



*A long forest walk,
Changing altitudes and carefully navigated pathways,
The sound of machines in the far distance intertwined with wind, birds and talk..
A unique mix of landscapes- open, closed, light and dark,
Nothing you have seen in any winding park.*

*Where once stood a destroyed land
Now stands nature, and no, not destroyed land, constructed land.
Can every other tainted piece of earth be seen as beautiful?
That is the question I have tried to answer in this tale, so unusual.*

*Clay, sand, gravel and stone,
there are but other relics exploited since the bygone.
We are the soothsayers, the designers,
Lets begin changing one, this majestic piece of earth we stand before,
slowly but surely, paving the way for two, three and many more.*



Reflection
Learning through a test case

6 ***DISCUSSION AND REMARKS***

6.1. REFLECTION. The fascination in the beginning of the year for exploited landscapes led to a project based on which I have learnt a great deal. Looking at the end results, I can reflect upon the process which led me to them.

The beginning stages of the project were inter-weaved with many questions about exploited landscapes. Through the design process, I have come to realize that the lack of clarity in the beginning was only warranted because of the high variations in the characteristics of each type of exploited landscape. Like many students of landscape architecture, I had naively started off with the idea that I could solve a very major problem of exploitation of the earth's surface since it seemed like the mining industry will never come to an end. After two years of studying landscape architecture in the Netherlands, I am able to realize that my growing up in India had made me blind to the beauty in such landscapes. The levels of corruption and disruption mask the true identity of such landscapes. The initial stages of finalizing a site area however changed these beliefs. At the end of the project, I can conclude that the ways of looking at (reading) a landscape through different lens itself has an impact on the way interventions are employed on the area.

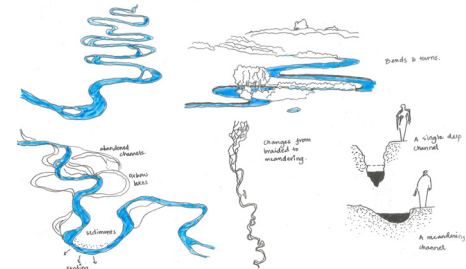
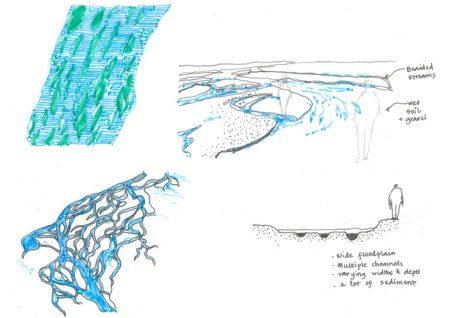
***6.1.1. Relationship between the research and the design
-the research method and application to other excavation sites***

The thought about how man is not going to stop exploiting earth for its resources for at least the next century this led to the selection of a site where excavation will continue to take place for the next 15 years (or more). If I needed to design for the future excavations, it was important I understood how they did that in the first place. The lack of any straight-forward information about mining practices left me exploring by myself, finding new ways to understand this. My first instinct was to of course contact mining companies for this expert information, but soon I discovered that many of these companies have policies against disclosing information. Therefore, through many Youtube videos and Google search images (and common sense), I broadly concluded that there are certain machines which play the most important roles in the process, but I was still left questioning about the spatial qualities they create. Luckily, a site visit to the on-going excavation area early in the research process (October) helped me to get a grip on the spaces created during the process. The experience of feeling overwhelmed in the vast landscape drove a major part of the design. The site visit heavily guided the initial analysis steps. The experience of touching and walking on different materials in the quarry was very useful to the research process. **The combination of the technical understanding of the process along with the spatial experiences on site** drove the research and thus the design in a similar fashion.

The site visit further urged me to start thinking about the height differences, not only in the quarry, but also around the quarry. The bike ride up the hill near the border between the Netherlands and Germany had me questioning the sudden increase in elevation. This process turned out to be crucial to the research and the design since it led to the **geological reading of the site**. The curiosity about the extent of impact on digging made me to question how many years it would take for the earth to naturally compensate for this loss. This led to the understanding of many concepts which were translated later into design. At the end of the project, it has become more and more clear that the material of the excavation landscape is of primary concern which underpins the process of exploiting it. Therefore, the geological reading, along with the technical understanding of the processes involved, without losing sight that the site has experiential qualities can be employed on any excavation landscape.

6.1.2. The endless pit of variety in exploited landscapes

As discussed above, the research method is possible to employ on other exploited landscapes. The research conducted on this particular site mainly led to the need for a better balance of scale and proportion in the spaces in order to accentuate the machine-made spaces while still making it possible for human experience, the need for clarity about the (ecological and excavation) processes on site and to question the need for a program which drives the remediation of many “disturbed sites”. The principles derived to tackle these needs respond to this particular site and are tailored to fit other excavation landscapes as well but one must be aware that there are a very many types of excavation landscapes, each differing greatly from one another. (On the right are some images to prove this) Therefore, the principles can be applied to other cases, but being mindful of the variations of context can help in tweaking the principles as per the changes. It can also be noted that the geological reading, the excavation process and the specific landscape can provide its own clues into the tweaking of the principles.





1. Stone Quarry

Image source: http://www.4x4explore.com/rds/s_rds/stone_qry.html

2. Iron-ore Mining

Image source: <http://www.cet.edu.au/research-projects/iron-systems/projects/hypogene-mineralization-and-fluid-flow-in-selected-high-grade-bif-hosted-iron-ore-deposits>

3. Slate mining belt

Image source: <https://slateassociation.org/nature-characteristics-slate/>

4. Diamond mine

Image source: <http://www.mining.com/top-producing-diamond-mines-2016/>



6.1.3. The design proposals as a response to the research objective

In the end, does the design respond to the initial objective or not? Does the design contribute sufficiently to the ecological, recreational and educational development of the excavation landscape and how does the research method enable this?

The development plan is proposed for the year of 2030 when the excavation is projected to stop, and the design focuses more on the experiences of the area where excavation is complete and where it is on-going currently. This is because future development of the quarry as a ripple effect to the interventions and guidelines proposed is at the crux of the project. The area where excavation is completed lacks the characteristics of a quarry landscape, and therefore, the interventions focus on this part, designing the routing which binds the design together. It is believed that not all parts of the landscape need to be designed in detail, but the spatial guidelines for future excavation will allow flexibility for various possibilities. A program is not necessarily required to be the only solution for remediation of such sites, whereas, they can also be allowed to be a part of an ecological network - a program for flora and fauna. However, if required and it suits the case, based on the context, different functions are possible for a given space. This can be clearly seen through the demonstration of visualizations.

The design and composition of the lake and its surroundings was one of the most important parts of the research-by-design process. It showed that **recreational development** is possible by expanding the extents of the lake. The understanding of the layers of materials underneath helped in doing so. The search for the right placement of architectonic elements also helped to grasp the true spirit of the excavation landscape, i.e., the thresholds displaying various contrasts. The fluctuating water level and taking care of the water flow towards the lake ensures **ecological development**, along with steps taken to employ natural succession. **Educational development** is one that is implied since the design aims to make evident, the characteristics of the excavation landscape through subtle means. The walk along the axis towards the ruined rusted machine is intended to evoke the memory of the landscape and remind one about the activities on the site. On the other hand, the workability of such a project also involves literally educating the quarrying companies and workers about the impacts of quarrying in a certain way and ways of remediation. Therefore, the design facilitates the overall landscape development of the quarry.

6.1.4. Relationship between the project and the studio theme, 'Flowscapes'

The project is part of the graduation studio, 'flowscapes' under the MSc of Landscape Architecture. One of the main themes of the studio is to uncover infrastructures as landscapes and landscapes as infrastructures, and this project encompasses this theme. This demands that design be approached through a multi-layered understanding of the landscape, respecting the unique qualities of the infrastructure landscape. The excavation landscape is especially fitting to this due to the machines (infrastructure) that dominate it and the design being driven by this logic.

The "flow" of machines, materials, people, and ecology through the sculpting of the earth calls for design which pays attention to the landscape as a set of architectonic elements. There is a strong presence of green-blue elements in the site even though man carves away the land unaware of his fight against nature. The project creates this awareness and questions further developments based on these flows.

Research-by-design is part of the studio methodology which comes into play after the research stage to test the analysis and the effectiveness of the design principles. There was a constant tug between the formulation of the design principles, the overall development plan and the parts of the plan. The experiments and options during this process showed that there is always more than one way to apply the understanding on a site.

6.1.5. The role of the landscape architect

As mentioned earlier, the project aims to firstly create awareness and secondly, plan future excavations before they begin to ensure proper landscape construction. To achieve these goals, the excavation companies and land owners must involve a landscape architect in the planning processes. The landscape architect can in-turn also approach such companies to educate them about the challenges and potentials of such places from the landscape perspective. This will also help in a two-fold reading of the site - from the technical point of view and from the spatial-visual perspective. It is the role of the architect to then work with the technicalities and sensitively understand the economic needs of the exploitation while guiding to do the same to facilitate overall development during as well as after the processes are complete. The process of changing people's minds about such matters might be a tiresome one, but taking steps to educate them about the matter is a good starting point and it is the responsibility of the landscape architect to take these steps.

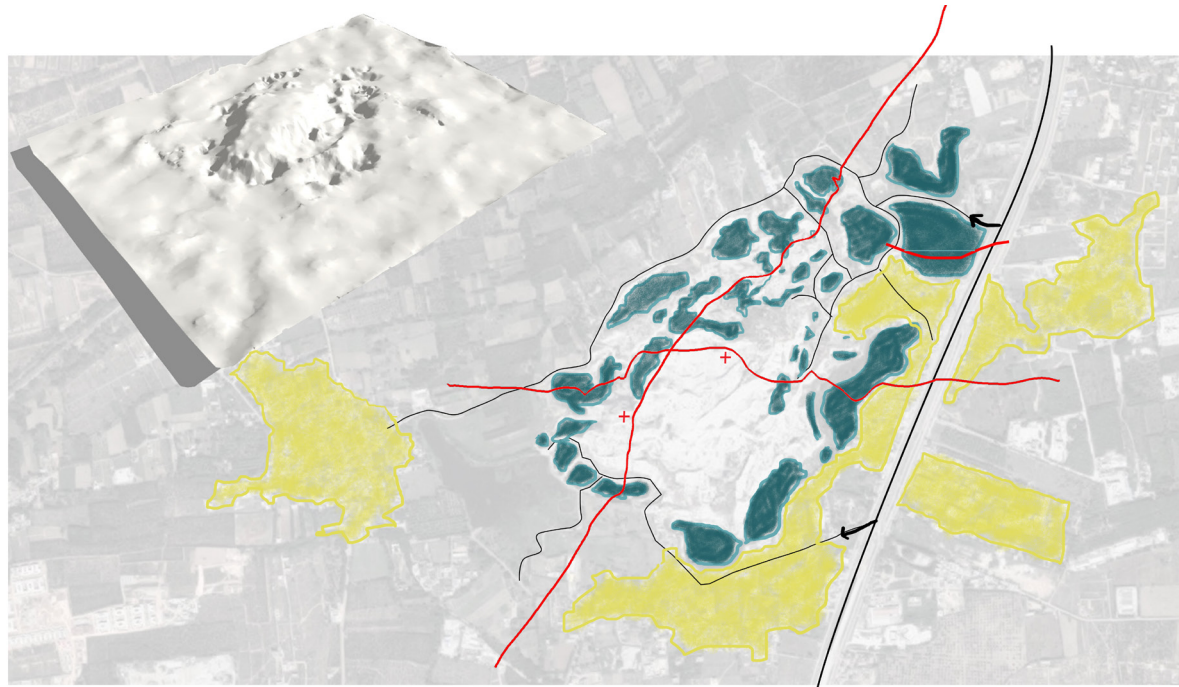
6.2. LEARNING THROUGH A TEST CASE. BETTAHALSOOR, BENGALURU, INDIA

6.2.1. Introduction. To learn further from the thesis, another quarry of a different type is explored through the lens of some of the principles derived in the graduation project. The test case chosen is a stone quarry (stone extracted/blasted from a hill), *Bettahalsoor* located in the city of Bengaluru in India. For the sake of exploration and trying to check if the principles can also be applied to other kinds of excavation sites, a stone quarry is chosen.

The chosen quarry in Bangalore was recently abandoned and requires attention due to many reasons. The main thing to note about the site is that the base material is stone and thus, there are numerous water bodies that form easily. The lower elevations of the villages and agricultural lands around the hill are constantly threatened by risk of floods from the water pools formed around the hill due to haphazard excavation. The micro climate of the region is in poor condition and the temperature is increased multi-fold because of the exposed rock surfaces that are not treated in any way. (Avg maximum temperature: 30°C and Avg minimum temperature: 23°C; Avg rainfall: 859mm) The water inflow (especially during the monsoons) exceeds the rates of evaporation and this poses a threat to the landscape. The site is also in threat of constant unplanned encroachments by the surrounding villages.

With this brief initial information about the site and its context, it is possible to quickly test some of the principles keeping in mind the Indian context.





Initial exploration of some principles.

Site model showing the terrain of the site which can be used for exploration.

6.2.2. Testing principles. Water being the primary characteristic of this site, the principle of **water gravitas** can be tweaked to find some site-specific starting points. A site model revealing the terrain can be utilized to understand the water drainage in the larger context as well as for the smaller pools. The landscape types and ecotones are also governed by the slopes of the water bodies and their edges. Therefore, paying attention to them would be a good spatial starting point.

But before addressing the water, one can understand a lot about the spatial qualities of the site by looking into the excavation process. Since blasting is one of the main methods used for such an excavation, the slopes formed in the smaller scale are more difficult to control during the excavation. Therefore, there must be careful consideration about the post excavation treatment of the uneven rough stone slopes.



6.2.3. Conclusions. The principles that are derived in the graduation project are specific for excavation sites and can be used as starting points for design solutions. One of the important conclusions of this exploration is that the principles are most quarry-specific when used in relation with each other. The application of two or three or more together will make the design stronger. The context plays a very strong role in the way in which these principles are applied. For example, the proximity of the villages and the agricultural fields calls for a proposal for the further expansion of the village without damaging the landscape, and the specific hill-like character to the site influences the other spatial choreographies.

That said, it is still possible to choreograph the experiences through excavation sites since there is no doubt that such sites have tremendous picturesque qualities to them. It has become evident that dealing with such sites is a complex matter due to possible ownership issues and bureaucracies that might be involved with them. Throughout the graduation project, one point that was repeatedly discussed was about the party that would execute any design that a landscape architect might propose. This is even more clear in the Indian context since the government bodies fear illegal activities (continuing exploitation of minerals) taking place once permission is granted to make changes to the site. Therefore, it is important to approach them with caution and to ensure that, at the least, some awareness is created in the process.

The project has been valuable in many ways to uncover the mysteries of excavation sites. Many of these sites still stand abandoned and in threat of contamination, many of which are yet to undergo unplanned changes. I hope that the graduation project can be a vehicle to drive addressing other such sites.

