ABSTRACT

Thesis Title: **POST-INDUSTRIAL PRODUCTION**

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> "In its very nature, successful economic development has to be open-ended rather than goal-oriented… necessity has not been the mother of invention; rather, necessity opportunistically picks up inventions and improvises improvements on it and new uses for it, but the roots of invention are to be found elsewhere, in motives like curiosity and especially, 'esthetic curiosity."
>
> *Jane Jacobs, The Economics of Cities*

This thesis seeks to explore two themes in current architectural discourse:

1. The values and ideas that influence industrial urban form, including creation of positive or negative edges, integration with surrounding uses, and the possibility for an expansion of the mixed-use concept.

2. The potential for a built environment to sponsor cooperation and innovation in conjunction with a parallel social and economic strategy, by facilitation or manipulation of expected behavior patterns, as well as formal architectural language.

POST-INDUSTRIAL PRODUCTION
Industrial Incubation in the Contemporary Urban Fabric

By

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Introduction

Mind takes form in the city; and in turn urban forms condition mind…The city is both a physical utility for collective living and a symbol of those collective purposes.

Habitually, people treat the realities of personality and association and city as abstractions, while they treat confused pragmatic abstractions such as money, credit, political sovereignty, as if they were concrete realities that had an existence independent of human conventions.

Lewis Mumford, The Culture of Cities

Industry in the Ideal City...?

Industry, while fundamental to contemporary society, was essentially banished from the urban environment – or perhaps from the ideal of the city – at the beginning of the twentieth century.

The Modernist conception of nature, inherited from the Romantics, created a dichotomy between nature and the built environment. The pilotis that lifted the ideal home from the earth would allow nature to flow freely. Le Corbusier wrote, "One is in Paris no longer; it is as if one were in the countryside."[1]

The crisis and subsequent relaxation of strict Modernist dogma in the late twentieth century gave way to a more holistic conception of nature, and an acknowledgment of man's influence on almost every place, from skyscraper to forest. Concurrently, the urban ideal shifted from a city of strict functional divisions to one of mixed use. However, the contemporary ideal city does not include industry as a positive ingredient.

There exists a method for humanely reintroducing industry into the city. Mumford: "Trade and industry have, therefore, a social significance within the city…While over-devotion to the subsidiary economic processes and their pecuniary evaluations may produce an insensate culture, devoid of further significance, one cannot doubt the enlivening effects of the more complicated processes of production, creation, and interchange." [2]

---

1 Le Corbusier, Oeuvre complete, from Curtis 176
2 Mumford 1968 263

We live in a world with a dwindling energy supply, while we have built an entire society base on cheap, plentiful fuel and expensive labor. The de-industrialization of US cities has been the prime physical manifestation of this premise. While short term forecasts do not predict a wide-ranging return to a manufacturing-based economy in the Western economies, industry does have a diverse future in the US. In the short term, there are still proximity-reliant industrial activities are better executed close to urban centers. Among the sectors that fit into this category are food, quick-turnaround printing, and custom manufacturing. The advent of internet-based "just in time" production, as well as skilled workers' demands for entertainment and a stimulating living environment support the urban industrial growth model.

Additionally, the economic medium- to long- term forecast is far less clear. Rising fuel costs and equalizing wages could change the de-industrial dynamic in Western economies. What will happen when Chinese workers make more than American workers? When crude oil costs $200 a barrel? When food costs rise 1,000%? It is important that our urban centers do not become irrelevant if thing don't go according to plan.

I therefore propose a public/private venture to maintain and enhance the role of industry in a typical post-industrial US city. The Urban Industrial Incubator (UII) will bring together a diverse range of firms in a dense urban setting. By conglomerating, firms will benefit from shared administrative, infrastructure, and service costs. The UII takes advantage of the proves success of the incubator business model. Over the past two decades, commercial and industrial incubators have shown themselves to increase the survival rate of startups, while retaining a healthy market-based development incentive.

The mission of the architecture of the UII is twofold:

1) To create a place for innovation and cooperation. The answers to the problems of production in the urban environment lie in both new technology and in new implementation of old technology. In order to find new solutions, it is important that experts not only talk to each other, but actually see what each other are working on. Additionally, the streamlining and study of life-cycle costs of production is important. This will be sponsored by placing research and development concerns alongside manufacturing and sales.

2) To create a facility that is emblematic of healthy urban development patterns. The urban corollary to successful industry is intelligent zoning and site planning. By bringing both white-collar and blue-collar employment together in an urban setting, the UII will be a model for the re-integration of the industrial production chain into the American city.

I. Conceptual Framework

> Memory cannot retain everything; if it could, we would be overwhelmed with data… serendipity is possible only when recollection is essentially a holding fast to what is meaningful and a release of what is not.
>
> *Kevin Lynch, What Time Is This Place?*

The scale of the city is where the grand ideals of a people can be expressed most forcefully.

Those who concern themselves with the understanding, maintenance, and creation of the built environment are continually conscious of Kevin Lynch's observation. We must always leave out some places or some information. The world is simply too big and complex.

Because of the intrinsically complex nature of the urban environment, we make rules for ourselves. These rules come in many forms, from building codes to land use regulation to social taboos.

Industry in the City

The earliest industries were small, water powered mills. Workers could easily settle near rivers, and access was the limiting factor for growth. Larger mills demanded larger workforces. Before the advent of mechanized transportation, this requirement led to exclusively urban factories. The factory became the center of a new kind of city, famously expressed by Claude-Nicolas Ledoux with the Royal Salt Works at Chaux.

1 Royal Salt Works, Chaux
(Claude-Nicolas Ledoux) The project represented an idealized relationship between worker and manager, industry and landscape, and man and the universe.

The advances in coal technology during the nineteenth century brought great changes to the dependence of industries on city centers. The exponential production increase afforded by coal inflated factories to enormous sizes. The introduction of the railroad allowed production to more efficiently remove itself from localized markets and resources. Factories no longer needed to remain at the locus of population density, and their larger land requirements were impossible to meet in the centers of eighteenth-century cities. These factors resulted in the spreading of industrial facilities out from city centers, usually along a river.

The coal revolution also changed the impact of industries on their host cities. The ill health effects of industry were multiplied. Additionally, the vast rail yards required by new factories were dangerous and interrupted the pedestrian scale of the former cities. Those who could afford to live in hills above the smoke moved "uptown."

Workers' housing sprang up around the factories. Neighborhoods became known for certain types of industry.

The late nineteenth and early twentieth century saw an explosion of ideas to resolve the contradiction of living and working spaces. Ebenezer Howard in 1898 proposed an ideal town of 32,000 inhabitants with his Garden Cities of To-morrow. Howard presented a dichotomy between "Town" and "Country." Where the town had jobs and society, the country had fresh air and low rents. Howard's "Town-Country" would create centers that had the best of both. Mass transit would connect the community centers to one another, with industrial jobs clustered near the railroad. Housing would surround the center, and greenbelt buffers would separate one Garden City from another.

2 Garment District, NYC
Many industries had their own districts in the 19th century so that individual small business owners could pool resources.

3 Group of Slumless Smokeless Cities
Reminiscent of the mandala, this diagram illustrated Howard's vision of the strategic distribution of commercial, residential, industrial, and infrastructural functions.

Howard, as well as his contemporaries such as Frenchman Tony Garnier, disclose a characteristically Romantic concept of nature. While the eighteenth- and nineteenth-century cities began to visibly change their surrounding landscapes, artists and writers began to idealize the unspoiled earth, as Samuel Coleridge wrote without irony in 1802:

> In Xanadu did Kubla Khan
> A stately pleasure-dome decree :
> Where Alph, the sacred river, ran
> Through caverns measureless to man
> Down to a sunless sea…
> …And here were forests ancient as the hills,
> Enfolding sunny spots of greenery.

The effect of "untouched" nature on man was considered a spiritual experience, which ran counter (or alongside) the rational process that brought on the industrial revolution.

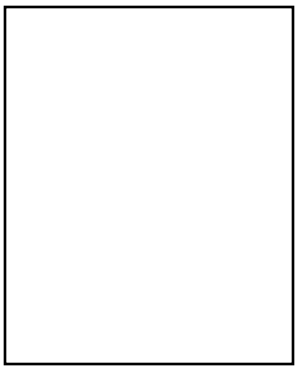
Meanwhile, the system of functional zoning clearly relieved living areas of the harmful effects of industry. The fourth Congrès International d'Architecture Moderne (CIAM) brought this system to a new extreme. Led by Le Corbusier and Sigfried Gideon, CIAM decreed the "Functional City" with the Athens Charter of 1933. There was to be a strict separation of living, recreation, and working zones. At the same time, distance between housing and work should be minimized.

Simultaneously, CIAM advocated the raising of buildings on piloti, allowing the natural landscape to freely flow beneath. There could be no stronger expression of the Romantic ideal of nature. Rational architecture and urban design would be the means by which wild nature would be saved. Thus, architecture was recast as a problem-solving endeavor, akin to engineering. The executive body of CIAM was called the Comité International pour la Résolution des Problèmes de l'Architecture Contemporaine (International Committee for the Resolution of Problems in Contemporary Architecture).

After World War II, as CIAM's pronouncements found built expression, it became clear that mere engineering could not create humane cities. The landmark secession of Team Ten from CIAM in 1953 was a revalidation of the social nature of architecture and the existence of different types of communities. From the Doorn Manifesto of 1954:

> 3. 'Habitat' is concerned with the particular house in the particular type of community.

> 4. Communities are the same everywhere.
> (1) Detached house-farm.
> (2) Village.
> (3) Towns of various sorts (industrial/admin./special).
> (4) Cities (multi-functional).
> 5. They can be shown in relationship to their environment (habitat) in the Geddes valley section.[1]



4 Team Ten urban diagram
The haphazard, almost desperate character of the Team Ten manifesto reflected the unanimous accord that architecture and urbanism was failing the population as well as the lack of consensus about paths to success.

The manifesto is vague almost to the point of meaninglessness, but at every moment is obsessed with diversity. The one-size-fits-all strategy of the International Style was discarded.

During this debate, however, the space demands of industrial facilities continued to grow. The realities of economic efficiency, the intestate highway systems, and overnight development had trumped issues of humaneness and the ideal city. By 1969 Kenneth Frampton could write

> It is a sad testament to the cultural predicament of our so-called affluent society that the Team Ten Primer has transformed itself in so little time from being an optimistic presentation of a new neo-capitalistic approach to architectural and urbanistic thought to becoming, through retroactive prefaces, a desperate and pessimistic polemic.[2]

1 Smithson 34
2 Frampton 202

Types of sustainability

> Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.
>
> *"Our Common Future" United Nations Report*

The problems of urbanism and industry are not simply "related" to sustainability. The words are aspects of the same issue. We live in a world that is based on methods of moving people, information, and goods quickly, reliably, and relatively cheaply. This broad-based view of sustainability creates far-reaching implications. If we believe that our transportation methods are unsustainable, we must also view as unsustainable all the benefits of that transportation: photovoltaic panels from Japan, shrimp from Indonesia, engineered lumber from Finland.

Current architectural discourse tends to view sustainability from the perspective of harm reduction. LEED certification guidelines award points for a variety of "green" specifications, energy use patterns, and construction methods. The sustainability that this thesis attempts to address is more general, and perhaps, more far-reaching.

By starting with an idea of the city as an environment that facilitates desired activities, the process of architecture can serve to continually test goodness of fit. If the urban fabric becomes inconsistent with long-term societal needs, it must evolve. A true measure of sustainability must take into account the infrastructure and transportation sunk costs that the current city represents. In addition, and possibly more importantly, the evolution of the city fabric must take advantage of the cultural

phenomena, symbology, and social patterns that exist. The clean slate social housing projects of the 1950s and 1960s were far more unsustainable in their cultural polemic than in their use of energy or materials.

This argument should in no way detract attention from the very real problem of energy embodied in the existing city. Before visualizing the ideal final form of an environment, it is necessary to judge what the optimal social and functional use of the existing condition. While long-term plans may include additional construction, the "construction of use" may be far more effective in the short and medium term.

What are the real-world implications of all this? The past few decades have seen the growth of adaptive reuse, especially in urban centers. The lesson of a sustainability-based approach is to regard flexibility as a primary quality for new building. Flexibility may emerge in the form of simultaneous activities (conventional mixed-use), or temporal shifts (space used rhythmically), or through evolution (new activities replace old).

II. Site

Overrated: The whole notion of green buildings. And green roofs, which everyone is just gaga about. It's an excellent idea, but it's such a small part of sustainability, which isn't just about the mechanics of the building. It has to do with whether you're supporting life within a city, whether you can get there by public transportation, whether there are places for your children.

Martha Schwartz

It is not customary to pull down all the houses of a town with the single design of rebuilding them differently

Rene Descartes, Discourse on Method

The Role of Site

5 Study Area Model

The problem addressed by this project - namely, the implications of industry on the contemporary city - requires a site with certain characteristics Foremost is proximity to an urban center of some regard (The problem of developing industry next to a highway near nothing has already been addressed sufficiently). A historic or current link to industry is preferable. Finally, and perhaps most importantly, the optimal site will not have an agreed-upon image for future development. While may be safe to say that *no* site has an agreed-upon future, sites for which strong existing legal, cultural, and social frameworks exist do not represent the crux of the industrial urban dilemma.

Baltimore, as a typical postindustrial U.S. city, has long been a testing ground for urban ideas. The primacy of Manhattan in nineteenth century urbanism is apparent, as vast areas outside of the original city were gridded shortly after 1811. Most of the grid was built out by the early twentieth century, but Port Covington remained undeveloped. The interstate highway system in the mid twentieth century served to create a new set of negative edges in Baltimore. In the 1980s, the Inner Harbor was redeveloped as a mixed-use waterfront project, a paradigm for US cities since.

Port Covington is an ideal site for an urban demonstration project for four reasons:

1. The Port Covington is the only section of the original grid plan to remain unbuilt. This provides an unparalleled opportunity to accept, critique, or modify the standard American gridiron as it was designed in the early nineteenth century.

2. The site's proximity to Baltimore's historic core implies an urban program. (Port Covington is the same distance from Charles Center as The Lincoln Memorial is from the US Capitol.)

3. Surrounded by the Patapsco River, Port Covington offers an opportunity to reevaluate the ideal waterfront development. The "Festival Marketplace" blend of entertainment and commerce, executed at Harborplace in Baltimore and Faneuil Hall in Boston, remains the current paradigm.

4. The site provides opportunities to demonstrate the transformation of negative edges (highways, overpasses, rail lines) into positive linkages.

The least energy-consuming building is the one that isn't built. For this reason, it is imperative that architects, planners, and developers look to reuse the structures that already exist. Baltimore City government has already acknowledged this concept with its pioneering "Historic Restoration and Rehabilitation Tax Credit." The big-box retail buildings that currently occupy Port Covington represent large financial and energy expenditures in the cause of short-term planning horizons. Design alternatives for the UII will include attempts to reuse the vast existing enclosed space in a new way.

Site History

Port Covington lies at the south of a peninsula between the Northwest and Middle Branches of the Patapsco River. Charles Gorsuch was the first European to settle the land in 1661, when Lord Baltimore granted him a patent to today's Locust Point. Over the next two decades, other parts of the peninsula were patented to various English settlers. Gorsuch eventually abandoned the land. There was no lasting settlement until 1725, when John Giles consolidated 400 acres of "Whetstone Point" and "Upton Court," and sold it to the Principio Company, a British iron company that had been operating nearby for a decade. Whetstone Point became a primary source of iron ore for the company. In the 1730's, John Moale and Richard Gist bought up the remainder of the peninsula and established mines.

6 South Baltimore 1792
The first known survey of what became Port Covington and Fort McHenry was created by Lewis Brantz in the 1790s. Brantz immigrated from Stuttgart at the age of 17. A lifelong adventurer, he explored the "Indian Lands," created images of Pittsburgh when it was a frontier town, wrote a Choctaw dictionary, and was nearly enslaved in North Africa during his career as a sailor. Brantz retired to Baltimore, where he recorded the minutia of business life, astro-

As the Revolution drew near, Maryland confiscated the Principio Company's works to support the coming war. The state set up a gun battery at the tip of Whetstone Point. After the war ended, the rest of the confiscated land was auctioned off.

8 The Bombardment of Fort McHenry
A. J. Miller, 1829. Fort Covington can be seen at the far right.

In 1793, the federal government saw the strategic importance of the site, and established star-shaped Fort McHenry. When the U.S. fought the British in the War of 1812, other defenses were erected, included ten-gun Fort Covington in 1813.

In 1814, Francis Scott Key was negotiating aboard a British vessel during its attack on Fort McHenry. The defensive fire from Fort Covington helped ward off the invasion, and inspired Key's writing of the Star-Spangled-Banner.

7 South Baltimore, 1836
The Baltimore street grid was extended over Port Covington after an 1822 legislative act by the Maryland Assembly. Few of the blocks were ever built.

After Manhattan's landmark gridding of 1811, the entire peninsula was platted. Two grids were used: one in the cardinal directions, orthogonal to the grid of downtown Baltimore; and another, aligned with the long coastline that stretched to the southeast. This grid also incorporated the existing road from Baltimore to Fort McHenry. Historic maps illustrate, however, that Port Covington would never see fulfill its urban potential. Fort Covington was vacated in 1832.

10 Winans' Depot
This detail from the 1869 isometric illustrates the entrepreneurial industrial spirit of the 19th century

In the second half of the 19th century, industrial uses thrived at Port Covington. Brickyards abounded. A bridge was built across the Middle Branch from the tip of Ferry Bar. In the 1860's, an engineer named Winans experimented with unconventional forms at his shipyard near the old fort, but he was eventually unsuccessful. He gave his name to the Middle Branch Mt. Winans neighborhood. The Western

11 South Baltimore, 1869
This illustrative axonometric map depicts Port Covington as a wild marshy swath at the edge of Baltimore proper. Land was cheap, and various businesses came and went without much success.

Maryland Railroad established its terminal at Port Covington, bringing coal from the mountains around Cumberland for export. For a century, industry flourished.

12 Coal in the early 20th century
Port Covington in busier days, as a coal terminal for the Wester Maryland line.

Interstate 95 cut the peninsula in half in the 1960s. The rise of containerized shipping and enormous bulk ships in the 1960s destroyed the economic backbone of Port Covington. While Baltimore on the whole lost out to New York, the deep water ports of Baltimore rendered Port Covington useless as an industrial terminal. The Locust Point Port facility next door continued to thrive. A few industrial plants remained at Port Covington, including the still-thriving Locke Insulator Company.

11 South Baltimore, present-day
This recent aerial photo makes clear the dichotomy of scale that exists in this district. The interstate and railroad blocks fine-grained urban development from growing southwards. Waterfront development extends into the water for industrial and infratructural use.

A few revitalization plans in the 1970s and 80s came to nothing. In 1988 the Baltimore Sun built a production plant on 61 acres north of I-95. Meanwhile, the neighborhoods surrounding the Middle Branch – South Baltimore, Westport, and Cherry Hill – continued to decline.

In the late 1990s, three forces created development pressure on Port Covington and the other Middle Branch neighborhoods. First, the Gwynns Falls Trail was built, linking the area to a hike/bike route from Carroll Park to the Inner Harbor. Second, the National Aquarium, in danger of losing its lease on an Inner Harbor facility, sought land at Port Covington. A swap deal with the City's Department of Public Works resulted in the Aquarium renovating a vast storage structure into a LEED-certified Center for Aquatic Life and Conservation and adjoining park.

13 "Alternative" urban activities
The Intertribal Powwow, an annual regional Native American celebration has been held at Ferry Bar Park at the tip of Port Covington in years past. The development of Wal-Mart eventually pushed this "nontraditional" use elsewhere.

Third, the late 1990's saw the build-out of the Inner Harbor. Developers and planners immediately looked to the land surrounding the Middle Branch. As development pressures grew, the

14 Current Middle Branch development proposals
Developers have proposed high-density commercial and residential buildings all around the Middle Branch. The lack of consensus regarding Port Covington itself has led to a series of stalled proposals.

industries and blue collar residents of the area pushed back. In 2004, the City Council established the Maritime Industrial Zoning Overlay District to protect industry from high-end residential development.

Currently, Port Covington is home to the Locke Insulator Company, the Baltimore Sun Printing facility, and a commercial complex built in 2002 that includes a Wal-Mart and Sam's Club. In recent years, Ferry Bar Park has been the site of the Intertribal Powwow, an annual festival held by Native Americans. The drainage pond from Wal-Mart's parking lots has infringed on the park space, however.

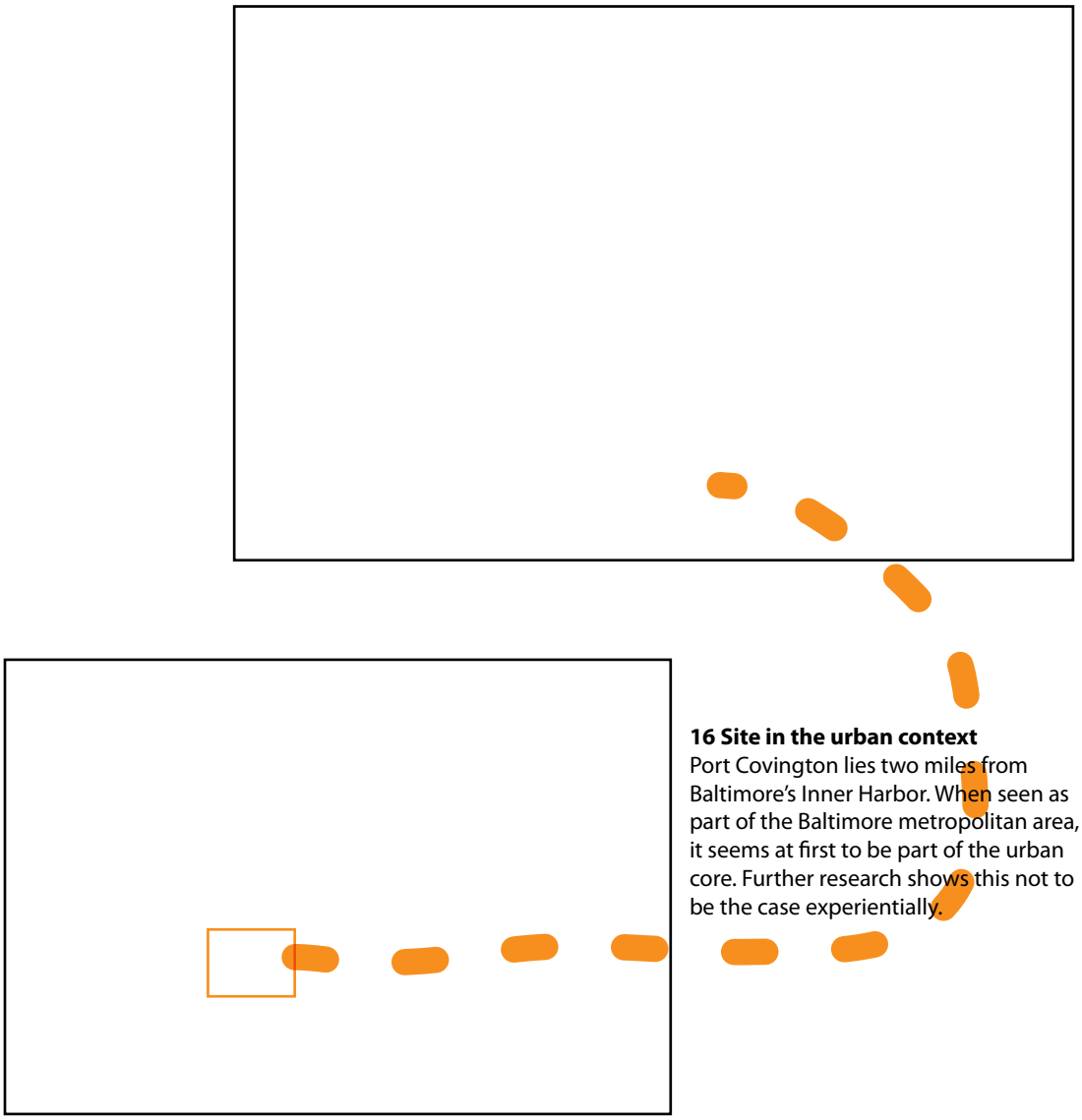
High-profile luxury and mixed-use development proposals blanket the Middle Branch area. Projects in Cherry Hill and Westport are relatively far along. PUD proposals have appeared at various points over the past two decades. Developers have recently proposed a project for Port Covington of almost 1 million square feet, mostly residential towers of 15-20 stories.

Site Analysis

All architecture - indeed, all human endeavor - becomes a compromise between ideal and circumstance. The degree to which circumstances hamper the realization of ideal form is of course, variable. Circumstances may be formal, economic, cultural, or ecological in nature. They may be real (the edge of a cliff) or psychological (a former graveyard). All projects exist somewhere within this matrix.

The larger the scale of a design, the greater its propensity for altering behavior, demonstrating power, and expressing ideals. At the same time, the greater chance of it being afftected by circumstances. Site analysis is the exploration of circumstances in regard to a project which may already be designed, or merely a glimmer in the eye of its creator.

15 The ideal and the circumstantial
Angkor Wat, Cambodia &
Mae Kum Pong village, Thailand



16 Site in the urban context
Port Covington lies two miles from Baltimore's Inner Harbor. When seen as part of the Baltimore metropolitan area, it seems at first to be part of the urban core. Further research shows this not to be the case experientially.

= study area =

190 acres total
28.25 acres building coverage
(all currently industrial/commercial/retail)
161.75 acres open (85%)

Port Covington

Boston, Telegraph Hill

17 Scale
Port Covington is comprised of about 290 acres. Here the area is illustrated at the same scale as some other urban districts.

Lower Manhattan

Paris XV Arrondissement

Beijing, The Forbidden City

London, Isle of Dogs/Canary Wharf

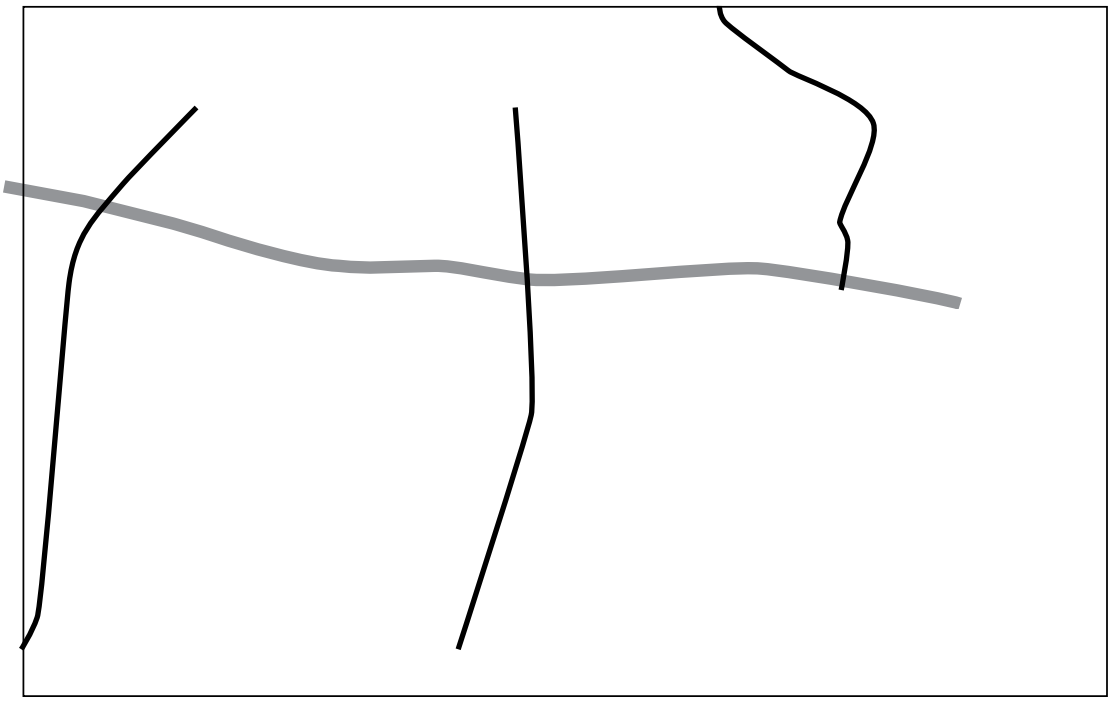
Washington DC, East Potomac Park

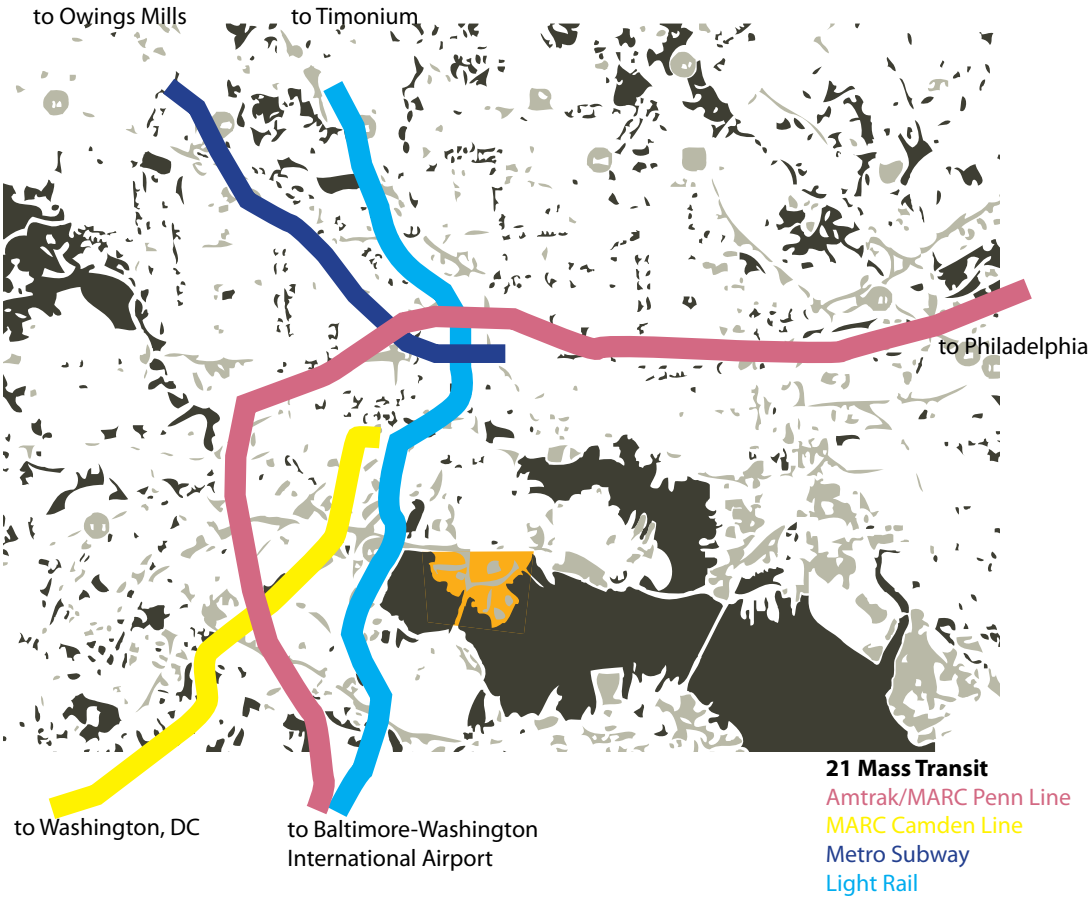
18 Topography
The rolling hills that define much of Baltimore are absent at Port Covington. The land is extremely flat, with only a 30 foot elevation change over about a mile of width. Local topographic shifts such as ditches and curbs define hydrology.

19 Odeology
Access to the site is provided via Intestate 95 from the west. The crossing of several highways over railroad tracks creates a virtual wall of road. The highway dives into the Fort McHenry Tunnel to the east.

Additional access comes from Cherry Hill via the Hanover Street Bridge, which continues into the fine-grain of South Baltimore.

Key Highway and its new developments can be accessed at the northeast corner of the site.





20 Railroad

Freight, once the reason for development at Port Covington, is now treated as a liability. While most businesses operate primarily by truck (made convenient by the Interstate system), a large rail repair yard at the north edge of the site makes north-south movement difficult. The Locust Point ports still rely heavily on the railroad, however, and its right-of-way speaks of future possibilities of diverse modes of transport.

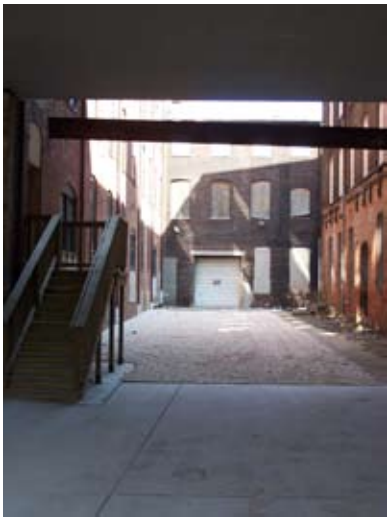
22 Figure-Ground and Ground-Figure

The void created by Interstate 95 and the railroad creates a clear threshold between building patterns. The large masses of industry, warehouses, and big-box retail acknowledges a different scale of owner and builder than the row houses of South Baltimore. Access to the water is blocked by a few behemoths, where smaller building masses could create porosity.

The fine grain of South Baltimore easily accepts figural open space, and many alternatives for movement through. The enormous facilities at Port Covington only hint at a plan of any kind. The possibility of movement without a vehicle is eliminated.

23 Scale II
The smaller buildings of South Baltimore are also more highly articulated, creating humanizing spaces even within an industrial district. They *mediate* between man and machine.

Port Covington's buildings are "dumb boxes," incapable of creating any recognizable human space without extensive camouflaging. The simply bring together machines and products.



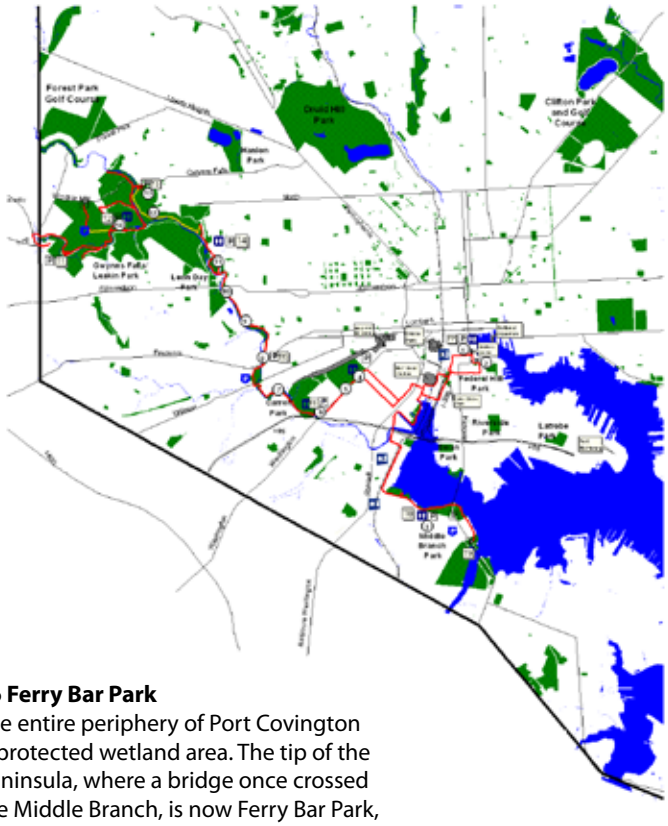
24 Edges
Port Covington can perhaps be best described through its edges. "Raw" infrastructure creates the strongest, most impenetrable edges. Through passage can only occur where massive public investment has made it possible.

There is a strict delineation of legal authority and property control. Fences, walls, and extensive signage tell trespassers where they are not wanted. A black wire mesh fence divides "wetland" from "lawn."

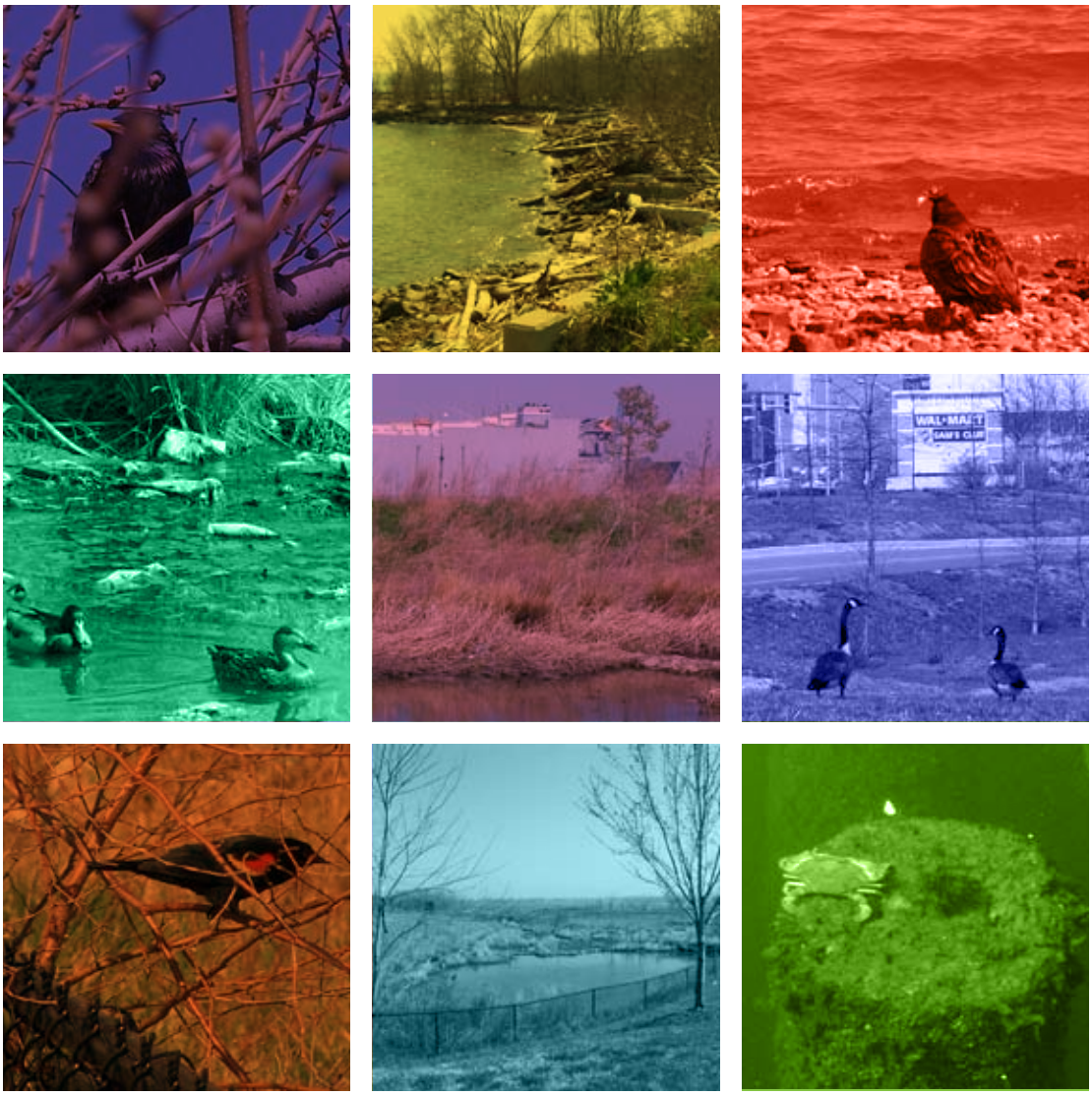
At the same time, there is a complete lack of strategic thinking about spatial delineation in the public realm. For acres in the center of the site, six-inch curbs provide the only meaningful spatial edge.

25 Citywide park system
The Gwynns Falls trail system is a connects over 200 acres via 15 miles of trails. The streambed empties into the Middle Branch of the Patapsco.

The conservation strategies at Port Covington may recognize the site's adjacency to this comprehensive system.



26 Ferry Bar Park
The entire periphery of Port Covington is protected wetland area. The tip of the peninsula, where a bridge once crossed the Middle Branch, is now Ferry Bar Park, a sandy beach, is a unique park type in Baltimore.



27 Urban Wildlife
The attempts at wetland conservation along the water's edge have provided for a surprising biological diversity at Port Covington. Since visitors usually don't venture from the parking lot or retail spaces, the natural buffer is relatively undisturbed.

● = one thousand workers

28 Employment context

The largest employers in Baltimore today are almost all in the health, educational, or financial services sectors. While government employs many workers, its location is in reality much more dispersed across the city.

Port Covington currently has no serious employment density.

The degree to which smaller employers create the majority of jobs in Baltimore is heartening. This statistic supports a bottom-up approach to economic development.

large employers: 89,750 (more than 1,000 workers)

total employment Baltimore City: 460,800

site

health

education

government

commerce

industry

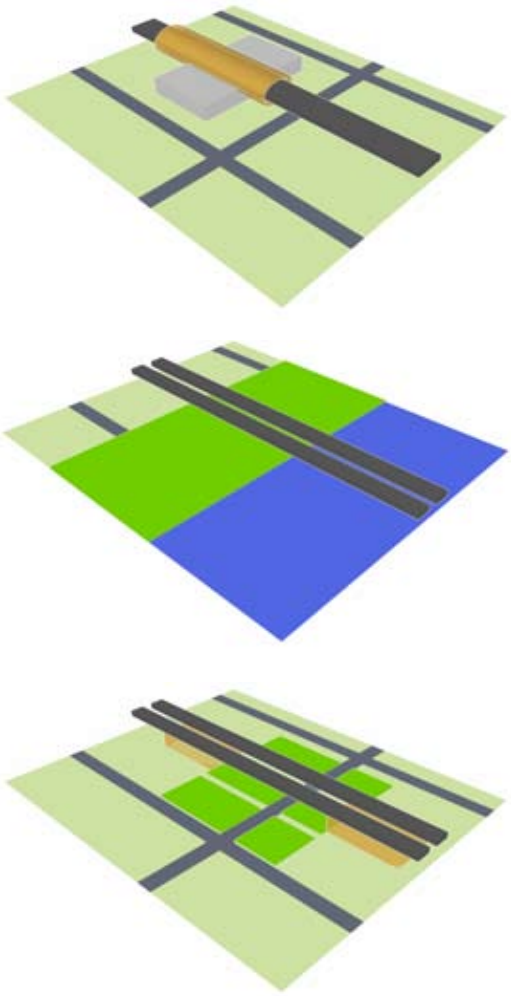
29 Invisible Cities
Anything beyond a cursory glance at the landscape at Port Covington reveals hints of all kinds of unclear activities. The current landscape is predominantly politically shaped, so much that the artifacts of individual, nonfinancial, sporadic activity seem like silly accidents.

Site Precedents

A glaring contradiction lies at the heart of this thesis project. How can industrial needs be fully met without creating an inhumane, insensate environment for other land uses, especially housing? This is nothing less that the crux of the conflict within modern city-building. The contemporary tendency to push industrial and large commercial uses away from residential and retail program intensifies traffic problems, and makes it easier for businesses to create even less humane environments. This positive-feedback loop is what some call "sprawl."

Conversely, places where work of all kinds is interspersed with the other activities of living can be to some degree self-regulating. People who live and work in a neighborhood will have less incentive to harm that environment. There is also the bonus decrease in traffic.

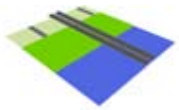
Here are three projects that address the problem of simultaneous use. Where infrastructure meets the human environment, architecture is given an opportunity to make space better.



30 Projects at Edges
(Top to botttom)
Tube Building
Green Space
Program Deadspace

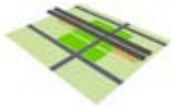
Tube Building
IIT Student Center Chicago OMA 2003

31 IIT Student Center
This project celebrates its role as a connector across what would normally be regarded as a negative edge. By literally embracing the elevated line, the project improves connection while drawing attention to the historic transit system.



32 Waterfront Park
The project illustrates the unique role of parkland in the American urban landscape. Elevated highways, objectively "evil," are balanced by rolling picturesque parkland, objectively "good."

Program Deadspace
Zaanstadt, Netherlands NL Architects 2005



33 Zaanstadt
The dark cutural vacuum underneath an elevated highway is packed with programmed activities, including a grocery, skateboard park, and community center. A gap between the two spans creates a shaft of light on the citizens below.

III. Program

The institution is not the building. The institution is the agreement to have that which is supported. It is an agreement that this kind of activity is natural to man. It is an undeniable part of the way of life.

Louis Kahn

Of the courses of action which are still open to contemporary architecture…only two seem to offer the possibility of a significant outcome. While the first of these is totally coherent with the prevailing modes of production and consumption, the second establishes itself as a measured opposition to both.

The sole hope for a significant discourse in the immediate future lies, in my view, in a creative contact between these two extreme points of view.

Kenneth Frampton, Modern Architecture: A Critical History

Program History

The history of industrial building is in many ways the history of modern architecture. The intention of this survey is not to explain the complex cross-pollination of architectural themes that this history includes, but merely to provide a brief background of the structural, spatial, and functional ideas that have found built form in industrial buildings.

The large space requirements of industrial processes linked industrial buildings to existing long span technology. Early on, engineers and industrialists influenced the form of the buildings, since architects were primarily concerned with churches, estate houses, and civic buildings. The English textile mills 18th century were the first recognizable industrial building type. John Lombe copied a design for spinning silk thread from factories he had seen in Italy. In 1718, engineer George Sorocold designed a factory for Lombe in Derby, England. It was five stories and 36 by 100 feet. Masonry bearing walls and timber posts supported the timber floors. Later examples of the mill type replaces the timber stanchions with cast iron, and later steel, columns. Bay dimensions were limited by the strength of cast iron girders. Simple rectangular sections allowed for ten-foot bays, and the development of the T-section increased the bay size to 14 feet.

Bridge-building saw the aggressive development of iron's spanning abilities. Thomas Farnolis Pritchard

34 Lombe Silk Mill, Derby

designed a 100 foot bridge over the Severn River in Coalbrookdale, England in 1779. The design was quickly copied and elaborated upon all across Europe and North America. The adoption of spanning technology in architecture saw the use of iron's structural form for expressive ends, notably in Karl Ludwig Althans' 1830 Sayn Foundry in Prussia. The factory, which itself produced cast-iron components for military, industrial, and infrastructure, was powered by water wheels and a coal blast furnace. Althans' design was based on the basilica plan. The shed was three 25-foot bays wide and nine bays long. The glass front and clerestory windows allow for even light. Trusses and connection details come together to create a structure of enormous Gothic expression.

35 Coalbrookdale Bridge

36 Sayn Foundry
The adoption of Gothic motifs was a natural reaction to the flowing curves of cast-iron construction.

John Paxton's Crystal Palace at the 1851 London World Exhibition articulated the possibilities of prefabricated iron and glass construction. The propagandistic role of the technology in expressing the power of the modern state became common, most famously with Gustave Eiffel's 1889 Tower in Paris. Actual industrial buildings, such as

37 Crystal Palace
The short-lived structure was one of the most influential in modern architecture. The new possibilities of prefabricated framed glass were inspiring to architects, engineers, and the public.

the Borsig Engineering Works in Berlin (1837) often borrowed decorative motifs from religious and civic architecture.

A notable early exception to traditional building decoration was the Sheerness Boat Store, designed by Godfrey Greene in 1860. The warehouse was the first multi-story iron frame building. Three 45-foot bays run 210 feet long, with the central bay open from floor to roof - a distance of 53 feet. The side bays are divided into three floors, which are supported by H-section cast iron columns, and rigidly connected girders. The central open space measured 9,450 square feet. In stark contrast to other buildings of the 19th century, the exterior of the Boat Store was undecorated, and in fact barely treated. Metal cladding Ironically, the Boat Store, as the prototype for multi-story iron construction, lay the groundwork for the skyscraper, the building type which would eventually displace the factory as the icon of

38 Borsig Engineering Works
The use of Classical motifs gave the urban factory a Piranesean feel, complete with dark skies.

39 Sheerness Boat Store, exterior
The lack of exterior ornamentation makes this warehouse seem far more modern than it is. The building still exists today, with minor renovation.

40 Sheerness Boat Store, interior
The interior atrium was a typical factory layout in the pre-Ford years.

modern urbanity.

The end of the 19th century saw the isolation of industry from other functions in the city. At the same time, reinforced concrete technology became available for large building spans. Francois Hennebique's system for concrete floor construction, patented in 1892, was valued for its fireproofing, resistance to vibration and temperature variation, and cheapness. In the United States, Ernest Ransome patented a similar cast-in-place construction system, adopted by Albert Kahn in his factories for the emerging American automobile industry. The long (945 feet), uniform plan reflected the systematic assembly line process that took place inside. Materials were delivered by lifts to one of the four floors, and assembly flowed downwards. The frame allowed for clear bays of fifteen by twenty feet. The externally expressed structure with infill glass walls became a basic unit of the industrial vocabulary.

41 Borax Factory, Bayonne, NJ
Erneste Ransome introduced reinforced concrete construction to the United States.

42 Ford Factory, Highland Park, MI
Albert Kahn made a career of building for the automotive industry. This factory for Ford is the prototypical turn-of-the-century assembly-line building.

Industrial architecture, which had introduced new construction methods and materials, had still yet to develop an expression of its own. "Peter Behrens' turbine factory for AEG stands at the turning point between nineteenth century historicism and the emergence of modern architecture."[1] Behrens merged an abstracted Clas-

1 Ackermann 52

sicism with the *forms* of the structure beneath. The lack of comprehensive structural honesty allowed for an architecture of monumentality. This was a new type of propagandistic building resulting from the interpretation of the architect rather than the audacity of the engineer.

43 AEG Turbine Factory
Peter Behrens' imagination brought new life and expressive possibility to the materials of industrial construction.

Walter Gropius, who had worked at Behrens' office until 1910, devoted his career to the articulation of the industrial aesthetic. He created the first curtain wall for the 1910 Fagus shoe factory. The curtain wall is suspended from load-bearing brick piers, completely independent from the floor slabs. The clean lines and generous light went on to exemplify the modern movement generally. Additionally, where Kahn had packaged all the factory activities into a single volume, the Fagus factory expressed different functions with building volumes.

44 Fagus Shoe Factory
Walter Gropius abstracted the concepts he learned working for Behrens, and added his own innovation - the curtain wall.

The strict articulation of function and structure represents one stream of industrial architecture. Erich Mendelsohn's Steinberg hat factory displayed a more expressive interpretation of the technological context.

This theme would be picked up with what Reyner Banham termed "brutalism" in the 1960. Paul Rudolph suppressed the expression of structure to favor the modelling of building mass in his 1964 New York pharmaceutical factory. The most recent project in this lineage is Zaha Hadid's BMW factory in Leipzig, Germany. Propoganda - now "Marketing" - in large part becomes the program. Structure works in service to concept.

45 Steinberg Hat factory
Erich Mendelsohn's almost playful articulation of form represents a highly expressive thread in architecture, including Russian Constructivism, Brutalism, and the work of those connected to the Architecture Association in the 1980s and 90s.

The post-WWII era saw advances in acrobatic structural systems in long-span structures. Pier Luigi Nervi pioneered the use of prefabricated modular concrete components, and his strategies were adopted for single-span industrial uses. Feliz Candela's 1959 Bacardi Rum factory in Carretera, Mexico exemplifies this movement.

46 Bacardi Rum Factory
The twentieth century saw almost infinite advances in structural possibility. Felix Candela used this ability for a clean expression of structure.

Structural expression was epitomized in the "high tech" movement in France and England from the late 1960's onwards. Architects such as

47 PA Technology Laboratory
Richard Rogers created architecture out of the marriage of structure and systems. This "high-tech" aesthetic was and continues to be popular, especially in France and England.

Norman Foster, Richard Rogers, and Renzo Piano designed buildings whose forms were derived from their structural systems. At the same time, mechanical systems were integrated and even celebrated.

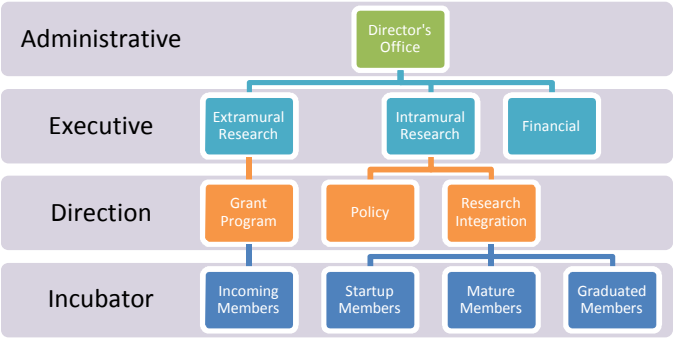
It should be kept in mind that these projects represent only the newest thinking in their respective ages. All the while, buildings from the past continued to house new functions.

Program Basis

The Urban Industrial Incubator is an organization that supports firms involved in basic research, development of technique, as well as manufacturing implementation. Rather than a top-down bureaucratic structure, the UII will strive to diffuse decision-making among its members. The primary goal of the UII would be to increase survival rates for innovative industrial companies.

The strategy of the UII would be to harness the unpredictable benefits of competition, but reduce the large financial risks associated with research and development. Subsidy of startup and administrative costs would reduce barriers to concept development. A greater number of ideas could be pursued further. Additionally, best practices could be disseminated among participants. A profit-sharing plan would allow all member entities to benefit partially from UII developments.

A grant program will seek out and admit promising firms into the program. As firms are admitted to the program, they gain access to the administrative, marketing, procurement, and information-sharing capabilities of a larger entity. Members must commit to a set time in the program, during which profits are redistributed through the incubator. Mature firms, will gradually be pushed out into the "real world," creating space for newer members.



48 UII bureaucratic organization
The structure of the UII is hierarchical in terms of administrative functions, while executive power is distributed through the system. The system attempts to resist a top-down decision-making process.

Mixed-Use

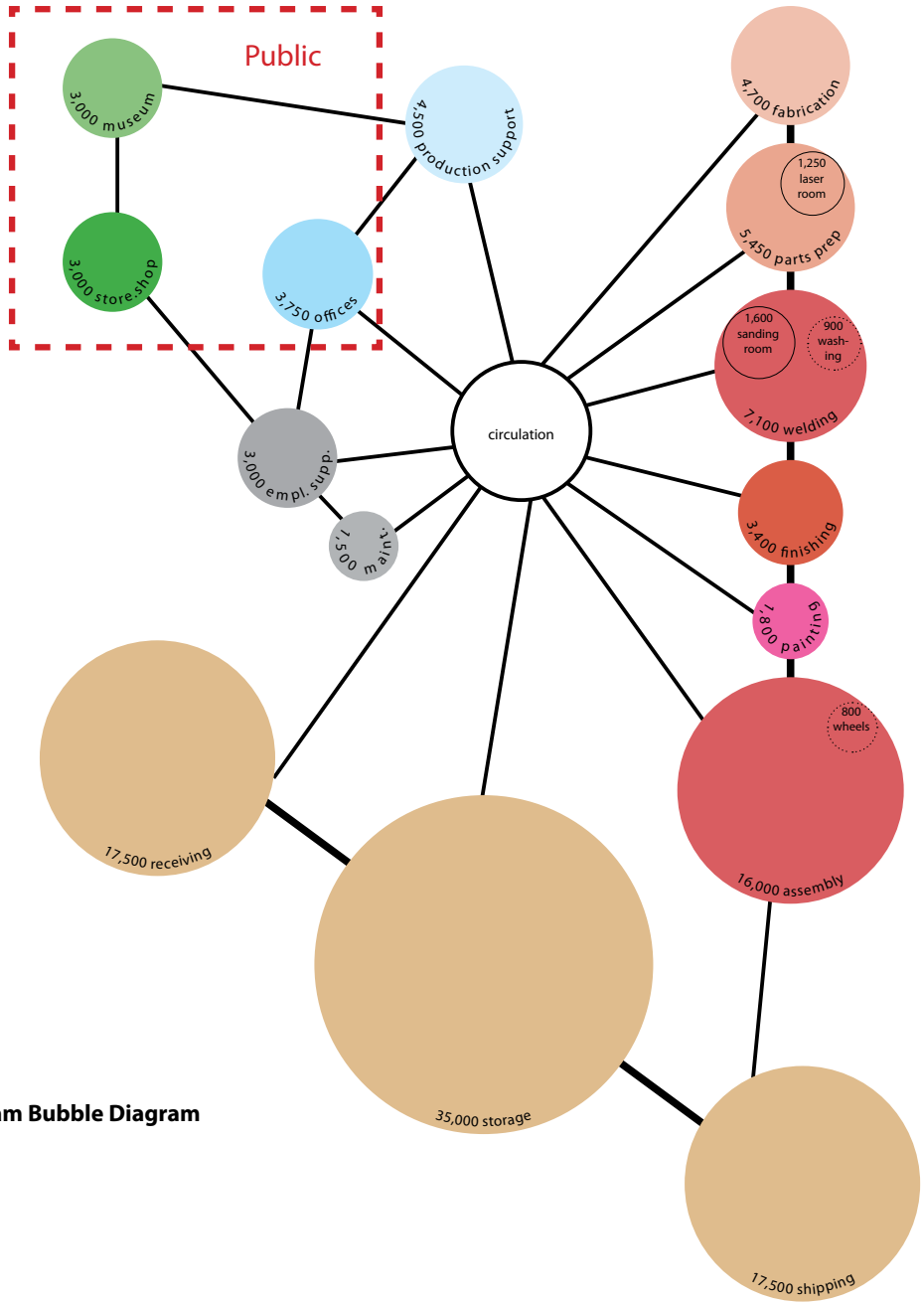
There are two ways of looking at mixed-use environments. One is to mix all uses through the site evenly – the casserole method. The other is to focus on creating positive edges between uses – the lasagna method. It seems that a strategic mix of casserole and lasagna is the key to successful mixed-use environments.

Mixed-use urban environments also create a degree of uncertainty in a project. If future activities are diverse and unknown, how can space be planned accordingly. A way of reacting to this dilemma is to search for spatial concepts that can accommodate a wide range of activities.

A contradiction also lies in the responsible addressing of the site's water edge. How can public access to the water be facilitated while minimizing impact on the same water? This question calls for the recognition that the built environment has many effects on what is commonly called "nature." These effects can often be designated "positive" or "negative," but often cannot, and are sometimes both.

Program Note

Through the design process, it was discovered that the "incubator" program was far too ambiguous given the exploratory nature of the project. In order to fully engage with the conflicts between urban design and industrial necessity, a more specific industrial program was determined - the bicycle factory.



49 Program Bubble Diagram

Preliminary Program

50 Program requirements

		#	sqft	subtotal		100% Storage	Circulation (30%)
Fabrication	CNC routers	12	150	1800			
	Annealling Ove	1	150	150			
	Lathe	1	100	100			
	Punch	2	50	100			
	Cutoff Saw	1	200	200	2350 sqft	4700 sqft	6110 sqft
Parts Prep	Stocked Metal	1	1500	1500			
	Bending Dies	2	75	150			
	Finish Brazing	6	40	240			
	Fork Shaping	2	100	200	2090 sqft	4180 sqft	5434 sqft
Laser/Plasn	Laser Cutter	3	100	300			
	Plasma Cutter	3	100	300			
	Plasma Tank S	1	25	25	625 sqft	1250 sqft	1625 sqft
Washing	Washing setup	2	100	200			
	Jumbo setup	1	200	200			
	Detergent storage			50	450 sqft	900 sqft	1170 sqft
Welding	Tacking weld s	4	75	300			
	Finish Weld Se	50	40	2000	2300 sqft	4600 sqft	5980 sqft
	Sanding Setup:	8	100	800	800 sqft	1600 sqft	2080 sqft
Heat Treati	1000deg Softe	1	400	400			
	Trueing Tables	2	50	100			
	350 deg tempe	1	200	200	700 sqft	1400 sqft	1820 sqft
Machining	Various Toolsets			1000	1000 sqft	2000 sqft	2600 sqft
Painting	Paint prep	1	300	300			
	Painting	4	150	600	900 sqft	1800 sqft	2340 sqft
Assembly	Assembly cour	20	350	7000			
	Wheel assemb	4	200	800	7800 sqft	15600 sqft	20280 sqft
					Production Total:		**49,439 sqft**
Production Support							
	Testing Room				2000 sqft		2600 sqft
	Check Lab				750 sqft		975 sqft
	Engineering	8	150		1200 sqft		1560 sqft
	Restrooms				300 sqft		390 sqft
	Planning				250 sqft		325 sqft
	Lunchroom				1000 sqft		1300 sqft
	Restrooms				300 sqft		390 sqft
	Locker Room				1000 sqft		1300 sqft
	Bldg Maintenace				1500 sqft		1950 sqft
					Production Support:		**10,790 sqft**
	Shipping/Receiving				35000 sqft		45500 sqft
	Parts				35000 sqft		45500 sqft
						Storage	**91,000 sqft**
	Executive Offices				1000 sqft		1300 sqft
	Design	6	150		900 sqft		1170 sqft
	Admin/HR				800 sqft		1040 sqft
	Wholesaling				750 sqft		975 sqft
						Admin:	**4,485 sqft**
	Museum				3000 sqft		3900 sqft
	Shop				2000 sqft		2600 sqft
	Retail Store				1000 sqft		1300 sqft
						Public:	**7800 sqft**
				gross:	**106,765 sqft**	**Net:**	**163,514 sqft**

Programmatic Precedents

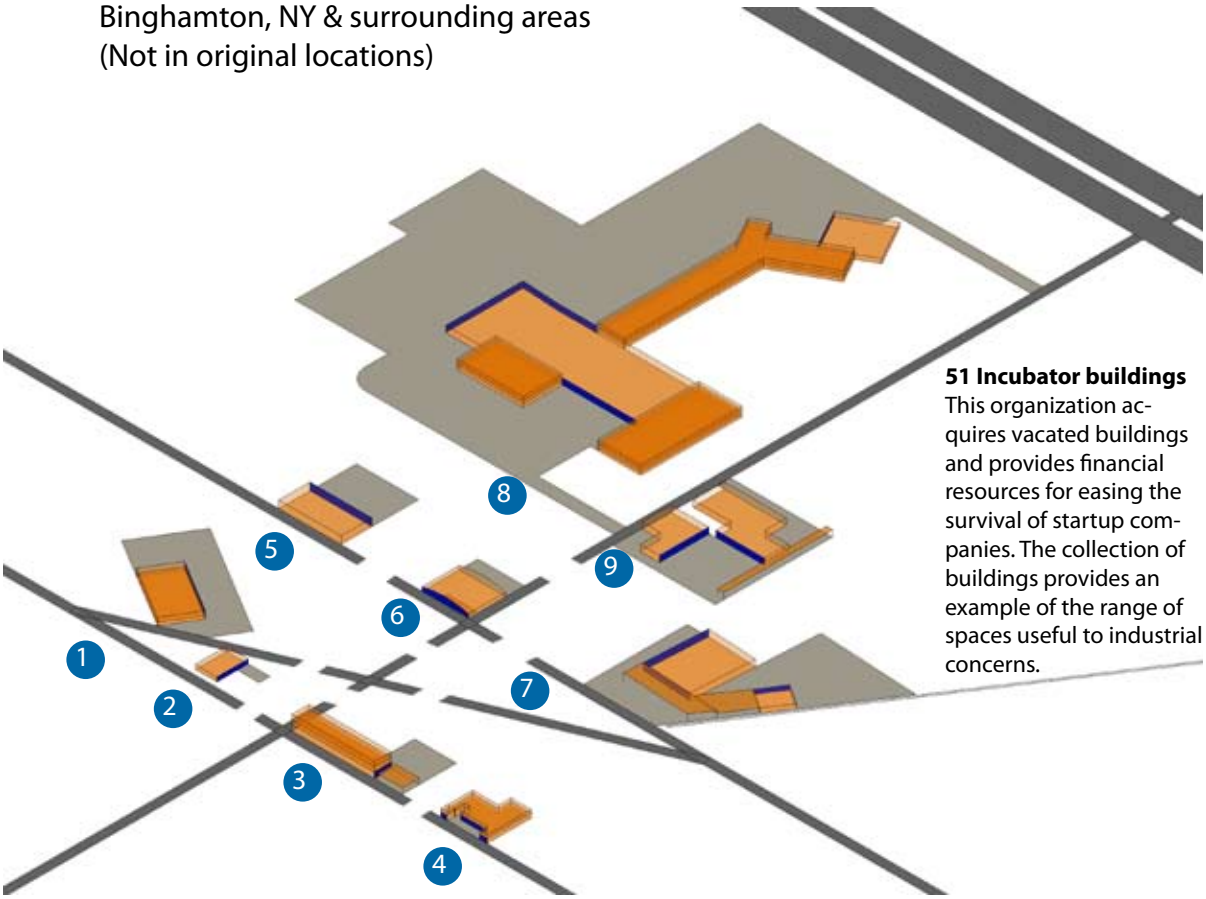
Precedent for the UII program address several factors:

1. Industrial spatial needs

2. Spaces for innovation

3. Symbolic & civic spaces

Broome County Industrial Development Agency
Binghamton, NY & surrounding areas
(Not in original locations)



51 Incubator buildings
This organization acquires vacated buildings and provides financial resources for easing the survival of startup companies. The collection of buildings provides an example of the range of spaces useful to industrial concerns.

1 780 Harry L. Drive
22,400 sqft
2 floors
1 loading dock
100 parking spaces

2 105 Airport Road
7,000 sqft
1 floor
1 loading dock

3 44 Corliss Ave
60,000 sqft
3 floors (18', 14', 14')
50 outdoor parking

4 403 Nanticoke Ave
22,500 sqft
2 floors
1 loading dock
3 overhead doors

5 Business Growth Center
20,000 sqft
1 floor (24')
2 high loading docks
100 outdoor parking

6 49 Griswold Street
19,600 sqft
1 floor + Mezzanine
1,000 sqft office
30 parking spaces
2 overhead doors

7 7 Badger Ave
38,000 sqft
1 floor to 22'
2 loading docks
3 overhead doors
rail access

8 Edwin Link Building
428,000 sqft
3 floors office
64,000 sqft 21' clear space
250 seat cafeteia
Full A/C, sprinkled
10 loading docks
1450 parking spaces

9 631 Field Street
46,500 sqft
1 floor + 7,000 canopy
2,500 sqft office
40 parking spaces
5 loading docks

GM Technical Center Warren, MI

Eero Saarinen, 1948-56

The Center was, of course, designed at an automobile scale, and the changing vistas were conceived to be seen as one drove around the project.

Eero Saarinen

52 GM Site Plan @ 1"=1600' (Google Earth)

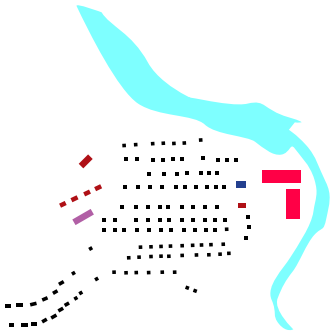
53 GM Aerial

54 GM Site Plan @ 1"=800' (Saarinen)

Company Towns through history

Saltaire, England
1853

55 Saltaire



Newry, South Carolina
1890s
69 duplexes
8 single family homes
4 supervisor houses
1 owner's mansion

56 Newry, SC

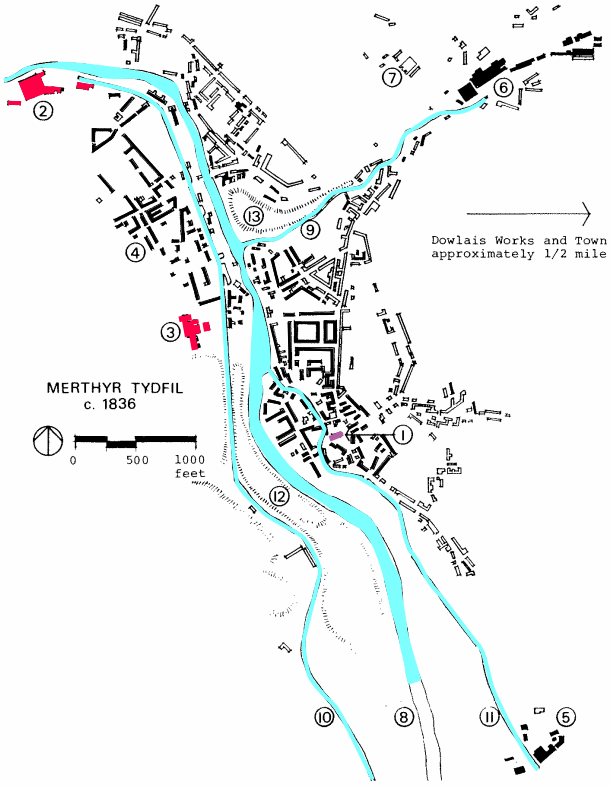
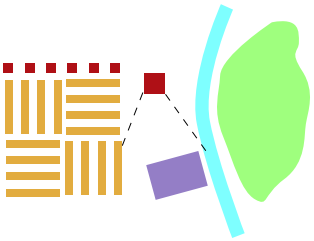


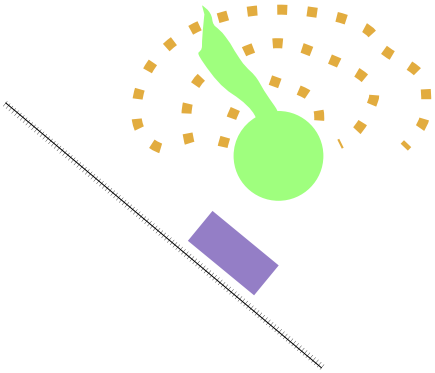
Figure 1.2 Plan of the ironworks of Merthyr Tydfil, Wales: 1. Merthyr village; 2. Cyfarthfa Works; 3. Ynysfach Works (Cyfarthfa); 4. Georgetown (Cyfarthfa housing); 5. Plymouth Works; 6. Penydarren Works; 7. Penydarren House; 8. River Taff; 9. Morlais Brook; 10. Glamorganshire Canal. (Drawn by Bruce Thomas, 1991.)

57 Merthyr Tydfil, Wales

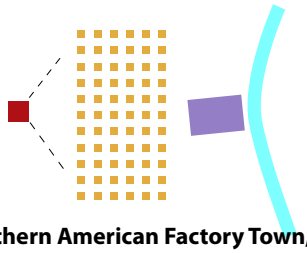


58 English planned mill town, 18th century

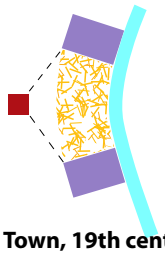
59 French planned mill town, 18th century



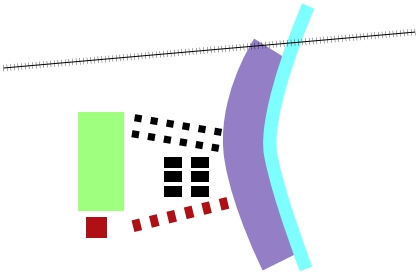
60 Midwest American Factory Town, 1920's



61 Southern American Factory Town, 19th century



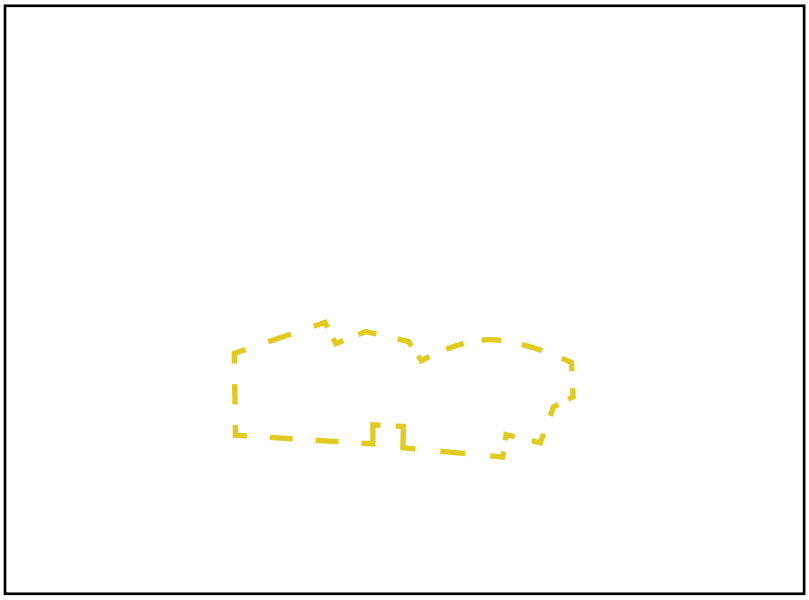
62 English Factory Town, 19th century



63 New England Factory Town, 19th century

Googleplex Mountain View, CA

Clive Wilkinson Architects, 2005



64 Site Plan@1"=400' (Google Earth)
What seems at first to be a highly irregular plan is actually made up of a few large masses with spatial volumes subtracted from them

Google, Inc. is headquartered in the infamous Silicon Valley south of San Francisco. The companyin many ways epitomizes the "dot-com" generation of companies, idealizing innovation, interaction, socializing, and recreation.

The facility is made up of two long main buildings stretching east to west, with several auxilliary buildings nearby. Each main building is bisected by a "main street," a central pedestrian corridor lined by public shared spaces and private workspaces of many varieties.

65 Workspace concepts (Clive Wilkinson Architects)

66 Building 43 Plan @ 1" = 50'
The floor plan is highly "inefficient," with few double-loaded corridors and lots of shared/public space. Space varies from highly flexible to highly programmed.

67 Building 43 Section @ 1" = 50'
Private workspaces receive indirect natural light, while shared meeting space has open skylights. Public/group space is distibuted throughout the plan. Parking is invisible, below the building

The design was formulated on the idea that groups of individuals cooperate best when they have a choice of environments in which to work. Open-ended research can lead anywhere, so the working environments sponsor many types of interactions

68 Site Model (Clive Wilkinson Architects)
What would otherwise be large mass of building is cut away with a series of volumetric open spaces. This maximizes eastern exposure and views into the garden.

69 "Fun" is central
to Google's concept of the successful innovative work environement. Employees constantly interact within the (over)stimulating environment, but can retreat into quiet private workspace if needed. (Time Magazine)

Spatial Typologies

The UII program has three classes of industry-related space:

1. Machining shops (light/heavy/assembly)
2. Administrative & research space (offices, meeting rooms, servant spaces)
3. Civic space – the institutional public face

These spaces, however, are by necessity fragmented and clustered with one another. Member entities in different stages of development require different types of space. A small logistics member will require a small office and little or no shop space. A mature manufacturing member might take up a large proportion of the heavy machine shop, but little office space.

In addition, other programmatic elements such as retail and residential will be included in the schemes.

Machining shops

The UII will provide full-service machine shop space to a limited number of mature members. It is imperative, however, that every member has access to some shop space, of appropriate size. This condition implies a facility with a few quite large machine spaces – 100,000 ft^2 or more – and many small shops – down to the size of a two-car garage. As members grow or change their methods, their space requirements will vary accordingly. To ease transitions between spaces (machinery can be tedious to move), a modular shop typology is practical, where members can simply take charge of multiple adjacent small shops.

Administrative & research space

Each member will require office space of some kind. The smallest members will simply carve this space out of their shop spaces. Medium-sized members will have offices, which will be organized to overlap space with one another in order to maximize interactions.

The administrative and executive branches of the UII will occupy offices separate from the member firms, but open to them.

Civic space

As a semi-public institution, the UII has a responsibility to allow visibility of its activities (within reason), as well as a selfish goal of improving public opinion. Therefore, the civic space is an important component of the Institute's program. The UII will exist partially in the public realm – physically as well as conceptually. In addition, the stated urban goals of the project imply a civic space that articulates a philosophy – nothing less than an ideal of how people should live and work together. The dimensions of the public space will vary according to the specific visibility and use requirements.

IV. Design Goals & Alternatives

Five Urban Goals

Retain & Enhance Industrial Activities

The primary needs of an industrial and research facility are: small, medium, and large building masses with minimized vertical movement of materials; easy access to transportation infrastructure; and accommodation of appropriate safety and privacy requirements.

Increase Citywide Connectivity

Along with the access needs of industry, this project has a goal of maximizing connections from Port Covington into its surrounding environment. These connections should be for pedestrians, vehicles, and furry creatures.

Responsible Environmental Strategy

Port Covington is surrounded on three sides by the Middle Branch of the Patapsco River. Any development plan should minimize detrimental effects to the vibrant Patapsco ecosystem, as well as facilitate public access to the water amenity.

Mixed Use

Housing, commerce, and retail should be included in the development plan. This will ensure that a vibrant neighborhood comes about, not just a built-up district.

Temporal Consciousness

The phasing of development should reflect a sensitivity to evolving uses within districts, blocks, and buildings. The plan represents a desired mix of activities on the site, not necessarily a final built reality.

Three Architectural Goals

Innovation

At the scale of the site plan and the building, the project seeks to establish methods by which architecture can instigate cooperation and heightened innovation. This primary directive goes hand in hand with the stated urban goal of integrated land uses.

Flexibility

The diverse nature of a business incubator means that companies will have varying and sometimes dynamic space requirements. A highly flexible organizational and building system will thus enable fluid growth of companies.

Symbol

In addition to accommodating the needs of its members, the institution will display a civic face to the outside world. This central focus, be it a building or public space, must have appropriate architectural expression.

Design Strategies

The design of such a large urban area is clearly an open-ended endeavor. People have many conceptions of what the city should be, and there are as many strategies as to how to get there. This project will examine several "extreme" strategies. It should be emphasized that the following processes are non-exclusive. They simply represent different value systems and starting points for urban form.

Status quo: consolidate and develop

This strategy posits a completely market-based development sequence, and weak or ambivalent government. Land will be divided according to desired parcel sizes, and projects will be designed relatively independently. Phasing occurs at the scale of the building or wing. This strategy can create a mix of uses on the district scale.

Urban Design: public space

Taking a cue from the original 19th century Baltimore platting, this strategy will impose a public-based geometry upon the site. Roads, parks, and other spaces will be built as public goods. Intervening lots will be developed according to predetermined desired land-use, allowing mixed-use at the building scale. Phasing occurs at the building scale.

Temporal integration

This strategy does not differ from the others in formal ways, but in process. Starting from a definition of architecture as a "container for desired activities," the process seeks to define an optimal mix of uses on the site. A prototype block or building type is then developed that:

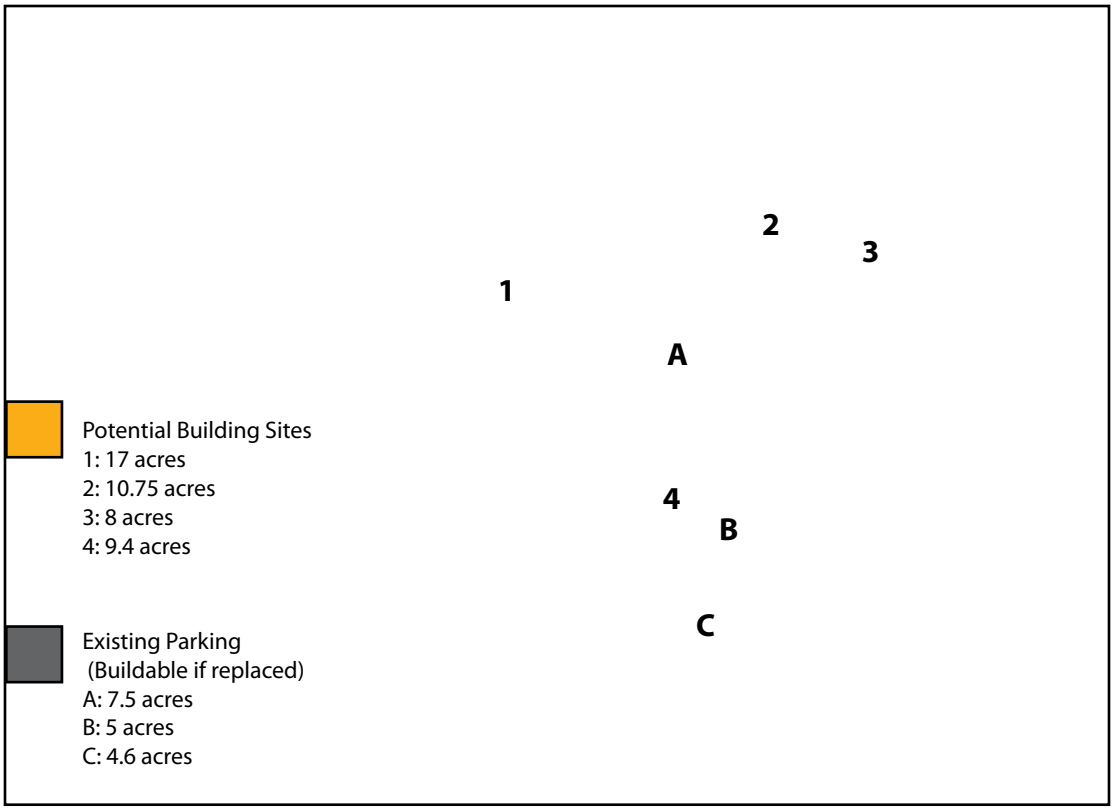
allows for the sharing of spaces by several user groups;

is not biased towards either public/private, indoor/outdoor, or living/working space;

has designed-in opportunities for flexibility and expansion;

Ideally, such an activity-based approach will lead to project that is generous to the public and the private users, can mix uses at the building scale and temporally within single spaces, and can allow for greater density with minimal detrimental effects.

Design Alternative - Status Quo



70 Parcel-based development
This most conservative strategy accommodates contemporary conventions and existing financial and political power structures. This strategy also meshes easily with existing structures. Four large sites are readily available with existing service roads and infrastructure accessibility.

New buildings would be of a similar scale to existing. Expansive sites will probably allow for single floor buildings. Adding structured parking will allow existing surface parking to be replaced by additional building mass.

Total buildable site area: 62.25 acres

Parking assumptions:
Wal-mart, Sam's club need:
5 spots/1,000 ft^2
120,000 ft^2/1,000 = 600 spots
5 story parking garage @ 120 ft X 300 ft =
36,000 ft^2 (.85 acres) per garage
Assuming 5 parking garages, net site area = 58.12 acres

@ FAR:
0.5 = 1.25 million ft^2
1.0 = 2.5 million ft^2
1.5 = 3.75 million ft^2
2.0 = 5 million ft^2

Design Alternative - Urban Design

71 Street Grid Extension
This process is predicated on the extension of some ideal urban fabric. In this case, the street grid from the 1822 legislated platting is adopted. In addition, existing structures are retained and integrated.

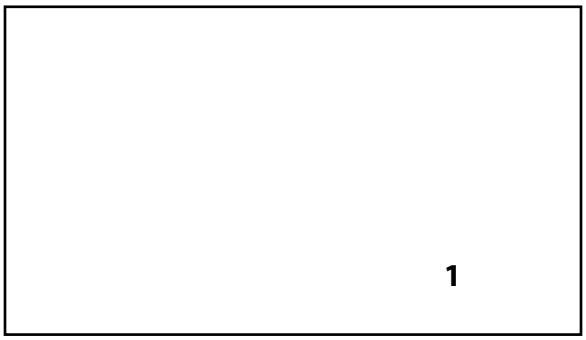
(1) The existing urban form of Port Covington demonstrates no clear relationship between several large building complexes.

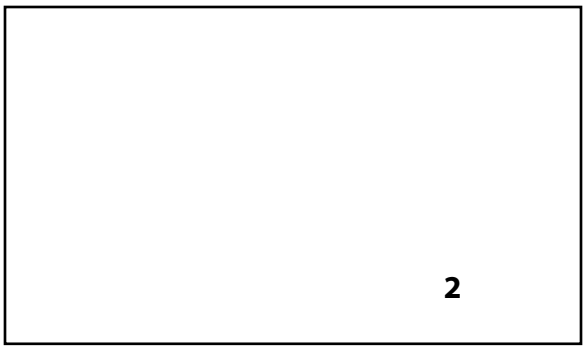
(2) The simple overlay of the 1822 grid onto the peninsula creates a situation of tension between the ideal democratic grid and the expressions of power represented by the monolithic, single story industrial buildings.

(3) A few edits and modifications to the grid resolve the discrepancies between building form and grid dimensions. The slack in the grid created by the irregular landform becomes conservation area. Charles Street is lofted to connect into the site along side the existing Hanover Street. Connections to the public green space at the site's edges are maximized.

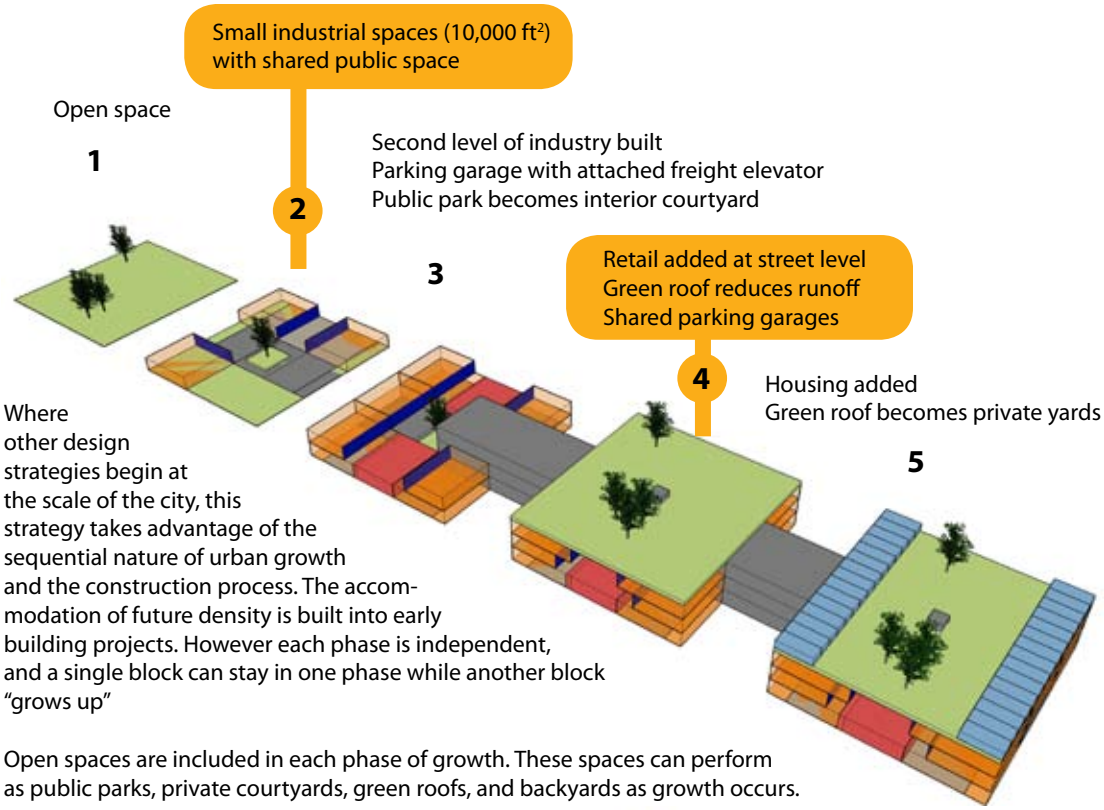
(4) Street hierarchy is developed by identifying significant through streets and paths to public spaces. This creates a pattern of partial superblocks with secondary through streets. Alleyways are indicated if desired. Block sizes range from 1.35 - 2.25 acres. (200-250 ft X 300-400ft)

(5) Land-uses are defined block by block. Space at the junction of the central two streets is retained for public green space. Industrial use dominates the south and west portions of the peninsula, while retail and residential use is clustered around the "main streets."



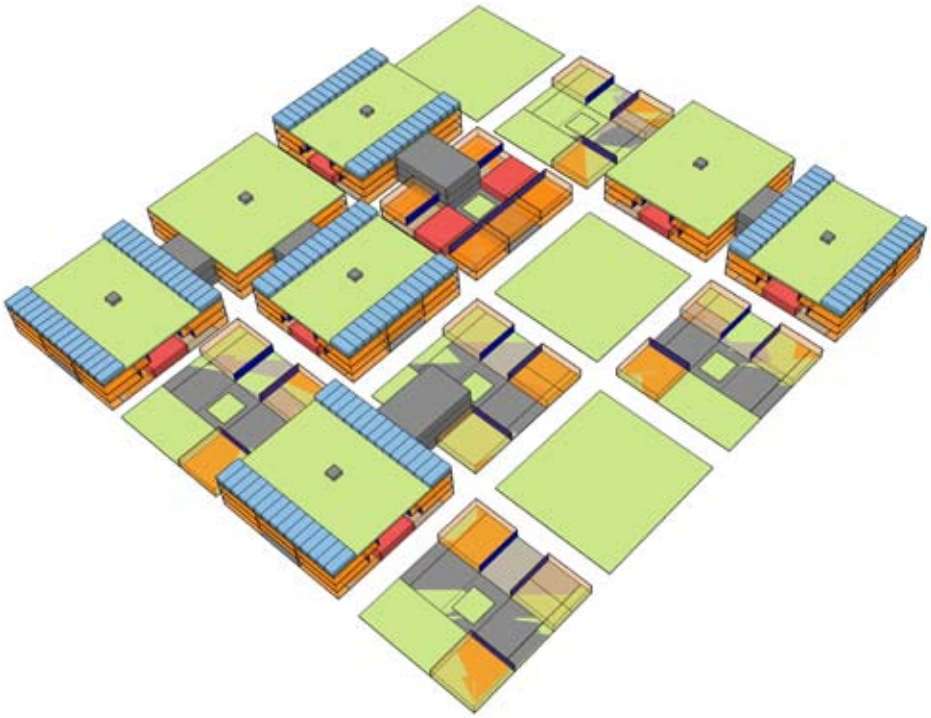


Design Alternative - Temporal Strategy



Where other design strategies begin at the scale of the city, this strategy takes advantage of the sequential nature of urban growth and the construction process. The accommodation of future density is built into early building projects. However each phase is independent, and a single block can stay in one phase while another block "grows up"

Open spaces are included in each phase of growth. These spaces can perform as public parks, private courtyards, green roofs, and backyards as growth occurs.

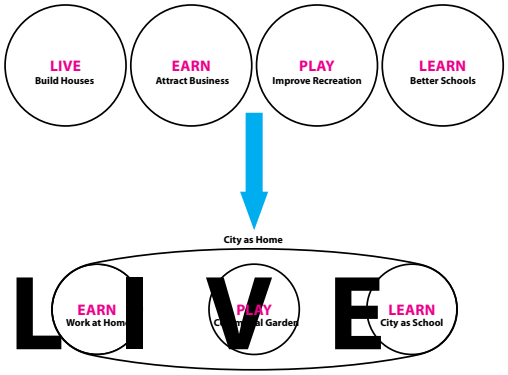


V. Design Development

Design Conclusions - Regional

The regional demands of the site implied several characteristics of the final design. The City of Baltimore Department of Planning's "Live - Earn - Play - Learn" mission statement was reformulated to become "LIVE," with earning, playing, and learning as sub-components of life.

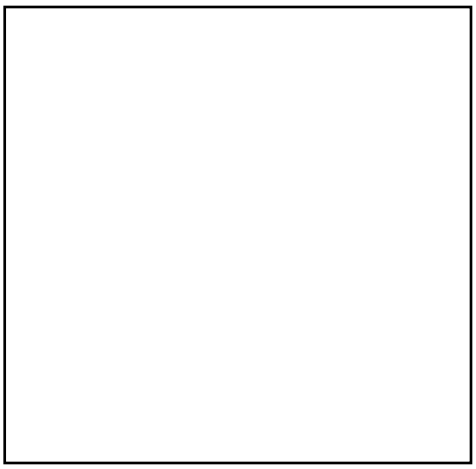
72 Planning concept



The diagrams below illustrate the design principles adhered to at several scales of urban design. The regional density gradient provided a strong cue as to final built mass on the site. The concept of the polycentric city, with intelligent connections between independent areas, led to a n idea about connections to the rest of Baltimore. The division of the site further into separate areas, led to intra-site density hierarchies, and the distribution of program within these areas was further developed.

73 Urban Organizational Diagrams

The centrality of Port Covington within the Baltimore metropolitan area implied a relatively high level of overall density. The final density level was 30-80 units/acre over the entire site.



74 Baltimore Place Names

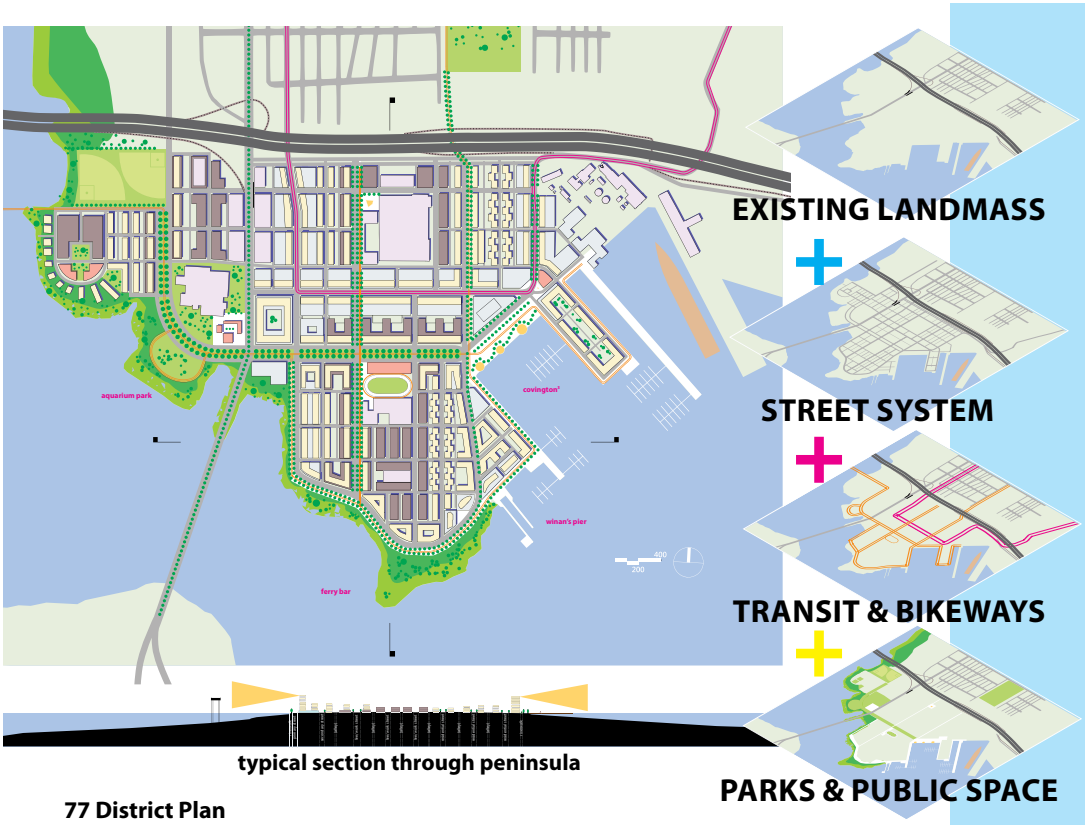
An urban fabric was developed that was at once coherent with the existing city and responsive to the peculiar demands of a live-work district.

75 Proposed Figure-Ground

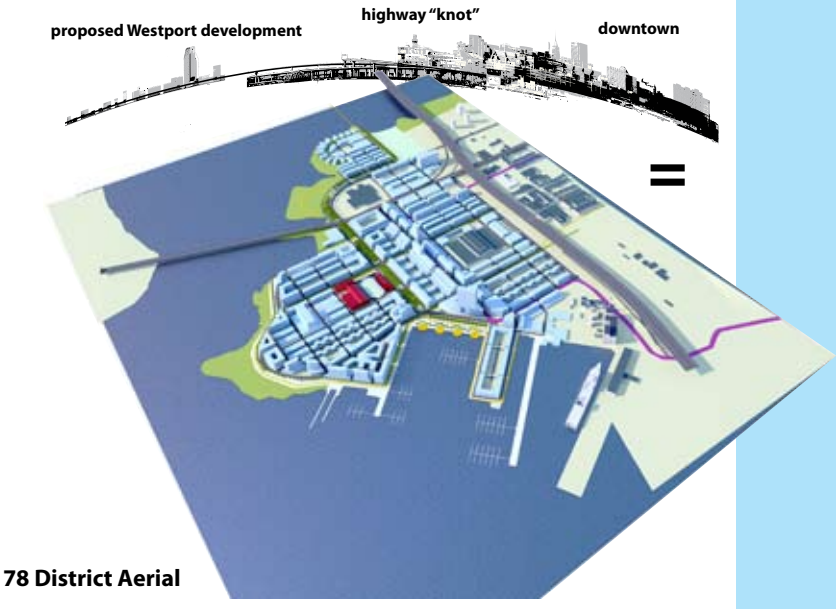
Connections between Port Covington and the rest of Baltimore were conceived of a the links between hubs, rather than the infinite extension of the city grid system. Transit, highway, local vehicle and bike/pedestrian routes were all considered and established.

76 Urban Connections

Design Conclusions - District



77 District Plan

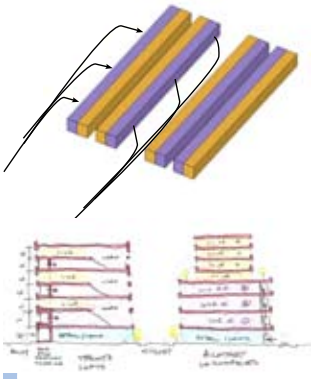


78 District Aerial

The design of the Port Covington Live-Work district was dominated by a few consideration. Several large-scale decisions shaped the site broadly, and attention to building typologies created communities from the small scale on up.

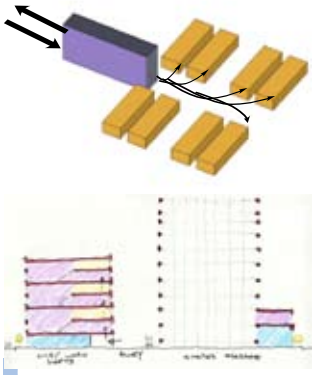
1 Individual Live/Work Spaces

Distributed Access
Commute = 0
Many Loading Areas
environmental overlap: High



2 Space as Public Good

Individual Live/Work Spaces
Concentrated Access
Commute = 0
Single Loading Area
environmental overlap: Medium

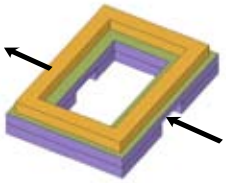


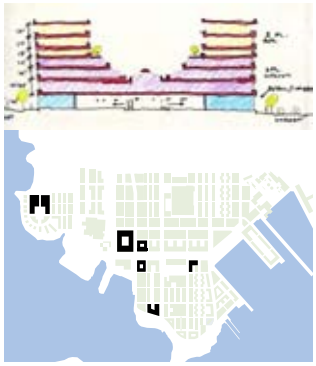
4 TYPES OF LIVE/WORK

79 Live/Work Typologies

3 Hôtel Industriel

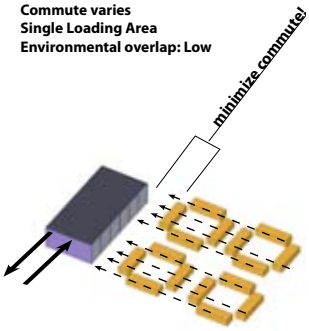
Share: Services
Individual Live/Work Spaces
Concentrated Access
Commute = 0
Single Loading Area
environmental overlap: Medium





4 Factory

Share: Workspace, Storage, Services
Individual Living Spaces
Concentrated Access
Commute varies
Single Loading Area
Environmental overlap: Low



80 Parking Concept

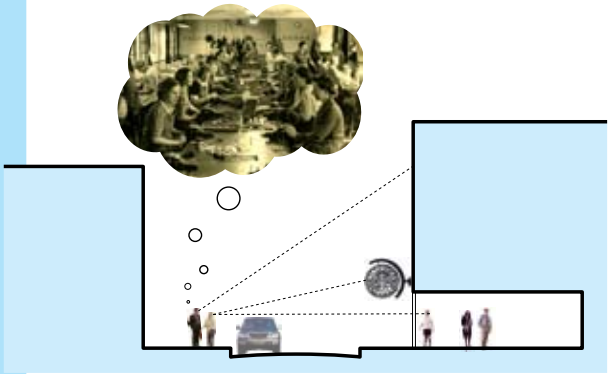
81 Urban systems

82 Pier/Wetlands Connection

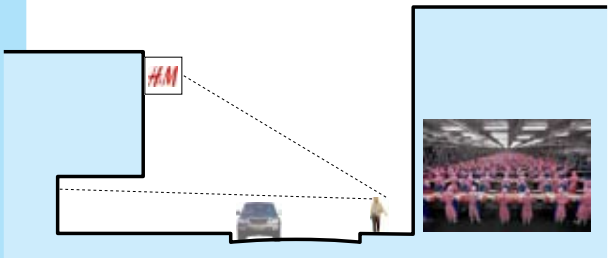
83 Urban Riverfrfont Plaza

84 Recreational "Beach"

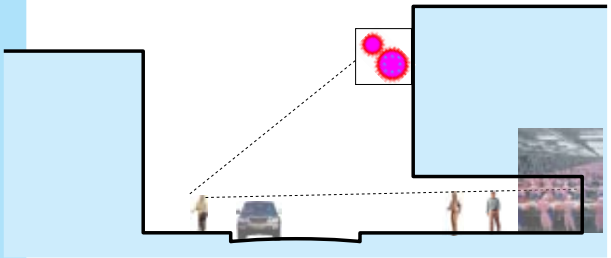
nostalgia



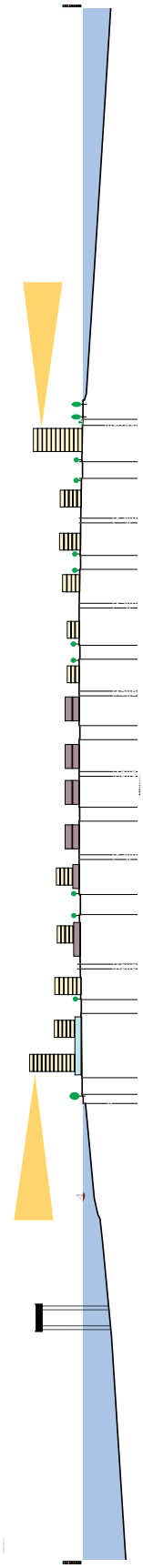
hidden function



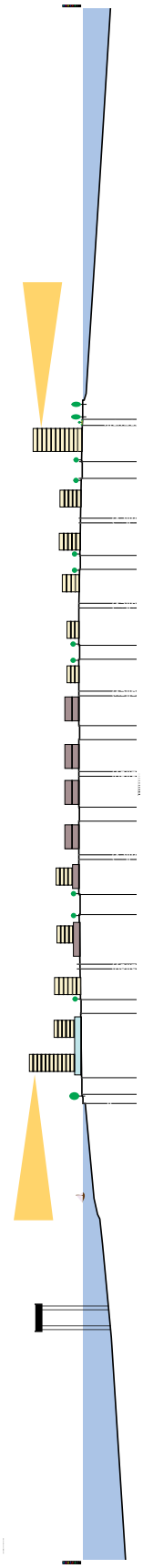
combination



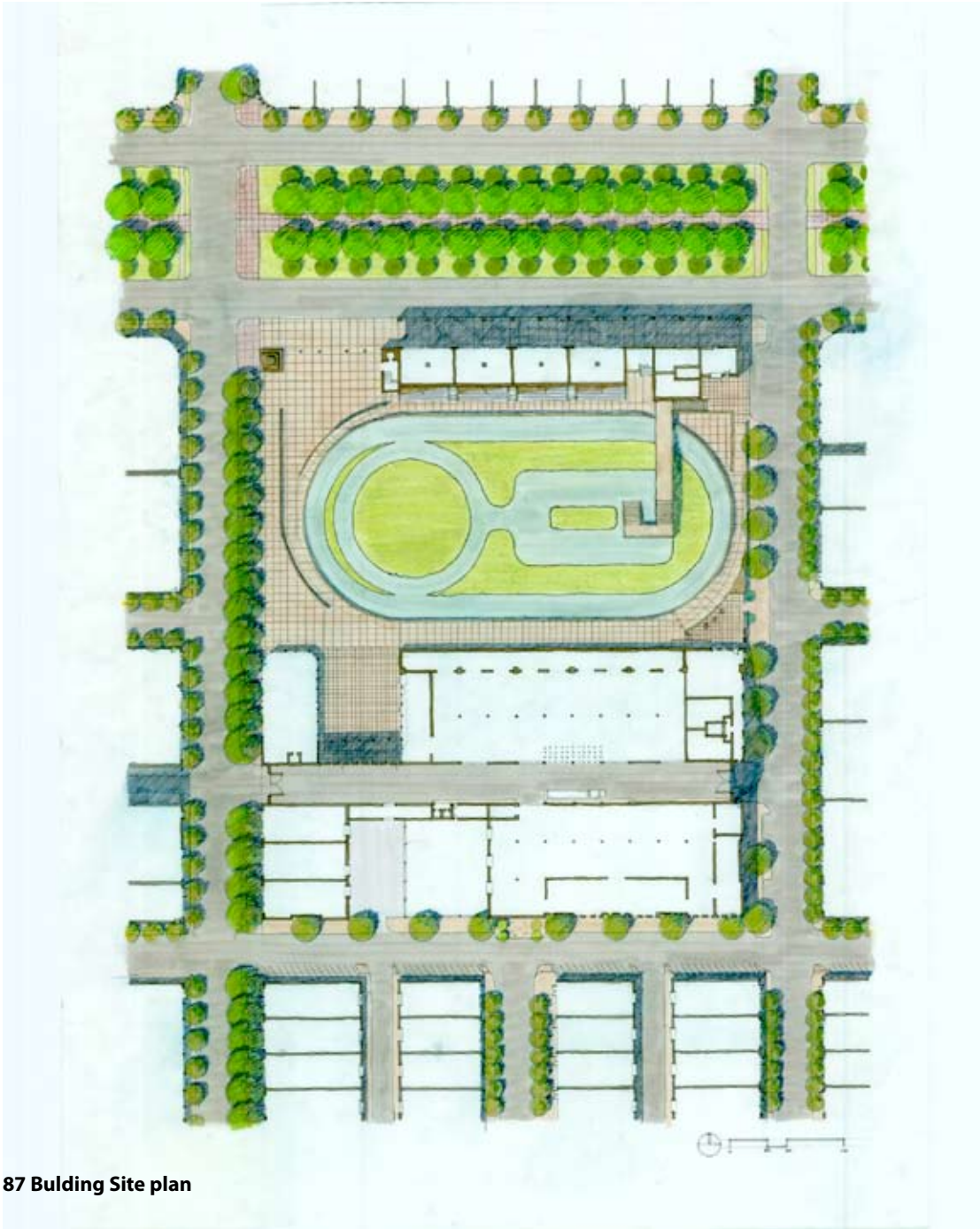
THE IMAGE OF INDUSTRY



86 Site Sections

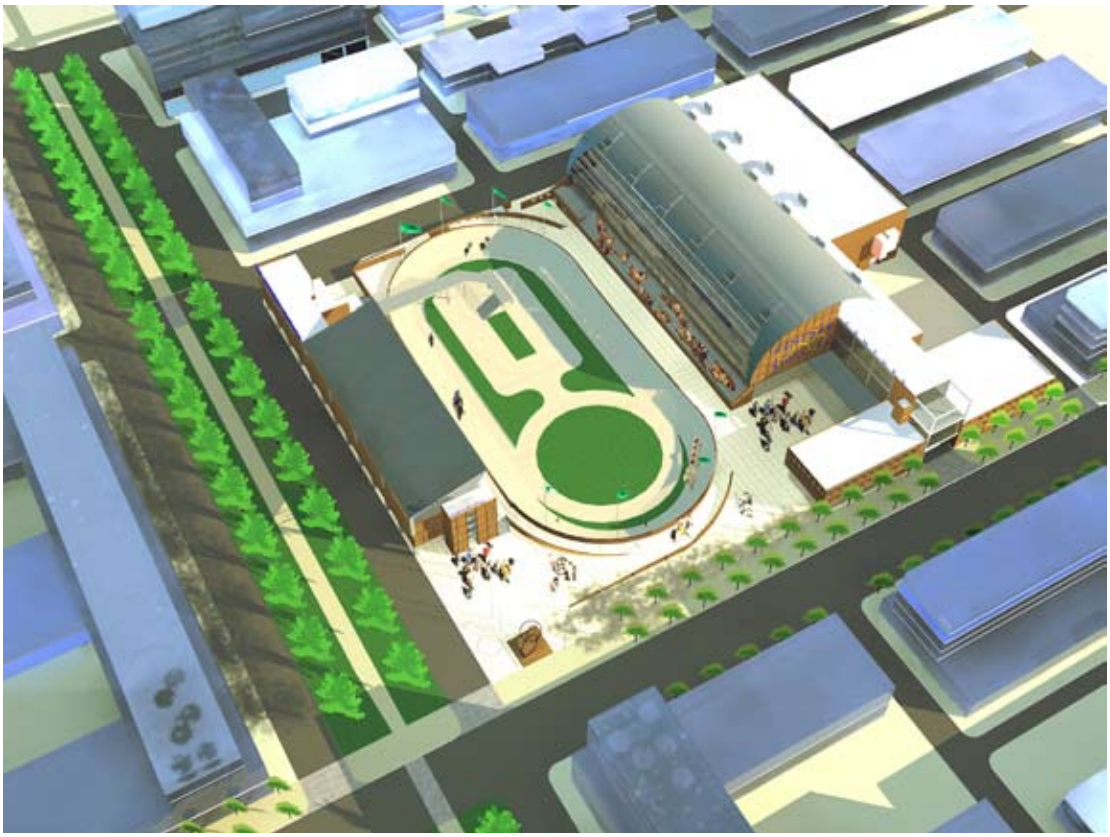


Design Conclusions - Building

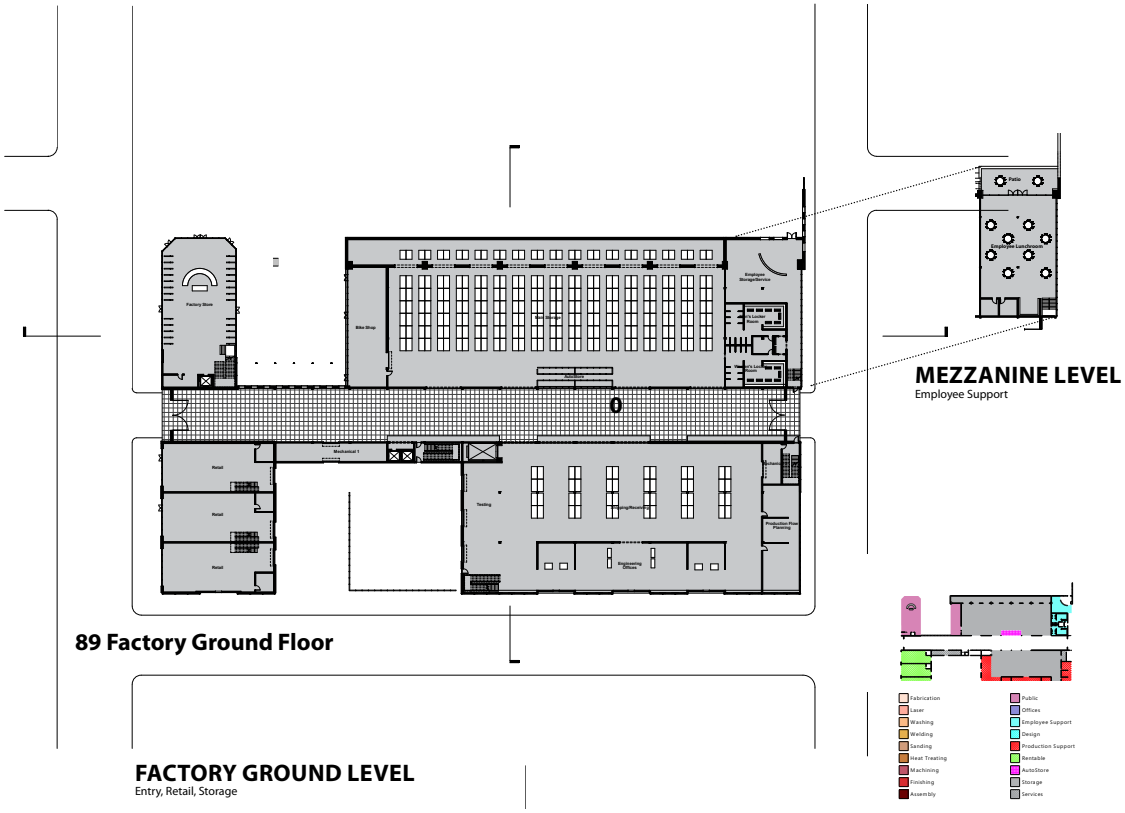


87 Bulding Site plan

The bicycle factory was integrated into the urban fabric by coordinating the structure with a large piece of public space - a velodrome. Through this public/private synergy, industrial, residential, and public space can be more easily mixed.

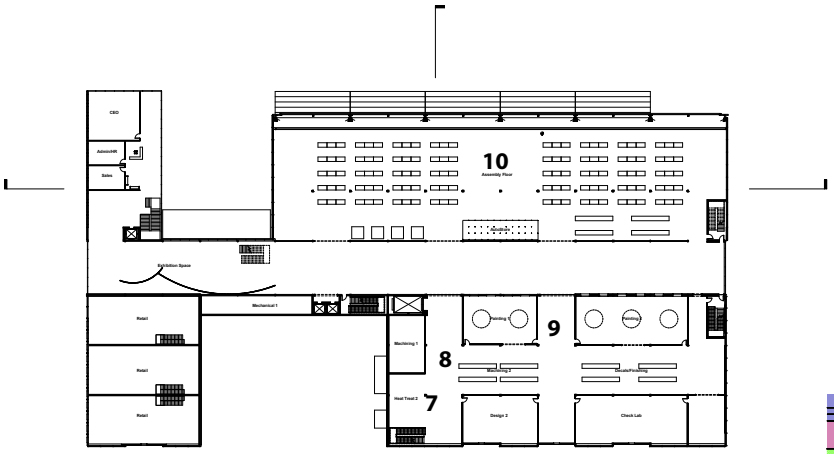


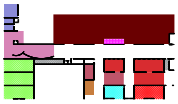
88 Building Aerial



89 Factory Ground Floor

FACTORY GROUND LEVEL
Entry, Retail, Storage



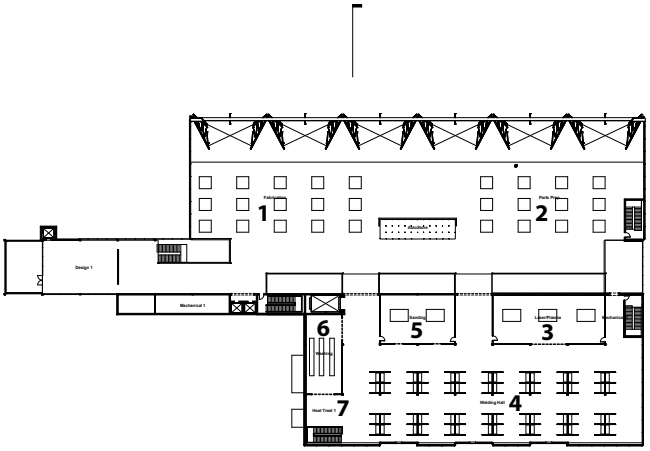


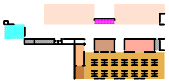
Fabrication
Laser
Washing
Welding
Sanding
Heat Treating
Machining
Finishing
Assembly
Public
Offices
Employee Support
Design
Production Support
Rentable
AutoStore
Storage
Services

LEVEL 2

Finishing, Assembly Floor, Offices

90 Factory Upper Floor Plans

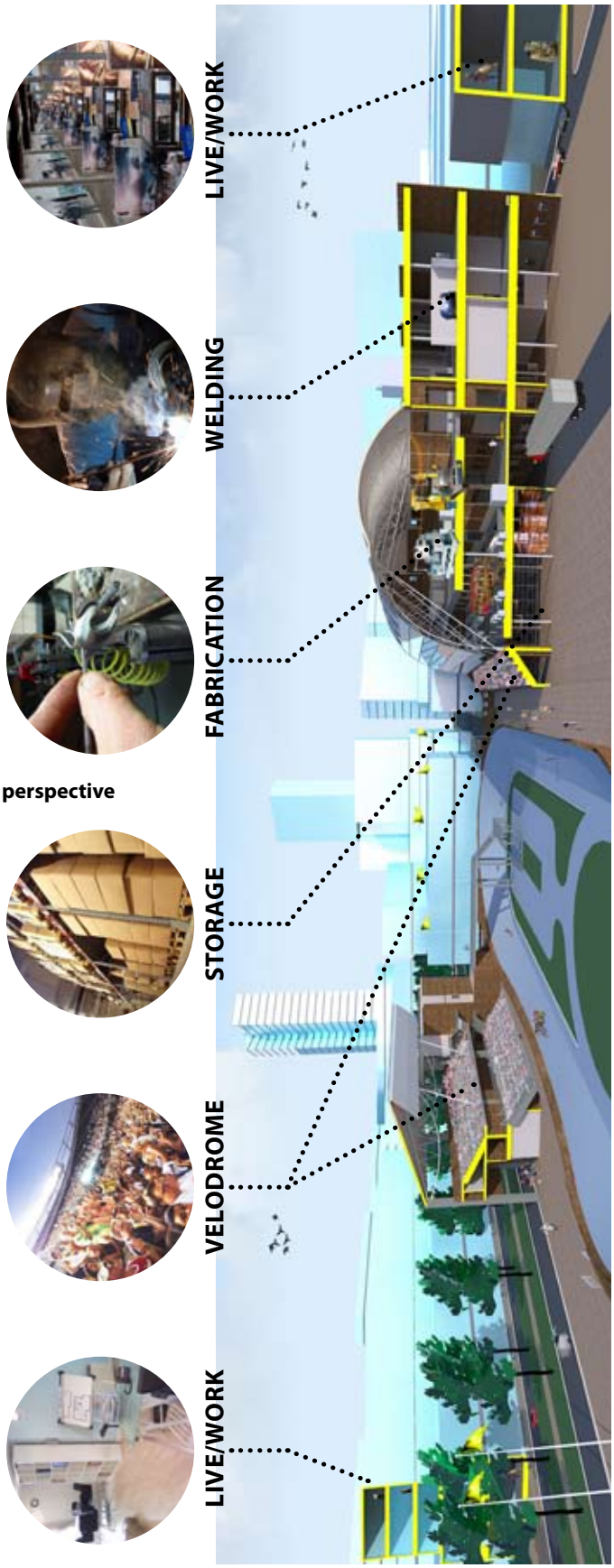




Fabrication
Laser
Washing
Welding
Sanding
Heat Treating
Machining
Finishing
Assembly
Public
Offices
Employee Support
Design
Production Support
Rentable
AutoStore
Storage
Services

LEVEL 3

Fabrication, Welding

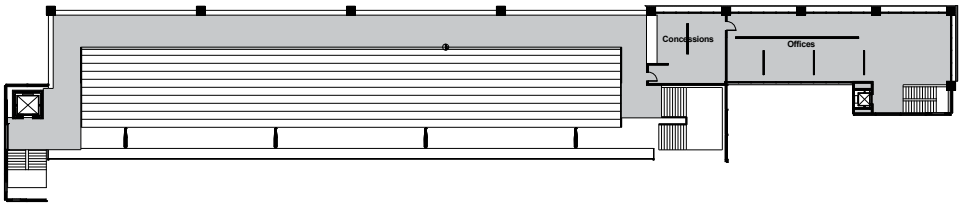


91 Building Section perspective

EAST-WEST SECTION

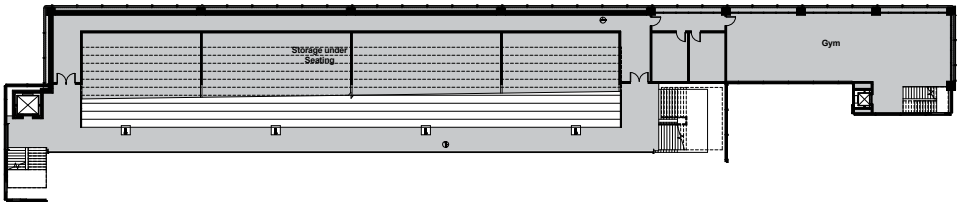
92 Bulding Sections

NORTH-SOUTH SECTION



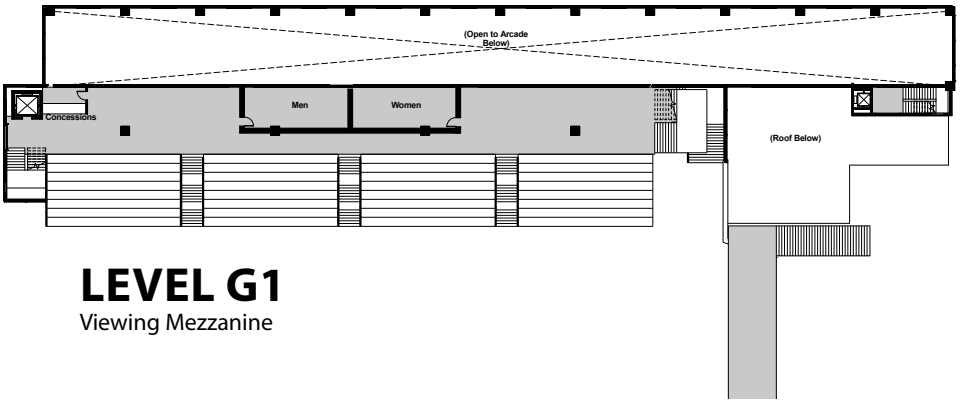
LEVEL G3

Seating, Offices



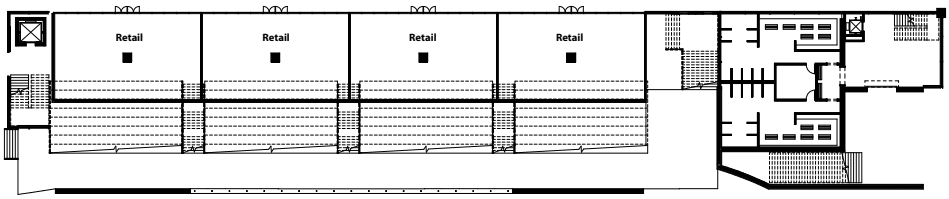
LEVEL G2

Storage, Gym



LEVEL G1

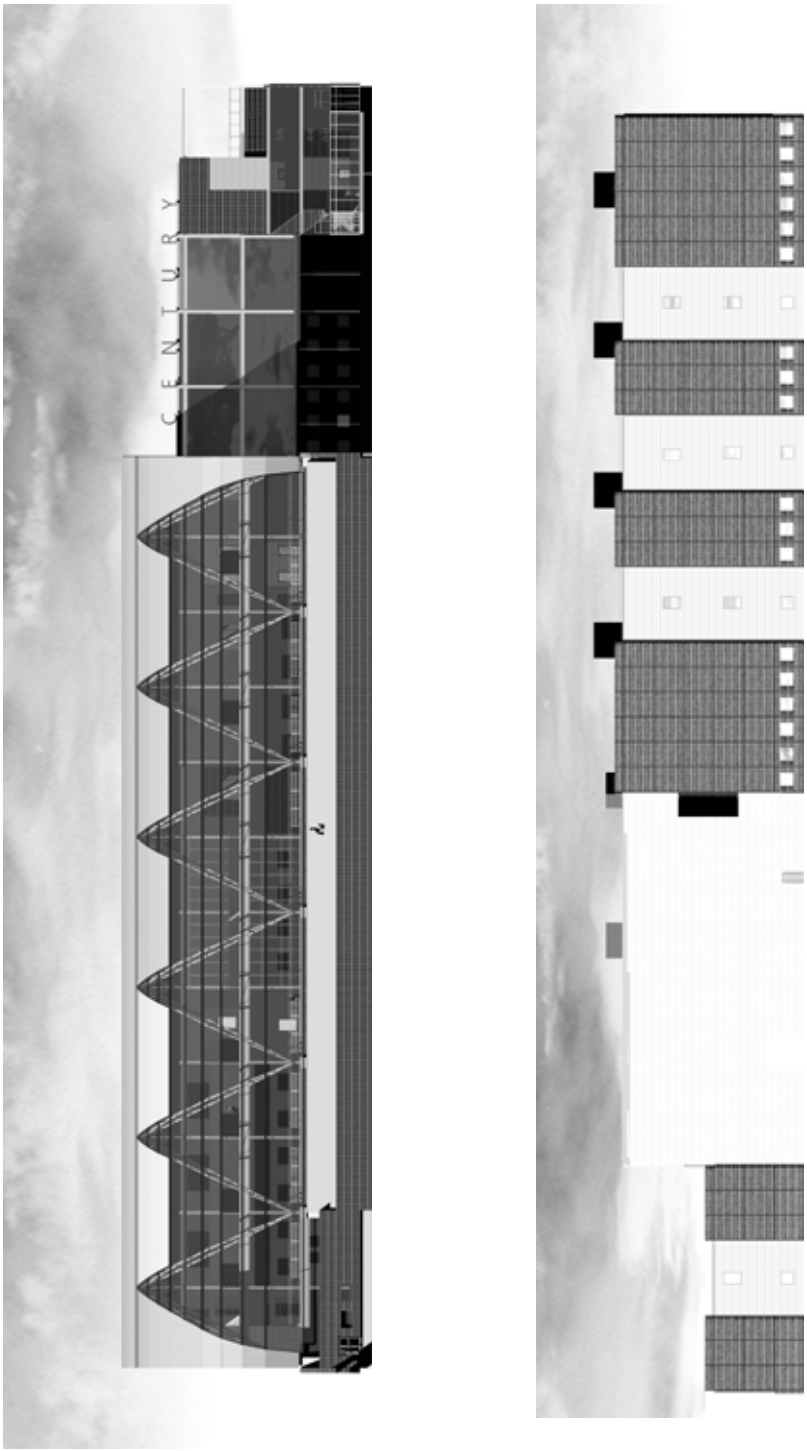
Viewing Mezzanine



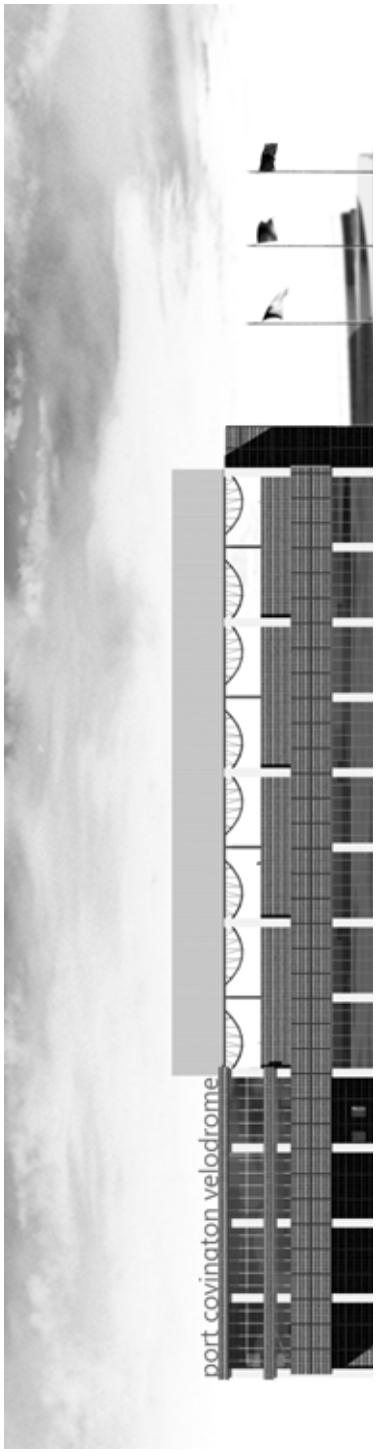
GRANDSTAND GROUND FLOOR

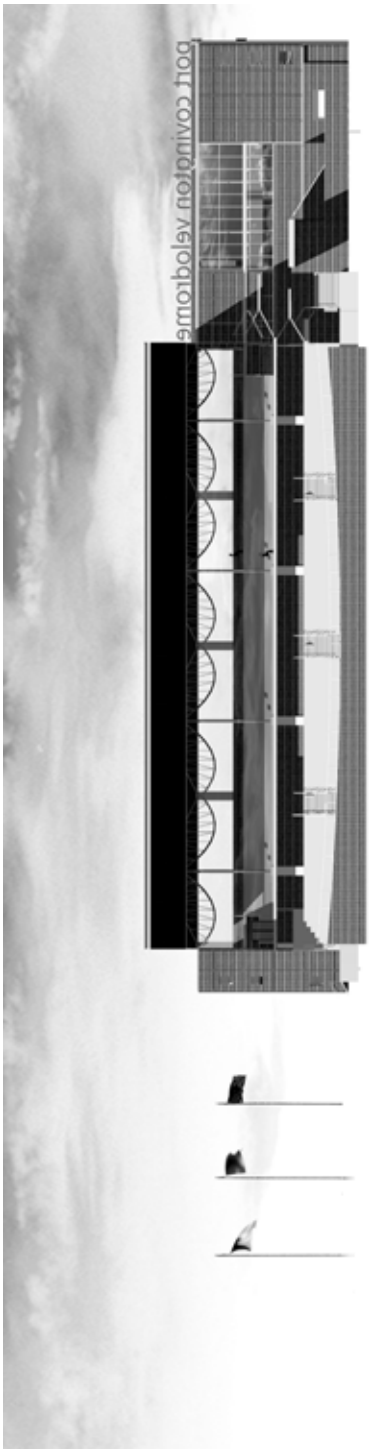
Entry, Retail, Locker Rooms

94 Factory North/South Elevations



95 Grandstand North/South Elevations



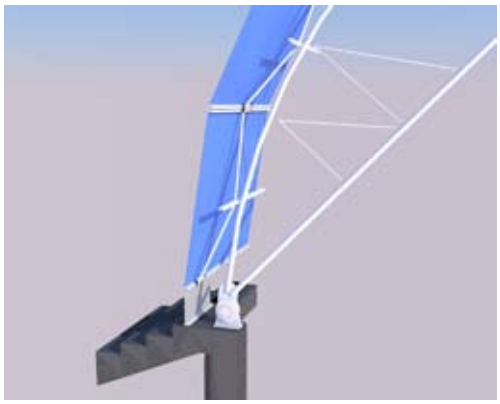


96 Building East/West Elevations

TECTONICS

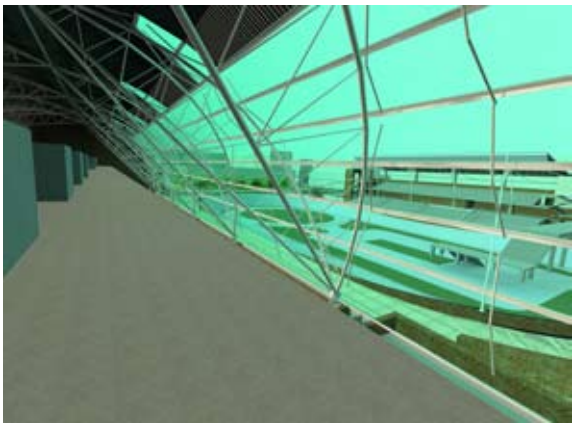
SINGLE PIECE
MANY CONFIGURATIONS

97 Trusses

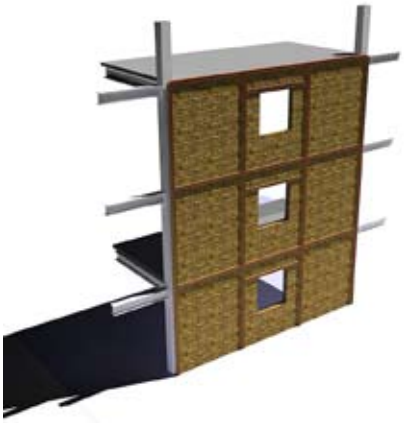


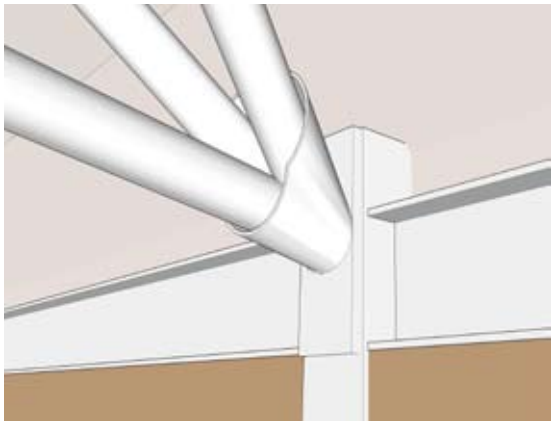
98 Glazing Connections

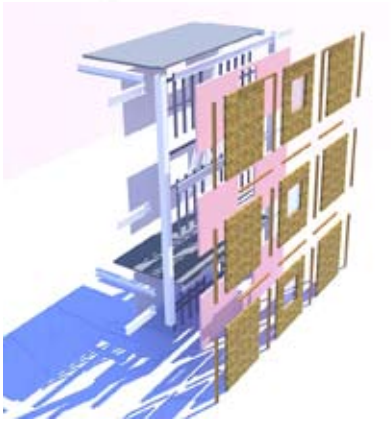
99 North Glazing Interior



101 Panelized Brick Curtain Wall

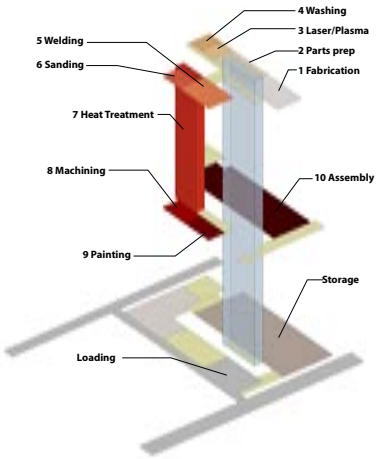




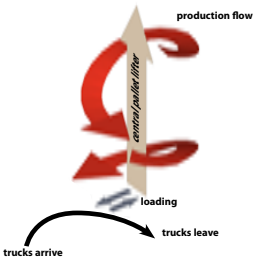


100 Truss Lug Connection

103 Program Organization

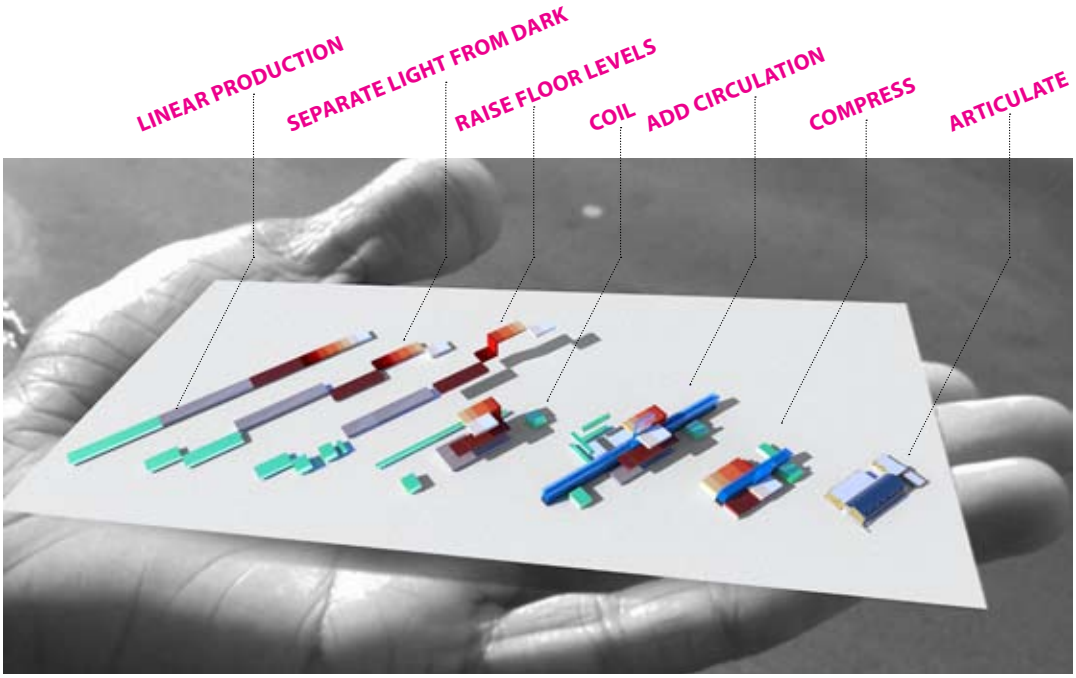


104 Production Flow



FACTORY ORGANIZATION

105 Factory design porcess

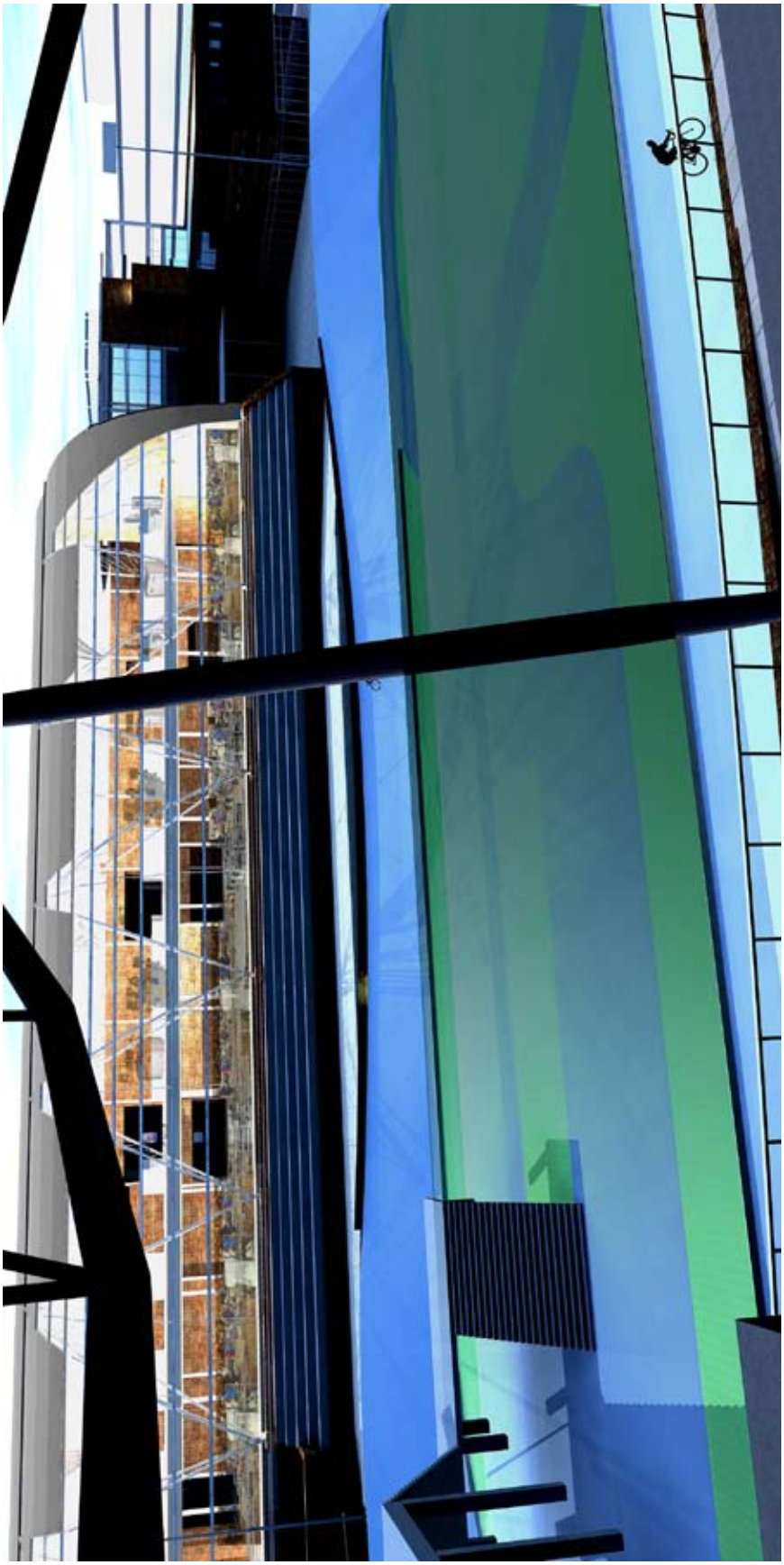


106 East Approach

108 West Approach

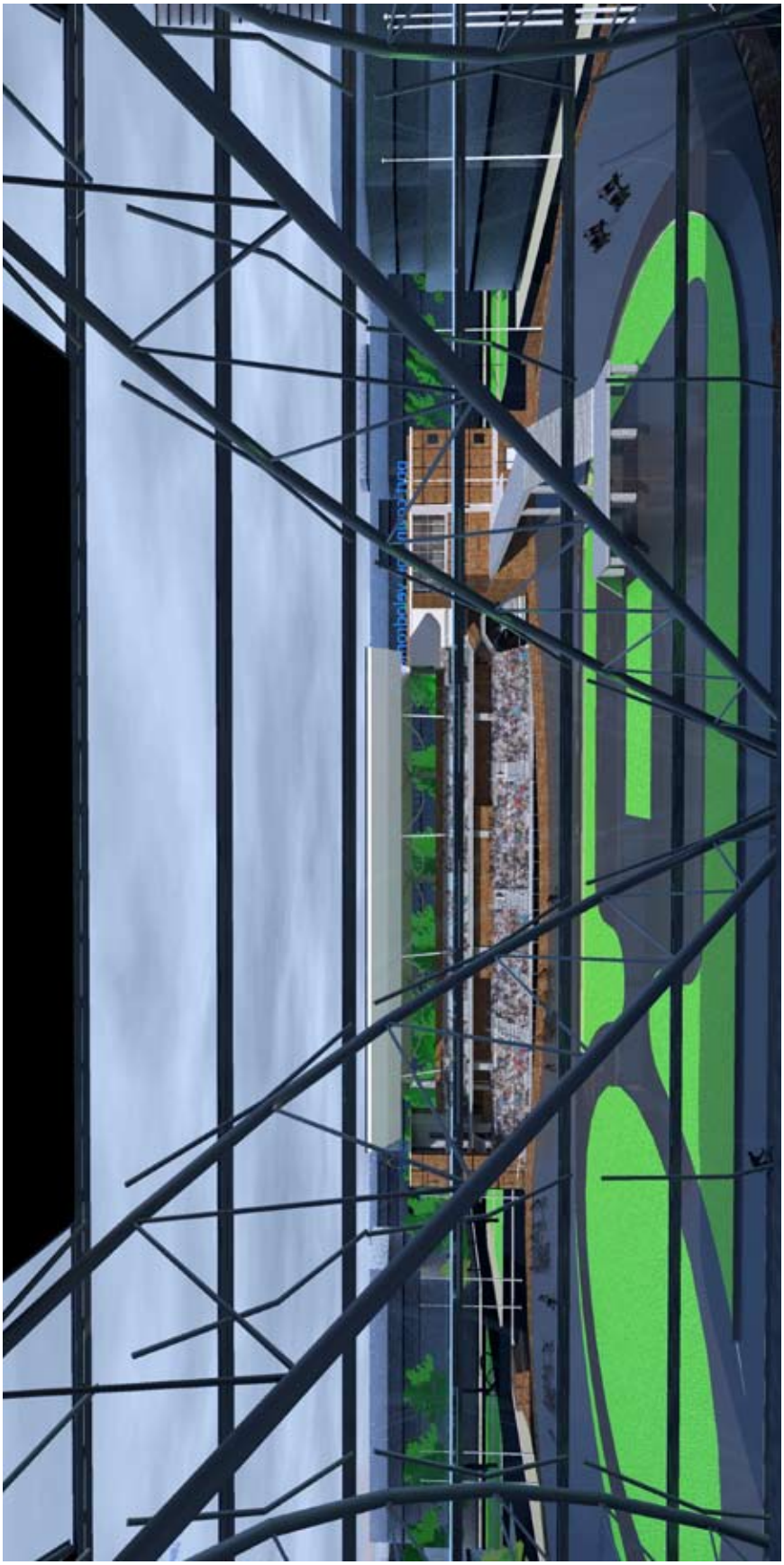
109 Public Entry

110 From Grandstand

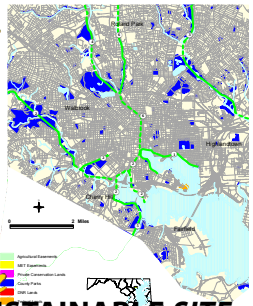


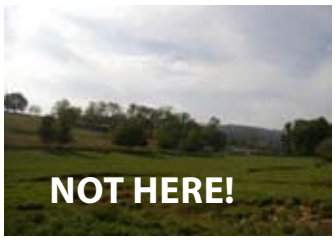
111 Factory interior

112 From Factory



SUSTAINABLE *REGION*

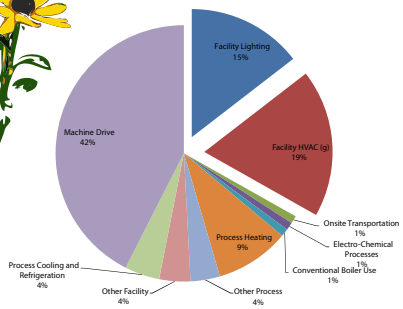




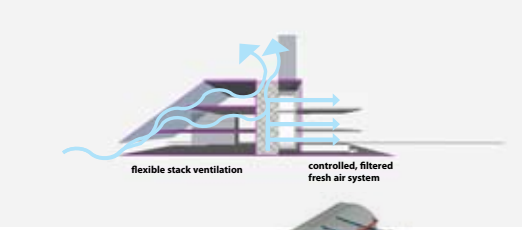
SUSTAINABLE *SITE*

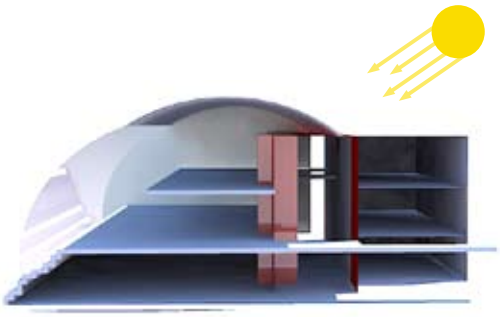
CONTINUOUS HABITAT

SUSTAINABLE *BUILDING*

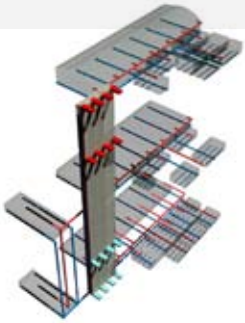


PRIORITIZATION





EVEN NORTH DAYLIGHTING



HVAC BREAKDOWN

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