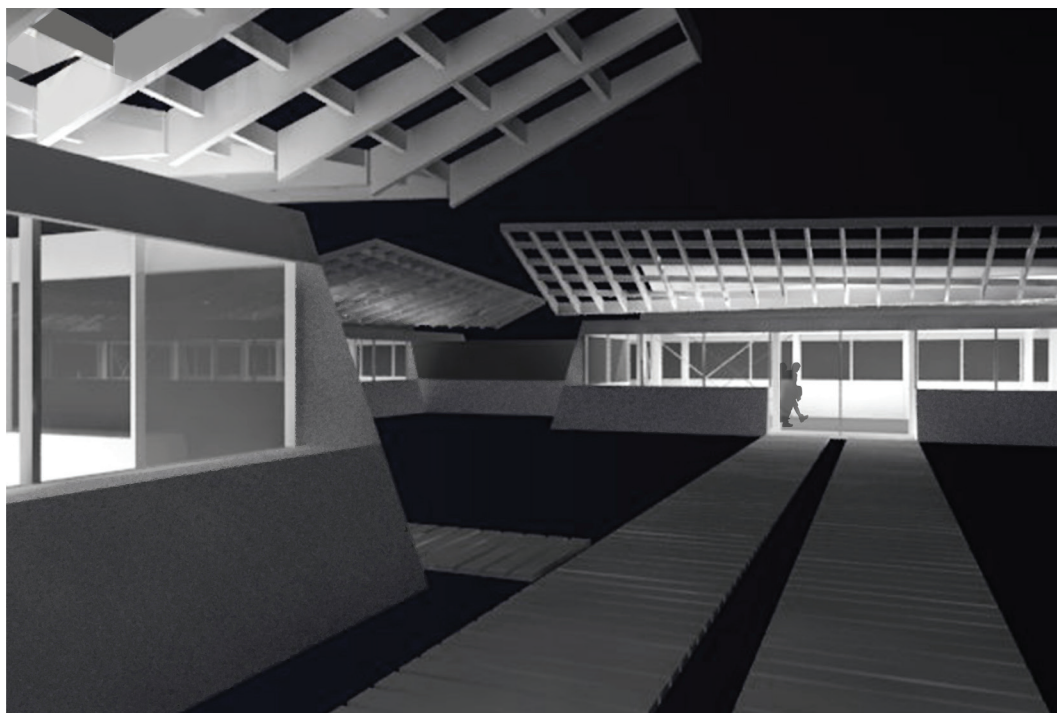
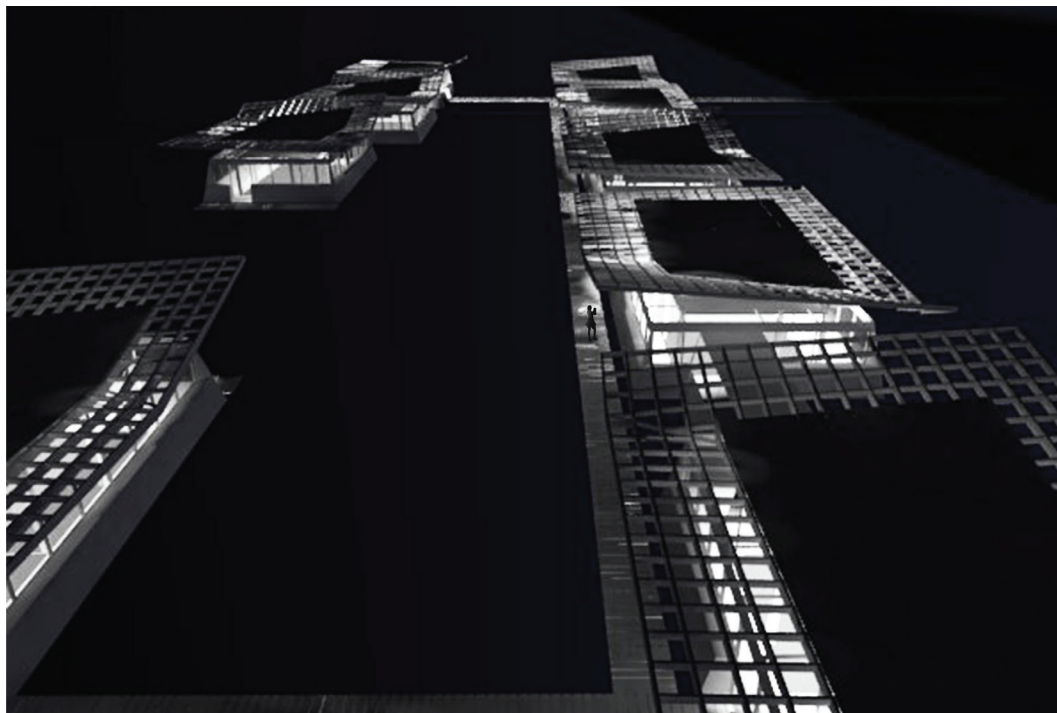


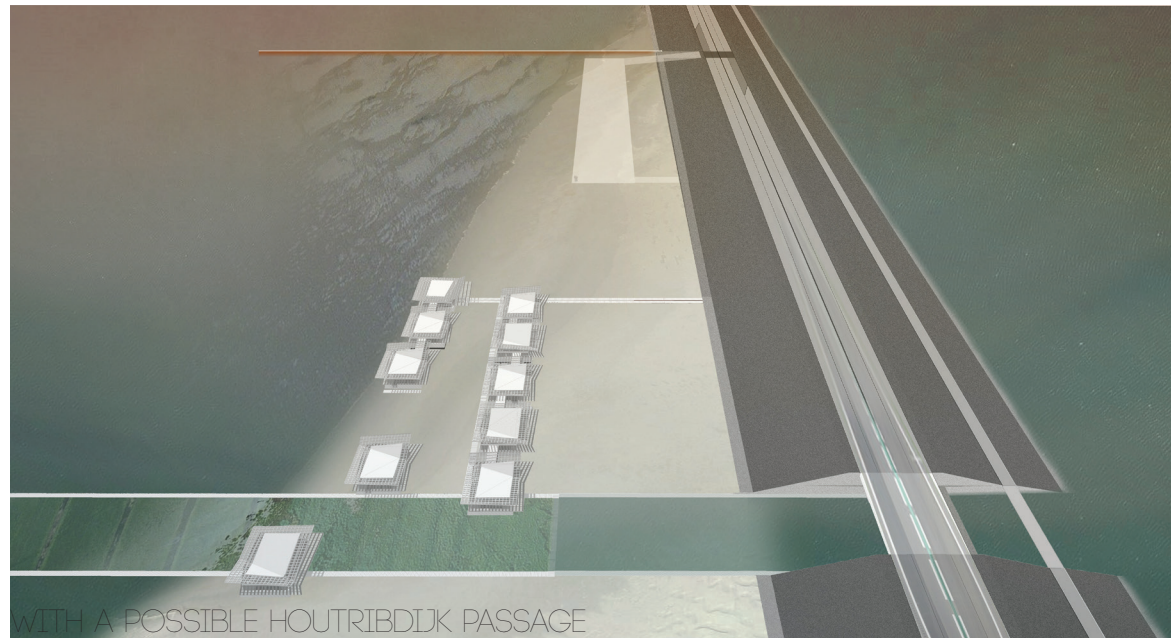




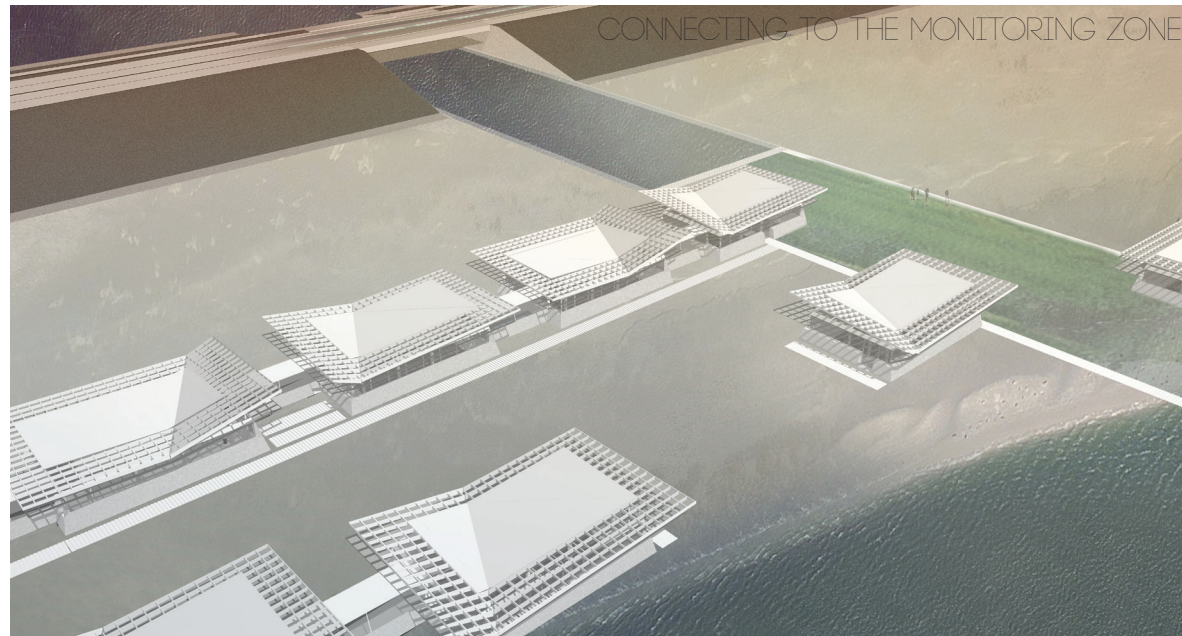


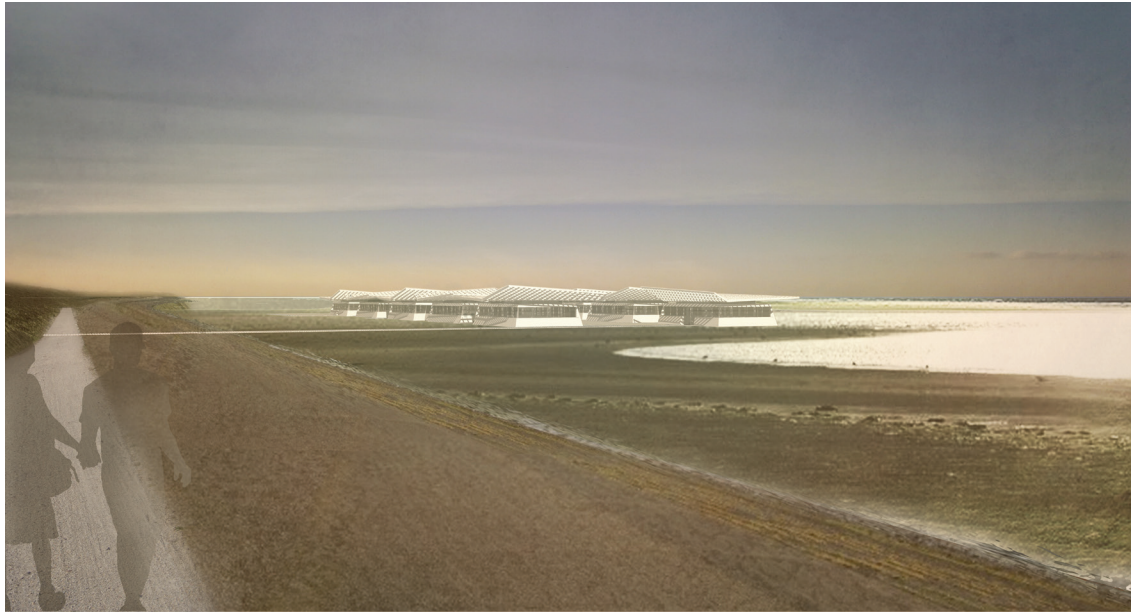
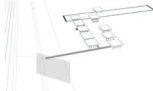


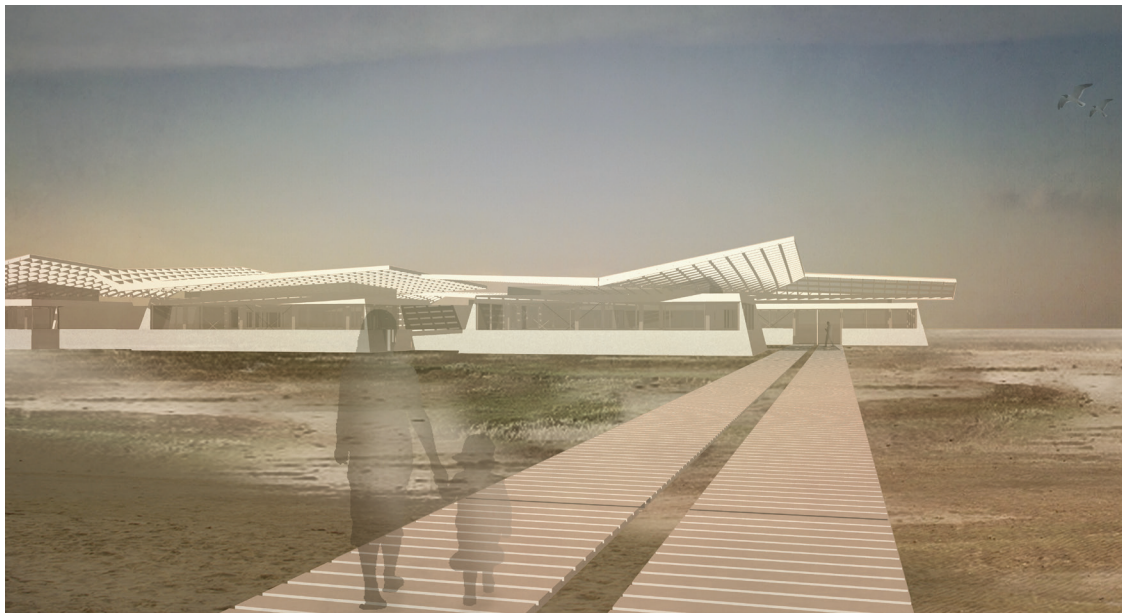
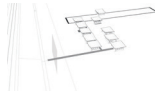


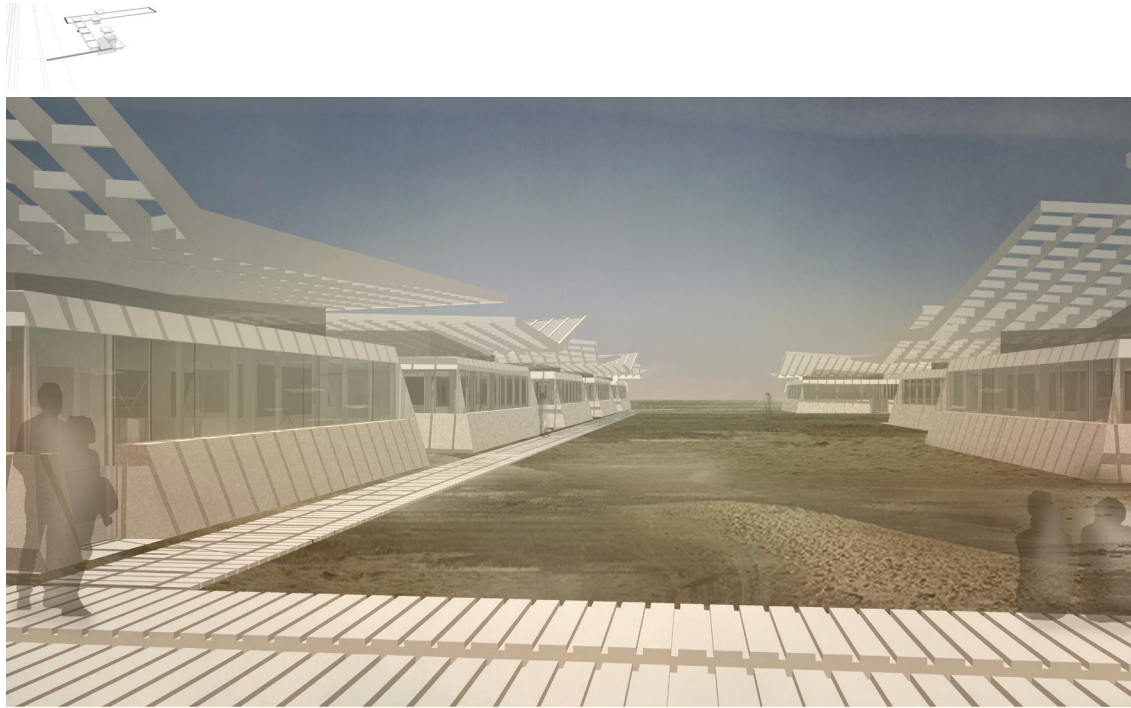




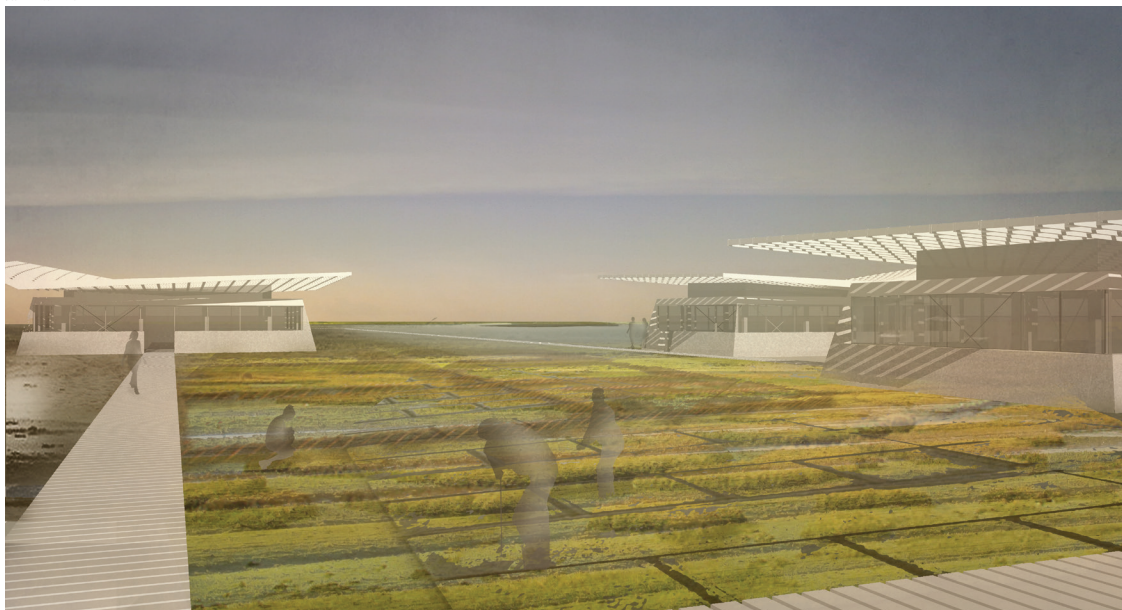
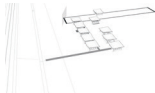




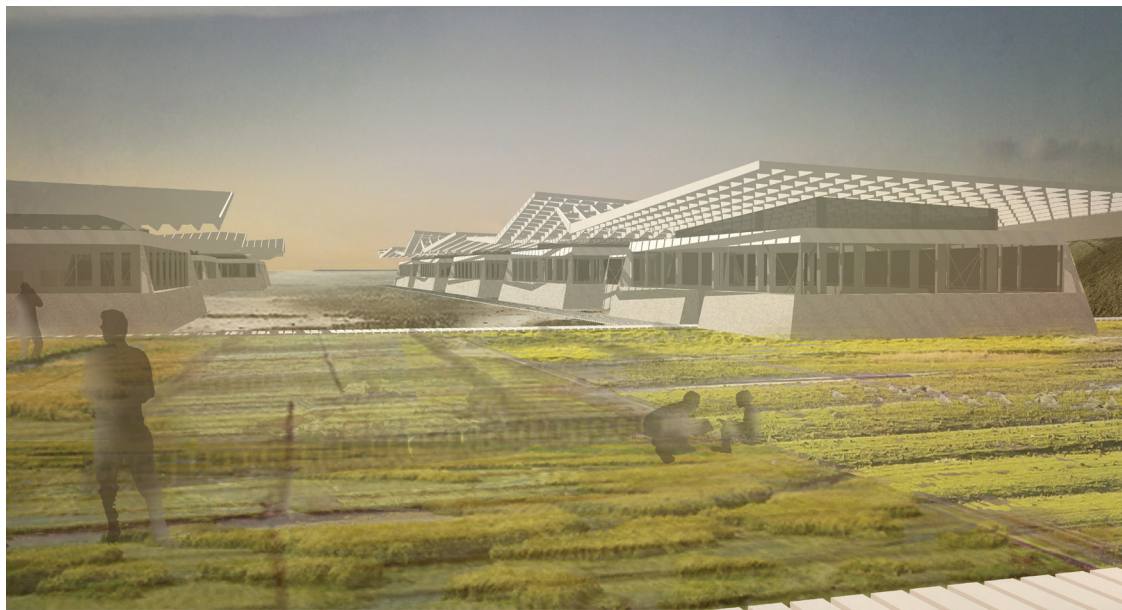
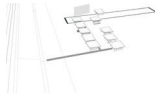


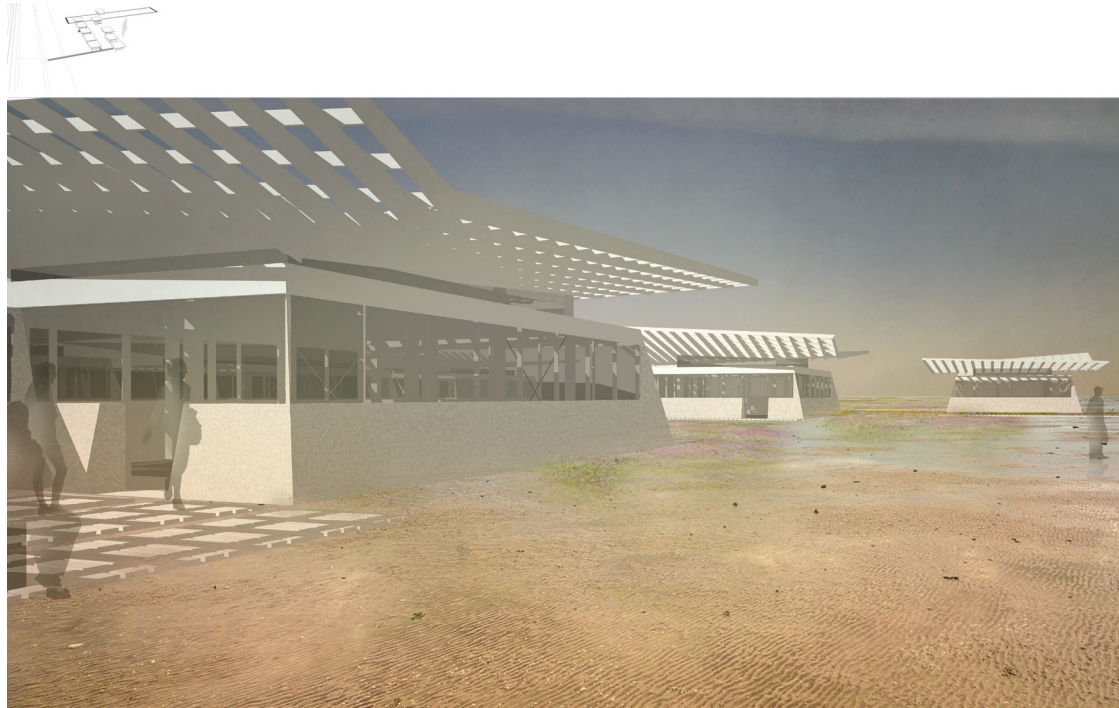


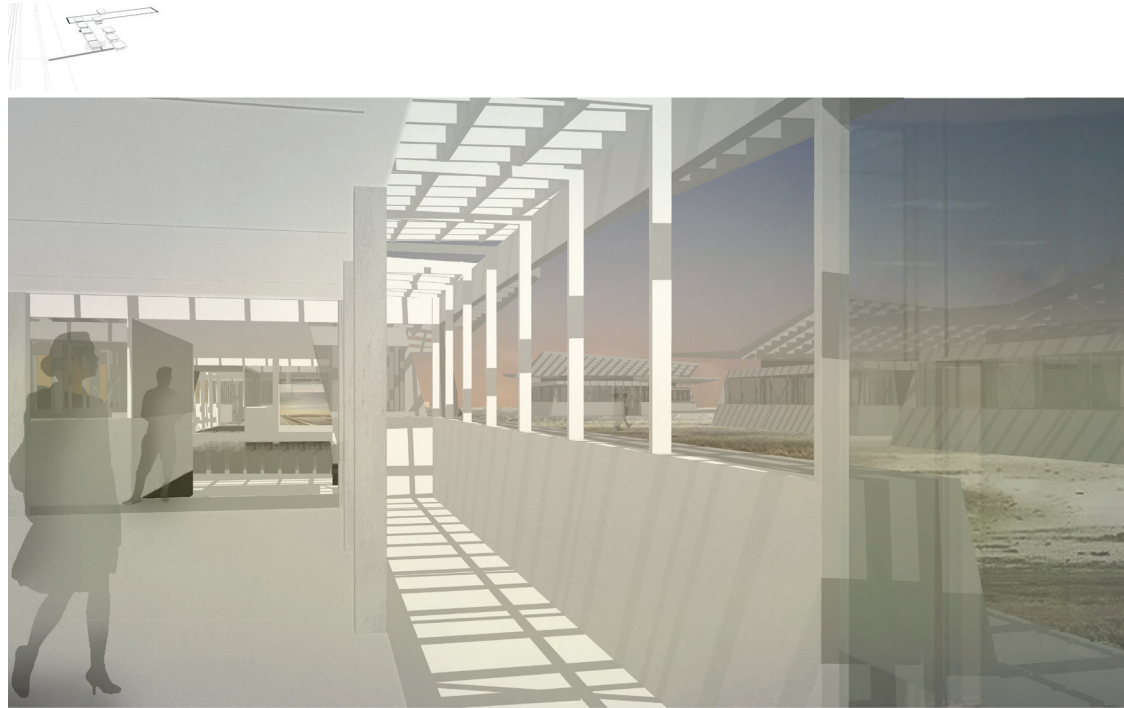




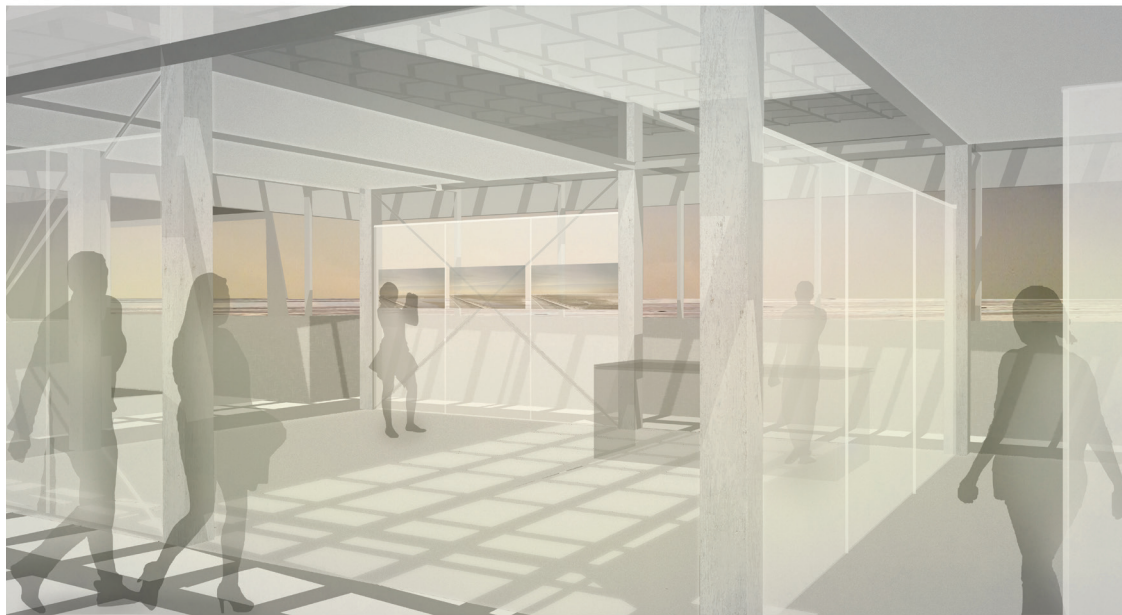
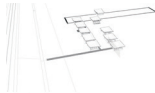






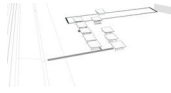












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# The Meaning of the Landscape and Ecology in Deltaic Architecture in the Netherlands

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**Abstract** – In architecture, one of the most essential aspects is the genius loci. The distinct characteristics of a certain location involve the architecture in its unique context. This refined notion can be a key towards deltaic architecture. In this perspective, architecture is tangent to many other fields and subjects such as environment, climate change, but also the disciplines of landscape and ecology.

The area where architecture, landscape and ecology intervene with each other, is explicated in this position paper. As area of interest delta's are chosen; regions where elements meet, societies settle and where water ecology infringes the built environment. Here, landscape, ecology and architecture should not be seen and studied separate from each other, though one can evoke and affect the other to a large extent. A benefit is created when an architectural intervention enhances the landscape and ecology properties of a delta.

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**Key words** – Architecture, Landscape, Ecology, Delta

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## 1. Introduction

Delta regions worldwide consist out of a very diverse, dynamic and comprehensive landscape structure and ecology. When introducing elements of the built environment in the form of an architectural intervention, issues regarding the elaborate context of a deltaic landscape come into place. As a result deltaic architecture – i.e. architecture in a delta area – deals with not only the field of architecture, but as well with the tangent disciplines of landscape and ecology. This relevance can be found in the fact that a design intervention in a delta region touches upon the vulnerability of the natural resilience and vital ecosystems of that delta (Delta Alliance, 2011).

This position paper investigates the relevance of the field of landscape and the field of ecology on architecture shaped within a delta region, in order to strike a balance of the meaning of each discipline in the scope of deltaic architecture. Resulting in the following research question: What is the relevance of landscape and ecology for an architectural intervention set in a delta region?

Via a literature study, several theories will pass in review to get an adhesion on the aforementioned disciplines. In addition, a case study of an architectural project of the Delta Interventions specialization studio is dealt with.

The paper is structured as followed. In section 2, the context of delta regions is explained, with an eventual focus on the Dutch delta. Section 3 provides an elaboration on the field of landscape and its relation to architecture. Section 4 explicates the relevance of ecology with regard to architecture. Section 5 deals with the case study that will showcase as a practical example of deltaic architecture, thus previously mentioned theories will be set out against

practice in this section. In section 6, an overall methodology is proposed regarding practicing architecture in delta regions. The paper ends with a conclusion and short discussion.

## **2. The context of the delta**

On a global scale, delta regions function as magnets for urban development. The prosperous water characteristics of the place where rivers meet the sea, cause people to settle at deltas, as a headspring for urbanization. Therefore, delta regions can be seen as some of the wealthiest places in the world, with their various environmental resources and biodiversity. However, a certain tension can be noticed between various phenomena such as population growth, industrialization and climate change occur in these water related areas (Delta Alliance, 2011). In addition, these worldwide phenomena challenge future urbanization trends as water resources may become scarcer and less reliable, thus flexible and resilient interventions regarding water management are needed. A larger influence of natural water systems can set off this shift towards resiliency (Vairavamoorthy, 2009). It is currently of utmost importance to increase adequate adoption of the valuable and at the same time vulnerable delta regions, regarding to the future pressure of the aforementioned phenomena (Delta Alliance, 2011).

The Dutch delta, as part of the Rhine-Meuse delta, has its own relevant future trends as due to climate change the sea level might alter and salinization in rivers may occur. Interventions tackling these threads have influences on water quality and flora and fauna (Rijkswaterstaat, 2014). From this notion, the necessity of involving the site specific delta landscape and its ecological values into a designed intervention becomes apparent.

## **3. Landscape and architecture**

The delta comprises a various landscape, while its naturally under influence by the tides of the sea and the seasonal fluctuations of the rivers. This dynamic context requires an accurate grip on the present elements in the delta, which together shape the landscape. A deltaic intervention literally intervenes in the natural flow of the delta.

In order to clearly determine in which domain the planned intervention will take place, it is evident to describe the relation between the fields of architecture and landscape, via the unique properties of both disciplines. The two fields are different from each other, nor they are the same. The best way to describe the relation between landscape and architecture is that the two share similarities (Leatherbarrow, 2004). The common relationship between the two fields holds upon so- called topography; incorporating the aspects of theme, framework and place to provide patterns and expressions of beauty by the design of form and space (Leatherbarrow, 2004). Defining the topography of a designed intervention, should provide a handhold to define the exact topic and field of study.

To come to a more precise, distinct framing of landscape and architecture, mainly practical conditions such as construction, materialization, production and standardized dimensions should not be taken into consideration when comparing the two disciplines. Then, it is possible to compare for example a designed landscape with a plan for a building, where crucial elements such as proportionality, rhythm, layering, transparency, flow and continuity can occur in both plans of both disciplines (Leatherbarrow, 2004). Two more conditions can be mentioned with respect to comparing architecture and landscape; the design process that takes place while creating an intervention and the factor of scale. In the process of designing, various analysis and preliminary concepts pass in review. It is in the early stage of this process when no particular of specifically assigned functions are yet incorporated in the plans, that a comparison between the fields of landscape and architecture is relevant (Leatherbarrow, 2004). The factor of scale can influence the way that the two disciplines relate to each other as

well, in the sense that on a larger scale the overall landscape is more apparent, while on a smaller scale architecture finds its importance, imbedded in the site specific, delta landscape.

#### **4. Ecology and architecture**

The relationship between elements of the built environment and ecology and their necessity to be linked with each other, is apparent on various scales. On a large scale – the urban scale – so-called ecocities balance environmental factors with the goal of achieving sustainable urban development; here, sustainable management clusters are ecologically and hydrologically regarded as resilient (Novotny, 2009). Zooming into deltaic architecture, a small scale architectural intervention causes alterations in the landscape and thus influences the site specific ecology. Being part of the delta landscape, the ecological value can be lowered by the impact of an intervention, cause it reduces the natural resilience of the vulnerable ecosystems in a delta, which evokes protection measures in the delta regions (Delta Alliance, 2011).

Thus, it is important to get a grip on the site specific ecology, before the design process of the architectural intervention starts. Introducing a built environment onto a landscape can cause loss of habitat and isolation regarding biological diversity of a site (Collinge, 1996). The study on ecological change due to a designed intervention, is a very refined and extensive one. Still, several elements important for ecological sustainability can be distinguished, and thus these elements should be accounted for when planning an intervention. In this way, (i) creating edges or borders in a habitat may cause an apparent shift in ecology values, where intricate boundaries are better than plain boundaries, (ii) a larger landscape means a richer and more various ecology, (iii) the creation of green corridors in a landscape can cause a positive ecological effect (Collinge, 1996). These main three elements can form to a certain extent general guidelines for the design process of the architectural intervention in a landscape context.

In addition, the relationship of architecture and ecology can be explained in other way; when in the intervention the natural environment comes into place. As a notion of ecological consciousness, nature can be incorporated into the buildings itself (Leatherbarrow, 2004). Approaching ecology in this manner, the actual architectural intervention may enhance the site specific ecological value rather than influence it negatively.

#### **5. Deltaic architecture – a case study**

In the Markermeer/IJsselmeer area, as part of the deltaic region Rhine-Meuse of the Netherlands, a new large scale landscape interventions will take place as a group of wadden-islands will be created in order to enhance the ecological value of the Markermeer. These MarkerWadden (Lenselink, 2014), touches upon different fields of study such as landscape and ecology. The actual case study is an architectural intervention, MarkerWadden centre, which has an aim to keep its ecological footprint on the landscape as low as possible, and possibly even enhance ecological richness of the genius loci. To accomplish such a project, a clear description of the field of interest via the aforementioned topography is useful. Following the earlier mentioned theory of topography between landscape and architecture, the topography of the case study project can be described as followed: delta regions and waterscapes (as theme), urban/landscape/architectural intervention (as framework), and IJsselmeer area, The Netherlands (as the place). In terms of the relation between landscape and architecture, its differences become rather vague in this specific project, cause building and landscape literally infringe each other in the design; framed parts of the island landscape form imbedded ecological zones within the building composition. Seen on a larger scale of the entire MarkerWadden area, the difference between landscape architecture and architecture

becomes more apparent. Here, differences in area size – the large ecology of the MarkerWadden island group – and intervention – a building for people – pass each other. Even though the architectural intervention is of a smaller scale, the architecture of the project is composed in such a way that it can add value to the ecological richness of the site. Tactics derived from the earlier mention guidelines, such as making open spaces between the different building masses, and designing complex boundaries between and around the building composition should contribute to an enriched ecology of the near surroundings.

#### **6. A methodology for deltaic architecture**

Focusing on the relevance of the fields of landscape and the field of ecology for an architectural intervention set in a delta region, several theories can be taken into consideration before the actual intervention is planned and designed. The dominant factor might be the matter of scale which becomes relevant with respect to the actual size of the intervention in a delta region. If the architectural intervention covers a large area, working in the discipline of landscape becomes apparent, and therewith the assumed negative ecological effect. A smaller architectural intervention covers less of the landscape discipline, while evoking less negative ecological consequences. However, to a smaller or larger extent the planned architecture will have impact on the dynamic and rich ecology and landscape of a delta. The most profitable situation will be that the vice versa situation will occur; when the landscape and ecology are able benefit from the deltaic architecture.

#### **7. Conclusion**

This position paper dealt with the theories of the fields of landscape and ecology and investigated their relation to architecture performed in a delta region. This formulates a part of the research that is done for the individual architectural project of the design studio of Delta Interventions. Via an assessment of theories and of an practical case, methods of comparing and guidelines could be formulated, which can benefit the planning of a deltaic architectural intervention. Architecture in a delta deals with diverse fields of study, the value of the deltaic landscape and its refined ecology should strongly be accounted for in the field of architecture.

#### **8. Discussion**

While the literature study provided the necessary theoretical framework for this paper, theories and practice are challenged in only one case study – the architectural project of the Delta Interventions studio. Analyzing one deltaic architecture project as a case study, may not result in a ground truth.

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