REMOVE & EXPOSE
Chicago’s Public Soil Treatment Plant

Ilham Lakhal
Complex Projects, TU Delft

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Chicago's Public Soil Treatment Plant

A Graduation (MSc) project by Ilham Lakhal

Tutored by; Mick van Gemert and Hubert van der Meel
External Examinor; Willemijn Wilms Floet

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Mapping our location
The focus of the graduation project is metropolises that are dealing with urban questions. This year we zoom in on Chicago - one of the largest and powerful cities in the United States of America. The city of big shoulders, steel, livestock, trains, extreme temperature differences and of course; the birthcity of the skyscraper.
CTA line
CTA Public Transport

The Chicago Transit Authority are a collection of metro lines that run both above and underground. Most of which have their origin in the loop - the city centre of Chicago. The lines spread out into the north, west and south sides of Chicago.
Dottes lines represent CTA lines
One of the major flaws in Chicago’s CTA lines is that their lines are spread out like fingers from a hand that is the city centre. The problem with that is that there are only horizontal connections and a limited use to the lines (getting to and from the city centre).
A potential CTA line
An idea that came from the citizens of Chicago is the introduction of a vertical line in the west side of Chicago. This major undertaking will, in my opinion, create a great positive impact on the further development of the neighbourhoods. Not only is it an easier way for people living in between two cta lines to travel to and from the city centre easily - but it will also encourage and reinforce the connectivity between the neighbourhoods its running through. This means that the role of the city centre will become weaker - and therefore a focus on developing this neglected west side, a priority.
Vertical insertion will introduce nodes
When you hypothetically introduce this vertical cta line, you’ll be able to identify nodes at intersections with the existing CTA lines. The great thing about this is that you’ll be able to recognize these nodes as potential centres of movement and activity.
The ambiguous identity of the area between downtown and the suburbs
The Focus on the in-between;  
*Chicago MidCity*

Before developing a vision or approach for the area, we have to zoom out and understand its role as of now. This area seems to be stuck between the highly profiled and economically thriving city centre, and the suburbs further west where the wealthier people live in peace and harmony. This in between city is stuck in the middle and has no clear identity, other than its ex industrial character and countless foreclosures.
creates an identifiable scheme to follow leads to a less arbitrary way to add future interventions.

The Synergy between the two elements brings opportunities that are more than the sum of each leads to a less arbitrary way to add future situations and the identifiable character for the new urban dynamics gives a clear definition where the space in between two different urban patterns, a synergy to be created. This in order to give a chance to let them acting as elements this nodes is conceived to the Lime Line. The plan for major infrastructures meet configuration of where the space in between according to the existing one of them. We defined six as peculiar situation for each quality of it.

Vacancies have been used to reconfigure the programs. This opportunity to give an added value to the whole area. The whole strategy way, by analyzing the existing programs and then looking at places for future imposes programs, but looking at the elements that right now define the identities of this future improvement can be the chance to intervene in a way not to over-

Breaking the Grid - Superimposing D.L.REFORMA, MEXICO CITY on the Urban Fabric

Breaking the Grid - Superimposing CHAMPS ELYSEES, PARIS on the Urban Fabric

WAREHOUSES
PARKING LOTS
OFFICES
OPEN SPACES
RESIDENTIAL
COMMERCIAL
ENTERTAINMENT
PUBLIC BUILDINGS

PUBLIC AREAS' DISPOSITION
OPEN SPACES COHESION
COMPACT INDUSTRIES

Group vision; rhizome - TOD
From tackling a necessity to a vision for Midcity; *Rhizome*

So it then becomes clear that this area needs a major shift in identity. It needs to have its own character; reasons for people to live, visit, learn and work. Our focus is on the generation that now grows up in the suburbs and would want to move out as soon as they either start college or decide to work professionally. At that age, living in the loop will be unaffordable. This is an opportunity for these adolescents to move into the west side of Chicago and start businesses, work - if only to commute.

The way we envision to achieve this; is by an approach we call rhizome in which the vertical lime line plays an essential role. By developing the intersecting nodes - we make use of the TOD that can be applied here.
Selection of nodes complementing vision
Zooming in on one node:

*Personal Vision*

What we then decided to do is to each pick a node we wanted to develop and create a masterplan for. My choice was the recycle hub - an ex industrial corridor that is surrounded by residential areas that are now declared terrain vague; neither residential - nor industrial.
The many industrial corridors
Studying the Industrial corridors

As I do often, I zoomed out again and started to map the neighbourhoods the line will connect. I then realized that there are many industrial corridors in this area and seem to mostly be out of use. Most of these industrial corridors were surrounded by neighbourhoods that housed the many people that worked in these industries - this explains why the industrial corridors are so locked in residential zones. But because most of these industries have moved to asian countries, the large amount of people living there became unemployed - all at once.
My site; the industrial corridor
Focus on a specific industrial corridor

The site I chose is a stretched industrial corridor that we developed as the recycle hub. This is a very typical industrial corridor, one that is locked in residential neighbourhoods, which for years have housed workers and now is red with unemployment and crime. This area is also caught in a strict segregation in ethnicities. North of the corridor, is mostly populated by hispanics, whereas the south side is more ruled by african americans.
A factory overlooking a dilapidaded couple of blocks
Enclosed by A Terrain Vague

The aspect to the site that interested me the most was the fact that these ext industrial sites were surrounded by neighbourhoods that were so deserted. Many blocks had many foreclosed houses or houses that were burnt down or demolished. I decided that taking a closer look at this terrain vague, was where I could find the link to my project.
The site falls within three neighbourhoods
Neighbourhoods

My site falls within three neighbourhoods. One worse than the other. Austin has a massive problem with foreclosed and demolished houses. Many plots of lands are up for sale for only 1 dollar. People are eager to buy them for urban farming purposes. This is impossible however because of the high lead levels in the soil.
The site as a landmark

Pride

Education

Employment

Value
When examining and studying the site, I realized that these people and this place need a landmark. There is nothing in their area that acts as a landmark - nothing that is out of the ordinary. For stretches there’s only dilapidated houses and abandoned industrial sites to be found. This pride should be translated into a place where there is an opportunity to work, an opportunity to learn and to just enjoy oneself. If this becomes such a productive site, the value of the area will increase, which will attract investors to invest in the area.
The Urban Recycle Park
I have formulated my vision for the site becoming a landmark as an urban recycle park. Its a concept that works on a small scale; involving people living in the vicinity of the park - and people living both in the suburbs and the loop to come and see what this park is all about. A productive landscape that puts this area on the map.
DISCOVERING URGENCIES

ENVIRONMENTAL SYSTEMS AS DESIGN TOOLS

Specific Local Issue  →  Building Project around the issue

Approach to theme definition
As I said previously, my aim was to carefully map the residential area in which the industrial corridor is located. After doing just that I found out that there is a very pressing problem. When most of these houses were built, they were painted with the same cheap lead-based paint and now that most of them are getting older and chipping - the lead falls into the soil. Young children get exposed to it and slows the development of their brain. And because most of these houses have been built around the same time, this is happening on a large scale.
Site; houses next to industries
Local environmental threat

As these houses are chipping, the lead falls into the toplayer of the soil and becomes a hazard for young kids and teenagers.
harmful lead
LEAD contamination

The reason why this is harmful is for two main reasons; the stagnation/slow development of the brain functions in young kids and young adults. And 2, because of the growing interest in urban farming, the danger is that people will grow food on plot of land that are contaminated and therefore will end up in the crops.
Highest blood lead levels

Dutch boy - lead based paint
The importance of the issue

When mapping the blood lead levels onto Chicago - it becomes clear, that indeed - the site I have chosen has one of the highest affected areas.

Because of these problematic repercussions it is of the essence to tackle them, or to at least provide means of mediation.
Ex-site Treatment of soil

01 test
02 evaluate
03 move topsoil
04 bring to site
05 from site to block
06 clean soil
05 treat soil
lead absorbing plants
fungi turning lead into minerals
Using the site to solve these environmental issues

After doing thorough research on what to do with polluted/contaminated soil, I projected these methods onto the site and came up with a strategy in which the recycle park plays a leading role. In usual cases there is a possibility to either treat the topsoil layer (about 1-1.5m in depth) in-site or ex-site. Because it's not just an unused piece of land - these are people's backyards - I realized that it is a better option to treat the soil ex-site; on the recycle park. I identified two methods with which you can treat this soil: through plants and through mushrooms.
Masterplan and the Recycling Centers
The Urban Recycle Park

The problem of lead contamination does not only affect the soil. It also affects the groundwater that carries whit it particles of lead. This groundwater therefore has to be treated first before it can be used as anything else (i.e. grey or tap water). Because there is a growing demand for urban farming and so many empty plots available, I designed a compost collection centre on the peninsula as well. The idea is that as a visitor, you ar e encouraged to follow the connecting roads from recycling/treatment centre to centre.
CONNECTING THE THREE RECYCLING CENTERS

SMALL SCALE VERSION OF THE MASTERPLAN

Title of the image/description
Transition; Masterplan → Building

Something I found important in regards to the cohesive nature of the whole project is for the building to become a small scale version of my masterplan in its essence/concept. Meaning that the building had to have a continuous route that lead the public through the processes of treating the soil.
Standard sheds/barns - Useless References
One of the first things I did after deciding on the concept of the building, was to get an understanding of utilitarian architecture in both agriculture as industries. However, many of these sheds or barns were most of the time merely empty halls that were not specific and did not actually aid in the procession of whatever process was carried out - let alone there being some public involvement.
Wine Reference

- Image 1: Exterior view of a modern winery with a large open space.
- Image 2: Aerial view of vineyards.
- Image 3: Interior of a winery with stainless steel tanks.
- Image 4: View of a winery building with greenery around.
- Image 5: Front view of a classic winery building.

Wineries - Useful References
What did aid me in greatly in defining which direction I could best take on in terms of designing both the interior as the exterior of this semi public building were wineries. Wineries are meant to carry out a certain industrial/agrarian process and most of the time have a public element to it because of the wine tasting events or people who are just curious about how wine is made.
Design and composition development
Urgency = Typology
Defining the composition

In order to design a building that carries out a specific process I had to map these points in the process along the route I wanted the public to follow. Once I identified these points I went in depth to fully examine that the requirements are for each point in the process. Some spaces had to be very much closed, dark and humid - whereas others had to be open, light and airy. This is where the architecture started to form itself. Through finding the right balance between what logistically needs to happen and what I want people to show - I found a composition that creates a harmony between logtistics and public flows.
Long Section in Context
Logistics vs Public Flows
As mentioned before, finding the right composition was one of the most challenging points in the process because of the conflicting nature of the logistics and public flows. Each space had its own rules and requirements, which was leading in the definition of the space. This made it very difficult to find a public “intervention” in the space and for it to become a natural part of it. However, this was also the most exciting part because as soon as I found the right composition, I was able to zoom in and really design the spaces and all the data/requirements I had mapped before - now came to life.
The separation of logistic and public flows is what determined how to internally define the spaces and circulation.
What I then decided to do in order to keep it all clear and structured, was to define what the nature of the relationship between the logistics and public had to be. With the Shed it was clear that there had to be a clear separation between the logistics and public in terms of height. On the ground floor the forklift trucks were able to move around in between the storage units and the middle space was left open for the public to enter and move up to the breakout/cafe space where they could have a coffee/something to eat and look out over the movements going on downstairs.
Interior View Shed
Approach logistics/public
Designing the types based on; 

**LOGISTICS VS PUBLIC**

The labs were the elements that connected all the building elements together. Because all the building elements except for the labs relied on their immediate connection to the outside/site - the labs could therefore be perfectly used to unify the different elements to the design. The labs have a very strict organization where deviation from the path is not recommended. Because of disturbance, I allowed some lab rooms to be completely visible through glass screens, and some were closed for privacy reasons.
Logistics & Public Requirements = Inputs

For finding the right composition, public flow, logistic flow depend on which plant you're exposed to.

Approach logistics/public
Designing the types based on;

**LOGISTICS VS PUBLIC**

The seedbank was one of the most challenging in terms of thermal conditions and maintaining a low internal temperature. In terms of the separation of logistics and public it was fairly straightforward. The central elevator performs as a viewing platform that allows visitors to go up and down the seedbank and look at the staff at the seedbank restocking on seeds or taking seeds out of the drawers.
Logistics & Public Requirements = Inputs

For finding the right composition, logistic flow depends on which plant you're exposed to.

separation in height +
indirect sunlight

soil hall dark - storage
phytoremedi - mycoremedia - labs1 labs2

Approach logistics/public
The greenhouse has a very strict division in terms of public access. There are two cores that help in carrying the load of the extremely lightweight floors. The right shaft will be used by the public and the left shaft mostly by staff. On the top floor you’ll find a resting space where lunch can be served and where the public and the staff can meet and interact.
Logistics & Public Requirements = Inputs

For finding the right composition public flow logistic flow

depends on which plant you're exposed to

separation by separation in height + coverage separation in height + coverage

soil hall dark storage seed green

I

Approach logistics/public
The mixing hall is one that also has a very strict separation between public and logistic flows. On the ground floor it is totally dominated by logistics. One level up and you’ll see the public entering from the labs directly into the dark room. From the darkroom you move into an enclosed walkway that leads you to a path that leads the visitor along the edges to an elevator that takes you underground. This very sheltered approach is because of the potentially toxic wastes that can occur in the mixing hall.

Designing the types based on;

**LOGISTICS VS PUBLIC**
Interior view of the Mixing Hall
Approach logistics/public

Logistics & Public Requirements = Inputs
For finding the right composition

static posi- exposed
depends on which plant you’re ex-
seperation by seperation in
height + cov-

indirect sunlight
soil hall dark- storage     seed green-
phytoremedi-mycoremedia-
labs1 labs2

I

public flow
logistic flow

Approach logistics/public
Designing the types based on; **LOGISTICS VS PUBLIC**

The darkroom is in terms of volume the smallest of all. The ground floor is fully dedicated to staff and logistics. However, the first floor has an outer ring, separated by a glass screen where people can walk and make their way to the walkway to discover the mixing hall. This first floor also has a partial glass floor section that enables the public to look down into the space below.
Interior view of the DarkRoom
Re-using materials on site
Re-using the site, Materially

The site before my intervention was a collection of abandoned industrial buildings, decaying warehouses and a massive car dump site. For me that was an opportunity to conceptualize how I could reuse the material on site. I decided to use the scrap metal from both the cars as the warehouses - modify them to become perforated metal sheets. The glass from the cars can be reused to become a rainscreen on the roof of the mixing hall.
Axo; structure and materials
Ease of construction

Something that was essential to this project was how easily it could be constructed and dismantled again. But also figure to figure out a construction that allows a free internal flow without any pillars getting in the way. I decided to go for portal frames - inherent to traditional barn designs and recycled gladding.
Details of the mixing hall
Not only the loadbearing structure was meant to be easily constructed, but also the cladding of each building. I chose Structural Insulated Panels which are highly insulating, area very easy to build up and have a great structural performance. By using these SIP’s I managed to leave out many secundary elements to the original portal frame construction which is, again a very economic and durable approach.
External Views
Final Reflection

When I look back at this project and the process I first-ly have to mention how much I was pushed out of my comfort zone. An unusual typology is not foreign to me, but translating this complex system with so many parameters in every aspect (climatically, formally, structurally, circulation-wise) that it was very difficult to find the right balance and solution to all the problems that have emerged. However, I am satisfied with how it eventually developed, especially after I found the right composition of the build-ings. I believe that this is a very relevant topic that seems to now capture the interest of many cities and I am glad that I posess the sensitivity to understand what an area needs and the perseverance to follow through with a fascinating, yet challenging project like this.

This new facility becomes an example of how we can rethink industrial processes architecturally.