The Journey of the Sandstone

The Bernese Sandstone has been Bern's main building material for many centuries, shaping and defining the city like no other. It is estimated that about one point five million square meters of sandstone were extracted in the course of six hundred years in about a dozen quarries around the city. Today, only two remain active at a very low pace, mainly to sustain restoration efforts in the old city, since building laws still require all facades to be made specifically out of Bernese Sandstone. One of these quarries is located at the foot of the Gurten, a hill in the outskirts of the city. It supplies the material for the restoration of the Münster, Bern's most important cathedral. After their extraction, the stone blocks are brought to a storage location under a highway bridge. From there, they are transported to a workshop located along the river, where they are worked on by the stonemasons, after which the finished stone piece is brought to the Münster. This project proposes interventions at two sites along this spiritual path of the sandstone. The aim is to give these sites additional meanings, purposes and to make them accessible to the public.

1. In the beginning there was a fire

In May of 1405, two hundred years after its founding, the city of Berne was ravaged by a devastating fire. A few flames quickly turned into an inferno and spread easily across the city, built mostly out of wood. More than six hundred buildings were destroyed and over one hundred people killed. In order to avoid similar catastrophes in the future, the city council decreed that henceforth, the more durable and fireproof Bernese Sandstone was to be used as the main building material. Formed millions of years ago by the layering of alpine deposits in the Swiss Plateau, the material had already been used for a few key buildings in the past and was available in abundance in the ground all around the city. Furthermore, being a rather soft stone, it was easy to extract and process, characteristics which made it an ideal choice for the reconstruction of Berne. And thus began a century long tradition of mining and building with this peculiar material that would shape and define the city like no other. It is estimated that about one point five million square meters of sandstone were extracted in the course of nine hundred years in about a dozen quarries around the city. The peak was reached during the 19th century, when building activity increased drastically following the appointment of Berne as the Capital of Switzerland. Additionally, the city's connection to the national railway system meant that Bernese Sandstone could now be exported and used all over Switzerland, such as in Zurich and Lausanne. Traditional surface quarrying was soon complemented by underground mining, making it possible to work during the winter as well. However, due to the high demand, mining was sometimes rushed and the quarries not planned carefully enough, resulting not only in accidents but in lower quality shipments as well. Combined with the inherent proneness of the material to weathering, this resulted in many building facades deteriorating quickly and requiring heavy maintenance, giving Bernese Sandstone a bad reputation. The emergence of modern building materials at the beginning of the 20th century was the final nail in the coffin for the material and most quarries were subsequently closed and abandoned.

Today, only two remain active at a very low pace, mainly to sustain restoration efforts in the old city, since building laws still require all facades to be made specifically out of Bernese Sandstone. One of these quarries is located in Ostermundigen, a rapidly growing suburb of Berne, home to its second- highest tower after the Münster, Berns main cathedral. What used to be Switzerlands largest and busiest quarry has been reduced to a minimum, with no more than three stone cutters working in an almost idyllic place, slowly reclaimed by nature. It is privately owned and operated by a local company dealing with natural stone and can thus be seen as part of the commercial path of the Bernese Sandstone.

Conversely, the quarry at the foot of the Gurten, Berns most prominent hill, is part of a spiritual path. It is operated by the „Münsterbauhütte", a publicly funded association of stone masons, architects and other specialists established in 1880 for the construction of the long awaited upper part of the bell tower, giving the Münster its final appearance. Afterwards, the Bauhütte became responsible for the maintenance and restoration of the Münster. As many exposed pieces of stone were deteriorating and needed to be replaced, the abandoned Gurten quarry, known in the past for its high-quality material, was reopened in 1954 and has been supplying material for the Münster ever since. After their extraction in the quarry, the stone blocks are brought to a storage location under a highway bridge. When needed, they are then transported to the actual Bauhütte, a workshop along the Aare river, where they are worked on by the stone masons, after which the finished stone piece is brought to the Münster. In the In the last few years however, the Bauhütte has shifted its focus from restoration to conservation, experimenting with new methods of preserving and protecting the existing stones instead of replacing them. If successful, the need for new blocks of stone could diminish in the future.

With that in mind, this project explores alternative ways of operating two of the sites along this spiritual path of the sandstone. In the past, quarrying was done in the quickest and most efficient way possible to maximise the output. No thought was given to what would be left behind, resulting in unusable spaces that were often times dangerous and inaccessible to the public. Today, with speed and efficiency no longer being a deciding factor, this could be different. For instance, simply by changing the way that quarrying is carried out, architectural spaces could be created in the process, enabling a public use during and after the quarry's lifespan. Similarly, by reimagining the way that the stone blocks are stacked, the space underneath the highway bridge could become accessible to the public.



2. Quarry space: The other Münster

Currently, stone extraction in this quarry is carried out from top to bottom through the use of platforms: First, earth is excavated until the surface of the sandstone is exposed. Then electric chainsaws on tracks are used to cut vertical trenches approximately one meters deep, in a grid of two by one meters. Inflatable cushions are then placed within these trenches and filled with air. This releases a stone block of approximately 2x1x1 meters from the ground, which is then hauled by crane to the bottom of the quarry, where is it stored temporarily.

The alternative method of quarrying proposed here is as follows: Instead of quarrying down the whole surface of the platform, it is only done on a part of it, creating a hole in the ground. The stone blocks retain their standard size of 2x1x1 meters. On the first level, one block on the edge is left in its place and an additional one on each subsequent level, resulting in steps. These are complemented with smaller steps made out of blocks of lesser quality using the stone milling machine already present in the quarry. The resulting staircase can be used by the workers, as well as visitors outside working hours to see the evolution of the work. These visitors can access the platform using a new branch of the nearby hiking path.

Once a certain depth is reached, quarrying becomes horizontal, spreading out in all directions. The method is essentially the same as before, except that the cuts are made on the walls instead of the ground. For this, a forklift is needed to lift the electric chainsaw and to transport the extracted stone blocks to the middle, where they can be hauled out using the crane through the previously created hole or light shaft. It is during this phase, that the floor plan of the future space is determined. Some parts are left out at regular intervals to support the roof and at one point, the edge is reached to create a small opening. A little water basin is created underneath the light shaft, filled by rainwater, to cool the machines.

Then, quarrying becomes vertical once more until it reaches the ground level of the quarry. Two additional levels of stone blocks are extracted, but offset by one row on the edges, in order to create an arena theatre. Underneath the light shaft, a basin is made by removing five more blocks. Finally, the entrance is created by quarrying a tunnel and an entrance portal, making the space accessible from the ground level of the quarry.

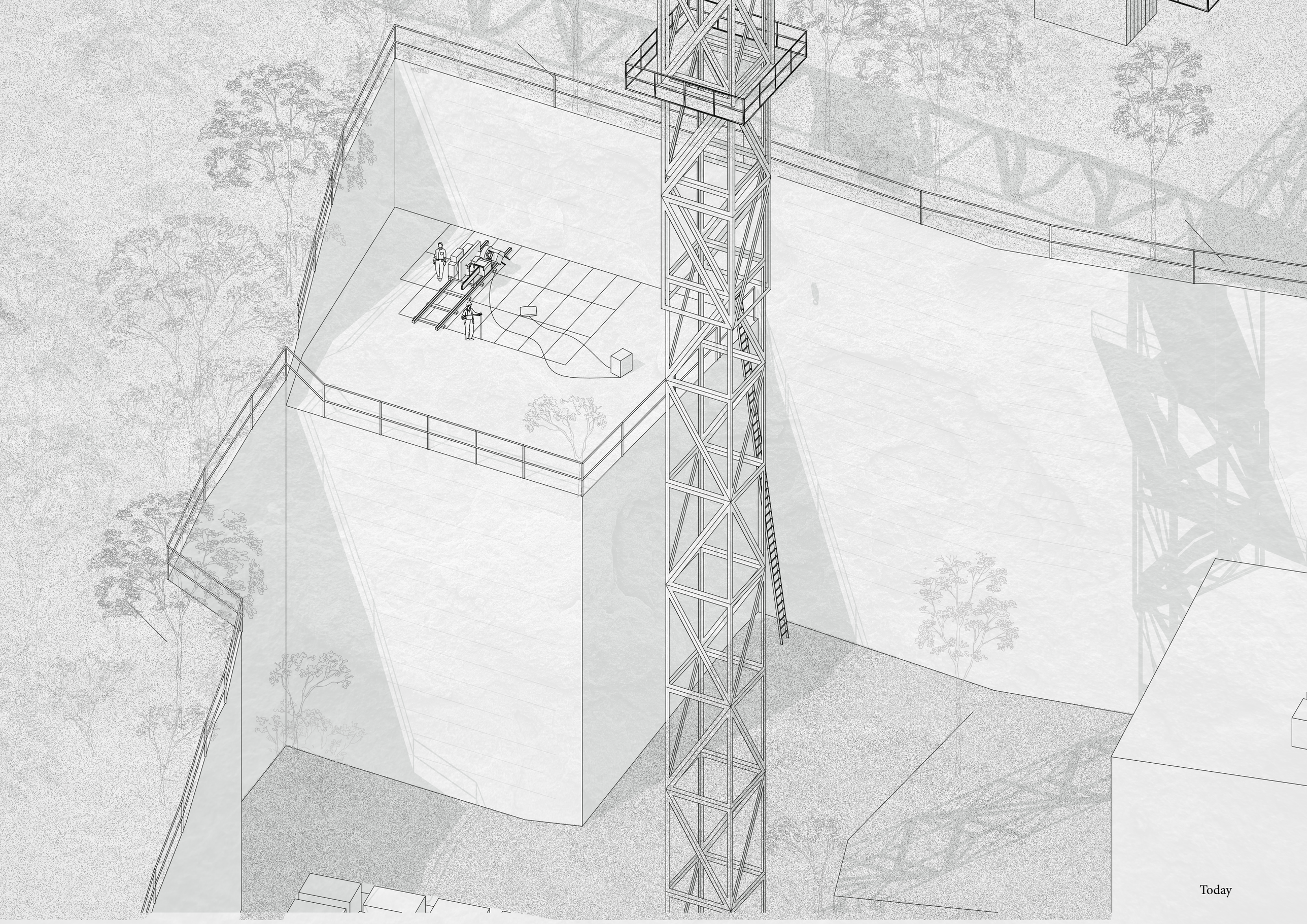
This space can be seen as another version of the Münster itself. The parts that have been left out have become massive and tall pillars, the small opening has become a large vertical window. The light shaft echoes the bell tower, which, like in the original, can now be ascended. Rain falls through, slowly filling the basin at the bottom with water. It is a spiritual place where people can gather. It is like the Münster, but without the burden of religion, open to all. There are no symbols and no ornaments, except for the traces that the machines have left behind.

This other Münster might take years, if not centuries to be completed. Essentially, the speed at which this space is created depends on two factors: How quickly the weather and especially the rain will damage the original Münster's stones. And how successful the Bauhütte will be at preventing it.





Site plan 1:500

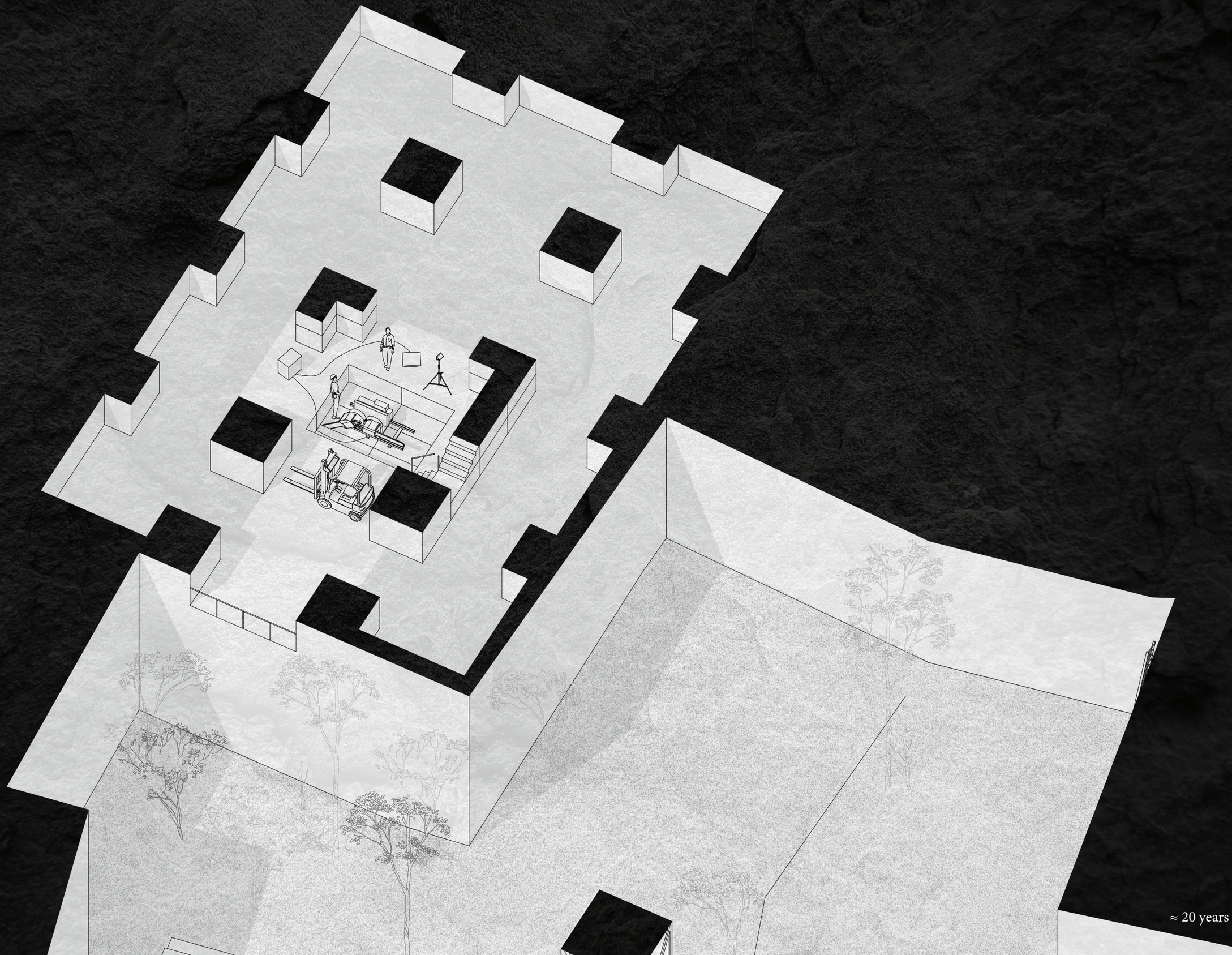


Today

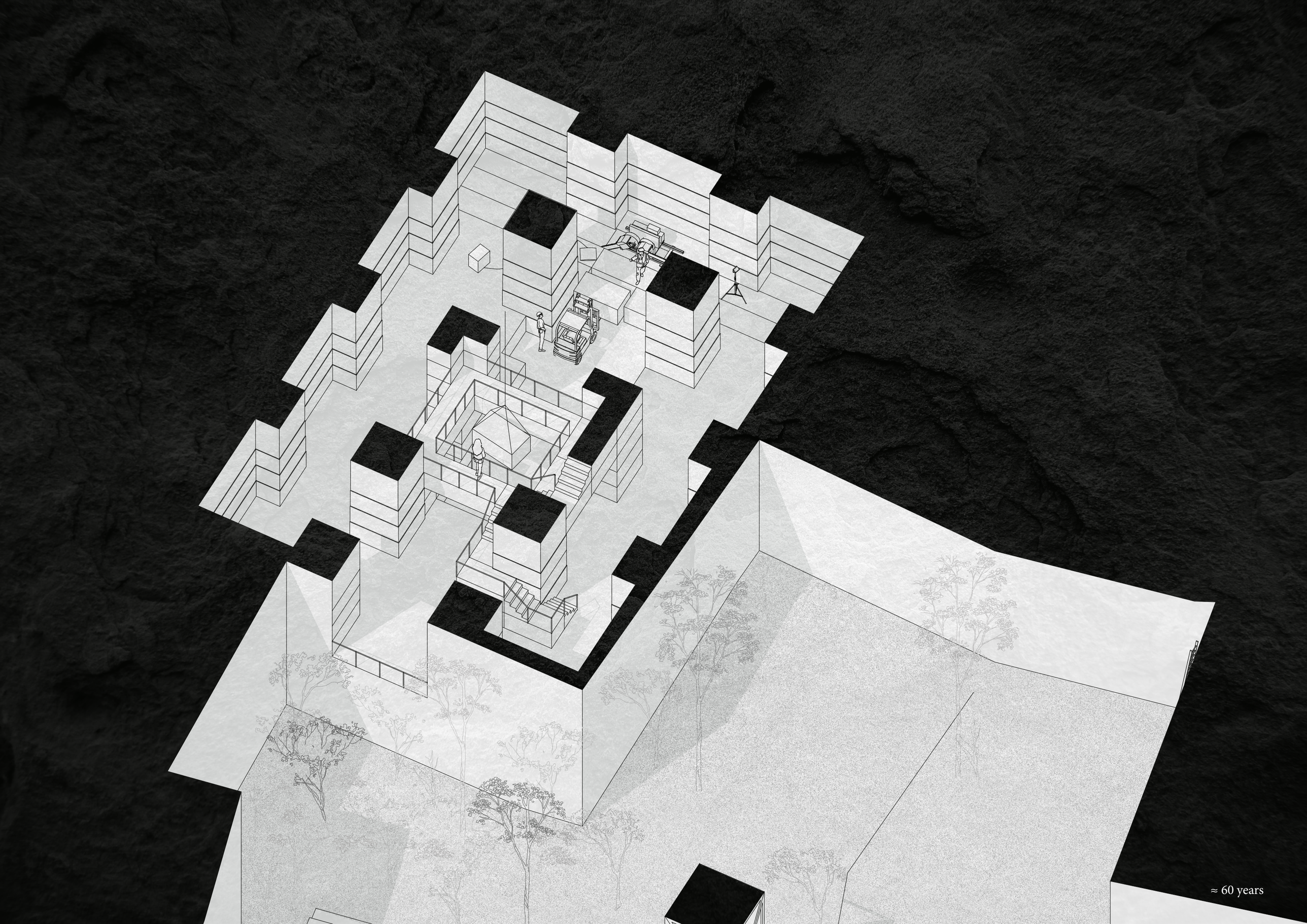
≈ 6 months

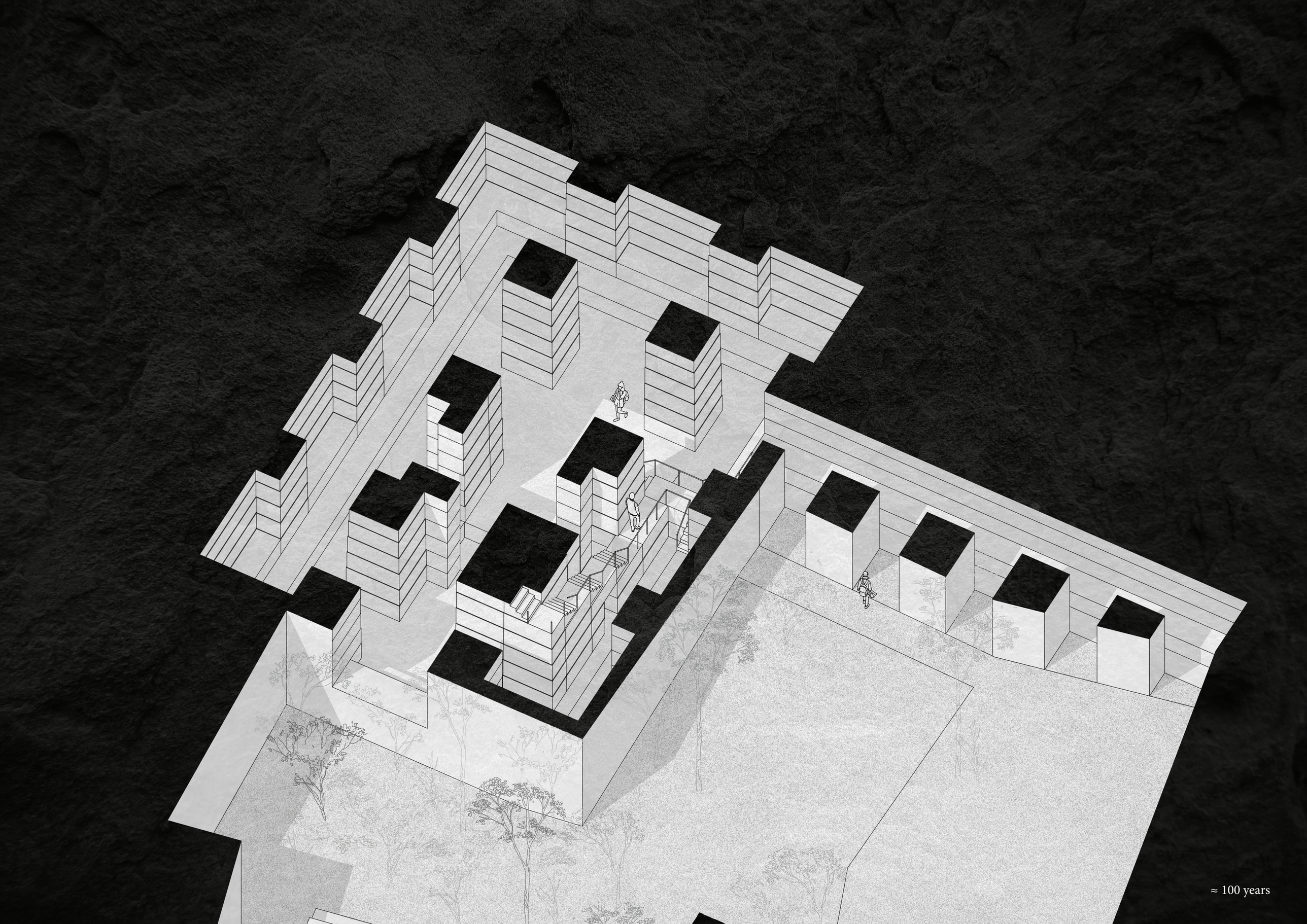
≈ 2 years

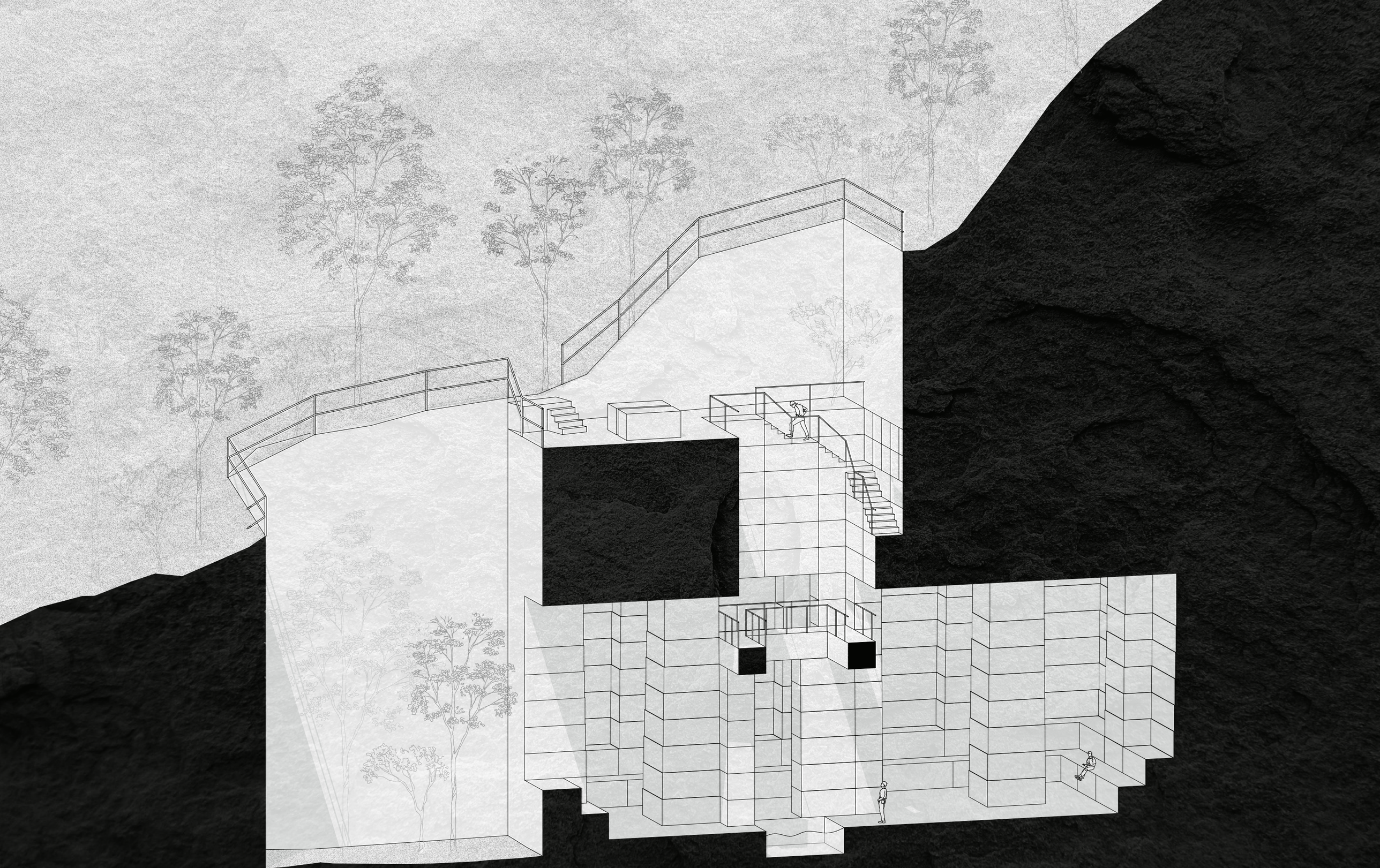
≈ 5 years



≈ 20 years


≈ 60 years


≈ 100 years















3.Storage space: A sandstone pavilion

The stone blocks are stored on a site in the western outskirts of Bern. The surrounding area is composed mainly of industrial buildings and former workers houses as well as some corporate headquarters and new office buildings, where many tech and start up companies are located. However, the neighbourhood lacks any meaningful public spaces.

The storage site itself is located under a highway bridge. It protects the stone blocks from the rain, while a metallic fence protects them from intruders. It is like an island bordered by train tracks, a street, a bike lane and a sidewalk. A maximum of two stone blocks are stacked on top of each other, separated by two pieces of of wood and scattered around the site on an earthen floor.

The proposal for this site is simple and twofold: The fence surrounding the site is removed to make it accessible and an overhead crane is attached to the underside of the highway bridge. On one hand, this facilitates the process of unloading the stone blocks coming from the quarry and loading those going to the Bauhütte. On the other hand, it makes it possible to easily move around the ones presently there, as well as other objects.

One possible way of doing this would be to arrange them in a regular grid, leaving out some parts in the middle to create inner courtyards. These provide a space for spontaneous activities and planned events. The regular grid combined with the irregular, polygonal shape of the site creates additional spaces on the edges. Some of them are an extension of the bicycle lane, and can therefore be used as bicycle parking and entry points. The one closest to the road can be the parking space reserved for the truck that loads and unloads the stone blocks and other things.
To connect all these spaces, it is possible to open or close certain paths by narrowing or widening the gap between the blocks. The pieces of wood sticking out between the blocks can also be used for that purpose. Such narrow paths between rows of stacked, massive stone blocks completely detach the visitor from the outside world: Since two blocks stacked on top of each other measure more than two meters in height, the only things one can see is the sandstone and the concrete from the bridge above.

Naturally, the demand for new material from the Bauhütte would also play a significant role in the organization, likely changing the space over time. In periods of low demand, towers or waves of sandstone might form on top. In periods of high demand, new courtyards could appear. Also, only removing the upper stone of a pair creates a stepping stone to climb to the top, revealing a landscape of sandstone.

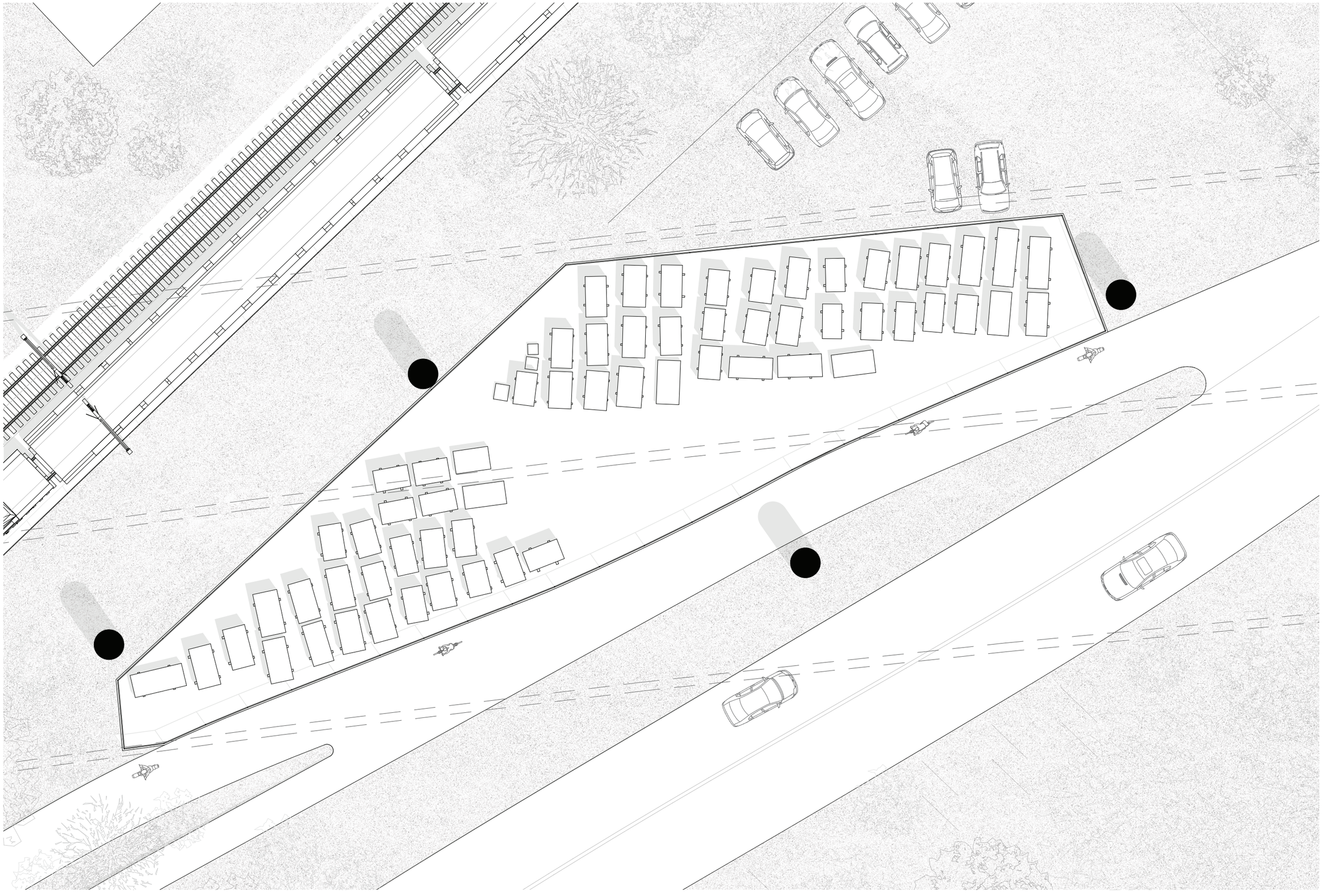
In short, through this intervention, this place now has three functions: A storage space for sandstone, a public space, and finally, a place to raise the awareness for this material and its great significance for the city of Bern. This will hopefully lead to its revival. Together with the ongoing research of the Bauhütte to make it more waterproof, this otherwise very durable and locally available material could once again become an important building material in the future, going beyond just the Münster and the old city of Bern.





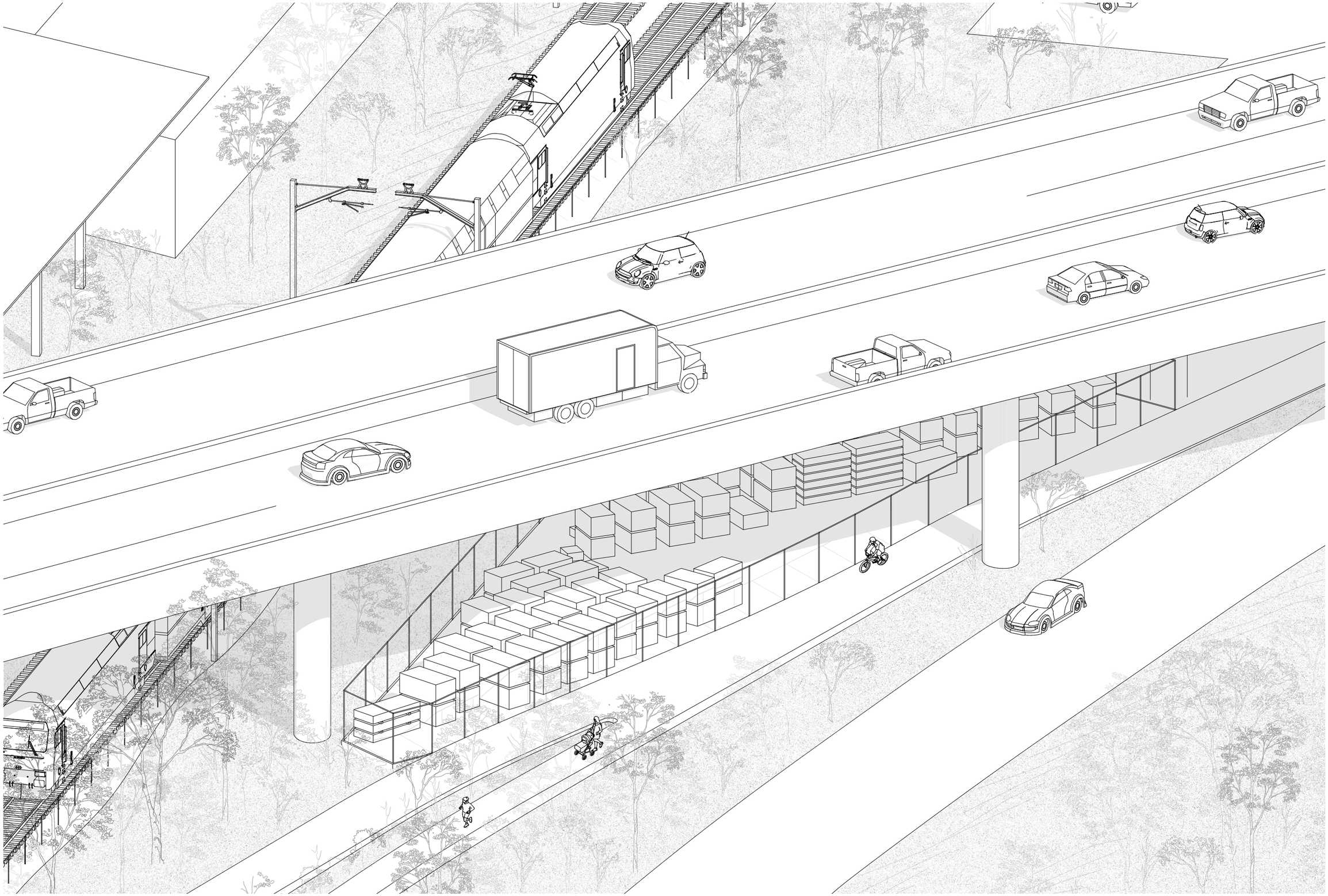


Site plan 1:1000



Current configuration 1:200


2KL 96



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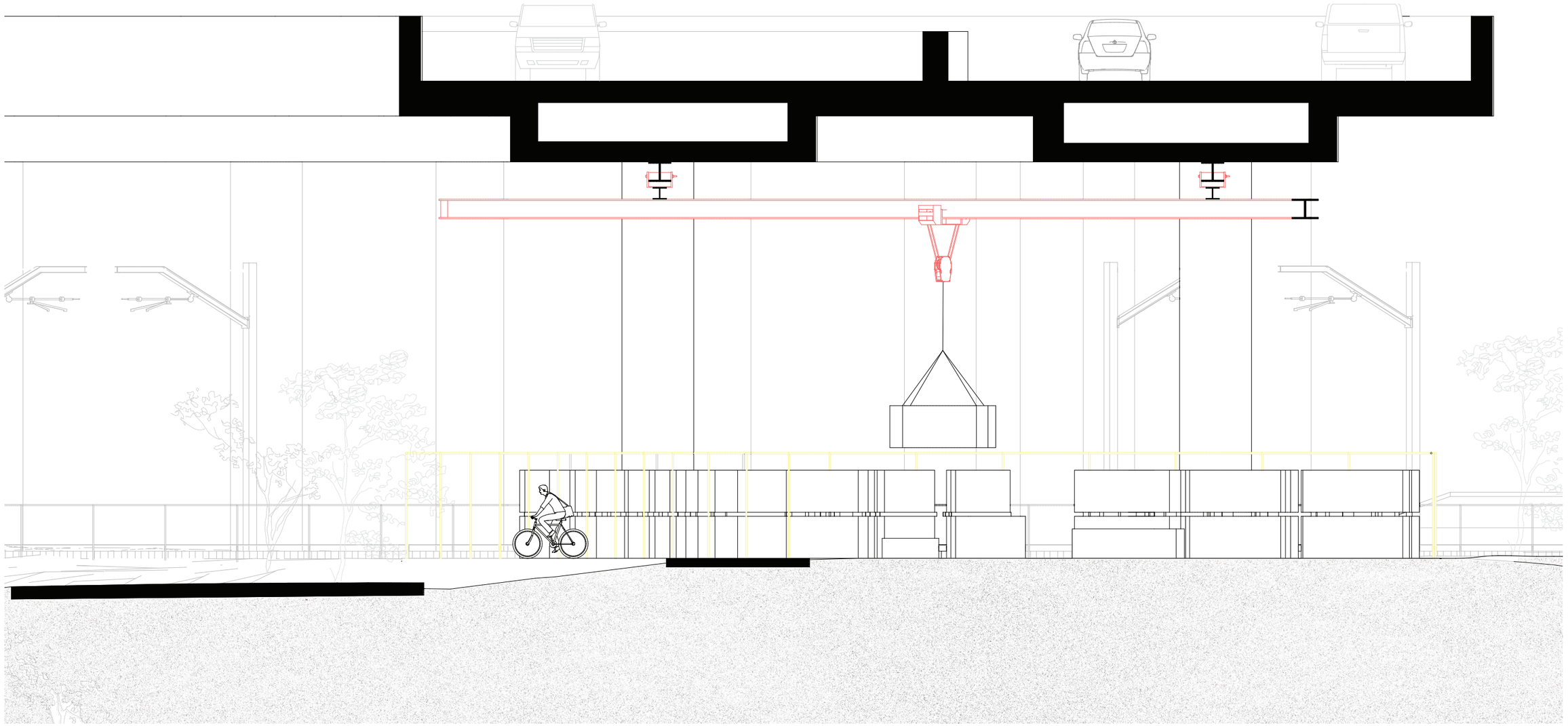
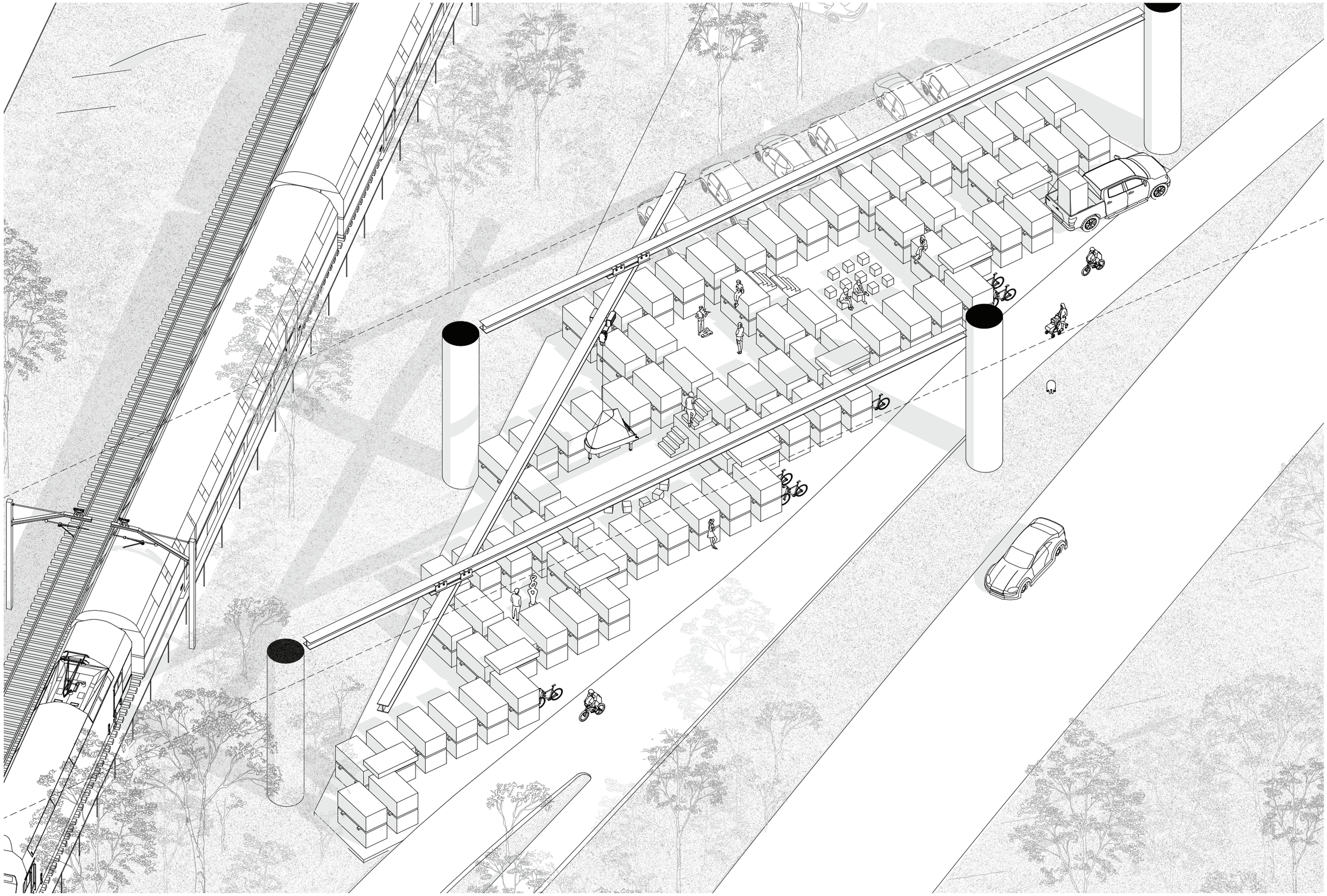


Intervention. Section 1:100



Proposed configuration. Axonometry





