

ABSTRACT

Title of Document: PATHWAYS AND PAVILIONS IN A
CHESAPEAKE BAY LANDSCAPE

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2005

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Preservation.

This thesis proposes the design of an environmental cultural park for the Chesapeake Bay that represents the culmination of a study of form, sustainability, and the history of the Bay. The thesis will also consider how architecture can redefine and mediate edge as it relates to experience of space and spatial connections.

A museum and a series of pavilions will be developed on a 45 ½ acre parcel of land on Maryland's eastern shore of the Bay. The museum will contain exhibits, both temporary and permanent, of a variety of mediums that speak to the life, culture, and history on the Chesapeake Bay

The thesis exploration will look critically at where and how the pavilions are situated on the site to ensure the connection and experience of the structures and the landscape will be enlightening and engaging.

PATHWAYS AND PAVILIONS IN A CHESAPEAKE BAY LANDSCAPE
EASTERN SHORE, MARYLAND

By

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Professor Brooke Wortham

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Background

Chesapeake Bay Area



Figure 1: Satellite photograph of Chesapeake Bay: www.cbf.org

The Chesapeake Bay was formed by the flooding of the primordial Susquehanna River due to the greenhouse effect that occurred with the recession of the Ice Age. What we are left with today is the nation's largest estuary stretching 185 miles in length and ranging from 3 miles to 22 miles in width. The name Chesapeake is Indian in origin meaning "Great Shellfish Bay" and couldn't be more appropriate considering its size and outstanding shellfish trapping (Meyer, 9).

The climate for this area is quite diverse with hot, humid summers, and cold dry winters. What is most enthralling is how it can change so rapidly and impact everything in the vicinity. Eugene L. Meyer describes it best:

At times, the Chesapeake Bay seems like a very tame body of water. But on hot, humid summer afternoons, when thunder rolls and lightning strikes, the wind whips the bay into frenzy. Sudden storms don't differentiate between the artifices of man and the creations of nature. Boats seek refuge in any nearby harbor, even as large chunks of shoreline disappear into the water. Over the years, entire islands have simply washed away, along with any trace of human habitation (Meyer, 9).

A look at the average annual temperatures clearly shows the diversity in climate for this area. The average summer temperature reaches 77.0°F with many weeks dipping into the 90's, while the average winter temperature falls to 37.2°F and many days below freezing. The area also receives a considerable amount of rain, 39.0" per year, and a marginal amount of snow averaging 16.7". (U.S. NOAA, Climatology of the United States.)

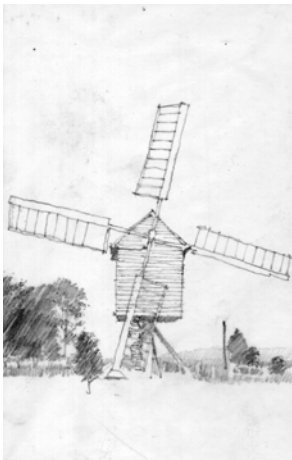


Figure 2: Left: Windmill in the landscape. Right: Oystering on the Chesapeake Bay. Drawings of photographs from Bodine, Audrey. Drawings by Jeremy Little



Figure 3: Left: An active wharf. Right: Sailing on the Chesapeake Bay.

Drawings of photographs from Bodine , Audrey. Drawings by Jeremy Little

Historically, life on the Chesapeake Bay has been one of great hardship. The first colonists in Jamestown faced death and deprivation due to the stagnant mosquito infested swamps and unsuitable drinking water. Many contracted diseases such as malaria and dysentery, and have been called victims of the Promised Land. Fortunately, with the improvement in medicine and arrival of fresh supplies and settlers the establishments took to the Bay to discover the bounty of wild game and trapping. (Meyer, 29)

Commercial fishermen, or ‘watermen’ as they are called on the Chesapeake Bay, derive their livelihood directly from the waters and represent one of the most notable icons of the Bay area. Up until the last 20 years their skills included oystering, fishing, crabbing, and clamming, but because of over-dredging, the oyster and fishing industry have become almost obliterated, leaving only crabbing and clamming, forcing watermen to take jobs inland. As a result, many of the oystering and crab towns have been subject to development of condominiums for Washingtonians willing to commute the extra miles for a view and a spot on the water’s edge.

When considering the site for development there are four principles that I wish to explore.

1. Create a model for environmental sustainability and inform the public about sustainability in architecture, culture, and economics. The choice of material, its longevity, maintenance, and impact on the environment must also be considered.
2. Mediate the edge between the built environment with the natural environment. This requires a study of interior/exterior relationships so that the experience of the built environment is never to far from the natural environment.
3. Celebrate the life, culture, history, past, present, and future of the Chesapeake Bay. Immerse the public in the Bay environment with a short hike along the waters edge to connect the entry pavilion to the rest of the park.
4. Study how form affects human experience of space. The design of kinetic pavilions that anticipate changing programs, allow for a variety of studies in placement of pavilions in the landscape and experience of the interior/exterior connection.

The Site

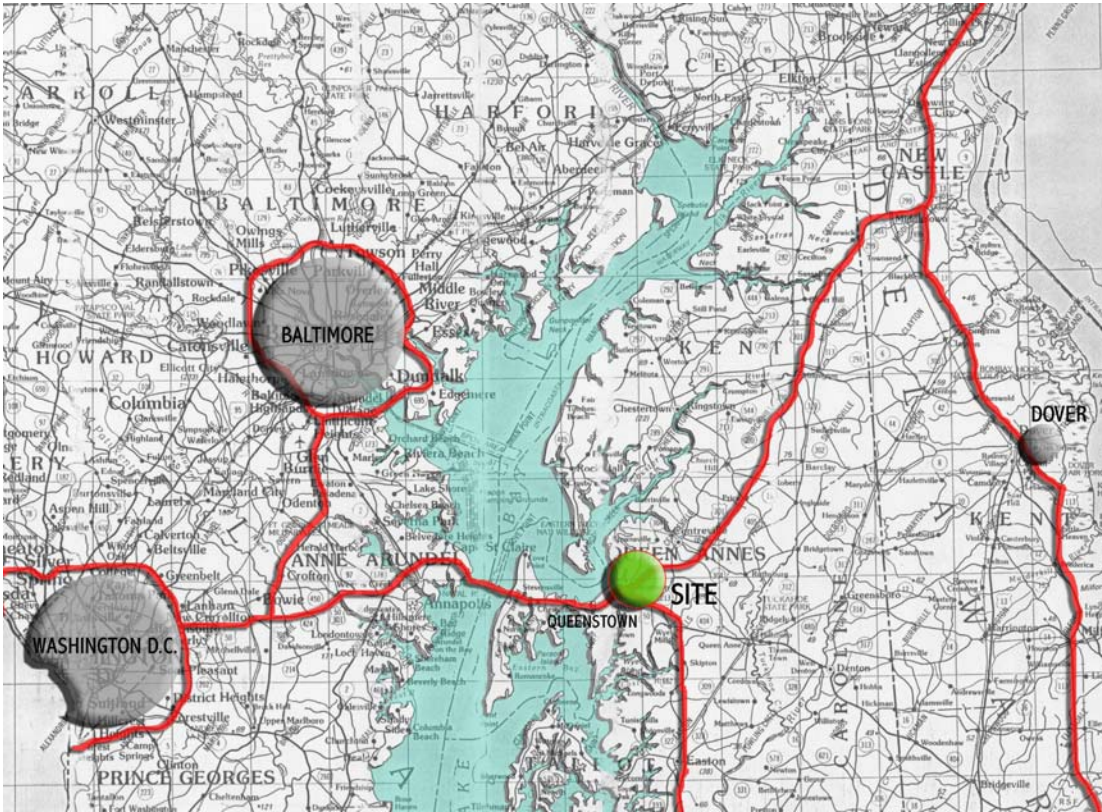


Figure 4: Regional Map

The location for this thesis project is on the eastern shore of the Chesapeake Bay at the mouth of the Chester River. The entry to the site is in Queenstown, Maryland, and connects via trail or MD Route 18 to a 45 ½ acre parcel of land ¼ mile to the northeast. The attraction to this specific portion of land is due in part to its proximity to four major cities- Baltimore, Washington D.C., Dover, and Wilmington- while maintaining its rural presence, vernacular charm, and devotion to the Chesapeake Bay. This section address issues relating to the site, such as climate, topography, vegetation, access, views to and from, and orientation in respect to the path of the sun and prevailing breezes.

The entry for the park is located at the south eastern most corner of the site. The land for the park is rectangular in shape, capped on the northeast and southwest ends by

dense forest, screened on the northwest side by low lying brush and a few trees; the southeast side is open to fields.

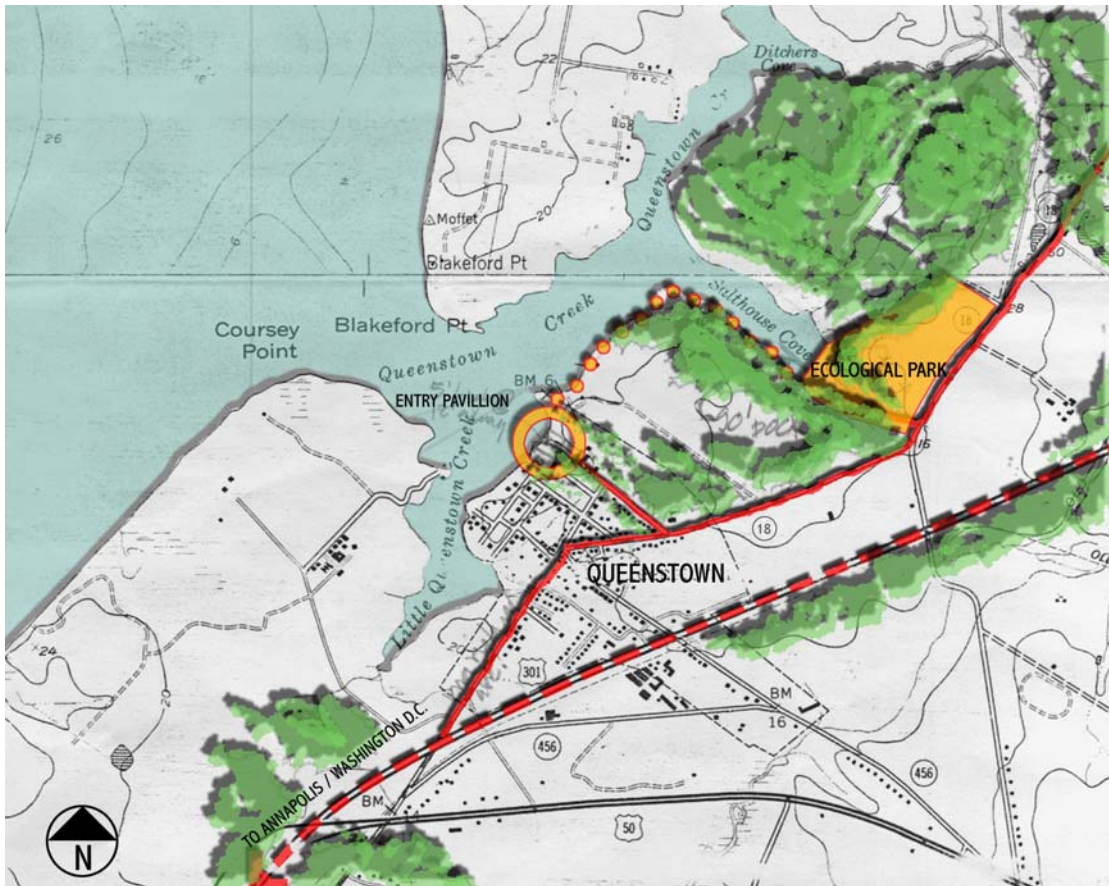


Figure 5: Location of proposed sites

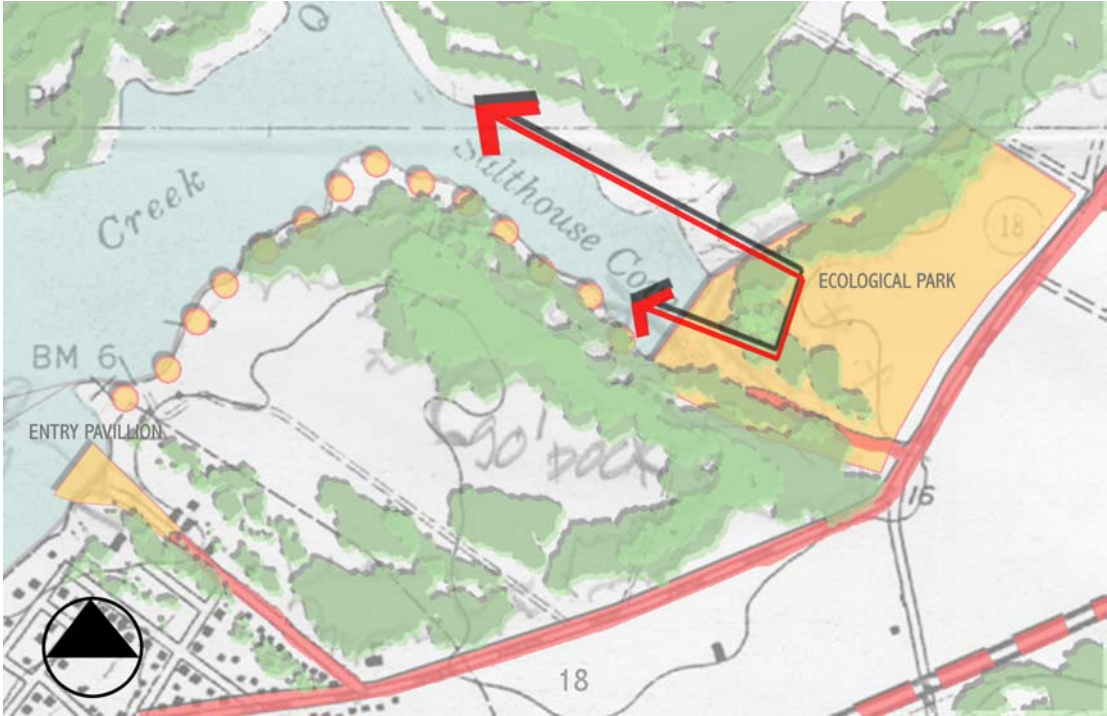


Figure 6: views to the bay

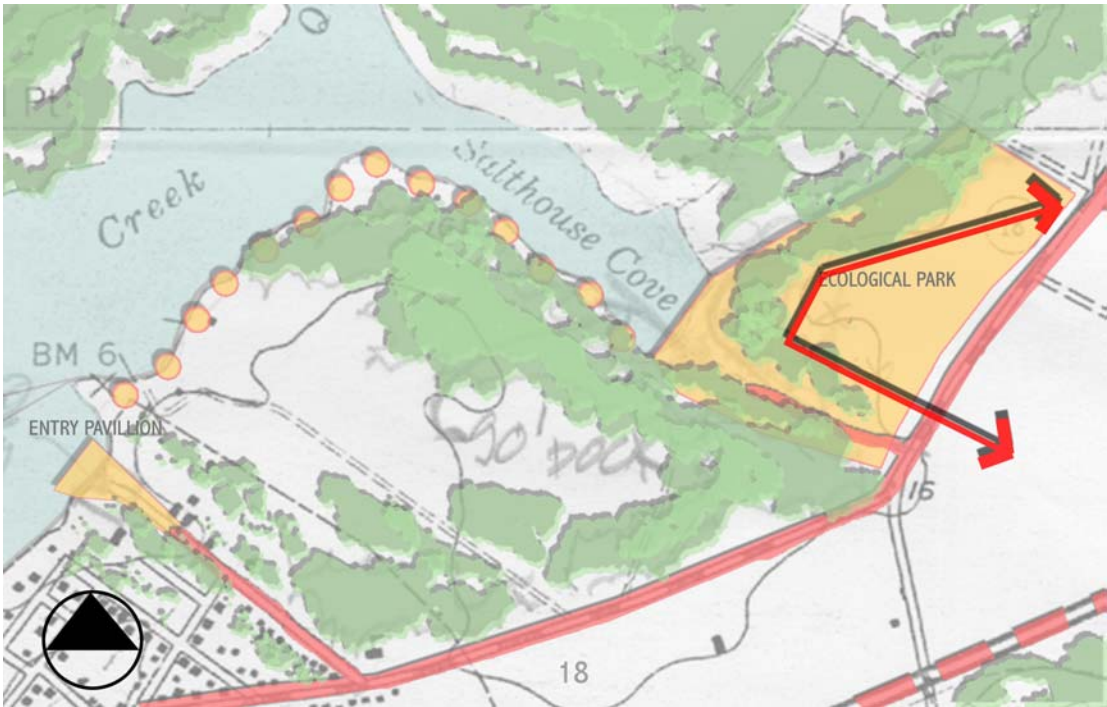


Figure 7: sweeping views of the landscape



Figure 8: Aerial photo of the site

Park Site

Entry to the park will occur at the south eastern corner of the site for vehicular traffic and the south western side for those traveling by small water craft. Those arriving via car will be enter through a narrow opening in the bermed earth and park among a gathering of trees. After leaving the car the traveler will slip through another berm of earth to signify the leaving behind of the highly mechanical world and entering into a more natural world where the built environment and the natural environment peacefully coexist.



Figure 9: Park site panoramic photographs - existing condition

The figures 10-13, begin to describe the experience of being at the water and above the water. In this instance there is a great change in elevation, approximately 20 feet, from the water to the top of the bluff.



Figure 10: Existing section

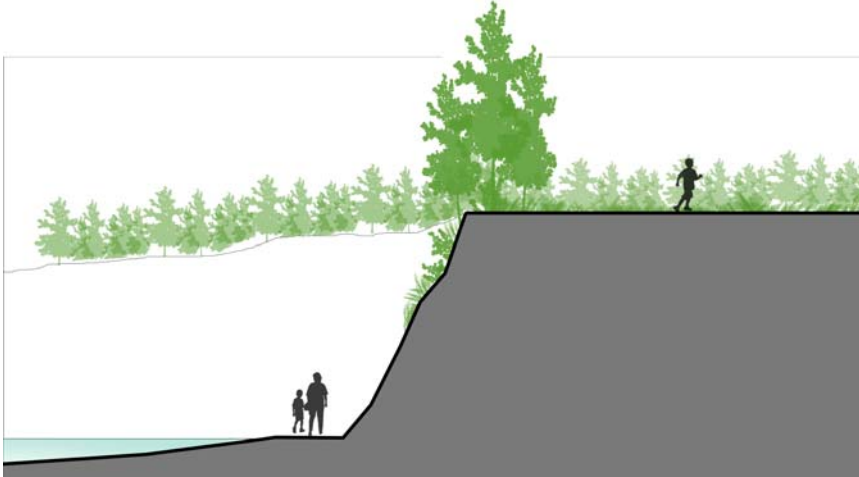


Figure 11: Existing section at water's edge

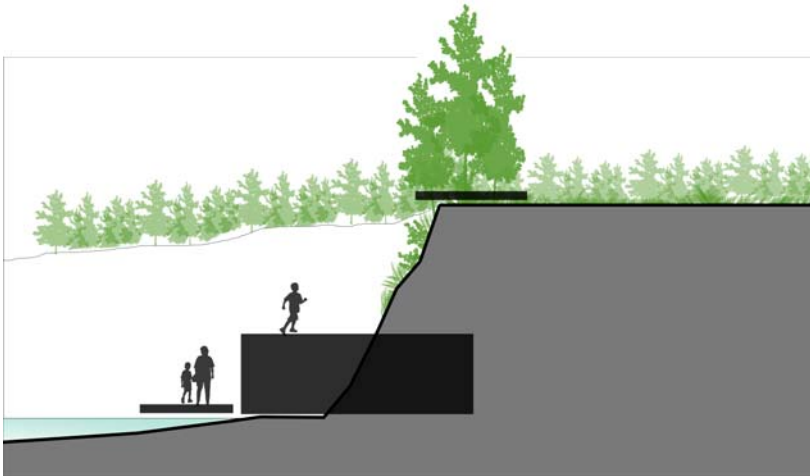


Figure 12: At the water's edge

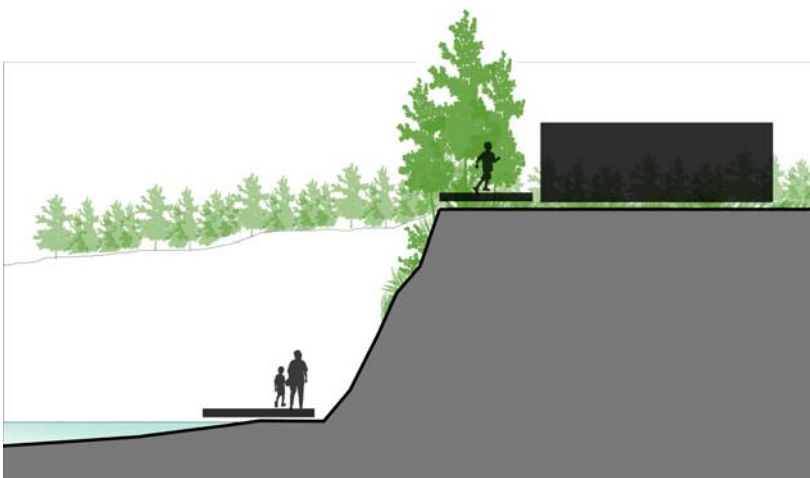


Figure 13: At and above the water's edge

Building and the Topography

Understanding the topography of the site and its potential to create or house shelter will be vital to the success of marrying the pavilions with the landscape and creating models of ecologically sustainable architecture. This section explores four ways of building with the landscape, how they influence the perception of the building, and their effects on experience.

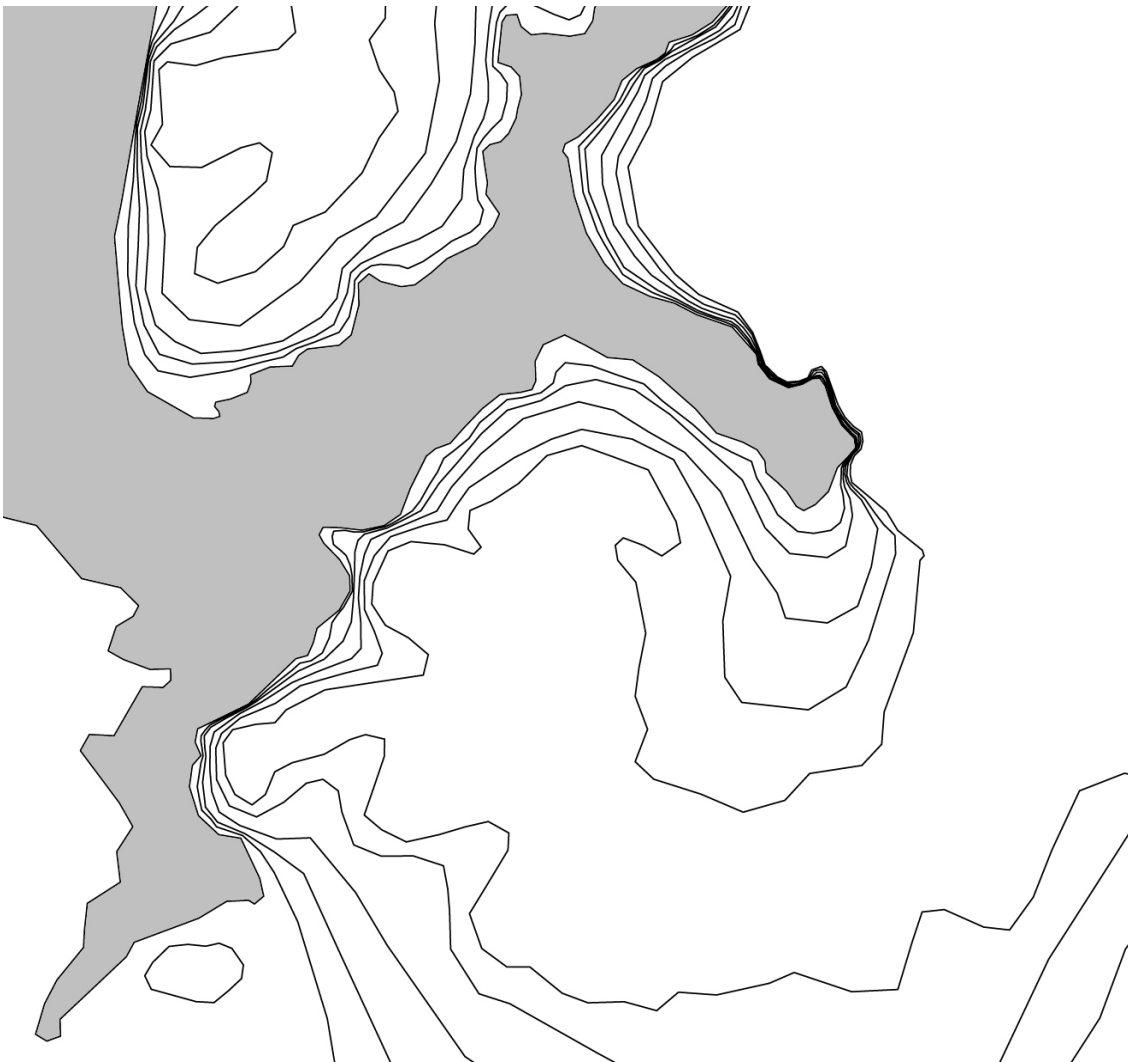


Figure 14: Topography

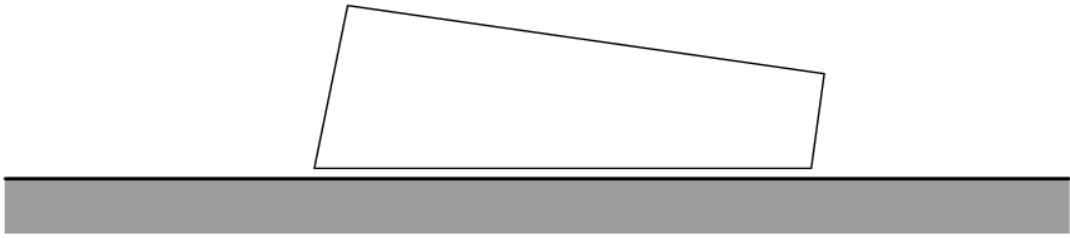


Figure 15: On the land

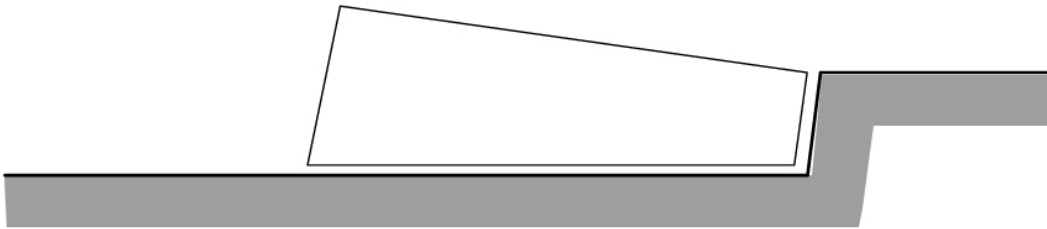


Figure 16: Abutting the land

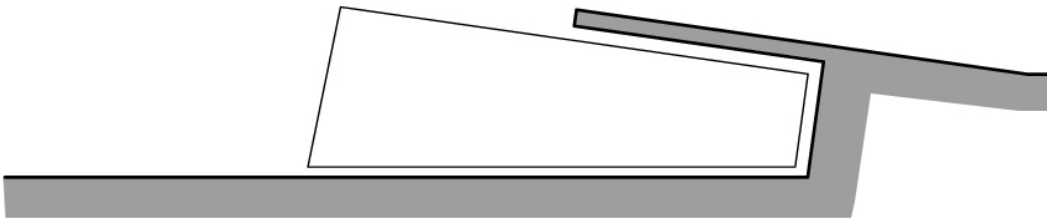


Figure 17: Partially engaged in the land

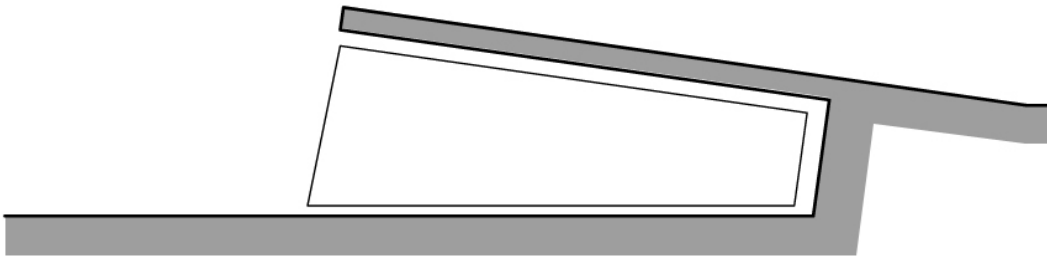


Figure 18: Fully engaged in the land

The first approach is to place the pavilion directly on the land, typical of the vernacular house, allowing the carpet of the earth to seemingly slip underneath the building. The pavilion is then perceived as a vertical extension or extrusion of the ground plane. A more dramatic illustration would be raising the pavilion up on piloti.

A second approach is to abut the building against the land. Here the pavilion becomes a horizontal extension of the land and has a more permanent or securely anchored presence. This approach is more akin to the vernacular sheds and barns of the bay area.

The third approach would be partially engaging the building into the land. This method, along with the second approach, anchors the pavilion but also allows it to become part of the landscape as if it were growing out from it.

Further emphasizing a building being part of the landscape would be fully engaging the pavilion within the land. Creating a dugout of sorts allows the building to disappear into the landscape and fully exploit the notion of nature creating shelter. This presents a sense of protection from the harshest of weather while still opening up to the exterior.

Program

There are two primary components to the museum and ecological park: building program, including public spaces and private service spaces, and landscape program. An understanding of each programs set of complex issues will help in the successful integration of the two programs and aid in the marrying of the buildings and landscape as discussed earlier. The issues to be considered range from the formal organization of the park to celebrating the life of the Bay while respecting its natural habitat, be it aquatic or land based. This section will outline these issues to better understand the effects a design could have on the site and outline the specific programmed spaces.

Below are four primary design questions to be considered.

1. How does the topography at the water's edge affect the experience of the site?
2. What drives the organization of the pavilions within the site?
3. How rigidly are the pavilions programmed?
4. How can the design of the park and pavilions celebrate the life and history, past, present, and future, of Chesapeake Bay while being respectful of its natural habitat?

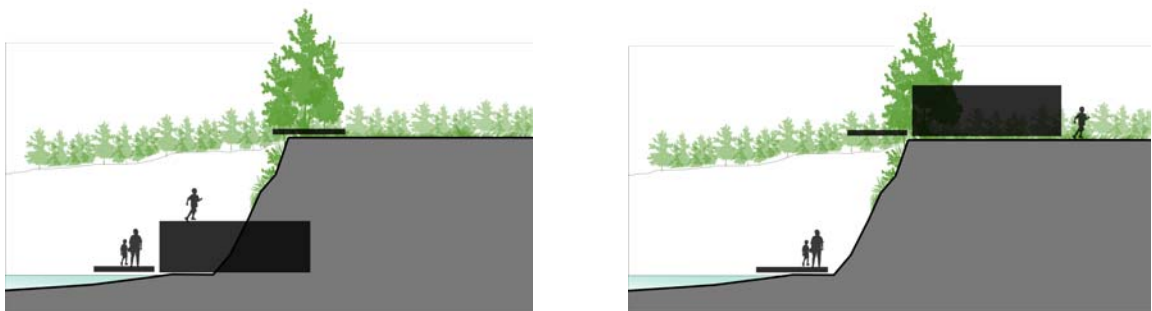


Figure 19

The organization of the pavilions within the site can be influenced by a variety of factors. A few of the significant ones are site constraints such as natural landforms and edges, sustainability factors, such as solar gain and natural ventilation that demand specific location and orientation, program of pavilions and their connection to one another, and a relationship to the organization of the local fishing/commercial ports and how they operate.

Programming of the pavilions raises a question as to whether they are rigidly programmed or flexible to house changing programs. Either option or combination of the two will affect the form of the building and ultimately the experience. This must be considered in conjunction with the organization of the site such that the function meshes with the placement of each pavilion.

Finally, there must be attention paid to the lives of those in the Chesapeake Bay area and the vernacular architecture. The intention is not to copy or imitate what is there but to celebrate or pay homage to the culture, past, present, and future, and introduce an architecture and sustainability that speak to the values and life of the Bay.

Program Areas

The general program for the site consists of a hierarchical or main pavilion followed by a series of smaller pavilions and gardens organized in the landscape.

Exhibit/Gallery: 5,000 sq.ft.

The exhibit spaces will house changing displays of drawings, paintings, and sculptures by local artists, while the galleries will hold a permanent collection of art about the Chesapeake Bay done by artists nation wide.

Multi Media Gallery: 2000 sq.ft.

The multi-media gallery is intended to showcase a variety of temporary video exhibits about the natural Bay environment.

Reference

- Audio Visual: 2000 sq.ft.
- Audio and visual cassettes, dvd's and cd's of the natural environment.
- Printed Media: 2000 sq.ft.

Cafeteria and Kitchen: 1000 sq.ft.

Retail: 1000 sq.ft.

Administration: 1000 sq.ft.

- Curator office
- Reference collection office
- Park director office
- Financial director office

Conference: 800 sq.ft.

- Meeting rooms

Landscape Program

Formal Gardens

- Low lying shrubs and flowers
- Small to large trees

Informal Gardens

- Low lying shrubs, grasses, and wild flowers
- Small to large trees

Vehicle Parking

- 30 spaces for cars and light duty trucks.
- 5 spaces for tour busses and large trucks

Precedents

As a source of reference for the design of this museum and park I turned to late 20th century parks in Paris, France as well as a cultural center in Noumea, New Caledonia by Renzo Piano to better understand how a multitude of buildings with specific functions relating to the life of a culture can occupy a landscape while organizing the landscape. This section of the document examines the principles and theories of these parks, how built structures organize a landscape, and Chesapeake Bay vernacular architecture, as they relate to the proposed park.

Parc de La Villette – Bernard Tschumi

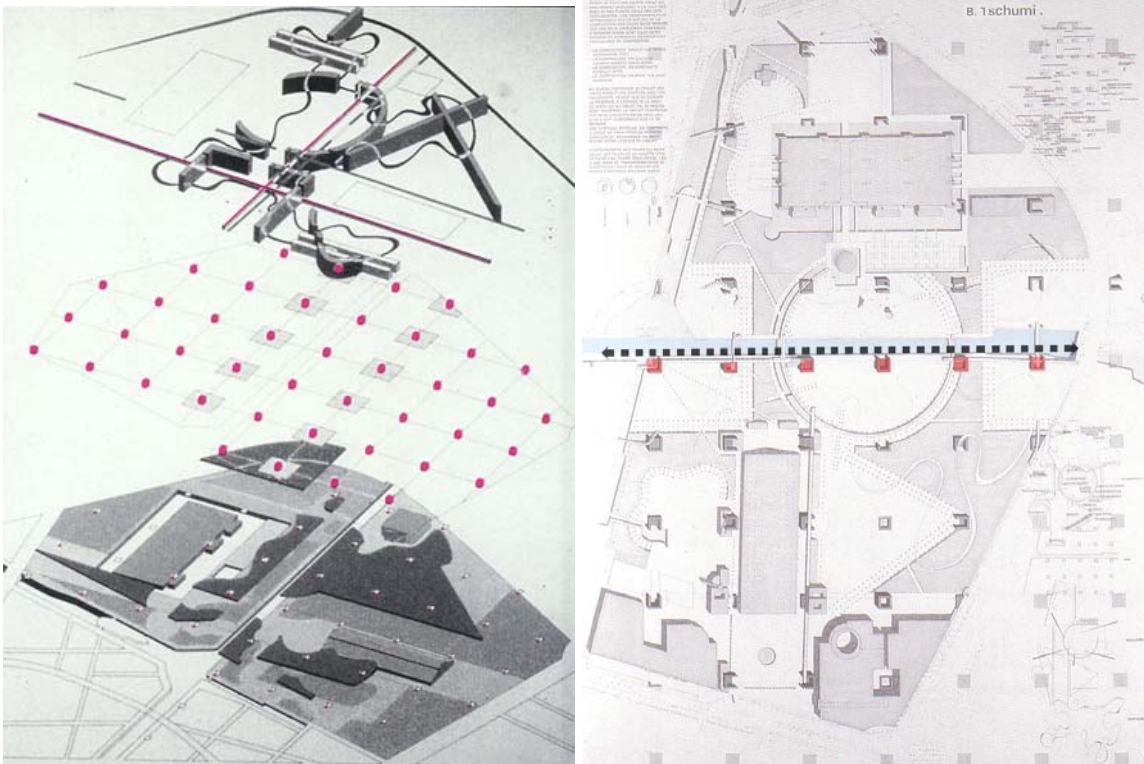


Figure 20: Baljon

A look into Tschumi's design for Parc de La Villette reveals a very clear layering of expressive ideas that are organized by the rational and unforgiving grid layout of the 'follies' seen in figure 20. The image on the right shows the follies as they march along the water's edge thus being organized by the amenity.

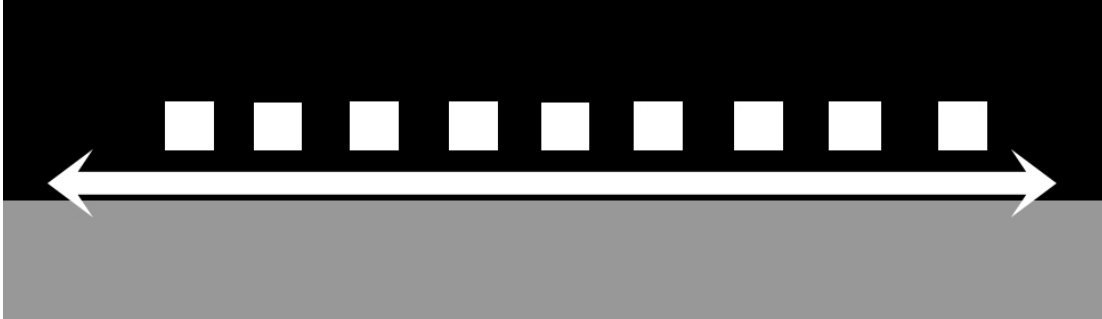


Figure 21: Plan parti

The diagram above and figure 22 below present a clear image of the linear organization of structures along the water's edge which reinforces the movement into and through the park.



Figure 22: www.pwpeics.se

The following images describe the sectional parti and how it relates to the water's edge. As seen earlier in site analysis we can understand the experience of being at the water and above the water. In this case, the multiple levels are infrastructure for movement and connection from follie to follie and less for observation and view.



Figure 23: www.pwpeics.se



Figure 24: Section parti

Parc Andre Citroën

A similar linear organization was used for the design of Parc Andre Citroën also in Paris, France. Here the structures are pulled away from the major directional axis creating an ancillary zone.

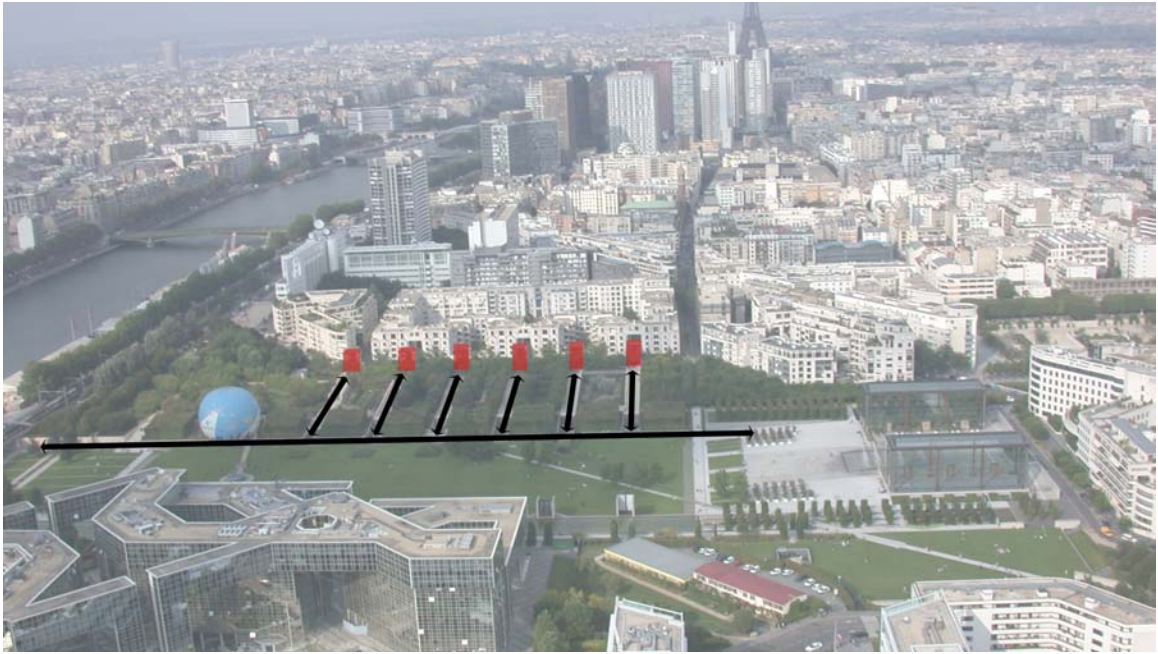


Figure 25: www.helmatpro.free.fr

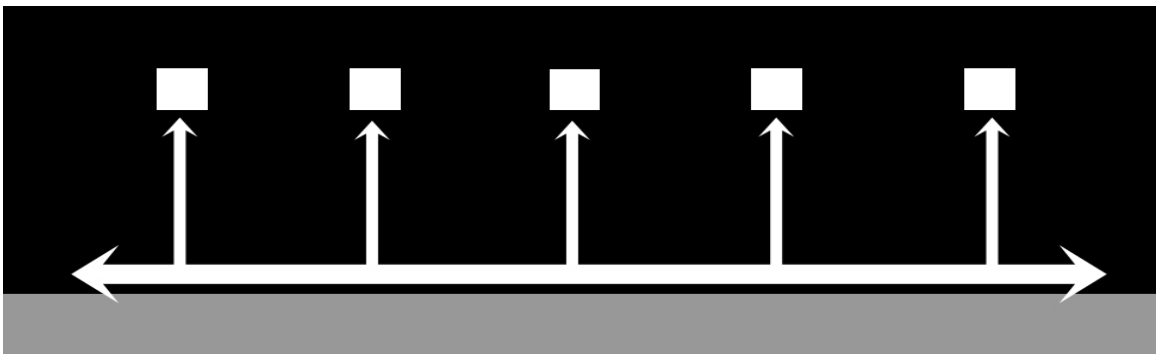


Figure 26: Plan parti

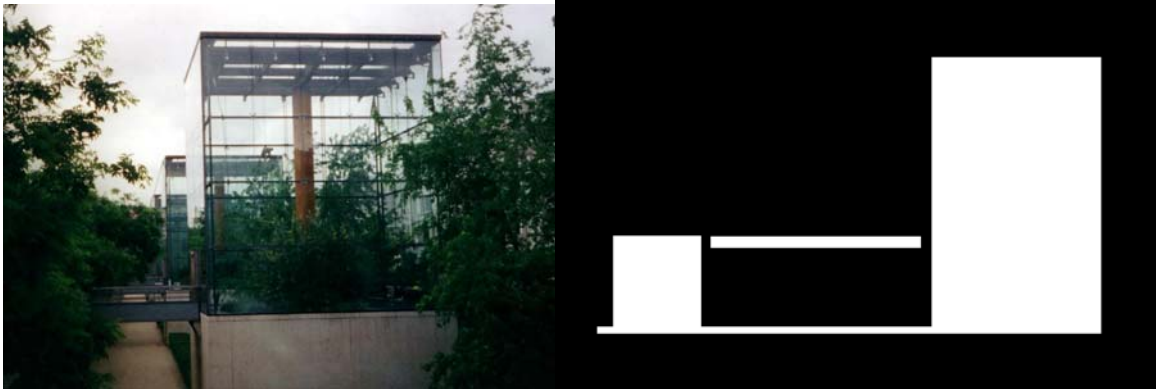


Figure 27: View of gardens, Section parti

Again, as in Parc de la Villette, there is a layering of movement systems, but here they are perpendicular to one another and one serves as a connector. The images above indicate a path along side the pavilions as a secondary thoroughfare through the park while elevated bridges perpendicular to the path below connect from the main mall of the park to the outlying pavilions.

Tjibaou Cultural Center – Renzo Piano

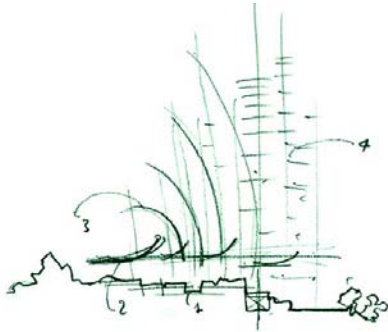


Figure 28: www.rpbw.com

There are a variety of components of the Tjibaou Cultural Center related to this thesis but of greatest interest is program of the spaces, and the way in which they is organized and represented. Attention is also paid to the careful integration of the built environment into the landscape and it formal representation.

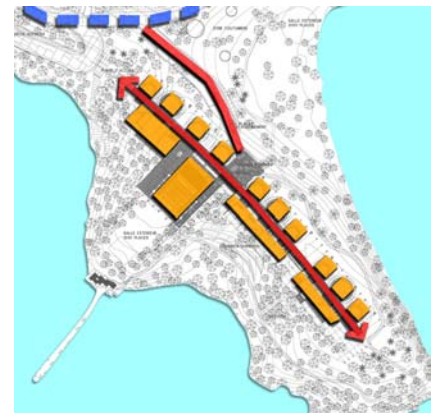


Figure 29: Parti and access through the site. Base image form www.rpbw.com

The Center is composed of 10 “huts”, that respond to the indigenous shelters and the way in which they were crafted, organized in a linear manner. There is a spine that is the main circulation corridor that connects the “huts” on one side to low, one story spaces on the other. The “huts” contain a variety of programs from a cafeteria, to visual

resource collection. Each is sized accordingly to its program and in turn creates a visual hierarchy to the profile of the building (see fig. 31 next page) and alludes as to what the function of the “hut” is before entering the building.

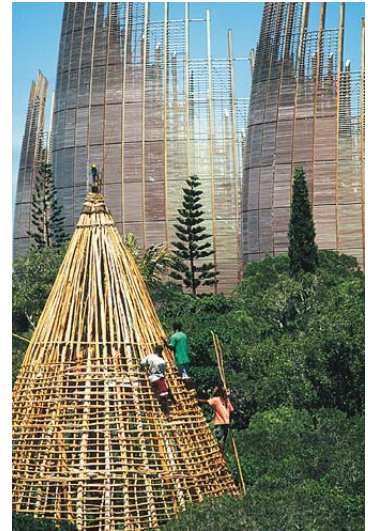


Figure 30: Left and right images. www.rpbw.com

Another important component to this project pertinent to this thesis is the way in which it is situated in the landscape and recalls the indigenous building. The two previous images (fig. 30) demonstrate how the “huts” become an extension of the landscape as they delicately pierce the sky and blend into the foliage of the trees. The figure on the right illustrates the brilliance in reflecting indigenous symbols of building while introducing modern methods of construction and detailing.

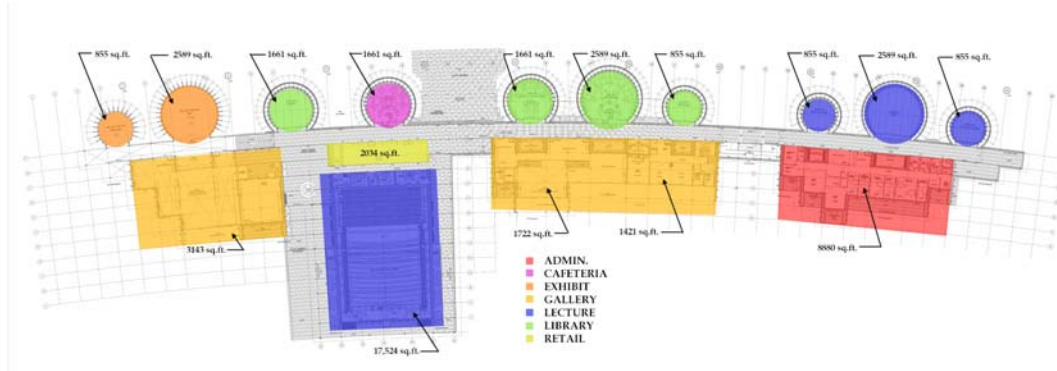


Figure 31: Plan organization of programs. Base image from www.rpbw.com

- Administration
- Cafeteria
- Exhibit
- Gallery
- Lecture
- Libraries
- Retail

Marika-Alderton House: Yirrkal Community, East Arnhem Land, Northern Territory –
Glenn Murcutt



Figure 32: Exterior and interior photograph; Fromont

As mentioned earlier, a physical connection of the interior spaces of the pavilions to the exterior is an important component to the success of marrying the buildings with the landscape as well as enhancing the experiential aspect of being engaged with the landscape. In the Marika-Alderton house, Glenn Murcutt has literally unfolded the exterior walls such that the main living area is defined mostly by the roof and allows the exterior to become part of the interior.

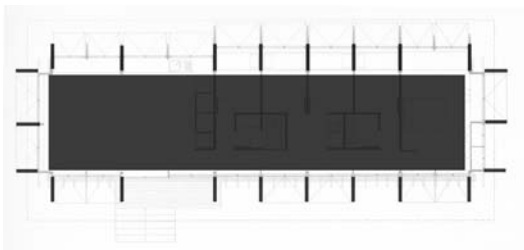


Figure 33: Plan parti

The plan parti further illustrates the opening of the building to the exterior. Each room within the simple rectilinear form has an operable portal, delineated by the fins that allow for views, maximum natural ventilation and illumination.

reduce the need for an artificial cooling system. The opening up of the building also allows light to easily fall or bounce it's way to the interior while the walls, now propped open, serve as sun shades to screen from the direct, intense afternoon sun.

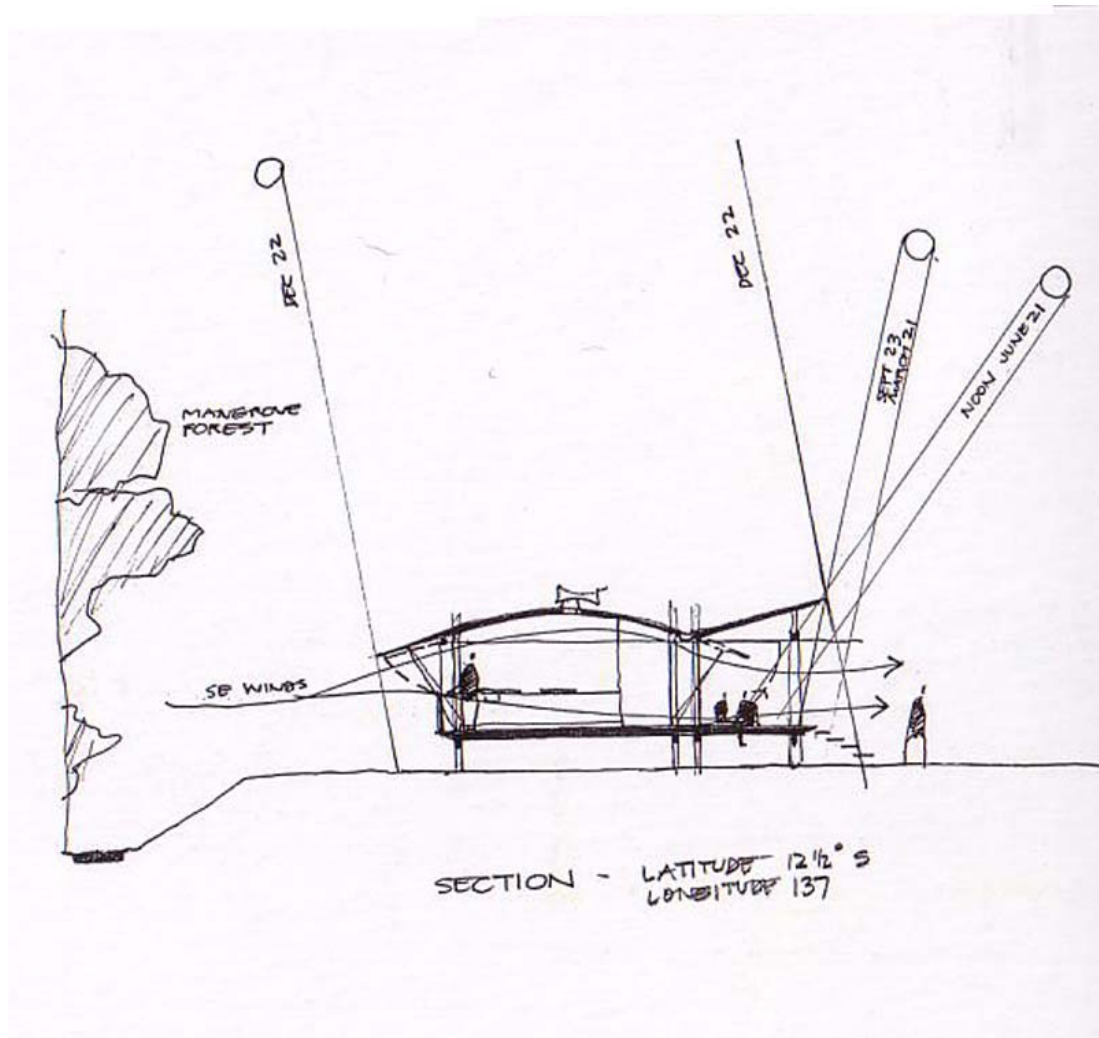


Figure 36: Sun angles; Fromonot

Vernacular Bay Architecture



Figure 37: Dwelling unit at Jamestown



Figure 38: Left - Typical dwelling. Right - 17th century church; Meyer

This section looks at early vernacular architecture on the Chesapeake Bay as a means to begin to understand how architectural form was linked to everyday life.

Most of the architecture of the earlier settlers was based on providing a simple shelter to house a function, and in crisis situations a building would be used to house multiple functions. Dwelling units, as seen in figures xx and xx, were almost always rectilinear in form with a steep pitched roof to quickly shed water and snow, and generally part of a larger plantation or fort. Religious buildings were not too dissimilar from the dwelling units. Almost identical in form these buildings stood just slightly larger than the typical home, and were often constructed of more permanent materials such as brick and stone. Commercial buildings were also similar to dwelling units and religious buildings. Larger rectilinear forms sometimes arranged in an “L” configuration and capped with pitched roofs defined these commercial buildings.



Figure 39: Modern-day recreation of 17th century tavern; Meyer



Figure 40: 1676 State House

The simple rectilinear volumes with pitched roofs and small openings stand as icons for the Chesapeake Bay and have lasted through the centuries to house many functions with only mild transformations. It is important to understand the function the building was housing did not drive the form of the unit rather it was the function of the building as shelter that drove the form, the buildings then adapted in size and organization to meet the needs of the internal functions.

Concept

Edge

The New Webster's Dictionary and Thesaurus defines edge as the line of intersection of two surfaces. The concept for this thesis challenges the conventional definition of 'edge' and poses the question, how can architecture redefine edge?

Consider a flat plane bounded on four sides. The plane has no thickness yet we recognize an edge. Thus the definition of an edge being the intersection of two surfaces doesn't apply. Edge is now the delineation between surface and space. This creates boundary edges, or lines that contain the plane, and surface edges, or the surface between the plane and space beyond.

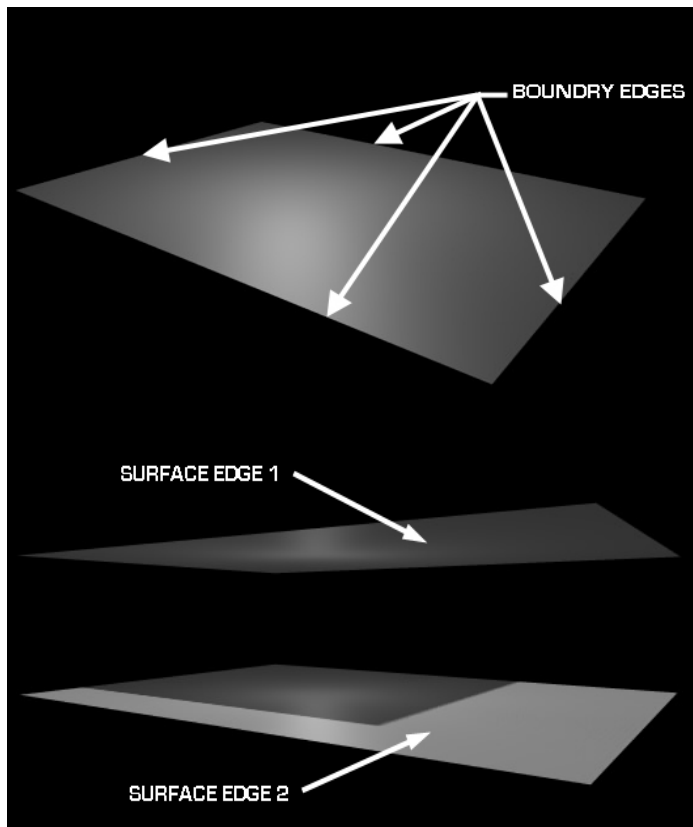


Figure 41

When two planes are placed with some distance between them there is space created. This space is not of one plane or the other, but of both. Thus the space becomes the mediator between two surfaces or edges.

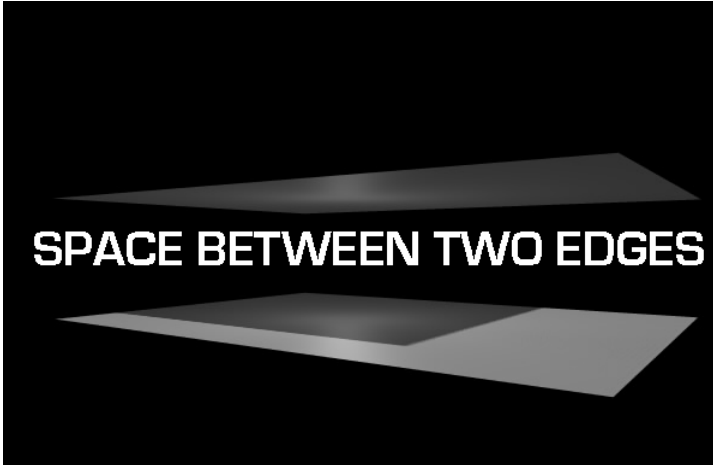


Figure 42

The in-between space is of most interest for this thesis as it will become the architecture that mediates between the water and the land.

Ripples

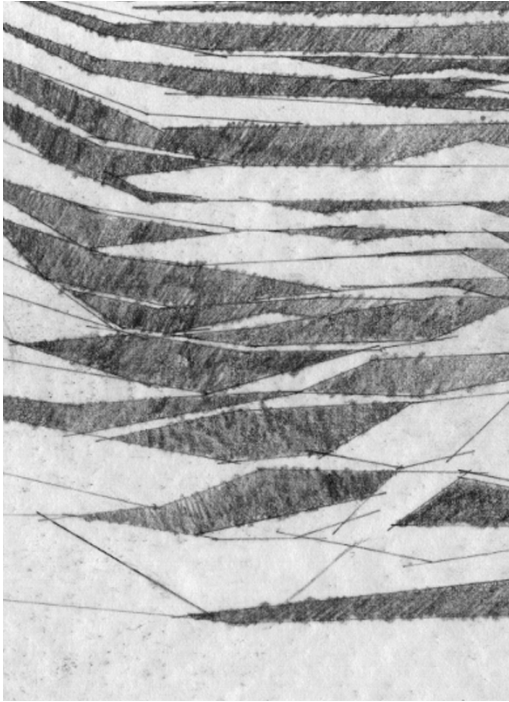


Figure 43: Ripples drawing

Ripples can be described as a disturbance through a surface over a period of time. They are significant to this thesis because they represent the changes of the Chesapeake Bay as an undulating pattern of highs and lows over a period of time; and introduce a formal strategy for development of the site and its architecture.

Figures 44 and 45 are three dimensional models of the ripples drawing seen in figure 43. The model describes the undulations of the surface as a series of edges as we typically understand them; a series of intersecting surfaces. Given the new definition of edge we can recognize a space between the undulations as a space between two surface edges.

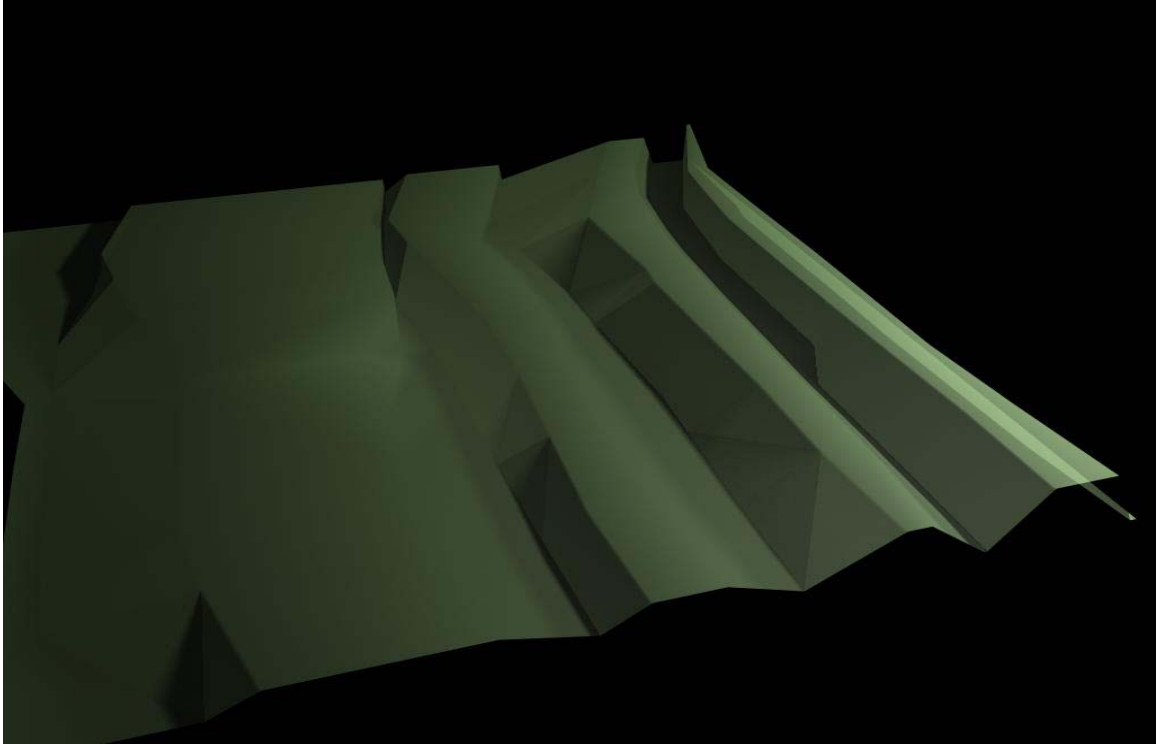


Figure 44: Ripples model

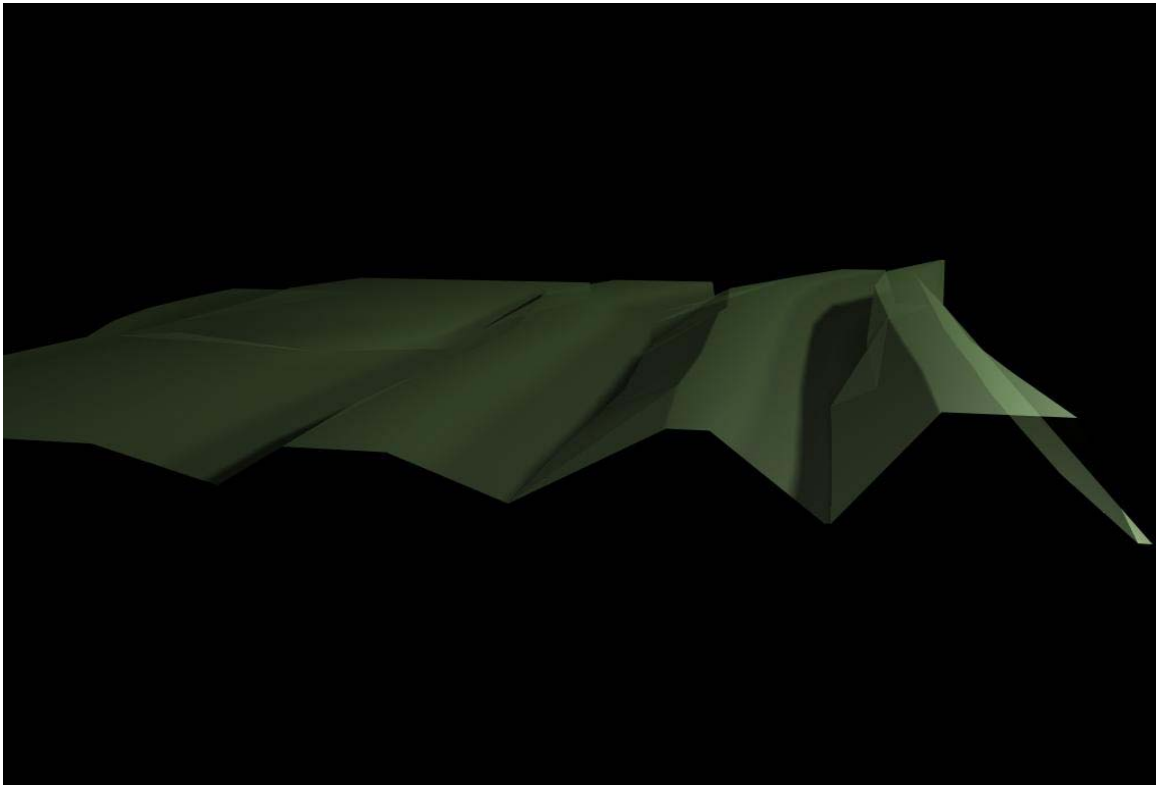


Figure 45: Ripples model

Couple this model with another series of planes extracted from the geometry of the ripples and the result is a dynamic space vertically and horizontally linked to surface edges as seen in figure 46 and figure 47.

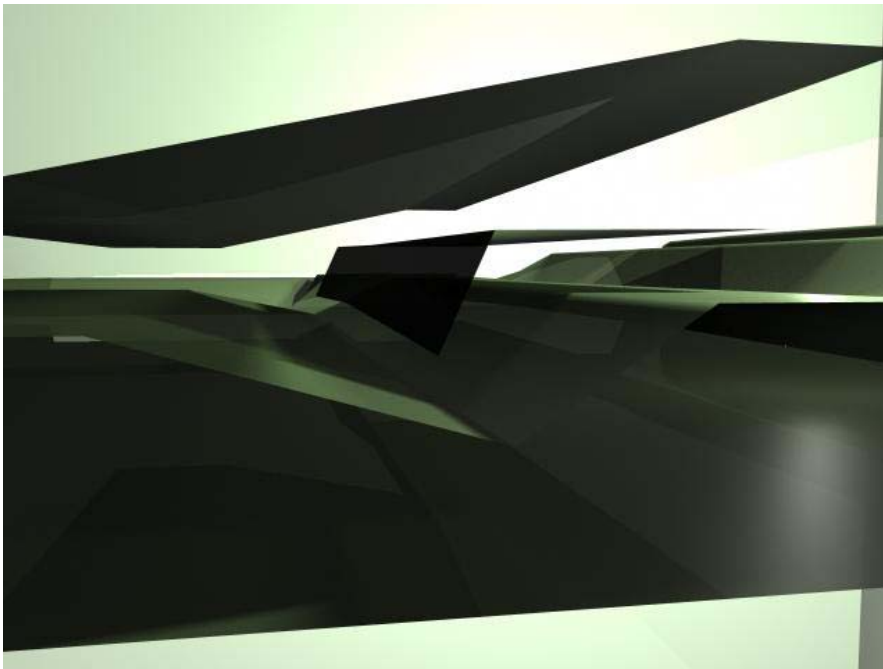


Figure 46

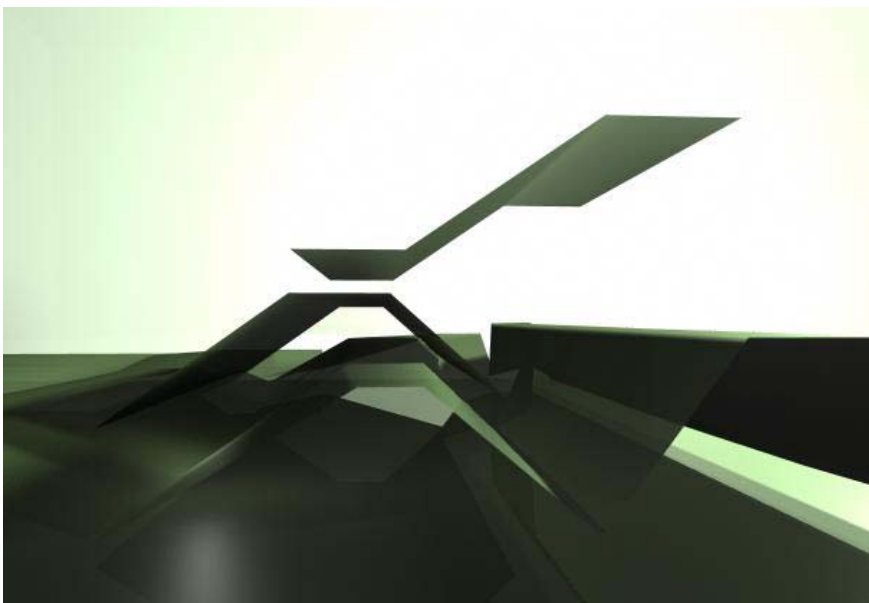


Figure 47

The following images are conceptual spaces based on the preceding investigations and are intended to inform the architectural development and connection of spaces for this thesis. The connections that are explored are based on the following: space as a connector between surfaces and surface as a connector between spaces.

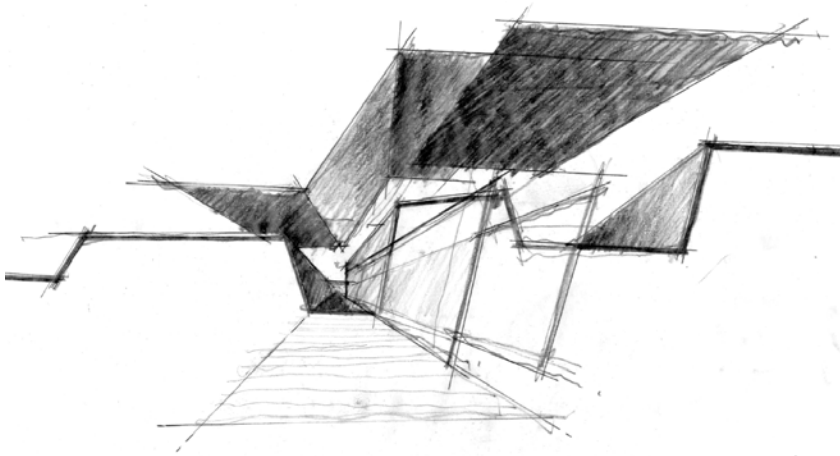


Figure 48: Conceptual sketch

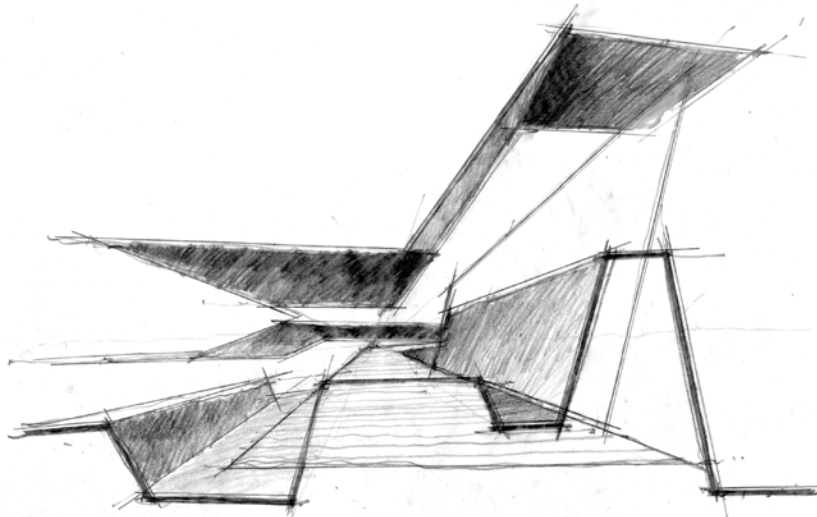


Figure 49: Conceptual sketch

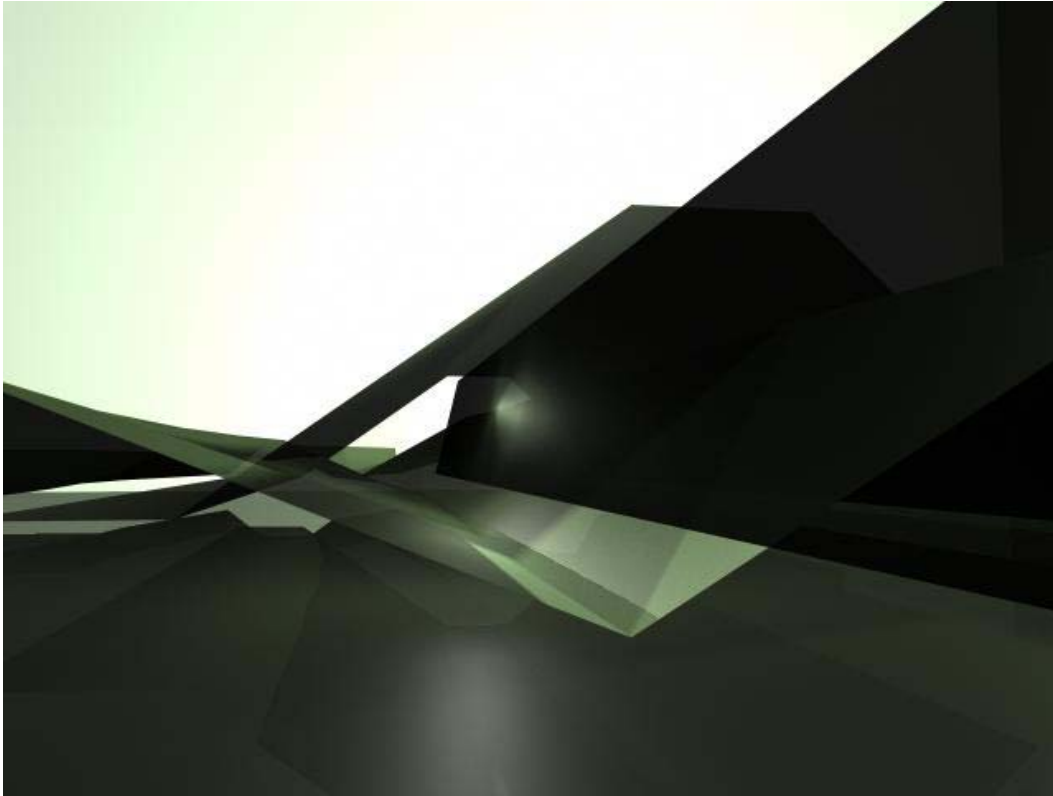


Figure 50

This image most clearly illustrates the joining of space by means of surface. One surface acting as an overhead covering in one area is simultaneously serving as a wall or floor surface for an adjacent area.

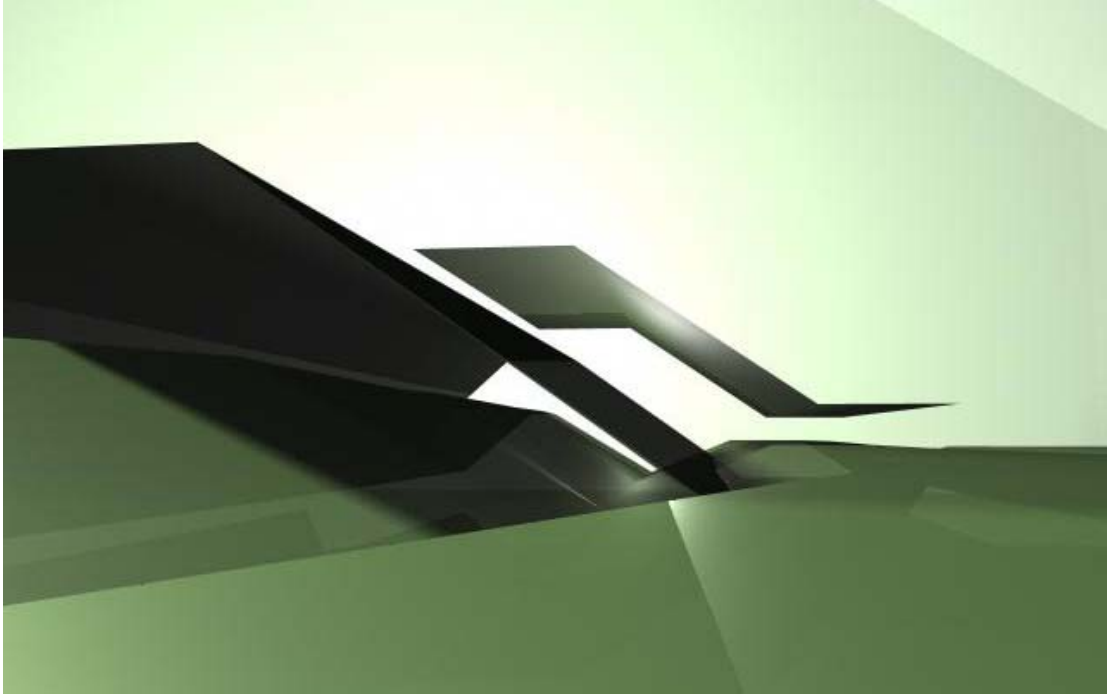


Figure 51

Figure 51 best describes the extraction of surface geometry to form space. Notice how the bent plane on the right most side could slide directly onto the surface of the bent plane in the middle of the image. This plane could in turn fit onto the ground surface. The layering of spaces then become linked to one another by the surfaces.

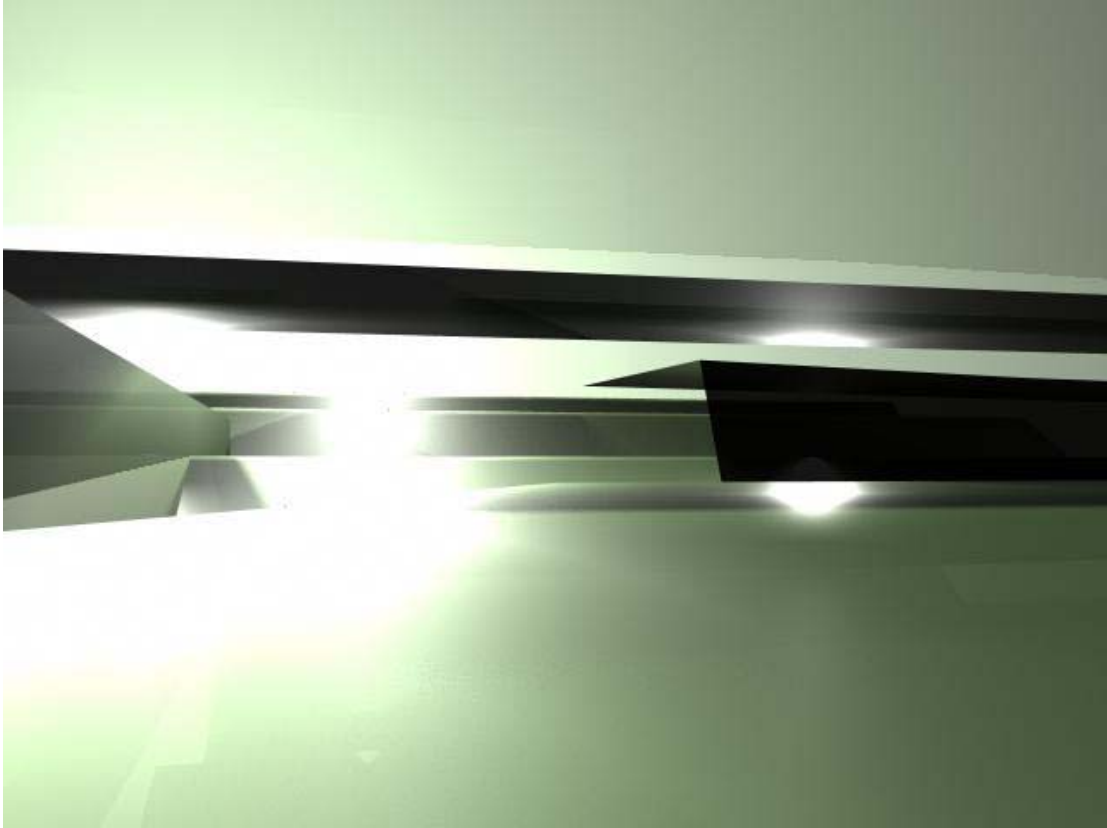


Figure 52

This image looks at the use of surface to inform movement patterns parallel and perpendicular to one another.

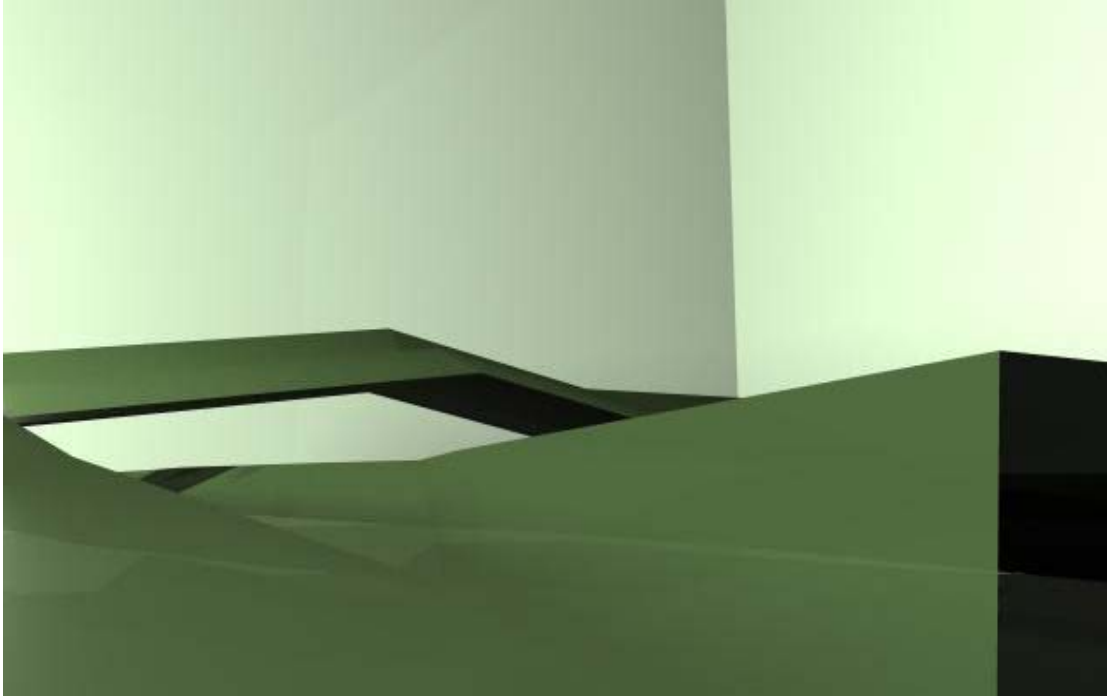


Figure 53

Figure 53 describes space and surface as a connector, however, here the connection of space is perpendicular to the connection of surface. The way in which the arching surface rises above the lower surface allows for a physical connection of surface, seen left to right, and a visual connection of space by the arching surface frames a view to beyond.

Schematic Site Proposals

Organization of the Site

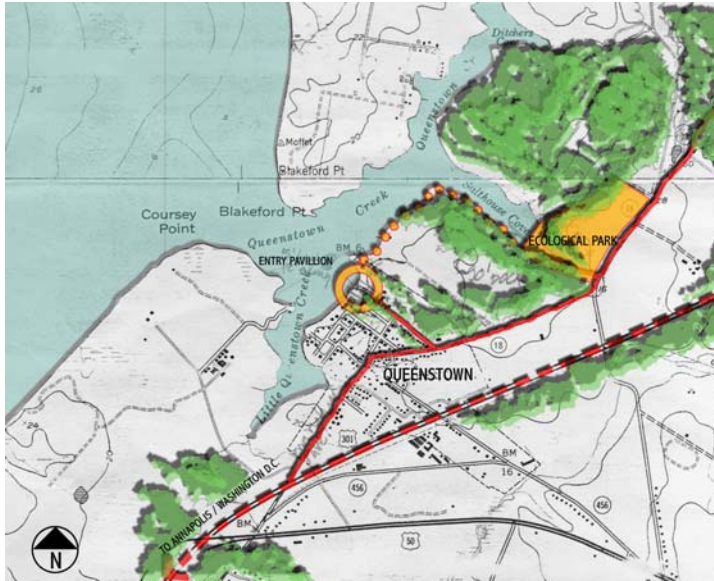


Figure 54: Existing site plan

The investigations for development of the park began with a look at both sites together, the entry site and the park, and develop an attitude as to how they should be represented in terms of approach and the use of landscaping.



Figure 55: Overall landscape options

Figure 56 describes the park site and its approach in three different ways. The first image represents a dense and narrow approach that quickly explodes into an open landscape. The second image has a similar approach but gradually opens up to the park area and invites slivers of view through the careful placement of the trees. The third image takes the opposite approach of the previous two and transforms the park site into more of an object by clearing away the trees along the approach and planting them densely around the site.

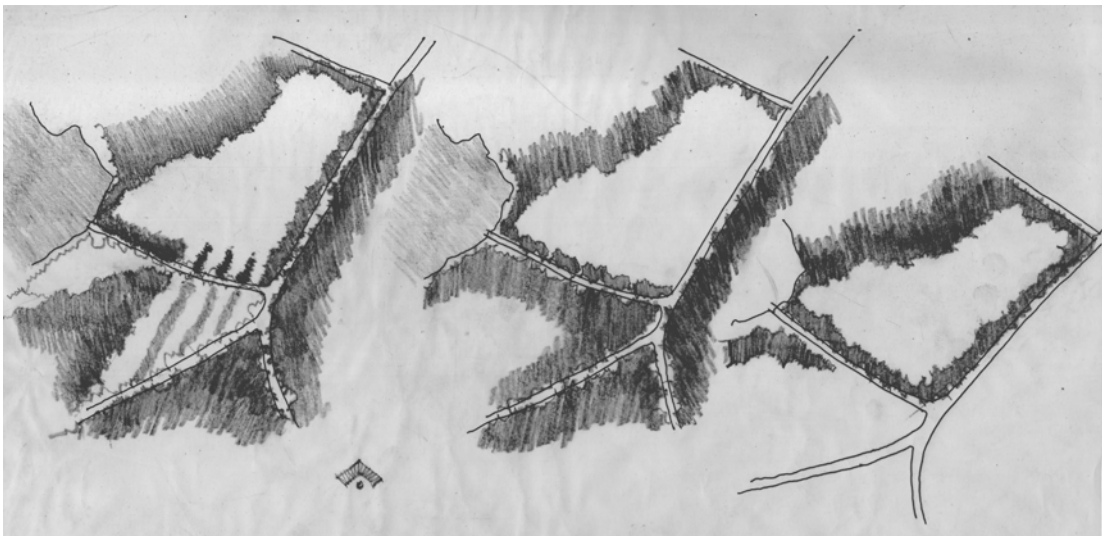


Figure 56: Landscape defining edges

The image above describes in more detail the three previous schemes as they relate to the entry to the park site from the road and the connecting trail.

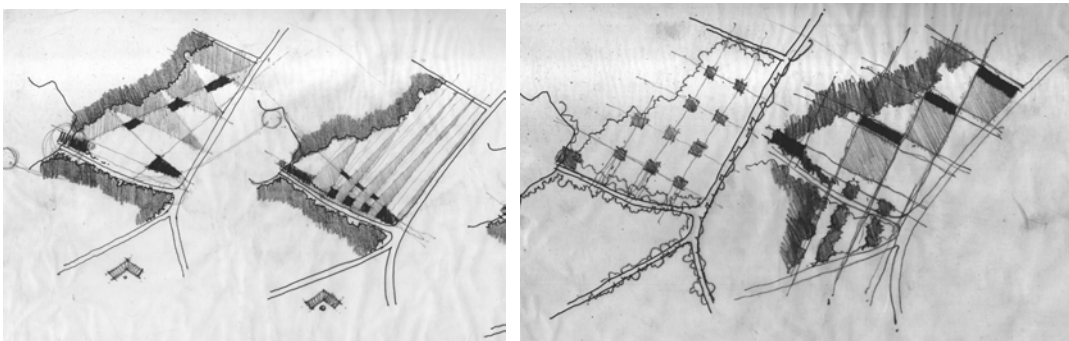


Figure 57: Organization of pavilions and landscape

The four sketches in figure 58 begin to outline possible organizations for the placement of the pavilions and garden areas. The first sketch is knitting back and forth between the water's edge, the forest, and the fields adjacent to the site. This activates the circulation pattern and further informs the orientation of the pavilions. The second sketch uses the pavilions and their orientation to define edges that direct view towards the water while the gardens run perpendicular out to the forest and fields. This juxtaposition of landscaping and building allow for a highly dynamic intersection. The third sketch illustrates the use of a grid to place the pavilions and generates a dichotomy between the buildings and the landscape. The fourth sketch is also a grid but of less rigidity. Here the grid is responding to the orientation of the site and desire to create gardens as extensions of the pavilions or vice versa.

The following four schematic site interventions are a combination of the four pavilion and garden organizations with variations on the arrival scheme that gradually opens up to the site. An extension of the site is proposed in first, second, and fourth scheme to emphasize the orientation of the site and movement into and through it.

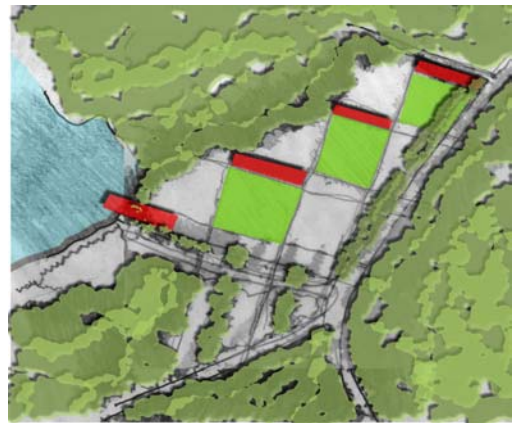
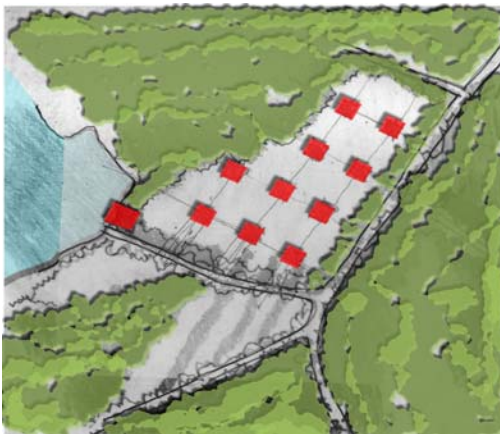
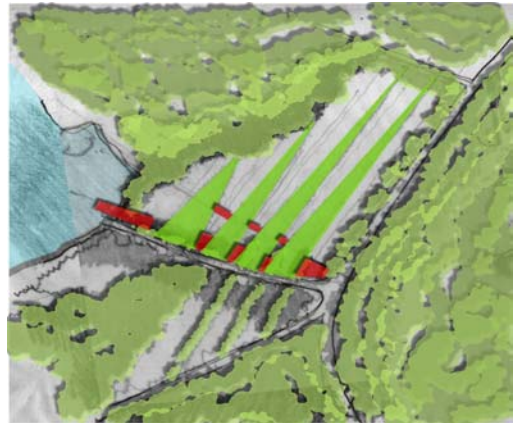
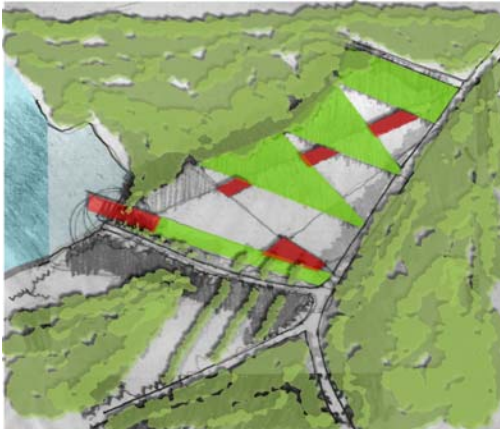


Figure 58: From top left to bottom right - Interventions 1-4

The two following collages were created to gain a graphic understanding of the natural forces at work on the site and to spur thoughts about how they can influence the design of the site and the buildings.

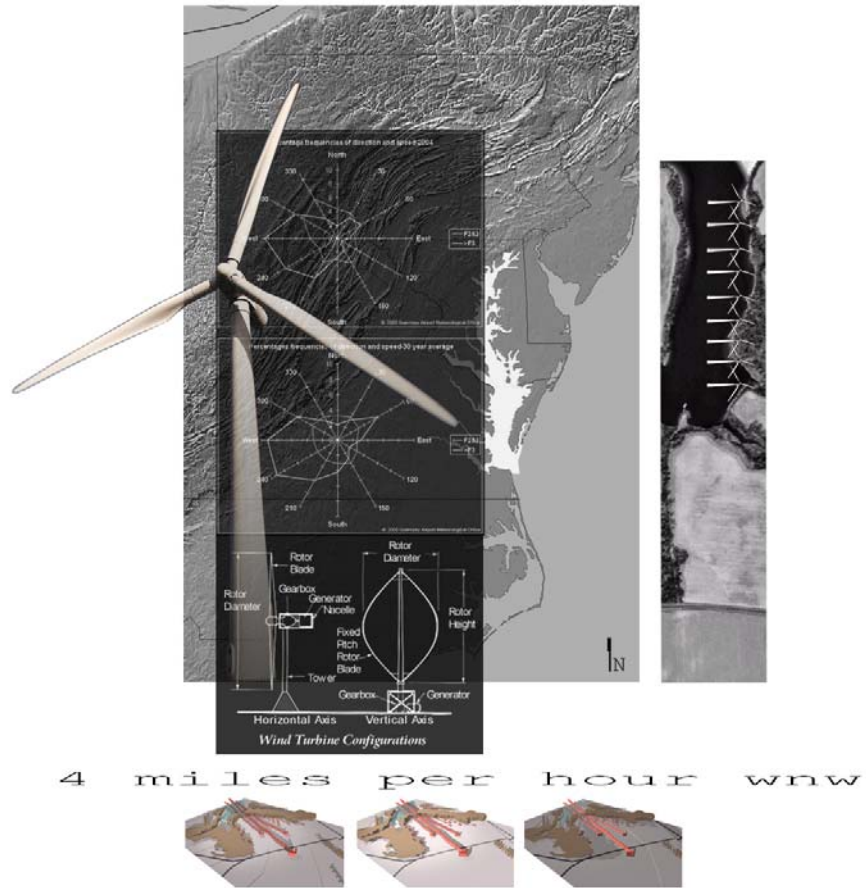


Figure 59: Wind collage

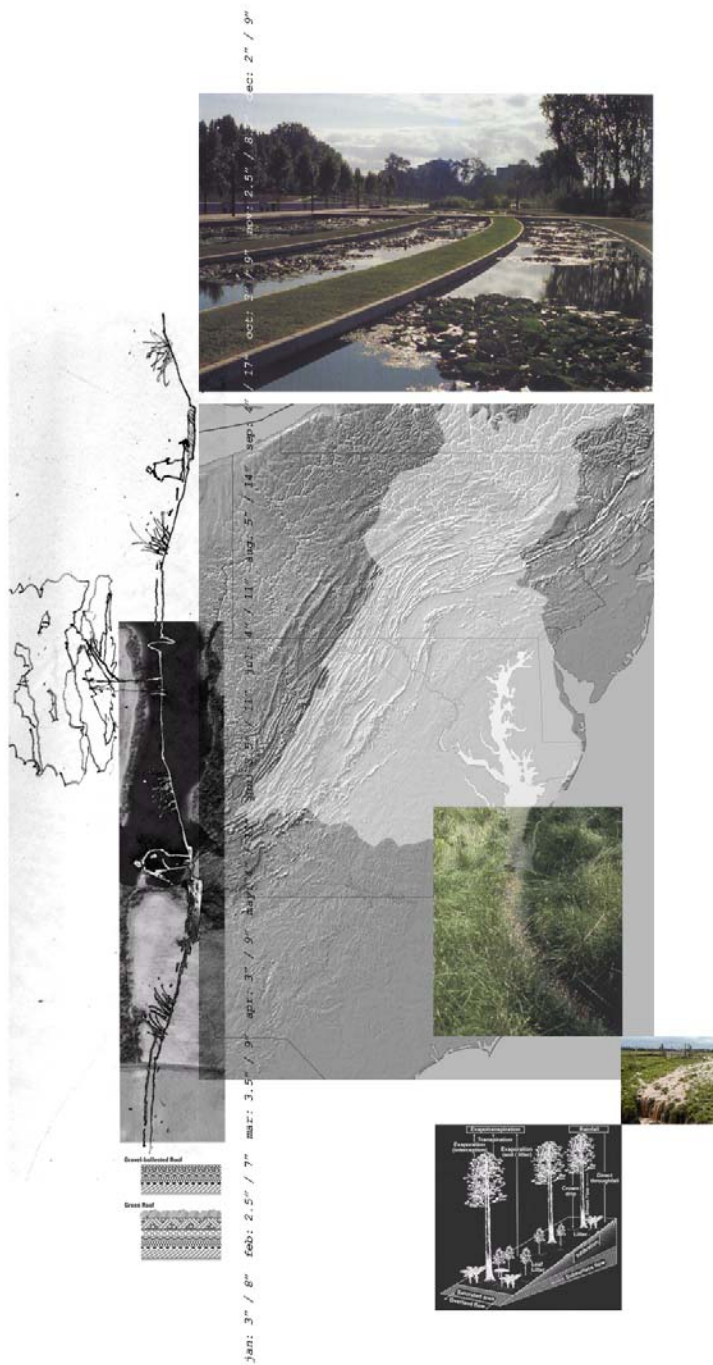


Figure 60: Water collection collage

Final Design Proposal

The final design will be represented in two sections, the site and the building. The site design consists of four seasonal gardens (fig. 64-67), a catch basin to collect water from the site and reuse it within the building, and four pavilions specifically situated to capture the sunset over the water during the two equinoxes and solstices. There is parking for both small vehicles and large busses, and a series of pathways to knit the open landscape to the pavilions, through the museum and out to the water.

The building situates itself on the south western edge of the site by striking a hard edge 20 feet above water level on the western most corner. As it moves to the east it progressively stretches itself thinner and eventually becomes a line of trees defining the path to and from the parking area. Upon arrival to the museum from the east one slips through a modest opening in the façade with minimal views to the landscape and the water. (fig. 82) After entering the museum the northern face of the building opens up completely to the landscape thus blurring the edge between building and landscape. (fig. 85) Continuing through the museum will lead to the main gallery (fig. 85 right, 86) finally ending in the end gallery or overlook gallery. (fig. 87,88) Figures 83 and 84 best represent the end and overlook galleries that boast panoramic views of the Chesapeake Bay.

The sustainability and longevity of the buildings on the site is a critical factor when choosing materials for construction. Thus the pavilions will be constructed entirely of reclaimed lumber from local sources, and the museum will be constructed of local stone, board formed concrete and reclaimed lumber from local sources. These materials will also reinforce image of strength and stability with sensitivity to the landscape.

The Site

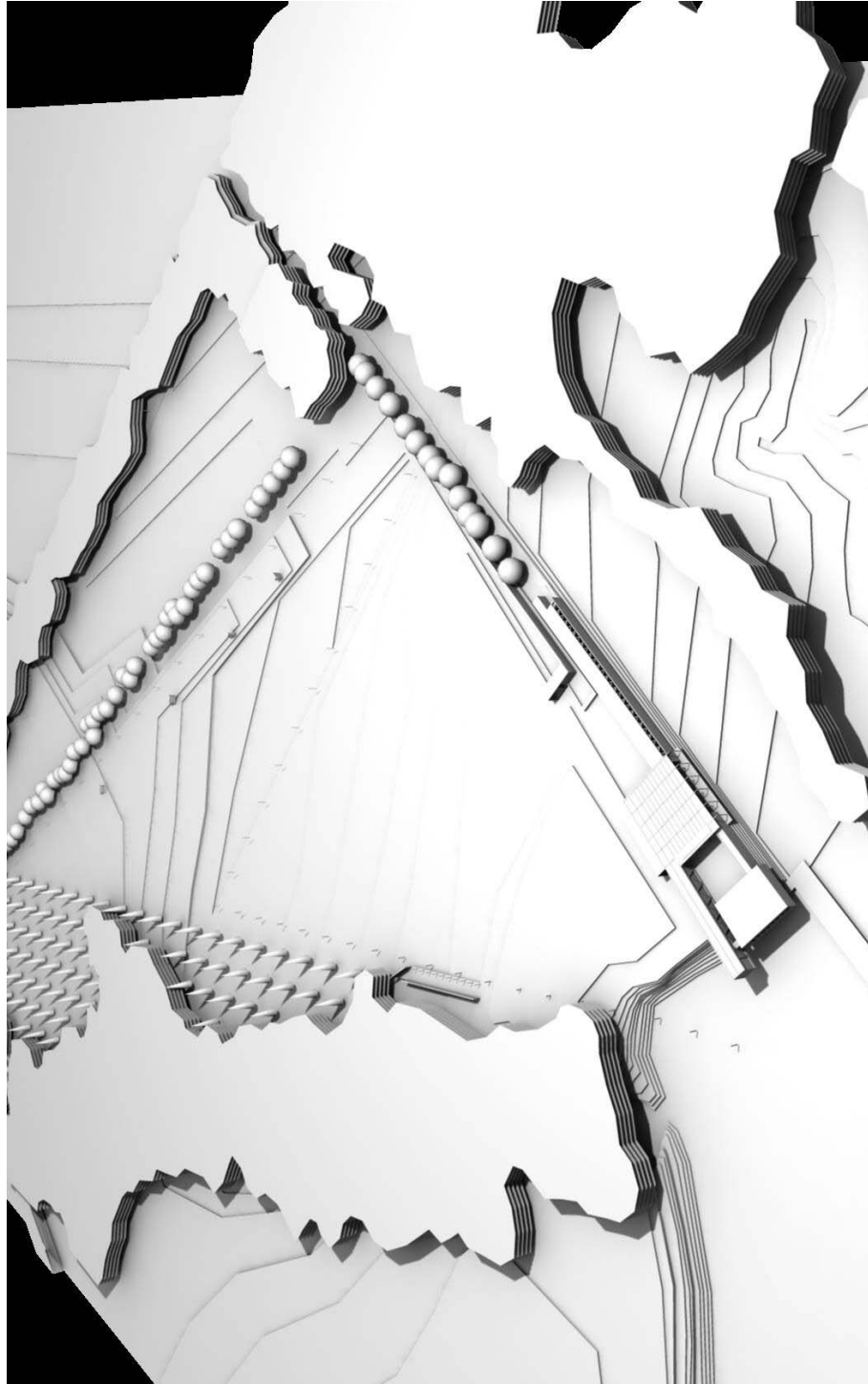


Figure 61: Site model aerial

The following four images represent seasonal gardens that bloom during the four different seasons. At the waters edge, each season defines a different outdoor room and connection to an outdoor gallery.



Figure 64: Spring garden plan



Figure 65: Summer garden plan

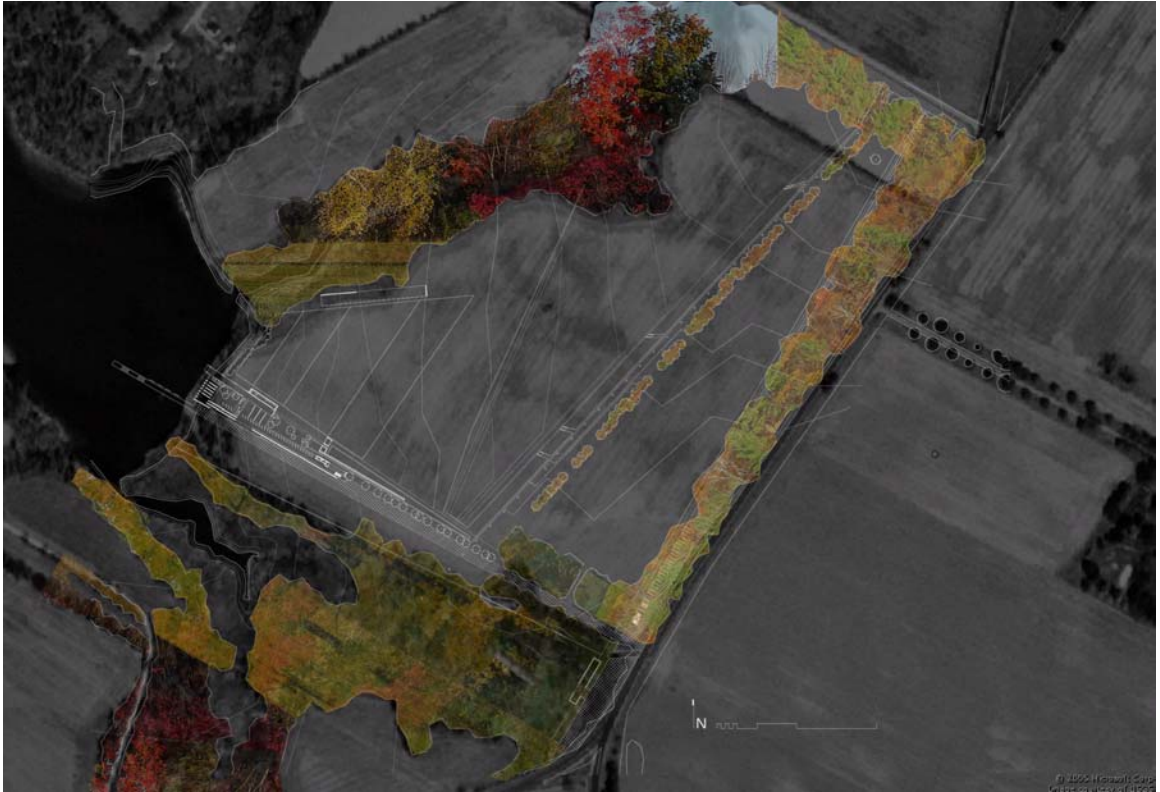


Figure 66: Fall garden plan. Focus on tree foliage



Figure 67: Winter garden plan

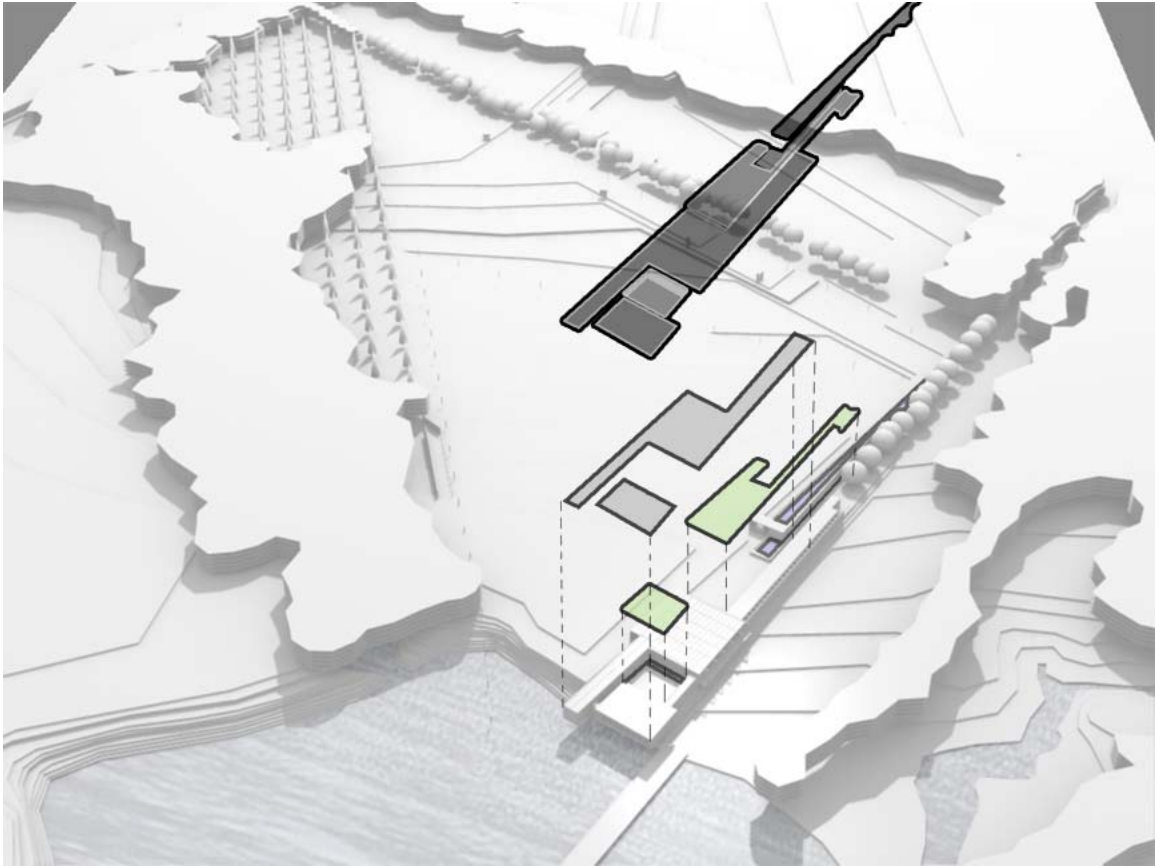


Figure 68: Layering of building spaces. Courtyards, water elements, and gallery spaces.

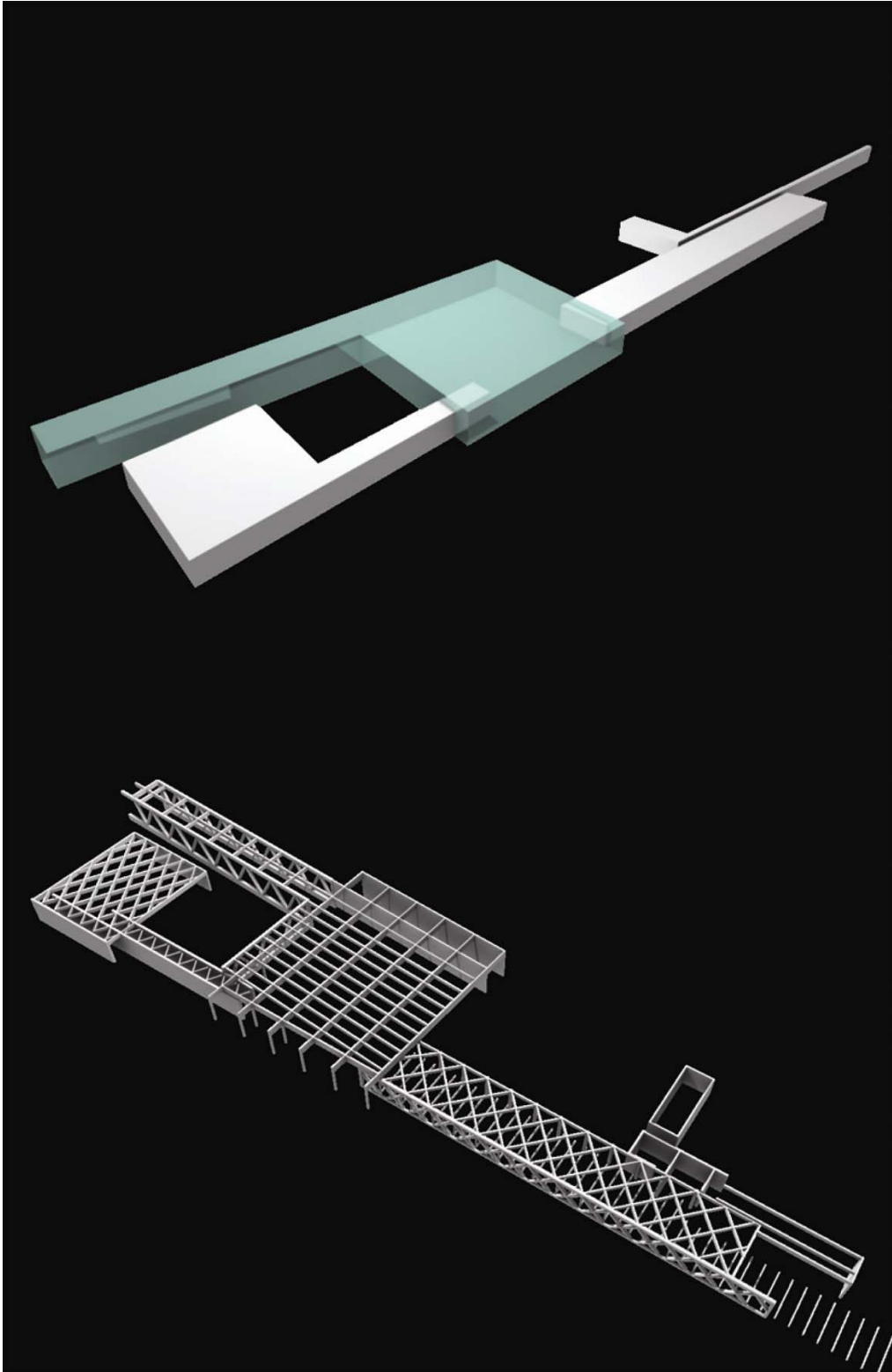


Figure 69: Top, interlocking of solid building masses and lighter/transparent mass fo the main and overlook galleries. Bottom, structural diagram

Park and Pavilions

Plans



Figure 70: Site plan



Figure 71: Summer sunset pavilion

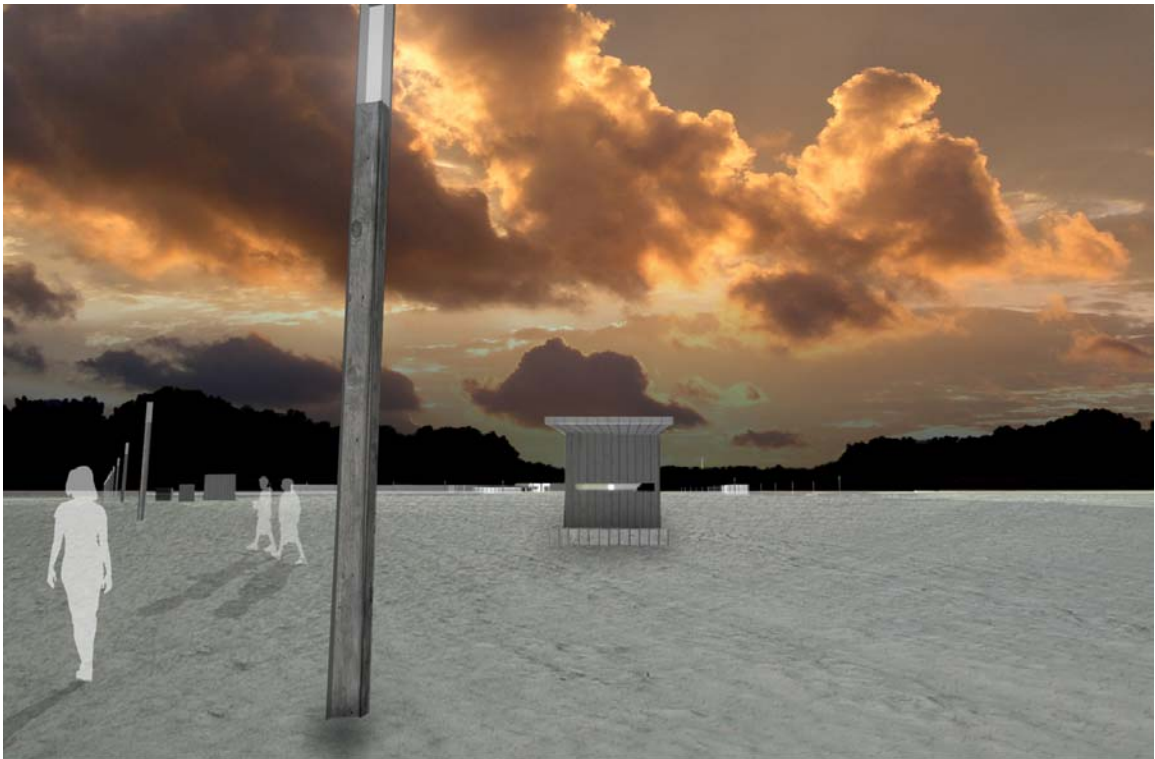


Figure 72: Winter sunset pavilion



Figure 73: Path along pavilions looking towards the water.



Figure 74: Path along pavilions looking towards the pavilions.

The Building

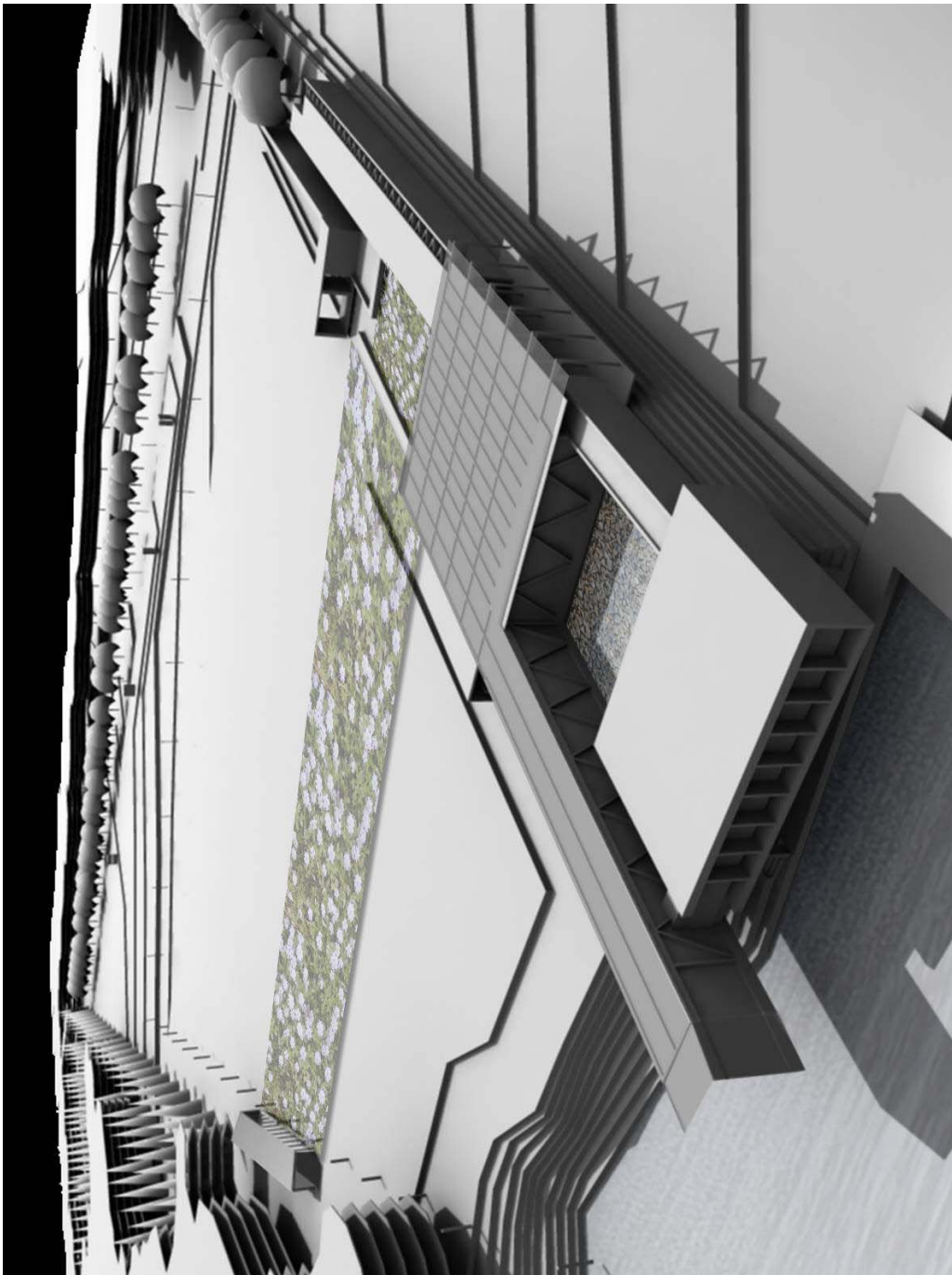


Figure 75: Aerial of museum



Figure 76: Building plan

Elevations

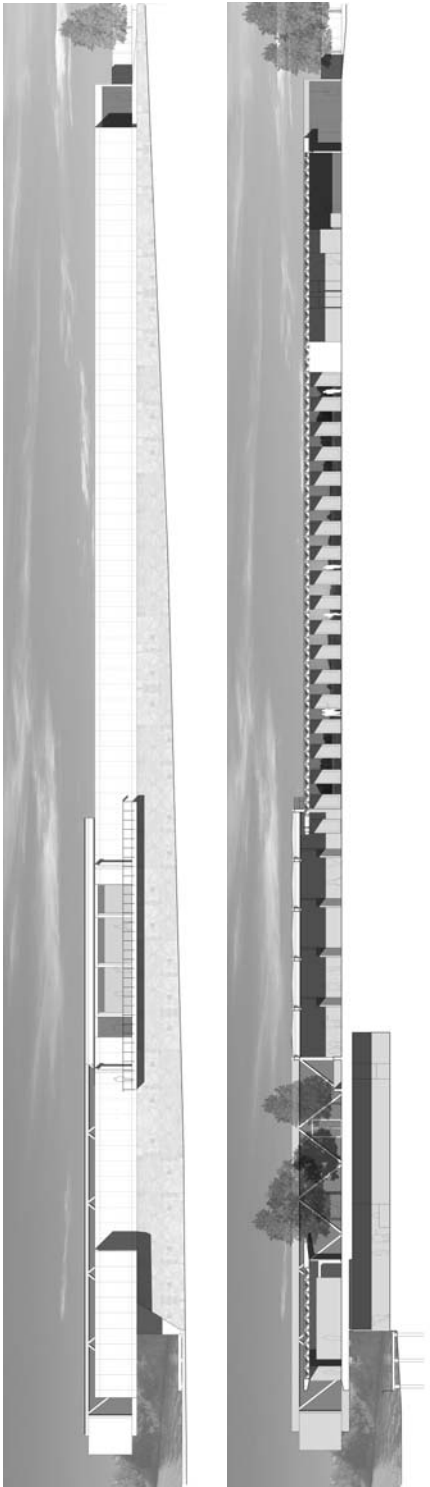


Figure 77: South elevation and section elevation through main galleries.

Sections

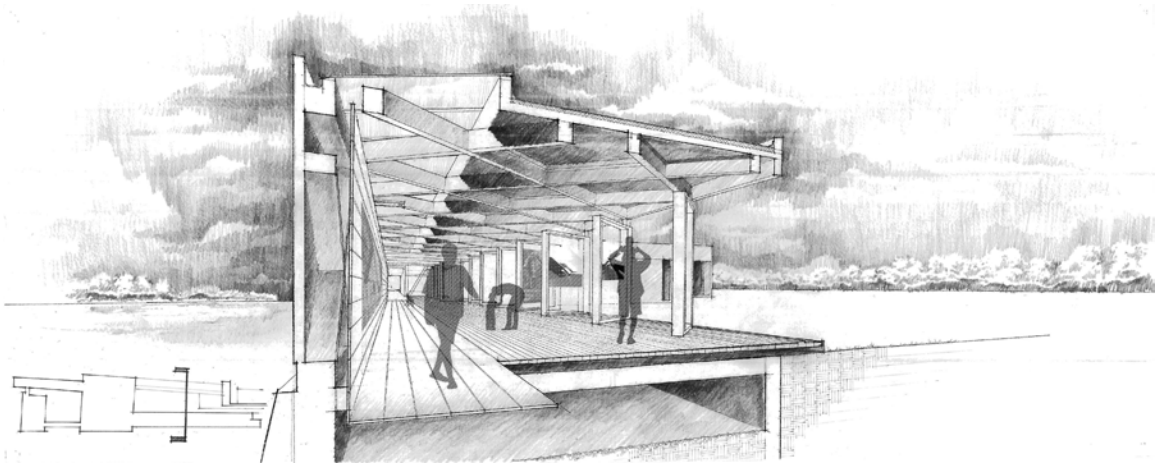


Figure 78: Section perspective through first long gallery.

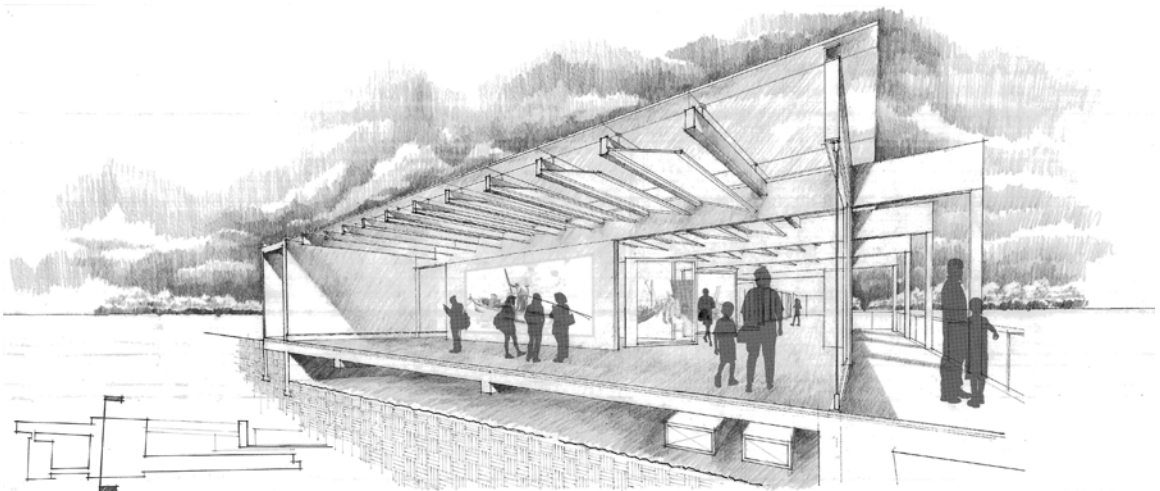


Figure 79: Section perspective through main gallery.

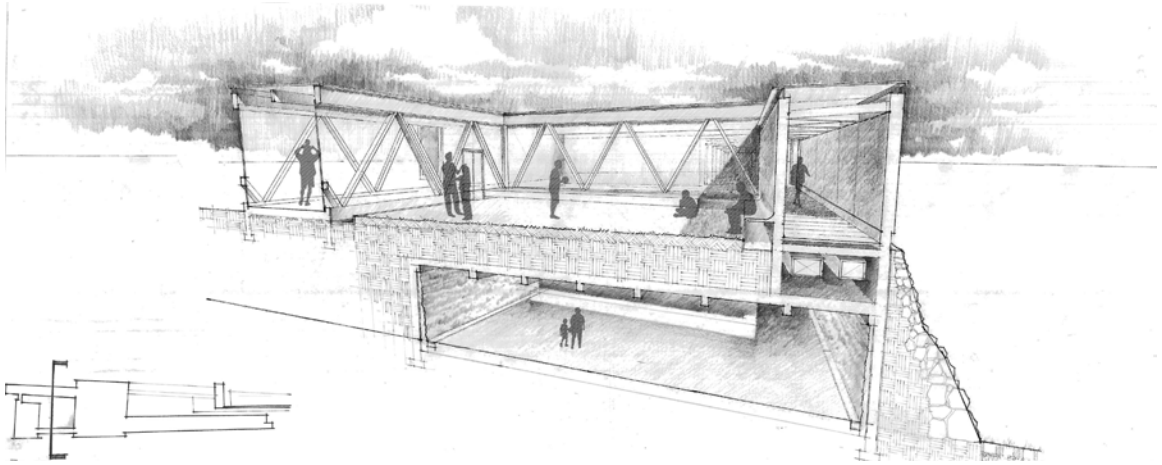


Figure 80: Section perspective through interior courtyard.

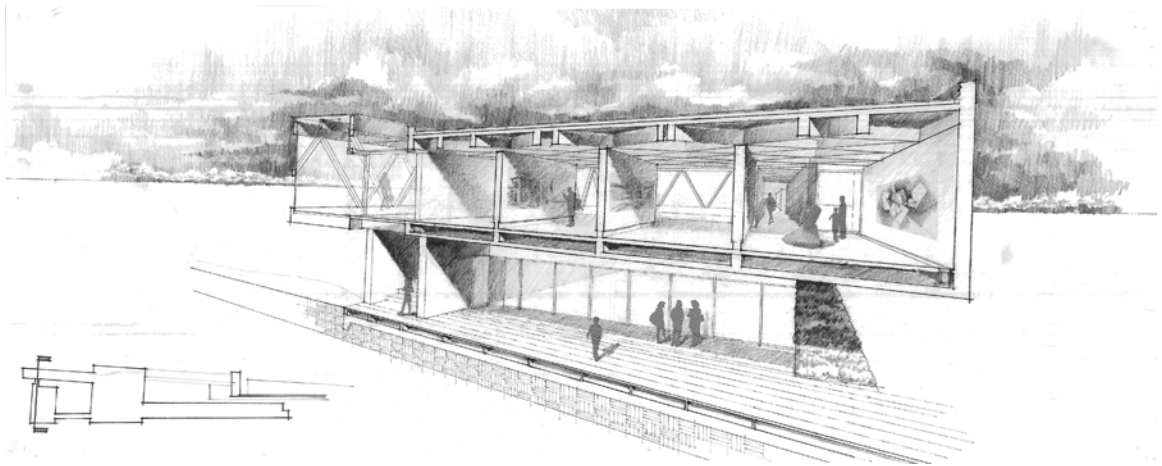


Figure 81: Section perspective through end gallery and cafe deck on lower level.

3-Dimensional Representations



Figure 82: Main entrance to museum



Figure 83: View of museum from dock.



Figure 84: View of museum from dock



Figure 85: Left - long gallery and connection to landscape. Right - main gallery and connection to landscape.



Figure 86: Main gallery

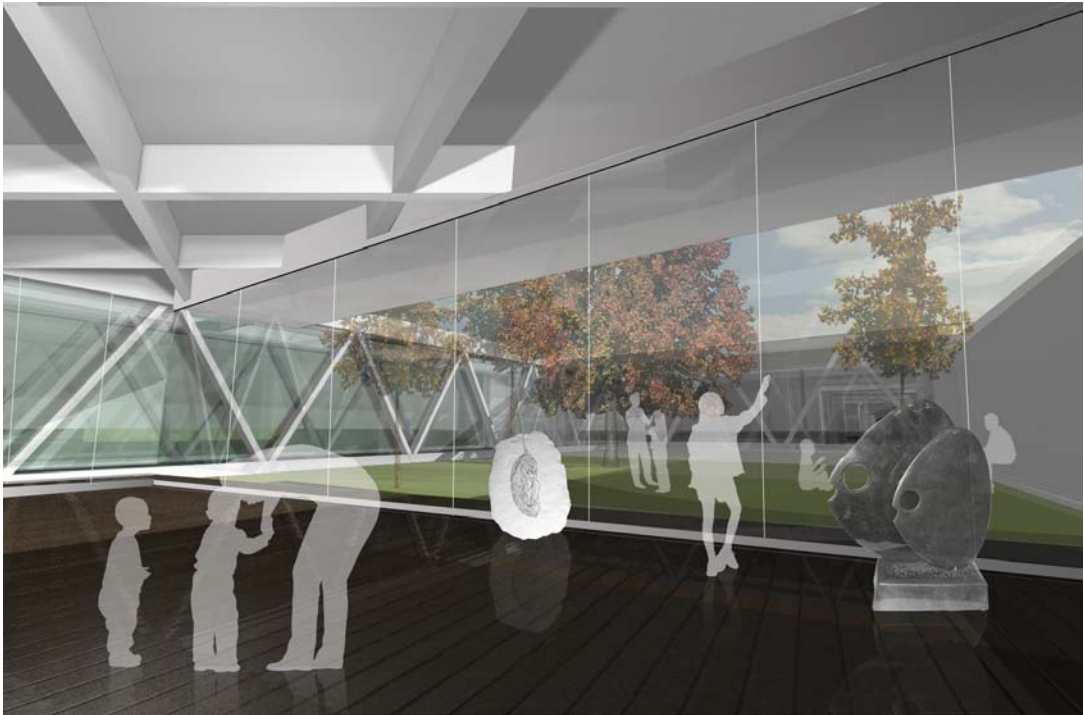


Figure 87: End gallery looking to courtyard

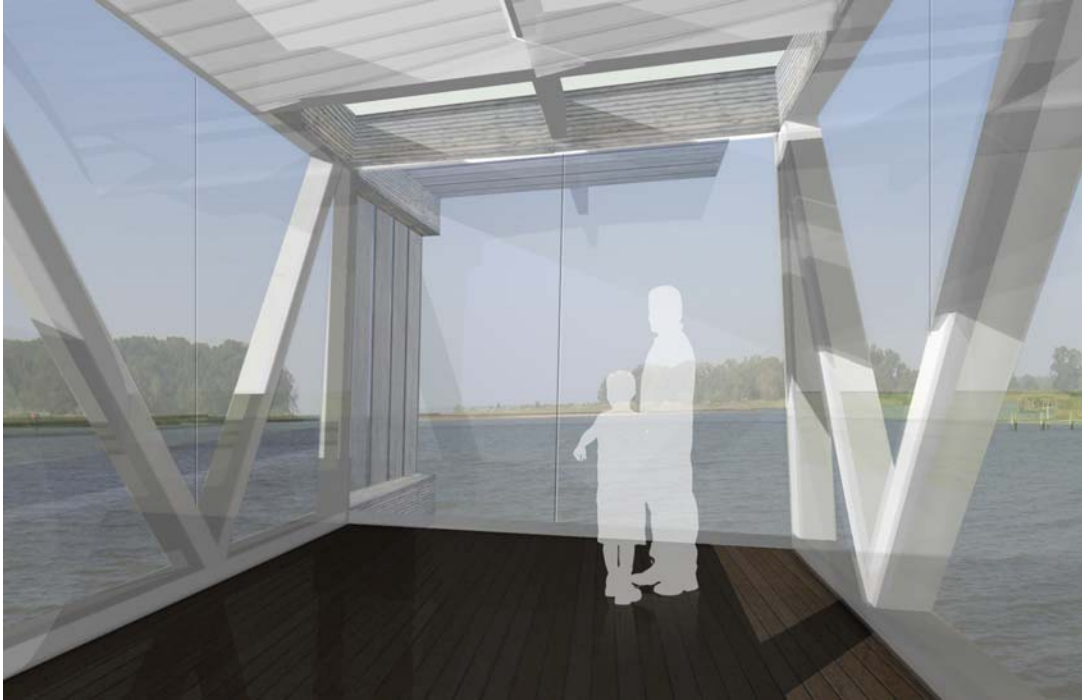


Figure 88: Overlook gallery

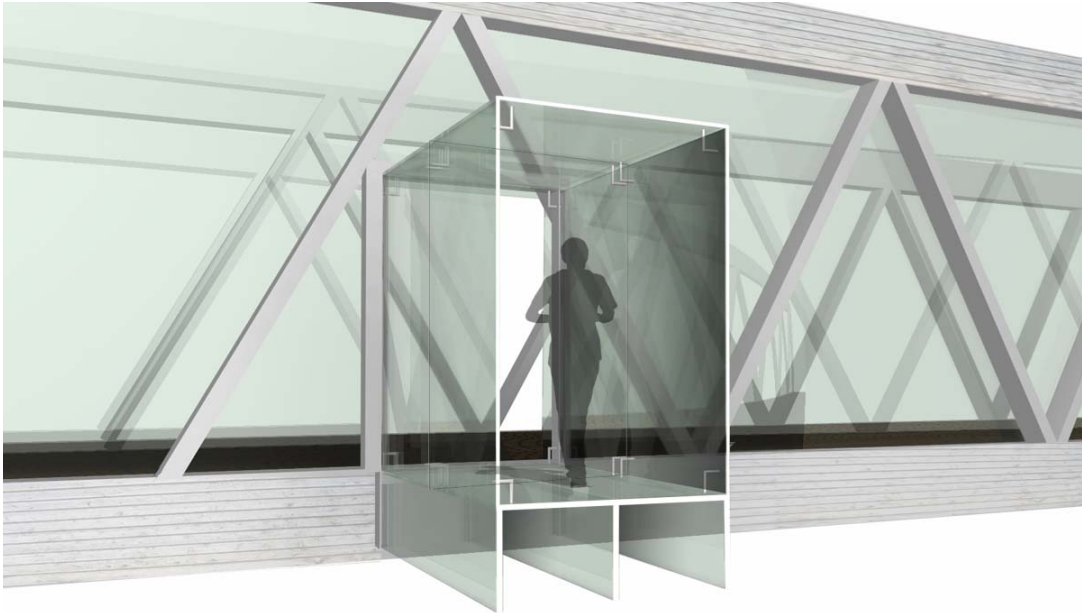


Figure 89: Glass bridge connector between lookout gallery and end gallery.

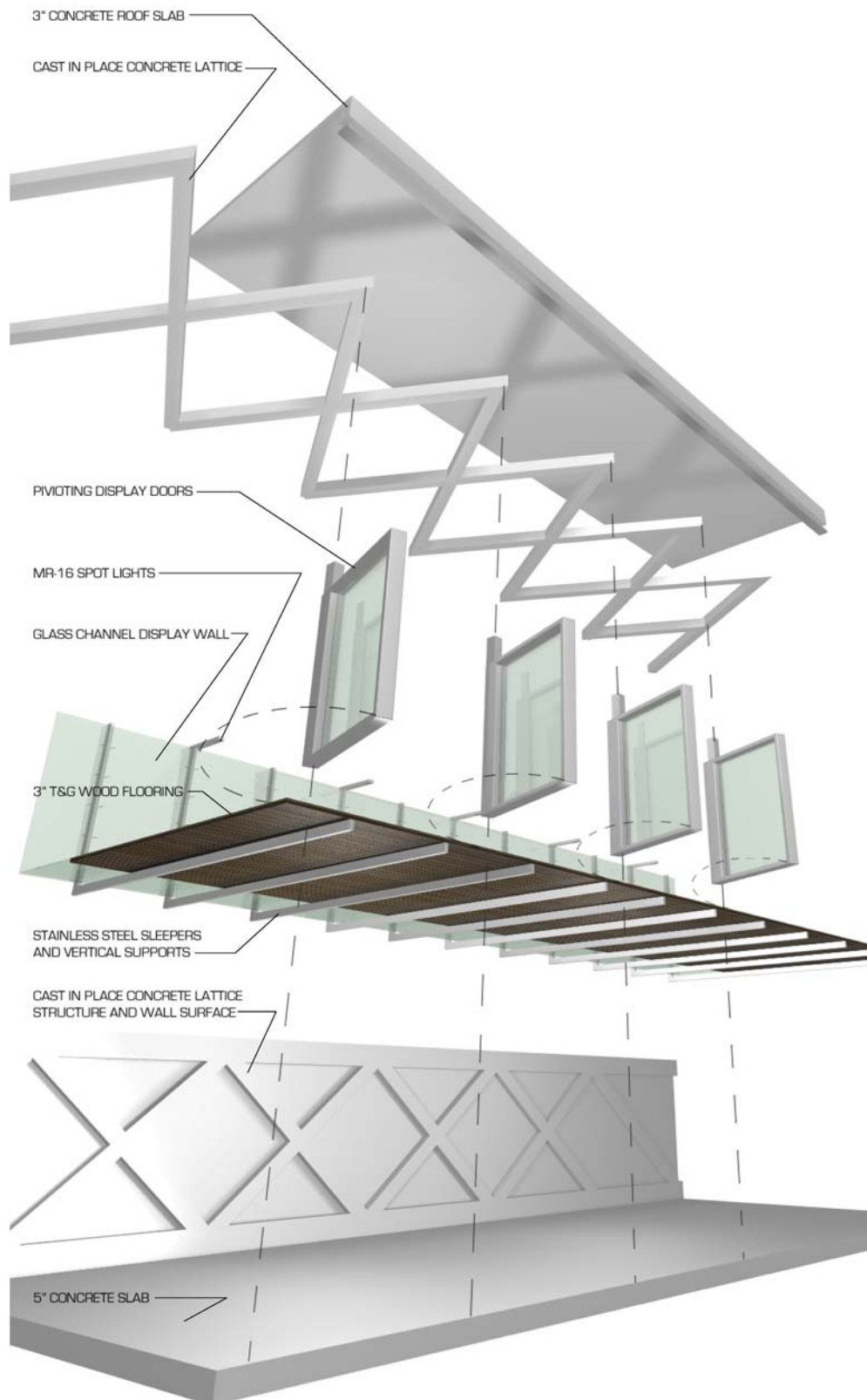


Figure 90: Exploded perspective of long gallery kit of parts.

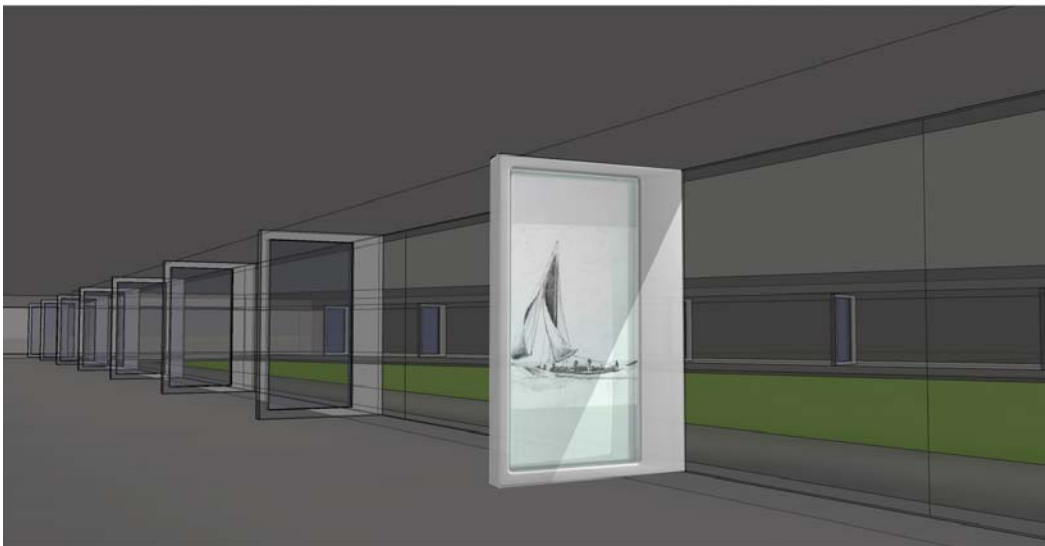
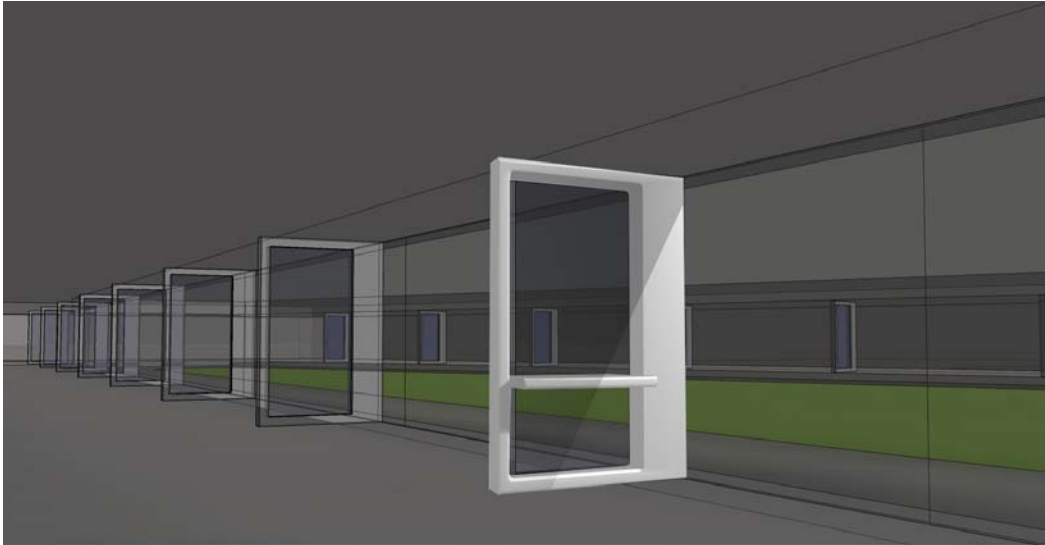


Figure 91: Operable display units.

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