



undergraduate design thesis: derek kohlhase



# DIGITAL MEDIA LAB

A Design Thesis Submitted to the  
Department of Architecture and Landscape Architecture  
of North Dakota State University

BY

Derek Kohlhase

In Partial Fulfillment of the Requirements  
for the Degree of  
Bachelor of Architecture

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Primary Thesis Critic: Bakr Aly Ahmed Assistant Professor

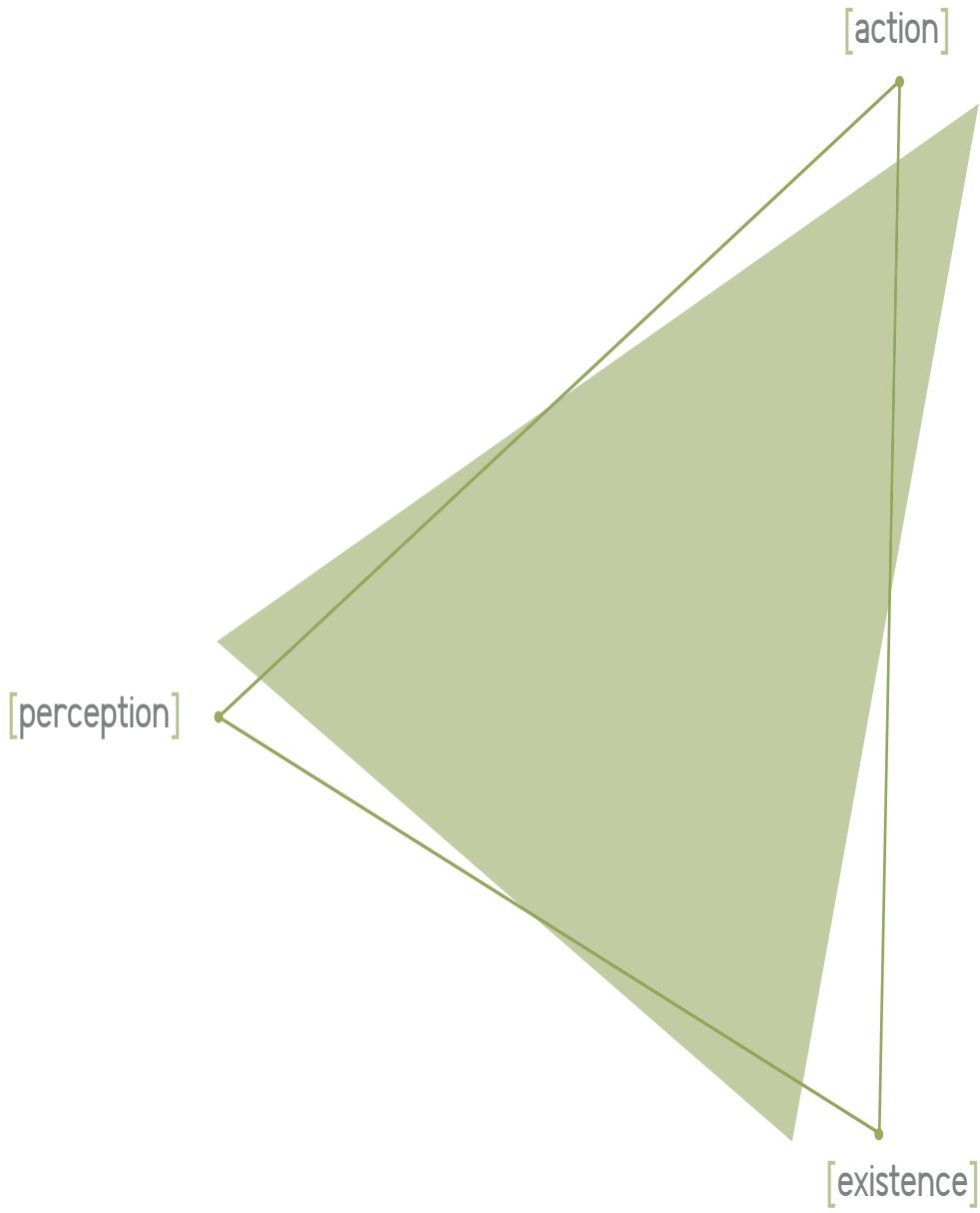
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Thesis Committee Chair: Don Faulkner Associate Professor

May 2006  
Fargo, North Dakota









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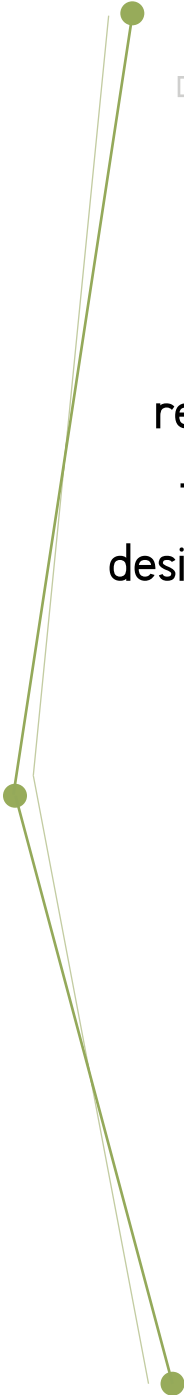
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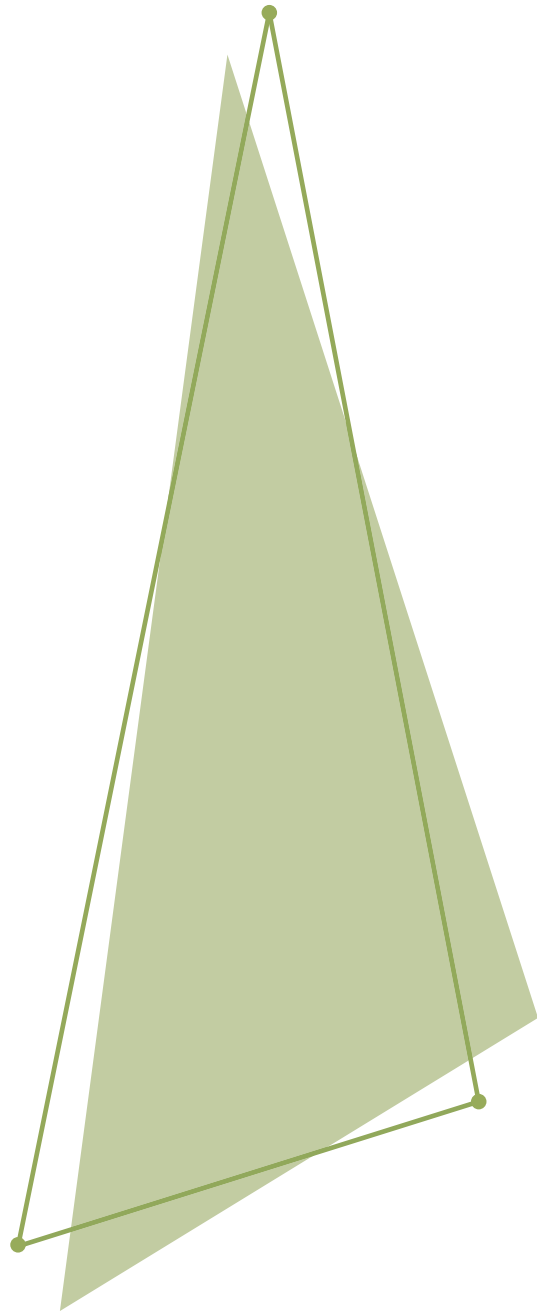
## digital media lab

The project typology for this design thesis will be a research and technology park in conjunction with the University of Minnesota and the design profession as a bridging facility for the advancement of digital techniques in design. The thesis will examine the tension between the materialism of the built environment and the dematerialism of the data used to design it.

The project will be located in the city of Minneapolis along the Mississippi River. The site is known as Gasworks Bluff, and is centered between the University of Minnesota and downtown Minneapolis.

The project will consist of two buildings with a total of 30,000 square feet. The majority of the nine acre site will be developed as a park for the community.





# statement of intent

## project typology

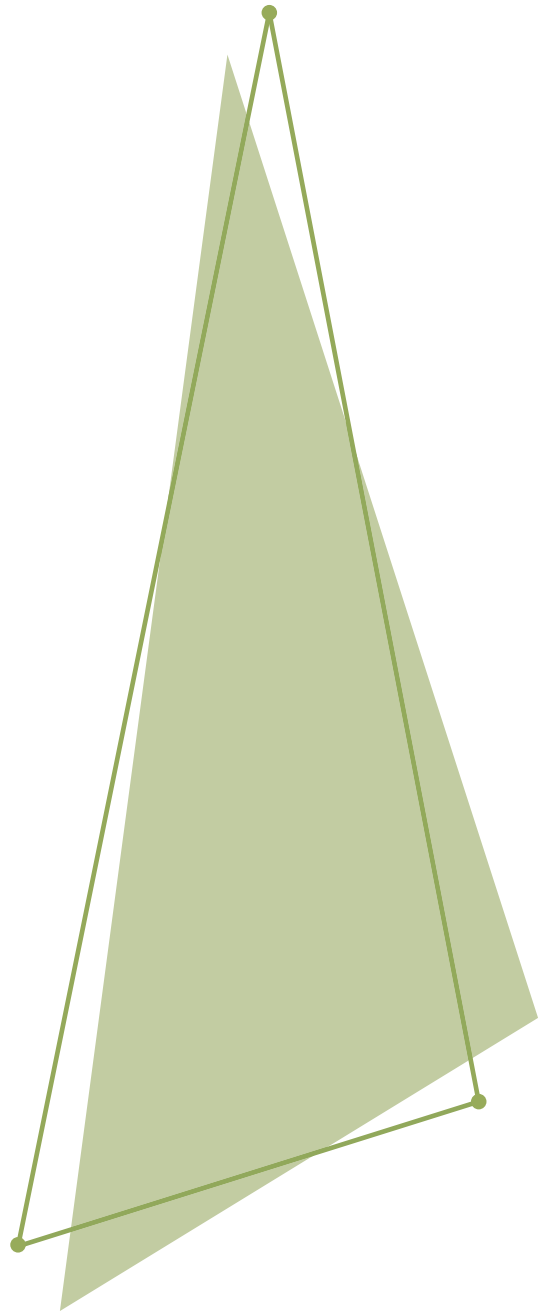
The typology I will use to explore my theoretical premise will be a research and technology park in conjunction with the University of Minnesota and the design profession as a bridging facility for the advancement of digital techniques in design.

## theoretical premise

The thesis will examine the tension between the materialism of the built environment and the dematerialism of the data used to design it. Design metaphors, analogies, and or tectonics will be developed from the examination

## project justification

The project is justified by the fact that the technological world is continually changing and evolving. The design community must also be able to advance along with the technology. This facility will be a proving ground for many of the issues that will arise within the world of architecture. The concepts and theories that will be applied in this design exploration are mainly of the subjective world. it will demonstrate The importance of computer technology and the capabilities which they hold.



# thesis proposal



architecture in its purest state attempts to reduce structures to their simplest form. it attempts to create a spiritual place in which masses and voids interact with their surroundings. it creates a place where the unnecessary objects are forgotten and one can appreciate the voids left by their absence. technology has brought about a new aspect to architecture. architecture and objects can begin to take on new forms through the use of media. It can create subjective models which are used to manipulate, abstract, transform, absorb, and exchange ideas within itself and its surroundings. the forms and objects exhibit a deeper meaning or essence behind the simplicity. the architecture then becomes the purpose for reaching and relaying this essence. it creates new geometries in space which were once not possible. these geometries enhance and bring about a new dimension of interaction, perception, and feeling of place. it can create spaces that change throughout time. perception of the objects and spaces can be made to change depending on where you stand and the time of day. it can create a harmony between the built environment and the natural world. it can create a place which interacts, and takes lessons from the earth and its natural systems. the building will not be a showcase for these sustainable ideas, but will instead use them in a way which will blend with their natural surroundings, and allow nature to impose itself on the forms. the idea that a definite material object can be reduced to a subjective form in space creates a tension between material and technology. it creates an energy. it creates a total, interactive, ideal perception of design experience that brings about sensual and spiritual values not possible before the use of media in design.

- **user**\_\_\_\_\_ The project will be a collaboration between the University of Minnesota and the Minneapolis parks district. Users will include students, faculty, researchers, design professionals, industry, and the general public.
- **owner**\_\_\_\_\_ The site will be owned by the park board and leased to the university of minnesota for use as a research facility. The site and buildings will be maintained by the university as part of its lease agreement.
- **user groups**\_\_\_\_\_ **the general public**

The site for the proposed project lies along a section of the Mississippi River owned and operated by the Minneapolis park board. The site, which has historical significance to the area however, has remained depleted and neglected for the past twenty years. As part of the project development the area will be renovated to serve the public as part of its scenic river by-way.

The peak usage of the site for this group of users will be between 6 am and 10 pm. The public will be able to use the building facilities between the hours of 8 and 5. The site will mostly be used by bikers, walkers, and some tourists and therefore will require no parking. Parking for this group of people will be at the bohemian flats parking area to the west of the site.



## students

Students from the architecture and engineering departments at the University of Minnesota will use these facilities for classrooms, labs, and studio spaces. The goal for this group of users is learning through collaborative techniques. Students will be encouraged to interact between departments and partake in their own research projects.

The peak usage time for this group of users will be 24 hours a day. During regular operating hours (8-5) students will have no parking requirements however will be able to park on site after hours.

## faculty

Faculty from these departments within the university will use these facilities for teaching, learning, and research. Collaboration between these groups and students will aid in the advancement of computer technologies within the fields of architecture and engineering. Faculty will also be given space in which they can engage in their own research studies.

Peak usage for this group of users will be between 8 and 5 pm, however they will have access to the building 24 hours a day. The faculty will require parking spaces for each of the main users.

## staff and employees

This group of users will include a full time maintenance member, receptionists, computer technician, lab technician, and specialists in the participating fields.

The peak usage hours for this group will be between 8 and 5 pm, however they will have access to the building 24 hours a day. Each member of this group will require a parking space on site.

## site security

This group of users will include staff from the university security system as well as park patrol from the City of Minneapolis. Security personal will have full access to the site and its facilities at all times of the day.

Security personal will make required stops and passthroughs of site at certain hours throughout the day. Peak usage will be at all times during the day.

## guest researchers

Guest researchers will include persons from within the local community as well as the global community. Guest researchers may be granted access to the site and its facilities in order to partake in research studies from within the center as well as their own studies. Guest researchers will be given the opportunity to lecture and give presentations on their studies to the community and university.

The facility will be a place for students, faculty, architects, engineers, and other professionals to collaborate in new ways to encourage a growing relationship between the fields.

The peak usage times for this group will be between the hours of 8 and 5 pm, however they will have access to the facilities at all times during the day. Their parking requirements will be included within the parking of the faculty.

- **typology** ————— The design typology for this building is not completely defined. While many of the required spaces can be defined, some changes in the spatial program will occur throughout the process of research and development. The space will be a bridging facility between the university and the design profession.

- **laboratories** ————— **computer labs**

Computer labs within the facilities will be for use by faculty and students within all participating departments.

#### testing labs

Laboratory space for testing hypothesis and projects developed from the computer studies will be included in the program. Lab spaces will include area for testing material, structure, and other issues within the professions.

- **office/studio space** ————— **faculty offices**

Offices for faculty will be provided for those whose main area of involvement are within these facilities.

#### grad student offices

Offices for graduate students will be provided within the facilities for students performing research projects for graduate studies.

#### undergrad studios

Combined studio space will be provided for students within their respected fields to collaborate with a other students and work on their projects.

#### security offices

- presentation/meeting conference rooms

Two conference rooms of differing sizes will be provided.

### breakout spaces

Breakout spaces between offices and lab spaces will encourage interaction between users of the facilities and provide an alternate space for group work and meetings.

### classrooms

Two classrooms within the facilities will be reserved for lecture and work spaces for students and faculty.

### auditorium

A larger auditorium will be used for faculty/student lectures as well as for outside presenters for the university as well as the community.

- learning center river overlook/gallery

By taking advantage of the bluff, this facility will be able to provide a river overlook space for both visitors and users of the facilities. The space will also include room for display of projects and allow the public to see the importance of such a facility on their site.

- outdoor spaces \_\_\_\_\_ public park

Much of the site will remain undeveloped with buildings. The current state of the site will be made suitable as a public park and recreation area.

  - river overlook

    - As an extension to the indoor overlook area, a scenic viewing area will give users and guests the opportunity to take in the river and its surroundings.

  - bike/walking path

    - A walking and bike path currently runs through the site and across the Mississippi to the university. This path will be preserved with the new plan of the site.

  - outdoor classrooms

    - Outdoor spaces for research and learning will give users the opportunity to work in a different environment and interact with the public using the site.

- auxiliary spaces \_\_\_\_\_ reception

  - circulation (including vertical)

  - rest rooms

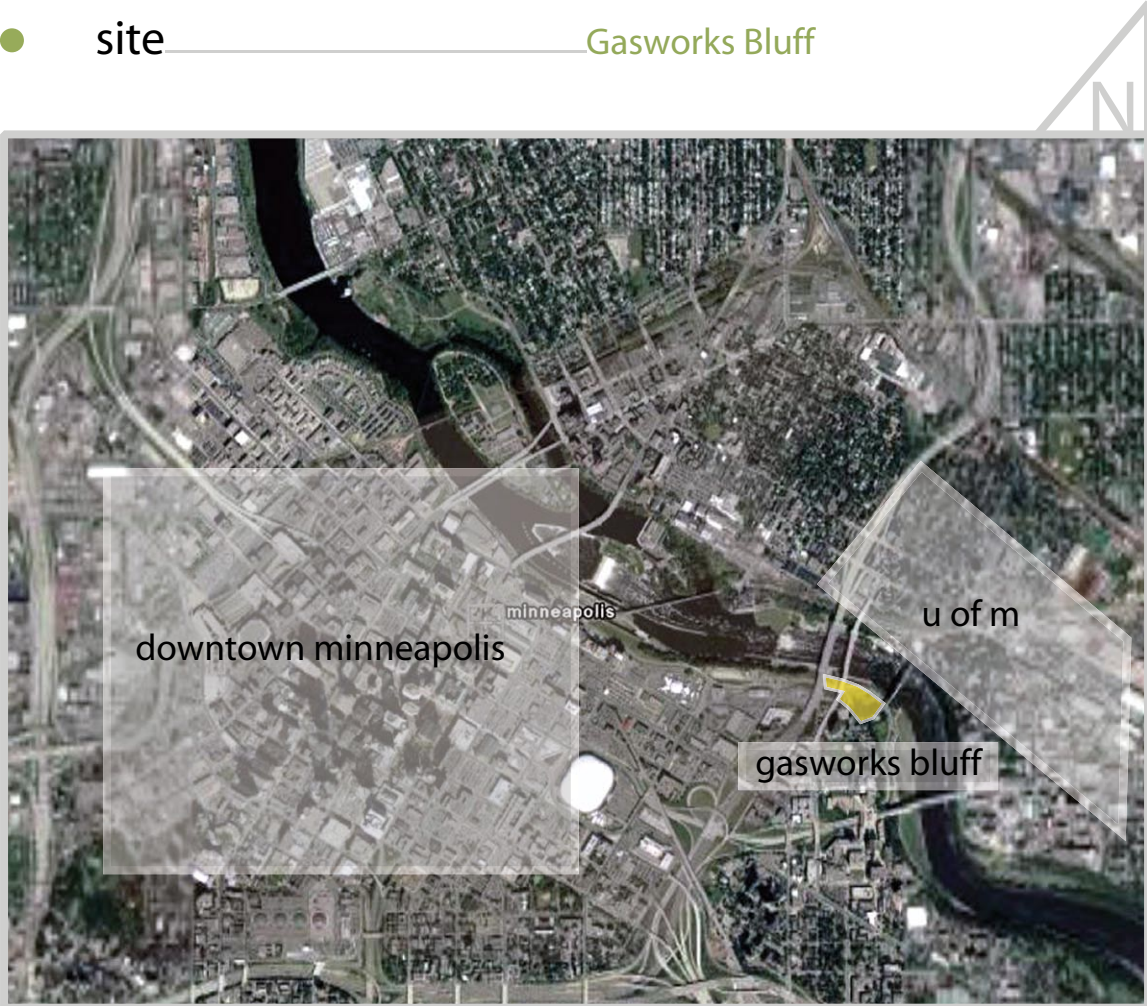
  - mechanical

  - receiving/loading dock

# the site

The site for this design thesis is a section a land along the mississippi river in downtown Minneapolis, MN. The site is currently owned by the minneapolis parks but has been neglected and rundown due to contamination issues dealing with the sites past as a former gasworks.

- region \_\_\_\_\_ Minnesota
- city \_\_\_\_\_ Minneapolis
- site \_\_\_\_\_ Gasworks Bluff



relationship map

- site importance — This site provides numerous opportunities of which other sites do not. It provides a level of complexity to the exploration and depth to the project. Constraints of the site allow for a deeper understanding and involved design solution in which the theoretical premise can be explored. The site is located off the West Riverside Road along the Mississippi River in Minneapolis between the downtown area and the University of Minnesota. The site is currently a forgotten part of the Minneapolis Parks. It has been left to deteriorate and has become a place for people to through their garbage. It is the last piece of land along this portion of the river that remains in this bad condition. The site is a bluff which was once used as a coal gasification facility in this once industrial area. The site's past has left it contaminated and leaves many to shy away from renovating the land. Remediation of the site will be a major part of the research and the final design solution.

The site topography provides many constraints and opportunities. As a remediation project, it will allow for the exploration of building on top of the land. It will also allow for the exploration of combining the natural state of the site with new high tech buildings and how these two systems can come together into a complete design solution.

The Minneapolis Park Board has received proposals from both condo developers and community activists hoping to turn the depleted site into a community park. The proposal to use this site as both a city park and an expansion to the university, will give the city a third option to what to do with the site.

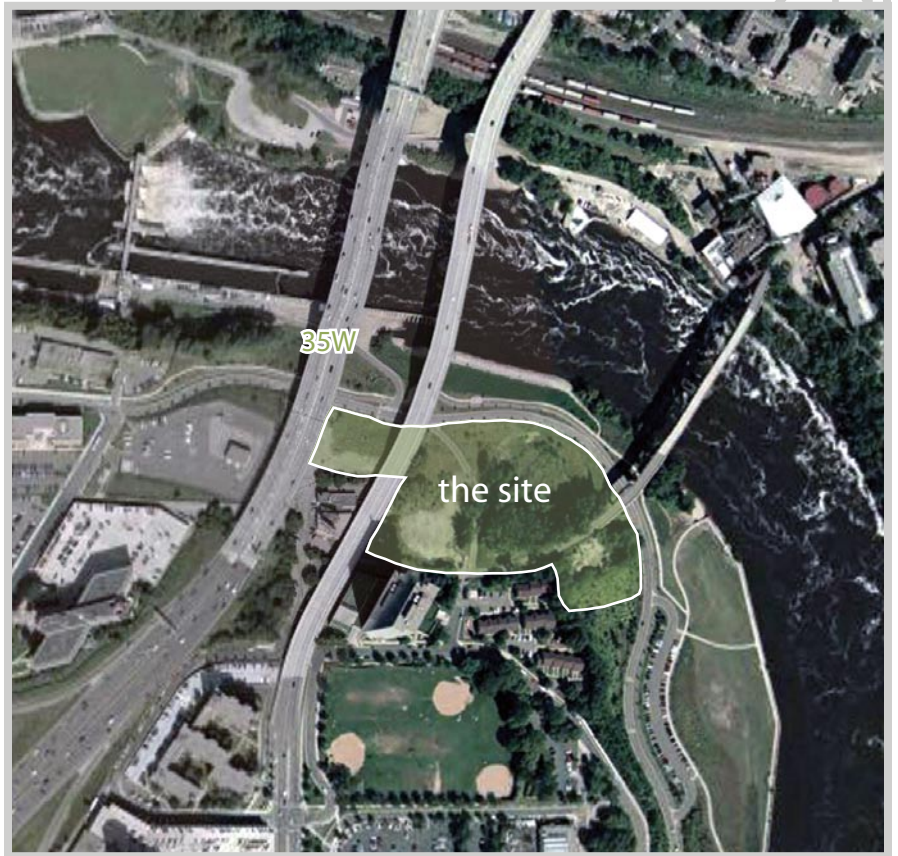
- demographics — University of Minnesota  
Minneapolis Parks System  
professional community

- history — The area now known as Gasworks Bluff begins at 11th avenue south and ends at 20th avenue south. Since the beginning of early white settlement, the bluff has been used for mainly industrial purposes. During the mid 19th century, the site was covered with piles of lumber.

In 1871, the Minneapolis and St. Louis railroad constructed a switching yard and roundhouse in the area, and by the late 1880s railroad yards covered much of the top half of the bluff. The western half of the bluff was soon covered in railroad tracks. Railroad traffic began to interfere with classes at the university. the railroads were relocated to the northern half of the university and a bridge [bridge#9] was built connecting the east and west banks. in 1924 bridge #10 was built to connect the Minneapolis Gas and Light Company to the Bohemian Flats housing area.

At the same time, the eastern half of the bluff started to become taken over by gasworks. In 1870 the first gasworks building was constructed. By the end of the 19th century, this complex eventually took over 10 acres at the top of the bluff. The bluff face below was soon covered with debris from the coal gasification process.



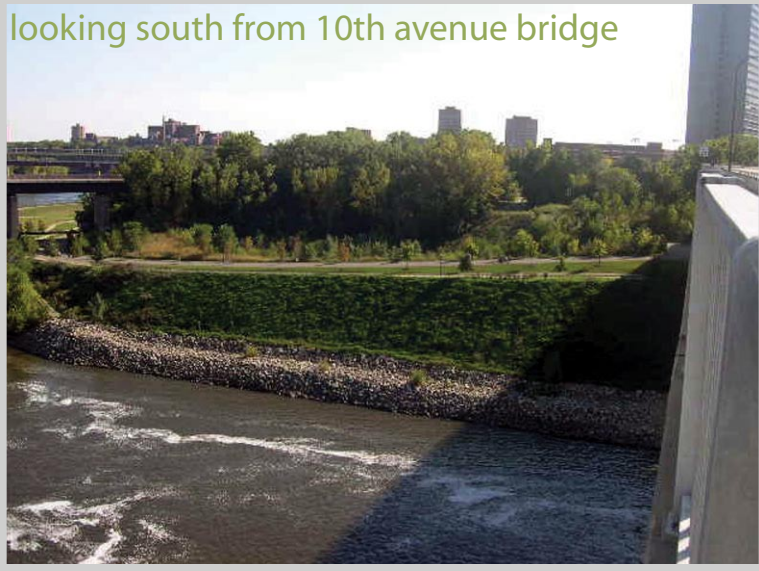


# the site

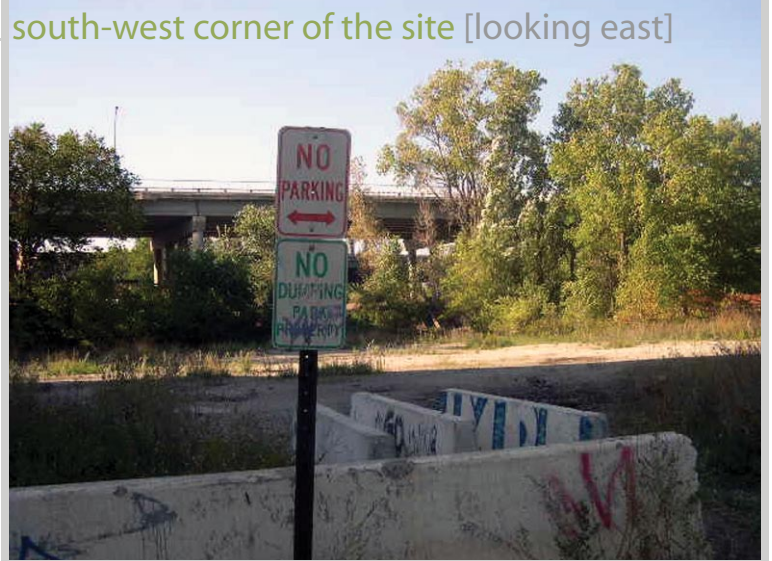
- view 1



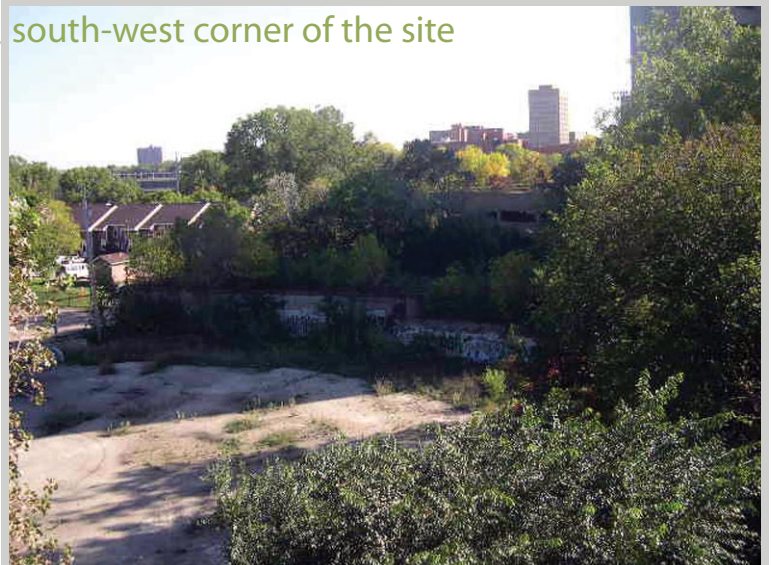
- view 2



- view 3



- view 4



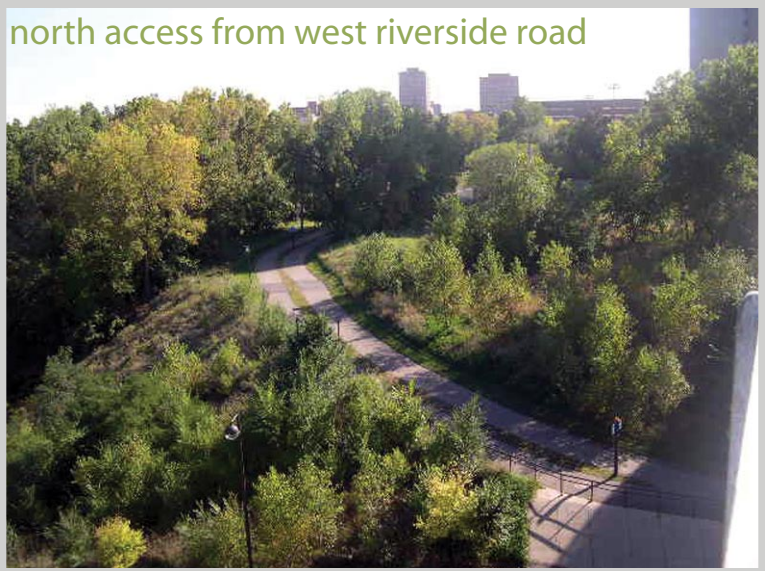


# the site

- view 5

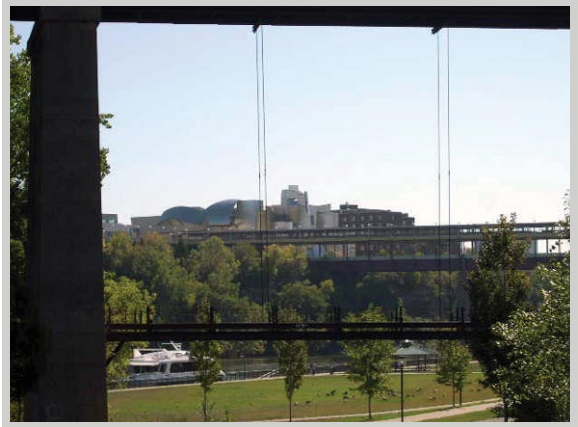


- view 6



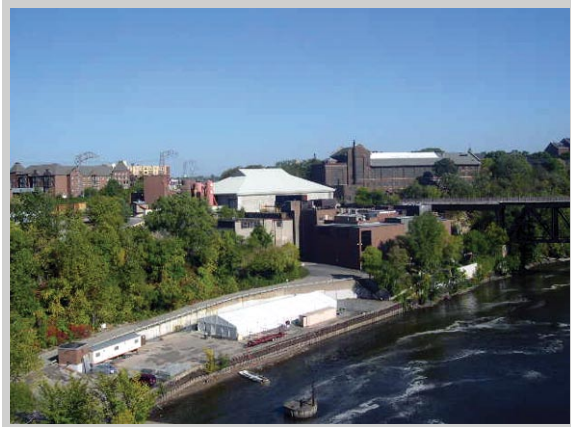


● view 7



● view 8

● view 9



● view 10



This thesis will explore numerous subjects dealing with the current issues involved with architecture and design. These issues include purity of form and material, media in design, remediation and contamination, merging technology and nature, and essence of place. Each issue contains links to the next, creating a unified presentation of parts.

- collaboration

---

Collaboration is the link which will bring this thesis to a complete design experience. This thesis will explore the collaboration of university, community, and corporation. The facility will work towards providing a new understanding of how professional fields can work together to create efficient, unified design. As a design methodology, this thesis will explore the collaboration of aspect and emphasis. Each piece must be integrated to create the whole.

- purity of form and material

---

Purity of form and material is in response to the true nature of material and the forms created. Elimination of all things superfluous, and the creation of a building which demonstrates meaning behind the form is of the most importance.

- media in design

---

Media in design has created a new dimension to the meaning of purity and the perceived true nature of materials. Design with the computer has given professionals the opportunity to explore new forms and geometries and create spaces which were once deemed inconceivable. Design through technology can also create new materials with new limitations. The combination of new geometries and new materials can create a new perception of the honesty and purity of architecture.

- remediation and contamination issues

---

The site for this thesis is part of a former coal gasification facility. Years of neglect has left the site unsuitable for development and use. Remediation will bring the site back to a usable space for the community. Issues dealing with the site will allow the project to explore new design techniques with how one builds on a contaminated site. These techniques can enhance the issues of material and form as well as add new ways in which we can use technology to aid in the creation of a complete design.

- technology and nature

---

This thesis will also explore the issues of building on a natural site. As a collaborative project, community, university and corporation will come together at one site. Each has specific issues in regard to their perception of how the space should be designed. These issues must create a space with unity while still creating a defining difference between technology and the nature.

- essence of place

---

All these issues combined will create a complete design experience. they must all work together in order for this to be accomplished. as a final solution, the design must create an essence. it must create a spiritual place in which mass, void, nature, and technology interact within each other and there surroundings.

- strategy

---

Research and analysis for this thesis will be of a mixed method approach in which quantitative and qualitative data will be gathered concurrently. A concurrent transformative strategy will be employed in which the strategy will be guided by the theoretical premise. Integration of the data will occur at several stages in the process of the research and will depend on the requirements of the examination of the theoretical premise.

The design process will work through all issues of design as a concurrent process where all issues are developed at the same time to create a succinct design.



- fall semester 2005

---

week 1 [23 aug - 26 aug]

t - classes begin  
begin work on statement of intent

week 2 [29 aug - 02 sept]

continue work on statement of intent

week 3 [05 sept - 09 sept]

th - statement of intent due  
begin work on proposal

week 4 [11 sept - 16 sept]

continue work on proposal

week 5 [19 sept - 23 sept]

continue work on proposal

week 6 [26 sept - 30 sept]

continue work on proposal

week 7 [02 oct - 07 oct]

continue work on proposal

week 8 [10 oct - 14 oct]

m - primary thesis critic announced  
w - first meeting with primary critic  
th - first draft of proposal due

week 9 [17 oct - 21 oct]

continue work on proposal with primary critic

week 10 [24 oct - 28 oct]

final draft of proposal due  
site analysis

week 11 [31 oct - 04 nov]

case studies research  
case studies analysis

week 12 [07 nov - 11 nov]

case studies research  
case studies analysis  
program draft

week 13 [14 nov - 18 nov]

program draft

week 14 [21 nov - 25 nov]

first draft of program due

week 15 [28 nov - dec 02]

finish thesis draft

week 16 [05 dec - 09 dec]

th - final draft of program due

- spring semester 2005

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week 1 [10 jan - 13 jan]

t - classes begin  
start design  
schematic concepts

week 2 [16 jan - 20 jan]

schematic design  
spatial, structural, site issues, facility  
issues, and sustainable issues

week 3 [23 jan -27 jan]

schematic design  
spatial, structural, site issues, facility  
issues, and sustainable issues

week 4 [30 jan - 03 feb]

schematic design  
spatial, structural, site issues, facility  
issues, and sustainable issues

week 5 [06 feb - 10 feb]

design development  
spatial, structural, site issues, facility  
issues, and sustainable issues

week 6 [13 feb - 17 feb]

design development  
spatial, structural, site issues, facility  
issues, and sustainable issues

week 7 [20 feb - 24 feb]

design development  
spatial, structural, site issues, facility  
issues, and sustainable issues

week 8 [27 feb - 03 mar]

design development  
spatial, structural, site issues, facility  
issues, and sustainable issues

**week 9** [06 mar - 10 mar]

design detailing  
interior development

**week 10** [20 mar - 24 mar]

design detailing  
exterior and facade development

**week 11** [27 mar - 31 mar]

presentation production  
drawings, animations

**week 12** [03 apr - 07 apr]

presentation production  
finish drawings, animation  
development, digital presentation  
development

**week 13** [10 apr - 14 apr]

finish presentation  
final boards, animations, and digital  
presentation

**week 14** [17 apr - 21 apr]

ready to exhibit  
verbal presentation preparation

**week 15** [24 apr - 28 apr]

m - thesis projects due at 4:30

**week 16** [01 may - 05 may]

graduation

- 2nd year \_\_\_\_\_ fall semester [bakr alyahmed]
  - ndsu housing development [fargo, nd]
  - ndsu daycare/school [fargo, nd]

spring semester [vince hatlen]

- fargo pocket park [fargo, nd]
- fellowship green [new orleans, la]
- fargo branch library [fargo, nd]

- 3rd year \_\_\_\_\_ fall semester [steve martens]
  - golf course clubhouse [battle lake, mn]
  - groen hoek boathouse [greenpoint, ny]

spring semester [mohamed elnahas]

- columbia convention center [columbia, sc]
- earth system science and policy [education, grand forks, nd]

- 4th year \_\_\_\_\_ fall semester [rebecca pinkston]
  - fargo business  
[frederick's floral, fargo, nd]
  - noll's figure ground
  - role of the block
  - spatial sequence
  - synthesis of parts
  - urban design project  
[st. paul, mn]

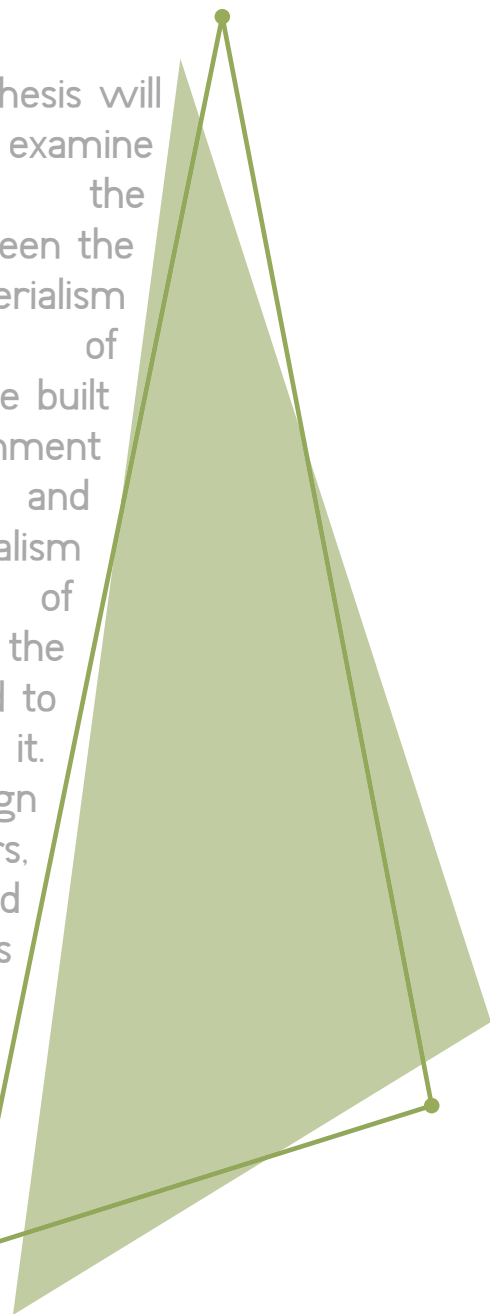
spring semester [mark barnhouse]

  - highrise design  
[mixed use, san francisco, ca]
  - ndsu downtown addition  
[education, fargo, nd]
- 5th year \_\_\_\_\_ fall semester [ganapathy mahalingam]
  - on the verge of echoes
  - rivulets of equal fatham
  - volumes of heat
  - the space of visual desire
  - nestling in the mother

- city pages. is the minneapolis park board considering selling a prime parcel on the mississippi river: a bluff on the river. 29 september 05. [www.citypages.com/databank/26/1292/article13653.asp](http://www.citypages.com/databank/26/1292/article13653.asp)
- department of architecture and landscape architecture at north dakota state university. [design thesis handbook](#). 2005
- from site to story. archaeology of the central minneapolis riverfront. 29 september 05. <http://www.fromsitetostory.org/sources/papers/mnarch48/48inv-gb-b.asp>
- koedam, andrew. (2005). facility for industry technology and power generation. design thesis: north dakota state university
- metropolitan design center. college of architecture and landscape architecture at the university of minnesota. 29 september 05. [www.designcenter.umn.edu](http://www.designcenter.umn.edu)



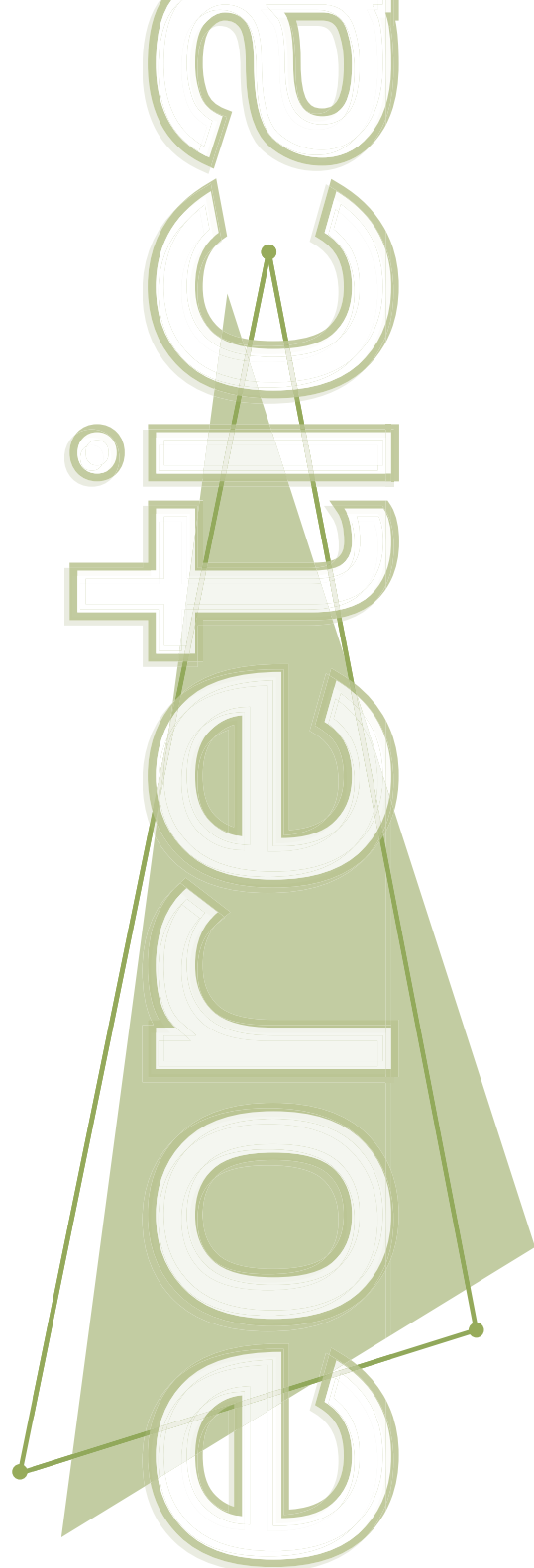




the thesis will  
examine  
the  
tension between the  
materialism  
of  
the built  
environment  
and  
the de-materialism  
of  
the  
data used to  
design it.  
design  
metaphors,  
analogies, and  
or tectonics  
will be  
developed  
from  
the  
examination

# program document





theoretical premise  
research

This research paper is based on an article by Lars Spuybroek in his book, *Machining Architecture*. He relates the acts of perception and action to being simultaneously developed. 'Perception relies on action, and action is possible only through perception.' In his book, he quotes a neurological study done by Richard Held, and Alan Hein. In the study, two kittens were raised in a carousel. One kitten was able to move freely around a circular track, and the other was strapped on a suspended gondola, pulled by the other kitten. When they were released from the carousel, the active cat was able to move and behave normally, while the one strapped in the gondola stumbled and bumped into objects. The cat that was strapped into in the gondola was not able to link the act of movement to its own perceptions.

According to Spuybroek this study is fundamental to architecture. Architects are trained to first plan movement and then abstract it upwards. The movement becomes the plan, or the 'surface of action,' and the abstraction becomes the elevation, 'the surface of perception.' But if these two phenomenons are simultaneously developed should they not be architecturally developed together. The design of space should not be broken down into separate pieces. The development of these two ideas together will create an architecture of continuity. How we perceive a space is more than just how we use it in plan. Through the use of digital operations, we can see the three dimensional framing of spaces, adjusting, and changing them to the desired perceptions.

Materialism is the philosophical view that the only things which can actually exist are those that are made up of matter. In this view, all that can exist is mass and void. But it exists only through realization of its existence. Does a spirit not exist? Or is it just the body of the human creating and manipulating space that exists? How than can an architecture relay an essence or feeling if feeling and spirit do not exist? Architecture is created by two sets of rules. By defined quantitative knowledge, results and goals, and by emotion and desire. Design comes from within the designer. From internal perceptions of what a space should convey. Through the use of complex modeling, mass and void are created. Though there existence is brought about only through the one perceiving it to exist. A computer is made up of matter, which by the rules of materialism must exist. Then to must the process and images that it creates exist. Human desire to create a space can be limited by ability to draw and make it real. An internal image may not be able to be projected onto paper. But through the use of the computer, the image becomes realization. It becomes external, not only to the one creating it, but also to others. It is not the computer that created the design. But it is the computer that relays the mind's image. The realization then has the ability to become a material object. A material object created by a subjective, ephemeral image.

As a sub-division of metaphysics. Ontology directly relating to philosophy means “the study of being.” It looks to establish the extent to which an object or any entity for that matter exists. For its purpose in this study relating to the subjective world and the objective world, Ontology will define that which can be represented. If an entity can be represented whether by actual objectivity or decoding, it can be perceived as existing. Although seemingly having no relationship to architecture and the built environment, it is with these representations of space that objective forms come into existence. Existence becomes the key term in this study. If an entity were to exist in cyberspace why can this representation not be perceived as existing within the real world. It becomes a connection between the built and subjective world. What’s forgotten however is the difference between the existence of a material object and that of a soul or spirit. One might make the claim that the only way something can exist is if it has the ability to experience emotions. The ability to feel pain, to hurt, to cry or laugh. A building cannot feel pain. It cannot be hurt by another person. Its emotion cannot change. It’s steady. The building relays a feeling. But it cannot change a person. It can not solve social or psychological problems. It can only hope to inspire and spark emotion. To reflect emotion. The emotion is within its users. The building and site are a ‘gateway.’ Creation must consider how one is perceived or meant to feel within these spaces. The environment must be positively charged, so that it becomes the reflection of emotion. It must burn. It must leave its users with a perception of spirituality, and connection to the world of existence.

The creation of space or natural spaces all have a different essence or feeling which sparks an internal response. The method known as phenomenology, as referred to as the 'return to things themselves' is useful in the realm of architecture when defining a specific place.

Phenomenology is the philosophical movement which takes phenomena, that which presents itself to us in conscious experience, and extracts the essence behind the experience. To find essence and essentialities of the object, one must look to mental phenomenon which creates the object. All structures are intentional, man-made, natural, real, and ideal. Mental acts give objects and places meaning. It is with the ideas behind phenomenology that a place has meaning. By breaking space down we begin to find meaning. We cannot however define a meaning to a place, because a place cannot be defined for all users. Architecture is a personal experience. Just as subjective models will be used to define objective places, objective places emulate subjective experiences. While many characteristics and perceptions are shared between individuals, each individual experiences different emotions from their personal experience.

Philosophy of Perception deals with how mental processes depend on the world internal and external to the person perceiving them. Perception begins with the senses. Our sense of sight, hearing, touch, smell, and taste all determine how a person perceives and provides an impression of the world in which they live.

There are two types of perception, internal and external. Internal perception tells us what is going on in our body. It is with this perception that a person can tell if they are standing or sitting. Internal perception also provides us with a way to determine learnt cognitive process. The external environment which we live in presents obstacles and experiences which by the simple act of living through them we can tell our brain what to do in specific situations, such as pulling your hand away from a hot surface. External perception tells us about the world around us. How one perceives the space which they are occupying is sensitive to the person experiencing it. Albeit not able to define how a person feels within a space, architecture and its environment can influence perception of the mind. Perception becomes an image. Through this image a representation of a space is made. Without a representation, there can be no experience. By creating an ephemeral, subjective model, we can begin to perceive and experience a space without actually occupying a built environment. Digital models become the image of perception, defining spaces, form, mass and void. The perception becomes ideal. A holistic experience. One not possible through plan, elevation, or even perspective. It takes you into the space, places it around you, and becomes the reality based on the image.



Building form and structure depends in large to the laws of physics and the capabilities of the materials we use. Certain materials, such as stone and brick, are good in compression, but fail when subject to tension. The forms of the buildings made with these materials are limited to their capacities. Concrete, another material which acts well in compression was expanded to hold tensile strength with the use of steel. It allowed for the ability to create structure frames for buildings. With the advancement of steel, we could now cast structure into desired shapes with great strength.

With the physical ability of the materials, also is the ability to use what is available. Through time we were able to adapt materials and create desired forms. Needs have shaped the built environment. The need for shelter, the need for security, the need to harness nature, and the need to communicate. All though limited by the materials provided by nature.

As we continue to find new needs, the future of building and materialism must change to adapt to these needs. Through the use of computers, we can now create virtual buildings which simulate physical behaviors. The need to harness nature and its systems is emerging as one of the primary needs of our time.

De-materializing the built world, will give us the ability to look at the laws of physics and provide new ways to abstract from them new ways into which to use the materials provided to us. The laws of physics have not changed, but the technologies given to us can begin to adapt to new ways of thinking.

Sociology, as a broad field relating to many others, has a huge relevance to architecture. As the study of social life, social change, and the social causes and consequences of human behavior, (as defined by the American Sociological Association) sociologists can tell a lot on the structure of groups, organizations/societies, and their interaction within these contexts.

Some topics relevant to architecture include organizational effectiveness, job satisfaction, how space design influences organizational well being, and how buildings impact human behavior. These topics will be evaluated for two separate user groups to the site.

The first is that of the community users. This group of people's needs lie in the site rather than the architecture. Careful placement of a building on a site owned by the parks and meant for use as a park will be crucial to the success of the project. The need of this group is for a satisfactory park for the community which encourages interaction between other community members, and to the second group of users.

The second group of users for the site will be the university and professional users, students, professors, and design community. As a collaborative project, this group will work together in flexible spaces designed for interaction and change.

Psychological responses in general are triggered by physical stimulus. In architecture, these stimuli are related to perceptions. Perception of space, motion, and sequence are three related ideas of psychology in architecture. How one perceives a space is determined by their previous experience. One's previous experience is usually a predetermined motion or sequence of spaces. So the motion or sequence of spaces on the micro and macro scale become of great importance. Architecture is usually designed for a set pattern of usage. David Canter, in his book *Psychology for Architects*, highlights this as one of the assumptions which finds much support in psychology. Architectural spaces are not designed for randomness. But it is this notion of predefined function that takes away from experience of place. Although many spaces must be defined by certain functions, it is the architecture of vagueness and flexibility that sparks imagination, growth, and understanding of oneself and their environment. On a personal level, no one person has the same experience as another. But as a group or social dynamic, perceptions are shared among users with common interests, purposes, and goals.

Here the purpose is knowledge and growth. Knowledge sparked by vagueness and subjectivity of space. The de-materialized space becomes a way to study the interactions of both the human and environmental needs. By creating an architecture that responds not with a set perception of how to use a space, but variability in layout and design, interest and imagination are sparked, creating a dynamic space for learning. This idea is fueled by the fact that a person interacts with their environment rather than reacts to it. People need to be guided in their experiences, but not told in what specific way they should use it.

I combined these two topics into one study because I believe that typology is an 'extension' of and derived from topology. When used in the realm of design and the architecture that is derived from this design, topological studies of space are case sensitive. I will relate it directly to its importance in designing a media lab for studying computer technology, which is the typology of this thesis project. Topological aspects can transform and change. They are constricted to defined parameters. The topological aspects will deal with how space is used within typology. We topologize for specific cases. Any building function can not be squeezed into any form. Plan and elevation (action and perception) define the topological levels. You would not topologize vertically for a program that requires spaces to be flexible and capable of change.

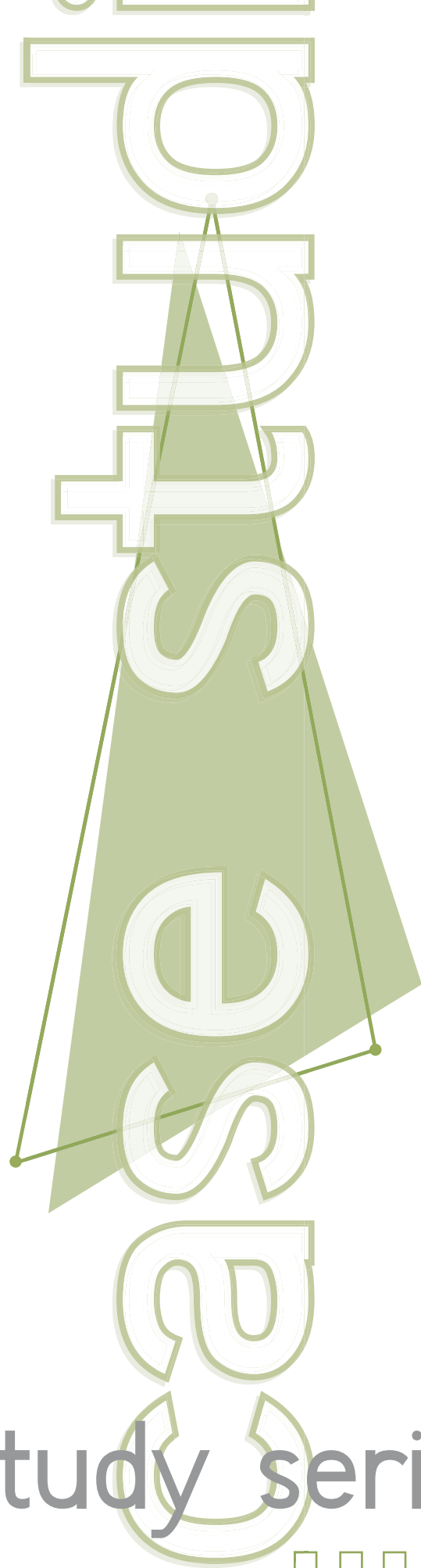
A typology is not capable of transformation, only deformation. This is why a typology can be defined before a design is defined or even constructed. It is the individual topologies that make up of the typology. A building typology is defined by function. This is why typology is often defined first. It is the individual pieces of the the typology that we need to topologize.

A reoccurring theme tends to appear in most of the individual research reports; perception, realization, and existence. Their connection is triangular. Each takes from and relies on the others. Existence is defined by what is perceived and how this perception is realized.

Architectural and natural spaces can not be said to have a universally defined feeling. As an architect designs, their emotions and feelings change throughout the process. The designers feeling and emotion are therefore reflected in the resulting spaces. But it is not just the designer's emotions which define the space. The feeling of a place is influenced by all its users. The value and meaning is then defined by change and subjectivity. Just as an environment changes with natural phenomenon (light, shadow, wind, rain), so to does an environment change with the phenomenon of human perception and emotion. It is the combination of natural, built, and emotional phenomenon that gives a place meaning and brings it to life. It is then the architect's responsibility to understand the complexity of emotion present in the spaces they design. They must strive to create a place which engages the human, natural, and built aspects in a positive way.

These ideas begin to define their relationship to the theoretical premise. The tension is not in the de-materialism or the materialism. The tension is somewhere in between. It is within the person creating the objective from the subjective. It is in their own emotion as well as their understanding of how a place influences emotion in others. It is not within the pen in their hand, or the keyboard from which they perform operations. Just as a physical space can illustrate an emotion, so to can an emotion illustrate a physical space. It is with knowledge of human emotions that spaces become defined. But it is with only human emotion that a space comes to life (existence). If all that is able to exist is that which is able to feel pain or happiness, the site takes these feelings from its users.

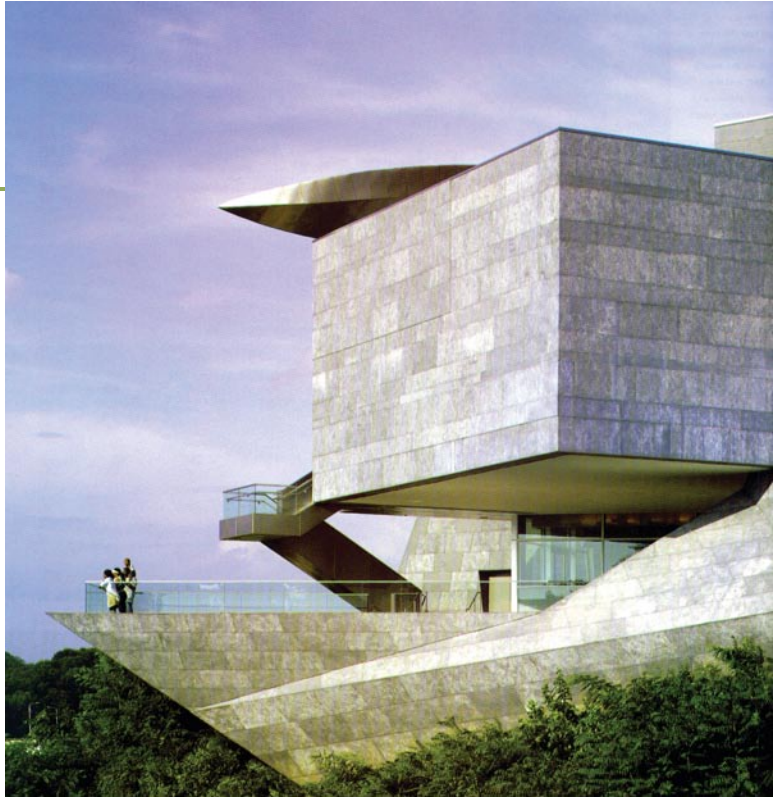




# case study series

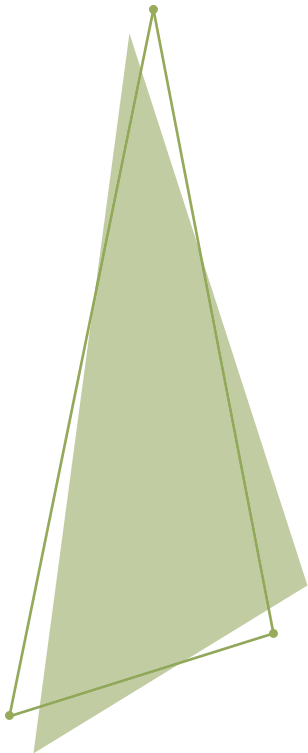






f.1

terrace



Chattanooga Tennessee  
Randall Stoudt Architects  
30,000 sqft expansion

hunter museum

# hunter museum



f.2 addition entry



f.3 bluff view



f.4 bluff view

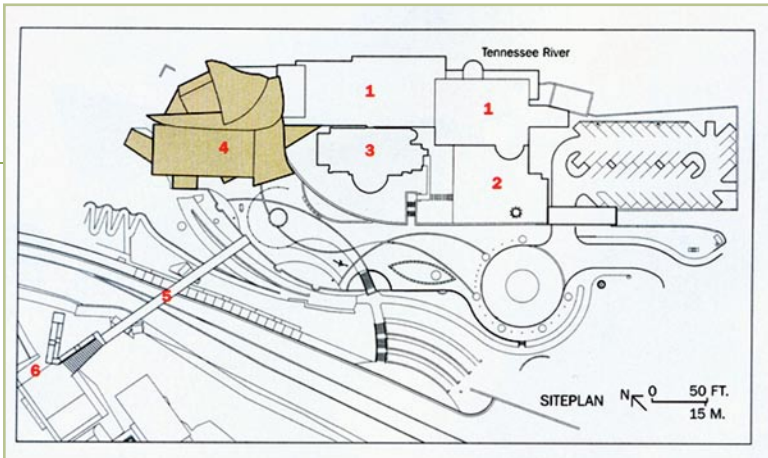


The Hunter Museum's newest expansion connects the museum to the redeveloped waterfront and the downtown area. The project was an attempt to invite the city residents and visitors who never felt welcomed before.

The original facility for the museum is housed in a 1905 neo-Georgian mansion which was only inviting to a select few visitors.

The buildings program includes a lobby, auditorium, cafe, museum store, terrace, gallery, temporary and permanent exhibitions, and a pedestrian bridge.

The existing facility also includes a 1970s Brutalist addition to the east of the mansion. A seamless flow of the compilation of parts would have been impossible, so Stoudt's addition is built to the west, shifting the focus towards downtown and making the mansion the center of an "ensemble" of buildings.



f.5

site plan

1. 1970s building
2. east addition
3. mansion
4. west addition
5. pedestrian bridge
6. walnut street bridge

The Hunter Museum's newest expansion connects the museum to the redeveloped waterfront and the downtown area. The project was an attempt to invite the city residents and visitors who never felt welcomed before.

The original facility for the museum is housed in a 1905 neo-Georgian mansion which was only inviting to a select few visitors.

The design leads visitors to a central point in the lobby. A series of terraces gives multiple views of the river and downtown area. The spaces are inviting and allow visitors to make decisions on when they want to stop or go.

The central lobby area connects to the exterior with large amounts of sunlight, and the continuation of flowing forms.

A pedestrian bridge, also by Stoudt, connects the museum to the rest of downtown Chattanooga.

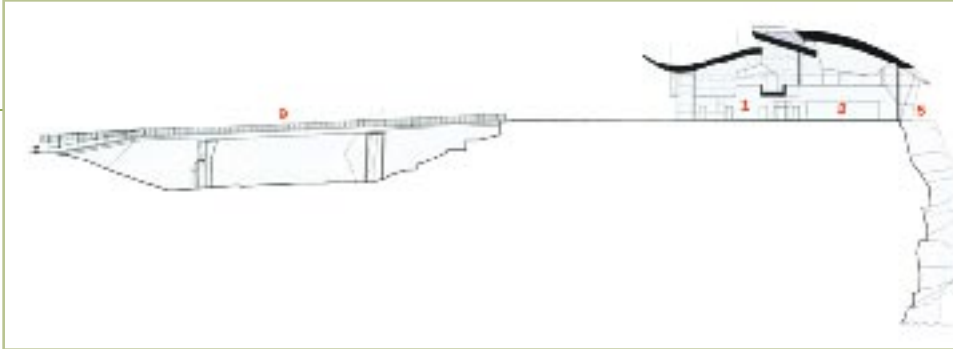


f.6

pedestrian bridge



# hunter museum



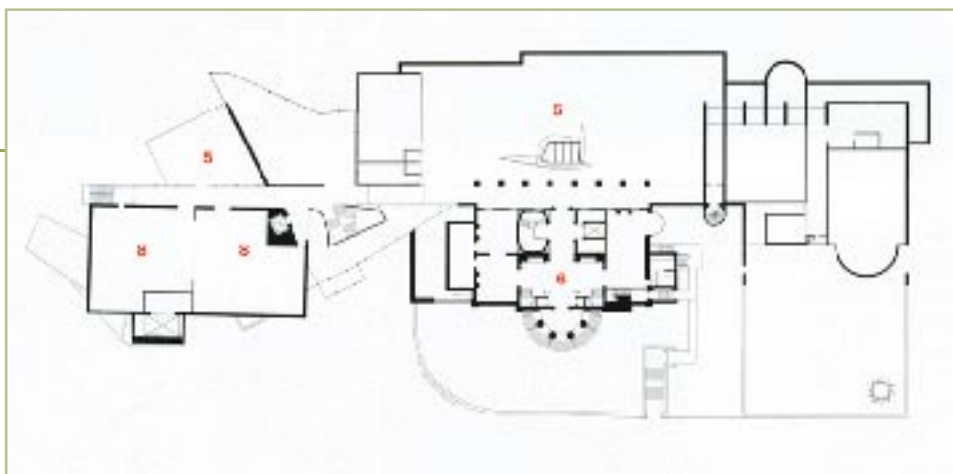
f.7

site section



f.8

ground floor



f.9

upper floor

- 1. lobby
- 2. auditorium
- 3. cafe
- 4. museum store
- 5. terrace
- 6. gallery
- 7. mansion
- 8. temporary exhibition
- 9. pedestrian bridge



Case Relevance

River and bluff site

The building takes lessons from both the site's physical context as well as its history. On such a dynamic site, inspiration should be taken from these aspects

Connection to urban areas

The building becomes an extension of the urban downtown area inviting the public and welcoming new visitors.

Movement and perception of space

The design moves people through the space in an organized manor, yet allows visitors to make decisions throughout their visit, allowing individuals to explore and experience the space in a personal way.

Theoretical premise affects

The theoretical premise is left unchanged, however, inspiration from site issues, history, and user experience will be considered as part of the tension in the design.



f.12 stair case

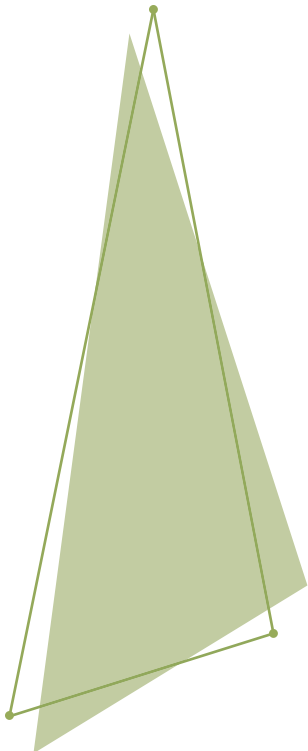


f.11 lobby





f.14



La Jolla, CA  
Louis Kahn

salk institute



f.15 construction



The Salk Institute is a present-day landmark known by architects all over the world. The facility consists of two facing building with a central plaza. The laboratory is occupied by 500 scientists, students, and staff whom many consider the best spaces they have worked in.

The buildings are successful in many ways. Large flexible lab spaces allow scientists to work more freely and expand the uses of the spaces. Deep ceiling trusses allow for open spans which clear the spaces of mechanical and electrical obstacles. The buildings are also characterised by the amount of light, and desired views.

A diverse arrangement of open and private spaces allow scientists to work alone, and collaborate, and discuss with others. The numerous open staircases have become a meeting point for discussion and interaction.

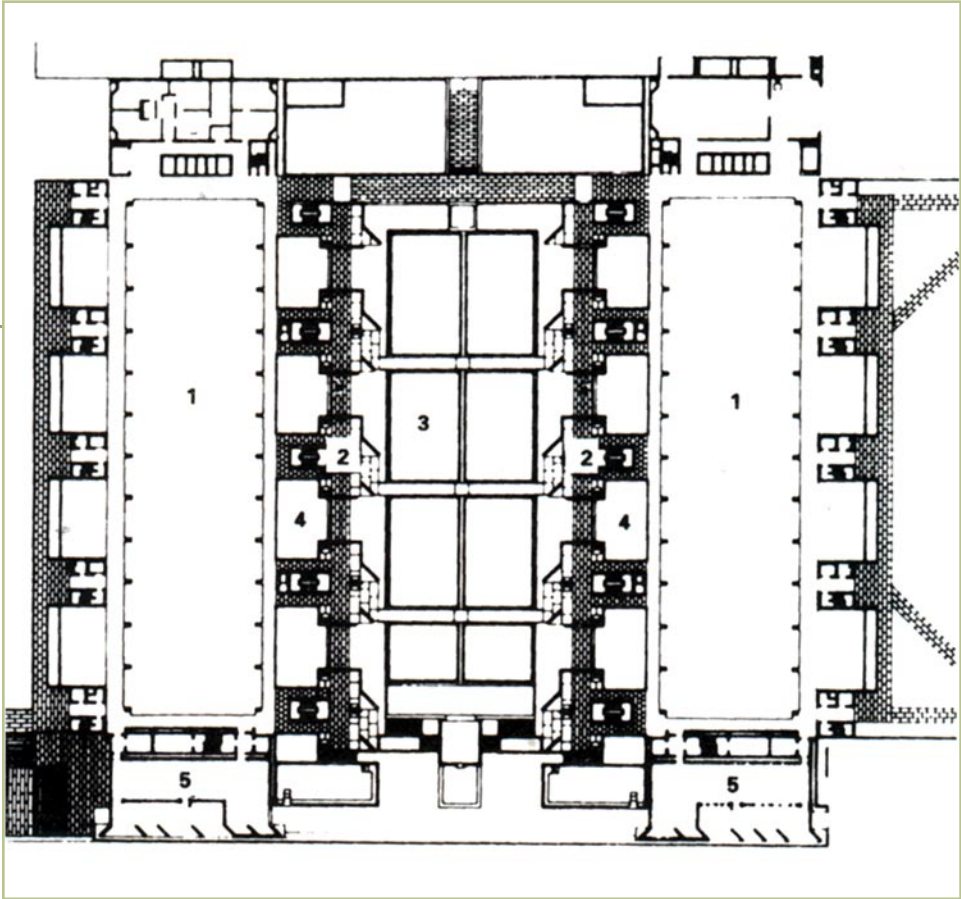
The central plaza is the feature most noticed and admired by architects. The plaza exerts a spiritual sense. The large open space has a mysterious feel. It is not often used by the buildings occupiers because of the unhuman scale, and vast openness.



f.16

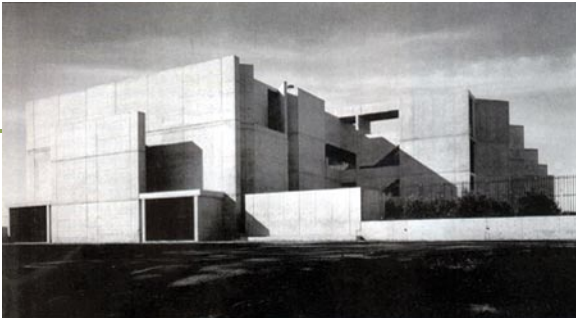




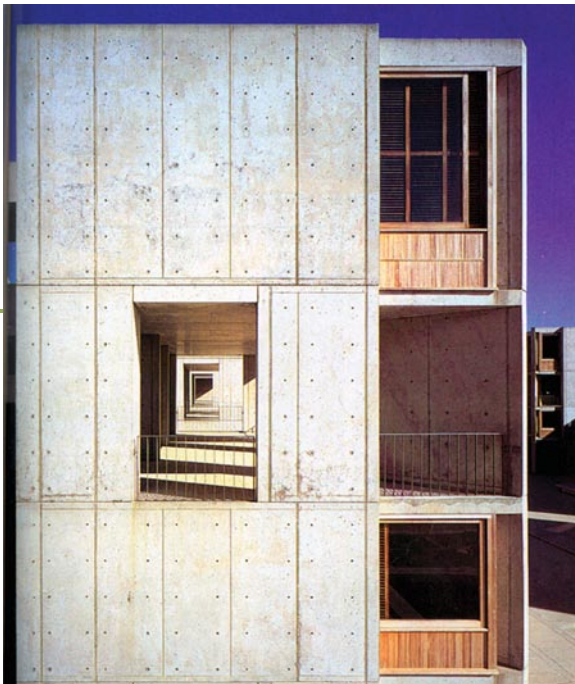


f.17

floorplan



f.18



f.19

### Case Relevance

#### Honesty of material

The building exerts a feel of honesty and truth. The unfinished concrete structure is void of any decoration and excess material.

#### Flexible work spaces

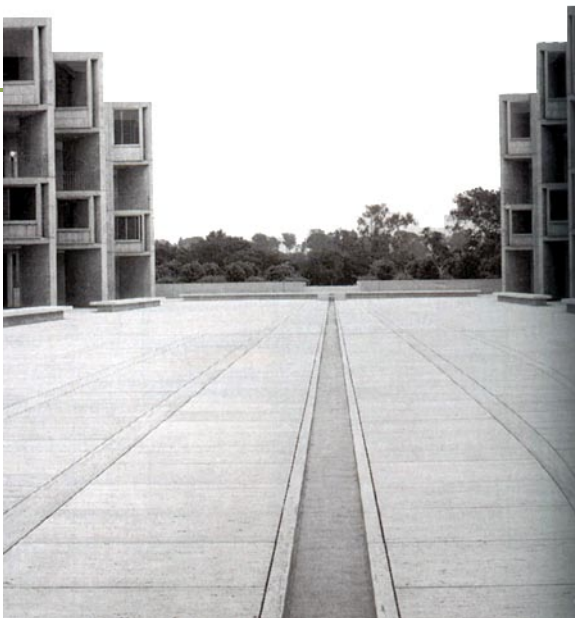
The lab as a large flexible space where functions can change allows scientists to work on different projects without limitations of space.

#### Interaction and collaboration

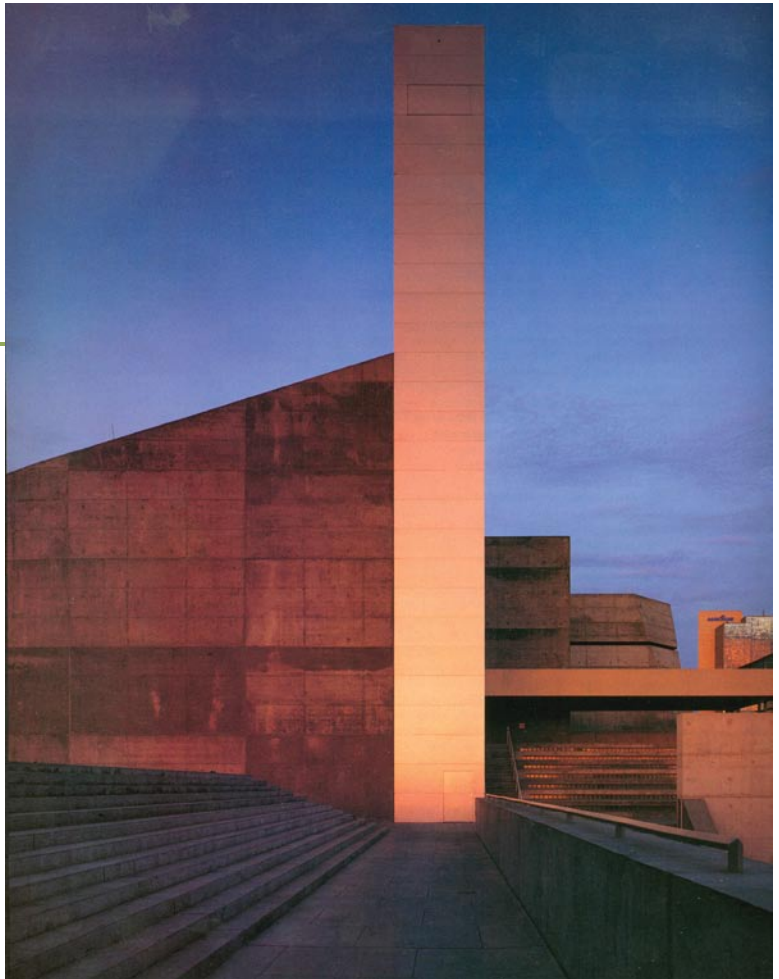
Flexible lab spaces and large communal and open areas allow for interaction between scientists.

#### Theoretical premise affects

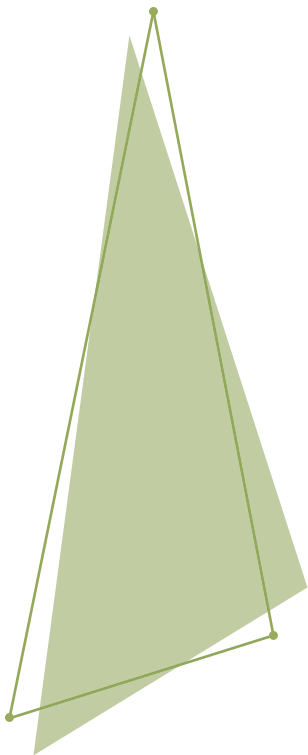
The issues of honesty of material will become important in discovering the final design. However, the definition of an honest material use may change through the process of design.



f.20



f.21



Phoenix Arizona  
Antoine Predock  
127,000 sqft

# arizona science center

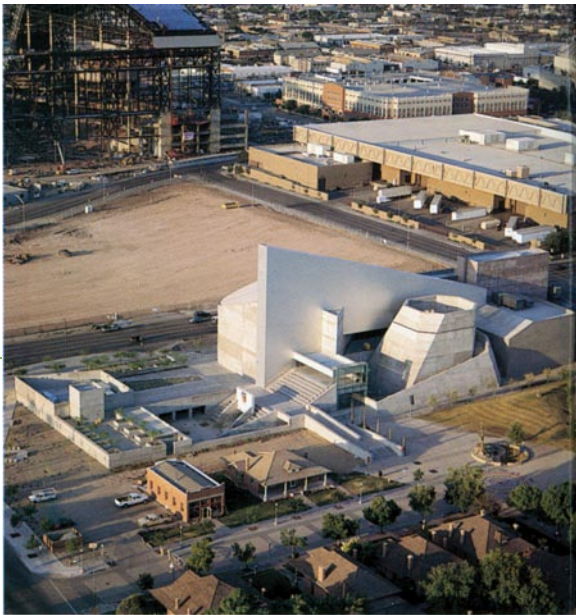


f.22



The Arizona Science Center by Antoine Predock is a 127,000 sqft building including a theater, planetarium, 5 exhibition halls, store, a cafe, and employee office spaces.

The building sits in the center of the city, between Heritage square and its historical houses, the downtown area, a shopping center, and most recently a baseball stadium two blocks over.



f.23

aerial



The design takes its language from the peaks, valleys, canyons, and mesas of the Arizona landscape. The design leads visitors down to a sunken courtyard that takes them out of the city and into a new redefined context. The sunken courtyard forces your view up into the large windowless forms echoing a natural landscape. Predock plays with light, shadow, water and the sense of coolness in underground spaces to enhance the feeling of being in a natural landscape.





f.24 sunken courtyard



Many criticisms of the facility have arose on the neglect by Predock to recognize, the urban context, and lack of development of the interior of the building.

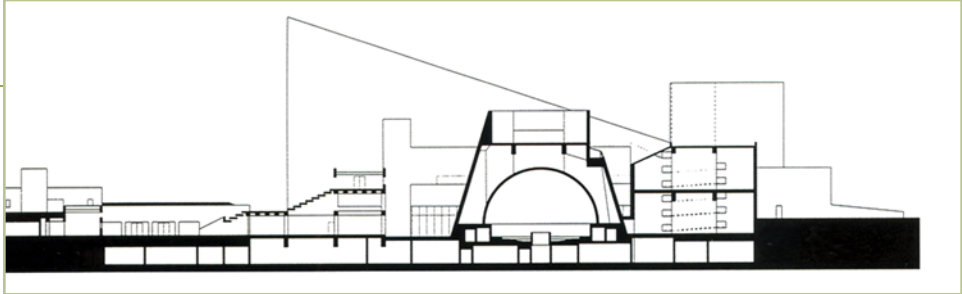
The large windowless forms of the exterior of the building seem to have no connection to the urban context. The building overshadows the small scale Heritage Square, and has no way of drawing in visitors from that area. In an attempt to create a sense of leaving the city, Predock also makes no attempts to connect with the busy pedestrian downtown area directly to the north of the site.

The science center's employees's also ended up with the worst space for offices and workshops, being placed in the sub-basement with no natural light. The interior of the building is left unfinished and unconnected to the exterior forms. The perception that you are left with of the naturalness of the space on the outside fails to brought to the interior.

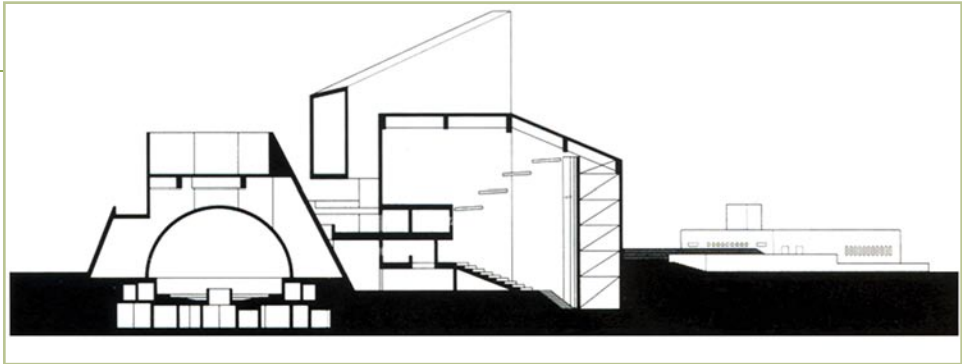


f.25 entrance

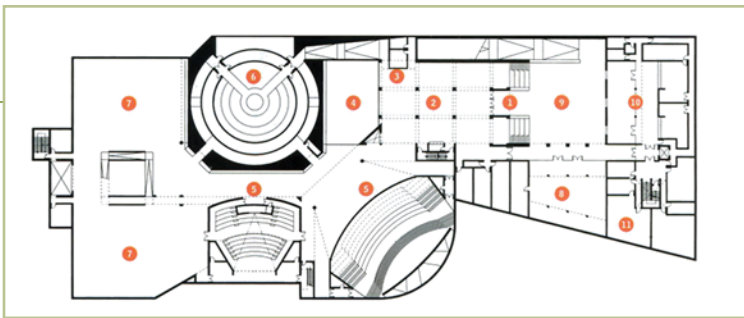




f.26 east-west section



f.27 northwest-southeast section



- 1. entrance
- 2. lobby
- 3. security
- 4. reflecting pool
- 5. theater
- 6. planetarium
- 7. exhibit space
- 8. museum store
- 9. courtyard
- 10. restaurant
- 11. administration

f.28 entrance level plan



Case Relevance

Connections to local landscape

Taking inspiration from the surrounding landscape places the building in the its local context.

Connections to the urban context

While the building responds well to the natural landscape, it does not respond to the urban landscape. It is important to allow a retreat for visitors, but not take them out of the city.

Comfortable environment for all

the group that was neglected in this design is the one which uses it the most often the staff. Whether, staff or researchers, members of the building community should have comfortable, interactive places to work and study.

Theoretical premise affects

Materialism and form as a connection to the natural landscape as well as the urban context.



f.29

lobby

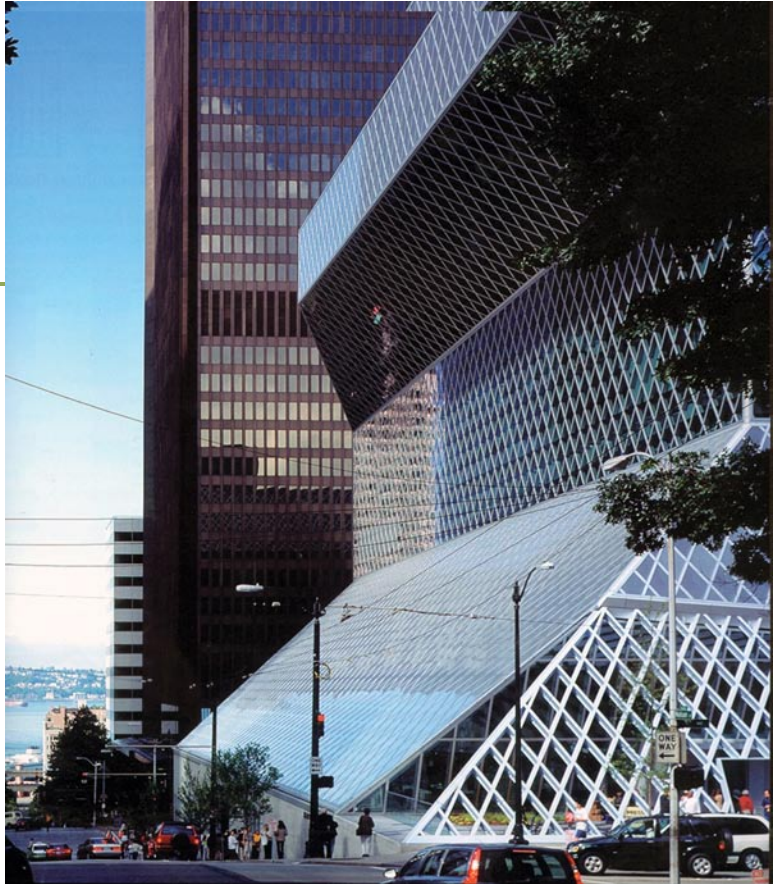


f.30

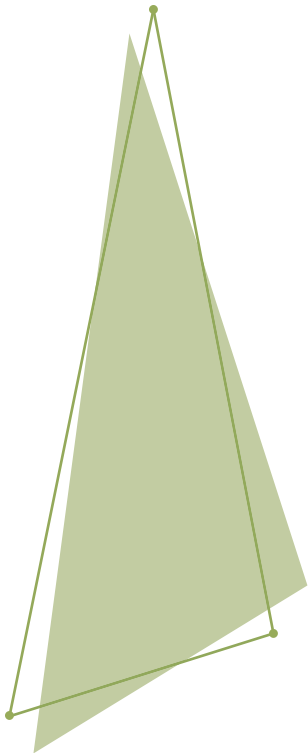






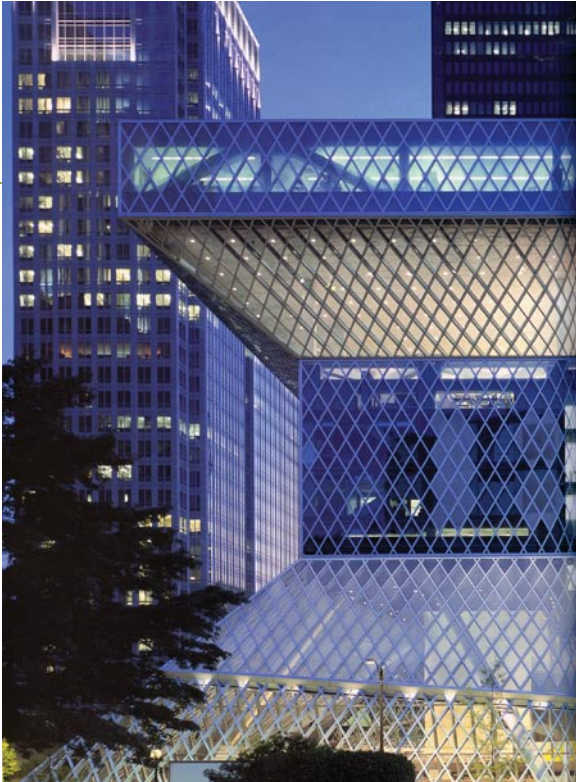


f.31



Seattle, Washington  
OMA/LMN  
335.000 sqft

seattle library



f.32

The Seattle Central Library designed by OMA Architects is a 335,000 sqft building in downtown Seattle. The library houses traditional library spaces as well as spaces for new media and technology.

The distinguishing characteristic of this building is the sliding floors that hang out over the top of each other in some places as far as 50 feet. The sliding floors create flexible zones of space, each with its own use. This allows for change and growth while not encroaching on other use area.

In between each floor are open spaces for meeting, searching the internet and reading.

Working with physical and computer models, OMA was able to present their ideas effectively to the Seattle public. The design was not well appreciated at first, but after hearing of how the building worked, most residents became very excited with the design and layout.

The design for the Seattle Library was a very closely collaborated design effort between the architects and Engineers, ARUP.



f.33

model





f.34



By bringing the engineers in early to the design process, they were able to do many studies of how the structural system would work, which led to a most efficient system.

The library received a LEED silver rating. The building utilizes a unique highly efficient air conditioning system developed by ARUP. Thermal energy from relief air is recycled and used to heat or cool the buildings glazed surfaces. The building exceeds the standard LEED building in energy efficiency by 40 percent.

Case Relevance

Collaboration of design

Collaboration between architect and engineer made this building possible. The structural system was not integrated to fit the design, but emerged along with it.



f.35



The computer as a tool for design

Technology along with the collaboration makes this design unique. By putting concept into digital format, engineers were able to produce the complex structure.

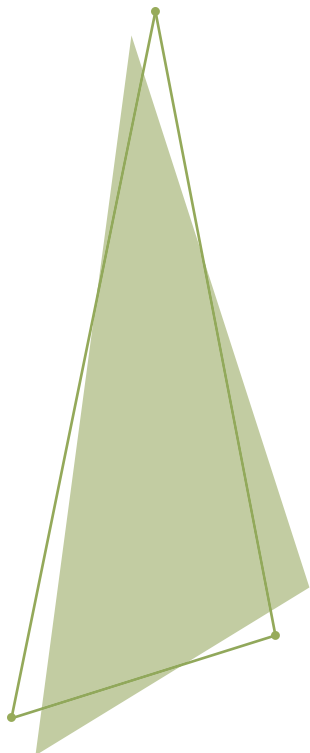
Theoretical premise affects

A building does not necessarily need to grow physically to adapt to changing conditions and functions.





f.38



art and art history building  
Iowa City, Iowa  
Steven Holl Architects

university of iowa



f.39



The new addition to the University of Iowa's art department is a building designed by Steven Holl Architects which attempts to interact, and connect with the site and the original art building built in 1937.

The building partially bridges the lake and partially connects to an adjacent limestone cliff connecting the manmade with the natural world.

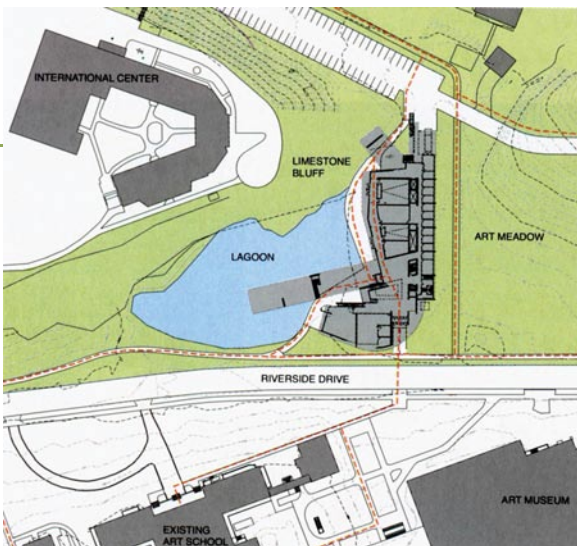


f.40



The red oxidized metal plates allude to the red brick of the original building. The buildings low drawn out form and landscaping also make connections to the original building.

Flexible interior spaces allow for numerous types of functions to take place within the building. The studio spaces open up in nice weather and allow the work by the students to be shown off. The long horizontal passage ways become meeting spaces and the informal geometries encourage interaction.



f.41



The use of materials and daylighting allow the building to interact with the sunlight, water reflections and snow-fall.



## Case Relevance

### Connection to existing structures

While there are no existing structures on the site for this thesis project, the building will make connections to the surrounding urban context.

### Connection to the site

As with many of the other case studies, this building takes lessons from the site features.

### Interaction and collaboration

flexibility in spaces allow for flexibility in learning styles and functions. The open studios again foster collaboration and interconnections.

### Theoretical premise affects

Using the ideas of connection, to the case sensitive aspects of the specific site as well as the surrounding context, must first be considered before the process of design form takes place. Movement and group usage must also be considered.



f.42



f.43



f.44

section

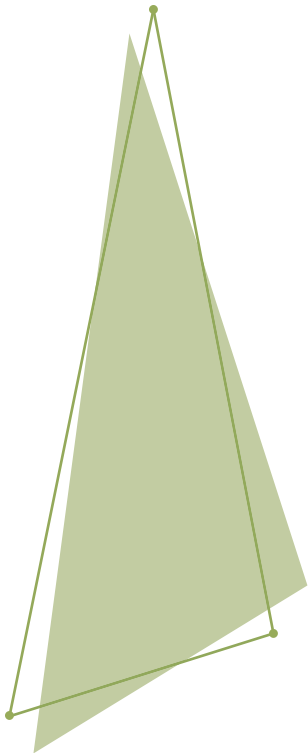








f.45



Amsterdam Center for Architecture  
Amsterdam  
Rene van Zuuk

ARCAM



f.46

entry



The Amsterdam Center for Architecture by Rene van Zuuk is a small building of 6,450 sqft which houses architectural exhibitions, research, and educational programs

The building is both simple and complex appearing both still and dynamic. Meant to engage public interest in local architecture, the building sits on a site by the water previously occupied by a Renzo Piano building. The buildings form reflects the forces of wind and water.



f.47

interior

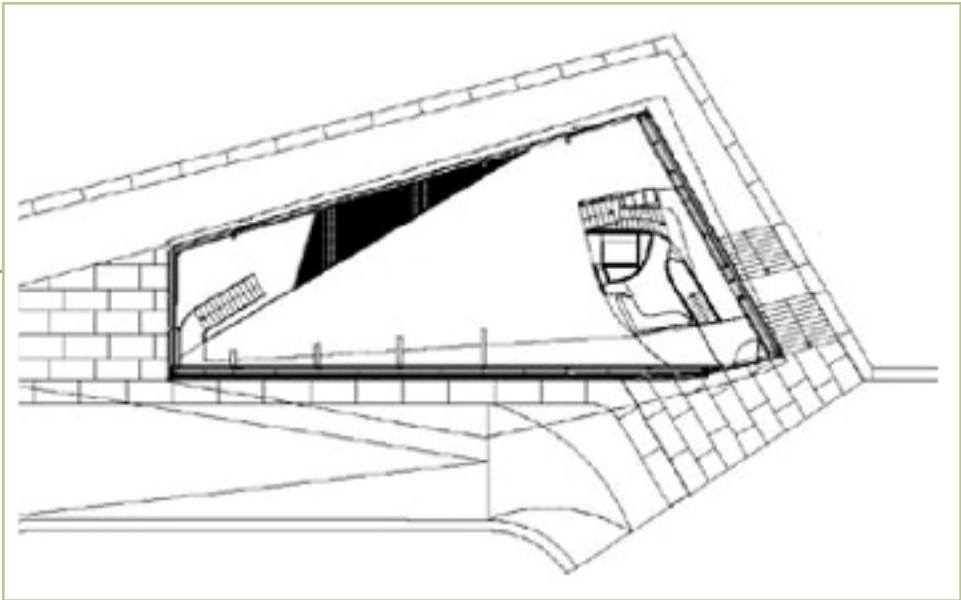


A literal architectural section is expressed at the entry appearing as if part of the building was sliced off. The full height glazing extends the interior spaces perceptually to the outside context.. To keep the intimate atmosphere of the previous facility, interior partitions were kept to a minimum, and balconies overlook all three stories of the spaces.



f.48

section



f.49

ground level plan



f.50



## Case Relevance

### Engaging the public

The building engages the public. Making a building which sparks public interest gets them involved and excited about development in their community.

### A dynamic place for learning

Though small in size, the dynamic form creates an exciting place which can help spark imagination and creativity.

### Creating an intimate atmosphere

The small size and open interior creates an intimate atmosphere in which to work. The staff has become a close group through their work and small size. Full height glazing connects the interior to the exterior.

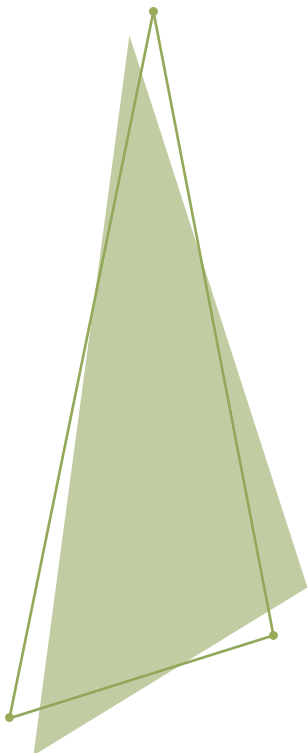
### Theoretical premise affects

Using technology to de-materialize the built environment can help create dynamic forms which engages public interest, and creates dynamic places in which to work.



f.51





# media labs

creative artists agency

[pleskow + rael]

MIT media lab

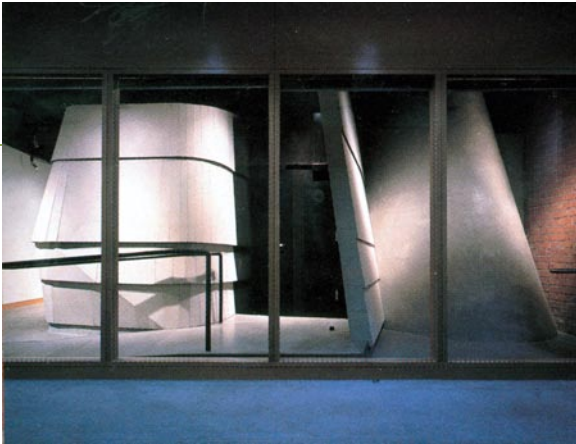
[centerbrook architects]

NYU center for advanced digital applications

[voorsanger and associates]

gardiner symonds teaching laboratory

[interloop architects]



f.52

Creative Artists Agency  
[Pleskow + Rael]

The Intel Media Lab is a 2,000 sqft interactive space inside the CAA's headquarters building by I.M. Pei. The space is a steel and fiberboard clad cocoon building within a building. Informal seating replaces task chairs. Workstations are eliminated and replaced by a "technology bar" housing all digital media. The space is for actors, writers, and producers to learn about new digital technologies.



f.53





f.54



MIT media lab  
[Centerbrook Architects]

The MIT media lab is 3,900 sqft space housed within I.M. Pei's Weisner Building. The media lab is in the center of the windowless theater building which created the biggest challenge for the architects. The original layout of the interior spaces was considered inefficient and overcrowded. To create more space, Centerbrook lowered the ceiling and inserted a new media lab in the top 15 feet.



f.55



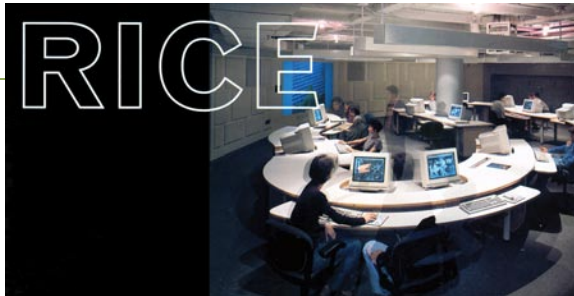


f.56

NYU center for advanced  
digital operations  
[voorsanger and associates]

The media lab at NYU's Center for Advanced Digital Applications was an attempt by the architects to connect students to the world of tomorrow's reality. The space is used for computer modeling, animation, editing, and production management. The color spectrum of the space can be changed by users to change the feel of the space. The change reduces eyes strain, and diminishes reflections, allowing users to stay at there computer for longer amounts of time. The center has four digital classrooms





f.57

gardiner symonds teaching laboratory  
[interloop architects]

The space is located within the campus main library, and is used by students of all departments. The typical computer workstations were replaced by a more informal interactive layout.

#### Case Relevance

##### Media lab space design

The purpose of these case studies are for design precedents in media spaces. The labs within these existing buildings are integrated to perform better than the previous. Informal seating, interact layouts, and high tech aesthetics make these spaces successful.

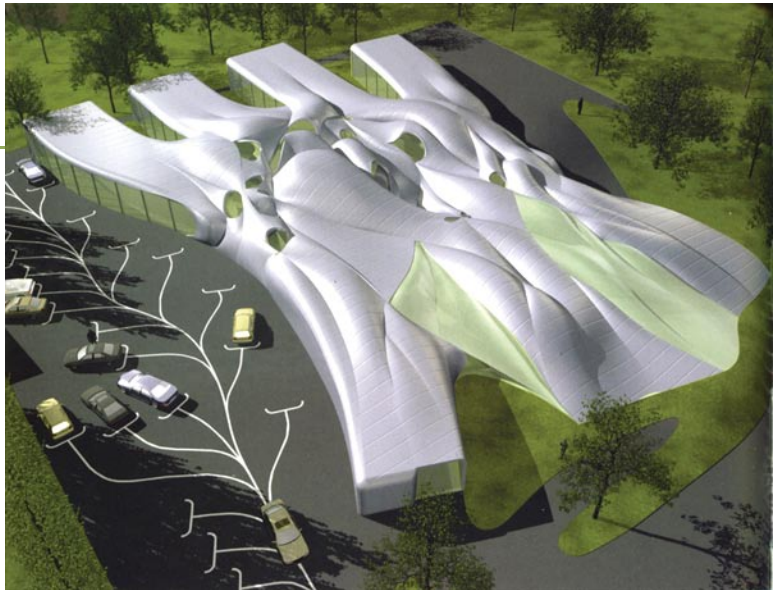


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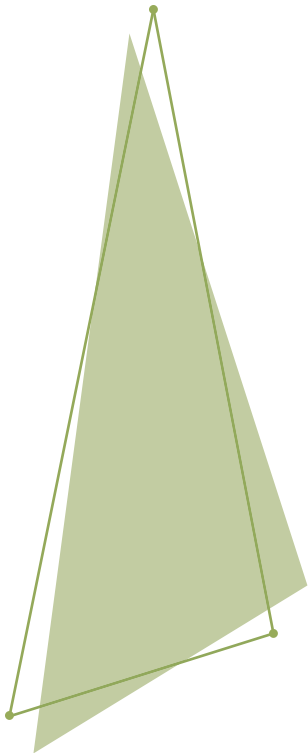
##### Theoretical premise affects

The design for a building with a purpose of creating computer technology and advancement must express this in its own design. Computer technologies will help create the dynamic fluid spaces for learning and computer technology.



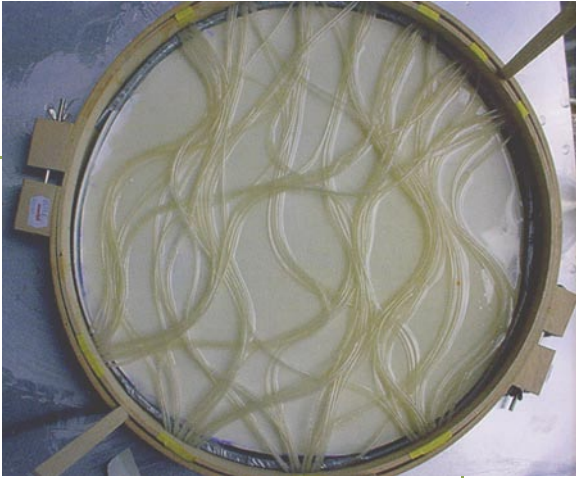


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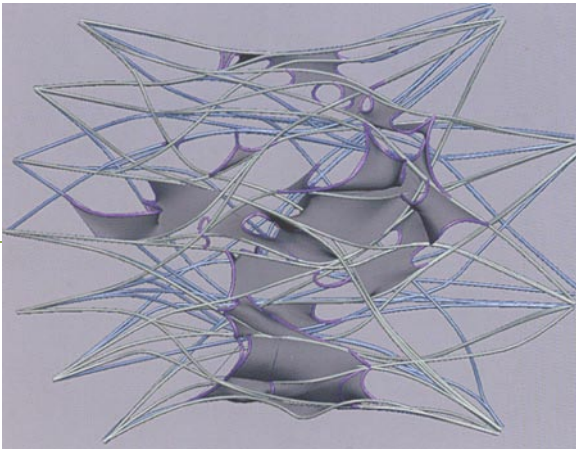


Stratford-upon-Avon  
United Kingdom  
NOX

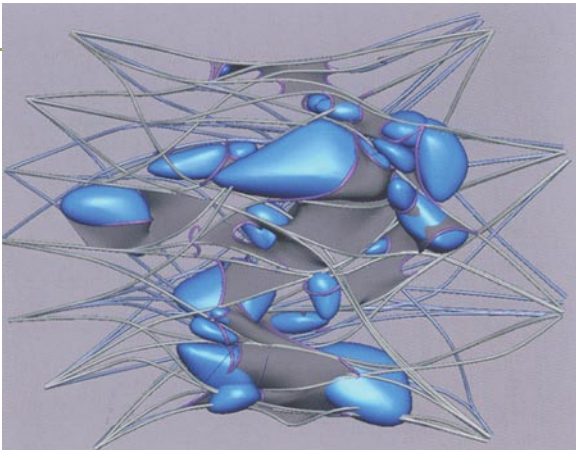
soft-office



f.60



f.61



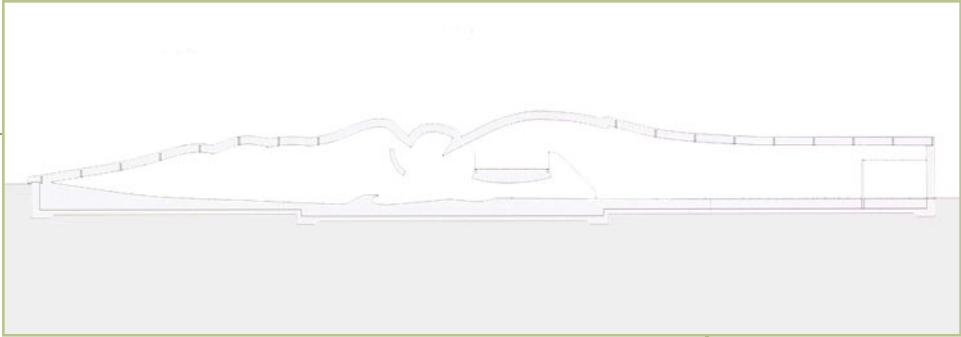
f.62



Soft-Office is building in which work and play are combined into one space. Half of the building is an interactive play area for children and the other half an office space labeled a “flexi-office” where no one has a specific workplace.

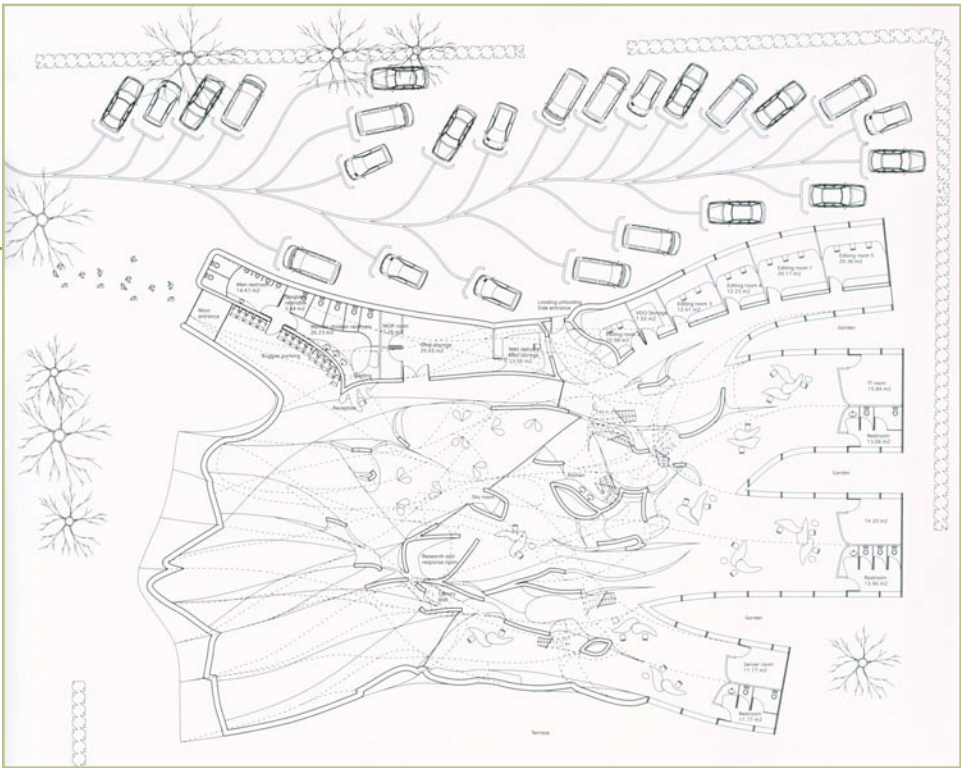
The design for this space uses computer technologies to define the structure, form, and interactive layout. However, the design did not begin in the computer. Initial models of the space were created using techniques by Frei Otto. The geometries of space are based on the complex material behavior of wool threads when dipped in water and allowed to separate to form a complex series of gaps and thickened threads. Using this as a guide, NOX used rubber tubes and lacquer to create a three dimensional model of space. This model was then digitized and transformed into spatial arrangements that fit their program.

The resulting office design was able to improve efficiency over a typical office building with the same functions. Through NOX’s use of extensive studies in the use of the building, along with their physical and digital models, they were able to reduce the size of their “flexi-office” considerably.



f.63

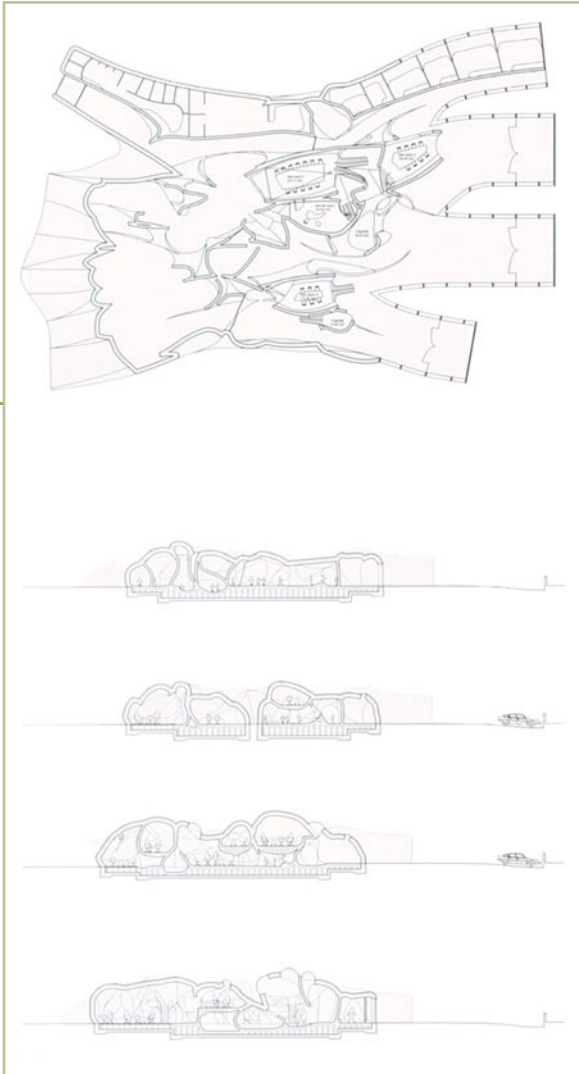
section



f.64

ground level plan



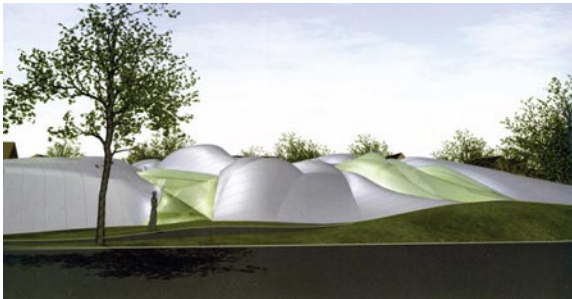


f.65

In an office space with an occupant load of 60 people, the typical square footage is 1000 square meters. In Soft-Office, the square footage is 675 square meters. NOX was able to accomplish this by studying the usage and the amount of time spent in the office by different groups. A typical office layout would not work. Leaving the static work environment would not stimulate the communication and interaction amongst users. Small workspaces were interwoven between more casual dynamic spaces. By creating digital models of space, they were able to create an interactive building in which areas of space were left undefined, hence the term 'flexi-office.'

Soft-Office is just one of the many projects in which NOX has explored alternate design techniques. All these projects use the digital means of development, but all start out with a concept based on other aspects. As a tool, the computer has been able to give them designs which were once impossible to design and especially build.

NOX uses the computer and its media to create pure and honest spaces, forgetting about superfluous 'things.' Their designs present an honesty of material.



f.66 office area

By expanding the properties of materials, they have been able to give us a designs that emulate what design could be and how the lines of material properties and honesty may be blurred or expanded.



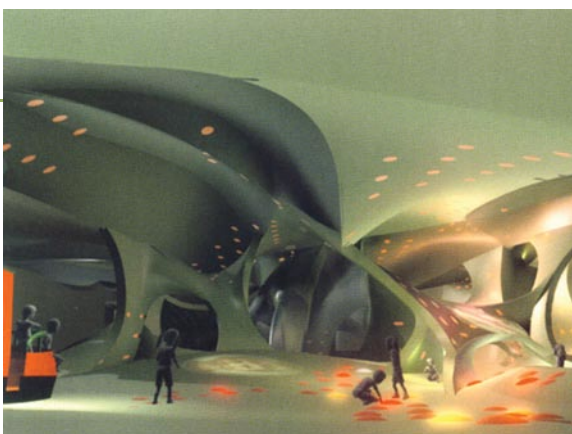
f.67 office area

NOX's design presents an honesty of material. By expanding the properties of materials, they have been able to give us a designs that emulate what design could be and how the lines of material properties and honesty may be blurred or expanded.

#### Case Relevance

##### The computer as a tool for design

Design does not start in the computer. It can only be a tool. The architects took lessons from the nature of a material and used the computer to develop the design.



f.68 play area

##### Interactive office spaces

The absence of walls and partitions within the majority of the space along with dynamic, fluid forms creates an interactive work space.

##### Theoretical premise affects

Spatial Requirements can be reduced by looking critically at how a space is used and how it is designed creating a more efficient use of space and material.

The case studies for this project comprise of a series of unique projects. Each contributes a separate value to the results of the research. Some projects relate directly to the typological study of the project, while others contribute to the concept behind the theoretical premise. The series expands on the connection between perception, realization, and existence, grounding them with past and current precedents of design.

While all the studies are of various building types with very different functions, each of them focuses on the user as the most important reason for design. As architects, we must be able to relate our ideas to the public in a way that gets them excited about design. We design for the people. We design for interaction. Architecture must inspire. We must be able to connect the user to the building and site both physically and emotionally. We must be able to design spaces where people desire to be, whether for academia, business, or recreation. A design must be dynamically charged to inspire knowledge, learning, and emotional values.

Reoccurring themes in the results of the series are; connection to the site, connection to the user, adaptability, technology, collaboration, and efficiency of design. Many case studies focused on the connection of the building to the local context. Design takes inspiration from the natural landscape as well as the urban context. Every building site is unique. A unique site will be developed in this thesis, a natural site within an urban context. The design must connect to both, taking inspiration from the surrounding context, the natural setting, and the history of the local site.

Flexibility and adaptability are also important to the study. Flexible spaces for work, and recreation inspire change and evolvment. Without flexibility there is no change, and without change there is no evolvment.



A special case to the series was Soft Office by NOX. The idea behind the project is the connection between non-digital and digital techniques. Nox uses abstract techniques to develop a form for a function. They stress the idea that each building is a special case, and not just any building form can be manipulated to serve every function. Their philosophy exemplifies perception and reaction, the floor plan as the reaction, and the elevation as the perception. The two realms are developed together not separate.

To be able to inspire, nature and building must be honest. A dynamic space does not mean that it is covered with unnecessary objects and design. It portrays purity and naturalness. Materiality is defined by the laws of physics and the inherent properties of the material. Just as a natural landscape portrays honesty, so to must the architecture of that site do the same. Buildings such as the Salk Institute portray this honesty. There is nothing covered up in the design. The buildings and its site with bare concrete, blocky forms, and large open plaza, has become more than just a place for scientists to work, but it also a spiritual place where the harmony between building and nature connect.

Materiality is defined by the laws of physics and the inherent properties of the material. However the capabilities of materials have evolved with the use of computers. It is here that the tension between the data and the built can begin to take form. Computers cannot design spaces where emotion, and knowledge come to life. But as a steering device for the architect, it can help create form from internal perceptions. It is true form that is the goal of the architecture. As technology evolves architects can begin to find new form from material properties. By looking to natural and human phenomenon we find the tension between the data and the built. It is our internal perceptions that the architect relays through the computer. This becomes the realization and puts it into existence.





historical context

Learning through interaction and collaboration is increasingly becoming important in the way of advancement within the world of academics. Interdisciplinary programs provide students the opportunities to take lessons from disciplines outside of their own. Working with professional industry allows students to learn from those within the field. Work with community groups allow students to make a difference in the communities which they live. As one of the top researching universities in the country, the University of Minnesota has for a long time been a leader in creating connections between university programs, community groups, and professional organizations.

The College of Architecture and Landscape Architecture (CALA) at the University of Minnesota is one department making advancements in collaboration and community involvement. Within the CALA are several institutes reaching out to other departments and community groups. The Metropolitan Design Center, in working with community members, focuses on creating interactive educational projects in the areas of urban design and planning issues. The Design Institute looks to improve design within the public realm through the use of advanced research. The Center for Rural Design is the first of its kind in the nation. It is a collaborative effort between the CALA and the College of Agricultural, Food and Environmental Sciences. Research-based design projects use the problem solving approach to connect members of separate disciplines. The Center for Sustainable Building Research is another interdisciplinary group which conducts research and develops tools to improve the environmental impact and energy efficiency of building design. The final is a collaboration between the CALA and the College of Natural Resources. The Center for Changing Landscapes focuses on social, economic, and ecological sustainability in changing rural and urban landscapes.

The University of Minnesota is also becoming a leader in the technological advancement of computer practices. The Digital Technology Center (DTC) is the 'hub' of innovation at the university. The DTC serves industrial, educational, and public needs within the state and nation. The DTC's program includes research, education, and outreach in digital design, computer graphics and visualization, telecommunications, intelligent data storage and retrieval systems, multimedia, scientific computation, and other digital technologies. Through this program the University has made great advancements in interdisciplinary programs.

It is also through the DTC that the Digital Design Consortium (DDC) took rise. The DTC sponsors a consortium program to provide focused technology opportunities for its members. This allows industry groups to work with faculty, researchers, and graduate students with similar interests. The DDC is a collaboration between the architecture and computer science programs at the university. The DDC focuses on all aspects of the design process and their relations to the emerging digital design field.

It is through research and development of programs like these that a new collaboration has come upon the design profession. The need for sustaining our natural environment and its resources is becoming more and more important in our changing world. Design needs to look to nature and its systems for inspiration of design and structure. A new way of design is becoming necessary. A new relationship between architects and engineers will help solve issues of efficiency in design. Architects and Engineers have worked together for years in the design profession. However it has become a give and take relationship, rather than a collaborative effort by both parties.

Past programs have proven that interdisciplinary research has improved design and the technologies used to create it. Through a program such as this, architects and engineers will have the ability to use new technologies in the digital design era to create structures of profound efficiency. Developing new materials and systems that are not integrated into a design after the fact, but interwoven as part of a complete system. The program will focus on the use of the computer and technology as a tool for development. Not as a replacement for human knowledge and understanding. The program will involve members of the architecture and engineering programs at the university, as well as design professionals, and guest researchers. The program will become a 'gateway' between academia and industry. A place where students can learn from professionals and professionals can learn from students and professors. Where interdisciplinary collaboration can give the new generation of architects and engineers a new perspective on their perceived relationship within the design community.

The program will also become a link to the community, both physically and conceptually. The site for the project lies within the center of the University of Minnesota and the downtown business area of Minneapolis. By moving the program to an intermediary site, the program will become the center of academia, business, and community. The design will show the public the efforts being made to sustain both their local community and the world wide community. The majority of the site will be preserved and renewed for use by the community. They will also be invited to come within the institution and learn of the advancements of design and its effects of them and the places in which they live, work, and recreate.

# site analysis









qualitative  
aspects

An architecture that interacts to and responds with its site conveys the importance of man and nature coming together to enhance the experience and feeling of place. A site which visitors can interact with rather than react to enhances this experience. A natural site, with peaks and valleys, bring about a new dimension of experience and essence. It becomes a place where not only does the architecture take lessons from its surroundings, but so do the users of the site. Perception of space, time, mass, and void enlightens and expresses a spiritual value. It becomes an internal retreat from the surrounding urban context. Not a place to leave the city behind, but to appreciate it. The creation of different and new experiences will be the goal of this design process. As one of the last undeveloped lots on the river, the site will become a place for interaction between residents and community members. It will become a place where, university, business, and community come together. The site will be a bridging facility both physically and metaphorically, sitting between the university and downtown. Buildings will be placed in such a way that they do not take away from the natural and historic features of the site. As a remediation project, a new way of building will be explored. Building above the ground, rather than into it, will bring buildings up, and create new views and vistas without disturbing the land and its features. The site will become a landmark and a lesson for design which is fully integrated, responsive, and portrays the essence of place.



f.69

### Vegetation

The existing site promotes an abundance of deciduous trees, shrubs and flowers. The site, which has never been developed, lacks proper care and maintenance of the vegetation patterns.

Deciduous trees line the bluff where the slope is too great for use by pedestrians and park goers.



f.70

north ↑



f.71



### Winds

The prevailing winter winds are out of the North-West. The winds are partially blocked by the 10th Avenue bridge and the edge of the bluff. The trees along the bluff also block winds from penetrating deeply into the site. In the summer, the prevailing winds are out of the South-East. The winds are directed around



f.72



### Water

The Mississippi River is the prominent water feature to the site. The developed site will become part of a vibrant river front for the city of Minneapolis. To the East of the site, most of the riverfront is owned by the parks. This site will become an important link between the natural park land and the vibrant downtown.



f.73







f.74



### Human Characteristics

The site is outlined by a pedestrian street and bridge that crosses the river. University of Minnesota vehicles are currently the only vehicles allowed on the bridge. The neglect of the site, has left the rest unused, except for by the homeless, and as a garbage dumping area.



f.75



### Distress

As a former coal gasification site, it has become contaminated over the years. Development has been limited by the cost of remediation. Using the majority of the area as a park will limit the amount of remediation needed to bring the site back into a proper use area.

The current condition of the site is in disuse. The site seems to be a dangerous place to spend much time in. Little pedestrian traffic, and the barrier set up by trees creates a seclusion between the site and the rest of the park land.



f.76







quantitative  
aspects







f.78



f.79



north ↑



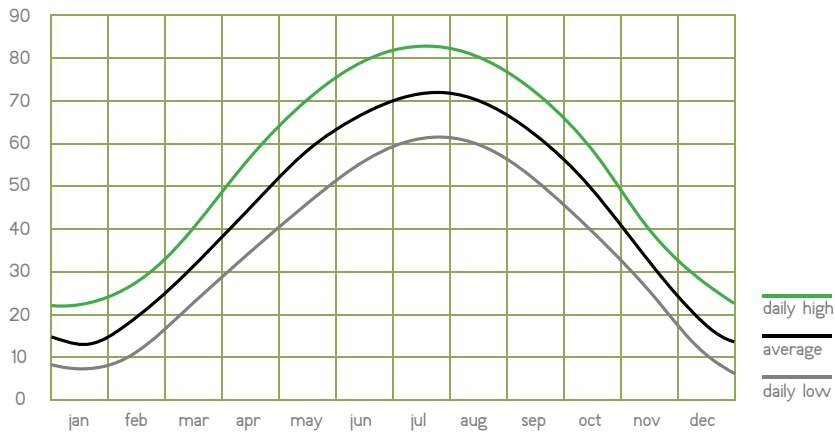
f.80



f.81

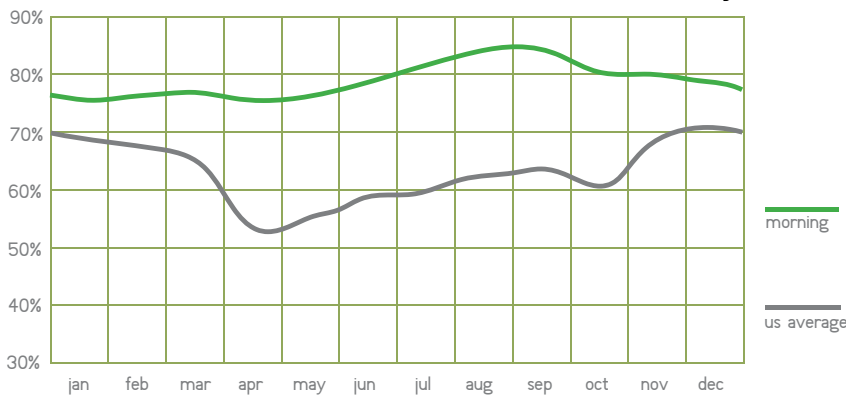
# climate data

## average temperature



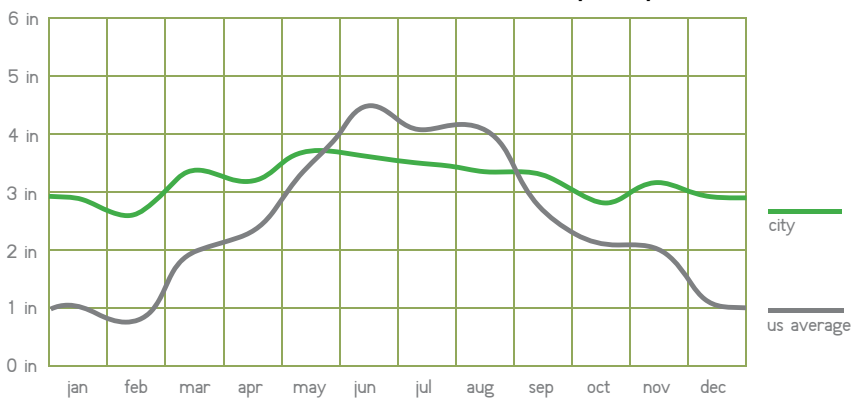
f.82

## humidity

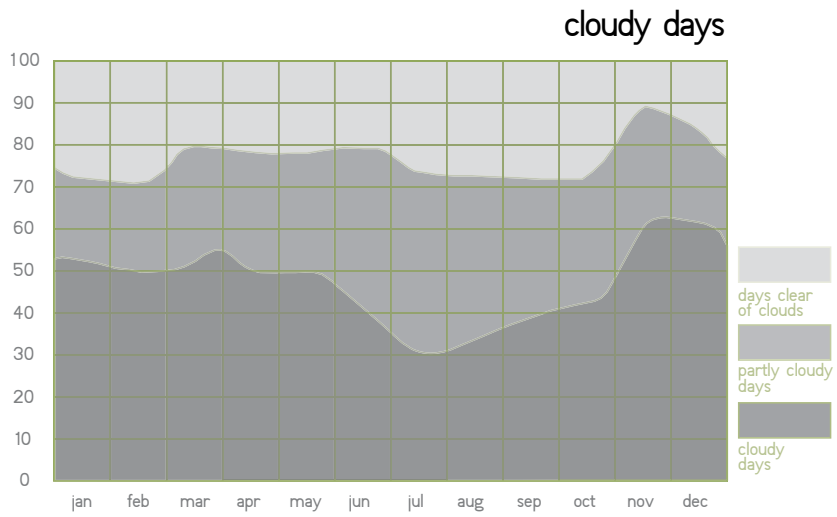


f.83

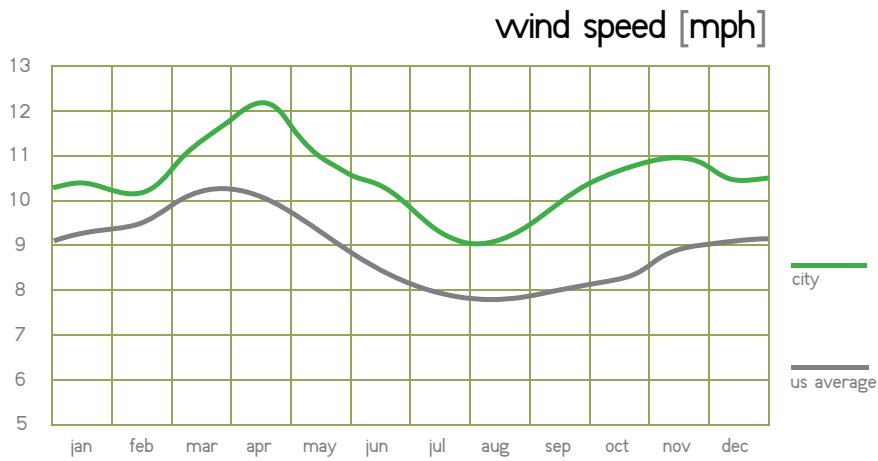
## precipitation



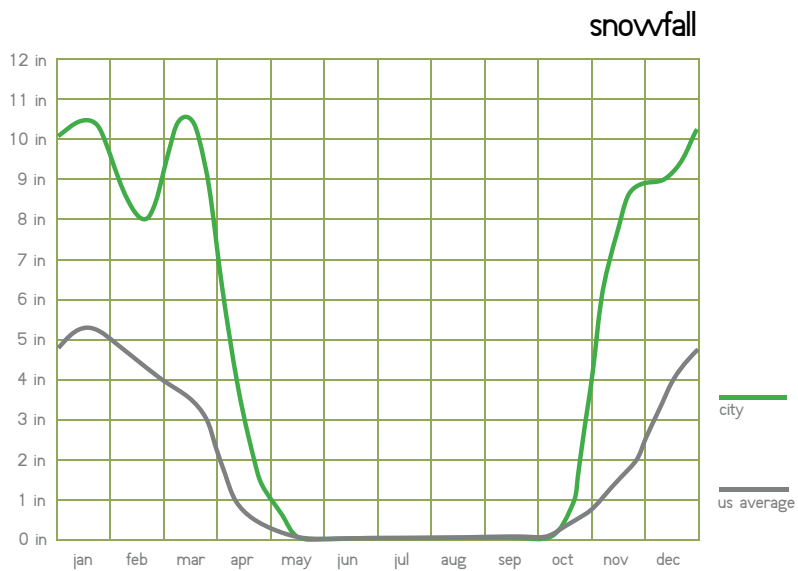
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f.85

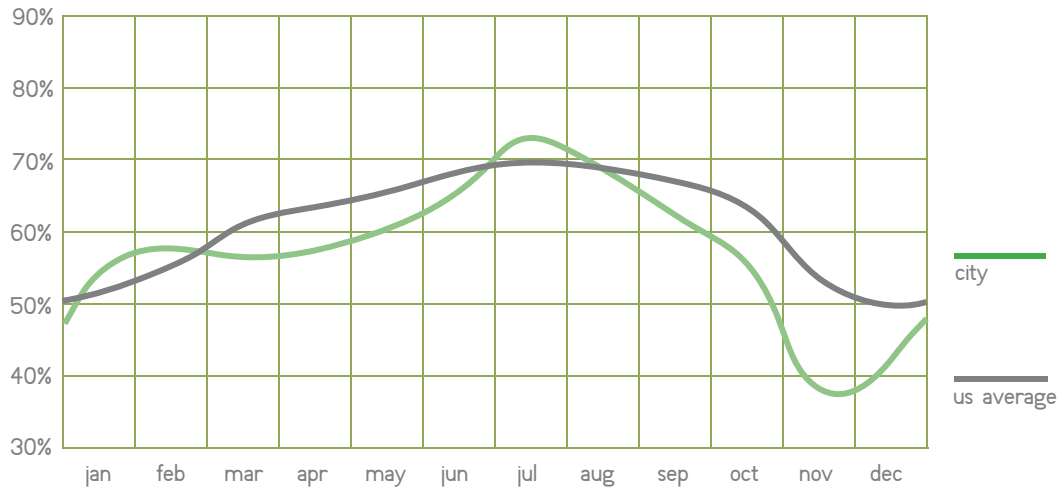


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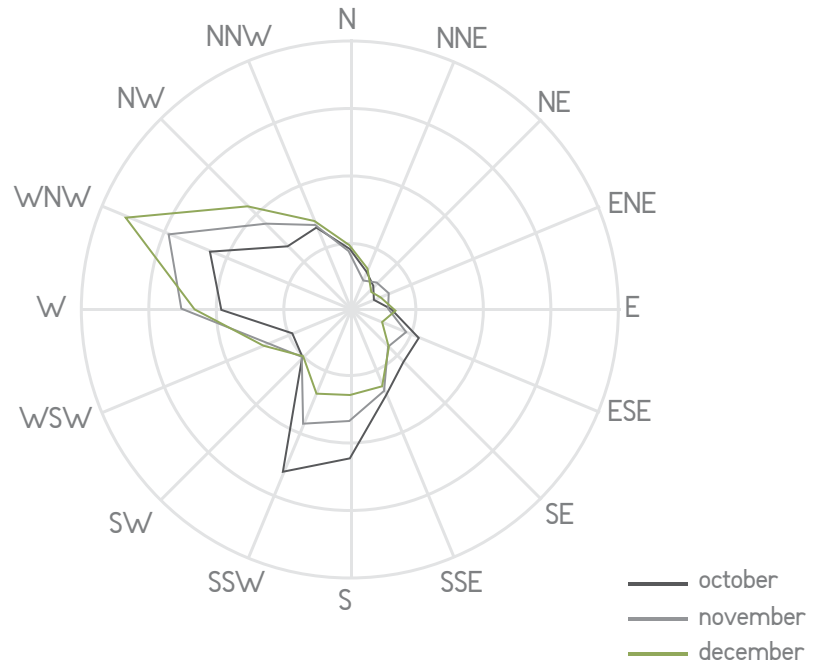
f.87

### sunshine

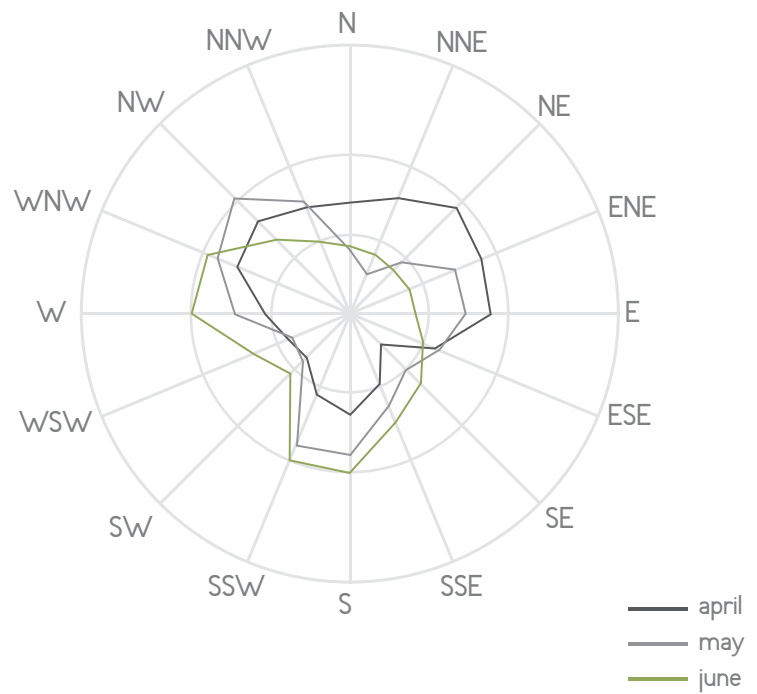


f.88

wind roses



f.90



f.91

additional images



f.92



f.93



f.94



f.95



f.96



f.97





building program





building 1.....	19,020 sqft
building 2.....	12,320 sqft
total.....	31,340 sqft



spatial allocations

□ building 1

media labs.....2 @ 800 sqft  
total = 1600 sqft

hours of operation

- 24/7 with card access
- 8-5pm restricted use

function

The media labs are interactive computer and technology spaces which will house functions such as digital presentations, classrooms, and workspaces. The labs will be equipped with the latest technology with the ability to change with advancement in the technology. These spaces will provide graduate students, faculty, professionals, and researchers with the latest programs available. The space will also be available for students outside of the institute, specifically undergraduates interested in the technology and program.

requirements

- flexible, interactive space, capable of adaptation
- 800 sqft labs - 20 workstations

considerations

- "high tech" atmosphere
- electronics (wires, cords, outlets)
- long term use (eye strain)
- natural/artificial light
- adaptability between work and presentation

open studios.....6600 sqft

hours of operation

- 24/7 with card access

user groups

- faculty (architecture/engineering).....15
- graduate students (architecture/engineering).....20
- professionals.....10
- guest researchers.....10

function

The studio spaces will define the main purpose of the institution: advancement of the build environment through collaboration and increased knowledge. Individual work spaces will not be house in closed offices. All members of the institute will work amongst each other in a directed randomness. This atmosphere will get rid of the hierarchy of importance, and encourage learning through and from all users groups. There will be no division of programs. The studios will be flexible, adaptable, and inspire knowledge and growth.

requirements

- computer hookups, sufficient power sources
- internet connections (wireless/broadband)

considerations

- natural and artificial light
- adaptable to private

breakout/group spaces.....4000 sqft

hours of operation

- 24/7 with card access

function

The breakout and non-digital workstations will be dispersed throughout the labs and studios. The breakout spaces prime function will be fir group meetings and preparation, informal conversation, and lobby and relaxation. They will become small commons areas. Since many users will spend much of their time there, different functions will be considered for individual spaces, including cooking, eating, and rest.

The non-digital workstations will be used primarily for design concept modeling, final modeling, and group work. There function will foster they concept of the computer as the steering device or supporting tool for design, not as the design creator.

requirements

- natural daylight
- informal atmosphere
- open space

considerations

- variety of uses
- adaptability (expanding and collapsing of space)
- space sizes will be developed during schematic and design development phases

river overlook.....1000 sqft

hours of operation

- 24/7 with card access
- 8-5pm restricted access

function

The river overlook is a connection to the exterior overlook and the public park. Its purpose will not only be for scenic value, but also to give the public a glimpse of the program within the institute, and attempt to get them excited about design and how the built environment affects their lives. The space will display completed and in progress projects done by the institute.

requirements

- scenic view of the river and surrounding sites
- connection between community and university

considerations

- number of users
- process of engagement

support/auxiliary.....5820 sqft

reception/lobby

The lobby and reception area will be worked into the circulation square footage. The reception area will house check-in for guests and visitors. There will be a staff member available to answer questions, give tours, and provide the daily tasks of the institute.

rest rooms.....800 sqft

Men's and women's restrooms will support public and non-public areas.

mechanical room.....800 sqft

Mechanical space will be reduced with sustainable heating and cooling strategies.

electrical and voice/data.....400 sqft

Sized to meet the needs of the systems required.

security.....120 sqft

Security rooms will be required for monitoring the building and site during non-public hours.

storage.....300 sqft

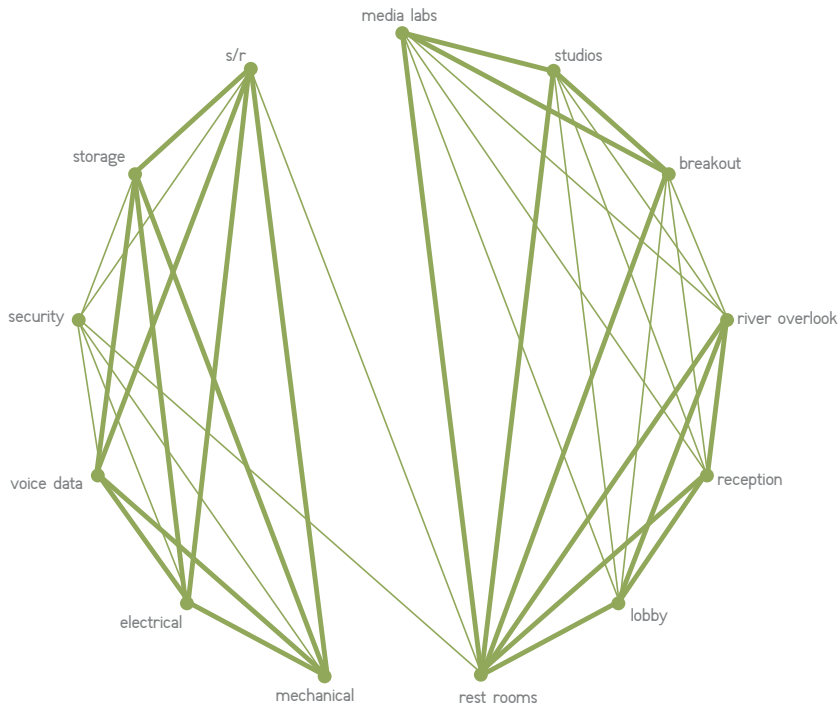
Storage for building resources and functions will be provided.

shipping/receiving.....400 sqft

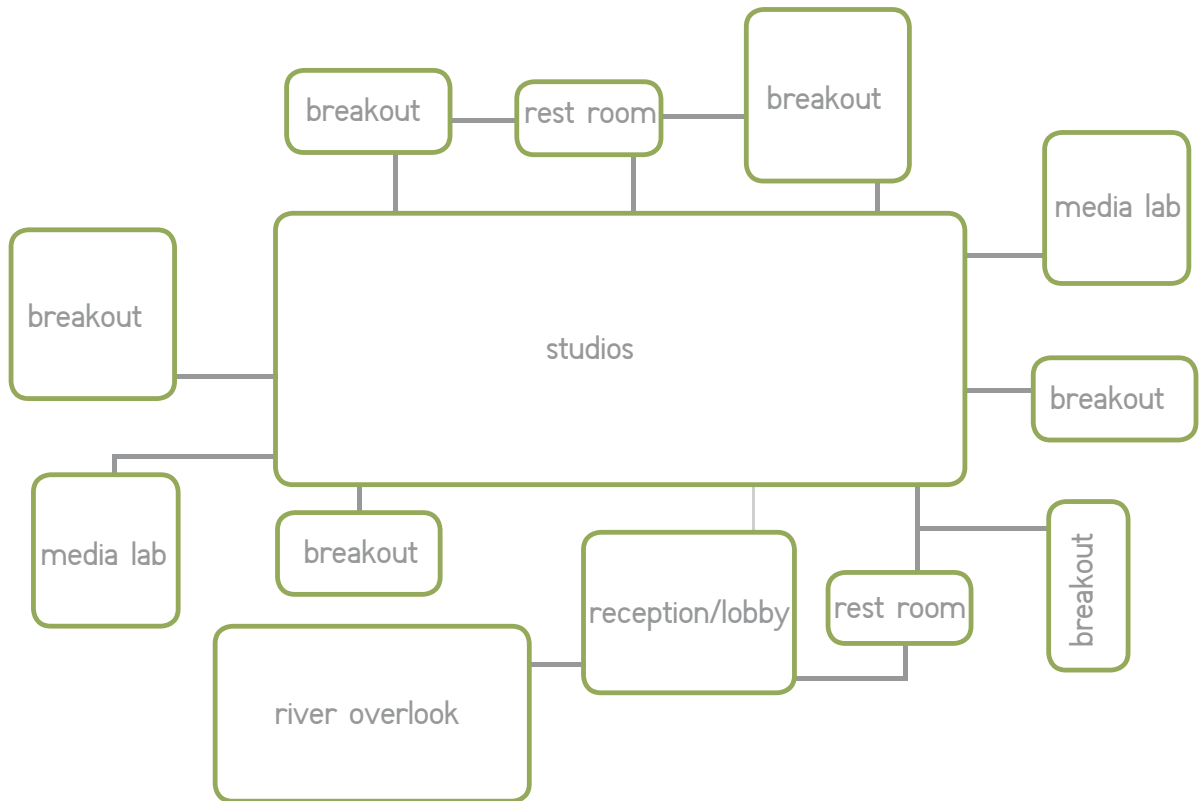
Storage for building resources and functions will be provided.

circulation.....3000 sqft

Storage for building resources and functions will be provided.



f.98



f.99

□ building 2

auditorium.....2500 sqft

hours of operation

- hours arranged by event

function

As the main function for the second building on the site, the auditorium will be a connection point between university, community, and business. The auditorium will hold large presentations of projects done within the institute, and also outside events. The auditorium will be integrated into the program to allow the public and other business people to engage and learn about the design process and how it may affect them.

requirements

- seating for 250 people
- technology resources should be equivalent to labs
- audio/visual room
- preparation room

considerations

- accoustics
- visual aspects (most presentations will be digital)



gallery.....2000 sqft

hours of operation

- hours arranged by event

function

This gallery will surround the auditorium and act as an extension to the gallery space in the main building. It will display completed and on-going projects by the institute. The gallery will be open before and after events at the auditorium.

requirements

- flexible display spaces
- projection and computer capability
- adaptability to changing technology

considerations

- daylighting, and passive heating and cooling
- possibility for exterior 'media facades'

testing lab.....2000 sqft

hours of operation

- 24/7 by card access

function

This large work space will be for testing and building model as well as large group sessions. Equipment such as a CNC milling machine used for making models will be house in this space.

requirements

- clear span open space
- large group space
- storage area for models

considerations

- adaptability to new machines and equipment

support/auxiliary.....5820 sqft

reception/lobby

The lobby and reception area will be worked into the circulation square footage. The reception area will house check-in for guests and visitors. There will be a staff member available to answer questions, give tours, and provide the daily tasks of the institute.

rest rooms.....800 sqft

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mechanical room.....800 sqft

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storage.....300 sqft

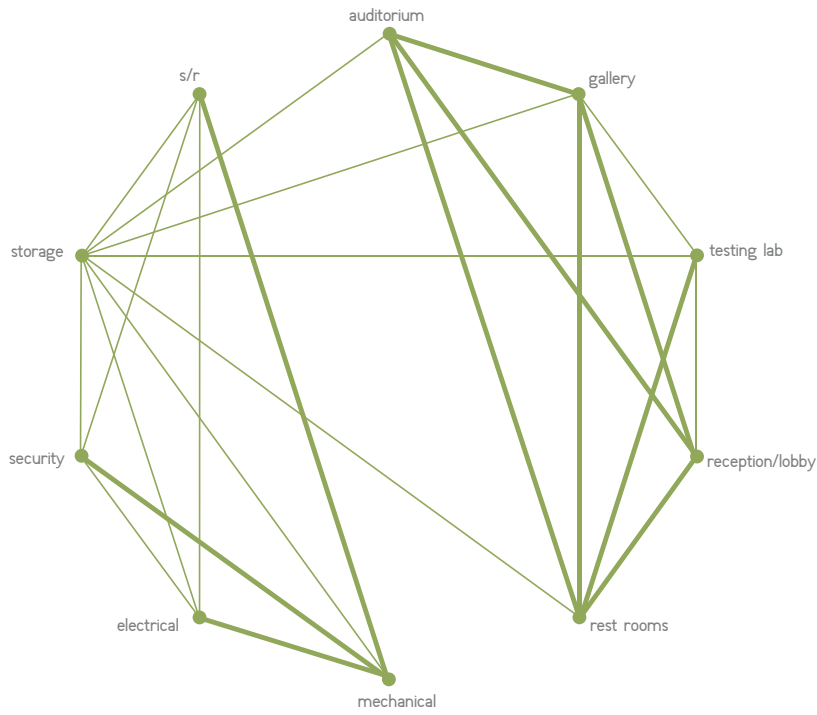
Storage for building resources and functions will be provided.

shipping/receiving.....400 sqft

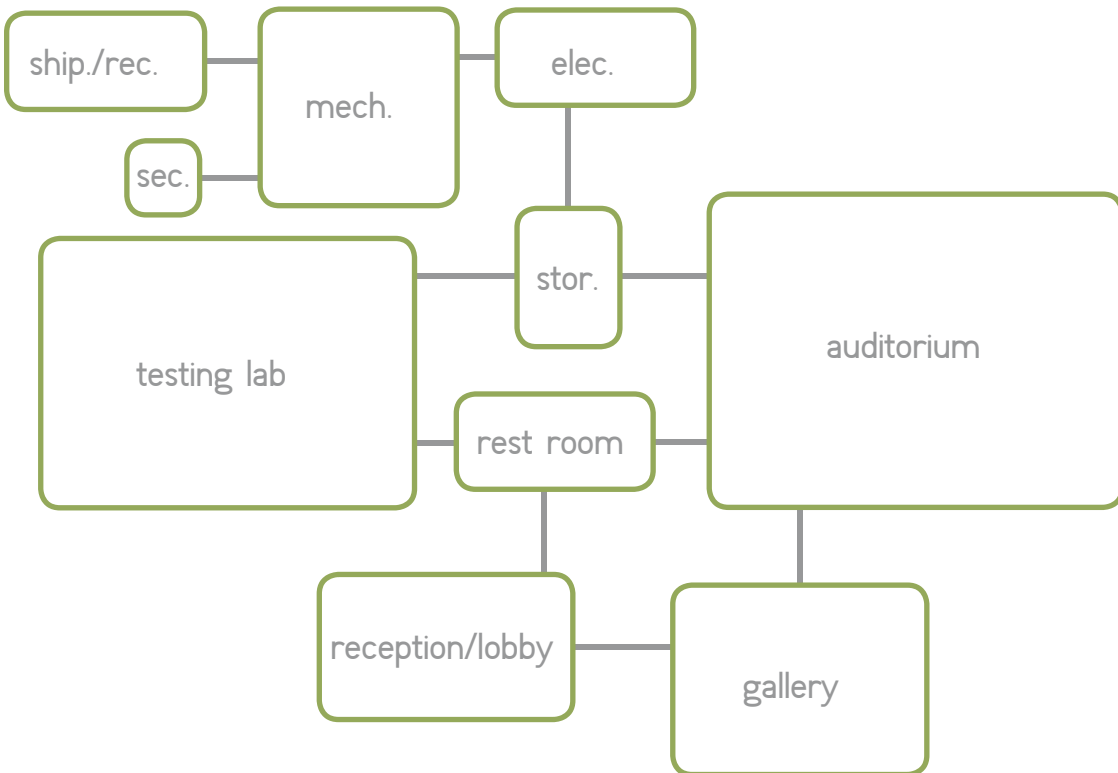
circulation.....1000 sqft

Figured as 15 percent of the total building square footage.

# spatial diagrams



f.100



f.101

□ outdoor

river overlook.....

The river overlook is part of the interior overlook area. It is also an extension of the public park which is a large majority of the site. The space provides community members and visitors a space to view the river and surroundings as well as get a view into the institute.

public park.....

The public park will take up the majority of the site. The two buildings will be placed on either sides leaving the natural site area for the community. Design concepts will be developed from concepts put out by the university design center which was done in collaboration with community groups. This information shows how the residents would like to see the park.





goals for the thesis

To create a clear connection between individual narratives and their relationship to the theoretical premise.

To continually develop the theoretical premise based on the research and findings of the program.

To develop a well defined typology based on the case study and theoretical premise research.

To create a clear connection between social, psychological, and philosophical studies and their relationship to architecture and the built environment.

To create a clear, well organized, and understood program for the thesis.

To develop the design of the project according to schedule.

To develop the design in a way which shows the importance of developing the theoretical premise.

To present the project in a way that is clear and succinct.

To develop superior graphics which rightfully display the importance of the project.

To be personally satisfied with the completed design as my last design project at NDSU



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Kohlhase, D. 2005. Photos. October

figure 70, 77

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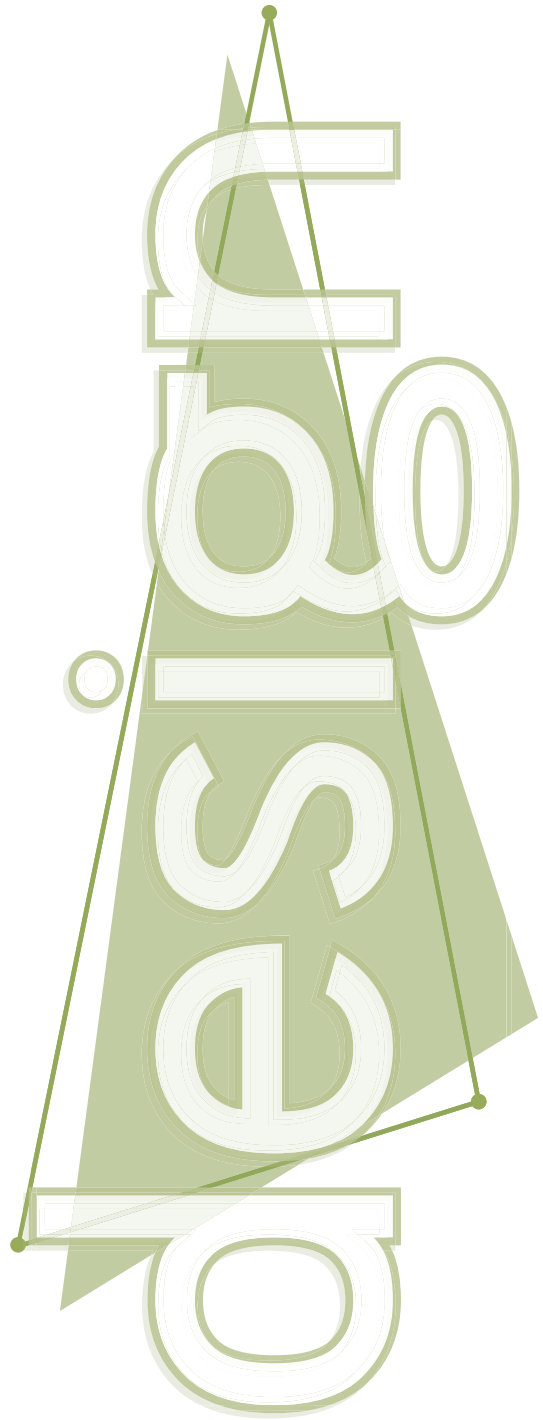
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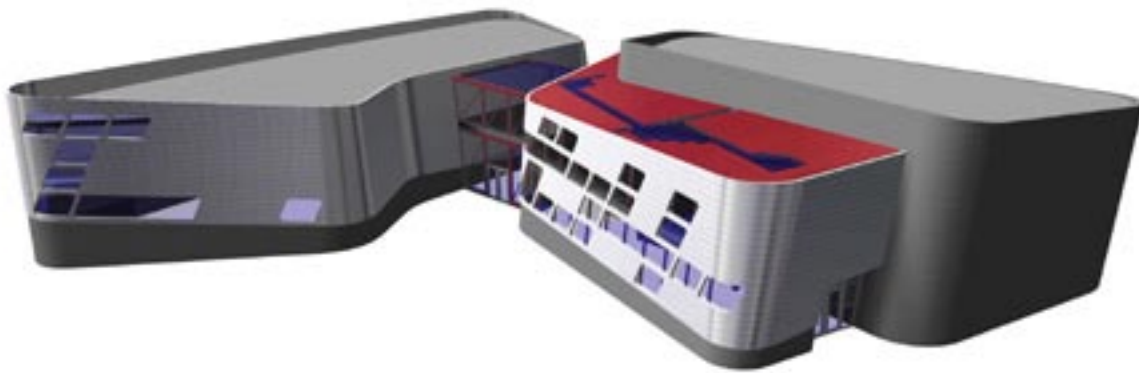
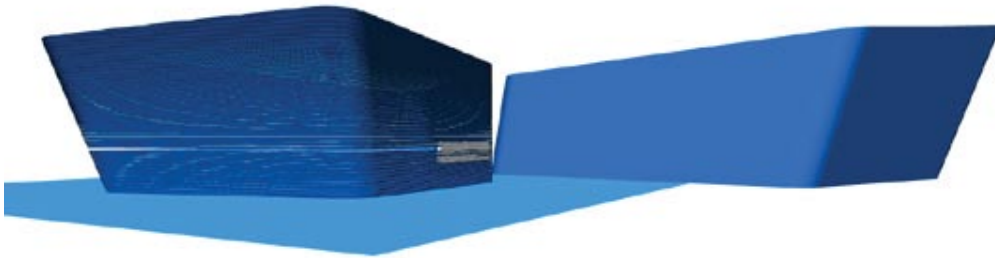


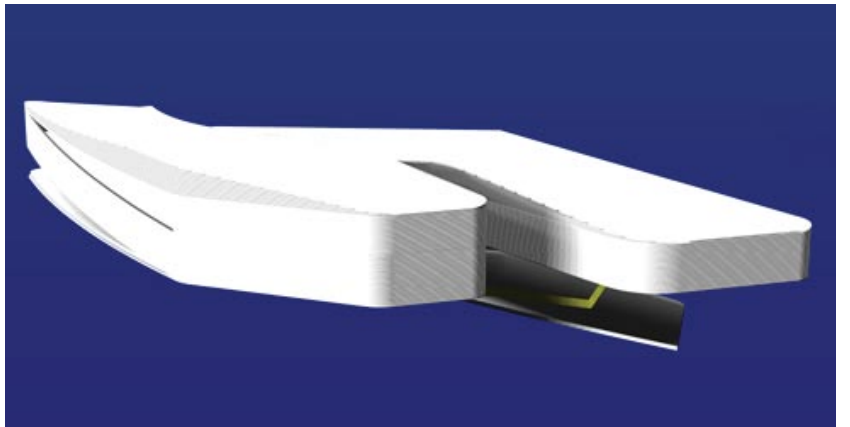
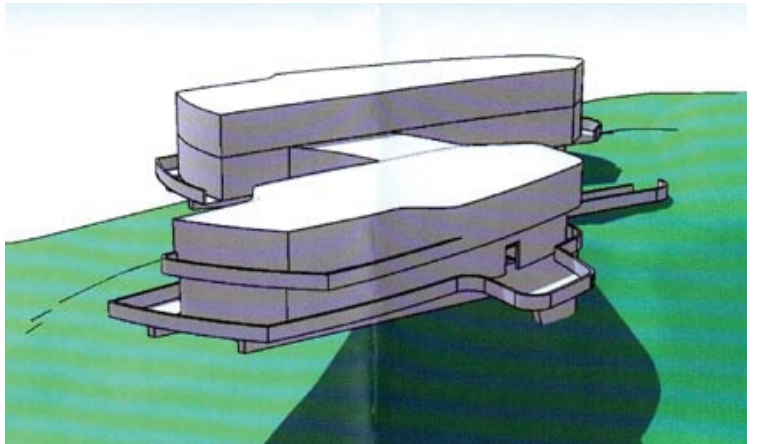
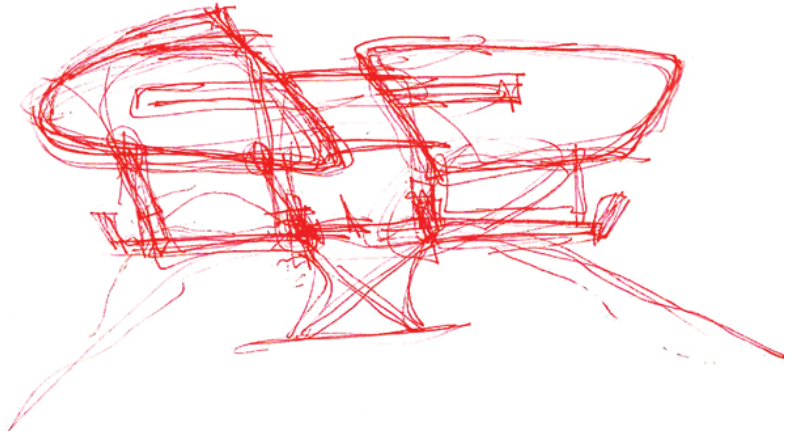


design documentation









## typologizing the project

Learning through interaction and collaboration is increasingly becoming important in the way of advancement within the world of academics. Interdisciplinary programs provide students the opportunities to take lessons from disciplines outside of their own. Working with professional industry allows students to learn from those within the field. Working with community groups allow students to make a difference in the communities which they live. As one of the top researching universities in the country, the University of Minnesota has for a long time been a leader in creating connections between university programs, community groups, and professional organizations.

The University of Minnesota is also becoming a leader in the technological advancement of computer practices. Through programs such as the Digital Technology Center and the Digital Design Consortium, students and faculty have the opportunity to collaborate between departments to research, educate, and create outreach programs for computer graphics and visualization.

It is through research and development of programs like these that a new collaboration has come upon the design profession. The need for sustaining our natural environment and its resources is becoming more and more important in our changing world. Designers need to look to nature and its systems for inspiration of design and structure. A new way of design is becoming necessary. A new relationship between architects and engineers will help solve issues of efficiency in design.

Through a program such as this, architects and engineers will have the ability to use new technologies in the digital design era to create structures of profound efficiency. The program will focus on the use of the computer and technology as a tool for development, not as a replacement for human knowledge and understanding. The program will involve members of the architecture and engineering programs at the university, as well as design professionals, and guest researchers. The program will become a gateway between academia and industry. A place where students can learn from professionals and professionals can learn from students.

The program will also become a link to the community, both physically and conceptually. The site for the project lies within the center of the University of Minnesota and the downtown business area of Minneapolis. By moving the program to an intermediary site, the program will become the center of academia, business, and community. The design will show the public the efforts being made to sustain both their local community and the world wide community. The majority of the site will be preserved and renewed for use by the community. the public will also be invited to come into the institution and learn of the advancements of design and its effects on them and the places in which they live, work, and recreate.



1

### typologizing the project

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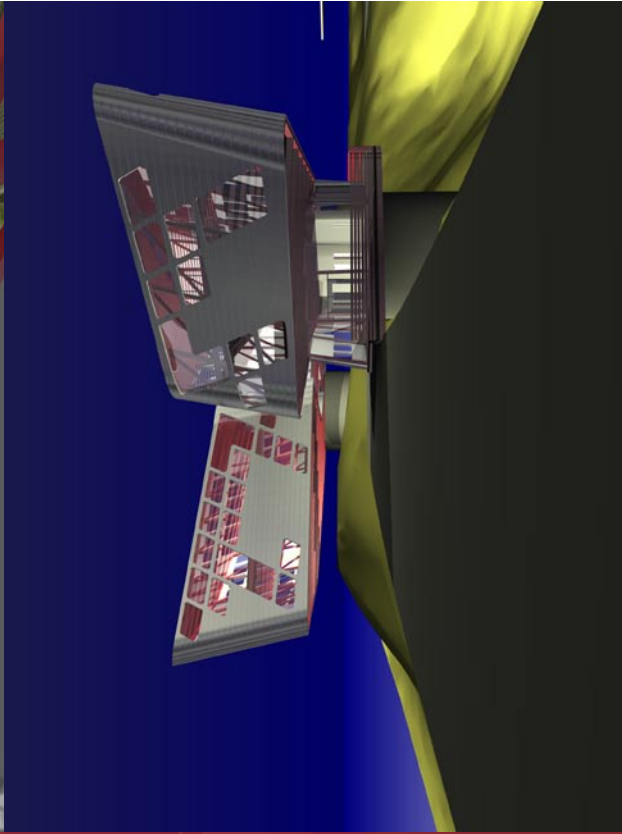
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2



## the buildings

The design of the site is meant to alter the perception of its users as they approach from different directions and at different times during the days and seasons. Each person experiences the space in their own unique way. The goal is to achieve a dynamic experience that brings the spaces to life

The auditorium building sits on the ground and acts as the connection point for both buildings. Its typology and physicality is directed toward community members. Pedestrian paths radiate out toward the river and pedestrian bridge. The existing condition of this area of the site is a depleted parking lot. The ground soil has been contaminated by its years housing a coal gasification facility, making the renovation of this site possible.

The studio building sits on top of the bluff and is defined by its flowing forms and flying structure. The building is meant to frame the views looking into the site and across the river. By reducing the footprint to minimal connection points, most of the site and vegetation was left untouched. The slight curve in the building facade makes the building appear to be floating in air. It is connected to the ground by two large concrete cylinders which are the base for the structural system. By turning the building into two large and two adjunct box trusses, the structure becomes a counterweighted lever, allowing the building to soar over the bluff

## the site

The master plan for the site is derived from the need for the community to retain the land as a park. Currently the site is owned by the parks district but has been undeveloped due to lack of funds. As a collaboration project, the community will get its parks while being provided a look into the world of design, and a link to the future. The center of the site is a large open green area which will be used as a park which is a continuation of the parks district to the east. Meandering paths bring users into the center of the site allowing them to explore.



3

### the buildings

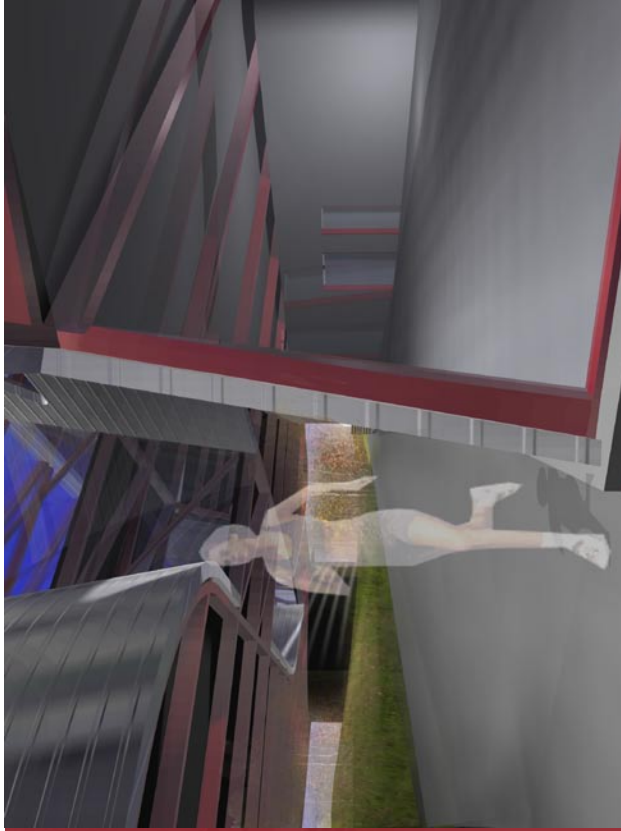
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4





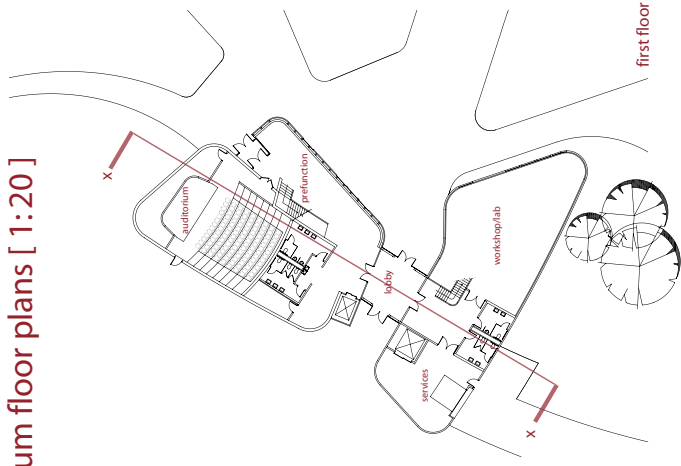
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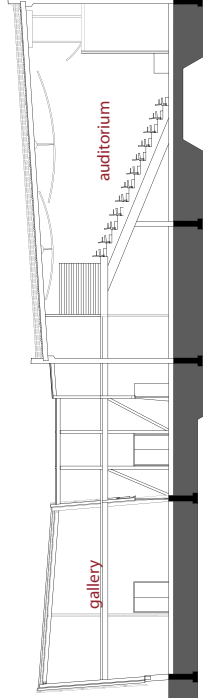
6



auditorium floor plans [ 1:20 ]



section xx [ 3/32" = 1' ]

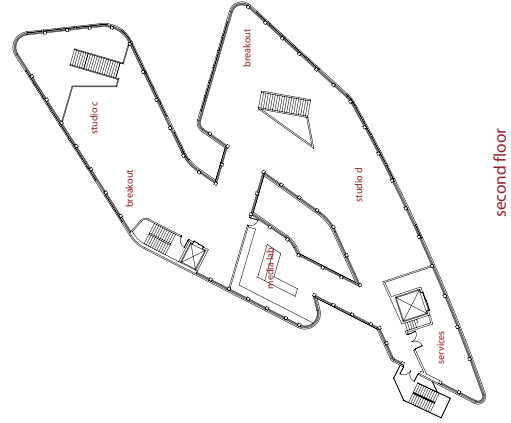
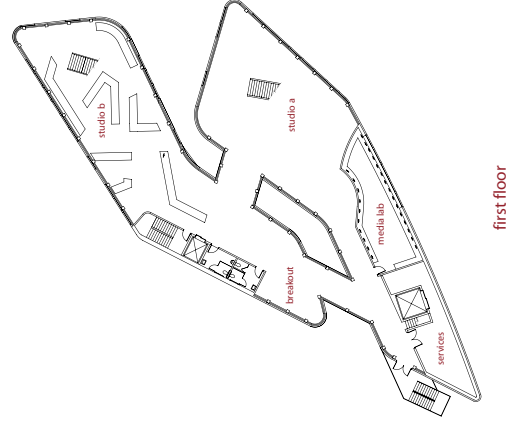
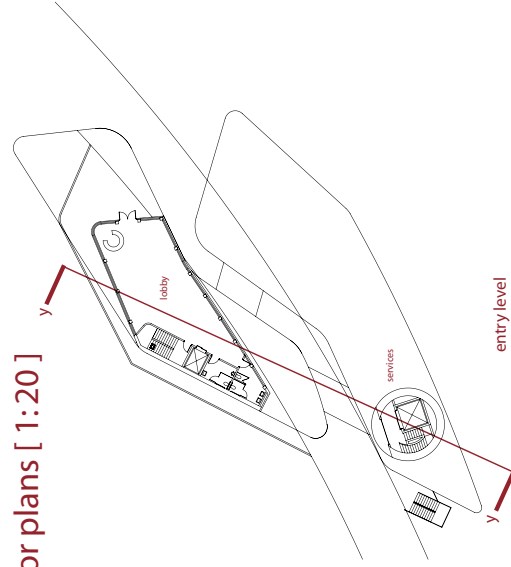




7



studio floor plans [ 1:20 ]



architecture in its purest state attempts to reduce structures to their simplest form. it attempts to create a spiritual place in which mass and void interact with their surroundings. it creates a place where the unnecessary objects are forgotten and one can appreciate the voids left by their absence.

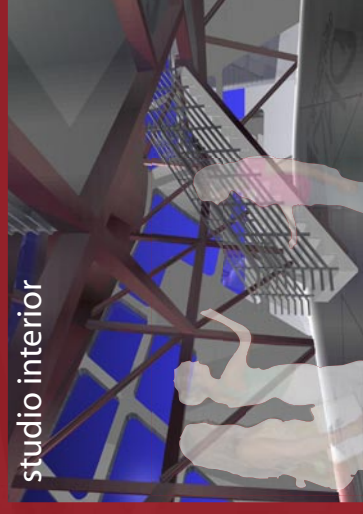
architecture is created by two sets of rules. by defined quantitative knowledge, results and goals, and by emotion and desire. spaces come from within the designer. from internal perceptions of what a space should convey. just as a physical space can illustrate an emotion, so too can an emotion illustrate a physical space. it is with knowledge of human emotions that a space becomes defined. but it is with only human emotion that a space comes to life.

from the materialistic point of view, all that can exist is mass and void. but it exists only through the realization of its existence. does a spirit not exist? or is it just the body of the human creating and manipulating space that exists? how then can an architecture relay an essence or feeling if feeling and spirit do not exist? our perceptions become a connection between the built and subjective world. what's forgotten however is the difference between the existence of a material object and that of a soul or spirit. one might make the claim that the only way something can exist is if it has the ability to experience emotions. the ability to feel pain, to hurt, to cry or laugh. a building cannot feel pain. it cannot be hurt by another person. its emotion cannot change. it's steady. the building relays a feeling. but it cannot change a person. it can not solve social or psychological problems. it can only hope to inspire and spark emotion. to reflect emotion. the site's emotion is defined by its users. the building and site are a 'gateway.' our actions must consider how one is perceived or meant to feel within these spaces. the environment must be positively charged, so that it becomes the reflection of emotion. it must interact, rather than react. it must burn. it must leave its users with a perception of spirituality, and connection to the world of existence.

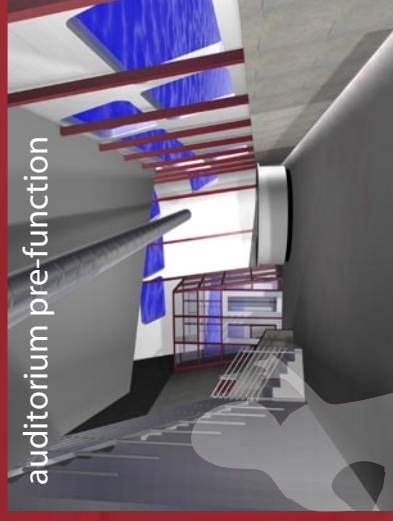
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studio interior



auditorium pre-function

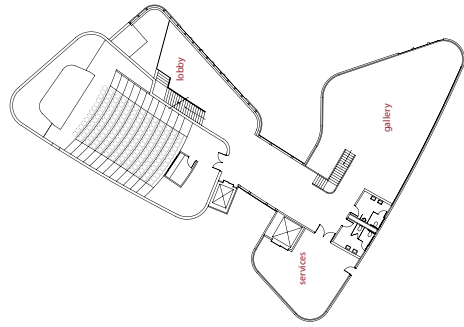
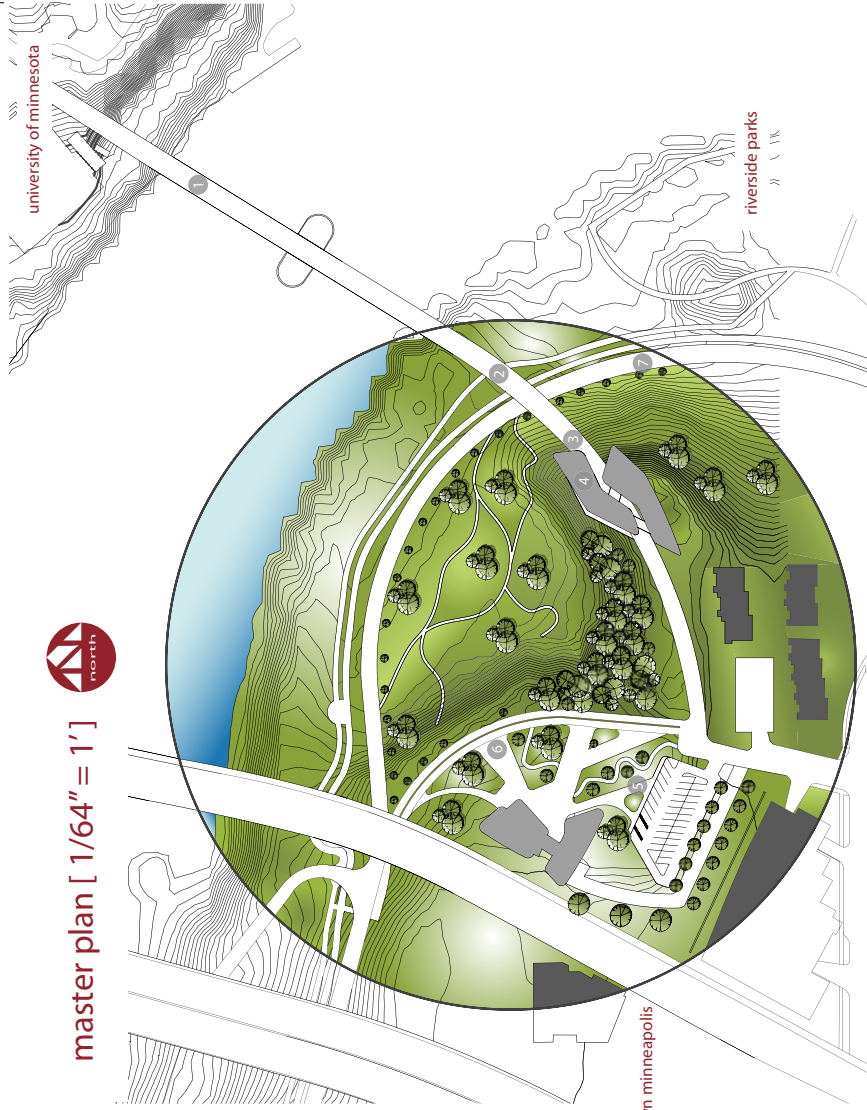


an undergraduate design thesis by Derek Kohlase



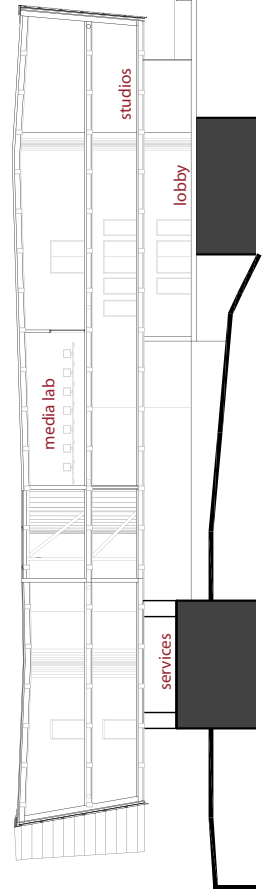


master plan [ 1/64" = 1' ]



second floor

section yy [ 3/32" = 1' ]







**derek kohlase**

thanks to all my family and friends for their love and support through the years