
URBAN WATER

URBAN WATER

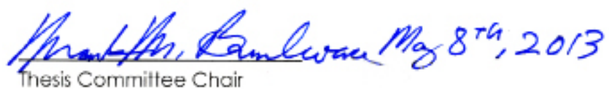
A Design Thesis Submitted to the
Depart of Architecture and Landscape Architecture
of the North Dakota State University

By
Ploiphan Saengporm

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

Primary Thesis Advisor

May 8, 2013
Fargo, North Dakota



Thesis Committee Chair

TABLE OF CONTENT

TABLES AND FIGURES

ABSTRACT

Architecture acts as a tool in creating a healthy environment, a settlement for nourishing culture, whether through the natural or built environment.

This thesis is aimed toward an exploration of urban water through architecture. By studying the relationship and the connection that Thai people have with the water within Bangkok, Thailand, the result is a framework of the past that can help identify the community's future. The typography of this thesis is an urban water educational center. The center deals extensively with creating healthy environment, educating the people, especially the waterfront community, and exploring new opportunities through social, economic and political factors while maintaining its cultural meaning.

water slum community urban sustainable Bangkok

Statement of Intent

PROBLEM STATEMENT

How can the architecture shape the community future while maintaining a cultural meaning?

STATEMENT OF INTENT

Typology:
Urban water educational Center

Theoretical Premise and Unifying Idea:

Claim:
Healthy environment is a symptom of a flourishing culture

Actor: healthy environment
Action: being
Object: culture
Manner of action: flourish

STATEMENT OF INTENT

Unifying Idea:
This thesis uses architecture as a tool to bring a sustainable healthy environment to the water front slum community. The design acts as an influential framework for the people in order to enhance, change and sustain their quality of life while maintaining a rich cultural meaning.

Project Justification
Water has been an important resource for all the living organism. Many rituals were created by our ancestry showing the importance of the water. Today, the many sources of water within the city such as the river, the canals, the rainfall, are contaminated by the waste from the urban run off. This phenomenon results in people turning their back on the water . However, the health of the city always go hand in hand with the quality of water.Thus, by using an architecture as a tool, this thesis will provide ways to improve the community environment and shape its future, whether by exploring the locals relationship to water or exploring the its possibilities in social, economics and

Premises:
Actor: by providing the healthy environment through the opportunities and the environments necessary, the society can grow and develop to achieve to its full potential without impairing the stability of the environment that it is rested on (Shoshkes, 2009)

Action: as the people be a part of the surrounding environment, affect is the interconnection of the psychological and physical outcome of the individual

Object: the product of the people's way of life can be enhance and maintain through the healthy behavioral pattern and group interaction

Manner of Action: the flourish of the culture help strengthen and expand the community

Proposal

NARRATIVE

Architecture can become more than just a cool design around the corner when it is responsive to the society and the existing environment. Architecture has an ability to sustain, shape and change the people and its environment to better or to worse. As being said, this thesis is aimed to use architecture as a tool to re signify the role of the water resource, and the community that has been lost in Bangkok, Thailand. Eventhough, water has been a part of the society and geography before the formation of the country; however, due to the rapid grow of industrialization, people have been turning their back on the water. This notion responds and also is responsible to several serious sub issues that Thailand is facing today. Through personal experience, there are three important sub issues: the first one is the decreasing number of the waterfront development of the residential community due to seasonal flooding. The second one is a cultural change in relationship to the waterways. And the third one is the degrading of the environmental and the living quality of the waterfront community due to the lack of sustainable practice. These issues are interconnected to each other. Thus, by starting to look at the most alarming issue such as, flooding, will allow the architect to have a better understanding of the geographical nature of the site.

Bangkok is located on the Chao Phraya river delta which is known for its low land elevation and swampy characteristic. The Chao Phraya river itself is the main artery where the elaborative vessels of water ways meet. The waterways include klongs, the Thai word for small rivers, and canals that were dug between the 1782 to the 19th century for irrigation, transportation, and drainage (cited in Bodry, 2012). However, now a day, many of the canals were filled and cut off due to road base transportation system. The canals now become a left over backdrop for the city. Many of them are filled with over flow garbage, sometimes raw city sewage and urban runoff, blocking the flow of the water. During the rainy season, the heavy rain water from the mountain sheds to the Chao Phraya river creating seasonal flooding. And, with the ineffective canals system, the river doesn't have any way to shed the water to the inland. The result is a higher volume of water that is slowly channel to the gulf of Thailand resulting in longer and more destructive flood period. Clogged sewer and canals have also turned the city into a swamp for couple to several hours, especially if the area is by the waterways. This excessive body of water on the ground is now a national crisis. Because of the recent flood in 2011, half of the country was left with large amount of damage, twice as destructive with the waterfront communities. So, the seasonal flooding and the introduction of the road base transportation results in a decreasing number of the waterfront development of the residential community which overtime has led to the cultural change in relationship to waterways.

In the old days, living by the water used to be one of the most luxurious choices for many Thai people; although, living by the water is now not by choice. Comparing to the attitude toward the water when I was growing up and now, I cannot imagine what will happen to Thailand if the water is not a part of the tradition anymore. When I was young we were taught that water is sacred. Each year we have a tradition to respect the mother of water, Kongka, she represents the water element. Every year during the month of November, we give her a respect by floating a traditional lantern that is made by banana leaves on the river every year. Sadly, this tradition is starting to change. Each year, we see more lanterns that are made by foam for reselling purpose. These lanterns show how selfish and careless people have become to the environment, especially the water. Because of the changing of tradition, people rather build the house facing the activity on the street and turn their back on water. The canals and the rivers are becoming a backyard sewer for many communities.

While many of the new Thai generation views the waterways as an inactive passage, contrary, the foreign investors and the visitors view it as an opportunity for hotels and restaurants. The Chao Phraya river front is filled with activities from the non-Thai visitors. As a development of the high class hotel and restaurants increases, there is a gradual decrease in the traditional waterfront housing and public green space. Due to the lack of the economic access, many of the waterfront communities don't have any public space or the waterfront access since many of the properties are owned by the investors or the government.
Without the access to the waterfront, some of the community has little to no opportunity to bring the activities into the community to expand their economy. This results in the forming of the low income housing or slum community. These issues such as, Seasonal flooding, canal water contamination and economic accessibility, all contribute to the degrading of the environmental and the living quality of the waterfront community. Without an adequate access to the basic needs , the locals have a hard time making an efforts in caring about a sustainable environment. In order to make an impact upon the environment and the quality of life with a minimum cost: we need to create an economic opportunity. So, by bringing the people to the waterfront, and the people from the water front to the community, and by introducing the people to passive strategies, we then allow the community to be engaged and that helps create a sense of belonging and a change in habit as a whole community

By using architectural designs to create a healthy environment that optimistically responses to all of these issues, the end result will become a model in solving a national issue.

USER/CLIENT DESCRIPTION

Researchers, local residents, Thai/none-Thai visitors, students, instructors, government officials, royal family and general public

Owner
Bangkok Department of Water Resource

The primary users of the building will be the researchers who work for the Bangkok Department of Water Resource. The secondary users will be the locals from the surrounding communities. This project is framed to engage both the researchers and the locals in working together to create a healthy environment.

Since the site is in the corner where two major rivers meet, most of the locals already use the existing public boat transit as a main transportation. The visitors and the some of the workers will be using the boat transit as well.

Researchers
The scientist/researchers will be performing their scientific experiment as well as gathering the data. Each datum and the experimental result will be available to public through Bangkok Department of Water Resource's data base and occasional presentations given by the researchers. The working areas for the researchers need to have a high level of privacy. During the flood season, some of the researchers are required to stay in the center to record the data. The center will provide a living space during the flood time and other time that is necessary.

The local residents
Since the community will be engaging in monitoring the canal and keeping it clean, there will be a space for the locals to gather around for meetings and cultural event. To expand the economic growth and making an improvement on people lives, the locals will be provided with designated space for food vendor and public green space that they can use regularly.

Instructors and students
Instructors and students from a nearby school and a long distant school come visit the center each month to learn about Bangkok waterways, sustain ability issues and its relationship to the community. The space such as demonstration room, and presentation room will be most use by them.

Government official and the royal family
This center will be supported by the government and the royal family to do an ongoing research on waterways since it is a national issue in Thailand. There will be a regular visit from the Bangkok Department of Water Resource and an occasional visit from the royal family. The royal family will hold a ceremony each year to receive donation funds.

MAJOR PROJECT ELEMENTS

Private space
Offices
- Work stations
- Director office
- Break room
- Work/mail room
- Storage

Research area
- Laboratories
- Apparatus room
- Shower room
- Storage

Living area
- Sleeping space

Space for all users
Educational space
- Library
- Demonstration areas
- Presentation room
- Conference room

Community space
- Public green space
- Designated vendors area
- Boat dock
- Parking
- Meeting area

Coffee shop
Restrooms
Mechanical rooms

SITE INFORMATION

Macro
The site is located on the delta river soil within the oldest and the most important district of Bangkok, Thailand. The country's major landmarks, such as palaces, old temples, Royal Barge Museum, Asia largest research hospital are located within the 2 miles radius of the site. The landmarks will help bringing the visitors to the site. Unfortunately, the riverfront community and many of them are facing some serious chronic issues on the water quality, living quality, and yearly issue on flooding. Due to the lack of financial resource opportunity, the community has little or no access to the river front and the urban development. According to Apichart on his thesis discovery, there is only 3 percent of public space. The rest are consisted of residential, governmental, unused land and warehouse. Since there are already a high number of Thai/ none- Thai visitors that visit the district daily, by creating a space for public, the project will open up new opportunities for local business to start or expand. The site will act as a linkage between the communities and the riverfront activities.

Micro
The location of the site is on Soi Wat Dusitaram Bangkok Noi, Thailand 10700.

It is surrounded by slum housing communities, elementary school, kindergarten, a temple, National Royal Barge Museum. Due to the site location, the more convenient ways to access the site include, but are not limited to the following: boat transit, sky rail transit (BTS), and motorcycle taxi /taxi.

The site presents its geographical advantage and it challenges. The advantage is the two canals that run through the site, one canal connects the klong (smaller size river), to the main Chao Phraya river. The other canal goes into the heart of the community; however, the end was cut off due to the road construction. This canal is a perfect opportunity for an architect to use as a case study as a model for other similar situation. Lastly, the challenge of the site is the actual formation of the soil on the site. Through studying from Google Map, it seems that part of the land by the river was formed within the past ten years, which might raise a question of stability of the site.

figure.1, 2, Panoramic images from Google Earth

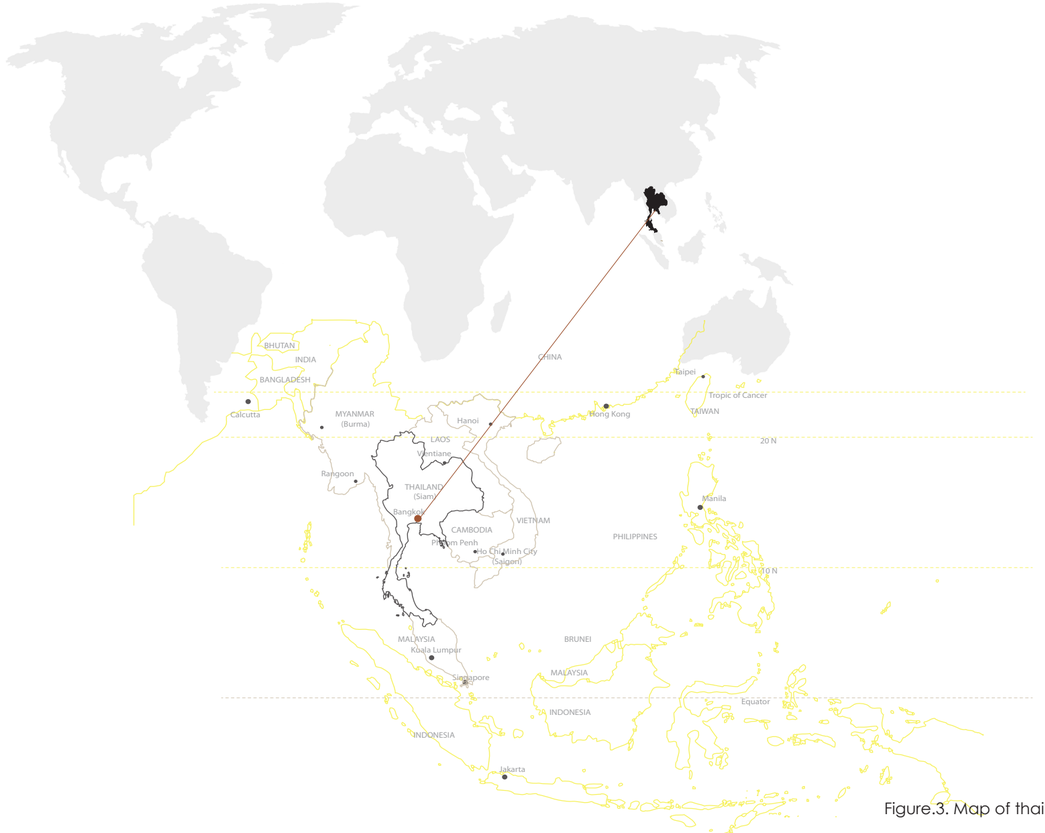
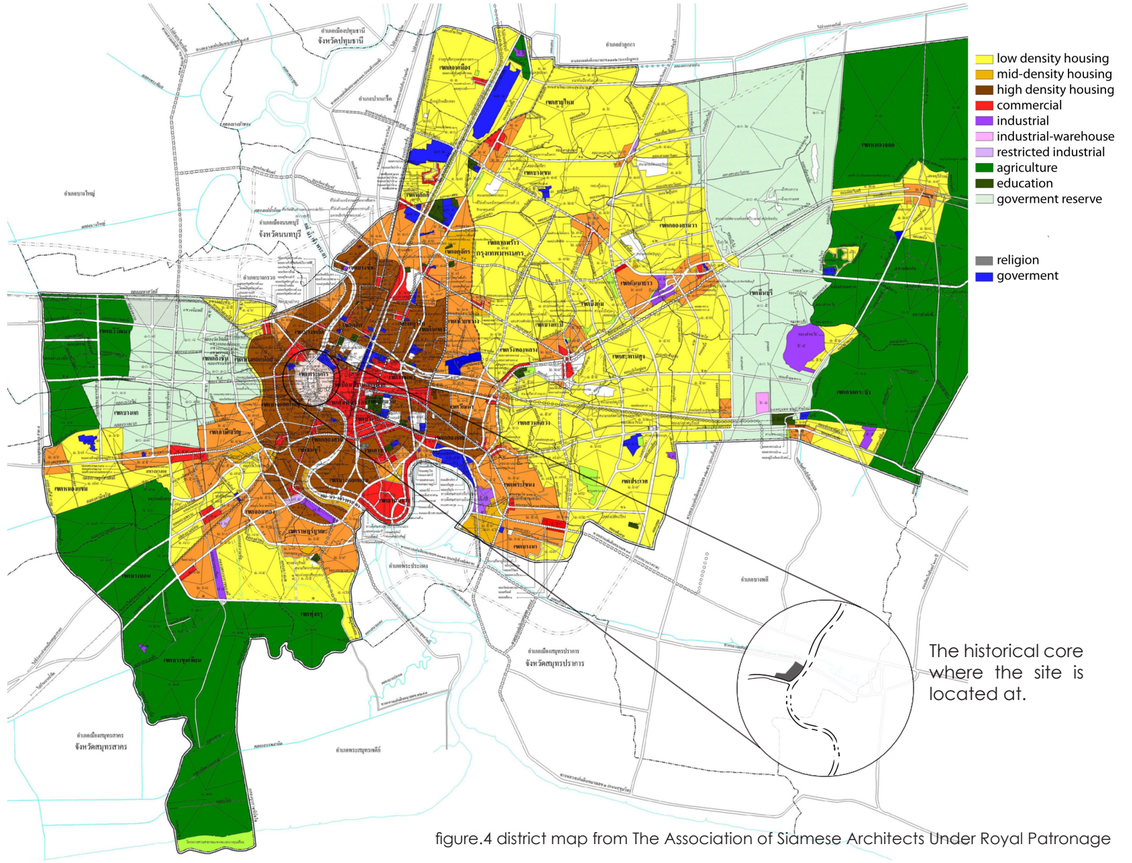


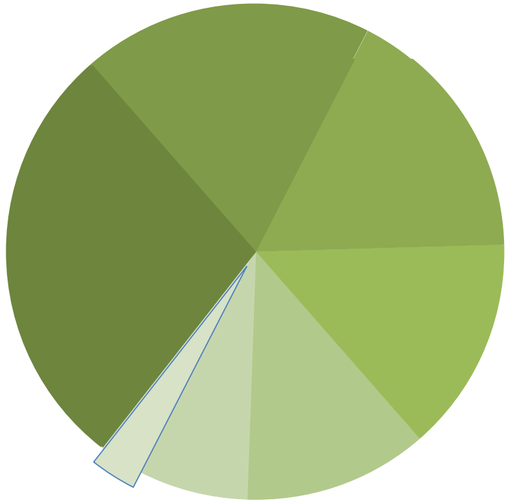
Figure.3. Map of thailand



The historical core where the site is located at.

figure.4 district map from The Association of Siamese Architects Under Royal Patronage

Figure.5. Landmark Map of Thai Historical Core



land used within the districts around the water front

- residential use
- governmental
- unused land
- warehouse
- commercial
- industrial use
- open recreational

3% of open recreational space

Figure 6. Land use

Different light rail transit systems. The orange line(BTS) show the conection to the boat pier

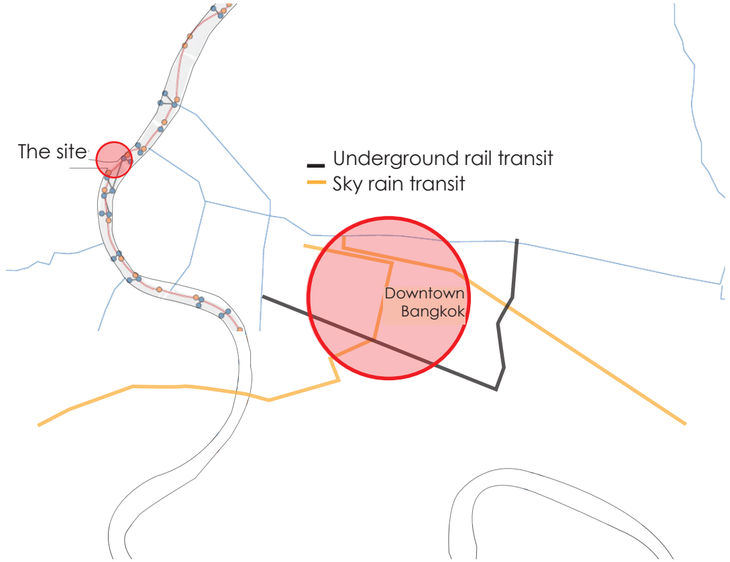


Figure. 7. Light rail and Boat Transportation Map

Figure.8,9,10,11.Photos of the Site

figure.12.google base map 2011 from google earth

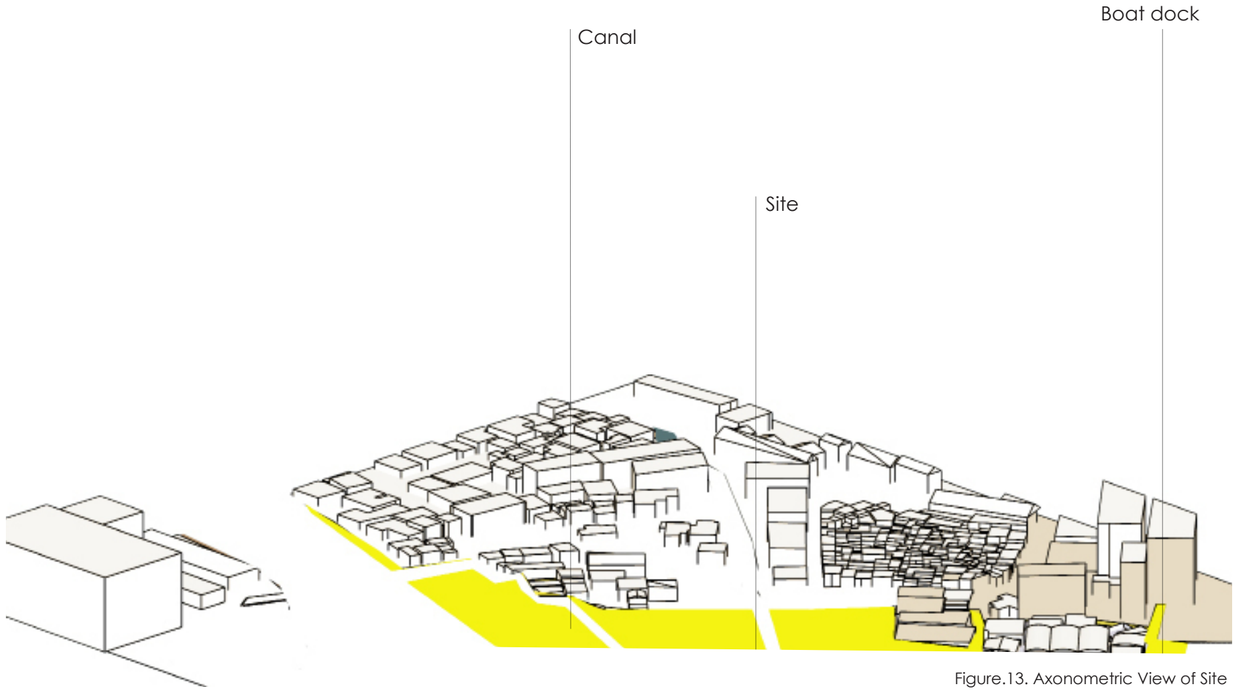


Figure.13. Axonometric View of Site

PROJECT EMPHASIS

The idea behind this project is how can architectural design take advantage of the existing site to improve upon people lives by engaging the community as a whole and yet planting a habit of sustainability

The project emphasis is to focus on exploring the solutions to different issues that Bangkok waterfront communities are facing today, such issues are flooding, degrading in quality of lives due to the unclean environment and the culture lost. The project will respond to each issue by using architectural design as a tool to re signify the role of the water resource to its surrounding community. The locals will have an access to clean/safe environment, an opportunity to expand their economy, restore their culture and a more sustainable way of life. This project and the whole community will become an educational model for its kind.

PLAN for PROCEEDING

Research direction
The direction of this research is aimed to analyze and gather different data to support the theoretical/unifying idea which is a focus of the project. Different case studies of the building typology will be used as a basic design guideline for the programmatic requirement. Through in depth site, historical and cultural analysis, the building materials and technology will respond to the discovered information.

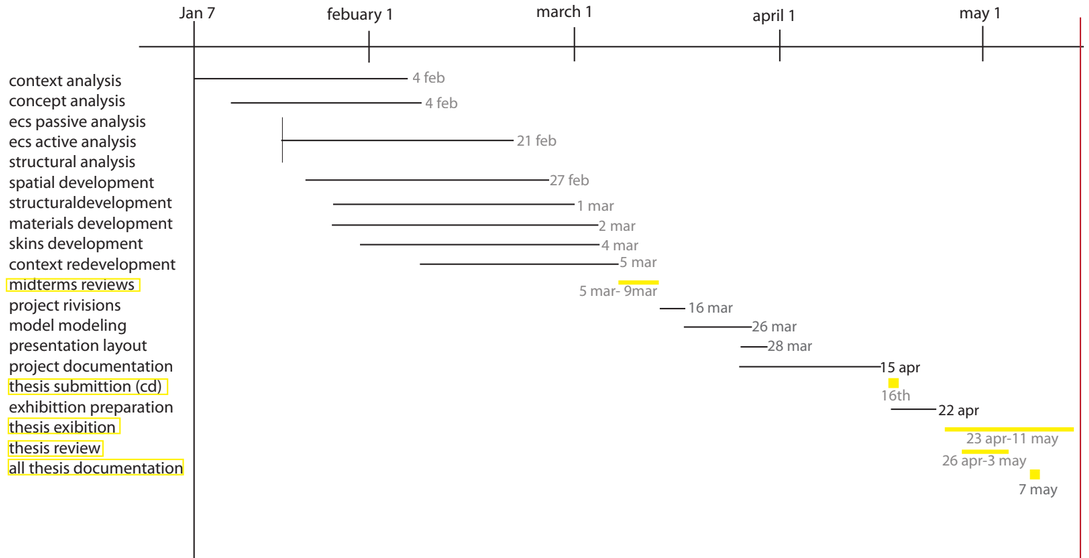
Design methodology
It is a mix method of qualitative and quantitative data gathering that is based on the theoretical/unifying idea.

The qualitative data consist of subjective analysis such as aesthetic and theoretical aspect that is gathered through direct observation, local survey, archival search and direct interviews. The quantitative data are include, but not limited to statistical data and scientific data, the quantitative data can range from materials calculations to geographical statistic. By combining the two methods, it will allow me to collect wider range of data.

Any information that is obtained through the graphical, digital, conversational and physical presentation is required to have constant analysis, interpretation and reports in order to effectively and efficiently develop the research throughout the phases.

DOCUMENTATION PLAN

All the used or unused sources from websites, articles, images, books, and archives will be marked and stored digitally into different sub folders within a single folder. All of the hand drawn images and physical objects will be scanned and photographed. All the documentation of the data will be saved on my personal computer and online data base which the process will happen at the beginning and the second weekend of the month. In the end, all the documentation will be compiled in to a folder along with my final thesis book for digital submission which will be available to the public.



PREVIOUS STUDIO EXPERIENCE

Fall 2009: Heather Fisher
- Tea house, Fargo, ND
- Boat house, Minneapolis, MN

Spring 2009: Joan Vorderbruggen
- Montessori school, Fargo, ND
- Dwelling, Marfa, TX

Fall 2010: Regin schwaen
- Red river hotel, Fargo, ND
- Brick sustainable office, Baltimore, Marryland

Spring 2010:Steven Marten
- Rehabilitation center, Fargo, ND
- Dinosaur Museum, Marmath, ND

Fall 2011: Bakr M. Aly Ahmed
- High rise, San Francisco, CA
- KKE, trash to treasure competition

Spring 2012: Kerrie Butts
- Flood design

Research

THESIS RESEARCH

Premises/Unifying idea–This thesis uses architecture as a tool to bring a sustainable healthy environment to the water front slum community. The design acts as an influential framework for the people in order to enhance, change and sustain their quality of life while maintaining a rich cultural meaning.

surrounding environment is an important factor of human and other living species' survival. Different community of living organisms requires different living condition. As for the human, we have a capacity to make a significant change, often times to alter the surrounding environment to suit our needs. Many changes we make on the environment, whether through architecture, or through our excessive needs to survive, they often affect the ability of other species survival. As the population rise, we begin to understand that in order for us to survive we need to create a healthy environment for all living organism, because when the earth is in its equilibrium that is when the entire living organism are healthy. According to James Lovelock, a NASA researcher, he found that earth is like Gaia, it is a system that keeps the optimum conditions for all of the terrestrial life. It is the product of all the living species connecting as one (Lovelock, 2000). Today, while some of the communities have a better understanding and are beginning to practice the concept, the others still have no regard in practicing the idea. These other communities are the one that require their basic needs to be met; such the communities are presented in many of the Asia Pacific region. As being said, the type of the slum community that this thesis is focused on has its

own settlement and characteristic that relate to the waterways. In order to comprehensively understand the thesis, this research is aimed to analyze the three important factors that contribute to the thesis unifying idea: the first one is the general back ground of the lack in access within the waterfront community. The second one is the importance of the relationship between the people, the community, and its surrounding environment, especially the relationship to the water. And the third one is how sustainable architecture can help improve upon an environment for the community to grow to its full potential. Thus, to be able to fully identify the problem that the community is facing, we need to first understand the background and the lack of access within the community.

With a fast increase in urban population; the demand of access is far too high for the public capacity to come up with the supply, especially when the country is still developing, like Bangkok, Thailand. (Daniere & Takahashi, 1999, p.272). According to Pornchockchai, "The Bangkok Metropolitan Administration defines the slum community as over crowned, dilapidated and high population density with a minimum of 15 housing units per 1600 square meter. UN Habitat estimates that the population of the urban slum can be vary from 2,061,000, which account for 26 percent of the urban population, to 5.13 million people" (as cited in Archer, background section, para.1). As he mentioned, what the slum communities are facing today is more than just the economic issue, they are also facing the tenancy insecurity;

many of the residents are excluded from many basic services starting from clean water to public education (Archer, 2012). The lack of access in housing, education, economic and healthy environment consequentially result in a formation of a slum community. While many of these slum communities are experiencing the lack of access, the water front slum communities have to face with more serious issue relating back to water. Since water is a perfect medium for housing bacteria and new diseases, and without an access to clean water, the people will be exposed to a risk of physical and mental health. According to Daneire and Takahashi (1999), "Adequate access to basic services, particularly services such as water and sanitation, is vital to the health, economic productivity and general quality of life experienced by urban resident" (p.272). There are more than 60 percent of people in the Bangkok area who believe that there is a connection between their health and the quality of water. This suggests that the public are not at all ignorant to the issue. Although, often times, they treat the policy regarding the environmental protection as a minority concern (Daniere, Takahashi, & Naranong, 2002, p.464). So, to raise the awareness, it might take all of the public to obtain a deeper understanding and a change in attitude. Even though, it is more difficult since these highly populated areas do not allow for any room for physical, economic and cultural access. However, according to interviews from KT8, these small areas seem more natural. Whether if this attitude is right or not, for the people, the slum communities seem more normal since it is a product of their way of life. There is a study from Ban Mankong (secure

house) project that shows the people's attitude toward the new low income housing project. The 85 residents within the community felt that their new, well organized house and community are prettier and neater; nevertheless, they felt that the culture of helping has decreased; people keep it more to themselves in their own house (Archer, 2012). This notion of separation between the people, the community and the surrounding environment can make it more difficult in improving the access within the community.

There are many factors that go into creating a community. What we define as a community might be different from others, for some, it might start from an individual to a neighborhood or a family to a neighborhood. However, according to Brookner (2009) from Urban Rain, "The true extended family of community is even larger. The vitality of any community and the continuity of its cultural heritage depend upon the health of the natural world that sustain it" (p.10). Thus, if one community is consisted of all the living and nonliving things, then the important question might be, how these things are connected to each other to form a cohesive community in order to help sustain and support our lives. For instance, when there is a lack of community participation, it usually indicates that there are also shortages in economic, educational, environmental and social access. A study found that there is an increase in community project participation when there are more social interactions, and when people

are more educated on the issue (Daniere et al., p. 476). Also, by looking at the relationship between the people and the community to the water, we can conclude that the interconnection between each living and nonliving cycle is more important than each element itself; it is the whole that is greater than the sum of its part as was said by Aristotle.

The cycle of the water within the urban area is a great example. It shows how connected we all are to everything. Goldstein and Tovar (2009) talked about the water runoff that is often untreated within a city. "Rain water or even irrigation water flow across streets, lawns, roofs, parking lot, and sidewalks through the local creeks without treatment" (p.7). And, when a community doesn't have a proper waste management, the run off then continues to bring all the litters from streets, the vacant lots and overflow trashed to the waterways. Due to the urban sprawl, the empty lands are being filled with buildings after buildings creating more paved surface within the city. The paved surface makes it impossible for the runoff to filter through. The city runoff usually ends up contaminating the ground water surface. This contamination of waterways contributes to the degradation of the environment within which causes an unwanted space. It is a type of space where the families are exposed to health problem. These unwanted spaces then become a treasure to the families who live below the poverty level inhabit in. The families that live by the contaminated canals or river usually have little to no access. The money that flows around the community is very little, and overall not enough for the developer to invest something in

since they know that they might not get their profits back. This results in a declination of the economy, the culture, and a limitation of architectural typologies within the community.

Fewer typologies can cause limitations, especially when it comes to the community that have little to no access to different services. The limitation includes but not limited to the diversity between the type of people within the community, and the income that flow within the community. We can see that within the community that has fewer typologies, the more resources go in to supporting the cost of transportations. According to Owen, a sustainable community can be created by placing mix variety of building typologies such as restaurant, office, retail, residential, green space, in order to keep the traveling distance short and fulfill the needs that suit all the people (Owen, 1999, p.48). Often times within these communities, in order for the residents to go to work, they need to use public or private transportation such as motorcycle. As in the old days before the development of cars, the primary means of transportation are mostly involved with human and animal strength. These types of transportation, whether it is walking or riding an animal, they all have higher limitations as are compared to the machine. However, these limitations surprisingly did not affect the people lives as much as we would think. Since everything in the old days was built so close to each other, it didn't take as much resources to travel across the

town to get a dozen eggs. Before the automobile development, the neighborhoods were much smaller. They usually are consisted of work places, schools, retails, places of worship, and public facilities. All of these neighborhoods are an example of successful proxemics, because most of the activities were happening within a close distance creating a harmonious balance between the people, the activities and the surrounding environment (Sanoff, Smith, Liberatore, Polston, p 44).

In order to permanently solve the issue, the architects do not have to build the whole entire community, because one building can really make a different, especially when it designs to promote a community's identity. Through environmental diversity, the designer can introduce a building that is unique to the community to later bring the people and other businesses, as well as a creating a sense of community. When the community has its own identity, the people will feel a stronger connection to the place which later will play a big role in historical preservation. The historical context within the neighborhood area allows for a cultural memory. According to Sanoff, Smith, Liberatore and Polston, architecture is a physical reminder of the history for the next generation. It a record of the types of the environment in which the ancestors lived in (Sanoff, Smith, Liberatore, Polston, 1978, p 44.)

It is true that any little things can make a different, especially when it comes to proposing a new thing within a low income community. The architect Jorge Mario Jauregui (2006) said that "When a new, planned building rises in

the slum–be it a public toilet or a sewing co-operative–it immediately becomes a monument. It was conceived by an architect, it indicates things are changing: People understand they now have the right to what was only available in the so-called "formal city"."(as cited in Sinclair & Stohr, p.218). This shows that when you have little to nothing, the effect of any changes within these communities becomes larger than what they actually are comparing to the first world community.

However, since we can't waste any more of the environmental resources, any new building that sits within the first world or the third world country should contribution more to the people than just being unique. It must help educating the public about the environmental awareness, such as an educational space or a gathering space. Not only these spaces will help bringing the visitors to the community for the economics growth, it also will give the people the knowledge to help foster a more sustainable future. Thus, when people have enough means and understand the importance role that they play within the society, there will be an increase in a new attitude toward the environment. This will result in community involvement and participation. According Rees, "To revive the local economy, describes that it is important to increase local involvement, because the local population's time is longer than investors who are concerned with benefits" (as cited in to Patarakiatsan,Theory Related Herutage section, para.3).

Healthy environment is a key factor, especially when it comes to developing a society. Without a clean, safe and livable environment, people will not be able to sustain a healthy life nor their culture. Because, when the society that has little access to basic needs, they have to use most of their energy and time to worry about the future. Through researching, the development of a slum community is an example of the lack of access. However, to really understand the role of the surrounding environment that affects the slum community, this thesis does not only need to touch on the lack of access, but also the role of people and their surrounding environment, and the effect of the architectural design.

With the fast increase in urban population across the globe, Bangkok is one of many places within the developing country that faces the access inequality issue. The lack of access in housing, education, economic and healthy environment consequentially results in a formation of a slum community. Although when the community is located by the waterways, the lack of access in clean water then becomes crucial, especially when most of the resident houses are built by or on the top of the waterways. The waterways such as the rivers or canals, when they are contaminated, the odor is not the only thing that they give out, but also these waterways become a house for bacteria and new diseases. As the study shown, the public know that unclean water can affect their health; however, to live within these highly populated areas, the room for any physical activities, the cultural practices and the environmental concern is less. So in order to make a different, the people need to treat everything, especially the water and the environment in a more holistic approach, or as a true extended community.

A true extended community is a network of living and non-livings that coexist within the same environment. If there is an unbalance within the network, the effect will extend out to the whole network. The effect of the flow from the urban runoff due to the urban sprawl in Bangkok is a great example. Since the waterways now act as an indirect city raw sewage dump, the contamination contributes to the land distress which causes many unwanted spaces that mostly occupied with the families that have less mean. These small residential usually take up most of the unwanted land creating a slum.

Many of the slums in Bangkok have fewer building typologies within them. Fewer typologies can cause limitations, especially when it comes to the community that have little to no access to different services. Since many of these communities are only consisted with residential, there is no economic opportunity to bring in the income. Contrary, many people who live in these communities usually spend their income outside of the community, especially on the transportation. In order to expand the economy within the community, the designer needs to promote different typologies within the community, as well as finding the community's identity whether through historical preservation or a cultural preservation.

By creating a strong relationship between the people to the existing environment and y establishing the community's identity, the people will feel that they are a part of something greater. Therefore will lead them to being responsible to what happens to the community as they take an indirect ownership of their surroundings.

Max Planck Institute of Biophysics

Frankfurt am Main, Germany
Auer+Weber+Architekten

This 5 stories research building is located within the natural science campus of Joham Wolfgang Universiy in Frankfurt am Main, Germany. The building stands between the old and the new. Auer+Weber+Architekten, a Germany base architecture firm used its urban context as a starting point (Braun and Gromling, 2005). By allow the architecture to act as a border that link between the purpose campus and the existing institutes. This 65000 square meter building consists of two parallel wings that are separated by the atrium. The atrium runs between two wings, the north wing contains offices and the south wing contains a well-equipped laboratories. The lowest level within the north side is situated underground since the building is placed parallel to an ascending slop to the south.

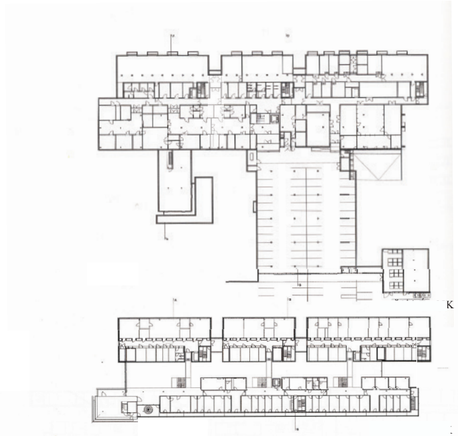


Figure.14 plan (Rechearch and Technology Buildings, 2005)

Figure.15 South Elevation (Rechearch and Technology Buildings, 2005)

Figure.16 . Cross section with guest house (Rechearch and Technology Buildings, 2005)

Figure.17 Longitudinal section (Rechearch and Technology Buildings, 2005)

The atrium is the main focus of the design as it also reflects to the characters of the northern façade and the southern façade. Since the northern façade consists of the offices mostly, the interior façade that faces the atrium is constructed using a light weight walls and glass. The southern side of the atrium wall is an exposed concrete wall to fulfill the need for the cold storage and the other function of lab space. In the aspect of the users' experience, the atrium becomes a bridge that makes the two distinct spaces a whole. "The consistent separation of laboratories and offices requires the user to cross the atrium regularly on various paths; this way, it deliberately supports internal communication and informal exchange of ideas" (Bruan, Gromling, 2005).

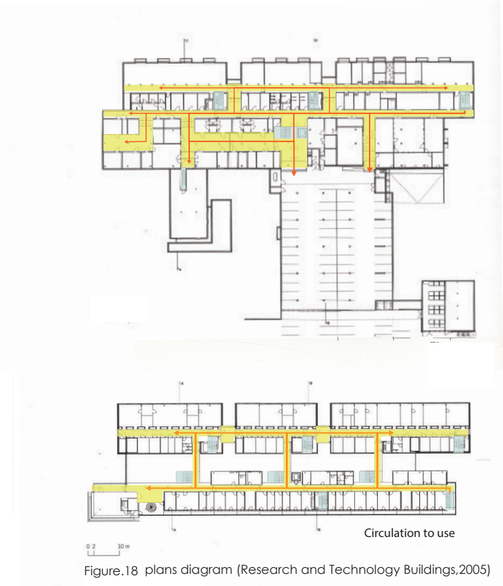


Figure.18 plans diagram (Research and Technology Buildings,2005)

Figure.19. Cross Section With Guest House(Research and Technology Building, 2005)

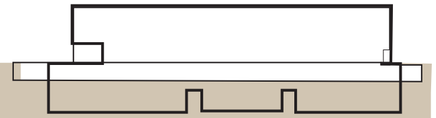


Figure.20. Plan to section

In many of the research buildings, it is difficult to create a cohesive space when there is a distinct function within each internal space. This case study responds well to each of the space requirement. By using an existing resource such as natural light that penetrate through the atrium, it gives the spaces the main element that bring the spaces together. Like many other projects, the study of light can really create cohesion within the design as well as a more sustainable space.

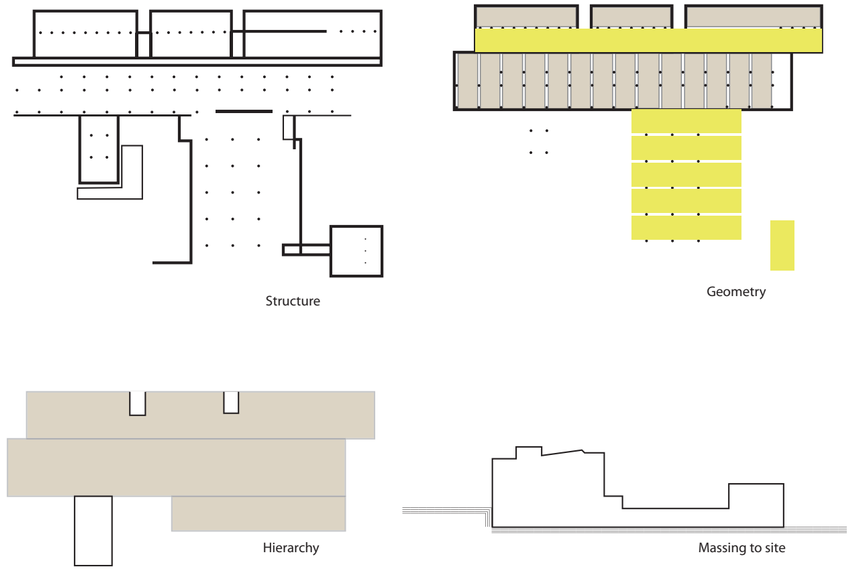


Figure.21.Max Planck Institute of Biophysics Structure, Geometry, Hierarchy, Massing to Site diagrams

This project clearly has its own unique value. As far as the site context goes, the way this building sits adjacent to the other institutes that were built from the seventies, creatively gives the project its own challenge and opportunity. Instead of mimic the appearance of the adjacent institutes, this building fosters its appearance for its own time, and yet it fits with the rest of the campus. In the south side of the building, an institute's garden is located. The garden helps filling the void, and as the same time creates a connection between the neighboring buildings and acts as a quiet buffer zone.

To me, when I think about research building, I think of a boring secretive building with fragmented interior space; although, this project shows how "form follows function" can be as cohesive as "function follows form". Through careful choice of materials, layouts and type of relationships between the every element, the building can uniformly allow the users to experience the space as a whole which will result in more interactions within in the space. To me, when I think about research building, I think of a boring secretive building with fragmented interior space; although, this project shows how "form follows function" can be as cohesive as "function follows form". Through careful choice of materials, layouts

Vals Thermal baths is located within an incredible site of Graubünden, Switzerland, the bath house is part of an existing hotel that is situated on top of a hill in Vals. Before the new 15,000 square footage building was built to replace an existing building, the bath house was a rundown hotel spa (Henry and Taylor, 2005, p. 46). Throughout many hard years, the Vals community had faced with the declination of young people and the loss of community income. Since the 1893, most of the town's income had been from thermal healing and spa, so to bring the town business back up, Peter Zumthor was hired to design a new bath house. This bath house was built to symbolically represent "a small canton in a basin shaped valley" (Henry and Taylor, 2005).

Vals Thermal bath

Switzerland

Peter Zumthor

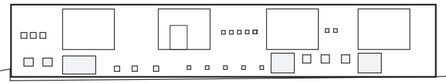


Figure.25.Vals Thermal Bath Elevation

Figure.22.Plan (Peter Zumthor Thermal Vals, 2007)

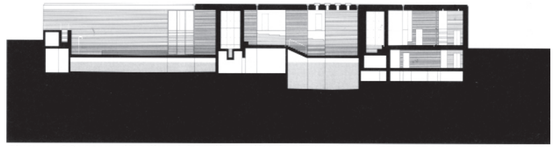


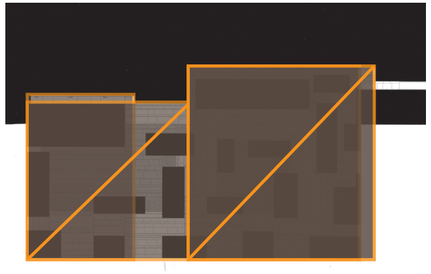
Figure.23. Longitudinal Section. (Peter Zumthor Thermal Vals, 2007)

Figure.24. Cross Section (Peter Zumthor Thermal Vals, 2007)

The house itself sits within a hill side with layers upon layers of "locally quarried Valser Quartzite slabs" (Karaiskakis). Through the use this local material, Peter was able to create a space that responds to the natural element of its context, which is the water and stone. These natural elements are not only necessary to make up the bath house, but they are also the inspiration behind the master creation. As Zumthor mentioned:

"Mountain, stone, water – building in the stone, building with the stone, into the mountain, building out of the mountain, being inside the mountain – how can the implications and the sensuality of the association of these words be interpreted, architecturally?" (O'Grady, 2009).

Circulation to use
Thermevals bath (peter zumthor thermal vals, 2007
Figure.26. Thermal Vals Circulation to Use Diagram



Thermevals bath (peter zumthor thermal vals, 2007)
Figure.27. Thermal Vals Geometry Diagram

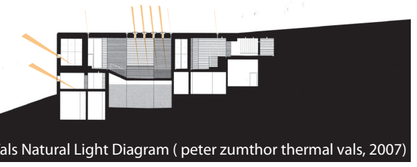


Figure 28. Thermal Vals Natural Light Diagram (peter zumthor thermal vals, 2007)

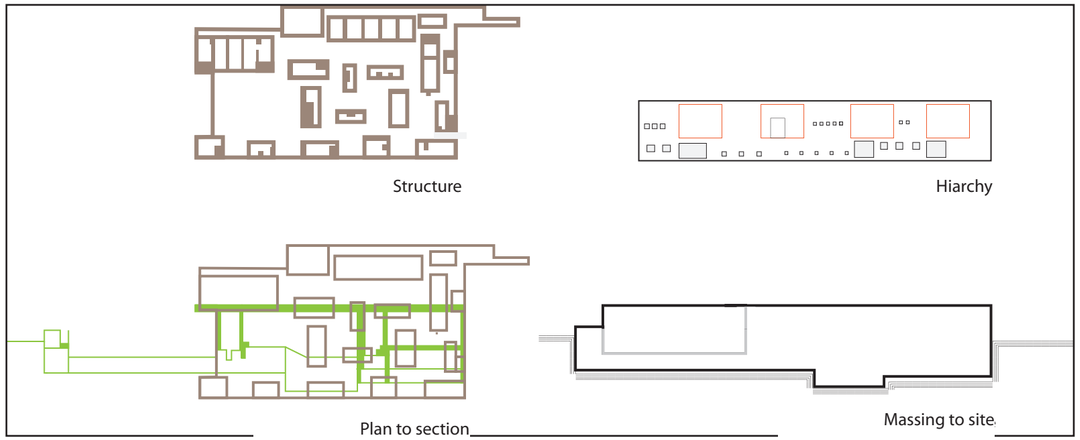


Figure.29. Thermal Vals Structure, Hiarchy, Plan to Section, Massing to Site diagrams

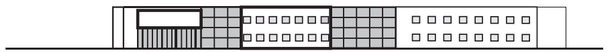
Since the completion in 1996, all type of visitors from all over the world have come to explore the Vals's hot spring to experience the ritual, as well as receive the health benefits. Different voids are cut within the space creating different pools and paths creating different program space. According to an interview with Craig Martins, he refers to these spaces as one big space with different nooks and corners that have different functions. Starting with the entry, the first thing that the user goes in is the lockers room which later lead to an indoor/outdoor pool and a path to an interior central pool. The interior pool is surrounded by different pods of hot tub room, cold tub room, scented pool room and also a massage room. For the indoor/outdoor pool, the interior and exterior environment is connected by the same void, and yet separated by an overhang wall. By using water as a medium to connect the indoor to the outdoor, Zumthor allows the user to capture the spirit of the site. The settle transitions between the lights, the materials and the atmospheres able each person to move through the space while discovering their own paths. The discovery is guided through natural light and fixtures leaving the users with open experiences.

This baths is more than just a pretty space to look at; it is also a place where a whole community of Vals depends on. This building show how successful the architecture can be when responds to all the quality of the site, desirable or undesirable. Zumthor's design responds to the desirable part of the site such as the use of materials, the nature of the thermal water and the topography; his design also reacts to the undesirable part such as the minimum view of the landscape. Since he can't change the location of the baths, the only thing he could do is to frame the part that people can see. By elevated the openings, he created view ports that only show the desirable view. This is an example of a project that shows how space can encourage or and move the people. To me, when I think about a research building, I think of a boring secretive building with fragmented interior space; although, this project shows how "form follows function" can be as cohesive as "function follows form". Through careful choice of materials, layouts and type of relationships between the every element, the building can uniformly allow the users to experience the space as a whole which will result in more interactions within in the space. To me, when I think about research building, I think of a boring secretive building with fragmented interior space; although, this project shows how "form follows function" can be as cohesive as "function follows form". Through careful choice of materials, layouts and type of relationships between the every element, the building can uniformly allow the users to experience the space as a whole which will result in more interactions within in the space.

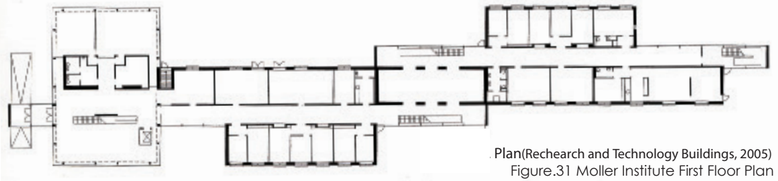
Moller Institute for Production Technologies

Odense, Denmarrk

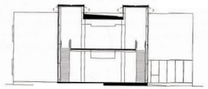
Henning Larsens Tegnestue A/S



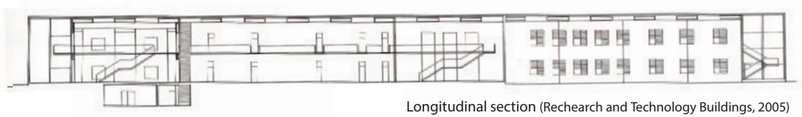
South Elevation
Figure.30. Moller Institute South Elevation



Plan(Rechearch and Technology Buildings, 2005)
Figure.31 Moller Institute First Floor Plan

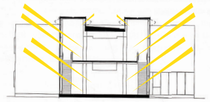


Cross section
(Rechearch and Technology Buildings, 2005)

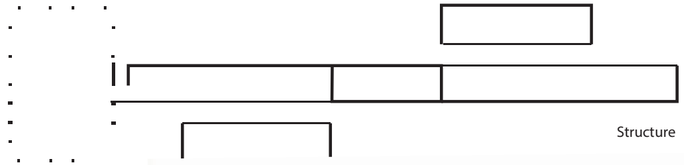


Longitudinal section (Rechearch and Technology Buildings, 2005)
Figure.32. Moller Institute Longitutional Section, Cross Section

Maersk McKinney Moller Institute for Production Technologies is located in Odense, Denmark. The institute is located at the southern part of Odense University campus on Funen Island, Denmark. Since 1997 to 1999, "the building has served as facilities for doctoral candidates and students that are mainly occupied with the development of software for robots" (Braun&Gromling, p.66, 2005).



Natural light



Structure

Plan (Rechearch and Technology Buildings, 2005)

Figure.33. Moller Institute Natural light, Structure, Plan Diagram

The first floor of this building is for guest apartments, offices and a place for team collaboration. This linear layout is different for other building buildings on the campus since it is oriented east and west, instead of north and south. The main hallway is oriented west-east as well as the building with the west part as a main entrance. The entrance is extended and transforms into an exit to the east as it becomes the exhibit space and a main structure of the building.

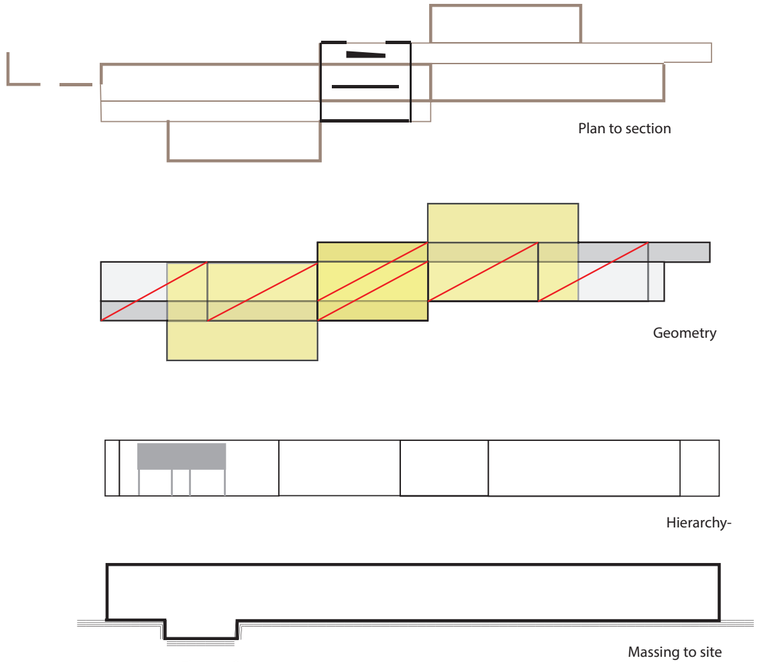


Figure.34. Moller Institute Plan to Section, Geometry. Hierarchy, Massing to Site Diagram

Through opaque and transparent materials, the building gives different surprises to the users as they walk down the hallway. Also, to maximize the long hall way, the architect oriented the floor planks following the building orientation to passively move the users through the hallway.

The long rectangular shape of the building allows for more openings which is very important to a research building. Because the scientist needs to work long hours, the openings can help them to take an eye break. The long layout does not only help with the view, but also the natural ventilation. However, the long layout is questionable when it comes to dealing with a cold climate. Since Denmark is within a subtropical region, it might be more sustainable to design a more square building in order to preserve the heat. If the architect was to design this type of layout within a tropical region, it would benefits the users and the clients more since natural ventilation is the key to tropical design.

CASE STUDIES
Summary

There are so many factors that go into designing a good building. Different factors and requirements affect the outcome of the design differently. As a designer, sometimes we only want to design to please our eyes while ignoring all the factors that go into effecting the users within the building. This kind of attitude sometimes works for certain type of projects; however, with a project for the public, it is impossible for the designers to express their creativity. The research/educational institute are one of the examples of the type of project that needs to follow the entire requirement. Through researching, there are not many institutes that successfully express the designers' idea. The only two that I found interesting are Max Planck institute of Bio physicist and the Moller Institute for production technology. These two institutes show different ways of approaching certain issues.

With Max Planck Institute, the designer had to design a building that does not only have to fit within an existing campus, but it also needs to act as a border between the old and the new, as well as link the two. The designer came up with some solutions to make the building fits the context. By sinking part of the building underground, and create a garden to act as a buffer zone, the building becomes part of the landscape. Also by creating an atrium for user's interactions, the architect was able to express their idea of connectivity while creating a sustainable building. However, with the Mollor Institute for Production Technologies is different. The architect concentrate on the layout of the building to more to create different experiences. The long hallway that goes through the whole building allows for successful ventilation; although, with climate type that the building sits in, sustainability might be a questionable issue. These two research buildings are a good example of using an innovative design to create spaces that have certain requirement.

There are many ways that an architect can practice the innovative design. The space that allows the user to engage in certain experience is also an example of being innovative. The Theme Vals, bath house is one of the many projects from Peter Zumthor that deals with how a space can be used for the users to gain certain experience. The way he used the materials, the planning of the space and the property of the water, Zumthor created a space that allow the people to be with the nature by using the site context as part of the building. The popularity of the Theme Vals has led the town to being a travel destination. As the same time, his design also helps save Vals from losing its population, as well as its identity.

PROJECT GOAL

The construction of this thesis has helped me reconnect to what I believe in. This thesis is a reflection of who I am and what I value. Since this is a cap stone project for my educational career, I hope the end result with not only reflect where I stand within my education, but also help me fulfill all of my goals. These goals lie within the academic, the professional, and my own personal terms.

Throughout my 8 years of education, I finally can say that I am beginning to see the end of my tunnel. However, as the same time, it is also harder for me to see what I have learned. I hope that the production of this thesis project will help me bring together all my knowledge which will guide me to understand where I am, and also, realize what my potentials are. I hope that at the end, I will use what learn from this thesis to feed into my changing point of view. I believe that the point of leaning is so you help you to be more accepted to change. Since "Your mind is your predicament. It wants to be free of change. Free of pain, free of the obligations of life and death. But change is a law, and no amount of pretending will alter that reality" (Millman, 1980, p.51). Thus, the continuous change that a person goes through will help shape him or her to become a wise individual. I hope that other people will gain something from of this thesis, at least as much as I have already gained.

Not only this thesis is my cap stone project, it is also my stepping stone research. For my future career, I would like to continue this research to further develop the idea, in order to use as a model for the community in Thailand. Because this thesis is within the sustainability and resource conservation realm, it will assist me to fulfill my future goal of being a LEED certified architect. However, my ultimate goal is to expand my ability to be able to achieve other certifications in other part of the world. Especially, being familiar and being able to practice in Thailand which is where I came from.

For my personal goal, I would like to use this thesis as a reminder that architecture or designing in general is what makes me happy, and as well as the others. By purposing the solutions that will be achieved by this thesis, the river ways community can make an improvement upon the environment and their lives, or can at least become more aware of the issues. I want them to see the connection between the waterways and their way of lives. Starting from the community, it is important to show them that their culture and their roots is something they need to appreciate. By accomplish these tasks; personally, it will ensure me that architecture can make a different. I have lived in the US for almost half of my life time, and this thesis is a great opportunity for me to give back to the country where I came from.

These goals are just a small part of what I will gain overall. The formation of this thesis has already had different surprises at every turn. Within this unpredictable world, what I have learned from these surprises help me gain the most. So as an architect, we need be prepared to face different challenges that our notorious actions brought to us. Which that is why, I would like to say thank you to all of the North Dakota State University's professors and friends, for helping me to be ready to face –the future change and challenges

HISTORICAL RESEARCH

The present is a result from the past, while the future is a reflection of the present. In order to understand the overall context of the project and yet able to predict the future of the project, it is crucial for us to discover the past. This historical research aims to seek an understanding of different topics from the past that relates to the project, such as, the historical relationship of the site location at a large scale, the social trends in Thailand, and the hydrology design and urbanism.

Bangkok is located within a central part of Thailand which used to be called Siam. Siam where Choa Praya River Basin is today has been occupied by the Tai people for more than forty thousand years ago (Wyatt, 1984, p.3). Although, the records that show the country history can only be traced back to 800 years go. Within the 800 years, Thailand's history can be divided into five different periods:

The Nanchao period from 650-1250 A.D., the SukhoThai period from 1238-1378 A.D., the Ayutthaya Period from 1350-1767 A.D., The Thon Buri period form (1767-1772) and lastly the Rattanakosin period from 1872 to present(Yongvanit, 2008, p.3).

Starting with the relocation of the old Thai capital Ayutthaya in 1767 due to the destruction from the Burmese war (Wyatt, p.139), Bangkok has served its purpose as a new Thai capital ever since. As a capital, Bangkok has gone through so many wars with the neighboring countries and has been ruled

by different reigns. The first official king of Thailand is the King Rama I; he is a family's ancestor of the current king, Rama the ninth, After the King Rama the first was crowned, he made a decision to move the capital across Chao Phraya River, Krung Thonburi to Bangkok on the east bank. He thought that Chao Phraya River can acts at a natural barrier which might help the government to be less vulnerable to a Burmese attack from the west. Soon enough, the development along the east bank raised, the city was bursting with constructions of a new royal palace, the Buddhist monasteries. Many officials and merchandiser built their homes along the canals that radiating away from the royal palace (Wyatt, p.145). The King Rama the first did not only move Bangkok, but he also changed the name of Bangkok. Originally Bangkok means the City of Wild Plums", but, the king desired to give Bangkok a more attractive name. While Thai people call it Krungthep, meaning the City of angel, the foreigners still call it Bangkok. During the royal official business, people then used it full name (Blofeld, p.11) which is กรุงเทพมหานคร อมรรัตนโกสินทร์ มหินทรายุธยา มหาดิลกภพ นพรัตนราชธานีบูรีรมย์ อุดมราชนิเวศน์มหาสถาน อมรพิมานอวตารสถิต สักกะทัตติยวิษณุกรรมประสิทธิ, and it translates into "City of angels, great city of immortals, magnificent city of the nine gems, seat of the king, city of royal palaces, home of gods incarnate". After the establishment of Bangkok in 1767, the city had no urban planning whatever. Any construction within the city before the modernization Era, during the king Rama V, was based on the needs of a particular district. "Before the era of King Rama V, there is only a purpose for beautification" (Patarakiatsan, p.59).

Figure.35.Historical Canal Map

During the modernizing era which is within the era of the King Rama V and IV, Bangkok was introduced with a road base construction, streets and rails. However, even there were streets and railways; people still preferred to use boat as their main transportation. Although, after introduction of a new planning policy in 1932, the focus of the new policy was mostly concentrate on land base expansion (Patarakiatsan, p.62). Consequently, Bangkok did not take the policy well. Since Bangkok was built base on the waterways, instead, of an inland transportation. The characteristic of the waterway base development has to do with the orientation of the dwellings. The fronts of many houses face the river which leaves the land in the back yard for other activities such as fruits orchards and farming. However, the reverse effect happened when the people started to sell part of their orchards land. Many of these lands were sold to investors that later turned the land into a street front business leaving the land between the street front and the waterfront dwelling a "dead Zone". Therefore, these houses have no connection to the major streets which consequentially create many slum communities (Patarakiatsan, p.64).

Many of the recent social trends in Thailand have been involved with the effects of globalization (Ministry of Social Development and Human Security, 2011, p.1). Since Thailand is known for being land of the free, a literal meaning of Thailand, it does not have many rules and restriction in what comes in and out of the country (Yongvanit, p.2). With less than half of a century, the country, especially, within the

Bangkok area has developed itself into one of the most modernize city in South East Asia. Globalization has not only brought the social structure to Thailand; however, it also brought its own conflicts.

Starting from the first stage of globalization which is during colonization within the King Rama the fourth's era 1868 to 1910, Thailand was part of the western imperialism (Yuthasak, p.3). In order to maintain the country's independency, Thailand had to portray itself as a well develop, civilized society. Through, the capital infrastructure development, trading policy and the governmental and society reform, the country was on its way of a very first major transformation (Yuthasak, p.3). By 1950, the country was under the second stage of transformation, the global capital economic expansion. This created a high production of agriculture goods, and expansion of different industries (Jitsuchon, 2005). And the last transformation is during the touristization period (Chatkaewnapanon, 2011, p. 5). This period has been transforming Thailand for the past four decades (Choibamroong, p.4). Since majority of the nation's income depends on tourism, the government set up a public authority that oversees the whole campaign and the development of the tourism in Thailand. While these periods of globalization help the country sustains itself through the expansion of the economic overtime, the side effect is the changing in social trends. The view of society, education, life security, and the culture has changed. According to the analysis study from the Ministry of Social Development and Human Security, the expansion of an economics allows for an increase in education, as well as access to life security, while creating negative effects on the society and the

culture. The impacts start from a small social unit such as a family. A study shows that there is a decrease in size of a household comparing to what the old Thai household used to be. From a personal experience, it used to be that one household is consisted multiple family units which include grandparents, parents, children, grandchildren, and some time relatives. However, now, the household is just a single family unit which is just parents and their children. The decrease in a household size has led to a decrease in a family interaction which consequently leads to a dysfunctional family due to the inexistent family bond (Ministry of Social Development and Human Security, p.18). Since families are what make up the society, therefore, a human product from a dysfunctional family can lead to a change in culture.

Thai culture is centered on Buddhism (Ginsburg, 200, p.11). Many of the ritual and ceremonies are what reflected from the Buddha's teaching. Many of the important philosophy from the Buddha relates to "the middle way". This philosophy "has taught Thais to not be greedy and to learn to accept what they have (or what they can have)" (Watchravesringkan and Dyer, p.24). This teaching has affected the evolution of agriculture before the globalization in Thailand. According to the Government Public Relation Department, "Thailand is situated in a region of the world that is rich in biodiversity. The land is abundant in food crops. Since time immemorial, residents have earned their living with cultivation, thriving on the abundance on land, in the sea, and in the rivers". Since the older days, most of the families own a farm; however, due

to the changing in technology, small farmers try to expand their farm to create something similar to American type of farming. That notion has changed the overall life value in Thailand. Instead of living within their own means by practicing a sufficient farming, people start to getting used to living above their means. From the agriculture community, Thailand has stepped into an industrialize society (Ministry of Social Development and Human Security, p.20). Also, with a high number of tourism that flushes to Thailand every year, Thailand starts to become a melting pot. New products and new way of living are what the young people contrive today. The middle way of living does not match the characteristic of the new urbanized way of life anymore (Watchravesringkan and Dyer, p.24). People start to change their way of life, their beliefs, and also their value. The social trend that relates to materialism is now the key value within the society. People use materialism in a way to show the social status instead of the personal growth. As being said, the changing social trends toward the society and the culture lead to an identity loss of being Thai.

According to Danai Thaitakoo during the unanticipated futures symposium lecture in Thailand, he mentioned that water is one of the most important aspects. Water is everywhere; it is underground, above ground, in the body, in the air, as it is part of the culture and the political borders, whether it is in Bangkok, Thailand, Buenos Aires, Argentina, or New York, United States. Hydrology and design can be dated back to the starting of civilization. As far back as Roman Empire, according to Potter, the first water conveyance was an aqueduct system that was built in 321 B.C. The aqueduct was designed to use gravity as a way to transport water throughout the Roman Empire. Not only the roman, this gravity fed system has been used in Arabian country in a form of Falaj or Qanat (Butts, p.18). The system was used to irrigate the farmland for thousands of years. As the need farming decreases, the similar idea was introduced to help to channel the urban runoff and sewerage system. Within the urban area, these systems clearly fail to involve the biological and ecological factor since the goal was to just transport the water. According to Bell and Hui teh, "the nineteenth century fail to realize an urban water system based on essentially biological and ecological principles presents a prescient warning to contemporary designers" (as cited in Hackney, Glynne & Minton, p.22). Modern urban water concentrates on the sanitation of the element. Whilst Chadwick purposed the famous idea of urban water system that base on sustainability principles. He compared the sewerage and pipe system as system of vessels within our body. So, to keep our body healthy, the fluid that moves through these vessels need to contain nutrients to produce foods cycle. Halliday also mentioned that as great as the plan sounds, the plan had to be altered for sanitation factor. Result in high water pressure flow directly to the household, with the waste water channel away. The ocean is a sewage dumping place instead of being recycled (as cited in Hackney, Glynne & Minton, p.21). It is important for a designer to keep revising the design, and need to look at the big picture instead of just the goal.

Site Analysis

SITE NARRATIVE

What really makes this site wonderful is the experience that the person gets, starting from how a person transports him or herself to the site. The preferable way to get to the site is the public boat ride through a historical river, Chao Phraya.

As you channel through this large river, the movement of the boat, the splashing mist from the river, and the cool breeze, are the finest thing a person can experience, especially after walking around Bangkok in a hot humid day. The boat ride begins at the more urbanize part of Bangkok, and then makes it way up to the historical core. As the boat moves closer to the historical core, the tall skylines get lower. The uninterrupted skyline allows you to see the life of the Thais by their river. The old wooden houses on the stilts, the temples, the palaces, and the public buildings are a physical record of the rich culture. Consequentially, by the time, the boat arrived to the historical core; you will feel like you have travel back in time.

Within the historical core, the boat dock for the site is located between the two important docks, the first one is where a Thai royal temple is, and the second one is where many of the tourist attractions are. Once a person gets off the boat, the inactivity of the area makes it feel like the site is within a dead zone. There were only the locals that used the docks. This dock is totally opposite from the two important docks that are located by. Since the site is inaccessible from the docks, the person has to go through a small community. However, since I was an outsider, the safest and the easiest way to go through the community is to ride a motorcycle taxi. The entrance of the community was easily noticeable, because it was very well ordered. An elaborative Thai design sign was hung above the "gate like" metal frame addressing the community's name and its border. Through a 15 – 20 feet wide street, both sides were filled with

old gritty houses and food vendors for the locals and the school children. There was a nice old temple that was in a restoration and a public school that was first built to educate the monks. After passing the school, the community started to look less organized. The street is scattered with over flow garbage, and people personal things that they cannot fit in their house. The path was fairly flat; accept when I went over archlike canal bridges which was right by the site. Even though, the canal looked contaminated, there was hardly any smell.

Because the site itself is an empty land within a highly dense low income community, the government had put up a gate to stop people from inhabiting the site. From the gate, the site looked fully flushed with green tall grass, natural vines, bushes, a big Bayan tree; it is the most natural spot within the community. The site was way different from the last visit. As of three months ago, there were about eight contemporary houses that were built for the construction workers who had moved to Bangkok hoping for a better future. At that time, the site was accessible because the gate was broken into. Even after, the construction of the contemporary houses, the site did not look at all damage since it was still flushed with tall green grass.

Once I got back to the dock, as physically distress as the area was, the community presented the liveliness of the people and the history within itself. Along the ride back, as the city was filtered with amber sun, the airy atmosphere made me think of the site which was the thing that I think helped me complete the experience of Bangkok. By the end of the day, the temples, the palaces, and the stilt houses cast their shadow onto the Chao Phraya River as a reminder of how importance the waterway once was to Thai people.

The panoramic view of the boat ride as arriving to the site

Figure.36. Panoramic View of The Boat Ride 1

Figure.37.Panoramic View of The Boat Ride 2

Figure.38.Site Texture Map

The texture of the site
and its surrounding
The texture on the site consists of different plants and shrubs, Lose gravel and underneath it everything is where the soft clay is located at, The texture around the site is very hard, dirty and gritty since the streets are paved with concrete. However, with the canals water running through the site, the over all quality seems balanced

Figure.39.Site Textures

Figure.39. Points of Photos

Figure.40.Panoramic View of The Site

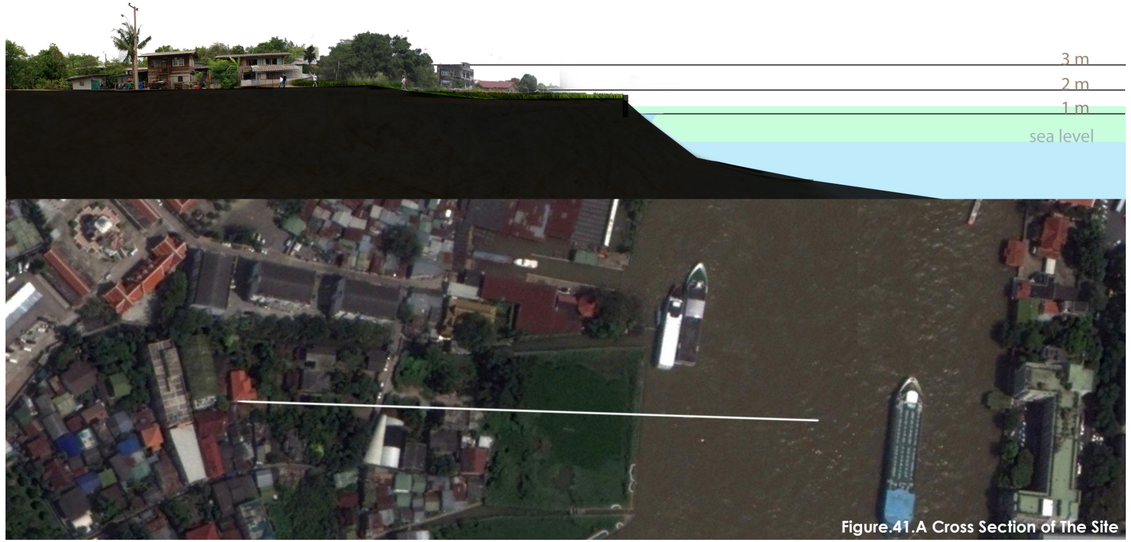


Figure.41.A Cross Section of The Site

Macro - Agriculture

The agriculture of the Chaophraya Basin has a huge impact on the city seasonal flood. Since large amount of contaminate water from rice paddy is being released every year during the flood season.

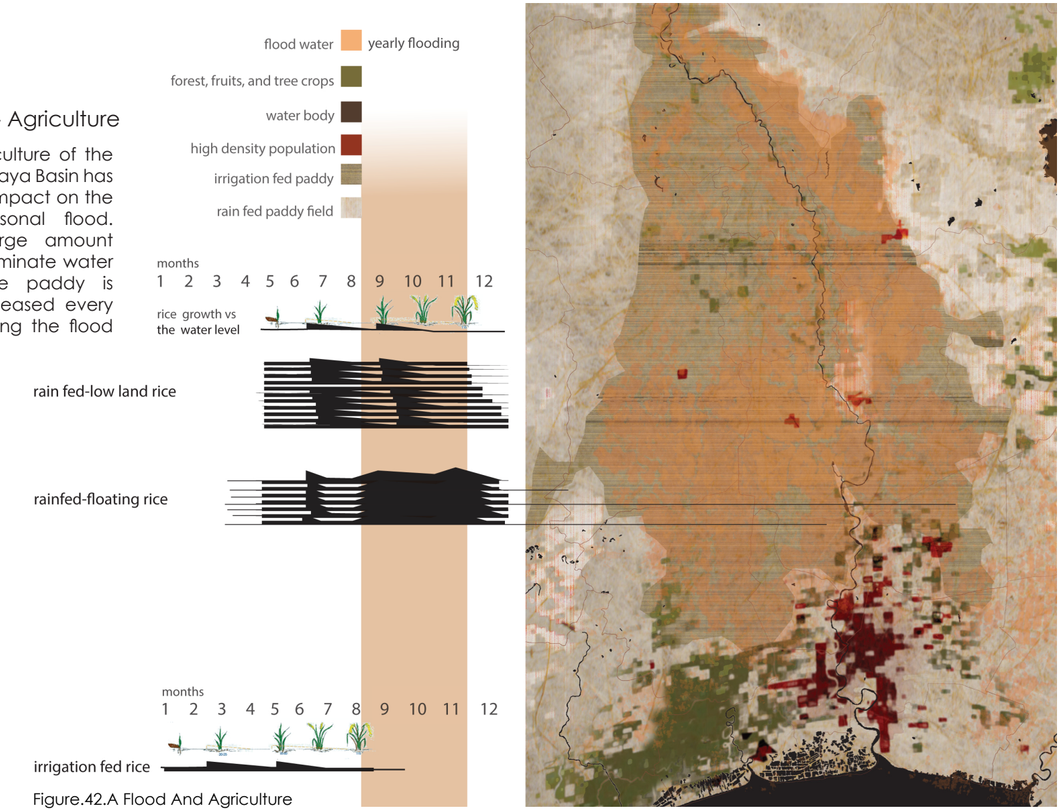


Figure.42.A Flood And Agriculture

Micro -plants

Different kind of plants were present in the site starting from weeds, vines, banana trees and a large Bayan tree. The property of the soil is like many places in Bangkok. It is rich and full off nutrients, most of the plants will grow within this type of soil whether you plan for it or not, Just like how this site was inhabited three months ago, and as of now the site stills look like it has been untouched for a long time.

Figure.43.Existing Plants on Site

Water

There are overall 2 types of water body around the site. The first one is the Chao Phraya river. The second one is the canals. There are overall two canals that run through the site. The first one seems more contaminated than the other one since it gave out a little but of odor. Two of these canals will the main focus for the project.




Figure.44.Existing Water Bodies on Site

Wind:

Since the site is right by the river, the prevailing wind was able to move through the site. At a higher elevation or when a person stands closer to the river, the more breeze there was.



Figure.45.Existing Wind Pattern on Site

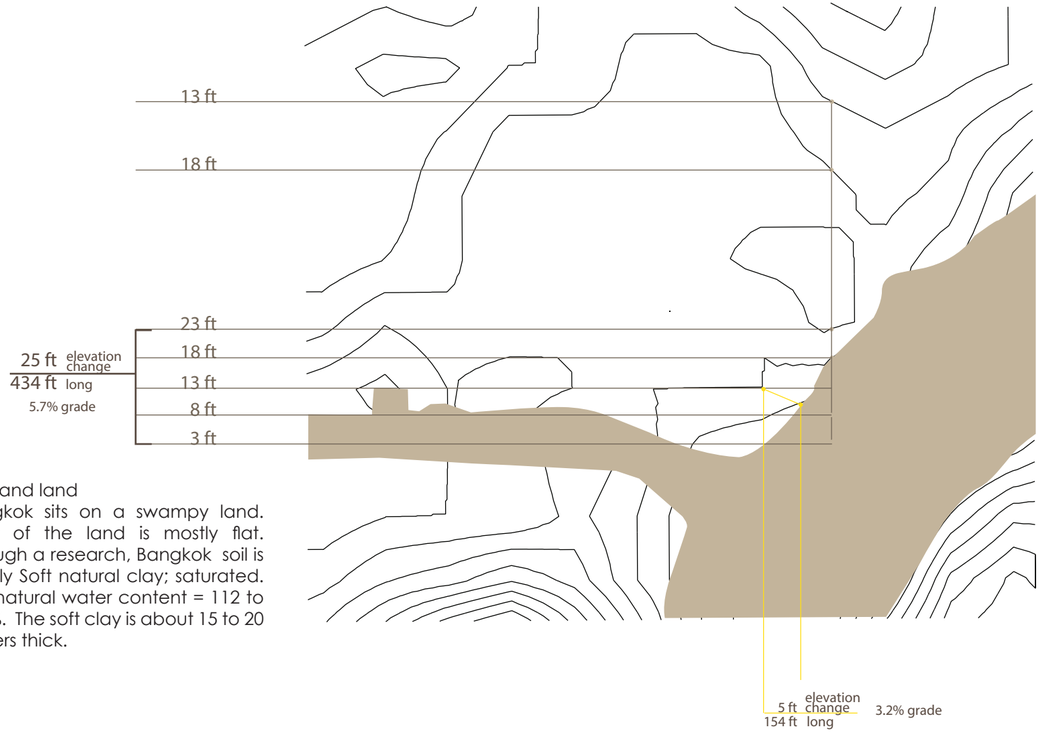


Figure.46.Soil Study

soil and land

Bangkok sits on a swampy land. Most of the land is mostly flat. Through a research, Bangkok soil is mostly Soft natural clay; saturated. The natural water content = 112 to 130%. The soft clay is about 15 to 20 meters thick.

The formation of the site through time

It seems like the formation of the land within the site might be man made. Due to how the land start to from after placing a concrete edge. Since the formation is new, the right structural foundation is crucial.

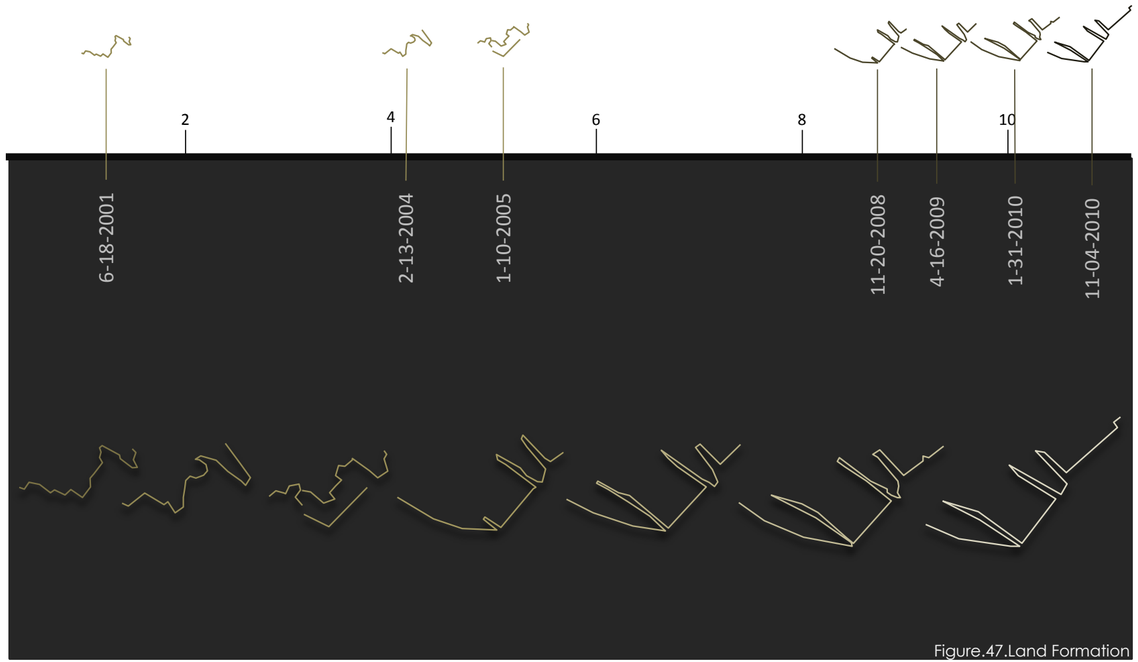


Figure.47.Land Formation

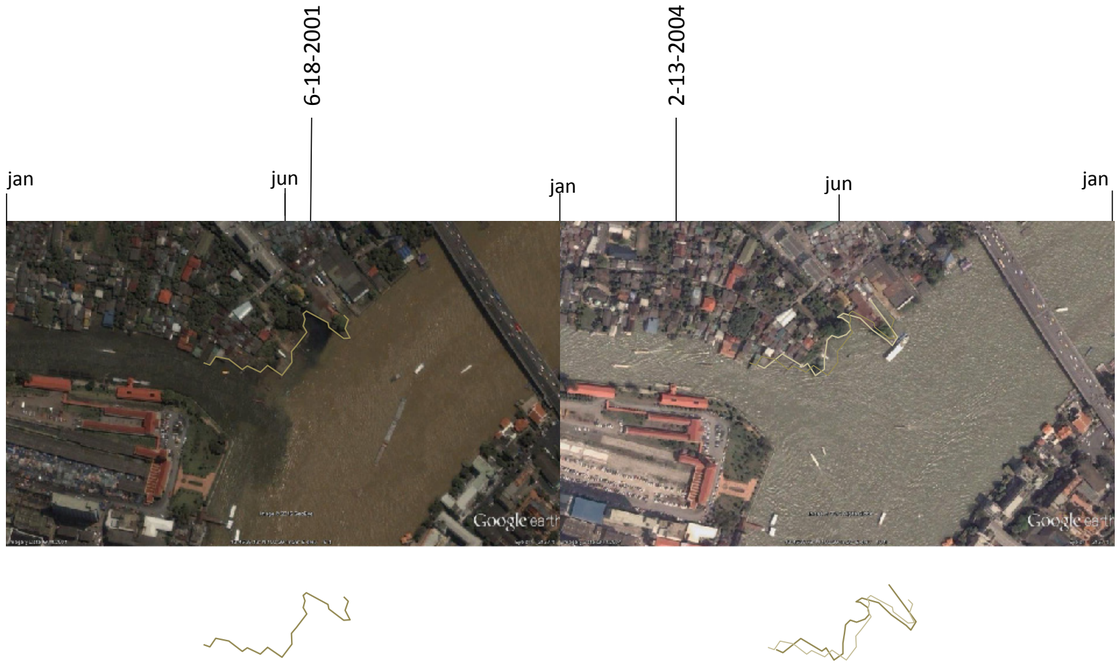


Figure.48.Land Formation 2001,2004

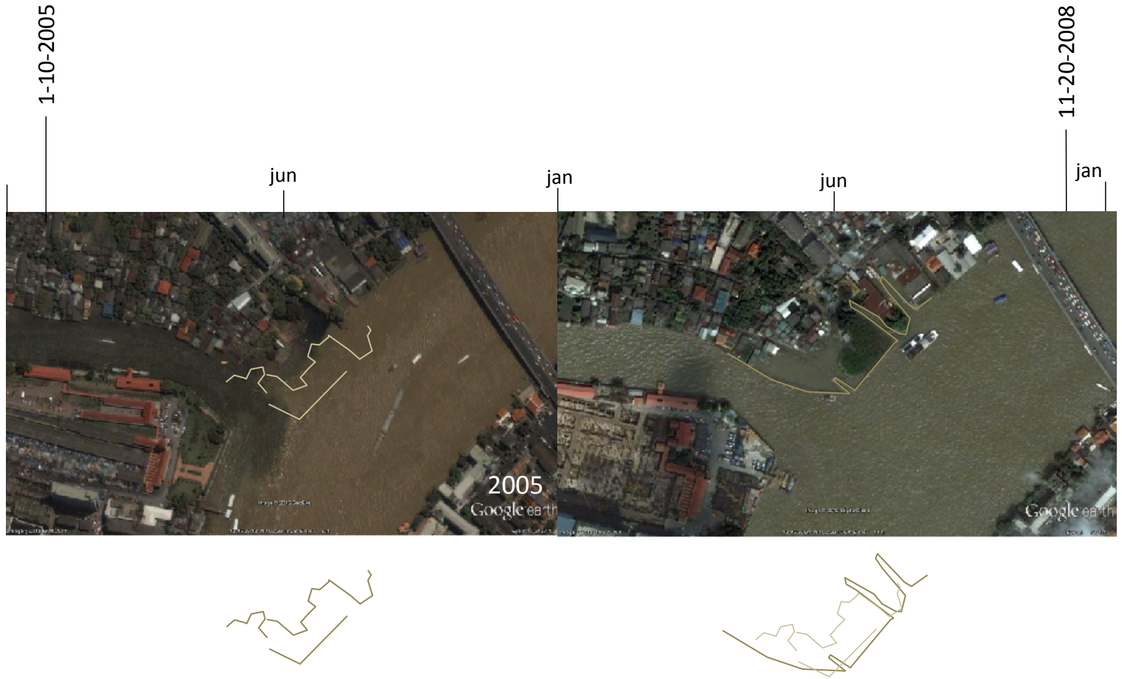


Figure.49.Land Formation 2005,2008

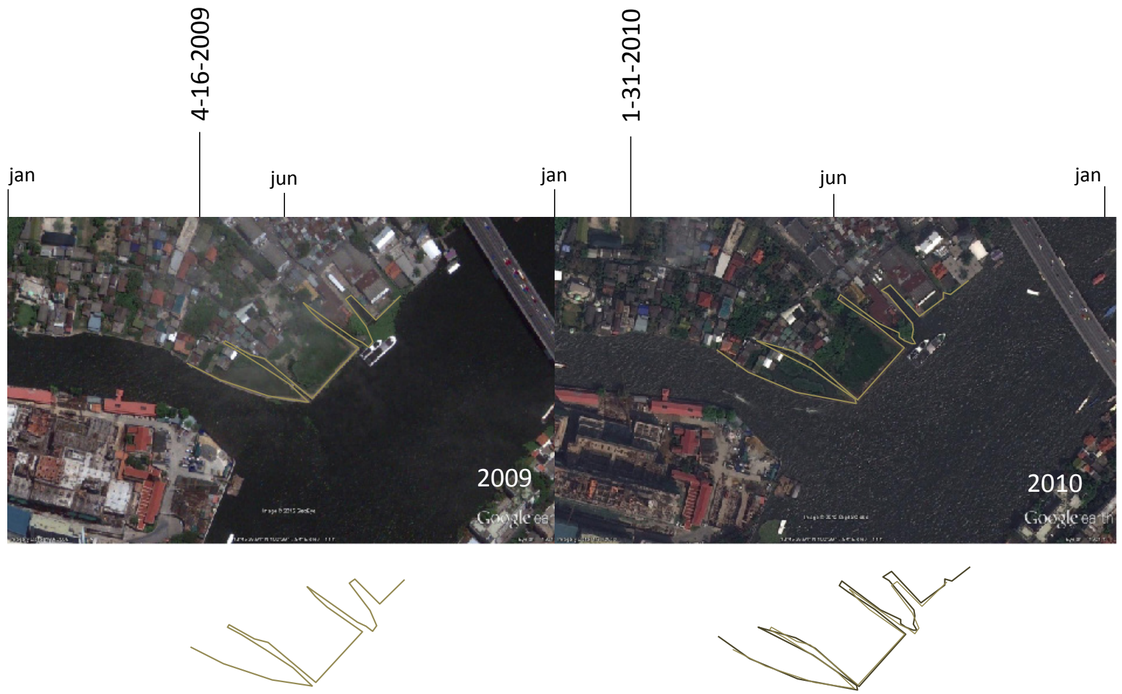


Figure.50.Land Formation 2009,2010

Figure.51.Land Formation 2010

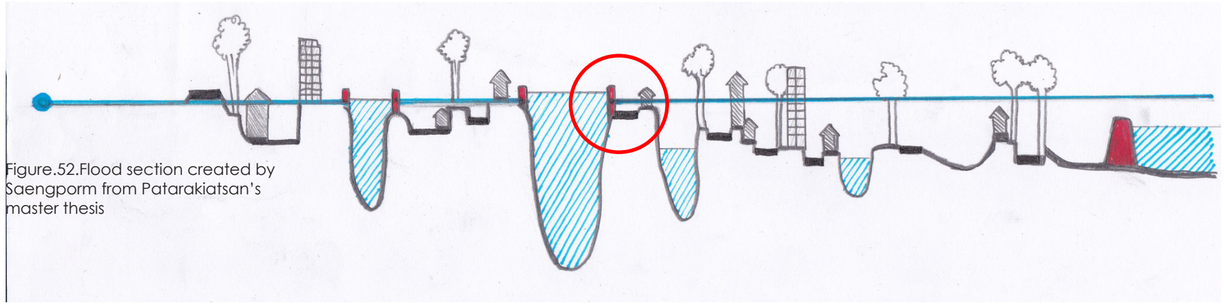


Figure.52.Flood section created by Saengporm from Patarakiatsan's master thesis

Figure.51.Land Formation 2011

Utilities:
The utilities of the site is visible from the street. Starting from the community's main entrance, the person can see how the light polls are placed at one side of the street.

Vehicle and Pedestrian:
The streets within the community are used for all kind of transportation and also human activities. The size of larger street can between 15 - 25 feet wide. Small streets can starts from 5 feet wide which is used for motorcycle and bicycle or as a walking path

Human characteristic:
Since this is an older water front neighborhood, people within the area seem to know one another pretty well. Mostly consist of Thai people, the locals. Since there is a school on the site, there are a lot of young families that were present.

Figure.53.Site Photos(Streets, Canal)

Site characters:
Some of the area within the site was filled with overflow garbage and there were a lot of people's personal things that were just placed on the street to create a little gathering space or just a storage since some of the houses were too small

Figure.54.Site Characters Photos

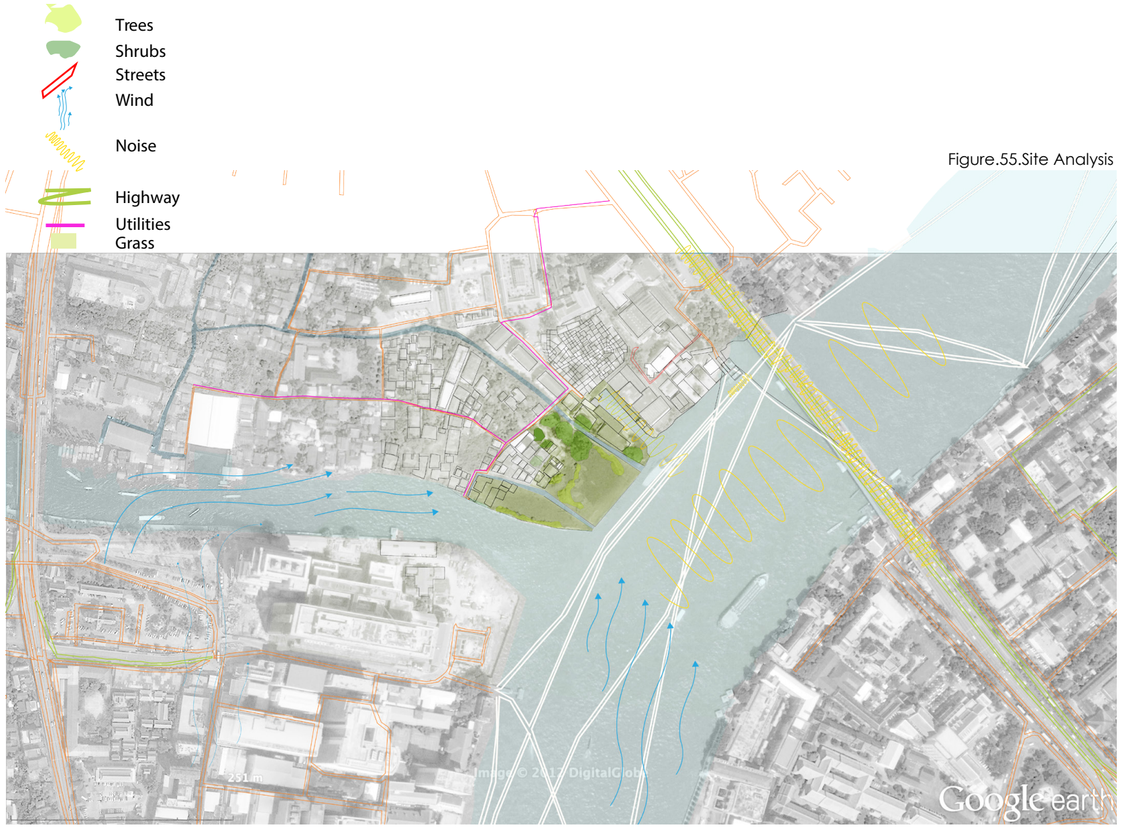


Figure.55.Site Analysis

Climate

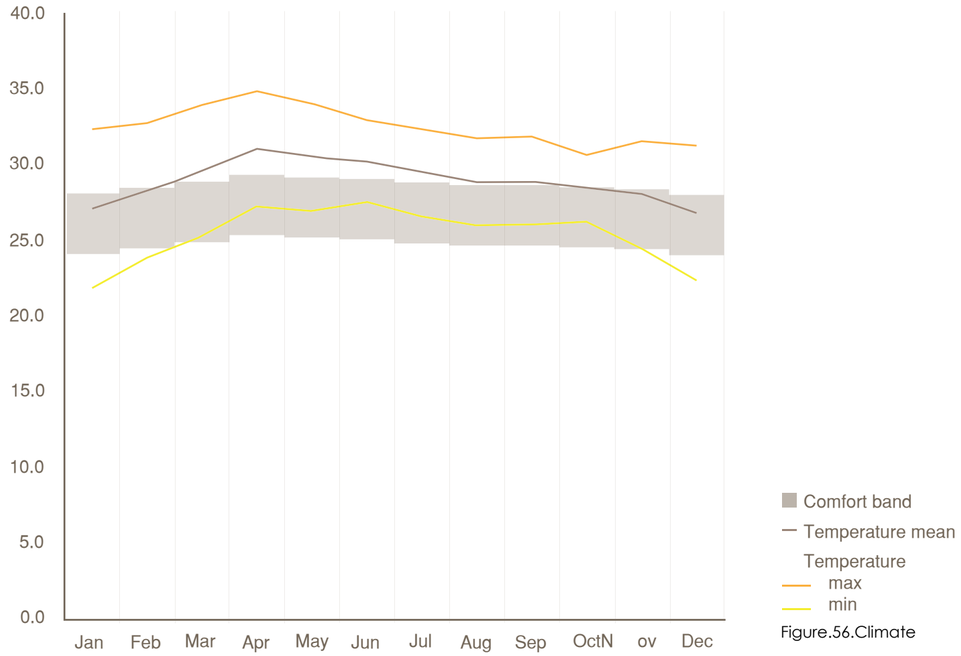


Figure.56.Climate

rain fall

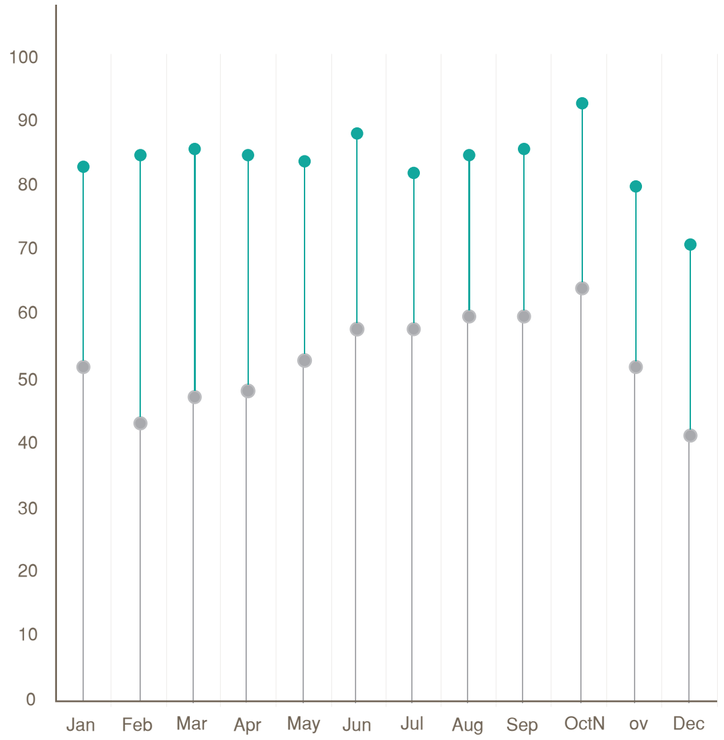


Figure.57.Rain Fall

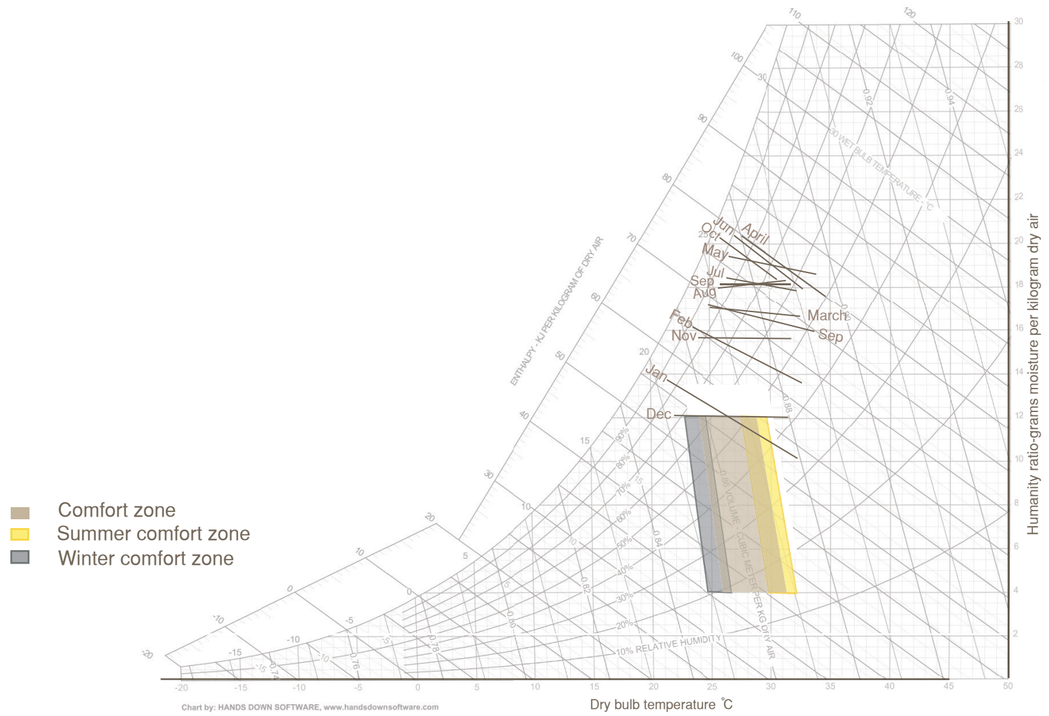


Figure.58.Humidity

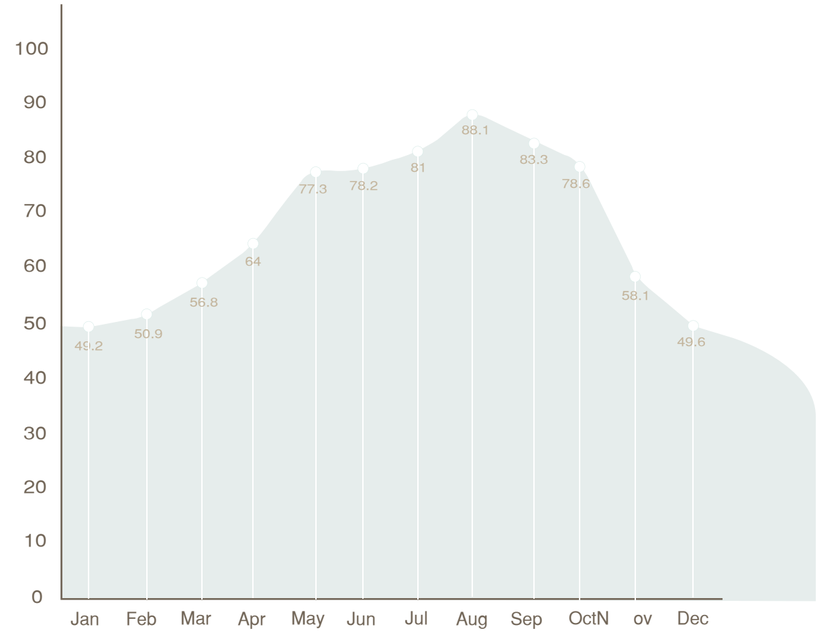


Figure.59.Cloud Coverage

wind

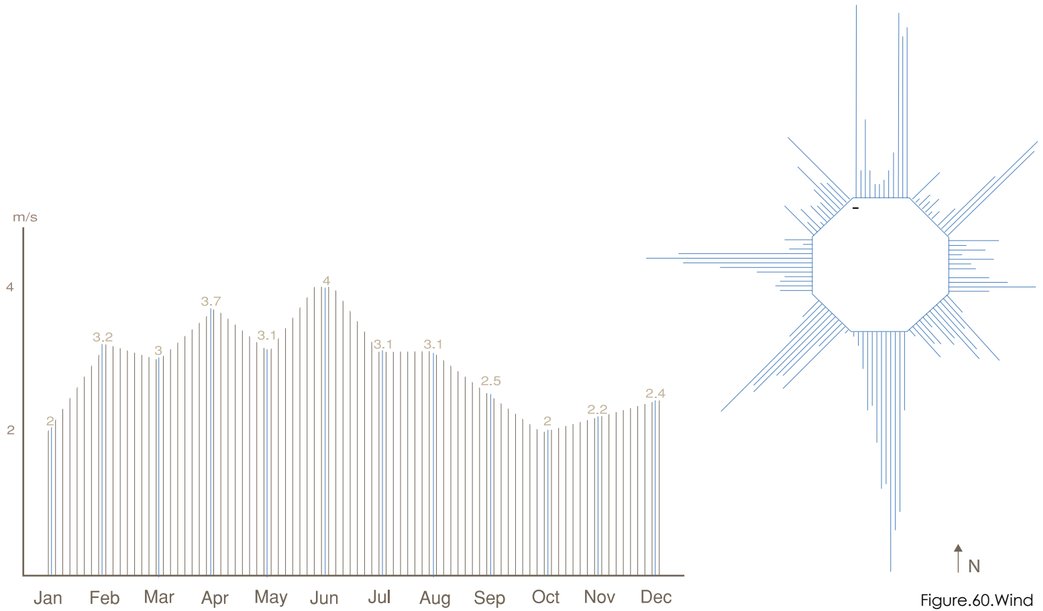


Figure.60.Wind

sun path

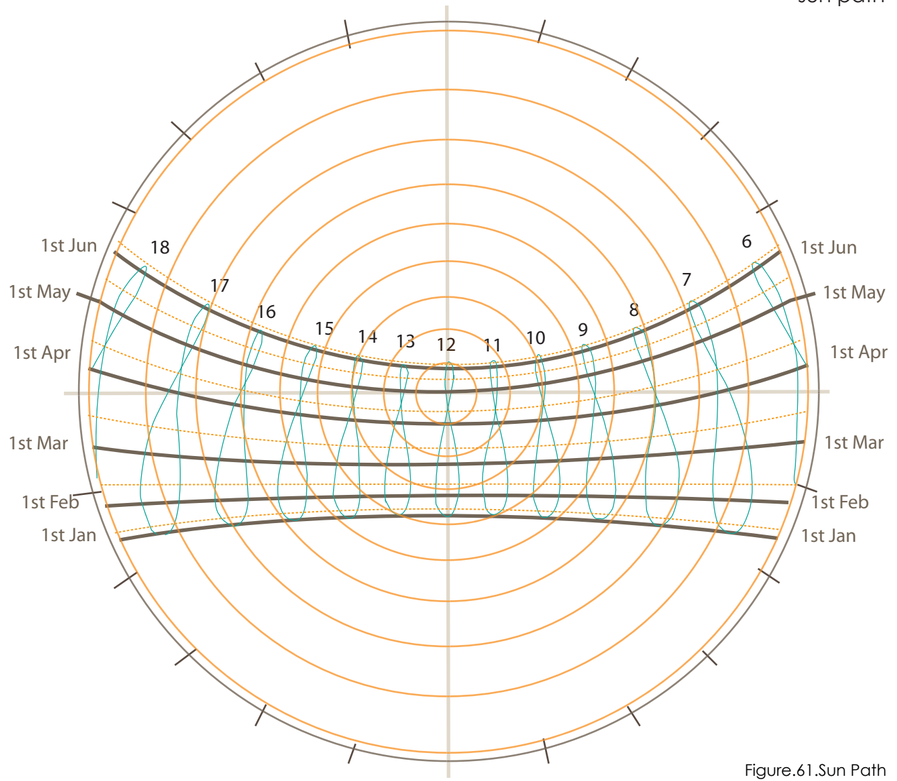


Figure.61.Sun Path

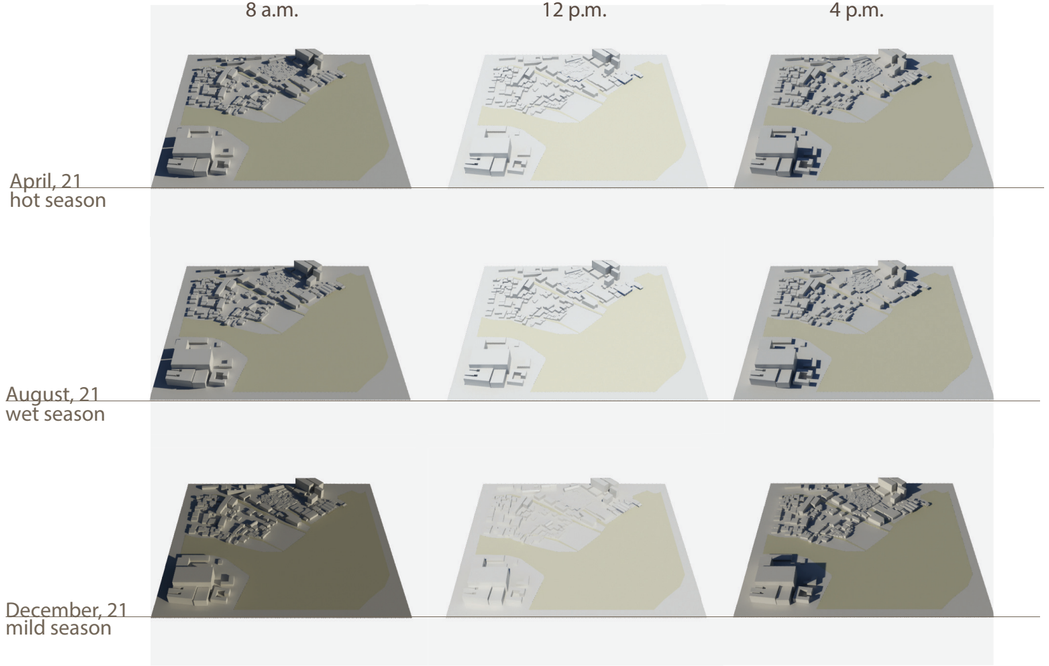


Figure.62.Shade&Shadow

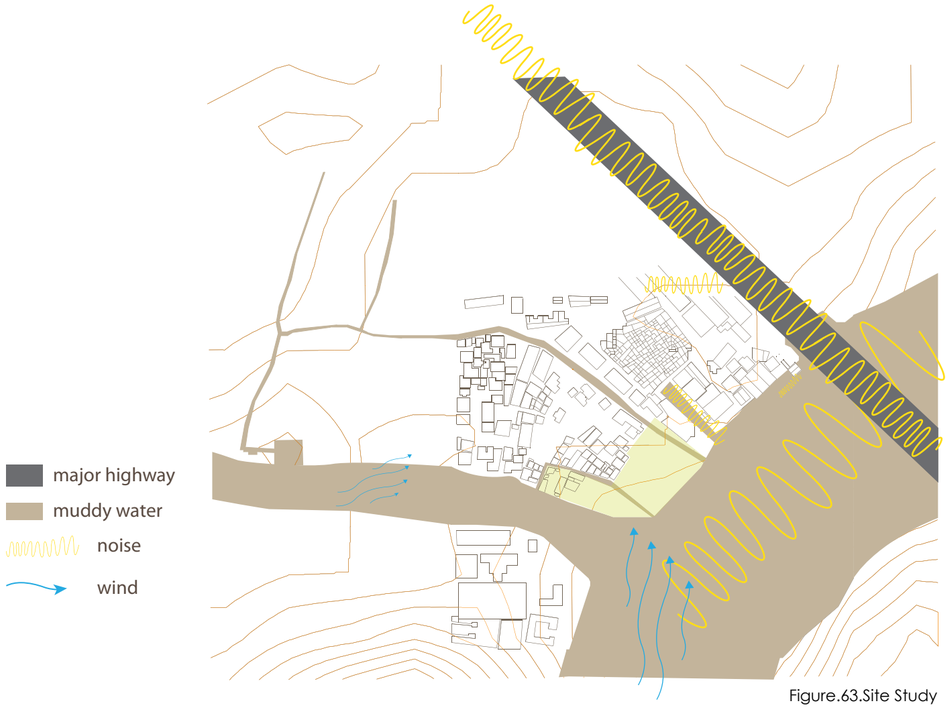
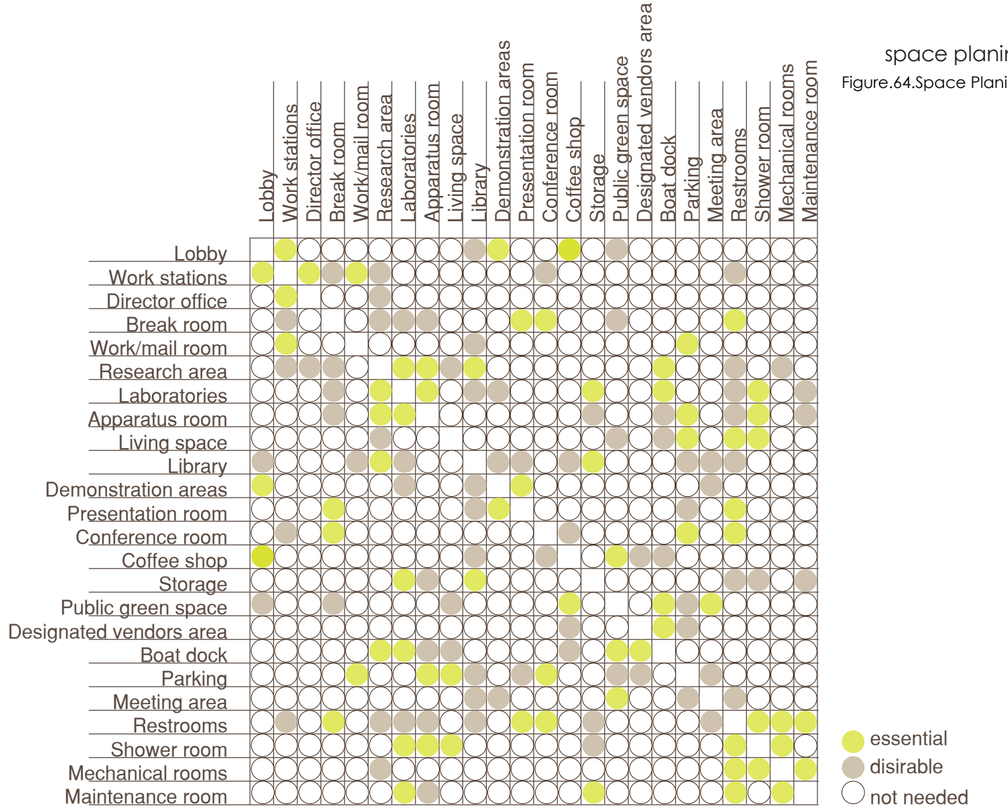


Figure.63.Site Study

Program

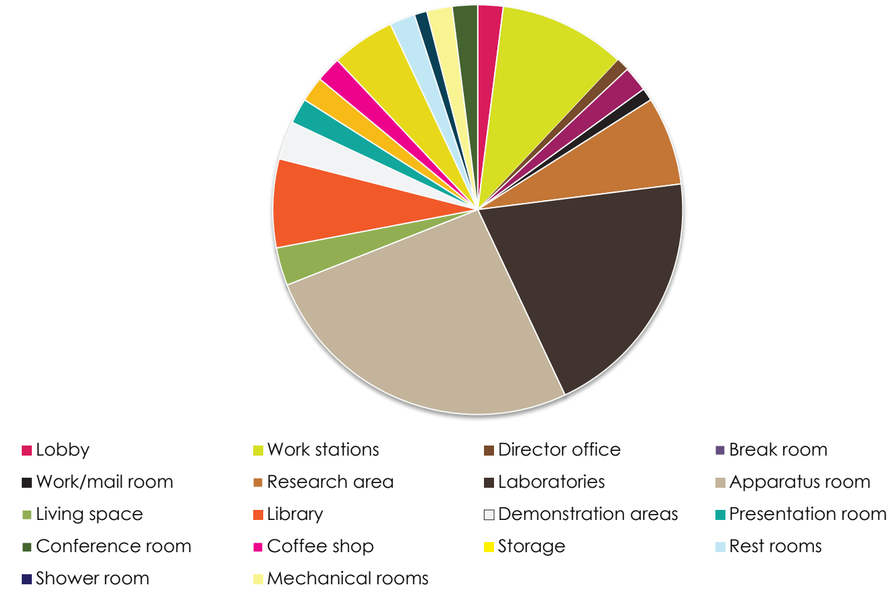


space planing

Figure.64.Space Planing

spatial distribution

Figure.65.Spatial Distribution



Lobby	3550
Work stations	1120
Director office	250
Break room	350
Work/mail room	100
Research area	2600
Laboratories with 10 stations	7700
Apparatus room	5000
Living space	2000
Library	1800
Demonstration areas	1200
Presentation room	1200
Conference room	900
Coffee shop	900
Storage	2770
Public green space	No requirement
Designated vendors area	No requirement
Boat dock	No requirement
Parking	10 Cars
Community meeting area	No requirement
Rest rooms	1400
Shower room	200
Mechanical rooms	2200
Maintenance room	400

Community

35600 Square feet

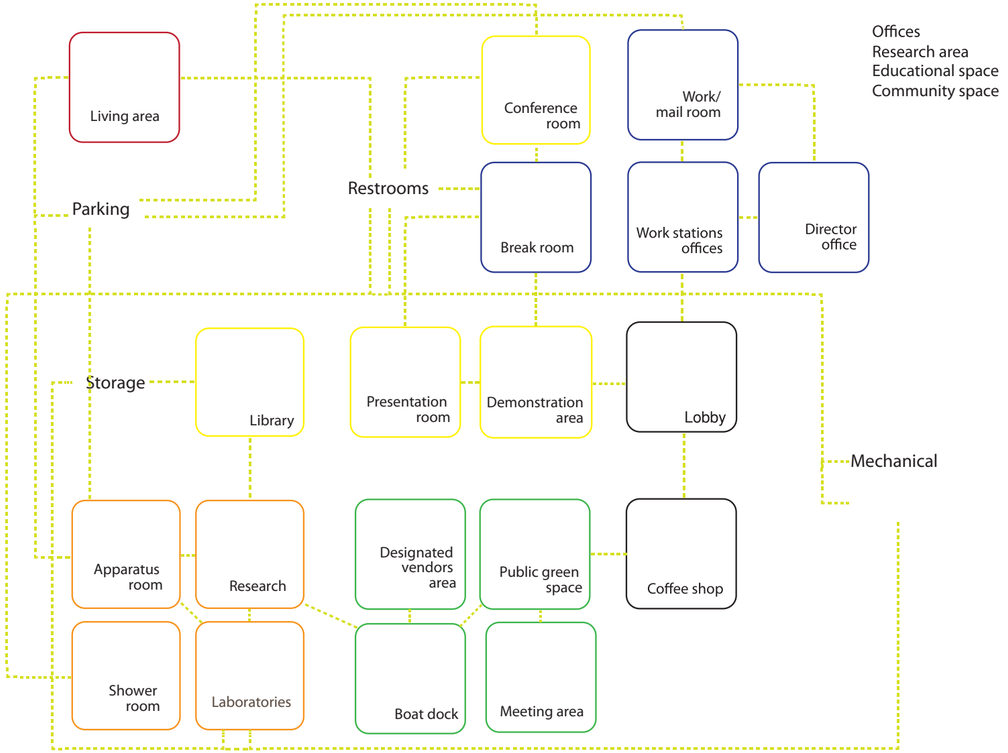


Figure.66.Spatial Map

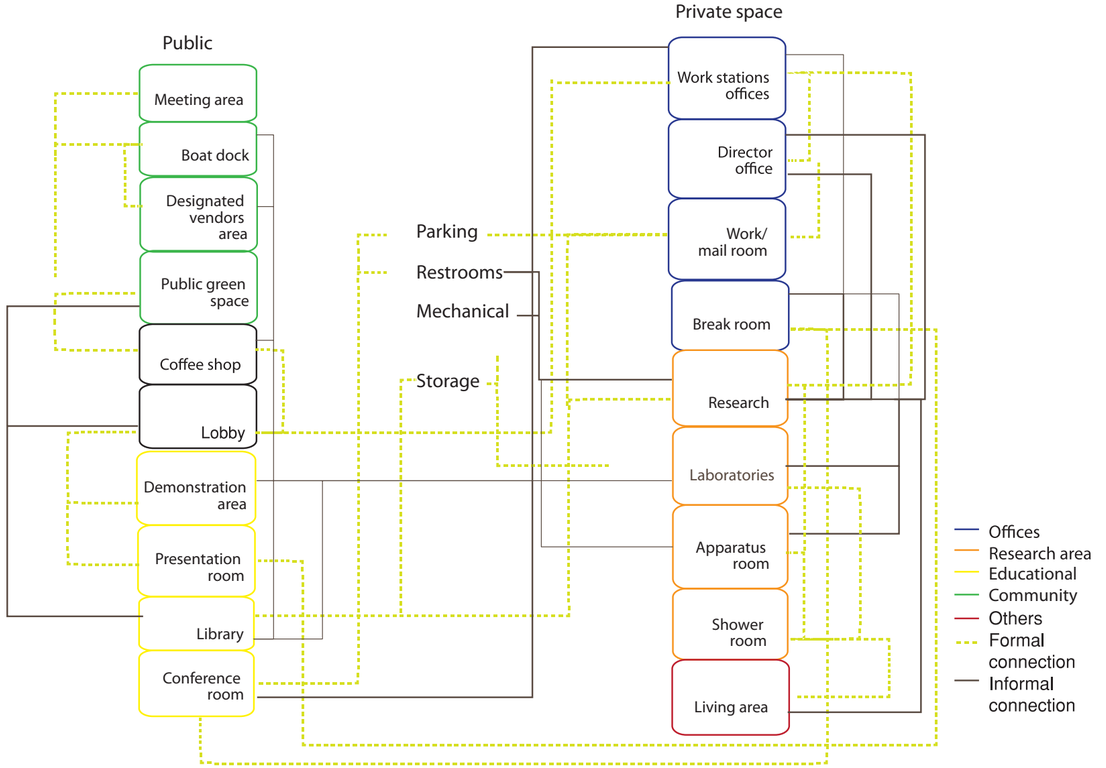


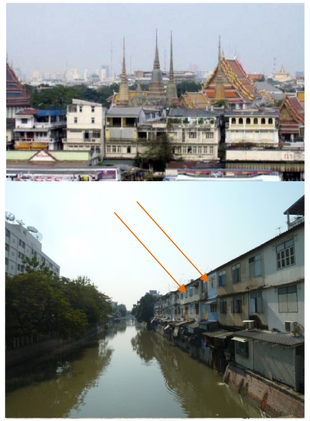
Figure.67.Spatial Map 2

Process

Concept: integration through water

To weave the locals, visitors, researchers and surrounding community through a central location to better access and integrate the importance of Bangkok water culture.

Bangkok + its issues



Waterfront development
-people turn their back on water

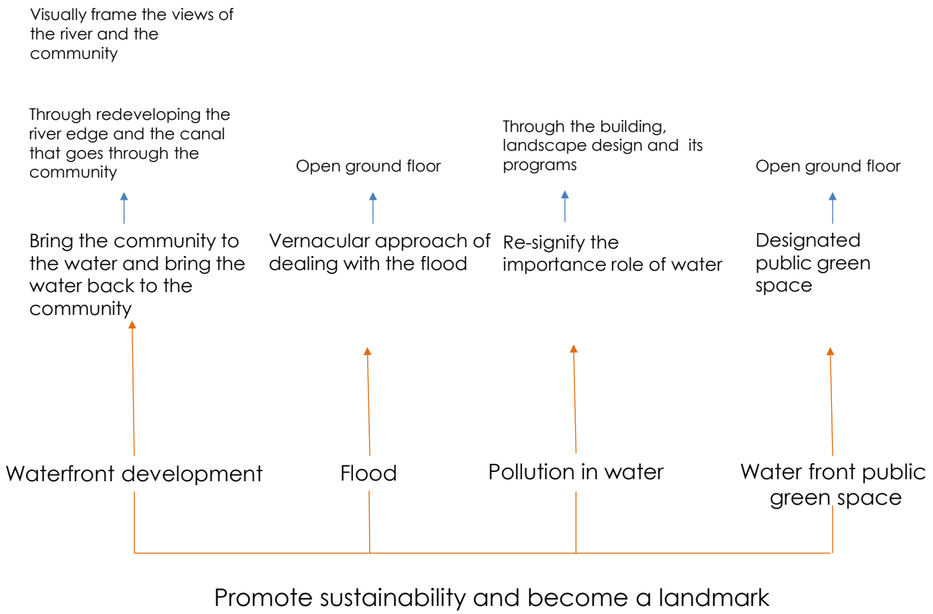
Flood

Pollution in water

Water front public green space

Figure.68.Bangkok and Its issues

Check list



INSPIRATIONS

Openness of Thai architecture and the use of circular geometry to create and unite the people to central

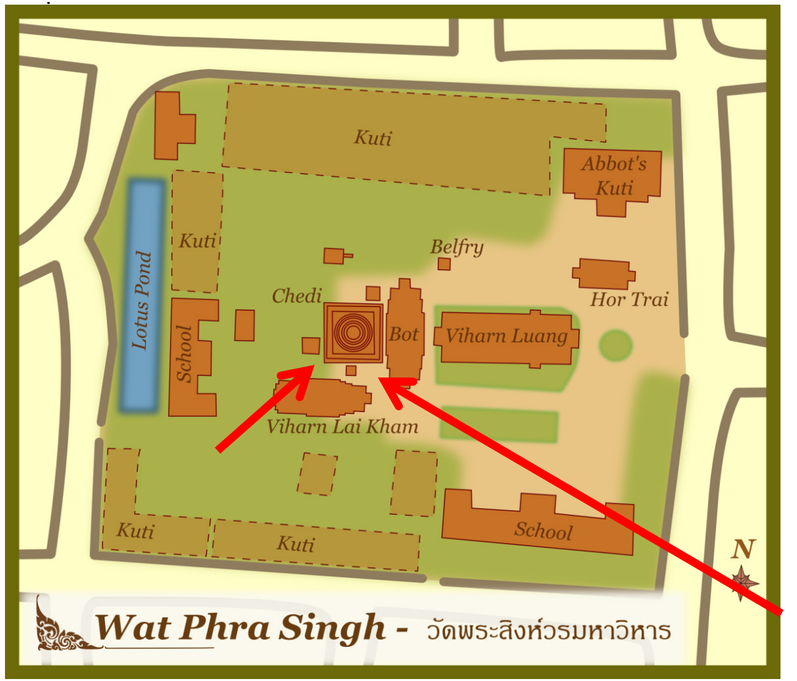
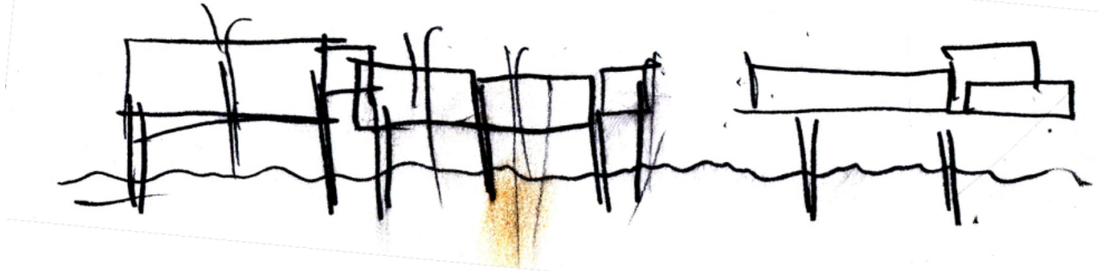


Figure.69. Floor plan diagram of Wat Phra Singh from wikipedia

Raise floor, a vernacular way of dealing with flash flood and seasonal flood



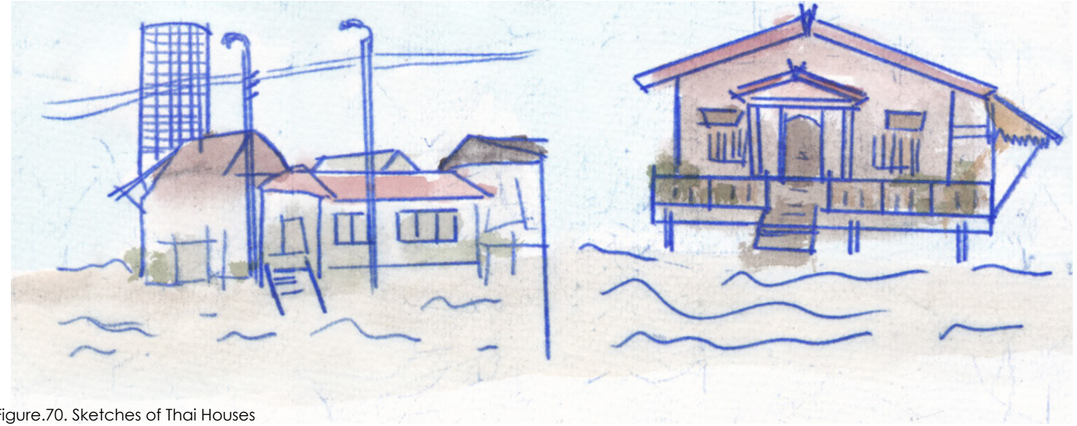


Figure.70. Sketches of Thai Houses

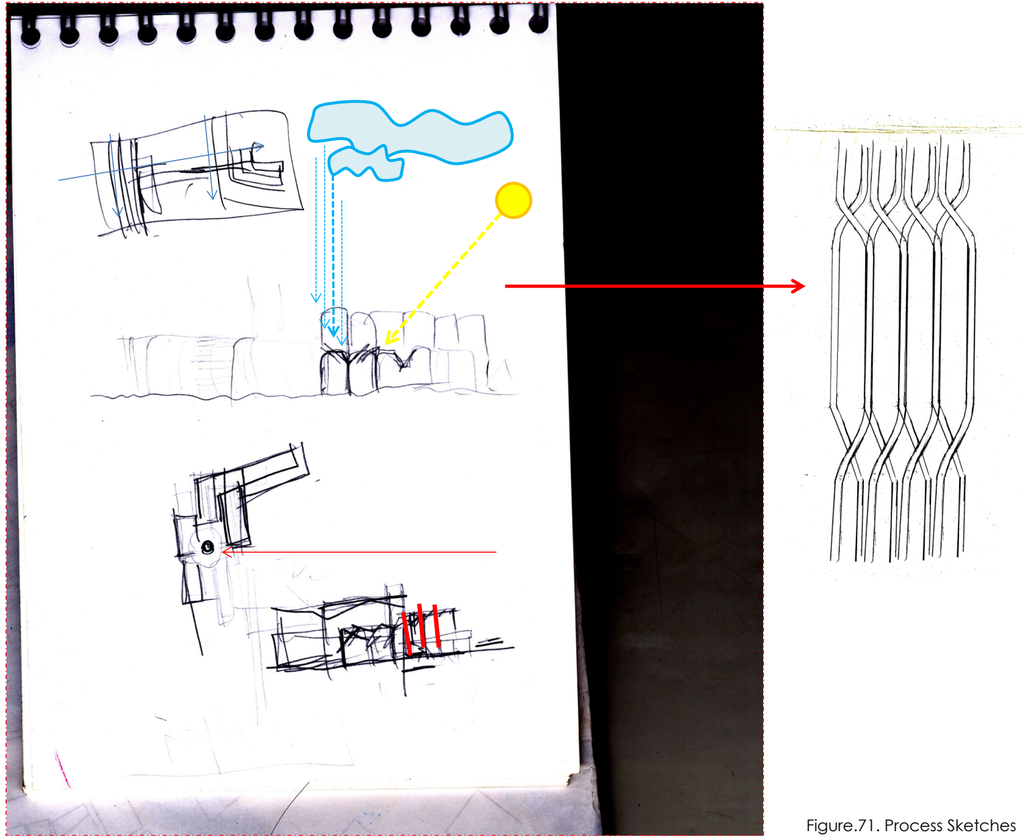


Figure.71. Process Sketches

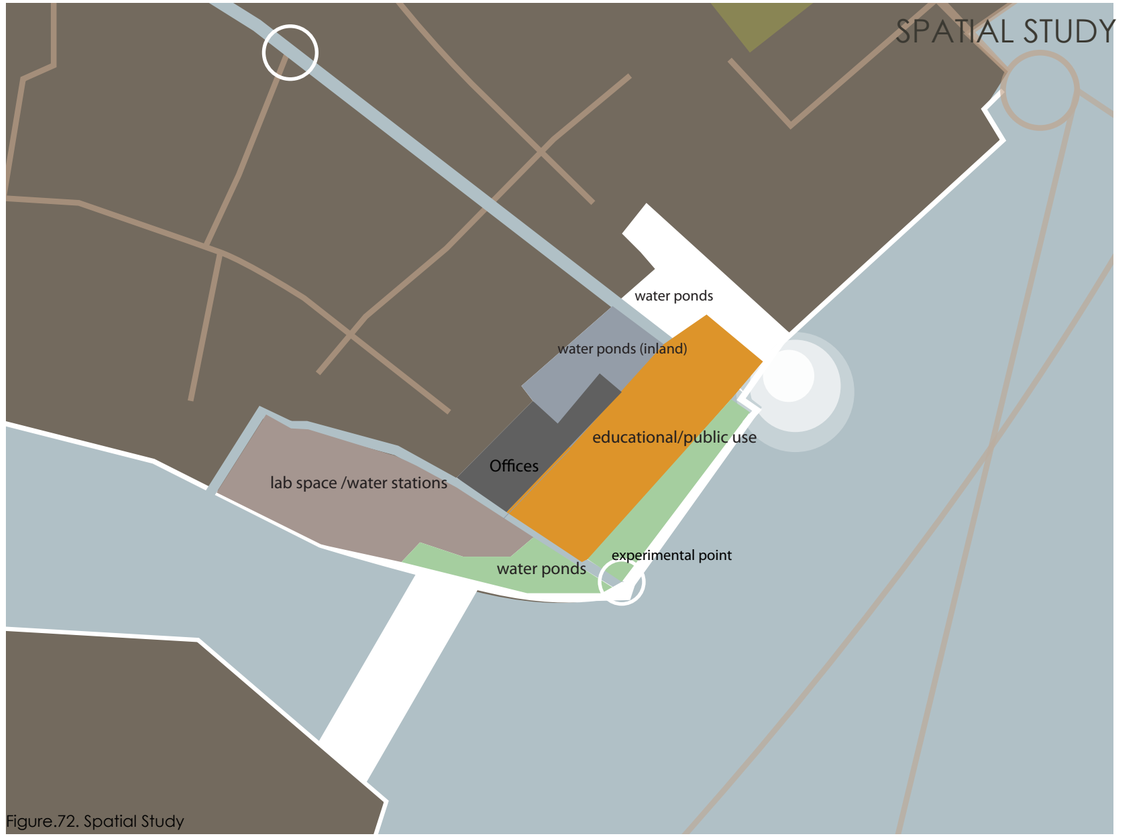


Figure.72. Spatial Study

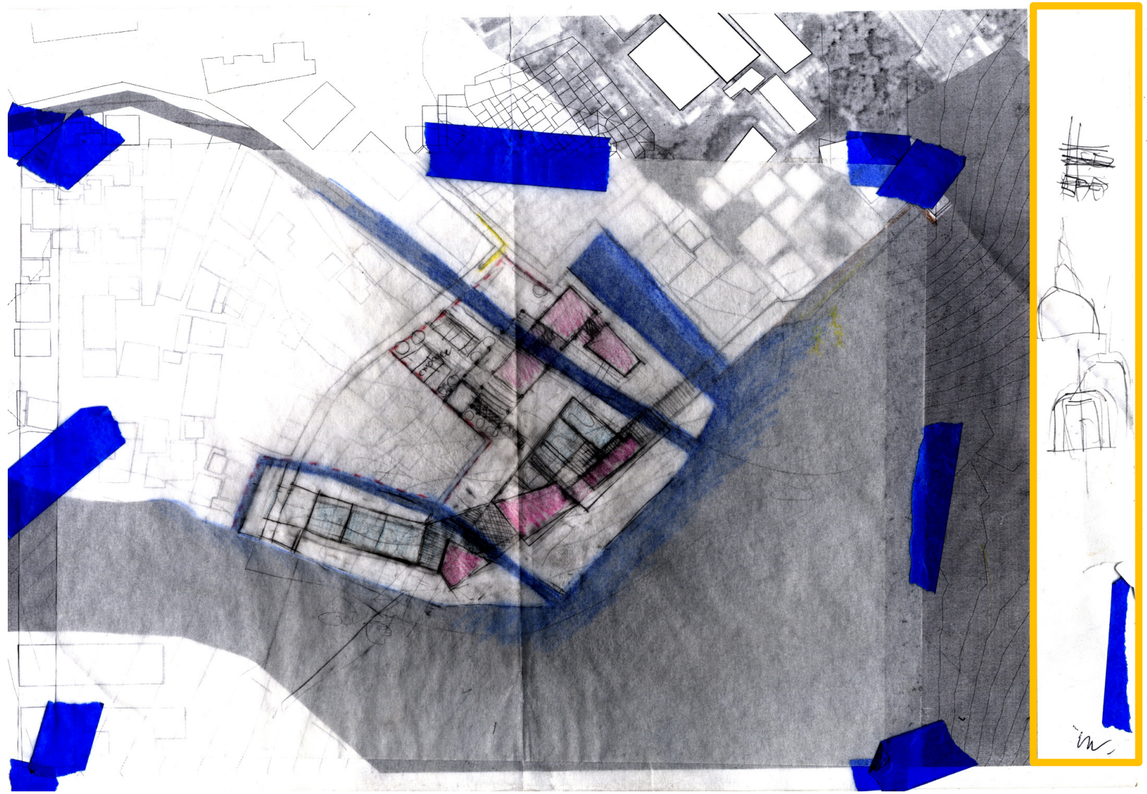


Figure.73. Spatial Sketches

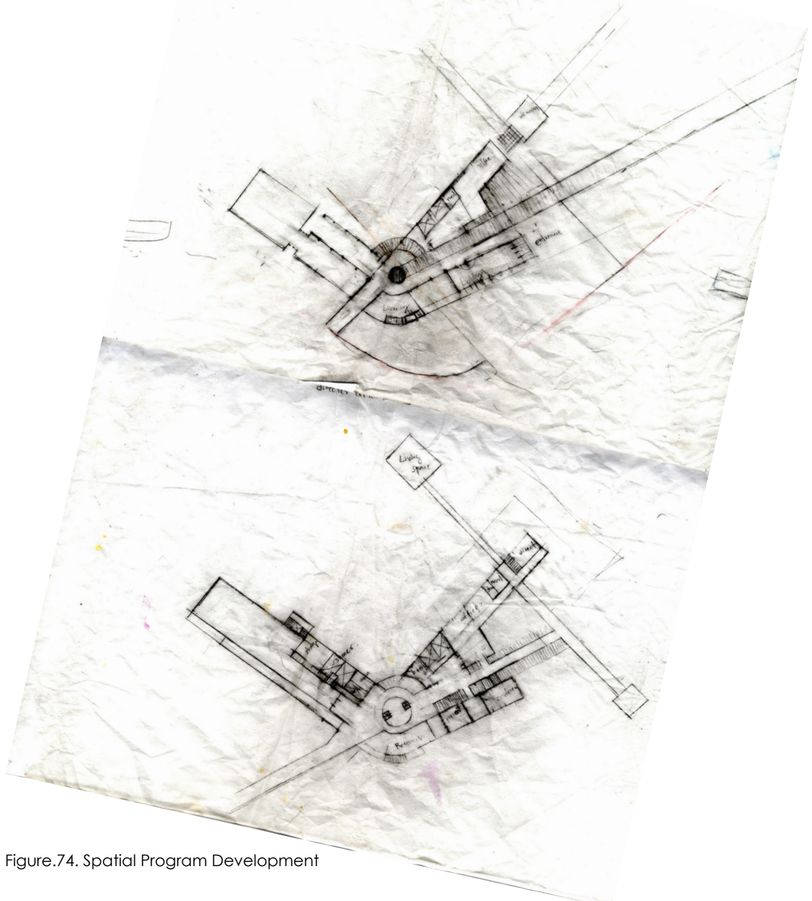
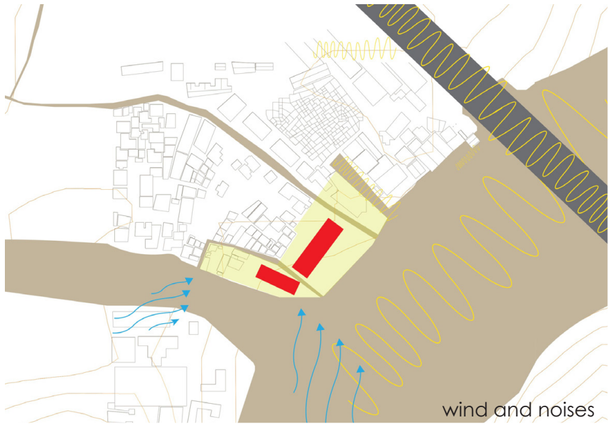
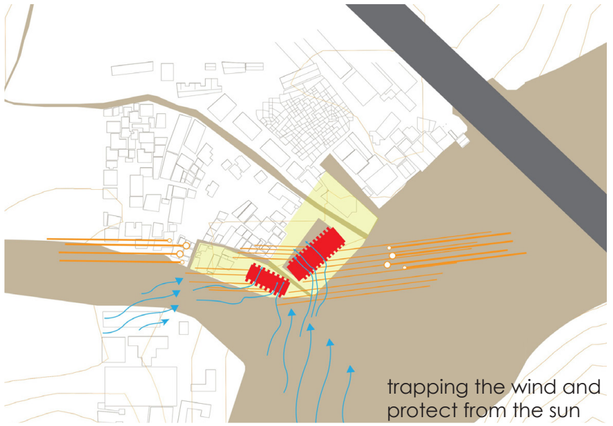


Figure.74. Spatial Program Development





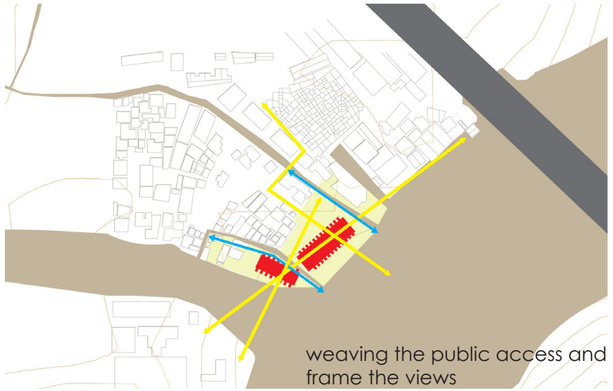


Figure.75. Building Form Development

Final Design

Figure.76.Site Map

Walking path that can trap overflow garbage

The steps allow the people to interact with the canal as well as maintain it. Through out the canal edge, the land also is elevated 5 feet lower to create a more intimate public space for all the activities such as for food venders, community meeting area.

Water filter : rocks, course sand, fine sand

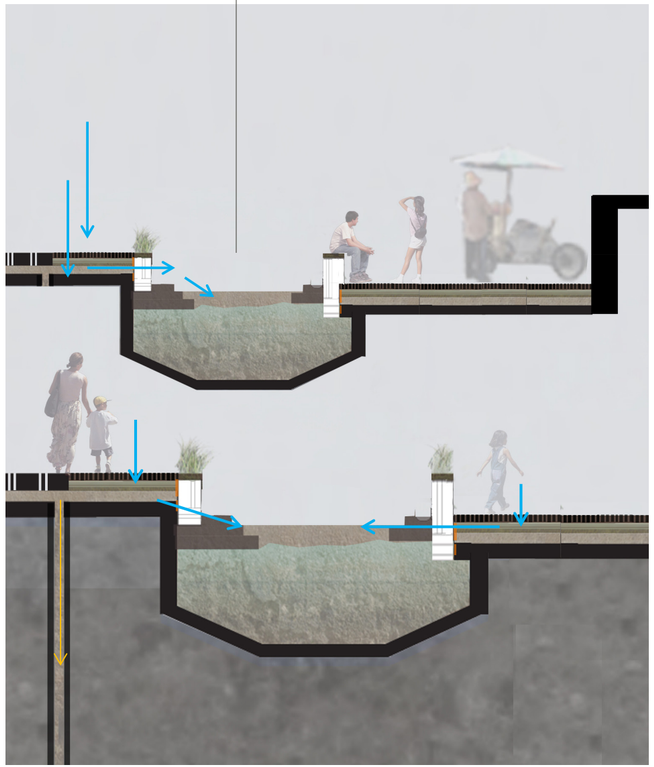


Figure.77.Canal Design

By expanding the walk path, the users are able to use the space for other activities and also allow them to become more away of the canal.

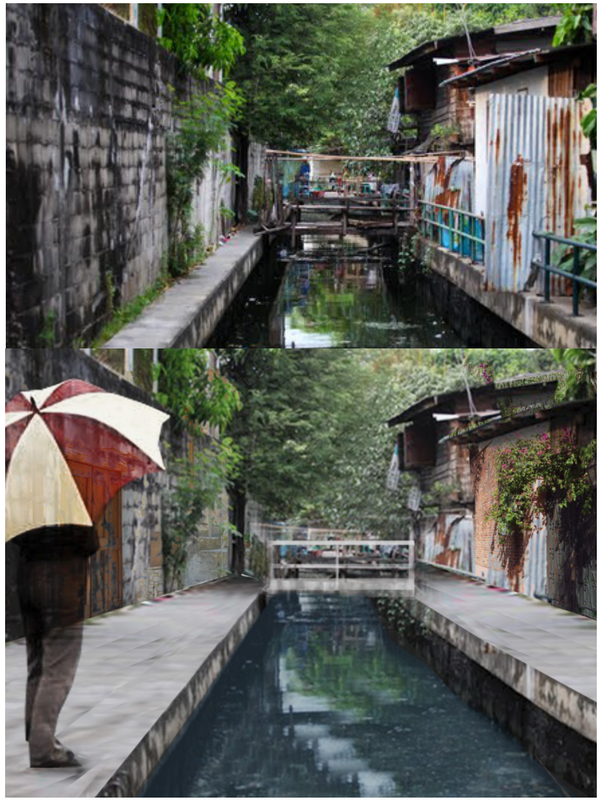


Figure.78.Canal Design As You Enter the Site

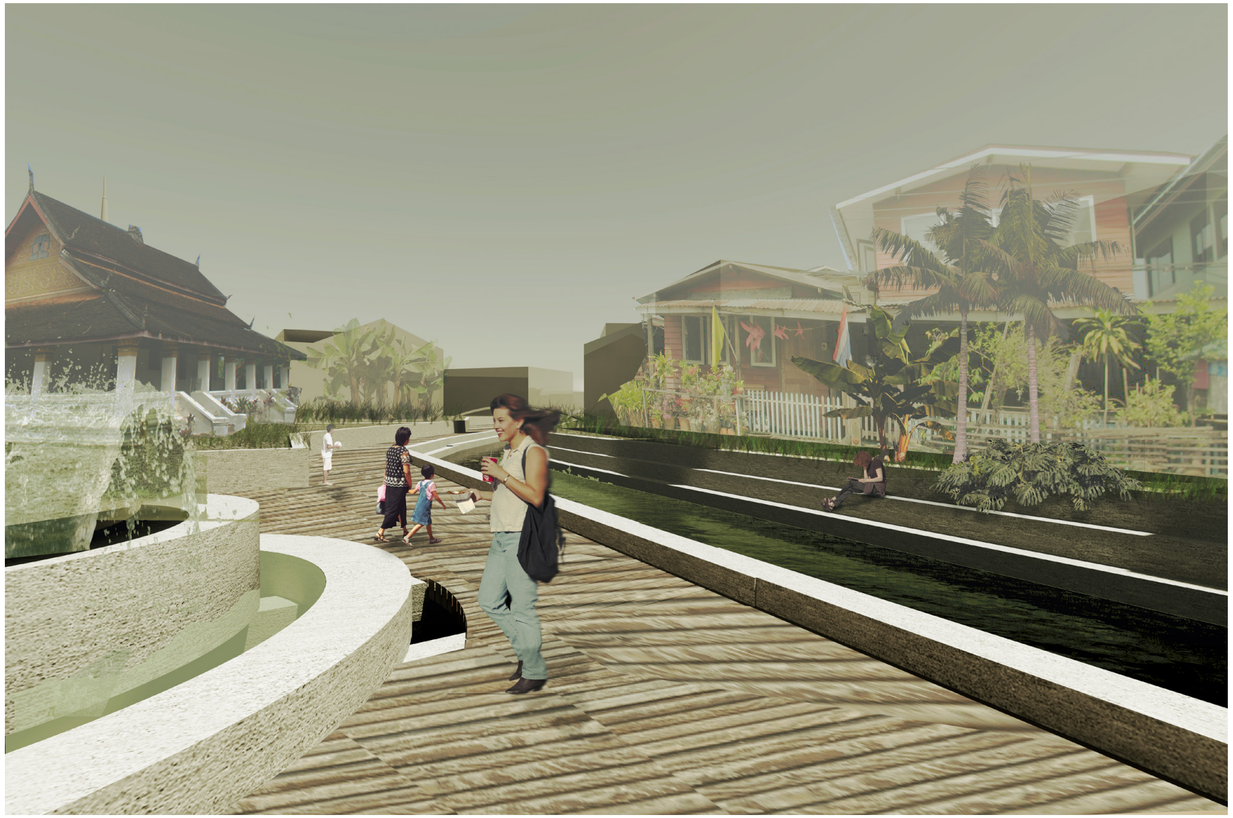


Figure.79.Canal Design With a Community Fountain

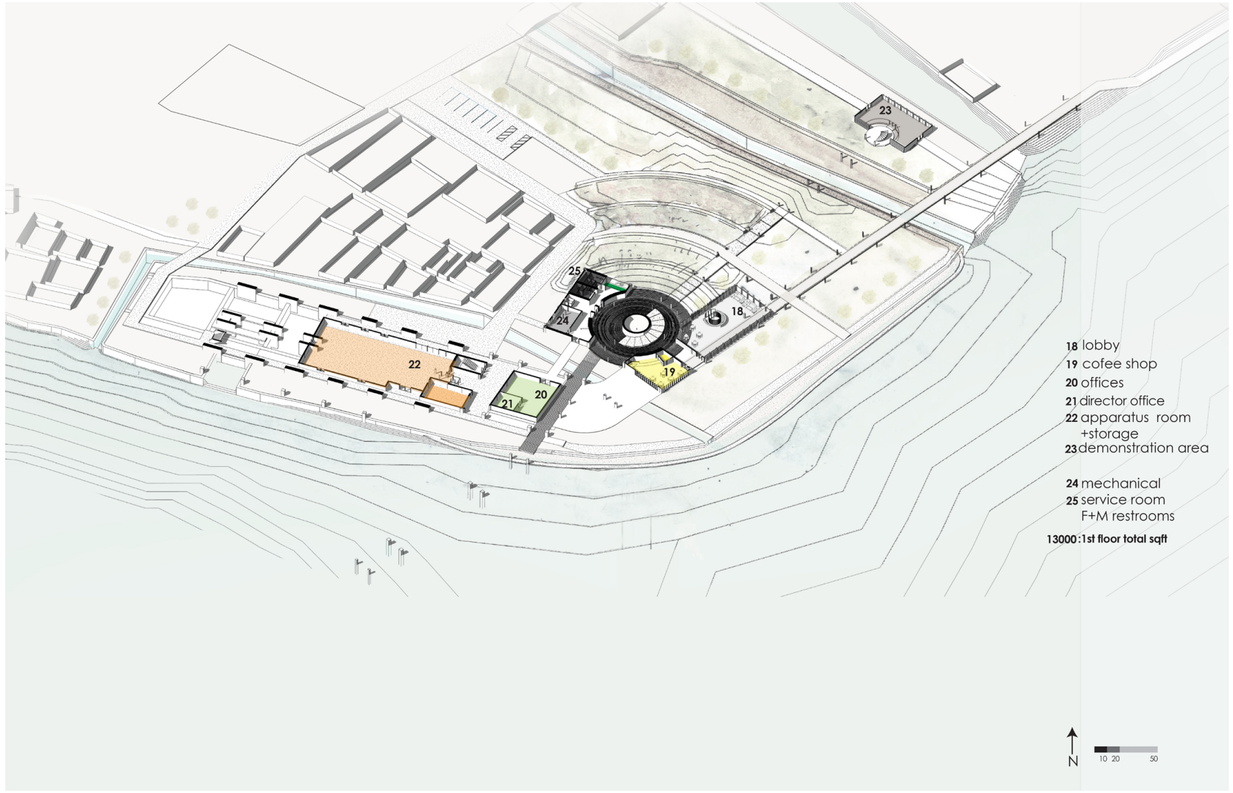


Figure.80. Level 1 Floor Plan

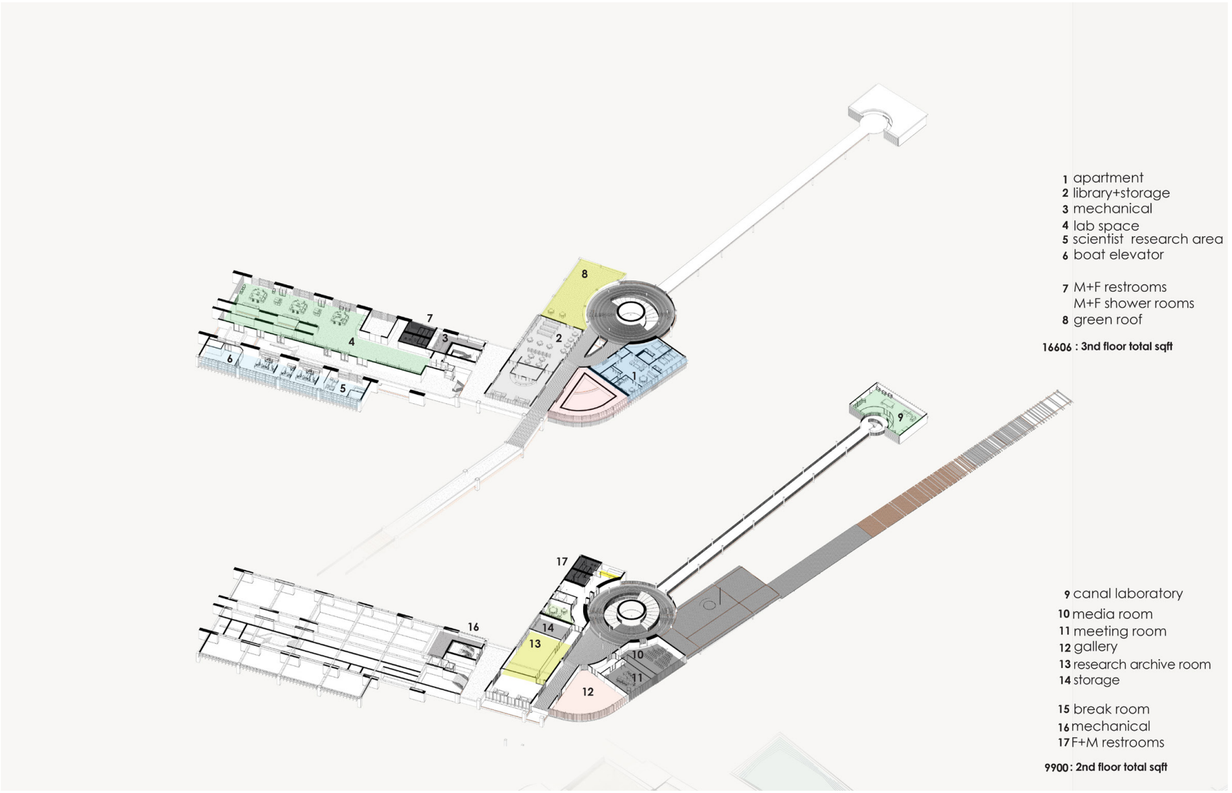


Figure.81. Level 2,2.5 and 3 Floor Plan

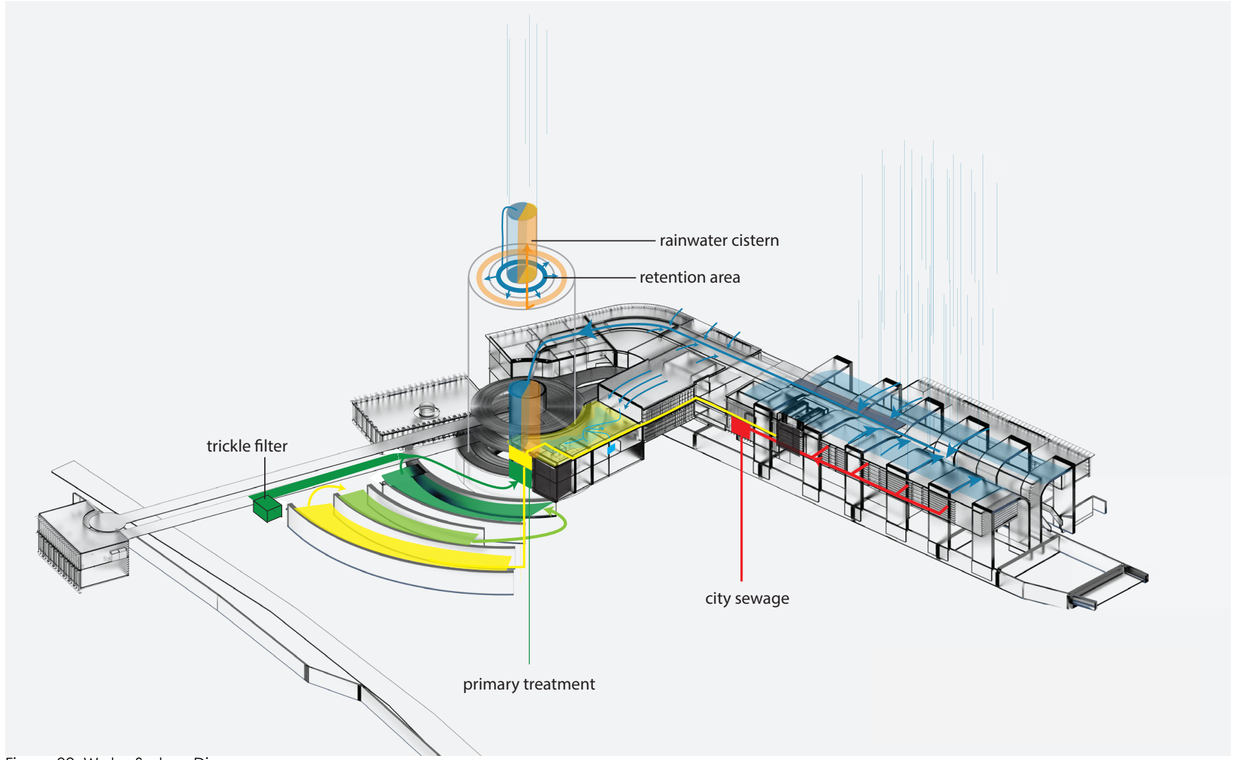


Figure.82. Water System Diagram

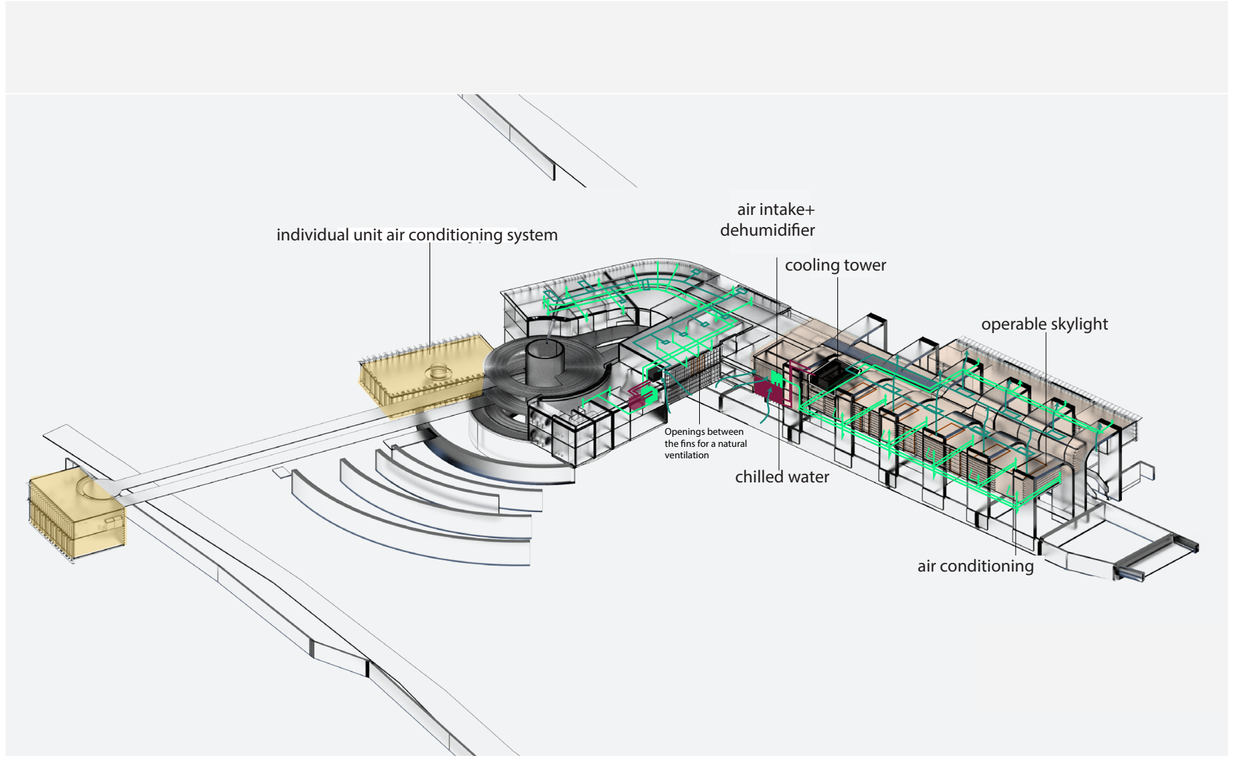


Figure.83. Ventilation And Cooling System Diagram

This diagram shows different structural systems through out the building. Most of the systems are post and beams construction accept for all the lab spaces. These spaces are constructed using barrier wall system to create the feeling of permanentness.

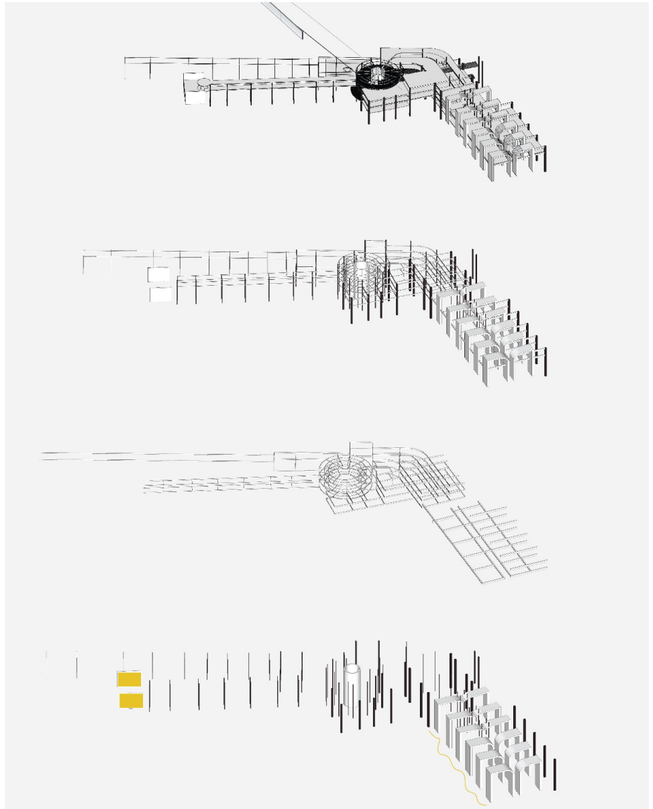


Figure.84. Structural Diagram

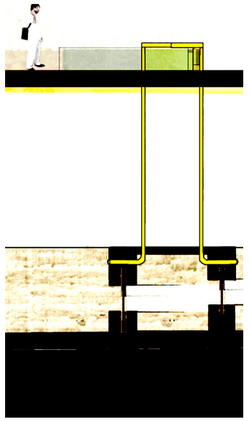
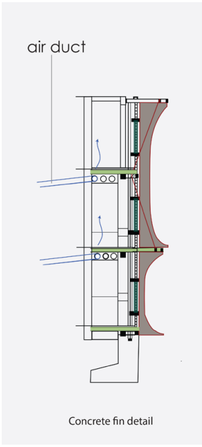


Figure.85. Lab water Diagram

Figure.86.Cistern Section



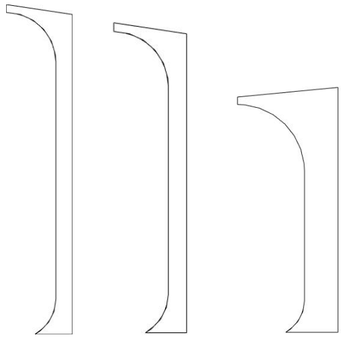
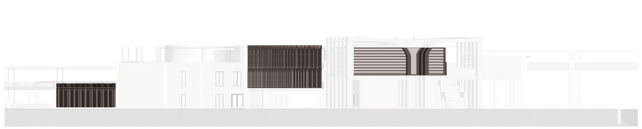


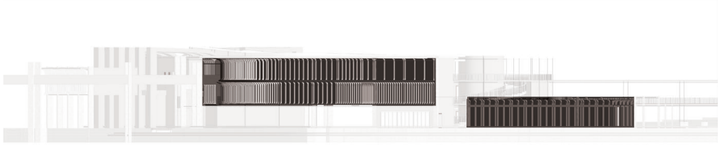
Figure.87. Concrete Fins Details

North-require less protection

West-require sun protection



East-require sun protection during the late morning and maximum prevailing wind capture



South-rquire medium sun protection during the late afternoon and maximum prevailing wind capture

Figure.88. Elevations Showing the Building Skin

Figure.89.East to West Section

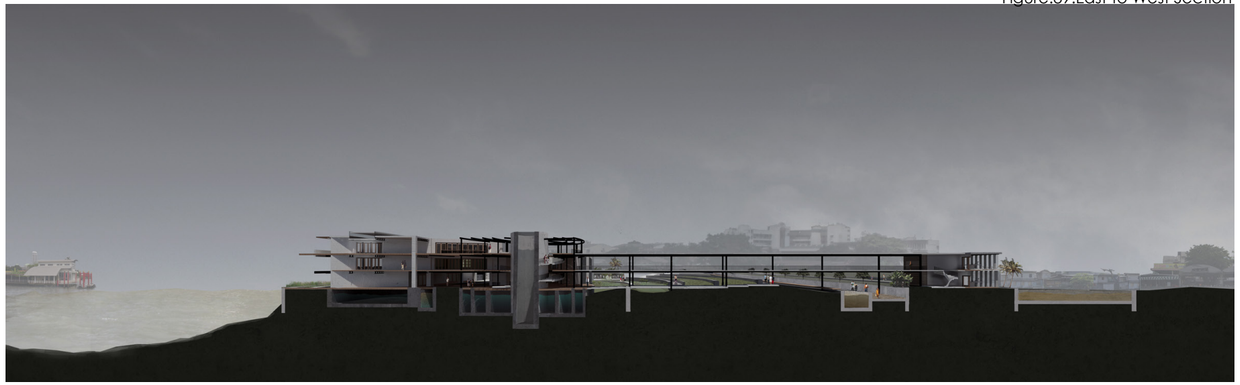


Figure.90.North to South Section

Figure.91.Main circulation space

Figure.92.Lobby

Figure.93. Third Floor n the South Side

Figure.94. Gallery Space

Figure.95. Lab Space

Figure.96. Looking at lab Space and Research Area

Figure.97. Water Front Activity at Night

At the end of the day, this Urban Water Educational Center, the temples, the palaces, and the stilt houses, together cast their lights and shadow onto Chao Phraya River as a reminder of how importance the waterways are to Thai people.

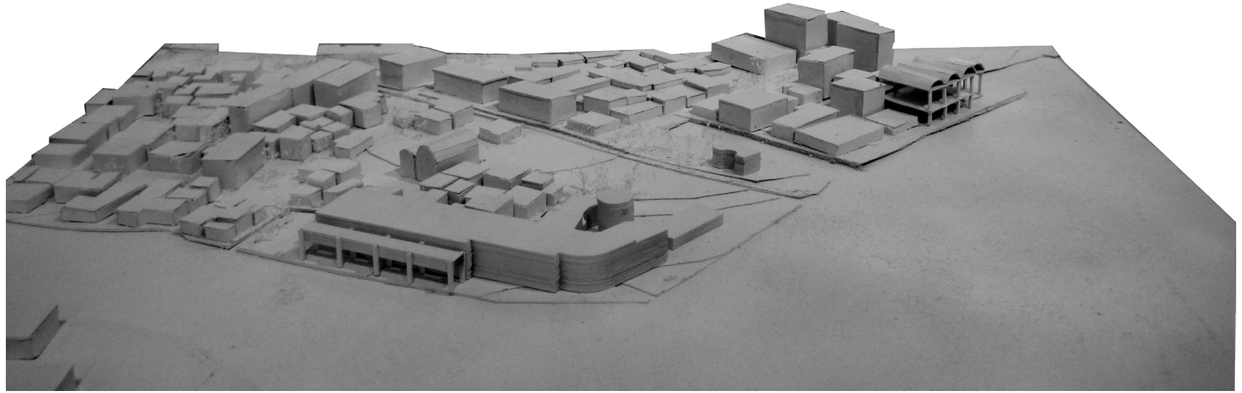


Figure.98. Site Model

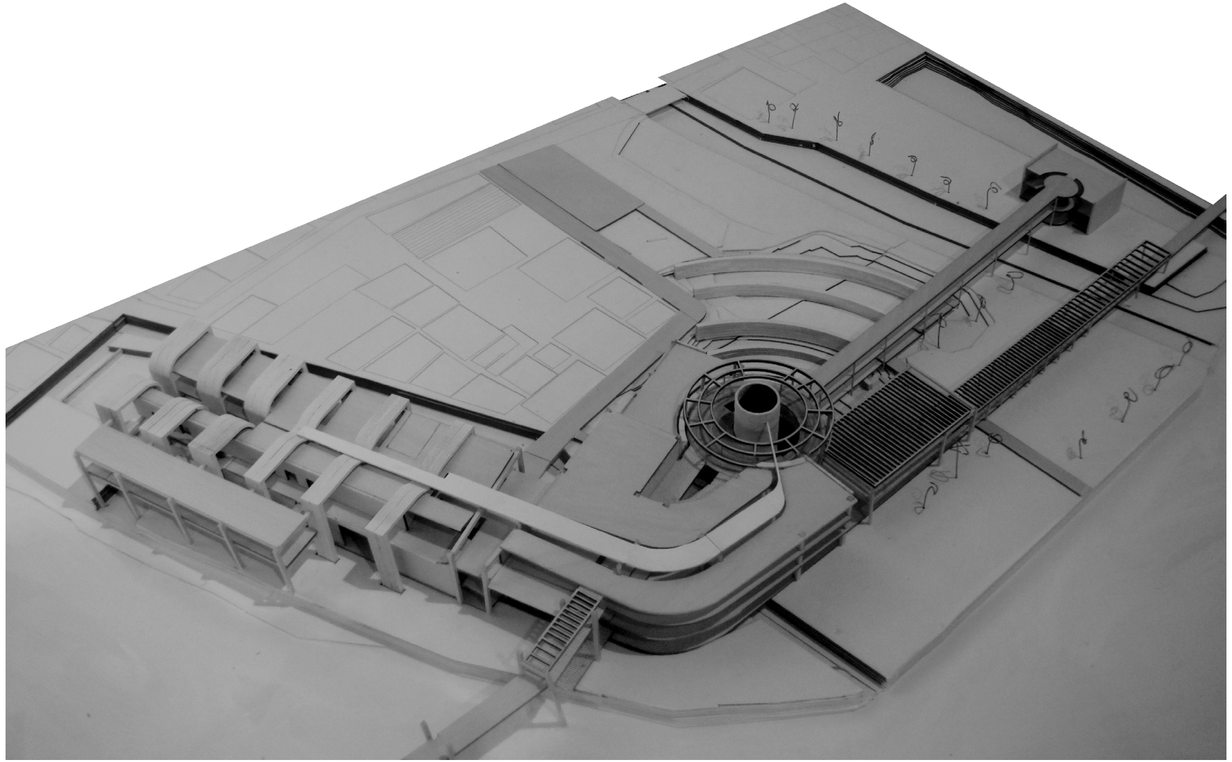


Figure.99. Building Model

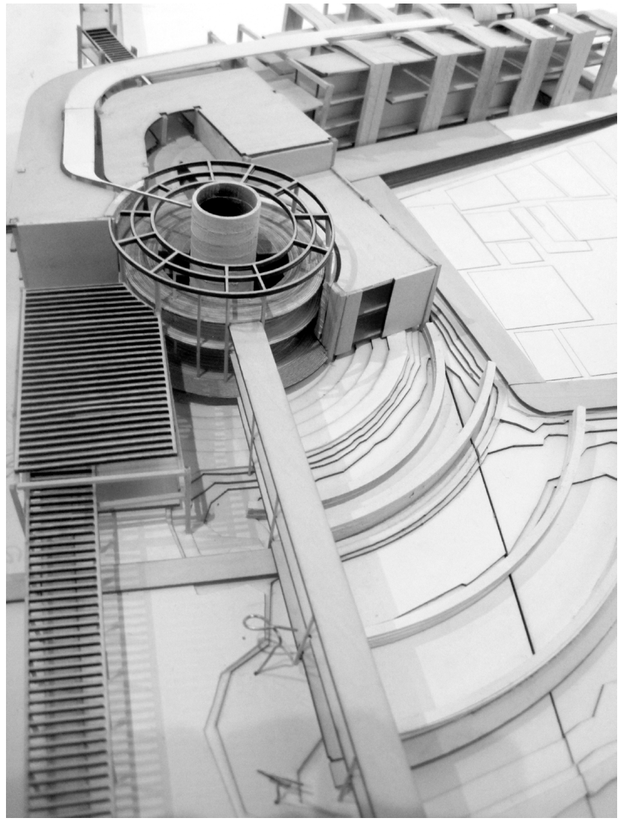


Figure.100. Building Model

Figure.101. Project Installation

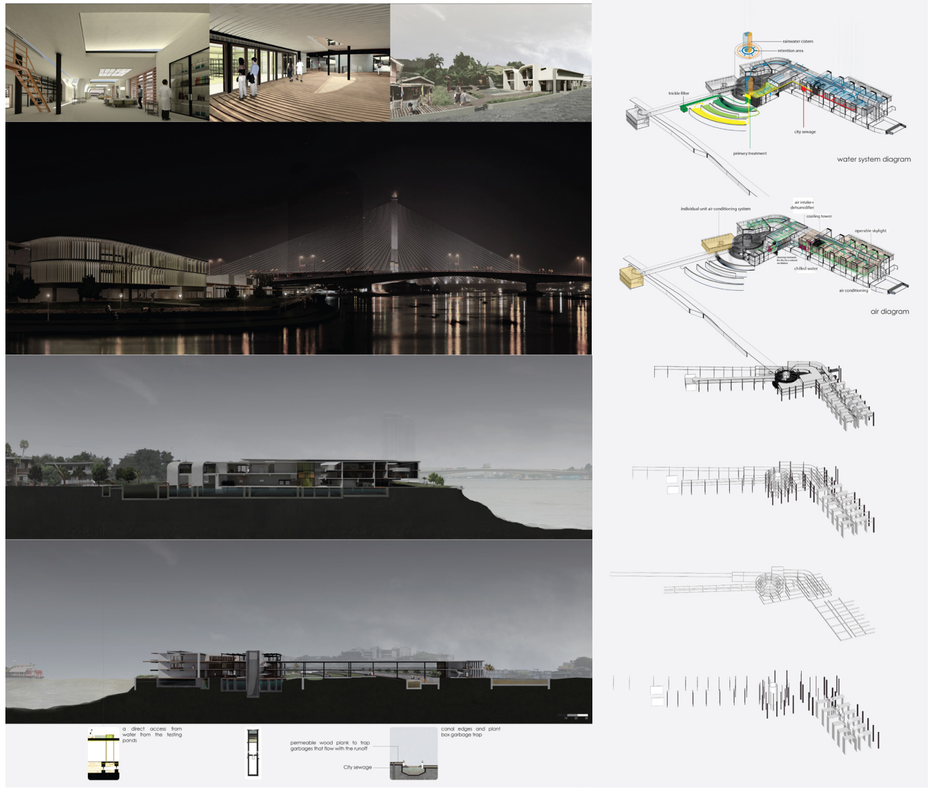


Figure.102. Boards Part 1

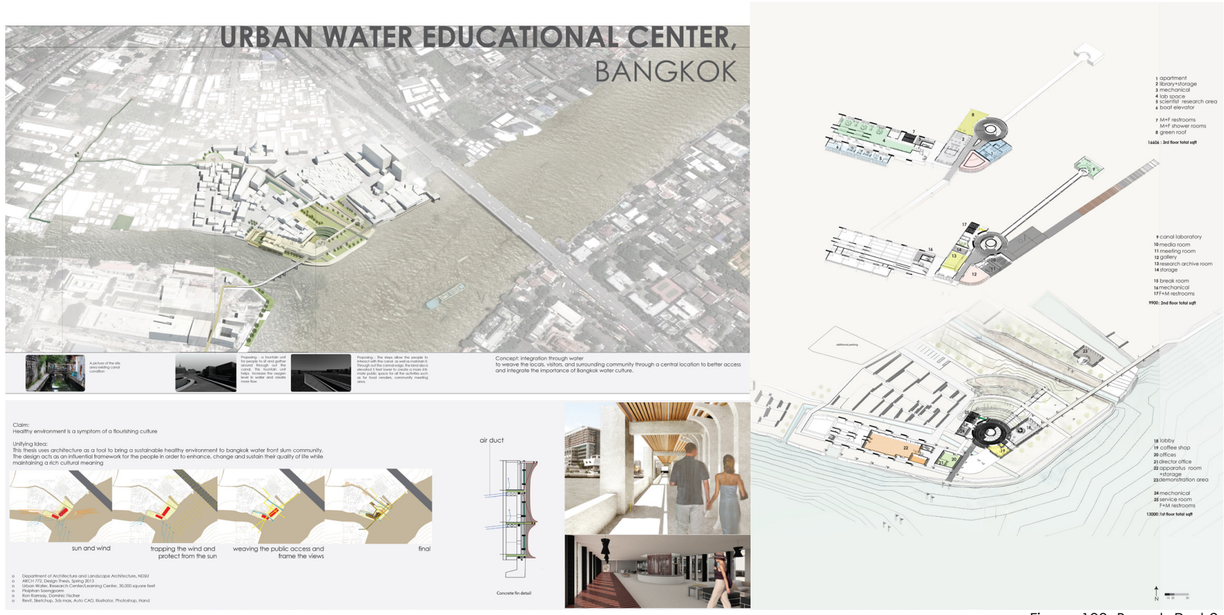


Figure.103. Boards Part 2

REFERENCE LIST

Archer, D. (2012). Ban Mankong participatory slum upgrading in Bangkok, Thailand: Community perceptions of Outcomes and security of tenure. Habitat International, 36(1), 178-184. doi:10.1016/j.habitatint.2011.08.006

Bodry Catheine (2012, August 29). Exploring Bangkok's canals. Retrieved from http://www.bbc.com/travel/feature/20120827-exploring-bangkoks-canals

Braun, H., & Gromling, D. (2005). Research and technology building. (pp. 130-133). Basel: Birkhauser.Issue

Chatkaewnapanon, Y. (2011). Moving towards tourism-modernity: The process of Thai touristization and eco nomic transformation. Informally published manuscript, Payap University, Chiang Mai, Thailand. Retrieved fromhttp://www.lc.mahidol.ac.th/thaistudies2011/archive/THS2011-Chatkaewnapanon_ Moving-Towards.pdf

Chanson, H. (2010). Hydraulic engineering in roman times: From hydraulic structures to water conveyance . Infor mally published manuscript, Retrieved from http://staff.civil.uq.edu.au/h.chanson/reprints/kanaza wa2010.pdf

Daniere, A., Takahashi, L. M., & Naranong, A. (2002). Social Capital, Networks, and Community Environments in Bangkok, Thailand. Growth & Change, 33(4), 453-484. doi:10.1111/1468-2257.00206

Dwyer, D. (1974). The city in the third world . United Kingdom : Harper and Row publishers, Inc.

Department of drainage and sewerage. (1, October 2008). Retrieved from http://dds.bangkok.go.th/

Dwyer, D. (1974). The city in the third world . United Kingdom : Harper and Row publishers, Inc.

(n.d.). Blankmap-world-large3. [Web Map]. Retrieved from http://en.wikipedia.org/wiki/File:BlankMap-World-large3.png

Hackney, F., Glynne, J., & Minton, V. (2009). Networks of design: Proceedings of the 2008 annual interna tional conference .. Boca Raton, Florida : Universal Publishers Retrieved from http://books.google.com/books?hl=en&lr=&id=3B5bbv0r-EkC&oi=fnd&pg=PA19&dq=history of hydrology design and urbanism&ots=BFKSpRDO24&sig=NvOHspcKVJ7inyfVkyl8gHPiTZc

Hammer, M. J., & Hammer, J. (2008). Water and wastewater technologies. (6th ed.). Upper Saddle River, new Jersey: Pearson Prentice Hall.

Henry , R., & Taylor, J. (2005). Spa: The sensuous experience . (p. 46). Victoria, Australia -: The Images Publishing Group

Jitsuchon, S. (n.d.). Thailand's economic growth: A fifty-years perspective (1950-2000). Informally published manuscript, . Retrieved from http://econ.tu.ac.th/class/archan/RANGSUN/EC%20460/EC%20460%20Readings/Thai%20Economy/Structure%20of%20Thai%20Economy/Thailand's%20Economic%20Growth%201950-2000.pdf

Karaiskakis, D. (n.d.). Kingston university london. Retrieved from http://www.kingston.ac.uk/postgraduate/courses/documents/architecture-thinking-building-dimitrios-karaiskakis2.pdf

Lovelock, J. (2000). Gaia a new look at life on earth. (pp. 100-132). New York: Oxford University Press.

Miller, T., & Williams, S. (2007). Southeast asian musics: An overview. Informally published manuscript, . Retrieved fromhttp://cw.routledge.com/textbooks/9780415960755/Southeast%20Asian%20Musics%20Overview.pdf

Moe, K. (2008). Integrated design in contemporary architecture . (1 ed.). New York : Princeton ArchitecturalPress

O'Grady, E. (2009, February 11). The therme vals/peter zumthor. Retrieved from http://www.archdaily.com/13358/the-therme-vals/

Patarakiatsan, T. Synergy (Master's thesis, Delft University of Technology), Available from http://www.slideshare.net/TridtiPatarakiatsan/thesis-report-resized

PIANCHAROEN, C. (n.d.). Retrieved from http://iahs.info/redbooks/a120/iahs_120_0510.pdf

Potte, H. (n.d.). The roman aqueducts in rome. Retrieved fromhttp://traveltips.usatoday.com/roman-aqueducts-rome-57048.html

Regional Resource Centre for Asia and the Pacific(RPS.AP), Asian Institute of Technology. (2001). Water pollut ion in bangkok. Retrieved from website: http://www.rrcap.unep.org/pub/soe/bangkok_water.pdf

Shoshkes, E., & Adler, S. (2009). Planning for healthy people/healthy places: lessons from mid-twentieth century global discourse. Planning Perspectives, 24(2), 197-217 doi:10.1080/02665430902734301

Simachaya, W. (n.d.). Water quality situation in the chao phraya delta. Informally published manuscript, Chao Phraya River Delta Conference, Kasetsart university, Chulalongkorn university, Bangkok, Thai land. Retrieved from http://std.cpc.ku.ac.th/delta/conf/Acrobat/Papers_Eng/Volume 1/wijarn_PCD.pdf

Sunitsakul, J., Sawatparnich, A., & Sawatparnich, A. (n.d.). Basic soil properties from cpt in bangkok clay for highway design. (Master's thesis)Retrieved from http://www.cpt10.com/PDF_Files/2-07Sunbsp.pdf

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. June 18, 2001. October 2, 2012

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. Febuary 13, 2004. October 2, 2012

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. October, 1, 2005. October 2, 2012

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. November 20, 2008. October 2, 2012

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. April 16, 2009. October 2, 2012

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. January 31, 2010. October 2, 2012

Source: "Bangkok." 13 45'39.97"N and 100 29'18.45"E. Google Earth. November 4, 2011. October 2, 2012

Source: "Bangkok." 13 45'46.74"N and 100 29'20.04"E. Google Earth. 2012. October 3, 2012

Source: "Bangkok." 13 45'47.10"N and 100 29'19.53"E. Google Earth. 2012. October 4, 2012

Sinclair , C., & Stohr, K.(Eds.). (2006). Design like you give a damn: Architectural responses to humanitarian crisis. (1st ed.). Metropolis Books.

Srirojanapinyo, A. (2009). Open to the public! : a new network of communal recreation waterfront space in bangkok. (Master's thesis, Massachusetts Institute of Technology), Available from DSpace@MIT. (http://hdl.handle.net/1721.1/49543)Retrieved from http://dspace.mit.edu/handle/1721.1/49543?show=full

Takahashi, L. M., & Daniere, A. G. (1999). Poverty and access: differences and commonalities across slum com munities in Bangkok. Habitat International, 23(2), 271. Watchravesringkan, K., & Dyer, B. (n.d.). materialism among young consumer in china and thailand.

Tanabe , S., & Keyes, C. (2002). Cultural crisis and social memory . Honolulu, Hawai: University of Hawai'i Press.

The Association of Siamese Architects Under Royal Patronage. Bangkok district map. (2006). [Web Map]. Re trieved from http://www.asa.or.th/?q=node/312

Tzonis, A., Lefaivre, L., & Stagno, B. (2001). Tropical architecture . Great Britain : Wiley-Academy

Weesakul, S. T., & Thammasittirong, S. P. (n.d.). Operational flood forecasting for chao phraya river delta. Infor mally published manuscript, Chao Phraya River Delta Conference, Kasetsart university, Chulalongkorn university, Bangkok, Thailand. Retrieved from http://std.cpc.ku.ac.th/delta/conf/Acrobat/Papers_Eng/Volume 1/sutat supot OK.pdf

PERSONAL

Address:
66/1 M.4 Ratchasima-Paktongchai Rd.
Muang, Nakhon Ratchasima Thailand
30000

Telephone: 701-2209496

E-mail address:
ploiphan.saengpoorm@gmail.com

Home town:
Nakhon Ratchasima, Thailand

Quote about NDSU:
self motivation is created through passion. So, discover your passion in anything you do, whether it is an insignificant one.