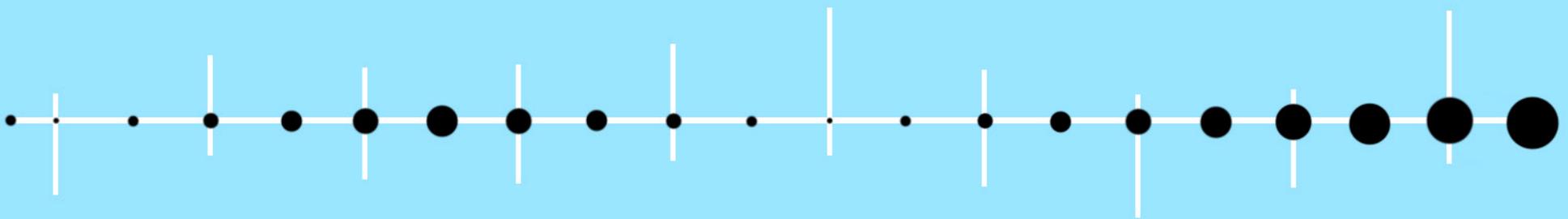


Harmony A–new:
Alternative High School Design
Luis Angel Acevedo



HARMONY A-NEW: *Alternative
High School Design*

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

By

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


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September 2012
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abstract

The typology of this thesis is a 14,440 sq foot public high school for underprivileged students of the Chicago Public School system. This thesis is an exploration of the potential for architecture to promote the overall wellness of the occupants in a learning environment. The harmony between the three main aspects of wellness (mind, body and soul) will be achieved through conscientious design of learning spaces and the ability of the built environment to foster learning and education for the twenty-first century. The current wave of innovative school design and curriculum is moving away from education reform to a learning revolution. This challenge of the conventional school system is setting precedence for the future of school design. Likewise, the design principles of the built structure will also move away from the conventional modalities of construction and material, and it will look towards a the future of new building practices. This process will be facilitated by a revolutionary structure that allows for new models of teaching styles parried with new technologies for learning in the current technological era of the twenty-first century.

Keywords:

wellness
harmony
high school
public education
learning
underprivileged student

problem statement

Can architecture cultivate the wellness of students in the public education system?

Wellness is “a way of life oriented toward optimal health and well-being, in which body, mind, and spirit are integrated by the individual to live life more fully within the human and natural community.” (Jang, 2000, pg 75)

Statement of Intent

statement of intent

Typology

Public high school

The Claim

A healthy level of wellness for students can be cultivated through bottom-up design in teaching curriculum, learning environment and architecture.

Who is the actor(s)? The public education system, architect, and structural engineer.

What is the action? Bottom up approach in the design of learning spaces, curriculum, and architecture.

What or who is the object (acted upon)? Wellness

The Premise

The principle building structure and space design of schools have changed very little since the dawn of the public education system in the United States. The current model of public education still follows the same model initiated during the industrial revolution.

The current design of school systems separates the mind, body and soul. Focusing largely on top-down education rather than bottom-up learning. This main stream model of education only stimulates the mind, and puts very minimal attention to the body and soul.

Architecture of new schools should be designed in such a way that will cultivate bottom-up learning

styles of students. This in turn will better prepared students to enter a dynamic and changing technological economy of the 21st century.

New bottom-up architecture, combined with innovative designs of learning spaces, and innovative teaching curriculum will invoke a higher level of wellness for each student.

Theoretical premise & unifying idea

This thesis project will demonstrate that it is possible to design a school that will promote the overall wellness of students through bottom-up design which in turn will foster bottom-up learning. This will be achieved by implementing bottom-up architecture that facilitates new modes of teaching along with different styles of learning for optimal wellness.

Project Justification

A shift away from solely auditory learning must be made in order for all the students to succeed in the public education system. Schools must be designed in such a way that new learning environments and teaching technologies can seamlessly be incorporated with a curriculum that combines all aspects of wellness. Once these students leave the school system, they will be well-equipped with the skills needed to be a productive member of the twenty-first century. If they are able to achieve a high level of wellness in their adolescent years, then they will be better suited to maintain a high level of wellness throughout their lifetime.

Proposal

In the past, ramped growth of cities and blank disregard for the overall wellness of the occupants of poor neighborhoods have created multiple problems in society.

Government data isn't needed to convince surrounding neighborhoods (of dilapidated areas) of the unhealthy environment that exists within its implied borders. It has become part of the mainstream fabric that poverty is associated with crime, which is associated with a low quality of education, which is interwoven with poor wellness. This in turn has deterred positive development in infrastructure and community development of these neighborhoods. These associations go full-circle from one generation to the next and continue to the present day.

One of the reasons for the existence of this situation in the U.S.A. is due to the profession of architecture. Through the allocation of funds in the public school system many aspects of wellness are put in lower importance when building a public school. This results in designs that limit the wellness of students by only stimulating their ability for auditory learning.

This phenomenon is more noticeable in low-income neighborhoods than in high-income neighborhoods. For that reason, this project will explore a building design of a new alternative high school composed of students from different

dilapidated neighborhoods of the Chicago, IL Public School System.

Through conscientious design, this new proposed built environment will foster a healthier level of overall wellness for the students. Consequently, this positive influence will seep into the surrounding natural environment and the societal web in which they dwell. In essence, this architectural design will promote the wellness of the mind, body, and soul for all the students, regardless of their learning style.

Learning is a natural process. Some people learn by doing, others by watching, and some by hearing. Yet, the public school system is unable to adapt its built environment to these issues. It is because of this kind of inability to change, that many brilliant people such as Albert Einstein and Steve Jobs, were not able to flourish within the realm of public education.

Politicians like to talk about school reform, but school reform can only attempt to fix a broken system. What students need for a better learning experience and wellness is a learning revolution. This will include a revolution from teachers being a "sage on the stage" to a "guide on the side." Therefore new space must be able to adapt to different styles of learning.

user/client description

Owner

Chicago School District will be the owner and operator of the alternative high school.

Users

The user will be the Alternative Schools Network and the enrolled students. This building will be mainly occupied by:

staff: teachers, community mentors, administration, staff, and security guards.

students: from 9th-12th grade who are not currently enrolled in the regular educational setting due to issues such as: low academic skills, economic disadvantage, personal/social/family problems, homelessness, etc.

community members: this building will be an area to foster a healthy sense of community, through the use of public space, such as community gardens and outdoor recreation areas.

Special notes:

One issue that needs to be addressed is the emphasis on safety, for both the students and staff at all times.

Since the students come from diverse backgrounds and ethnicities, it is recommended that the mentors and teachers be familiar with a range of different cultures.

Parking requirements: This building will encourage more density in the downtown district by relying heavily on the public transportation system. Parking space will be rented from the hotel directly to the north of the building site. There also needs to be ample room for drop off zone for school and city buses on the east side of the site.

The initial phase should leave a plan for an addition to be added at a later time during a second phase of growth.

project elements

-The term class room will be replaced with learning studios

-Administration spaces, learning studios, private spaces, group learning spaces and workshop learning spaces

These learning areas should not have walls that completely isolate the inside from the out. It is imperative for students to know that they are constantly on display. This will in turn reduce delinquent behavior.

The physical space should not be static and needs to be easily adaptive to any changes in the daily curriculum.

-ADA restrooms

-kitchen and cafeteria/dining center

A group of students interested in the culinary arts will have the opportunity to prepare the meals of their classmates under close supervision and permission from the school board.

-storage

These spaces should not be static. Since this high school will be project based and will have many work shops. It is imperative that easy access to equipment and material is available on a daily basis.

-library

This space will house traditional elements of a library such as books, a check out space and private study

rooms. However it will also house an environment for socializing in very much the same way a cafe is meant for human to human interactions.

-locker space

These space must be kept to minium storage units within individual work pods.

-universal design elements

-lobby/vestibule

-wellness center

Mind: a psychologist should be on hand to help students when needed.

Body: Traditional schools use gyms as an offset for the class room's lack of physical engagement. Since the curriculum of this high school will be project based, the students will constantly be getting physical excises thought out the day, thus eliminating a need for a traditional gym. However space should allow for the option to 'play.'

Soul: A private space for connecting with ones inner self will also be available.

-outdoor community space

-indoor/outdoor auditorium

This space will be assembled when needed and packed away when not in use.

-green space

Community gardens will be part of the learning curriculum.

-youth trades academy: building area and shops

The traditional class room will be replaced with learning studios, where individual learning is celebrated and collaboration is encouraged.

-connection to the shore line

The projects from these learning spaces will be transported from the site, via the Chicago river, to various part of Chicago as part of the "City Beautiful Movement."

-parking

Student, staff, and bus parking will utilize the parking structure of the hotel directly to the north of the site.

-safety

Discrete metal detectors, and security cameras must be installed in such a way that the students don't feel like they are in a jail-like structure. Misconduct must be offset using other subtle methods, such as unobstructed views into learning studios from adjacent spaces.

site information

1. Macro

Region: Midwest USA

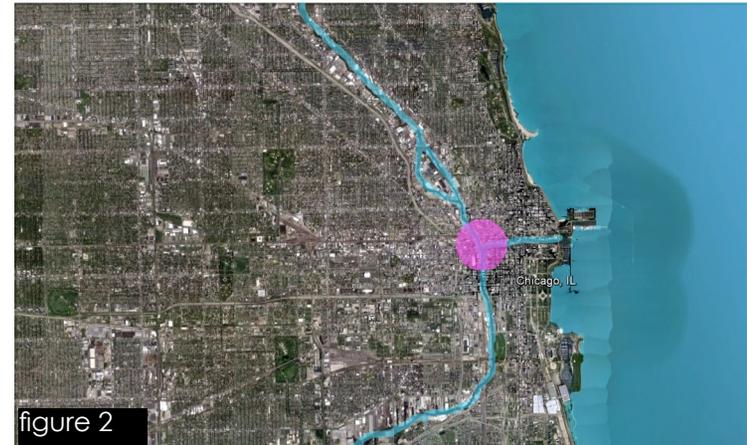
The site is located in the northeast corner of Illinois. The site is situated along Lake Michigan.



2. Micro

City: Chicago, IL

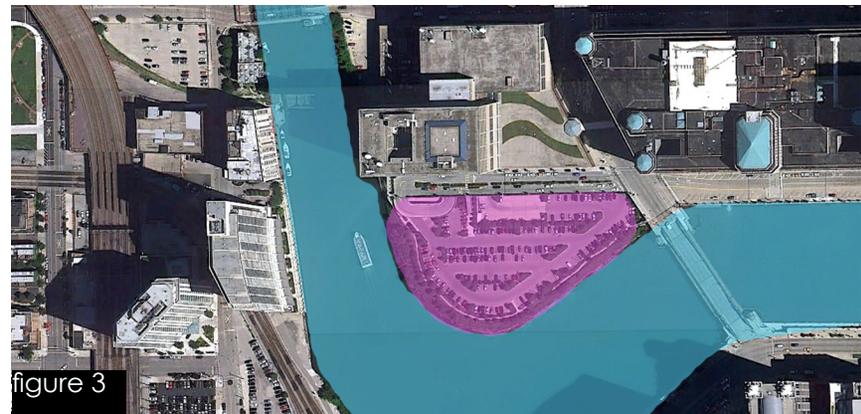
The city is part of a metropolis, sometimes referred to as Chicagoland. It is known throughout the world for its architecture and city life.



3.Site:
350 West Mart Center Dr.
Chicago, IL 60654

This particular site is ideal because of its location in the heart of downtown Chicago. It is surrounded by a busy downtown district and a scenic river. This site is unique from other downtown sites in that it is surrounded by both the urban city and nature.

The site's proximity to the many amenities that downtown has to offer is ideal in order to foster a scene of community between the students and the sounding connect. The site is within a 10-minute walking distance from Grand Central Station, and a 5-minute walking distance to several bus stops. The site has several access points for the public bus system. The site is also separated from tall built structures to the south that could reduce its solar access.



emphasis

Realizing that education for the twenty-first century can no longer follow the model set up by the industrial revolution, will open the doors to new styles of teaching and learning. Learning will flourish once the overall wellness of individual students is improved through conscientious design.

The built environment should set up the foundation for new teaching styles of the twenty-first century. This style is more in tune with our natural way of learning as opposed to the institutionalization of education.

The hierarchy of spaces needs to be challenged in order to design appropriate schools of the present and future. With the improvement of software used in teaching environments, students are able to receive personalized teaching material. With the need for less lectures, learning will be achieved through mentoring rather than teaching. The focus in the curriculum will be guided towards learning by doing and learning in groups. Conventional homework will be replaced with project base learning.

Along with the notion that schools need to have a bottom-up approach in their design and curriculum, so too should the architecture be designed with a bottom up approach. This will be based on research in biomimicry.

plan for proceeding

Research direction:

Research and design methodology will incorporate the mixed-method quantitative/qualitative approach, which include; theoretical premise, bottom-up design, bottom-up learning, public education, new teaching/ learning styles of the twenty-first century, bottom-up building practices, wellness and learning environments.

Design methodology:

The process of design methodology will include the following aspects:

- Mixed-Method Analysis
- quantitative/ qualitative analysis
- graphic analysis
- 3D analysis
- statistical data gathered from a site visit.

Plan for documentation of design process

Documentation will be compiled through digital images of drawings, physical models, sketches, digital models. Data will be compiled and reviewed on a weekly basis. These files will be formatted and uploaded to North Dakota State University Institutional Repository.

previous studio experience



figure 4

2nd Year

Fall 2008: Professor Heather Fischer & Meghan Duda

-Tea House

-Boat House and Rowing Club

Spring 2009: Professor Darryl Booker

-NDSU Dance Academy

-Marfa Small Dwelling



figure 5

3rd Year:

Fall 2009: Cindy Urness

-Center of Excellence

-NDSU Wellness Center

Spring 2010: Professor Mike Christenson & David Crutchfield

-Tx Performing Art Center

-Iterations

4th Year:

Fall 2010: Professor Frank Kratky

-Mixed-Use High Rise Facility

-KKE design competition

Spring 2011: Professor Don Faulkner

-Williston ND, Master Plan

-Marvin Window Competition



figure 6

5th Year:

Fall 2011: Professor Stephen Wischer

-Artifact

spring semester work plan

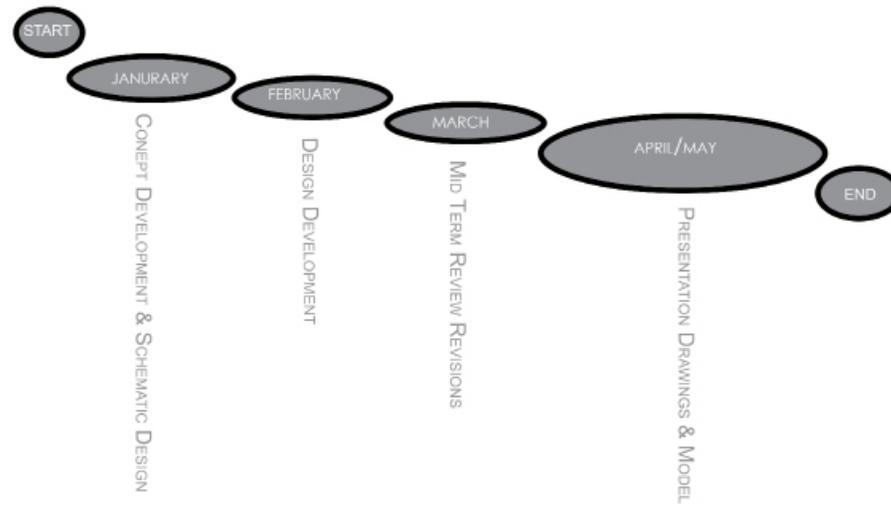


figure 7

program document

results from the theoretical
premise research

Wellness

What is wellness?

Wellness is not a new concept that emerged with the fitness craze of the past century. In fact, the idea of wellness has been around for a very long time; as far back as Aristotle, the Greek philosopher, who wrote about wellness in the 4th century (Robinson, 2011). The definition of wellness encompasses the mind, body, and soul as separate entities that are interconnected to each other to form an overall level of optimal health.

Wellness is further defined in the current century by Myers, Sweeney, and Witmer as “a way of life oriented toward optimal health and well-being, in which body, mind, and spirit are integrated by the individual to live life more fully within the human and natural community” (Jang, 2000, pg 10).

A more elaborate definition is given by Travis and Ryan (2004): “Wellness is not a static state. High-level wellness involves giving good care to your physical self, using your mind constructively, expressing your emotions effectively, being creatively involved with those around you, and being concerned about your physical, psychological, and spiritual environments.”

It is easy to see why there is a misconception that wellness is solely a physical attribute, since exercise and nutrition play a vital role in achieving wellness. It is easy to look at people and denote by their phy-

siques whether they are in good health or not. It is harder to look at people and determine if their minds, and souls are in at a healthy level of wellness. Acquiring one aspect of wellness does not mean that the other aspects are automatically acquired.

How many types of wellness are there?

A list was proposed by Hettler in 1984, who is considered the father of wellness, that includes the following six components: physical, emotional, occupational, social, intellectual, and spiritual (Robinson, 2011). This list has influenced many of the current wellness assessments that are used today by different professions (Robinson, 2011). Hettler described wellness as “an active process through which people become aware of, and make choices about, a more successful existence” (Ballentine, 2010, pg 4).

How is wellness measured?

It is hard to define and accurately measure the level of an individual's wellness directly since it is a subjective mode. Despite this premise there have been many attempts to objectively measure wellness levels, especially in the counseling profession.

Currently there are several forms commonly used to define and measure wellness. The most prominent forms are the “wheel of wellness,” “the indivisible self,” and the “five factor wellness inventory” (Ballentine, 2010, pg 6)

One of the assessments that will be crucial to the design of the Alternative High School was developed by Constantine and Sue (2006). This assessment incorpo-

rates factors such as “oppression and social injustices in people of color” (Robinson, 2011, pg 40).

Wellness and education

According to the *Commission to Build a Healthier America* findings in September’s 2009 issue of *Education and Health*, there is a very strong and consistent link between education and health.

In this context, education refers to the level of education or the overall schooling a person has. The stated that “People with more education are likely to live longer, to experience better health outcomes, and to practice health-promoting behaviors.”

One of the most pertinent findings was that “educational attainment among adults is linked with children’s health as well, beginning early in life: babies of more-educated mothers are less likely to die before their first birthdays, and children of more educated parents experience better health” (*Education and Health*, 2009, pg 3).

The article *Commission to build a Healthier America* stated that there are three major pathways that link educational attainment with health:

1. health knowledge and behaviors: education can lead to improved health by increasing health knowledge and healthy behaviors.

2. employment and income: greater educational attainment leads to better employment opportuni-

ties and higher income, which are linked with better health.

3. social and psychological factors: education is linked with social and psychological factors that affect health (Education and Health, 2009, pg 4).

The following is a list of more startling findings:

-“Children whose parents have not finished high school are more than six times as likely to be in poor or fair health as children of college graduates” (Education and Health, 2009, pg 3).

- “The United States is the only industrialized nation where young people currently are less likely than members of their parents’ generation to be high-school graduates” (Education and Health, 2009, pg 4).

- “The likelihood of dropping out increases with decreasing income. In 2007, for example, 17 percent of 16 to 24 year-olds from families in the lowest income quartile were not enrolled in high school and had not received a high-school credential, compared with 3 percent of those from families in the highest income quartile” (Education and Health, 2009, pg 4).

- “people with more education are more likely to live in health-promoting environments that encourage and enable them to adopt and maintain healthy behaviors” (Education and Health, 2009, pg 5).

-“The level of educational attainment children even-

tually achieve also affects the health of their own children—perpetuating a vicious intergenerational cycle of low educational attainment and poorer health (Education and Health, 2009, pg 10).

The *Commission to build a Healthier America* proposes that by providing the “knowledge and skills necessary to fully participate in the labor force, education can be key in promoting social mobility and in breaking the cycle of intergenerational disadvantage and related health disparities” (Education and Health, 2009, pg 11).

Education and community

As show in the previous section, poor levels of education negatively affect an individual's health, and this in turn must also affect the community of the individual (this is evident in dilapidated neighborhoods where there is a generational cycle of low levels of education and poor health conditions).

What is harmony?

Merriam-Webster (2012) defines harmony as a pleasing or congruent arrangements of parts.

How can we live in harmony?

We can live in harmony with nature by learning from past cultures (before the misuse of technologies).

According to Linda Kalof, in her book *The Earthscan reader in environmental values*, “human's genetic

needs for natural pattern, for natural beauty, for natural harmony, [are] all the results of natural selection over the illimitable vistas of evolutionary time” (Kalof, 2005, pg 137).

How can design incorporate more sustainable methods?

Prefab architecture: A guide to modular design and construction argues that in the same manner in which Toyota understood the core structure of the automobile to produce it with greatest effectiveness to reduce the cost, so can the building industry follow the same process to mass produce parts of buildings.

An issues of interest in this field of construction, deals with increasing variety and customization without increasing cost. This tends to be a hard task to undertake for most construction companies, who are unwilling to embrace innovations due to the higher initial cost of construction.

The book also says that prefabrication is not a new phenomenon, and that many famous architect have dealt with this problem in the past including: Gropius, Mies van der Rohe, Le Corbusier, and Frank Lloyd Wright. This shows that prefabrication indeed has its role in architecture (in its true sense, not in the sense of commercialization).

There are several advantages to building with prefabricated parts: shorter construction time, reduced site disruption, more consistent quality, financial savings, and flexibility of use (Modular Buildings , 2010).

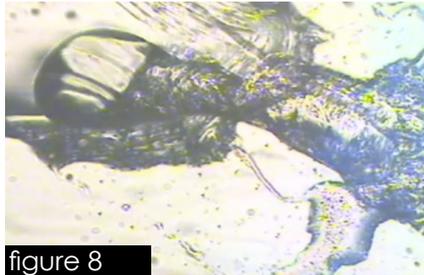


figure 8

protocell



figure 9

protopearl

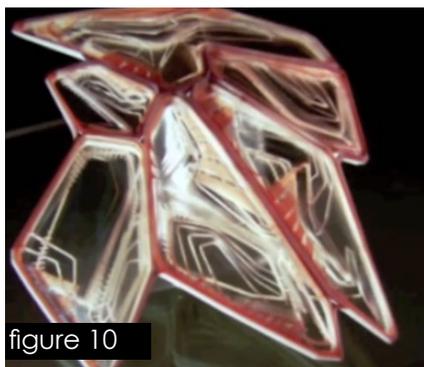


figure 10

composite panel

What are bottom-up designs in architecture?

Bottom-up materials:

In a 2010 TED Talk, Rachel Armstrong, states “the problem with Earth 1.0 technologies, is that they are divorced from ecological considerations, In other words, earth 1.0 technologies do not behave in ways that are environmentally sensitive. In fact these technologies are completely alien to the rest of the biospherical system in which they exist... Earth 2.0 is A built environment who's surface behaves in a sensitive and lifelike way. For example, by absorbing greenhouse gases. Or by modulating its opacity and color to reflect more or less sunlight. Or even by harvesting its own energy.” In this TED Talk, she not only proposes the idea of using these kinds of technology for architecture, but she also demonstrates the ability of a protocells (chemically programmable agent based on the chemistry of oil and water) that secretes hard outer shells that could be used for building materials. She proposed the idea of using these technologies to produce a paint that would remove carbon dioxide from the air and produce a lime stone substance at the same time. She stated that this is practices that we architecture can be sustainable.

Bottom-up construction:

Tom Wiscombe, from Emergant Architects, is leading researching in the design of fiber composite panels. In a lecture at Texas A&M 2011, he explains how 3D printing, can integrate materials into one another to perform as dynamic surfaces. This will remove hardware in architectural assemblies. Therefore, the tasks of maintaining a building will be integrated in composite panels rather than in separate entities of structure, heating and coolin

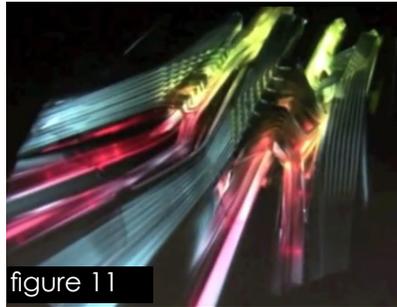


figure 11
Algae bioreactors



figure 12



figure 13

3D printed pleating

The following is a list of current prototypes of new building technologies.

Algae can be used as a bioreactors to generate energy day and night.

3D printing in multiple materials and pleating in the design of fiber composite to increase strength.

Microcapillaries for optimal heating and cooling.

Bottom-up forms

Neri Oxman, founder of Materialecology, proposes that the design of structure can be generated from analysis, the environment and material properties to generate three dimensional form. She mentions that nature is a grand material engineer. For example silk is five times stronger than steel and it can produce shells that are twice as strong as ceramics.

Nature is a based on mass customization and the current building industry is based on mass production. "So how can we begin to think in naturel ways to design that uses and utilizes principles of nature on scales that match human production?"

Why is bottom-up learning important?

Sir Ken Robinson, a world-renowned education and creativity expert gave a profound speech during a TED Talk in 2010. He states that the current school system is alienating the youth of today. He states that schools are impending creativity of the students by increasing standardization of education. An underlying reason is that the current system of education is modeled after the industrial revolution.

summary

In order to design a structure that will promote wellness for the students, the public education system needs to understand what wellness is. It is crucial to understand how to measure wellness so architects can design accordingly. Since the idea of wellness is not a new idea, many sources are available to describe how it is assessed and measured. Most of the findings come from the counseling profession. This goes hand-in-hand with the program of this alternative high school, where mentoring (wisdom), and not teaching (information) is the predominant teaching style. This information will lead to an interesting catalyst for design.

For the most part the demographics of the alternative high school are of lower income families who live in dilapidated neighborhoods. This goes hand-in-hand with the findings from the Commission to Build a Healthier America. The challenge that this information creates is how can a design promote overall wellness, which will in turn promote better education, which will in turn promote better health for the occupants? This will create further discussion of the theoretical premise.

Is the premise too far out of touch with reality? No, it very much in touch with reality, because it deals with

a human experience that is undeniable (i.e. wellness and harmony). If harmony can be sensed in an environment in one form or another, then that essence can also be captured in architecture.

By designing a structure that is built with bottom-up concepts, the school will be able to live in harmony with nature. In doing so, the students will also learn in a bottom-up approach, which will increase the harmony between a student's mind, body and soul.

1. The Cooper Union for the Advancement of Science and Art
Location: New York, NY, USA
Morphosis Architects, 2009
16,258 sqm

This case study, like the others, is a very public building. It was designed with the inclusion of the public sector in mind. This building in particular emphasizes its openness to the community, with the openness of its transparent building skin. One unique aspect of this project is that the institution believes that education should be as free as water and air.

This new building responded to the preexisting site conditions by collectively organizing all the previous programs (which were separated into three different buildings) into one new building. This reduced its footprint and increased its density, which is crucial in an urban setting. This building incorporates the skip-stop circulation method. By having elevator doors that stop at intermediate levels, the architecture itself promotes a healthier lifestyle along with more opportunities for interactions between its occupants as they move throughout the building.

This building was built to LEED Gold standards. The building skin is made of perforated stainless steel panels offset from a glass and aluminum window wall. This technology reduces heat radiation during the summer and helps insulate the building



figure 14

during the winter. This building also incorporates a very sophisticated HVAC system that makes this building 40% more energy efficient. One of the best parts of the human experience in this building is that 75% of it is illuminated by natural daylight. This building also benefits the surrounding community because it is less of a strain on the existing infrastructure.

My biggest critique of this building is that at first glance it appears like a brute force within its context. Since one of its main objectives was to be an icon on the corner lot, it is not as elegant as I believe it could be.

The contribution that this case study will make to my unifying idea is that one of the physical aspects of wellness can be achieved through interventions in the architecture, such as the stop-skip method. This will greatly increase the use of the stairways, which will increase human interactions, which will increase the sense of community and therefore affect the spiritual and mental wellness of the occupants.

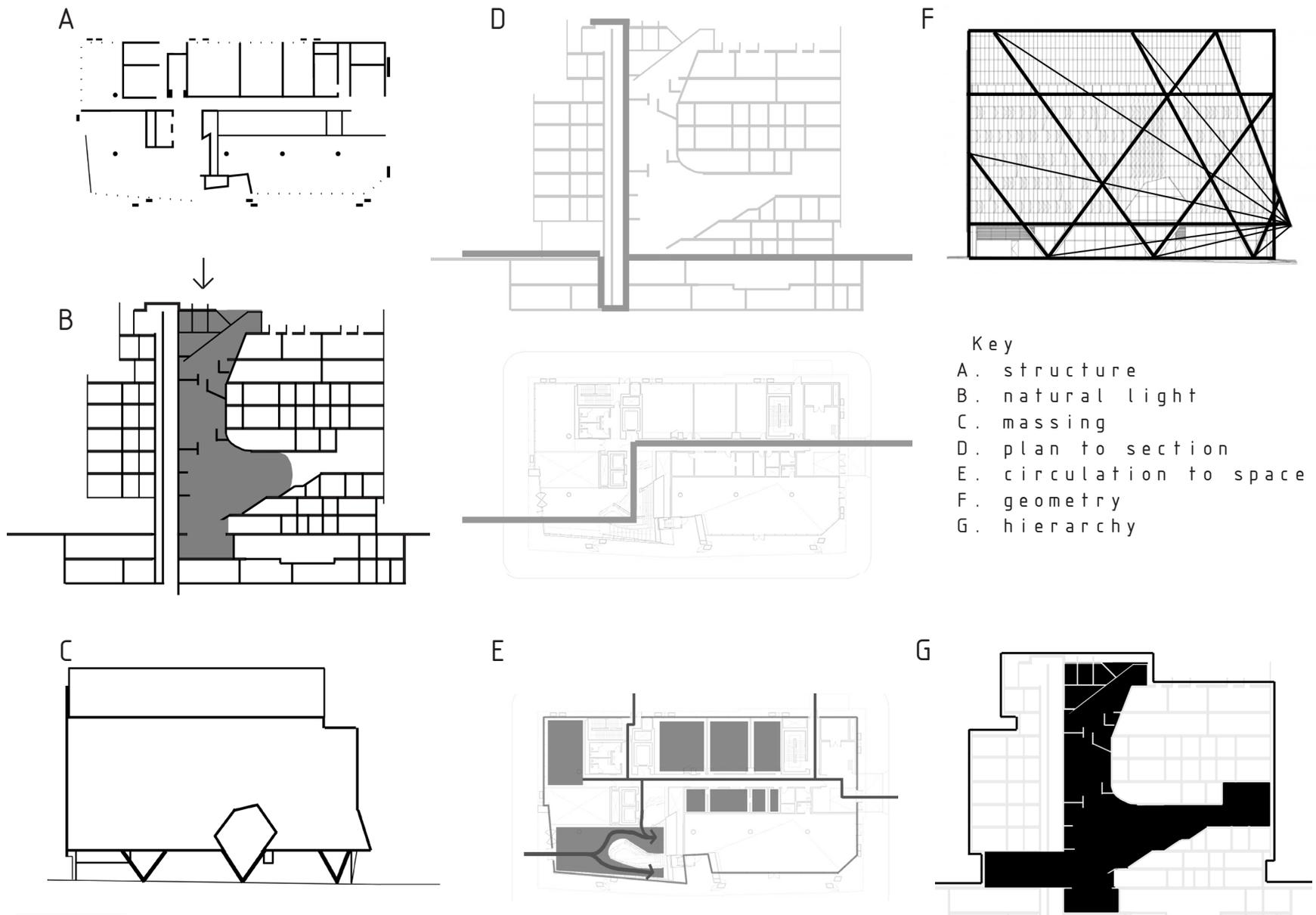


figure 15

2. Young Centre for the Performing Arts

Location: Toronto, Ontario, Canada

KPMB Architects, 2006

44,000 sf

\$10 million

This building tries to incorporate the quality of light as a symbol of transition from one space to another. It invites the public domain into the design by making it a cultural destination in the community. This building, like the previous case study, also incorporates what used to be separate programs into one building. This building, unlike the previous, was not constrained by the availability of surface space, so in turn the structure is more horizontal than vertical. This project would be classified under adaptive reuse, and it was built elegantly for \$10 million. This building addressed the historic aspect of its preexisting site by incorporating several of its elements into the new construction. The structural elements are not hidden but rather but on display and celebrated. This project is unique in that it was a collaboration between George Brown College and Soulpepper Theatre Company. This allows for more interaction between different parts of the population.

One of the weekpoints of this case study is that it does not house any unique innovations. It just incorporates technologies that are standard to the green retrofitting field of architecture.

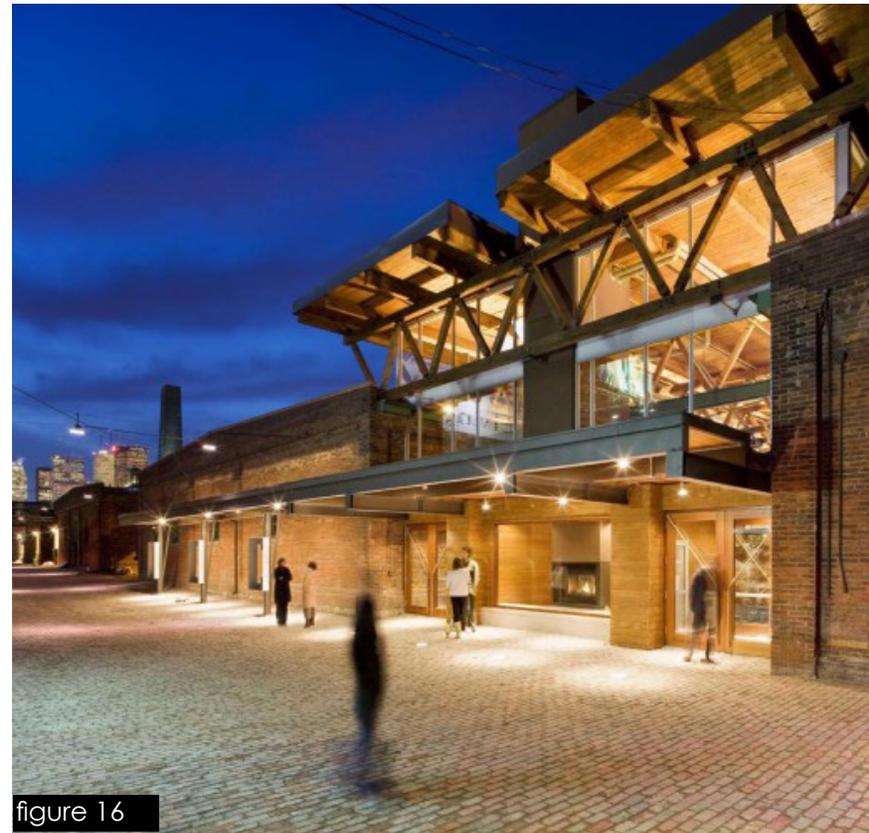


figure 16

The contribution that this case study will make to my unifying idea is that the architecture of this building evokes a sense of harmony. A similar technique could then be used to improve the physical, spiritual, and mental wellness of the community members and occupants of my building.

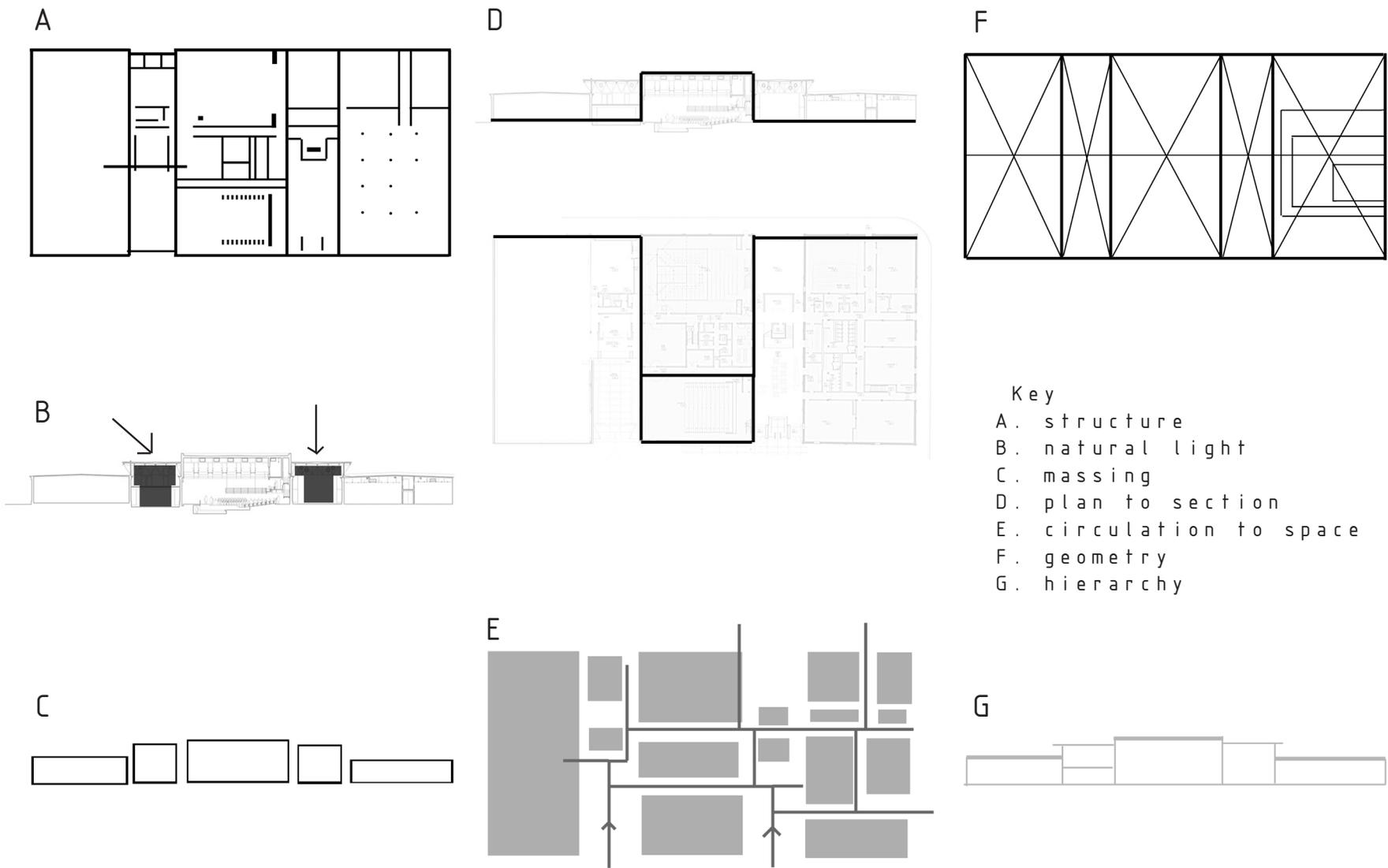


figure 17

3. The Nelson–Atkins Museum of Art

Location: Kansas City, Mo, USA

Steven Holl Architects, 2007

51,329 sqm

\$200 million

This building is very much a building for public interaction. This building took a different approach to how it would engage with its old program. Instead of retrofitting, or completely clearing the site, this building is built next to the preexisting building and it caresses the landscape.

This building tries to reduce its impact on the environment by building with green strategies. It is significant in more than one aspect; not only is it an exceptional museum for displaying art, but it is also a symbol for new and innovative architecture. This building is also a prime example of the effective use of computer-controlled screens and of special translucent insulating material embedded in the glass cavities.

The negative aspect of this building is that it was quite expensive to build. There is a give and take to the benefits and disadvantages of building expensive projects, and it is hard, for a project with a smaller budget, to use this building as a case study to achieve similar positive results.

The contribution that this case study will make to my



figure 18

unifying idea is that harmony can be created with more than just nice building materials and colors. In this case study, light is masterfully and beautifully used to capture a sense of wonder and hope that is essential to improving one's overall wellness.

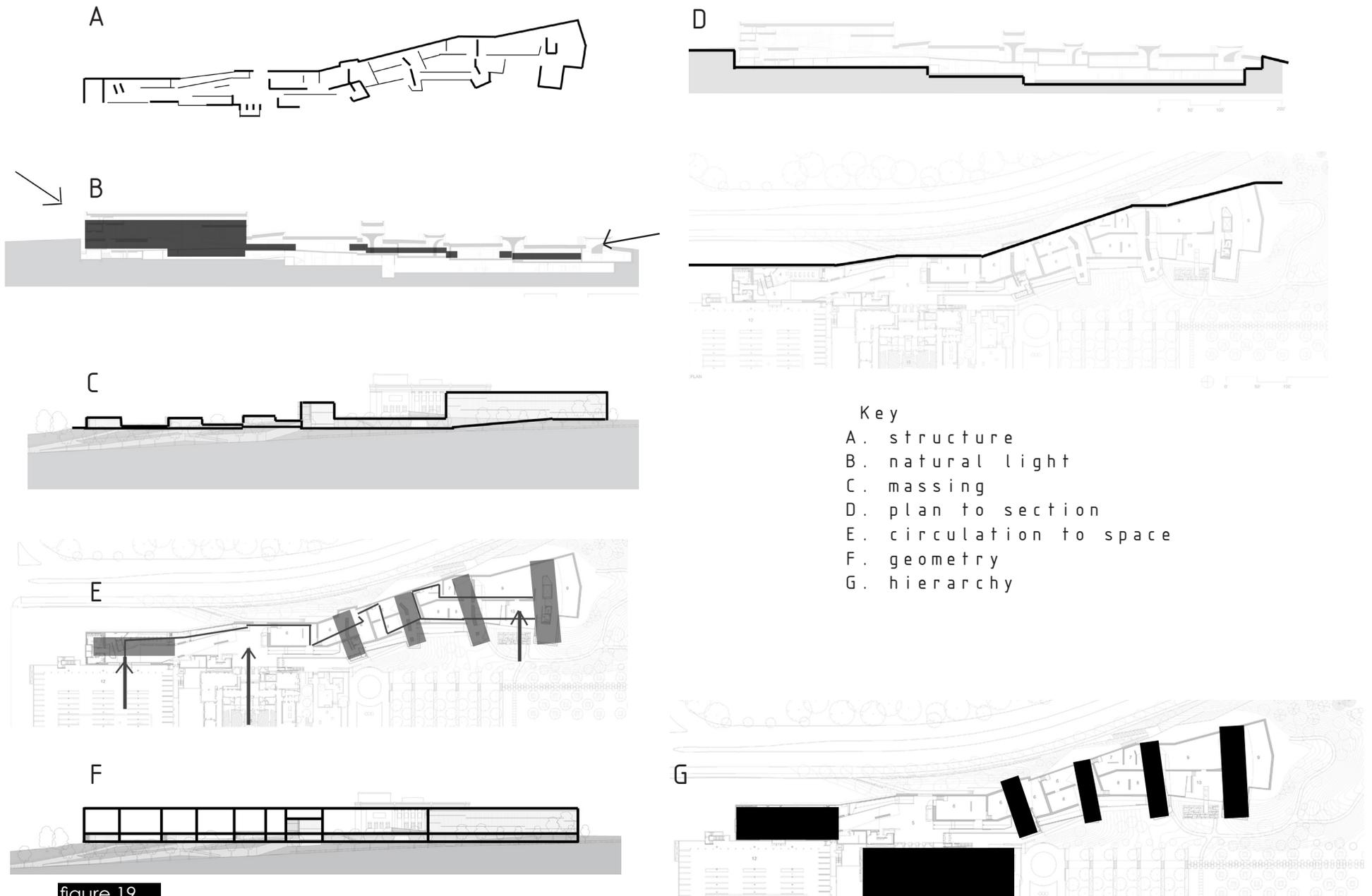


figure 19

summary of case studies

This sample of case studies looks at architecture that was specifically designed to bring together two or more different programs in a harmonious manner, and to incorporate incorporating the community as a vital part of the architectural design.

The first case study in New York is a higher education facility focused on free higher education for the public. This building is LEED Gold certified and it has incorporated several green strategies that involve sophisticated technologies. This aspect is crucial part of the research, because of its sophisticated technologies to create harmonious spaces that improve wellness among the students of the alternative high school proposed this thesis design. The second case study in Ontario is a retrofit design to house George Brown College and the Soulpepper Theatre Company. This posed a unique challenge in that they are two different entities in society. They were combined into one, through architecture, in a new and harmonious way. The third case study, in Kansas City, is an art museum that incorporates new technologies in order to alter the physical perception and the wellness of the occupant. This building incorporated a new use of materials to affect the quality of light throughout the design.

The claim was affected by these case studies in that the use of modern technologies to improve overall wellness can be achieved through structure, circulation, and the quality of light. It is also important to consider the community interactions that will be a result this design Thesis.

All the case studies varied in size, but they all responded to their site in unique ways. Each design reacted to the existing site differently, but they all kept a level of 'public invitation' to the building. This was achieved through the way the main entrance was perceived from the street level. The first of the case studies built upward on the site to be more efficient through higher density. The third case study built along the existing contours to be part of the site rather than just on the site.

The program of these case studies can be generalized into two parts: big common spaces (i.e: auditorium) with ancillary smaller spaces (i.e.: classrooms and offices). Their functional relationship is that the smaller spaces revolve around the bigger spaces.

historical context

This project relates to other projects in the past, in that it is not the first alternative school in Chicago. The proposed design will be the new home for the existing alternative schools which are currently flawed building design.

The combination of wellness and architecture is not a new one. If we could go back in time to a more primitive culture we would be able to see that the home itself was an extension of the person; therefore, if the structure was unhealthy, then the occupant was unhealthy. If we look at the recent past we see a trend in the medical and nursing field that indicates towards architecture that tries to rejuvenate the soul in order to rejuvenate the body.

This project relates to the “problem with technology” in the current web of society. Through the overuse of technologies we have distanced ourselves from true experience. This in turn has lead to many problems in our environment, in our economy, and in our society. The design of this building will allow us to take a step back and rethink some of the aspect that our culture has taught us that we need. Examples include the reliance on an elevator, the need to rely on the power grid, and the need to rely on the HVAC system over passive systems.

There is a current way in technology, that questions the inherent nature of its use. In other words can technology be used more intuitively. This is clearly seen in new mobile devices that rely on touch screens and human interactions to function. This is the kind of technology that can improve human lives instead of damaging it.

Over the years, only a handful of schools have moved out of the old model of education. They have been willing to adapt to new teaching styles and learning spaces.

Unfortunately, these schools tend to be private schools for the upper class.

This rift between the well-educated and the non-educated has brought about huge consequences in our society. In dilapidated neighborhoods this is seen by simply by walking around the perimeter of the schools. The schools of upper class individuals are cleaner and safer when compared to those of dilapidated neighborhoods.

It should be of no direct correlation between where a child lives and the quality of his or her education. Yet in the present society in which we live, there exists a rift between quality schools and those of failing schools. It is important that all children receive a high quality of education regardless of their economic background. It is through this mentality that the social fabric of the urban cities can improve. Once these improvements are implemented, then a drastic change from one generation to the next will occur.

There will be a drastic shift in criminal activities, since the youth will no longer need to look for a source of income from criminal acts. Neighborhoods that were once an eyesore will be rejuvenated when students take pride in their accomplishments and their surroundings.

goals

The Academic

One of my goals for this thesis project is to be able to learn as much new information as possible. This in turn will help me have to better understand the academic sphere. I will have a better grasp of the research process and how to strategize to solve problems presented in academia.

The Professional

One goal is to be able to produce a superb project that, when a future employer looks at my thesis project, they will know that I have received an excellent education and I would be an asset to the firm. I also wish to contribute to the profession in more than just standard design, so I will take advantage of the freedoms have in the academic setting to further explore aspects that would otherwise be standardize in the office setting. This will give me a unique edge in the profession.

The Personal

I feel as if I have yet to really push my designs to the next level; therefore my thesis semester is a perfect opportunity to do so. My goal is to be able to walk away from this project at the end feeling fulfilled and proud of what I have accomplished.

site analysis:
qualitative aspects

Welcome to the concrete jungle of the Midwest, more commonly referred to as Chicago. The downtown district is located on the southwest side of Lake Michigan. The rest of the town has sprawled into the north, south, and west, creating a large metropolitan city.

Throughout history, the city has sprawled along the Chicago River, the railroad, and the interstate system. This allowed for a large population to feed the economy of Chicago, in order to continue growing. Just like every other city that has experienced similar growth, there has been a growth in the rift between the upper class and lower class.

Throughout the years, the rift has been a driving force that has laid the foundation for many of the current problems that have been created in the present web of society. These include, but are not limited to, poverty, crime, pollution, health risks, and a population with a lower than average quality of education.

If it was growth that caused this problem, then why not implement smart growth? If it was the economy that caused this problem, then why not create positive policies to help bridge the poverty gap. If it was politics that caused this problem, then why not encourage advocacy groups to give the poor a stronger voice? All of these problems and solutions can be traced back to the education system and the youth; therefore, let us create new ideas that will ensure that

the rift will not continue to grow and cause further problems in our society.

There exists an opportunity for such an amazing catalyst into the next generation... and it will start with an alternative high school built in the heart of downtown Chicago. It is here where the course towards a brighter future begins.

This school will be made up of kids that would otherwise be discarded into the same vicious cycle that encompasses the major flaws in society. In the alternative high school, youth will be mentored, not standardized. They will gain wisdom, not trivial facts. This, along with community interactions, will bring the next generation into a brighter future.

site analysis

a. existing grid

Unlike much of the town, here there are diagonal elements that disrupt the north-south grid. This is due to the fact that there is a split in the Chicago River directly to the south of the site. This results in the site being triangle shape rather than a square. The bridge to the south east (N Franklin St.) cut through the north eastern corner of the site. Since the site is 15 feet below the city street level, the current access points are limited to the 4 approaches.

b. existing textures in plan

There are primarily 4 textures

1. concrete: in numerous building structures and facades, also in the parking lots/ramps, and roads.
2. steel: along the numerous bridges that span the river.
2. grass/green: the proposed site currently has a 15 feet brim of grass and trees growing along the river front.
3. gravel: along the railroad tracks which are across the river to the south.
4. other: garbage, debris and construction materials.

c. material textures

The taller and newer buildings consist of a concrete structure, steel reinforcement, and a glass façade. The older buildings are less impressive in height and are made of primarily brick, concrete and stone.

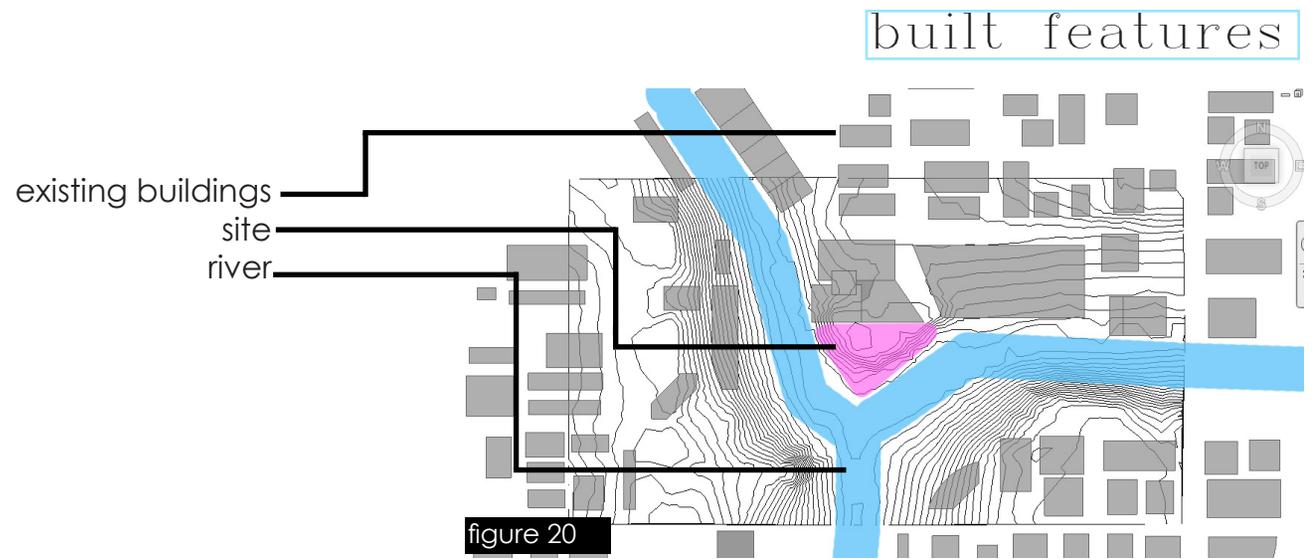
d. geometric relationships

In Plan: the surface of the sounding site has been extensively altered by humans. The majority of the natural environment has been covered over by concrete or other man-made surfaces. Therefore the natural contours that once existed now follow the outline of the railroad and street. The river is also controlled by man-made structures in order to control the river height and to prevent flooding of the downtown district. This creates the unique grid of Chicago.

In Elevation: The tallest of the buildings are located in the downtown district and there is drastic drop in building height within two blocks of the downtown district, especially on the west side of the Chicago River.

c. sections and shading

The building directly to the north of the site defines the northern boundary. This building will be the most likely to be affected by the building height of this thesis project. The tallest buildings initially across the river will cast a shadow onto the site. During the summer, this is welcomed. During the winter months the new building design will have to address its access to natural day light through architectural design.



site light quality

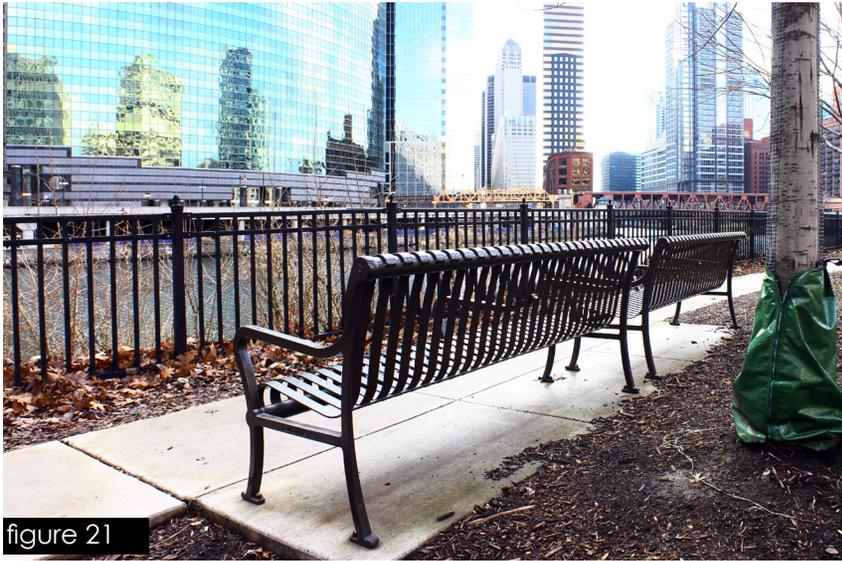


figure 21

In a late fall afternoon there is ample access to daylight. There are also strong reflections that come off the ground allowing for more than desired day light in the summer time.

On a brisk fall day in November, the sunset on the site will be an intense yellow with red-oranges. To the east the sky will be a dark blue with touches of violet here and there.

vegetation



figure 22



figure 23

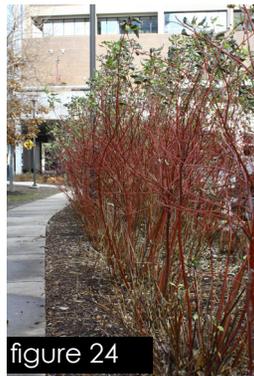


figure 24

The only signs of vegetation are the trees, shrubs, grass and weeds. There are a few planters to the north.

At this time of year (late Fall) everything is bland green color with shades of yellow and brown. The grass is not soft grass, it is rather rough.



figure 25

water

The Chicago River helps form the site. The river was engineered to have reverse flow, and therefore is a controlled body of water.

wind

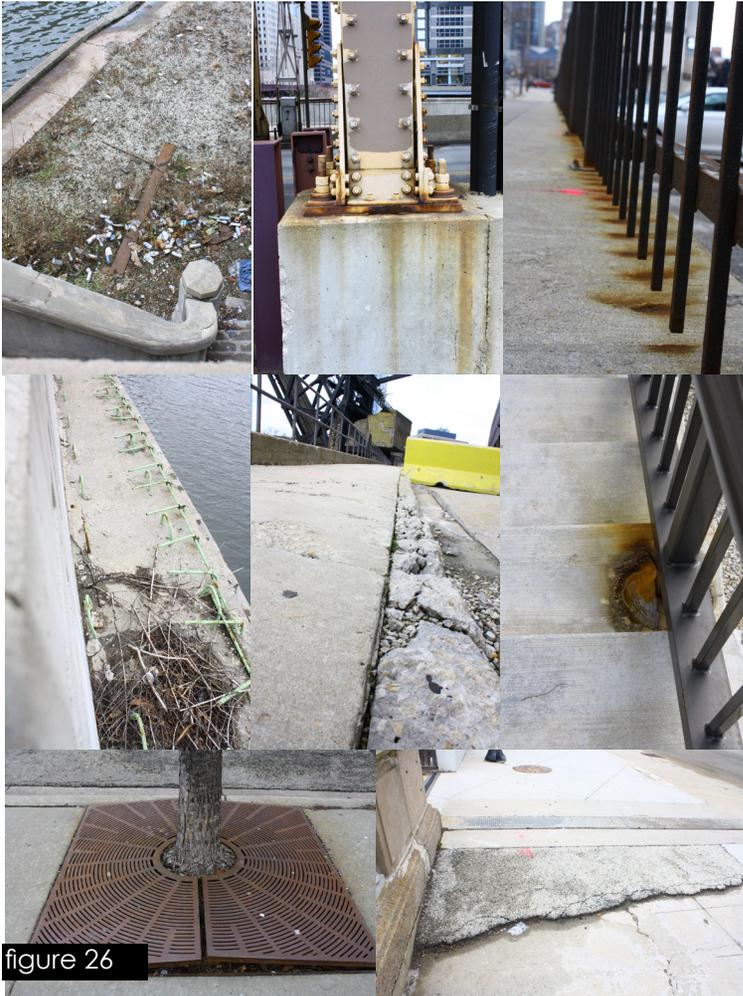
On the day the site was visited, the wind was 10-15 miles an hour, coming from the north. There were no foul smells. The land forms that are created by the railroad and the under pass, on the north side of the site, create a slight wind tunnel that pushes wind along the north-east side of the site southwards.

human characteristics

The effects of humans are seen all over the site. Only about 5% looks like it has not had any major alterations by humans. This site is primarily used as a parking lot. Therefore not very many social spaces are created.

distress

There are numerous signs of distress, on the site as well as around the site. The very little vegetation that exists, is highly disturbed by human actions. There is a heavy amount of trash along the water shore. The soil is not very healthy and lush. Furthermore, there are signs of aging materials. Along with this there are signs of economic distress on the northwest side.



site analysis:
quantitative aspects

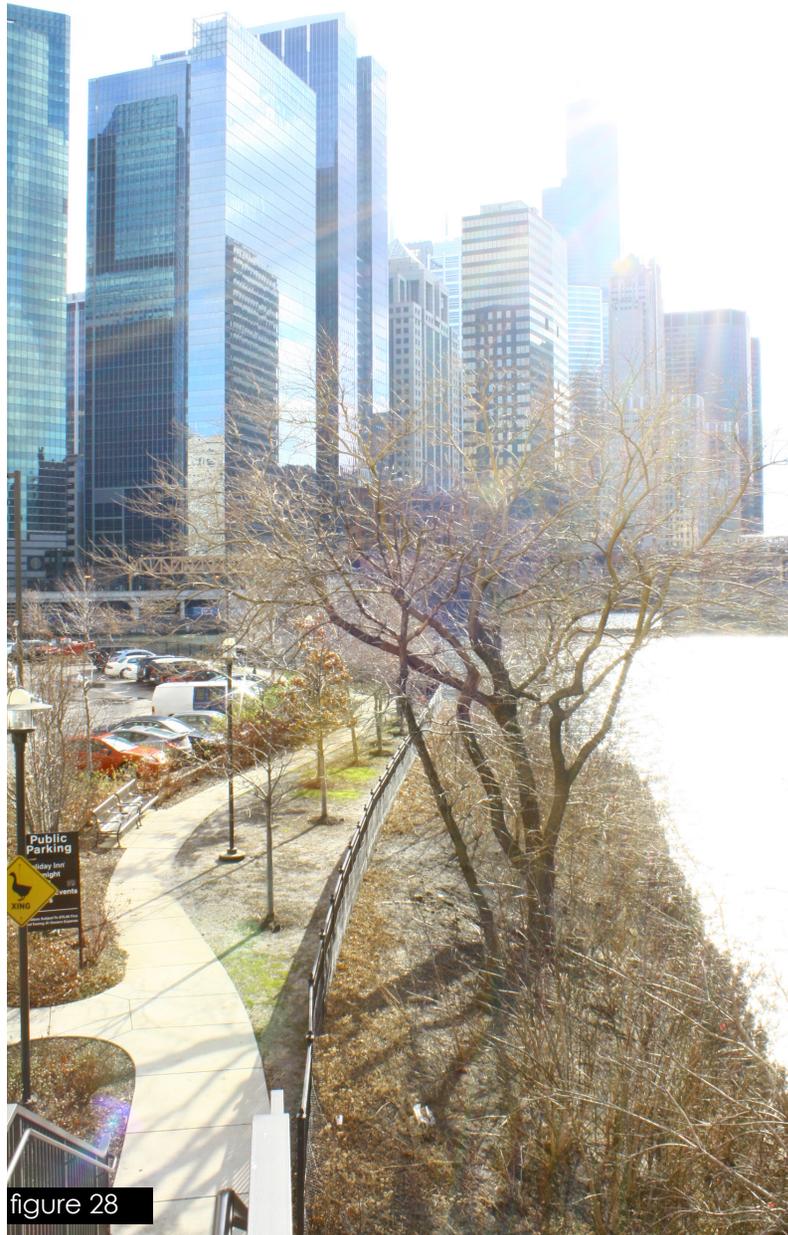


figure 28

soils

0 -12 inches= Silty clay
12 -24 inches= Silty clay
24-60 inches= Clay

water table

6-18 inches below surface

This site is along the 500 year flood plain

utilities

There are two built future on the north side slope of the site. They both belong to the city of Chicago utilizes department. Also there are storm drains and street lamps.

vehicular traffic

There is a constant stream of traffic throughout the day along the west side of the site because this is where parking lot of the block is located. There is also a constant stream of traffic along the north side of the site for though traffic along the storefront.



figure 29



figure 30

pedestrian traffic

Pedestrian traffic is created between the building to the north and the parking lot. Very little pedestrian traffic occurs elsewhere on the site.

topographic survey



figure 31

slope analysis

The topography of the site does not differ much, with the exception along the shore and the approach. For the most part the site has a 1%-2% slope. The north corner slope is 15%. This offers a nice view to the west, and since most of the terrain in Chicago is relatively flat, this opens a door for design opportunities (despite the buildability issues on a steep slope).

cost effectiveness of slope
most expensive
more expensive
least expensive

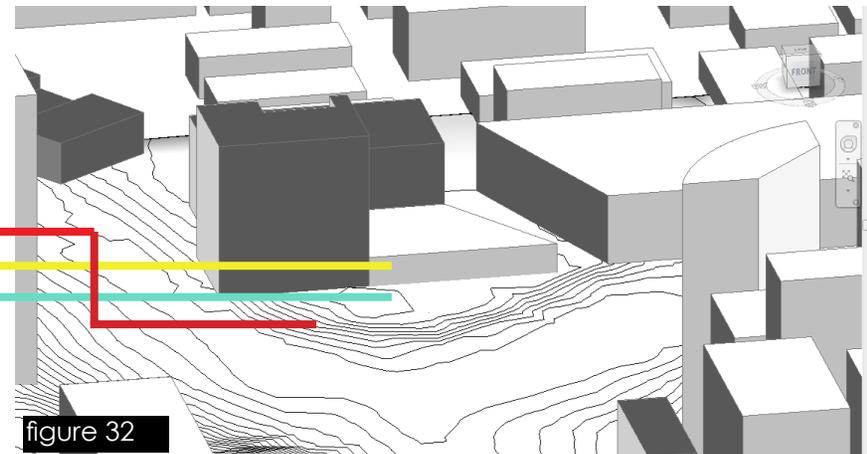




figure 33

visual form

Since most of the terrain is flat with a 1%-2% slope throughout the area, the most notable form would have southern shore line. One of the most pleasing things about this site is the breathtaking view at night.

plant cover

It is clear that nature has been altered by humans on this site. The existing trees are not growing in random pattern but rather in a gridded fashion. The grass is always maintained and trimmed. This site also has very good drainage to towards the south.

site character

The site has a very 'big city' feel to it. The human scale is rather small tough out downtown, but this site is unique in that there is an opportunity to play off of the horizontal rather than the vertical plane.

parcel line

- school district property 
- private property 
- proposed site 

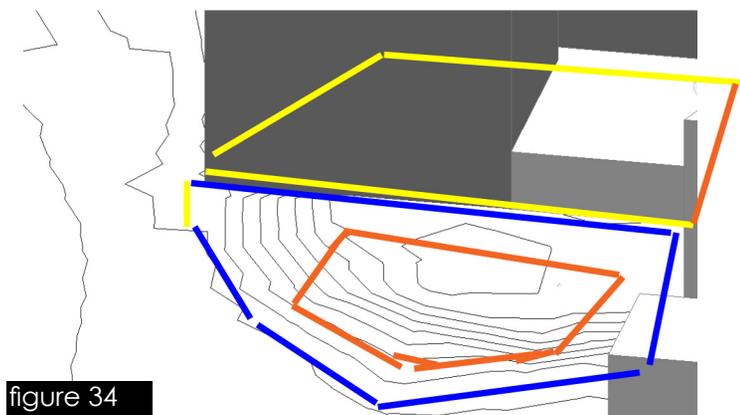


figure 34

existing utilities

- utilities 

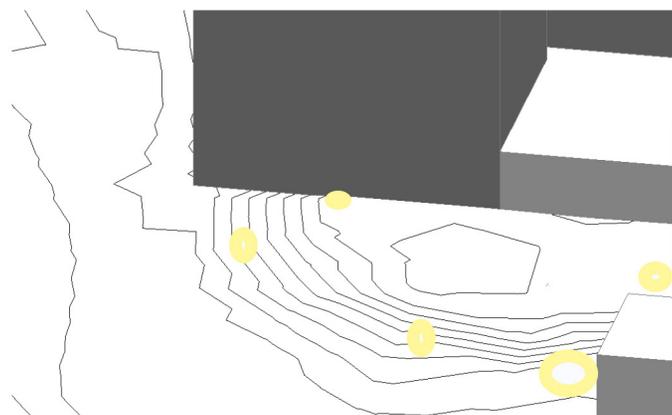


figure 35

figure ground

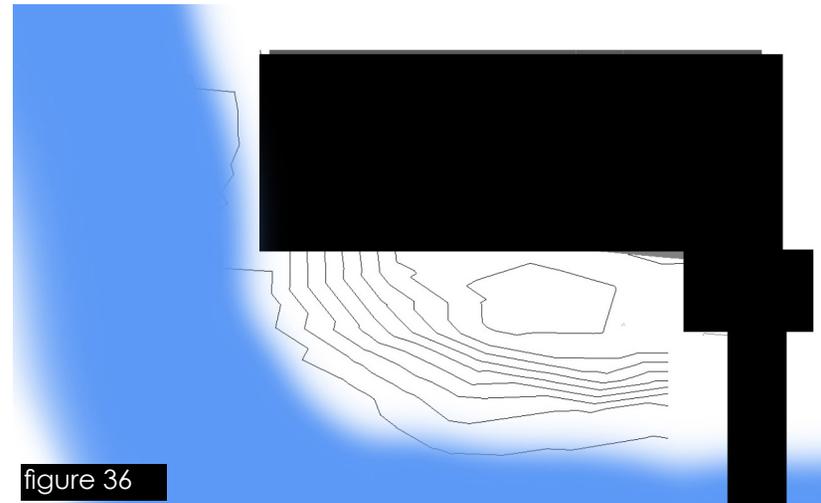


figure 36

trees & vegetative

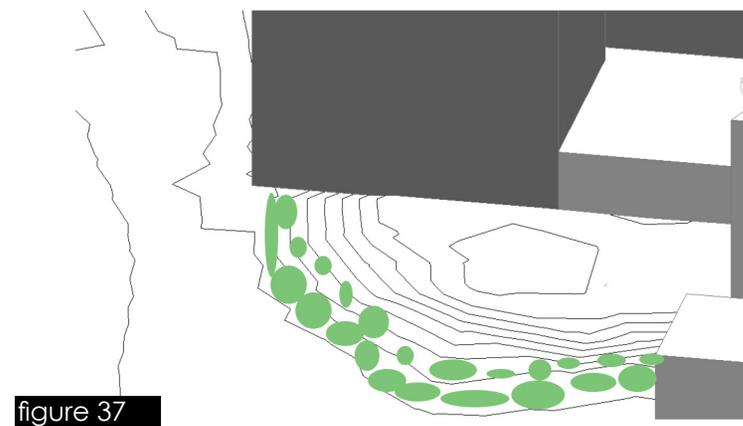


figure 37

site reconnaissance: views

view 1

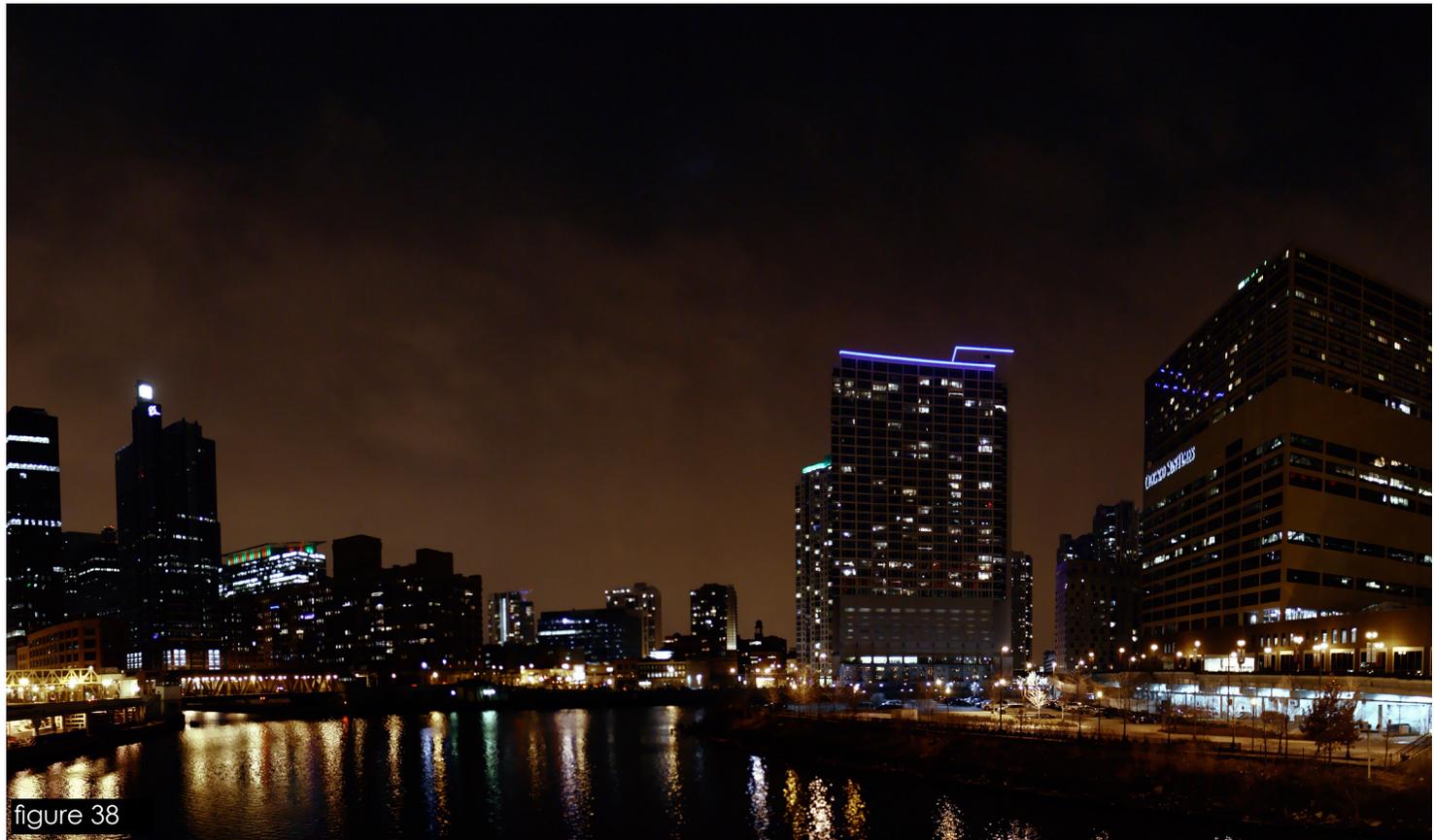
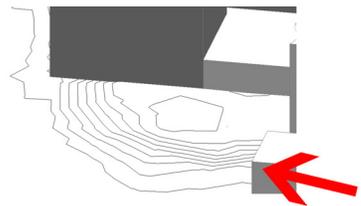


figure 38

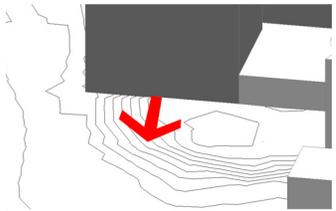


figure 39

view 2

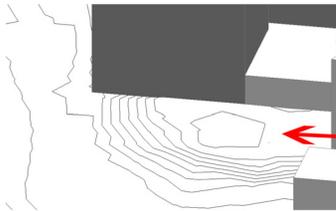


figure 40

view 3

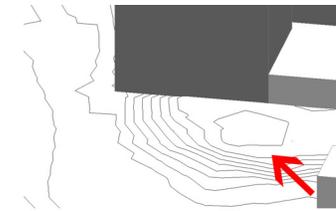


figure 41

view 4

view 5



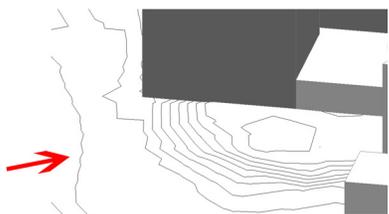
figure 42



view 6



figure 43



temperature

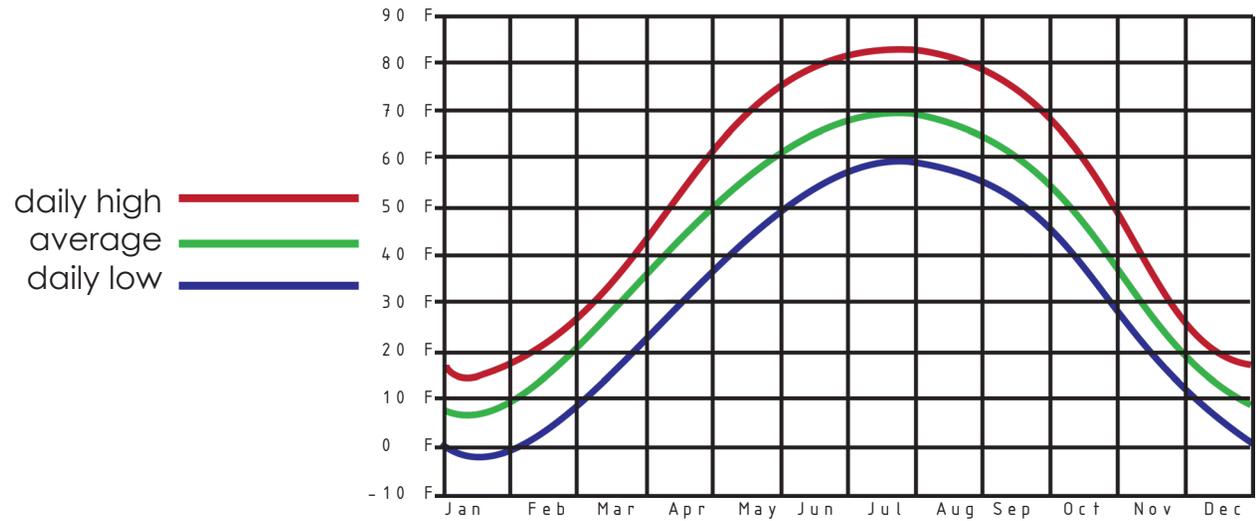


figure 44

humidity

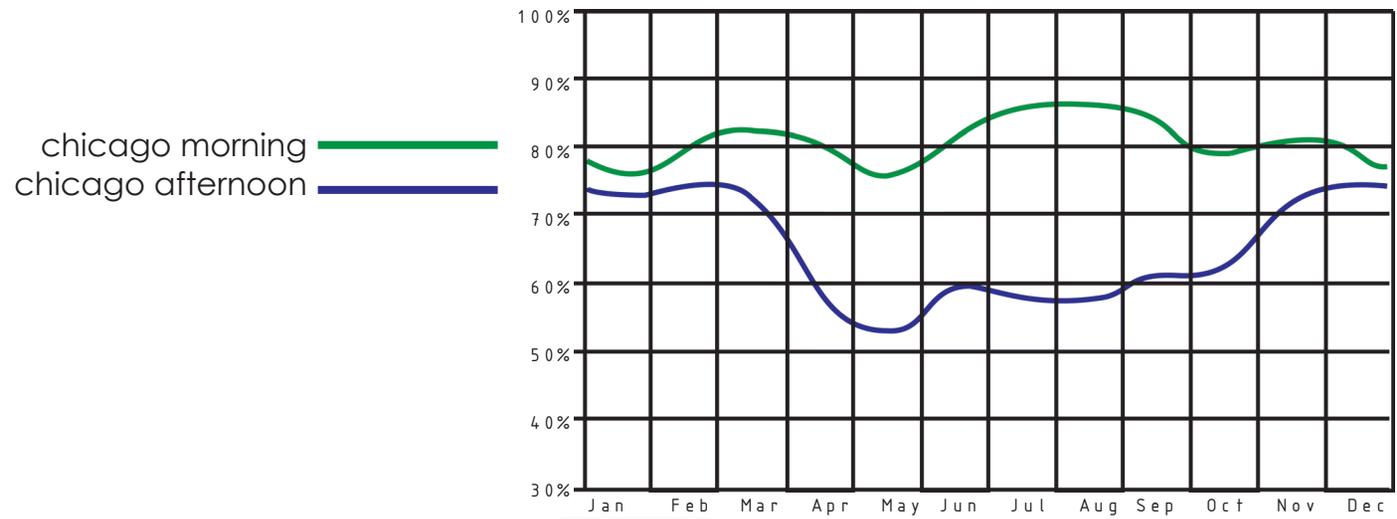


figure 45

precipitation

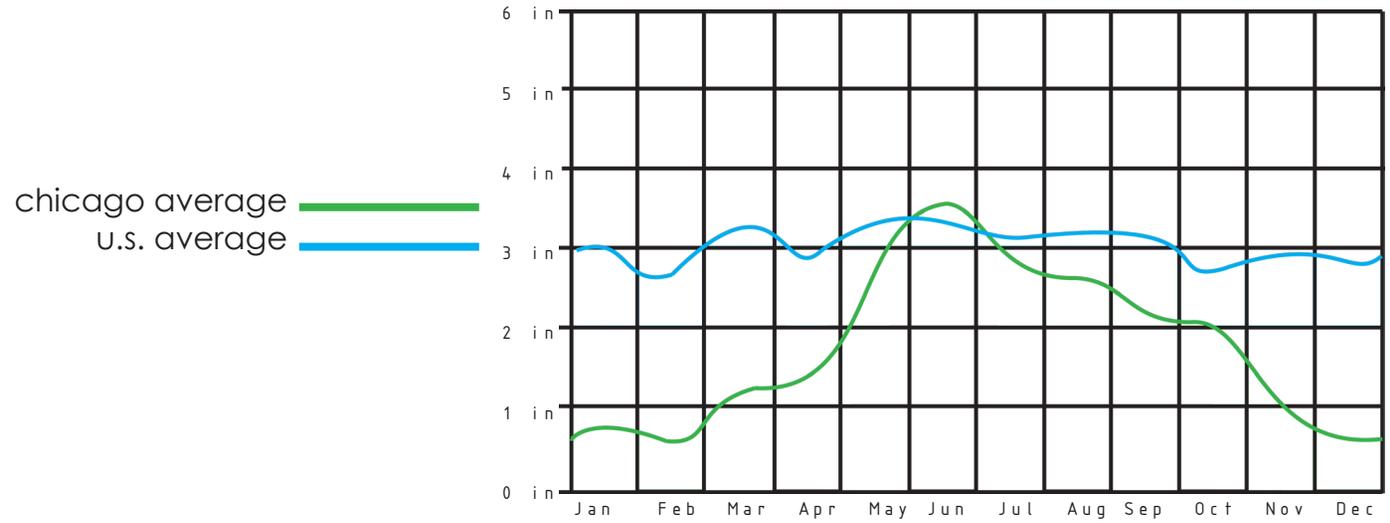


figure 46

cloudiness

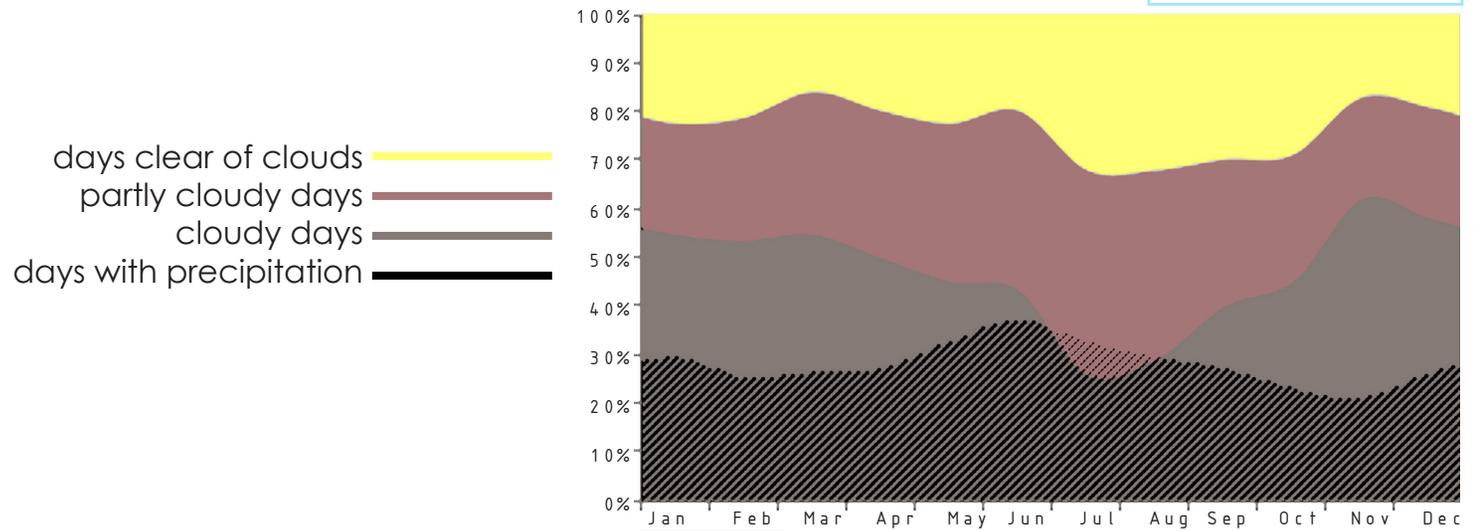


figure 47

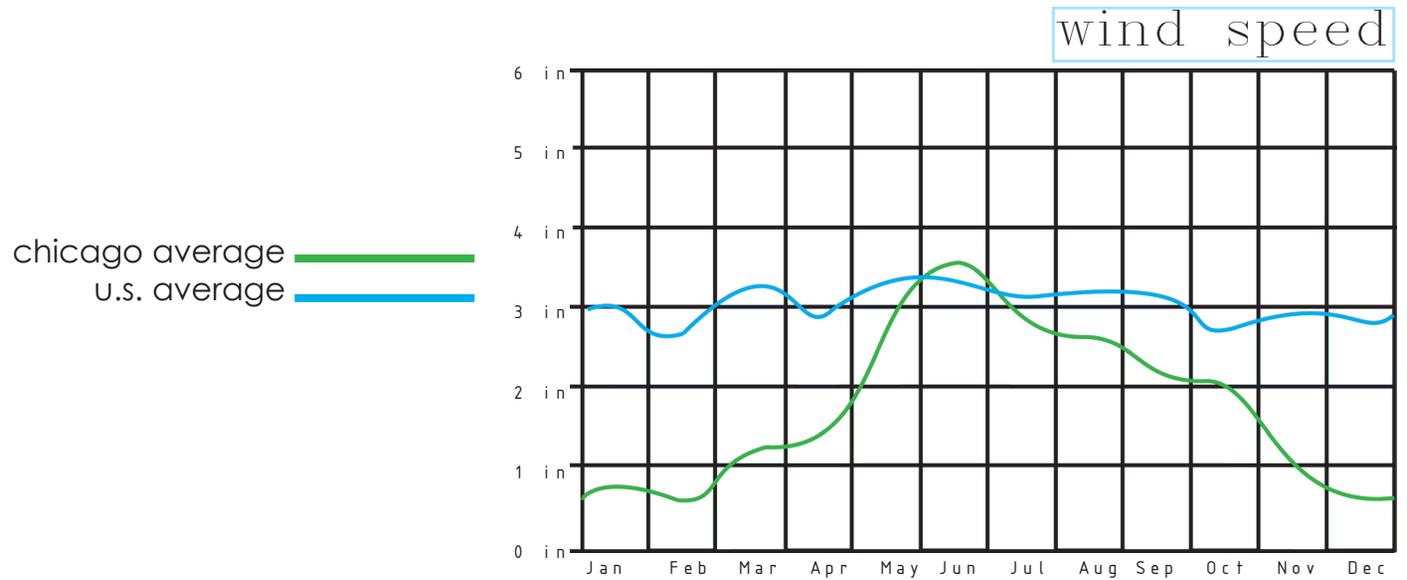


figure 48

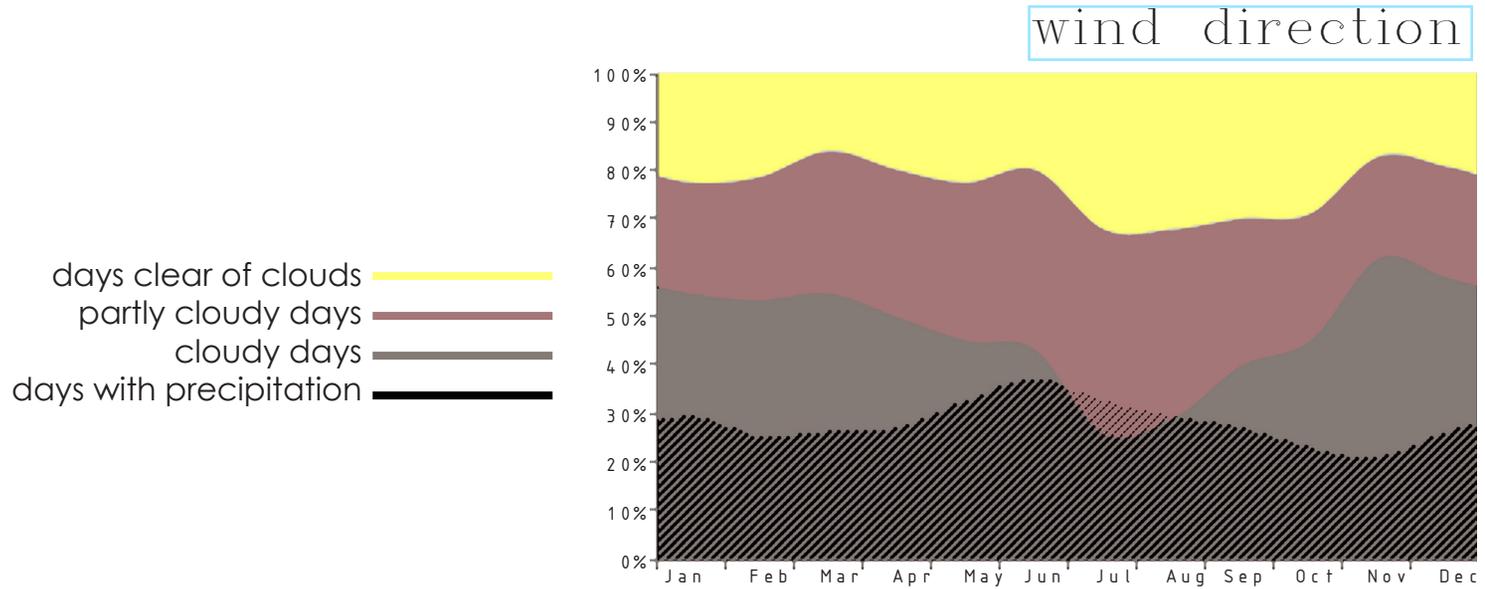
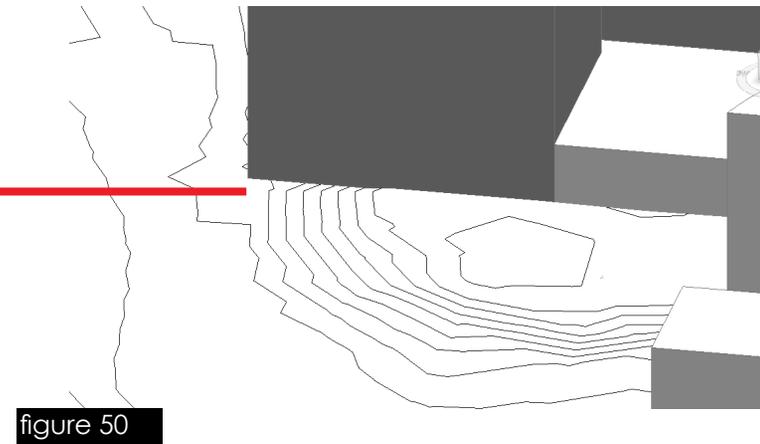


figure 49

slope and climate

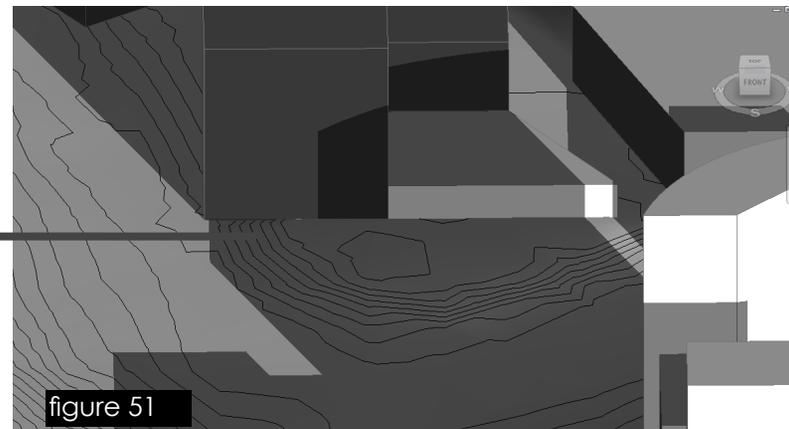
aspect analysis
northwest slope

The northwest facing slope will be warmer than the rest of the site in midsummer



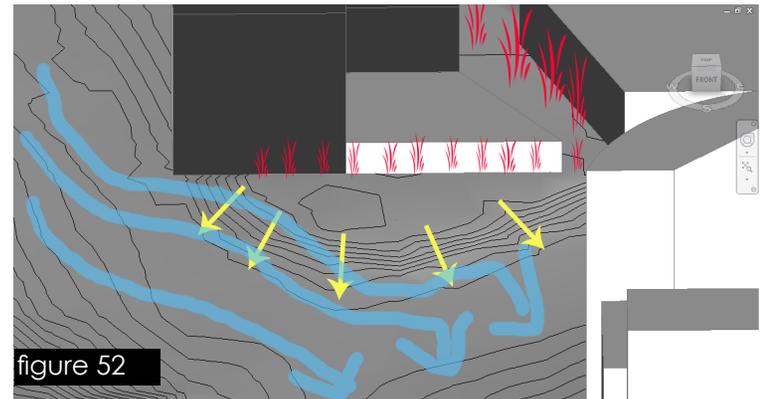
shading
winter morning shadow concern

The shaded area will be colder during a winter morning

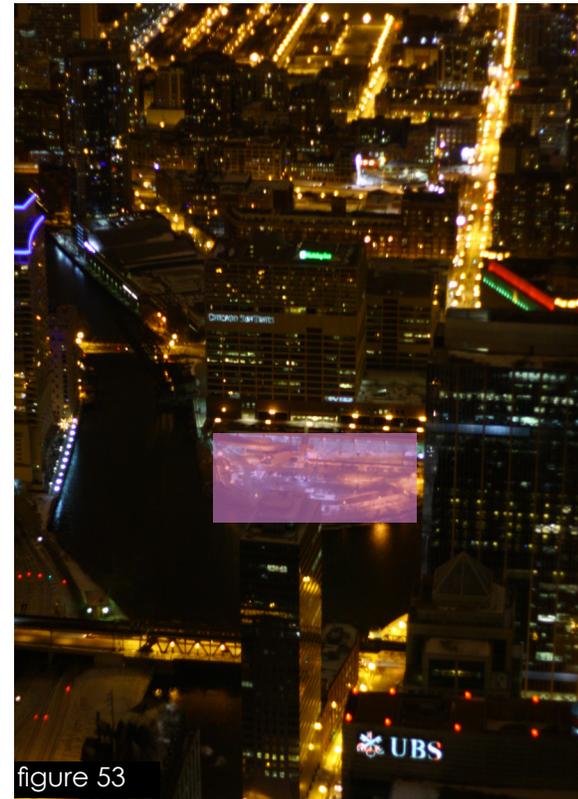


topography, air move-

topography: east slope 
air movement: winter winds from the north 
noise: from vehicular traffic 



site from aerial view



programmatically requirements

space allocation

12 classrooms with 15 students each = 180 students total

2 main entrances & vestibule = 20000 sf

1 main lobby = 2500 sf

12 classrooms = 2000 sf

8 mentoring rooms = 2400 sf

2 sets of lockers = 600 sf

security room = 900 sf

2 labs = 500 sf

6 administration offices = 1800 sf

1 principal's office = 400 sf

nurse room = 300 sf

faculty lounge = 900 sf

2 sets of student restrooms = 3200 sf

1 faculty restroom = 900 sf

1 administration restroom = 900 sf

1 lab restroom = 225 sf

outdoor garden = 40000 sf

school food preparation = 2500 sf

student classroom kitchen = 900 sf

dining area = 40000 sf

shipping and receiving = 600 sf

mechanical & storage = 1200 sf

wood shop = 3600

library = 1500 sf

auditorium/ black box = 40000 sf

parking lot = 20000 sf

bus drop off = 6000 sf

20 individual study rooms = 1280 sf

10 group study areas = 4000

gallery/display = 300 sf

total = 199405 sf

interaction matrix

alternative high school

essential ●
desirable ●
not needed ●

	2 main entrances & vestibule	1 main lobby	12 classrooms	8 mentoring rooms	2 sets of lockers	security room	2 labs	6 administration offices	1 principal's office	nurse room	faculty lounge	2 sets of student restrooms	1 faculty restroom	1 administration restroom	1 lab restroom	outdoor garden	school food preparation	student classroom kitchen	dining area	shipping and receiving	mechanical & storage	woodshop	library	auditorium/black box	parking lot & bus drop off	individual study rooms	group study areas	gallery/display	
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library																													
auditorium/black box																													
parking lot & bus drop off																													
individual study rooms																													
group study areas																													
gallery/display																													

figure 54

formal connection —
 informal connection —
 casual connection —

public spaces ○
 private spaces ○
 work spaces ○

interaction net
 alternative high school

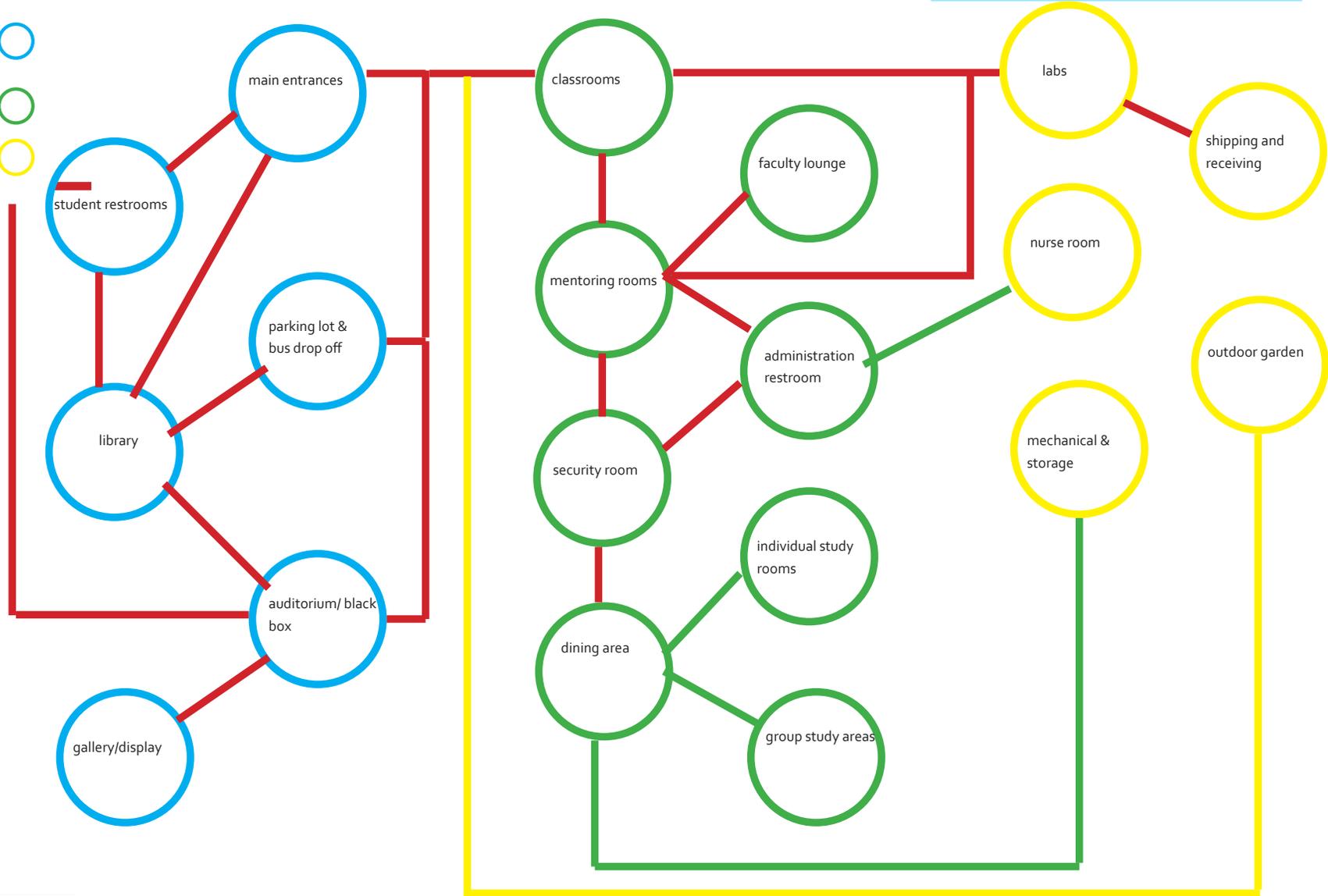


figure 55

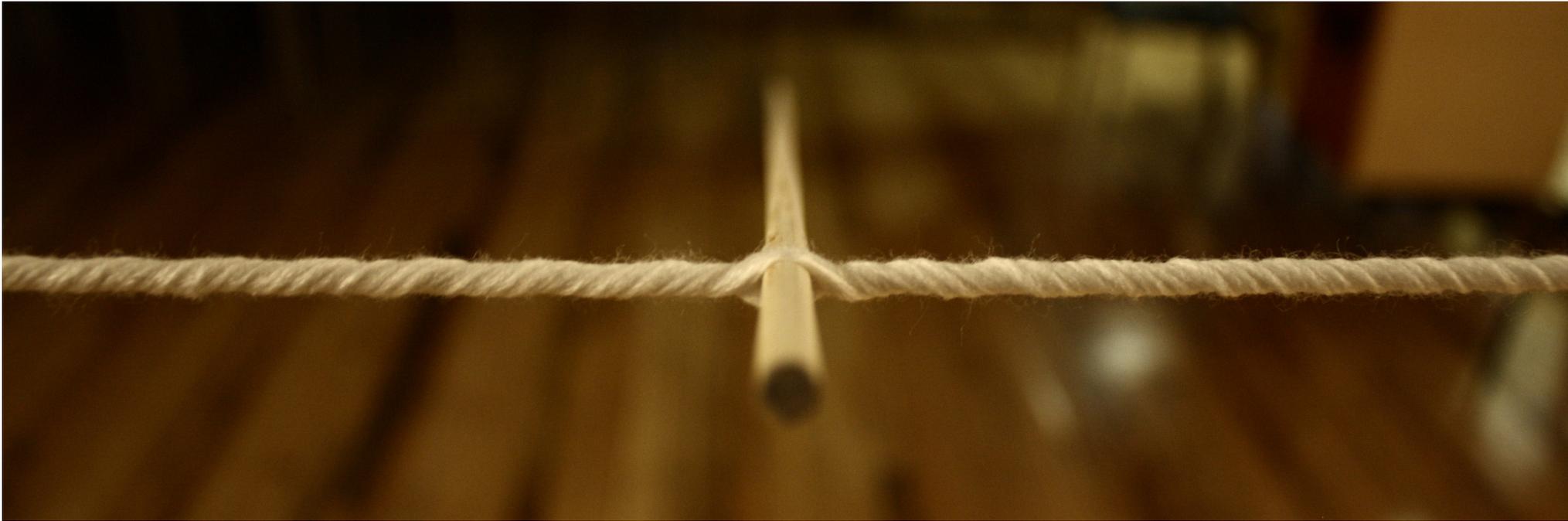
Design Solution

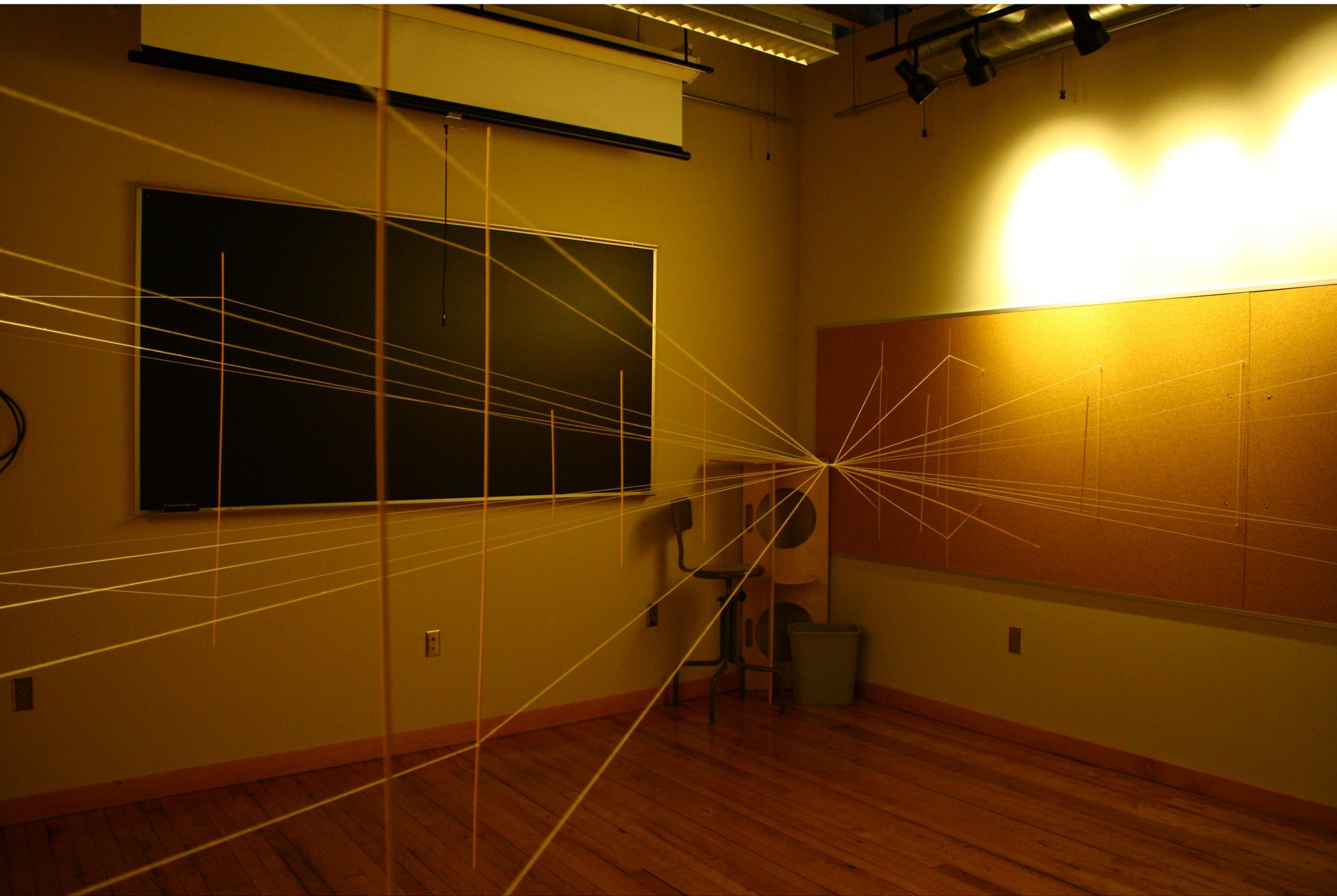
metaphor

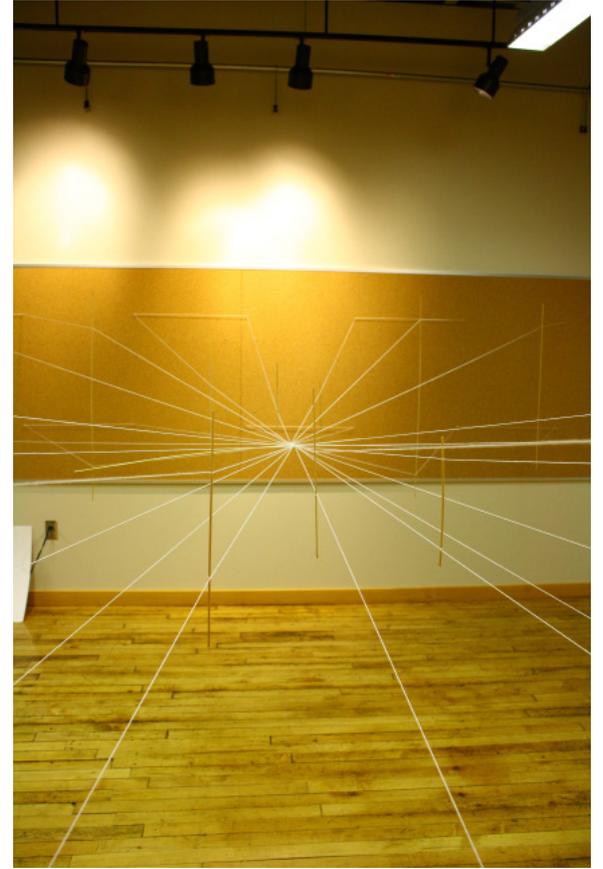
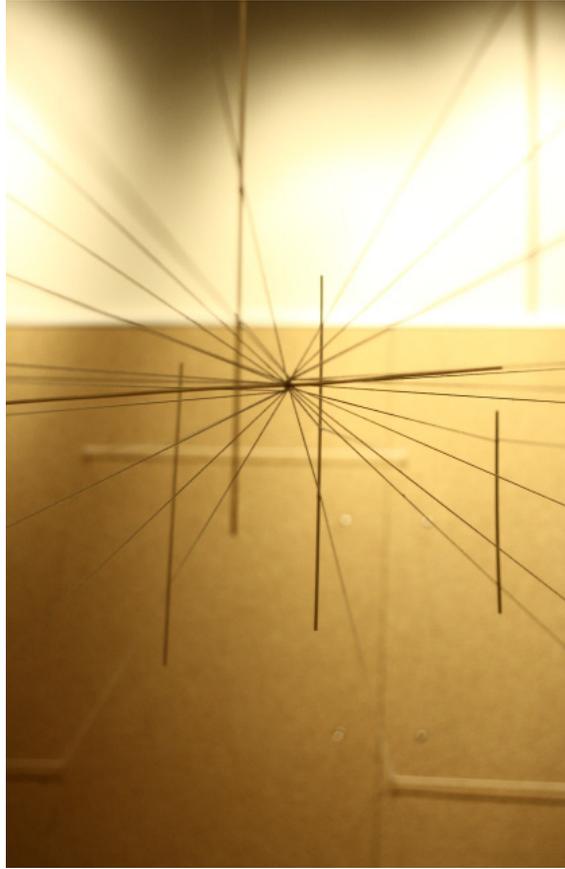
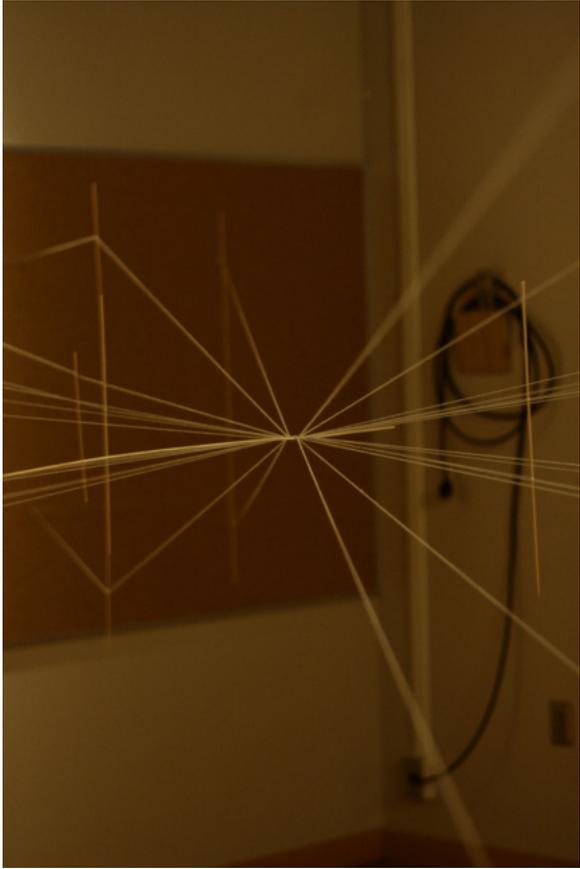
The artefact presented embodies the essence of a sigh, via a metaphor. A sigh is a human's physical action and metaphysical reaction to the releasing of tension.

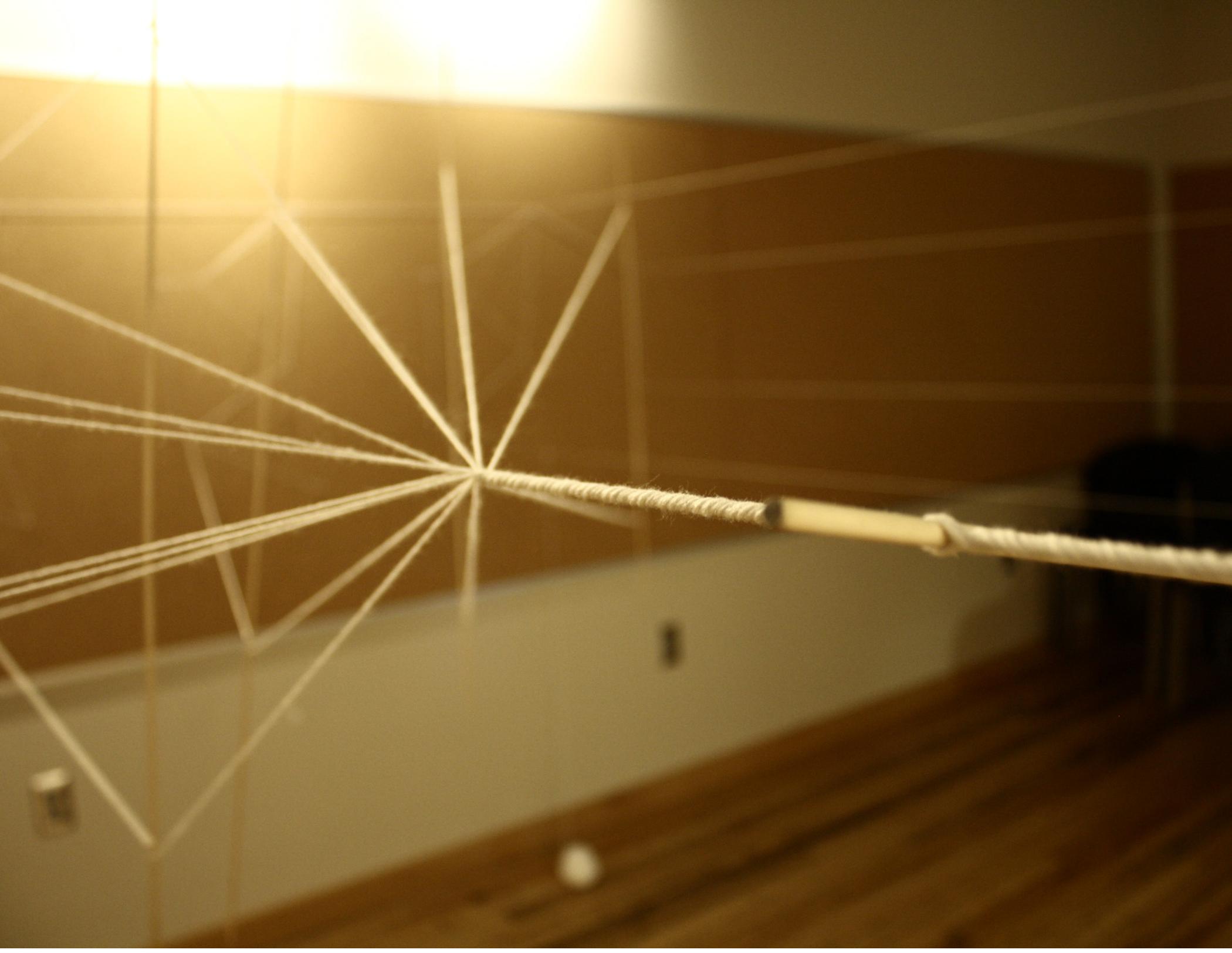
Whether the tension is a physical or psychological force, the sigh is an indication (prelude) that tension is being released, and that the body wishes to be in a relaxed state.

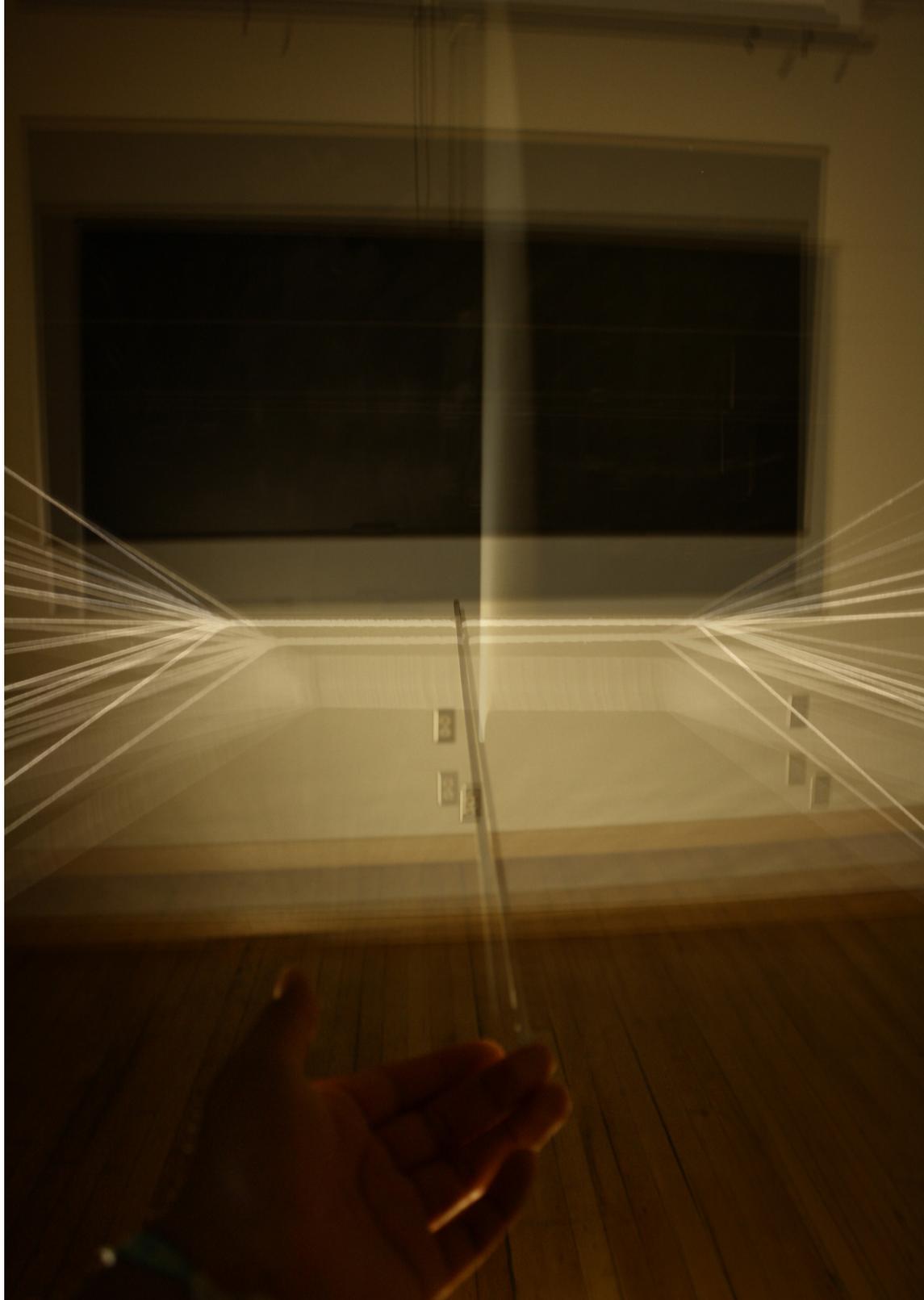
The artefact is a physical representation of a sigh. To engage the artefact, the participants must stand in-between the space created by the web like structure prior to its performance. This will provoke a feeling of being surrounded by tension, in such a way that the participant will feel constrained, even by such a delicate structure. Once the artefact is engaged, it will slowly release the tension in such a manner that the subtle releasing of this particular tension will evoke the feeling of a relaxed state via a metaphysical sigh.

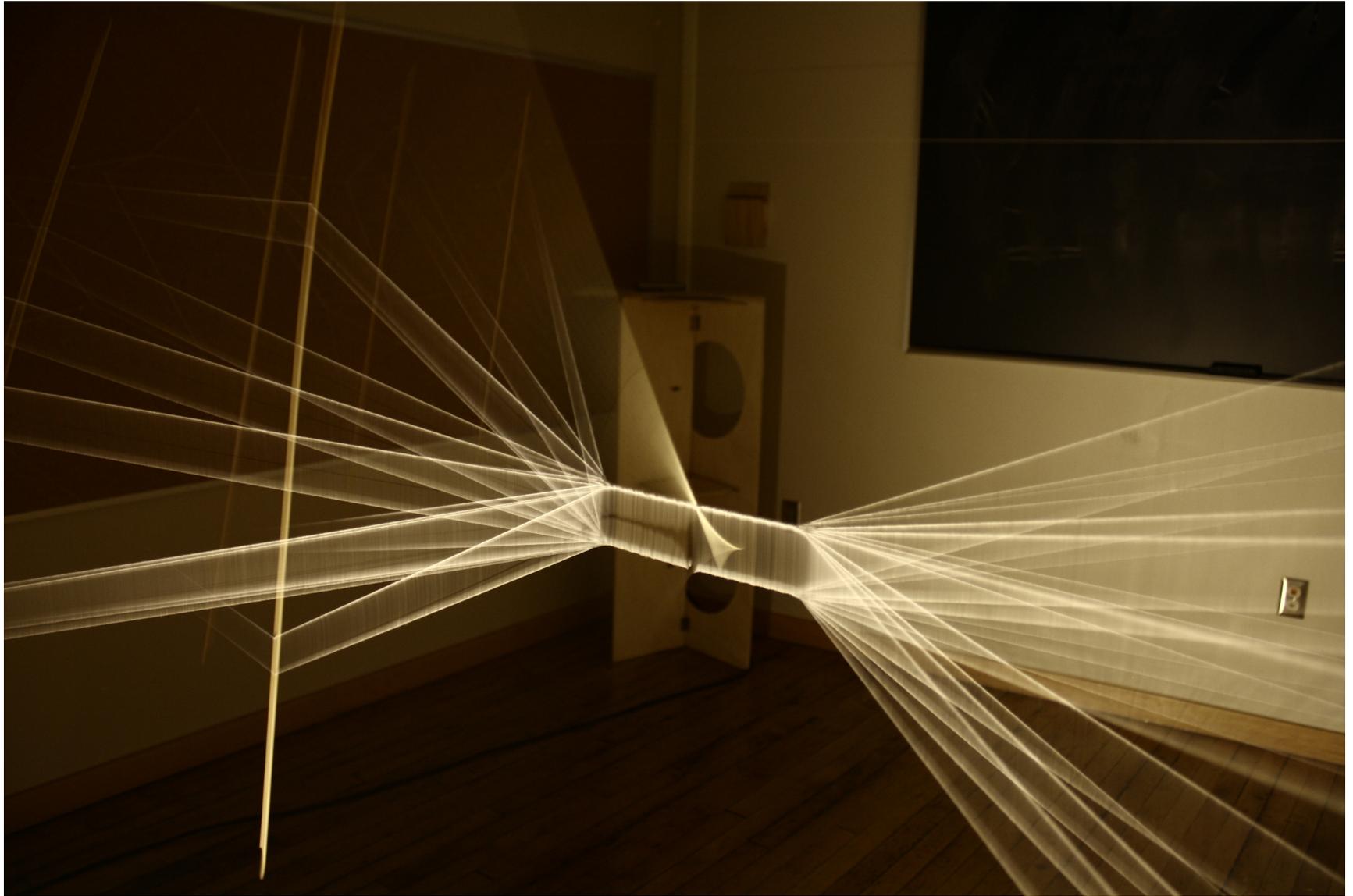


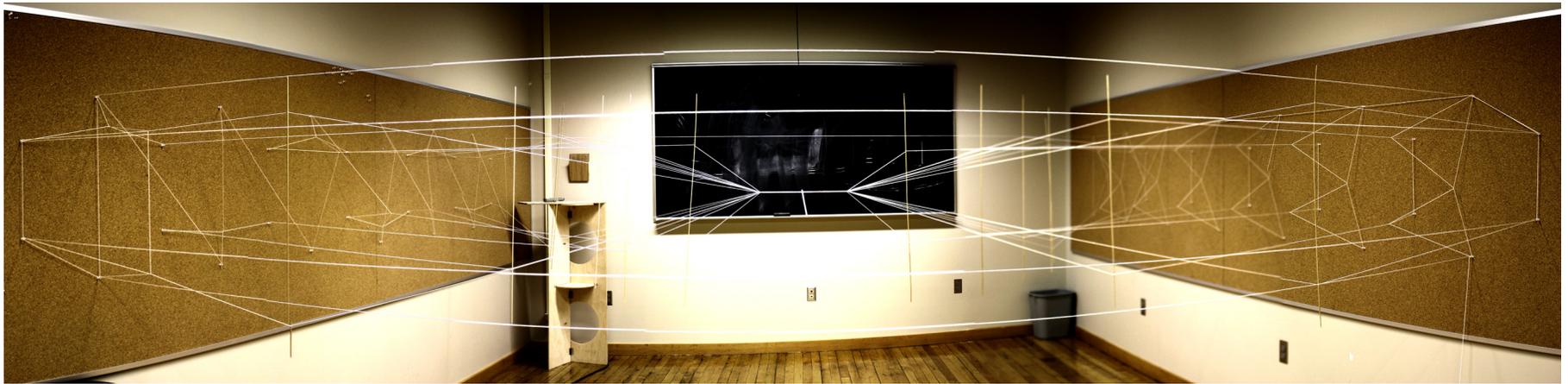


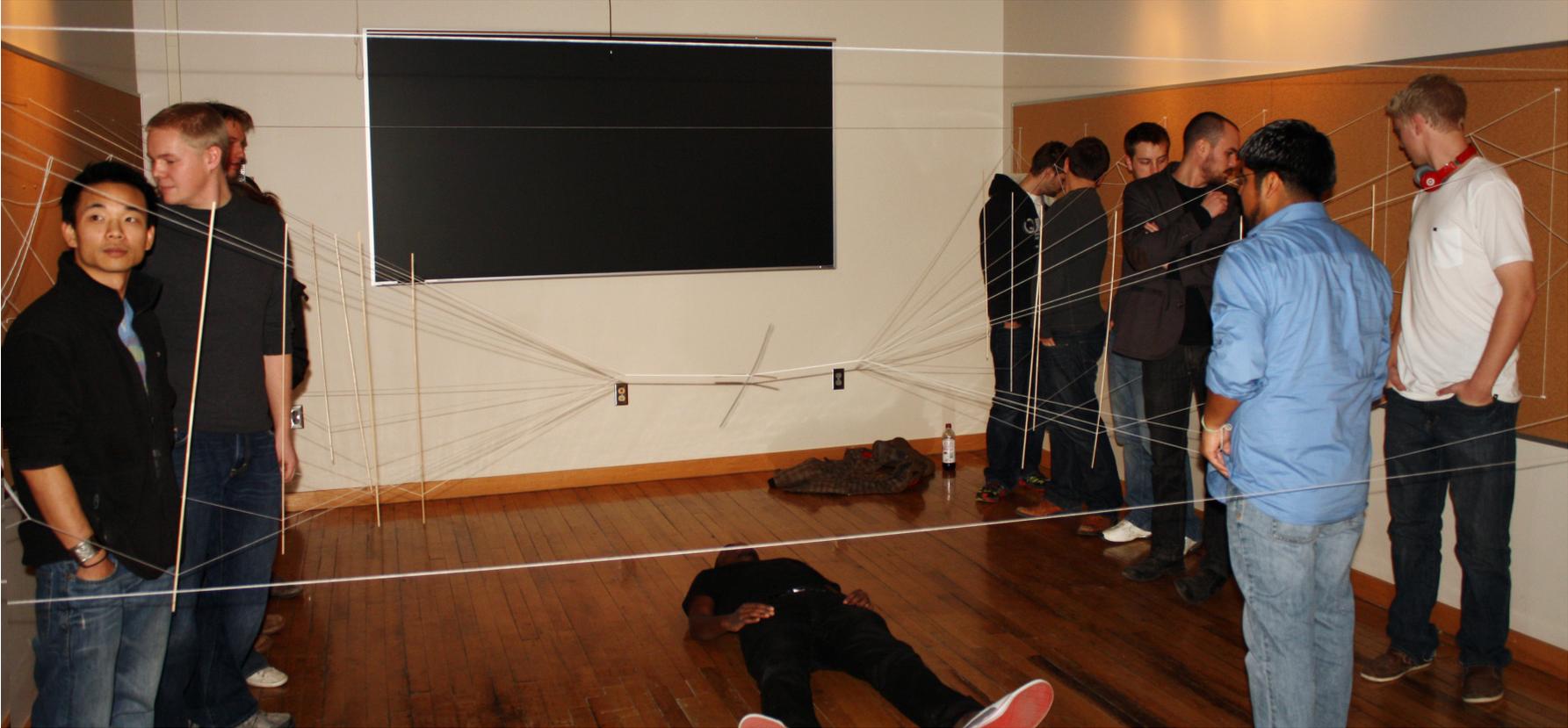


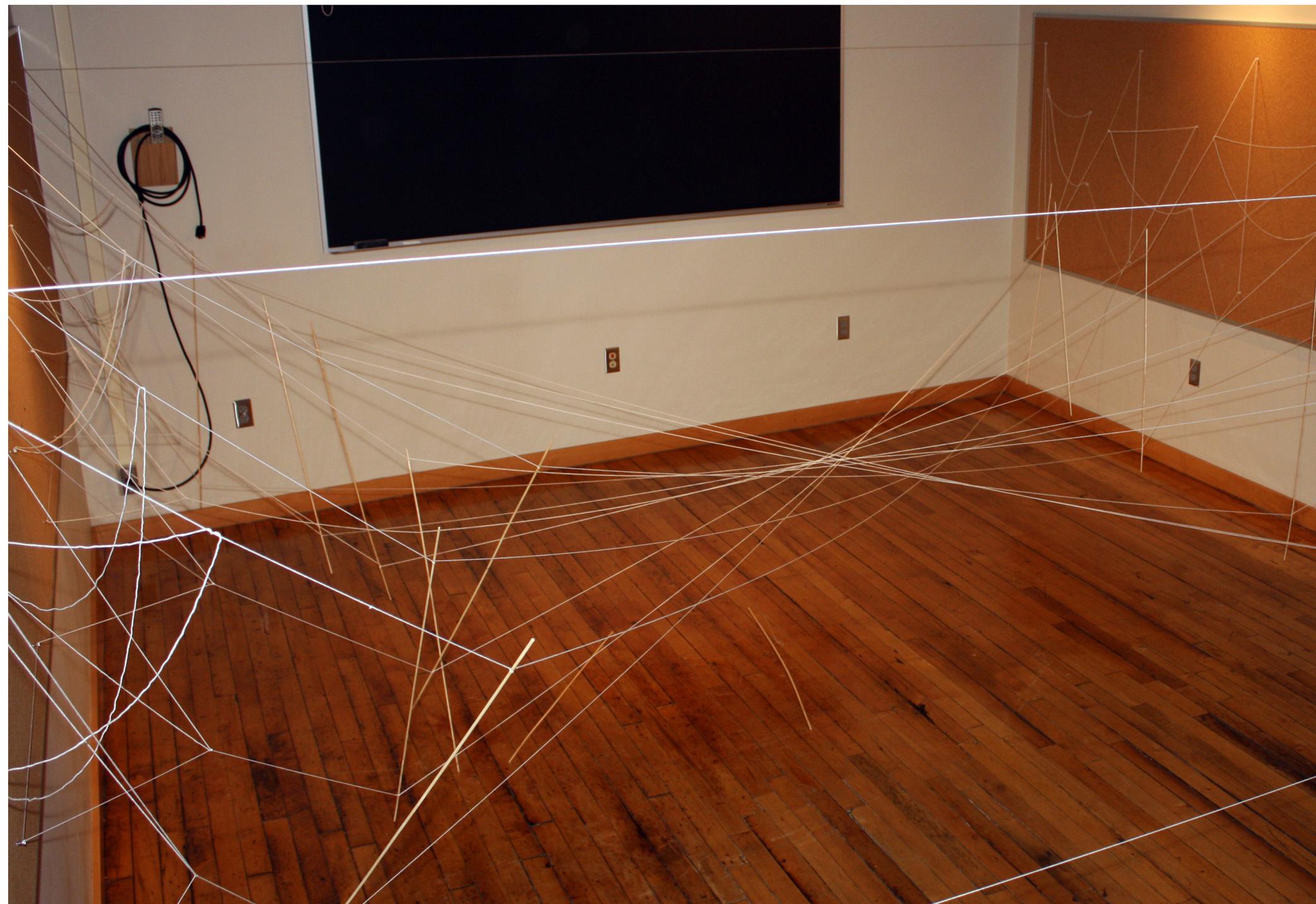


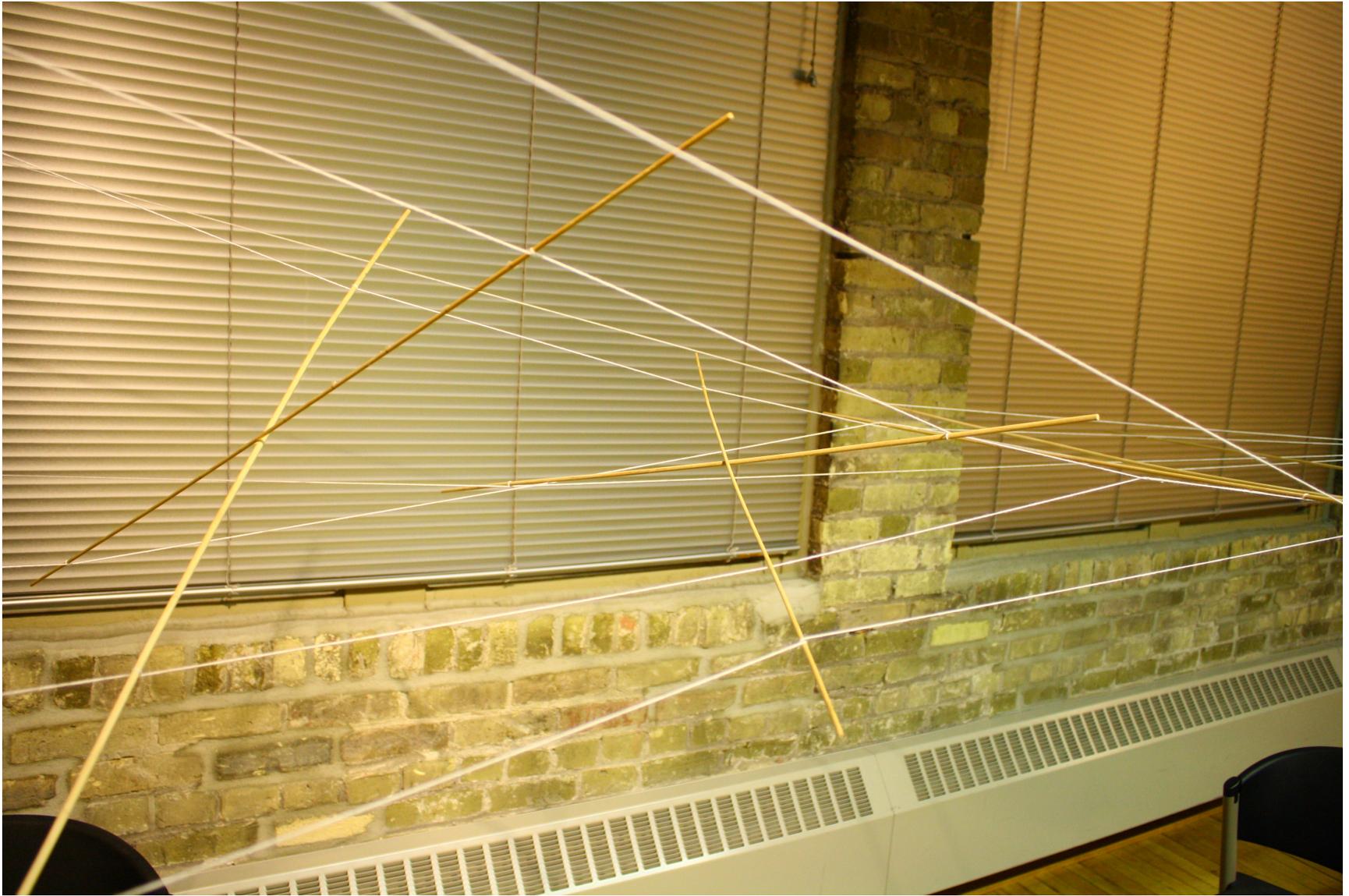




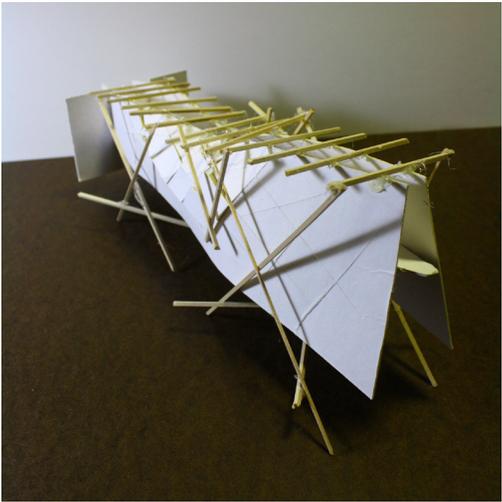
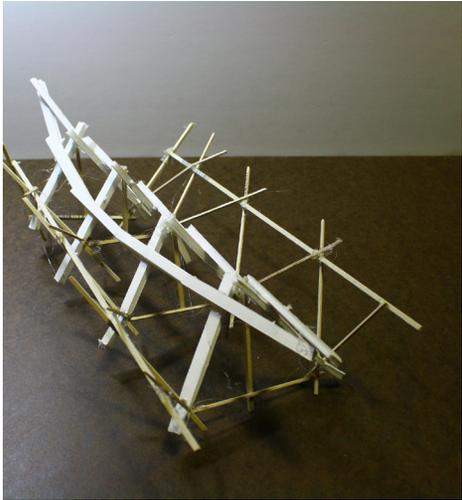
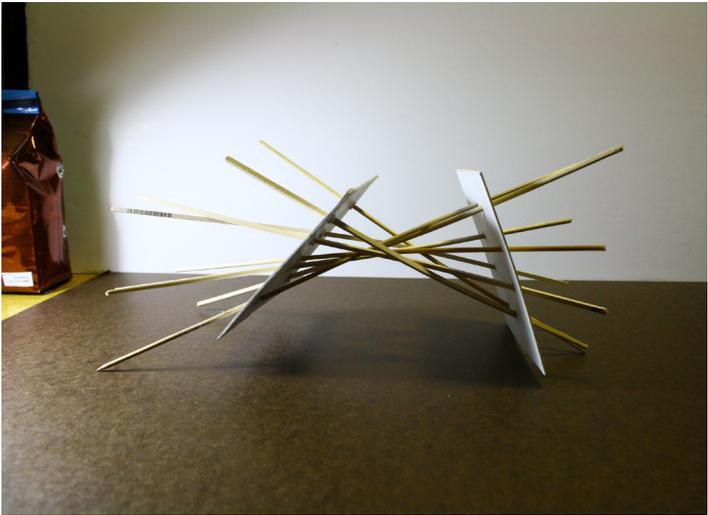
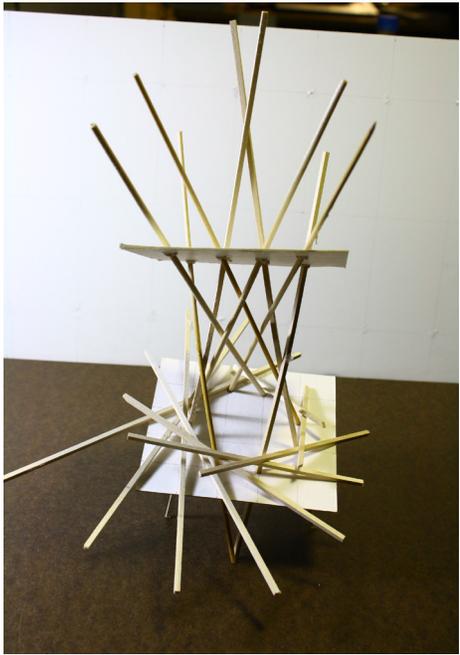
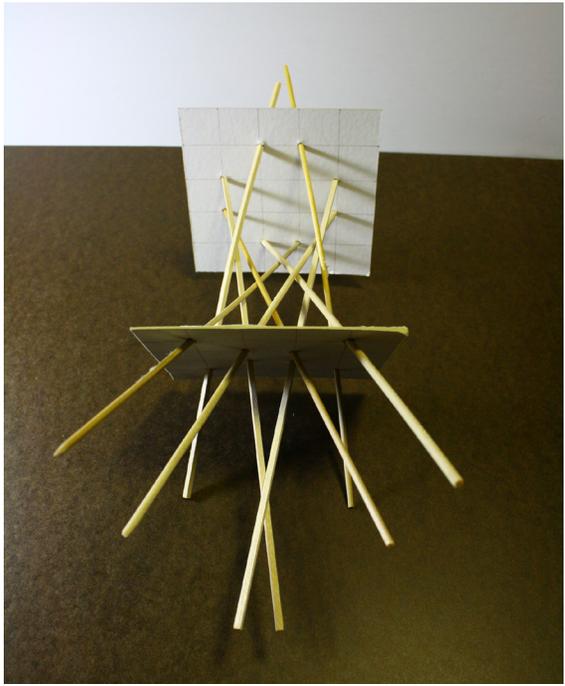


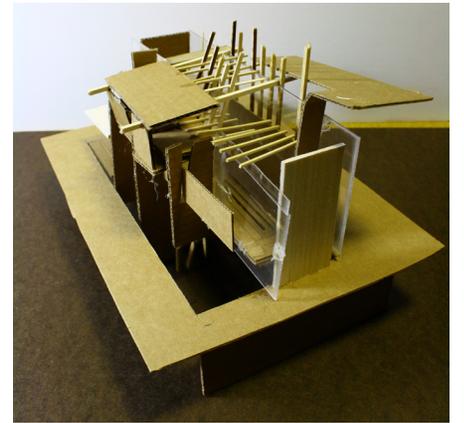
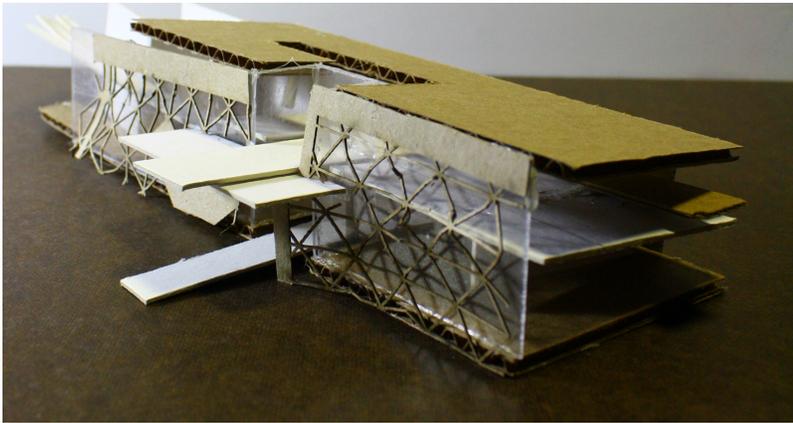




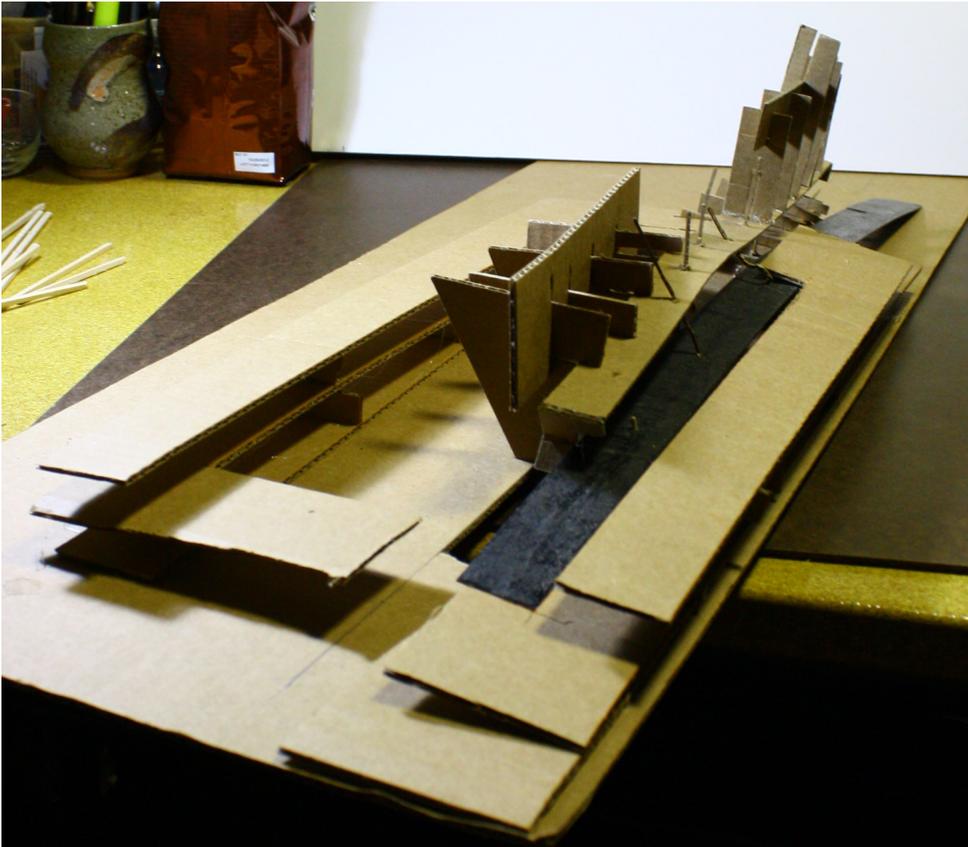


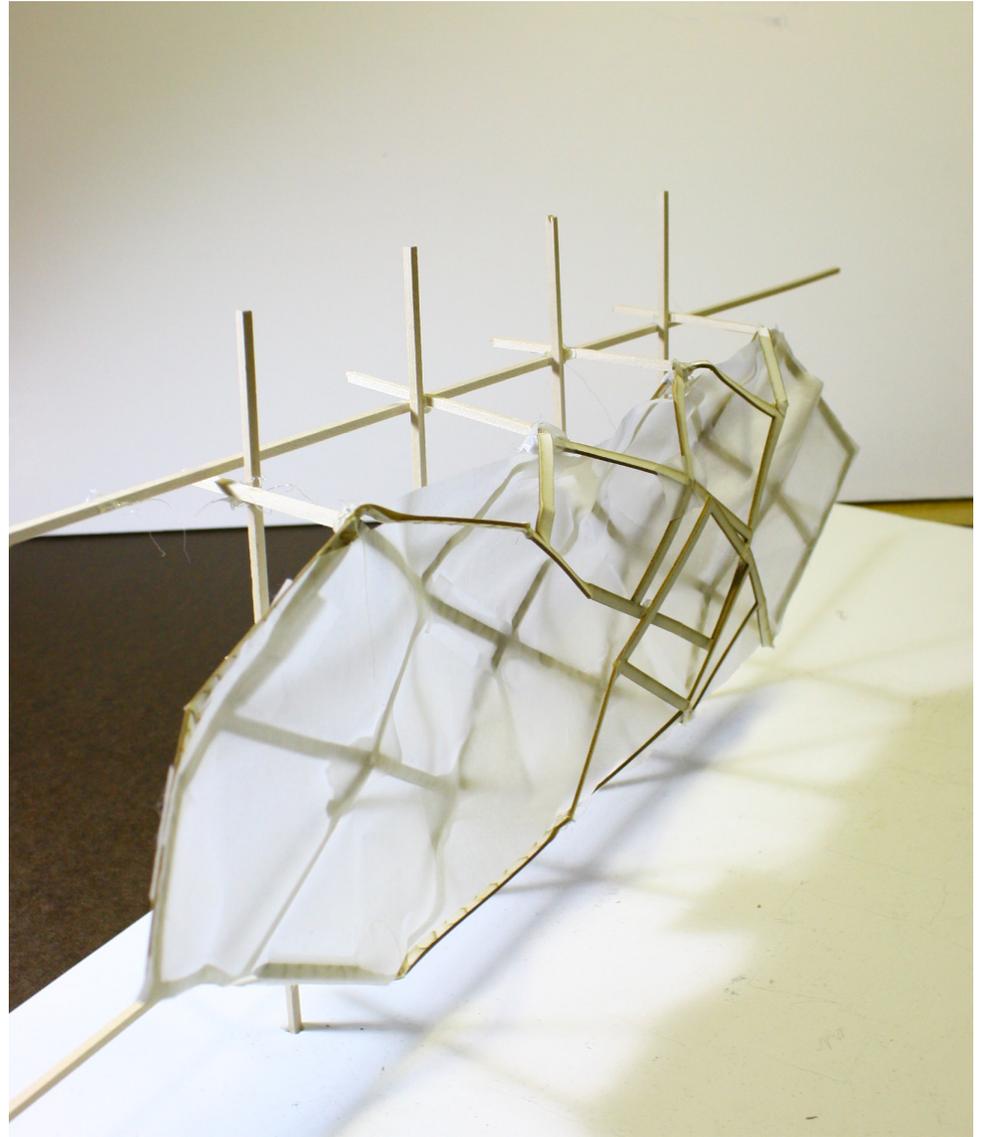
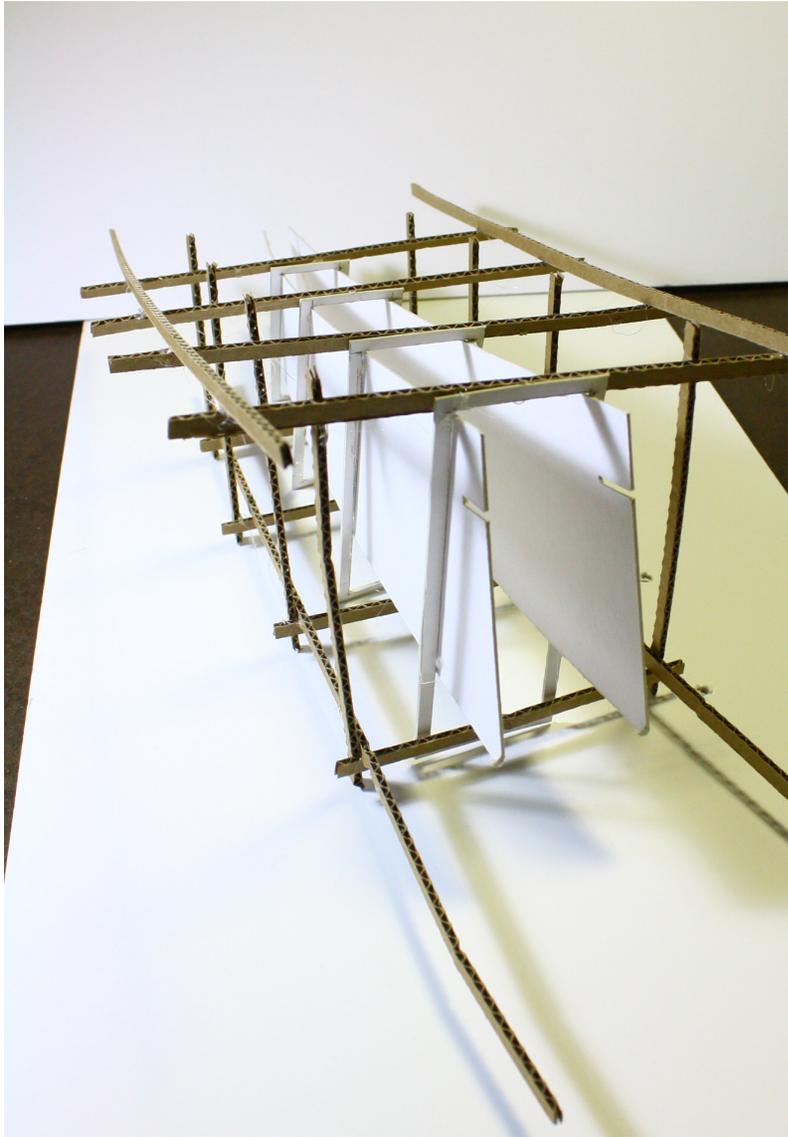


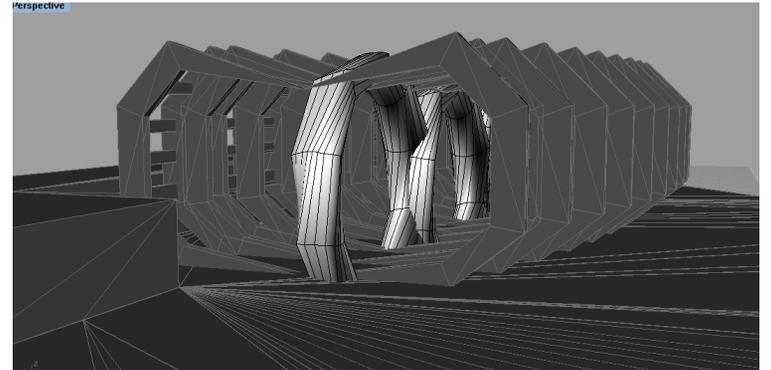
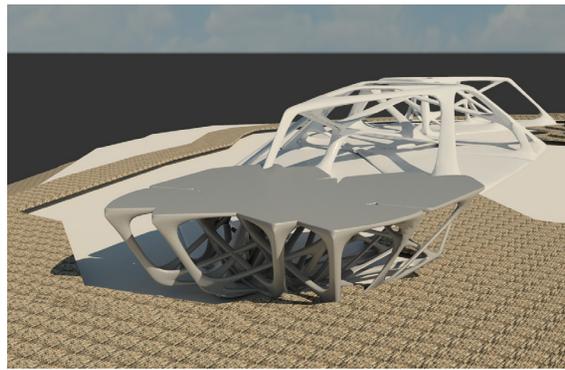
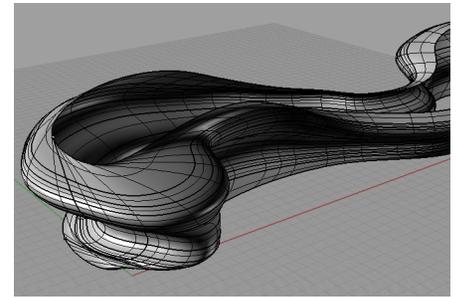
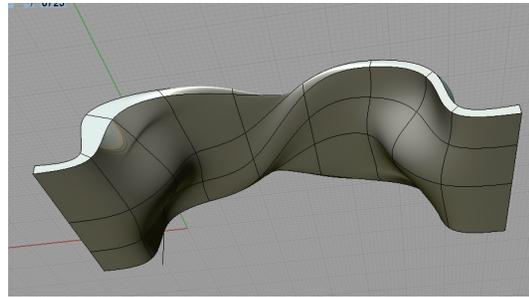
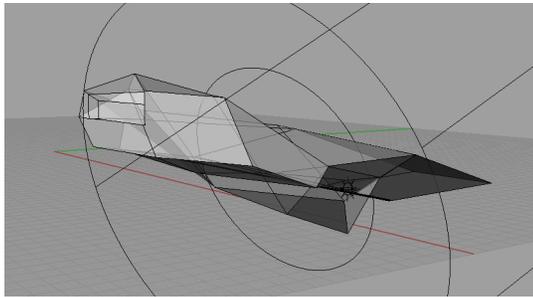
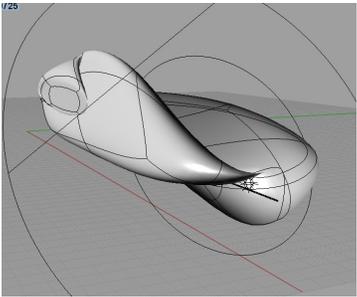
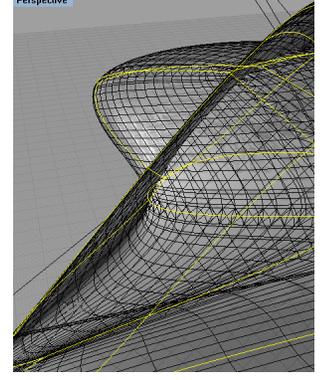
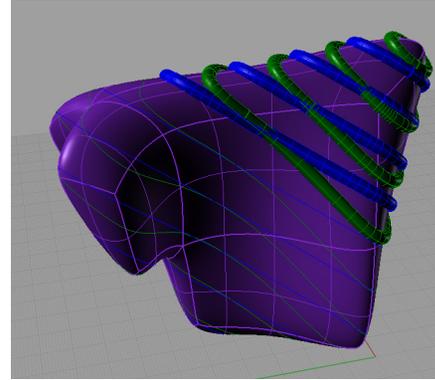
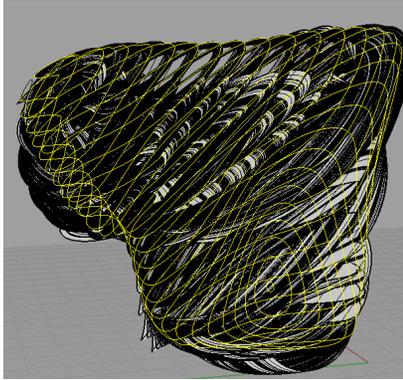
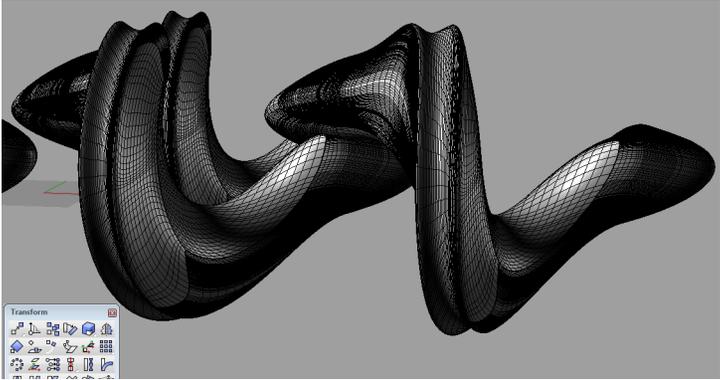
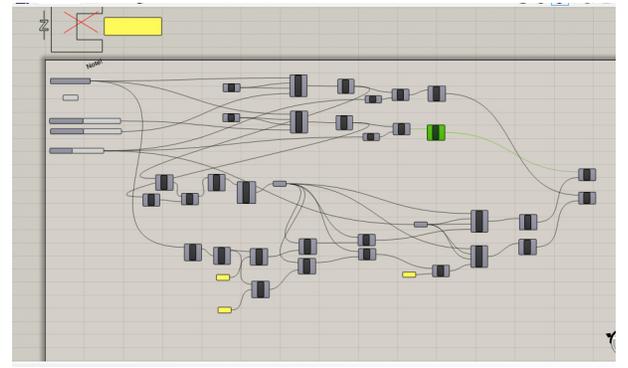
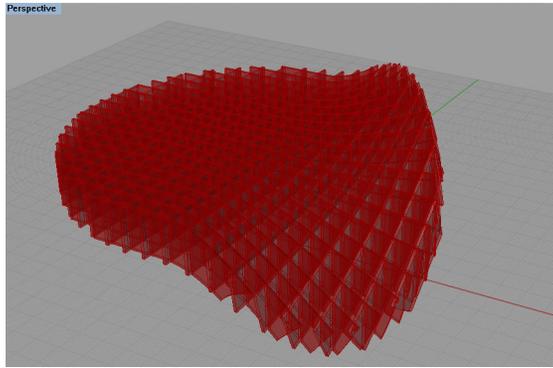
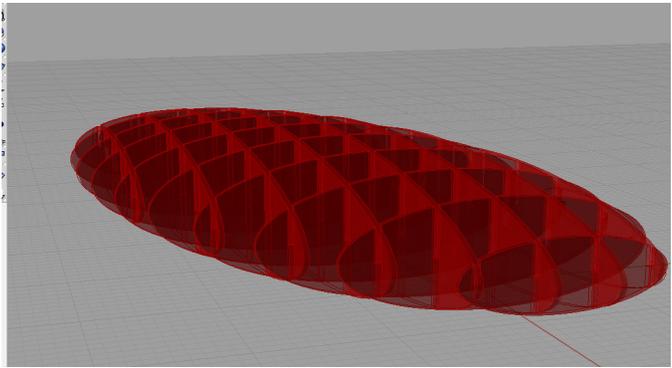






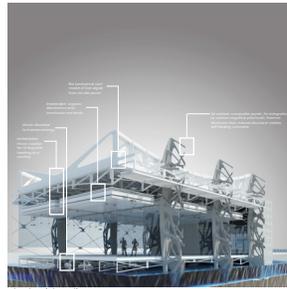




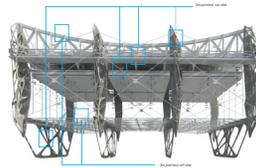


Final Design

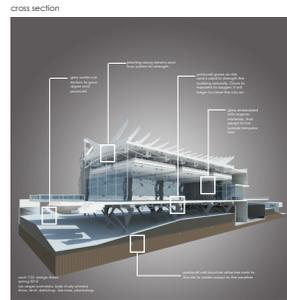
Harmony A-new alternative high-school



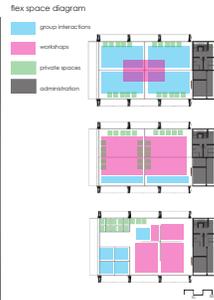
structure integration



principle structure



cross section



flex space diagram

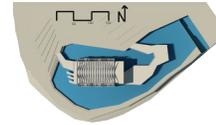
Problem statement
How can architecture promote living in harmony, with our natural environment, in order to ensure a healthy level of overall wellness for the occupant?

We are currently living in the technology era yet the current public school system in the United States is still modeled after the industrial revolution. The old model of public education has long past its era. We need to embrace new technologies to enhance the potential of the future generation.

The plan of action for this new alternative high school will focus on a 'learning revolution' as opposed to education reform (which in many ways is an attempt to fix a broken system with the same methods that broke it). With the help of new technologies and software, teachers are able to become a 'guide on the side' instead of a 'sage on the stage.' This method of teaching is more in line with our natural way of learning. Humans are engineered to learn by more than just auditory learning.

We are no longer in the industrial revolution yet the practice of making buildings still follows the Victorian method of structures, and the industrial revolution's thirst for mass production. At best, building technologies of today, can only be carbon neutral. Architecture must look towards being carbon negative, in order to ensure the wellness the occupants.

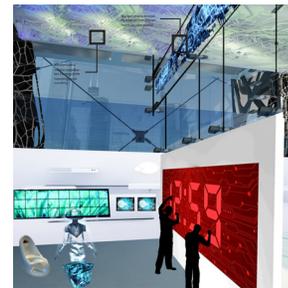
Program
The proposed structure will house an alternative high school in the heart of downtown Chicago. The spaces in the new building will be ever changing and dynamic, so the space adapts to the user instead of the user adapting to the space. The structure will be able to house a learning curriculum focuses heavily on project based learning. In turn the projects are distributed throughout the community, to keep with the 'city beautiful' movement.



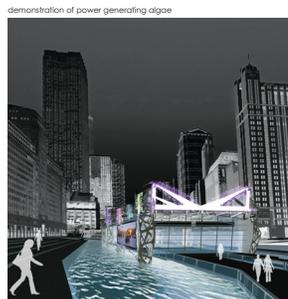
student entrance



public entrance



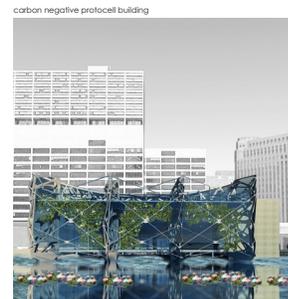
flexible learning studio



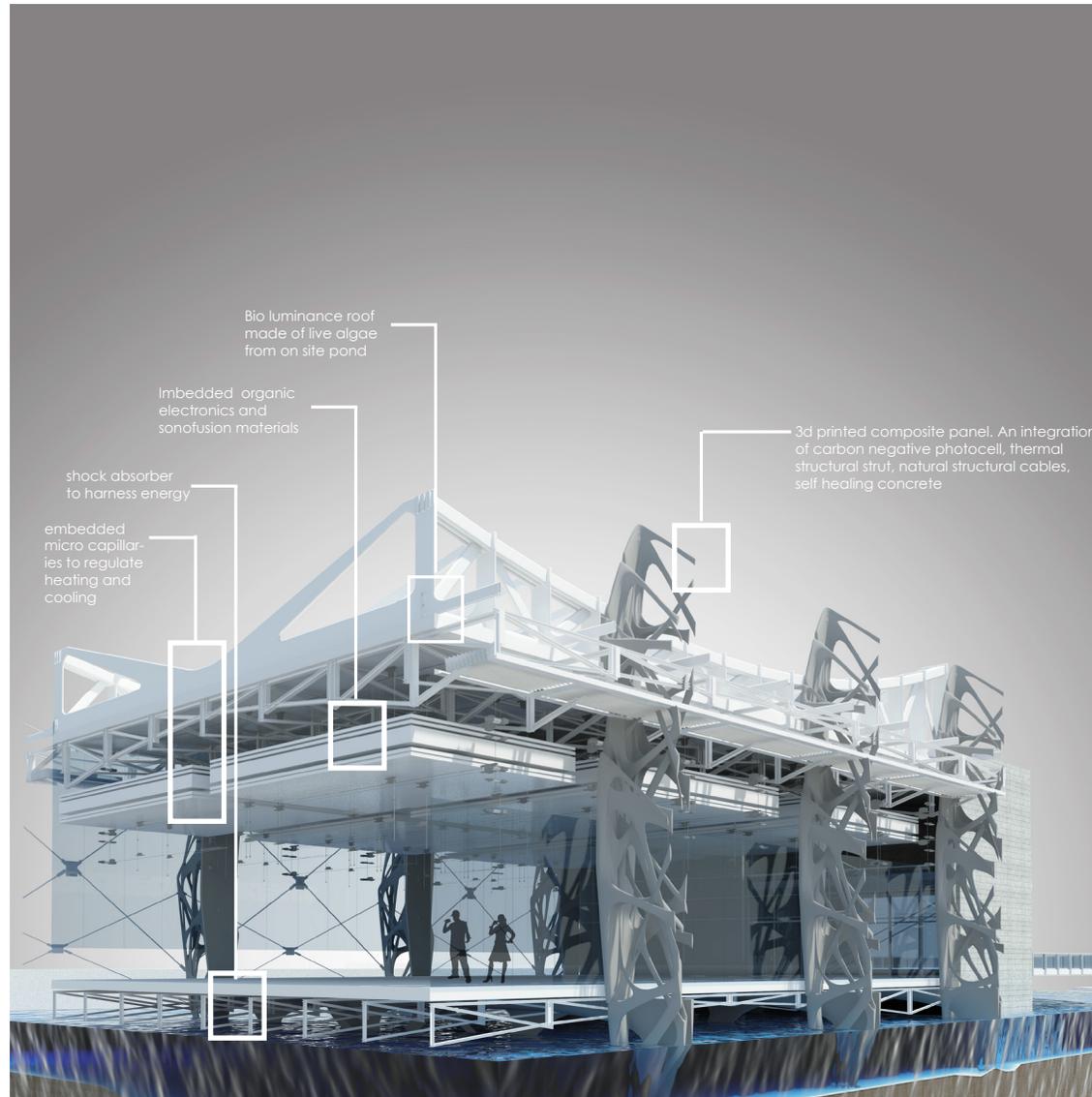
demonstration of power generating algae



on site city garden for the city beautiful movement

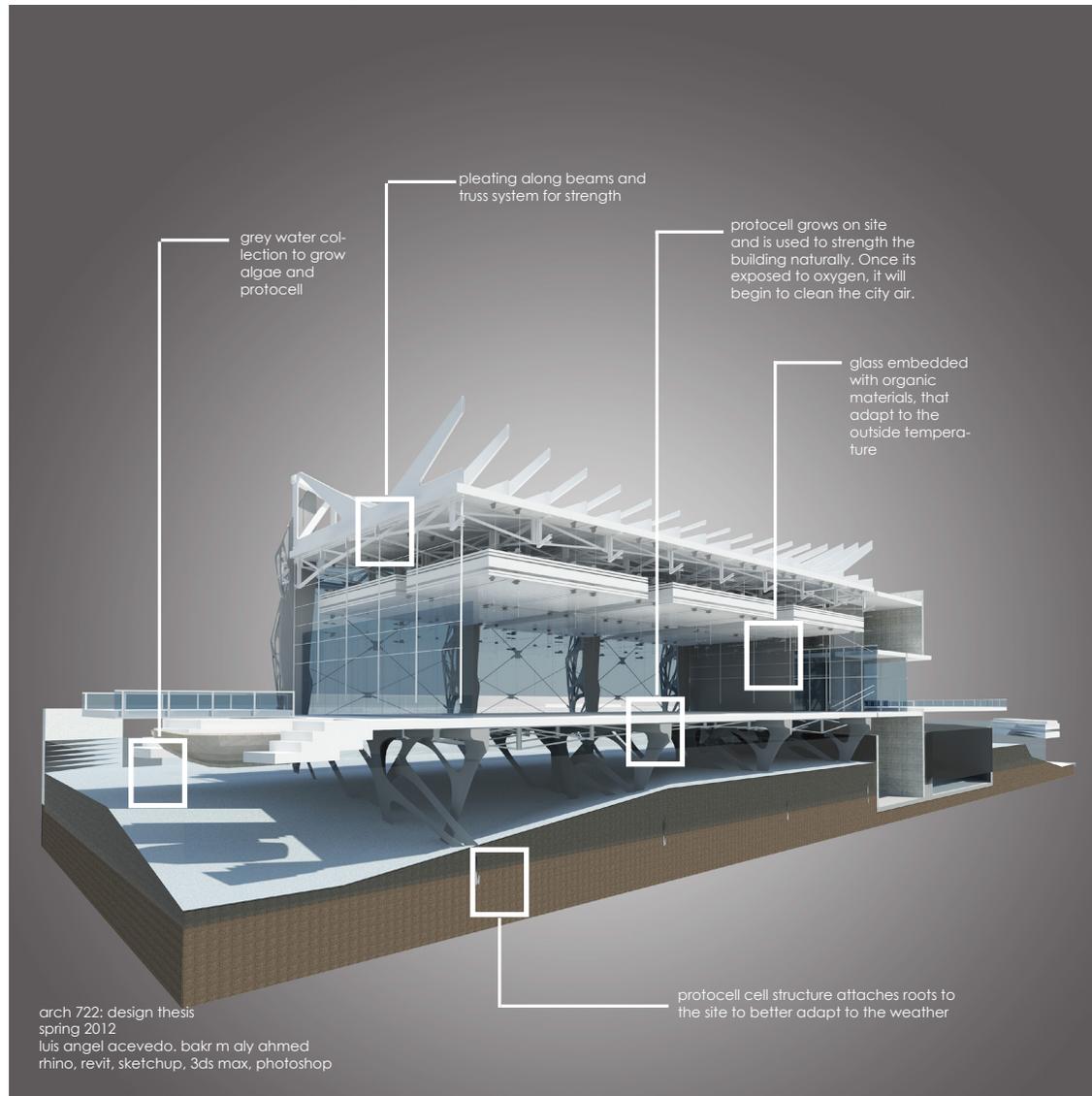


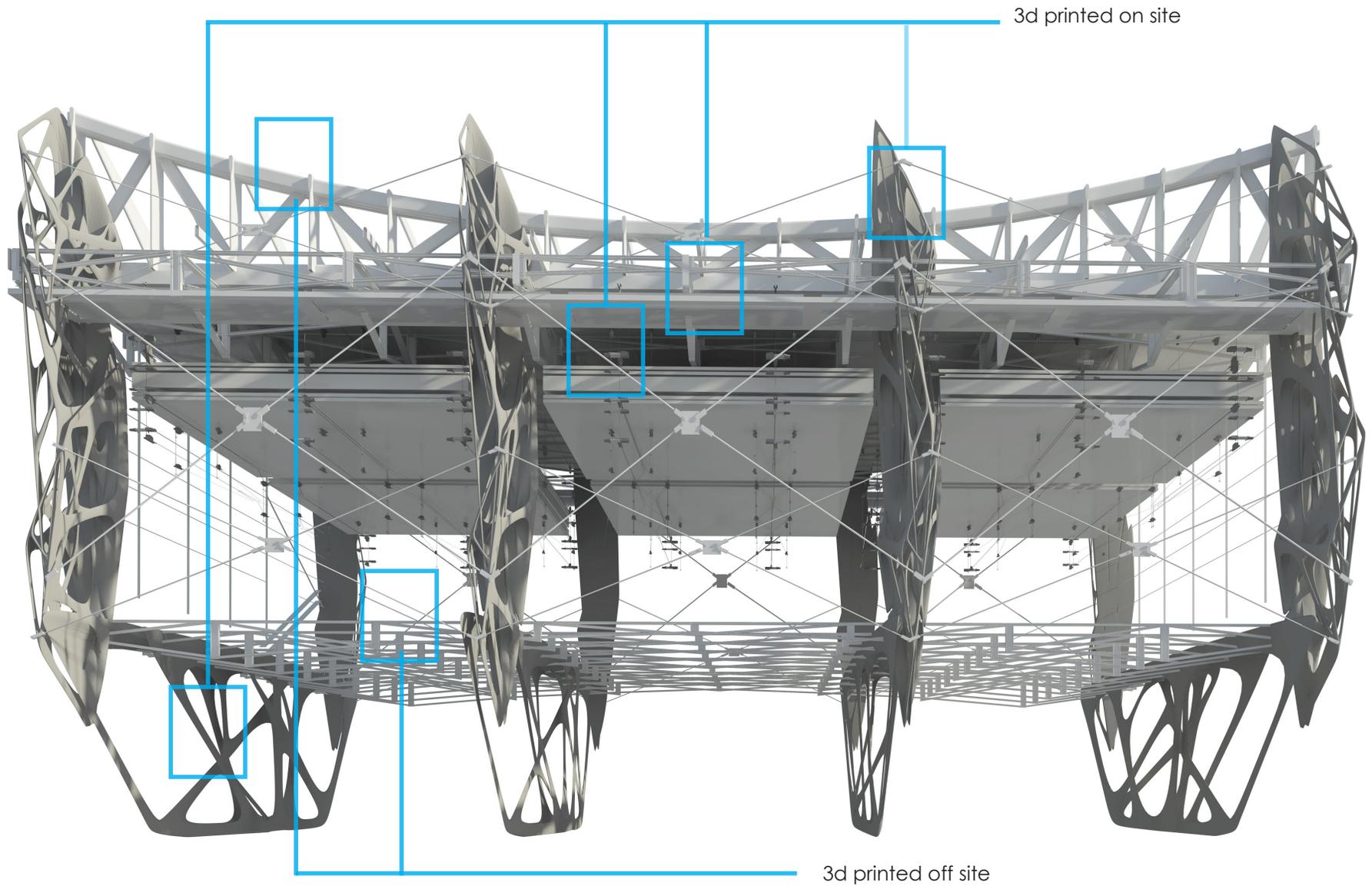
carbon negative procel building



structure integration

cross section





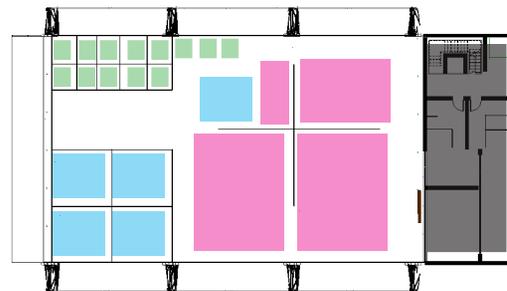
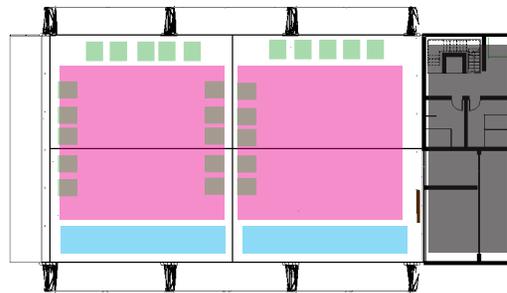
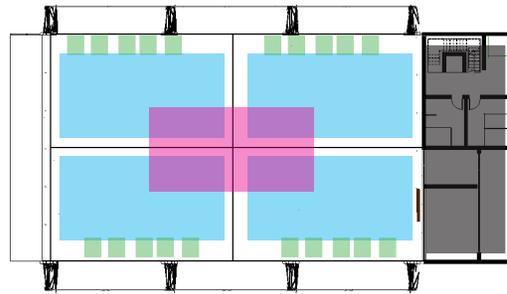
3d printed on site

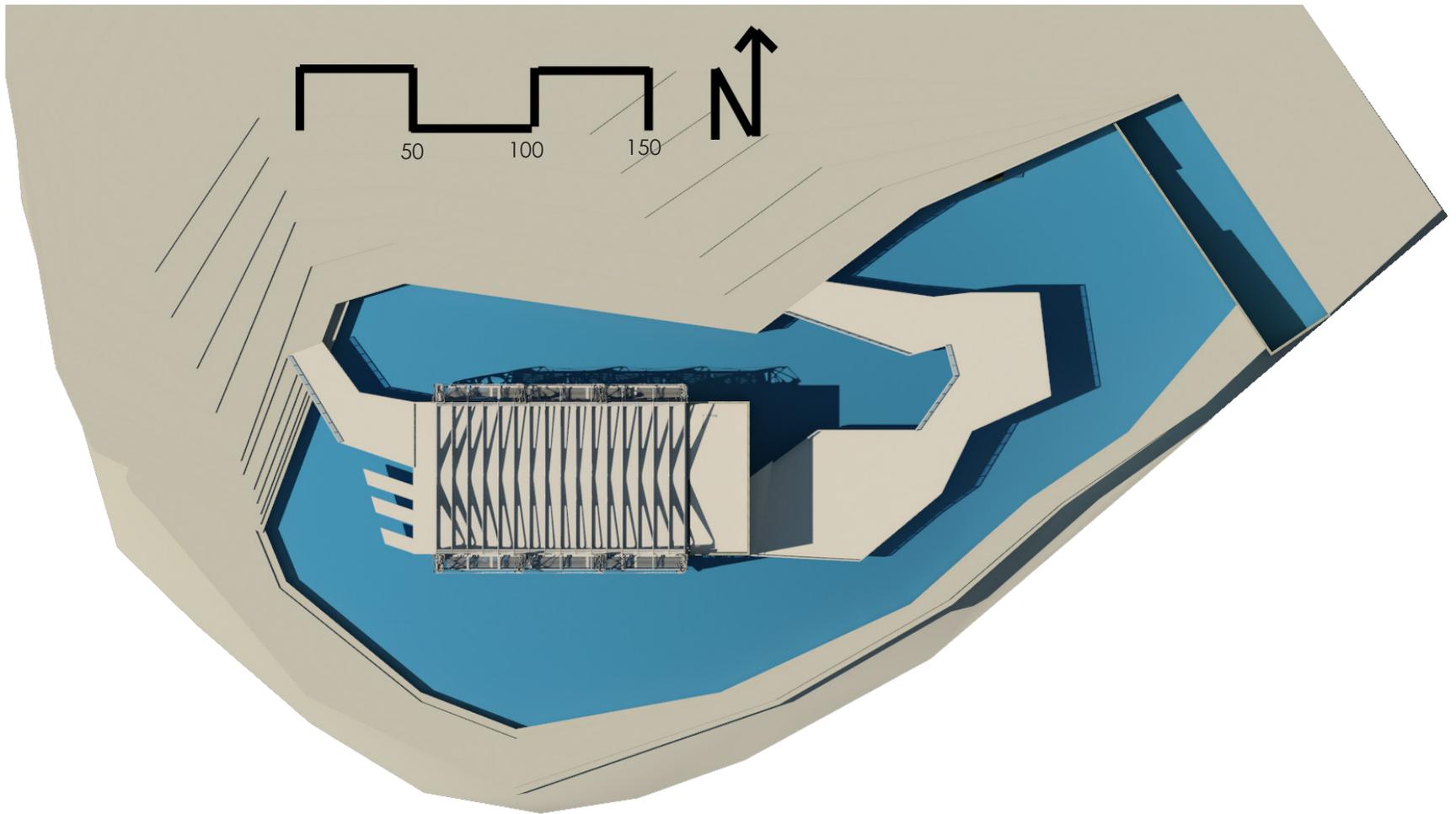
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principle structure

flex space diagram

- group interactions
- workshops
- private spaces
- administration





site plan



demonstration of power generating algae

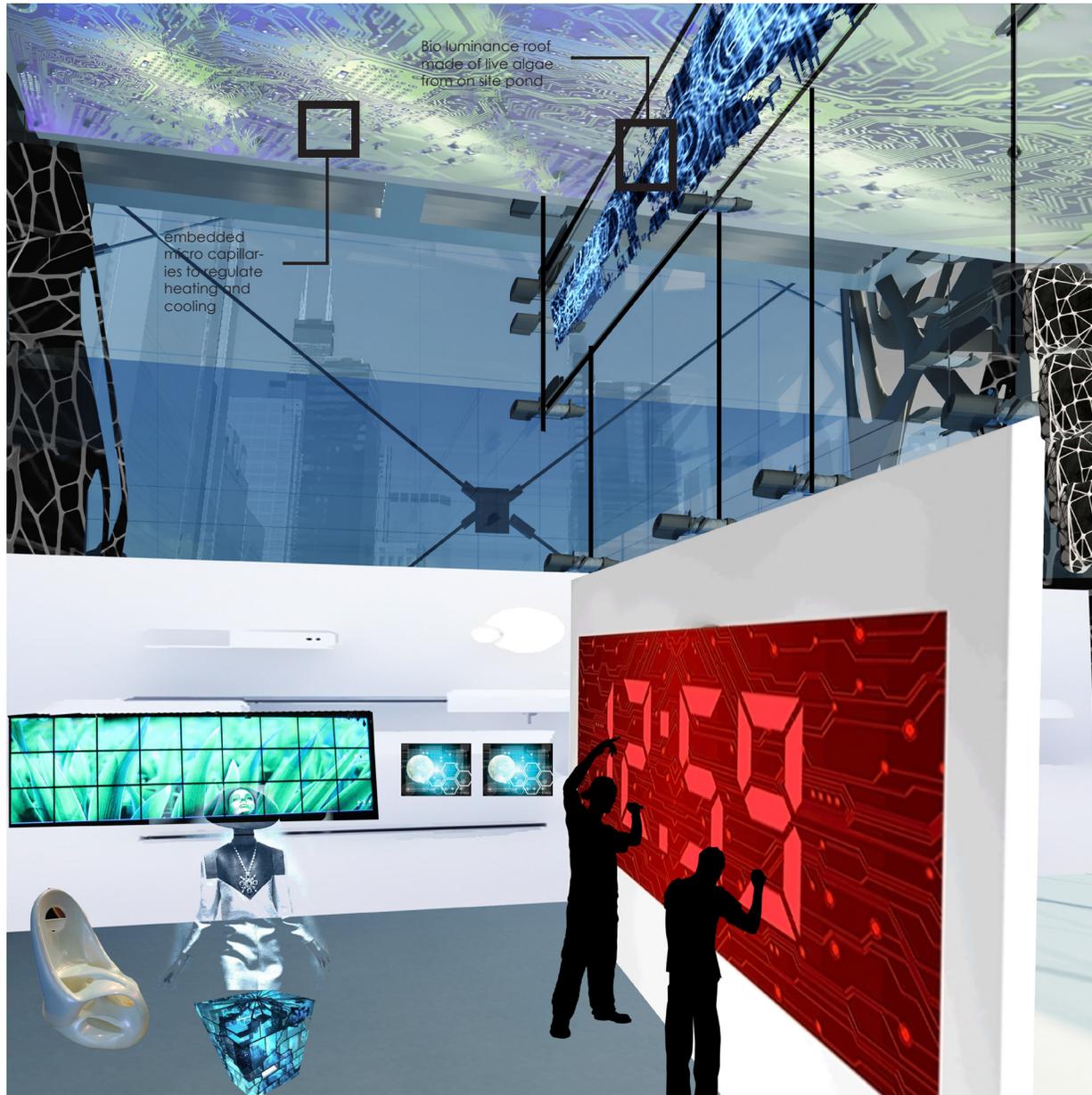




public entrance

on site city garden for the city beautiful movement



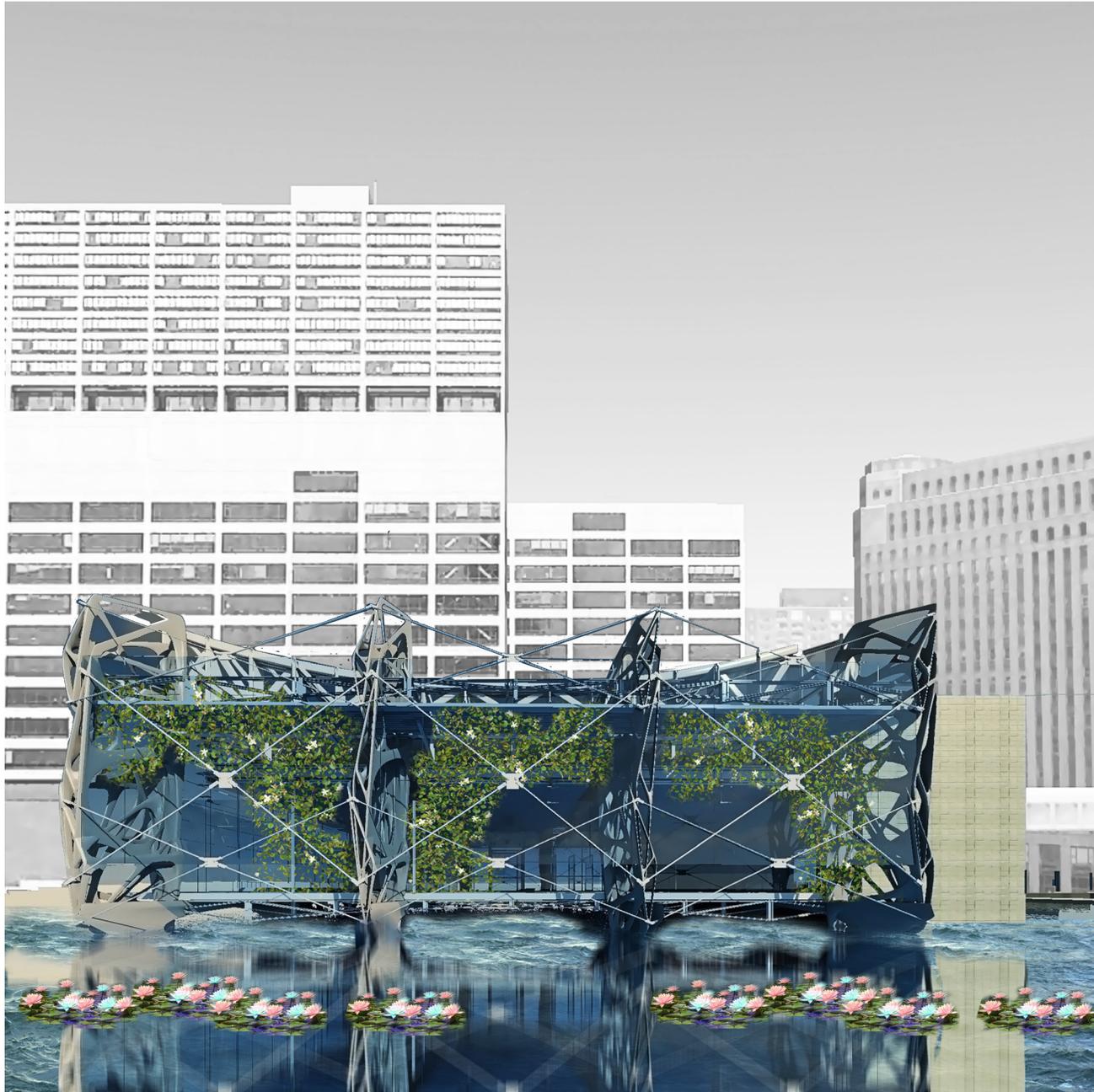


Bio luminance roof
made of live algae
from on site pond

embedded
micro capillar-
ies to regulate
heating and
cooling

flexible learning studio

carbon negative protocell building



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<http://archimorph.wordpress.com/2011/11/01/tom-wiscombe-composites-lecture/>

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Author

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e. "It is evident that 'life-enhancing' architecture has to address all the senses simultaneously and fuse our image of the self with our experience of the world." (Pallasmaa, 2005)