



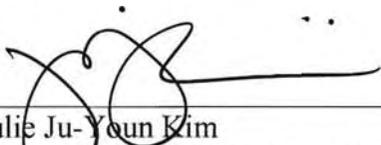
UNIVERSITY OF DETROIT MERCY
GRADUATE SCHOOL
MASTER'S PROJECT

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF ARCHITECTURE

TITLE: **Post-Industrial Environment Resuscitation**

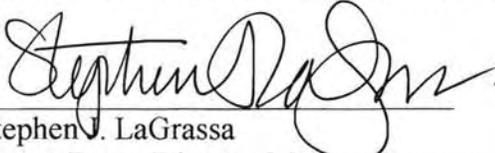
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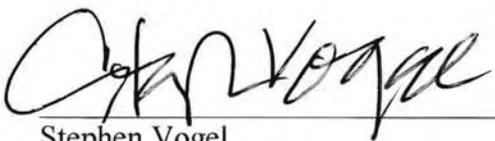
30 APRIL 2007
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POST-INDUSTRIAL ENVIRONMENT RESUSCITATION

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MASTER OF ARCHITECTURE
THE UNIVERSITY OF DETROIT MERCY
AR-510 & 520
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30 APRIL 2007

"Per Ardua."

To my parents, friends, family, and educators, thank you for your motivation, guidance, and understanding.

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THESIS ABSTRACT

This thesis seeks to investigate an architectural reaction to abandoned and underutilized waterfront post-industrial urban environments. The decay of these sites has had negative effects on their surrounding communities, including human separation from the riverfront, pollution, and lowered property values. The current negative attitude towards these environments needs to be reconsidered in such a way that a new light of potential can be cast upon them. The intent is to explore the post-industrial waterfront landscape as grounds for resuscitation in a new form, therefore renewing the lifecycle and purpose of these types of environments. What architectural response can eliminate the negative connotations associated with these environments and strive to exemplify the opportunities and benefits of reclaiming them?

PROJECT SUMMARY

“Post-Industrial Environment Resuscitation”

Former industrial belts line portions of the waterfront in cities across the nation. Evidence of the decline of activity in these zones exists in a multitude of abandoned and underutilized sites along these urban waterfronts. These sites were formerly the first locations of human settlement because of their proximity to the water, but today these post-industrial strips form a barrier between the waterfront and human interaction. These post-industrial urban environments decrease surrounding property values and are viewed as eyesores by their surrounding communities, but the perceived expense and difficulty associated with reclaiming them often prevents their redevelopment. What type of architectural intervention can take place in these environments that will restore human interaction with the waterfront while programmatically reintroducing some form of industrial activity?

Numerous benefits can be realized through the act of reclaiming and remediating post-industrial urban Brownfield landscapes. This thesis seeks to explore the post-industrial landscape as grounds for resuscitation in a new form. The process of recycling and remediating such an environment will concentrate on reusing portions of it and focusing on reestablishing connections to surrounding areas. The product of this investigation will strive to blend the built portion of the program with its surrounding natural environment in a way that exemplifies the renewal of the site while responding to its history. The aspirations of this exploration will be to transform a strip of land that was formerly a booming industrial center and redevelop it in a way that physically exemplifies its resuscitation and programmatically aims to restore some form of industry to the area.

THESIS POSITION

"But, for one Savannah there are a hundred squalid, pointless turnings-away from the American rivers. The hatred is almost pathological – the standard pattern of neglected banks, railroad yards, fag-ends of town pulling away their skirts from the too-too nasty mess. A whole book could be written on American river banks alone, for they form the biggest single waste of opportunity in the whole environment. And not only rivers – some places, fishing and tourist places, even actually manage to turn their backs on the sea. Just how disintegrated can urban life get?"

-Ian Nairn¹

Many urban waterfronts across the country are sitting in abandoned or underutilized states. Formerly the initial points of settlement of virtually every city in the nation, these environments now sit idle awaiting the next phase of their lifecycles. Industry engulfed the urban waterfronts in the early twentieth century and over time has left its trail of abandoned buildings and pollution as it has faded out of our city centers. With the help of governmental legislation and the encouragement of local officials many cities have begun to reclaim their post-industrial waterfront environments. We must learn from our historical mistakes in the realm of urban waterfront planning as we attempt to reclaim these post-industrial environments. Architects, planners, and developers must strive to recreate waterfronts that will benefit cities and their residents for decades to come. This thesis seeks to address architectural questions pertaining to post-industrial waterfront environments. How can abandoned urban post-industrial waterfront sites be reclaimed in a way that benefits the city, its population, and the surrounding environment while still maintaining a positive role in industry? What architectural response can eliminate the negative connotations associated with these environments and strive to exemplify the opportunities and benefits of reclaiming them?

HISTORY OF DEVELOPMENT ALONG THE WATERFRONT

In early times human settlement near the waterfront was not a choice, it was a necessity. Water was needed in its most essential form for drinking, irrigation, and early sanitation needs. It is then no wonder that the earliest settlements in the United States also were formed on the edge of some form of water. Evidence of this early prerequisite can still be found in America today. Of the seventy-five largest cities in the United States, only six are not located on a significant body of water.² However, the urban waterfronts of today's cities do not serve the same purpose as they have in the past.

The earliest form of settlement along the waterfront was that of

ribbon farms. The ribbon farms, typically managed by one family, drew water from the close source for irrigation purposes. The farms lined the water while small villages and cities began to form just behind the property of the farms. As time progressed and technology advanced new ways to divert water further away from the source allowed farms to move inland. The result was the vacancy of the waterfront properties. During this time period the waterfront took on the new role of servicing places of industry. Industry began to occupy the spaces in villages and cities adjacent to the waterfront. The water provided both the resources necessary for industrial production and a means of shipping and receiving for industrial facilities. Places of industry were developed quickly and at the largest scale possible. Production was to occur as quickly as possible with little regard for its effects on the environment. An unfortunate side effect of locating places of industry adjacent to the waterways was that they dumped byproducts and consequently pollution into them. The attitude during this time period was best summed up by modern day architect and environmentalist William McDonough, stating "If brute force doesn't work, you're not using enough of it!"³ Unfortunately the true effects of this approach would not be realized until many years later. The presence of industry along the riverfront continued well into the twentieth century.

Following the end of World War II the role of industry along the riverfront slowed dramatically. Factories and industrial facilities along the riverfront became old and outdated as industry downsized and technology advanced. Inadequacy and the expense of maintaining or redeveloping properties along the waterfront led most surviving places of industry to relocate elsewhere, mainly towards inland Greenfield locations. The harsh side effect of this change in the realm of industry was the abandonment and decay of former industrial urban waterfronts.

INDUSTRIAL ENVIRONMENT DECAY

Cities across the nation began to encounter a common problem with the decay of former industrial waterfront districts. Pollution and the lowering of surrounding property values became a major cause for concern for local governments and communities. The concept of former industrial environments being labeled as Brownfields began to emerge in the 1970s and 1980s when federal legislation was passed for the cleanup of polluted industrial sites. A "Brownfield" was defined as an underutilized or abandoned property with known or perceived environmental contamination associated with post industrial or waste disposal activities.⁴ It was at this time when the legislation for "Superfund" sites was also established as well as many other laws that govern the cleanup of contaminated places.⁵ The creation of such legislation was an important step because it marked the realization at the national level that there was an excessive

amount of polluted sites requiring remediation and redevelopment.

The problem with the Brownfield legislation early in its development was that it called for buyers of a given property to be responsible for cleaning up contamination from past activities that occurred on the spot. No responsibility was given to the parties or previous owners who had attributed to the polluted state of the properties being purchased. This led to the creation of a very risky real estate market in terms of commercial and industrial properties. Buyers were reluctant to purchase property for fear of finding it to be contaminated and thus being forced to pay exorbitant amounts of money to clean and redevelop it. Sellers of these types of properties were also reluctant to get involved for fear of being listed as liable by being part of the chain of title.

The result of this underdeveloped and often unfair legislation was that many former industrial properties were left abandoned to decay for several years or decades. The perceived costs with cleaning up or redeveloping these types of environments led to their further decay. The historically industrial portions of cities, often of the waterfront variety at the heart of this investigation, were disregarded to the point that their property values diminished as well as the values of their surrounding neighborhoods and downtown districts. Developers and new industrial ventures chose to seek out Greenfield sites never before developed because they held no potential pollution or resultant costs to clean up before new construction could begin on them. In essence it became "cheaper to buy a new faucet than to fix a leaky one" in terms of industrial properties and facilities.

Industry therefore consumed more land and materials by developing or relocating to Greenfield sites to construct new facilities. Farms and open fields on the "outskirts" of towns and cities became the new industrial centers. The former industrial belts were left to live up to their name until new initiatives could be put in place to encourage their reclamation and redevelopment. It was in fact on the city and state level where these initiatives to help clean former industrial sites truly began to take form. While the number of underutilized and abandoned sites continued to grow, states such as Minnesota and Michigan began introducing and encouraging "Brownfield" legislation and voluntary cleanup programs during the 1990s. It was through these initial schemes that the Voluntary Cleanup Programs (VCPs) and financial initiatives that are available for Brownfield redevelopment today were started.

With the programs and legislation in place today it is becoming financially feasible and therefore attractive to developers, industrial ventures, and city officials to attempt to resuscitate former industrial waterfront sites in urban areas. The task at hand, and a main intent of this investigation, is to present an architectural response to these types of environments that will help to eliminate the negative connotations associated with them while striving to exemplify the opportunities and benefits of re-

claiming them. What type of architectural intervention can take place in these environments that will restore human interaction with the waterfront while programmatically reintroducing some form of industry/commerce to the area?

SITE HISTORY

Grand Rapids, Michigan – Furniture Industry along the Riverfront
The site selected for this investigation is located along the banks of the Grand River just south of what is considered downtown Grand Rapids, Michigan. This strip of land flanking the river was formerly the industrial center of a city initially known for its production of furniture. Grand Rapids was first known as "The Furniture Capital of America." The first furniture makers practicing in Grand Rapids can be traced back to the 1850s. The Widdicomb Furniture Factory, The Grand Rapids Chair Company, and Steelcase are among the many furniture companies to be founded in Grand Rapids between 1850 and 1915.

The industrial activity of Grand Rapids initially settled near the river as was the common trend of the time. The river was a resource necessary for production and shipping. The effect of placing the industrial activity adjacent to the Grand River was that it physically and psychologically cut off all forms of pedestrian interaction with the riverfront. The industrial production in this region of the city slowed around 1950, as factories became outdated and the pattern of settlement shifted away from the central city outward towards suburbs. Since that time a slow decay has occurred along this strip of land similar to the decay happening across the "rust belt" following the end of World War II.

What remains along this strip today is a series of underutilized and abandoned properties that serve as a barrier between residential neighborhoods and the Grand River. Remnants of the former furniture industry still exist today in the form of heavy brick abandoned factory buildings adjacent to the water. Two to four story industrial structures occupy the strip and a railway cuts through the heart of it crossing the Grand River in the form of an old iron bridge. A natural island exists between the banks of the river providing an attractive segment of vegetation in the middle of an otherwise desolate and seemingly uninhabited district.

It is in the area described above that the heart of this investigation will take place. How can a portion of this former industrial riverfront be re-suscitated in a way that reconnects the people of the surrounding Grand Rapids neighborhoods to the Grand River? Can a portion of the existing buildings which were once the heart of the furniture production industry of the city be reused in a way that addresses the rich history of the site? Can a new form of industry/commerce be introduced to the site in such a way that it can coexist with the flow of people to and from the riverfront?

PROGRAMMING & DESIGN

It is important for the program of this investigation to address the history and surrounding context of the selected site. Furniture design and manufacturing still plays a large role in industry in the Grand Rapids area. For this reason, the aspiration of this program is to provide a resource to educate students and professionals seeking knowledge about the aspects of today's furniture business, from design and research to marketing and sales. The site chosen for this study must thoroughly be reconnected to its surrounding natural environment and built context. Folding this program into the selected site will permit the transformation and redevelopment of a strip of land that was formerly a booming furniture producing industrial center while still addressing its history on a programmatic level. The site and the built fabric that will occupy it produced by this investigation must strive to physically and visually reconnect the city to the riverfront. Careful consideration of site lines and opportunities for pedestrian traffic through the site should be carefully considered throughout the design process. A general attitude towards the redevelopment of the area surrounding the chosen site must also be established in order to further convey the sense of reconnection to the city, its neighborhoods, its people, and its surrounding natural environment.

Incorporating concepts of sustainable design will further integrate the facility that is to be woven into this site. While "green design" will not be the focus of this investigation, it is inherent that some of its principles will be used to fabricate this facility. Sustainable design decisions will further support the underpinnings of this investigation to cast a new shadow of opportunity upon former industrial waterfront landscapes such as this one. The selection of a program which responds to the historical activity that once occupied the selected site will serve as another tool to reconnect the end result of this investigation to the city of Grand Rapids. Ties to the modern day furniture industry of Grand Rapids will reestablish the former industrial area as a useful and productive portion of the city. Such a program will exemplify the possible benefits of reclaiming this abandoned and underutilized former industrial area.

Pursuing the program described above will allow the resultant facility to reconnect to the local economy and job market while physically exemplifying the site's resuscitation and reconnection to the city. Considerable efforts must be made to redevelop the site in a way that carefully balances the mix of industry and human interaction with the riverfront.

"Waterfront work uses, which are often interesting, should not be blocked off from ordinary view for interminable stretches, and the water itself thereby blocked off from city view too at the ground level....Near where I live is an old open dock, the only one for miles, next to a huge Department of Sanitation incinerator and scow storage. The dock is used for eel fishing, sunbathing, kite flying, car tinkering, picnicking, bicycle riding, ice cream and hot dog vending, waving at passing boats, and general kibitzing....You could not find a happier place on a hot summer evening or a lazy summer Sunday....Penetrations into working waterfronts need to be right where the work (loading, unloading, docking) goes on to either side, rather than segregated where there is nothing much to see."

-Jane Jacobs⁶

What Jane Jacobs discussed over four decades ago should still hold true today, but we must attempt to adjust our urban waterfronts to match society's current mix of industry and desire for human connection to the water's edge. This thesis recognizes the nationwide issue of underutilized and abandoned post-industrial waterfront environments, and seeks to suggest an architectural response to the situation. These environments can no longer be permitted to serve as barriers between the city and the waterfront. The physical, psychological, and environmental decay of sites must be reversed such that they provide healthy and productive habitats for both society and nature. This investigation understands the requirements of today's industry and seeks to develop a method of interweaving them into the urban waterfront landscape. Industrial activity and human interaction must find a way to coexist with one another in these locations, thus establishing a healthy and productive working waterfront.

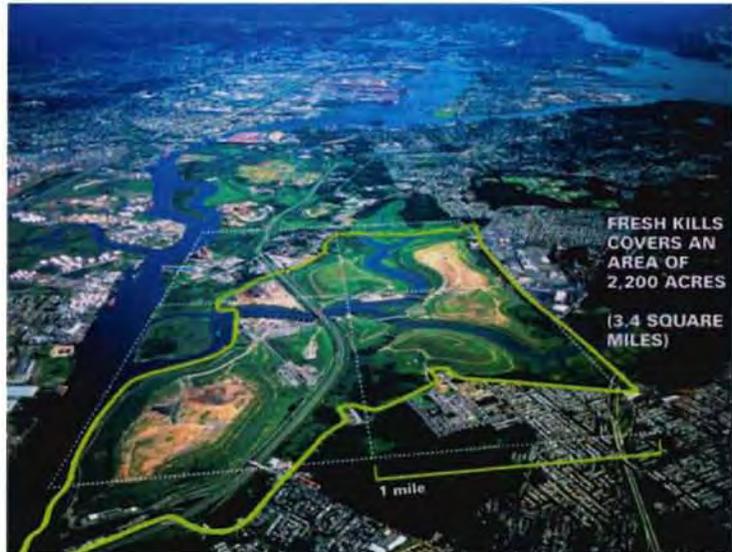
FRESH KILLS LANDFILL TO LANDSCAPE

STATEN ISLAND, NY. DESIGN COMPETITION. 2002

Project Synopsis

At 2,200 acres, the Fresh Kills Landfill on Staten Island in New York was the largest landfill in the world until citizen involvement led to its closure in March of 2001. The landfill was then considered public land which led to an international competition to design its future use. At the competition brief those planning to enter a design were encouraged to "Set new standards for landscape, architectural, and environmental design."

The winning design, titled "Lifescape" by Field Operations, was based on their analysis of the landfill and its surrounding environment as a series of threads, islands and mats. This concept focuses on the power of nature's flexibility & fecundity to create an educational park in the process. Additional design consideration had to be made after the landfill was reopened in order to respond to the tragedy of September 11. Debris from the World Trade Center was transported to the landfill to be sorted and stored, transforming part of the site from being considered an eyesore to becoming nationally consecrated ground.



Relevance to My Investigation

This project strongly relates to my project in terms of its desire to remediate and reclaim a site that has been negatively impacted by industry. This project also has educational implications incorporated into its product intended to teach the public about the environment and how to better care for it.



Strengths of the Project

The major strength of the Fresh Kills Landfill to Landscape Competition that can be related to my thesis study is the attempt to reclaim the landscape of a former industrial site. The Fresh Kills Landfill is a highly contaminated Brownfield site. Rather than allowing the site to be left abandoned and destroying its surrounding environment, this project seeks to intervene and resuscitate the struggling environment. The proposals for the reclamation and remediation of the landfill also seek to better the overall image of Staten Island by reusing it as a large and desirable public space.

The winning design by Field Operations, titled Lifescape, aims to strategically revegetate the landfill. The part of the Field Operations design that I found to be most intriguing was their breaking down of the landscape into a series of "threads, islands, and mats."



The threads refer to incorporating better circulation patterns into the site. This idea of circulation includes plants and animals as well as human circulation. This strategy seems thoughtful and successful to me because circulation is vital to the remediation of the lifecycle of the site. Plants and animals need to circulate and replenish themselves throughout the entire local environment in order for it to truly be rebuilt. The human circulation will allow people to see the different portions of the site and understand the remediation techniques as they occur throughout the site.

The islands refer to centralized areas of activity throughout the site. This is a strong concept to me because these islands will grow outward over time and begin to reclaim the entire site. They remind me of bursts of life intended to spread out over the site as time goes on. The islands also have architectural implications which will keep human impacts organized and centralized at different areas around the site. The idea of focusing on "islands" within a site as bursts of energy and areas to grow from is one that I will take with me from this precedent study and hope to incorporate into the product of my investigation.

The idea of "mats" within the Fresh Kills Landfill is a site specific attempt to revitalize a local environment. The Fresh Kills habitat once included multiple salt marshes which have been deteriorated over time. This portion of Field Operations' plan hopes to revitalize these salt marsh islands on a local scale. The strength of this gesture to me is the remediation and preservation of a localized environmental circumstance. Upon revitalization these marshes will also show human visitors what the site environment used to be like. I think it is important to restore native species and environments to the site whenever possible and I will strive to incorporate this technique into the product of my thesis.

Another interesting aspect of the Field Operations design was their attempt to inject portions of habitat onto the site that were not native to the

area as a means to educate human visitors about other environmental habitats that exist around the world. This concept of "eco-tainment" could be used to further educate people about how delicate some environments can be and show why we need to be careful with our impacts on them in the future. "Eco-tainment," a combination of ecology and entertainment, is an interesting concept to consider for my thesis, especially in relation to my interest in educating the public about reducing the impact of industry on the environment.

The Fresh Kills Landfill to Landscape project also sparked my thinking about the many layers that form conceptually and figuratively on a site throughout its lifecycle. There are physically many layers that makeup the site at Fresh Kills, but conceptually this same way of thinking can be applied to almost any site. From the surface the a site may appear flat and simple, but from a sectional standpoint it may be very layered and complex. It is likely that the product of my thesis will strive to include an understanding of the many "layers" that have become intertwined with my chosen site throughout its lifecycle. Perhaps this understanding of the history of the site will even begin to project future conditions and circumstances that will exist in my chosen environment.



THE HIGHLINE DEVELOPMENT

NEW YORK CITY, NY. FIELD OPERATIONS. 2004-PRESENT

Project Synopsis

The High Line in the City of New York is a 22-block elevated railway on the west side of Manhattan that was first constructed in 1929. It originally carried freight trains above the busy city streets, but was closed in 1980 after the need for its tracks declined. After being abandoned for nearly 30 years, a 1.5 mile stretch of the High Line has been saved from demolition and is now planned to be transformed into a public space. A firm by the name of Field Operations won a design competition for the future elevated park.



Their overall plan for the High Line is to create an easily accessible, quiet, and natural public space to be enjoyed by all pedestrians who meander along it.

Relevance to My Investigation

The High Line development project in the City of New York is important to my study because it involves the creative reuse of a former industrial environment. The High Line development embraces the history of the elevated structure and seeks to preserve and reclaim its grounds in a way that will make it conducive to everyday human interaction.



Strengths of the Project

There are several strengths of this project that relate to my thesis study. The redevelopment of the High Line in New York is most importantly a reuse of a former industrial site. Local constituents and City officials realized that the High Line had both historical value and potential to become something great for their city. Rather than simply destroy the High Line railway, architects and landscape architects chose to intervene and redevelop the path into a linear park for pedestrians to enjoy. A strength that can be drawn from the process involved with the redevelopment of the High Line is a different way of looking at the lifecycle of the structures that we produce. A more typical way to look at this situation would have been to tear down the High Line



and build something new, for it no longer served its original purpose and was an "eyesore" to its surrounding community. Instead, architects found a new way to use the High Line which will extend the lifecycle of the materials used to construct it as well as preserve part of its history for future generations to understand while enjoying its new purpose. This aspect of the High Line development sprung my further exploration into the concepts of building lifecycle(s). The built fabric of the High Line will be reused rather than destroyed. This is an important concept to draw out of this project because it prevents old materials from being sent to landfills and forcing new materials to be produced to take their place.



The winning proposal for the High Line, developed by Field Operations with Diller Scofidio & Renfro, also has several strengths that relate to my thesis. They seek to use native plantings throughout the site, thus revitalizing the natural environment. Their design also reclaims the site for pedestrian use. One highlight of this design is that it is intended to be used by the people who are currently around it everyday. Pedestrians will gain access to the linear park on a daily basis and realize the positive effects of revitalizing a former industrial site, two concepts which are very closely related to the underpinnings of my thesis. The idea of reusing built fabric and infrastructure from the former industrial site also ties strongly to the aspirations of my thesis to reuse structures already existing on the Brownfield site wherever possible and appropriate.



RIVER ROUGE FACTORY RENOVATION

DEARBORN, MI. WILLIAM McDONOUGH. 2000

Project Synopsis

The Ford River Rouge Plant was first constructed in 1917. Throughout its lifetime it has produced anything from automobiles to war machines such as submarines and airplanes. A renovation of this historic industrial facility was begun in 2000. Bill Ford wanted the renovation to "Transform a 20th century industrial icon into a model of 21st century sustainable manufacturing."

Under the supervision of lead designer William McDonough, the result of the plant and landscape renovation includes the world's largest green roof at 500,000 square feet. It also incorporates many other green products and design principles that together make it one of the most environmentally friendly manufacturing sites in the world.



Relevance to My Investigation

The Ford River Rouge Plant Renovation is significant to my study because it is a revolutionary example of how to address a decaying industrial site. This renovation included reclamation and recycling of both the landscape of the site and the buildings on the site, both of which are included in the aspirations of my thesis investigation.

Strengths of the Project

Ford's River Rouge Plant Renovation is a local, large-scale example of the remediation of an industrial site. The unique part of this overhaul is that the Rouge Plant was never shut down completely. The Ford Motor Company recognized that the technology to make their plant more efficient was



available and they took the initiative to cleanse their outdated manufacturing facility. The largest strength that I draw from this case study is the innovative way of thinking about how we construct our manufacturing facilities today. Ford's new facility was constructed with environment impact in mind, something that relates directly to the aspirations of the product of my thesis.

Another important incorporation into the Rouge Plant overhaul is the opportunity for the public to visit and tour the facility. This provides the public a source to understand the most up to date principles of green design and see the benefits of operating from a clean industrial site. The landscape around the facility has been cleaned up a great deal using phytoremediation, and the green roof collects rainwater while keeping the building insulated and providing nature the opportunity to exist on top of the plant. William McDonough's concept

for Ford's plant is a revolutionary way of thinking about how industry can interact with a site, and also exemplifies how architects can intervene with the industrial process in order to improve its efficiency and relationship with the environment.

The concept of phasing a master plan for an industrial site such as the River Rouge Plant is another strength that I perceived in this case study. The phasing plan allowed for activity to still occur on portions of the site while other portions were being overhauled. This idea of a slow progression to improve the site is a healthy one because it recognizes that the environment will take time to complete its healing process. The industrial impact on the site was lessened and the environment is slowly being permitted to heal itself using remediation techniques and green design principles for all areas of human interaction.

The renovation of the Ford River Rouge Plant again sparked my interest in the study of the lifecycle of a building. The images on the right show one of my conceptual models representing the lifecycle of buildings. This study started out as a series of overlapping 2-D diagrams, and then grew into the model shown here. The rings represent the cycle itself, from the initial design of the building, to its peak, and then back down to the end of the phase of a building. The break between levels represents some form of reuse or revitalization of the given building. At this point the building begins a new phase of its lifecycle. The threads winding through the rings represent the history of the building as it moves forward in time. The threads change color as the phases change to represent the different layers of history that the building picks up or maintains as the different phases progress.

LIVING ROOF

Sedum plantings
These collect and filter rainfall, trap dust, absorb carbon dioxide and release oxygen.

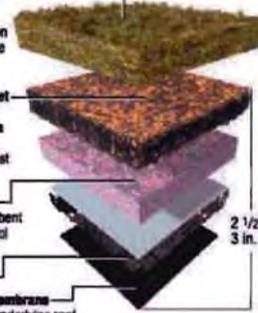
Vegetation blanket
The semi-organic material contains a mixture of shale, sand, peat, compost and dolomite.

Fleece
The felt-like absorbent mat of mineral wool holds water.

Drainage layer

Root-resistant membrane
This protects the underlying roof from water and root damage.

Sources: Dan Russell, Ford Motor Co. Manufacturing Sustainability Manager; Harshith and Walters, *Concrete Manual of Materials*; Ornamental Plants; Ambridge Garden Potentials



PLANTS ON TOP
Drought-resistant perennial ground covers, about 3 inches tall:

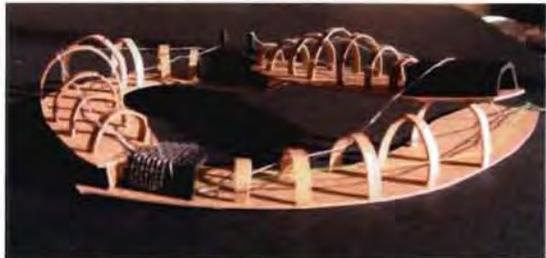


Sedum rubrodortmum var. diffusum



Sedum spurium Fuld's Glow

NOVA KNOB/IT/Daniel Free Press



VIADUCT DES ARTES

PARIS, FRANCE. PATRICK BERGER-PHILIPPE MATHIEUX. 1988

Project Synopsis

This historic urban railway viaduct was first constructed in 1858. Facing destruction after the need for its tracks was eliminated, it was revitalized in



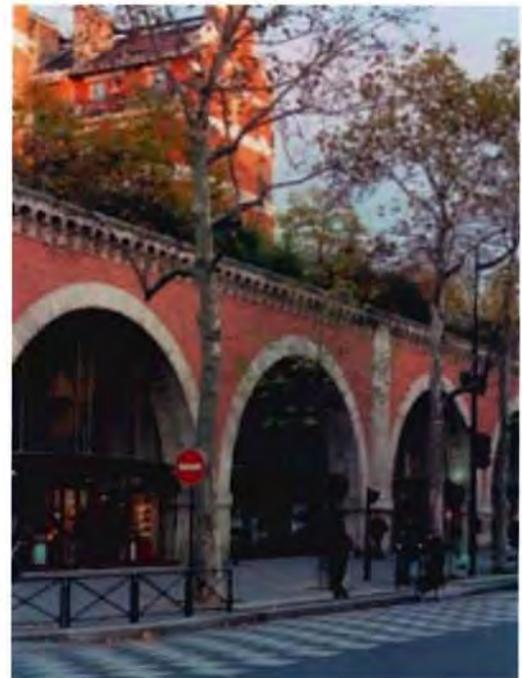
1988 by Patrick Berger and redeveloped as an elevated park with individual commercial spaces running beneath it. This imaginative reuse of a former industrial structure shows the value of preserving such an environment and refurbishing it for public use. The Promenade today is a desirable and well-known destination in Paris for pedestrian enjoyment and a thriving shopping/art district.

Relevance to My Investigation

This former industrial site, an urban railway, was closed and abandoned in the late 1960's. It became rundown and was considered an eyesore throughout the city of Paris. Facing demolition, Patrick Berger devised a plan to develop the viaduct into a park and shopping/business strip. This creative redevelopment is an example of how to reuse and preserve an industrial site and bring life back to a struggling district in the process. It has become a precedent for future redevelopments such as the High Line in New York to follow.

Strengths of the Project

The Viaduct des Artes is an early example of a revolutionary way of renovating a former industrial site and finding a new use for it. After nearly 30 years of abandonment the former railway viaduct was in shambles and facing demolition. However, the intervention of Patrick Berger gave new life to the viaduct when he proposed a new use for the linear stretch of arches running through part of Paris. He sought to extend the lifecycle of the viaduct by creating a public park on top of it and a series of small businesses in the arches beneath it. I feel it is important to recognize that Berger successfully rehabilitated and adapted the viaduct with a great deal of respect for the original structure. He chose to keep and reuse the existing building fabric of the industrial



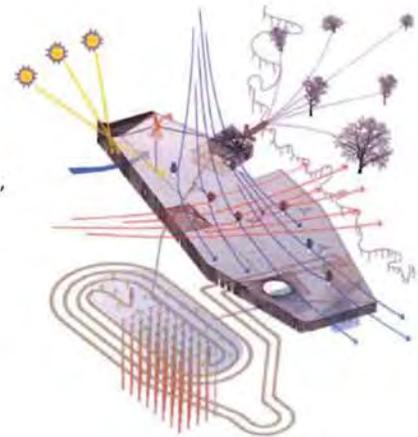
FORD CALUMET ENVIRONMENTAL CENTER

CHICAGO, IL. DESIGN COMPETITION. 2004



Project Synopsis

The Calumet reserve on Chicago's far south side is surrounded by areas of industrial manufacturing. The city of Chicago partnered with Ford Motor Company to realize an environmental center within the Calumet reserve to educate the public about the industrial, cultural, and ecological heritage of the Calumet area. An international competition for the project was won by Chicago based Studio Gang, whose concept draws inspiration from bird's nests. They propose using discarded steel from surrounding industrial sites to form the structure for the environmental center.

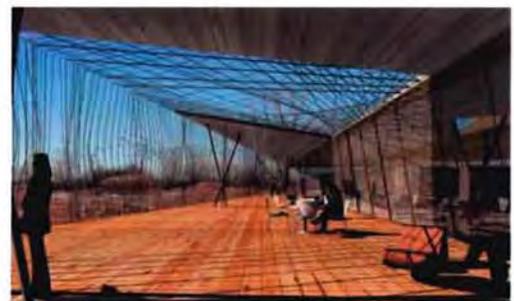


Relevance to My Investigation

The Ford Calumet Environmental Center Project is important to my thesis investigation because it involves educating the public about industrial presence while demonstrating the sustainable principle of reuse at the same time.

Strengths of the Project

The major strength of the Ford Calumet Environmental Center Project in relation to my thesis is the programming effort to educate the public about the history and environmental impact of industry on a given site. This type of programming assures that the public will gain knowledge of the benefits of reclaiming industrial wastelands and materials. The idea of public educational programming that was used for the Calumet Environmental Center is something that I hope to incorporate into the product of my investigation.



Another strong point of this project was the reclamation of industrial materials from nearby sites for incorporation into the new built fabric of the Environmental Center. The winning design by Studio Gang incorporates harvested steel from nearby industrial centers to reuse in the construction of the project. The concept of the building itself drew inspiration from bird's nests, which is also a strong gesture tying the building in with the natural environment around it. The final design of this project is an eloquent structure of woven steel and rebar carefully nestled into the landscape. This provides visitors with close interaction to the environment surrounding the facility forcing them to take into consideration the impact of industry on the area when visiting the Environmental Center.

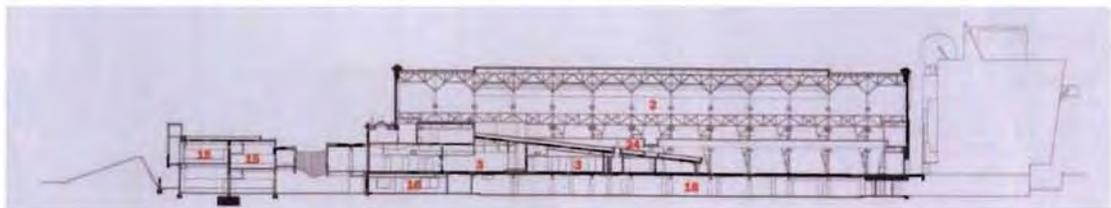
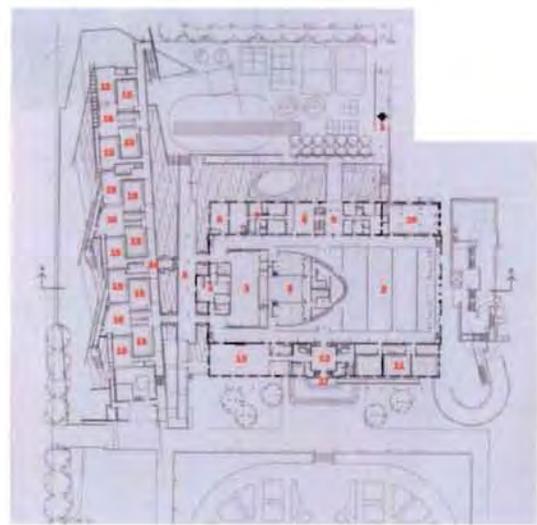
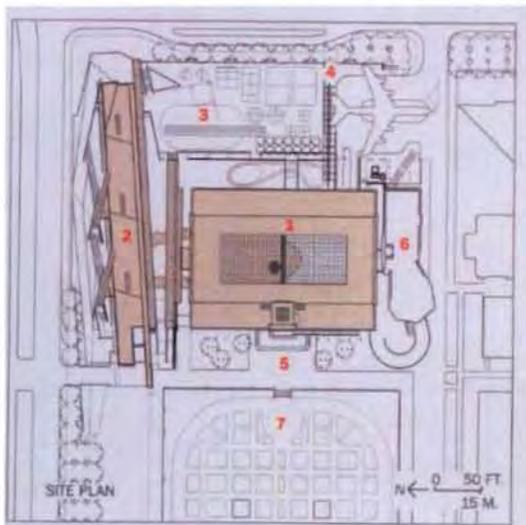
SCIENCE CENTER SCHOOL

LOS ANGELES, CA. MORPHOSIS ARCHITECTS. 2006



Summary Statement

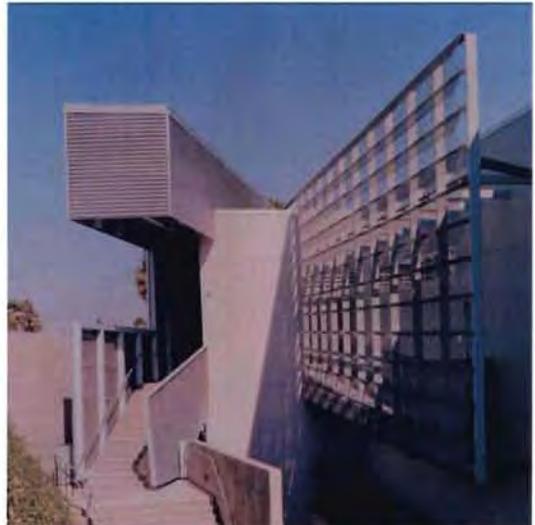
The Science Center School by Morphosis Architects has a strong relation to this thesis exploration. The simplest connection to my investigation is that the Science Center School is an educational facility. It contains all of the necessary functions that I will be considering for the programming of my project proposal. Perhaps the strongest connection to my investigation, however, is that the Science Center School incorporates the reuse of an existing structure in combination with the addition of a new building. The blending of an existing structure with a new building is a key point in my examination of this project. Morphosis used a combination of earth retaining walls and overlapping materials to successfully form a connection between the new building, the existing structure, and the site.



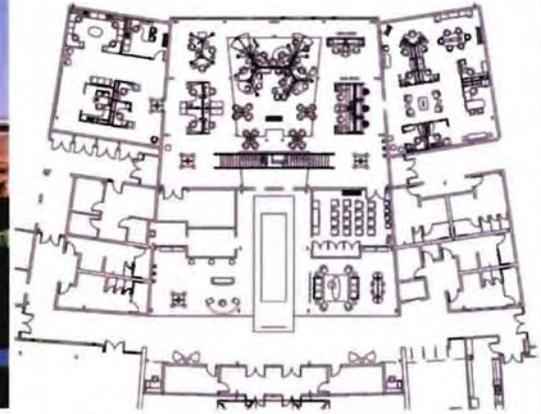
Summary of Spaces

Sq. Ft.

School Entrance (outdoor)	1000
Exhibition/Event Hall	4800
Multipurpose Space	3000
Kitchen	1200
Lunch Garden (outdoor)	2100
Faculty Dining/Lounge	225
Faculty Offices	150
Reception	400
Lobby	450
Student Library	1000
Lab Classroom	400
Conference/Even Room	675
Courtyard (exterior)	2400
Classroom	350
Commons Room	400
Kindergarten Classroom	800
Multimedia Labs	400
Sound Stage	300
Student Workroom	500
Shop	375
Bamboo Garden (exterior)	500
Parking (Lower Level)	9100



HERMAN MILLER FACILITIES TOUR



Considering my program and the aspirations of my thesis I sought out to explore some current day examples/trends in the furniture industry. Herman Miller, Inc. was an excellent source for me because of their passion for great furniture design as well as their dedication to sustainable building techniques and the happiness of their employees. I would like to give a special thank you to Mark Schurman, Director of Corporate Communications at Herman Miller, for taking the time to guide me through several of their facilities.

SCA GREENHOUSE FACTORY

The Herman Miller Marketplace creates a prototype office environment that supports progressive business-place thinking within a sustainable framework. This facility is located within an existing commercial development proving that new environmentally friendly architecture can be woven into the existing built fabric.

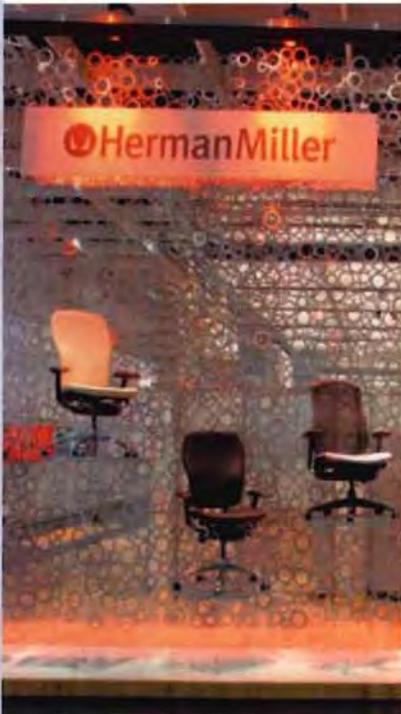
From this facility I gained an understanding of techniques that successfully allow natural light into a new structure. The interior courtyard space within this facility also provided a strong connection to nature within an office setting, an concept which fits well into my thesis project.





THE DESIGN YARD

The Design Yard complex houses a major portion of Herman Miller's design, development, manufacturing, engineering, and testing facilities. The concept for this facility was based on that of a yard, one that contains many buildings that function in the spirit of a collective production. The standard Herman Miller desire for excellent natural lighting and views to the exterior was also incorporated into the design of the facility.



The prefabricated elements such as silo-shaped conference rooms, metal structures, and houses reflect the farm-like setting of the site's surroundings. This creative design, while certainly not applicable to my chosen site, opened my eyes to a new light of design opportunities. The furniture designers of today are part of the creative class and therefore deserve a facility that will permit and inspire their creativity throughout the educational process.



HERMAN MILLER MARKETPLACE

The Herman Miller Marketplace creates a prototype office environment that supports progressive business-place thinking within a sustainable framework. This facility is located within an existing commercial development proving that new environmentally friendly architecture can be woven into the existing built fabric.

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SITE ANALYSIS



SITE ANALYSIS

SITE CRITERIA

1. The site selected for this study should first and foremost be a former industrial site.
 - This former industrial site should be a Brownfield environment. (Definition of a Brownfield: Underutilized or abandoned properties with known or perceived environmental contamination usually associated with past industrial or waste disposal activities.)
 - This site should also be a place holding a negative reputation in terms of local stakeholders. Perhaps nearby property owners fear the dangers of contaminants of the feasible site, or they may simply view it as an eyesore to their community driving down property values and diminishing local pride.
2. In order for this study to have a positive impact on a number of people and perhaps a whole community it is important that it be located in an urban setting.
 - An urban setting will ensure the greatest impact of the study on the surrounding areas of the chosen site.
 - The urban site will also ensure that a larger number of people will be able to enjoy the benefits of the consequent redevelopment instead of a rural one with little surrounding human interaction.
3. The site selected for this investigation should have a combination of both built fabric and "open" terrain.
 - This study will show an interest in the redevelopment of both built fabric and open terrain on an industrial site. The concepts of reclamation, recycling, and remediation will be better tested on a site where both of these conditions are present.
 - The built fabric on the chosen site should include a structure feasible for possible redevelopment in some fashion. It is not necessary that all built fabric on the site be candidate for reuse, but a portion of it must be in order for this investigation to have greater success.
4. A site with proximity to a source of water would prove to be more beneficial to this study than one without.
 - On site bodies of water or adjacent bodies of water open the door to a wider variety of possible remediation techniques.
 - Bodies of water could also become parts of a visually pleasing environment at the conclusion of the investigation and allow for a greater range of on site activities. (both educational and recreational)
5. An environment with some variance in topography would be preferred over one with no change in topography.
 - Changes in elevation would aid the process of recycling the landscape of the site. These topographical variances allow for greater remediation options than a flat site.
 - Elevation changes could also have human interaction benefits from increased site lines to foliage providing visual evidence of on-site remediation techniques and reclamation of land.

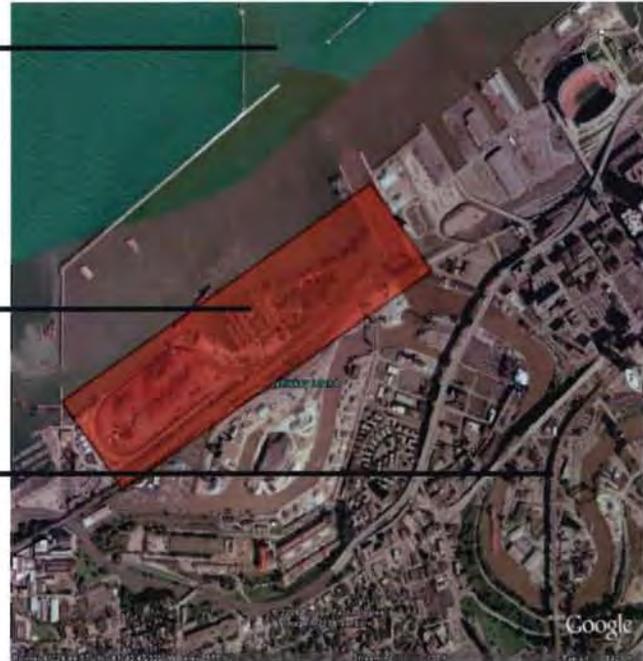
SITE POSSIBILITIES

"WHISKEY ISLAND" -CLEVELAND, OHIO

Harbor Entrance

Whiskey Island

Cleveland



Whiskey Island in Cleveland, Ohio is an area with a rich history. It was initially settled by Irish Immigrants who were responsible for trenching out the opening to the city's river. Over time the Island was backfilled with soil from the river which connected it to the land and made it the peninsula that it is today. It also became an area filled with industrial activity. A railway runs through the site that serviced loading stations for various industrial goods being shipped via the Great Lakes. As industry slowed, the Whiskey Island area has become run-down and is viewed as an area needing improvement by the City of Cleveland.

The combination of its rich history and former-industrial activity along the riverfront make Whiskey Island a possible site for my investigation. There are a number of Brownfield sites in the area that would be grounds for revitalization.

This location also fulfills all of my site criteria and has the added benefit of being close to the mouth of the river, making it one of the first sites viewed by people visiting Cleveland by water.



SITE POSSIBILITIES

"GLOBE TRADING CO." - DETROIT, MICHIGAN

Dequindre Cut

Globe Trading Co.

Former Dry-dock



The Globe Trading Co. site in Detroit could prove to be a very successful location for the product of my exploration to be sited. This location has a strong combination of built fabric and open site which would provide a number of options and challenges for my investigation. It is also adjacent to a historic former dry-dock along the Detroit River. This site could also provide an additional layer to my investigation due to the current plans that the City of Detroit has approved for this portion of the riverfront.

The Globe Trading Co. building itself would be an excellent candidate for the resuscitation of a Brownfield site and it could tie in nicely with my proposed technology oriented trade-school program.

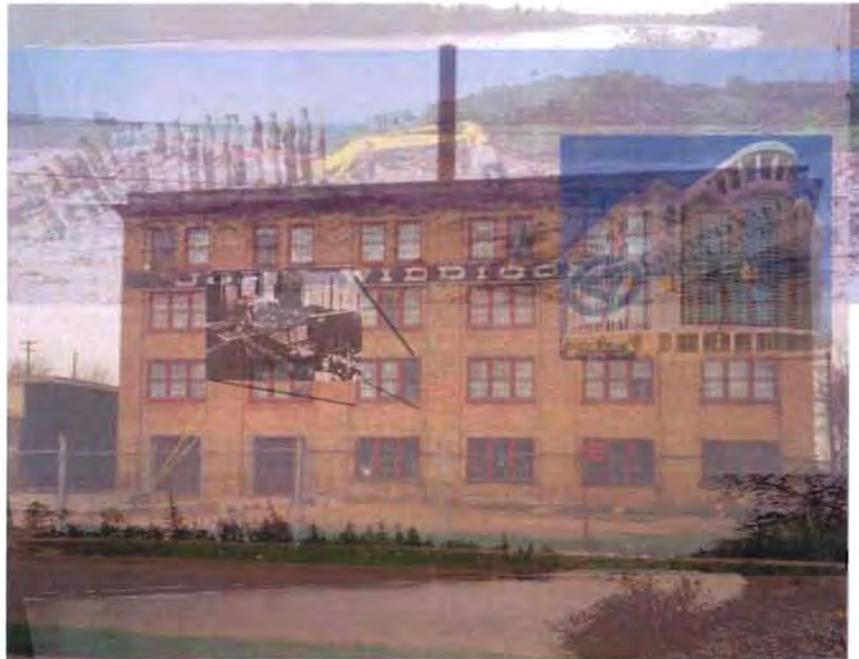


SITE POSSIBILITIES

"FORMER FURNITURE DISTRICT" - GRAND RAPIDS, MICHIGAN

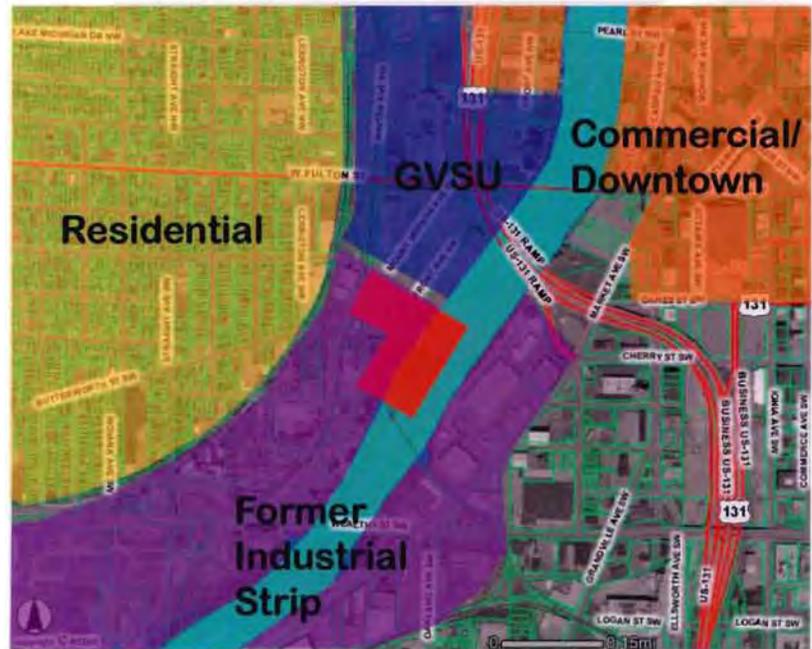


The proposed site in Grand Rapids, Michigan is located along the Grand River in the former industrial strip that was well known for furniture production. As industry has slowed over time this area has been abandoned and is viewed by many as an eyesore to the city. This area would be an excellent one to revitalize because of its prime location along a clean river in a city that embraces its riverfront location. The educational program that I am proposing is fitting for this area because Grand Valley State University is investing into a site just to the north of this site and a residential neighborhood is located directly to the west.



SITE POSSIBILITIES - SELECTED SITE

"FORMER FURNITURE DISTRICT" - GRAND RAPIDS, MICHIGAN



The former industrial strip that exists at the selected site creates a barrier between the riverfront and the nearby pedestrian neighborhood. Grand Valley State University has recently developed two new educational facilities to the north between this site and what is typically considered downtown Grand Rapids.

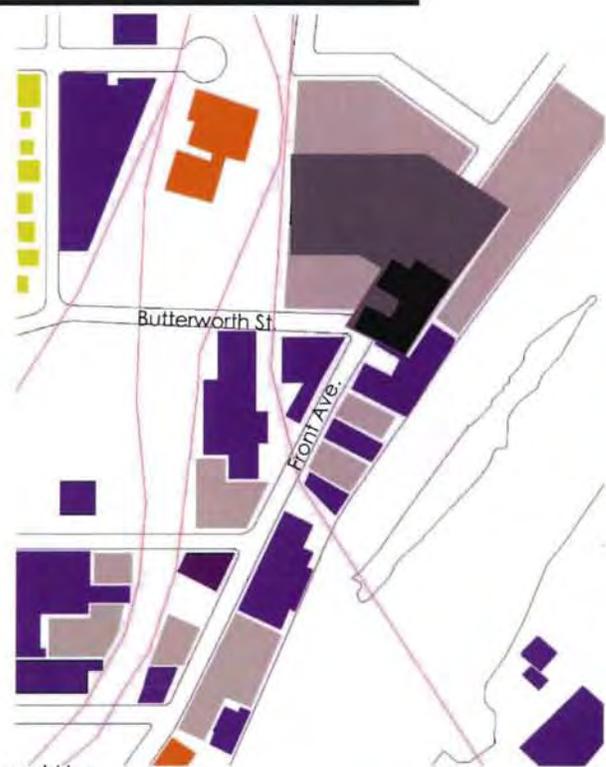
The specific physical site that I am investigating exists to the east of the intersection of Front Avenue and Butterworth Street. Its riverfront location provides an ideal spot to investigate the questions of this thesis investigation. A four-story former furniture manufacturing building currently sits on the site and a portion of it may be reused for my proposal. This portion of the building is depicted in the pictures to the right.



SITE ANALYSIS



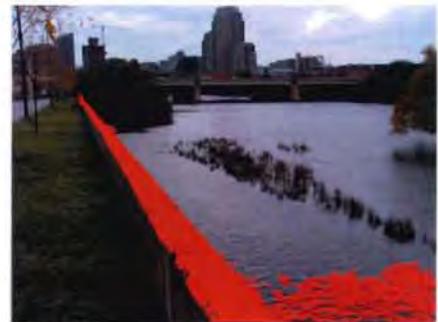
Figure Ground



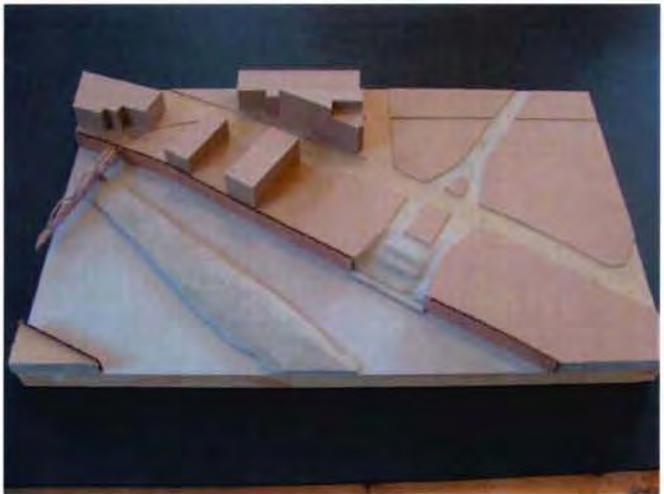
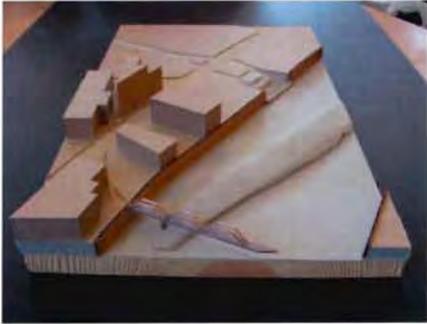
Land Use

As the Figure Ground and Land Use studies depict this area is rather sparse with a abundant amount of surface parking lots. These lots serve little purpose, other than for overflow parking for Grand Valley State University or major events hosted downtown. This proposal will seek to eliminate all parking along the riverfront, and will likely include a proposal for a future parking structure.

The riverfront condition at this site is an interesting and potentially challenging one. A twenty foot drop-off exists at the river's edge further defining the barrier between the riverfront and any possible pedestrian activity. This barrier will need to be successfully overcome in order for this investigation to be meaningful in the end. An island exists in the middle of the river creating a scenic portion of vegetation that breaks up the harshness of the concrete walls lining the river at both sides.

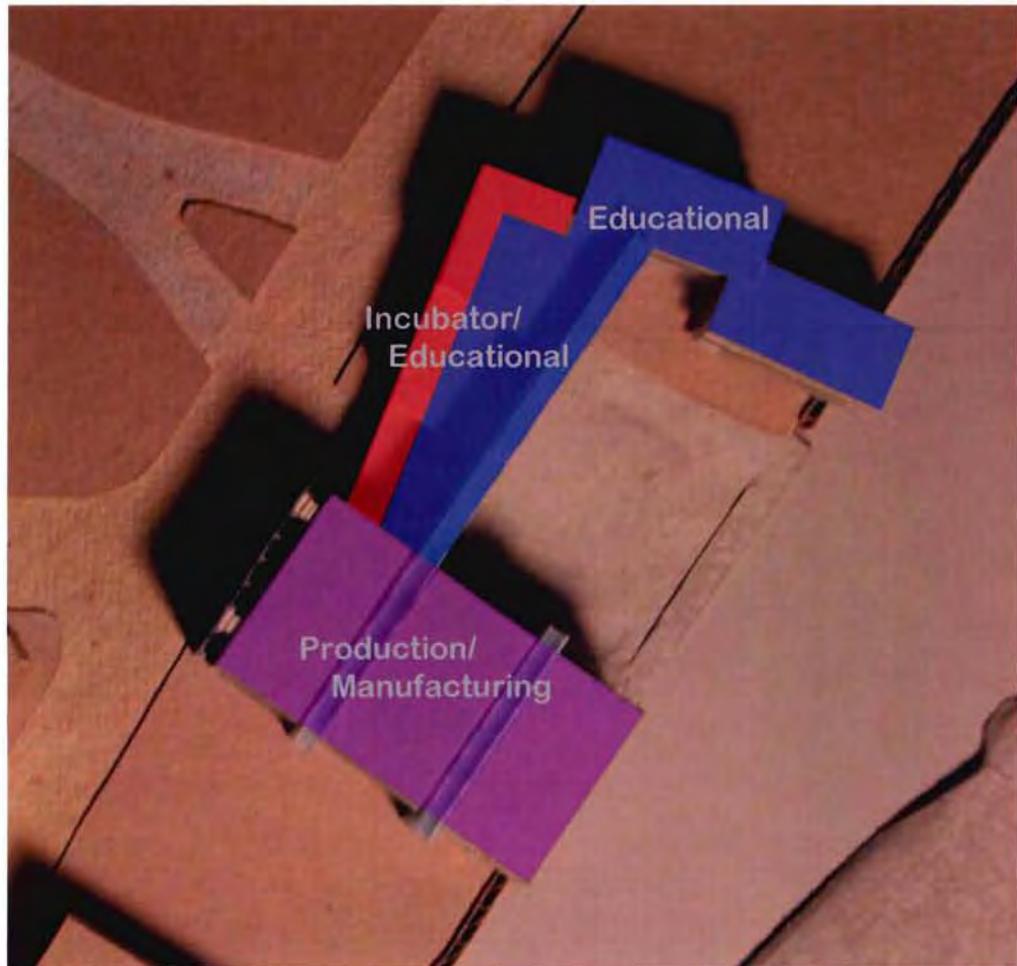


SITE MODEL



SITE ANALYSIS

PROJECT PROGRAM



PROGRAM STATEMENT

"Grand River-side Furniture Learning Center"

The aspirations of this program are to provide a resource to educate students and professionals seeking knowledge about the aspects of today's furniture business, from design and research to marketing and sales. The center itself would include all of the components necessary to sustain a small furniture manufacturing facility as well as the entities required to maintain an educational process within it. Also important to the Furniture Learning Center would be a series of Incubator/Outreach spaces. The ideology of these units would be to house either portions of established furniture businesses or to accommodate new business start-ups. This would provide the opportunity for an apprenticeship program with existing companies or a jumping off point for new businesses housed on the grounds of the Furniture Learning Center campus itself.

It is believed that the Furniture Learning Center could become an example of how to reclaim a post-industrial waterfront location. The new development on the site would incorporate a portion of the former industrial building that stands on it today. Its new use as a portion of the Grand River-side Furniture Learning Center would commemorate its former use as a furniture manufacturing facility. The reclaimed site would be woven through the new development in such a way that it exemplifies the opportunity for public interaction with the riverfront. The private and public portions of the site will blend together in a harmonious manner illustrating the past, present, and future of the post-industrial waterfront location. The end result of this investigation will transform a strip of land that was formerly a booming furniture producing industrial center and redevelop it in a way that physically exemplifies its resuscitation and programmatically aims to help rebuild the struggling job market of the area.

PROGRAM QUANTITATIVE SUMMARY

<u>Program Space</u>	<u>Sq. Ft.</u>	<u>Quant.</u>	<u>NSF</u>
1. Educational:			
1.1 Exterior Courtyard	2500sf	1	2500sf
1.2 Entrance/Reception/Lobby	1000sf	1	1000sf
1.3 Administrative Office	500sf	1	500sf
1.4 Conference Room	300sf	1	300sf
1.5 Classrooms	400sf	6	2400sf
1.6 Computer Lab	400sf	1	400sf
1.7 Restrooms	300sf	2	600sf
			7700sf
2. Research/Development:			
2.1 Professor Offices	400sf	3	1200sf
2.2 Design Lab Studio (open plan)	2000sf	5	10000sf
2.3 Research/Testing Lab Studio	1000sf	2	2000sf
2.4 Large Conference Room	500sf	1	500sf
2.5 Small Conference Room	150sf	3	450sf
2.6 Restrooms	120sf	10	1200sf
2.7 Loading Dock	2000sf	1	2000sf
2.8 Material Storage	4000sf	1	4000sf
2.9 Finished Project Storage	1000sf	1	1000sf
2.10 General Workshop	3000sf	1	3000sf
2.11 Mechanical	800sf	1	800sf
			26,150sf
3. Accessory Functions:			
3.1 Kitchen	400sf	1	400sf
3.2 Cafeteria/Breakroom	1000sf	1	1000sf
3.3 Gym/Fitness Center	800sf	1	800sf
			2200sf
4. Exhibition:			
4.1 Exhibition Hall	2000sf	1	2000sf
4.2 Exhibition Storage	500sf	1	500sf
			2500sf
5. Outreach/Incubator:			
5.1 Entrance/Reception/Lobby	500sf	1	500sf
5.2 Lounge/Breakroom	200sf	2	400sf
5.3 Small Conference Room	150sf	4	600sf
5.4 Large Conference Room	300sf	2	600sf
5.5 Restrooms	200sf	4	800sf
5.6 Copy/Resource Center	200sf	1	200sf
5.7 Large Incubator Suite	500sf	3	1500sf
5.8 Medium Incubator Suite	200sf	3	600sf
5.9 Small Incubator Suite	100sf	10	1000sf
			6200sf
Total			44,750sf
20% Circulation/etc.			8,950sf
Overall Interior Spaces			53,700sf

SPACE DETAIL SUMMARIES

1.1 EXTERIOR COURTYARD

A. Quantities

- 1 Unit
- 2500 square feet
- 1 x 2,500sf = 2,500 square feet

B. Purposes/Functions

The purpose of this space is to provide an exterior to interior transition while funneling people into and out of the facility. This space will portray an outdoor image of what the Furniture Learning Center aspires to be, and therefore should incorporate some installation student work whenever possible. This space will also be a key point to exemplifying the reclamation of the site itself and its overall connection to the natural surroundings. A view the river or close interaction with it would help achieve the reconnection of the site to its surroundings.

C. Activities

The activities taking place in this space are varied. It could serve as a meeting point for groups, an informal meeting place for students, an outdoor seating area, an outdoor cafeteria, or simply a place to observe and enjoy the outdoors.

D. Spatial Relationships

This space should be located adjacent to the entrance to the facility. It should have a combination of covered and uncovered space to accommodate all weather conditions. Spaces within the building may become more successful if they allow view towards this exterior courtyard. Therefore, it may be situated in such a way that part of the building wraps around the courtyard in a caressing fashion.

E. Special Considerations

This space will be an important transition point between the exterior and the interior of the building, and because of this it would benefit from possessing indoor and outdoor materials/qualities. This space will need to be handicap accessible which will be particularly important if there are changes in grade.

F. Equipment/Furnishings

Benches and outdoor seating should be designed to handle the outdoor elements, yet be well designed to reflect the work of the Furniture Learning Center itself. Some space should be left open to accommodate for installation work of the students of the Center. Exterior signage will also be needed in this space.

G. Behavioral Considerations

H. Structural Systems

Open sight lines are vital to this space. The structural system should at all times attempt to incorporate the natural outdoor environment. Plantings and trees will provide a softer natural structural system for much of this space.

I. Mechanical/Electrical Systems

Natural daylight will provide adequate lighting for this space during the daytime. Outdoor lighting will be important in this space for nighttime conditions. The exterior signage in this space will need lighting, as well as a well lit pathway leading visitors/students to the main entrance of the facility. Accent lighting should highlight the exterior furniture as well as connections to nature.

J. Site/Exterior Environmental Considerations

Opportunities to exemplify the reclamation of the site and its connection to nature should be exploited whenever possible. Views to the interior of the building may also provide inspiring glimpses to the activities and spaces within the facility itself.

1.2 ENTRANCE/RECEPTION/LOBBY

A. Quantities

- 40 People
- 1 Unit
- 1000 square feet
- 1 x 1000sf = 1,000 square feet

B. Purposes/Functions

The purpose of this space is to introduce people to the interior of the building and to direct them towards their desired destination. It may also be used as a gathering point for visitors to the facility.

C. Activities

Individuals or groups of people may enter the facility through this space at any given time during its hours of operation. It will need to provide visitors with an introduction to the facility, and therefore will require space for a receptionist/help desk. Individuals or groups of visitors will also require an adequate amount of room to wait for tours/orientations/interviews. Everyday inhabitants of this space would include anyone visiting or working at the school, and adequate circulation space will be needed to funnel people through this portion of the facility. It will be the main interior circulation point, and therefore all other program spaces within the facility will branch off of this entrance/reception/lobby.

D. Spatial Relationships

This space will be the initial point of all interior spatial relationships given the fact that inhabitants of the building will first pass through it before reaching any other point in the interior. It should be directly adjacent to the courtyard/entryway. This space should also be situated relatively close to administrative offices to accommodate visitors.

E. Special Considerations

The interior of the building would be more successful if its inhabitants could always possess a sense of where they are in relation to this space. It should take advantage of visual sightlines to the outside/surrounding natural elements.

F. Equipment/Furnishings

At minimum a desk/office will be required to accommodate the facility's receptionist. Typical furnishings such as chairs and tables will be needed for the waiting area. The lobby would be an excellent point to incorporate photos, mission statements, and other forms of publicity to familiarize visitors with the Furniture Learning Center.

G. Behavioral Considerations

H. Structural Systems

This space, serving as the main transition between interior and exterior as well as the main point of circulation within the building, would benefit from a close physical relationship to the surrounding natural elements. Potential connections could include operable windows/envelopes in the building that could be opened to exhibit the presence of nature on the site of the building.

I. Mechanical/Electrical Systems

Natural Lighting would be appropriate in this space during the daytime. At night lighting should be bright in this area to indicate its importance as an entry/exit point. As mentioned above, natural ventilation could be used when the weather permits it.

J. Site/Exterior Environmental Considerations

The riverside location of this site could be exemplified by locating this space in a position that overlooks the river itself. Views overlooking the site could exhibit its reclamation and connection to the riverfront.

1.3 ADMINISTRATIVE OFFICE

A. Quantities

- 4-5 People
- 1 Unit
- 500 square feet
- 1 x 500sf = 500 square feet

B. Purposes/Functions

This office is intended to house the administrative staff of the Furniture Learning Center and their visitors.

C. Activities

Administrators will use their offices within this space to carry out their everyday duties as well as meet with potential students/clients/visitors of the facility.

D. Spatial Relationships

This office should be located in proximity to the entrance/reception/lobby space. It should also be within reasonable distance to the major educational program spaces of the facility.

E. Special Considerations

This space will need to portray the professional, yet creative image of the administrative staff to their visitors. Comfortable/innovative furnishings created from within the school may help this space to portray that image.

F. Equipment/Furnishings

This space will require office tables and chairs for its users as well as additional seating for visitors. Systems for filing educational paperwork/supplies will also be needed within this office.

G. Behavioral Considerations

H. Structural Systems

Typical office structural systems will be required in this space in order to provide visual/audible separations between offices. Visual connections to the exterior/nature of the site will make this space a more desirable place to inhabit on a daily basis.

I. Mechanical/Electrical Systems

The users of this space will require task lighting as well as internet and telecommunication connections. Thermostat controls will be required to keep the users of this space comfortable year-round. Operable windows/adjacency to the exterior would be good for natural ventilation purposes/daylighting.

J. Site/Exterior Environmental Considerations

The ability to see the exterior environment from this office would be appealing to its users, but it is not required for this space.

1.4 CONFERENCE ROOM

A. Quantities

15 People

1 Unit

300 square feet

1 x 300sf = 300 square feet

B. Purposes/Functions

This conference room will be used by administrators for meetings and presentations with faculty or visitors.

C. Activities

This space will be used for meetings by the administrative staff of the Furniture Learning Center. Presentations will also be given and viewed in this space.

D. Spatial Relationships

This space should be located near the administrative offices and the entrance/reception/lobby space.

E. Special Considerations

A large amount of wall space in this room will be used for visual displays/projection of digital media.

F. Equipment/Furnishings

A large table and chairs will be needed for the users of this space. A mobile podium will also be required for users giving presentations in this conference room.

G. Behavioral Considerations

This space will need the ability to turn from light to dark in a quick amount of time to accommodate presentations. Some form of blinds/visual screening may be used to achieve this as well as provide privacy for the events taking place in this room.

H. Structural Systems

The most important structural consideration will be to insulate the space to block undesired sound transference between the conference room and its adjacent spaces.

I. Mechanical/Electrical Systems

Full projection and wireless abilities will be required within this space. An audio/telephone system will be needed for conference calling capabilities. Task lighting will be needed over the conference table as well as along the presentation wall.

J. Site/Exterior Environmental Considerations

This space does not require adjacency/visual connection to the exterior of the building nor is natural lighting desirable in this location.

1.5 CLASSROOMS

A. Quantities

- 30 People
- 6 Units
- 400 square feet
- 6 x 400sf = 2,400 square feet

B. Purposes/Functions

The purpose of these classrooms will be to house typical lecture/seminar style classes.

C. Activities

Professors/Visitors will use the space to educate students about certain aspects of the furniture production process.

D. Spatial Relationships

These spaces should be located in proximity to other educational spaces, including other classrooms and labs. They should also be relatively near the manufacturing program spaces if possible.

E. Special Considerations

The latest technology should be used in these classrooms wherever possible. Wireless internet capabilities will be especially important in these rooms, as well as throughout the facility.

F. Equipment/Furnishings

Student seating/desks will be needed in each of these rooms. Professors/educators will need podiums and visual presentation space from drawing boards to projection screens.

G. Behavioral Considerations

H. Structural Systems

A structural system that permits the option of opening itself to the exterior environment would be desirable for these spaces during the warmer months of the year when the weather would permit it.

I. Mechanical/Electrical Systems

The temperature of these spaces will need to be alterable to compensate for the exterior temperatures on any given day. Natural daylighting should be used whenever possible, but additional lighting may be required for typical reading/writing purposes.

J. Site/Exterior Environmental Considerations

Proximity to the perimeter of the building and exterior sight lines would be preferable to the occupants of this space.

1.6 COMPUTER LAB

A. Quantities

30 People

1 Unit

400 square feet

1 x 400sf = 400 square feet

B. Purposes/Functions

The purpose of this space will be to provide students access to the latest technology of the furniture manufacturing process.

C. Activities

Students will use this lab to research and design their projects. This space may also be used as a digital classroom and will therefore often need to accommodate an instructor.

D. Spatial Relationships

This lab should be located near the other classrooms of the facility.

E. Special Considerations

This lab will provide students access to the latest technologies, and therefore will need the ability to accommodate new technology as it progresses. This lab will also require additional means of security due to the expensive electronics it will house.

F. Equipment/Furnishings

Individual workstations will be needed for each student occupying the space. The lab will also require a plot/copy/scan station for students.

G. Behavioral Considerations

H. Structural Systems

A system that allows users the option to enclose themselves in their own private workspace or open up to the rest of the class for lecture purposes would make this lab a more desirable place to inhabit.

I. Mechanical/Electrical Systems

This room will require a constant temperature to protect its advanced electrical devices. A good deal of space will need to be dedicated to wiring and lighting for this technology oriented lab.

J. Site/Exterior Environmental Considerations

A visual connection to nature and the exterior could be an interesting and challenging opportunity for this lab.

1.7 RESTROOMS

A. Quantities

- 8 person maximum capacity
- 2 Units
- 300 square feet
- 2 x 300sf = 600 square feet

B. Purposes/Functions

These restrooms will primarily serve the students and administrators in the educational portion of the facility. The two restrooms will serve as a men's and a women's. This space is private in its usage and should be designed accordingly.

C. Activities

Typical expected activities of a restroom, as well as the cleaning of the space. Each restroom should include a custodial closet.

D. Spatial Relationships

The restrooms should be positioned in a relatively central location in terms of the educational portion of the facility.

E. Special Considerations

The restrooms should be comprised of durable and cleanable surfaces such as tile flooring and laminate countertops.

F. Equipment/Furnishings

Typical restroom furnishings should be included in these spaces including the required number of toilets, sinks, and stalls per the number of occupants. A drinking fountain directly outside of the restrooms should also be included.

G. Behavioral Considerations

H. Structural Systems

There are no specific structural systems.

I. Mechanical/Electrical Systems

Proper lighting (perhaps censored lighting to turn on and off when occupants enter) and adequate ventilation should be provided.

J. Site/Exterior Environmental Considerations

This space does not require exterior views, and all windows should be non-transparent.

2.1 PROFESSOR OFFICES

A. Quantities

- 2-3 People
- 3 Units
- 400 square feet
- 3 x 400 = 1200 square feet

B. Purposes/Functions

This office is intended to house the professors of the Furniture Learning Center and their visitors.

C. Activities

Professors will use their offices within this space to carry out their everyday duties as well as meet with potential students/clients/visitors of the facility.

D. Spatial Relationships

These offices should be located within proximity of the labs/classrooms where the professors will be instructing students. They should also be positioned within a reasonable distance to the administrative office so that the professors may interact with the administrative staff/support staff whenever necessary.

E. Special Considerations

This space will need to portray the professional, yet creative image of the professors to their visitors. Comfortable/innovative furnishings created from within the school may help this space to portray that image. These offices should also be semi-private in that the professor will have the opportunity to close off the office and work in private without distraction when necessary.

F. Equipment/Furnishings

This space will require office tables and chairs for its users as well as additional seating for visitors. Systems for filing educational paperwork/supplies will also be needed within this office.

G. Behavioral Considerations

H. Structural Systems

Typical office structural systems will be required in this space in order to provide visual/audible separations between offices. Visual connections to the exterior/nature of the site will make this space a more desirable place to inhabit on a daily basis.

I. Mechanical/Electrical Systems

The users of this space will require task lighting as well as internet and telecommunication connections. Thermostat controls will be required to keep the users of this space comfortable year-round. Operable windows/adjacency to the exterior would be good for natural ventilation purposes/daylighting.

J. Site/Exterior Environmental Considerations

The ability to see the exterior environment from this office would be appealing to its users, but it is not required for this space.

2.2 DESIGN LAB STUDIO

A. Quantities

- 20-25 People
- 5 Units
- 2000 square feet
- 5 x 2000 = 10,000 square feet

B. Purposes/Functions

The purpose of these studios are to provide students of the facility with a useable space for students to design and build furniture in an open studio atmosphere.

C. Activities

Students will be designing, drawing, and constructing furniture in these spaces based on instruction and input from their professors and peers. Student design reviews and presentations may also take place in these spaces when necessary.

D. Spatial Relationships

These labs should be located within proximity of the workshop and will require access to a freight elevator servicing both the workshop and the material storage space.

E. Special Considerations

This space will need to offer students a creative atmosphere and will likely require student access past the typical hours of operation for the school. A proxy card system will be the best way to maintain security and control access to the design lab studios. The individual desk spaces within the studios should be customizable to the changing likes of each individual student.

F. Equipment/Furnishings

Each student will need his or her own workspace incorporating a large desk with room to draw and construct their projects. Adequate storage will be required for each of these individual environments to store tools/supplies/ completed projects.

G. Behavioral Considerations

H. Structural Systems

These spaces should have an open layout, meaning that they will require large spans and tall ceilings.

I. Mechanical/Electrical Systems

General lighting will be required throughout the space as well as task lighting at each individual desk and presentation area. Operable windows would be preferable for natural ventilation during tolerable weather.

J. Site/Exterior Environmental Considerations

The ability to see and engage the outdoor environment would be desired for the users of this space, but is not required for its overall success.

2.3 RESEARCH/TESTING LAB

A. Quantities

- 15-20 People
- 2 Units
- 1000 square feet
- 2 x 1000 = 2000 square feet

B. Purposes/Functions

These research labs will be used for classes involving experimentation and testing with new materials used to produce furniture.

C. Activities

Students will use these spaces to test and learn how to work with certain materials to produce furniture. Professors will instruct students on working with wood, metal, fabric, and other materials in relation to furniture design and construction.

D. Spatial Relationships

These labs should be located within proximity of the workshop and will require access to a freight elevator servicing both the workshop and the material storage space.

E. Special Considerations

This space will need to offer students a creative atmosphere and will likely require student access past the typical hours of operation for the school. The individual desk spaces within the studios should be customizable to the changing likes of each individual student. The spaces will need to be constructed of hard materials that are durable and easily cleanable to facilitate experimentation with materials.

F. Equipment/Furnishings

Durable surfaces and workspaces adequate for material testing will be required. These labs will serve as smaller versions of the workshop with emphasis on individual work areas similar to the design labs. Adequate storage spaces will also be required for tools and supplies.

G. Behavioral Considerations

The research/testing labs should be considered a hybrid of the workshop and the design labs.

H. Structural Systems

These spaces should have an open layout, meaning that they will require large spans and tall ceilings.

I. Mechanical/Electrical Systems

General lighting will be required throughout the space as well as task lighting at each individual desk and presentation area. Operable windows would be preferable for natural ventilation during tolerable weather.

J. Site/Exterior Environmental Considerations

The ability to view the outdoor environment is not required for this space, but would be desirable to its users.

2.4 LARGE CONFERENCE ROOM

A. Quantities

- 12-15 People
- 1 Unit
- 500 square feet
- 1 x 500 = 500 square feet

B. Purposes/Functions

This conference room will be used by students and faculty for meetings, presentations, and small classroom situations.

C. Activities

Students and faculty will meet in this space to discuss and review projects or hold general meetings.

D. Spatial Relationships

This conference room should be located close to the professor offices as well as the design studios to facilitate interaction between students and professors.

E. Special Considerations

F. Equipment/Furnishings

This room will require a large conference table, chairs, and one wall dedicated to presentations and projections.

G. Behavioral Considerations

H. Structural Systems

The most important structural consideration will be to insulate the space to block undesired sound transference between the conference room and its adjacent spaces.

I. Mechanical/Electrical Systems

Full projection and wireless abilities will be required within this space. An audio/telephone system will be needed for conference calling capabilities. Task lighting will be needed over the conference table as well as along the presentation wall.

J. Site/Exterior Environmental Considerations

This space does not require adjacency/visual connection to the exterior of the building nor is natural lighting desirable in this location.

2.5 SMALL CONFERENCE ROOM

A. Quantities

- 8-10 People
- 3 Units
- 150 square feet
- 3 x 150 = 450 square feet

B. Purposes/Functions

This conference room will be used by students and faculty for meetings, presentations, and small classroom situations.

C. Activities

Students and faculty will meet in this space to discuss and review projects or hold general meetings.

D. Spatial Relationships

This conference room should be located close to the professor offices as well as the design studios to facilitate interaction between students and professors.

E. Special Considerations

F. Equipment/Furnishings

This room will require an adequate conference table, chairs, and one wall dedicated to presentations and projections.

G. Behavioral Considerations

H. Structural Systems

The most important structural consideration will be to insulate the space to block undesired sound transference between the conference room and its adjacent spaces.

I. Mechanical/Electrical Systems

Full projection and wireless abilities will be required within this space. An audio/telephone system will be needed for conference calling capabilities. Task lighting will be needed over the conference table as well as along the presentation wall.

J. Site/Exterior Environmental Considerations

This space does not require adjacency/visual connection to the exterior of the building nor is natural lighting desirable in this location.

2.6 RESTROOMS

A. Quantities

5 Person Maximum Capacity

10 Units

120 square feet

10 x 120 = 1200 square feet

B. Purposes/Functions

These restrooms will primarily serve the students and faculty in the research and development educational portion of the facility. Five restrooms will serve as men's and five as women's (two on each floor of existing building). This space is private in its usage and should be designed accordingly.

C. Activities

Typical expected activities of a restroom, as well as the cleaning of the space. Each restroom should include a custodial closet.

D. Spatial Relationships

The placement of these restrooms should be vertically oriented on top of each other on every floor of the existing building. The reason for this positioning is for ease of plumbing and general understanding of restroom layout for users of the facility.

E. Special Considerations

The restrooms should be comprised of durable and cleanable surfaces such as tile flooring and laminate countertops.

F. Equipment/Furnishings

Typical restroom furnishings should be included in these spaces including the required number of toilets, sinks, and stalls per the number of occupants. A drinking fountain directly outside of the restrooms should also be included.

G. Behavioral Considerations

H. Structural Systems

There are no specific structural systems.

I. Mechanical/Electrical Systems

Proper lighting (perhaps censored lighting to turn on and off when occupants enter) and adequate ventilation should be provided.

J. Site/Exterior Environmental Considerations

This space does not require exterior views, and all windows should be non-transparent.

2.7 LOADING DOCK

A. Quantities

4-5 People (delivery and receiving)

1 Unit

2000 square feet

1 x 2000 = 2000 square feet

B. Purposes/Functions

This portion of the facility will be used for receiving and sending goods and products.

C. Activities

Receiving of goods and supplies for the production and construction of furniture within the facility. Unloading and loading of trucks used to ship supplies or finished products. Sorting of received materials. Packaging of goods to be shipped from the facility.

D. Spatial Relationships

This space needs to be located directly adjacent to the main storage portion of the facility. It should also be located close to the workshop as that is where raw materials will most likely be processed first.

E. Special Considerations

This space will have to be positioned at the exterior of the building in a position permitting direct access of large trucks or vans.

F. Equipment/Furnishings

The loading dock will require a freight elevator to service the rest of the facility. It will be used to transfer materials to the studios on the upper levels of the existing building. Large garage style overhead doors will be needed to permit the unloading/loading process.

G. Behavioral Considerations

H. Structural Systems

Ceiling heights of at least 10'0" will be required to move raw materials into the facility.

I. Mechanical/Electrical Systems

Outdoor lighting will be required directly adjacent to the loading dock to service the loading and unloading of materials and goods. Electrical systems will need to operate the large overhead door(s) located on the perimeter of the loading dock. A small crane/lift system would be useful in this space to unload and move heavy raw materials such as steel and wood being delivered to the facility.

J. Site/Exterior Environmental Considerations

As mentioned above, the loading dock will need to be directly accessible to large trucks and vans to facilitate unloading and loading of goods at the furniture learning center facility. This consideration will also be important in the site planning/access planning of the facility.

2.8 MATERIAL STORAGE

A. Quantities

- 8-10 People
- 1 Unit
- 4000 square feet
- 1 x 4000 = 4000 square feet

B. Purposes/Functions

This space will be used for the storage of raw materials to be processed within the facility.

C. Activities

Materials will be moved from the loading dock into this space for storage purposes until selected for use within the facility in the furniture design/ manufacturing process.

D. Spatial Relationships

The material storage space should be located directly adjacent to the loading dock and the workshop.

E. Special Considerations

This space will contain a higher than normal amount of highly combustible materials including wood and plastics, and therefore will require additional fire suppression equipment in case of fire.

F. Equipment/Furnishings

Racks and shelving units will be required to store wood, plastic, metal, fabric, and any other materials to be consumed and refined within the facility.

G. Behavioral Considerations

H. Structural Systems

This space will require at least 10'0" ceilings and large spans. The racks and shelving will be laid out within the space in a row-like fashion and organized by material.

I. Mechanical/Electrical Systems

As described above, additional fire suppression requirements will be needed in this space. Lighting in the space should be even and consistent so that materials can be selected properly.

J. Site/Exterior Environmental Considerations

This space does not require fenestration to the exterior environment, and would be appropriately located in the lower level of the facility adjacent to the loading dock.

2.9 FINISHED PRODUCT STORAGE

A. Quantities

- 4-5 People
- 1 Unit
- 1000 square feet
- 1 x 1000 = 1000 square feet

B. Purposes/Functions

The purpose of this space is to store finished projects of students or small businesses within the incubator spaces.

C. Activities

Storage and retrieval of finished projects - Those granted access to this room will store or retrieve projects produced within the furniture learning center.

D. Spatial Relationships

This room should be located within proximity of the freight elevator for ease of movement of projects to and from storage.

E. Special Considerations

The finished products stored in this space will be worth considerable amounts of money in many cases, and therefore proxy card access should be used to limit access.

F. Equipment/Furnishings

Racks and shelves will be needed to store the finished projects. Lockable spaces within this room may be preferable for the incubator users to store their projects collectively.

G. Behavioral Considerations

H. Structural Systems

Ceiling heights of at least 10'0" will be required to move raw materials into the facility.

I. Mechanical/Electrical Systems

This room will house highly combustible materials and therefore may require additional fire suppression systems. The proxy card system mentioned above will also require additional electrical service.

J. Site/Exterior Environmental Considerations

This space has no requirements for adjacency to the outdoor environment.

2.10 GENERAL WORKSHOP

A. Quantities

- 25 People
- 1 Unit
- 3000 square feet
- 1 x 3000 = 3000 square feet

B. Purposes/Functions

This workshop will likely be utilized by all users of the facility for the refinement of raw materials in order to produce specific furniture projects.

C. Activities

Processing materials using machinery and tools to produce furniture projects. This space will include all of the tools/saws/machinery required for a workshop space.

D. Spatial Relationships

The workshop should be located adjacent to the material storage room. Access and proximity to the freight elevator will provide students the ability to move their projects to and from their design labs.

E. Special Considerations

This workshop will require a dust collection system to remove airborne dust and saw-dust created by woodworking tools. The paint-booth will also require a separate air-filtration system.

F. Equipment/Furnishings:

Work benches, hand tools, saws, woodworking equipment, metalworking equipment, paint-booth, wash sink, etc.

G. Behavioral Considerations

H. Structural Systems

The workshop should have an open layout with ceilings at least 10'0" high.

I. Mechanical/Electrical Systems

Electrical system requirements will be higher than average to run the equipment necessary for this space. Lighting should be even and consistent throughout the space and additional task lighting will be needed at the different work stations.

J. Site/Exterior Environmental Considerations

This space does not require sight lines to the outdoor environment, but direct egress to the exterior is required for safety concerns in the workshop.

2.11 MECHANICAL

A. Quantities

- 2-3 People
- 1 Unit
- 800 square foot
- 1 x 800 = 800 square foot

B. Purposes/Functions

This space will house the mechanical equipment necessary to operate and maintain the facility. It will also provide access to the equipment to those needing to service or repair it.

C. Activities

An isolated room or series of rooms to house mechanical equipment required to run the facility. Maintenance will also be required on the equipment in this room at any given time.

D. Spatial Relationships

This space will be linked to every room in the facility via ducts and therefore should be as centrally located as possible. However, being that this is a rather noisy accessory space it would be best located in a service area such as a lower level or adjacent to a storage room. It should not be placed near noise sensitive areas such as classrooms or offices.

E. Special Considerations

F. Equipment/Furnishings

Mechanical equipment necessary for the operation and maintenance of the facility will be housed in this space. If possible the dust collection system and the paint-booth air filtration system for the workshop should also be incorporated into this space. This may require adjacency to the workshop.

G. Behavioral Considerations

H. Structural Systems

I. Mechanical/Electrical Systems

This will be the central location for most mechanical and electrical systems within the facility. It will need to be temperature controlled and well ventilated. Lighting in this room should be even and consistent, but no task lighting is required.

J. Site/Exterior Environmental Considerations

This space does not require visual ties to the outdoor environment, but it will require adjacency to the outdoors for exhaust/ventilation.

3.1 KITCHEN

A. Quantities

- 4-8 People
- 1 Unit
- 400 square feet
- 1 x 400 = 400 square feet

B. Purposes/Functions

The purpose of this space will be to provide food to students, faculty, and occasionally visitors for special events.

C. Activities

Chefs will prepare meals for users of the facility on an as need basis. Daily services may include a breakfast bar, a deli style lunch sandwich station and burger stand, and occasionally food for special events such as exhibitions and presentations.

D. Spatial Relationships

This space should be located adjacent to the cafeteria and within proximity of the exhibition space.

E. Special Considerations

The kitchen will require additional fire suppression systems in case of fire. This space will also require durable and slip-resistant surfaces (preferably tile).

F. Equipment/Furnishings

This kitchen space will need all of the typical appliances of a small restaurant kitchen. Key considerations would include space for refrigeration units, a grill/fryer/sauté line, a deli/prep area, and a dishwasher area.

G. Behavioral Considerations

H. Structural Systems

Walls should be well insulated to silence loud kitchen equipment noise to surrounding rooms. The layout of the kitchen should be kept as open as possible.

I. Mechanical/Electrical Systems

This space will need additional exhaust fans above the cooking area as well as adequate electrical power to run the large appliances to be located within the space.

J. Site/Exterior Environmental Considerations

The Kitchen space does not require visual connections to the outdoor environment.

3.2 CAFETERIA/BREAKROOM

A. Quantities

75-80 People

1 Unit

1000 square feet

1 x 1000 = 1,000 square feet

B. Purposes/Functions

This cafeteria will serve as a place for students, faculty, and incubator workers to sit down and eat or take a break throughout the day.

C. Activities

Users of this space will be eating, relaxing, or studying at any given time during the day. Students may use the space as a social gathering point, and the space should therefore be laid out in a way that allows for flexibility in use.

D. Spatial Relationships

This space should be located directly adjacent to the Kitchen and should have proximity to views of the outdoors/nature.

E. Special Considerations

F. Equipment/Furnishings

Furnishings in this space should be varied. Most important are tables with chairs or benches that will accommodate those who are eating in the space. However, some of the seating in the space should be flexible as a study area or just a place to socialize. Table should vary in terms of numbers of seats at each space. (some individual seats as well as tables of up to 10 or 12 people.

G. Behavioral Considerations

H. Structural Systems

This space should be open and inviting and therefore should have ceilings at least 10'0" and the span of the room should be large. A tie to the natural surroundings could be achieved through operable windows and doors to the outdoors. Outdoor seating would also be desirable to the users of this space.

I. Mechanical/Electrical Systems

Wireless internet would be highly desirable in this space.

J. Site/Exterior Environmental Considerations

Views to the outdoors are important to this space as it is to be used as a break area/ lounge as well as a cafeteria. As mentioned above, the ability to eat outdoors in manageable weather would be desired by the users of this space.

3.3 GYM/FITNESS CENTER

A. Quantities

- 15-20 People
- 1 Unit
- 800 square feet
- 1 x 800 = 800 square feet

B. Purposes/Functions

This space will serve as an exercise space for students and faculty of the Furniture Learning Center.

C. Activities

This space will be provided for typical workout facility activities. Adequate equipment and locker room facilities will be incorporated into this space.

D. Spatial Relationships

This space has no adjacency requirements, but the design should keep in mind that this is a semi-private space and it should be positioned accordingly.

E. Special Considerations

Employee fitness is an important aspect of all modern day furniture companies researched for this thesis project (Herman Miller, Steelcase, & Haworth). Therefore, an exercise facility for the users of the Furniture Learning Center is an important addition to its program. Users will have the opportunity to occupy the gym during all hours of operation, and it may be used to serve outside members after typical hours of operation.

F. Equipment/Furnishings

All necessary workout facility equipment will be included into this space as well as locker rooms and shower facilities.

G. Behavioral Considerations

H. Structural Systems

This space should be open in terms of layout and therefore will have a large span. Ceilings in this area should be at least 10'0" to accommodate workout activities and equipment.

I. Mechanical/Electrical Systems

J. Site/Exterior Environmental Considerations

This space would be more successful and desirable to its users if it was located near the perimeter of the facility with views to the outdoors and nature. Operable windows/doors to the exterior would make this tie to nature even more powerful.

4.1 EXHIBITION HALL

A. Quantities

- 80-100 People
- 1 Unit
- 2000 square feet
- 1 x 2000 = 2,000 square feet

B. Purposes/Functions

This space is intended to accommodate exhibitions and presentations taking place within the Furniture Learning Center.

C. Activities

The Exhibition hall will be the main presentation area within the facility. It may host any variety of furniture related seminars/presentations, or may host outside events for those who may wish to rent the space. Exhibitions could be displaying the work of students within the school or hosting lecturers who may require projection capabilities within the room. The space should be designed to be very flexible in terms of what type of activity may take place within it on a given day.

D. Spatial Relationships

The Exhibition Hall should be located near the main public entrance to the facility. It should also have restrooms and other support spaces within close proximity.

E. Special Considerations

Special acoustic considerations must be made for this space. Adequate egress must also be considered given the large gatherings that may occur in this room.

F. Equipment/Furnishings

No equipment or furnishings in this space should be permanent. All tables, chairs, podiums, stages, projections screens should be mobile or freestanding. This will assure that the space remains flexible in terms of use.

G. Behavioral Considerations

H. Structural Systems

This space will have a large span and should be designed as open as possible for adequate viewing of lecture style presentations/seminars or open displays.

I. Mechanical/Electrical Systems

This room should have adequate ventilation due to the raised internal temperature of a large crowd for a given exhibition. Lighting within the space should also be designed to be as flexible as possible. Task lighting should be able to adjust to different targets. All lighting within the space should be on a dimmer system to accommodate presentations within the hall.

J. Site/Exterior Environmental Considerations

This space does not require direct adjacency to the outdoors, but due to its proximity to the main public entrance it is likely that it will be close to the perimeter of the facility. Therefore, a curtain system may be required to block natural light for a given exhibition or presentation.

4.2 EXHIBITION STORAGE

A. Quantities

- 3-5 People
- 1 Unit
- 500 square feet
- 1 x 5000 = 500 square feet

B. Purposes/Functions

This space is required to store furnishings and equipment from the exhibition hall.

C. Activities

Users will store furnishings such as tables and chairs in this space when an open layout is required for the exhibition hall.

D. Spatial Relationships

This space should be physically connected to the exhibition hall so that furnishings can be easily moved in and out of the space.

E. Special Considerations

No Specific Requirements

F. Equipment/Furnishings

Racks and shelves may be used in this space to store chairs, tables, or exhibition equipment not being used in the exhibition hall.

G. Behavioral Considerations

H. Structural Systems

This room requires an opening/door that is large enough to easily maneuver chairs and tables in and out of it from the exhibition hall.

I. Mechanical/Electrical Systems

No Specific Requirements

J. Site/Exterior Environmental Considerations

Adjacency to the outdoors/perimeter of the facility is not required for this space.

5.1 INCUBATOR ENTRANCE/RECEPTION/LOBBY

A. Quantities

- 15-20 People
- 1 Unit
- 500 square feet
- 1 x 500 = 500 square feet

B. Purposes/Functions

This space will serve as the main entry and lobby for the incubator spaces located throughout the facility.

C. Activities

The purpose of this space is to introduce people to the interior of the incubator spaces and to direct them towards their desired destination. It may also be used as a gathering point for visitors to the facility.

D. Spatial Relationships

Individuals or groups of people may enter the facility through this space at any given time during its hours of operation. It will need to provide visitors with an introduction to the facility, and therefore will require space for a receptionist/help desk. Individuals or groups of visitors will also require an adequate amount of room to wait for tours/orientations/interviews. Everyday inhabitants of this space would include anyone visiting or working at the school, and adequate circulation space will be needed to funnel people through this portion of the facility.

E. Special Considerations

The interior of the building would be more successful if its inhabitants could always possess a sense of where they are in relation to this space. It should take advantage of visual sightlines to the outside/surrounding natural elements.

F. Equipment/Furnishings

At minimum a desk/office will be required to accommodate the facility's receptionist. Typical furnishings such as chairs and tables will be needed for the waiting area. The lobby would be an excellent point to incorporate photos, mission statements, and other forms of publicity to familiarize visitors with the incubator portion of the Furniture Learning Center.

G. Behavioral Considerations

H. Structural Systems

This space, serving as the main transition between interior and exterior as well as the main point of circulation within the building, would benefit from a close physical relationship to the surrounding natural elements. Potential connections could include operable windows/envelopes in the building that could be opened to exhibit the presence of nature on the site of the building.

I. Mechanical/Electrical Systems

Natural Lighting would be appropriate in this space during the daytime. At night lighting should be bright in this area to indicate its importance as an entry/exit point. As mentioned above, natural ventilation could be used when the weather permits it.

J. Site/Exterior Environmental Considerations

This space will be located adjacent to the outdoor environment and the main public entrance to the facility.

5.2 LOUNGE/BREAKROOM

A. Quantities

- 10 People
- 2 Units
- 200 square feet
- 1 x 200 = 200 square feet

B. Purposes/Functions

The lounge/breakroom will serve as a relaxation area for the employees and guests of those working in the incubator spaces.

C. Activities

Users of this space may be taking a short break from work for coffee or a snack, or may be sitting down to use their laptops for a short amount of time or watch the latest news on television. This space should be designed to be flexible to meet the needs of its users.

D. Spatial Relationships

These spaces should be located within proximity of the incubator spaces as they are intended for users of these spaces.

E. Special Considerations

Individuals or small groups may gather in these areas, and seating should accommodate for both.

F. Equipment/Furnishings

Individual seating areas and small tables should be incorporated into the design and layout of these rooms.

G. Behavioral Considerations

H. Structural Systems

Walls in the lounge areas should have fenestration with a clear view to the exterior/natural environment.

I. Mechanical/Electrical Systems

Wireless internet would be desirable to users of these spaces.

J. Site/Exterior Environmental Considerations

Views to the exterior are important to these spaces as they are intended to provide a break from the workplace environment. Operable windows or openings to patios on the outside would make these spaces even more desirable to their users.

5.3 SMALL CONFERENCE ROOM

A. Quantities

- 5-8 People
- 4 Units
- 150 square feet
- 4 x 150 = 600 square feet

B. Purposes/Functions

This conference room will be used by incubator users for meetings and presentations with clients or co-workers.

C. Activities

This space will be used for meetings by the incubator staff of the Furniture Learning Center. Presentations will also be given and viewed in this space.

D. Spatial Relationships

This space should be located near the incubator offices and the entrance/reception/lobby space.

E. Special Considerations

A large amount of wall space in this room will be used for visual displays/projection of digital media.

F. Equipment/Furnishings

A small table and chairs will be needed for the users of this space. A mobile podium may also be required for users giving presentations in this conference room.

G. Behavioral Considerations

This space will need the ability to turn from light to dark in a quick amount of time to accommodate presentations. Some form of blinds/visual screening may be used to achieve this as well as provide privacy for the events taking place in this room.

H. Structural Systems

The most important structural consideration will be to insulate the space to block undesired sound transference between the conference room and its adjacent spaces.

I. Mechanical/Electrical Systems

Full projection and wireless abilities will be required within this space. An audio/telephone system will be needed for conference calling capabilities. Task lighting will be needed over the conference table as well as along the presentation wall.

J. Site/Exterior Environmental Considerations

This space does not require adjacency/visual connection to the exterior of the building nor is natural lighting desirable in this location.

5.4 LARGE CONFERENCE ROOM

A. Quantities

- 12-15 People
- 2 Units
- 300 square feet
- 2 x 300 = 600 square feet

B. Purposes/Functions

This conference room will be used by incubator users for meetings and presentations with clients or co-workers.

C. Activities

This space will be used for meetings by the incubator staff of the Furniture Learning Center. Presentations will also be given and viewed in this space.

D. Spatial Relationships

This space should be located near the incubator offices and the entrance/reception/lobby space.

E. Special Considerations

A large amount of wall space in this room will be used for visual displays/projection of digital media.

F. Equipment/Furnishings

A large table and chairs will be needed for the users of this space. A mobile podium may also be required for users giving presentations in this conference room.

G. Behavioral Considerations

This space will need the ability to turn from light to dark in a quick amount of time to accommodate presentations. Some form of blinds/visual screening may be used to achieve this as well as provide privacy for the events taking place in this room.

H. Structural Systems

The most important structural consideration will be to insulate the space to block undesired sound transference between the conference room and its adjacent spaces.

I. Mechanical/Electrical Systems

Full projection and wireless abilities will be required within this space. An audio/telephone system will be needed for conference calling capabilities. Task lighting will be needed over the conference table as well as along the presentation wall.

J. Site/Exterior Environmental Considerations

This space does not require adjacency/visual connection to the exterior of the building nor is natural lighting desirable in this location.

5.5 RESTROOMS

A. Quantities

- 4 People
- 4 Units
- 200 square feet
- 4 x 200 = 800 square feet

B. Purposes/Functions

These restrooms will primarily serve the occupants of the incubator offices. Two restrooms will be men's and two will be women's. This space is private in its usage and should be designed accordingly.

C. Activities

Typical expected activities of a restroom, as well as the cleaning of the space. Each restroom should include a custodial closet.

D. Spatial Relationships

The restrooms should be strategically positioned in proximity to the size and location of the incubator spaces.

E. Special Considerations

The restrooms should be comprised of durable and cleanable surfaces such as tile flooring and laminate countertops.

F. Equipment/Furnishings

Typical restroom furnishings should be included in these spaces including the required number of toilets, sinks, and stalls per the number of occupants. A drinking fountain directly outside of the restrooms should also be included.

G. Behavioral Considerations

H. Structural Systems

There are no specific structural systems.

I. Mechanical/Electrical Systems

Proper lighting (perhaps censored lighting to turn on and off when occupants enter) and adequate ventilation should be provided.

J. Site/Exterior Environmental Considerations

This space does not require exterior views, and all windows should be non-transparent.

5.6 COPY/RESOURCE CENTER

A. Quantities

- 3-4 People
- 2 Units
- 200 square feet
- 2 x 200 = 400 square feet

B. Purposes/Functions

The copy/resource centers will be collectively used by the occupants of the incubator spaces for everyday office needs.

C. Activities

Users will occupy this space to make copies, scans, or faxes for everyday office needs. The collective use of this space will prevent individual incubator occupants from needing to have their own spaces for everyday office functions. This will cut down on costs and materials used by the incubator occupants.

D. Spatial Relationships

These resource centers should be located centrally between the incubator suites.

E. Special Considerations

Given that these resource centers are to be used by multiple incubator occupants they should be designed openly so that everyone may access them but nobody can claim space within them as private.

F. Equipment/Furnishings

Typical office equipment and storage: Copy/Fax/Scan machines, locking filing cabinets, office supply cabinets.

G. Behavioral Considerations

H. Structural Systems

No specific requirements.

I. Mechanical/Electrical Systems

No specific requirements.

J. Site/Exterior Environmental Considerations

These spaces would be more desirable to users if they had views to the exterior environment given that the users will be outside of their incubator spaces while using the resource centers. These spaces may serve as informal gathering spaces for small numbers of incubator occupants at any given time.

5.7 LARGE INCUBATOR SUITE

A. Quantities

- 5-10 People
- 3 Units
- 500 square feet
- 3 x 500 = 1,500 square feet

B. Purposes/Functions

The Large Incubator Suites are intended to be inhabited by larger outside furniture companies looking to obtain interns from the Furniture Learning Center. Examples of possible furniture production companies that may occupy these large suites would include Herman Miller, Steelcase, or Haworth.

C. Activities

Occupants of these large suites would be a combination of company employees/mentors and interns from the Furniture Learning Center itself. These users would be performing outreach functions of the main company, such as furniture design and marketing. Interns would be gaining the necessary skills to join the furniture workforce.

D. Spatial Relationships

The Incubator suites should be located on the first floor of the building with facades facing the street for retail use.

E. Special Considerations

The Incubator suites will have public access via the street as well as private entrances from the interior of the building.

F. Equipment/Furnishings

The large incubator spaces will feature a series of workspaces and design areas. Individual desk spaces will be required and will need to house computers as well as other everyday personal office needs.

G. Behavioral Considerations

H. Structural Systems

The front wall of the incubator space facing the street should be designed to look and operate like a retail façade, including space for displaying furniture produced by the company itself.

I. Mechanical/Electrical Systems

No specific requirements.

J. Site/Exterior Environmental Considerations

The Incubator spaces require direct adjacency to the street in order to permit public access to the individual suites. Therefore windows and doors to the street will be necessary from each individual suite.

5.8 MEDIUM INCUBATOR SUITE

A. Quantities

- 4-5 People
- 3 Units
- 200 square feet
- 3 x 200 = 600 square feet

B. Purposes/Functions

The Medium Incubator Suites are intended to be inhabited by small to medium sized furniture companies who may employ one or two interns from the Furniture Learning Center.

C. Activities

Occupants of these suites would be a combination of employees/mentors and interns from the Furniture Learning Center itself. These users would be performing everyday functions of the company, such as furniture design and marketing. Interns would be gaining the necessary skills to join the furniture workforce.

D. Spatial Relationships

The Incubator suites should be located on the first floor of the building with facades facing the street for retail use.

E. Special Considerations

The Incubator suites will have public access via the street as well as private entrances from the interior of the building.

F. Equipment/Furnishings

The medium incubator spaces will feature a series of workspaces and design areas. Individual desk spaces will be required and will need to house computers as well as other everyday personal office needs.

G. Behavioral Considerations

H. Structural Systems

The front wall of the incubator space facing the street should be designed to look and operate like a retail façade, including space for displaying furniture produced by the company itself.

I. Mechanical/Electrical Systems

No specific requirements.

J. Site/Exterior Environmental Considerations

The Incubator spaces require direct adjacency to the street in order to permit public access to the individual suites. Therefore windows and doors to the street will be necessary from each individual suite.

5.9 SMALL INCUBATOR SUITE

A. Quantities

- 1-3 People
- 10 Units
- 100 square feet
- 10 x 100 = 1,000 square feet

B. Purposes/Functions

The Small Incubator Suites are intended to be inhabited by small to sized furniture companies who may employ one or two interns from the Furniture Learning Center.

C. Activities

Occupants of these suites would be a combination of employees/mentors and interns from the Furniture Learning Center itself. These users would be performing everyday functions of the company, such as furniture design and marketing. Interns would be gaining the necessary skills to join the furniture workforce.

D. Spatial Relationships

The Incubator suites should be located on the first floor of the building with facades facing the street for retail use.

E. Special Considerations

The Incubator suites will have public access via the street as well as private entrances from the interior of the building.

F. Equipment/Furnishings

The small incubator spaces will feature a small workspace and design area. Everyday office needs would be shared with the other incubator spaces in the resource center.

G. Behavioral Considerations

H. Structural Systems

The front wall of the incubator space facing the street should be designed to look and operate like a retail façade, including space for displaying furniture produced by the company itself.

I. Mechanical/Electrical Systems

No specific requirements.

J. Site/Exterior Environmental Considerations

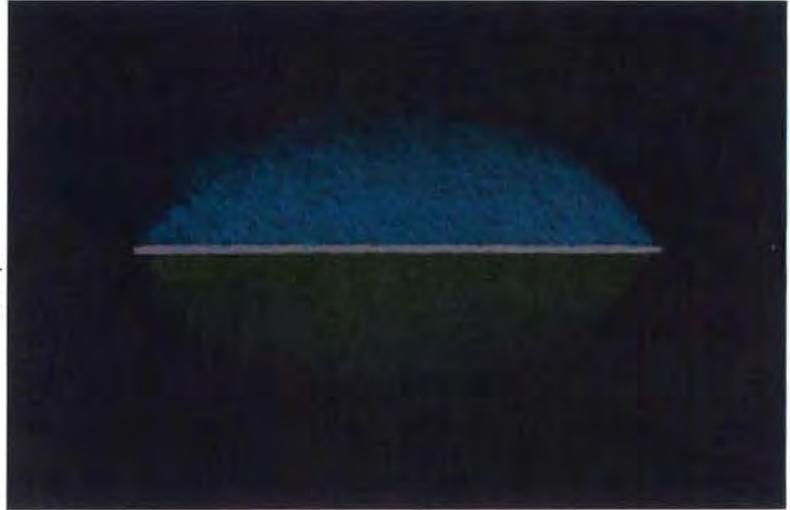
The Incubator spaces require direct adjacency to the street in order to permit public access to the individual suites. Therefore windows and doors to the street will be necessary from each individual suite.

SPRINGBOARD

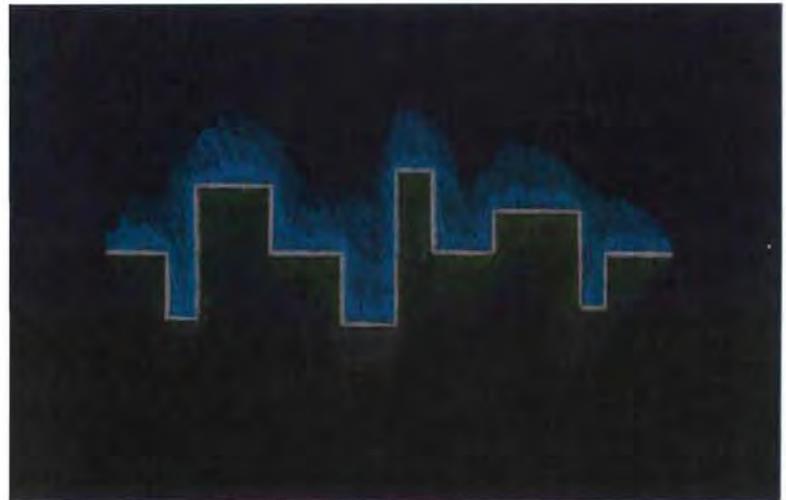


The Springboard portion of the investigation was intended to set in motion a process of speculation that started to translate the ideas that I had been studying up until this point into an architectural intervention. I was encouraged to test, to fail, to wonder, and to speculate. This was a fluid and open portion of the investigation, and was intended to allow me to ask questions, but not to determine immediate definitive answers.

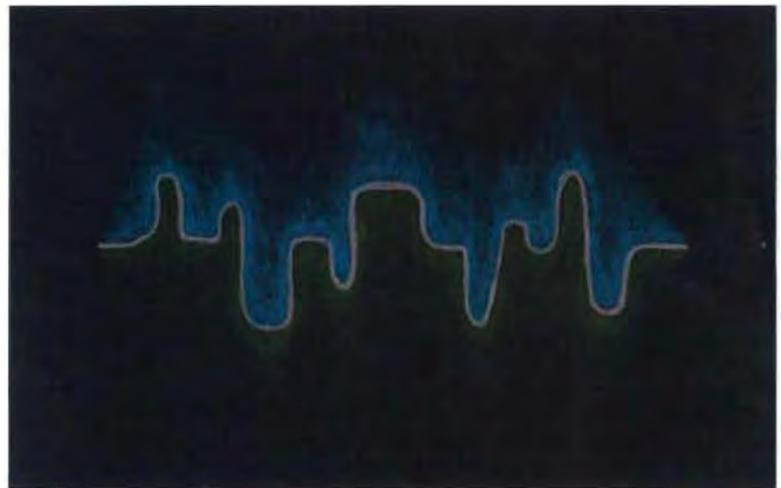
This series of studies questioned how to address the twenty foot drop-off at the river's edge on the east side of my site.



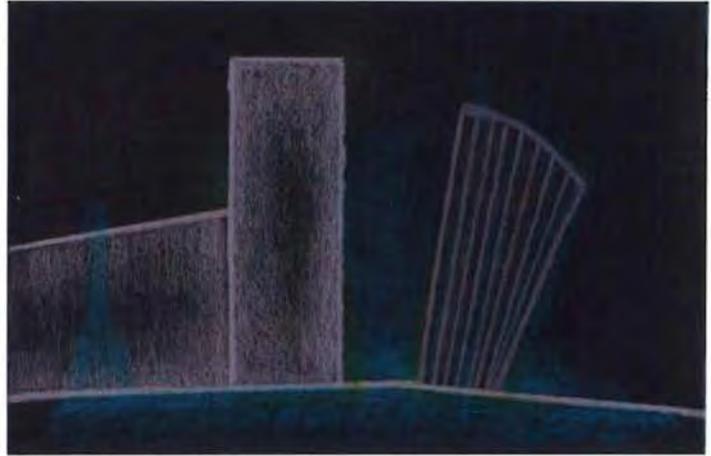
I was pondering how to begin to break up this edge as a means of connecting/blending the site with the surrounding land and water.



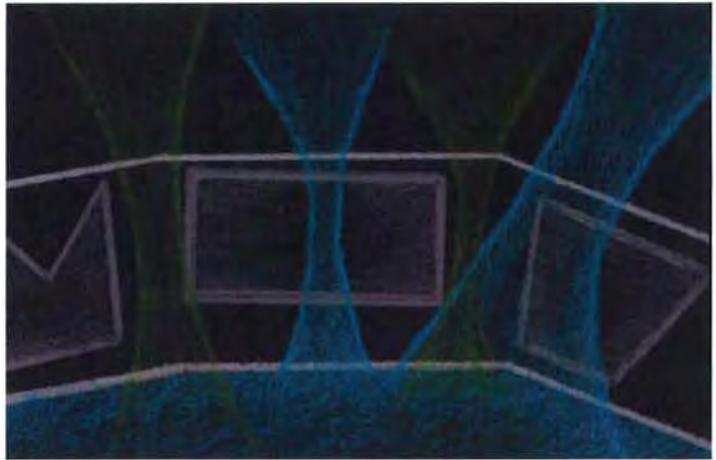
It was my goal to create a softer, more pedestrian friendly connection at the riverfront.



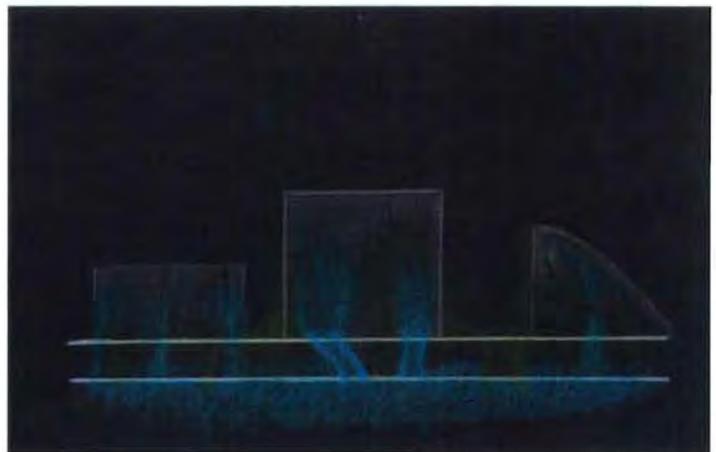
Further studies of how to blend the landscape into the site.

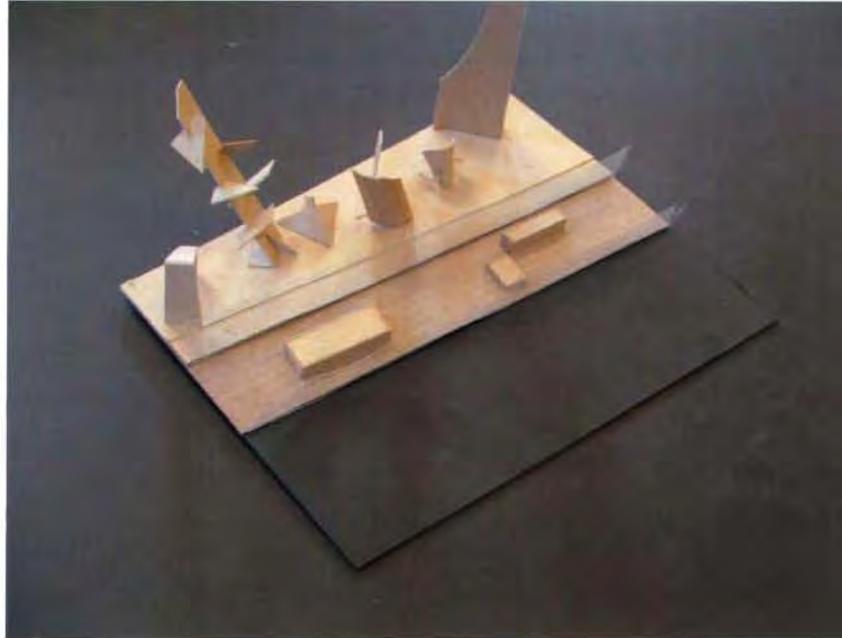


Is there a way to create a push-pull relationship between the water, the land, and the building on my site?

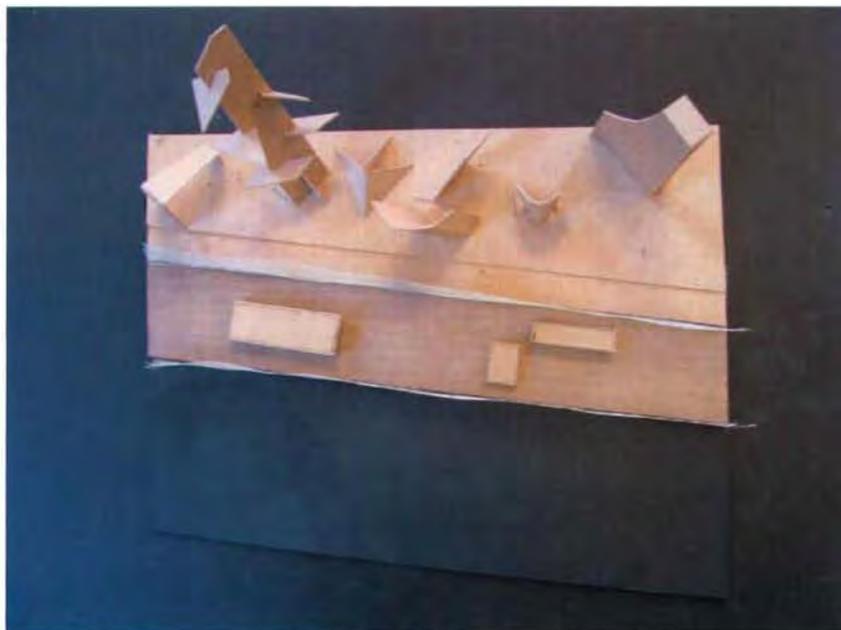


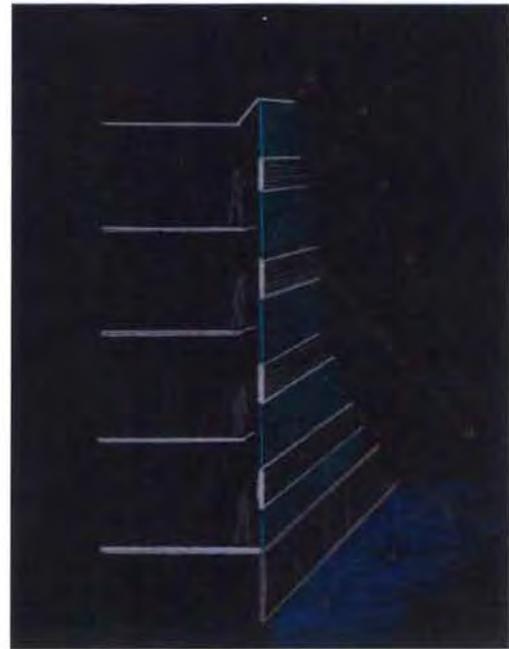
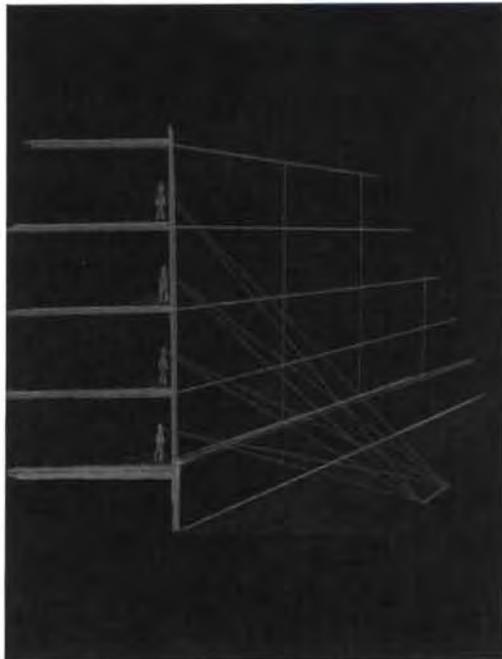
Can water and landscape flow through my building? How do pedestrians fit into this flow pattern?



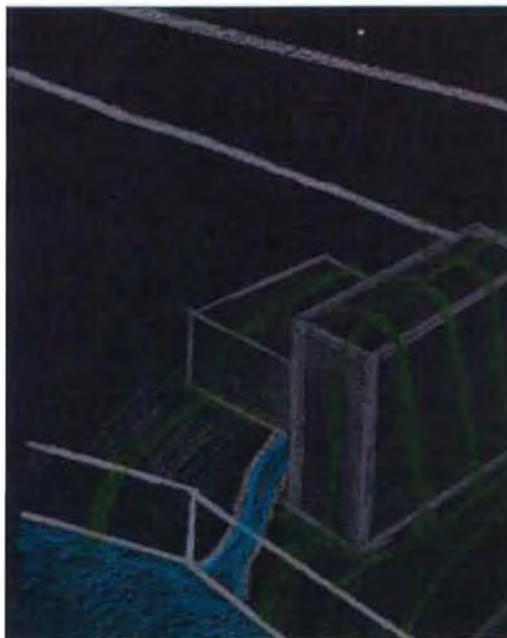


This model was created to physically show the barrier that is created by underutilized and abandoned post-industrial environments between the waterfront and the surrounding city. The challenge of this investigation is to find a way to lessen or overcome this barrier, this reconnecting the people of the city to the waterfront.



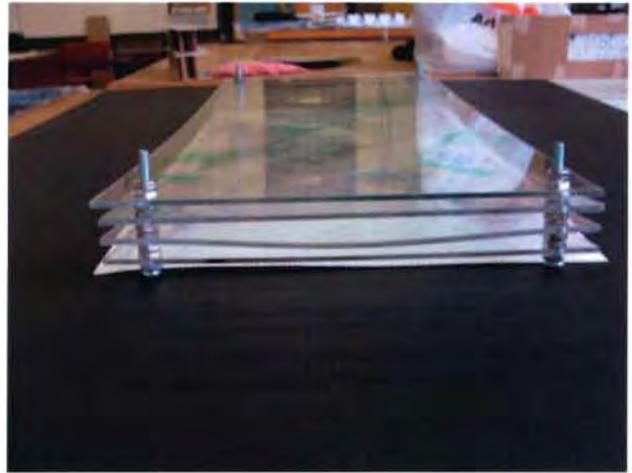


The top two drawing investigate site lines from a facility at the water's edge. The design of this facility should take advantage of views towards the scenic river and island.

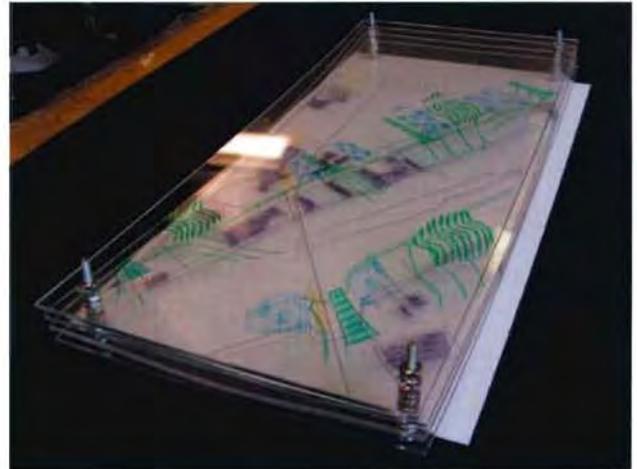


These images begin to question how the landscape may begin to wrap around or weave through the building and the site.

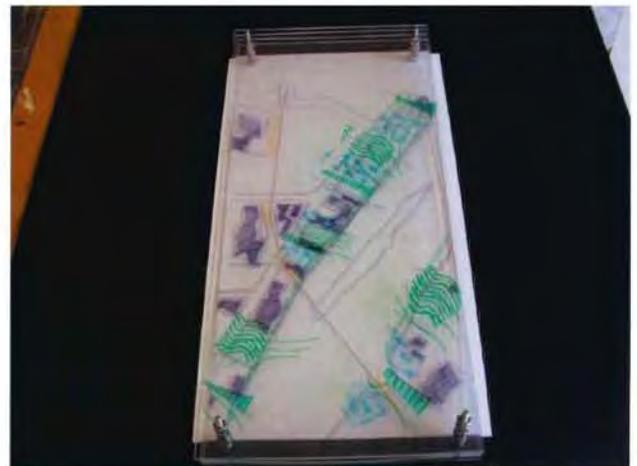
This model was created to depict the layers that exist on and around my selected site.

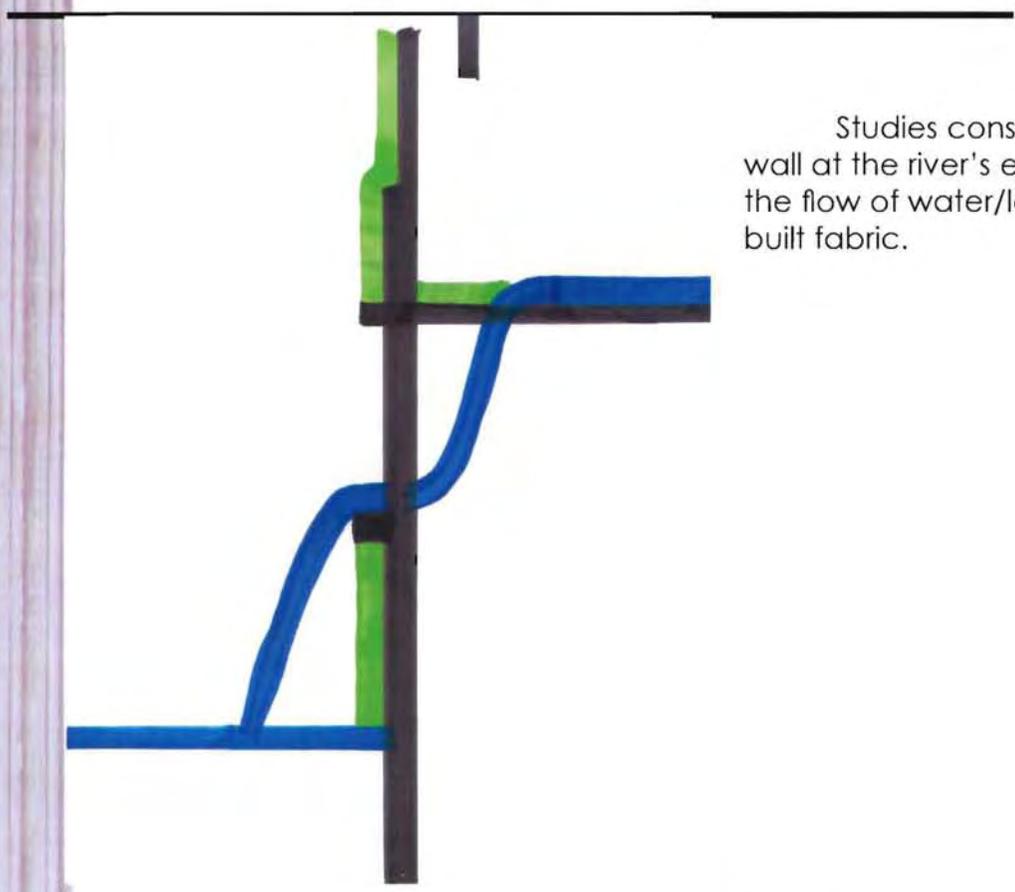


Included into this investigation was a combination of existing built fabric, circulation patterns (vehicular and pedestrian), existing greenspaces vs. hardscapes, and the potential spots for intervention.

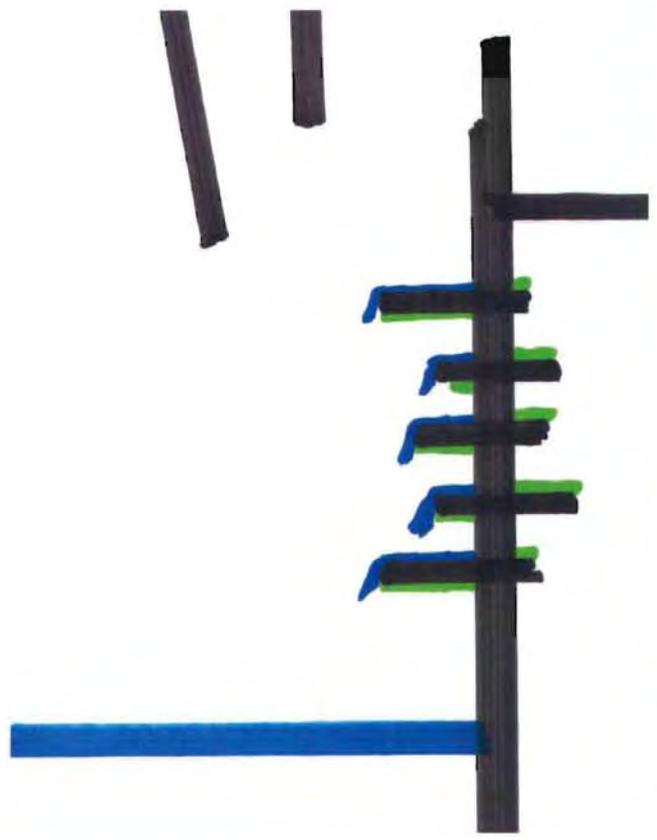


Viewed from the side the multiple layers of the site are visible, but from above this site becomes a whole.





Studies considering the wall at the river's edge and the flow of water/landscape/built fabric.



SPRINGBOARD

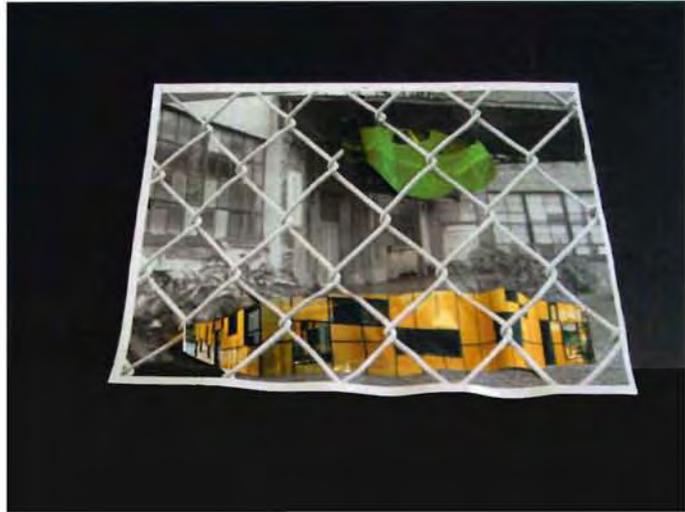


Overlay of the existing building thinking about how the landscape and the built fabric can begin to work together. How can the site and the existing building inform the future proposal for the site?

Site & Environment
Blending

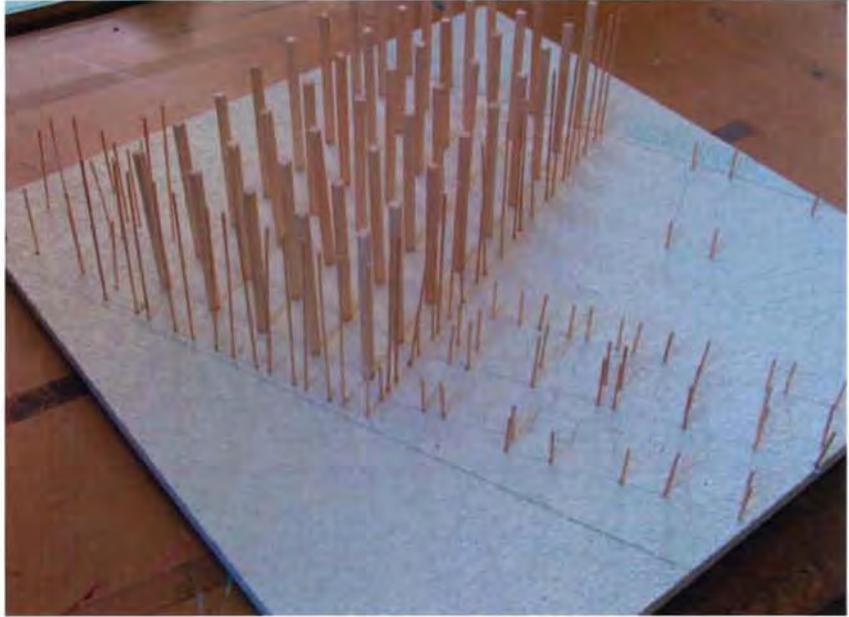


Site & Environment
Blending

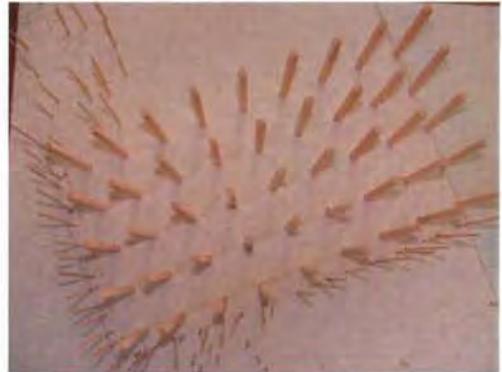


Site & Environment
Blending

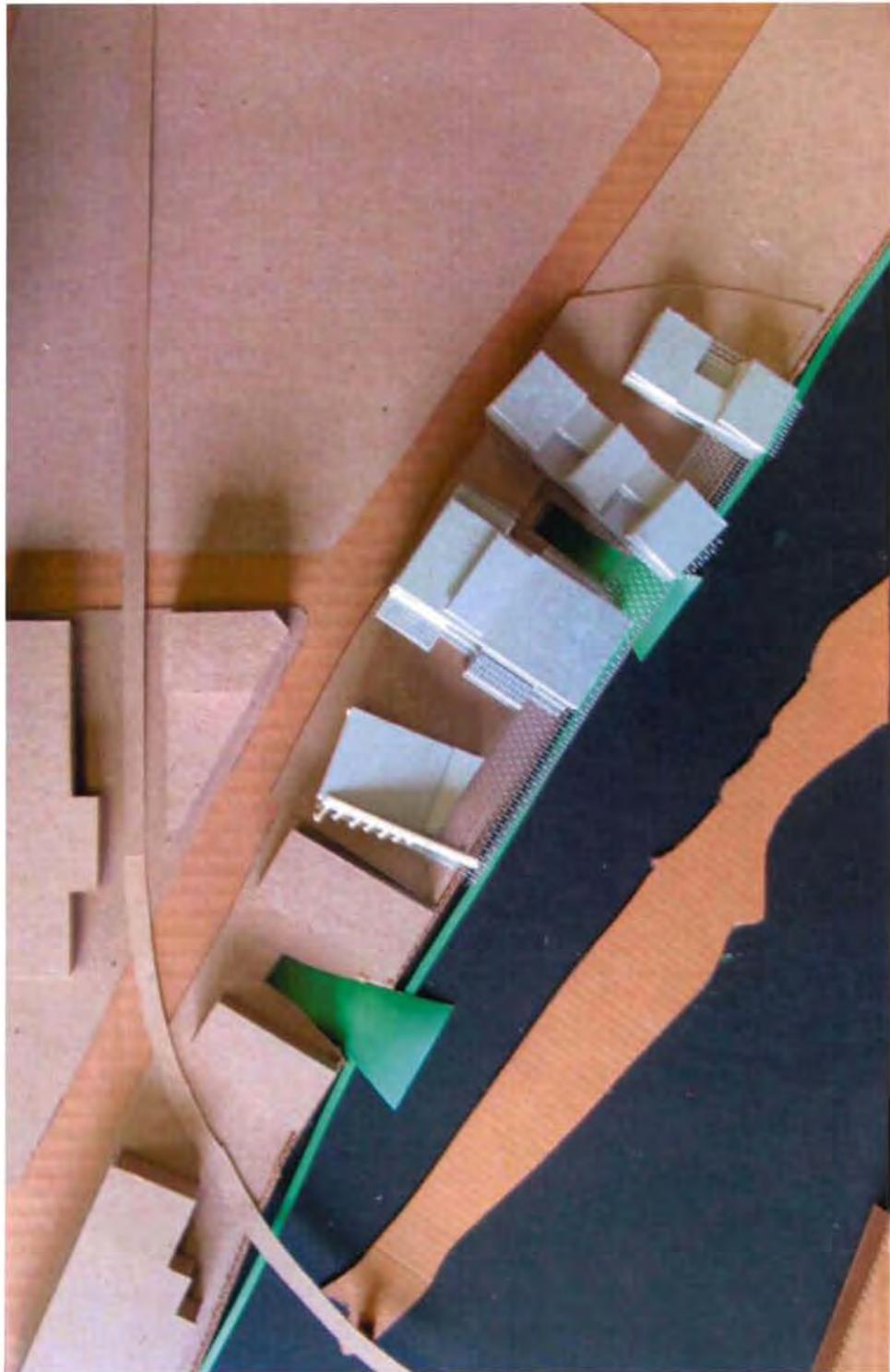




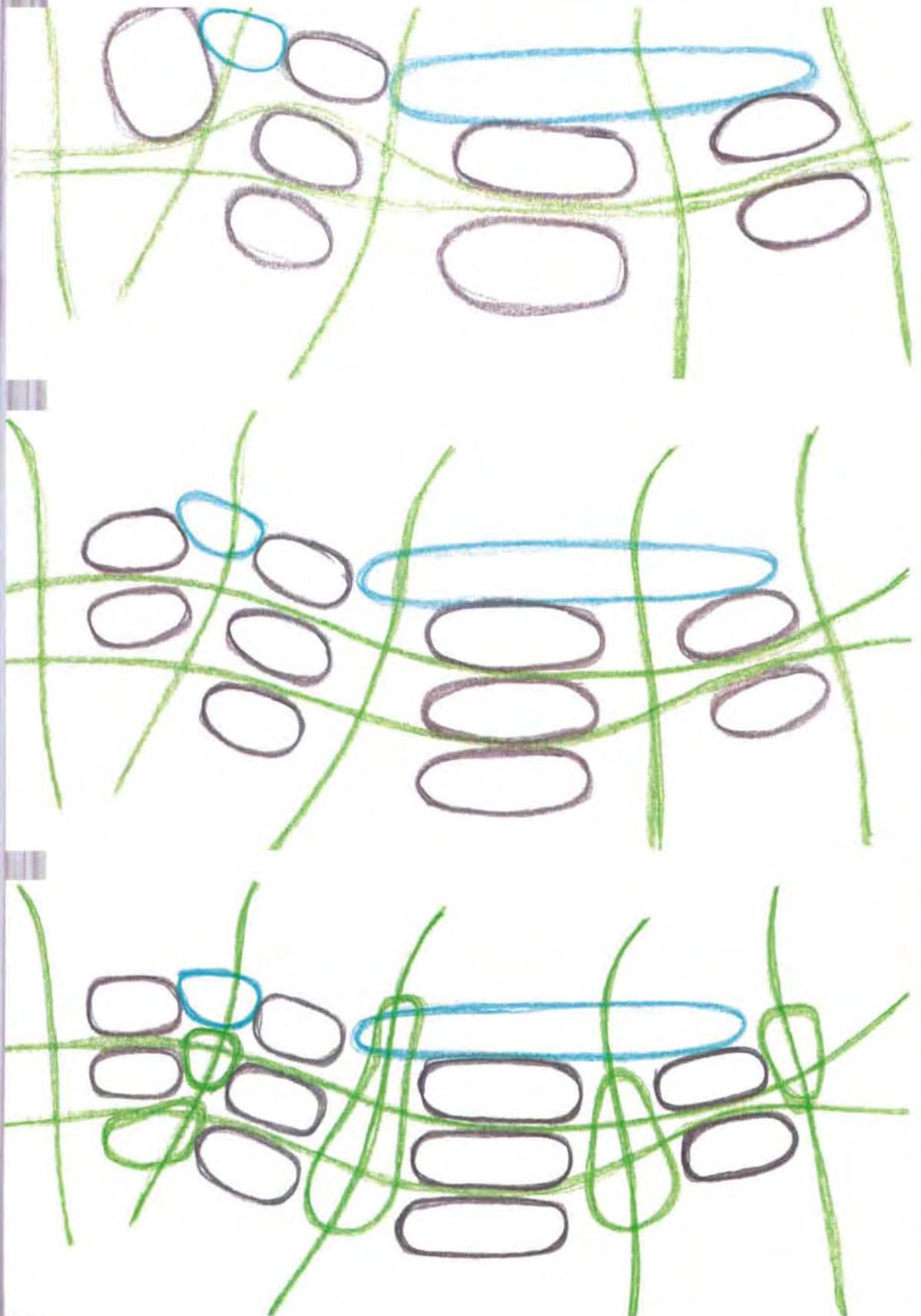
This model removed the skin of the existing building to consider if there was a field of operations in place on the site that might begin to inform the design. The existing columns create an interesting order and axis to the site. The model encouraged thinking about structure throughout the design process.

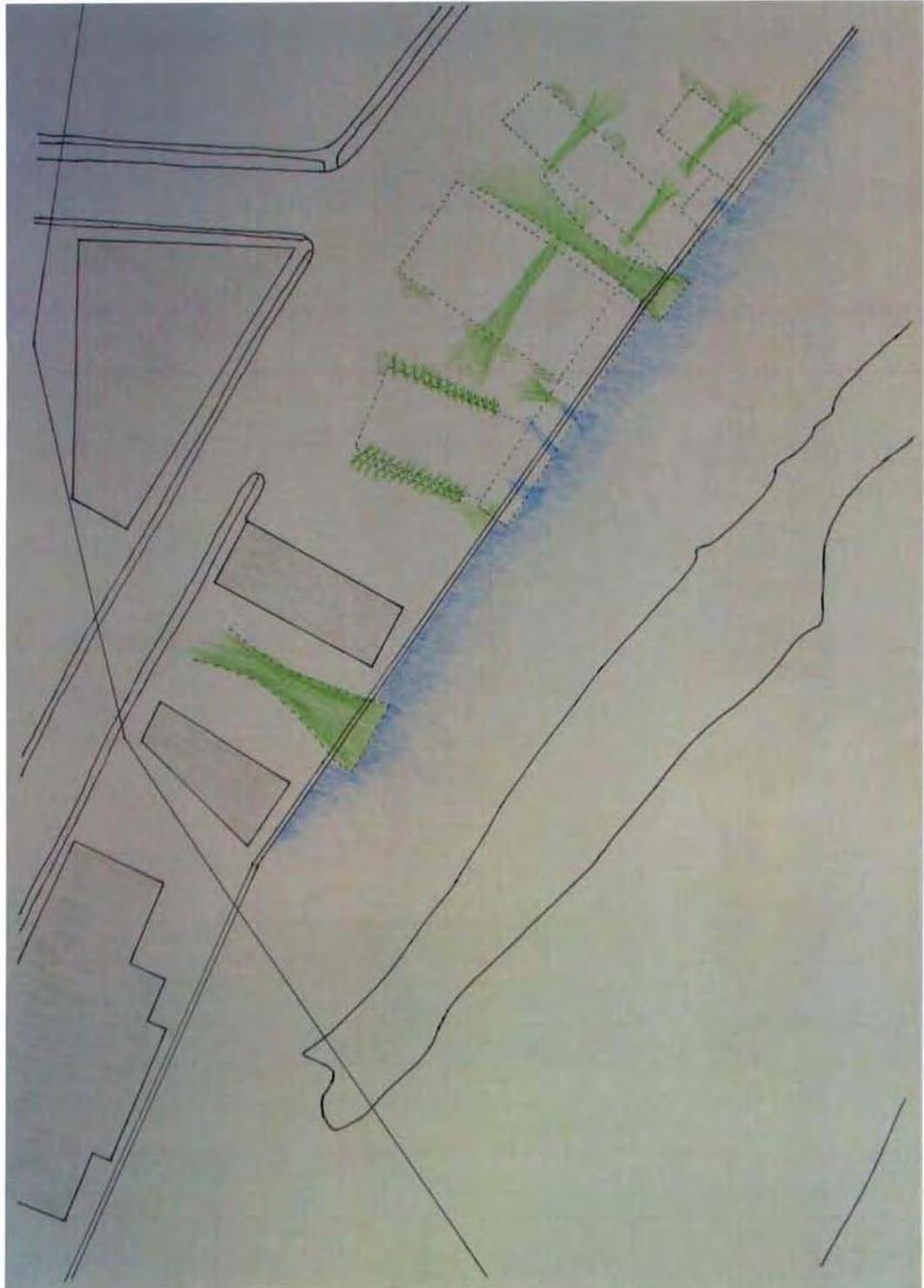


SCHEMATIC DESIGN



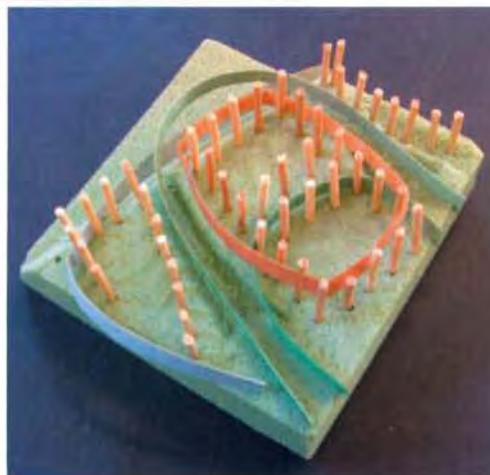
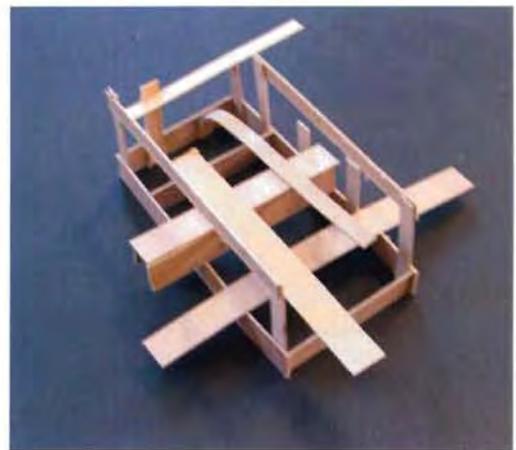
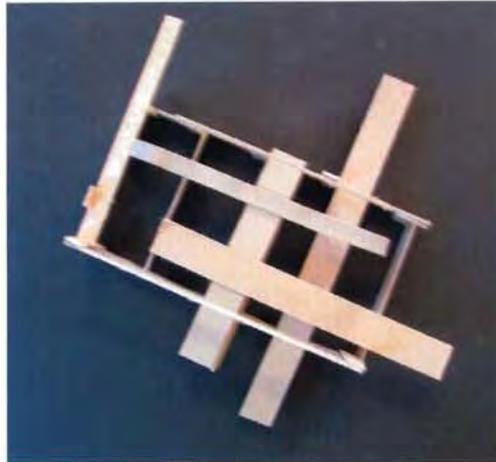
SITE FLOW STUDIES



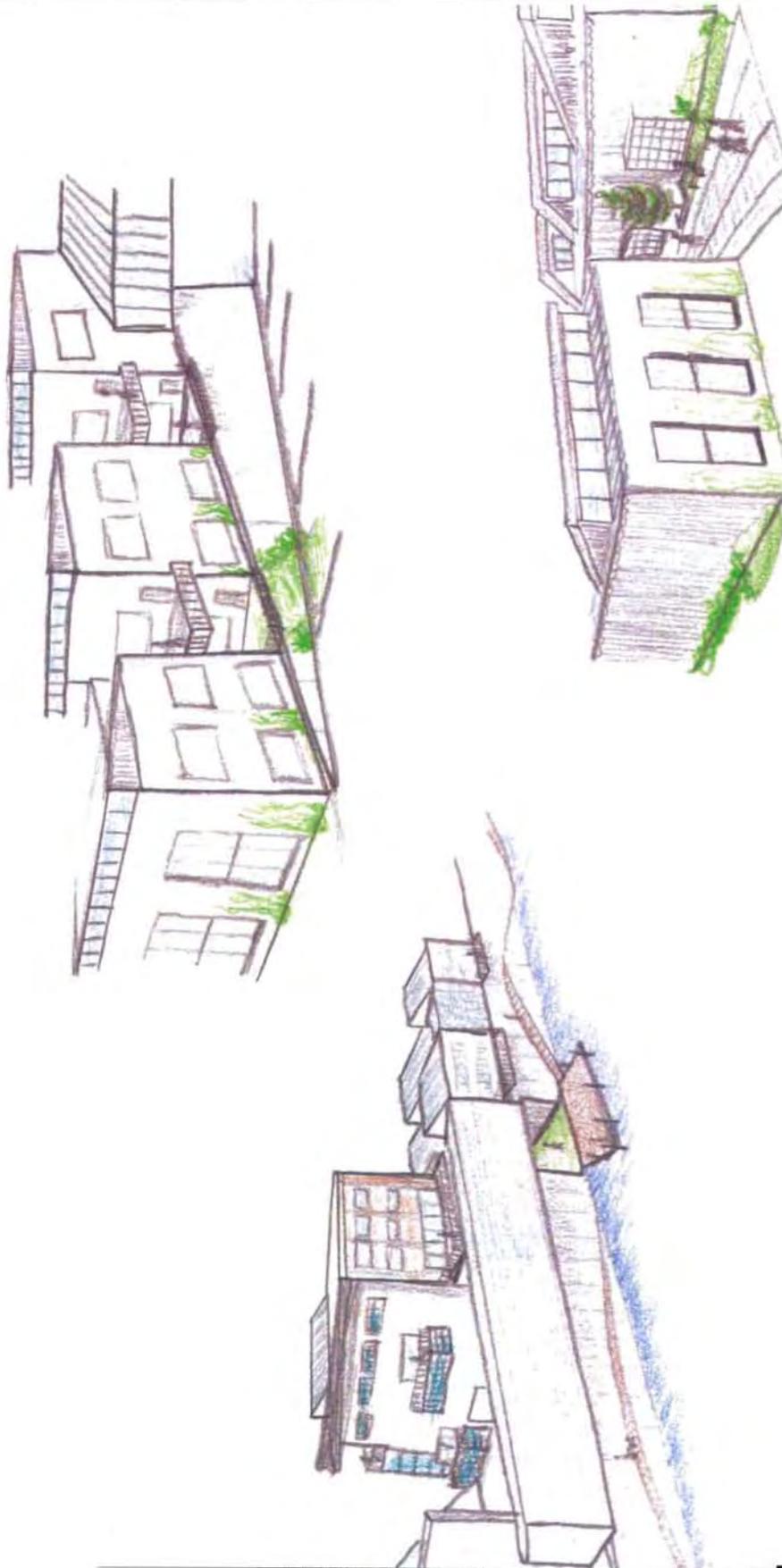


This is a conceptual site plan that was developed based on the previous site flow studies. It was considering the flow of the natural environment through the building and the site.

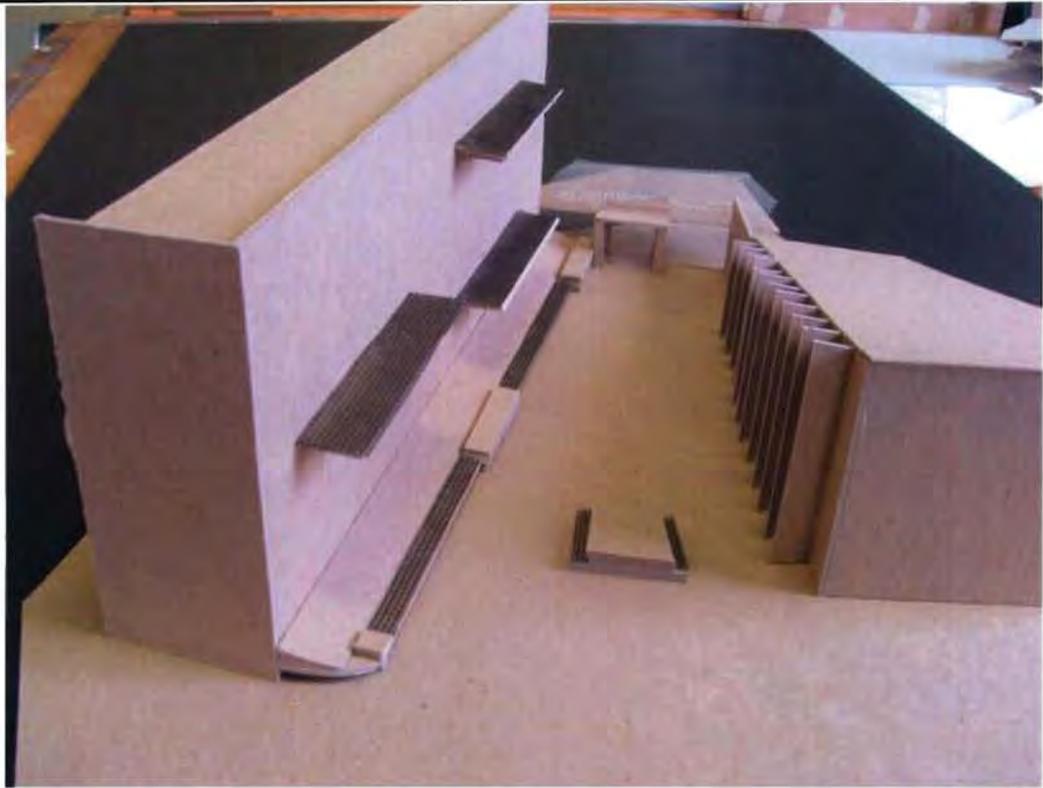
Push/Pull through
the existing building



Natural flow in and
around the site and
buildings



SCHEMATIC BUILDING SKETCHES

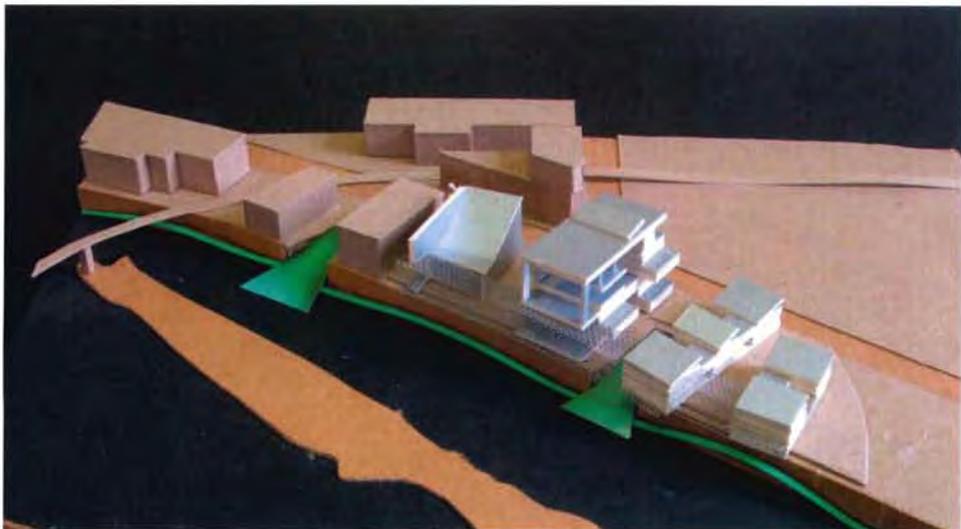
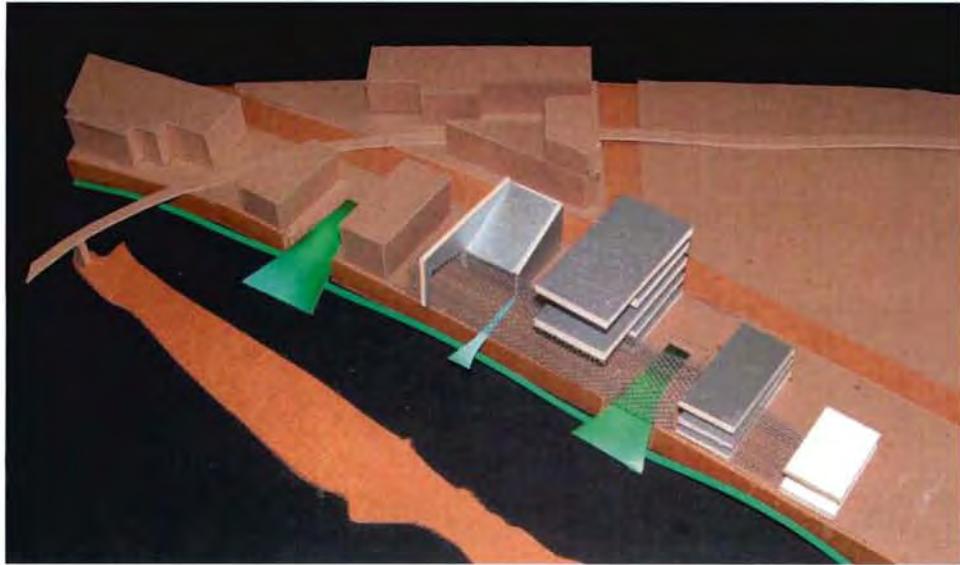
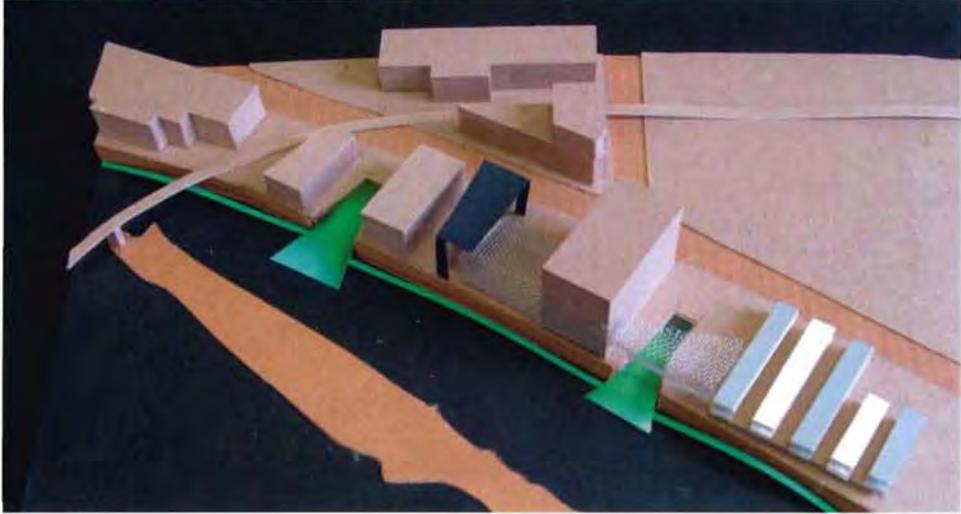


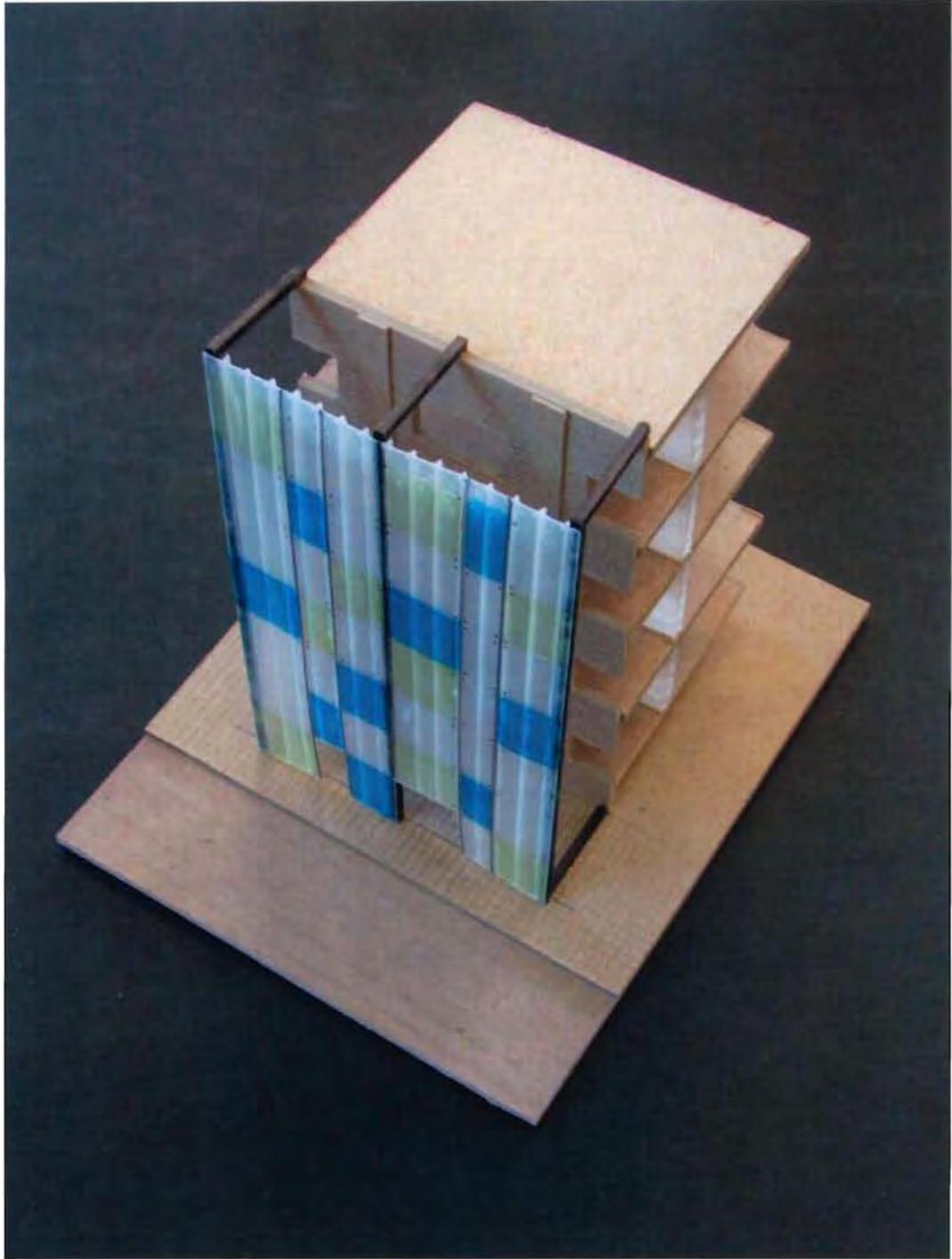
The top model is of an exterior courtyard space. This space was located outside of the main entrance to an early scheme of my design. It was investigation sight lines between the existing building and portions of new construction. The downsides of this model were that it still blocked the pedestrian from the river's edge and cut off views to the island.

The lower images are of a study model created later in the process, but still concerned with the concept of creating a courtyard space without blocking desirable views. Each step began to inform the next one at this point in the process.



SCHEMATIC SITE/STUDY MODELS





This initial design created a courtyard at the end one of the pedestrian fingers running through my site. The pedestrian fingers were intended to physically and visually reconnect the surrounding residential neighborhood to the riverfront.



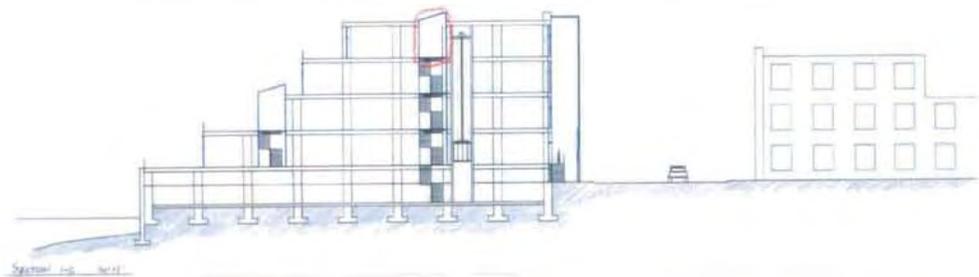
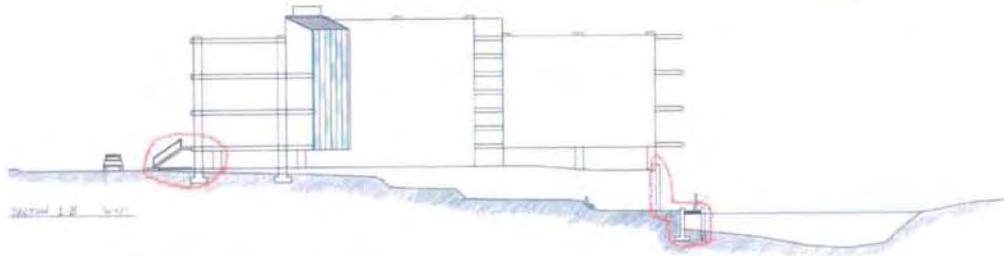
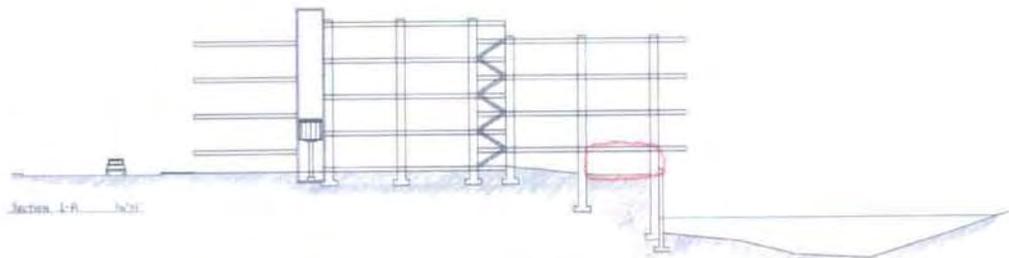
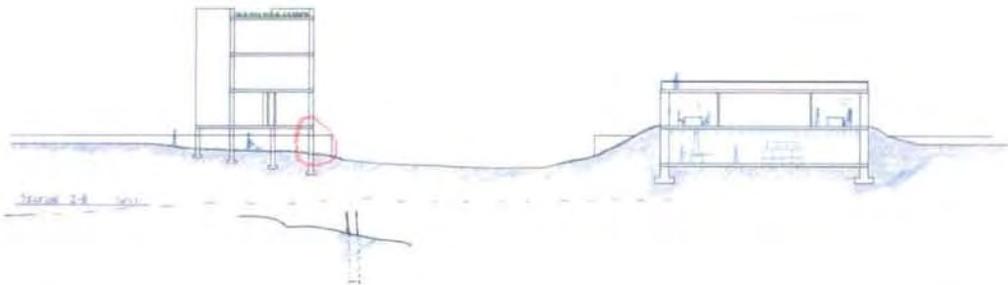
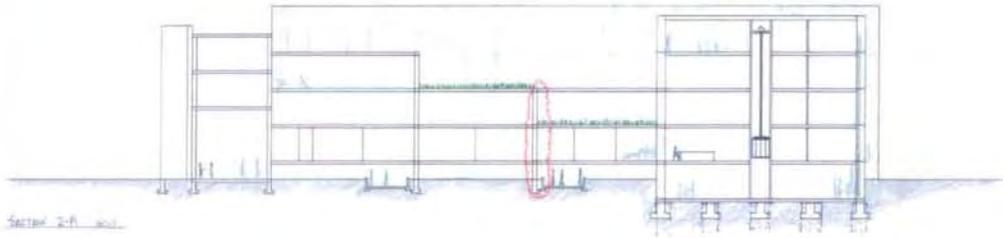
The existing building and the new construction wrap around the courtyard, thus defining a pedestrian oriented space at the waterfront within an industrial setting.



The struggle at this point in the process was creating a successful flow of pedestrians through and around my design and to and from the riverfront. The final design would have to address this issue as well as further embrace the connection and blending of nature through the site.



SECTIONAL STUDIES

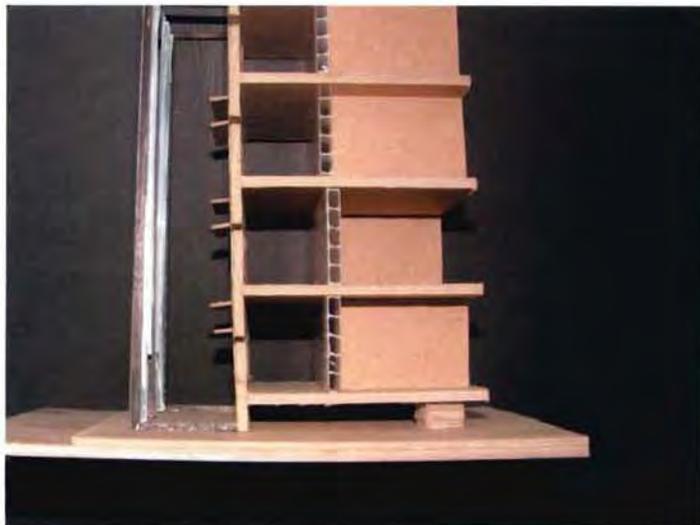


This sectional model represents the condition to be created at the front (west) side of the existing building. A Glass Curtain wall will create a showcase for works from the school that are to be displayed on the brick wall of the existing building.



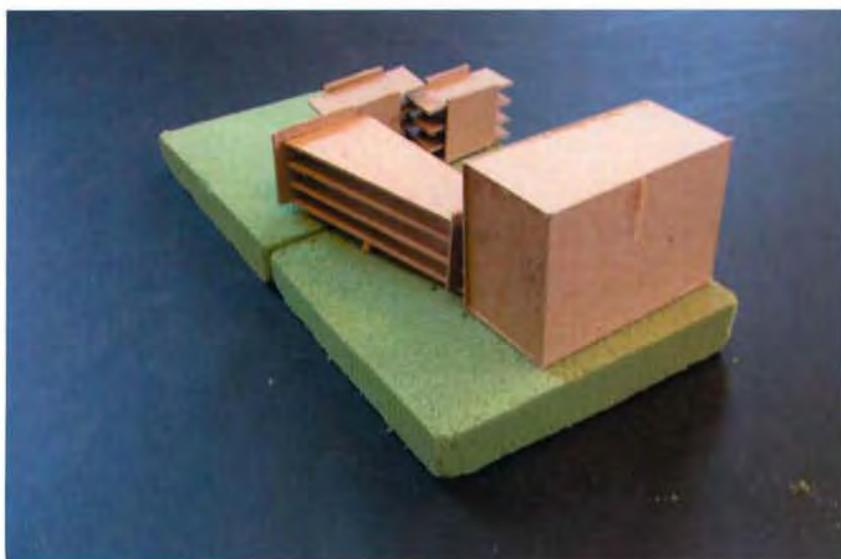
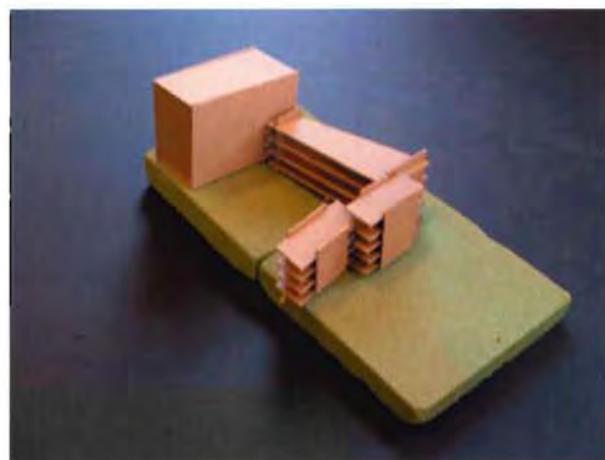
During hours of operation the curtain wall would have the ability to open at the bottom and allow pedestrians to flow into the space directly from the sidewalk, encouraging interaction with the building and the school.

This additional layer to the façade creates an interesting small scale courtyard experience while also creating an inhabitable layer between the existing building and the new fabric.





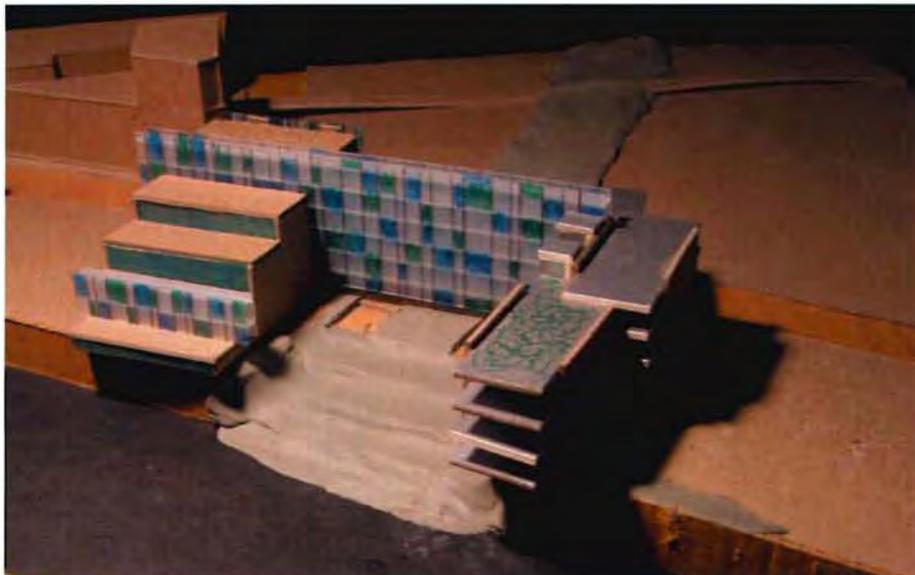
This study model informed the following model that concluded the design development phase of the investigation.



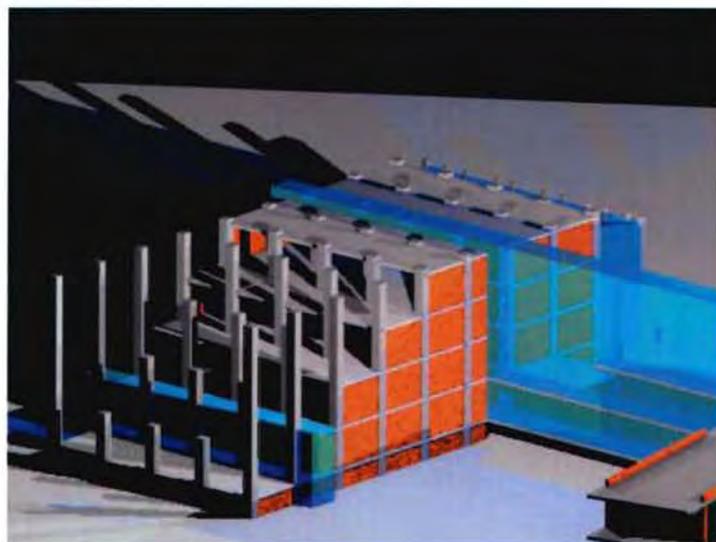
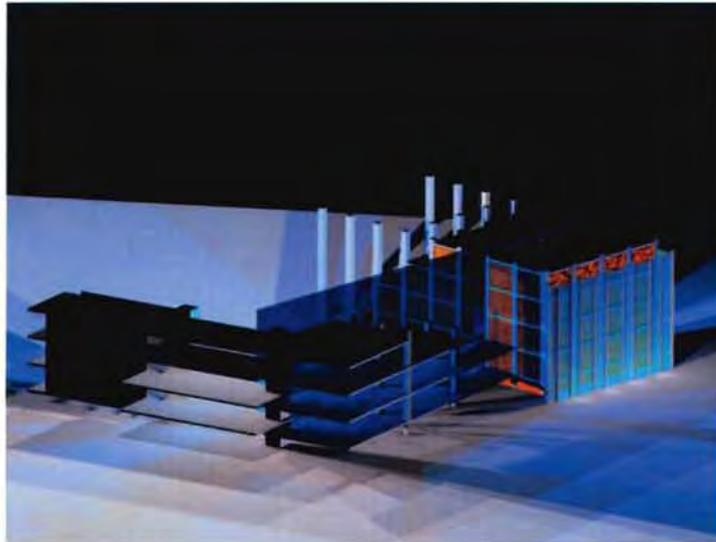


Final Design Development model depicting newly created exterior courtyard wrapped by new educational wing.

New glass circulation corridor is visible from all sides of the structure, and provides an axis to the facility.



RENDERINGS OF INITIAL 3D MODEL



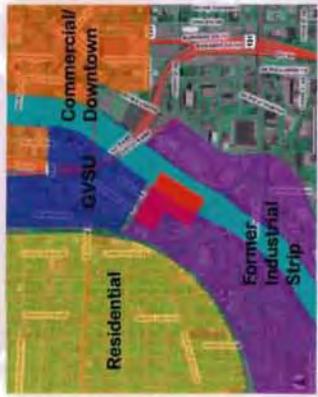
FINAL PRESENTATION



Grand Rapids, Michigan



Location



Districts



Selected Site

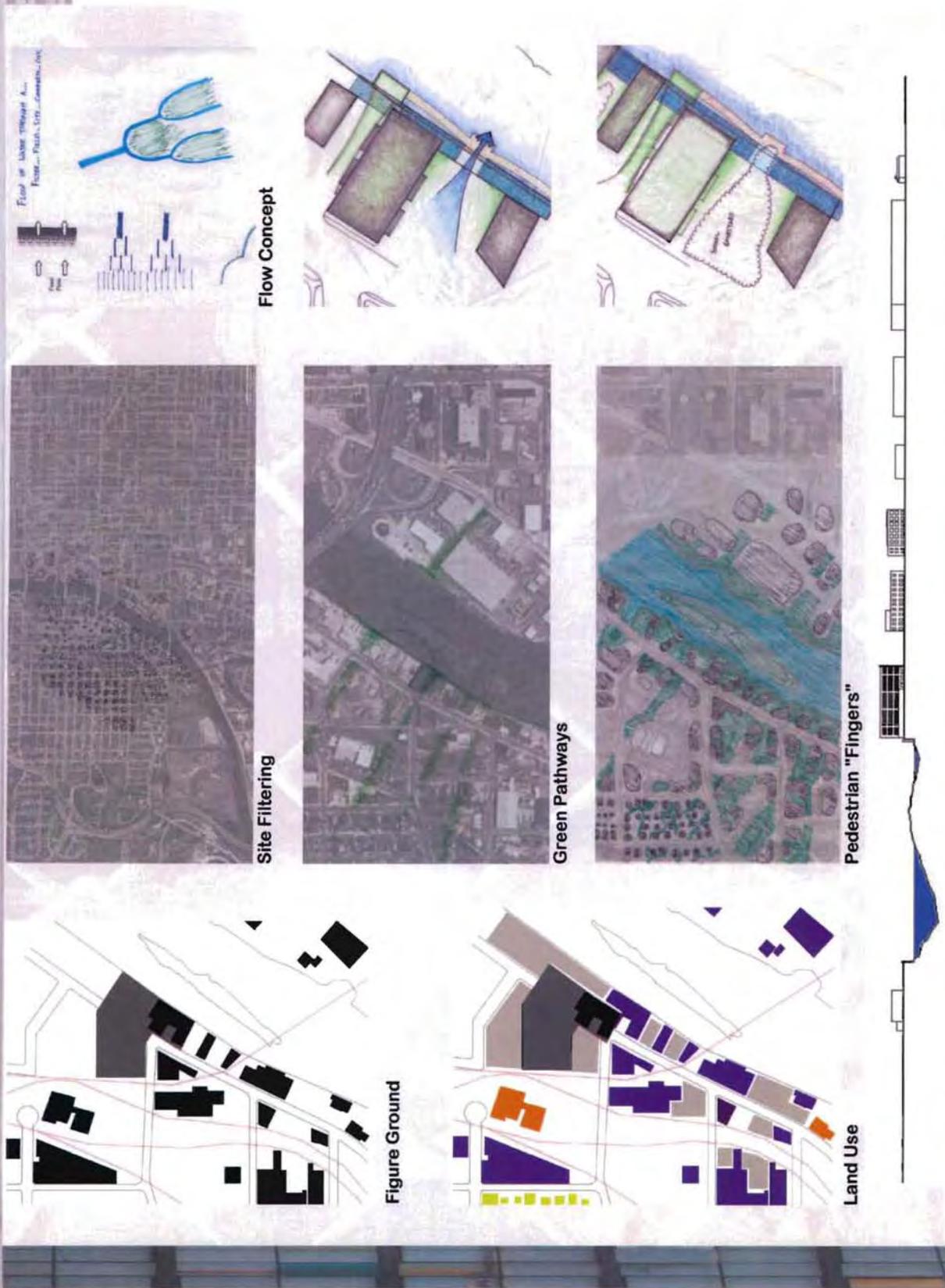


Panorama



Existing Building





Flow of water through A...
 Figure 1. Path, City, Community, Inc.

Flow Concept

Site Filtering

Green Pathways

Pedestrian "Fingers"

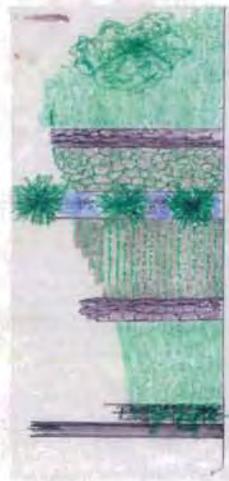
Figure Ground

Land Use

FINAL DESIGN



Site Plan 1"=50'



Pedestrian Pathway Plan Study



Pedestrian Pathway Sectional Study



Pedestrian Pathway Sectional Study



Ground Floor Plan
1/16" = 1'



Ground Floor Plan



First Floor Plan



Second Floor Plan



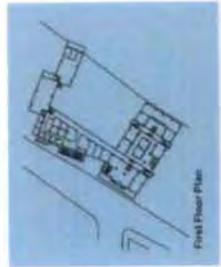
Third Floor Plan



Fourth Floor Plan



First Floor Plan
1/16" = 1'



First Floor Plan



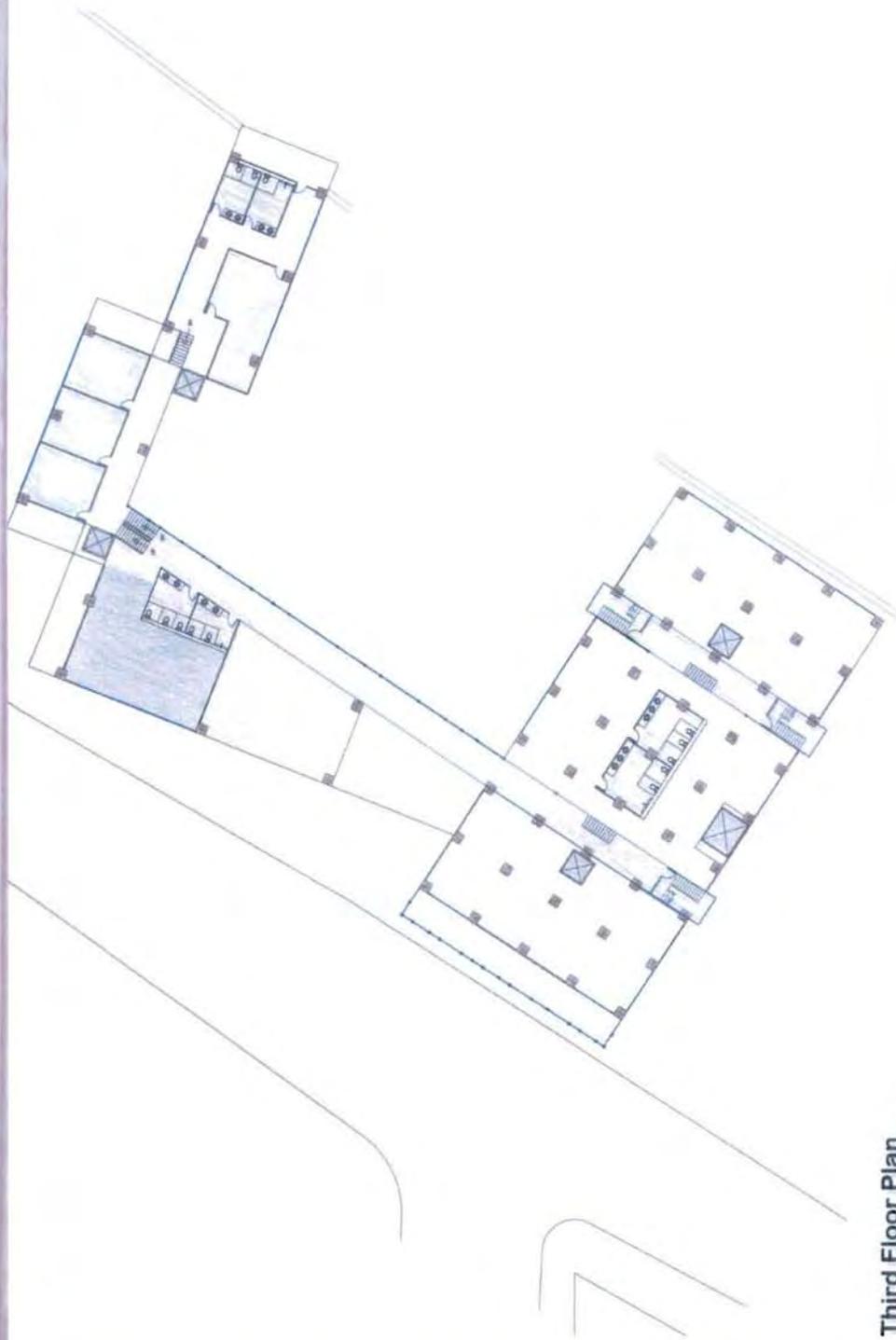
Second Floor Plan



Third Floor Plan



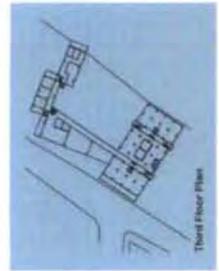
Fourth Floor Plan



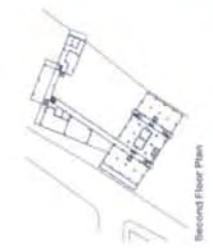
Third Floor Plan
1/16" = 1'



Fourth Floor Plan



Third Floor Plan



Second Floor Plan



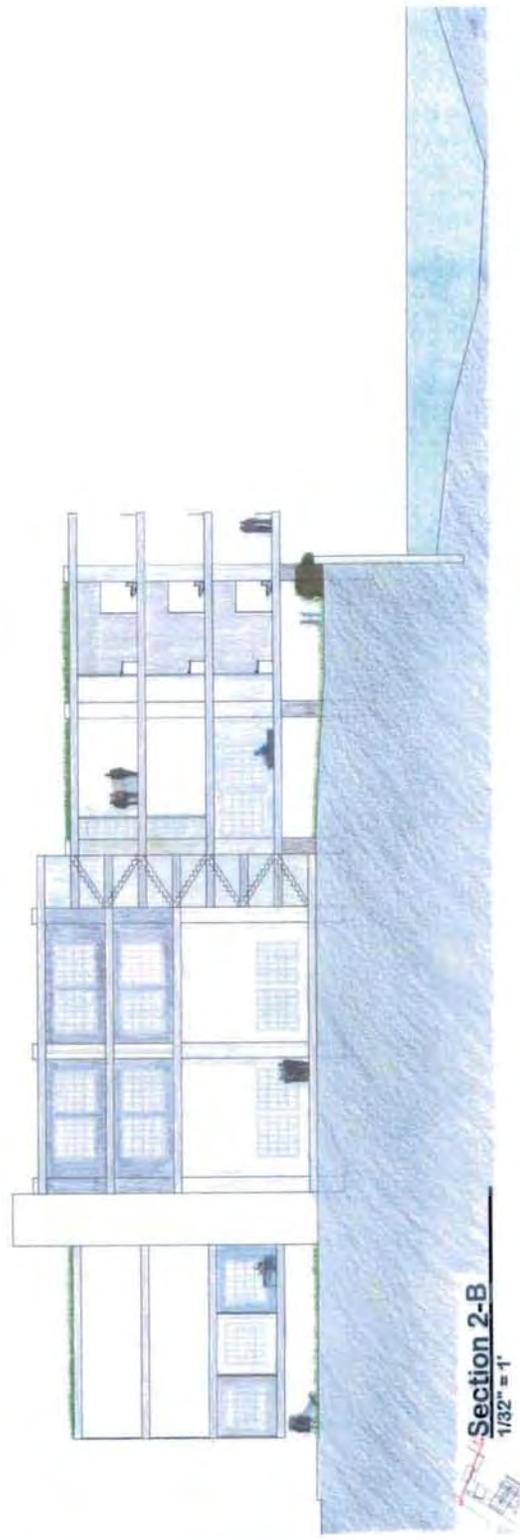
First Floor Plan



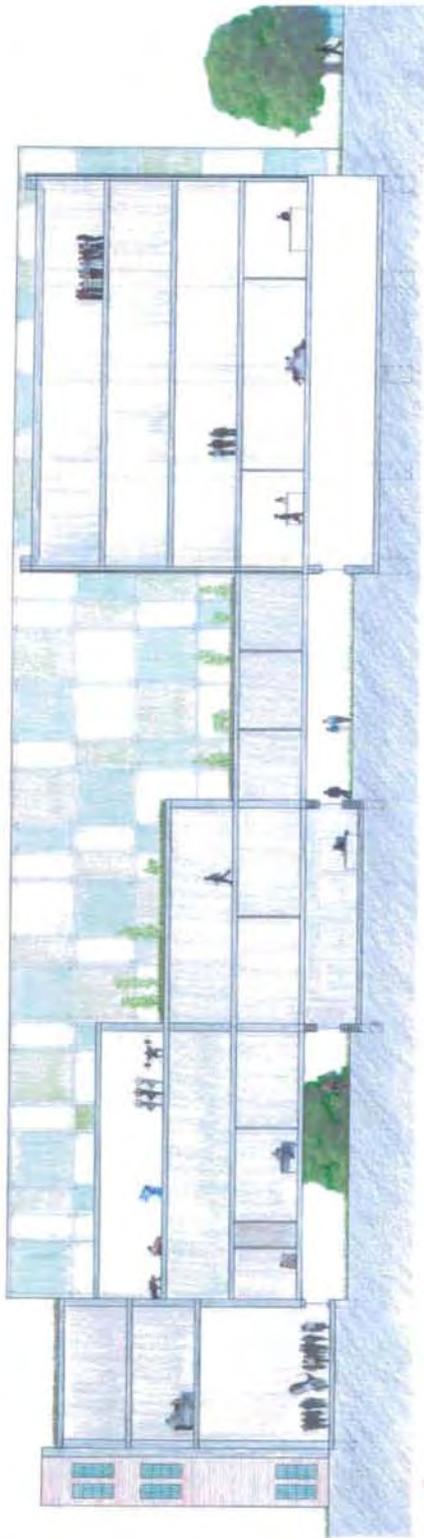
Ground Floor Plan



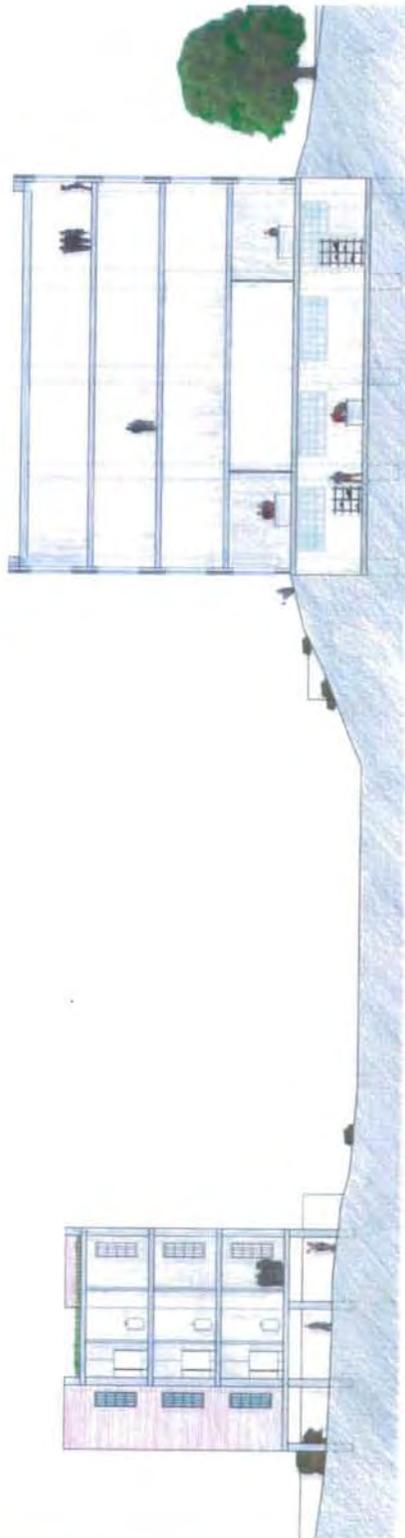
Section 2-A
1/32" = 1'



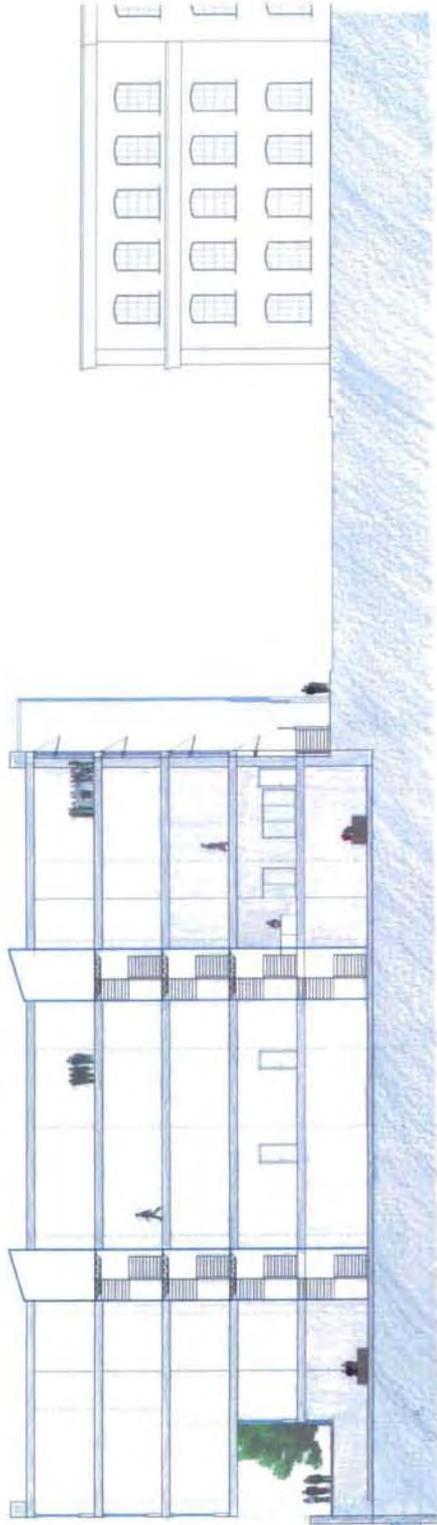
Section 2-B
1/32" = 1'



Section 1-A
1/32" = 1'



Section 1-B
1/32" = 1'



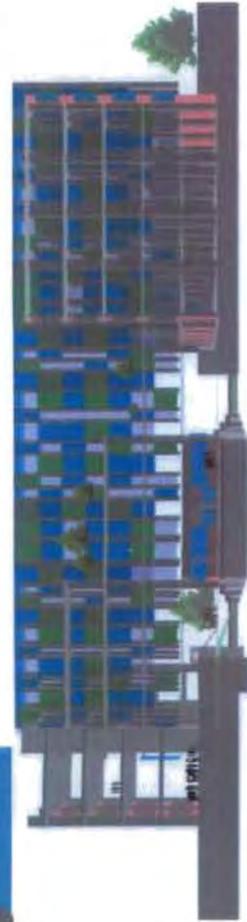
Section 2-C
1/32" = 1"



Riverside Section



Slipping Past Workshop



Section Facing Riverfront

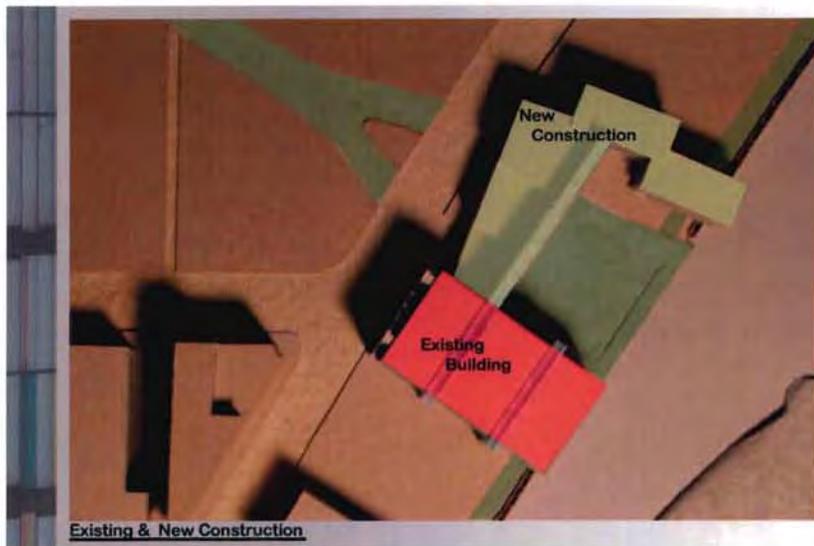
FINAL SITE DIAGRAMS



Existing Site Conditions

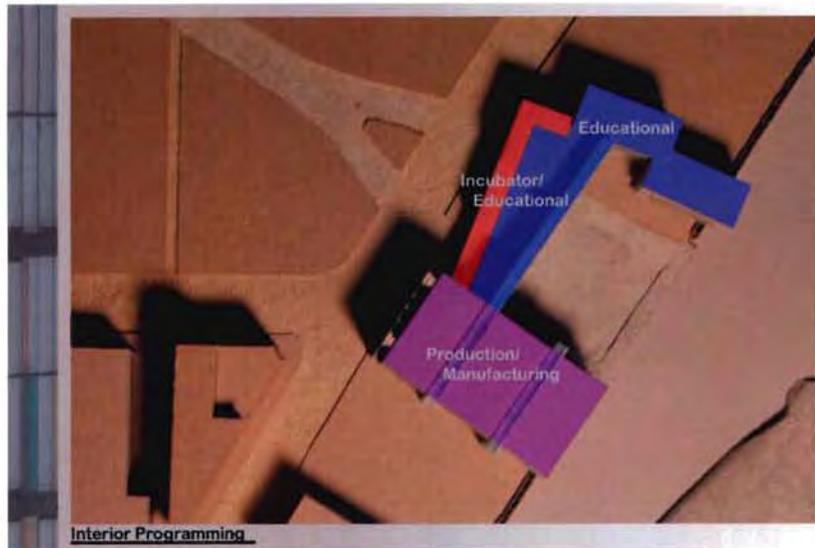


New Building Orientation

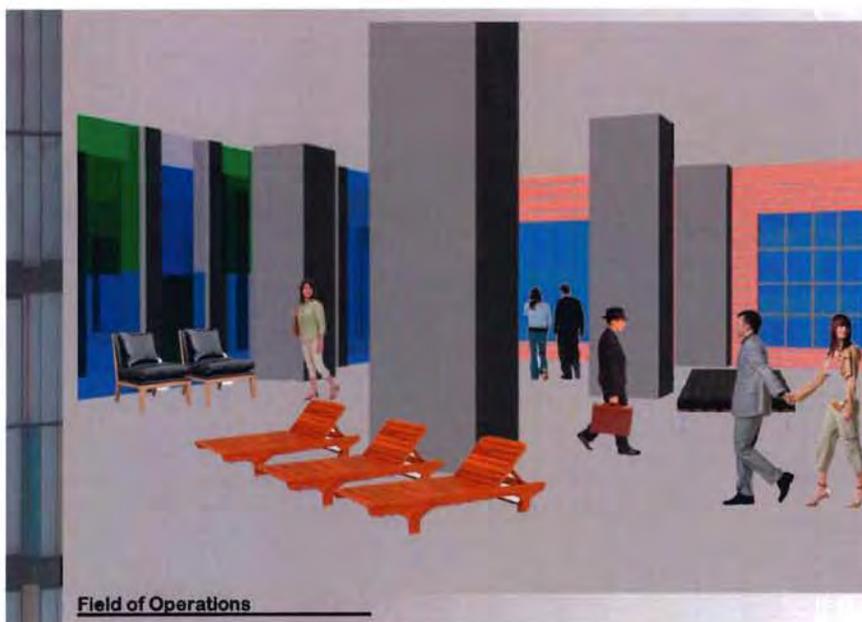


Existing & New Construction

FINAL BUILDING DIAGRAMS



FINAL 3-D MODEL RENDERINGS

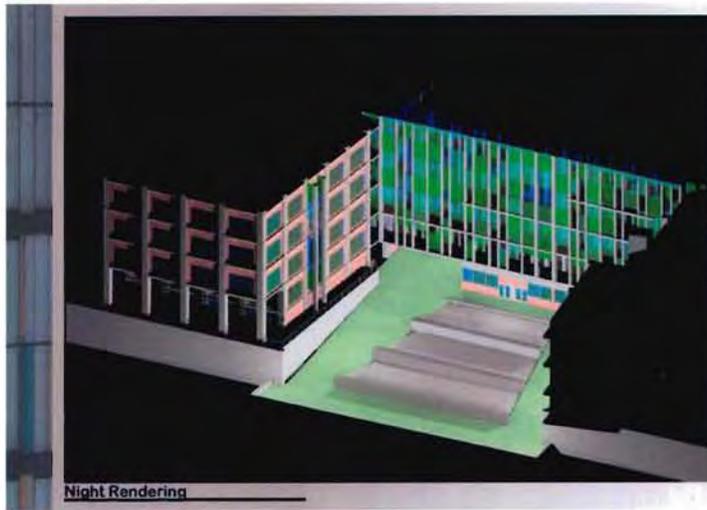
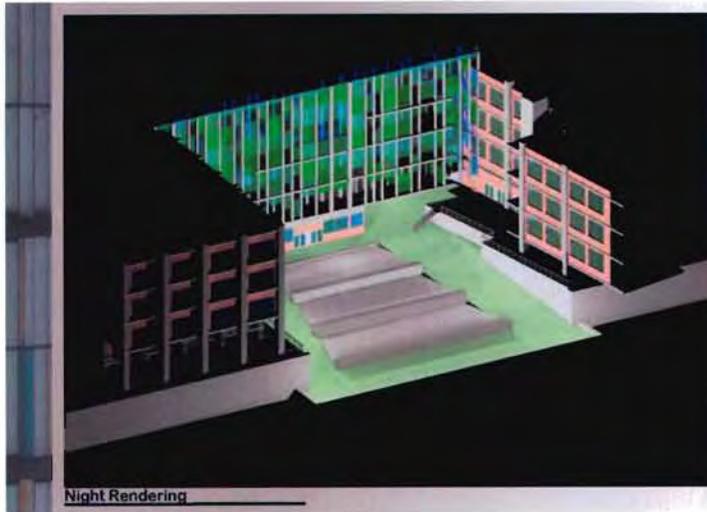
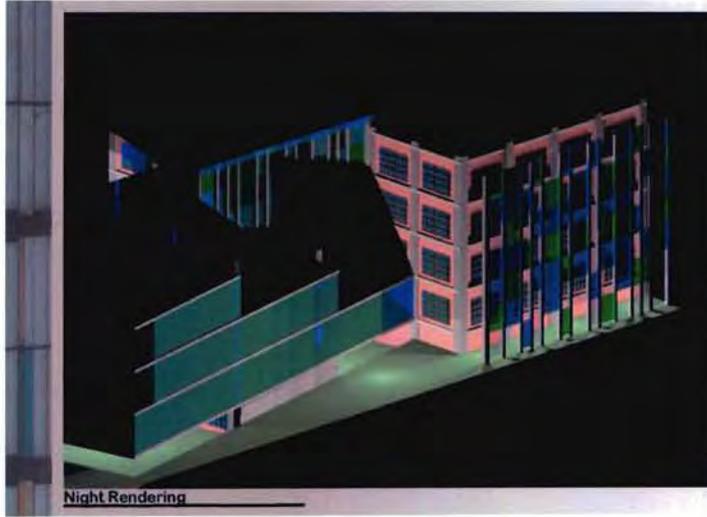


FINAL DESIGN

FINAL 3-D MODEL RENDERINGS



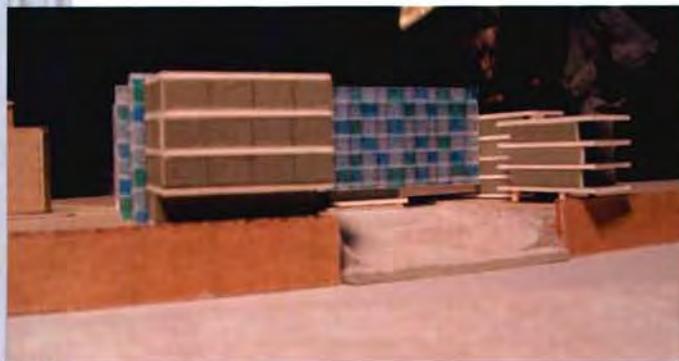
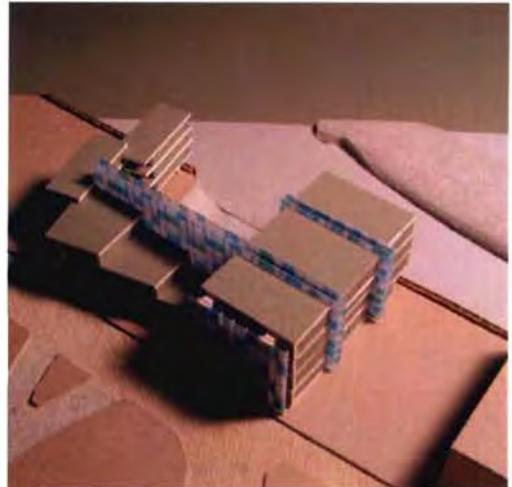
FINAL 3-D MODEL RENDERINGS



FINAL MODEL



FINAL MODEL



CONCLUDING THOUGHTS

I believe this thesis investigation asked an important set of questions that many cities have to address about the post-industrial waterfront today. These environments are sitting underutilized and abandoned, and the challenge is to overcome the barrier that they create in order to reconnect people to the waterfront. One part of this investigation that was satisfied with was its attempt to prove that light scale industry/commerce can co-exist with pedestrian and recreational activity at the waterfront. There does not have to be a clear distinction between waterfront park space and privately owned businesses, rather the most successful waterfront environments could be a hybrid of the two. The concept of a pedestrian path running parallel to the edge of the river with other paths connecting to it from the surrounding communities is a strong one; however its implementation into this design might have been too literal at times.

One difficult portion of this proposal was convincing others that such a project would fit in/excel in the Grand Rapids environment that I selected. I would have like to have spent more time examining the site at a larger scale in order to validate the connection between what is currently downtown Grand Rapids and my selected site. While the city is clearly growing and money is being invested into it I should have made it a stronger point to emphasize other projects and investments in the area. The connection to newly constructed Grand Valley State University facilities adjacent to my site should have been further developed and discussed throughout the investigation.

The reuse of a portion of the existing building on the site is something that I felt strongly about throughout the process, however it did present another set of challenges to the proposal. The fact that it formerly served as a furniture manufacturing facility made it appealing to reuse with my furniture learning center proposal. However, it was difficult to balance my approach to the building between being overly aggressive or passive regarding my design strategy towards it. By aiming to reuse this structure, a portion of the built fabric and the history of the site was being maintained. Its incorporation into the new furniture design school would have been a decision well accepted by a city that prides itself on its role in the furniture industry.

This led to a personal discovery regarding my approach to the design process. I discovered myself to be overly concerned with criticism/advice from jurors and peers throughout the progression of the project. The result of this concern led me to overcompensate portions of my design in order to "fix" perceived problems. In actuality, there were several instances where I could have looked to further explain my decisions or further develop them in order to confirm my reasoning. The constant changing of de-

sign decisions was time consuming, and looking back much of this time would have been better spent developing and refining existing concepts and strategies. While hindsight is 20/20, it is evident looking back on this process that several good ideas that may have further clarified the intentions of this study were lost along the way due to a constant attempt to make the "accurate" decision about each design move.

The connection of the new portion of the facility to the existing building is one that could have been further developed. The circulation corridor that penetrates the existing building creates a strong sense of connection between the two portions of the facility, but from the exterior this visual connection could have been made stronger. However, the pedestrian passage beneath the circulation corridor of the new wing of the facility was a successful portion of the design. The ability for pedestrians to slip beneath the building while being able to see into workshops and design spaces is a strong move, and it was also important to the thesis in terms of industry being able to coexist with pedestrian activity at the waterfront. This same design technique was also incorporated at the riverfront side of the existing building where a portion of the first floor was removed in order to permit the pedestrian boardwalk to move past the structure.

While several portions of this investigation were successful, it also has created a new series of questions that I find myself asking. While this thesis question was relatively simple to understand on a conceptual level, what steps could have been taken to further validate it at my selected Grand Rapids site? How could I have further developed the concept of "Pedestrian Fingers" reaching out towards the surrounding residential community? Would it have been a possibility for a pedestrian connection between the boardwalk and the island? However I do not feel that these questions make the project a failure, rather they represent the next layer of steps in the investigation should it continue down its current path.

ENDNOTES

THESIS PAPER

- ¹ Ian Nairn, *The American Landscape*. (New York, 1965)
- ² Ann Breen and Dick Rigby, *Waterfronts: Cities Reclaim Their Edge*. (McGraw-Hill, 1996)
- ³ William McDonough and Michael Braungart, *Cradle to Cradle*. (North Pont Press, 2002)
- ⁴ Thomas H. Russ, *Redeveloping Brownfields*. (McGraw-Hill, 1999)
- ⁵ Ann Breen and Dick Rigby, *Waterfronts: Cities Reclaim Their Edge*. (McGraw-Hill, 1996)
- ⁶ Jane Jacobs, *The Death and Life of Great American Cities*. (New York, 1961)

ANNOTATED BIBLIOGRAPHY

Cruikshank, Jeffrey L. Herman Miller, Inc.: Buildings and Beliefs. Washington D.C., The American Institute of Architects Press, 1994.

This book discussed the theory and buildings of Herman Miller, Inc., a furniture design and production company dedicated to sustainable design and green architecture. From this book I was able to see the facilities that a modern day furniture design and manufacturing company uses in its operations.

Krink, Rebecca. "Fresh Ideas?." *Landscape Architecture* June(2002): 76-85.

This journal article provided me with an overview of the Fresh Kills Landfill Competition as well as examples of the work of each finalist. The author also followed the description of each finalist's entry with her own brief critique.

Greenstein, Rosalind. Recycling the City. Cambridge, Mass: Lincoln Institute of Land Policy, 2004.

This book sought to exemplify how vacant land can be an opportunity in urban environments. It depicted how to turn urban brownfields into community assets and also discussed the concepts of urban agriculture. This book provided me with several suggestions as to how to approach reclaiming my site.

Meade, Martin. "Parisian Promenade." *Architectural Review* Sept.(1996): 52-55.

This journal article described the history of the Viaduc des Artes in Paris, France from its initial construction to its redevelopment as a park with arches of commercial space running below it. It is relevant to my thesis as an example of the creative reuse of a former industrial site.

McDonough, William. Cradle to Cradle. 1. New York: North Point Press, 2002.

Cradle to Cradle discusses the ways in which we make things and the lifecycles of those things that we produce. This book is relevant to my thesis due to its consideration of the lifecycle of our products, which I paralleled to the lifecycle of our buildings and landscapes.

Miller, Megan. "Fresh Kills Landfill to Landscape." *Praxis-Landscapes* 4(2002): 18-57.

This article provided more thorough graphic representation of the finalists' projects submitted into the Fresh Kills Competition. The graphic representations gave me insight as to how to start thinking about my own graphic representations and the article presented me a more thorough understanding of the thinking behind the entry of each finalist.

"Fresh Kills: Landfill to Landscape." New York City Government. nyc.gov. 15 Sep 2006 <www.nyc.gov/html/dcp/html/fkl/ada/competition/2_3.html>.

This is New York City Government's official site for documenting the graph-

ic presentations of the finalists for the Fresh Kills Landfill Competition. These graphic presentations of the redevelopment of this former industrial site (landfill) relate to the possible outcomes of my thesis study of a brownfield former industrial site.

"Ford Calumet Environmental Center Design Competition." Architecture.org Studio Gang. 19 Sep 2006 <http://www.architecture.org/BG/Ford_port.html> This web-journal page provided me with a synopsis of the Ford Calumet Environmental Center Design Competition in Chicago. This project is very similar to the type of program that I am interested in proposing for my thesis project. This source consequently provided me with examples of techniques and the process required to propose such a project.

Russ, Thomas H. Redeveloping Brownfields. 1. New York: McGraw-Hill, 2000. This book provides me with a better understanding of what a Brownfield is and common ways to go about redeveloping and reclaiming them for new uses.

"The Highline Redevelopment Project." thehighline.org Friends of the Highline. 19 Sep 2006 <<http://www.thehighline.org>> This web page provided me with a synopsis and images of the Highline Redevelopment project and competition taking place in New York City. This project was important to my study because it is an urban example of reuse of a former industrial site. This site provided the history of the former raised railway and the process involved with revitalizing it from preservation efforts to the design competition for its future use.

Torre, L. Azeo. Waterfront Development. New York: Van Nostrand Reinhold, 1989

This book included a series of case studies of urban renewal at the riverfront and provided me with examples of projects that have been completed in urban settings. One particular study that I investigated in this book was the renewal of Allegan, Michigan. This site also faced the challenge of overcoming a large drop-off at the riverfront.