



ARCHITECTURAL LANDSCAPES

An Intervention Into a Landscape Shaped by
Natural and Industrial Processes

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Natural and Industrial Processes

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Tutor: Jonas Carlson



CHALMERS

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INDEX

7	ABSTRACT
9	INTRODUCTION
11	DISCOURSE
13	CHAPTER ONE: REFERENCES <i>CAPTURING THE SPIRIT</i>
14-23	INSPIRATIONAL PRECEDENCES
24-27	WRITTEN REFERENCES
29	CHAPTER TWO: ARCHITECTURAL INVESTIGATIONS <i>CAPTURING THE SITE</i>
30-33	RIBERA DEL DUERO
34-35	GEOMETRIC HOT SPRINGS
36-37	CHICHU ART MUSEUM
38-41	NATURE VS INDUSTRY
42-45	MATERIALITY
47	CHAPTER THREE: SITE AND CONTEXT <i>STORUGNS QUARRY</i>
48-51	CONTEXT
52-53	DEVELOPMENT
54-59	SITE
60-63	PHOTOGRAPHY
65	CHAPTER FOUR: DESIGN PROPOSAL <i>ARCHITECTURAL LANDSCAPES</i>
67	ADDITION & SUBTRACTION
68-69	SITE PLAN & SECTION
70-71	WALKING THE SITE
72-77	VISITOR CENTRE
78-83	DIVING CENTRE
84-89	LODGINGS
90-95	LOOKOUT TOWER
97	CHAPTER FIVE: CONCLUSION <i>MERGING OF NATURAL AND ARTIFICIAL</i>
99	CONCLUSION
100	BIBLIOGRAPHY

ABSTRACT

ARCHITECTURAL LANDSCAPES

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The existence of architectural landscapes is the consequence of the world we live in. The idea that buildings made of stone must have a negative version somewhere out there, because the stones had to have been taken out of a quarry one stone at a time. This idea led me to the Storugns Quarry on northern Gotland, a site facing closure, with the question: Can this man-made place be seen as an architectural landscape with a purpose of existence beyond the industrial?

The Storugns quarry on northern Gotland is a rough and changing site, shaped by both industry and nature. This thesis is about what happens to an industrial site once the industry shuts down. Places like Storugns play a large part in the local culture, economy and natural environment, but exist separately from our every day life. Any intervention into the site needs to be flexible and robust, being able to evolve with time and change according to new circumstances.

The project creates paths for visitors in the quarry, connected to a visitor center that highlights the mining activity of the site with a café, lodgings, a diving center, and a look-out tower spread throughout the quarry to activate a large part of the site. Visitors start out at the visitor center and those who want can continue on the trekking paths to other nodes, look out points and spots for interaction with industry and nature. This allows the site to remain relatively untouched without spoiling its unique characteristics. It also creates a feeling for the visitors that the huge site is open to exploration

I have worked to produce simple, timeless, staged buildings with a clear function. They are similar to the present vernacular and industrial structures of the quarry in that they have been created to fulfill a clearcut purpose, but instead of an industrial function for the quarry they will have an experience based function for the visitor.

Examiner: Morten Lund
Supervisor: Jonas Carlson

INTRODUCTION

"The voyage of discovery consists not in seeking new landscapes, but in having new eyes"

- Marcel Proust -



The scale and processes of the quarry like most industrial sites is something fundamentally different from the world most of us live in. It exists separately from our lives and we never come into contact with it. It is a world hidden to us behind fences but also behind negligence and uninterest. Places like Storugns are themselves becoming endangered in our society and pushed toward the fringes. We have no natural connection to them and industrial places are not seen as a part of our cities or countrysides, it is seen as something else, something unfamiliar and perhaps a bit frightening to be exposed to. In this project I want to reveal this world's unique characteristics and exposing it to interaction with the outside. The fascinating and unexpected experiences these sites have to offer, and what it tells us about our world and our history.

Storugns is part nature and part industry. It is an artificial landscape, created and effected by both man and nature.

How can the visitor relate to the scale and materiality of the site? It is an exposed environment, dusty, windy and completely open to the elements. A visitor would to a degree need to be sheltered from the site and guided through it. To see architecture as a shelter is however to distance oneself from the site, while my goal is to expose the site to the visitor. Therefore the architecture should instead be an integral part of the site while facilitating sheltering and guiding functions, but enhance and highlight the characteristics of the quarry. To give the liberating feeling of a landscape stretching on seemingly forever, to feel the enormity of the sky, the strong unstopped winds and rain.

In my design i have worked to produce simple, timeless, staged buidings with a clear function. They are similar to the present vernacular and industrial structures of the quarry in that they have been created to fulfill a clearcut purpose, but instead of an industrial function for the quarry they will have an experience based function for the visitor.

DISCOURSE

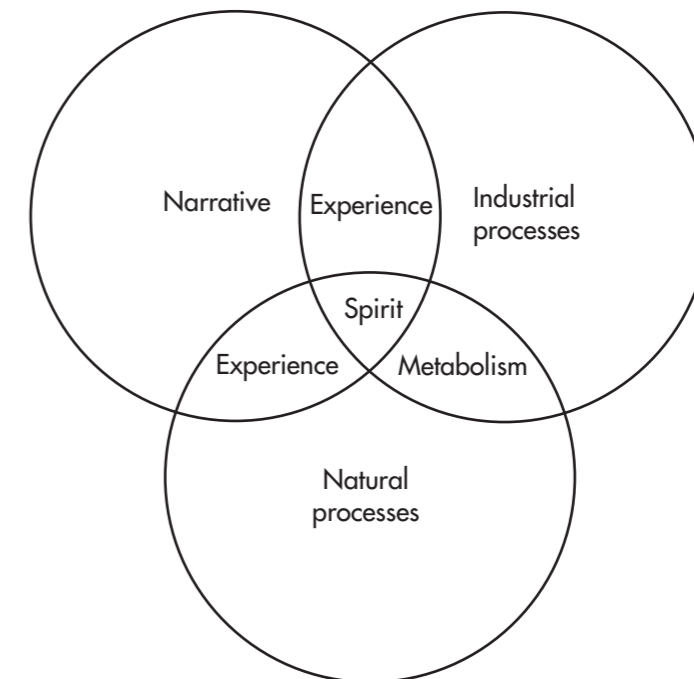
- Thesis Claim -

This thesis argues that the Storugns quarry is an integral part of the local landscape and that it must continue to exist after its industrial use has played out.

The discourse that this thesis propagates are the re-use of industrial sites in combination with the genius loci, the preserving of the site's atmosphere. It draws upon research from architectural re-use of buildings as well as abandoned industrial areas. Since the site chosen is still active and will be for some time I have studied the relationship between active industry, tourism and nature. To keep and develop the spirit of the site it is key to work carefully with the genius loci of said site.

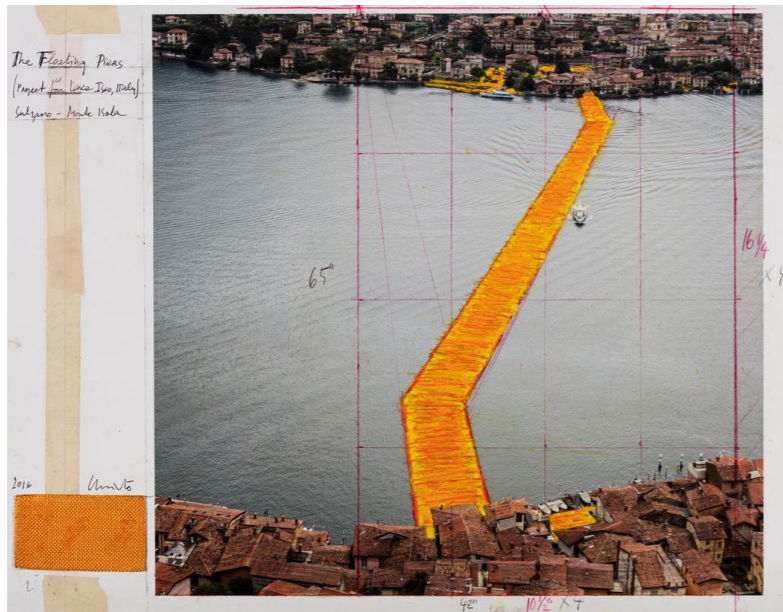
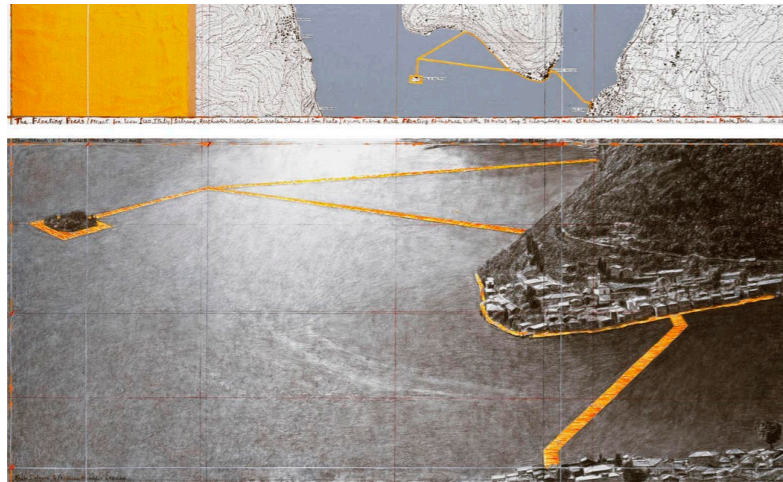
I have looked into other projects and research about the re-use of industrial sites and techniques associated with it. Specifically how a site can be used in new ways without destroying or hiding its past.

The natural processes of the site are equally important as the industrial. The site is being reclaimed by nature even while it's active, and this will speed up when it is abandoned. I have looked at research from similar sites and at the official "after-treatment" plans for the Storugns and Slite quarries on Gotland in order to be able to predict how the site will change in the future.



Chapter One: References

CAPTURING THE SPIRIT



THE FLOATING PIERS

The Floating Piers
- Christo & Jean-Claude -

In 2016 the Artists Christo and Jean-Claude created a series of floating piers on the Italian lake Iseo. Visitors were able to walk upon the piers, taking them from the town of Sulzano to the island of San Paolo, which itself was surrounded by the piers. The entire walkway spanned 3 kilometers and continued on land a further 2.5 kilometers through the use of fabric among the town's streets. It is a fascinating piece of landscape art, which completely changes the local environment, opening up new movement and experiences. This is something which to a great deal inspired this thesis approach to how to treat a site.

"Like all our projects, The Floating Piers was absolutely free and open to the public, said Christo. There were no tickets, no openings, no reservations and no owners. The Floating Piers were an extension of the street and belonged to everyone.

Those who experienced The Floating Piers felt like they were walking on water – or perhaps the back of a whale," said Christo. The light and water transformed the bright yellow fabric to shades of red and gold throughout the sixteen days."¹

¹ <http://www.designboom.com/art/christo-floating-piers-christo-jeanne-claude-lake-iseo-italy-06-07-2016/>



STRUCTURES OF LANDSCAPE

Structures of Landscape
- Ensemble Studio -

Ensemble Studio created this unique architectural installation where they seemingly constructed the landscape again, on top of itself. This reinterpretation of what a landscape is and how it can be seen and used as architecture effected my thinking throughout this thesis.

"We imagined structures of landscape: site-specific architectures that build space by reorganizing local matter; that cultiivate landscapes within landscapes. Working with earth and stones and interpreting their formation logic, we developed techniques and processes to manipulate the structural, acoustical and thermal properties of these materials at various scale; learning from geological transformation processes - sedimentation, erosion, weathering, crystallization, compaction, metamorphism. And so, Structures of Landscape occupy an ambiguous position between nature, architecture and art: they can be one and all, or a completely different category that only makes sense where it was born."¹

¹ Anton Garcia-Abril, Debora Mesa Molina. Biennale Architettura 2016



MARYHILL OVERLOOK

Maryhill Overlook
- Allied Works -

I was drawn to Allied Works' project The Maryhill Overlook because of its very effective use of scale and geometry. The project seemingly disappears into the horizon while it still manages to work on a very human scale as well.

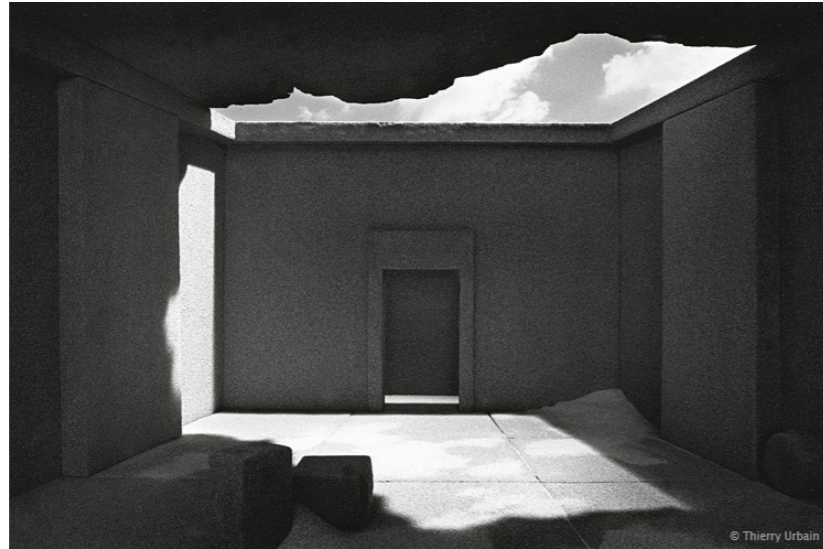
The following text has been taken from the Allied Works website:

"The Maryhill Overlook is a site installation that lies on a bluff above the Columbia River Gorge, within a vast landscape of barren grasslands marked by basalt scarps. It is a harsh environment exposed to extreme wind, weather and dramatic swings of light. Constructed in 1998, the Overlook is Allied Works' first completed Sitings Project, part of a series of conceptual proposals that seek to interpret and reveal the diverse landscapes of the Pacific Northwest.

The Overlook is organized as a single, eight-foot wide ribbon of concrete that emerges from the earth, rising and falling as it moves to the edge of the cliffs. Along its 150-foot length are eight volumes that open and close to the sky. From a distance the form dissolves and reemerges as line or plane in response to the quality of light, the shape and intensity of shadow and changing point of view. Drawing closer, held in the hollow wall, the surfaces are cut by a datum that establishes a specific reference to the body and to the surrounding landscape. As the form extends to the south, the land falls away, at first gently, then steeply down to the level of the river. Across the Columbia, a flat stone outcropping provides a focal point for the Overlook, both anchoring it to its place and extending its energy into the high desert beyond.

The Overlook serves to amplify the natural and experiential forces at work on the site. It is a demarcation that allows occupation and provides a measure of scale, distance, and time. Through a single act of making, the inherent architecture of this landscape is revealed."¹

¹ <http://www.alliedworks.com/projects/maryhill-interpretive-overlook/> 2017/05/28



HYPOGEE

Hypogee
- Thierry Urbain -

The french artist Thierry Urbain has in his series Hypogee carefully staged rooms to give a certain effect to the visitor and a certain interaction with the site. In the examples to the right is three different rooms. The top room is based around a caved in roof, giving the room contact with the day- and nighttime sky. The middle room is based around a well filled with water which reflects the light of the entrance into the roof. In the third room the dusty air almost takes on a physical form by dramatic use of a skylight.

His work inspired me when creating the subtracted structures in my design. His work has an effective use of minimal elements to create a big impact on the visitor, and the feeling of purity and timelessness his designs carry.



AN EMPTY VALLEY

An Empty Valley
- Ettore Moni -

Italian photographer Ettore Moni has in his project An Empty Valley captured an abandoned quarry and shown how the mining has effected the valley and the people who live there.

The following words have been taken from the website Atlas of Places:

“Not far from the iconic city of Carrara, in the heart of the Apuan Alps, and uncommonly for Italian expectations in this field, the history of this valley and its force break down any stereotypes about the world of marble, about quarriers and those who live there. This history merges images and imagination and results in sometimes bitter yet never banal narration, which provides an alternative, new, discouraging point of view. The rays of sunshine barely reach out to here, let alone the first pages of magazines and the flashes of photographers. Here, all voids are filled. Filled with stories about courage - that of an abandoned valley and of those who still live here, among all its wounds, contradictions and natural limits. On one side this tough nature hardly allows space for man-made constructions, yet on the other side it lets quarriers reach its very heart with their apparently unnatural lengthwise cuts, which in fact follow the geological patterns of marble layers. The antagonist here, if there is one, is history, which is always such a severe teacher: think of the industrial revolution, whose - mainly negative - effects have deeply affected the valley, and think of the massacre of about a hundred people. This is why it is of little importance that this place is barely reached by the rays of sunshine, because here I could actually arrive. And I came back. After all, here one could well imagine to be able to look at the sea from the ‘Dolomites’ or to walk on the austere lunar soil. One may also find a shepherd writing poetry, or a quarrier with a university degree; and even meet a hunter who prefers using his legs for trekking to using his rifle for killing, or a sculptor considering his solitude an opportunity.”¹

¹ <http://atlasofplaces.com/filter/Photography/An-Empty-Valley-Ettore-Moni>.



LOST AND FOUND

Lost and Found - Architectural transformations
- Royal Danish Academy of Fine Arts -

Lost and Found showcases the work method and built examples from different studios and projects focused on architectural transformation at the Royal Danish Academy of Fine Arts.

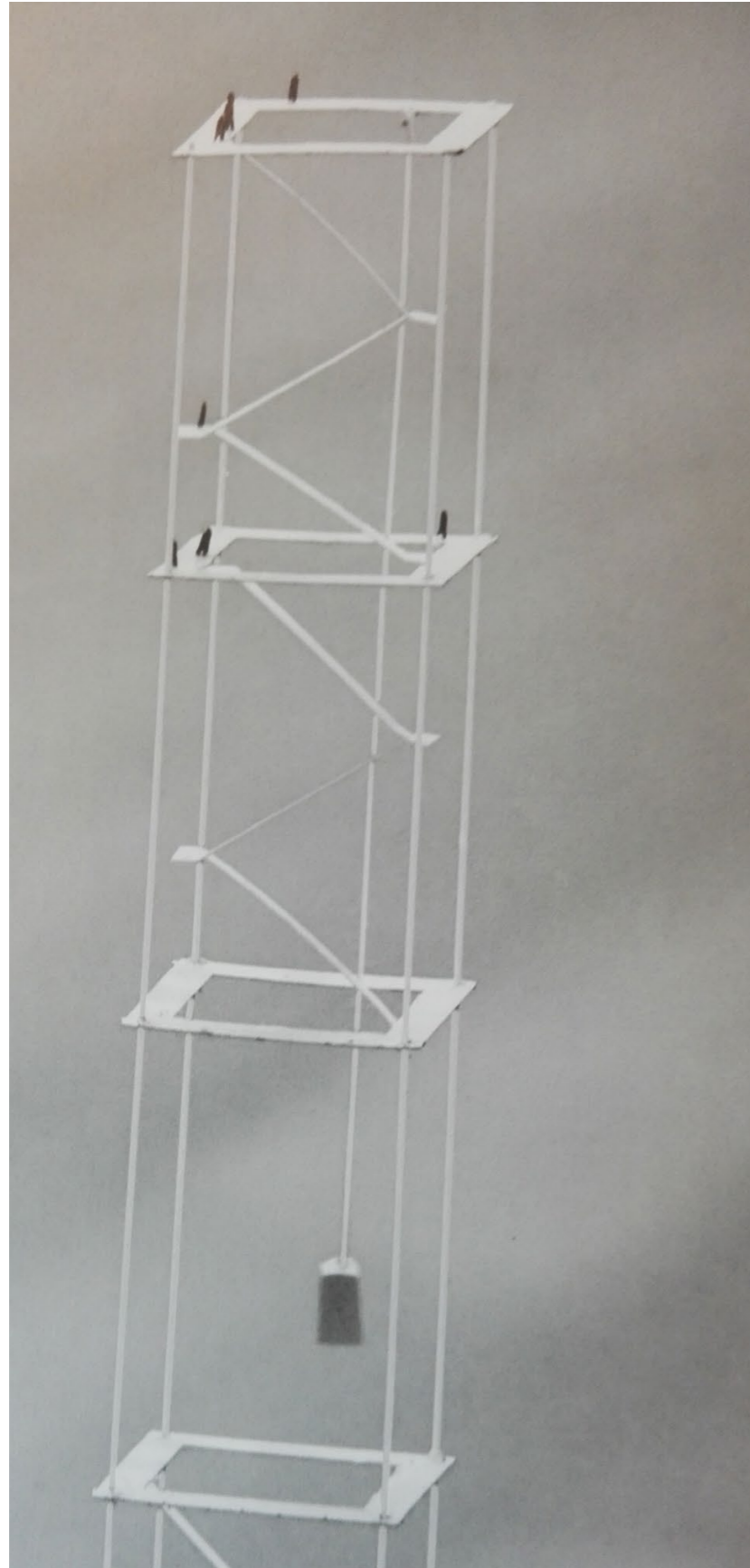
The roman architectural theorist Vitruvius, who lived around 25 years BCE set out two principles which mankind has used as a basis for creating an enclosed space. In the first principle the space is formed by eroding a solid mass, i.e. through subtraction of material. The second principle is forming a space by creating a construction, i.e. through addition of material.

For space as erosion or excavation, the relationship is very different from that of the space as construction, even though we know that it is possible too create aesthetic effects in the constructed space that draw on the effects we know from the hollowed-out space. It can be somewhat cave-like in its essence but the space is by no means a cave if it is formed of a floor, free standing walls and a roof, separating an outside and an inside. But the cave like feeling of the space is something we can feel very strongly, resulting from the special effects that can be created through the architectural selection of materials, window openings, light and shadows. An example of this is Sigurd Lewerentz's church Klippan which can be seen in the pictures to the left.

In the book Christoffer Harlang writes the following passage about change:

"The world is changing and so are we. Along the way, there are things which will disappear from our lives forever; things which we will never see again. We may miss them, but this will not always be the case - the loss could feel like a relief. We may be replacing it with something better. But some things may reappear. Resurrected, perhaps altered in some way, transformed or damaged; it may become part of our lives once again. Perhaps through a stroke of fortune or due to a certain resilience or perseverance from it or ourselves; some things are destined to stay with us for a long time. As faithful moments of our everyday life or consistent characters of our culture amidst this dynamic world and it's ever changing inhabitants.¹"

¹ Harlang, C. Lost and Found - Architectural Transformations. Centertryk A/S. Copenhagen. 2013. p. 44.



ANOTHER SCALE OF ARCHITECTURE

Another Scale of Architecture
- Junya Ishigami -

In the book *Another Scale of Architecture* the author Junya Ishigami writes about seeing landscape and natural environment as architecture. The book influenced my thinking of how to be treating an artificial man-made landscape and how architecture can relate to such a place. Ishigami writes about the fundamental point of architecture - to facilitate a sheltering function for humans - and how it distances us from our natural environment. He continues to argue that today the clear line between artificial and natural environments have begun to blur as we have started to fully dominate our planet and changing it according to our needs. The artificial environment is affecting the natural to such a degree that the natural environment is now forced to affect the artificial in order to survive. They are starting to blend, and nowhere is it as evident as in this thesis' site, the Storugns Quarry. The two separate systems are so intertwined it is no longer possible to judge what belongs where, as the site would not exist if it were not for the meeting of the artificial- and natural environment.

Ishigami also writes about scale. In particularly the immense scale which can only be found in the natural environment. If architecture becomes a fusion of artificial and nature this scale can be used to create completely new environments for us as humans. He argues that in order "to conceive architecture for this new environment - Architecture as shelter - such an image is unsuited to this newly emerging environment. To see architecture not as shelter but as environment, itself. Architecture thus created will melt into the new environment now emerging and, simultaneously, give form to a new environment. That new environment = architecture. This is another scale of architecture; the new image for architecture."¹

¹ Ishigami, J. *Another Scale of Architecture*. Seigensha Art Publishing, Inc. Kyoto. 2015. p. 32.

Chapter Two: Architectural Investigations

CAPTURING THE SITE



RIBERA DEL DUERO

RBGO Ribera del Duero Headquarters

- Estudio Barozzi Veiga -

Barozzi Veiga have designed the headquarters for the Ribera del Duero wine region Regulatory Board. Situated on a hill at the very edge of the town of Roa in Spain the building is shaped both by the town and it's bordering landscape.

The identity of the existing buildings and landscape is captured through the method of using local stone materials and traditional building techniques in the new structures.

The new buildings act as extensions to the old buildings, connecting to them on three sides of the square. The fourth side is left open, creating viewing platform that makes the hilltop accessible to all visitors and the landscape part of the square.

The architectural structure gives a timeless and monolithic expression to the new buildings. It is as though they've always been there and will always remain, aging and changing together with the landscape and fusing them together.

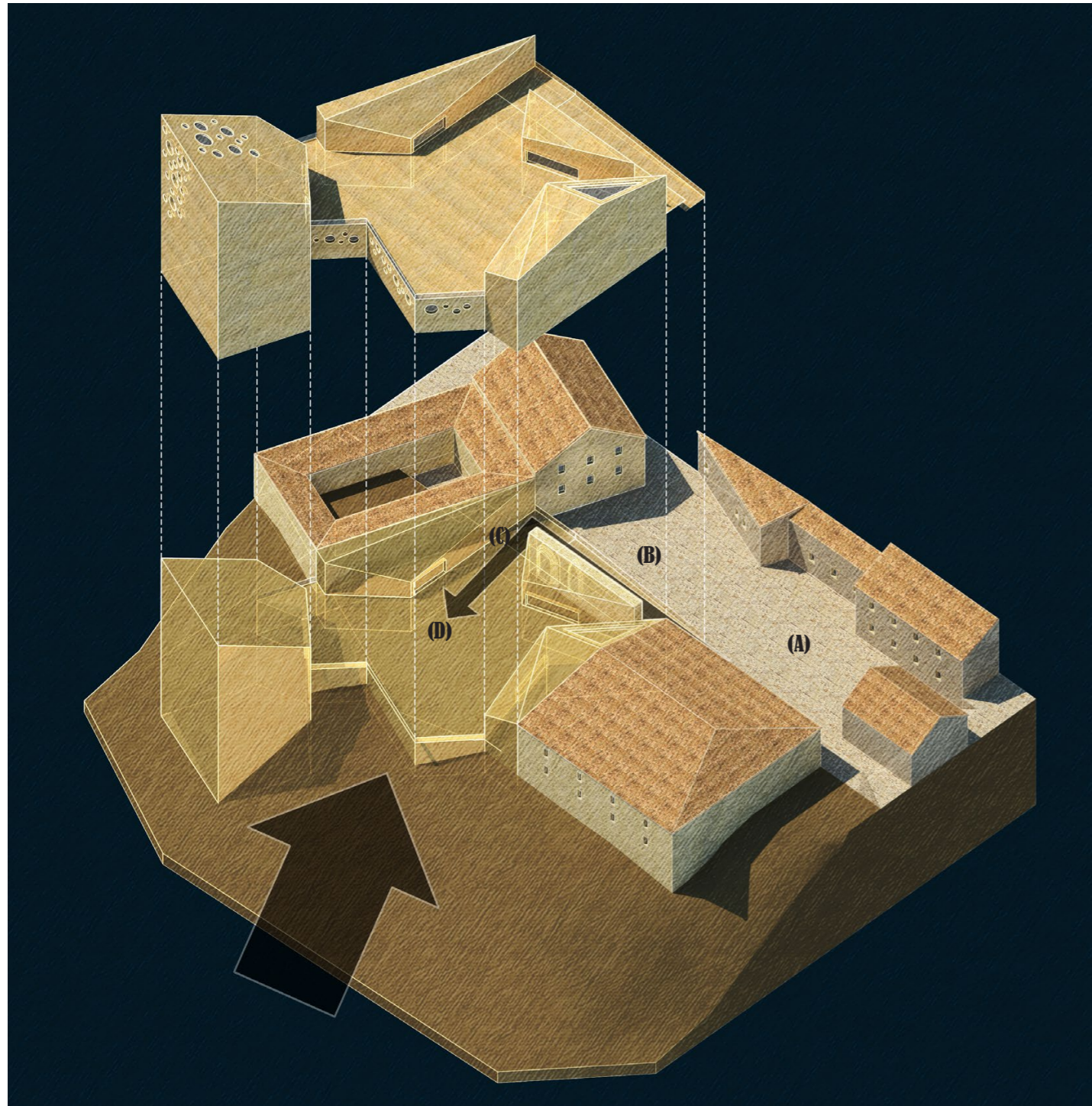
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Key points:

- Materiality
- Highlighting of characteristics
- A narrative walk
- Intense usage of site
- Possibility of choice
- Views

- Exploded Axonometric View -



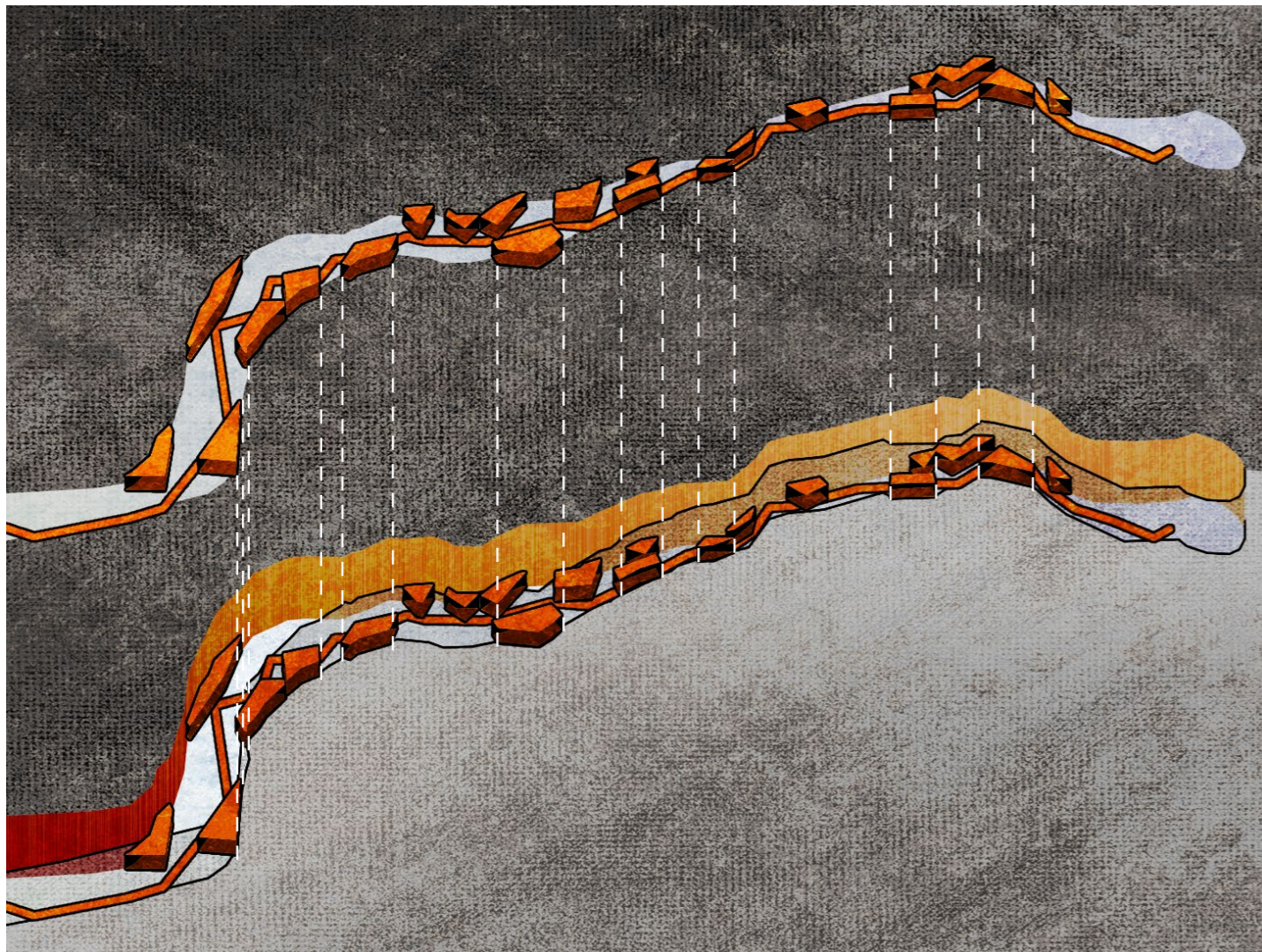
Before you enter the new complex you stand on a small town square, surrounded by medieval stone buildings. (A)
The building complex is situated behind a previously existing wall turned towards the town square. The wall is perforated by two seemingly ancient arches. (B)
A glass wall has been put inside the arches, signaling in a discreet way that the old structures are inhabited. On the right side of the wall you can glimpse two of the new extensions, displaying an opening. You move through the narrow corridor between the old wall and a new wall and the plaza expands in front of you. (C)
Two flanking extensions lead you forward towards the monolithic tower and the view of the landscape. You move and the town recedes. The landscape is rushing towards you and the plaza seem to blend into it. The view is focused by the flanking buildings. The roofs point downwards making the sky seem larger. (D)



GEOMETRIC HOT SPRINGS

Geometric Hot Springs

- Germán del Sol -



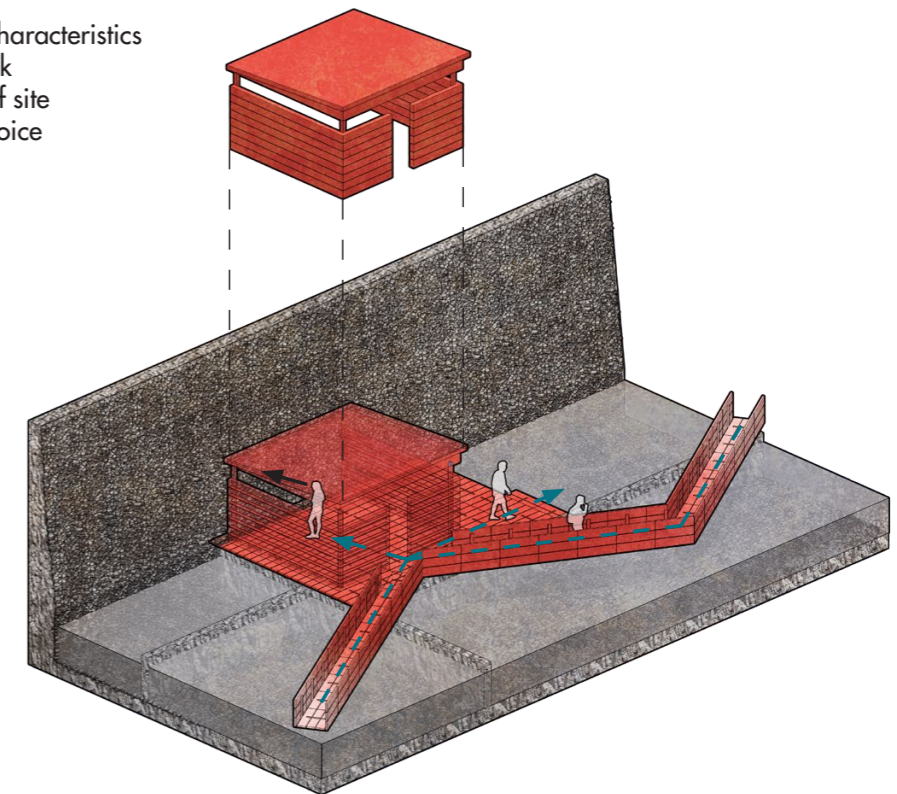
The project is located in the middle of the Villarica National Park, Chile. 17 pools were carved along 450 meters, with red wooden paths and ramp without steps that drive the visitors into the pools and lets them walk through the project to pick a pool to bath in.

The architecture is simple but geometric and painted to make it contrast to the nature. The visitors are funneled by the walkway. It creates the opportunity to interact with the site, without it it would have been impossible to move around. The large number of stops along the walk makes it eventful and interesting as you can pick your own stops.

The structures along the path are all put against the rock wall, letting it form one of the walls of the building. The walkway zig-zags between them.

Key points:

- Respectful but contrasting
- Materiality
- Highlighting of characteristics
- A narrative walk
- Intense usage of site
- Possibility of choice



CHICHU ART MUSEUM

Chichu Art Museum
- Tadao Ando -



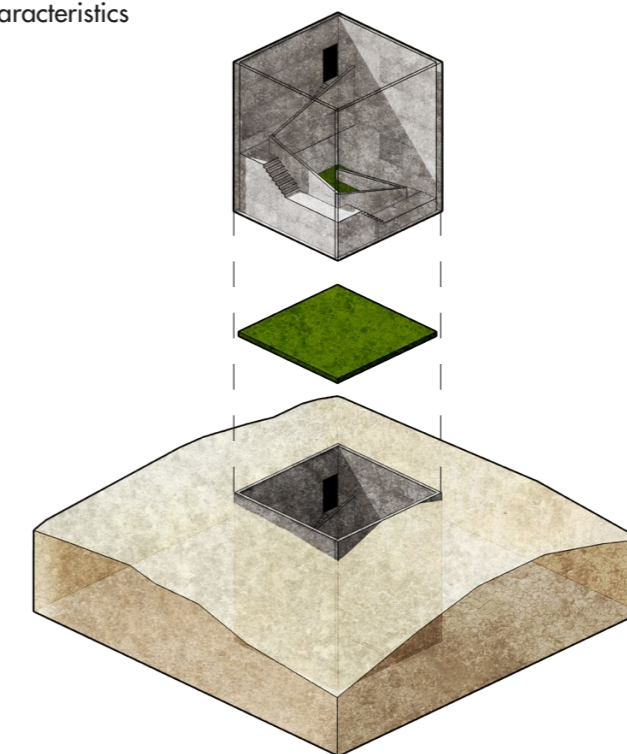
The project is located on Naoshima Island in Japan. To not disturb the natural beauty of the island the museum was placed entirely in the hillside while still managing to give every piece of art natural light.

It is a walk through the hill where you are not only able to experience the art works but also the site. Highlighting of certain elements - the sky, the light, the stone and so on gives a heightened perception of the characteristics of the place.

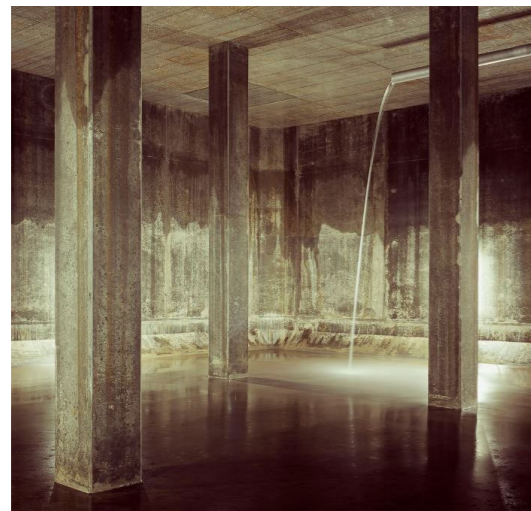
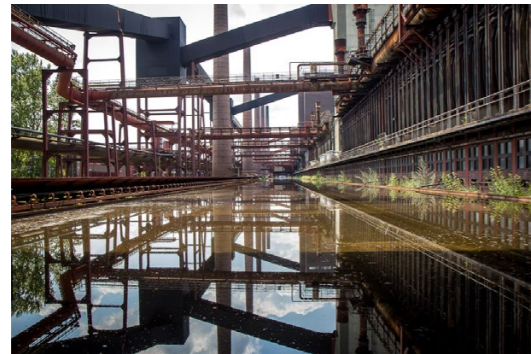
It uses void courtyards cut out of the hill with two different natural floors - grass and stones. The staircase leans against the concrete walls moving you up from the grass floor towards the sky which is framed by the high walls. The courtyards lets you experience a carefully staged version of the site.

Key points:

- Cutting out
- Materiality
- Heightening of characteristics
- Natural light
- A narrative walk



INDUSTRIAL PROCESSES



The industry is what has created the quarry and what dominates it at present. However, in a couple of decades the quarry will have run out and the industry will need to shut down. What happens to the buildings and structures present in the quarry? The great silos and runways to transport and distribute stone will remain. How can change relate to them? Will they just stand as ruins? Are they to function as a reminder of a past or can they be incorporated into a new function of the quarry?

In the Ruhr Valley many projects have been carried out in abandoned industrial sites. The old Zollverein coal mine has been transformed into a sort of urban park where visitors can admire the industrial architecture and also swim and iceskate. This is done without effecting the integrity of the buildings. They instead form the setting. New function like the museum of water in the Ruhr valley has been added to inform and accentuate the historical heritage of the industry. Instead of tearing down or changing the old factories are allowed to remain as a part of the landscape and the local culture.

The photographer Silvio Maraini has documented a series of unused underwater cisterns in his series *Underwater cathedrals*¹. These industrial and vernacular spaces have through time and erosion turned into something more than intended. They tell the history of their use and the water while becoming new and beautiful spaces.

¹ <http://www.maraini.ch/en/underwater-cathedrals/>

NATURAL PROCESSES



40



Reclaiming by nature occurs in the quarry in several different forms. First and foremost there is the water. Substantial flooding will occur and is something that a structure will need to relate to and is something I will study closely.

Secondly there is plantlife. Once the quarry floor begins to settle vegetation will start to reclaim the site. This is also true for the submerged areas. As is evident from similar quarries like Limhamn outside of Malmö the nature have no problem of taking hold of a quarry. At the nearby quarry in Slite, Gotland, the after-use plan is very influenced by an ecologists view that the site is a unique opportunity to introduce rare and endangered plants that suits the environment well. The plan for Slite is to make the quarry, once abandoned, into a sort of public park environment. This is deemed suitable especially since it's located in the outskirts of the actual town of Slite and could function as a natural part of said town. In the case of Storugns the situation is quite different. The quarry is situated quite isolated surrounded by forests and nature reserves. Because of this it could be suitable for Storugns to function as a part of said nature reserve, and to change the ecology as little as possible.

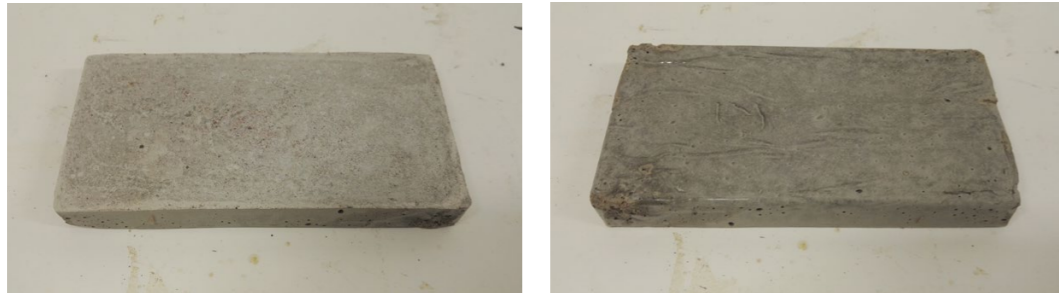
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Thirdly there is the dissolution of the physical quarry form. This means the erosion of the quarry wall which will begin to disintegrate and become less stable with time. The existing plans for after-use of quarries at several different sites cite this as a danger to visitors and proposes to make the high walls into more gentler slopes. To do this however would remove a very characteristic aspect of the quarry and would also require immense work as the wall spans tens of kilometers.

To design architecture for a site like Storugns it is necessary to embrace the natural processes of the site and work together with them instead of against them. This approach can be seen in the work of Swedish photographer Helene Schmitz. In her photograph series *Earthworks* and *Sunken Gardens* she captures places being subjected to natural processes, changing and distorting the man-made structures.

MATERIAL STUDIES

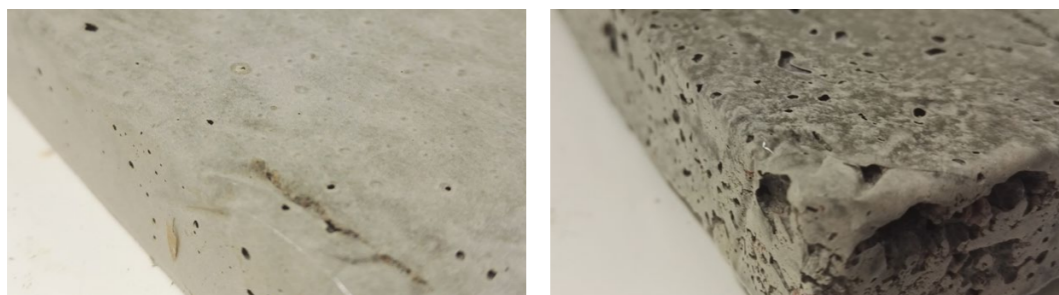
Test #1.1: Concrete casting with 100% concrete. (Upside to the left, bottom side to the right)



Test #1.2: Concrete casting with 60% concrete and 40% slag-stones (size 2-10 mm)



Test #1.1 & 1.2: The two tests are shown below side by side for comparison.



Test castings of concrete to determine the possibilities of mixing in slag-stones with the concrete. A reference cast of 100% concrete is made and compared with a cast using the same concrete but with added slag-stones. The two castings can then be compared and evaluated as to structural solidity and aesthetic qualities.

The two casts can be seen in the pictures, 1.1 to the left and 1.2 to the right, with close-ups below.

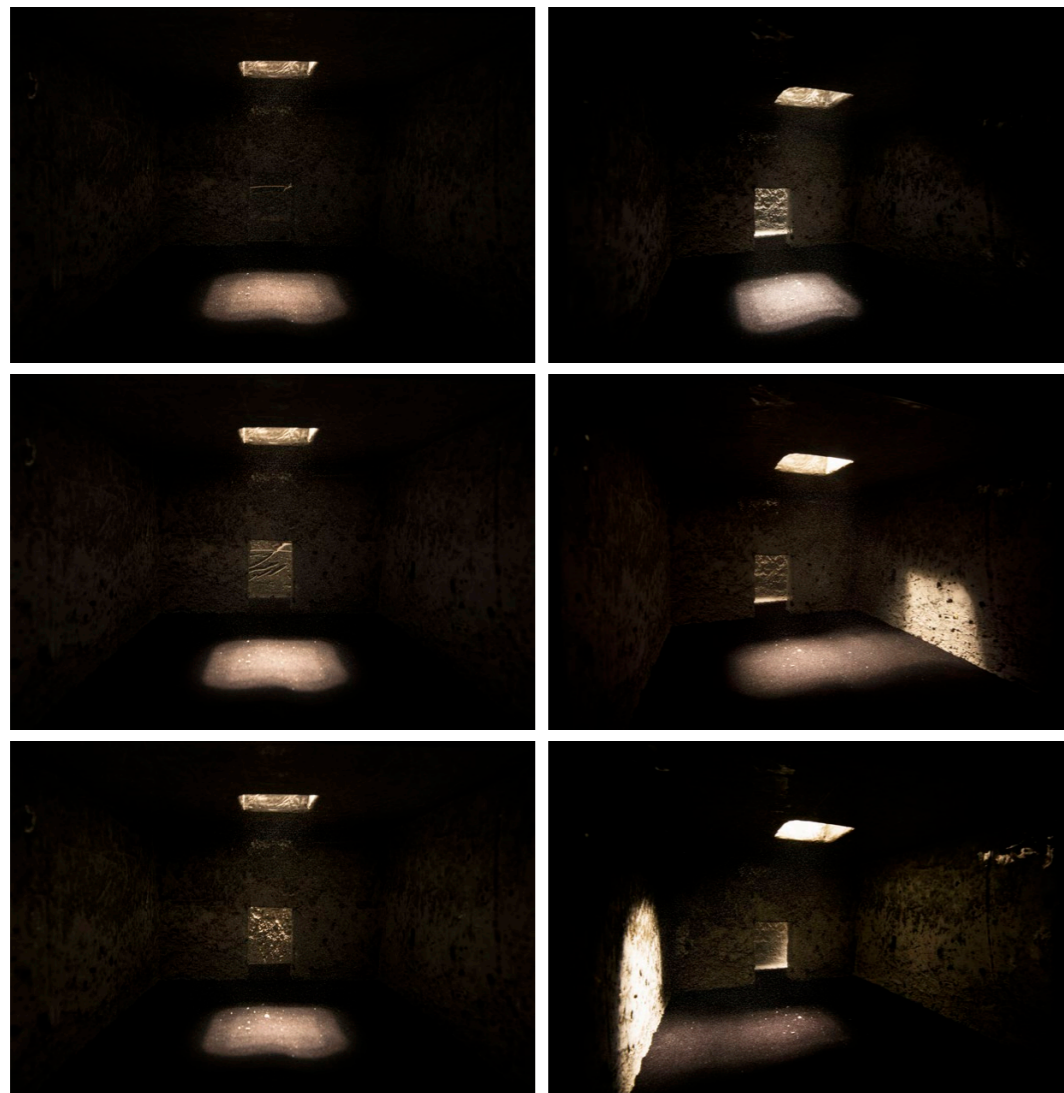
What struck me as interesting was the effect the taping of the casting form had had on the concrete. Not only were the casts very smooth but they had inherited the reflectiveness and shape of the tape. Since the tape had some airbubbles it left dents in the concrete. This effect was noticeable in both casts but particularly in the 1.1 test. In the 1.2 test the smooth surface was perforated by small holes created by the cement not spreading perfectly in the form because of the larger stones. This creates an interesting mixture between rough and smooth and gives more life to the surface. The concrete is weakened by the use of larger stones and it is prone to crumbling at exposed areas.

MATERIAL STUDIES



The second test cast was a development of the initial tests. Using the same concrete mixture that I used for the 1.2 test a form was made to create a room-like model with three walls and a roof. The cast has one opening in the roof and one doorway in one of the walls with the fourth wall of the modelled room left open to facilitate photographic possibilities of the space. Photographs of the interior can be seen to the right.

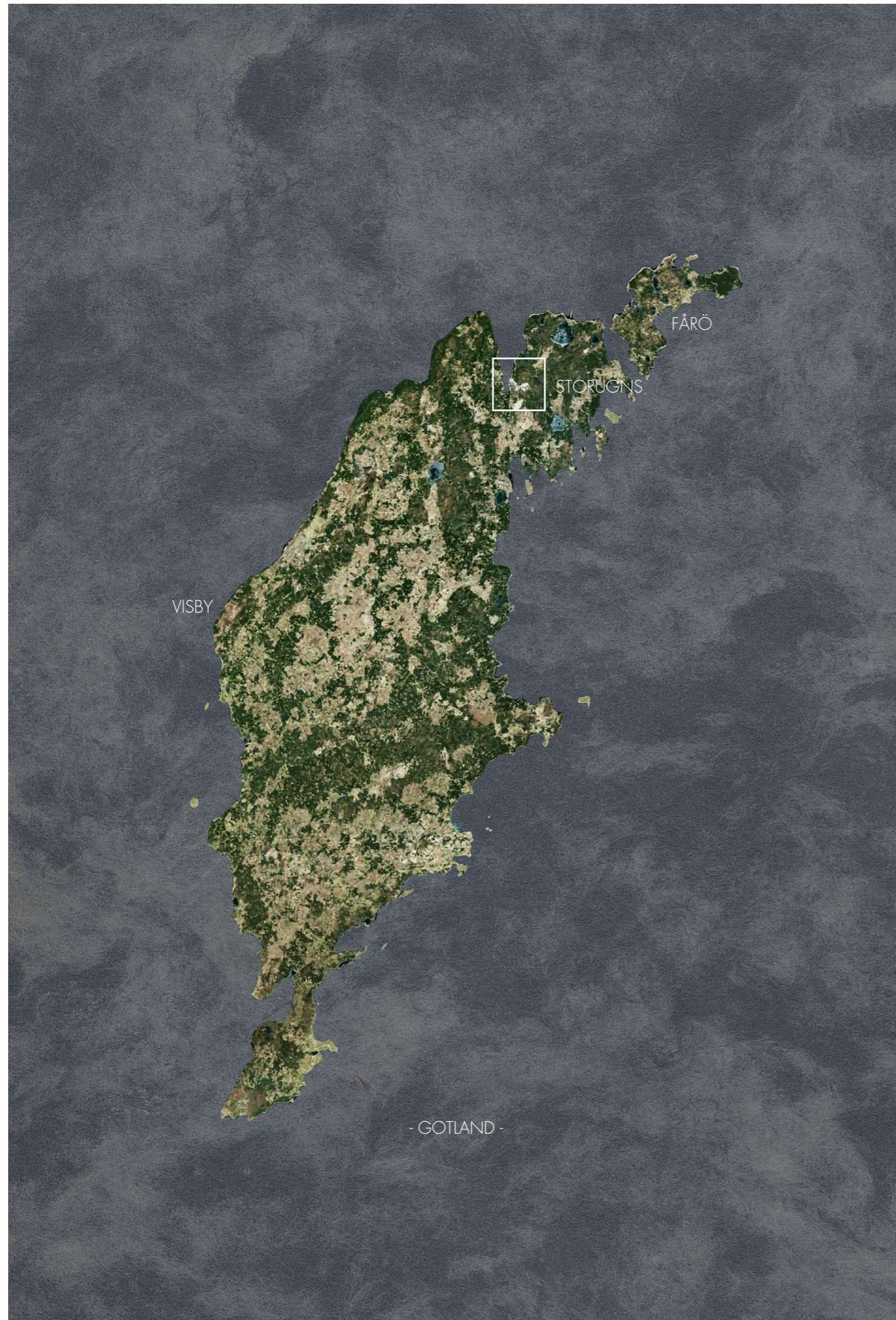
On the opposite page are 7 photographs of how a small room could be staged to a certain effect, working with light and material.



Chapter Three: Site and context

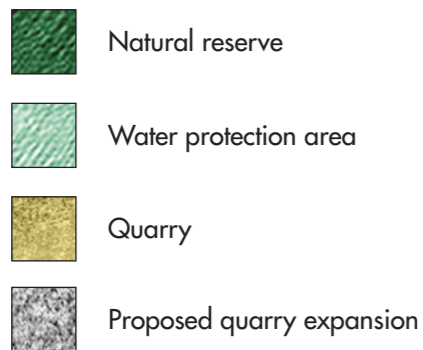
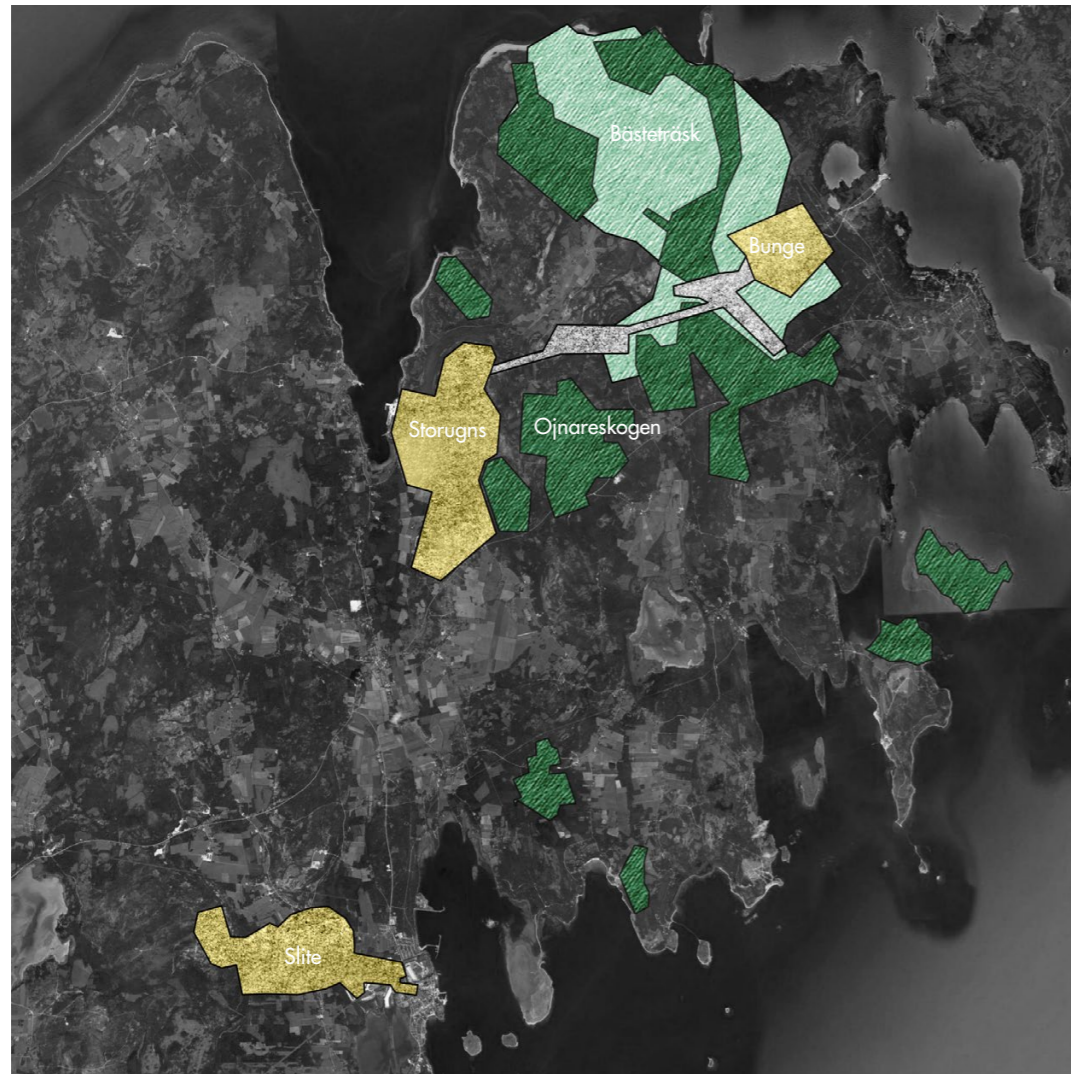
STORUGNS QUARRY

GOTLAND & STORUGNS



The Storugns quarry is located on Gotland, a Swedish island in the Baltic Sea, mainly seen as a tourist destination for summer vacation. Gotland has 58,000 permanent inhabitants, half of whom live in the medieval city of Visby on the western coast. The island is made of limestone and is famous for its coastal rock formations called "raukar". The abundance of limestone has led to a prosperous quarrying industry, with roots as far back as 1000 BC. The quarry industry has a particularly strong hold on the northern part of the island, with large-scale mining at Slite, Bunge, and Storugns. The industry is dominated by two companies, Nordkalk and Cementsa, and plays a prominent part in the local economy.

The Storugns quarry is a man-made natural landscape of unparalleled size in Sweden. The site is off-limits to the public and has negative annotations as a destroyer of local nature and environment. Still, it tells an important story of the local society and economy, both through history as well as in the present. It is a sublime and beautiful place created by a brutal industry.



NATURAL PROCESSES

The stone at Storugns quarry is running out. The established mining rights restrict excavating below 18 meters above sealevel at Storugns, and with horizontal expansion nearing the borders of the mining rights a proposal for expansion of the rights to quarry was made. The proposed expansion was to take place north-east of the Storugns quarry and an excavated road would connect the new site and the old. A connection to the Bunge Stucks quarry operated by SMA Svenska Mineral AB was also proposed in combination with expansion of the Bunge site as the stone there has already run out.

Directly bordering the Storugns quarry to the east is a natural reserve area, a so called Natura 2000 area, which is part of a larger complex of natural reserves on northern Gotland. It was created to protect the nature and wildlife from the expanding quarries. Gotlands largest lake, Bästeträsk, is also located close to the quarries. The lake provides fresh water to substantial parts of Gotland and a new quarry would potentially interfere with the water supply of the lake.

Following a long legal battle it was established by the Hovrätt in 2016 that Nordkalk Storugns would not be allowed to expand its mining activity in northern Gotland as they had planned. The rejection of the expansion plans was following a substantial protest movement to save the nearby forest "Ojnarekogen" and its unique nature. This means that if no alternative plans for expansion can be agreed upon the Storugns quarry will need to shut down once the present quarry is finished. An appeal to be allowed to expand the quarry downwards a further 18 meters to reach sea level has been put forward by Nordkalk, who have also appealed against the Natura 2000 protection of Ojnarekogen. Naturvårdverket are working on a pre-study to turn the entire area into a national reserve. The outcome is not yet determined but it seems unlikely that Storugns will be able to expand in the future in any of the proposed ways.

The industry seems to be fighting a losing battle in northern Gotland. The attention the local nature are receiving from outside Gotland could however be a way forward for the quarry. Not as an industrial site but at a potential part of a natural reserve once the mining stops. As is evident from the post-shutdown plans for the Slite quarry these sites offer unique natural environments for rare plants to establish. To make the Storugns quarry be seen as a part of the landscape again could guarantee that the physical quarry would be allowed to remain, to be treated as an important part of the local environment instead of being seen as an industrial threat to the local nature.

DEVELOPMENT



1958



1995



1998



2003



2007



2017

The development of Storungs quarry over the last six decades can be seen in these six pictures. From the small scale quarry of the fifties the site grows slowly in size up until the nineties. A connecting track to the harbour is built as the quarry gets more automated.

Since 1995 The quarry has been greatly expanded in the southwest and north-east. The southernmost part of the quarry which was excavated in the early 2000's is since 2007 waterfilled. The increase in waterlevels can be noted between 2007 and 2016.

STORUGNS & VICINITY



Storugns is located by the Kappelshamn inlet north of the town of Lärbro.

Today the only interaction point between the quarry and the outside world is the road that passes inbetween the harbour and the stone depot area in the north-west. Due to the intense industrial processes at the harbour and the stone depot it is strictly forbidden to leave the road and enter the quarry. The road leads north to Bläse, which is home to a museum of quarrying activity located in 18th century mining buildings.

By placing a new interaction point in a part of the quarry with no present industrial processes the possibility to interact safely with the site is created.

The main road of northern Gotland runs from Visby to Färösund. It passes through Lärbro, a small town close to the quarry, and continues just south-east of the site. The road is intensely trafficated, especially in summer. All visitors to Färö, a very popular tourist destination, drive or bike this road to get to the island's ferry. This creates a possibility of making the site a convenient stop along the busy road, placed closely to the proposed Visitor Centre which will be the new entrance to the quarry.



THE QUARRY

The main quarry is situated at around ten meters below the surrounding terrain with sharp rock walls spanning its entire circumference. The floor is generally quite level but there are two main exceptions in the main part of the quarry; the dirt hill in the central part and the stacked rock piles against the eastern wall. The northern hill in particular rises considerably over the quarry floor. It offers a view of the entirety of the quarry as well as the harbour and sorting depots.

The lower parts of the quarry are water filled. The water is very clear and transparent, allowing great visibility. The water level fluctuates with weather and season. The water level will rise in phases. The southern part of the quarry with the existing quarry lake will be the first to get flooded since the ground here is the lowest.

A huge pile of grinded rocks and gravel stands on the edge between the central and northern part of the quarry. The pile rises 25 meters above ground with an improvised road in its center, allowing you to get to the top. From the pile you can see all parts of the quarry and even as far away as the factory in Slite, 20 kilometers away. It is also a good place to spot the eagles that circle above the quarry.

The large rust-colored field of stones in the south part of the quarry is made up of the waste material from mining activity. The stone is stacked in high piles which are unstable and jagged to walk upon. Oxidizing gives the stone a glowing rusted color with time and it is possible to roughly judge the time that has passed since the stones were unearthed by the oxidizing process. Eventually the color will begin to appear throughout the quarry as more stones oxidize.

At Storugns the mined stone is transported from the quarry to an open air depot. The transportation is achieved through the means of a raised track a couple thousand meters long. Trucks empty their stone loads onto the track that takes the stone through the different sorting and shifting nodes, changing direction and getting split up according to quality and size.

The stone is eventually spread out in piles around the depot, waiting to get transferred to the ships in the harbor. The shifting process is complex - there are multiple stops for shifting and splitting before the stone is divided into piles according to size and use.

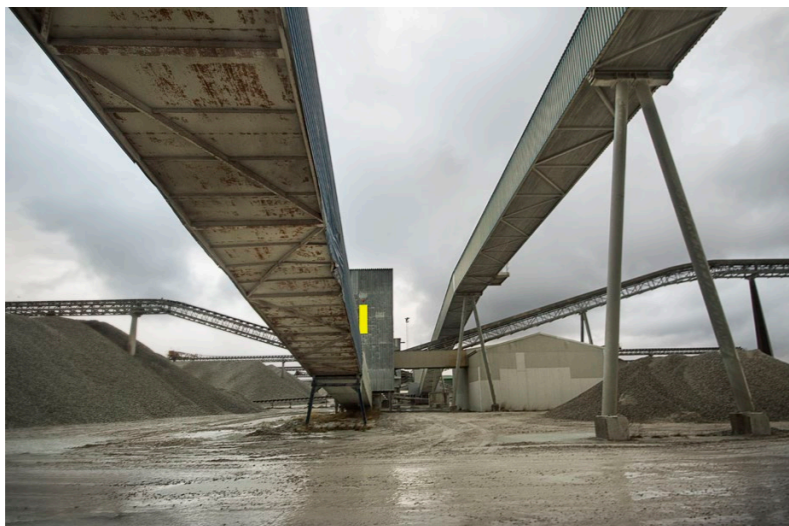


SCALE

The quarry at Storugns has a vast scale. It is the largest quarry in Scandinavia. The quarry floor spans for kilometers in each direction and the walls shoot up 10 to 25 meters. Very soon you lose all perception of scale. The enormous trucks and digging machines weighing in the 100-ton range starts to look like toys. Working with the scale of nature and landscape is therefore a necessity in the Storugns quarry.

Because of the enormity of the site the subject of scale is very present. The main quarry measures approximately 3000 meters from south to north with a width of 750 to 400 meters. The rusted stone field covers an area of 700 times 300 meters while the main quarry lake roughly measures 1000 x 350 meters. The large open field in the middle part of the quarry is 1700 meters long north to south and 750 to 400 meters wide. Parts of the field's area is currently covered in piles of rocks with a shallow lake at its top right corner.





Chapter Four: Design Proposal

ARCHITECTURAL LANDSCAPES

ADDITION & SUBTRACTION

There are two principles which mankind has used as a basis for creating an enclosed space. In the first principle the space is formed by eroding a solid mass, i.e. through subtraction of material. The second principle is forming a space by creating a construction, i.e. through addition of material. I have worked with these two principles to enhance the experience of the quarry.

Addition to the site means to build on and develop the site's existing circumstances with a structural addition, placed on top of the site.

Subtraction of the site means the tearing up or hollowing out the site to create a subtraction, a cavity which could be used to fulfill one or several program functions.

The quarry itself is a consequence of subtraction, a hollowed-out artificial landscape. It is however a open pit. Nothing is buried or underground. There is always the connection to the landscape, the sky and the elements.

It seems fitting to work with architectural subtraction in the quarry but to maintain the connection to the outside. All present structures in the quarry are made through addition and to ignore this is to ignore an important aspect of the site.

I have worked with loosening the border between the site and the buildings. The architecture is a part of the site, is effected by the change and processes; ground water, rain water, sand, gravel, dust and vegetation.

I have been working with a scale from heavy, solid concrete to lighter steel pillars and nets. The concrete relates to the materiality of the site itself - the stone and the gravel, and the steel is taken from the industrial buildings at the site. I have chosen to use hardy and rough materials to make the buildings durable, autonomous, and be able to withstand change. Staircases and nets are used to create a gradient between building and site, creating interaction points.



WALKING THE SITE



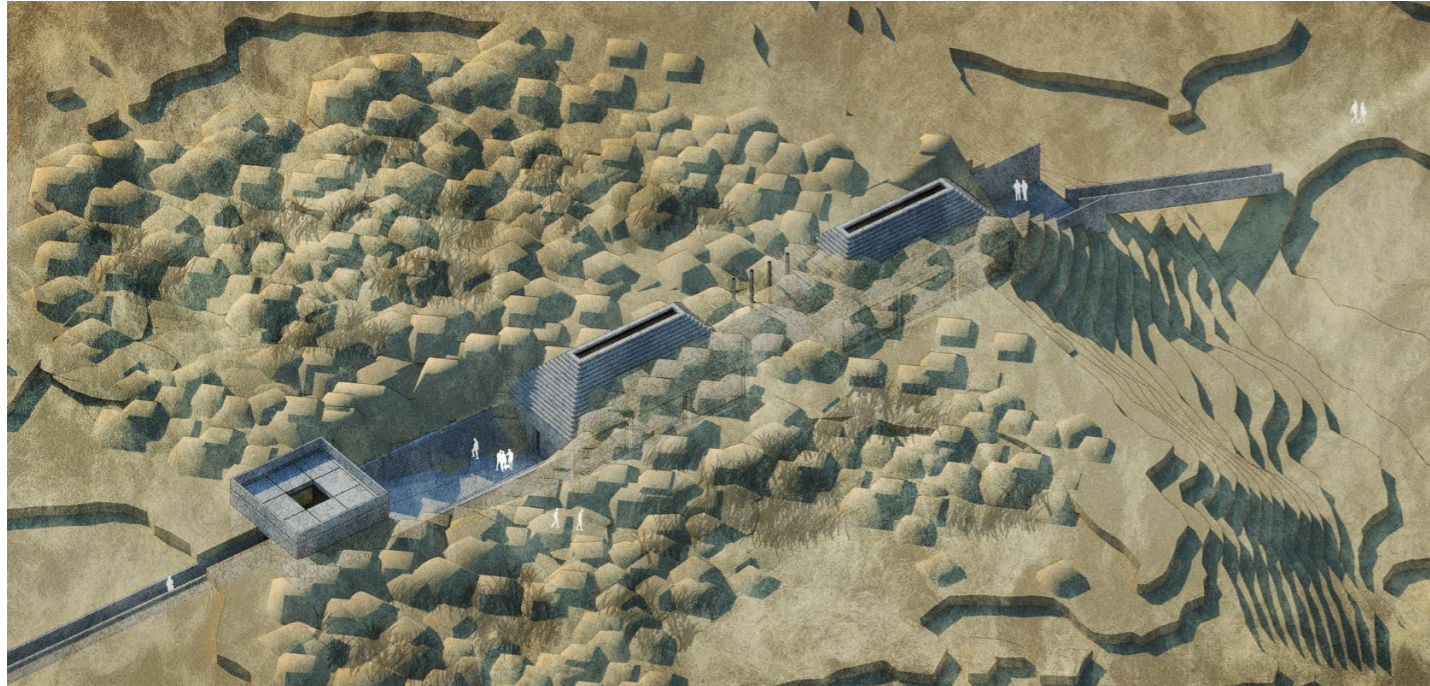
The site is rimmed with high vertical walls and sharp hills creating a hidden and isolated world inside the quarry. The visitor is exposed to the rough and changing terrain. Pillars are placed 50 meters apart along the proposed walk. The concept is to guide but not force the movement of the visitor through the visual connection to the next pillar or the next structure.

To explore a hidden world, the architectural landscapes of the Storugns Quarry, the visitor needs to be able to roam freely throughout the site. The pillars will lead the visitor to the four different structures placed in the quarry.



VISITOR CENTRE

- Architectural Subtraction -



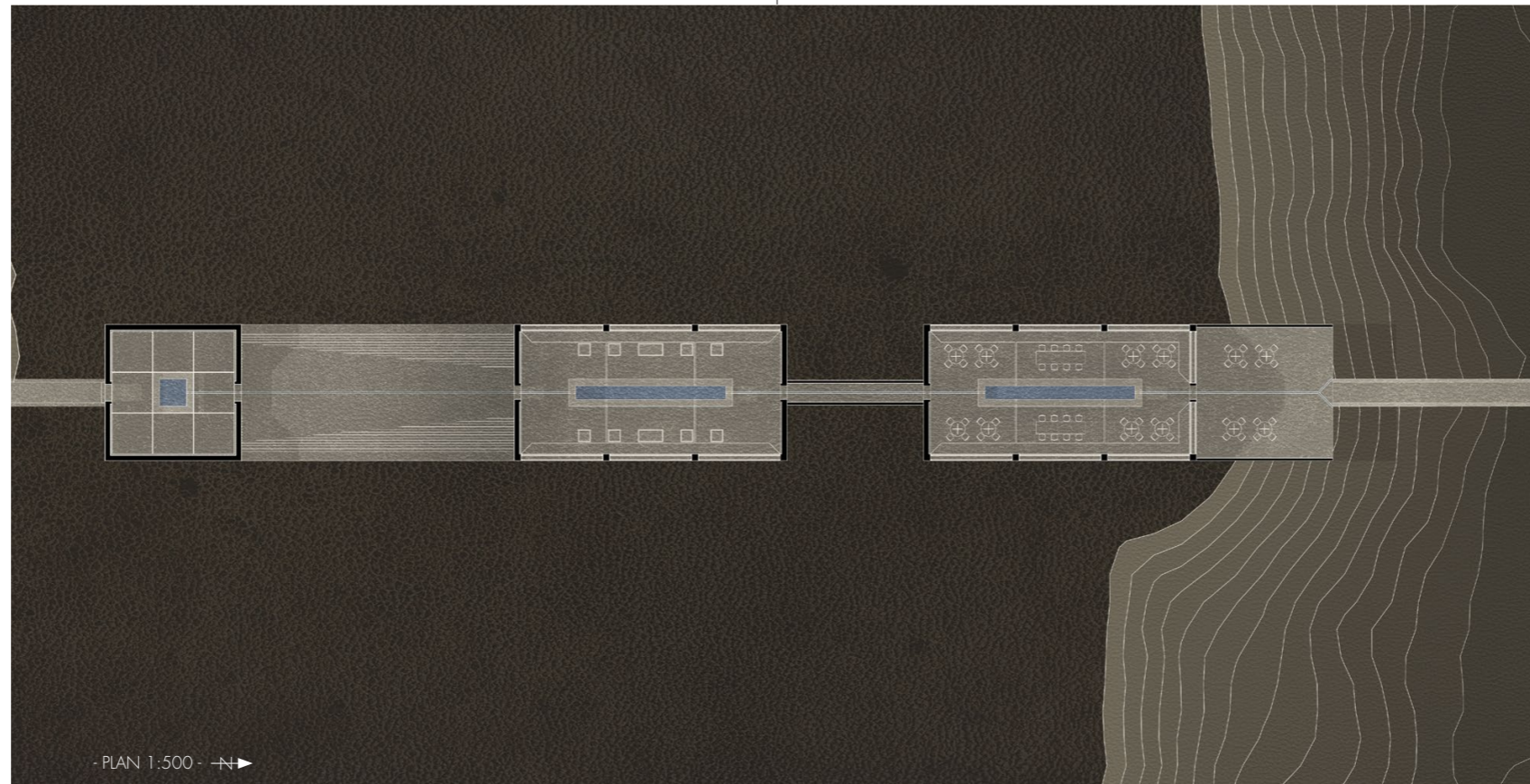
The visitor centre is the entrance point of the quarry, connected to the road between Visby and Fårö. For the visitor it is the first contact with the quarry and as you move down into the central hill through the building you are being submerged into the site.

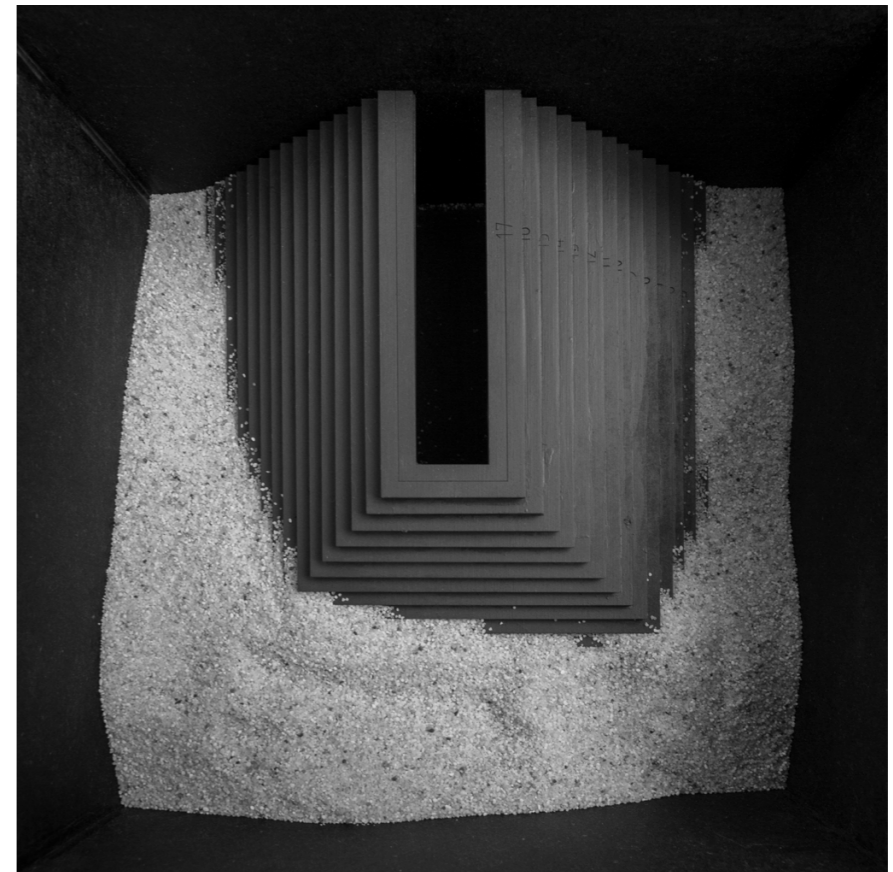
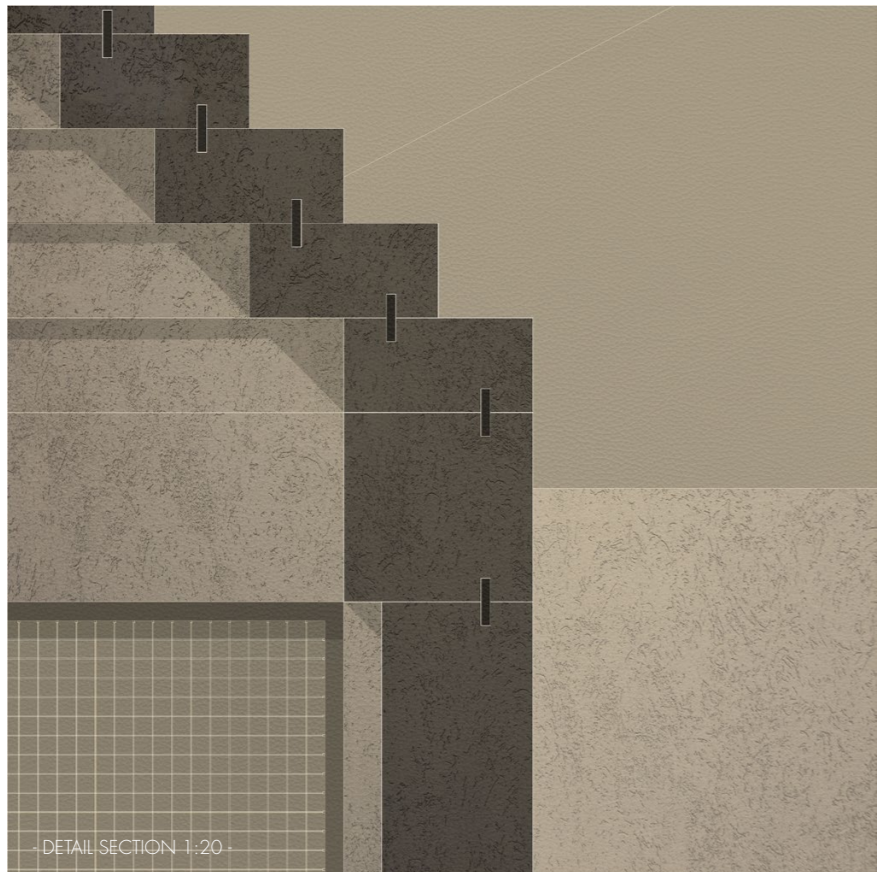
The structure is located centrally in the quarry on top of a freestanding hill, rising 15 meters above the quarry floor. Because of its height the hill forms a separate environment from the rest of the quarry. It won't be flooded by the rising water and it offers overview of the quarry in all directions. The hill is situated closely to the main road of the area and will act as a barrier to pass through on your way into the rest of the site. The structure acts as the entrance point of the quarry and contains a visitor center with an exhibition of the site and a café for visitors.

As a visitor you enter the entrance hall at ground level and then proceed down on a slope, framed by the gravel of the hill. Staircases on the side makes it possible to peak over the surrounding walls and to wander around the hill freely. Once you enter the visitor centre you are fully submerged inside the hill, with a framed part of the sky above you and the bare stone and gravel walls on your sides. The hill will through erosion begin to intrude on the rooms, sand and stone will be filtered through the netting of the wall and begin to fill up the room, and submerge the building further into the hill. Water will enter the building through the walls and the open roof and gathered in a central pool. The water is then led through the structures, creating a motion forward and accompanying you as you walk forward towards the quarry. You pass through a narrow tunnel to the café building which opens up forward as you continue into the quarry.

73



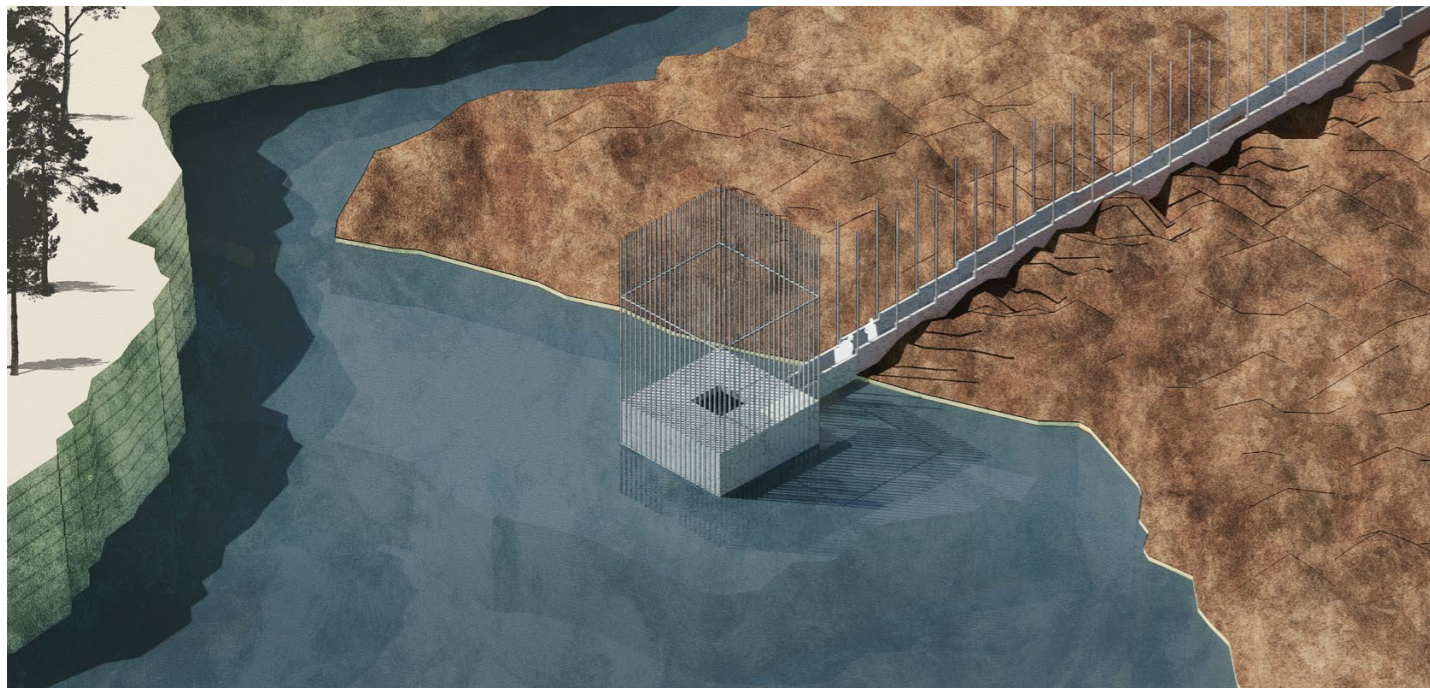
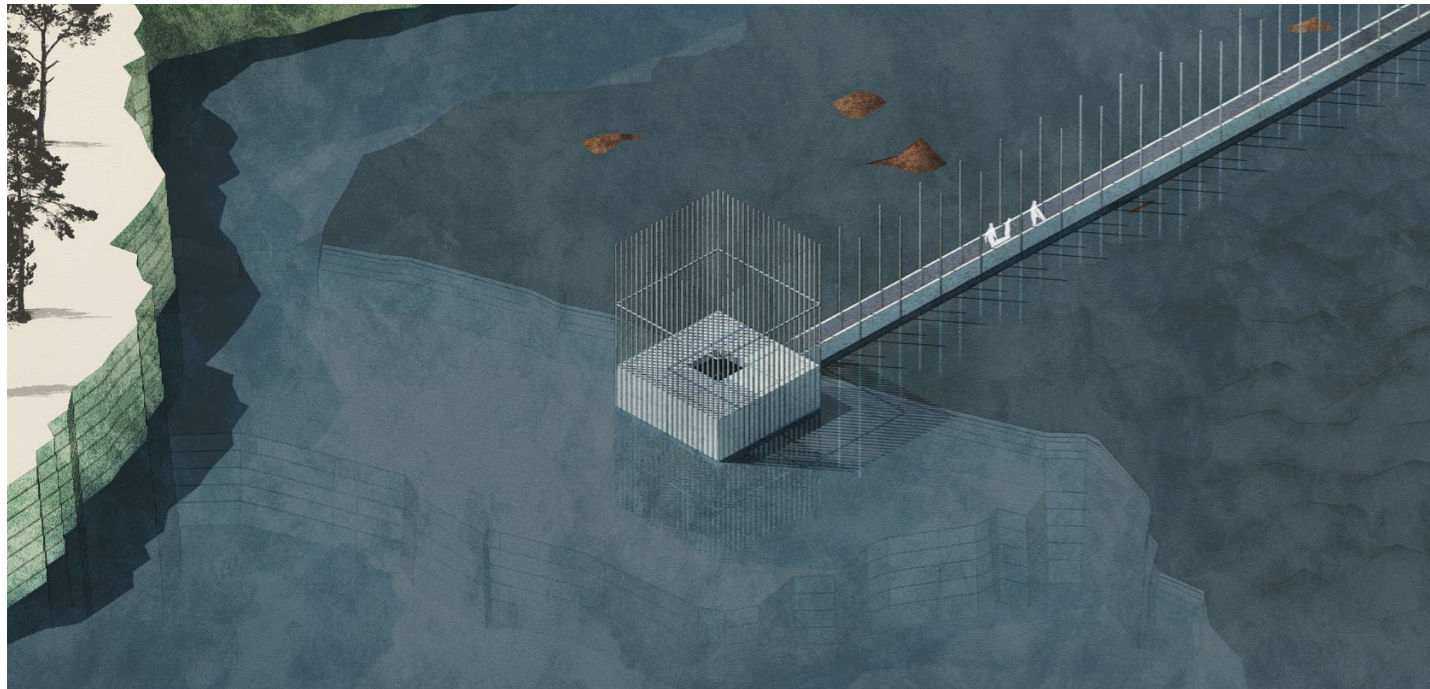




Design proposal

DIVING CENTRE

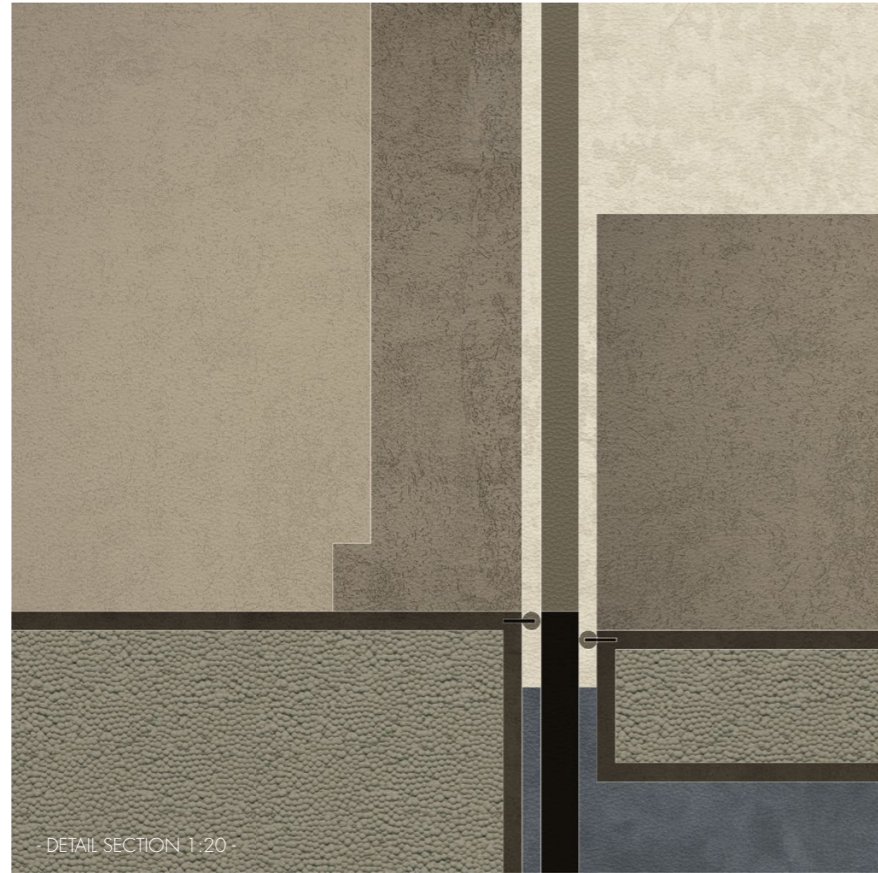
- Architectural Addition -



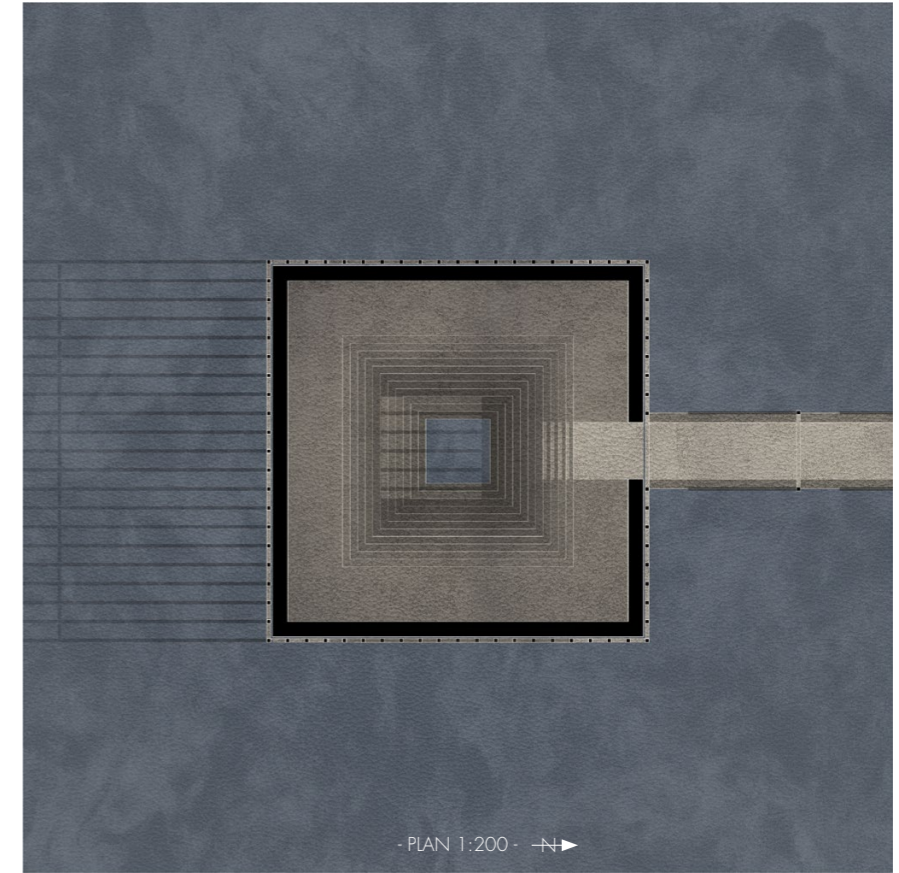
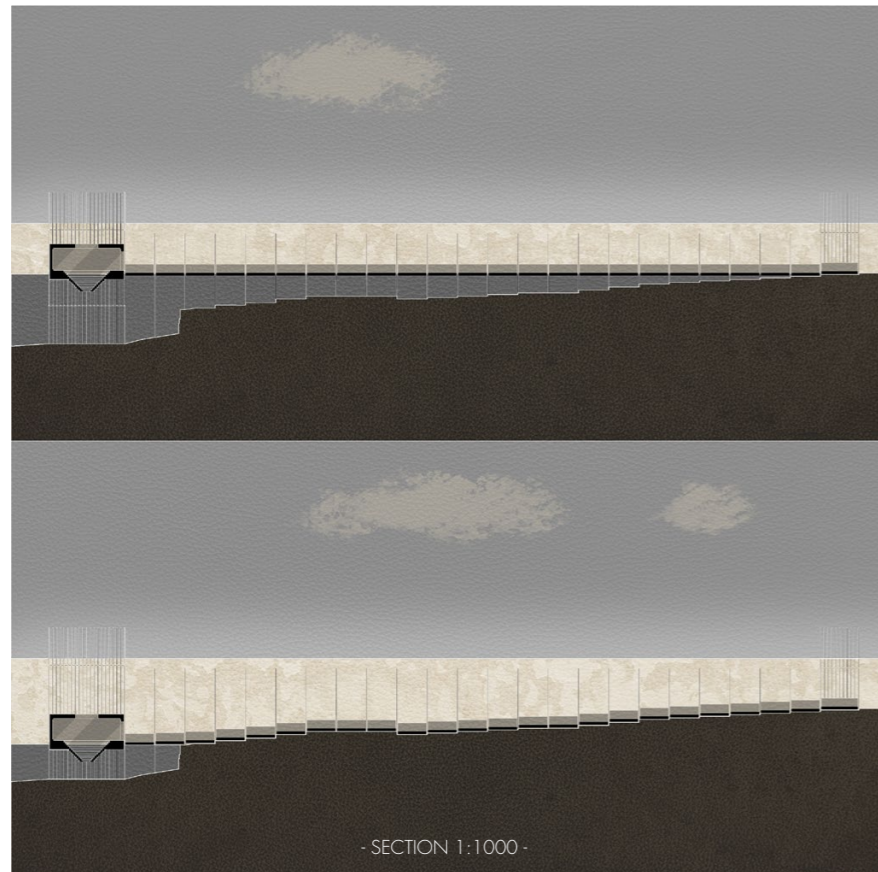
The diving center is located in the large lake in the southern part of the quarry. Diving in disused quarries are very popular in the diving community. The quarry lake will eventually engulf most of the quarry and diving activity is very suitable to the site. The building floats in the lake just off the shore. It is made up of a steel cage containing a floating room, which can rise and fall vertically but is held into place horizontally. The room is centered on a square staircase leading down into the water, bringing it inside the room, with an open air skylight above it, making the room exposed to rain and sun.

The room is connected to a bouyant walkway leading towards the higher rising parts of the rock field just north of the structure, making the building accessible even when the water rises. It is a creaky room that floats and swings with the lake.

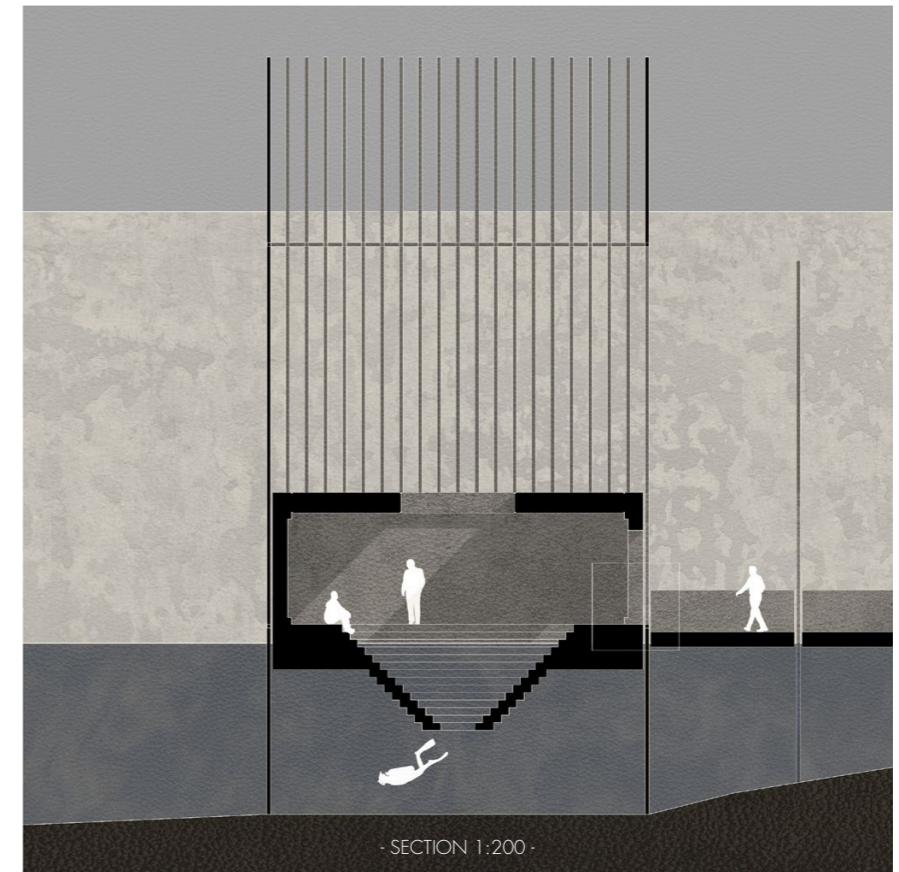
To the left the structure can be seen before the flood (below) and after the flood (above).



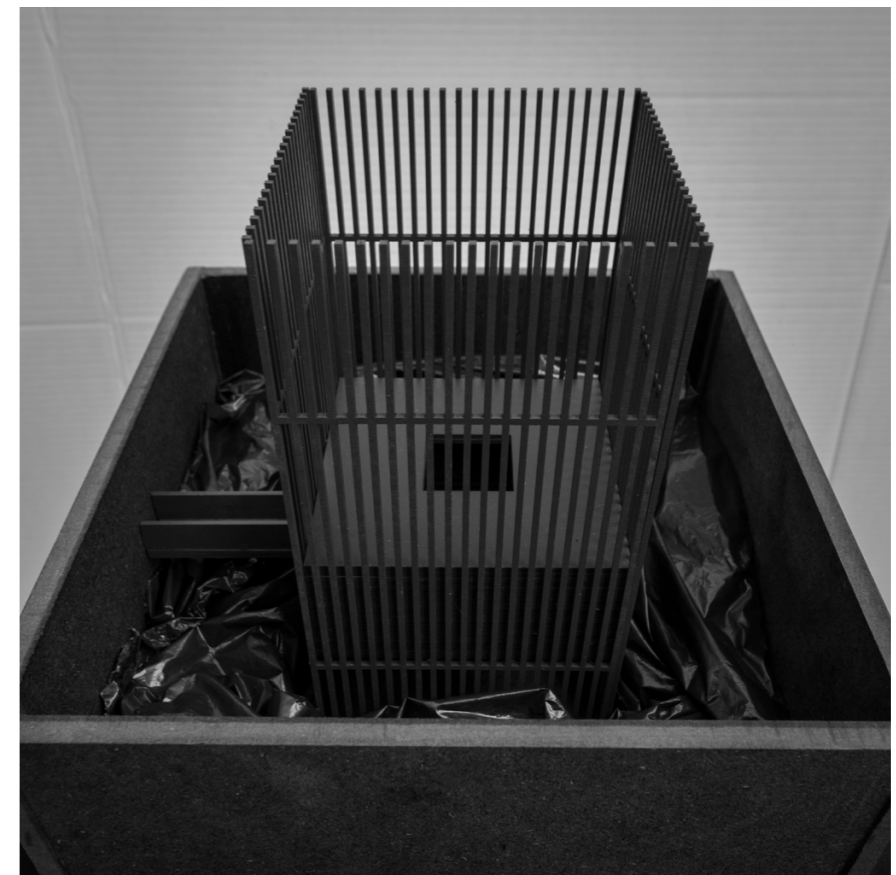
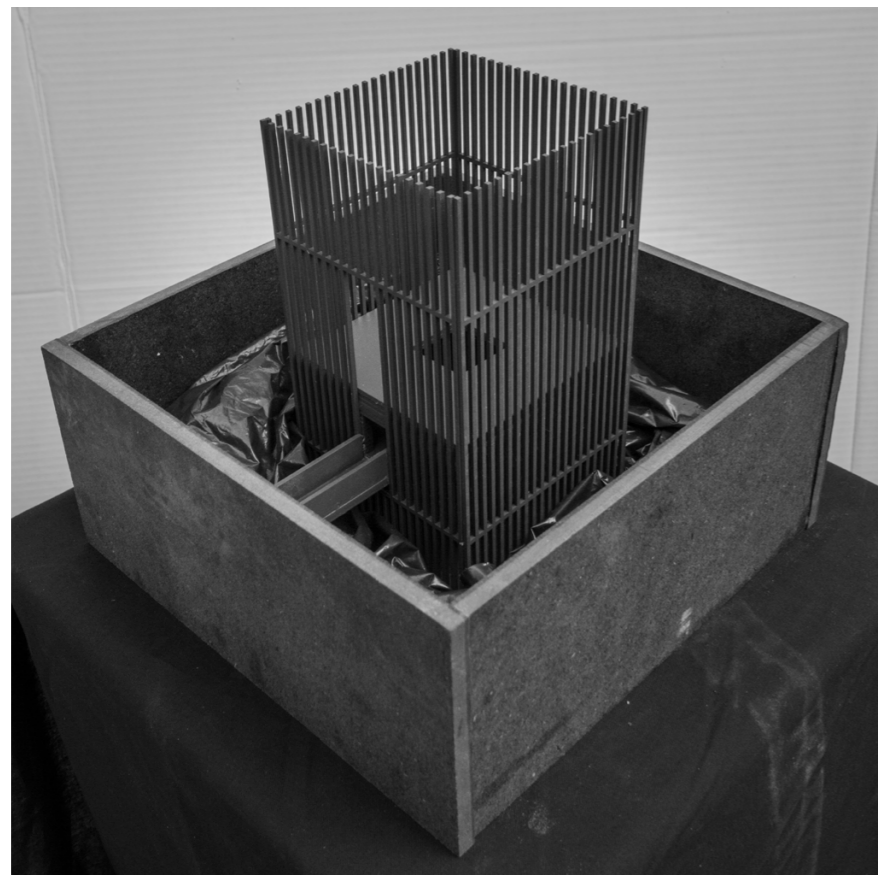
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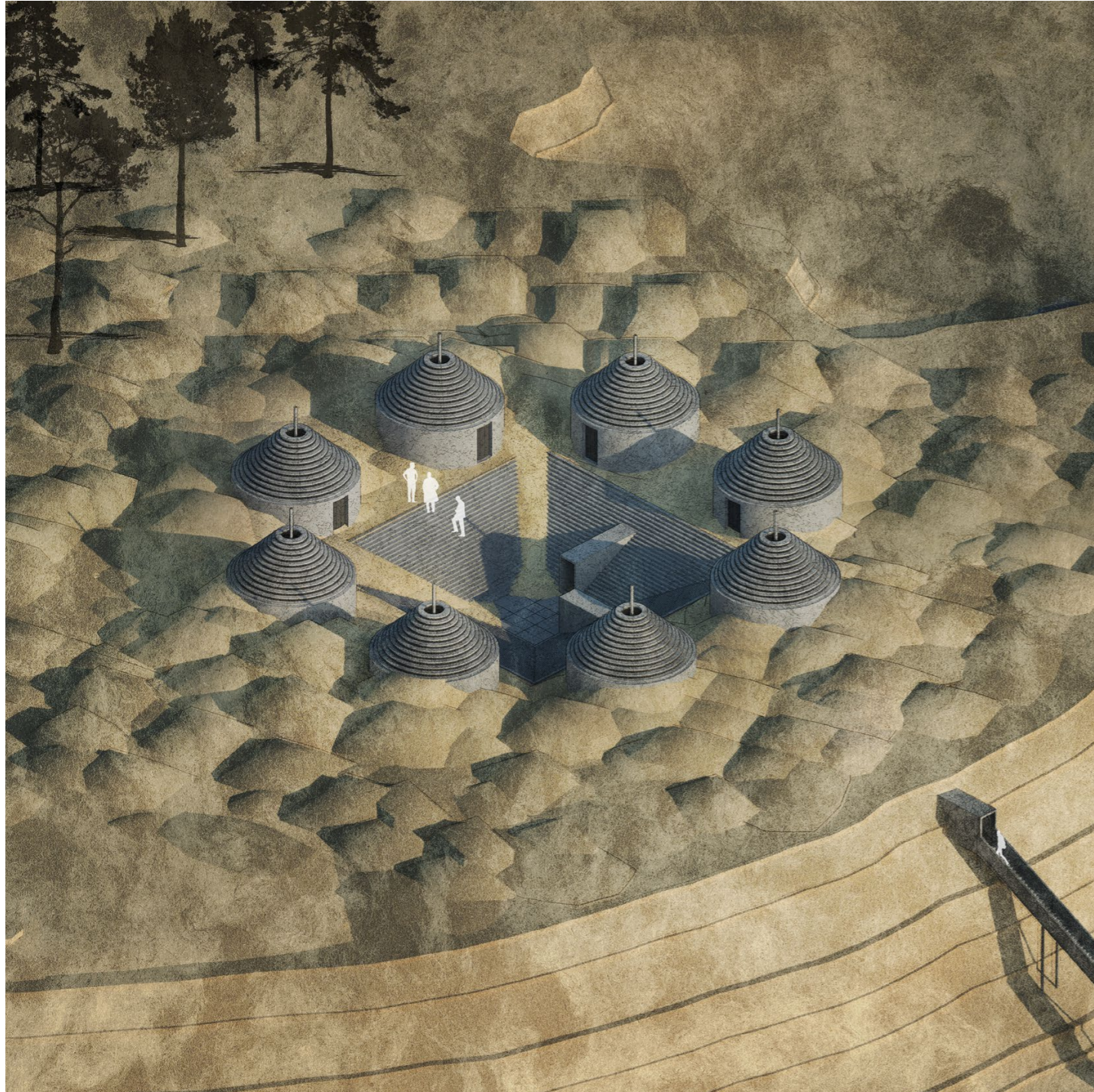


Design proposal



LODGINGS

- Architectural Subtraction -



The lodgings are located privately on top of a collapsed wall in the eastern part of the quarry. Here the wall has eroded and tumbled down, creating a landscape in upheaval. Nature will soon start to invade the site and the sand and gravel dunes will be moved with the wind and rain. You enter a central courtyard surrounded by stairs through a tunnel. It is a semiprivate open room away from the quarry.

The lodgings themselves are submerged into the ground and dust and sand will start to partially cover them. Once you enter the lodging you move down on a staircase to the main room, centered on an enclosed fireplace, a semi circular bench for sitting and sleeping, and a door to the toilet. The space is gathered around the fireplace and focused upwards towards the light. It is a cavelike chamber, tranquil and private.

The visitor can leave the courtyard through the second tunnel and enter the quarry by walking down a staircase.



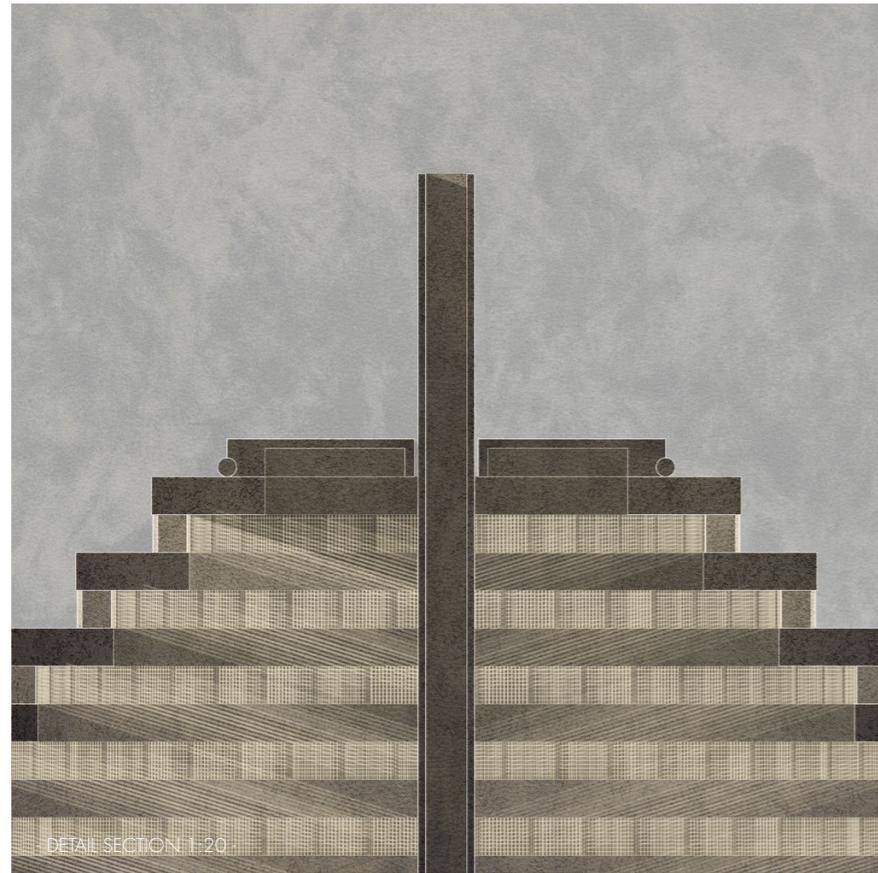
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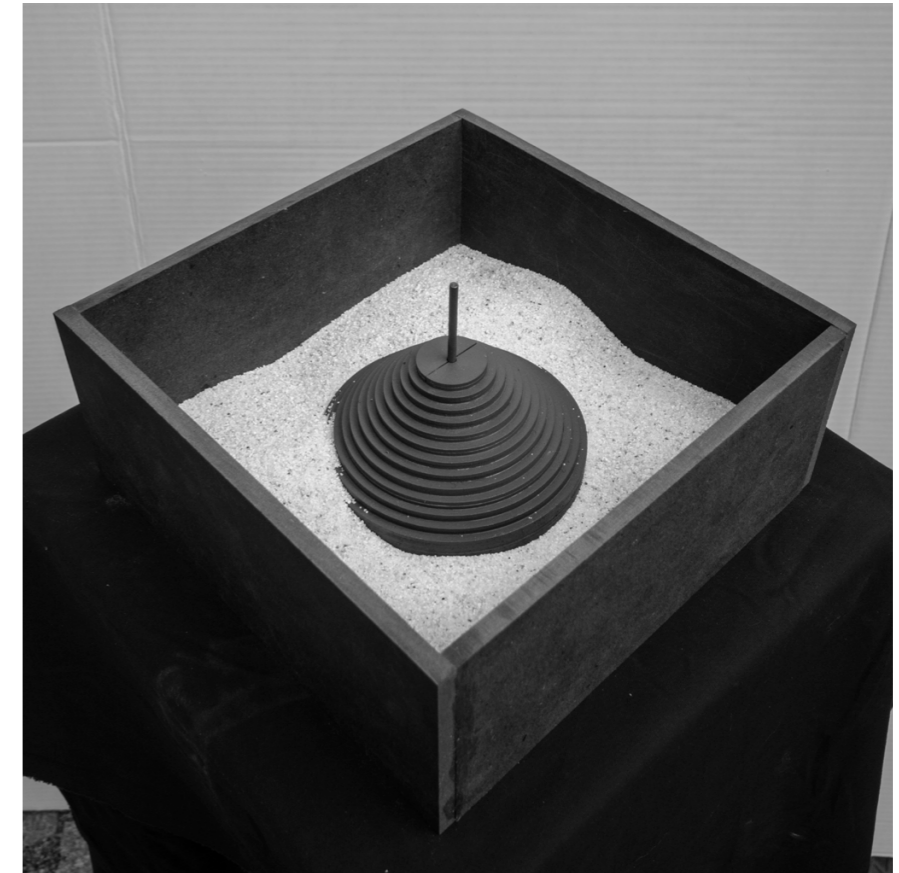
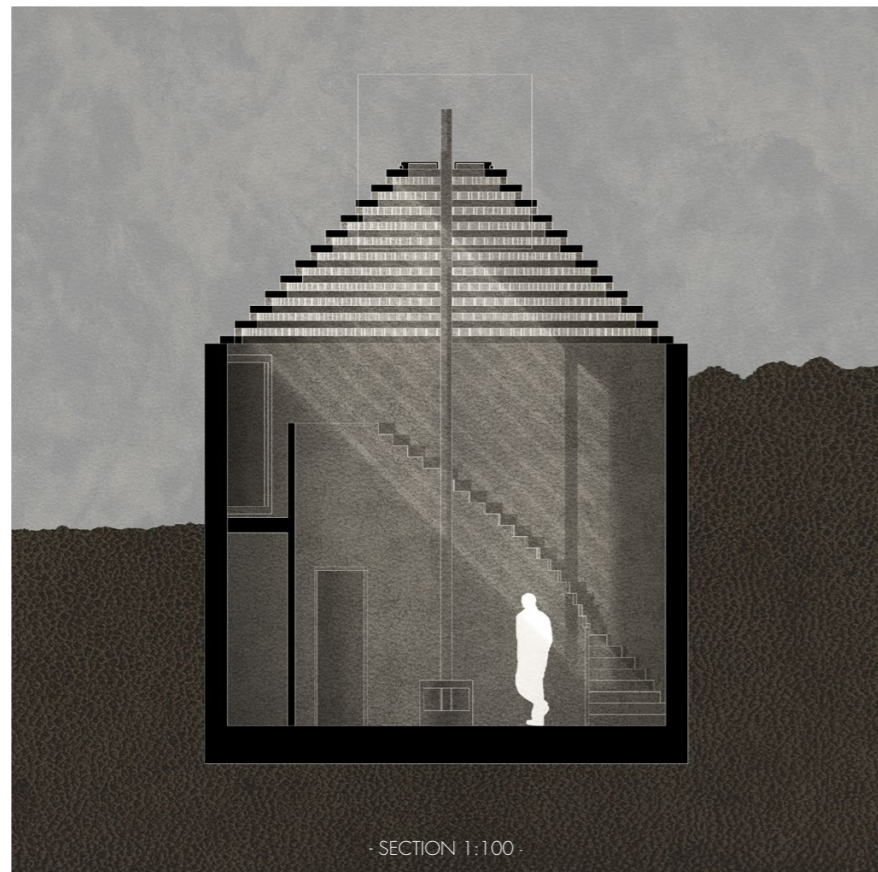
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Design proposal



88



89



Design proposal

LOOKOUT TOWER

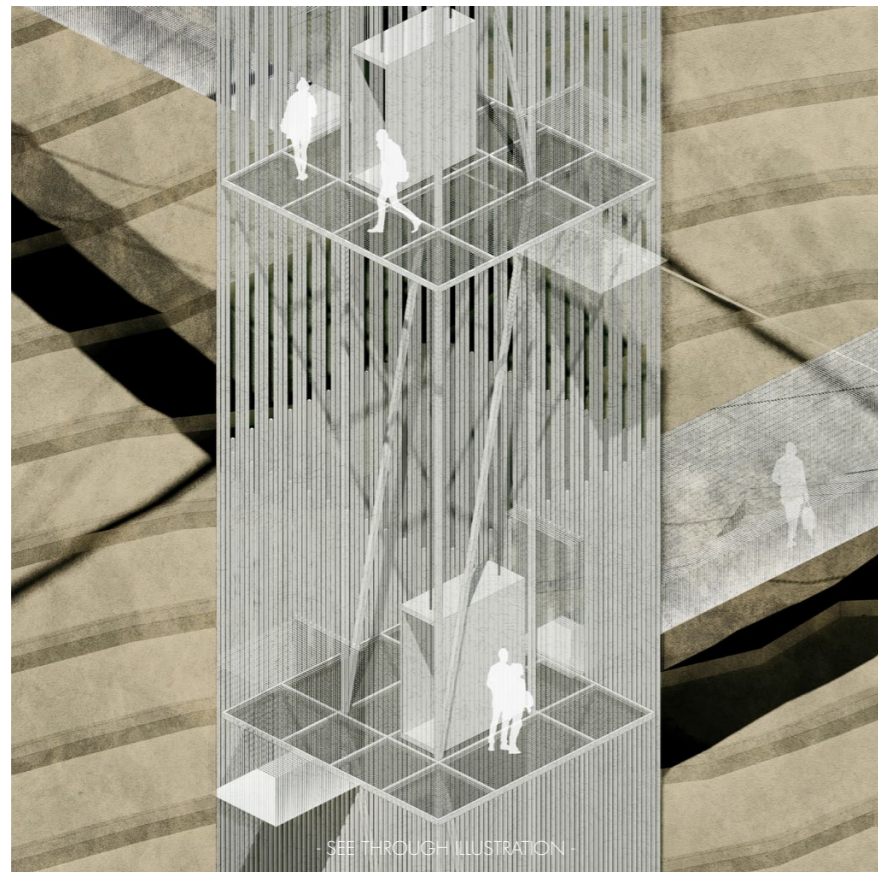
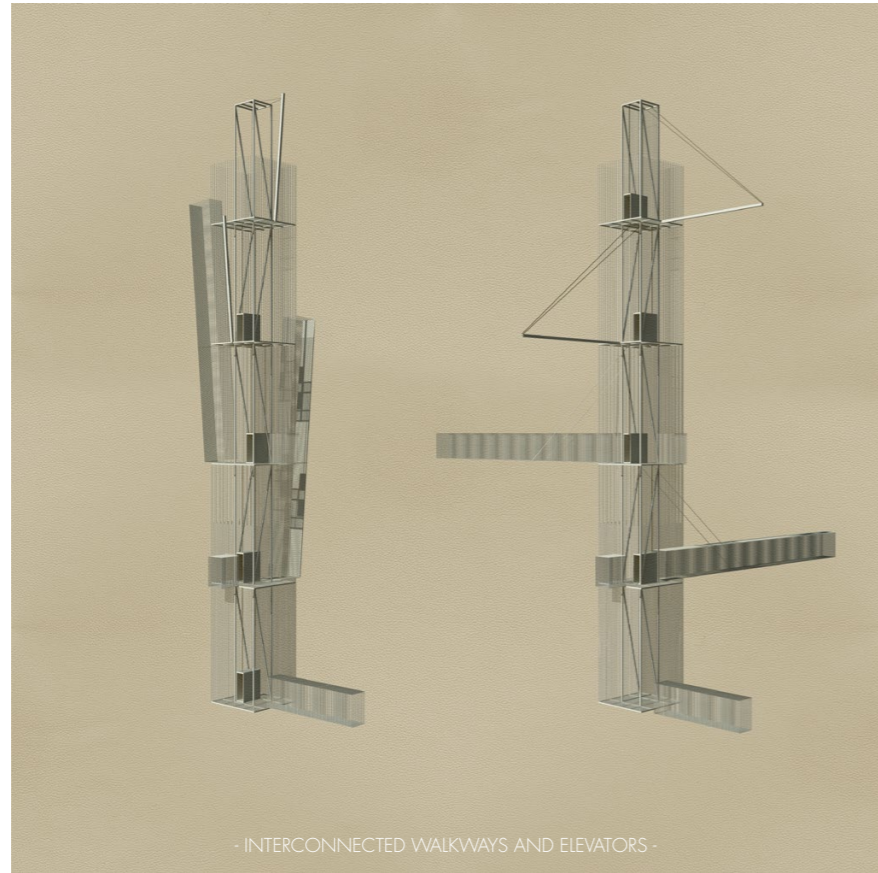
- Architectural Addition -



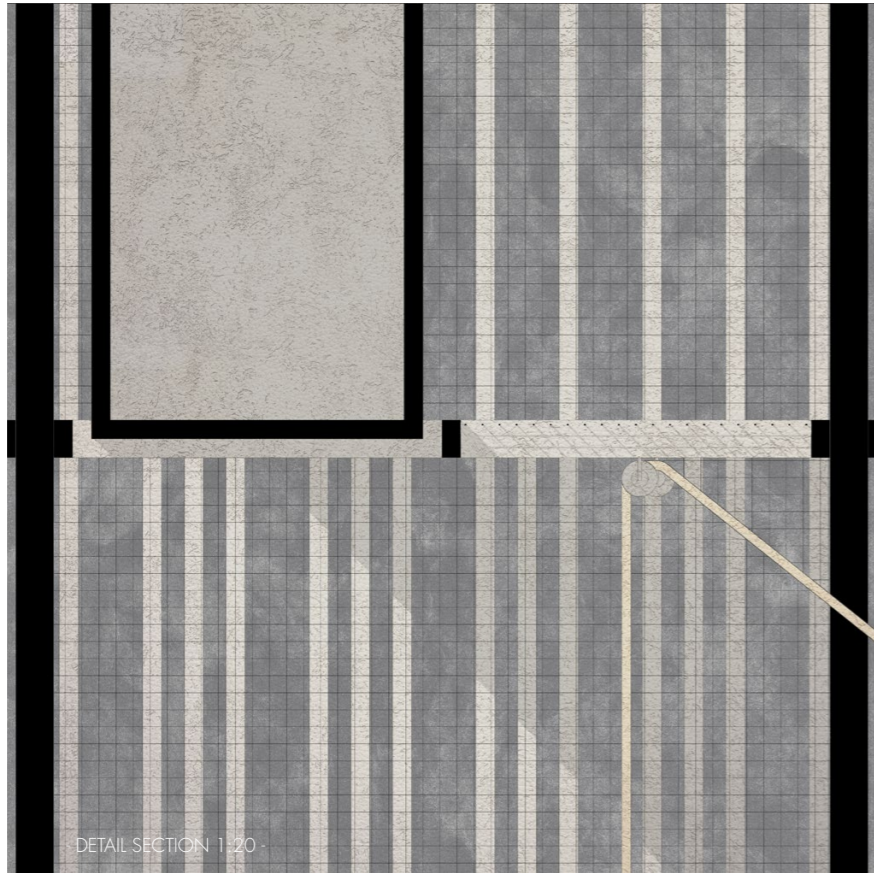
The gravel hill rises 25 meters above the ground just north of the quarry floor. It offers uninterrupted views of much of northern Gotland.

The hill is made up of excess gravel from the industrial activities of the site and it is a changing environment, shaped by wind and rain. The hills steep sides are impossible to climb and because of this the tower will act as a connection between the different levels of the hill. It is a simple mechanical structure where elevators and folding gangways are interconnected. The elevator moves upwards one level at a time, unfolding the connected gangway that grants access to that level of the hill. The gangways can be lowered to varying levels compensating for the changing nature of the hill.

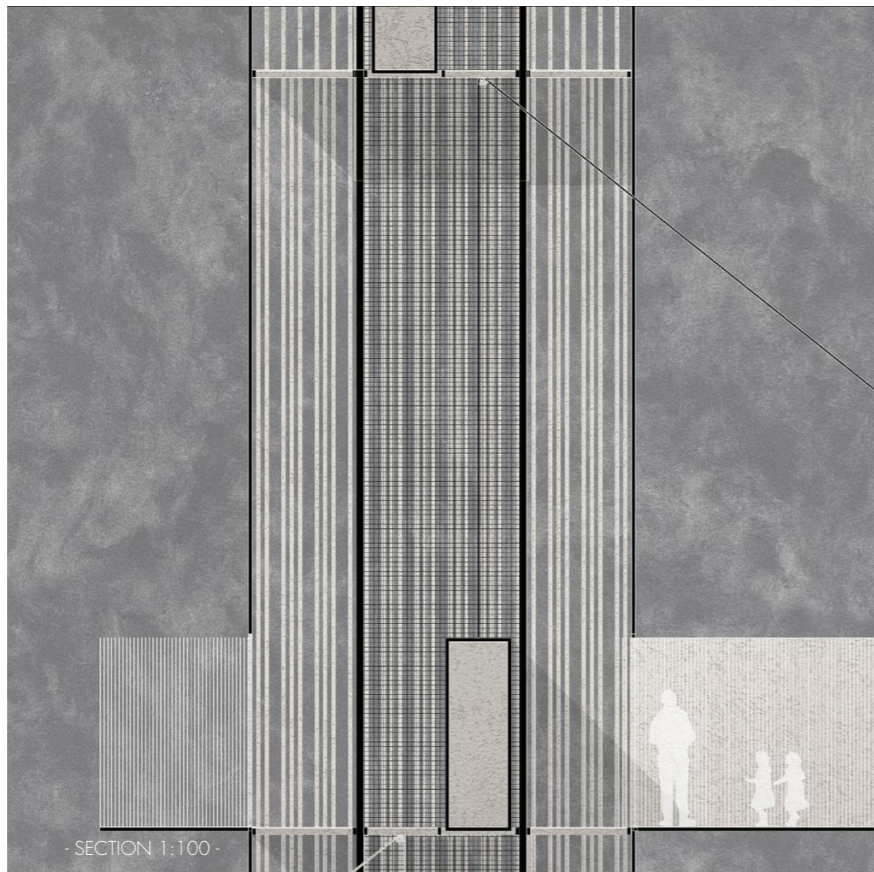
The structure dissolves as it climbs, starting at ground level as almost solid, and ending up almost transparent at its top, enhancing the sense of height and moving up towards the sky and being exposed to it. The mechanical functions anchor you to the site and makes the visitor an active agent in moving around the tower.



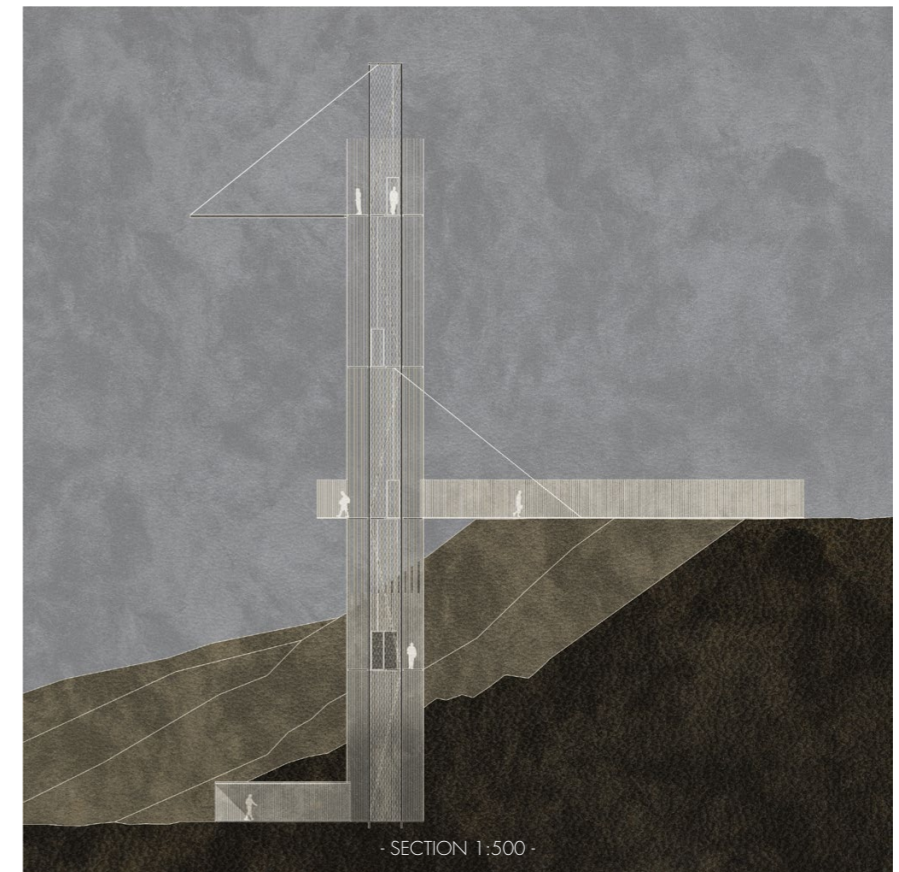
Design proposal



94



95



Design proposal

Chapter Five: Conclusion

MERGING OF NATURAL AND ARTIFICIAL

CONCLUSION

The real conclusions of this thesis would only show if it was ever realized. However, I do believe seeing our industrial heritage with new eyes could open up unexplored parts of our world and add to the understanding of what architecture is, where it comes from and what it needs in order to be constructed. Not to look at the remains as a sign of destruction but as a part of the landscape, our landscape - an architectural landscape.

This thesis main idea is the merging of what is natural and what is man-made. It is easy to criticize the quarry for tearing up nature when it happens in our own backyard, it is harder when it happens in another part of the world. The quarry is a consequence of the way we live our lives and build our societies. We should either change our way of living or accept the consequences of it, and this thesis tries to do the latter. If it is possible to show and educate about places like Storugns it will add to our collective knowledge of how our world works. To turn numbers and statistics into an experience for a visitor and to hopefully leave a lasting impression.

"The ruin is a complementary counterimage to the city - a form on it's way to return to nature, but thereby also an ensurance of a deeper continuity between culture and nature"¹

¹ Schmitz, H. Borderlands. Art and Theory, Stockholm. 2015. p. 22

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INTERVIEWS

Kerstin Nyberg, Environmental Manager at Cementa Slite, Interviewed by Author, 2 November 2016.

Ola Thuresson. Site manager at Nordkalk Sturugns, Interviewed by Author, 3 November 2016.

All map material and satellite imagery collected from: SLU Geodata Extraction Tool, <https://www.geodata.se/GeodataExplorer>. Commercial use is forbidden.

