UNIVERSITY OF DETROIT MERCY
GRADUATE SCHOOL
MASTER'S PROJECT

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

TITLE: Shelf Life: Addressing Consumption, Permanence through Adaptability

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SHELF LIFE

Addressing Consumption,
permanence through adaptability.

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to my parents, educators, family, friends and those closest to me, thank you for your guidance. thank you above all, for making this possible. it is a privilege many cannot have.

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THESIS ABSTRACT

This thesis intends to investigate an architectural response to contemporary need for a built environment that is adaptable, portable, and flexible in order to prevent architectural consumption. A vast amount of solid wastes created by our society are the result of the construction or demolition of architecture. Initially, we must generate a new attitude towards the permanence of buildings, and the value of the infrastructure in place. The intent is to create a system in which portions of an architectural construct can be manipulated or replaced as deemed necessary by its users, thereby extending the shelf life of the whole. What architectural response can remove the associations of the commodified object, and retain value over time?

THESIS POSITION

Shelf Life
Addressing Consumption: permanence through adaptability...

Our environment is threatened by our actions, and the building of architecture accounts for a great deal of material and energy waste in our society. Concurrently, our attitude toward the production of commodities (which includes architecture), and our predilection towards consuming them rises in intensity.

Attitudes toward the permanence of architecture must be changed. Those things with cultural value have greater permanence than those that do not, and by maintaining the value of architecture we may prolong its lifespan. In response, one may envision an architecture that is able to conform to user needs, allowing for different ideas or functions. This would allow architecture to hold its value over time and a multitude of users, negating the need for new construction or significant renovation. This architectural solution may have portions that are more enduring, but also more flexible portions, that might be considered mobile, impermanent, and recyclable due to their disposable value.

In addition, materials can be transformative through considerations of the permanent and ephemeral, and by conditions of dematerialization. Materials conceived of as waste could be adapted to new uses, defying the notion of waste.

Flexibility or adaptability also pertains to programmatic requirements, both current and future uses as well as adaptive reuse issues. On a smaller scale, transformative environments allow the user to adapt the architecture that surrounds them through a series of physical or sensual manipulations. The user has a greater control of space, and acts as the designer. This space would ideally be anticipatory rather than prescriptive.
By allowing for adaptability, architecture may redefine itself as accommodating to the changes required of it by social forces. Ultimately, the intent of this thesis is to investigate adaptability in architecture that allows for transformations on a variety of temporal and physical scales.

THESIS POSITION

Shelf Life

Preface

Architecture, or the built environment, exists within, and is an expression of a culture. It meets specific functional needs of this specific culture, and, as a result, is transformed by and reflective of this culture. The United States, and increasingly the rest of the world, has embraced late capitalism. Contemporary architecture is a product of this culture, thus the options for resistance are limited. Architecture could regress to a more traditional, permanent, and unchanging model as a reaction against this cultural flux. While this is an acceptable reaction, it requires a consistent rejection of cultural values and market trends, in addition to public policies. This is unlikely, and more so fallible, because in doing so, it no longer performs its obligation or function to society. Another option would be to create an architecture that is more flexible to the contemporary need for change. Adaptable architecture is more consistently modified or controlled and can meet both a variety of functional requirements of a place, as well as the cultural trends and values. Our gross misunderstanding of our environment and the implications of modern culture and architectural production pose a serious threat to our existence, and our consumption of the built environment concerns this thesis greatly.

"Ralph Waldo Emerson, a prescient philosopher and poet with a careful eye for nature, reflected a common belief when, in the early 1830's he described nature as 'essences unchanged by man; space, the air, the river, the leaf'. " - William McDonough[1]

At this time, the United States demolition industry takes down two hundred thousand buildings each year, and thirty to forty percent of all waste material is related to activities of the built environment. In 1996, the Environmental Protection Agency provided statistics that stated that as much as ninety-two percent of construction waste was attributed to building renovation and demolition[2]. In the last forty years, we have begun to understand the consequences of our lifestyles, and particularly our industrial creations. We must take notice from the environmental debacles of history, and thoughtfully recognize that serious problems exist in the way in which we currently live.

This thesis addresses a primary architectural question. What architectural response contains the desirable characteristics of sustainability while still providing for the needs of our built environment? This thesis will investigate the integration of an adaptive architecture with consideration for waste.

Flexibility to adapt to user's needs has now become a necessary aspect of the built environment in order to limit both the commodification and the wastefulness of architecture. This adaptation may allow easy shifts of programmatic elements to address user needs; the result being an architecture that is less susceptible to demolition and renovation. This architectural solution might also encourage the use of societal waste as a building material. This thesis will seek to challenge notions

of permanence in the fluidity of contemporary culture and establish a sustainable option for a new paradigm.

Current sustainable movements and corporate idealism cloud the most important issues at stake. While the new hybrid of "greenish" buildings begin to hint at a new ecological agenda, they often ignore a larger issue of consumption. Though these buildings may have a smaller impact on the environment than conventional buildings, they are still commodified entities that fail to challenge our understanding of waste and consumption. Architecture has adopted the commercialization of aesthetic trends as much as fashion, and for many has become the art of creating interesting skin and form, with tastes changing nearly every five years. We are not yet thinking differently about how we define necessity or how things might be shared minimize duplication. William McDonough rejects the current approach to sustainability in his recent book, Cradle to Cradle, "To be less bad is to accept things as they are, to believe that poorly designed, dishonorable, destructive systems are the best humans can do. This is the ultimate failure of the "be less bad" approach: a failure of the imagination... What would it mean to be 100% good?"[3] In essence, sustainability is not a moral choice that promises to complicate and deprive us our needs and objectives, but rather it is working within our ecological systems to provide the healthiest environment to sustain both plant and animal life. McDonough contends that our current attitude should encourage ways to look at being better to the environment, while maintaining a high quality of life.

Historically, we tend to view humanity and nature in an adversarial relationship. Several people, including McDonough, have cited a modern theory of "brute force" that hopes to overcome natural obstacles through forces of industry. We maintain an attitude that nature serves us with materials for our making, and through our intelligence, we may conquer nature for our means. We use its resources, which are occasionally thought of as permanent, to our ends. This attitude was more prevalent in the past but seems to still hold contemporary value.

Consumption of Goods

There is some debate as to who is responsible for our current rate of consumption, though it seems that consumers will need to alter their attitudes, rather than corporations. In our current market, most businesses assume that they cannot care for the environment and also stay competitive. On the other hand, it is the responsibility of business to raise ecological concerns regarding their product, process, supply, and by-product. As consumers, do we simply accept the rate of consumption by which we currently live? Perhaps we may consider an alternative; products (and architecture) could be made with remarkable durability, quality, and adaptability - in total, a more sustainable design.

One such sustainable practice is known as Design for Disassembly. Randy Croxton of the Croxton Collaborative, a leader in the, argues for a school he designed, "If a building doesn't support change and reuse, you only have the illusion of sustainability. You may have excellent building orientation and other energy-saving systems, but the building must also be able to be flexible to meet a change in curriculum[4]." The reality of society is that buildings no longer need to maintain a fixed use or function, (nor could they.) This is an age, in many circumstances, in which architecture is known to be impermanent and is designed as such. Retail and commercial

developers understand the shifting market forces that make something like Home Depot viable in many communities for only thirty years before its almost predictable decline. In response, the building has little monetary and architectural quality, and the implication that the building will be demolished when it is no longer useful. In other markets, however, the built environment has slightly more stability, though the internal aspects of the architecture still must respond to adaptation.

How would this alternative translate to a building? In many ways, buildings share many characteristics with other "durable" products. They are made up of a variety of materials with little regard for the environment or the health of the inhabitants. They also reflect an attitude that regards buildings as a commodity that is traded, owned for profit, sold, and used until it no longer has value to someone. Real estate is one of the primary methods of storing and investing wealth. At some time in the future, it is expected that a building will be significantly altered for a new use, or demolished altogether. This associated cultural value is what defines the worth of a thing, and extended or enduring worth will typically define permanence. In the context of goods or buildings, that which is temporal, transient, and ephemeral is such because of a limited cultural value. The associated value of a commodity, or the commodification of an object has much to do with its making. When an object is created for you, it contains far less personal associations than something that one creates for themselves. Instead, value is merely associations to the actual object, reflective of society's opinion of that thing. If the necessary characteristics are not found within that thing, it no longer has value.

In his book, The Green Imperative, Victor Papanek defines this state of consumption and planned obsolescence. "...[D]esigners have been able to sell 'longing and dissatisfaction.' Manipulative styling creates the initial lust for the object, and then the subsequent disenchantment when it no longer looks fresh. Built-in obsolescence helps to create this dissatisfaction[5]." Planned obsolescence in the building industry is quite circumstantial, but is more evident in the commercial, retail, and industrial markets. Buildings in this category are built at a lower cost, with the intent of demolishing the structure, or selling it prior to the end of the building's shelf life. It is not uncommon for certain key building elements to only be rated for a twenty to thirty year life. Steward Brand, in his book How Buildings Learn, declared that buildings seem to be formed by three forces: technology, money, and fashion[6]. His book describes several different typologies of adaptation, each based upon certain influences. Brand argues that buildings exist in the fluidity of time or "flow" and must adapt to these changing circumstances but are not designed to do so. Furthermore, in a 1960 manifesto, GEAM, an architectural collaborative in Western Europe wrote a program for a mobile architecture, citing the increasing question of mobility, communication, and interconnectedness. While investigating modern town planning, one primary premise read as follows, "Existing constructions and those still being put up today are too rigid and difficult to adapt to life as it is lived[7]." All of these ideas inform a single concept that is central to this thesis; in order to extend their longevity, and thereby reducing consumption and waste, buildings must be adaptable.

The commodification of architecture has also been a negative aspect to building consumption. Current tax structures encourage turnover of buildings, allowing the construction industry to self perpetuate. Real estate speculation forces architecture into an environment where it is valued for its marketability as an investment or valued object. It is the primary generator of wealth for a majority of society's

members. Real Estate is commonly a positive investment opportunity, and in certain markets it has great prospects for profit. This is not necessarily a large problem, but contemporary trends seem to display an emphasis on that building which can be built most cheaply, while maintaining a market value, and ensuring the greatest profit margin. In this context, buildings are no different than any other product, with the exception of its greater expense.

Through examining the commodification of buildings, we can make similar conclusions about the products of mass production. Today, when an object is bought, it most likely was created in a far off, unidentified land, and brought to us through a variety of transportation means. The consumer is separated from the creation and production. The result of this situation is a continued disenfranchisement from making. Detroit is a city that was created by making and manufacturing. It identifies itself as the "motor city" and takes pride in the blue-collar employee who slaves in a factory for a wage. Each person understood that their car was made here, and pride bellows by association. Today, this identification is merely nostalgic, as industry has moved elsewhere. Detroit's loss of the auto-industry is representative of the larger movement of global economics, where making takes place in the third-world, rather than the first. One could argue that consumption and the loss of meaning in the making of goods are interrelated. We are increasingly less emotionally attached to our things. We have overcome our uneasiness with purchasing foreign-produced goods and care less about our domestic disinvestments. Conceivably, we could renew this association to making by beginning to produce goods again in our communities. Alternatively, new manufacturing technologies and processes may allow consumers to customize products to their specific needs or tastes. By participating in the process, the customer may have a greater attachment to the associated thing.

Context and Circumstance

Economic globalization has created a society and a built environment of uncertainty and flux.

In the Midwestern post-industrial (rust belt) cities, and in particular Detroit, one can see that a series of rapid socioeconomic shifts have occurred, drastically changing the way that buildings are used, and whether they are used at all. In this voided space, where industry has fled (as has the middle class) the remnants of buildings are the only reminders of the past. It is this environment-in-flux that characterizes many regions throughout the country. Adaptation becomes necessary as tenants and building ownership become more fleeting and temporary in today's ever-changing marketplace.

This thesis addresses questions of consumption and commodification in a controversial arena; the program selected as a vehicle for this investigation is the central corporate operations and factory for a furniture company. The decision to name a program that is both dependent upon and prosperous through consumption, allows the project to ask an important question; can a corporation embrace the concept of truly durable goods and still be successful?

Conventional wisdom suggests that a furniture corporation, competing in the global marketplace, seemingly has little choice in its sustainable vision. Environmental compliance, even an attitude of preservation, can destroy the competitive edge of

a company. However, some companies, such as Ford Motor Company and Herman Miller, are finding it financially desirable to be green. Increasing efficiency, reducing energy consumption, and establishing healthy work environments all improve the bottom line and assist in maintaining a competitive edge. However, consumers are still hesitant to spend more on products that ensure nature's well-being. The result, McDonough suggests, is that consumers purchase the cheaper products produced overseas where regulations are insignificant or non-existent[8]. McDonough also argues that, "Eco- efficient factories are held up as models of modern manufacturing. But in truth many of them are only distributing their pollution in less obvious ways[9]." In essence, they are better at hiding the fact that they do pollute. McDonough cites the high smokestacks that can distribute and displace pollution at great distances.

Historical Response

Recognizing these trends created by economics and policy, and the contemporary needs and tastes for newness and change, several architectural movements were formed. The metabolists, a group of architects and planners from Japan, formed a strong position on these issues. Kisho Kurukawa, one of the leaders of this movement wrote, "Architecture and cities are always changing, so likewise, their structures should be open, and their relationship with nature valued. We should not be preoccupied with matter, with substance[10]."

The cultural condition that created this thinking was rooted deeply in tradition. Eastern culture's attitudes have long been reflective of religious beliefs, and Buddhism holds a central belief in the impermanence of things. The Ise Shrine has been taken apart and rebuilt every twenty years, over sixty times, as part of a ritual. The shrine has what Victor Papanek describes as "permanence through continuity[11]." The Japanese also favor modular building systems. The tatami mat and the shoji screen comprise the modular components for traditional Japanese architecture which might be reused in other buildings, or changed easily when new modules were needed[12]. By adopting the concept of modularity, they have embraced prefabrication in building construction. Kisho Kurokawa described his modern architecture that was derived from this cultural condition, "Mobile dwelling units inspired by the space age and the rapid onset of the throwaway consumer culture were central to these visions. Permanent buildings would become redundant and give way to flexible structures better able to cope with a society in flux[13]." These metabolists initially thought of three scales of equipment, house, and city[14]. Alvin Toffler summarized Metabolism simply as, "the attempt to lend whole structures permanent by making their substructures impermanent[15]." A variety of systems were employed in actual built environments. The goal was flexibility and adaptability of building components, systems, and architecture in general. Kurokawa, elaborate?, "Metabolism became an extended biological analogy.... It compared buildings and cities to an energy process found in all life: the cycles of change, the constant renewal and destruction of organic tissue... their ideal is to design a city so flexible in its connections that parts could grow, transform themselves and die while the whole animal kept living[16]..."

At the same time, several other architects aligned with these ideas. Archigram, a collaborative out of London, described several fantasy-like urban design proposals. The Plug-In city was a proposal by Archigram for the London Metropolitan area which was created around a high-speed mass transportation device. The intent was to facilitate a new kind of living that was emerging in the early 1970's and define

a better way to live in the future. However, the plan also recognized the rates at which people move and change. It "acknowledges throwaway architecture[17]." Plug-In city was incongruous with the traditional European architectural tradition of permanence and monumentality, but was careful to appease the public. The new plan was linear and did not depend on any significant destruction of the existing urban fabric. Rather, it proposed an alternative condition for the sprawl that consumed the natural countryside and surrounding cities. Its creators also envisioned that this system would grow to connect other cities such as Paris and Liverpool.

In this proposal, there is a consideration for both temporal and physical weight. Those city components with greater physical and/or temporal weight are located on the lower levels of the city, while those rapidly changing and lightweight structures were placed at the upper levels of the city. The building and rebuilding of the city is facilitated through a crane system attached to a monorail above the city. The result is a city grid of services, residential, commercial, and industrial spaces, suspended in a narrow vertical grid. Speed and transportation of goods and people are emphasized. The Plug-In city was a rational approach to a series of problems of modern life. Simple ideas were created, such as the department store that 'plugged-in' additional space for the holiday rush to meet changing needs[18].

Contemporary society, in addition to the concerns addressed in Plug-in city and Metabolist theories, must deal with the larger issue of waste. Both of the aforementioned architectural proposals allow for efficient and fluid change of architectural units, yet a variety of concerns for these proposals arise. The most significant question is where do these expendable components go when they are unwanted? While the waste of consumption may have been a limited concern forty years ago, today we recognize the fallibility of these proposals. The environmental risk of reckless consumption is a far greater concern. Assuredly, the thesis of Metabolism and the Plug-in city did relatively little to care for the environment. In fact, both encouraged architectural consumption and planned obsolescence as a societal fact, rather than a misguided trend.

By definition however, these proposals were adaptive. Adaptation or flexibility is a necessity in some built environments. In some instances, the land value exceeds the worth of the building, and in others, the building location is desirable but not the structure. Adaptation defines the way in which a thing reacts to certain environmental conditions, or stimuli. When a thing is acted upon, it in turn adapts to this effect, creating a more desirable state for that thing. Flexibility allows a condition of built-in change, for a variety of needs and environments.

Adaptation and Flexibility

The hypothesis of an adaptable or flexible architecture is plausible as a logical solution to problems associated to waste in contemporary society. If our buildings were developed to allow manipulation of internal space or external appearance, perhaps they would maintain their worth over time, becoming a more permanent part of the built environment. By extending this building life, we essentially can conserve a significant amount of materials and energy, thus sustaining the built and natural environments. One simple example of this adaptation, or adaptive-reuse, as it is currently named, is the conversion of early 20th century factory buildings into high rent lofts that takes place across the country. These buildings are particularly

suited to adaptation because of their layouts, narrow plans, high ceilings, structural condition, and extensive daylight. They also have a specific character that holds a trendy aesthetic value.

Adaptive Reuse takes place on a longer time scale and is most commonly dependent upon a certain vacancy. It also usually occurs following a change of property ownership. This adaptation takes place over the time of construction, perhaps up to two years. In this case, the adaptation is cheaper than a new building and has added "character value that comes with a historic building. It answers a very specific need in the built environment. But what if adaptation could take place at a much shorter temporal scale? What if it did not involve a change in ownership? What if a building could literally shed its skin as required by aesthetic trends? What happens when a building is so flexible that there are few circumstances that would ever lead to its destruction?

One proposed design tool for adaptive architecture is known as scenario planning. This attempts to anticipate the building's needs in the next five to twenty years and provides accommodations to a variety of needs, rather than choosing a single program objective[19]. It attempts to analyze the complex relationships of the global marketplace and provide a series of hypothetical situations which become part of the design program. In addition, scenario based program operates under some basic assumptions. Steward Brand argues, "A spatially diverse building is easier to make use adjustments in than a spatially monotonous one – people can just move around[20]." In his opinion, medium to small rooms accommodate the widest variety of uses. He also developed the notion of anticipated growth, where portions of a building may be usable, but unfinished. This would allow the spaces to be finished as growth required, and with the lessons learned from the finished spaces.

Brand also cites Building 20 on the campus of Massachusetts Institute of Technology. This building has unusual flexibility because of its oversized structure, allowing it to handle significant loads and accommodate growth[21]. Despite the conditions of the building – it was dirty, ugly, too hot or too cold - its inhabitants found that they could manipulate their spaces as they pleased and reveled in the freedom. "Nobody complained when you nailed something to a door," stated Jerome Wisner, retired president of MIT[22]. MIT has kept accurate records of their building facilities, and have found that five percent of their buildings change use each year. Because of this rate of change, John R. Freeman developed typology efficiencies for the campus which would accommodate change most easily and found that a sixty-four foot wide building performed most graciously[23]. Building 20 illustrates this concept of adaptation, the personalization of space for one's interests, as a very important aspect of architecture for select groups of people. Artist occupied lofts, prior to the renovation boom, also are indicative of this creative class.

This proposed adaptation takes place at a variety of scales. On the smallest scale, building assemblies could react to natural climatic conditions, where doors and facades open to the outdoors, and skylights pivot in reaction to the sun. Illustrating a creative control over environment, transformative environments allow the user to manipulate the physical and sensual qualities of space. Through hinging, folding, packaging, and extending, users have greater control over space and are more satisfied and efficient. On a slightly larger scale, one could imagine portable, on demand pods of offices, storage, and other functions addressing immediate needs of the building

to grow or shift. Buildings could also grow in pre-designed manipulations, where the defined building perimeter is fluid, and breathing. These changes could take place over a matter of days. On the largest scale of programmatic shifts, scenario based changes could be adopted, involving larger portions of buildings, and complete changes of program. In this case, a series of pavilions allow parts to be changed or broken off as necessary.

The condition or qualities of space with regards to adaptation is also important. Differing functions will have their own desirable characteristics of space, lighting levels, and ventilation requirements. Thus, the tectonic must have the ability to provide these spatial qualities with ease. While these changes are not expected to be as immediate, the architectural response should be anticipated if possible. For this reason, the operability of the building envelope and its varying configurations is an emphasis.

The issue of flexible architecture's construction is very much tied to the larger goal of adaptability. Material joining, uniformity, and ease of disassembly are important considerations. Does this architecture still retain an on-site construction processes which are proven to be inefficient in time, quality, and are more threatening to ecology? Perhaps it could become a modular system where pre-manufactured uniform parts are interchanged as necessary. What is permanent on the site and what is considered interchangeable? What is the scale of this transformation? What scenarios are possible, and what typology is most suited to these changes? What is the desired quality of space, such as light and ventilation, in various types of uses, and how are these environments attainable through the adaptable architecture?

Additionally, there exists a growing concern with the quality of building construction today. Steward Brand cites typical or average shelf lives for building components. Site is considered to be eternal. Structure may last 30 to 300 years. Building skin lasts no longer than 20 years. Heating, ventilating, and cooling equipment may last seven to fifteen years. Lastly the space inside may last up to thirty years in a home, but no more than three years in a commercial or retail application[24]. If we are to assume that these components will change at these rates, how can the design accommodate these interventions? The need for adaptation is essential in our current cultural condition.

Material Adaptation

One could also anticipate a form of material adaptation that would engage the use of waste as building material. Rural Studio, a student study program run by the Auburn University School of Architecture, has created several projects using waste as the primary building material. While these decisions were often guided by economics rather than some ecological agenda, they prove the utility of waste. Using car windshields (Mason's Bend Community Center), old tires (Yancey Chapel), wax-impregnated cardboard (Cardboard Pod), carpet, and license plates, the students and directors of the Rural Studio have, in essence created an architecture of discarded materials. Many of their projects include salvaged materials.[25]

Lot/ek has also engaged this question. They are an architecture firm based in New York City that has taken an unusual theoretical position. They define themselves as "an ongoing investigation into artificial nature, or the unmappable outgrowth of

familiar, unexplored, man-made, and technological elements woven into urban and suburban reality[26]." From this context they seek to "[extract] from this artificial nature prefabricated objects, systems and technologies to be used as raw materials." Furthermore, they define the work as the "random encounter with objects that are displaced, transformed, and manipulated to fulfill program needs." They seek to "[rethink] the way in which the human body interacts with the products and by-products of industrial/technological culture."

Translating this into their projects, Lot/ek has done extensive research into the use of shipping containers and has found other materials, such as petroleum tanker trailers, used in the Morton Duplex in New York in 1999[27]. Again the emphasis is not on any ecological cause, but rather answering questions with solutions that have already been created. This work again displays the possibility of adopting the remnants of industrial society as building materials. Their work has analyzed the shantytowns of South America where industrial materials are pulled together to form habitation. They also use an extensive vocabulary of language such as detritus, decay, abandon, discard, delete, disposable, dismantle, throwaway, throw out, surplus, trash, obsolete, leftover, neglected, residue, alien, deformed, and hundreds of others to describe their analysis. Other projects produced by this firm include a work island made up of four refrigerators, a multifunctional space created from the fuselage of a decommissioned Boeing 747, and several other gallery installations dealing with the integration of technology and industrial waste.

Both Lot/ek and the Rural Studio have initiated investigations into waste as building materials with different intent. Both have motives that extend beyond a purely environmental question but have nonetheless succeeded in redefining waste. This ad-hoc spirit, discussed at length by Charles Jencks in Adhocism[28], adopts the mass-produced object as a part of the material palette "for this" new purpose. It literally translates the notion of recycling without reprocessing. This is a labor intensive, custom craft, which allows the material to have power over design. The materials exist in a state that is not easily altered, and the design accommodates. One could argue that this form of adaptation may have a future in the first world. In other parts of the world, inhabitants have graciously accepted, modified, and constructed shelters out of what we might consider garbage. There is something admirable about the creative and industrious nature that their desperate needs necessitate.

Material recycling and reuse may be implemented to facilitate William McDonough has written extensively about the state of recycling materials. He argues that recycling often requires the material to be down cycled, which can be far more destructive if not done properly. Our products often bond recyclable products with harmful chemicals and toxins, which can be released in the process of reforming the material, essentially creating more damage to ecology[29]. McDonough proposes the concept of up cycling, whereby products of a good are isolated and retain their desirable purity, so that they may be used again in the same manner in the future. He calls it the closed loop industrial cycle[30]. This attitude is also reflected in the ideas of design for demolition, which Victor Papanek defines as the conscious intention of demolition that allows ease of taking apart and removing portions of a larger construction[31]. He suggests that parts be made of the same materials and fasteners joining differing materials be easily taken apart. This notion has taken hold in Europe, where German car manufacturers are required to obtain, disassemble, and recycle their cars when their buyers are finished with them. This has led to a design for

disassembly in the BMW Z-1 automobile among other things[32]. While the acronym DFD holds a different definition for several groups, they all intend to make recycling an easier process.

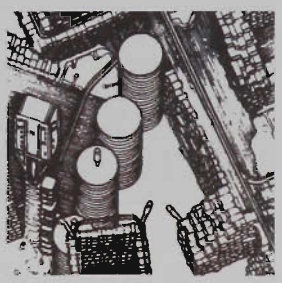
This thesis proposes a subversive economy of need, rejecting consumerism, planned obsolescence, and a lack of material integrity. Rather it supports quality design and durable products. What might an economy based on considerate consumption deem as the proper venue for selling and manufacturing objects for sale? In this uncertain environment, the health of the environment is the interest, rather than last month's sales. This program is intended to reform the current state of production and consumption that McDonough describes. "At its deepest foundation, the industrial infrastructure we have is linear: it is focused on making a product and getting it to a customer quickly and cheaply without considering much else[33]." This architecture will attempt to provide a venue which will encourage the productive and considerate consumption of both manufactured goods and architecture.

This thesis recognizes the commodification, commercialization, and consumption of architecture today. From the perspective of sustainability, architecture's building life must be extended in order to conserve building materials as well as energy. Passive strategies, energy and water conservation, and green materials can be used for remarkable results, yet they ignore the larger issue of architecture's shelf life. Recognizing the contemporary need for cultural fluidity, this architecture attempts to adapt to changing needs, extending utility, and therefore value of the architecture. This negates the need for significant renovations or perhaps demolition. By accepting the program of a factory where facility needs change rapidly, this thesis challenges notions of impermanent architecture. It also questions the notions of waste and utility, and investigates the use of discarded materials as suitable building materials and assemblies. This thesis is intended to find a solution for a relatively undiscovered aspect of building sustainable architecture.

[1] William McDonough and Michael Braungart, Cradle to Cradle. (New York: North

PRECEDENT STUDY

cook



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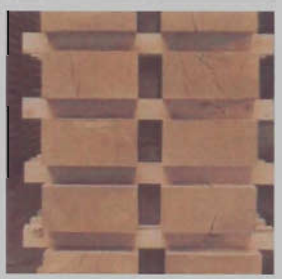
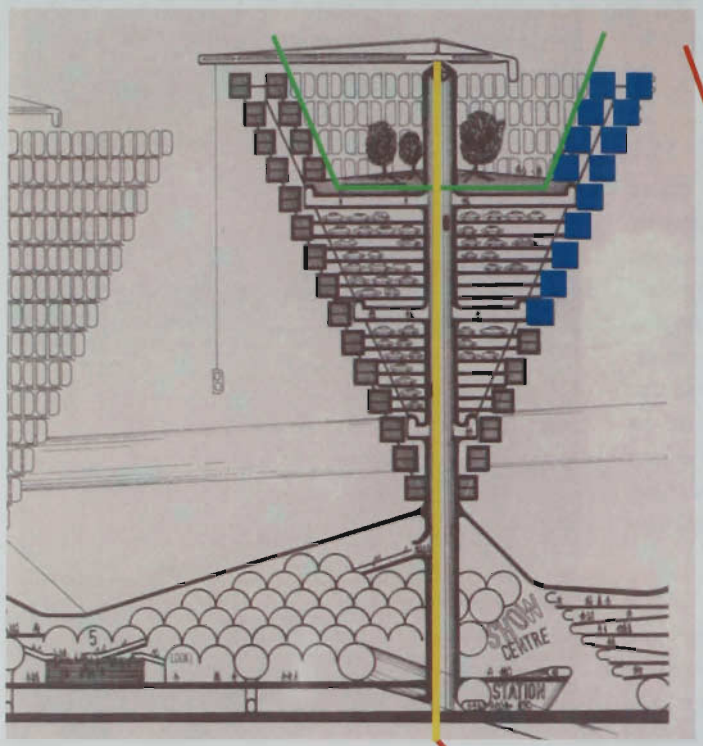


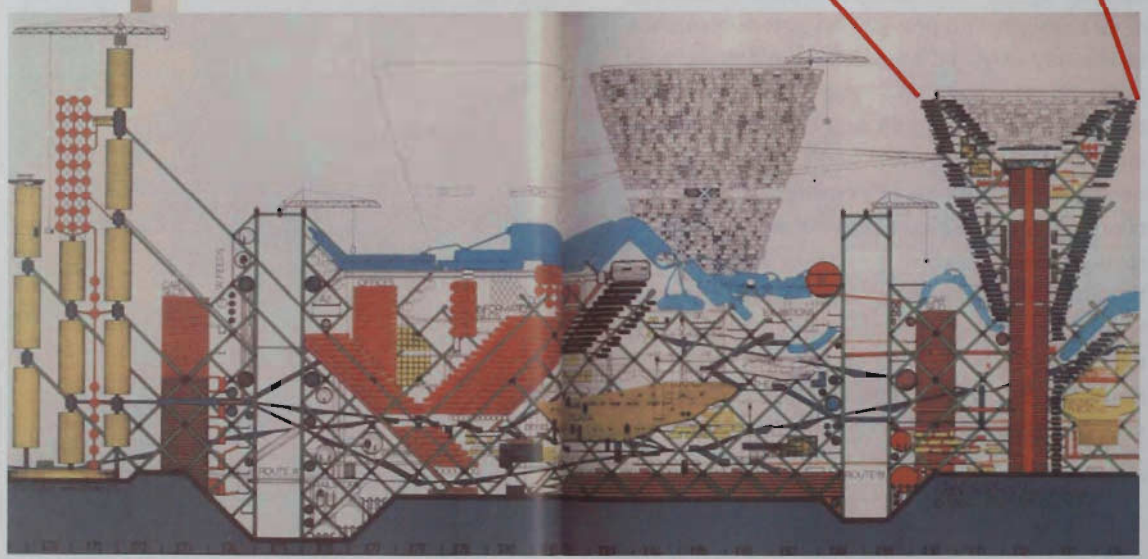
kurokawa



green space

living unit

services and circulation

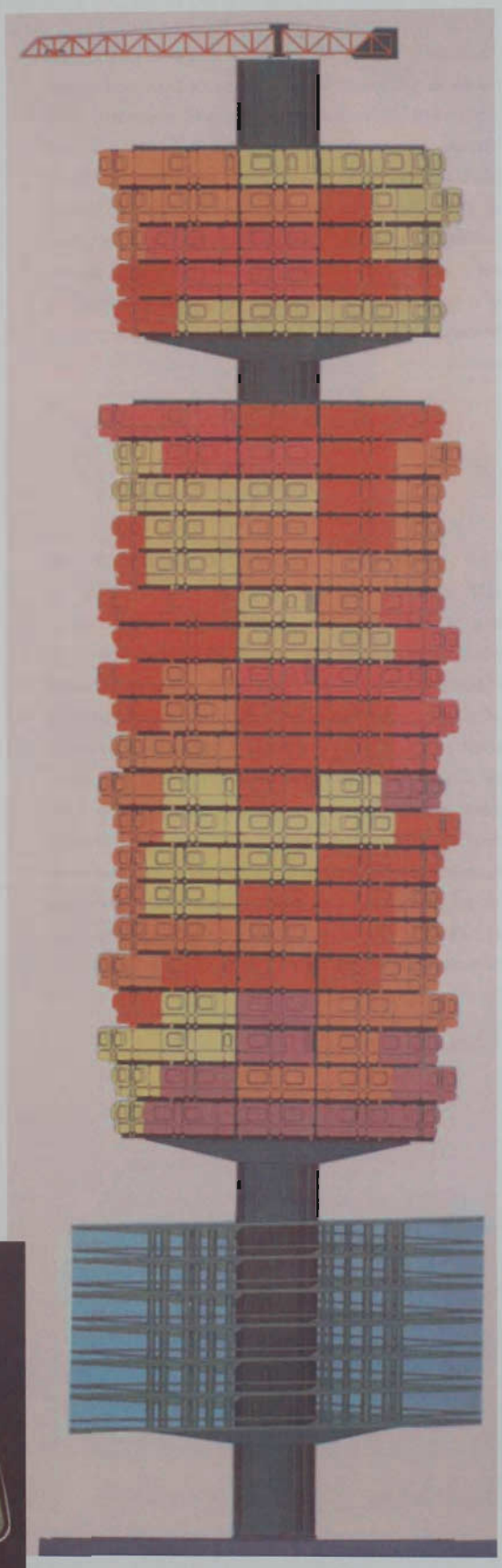


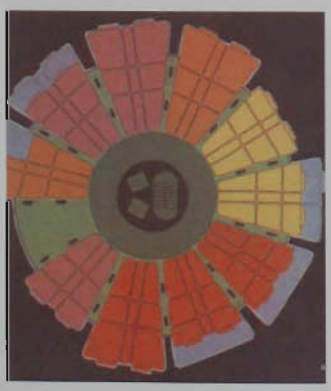
Similar to Japanese architect Kisho Kurokawa's proposals, this is an example of a residential tower. The exception in this example is the means of construction and change is contained within, with the crane at the top of the building. The capsules are a basic living unit, and portions of the unit were specifically designed to be removed. An appliance unit was designed to be removed through an oversized door and replaced as necessary, without replacing the housing unit.

The goal of the plug-in city is to eliminate the development of in between cities and development that swallows the natural rural landscape, and develop a city organized by the requirements of a contemporary lifestyle.

Opposite Page:

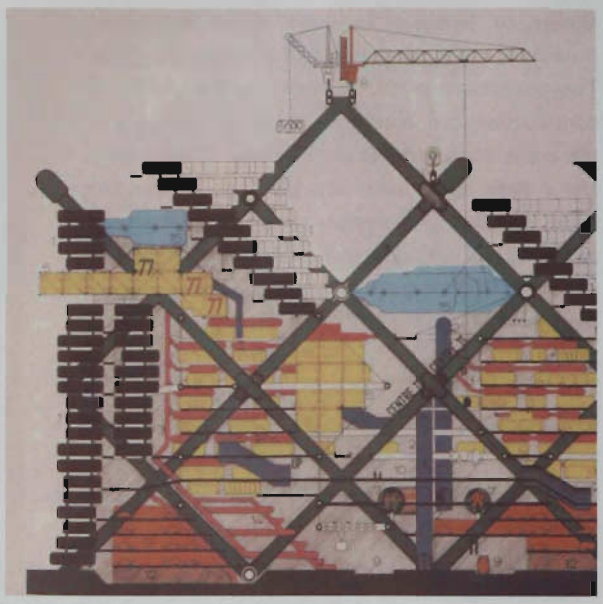
The layout of a housing prototype. Living units wrap the exterior of the building, while interior spaces are relegated to parking, circulation, and environmental systems. Crowing the building is a community green space. The building is part of a larger network of transportation to all other portions of the city. The project also considered the possibility that in the future, parking space could be used for other functions, and the automobile would no longer be necessary.



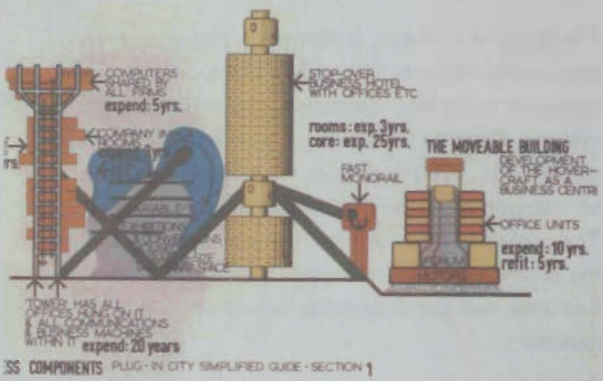


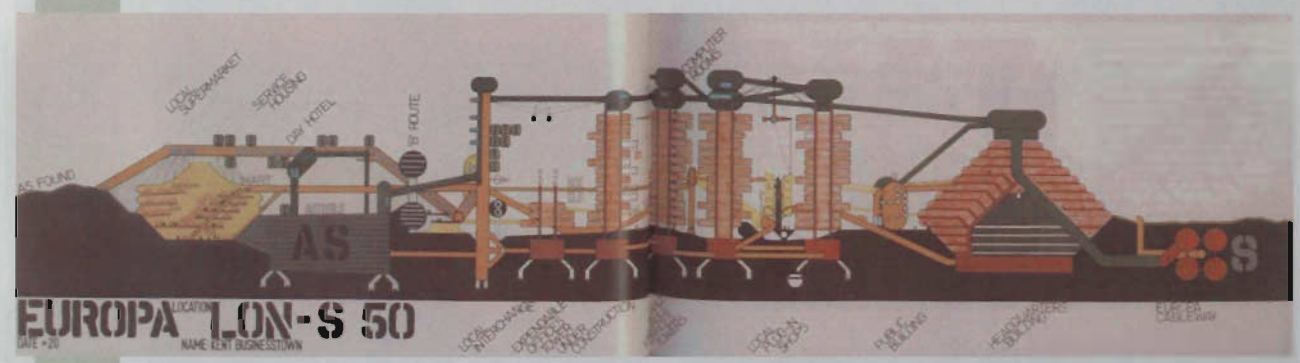
Section through city:

Archigram's designers saw the diagonal circulation tubes as a more efficient means of transportation. These would house escalators and elevators. The literal weight of the city, both temporal and physical, would be relegated to the lower portions of the city, while the transitory and light would reside in the upper layers. In this instance, a crane on a monorail handles the work load. Below is a proposal for a center of business, including hovercraft buildings. At the bottom of the page, a community.

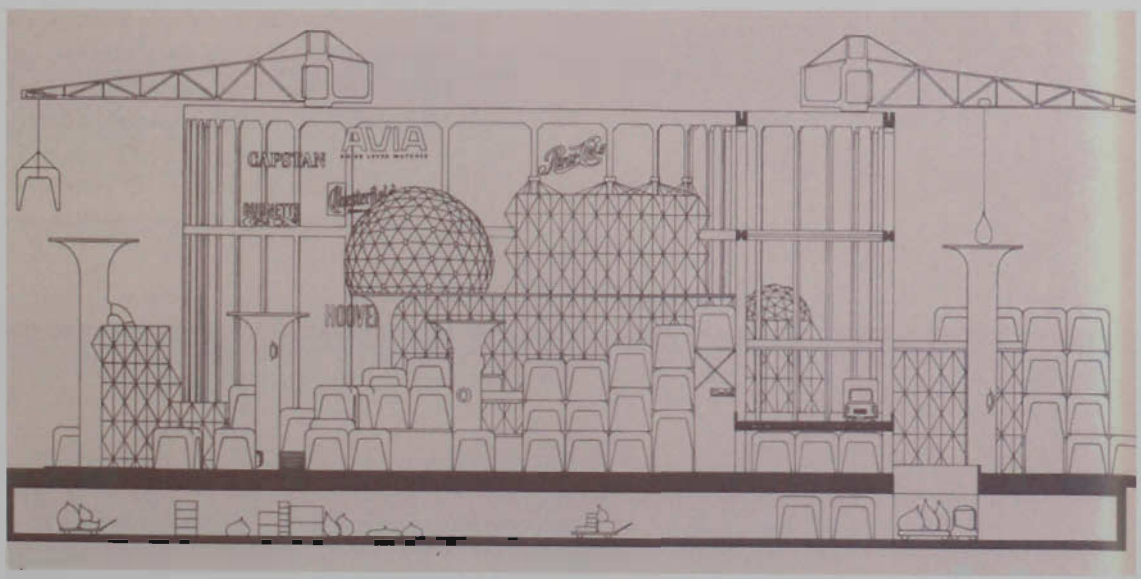


The contemporary need for mobility and change still exists today. In plug-in city, mobility is the primary concern, as transportation, housing, goods, and people are moved as they choose. Materials also favor metal and plastics instead of the typically solid and monumental materials such as brick and concrete. They are considered by Cook to be non-reusable and messy in their destruction. To be critical, the design never fully displays any type of anticipated use, nor displays how these could be accommodated. Instead they relied on system that removed obsolete buildings as needed. The concept seems to reject any type of sustainability cause.





Being theoretical, it is difficult to completely analyze this work. Without question, it has profound vision, and realistic applications. These ideas have been dismissed as Utopian, or unable to be realized without a political dictatorship. Truthfully, perhaps this is the reason that these ideas have been dismissed for decades as we continue to think about cities the way we always have. The plug-in city thinks about architecture as impermanent, perhaps "throwaway," but seems to respond to the way society truly is, a group of mindless consumers, disgusted with their own past taste, and intent on having the newest product. The plug-in city did not necessarily offer these ideas as the only option, but recognized that it is an alternative response to contemporary urban issues.



the plug-in mall

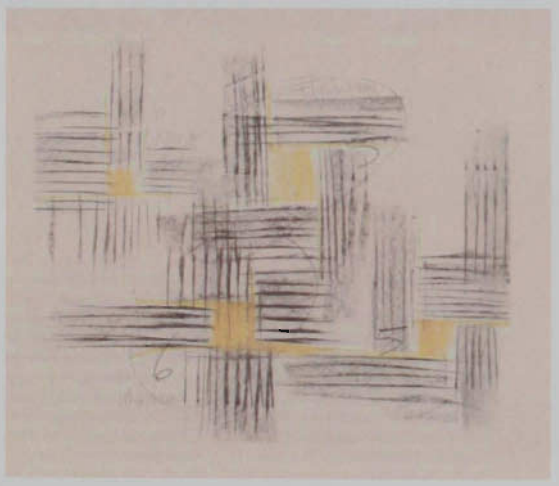
Swiss Pavilion

Peter Zumthor
Hanover, Germany
Expo 2000

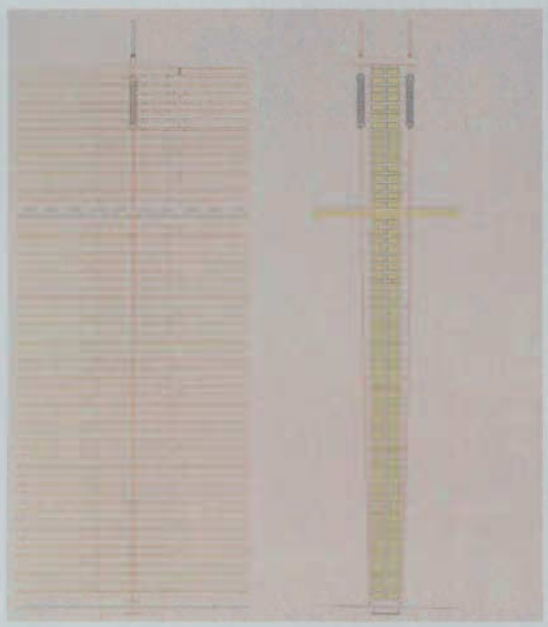
"Klangkorper Schwiez"
"Switzerland as Resonating body"

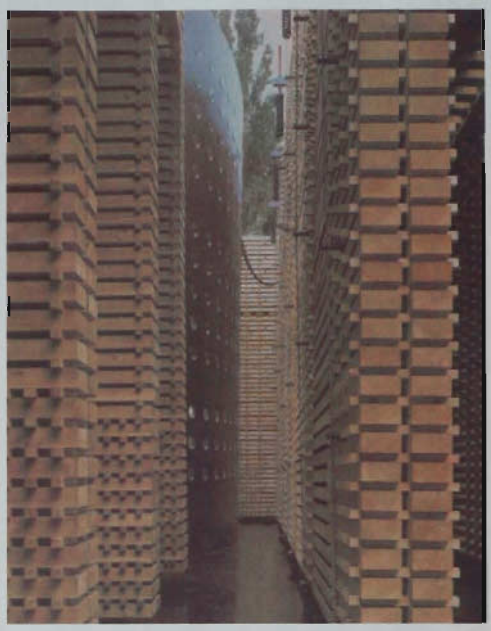
Peter Zumthor designed this pavilion in the face of the high tech pavilions found representing the many countries across the globe. Zumthor chose a natural box, constructed of wood and steel tension rods. The goal of the pavilion is to provide live music, rest, food and drinks to the weary visitors. One gets lost in the aromatic wood labyrinth.

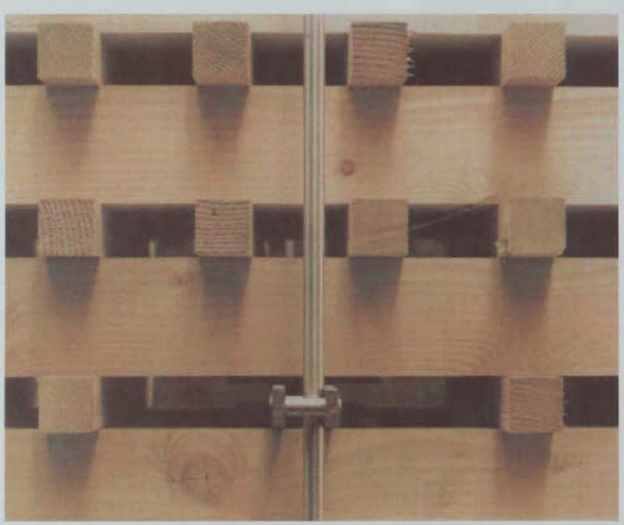
This project represents a temporal condition for my investigation. More importantly, it is designed for its own removal, by which the materials can be reused after their original use. Zumthor achieves a construction system of disassembly. This project exemplifies an ephemeral existence of architecture as well as the recycling of materials.



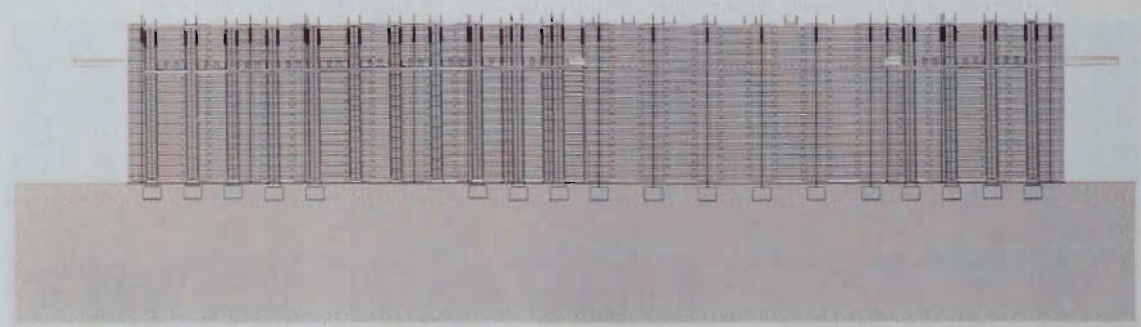
This structure also creates a connection with natural materials in an exhibition that desires to showcase technology. "...I never start with technology. Rather, I always have an architectural idea, which very conventionally, has something to do with the place and function which has to be fulfilled," stated Zumthor in an interview. Said one critic, "The sound box, simply enough, is above all an offering for visitors overwhelmed by the stimuli of the fair, a place to rest and relax."

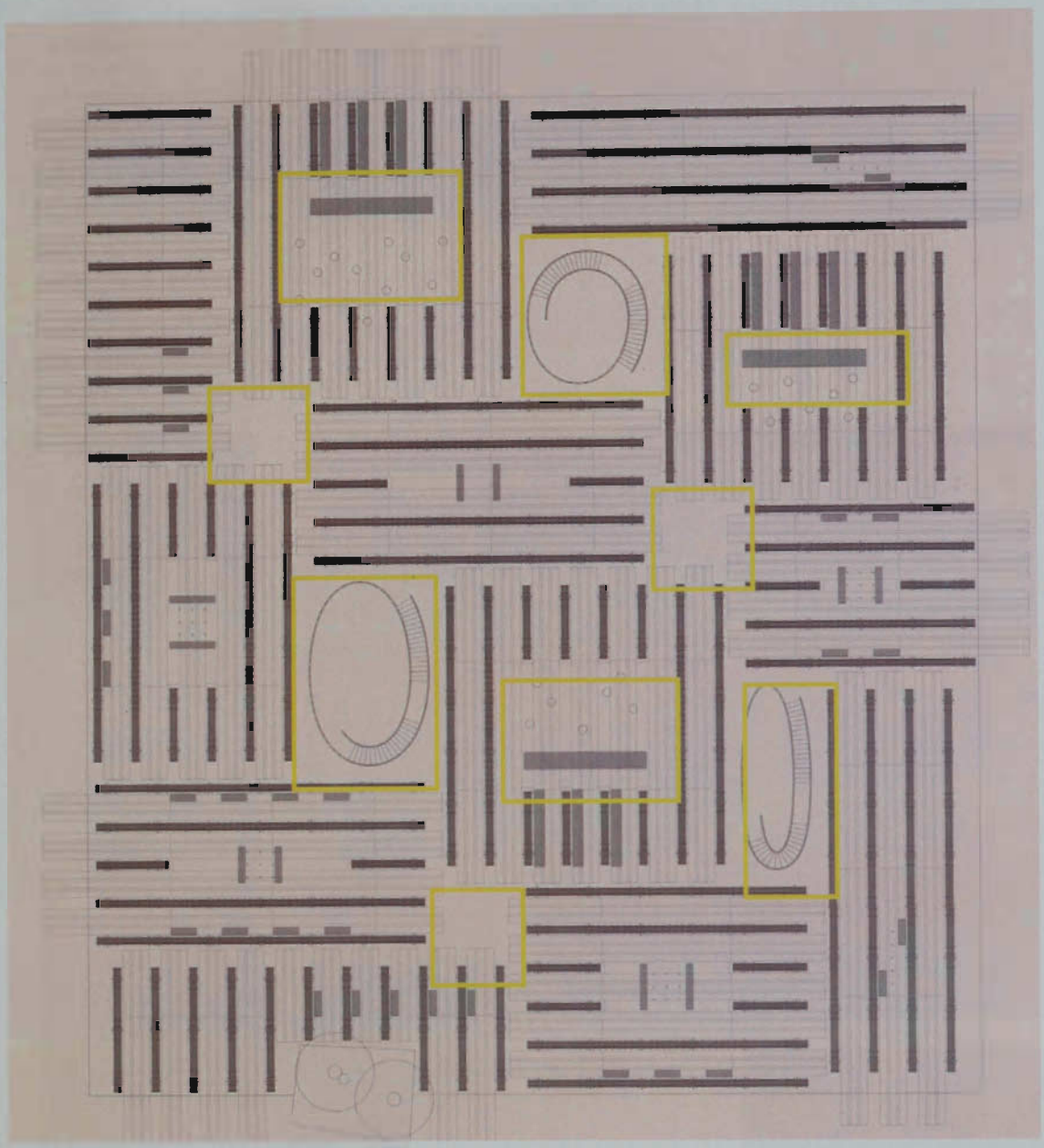






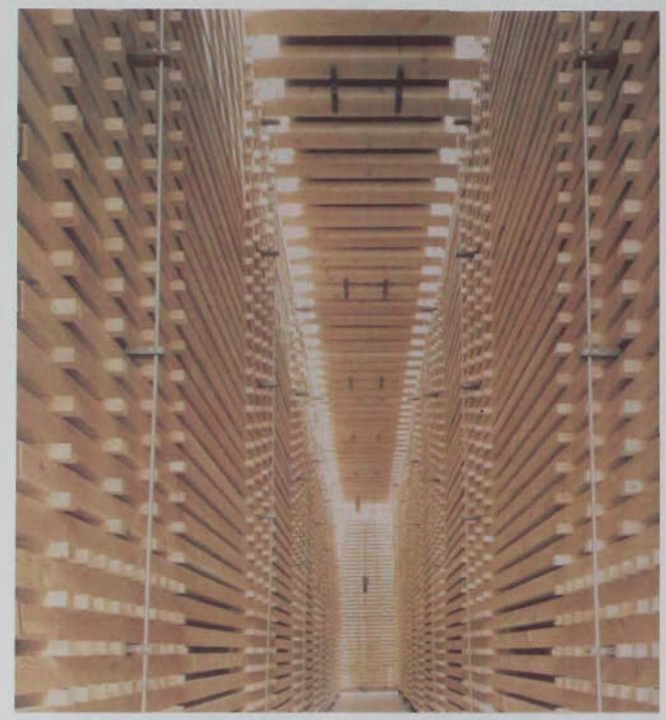
Illustrated here is the typical construction detail for the wall structures. The wood timbers are cut, then stacked. Following this, a series of tension rods are attached to the top of the wall, and tightened as necessary to provide stability. After its desired use, the wood is ready to be used in another condition. The wood has dried evenly, due to the open, stacking pattern and could arguably be a better product than one that a lumberyard would provide. The simplicity of the tectonic system presents surprising interest and aesthetic beauty.





Formally the plan is constructed as a loose labyrinth, with gathering spaces to house the desired functions.

The most interesting aspect of this structure, and those of the expo, is that they are designed as temporary pieces, but yet still retain a high cultural value by association. Still, we realize that these pieces have a set expiration date, a building that is to be a non-building when the value is terminated by the closing of the Expo. On a long enough time line, all buildings have an end, which is generally determined by its inhabitants. The temporal condition of event architecture merely seems to be a shorter version of our normal built environment.
An additional consideration is the involvement of people to this structure. People essentially inhabit an instrument where music drifts and resonates. As one moves through the space, the sensory perceptions can influence many different experiences. This is a temporal condition experienced through the influence of people, not architecture alone.



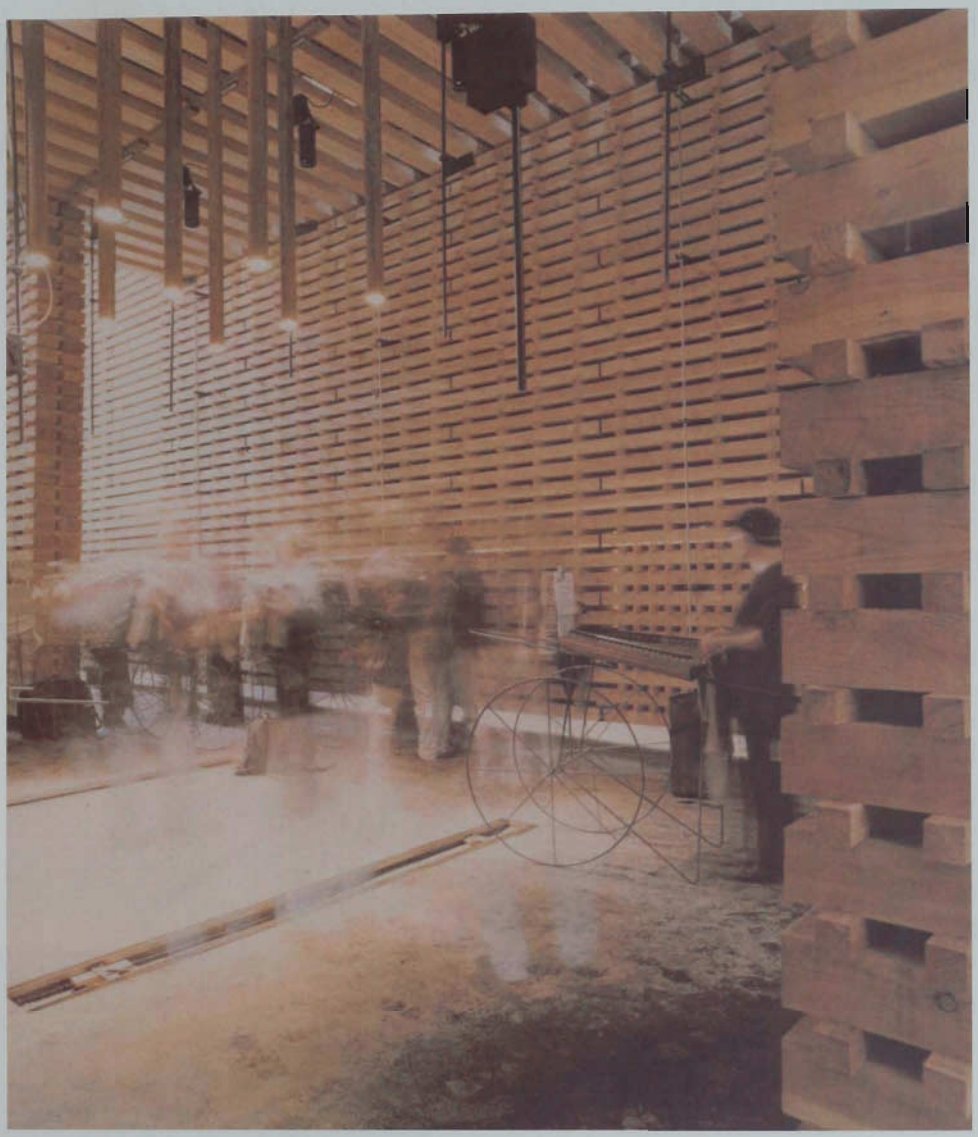
The use of natural materials in a relatively unprocessed state makes strong connections to nature, while serving the function of the music box. The failure of this structure is also the impermanence of its construction. The structure had to be constantly monitored, evaluated, and repaired over time, as it was somewhat unstable.

The idea that building materials can be reused is not new, and yet the idea is refreshing in this instance. This project shows that architecture that is designed to be salvaged can still have pronounced permanence and architectural quality. Their materials can also be designed in such a way to promote further use after the initial planned function.

MATERIAL

DE-CONSTRUCTION

RE-CONSTRUCTION



temporal condition

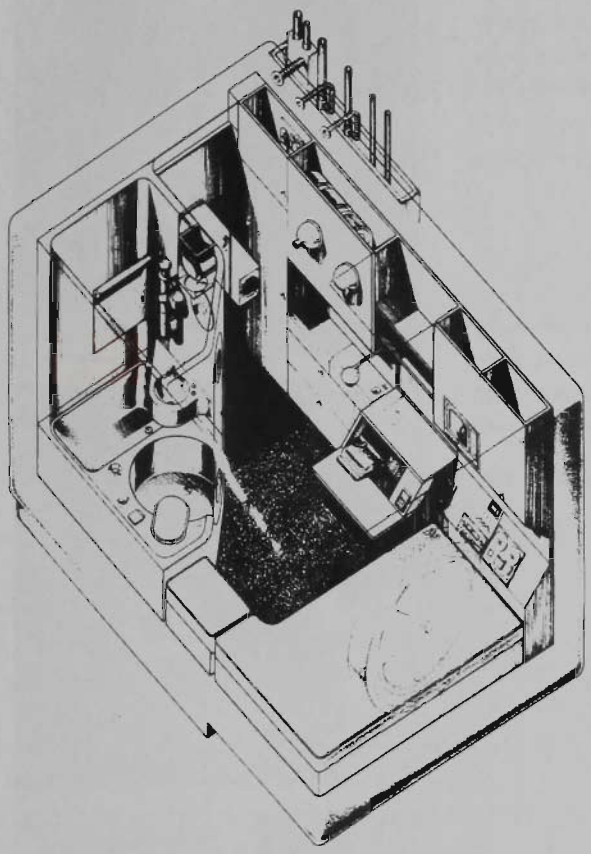
after the exposition, the building is dismantled,
and its parts are used elsewhere.

Nakagin Capsule Building

Kisho Kurokawa
Tokyo, Japan
1970

This project was an expression of the Metabolist Movement that grew out of Post-war Japan. Kurokawa was a major proponent of capsule architecture, no doubt resulting from the creation of the space age. The Nakagin capsule towers are comprised of an arrangement of bachelor capsules intended to provide a very specific need of small scale residential living. Sited in Tokyo, one can see a specific response to a city with extremely high density of development and an ever changing context.

Metabolists recognized a new age of mobility as well, and encouraged prefabrication methods. Modular designs were inspired by traditional Japanese Architecture. The tatami mat and shoji screen were both created out of a universal modularity. Contradictory to the building's concept, however, all of the capsules remain unchanged, and interest groups vie to save the architecture as an artifact. Kurokawa has argued himself that the capsules needed to be updated and maintained, and yet no work has been done.

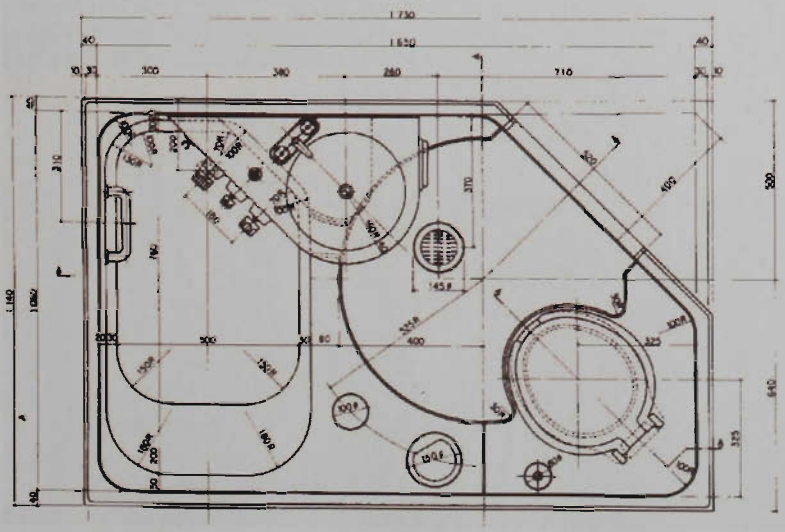


The 144 capsules are prefabricated units that were attached in about thirty days time. The 10 square meter capsules serve as studio apartment units for travelling businessmen. They are fastened to the central shaft via a series of steel connections, and these connections are able to be disassembled in order for the unit to be moved elsewhere, or be replaced over time.

This process allows the core structure and service portions of the towers to remain even as its capsules change. Instead of demolishing an entire building because of its perceived obsolescence, the building can be easily preserved.

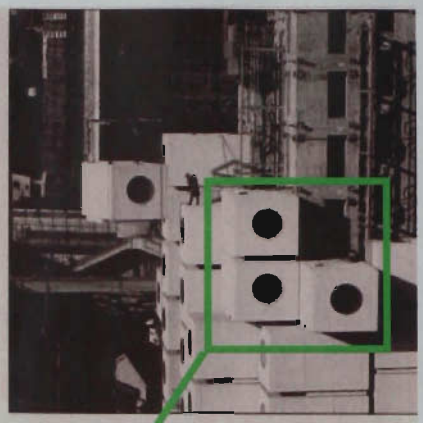
Prefabrication conserves the embodied energy of the final product. Manufacturing processes encourage a higher level of quality, minimal waste of material, and a concentration of spent energy. In addition, it may not be difficult to create a module that is entirely recyclable. We can significantly reduced the amount of waste in our landfills by using these ideas.

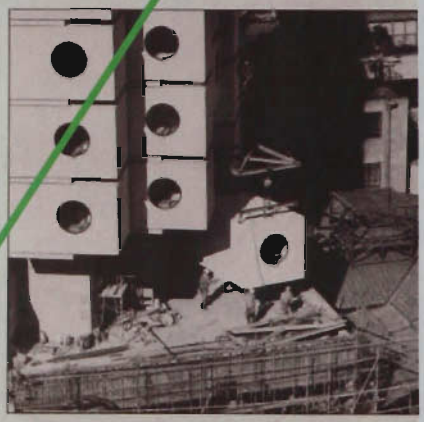
The problem with this system is one of flexibility. The capsules themselves are extremely efficient, yet the engineering accepts only parts that are designed as specifically compatible.

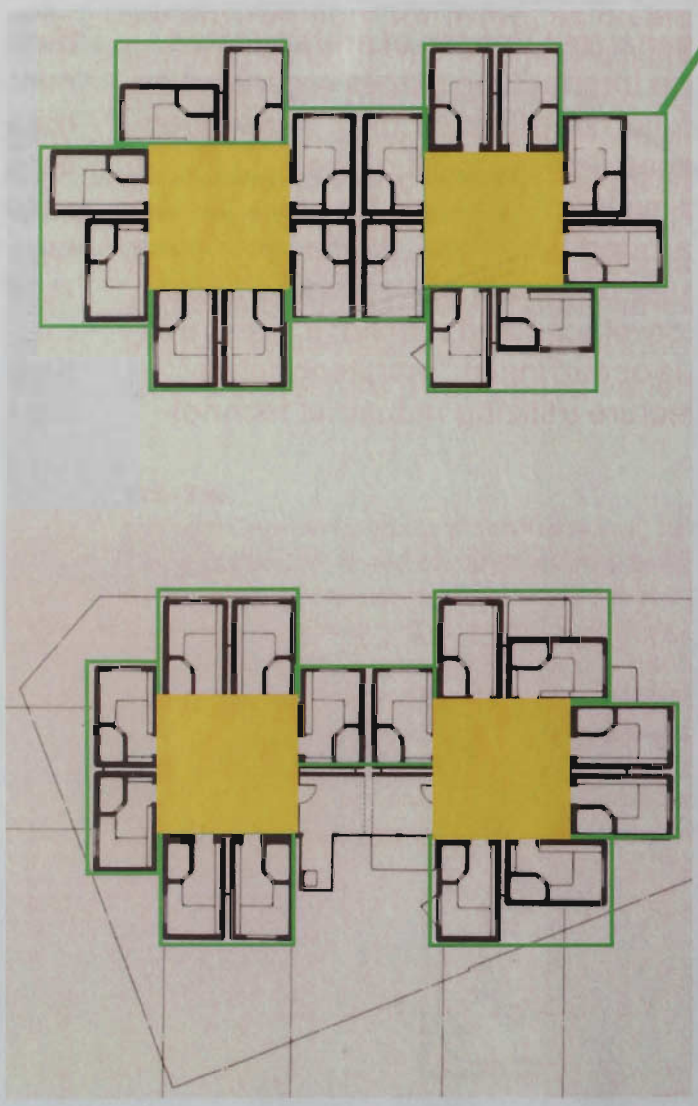


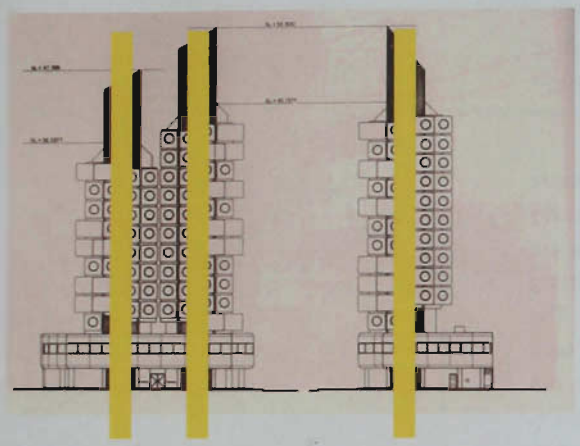
The failure of the individual capsule unit is the failure of this building. By adopting a closed system, the units have not been replaced as planned. They were designed as ultra contemporary modules of living, and from the standpoint of today, look extremely dated on the interior. Also, the inflexible units allowed only one use for a limited number of occupants, essentially making them of little value to many users. If given the chance, however, the building could be updated within as little as a few months.

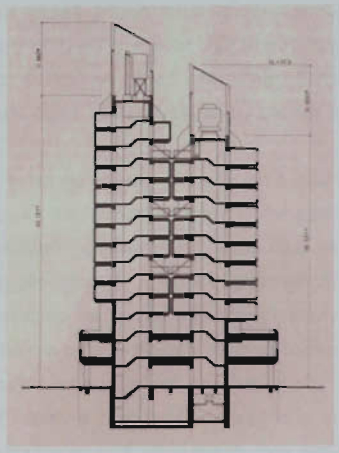
Modular systems, capsules included, seem to be too rigid for universal acceptance. American thought values individuality, and would reject any thought of sameness. However, drive down any street, and one may find that we too all live in the same house. New technologies in manufacturing might allow maximum customization of the individual units, much like purchasing an automobile, with many more options.

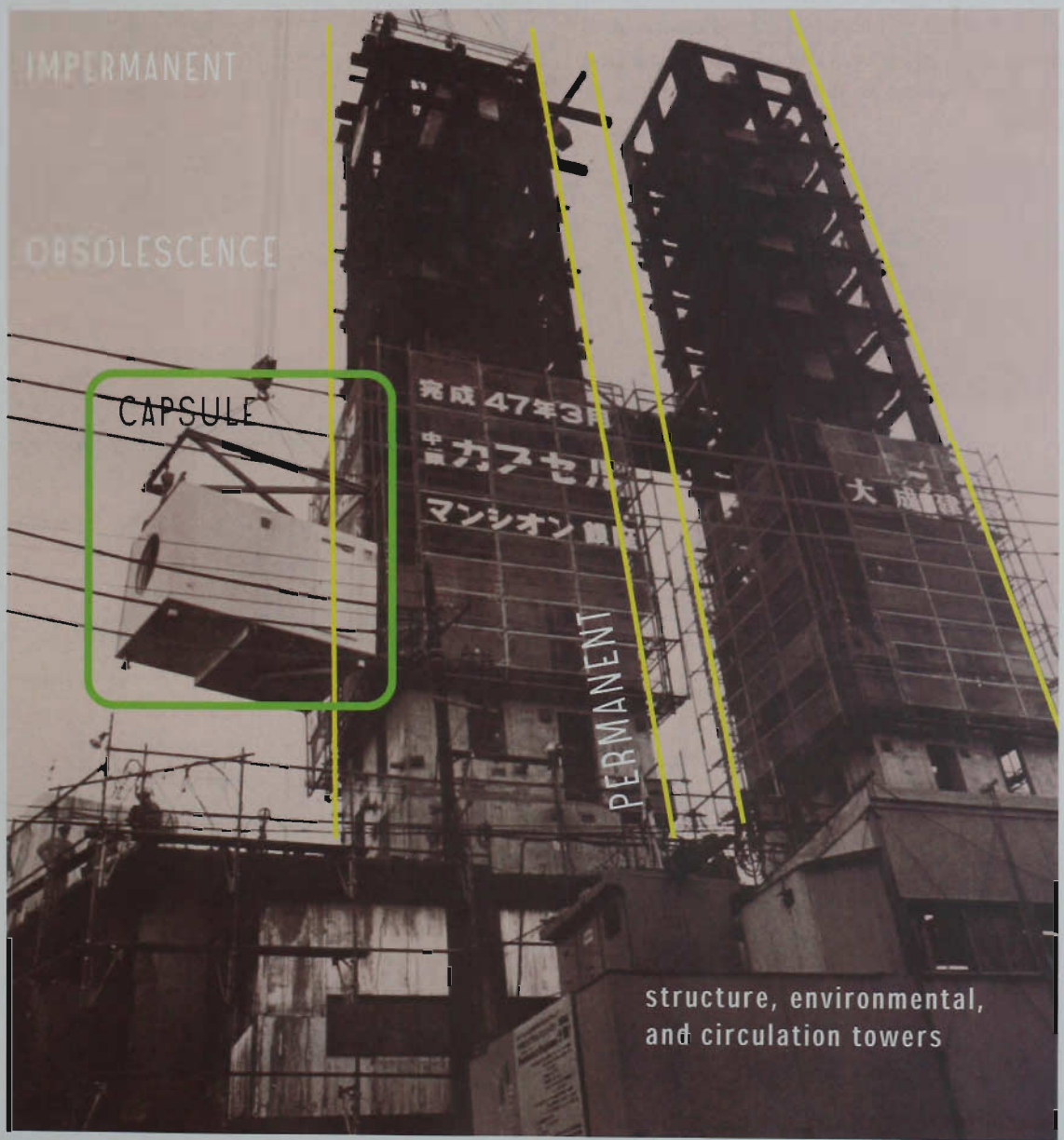






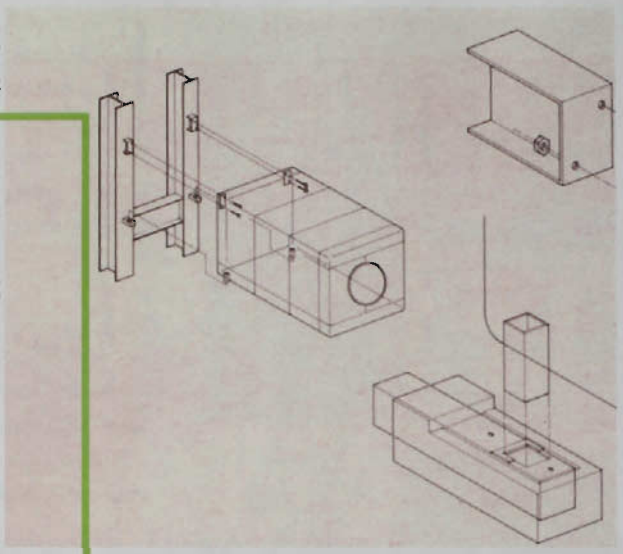


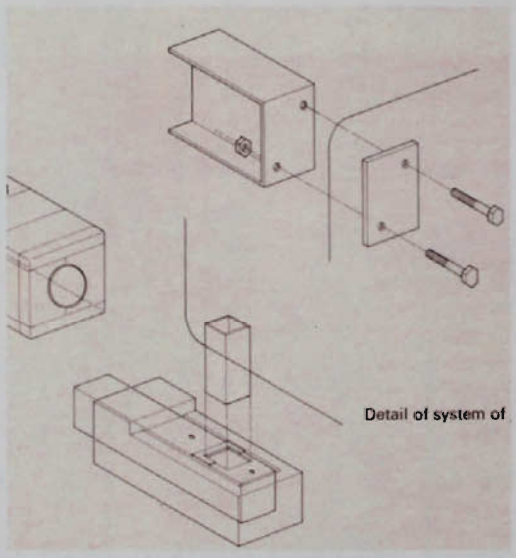



IMPERMANENT
OBSOLESCENCE
CAPSULE
PERMANENT
structure, environmental,
and circulation towers

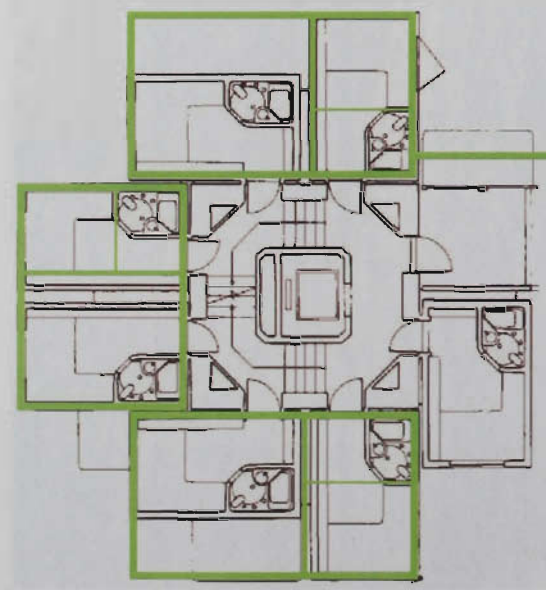
Conceptually, one could easily see these capsules growing in size to a two bedroom apartment unit, or small office that could be prefabricated and brought in pieces to be assembled onto the tower.

Most importantly, the project is proof that these ideas which may be construed as utopian can actually be built and inhabited for decades. The Japanese displayed a mastery of technology and engineering when they built what other dreamers could not. The use of prefabrication is also commendable for such a scale, and the variations of attachment which can be changed could create a visual/ temporal texture. One can appreciate the simplicity of the concept, and the ideology that was presented with this work. However, the capsules surpassed their obsolescence, and in doing so may have jeopardized their original intent. After taking on a cultural and architectural value, the building is in danger of becoming an artifact.





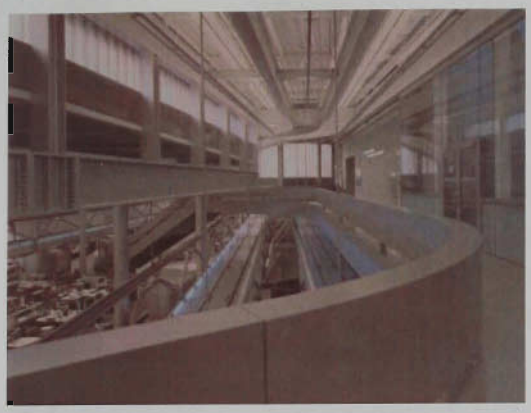
Detail of system of



PROGRAM PRECEDENT

hadid

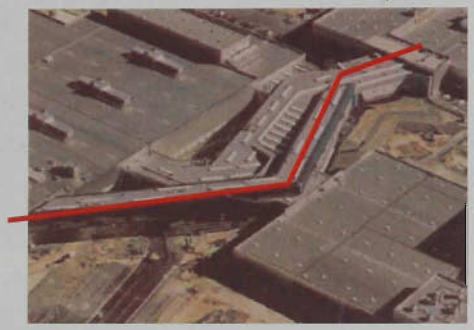
mcdonough



BMW Central Facility

Zaha Hadid
Leipzig, Germany

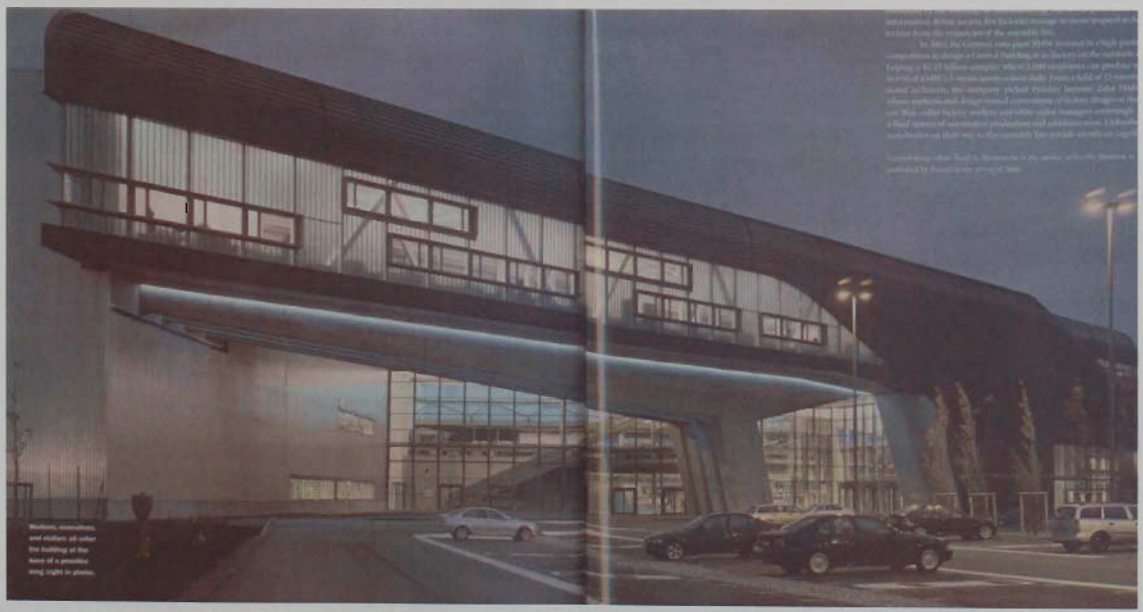
General Program Spaces
in square feet
Connector space - 430,000
Fabrication - 645,000
Paint - 270,000
Assembly - 1,075,000



Zaha Hadid designed this building to act as a connector space for the rest of the plant. This building takes on a varied program, as well as the role of a vehicle of production. Large amounts of people, information, and the actual assembly line are routed through this facility. Areas are designed for quality control, engineering, and eating, in addition to office spaces.

"We didn't think about the project as compartments; we always saw it as a whole, a single diagram," said Hadid (Barreneche 86). One can see this impetus throughout the building, as fluid spaces collide and blend with one another. The constant architectural expression is one of movement. The cars move eerily above the office spaces from one building to the next, and people transverse raised walkways.

One of the principal goals was to create a democratic, transparent, and accessible workspace for all. No one employee is isolated, and employees can maintain lines of communication across space through the open floor plan.



Office functions are placed on a "cascade" of floors. They are designed as largely flexible and open spaces, day lit from above, with views to the exterior spaces. All office workers, regardless of the seniority or superiority work together in the same condition.
As a quality control measure, random cars are pulled away from the assembly line and disassembled in a public viewing. The space is surrounded by a glass wall.

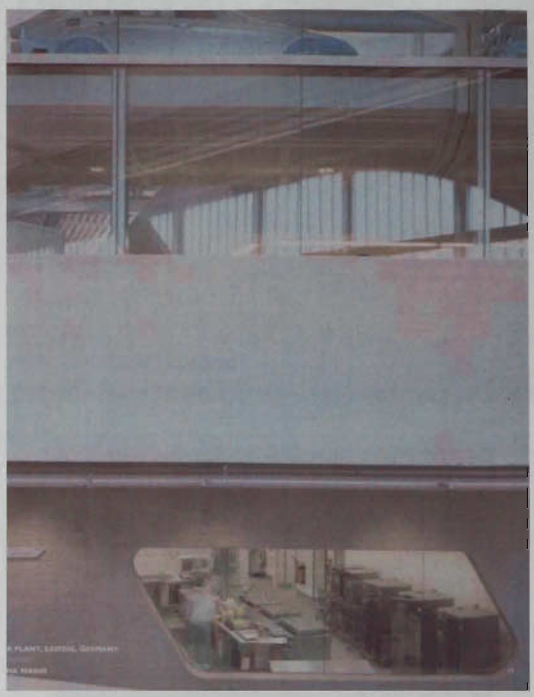
Raul Barraneche wrote, "Her building functions neither solely as administration nor production space; it melds two integral but typically isolated strands of industrial business into a mutually inspiring relationship."

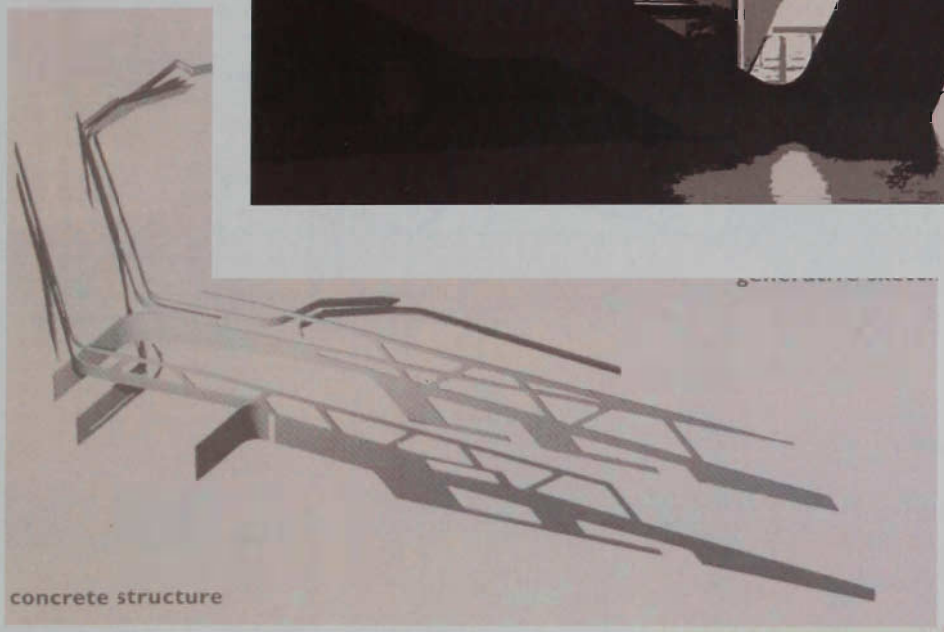
"Our idea was always to challenge the typology...."
-Zaha Hadid

By exposing the portions of the manufacture, all occupants are aware of production, when and how much is being produced.

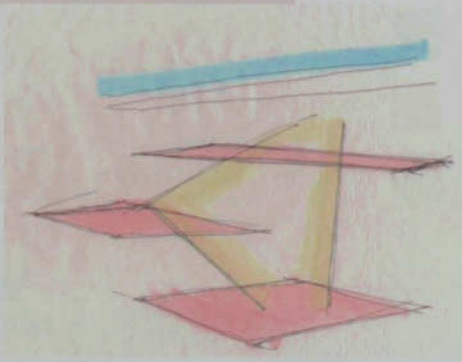
Clearly the plan's organization was derived by the needs of the separate manufacturing facilities. By tracing the production line, the general plan of the central building can be generated. These lines occupy the area at the top of the volume, while the rest of the functions are placed underneath. In many ways, this places the half built cars in a superior hierarchy. This could be interpreted as a reinforcement of the sole reason each employee is there; the production of these vehicles that float ominously above.

Despite this negative aspect, the involvement of these products into the office environment is a novel concept. The relationship established involves the white-collar worker and the actual product of manufacture. Also, the plan and architecture convey movement, which substantiates the product as a vehicle, specifically a higher performance luxury vehicle. Hadid does well not to extend the metaphor too far, and relies upon her trademark architectural style.

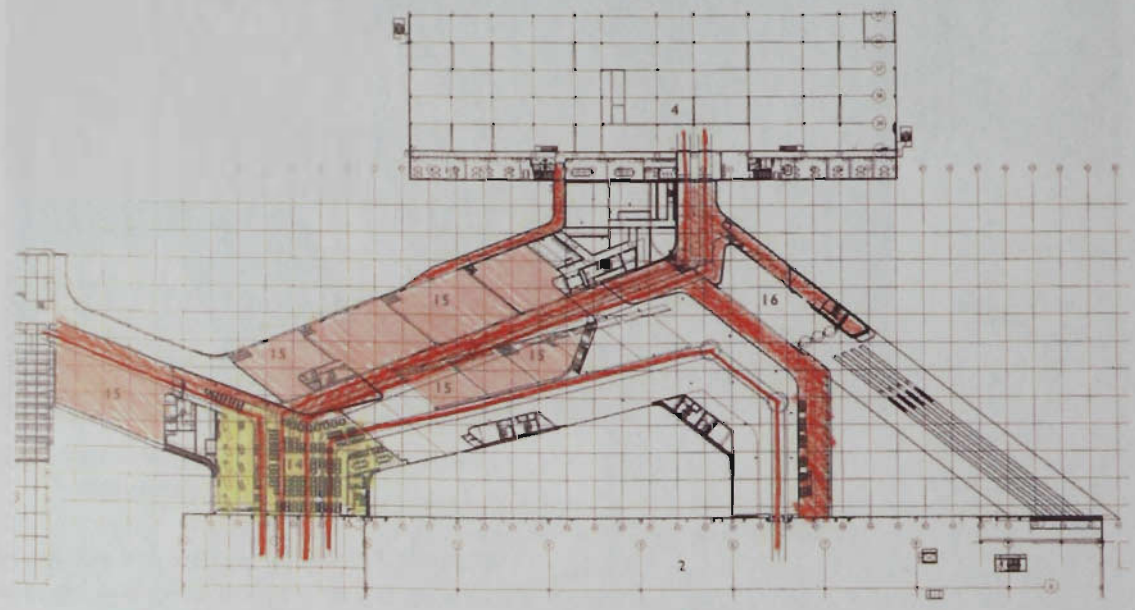




concrete structure



open, non-hierarchal office space



second floor

offices

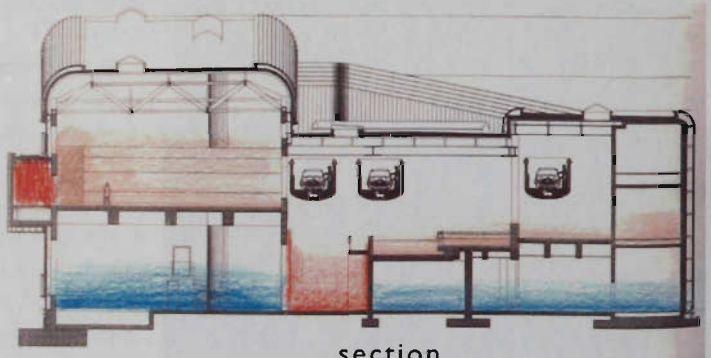
circulation

food facilities

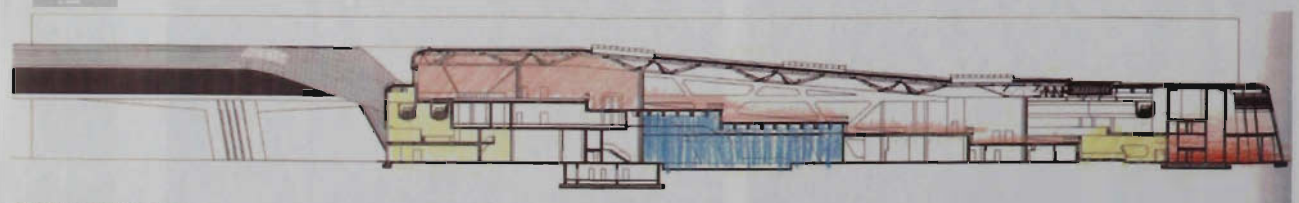
labs/ testing

manufacturing

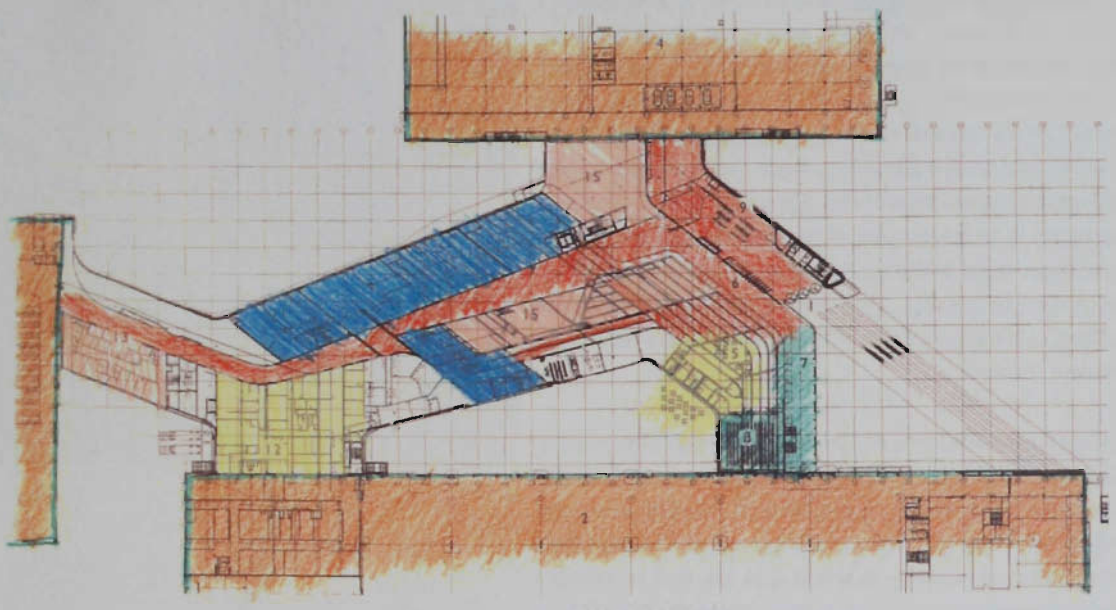
display/ auditorium



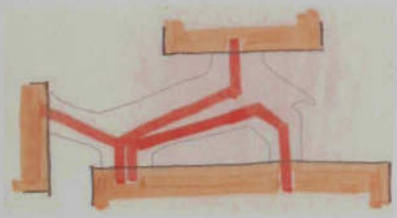
section

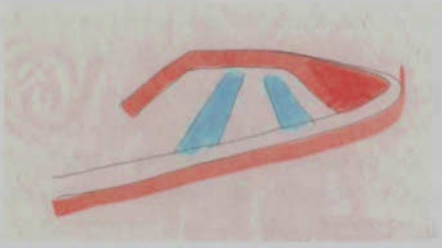


ıg section looking east



first floor





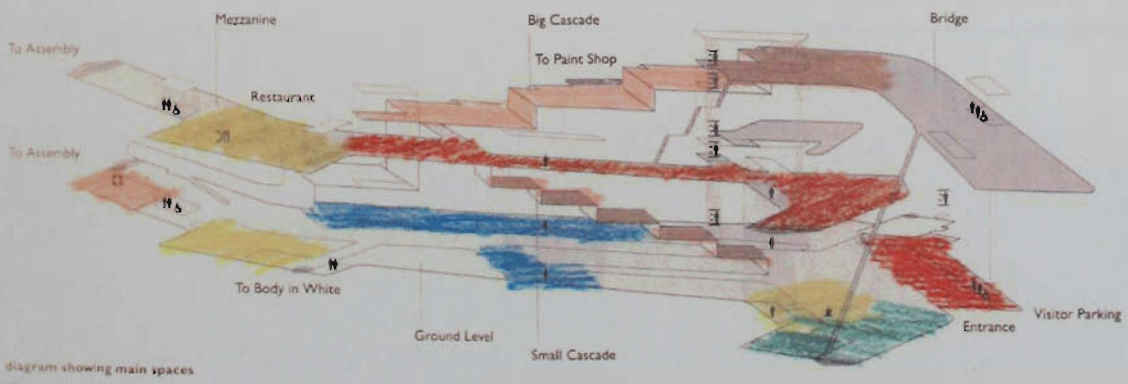
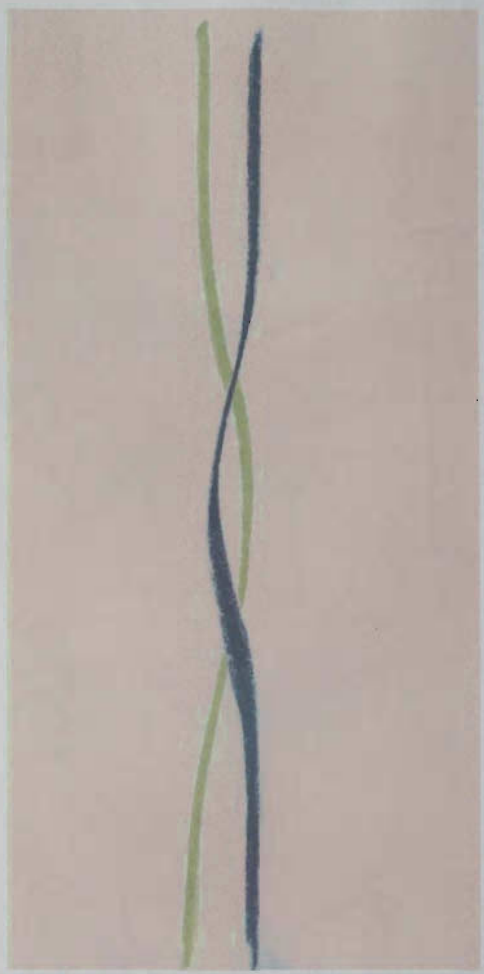


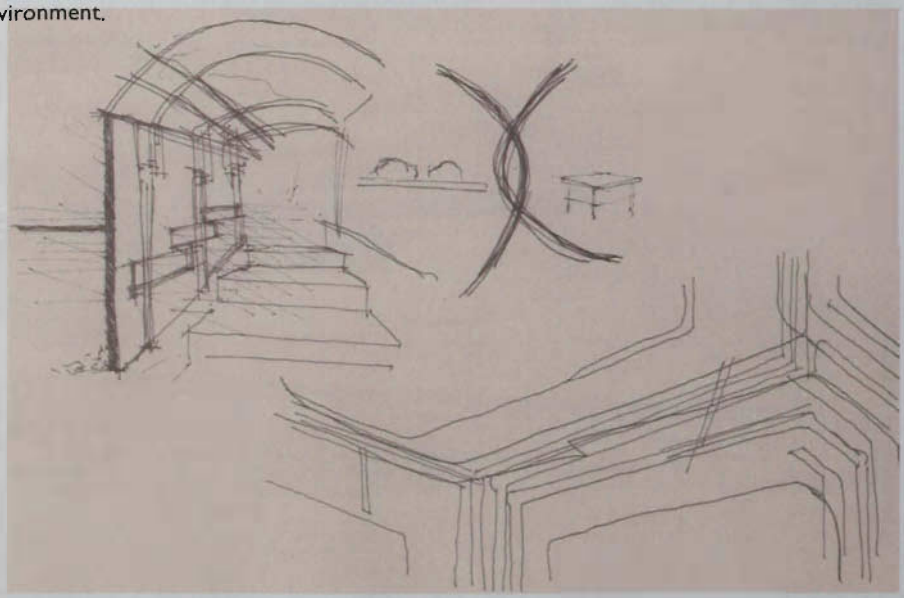
diagram showing main spaces

This project is most successful in that it juxtaposes a variety of different program spaces in dynamic ways. The manufacturing process punctures the volumes with strong directional moves. Office spaces cascade down space. Circulation spaces convey movement through formal expression. According to one source, the conveyers for the dishwasher in the kitchen create more noise than the cars overhead. In addition, none of the manufacturing processes enter the central building. It merely moves the parts from one facility to another. The primary function is an office building, but it allows parts of the manufacturing process to circulate through.



The spatial qualities may be the weakest part of the building. Office spaces have soaring ceiling heights, and seem to lack a human scale. Much of this has to do with the bold architectural moves. Other spaces, such as the labs, have a very reasonable scale. It seems that the idea to connect workspace with the view of the cars overhead has extended some spaces to an uncomfortable quality of space. Also, this building, like most of Hadid's work raises a question of utility of space. Some of her spaces could be considered wasted, oversized, or non-functional as a derivative of her geometry. In this instance, the foyer area is extremely large, somewhat barren space.

In general, this building is extremely successful. It creates flexible office space which facilitates communication. It mixes a variety of functions well, in addition to the cross section of workers in the facility. Blue-collar and White-collar workers eat lunch together. Engineers test cars underneath accountants and managers. Circulation patterns create opportunity for conversation. As a central building for a manufacturing complex, it is model for the cross disciplinary business environment.



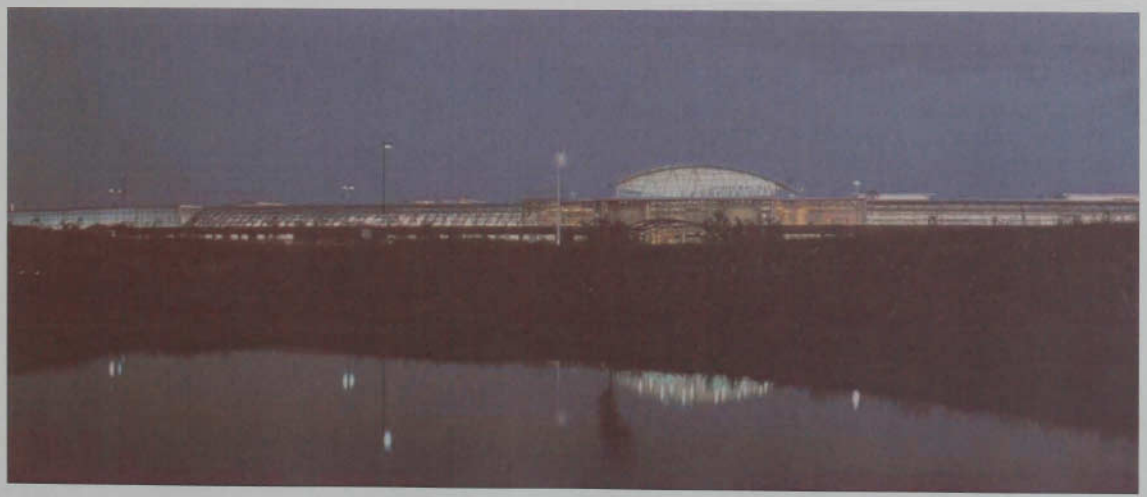
Herman Miller SQA Factory

William McDonough + Partners
Holland, Michigan

"simple, quick, and affordable..."
Miller SQA is a subsidiary company of the furniture giant Herman Miller. This facility is a 295,000 square foot office, distribution, and manufacturing facility in West Michigan. Miller SQA comprises about 15% of the total revenue of Herman Miller, and is a revolutionary technology based business that has allowed for limited choices, but amazing delivery times of products.

The most intriguing portion of the facility is the interior "street" where different 'class' and work divisions commingle with coffee, food, and conversation. The facility also shares supporting spaces such as the copy room, conference areas, cafeteria, and fitness center with all employees. The street has a strong connection to nature through the building envelope as plants grow on either side of the glass. The street also has art and serves as the organizing spine for the plan.

McDonough also designed this building with many green considerations, including natural lighting and ventilation. In this workplace, half of the plant's employees maintain perfect attendance, and production has doubled (The Next Industrial Revolution). This facility is friendly to the employees and to the environment. In plan, the building stretches to allow for exposure to the sun. The "greenhouse" as it is now called, is filled with light and natural ventilation.



In criticism, the program's organization is still hierarchal. Some offices take a second floor position, and all office or 'white-collar' program functions are brought to the front of the building, which I would consider to be the most desirable. The architecture gives separate space to the office worker by compartmentalizing these spaces, and places them adjacent to the greatest amount of daylight on the main circulation path. The needs of the manufacturing facility, specifically the need to move products out of the buildings upon completion seems to force it to the rear and sides.

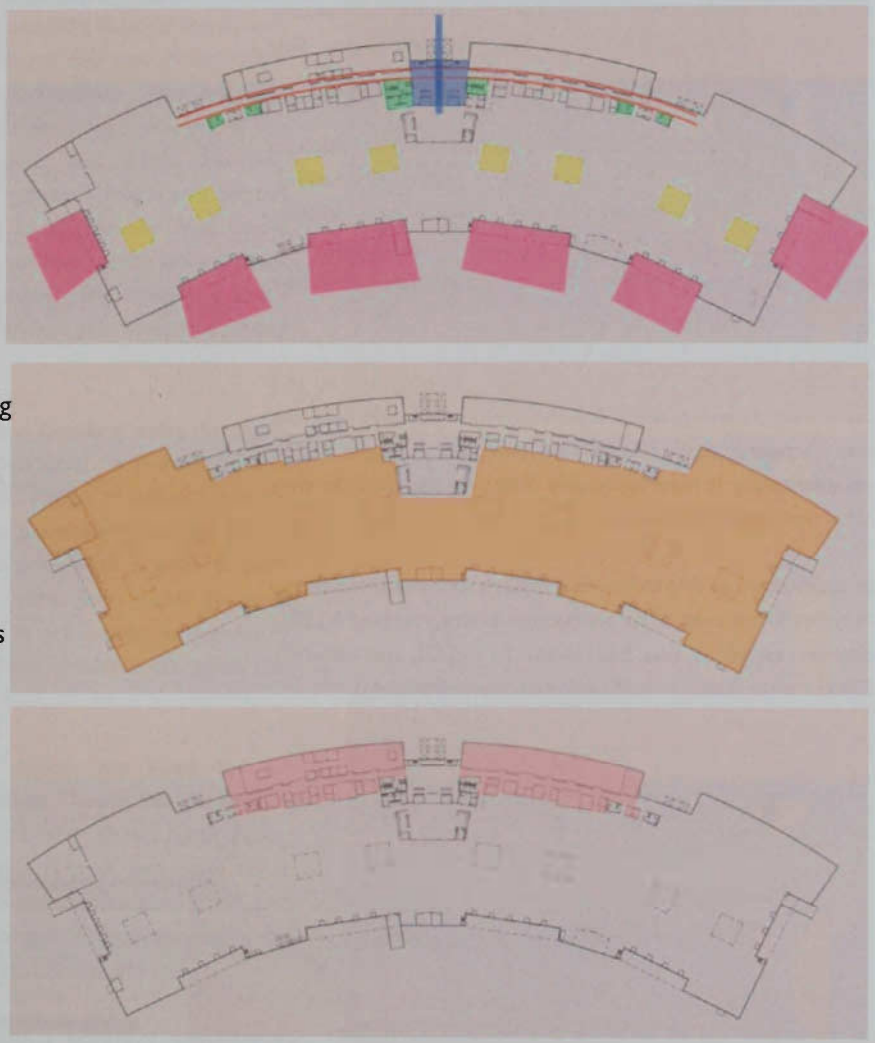
In the manufacturing area, clerestories area part of 47,000 square feet of glass emitting daylight onto the workspace.

The most important aspect of this program is the space known as the street. Conceptually, integrating the office worker with the factory worker... connecting... it is a magnifying event, said McDonough in an interview (The Next Industrial Revolution). The street is well intentioned, even if it may not work exactly as promised. At the least it affords the acknowledgement that other people, perhaps people of a lower company status do exist. In this circumstance, the opportunity for collaboration and conversation in this space is probably not cross-disciplinary, due to the single role of this facility. The hope is that in a place where there are a larger amount of disciplines, this program could flourish as an excellent space of collaboration. In any event, the care for circulatory space, as a place for more than moving through a building is an important concept.

Operational Flexibility is achieved in the manufacturing area by allowing 26 loading docks to occupy three of the four sides of the building. In this way, the manufacturing process could be changed quite easily, with the exception of growing in scale. It also allows the space to function in both a linear or non-linear production. This facility is a light manufacturing program, and no parts are fabricated at this location. It assembles furniture from parts, and distributes these items.

daylight entering the building

entry, street, daylight and loading docks



manufacturing

circulation

offices

loading docks

The most important move McDonough makes is the attempt to create opportunities for interaction among the workers of all levels. While this creates greater unity among employees, it also can facilitate discussion on how the entire environment could be better. Those working on the line could make suggestions toward production efficiency, and managers could establish real life relationships with their subordinates. In creating the 'street', the architecture certainly makes the workplace more enjoyable, but also increases the quality of the products.

This program also establishes an excellent scale at which to work. The floor plate is dominated by manufacturing spaces, and the other support systems are clustered in one location. This thesis develops a program of similar scale, with the exception that the several other program elements will be added, including a showroom.

Spatially, the program elements work well, as offices and other support functions are smaller volumes, while the manufacturing maintains a full two story height. The manufacturing is able to quickly adapt to demands as they arise due to its flexibility.

In addition, according to Herman Miller's web site, this building recycles 97 percent of its production waste, received a LEED pioneer award (it was built prior to LEED), and naturally filters storm water runoff (www.hermanmiller.com).

section through street

Herman Miller National Showroom

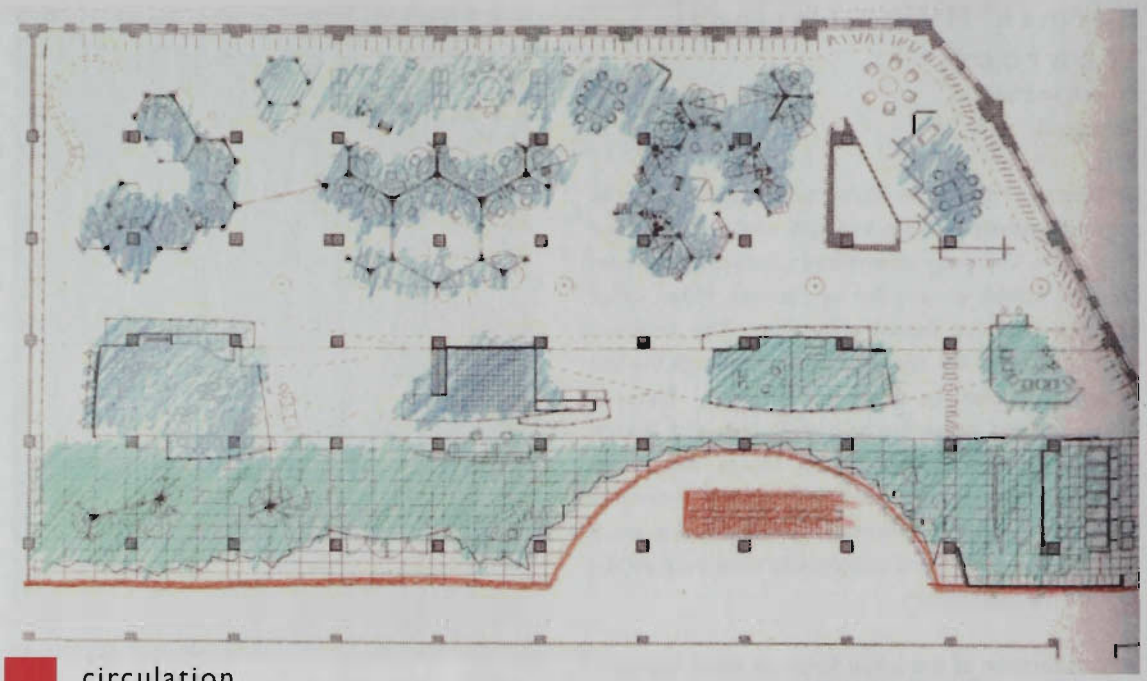
Krueck and Sexton
Chicago, IL

Because the Miller SQA facility lacks a showroom, the program analysis will also examine one such furniture showroom. This program involved a national showroom used to exhibit a new line of Herman Miller office furniture and the Eames collection. The architect desired to make the space interesting through the use of light, transparency, material and space. Elevating the showroom to an art gallery, Krueck and Sexton transformed the roughly 20,000 square foot single floor space into an office and conference environment to display the office collection. The remaining space attempted to grasp some concept of a residential setting for that display purpose.

In consideration of the actual furniture being displayed, the space seems grossly oversized. A portion of this scale is determined by the needs of office furniture pods. By spacing out furniture rather than stacking it in like a parking lot, special preference is given to each piece. In some cases this works for a highly designed furniture piece, treating it as art instead of furniture. In many ways, Herman Miller products are given the consideration of art.

This project seems to display the need for an architectural idea of adaptation. Though this showroom is less than five years old, it already shows some dating of its design. New materials, lighting, and other tools of the architectural palette have been introduced, and design tastes have since changed. Programmatically, the retail space holds the shortest design life span.

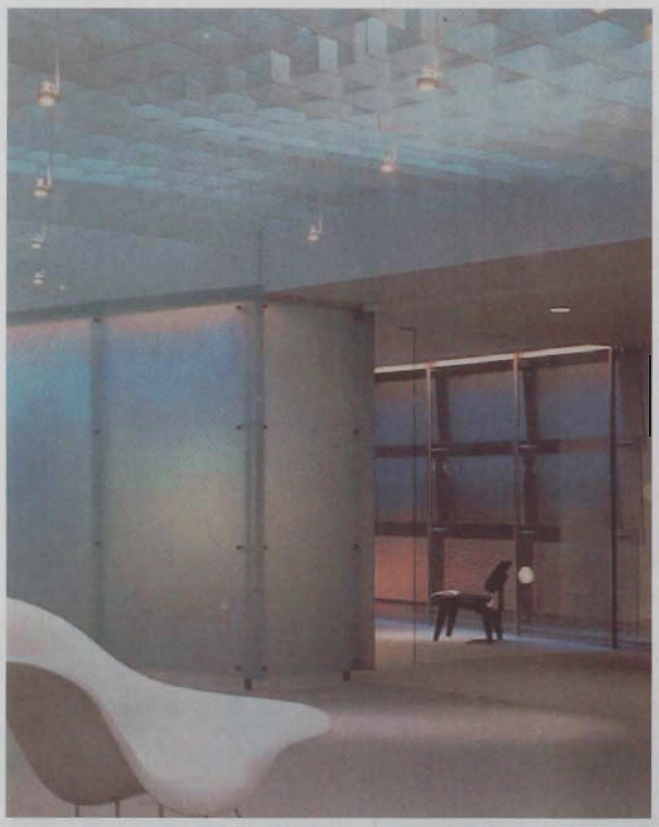
The showroom operates as a series of installations in a large and flexible space. In this way, the space can remain generic, but a majority of the interior architecture could be easily changed. Programmatically, there is little to be learned. By providing an open and flexible space, the architects were able to isolate and highlight the furniture. The surrounding aesthetic is restrained.



circulation

commercial/ office furniture

residential furniture



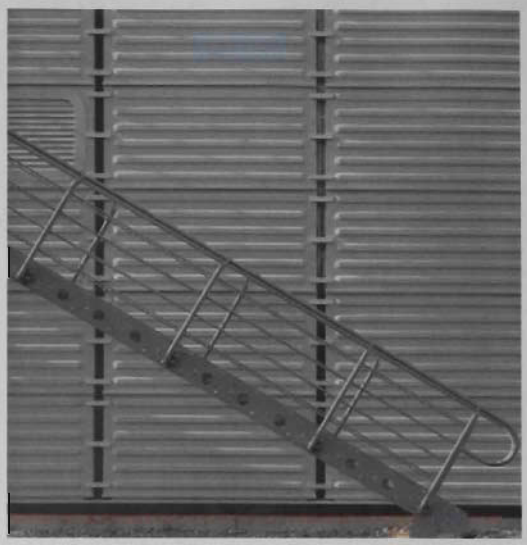
TECTONIC PRECEDENT

igus factory and
headquarters

cologne, germany
nicholas grimshaw

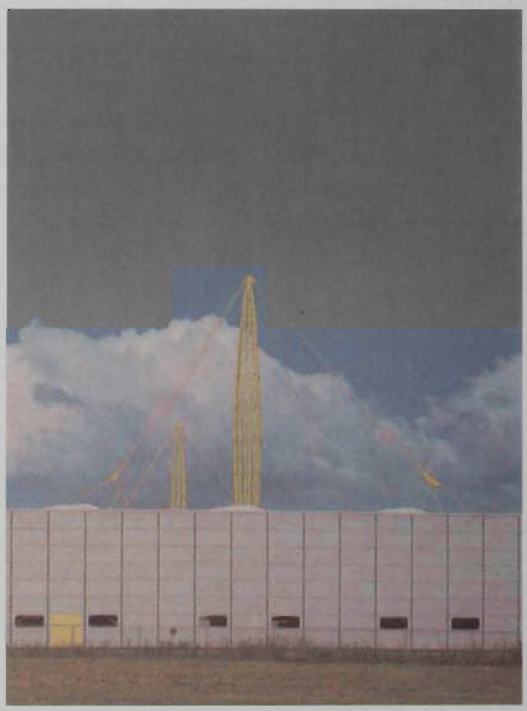
IGUS Factory and Headquarters

Nicholas Grimshaw and Partners
Year Built - 1995
Porz Lind, Cologne, Germany

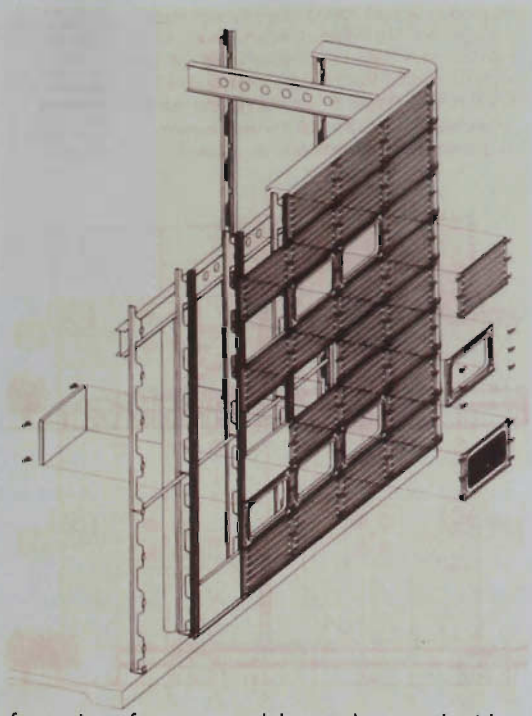


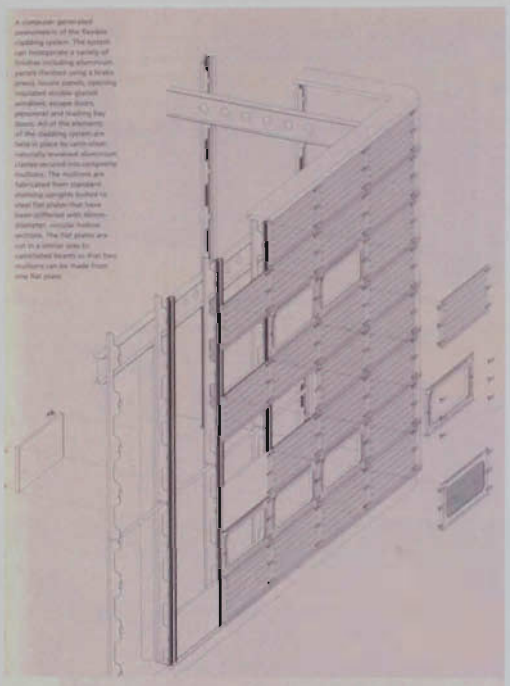
Gunter Blasé required extensive flexibility for a new factory he was building for his growing plastics company. His innovative environment required a space where production could change quite rapidly, and the building had to accommodate these needs. The building had to be extendable to allow for growth, but also internally flexible to the extent that any building function could happen anywhere within.

In response, Nicholas Grimshaw created a unique building that, in essence was static, but could be entirely disassembled and reconfigured at ease. The building construction is founded on several modular principles. On the smallest scale, the buildings skin comes in removable components, a demountable cladding system, where windows and metal skin can be rearranged and removed with the pull of a lever. This allows the skin elements to be relocated in a larger framework of the exterior building wall. The goal of this system is to remove portions of the building without damaging its components to be reused again.

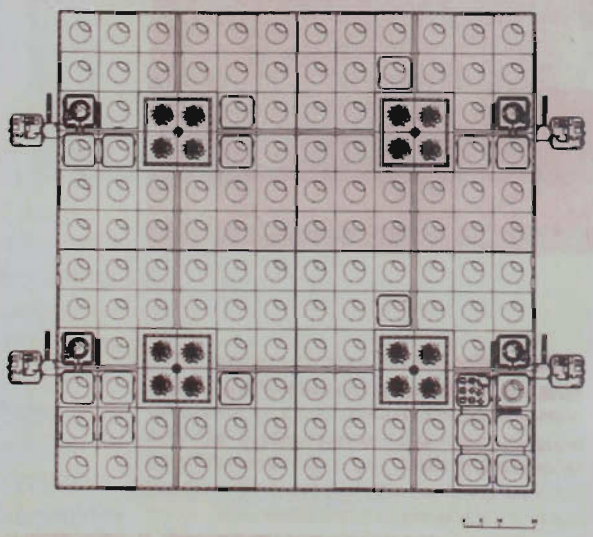


Internal spatial flexibility was conceived as column free space, where several large pylons (structural cores) rose out of the structure. From these the roof was hung on a series of tensile members. The building layout consisted

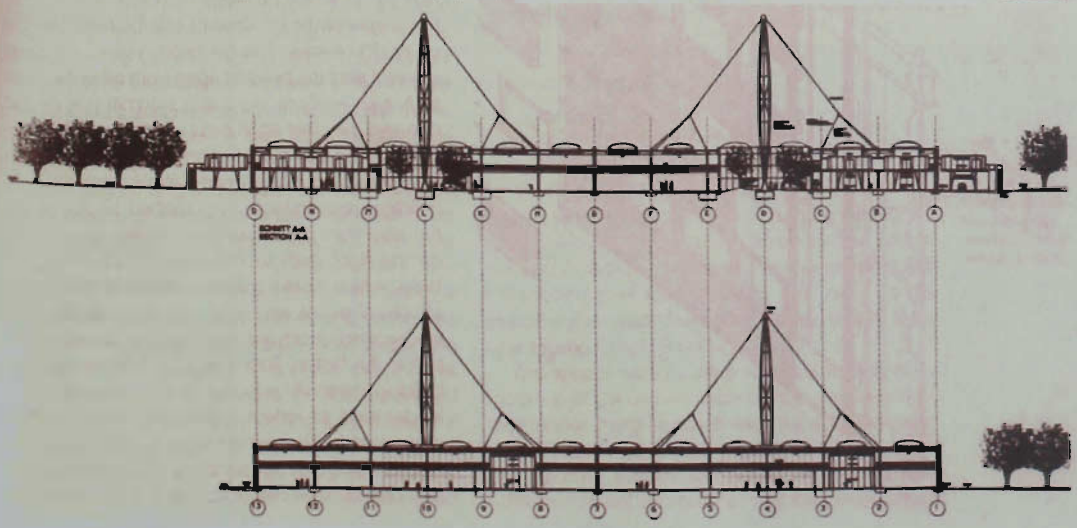


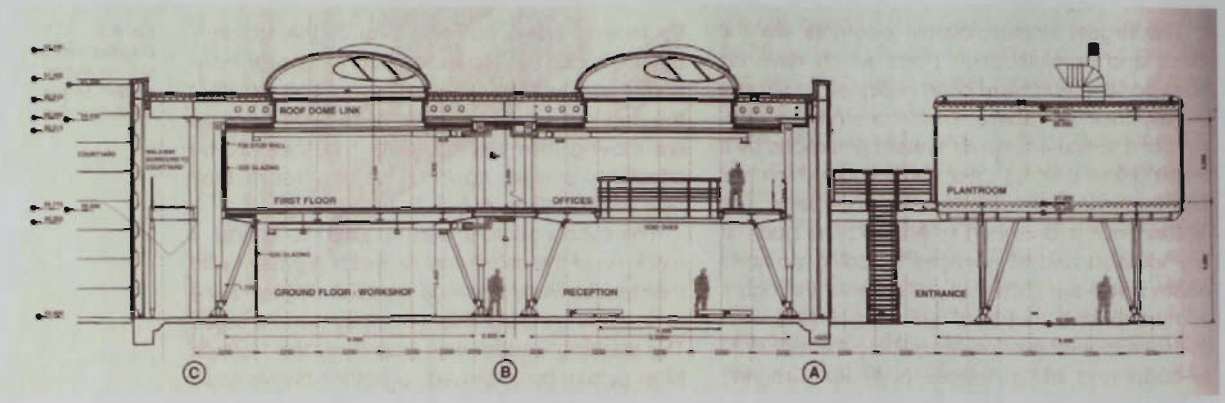


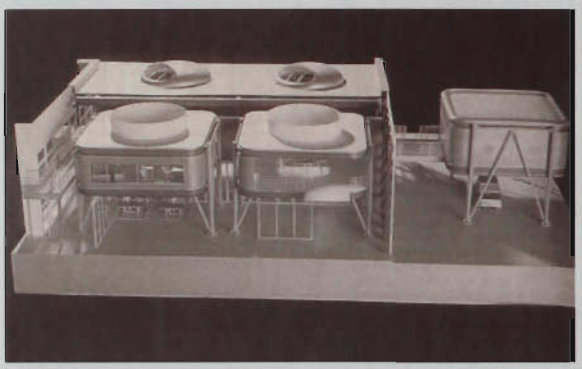
of a series of square modules, each topped with a skylight. These modules could be replicated again and again in any direction as necessary. Doors and loading docks can also be removed and placed elsewhere with the same technology.

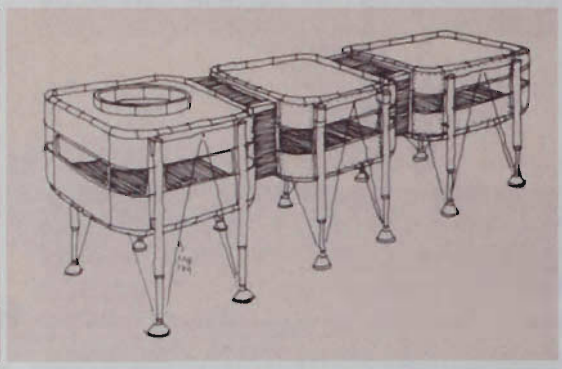


Another method of flexibility included the office pods. These large-scale modules set within the framework of the whole, perched on legs above the factory floor. These are self supporting units, which can be simply lifted and moved around the floor as function required. All services where brought into pod units from the roof, using an pumped waste water system, as well as a pumped fire suppression system, and roof drainage system. Utilizing pumps



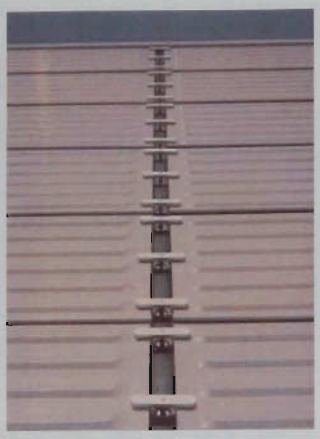


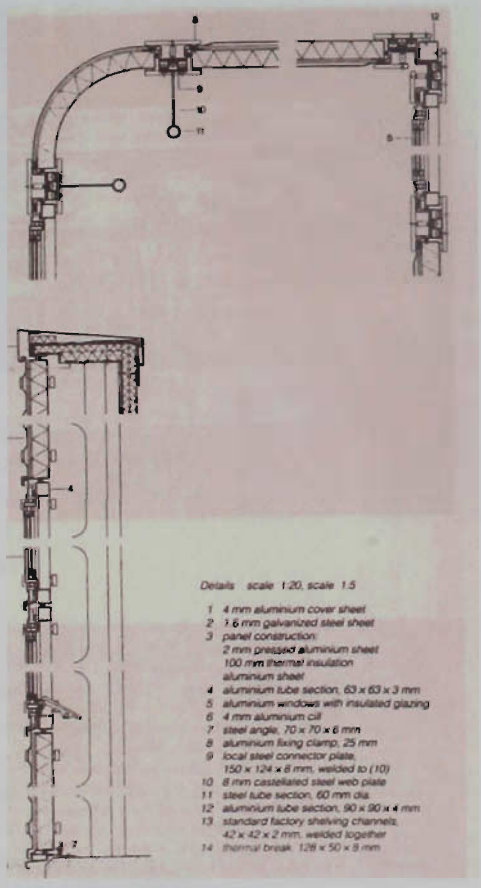




allowed the pipe diameters to be smaller, and therefore lighter in weight. The pods can be dismantled and moved within two weeks time. Each pod has a services box that uses flexible connectors to link to the permanent services of the building. In the event that additional pods would be required, they can be located externally and linked through the building envelope. The pods also contain the bathrooms and other plumbing needs. The floor slab was reinforced throughout so that the pods may be able to rest anywhere within the building.

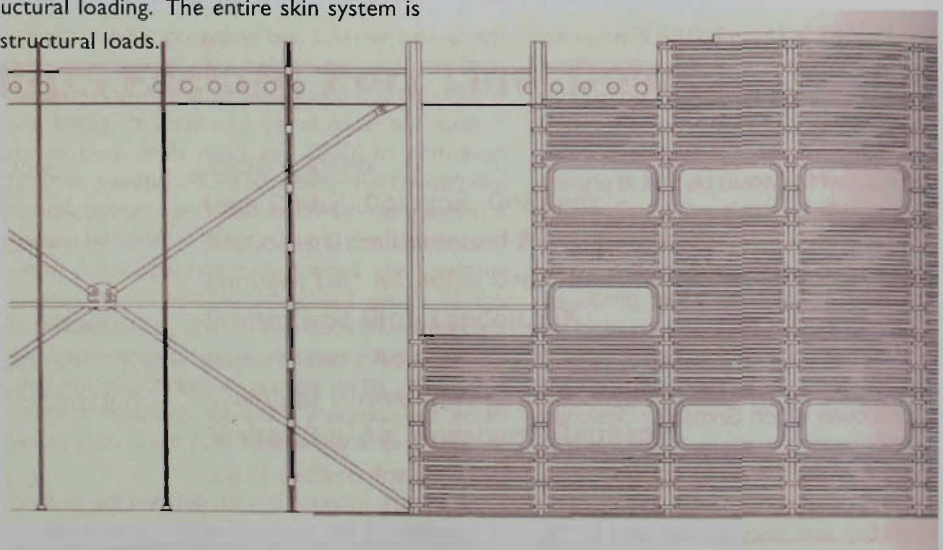
Robert Kronenburg, in his book *Portable Architecture*, defined the structure simply as "the most flexible static building ever built." Although the intricacies of the detail design proved to be complex and time-intensive, the unique flexibility allowed the building users to easily recover costs. Upon completion, factory workers and managers were instructed on how to make these changes to different building components, and the company was able to understand and manage their building's operations.

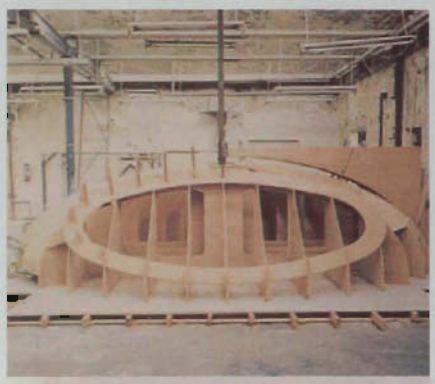


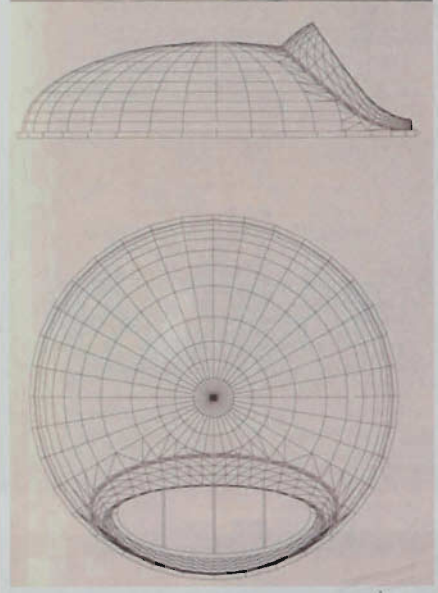


The client of this project has also considered the fact that his facility has such flexibility that it may be able to adapt to entirely new functions, such as a growing sub-division of his own company, or other viable alternatives such as a supermarket or office use. It is believed that this building may undergo significant changes over a matter of hours or days. The genius of this architecture is that it uses relatively generic building parts and existing technologies, but reinvents them for this new use.

Tectonically, this project engages a multitude of scales. Building components such as windows and cladding are arranged as the same unit, so that they may be infinitely arranged according to light, ventilation, and other envelope requirements. The skin is modular, but extremely flexible to the internal requirements of it. The simplicity of removing the panels without damage allows them to be changed out by the factory employee. The panels are engaged externally by a series of anodized aluminum clamps, and internally by a series of similar elements. These cladding elements are attached to a larger frame of vertical unistrut shelving units stiffened by steel plates. These vertical member attach to a series of larger structural beams that contain the structural loading. The entire skin system is independent of the structural loads.







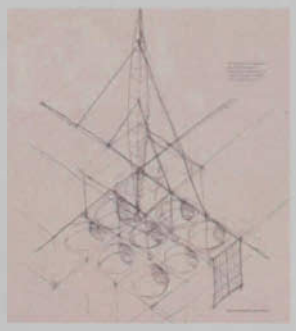
The larger scale of the pod units and building modules provide spatial and functional flexibility. If the building can replicate and grow, and the pods provide the accessory uses unique mobility, then the building is theoretically infinitely flexible.

The skylights are directed north for natural day lighting, and are designed to allow smoke and heat to escape in the event of a fire. This allows the building as a whole retain a single fire rating. These building systems were custom made, with a slight lip at the window surface to ensure that no direct sunlight would enter the space.

In the context of this thesis investigation, the IGUS factory provides valuable insight to flexible architecture. First, it engages in the practice of a modular system with components that are easily changed and standardized within the building. By allowing the building skin a series of different configurations, interior qualities of space are controllable to the needs of varying uses. This becomes important in that the quality of space cannot become generic if the functional shifts are to be believable. The initial work in this thesis also emphasized the need for the building envelope to open for natural ventilation and sunlight. If the envelope can be controlled, then the light and air qualities can be adjusted as required.

The demonstration of pods is also an important portion of this tectonic study. These have engaged a slightly larger scale, but nonetheless illustrate the use of the flexible office pods in a manufacturing environment, both internally and externally. Furthermore, the structural pylons align with the studies for a structural core system that would allow loads to be carried to the ground in a controlled fashion, leaving flexible spaces surrounding them. The use of vertical structural cores for mechanical runs and also vertical circulation seems feasible in this scheme as well.

The project is said to be extendable, in that it may grow quite easily without affecting the building whole. In the case of the site that this thesis engages, this type of flexibility is less feasible. In an urban context, space is constrained by the size of the block, and so flexibility must creatively use the space available. It does necessitate an investigation into the ground surface as a work plane, in the instances when the building is to grow outward. How might the ground be treated around the expected areas of expansion?

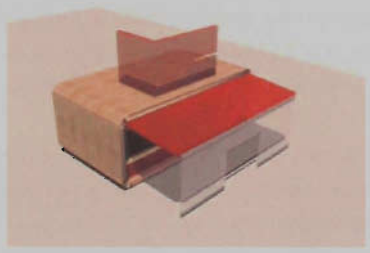


Aesthetically, the buildings tectonic expression contains many associations which would easily define it as a industrial complex. It is important to emphasize the internal functions of the building in the external context, giving people the proper understanding and experience of the site and the building.

The major weakness of this tectonic study is that it contains a strong relationship to the ground plane and only addresses internal flexibility at this point. This thesis will likely investigate further the relationship with the site and ground, as well as the way in which the building may expand and shrink with the varying needs. In addition, the building is said to be capable of a functional transformation, yet the tectonic expression is nearly too industrial. It may be considered a slightly cold environment for human inhabitation. This thesis will most likely investigate a functional shift from a manufacturing use to a residential one.

Most importantly, this project emphasized lightweight, modular systems and vertical structural elements that will surely be investigated in this thesis proposal. The use of internal pods instead of external also relates to initial ideas about the thesis that have not been implemented, but could be investigated again for the manufacturing areas.

SKETCH PROBLEM

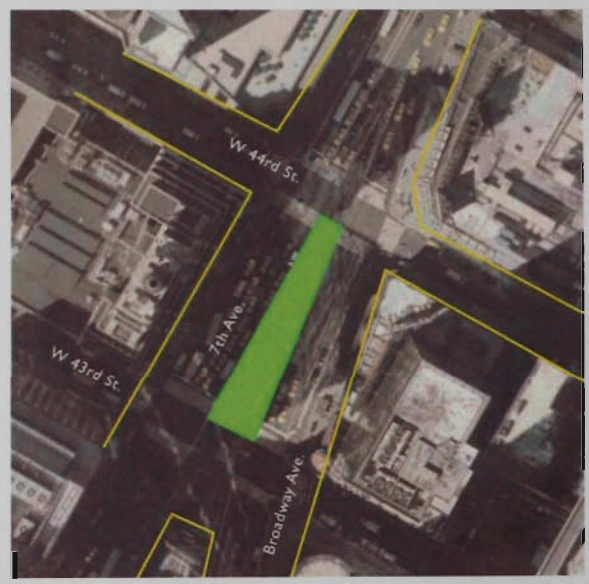


Ticket House

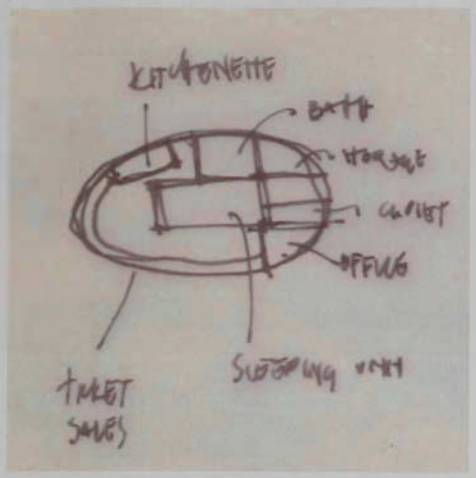
This initial study in adaptation attempts to accommodate the diverse functions of a homeless shelter and the famous Times Square ticket booth commonly known as the TKTS pavilion. The space is to provide for both of these functions in alternating shifts of day and night conditions. A third programmatic element was the inclusion of a rooftop celebratory surface for events such as New Year's Eve.

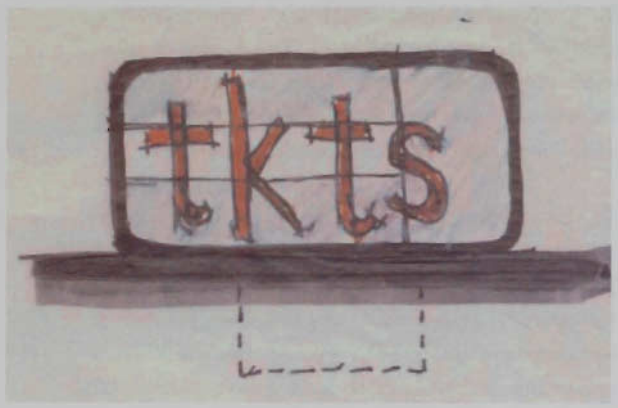
Times Square in New York City is most likely one of the most visually demanding environments one can experience. Signage and graphics compete for attention. In response to this context, I chose to minimize the expression in order to distinguish the form through contrast. I also used a wood veneer at the exterior in order to differentiate the form apart from its urban context.

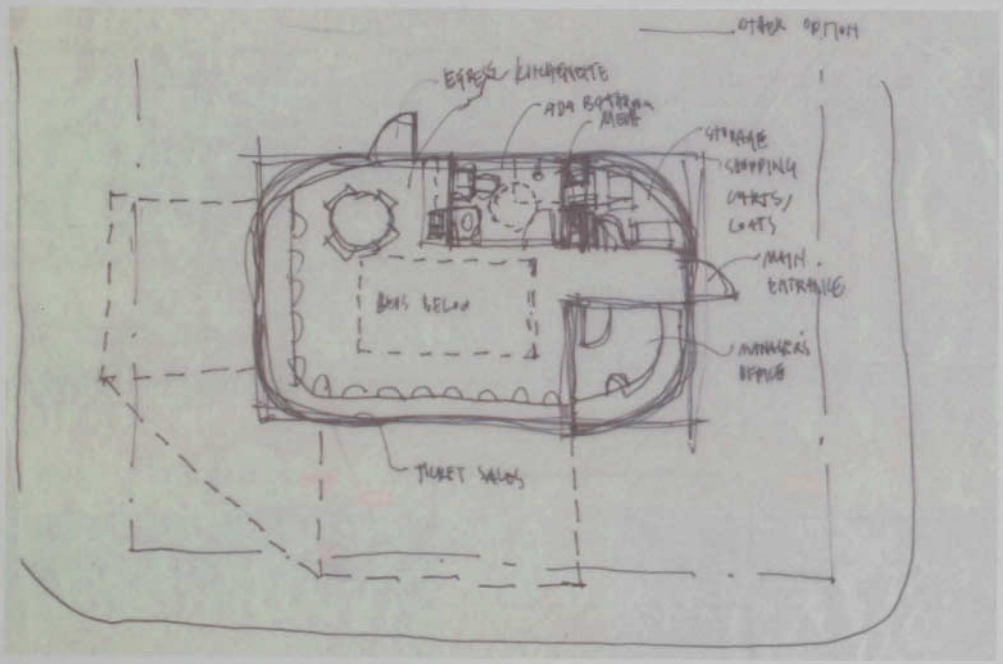
I also imagined that this structure is transient, so its bottom edge is withheld from the ground surface in order to imply this idea.

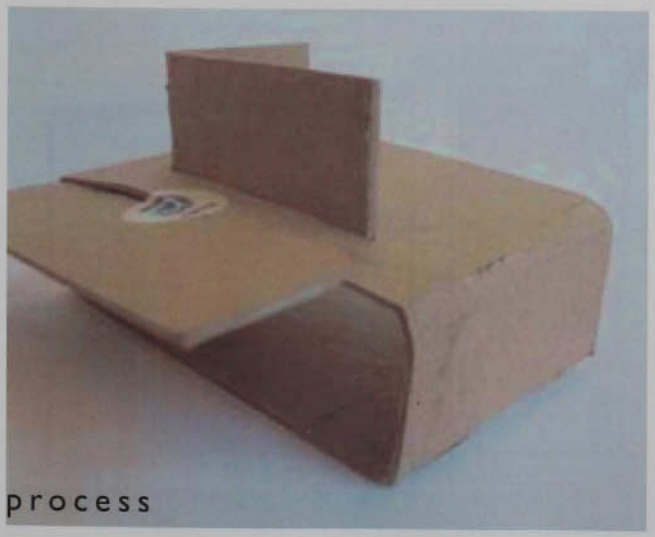


Transformation takes place through a series of kinetic movements, creating perceived open and closed conditions. This avoids confusion as to the current program condition. By day, the sides open, and workers take their place at the counter, selling Broadway tickets at discounted rates. The signage and information board hoists out of the structure. By night, the shelter takes on its other function. The signage wall retracts down, sealing the night functions from the day. Three beds are pulled up out of the floor. The guests can shower, rest, prepare meals, and store their personal belongings in safety.


KITCHENETTE
BATH
TICKET SALES


tkts


OTHER OPTION
STORAGE
SHOPPING CARTS/ CARTS
MAIN ENTRANCE
TICKET SALES

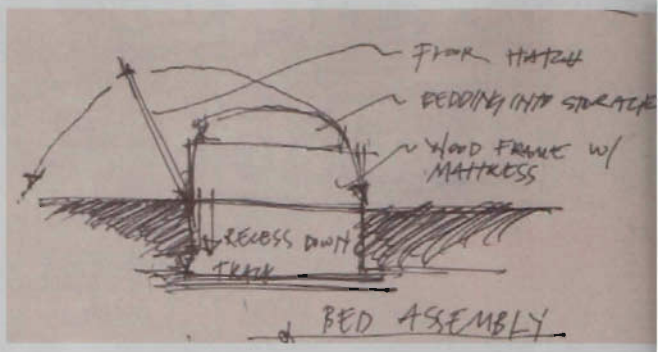


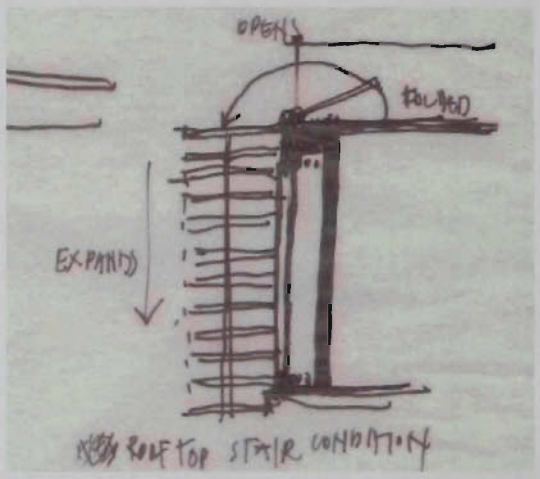
process

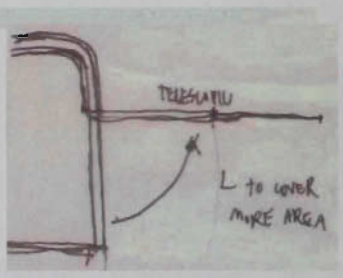
In a series of mechanical transformations, the program changes for the night. This begins to think about the spaces outside of the intended space as storage, including exterior areas. Ideas about folding and sliding begin to define the adaptive process.

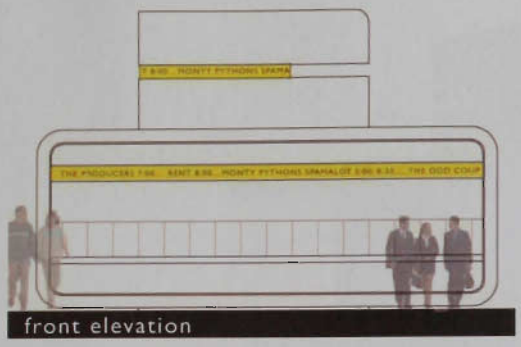
To be critical, the adaptation in this sketch is extremely specific response to program, and illustrates a problem. How does architecture become anticipatory? How would any unknown number of functions use this space? Would these mechanics create any desired function for the new inhabitants? Also, these design solutions do not engage the wall system, but rather the roof and floor conditions, which are typically unavailable in a stacked program.

adaptation







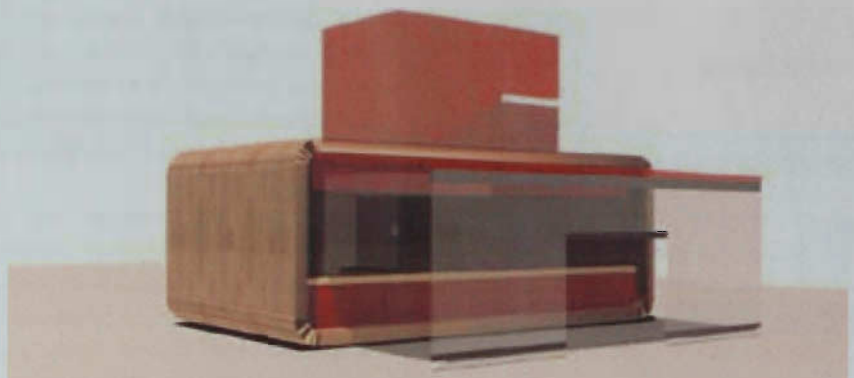


front elevation

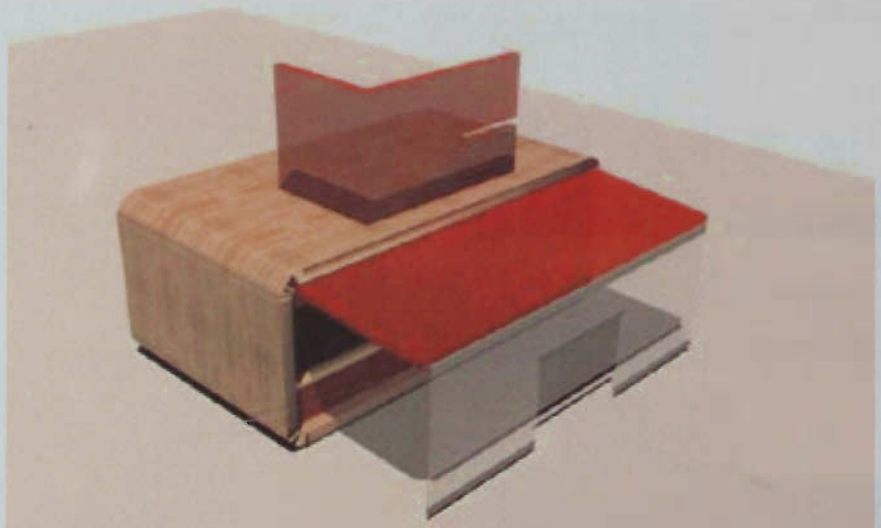
rear elevation

ticket booth

homeless shelter



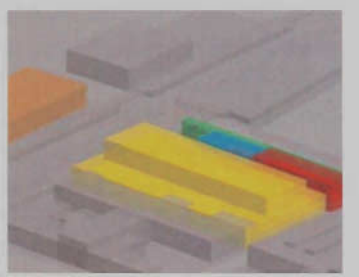
ticket sales elevation



open day condition

closing for the night

PROGRAM: ACTIONS, SPACE



PROGRAM STATEMENT

Project Identification

The program is loosely defined as a manufacturing facility. The functions of design, marketing, corporate office, manufacture, and retail sales will be included. One possible product of manufacture is the production of furniture, in which a high quality, well-designed product is made available to the market. The spaces of making and designing are inherently connected, and selling and marketing are equally related. Making should consider both the stylistic and materialistic permanence of the objects that are produced. The manufacturing function is considered to require the most flexibility for growth and adaptation. The office program would involve a majority of the other functions, while the retail showroom would be another separate entity. The program creates an interdisciplinary collaboration, where the complete environment is inclusive and dependent upon the whole.

Articulation of Intent

This project intends to provide a facility that can be easily adapted or transformed to meet changing needs. Also, to illustrate the objective of flexibility of the program, the building may be designed in anticipation of future uses. The architecture should allow for adaptation without making generic and unsuccessful spaces. Can architecture become self-programmable, or does it require human interaction? Is it possible that buildings could react to the environment or to user needs? Additionally, portions of the program may be mobile or portable at times with the overall goal being an architecture of flexibility. It is also a goal to create a collaborative and innovative environment for making and designing that is integrated with the latest technology. Ideally the program will suppress hierarchy and departmental or "class" divisions. Architecturally, the thought is to increase the actual building life by making portions impermanent. Conceptually, the facility will grow with the neighborhood, and become a part of a live/work district. Historically, strong communities have survived as homes surrounding a place of work. This facility would encourage its employees to inhabit the immediate context, conserving energy in transportation, and strengthening the community.

Enumeration of Actions

making – the creation of prototypes and one-off pieces, research of materials, experimentation, integrated to designing, flexible, most expandable, largest spaces, most daylight, intensive energy, and complex functions. Noisy and chaotic during operating hours, quiet at night, smells of materials. Dirty at times, making can be digital making as well as through the use of computers. Involvement of the hand, careful attention, supervision, craft, durability and quality of product. Durable materials, intricate technical/environmental services. Architectural expression is limited somewhat. Also a space of increased physical labor, ventilation and temperature become important in order to provide a cooler, well- ventilated space. Shop like, somewhat intimate in volume. Connected to researching and designing spaces directly. One of the most important verbs of the program. Durability of materials and immediate adjacencies to connected functions are the most important aspects of this space. Making spaces must be connected to design and manufacturing spaces.

manufacturing – implies mass production for profit, or mass making, process driven, economy, design of movement. Building skin generally has the most design opportunity. Large amounts of daylight, noise control. Making and manufacturing essentially become the same part of the program, with the exception that manufacturing does not involve the hand or careful crafting. The program should allow for massive movement of material going both in and out of the facility. Organization is typically linear in arrangement, strong relation to the input and output of materials and their location. Spaces

are larger in volume, double to triple heights. This space is easily expanded, and is the most flexible, for the reason that manufacturing technology changes frequently, as does production lines. The most important aspect of this function is flexibility of space and durability of materials. In the event that the program changes, this space is most easily converted into other spaces such as lofts or a gymnasium. This space has direct relationships to the design and making studio, as well as the storage and transportation spaces. Daylight from above.

testing – loud, quality of product, also- inventive, to apply or test ideas analyzing and documenting results from study. Shop-like. Well vented, may not require daylight. Connected to researching space with similar if not same architectural requirements. May involve repetitive and loud actions, so it should be sealed from other program elements acoustically and spatially. Flexible space to allow for a multitude of testing conditions, accessible space with large doors or moving walls.

shipping/ packaging – environmentally friendly, the products safety in transit, also the experience of opening, the surface first encountered by the buyer. Many people see the package as its box rather than its content. Larger area for staging and storing, large access to exterior - truck bays for loading and shipping. May contain some small offices for logistics. High energy demand to maintain comfort due to it being open to elements on occasion. Ceiling heights comparable to manufacturing –30' plus. Daylight from above.

storing – The storage of both raw materials and finished products. Space connected to exterior spaces of delivery and transportation. Adjacent to packaging, shipping, and manufacturing spaces. This space is non-descript, with few needs other than a durable floor surface, and ability to move large quantities of material. Volume requirements of at least 30' in ceiling height. Daylight from above.

designing/ creating – collaborative, innovative, connected to making in order to test ideas, thoughtful, occasionally introverted and individualized. Place of dialogue, research, intuitive decisions to guide making, seated task, usually furniture based, vibrant and well lit spaces, collaborative in organization –the design 'studio'. Computer involvement. No hierarchy of spaces. Seated at a desk typically. Architecturally less constrained both formally and in material expression. Spaces should have expansive views to exterior space. This space may also be viewed by the public, or those purchasing furniture. One of the most important spaces of the program. This action is in direct relationship to making, where design ideas are tested. This space becomes the hub for the program, an anchor space which is tied to all other aspects of program. It should be an expressive space, or one that can be modified by its designers. It is tied to the space of making, where ideas are tested and produced out of materials. Volume requirements of 14 to 16 feet tall studio space. Furniture should be adaptable to different desk functions, and space should be immediately adaptable to facilitate collaboration or meetings. In the future, this space may be required to convert to another office function.

selling/ buying – the act of consuming and producing, mass customization? – and connection to making, that buying can become a participatory act. observation, expectation, evaluation, contemplating, presentation of goods for their sale. Space is closest in proximity to the street, easily accessible, well-lit and designed, music floats, lower and intimate space – well dressed. Windows to face street with displays – view into the space from outside. Also, this space has the shortest life, where the skin must adapt quickly to either changing trends or design – spatial conditions do not need to change. Selling is reactive instead of proactive (needful consumption instead of mass consumption). Highly articulated space with excellent material use. Buying may also be connected to making. In the event that mass customization of products is used, one could tailor furniture to their own tastes or needs, and then actually watch the piece being made. Alternatively, the space may be required to become another retail tenant in the future.

working – a generic term applied to all jobs. implies a portion of life, connected to community - lives, space is personalized, private at times, includes eating lunch, general action, tasks create specificity of space. Spaces requiring physical labor should adjust in environmental comfort accordingly. The idea that this is a better work environment model is most important to this action.

collaborating – interconnectedness of actions, using specific talents and knowledge toward a common goal, larger space, discussion, large conference spaces for meetings both large and small, spatial connections to all portions of the program. Could also be digital connectivity. Large and flexible room that could possibly engage more than one function. No need for exterior views, volume requirements of 12' to 14' ceiling heights. Another way to think about it is a non-specific space of circulation among the separate program requirements that becomes a buffer condition. Spatially dynamic or interesting to draw people away from their divided spaces on occasion. Spontaneity space. Healthy space.

marketing – graphic, digital environment, analyzing market desires or trends, and using them for sales. An office task requiring research. Informs the direction of the business. This space is typically office oriented. Marketing might visually observe people shopping the retail front. Office function that should have exterior views and a good proximity to the other associated office spaces. Could involve public interaction – accessibility to public, on first floor, adjacent to retail showroom. Volume requirements of 8 to 10'.

planning – business planning, forward thinking, office task, perhaps done by a senior member of the staff, broad reaching conclusions. Probably the most senior position. All spaces should be open and non-hierarchal however. This space requires at least 10' ceiling heights, views to the outside. Might need adjacent space for private conversation, or the ability to seal this space off from others for confidentiality or privacy. Space should be private at times, and at others open to the office. Planning can also be done at any level, each person can make a decision that effects the future. In some terms, general activity that takes place anywhere.

researching – scientific, technological, interdisciplinary, associated with making and designing, multifunctional space with tests, failed experiments. The space is like a shop of making, but smaller in scale. Researching is connected to the making and designing programs. It may include an ergonomics lab, and some type of digital computer lab, but perhaps would share the making space, or have direct adjacency. The objective being a maximum disclosure and collaboration on information and events. The large lab should be 14' to 16' ceiling height, view to exterior is not necessary. Computer labs would be even smaller. May also be connected to the public front so that products may be tested in a lab environment by a sample user. Dynamic and changing space, accessibility in and out of space with large items would be necessary.

managing – overseeing the operations of the buildings by direct observation, meetings, analyzing various reports, budgeting, etc. direct involvement with aspects of business. Can be a private space at times, should adapt to the privacy requirements of the user. Managing and interacting can extend to all parts of the program. Most likely the same space as planning. Office environment, non-hierarchal, open system. Proximity to other office functions with exception of production managers which are on the manufacturing floor.

adapting/ growing – adaptable, flexible space for future needs, employing additional staff, creating more products, maturing in knowledge and design, changing the use of spaces to address specific needs. Moving out facilities to allow others to grow. Every business venture must have the ability for these innovations in order to remain competitive or organized properly.
employing –creating jobs for people, the opportunity to train and earn a living. Hiring process of

interviews, waiting rooms. Documenting time, paying etc. somewhat non-spatial.
connecting/engaging – ties to community, training, employing, growing with community, dialogue/ conversation, physical presence in a community as part of the built environment. Treatment of context, analysis of community, projections for community growth, anticipating adaptation within the building and the context.

recycling – might be a community recycling center, minimize waste of production of the manufacturing process, reusing said waste. Consideration for our environment, thoughtful design to minimize waste and energy. Proximity to transportation, that the materials can be transported to the their next use. Connects to the greater community and globe as a whole by committing to saving our environment. Is deeply rooted in manufacturing process. Can have a drop off location for the community to recycle goods near road traffic.

walking – the passerby shops a window; the jogger finds rhythm in the façade. Inside an employee moves from one function to another, or within a function. Circulation is celebrated in space, instead of being relegated to the least desirable spaces. In addition, circulation is the connectivity of space, and these spaces are about maximum accessibility between parts. Can the façade respond to the passerby and create an interaction there. Does the façade respond to environmental opportunities? People will also use the internal green spaces for exercise.

exercising – health of employees. Space for physical engagement such as cardio or weight lifting. Related locker facilities – shower, dressing. Single height volume, view to the outside, good ventilation. 10' max ceiling height, private function.

shopping – action of looking at or purchasing goods. Shopping space and selling space are nearly identical. Shopping space extends into the street, or possibly into the greater global community through the internet, in addition to every representation of the product worldwide. Shopping has become a passive, sub-conscious action. Evaluation of product in space. Shopping space should be most visible portion of the architecture at street level. Large windows for displays. Transparency of the building envelope.

supporting – day care, exercise, closets, cleaning, break room, lunchroom, kitchen, rest rooms, and related spaces for the carrying out of everyday tasks and amenities of the program. Some of these functions may be engaged by the public, especially the lunchroom/ café. Lunchroom and kitchen functions should be accessible from outside. Clean spaces, single volume, still connected to other functions. Day care function should be near the entrance or another entrance for utility. Day care is fun, full of expression and color, with exterior play space. Break room, kitchen and dining functions should be easily accessible by all employees.

relaxing – This action takes place outside of the building in the green spaces, where workers may get some air and rest from their tasks. This is a year round activity, as the green space will function in all seasons.

Site Criteria

This program would benefit from a strong and accessible retail front. The retail should be accessible for the simple reason that the goods produced here are for both local and national consumption. Most furniture producers have showrooms to display their products, which can be visited by people traveling great distances. The showroom must occupy some accessible space, both visually, and geographically.
The site should not be constrained if the structure is to adapt, and using some portions of an existing building could be an option. Spatially, this facility would likely begin quite small, but grow

quickly as the market expands. The program and site must both be accommodating to transition and adaptation. In addition, the site could benefit from adjacency to railroads or highway transportation for the ease of movement of materials and products. The site might also have some adaptation of place and context, in order to ground this theoretical work.

Metro Detroit is an excellent opportunity for this program. Detroit was the center for innovation in manufacturing processes and the development of technology, such as the assembly line, in the past and this would bring a new investment in technology and renewed excitement for manufacturing in Detroit. Detroit also is a city of change. It is a city of shrinking population and density, with an uncertain future. Detroit could bounce back economically or deteriorate even more. For this reason, it has great possibility for adaptation. No one can predict the state of this community in 20 years, or the state of the economy. Adaptation is certain in the Detroit landscape. Architecture should respond to this circumstance not by creating a temporary built environment, but one that could provide more confidence and connection to context - an adaptable architecture.

Adaptation Conditions

Immediate – user driven for flexibility of space with the original intent of design.

User's future – accommodating the needs of the user in the future, changing programmatic requirements. Ex. – design facilities are moved as corporate structure grows. Manufacturing is moved entirely off site, and the corporate entity grows. Company shrinks, leases out retail and portions of manufacturing. Company grows on site, building density and manufacturing space.

Alternate User – original user is gone and the architecture is to conform to another user's specific needs. Ex- manufacturing turns into lofts, and the offices are used by another tenant, the retail becomes a yoga studio. A school purchases the building, converting manufacturing spaces into classrooms and activity spaces, offices into administration.

Mix – some alternative in between the future condition and the alternate user. Programmatic mix where portions remain, but others are adapted to a new use.

PROGRAM QUANTITATIVE SUMMARY

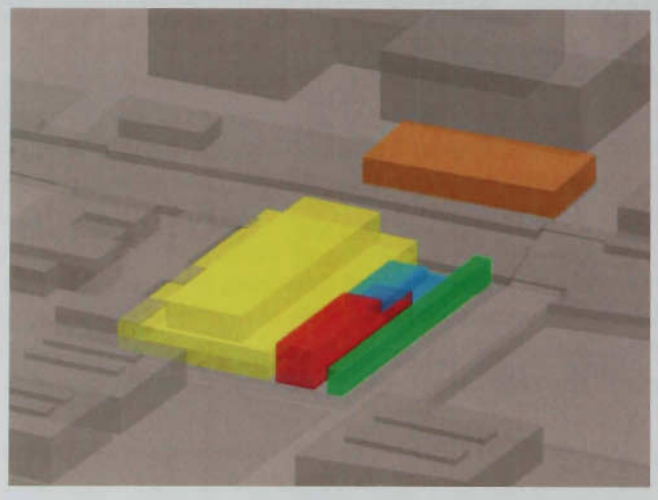
	Program Space	Qty.	Square Footage		Subtotals	Total
A	Manufacturing					
A.1	Raw Material Storage			10,000		
A.1.2	Finished Product Storage			10,000		
A.2	Loading Dock			4,500		
A.3	Manufacturing	2 - 38,500		75,000		
A.4	Packaging			6,000		
A.5	Transportation- Ext. space, railyard			12,000		
A.6	Restrooms	2 - 800		1,600		
A.7	Mechanical/ Control Room			800		
A.8	Circulation			Inclusive	Subtotals	
					107,900	
	Manufacturing Parking Required	1/1000	108 spaces			
B	Accesory Functions					
B.1	Kitchen			1,000		
B.3	Breakroom/ Cafeteria			2,000		
B.4	Exercise			1,000		
B.5	Central Mechanical			5,200		
B.6	Circulation		1.2	2,080	Subtotals	
					11280	
	Accessory Parking Required	3/1000 sf	34 spaces			
C	Office/ Making					
C.1	Office Space	50 persons		5,000		
C.2	Management Suite	3 persons		1,000		
C.3	Design Lab/ making space	1 studio		3,000		
C.4	Design Office	40 persons		4,000		
C.5	Research Lab			4,000		
C.6	Conference Large			800		
C.7	Conference Small	2 - 200		400		
C.8	Restrooms	2 - 600		1,200		
C.9	Reception			400		
C.10	Office Storage/ Technology			2000		
C.11	Mechanical			200		
C.13	Circulation		1.2	4400	Subtotals	
					26400	
	Office Parking Required	3/1000 sf	80 spaces			
D	Retail					
D.1	Retail Showroom			8,000		
D.2	Storage/ Receiving			1,800		
D.3	Utility Room			400		
D.4	Restrooms	2 - 300		600		
D.5	Mechanical			150		
D.6	Circulation		1.2	2190	Subtotals	
					13140	
	Retail Parking Required	5/1000 sf	66 spaces			

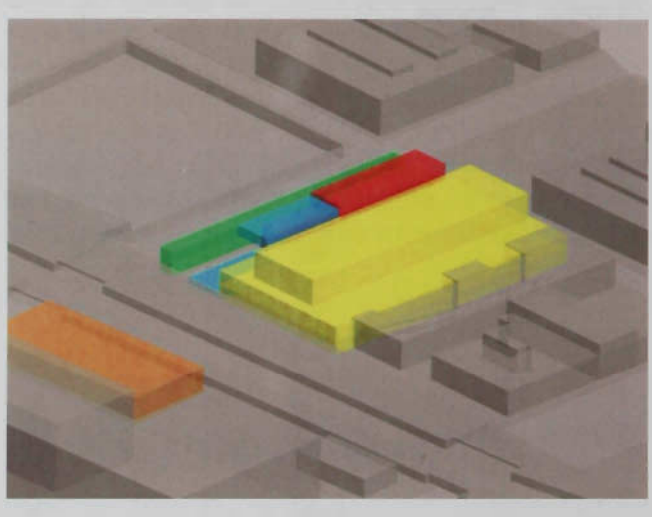
Parking
38,200 sq. ft. green space
Parking total - 288 spaces
288 spaces x 250 square feet per space = 72,000 square feet for parking needs.

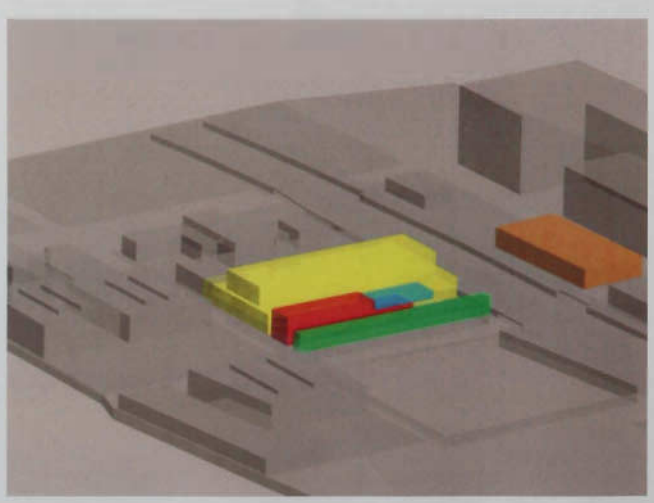
E						
E.1	Exterior green space			20% of site		
	Site Areas - in sq. ft.			Green Space		
	Site A	57000	x 1.2		11400	
	Site B	134000	x 1.2		26800	
	Site A+B	191000	x1.2		38200	Total area of desired green space

Total Square Footage for Building
158,720

Program Massing Sketch







retail

offices

manufacturing

accessory

shipping/ storage

A.1 Raw Material Storage

A. Quantities

33 person maximum occupancy.
1 unit
10,000 square feet
1 * 10,000 sq. ft. = 10,000 square feet.

B. Purposes/ Functions

The purpose of the storage room is to contain the variety of finished products, raw materials, and other miscellaneous contents. It is to serve the production and manufacturing functions with the necessary raw materials, and collect or recover the wastes of production processes. This space could also reconstitute these wastes for use in the manufacturing. In addition, this space could be used to transform waste from society into materials for furniture production. This is a private servant space that serves as the collection and distribution space for materials. It is integral to the idea of waste in the manufacturing process. In addition, certain materials must have very specific temperature and humidity requirements, which will include a separate climate controlled space.

C. Activities

The activities of this space are relatively simple. Unloading of raw material from a variety of transportation types, including train and truck. Organizing and storing these materials, as well as several processes for reconstituting materials for new use.

D. Spatial Relationships

This space has a minimum thirty-foot ceiling height, with stackable storage units. The larger open space is located near the material entrance, and several access points allow materials to travel from this space easily.

E. Special Considerations

Physical access to both the exterior transportation spaces, the railway, and the manufacturing spaces are critical.

F. Equipment/ Furnishings

This space would include several large overhead garage doors with access to the exterior transportation spaces. Day lighting from above would also be a consideration. The internal space can be unfinished, and the floor should be ground level. Forklifts and other machinery for lifting will occupy this space as well.

G. Behavioral Considerations

H. Structural Systems

The preferable structural system would allow for large clear spans and extremely flexible internal spaces. Mechanical systems would most likely be located on the roof, and there are no specific electrical requirements. Temperature control should be maintained at the same level as the manufacturing spaces, to ensure that the material remains physically stable throughout the process.

I. Electrical Systems

Lighting should be general, energy efficient, supplemented by skylights if possible.

J. Site/ Exterior Environment Considerations

This space should be located near the rear of the site, at grade.

A.1.2 Finished Product Storage

A. Quantities

33 person maximum occupancy.
1 unit
10,000 square feet
1 * 10,000 sq. ft. = 10,000 square feet.

B. Purposes/ Functions

The purpose of the storage room is to contain the variety of finished products, unfinished, and other miscellaneous contents. This room ideally would store the product after the manufacturing process as small inventory room. This inventory would then be sent as needed to the packaging phase. This room would also serve as a general storage space that would be accessible by the manufacturing and design spaces. This space is private, servant, based on serving a collective of users.

C. Activities

The activity in this space is limited to organizing and storing miscellaneous items and finished products when they are completed.

D. Spatial Relationships

This space has a minimum thirty-foot ceiling height, with stackable storage units. The larger open space is located near the receiving of finished products, and several other small access points for general use.

E. Special Considerations

This space would have immediate adjacencies to the packaging spaces, as well as the terminating point of the finished products. The secondary adjacencies would include the manufacturing and design spaces. Temperature extremes are slightly more allowable, but could result in damaging the product.

F. Equipment/ Furnishings

This space would most likely have at least one access point for delivery from exterior space. Day lighting from above would also be a consideration. The internal space can be unfinished, and the floor should be ground level. Views should be as unobstructed as possible internally to avoid accidents involving persons.

G. Behavioral Considerations

H. Structural Systems

The preferable structural system would allow for large clear spans and extremely flexible internal spaces. Mechanical systems would most likely be located on the roof, and there are no specific electrical requirements.

I. Electrical Systems

Lighting should be general, energy efficient, supplemented by skylights if possible.

J. Site/ Exterior Environment Considerations

This space most likely has little or no views to the exterior environment, but does have the ability to serve as a passive energy space. This space should be located at the rear of the site.

A.2 Loading Dock

A. Quantities

9 person maximum capacity.
1 unit
4,500 square feet
1 * 4,500 sq. ft. = 4,500 square feet.

B. Purposes/ Functions

This space serves to distribute and receive goods and materials. This space is responsible for managing reception of all materials and supplies, and coordinating the inventory. The space is a servant space because it acts as an important part of the main manufacturing space. It can be considered collective, and would be considered private with the exception of the transportation drivers.

C. Activities

The activities in the space involve the process of receiving goods from transportation, and documenting, moving, and storing these items. This space also must serve as the shipping and distribution of the finished product for the entire facility. Packaged product would be shipped via truck. The workers would operate forklifts and other lifting devices.

D. Spatial Relationships

This space has a minimum thirty-foot ceiling height, with stackable storage units. The larger open space is located at the actual docks, the door wall. A number of overhead doors would open to the exterior truck docking stations.

E. Special Considerations

This space would have immediate adjacencies to the packaging spaces, as well as the exterior transportation space. It will also have a strong relationship to both of the main storage spaces. This space may also require a minimal ability to store incoming and outgoing shipments for short time periods. The dock should also have secondary relationships with the kitchen and the design lab.

F. Equipment/ Furnishings

Day lighting from above would also be a consideration. The internal space can be unfinished, and the floor shall be at ground level. Views should be as unobstructed as possible internally to avoid accidents involving persons. Temperature levels can swing rapidly internally because of the permeability of the door wall. There are also a few offices for the dock managers, each with a desk and storage.

G. Behavioral Considerations

H. Structural Systems

The preferable structural system would allow for large clear spans and extremely flexible internal spaces. Mechanical systems would most likely be located on the roof, and there are no specific electrical requirements. Lighting should be hung at ceiling level.

I. Electrical Systems

Lighting should be general, energy efficient, supplemented by skylights if possible.

J. Site/ Exterior Environment Considerations

This space most likely has little or no views to the exterior environment, but does have the ability to serve as a passive energy space. It should be located at the rear of the site if possible, and at grade.

A.3 Manufacturing

A. Quantities

75 person maximum capacity.
2 workshops
38,500 square feet
2 * 38,500 sq. ft. = 75,000 square feet.

B. Purposes/ Functions

This space is the main manufacturing space and will encompass the various processes necessary in creating the product. Material forming, fabricating, assembly, and finishing will all take place in this space. The emphasis is internal flexibility, coordination of process with supply, and ability to accommodate both growth and loss of production quantities. This space is served by a variety of other functions such as storage spaces. It is collectively inhabited, and slightly public at times, especially when being viewed by the retail space. If this space is to be stacked, there are significant issues in process engineering, and services. It is also the area where wastes can be collected and recycled and used for new materials. It is also the place where materials are consumed at a mass quantity to make furniture.

C. Activities

There are a multitude of actions in this space. Observation from the line managers will take place, as well as a variety of labor by the factory workers. Also, this space will need to be cleaned often. There is also the recovery of wastes from the process which will be used again in the future.

D. Spatial Relationships

The rooms plan proportion should be linear in emphasis to accommodate manufacturing process.

E. Special Considerations

This space has immediate adjacencies to the employee service spaces such as the cafeteria and restrooms. It is also imperative that it be adjacent to the storage and supply rooms, the design labs and offices, as well as the packaging and loading dock areas. Extensive day lighting would be preferable.

F. Equipment/ Furnishings

A vast amount of equipment that is necessary for furniture production will be present on the floor. This will have varying needs, but generally, it assumes a stretched, linear progression. Material supply, and waste collection are also layout issues.

G. Behavioral Considerations

H. Structural Systems

The preferable structural system would allow for large clear spans and extremely flexible internal spaces. Mechanical systems will be extensive in certain areas for proper ventilation. Some of this will have to be cleaned or filtered before released in to the air. The structural system should be adaptable and flexible if possible.

I. Electrical Systems

Electrical systems will be designed extensively to meet the needs of the line. There may be some limited plumbing. Air handling and ventilation need to be able to grow and accommodate higher loads.

J. Site/ Exterior Environment Considerations

This space should have immediate views and accessibility to exterior green space. It will likely take up most of the site.

A.4 Packaging

A. Quantities

60 person maximum capacity.
1 unit
6,000 square feet
1 * 6,000 sq. ft. = 6,000 square feet.

B. Purposes/ Functions

This space is responsible for the packaging of any produced objects from the manufacturing process. From this space, the packaged product is ready for shipment. Packaging materials could be inclusive of the product, or used for another designated purpose. Packaging is instantaneous waste. Perhaps this could be thought of in a different way. If any time mobile lifting machines work in the space, worker safety is a priority. The space is served by the material storage, but also serves as the finishing aspect of the manufacturing process. It would be worked by a collective. It is also most likely a private space for the employees.

C. Activities

This activity would include applying packing material, any wrapping and boxing of the items required. Forklifts and other lifting devices would be necessary.

D. Spatial Relationships

This space may also have a linear arrangement, as packaging is also a process. Again, this space should have a relatively open plan with plenty of light.

E. Special Considerations

This space has immediate adjacencies to the manufacturing line, the material storage, the finished product storage and the shipping dock. It is the integral connector for all of these spaces.

F. Equipment/ Furnishings

A limited amount of equipment occupies this space. The packaging line will be fed with packaging materials as the product enters from the finishing portion of the assembly line. Packaged product will then be taken from this space to either storage or immediately to the shipping docks. Interior finishes are minimal, with extremely durable flooring a necessity.

G. Behavioral Considerations

H. Structural Systems

The preferable structural system would allow for large clear spans and extremely flexible internal spaces. Mechanical systems will be extensive in certain areas for proper ventilation. The structural system should be adaptable and flexible if possible. No plumbing is required in this space. Air handling must be able to accommodate growth.

I. Electrical Systems

This space has standard lighting requirements.

J. Site/ Exterior Environment Considerations

This space should have some views and accessibility to exterior green space. This space should be located on the site and the rear portion. Natural lighting would be beneficial.

A.5 Transportation

A. Quantities

Exterior space, no occupancy loads.
1
6,000 square feet
1 * 12,000 sq. ft. = 12,000 square feet.

B. Purposes/ Functions

This is an exterior space devoted to exterior storage, and transportation of both truck and trains. This space would ideally have immediate access to both the road and the railway.

C. Activities

Truck driving, exterior loading, boxcar loading and unloading would be the primary activities.

D. Spatial Relationships

This space will be located on the opposite of the street, as close to the loading dock and railway was possible.

E. Special Considerations

This exterior space must have immediate adjacency to the shipping dock. Railways are more efficient way to move goods, and therefore are less harmful to the environment. They are the more desirable way to transport these goods, however, they have to move in mass quantities.

F. Equipment/ Furnishings

Major equipment would include trucks and trailers, exterior storage containers if necessary, and stockcars. There may need to be some railway provided, as well as a lift to hoist boxcars to the elevated railway plane.

G. Behavioral Consideration

H. Structural Systems

I. Electrical System

Exterior Site Lighting is all that would be required.

J. Site Considerations

This space would most likely have a rather large paved surface which will have significant runoff. Recycle storm water onsite, and investigate alternate paving methods to reduce the heat island effect. This should be located at the rear of the site next to the railroad and the road.

A.6 Restrooms

A. Quantities

20 person maximum capacity.
2 units
800 square feet
2 * 800 sq. ft. = 1,600 square feet.

B. Purposes/ Functions

These restrooms will primarily serve the workers of the manufacturing areas. The two restrooms will serve as a men's and a women's. This restroom, because it will be located near the accessory functions, will provide the changing and shower facilities for the exercise space. This space is a servant space, used by a collective, and is private.

C. Activities

Cleaning this space, and the other expected activities of a restroom. Occupants will also use the space to change into exercise clothing and shower. The restrooms will also include a shared custodial closet.

D. Spatial Relationships

This space is typically comprised of the requirements of handicapped stalls, and the associated 5' circle required by the ADA.

E. Special Considerations

This space should have adjacencies to the other accessory functions if possible, and have good proximity to those functions expected to use this facility. It must have immediate access to the exercise room. Interiors should be durable and cleanable surfaces such as tile flooring.

F. Equipment/ Furnishings

Furnishings include the necessary number of toilets, sinks, and stalls per occupants. This space should also have about 10 lockers in each room, along with three shower stalls. The closet will have a mop sink and faucet. Outside this space should include a drinking fountain. These spaces may be considered as a modular system. This space has significant plumbing requirements.

G. Behavioral Consideration

H. Structural Systems

There are no specific structural systems.

I. Electrical System

Proper ventilation and lighting would be required.

J. Site Considerations

This space has no requirement to have exterior views. Any windows will have etched or frosted glass.

A.7 Mechanical/ Control

A. Quantities

8 person maximum occupancy.
1 unit
800 square feet
1 * 800 sq. ft. = 800 square feet.

B. Purposes/ Functions

This room will serve as a central position for controlling the complex mechanical, electrical, signal, and other associated manufacturing systems. General air handling and treatment is done at a variety of locations instead of this centralized position. This space is served, because it is essentially and control room for the entire complex. It is occupied by an individual or small group, and is extremely private.

C. Activities

In this space, workers will monitor the entire process by computer, and essentially control the entire floor.

D. Spatial Relationships

Smaller space with a preferred centralized location with regard to the manufacturing spaces. Ceiling height should not be anymore that ten feet. Lower lighting levels to reduce screen glare.

E. Special Considerations

F. Equipment/ Furnishings

Furnishings would include several desks with large displays of a variety of equipment, and task chairs for each position. Interior finishes will be at a normal level.

G. Behavioral Consideration

H. Structural Systems

There are no specific structural systems.

I. Electrical System

Lighting levels would be low, but the technology infrastructure requirements would be extensive.

J. Site Considerations

This space has no requirement to have exterior views. It might be more practical if it did not, but did have access to another space with environmental connection.

B.1 Kitchen

A. Quantities

5 person maximum occupancy.
1
1000 square feet
1 * 1,000 sq. ft. = 1,000 square feet.

B. Purposes/ Functions

This space will serve as a commercial kitchen for the entire complex. This space will provide food for the cafeteria, as well as receive other food from distributors. This space is a servant space, designed to provide food for the whole building. It is a private space, with only a few workers occupying this space. This space occupies a larger accessory function area devoted to making this place a better place to be.

C. Activities

Workers in this space will prepare food for the cafeteria, and serve lunch to employees. They will clean and cook. They will also receive food and ingredients for preparation.

D. Spatial Relationships

The kitchen should maintain a rectangular shape for appliance to wall efficiency. The ceiling should not exceed fourteen feet. Generally, all appliances will be placed against the wall, while larger work surfaces would be placed in the center of the room. It should also have direct access to deliveries. The space could have access to the shipping dock, so that it may not need its own. It will also obviously have direct adjacency to the cafeteria.

E. Special Considerations

F. Equipment/ Furnishings

Appliances and tables will fill this space. In addition, a walk-in freezer and a cooler should be located in this space. Mechanical equipment should accommodate the higher temperatures associated with cooking.

G. Behavioral Consideration

H. Structural Systems

There are no specific structural systems.

I. Electrical System

This space has larger mechanical and electrical requirements because of the necessary units contained in this space. Higher lighting levels are necessary. Ventilation of the cooking areas will need to be vented to the roof.

J. Site Considerations

This space should have at the least some connection to the exterior environment.

B.3 Breakroom and Cafeteria

A. Quantities

1 unit
2000 square feet
1 * 2,000 sq. ft. = 2,000 square feet.

B. Purposes/ Functions

This space will serve as the gathering place for workers when not engaged by work. It will also be the place where workers eat lunch or grab a snack. Generally it will act as a multipurpose space that will accommodate tables and chairs used by the employees on break. There may also be an exterior space for similar activities. This space will be used by the collective, and is served by a variety of spaces. It is also semi-public.

C. Activities

People in this space will buy food, talk with co-workers, discuss work, and serve food. This space will be one of the primary areas where employees at all levels will have chance meetings. This space fosters collaborative discussion and acts as an open forum for the entire staff.

D. Spatial Relationships

A square like space, with a larger ceiling height, perhaps 20 to 25'.

E. Special Considerations

This space should have immediate adjacencies with the kitchen, restrooms, and accessory mechanical space, as well as the accessory circulation space. The storage space should also be located next to this space, so that tables and chairs may be stored here.

F. Equipment/ Furnishings

Furnishings in this space would include the food serving equipment, registers, tables and chairs for eating, and additional armchairs and coffee tables for relaxation. Every person on a given shift should be able to all eat at the cafeteria at once. Tables should be round, and seat about 6 people. Interior finishes should be normal.

G. Behavioral Consideration

H. Structural Systems

Longer spanning structural members would be more desirable, and give this space more flexibility.

I. Electrical System

This space has larger mechanical and electrical requirements because of the necessary units contained in this space. Higher lighting levels are necessary. Ventilation of the cooking areas will need to be vented to the roof.

J. Site Considerations

This space should have extremely strong connection to the environment, including the ability to go outside quickly. If possible, this space should also have skylights to provide the maximum amount of natural light. It would also include several natural plants to add to the space. This space might be more beneficial at the ground level.

B.4 Exercise

A. Quantities

20 person maximum capacity.
1 unit
1000 square feet
1 * 1,000 sq. ft. = 1,000 square feet.

B. Purposes/ Functions

This space is to be used by the employees to promote a healthy staff. This space will have a variety of exercise equipment, and a smaller space for group activities such as pilates or yoga. It is based upon the fact that healthier employees will be far more productive. This space will also encourage interaction among employees. This space is a collective space, intended for both groups and single persons to have free access to exercise. This private space would have more servant characteristics than others.

C. Activities

Activities would include cardiovascular exercise such as the treadmill, stationary bike. It will also have a small amount of weights for weightlifting. The third group of activities, including yoga, pilates,

D. Spatial Relationships

This smaller space would work better as rectangular in plan, providing slightly more intimacy. Likewise, the ceiling should not be designed above about ten feet.

E. Special Considerations

This space will be grouped along with the other accessory functions, but should share an immediate adjacency to the restrooms where employees could shower and change.

F. Equipment/ Furnishings

Equipment would include several treadmills (4), stair climbers (2) and stationary bikes (2). There would also be several racks of free weights. This would also include a few televisions for joggers to watch. Mirrors on the walls would also be used. Interior finishes can be more exposed in quality.

G. Behavioral Consideration

H. Structural Systems

Because of the small size of this space, structural members should easily clear span. Mechanical requirements will be met by the accessory mechanical space.

I. Electrical System

Ventilation may be considered a higher level and lighting would be typical.

J. Site Considerations

This space has no immediate views to the exterior.

B.5 Mechanical

A. Quantities

6 person maximum capacity.
3 spaces
2000 square feet
1 * 2000 sq. ft. = 2000 square feet.

B. Purposes/ Functions

This space will serve as the electrical and mechanical space for the entire complex. It is a private, servant space.

C. Activities

Activities in this space are limited to installation, repair, and maintenance. It is not an inhabitable space.

D. Spatial Relationships

This space should have a somewhat larger volume to accommodate the many different systems located in this room that will be competing for overhead space.

E. Special Considerations

This space should occupy a centralized position among the assorted functions, but located near the accessory and office functions. There does, however, need to be large access doors for the purpose of changing or moving extremely large pieces of equipment. There may also be a need for secondary and tertiary rooms to handle the different mechanical zones.

F. Equipment/ Furnishings

Equipment in the electrical area would include massive switchgear and switch board due to the demands of the facility. Other mechanical equipment is dependent upon the system selected, but would likely include any number of heat exchangers, condensers, cooling towers, central boiler, geothermal, and any other associated equipment. Water pumps and fire suppression systems would also be located here. Rooftop mechanical systems will supplement this system.

G. Behavioral Consideration

H. Structural Systems

Because of the small size of this space, structural members should easily clear span. Structure has to accommodating to the many demands of the infrastructure in this space.

I. Electrical System

The electrical system would have a transformer pad on the exterior, and large switchgear. The infrastructure of this space would be significant.

J. Site Considerations

This space does not require views to the exterior. I will most likely be located at or below grade.

C.1 Office Space

A. Quantities

50 person maximum capacity.
40 office units
125 square feet
40 * 125 sq. ft. = 5,000 square feet.

B. Purposes/ Functions

These office spaces will serve a variety of office departments. All corporate office functions will take place here with the exception of the design staff, which will be nearby but working more closely with the manufacturing functions. This space is collective, semi-public, and served by several other functions. This space, because of the sheer numbers of working employees, will be the busiest space, the hub of activity. This space is collective, and semi-public.

C. Activities

Individual tasks in this space include using the telephone and working on the computer. Employees will hold meetings and discuss work and other topics. Other, larger collaborative meetings could take place in this space as well.

D. Spatial Relationships

The office should have a collaborative identity, although personal space and privacy should also be created. Those spaces creating more noise should be grouped together or secluded from others to ensure a tolerable environment for all. Space is democratic. In plan, there are no real requirements, but the ceiling height should not exceed 30' to maintain some sense of scale. These spaces could be split into multiple studios or one larger studio.

E. Special Considerations

This space should have strong adjacencies to the spaces serving it, such as the office storage and reception, and also good connection to the various conference spaces and management offices.

F. Equipment/ Furnishings

The furnishing of this space should include a desk for each occupant, with a flexible, semiprivate workspace (cubicle). Each of these spaces should allow for smaller group collaboration at the desk of two or three people. I would also like some larger tables in a central location to allow for larger group collaboration.

G. Behavioral Consideration

H. Structural Systems

If the space were to be contained within one large space, long spanning structural systems would be preferable. This space also desires to be extremely flexible and allow for a variety of configurations. Structural and mechanical system should accommodate as much as possible.

I. Electrical System

Lighting levels should be high, to be supplemented by individual task lighting at each workstation. Individual temperature controls at each workstation also go along way to worker productivity and satisfaction.

J. Site Considerations

This space should have extensive views to the exterior, including large amounts of day lighting. These spaces also should have a direct access to the outside.

C.2 Management Office Space

A. Quantities

3 person maximum occupancy.
3 offices
333 square feet
3 * 333 sq. ft. = 1,000 square feet.

B. Purposes/ Functions

These office spaces will serve as the more secluded management positions. These positions are dependent upon more privacy that the other office tasks. However, they should also be accessible by other employees. This space is served, individual, and private.

C. Activities

Managerial decisions take place in these spaces. The necessity of the privacy in management positions affords them larger offices so that they may do their work, but also hold smaller, casual business meetings as required.

D. Spatial Relationships

These offices should have immediate adjacency to the other larger office areas. They will function more efficiently in a rectangular space, and the ceiling height should be brought down to a level of about ten feet.

E. Special Considerations

This space should have strong adjacencies to the spaces serving it, and also good connection to the various conference spaces. Lighting levels should be high, to be supplemented by individual task lighting at each workstation. Individual temperature controls at each workstation also go along way to worker productivity and satisfaction. This space should be able to be fully enclosed, however, it should remain open to the main workspaces to serve as a democratic workspace.

F. Equipment/ Furnishings

The furnishings in these spaces should include and desk with task chair and storage. Two other armchairs should face the desk. The rooms should also include a smaller conference table with chairs for smaller meetings. Maintain a three-foot clearance in areas of travel. Interior finishes should be of a high quality.

G. Behavioral Consideration

H. Structural Systems

Structural and mechanical systems are typical to the office environment.

I. Electrical System

Lighting levels would be standard.

J. Site Considerations

This space would likely have some view to the exterior, and some day lighting.

C.3 Design Lab/ Making space

A. Quantities

30 person maximum capacity.
1 space
3000 square feet
1 * 3000 sq. ft. = 3,000 square feet.

B. Purposes/ Functions

This space is intended to provide an area where industrial designers and craftsmen can experiment and create prototypes of furniture. It is a place to test ideas, apply creativity, and generate innovation in design and technology. This space will likely be separated to accommodate different needs of making. This is the most exciting area of the facility. Rapid prototyping, CNC, and other technologies can be exploited to fabricate, assemble, and finish models at a variety of scales, and full scale pieces. This would also be the space where one off pieces could be created. This space is served by other storage areas, but also serves the main design space as the arena to physically create ideas. It is a collective space for any designers, craftsmen, plant workers, and others. This space would have portions that would be private in order to maintain confidentiality of ideas and products, while other portions would allow the public to see the process of creation from the retail space.

C. Activities

Any number of activities can go on in this space. Material cutting and forming, finishing, etc. Thinking, creating, innovating etc. Collaborative discussions, and group efforts would be promoted.

D. Spatial Relationships

The space should have immediate views and access to the design office area, the research labs, retail space, and the storage areas. It should also have a strong connection to the manufacturing spaces as well. Designers should be engaged in all processes. This space should have a ceiling height of at least fourteen feet. It should also have a secondary relationship to the shipping dock.

E. Special Considerations

This space should have strong adjacencies to the spaces serving it, and also good connection to the various conference spaces. Lighting levels should be high, to be supplemented by individual task lighting at each workstation. Individual temperature controls at each workstation also go along way to worker productivity and satisfaction. There may also be an opportunity to express the technologies and designs visually on the exterior.

F. Equipment/ Furnishings

Any number of machines and other technology will be located in this space, in addition to a variety of work surfaces. Also include would be several booths for finishing materials, along with the associated ventilation and cleaning system.

G. Behavioral Consideration

H. Structural Systems

Mechanical systems should be efficient at air changes and filtering of particles. The structural system can be exposed. Interior finishes must be extremely durable.

I. Electrical System

Lighting levels would be standard.

J. Site Considerations

This space should have some views to the exterior, including any day lighting possible.

C.4 Design Office

A. Quantities

40 person maximum occupancy.
1 studio
4000 square feet
1 * 4000 sq. ft. = 4,000 square feet.

B. Purposes/ Functions

The design office will house all creative tasks related to the production of furniture. It is here that pieces will be created in the computer or by model or drawing. This space will house individual workstations and a central collaborative core, where designers can work together, critique work, and research. This space is collective, served, and semi-private. This space is publicly visible through windows from the retail experience space.

C. Activities

Creating has as much to do with the hand as the mind. This space is inherently tied to the design lab. Thinking, creating, innovating etc. are the verbs of this space. Collaborative discussions, and group efforts would be promoted.

D. Spatial Relationships

The space should have immediate views and access to the design lab area, the research labs, and the storage areas. It should also have a strong connection to the manufacturing spaces, and retail space as well. Designers should be engaged in all processes. This space should have a ceiling height of at least fourteen feet.

E. Special Considerations

This space should have strong adjacencies to the spaces serving it, and also good connection to the various conference spaces. Lighting levels should be high, to be supplemented by individual task lighting at each workstation. Individual temperature controls at each workstation also go along way to worker productivity and satisfaction. This space should initially be a blank slate, allowing the designers to create their desired space and increase the control over the aesthetics of their environment.

F. Equipment/ Furnishings

This space is furnished by fifteen workstations with computers, drafting tables, and workspaces. There are also central collaboration spaces for discussion and work. Two tables with eight chairs apiece will provide this space. There are also a variety of storage spaces.

G. Behavioral Consideration

H. Structural Systems

Mechanical and structural systems are standard.

I. Electrical System

Lighting levels would be standard. Task lighting would be required at the workstations.

J. Site Considerations

This space should have extensive views to the exterior, including any day lighting possible. It should also have access to the outside.

C.5 Research Lab/ Testing

A. Quantities

40 person maximum occupancy.
1 unit
4000 square feet
1 * 4000 sq. ft. = 4,000 square feet.

B. Purposes/ Functions

The space is dedicated to product research. Here products will be tested structurally and ergonomically. This space will also contain research regarding ergonomics and the study of the bodies interaction with furniture. This space also will be used for dedicated research to sustainable materials, reconstituting both internal and external wastes for reuse, and material processes. This space could also house research that would investigate manufacturing process and efficiency of materials. It is both served by its associated functions, but serves the content of its research internally. It is also viewed by the public, and its findings on waste could be published externally. It is also a collective space. The researchers will need to search the vast human resources of the facility for information ideas.

C. Activities

Researchers will use a variety of testing methods, both physical and computer, to innovate and research ideas. In many ways, these occupants fulfill the most important task of any employee.

D. Spatial Relationships

The space should have immediate access to the design lab area, the making space, and perhaps the storage areas. It should also have a strong connection to the manufacturing spaces as well. Researchers should be engaged in all processes. This space should have a ceiling height of at least fourteen feet. Separate spaces for computers and offices from the testing labs.

E. Special Considerations

This space should have strong adjacencies to the spaces serving it, and also good connection to the various conference spaces. Lighting levels should be high, to be supplemented by individual task lighting at each workstation. Space should be extremely flexible to allow users to manipulate the space as necessary for experiments or tests.

F. Equipment/ Furnishings

This space will be furnished with workstations for each researcher, as well as an area for conference meetings. A variety of testing equipment will be necessary. Access to move this equipment in and out of the space will be necessary, as it will not always be needed.

G. Behavioral Consideration

H. Structural Systems

Mechanical systems would be extensive for air quality and control, and structural systems would be standard.

I. Electrical System

Lighting levels would be standard. Task lighting would be required at the workstations.

J. Site Considerations

This space should have extensive views to the exterior, including any day lighting possible. It should also have access to the outside.

C.6 Large Conference Room

A. Quantities

26 person maximum capacity.
1 space
800 square feet
1 * 800 sq. ft. = 800 square feet.

B. Purposes/ Functions

This space is simply a conference room for larger meetings of up to 20 persons. This space is collective, as it can be used by a variety of staff members, but entirely private.

C. Activities

The primary activities of this space would be sitting in a meeting or presenting.

D. Spatial Relationships

This space should have excellent exterior views and day lighting. It should also have immediate access to the main office space.

E. Special Considerations

This space will have a high level of quality, as it is most likely the space to house important clients and guests. Ceiling height should be about twelve feet. Temperature should maintain a comfortable level. Light levels should be controllable for computer presentations

F. Equipment/ Furnishings

This space should be furnished with one large conference table with executive task chairs for up to 20 people.

G. Behavioral Consideration

H. Structural Systems

Mechanical and structural systems are standard.

I. Electrical System

Lighting levels would be standard with the ability to black out the room for presentations. Task lighting would be required at the workstations.

J. Site Considerations

This space should have extensive views to the exterior, including any day lighting possible.

C.7 Small Conference Room

A. Quantities

13 person maximum occupancy.
2 spaces
200 square feet
2 * 200 sq. ft. = 400 square feet.

B. Purposes/ Functions

This space is simply a conference room for much smaller meetings of people (2-8). This space is collective, as it can be used by a variety of staff members, but entirely private.

C. Activities

The primary activities of this space would be sitting in a meeting or presenting.

D. Spatial Relationships

This space should have excellent exterior views and day lighting. It should also have immediate access to the main office space, the management offices, and the reception space.

E. Special Considerations

This space will have a high level of quality, as it is most likely the space to house important clients and guests. Ceiling height should be about twelve feet. Temperature should maintain a comfortable level. Light levels should be controllable for computer presentations

F. Equipment/ Furnishings

This space should be furnished with typically conference table with chairs for up to 8 people.

G. Behavioral Consideration

H. Structural Systems

Mechanical and structural systems are standard.

I. Electrical System

Lighting levels would be standard. Task lighting would be required to at the workstations.

J. Site Considerations

This space should have extensive views to the exterior, including any day lighting possible.

C.8 Restrooms

A. Quantities

14 person maximum occupancy.
2 spaces
600 square feet
2 * 600 sq. ft. = 1200 square feet.

B. Purposes/ Functions

These restrooms will primarily serve the workers of the design and office areas. The two restrooms will serve as one men and one women. This space could be considered servant, collective, as it is used by any employee or guest, and private. Cleaning this space, and the other expected activities of a restroom. The restrooms will also include a shared custodial closet.

D. Spatial Relationships

This space is typically comprised of the requirements of handicapped stalls, and the associated 5' circle required by the ADA.

E. Special Considerations

This space should have adjacencies to the office functions, and have good proximity to those functions expected to use this facility. Interiors should be durable and cleanable surfaces such as tile flooring.

F. Equipment/ Furnishings

Furnishings include the necessary number of toilets, sinks, and stalls per occupants. The closet will have a mop sink and faucet. Outside this space should include a drinking fountain.

G. Behavioral Consideration

H. Structural Systems

Structural systems are standard.

I. Electrical System

Lighting levels would be standard, mechanical systems would be necessary for ventilation.

J. Site Considerations

This space has no requirement to have exterior views. Any windows will have etched or frosted glass.

C.9 Reception

A. Quantities

26 person maximum capacity.
1 space
400 square feet
1 * 400 sq. ft. = 400 square feet.

B. Purposes/ Functions

This space serves as the main entry to the office, design, and manufacturing spaces. Guests will be received here and a receptionist and security person will occupy this space. It will house guests as they wait to be seen, and transfer people to the proper circulation spaces. This space should be considered servant, collective, as it is used by any employee or guest, and acts as one of the most public spaces in the building. This could also be used as the entrance for the retail space, thus furniture would be placed on display.

C. Activities

The activities in the space are walking, waiting, sitting, talking, and reading. Entering, removing coat, and other activities would also take place.

D. Spatial Relationships

This space should make an impression architecturally as the entrance to the building. It should also be identifiable on the exterior of the building. This space is smaller in plan, but could have a somewhat larger volume if possible. Entry should be central on one end of the space, with a short walk to the receptionist desk.

E. Special Considerations

This space should have a relatively high level of design and finishes because of its importance as the first room in the building. This space should have transparency toward the street, and day lighting from above. Perhaps the street could be brought into the interior smoothing this transition from exterior to interior. This space will have immediate adjacency to Woodward and to any parking.

F. Equipment/ Furnishings

Furnishings would include a larger and higher desk for the receptionist. Several chairs and a couch should be placed in a waiting area with a coffee table, plants, end tables, etc.

Mechanical systems must accommodate this space because it is consistently opened to the weather.

G. Behavioral Consideration

H. Structural Systems

This space should have a structural clear span in all directions.

I. Electrical System

Lighting levels would be standard, mechanical systems would be necessary for ventilation.

J. Site Considerations

This space is located on the corner of the site at Woodward and Cass at the most visible corner of the site. Transparency to the exterior is important.

C.10 Office Storage and Technology

A. Quantities

20 person maximum capacity.
1 unit
1000 square feet
1 * 2000 sq. ft. = 2,000 square feet.

B. Purposes/ Functions

This space is the office storage room, which will house the copy machines, plotters, printers and other associated technology. It will also house office supplies, and the IT department. It is a servant space, to be used by the collective, and is a relatively private space. This space will also be used to store any unused office equipment such as desks, computers, and chairs. This space will also include the recycling bins for the office.

C. Activities

The activities of this space would be organizing, stocking, and acquiring office materials. This is also where one would collect copies or print offs. Regular maintenance would also be required for all of the machines. The IT technicians will also occupy this space and work on the network systems, as well as troubled computers.

D. Spatial Relationships

This space should have a lower ceiling height. Storage of the office equipment should be hidden from view. This room should have immediate adjacencies to the main office area, including larger doors to move furniture through into storage.

E. Special Considerations

F. Equipment/ Furnishings

This space would include a couple desks for the IT technicians as well as a computer work area. Other equipment would include two to three copiers, several plotters, and the network computer system.

G. Behavioral Consideration

H. Structural Systems

This space should have standard mechanical and structural systems. The heat generated by the equipment must be dealt with.

I. Electrical System

This space would have a large technological infrastructure needs.

J. Site Considerations

This space would benefit from views to the exterior and natural day lighting.

D.1 Retail Space

A. Quantities

1 occupant per 30 square feet at grade, 1 per 60 above grade.
1 unit
8,000 square feet
1 * 8000 sq. ft. = 8,000 square feet.

B. Purposes/ Functions

This space is an interactive space to view the furniture produced at this factory and others for this company. It is intended to give the consumer a new experience by exposing them to the many processes that contribute to producing a commodity good. The space will allow consumers to view designers at work, and experience the manufacturing process. The smells, sights, and sounds of the factory floor can be taken in through this space. Consumers will have the opportunity to customize their pieces, generating ownership in the purchased product. They will also be informed about the many sustainable aspects of the piece they are purchasing. This space is also meant to re-inform the consumer about production, and connects the products to the material process.

C. Activities

The primary activity of this space is shopping. Secondary activities would include selling, informing, buying, talking, and questioning. By viewing the other parts of the facility, shoppers can also observe, smell, and hear.

D. Spatial Relationships

This space should have a double volume storefront on Woodward, with furniture displays focused on the immediate street. In plan, this space must be longer and stretched in order to access all of the functions that must be viewed. Woodward is not used as a strong pedestrian corridor, thus the retail may not have to be stretched parallel to it to maximize product viewing.

E. Special Considerations

This space should have excellent lighting and interior finishes. It is also the space that will change most often with trends. For this reason it should be immediately adaptable.

F. Equipment/ Furnishings

Equipment in the space would include a sales desk, where items could be ordered and paid for, with several stations for this task. A large assortment of displays and partitions will be distributed all over the retail space. Another desk could be used so that customers could customize the purchased product to their tastes from a series of options. This information/ customization space should be located near the sales desk.

G. Behavioral Consideration

H. Structural Systems

This space should have standard mechanical and structural systems.

I. Electrical System

There would be extensive display lighting necessary.

J. Site Considerations

Views to the exterior are not as necessary because they would detract from the products for sale. Natural day lighting from above should be used. Access to the exterior is not necessary except at the entrance, which should be readily identified.

D.2 Storage/ Receiving

A. Quantities

6 person maximum occupancy.
1 space
1800 square feet
1 * 1800 sq. ft. = 1,800 square feet.

B. Purposes/ Functions

This space is to store any inventory for the retail space, as well as receive any shipments for the store. It is a servant space, for use by those who work the retail showroom, and is completely private.

C. Activities

Activities of this space would include unloading truck shipments, running inventory, stacking products, and organizing the inventory.

D. Spatial Relationships

This space can have the same volumes as the retail space. It is important that a pallet lift can maneuver through this space, and would benefit from an open plan. It will have one truck dock at one end that connects to the exterior spaces. It must also have immediate access to the main retail space, and any freight elevator or vertical circulation. It must also have some larger doors between these two spaces.

E. Special Considerations

This space is for storage uses only, so interiors are not emphasized, structure and mechanical systems exposed.

F. Equipment/ Furnishings

G. Behavioral Consideration

H. Structural Systems

This space should have standard mechanical and structural systems.

I. Electrical System

There would be standard lighting.

J. Site Considerations

Views to the exterior are not as necessary.

D.3 Utility Room

A. Quantities

6 person maximum occupancy.
1 space
400 square feet
1 * 400 sq. ft. = 400 square feet.

B. Purposes/ Functions

This space functions as a smaller break room for the salespeople of the retail space. It will allow them to leave the sales desk and rest. It may also store small amounts of surplus inventory, and any other miscellaneous materials as necessary. It is a private space, used by the collective or the individual, and is a servant space.

C. Activities

Activities in this space are resting, talking, and sitting.

D. Spatial Relationships

This space should have immediate adjacency to the sales desk of the retail space. It should also have adjacency the storage/ receiving space of the retail space.

E. Special Considerations

Interiors can be of a lower quality.

F. Equipment/ Furnishings

The space contains a few tables and chairs, as well as some more comfortable chairs.

G. Behavioral Consideration

H. Structural Systems

This space should have standard mechanical and structural systems.

I. Electrical System

There would be standard lighting.

J. Site Considerations

Views to the exterior are not as necessary.

D.4 Restrooms

A. Quantities

6 person maximum occupancy.
2 spaces
300 square feet
2 * 300 sq. ft. = 600 square feet.

B. Purposes/ Functions

These restrooms will primarily serve the workers of the retail space and the shoppers. The two restrooms will serve as one for men and other for women. This space could be considered servant, collective, as it is used by any employee or guest, and private.

C. Activities

Activities include cleaning this space, and the other expected activities of a restroom. The restrooms will also include a shared custodial closet.

D. Spatial Relationships

This space is typically comprised of the requirements of handicapped stalls, and the associated 5' circle required by the ADA.

E. Special Considerations

This space should have adjacencies to the retail space, and most likely located near the circulation of this space. Interiors should be durable and cleanable surfaces such as tile flooring.

F. Equipment/ Furnishings

Furnishings include the necessary number of toilets, sinks, and stalls per occupants. The closet will have a mop sink and faucet. Outside this space should include a drinking fountain.

G. Behavioral Consideration

H. Structural Systems

This space should have mechanical ventilation and structural systems.

I. Electrical System

There would be standard lighting.

J. Site Considerations

This space has no requirement to have exterior views. Any windows will have etched or frosted glass, or placed at least 6 feet above the floor.

E.1 Exterior Green Space

A. Quantities

1. There is not any maximum occupancy loading, exterior space.
2. any number of spaces.
3. 20% of site square feet
4. 20% of the total site area if possible

B. Purposes/ Functions

The exterior space serves as the environmental connection for all employees. It should permeate building form to provide maximum exposure of building interior to natural exterior. This space can also be used as a path year round, challenging the idea that in winter, we are not supposed to be outside. By using the exterior spaces as circulation for limited, but tolerable amounts of time, the building users are connected to the environment. This is an important space in that it provides the inhabitants connection to the natural landscape.

C. Activities

Outside, in good weather, employees can relax, hold meetings, eat lunch, walk around, and enjoy many other activities that the green spaces have to offer.

D. Spatial Relationships

The exterior green space should have a strong relationship with nearly all of the functions. It is important that it receives generous amounts of sunlight as well.

E. Special Considerations

The space could be a variety of hardscape and landscaped spaces that could be both public and private.

F. Equipment/ Furnishings

The only furnishings of this space would be outdoor furniture that employees could use to eat outside, meet, or relax.

J. Site Considerations

This space could possibly operate as a storm-water runoff or constructed wetlands.

Restroom Requirements

Assembly theaters halls museums – men per 125, women per 65, 1 per 150, 1 per 1000.
Business Occupancy – men/ women toilets 1 per 50, sinks, 1 per 80, drinking fountain 1 per hundred.
Factory/ Industrial – 1 per 100, 1 per 100, emergency showers, drinking fountain 1 per 400.
Mercantile – 1 per 500, 1 per 750, 1 per 1000.
Storage – 1 per 100, 1 per 100, 1 per 1000.

SITE SELECTION

milwaukee and divsion
wicker park
chicago, il

lincoln and main
royal oak, mi

cass and amsterdam
detroit, mi

Site Selection
Opportunity I

site selection: historical reference to making, proximity to transportation, viable retail corridor for selling, ability to accommodate growth or change of the building and site.

Urban Context

Chicago's regional climate is characterized by harsh winter and summer temperatures in addition to high year round wind speeds. In designing for this climate, liabilities include summer sun and temperatures, as well as winter temperature and winds. In the summer winds can be used for natural ventilation and a cooling effect. The winter sun can also be exploited to create a comfortable internal environment during the winter months. Chicago's microclimate is modulated by Lake Michigan, but is also effected by the winds which can blow off the lake. The primary concern is temperature across the building envelope, while protecting from winter winds also becomes extremely important.

Average Temperature High/Low - Winter 28, Summer 80

Urban Texture

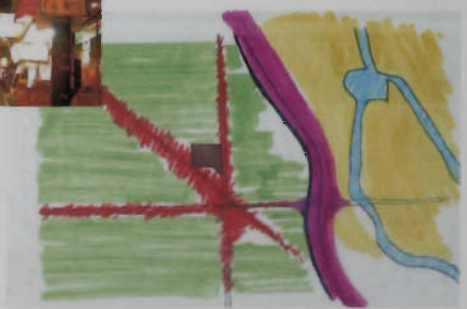
The building mass is typically about three stories in height, with few vacant lots. Overall, the are is spatailly dense, and most structures are built on the lot lines. Larger thoroughfares are lined with commercial developments. A majority of the streets are two lanes with one parking lane on each side. Most buildings utilize some sort of brick or stone, and has a orthagonal geometry, with a flat roof. The context is generally utiltarian, where no building has too much oc a presence over the other.

'cosmopolitan', a self professed blend of culture and charisma

Opportunities and Challenges

This site provides the greatest opportunity as far as commercial prospects. Wicker Park has excellent urban density and life, and is a destination for many residents of Chicago. The area already has a developed home furnishing store district, in addition to its other amenities. Most furniture brands have a chicago location as a showroom. The site has frontage on Milwaukee, an main commercial thouroughfare, and an expansive site for growth and adaptation. It has access to mass public transportation and major roadways. Viability of the urban condition is this site's greatest strength.

One of the greatest challenges is reconciling the industrial functions of this program into a dense residential neighborhood. The site has no direct access to railroads, and the transportation of materials may be difficult. It does, however, have great proximity to the interstate. An additional challenge is parking, which is notoriously difficult in this district.



Milwaukee and Division

Wicker Park, Chicago, IL

site selection: historical reference to making, proximity to transportation, viable retail corridor for selling, ability to accommodate growth or change of the building and site.

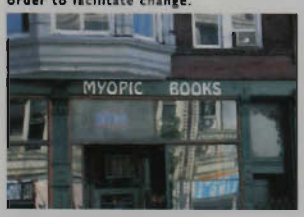
Urban Context

Wicker Park is to the west by northwest of downtown Chicago. Opposite of I-90, it is a vibrant entertainment and shopping district, known for its independent botiques, clubs, and restaurants. Housing values have soared recently, however, no doubt forcing out many residents. The density is rather high, and is definitely urban in quality. Buildings vary from two to eight stories in height and are representative of a number of architectural styles. Vehicular and pedestrian traffic volumes are extremely high. At the corner of Damen and Route 64 is a place known as Six Corners, which proves the central node for the area. Milwaukee provides a main throurofare towards downtown. Wicker Park is named after the 4 acre park left by the original developers of the area to its new residents. The park is just south of the central node. The El train also runs parallel to Milwaukee, providing public mass transportation throughout the city, eventually terminating at O'Hare airport.
To the east is a heavy industrial zone adjacent to the Chicago River known as Goose Island. On the north side is Bucktown, a similar area with greater diversity. East Village is to the south. Portions of Wicker Park also have a historic landmark status. This site is most promising in terms of its context. Chicago continues to strenghten as an quality urban city, and this district is a result.

Adaptation

build, settle, leave, renovate, demolish, paint, re- inhabit, plan, gentrify, subversion, art district, deteriorate, re-use, convert, starbucks, records,.

Adaptation of this site began shortly following the Chicago Fire, as the city expanded outward. Elegant houses and brownstones lined the streets. Following some deterioration and neglect, the neighborhood became undesirable, except to an artist class which settled in in the 1970's. In response to this move, wealth soon came back to the area. Today, Wicker Park is one of the most vibrant enertainment and shopping districts in Chicago, and property values have soared in the desirable community due to renovations, and the average home lists for about 300,000 dollars. Interestingly, the original developers had planned a community in which all economic groups could live. The story of evolving communities reinforcing the need for architecture to be adaptable in order to facilitate change.



Milwaukee and Division

Chicago, IL

Site Selection
Opportunity II

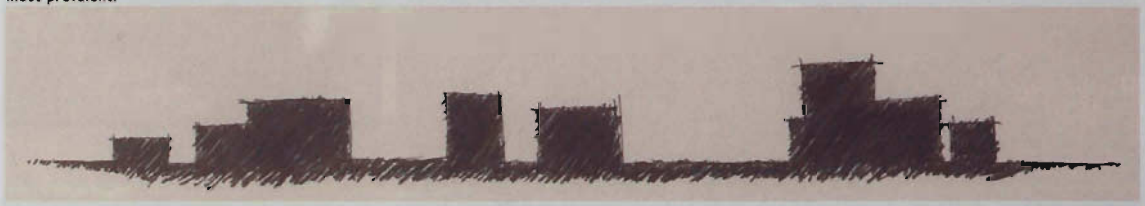
Climate

Royal Oak shares its regional climate with the City of Detroit. It has severe winters through low temperatures and high winds. Its summers remain moderate in temperature. Building designs must modulate temperature across the building envelope, as well as provide protection from winter winds. The winter sun can also be used to bring warmth into the building. During the summer, winds can provide cooling and ventilation, but a major priority is protection from the sun. Royal Oak is less modulated by the bodies of water as Detroit is. This site contains very limited vegetation and no trees of any significance.

Average Temperature - 73 in August, 23 in January
Average Precipitation - 32 inches
Average Wind Speed and Direction - Winter, WSW at 12 mph, Summer, SW at 9 mph.

Urban Texture

Royal Oaks urban texture is less dense than that of Wicker Park. Most sites have on-site parking available, and residential neighborhoods are designed with green space. This context also typically only rises to about two or three stories. Royal Oak is dotted with large amount of parks and green spaces as well. Main street has five lanes of traffic with an additional lane of parking on each side, and acts as a major roadway. Architecturally, the area leaves much to be desired. Much of the modern building prior to the past five years was poorly designed. The residential blocks are typically extended, with mature trees lining the sidewalk. Buildings in Main St. maintain a rectalinear form, with flat roofs being most prevalent.



Opportunities and Challenges

This site's greatest opportunity is in the way it can effortlessly combine the industrial and commercial functions. This site can easily coordinate the needs of both while maintaining and successful retail front on a busy corridor. Royal Oak has a growing market for lofts and related living which draws a market of young people who value design. This program targets this specific market, and would mesh well with such a context.
The greatest challenge to this site is that it south of the major density of people in the downtown area. It would therefore attract less pedestrian traffic than a location to the north. The site lacks a strong and vibrant immediate context. The strength of the site is in its size. It can grow quite easily over time and has good adjacencies for transportation.

Lincoln and Main

Royal Oak, MI

Urban Context

Royal Oak is a strong residential community to the North of Detroit. It has the most vibrant downtown area in the metro area. Main street is the main drag, and contains a variety of amenities, with larger loft developments rising against the primarily single family residences. The site has the luxury of frontage on Main St. but also has access to the railroad. In addition, the site is considerably South of the higher densities, and therefore has a less constrained site. The site also has excellent proximity to major roadways, and has a central location in the greater Metro region.

Royal Oak's demographic shift would complement a program such as this. Younger people continue to move into the inner ring suburbs as an alternative to the places they grew up. Ideally, it could capitalize on the market that values and maintains a taste for excellence in design. The site is clearly not in the center of vibrancy, but can acquire a front on Main street which is growing at both ends. Into the residential blocks surrounding the center, the street grid comprises of long blocks, filled with parks and housing from the 1920's to 1950's. For many metro Detroiters, Royal Oak manages to be in the center of it all. The site has an excellent opportunity for both its intended industrial use as well as a retail front for product sales. This site blends most easily the vastly different needs of the program.

Adaptation

Cultural shift, relocate, natural intervention, care, neglect, deteriorate, trail, road, rail, forest, charter, farm, plant, clear, build, demolish, build, leave, inhabit, grow, reuse, build again.

This part of Royal Oak is adapting quickly from a town of aging suburbanites to young crowd, looking for lofts, restaurant, and bars. This cultural shift may be attributed to the fact that Royal Oak boasts a strong downtown area with accessibility to major roadways. In particular, this site has changed over from an industrial use to a vacancy, ready for redevelopment. These changes mark more of an evolution of the city in which residents adapt to changing urban conditions. Royal Oak itself, was merely a swamp when General Cass surveyed it generations ago.

Lincoln and Main

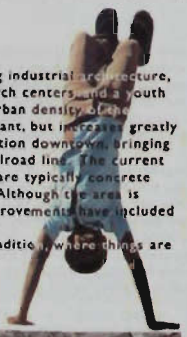
Royal Oak, MI

Site Selection
Opportunity III

site selection: historical reference to making, proximity to transportation, viable retail corridor for selling, ability to accommodate growth or change of the building and site.

Urban Context

On the South end of New Center, this area currently is characterized by aging industrial architecture, many of which is being rehabilitated and adapted for other uses. Lofts, research centers, and a youth community center are a few of the recent additions to the community. The urban density of the immediate area is somewhat low, with nearly half of the lots and buildings vacant, but increases greatly to the North. New Center was developed in order to decrease urban congestion downtown, bringing great investment. Industry located here for proximity to the Grand Trunk Railroad line. The current site condition is a parking lot. The existing buildings, and those in proximity are typically concrete frames with brick in fill or veneer, ranging in height from two to six stories. Although the area is isolated by interstate, it maintains good surface connectivity. Community improvements have included new trees, street lighting, and walks.
The vacancy of industrial buildings marks a larger cultural and economical condition where things are no longer made in this country.



Adaptation

Natural interventions, building collapse, the building as a canvas, care, neglect, deteriorate, trail, road, rail, forest, parking lot, meadow, farm, plant, clear, squat, build, destroy, build, leave, inhabit, grow, reuse, .

This site is representative of a larger trend in the abandonment of industrial areas throughout Detroit. Historically, the site had its beginnings in a portion of the forest which once covered the area, which progressed into farmland. Over time, the land was furthered developed into a fully industrialized site. Since, the building has been demolished, and paved for parking. Adaptation continues through the changing of programs, through adaptive re-use of existing structures.

Amsterdam and Cass

Detroit, MI

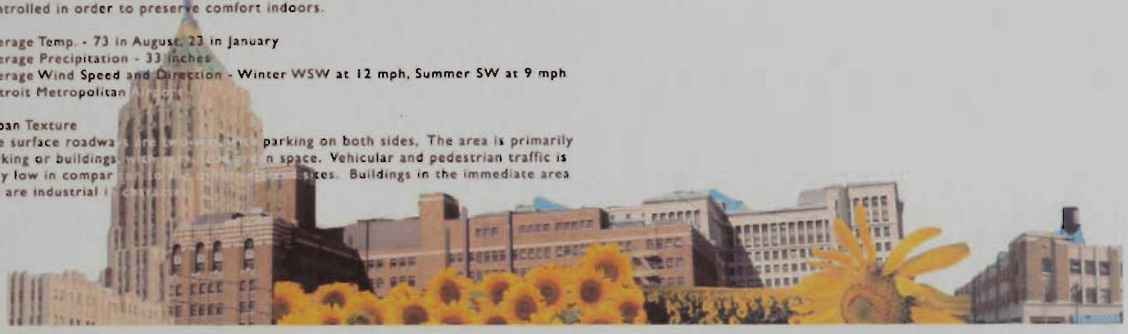
Climate

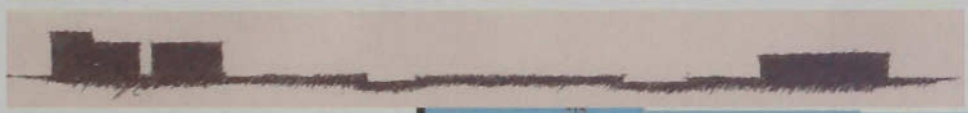
Detroit's regional climate is characterized by severe winters in both temperature and winds, with moderate summers. In designing for climatic response, winter winds, winter temperatures, and summer sun are major concerns. However, this climate has manageable summer temperatures, and summer winds which can provide cooling. In the winter months, the sun becomes a critical asset. The Detroit microclimate is influenced by the larger bodies of water in proximity to the city. This site has no real landmass that could be exploited for ecological means. The sun must be controlled in order to preserve comfort indoors.

Average Temp. - 73 in August, 23 in January
Average Precipitation - 33 inches
Average Wind Speed and Direction - Winter WSW at 12 mph, Summer SW at 9 mph
Detroit Metropolitan

Urban Texture

The surface roadwa parking on both sides, The area is primarily parking or buildings n space. Vehicular and pedestrian traffic is very low in compar ites. Buildings in the immediate area are are industrial





According to 2000 census numbers, only 188 people live in the .3 square mile area.

Site Opportunities and Challenges

The opportunity of the burgeoning loft market seems to define a need for products, particularly furniture. Another great item to exploit is the return of making to a city that consistently loses industry. The City of Detroit's Master Plan states that one initiative for this area is to ensure retention of industry, as well as attract additional businesses. Due to the large vacant building stock, the ability to adapt existing structure would be easily achieved. An additional prospect is the availability of inexpensive property, and the chance to improve a community in great need.
One of the primary concerns with this site is the density of both the built environment and the population. a vibrant context. In addition, the market for this type of product is somewhat limited in this location.

Amsterdam and Cass

Detroit, MI

SITE ANALYSIS

cass and amsterdam
detroit, mi

Site Analysis

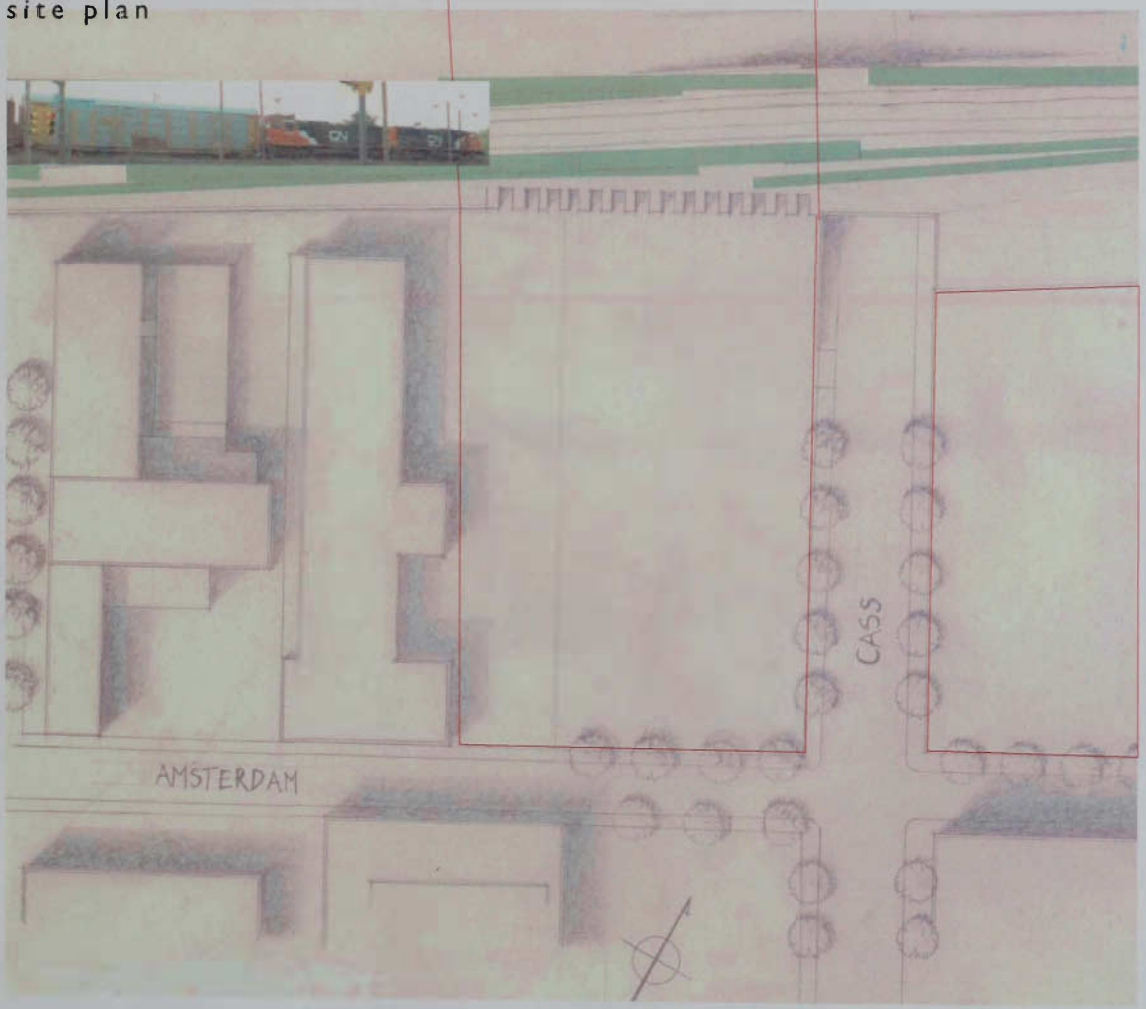
This site was selected primarily for its larger context. The city of Detroit has encountered an amazing series of events. While Detroit has lost over half of its population, it has experienced the withdrawal of large amounts of industry and the associated wealth of the middle and upper class. The city's inhabitants as a whole are extremely under educated and impoverished. What does the future hold for Detroit?

With shifting global economies, re-investment, and raising concern over issues of sustainability, architecture has a tremendous responsibility to respond to these conditions through adaptation. Detroit may or may not experience another socioeconomic shift. It is this uncertain environment that provides the circumstance for adaptable architecture.

The available site includes two plots on Amsterdam street, split by Cass street. An additional site possibility would include the adjacent site location on the North side of the series of railroad tracks.

figure ground

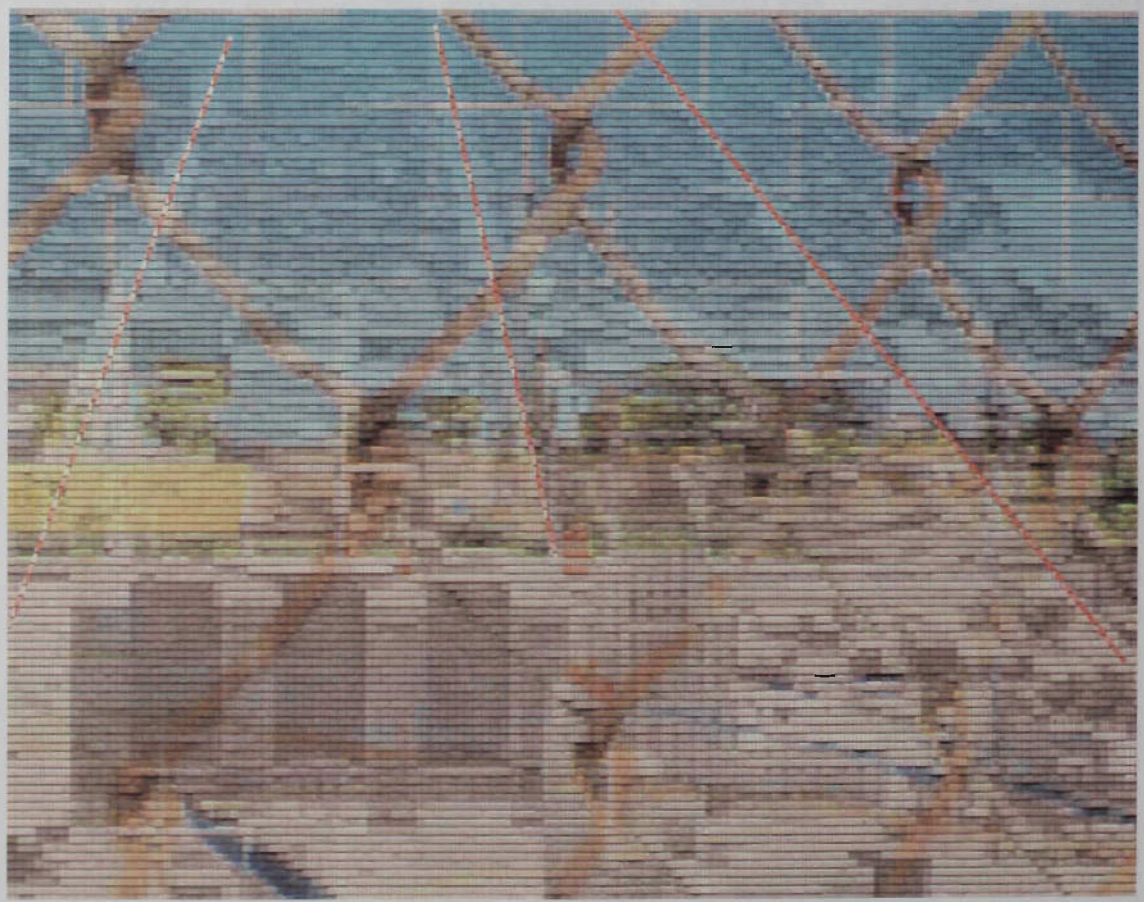
site plan



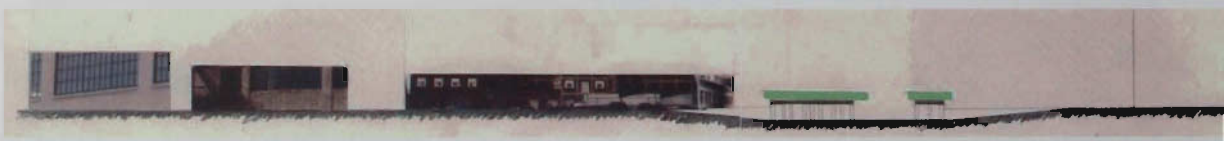
This site is also distinguished by its lack of natural environments. The site is understood through chain link fencing, and hardscapes of concrete and pavement provide the site texture. The feeling is one of grit that is Detroit. The site as a severed relationship with the dense urban characteristics of New Center, but can offer the opportunity to respond with a connection.

Proximity to the heavy rail system can provide the ability to move large quantities of material, and possibly building parts to and from the site with ease. In addition, the site maintains a balanced position between the two areas in Detroit experiencing generous investment, the Wayne State University and Cultural District, and New Center. Several structures in the area are currently being renovated into lofts, ,including a 415 unit conversion immediately to the north of this site. The possibility of adaptive reuse is also a characteristic of this site.

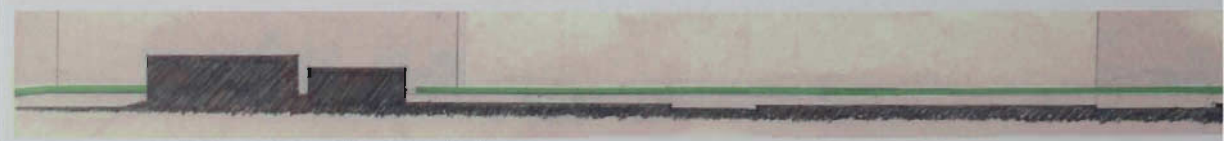
urban patchwork



panoramic photographs

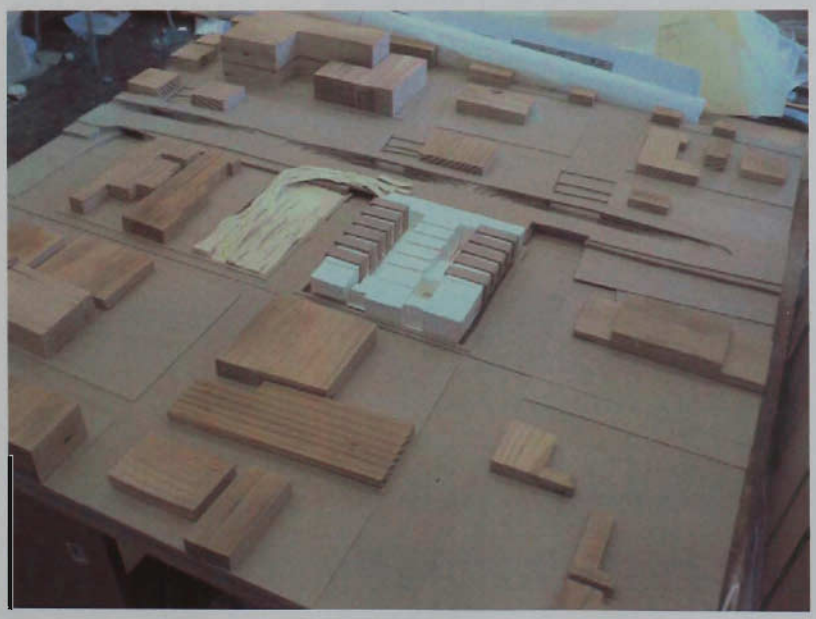


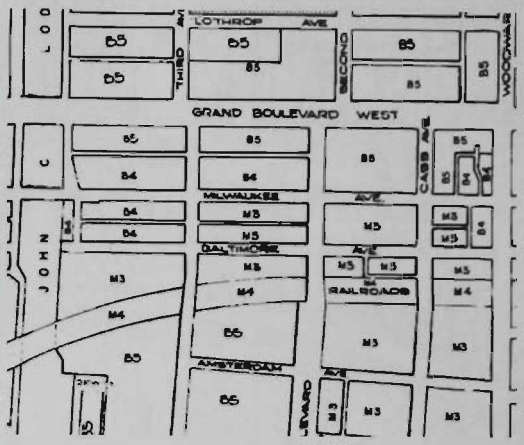
north south site section



east west site section

This site creates issues of visibility, accessibility, security, density, and programmatic questions of reuse.

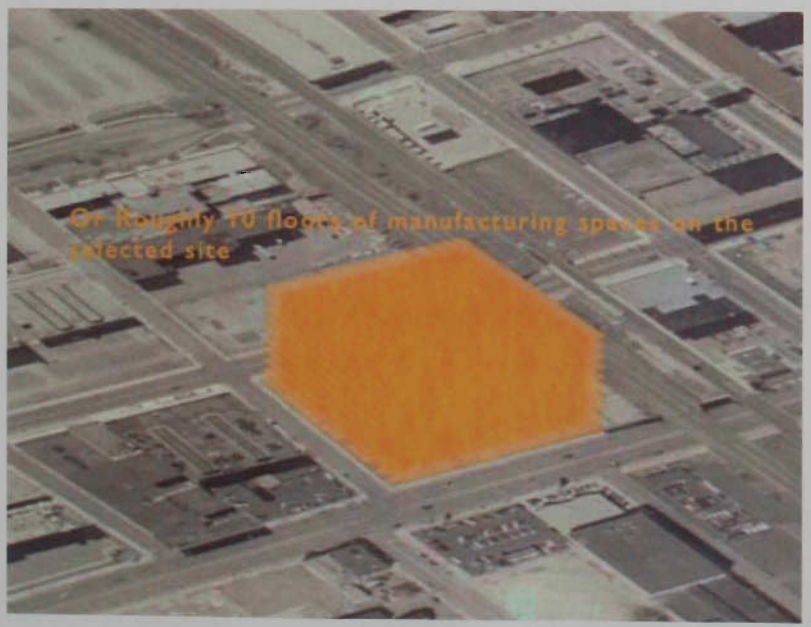




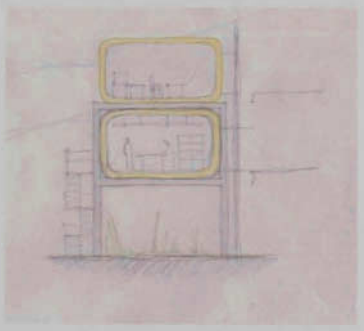
remnants of a past of making

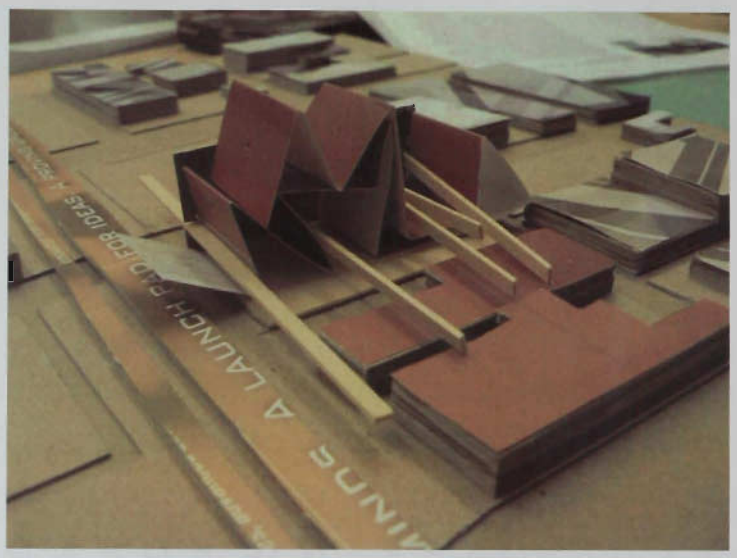
local manufacturing, 1950 and now

In 1950, nearly 1.2 million square feet of building footprint were dedicated manufacturing or making spaces in the immediate context. Today their is no existing medium to heavy manufacturing done in the 16 block area.

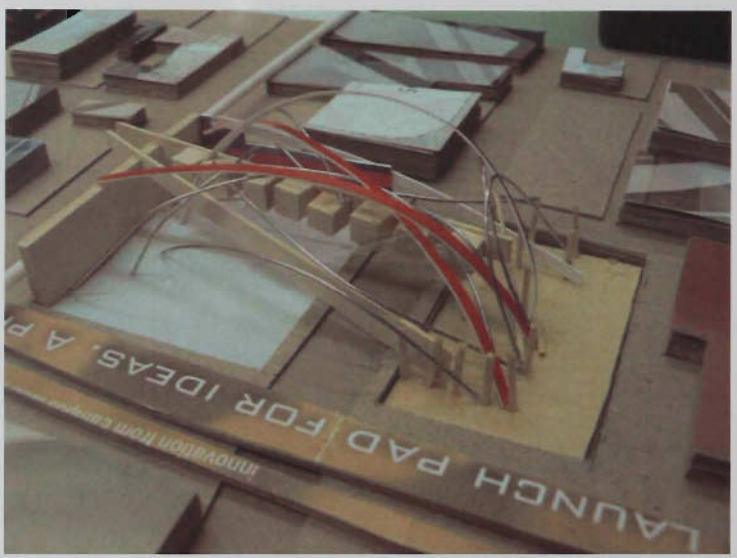


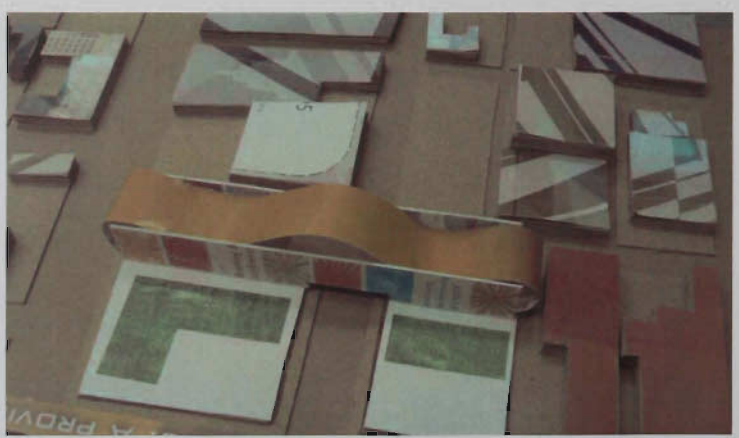
SPRING BOARD

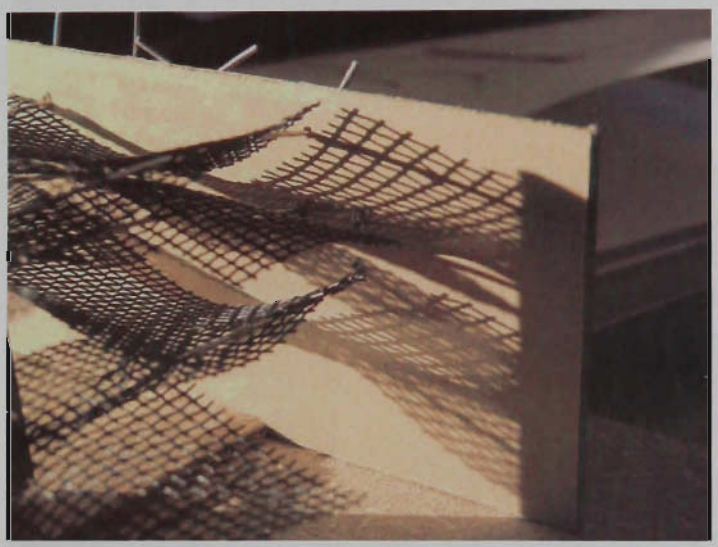




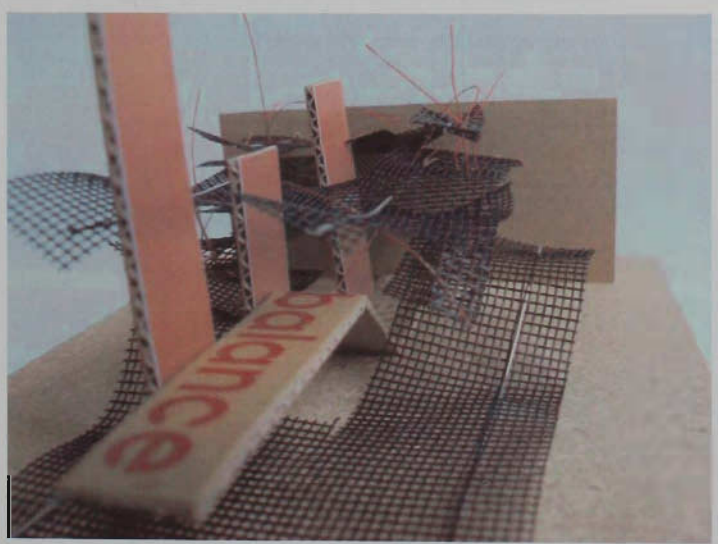
initial sketch models, investigating program interconnectedness, response to site conditions, and initial ideas about massing in relation to context.

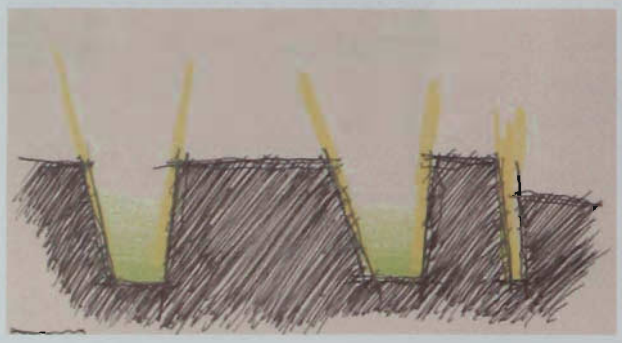


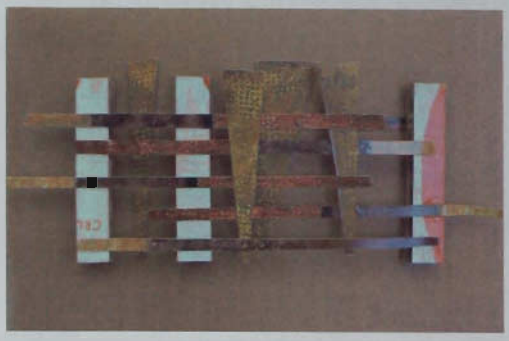




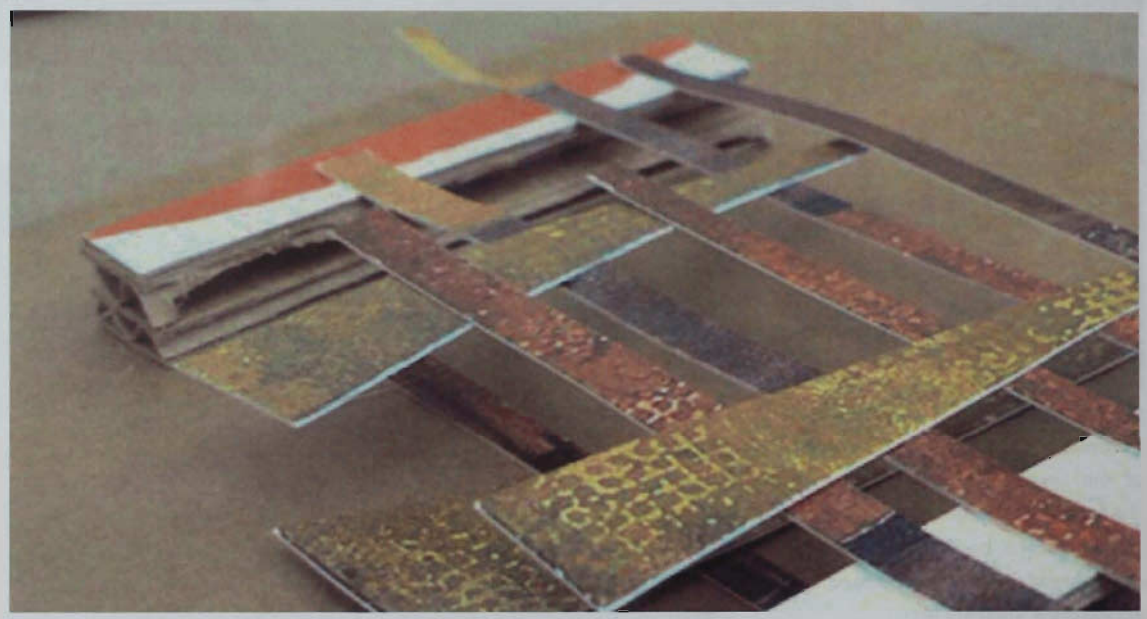
the three dimensional program model intends to discuss the relationship of functions. multiple overlapping layers refer to the interconnectivity of the spaces, while vertical and horizontal circulation elements tie the whole together. the model also expresses building weight, which is thought to be contained toward the woodward portion of the site. threads weave from space to space, connecting technologies and establishing adjacencies



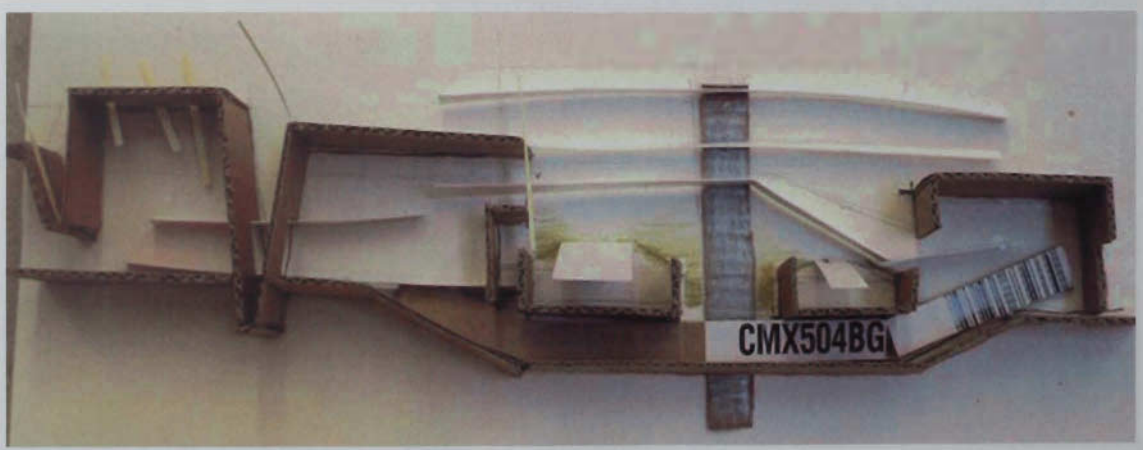




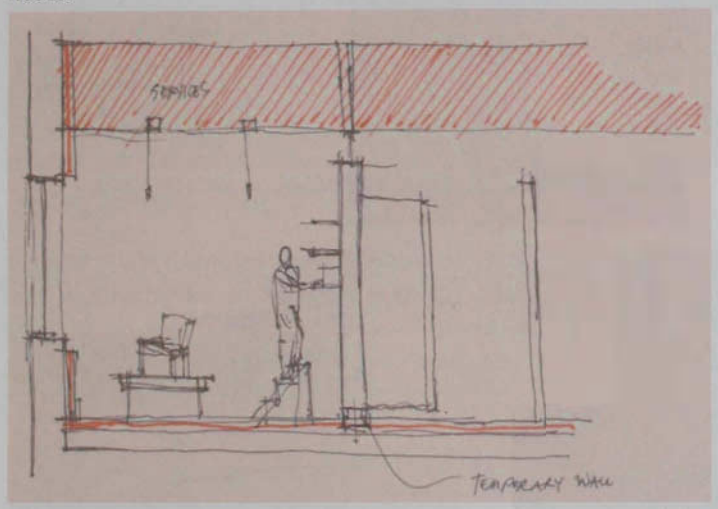
the void allows for green space, interaction with the environment, and the allowance of daylight into the building form. it enhances the connectedness with the natural environment.

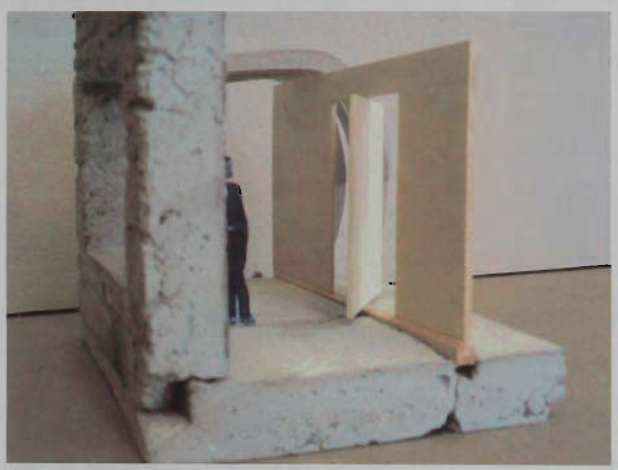


The model also begins to think about engaging the railway by building over and under it, and addressing the more urban northern portion of the site.

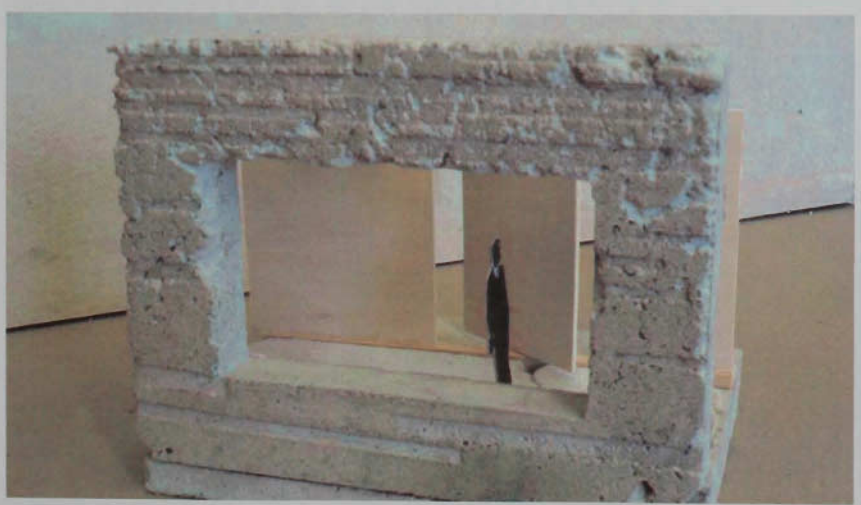


the interiors will allow for the creative manipulation of space. flexible services, movable partitions, and flexible space layouts allow the users to control the space to their specific needs.

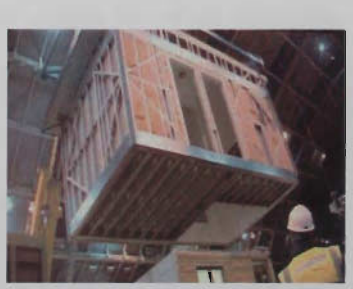


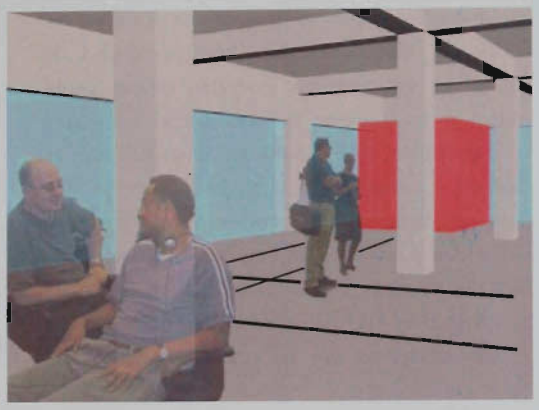


this model is meant to convey the idea of a rigid, and durable building construction, with built-in design for user accommodation. the slab contains raceways that allow for removable partitions. it also creates the atmosphere of control, where the users design their space.

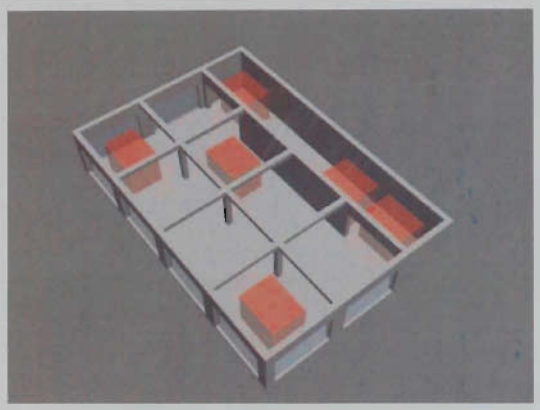


pod studies

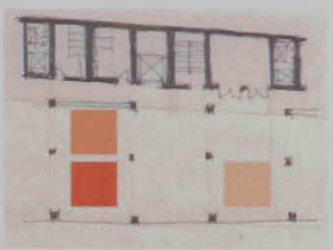




the pod studies investigate the portable program unit as a means for an adaptable building. these could be internal, or moved on tracks of rollers. a core of storage could contain the units when they are not in use.

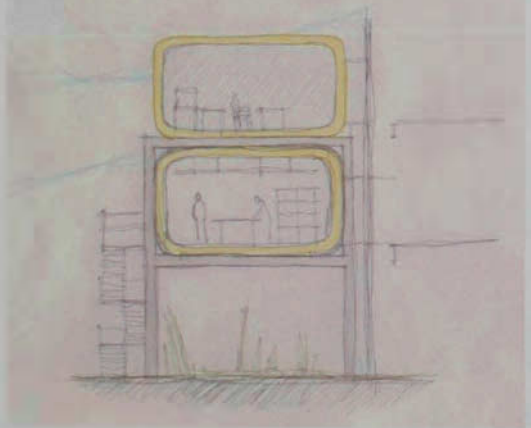


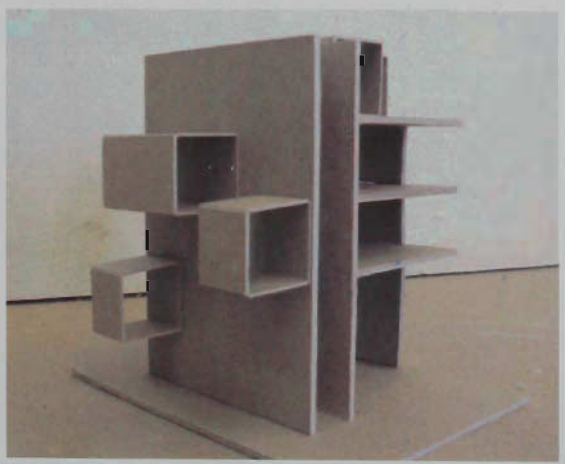
cross section through the storage and office pods, set into an external concrete frame.



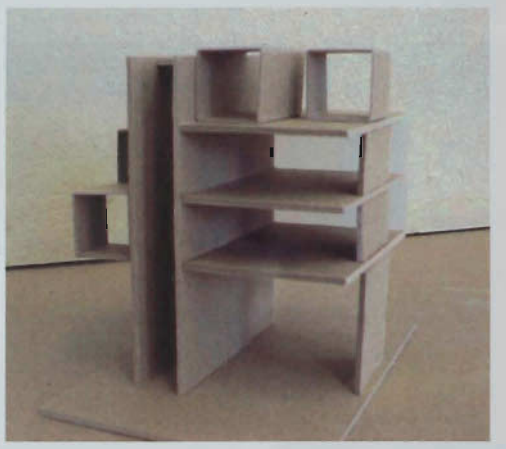
building service core

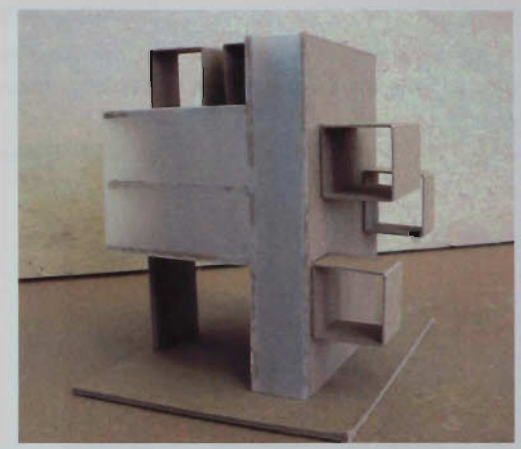
flexible open office plan



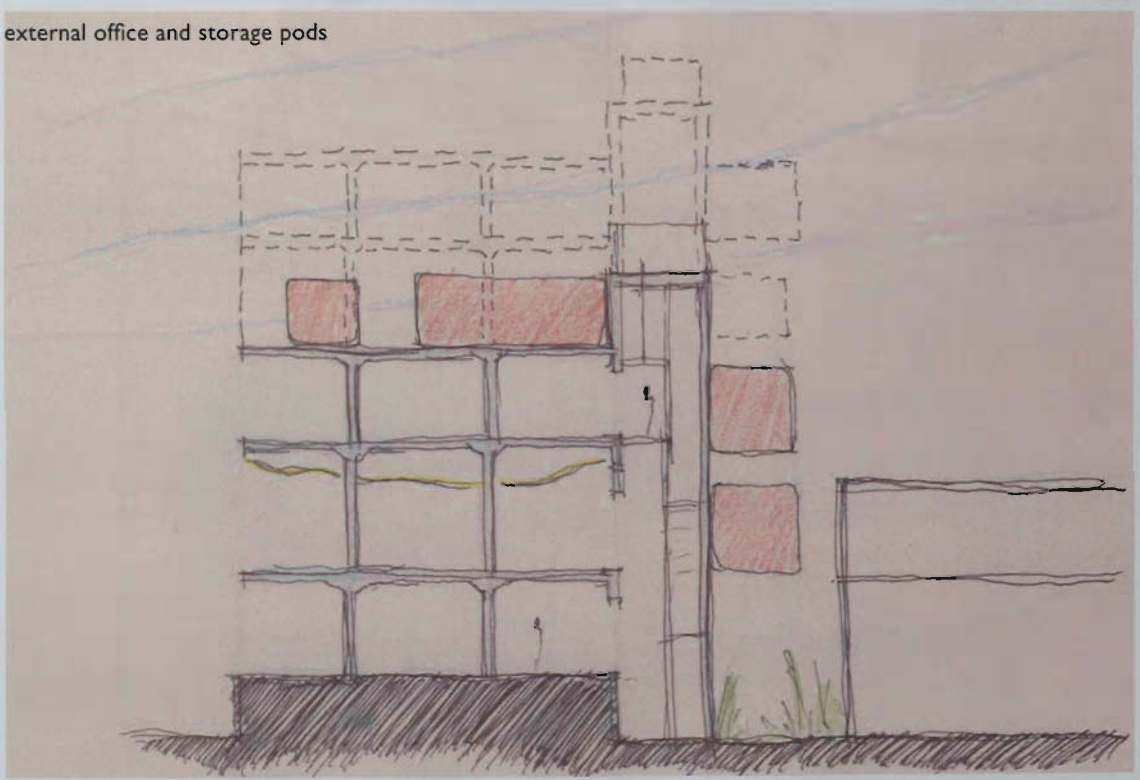


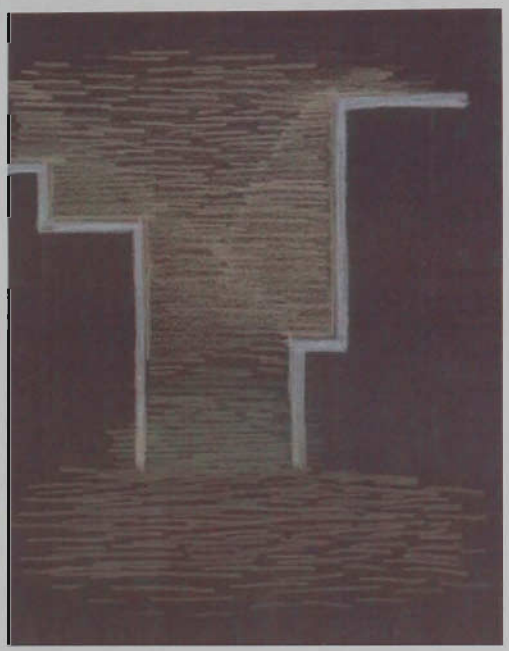
these studies began to look at the scale of the office and the scale of the architectural pod. In the office environment, portable offices could move and assemble to create the necessary configurations, and could be changed out as desired. external pods might attach to the building's exterior and provide on demand use. these could move by any number of means, but address immediate needs for the users of the building. they might also occupy much neglected rooftops. interior storage spaces would contain these pods.

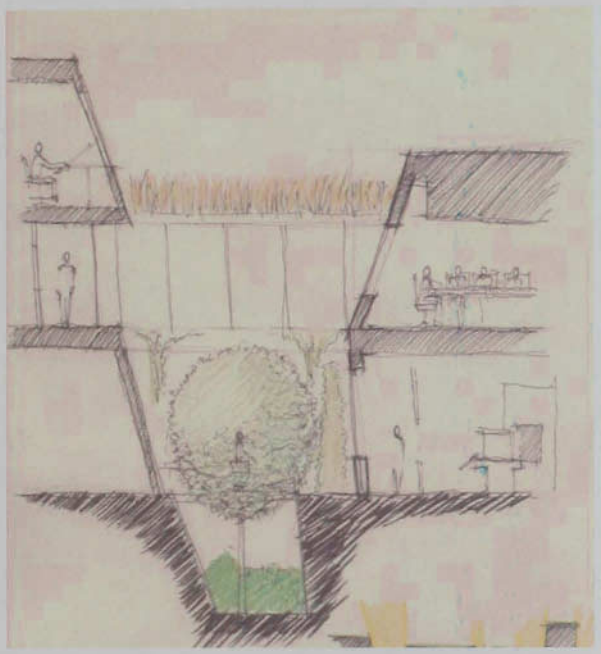


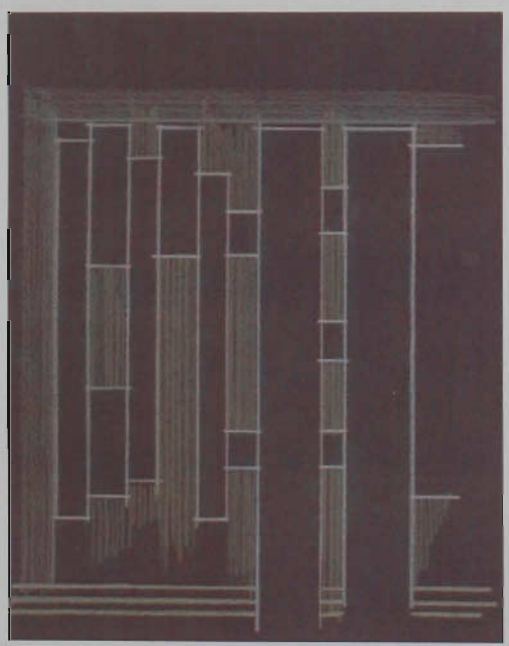


external office and storage pods





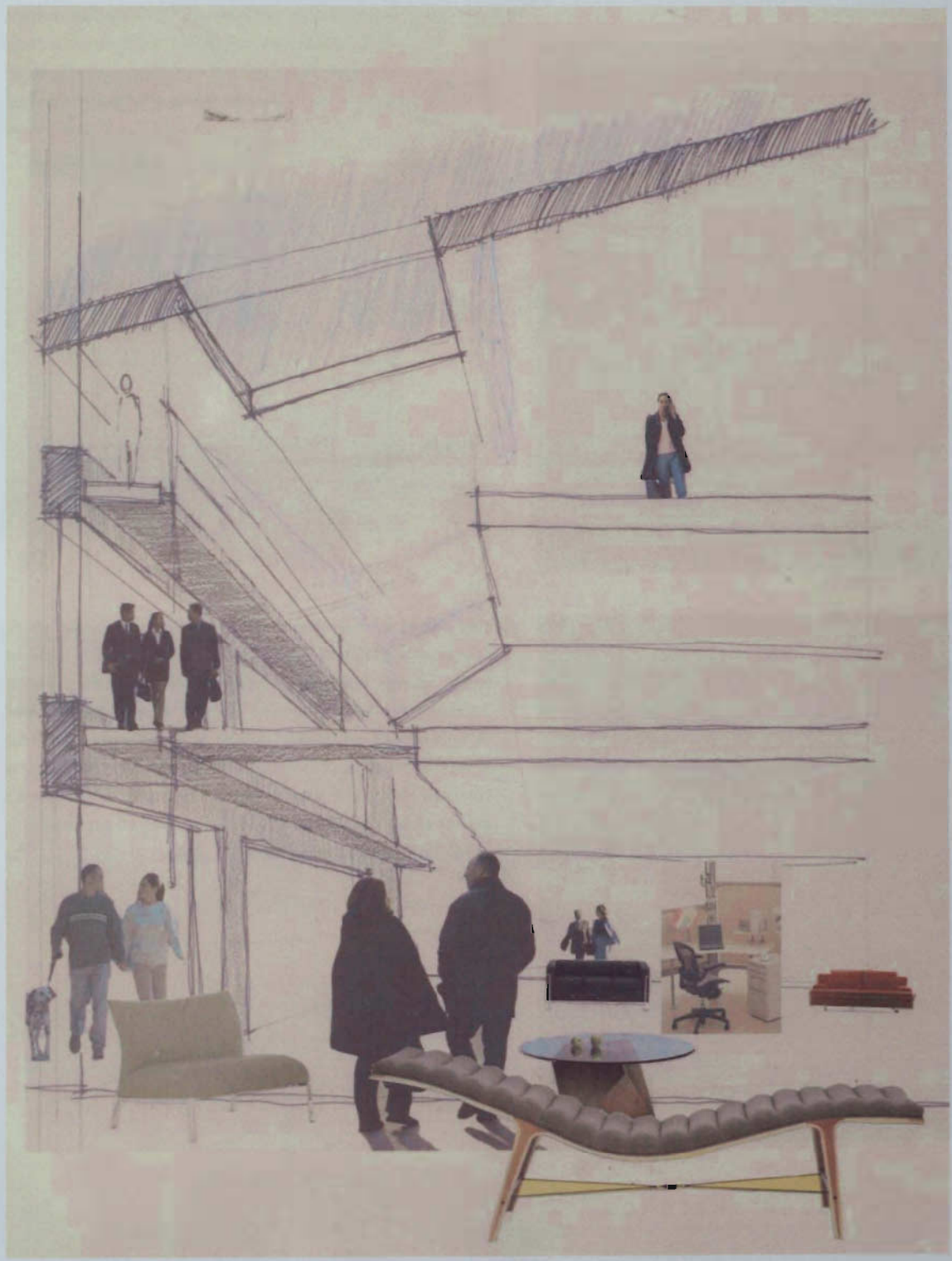




this series of sketches begin to think about the green spaces as a series of fingers which penetrate the building form. in this, visibility and connection to green space is maximized, while it remains narrow enough to be used as an external circulation space. it is bridged by internal functions. the next investigation into the green space is to think about the way in which this space might handle storm water runoff and the other ecological aspects such air quality and air temperature.

green space sketches

this perspective was intended show the relationship between the various program elements, where shopping and office spaces have visual relationships

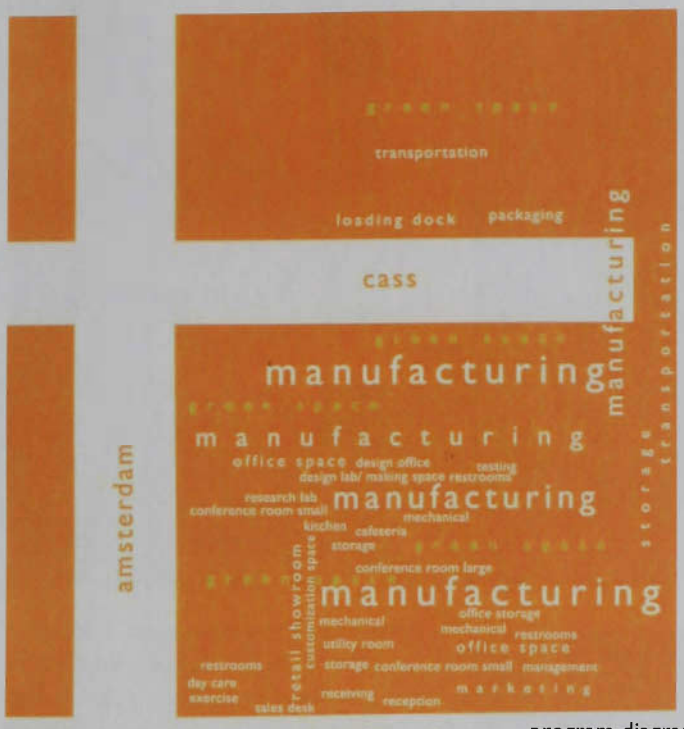


this perspective displays the retail space

another perspective here is intended to show the inhabitable green spaces that will permeate the building form. these are intended to be voids where people can connect with the environment. users may also use this space for circulation, where inhabitants can establish a greater connection with the thermal extremes and weather conditions, as well as living plant life.

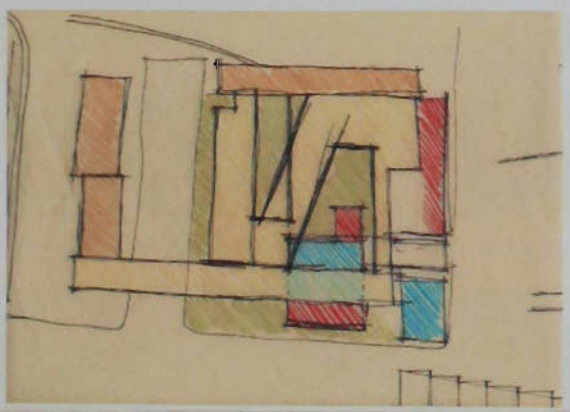
skin

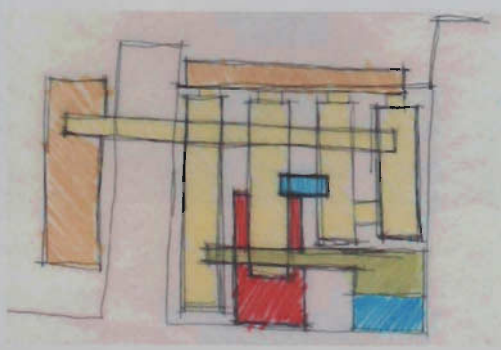
if the building facade is to change with the contemporary architectural trends, perhaps a building skin could become a kit of easily removable parts. this would allow what is described as a "facadectomy" by Joel Garreau in his book *Edge Cities*.

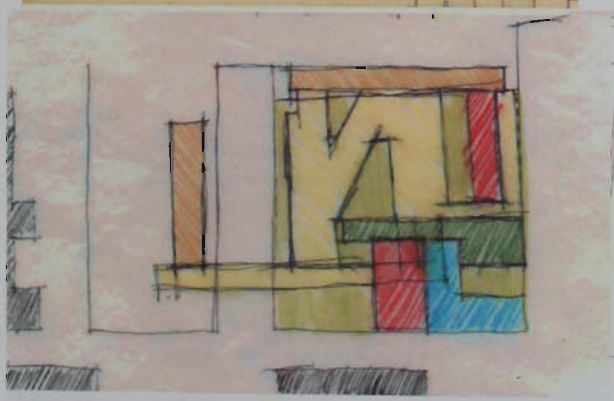


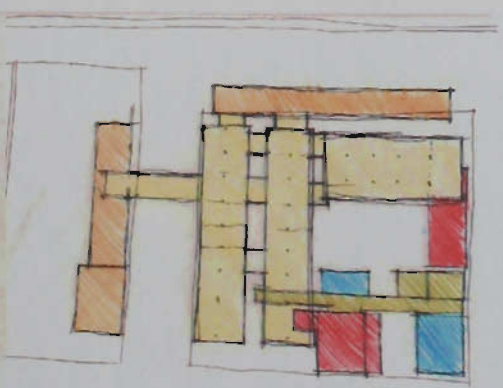
program diagram
establishing visual relationships of program spaces. size corresponds closely with actual space in relationship to site.

Initial plan and massing studies

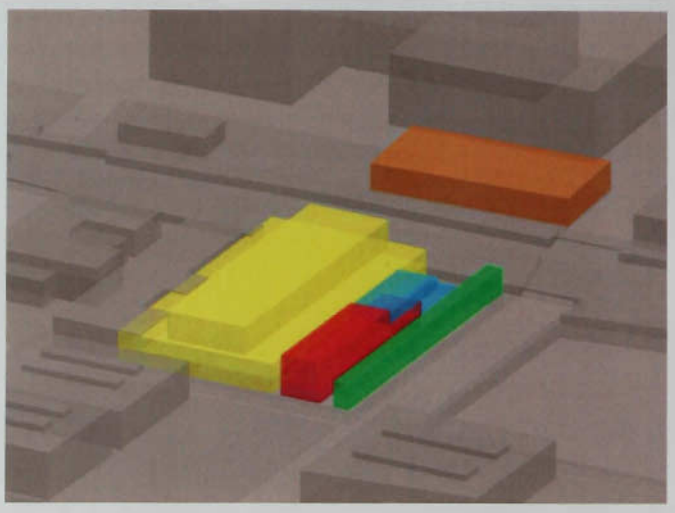


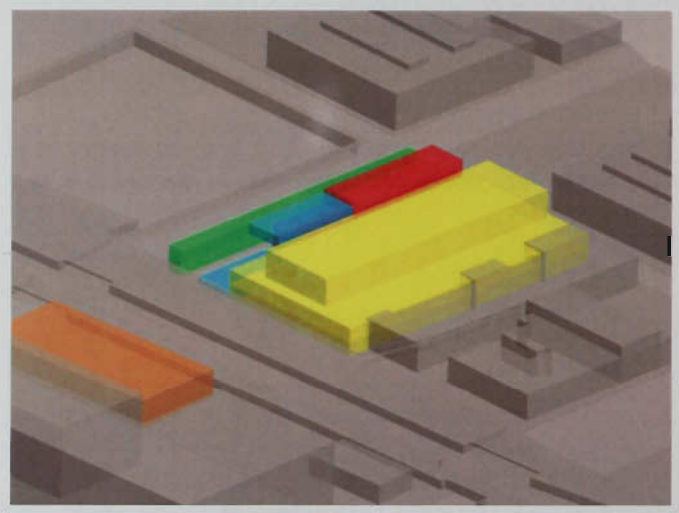






building schemes





retail

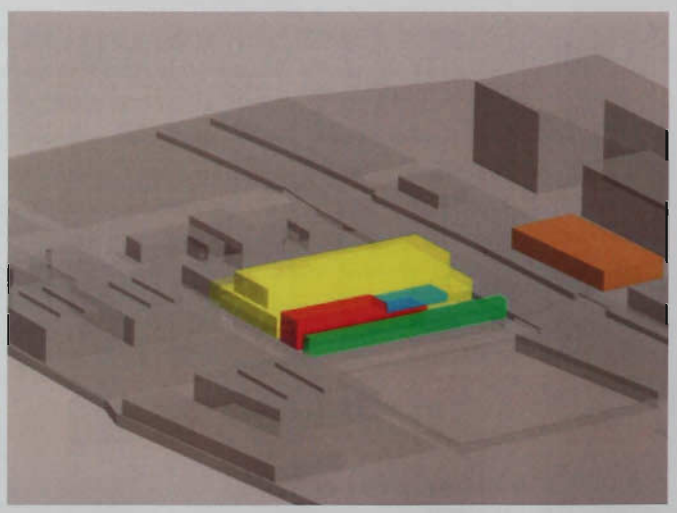
offices

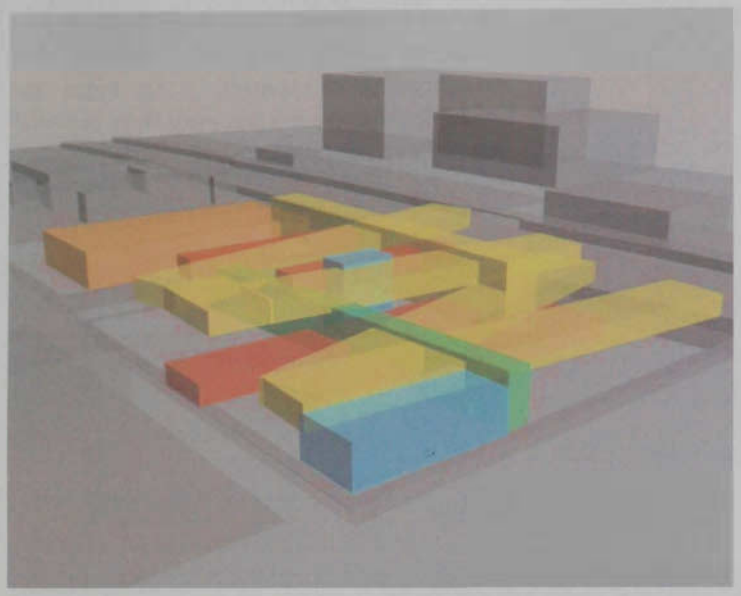
manufacturing

accessory

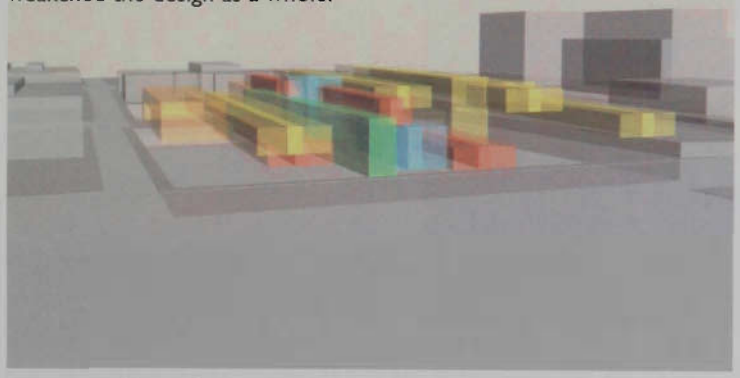
shipping/ storage

prior studies which only dealt with scale of the program in relationship with the site.

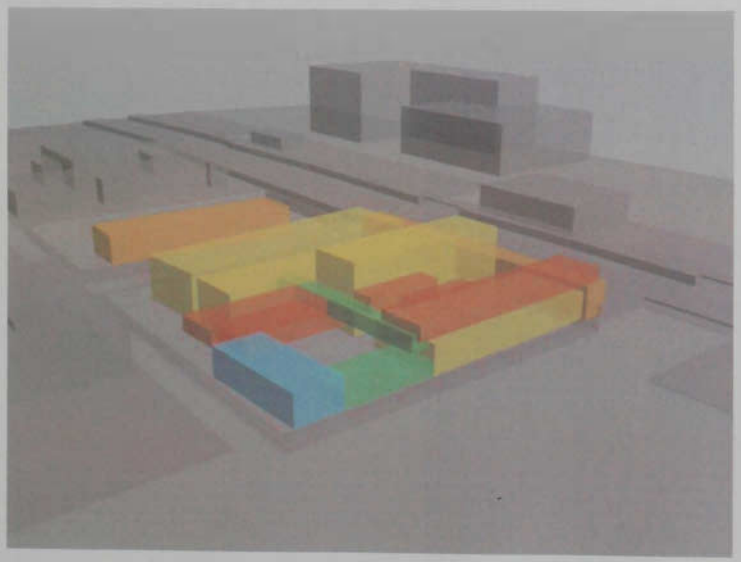


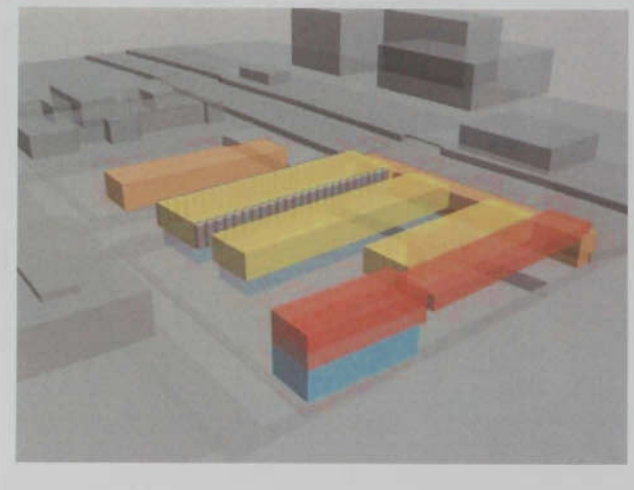


initial three dimensional computer models -
these displayed relationships of program parts and scale, while developing a feasible manufacturing process. the complete integration of various program parts became difficult, and weakened the design as a whole.

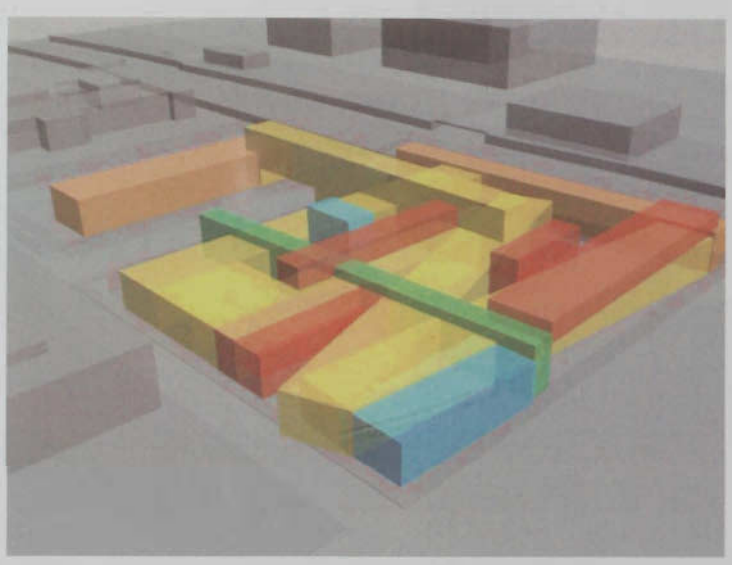


evaluating a linear form with permanent cores.

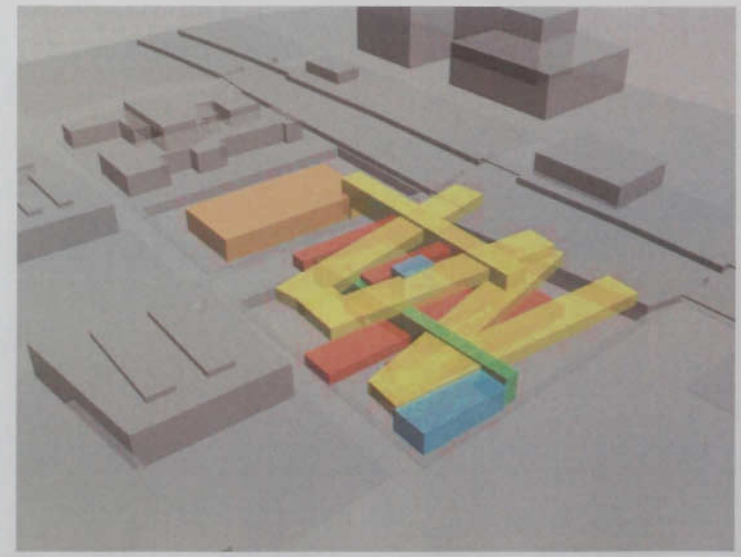




initial three dimensional computer models - simplifying building form, and allowing stacked manufacturing components. this began the realization that the site was most likely too small for the program as designed.

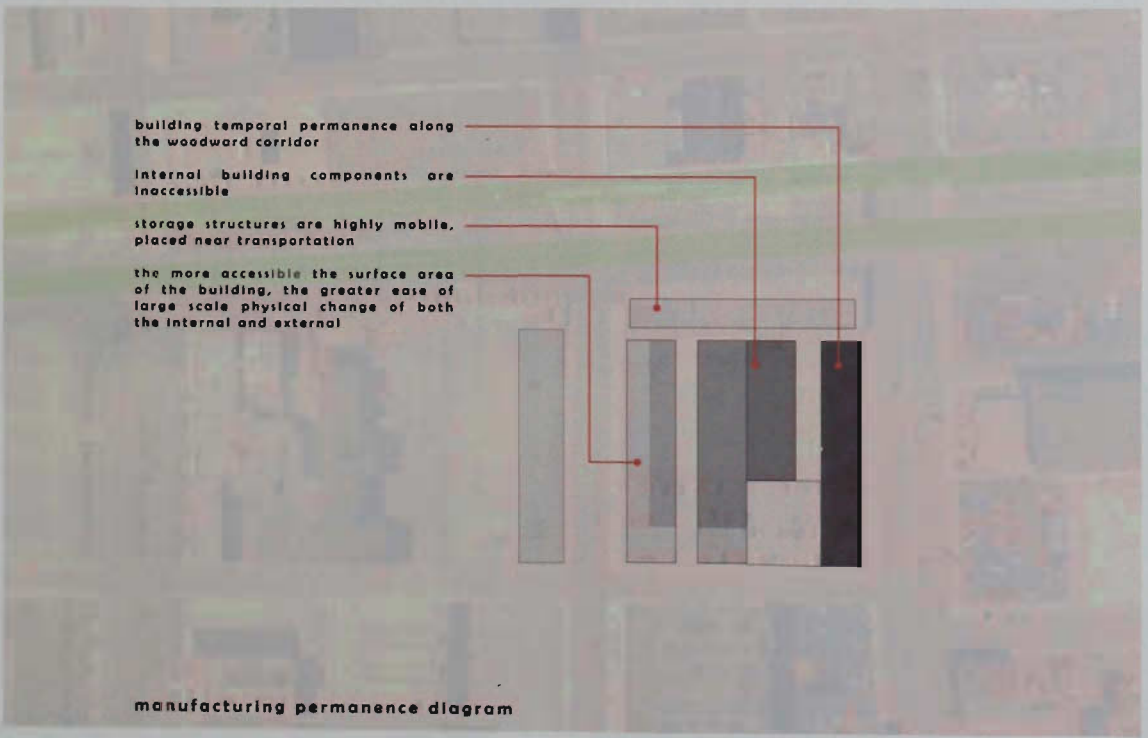


recognizing the ground plane and practicality of construction. program elements no longer float above the ground plane.



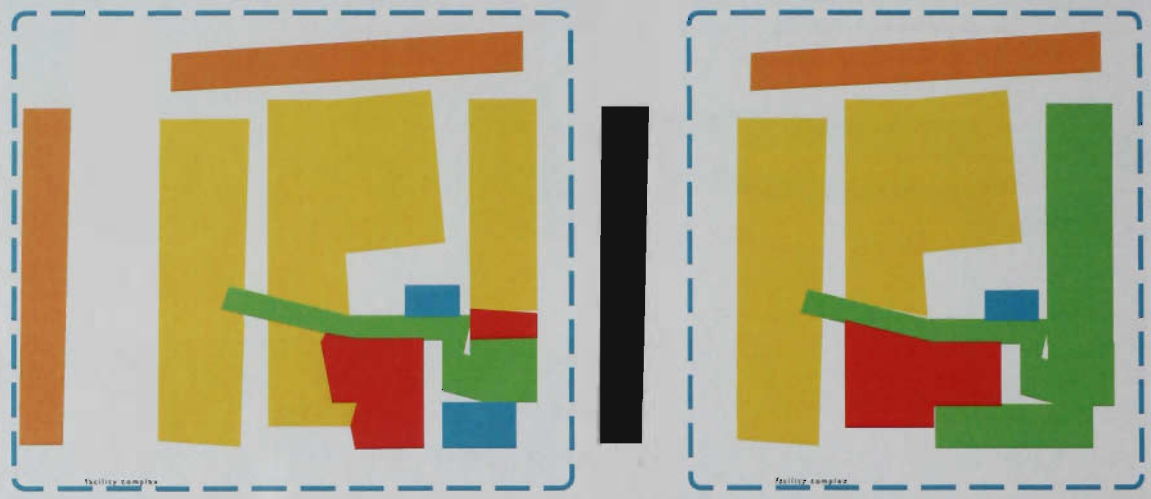
green space and maximum visibility

site analysis in the context of thesis questions, and schematic design intentions.



manufacturing permanence diagram

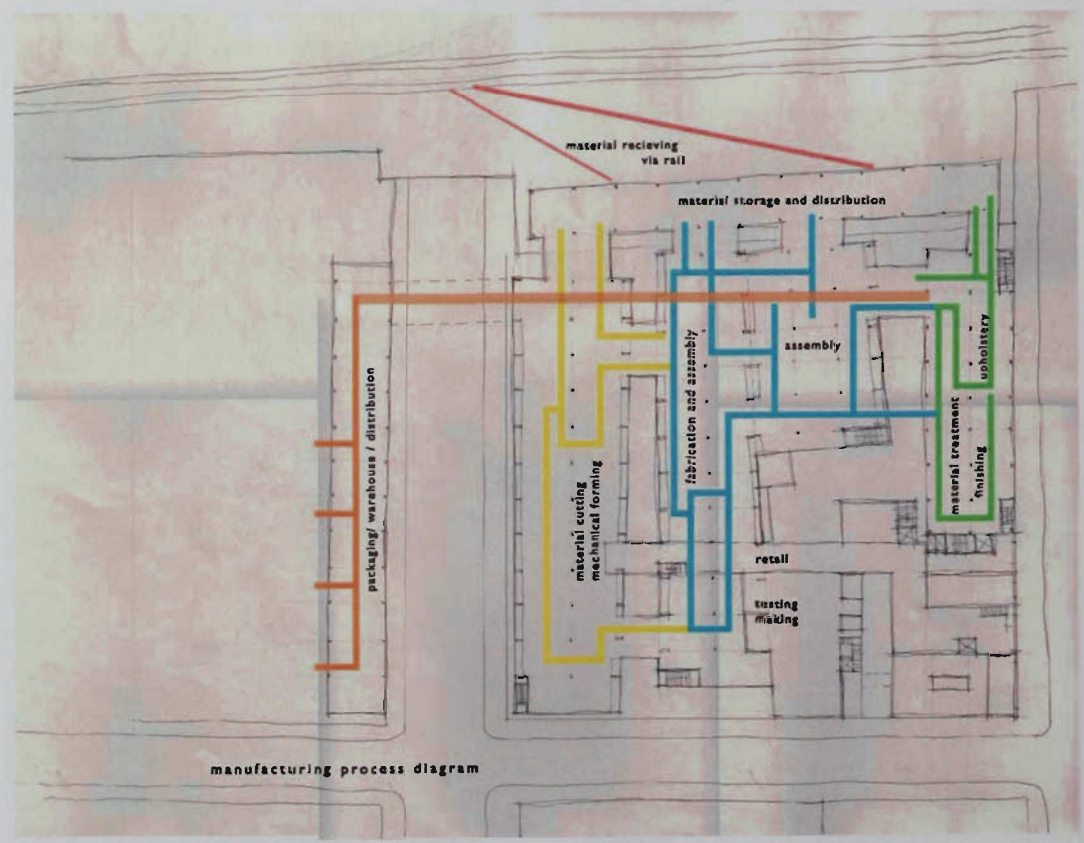
proposed manufacturing process diagram
in relationship to the factory floor.

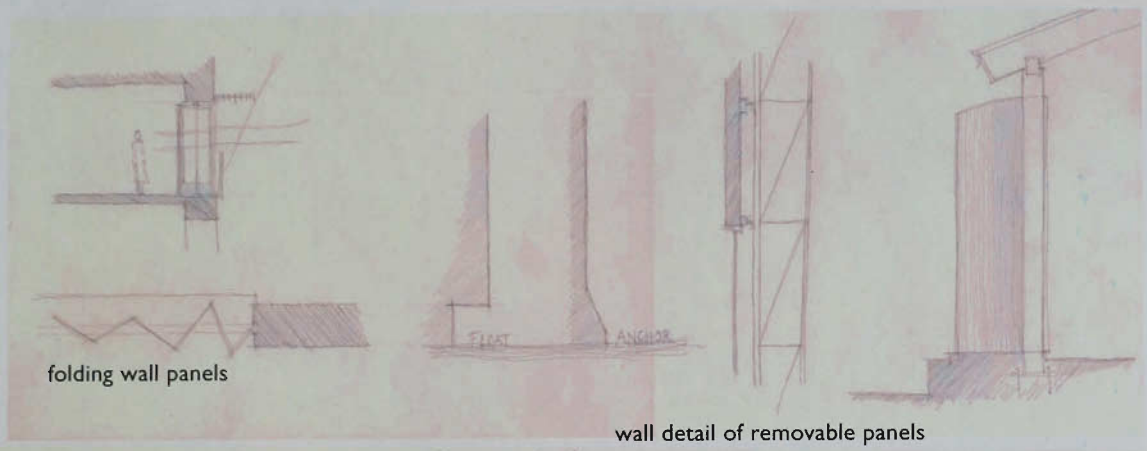


current use diagram
manufacturing dominated complex
small retail space
corporate office and design functions

future senario use diagram
production is moved elsewhere, but the retail needs have grown
offices consolidate locations and grow as required
warehousing and distribution move elsewhere
the warehouse is sold

manufacturing process diagram

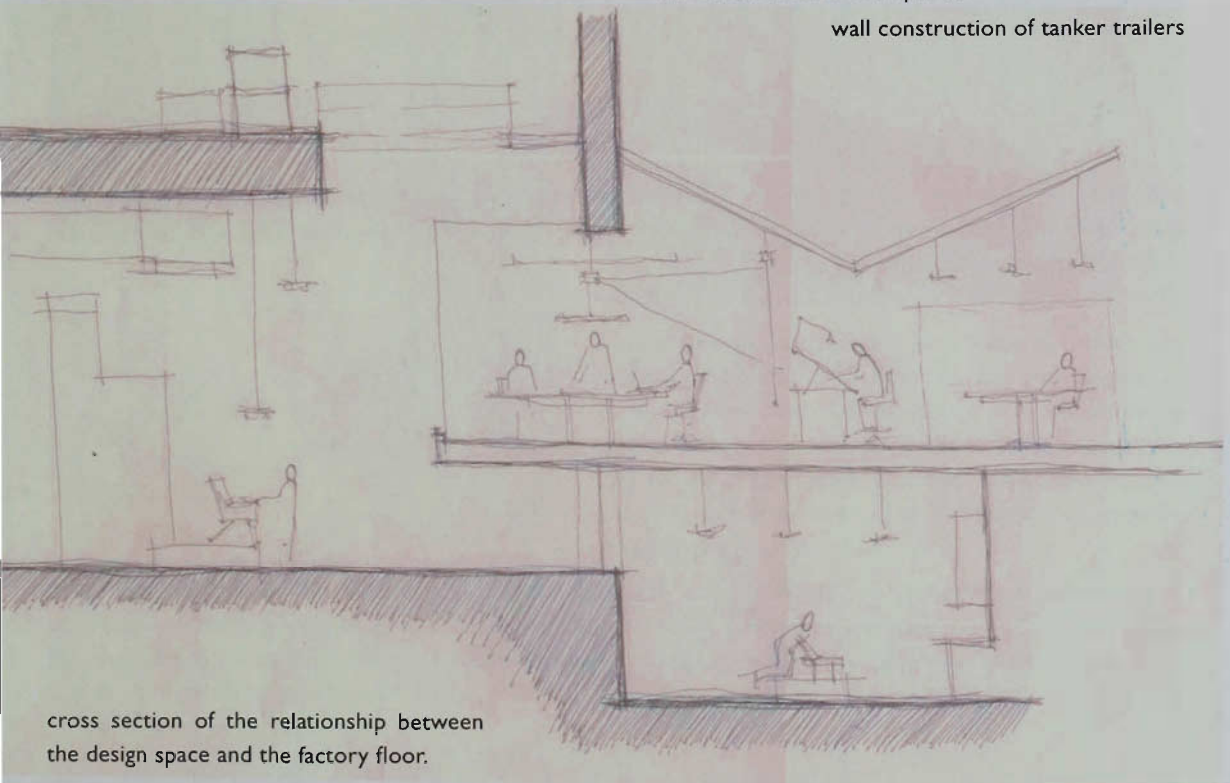




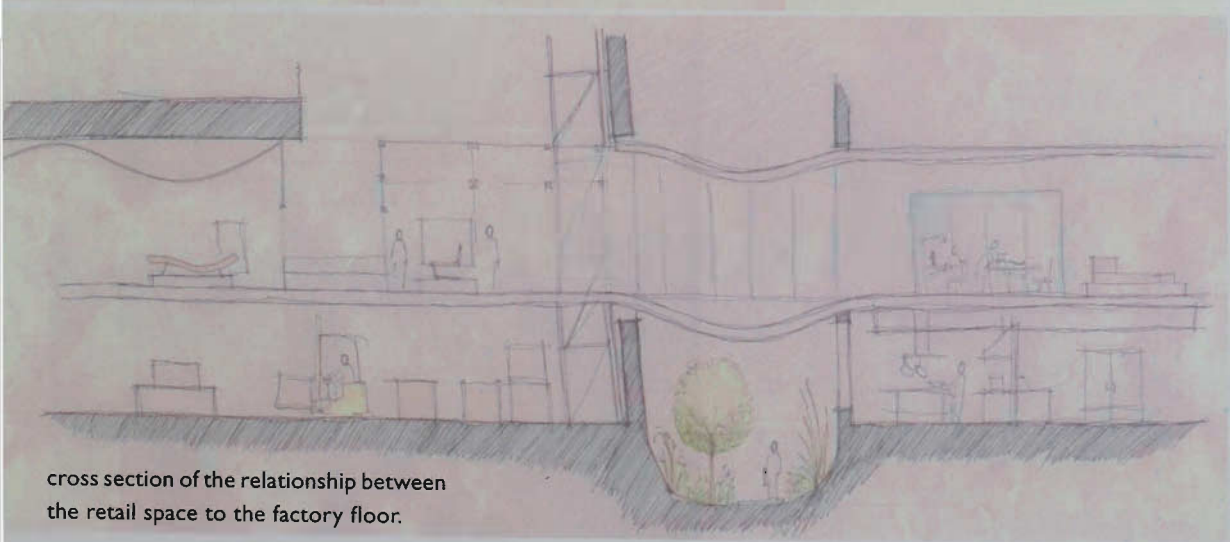
folding wall panels

wall detail of removable panels

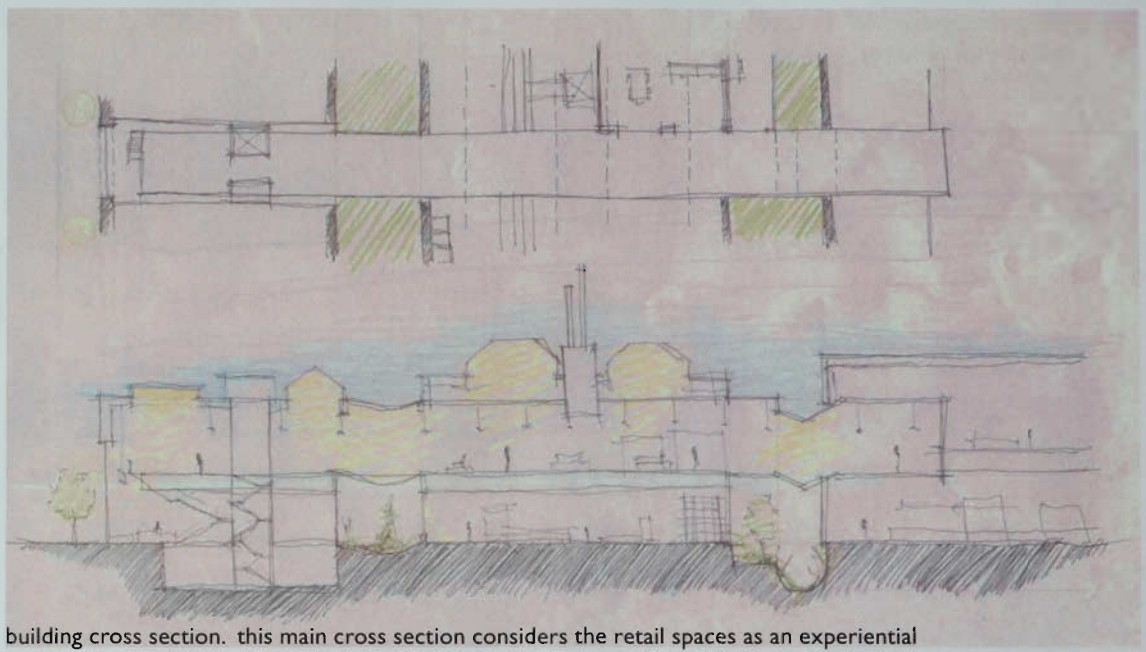
wall construction of tanker trailers



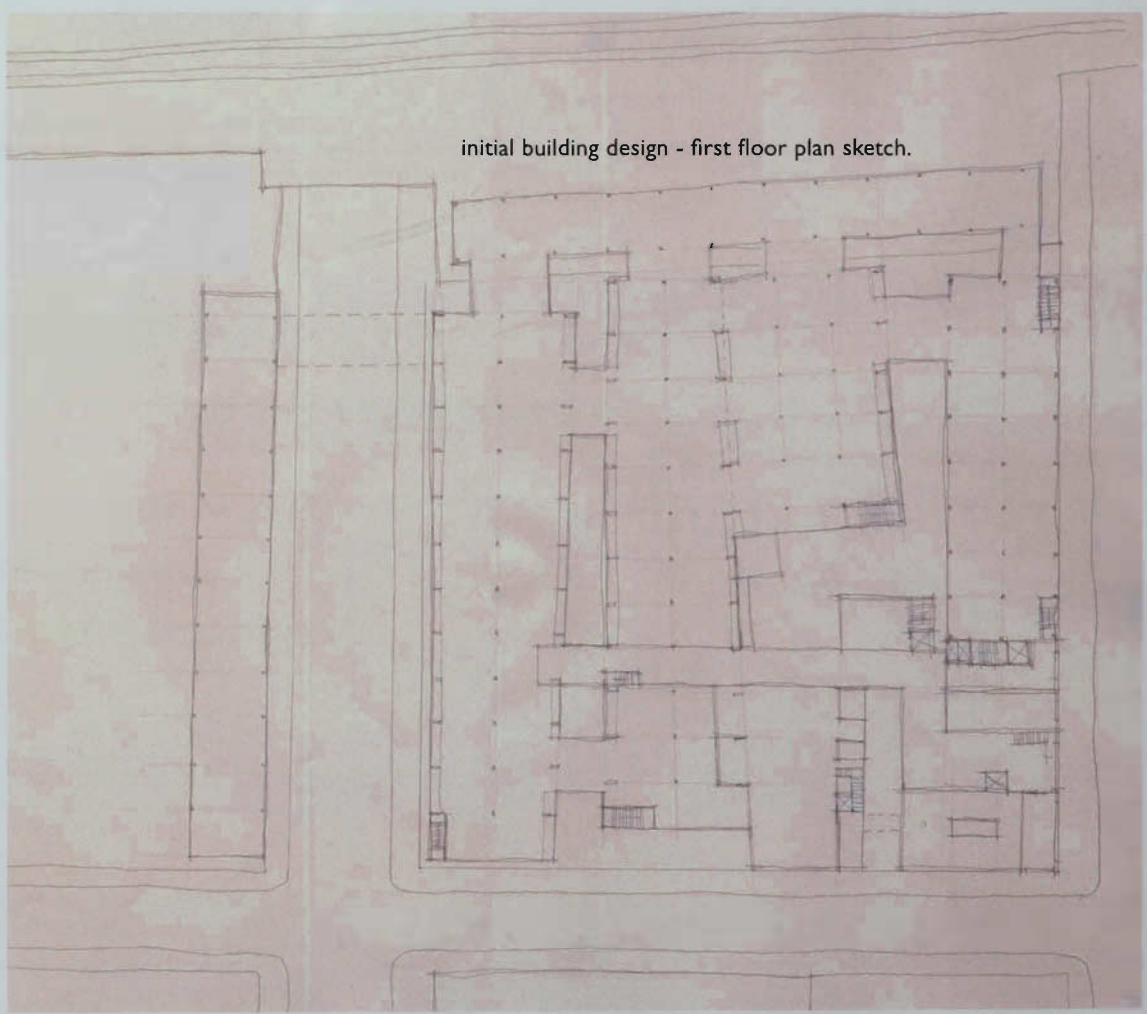
cross section of the relationship between the design space and the factory floor.



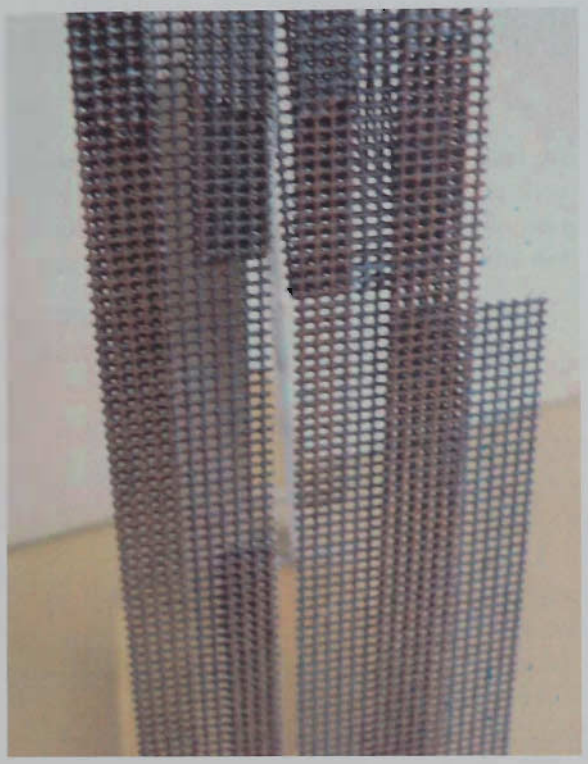
cross section of the relationship between the retail space to the factory floor.



building cross section. this main cross section considers the retail spaces as an experiential shopping environment. buyers will pass through manufacturing spaces and browse products under diffuse natural day lighting.



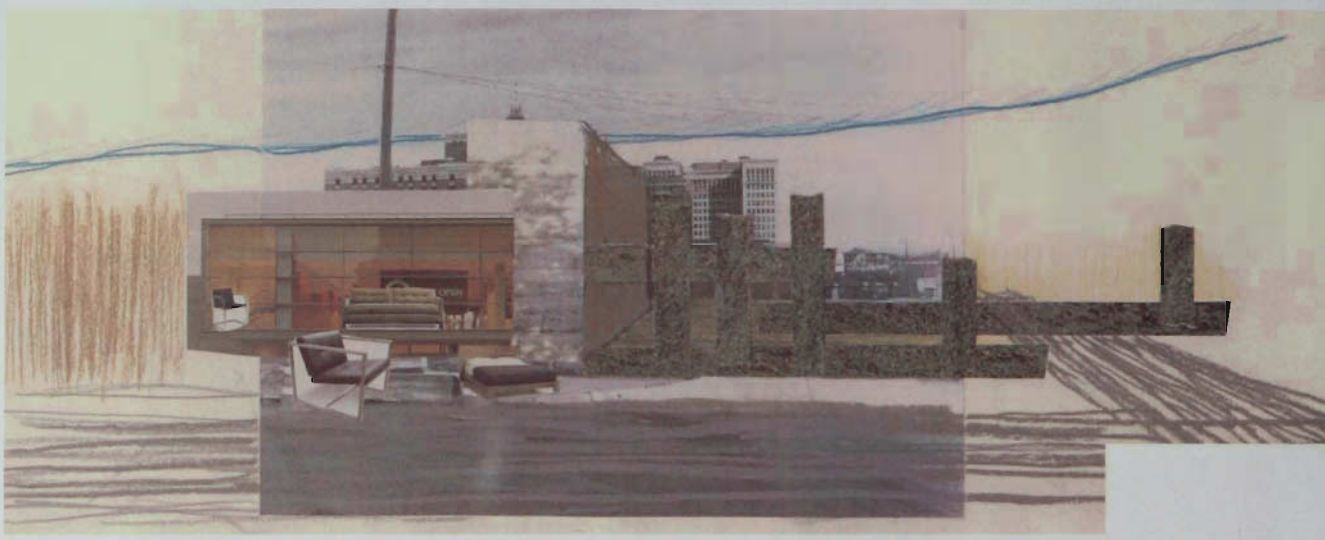
initial building design - first floor plan sketch.



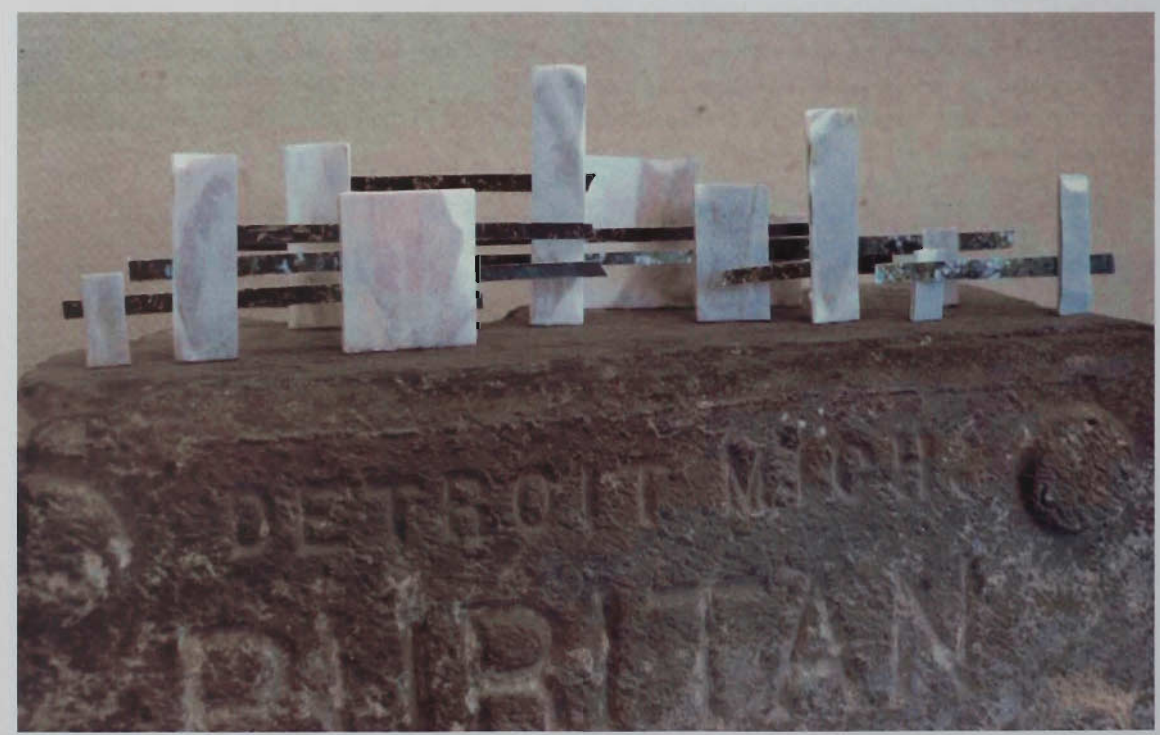
this perspective displays the exterior green space and the external metal screen wall. the wall was designed as a screen comprised of the excesses of a manufacturing process. they have a linear quality that would resemble the excess of cut sheets of corten steel. this material could be perforated with a cnc machine, and then assemble to provide a filtered screen.

these two paintings attempt to communicate the aspect of the immaterial. the corten steel curtain wall is perforated so as it allows light to pass through it. during the day, it maintains a certain solidity as it filters light into the building. at night, however, the internal lights of the building dissolve the appearance of the solid, and the screen dematerializes. corten steel will, over time, corrode away, and so the material has a distinct quality of a foreseeable dematerialization over time.

this collage study investigates a specific site condition. the retail space connects with the street, while the other program spaces spill into a large green space. this collage also beings to think about the play of materials and their associated permanence, both perceived and actual.

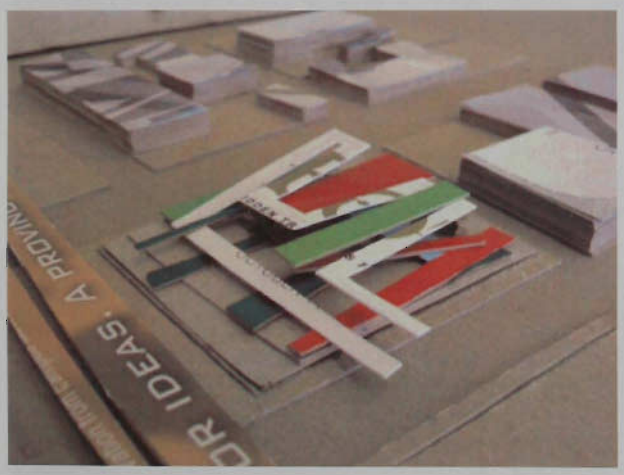


a model created from a brick found at the site. this thinks about a very ecological sentiment of resting lightly on the ground. by being less invasive to the ground surface, we preserve its qualities and abilities. structural piers support a framework of building above.

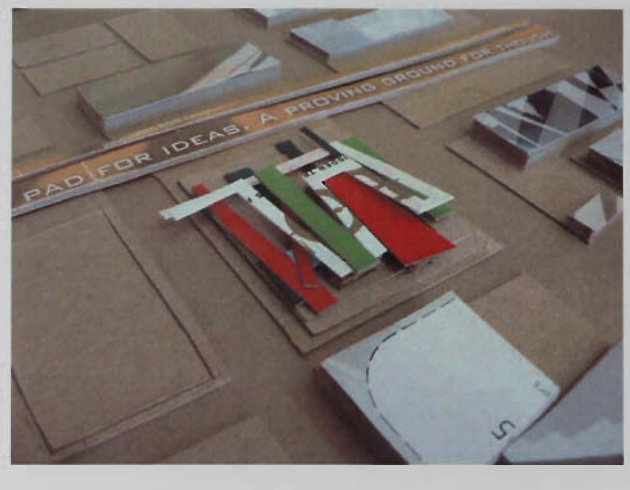


additional sketches

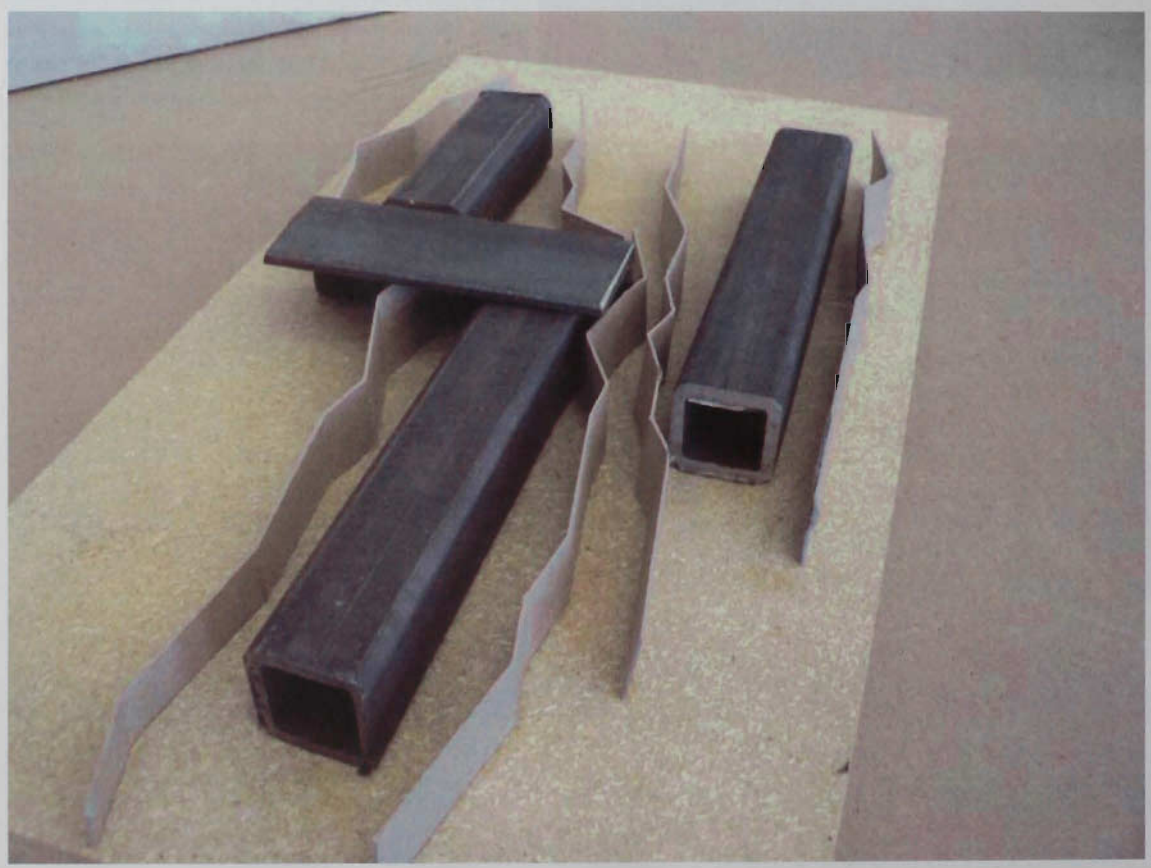
later study models investigated the use of the western and northern portions of the site, using the railway as feasible way to move materials, products, and perhaps buildings. physical obstacles like cass avenue and the railroad necessitate the constant bridging of form, though functional relationships were difficult to achieve.



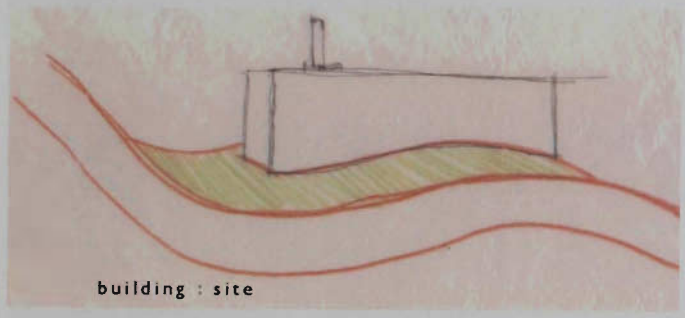
this sketch model begins to examine the overwhelming scale of the program as written at the time. by allowing the linear manufacturing process (in white) to move through the other programmatic elements, the relationship with making is established.



this lower sketch model elaborates on the idea of building core and skin. cores are seen as structural elements that contain permanent or semi-permanent portions of the program. circulation and services are also placed in the core. outside, the floor plates have flexibility, and can be removed if necessary. the steel represents the cores, and the folded parts communicate the wall envelope, which lacks any temporal definition. it is ultimately a breathable skin, acting in concert with the needs of the building's changing program.



in thinking about establishing an external architectural expression of the internal function, i began to analyze the relationship of the body to furniture. in essence, the relationship of building to site is much like the one which we share with furniture. what kind of dialogue could be created to express this relationship in a manner that could be interpreted? because the initial plan is to cut into the site and create topography, opportunities exist to play with the architecture.



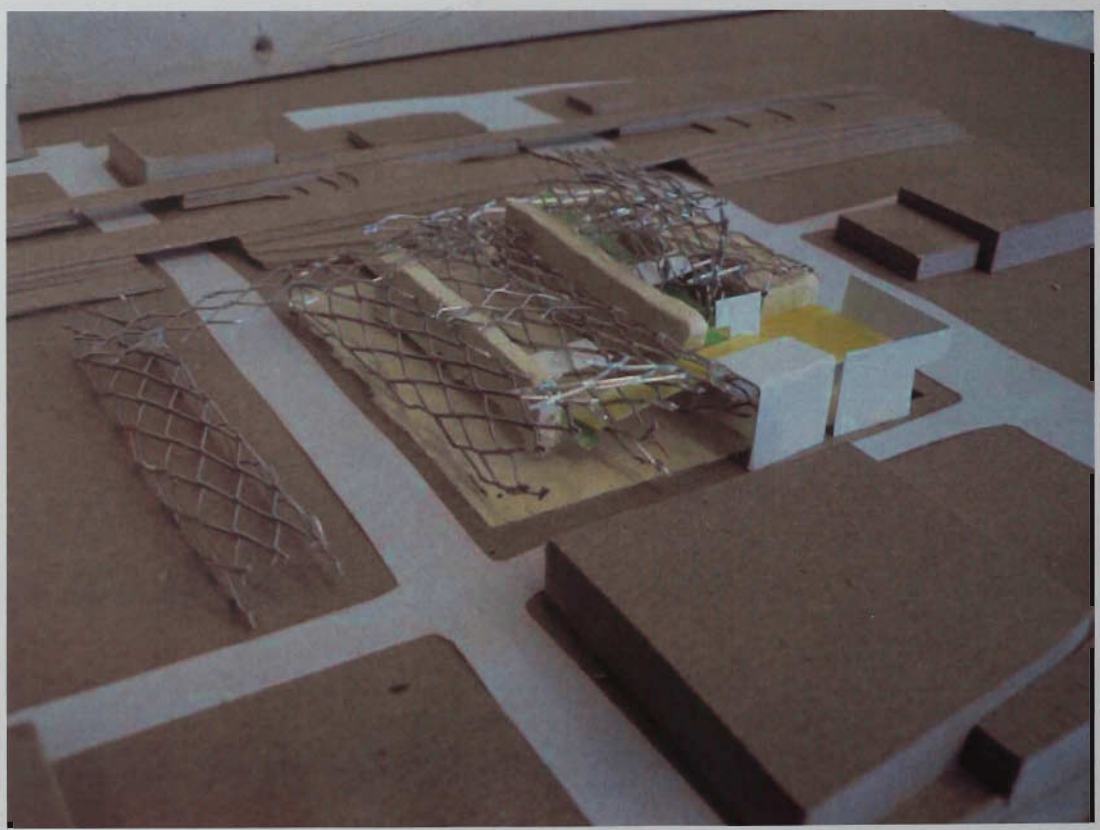
building : site

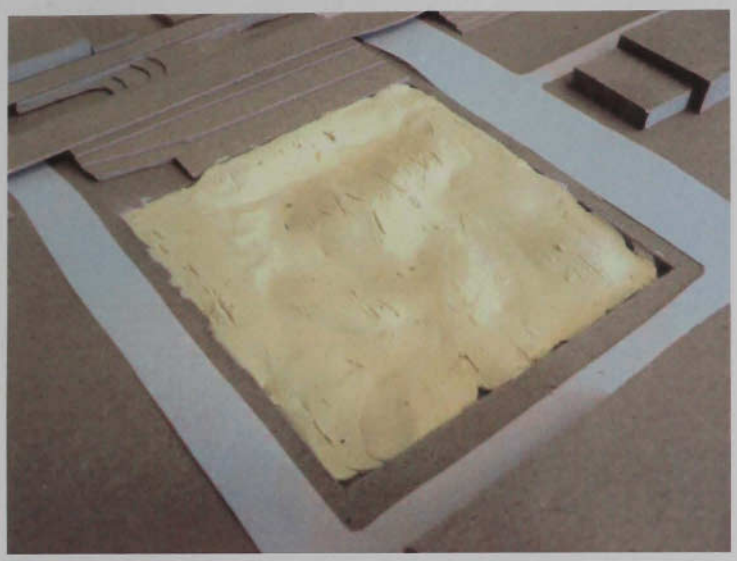
body : furniture

this model further investigate the building, site relationship. how could the rhythm of structure or architectural expression reveal more about its dialogue with the site?

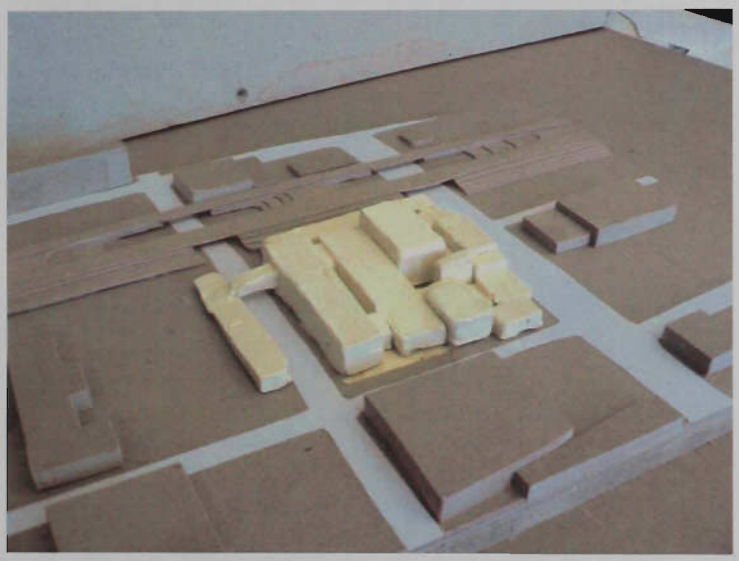
this model represents the final architectural solution in the schematic design process. the design is dependent on a series of connected pavilions separated by green spaces, with other programmatic elements dispersed in these spaces or penetrating the manufacturing functions. through this model, it was determined that the program was far too large for the site for my design intentions.

final sketches



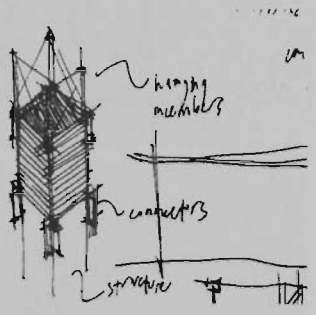


the image above begins the idea of an introduced topography .

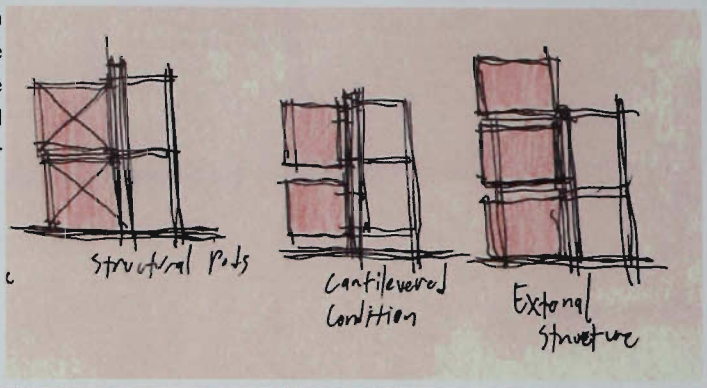


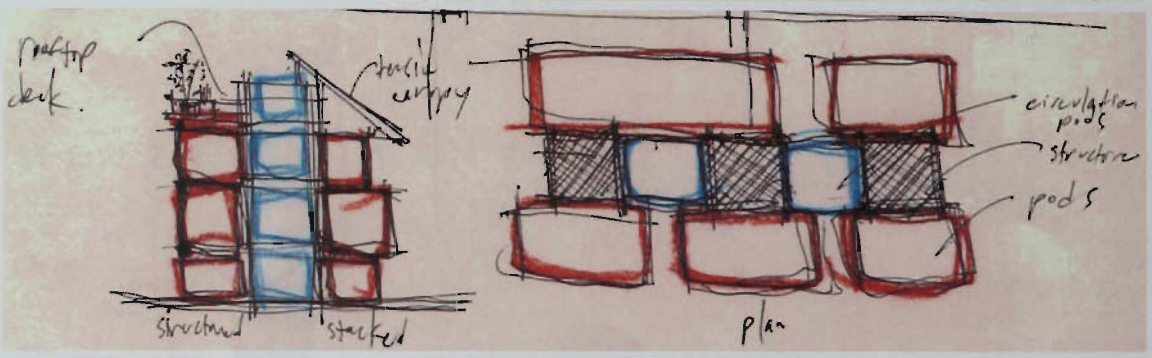
this model displays the massing of the previous final model. although its scale is reasonable in the context of the site, it is somewhat impractical to stack manufacturing functions into three levels and create this level of density throughout.

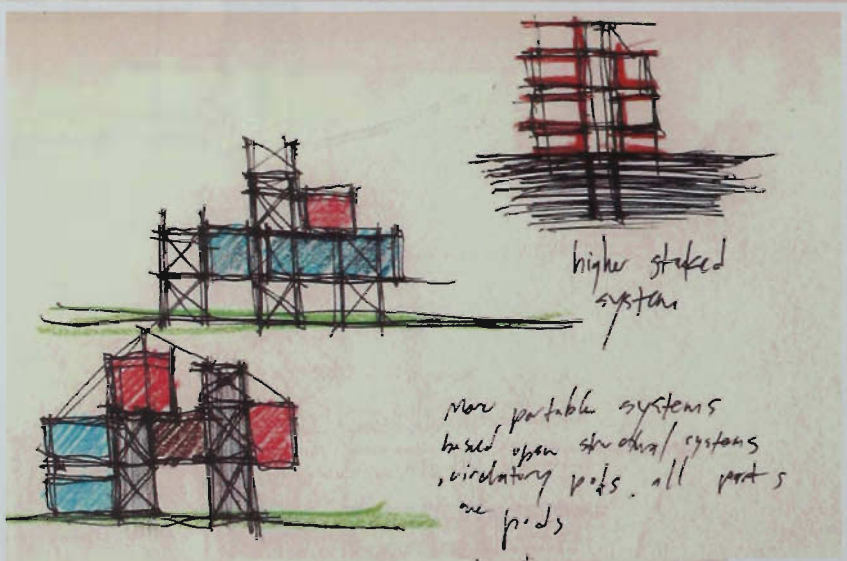
SCHEMATIC DESIGN

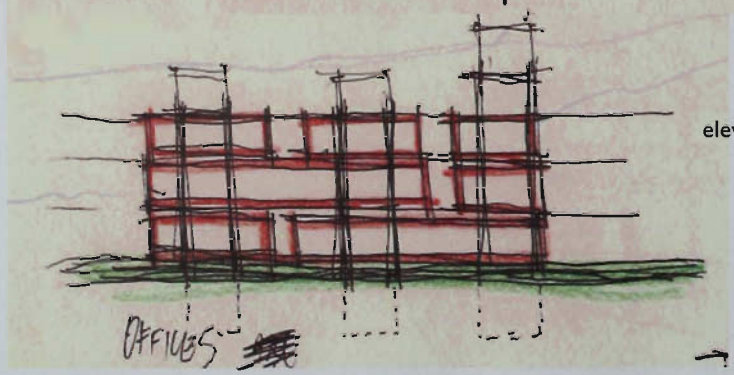


external pod typologies and studies. analyzing the different configurations, structure, and tectonic systems. do pods self support or become dependent upon another system? which portions are programmatic and what other become circulatory? all of the pods were designed to be halved and placed on a trailer for road travel.

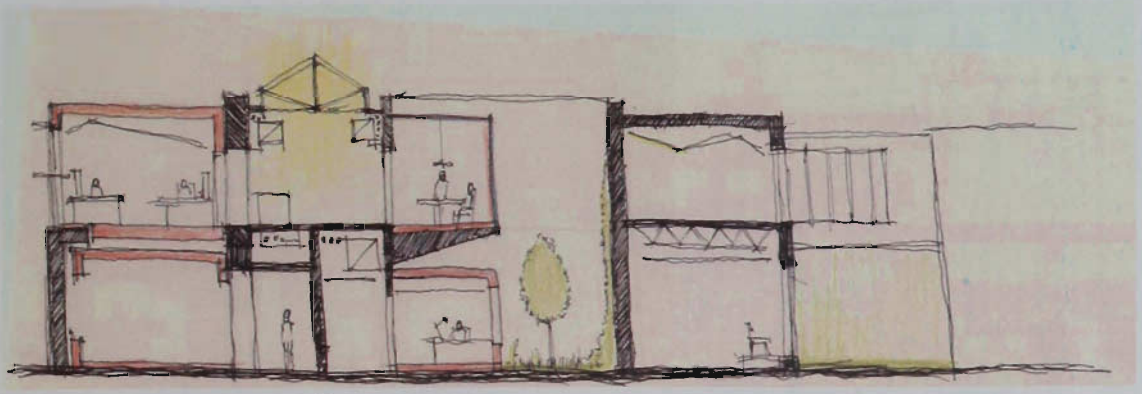


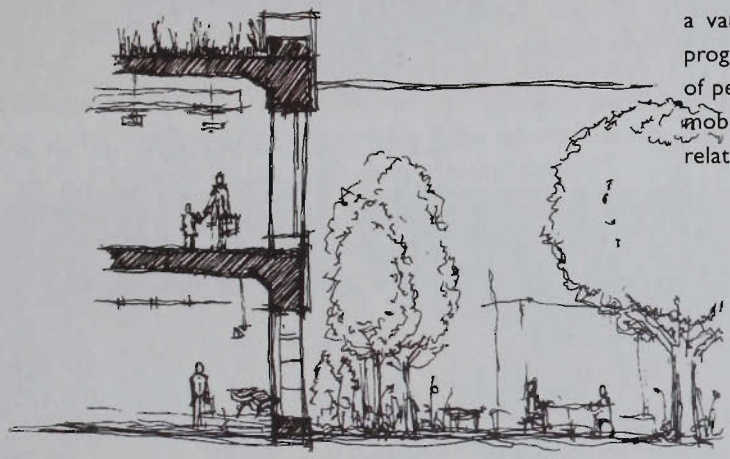




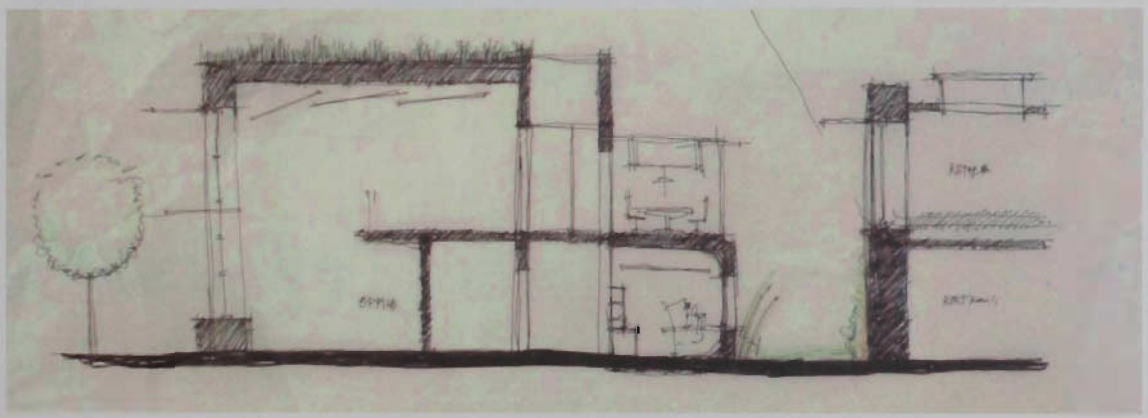


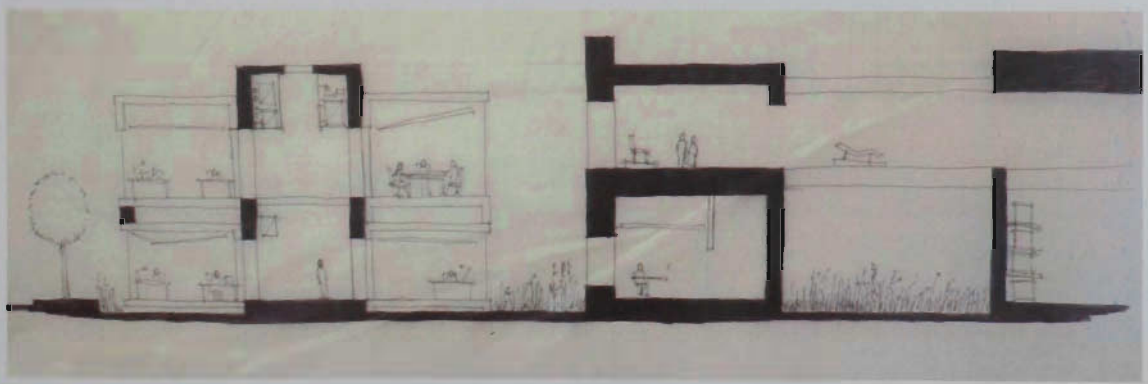
elevation of the office pod systems

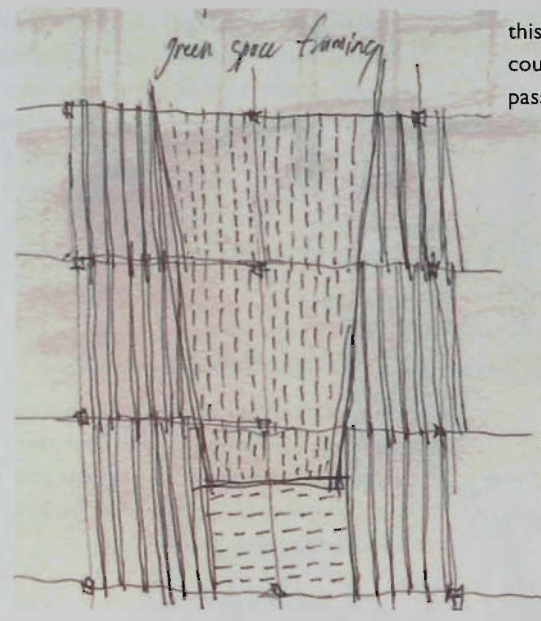




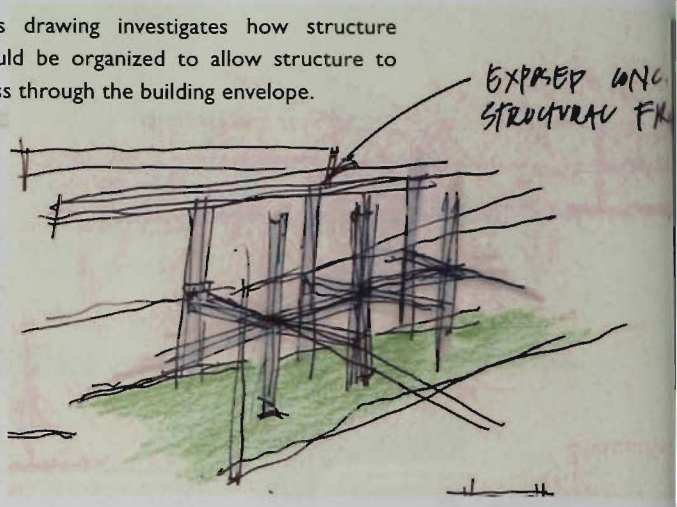
a variety of sectional studies investigating programmatic relationships, and questions of permanent portions versus portable and mobile components. these also looked relationships to green spaces.



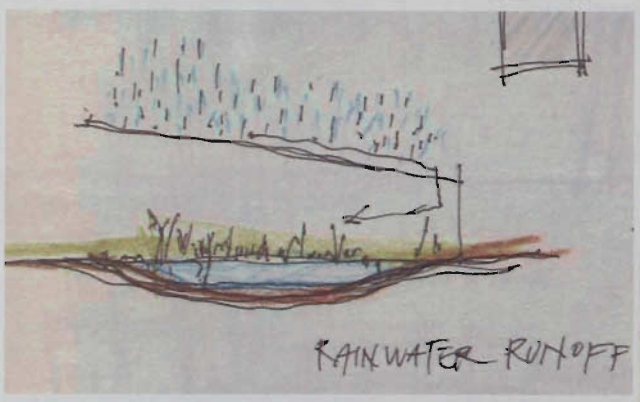




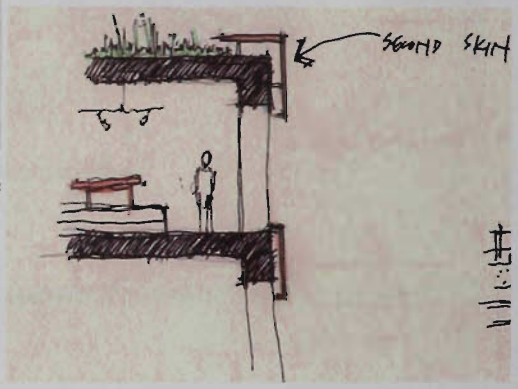
this drawing investigates how structure could be organized to allow structure to pass through the building envelope.



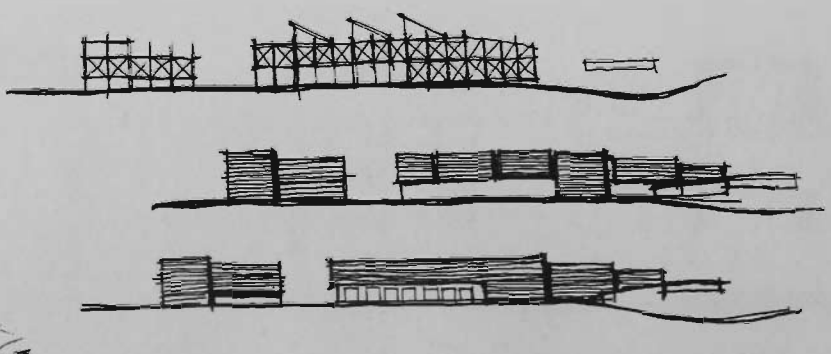
exterior structural framing in the green space to accommodate building out the space for new functional needs. this other sketch illustrates the idea that these green spaces could act as rainwater collectors.

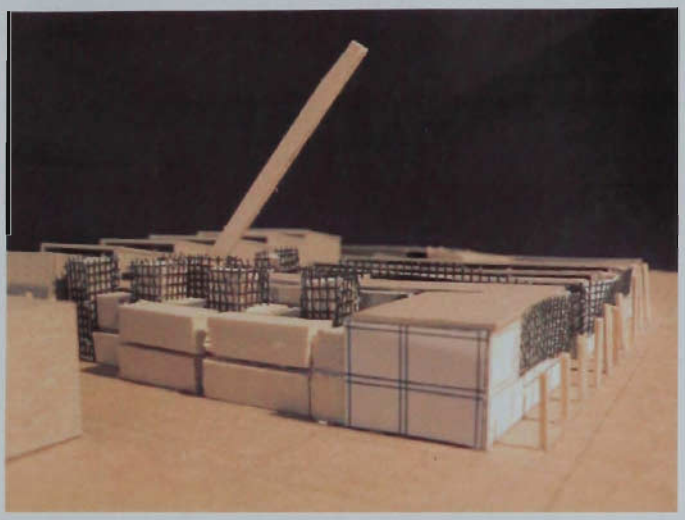


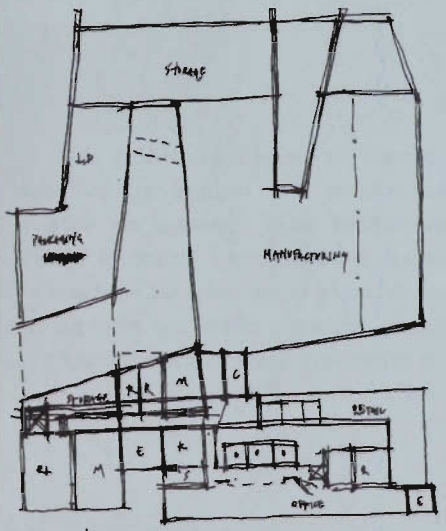
another sketch looking at the concept of the second skin.



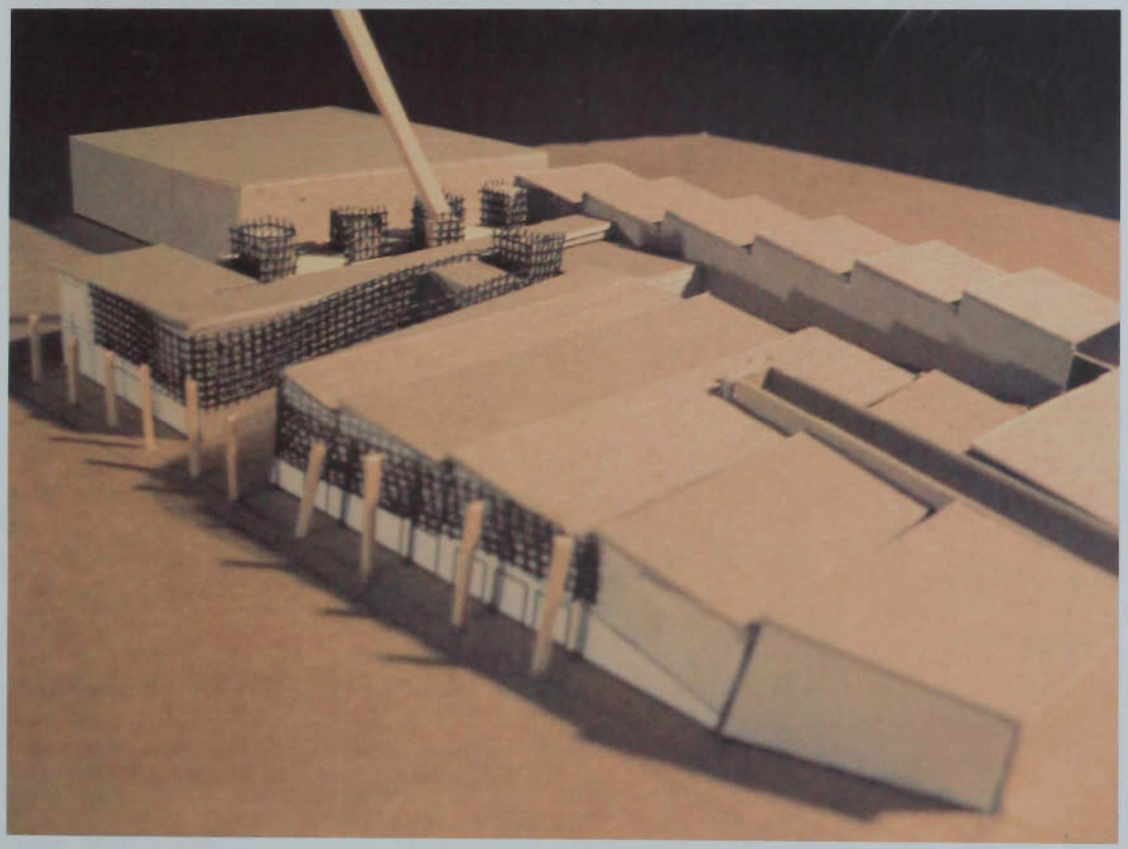
elevation sketches investigating structure and aesthetics.

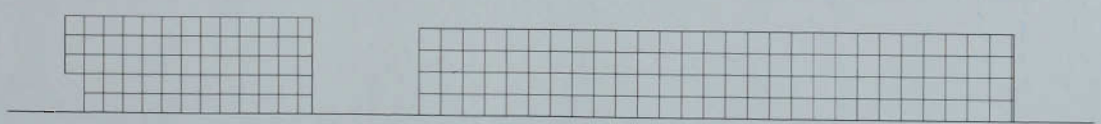




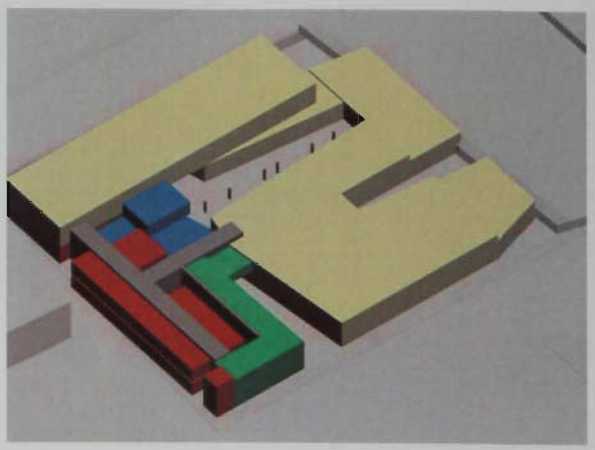


models, plan sketch, and elevation sketches of the schematic design proposal. green spaces carve out form, while the saw tooth allows in natural daylight.

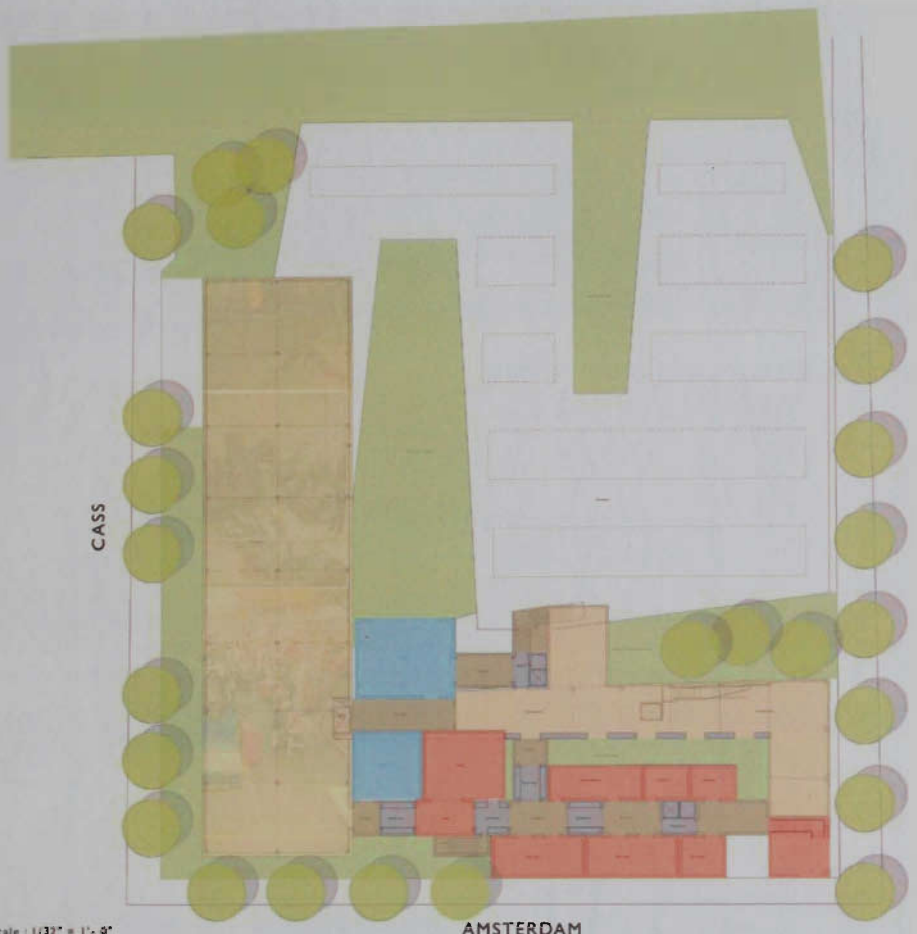




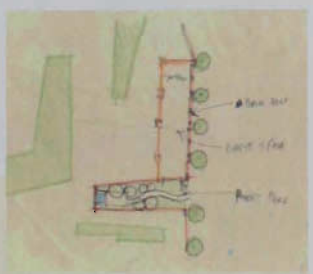
schematic viz model and first floor plan.
this scheme was focused on the concept of externalized pods organized on solid cores of vertical circulation and structural systems. the manufacturing spaces are more solid and permanent systems, while the offices and retail portions were less permanent. green spaces permeate the building form.



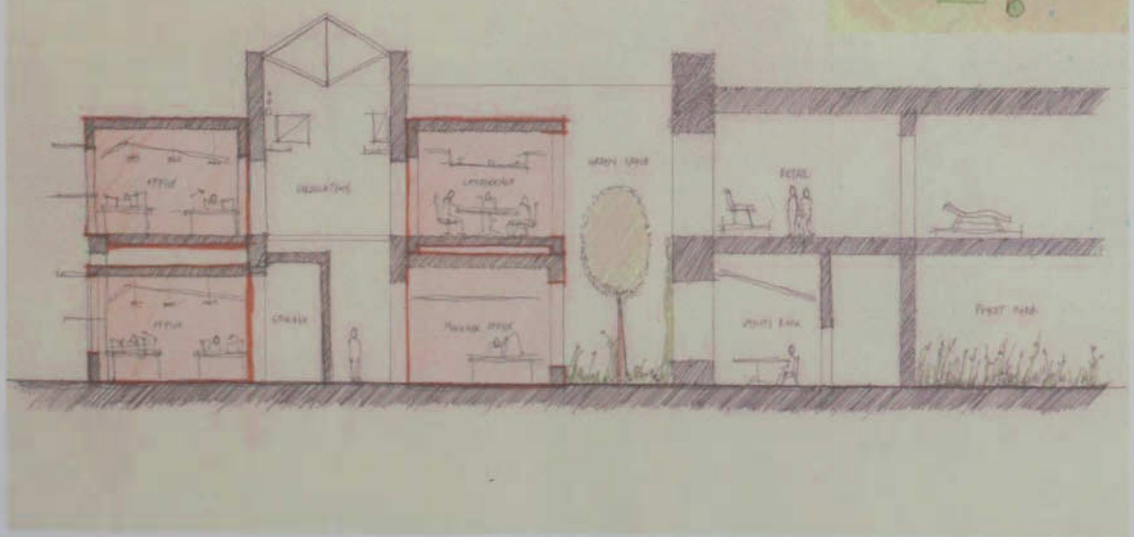
First Floor Plan scale : 1/32" = 1'- 0"

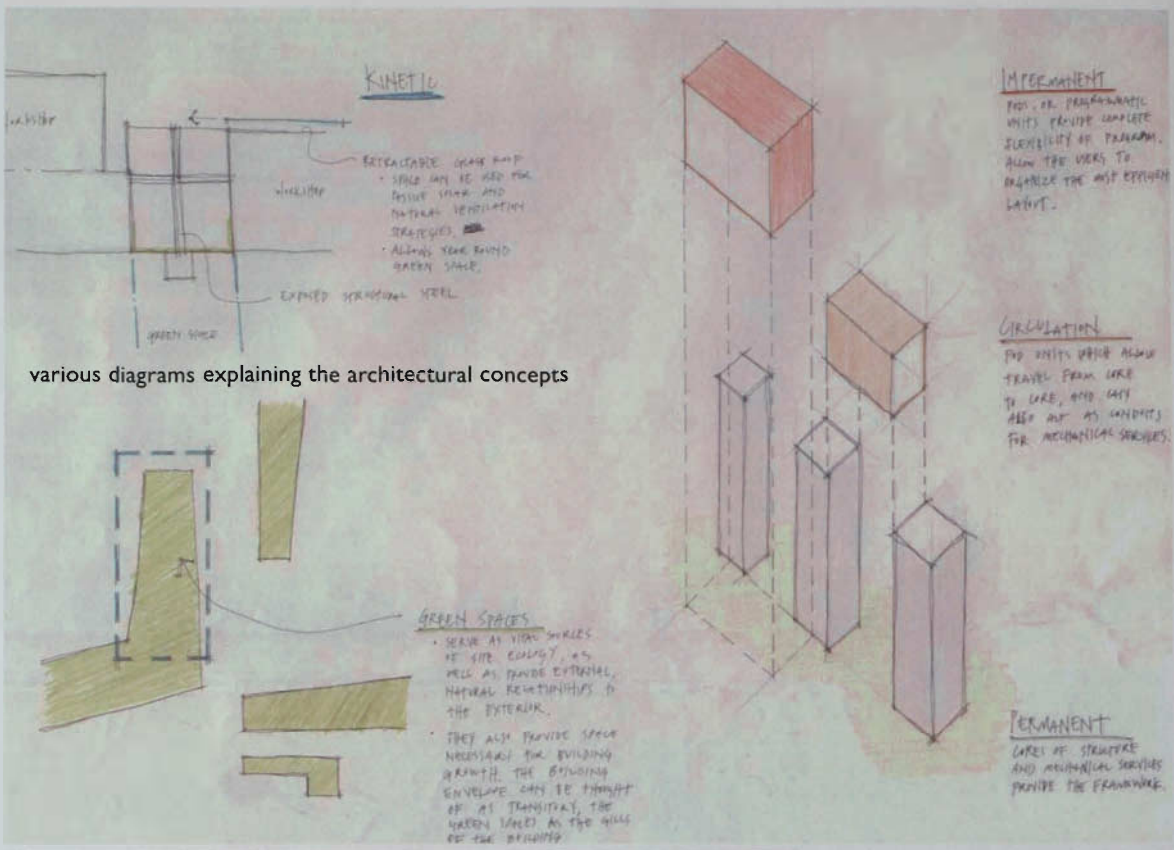


Second Floor Plan scale : 1/32" = 1'- 0"

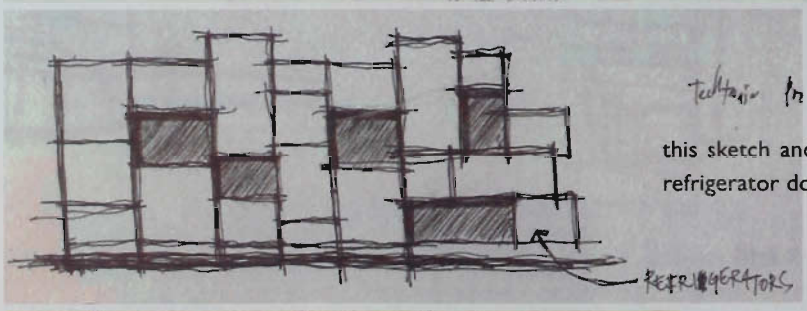


second floor plan of the schematic design.
another sectional study and pocket park diagram. this scheme looked at the concept of central structural cores that allowed attachment of pod configurations.

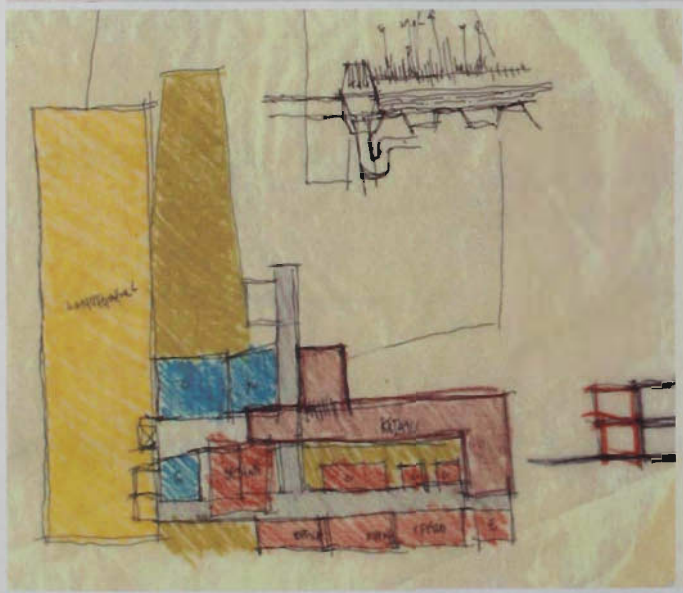


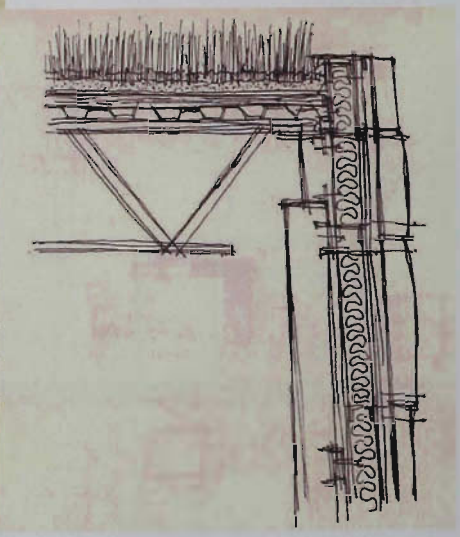


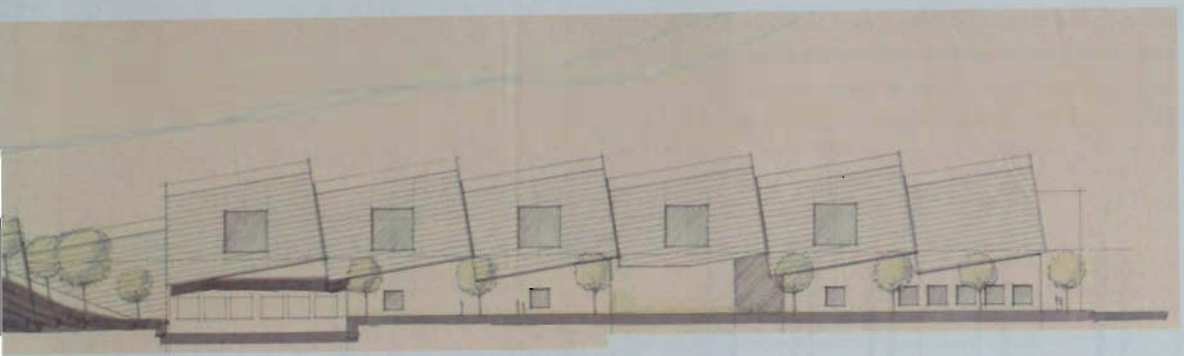
various diagrams explaining the architectural concepts



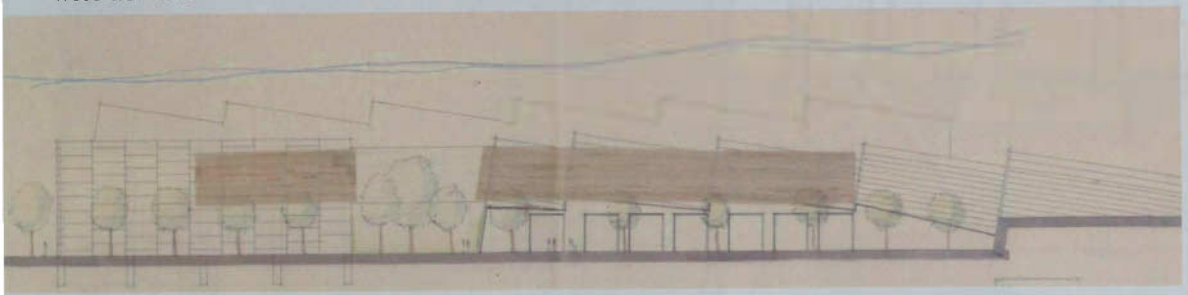
this sketch and the investigates the use of old refrigerator doors as a skinning material.



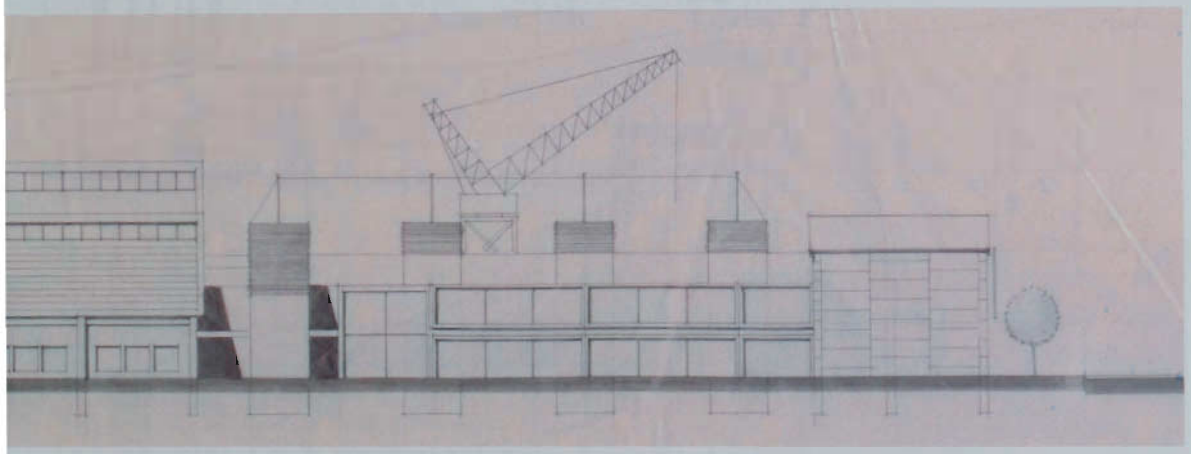




west elevation

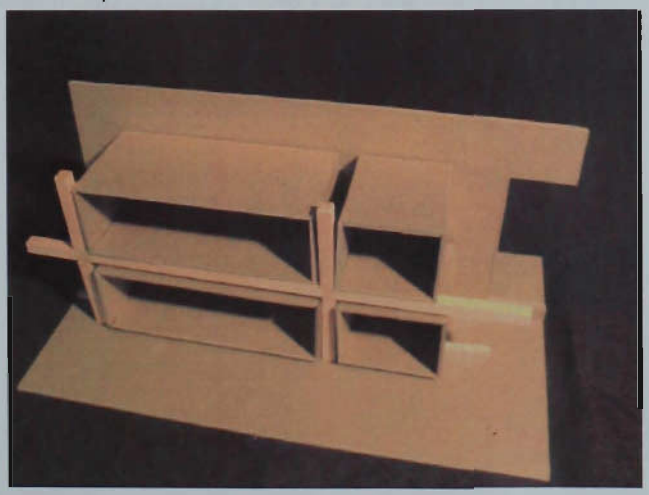


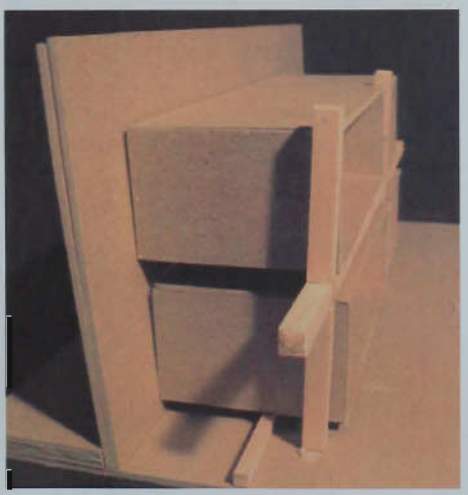
east elevation fronting wooward, with consideration for the second skin.



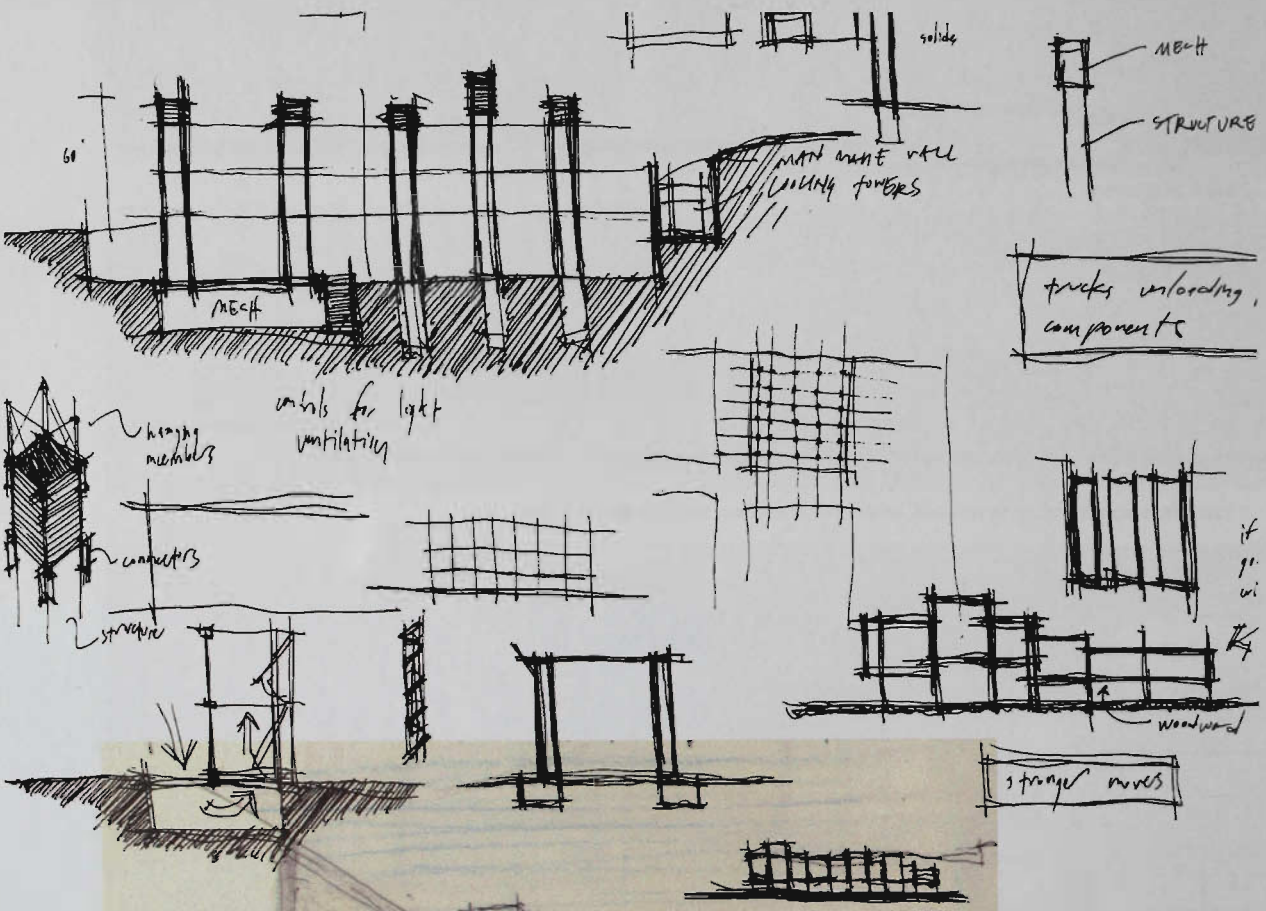
south elevation displaying the pods, vertical structure and crane.

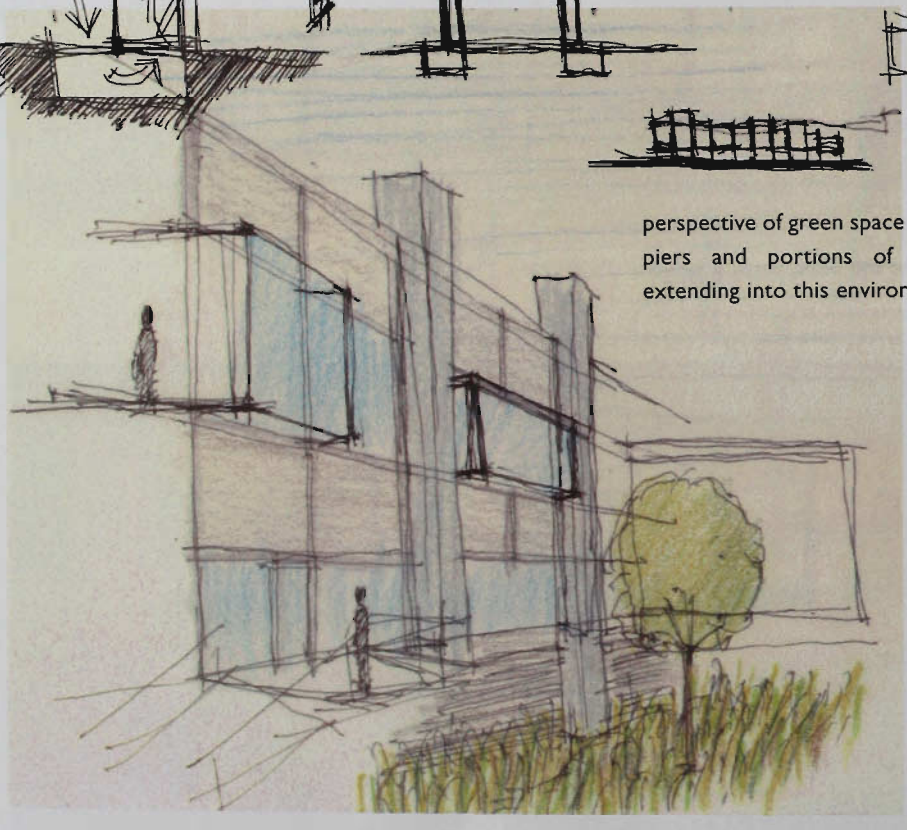
model of pods on structural frame and solid central circulation core.



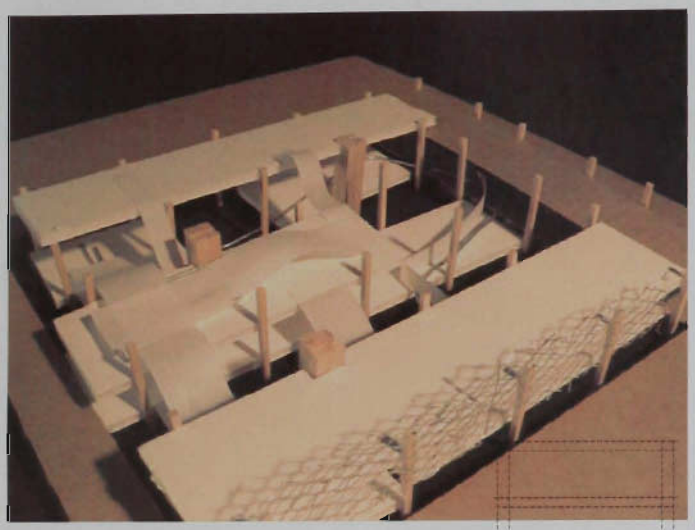


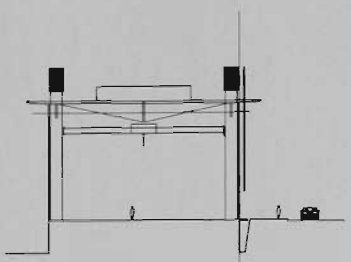
following the schematic design, new sketches began to think a more modular structural system of concrete piers placed as a grid on the site at 80' spacing. mechanical spaces would be placed below grade, and the entire site would be excavated 14' below grade.

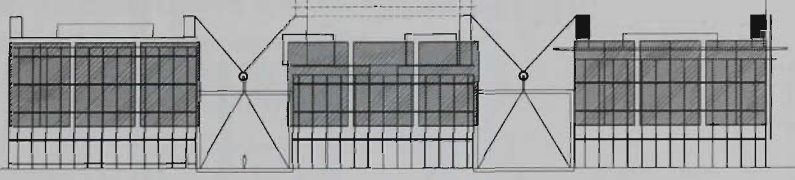


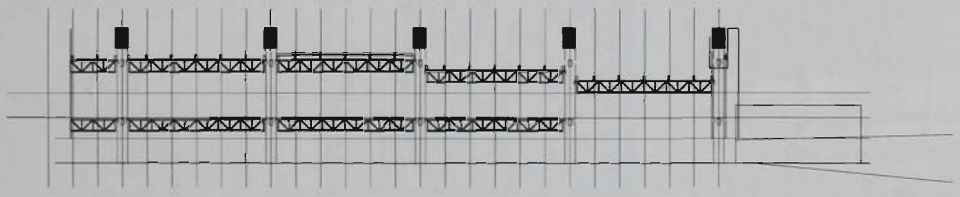


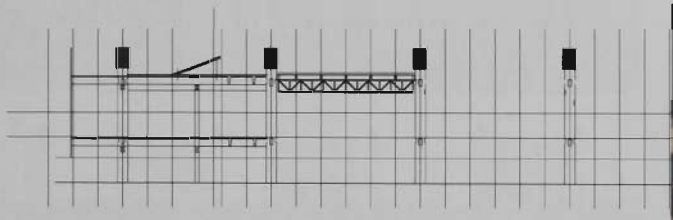
perspective of green space with the concrete piers and portions of the architecture extending into this environment.

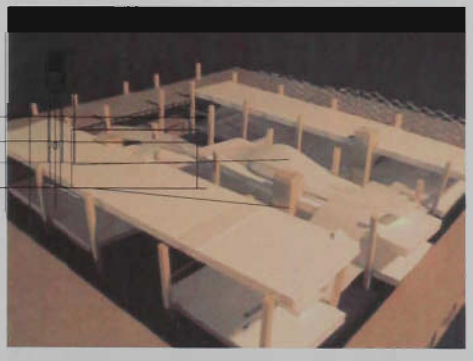


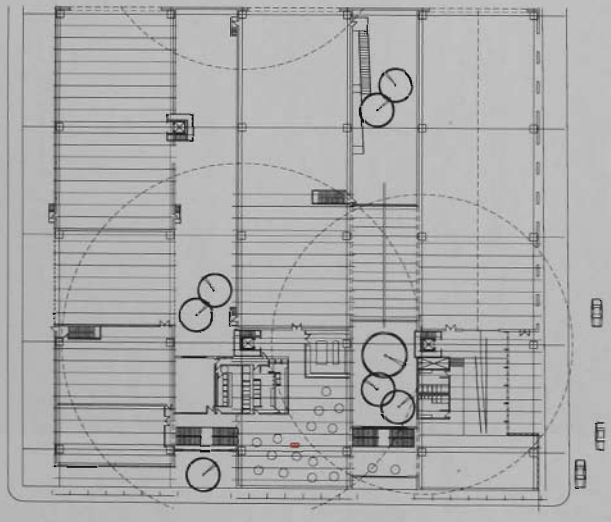




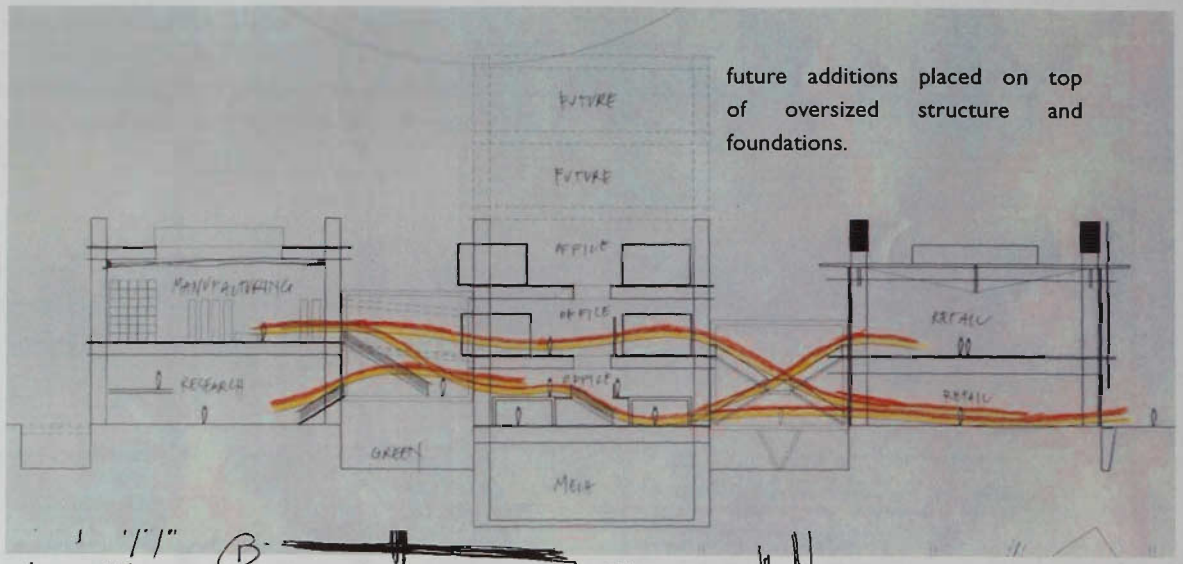




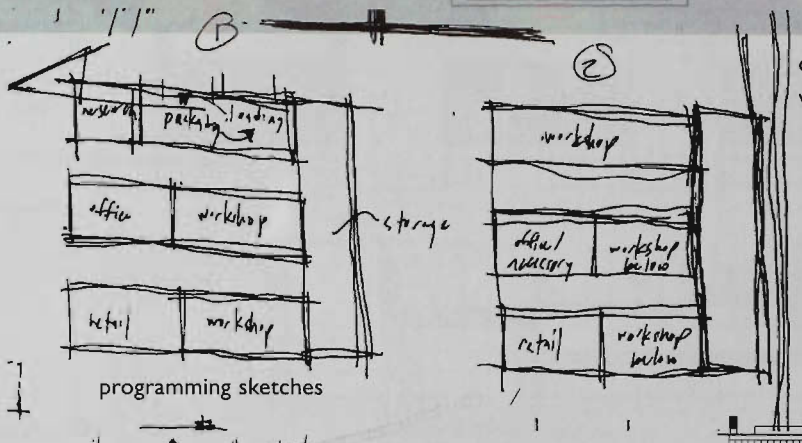




elevations, sections, models, and plans investigating this scheme. circulation between the bars of the building form are conceived as mobile components and serve as vital connectors of program adjacencies.

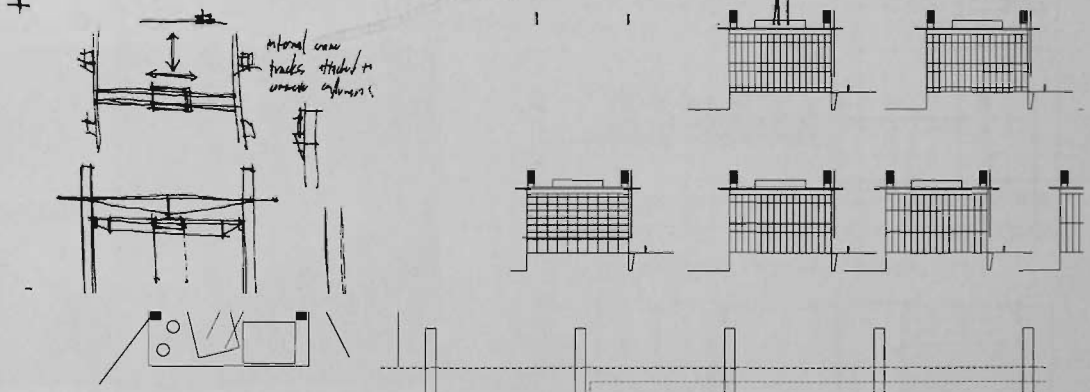


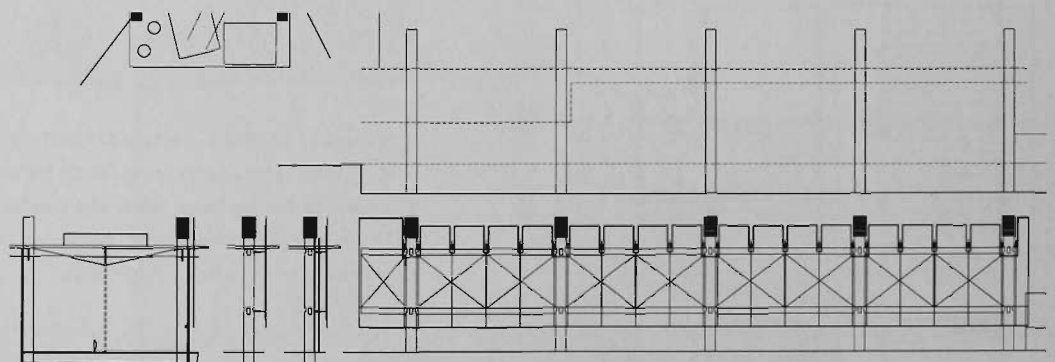
future additions placed on top of oversized structure and foundations.



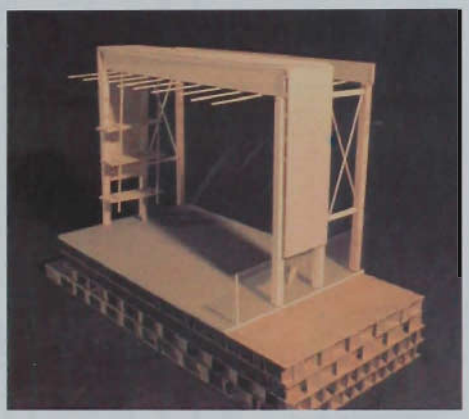
circulation and program distribution within the building structure.

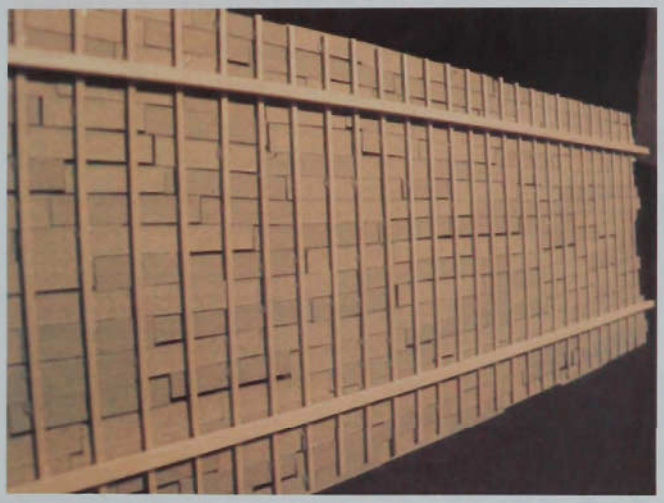
programming sketches



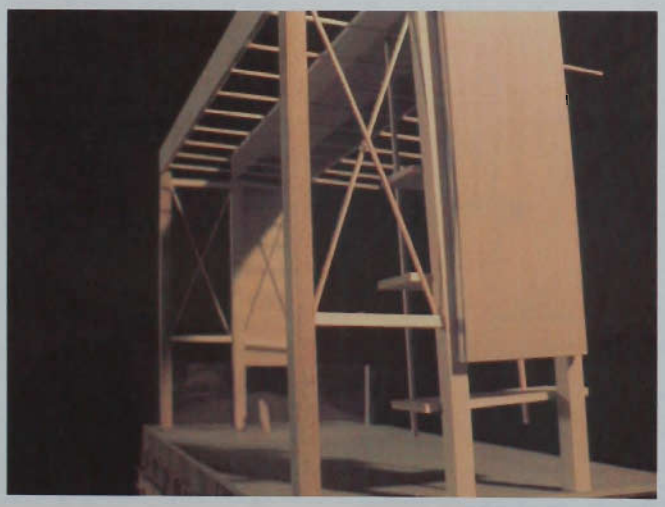


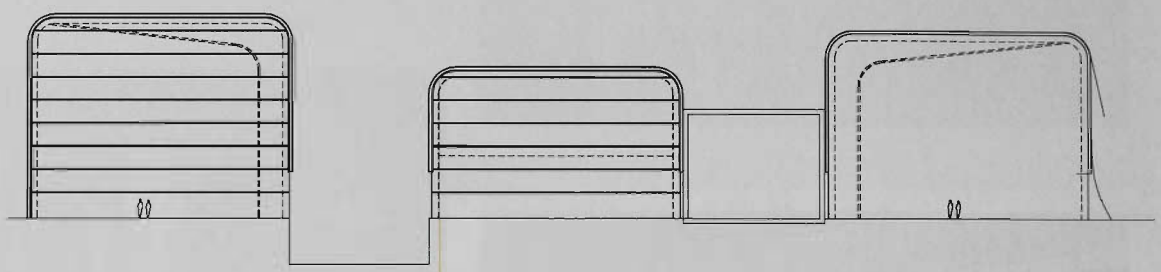
elevation studies. construction details and structural conception.



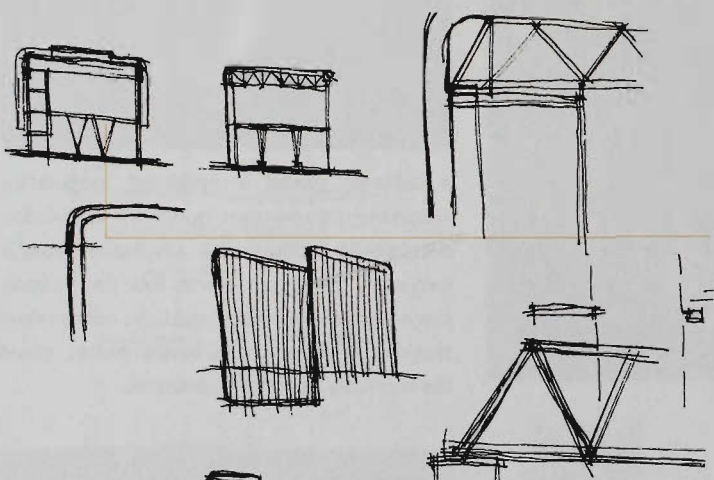


a tectonic model investigating modularity, proposing intermittent floors for circulation that would facilitate the adaptation from a two story space to one with four floor plates. the other model investigated the corten skin, thinking of how these waste pieces could theoretically become expressed.

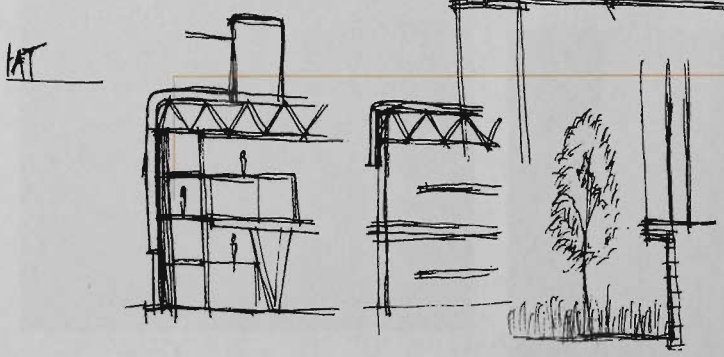




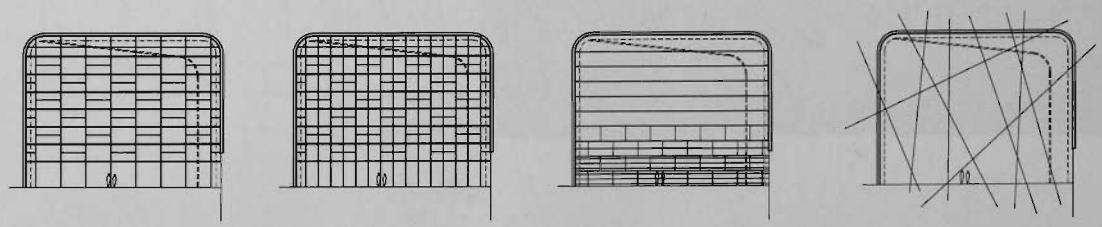
considering a different aesthetic which is more relevant to the expression of furniture. the second level is conceived as an independent system self supporting and capable of moving and being removed.

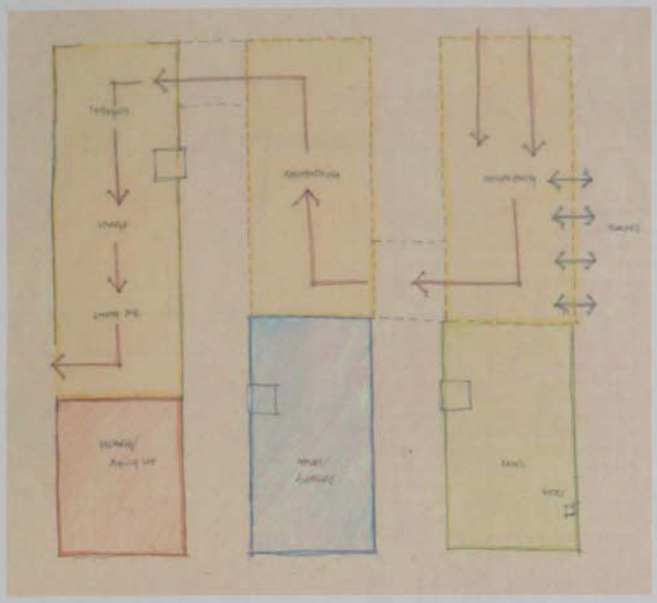


also included in this thought process was the notion of a removable flooring system. the second floor plate would be modularized and capable of shifting or being removed as necessary. these types of large scale transformations are somewhat difficult to make believable.

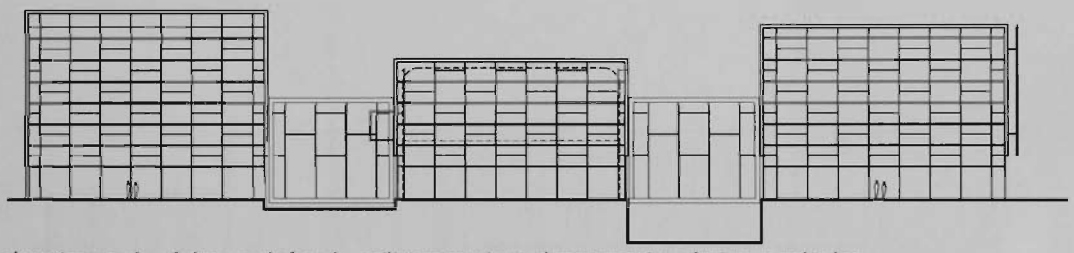


these studies also considered loading one side of the building form with structure and other services, including circulation, creating an organizing spine. this allowed minimal structure on the opposite side.

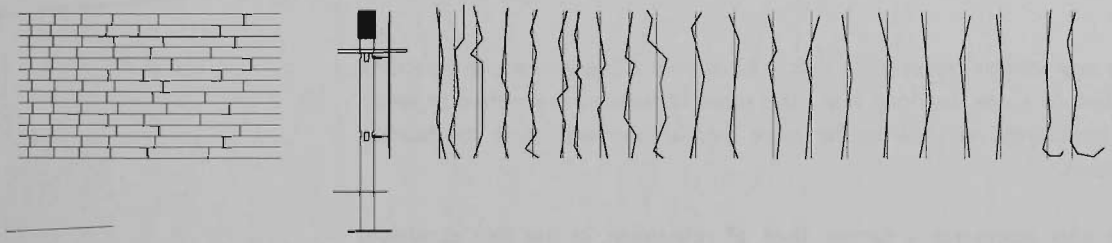




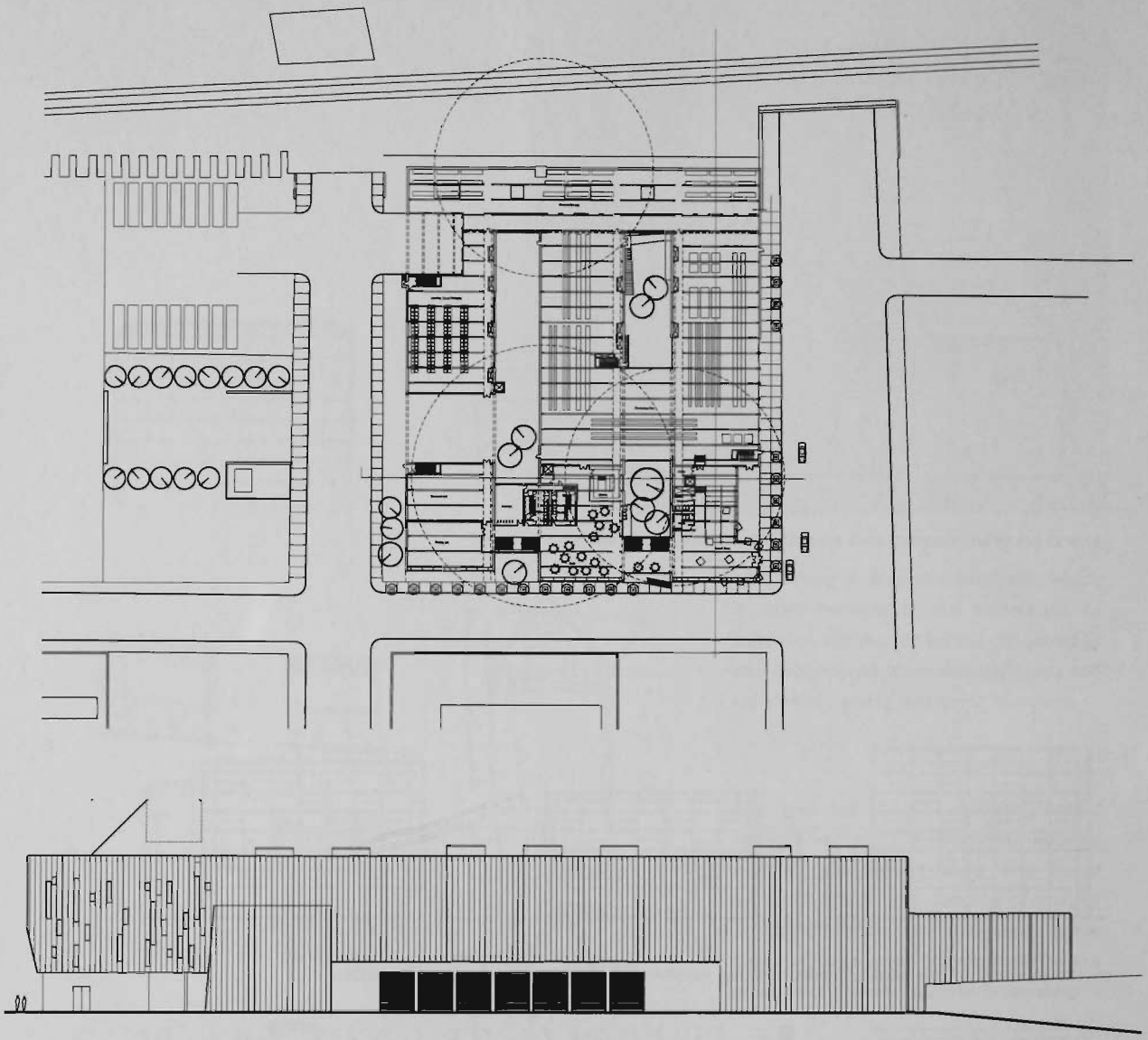
general program diagram and manufacturing process sketch.



elevation study of the south facade, utilizing passive solar strategies, glazing, sunshades.



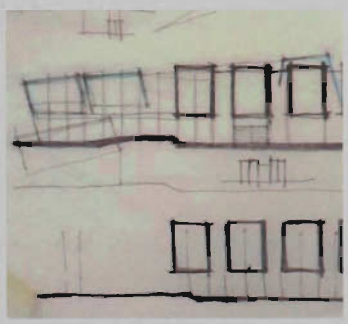
skin studies - variations of surface and skin
skin was intended to provide articulation to the generally mundane and rational system of expression. rhythm, tension, release, cut, offset.

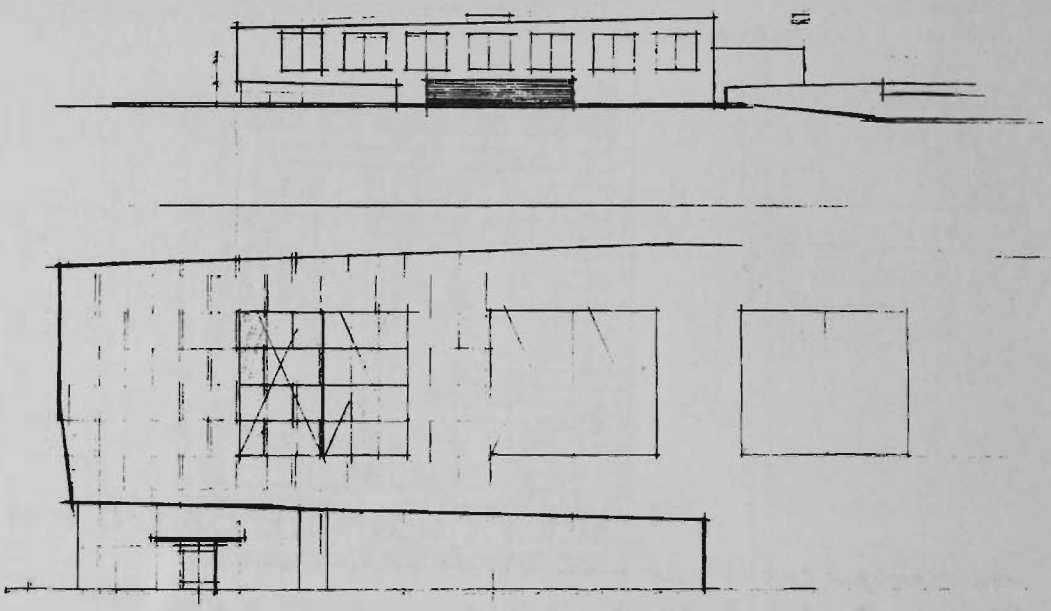


this new scheme represents a shift in focus from a 2-way long span structural system to a one way long span. this move considered the system to retain its modularity, yet allow for far more specific interventions to the building systems.

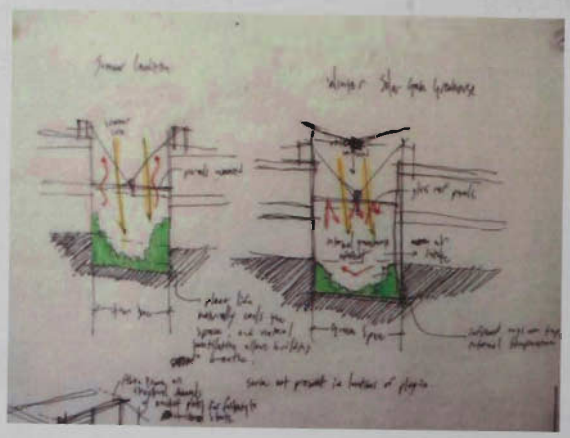
this also represents a further level of refinement in the skin condition, materiality, fenestration development, and building form. the building plan and program placement are also refined to another level of development. this new developing scheme translated into the design development scheme.

DESIGN DEVELOPMENT



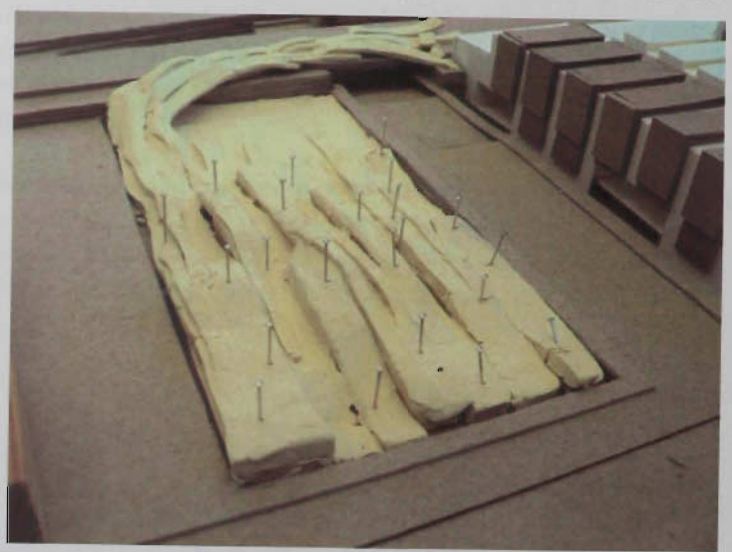


the design development stage resulted in further consideration for the form and aesthetic decisions in the project. the architectural responses to the thesis questions are further investigated.

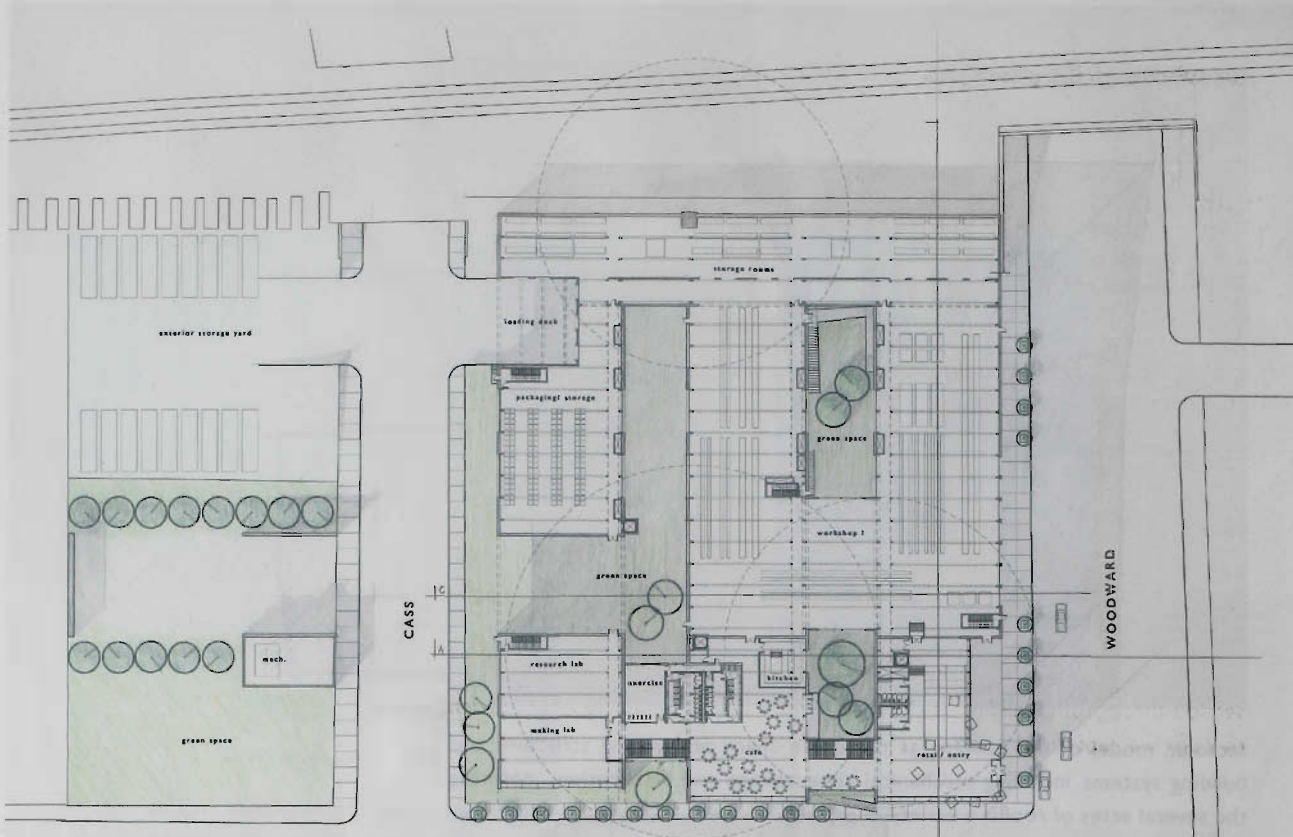


to the right are sketches considering the green space as seasonal inhabitation. in the winter, the space acts as a greenhouse, trapping heat and allowing it to flow into the building. in the summer, it dissipates heat when the roof glazing is removed.

below, a conceptual model for an adjacent park. shifting topography and creating a pedestrian path.



tectonic model of the building at the green space articulating structure and building systems, including mechanical air exchange and distribution. covering the several acres of roof is a variety of grasses.

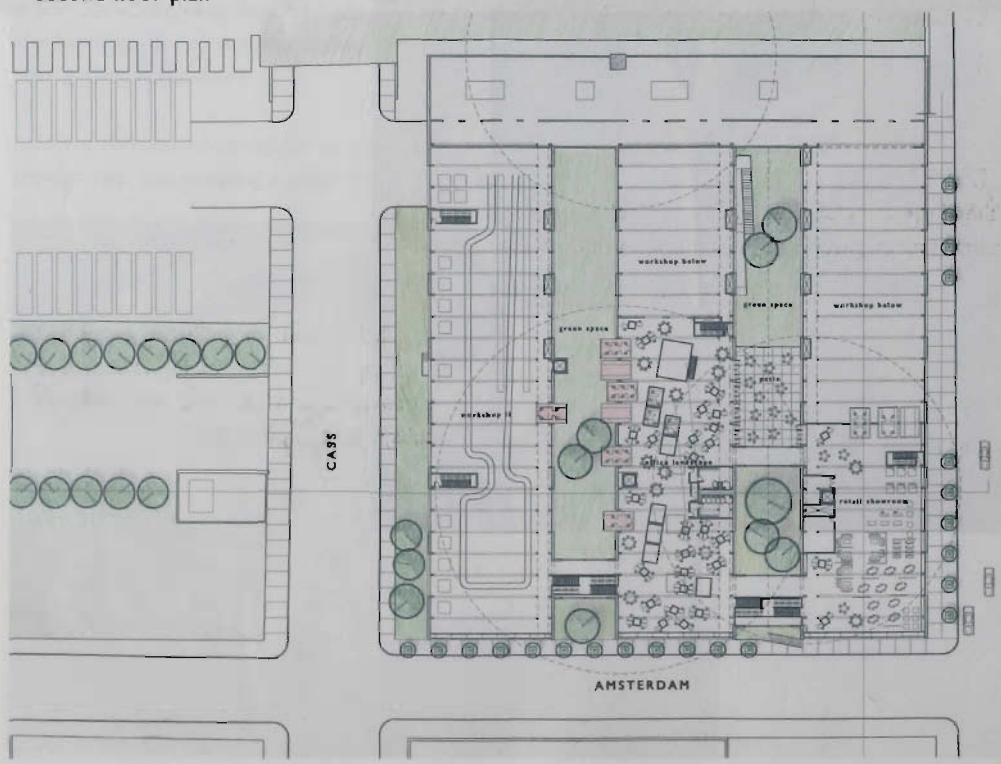


first floor plan at the design development stage.

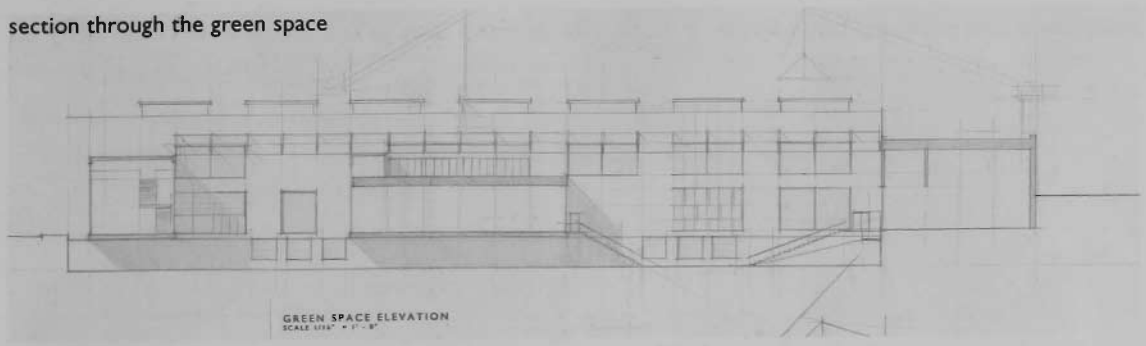
FIRST FLOOR PLAN
SCALE 1/32" = 1'-0"

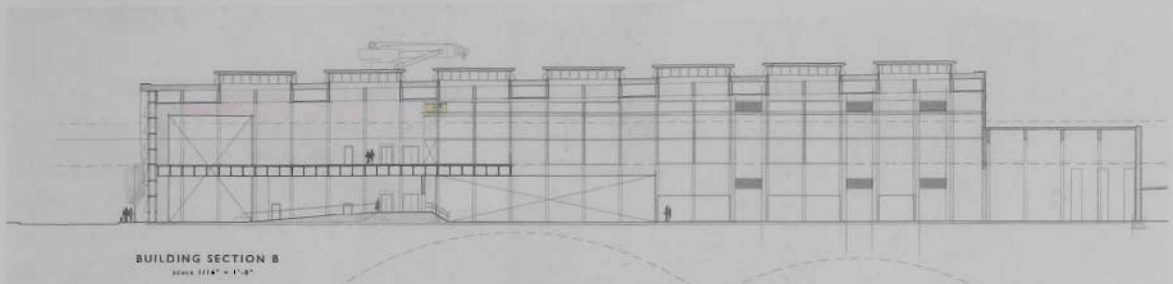
SHELF LIFE

second floor plan

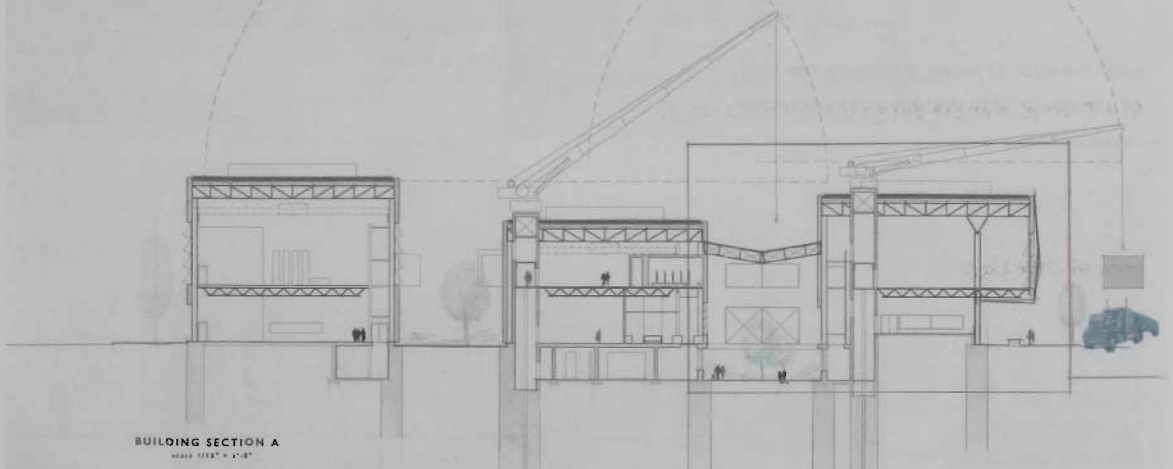


section through the green space

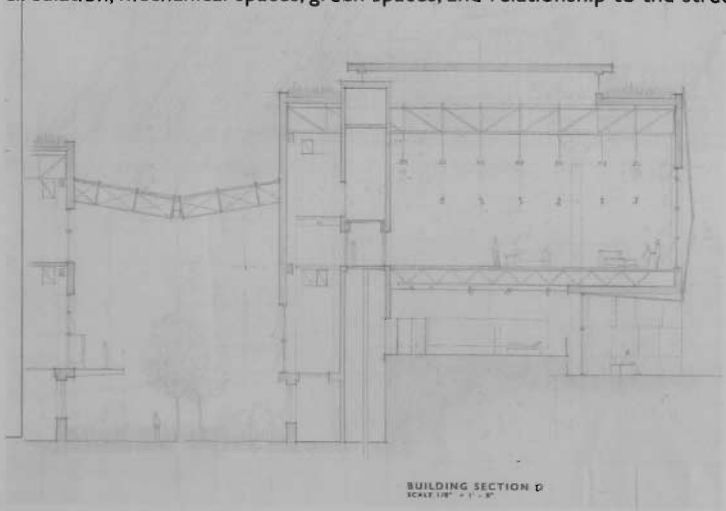




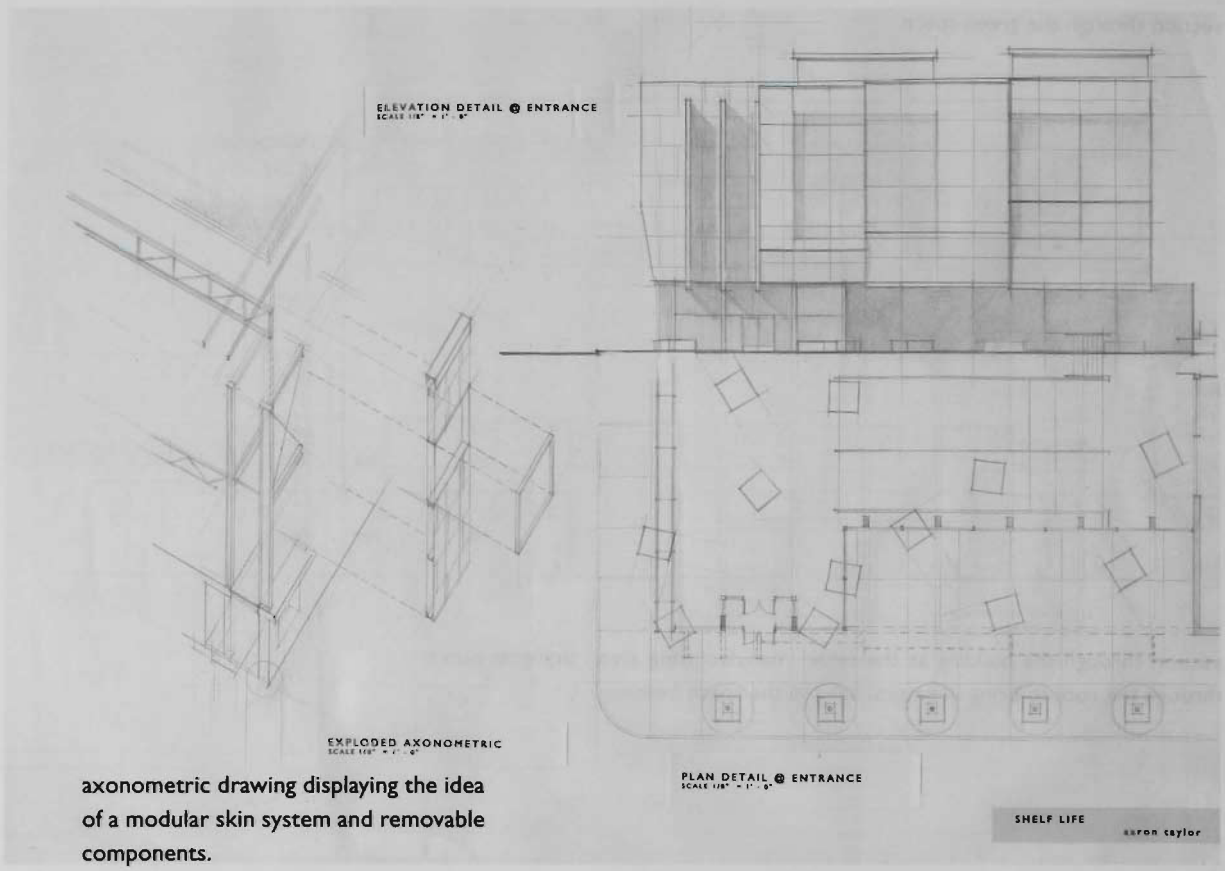
section through the building at the retail/ manufacturing area. skylights punch through the roof to bring in natural light to the space below.



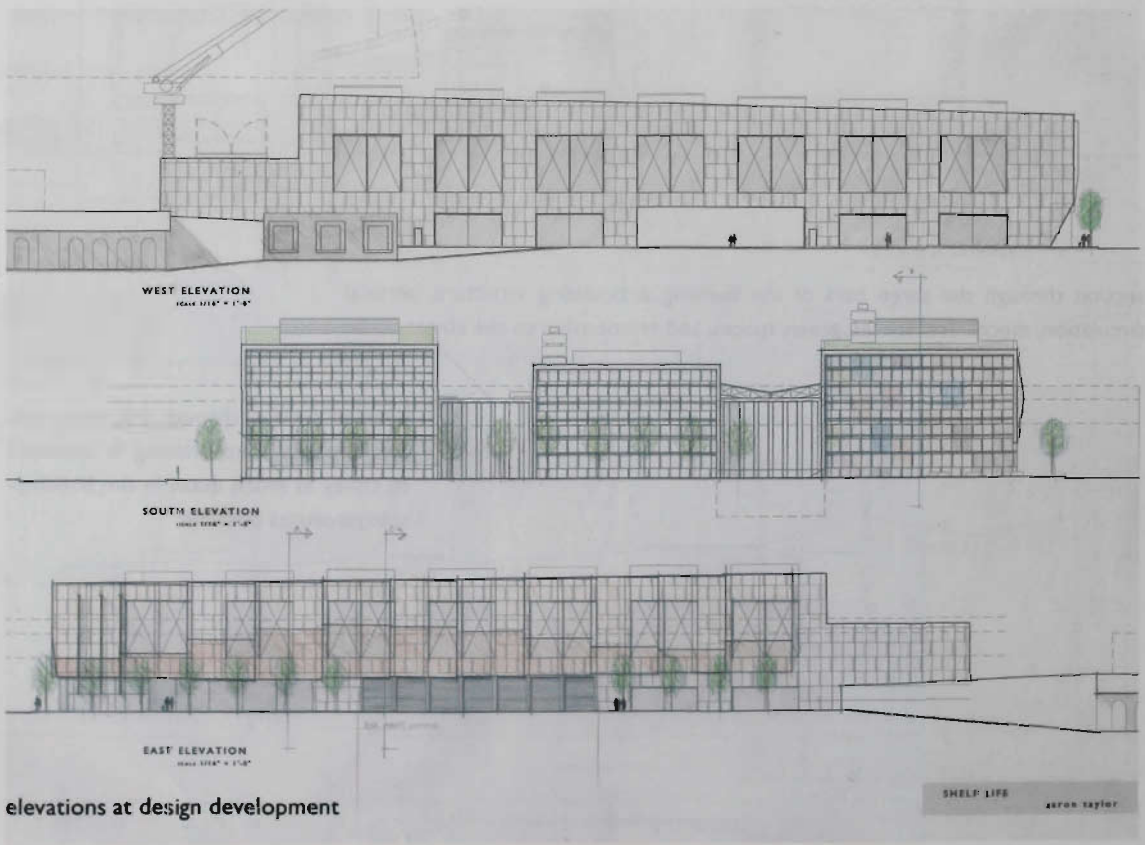
section through the three bars of the building, articulating structure, vertical circulation, mechanical spaces, green spaces, and relationship to the street.



detailed section through the entry and retail spaces. the drawing is intended to covey as much detail in the buildings subsystems as possible.



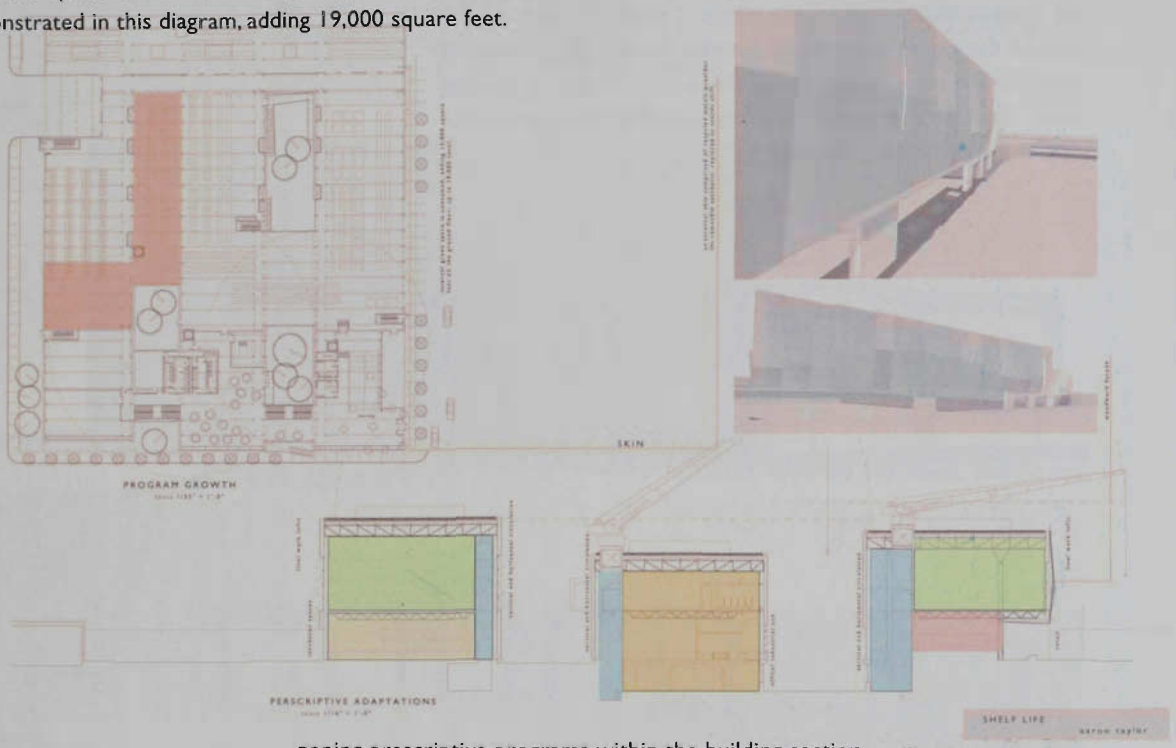
axonometric drawing displaying the idea of a modular skin system and removable components.



elevations at design development

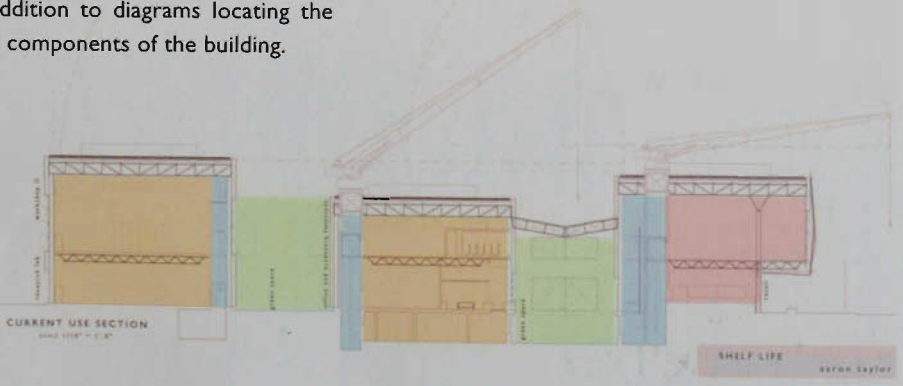
the green spaces allow the building to grow internally, as demonstrated in this diagram, adding 19,000 square feet.

digital model of building skin at woodward



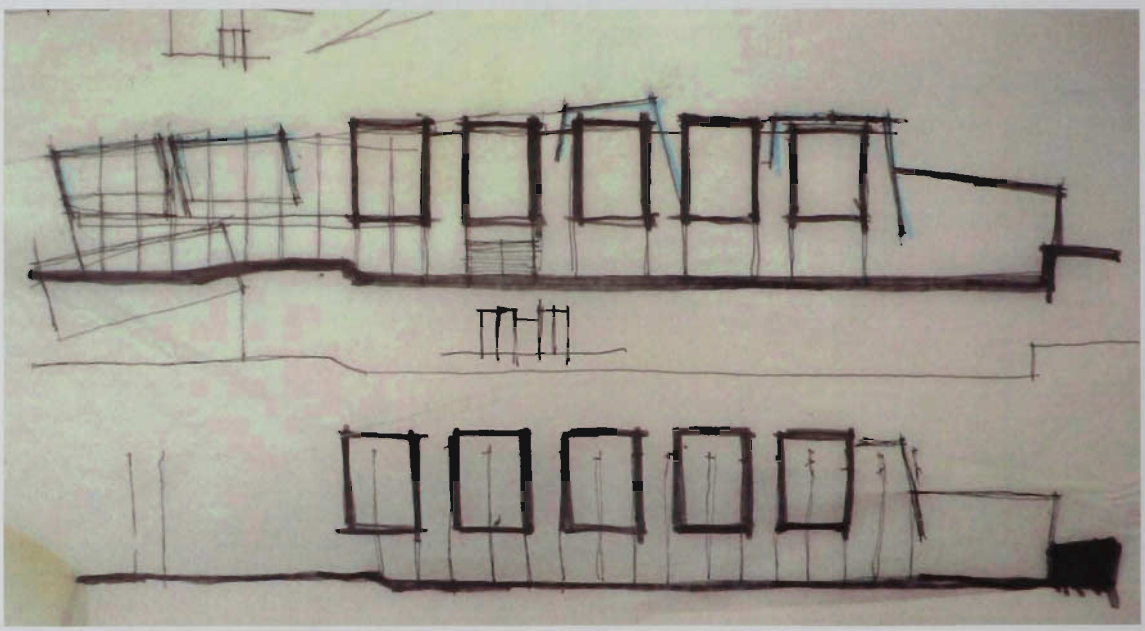
zoning prescriptive programs within the building section.

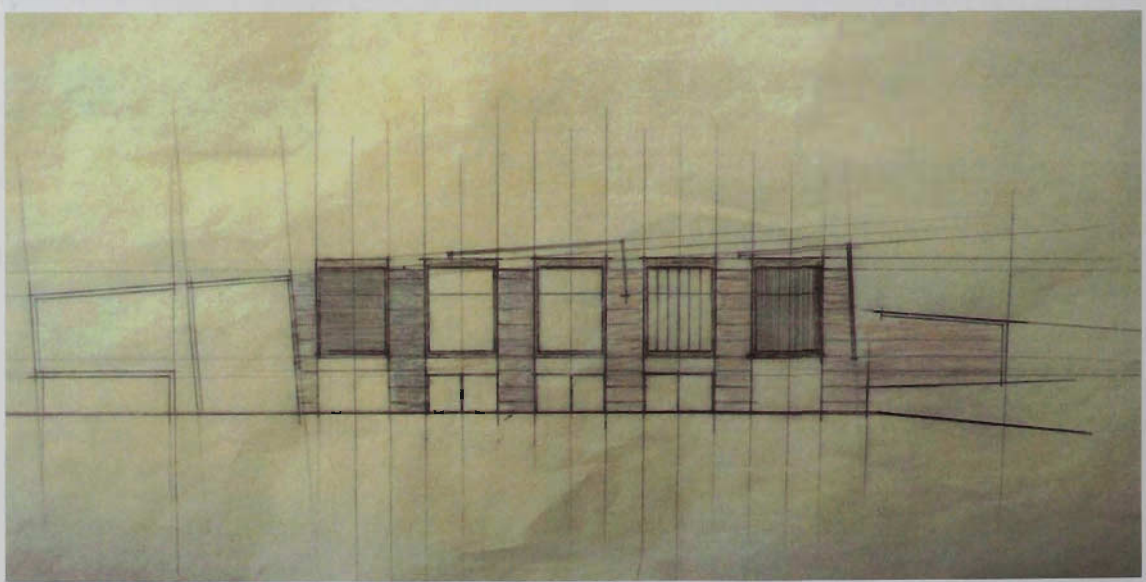
structural diagram, in addition to diagrams locating the mobile, or impermanent components of the building.

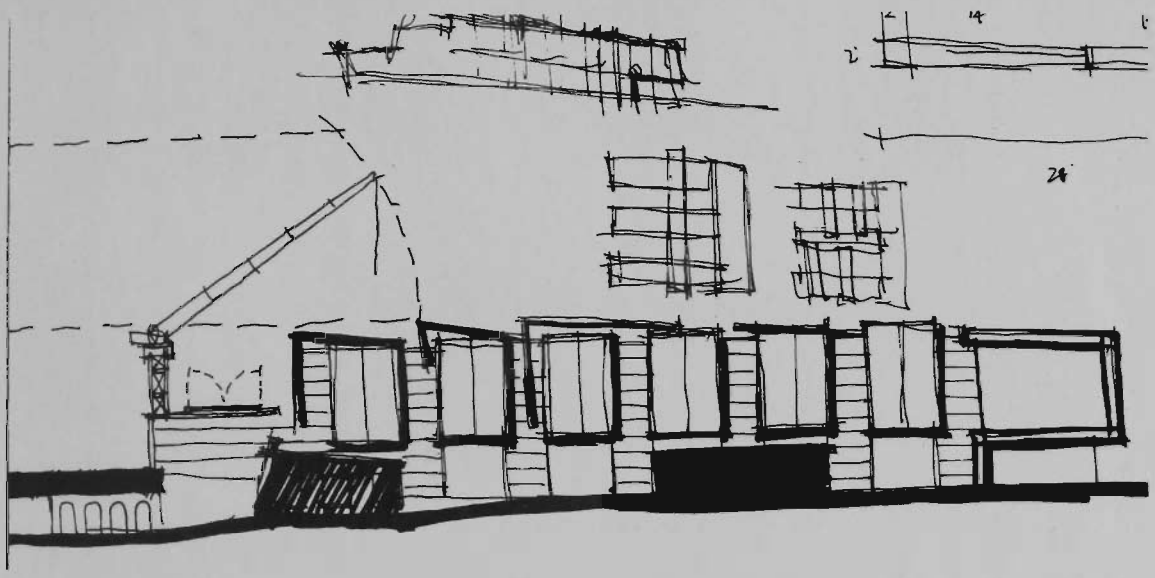


the design solution for the design development stage was, in my opinion, lacking some articulation. i began to work on the skin of the building, while the interior components remained relatively the same. in this time, i also worked to better develop some detail throughout the building, including the components responsive to thesis questions.

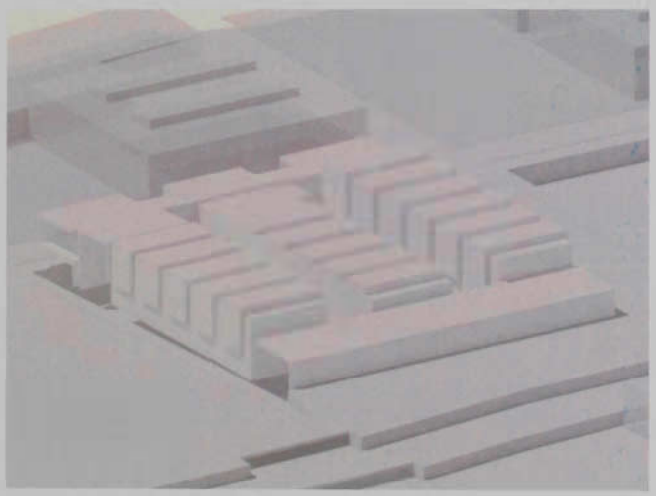
conceptual model and elevation sketches

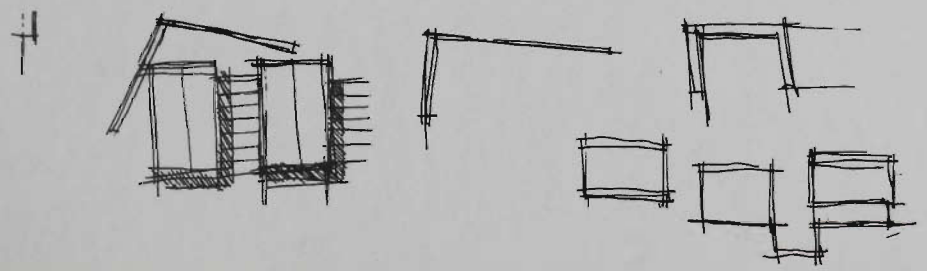




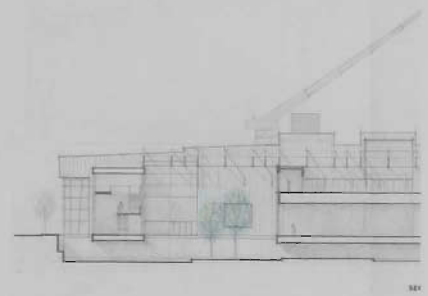


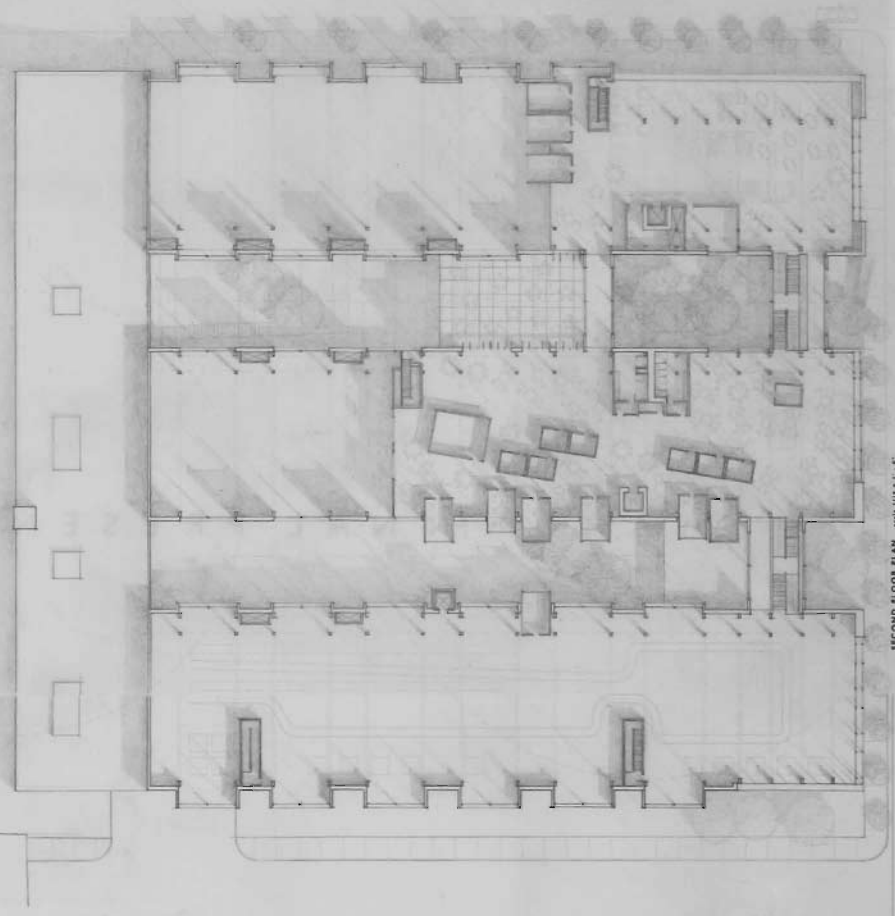
further investigation to this modification of the formal expression. the large forms punching through became articulated as skylights and began to wrap the building, as seen in the digital models. in this phase, considerable thought was given to the way in which the terminating ends should be treated. the northern side simply falls off into the raised landscape, while at the southern end, the building tapers to an end that, in turn, ribbons back towards itself and then into the ground.



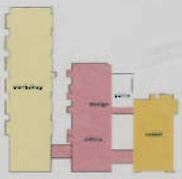


FINAL PRESENTATION





SECOND FLOOR PLAN



SECOND FLOOR PROGRAM DIAGRAM

FIRST FLOOR PROGRAM DIAGRAM

GREEN SPACE

ACCESSORY FUNCTIONS

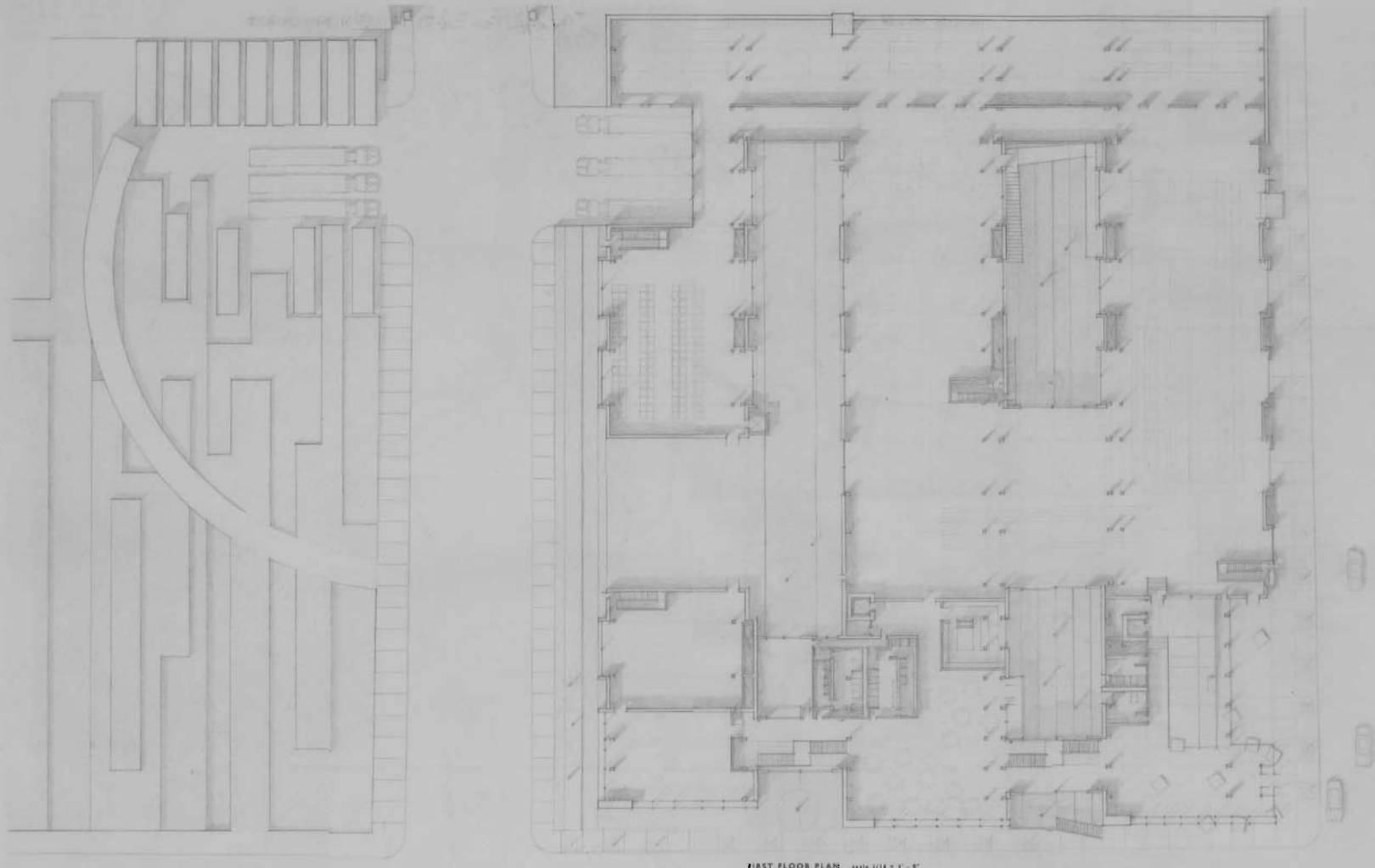
TRANSPORTATION YARD

RETAIL ENTRY

OFFICE, RESEARCH, DESIGN

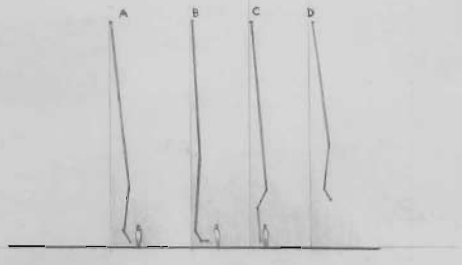
MANUFACTURING

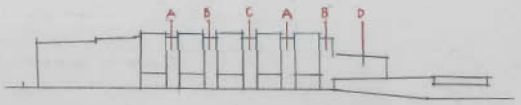
second floor plan and program diagram



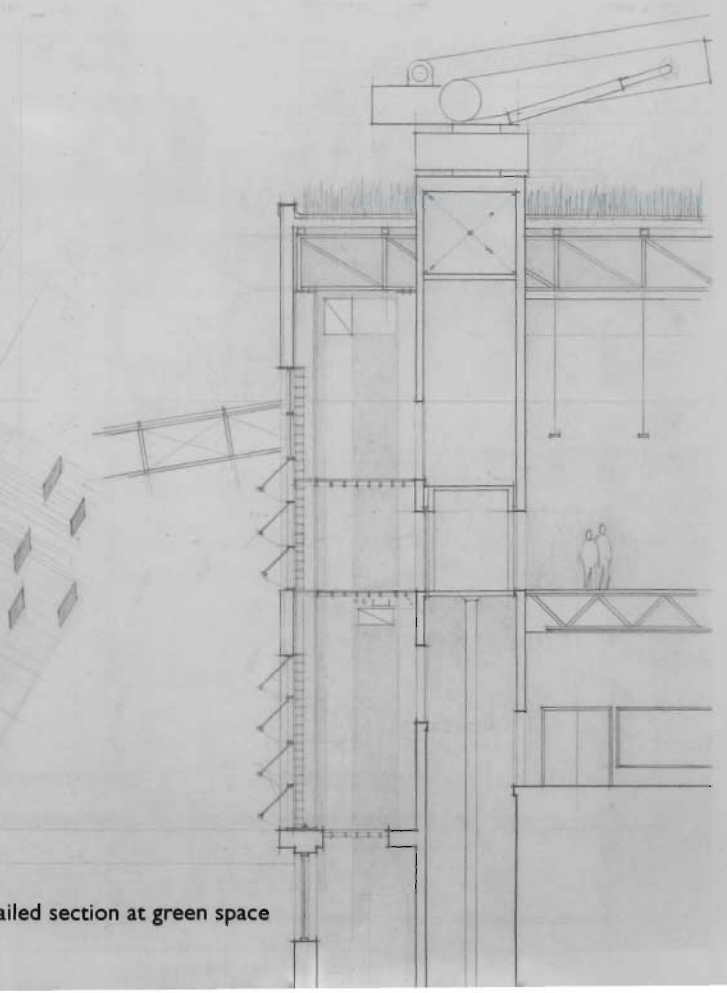
first floor plan

skin studies and locations

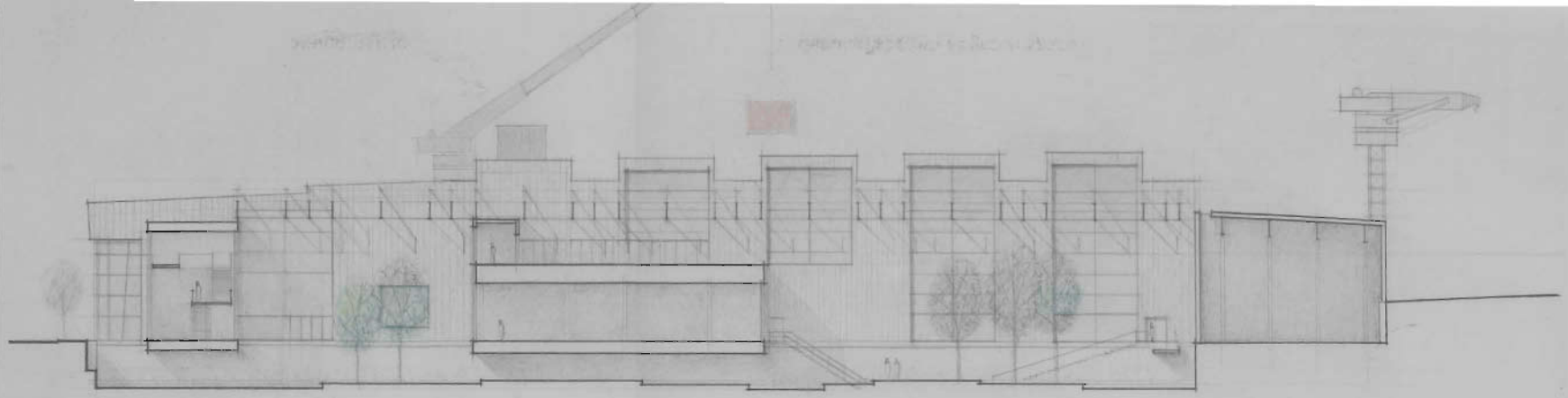




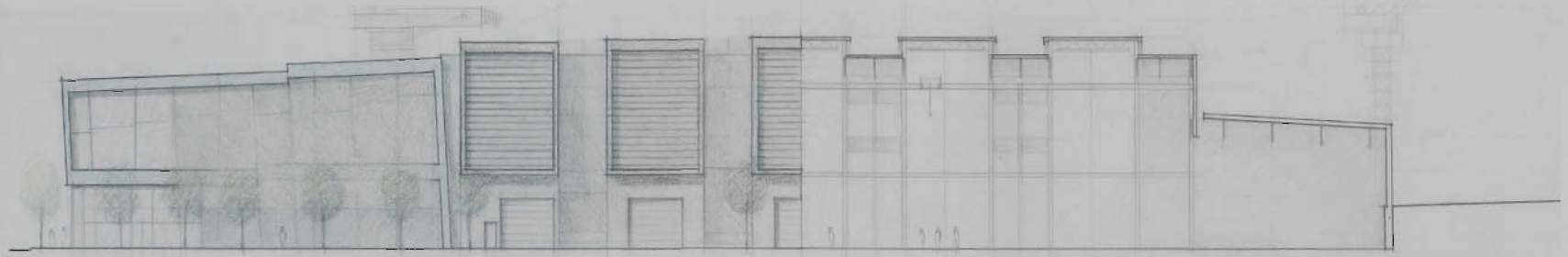
axonometric



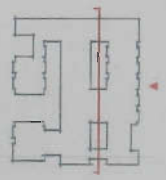
detailed section at green space

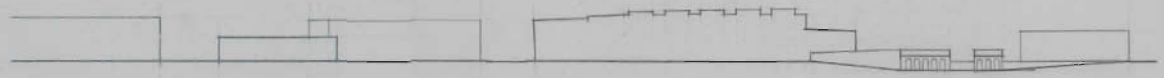


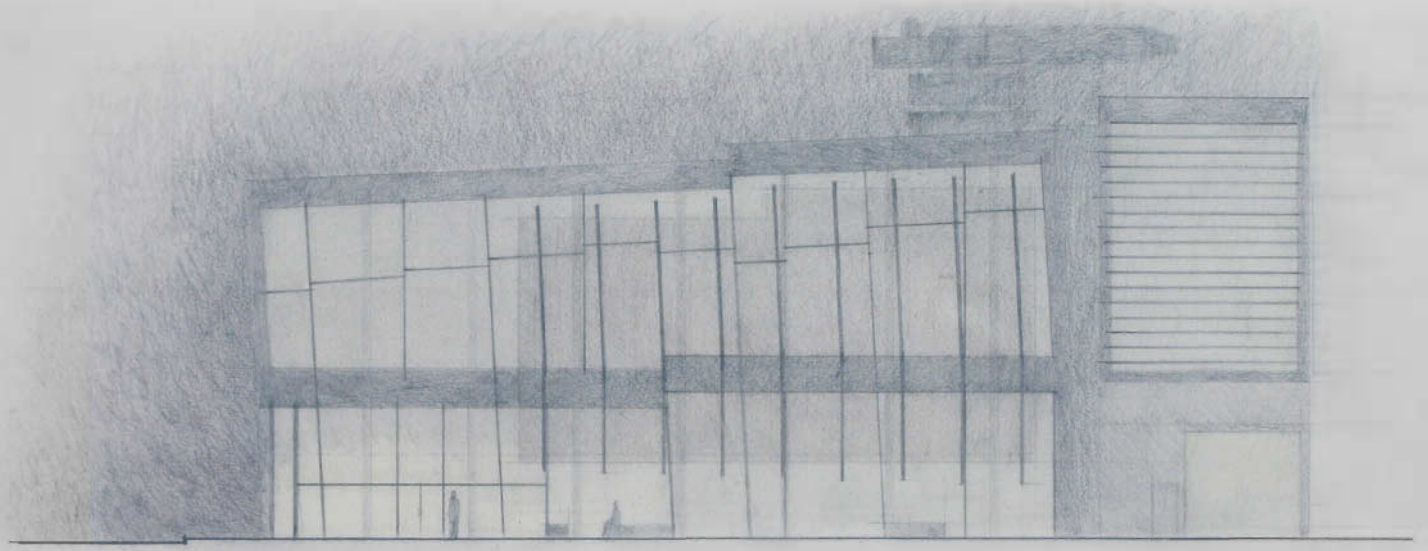
SECTION SCALE 1" = 16' - 0"



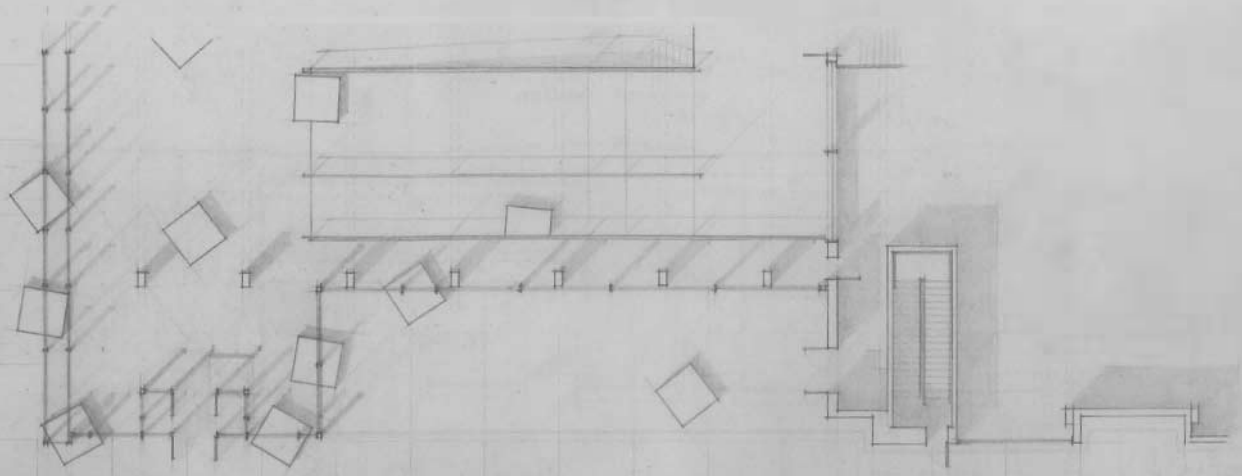
EAST ELEVATION SCALE 1" = 16' - 0"



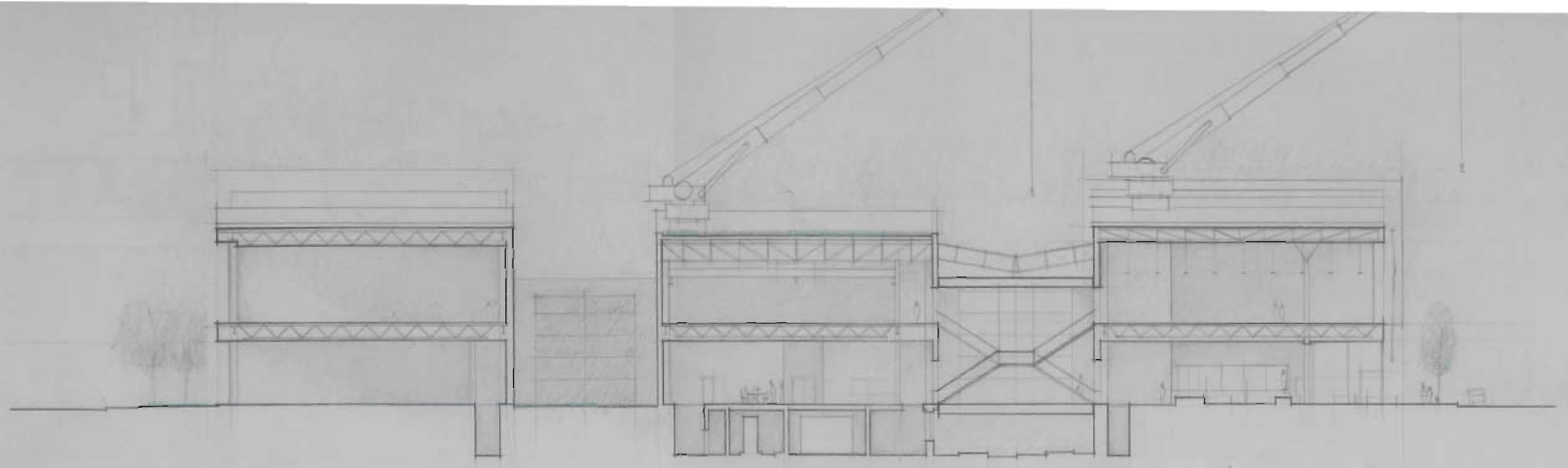




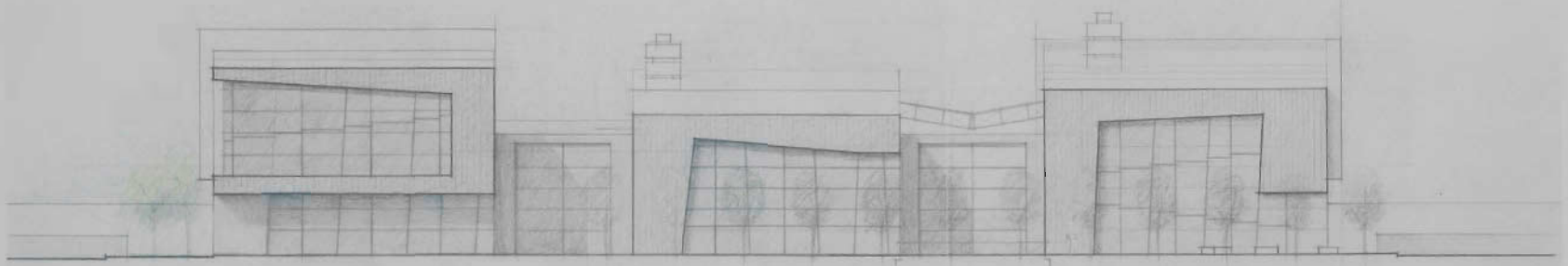
ELEVATION DETAIL AT ENTRANCE scale 1/8 = 1' - 0"



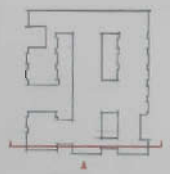
PLAN DETAIL AT ENTRANCE scale 1/8 = 1' - 0"

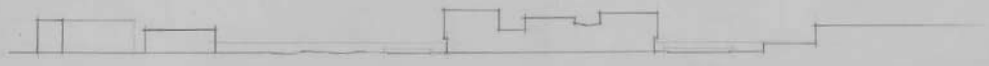


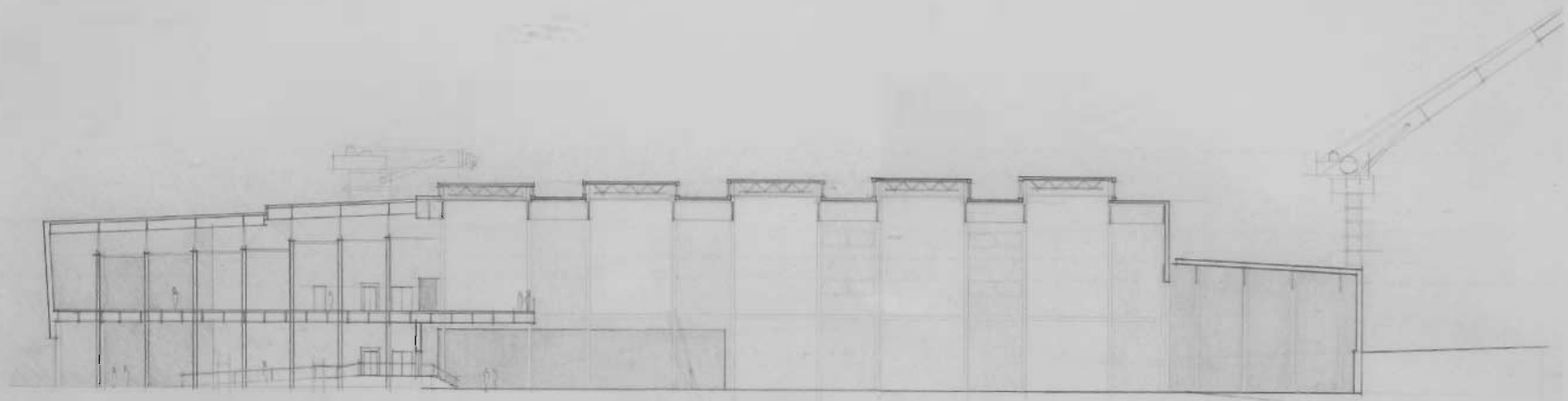
SECTION scale 1/16 = 1' - 0"



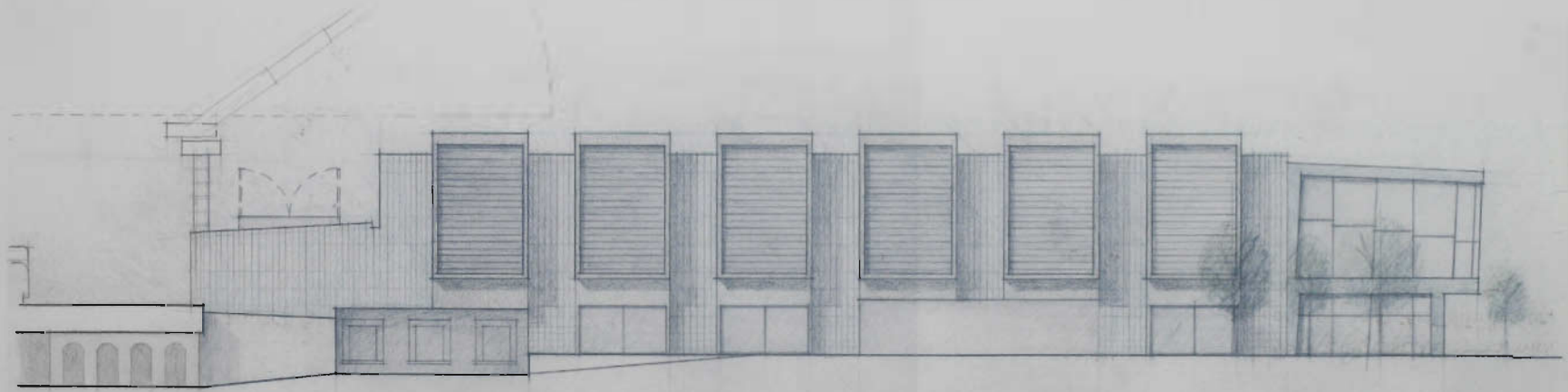
SOUTH ELEVATION scale 1/16 = 1' - 0"



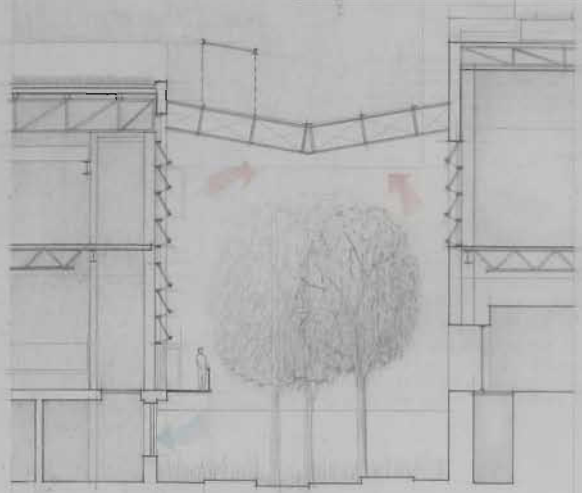




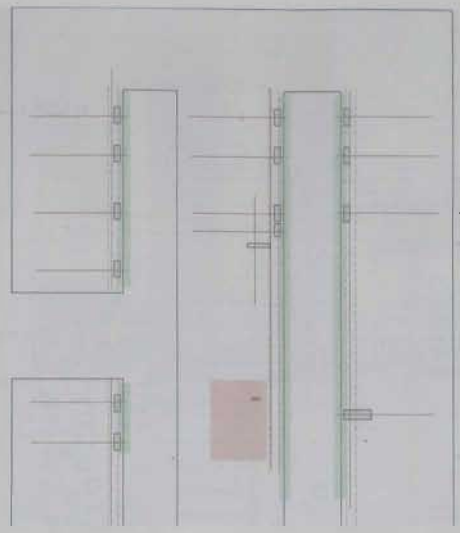
SECTION scale 1/16 = 1' - 0"



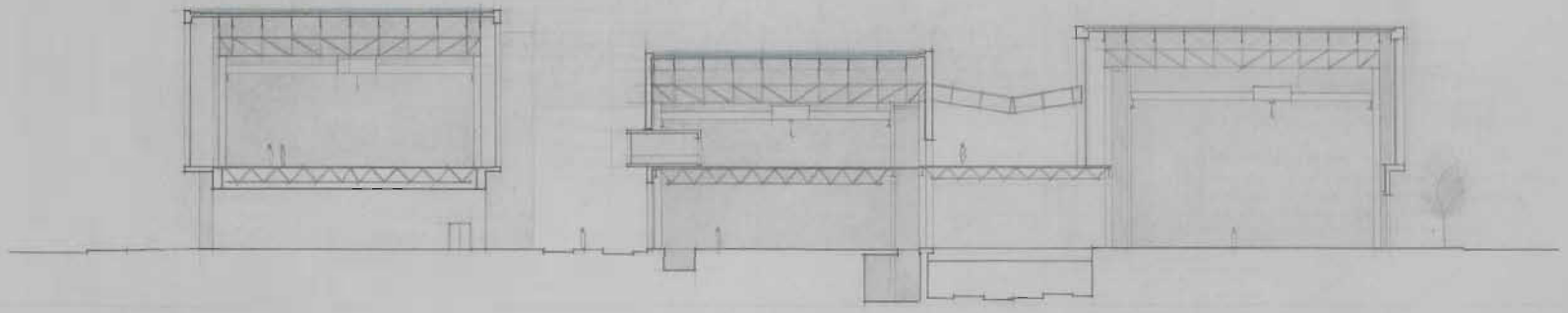
WEST ELEVATION scale 1/16 = 1' - 0"



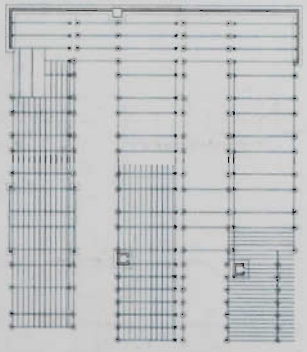
GREEN SPACE SECTION scale 1/8 = 1' - 0"



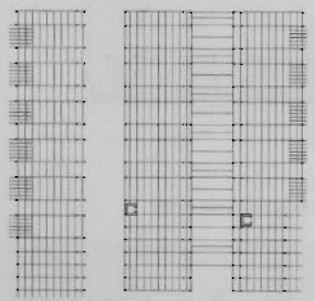
schematic mechanical diagram, with vertical and horizontal distribution, including the appropriate zoning.



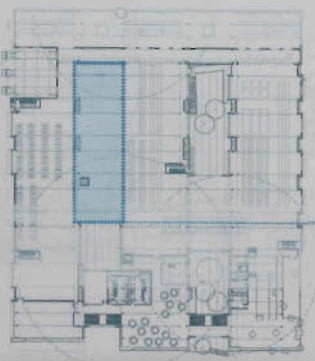
SECTION scale 1/16 = 1' - 0"



FIRST FLOOR STRUCTURAL



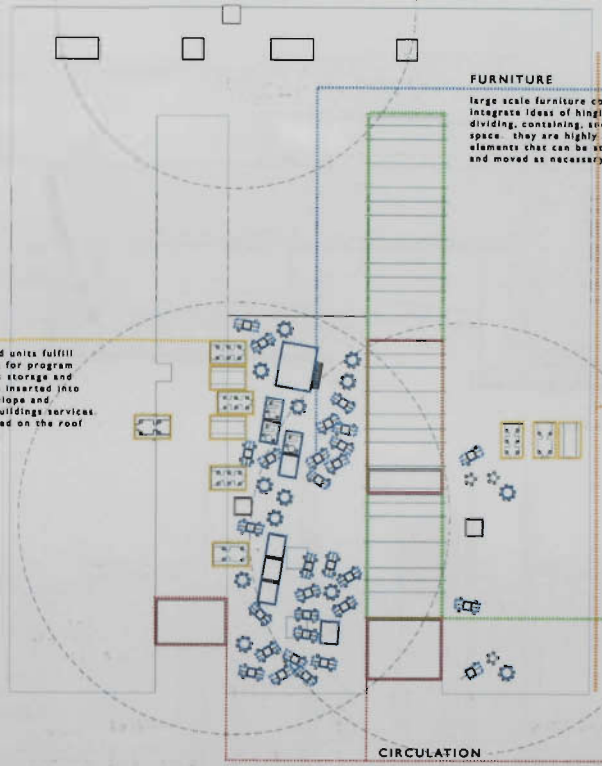
SECOND FLOOR STRUCTURAL



PROGRAM GROWTH DIAGRAM

GROWTH

internal green space is consumed, adding 13,000 square feet to the first floor plate, and as much as 19,000 square feet total in response to new functional needs.



FURNITURE

large scale furniture constructs integrate ideas of hinging, folding, dividing, containing, and creating space. they are highly mobile elements that can be stored easily and moved as necessary.

PODS

highly mobile pod units fulfill on demand needs for program functions such as storage and offices. they are inserted into the building envelope and connect to the buildings services. they may be stored on the roof when not in use

SECOND SKIN

the second skin is comprised of a frame to which a perforated recycled material is attached. this skin provides an easily removable aesthetic, able to adapt to new fashion trends in architecture.

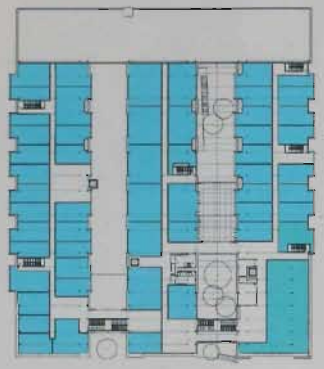
GREEN SPACE

the internal green space is covered with glazing, converting it into year round habitable space, allowing daily adaptations in the building envelope, as well as passive strategies for heating, cooling, and cleaning indoor air.

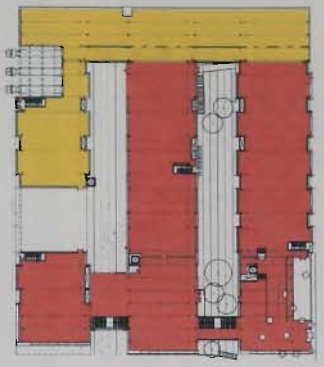
CIRCULATION

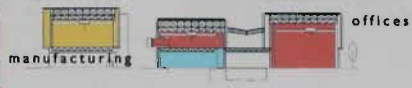
circulatory elements can be removed or reorganized to create programmatic connections. they are constructed of lightweight materials, and are attached as a system to the modular building structure.

ADAPTATION DIAGRAM



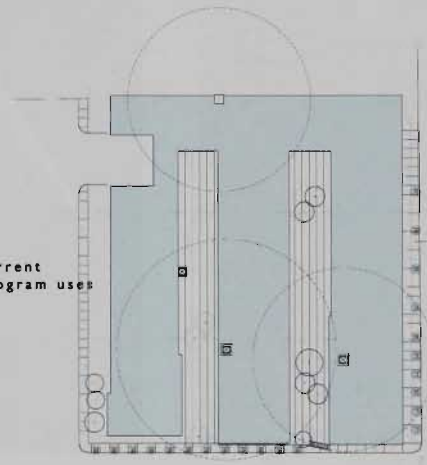
MIXED USE CONVERSION
adaptive reuse of entire building into second floor live/ work lofts and first floor retail and office spaces



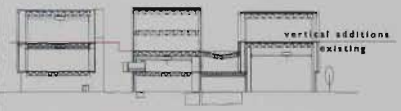


CORPORATE GROWTH
office operations adapt manufacturing spaces, while limited manufacturing takes place in the remaining workshop.

SCALING BACK
one half of the maufacturing operations are moved off site, and this portion of the building is leased.



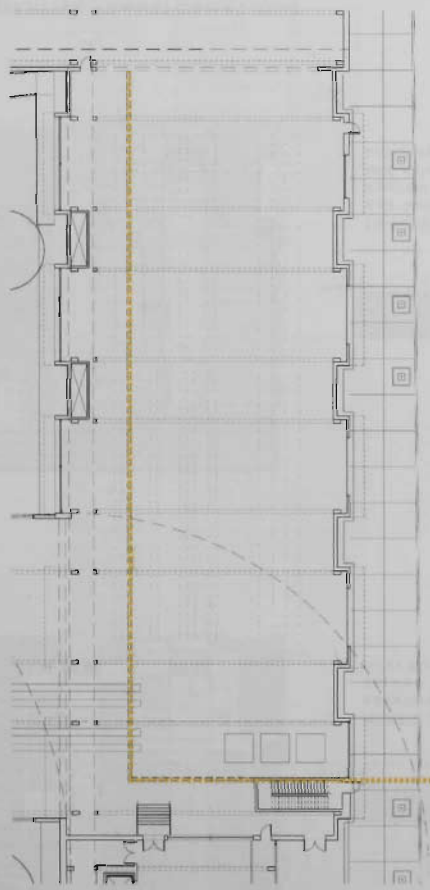
oversized structure and foundations allow for vertical expansion



EMPTY CONDITION
the building components are deconstructed and reused in other structures, leaving behind the cranes, ready for new construction placed on the existing foundations.

ADAPTIVE TRANSFORMATIONS

these reconfigurations are prescriptive and allowed primarily by the use of narrow floor plates, a separated building form, and modular building systems



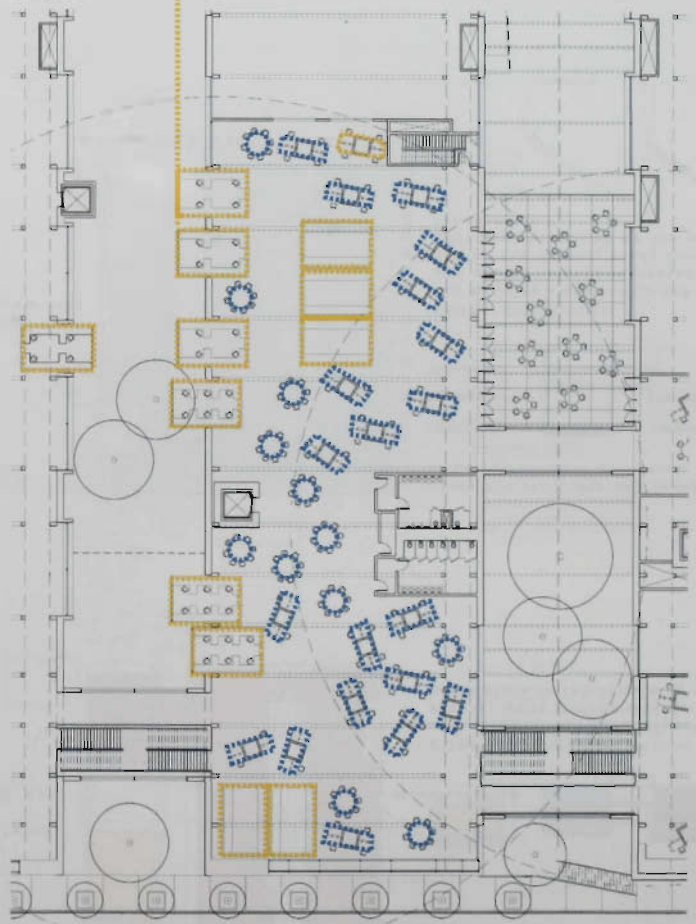
MARKET

on weekends, the manufacturing space converts to an open market for goods.

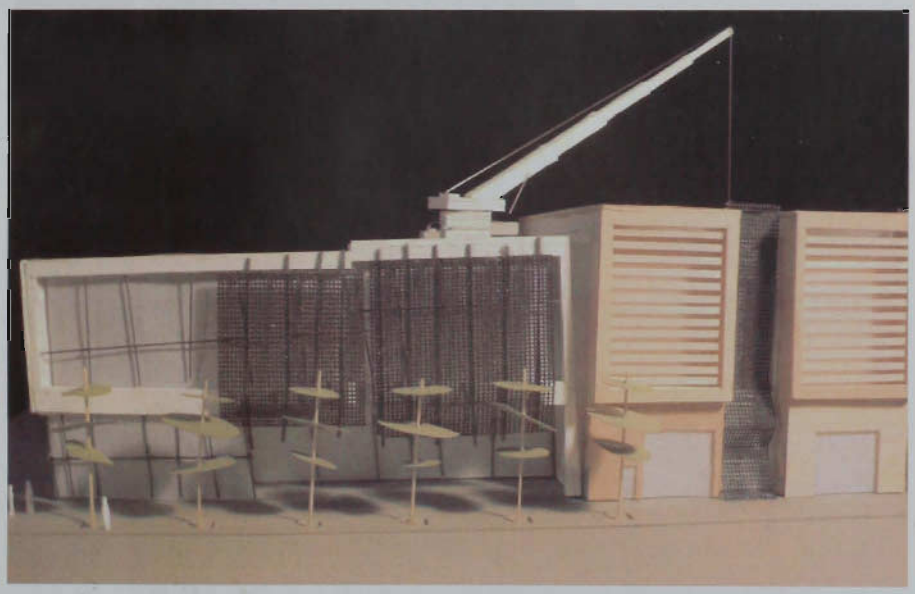
WEEKEND MARKET SPACE
scale 1/16 = 1' - 0"

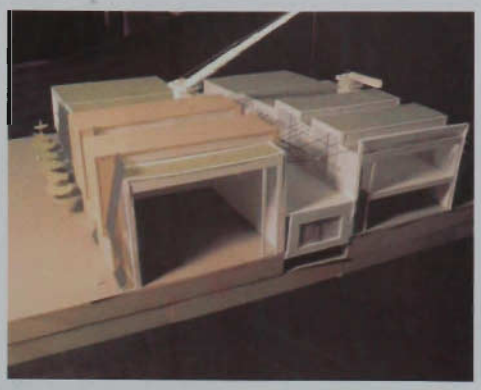
OFFICE

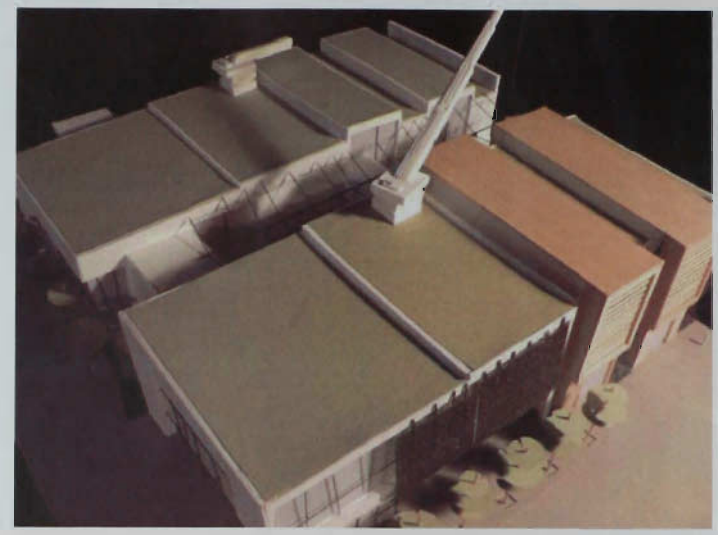
the office environment is easily adaptable, as pods can move into the building, and furniture can be reconfigured

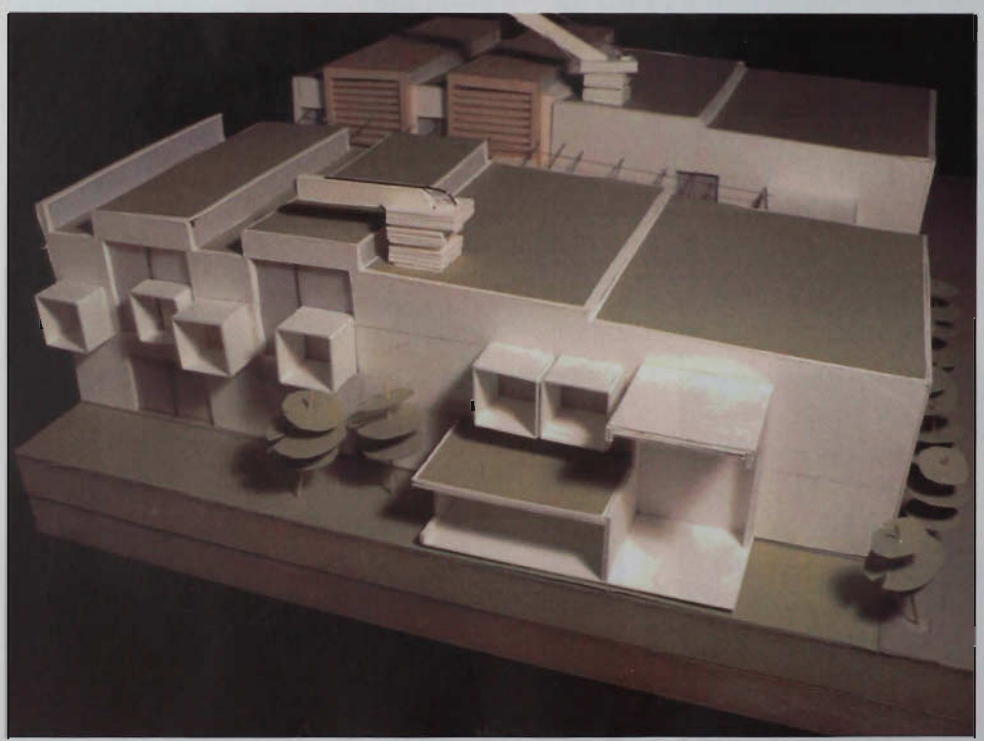


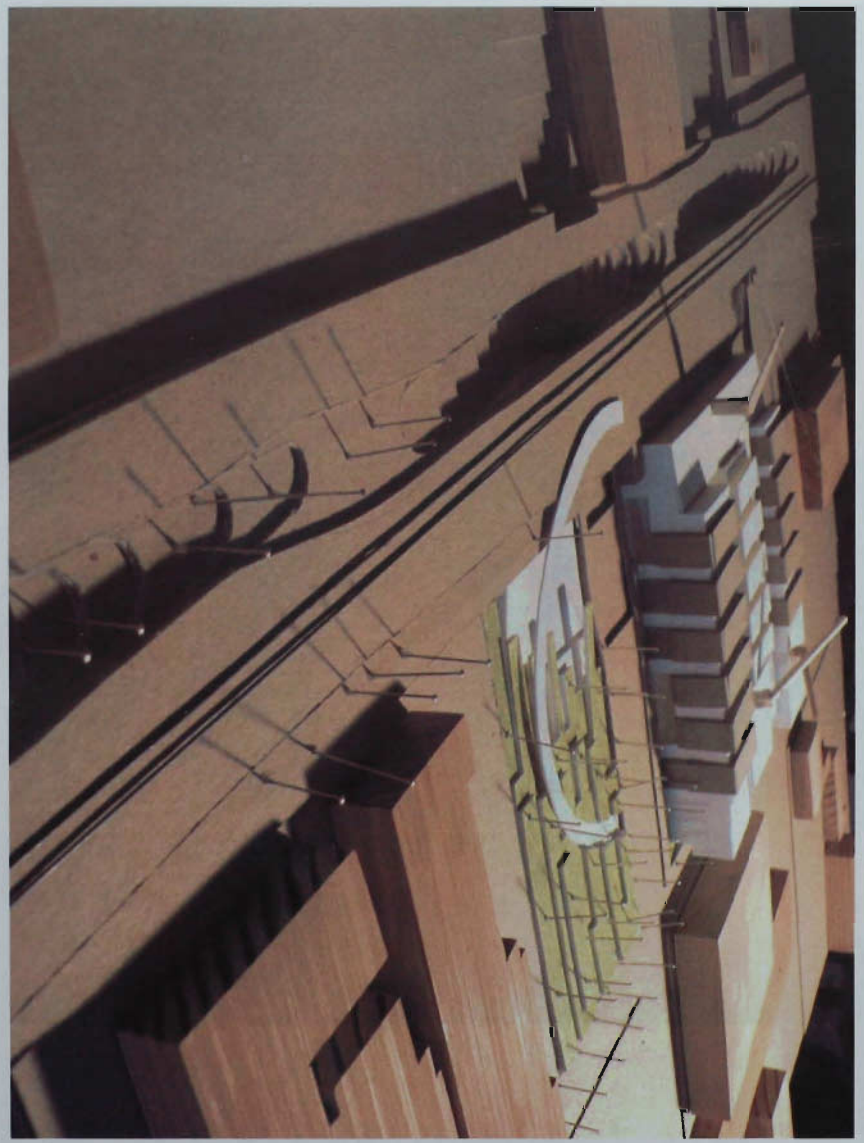
ALTERNATE OFFICE CONFIGURATION
scale 1/16 = 1' - 0"

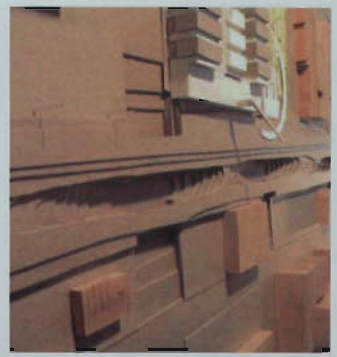


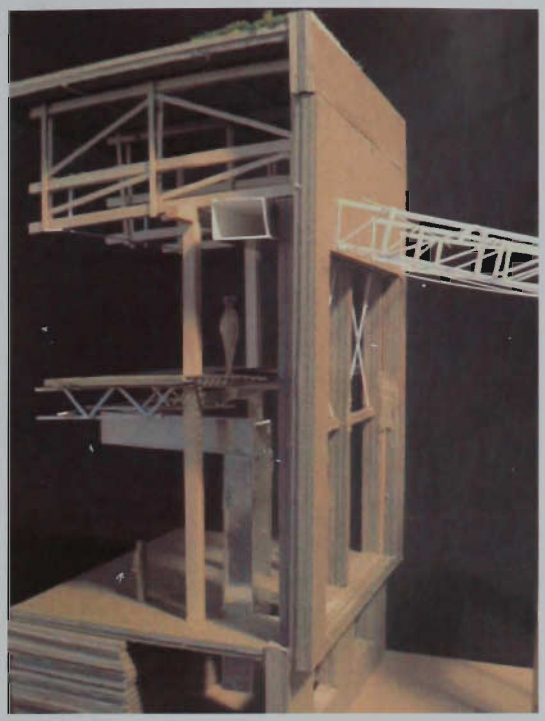


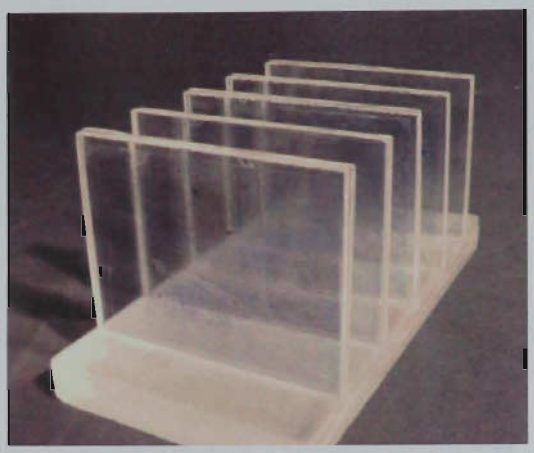




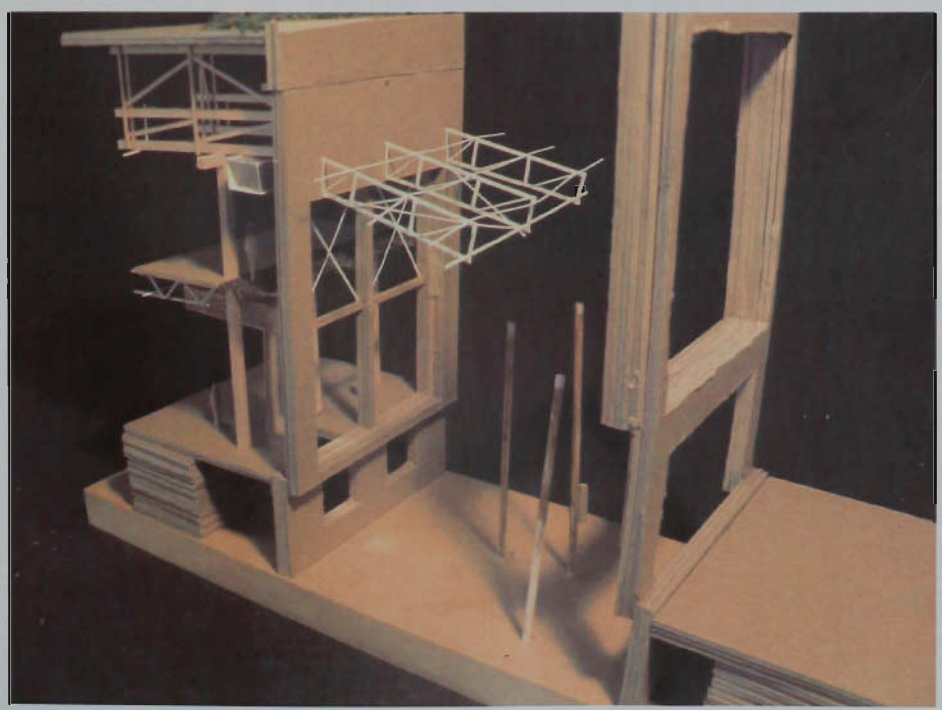


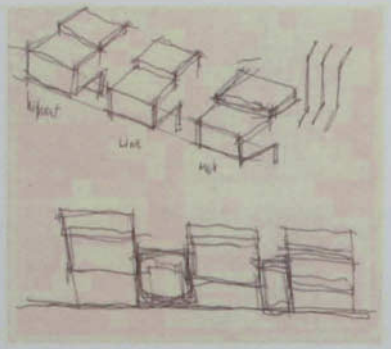


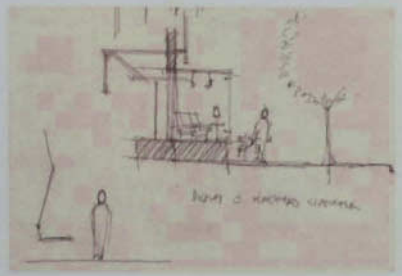




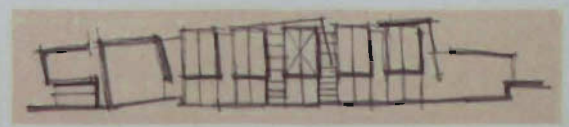
conceptual model displaying the layering of program and architectural space. transparent images layer green space and program.

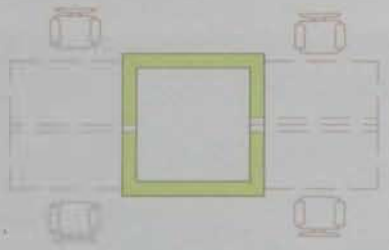


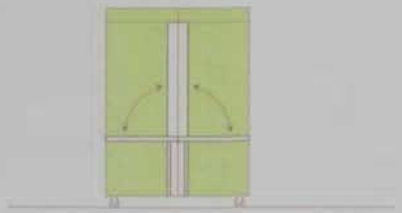




EAST ELEVATION

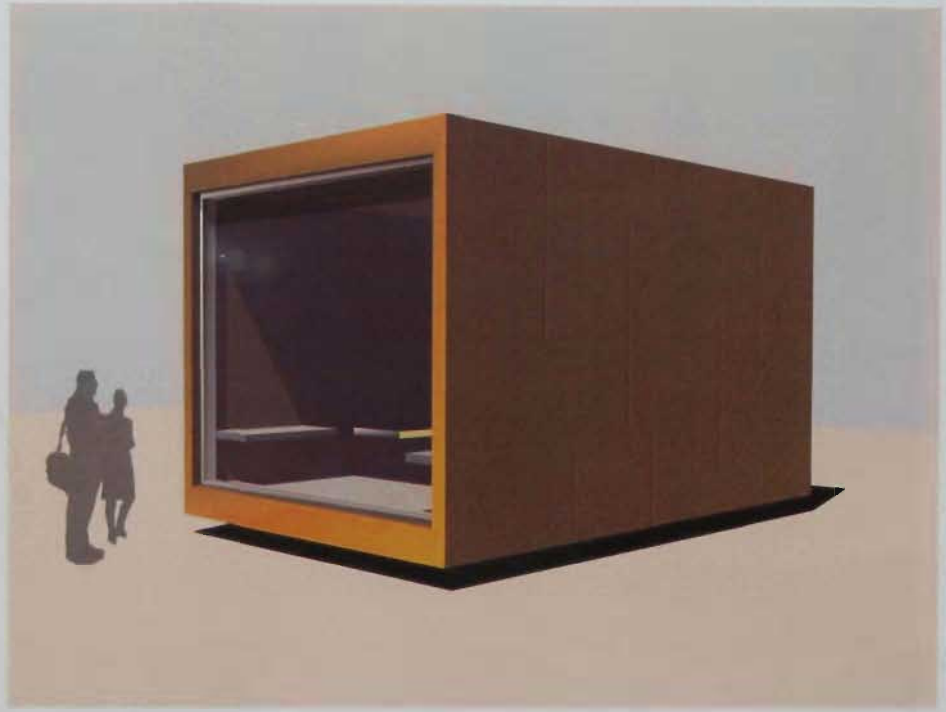






OFFICE LANDSCAPE

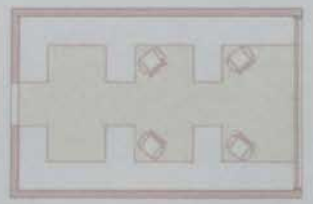
portable desks and other furniture scale constructs are designed to be mobile and collapsible - folding, extending, hinging into configurations. space can be reorganized as necessary, and desks can be removed and replaced.



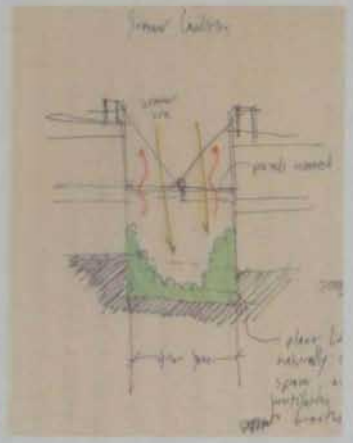
PODS

pods are portable structures which can engage the building both internally and externally as necessary. they can be transported via rail or trailer and provide transformable office environments with office and storage uses.
pods can be stored on the roof when not in use.

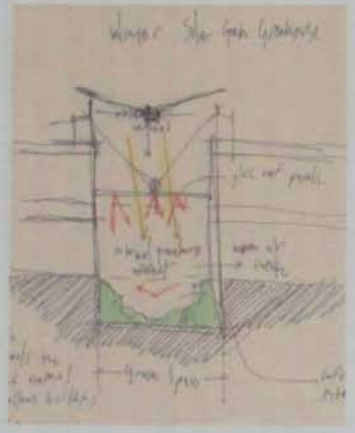
section through pod



plan



summer. glazing removed, space disipates internal heat



winter. glazing in place, heat is trapped in greenhouse and circulated throughout the building.

GREEN SPACE

the internal green spaces function to collect rainwater, establish relationships with the environment, and work as a critical passive energy strategy.

CONCLUDING THOUGHTS

I believe that this project met a variety of specific goals of the thesis. While going through a variety of large-scale changes throughout the design process, I feel strongly about where the design concluded. I believe each change was a strong improvement over the last, and I am generally satisfied with the conclusion. The process always engaged the idea of program configuration and smaller scale mobile components. However, the initial schematic design was complicated because it was externalized. By moving these program pieces into flexible 'barn' space, the organization became far more fluid. Other strong architectural concepts were the creation of modularity, and the exposure of building systems.

On the human scale of this project, the question of multi-purpose space grapples with the notion of specificity. If a space responds to a multiplicity of program intentions, then it begins to lack character, becoming generic. However, the answer to this type of problem seems to lie in smaller scale constructs, perhaps furniture size or larger that can address scale and issues of character on the level of the user. Inherent to this project is the idea that architecture is impermanent, and that our ideas as architects are not as permanent as we may think. Architecture addresses the needs of a function, but may not as easily conform to those of another. The scale of this project, meeting the requirements of a manufacturing program, is ultimately adaptable to nearly any function. Building typological and form making studies could further enhance adaptable building design.

The external cranes walk a fine line between utility and excessive accommodation to change. I would justify the need for these in several points. The first is moving large scale constructs around the building, including storing these on rooftop locations. They may also be involved in the construction or deconstruction of the building parts. I do not believe that they would facilitate the intentional change of the entire building to the point of actually being wasteful. Instead, I think they provide another level of important flexibility to move building parts, critical concepts of seasonal change, among others. The next level of detail, I suppose, is in the prescriptive transformations of the building's function. Exactly how do buildings meet new requirements of building systems to new programs? Egress distances may shift, and mechanical needs change. If the structure is to expand vertically, how does vertical circulation accommodate? These questions are not addressed in this building design, primarily because of time and scale constraints.

I would have liked to generate more work regarding the idea of using waste as a building material. I believe this concept to be critical in reforming notions of waste in our society. My earliest readings were focused on consumption in the United States, and I think a cultural shift is necessary in the way Americans view newness and the products in our lives. We must be far more engaged in the protection of our environment and more interested considerate consumptive practices. One way I believe we can make steps toward this shift is by illustrating the utility of our perceived waste, and by flipping notions of new materials and waste on their head. While this is taking hold in our culture in limited cases, its reaches are limited by consumptive ideology that permeates contemporary society. We must begin to recognize the value in seemingly old things, and I am increasingly interested

in these types of investigations to propagate change. In some circumstances, the position of this thesis and its goal of adaptation would be nullified by thoughtful consideration of waste.

Another question arises regarding form making and building planning. If a building is deferential to program in that it allows a variety to take place, then what generates building form an organization? I might guess that a sort of typological classification could predict the best performance of the building's adaptation. Perhaps some building types are more conducive to changing into others. These typological investigations would most likely consider both the quality and scale of space involved so that space would perform as efficiently as possible under a variety of criteria.

The idea that the building skin was based upon a modular system and could be changed out to meet changing aesthetic desires was lacking in this specific proposal. However, in this design instance, the elevations have become to articulated and the skin to minimal to really discuss this idea. I do think it could be applied as a concept in other circumstances. In many ways, this would be well received to a building owner, but I understand that this may extend into making architecture even more fashionable and changing, which is against my intentions. I do believe that the skin must have some ability to change as the materials become weathered and no longer perform as necessary. This particular issue raises the larger concern in this thesis. It is one of accommodation. This thesis has always been maintained that architecture is reflective of a variety of larger influences than itself, and in order to be functional, must operate within certain rules. In response my architectural response slips in between the two sides, allowing for adaptation and change as is required, but with the end goal of a more permanent built environment. In many ways, this architecture is easily exploitable, only contributing to the change, flux, and impermanence in architecture today rather than curbing it. In my idealized version of this thesis, I believe the response to be adaptable enough, but not overly changeable, sustaining the life of the building. I recognize the gray area in which these ideas operate.

Perhaps the greatest criticism for this project is that the future adaptations, in conjunction with the original design are predictable to a fault. The conversion of a manufacturing space to live/work lofts is a proven concept. In many ways, this undermines the goal of the thesis. While it is believable, it is not challenging perceptions or thinking critically. I believe that some people will perceive this project to be uninspired or lacking a realistic application. Because this thesis operates within complex social and economic forces, it is difficult to imagine the effectiveness of these concepts without actually using them in practice, allowing these forces to test their true utility.

As a conclusion, I am left wondering to what extent I have answered the thesis concern over commodification. In essence, I think that users might believe the building to perform the tasks required by fashion and program shifts, depending on how influential they are to the activities of the space. I hope that in some way, the building actually performs in the way I intended, establishing a more lasting physical landscape. I have ended this investigation with more questions then when I entered. This is a good thing. This year of thought and consideration has revealed a new understanding of space, building systems, and critical thought – both architectural and sociological that I believe will continue into the future.

ENDNOTES

Thesis Book
Point Press, 2002), 25.

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[3] William McDonough and Michael Braungart, Cradle to Cradle. (New York: North Point Press, 2002), 67.

[4] Barbara Knecht, Design for Disassembly and Deconstruction p 14. (Architectural Record (New York: McGraw Hill 10/04)

[5] Victor Papanek, The Green Imperative (London: Thames and Hudson, 1995), 160.

[6] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 5.

[7] Ulrich Conrads, ed. Programs and Manifestoes on 20th Century Architecture. (Cambridge: MIT Press, 1971), 167.

[8] William McDonough and Michael Braungart, Cradle to Cradle. (New York: North Point Press, 2002), 60.

[9] William McDonough and Michael Braungart, Cradle to Cradle. (New York: North Point Press, 2002), 54.

[10] Kisho Kurokawa, Kisho Kurokawa: From Metabolism to Symbiosis (London, St. Academy Group Ltd. 1992), 16.

[11] Victor Papanek, The Green Imperative (London: Thames and Hudson, 1995), 245.

[12] Victor Papanek, The Green Imperative (London: Thames and Hudson, 1995), 115.

[13] Sean Topham, Move House (Prestel Publishing, 2004), 14.

[14] Kisho Kurokawa, Metabolism in Architecture (Boulder, CO: Westview Press, 1977), 42.

[15] Michael Franklin Ross, Beyond Metabolism. (New York: Architectural Record Books, 1978), 65.

[16] Kisho Kurokawa, Metabolism in Architecture (Boulder, CO: Westview Press, 1977), 29.

[17] Exit Utopia Ed. Martin van Schaik and Otakar Macel (New York : Prestel 2005), 71.

[18] Exit Utopia Ed. Martin van Schaik and Otakar Macel (New York : Prestel 2005), 70.

[19] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 181.

[20] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 186.

[21] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 24.

[22] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 28.

[23] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 176.

[24] Stewart Brand, How Buildings Learn (New York: Viking Penguin, 1994), 13.

[25] Andrea Oppenheimer Dean, Rural Studio, Samuel Mockbee and an Architecture of Decency. (New York: Princeton Architectural Press, 2002)

[26] Ada Tolla, Giuseppe Lignano, Philip Nobel ; essays by Philip Nobel. Lot/ek /Urban Scan (New York: Princeton Architectural Press 2002), 135.

[27] Ada Tolla, Giuseppe Lignano, Philip Nobel ; essays by Philip Nobel. Lot/ek /Urban Scan (New York: Princeton Architectural Press 2002), 98.

[28] Charles Jencks, Adhocism (New York: Doubleday and Company, 1972).

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[30] William McDonough and Michael Braungart, Cradle to Cradle. (New York: North Point Press, 2002), 110.

[31] Victor Papanek, The Green Imperative (London: Thames and Hudson, 1995), 42.

[32] Victor Papanek, The Green Imperative (London: Thames and Hudson, 1995), 248.

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Precedent Studies

Swiss Pavilion, Peter Zumthor

Gunther Uhlig, "Klangkorper Schweiz: the Swiss Pavilion at the Hanover Expo 2000," *Domus*, July/August 2000, 24-31.
Peter Davey, "Moral Maze," *The Architectural Review*, September 2000, 50-53.
Peter Zumthor, "Swiss Sound Box," *Casabella*, September 2000, 62-69, 97.

Plug-In City, Peter Cook

Exit Utopia Ed. Martin van Schaik and Otakar Macel (New York : Prestel 2005) pg 77-87 Peter Cook Plug-In City, pg. 69-76 The Plug-in City, by Priscilla Chapman - The Sunday Times/NI Sydication and Peter Cook ed. Archigram, New York, 1999 Princeton Architectural Press.
Peter Cook. "Plug-In City," in *Exit Utopia*, ed. Martin van Schaik and Otakar Macel, (New York : Prestel 2005).
Peter Cook, ed., *Archigram* (Boston: Birkhauser, 1991). Originally published in London: Studio Vista Publishers, 1972.
Priscilla Chapman, "The Plug-in City," in *Exit Utopia*, ed. Martin van Schaik and Otakar Macel, (New York : Prestel 2005).

Program Precedents

Herman Miller SQA, William McDonough

Barbara Crisp, *Human Spaces* (Gloucester, MA: Rockport Publishers, Inc., 1998).
The Next Industrial Revolution. Willliam McDonough, Micheal Braungart, and the Birth of the Sustainable economy, narrated by Susan Sarandon. DVD

BMW Central Facility, Zaha Hadid

Raul A. Barreneche, "Zaha Hadid Central Building," *Architectural Record*, August 2005, 82-91.

Tectonic Precedents

IGUS Factory and Headquarters, Nicholas Grimshaw

Colin Amery, *Architecture, industry, and innovation: the early work of Nicholas Grimshaw & Partners.* (London: Phaidon Press, 1995.)
Rowan Moore, ed. *Structure, space, skin: the work of Nicholas Grimshaw & Partners.* (London: Phaidon, 1993)

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Ada Tolla, Giuseppe Lignano, Philip Nobel ; essays by Philip Nobel. *Lot/ek /Urban Scan* (New York: Princeton Architectural Press 2002)
This text investigates the waste of industrial society for reuse in architecture and installations. There is extensive research in shipping containers, and the integration of industrial waste and modern technology.

Andrea Oppenheimer Dean, *Rural Studio, Samuel Mockbee and an Architecture of Decency.* (New York: Princeton Architectural Press, 2002)
This text was used to investigate the low tech, use of trash or waste in the construction of buildings without reprocessing the materials. The cardboard pod and Yancey chapel were specifically referenced.

Arthur Drexler, *The Architecture of Japan* (New York: The Museum of Modern Art, 1955).
Used for study of the traditional Japanese modular systems of Shoji and tatami. Also, it discusses the quality of the impermanence of things, i.e. the Shinto temple shrine concepts.

Barbara Crisp, *Human Spaces* (Gloucester, MA: Rockport Publishers, Inc., 1998).
Used for the Herman Miller SQA Facility program precedent study. It referenced images and text, including sectional studies and building floor plans. It, also discusses the human quality of space in an industrial context.

Barry M. Katz, "Evolution," *ID*, May 2002, 55-59.
This article investigates biomimicry, and the influence and connections of humans and the natural environment.

Charles Jencks, *Adhocism* (New York: Doubleday and Company, 1972).
A text expounding on the concept of adhocism, or 'for this' use, this text investigates the many aspects of using waste or materials which are not intended for a specified use.

Colin Amery, *Architecture, industry, and innovation: the early work of Nicholas Grimshaw & Partners.* (London: Phaidon Press, 1995.)
Images and information regarding the IGUS Factory for the tectonic precedent study.

Emergence Design Group, "Emergence," *AD*, May/June 2003.
Emergence investigates the replicating of natural models, thinking of buildings as complex energy and material systems. Buildings could become naturally programmable and adaptable environments.

Exit Utopia Ed. Martin van Schaik and Otakar Macel (New York : Prestel 2005) pg 77-87 Peter Cook Plug-In City, pg. 69-76 The Plug-in City, by Priscilla Chapman - The Sunday Times/NI Sydication and Peter Cook ed. Archigram, New York, 1999 Princeton Architectural Press.
This reference was used for the study of the Plug-In city for precedent study. The images and text were used to describe and understand the concept of the city that constructs and deconstructs itself over time.

Gunther Uhlig, "Klangkorper Schweiz: the Swiss Pavilion at the Hanover Expo 2000," *Domus*, July/August 2000, 24-31.
Precedent study investigating the use of materials that can immediately be used elsewhere in completely different projects. The tectonic system simply compressed the members into a stable vertical wall. It also inspired thinking about the temporal qualities of space that are intertwined with experience of the senses.

Henry David Thoreau, *Walden* ed. Walter Harding. (New York: Houghton Mifflin Co., 1995)
This text has great thinking on *Economy* and critiques early needless consumption of the upper classes in early America.

Kisho Kurokawa, *Metabolism in Architecture* (Boulder, CO: Westview Press, 1977).
A resource used for study of the Metabolism movement in Japanese architecture – the foundation and theories, as well as their application in built works. Also discussed the foundational, cultural analysis of attitudes toward permanence.

Kisho Kurokawa, *Kisho Kurokawa: From Metabolism to Symbiosis* (London, St. Academy Group Ltd. 1992).
The theoretical grounding for Metabolism was covered in this text, and its progression through cultural and societal change over the career of Kurokawa.

Linas Alsenas, "In Living Color," *Interior Design*, August 2001, 100-101.
Used as a program precedent for the showroom space, covering the Herman Miller Showroom Chicago, using images and text.

Linda N. Groat, *Architectural Research Methods* (New York: John Wiley and Sons, 2002).
This text was used as a quick reference for direction regarding the thesis investigation process.

Lisa Skolnik, "Best Showroom: Herman Miller National Showroom, Chicago," *Interiors*, January 2001, 76-79.
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Michael Franklin Ross, *Beyond Metabolism*. (New York: Architectural Record Books, 1978)

Melis Liesbeth, ed., *Parasite Paradise* (Rotterdam: NAI Publishers, 2003).
This text covered an architecture of mobility. It discussed mobile living pods and mobility theory including the Nakagin Capsule Building.

O. Molloy, S. Tilley, and E.A. Warman, *Design For Manufacture and Assembly* (London: Chapman and Hall, 1998).
This reference was used for basic understanding of the concepts of mass production, and its architecture and implementation.

Per Mollerup, *Collapsible: The Genious of Space Saving Design* (San Francisco: Chronicle Books, 2005).
This reference was a guide to the transformative and inherently flexible objects in our world, and used to translate these concepts into the larger transformative principles of flexible space.

Peter Cook. "Plug-In City," in *Exit Utopia*, ed. Martin van Schaik and Otakar Macel, (New York : Prestel 2005).
This reference was used for the study of the Plug-In city for precedent study. The images and text were used to describe and understand the concept of the city that constructs and deconstructs itself over time.

Peter Cook, ed., *Archigram* (Boston: Birkhauser, 1991). Originally published in London: Studio Vista Publishers, 1972.
This text was used for precedent studies and western cultural analysis. It draws interesting parallels to Metabolism, with exception of the reliance on the machine. The discussion of scale is important in that it generates broad ideas for buildings and cities. Both Walking city and Plug-in city are important case studies.

Peter Davey, "Moral Maze," *The Architectural Review*, September 2000, 50-53.
This text was used for the Zumthor precedent study investigating the use of materials that can immediately be used elsewhere in completely different projects. The tectonic system simply compressed the members into a stable vertical wall. The temporal qualities of space are intertwined with experience of the senses.

Peter Zumthor, "Swiss Sound Box," *Casabella*, September 2000, 62-69, 97.
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Priscilla Chapman, "The Plug-in City," in *Exit Utopia*, ed. Martin van Schaik and Otakar Macel, (New York : Prestel 2005).
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Raul A. Barreneche, "Zaha Hadid Central Building," *Architectural Record*, August 2005, 82-91.
This text was used for the program precedent study of a central accessory space for a large BMW manufacturing facility. Investigating the connections of space and functions, as well as the transparency of specific functions to the office workers. Space is democratic, providing opportunities for interaction.

Rowan Moore, ed. *Structure, space, skin: the work of Nicholas Grimshaw & Partners.* (London: Phaidon, 1993)
Images and information describing the IGUS factory, the tectonic precedents study.

Sean Topham, *Move House* (Prestel Publishing, 2004).
This text provided a background for mobility history, including the Yurt, and other examples of the progression of the mobile architecture movement, as well as several examples of new living pods.

Stewart Brand, *How Buildings Learn* (New York: Viking Penguin, 1994).
This text is inherent to the study of adaptable architecture, discussing the reasons for, and the components of an adaptable architecture. It is critical of, and responds to the way in which people truly use buildings.

The Next Industrial Revolution. Willliam McDonough, Michael Braungart, and the Birth of the Sustainable economy, narrated by Susan Sarandon. DVD
This video was used for analysis of the Herman Miller SQA warehouse precedent study.

Ulrich Conrads, ed. *Programs and Manifestoes on 20th Century Architecture.* (Cambridge: MIT Press, 1971)
This text was used to provide additional support for the argument for flexible and adaptable architecture.

Victor Papanek, *The Green Imperative* (London: Thames and Hudson, 1995).
This book provided much of the emphasis in this project for the critique of consumption and consumerism. The focus of this reading was in analysis of chapters 8 and 9. The agenda is simplified; ecological design is a necessity for human kind's survival.

William McDonough and Michael Braungart, Cradle to Cradle. (New York: North Point Press, 2002)
This book was used extensively to discuss modern society, ecology, consumption, and the relationship of modern society to the environment.