BEYOND PROGRAM

Designing Future Industries for the Public Realm

Colin T. Kerr
B.S. Architecture
University of Michigan, 2004

Submitted to the Department of Architecture in Partial Fulfillment of the Requirements for the Degree of

Master of Architecture
at the
Massachusetts Institute of Technology.

February 2009

Author.....
Colin T. Kerr
Department of Architecture
January 15, 2009

Certified by.....
Alexander D'Hooghe
Associate Professor of Architecture and Urbanism
Thesis Supervisor

Certified by.....
Julian Beinart
Professor of Architecture
Chair, Department Committee on Graduate Students

Thesis Supervisor:

Alexander D'Hooghe
Associate Professor of Architecture and Urbanism, MIT

Thesis Reader:

Ana Miljacki
Assistant Professor of Architecture, MIT

BEYOND PROGRAM

Designing Future Industries for the Public Realm

by
Colin T. Kerr

Submitted to the Department of Architecture on January 15, 2009 in Partial Fulfillment of the Requirements for the Degree of Master of Architecture.

ABSTRACT

The thesis project is sited on an existing BP oil refinery site in Whiting, Indiana, just across the state border from Chicago. The project aims to operate within the context of the ongoing debate between the private corporation and its relationship with the public realm (including the commodification of natural resources). The background to this project is rooted locally in the early urbanization of this region at the hands of corporations such as U.S Steel, but also historically through an examination of the various positions taken by architects throughout the 20th century in regards to the notion of industrial production.

This thesis accepts the plurality of this site and the perceived role of the architect in the industrial sector as given and therefore suggests an architecture that operates as a staging ground for the seemingly conflicting interests of the private corporation and those of the public realm. In this sense, the architecture of the factory must operate strictly within a given PROGRAM that maximizes the efficiency and profit of the corporate client (think Albert Kahn), but it must also act as a mitigator to the challenge presented by a reluctant public, in essence calling for the architecture of the factory to become a symbol of something else entirely, or the ANTI-PROGRAM (think Gropius, LeCorbusier, Mendelsohn).

In terms of the lakefront BP site, my project hypothesizes that as oil becomes a less profitable product, companies such as BP will shift their business interests accordingly. Specifically, my project proposes that BP transforms itself from an oil company to a water company. As BP begins bottling water from Lake Michigan and selling it around the world for great profit, they will be sure to spin their new business as an environmentally responsible one, surely noting to the public that they are now financially invested in keeping the Lake clean and free of pollution.

But such a shift in business will positively stir the debate with the local municipalities that get their water from the Lake and also the environmentalists that cast the bottled-water industry in a similar dark light as the oil companies of today. Therefore, my thesis project will operate within the framework of this debate, employing methods of landscape intervention but also new architecture for a new product (BP water).

Thesis Supervisor: Alexander D'Hooghe Title: Associate Professor of Architecture and Urbanism

Colin Kerr M.Arch Thesis Fall 2008

\\BP\\Beyond Program

\\Designing Future Industries for the Public Realm

Thanks

to **Alexander D'Hooghe** for introducing me to a way of thinking about architecture that has expanded the limits of what I thought was possible. Your conviction and enthusiasm for your work and that of your students is admirable.

to **Ana Miljacki** for her tireless dedication to making certain that this thesis was my own and for asking me the tough questions that I could never answer right away.

to the other professors that I have studied under during my time at MIT. Your impact on my life and career will continue to manifest itself for years to come.

to my classmates at MIT. I have learned from you the most.

to my colleagues that provided assistance with the final model: **Victoria Lee**, **Nida Rehman**, **Eliot Stulen**, **Chris Taylor**, **Charlie Byrd Hagen-Caze**, **Chun Lun Otto Ng**, **Yushiro Okamoto**, and **Julianna Sassaman**.

to **CCW** for your willingness to listen and encouragement along the way.

to **my family** for giving me the support and means to follow my dreams. Those weekend trips to Long Beach were clearly influential in the development of this thesis.

A special thanks to **Dad**. You taught me what it means to work hard and for that I am eternally grateful.

\\Table of Contents

\\Introduction	Page 9
\\Research	Page 11
\\Research Timeline	Page 17
\\Site Research	Page 33
\\Site Photographs	Page 43
\\The Urban Project	Page 55
\\Landscape	Page 63
\\The Buildings: Floor Plans and Section	Page 75
\\The Buildings: Structure and Skin	Page 85
\\Armature for the Anti-Program	Page 93
\\Renderings	Page 101
\\Early Research and Design	Page 111
\\Bibliography	Page 121
\\Image credits	Page 125

“Every generation must carry both the burden of the past and the responsibility for the future. The present is coming to be seen more and more as a mere link between yesterday and tomorrow…Every generation has to find a different solution to the same problem: to bridge the abyss between inner and outer reality.”

from *Mechanization Takes Command,* 793. Sigfried Giedion

\\Introduction

Considering the undeniable significance of industry in the development of the contemporary world, it seems strange that there exists such a contentious relationship between the industrial corporation and the public realm that relies so heavily on the products produced within the walls of the factory. We can look at the building typologies of steel mills, oil refineries, and power plants and see that their forms were born out of deliberate programmatic decisions. But we must also acknowledge the symbolic implications of these structures as monuments reflecting the core values of our society. The factory as a purely programmatic machine suggests innovation, progress, and perhaps most notably, wealth, certainly all desirable attributes for an urban society. The factory as a monument finds its potential in the limitless nature of the human mind and its aptitude for reinterpreting meaning over the passing of time. The ability of the human mind to identify meaning through symbol is something quite powerful that cannot be ignored. This thesis will explore what happens when private corporations such as BP take note of the monument and begin to manipulate its form as a business tool. As BP enters a new era defined by increased public scrutiny and dwindling supplies of petroleum, its marketing slogan will be put to its first real test. This thesis suggests the notion of BEYOND PROGRAM as a way for BP to create the ongoing illusion of the ideal corporate citizen even if their actual business practices and programs fall in contrast to that image. This capacity to think beyond the physicality of architecture offers up the possibility that through the construction of monuments we can shape the future of our cities and the industries that support them. Ultimately, the parallel discourse of the factory as program and the factory as public monument should reveal both the overt and latent potential of industrial architecture in the 21st century.

\\Research

\\Early Modernist Theory of Industrial Architecture

THE PROGRAM

THE ANTI-PROGRAM

BEYOND PROGRAM

The discourse associated with the Modern Movement during the first half of the 20th century concerned itself with two common, yet seemingly dichotomous aspirations. On one side, there was the quest for knowledge and truth, as exercised by the breaking down of the world into scientific and rational explanation. On the other, there was the persistent question of the human psyche, the notion of the social behaviors that so often escaped such rational description. As this dialogue entered the realm of architecture, it revealed itself most clearly in the development of industrial methods of production. Dealing with the former of these concerns were the Industrialists, namely those subscribing to the theories of scientific organization and production attributed to the "–ism's" of Frederick Winslow Taylor and Henry Ford. The latter of these two concerns was the interest of the intellectual vanguards: the artists and architects who maintained a fascination with the new processes of industrialized production but also recognized the missing aspect of the seemingly inexplicable human spirit.

In 1933, the Italian Fascist, Julius Evola, wrote:

> "In the order of such construction there is a reversal of the usual notion itself, romantic/bourgeois, of beauty. In fact the beautiful was previously derived from the fantasy, taste, and personality of the individual artist – now the beautiful becomes the dominion dependent in the strictest sense on science and power… it corresponds to the kind of necessity to which the exact form of a modern machine obeys…Where the person disappears, there remains a method and style of pure objectivity."[1]

In contrast, Marcel Breuer, the architect writes:

> "the force of persuasion of the truly inspiring constructions is generated by a persistence, almost a passion, that is by itself beyond logic, and that with pure logic one cannot define the spirit of the time in its lost profound orientations."[2]

Breuer continues, however, to concede the importance of the industrial logic, saying he is convinced of the possibility of using

> "the most easily understood part of the modern will, the practical and technical one, to serve as a bridge to the other part, the one that, not precisely expressed, has an artistic and spiritual nature."[2]

These declarations from Evola and Breuer are truly emblematic of the dilemma facing architects during this period of rapid industrialization. But to examine the positions taken by architects during this era, it becomes clear that even amongst their own profession, there was significant debate over the role that an architect should fulfill in the process of industrial development. If a figurative line were to be drawn between the two sides, it would situate itself somewhere in the middle of the Atlantic Ocean: American architects on one side, and European architects on the other.

'The Program'

In general, the American architects, and their greatest champion of industrialization, Albert Kahn, strictly subscribed their methods of design to the theories of Taylorist and Fordist principles of production. For Kahn, there was no tolerance for any part of architecture that did not perform efficiently as mandated by the given program of production methods. The beauty of architecture for Kahn reached its perfection when form and program were completely wedded as a unified and logical whole. This devotion to progress and efficiency found receptive audiences outside of America in the totalitarian regimes of the Soviet Union, as evidenced by Kahn's prolific work there from 1929-1932, and in Italy with the construction of the Fiat Lingotta factory, whose lineage

1 Federico Bucci, *Albert Kahn: Architect of Ford* (New York: Princeton Architectural Press, 2002), 13.
2 Federico Bucci, *Albert Kahn: Architect of Ford* (New York: Princeton Architectural Press, 2002), 12.

can be traced to Kahn's Highland Park Ford Plant in Detroit. The Fordist model that Kahn ruthlessly employed in his designs was meant to be lean and pure, a machine for efficiency and profit. In other words, the architecture was about THE PROGRAM.

'The Anti-Program'

In Europe, Kahn's counterparts offered a different theoretical position. While many of these architects praised the genius of Albert Kahn and the rigor of his pursuit of technological innovation, they offered an additional component to the theory of industrial production and architecture: the sublime power of the iconic monument. Hans Poelzig, Peter Behrens, Walter Gropius, Mies, LeCorbusier, Erich Mendelsohn, and the Italian Futurists, among others, wrote and published their manifestos of admiration for the industrial buildings of America. But while many these individuals did genuinely admire the innovation and technology behind these industrial projects, they were equally interested in the "aesthetic" of the industrial project (although perhaps some would be reluctant to admit it). As powerful and impressive as the industrial complexes were from a production standpoint, they were equally stunning as symbolic gestures towards a future of progress and ability. As a symbol, these factories were the monuments of a new era. This was the architecture of the ANTI-PROGRAM.

Planned Obsolescence and the Emergence of 'Image' in the Industrial Corporation

Beginning during the Great Depression and reaching full maturity during the explosive growth of suburban culture following WWII, yet another theory and practice began to dominate the realm of industrial production: that of *planned obsolescence.* Reinhold Martin's book, *The Organization Complex*, deals specifically with the transition of the industrial corporation as one defined strictly by the evolution of the manufacturing process to one that now became more aligned with issues of design and style. In other words, the corporate industrial complex was not simply about creating a product in the most efficient way possible (although this of course was still of great importance), but now began to take great interest in the cultural behaviors and trends associated with the consumer or public. The notion of planned obsolescence, the practice of intentionally making a product obsolete after a relatively short period of time so that the consumer is obliged to buy yet another product at the end of the original product's lifespan, brought design to the forefront of the industrial realm. This transformation was perhaps most recognizable in the automobile industry. During the first twenty years of the century, Ford reigned as king over the industry by following a business plan that aimed to make every American the owner of the same automobile. With the introduction of planned obsolescence, General Motors quickly overtook Ford as the largest automobile maker in the world. By introducing a new style of car every year or two, GM established a new relationship with the public that was based primarily in the realm of image, fashion, and style. It was no longer enough to just own a *car*. Now the question was always, what *kind* of car do you own. The fascination with the automobile had matured from a technological one (Ford) to a highly stylized symbol of cultural status (GM). Ever since this transformation, the industrial corporation would continue to be defined not simply by their *product* but rather by the *image* of their product, and in turn the *image* of the corporation itself.

BP: Beyond Program

Today, the idea of corporate image continues to be a critical component of every major business, the evidence of this lying in the growing importance of Public Relations departments and the continued sponsorship of public projects like parks, museums, schools, and infrastructure, among many other examples. This thesis,

however, takes particular issue with this form of corporate citizenship. For the last 100 years in the industrial belt lining the southern rim of Lake Michigan, the solution to this debate between the private and public sectors has always been based on the formula of coupling industrial expansion with the authorization and construction of civic spaces. These civic spaces and industrial spaces, however, remain completely separate projects with nothing in common except perhaps the barbed wire fence that separates the two sites.

In the context of this thesis, the "client", BP, is of course well-versed in the tactics of public relations. In the year 2000 the company formerly known as British Petroleum rebranded itself as simply "BP" and introduced the corporate slogan, "Beyond Petroleum", undoubtedly a decision based more so on the desire to mitigate the poor public image of Big Oil than to actually promote the company's non-petroleum based businesses.

The political, economic, and environmental realities that define the world of today and tomorrow put a company like BP, who is in the business of commodifying exhaustible natural resources, in a precarious position. These very same realities have created a public realm that is increasingly skeptical and reluctant to accept the business practices that defined the industrial corporation of the previous century. For BP, this means that everything is not business as usual. But within these conditions of decreasing supplies of oil and public skepticism towards those providing such a product lies an enormous potential for a paradigmatic shift in the way the private industrial sector of society operates in relationship to its public counterpart. This thesis aims to situate itself at the heart of this potential opportunity.

As oil becomes more obsolete, BP will be forced to shift their business interests accordingly. When this happens, the slogan "Beyond Petroleum" will no longer simply be a marketing tool, but rather will become an actual reality of the company's operations. This thesis aims to hypothesize what this next product could be, and then of course, what type of architecture will be required to support such a product in the various conditions of the 21st century.

To navigate this territorial battle between the private industrial complex and the public realm, much of the research for this thesis was devoted to theories of industrial architecture promoted by various architects from the 20th century (as described previously). The challenge in such a project lies in how to actively engage both sides of this debate in a singular architectural project. In reference to modern protagonists mentioned earlier, the architecture of the new factory complex being proposed in this thesis must operate strictly within a given PROGRAM that maximizes the efficiency and profit of the corporate client (think Albert Kahn), but it must also act as a mitigator to the challenge presented by a reluctant public, in essence calling for the architecture of the factory to become a symbol of something else entirely, or the ANTI-PROGRAM (think Gropius, LeCorbusier, Mendelsohn). This thesis recognizes that to create a new architectural prototype for the 21st century, it is not sufficient to simply quote the masters of the previous century. Rather, by employing aspects of both theories in a new context, the thesis suggests that the two theories are, in fact, not mutually exclusive endeavors, but instead share a relationship that can serve as an architectural roadmap for the development of this project.

\\Research Timeline

\\Early Modernist Theory of Industrial Architecture

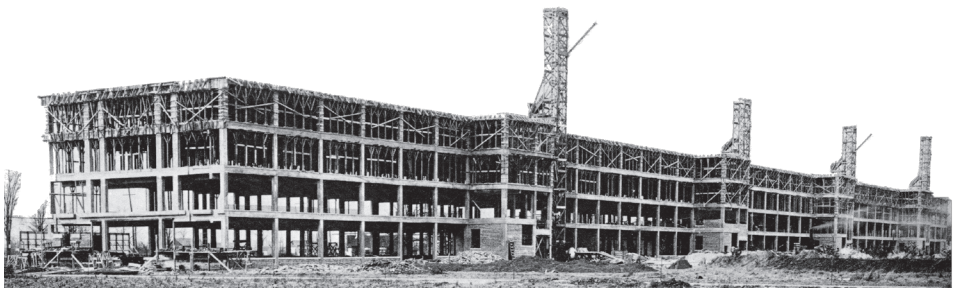
1910

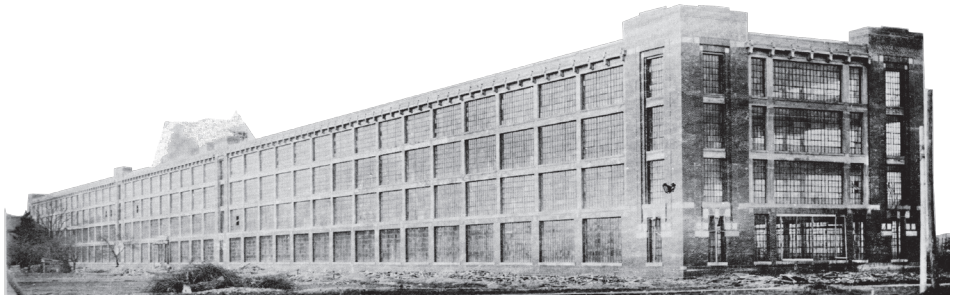
Ford Highland Park Plant

Notes: First factory for the mass produced automobile. Multi-story structure houses all factory functions under one roof

Albert Kahn

“It is proven that a straightforward attack of the problem, the direct solution generally applied, that avoidance of unnecessary ornamentation, simplicity and proper respect for the cost of maintenance, make for a type which, though strictly utilitarian and functional, has distinct architectural merit.”





1910

AEG Turbinenfabrik

Notes: Despite 3-hinged steel structure, concrete corners are employed to enhance the monumentality of the building.

Peter Behrens

1911

Fagus Shoe

Notes: Column-free corners accentuate the possibilities of new materials and methods of construction

Walter Gropius

1914

Power Plant

Notes: With no built work, the legacy of the Italian Futurists lies in the drawings of monumental object buildings that project an idea of a new age.

Antonio Sant'Elia

1917-28

Ford River Rouge Plant

Notes: Kahn and Ford construct a sprawling complex where each step of the process occurs in its own 1-story building, extruded to the necessary length. Now the factory, consisting of multiple sprawling buildings begins to have significant impact on the patterns of American urbanization.

Henry Ford

“There is something about a city of a million people which is untamed and threatening. Thirty miles away, happy and contented villages read the ravings of the city. A great city is really a helpless mass. Everything it uses is carried to it. Stop transport and the city stops. It lives off the shelves of stores. The shelves produce nothing. The city cannot feed, clothe, warm, or house itself. City conditions of work and living are so artificial that instincts sometimes rebel against their unnaturalness. And finally, the overhead expense of living or doing business in the great cities is becoming so large as to be unbearable”.

from *My Life and Work*, Henry Ford, 1973, 192-193.

1922

Luckenwalde Hat Factory

Notes: The expressive form of the dyeing works is partially born out of concerns for natural ventilation.

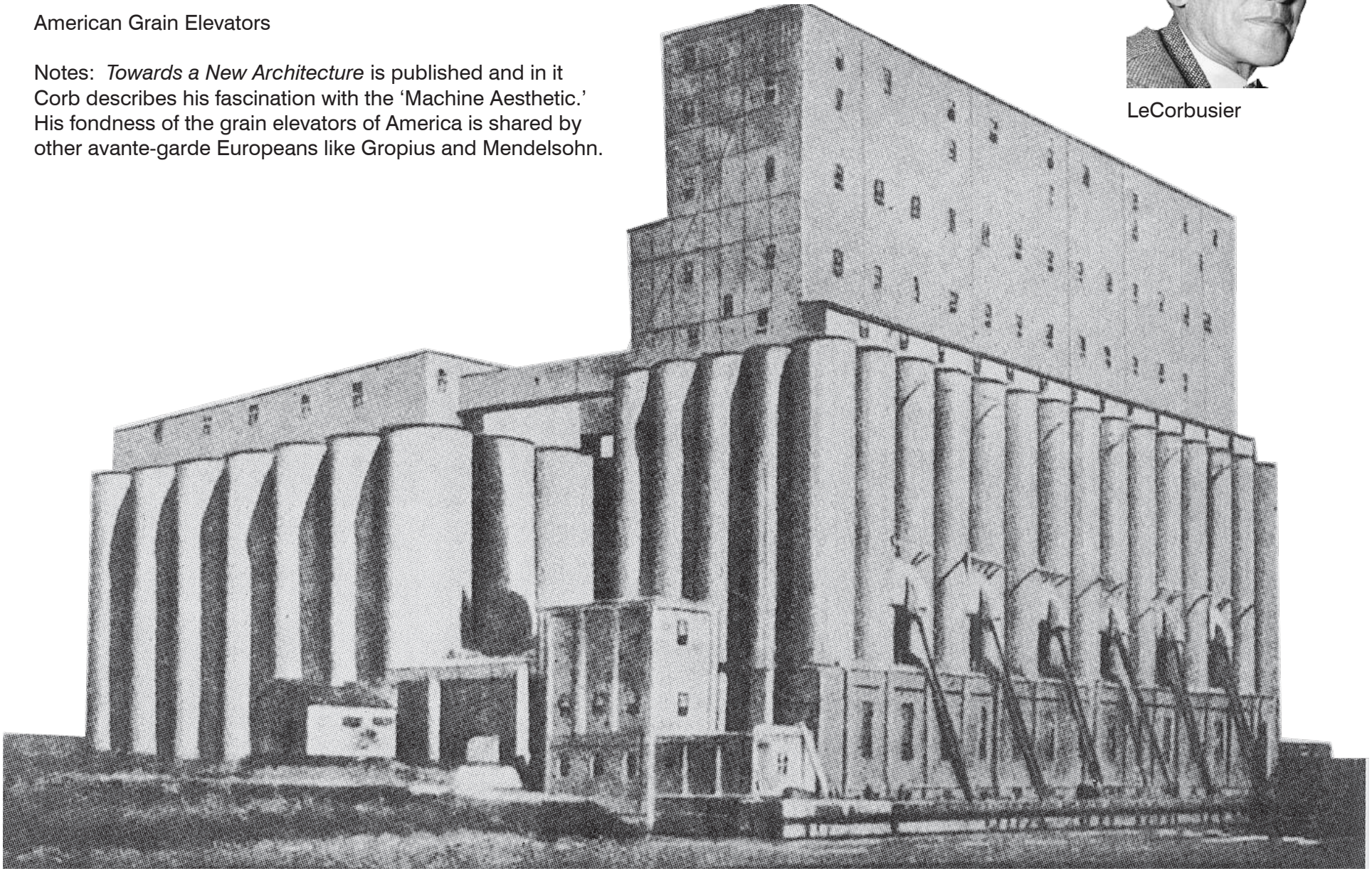
Erich Mendelsohn

1923

American Grain Elevators

Notes: *Towards a New Architecture* is published and in it Corb describes his fascination with the 'Machine Aesthetic.' His fondness of the grain elevators of America is shared by other avante-garde Europeans like Gropius and Mendelsohn.

LeCorbusier



1933

Julius Evola

“In the order of such construction there is a reversal of the usual notion itself, romantic/bourgeois, of beauty. In fact the beautiful was previously derived from the fantasy, taste, and personality of the individual artist – now the beautiful becomes the dominion dependent in the strictest sense on science and power…it corresponds to the kind of necessity to which the exact form of a modern machine obeys…Where the person disappears, there remains a method and style of pure objectivity.”

quoted in *Albert Kahn: Architect of Ford*, 13.

1934

Marcel Breuer

“the force of persuasion of the truly inspiring constructions is generated by a persistence, almost a passion, that is by itself beyond logic, and that with pure logic one cannot define the spirit of the time in its most profound orientations.”

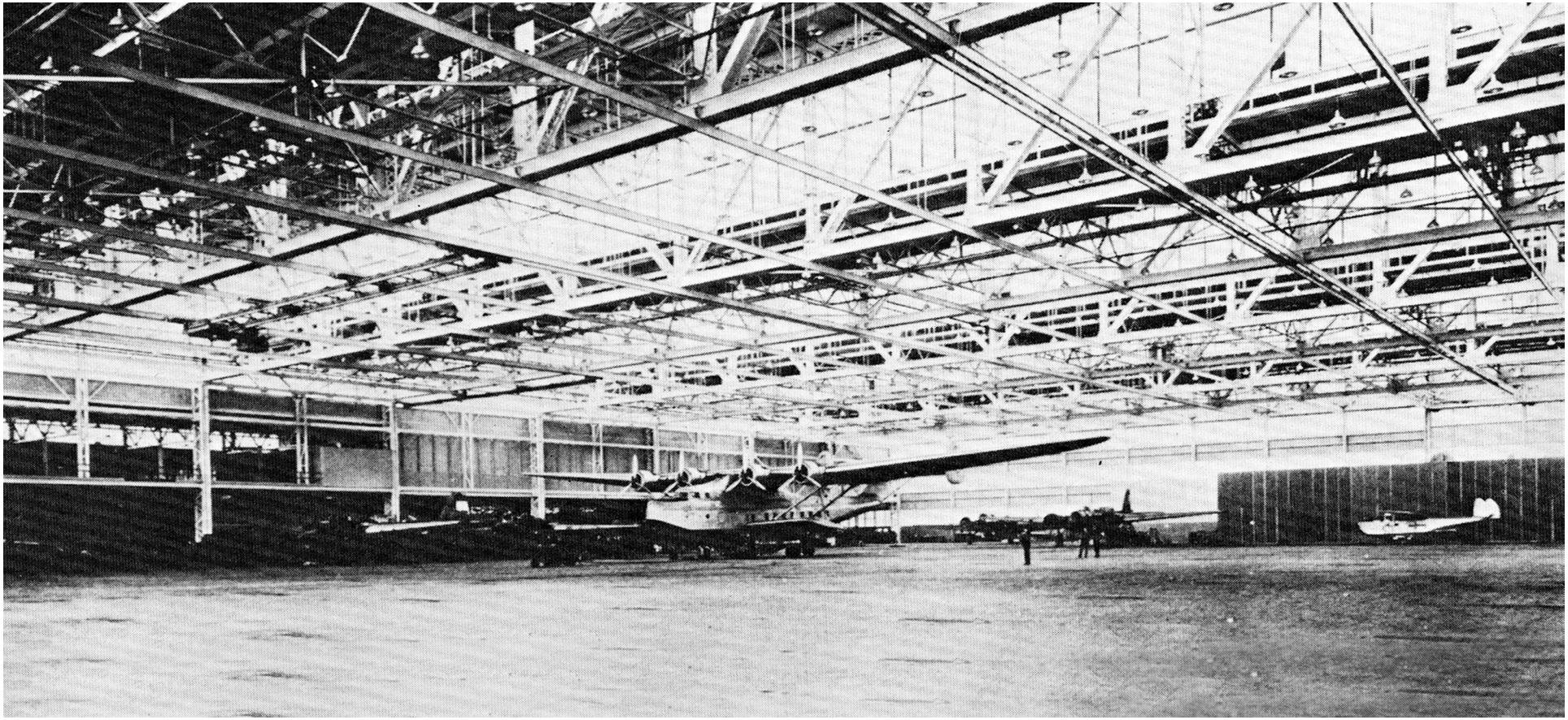
quoted in *Albert Kahn: Architect of Ford*, 12.

1937

Martin Airplane Factory, Albert Kahn

Notes: 100m x 150m hangar is freely spaned allowing one side of the building to be completely opened for moving airplanes in and out.

Albert Kahn

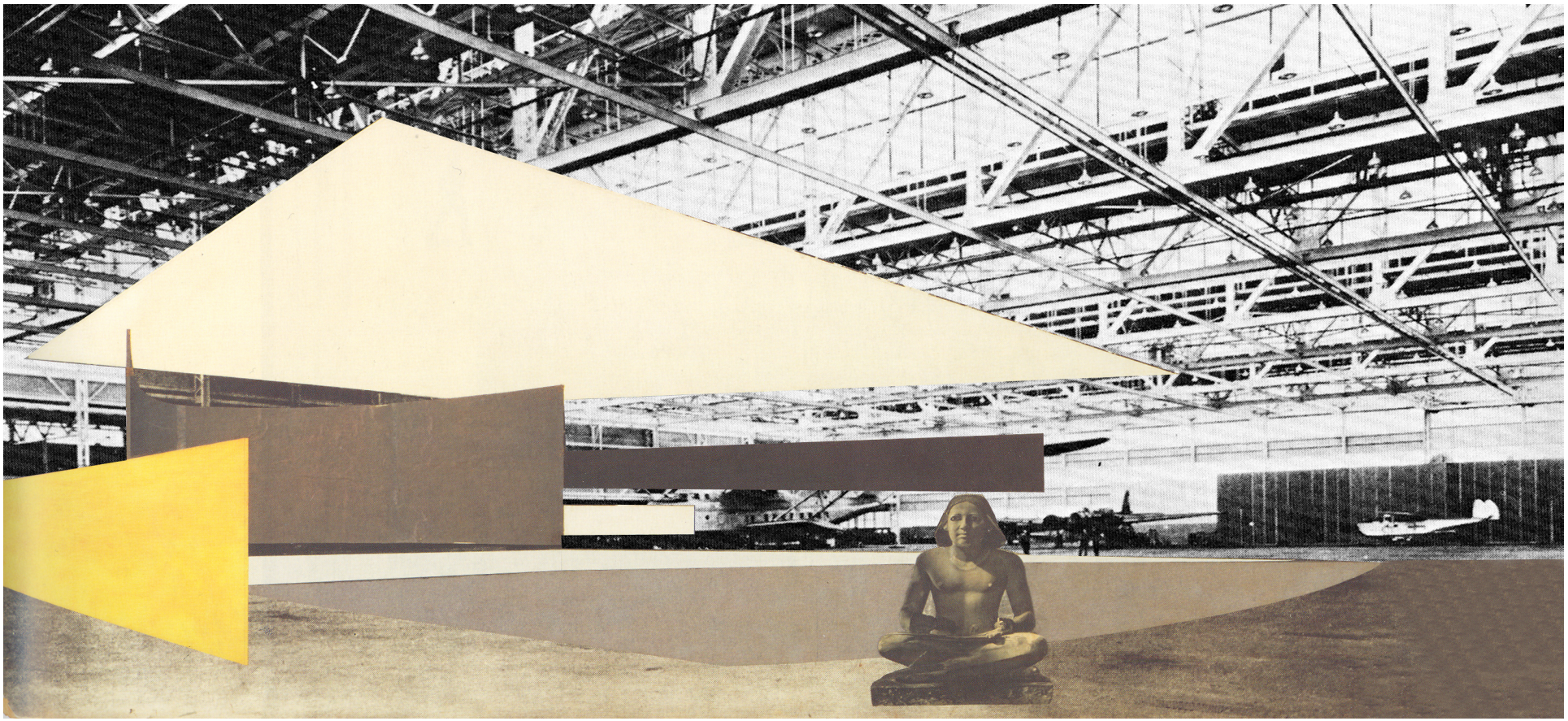


1942

Concert Hall Collage

Notes: Mies inserts a new program into Kahn's aircraft factory. The project embraces the flexibility of use and identifies in itself the power of architecture to operate as an armature for liberal interpretation and meaning.

Mies van der Rohe

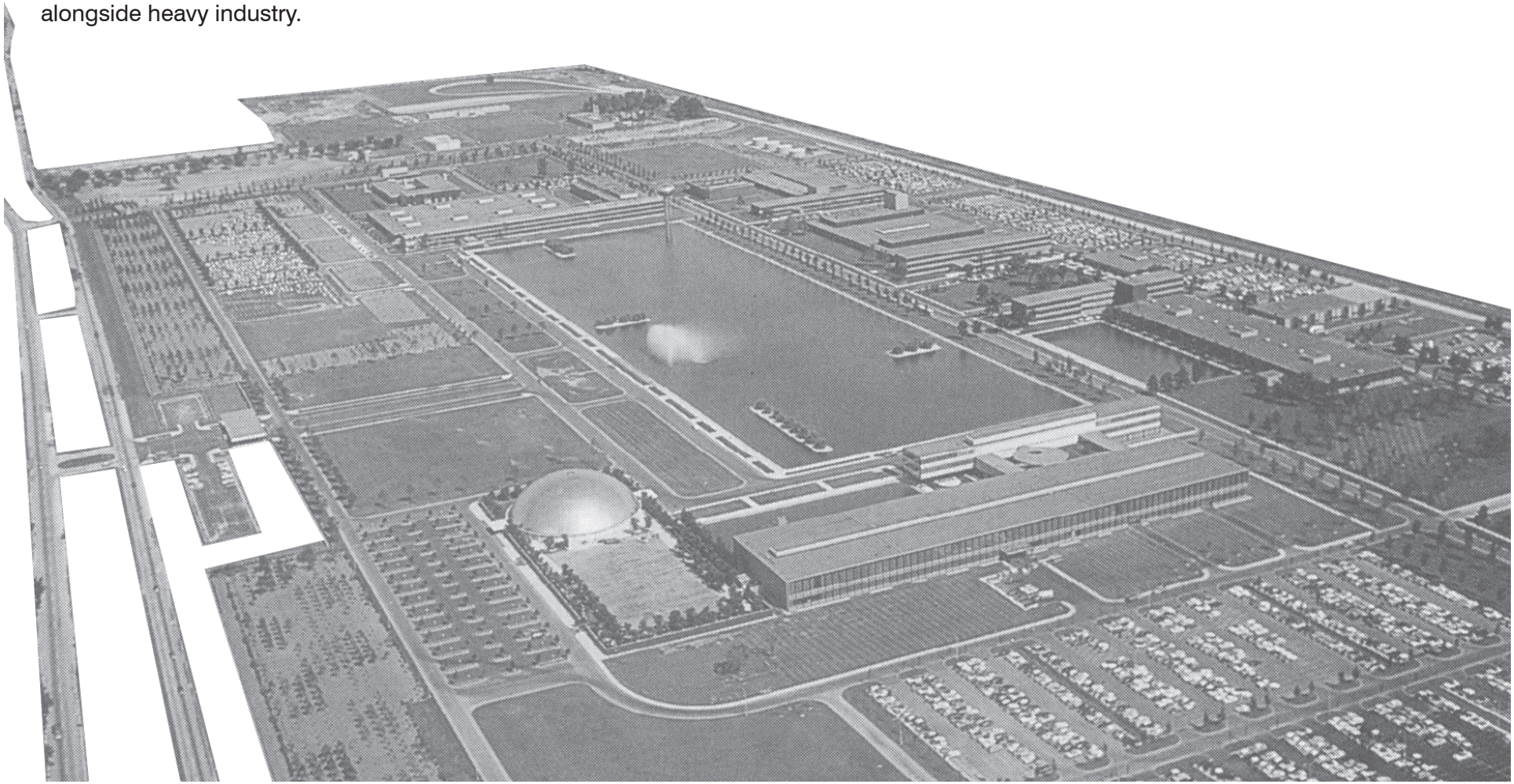


1956

Eero Saarinen

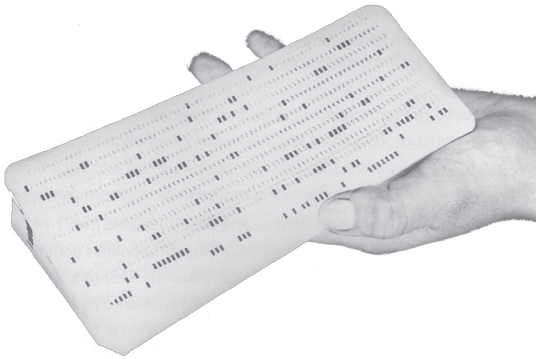
General Motors Technical Center

Notes: GM pioneered the notion of planned obsolescence, the idea that the style of the car would change frequently. Therefore, the new architecture of the automobile industry had transcended the pure functionality that Kahn had pioneered. GM was not just producing cars, but they were producing an image of the car, the 'American Dream'. The corporate campus was thus developed as style, fashion, and design found their place alongside heavy industry.



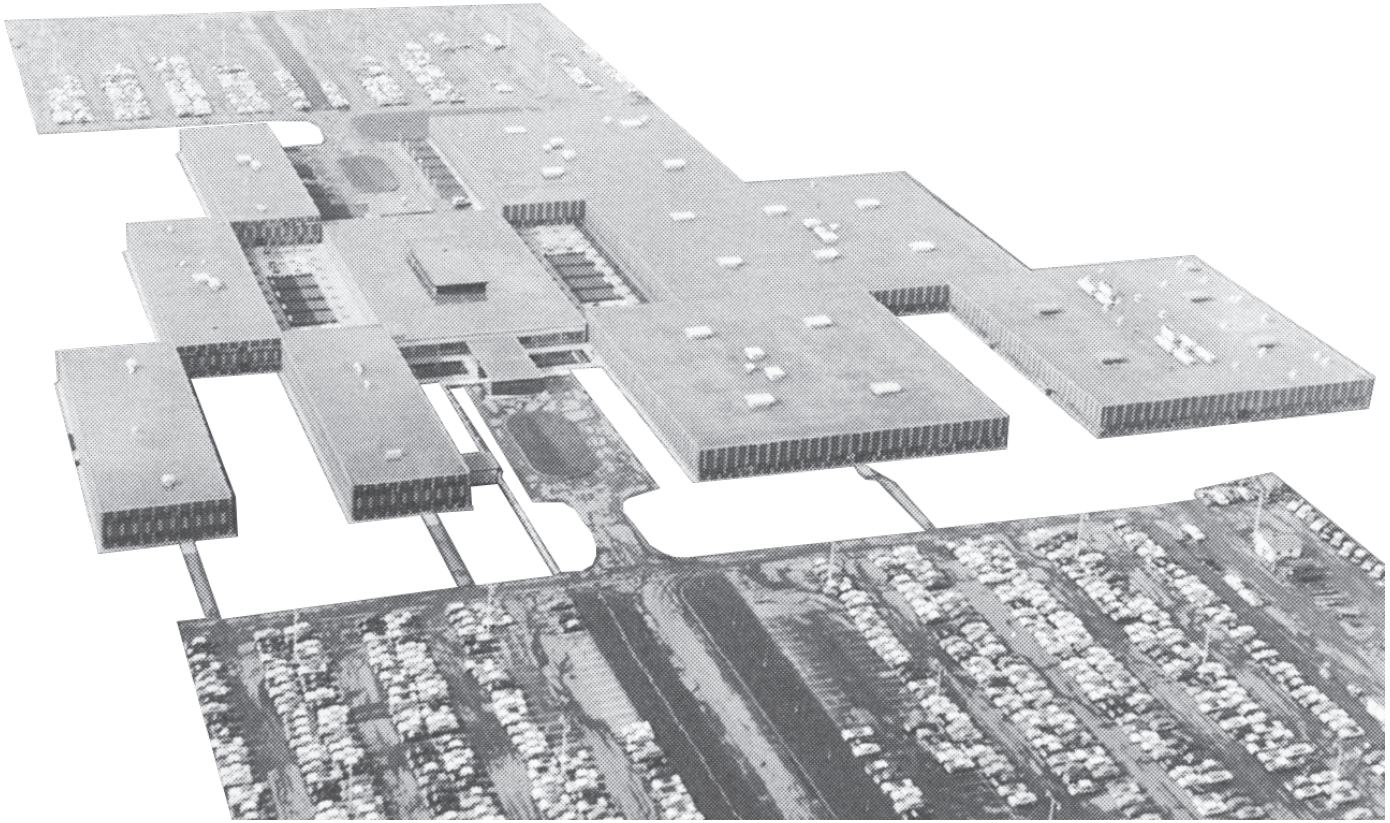
1958

IBM Manufacturing and Training Facility, Eero Saarinen



“IBM first came into your life when your birth was recorded on a punched card. From then on many such cards have been compiled, giving a lifetime of history of your important decisions and actions.”

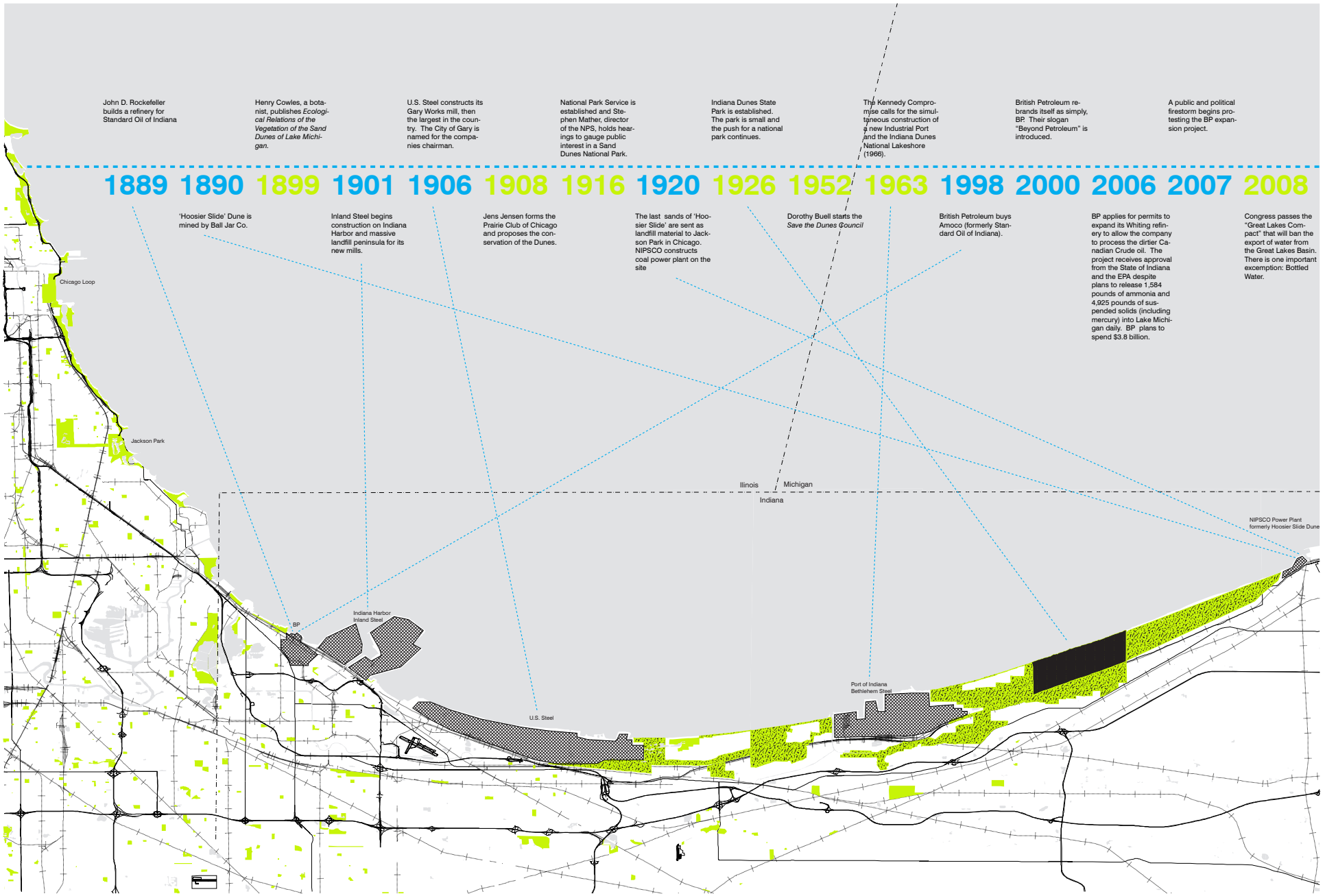
quote taken from *The Organizational Complex*




Project Site
Whiting, Indiana

\\Site Research

\\A History of the Contested Landscapes of Lake Michigan


John D. Rockefeller builds a refinery for Standard Oil of Indiana
Henry Cowles, a botanist, publishes *Ecological Relations of the Vegetation of the Sand Dunes of Lake Michigan.*
U.S. Steel constructs its Gary Works mill, then the largest in the country. The City of Gary is named for the companies chairman.
National Park Service is established and Stephen Mather, director of the NPS, holds hearings to gauge public interest in a Sand Dunes National Park.
Indiana Dunes State Park is established. The park is small and the push for a national park continues.
The Kennedy Compromise calls for the simultaneous construction of a new Industrial Port and the Indiana Dunes National Lakeshore (1966).
British Petroleum rebrands itself as simply, BP. Their slogan "Beyond Petroleum" is introduced.
A public and political firestorm begins protesting the BP expansion project.
1889 1890 1899 1901 1906 1908 1916 1920 1926 1952 1963 1998 2000 2006 2007 2008
'Hoosier Slide' Dune is mined by Ball Jar Co.
Inland Steel begins construction on Indiana Harbor and massive landfill peninsula for its new mills.
Jens Jensen forms the Prairie Club of Chicago and proposes the conservation of the Dunes.
The last sands of 'Hoosier Slide' are sent as landfill material to Jackson Park in Chicago. NIPSCO constructs coal power plant on the site
Dorothy Buell starts the *Save the Dunes Council*
British Petroleum buys Amoco (formerly Standard Oil of Indiana).
BP applies for permits to expand its Whiting refinery to allow the company to process the dirtier Canadian Crude oil. The project receives approval from the State of Indiana and the EPA despite plans to release 1,584 pounds of ammonia and 4,925 pounds of suspended solids (including mercury) into Lake Michigan daily. BP plans to spend $3.8 billion.
Congress passes the "Great Lakes Compact" that will ban the export of water from the Great Lakes Basin. There is one important excemption: Bottled Water.
Chicago Loop
Jackson Park
Illinois
Michigan
Indiana
NIPSCO Power Plant formerly Hoosier Slide Dune
BP
Indiana Harbor Inland Steel
U.S. Steel
Port of Indiana Bethlehem Steel
KEY:
Lakefront Industry
Indiana Dunes National Lakeshore
Indiana Dunes State Park
Municipal Parks

Introduction to the Site

The following narrative outlines the struggle for the contested landscapes of the southern shores of Lake Michigan. Physically, ecologically, and politically, this is a land of complex polarities. As outlined previously, the notion of PROGRAM versus ANTI-PROGRAM, or function versus monument, as it relates to the production of industrial space, provides a theoretical backdrop to reality of the site.

At the end of the 19th century, the southern rim of Lake Michigan was a scarcely populated landscape of forests, dunes, and wetlands: a place of dramatic contrasts where one could find old-growth arctic pine growing alongside prickly pear cactus. This complex landscape was created over thousands of years as the glaciers receded, leaving behind a series of several hundred dune ridges running parallel to the existing shoreline. Nearing the turn of the century, this idyllic landscape became the object of desire for the nation's most powerful industrial interests. Its location along the Great Lakes provided efficient access to the eastern seaboard via the St. Lawrence Seaway and also the central portion of the country via the extensive railway system already established in nearby Chicago. Goods and raw materials could be moved in and out of the site with ease and economy. Recognizing the explosive potential of such a strategic location, major corporations of industrial production quickly moved in to develop this land into company towns supported by the production of steel, glass (made from the pure sands of the dunes), oil, and power from coal.

Among the first to develop this land for industrial purposes was John D. Rockefeller when he built a massive refinery in 1889 for his Standard Oil Company in Whiting, Indiana, a town just across the border from the south side of Chicago. Yet another of these towns to emerge from this moment in time was Gary, Indiana, located to the east of the Whiting refinery. Founded in 1906 by the United States Steel Corporation, and named for its chairman, Elbert H. Gary, the city was to become the home of the largest steel production complex in the entire country, reaching its peak production of 35 million tons in 1953. Quick to follow the path of this rapid development, competing corporations built their own facilities and towns along the shoreline of the Lake without hearing any strong voice of opposition. Yet.

During this same period of time, as more virgin land was swallowed up by private industrial interests each day, a small but impassioned group of conservationists and politicians were mobilizing their efforts to preserve the dunes and forests that


1 .5 0 .5 1
mile
0 7000
feet
1 .5 0 .5 1
km
Illinois
Indiana

still remained just outside the walls of the factories. Led by Paul Douglas, an Illinois senator, Henry Cowles, a botanist from the University of Chicago, and Dorothy Buell, a local resident and English teacher, the argument to save these lands from further development was not singularly about saving the natural beauty of this place for its own sake, but also that the economic vitality of the region necessitated a more balanced relationship between public and private interests. Beginning in 1908 and continuing for the next 60 years, the battle between the industrial heavyweights and their growing conservationist counterparts resulted in a series of compromises supported by the federal government. The first victory for the conservationists came in 1926 when the State of Indiana opened the Indiana Dunes State Park to the public. This park, however, was but little more than a tiny slice of the contested lands over which the two groups were fighting. As the country entered the Great Depression, political agendas shifted dramatically, quieting further efforts to establish a larger park as part of the National Park system.

After WWII, this debate became an issue of national concern once again, reaching its climax in the early 1960s under the watch of President Kennedy. During this period, the industrial sector had been pushing the federal government to authorize the construction of a new port that would allow regional steel production to increase significantly. The opposition to this proposed industrial expansion was no longer the concern of just a small group of environmentalists, but now became part of the greater public consciousness. To mitigate this divisive battle, the President issued a directive that became known as the Kennedy Compromise of 1963-64, which allowed for the construction of the new Port of Indiana and the creation of the Indiana Dunes National Lakeshore. For the conservationists who spent a better part of their lives fighting to save the last remnants of a landscape destroyed by unbridled industrial exploitation, the Kennedy Compromise undoubtedly was seen as a victory to be shared by the people. But the greater debate over public and private use of the waterfront and the environmental stewardship of both continues on to this day.

In 1998, oil giant BP had taken ownership of the Whiting refinery. Nine years later, amid growing national security concerns pertaining to the use of crude oil sourced from the Middle East, BP proposed a 3.2 billion dollar expansion plan to the Whiting refinery that would allow the company to process and refine the dirtier crude oil from Canada known as Canadian Crude. Shockingly, in the 2007, the State of Indiana and the Environmental Protection Agency authorized the expansion that would allow an average of 1,584 pounds of ammonia and 4,925 pounds of sludge to be dumped into Lake Michigan each day. Furthermore, this permit was issued with an exemption from all of the provisions outlined in the Clean Water Act. As soon as this decision became public knowledge, there was an overwhelming roar of opposition from both the general public as well as many Illinois politicians, including Chicago mayor Richard M. Daley. Eventually, the public outcry became loud enough that BP was forced to revise their expansion plan so that pollution levels would not exceed current operating levels. To do so, BP announced that nearly a third of the proposed budget would be dedicated to pollution control measures.

What this example makes explicit, beyond the tremendous lobbying power of major industrial interests, is the narrow lens through which our industries view their practices in relation to the larger scope of natural resources affected by these practices. Does it not seem absurd that such violent actions of water pollution would be permitted when millions of people rely on the health of that resource as their source of drinking water? For the EPA and the State of Indiana, allowing BP to increase their daily contributions to the pollution of Lake Michigan became acceptable be-

"Interest was drummed up with apparent concerns about environmental sustainability, but the real agenda was not about that. The real issue is about being anti-big business and anti-big oil."
-Norm Labbe, Kennebunk, Kennebunkport and Wells Water District Superintendent
from *Portland Press Herald*, August 26, 2008

"Consumers are making a choice of bottled water versus another beverage. Do I want a Coca-Cola? Do I want a coffee? Or juice? Or is it happy hour? There's a time and place for bottled water, as there is for milk and juice and beer."
-Greg Koch, Director of Global Water Stewardship for Coca-Cola
from *Fortune Magazine*, April 26, 2007

"Water is an emotional issue, but this is displaced hysteria."
-Mark Dubois, Natural Resource Director for Poland Spring
from *Portland Press Herald*, August 26, 2008

"Cultivating consumers' willingness to pay more for a litre of bottled water than they pay for gasoline can help set the stage for public acceptance of privatized water services."
-Richard Girard, Polaris Institute
from *Insidethebottle.com*, October 3, 2007

"One of the smartest things we can do with oil is turn it into a polymer like PET, because if it is recaptured, it can be used an infinite number of times."
-Kim Jeffery, CEO, Nestle Waters North America
from keynote speech at Beverage Forum, May 21, 2008

"There's no question about it: Fiji is far away. But when it comes to drinking water, 'remote' happens to be very, very good." -FIJI Water website

"Because of the bottled water exemption, I regret that I have to urge my colleagues, to join me in opposing the Great Lakes Compact until proper protections are put in place."
-Michigan Rep. Bart Stupak
from *New York Times*, September 24, 2008

"We're moving 1 billion bottles of water around a week in ships, trains, and trucks in the United States alone. That's a weekly convoy equivalent to 37,800 18-wheelers delivering water."
-Charles Fishman
from *Message in a Bottle*, December 17, 2008

"By and large, bottled water isn't shipped that far. We found there is more bottled water sent into the Great Lakes Basin than sent out. It wasn't a matter of us losing water. We actually gain water from the shipping."
-Samuel Speck, Council of Great Lakes Governors
from *New York Times*, September 24, 2008

"At Nestle Waters, we are focussed on water, energy, and packaging."
-Kim Jeffery, CEO, Nestle Waters North America
from keynote speech at Beverage Forum, May 21, 2008

"Water as a beverage has more right to extend and enter into more territories than any other beverage. Water has a right to travel where others can't."
-Ahad Afridi, Marketing Vice President, Aquafina
from *Message in a Bottle*, December 17, 2008

"Our recycling rate for PET is only 23%, which means we pitch into landfills 38 billion water bottles a year--more than $1 billion worth of plastic."
-Charles Fishman
from *Message in a Bottle*, December 17, 2008

"The Great Lakes Compact signals to the rest of the world that water, the oil of the century, is a global imperative."
-Cameron Davis, Chief Executive, Alliance for the Great Lakes
from *New York Times*, September 24, 2008

"Taxing, banning, or otherwise handicapping this industry will do nothing to solve municipal water problems nor will it help with the very real problem of recycling in America."
-Kim Jeffery, CEO, Nestle Waters North America
from keynote speech at Beverage Forum, May 21, 2008

"24% of the bottled water we buy is tap water repackaged by Coke and Pepsi."
-Charles Fishman
from *Message in a Bottle*, December 17, 2008

cause they found the expansion project to be essential to the economic vitality of the region and country, a decision that was allowed through an exemption outlined in the Clean Water Act.

Big Oil, Big Water

In recent years, the territorial debate between the industrial corporations in the region and those in favor of preserving public space and sustainable environmental practices has broadened from land use concerns to include the water from Lake Michigan. For years, concerns over the long-term health of this precious resource have steadily grown and proven to agitate the already contentious relationship between the industrial and public constituencies. Beyond the obvious reasons for protecting the Lake for recreational purposes and as a drinking water source, many began to fear that the Great Lakes, as one of the world's largest freshwater reserves could be exploited and commodified on the global market. In fact, as the global population swells and temperatures rise, access to freshwater is becoming increasingly precious and valuable. Not surprisingly, it wasn't until a potential political and financial value could be placed on the water of the Great Lakes that the federal government took any action.

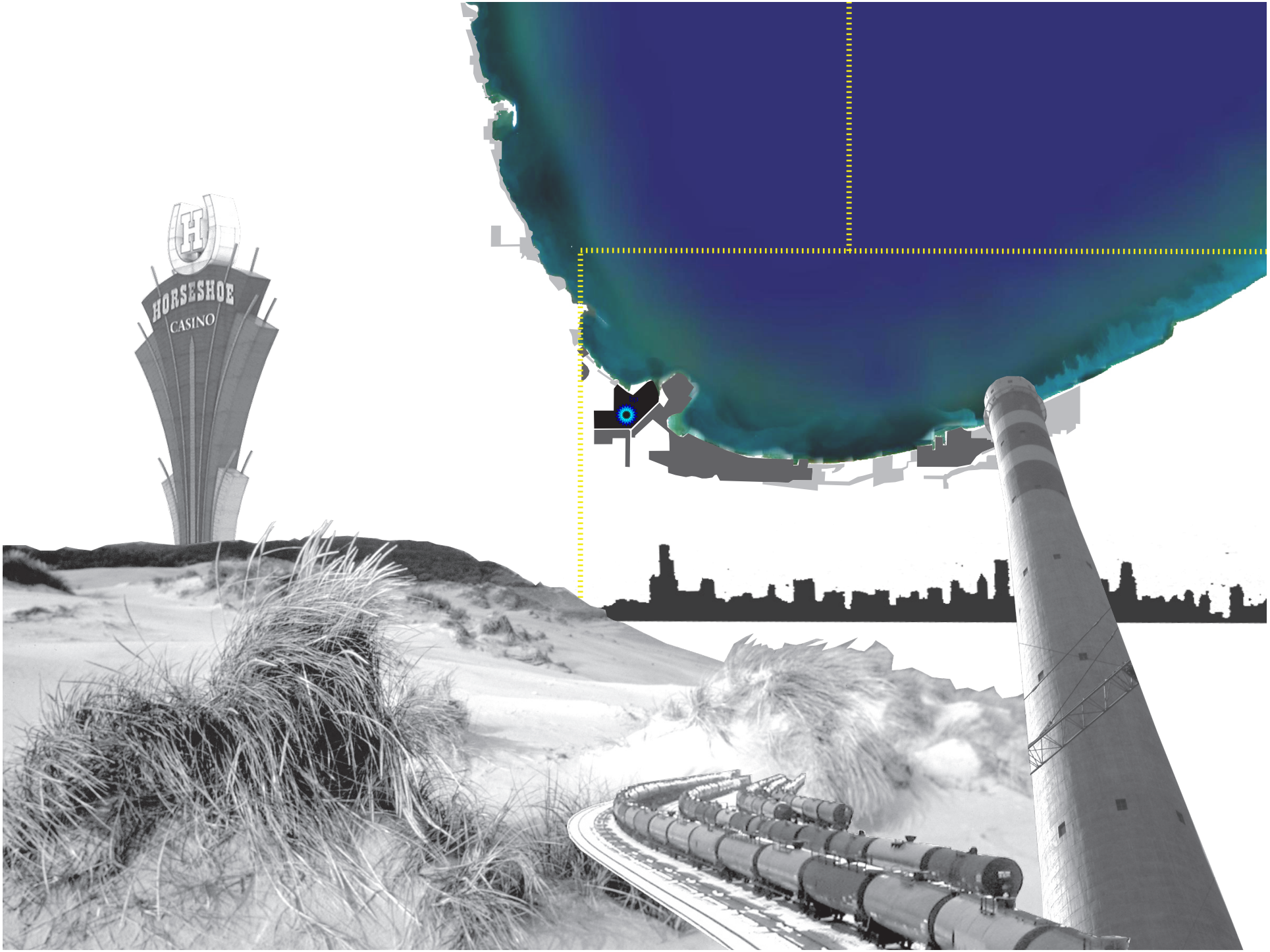
In 2008, Congress responded to these concerns by passing the "Great Lakes Compact," a bill supported by the governments of the all the U.S. States and Canadian provinces bordering the Great Lakes. This bill was designed to ban the export of water from the Great Lakes Basin, but it included a notable exemption from the ban: bottled water. The bottled-water exemption at first glance seems surprising given that the premise of the bill was to prevent the privatization of a public resource. However, a closer examination of the bottled-water industry yields an explanation that is really anything but surprising given the history of corporate influence in government.

The bottled-water industry in America is dominated by three beverage companies: Coca-Cola, Pepsi, and Nestle Waters. Of the hundreds of different brands of bottled-water available at every vending machine, gas station, and grocery store in the country, only three major corporations are making a profit. Naturally, given the ever-growing demand for bottled-water, and the limited group of suppliers, these three companies undoubtedly hold strong lobbying power with the state and federal governments. In this sense, the bottled-water industry is no different than any other industry. But while Congress promoted the "Great Lakes Compact" as a necessary measure to protect a public natural resource, what they were in fact doing, by including the bottled-water exemption, is legally allowing this resource to be privatized by the bottled-water industry. While disturbing to some, this is not a scenario without precedent. We need only to recall the exemption in the Clean Water Act of 1972 that allowed the EPA and the State of Indiana to initially grant the 2007 permit to BP that would allow for increased dumping into Lake Michigan.

These examples prove to illustrate the similarities that are beginning to emerge between the oil industry of the 20th century and the bottled-water industry of the 21st century. Furthermore, given the public's similar reservations and concerns over the environmental impact of both the oil industry and the bottled-water industry, it seems plausible that a company like BP, with its experience in shaping its public image in the face of fierce opposition, is prepared to make a transition from one industry to the other as the first one (oil) becomes obsolete and the new one (water) continues to grow.

A Strategy of a Contested Landscape

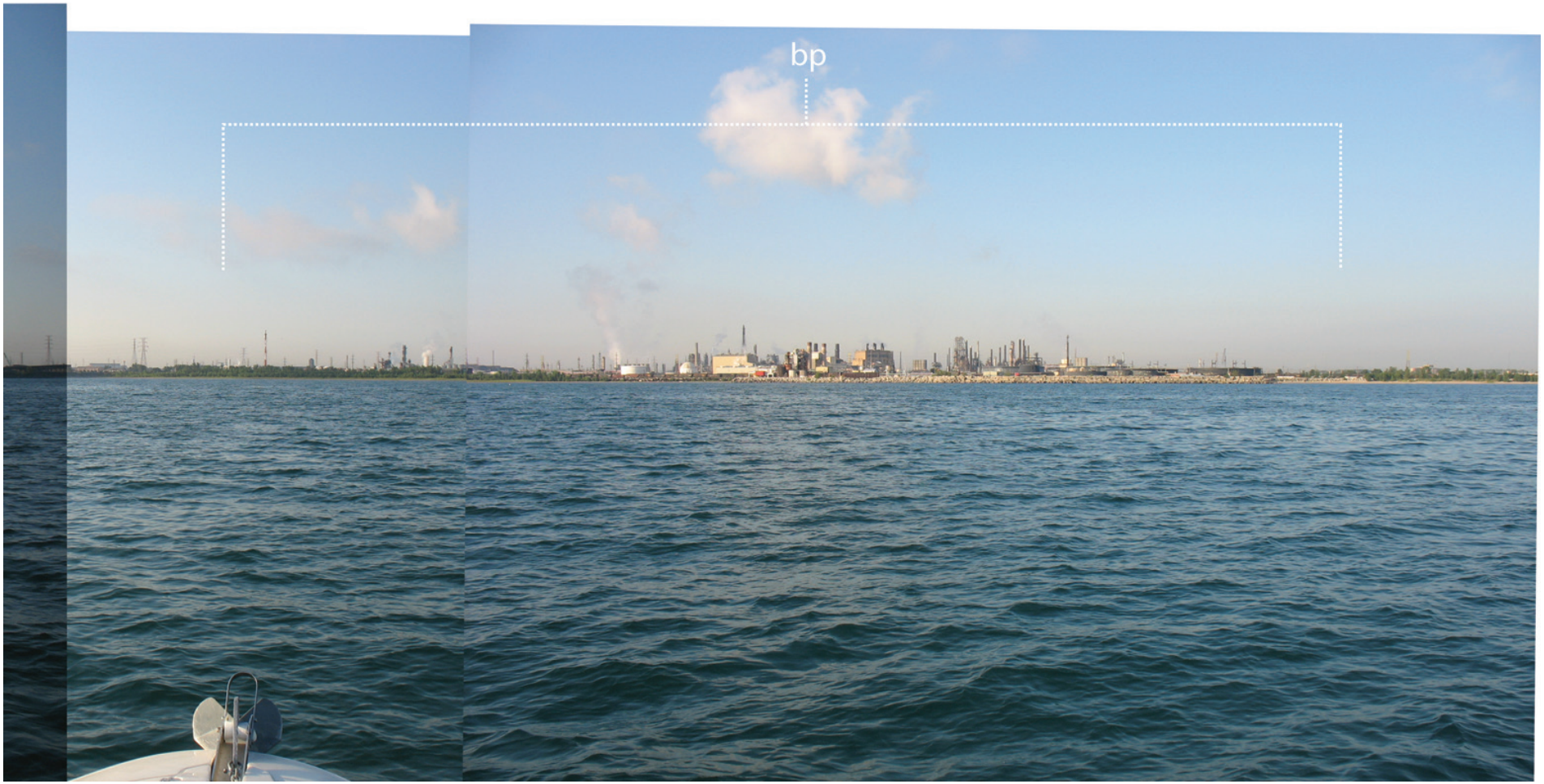
The objective of this thesis is not to place the architect in the position of moral juror, of having to decide which side to take. Rather, the project accepts the plurality of the debate as given and aims to play the role of instigator in that it must simul-


HORSESHOE
CASINO

taneously and concretely address both the profit, and hence, the program, of the corporation and also the public's desire to have spaces within the built environment that remain the property of all and cost nothing to occupy. As the environmental, economic, and social crises of the company towns of northwest Indiana rage on into the 21st century, it becomes all the more crucial that we re-examine how these problems are approached. If nothing else, the debates between the industrialists and environmentalists show us that we cannot view this issue in simple terms. These problems of urban and environmental decay cannot be solved by simply turning the industrial sites back over to "nature", as in most cases the damage done is so severe that the problem demands a more active and sustained process of remediation. Nor can the current methods of industrial production that were developed over a century ago be allowed to be the methods of this century. If we recall yet again the patterns of the last century, the solution to this debate has always been based on the formula of coupling industrial expansion with the authorization and construction of civic spaces (national and state parks, municipal plazas, etc). These civic spaces and industrial spaces, however, remain completely separate projects, leaving behind an urban landscape that is defined most clearly by its inherent fragmentation. This thesis aims to consider the possibility of integrating both public and private interests as a singular project that operates differently depending on what perspective it is interpreted from (either from the viewpoint of BP or from the viewpoint of the public).

\\Site Photographs

Scenes from within a 5 mile radius of the Project Site



Panorama from Lake Michigan

BP Refinery from Lake Michigan

Steel Mill adjacent to Project Site

Indiana Dunes National Lakeshore

BP Refinery from Lake Michigan

Indiana Dunes National Lakeshore

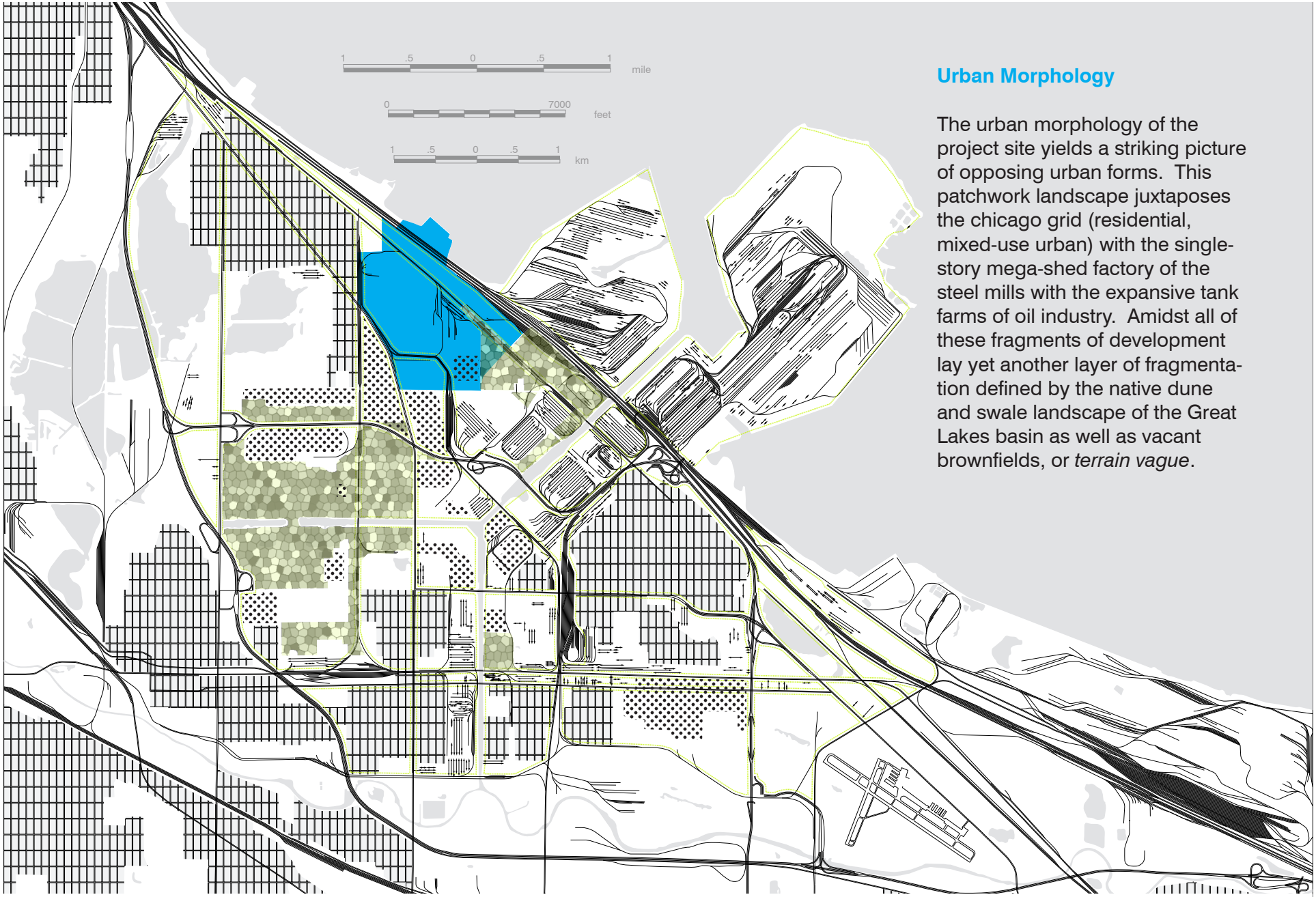
Steel Mill adjacent to Project Site

Indiana Dunes National Lakeshore

Aerial View of Steel Mills directly adjacent to Project Site

\\The Urban Project

Site Morphology, Project Layers, Urban Plans, and Phasing



Urban Morphology

The urban morphology of the project site yields a striking picture of opposing urban forms. This patchwork landscape juxtaposes the chicago grid (residential, mixed-use urban) with the single-story mega-shed factory of the steel mills with the expansive tank farms of oil industry. Amidst all of these fragments of development lay yet another layer of fragmentation defined by the native dune and swale landscape of the Great Lakes basin as well as vacant brownfields, or *terrain vague*.

Infrastructure Fracture Lines

Grid >Residential

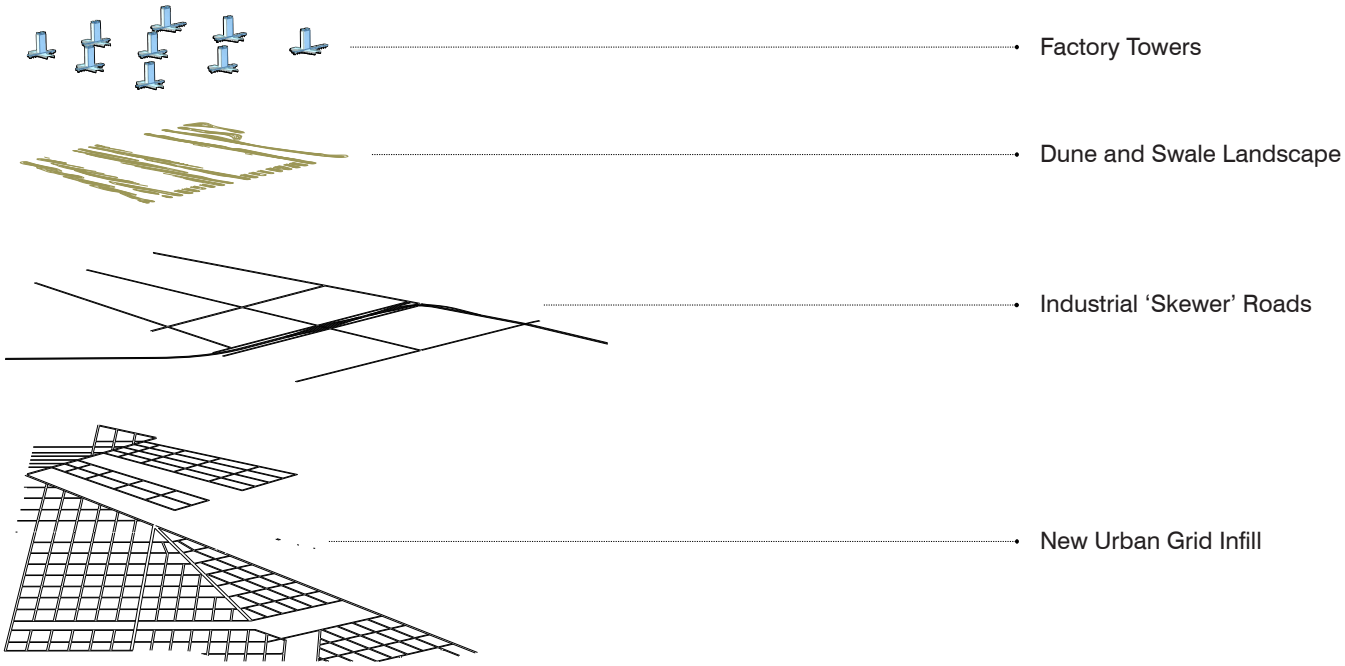
Line >Factory Flows

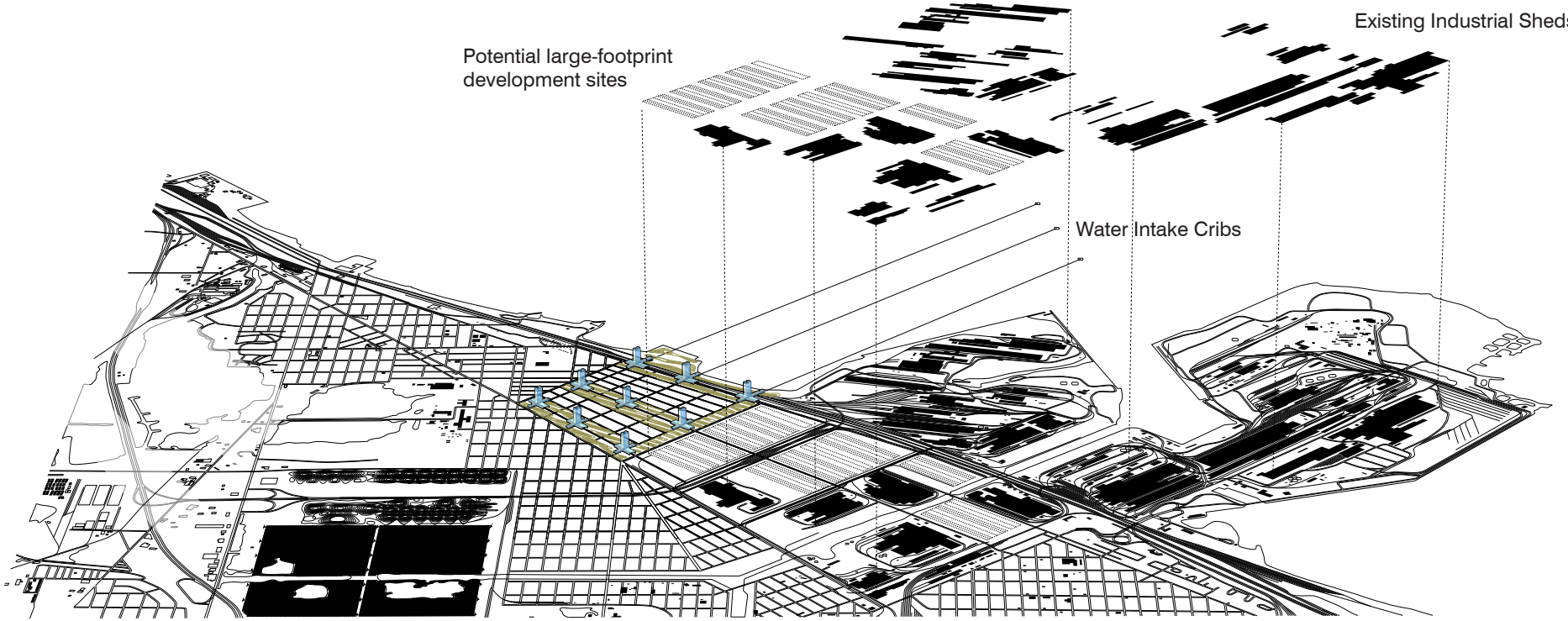
Point > Tank Farm

terrain vague

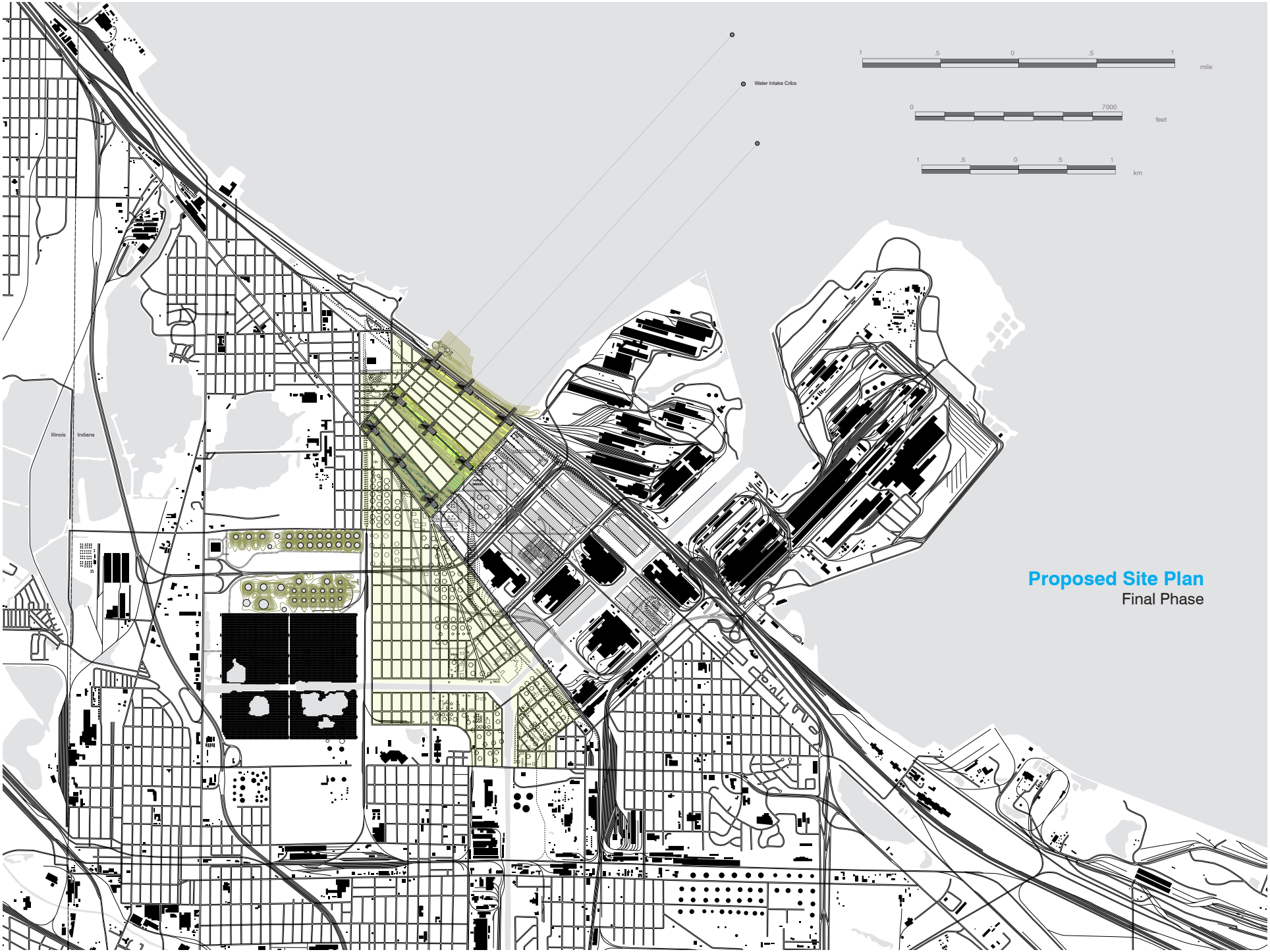
Urban Design Strategy

On the urban scale, the objective of this thesis was to layer all of these fragmented forms into a single project. As a counterpoint to the zoning practices employed in the Modernist city, this thesis suggests that an urban architectural project can act as a host for a variety of seemingly conflicting uses, both public and private, and that through this conflation of uses can offer up a new model for urban/industrial development in the 21st century.

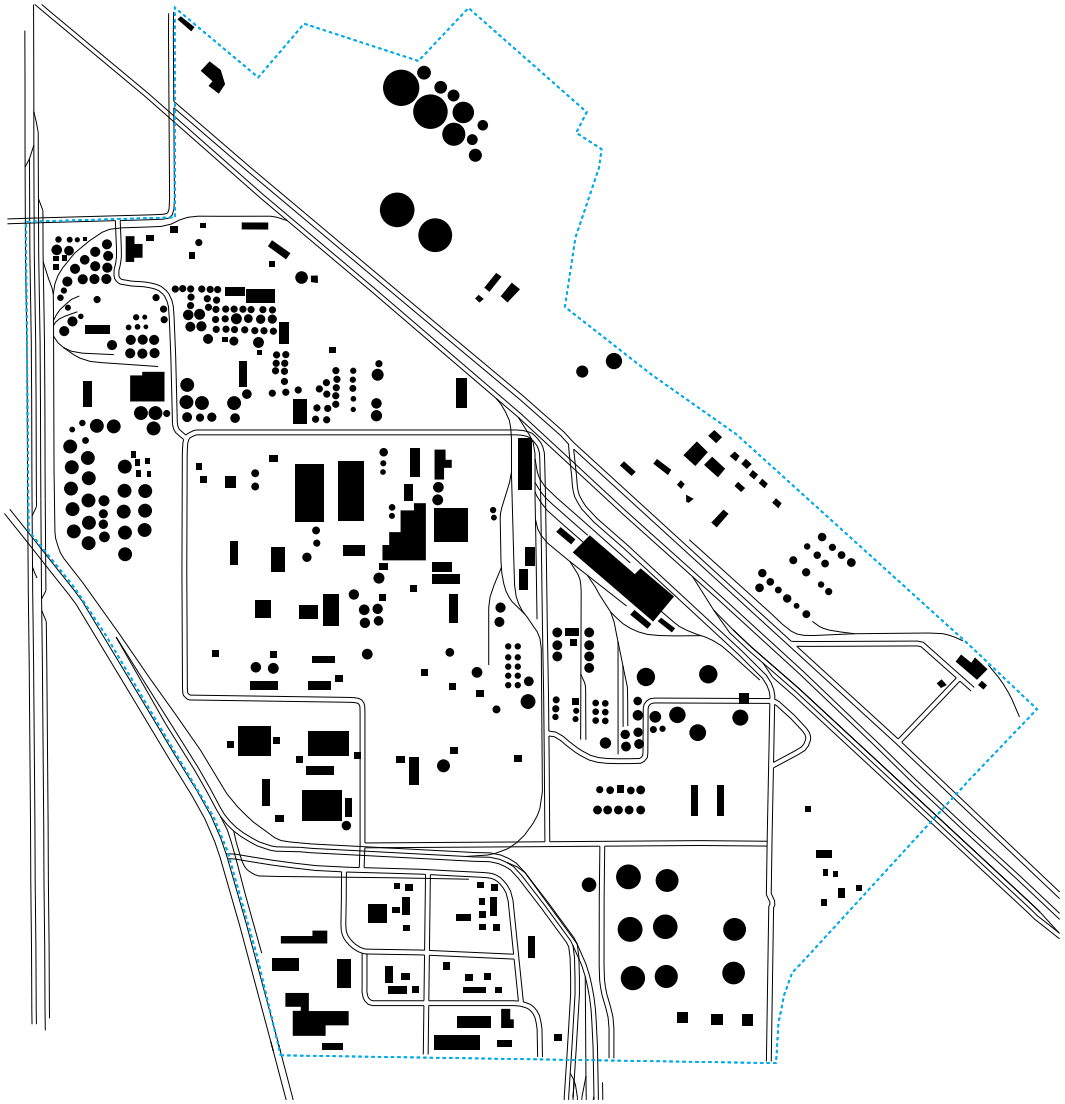




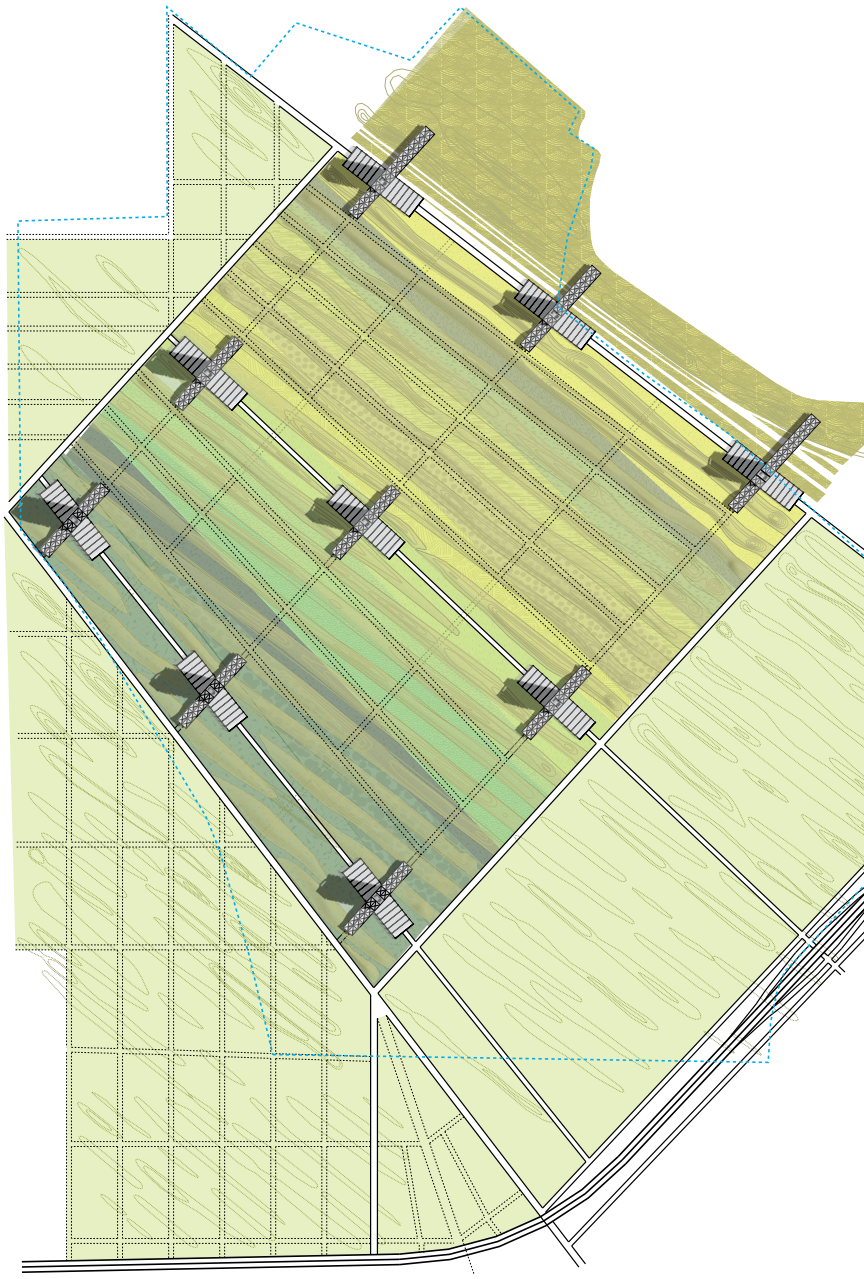
Existing Plan
(Existing BP refinery shown in green)



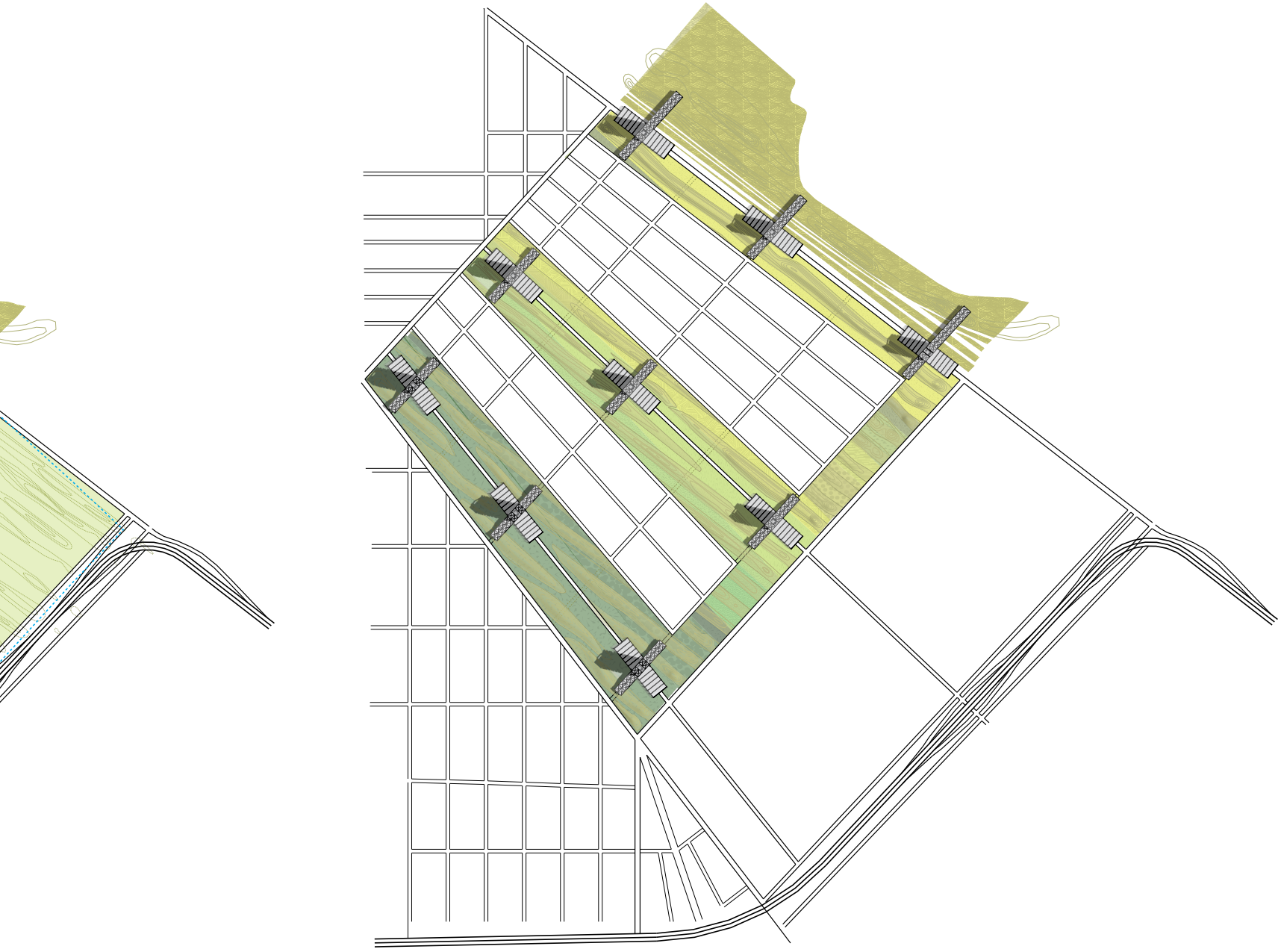
Proposed Site Plan
Final Phase



Existing BP Oil Refinery
High-security lakefront industrial complex



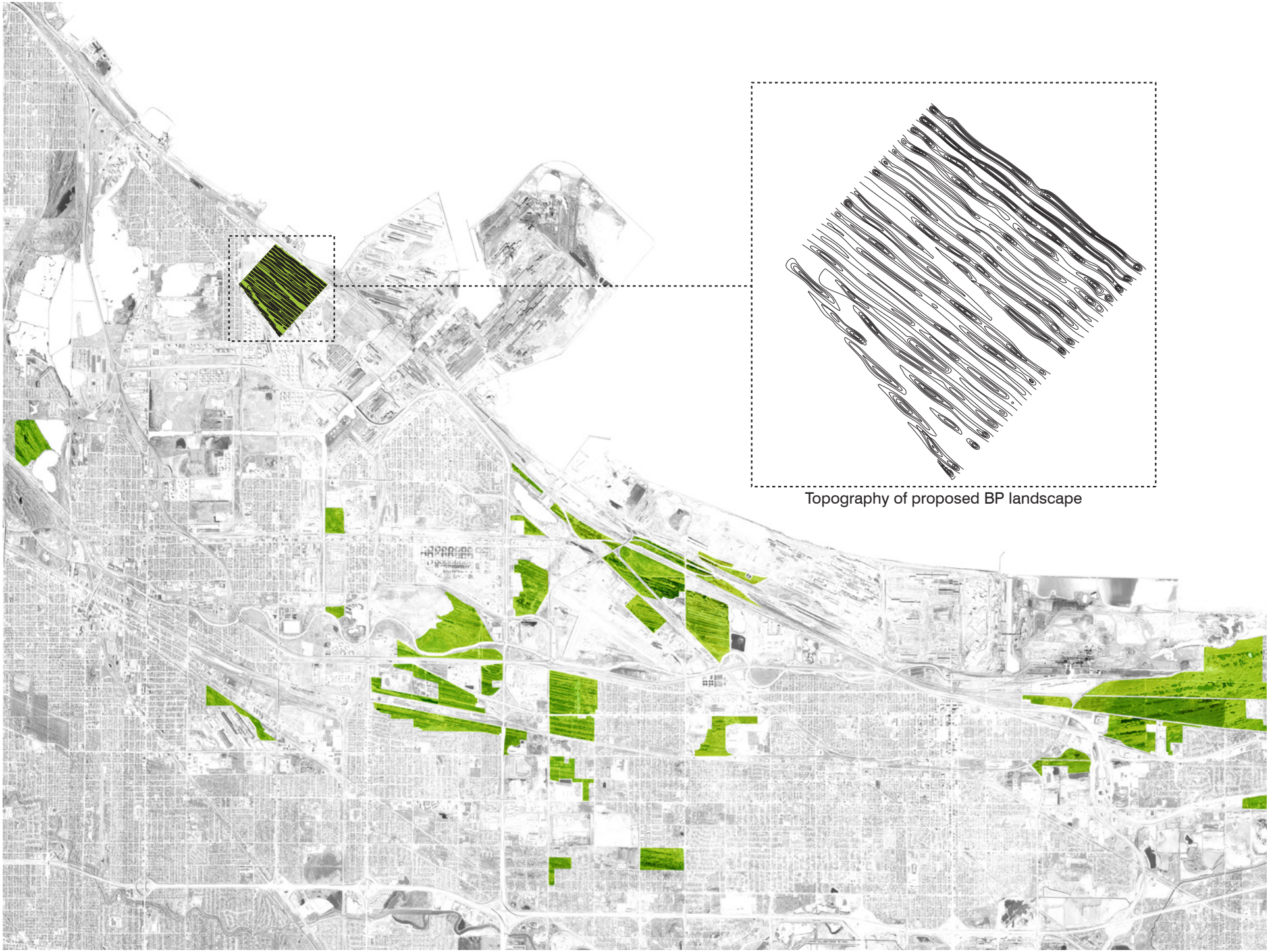
Phase One
Landscape remediation. A new factory ‘Tower in the Park’



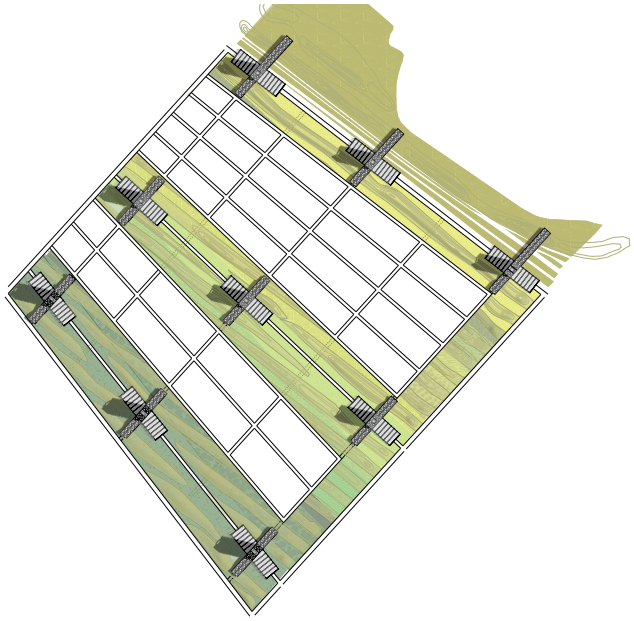
Phase Two
The factory tower as Civic Structure

\\Landscape

Natural and Constructed Systems



Topography of proposed BP landscape



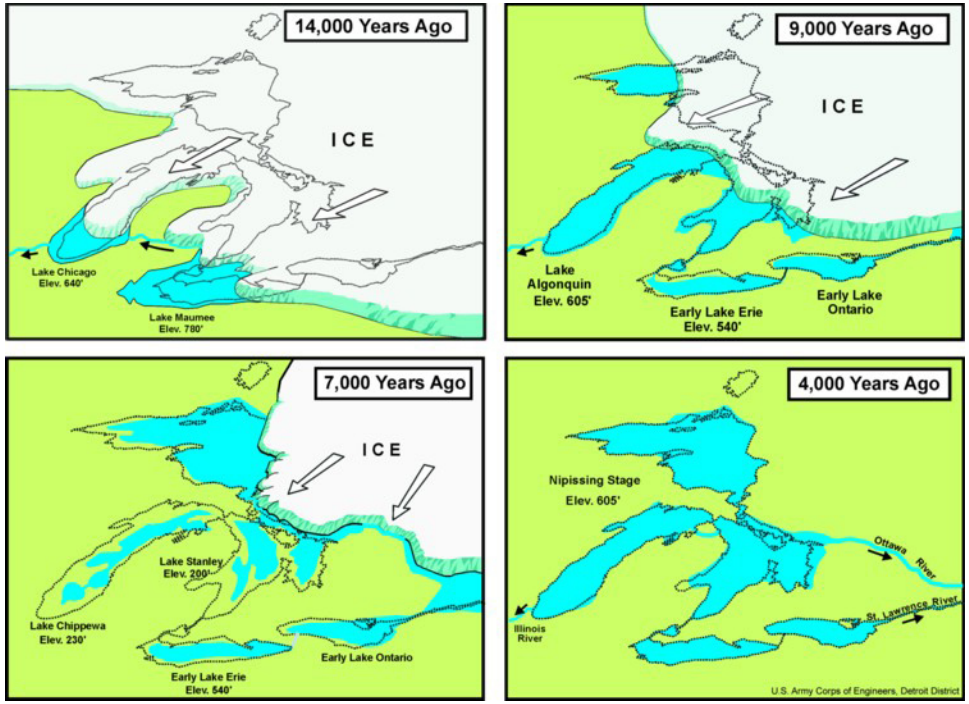
Combining the Industrial, Urban, and “Natural” Landscape

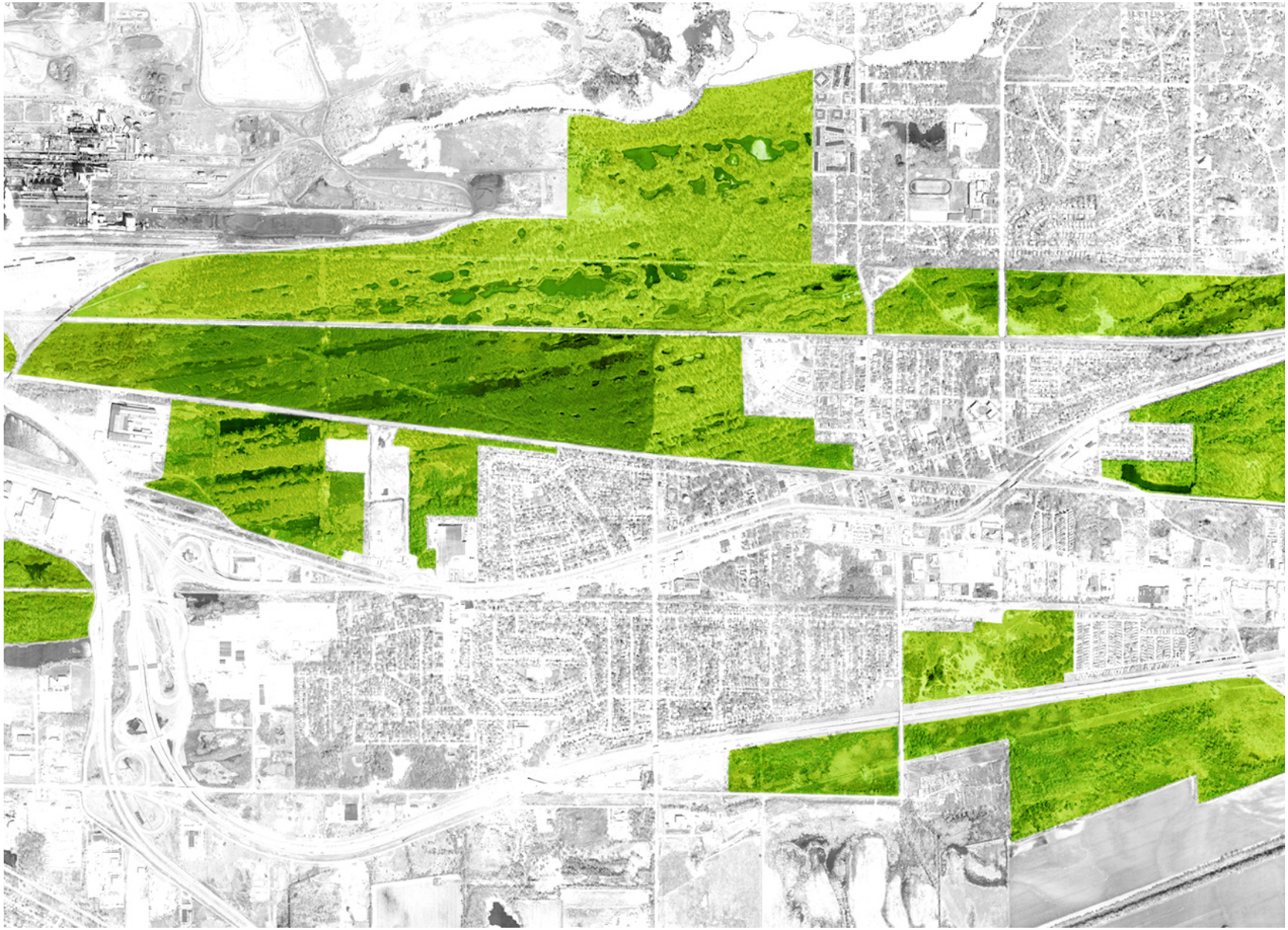
Dune and Swale Complex

As the glaciers retreated from the Great Lakes basin, they left behind a dune and swale complex defined by hundreds of dune ridges running parallel to the existing shoreline of the Lake. This unique landscape provides for a rare combination of natural habitats, one where arctic pine can be found growing adjacent to prickly pear cactus.

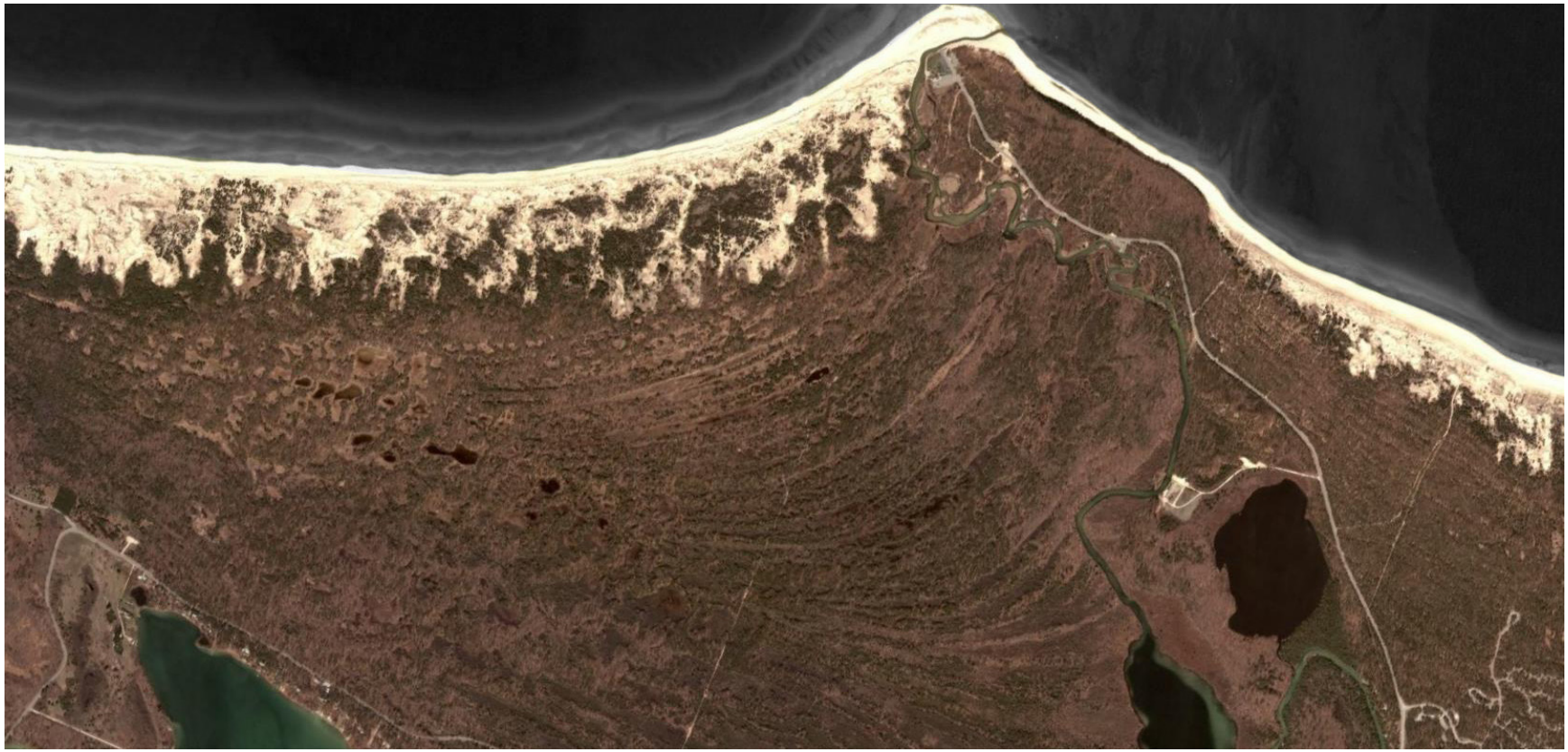
As industrial and urban development began at the beginning of the 20th century, this landscape began to be fragmented. What remains today of this original dune landscape is a series of “islands” surrounded by factories, residential development, and heavy transportation infrastructure lines.

As a counterpoint to this fragmentation of industrial, urban, and natural landscapes, this thesis aims to combine all three of these layers into a single site. But rather than completely reject the notion of fragmentation, the thesis openly accepts the possibility of this new combination of industrial, urban, and landscape intervention becoming a new “island” with its own formal identity, one that can be used as a prototype for sites facing similar conditions in the 21st century.





Fragmentation of Native Dune and Swale Landscape



Hardwood Forest

Tree Canopy: Red Oak, Paper Birch, Bigtooth Aspen, Red Maple

Short Shrub: Black Huckleberry, Blueberry

Herbaceous: Bracken Fern, Bunchberry, Wintergreen

Forested Swale

Tree Canopy: Northern White Cedar, Black Spruce, Red Maple

Short Shrub: Speckled Adler, Willows

Herbaceous: Sedges, Blue Joint Grass, Fowl Manna Grass, Water Horehound, Sphagnum Mosses

Forested Dune-Conifer

Tree Canopy: Jack Pine, White Pine, Red Pine, Balsam Fir

Short Shrub: Black Huckleberry, Blueberry

Herbaceous: Bracken Fern, Bunchberry, Wintergreen

Dry Swale

Short Shrub: Sweet Gale, Shrubby Cinquefoil, Bog Birch, Red Osier Dogwood

Herbaceous: Sedges, Spike Rushes, Twig Rush, Bulrushes, Blue Joint Grass, Rushes, Woolgrass, Marsh Fern, Horned Bladderwort

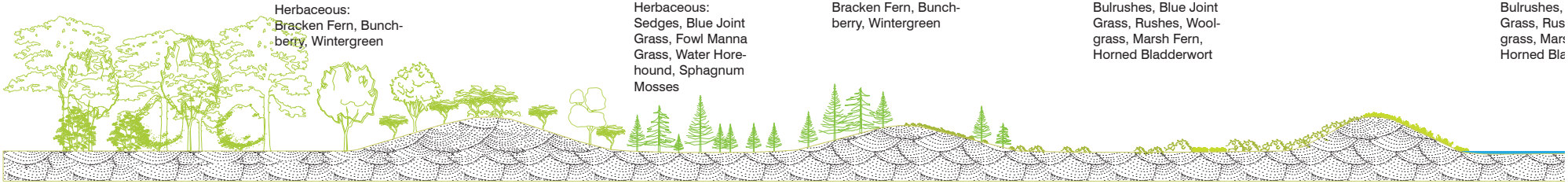
Vegetated Dune

See Open Dune

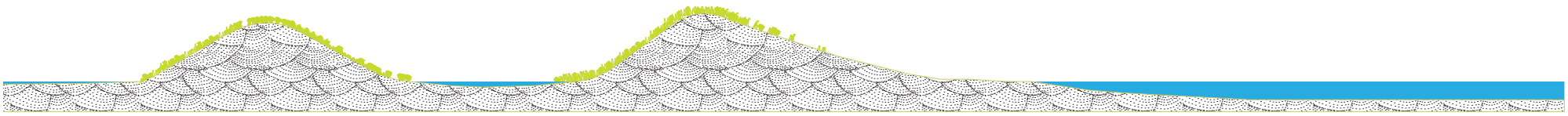
Wetland

Short Shrul
Gale, Shrul
foil, Bog Bi
Osier Dogv

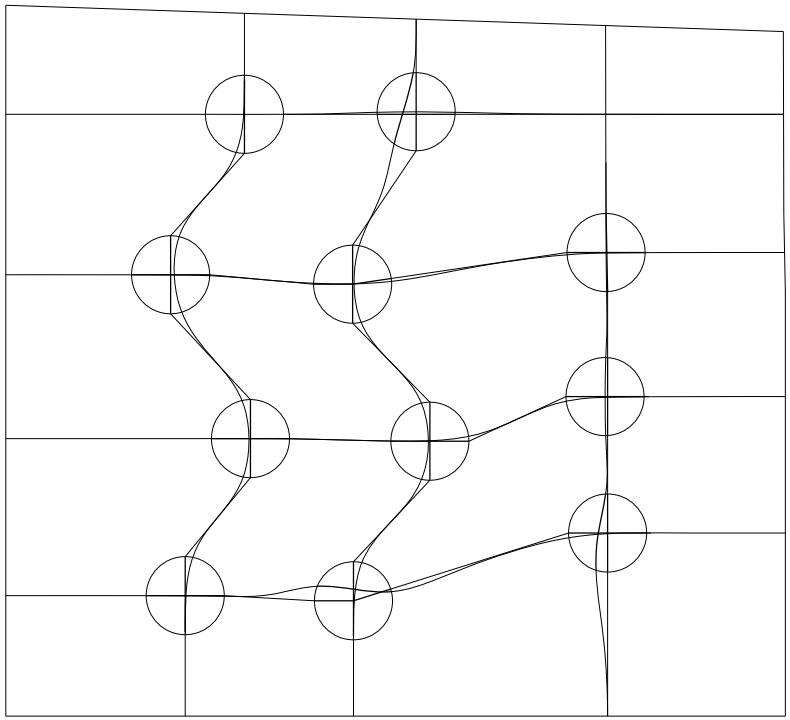
Herbaceou
Sedges, Sp
Rushes, Tw
Bulrushes,
Grass, Rus
grass, Mars
Horned Bla



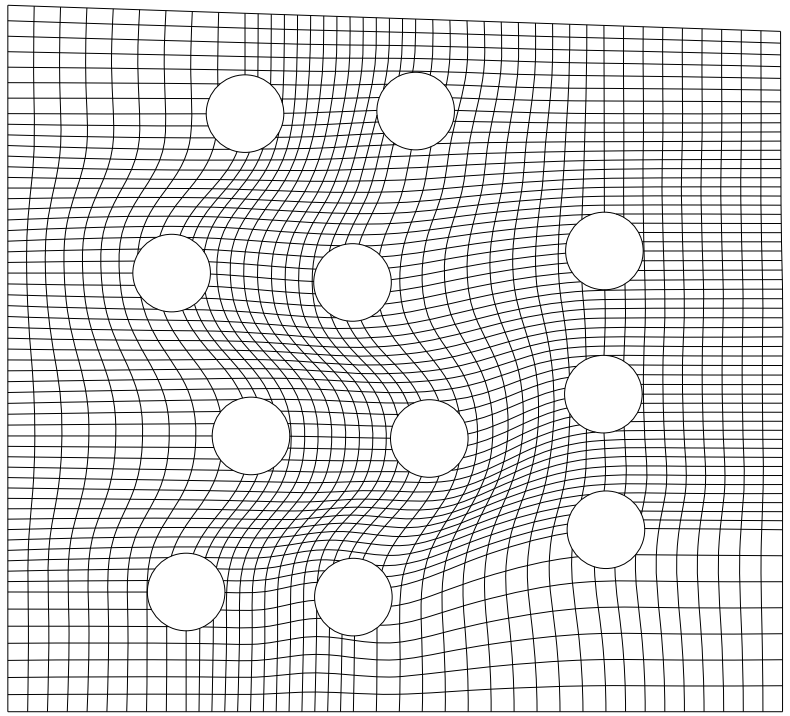
Swale	Open Dune	Wetland Swale	Open Foredune	Lake Michigan
b: Sweet bby Cinque- rch, Red wood s: bike /ig Rush, Blue Joint hes, Wool- sh Fern, adderwort	Tree Canopy: Balsam Poplar Short Shrub: Autumn Willow, Dune Willow, Ground Juniper, Creeping Juniper, Bear Berry Herbaceous: Beach Grass, Dune Grasst	See Wetland Swale	Tree Canopy: Balsam Poplar Short Shrub: Autumn Willow, Dune Willow, Ground Juniper, Creeping Juniper, Bear Berry Herbaceous: Beach Grass, Dune Grasst	



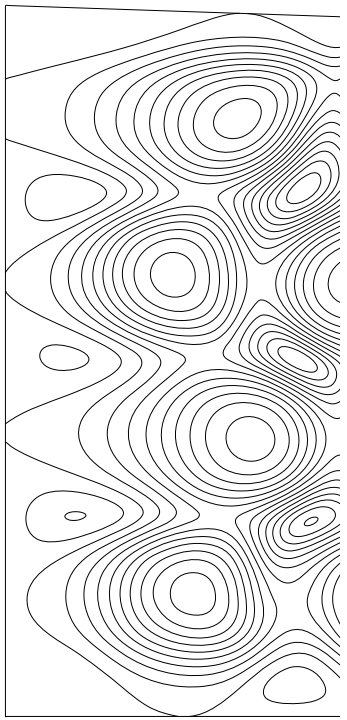
Plant Succession in a Dune and Swale Complex



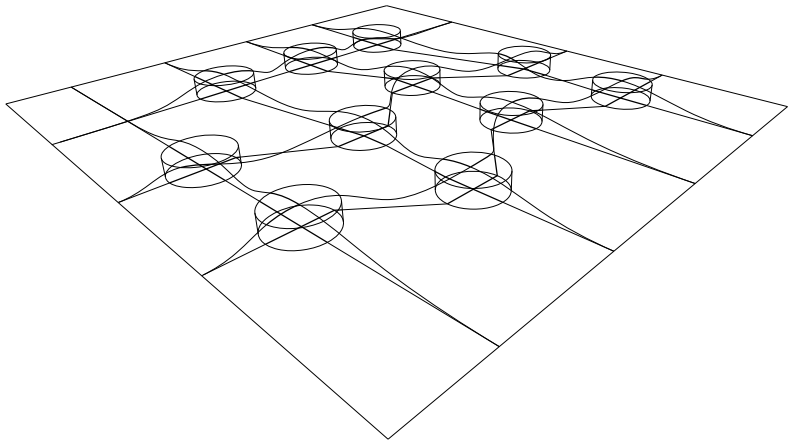
Tank farm grid

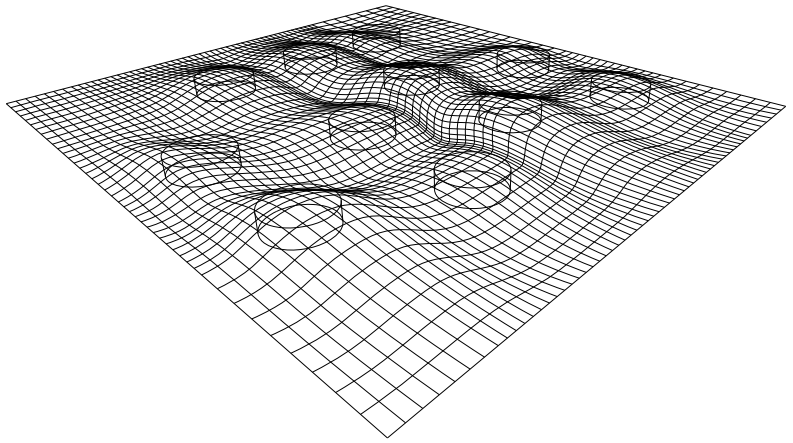


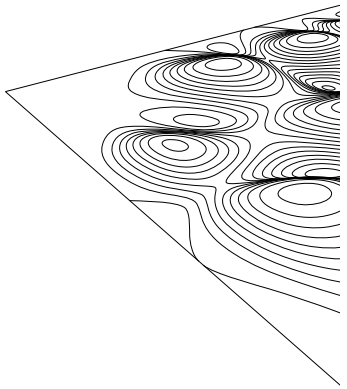
Creating topographical surface from existing tank farm

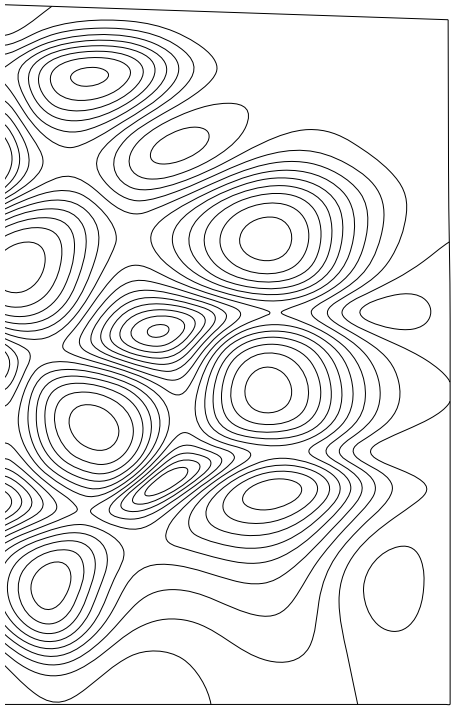


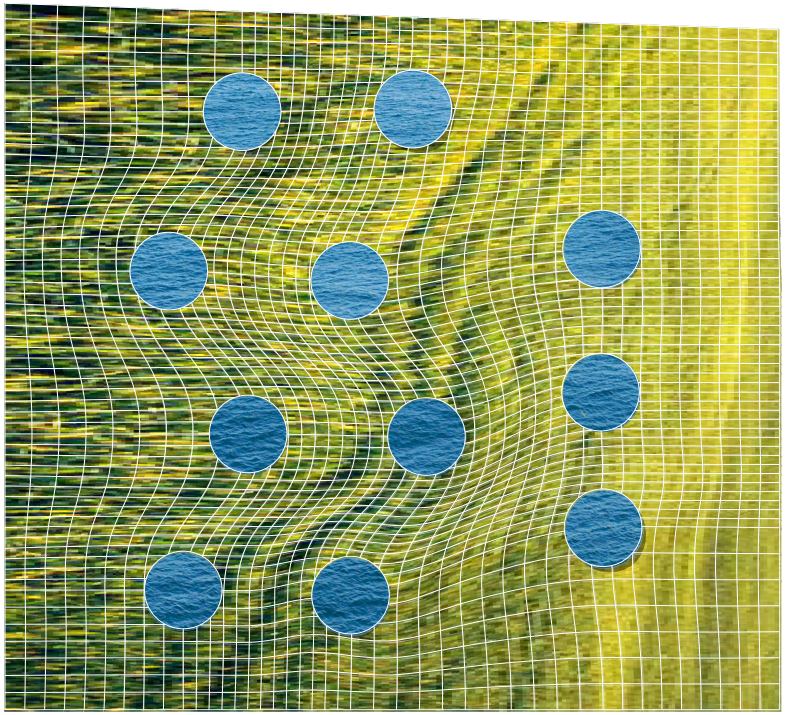
‘Wave Field’ topography

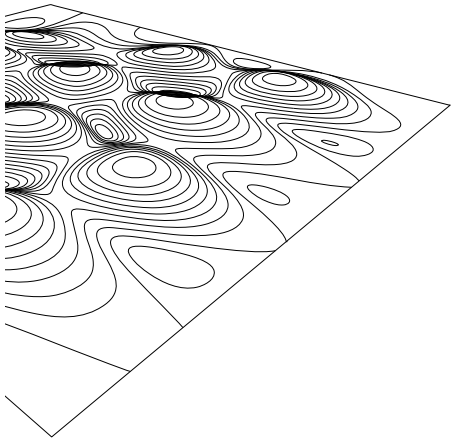


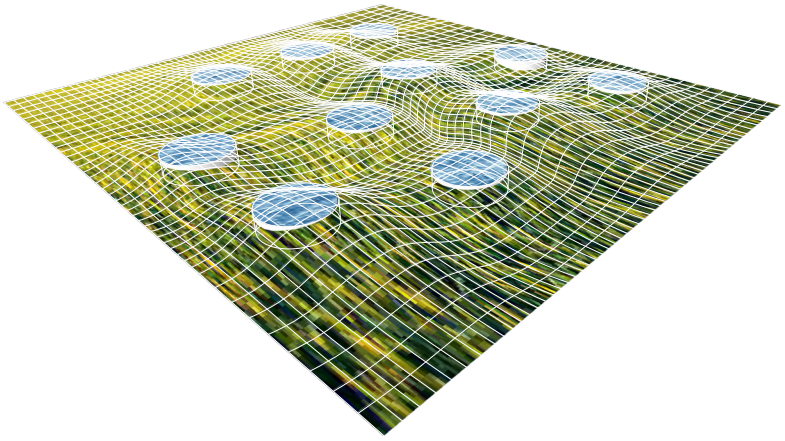












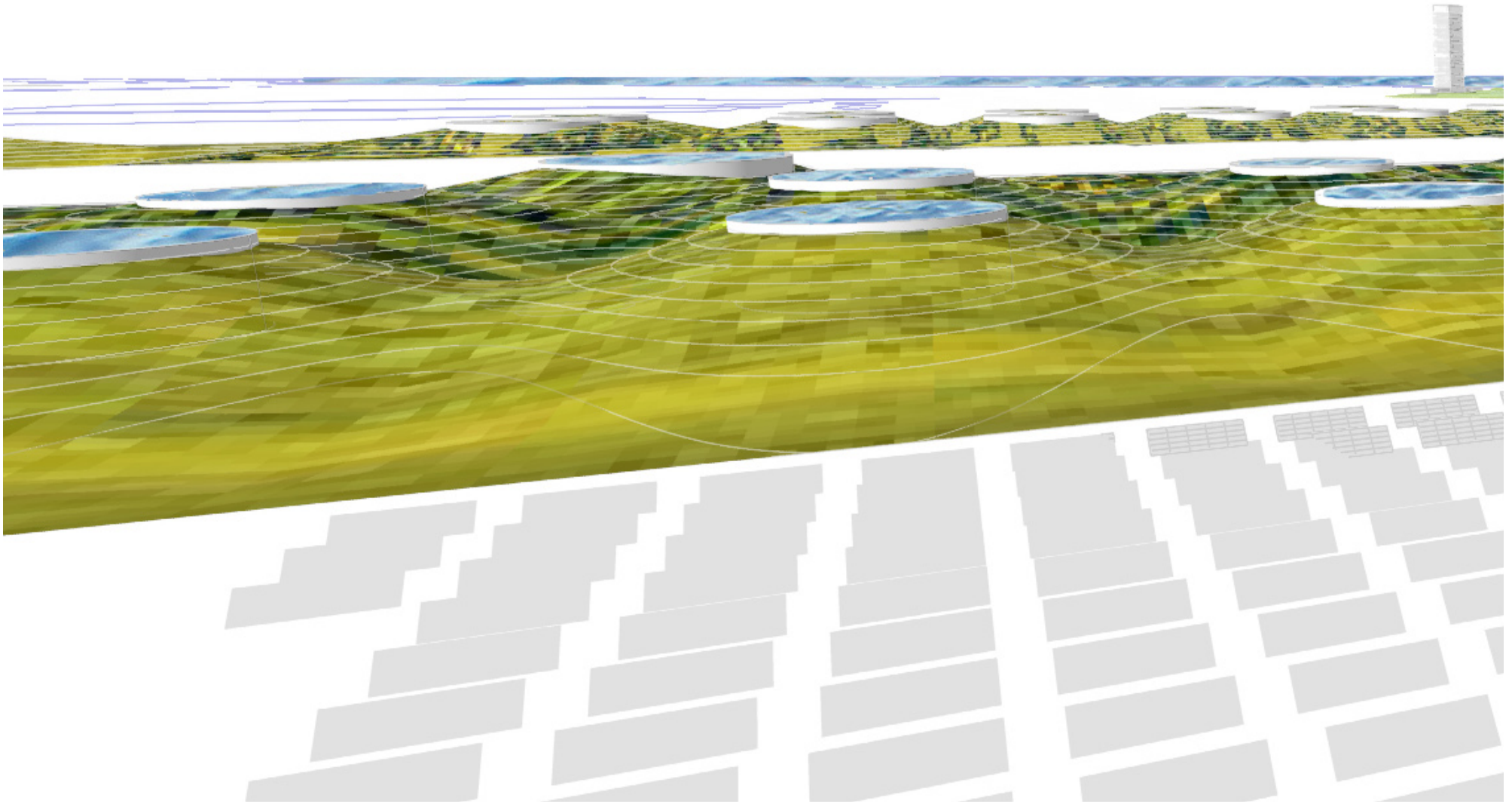
A new public landscape within a functional industrial site

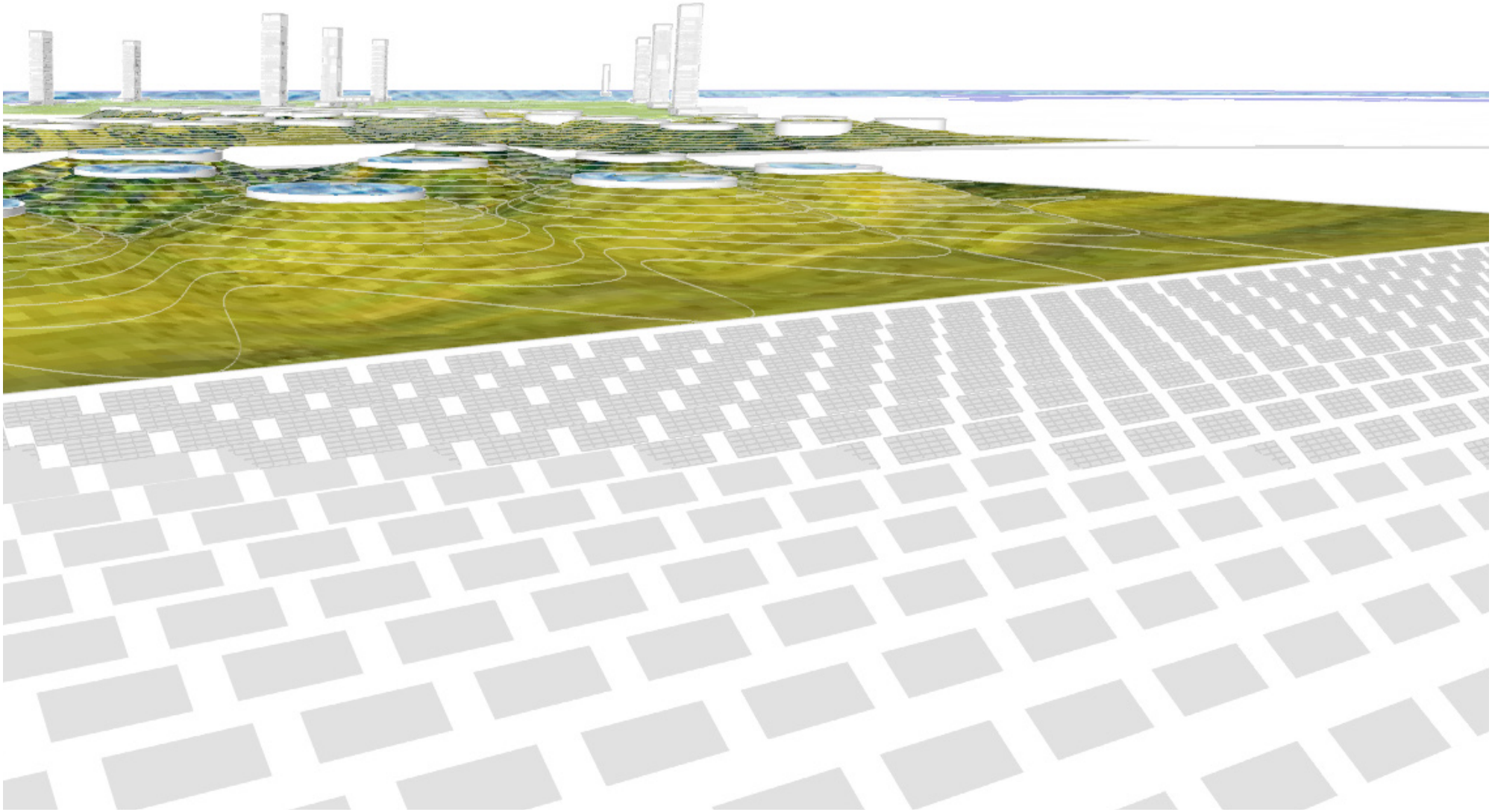
Tank Farm - an area used exclusively for storing petroleum in large tanks

Covering vast acres of land in the immediate vicinity of the site are numerous 'tank farms' used for storing oil reserves for the BP refinery.

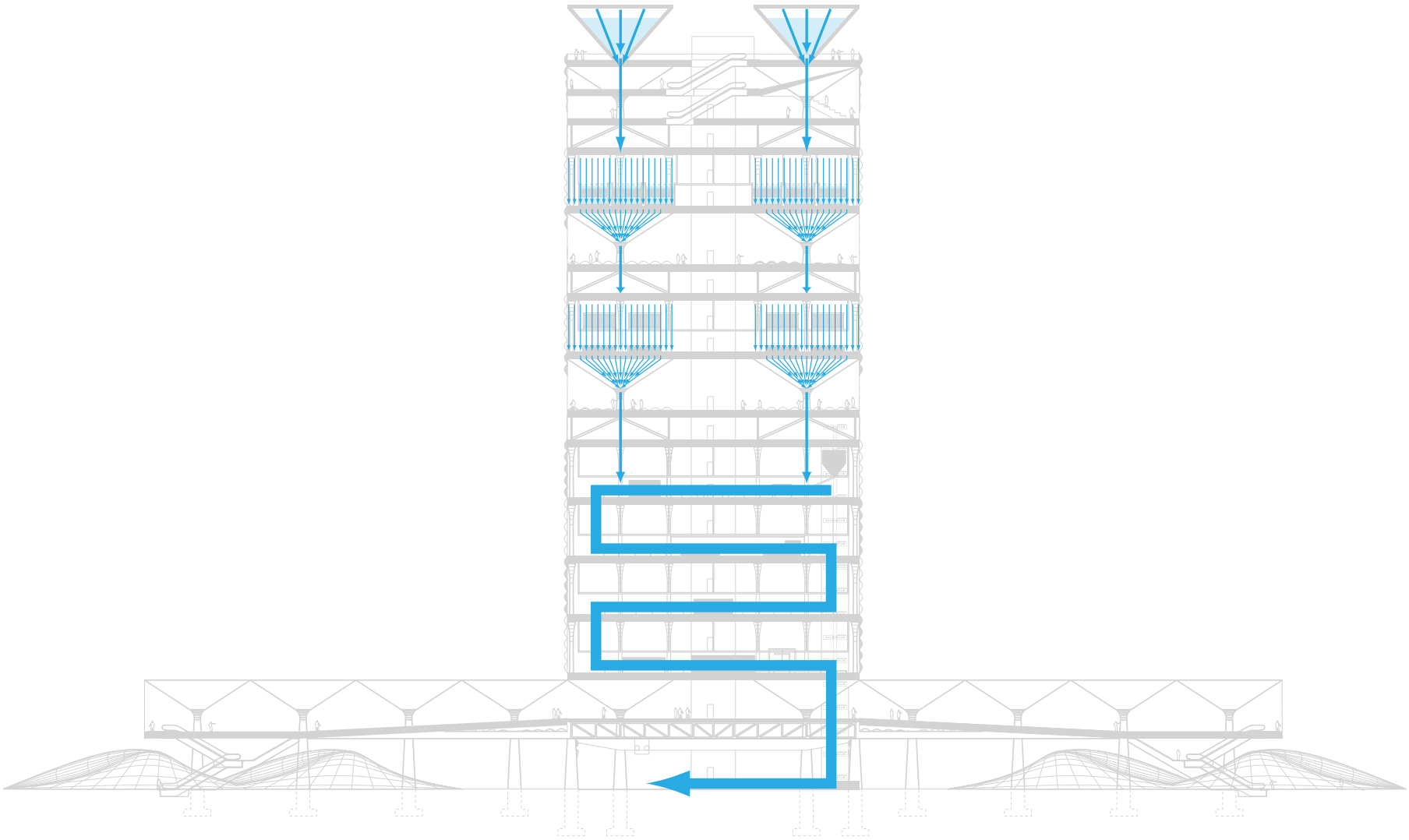
This thesis suggests that some of these 'tank farms' be reclaimed for use in the water filtration process. While almost all of the water filtration process occurs within the new factory towers, a limited number of these tanks will act as settling basins for the first stage of the filtration process. As water is pumped in from the new water intake cribs located offshore from the project site, it will first be stored in the tanks as the sand suspended in the water settles to the bottom. After the settling process, the water from these tanks is then pumped to the roof of the towers where the remaining filtration processes will occur.

The settling process will result in a large amount of sand build-up in the bottom of the storage tanks. As these tanks are regularly cleaned out, the sand being removed will be used to construct an artificial landscape of mounds surrounding the tanks. This constructed landscape will be accessible to the public and will provide visual and noise buffers between the surrounding residential areas and the new solar and wind farm located to the southwest of the primary project site.





Tank Farm ‘Wave Field’



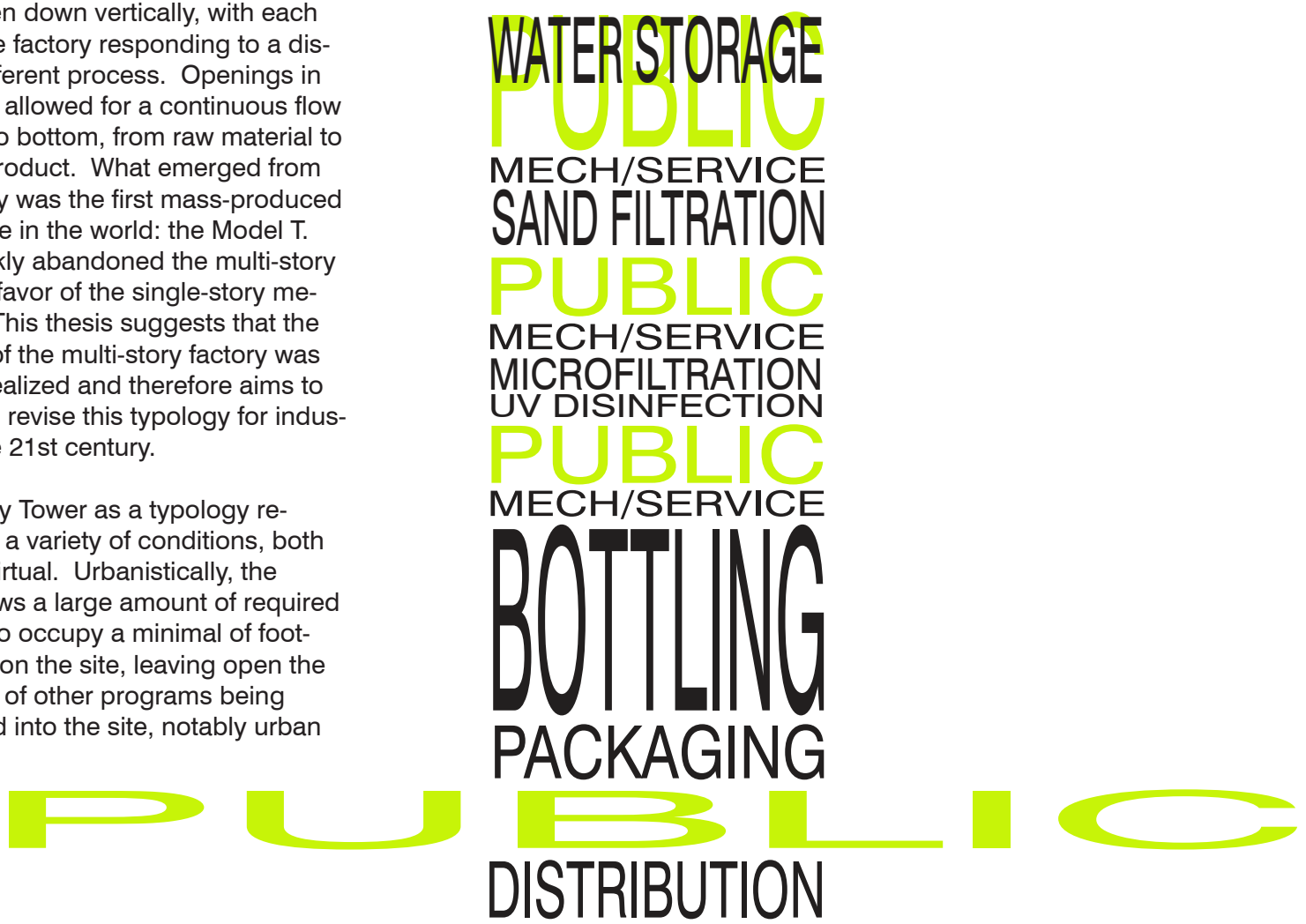
\\The Buildings

Floor Plans and Section

Tower Section: A Factory in a Tower

In the early stages of Ford, Albert Kahn designed the Highland Park Plant (1909). Here, the production cycle was housed primarily under one roof and was broken down vertically, with each floor of the factory responding to a discreetly different process. Openings in each floor allowed for a continuous flow from top to bottom, from raw material to finished product. What emerged from this factory was the first mass-produced automobile in the world: the Model T. Ford quickly abandoned the multi-story factory in favor of the single-story megashed. This thesis suggests that the potential of the multi-story factory was not fully realized and therefore aims to revisit and revise this typology for industries in the 21st century.

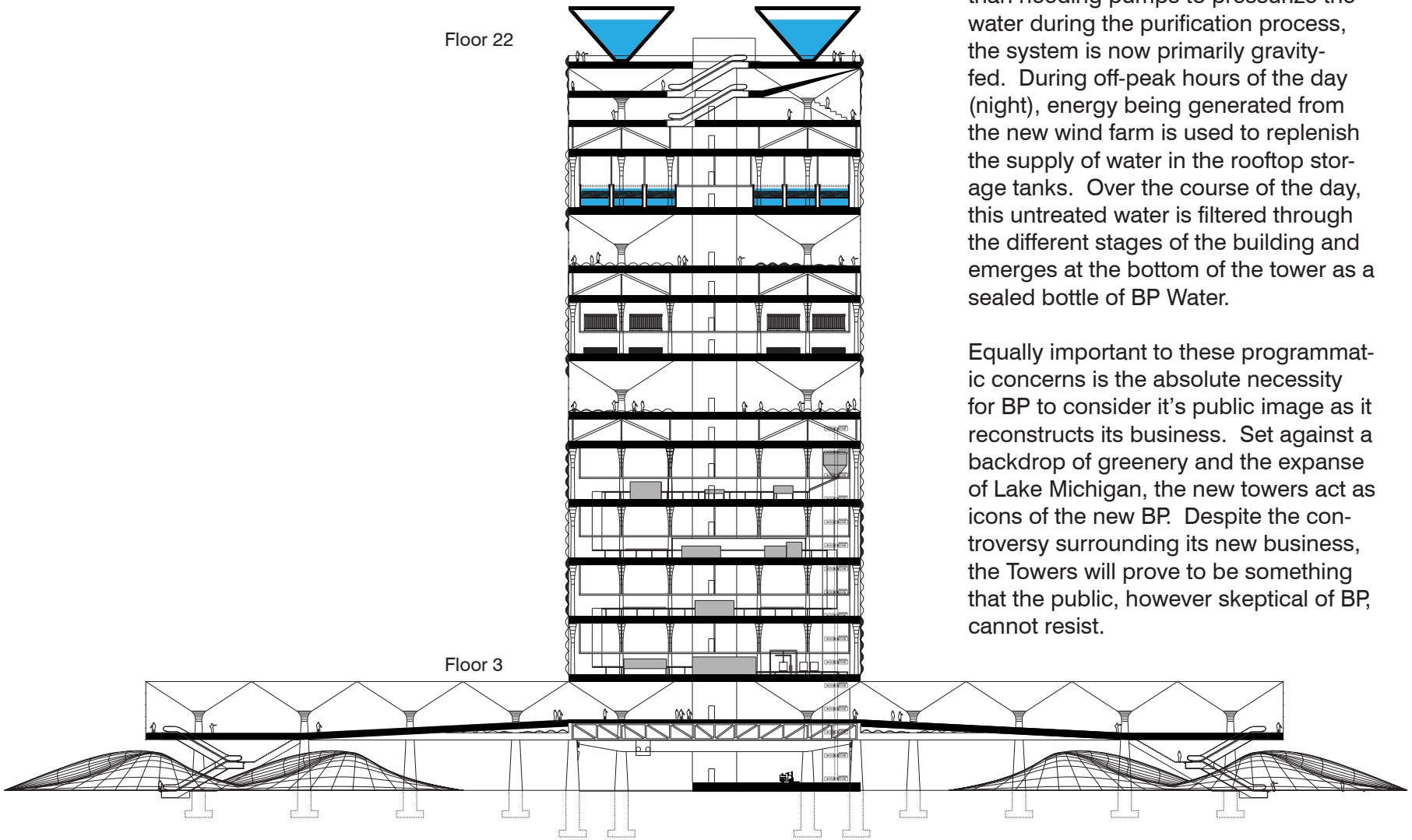
The factory Tower as a typology responds to a variety of conditions, both real and virtual. Urbanistically, the tower allows a large amount of required program to occupy a minimal of footprint area on the site, leaving open the possibility of other programs being introduced into the site, notably urban

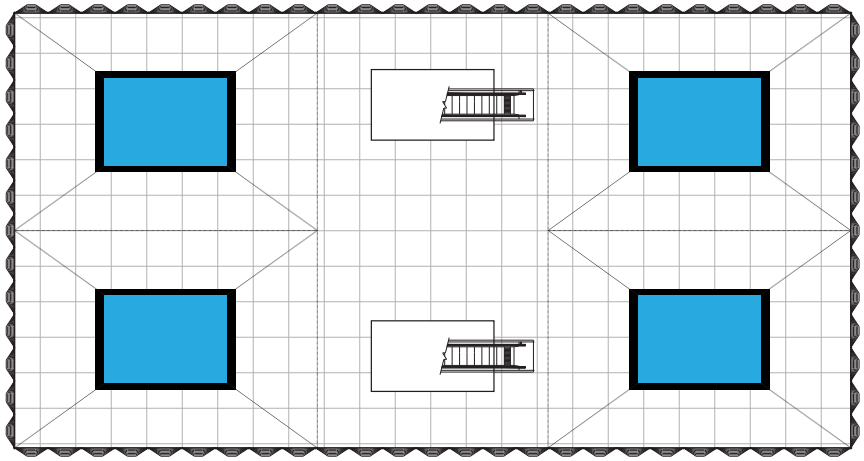


development and public open space.

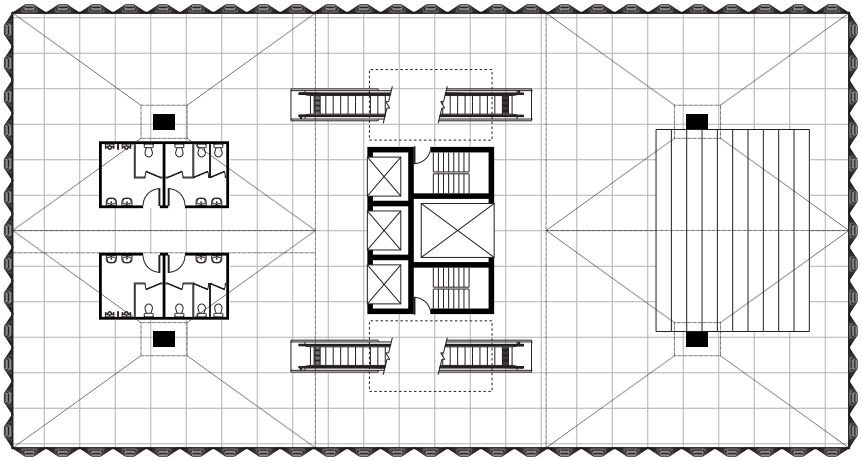
Programmatically, the vertical orientation of the factory takes advantage of the potential energy of the water being stored at the top of the building. Rather than needing pumps to pressurize the water during the purification process, the system is now primarily gravity-fed. During off-peak hours of the day (night), energy being generated from the new wind farm is used to replenish the supply of water in the rooftop storage tanks. Over the course of the day, this untreated water is filtered through the different stages of the building and emerges at the bottom of the tower as a sealed bottle of BP Water.

Equally important to these programmatic concerns is the absolute necessity for BP to consider it's public image as it reconstructs its business. Set against a backdrop of greenery and the expanse of Lake Michigan, the new towers act as icons of the new BP. Despite the controversy surrounding its new business, the Towers will prove to be something that the public, however skeptical of BP, cannot resist.

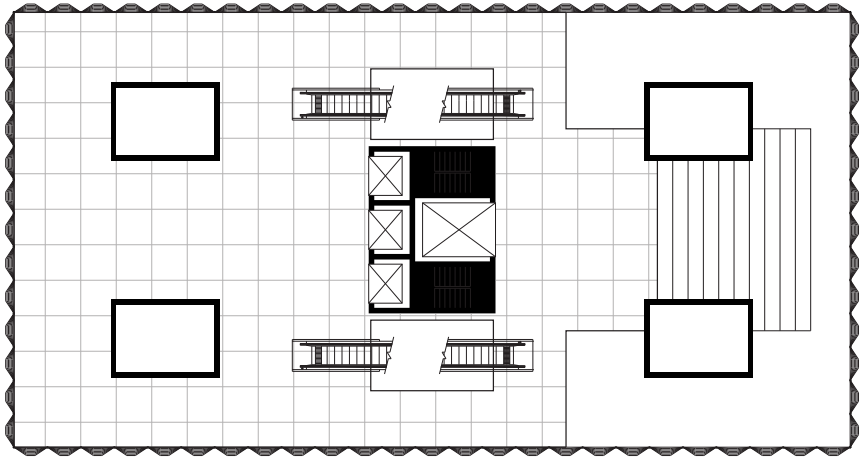




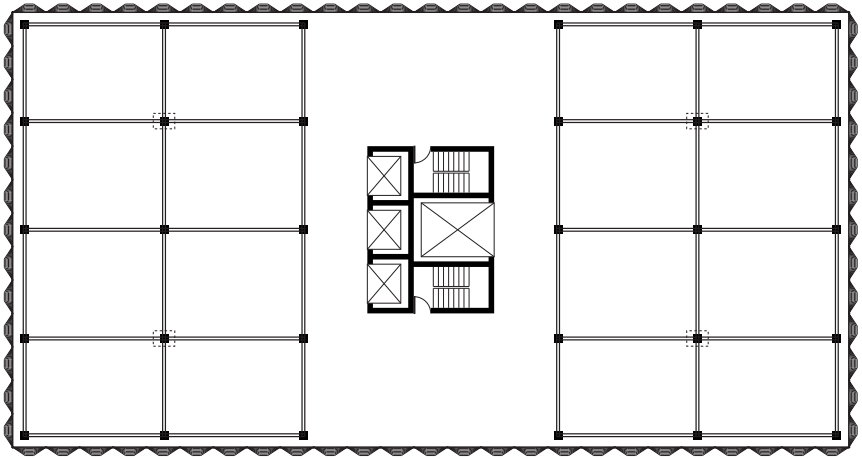
Water Storage Tanks and Public Roof Deck
Floor 22



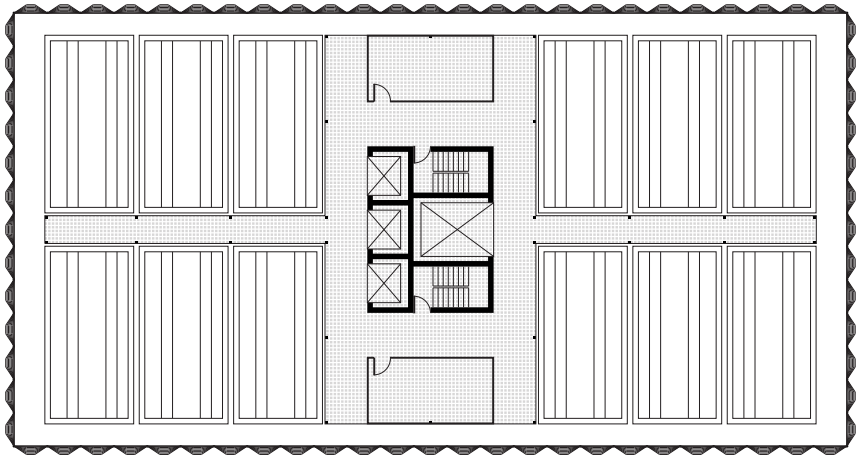
Public Floor Lobby for roof deck
Floor 20



Public Floor
Floor 21

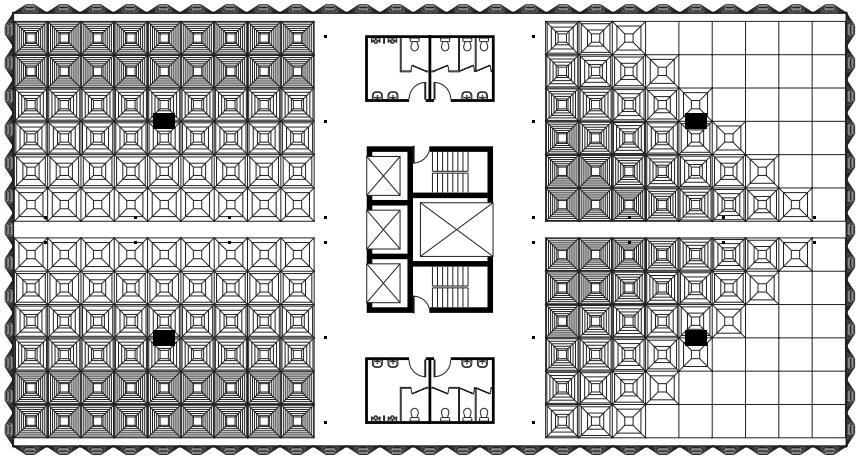


Mechanical and Service Floor
Floor 19



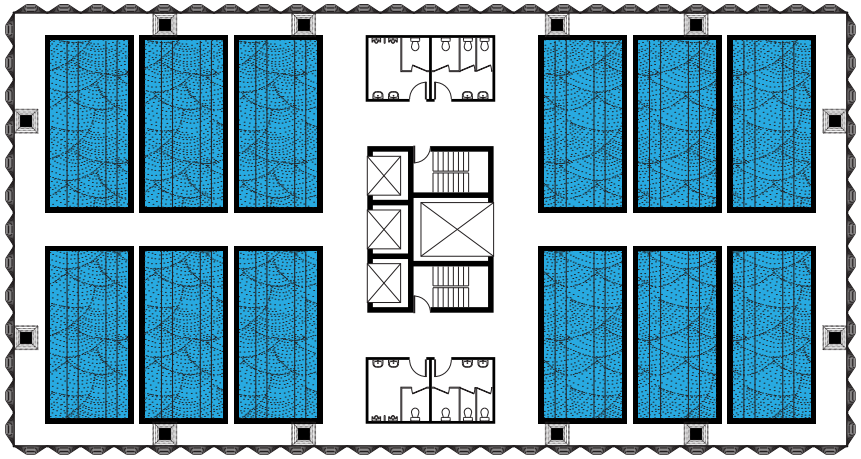
Mezzanine for rapid sand filtration process Control Rooms and manager office

Floor 18



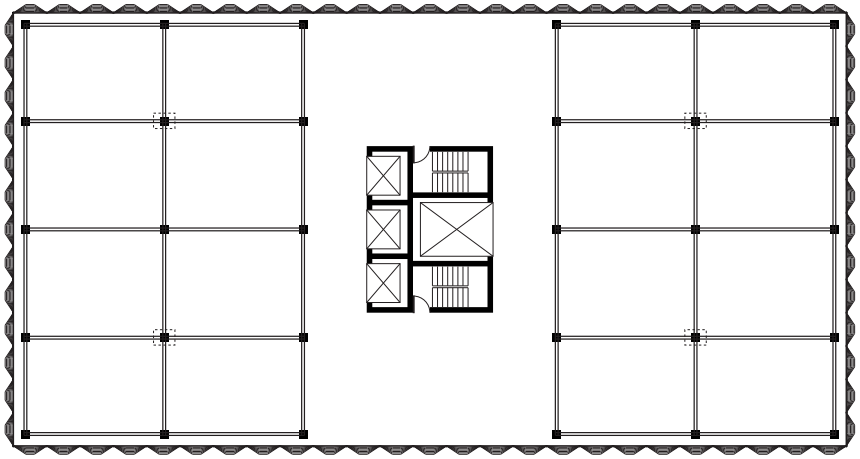
Public Floor

Floor 16



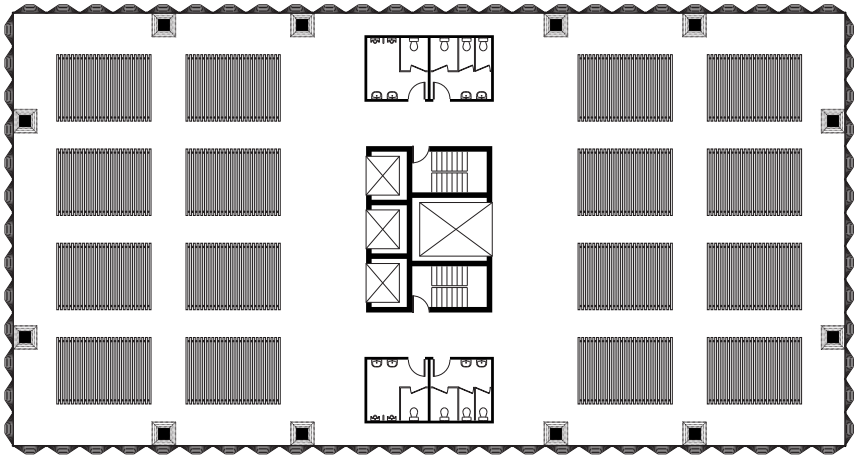
Rapid Sand Filtration

Floor 17



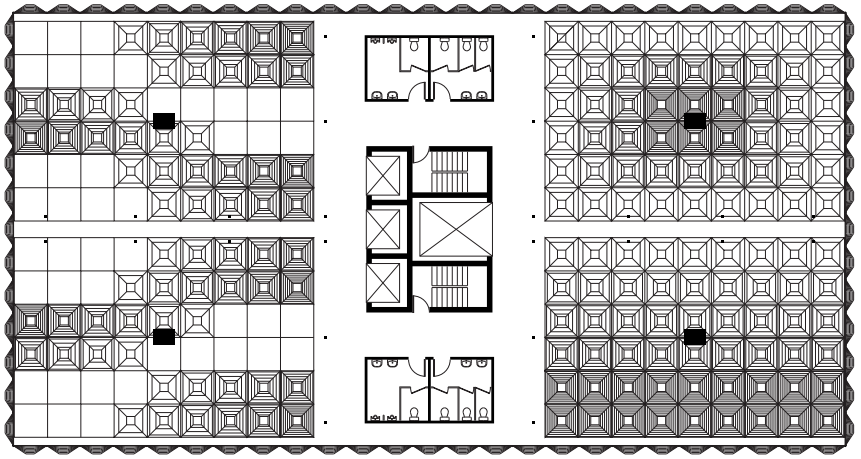
Mechanical and service floor

Floor 15



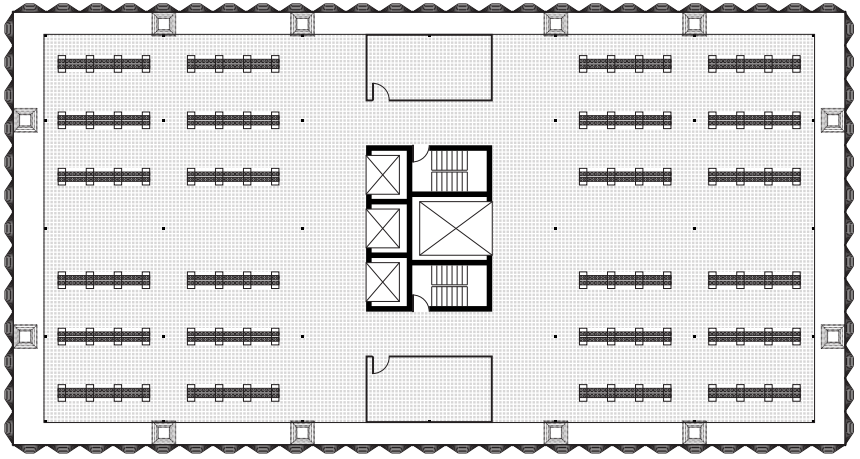
Ultraviolet Light Disinfection Units

Floor 14



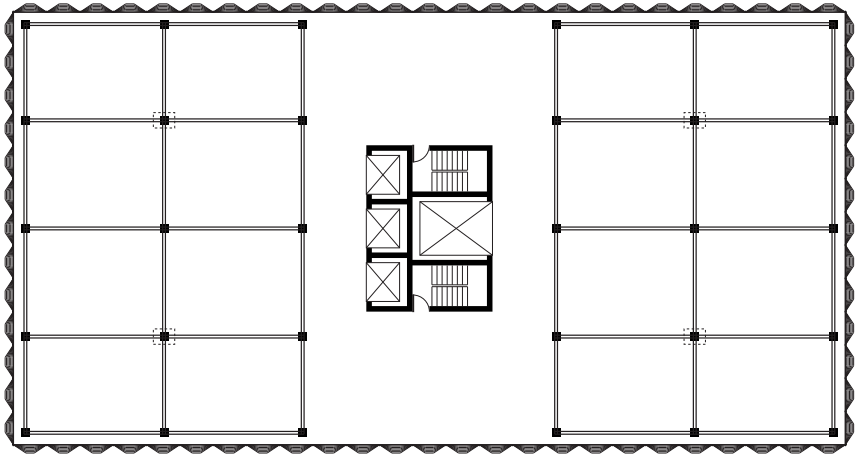
Public Floor

Floor 12



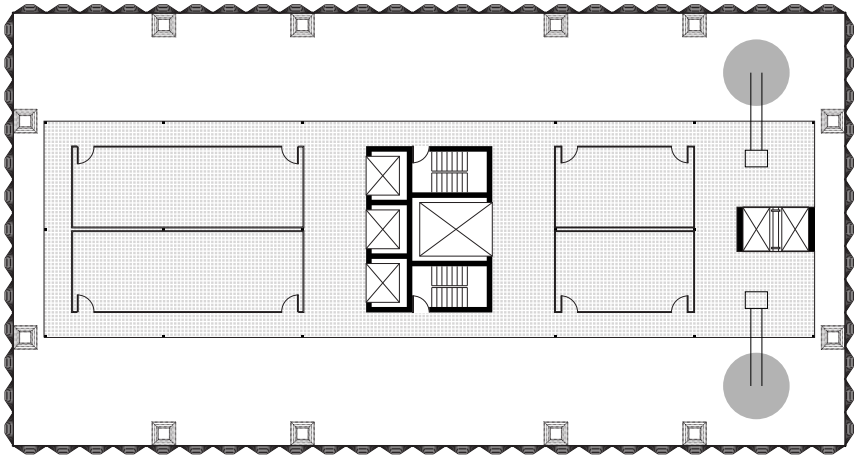
Microfiltration units

Floor 13

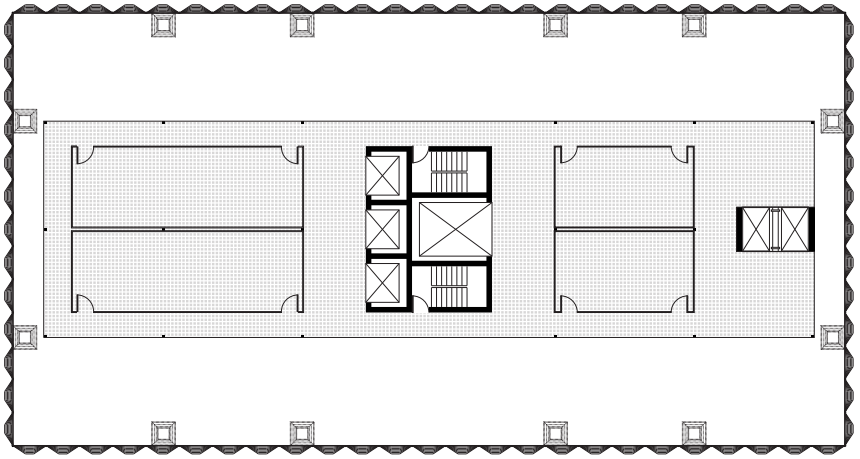


Mechanical and service floor

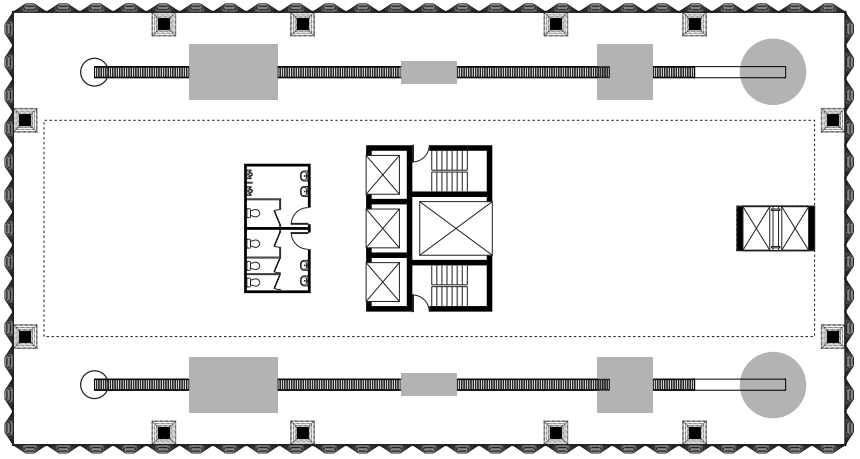
Floor 11



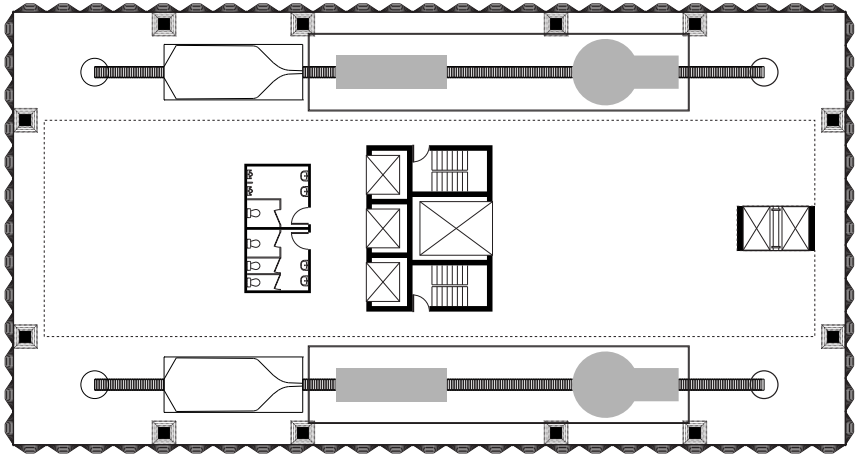
Mezzanine: Line Manager Office and Control Rooms
Floor 10



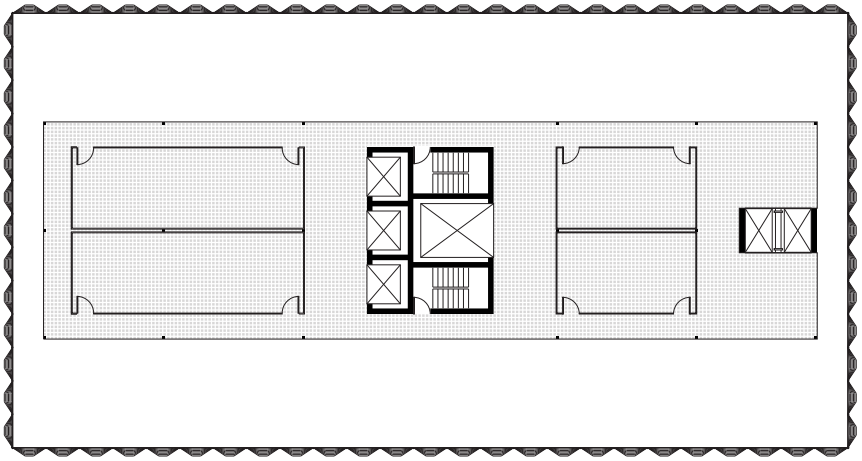
Mezzanine: Line Manager Office and Control Rooms
Floor 8



Blow Molder for Bottles < Preform Unscrambler < Preform Molder < Pellet Silo
Floor 9

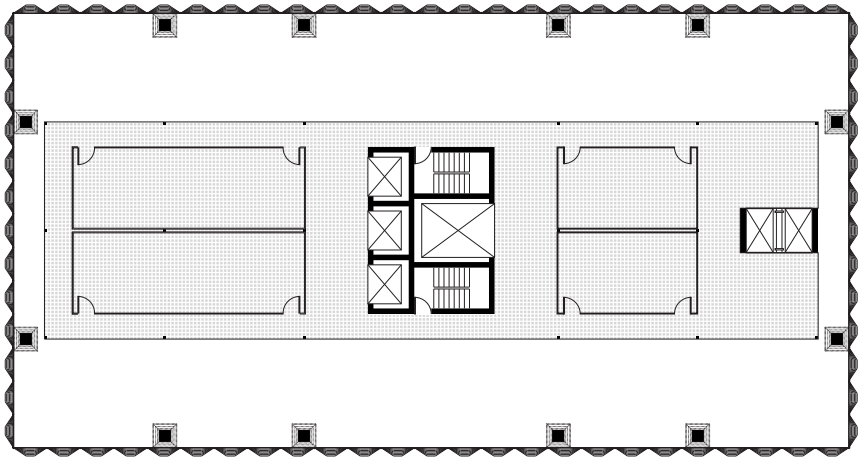


Accumulation Table > Bottle Washing > Filling and Capping
Floor 7



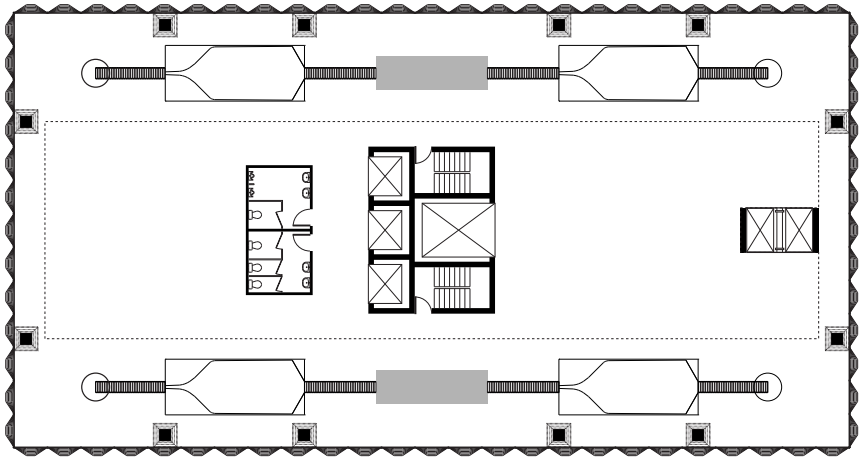
Mezzanine: Line Manager Office and Control Rooms

Floor 6



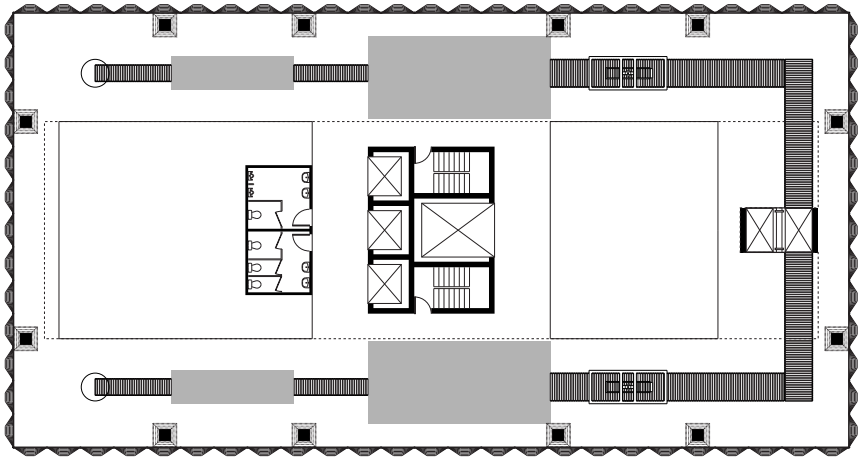
Mezzanine: Line Manager Office and Control Rooms

Floor 4



Accumulation table << Labelling << Accumulation table

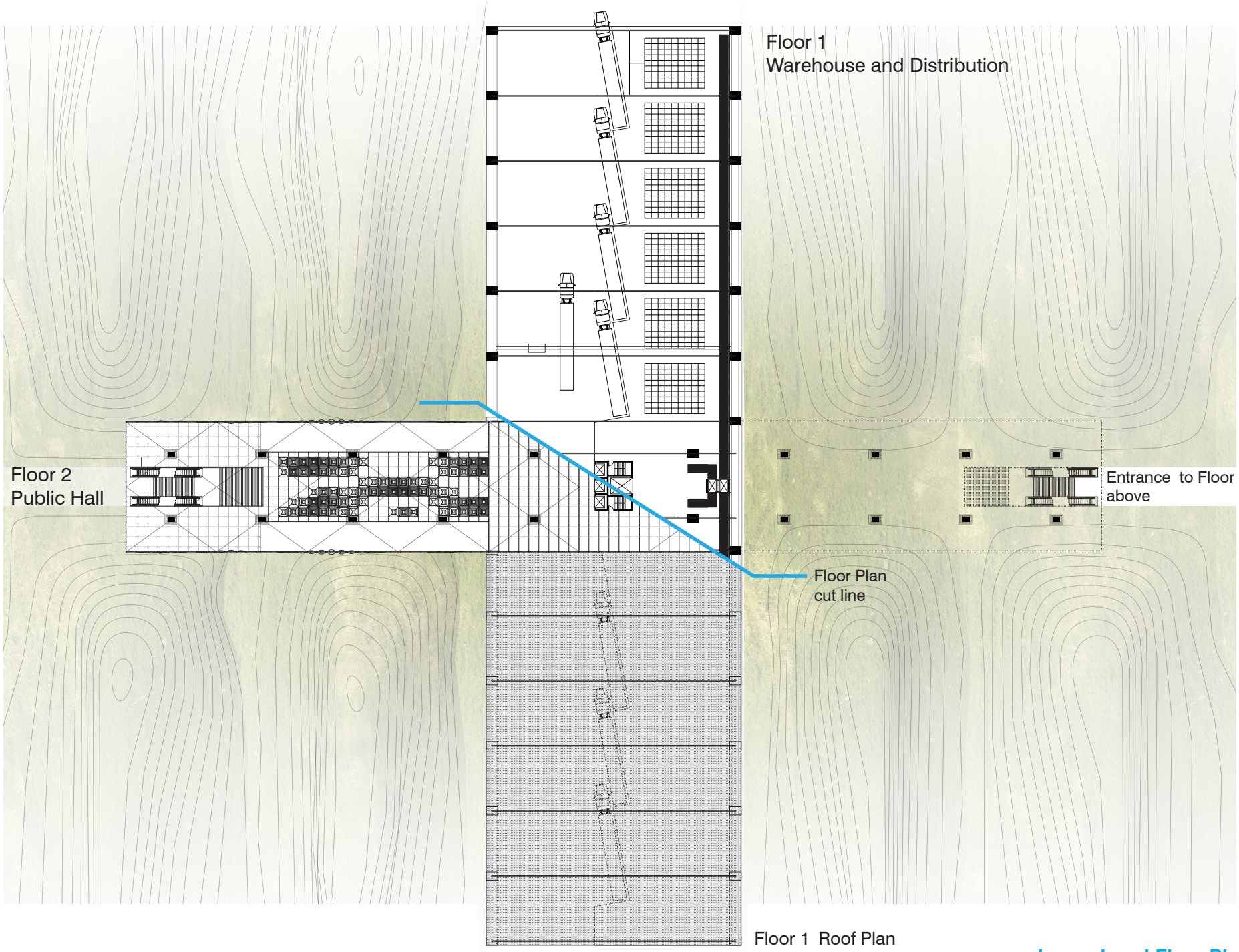
Floor 5



Case Packing >>> Pallet Packing > Shrink Wrapping

Floor 3

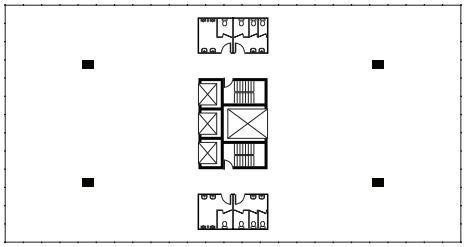
Enlarged Tower Floor Plans



Lower Level Floor Plans

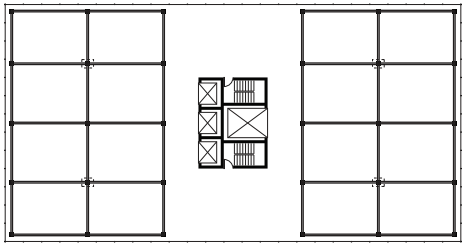
\\The Buildings

Structure and Skin



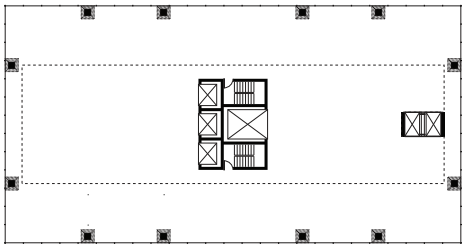
Unimpeded Views

Public Floors
Criteria:
Column-free facade for unimpeded views
Minimal columns for large space divisions
Hollow column shell to house water pipes



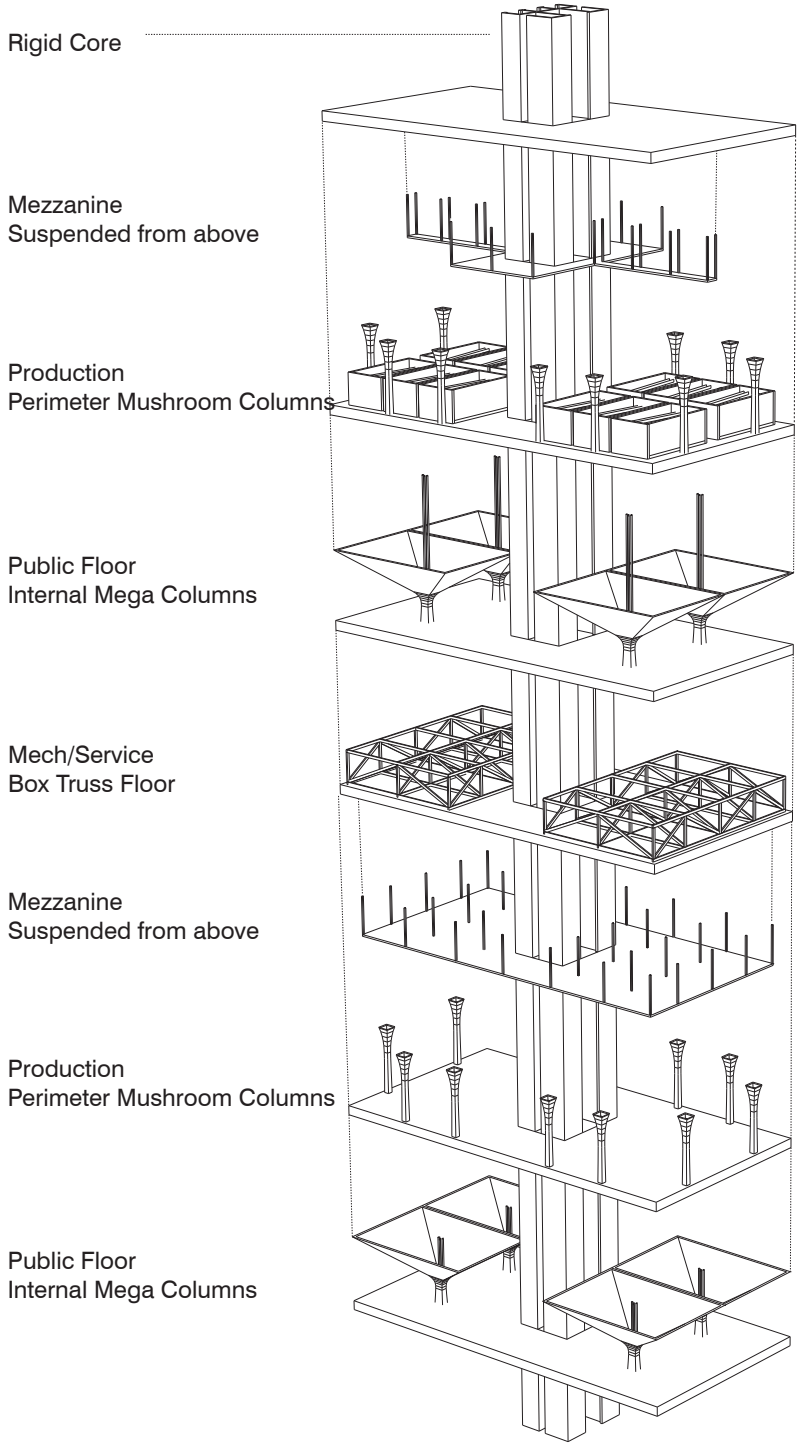
Load Distribution

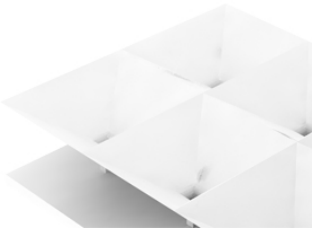
Mechanical/Service Floors
Criteria:
Box truss distributes loads from internal column base above to perimeter column heads below

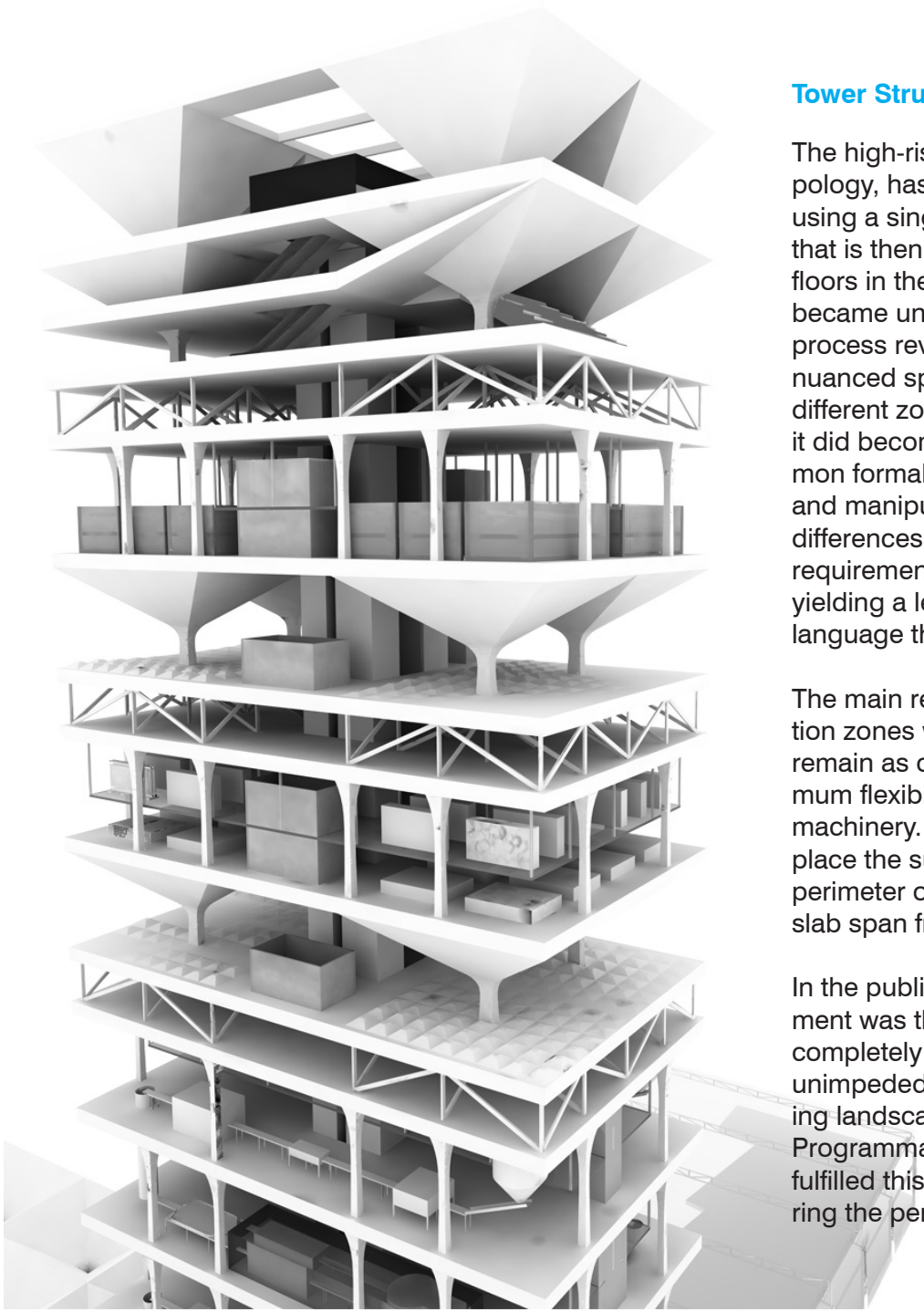


Column-free Flexibility

Production Zones
Criteria:
Perimeter columns leave entire floor space column-free allowing for maximum flexibility







Tower Structural Systems

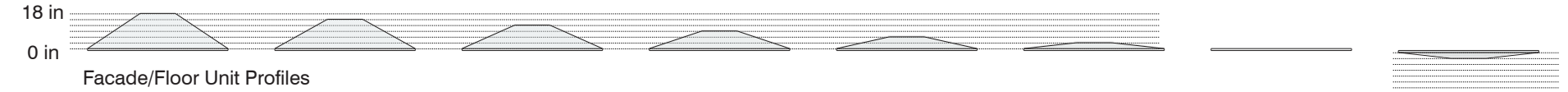
The high-rise tower, as a building typology, has typically been addressed using a singular structural system that is then copied for the number of floors in the building. Such a strategy became undesirable as the design process revealed a need for more nuanced spatial conditions within the different zones of the tower. However, it did become evident that a common formal language could be used and manipulated based upon these differences, providing for the spatial requirements of each floor, yet also yielding a legible structural/formal language throughout.

The main requirements of the production zones were that the floor slab remain as open as possible for maximum flexibility in the arrangement of machinery. This led to the decision to place the supporting structure to the perimeter of the floor and having the slab span freely from these columns.

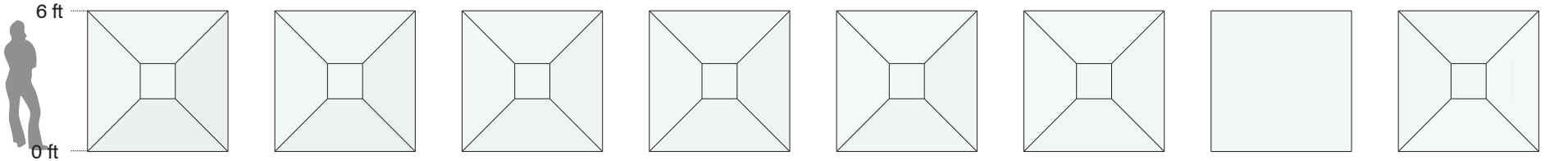
In the public floors, the main requirement was that the facade remain completely free of structure to provide unimpeded views to the surrounding landscape and Lake Michigan. Programmatically, the mega-column fulfilled this requirement by transferring the perimeter loads of the production floor above to centralized point loads at the floor level. Experientially, the monumental quality of these massive columns was desirable in that it revealed to the public visitor the immense weight of the water being filtered through the building without explicitly putting the process on display. Instead, this abstract experience of the production process is coupled only with panoramic views of the product's origin, Lake Michigan.

Because the roof of the tower is dedicated to an open-air public platform, it became necessary to include a series of mechanical and service floors throughout the tower. While these floors are rarely occupied by people, they play an essential role in the structure of the building. Essentially, the mechanical floors act as a large box truss, or space frame, that redistributes the internal point loads from the mega-column bases above to the perimeter of the slab so that another production floor can be placed below.

What results from these three systems is a building that dynamically registers the distribution of load as it move in and out from the core to the perimeter, and back. It is a structural system that is, at once, both rigid and fluid.

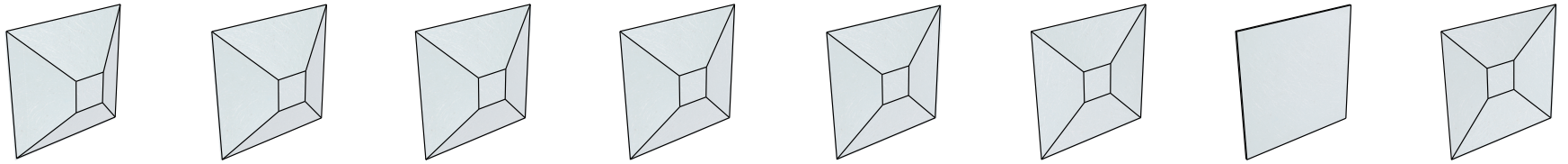


Facade/Floor Unit Profiles

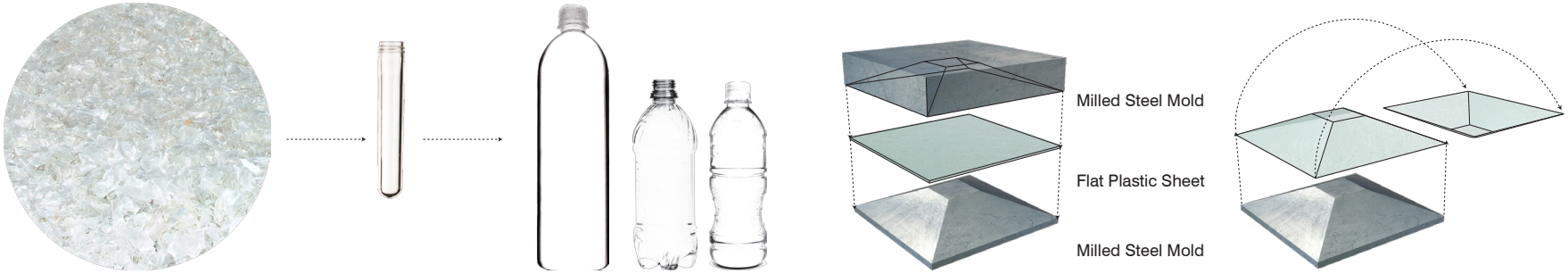


Facade/Floor Unit Elevation/Top View

Cast Concrete Floor Units



Thermoformed Plastic Facade Units



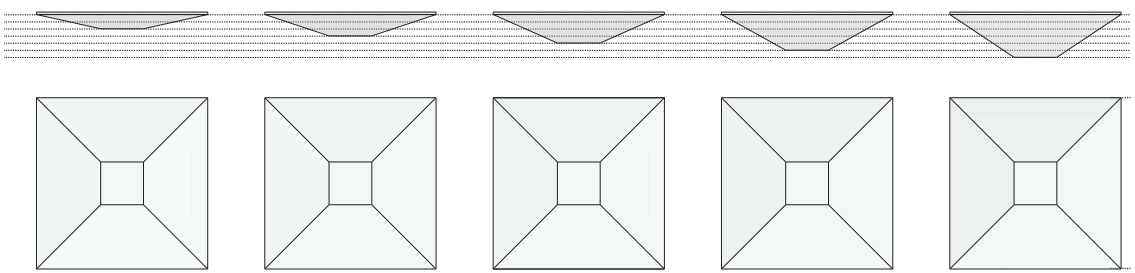
Step One:
Heat PET Pellets

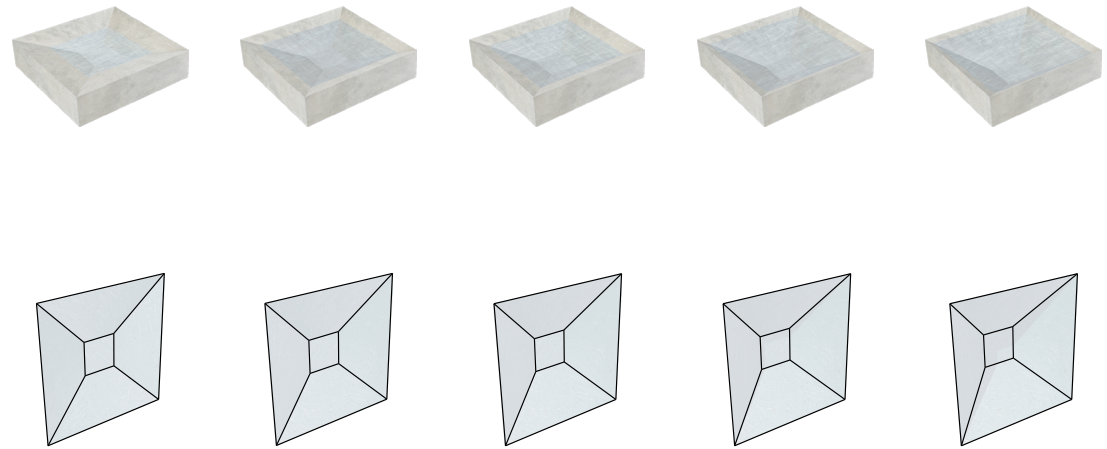
Step Two:
Blow Mold
Preform

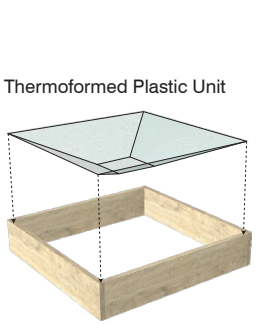
Step Three:
Blow Mold Specific Bottle
Shape

Step One:
Thermoformed Plastic
Mold

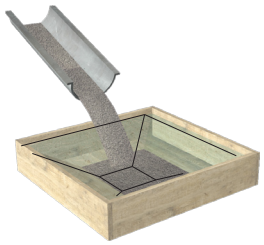
Step Two:
Remove Plastic Unit
from Mold



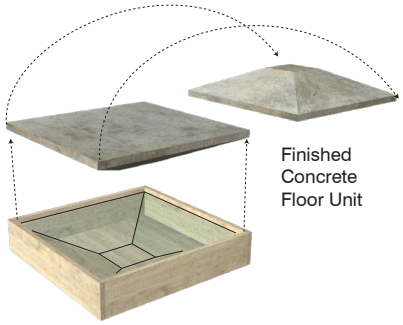




Step Three:
Construct Formwork for Concrete Casting



Step Four:
Cast Concrete using Plastic Facade Unit



Step Five:
Remove Concrete Floor Unit from Formwork

Tower Skin and Public Floor Units

After WWII, corporate America embraced modernism as it never had before. After emerging from the War, the world was looking for an architecture that would match the spirit of optimism and rebirth that was permeating through society. All of a sudden, the avant-garde became the mainstream and with this transition the glass curtain wall became the defining feature of American corporate architecture.

Initially, the glass box became the ideal statement for the corporate world: it symbolized technological superiority, transparency (beyond the literal sense of the word), and as Reinhold Martin discusses in *The Organization Complex*, reconfiguration of corporate structure and systemization. However, almost as soon as the corporate world took notice of Modernism, its proliferation and imitation across the cities and suburbs of America rendered it devoid of the symbolic power it once held.

In developing a skin for the towers in this thesis, the intention was to design a facade system that could operate on two levels, depending on the scale at which it was experienced. This led to the development of a modular panel system, constructed using the same

continued on next page

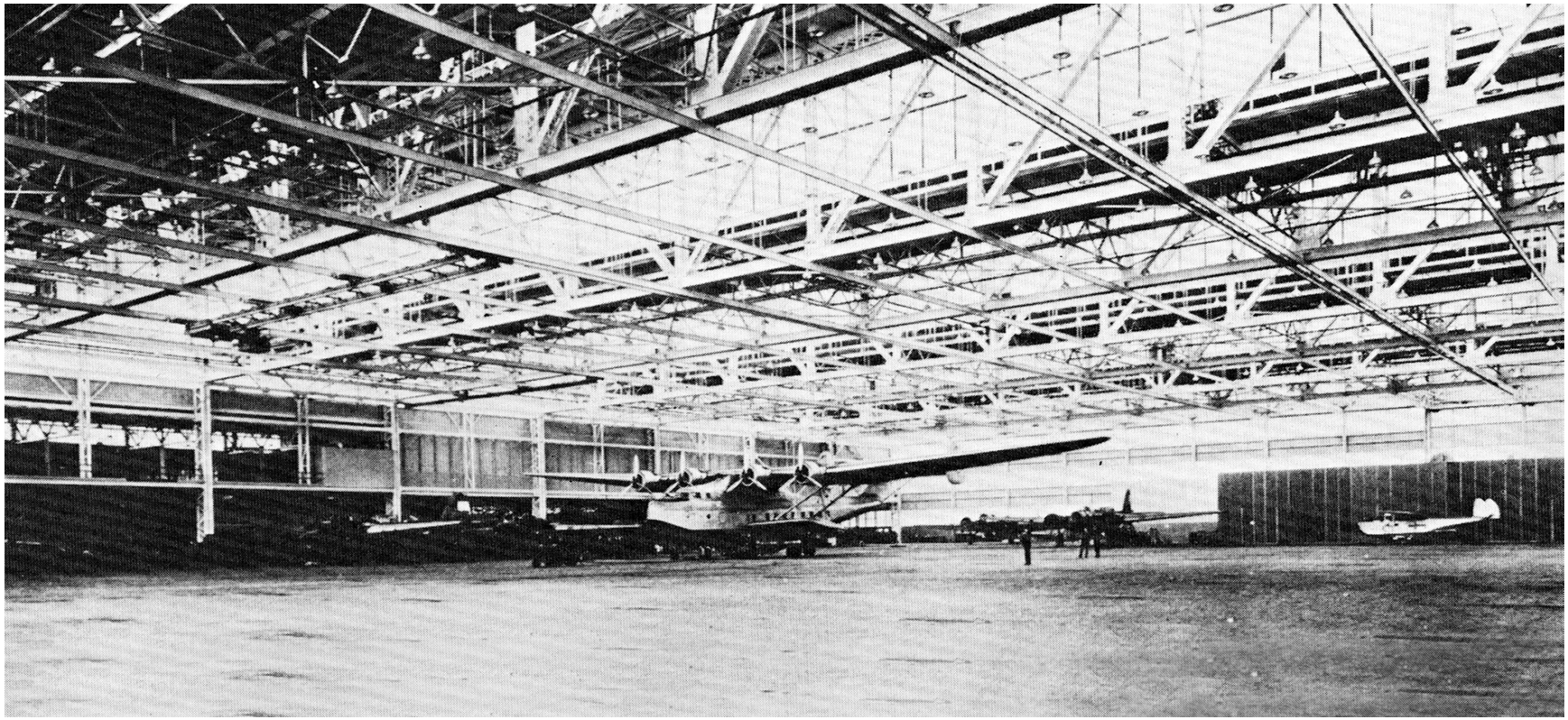
continued from previous page

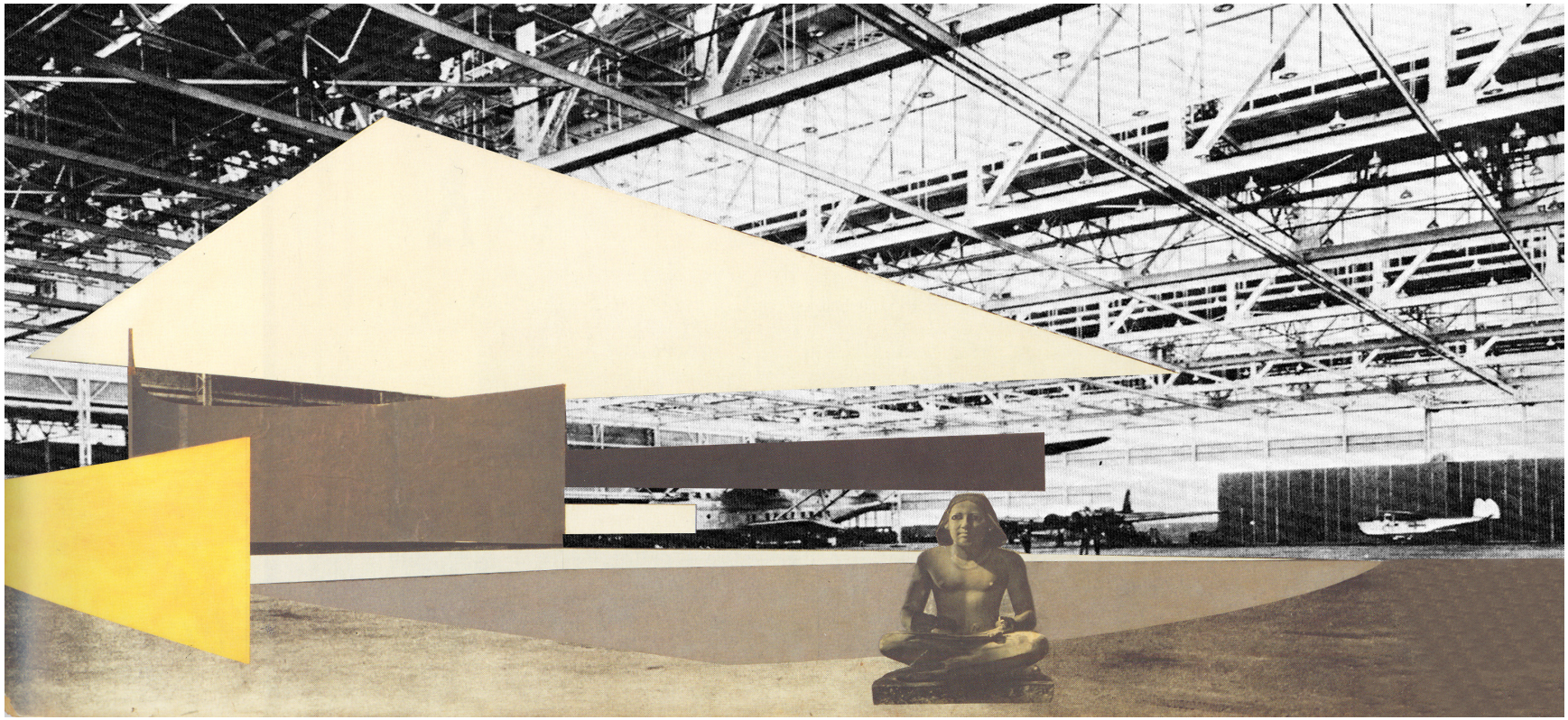
technology of thermomolded plastic used to create plastic PET bottles. The panels, each 6'x 6' in dimension but varying slightly in their depth, allow for this dual reading. From afar, the towers read as singular icons in the landscape, acting as transparent symbols of the new BP. At the scale of human occupation, the differentiation of the panels allows for the creation of spaces that are more dynamic and customized based upon the desired architectural experience.

Using the same formal language as the facade panels, and sharing a 1:1 relationship in the construction process, a series of cast-concrete floor tiles were designed for the public floors located throughout the towers. These floors, meant to be experienced by the public as "parks in the sky," then become defined by the topography of these floor tiles. But rather than create the illusion of a natural space within a high-rise factory tower, the formal qualities of this topography are derived from the formal language of the structural column systems of the tower.

\\An Armature for the Anti-Program

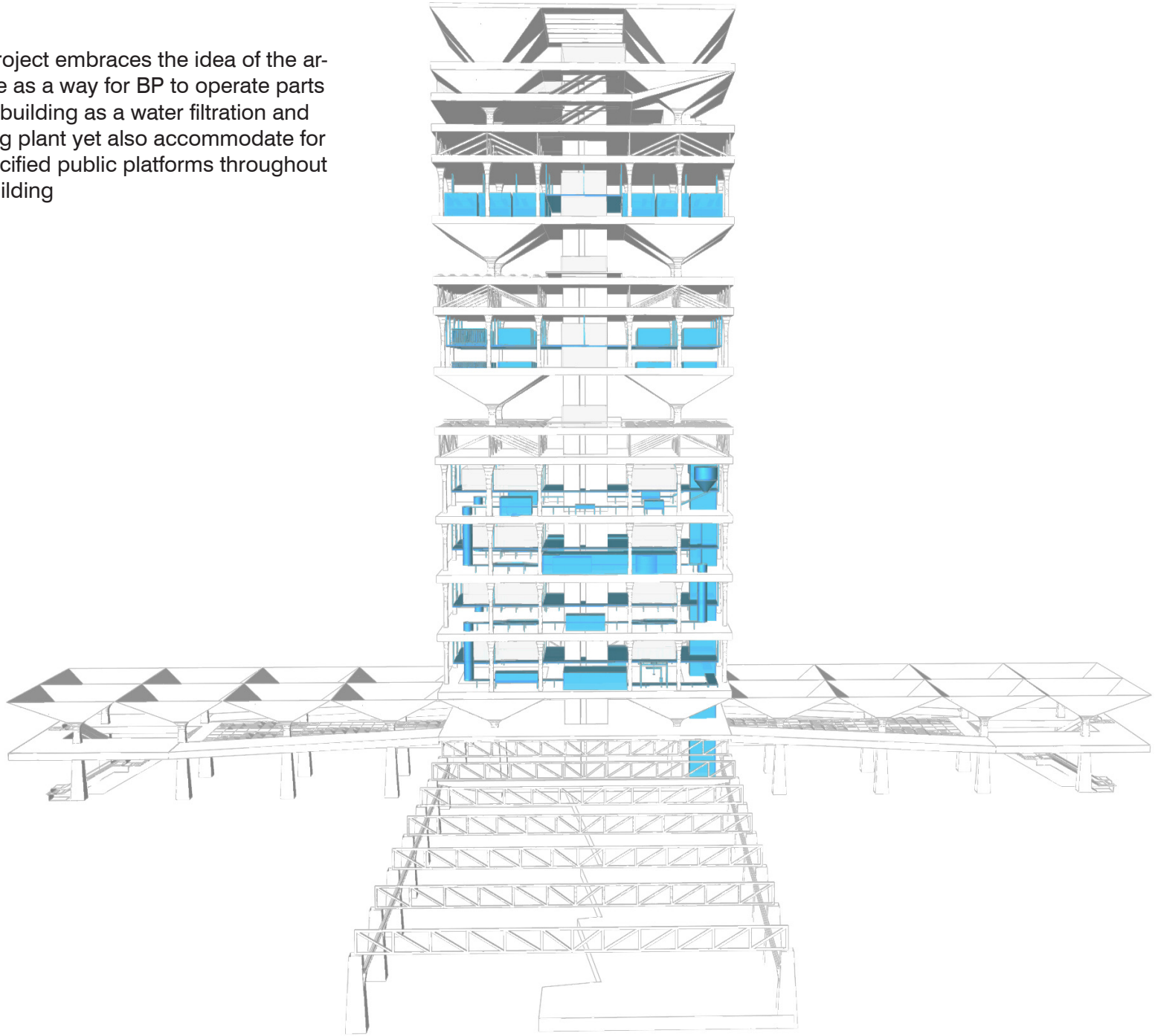
From Oil to Water and BEYOND

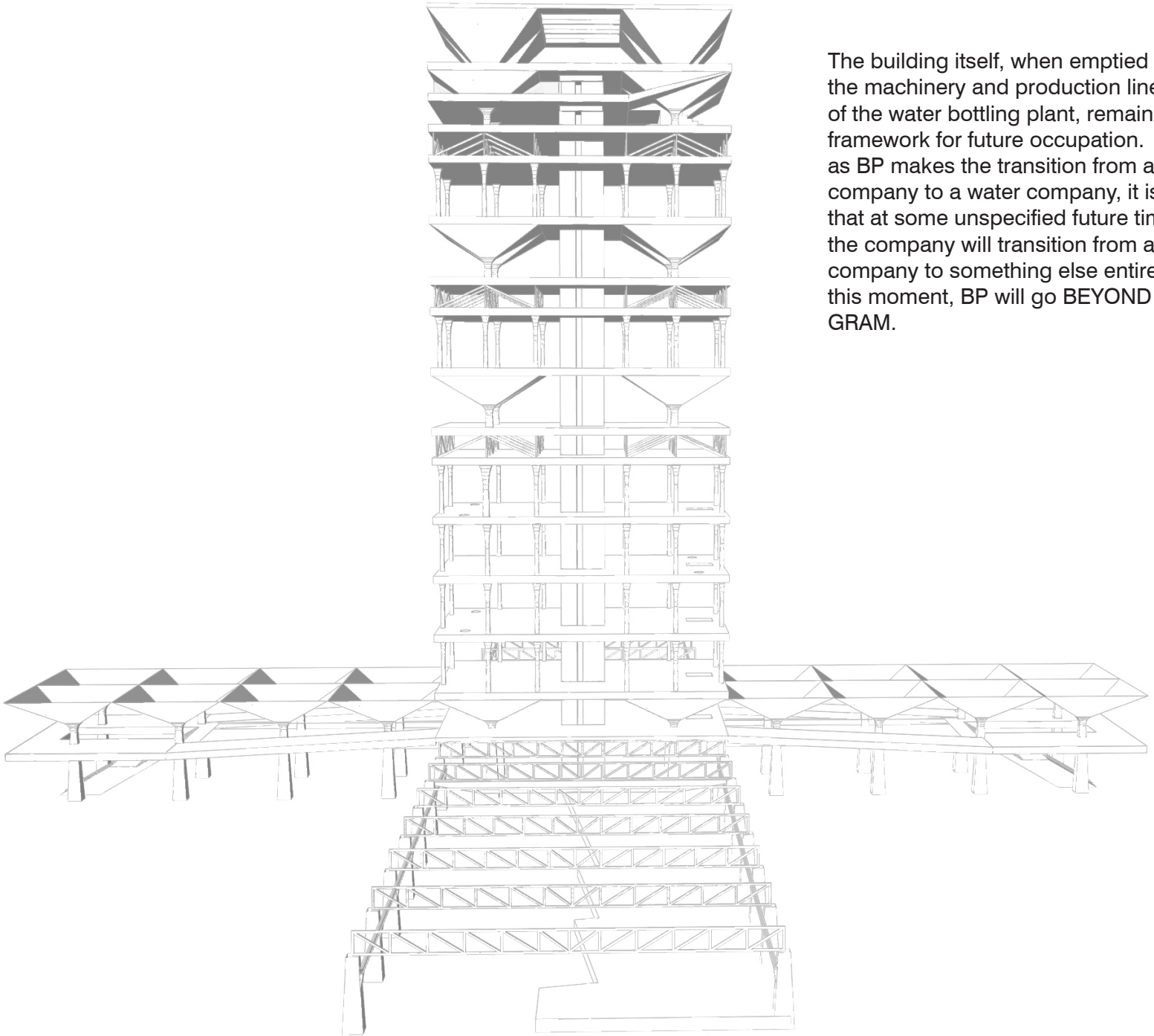




Albert Kahn always maintained his belief that the role of the architect was one that served, above all, the client and the program of that given client. In his 1942 Concert Hall Collage, Mies offered a counterpoint to this theory when he inserted his own project into Kahn's Martin airplane factory from 1937, showcasing the ability of such program-driven architecture to accept new, unexpected, and unrelated programs over time. As a diagram, these two images offer a clear insight into one of the primary components of this thesis: that by employing the notion of architecture as an armature, a building can be permanent yet still yield to the temporal nature of more programmatic concerns. Because the premise of the thesis is to provide a single architectural project for both public space and factory space and to accommodate the varying requirements of each, the idea of the building as a framework for various forms of occupation and use became critical to the design process.

The project embraces the idea of the armature as a way for BP to operate parts of the building as a water filtration and bottling plant yet also accommodate for unspecified public platforms throughout the building

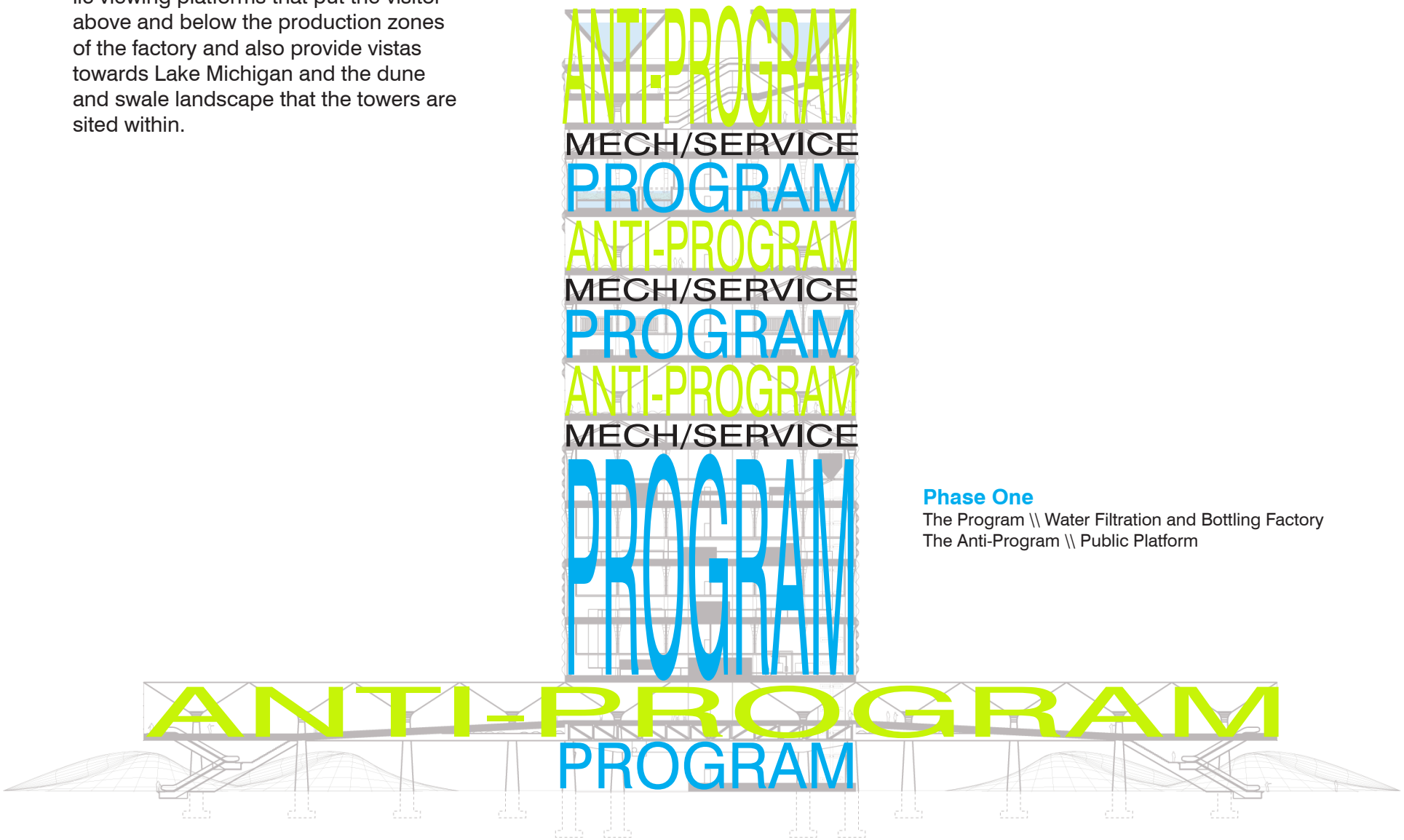




The building itself, when emptied of the machinery and production lines of the water bottling plant, remains a framework for future occupation. Just as BP makes the transition from an oil company to a water company, it is likely that at some unspecified future time, the company will transition from a water company to something else entirely. At this moment, BP will go BEYOND PROGRAM.

Initially, THE PROGRAM is defined by the specific requirements of a water filtration and bottling plant.

The ANTI-PROGRAM refers to the public viewing platforms that put the visitor above and below the production zones of the factory and also provide vistas towards Lake Michigan and the dune and swale landscape that the towers are sited within.

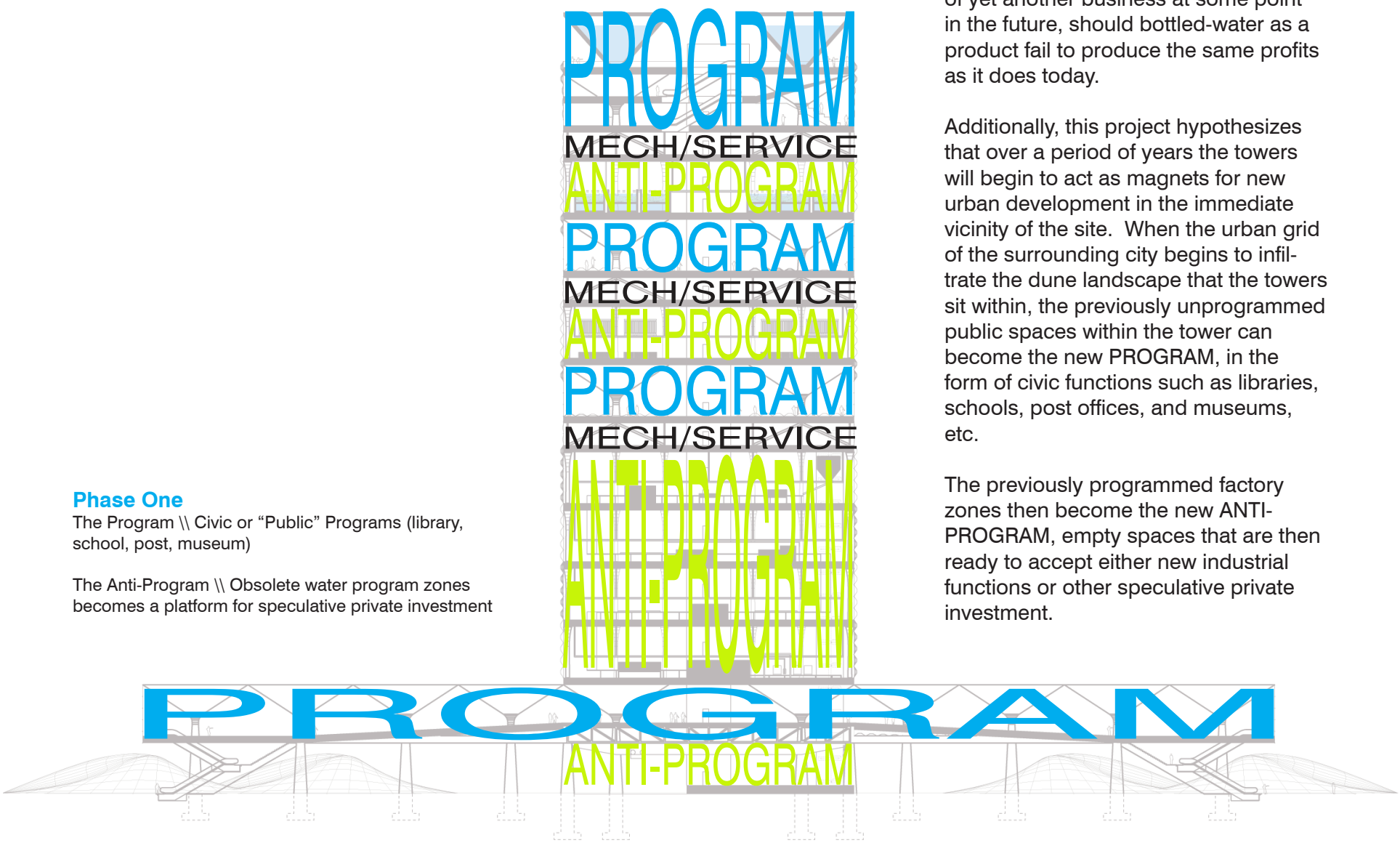


Phase One
The Program \\ Water Filtration and Bottling Factory
The Anti-Program \\ Public Platform

Just as this thesis hypothesizes that BP transitions from an oil company to a water company, it also accepts the reality that BP would be just as likely to abandon the bottled-water industry in favor of yet another business at some point in the future, should bottled-water as a product fail to produce the same profits as it does today.

Additionally, this project hypothesizes that over a period of years the towers will begin to act as magnets for new urban development in the immediate vicinity of the site. When the urban grid of the surrounding city begins to infiltrate the dune landscape that the towers sit within, the previously unprogrammed public spaces within the tower can become the new PROGRAM, in the form of civic functions such as libraries, schools, post offices, and museums, etc.

The previously programmed factory zones then become the new ANTI-PROGRAM, empty spaces that are then ready to accept either new industrial functions or other speculative private investment.

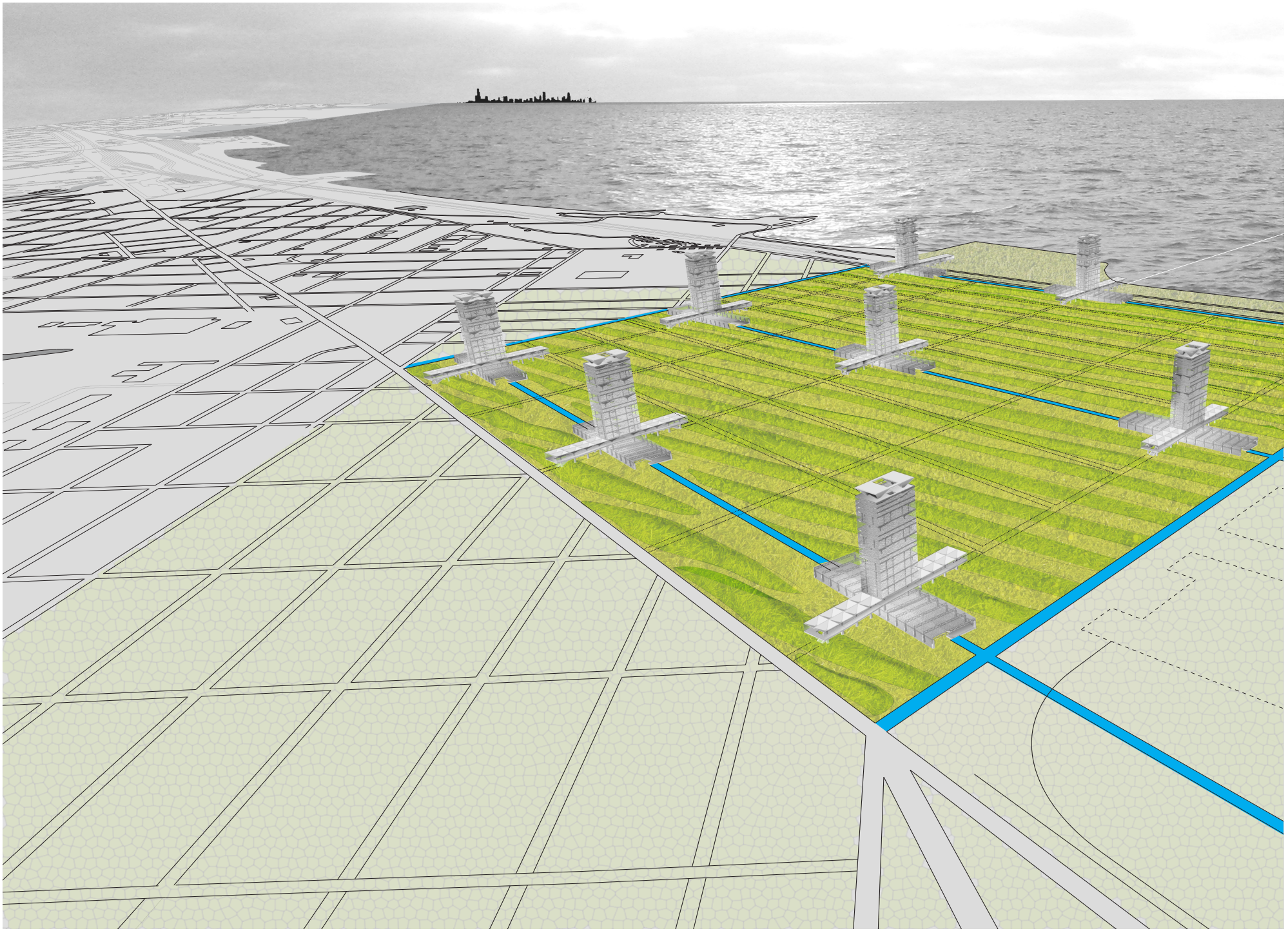


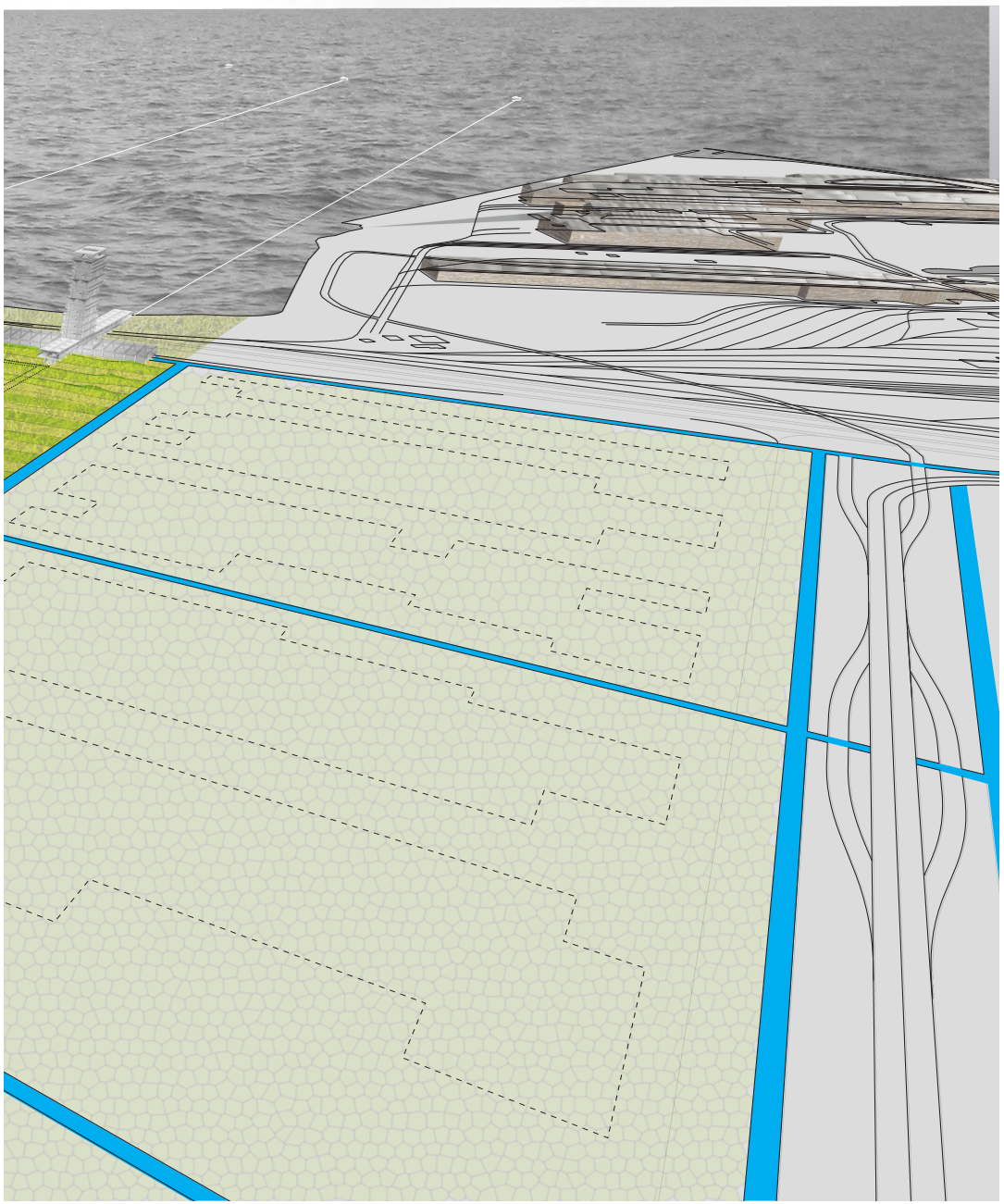
Phase One

The Program \\ Civic or “Public” Programs (library, school, post, museum)

The Anti-Program \\ Obsolete water program zones becomes a platform for speculative private investment

\\Renderings

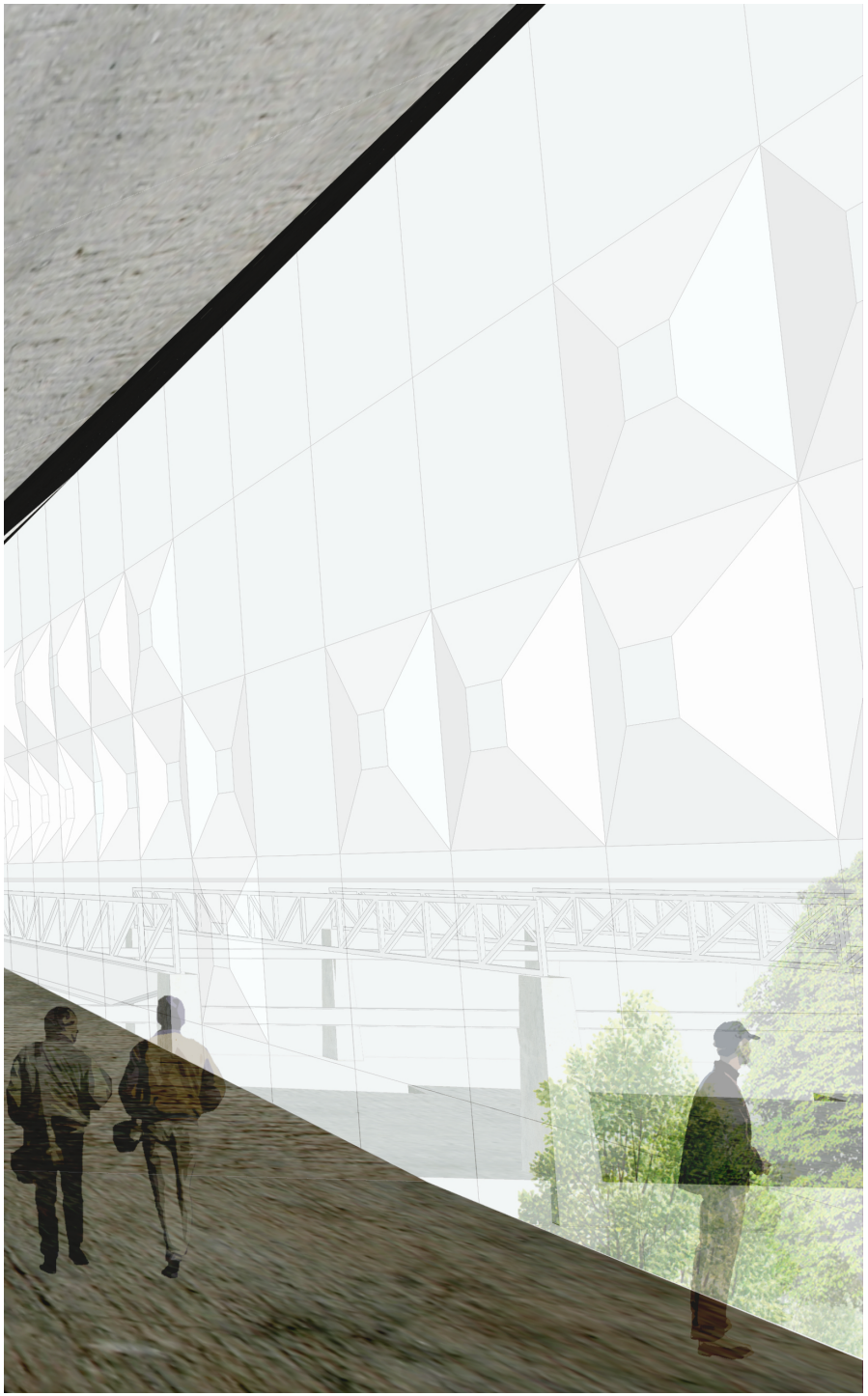




Monuments to a Contested Landscape
Prototype factory for the intersection of the Public and Private Realm

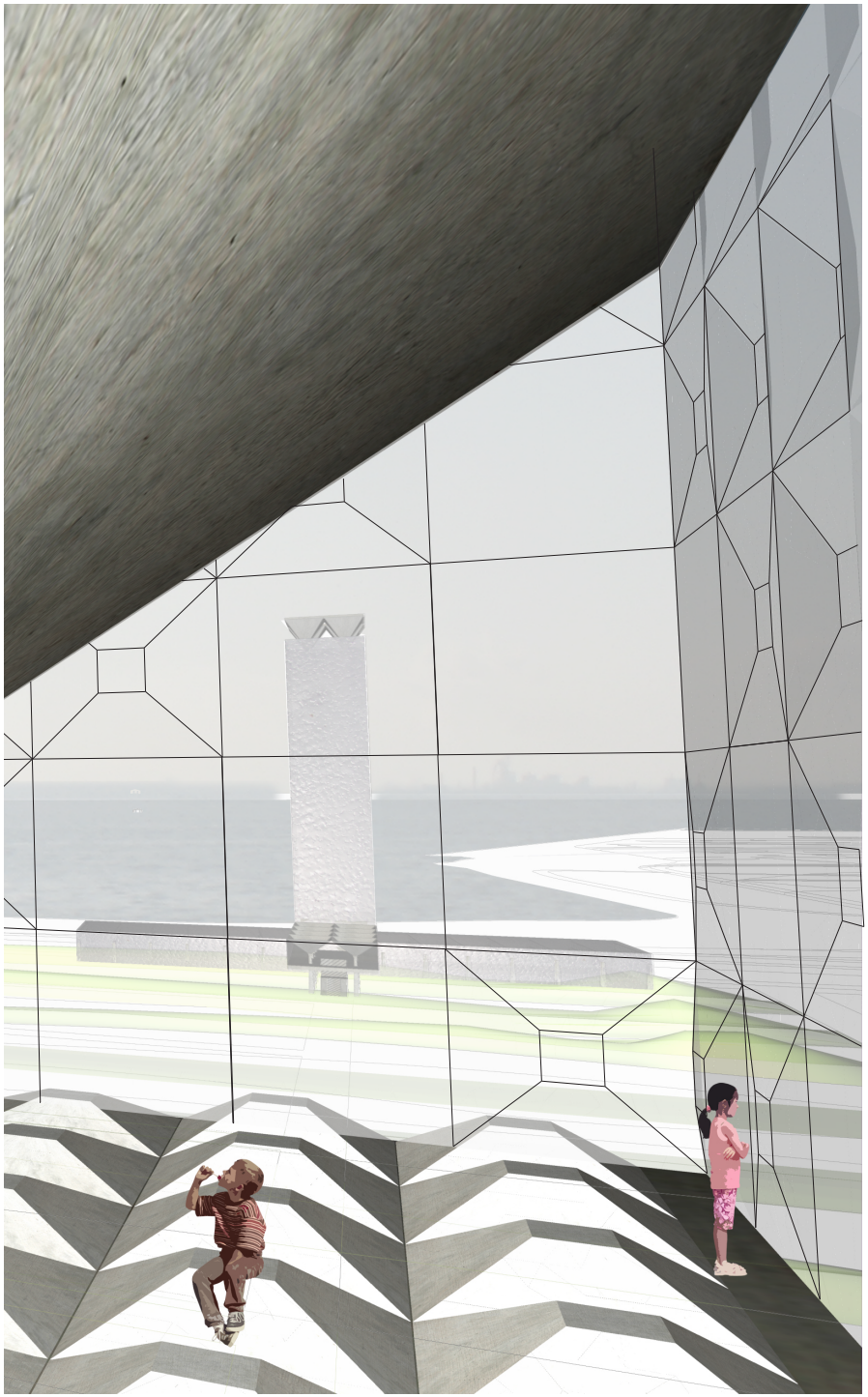
Monuments to a Contested Landscape

Prototype factory for the intersection of the Public and Private Realm



Public Entrance

Phase One \\ Viewing Platform, Garden, and Exhibition Hall
Phase Two \\ Programmed Civic Space

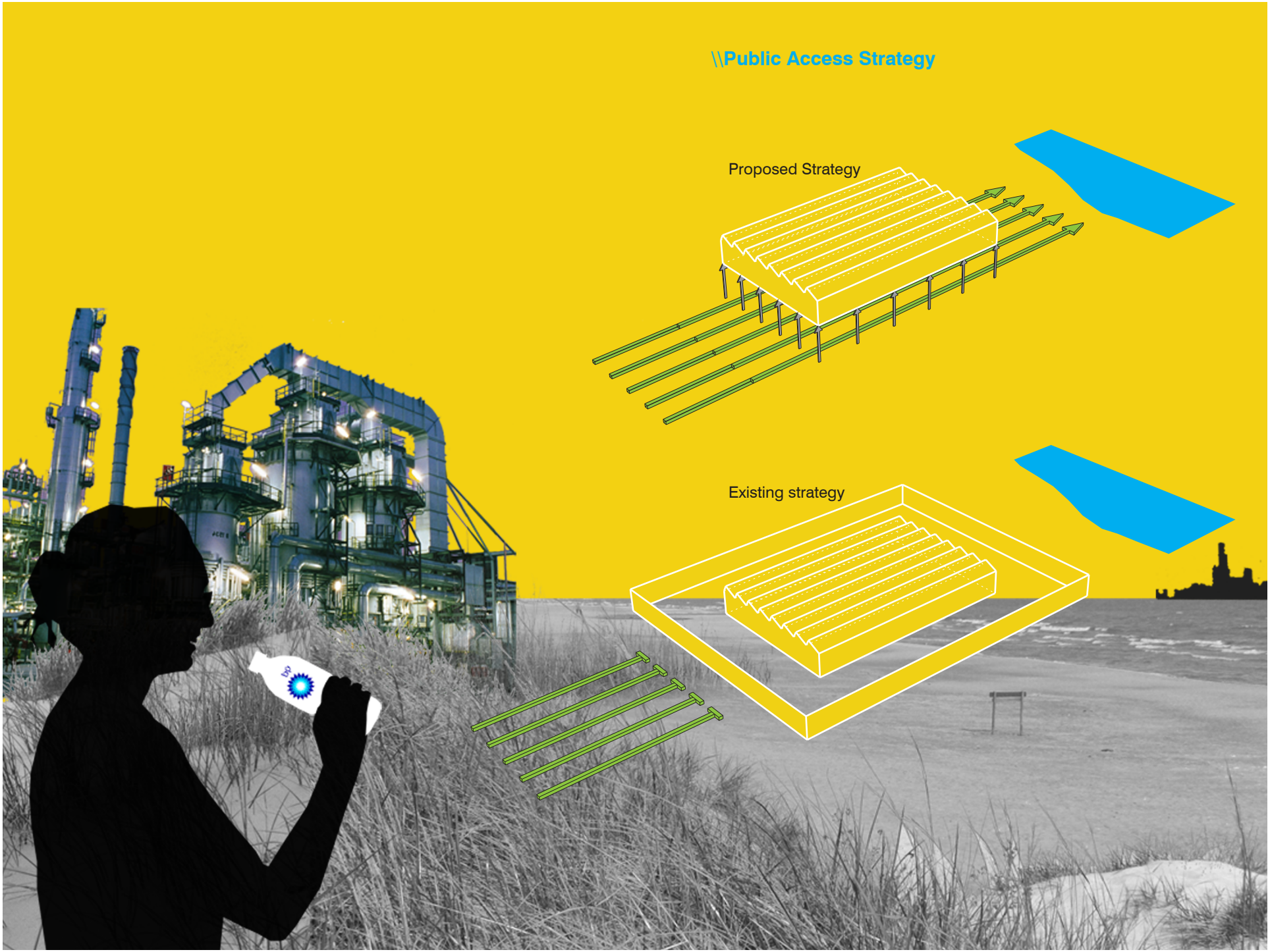


Park in the Sky
(Initially) Unprogrammed public floors within the Factory Tower

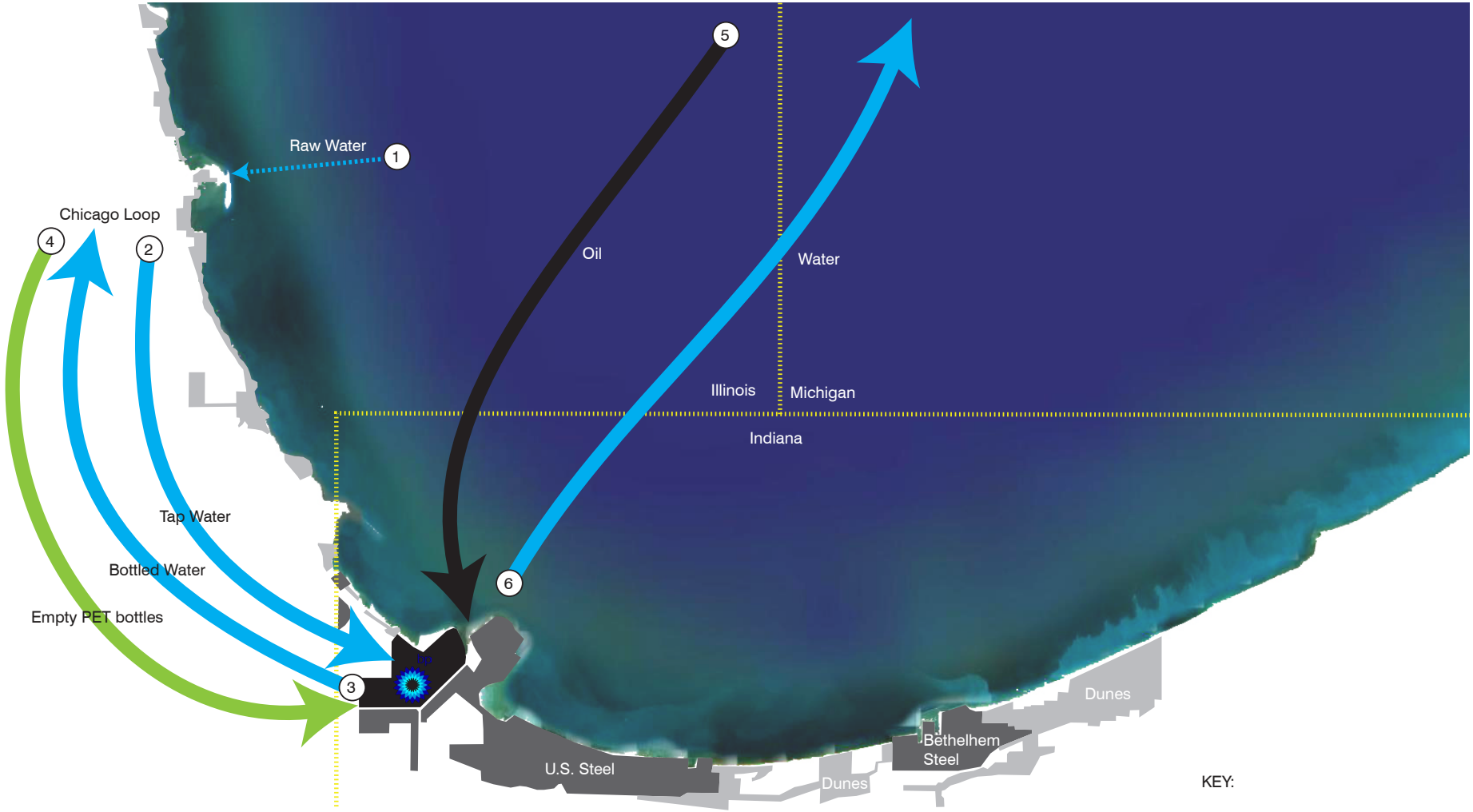
\\Early Research and Design

Selected Work

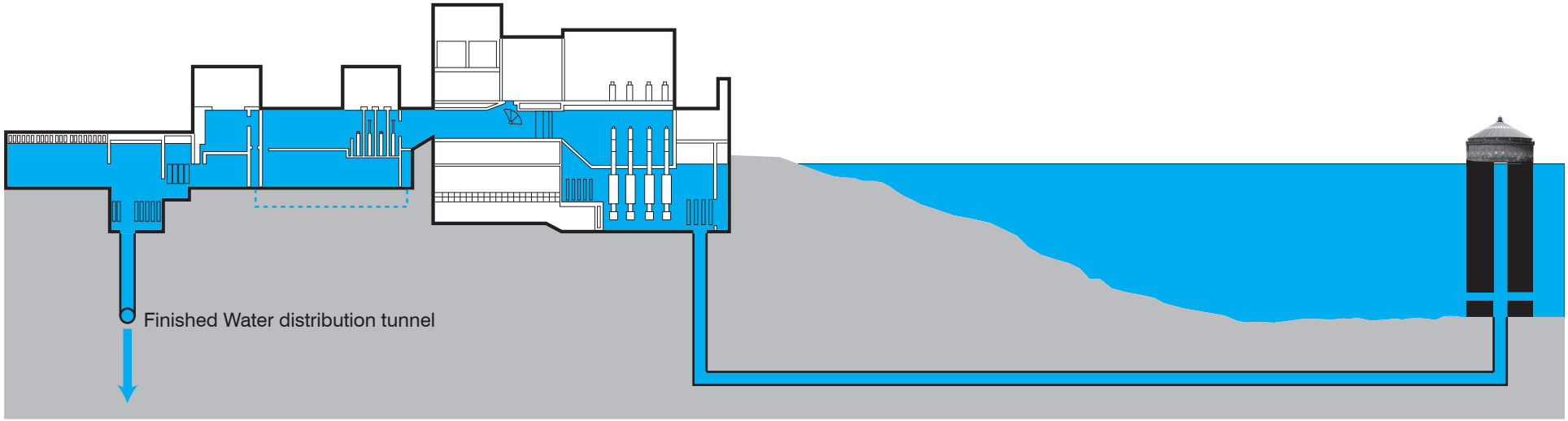
\\Public Access Strategy




Existing Water Intake Crib



1. Raw water collected from Lake via Chicago Municipal Water Supply System
2. Treated tap water from Chicago is sold to BP in Indiana
3. BP bottles the water and sells it back to consumers in Chicago. The City of Chicago collects a $.10 per bottle tax
4. The City of Chicago sends its PET bottle recycling waste back to BP for processing
5. BP continues to import and refine crude oil from Canada and the Middle East
6. BP aims to expand its stake in the global water market by exporting water in the empty tanks of oil tankders

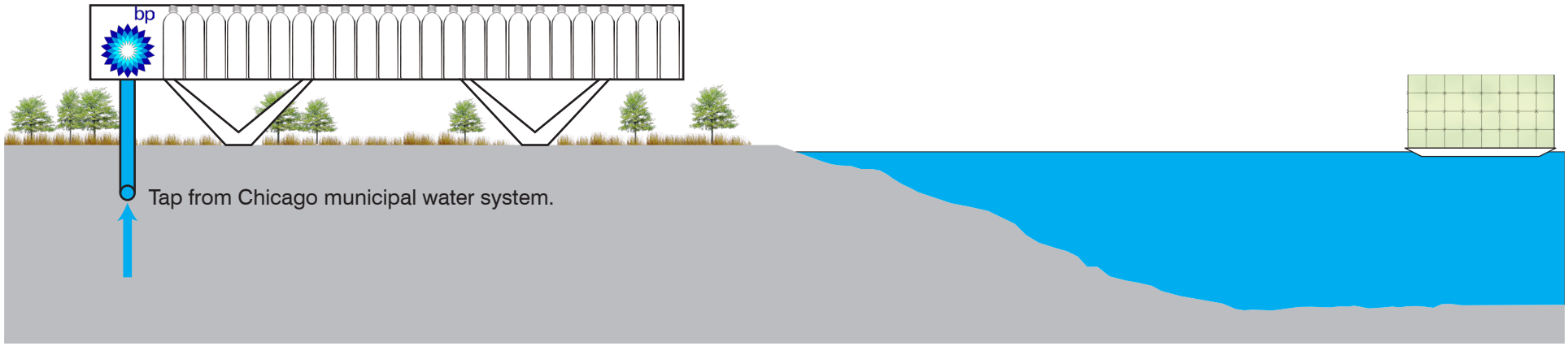


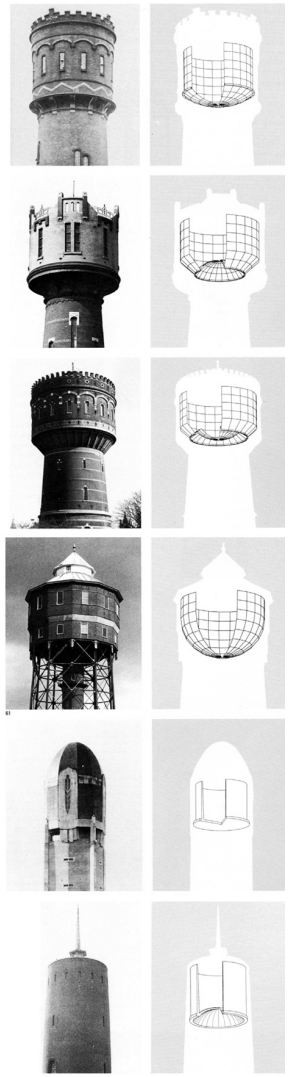
Top: Diagram of the collection and treatment processes of the Chicago municipal water system.

Illinois

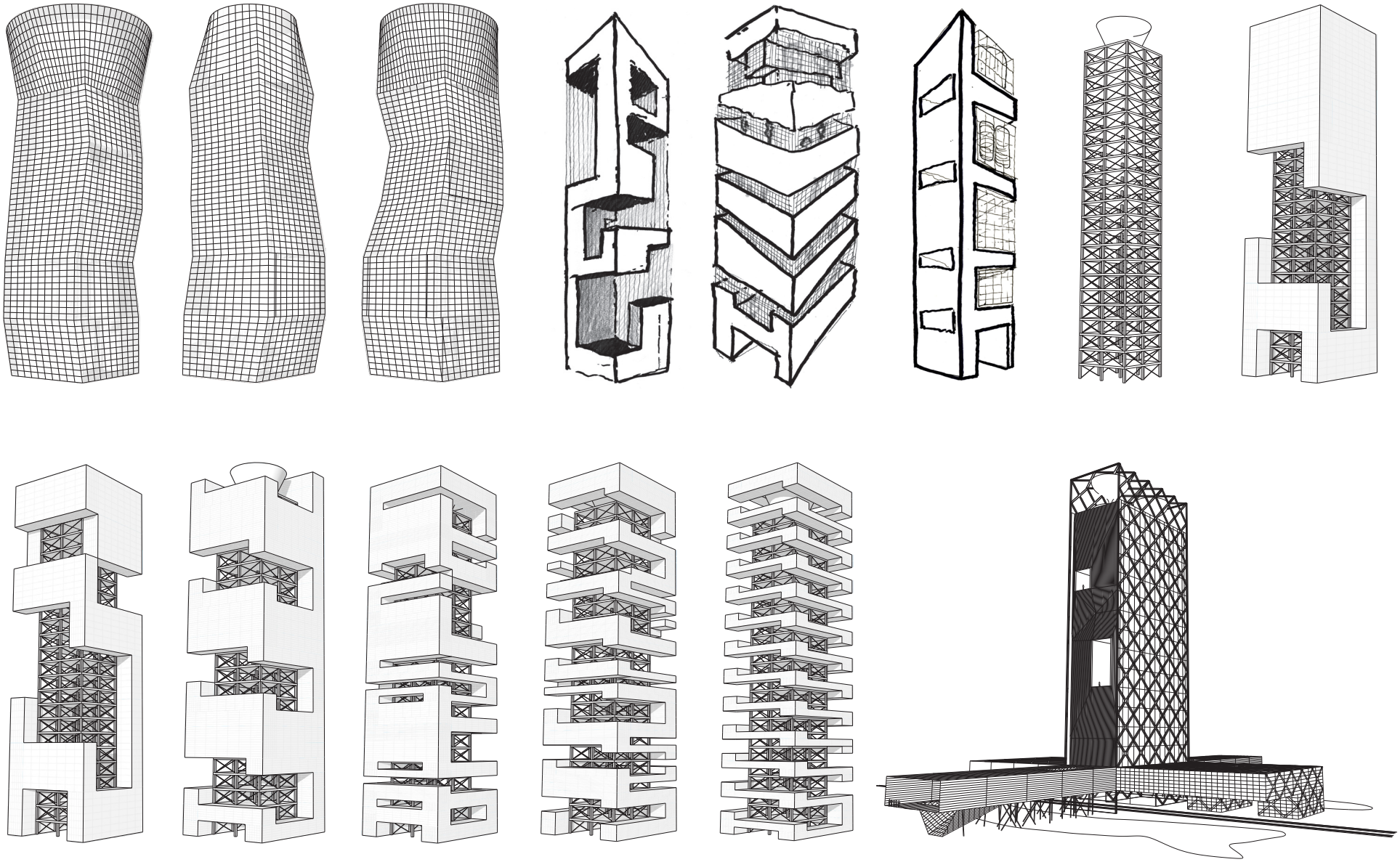
Indiana

Bottom left: Raised BP bottling facility (THE PROGRAM) with public landscape below
Bottom right: Floating “crib” with new Museum of Public Works (THE ANTI-PROGRAM)

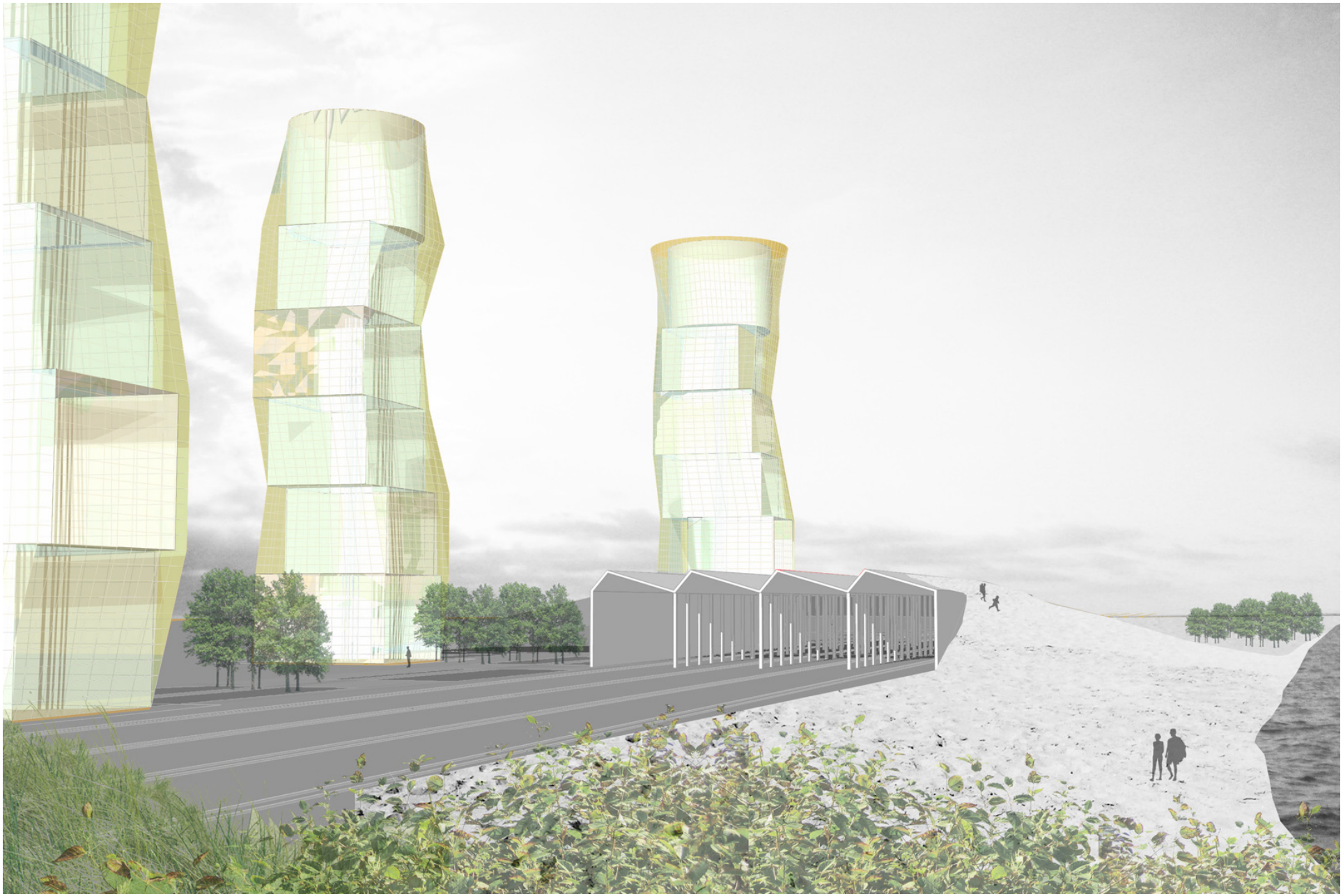




Water Tower Typologies



Factory Tower Typologies



\\Bibliography

Ackermann, Kurt. *Building for Industry* Godalming: Watermark, 1991.

Adam, Jurgen and Katharina Hausmann, Frank Juttner. *Industrial Buildings: A Design Manual* Boston: Birkhauser, 2004.

Albert, Dennis A. *Borne of the Wind: Michigan Sand Dunes* Ann Arbor: University of Michigan Press, 2006.

Anderson, Stanford. *Peter Behrens and a New Architecture for the Twentieth Century* Cambridge, MA: The MIT Press, 2000.

Auke van der Woud, and Kim Zwarts. *Wim Quist, Architect* Rotterdam: Uitogeverij 010, 1989.

Barkow, Frank, Kathleen James, John McAslan, Rowan Moore, Moshen Mostafavi, Kenneth Powell, and Francesca Rogier. *Ruins of Modernity: Erich Mendelsohn's Hat Factory in Luckenwald*e London: Architectural Association, 1998.

Barlow, Maude. *Blue Covenant: The Global Water Crisis and thee Coming Battle for the Right to Water* New York: The New Press, 2007.

Barlow, Maude, Tony Clark. *Blue Gold: The Fight to Stope the Corporate Theft of the World's Wate*r New York: The New Press, 2002.

Becher, Bernd. *Bernd and Hilla Becher: Tipologie = Typologien – Typotogies* Munster: K. Bussmann im Auftrag des Auswärtigen Amtes Bonn, aus Anlass der XLIV Biennale in Venedig, 1990.

Berger, Alan. *Drosscape: Wasting Land in Urban America* New York: Princeton Architectural Press, 2006.

Bergeron, Louis and Maria Teresa Maiullari-Pontois. *Industry, Architecture, and Engineering: American Ingenuity 1750-1950* New York: Harry N. Abrams, Inc., 2000.

Bucci, Federico. *Albert Kahn: Architect of Ford* New York: Princeton Architectural Press, 2002.

Burnham, Daniel, and Edward H. Bennett. *Plan of Chicago* New York: Princeton Architectural Press, 1993.

Castex, Jean, and Jean Charles Depaule, Philippe Panerai, Ivor Sameuls. *Urban Forms: The Death and Life of the Urban Block* Boston: Architectural Press, 2004.

Cronnon, William. *Nature's Metropolis: Chicago and the Great West* New York: W.W. Norton and Co., Inc., 1992.

Darley, Gillian. *Factory* London: Reaktion Books Ltd, 2003.

De Moel, P.J., J.Q.J.C Verberk, J.C. van Dijk. *Drinking Water: Principles and Practices* New Jersey: World Scientific, 2006.

Drinan, Joanne, ed. *Water and Wastewater Treatment: A Guide for the Nonengineering Professional* Lancaster, PA: Technomic Publishing Co. Inc., 2001.

Engle, J. Ronald. *Sacred Sands: The Struggle for Community in the Indiana Dunes* Scranton: Wesleyan University Press, 1983.

Falconer, Peter, and Jolyon Drury. *Building and Planning for Industrial Storage and Distribution* London: Architectural Press, 1975.

Giedion, Sigfried. *Mechanization Takes Command: A Contribution to Anonymous History* New York: Oxford University Press, 1948.

Goble, Emerson, ed. *Buildings for Industry: An Architectural Record Book*. F.W. Dodge Corporation, 1957.

Goldsmith, Myron. *Buildings and Concepts* New York: Rizzoli, 1987.

Henk van der Veen. *Watertorens in Nederland* Rotterdam: Uitgeverij 010, 1989.

Hildebrand, Grant. *Designing for Industry: The Architecture of Albert Kahn* Cambridge, MA: The MIT Press, 1974.

Kirkwood, Niall, ed. *Manufactured Site: Re-Thinking the Post-Industrial Landscape* London: Taylor and Francis, 2001.

Lambert, Phyllis, ed. *Mies in America* New York, Harry N. Abrams, Inc., 2001.

LeCorbusier. *Towards a New Architecture* London: John Rodker Publisher, 1931.

The Legacy of Albert Kahn Detroit: Detroit Institute of Arts, 1970.

Martin, Reinhold. *The Organizational Complex: Architecture, Media, and Corporate Space* Cambridge, MA: The MIT Press, 2003.

McDonough, William, and Michael Braungart. *Cradle to Cradle: Remaking the Way We Make Things* New York: North Point Press, 2002.

Mendelsohn, Erich. *Amerika: 82 Photographs* Berlin: Nachdruck Da Capo Press, 1976.

Oswalt, Philipp, ed. *Shrinking Cities Vol. 1+2* Ostfildern: Hatje Cantz, 2006.

Tandy, Cliff. *Landscape of Industry* New York: Wiley, 1975.

Waldheim, Charles, ed. *The Landscape Urbanism Reader* New York: Princeton Architectural Press, 2006.

Water Treatment Handbook Rueil-Malmaison, France : Degrémont ; Cachan, France: Distributed by Lavoisier, 2007.

Zevi, Bruno. *Erich Mendelsohn: The Complete Works* Boston: Birkhauser, 1999.

\\Image Credits

All Images by the author unless noted below. Credits are listed by page number

Disclaimer: The BP logo is a registered trademark and should not be reproduced without consent of the corporation.

page 18 from *Building for Industry*

page 19 from *Peter Behrens and a New Architecture for the Twentieth Century*

page 22 from *Albert Kahn: Architect of Ford*

page 24 from *Erich Mendelsohn's Hat Factory in Luckenwalde*

page 25 from *Towards a New Architecture*

page 28 from *Building for Industry*

page 29 from *Mies in America*

page 30-31 from *The Organizational Complex: Architecture, Media, and Corporate Space*

page 35 from the U.S Steel Photograph Collection at Indiana University

page 116 (left) from *Bernd and Hilla Becher: Tipologie = Typologien – Typotogies*

page 116 (right) from *Watertorens in Nederland*