

REVEALING THE GRID



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## REVEALING THE GRID

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### Abstract

Ruins have always fascinated me. These eerie, abandoned, man made buildings, hold you in awe. Buildings no longer in use, tell their story through whatever remains. What does one do with the ruins? Preserve, destroy or reinterpret? How do you build with ruins? How much do you destroy? How much do you retain? How do you build anew?

One such ruin is that of Mc Millan Sand Filtration Plant in Washington DC. A completely utilitarian structure, with a huge grid of columns covered with a roof spread over 25 acres of land. What appears from the eye level as a 25 acre lawn with a grid of manholes, interspersed with two rows of gigantic concrete towers, is actually a water purification plant that used a slow sand filtration process (purifying water by passing it through sand and gravel) to supply potable drinking water.

The grids (of columns and manholes) are the most striking features. When the manhole covers are opened, they cast a pattern of light on the floor. The manhole grid itself can be interpreted as a grid of skylights.

Furthermore, there are various extents of deterioration this purification plant has undergone, due to which the grids are presented in a variety of ways:

As a grid of columns with the roof of manholes (structure intact);  
As a grid of columns without the roof (columns not strong enough to hold the roof);  
As a collapsed structure/ mass of earth (complete state of deterioration).

Though water was the essence, the very reason why this plant was in existence, today this piece of land lies parched and thirsty.

Much was happening on this seemingly calm piece of land. I wanted to bring out its essence, reveal its grids, the unending array of columns, the play of light and shade they caused and most importantly, I wanted to bring water back to where it belonged. This thesis also explores the possibility of building on/with the 'old' in a strong existing context by introducing a shift/rotation in the grid and with the help of material and texture.

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Most of all, I want to thank the spark that brought me to life so that I could explore this world of knowledge through emotions and intellect.

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Fig 1.1

*Site.. First impression*

I first visited the site in June 2006. I was instantly awed by what I saw. A massive parcel of land located in the heart of a busy city with 2 rows of humungous concrete towers standing on it. The site appeared to be a ruin of some kind untouched for years. I also observed a series of manholes located on the site... a consistent grid of these. The site was barricaded on all four sides. The contrast of this quiet site and its busy surroundings made it quieter to the point that it was almost eerie. A short walk away I saw a body of water. I wondered if there was a connection between the site and water.

What were these towers? What was their function? What did these manholes tell about the site? How would one build on these ruins? Would 'the new' disregard 'the old' and stand independently, or would it derive from 'the old'. There were no answers at that point but one thing was certain... this was the site for my thesis project.



Fig 1.2



Fig 1.3



Fig 1.4



Fig 1.5

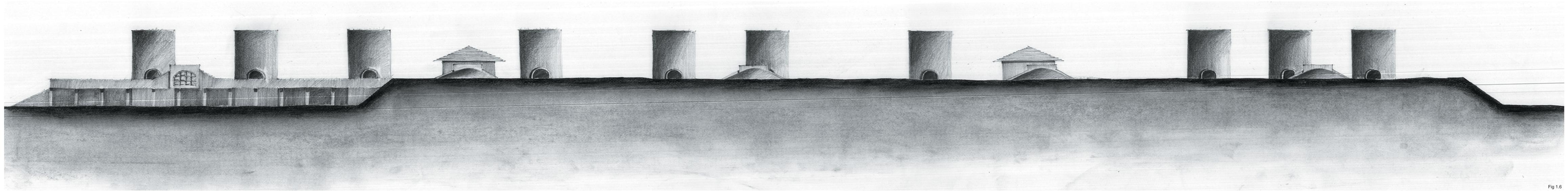
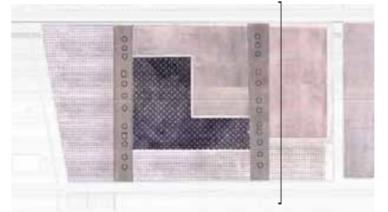


Fig 1.6



5 10 20 40

*Existing site section*



Fig. 2.1

*The site... what lies beneath?*

Underneath this sheet of grass on a flat topography, 25 acres in area lies a basement with 20 filter cells, a little over an acre each. There is a grid of columns (22" x 22") at 14' c/c that supports a concrete roof and 2 feet of earth. At the center of each column bay, on the roof, is a manhole 3'-4 1/2" in diameter. The manholes are located at a c/c distance of 20'.

This is the McMillan sand filtration plant which provided Washington DC with safe drinking water between 1905 to 1985. Due to the increase in demand of drinking water Congress approved the expansion of the Aqueduct system in Washington D.C. including the Mc Millan Reservoir. A four mile tunnel that would bring water from the Potomac River to the new reservoir was also built. After treatment in the sand filtration plant, clean water could then be distributed to most of Washington. In 1902, the tunnel was completed, the reservoir filled and the slow sand filtration plant began operations in 1905. There are 9 more filter cells across the street, which were a part of this industrial utility set up. That part of the site also inhabits the rapid sand filtration plant whose inception obviated the use of the slow sand filtration process for providing clean water.

**Sand filtration process**

Water from the nearby McMillan reservoir was made to pass through layers of sand and gravel in the filter cells. The sand-filtered water was collected by clay tile drains, traveled through regulator houses, and clean water was supplied to the city through a network of underground pipes. The pressure and quantity of water flowing through the filter cells was controlled by the regulator houses located in the service court. The sand used in this process was periodically washed in the concrete sand washers and stored in the sand bin towers each 32' in height and about 18'6" in diameter, also located in the service court, until it was ready to be re-introduced to the filter cells through manholes.

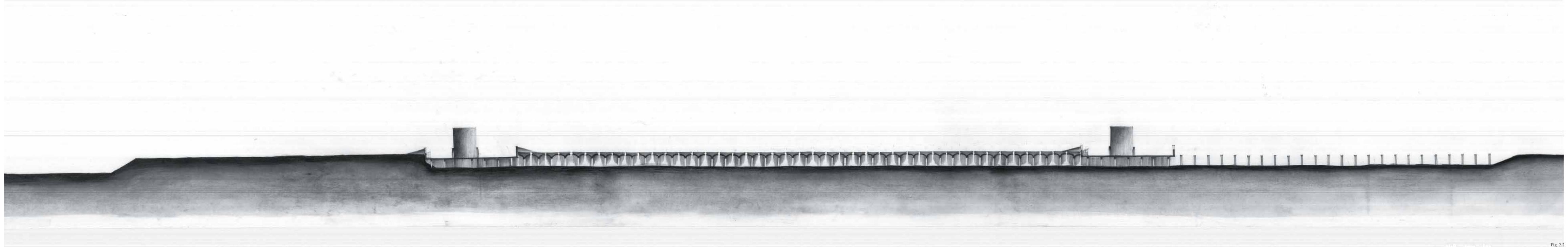
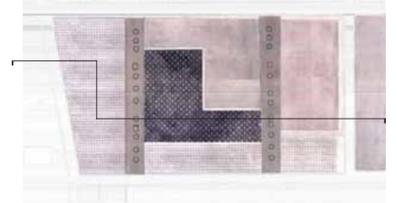


Fig. 2.2



10 20 40 80

Existing Site Section

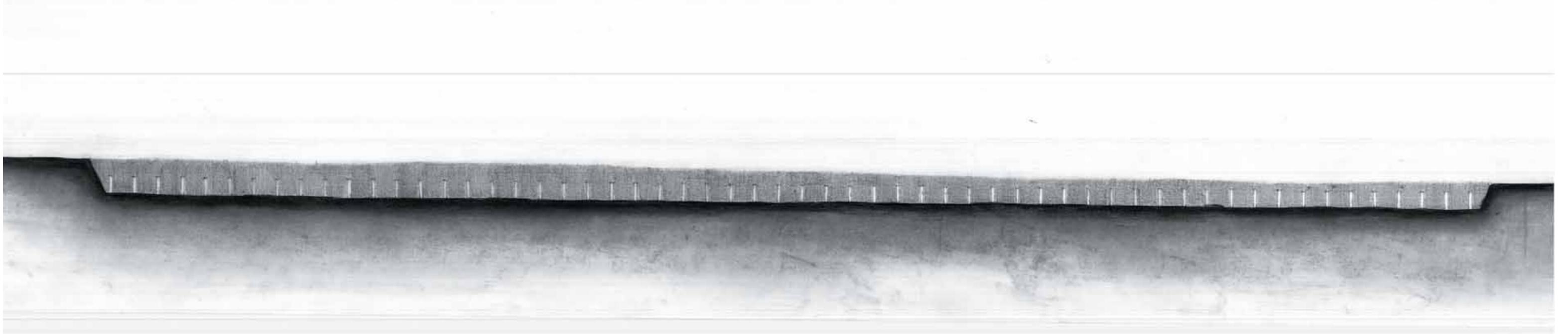
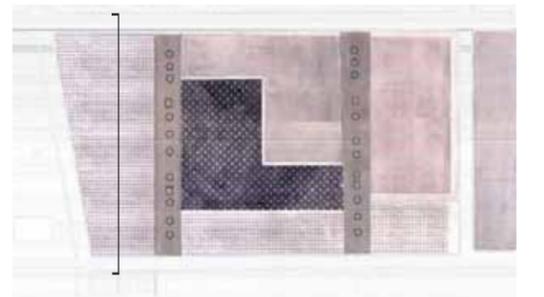


Fig. 2.3



*Existing Site Section*



Fig. 2.4

The two service courts intercepting the site are 100' wide and 5-6' below the grass cover or the filter plain level. At certain points there is ramp access from the service courts to the cells below through what appears to be a berm from the filter plain level. While sand was being washed, the filter cells (about four at one time) would not function. At this time, the manholes on the surface were opened for ventilation. I started re-interpreting these manholes as skylights that flushed the filter cells with light when the manhole covers were removed.

During WWII, public access to the reservoir and the filter plains was cut off due security reasons. Since then it has never been opened to the general public. However, the sand filtration plant was in operation till 1985, after which technology caught up and resulted in construction of a new sand filtration plant across first street. The 25 acre slow sand filtration plant was no longer needed.

Currently the site belongs to the government of Washington DC. In 1991, the site was designated a DC Historic Landmark.

The D.C. Preservation League included it in its "Most Endangered Places for 2000"

Uncared for, this site has undergone deterioration over a period of time.

In the Summary of Recommendations for Site Revitalization (February, 2002) the District of Columbia Office of Planning & Department of Housing and Community Development categorized the filter cells depending on the amount of deterioration.

The 4 TYPE III Cells are the most stable and should be preserved and adaptively re-used along with the 2 service courts.

The 8 moderately deteriorated TYPE II Cells can be preserved for adaptive re-use above and below grade or used as needed to accommodate uses compatible with proposed revitalization efforts.

The 8 significantly deteriorated TYPE I Cells are beyond preservation and should be demolished.

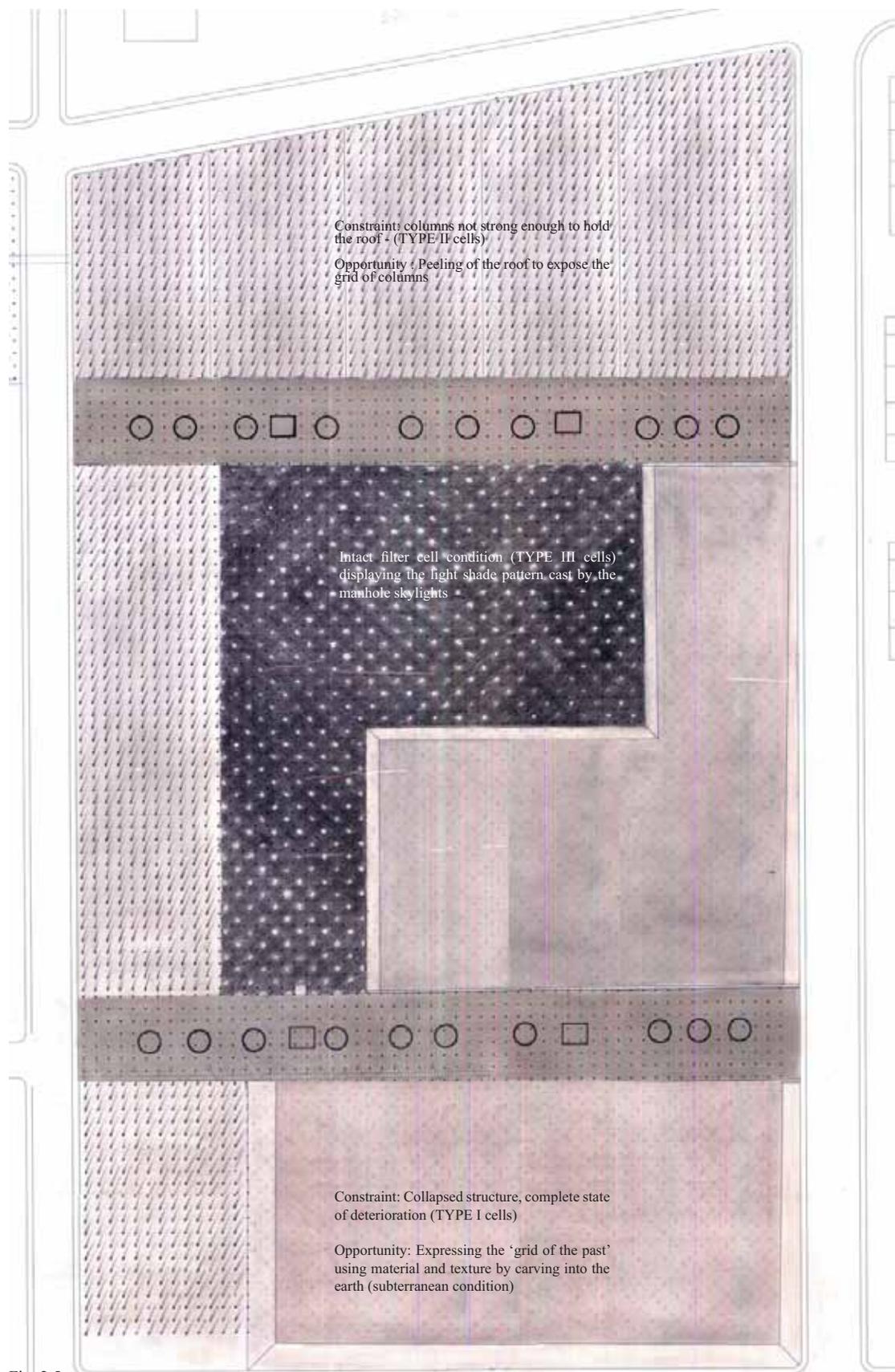


Fig. 2.5

These cell categories correspond to the various grid conditions addressed through the design viz.

Grid of columns with the roof of manholes (structure intact - TYPE III);

Grid of columns without the roof (columns not strong enough to hold the roof TYPE II);

Collapsed structure/ mass of earth (complete state of deterioration - TYPE I).

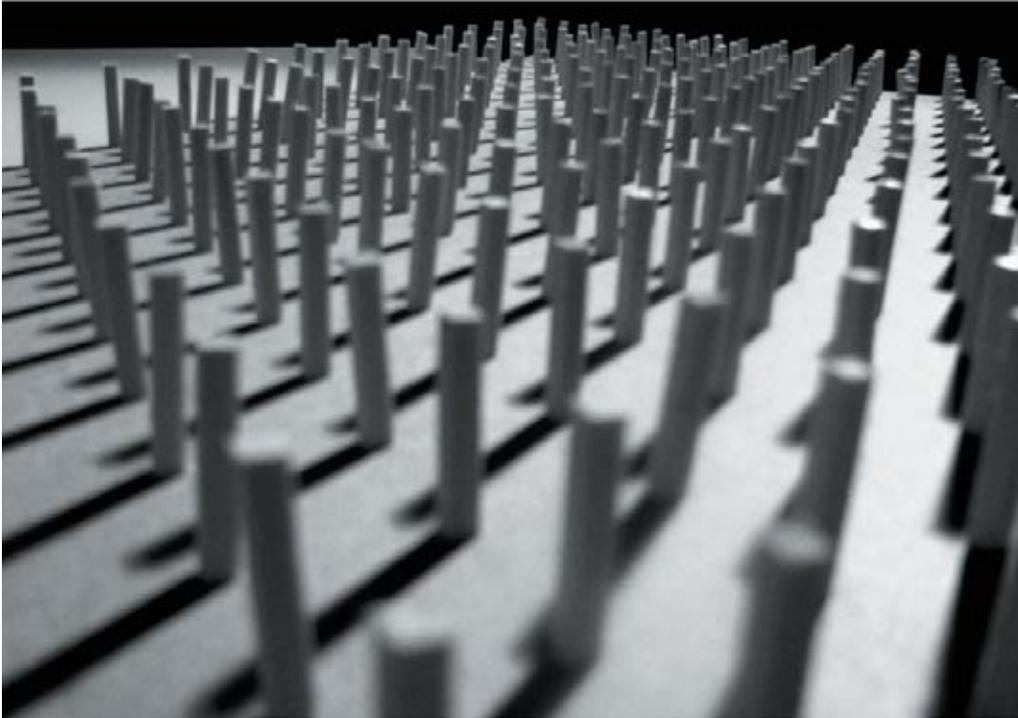


Fig. 2.6

This industrial site presented constraints that were reinterpreted as opportunities.

Type I cells would have to be filled with earth. The grid will have to be demolished but it will leave its impressions. How could I build anew and have the past leave its impressions? Subtle imprints using materials and textures could serve as a reminder of the grid.

Type II cells could be preserved to an extent. I thought that peeling the roof was a possible way to bring out the essence of this site as “a grid of columns” while relieving the columns of the roof load.

Type III cells could be completely preserved. The pattern of light and shade on the filter cell floors cast due to the manhole-skylights was itself a powerful revelation of the grid. I wanted to preserve this condition not only to display the filter cells from within but also to display the sheer beauty of this grid revealed through light.

There is no trace of water on the site today. Water, that was the reason for the existence of this site. Somehow I wanted to bring it back to the site.

Through my thesis, I wanted to reveal the various grids present in this industrial ruin through light, water and texture.

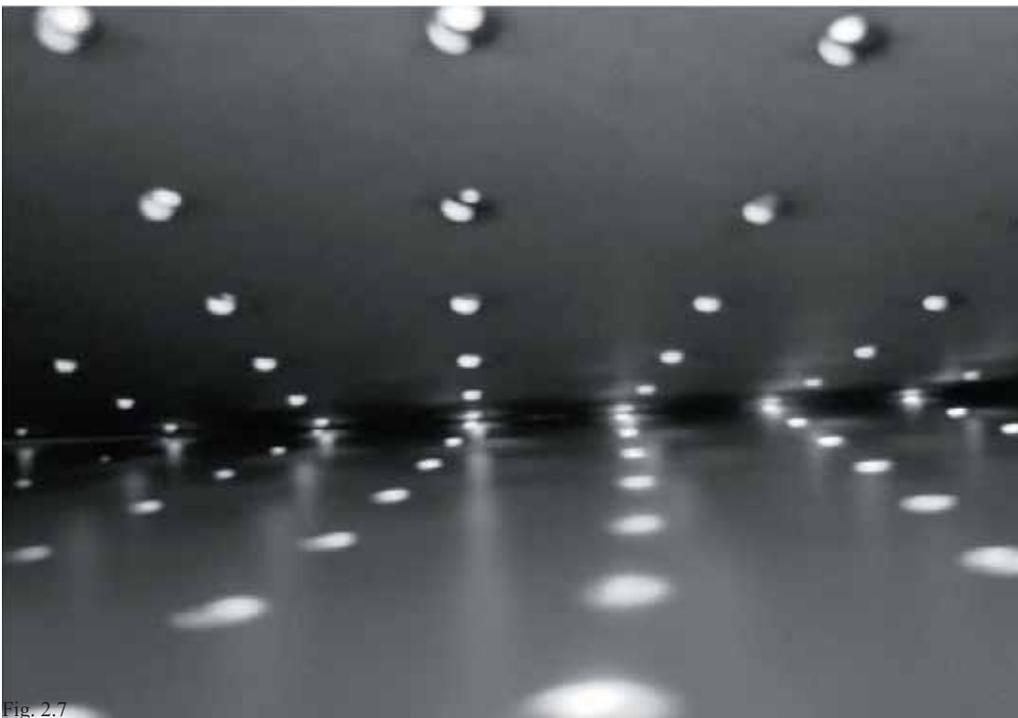


Fig. 2.7



Fig 3.1 *Fondazione Querini Stampalia*  
Carlo Scarpa



Fig 3.2  
*Brion Cemetery*  
carlo Scarpa

It is fascinating how Carlo Scarpa rendered a powerful feel to spaces by minimal intervention. In the image above careful placement of a thin strip of precious stone within concrete heightens material qualities of both. As a student, I have mostly worked on projects where the context may or may not have impacted my design, whereas my thesis project posed the challenge of building with the existing in a strong historical context. Scarpa's work helped me understand the importance of subtlety in material and detail.

### *Inspirational works*



Fig 3.3/3.4  
*Jewish memorial*  
Peter Eisenman

I have always perceived excessive repetition as "monotonous". A look at Peter Eisenman's Jewish Memorial helped me visualize the unending grid on my site, and the impact an unending multitude of elements could create.

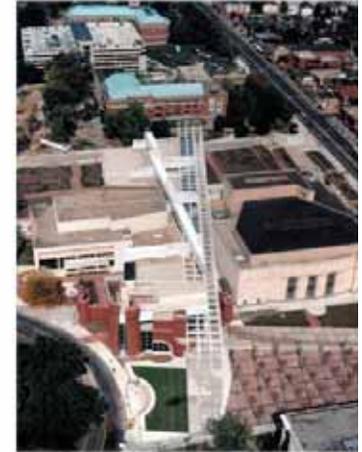


Fig. 3.5/3.6  
*Wexner Center for the Arts*  
Peter Eisenman

Peter Eisenman superimposed the grid of the city and the grid of the campus in his design for the Wexner Center where he visualized the site to be a palimpsest, writing over writing. This principle of shift of grids has been used in the design to show the deviation of "the new" from "the old"



Fig 3.7/3.8  
*Landscape Park Duisburg Nord*  
 Peter Latz

Peter Latz uses an abandoned industrial site to create a park. The existing patterns and fragments formed by industrial use were taken, developed and interlaced into a new "landscape". The Piazza Metallica is the symbol of this park, a metamorphosis of the existing hard and rugged industrial structure into a public park. Iron plates that were once used to cover casting moulds in the pig-iron casting works, form today the heart of the park.

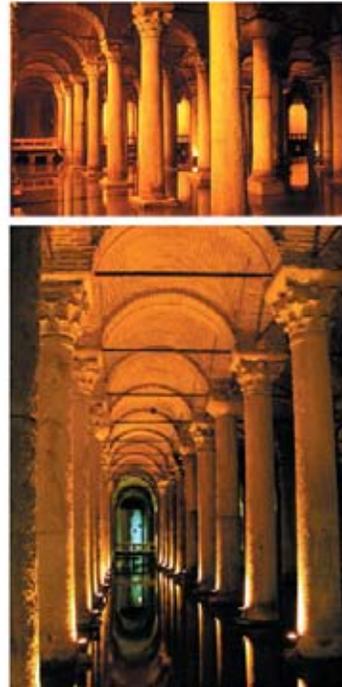


Fig 3.9/3.10  
*Yerabatan Cistern, Istanbul*

The Basilica Cistern (Yerebatan Saray) was built in the 6th Century AD, when the Romans excavated a waste hole 25 meters under the ground and built this cistern with 336 columns. In ancient times this huge room was completely full of water. During the restoration process pathways elevated from the ground were constructed and water was retained in the system up to a certain height. Today, the Basilica Cistern is a magic place where visitors walk along catwalks among marvellous columns. An example of how a small intervention can dramatize a spatial experience.

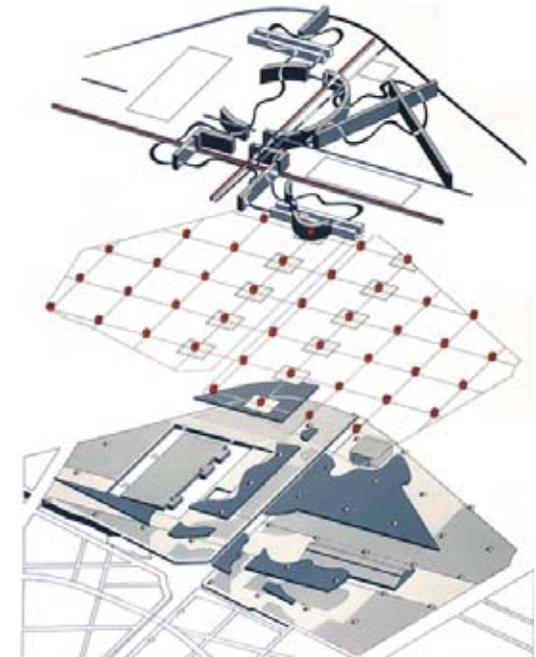


Fig 3.11  
*Parc de La Villette*  
 Bernard Tschumi

In Parc De La Villette Bernard Tschumi used an ordering system viz. The points of the follies which create reference grid on the 125 acre site, along with paths and planes that divide the site. Having designed individual buildings all through my student years, this was my first exercise in master planning and a 25 acre site seemed too big a scale to deal with.

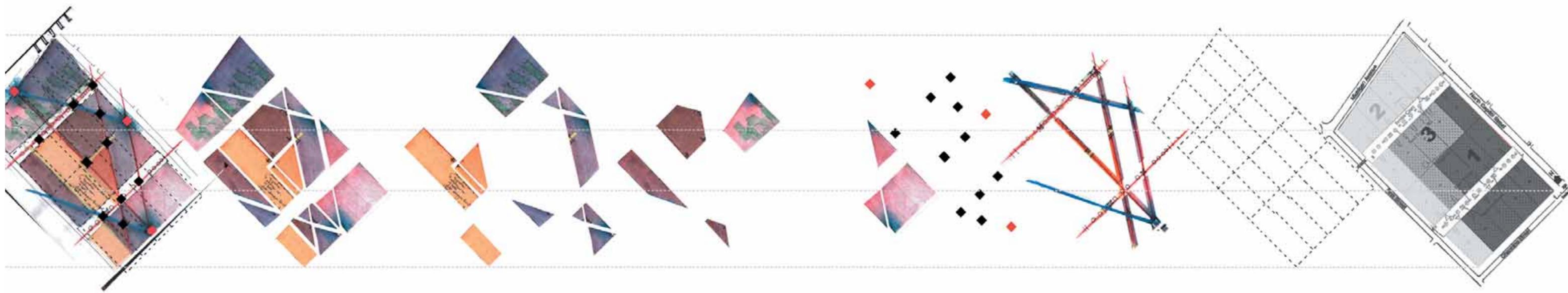


Fig. 4.1

*Grasping the site in entirety*

*Evolution - Master Plan*

With a huge site in hand, I found myself struggling with the scale. I needed a strategy I could adopt in order to be able to come up with a design solution for the entire site but at the same time it was important for me to be able to zoom into each space. How could I deal with the entire site at the same time concentrate on the specific conditions and details on the site? I started dissecting the site and separating its components viz. The 3 site conditions offered by the deterioration of the building, the junctions of these conditions, the through paths that I desired to maintain and the divisions between the filter cells.

This exercise generated surfaces with similar properties and important points or nodes that I could then focus on. Thus the design would not cater to the entire site but instead focus on parts of it which capture the essence of the site. This exercise yielded categories of such surfaces and nodes. I could now clearly trace their origins in the 3 existing conditions. I realized that it was probably just enough to propose a design for each site condition along with the junction between adjacent conditions.

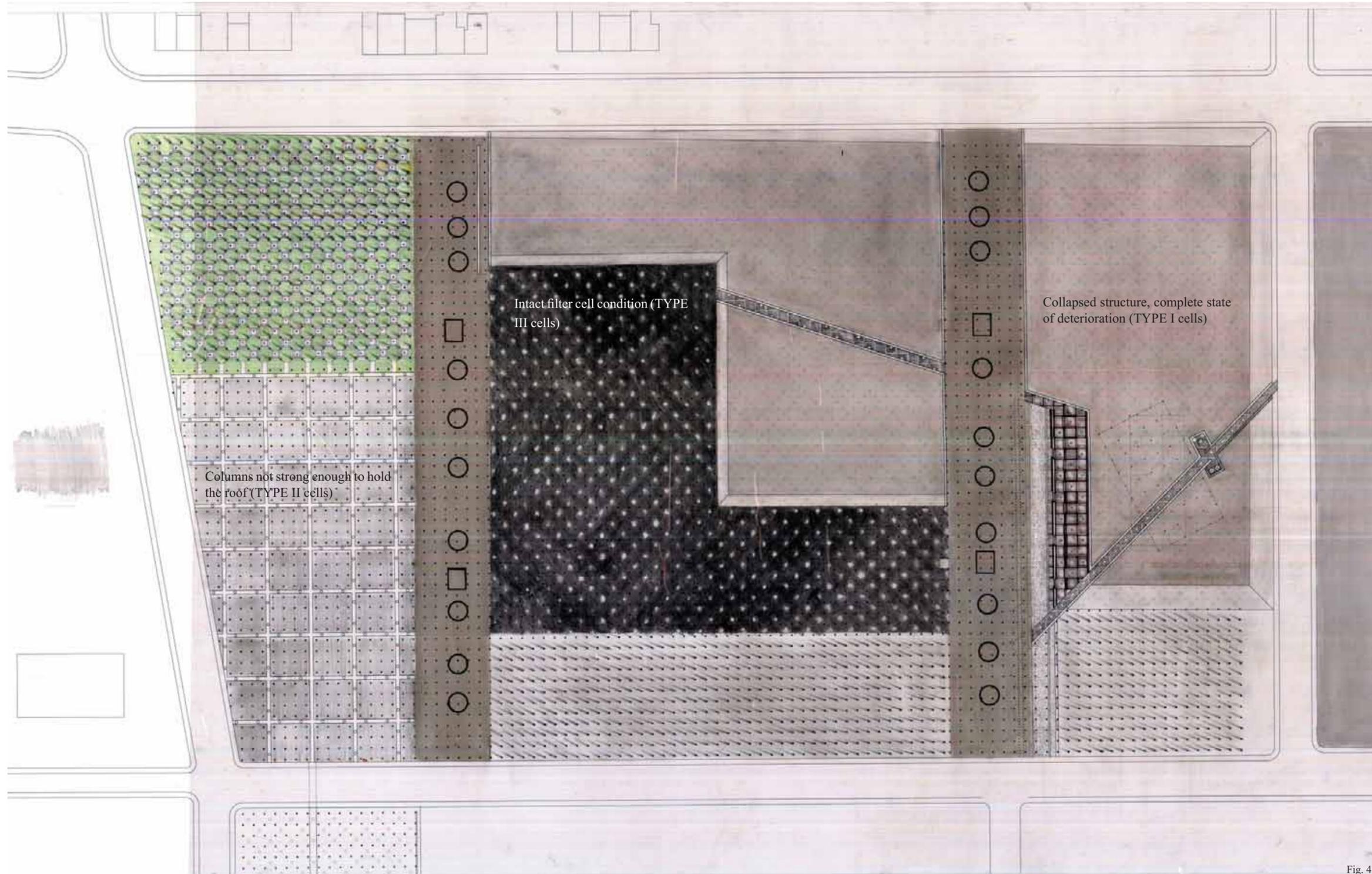
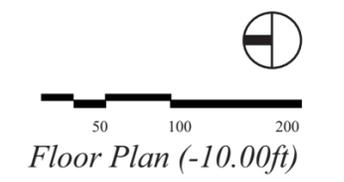


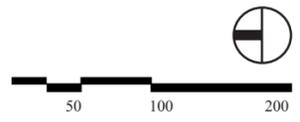
Fig. 4.2



Floor Plan (-10.00ft)



Fig. 4.3



*Floor Plan (+30.00ft)*