A NEW LAYER OF ICELANDIC IDENTITY

LOGBOOK

JEROEN THIJSSEN

GRADUATION STUDIO 18 | 19
JEROEN THIJSSEN

LOGBOOK

CONTENT

THEORETICAL FRAMEWORK

SURVEY

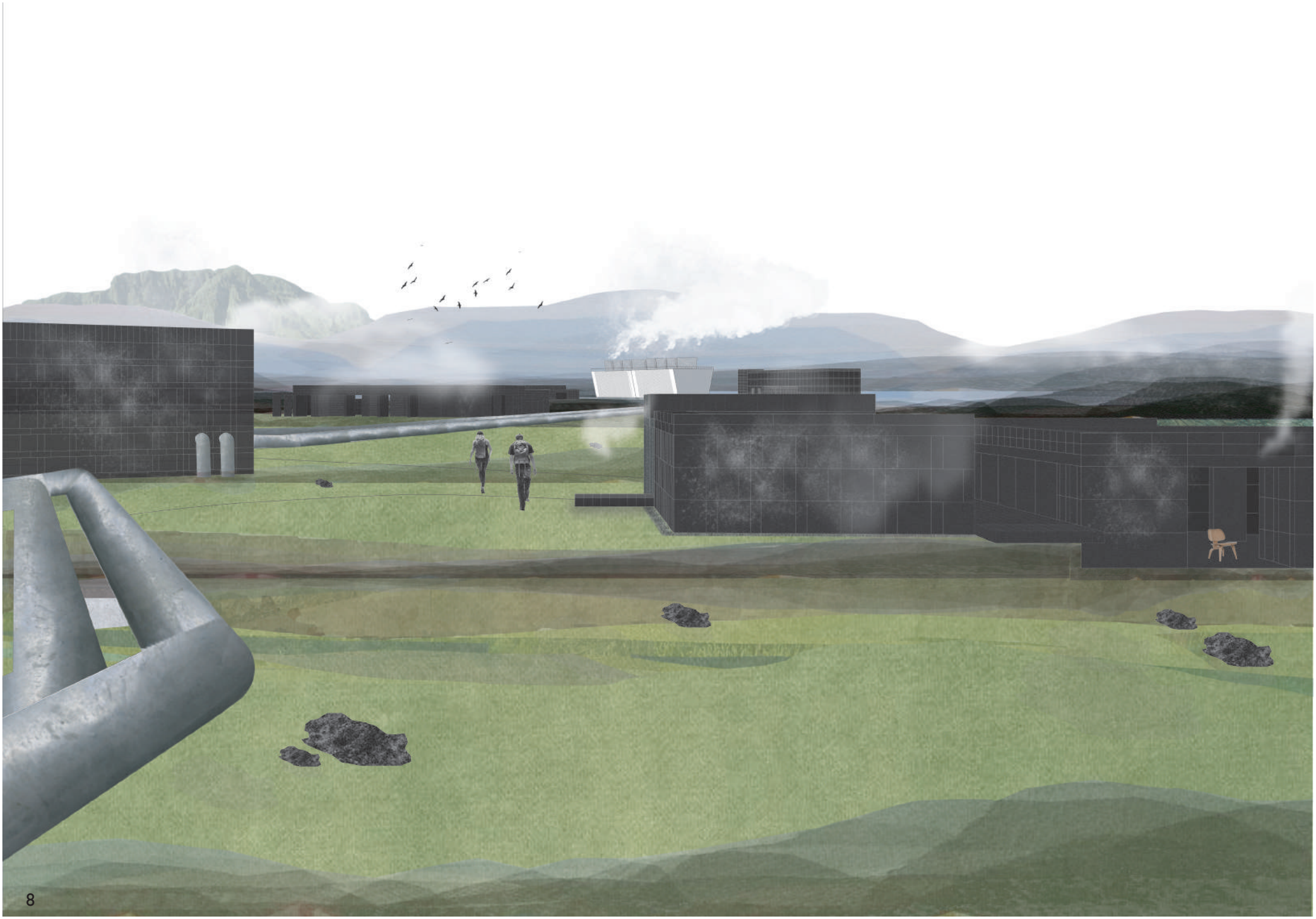
PROJECT SPECIFICATIONS

CONCEPTUAL DESIGN

PRELIMINARY DESIGN

DEFINITIVE DESIGN

THEORETICAL FRAMEWORK



A NEW LAYER OF ICELANDIC IDENTITY

The Icelandic landscape is facing increased pressure in a geopolitical situation where energy policies and increasing tourism lead to infrastructural development and ecological adaptation.

Tectonic plates and glaciers create renewable Energy industries in Iceland. They rely on considerable renewable energy resources, particularly geothermal and hydropower. The opportunities to create new forms of integration between energy exploitation and the landscape are unique in Icelands geology, and offers challenges to explore the intersection between industrial environments and the landscape system.

In the recent future Icelands unique and untouched landscape will be changing due the fact of rising interest of global economy in the countries cheap renewable yet considerable energy. The rebounding industries ignore the intersection between industrial aesthetics of the formal object and the landscapes systems.

Geothermal and hydropower can have negative effects on the environment and tourism industry, including surface disturbances as well as negative effects on vegetation and wildlife due land use and noise. The construction of large scale hydropower and geothermal projects in ecologically sensitive areas is highly contested, triggering wide opposition from the public and international non governmental organizations.

A NEW LAYER OF ICELANDIC IDENTITY

"a new layer of Icelandic identity" approaches Icelandic geothermal energy industry as a specific case inside architecture that requires a rethinking of the common ways of reading intervening and representing energy industries in pristine landscapes today.

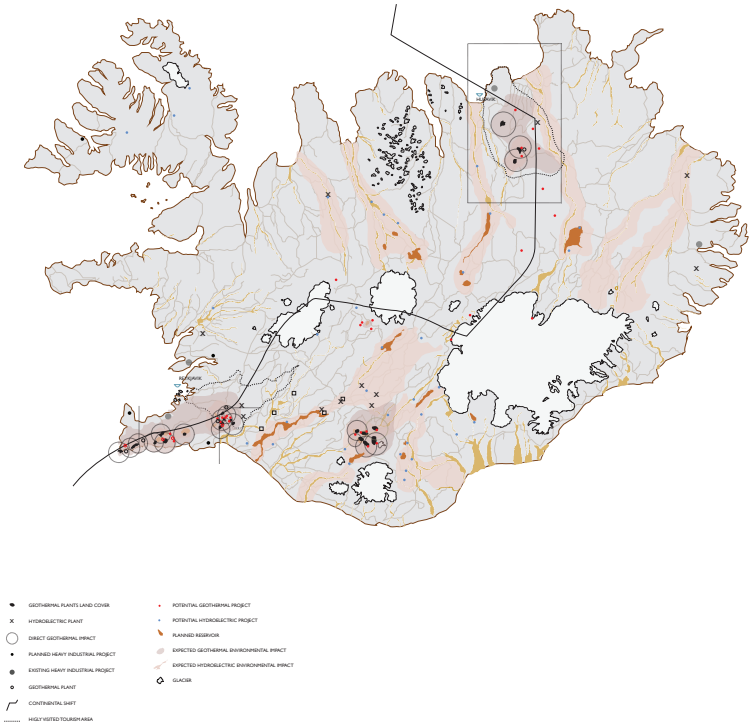
By expanding the field of architectural design into territorial studies, the project aims to claim the environmental system as part of the architectural | industrial object. The project's outcome makes an experimental proposition of reclassifications in defining space and function by using extreme temperatures and basalt stone in creating new types of architecture to combine industrial processes with tourism accommodations.

INTRODUCTION TO THE PROJECT

The Icelandic landscape is facing increased pressure in a geopolitical situation where energy policies and increasing tourism lead to infrastructural developments and ecological adaptation. Iceland's landscape is a distinctive national identity for Iceland's culture and society, tectonic plates and glaciers are the cause of its unique volcanic landscape. Beside unprecedented beauty tectonic plates defines two of the countries main industries. Growing tourism and geothermal stations increase as a result of targeted industrial developments that boost the country's economy after the financial crisis and attracted by the country's cheap energy surplus. It is needless to say that the number of geothermal sites is constantly growing and ongoing due to the future connection of Iceland and the mainland of Europe which makes it possible to export the countries energy surplus.

Researching the impact on the countries landscape showed the concentration of geothermal developments along the countries fault line. The results are collected in the map below and show the increased change in Iceland's country and ask for a rethinking of industries in Iceland's pristine landscapes.

iceland trip 2018



ENERGY AND LANDSCAPE

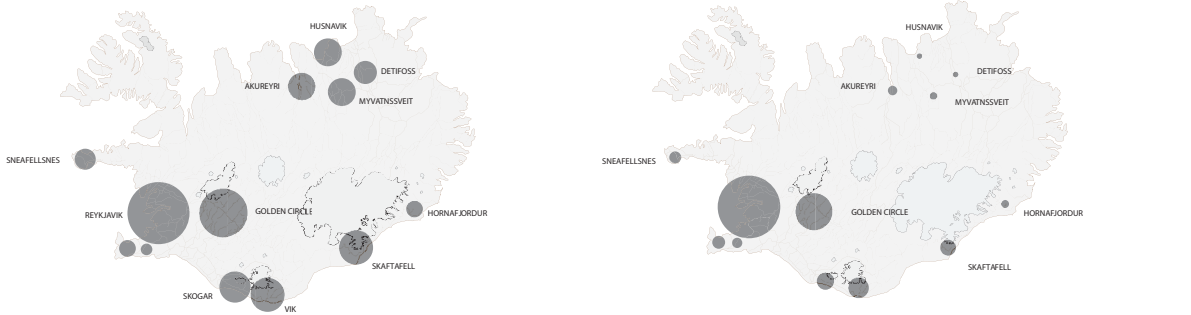
Energy is the medium that feeds human activity and depends on the structure of the landscape. This direct link between energy production and needs for society becomes evident through the physical, artificial intersections made in the natural landscape. This makes us living in an urban industrialized civilization what geologist call the "Anthropocene " what literally "the human era" means 2 In the age of the so-called 'Anthropocene' the earth has become dominated by industrial exploitation in which Iceland seems to be one of the last places on earth that are still untouched, but even those places we call "nature" are currently on the border of being maintained, this in order to preserve and protect fragile ecosystems or their biodiverse uniqueness.3

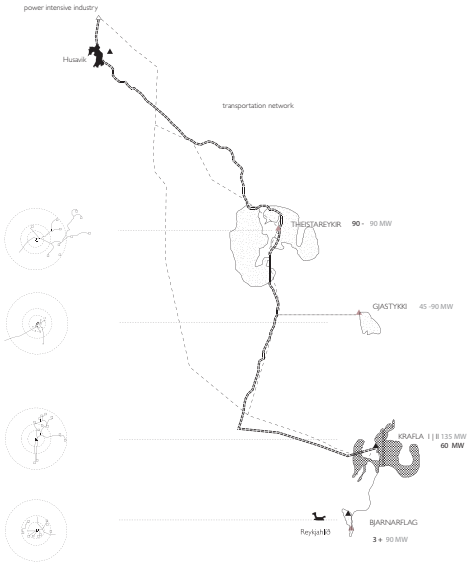
In response, this projects aims at the level of acceptance of geothermal energy industries in Iceland and investigates artificial industrial structures to reveal and intensify a new layer of a cultural landscape that grows over time and interweaves between people, geothermal industry and the landscape system. Throughout time a new recognition of fundamental elements can be seen as fundamental to Icelandic identity.

LOCATION, ICELAND'S NORTHEASTERN GEOTHERMAL MASTERPLAN

The project starts with the concept of architecture as environmental object and the relation to energy industries and their natural environment. The specific site of interest is the Krafla Power-station in North East Iceland. The Krafla Power-plant is considered to be one of Iceland's biggest geothermal sites with its 33 boreholes and is part of the countries North East geothermal masterplan. The Geothermal masterplan represents the development of 4 geothermal industries of which the Krafla Power station is growing from 60 to 135 megawatts.

Iceland's transformation offers a rethinking of the common ways of dealing with these industrial developments. Therefore this project proposes a consistency in development between tourism and geothermal industry in Iceland's pristine landscapes. The large scale developments are used to combine the tourism industry with the geothermal industry as a strategy to maintain the beauty of the northeastern region.





5 | Koert van Mensvoort 'Real Nature Is Not Green", next nature (6 November 2006): http://www.nextnature.net/2006/11/real-nature-isnt-green/

NEW CLASSIFICATIONS

"Nature is a mystified anthropocentric ideal"[4]

Nature is a mystified anthropocentric ideal, this Idea of artificially has its root in the word artificial, which means art craft or skill and eventually also acquired the meaning of inauthenticity" thereby coming to encompass the common associations of how to deal with nature and deceit with culture.[5]

However, nature in the sense of something non-artificial, unaltered by human activity, is rarely existing anymore. Even the places we call nature reserve maintenance in order to preserve them.

Human design in forms of tourism and industrial technology makes the term nature take on an artificial authenticity. Preserved and protected nature is always a cleaner human-friendly version of the reality. A domesticated natural version that is little other than a dressed up version of culture. In studying the essence in what we call nature I've been noticing that perhaps the more we learn to control and protect nature the less nature there is, and the more we try or change nature the more complex it will become.

Responding to the above metaphor Koert van Mensvoort in his essay 'Nature is not green" proposes of replacing the culture \ nature binary with that of the controllable versus the autonomous, whereby culture would be that which we can control and nature all that we cannot. In here he examples growing tomatoes as something cultural, and whereas computer viruses and traffic-jams can be considered as natural phenomena, something that arises and we cannot control it.
I agree with the belief that the way we draw the boundary between nature and culture will change. The domain of origin belonged to nature, while culture encompassed the domain of the things that are so to say made. Origin is playing a smaller and smaller role in human experience, therefore, the purposed architectural intervention is a tentative proposal for new classifications of defining space and function by using temperature out of the industrial and environmental system.

TEMPERATURE AS PHENOMENOLOGICAL DESIGN MATERIAL

By expanding the field of architectural design into territorial studies, the project aims to claim the environmental system as part of the architectural and industrial object, the territory or landscape into the site. This allows the architectural intervention to engage with the large scale that occurs in energy production. Seen as an environmental object, architecture expands its role to embrace not only the design of autonomous functional objects used in geothermal energy production but also to give form to its relevant environmental surroundings, objects and systems, buildings and landscapes can thus be integrated within the larger spatial creation. This would result in a kind of contextualism that is revealing elements

The strategy explores temperature as an invisible, phenomenological design material in the landscape by exploiting them. By researching the geothermal process conclusions can be drawn that current technologies and approaches used to develop geothermal energy are borrowed from the outdated and monotonous streamed mentality of fossil-fuel production: drilling extraction wells, pumping the energy source to a processing plant, distributing it through a network of pipes and transmission lines, and discarding waste products. In this process, the different stages of temperature, material extraction and waste products create new potentials.
This strategy can, therefore, move towards a bridge between culture and nature as visible hybridization of industrial, ecological and cultural processes in a new layer of the landscape.

The project is working with the cultural and material notions of the landscape, to create new types of organization principles, relationships and processes as a base for architecture, where extreme temperatures form that of the controllable versus the autonomous.

The outcome of using temperature as design material creates a new architectural language that enriches the countries identical landscape and unveils the originating core of Iceland. By analyzing the process of energy production temperature occurs in two different stages: water and steam. Both stages are used to set a new architectural language, where hot steam rises and water descents to the lowest point these characteristics are applied in the buildings.

METHOD | MASS | MATERIAL

The environmental sources of basalt stone and temperature are used to create the fundamentals of the building system and function as an infinite source of material provided through the geographic location of Iceland.

The electricity energy surplus is used to melt volcanic stone out of Iceland's surface material to create mass building blocks that contain and release heat. The un-used temperatures in the geothermal process are deployed to heat the basalt stone structures to provide functions as tourism accommodation.

The stacked mass defines a sequence of spaces and increase and decrease in mass results in fluctuating heat emissions in different rooms related to function. The architecture of transition creates trough open corners and a play between mass relations with the surrounded landscapes. The axes (diagonal and frontal) serves as corridors, they give the visitor the opportunity to explore the building at their own discretion. The most complex walls form spaces. As in a moment of transition, the walls themselves become spaces and thus enrich the sequence of routes. Because people always have to traverse spaces, the interaction between visitors, the landscape and temperature transitions are encouraged.

The stacked structure offers to set possibilities in control temperature and where temperature takes over control. The architecture is balancing between the controllable and autonomous function of the buildings and gives users an active role over a passive role inside the building in discovering and confronting Iceland's temperatures, in a way I became facinated by the thin line between hot and cold temperatures that makes the country unique in many ways.

LITERATURE | SOURCES | REFERENCES

01 Stober, I., & Bucher, K. (2013). Geothermal energy from theoretical models to exploration and development. Berlin, Heidelberg: Springer.
02 Harari, Y. N. (2017). Sapiens: Een kleine geschiedenis van de mensheid. Amsterdam: Thomas Rap.
03 Timoty Morton, Ecology without nature : Rethinking environmental aesthetics (London and Cambridge, MA : Harvard university press, 2007
04 Koert van Mensvoort 'Real Nature Is Not Green", next nature (6 November 2006): http://www.nextnature.net/2006/11/real-nature-isnt-green/
05 Koert van Mensvoort 'Real Nature Is Not Green", next nature (6 November 2006): http://www.nextnature.net/2006/11/real-nature-isnt-green/

DOCUMENTS BOOKS ARTICLES | WEBSITES

01. Jevremovic, L. (n.d.). AESTHETICS OF INDUSTRIAL ARCHITECTURE IN THE CONTEXT OF INDUSTRIAL BUILDINGS CONVERSION. Retrieved from http://www.academia.edu/1977965/AESTHETICS_OF_INDUSTRIAL_ARCHITECTURE_IN_THE_CONTEXT_OF_INDUSTRIAL_BUILDINGS_CONVERSION

02. Orka úr 100% endurnýjanlegum orkugjöfum. (n.d.). Retrieved from https://www.landsvirkjun.is/

03. Theistareykir Geothermal Power Plant Design & Engineering. (n.d.). Retrieved from http://www.mannvit.com/projects/theistareykir-geothermal-power-plant/

04. Harari, Y. N. (2017). Sapiens: Een kleine geschiedenis van de mensheid. Amsterdam: Thomas Rap.

05. Gugger, H., Costa, B. M., & Gutscher, S. (2015). Icelandic lessons: Industrial landscape. Zurich: Park Books.

06. Newsome, D., & Dowling, R. (2012). Geotourism. Hoboken: Taylor & Francis.

07. Sijmons, D., Hugtenburg, J., Hoorn, A. V., & Feddes, F. (2014). Landscape and energy: Designing transition. Rotterdam: Nai010.

08. Stober, I., & Bucher, K. (2013). Geothermal energy from theoretical models to exploration and development. Berlin, Heidelberg: Springer.

09 Koolhaas "Junkspace, p. 170

10 "making wilderness: tourism and the history of the wilderness idea in Iceland" (A. Seaporsdottir, C. M. Hall & J. Saarinen, 2011):

11 Boston Consulting group, Northern Sights: The future of tourism in Iceland, p98

12 Visit Iceland: http://www.visitngiceland.com/plan-your-trip-/accomodation

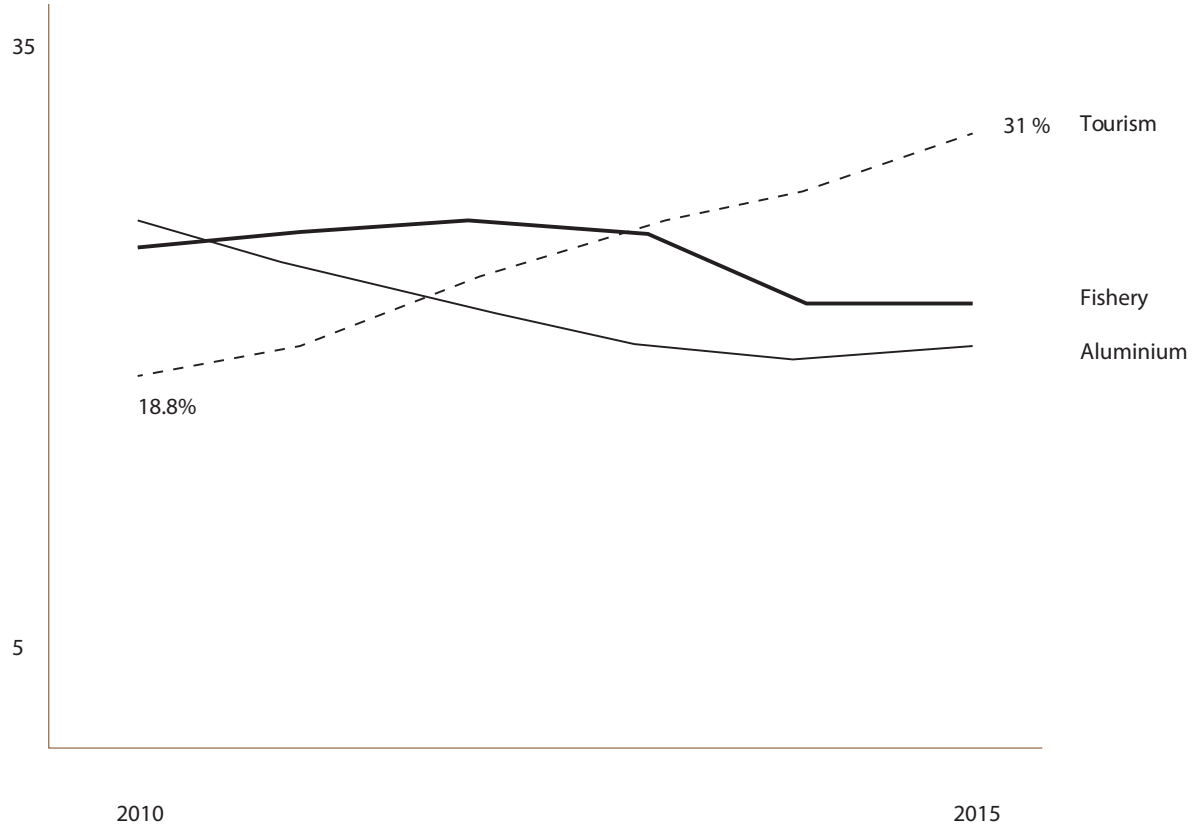
13 tourism in iceland in figures , april 2013 report by: oddyn pora oladotir

14 Iceland Map - geothermal production and high temperature zone Islandsbanki: 'The Icelandic energy Market : 2012

15 geothermal and environment map, saving iceland.org. Hellisheidi: A geothermal embarresment. 8 29, 2012. http://www.savingiceland.org/2012/08

SURVEY

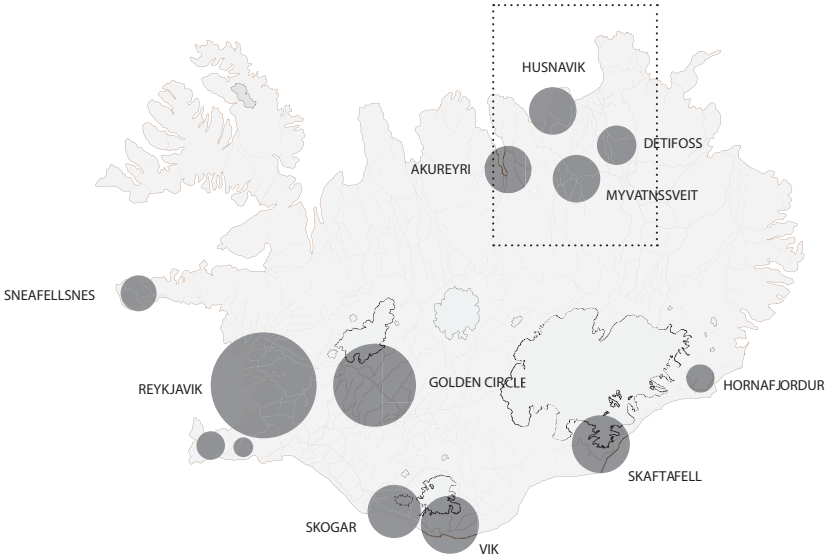
Tourism growth and services

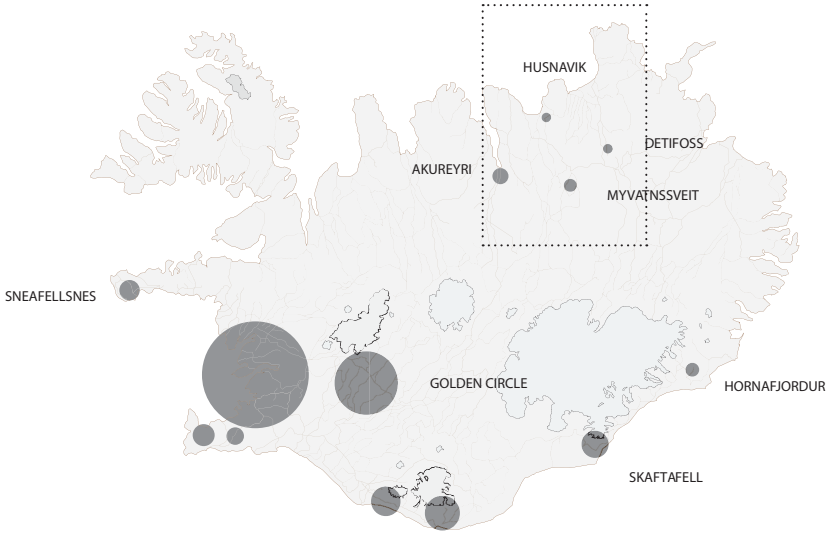


• In 2013 Iceland's tourism industry became the largest market in the country
• The number of foreign visitors exceeded 2 milion for the first time in 2017
• Region became highly dependend form tourism industry

source : http://www.icetourist.is

RESEARCH TOURISM - SPREAD DURING THE YEAR



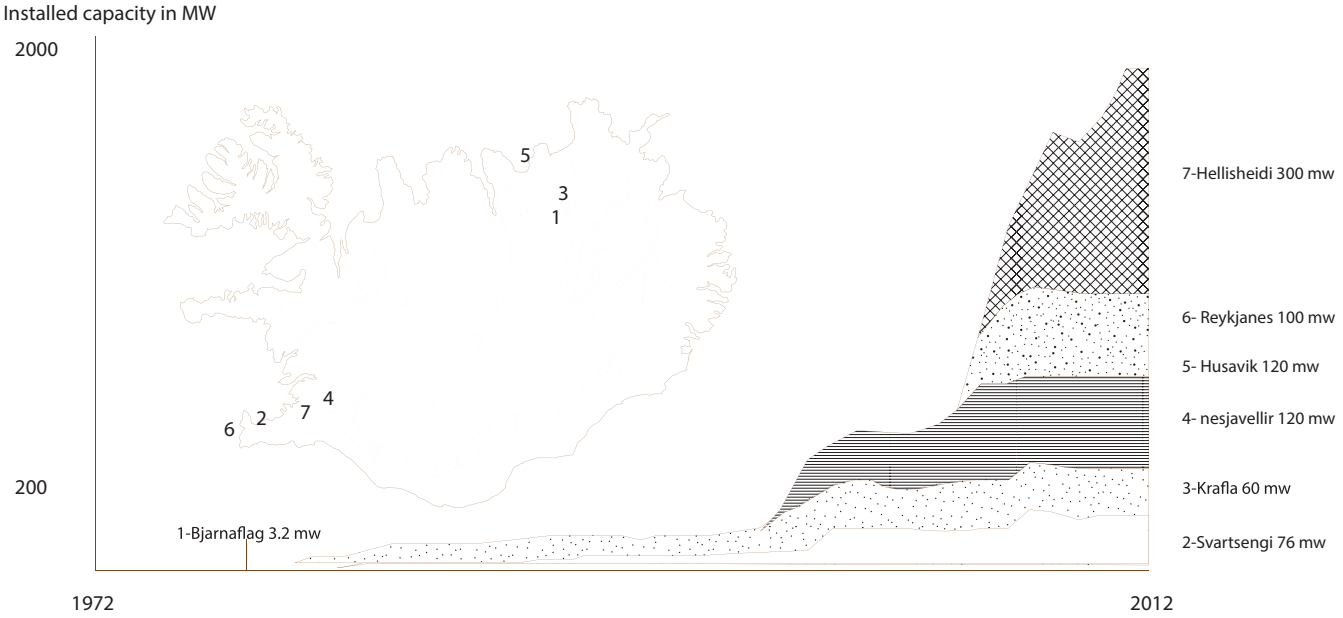


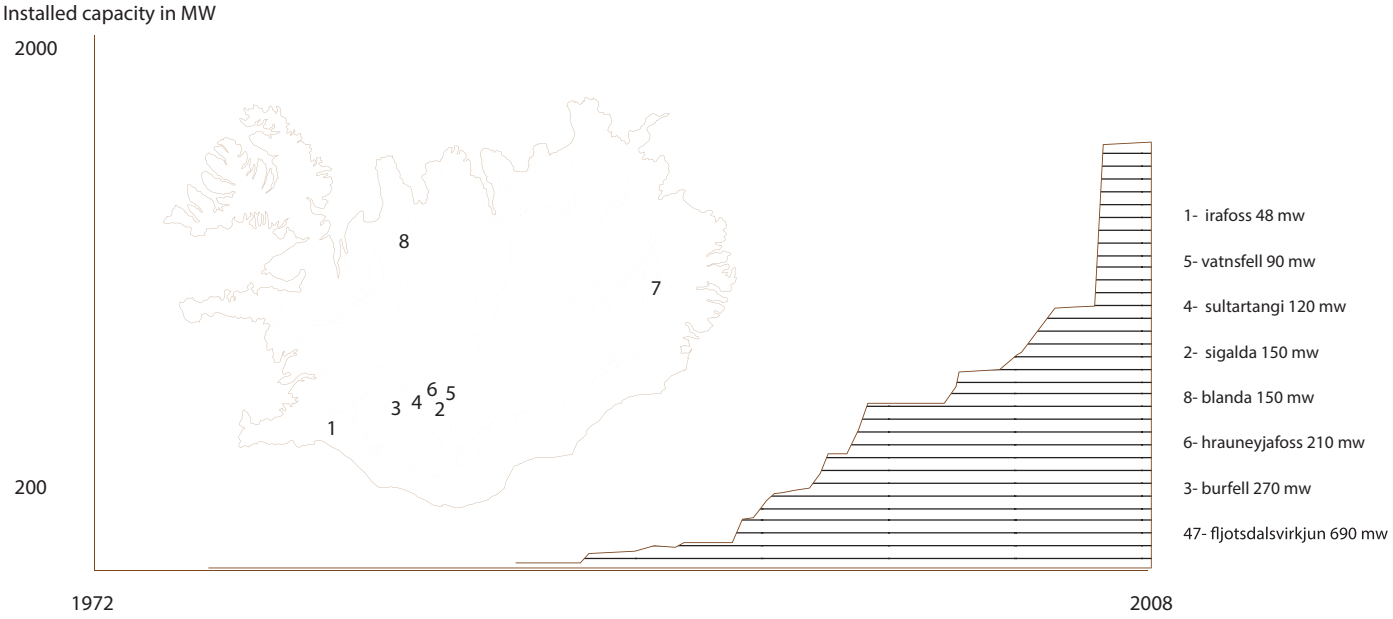
TOURISM SUMMER

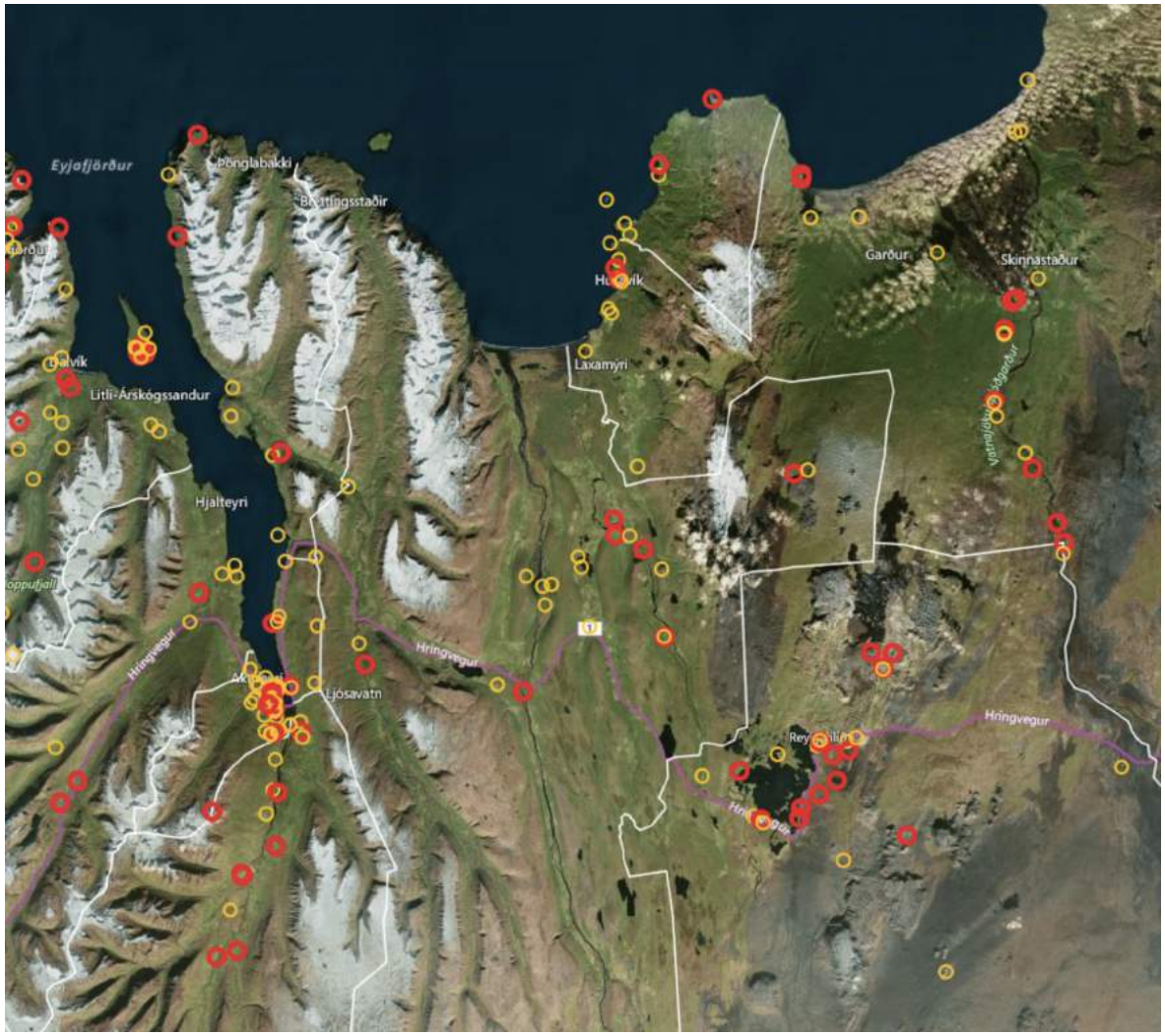
REYKJAVIK		GOLDEN CIRCLE		VIKS		KAFTAFELL		SKOGAR		AKUREYRI		MYVATNSSVEIT	
SUMMER	94.3 %	SUMMER	94.3 %	SUMMER	52.4 %	SUMMER	47.6%	SUMMER	45.3 %	SUMMER	42 %	SUMMER	42 %
WINTER	95.3 %	WINTER	95.3 %	WINTER	32.6 %	WINTER	22.8 %	WINTER	27.3 %	WINTER	13.7 %	WINTER	13.7 %

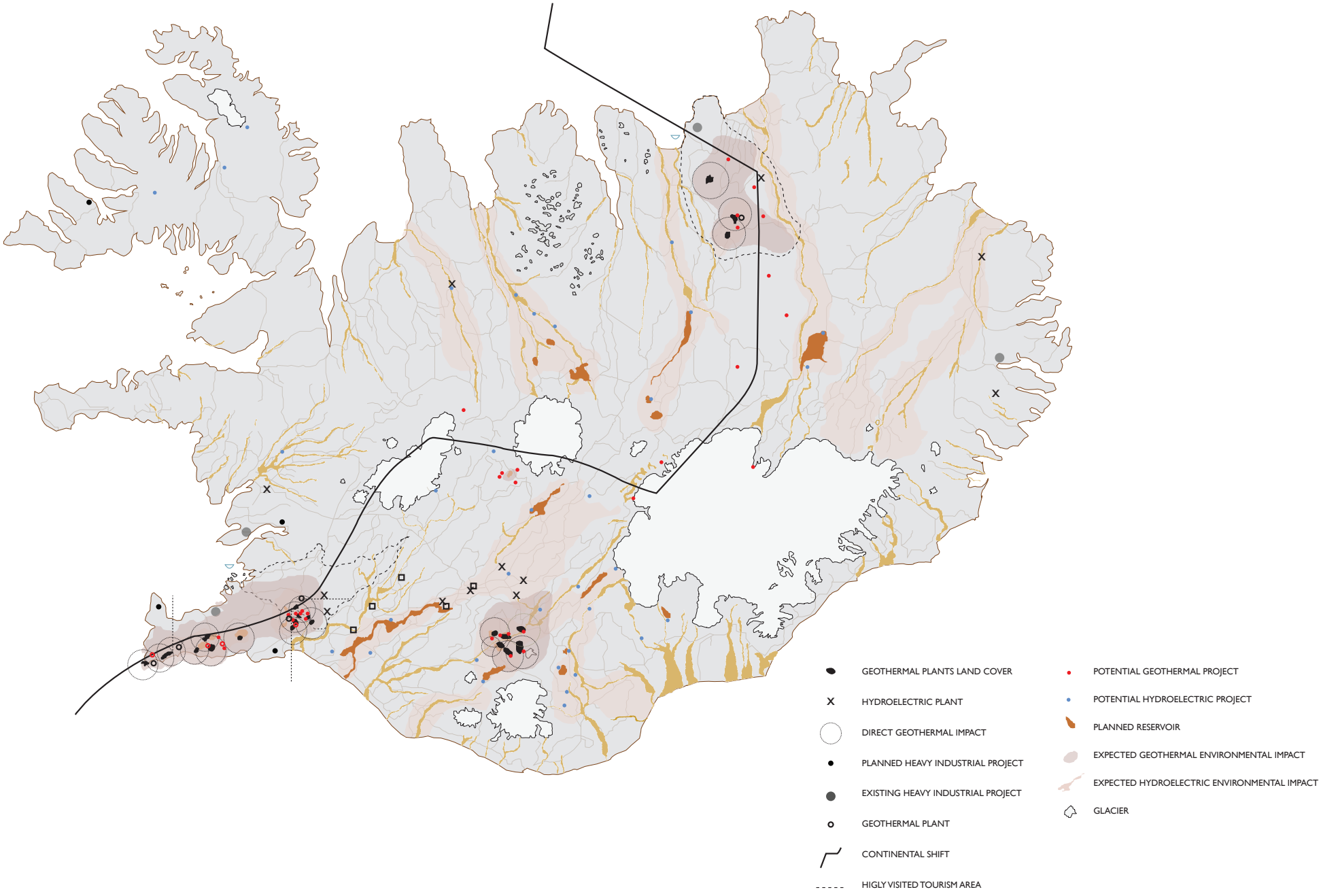
TOURISM WINTER

HUSNAVIKD		ETIFOSSS		NEAFELLSNES		REYKJANES		HORNAFJORDUR		REYKJANSBEAR	
SUMMER	42 %	SUMMER	42 %	SUMMER	42 %	SUMMER	14.7 %	SUMMER	20.5 %	SUMMER	21.3%
WINTER	13.7 %	WINTER	13.7 %	WINTER	13.7 %	WINTER	15.1 %	WINTER	13 %	WINTER	21.9 %


Installed capacity in MW
2000
200
1972
2012
5
3
1
6
2
7
4
1-Bjarnaflag 3.2 mw
7-Hellisheidi 300 mw
6- Reykjanes 100 mw
5- Husavik 120 mw
4- nesjavellir 120 mw
3-Krafla 60 mw
2-Svartsengi 76 mw

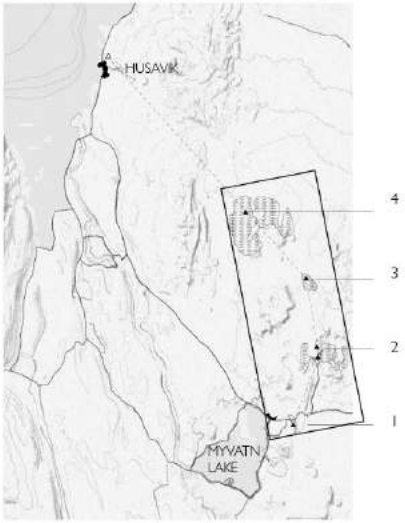

Installed capacity in MW
2000
200
1972
2008
8
7
3
4
6
2
5
1
1- irafoss 48 mw
5- vatnsfell 90 mw
4- sultartangi 120 mw
2- sigalda 150 mw
8- blanda 150 mw
6- hrauneyjafoss 210 mw
3- burfell 270 mw
47- fljotsdalsvirkjun 690 mw


Eyjafjörður
Þönglabakki
Garður
Skinnastaður
Laxamýri
Litli-Árskógssandur
Hjalteyri
Hringvegur
Ljósavatn


GEOTHERMAL PLANTS LAND COVER
HYDROELECTRIC PLANT
DIRECT GEOTHERMAL IMPACT
PLANNED HEAVY INDUSTRIAL PROJECT
EXISTING HEAVY INDUSTRIAL PROJECT
GEOTHERMAL PLANT
CONTINENTAL SHIFT
HIGLY VISITED TOURISM AREA
POTENTIAL GEOTHERMAL PROJECT
POTENTIAL HYDROELECTRIC PROJECT
PLANNED RESERVOIR
EXPECTED GEOTHERMAL ENVIRONMENTAL IMPACT
EXPECTED HYDROELECTRIC ENVIRONMENTAL IMPACT
GLACIER

PROJECT SPECS

ENERGY = LANDSCAPE



INTRODUCTION

The Icelandic landscape is facing increased pressure in a geopolitical situation where energy policies and increasing tourism lead to infrastructural development and ecological adaptation. **Landscape** is a distinctive national **identity** for Icelands culture and society, tectonic plates and glaciers are the cause of its unique volcanic landscape. Beside unprecedented beauty tectonic plates and glaciers define the countries main **industry**. Geothermal and hydropower stations increase as a result of targeted industrial developments that boost the country's economy after the financial crisis and attracted by the country's cheap energy surplus. Besides domestic consumption a possible planned energy connection between the UK en Iceland ensures further future development.

ENERGY

Energy is the medium that feeds human activity and depends on the structure of the landscape. This direct link between energy production and needs for society becomes evident through the physical, artificial intersections made in the natural landscape. This makes us living in a urban industrialized civilization what geologist call the "Antropocene " what literally "the human era" means. In the age of the Antropocene the earth has become dominated by industrial exploitation in which Iceland seems to be one of the last places on Earth that are still untouched, but even those places we call nature are currently on the border of being maintained in order to preserve | protect fragile ecosystems or their biodiverse uniqueness.

PROJECT

Therefore this project aims to develops a new architectural strategy form of domesticated landscape that interweaves between man made geothermal industries and natural landscape. Hereby industrial settings go beyond the classic approach and industry processes are reconsidered by uncovering their operations whereby they can hybridize with other purposes to enrich the environment with a new layer that impacts on the level of **tourism, economy and landscape.**

A NEW LAYER OF CULTURAL LANDSCAPE

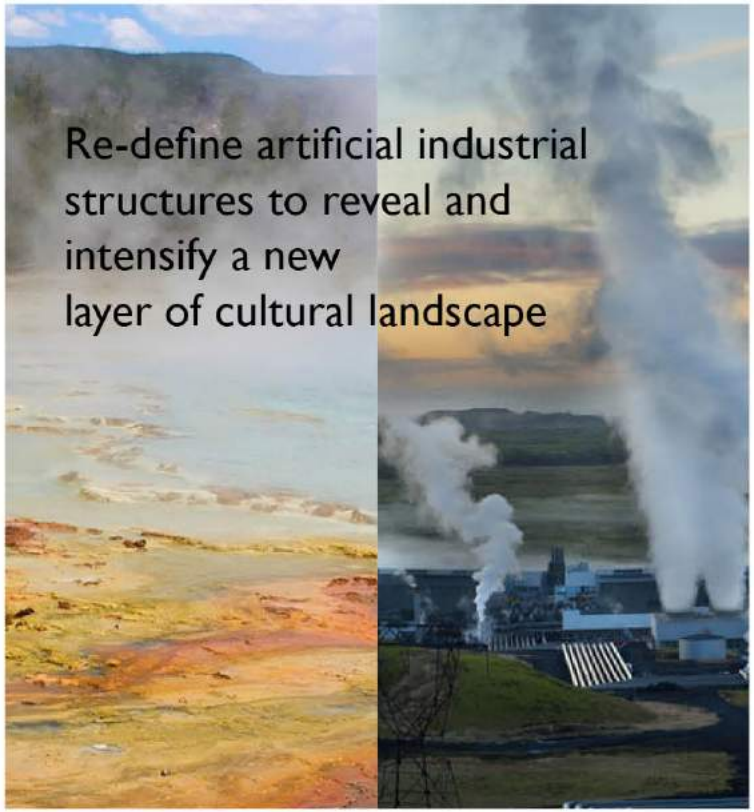
Preserve the pristine has almost become impossible, reason for this is the Antropocene, which has become globally dominated by industrial exploitation. Energy has become the medium that feeds human activity and constructs on the landscape, the earth is an essential source for sustaining production and economy. Evidence of human energy use is reconstituted and reassembled as physical intersections in the landscape.

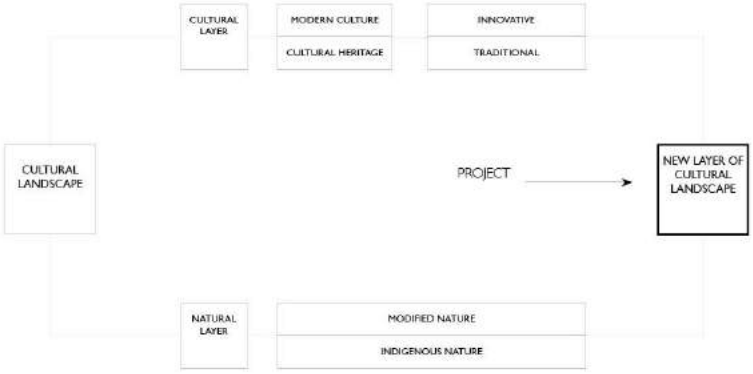
In respons this projects aims at the level of an acceptance of geothermal energy industries in Iceland and investigates artificial industrial structures to reveal and intensify a new layer of cultural landscape that grows overtime and interweaves between people, events and places. Throughout time a new recognition of fundamental elements can be seen as fundamental to Icelands identity.

ARCHITECTURE AS ENVIRONMENTAL OBJECT

By expanding the field of architectural design into territorial studies, the project aims to claim the environmental system as part of the architectural | industrial object, the territory or the landscape into the site. This allows architecture to engage with , the "large scale that occurs in energy production of both abstract thinking and spatial construction.

Seen as an environmental object, architecture expands its role to embrace not only the design of autonomous functional objects used in geothermal energy production, but also to give form to its relevant environmental surroundings. Objects and systems, buildings and landscapes, can thus be integrated within the larger spatial creation. This would result in a kind of contextualism that is not only about familiarity but rather about revealing unconscious elements.





The vertical structure - Vedenin, 1997- cultural landscape elements expaneded with a new layer

ARCHITECTURAL FRAMEWORK
THERMAL GRADIENT

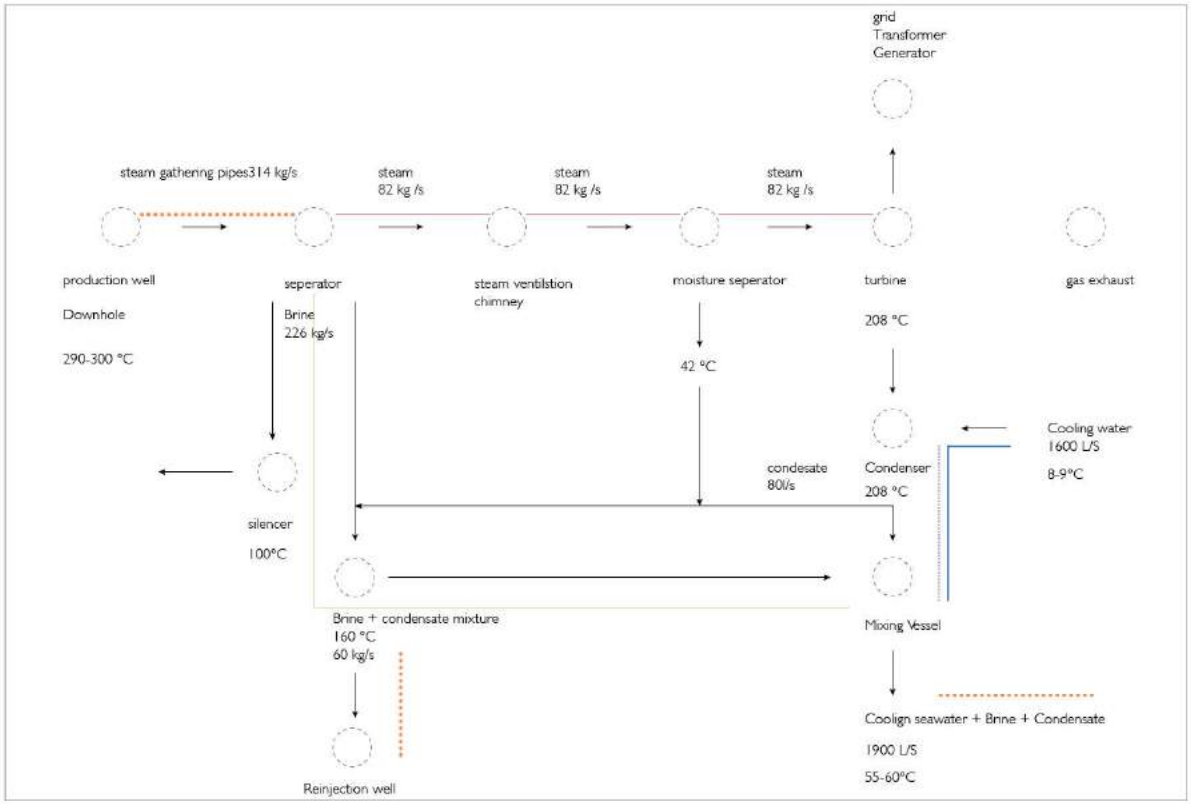
ARCHITECTURE AS ENVIRONMENTAL OBJECT

The strategy explores temperature as an invisible, phenomenological design material in the landscape by exploiting them. By researching the geothermal process conclusions can be drawn that current technologies and approaches used to develop geothermal energy are borrowed from the outdated and monotonous streamed mentality of fossil-fuel production: drilling extraction wells, pumping the energy source to a processing plant, distributing it through a network of pipes and transmission lines, and discarding waste products. In this process the different stages of temperature and material extraction can create new potentials.

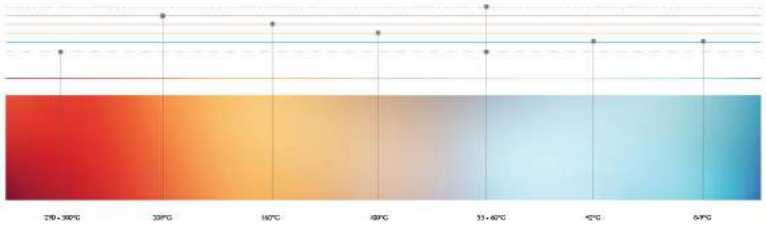
the project intents to propose an alternative methodology for using geothermal energy by exploiting the thermal gradient as architectural framework, decentralizing the network of energy use, and seizing new opportunity for programming across multiple temperature scales. This strategy can therefore move towards a bridge between culture and nature as visible hybridization of industrial, ecological and cultural processes of a new layer of landscape.

GEOTHERMAL PROCESS

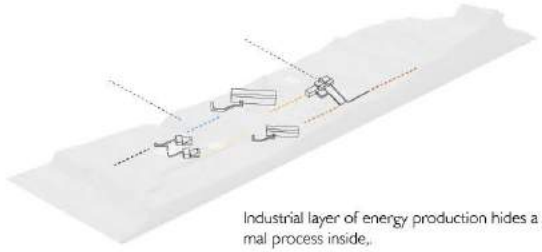
the geothermal process starts at mining 300°C brine from 1.6 to 3km below the earths surface. This hot water is piped to the plant, passing through steam seperators, which extract water and minerals from steam. It goes to two turbines producing electircity. After the generating process thermal brine is 190°C after the purification and is piped to a cooler where it is mixed with 8°C surface water to reduce its temprature before disposal or re-injection to 57°C.



Geothermal system showing the process and different tempratures on a 100 MW generation the waste material in combination with the tempratures hidden inside the process form new potentials in redefining the system with other purposes.



- Brine material
- high pressure steam
- low pressure steam
- moisture
- cooling water
- emmission gasses

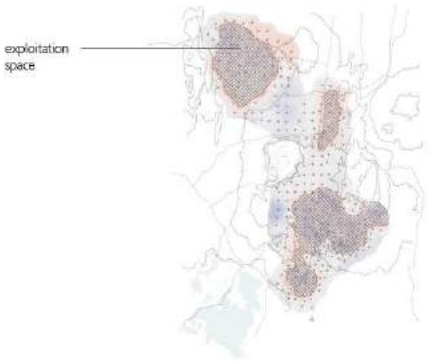


Industrial layer of energy production hides a thermal process inside,.

290 - 300°C | 208°C | 160°C | 100°C | 55 - 60°C | 42°C | 8-9°C

Temprature process form new potentials in order to transalte them in architectural elements

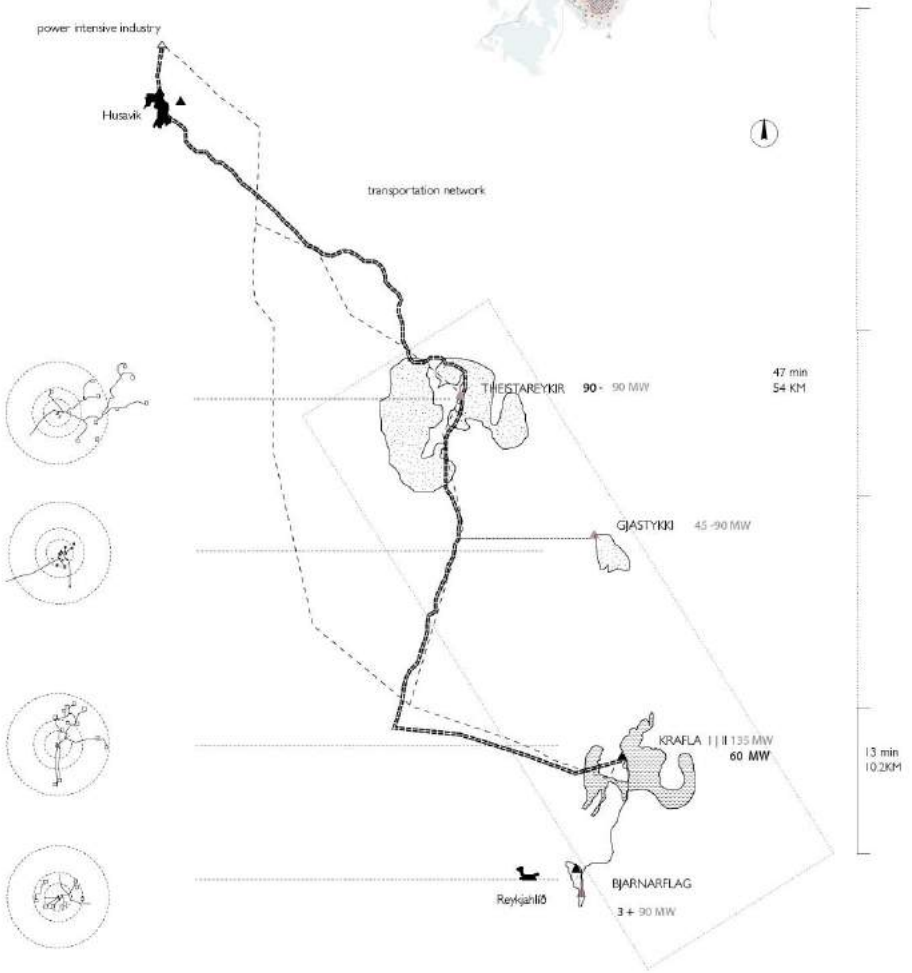
NORTH-EAST ICELAND GEOTHERMAL AREA
LOCATION



SCALE OF THE PRIOJECT

The project develops a masterplan for 4 geothermal powerplants that are connected throughout a geothermal area.

geothermal plan seen as one-continuous exploitation space connected by boreholes and studie drilling area's



NORTH EAST GEOTHERMAL AREA MASTERPLAN

The project examines how the concept of exploiting the thermal gradient as architectural framework can transform the existing and planned geothermal industries in the Northeastern region of Iceland. The Northeastern region is situated on top of several geothermal areas located nearby the continental shift.

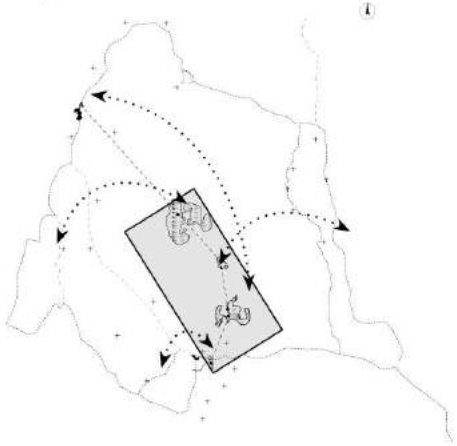
The existing power plants Krafla (60MW) and Theistareykir (90MW), both serving the silicon metal plant Bakki nearby Husavik are planned to be extended with another 135 MW and 45 MW for industrial developments. The Bjarnarflag geothermal power plant (3MW) mainly used for local district heating is planned to be extended to 90MW together with the construction of Gjastykki (45-90MW) for mainly serving power intensive industry.

Besides thermal active value the North-eastern region is a popular tourist route around Husavik and Lake Myvatn in Northern Iceland . The so called 'Diamond Circle" covers the same volcanic area where the developments of geothermal power-plants are situated and planned to be exploited.

The project therefore will focus on the transformation of the area that reaches from the Bjarnarflag geothermal energy site to Theistareykir geothermal industry site where it engages the senses and invites visitors to consider its thermal gradient in

"DIAMOND CIRCLE" REGION

the diamond circle is an essential region for Iceland's tourism distrubution located in the North East of Iceland. During summer 42% is visiting the region and in winter 13.4%. This allows to think in new perspectives and cross-fertilization that can reinfore each other in terms of tourism and industrial development.



Krafla powerplant current status

Bjarnarflag current status

Theistareykir current status

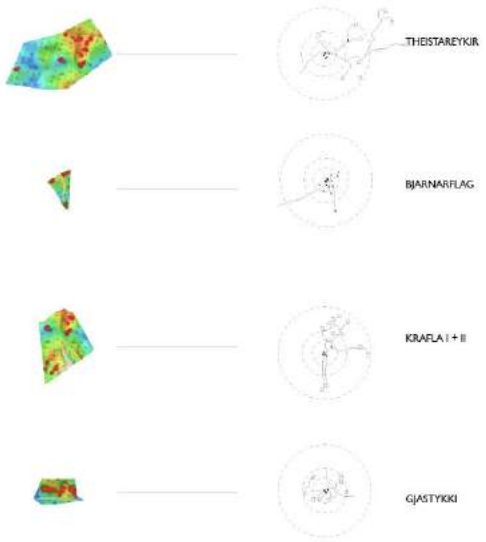
Gjastykki location area current status

ARCHITECUTRAL FRAMEWORK
PROGRAM

EXPLOITATION AREA AS DESTINATION, EXPERIENCE AND PRODUCTION SPACE

The Geothermal gradient spread-out over 4 geothermal industries forms a new landscape layer as base in the North-eastern 'diamond circle' and generates a natural process of making and a new cultural process of gathering, transporting and arranging heated material. The different use and proportions of the industrial area's create 4 different typological sizes where physical borders are used to transform the temperature gradient while thermal borders are used to define the program. The scale of the project ranges from a masterplan of 4 individual area's and uses the planned exploitation area for new interventions that impact and sustain on the level of economy tourism and landscape experience

the added productive qualities create several new forms of destinations with the sites unique characteristics and can be experienced as a value added benefit from the geothermal energy production.



Destination | accommodation

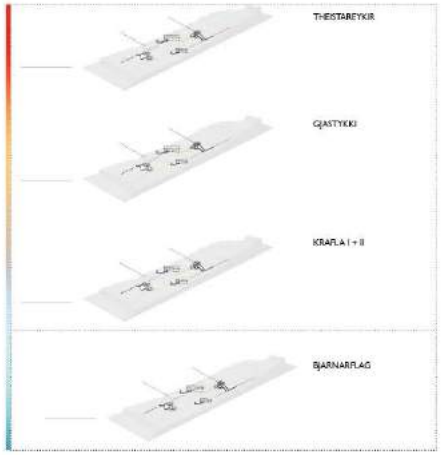
Iceland's sublime landscape is from great importance to its tourism industry, which has enjoyed explosive growth over the past decade, whilst also creating numerous problems. Paired with an inimitable geologically active territory, Icelandic tourism has enormous potential to grow and respond to its present day challenges through new forms of cross-industry and interaction with tourism accommodation in order to sustain a better flow of distribution.

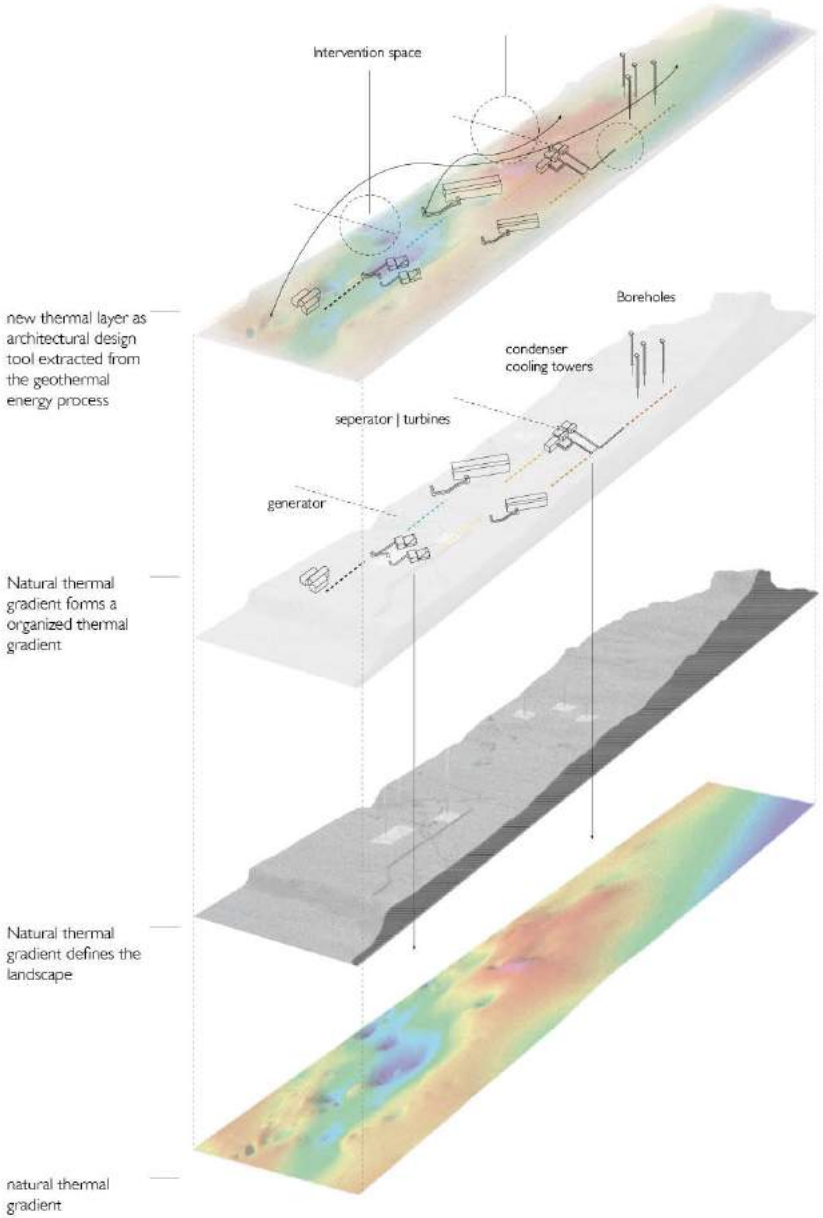
Production | economy

Each geothermal power plant has a series of infrastructure in order to extract heat from the ground and transport it to the central power plant in the range of approximately 2 KM. Electricity and hot water are generated by the facility, and transported to the near by industrial developments and cities by either transmission lines or pipes. By reconsidering the potential capacity of geothermal energy the temperature gradient can be used for new industrial and economical purposes in forms of production.

Experience

The experience of the thermal gradient invites people to understand the thermal activity as elemental source of the unique environmental system and shows opportunities to experience them through research and recreation. Therefore the added productive qualities create several new forms of destinations with the sites unique characteristics and can be experienced as a value added benefit from the geothermal energy production.





ARCHITECUTRAL FRAMEWORK

FURTHER DEVELOPMENT

TEMPERATURE RESEARCH IN ARCHITECTURE

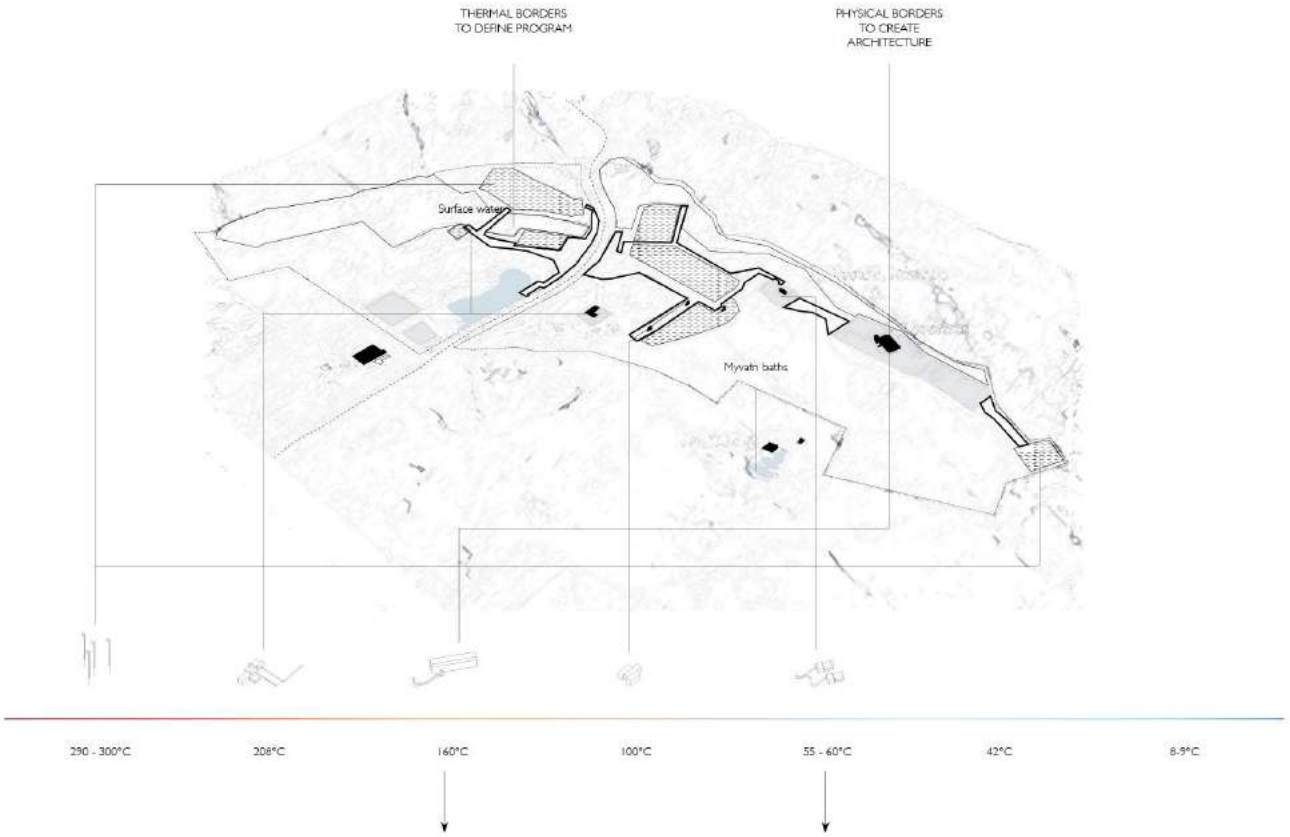
The architectural interventions that are going to be integrated on the basis of the geothermal gradient are interweaving as physical boundaries between the natural and industrial thermal transitions.

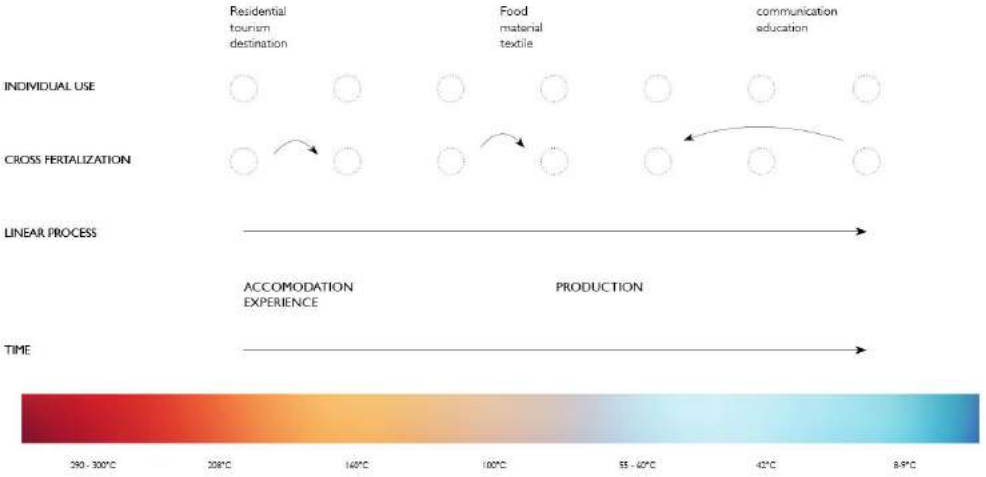
Translating the developed concept towards specific programmatic specifications the temperatures and their status in the process need to be further researched by design.

Researching the geothermal process and it's effluent gives insight into the qualities of a single, combined or varied temperature process and corresponding status. By researching the qualities of the gradient the temperatures can become visible and linked to new purposes towards tourism residence, production and experience. Furthermore a deeper understanding of the geothermal energy production process will provide specific elemental ideas that can be integrated in the themes of production accommodation and experience, as the table below shows I will investigate in how tempratures can be re-defined in creating architecture.

PERCEPTION AND UNDERSTANDING OF LANDSCAPES

Perception and understanding of landscapes vary within and across individual cultures and throughout history. The perception of human and nature's relationship is focused on landscapes and in Iceland emphasized on the distinct view that the national self perception stems from landscape and nature.





IMPLEMENTING NEW ARCHITECTURE IN INDUSTRIAL SETTLEMENTS

By researching the existing structures their functional and technical characteristics can be defined and considerd as valuable elements in the process of designing.

the Interior and exterior of powerplants form a sequence of interesting spaces

TUTROR | CONSULTANCY | THEMES

Sebastiaan Velthuysen

• Sebastiaan Veldhuisen is an architect, specialised in sustainable development. as a practicing architect, he has been involved in projects on a wide range of scales: from product design to interior design, renovation and urban projects. He has been a guest lecturer at the Faculty of architecture, Delft University of Technology, and at the Hogeschool Rotterdam and the academy in Tilburg.

Sebastiaan Veldhuysen lectures together with Klaske havik about how they call it "Territories" that are on the intersection of architecture, landscape, and research of several interesting territories that tell a story . Presented throughout photography and theater. Territories is a interdisciplinary approach that triggers architects awareness about city and landscape. In their writings becomes clear that human behavior has devastating effects in regard to the environment we live on. In order to achieve a more conscious way of shaping building and landscape, it can help me develop sensitivity to themes such as water, energy, natural resources (hydroelectric, geothermal, Iceland) and waste. These themes play a role

RAAF ARCHITECTURAL OFFICE

defines projects free from convential limits and tries to show what could happen if a different set of rules is used. This can help me redefining the current strucutral elements and re-use them in architectural purposes.

OFFICE KERSEN VAN SEVEREN

The Office is renowned for its idiosyncratic architecture, which can help me develop new methodologies directed in spatial and firmly rooted industrial architecture. The firm reduces architecture to its very essence and most original form what strengthens identification of the architectural object.

LANDSVIRKJUN | ICELAND's MAIN ENERGY COMPANY

Landsvirkjun, the National Power Company of Iceland, is Iceland's largest electricity generator and one of the ten largest producers of renewable energy in Europe. Landsvirkjun operates 17 power plants in Iceland concentrated on five main areas of operation.

During the process I wil try to investigate of the company can fullfill a role in strengthen the concept.

THEMES

- Cultural Landscape value
- Artificial value natural value
- Architectural identification
- Redefining industrial processes
- Industrial architecture
- overlapping functions and spaces
- phenomena of tourism

PLANNING

Pres. 02 • 16 november 2018 PROJECT SPCIFICATIONS

architectural framework of the thermal gradient

site analysis of the geothermal area's and their thermal typologies

Pres. 03 • 21 december 2018 PROGRAM SPATIAL DESIGN

Researching by design the temprature gradient and generate more specific in themes of production accommodation and experience

Pres. 04 • 01 februari 2018 PRELIMINARY DESIGN

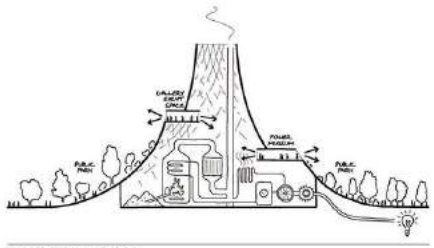
elaboration of the design in terms of physical models to examine the characteristic values of the design

Pres. 05 • 05 april 2018 DEFINITIVE DESIGN

elaborating the final design

Pres 06. • 20|21 June 2018 FINAL EXAM

REFERENCE ARCHITECTURAL PROJECTS



Teesside Power Station
Arrangement of public spaces

• Studio Heatherwick vision for a new power station in Middlesbrough | vision of a hidden model of industry

• RAAAF architecture | project is reveals the inner core of a extremely functional object releated to its enviroment what can be an inspiration to reveal the hidden process in the geothermal industrial process.

LITERATURE | SOURCES | REFERENCES

01. Jevremovic, L. (n.d.). AESTHETICS OF INDUSTRIAL ARCHITECTURE IN THE CONTEXT OF INDUSTRIAL BUILDINGS CONVERSION. Retrieved from http://www.academia.edu/1977965/AESTHETICS_OF_INDUSTRIAL_ARCHITECTURE_IN_THE_CONTEXT_OF_INDUSTRIAL_BUILDINGS_CONVERSION

02. Orka úr 100% endurnýjanlegum orkugjöfum. (n.d.). Retrieved from https://www.landsvirkjun.is/

03. Theistareykir Geothermal Power Plant Design & Engineering. (n.d.). Retrieved from http://www.mannvit.com/projects/theistareykir-geothermal-power-plant/

04. Harari, Y. N. (2017). Sapiens: Een kleine geschiedenis van de mensheid. Amsterdam: Thomas Rap.

05. Gugger, H., Costa, B. M., & Gutscher, S. (2015). Icelandic lessons: Industrial landscape. Zurich: Park Books.

06. Newsome, D., & Dowling, R. (2012). Geotourism. Hoboken: Taylor & Francis.

07. Sijmons, D., Hugtenburg, J., Hoorn, A. V., & Feddes, F. (2014). Landscape and energy: Designing transition. Rotterdam: Nai010.

08. Stober, I., & Bucher, K. (2013). Geothermal energy from theoretical models to exploration and development. Berlin, Heidelberg: Springer.

IEA: grotere vraag naar energie, overheden bepalen lot van de wereld

DINSDAG, 03:20 BUITENLAND, ECONOMIE

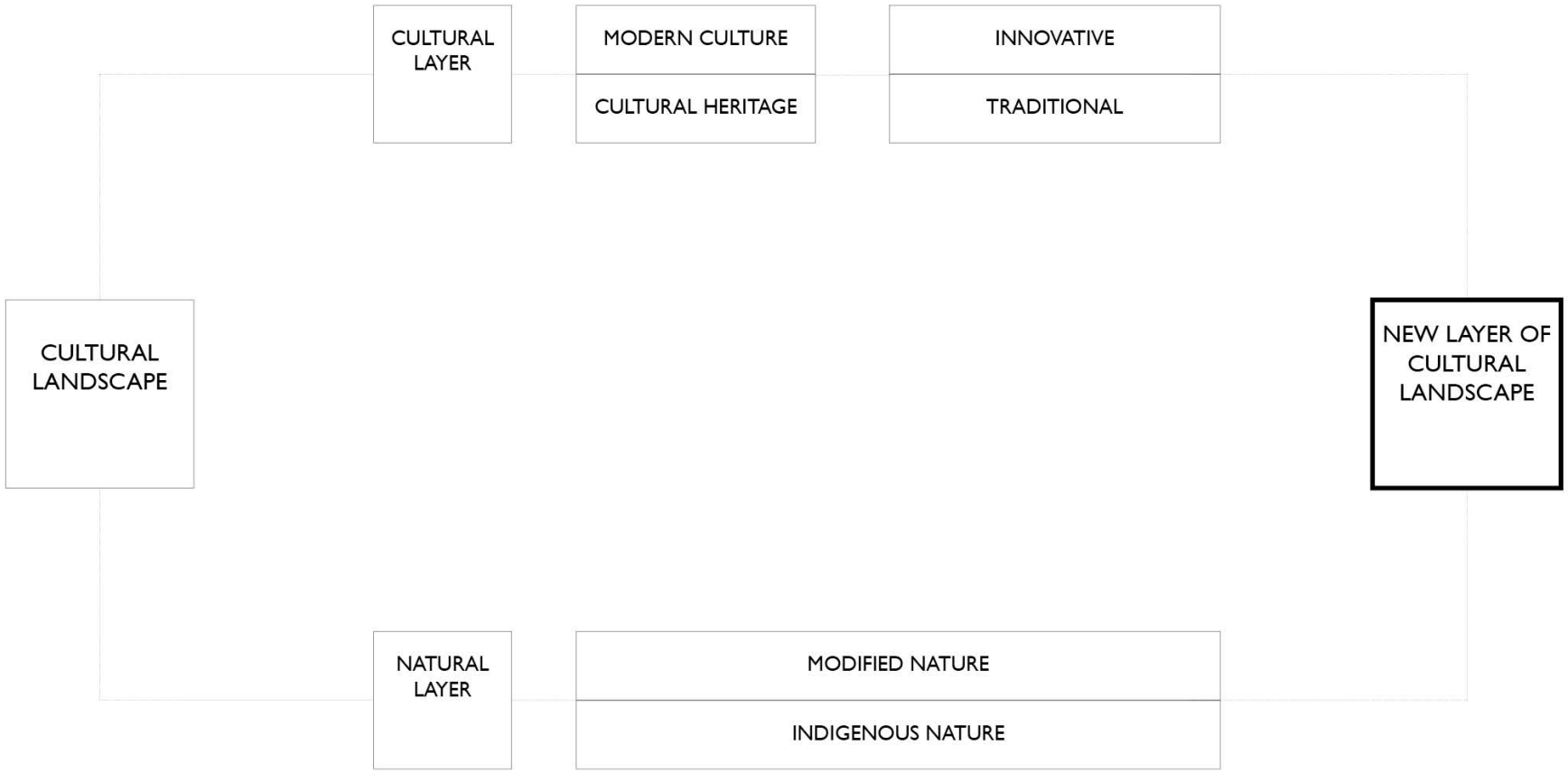
De komende decennia stijgt de vraag naar energie wereldwijd sterk, zo blijkt uit een rapport van het Internationaal Energie Agentschap (IEA). In 2040 gebruiken we met zijn allen een kwart meer dan nu, mits de wereld efficiënt met energie omgaat. Zo niet dan stijgt de vraag nog sterker.

De belangrijkste oorzaken zijn de bevolkingsgroei (1,7 miljard meer mensen in 2040) en de stijgende inkomens, waardoor mensen het zich kunnen veroorloven om meer energie te gebruiken.

Volgens het IEA zijn het vooral overheden die bepalen hoe de energie wordt opgewekt. "Uit ons onderzoek blijkt dat overheden verantwoordelijk zijn voor 70 procent van de investeringen in energie. Het lot van de wereld ligt wat dat betreft in de handen van overheden", zegt IEA-directeur Fatih Birol.

CULTURAL LANDSCAPE

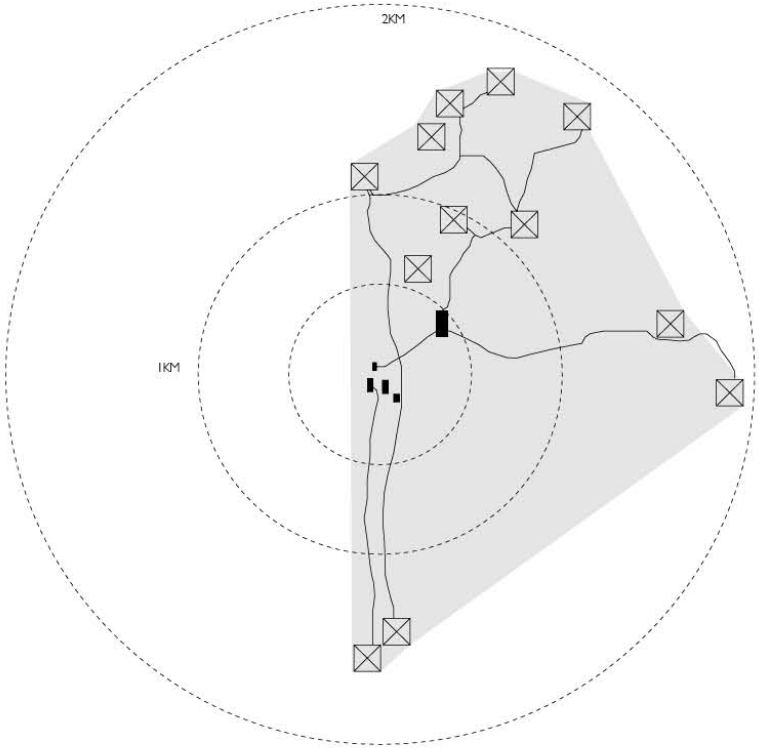
As the world looks today - and maybe has done always - the human landscape are in a constant state of change. The movement of people and the changes in the 'landscapes' is a fact that has to be considered in social, educational and cultural areas and services provided in society.



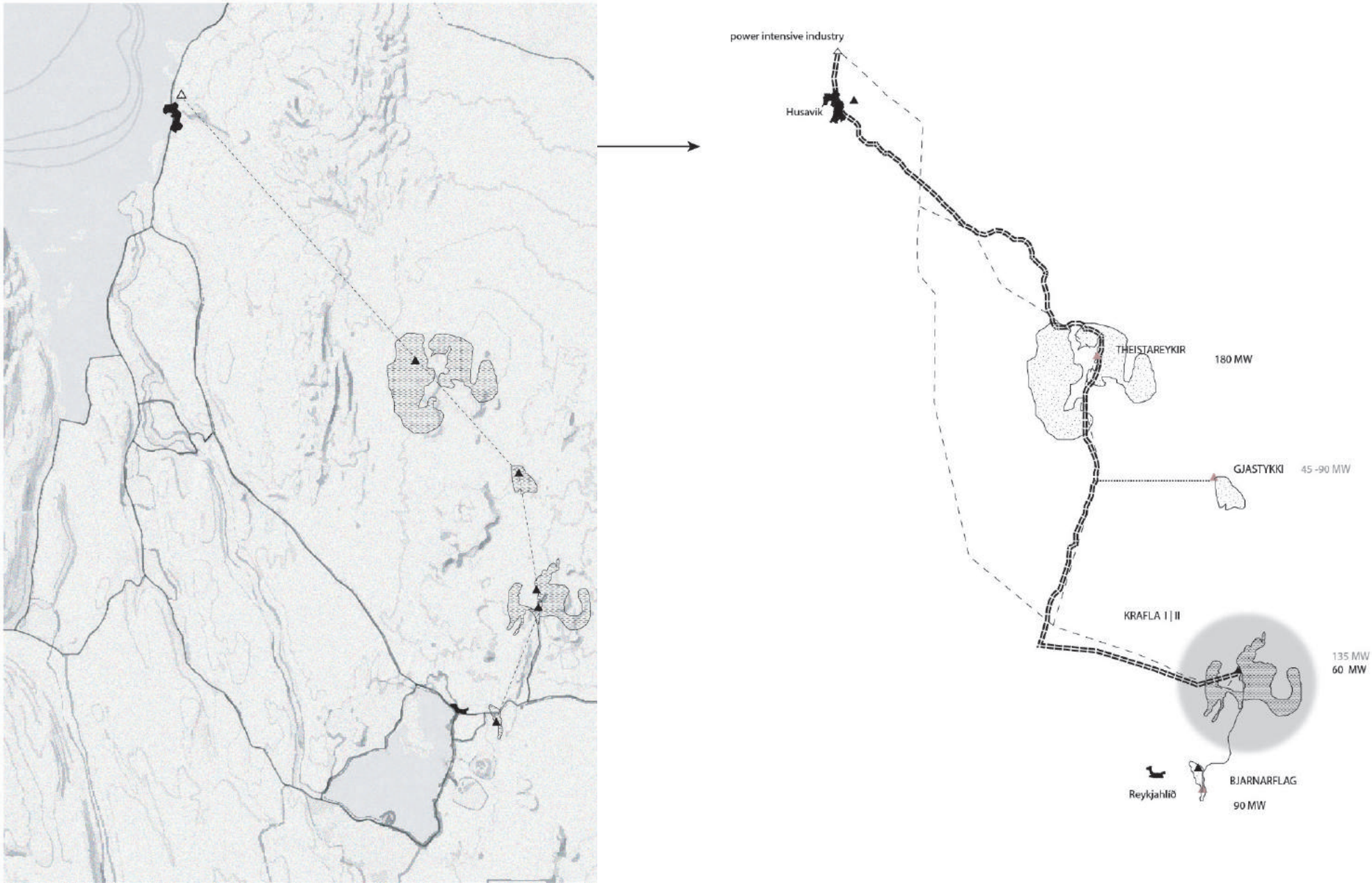
The vertical structure [Vedenin, 1997

cultural defined landscape

By expanding the field of architectural design into **territorial studies**, the project aims to claim the environmental system as part of the architectural object, the territory or the landscape into the site. This allows architecture to engage with , the large scale that occurs in energy production.



INDUSTRIAL REGION - THEISTAREYKIR, GJASTYKKI, KRAFLA, BJARNAFLAG



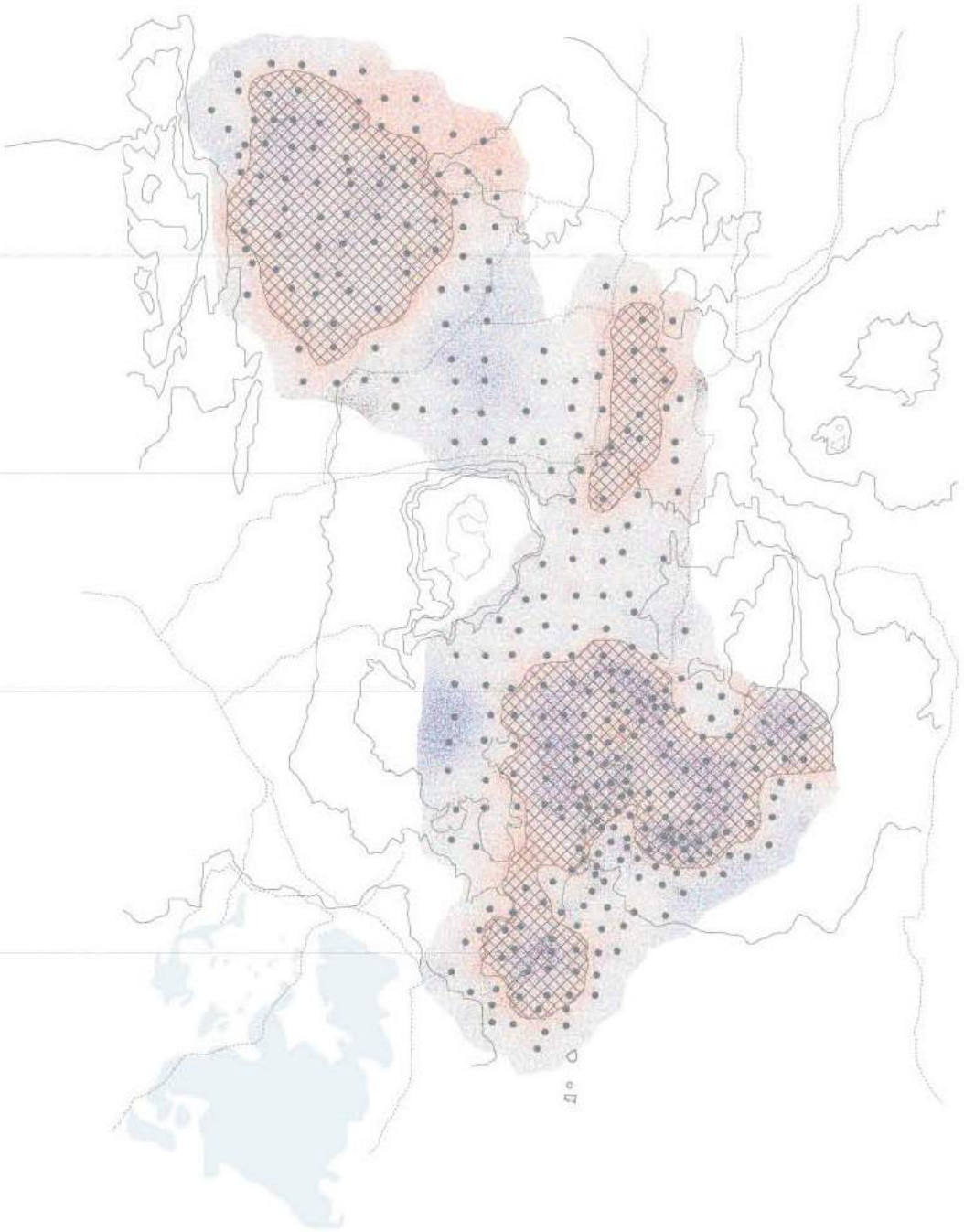
BOREHOLES IN THE INDUSTRIAL REGION

THEISTAREYKIR

GJASTYKKI

KRAFLA I + II

BJARNARFLAG



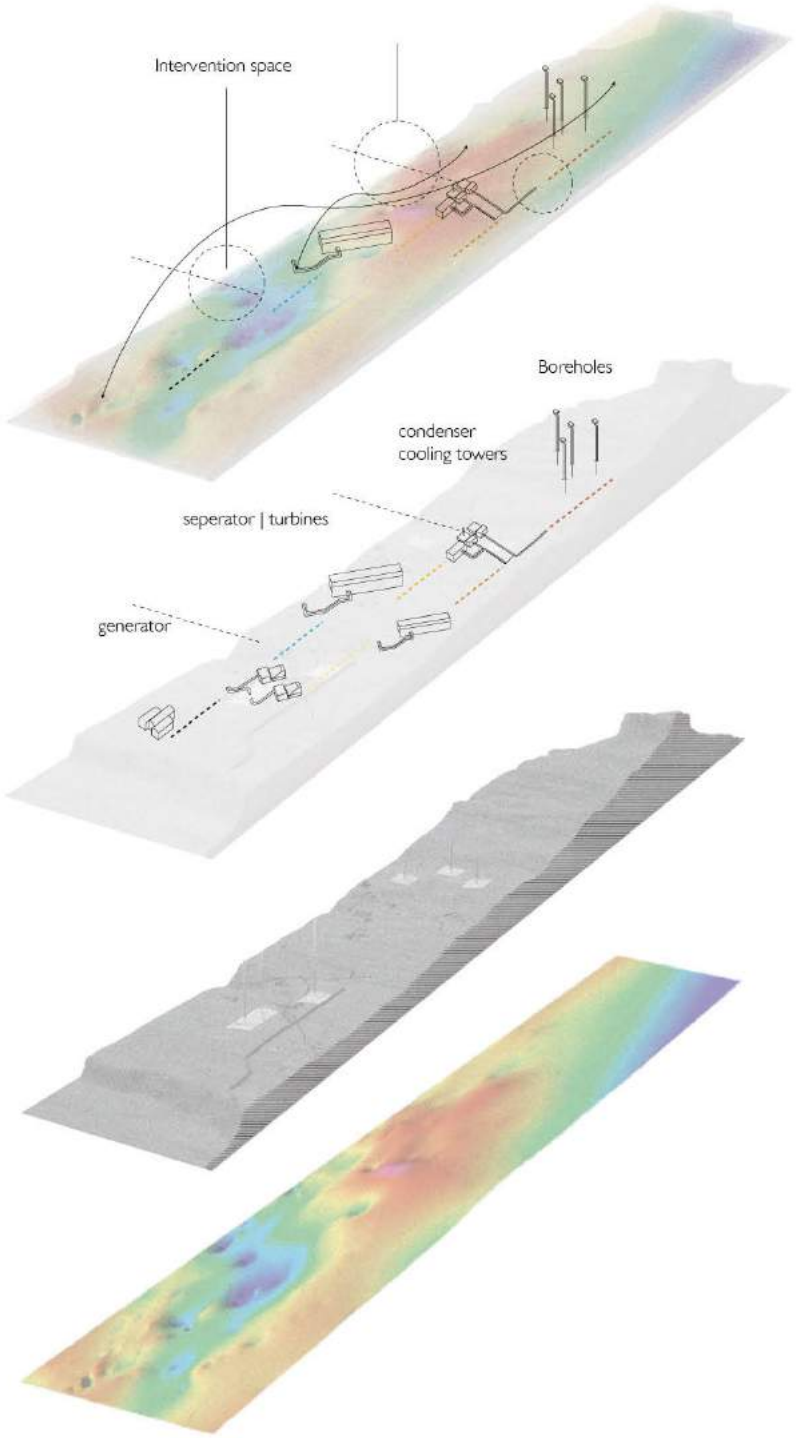
FROM THEORETICAL FRAMEWORK TO STRATEGY

• NEW LAYER OF CULTURAL LANDSCAPE

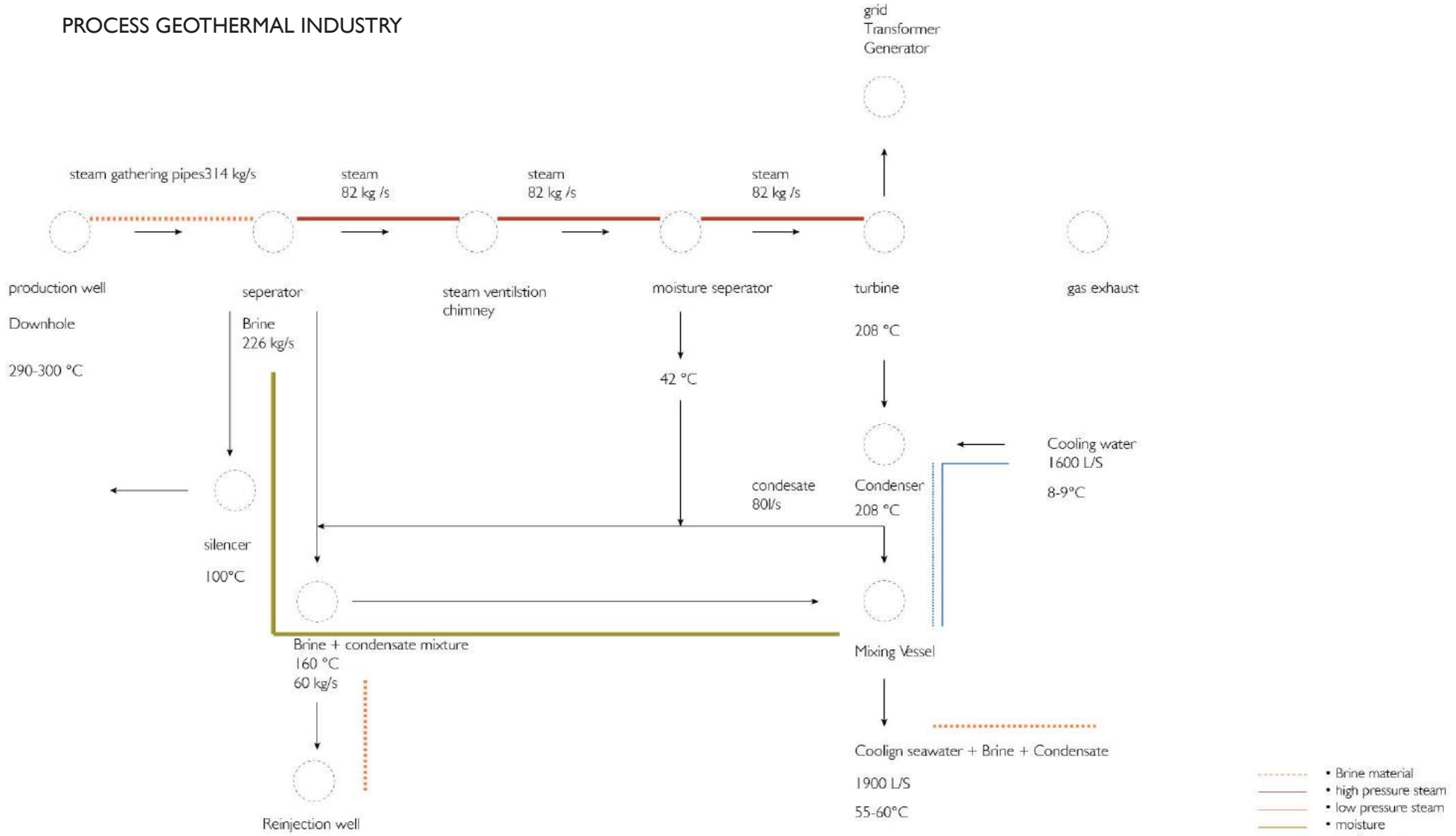
• LANDSCAPE FORMS A INDUSTRIAL ORGANIZED THERMAL GRADIENT

• NATURAL THERMAL GRADIENT DEFINES ICELAND NATIONAL IDENTICAL LANDSCAPE

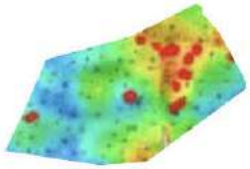
• NATURAL THERMAL GRADIENT

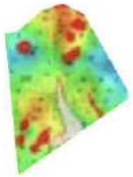


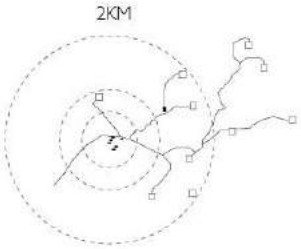
PROCESS GEOTHERMAL INDUSTRY



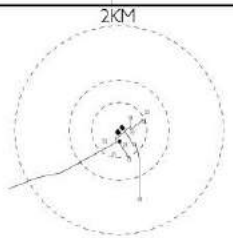
Geothermal process



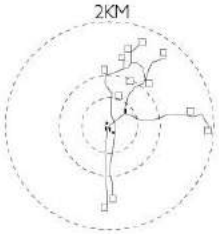




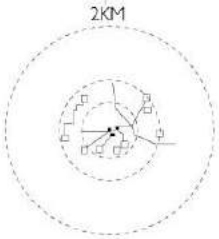
THEISTAREYKIR



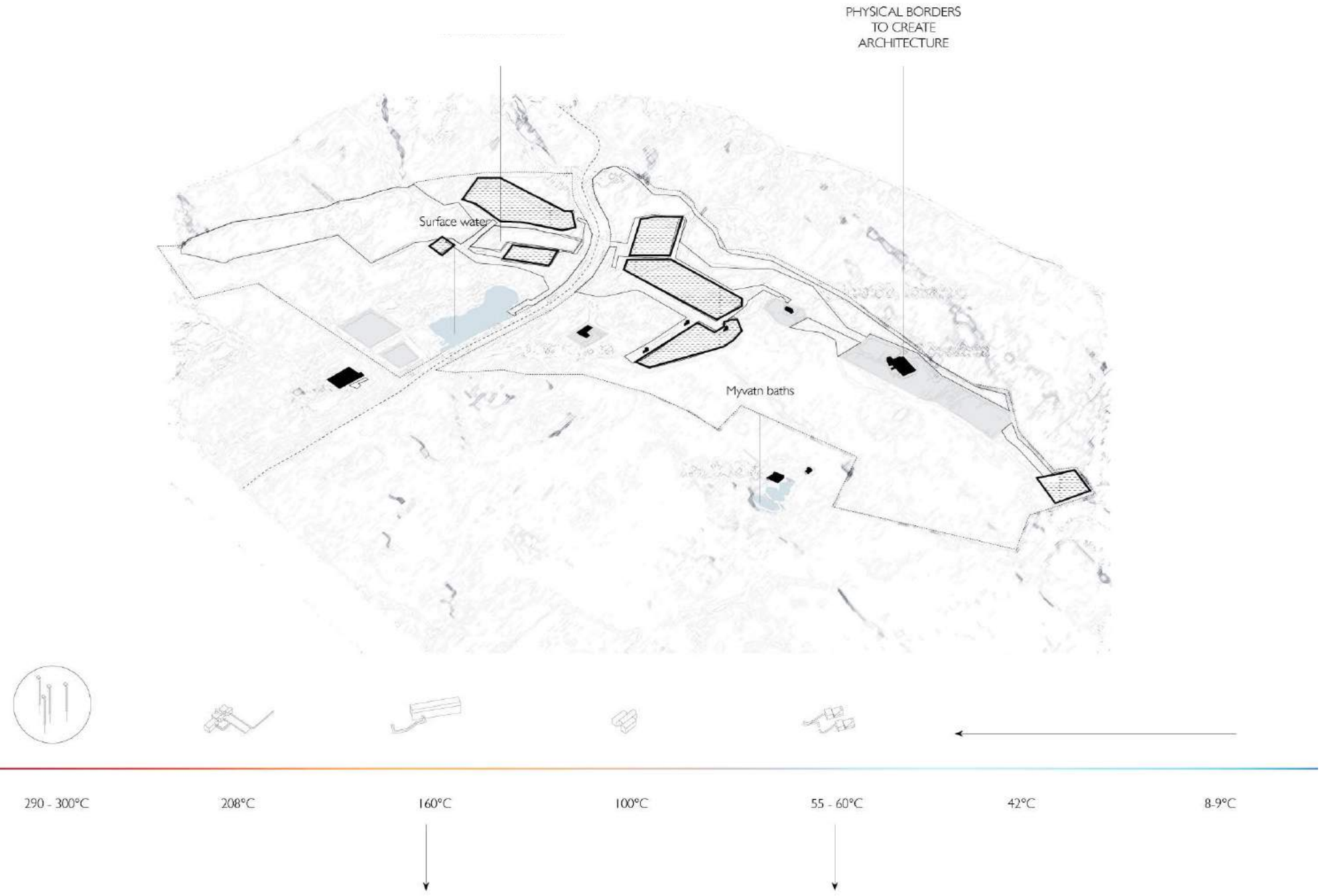
BJARNARFLAG



KRAFLA I + II



GJASTYKKI


PHYSICAL BORDERS
TO CREATE
ARCHITECTURE
Surface water
Myvatn baths
290 - 300°C
208°C
160°C
100°C
55 - 60°C
42°C
8-9°C

14-okt-2018

- Local value Iceland

Iceland spar
calcite
Landscape typologies
economic value
tourism → behavior locally
- Land cover
soil erosion local
Forest cover
- landscape experiences · characteristics

northern light
volcanic activity

Project

- integral vision for the development of sustainable landscape enjoyment

goal : facilitate different targed groups

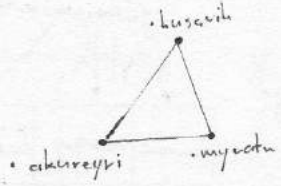
landscape value

ecology

economic

experience

Akureyri : ~~Reykjavik~~ 85.400 cruise passengers 2018



Landscape types
Geotourism = geology landscape

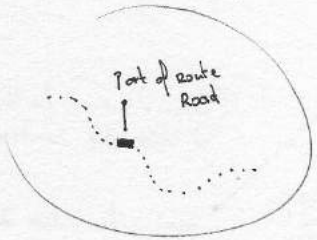
- Project specifications

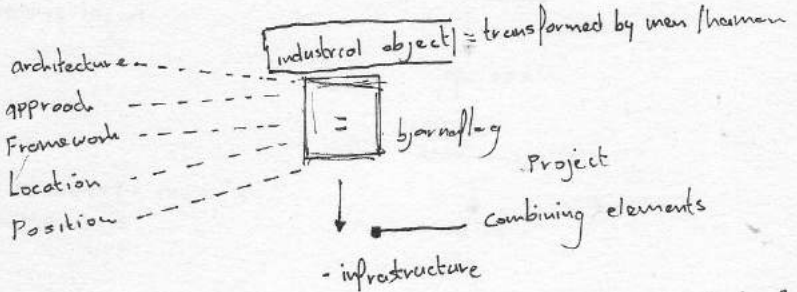
01 intro · loop main conclusions
02 thesis · urgent expressed
03 analysis ·
04 motivation Why this project where does it go
05 Reflection · method strategy approach
06 Relevance of the project
07 themes architectural
08 site survey
09 motivation button
10 building program scale
11 stake holders
12
13
14

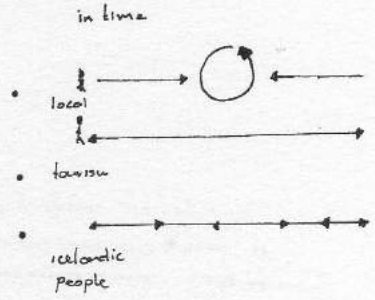
the importance of the site

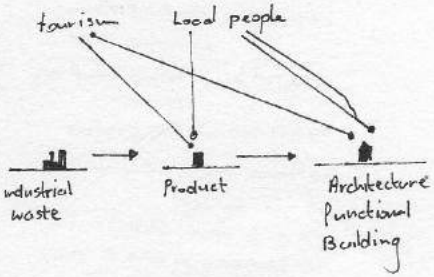
Local

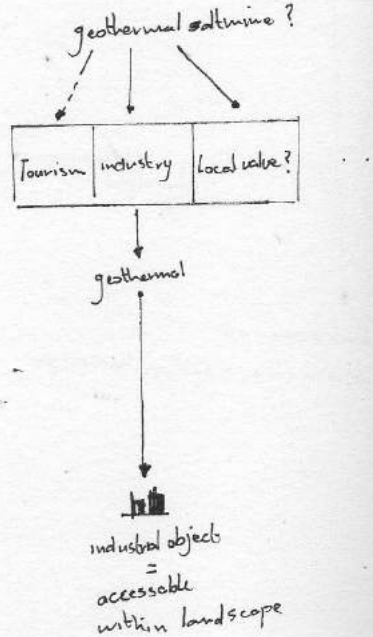
- pre-existing knowledge
  - industries
    - textile · wool · sheep
    - maritime
    - icelandic Horses

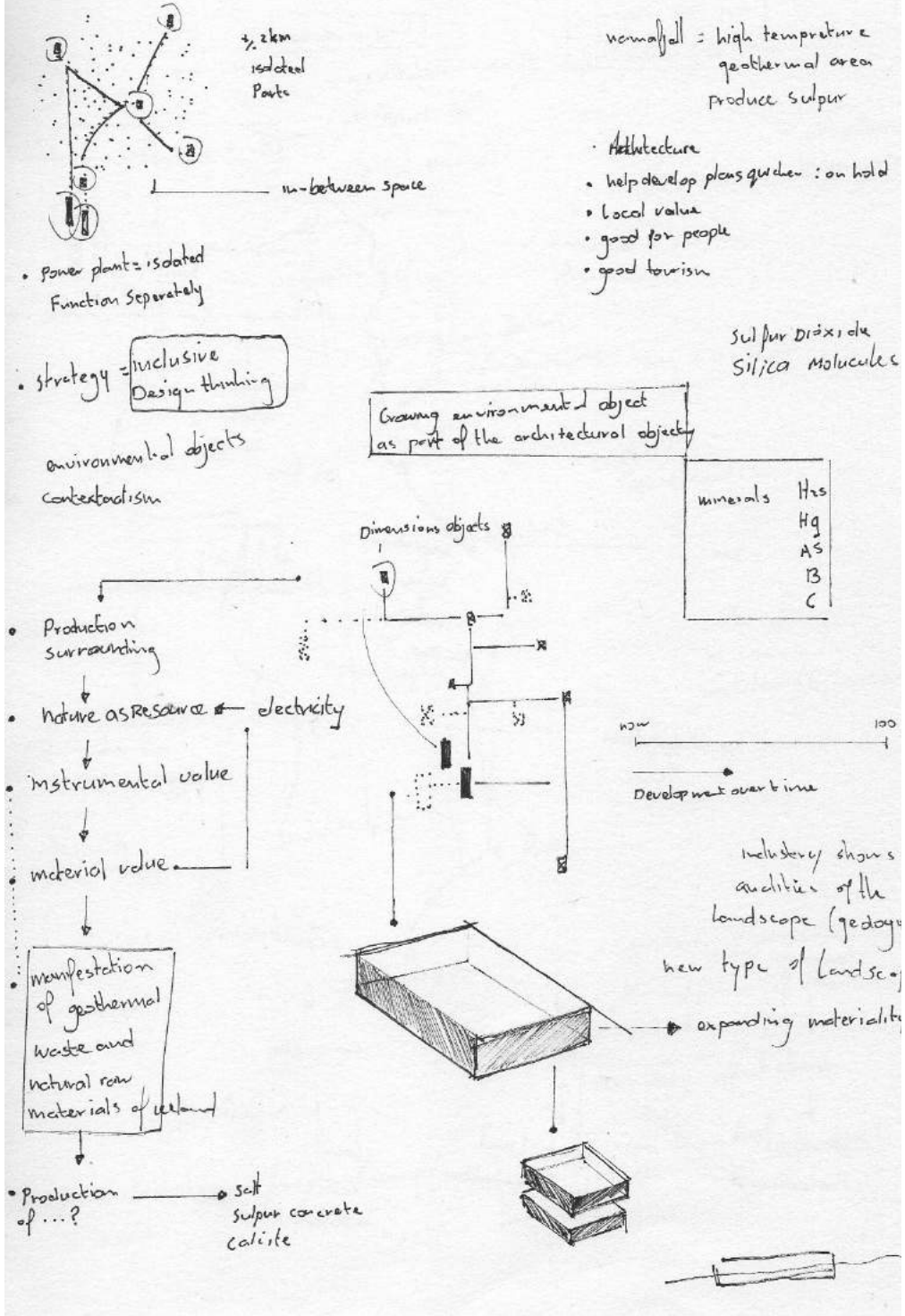


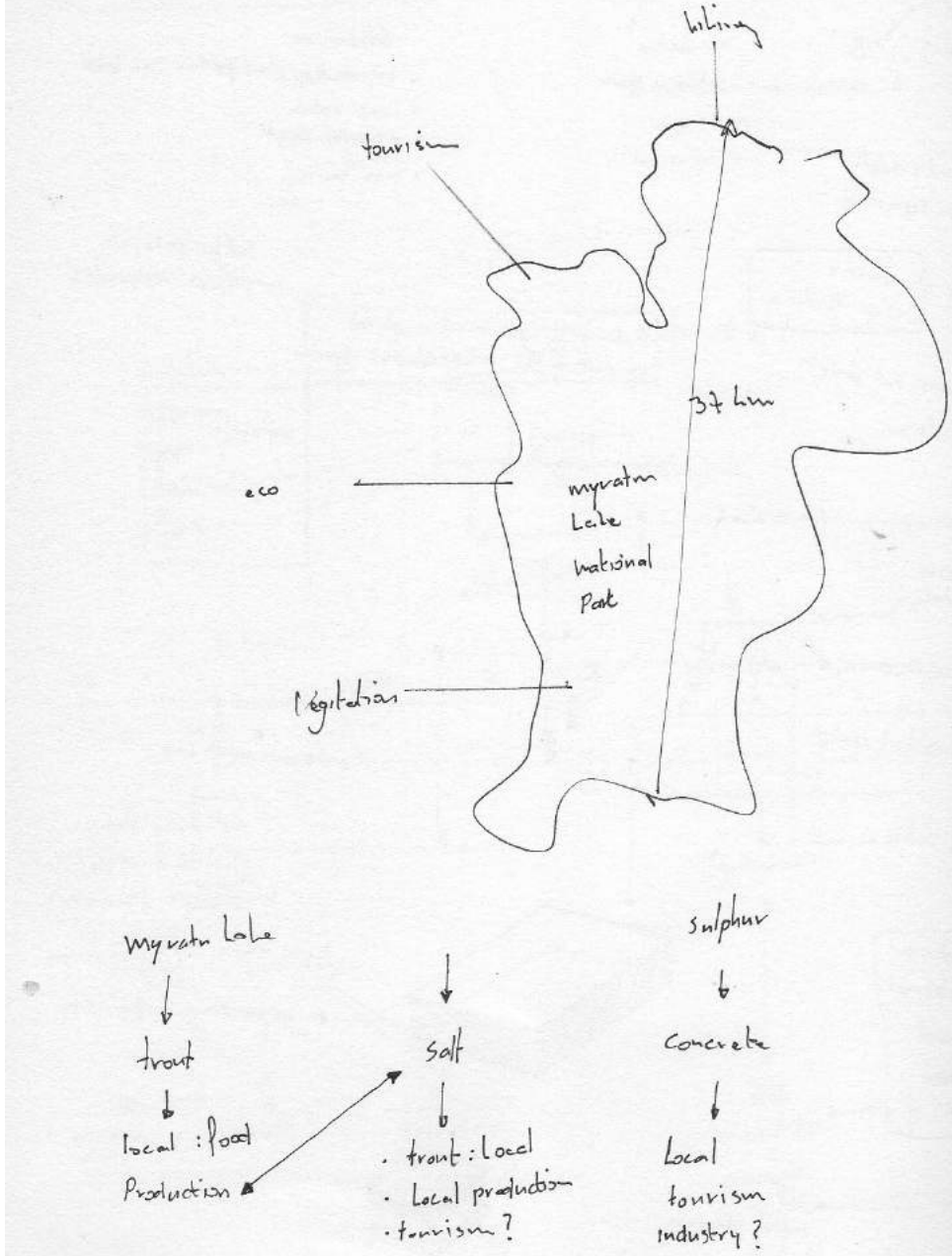









+/- 2km
isolated
Parts
in-between space
normalfall = high temprature
geothermal area
Produce sulpur
· Architecture
• help develop plans quicker : on hold
• Local value
• good for people
• good tourism
• Power plant = isolated
Function Separately
Sulfur Dioxide
Silica Molucules
• strategy = Inclusive
Design thinking
environmental objects
contextualism
Growing environmental object
as part of the architectural object
minerals
Hzs
Hg
AS
B
C
Dimensions objects
• Production
surrounding
• Nature as Resource ← electricity
• instrumental value
• material value
• manifestation of geothermal
water and
natural raw
materials of Iceland
• Production
of ...?
→ salt
sulpur concrete
calcite
now
100
Development over time
industry shows
qualities of the
landscape (geolog
new type of landsca
→ expanding materiality


hiking
tourism
37 km
eco
myvatn
Lake
national
Park
Vegitation
myvatn Lake
trout
local : food
Production
salt
. trout : local
. Local production
. tourism ?
sulphur
Concrete
Local
tourism
industry ?

generic pod

- qualitative specific
- designed units
- spatial envelops
- expanding

lifespan 30 year
Geothermal site

- orkuvinnslusv
byggingarrettir

agoustic Defence

environment
health
Defence

- silicia factory
German Company
pcc SE

weg von energie

husavik

plan
development

kelduhverfi

Cider mining
in unspecified area
Jarðbaðshólar hills

east

Peistareykir

make the
environmental
(waste)
visible

krafla

tourism accomodation

namafjall

- Strategy = connecting
place / space of movement
and stay

Strategy effects
- hiker
- car driver individual!
- etc

- Sulphur mining

Manifestation of geothermal
waste

- ontwerp = geen afbraak!
Landschappelijke waarden + toerisme
natuurlijke fenomenen
- laagste regio waarde!
= contreiningsbracht
- Lokaal • toerisme

diminuin - local value

nl → ijsland

position, different persp

1 + 1 +

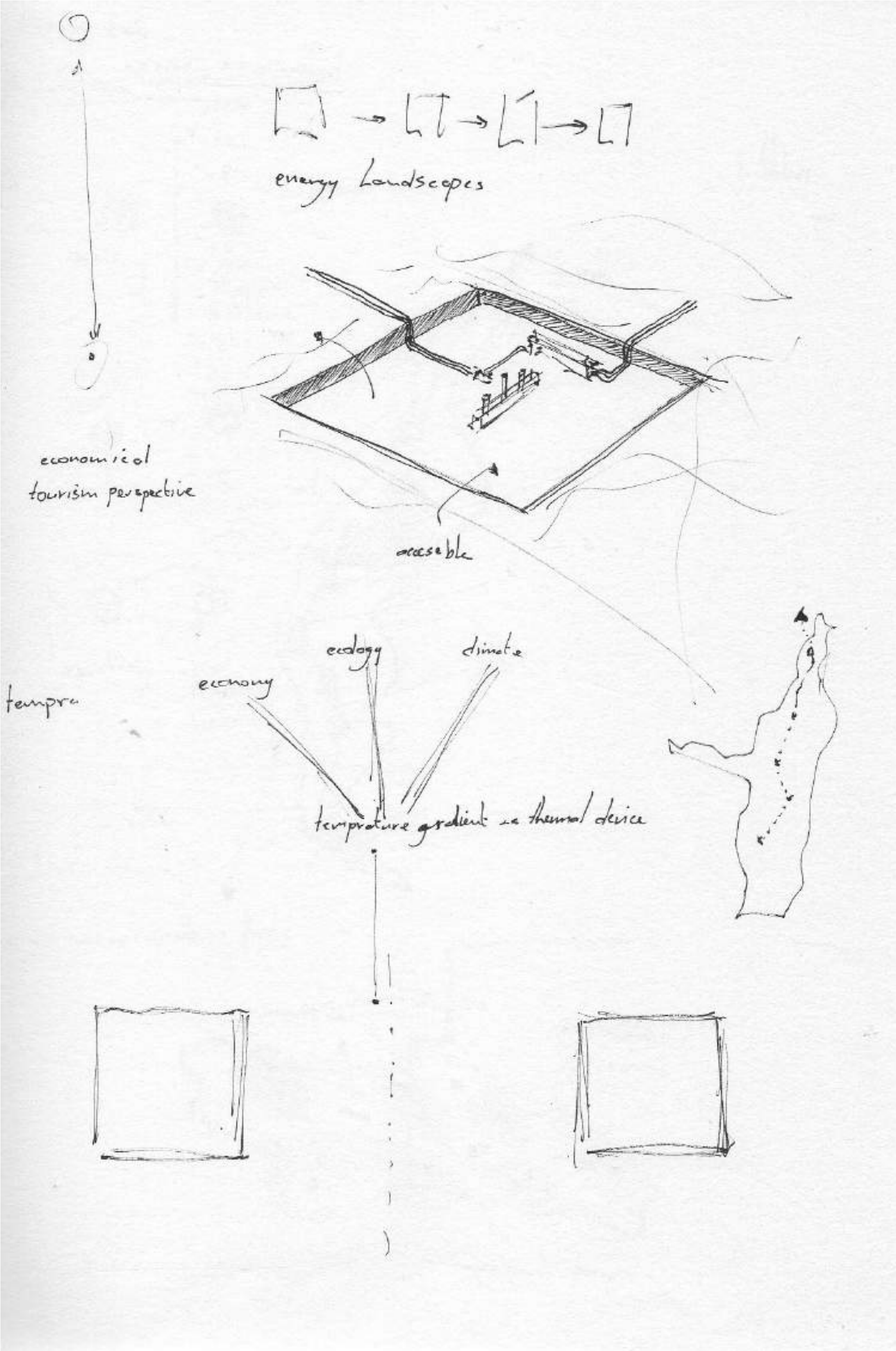
From existing industry
new industry
zinc

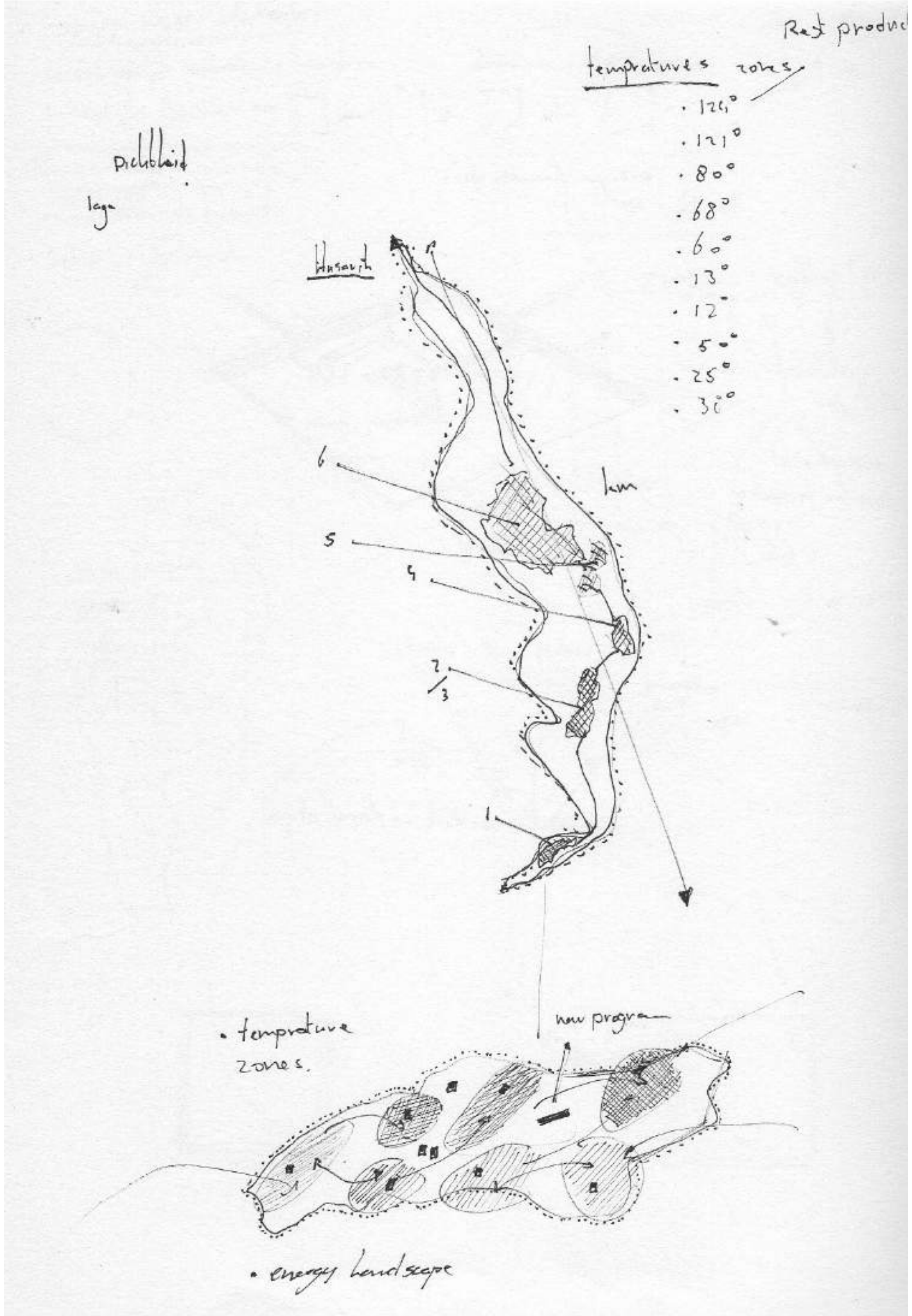
1/3
30 year

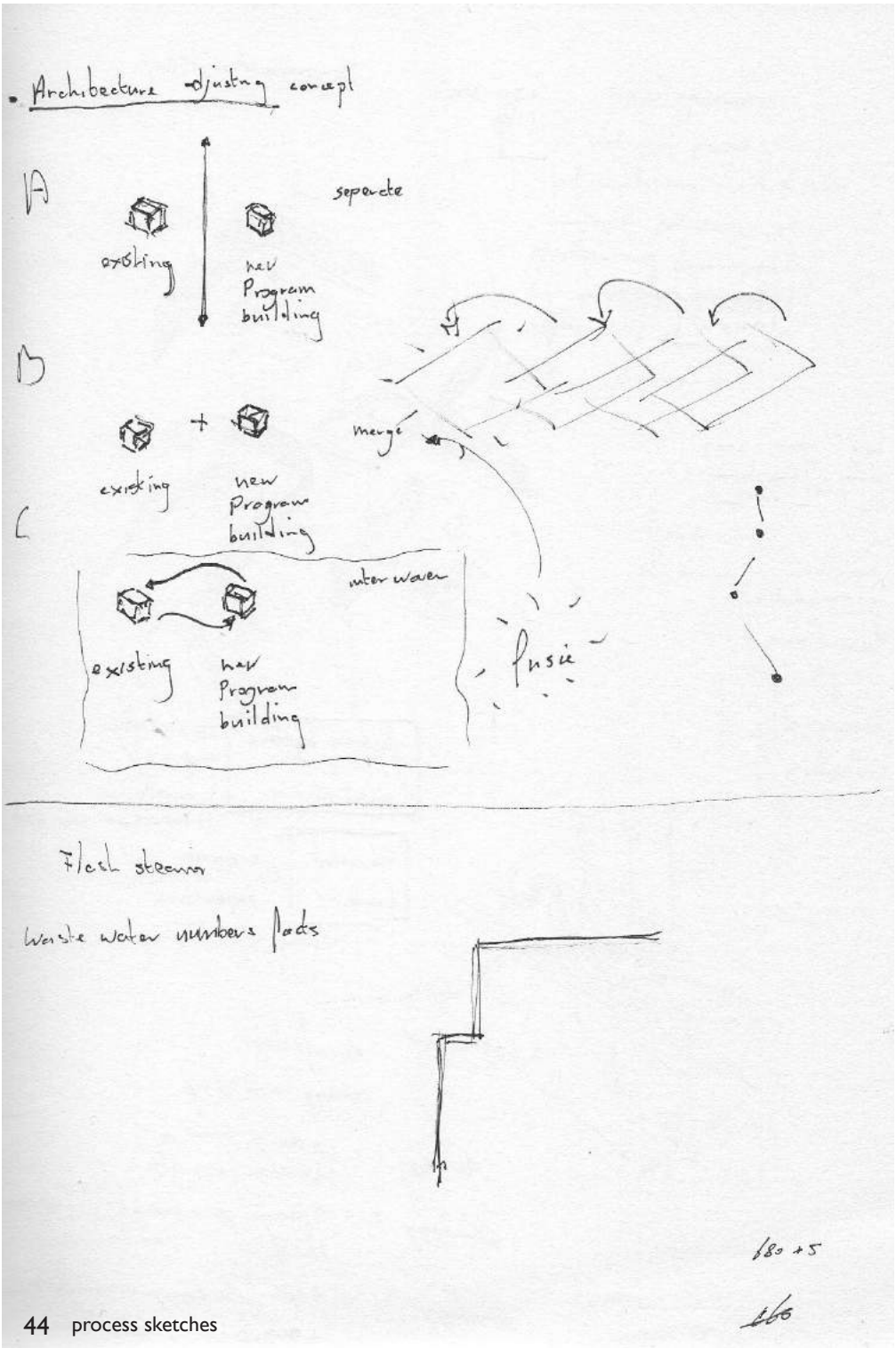
Different
Scenario's
position ac on arch

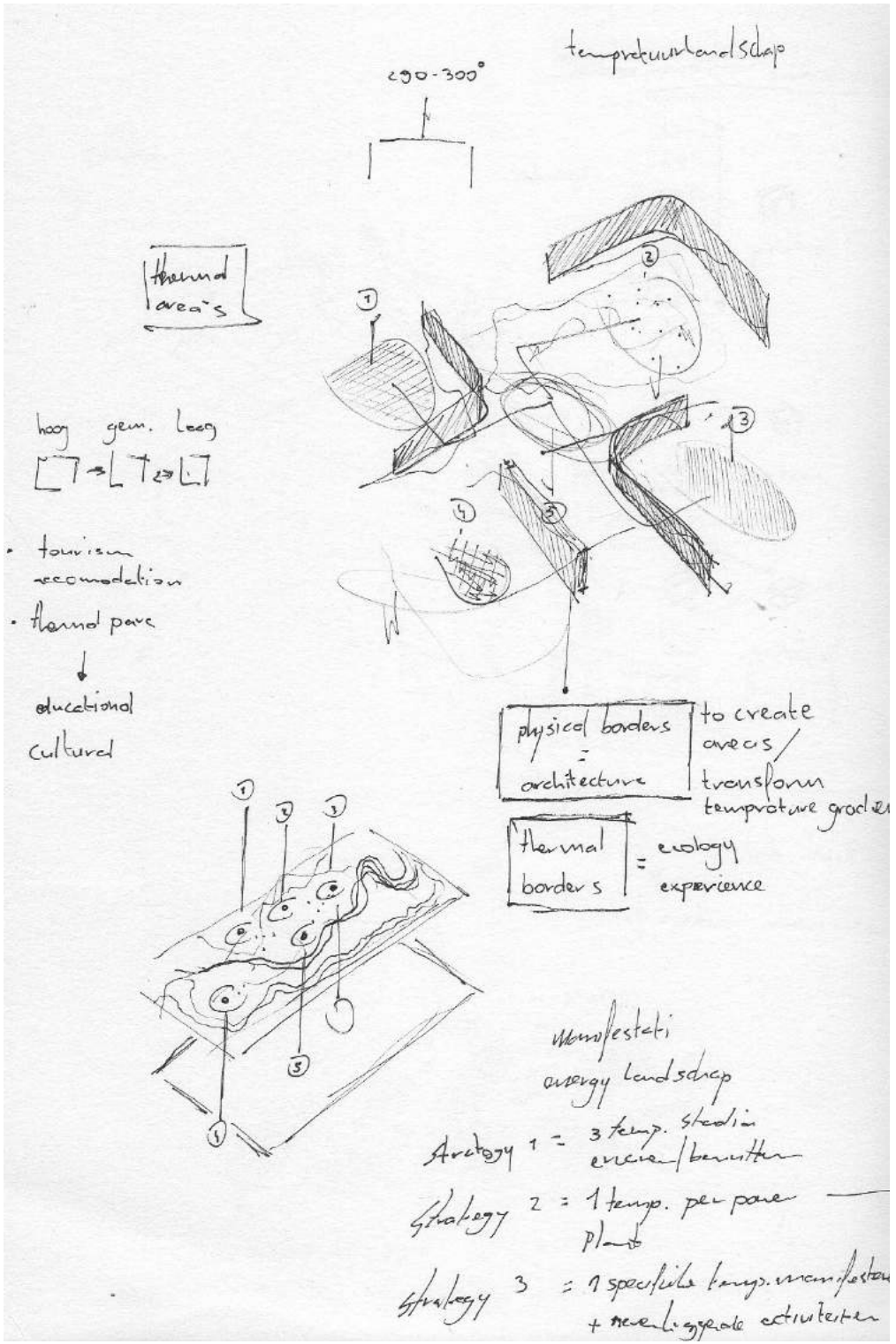
- Architecture
- approach
- Framework
- Location
- Position

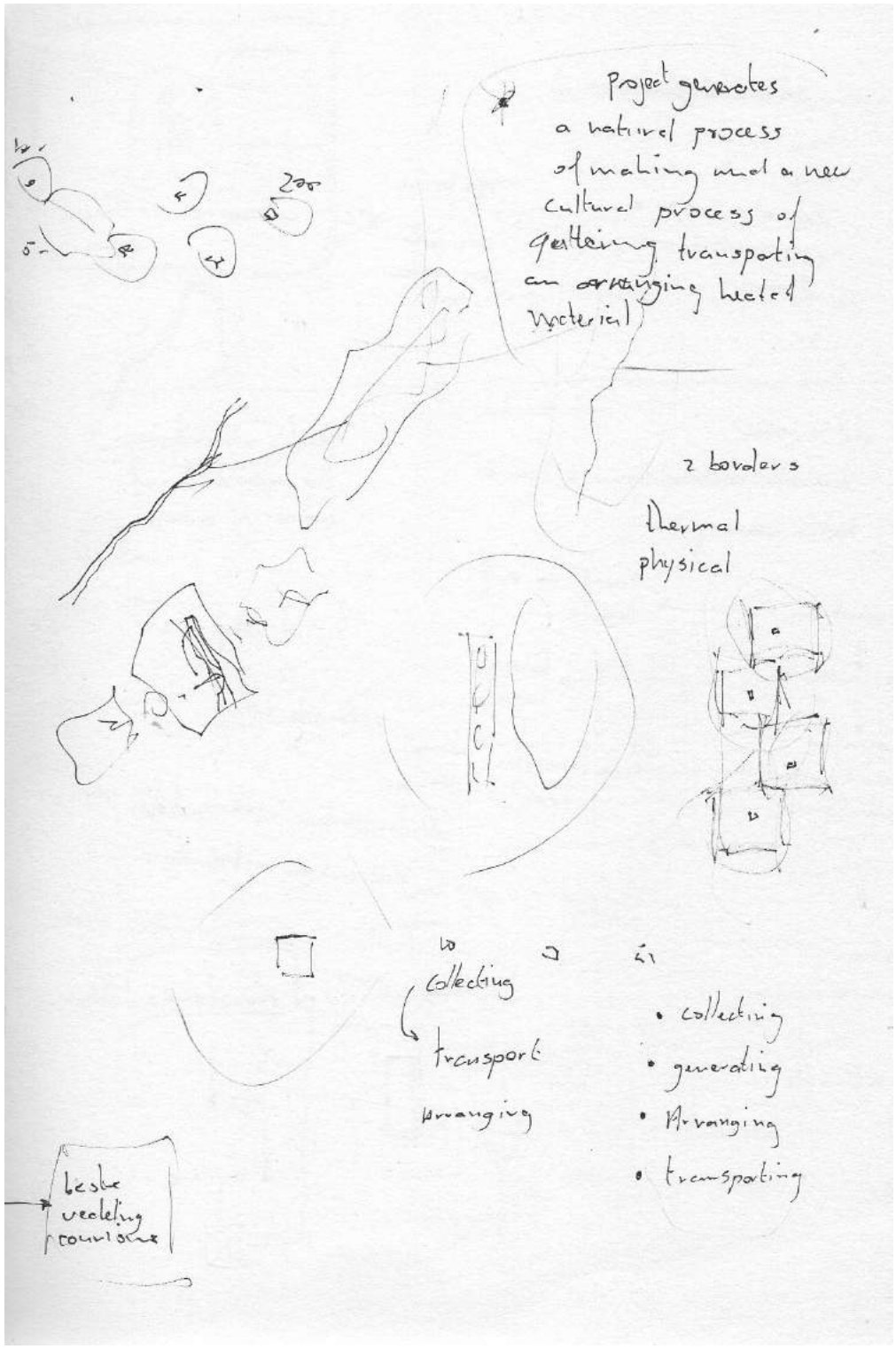
30 yea

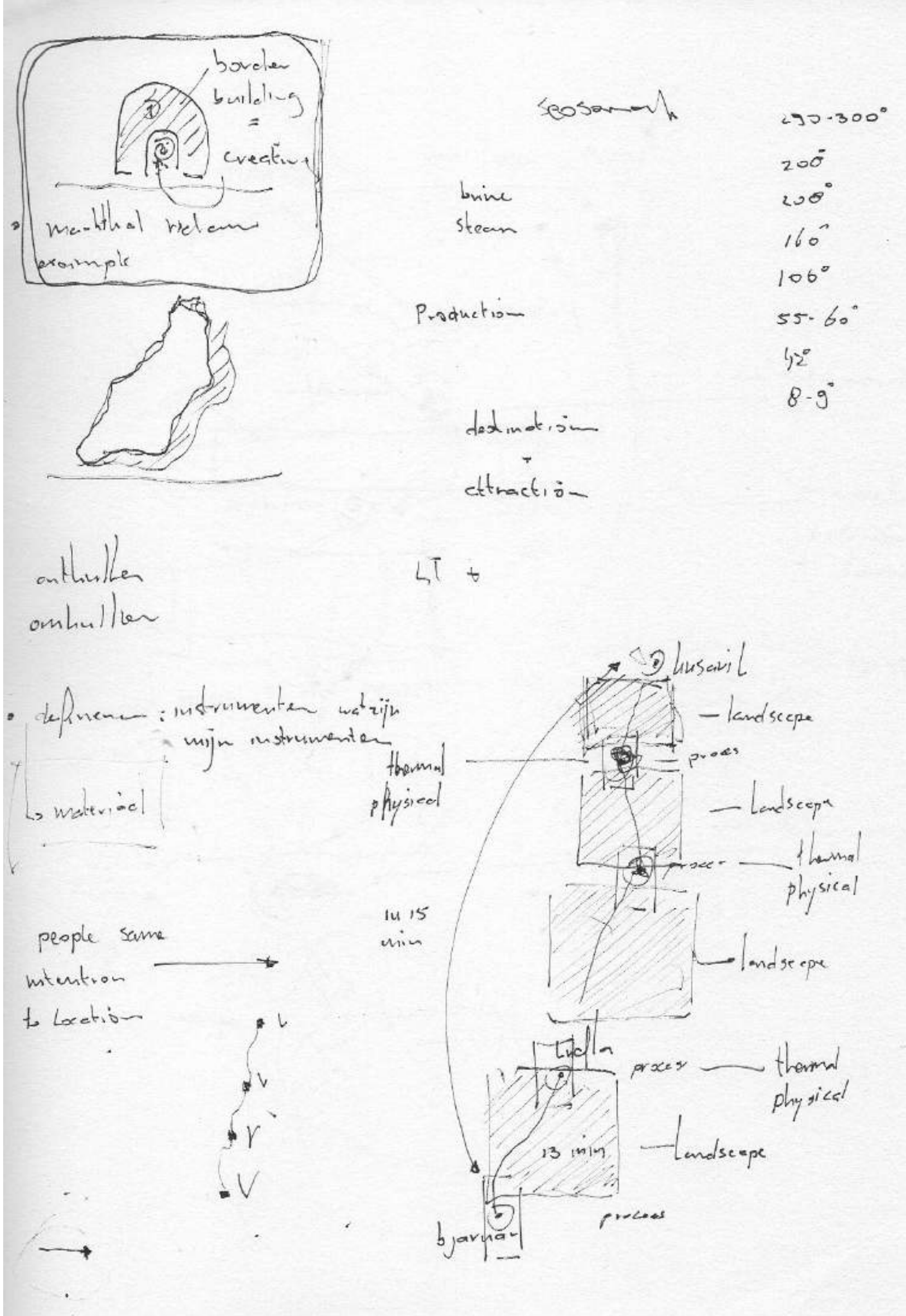

energy Landscapes
economical
tourism perspective
accesable
tempra
economy
ecology
climate
temprature gradient as thermal device

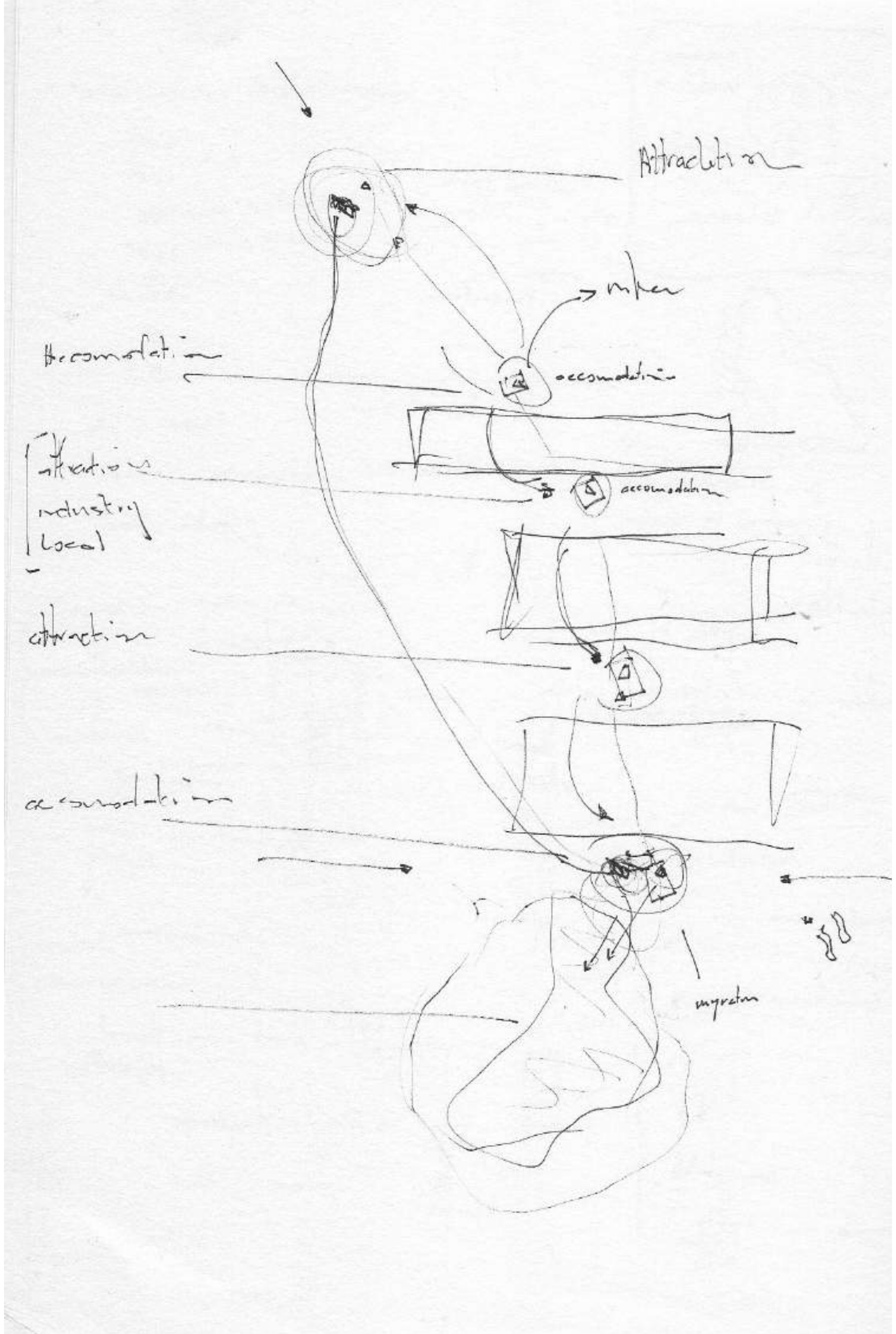

Rest product
tempratures zones
· 126°
· 121°
· 80°
· 68°
· 60°
· 13°
· 12°
· 5°
· 25°
· 30°
km
· temprature
zones.
new progra
· energy landscape

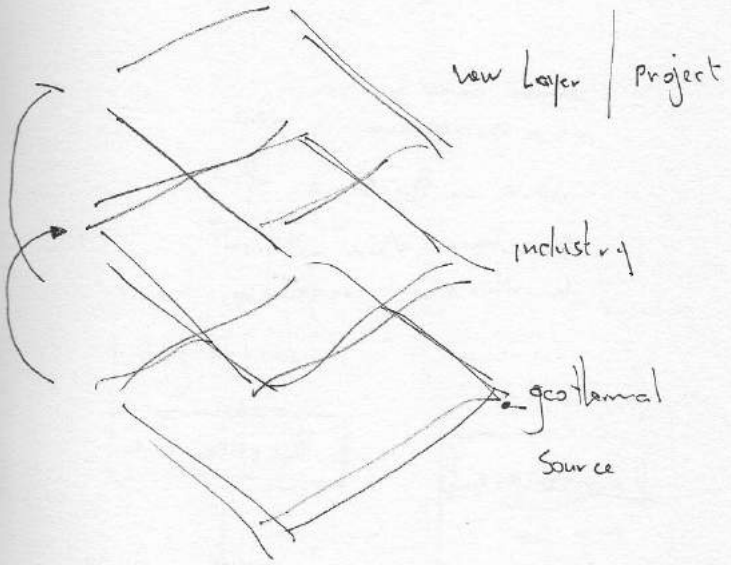

Architecture - existing concept
A
existing
new Program building
seperate
B
existing
new Program building
merge
C
existing
new Program building
inter waven
fusie
Fresh steam
Waste water numbers Pools
180 + 5
166


temprature landscape
290-300°
thermal area's
hoog gem. laag
tourism accomodation
thermal pave
educational
cultured
physical borders = architecture
to create areas / transform temprature gradien
thermal borders = ecology experience
manifestati
energy landscape
Strategy 1 = 3 temp. stadia
Strategy 2 = 1 temp. per pave
Strategy 3 = 1 specifiek temp. manifestat
+ new upgrade activiteiten

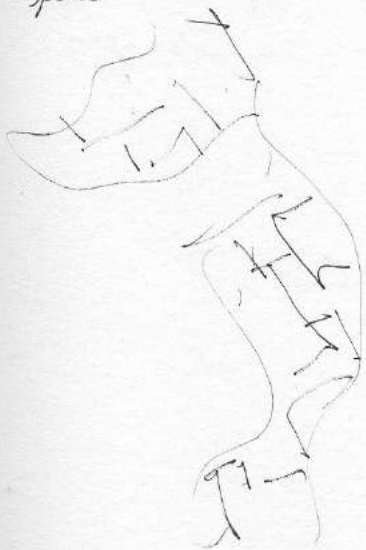

Project generates
a natural process
of making mud a new
cultural process of
gathering transporting
an arranging heated
material
2 borders
thermal
physical
collecting
transport
arranging
• collecting
• generating
• Arranging
• transporting
Steam Seperator
extracts water +
minerals from
Steam
190 brine
=
mix with
sea water
80°C
what is needed?
tourism accomodation
textile industry
goal = intensifying
the experience of
industrial nature
Production
food → salt
textile
accomodation
tourism
Local
experience
activity
attraction
tourism
Local
H-city
Droste effect
education
communication
schaal
XS
S
M
L
XL
② Landschap - staalconstruct
Architectuur - staalconstruct
Positie
Arch
Perspectief
①
in-between
staal
Landschap


border building = creation
example
geosanoth
290-300°
200°
brine
steam
160°
106°
Production
55-60°
8-9°
destination
+
attraction
onthullen
omhullen
landscape
proces
thermal
physical
landscape
thermal
physical
people same
intention
to location
landscape
thermal
physical
13 min
landscape
proces
bjarnar


Attraction
accomodation
accomodation
attraction
industry
local
attraction
accomodation



planned space = my Project
space



(1) water steam brine
(2) high pressure steam
(3) low pres
(4) moisture
(5) cooling w
(6) Gasses

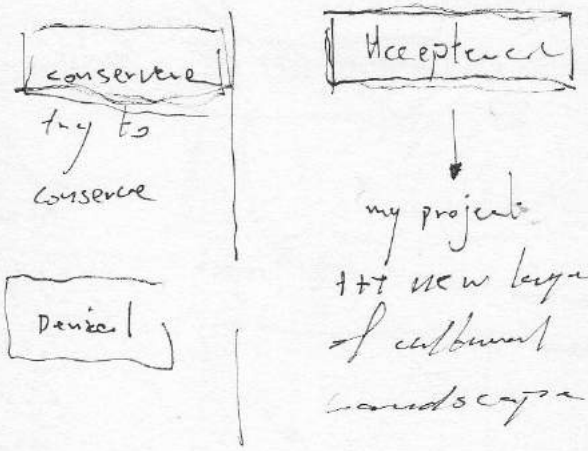
Presetation

introduction

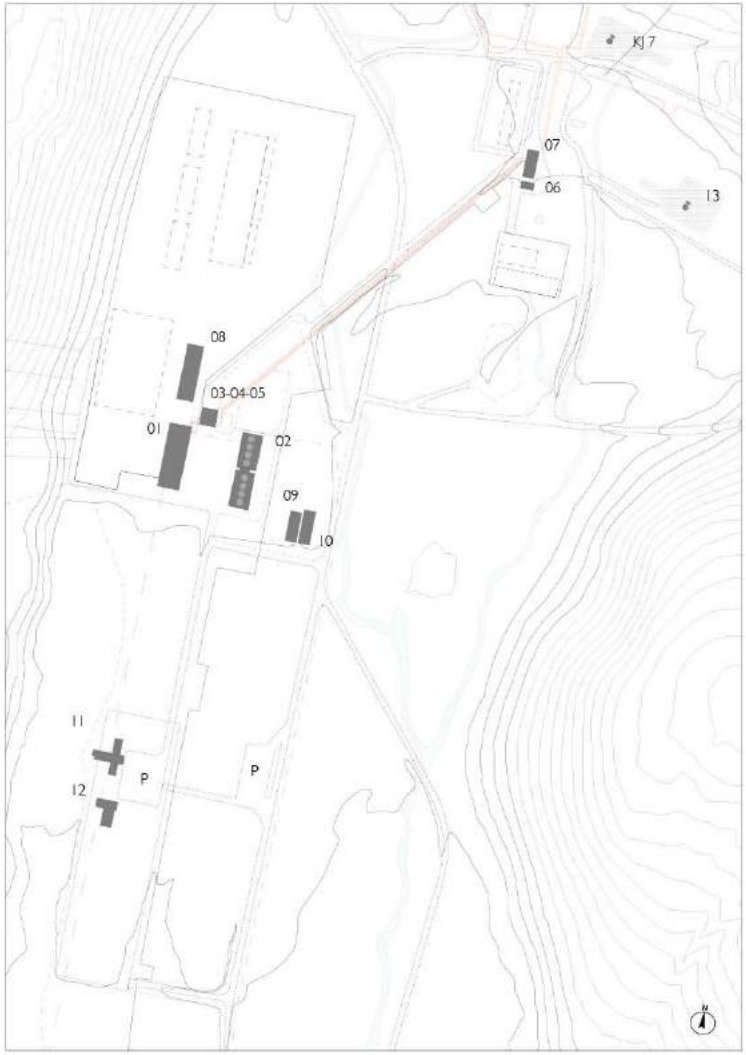
Denial
Anger
Bergining
Depression
acceptence

Nature can be seen
as a Antropocentric ideal

nature in the sense of
Something Non artifical
hardly exist anymore



CONCEPTUAL DESIGN



EXISTING

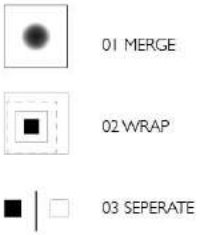
01 powerhouse
02 cooling towers
03 fire pump house
04 C02 house - waste storage
05 moister seperator house
06 valve house
07 seperator house
08 workshop I
09 workshop II
10 workshop III
11 cafe
12 staff house
13 bullethouse borehole

FLEXIBLE

- workspace
- staff house
- cafe

NEW PROGRAM | CONCEPT

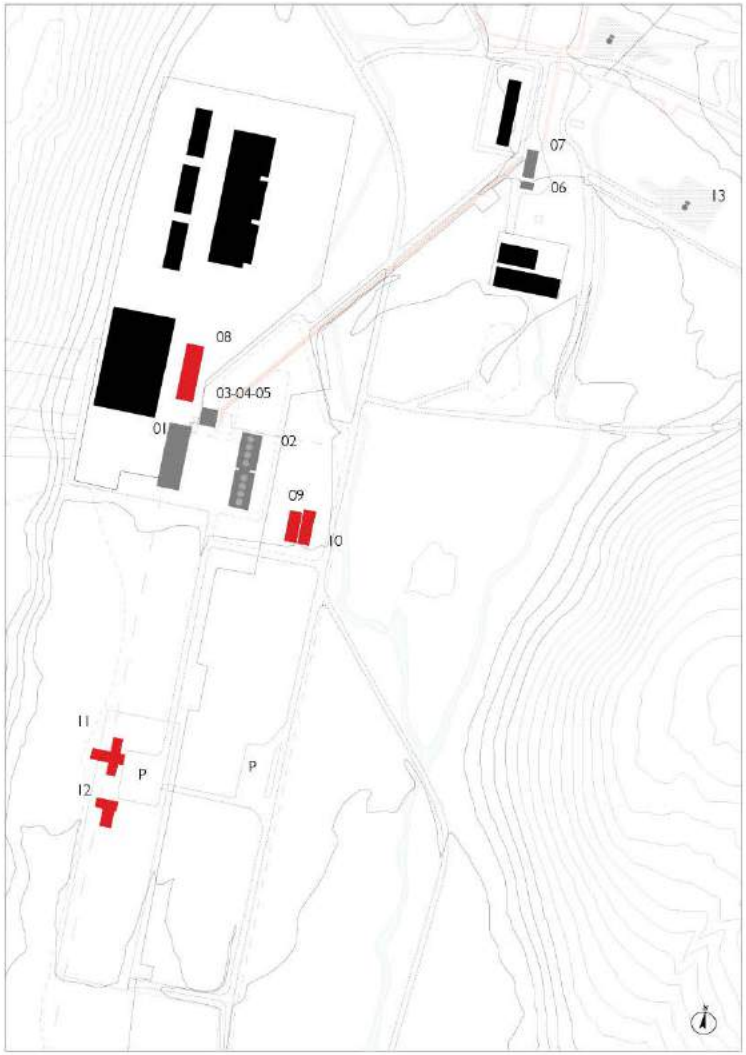
- MERGE
- WRAP
- SEPERATE



01 MERGE

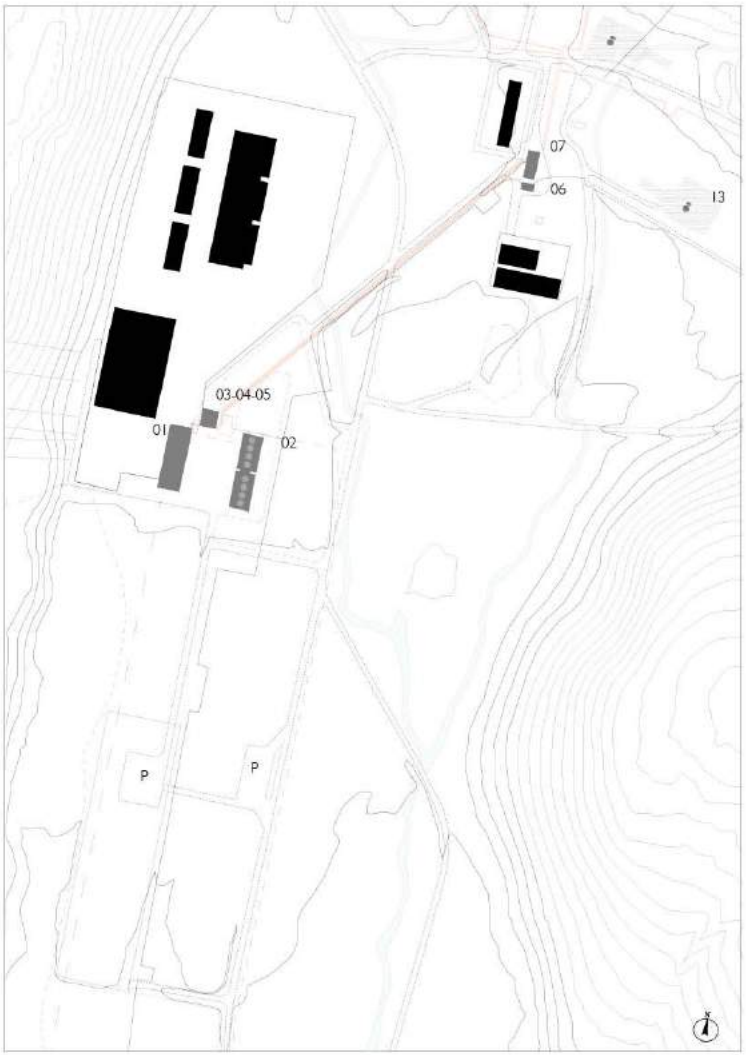
02 WRAP

03 SEPERATE

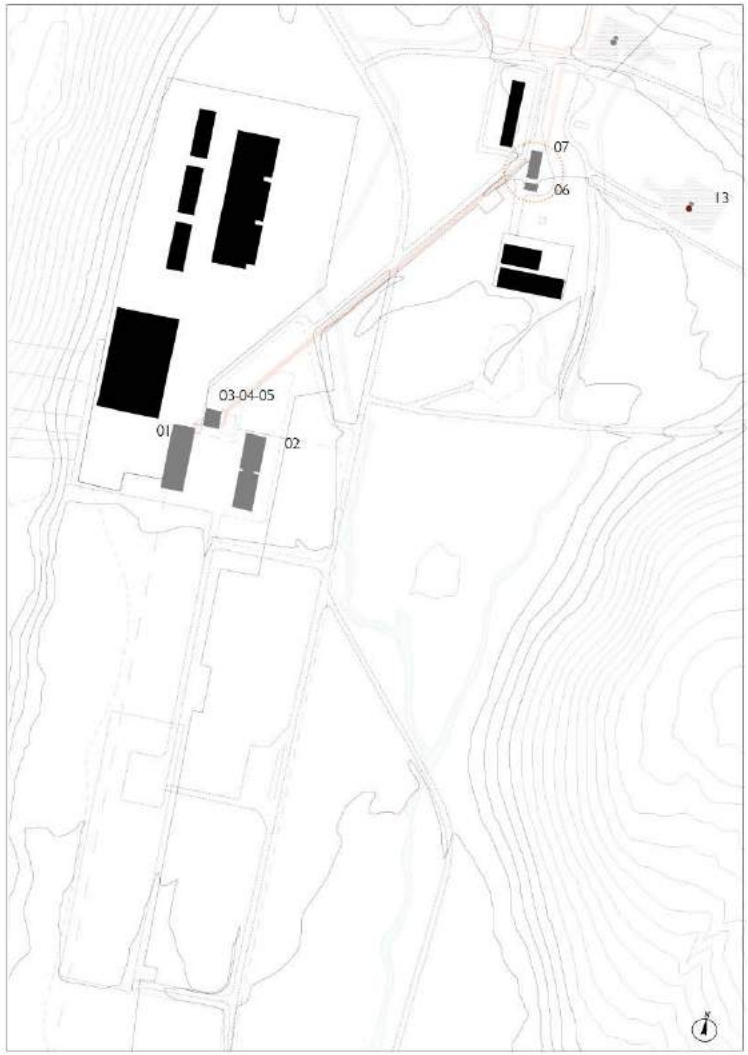


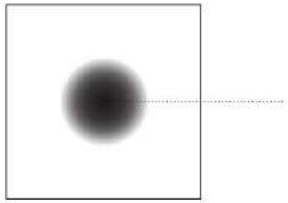
- EXISTING KRAFLA I

- KRAFLA I | EXISTING
- KRAFLA II
- FLEXIBLE STRUCTURE



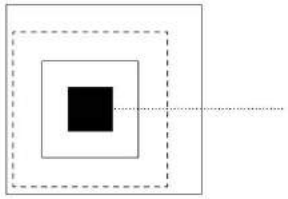
• KRAFLA I + II CONCEPT





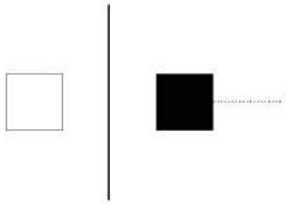
existing industry

01 MERGE



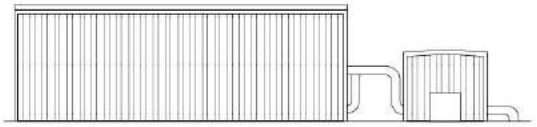
existing industry

02 WRAP

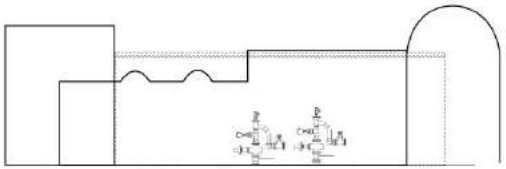


existing industry

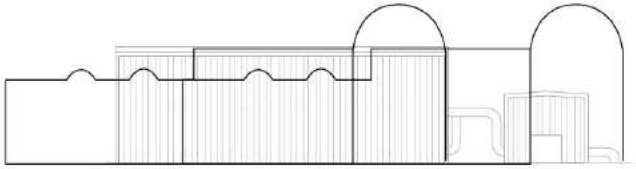
03 SEPERATE



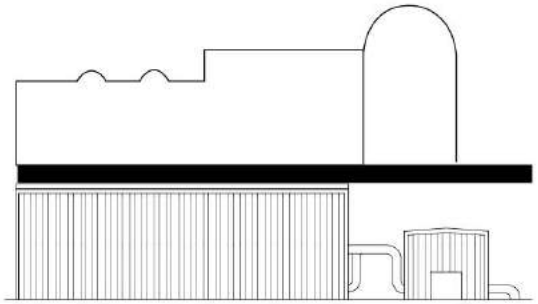
existing industry building 06 /07



Merge existing function + new

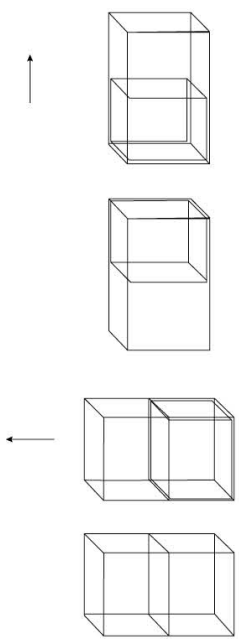


wrapped existing function + new

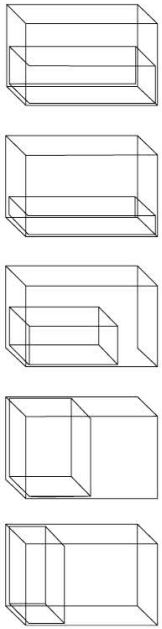


wrapped existing function + new

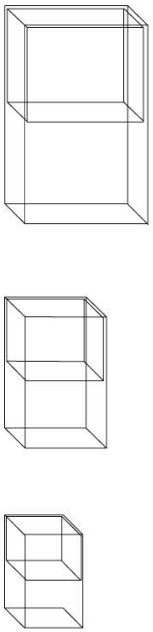
TOOLBOX



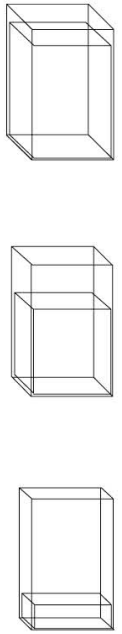
ORIENTATION



PROPORTION



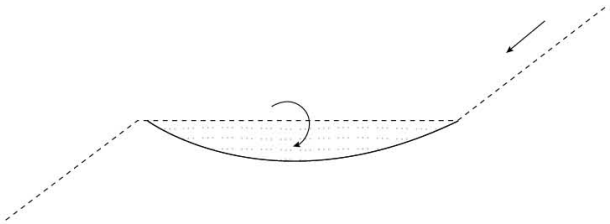
AREA



HEIGHT

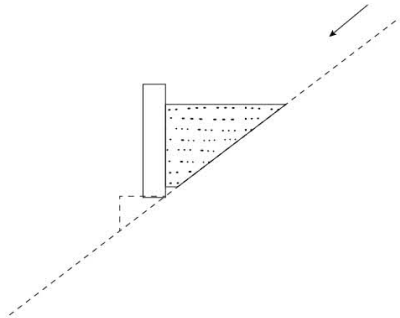
MATERIAL

LANDSCAPE TEMPERATURE

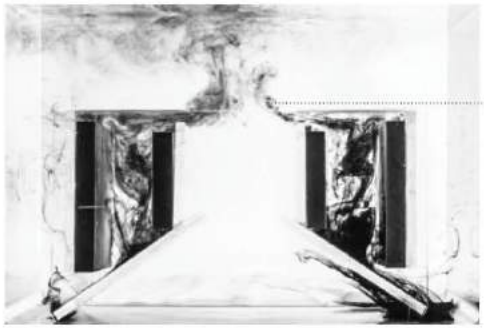


COLD AIR HELD IN HOLLOWS

HILL SIDE AIR FLOW

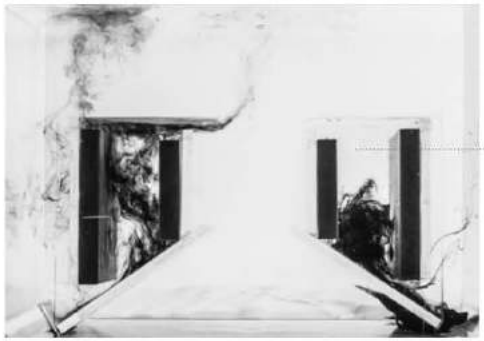


ELEMENT HELD COLD AIR



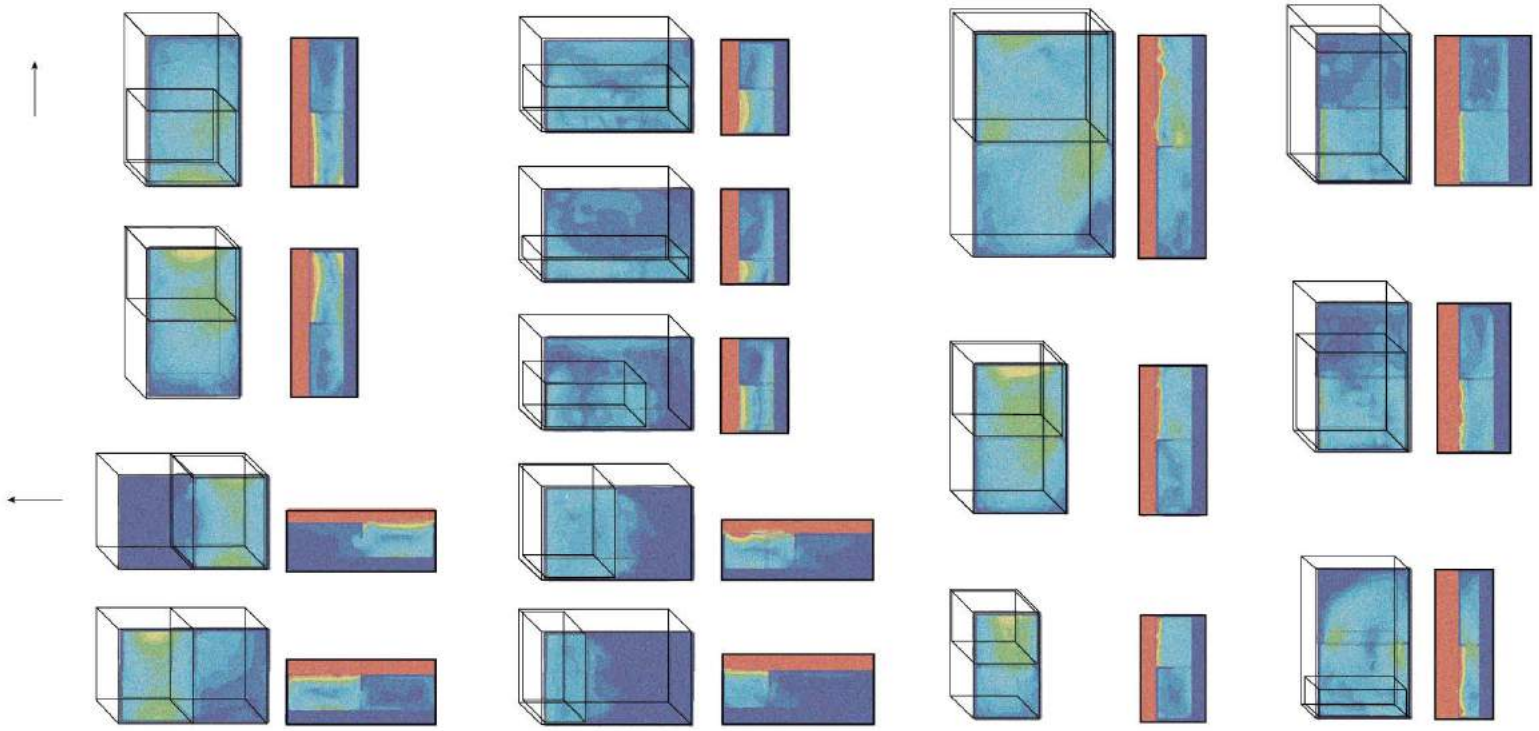
temperature release

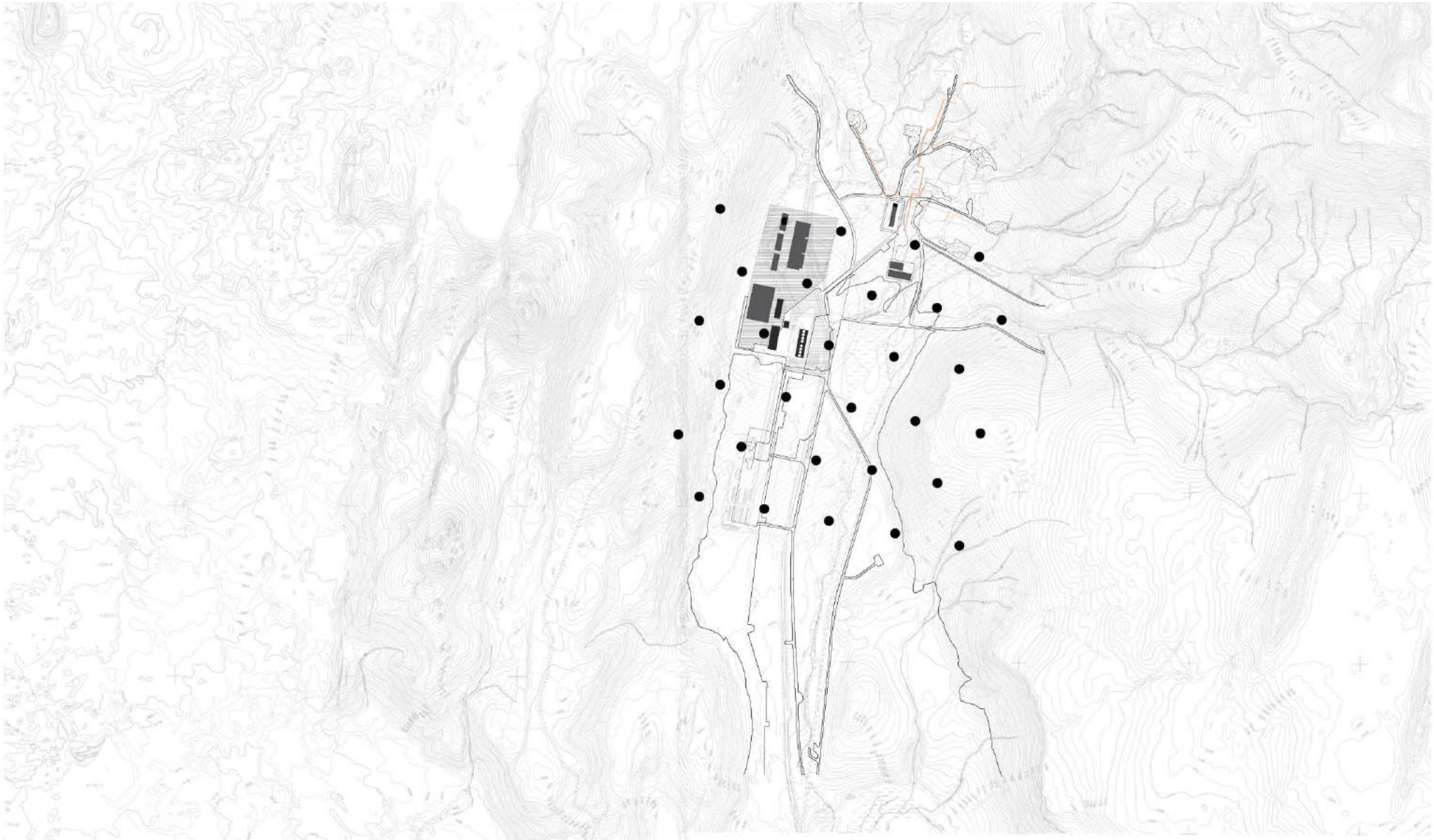
temperature release | Form

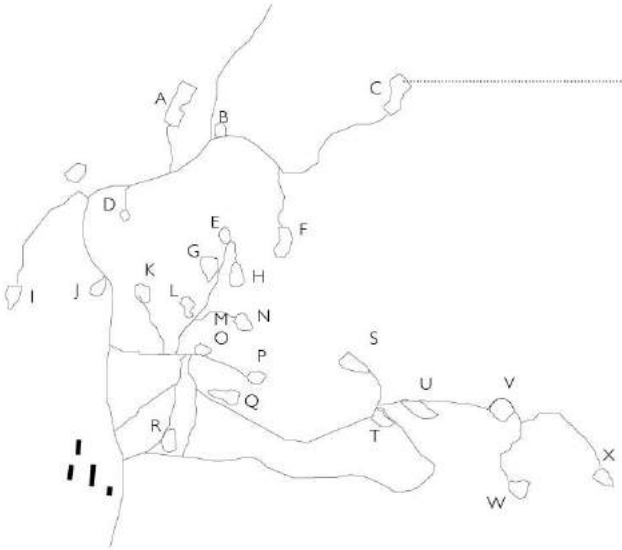


temperature capture

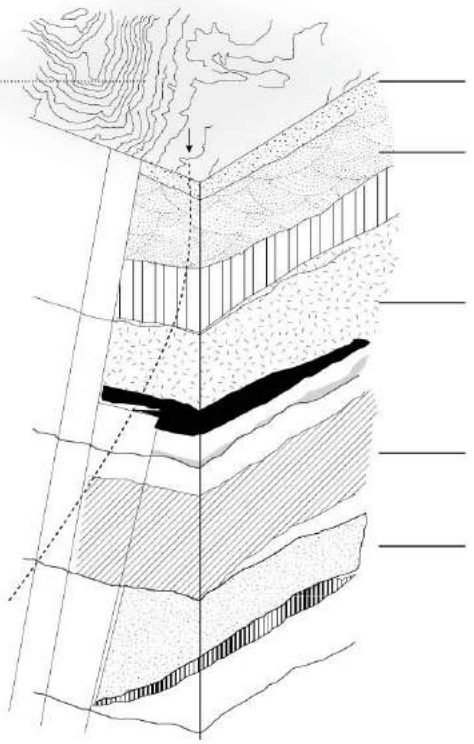
temperature contain


ORIENTATION
PROPORTION
AREA
HEIGHT

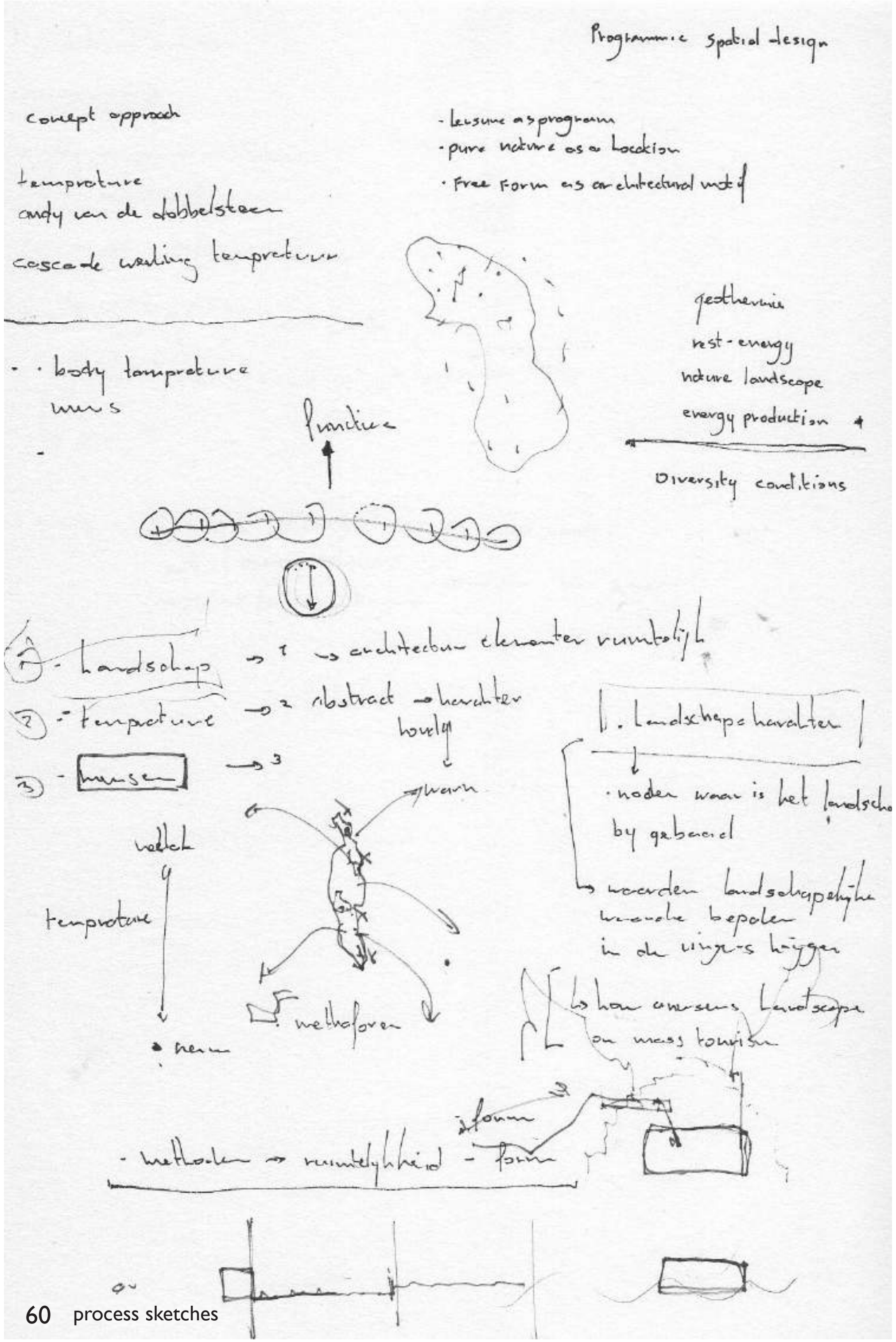


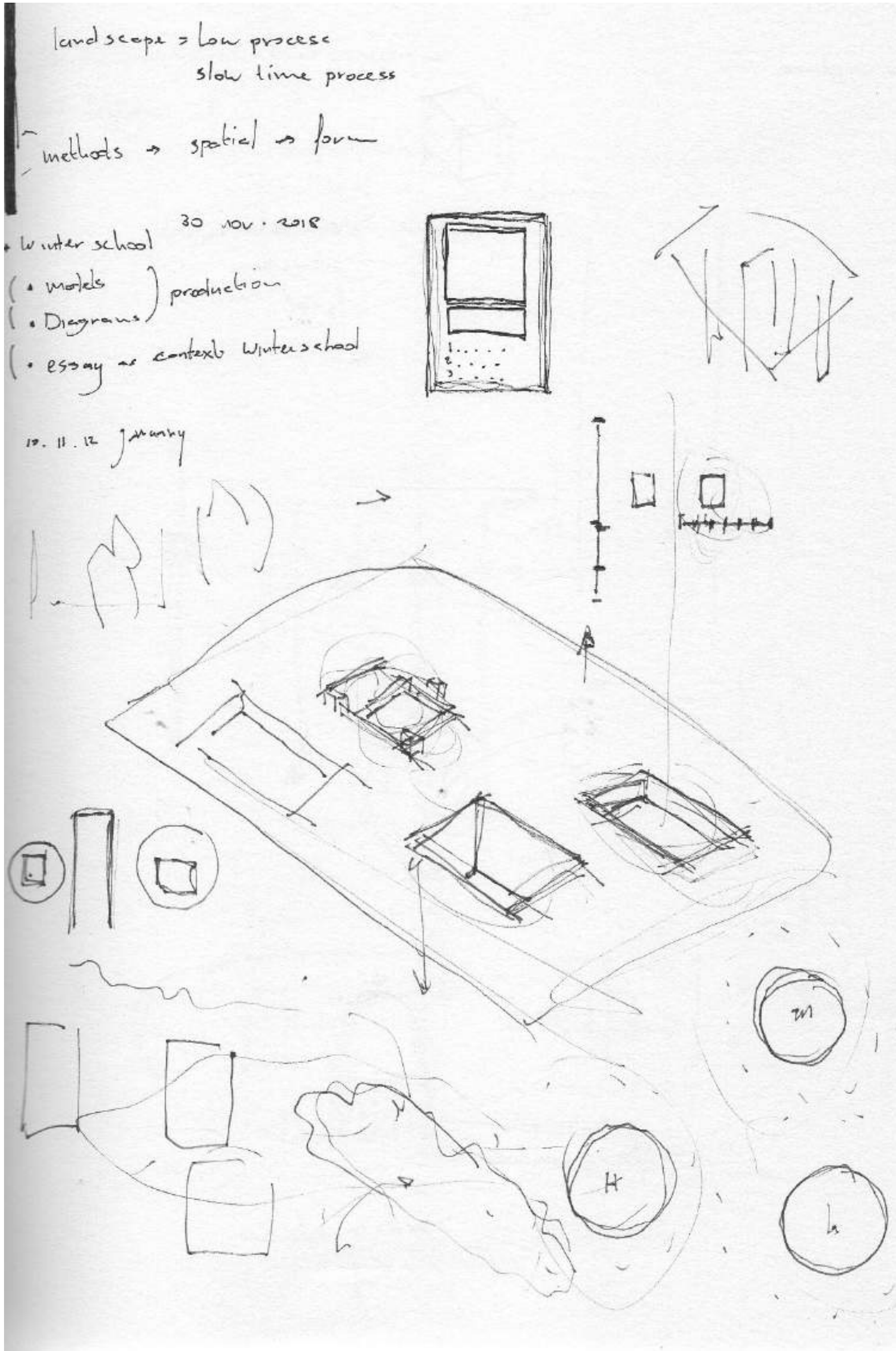


BOREHOLE PLAN | locations



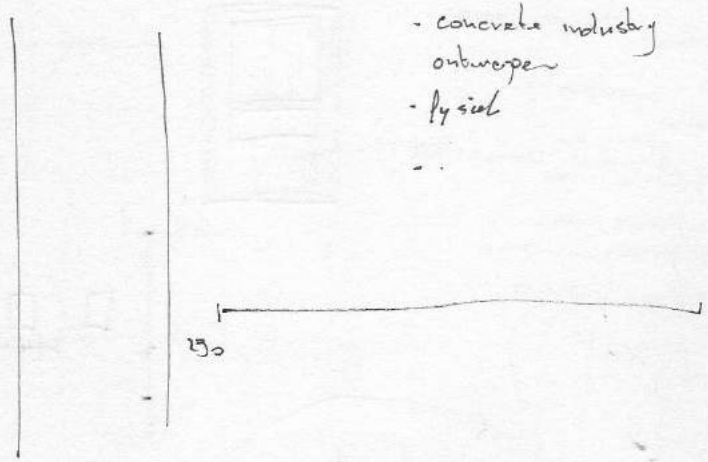
landscape cross section Kralfa well C

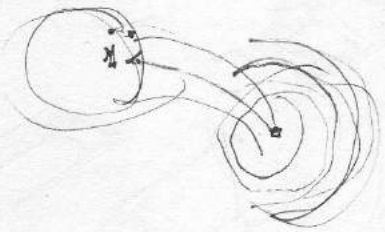

Programmatic spatial design
concept approach
temprature
andy van de dobbelsteen
- leisure as program
- pure nature as a location
- free form as architectural motif
geothermie
rest-energy
nature landscape
energy production
Diversity conditions
body temprature
mens
functie
1 - landschap
2 - temprature
3 - mensen
architectuur elementen ruimtelijk
abstract karakter
1. landschapskarakter
warm
metaforen
temprature
how conserves landscape on mass tourism
form
- methoden → ruimtelijkheid - form


landscape = low process
slow time process
methods → spatial → form
30 nov. 2018
• winter school
• models
• Diagrams
production
• essay as context winterschool
10. 11. 12 january

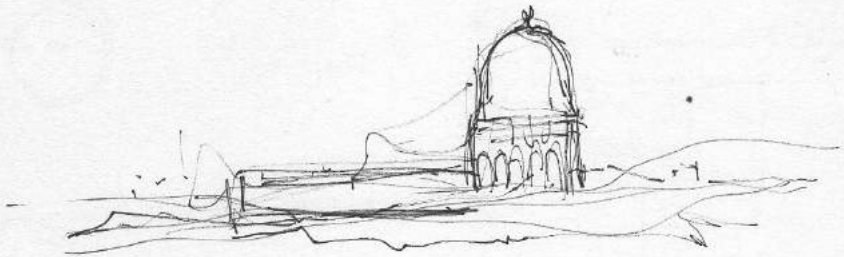
. capture

- concrete industry
  ontwerpen
- fysiek
- .





Scale

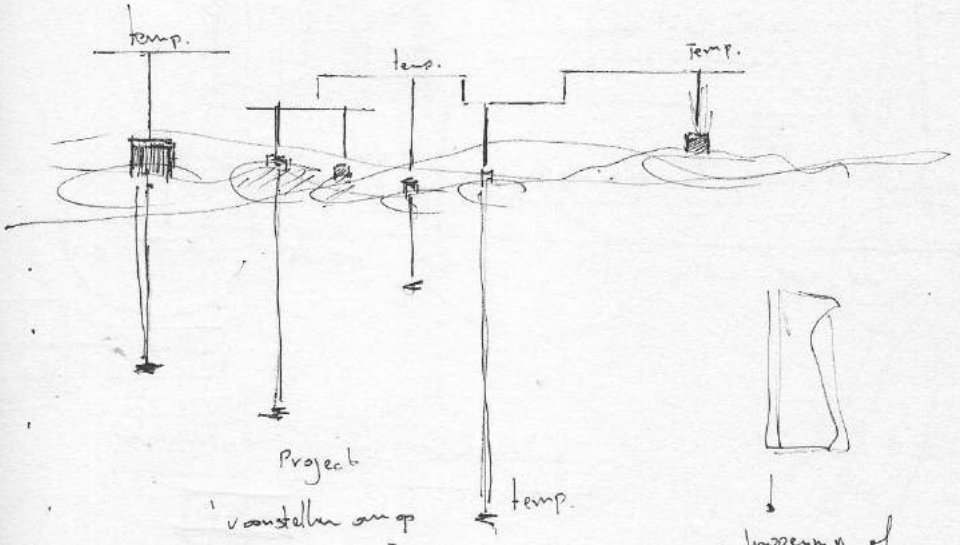


Scale? reference
Metafora

Landscape values and perceptions

- manifestation of :

{ biophysical
  cultural
  economic } process } change

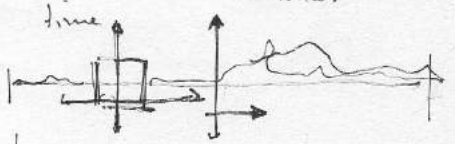


Project

voorstellen om op
Productieverse wijze
geothermische energie
opwekking te verbinden
met plaatsen van
frictie

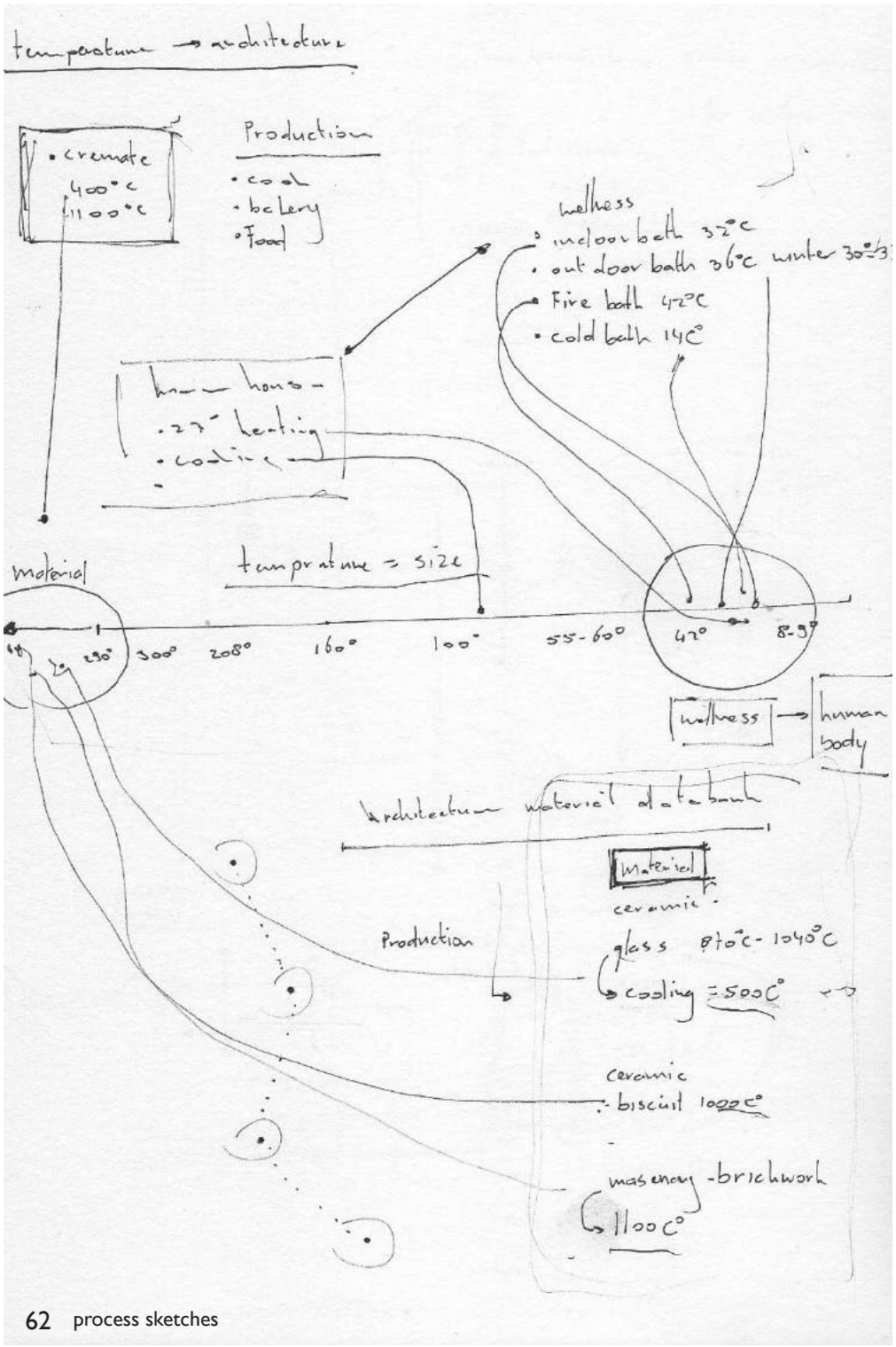
Verstoord gebied

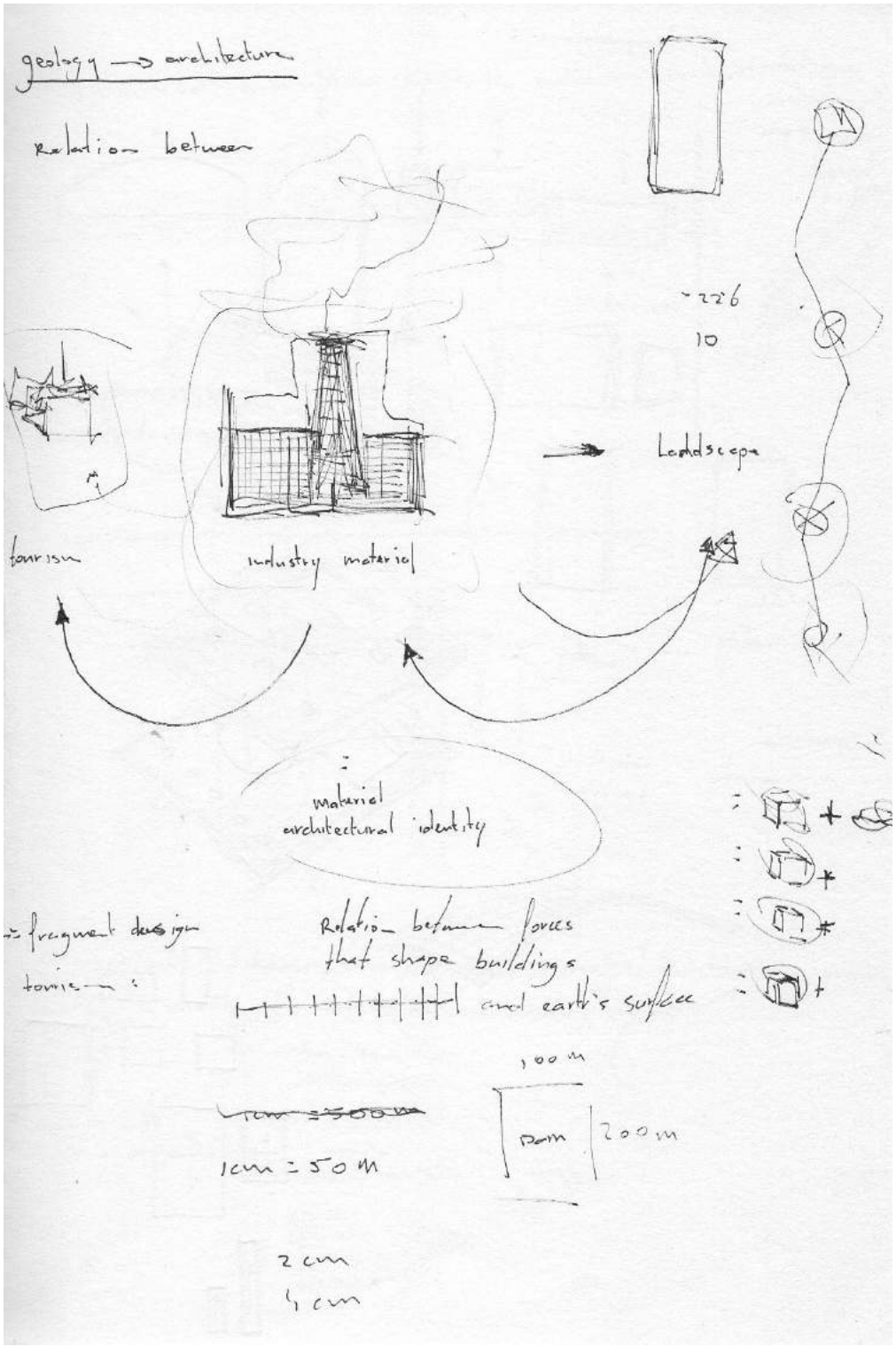
- happening of
  activities

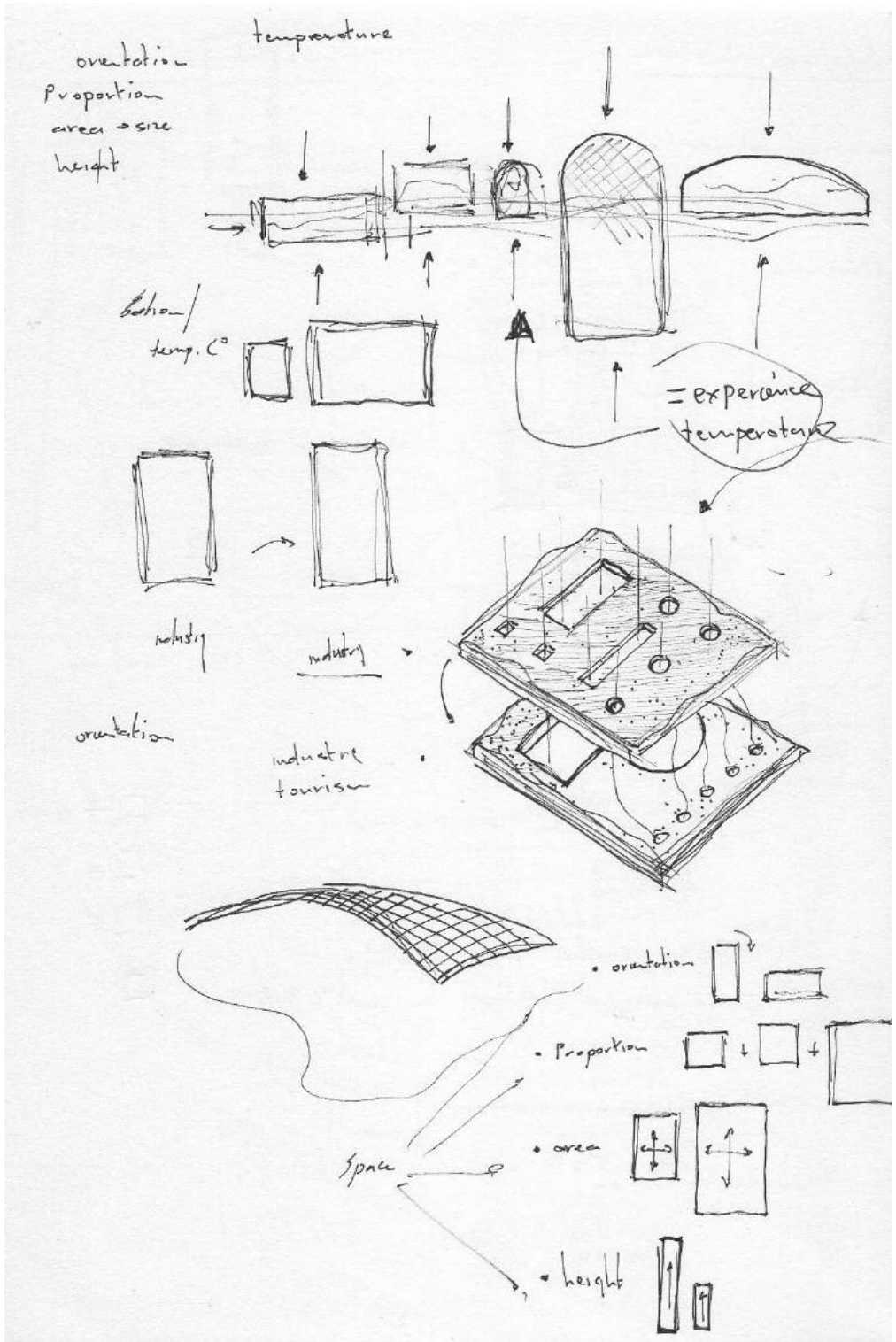


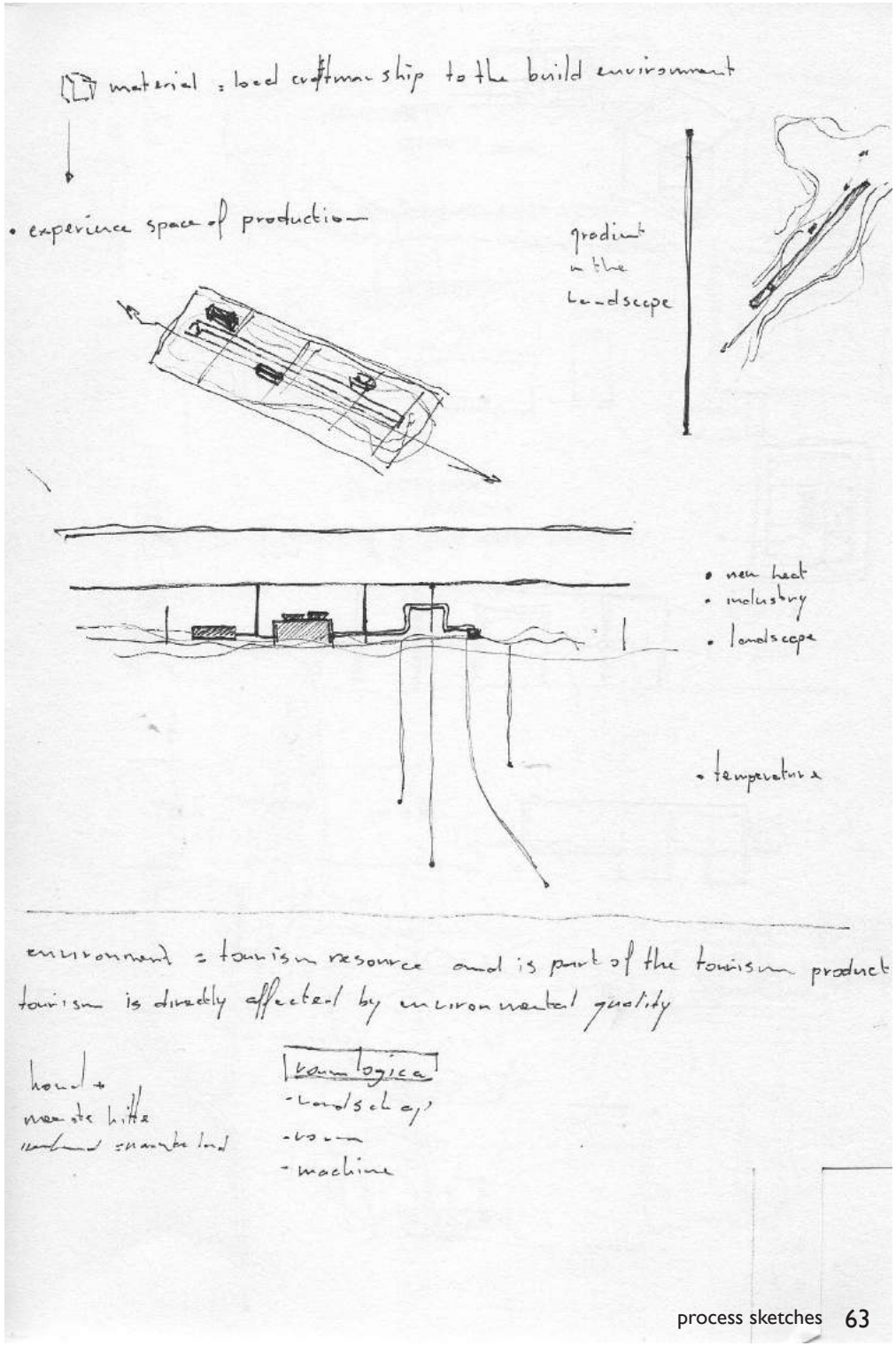
landscape proces

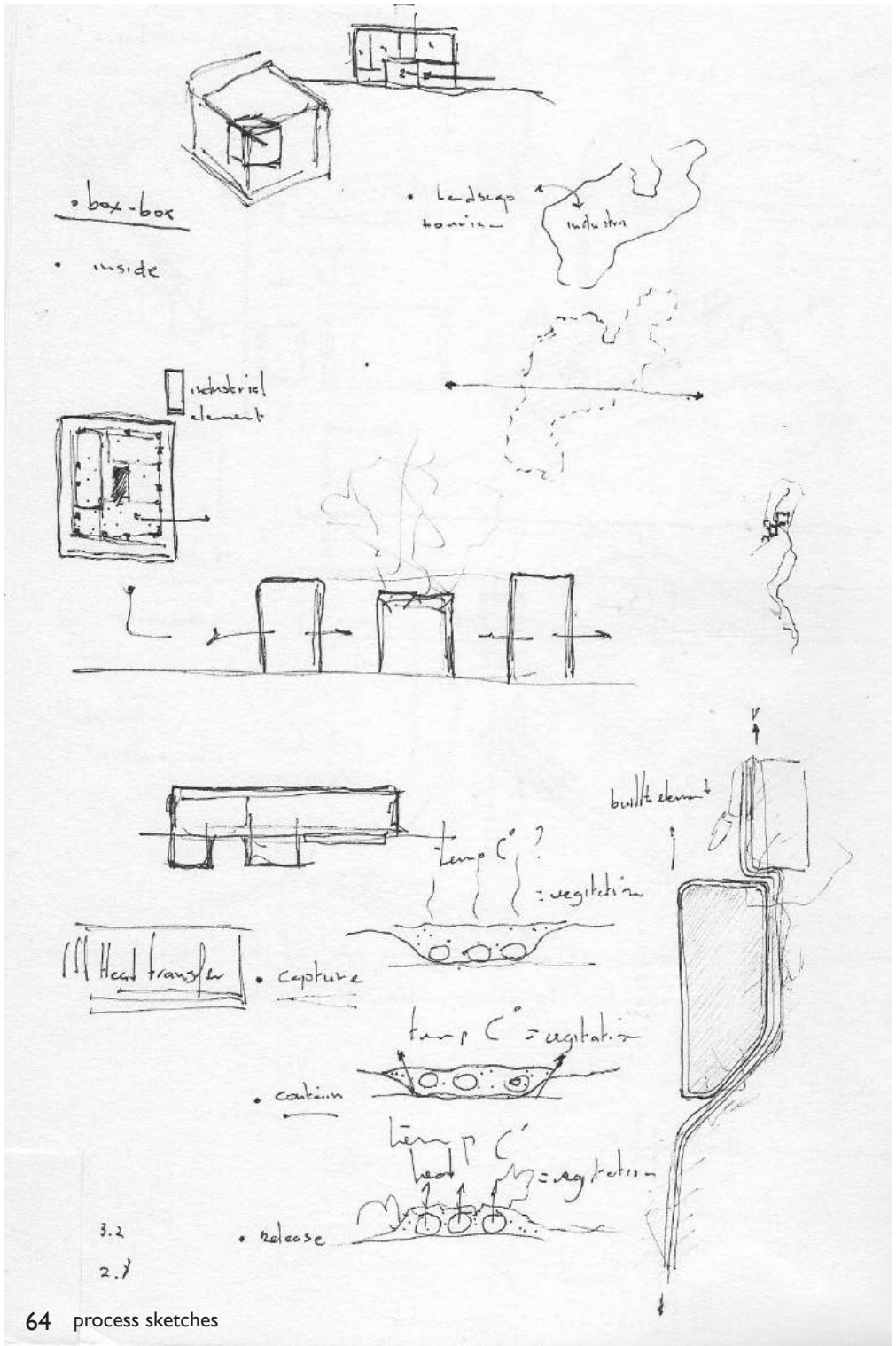
cut to reveal

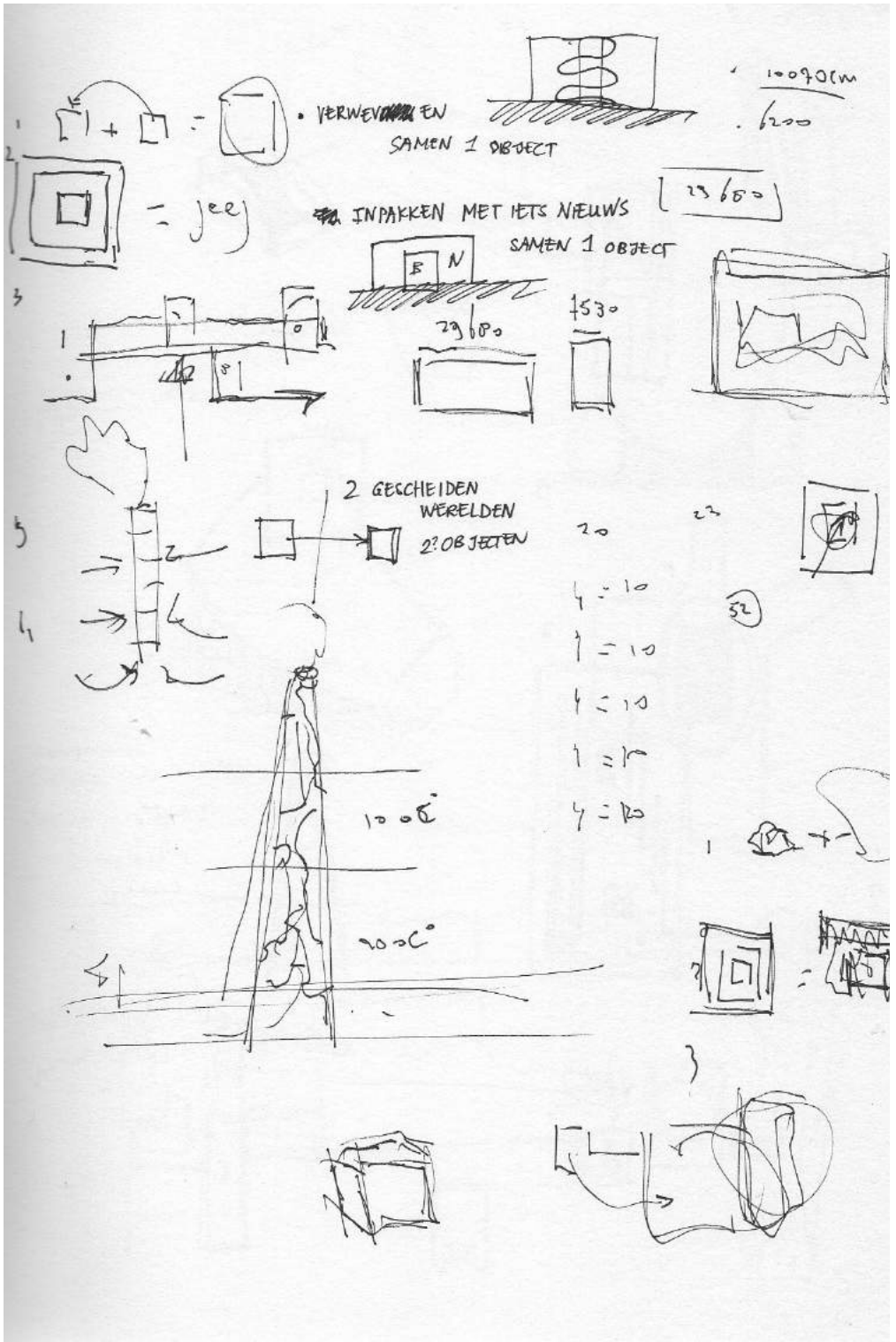

temperature → architecture
• cremate
400°c
1100°c
Production
• cook
• bakery
• food
wellness
• indoor bath 32°c
• out door bath 36°c winter 30°-32
• Fire bath 42°c
• cold bath 14°c
house
• heating
• cooling
material
temprature = size
230°
300°
208°
160°
100°
55-60°
42°
8-9°
wellness
human body
architecture material databank
material
ceramic
Production
glass 870°c - 1040°c
cooling = 500°c
Ceramic
biscuit 1022°c
masonry - brickwork
1100°c

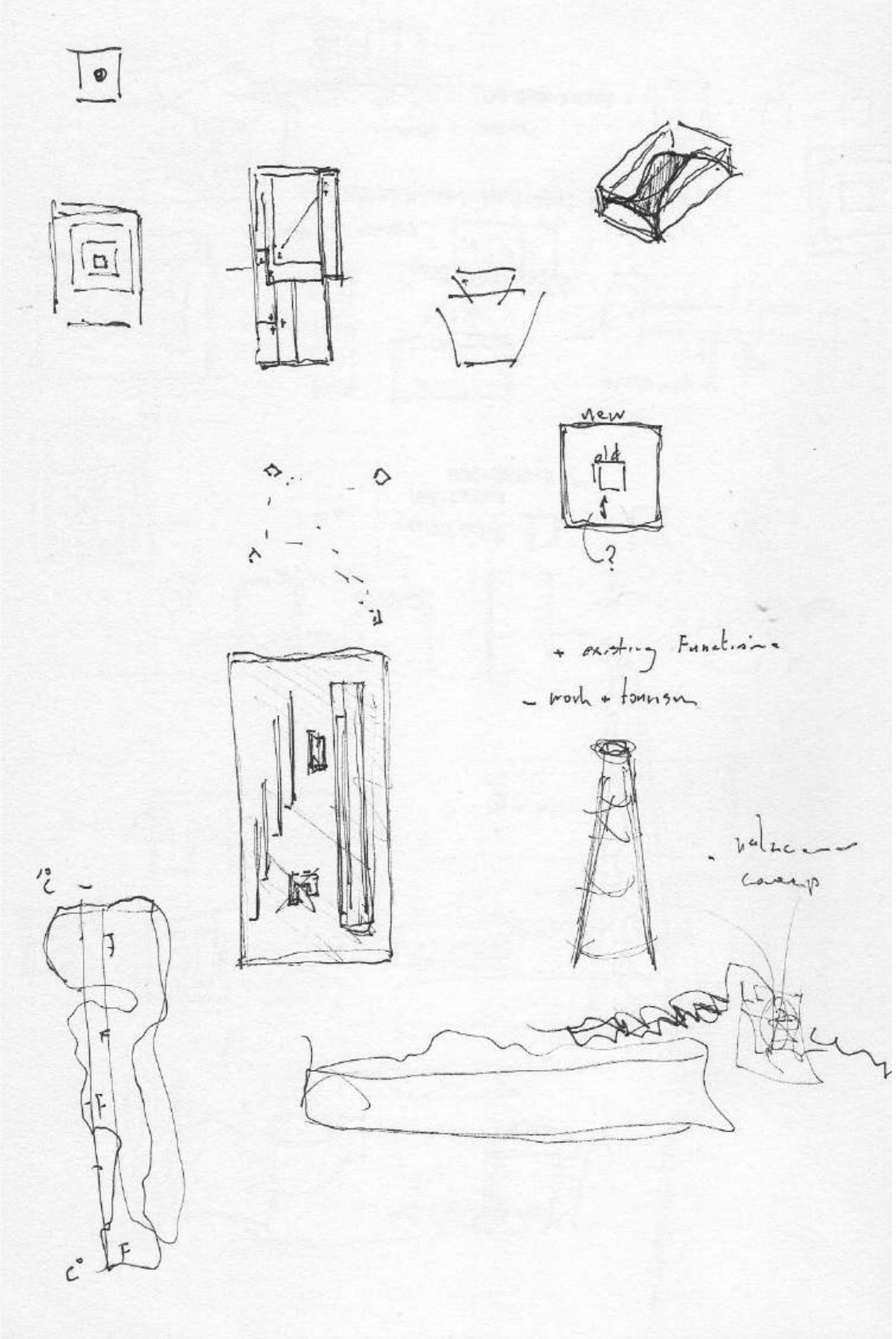

geology → architecture
Relation between
~226
10
Landscape
tourism
industry material
material
architectural identity
= fragment design
tourism
Relation between forces
that shape buildings
and earth's surface
100 m
200 m
1cm = 50 m
2 cm
1 cm

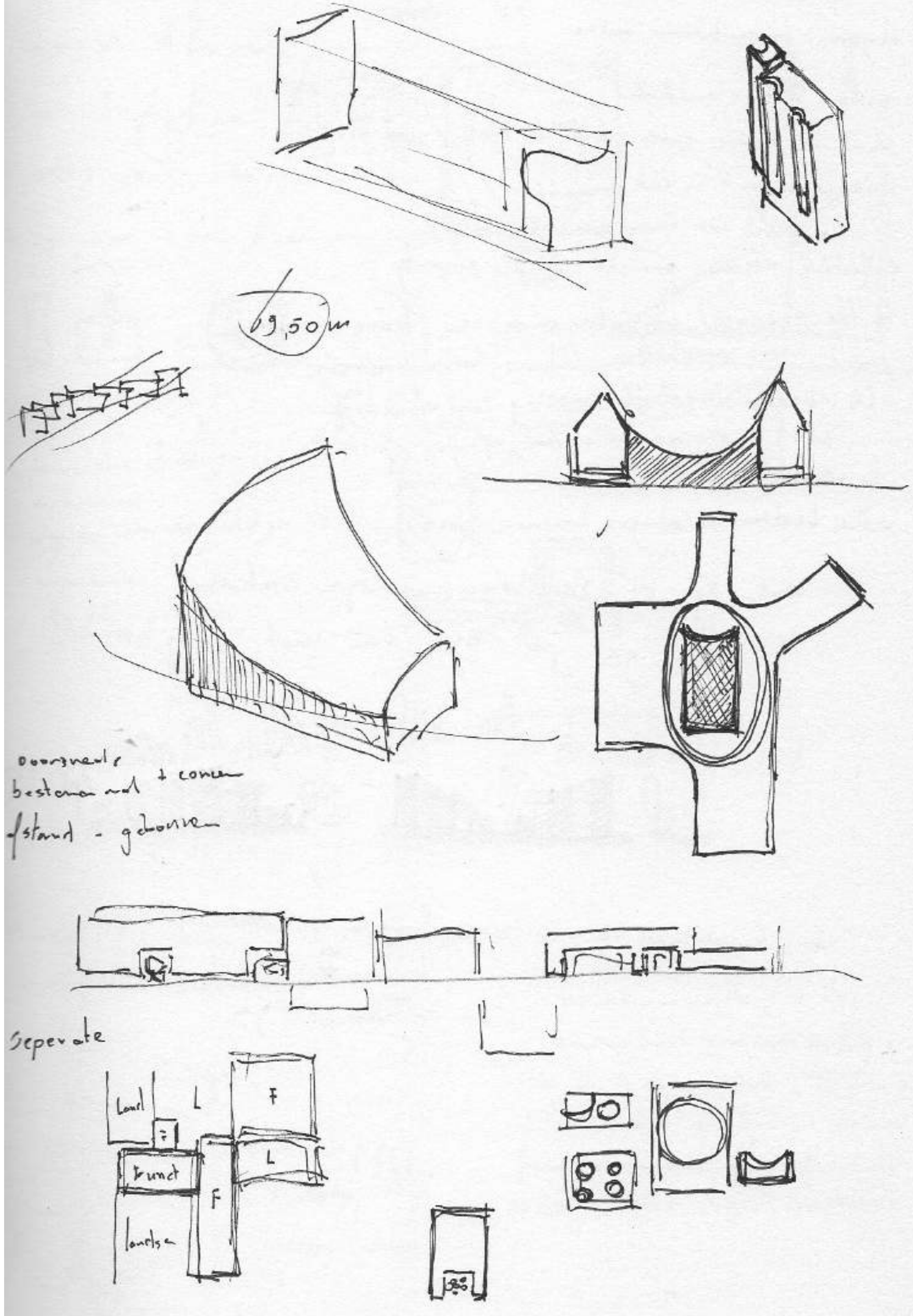

temperature
orientation
Proportion
area → size
height
Section /
temp. C°
= experience
temperature
industry
industry
orientation
industry
tourism
• orientation
• Proportion
• area
Space
• height


material : local craftmanship to the build environment
• experience space of production
gradient
in the
landscape
• new heat
• industry
• landscape
• temperature
environment = tourism resource and is part of the tourism product
tourism is directly affected by environmental quality
hand +
remote little
mechanized machine land
technological
- landscape
- room
- machine


• box-box
• inside
• landscape
tourism
industry
industrial
element
built element
temp C° ?
= registration
Heat transfer
• capture
temp C° = registration
• contain
temp C°
heat
= registration
• release
3.2
2.1


• VERWEVEN EN
SAMEN 1 OBJECT
= jeej
INPAKKEN MET IETS NIEUWS
SAMEN 1 OBJECT
2 GESCHEIDEN
WERELDEN
2 OBJECTEN
100°C
20°C


new
old
?


9,50 m
Seperate
F
L

thijmen presentation notes

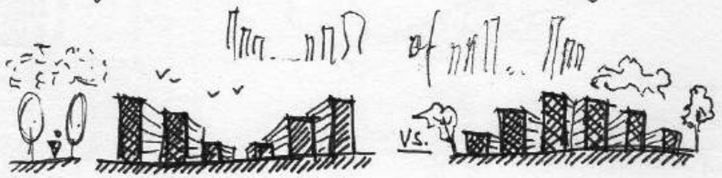
- million dollar question
  what is public space going to work / look like
- municipality? in the process
  ↳ what are they planning to do?
- collective issues private owned property
- is the proposal marketing or design | testing due design
- jw: more marketing than urban design
  ↳ choice direction missing tool of design
  what is the added value of the choice?

interventies testen

welke bestaande dingen hebben weg?

Wat zijn de stedenbouwkundige criteria?

Hoe ga je bijv. om met hoogbouw?



⇒ Combination between work of Art

⇕

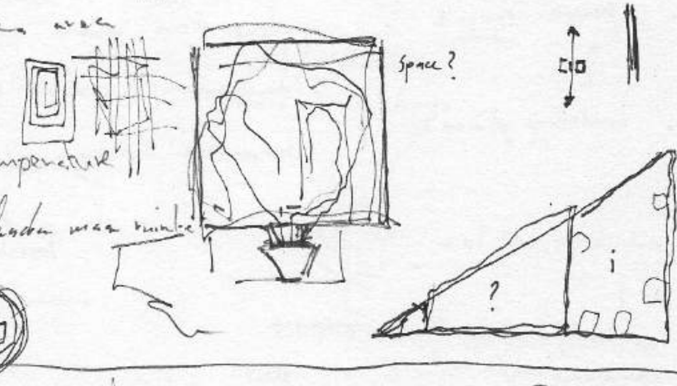
The stage

|||

notes

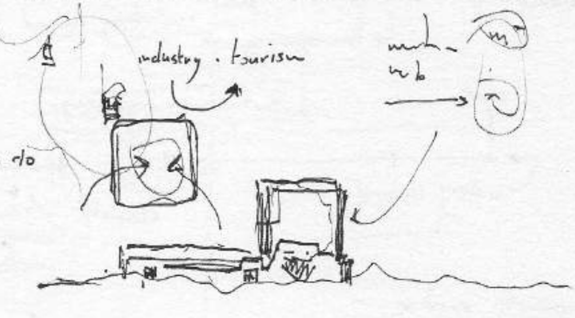
- analysis of the area
- space time place
- actions mass - temperature

temperature → green [illegible]



essay

- principles of design
- motivation
- why you are doing what you do
- importance
- inspiration guidance

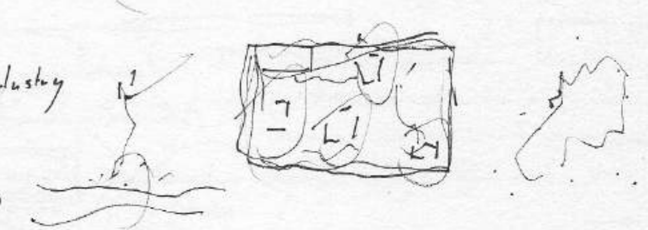


intro

temp. → landscape → industry

↓

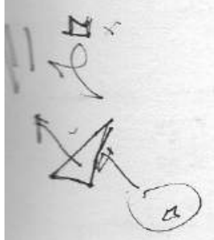
tourism



- Principles of the design
- blending architectural industry → environment

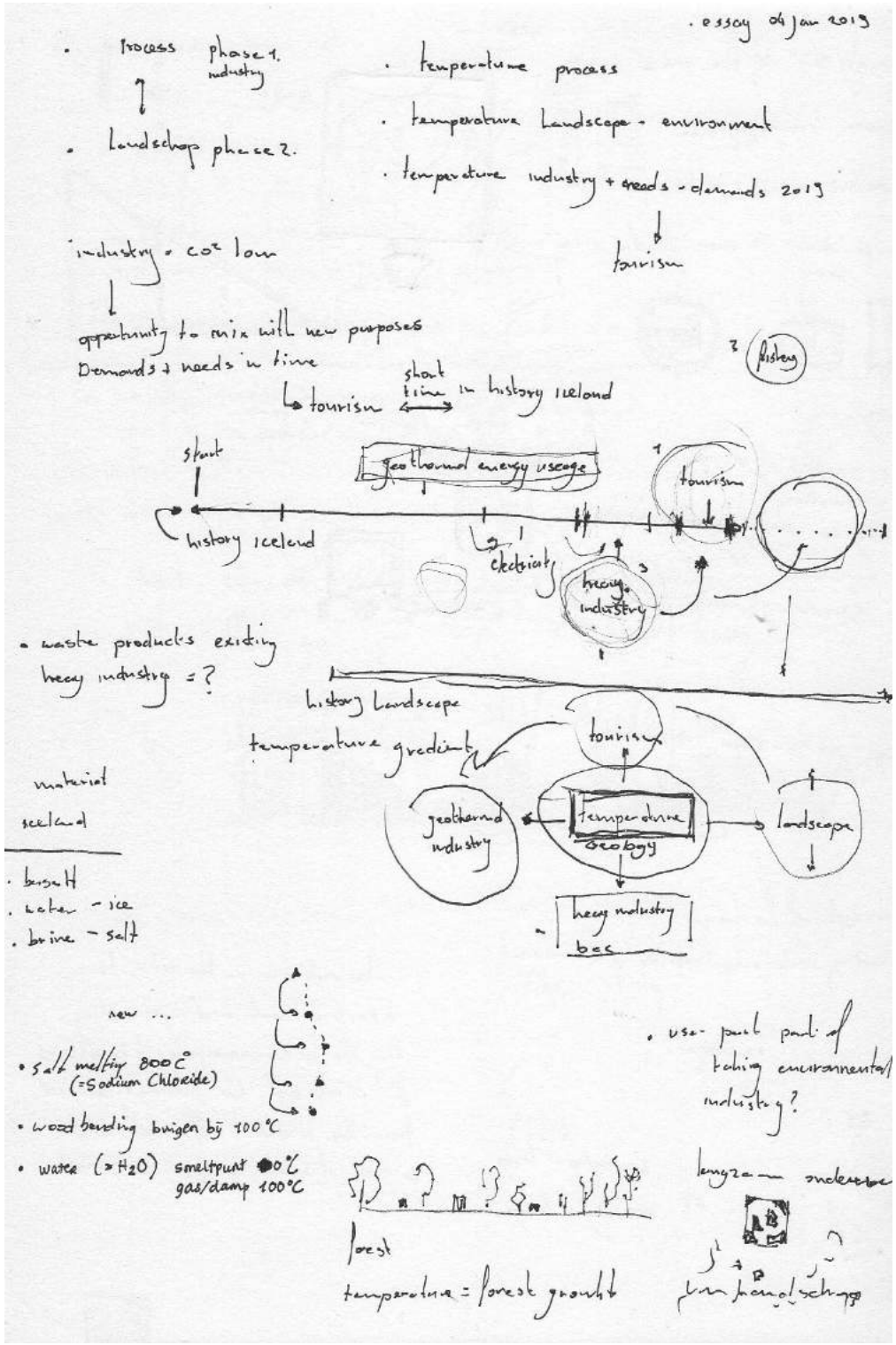
remove

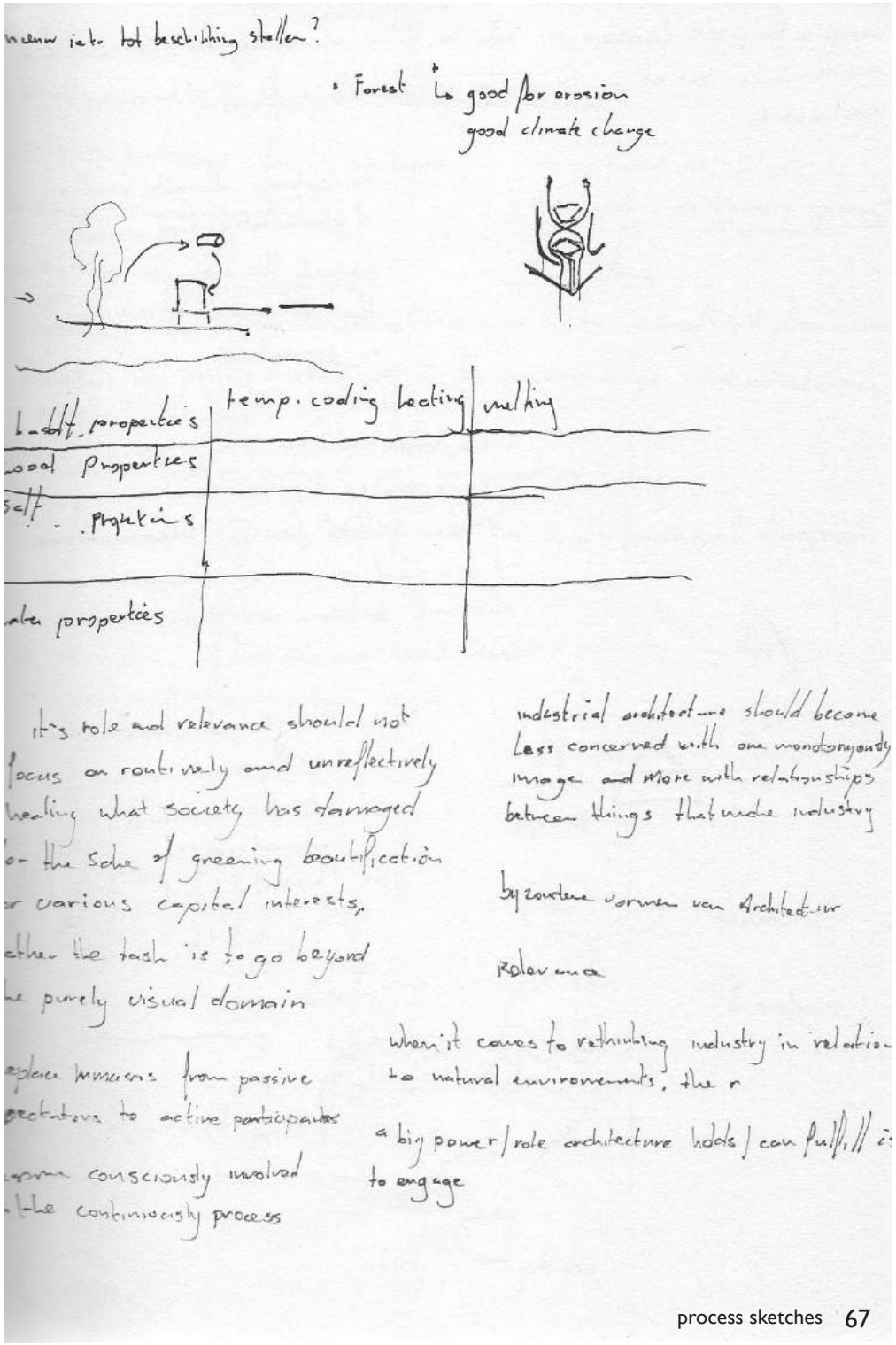
- intervention in the site to leave a mark and representing the site to communicate it to others yet it through the findings derived from the research offers alternatives to each of these project components



Landschap : temp.

industry : temp.


essay 04 jan 2019
process phase 1. industry
landschap phase 2.
temperature process
temperature landscape - environment
temperature industry + needs - demands 2019
tourism
industry - co² low
opportunity to mix with new purposes
Demands + needs in time
tourism
short time in history iceland
history iceland
geothermal energy useage
tourism
electricity
heavy industry
waste products existing heavy industry = ?
history landscape
temperature gradient
tourism
geothermal industry
temperature
ecology
landscape
heavy industry
bos
material
seeland
. basalt
. water - ice
. brine - salt
new ...
• salt melting 800°C (=Sodium Chloride)
• wood bending buigen bij 100°C
• water (=H2O) smeltpunt 0°C gas/damp 100°C
use- past part of taking environmental industry?
forest
temperature = forest growth


Forest
good for erosion
good climate change
temp. cooling heating melting
properties
properties
properties
its role and relevance should not
focus on routinely and unreflectively
healing what society has damaged
for the sake of greening beautification
of various capital interests,
whether the task is to go beyond
the purely visual domain
industrial architecture should become
Less concerned with one monotonously
image and more with relationships
between things that make industry
by zoveel vormen van Architectuur
Relevance
When it comes to rethinking industry in relation
to natural environments, the r
a big power/role architecture holds / can fulfil
to engage

therefore the project focusses on how to think of industry and nature / environments not as a complete or final thing fixed in a current need but to

Design principles

temp.

?

+ to explore alternate modes of representation that would embody the character of the site instead of relying on convential

the nordic pavilion as inspi. incorporates weather conditions as the spatial focus by accomodating trees and rain, Fehn expands the dialogue between architecture and nature

Architectural themes
+ entity in architecture
+ existing connections
+ landscape
+ orientation

. tiny house Principle

concept

Development

height

water

industry

- Re-define

an alternate entity for geothermal industry in iceland

Icelandic Landscape = facing pressure : energy industries
landscape = country's identity increasing tourism

tectonic
glaciers

+
culture + society

because we live in an industrialized civilization iceland = last place unt

therefore my project = rethinking of the common ways industrial architectu in pristine landscapes

- geothermal process = monotonous streamed mentality

- thermal gradient as Architecture tool for multi. functional development

Role of Architecture

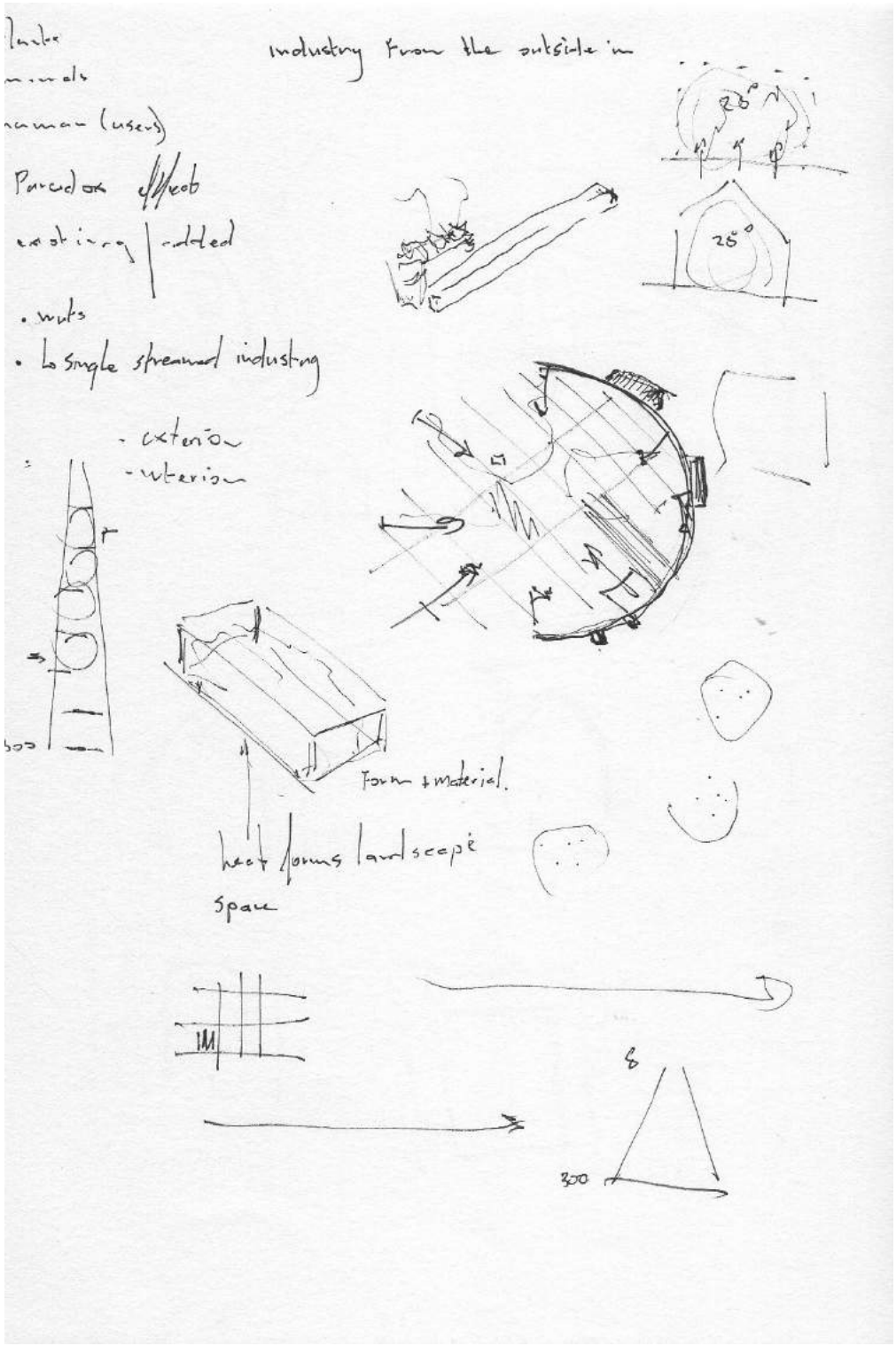
re mediation of the process industrial sites can be invested with new and attractive new Layer

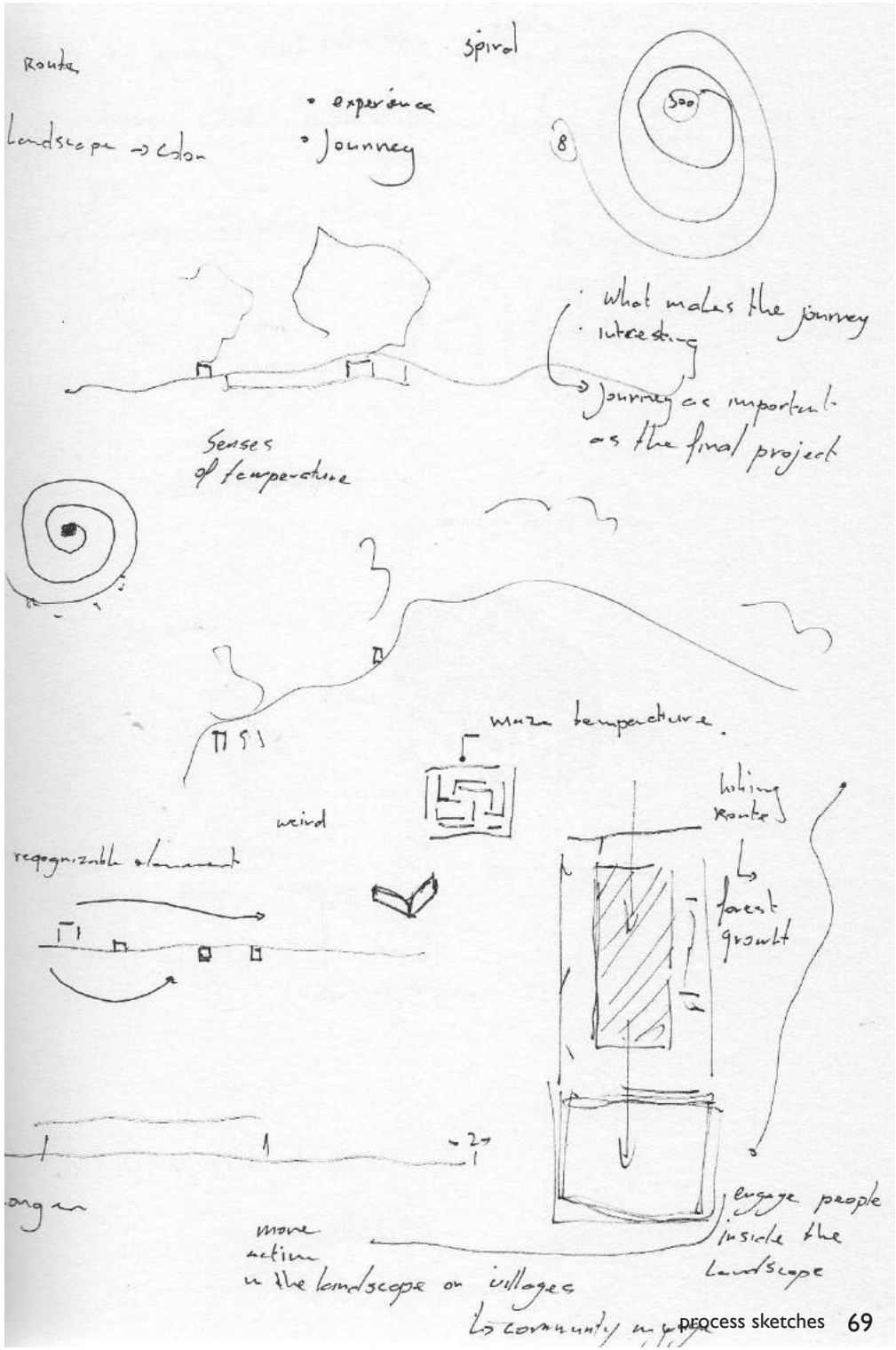
30

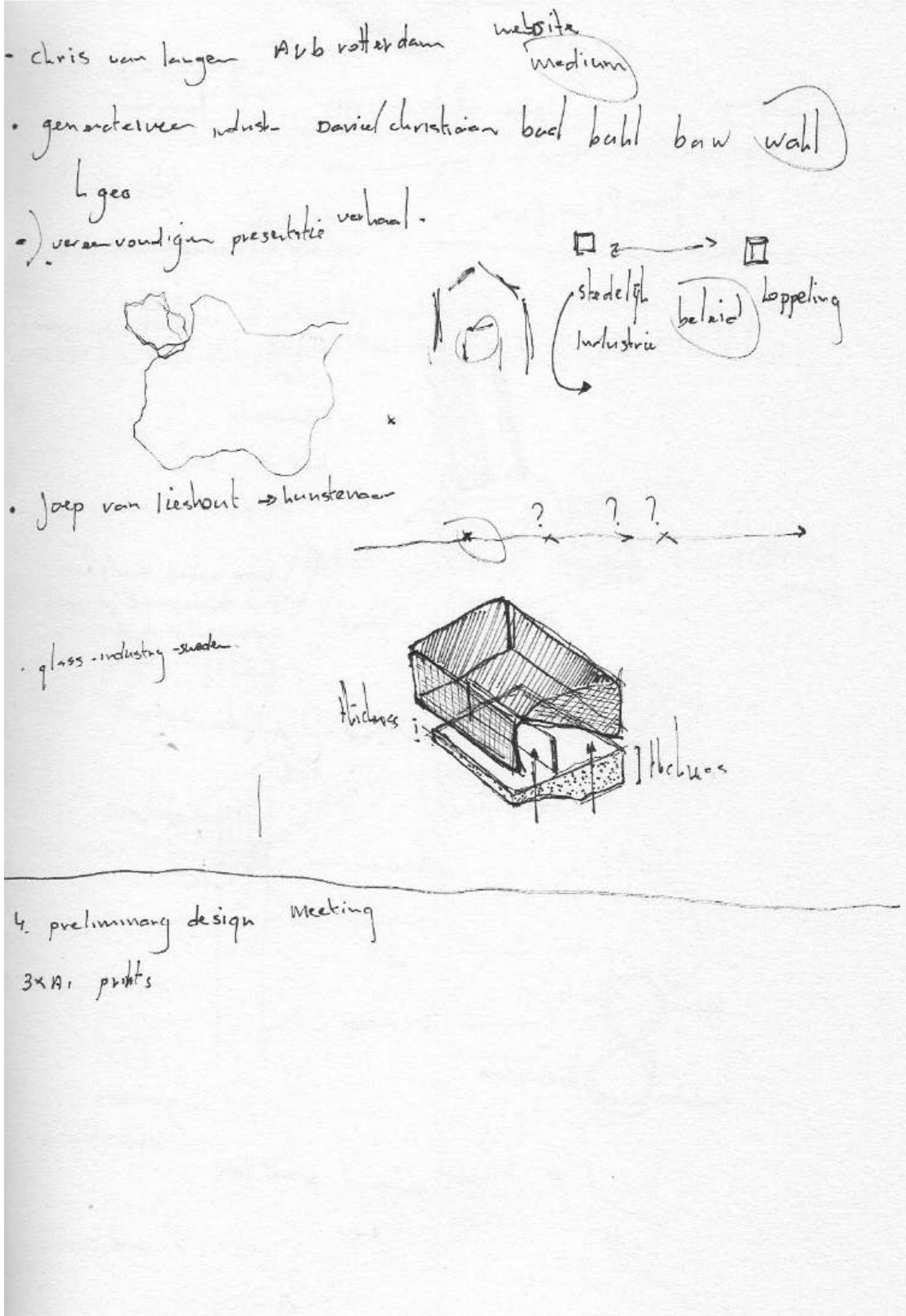
100

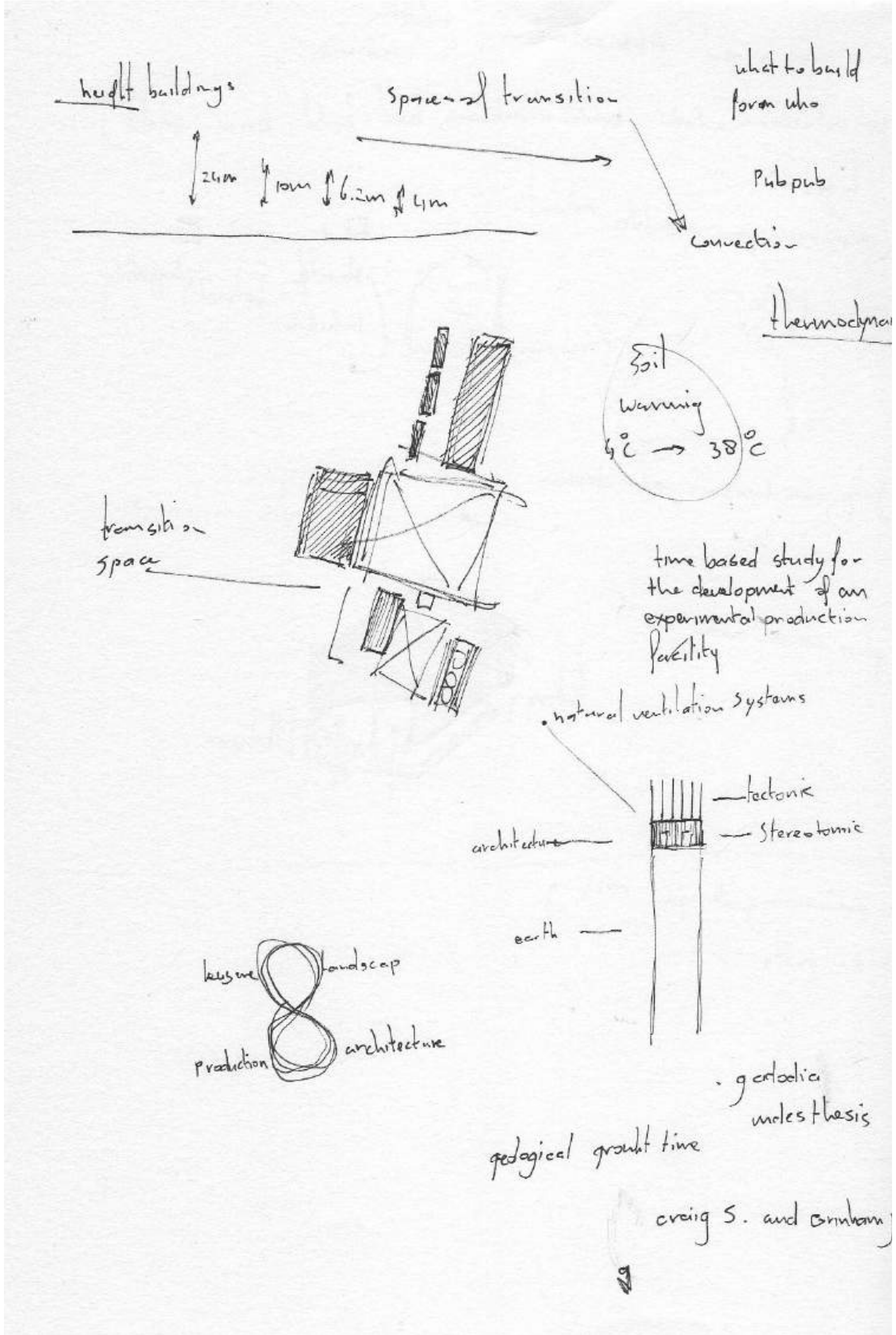
200

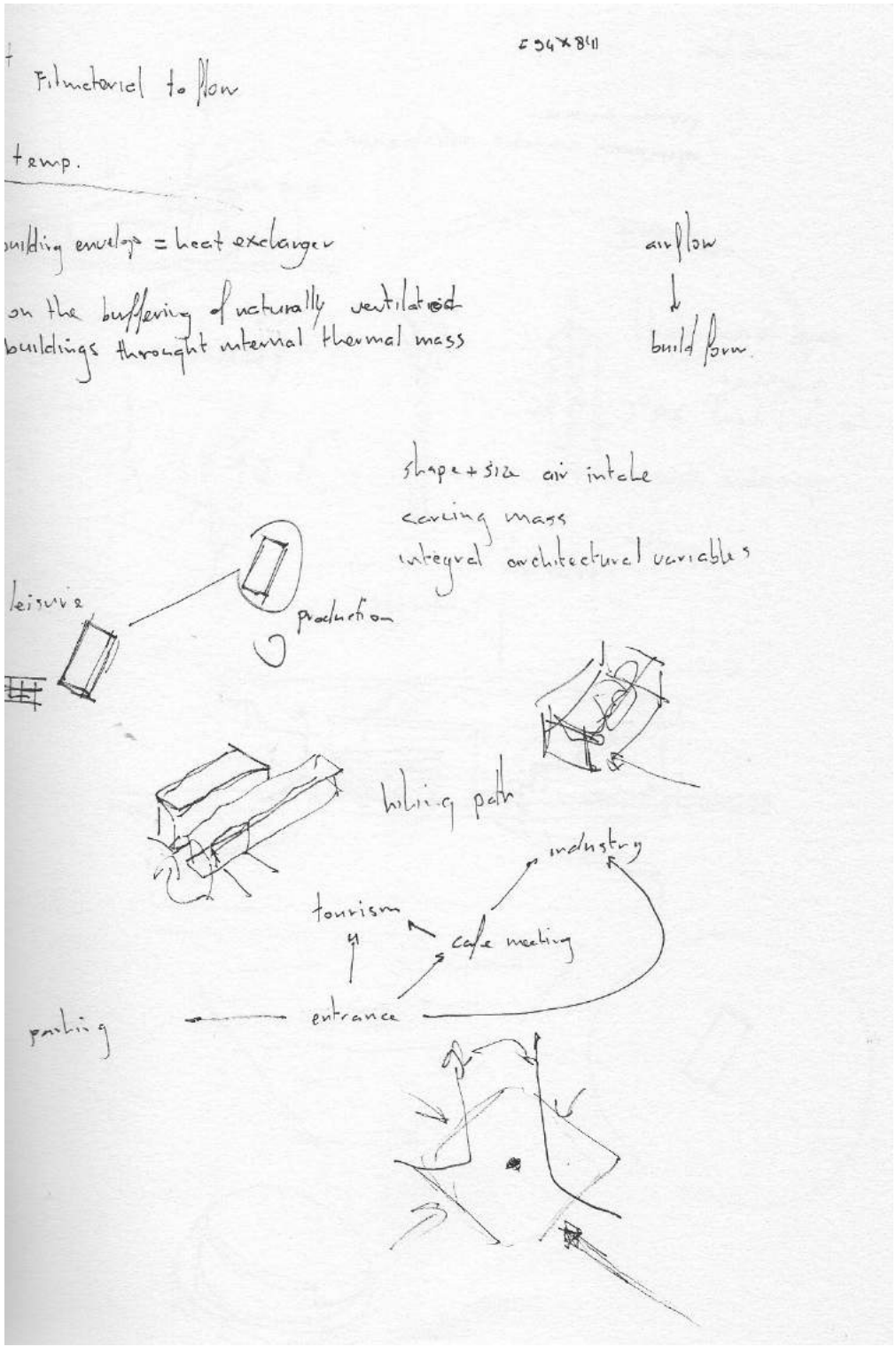
300

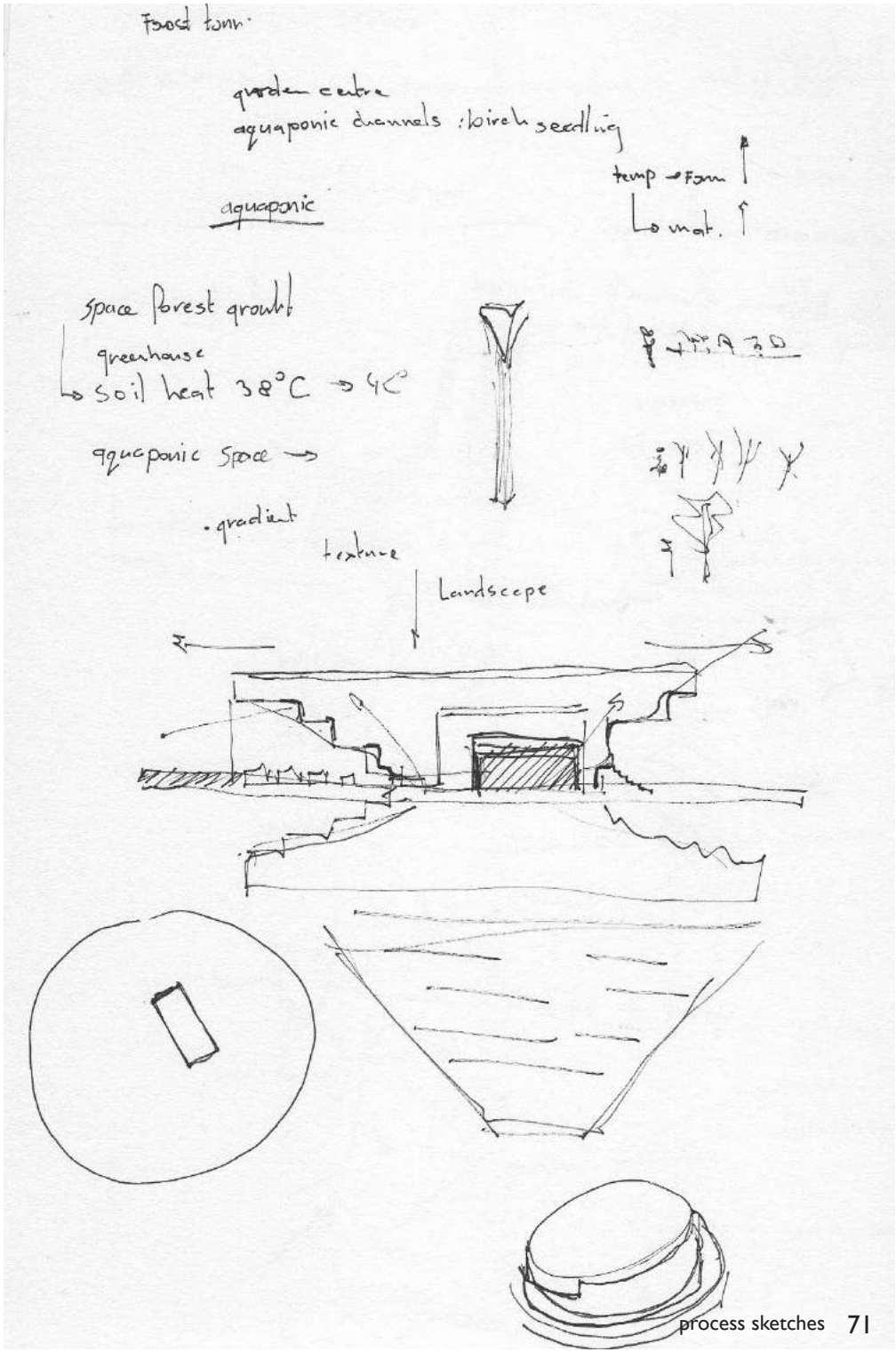

industry from the outside in
25°
25°
• works
• to single streamed industry
- exterior
- interior
Form + material.
heat forms landscape
Space
300

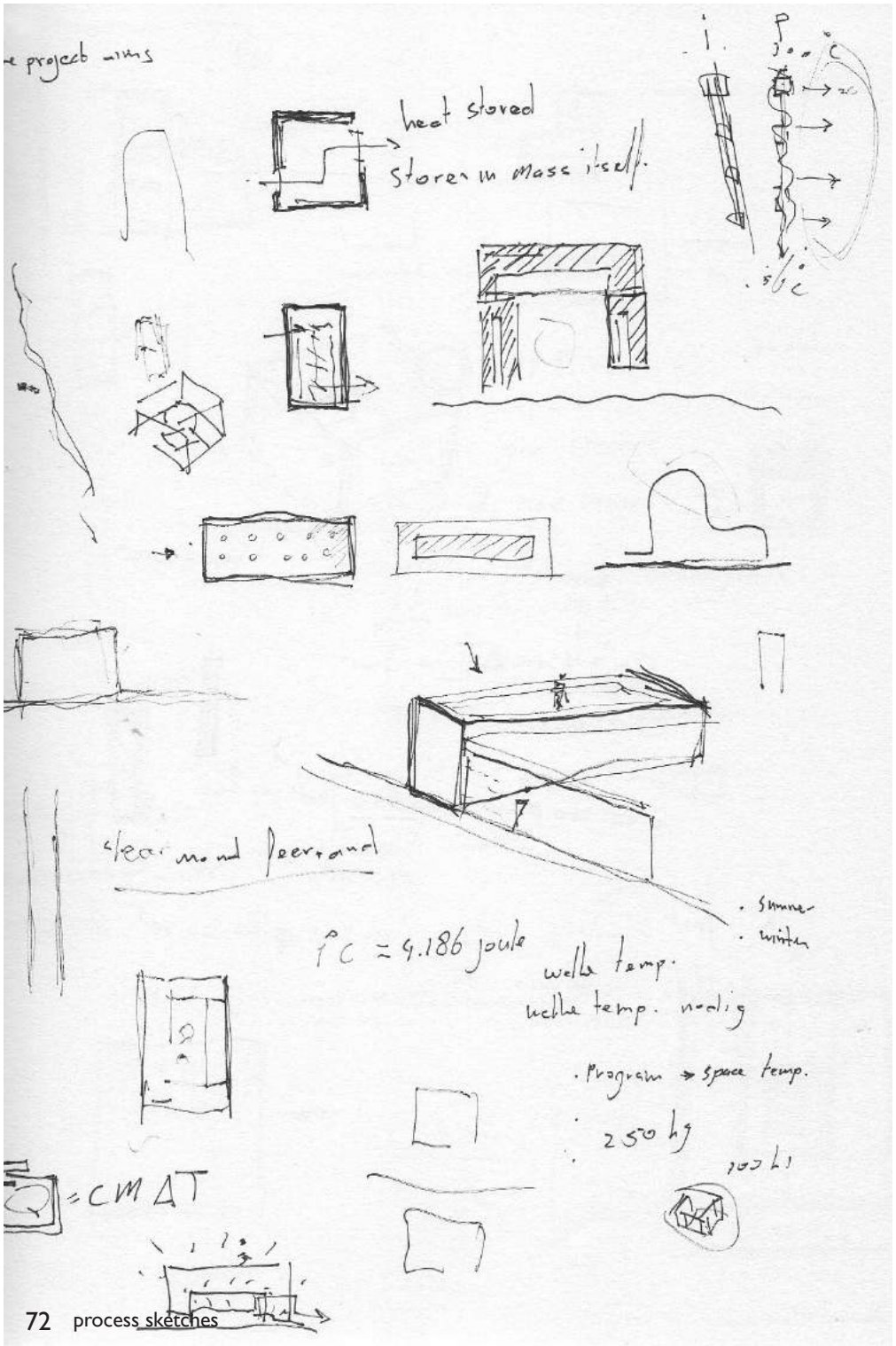

Route
spiral
• experience
• journey
landscape → color
What makes the journey interesting
Journey as important as the final project
Senses of temperature
warm temperature.
weird
hiking route
forest growth
engage people inside the landscape
more action in the landscape or villages

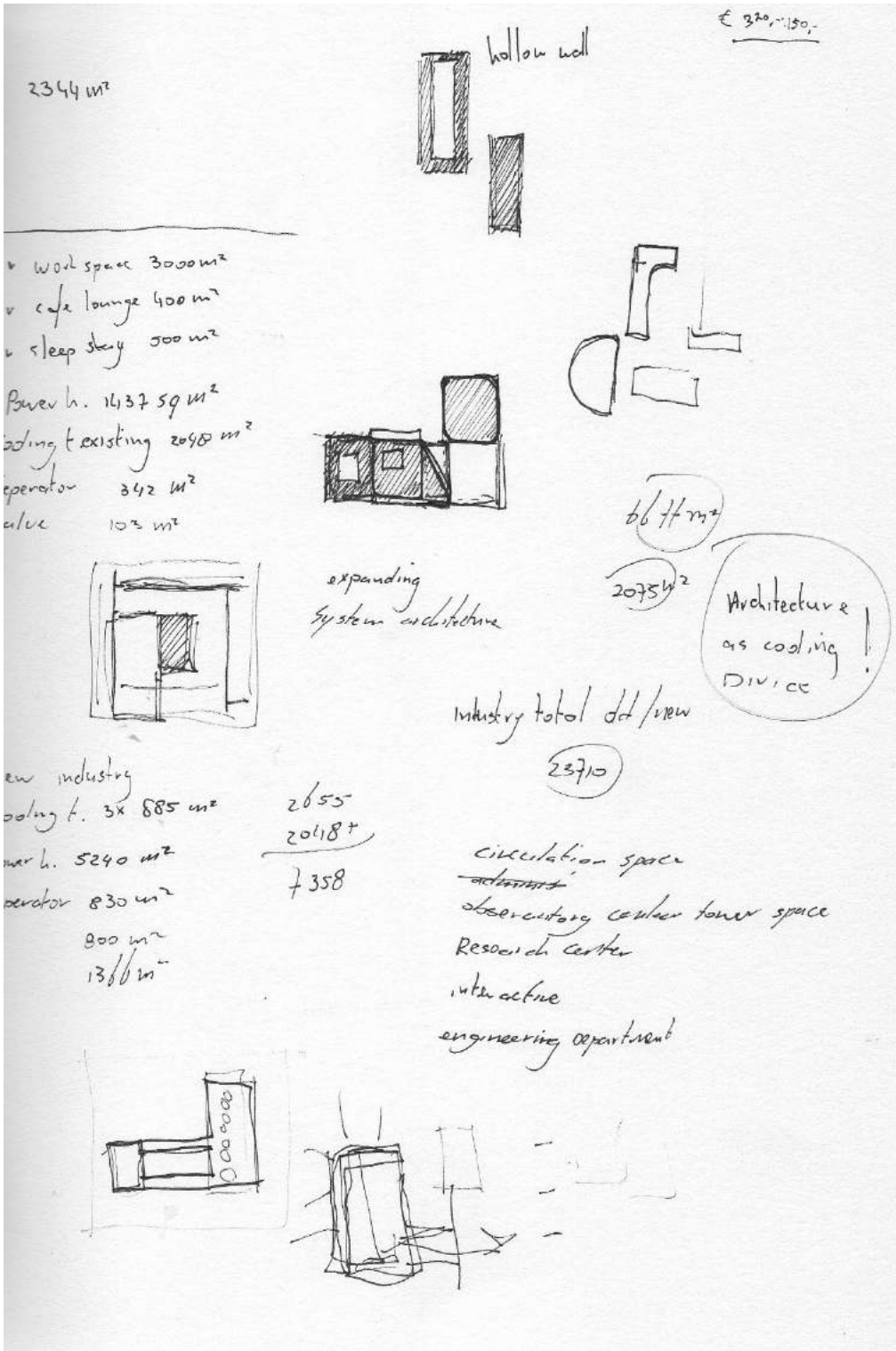

chris van langen
website
medium
Joep van Lieshout
glass-industry
4. preliminary design
Meeting
3xA1 prints


height buildings
Space of transition
what to build for who
convection
soil
warming
4°C → 38°C
transition space
time based study for the development of an experimental production facility
natural ventilation systems
tectonic
stereotomic
architecture
earth
landscap
architecture
production
geological growth time

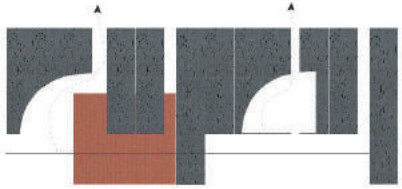

Filmeteriel to flow
temp.
building envelop = heat exchanger
on the buffering of naturally ventilated buildings throught internal thermal mass
airflow
build form
shape + size air intake
carving mass
integral architectural variables
leisure
production
hiking path
industry
tourism
cafe meeting
parking
entrance

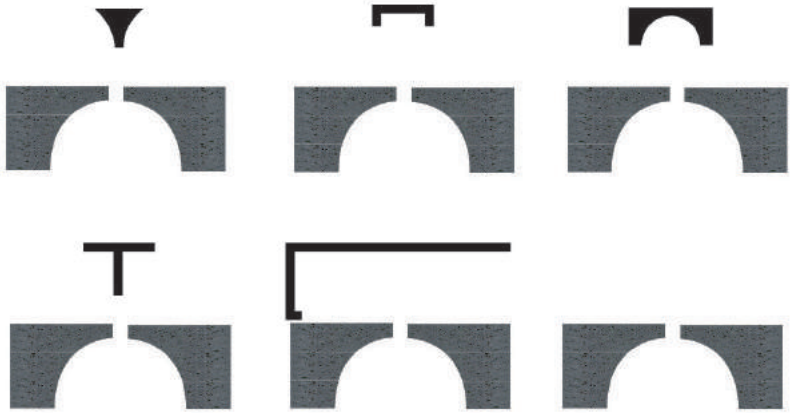

forest town
garden centre
aquaponic channels : birch seedling
temp → Farm
→ mat.
aquaponic
space forest growth
greenhouse
soil heat 38°C → 4°C
aquaponic space →
• gradient
texture
Landscape

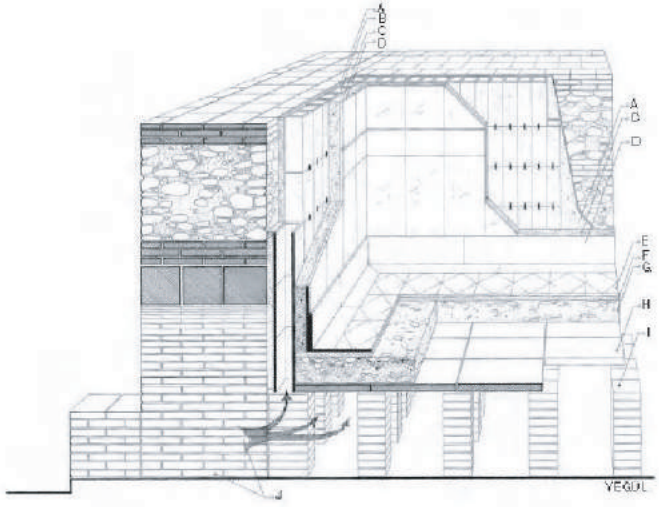

project aims
heat stored
Store in mass itself.
clear mould peer round
fc = 4.186 joule
walls temp.
walls temp. cooling
. Program → space temp.
250 kg
100 l
Q = cm ΔT
summer
winter


2344 m²
hollow wall
€ 320,- 150,-
work space 3000 m²
cafe lounge 400 m²
sleep stay 500 m²
Power h. 1437 59 m²
existing 2040 m²
operator 842 m²
86 Ht m²
2075 m²
expanding
system architecture
Architecture as cooling Device
Industry total dd/view
23710
2655
20187
7358
circulation space
observatory center tower space
Research center
interactive
engineering department

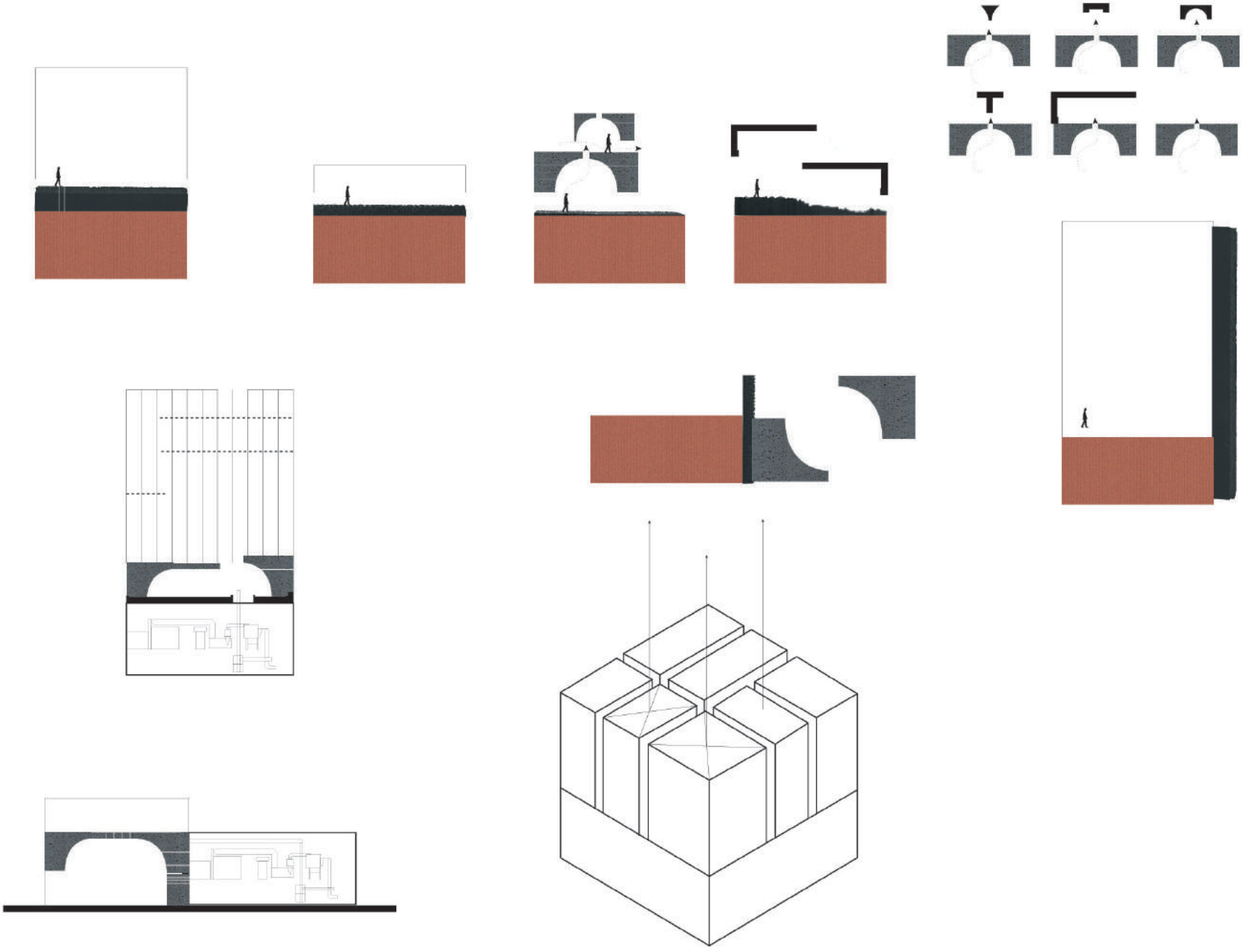
PRELIMINARY DESIGN



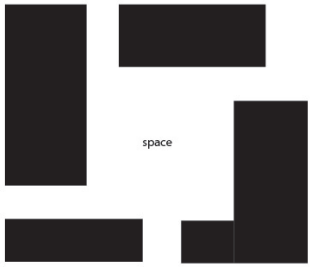


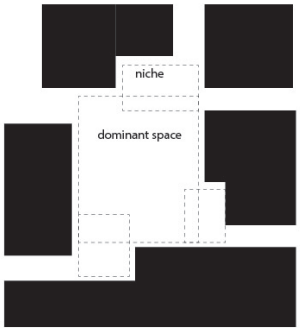

A
B
C
D
A
B
D
E
F
G
H
I
YEGÜL

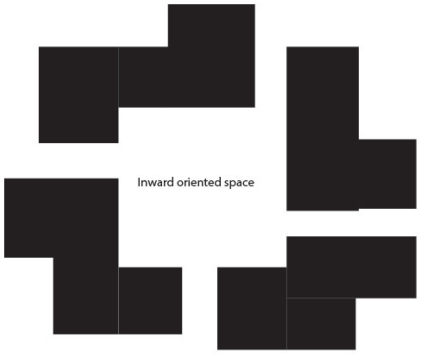
FORM STUDY



MASS STUDY


space


niche
dominant space


Inward oriented space

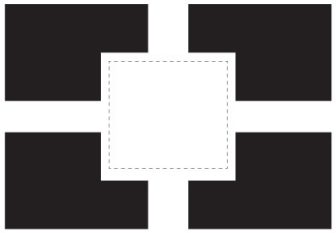

approach sightline gives
attention to landscape beyond
perceived enclosure
is reduced


asymettric implied space


directional implied space


directional enclosed space


fully enclosed space


maximally enclosed space

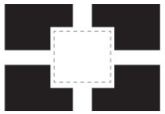
MASS STUDY

asymettric implied space

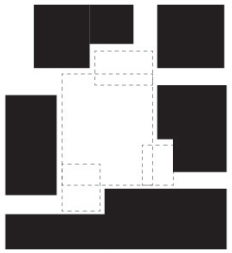
directional implied space

directional enclosed space

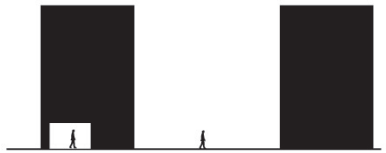
fully enclosed space



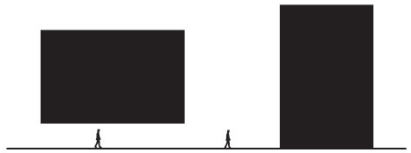
maximally enclosed space



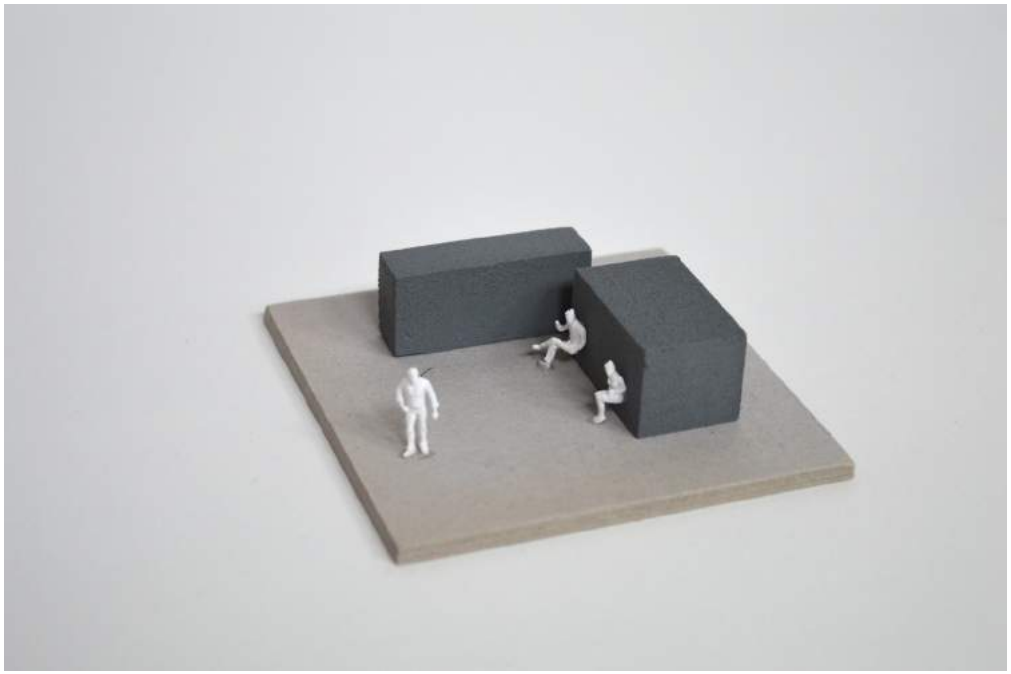
Inward oriented space



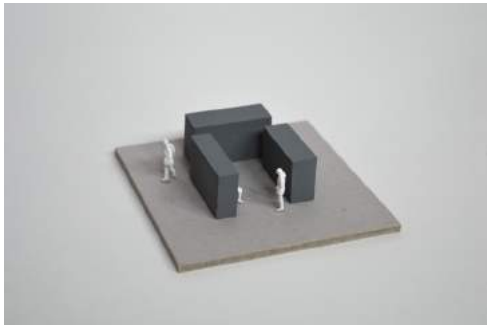
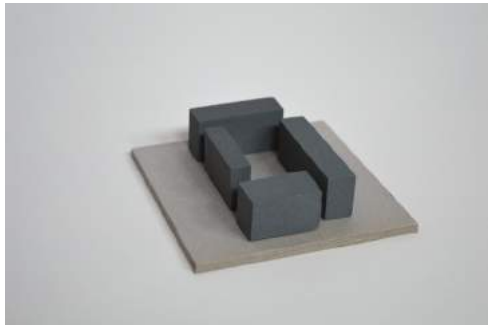
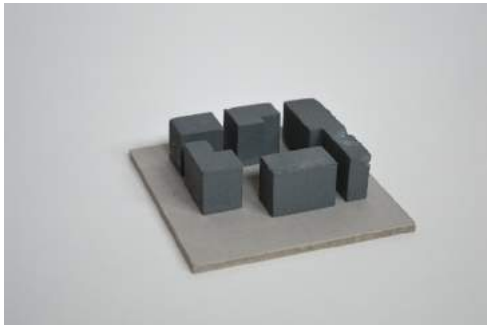
dominant space

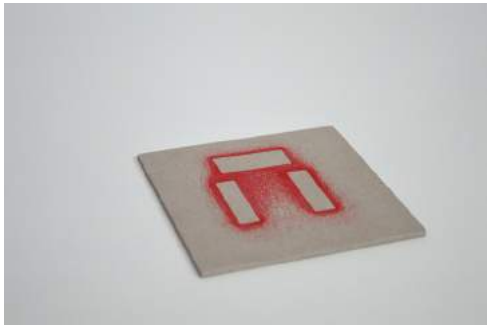
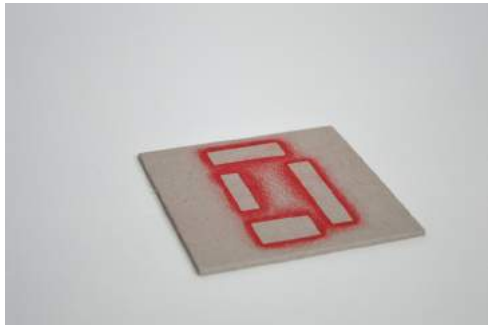
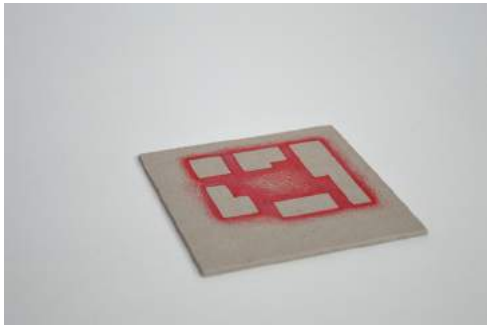
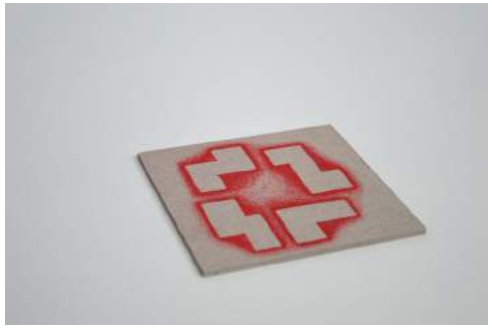


space

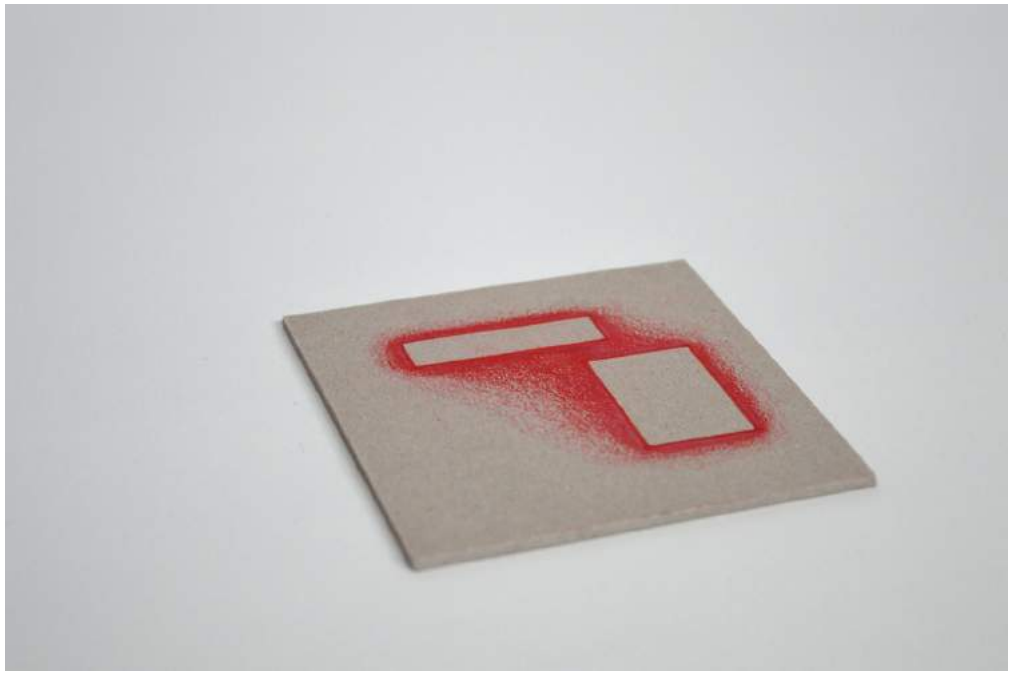


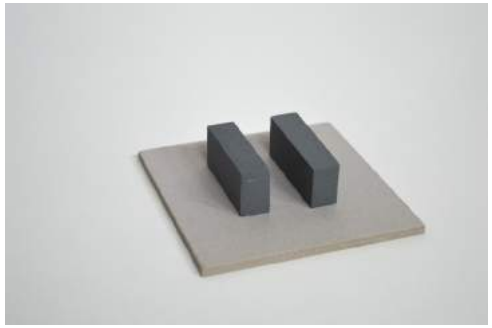
temperature study | relation between heated mass and temperature radiation

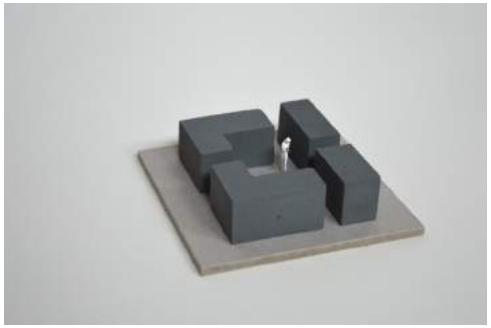




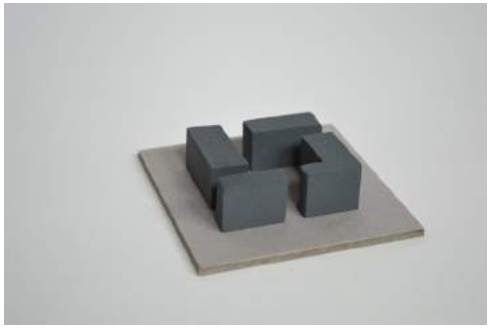





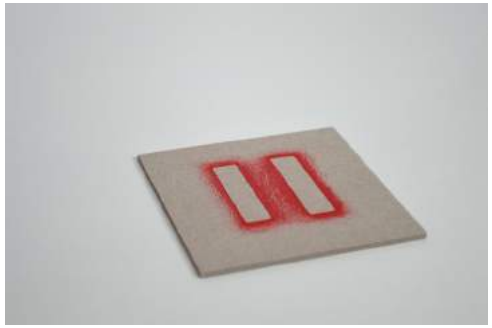
MASS STUDY RELATED TO TEMPERATURE

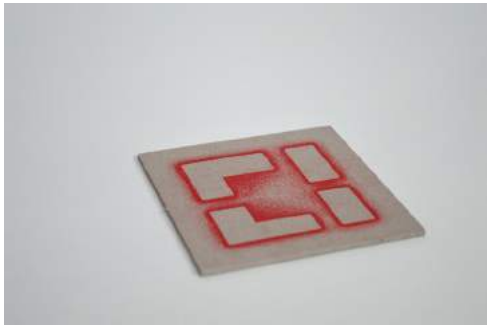


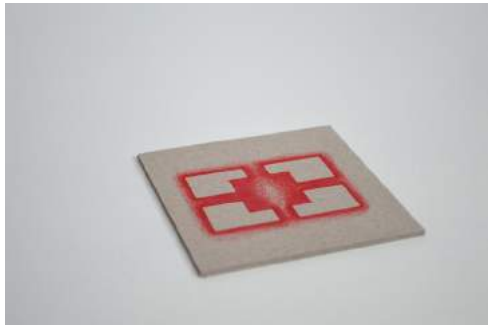


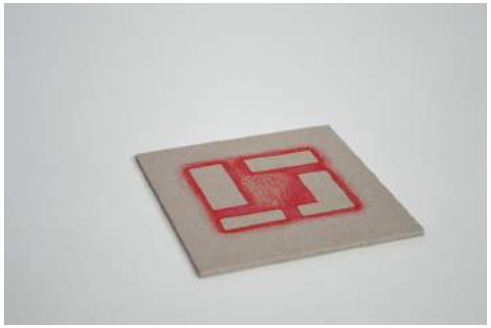




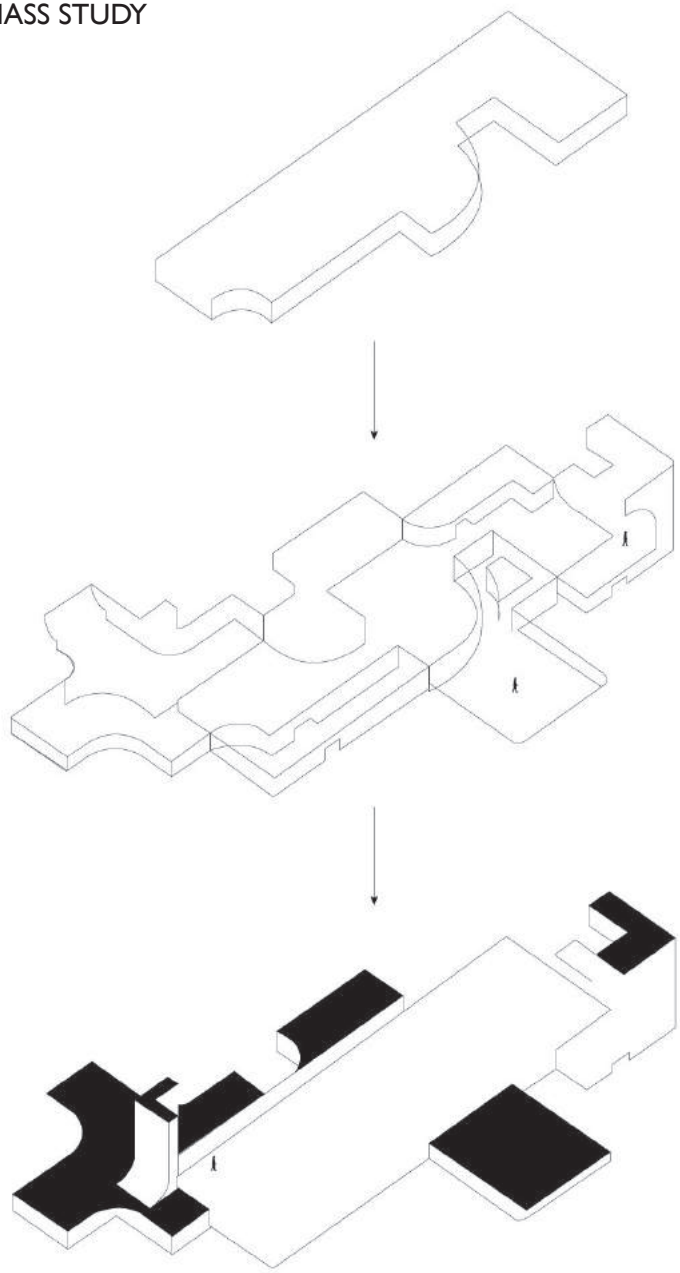


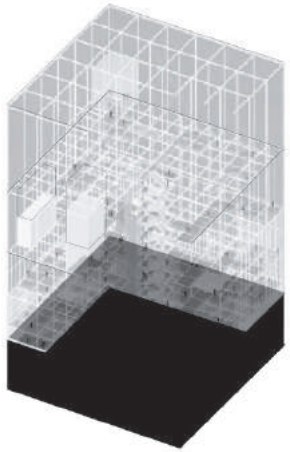






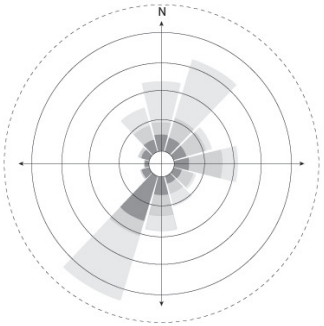
MASS STUDY

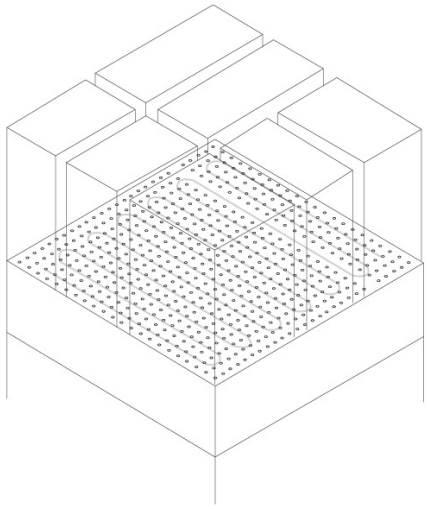


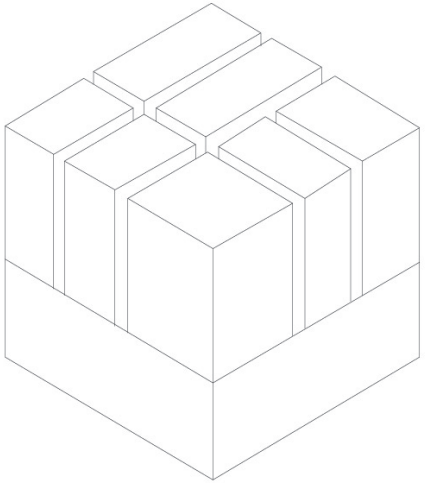


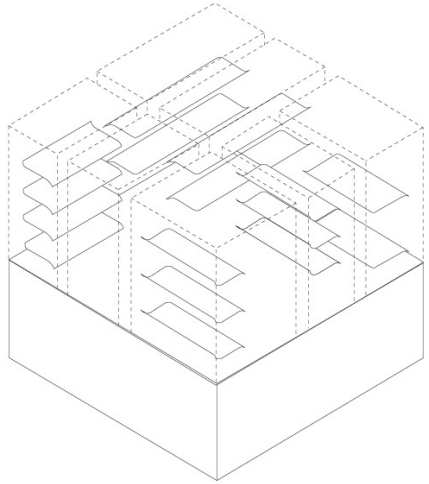
traditional turf house construction

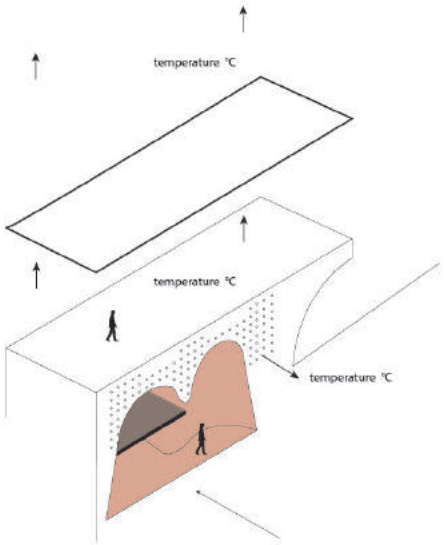
MASS STUDY

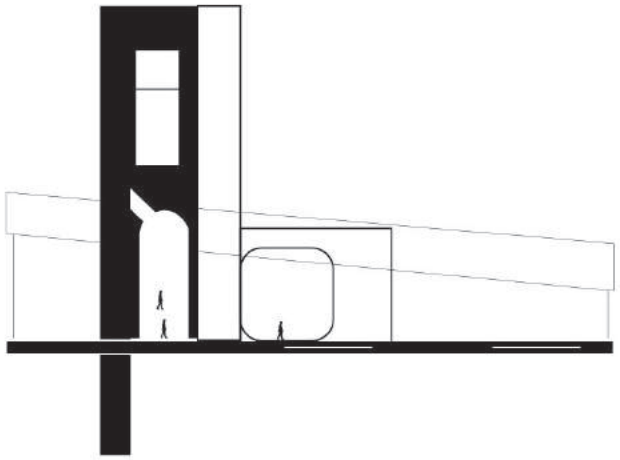


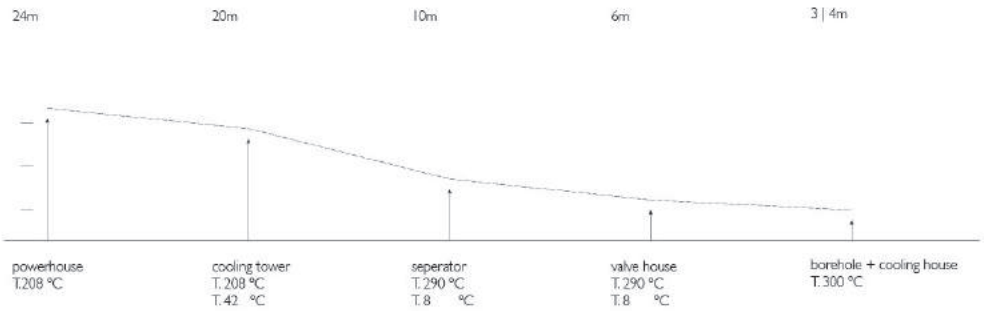




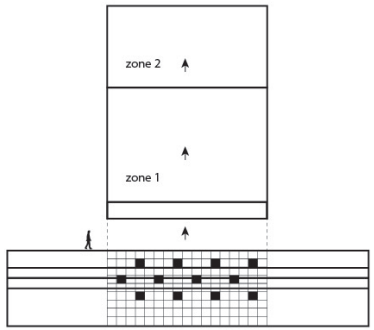




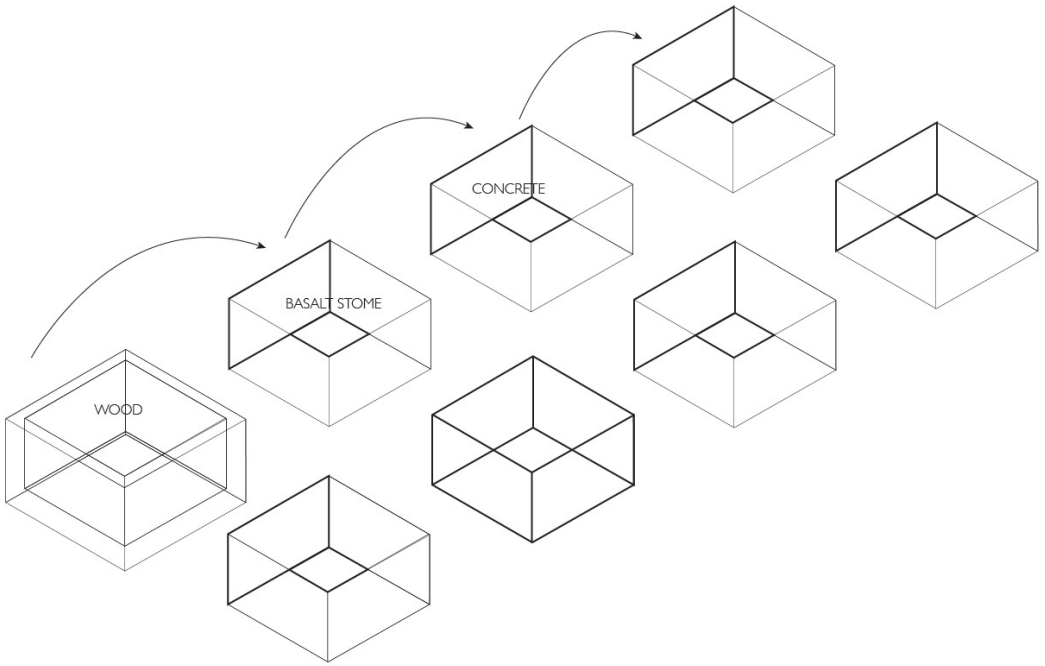


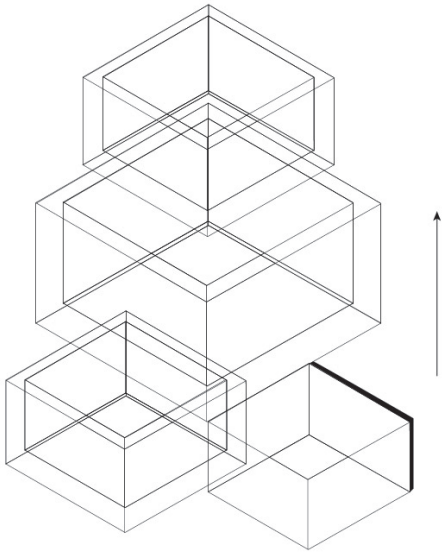


15 employees = living space + meeting space

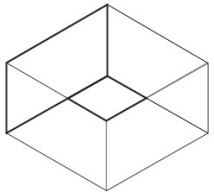


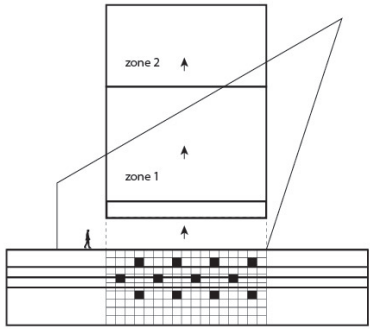
hypocaust multizone building



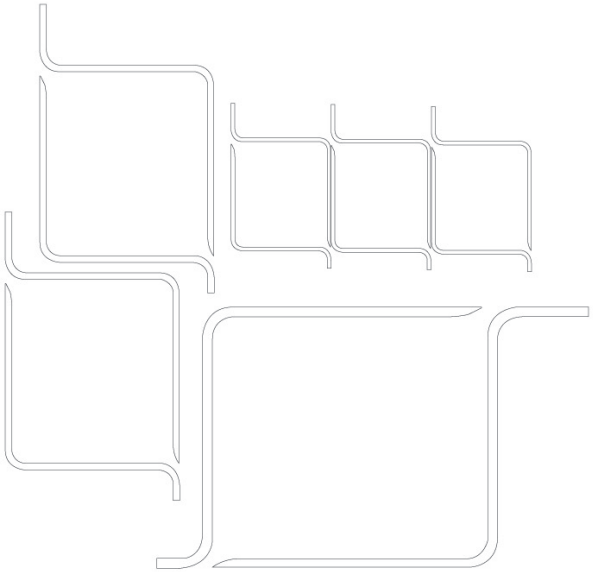


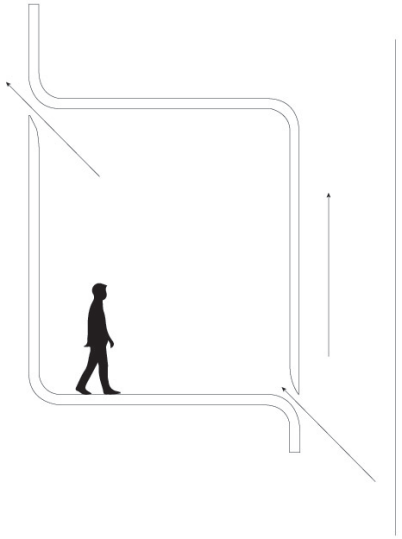
WOOD
GLASS
BASALT STONE
STEEL
STONE WOOL
TILES
CONCRETE
DRIFTWOOD

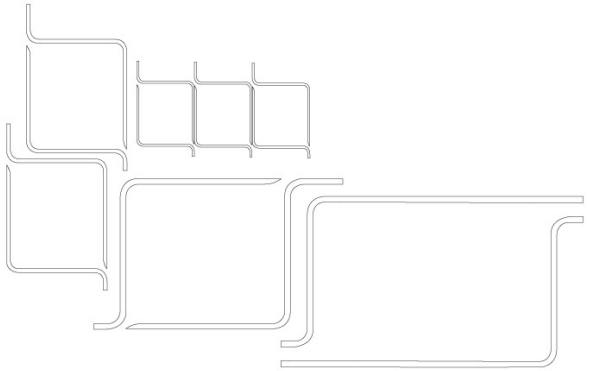


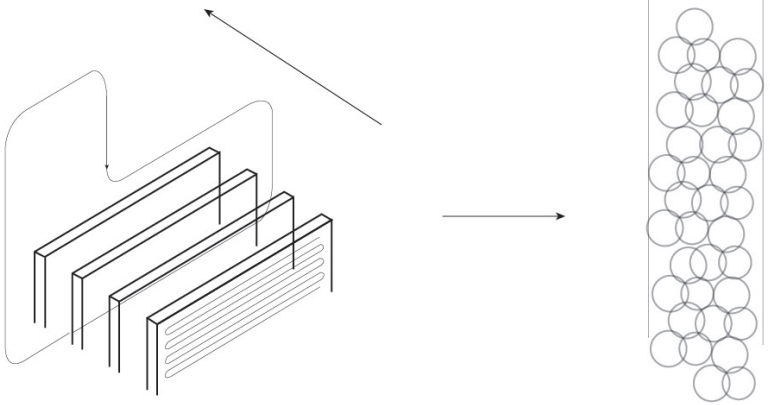


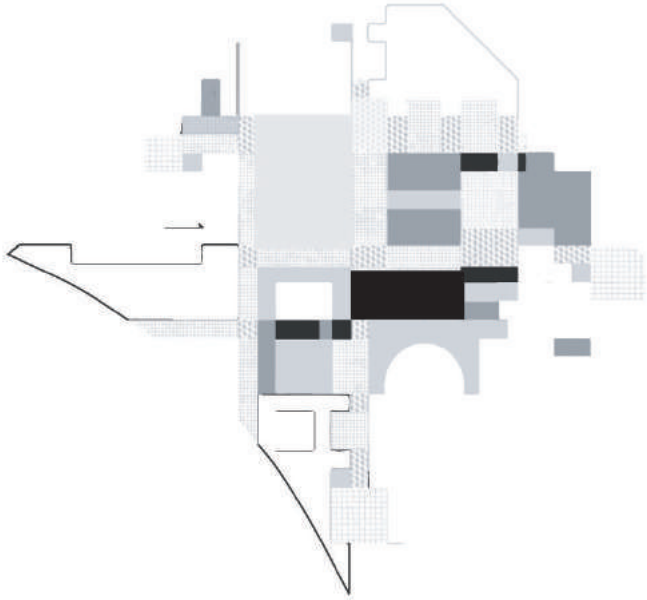
hypocaust multizone building

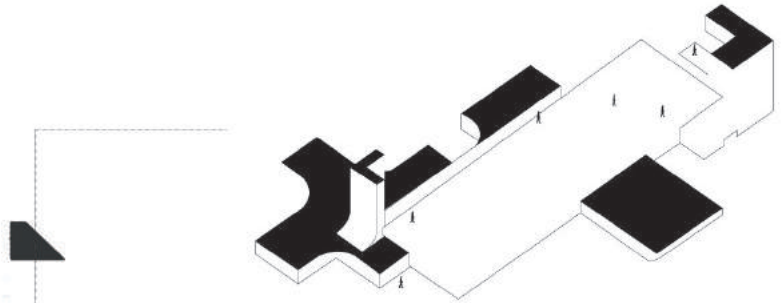




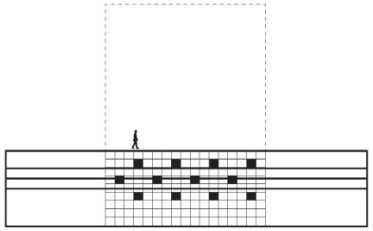




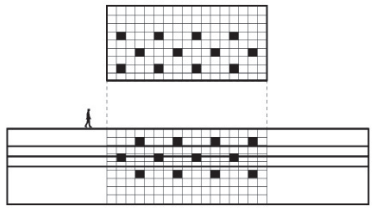




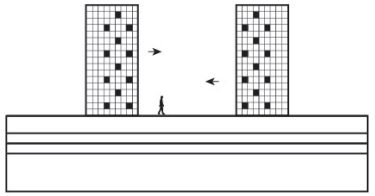
TEMPERATURE (SYSTEM) RELATED TO MASS, FORM AND DISTANCE



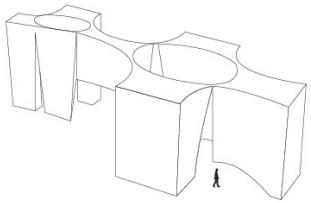
hypocaust multizone building

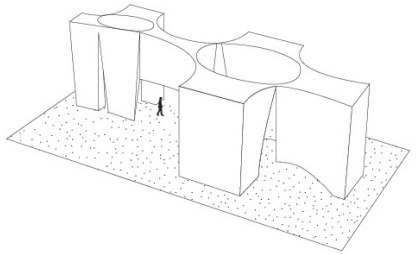


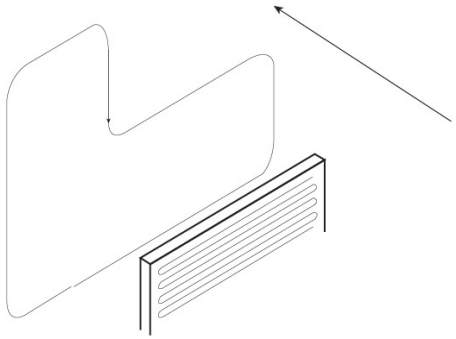
hypocaust multizone building



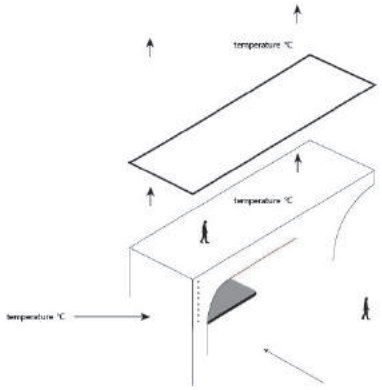
hypocaust multizone building

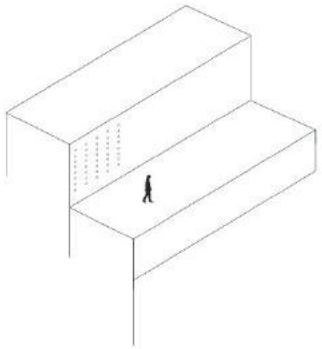


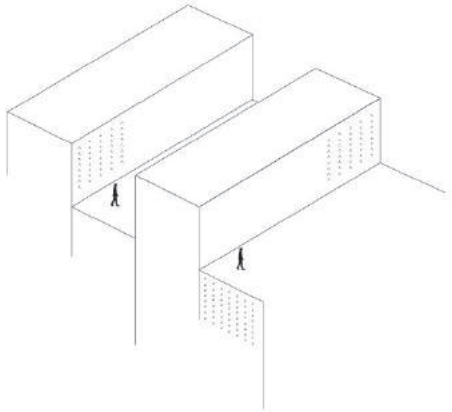


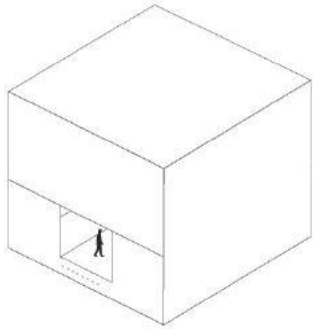


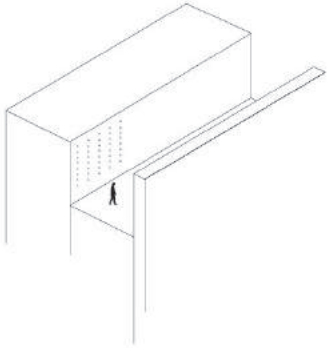
TEMPERATURE (SYSTEM) RELATED TO MASS, FORM AND DISTANCE

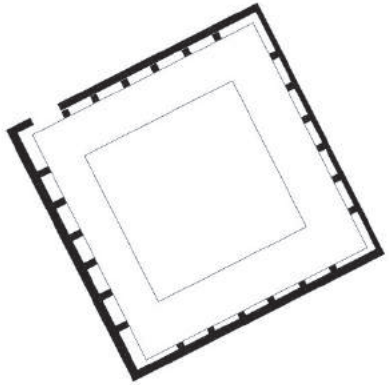




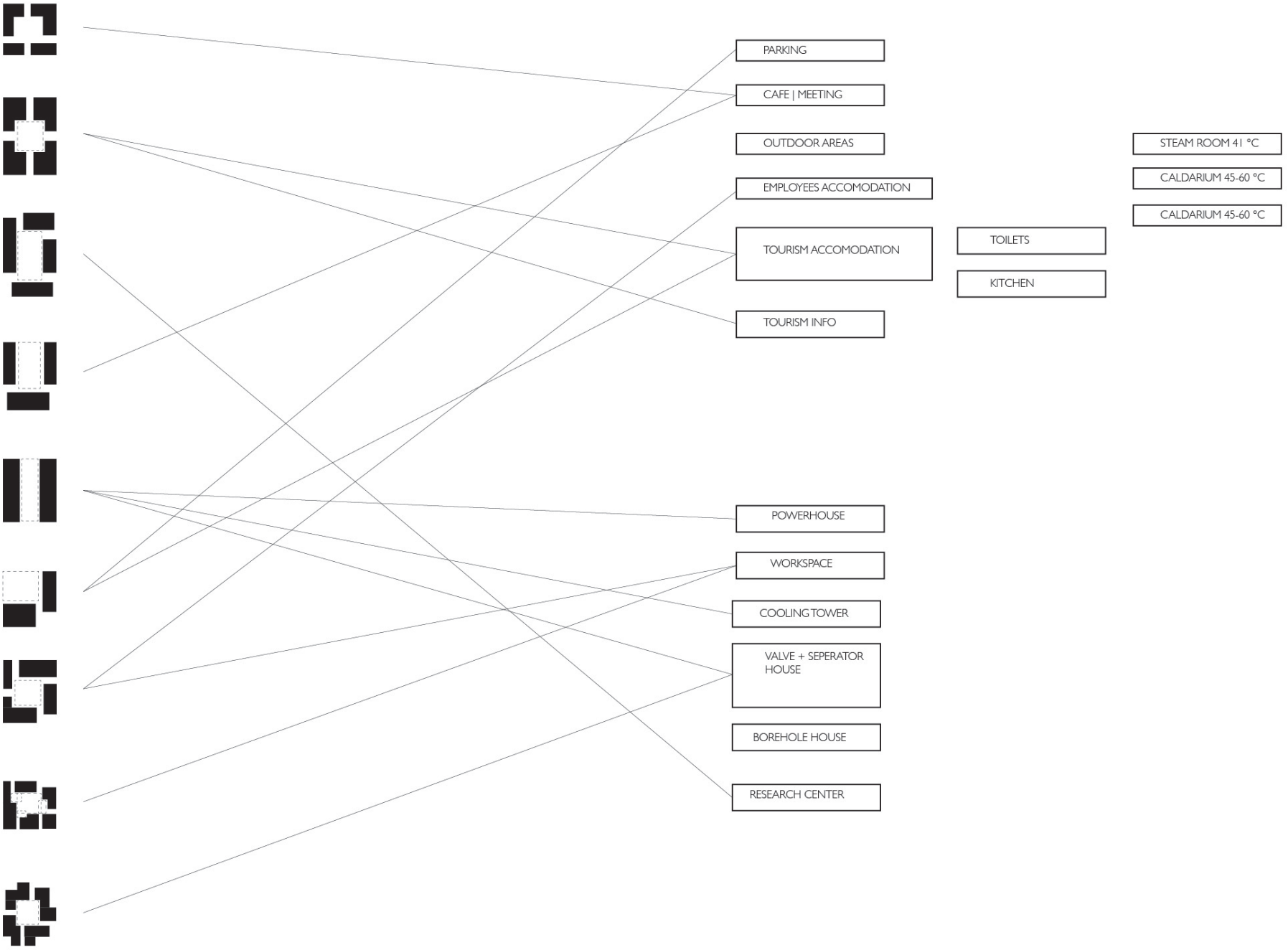


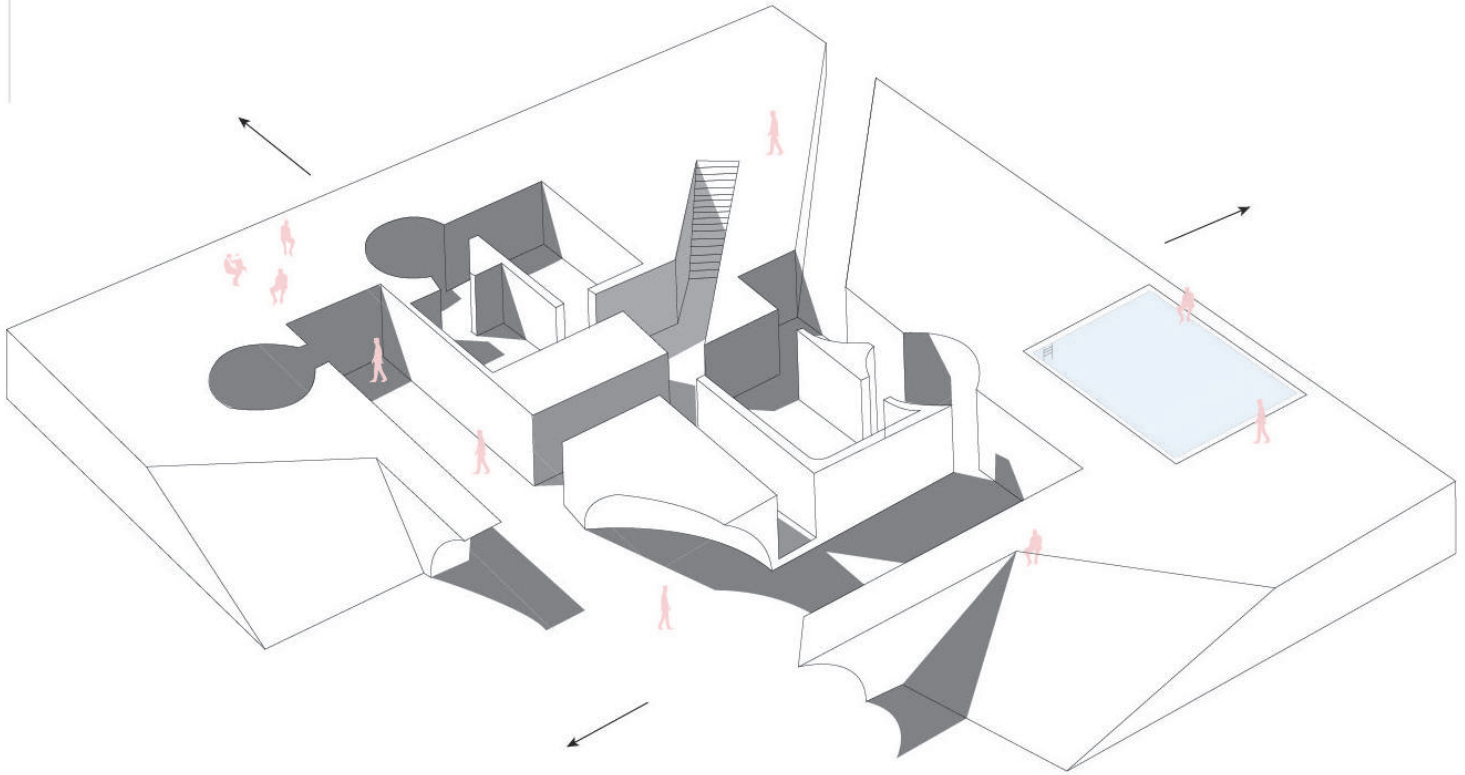


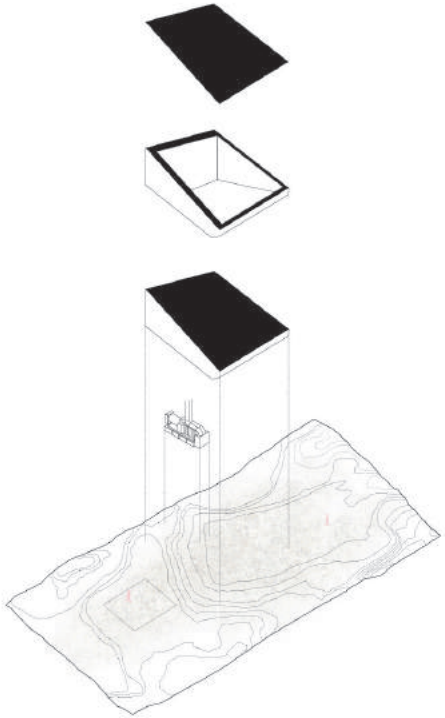


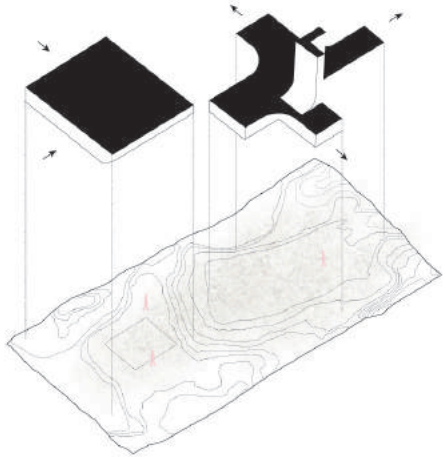


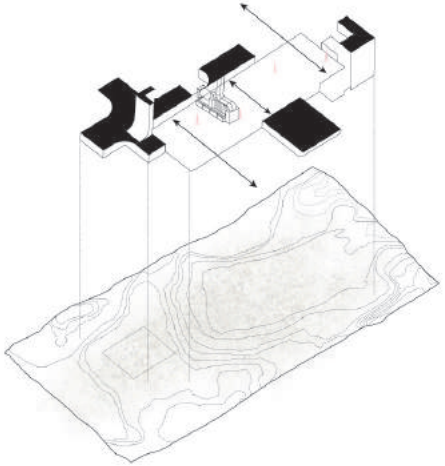
MASS RELATED TO PROGRAM







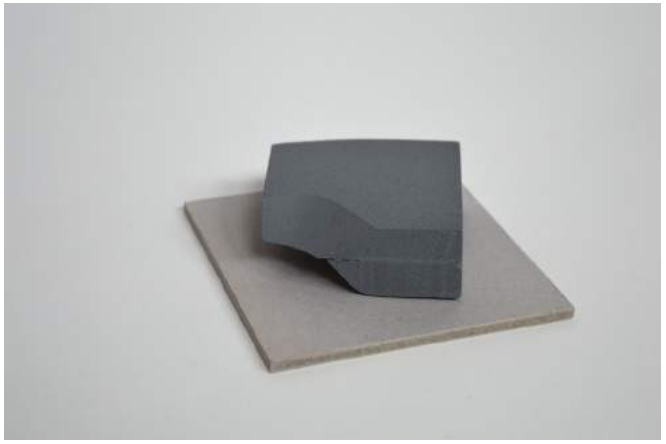




poored basalt mixed with concrete

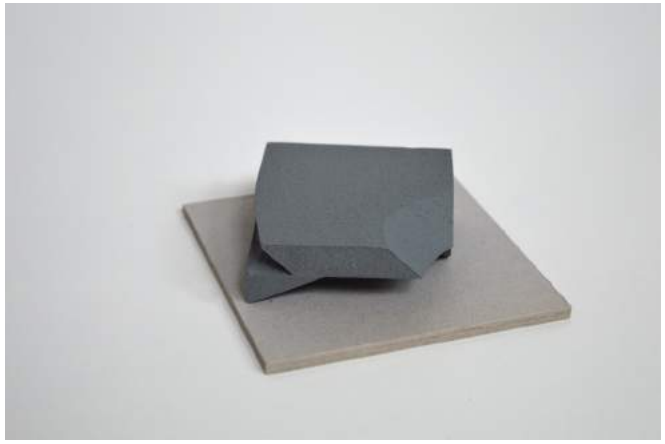
basalt rock

basalt rock with concrete



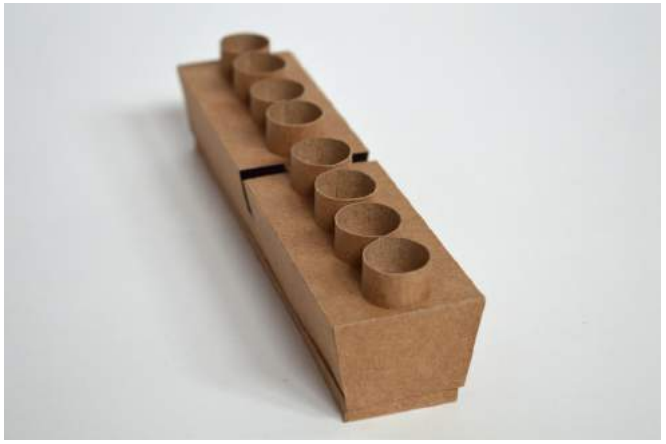
basalt form study

poored basalt mixed with concrete



basalt form study

cooling tower

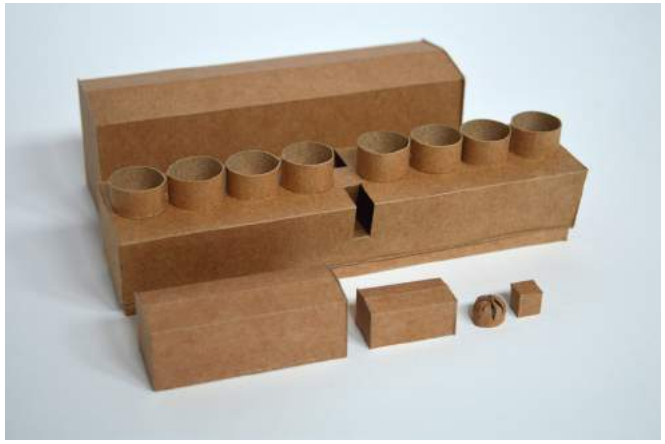


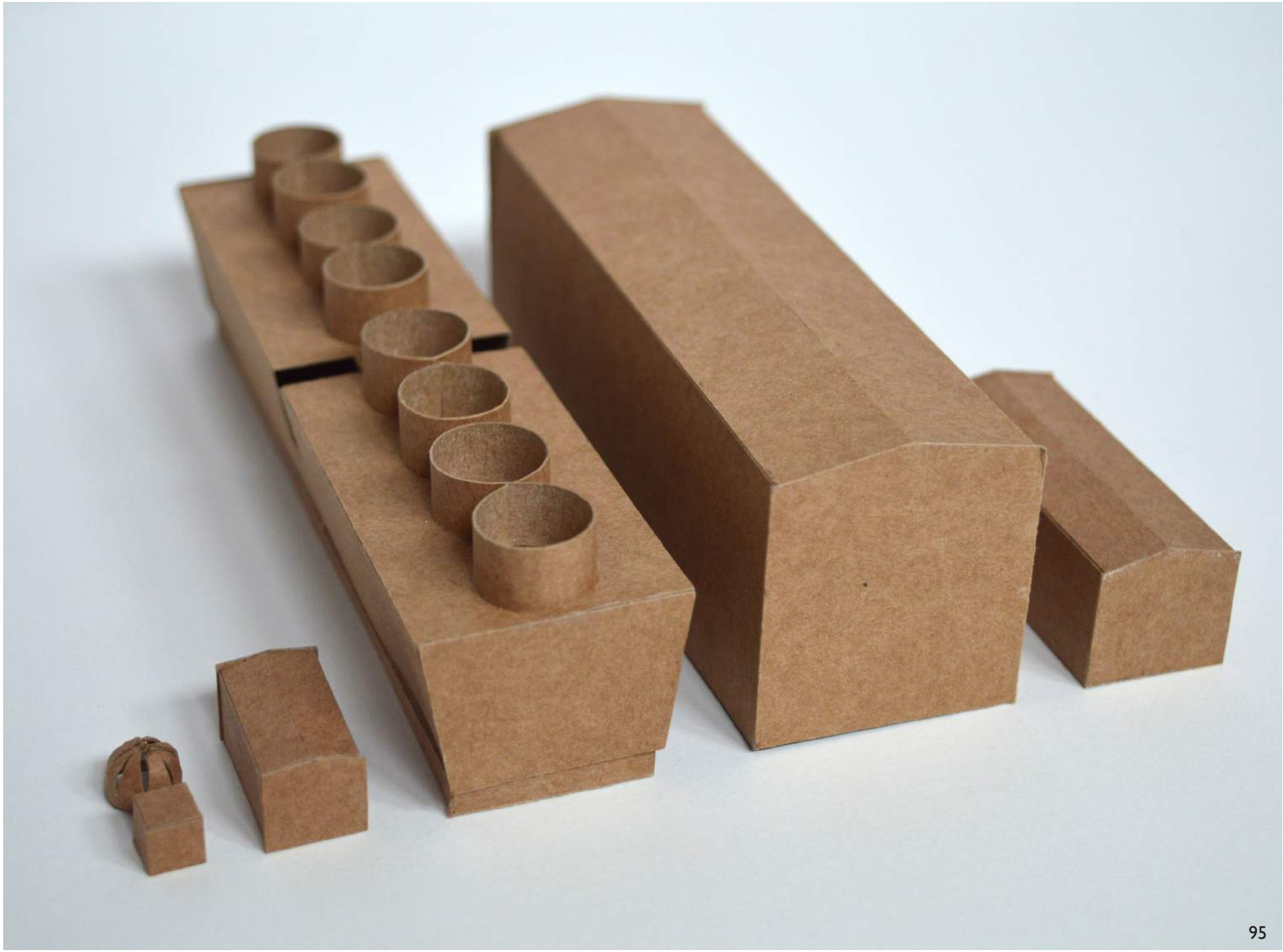
powerhouse

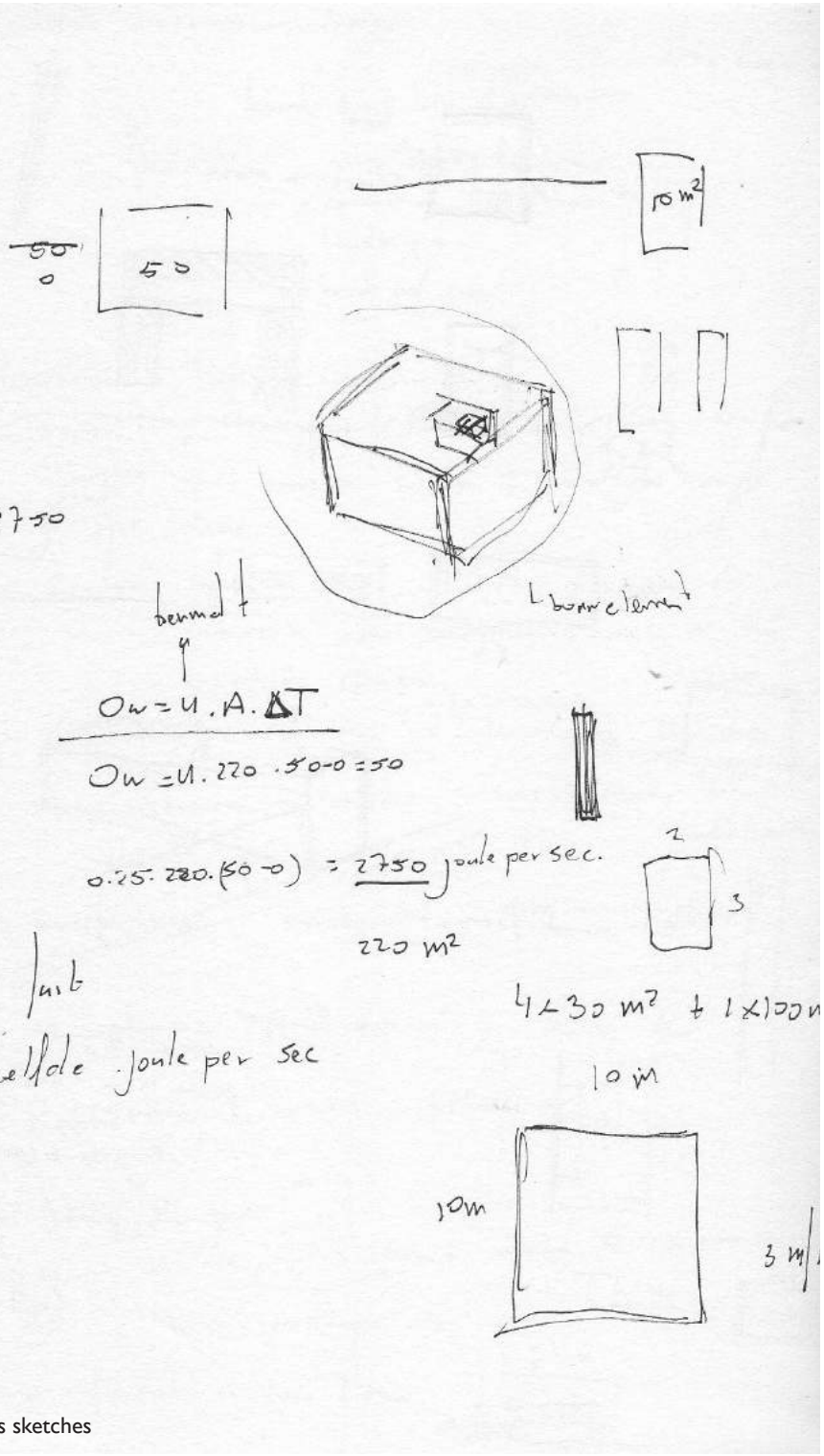
valve

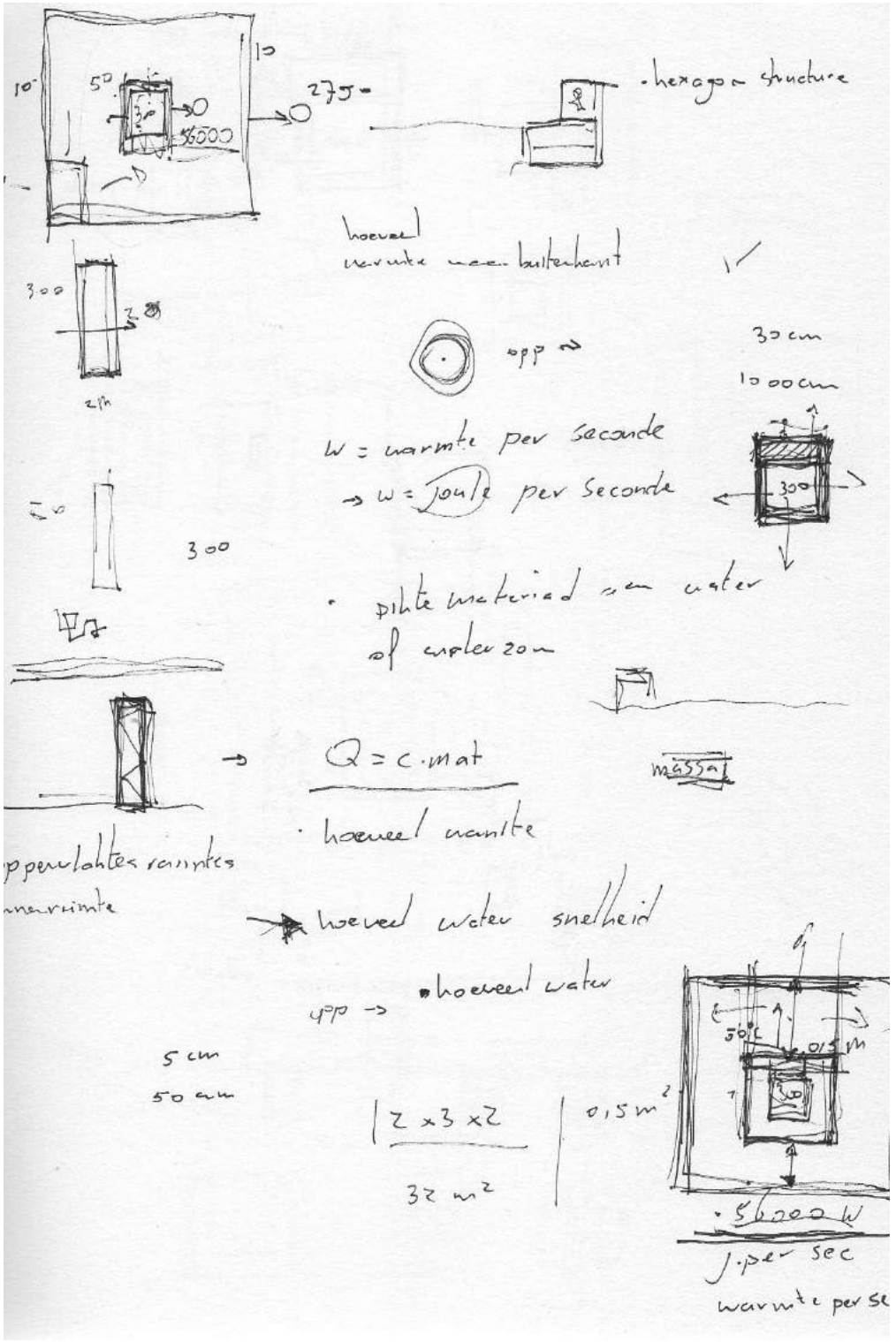
valve

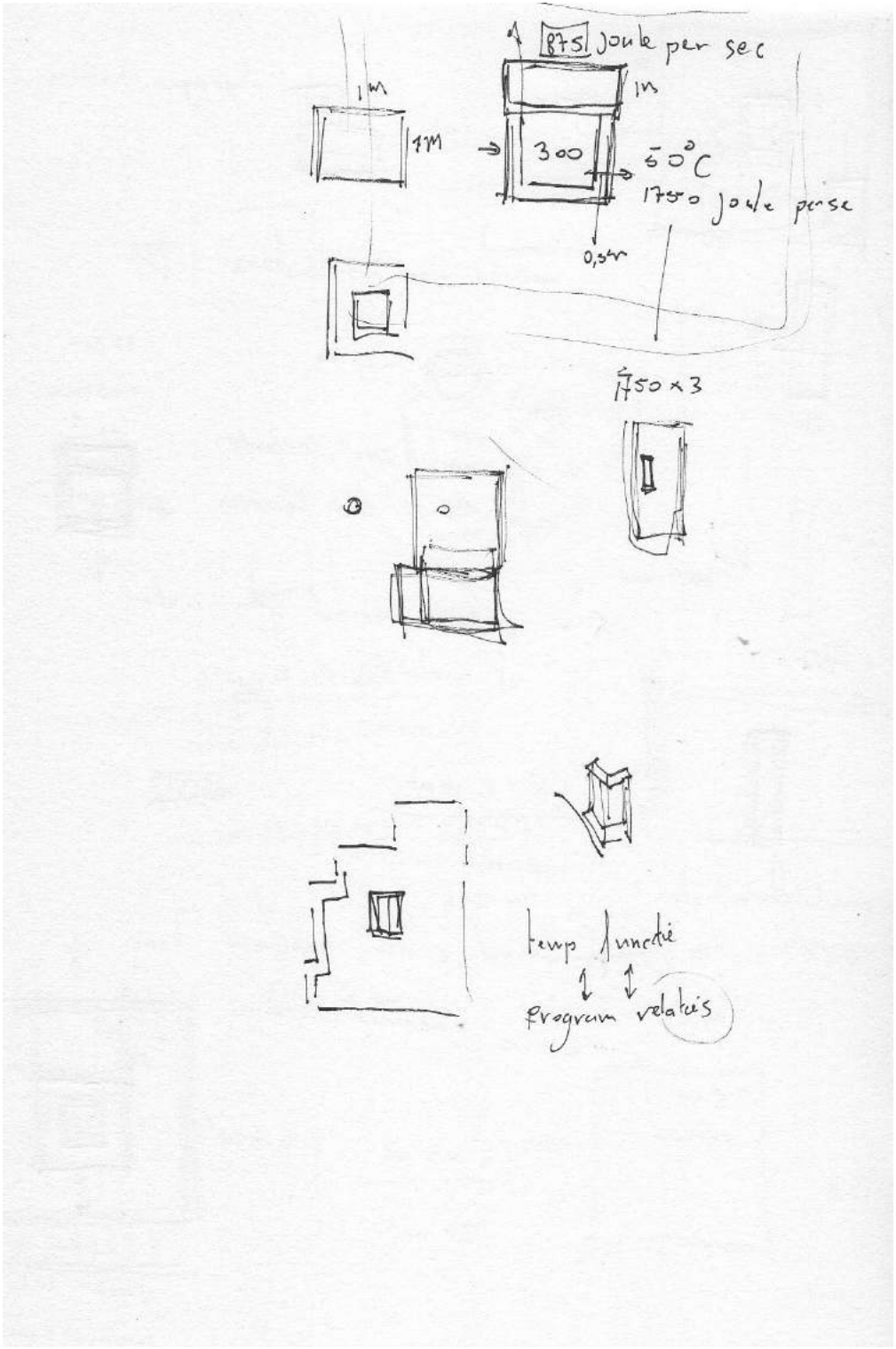
borehole

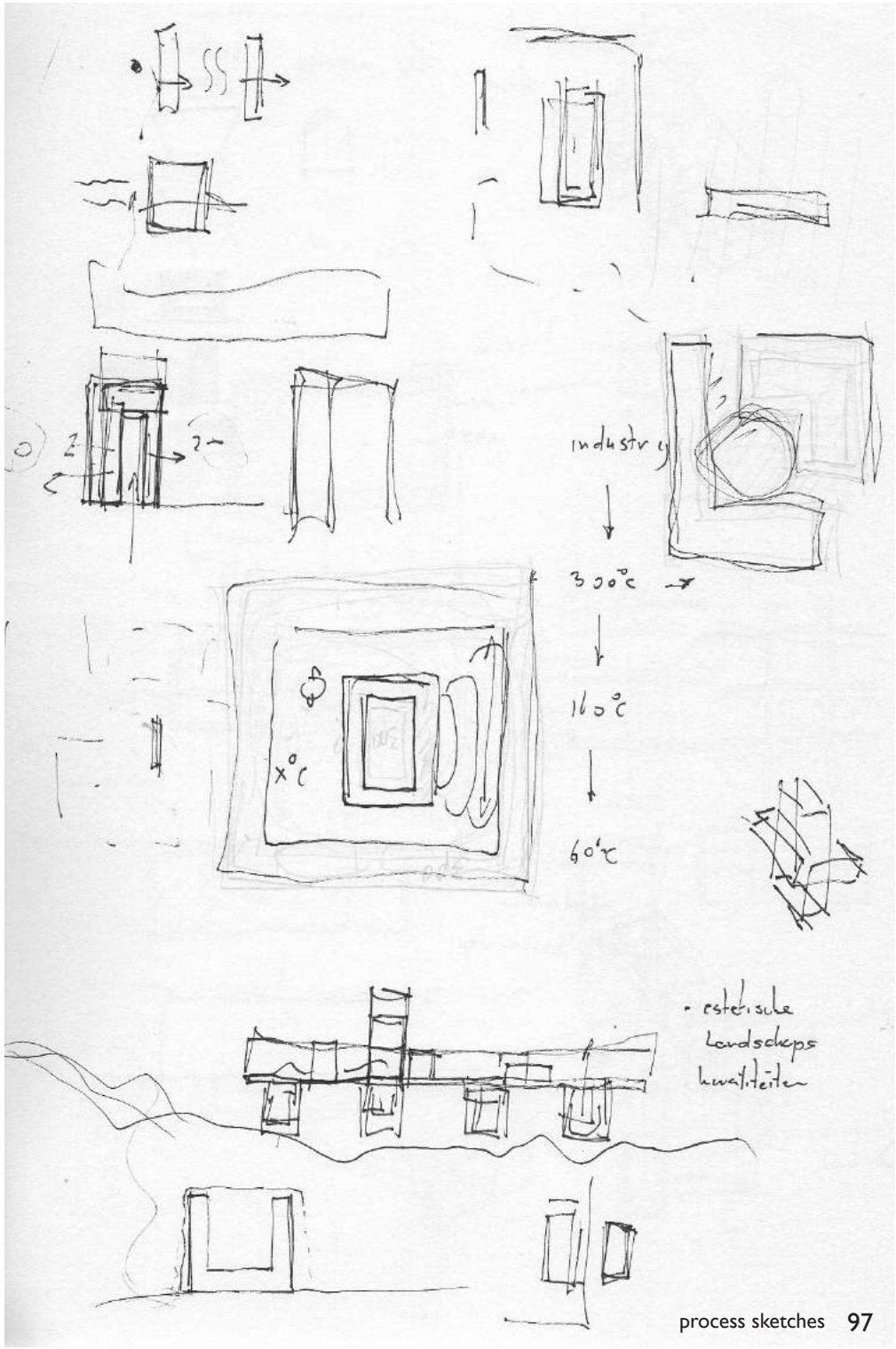


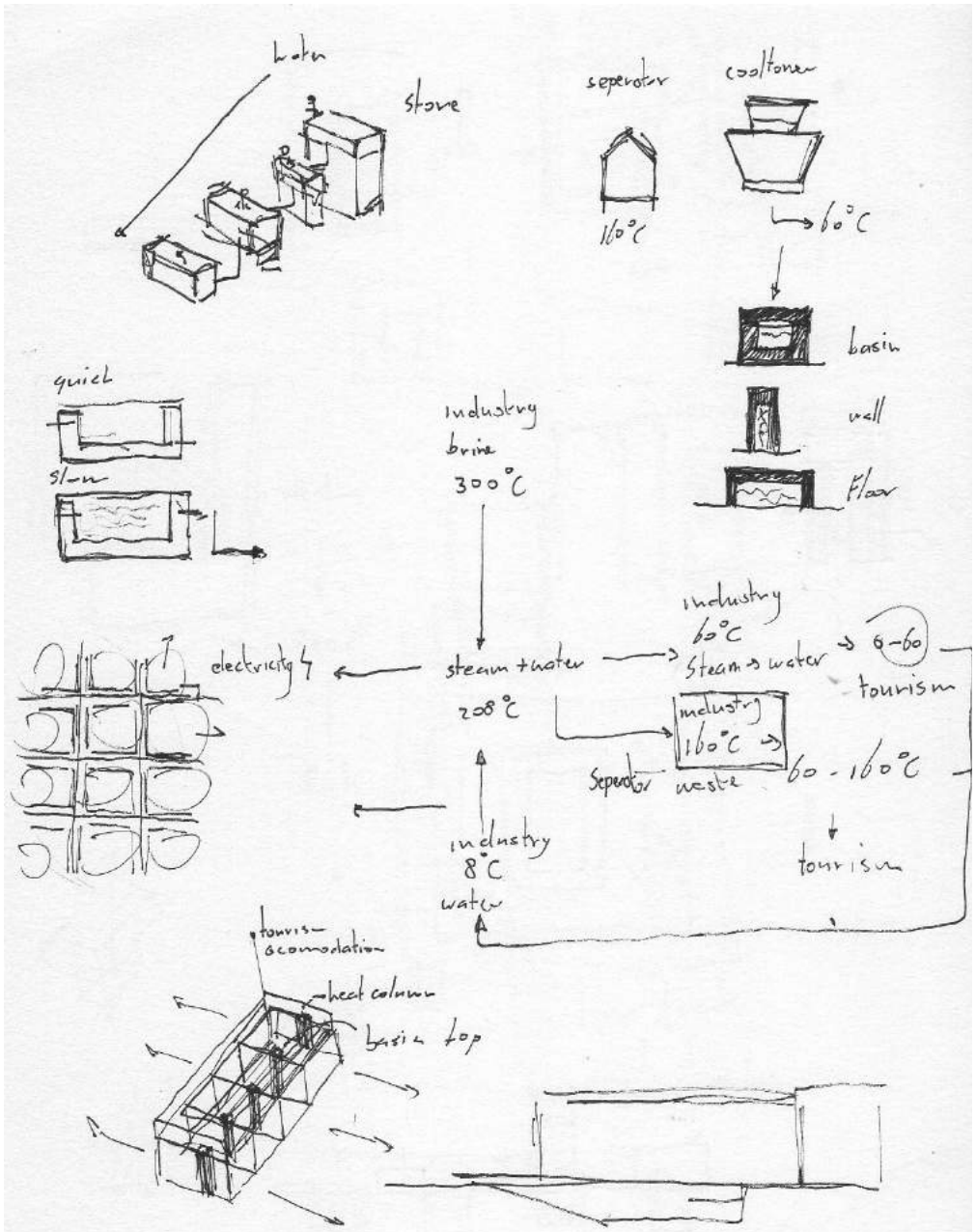


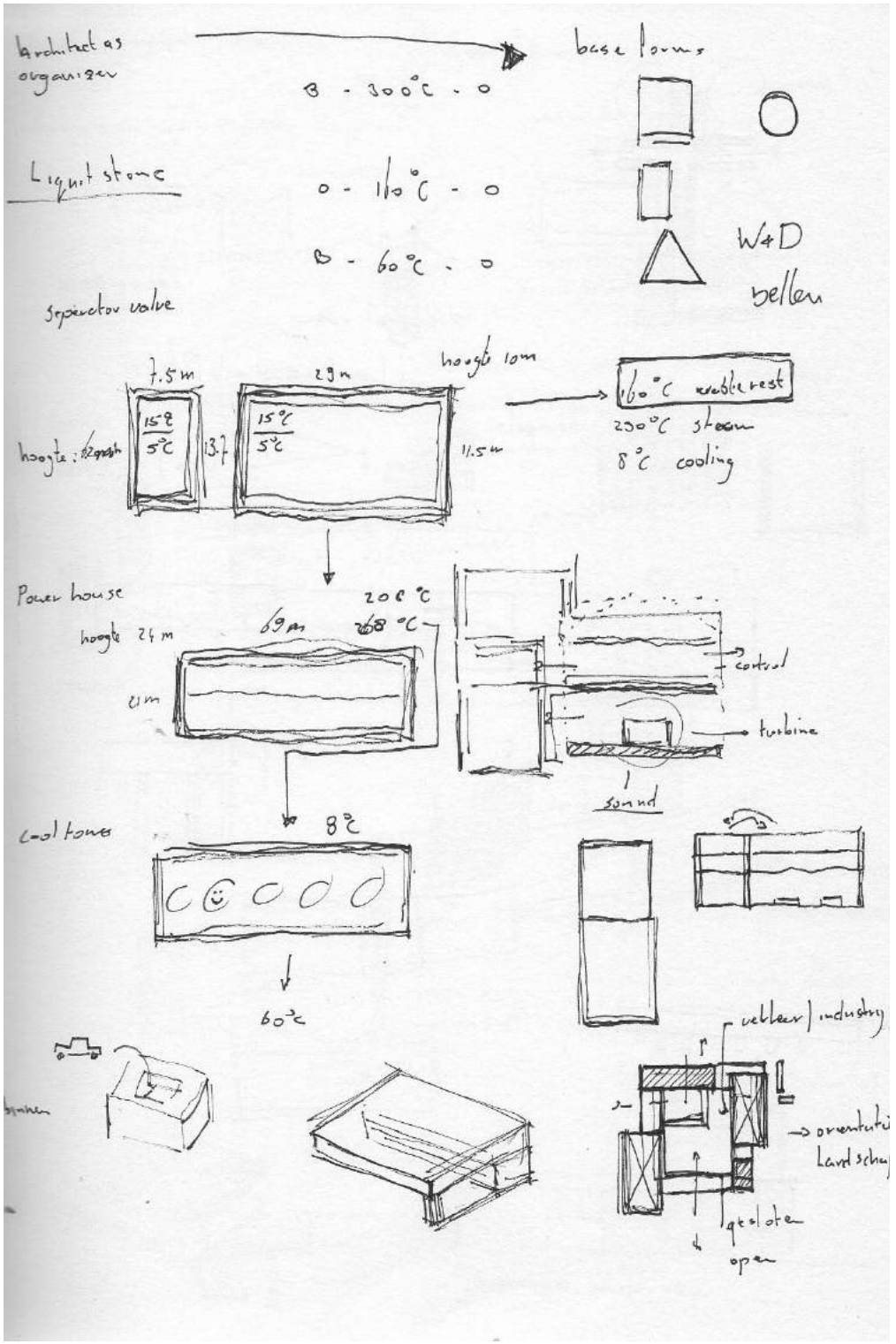

50
0
50
10 m²
8750
warmte
Ow = U . A . ΔT
Ow = U . 220 . 50-0 = 50
0.25 . 220 . (50 - 0) = 2750 joule per sec.
220 m²
2
3
4 x 30 m² + 1 x 100
10 m
10m
3 m
1 m
zelfde joule per sec

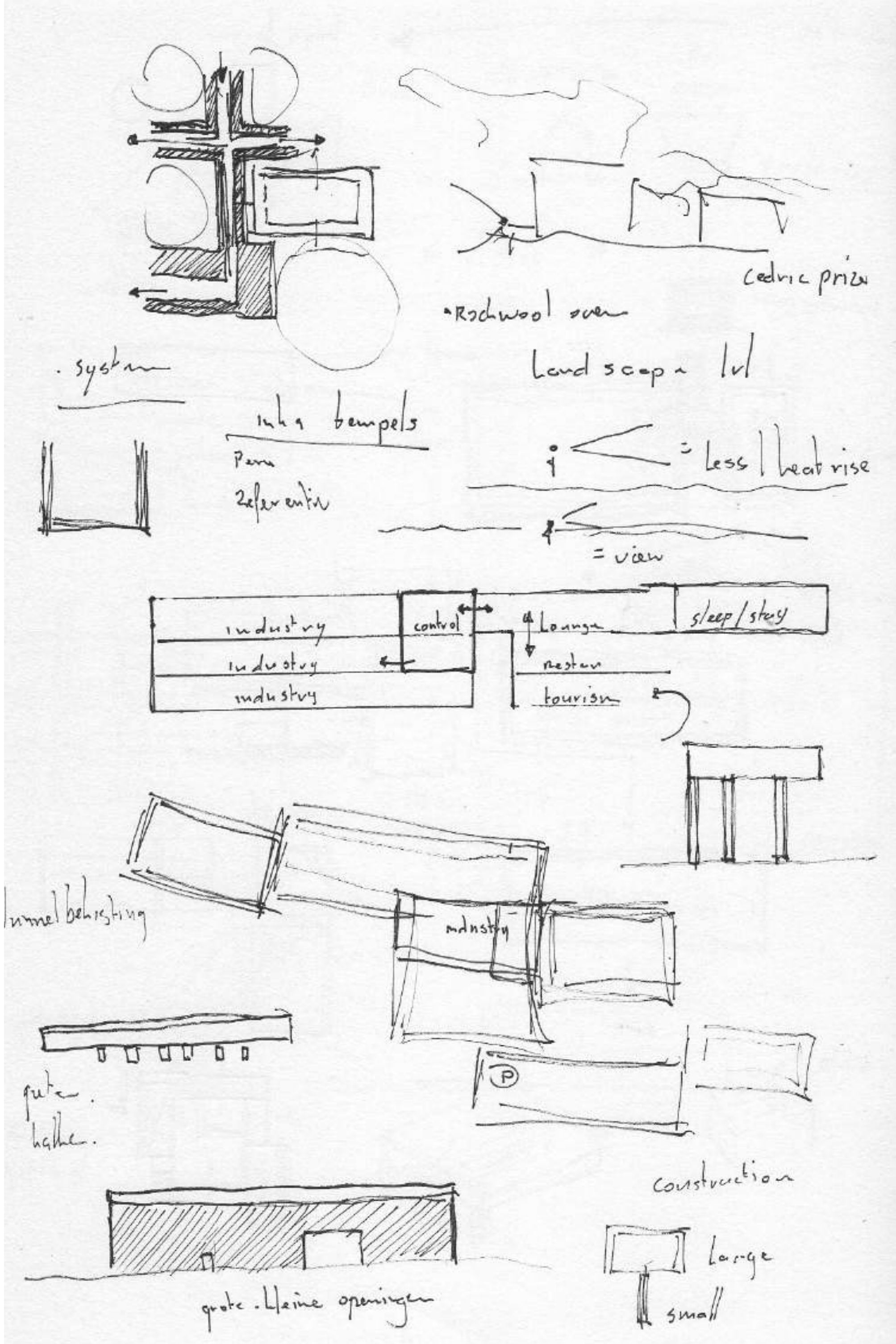

10
10
50
3
5600
275
hexagon structure
hoeveel warmte moet buiten komt
3,00
2m
opp
30 cm
1000 cm
W = warmte per seconde
→ W = joule per seconde
300
3,00
pikte materiaal van water of water 20 m
Q = c . mat
massa
hoeveel warmte
hoeveel water snelheid
opp → hoeveel water
oppervlaktes ramen
muren
5 cm
50 cm
2 x 3 x 2
32 m²
0,5 m²
5600 W
J. per sec
warmte per se

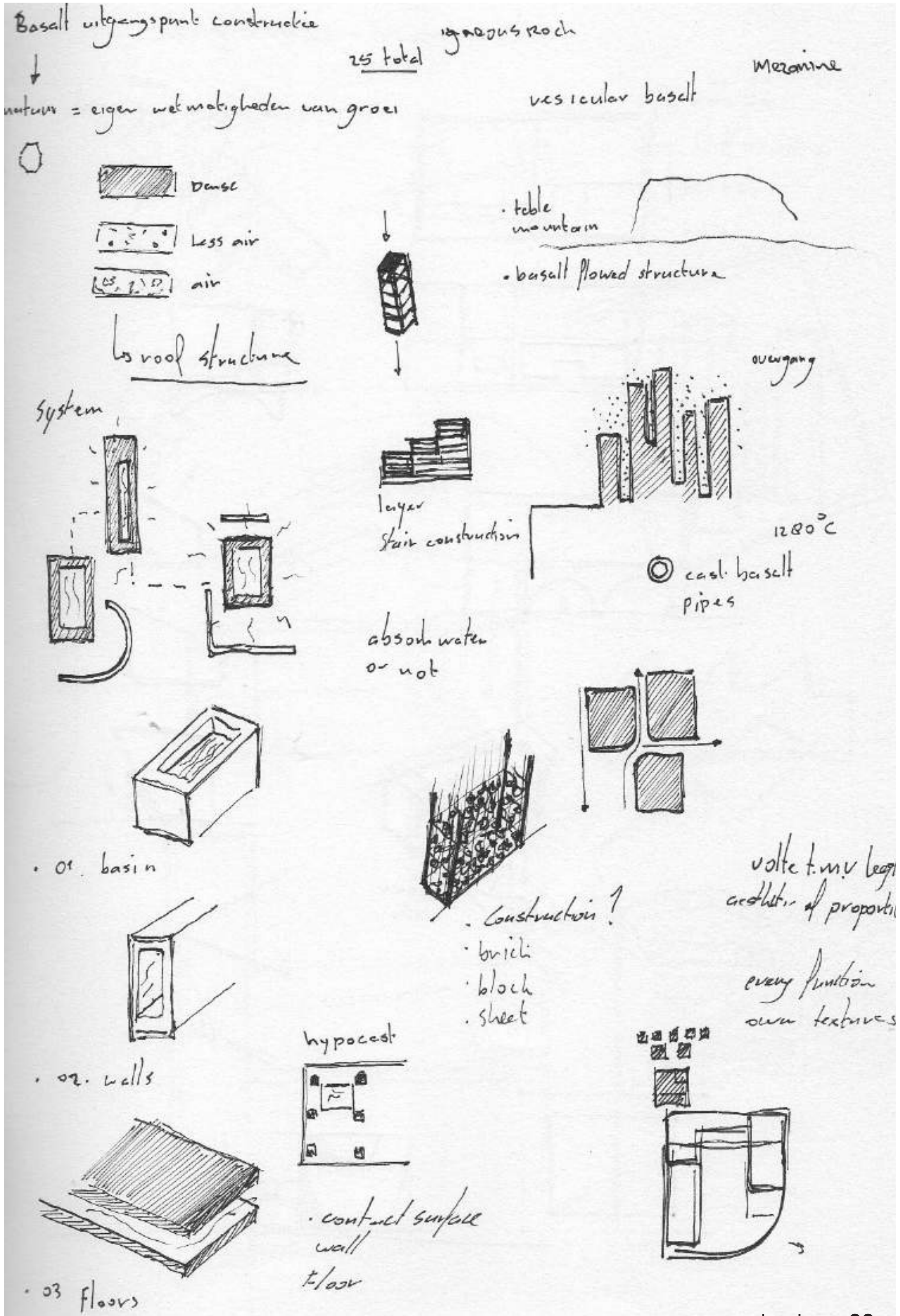

875 Joule per sec
1m
1m
1m
300
50°C
1750 Joule perse
0,5m
1750 x 3
temp functie
programma relaties

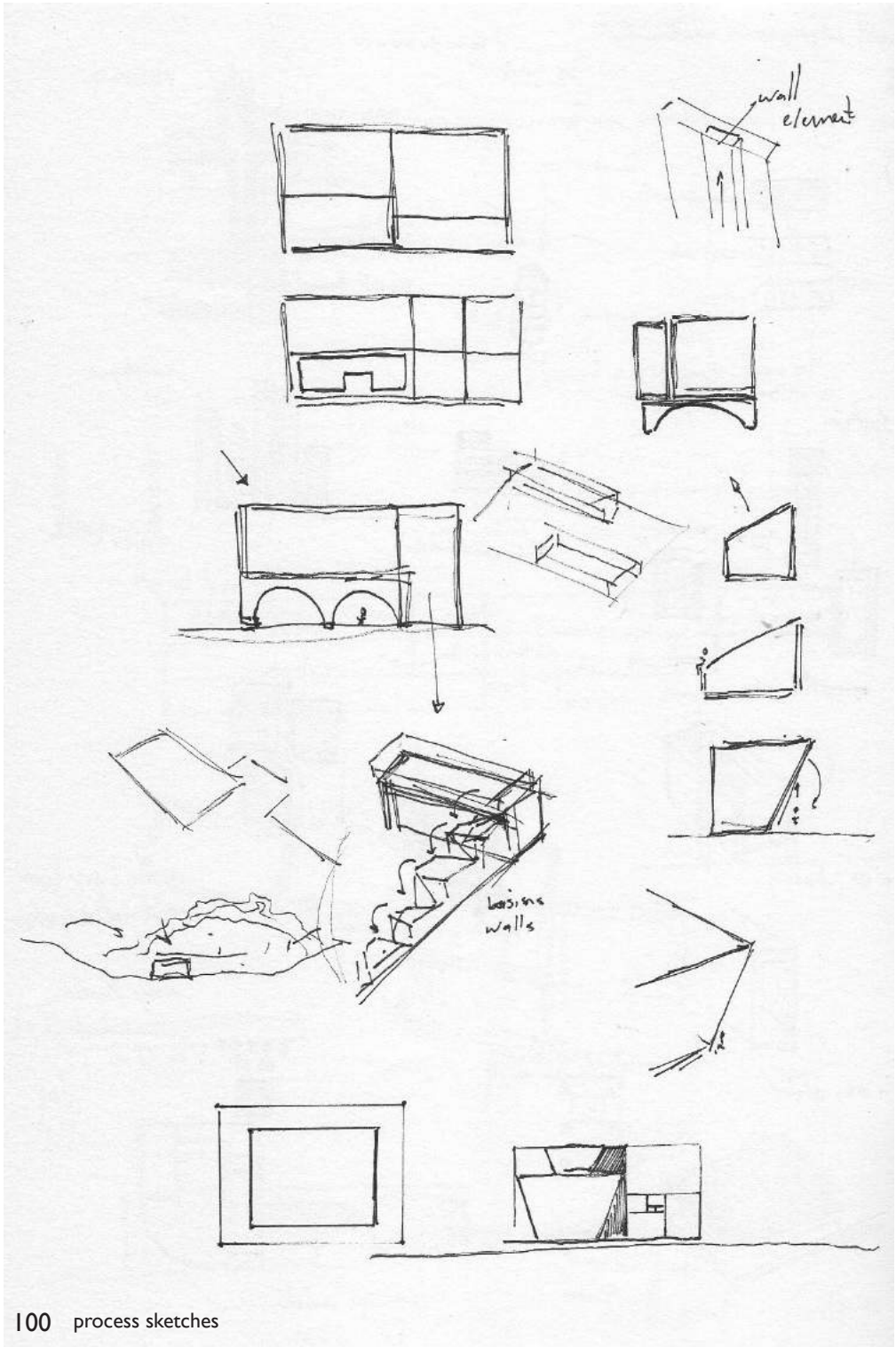

industry
300°c
160°c
60°c
x°c
- estetische
landschaps
kwaliteiten

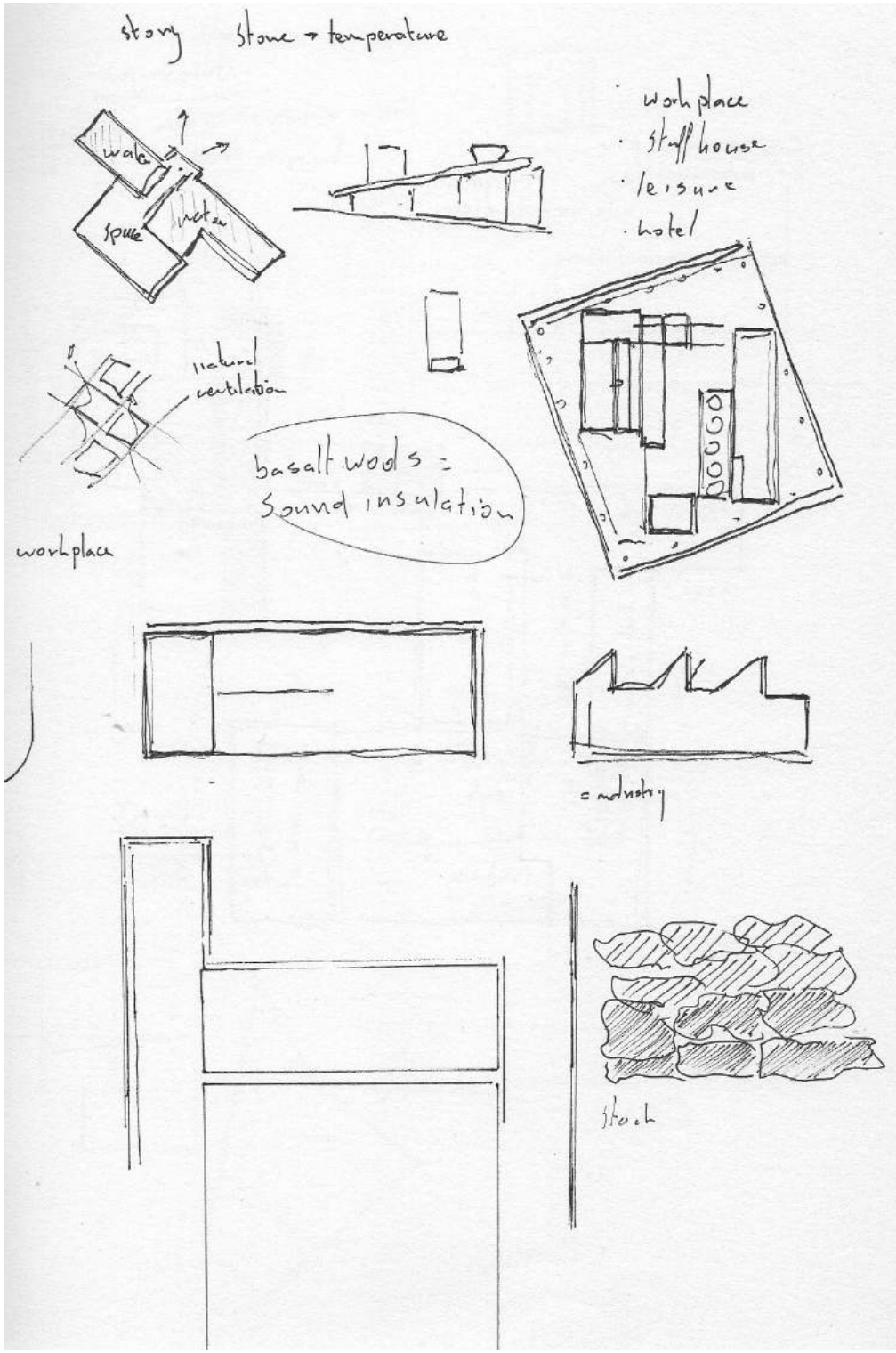

water
stove
seperator
160°C
cooltower
60°C
basin
wall
floor
quick
slow
industry
brine
300°C
electricity
steam + water
208°C
industry
60°C
steam → water
tourism
industry
160°C
seperator
waste
60 - 160°C
tourism
industry
8°C
water
tourism accomodation
heat colunn
basin top

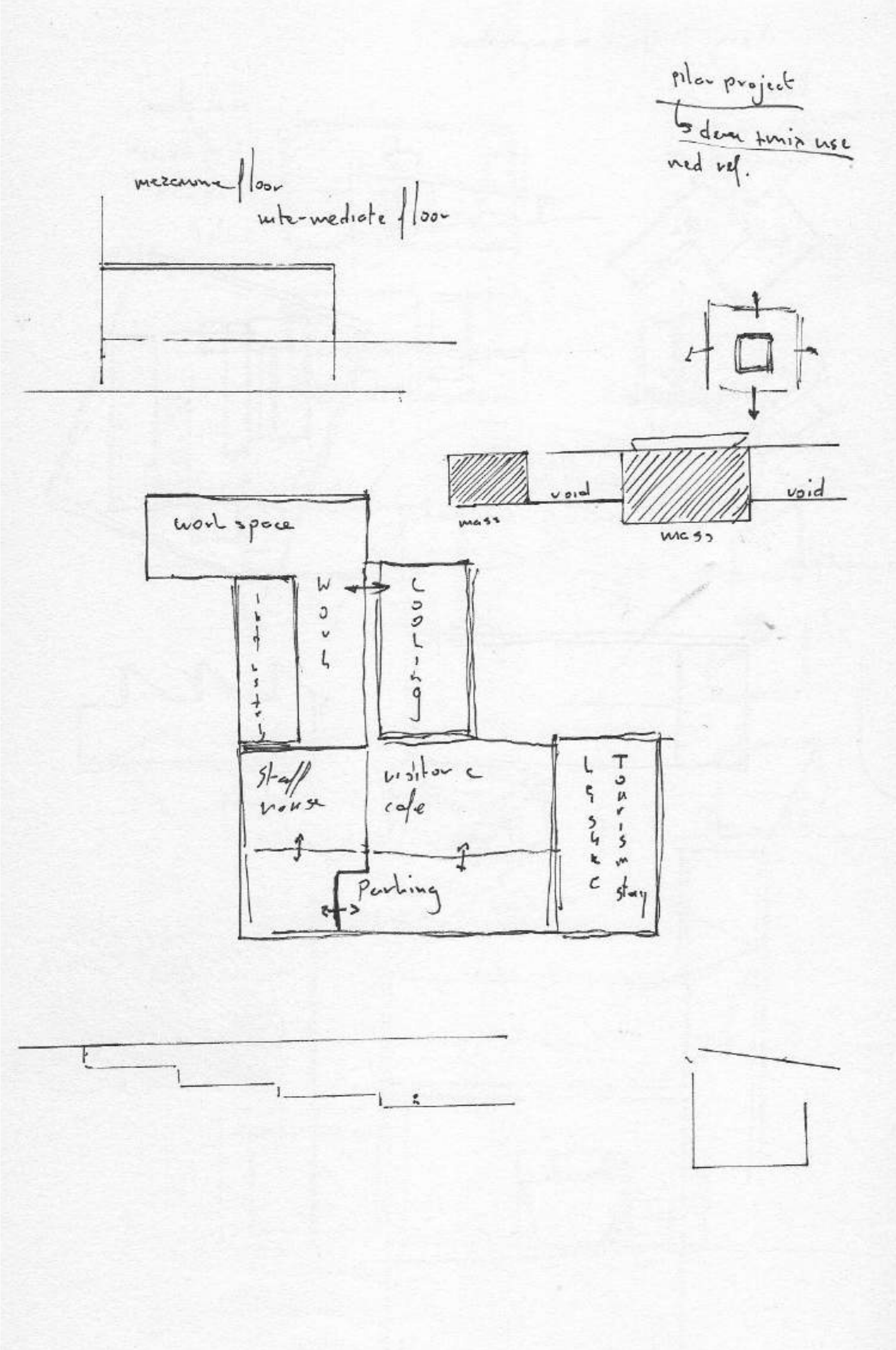

architect as organizer
B - 300°C - O
base forms
Light stone
O - 110°C - O
O - 60°C - O
W+D
cellar
seperator valve
7.5m
29m
hoogte 10m
15°C
5°C
hoogte:
13m
11.5m
160°C marble rest
200°C steam
8°C cooling
Power house
hoogte 24m
69m
208°C
268°C
21m
control
turbine
sound
cool tones
8°C
60°C
cellar | industry
orientation
Land schap
to lake
open

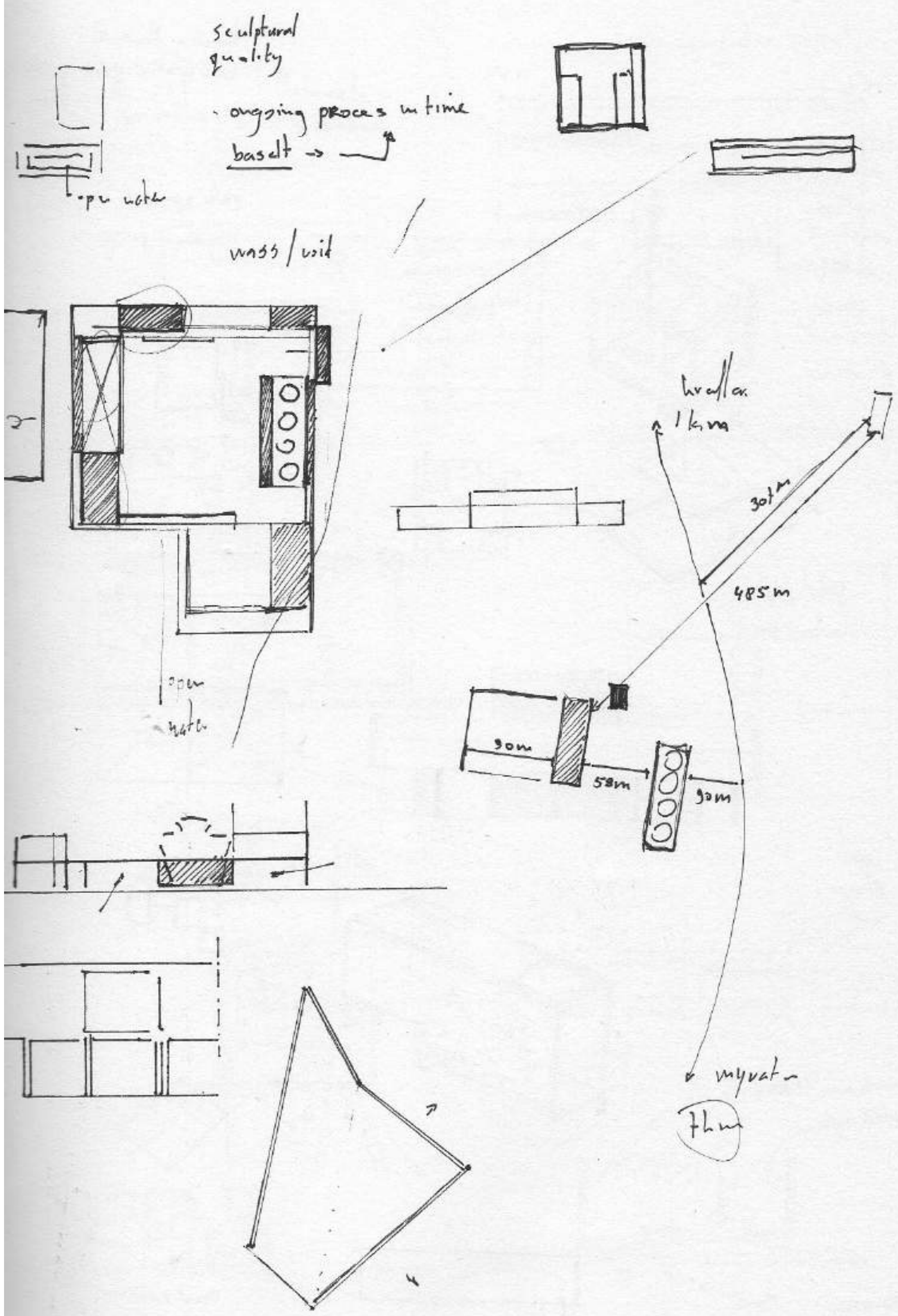

Cedric prize
Rockwool oven
Landscape lvl
system
inka tempels
Peru
Referentie
= Less heat rise
= view
industry
control
lounge
sleep / stay
industry
restaur
industry
tourism
industry
tunnel behuizing
grote kleine openingen
construction
large
small

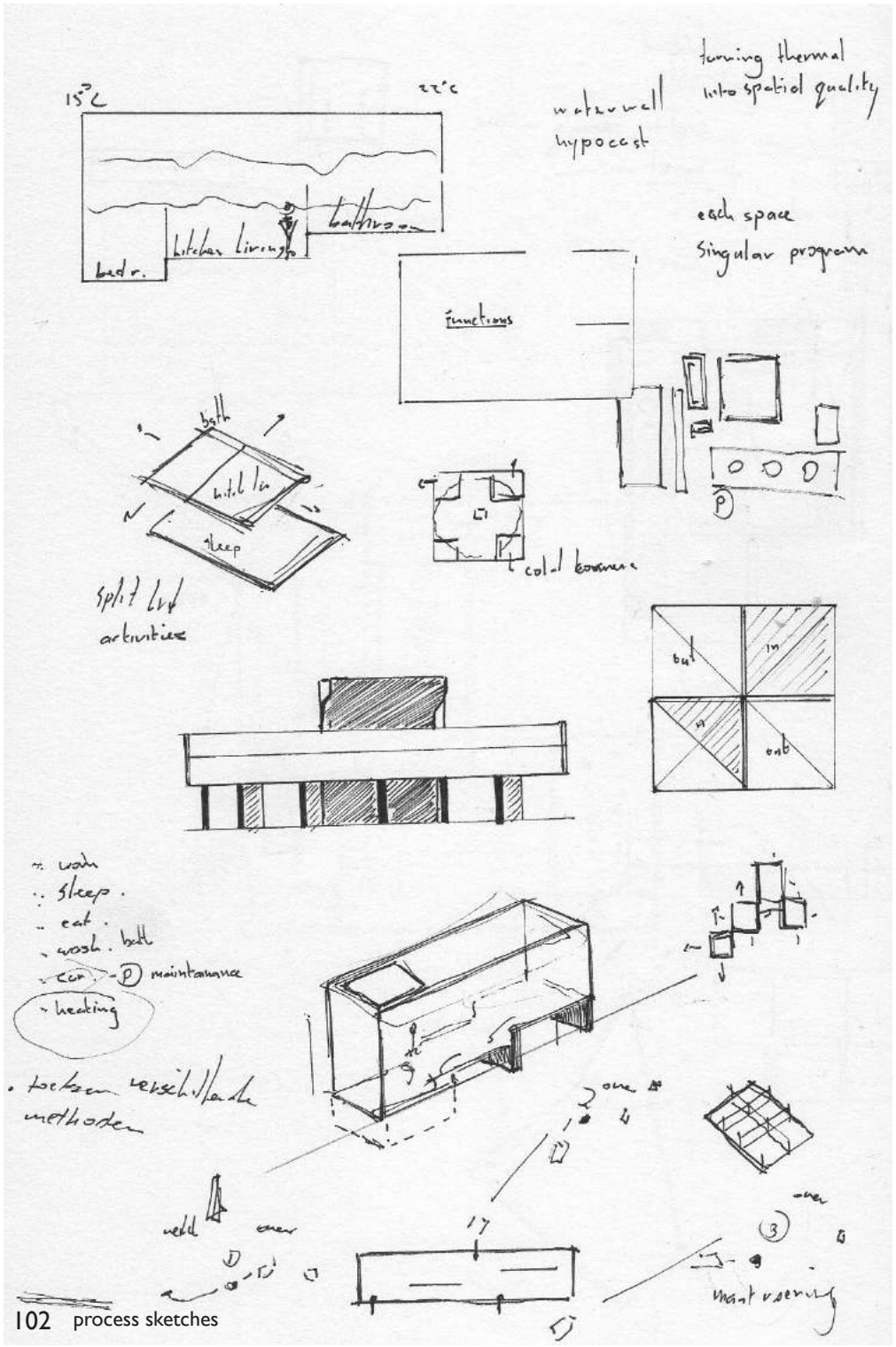

Basalt uitgangspunt constructie
25 total
igneous rock
Mezanine
natuur = eigen wetmatigheden van groei
vesicular basalt
Dense
Less air
air
roof structure
table mountain
basalt flowed structure
system
layer
stair construction
overgang
1280°C
cast basalt pipes
absorb water or not
01 basin
construction?
brick
block
sheet
every function own textures
02 walls
hypocaust
contact surface
wall
floor
03 floors

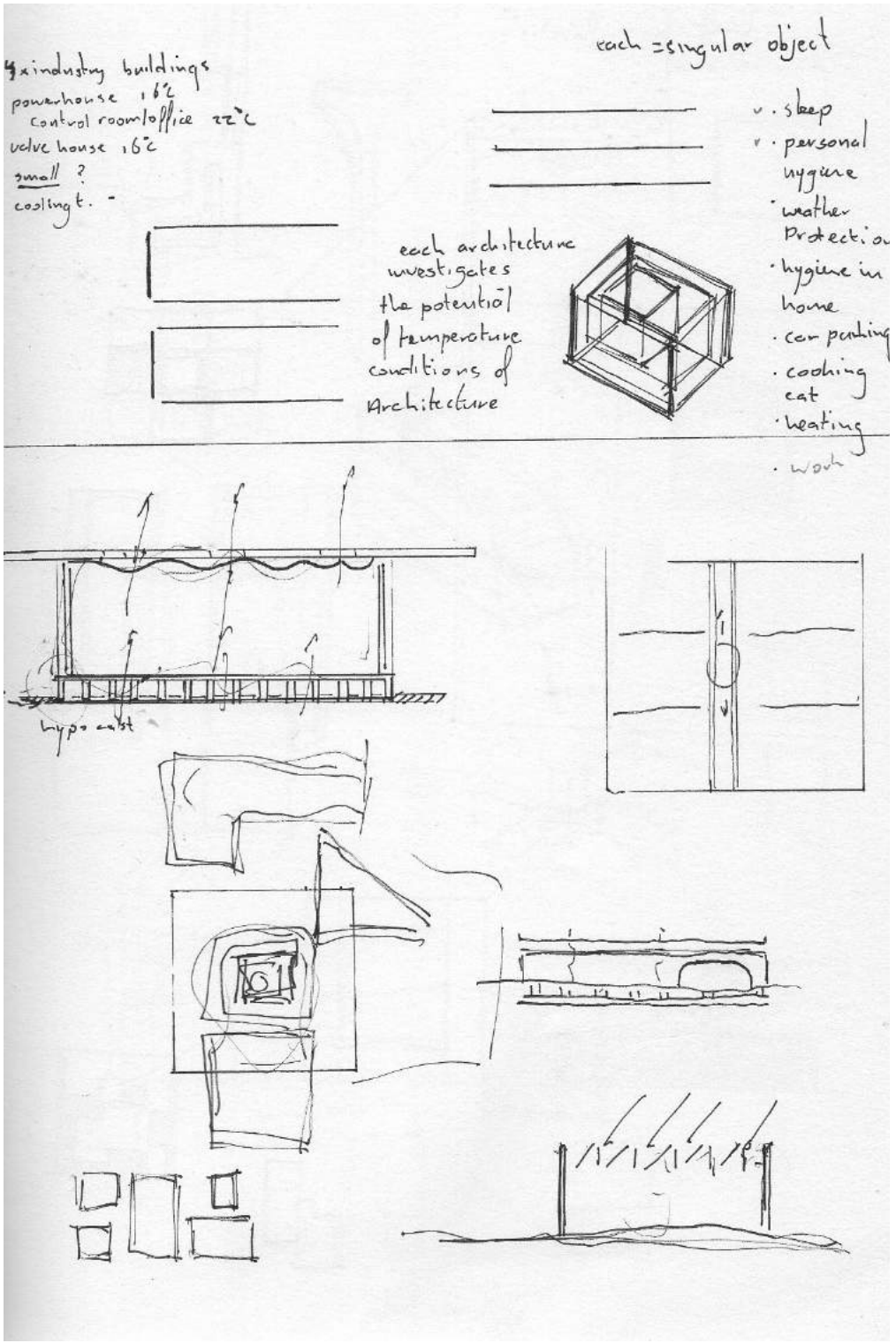

wall element
basing walls

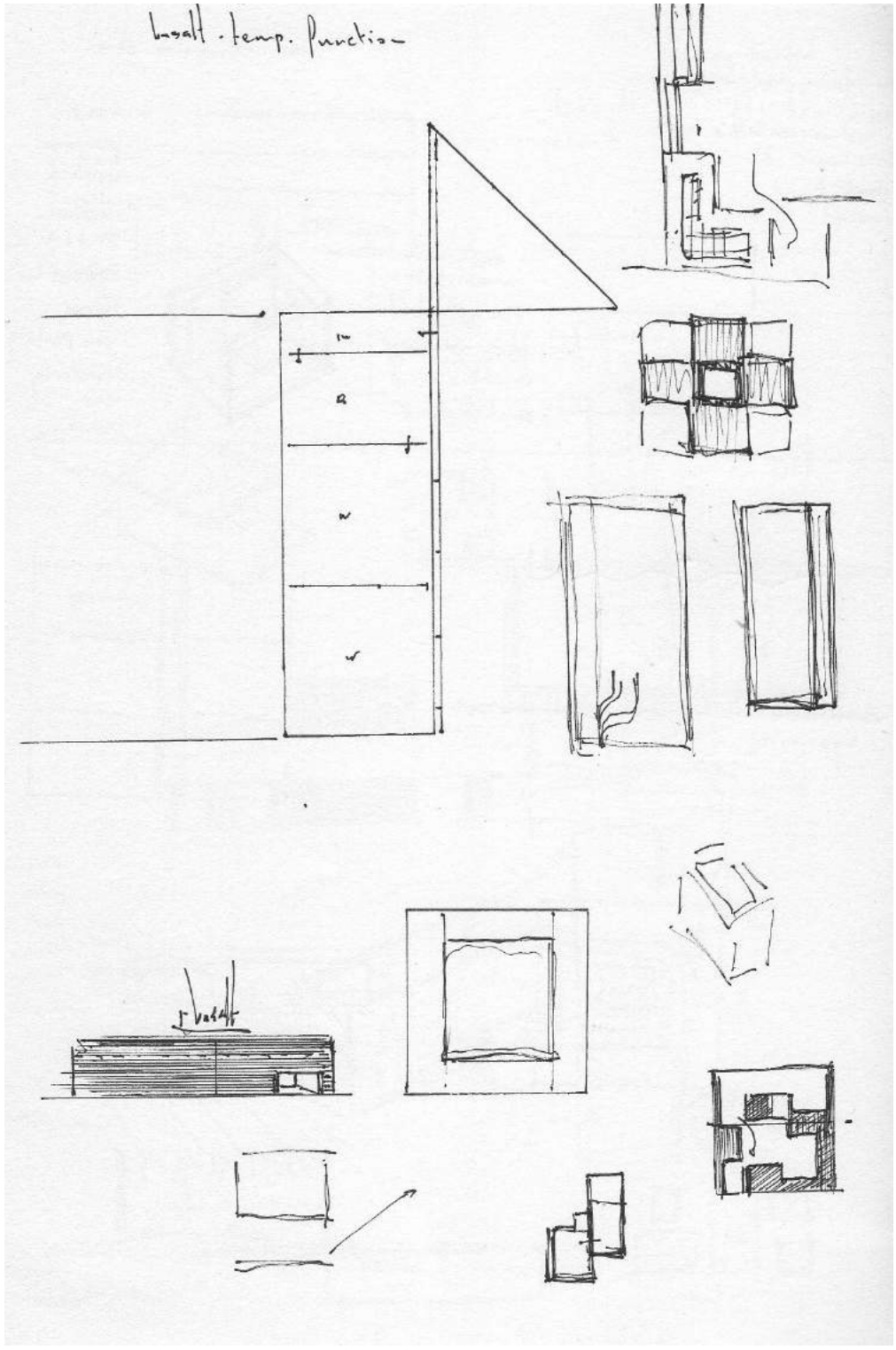

story
stone → temperature
water
spule
natural ventilation
basalt wools =
Sound insulation
workplace
· workplace
· stuff house
· leisure
· hotel
= industry
stock

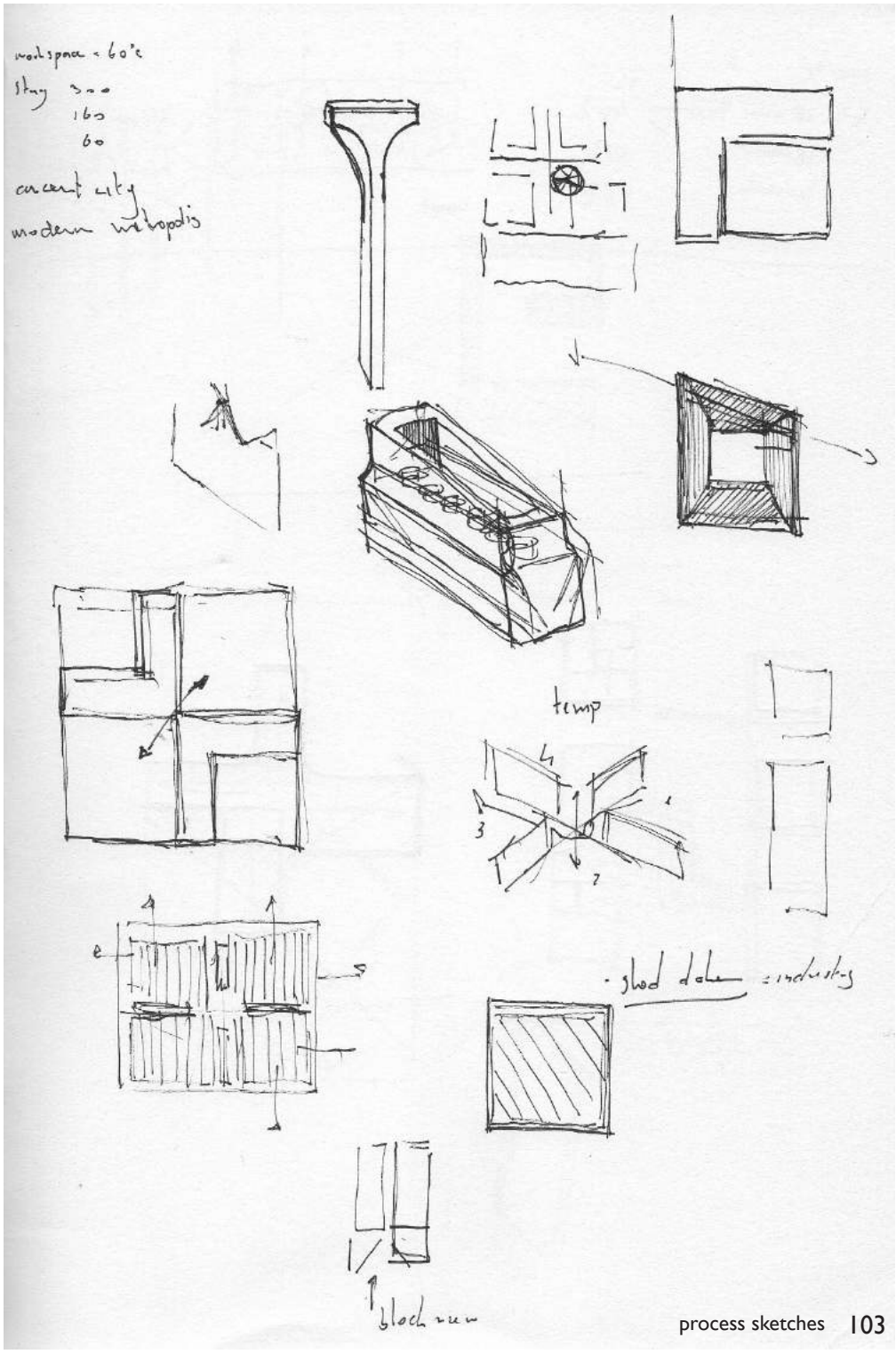

pilot project
work space
void
mass
visitor cafe
Parking

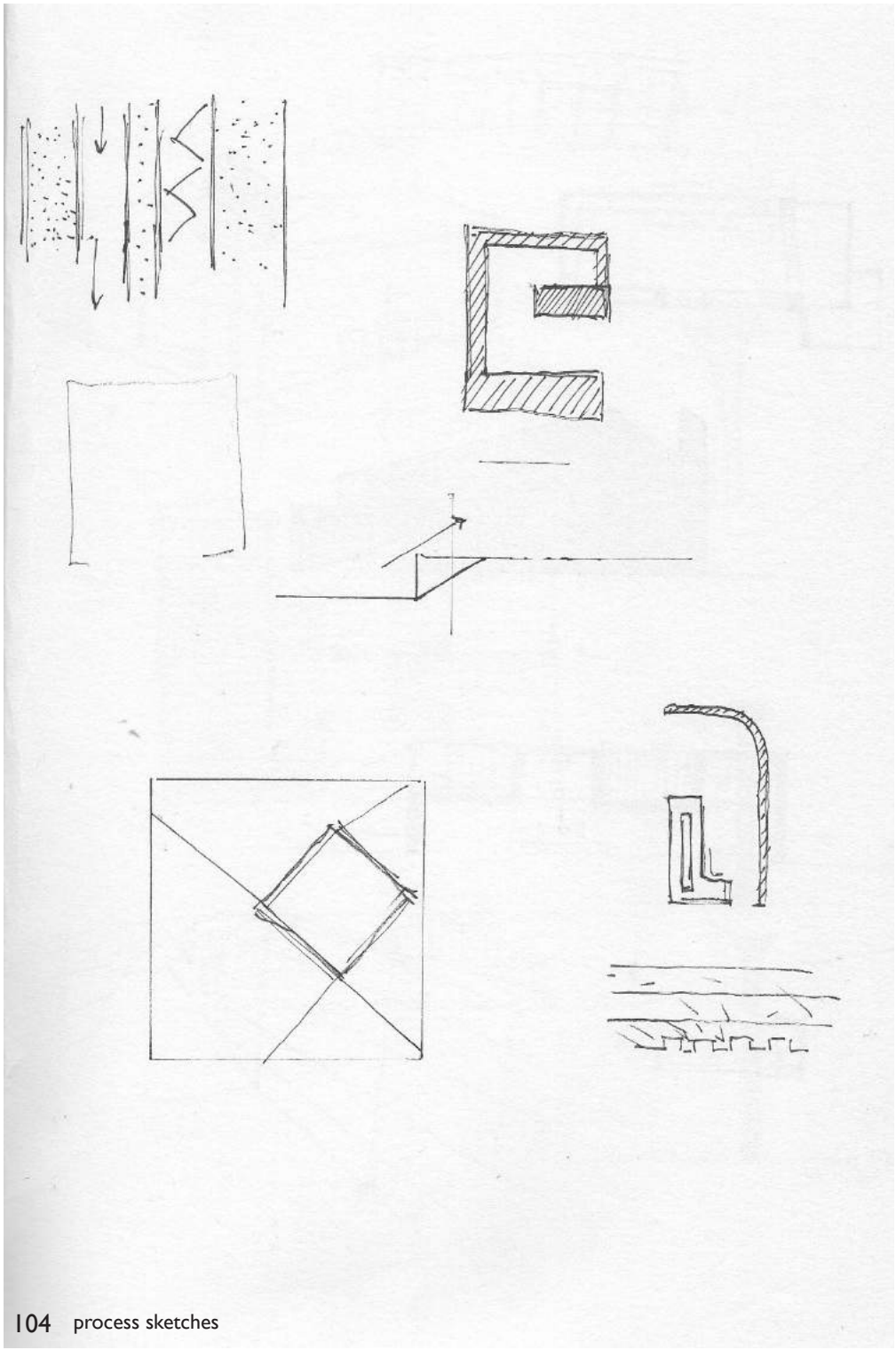

sculptural quality
ongoing proces in time
mass / void
485m
90m
58m

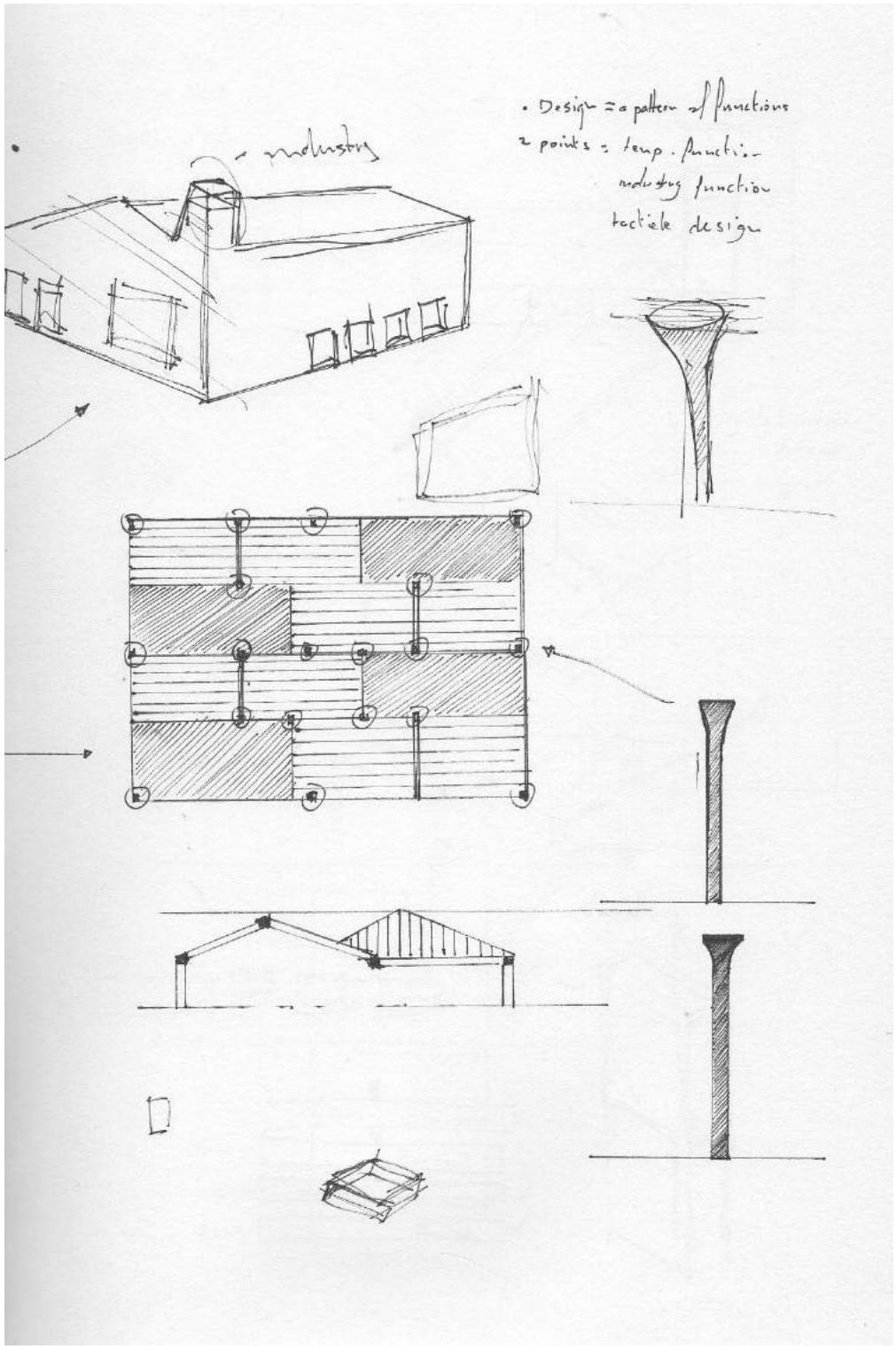

15°C
22°C
bedr.
kitchen
living
bathroom
water wall
hypocast
turning thermal
into spatial quality
each space
singular program
functions
bath
bed
sleep
split level
activities
cold
kitchen
wash
sleep
eat
wash. bath
car
maintenance
heating
technisch verschiedene
methoden
weld
over
maintenance

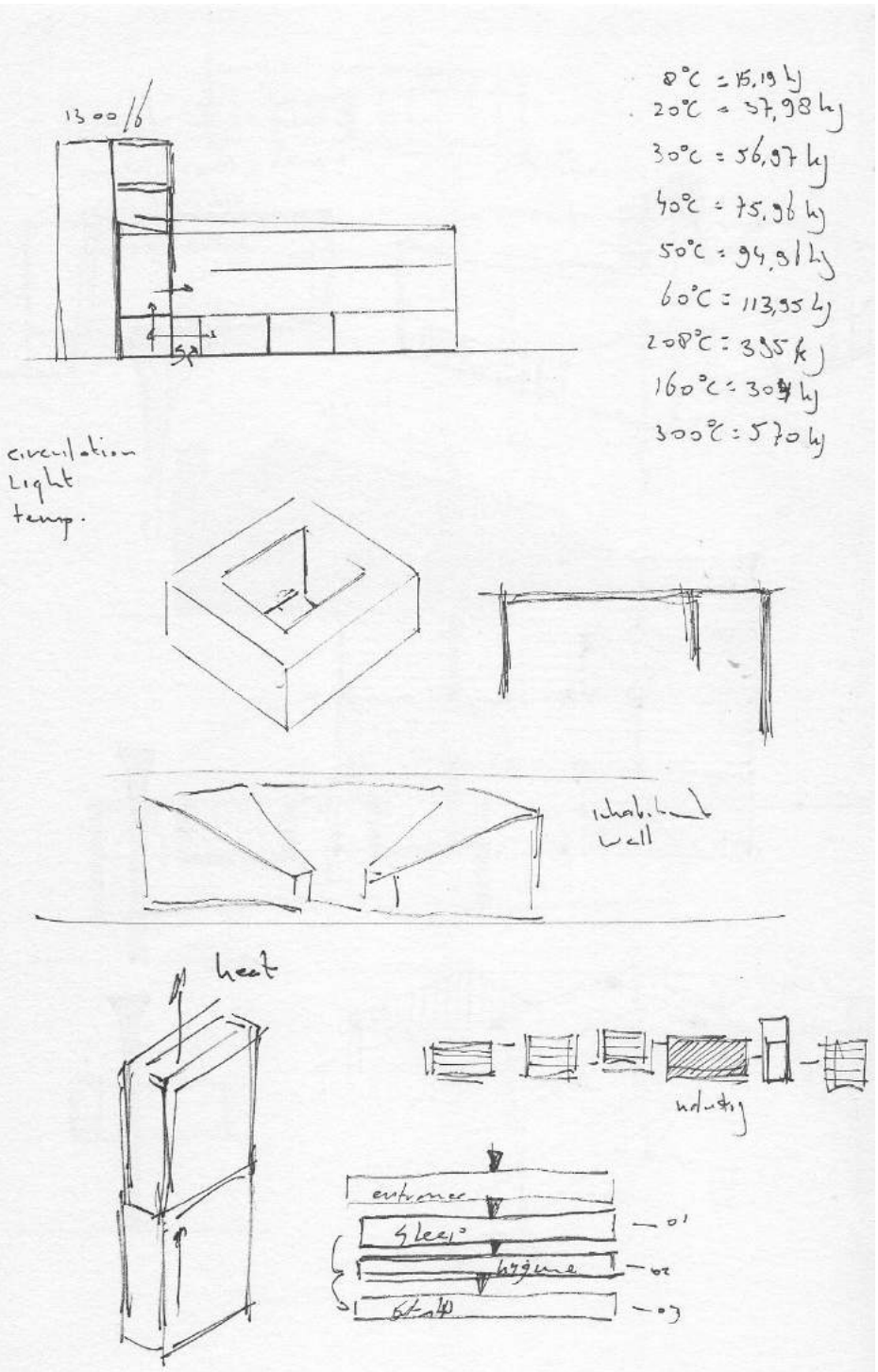

each = singular object
industry buildings
powerhouse 16°C
control room/office 22°C
valve house 16°C
small ?
cooling t. -
each architecture
investigates
the potential
of temperature
conditions of
architecture
v. sleep
v. personal
hygiene
· weather
Protection
· hygiene in
home
· car parking
· cooking
eat
· heating
· work
hypo cast

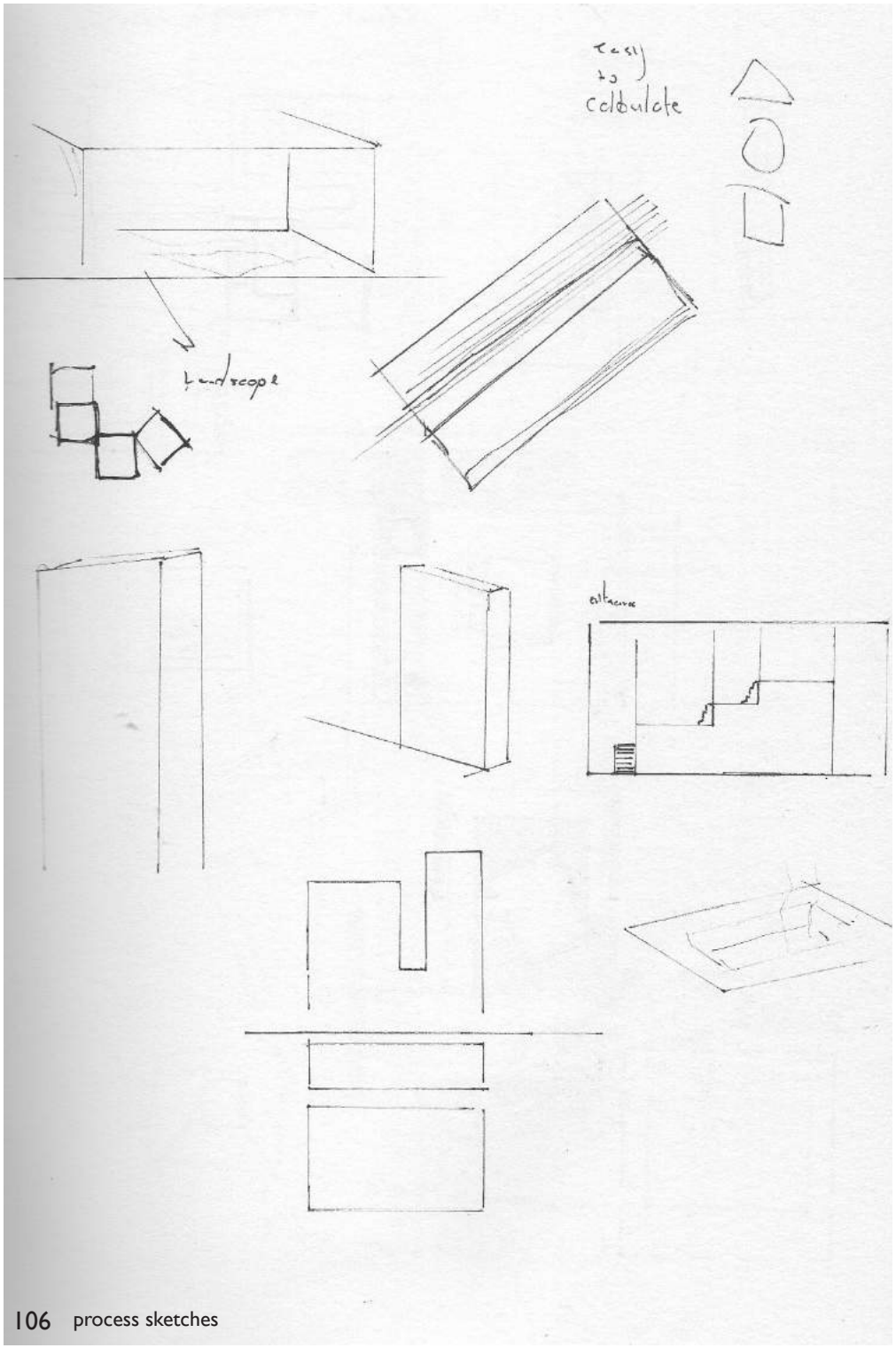

basalt . temp. Function

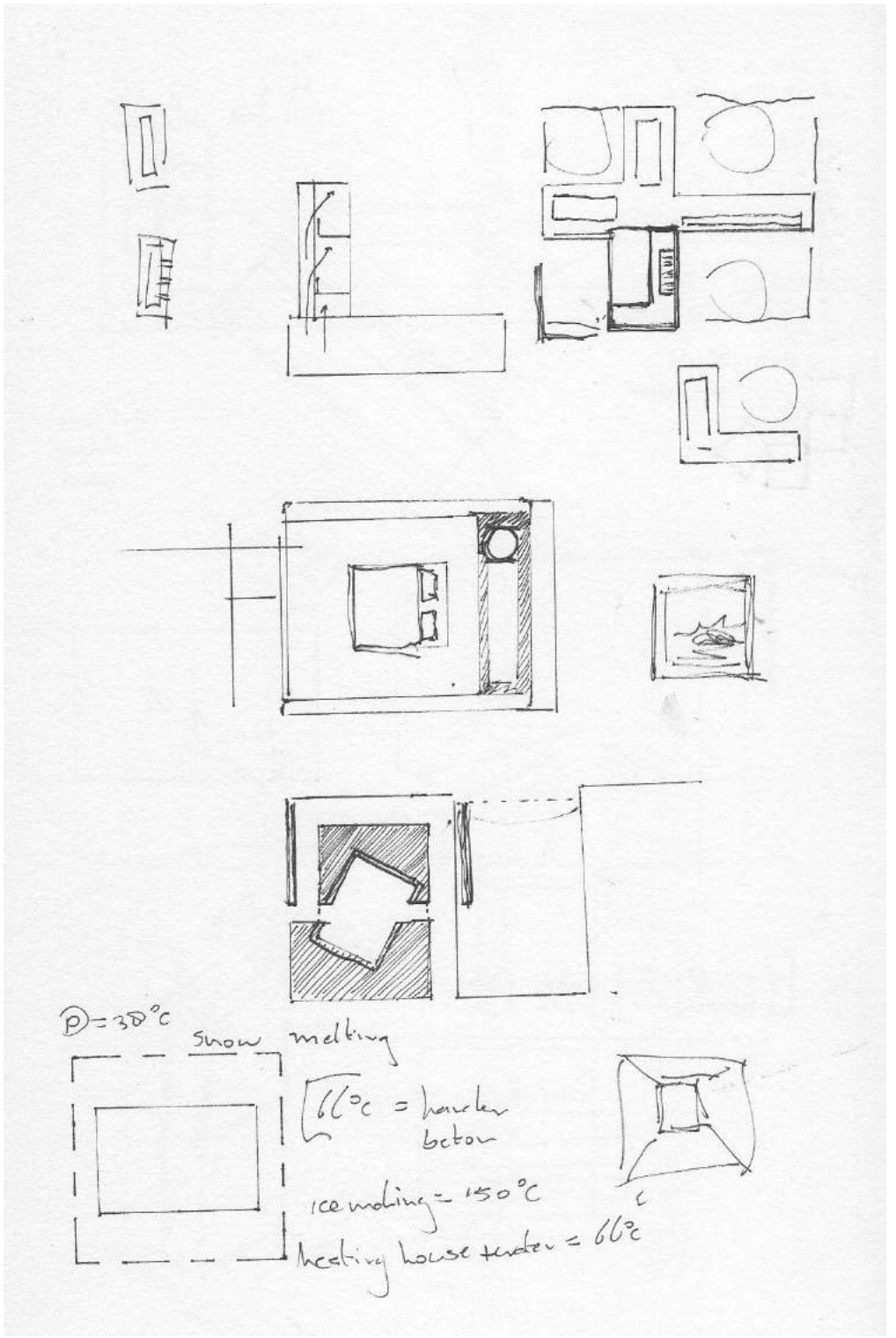

workspace = 60's
stay 300
160
60
concert city
modern metropolis
temp
· steel door = industry
block new

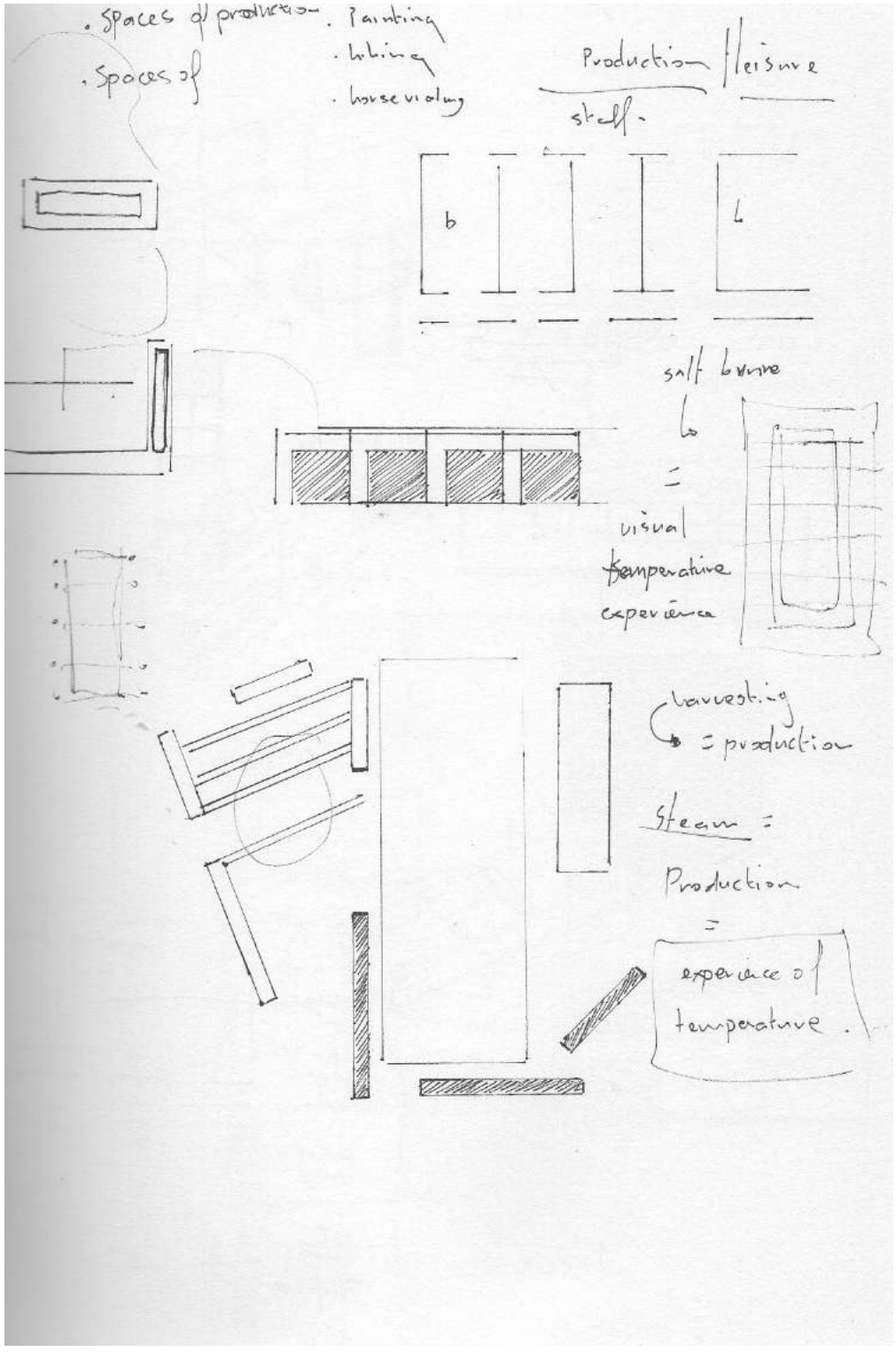


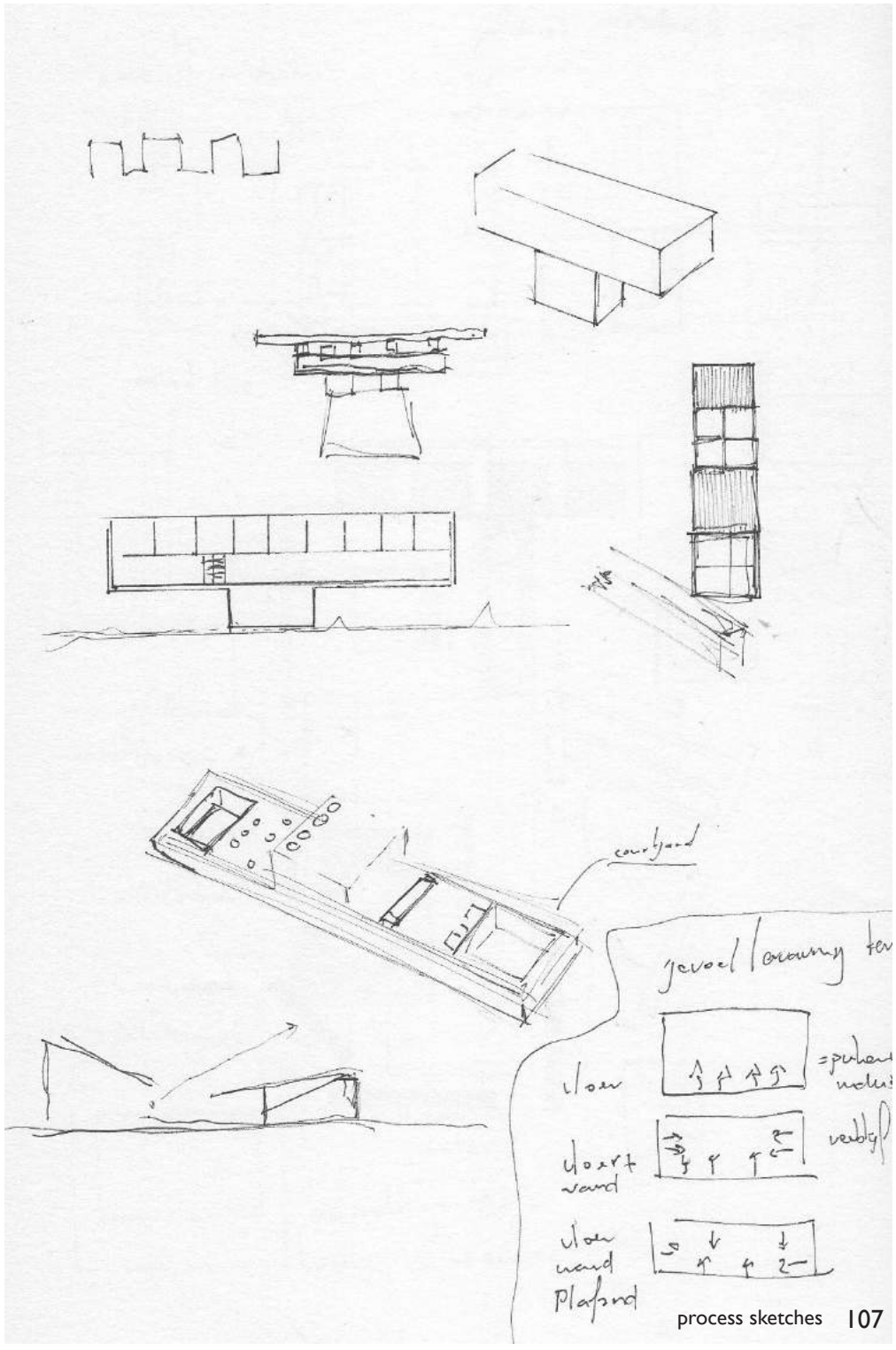

• Design = a pattern of functions
2 points = temp. function
industry function
tactiele design
industry

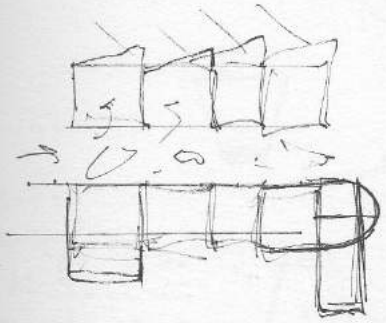

1300 l/d
8°C = 15,19 kJ
20°C = 37,98 kJ
30°C = 56,97 kJ
40°C = 75,96 kJ
50°C = 94,95 kJ
60°C = 113,95 kJ
200°C = 395 kJ
160°C = 304 kJ
300°C = 570 kJ
circulation
Light
temp.
inhab.
wall
heat
industry
entrance
sleep
hygiene
stair
01
02
03

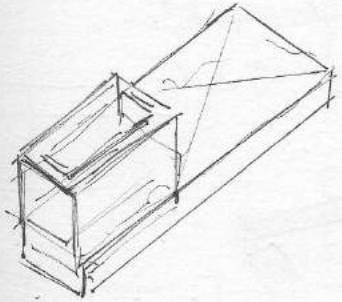

easy
to
calculate
Landscape
alternate

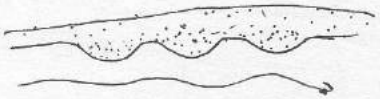

P=30°C
Snow melting
60°C = heated
beton
ice melting = 150°C
heating house water = 66°C

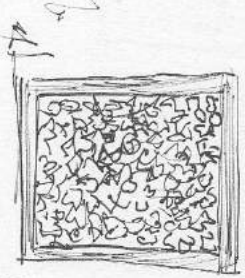

. spaces of production
. spaces of
. painting
. hiking
. horseriding
Production / leisure
staff
b
L
salt brine
=
visual
temperature
experience
harvesting
= production
steam =
Production
=
experience of
temperature .


courtyard
jewel / economy
floor
=
floor
wand
floor
wand
plafond









skelter

3 typen architectuur

door →

• koom →

• water →

• brine →

zoutgehalte

1	2	3
°C	°C	°C
=	=	=
60°C	160°C	208°C brine
water	stoom	

3! typologieen architectuur

bepalen architectuur typologie

• Regenwater

wearom lijft het ?

- Criteria
- wijn overwegingen ?

is er menselijke activiteit dat het landschap goed of niet

oud / nieuw ?

• instrumenten

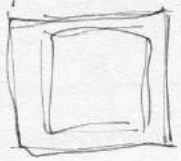
actief interveniëren in eigen process

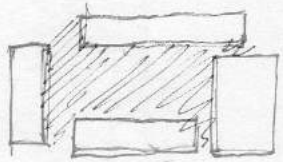
relatie landschap verbetering?

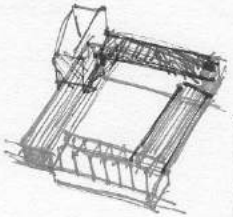
Fluctuerende activiteit

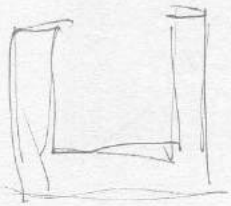
wat zijn mijn overwegingen dit te doen?

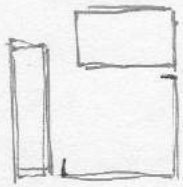
• actief handelen



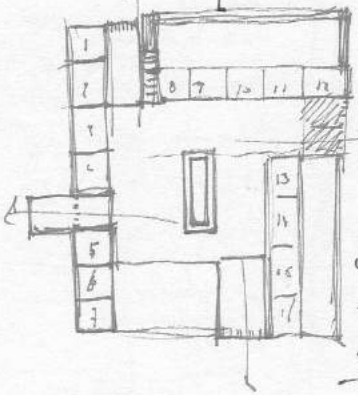






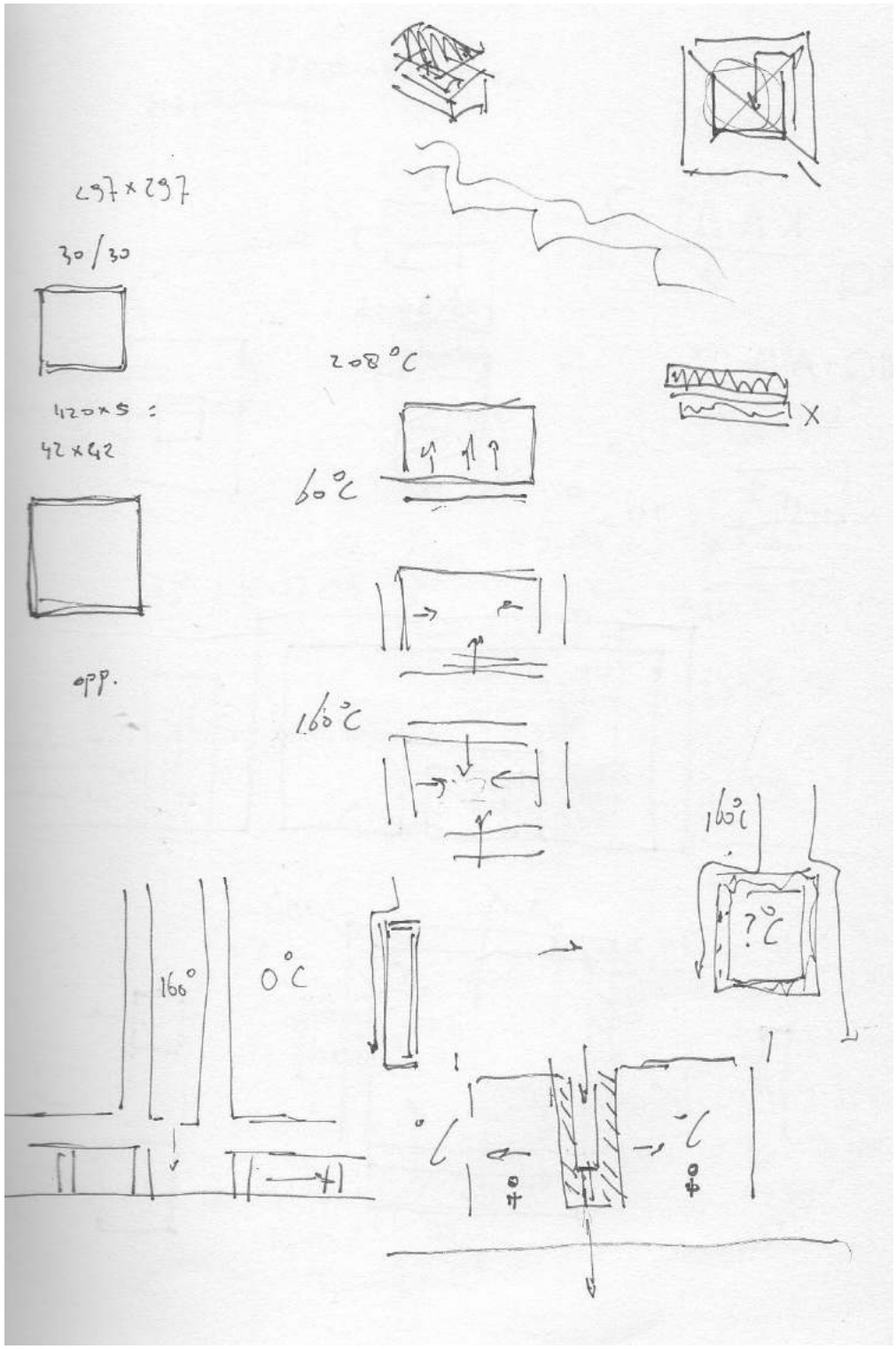


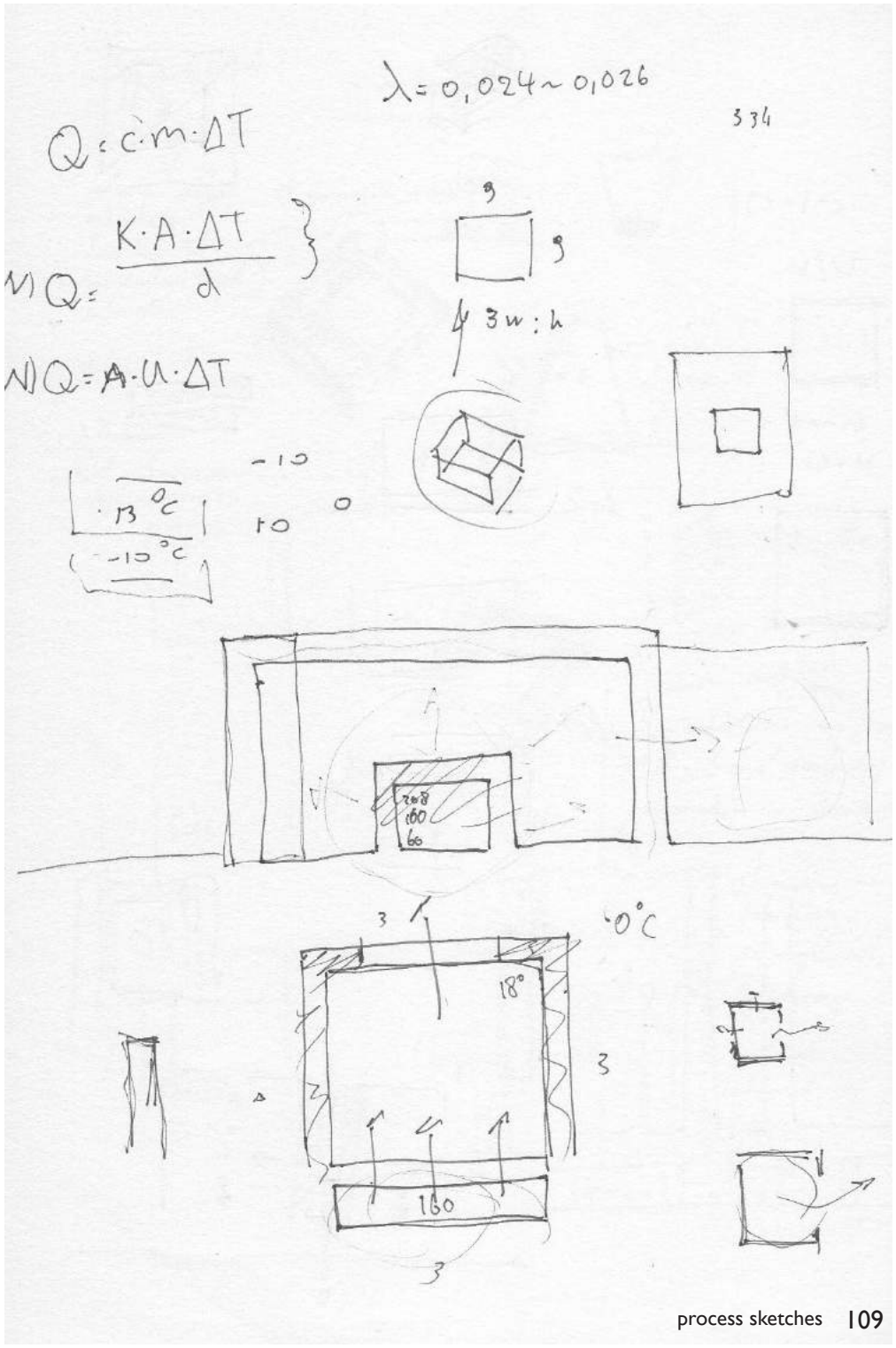
- industry hightech
- architectuur low tech
- functioneel materiaal
- accomodatie en industry

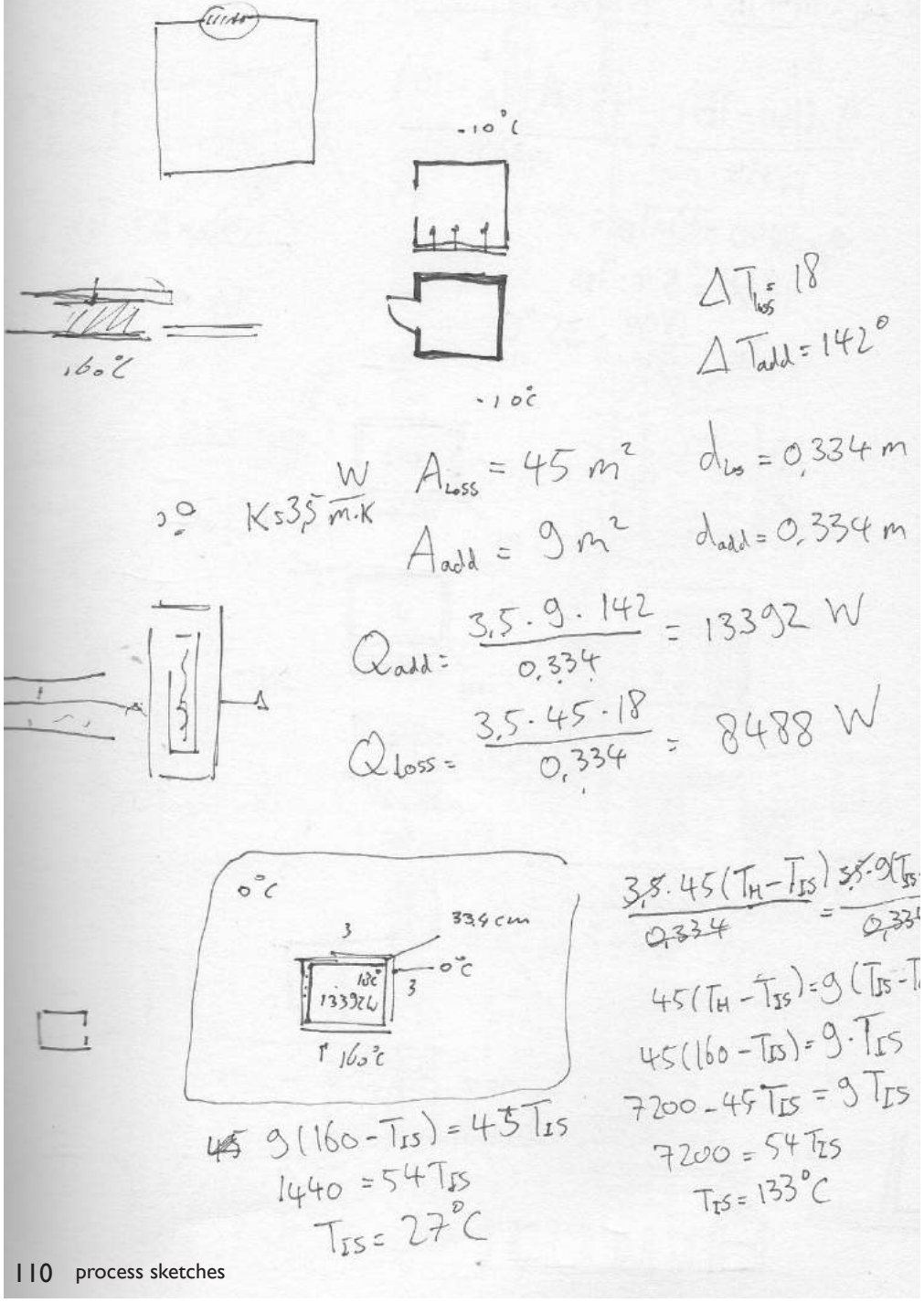


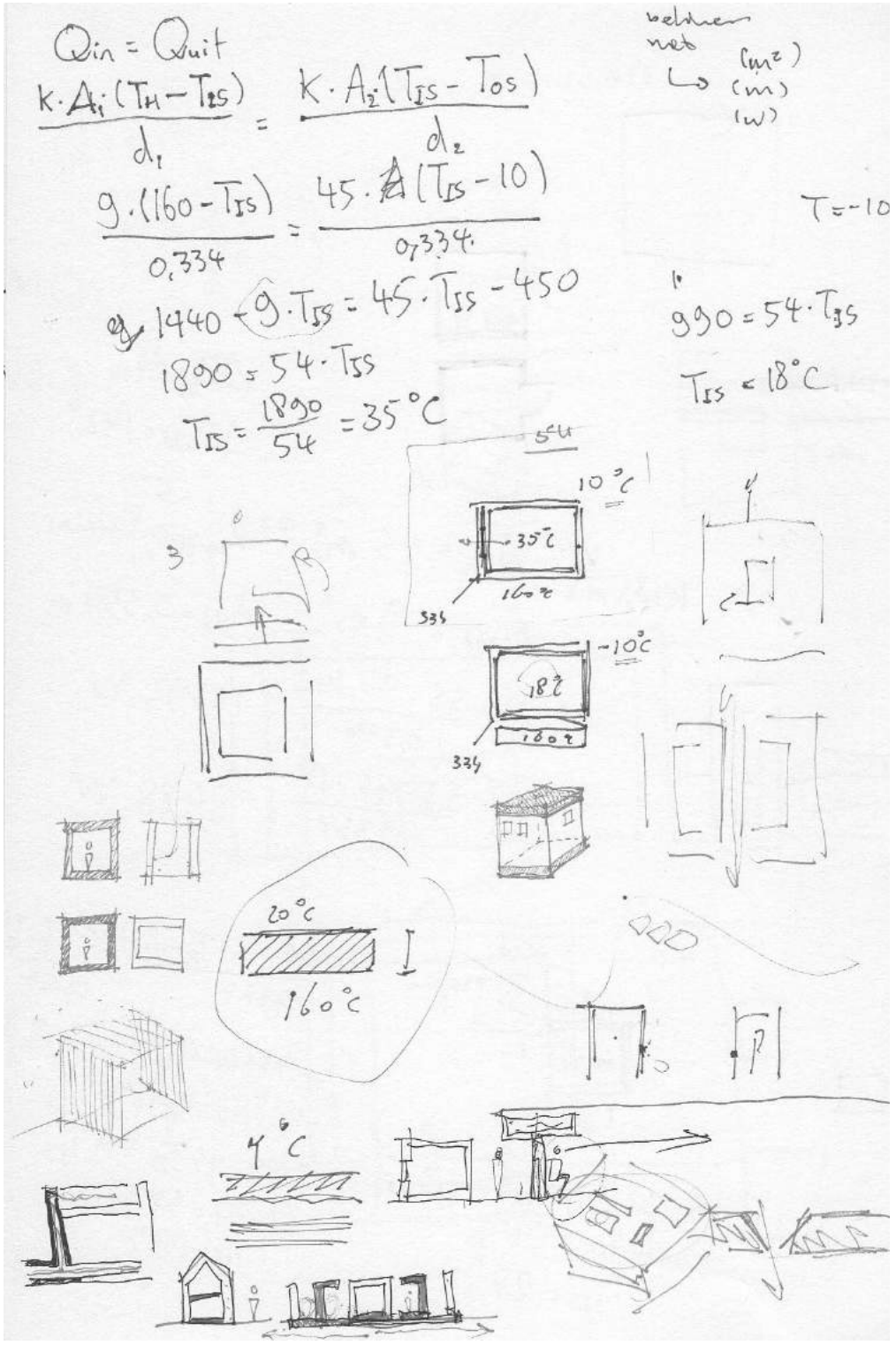
- toevoegen van toerisme
- gezamenlijk landschap

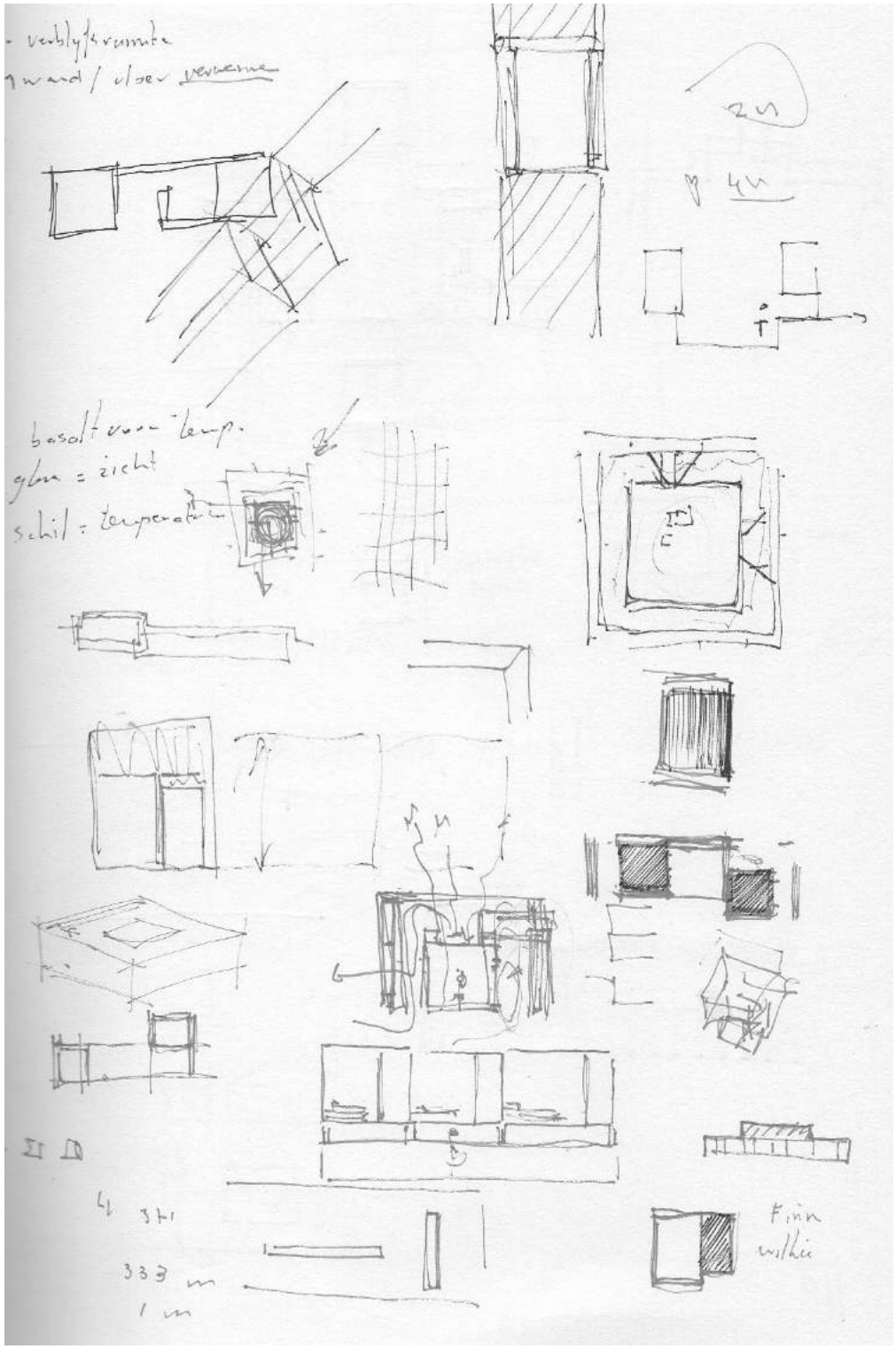
Vulcaan • uitbarsting = opnieuw bersalt

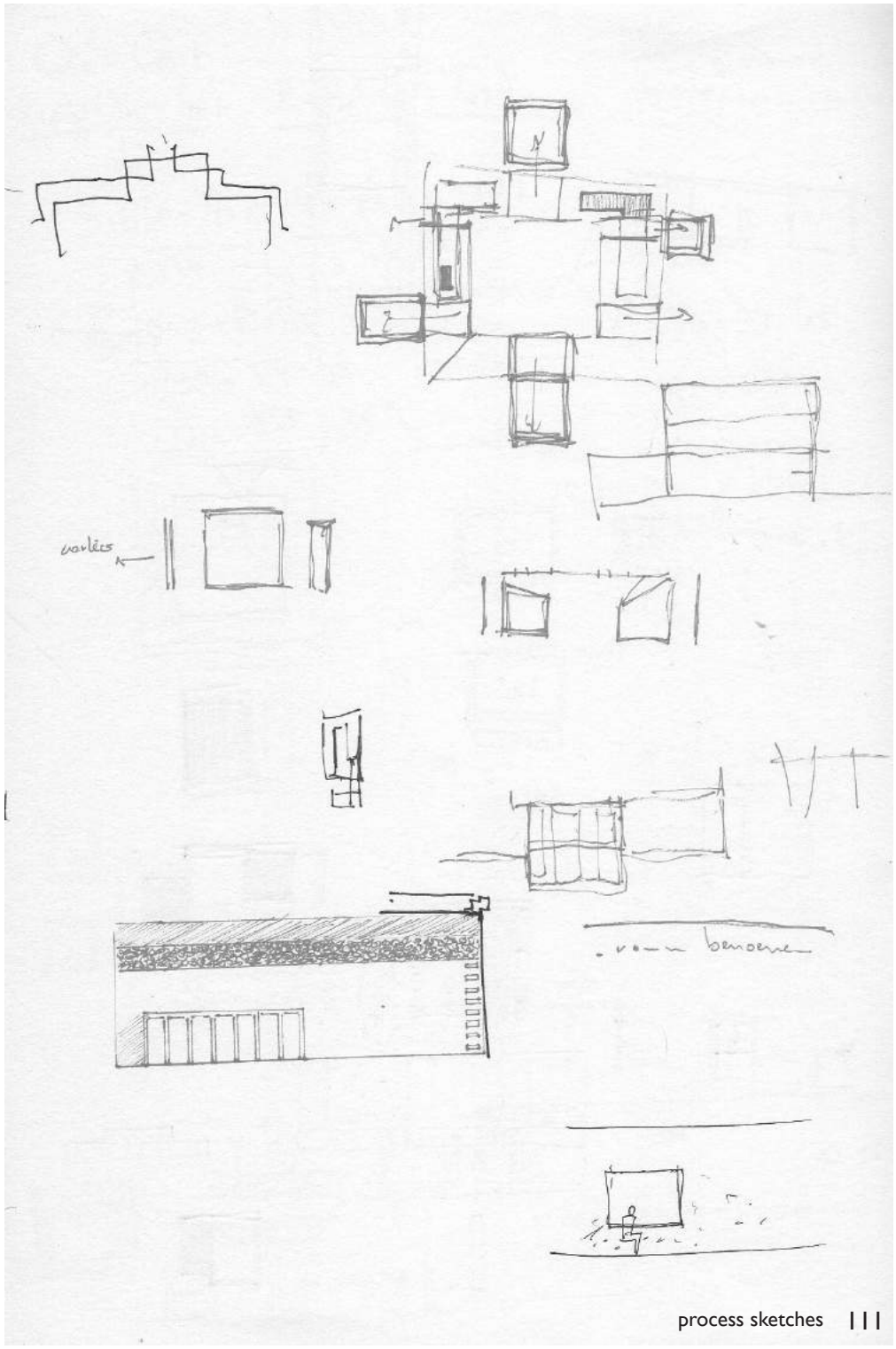

297 x 297
30/30
420 x 5 =
42 x 42
opp.
208°C
60°C
160°C
160°
0°C
?°C

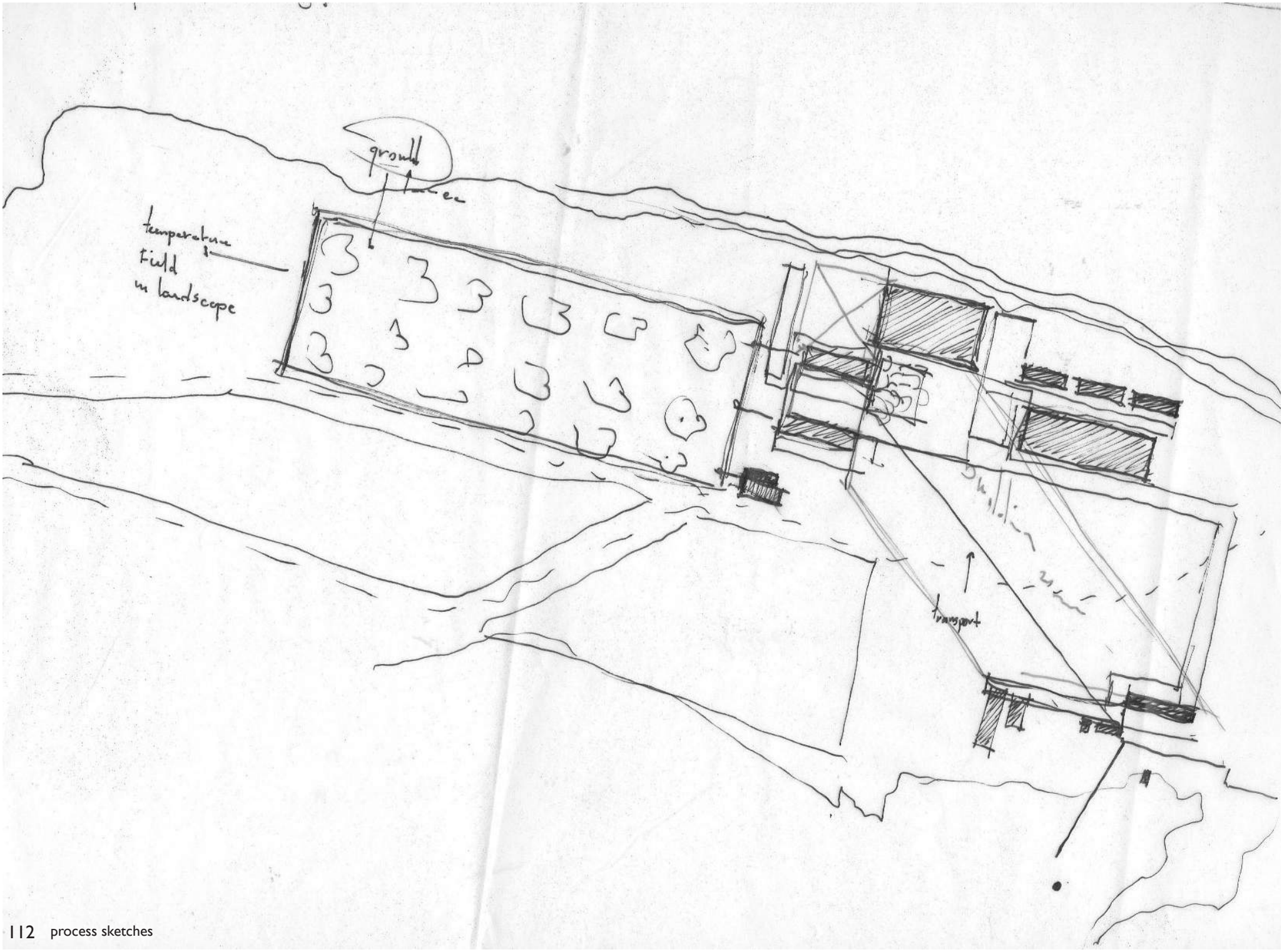

λ = 0,024 ~ 0,026
334
Q = c·m·ΔT
K·A·ΔT
d
3w : h
-10
10
0
13°C
-10°C
208
160
66
0°C
18°
180

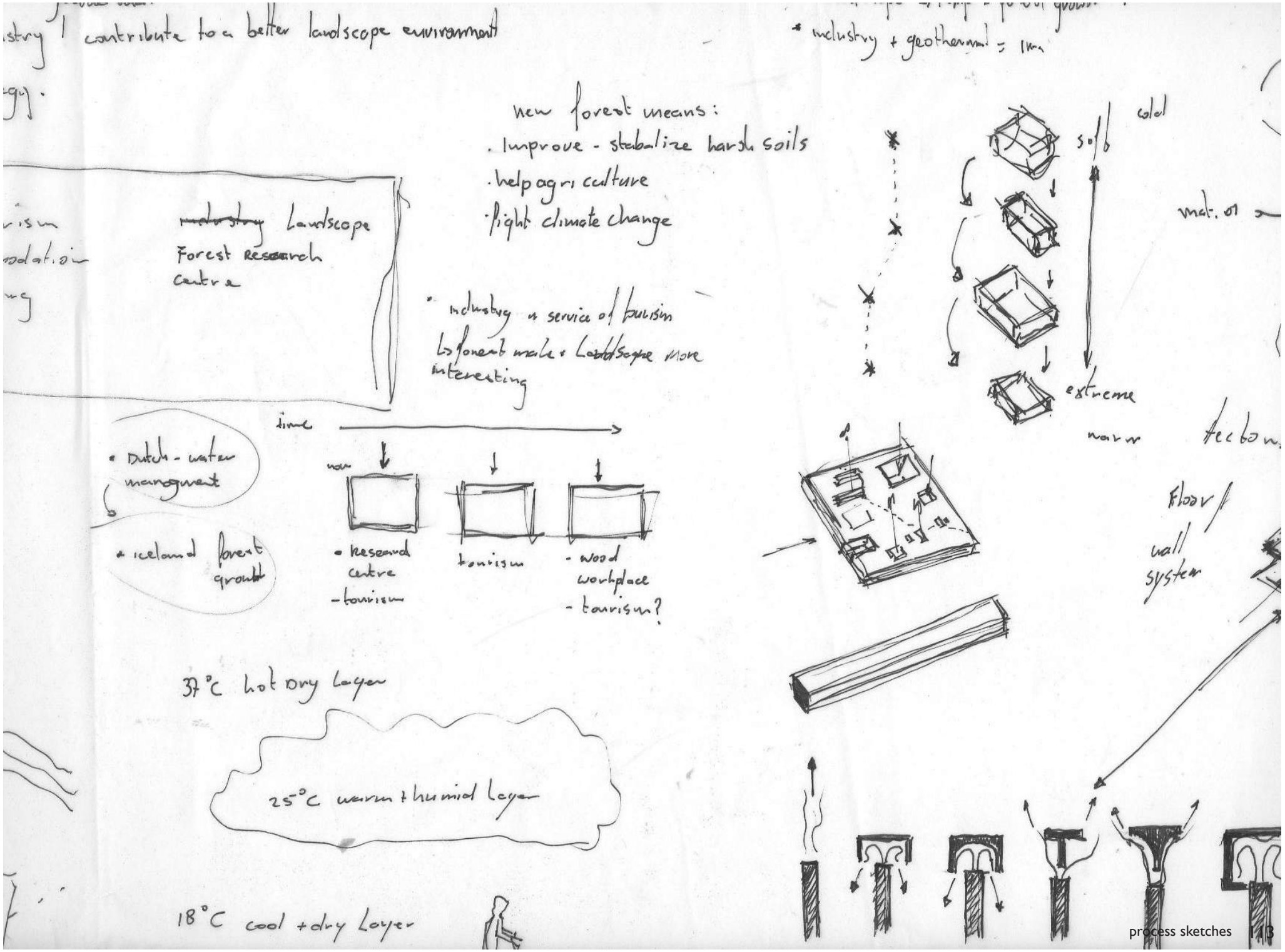

-10°C
160°C
-10°C
ΔT_loss = 18
ΔT_add = 142°
K = 3,5 W/m·K
A_Loss = 45 m²
d_Loss = 0,334 m
A_add = 9 m²
d_add = 0,334 m
Q_add = 3,5 · 9 · 142 / 0,334 = 13392 W
Q_loss = 3,5 · 45 · 18 / 0,334 = 8488 W
0°C
3
334 cm
3
18°C
133926
0°C
160°C
9(160 - T_IS) = 45 T_IS
1440 = 54 T_IS
T_IS = 27°C
3,5 · 45 (T_H - T_IS) / 0,334 = 9 (T_IS - T
45 (T_H - T_IS) = 9 (T_IS - T
45 (160 - T_IS) = 9 · T_IS
7200 - 45 T_IS = 9 T_IS
7200 = 54 T_IS
T_IS = 133°C

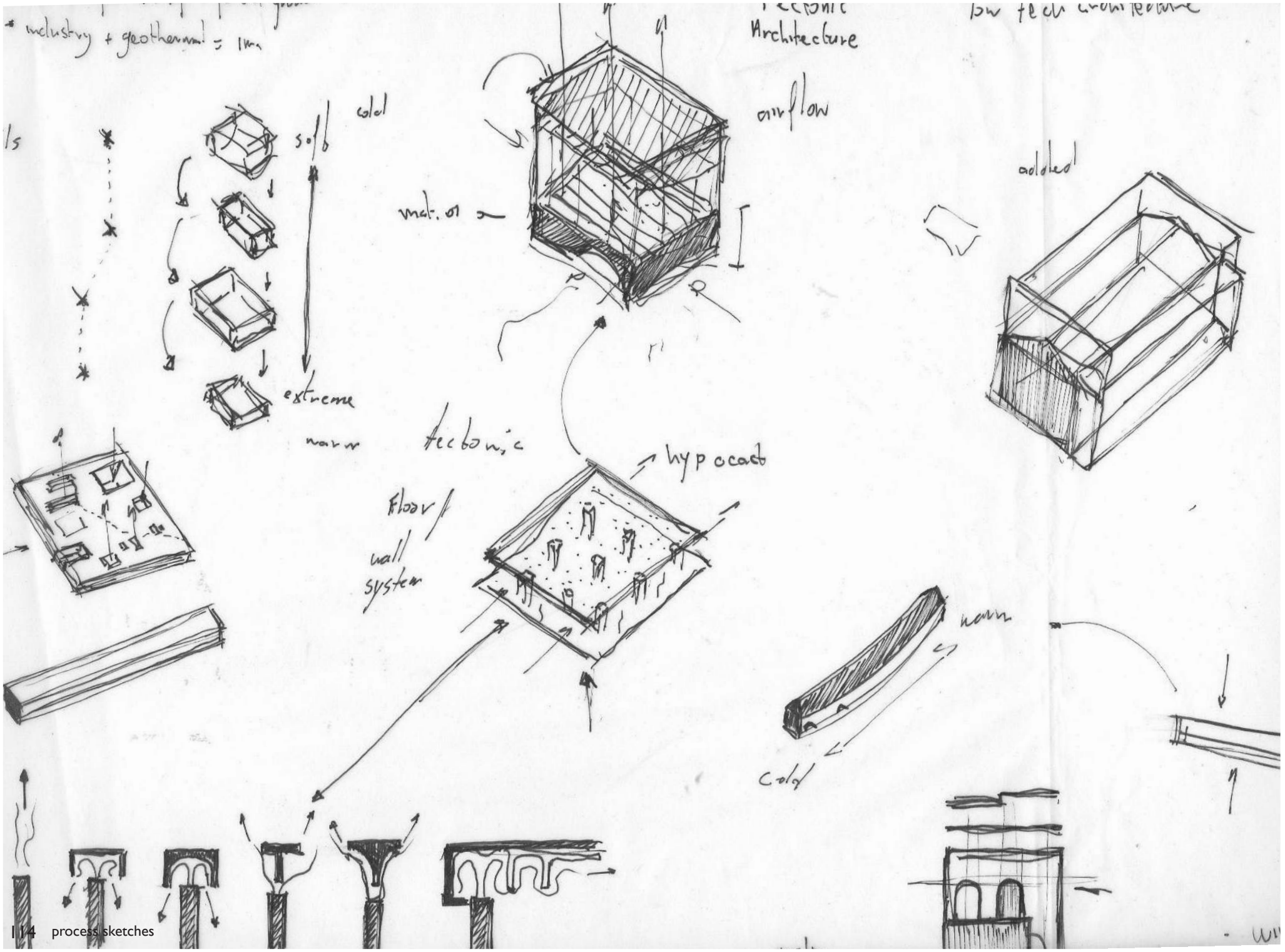

Q_in = Q_uit
k · A_i (T_H - T_IS) / d_1 = k · A_2 (T_IS - T_OS) / d_2
9 · (160 - T_IS) / 0,334 = 45 · (T_IS - 10) / 0,334
1440 - 9 · T_IS = 45 · T_IS - 450
1890 = 54 · T_IS
T_IS = 1890 / 54 = 35°C
T = -10
990 = 54 · T_IS
T_IS = 18°C
54
10°C
35°C
160 cm
334
-10°C
18°C
160 cm
334
20°C
160°C
4°C

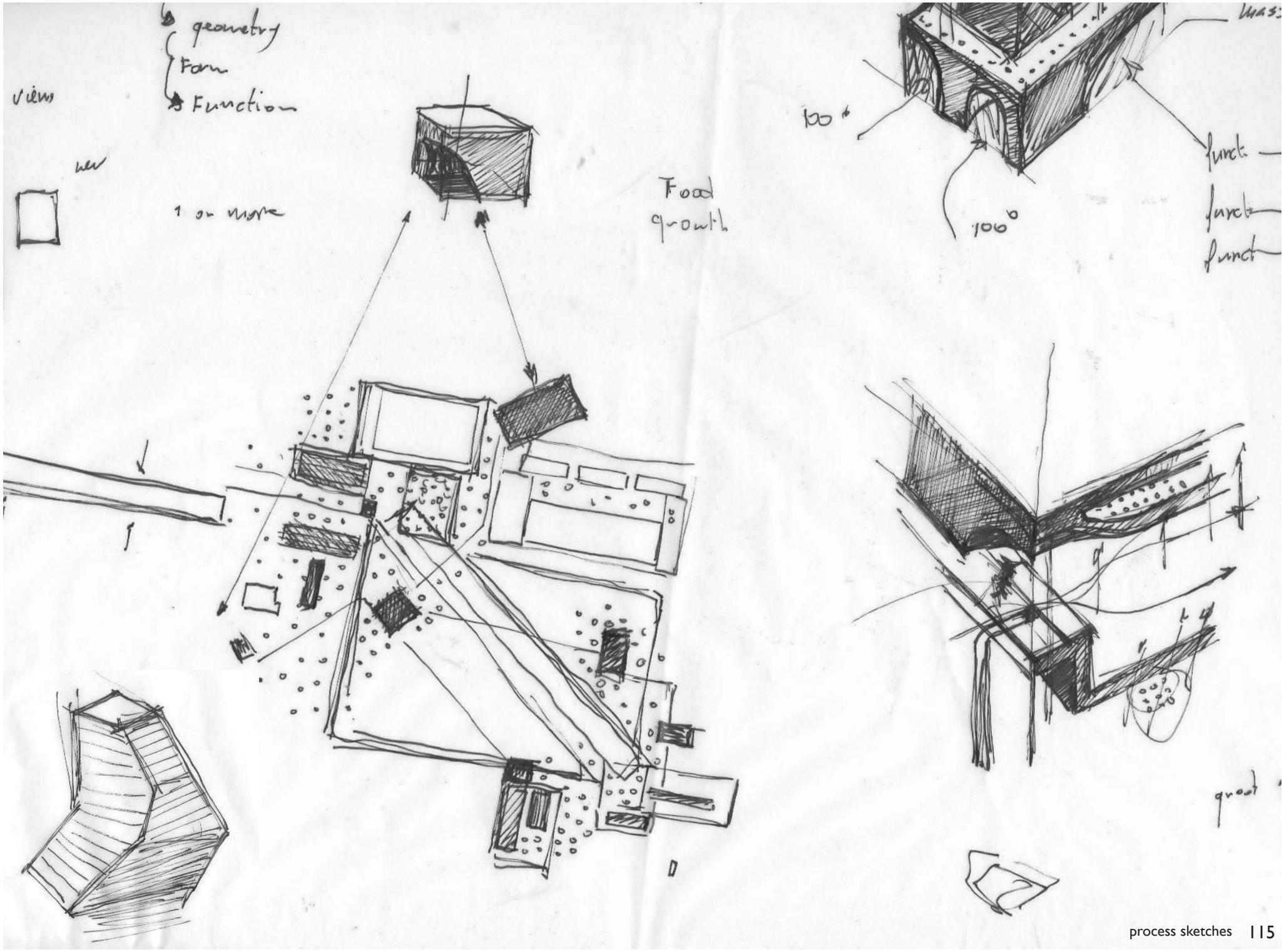


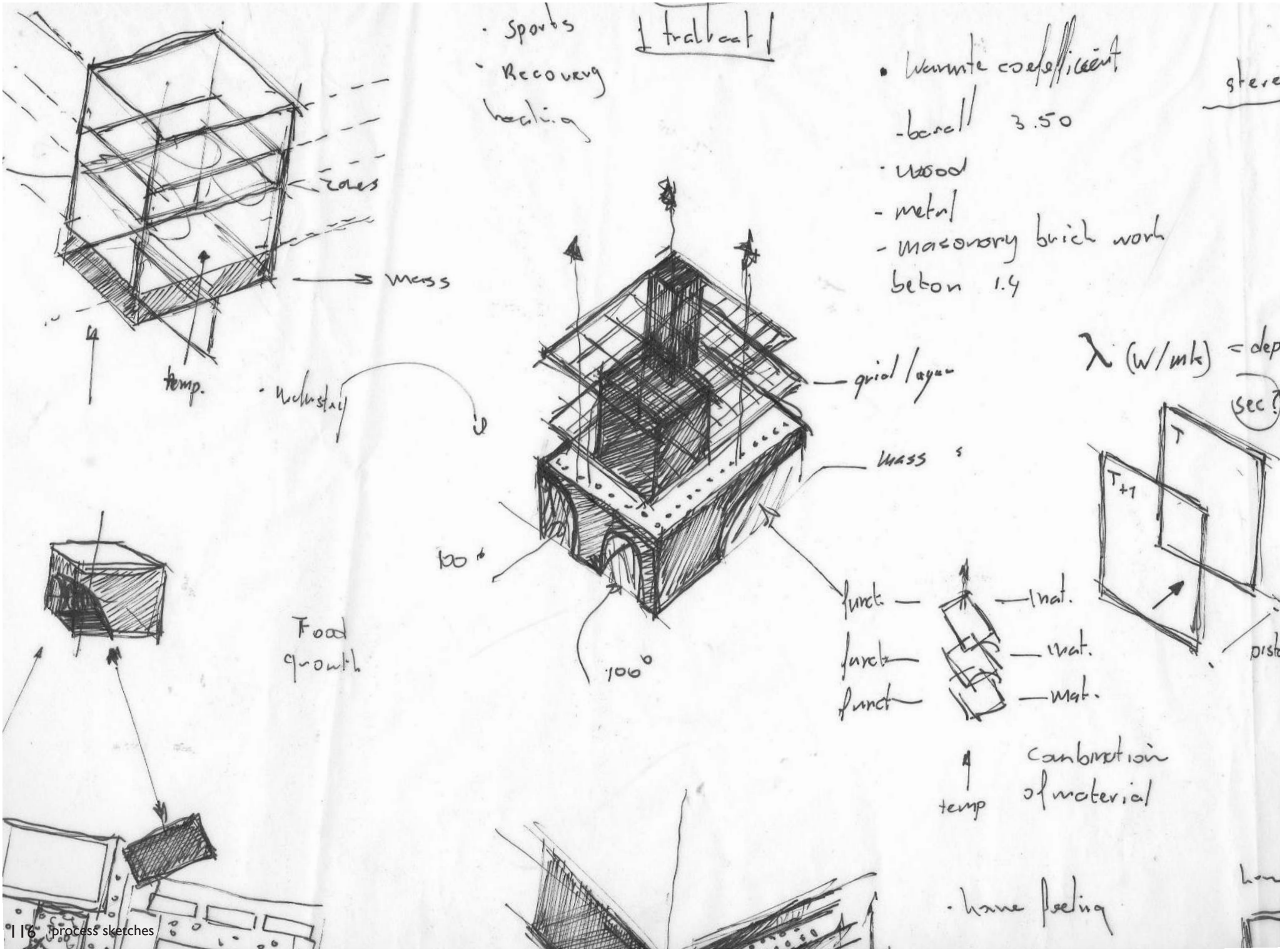


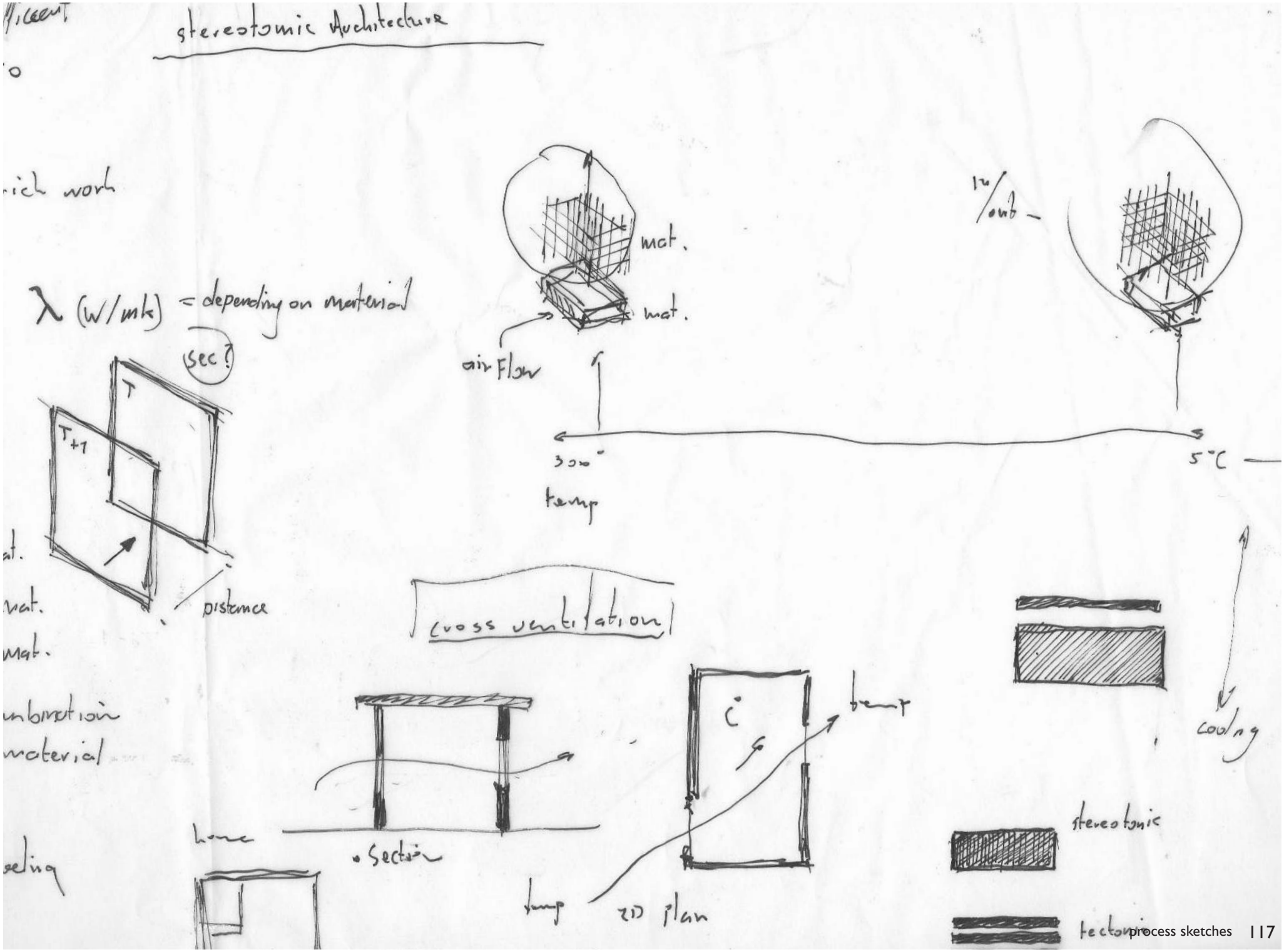

ground
temperature
field
in landscape
transport

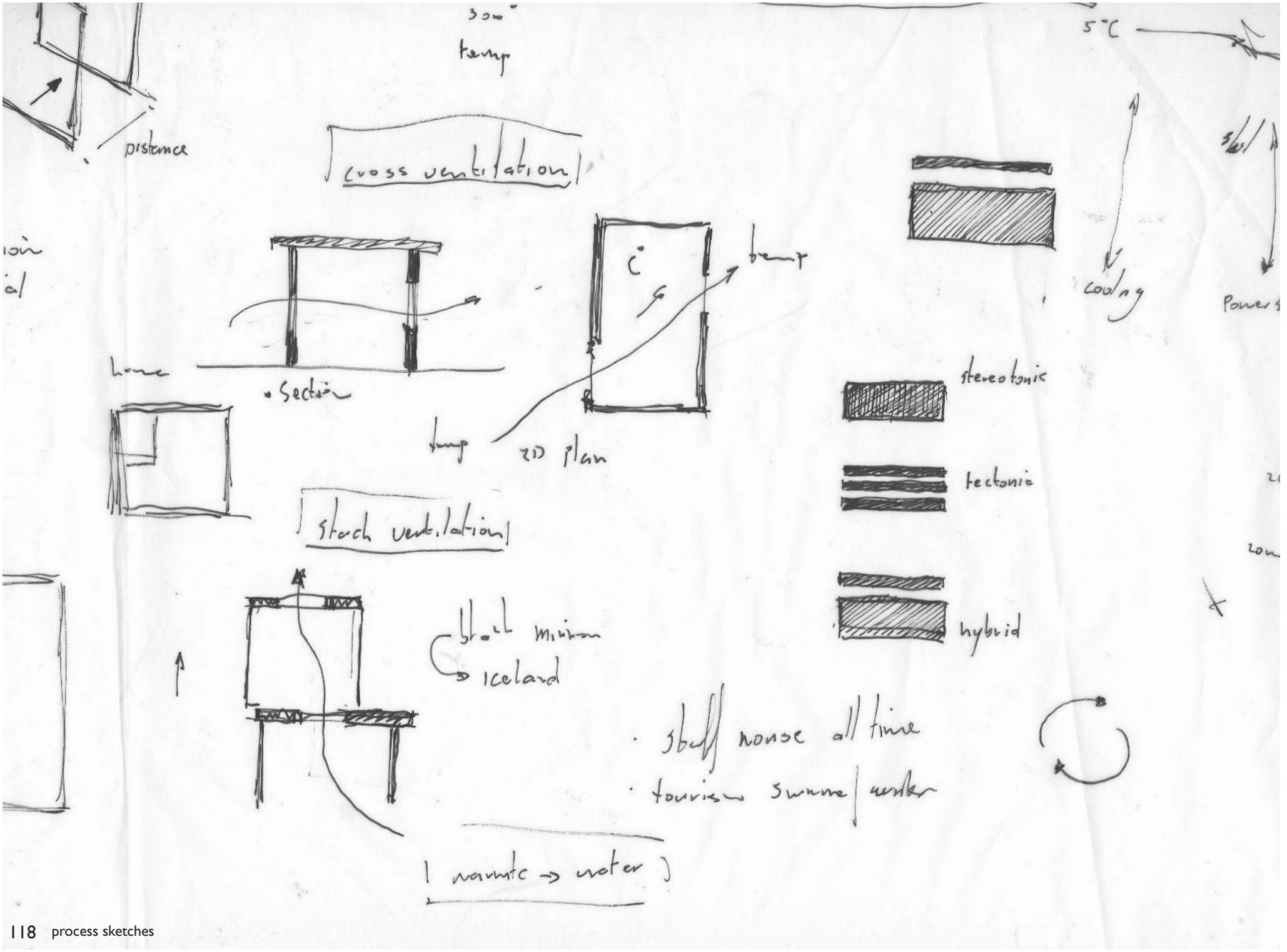

contribute to a better landscape environment
new forest means:
. improve - stabalize harsh soils
. help agri culture
. fight climate change
Landscape
Forest research centre
industry in service of tourism
to foment make a Landscape more interesting
time
Dutch - water mangment
iceland forest growth
research centre
- tourism
tourism
- wood workplace
- tourism?
37°C hot dry Layer
25°C warm + humid Layer
18°C cool + dry Layer
industry + geothermal = ima
cold
soft
extreme
warm
Floor
wall
system

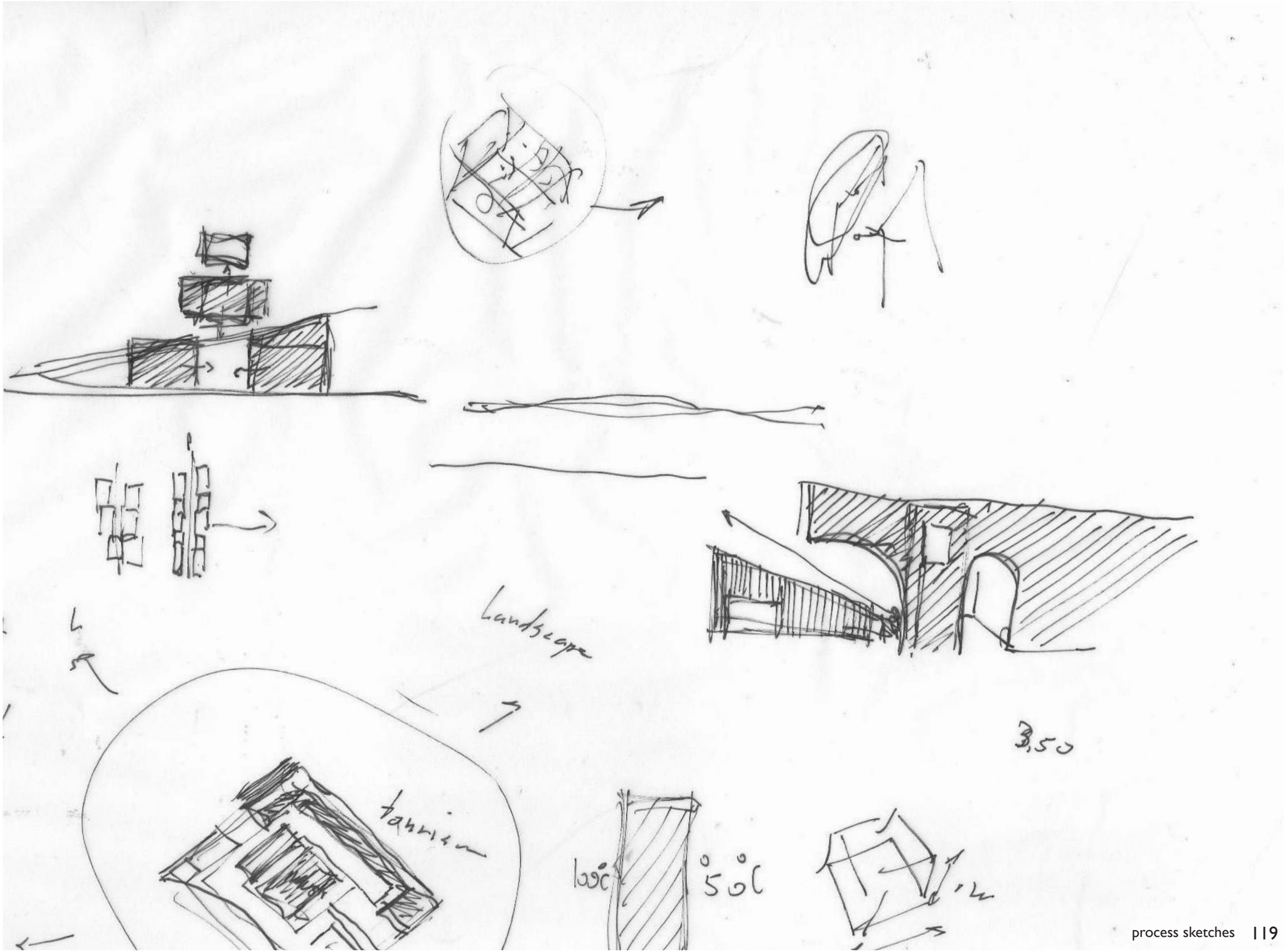

industry + geothermal = low
Architecture
airflow
cold
extreme
warm
mat. of
added
hypocaust
Floor
wall
system
warm
cold

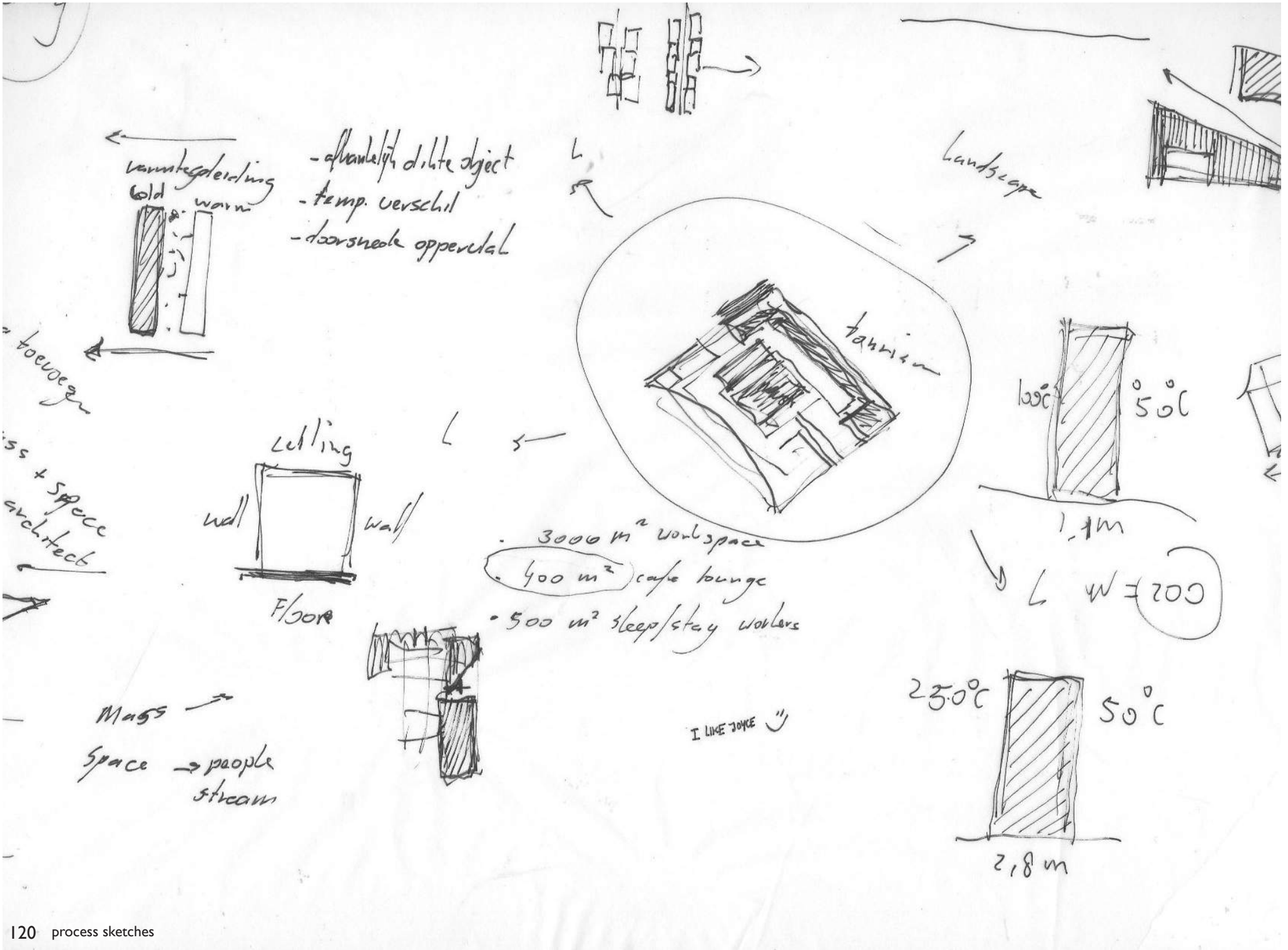

geometry
Form
Function
views
new
1 or more
Food
growth
100°
100°
funct
funct
funct

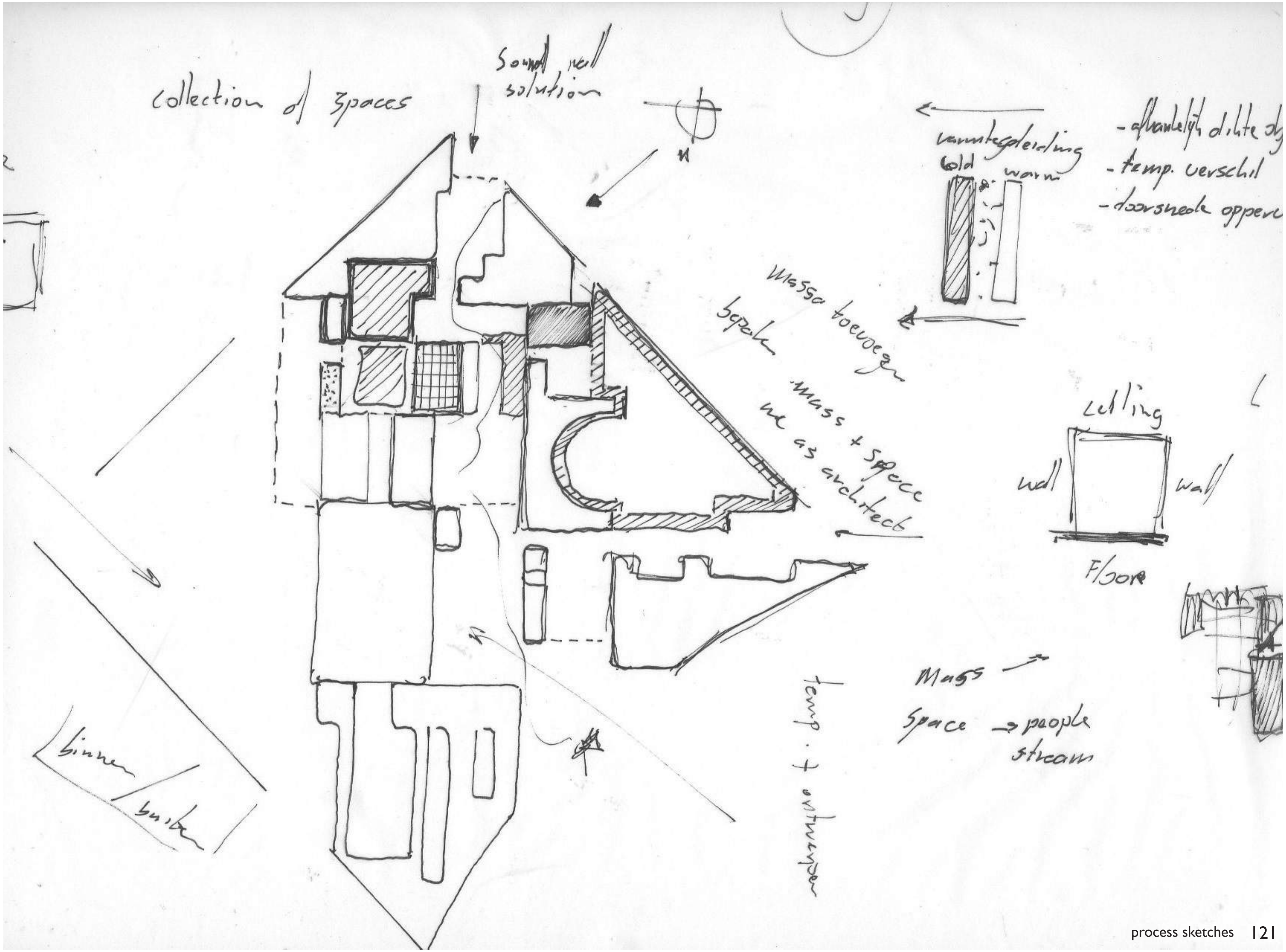

- Sports
- Recovery heating
trabeat
• Warmte coefficient
- beton 3.50
- wood
- metal
- masonry brick work
beton 1.4
stere
zones
mass
temp.
- Mechanical
grid / agua
mass
100°
100°
λ (W/mk) = dep
(sec?)
T
T+1
funct
funct
funct
mat.
mat.
mat.
Food growth
temp
Combination of material
- home feeling

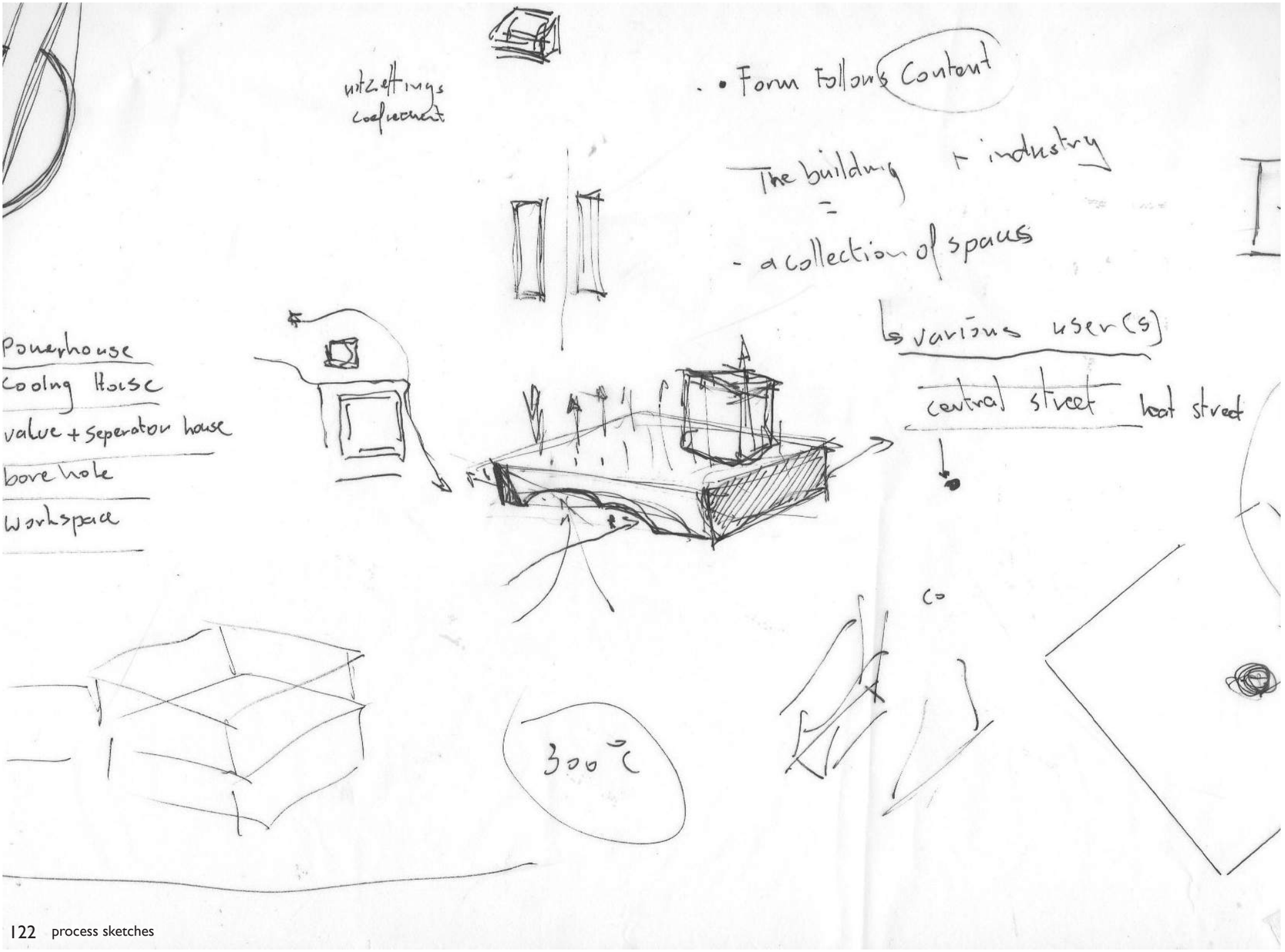

stereotomic Architecture
λ (W/mk) = depending on material
sec?
T
T+1
distance
mat.
mat.
air Flow
in/out
300°
temp
5°C
cross ventilation
cooling
stereotomic
tectonic
temp
2D plan
Section

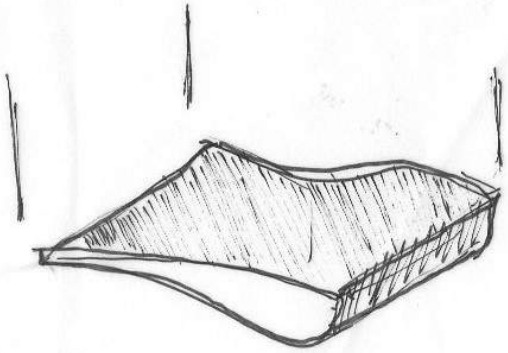

distance
cross ventilation
temp
temp
2D plan
Section
stack ventilation
Iceland
stereotonic
tectonic
hybrid
cooling
5°C
· stuff noise all time
· tourism summer/winter
(warmic → water)


Landscape
3,50


warmtegeleiding
cold
warm
- afhankelijk dikte object
- temp. verschil
- doorsnede oppervlak
landscape
tekening
ceiling
wall
wall
floor
. 3000 m² worksp
. 400 m² cafe lounge
. 500 m² sleep/stay workers
100°C
50°C
1.1m
W=700
Mass
space → people stream
I LIKE JOYCE
23.0°C
50°C
2,8 m

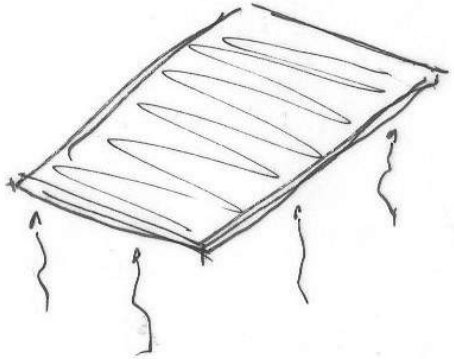

collection of spaces
Sound wall solution
cold warm
- temp. verschil
Mass
Space → people stream
ceiling
wall
wall
floor


Form Follows Content
The building + industry
=
- a collection of spaces
Powerhouse
Cooling House
value + seperator house
bore hole
Workspace
various user(s)
central street
heat street
300°C

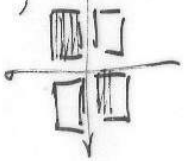


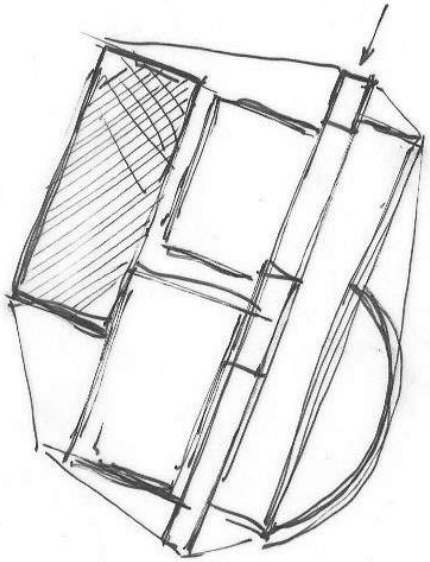
temp.
- mass
- space
- material

Platform heat
activity outdoor

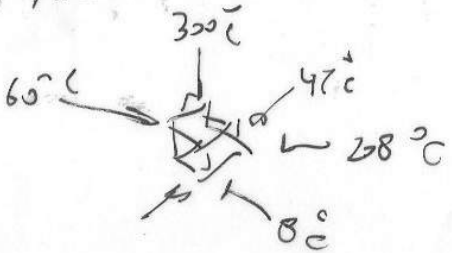


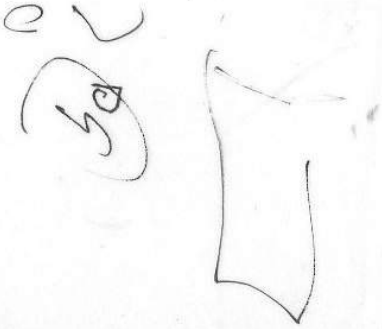
different height



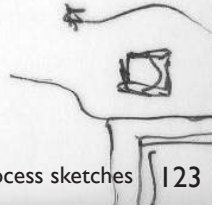


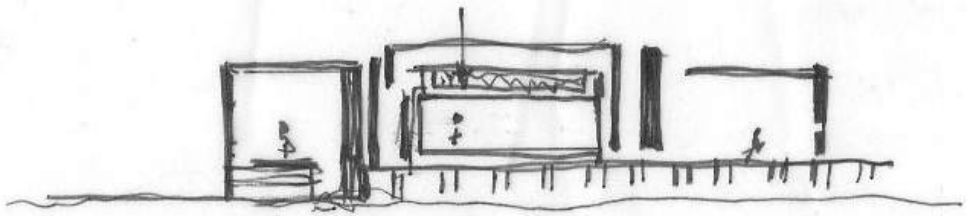
wall thickness material

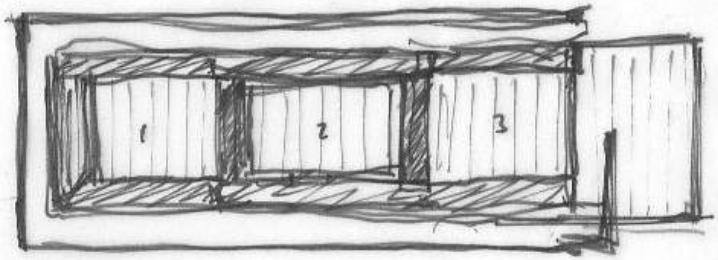


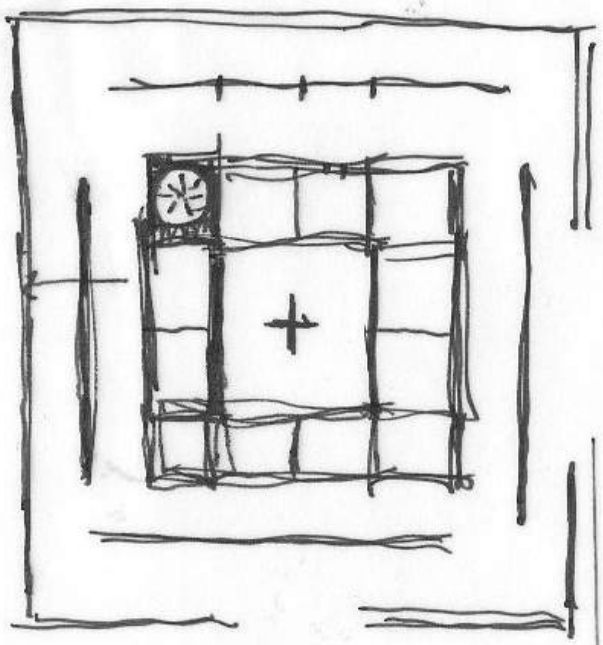


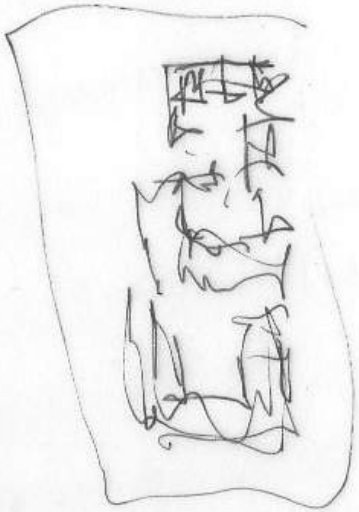
- Powerhouse
- Cooling House
- valve + seperator house

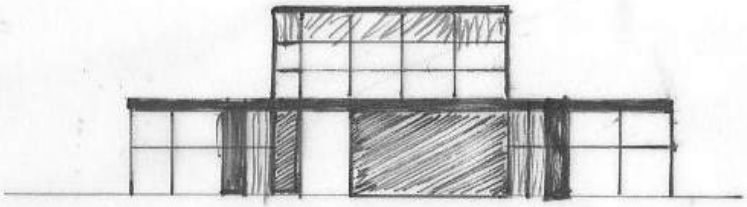


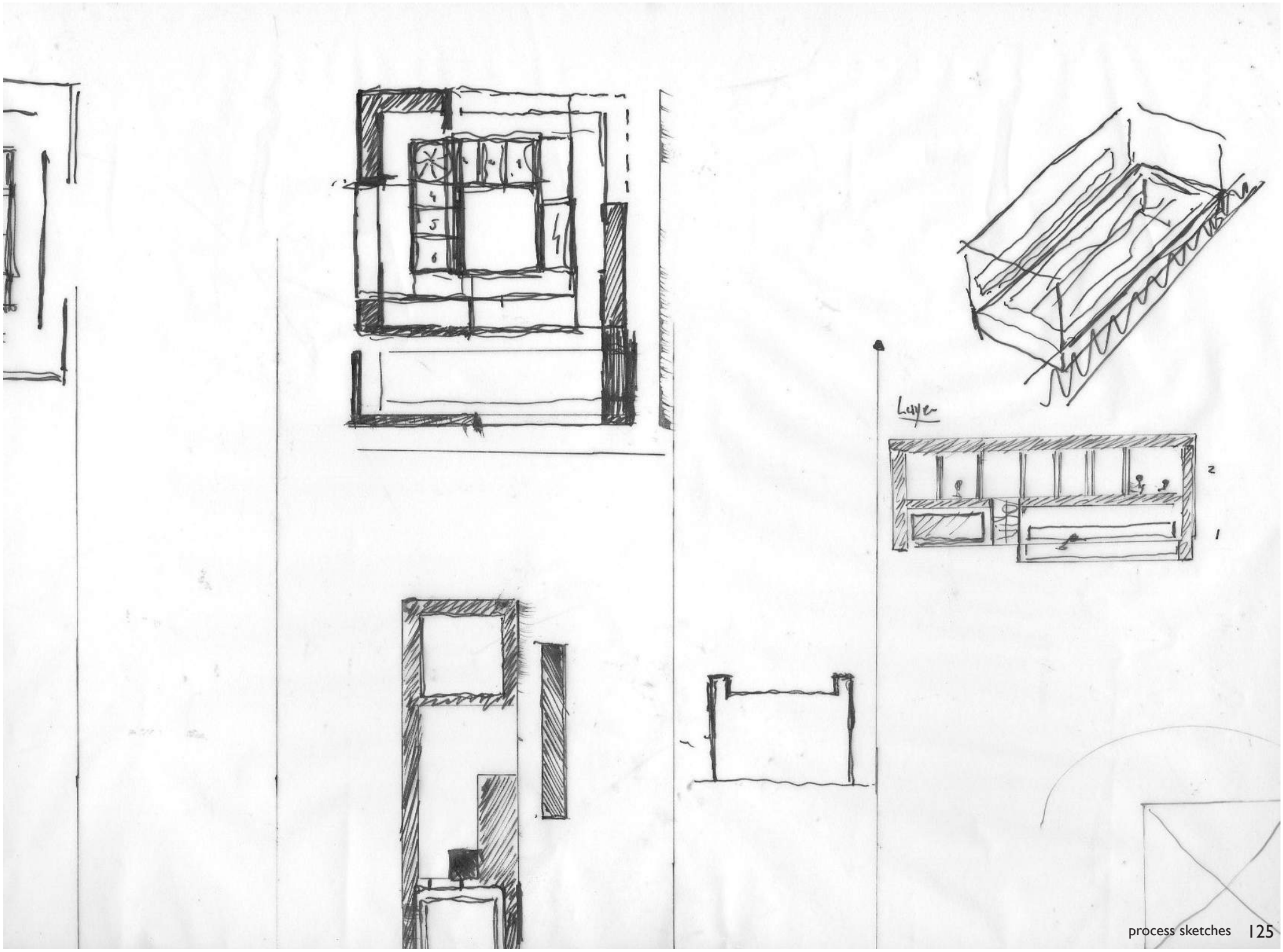


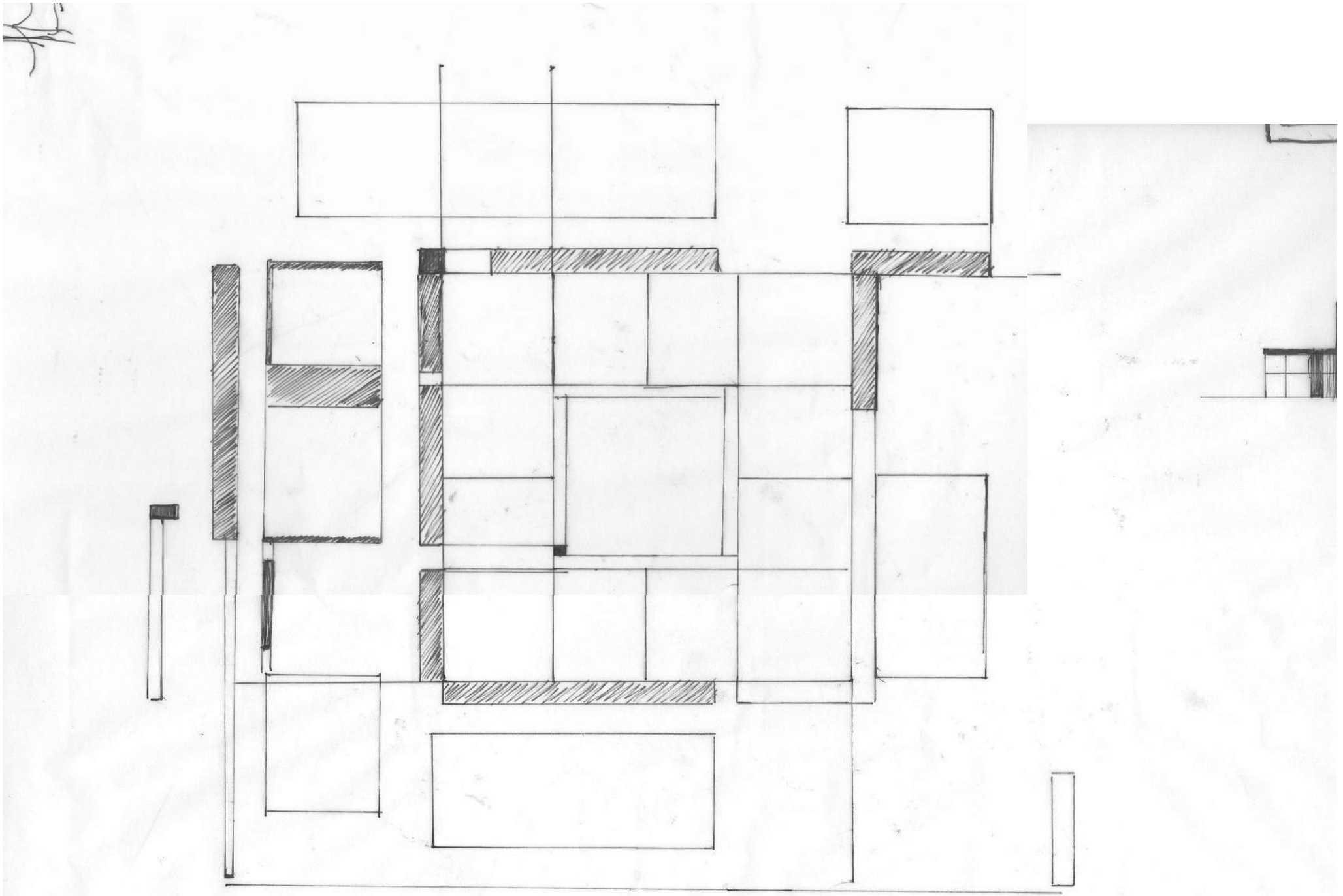

1
2
3

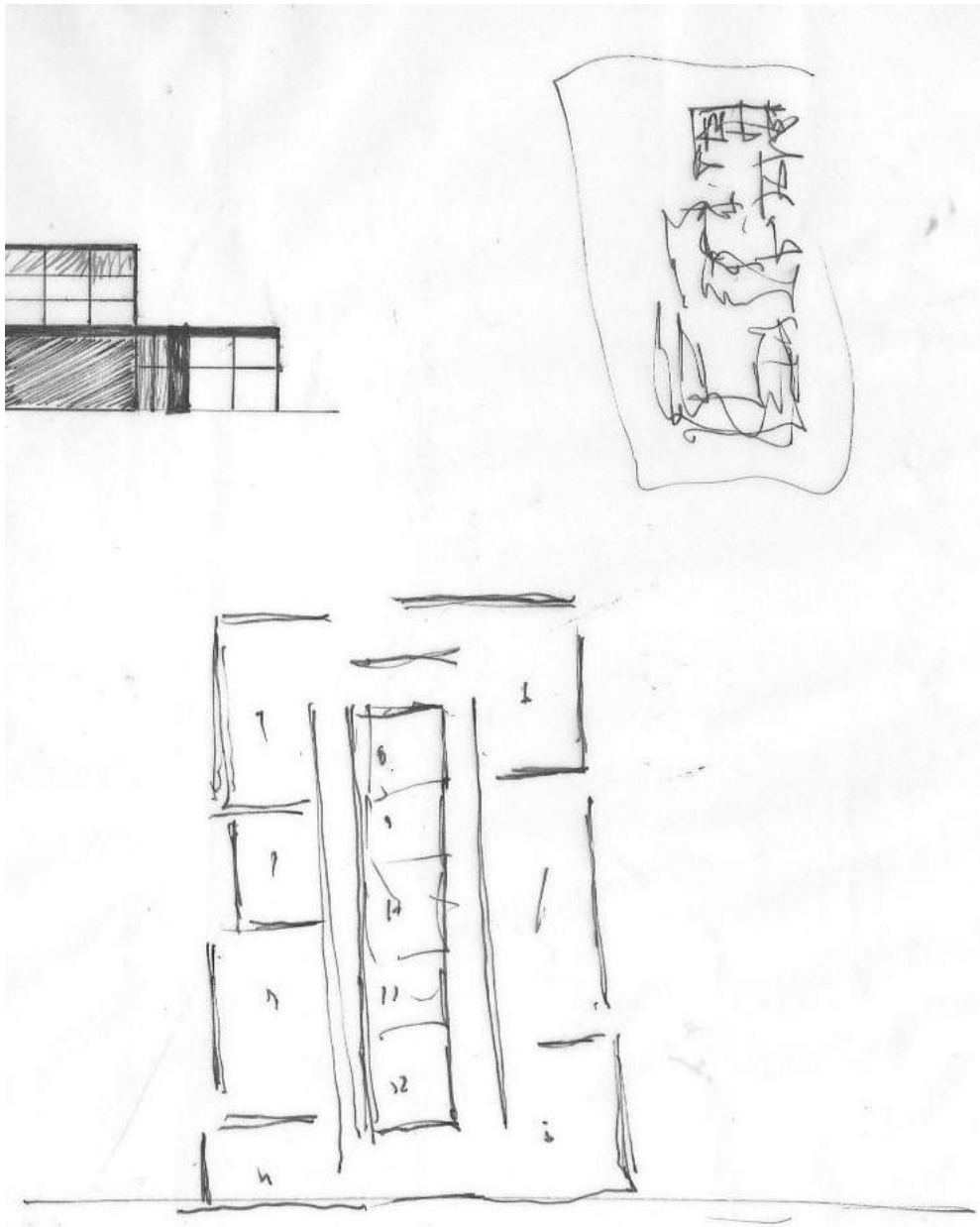


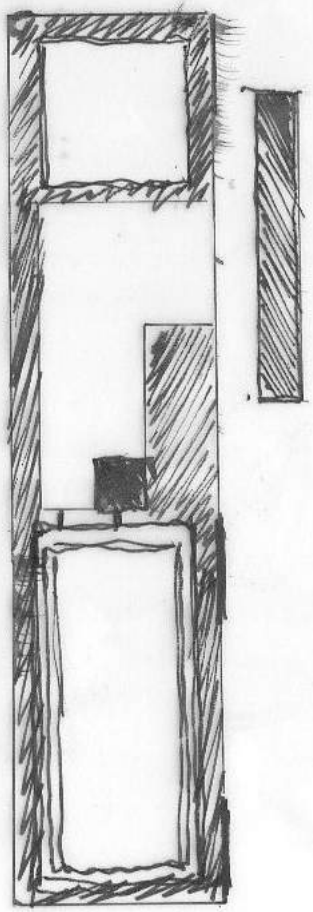





Layer
2
1

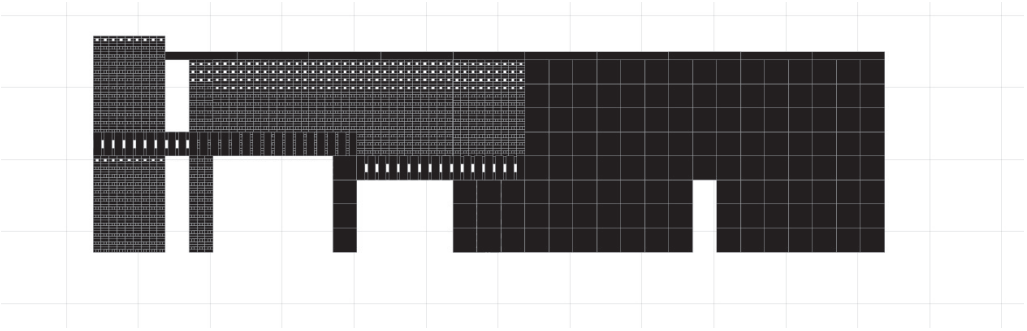


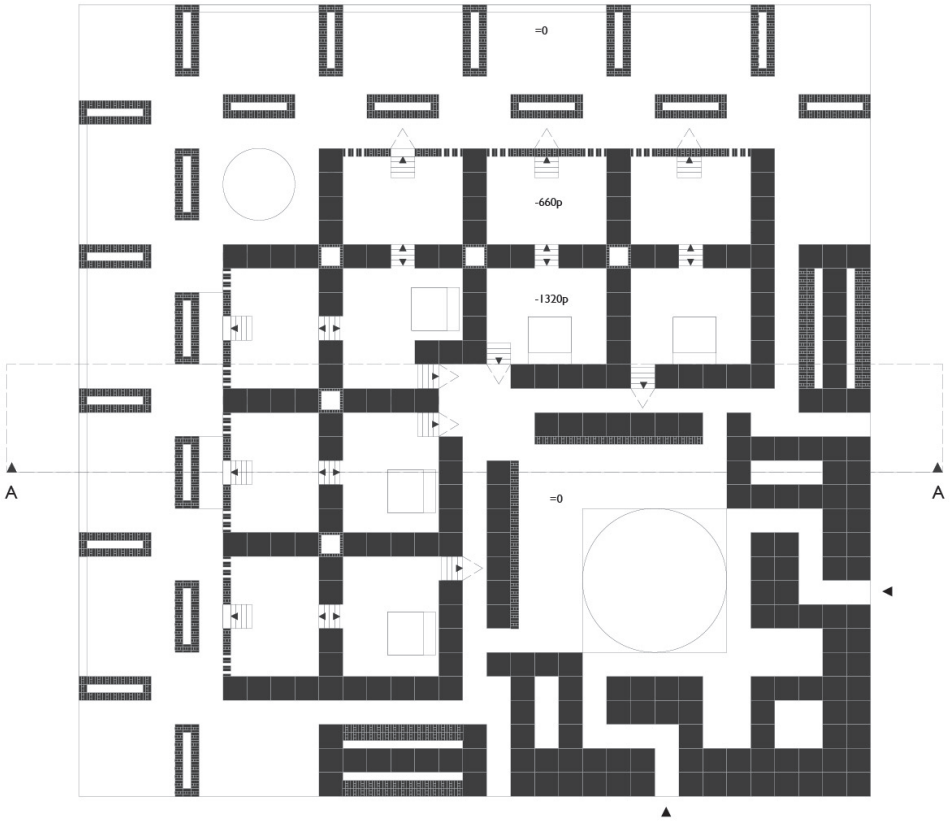


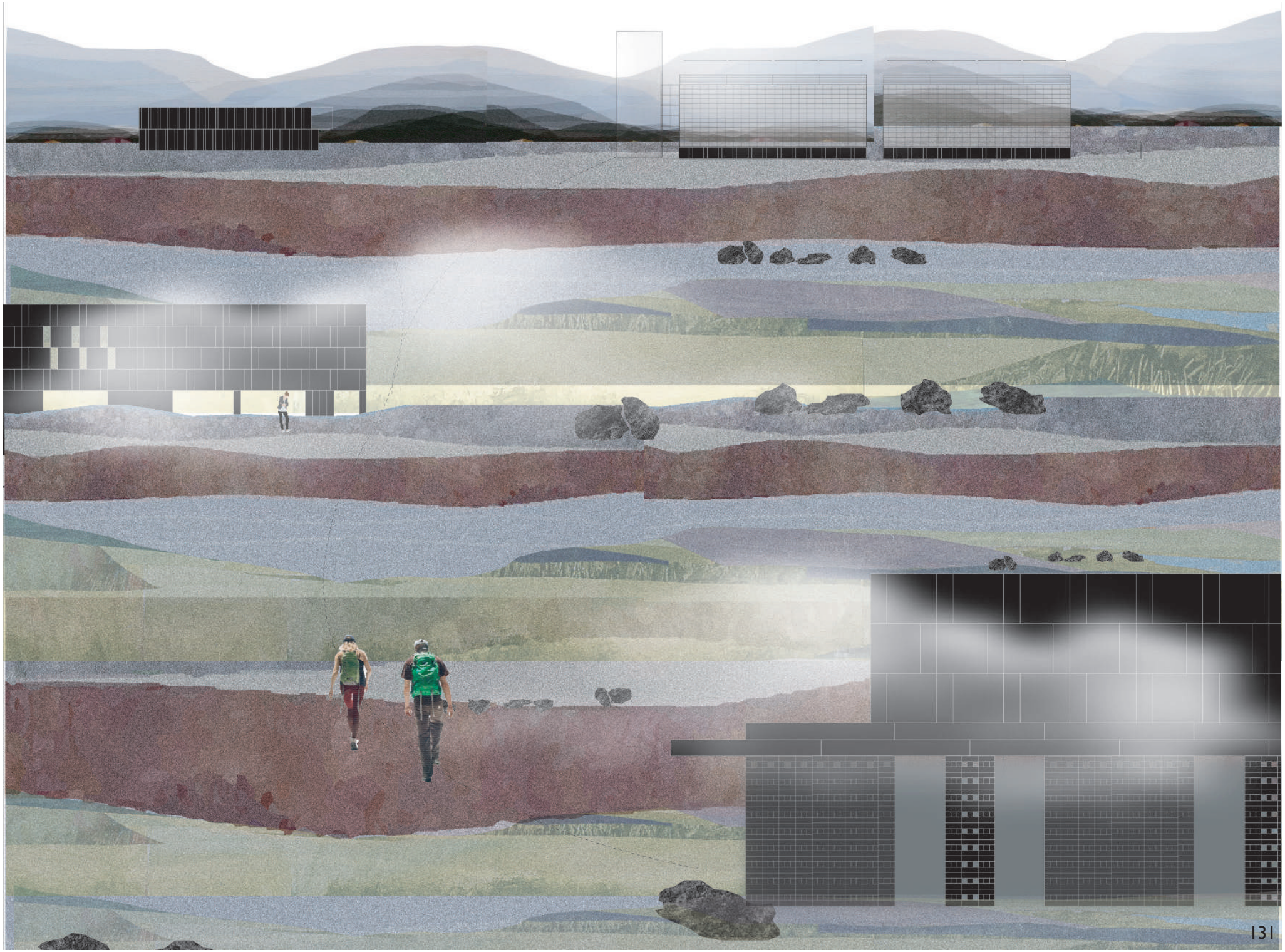


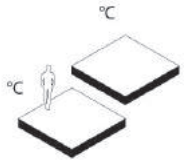
DEFINITIVE DESIGN

TOURIST ACCOMODATION - ELEVATION & FLOORPLAN

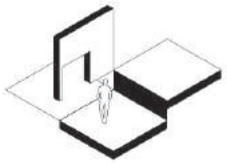




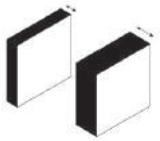




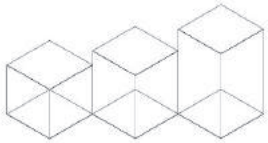
height difference = temperature difference



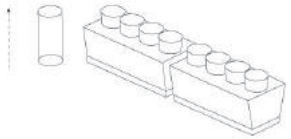
open walls decrease temperature



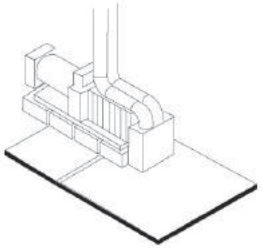
mass thickness extends the heat output



increase in m3 influence the temperature



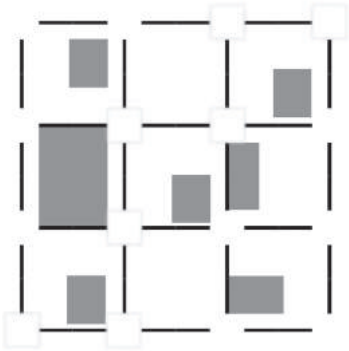
height use of existing structures



add existing industry with a new layer

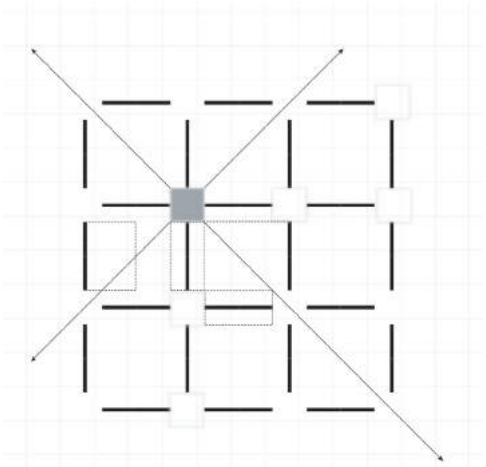
decrease in density or openings reveal heat

decrease in density or openings reveal heat



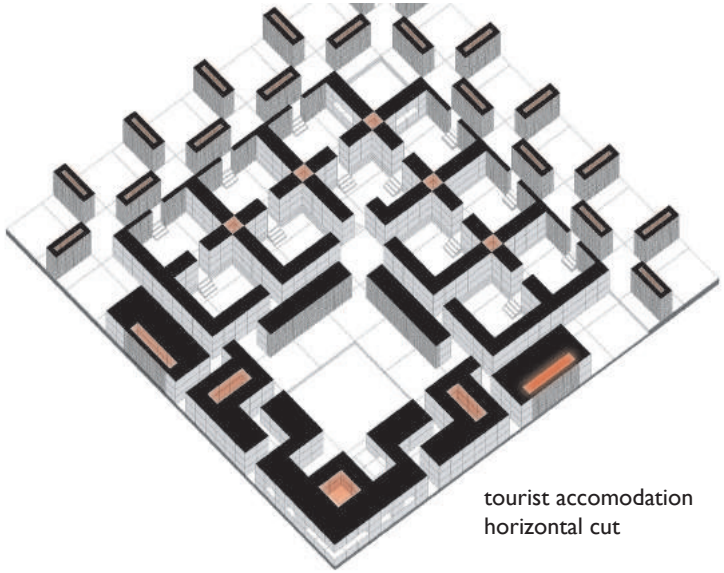
organisation of mass

The stacked mass defines a sequence of spaces and increase and decrease in mass results in fluctuating heat emission in different rooms related to their function.

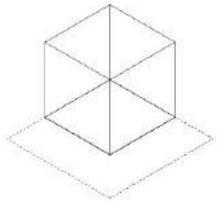


architecture of transition spaces

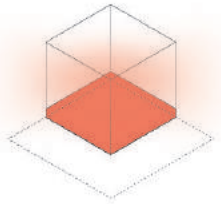
Diagonal views are created through the open corners of each space. These axes serve as corridors, they give the visitor the opportunity to explore the building at their own disrection.



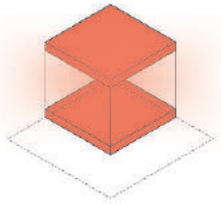
tourist accomodation
horizontal cut



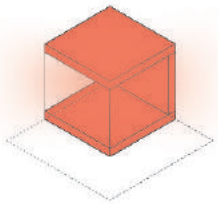
outdoor space



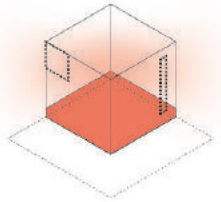
inward oriented space



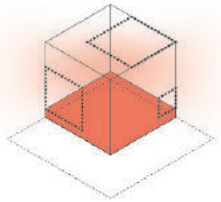
inward oriented space



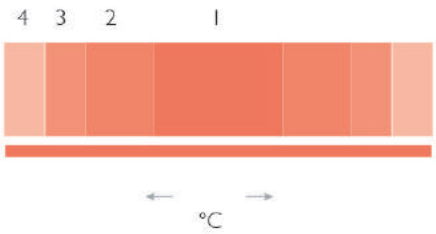
outward oriented space



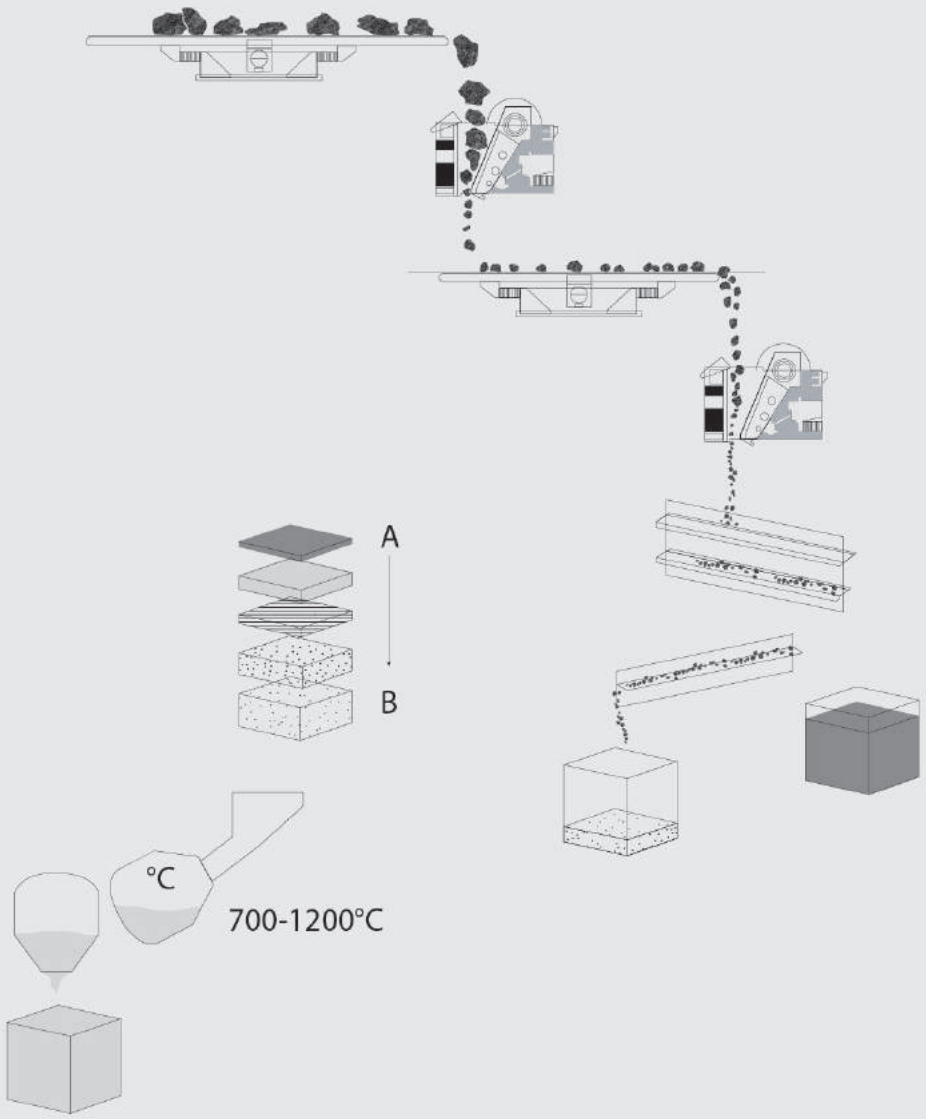
inward oriented space semi open

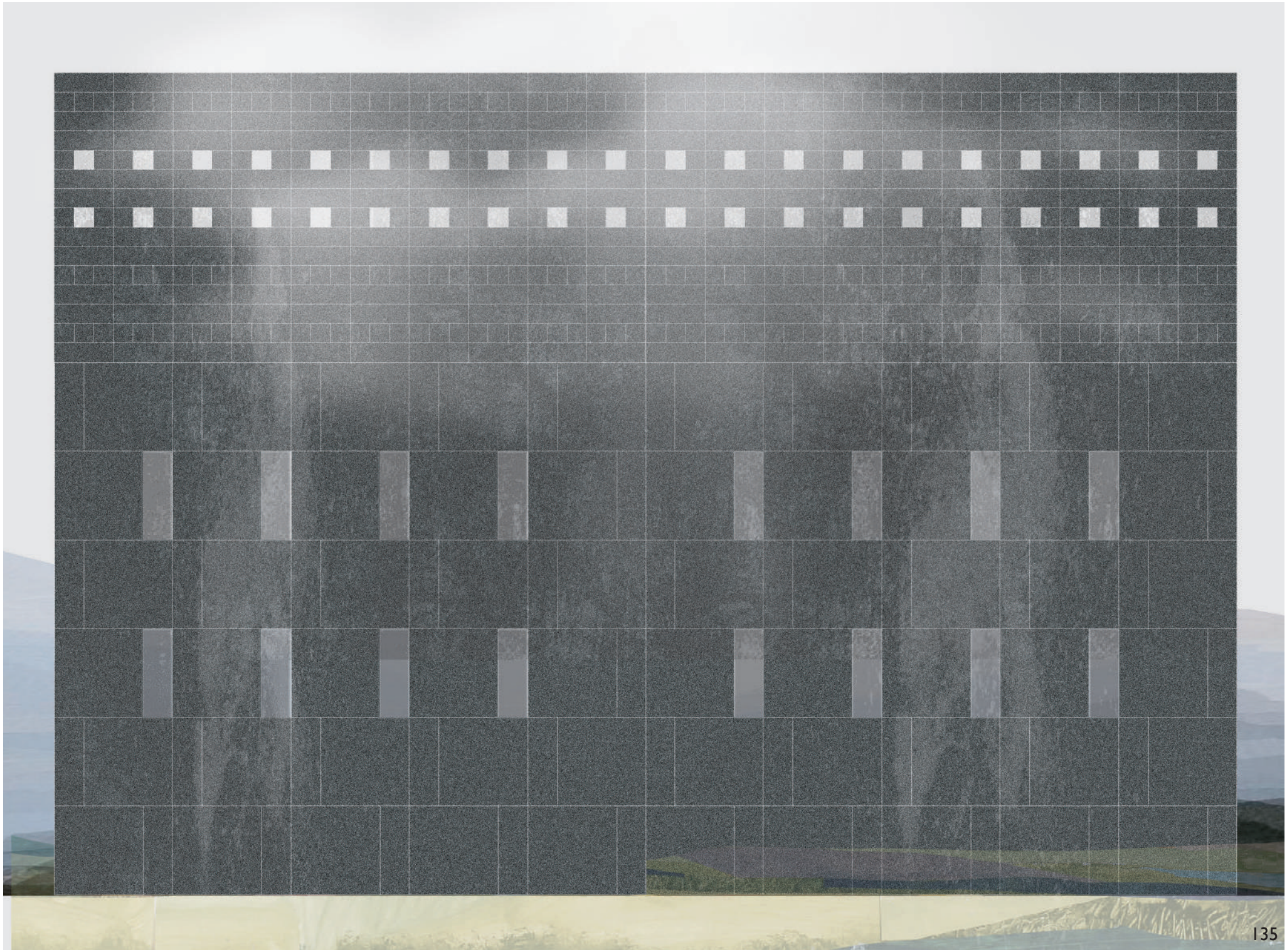


inward oriented space semi open



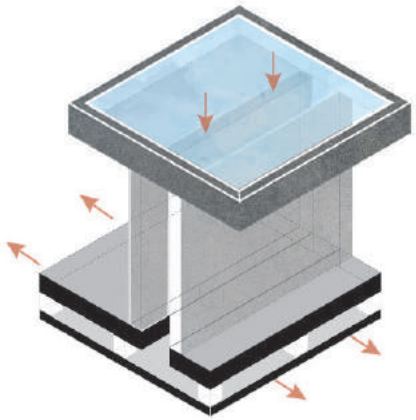
BASALT AS BUILDING MATERIAL

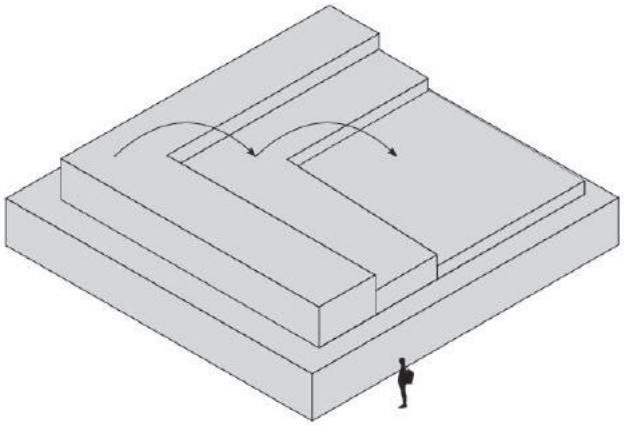




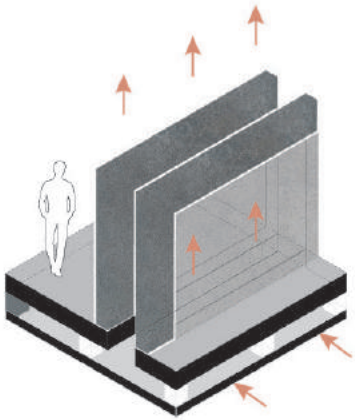
THE TWO TEMPERATURE SYSTEMS

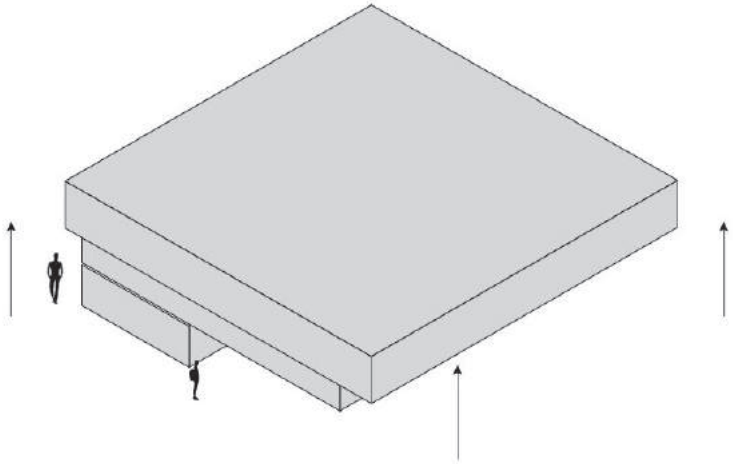
USING STEAM AND BRINE WATER FROM THE INDUSTRIAL PROCES





WATER PRINCIPLE - BRINE WATER GOES DOWNWARD



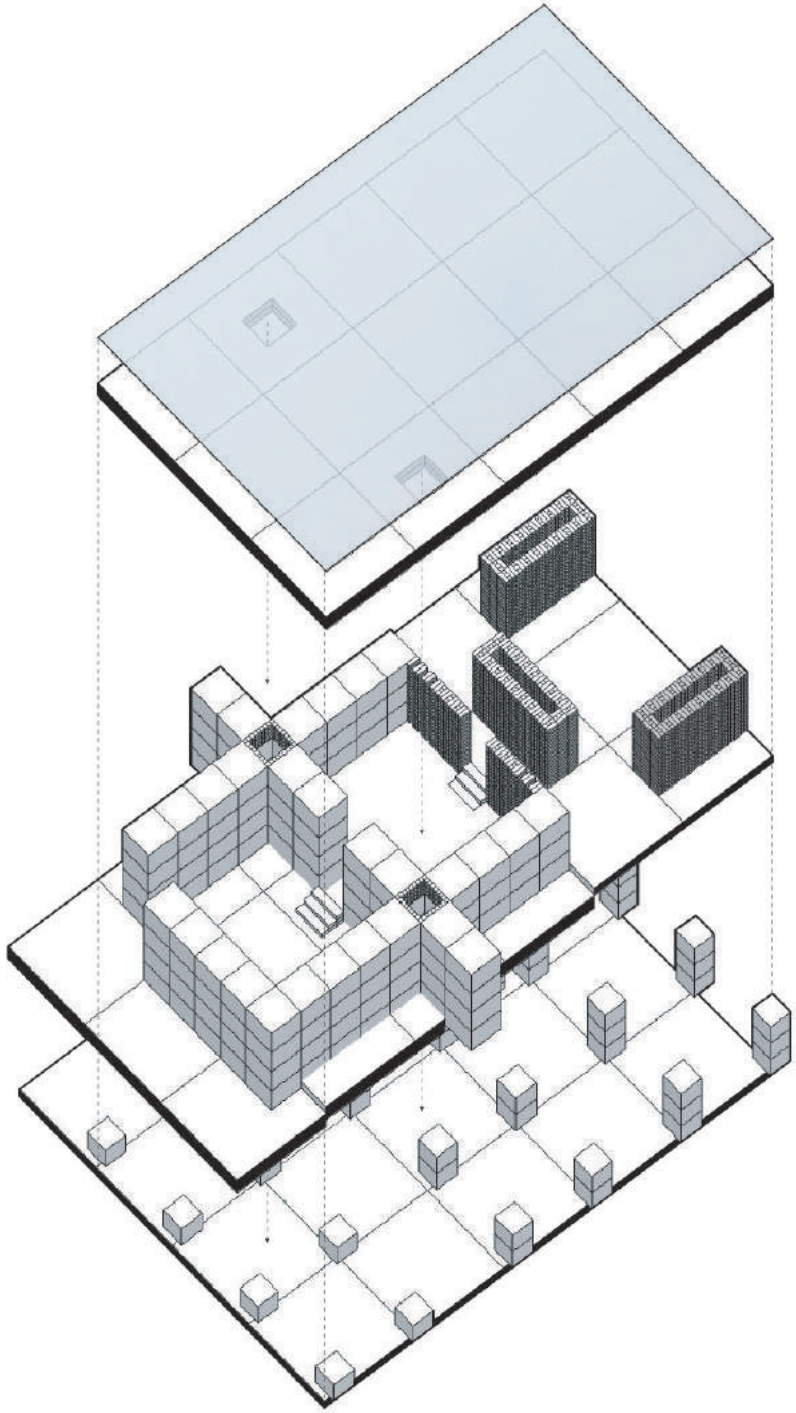


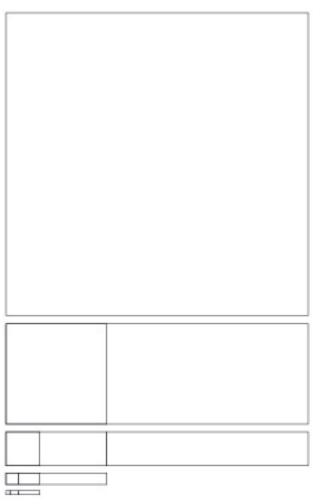
STEAM PRINCIPLE - STEAM GOES UPWARD

Steam 208°C

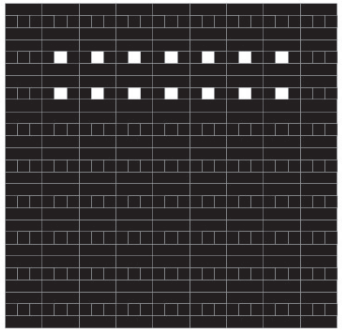
Water 60°C 8°C

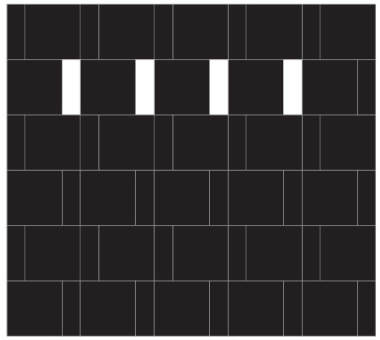
Brine Water 160°C



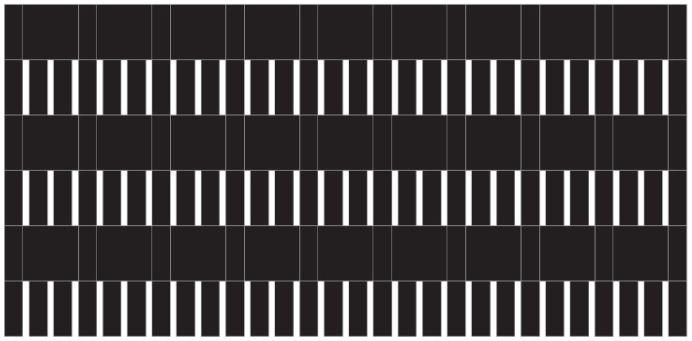


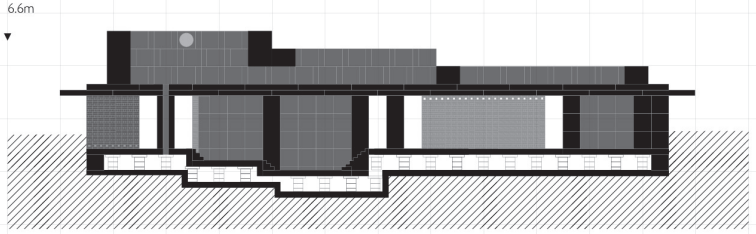
BUILDING METHOD: BUILDING WITH BASALT





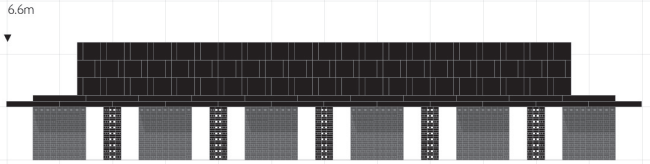
facades of basalt
solid mass versus perforation



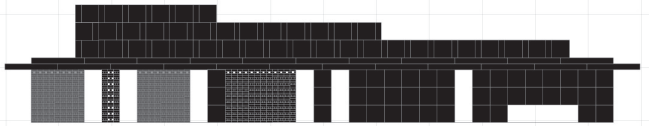


section A

tourist accomodation 'watersystem'

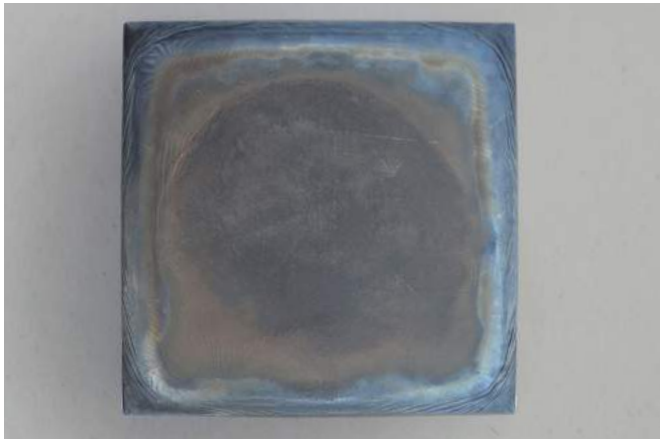


facade 1-2

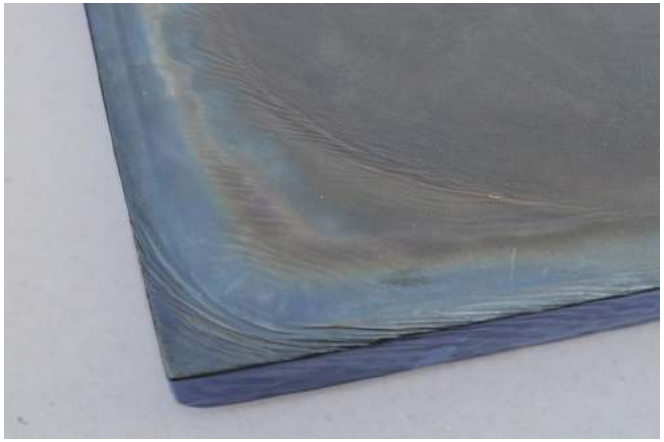


facade 1-2

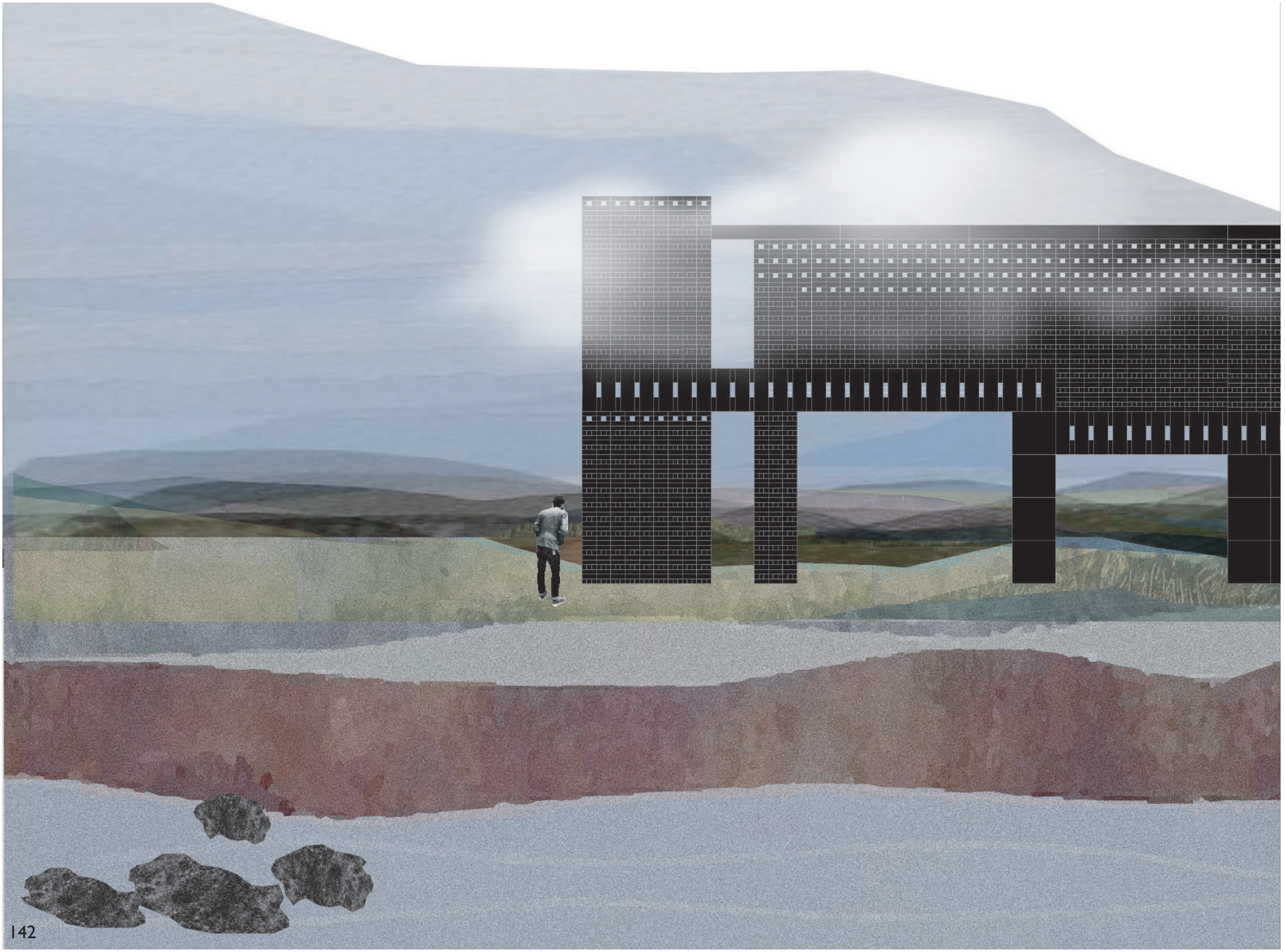
basalt rock with salt by vaporation

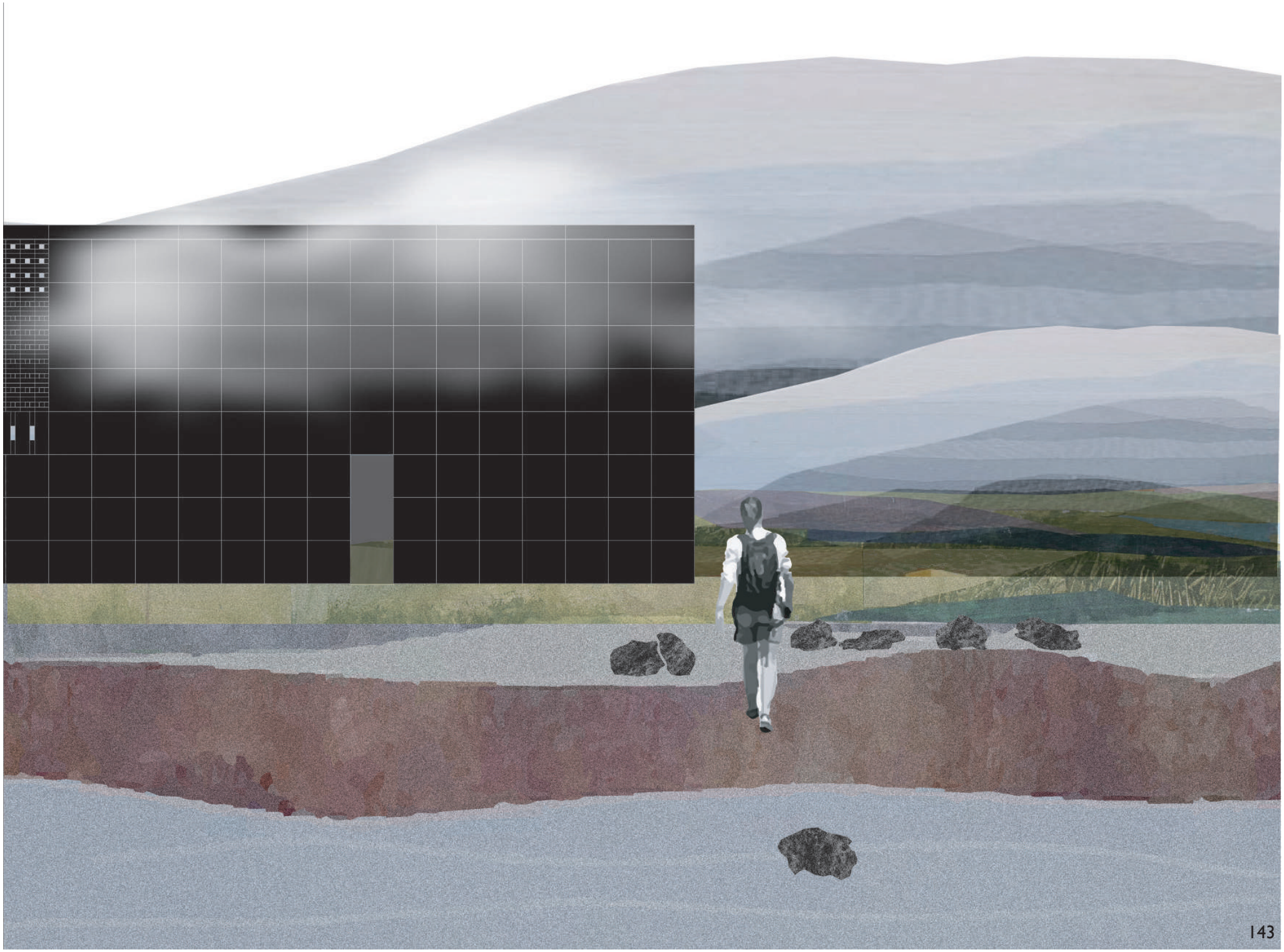


melted and poored basalt

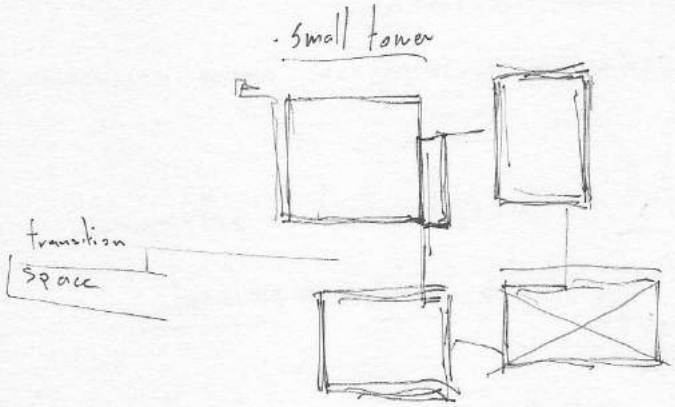


melted and poored basalt





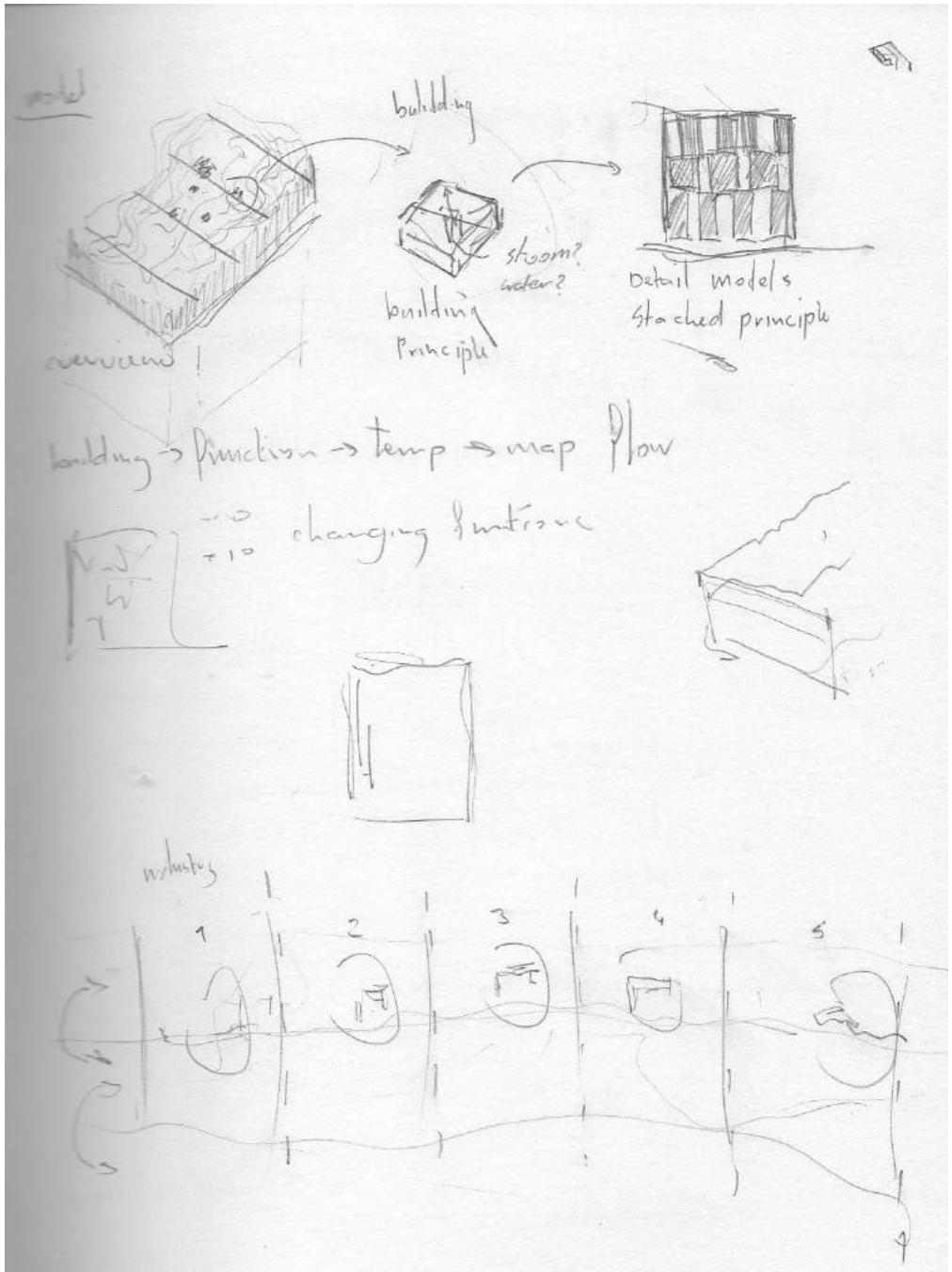
onderzoeks vraag / stelling die nog
niet bewezen is en dient als
uitgangspunt voor een experiment



energy industry

architecture

samengaan
mens + industry



• essay notes

• make natural → steam and water
elements control
- Architecture?

• new classification of nature in architecture

control / no control
natural / cultural/artificial
traffic jams / nature reservoir

- no control = nature
control = culture

hart van nederland

natural sources

onuitputtelijke bron.

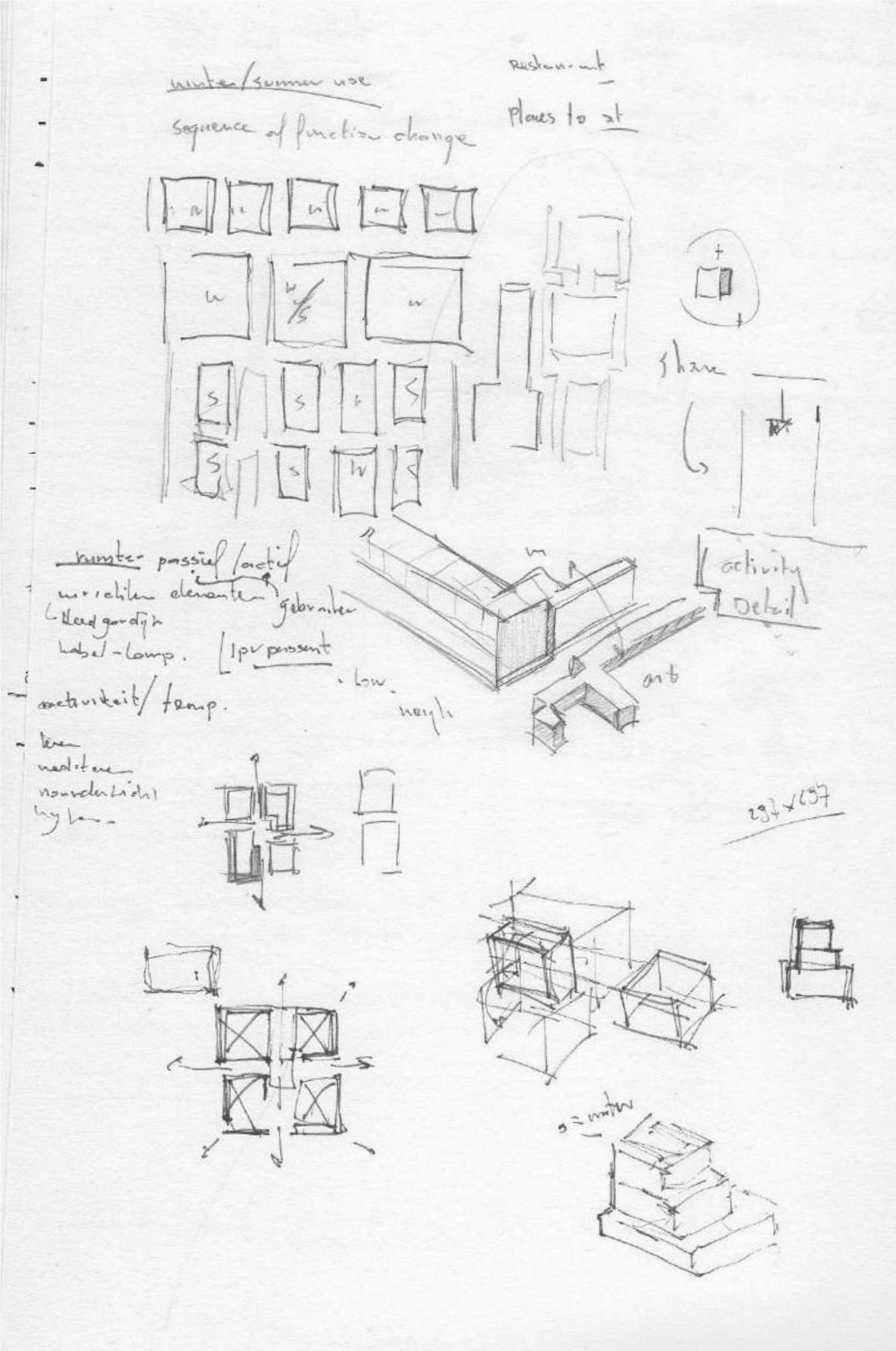
"natural elements as architectural framework

5 gl.
x 5 gl.

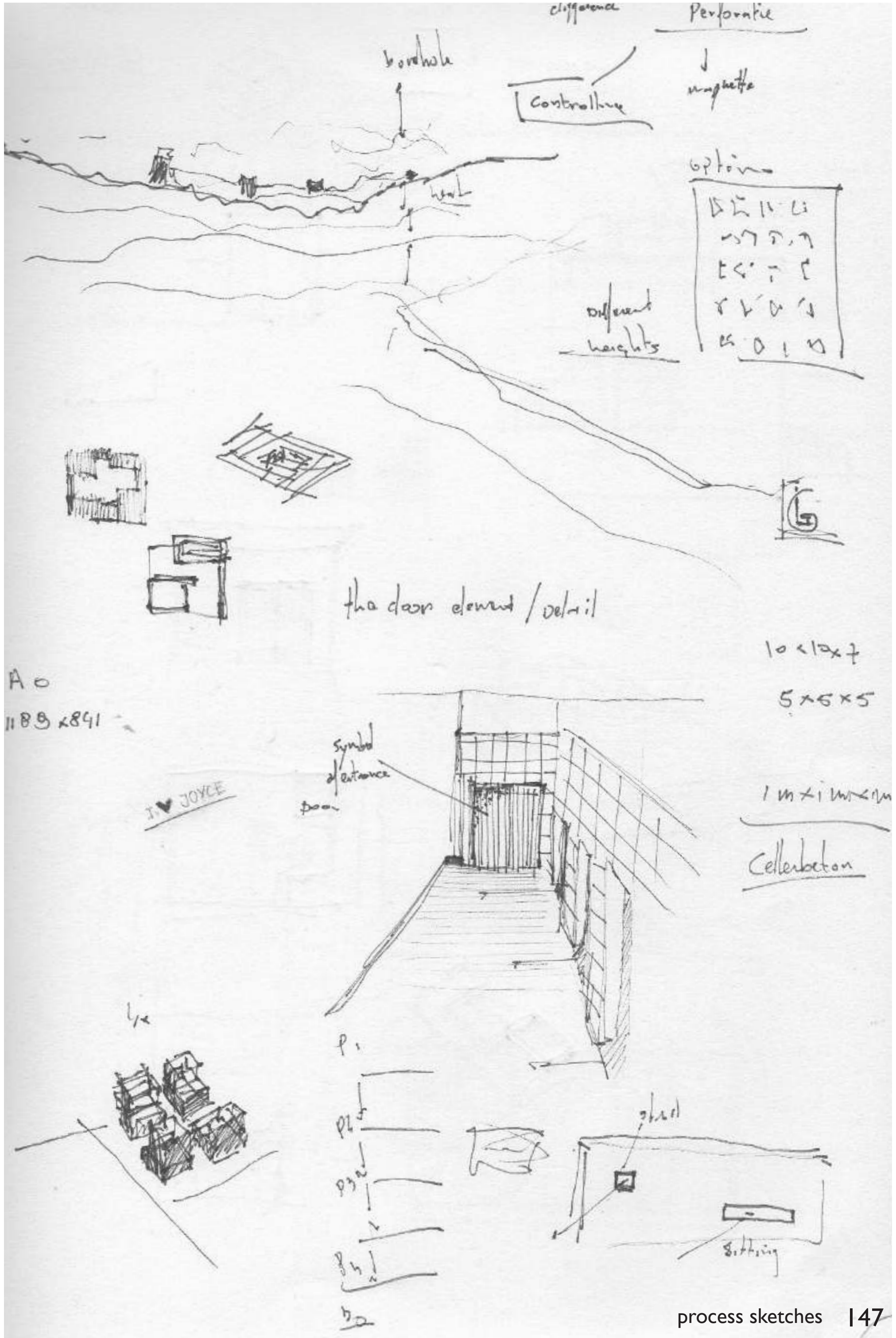
297
x
297

Van Gogh

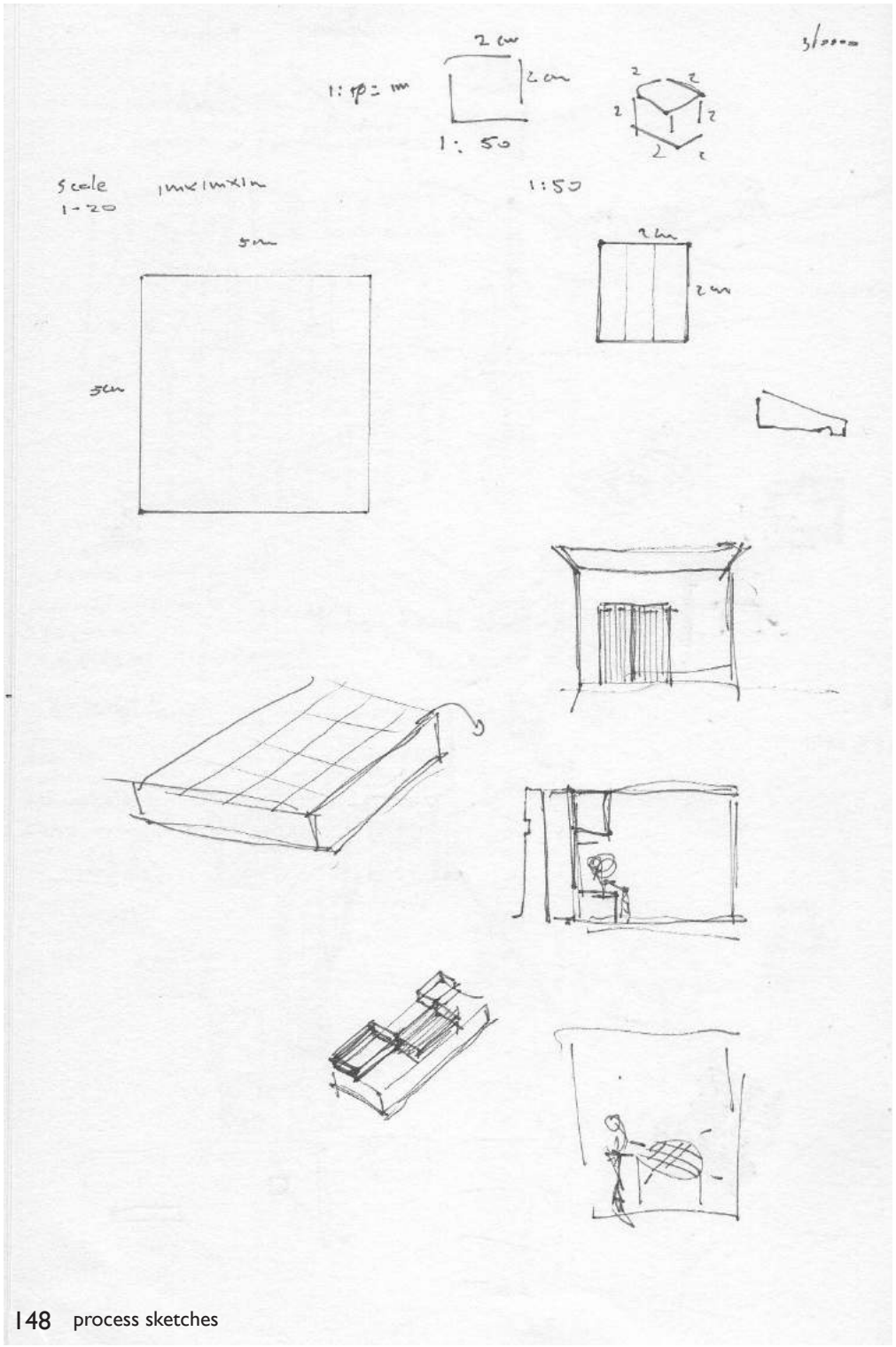
1 stall house
workplace

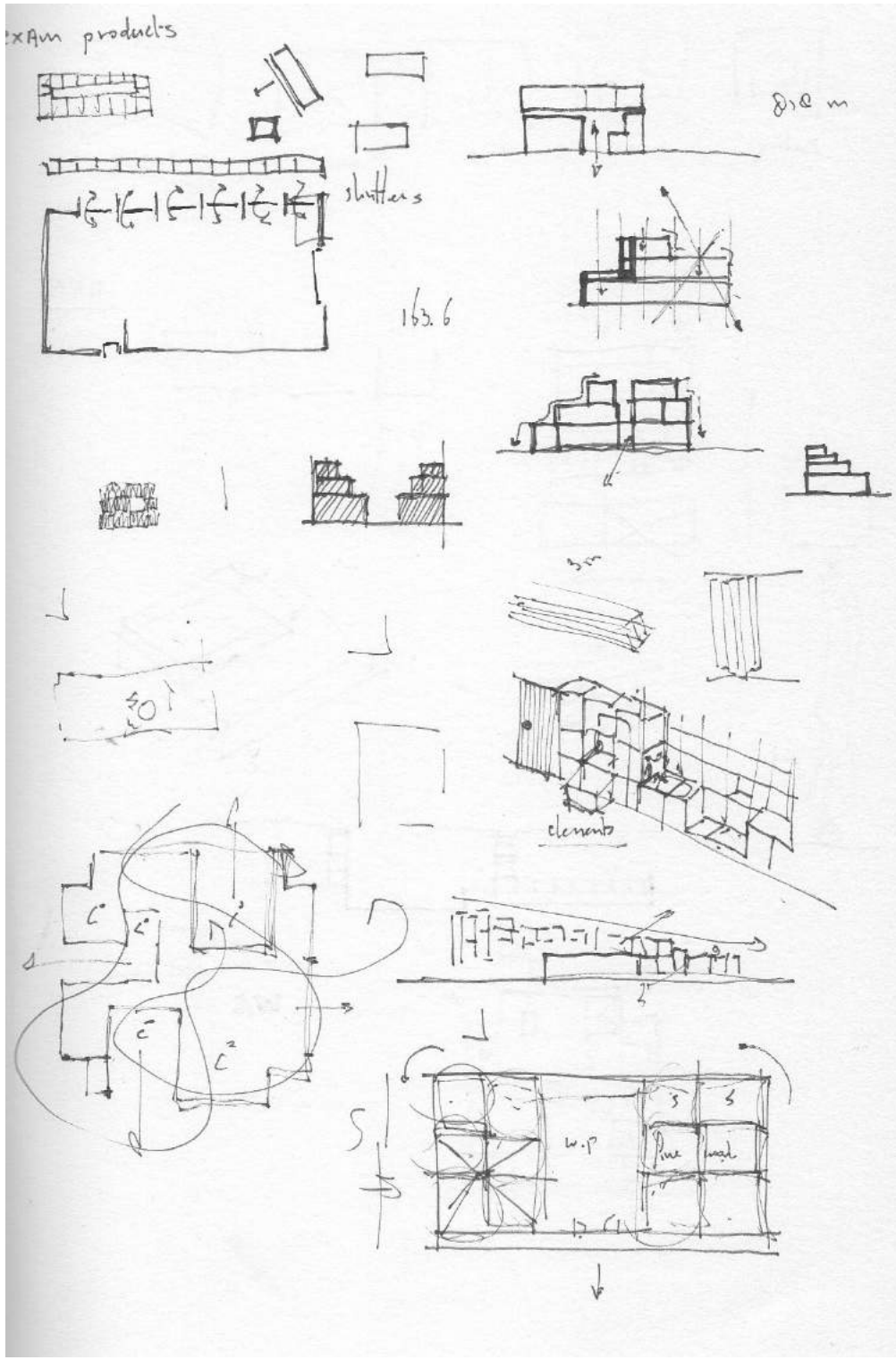


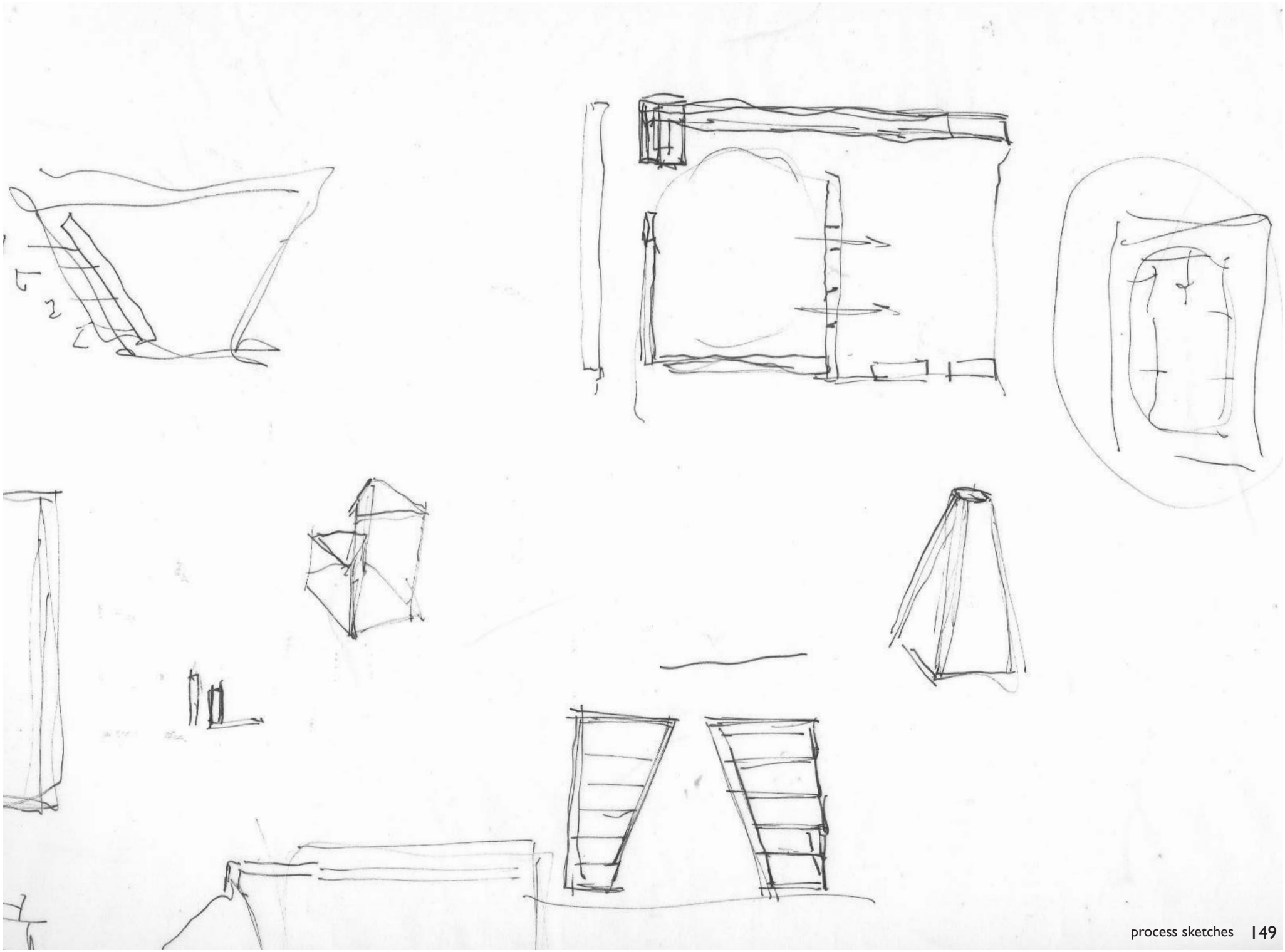
winter/summer use
Restaurant
Places to eat
sequence of function change
share
activity
Detail
activiteit/temp.
297x197

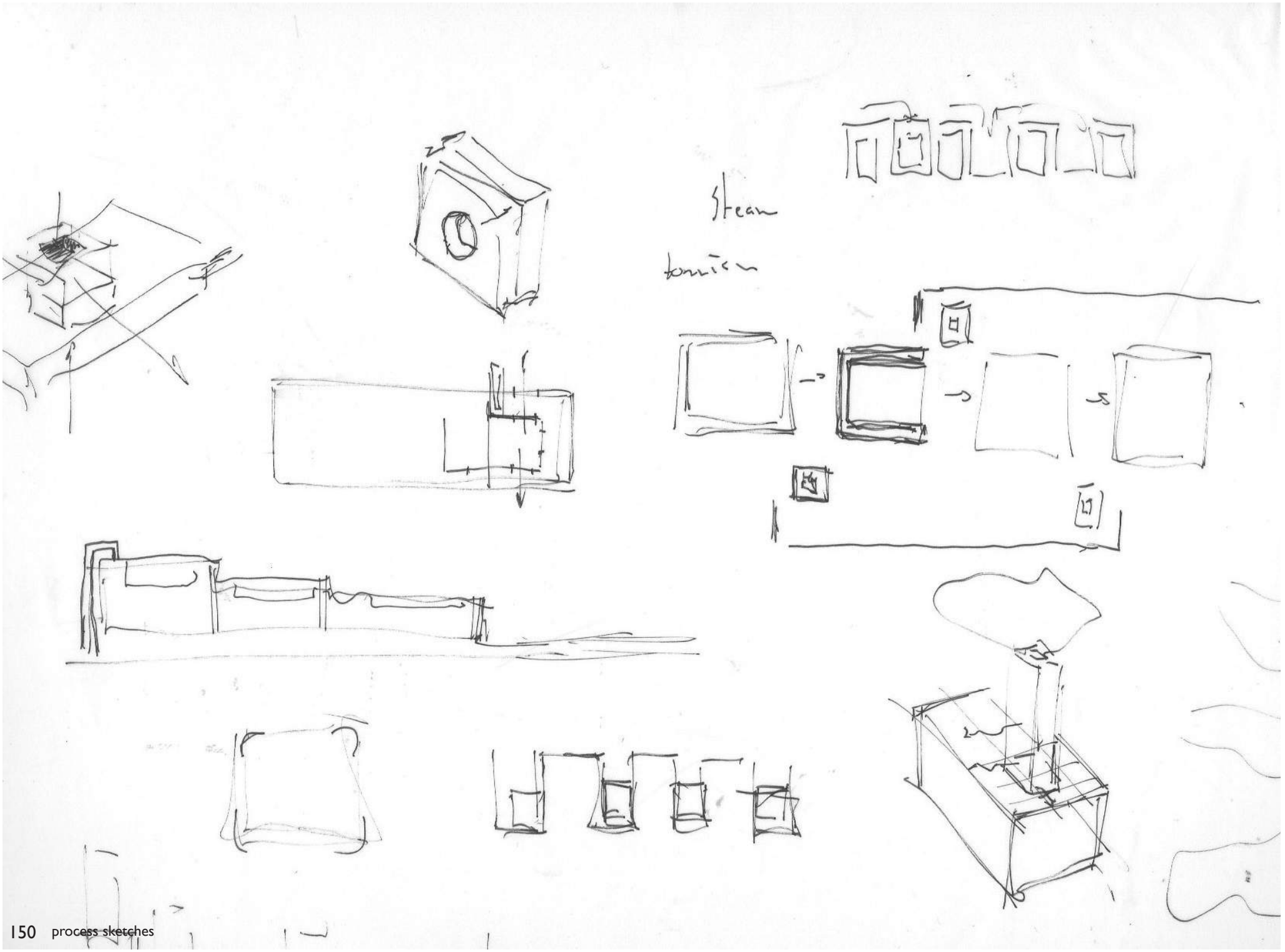


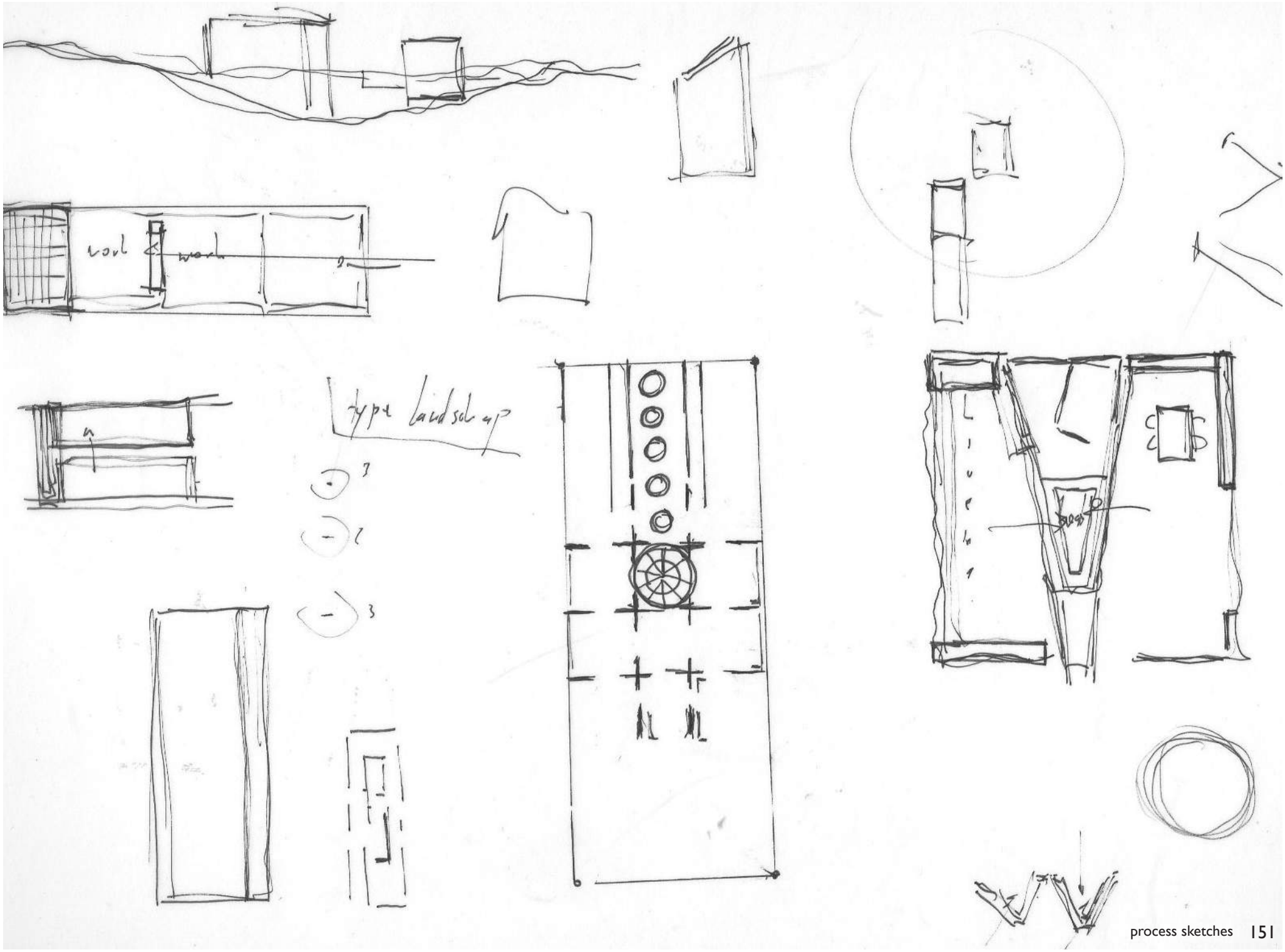
Perforatie
Controlling
options
different heights
the door element/detail
Ao
1189 x841
I ♥ JOYCE
door
5x5x5
Cellenbeton
sitting

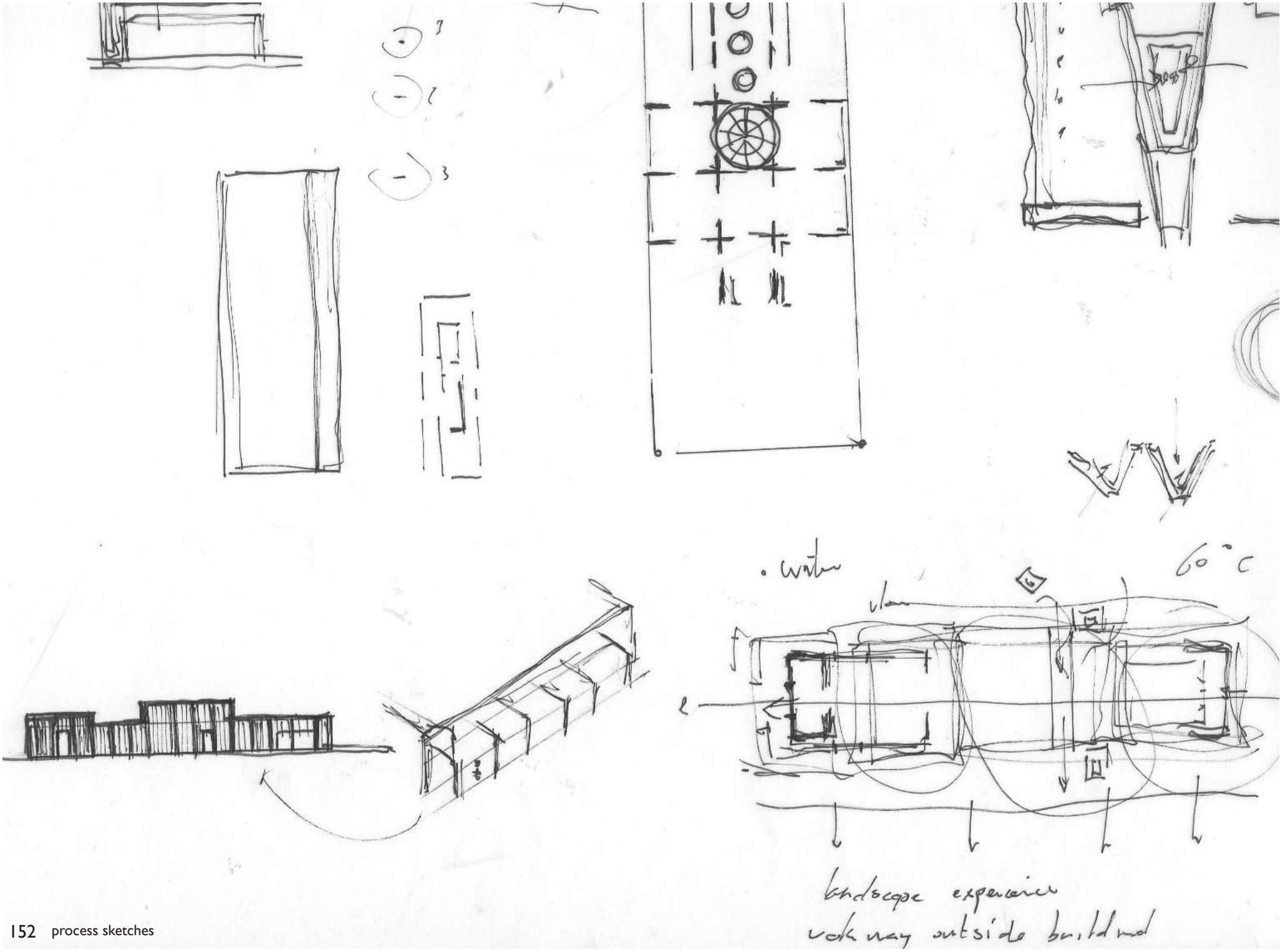

2 cm
2 cm
1 : 50
scale
1-20
1mx1mx1m
1:50
5cm
5cm
2cm
2cm

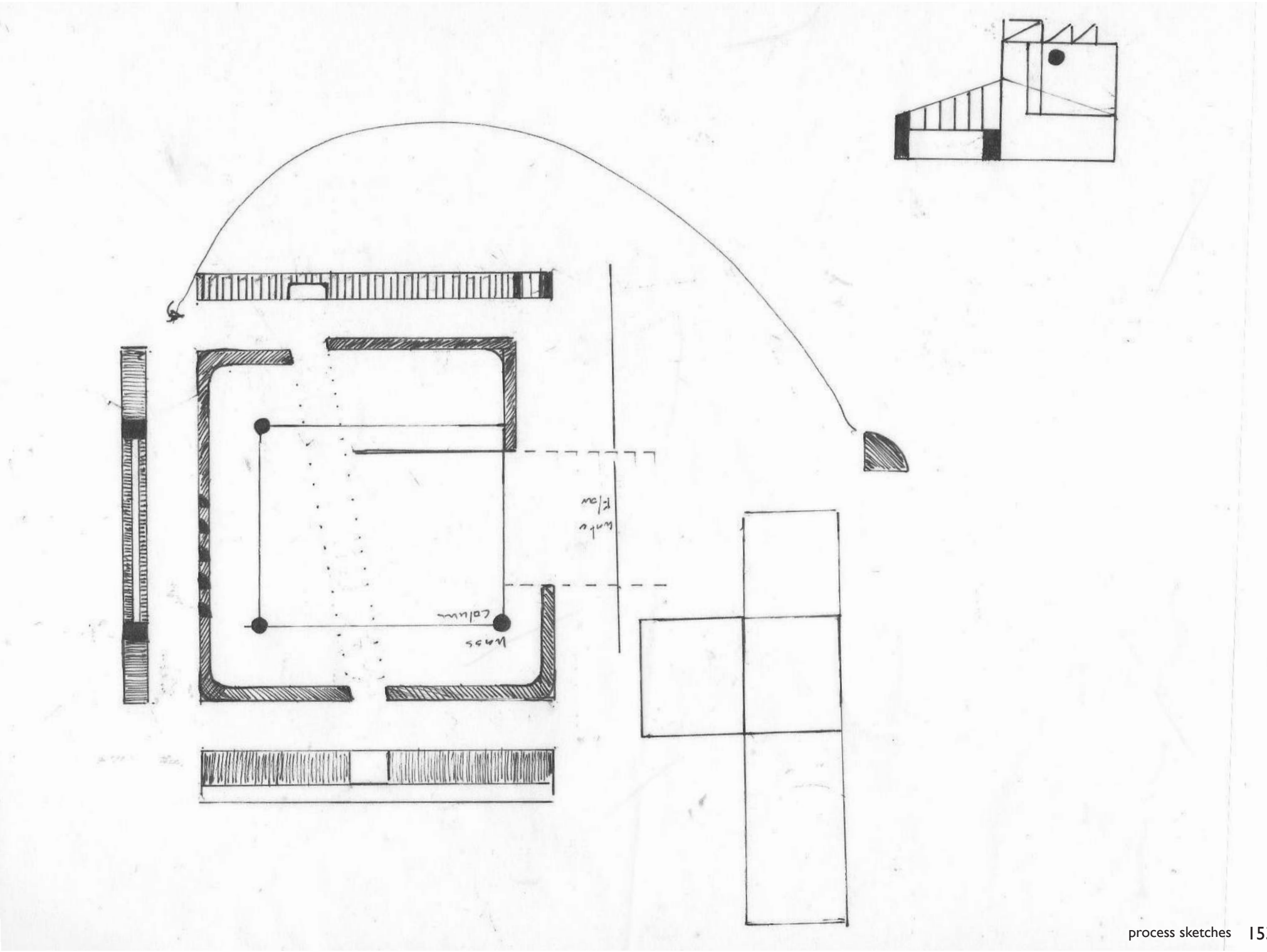

xAm products
shutters
163.6
elevation

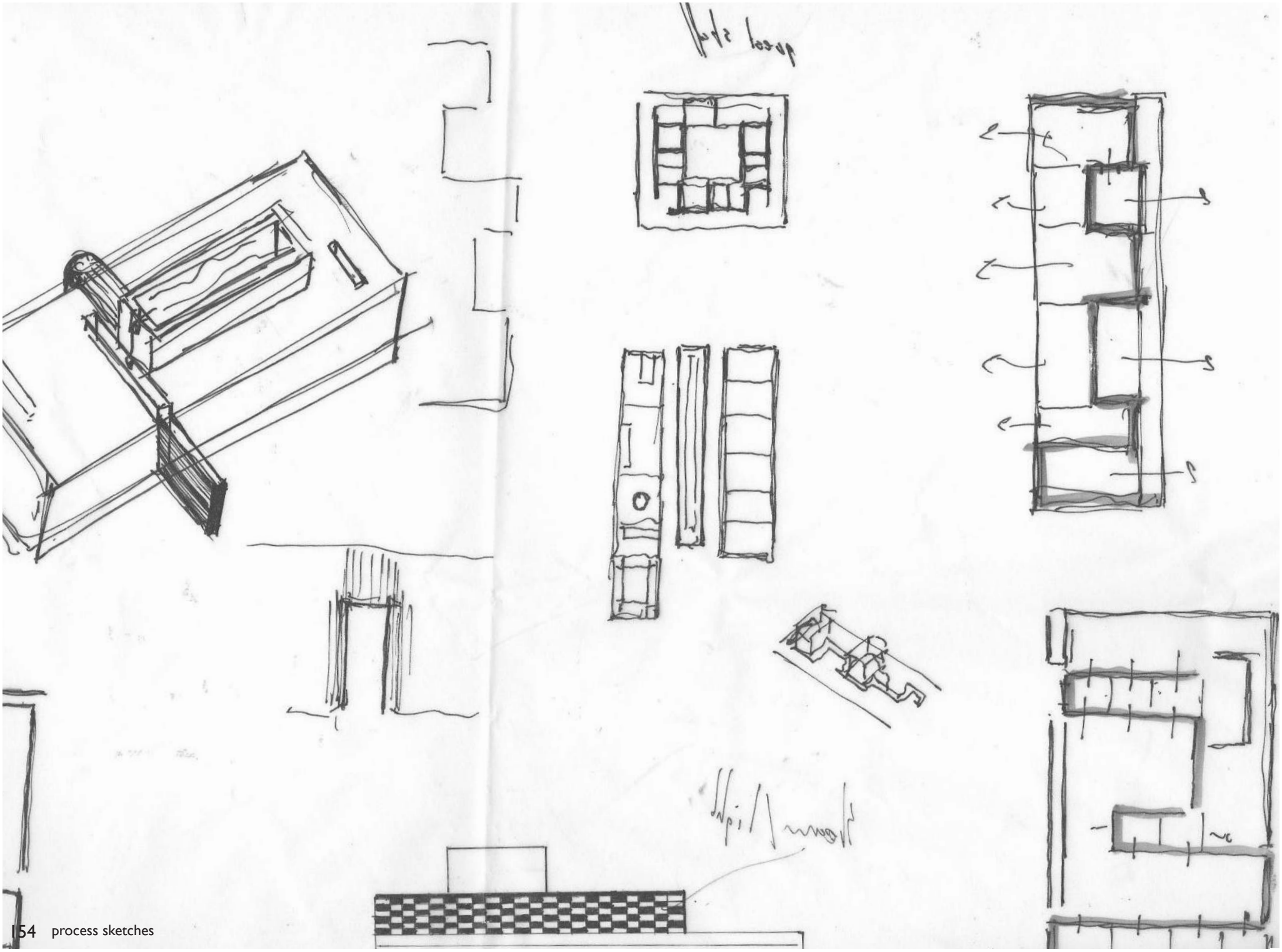


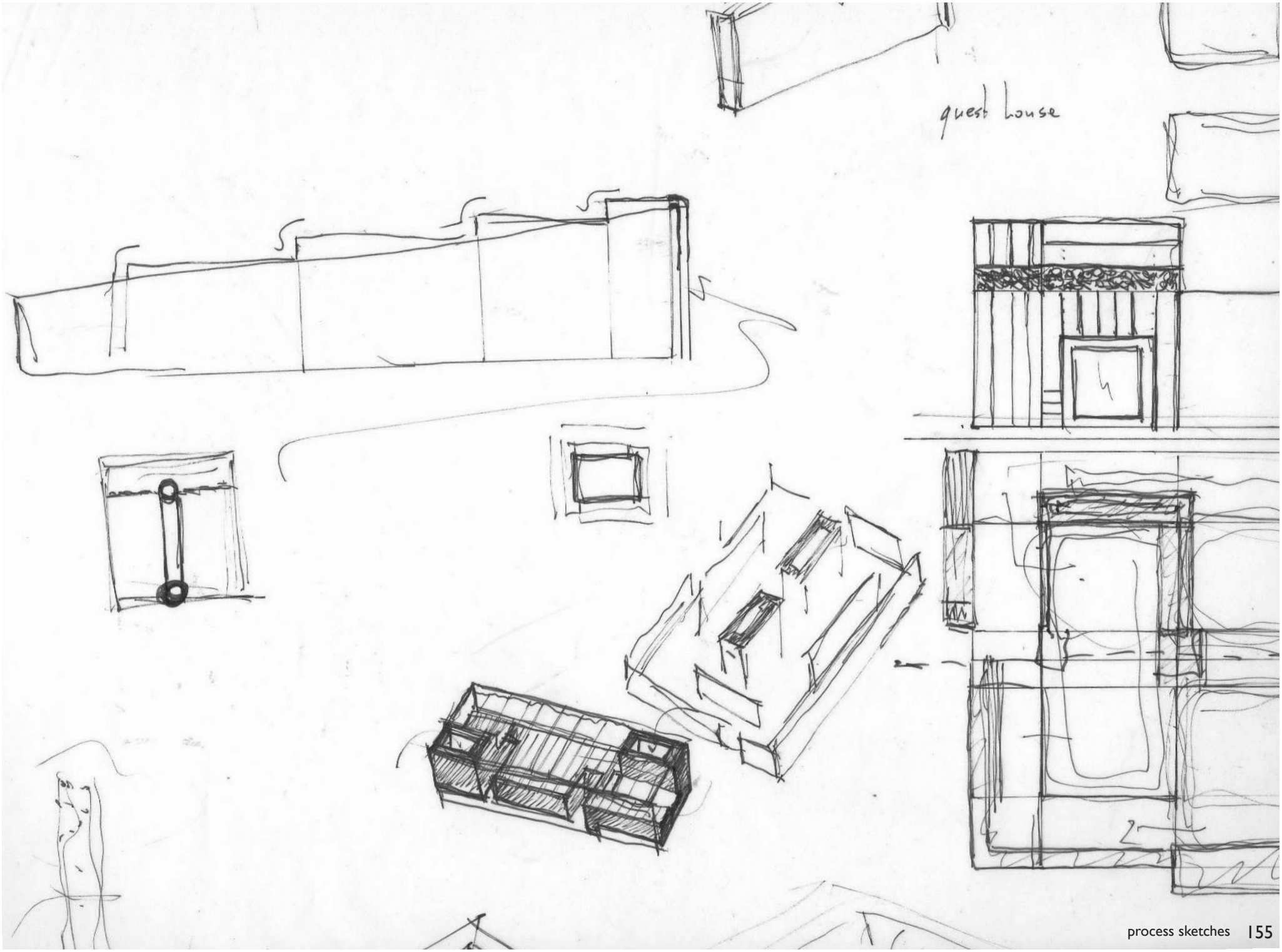

steam

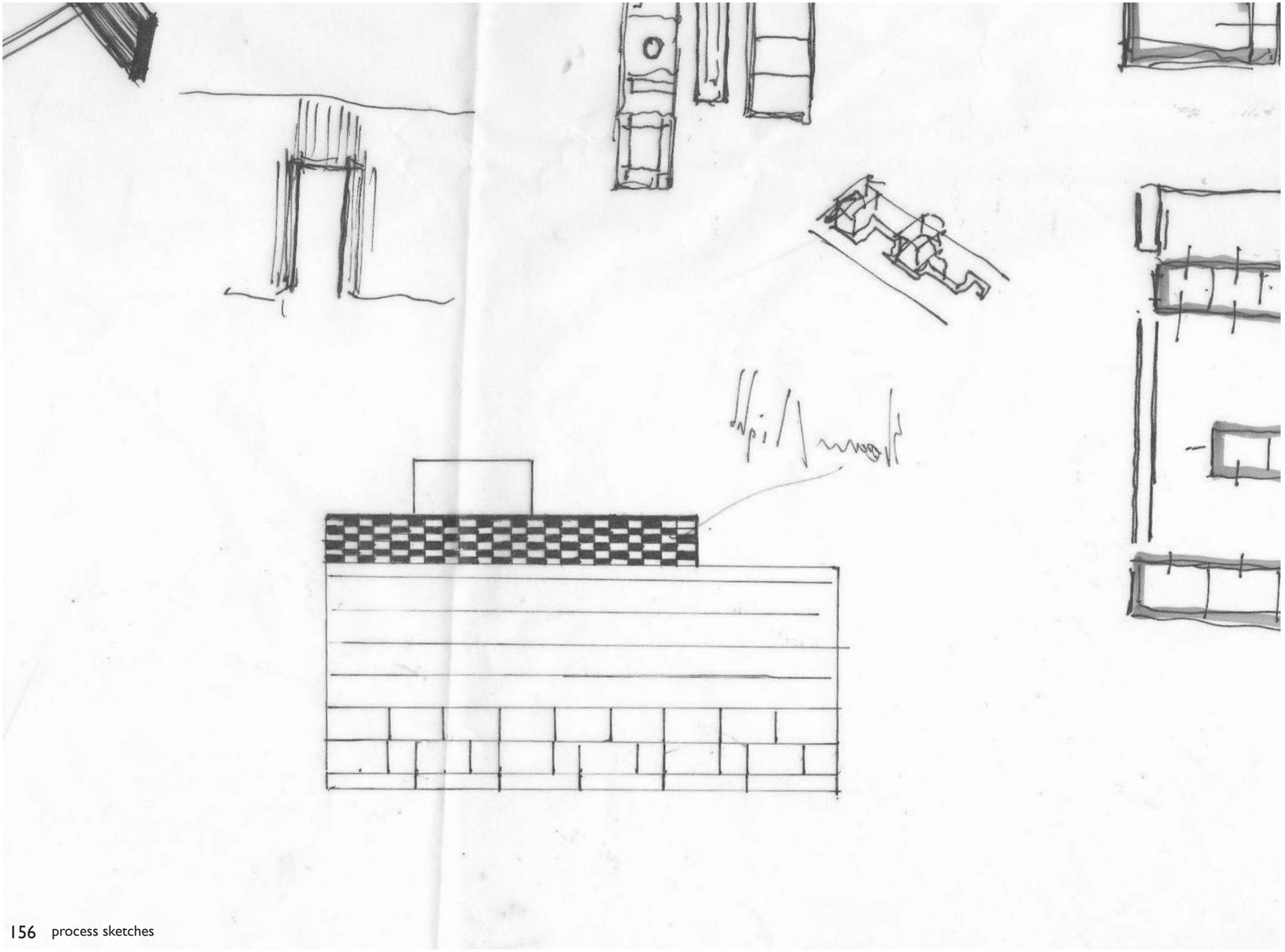

wall
work
type landscape

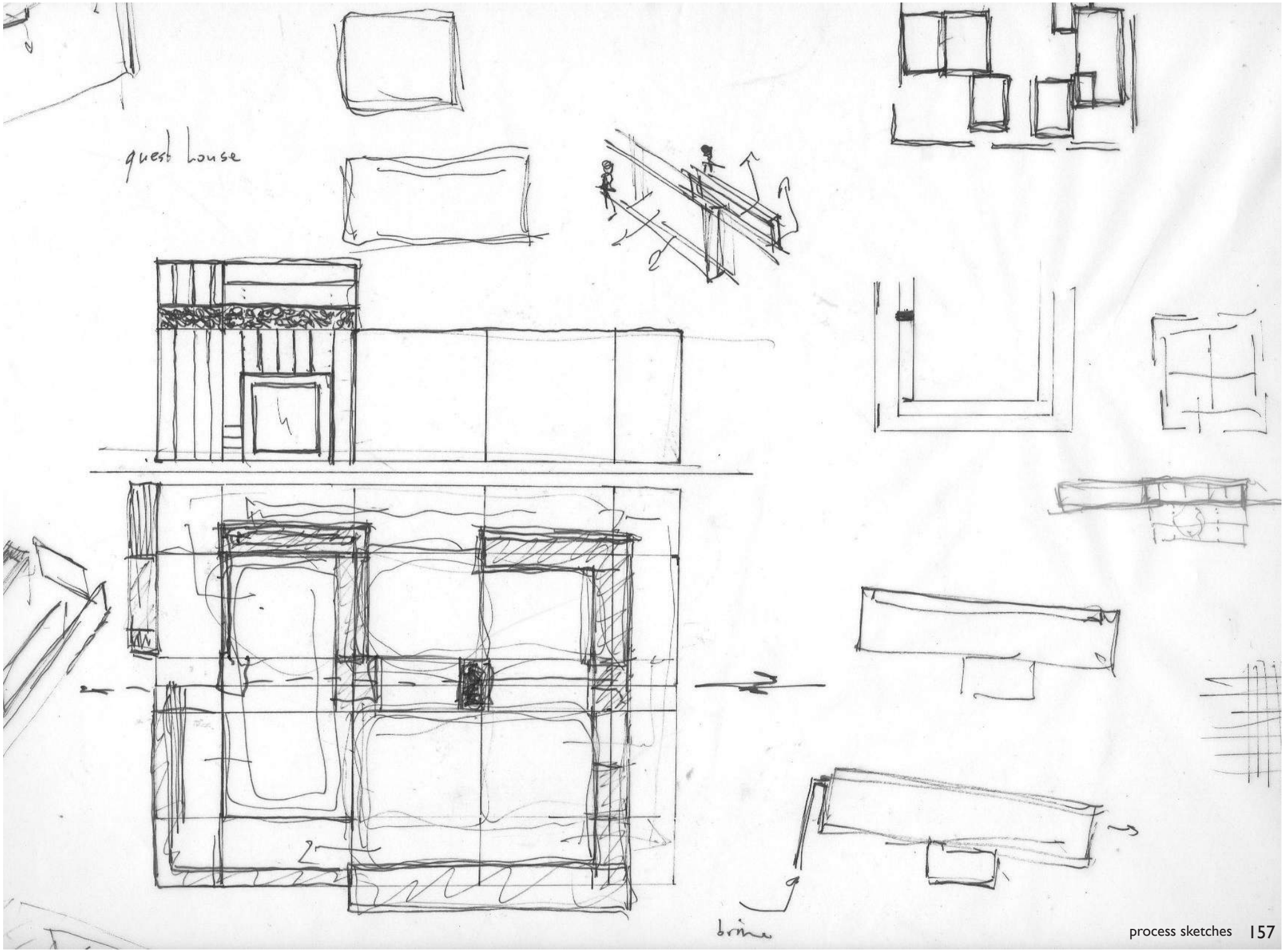

• water
60° C
landscape experience
walkway outside building

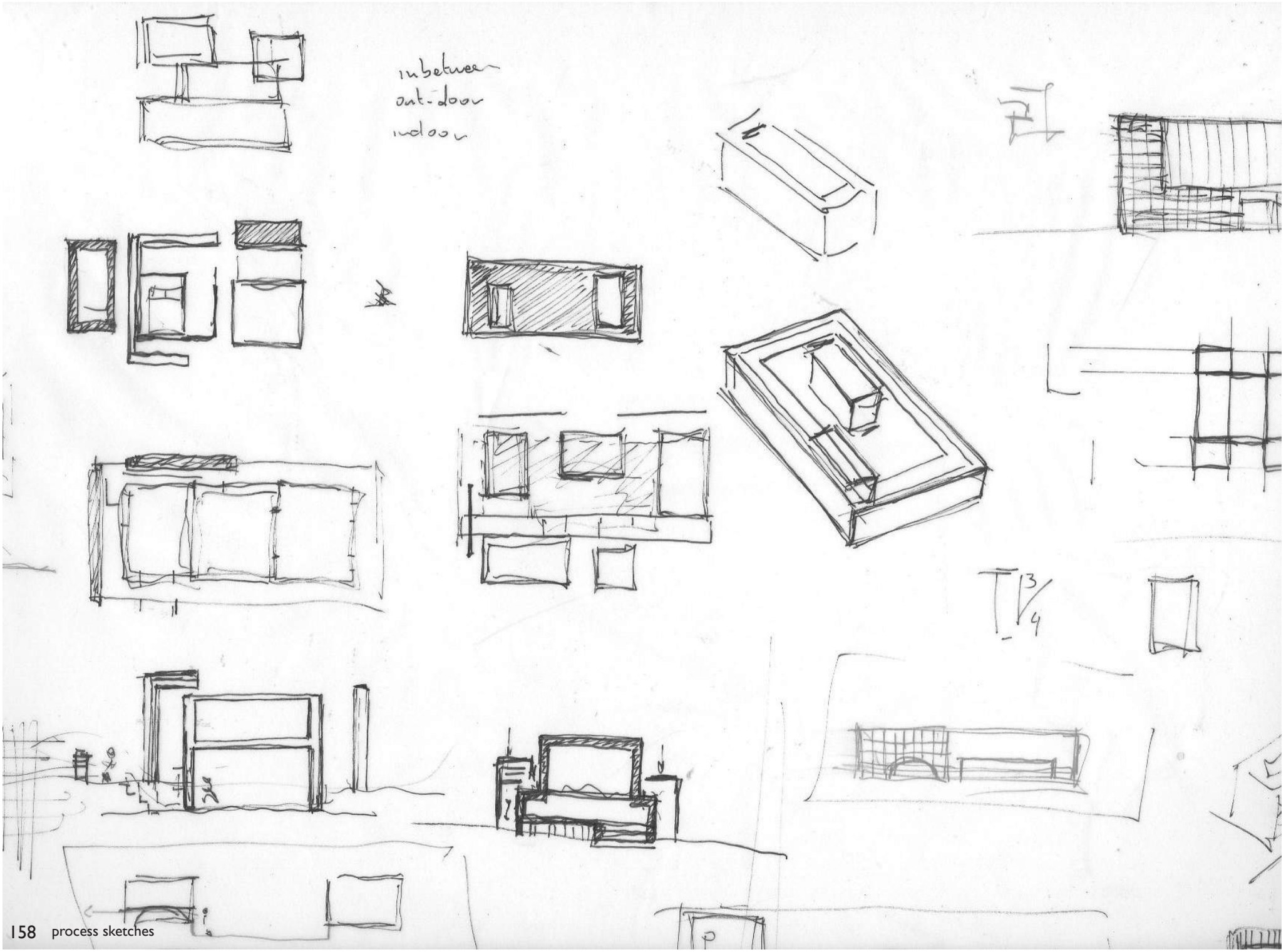


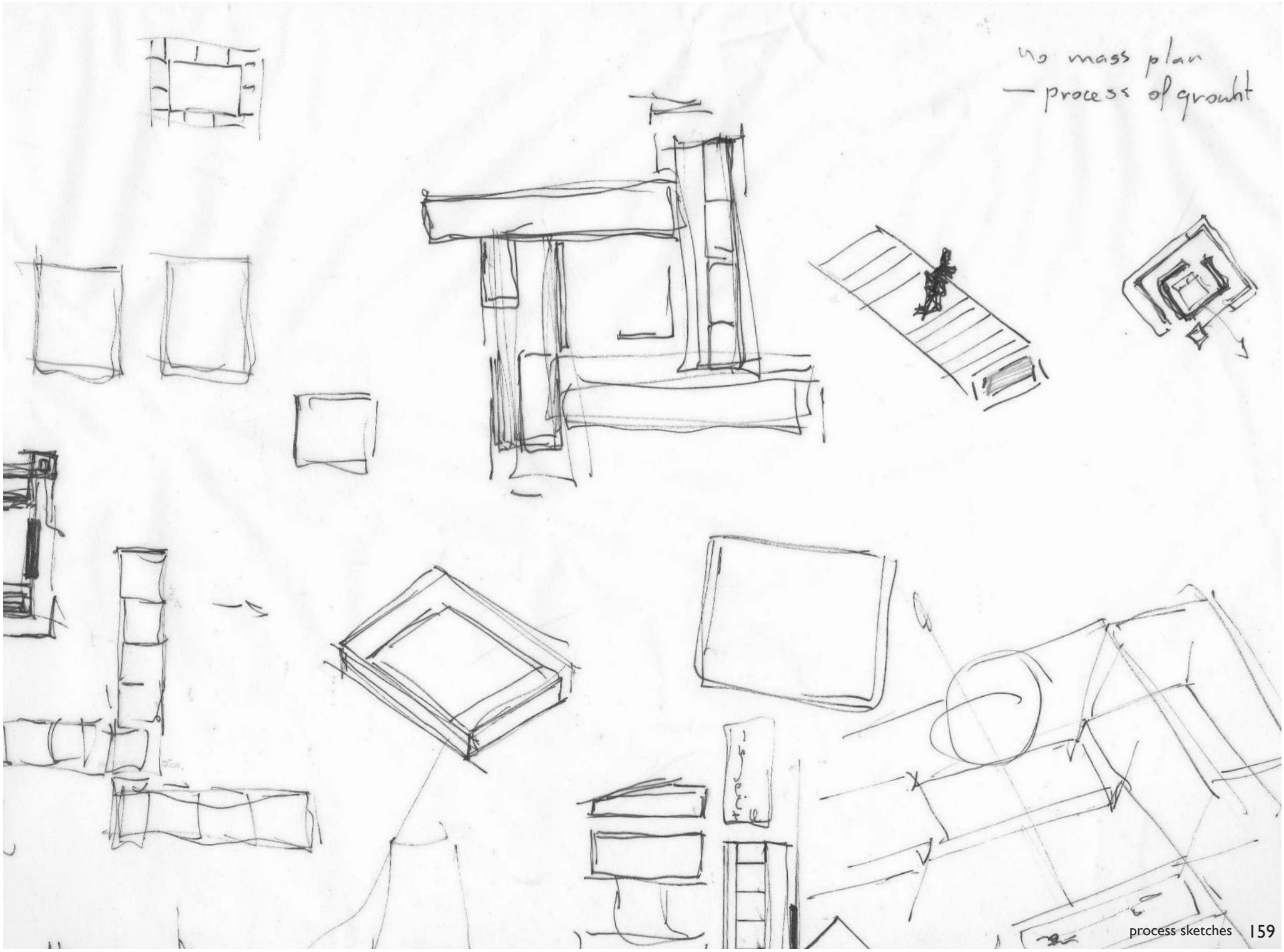


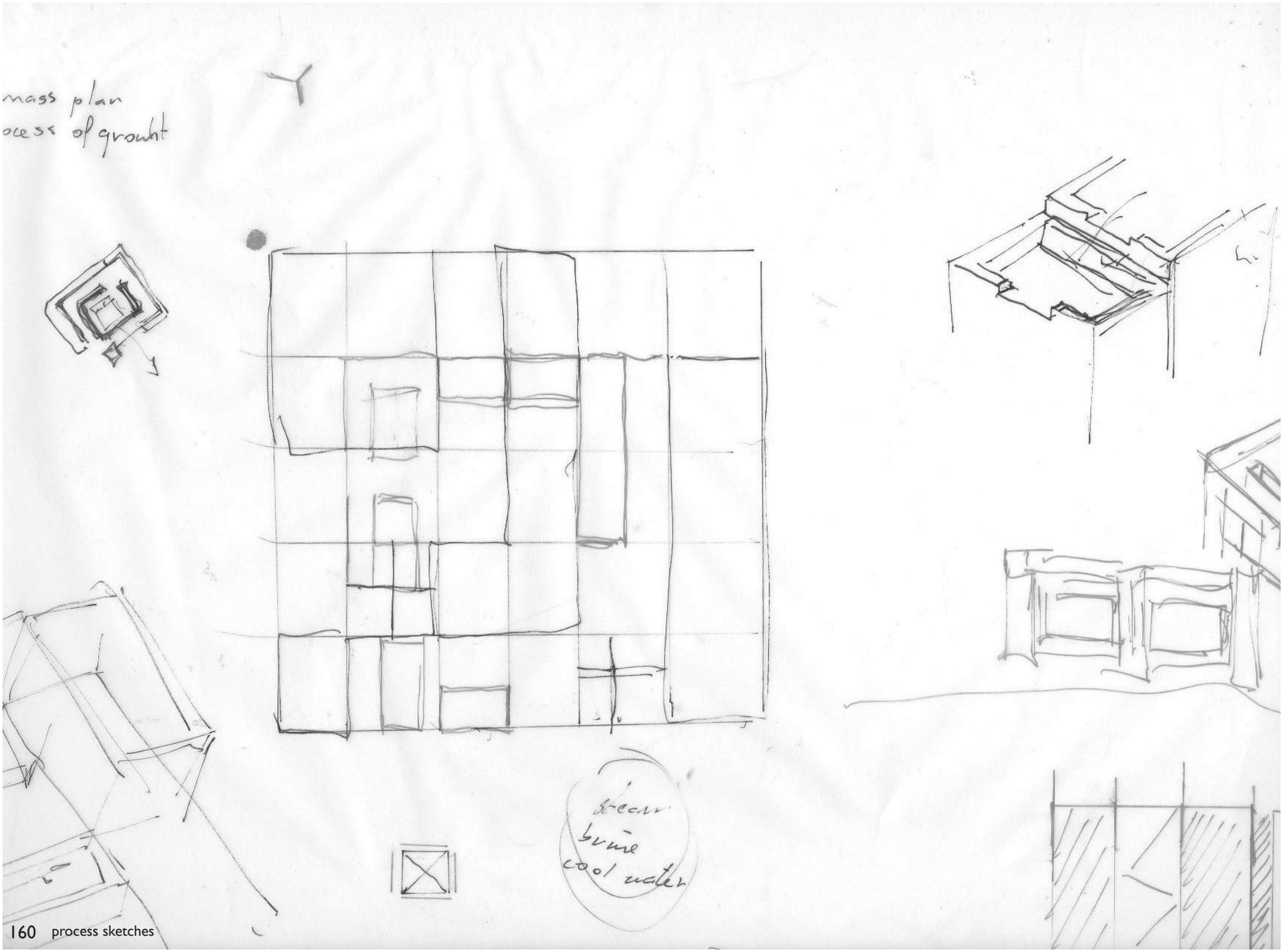

guest house

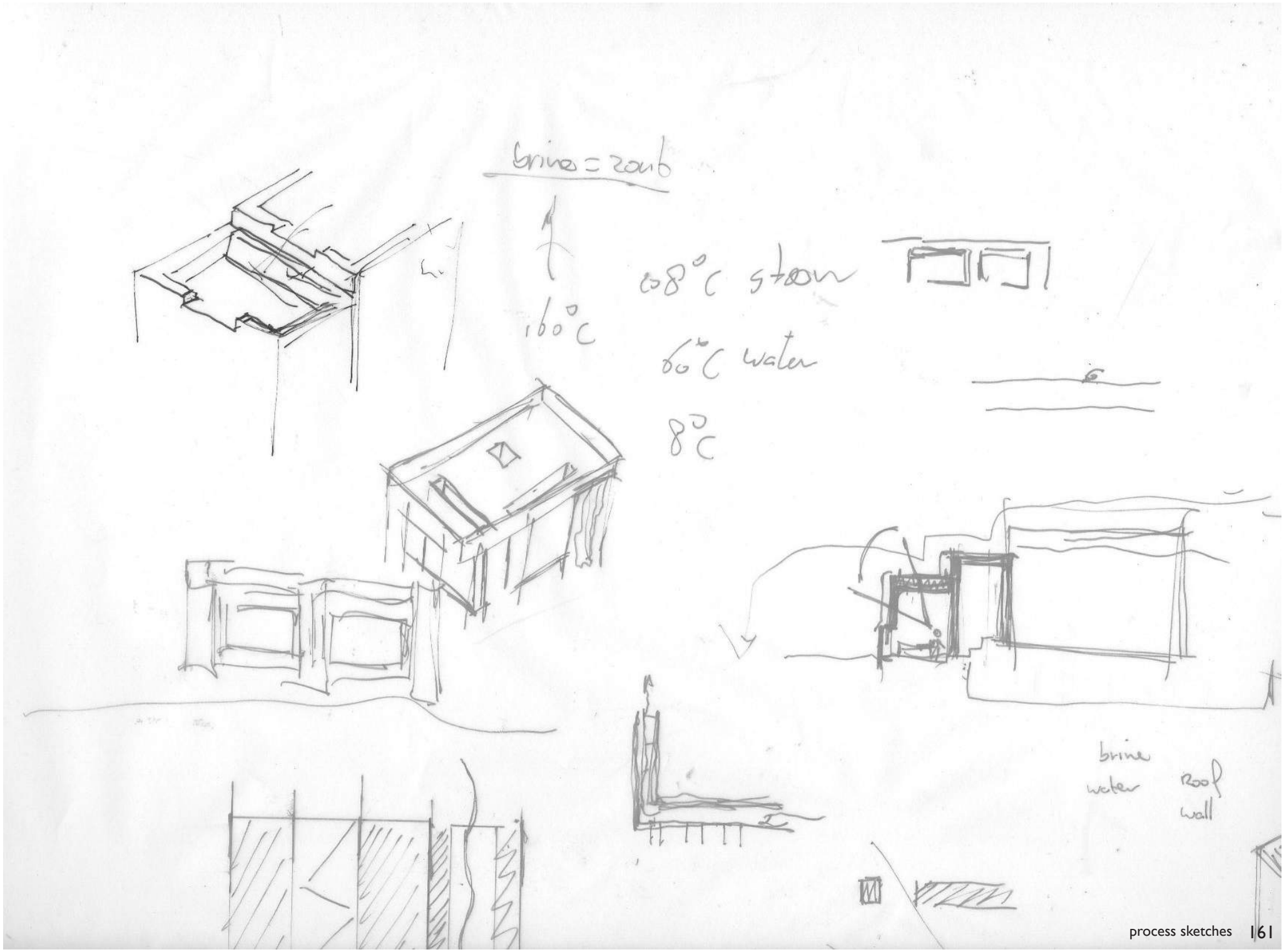


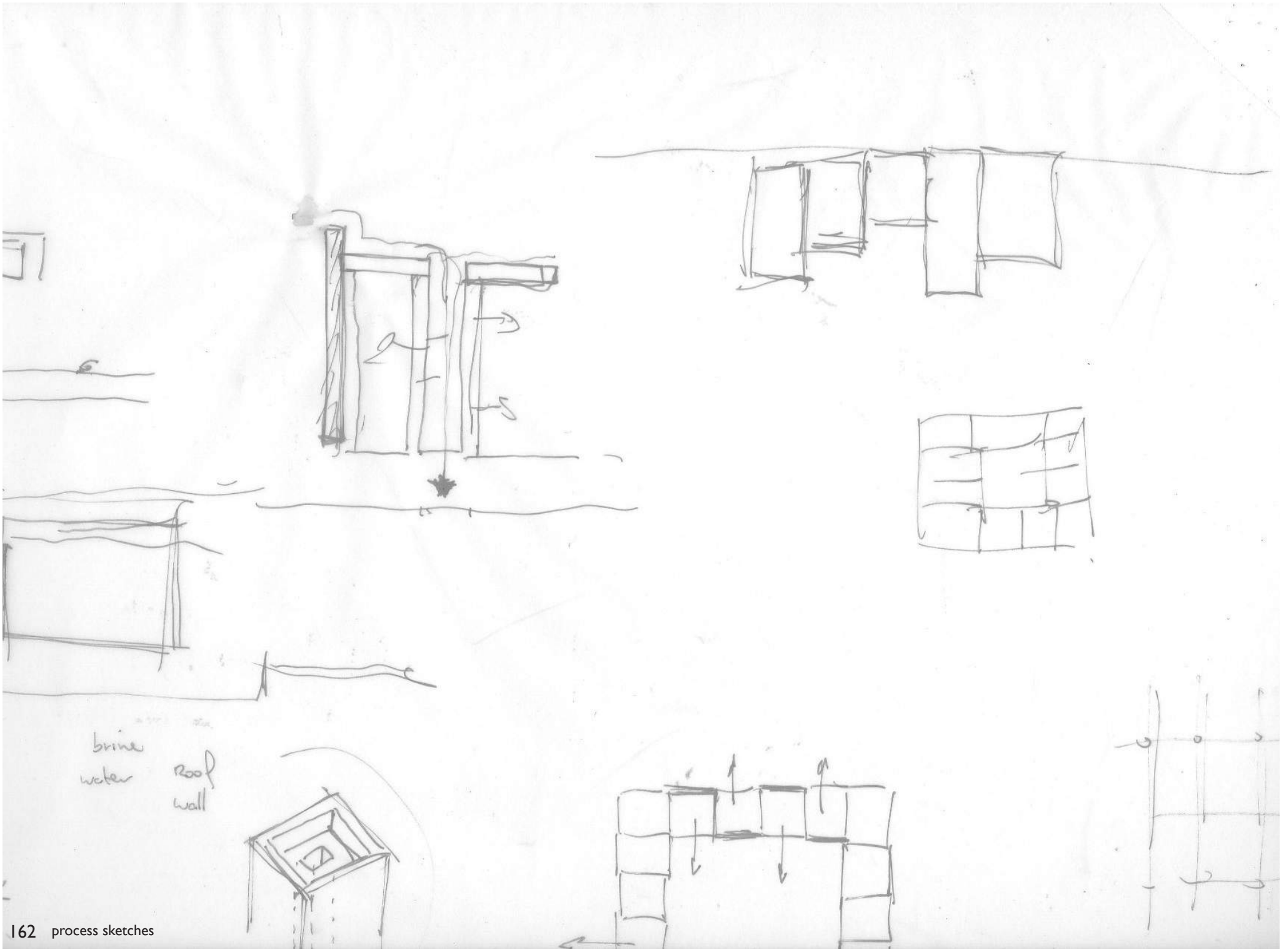

guest house

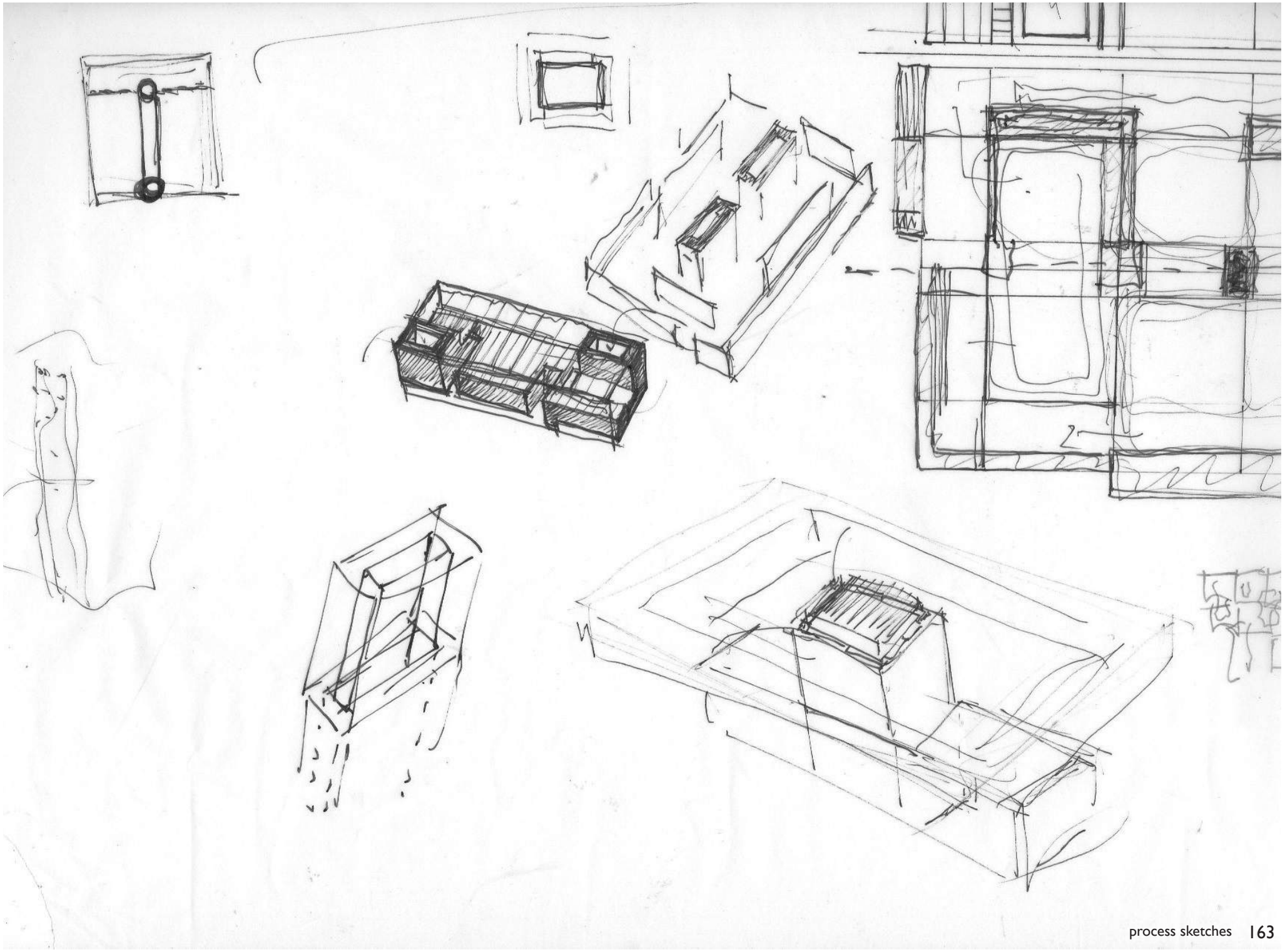

inbetween
out-door
indoor

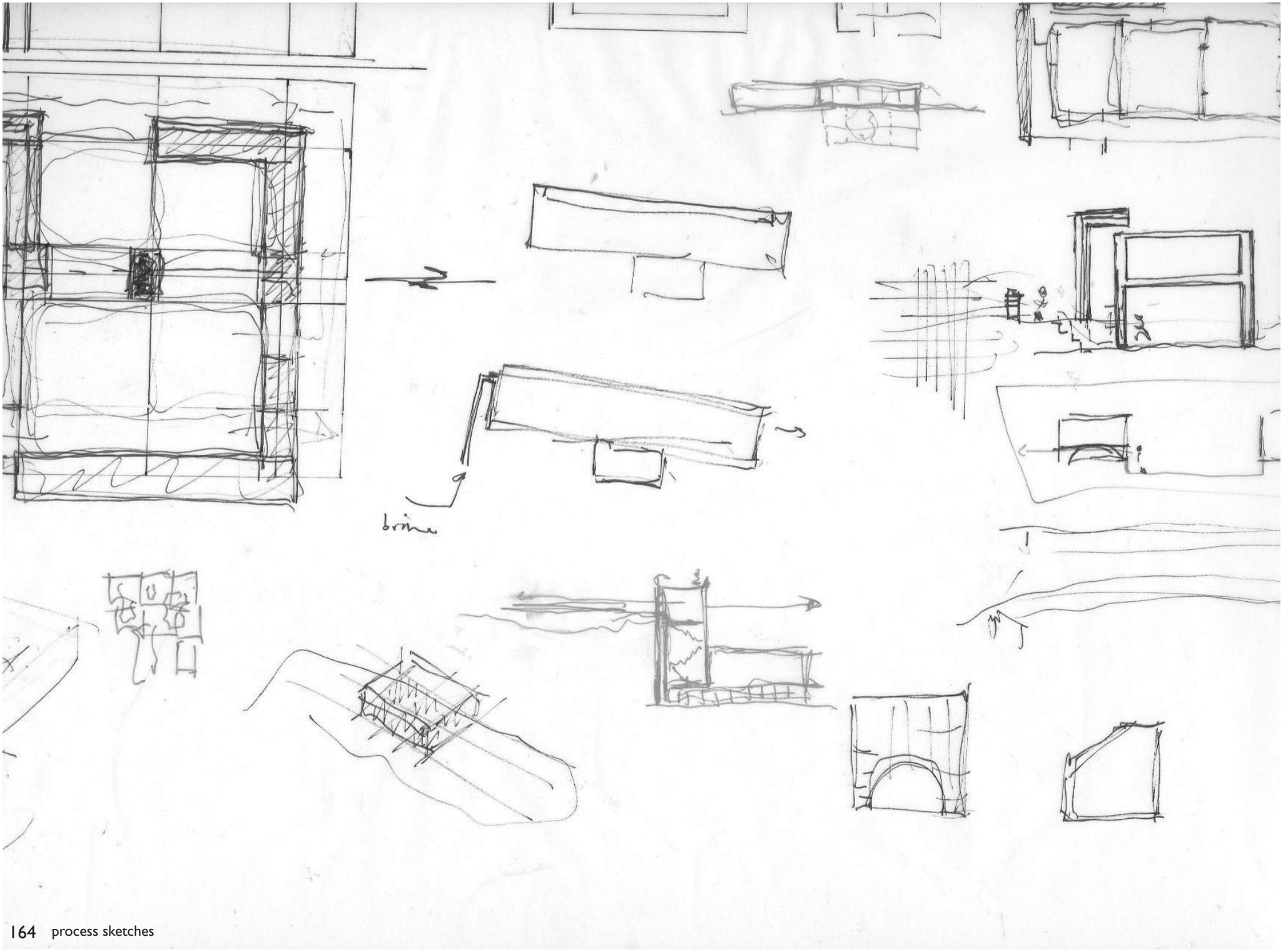

no mass plan
— process of growht

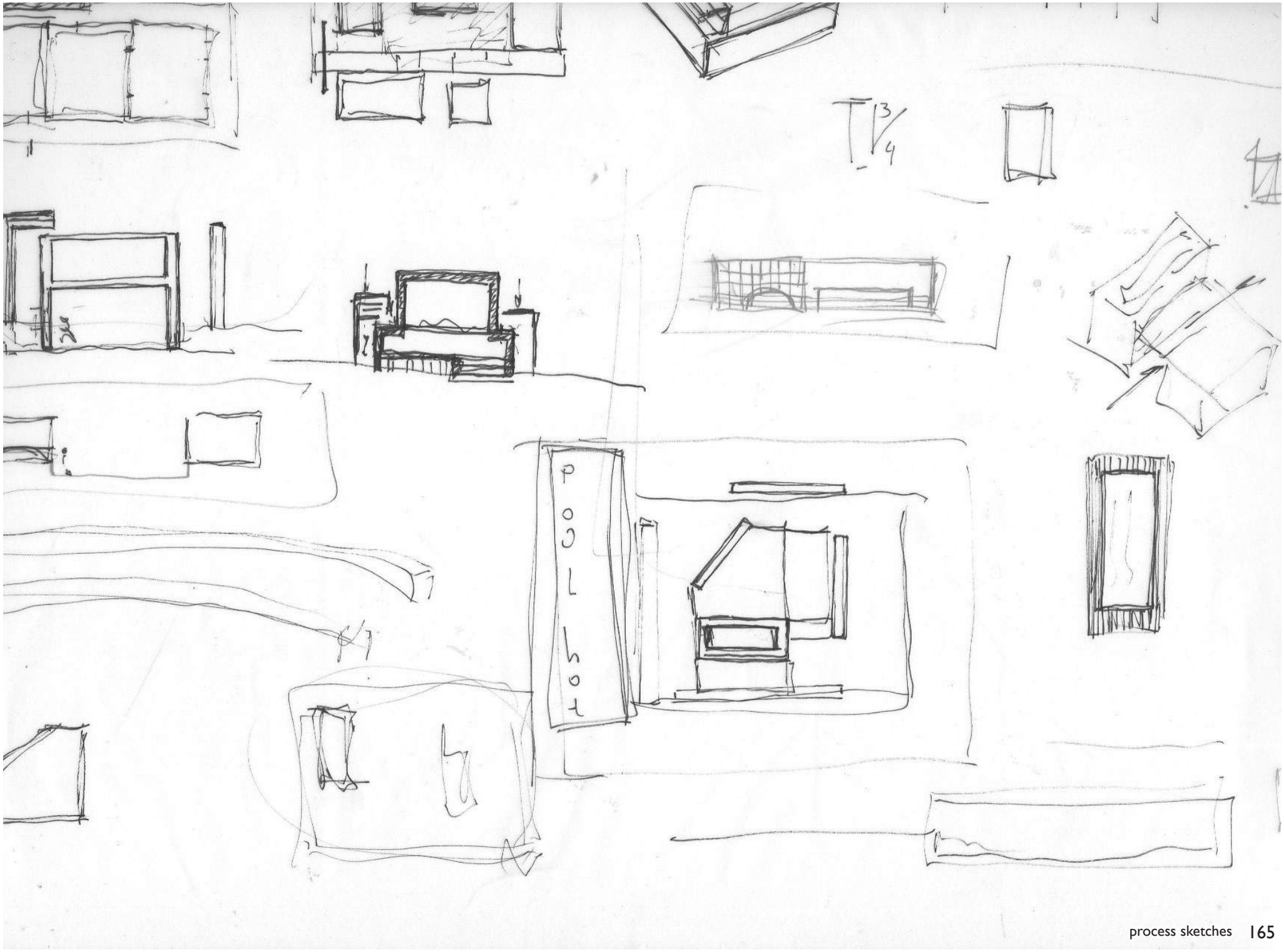

mass plan
ocess of grouht
steam
brine
cool water

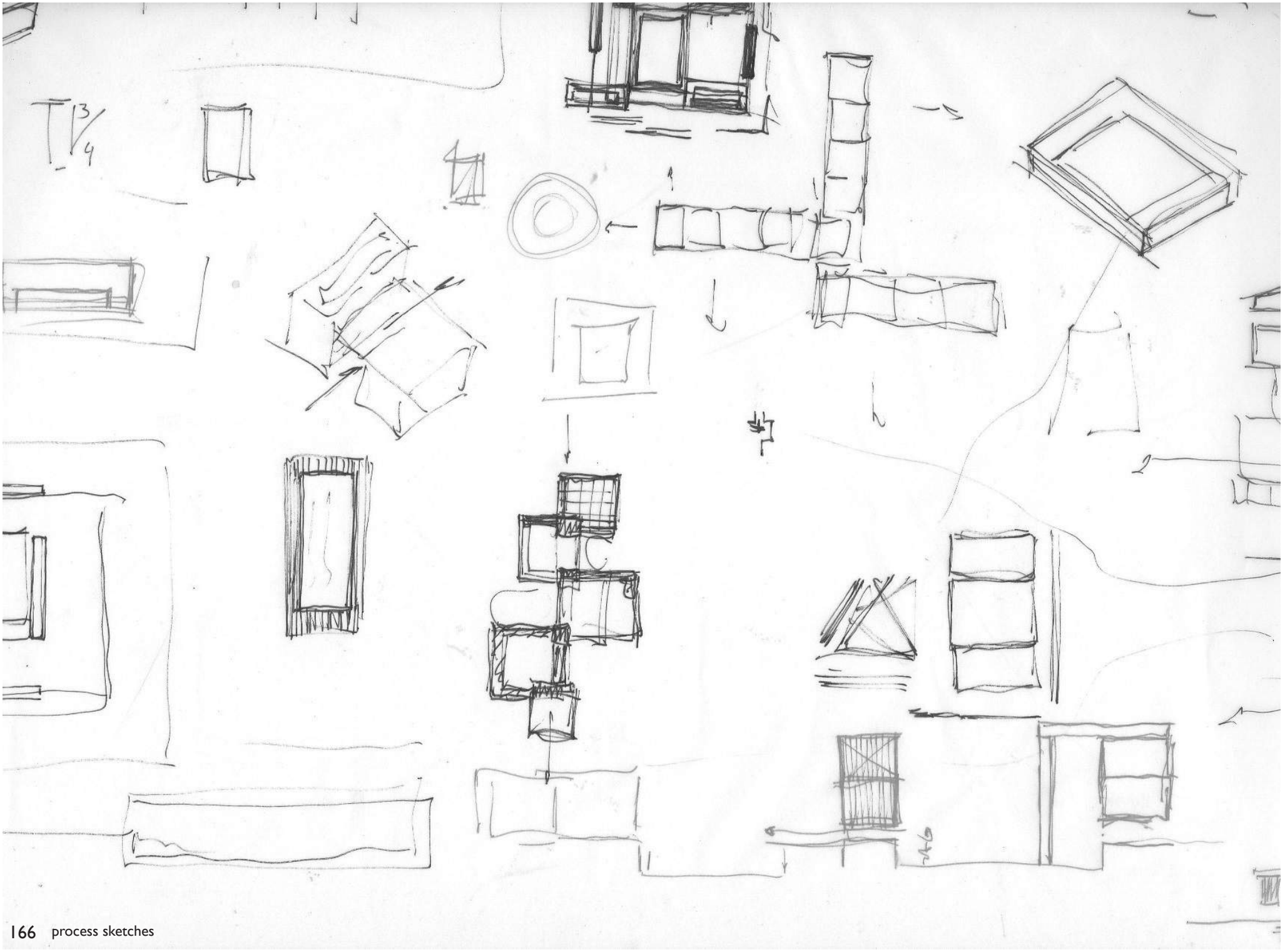

brine = 20ab
160°C
108°C steam
60°C water
8°C
brine
water
Roof
wall

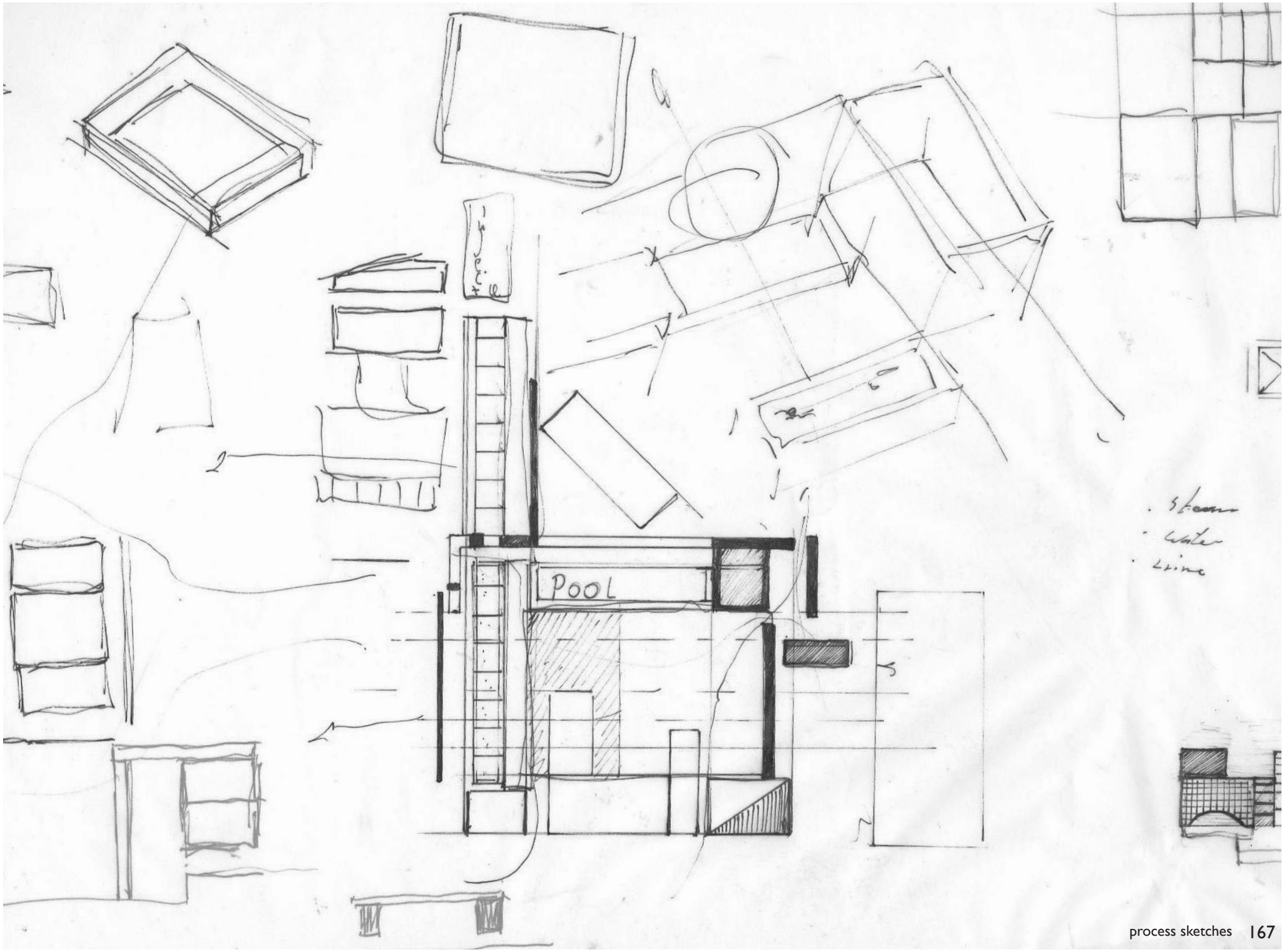

brine
water
Roof
wall

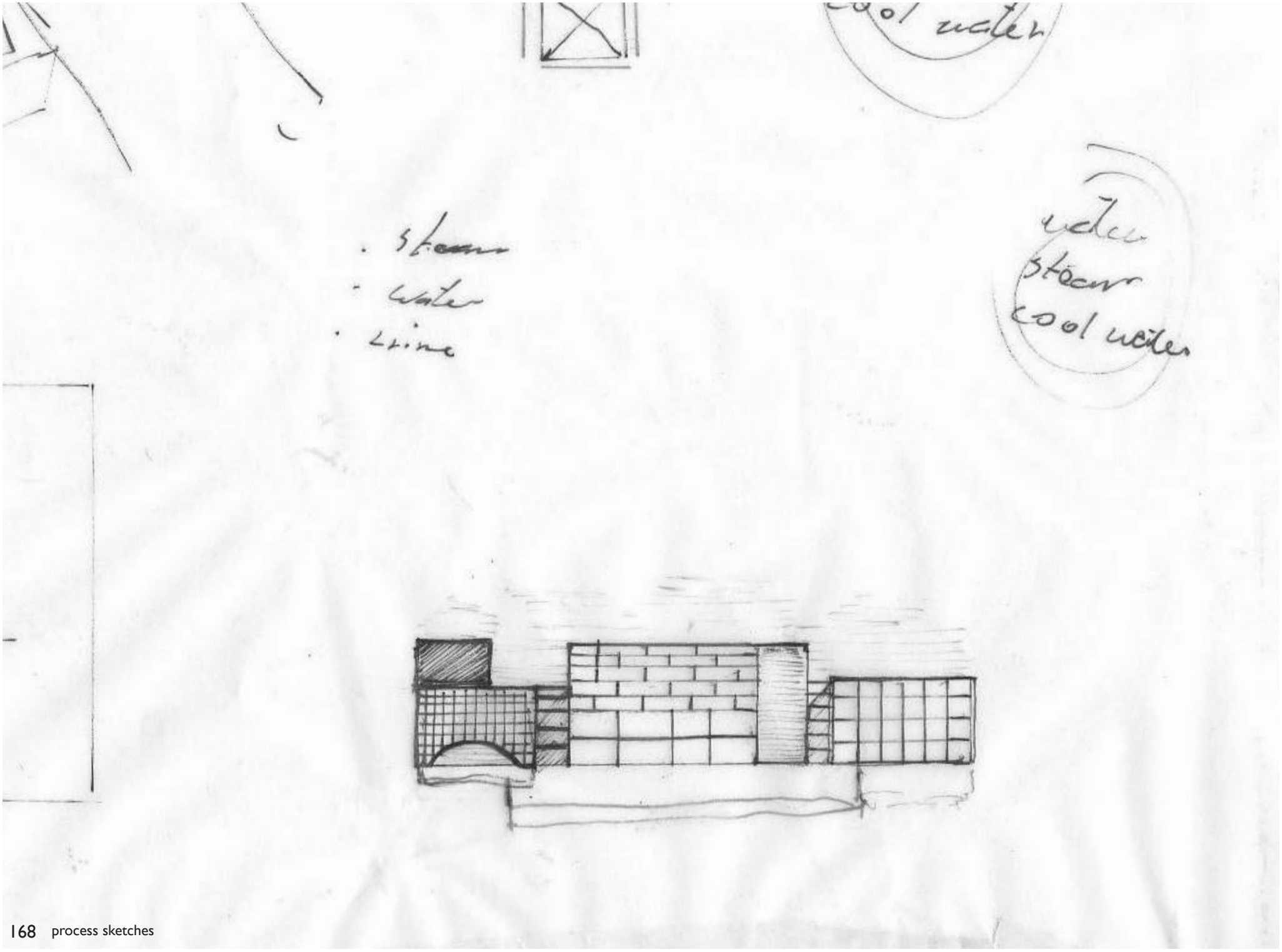


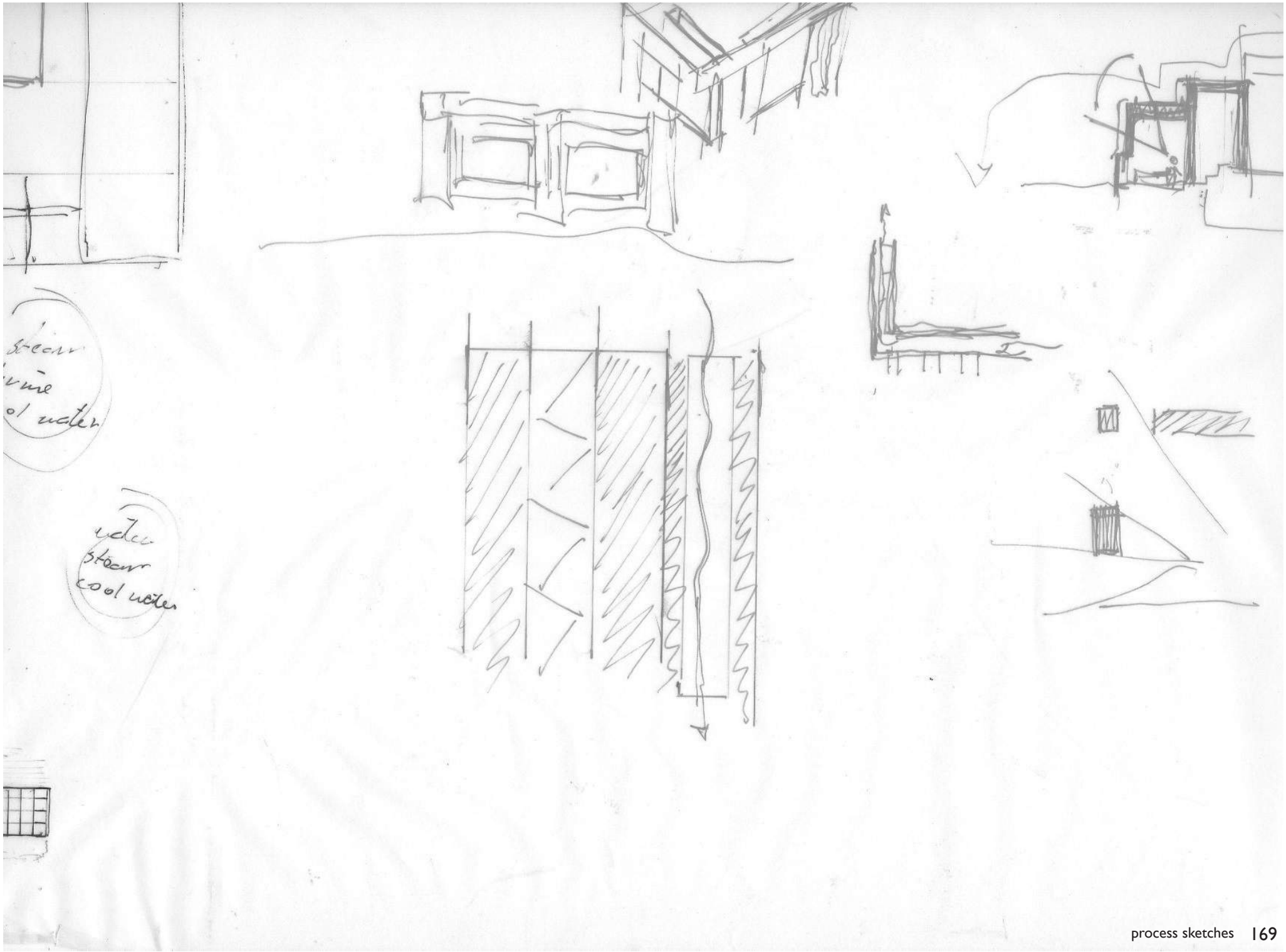

brine

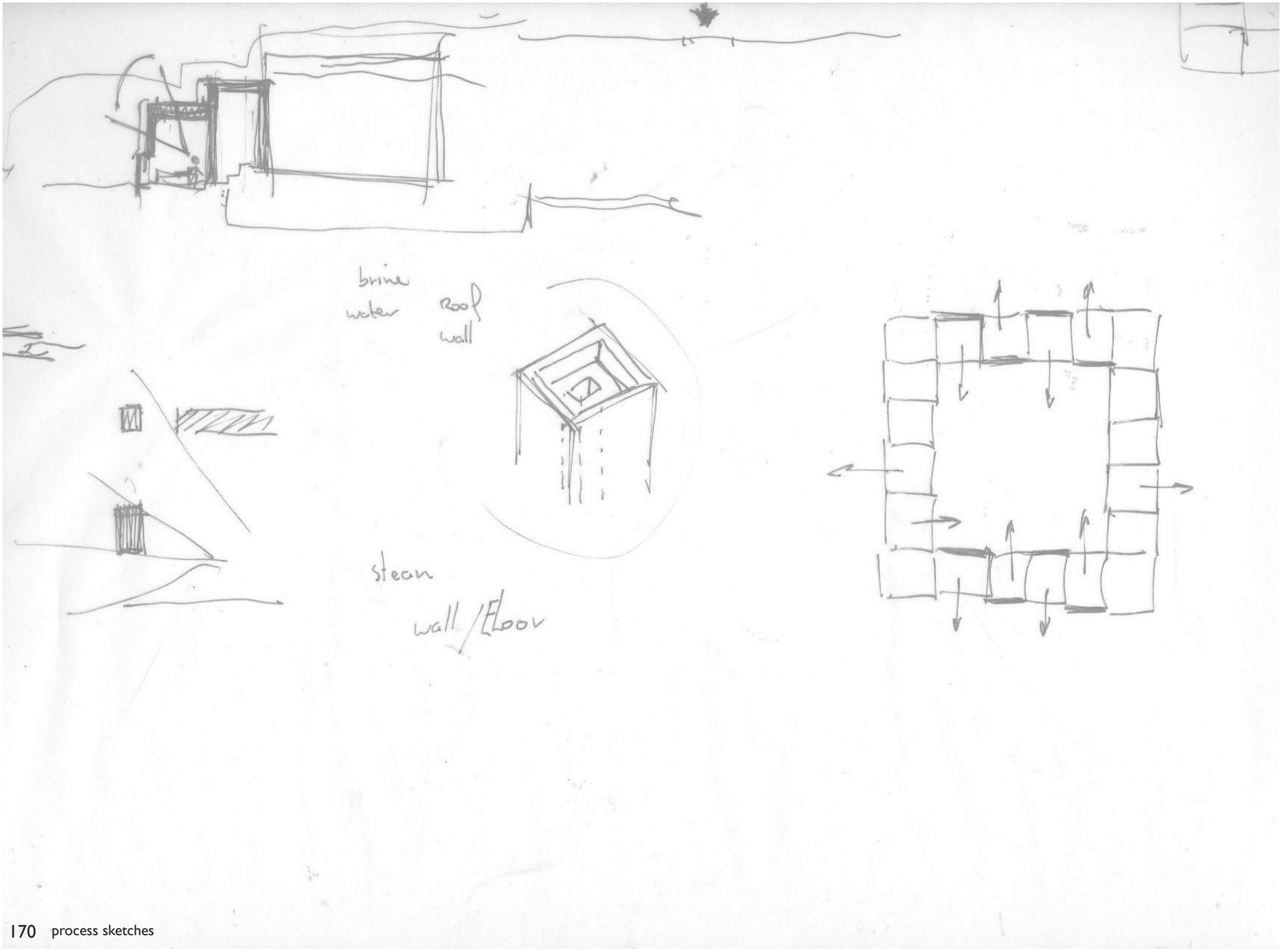

pool hot

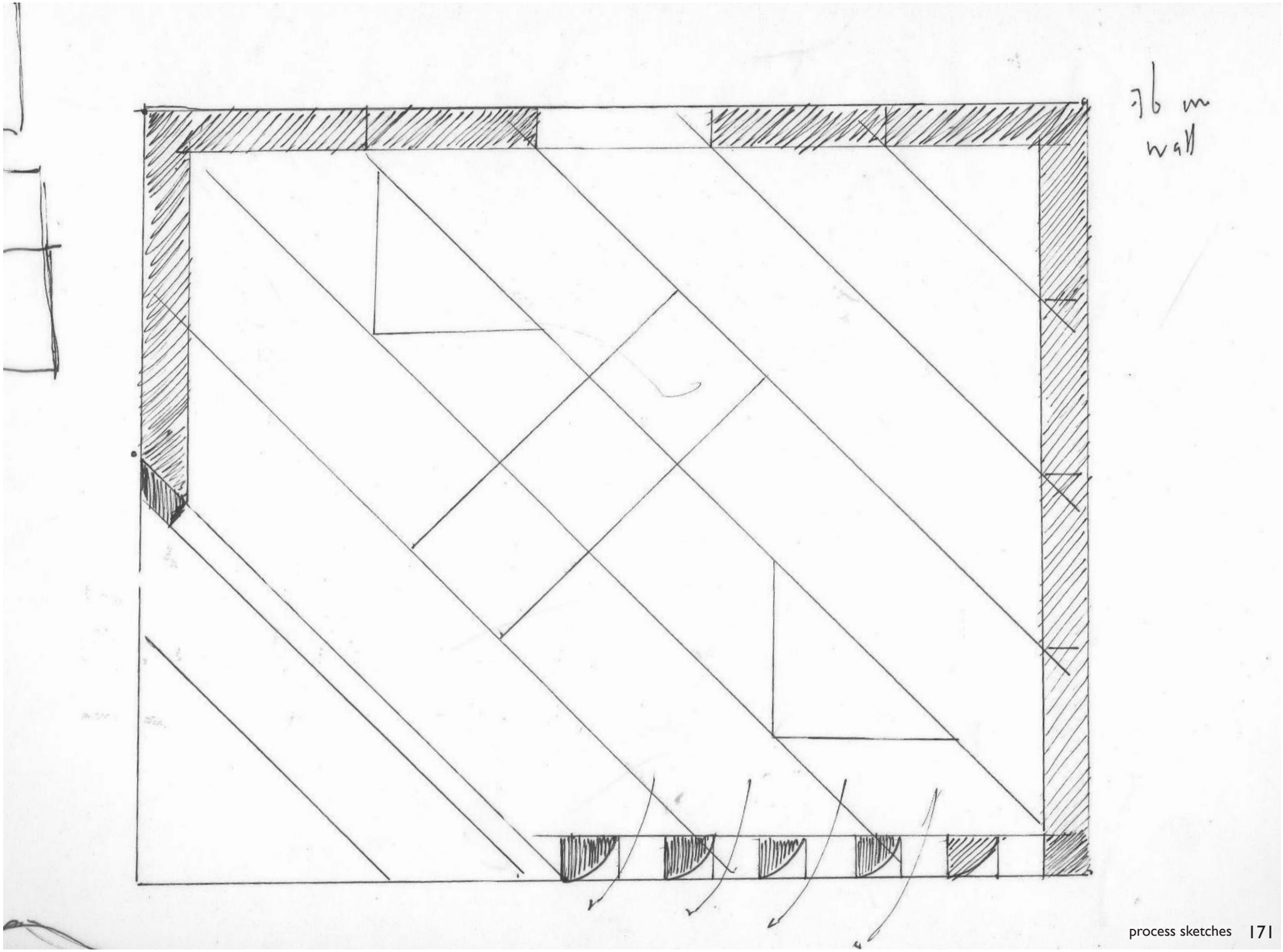


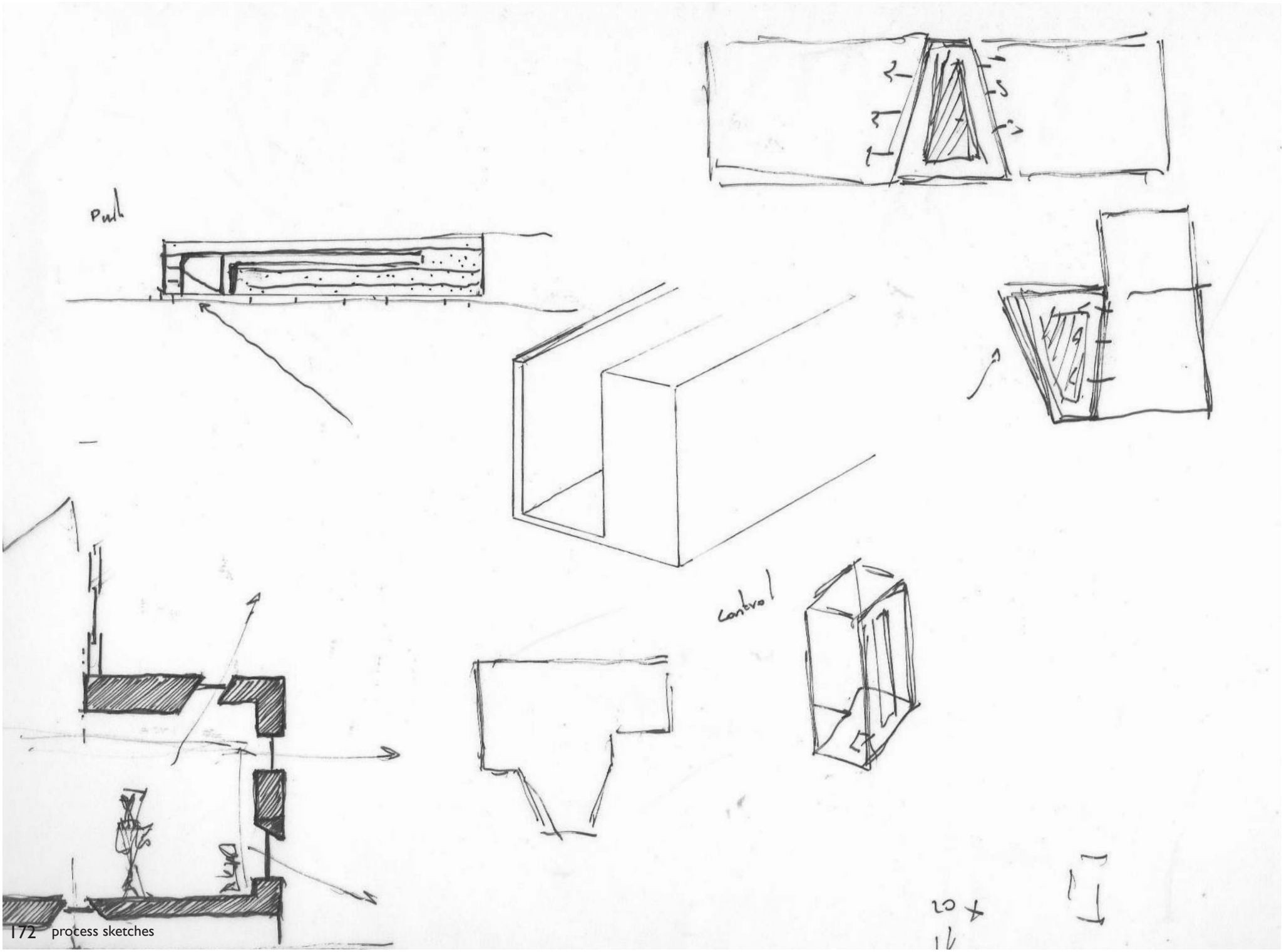

POOL

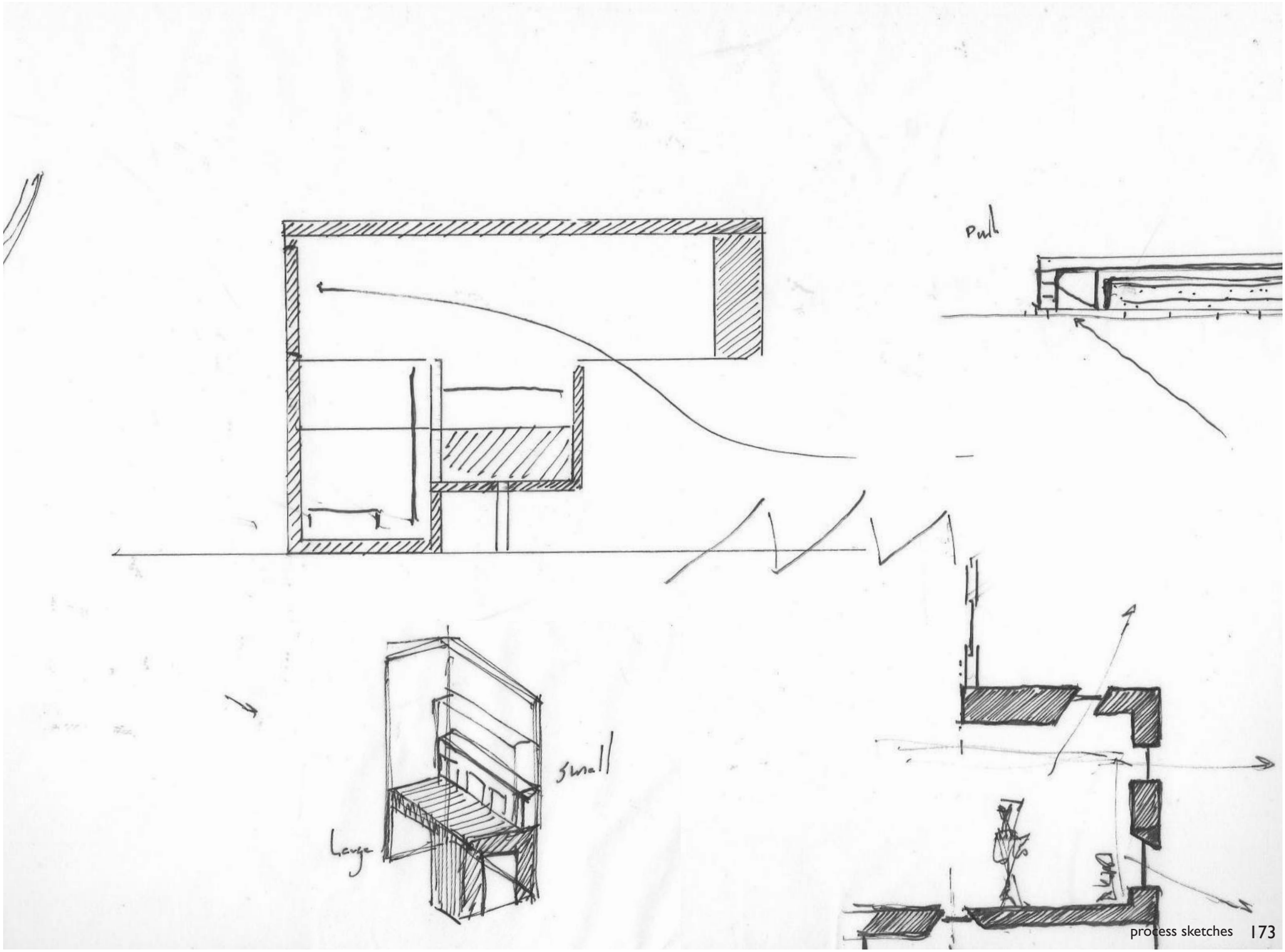

. steam
. water
. lime
water
steam
cool water

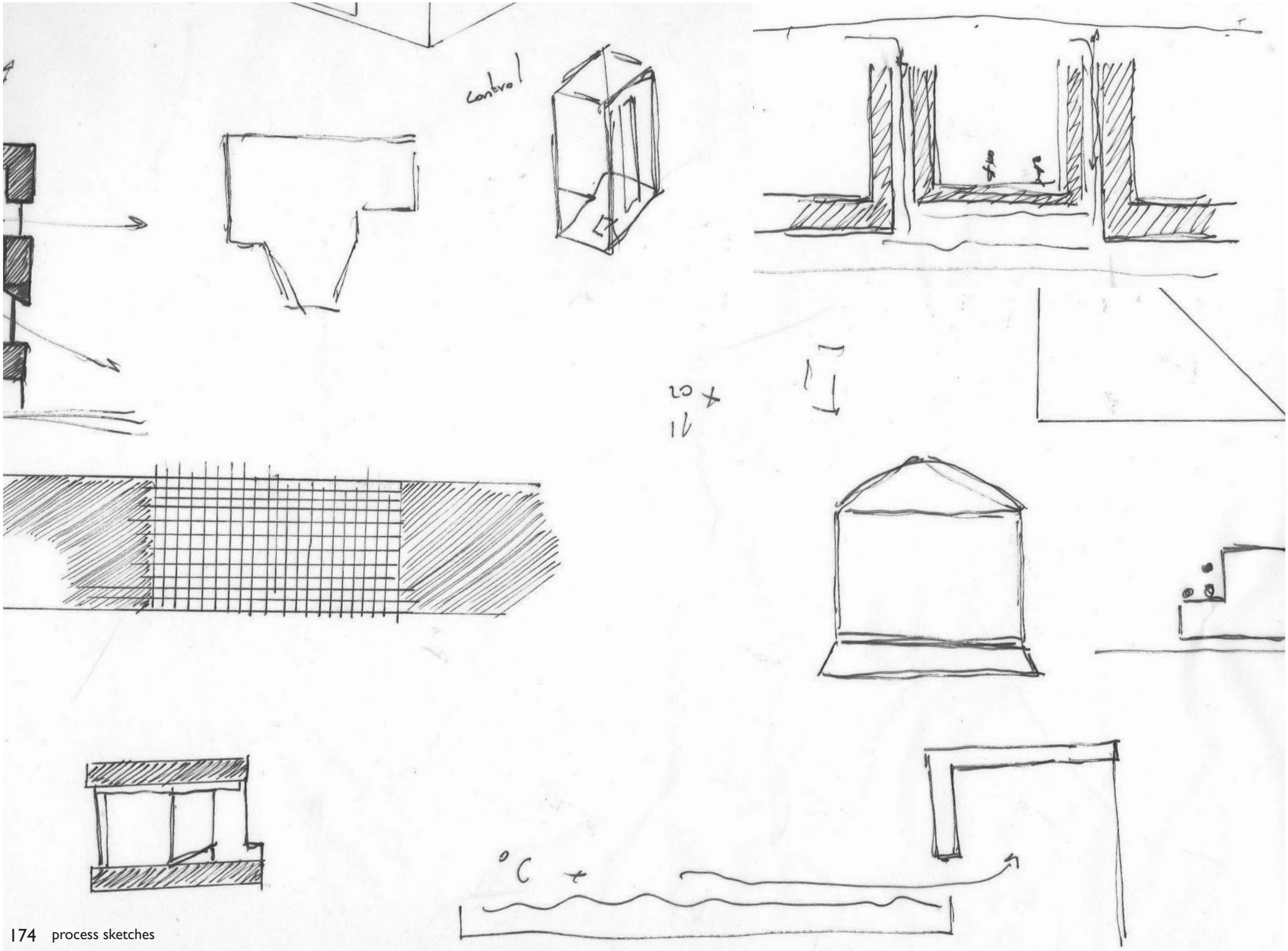

steam
cool water
water
steam
cool water

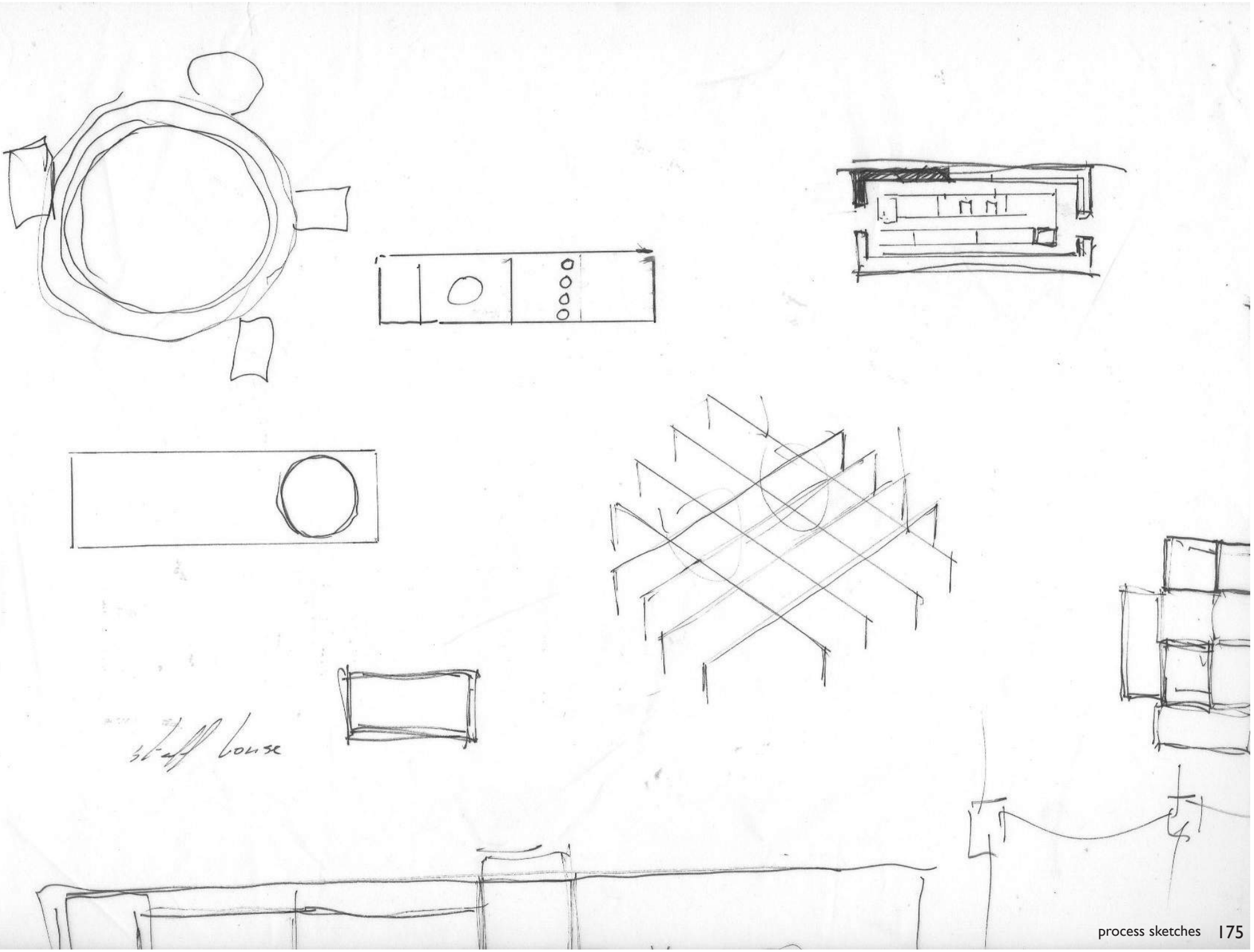

brine
water
Roof
wall
steam
wall / Floor

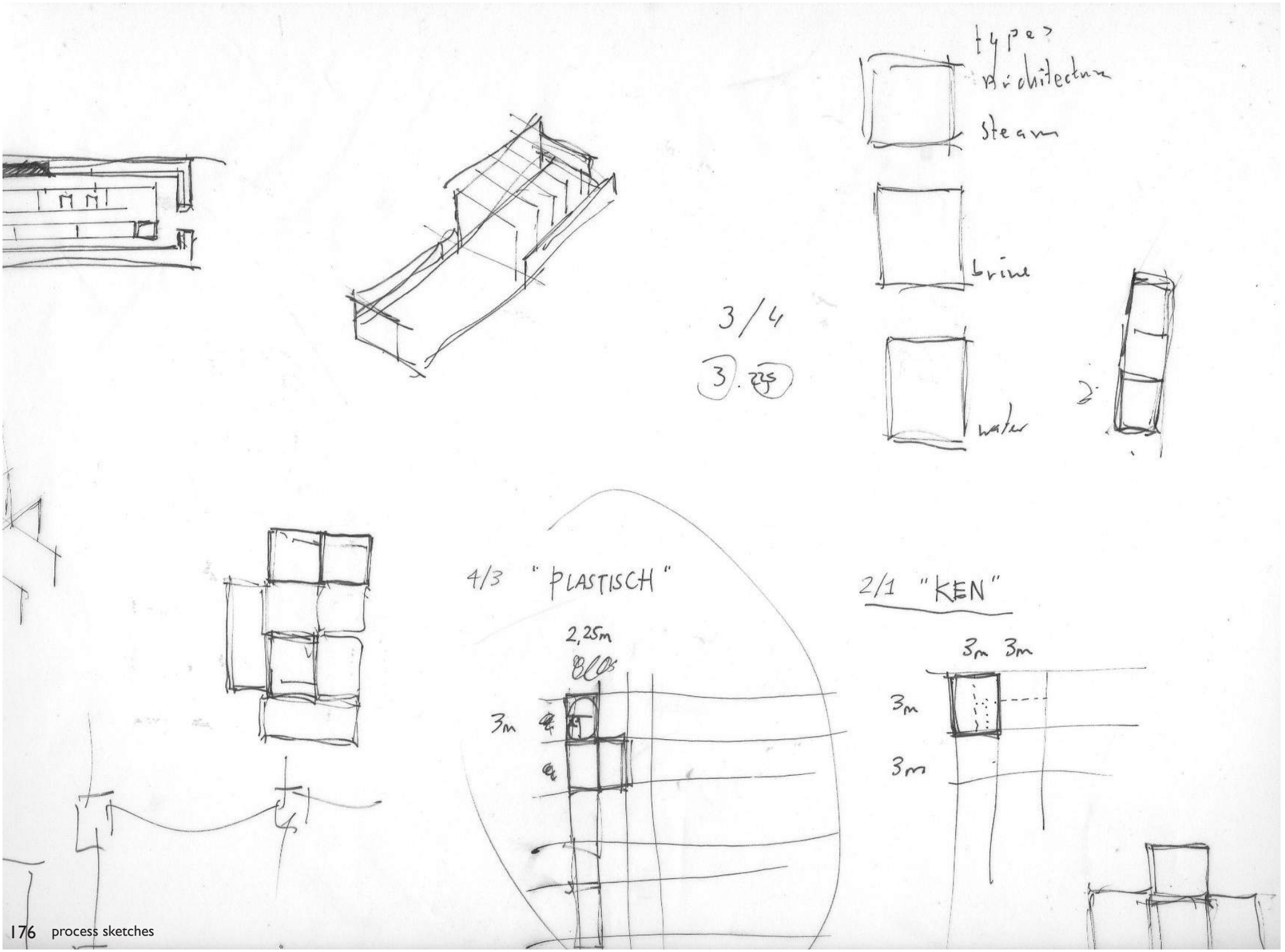



Pull
control


Pull
Large
small


control
°C +


Staff House


type
Architecture
steam
brine
water
3/4
3.25
4/3 "PLASTISCH"
2,25m
3m
2/1 "KEN"
3m 3m
3m
3m

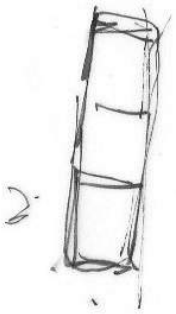
pe>
chitecture
eam

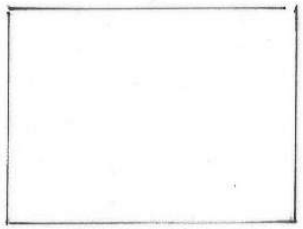
2
1

left open
to outside

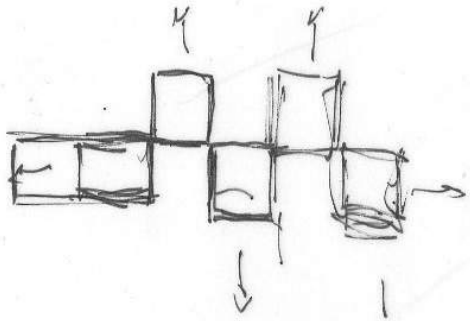
• 1x water basin
• 1x shower

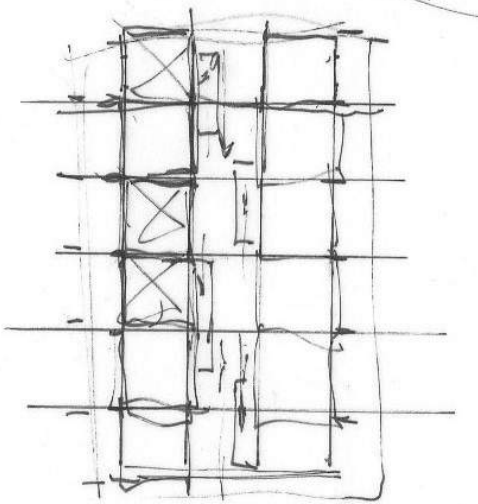
bed
toilet
guest house

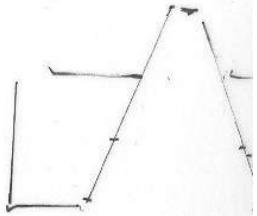




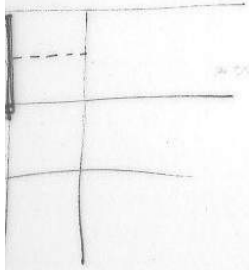
15x room

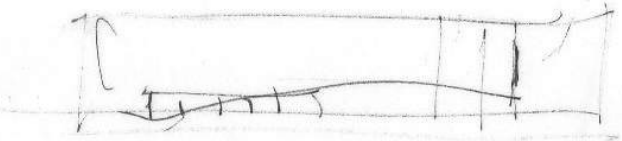


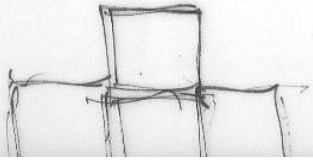




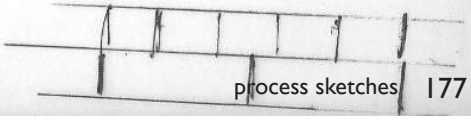
3m

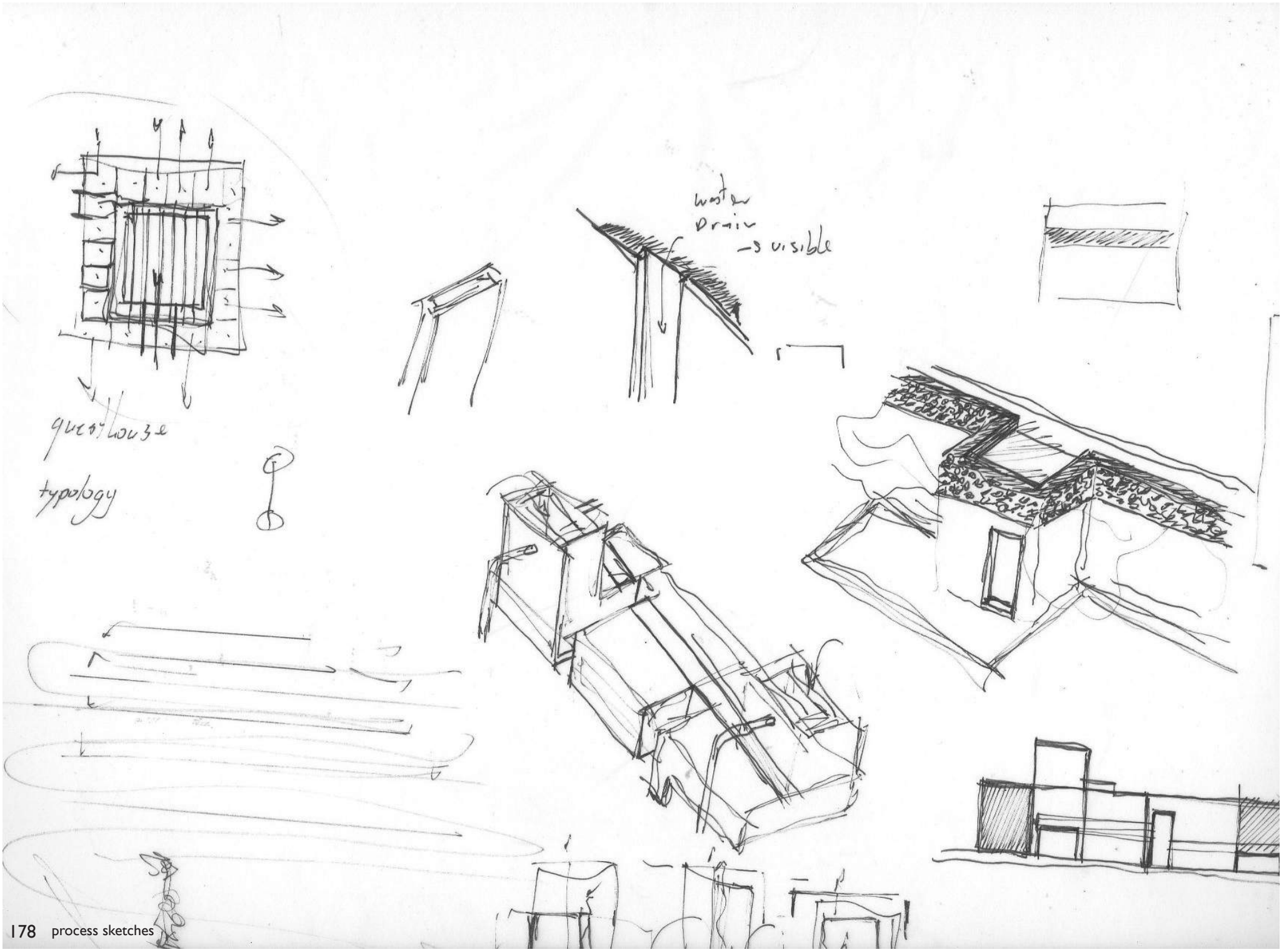


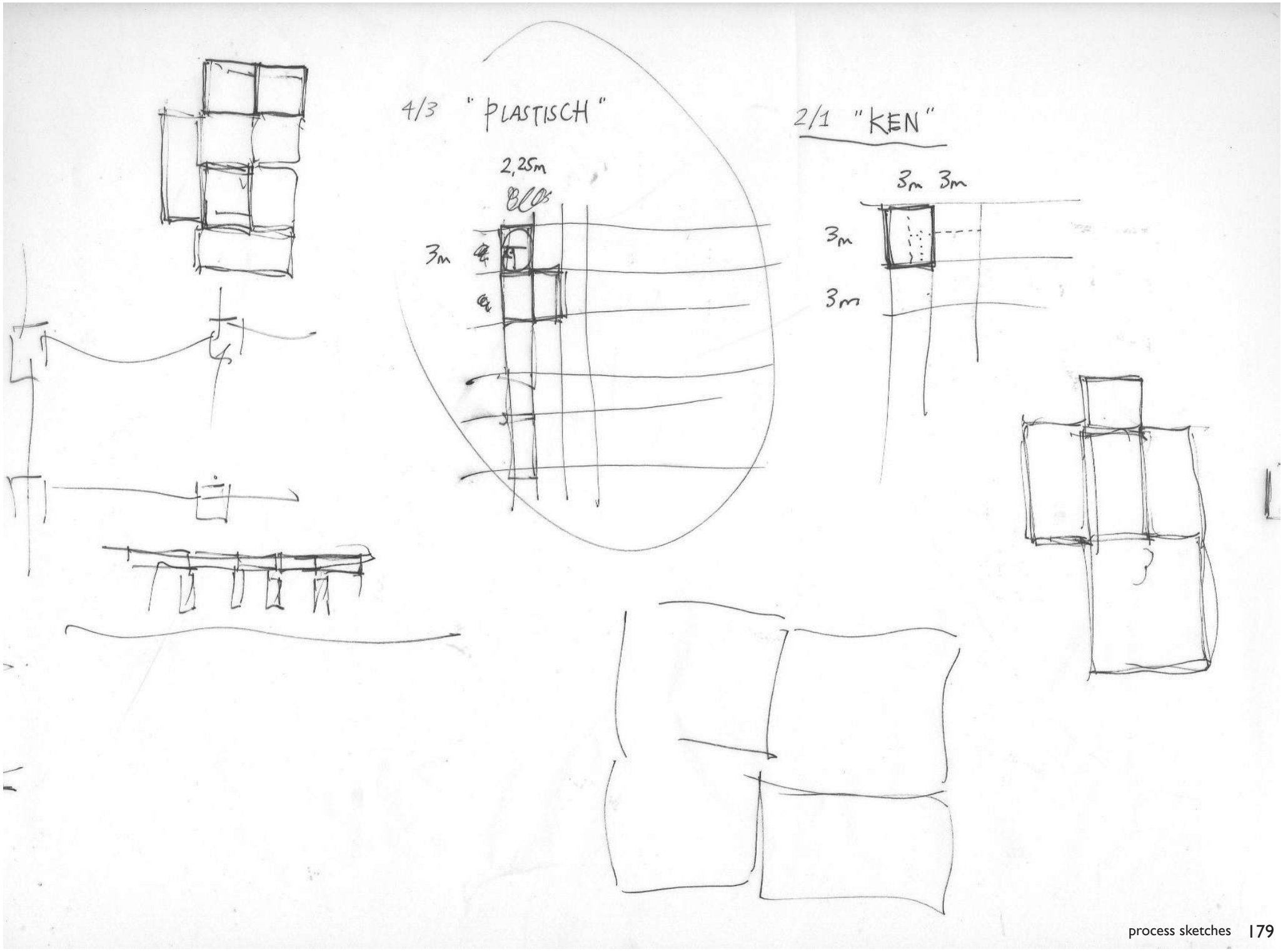


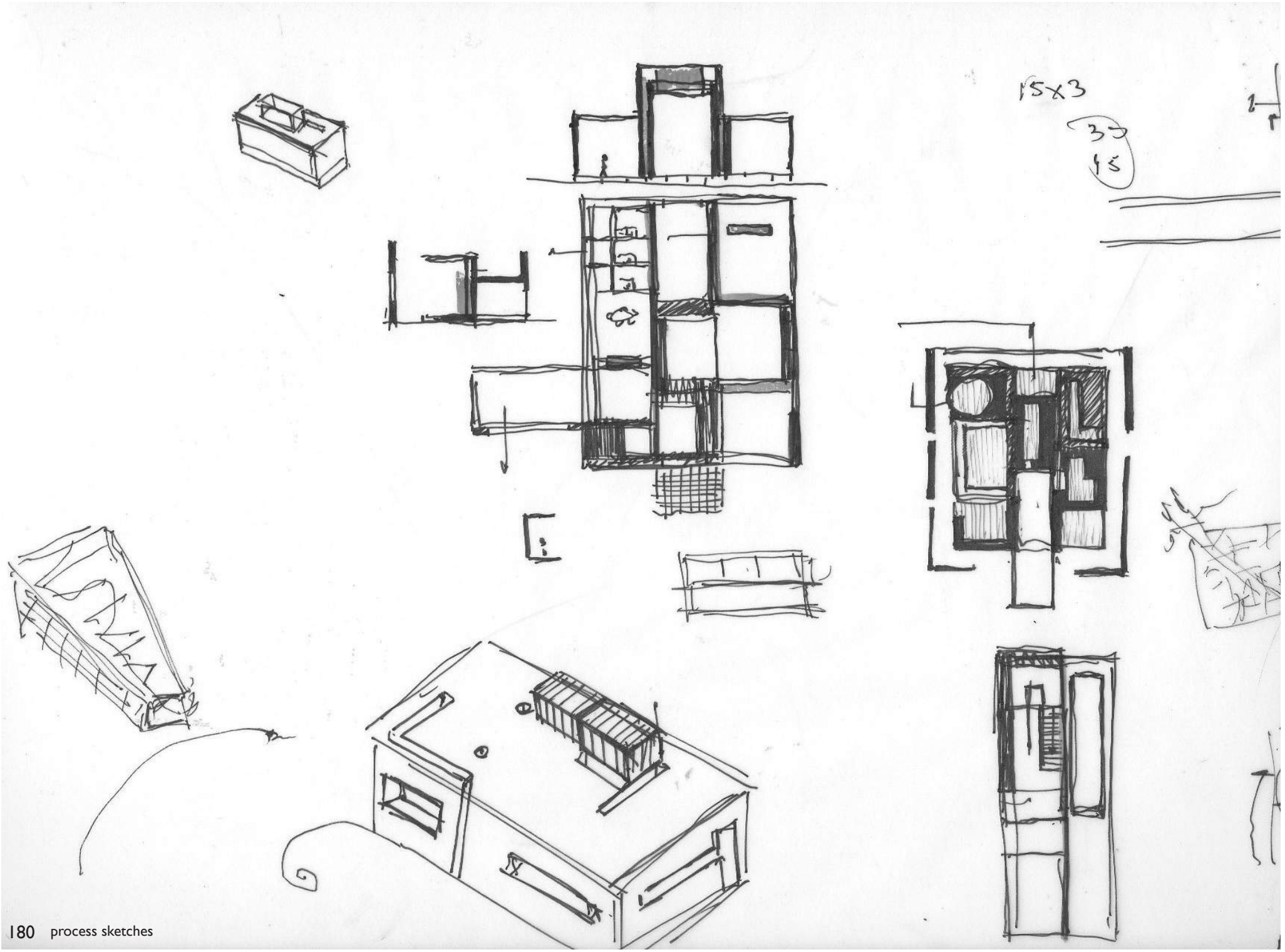


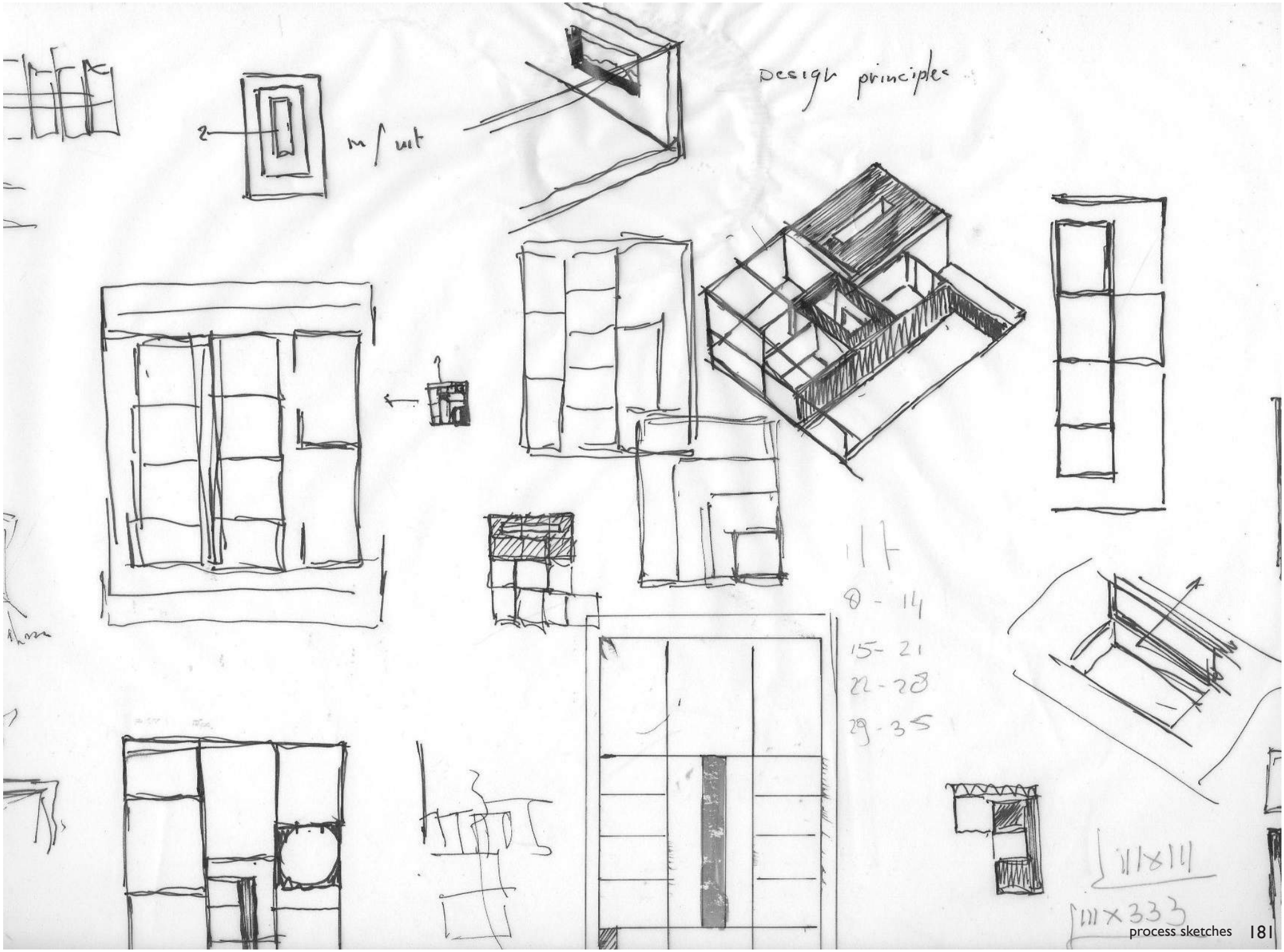
15

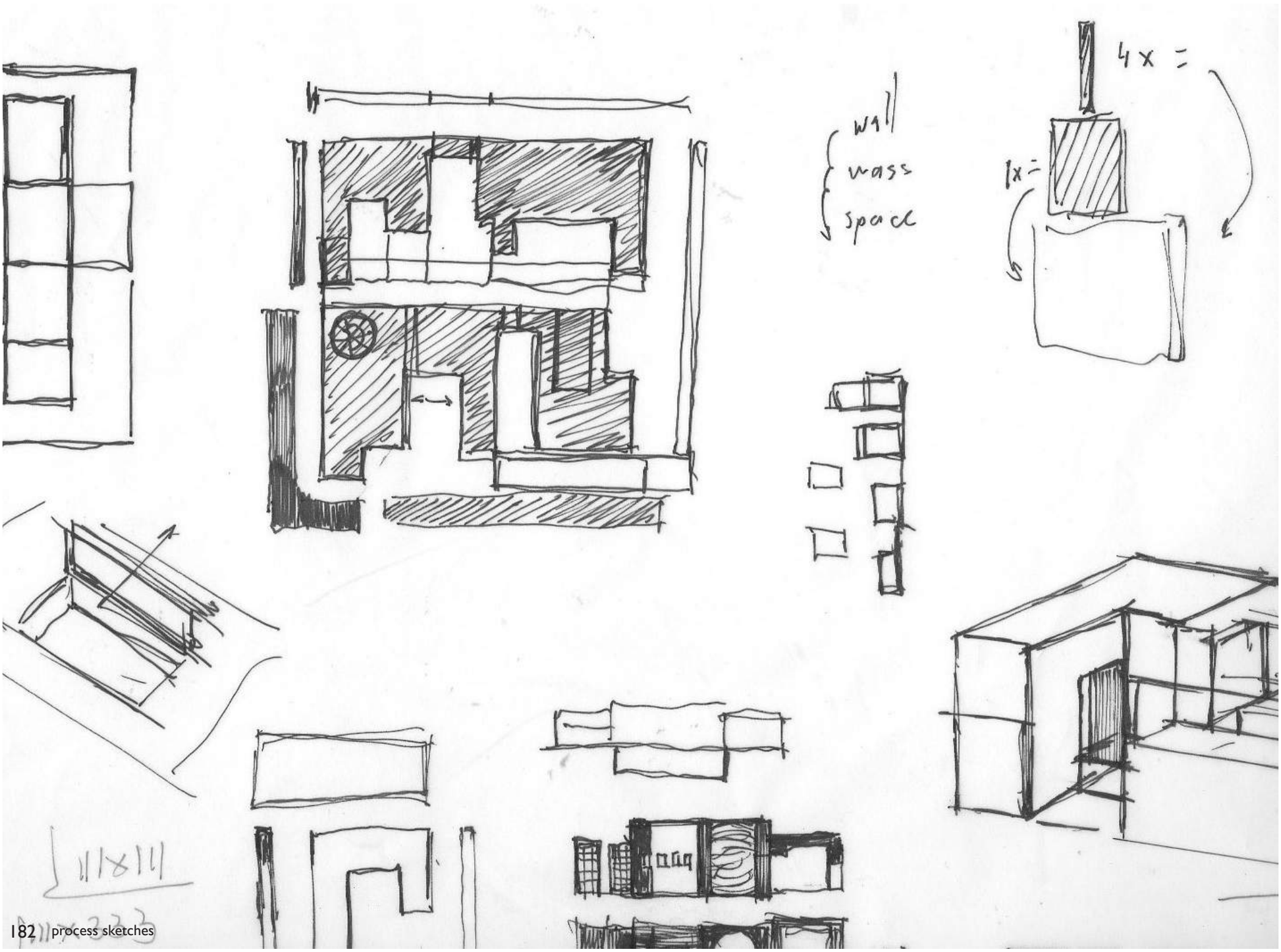


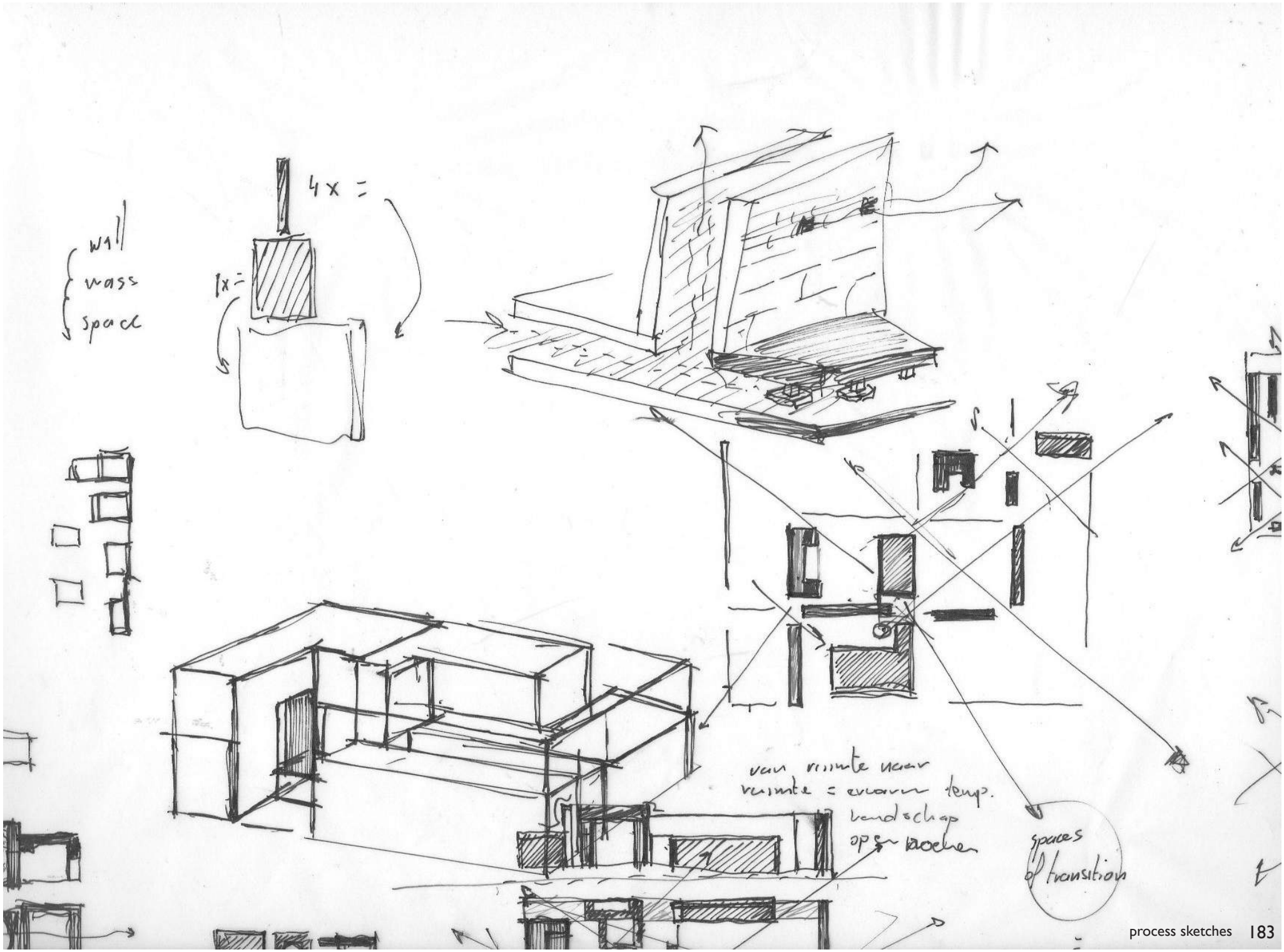

greenhouse
typology
water
drain
visible

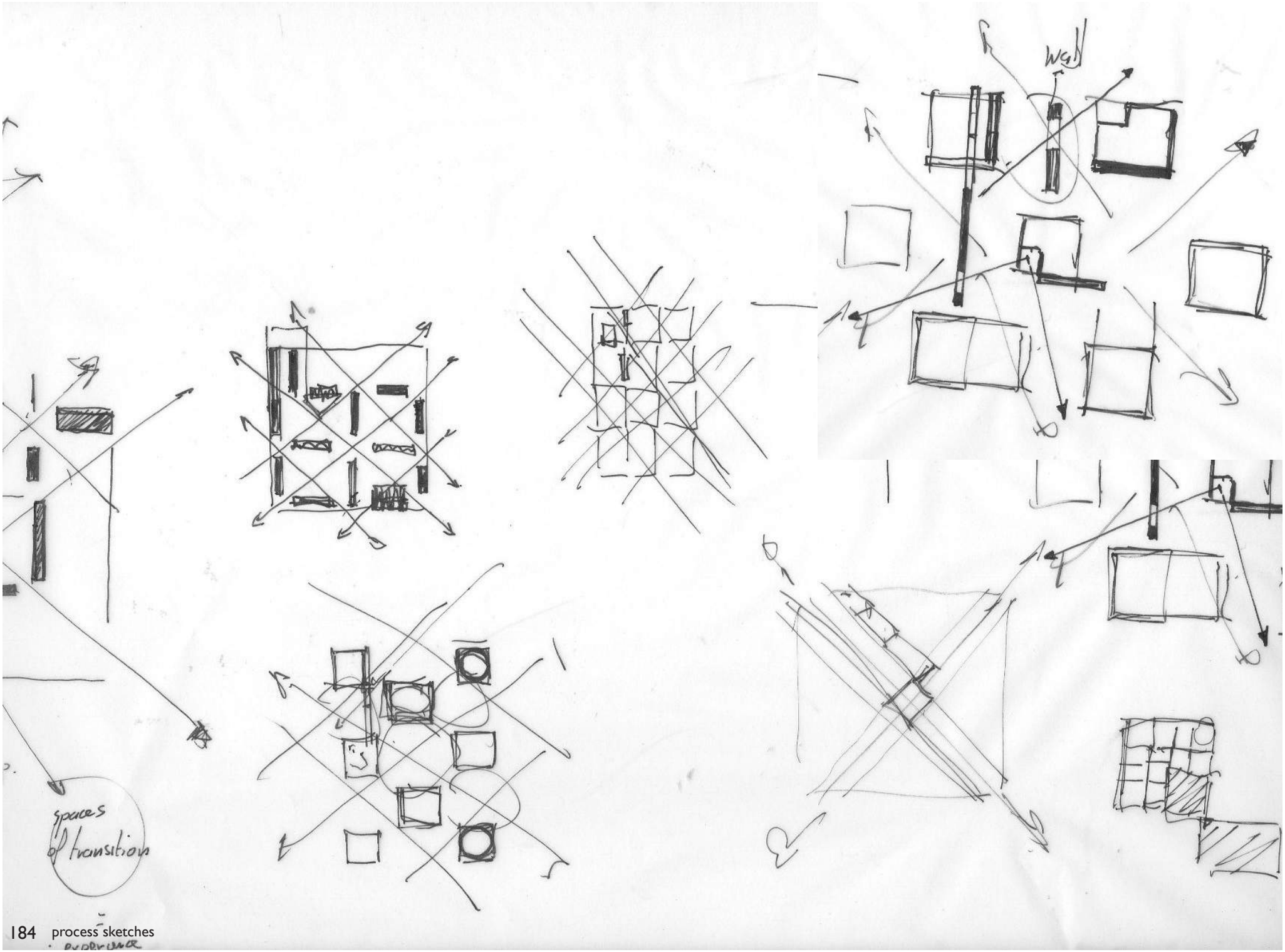

4/3 "PLASTISCH"
2,25m
3m
2/1 "KEN"
3m 3m
3m
3m

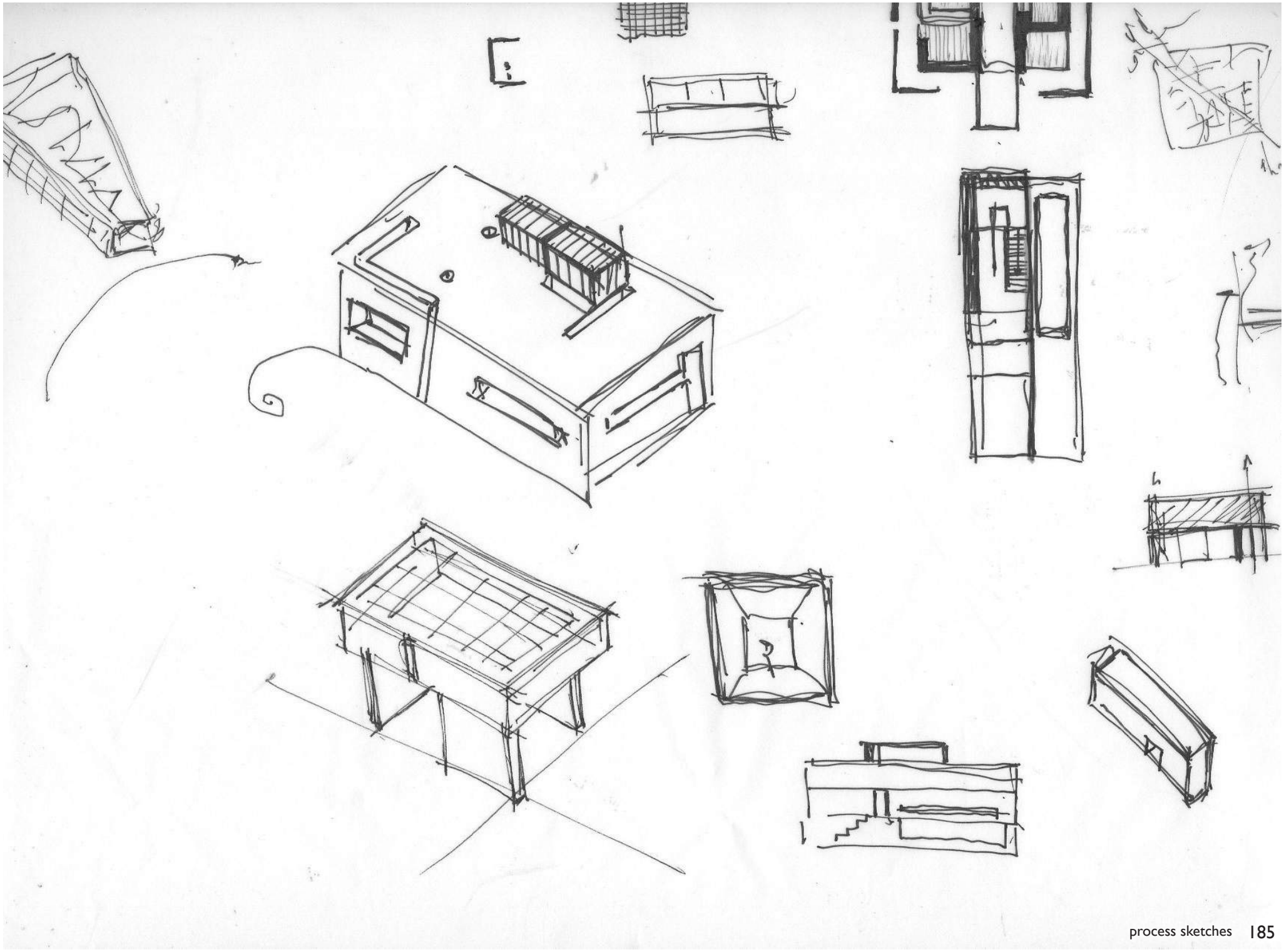

15x3
33
15

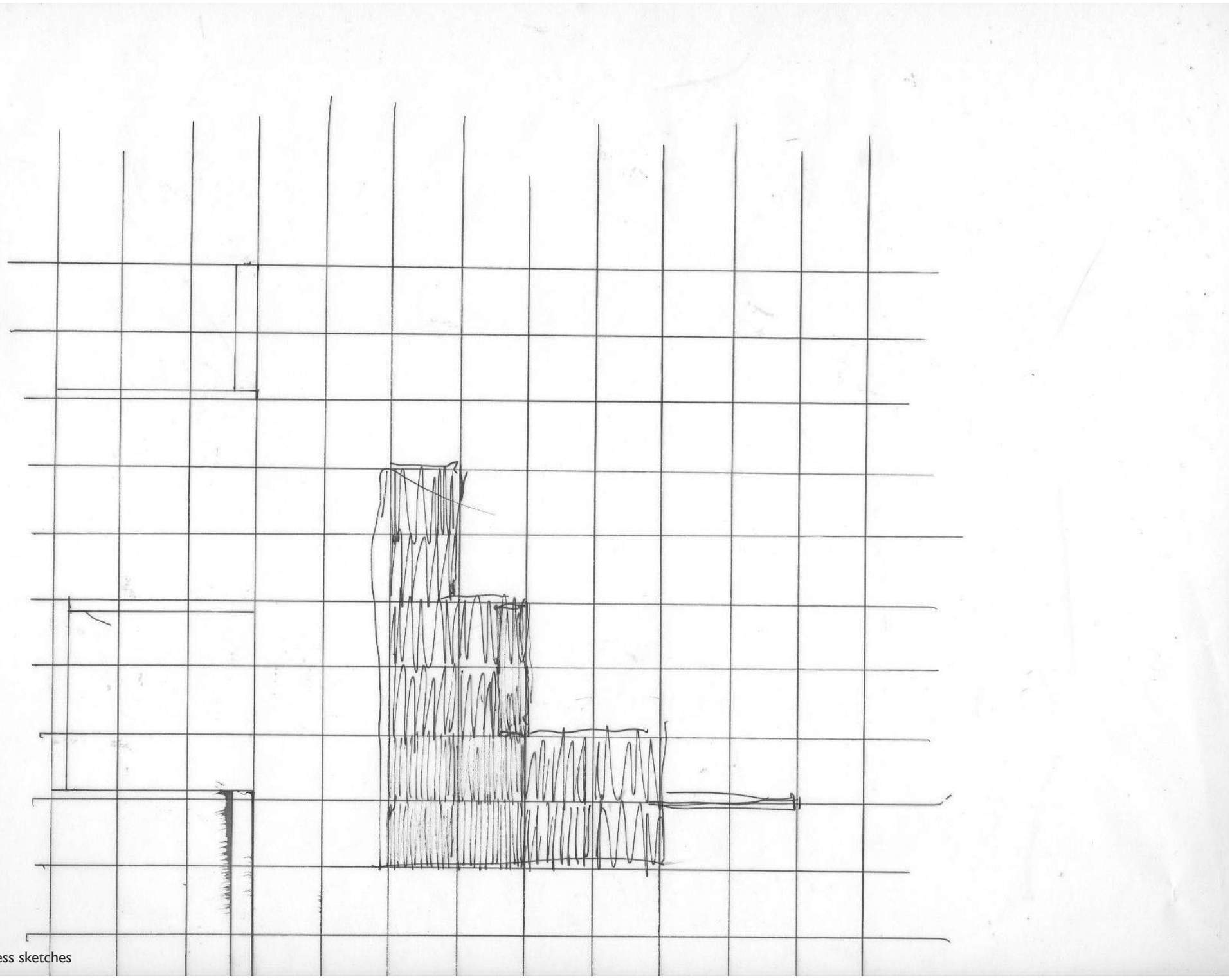

design principles
m/unit
8 - 14
15 - 21
22 - 28
29 - 35
111 x 111
111 x 333

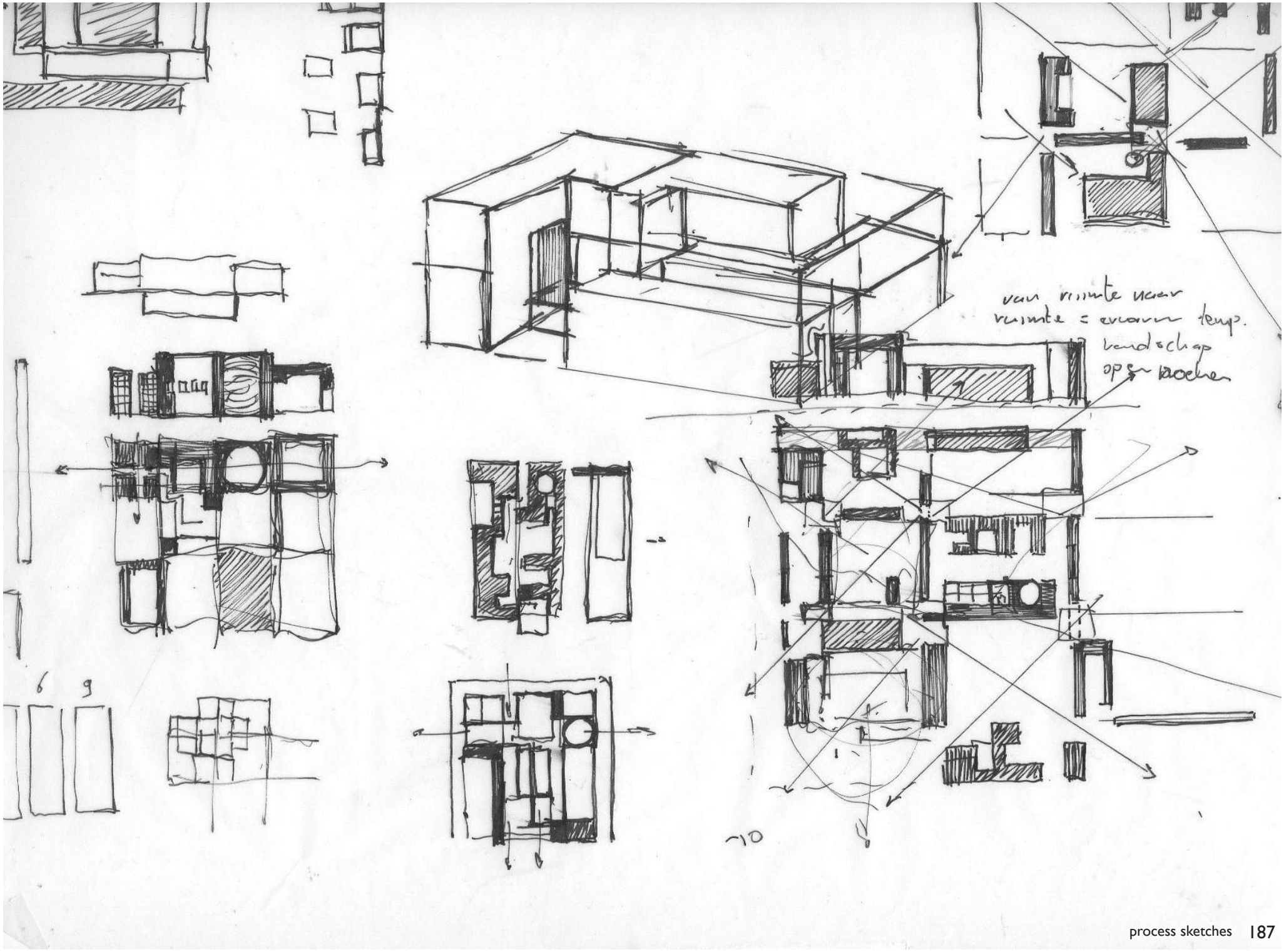

4x =
1x =
wall
mass
space

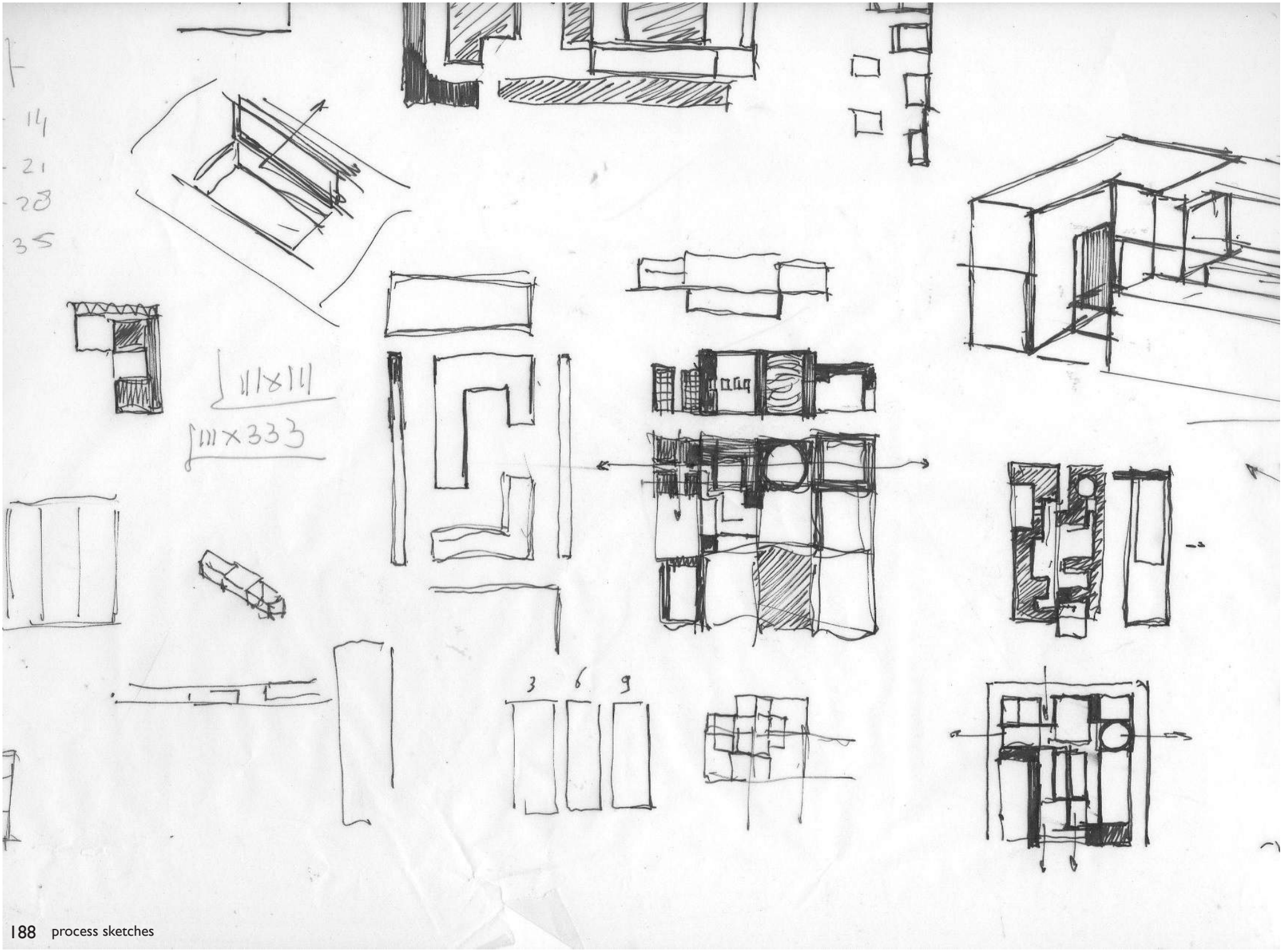

4x =
1x =
wall
mass
space
van ruimte naar
ruimte = evaneer temp.
landschap
spaces
of transition


spaces
of transition






van ruimte naar
ruimte = ervaren temp.
landschap
opp. waarden


14
21
28
35
111x111
111x333
3
6
9