



BETWEEN WATER AND LAND

A Design Thesis submitted to the faculty of
Virginia Polytechnic Institute & State University
in partial fulfillment of the requirements
for the degree of

Master of Architecture

by

Rosa D. Otero-López

Approved by:



Jack Davis, Chairman

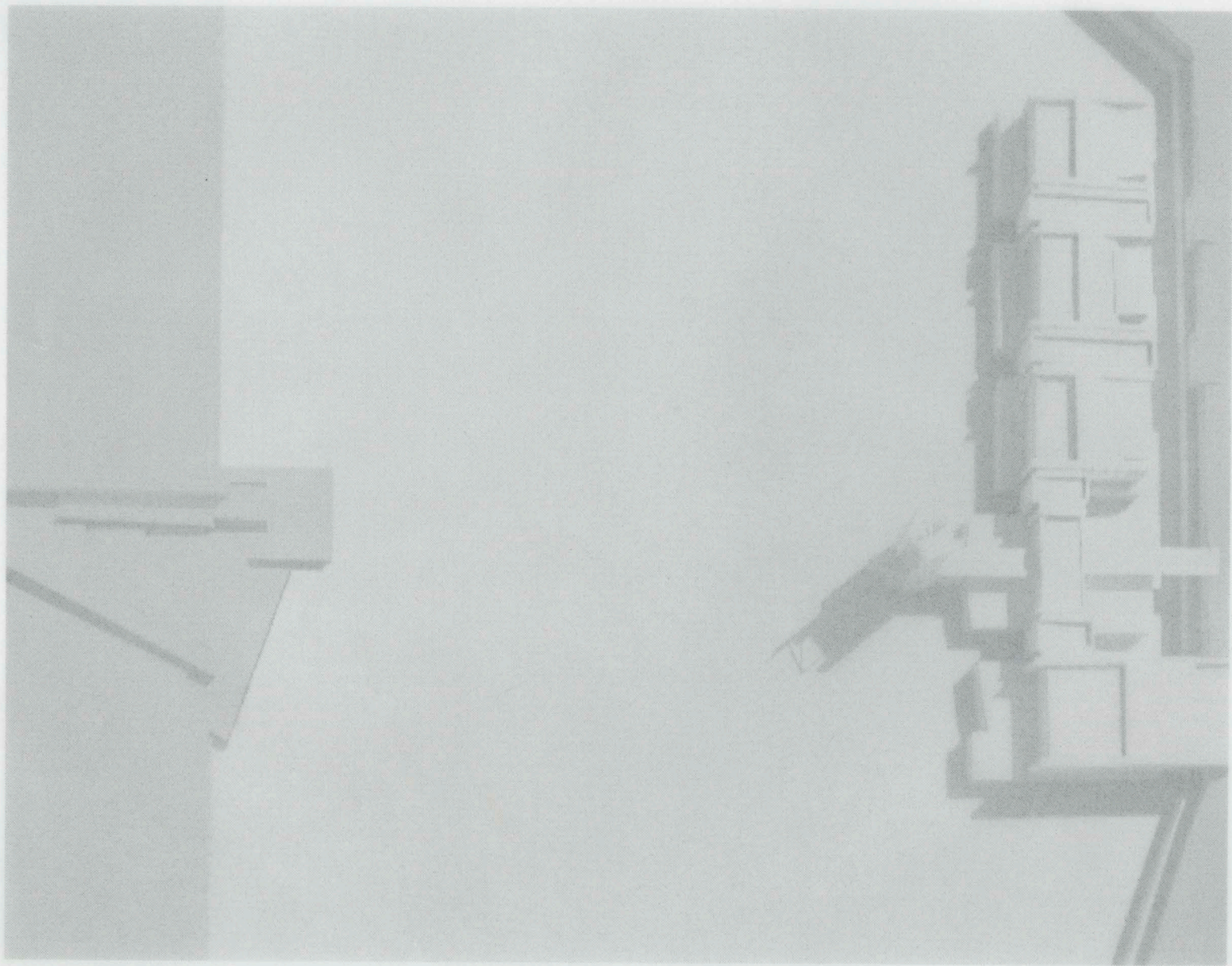


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Virginia Polytechnic Institute And State University
Blacksburg, Virginia
July, 1996



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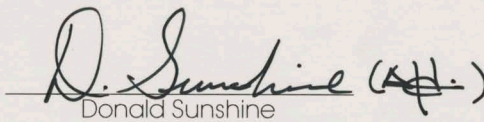
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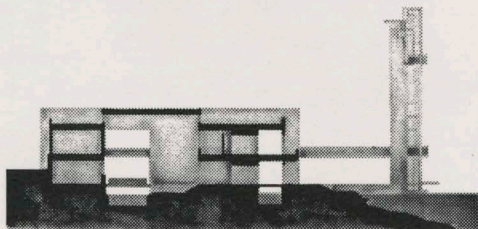
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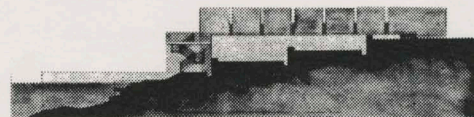
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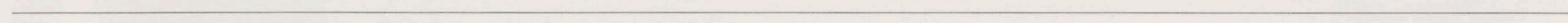
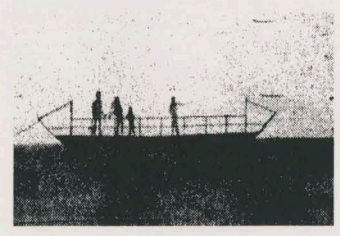
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A **Mama** y a **Papa**

To my Mom and Dad, Elena y Pepe, whose strength, encouragement and love have been an inspiration throughout my life: And to my godmother, Norma, who has always been there for me with wisdom and guidance. "Los quiero mucho".

I want to express my most sincere appreciation to the members of my thesis committee: Professor Jack Davis, Professor William Brown and Professor Donald Sunshine, who gave me the right input and advice when I needed it the most. And to my friends Todd and Clarissa whose faith, love and support gave me the energy and vitality to do it.



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The making of places we call architecture. Through building man gives meanings, concrete presence, and he gathers buildings to visualize and symbolize his form of life as a totality. Thus his everyday lifeworld becomes a meaningful home where he can dwell.

The basic act of architecture is therefore to understand the vocation of the place.

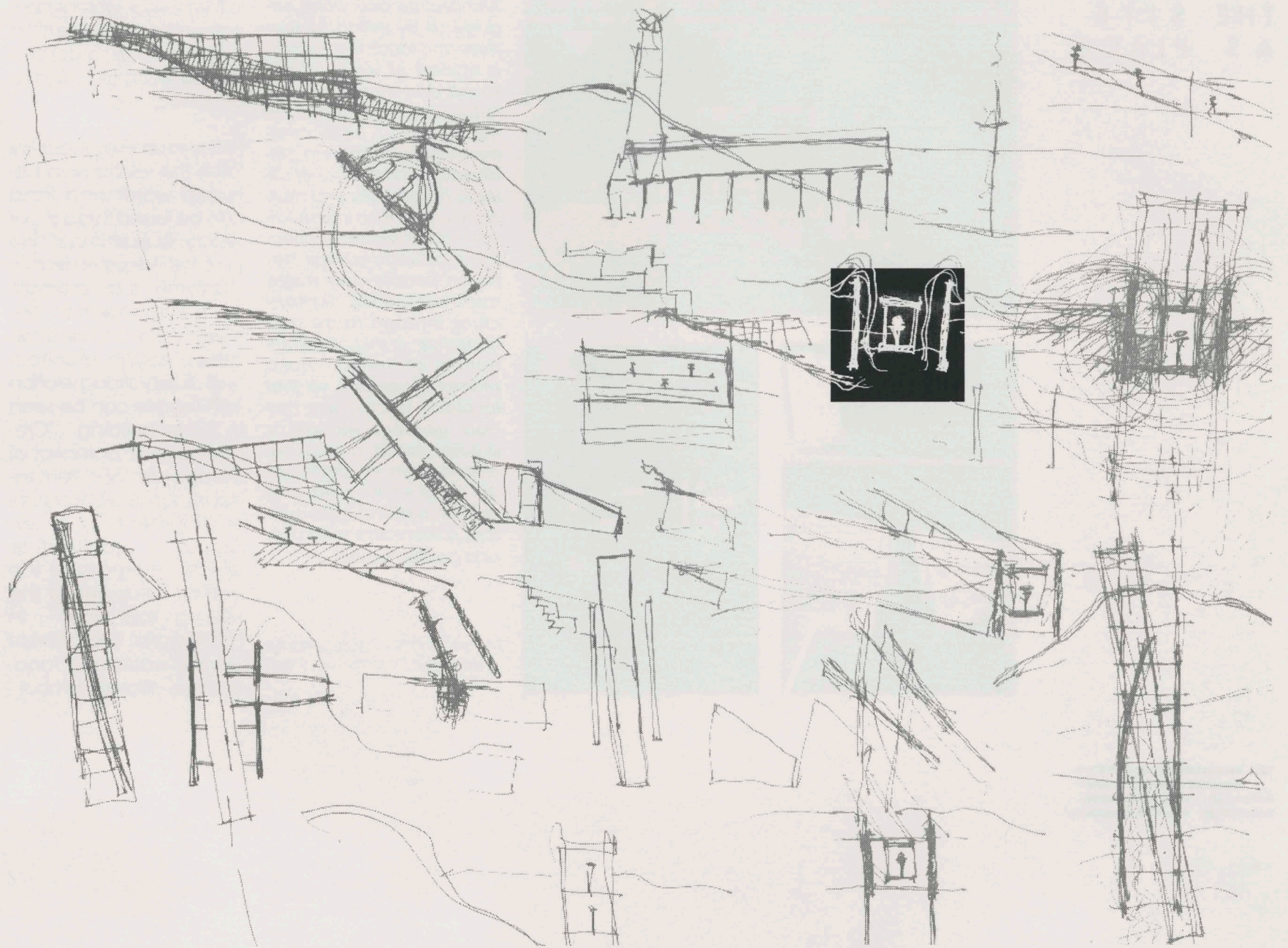
Christian Norberg-Schultz

Architecture should respond to regional conditions. These conditions and characteristics are what make a site become a place. They can evolve from natural events, an experience, or the past, thus implying the natural, cultural and historical characteristics of a particular place. It is very important to identify and understand the phenomenon of the place to enable one to identify its particularities.

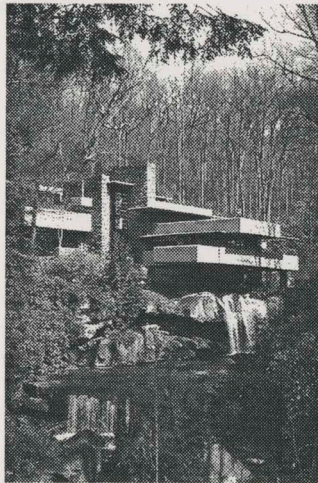
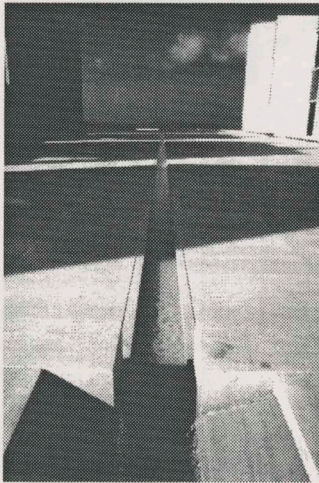


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Above: Frank Lloyd Wright's **Taliesin**
Opposite: Conceptual sketches



THE SITE AS PLACE



Architecture and water engage us by letting us see, hear, and touch the water in a myriad of ways. Sight, sound, and contact characterized the inception of all the places we have seen—from medieval Chinese gardens to European canal cities to harbors old and new. Architecture is an intermediary that negotiates connections or separations between people and water, communicating sensory clues through forms and materials. But what combination of senses make places successful, so that fountains, pools, rivers, harbors, gardens, islands, or streams inspire, amuse, rescue, frighten, or challenge us? What similar clues lead us to understand a city's history, a fountain's meaning, or a garden's spirit?

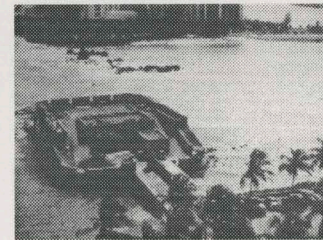
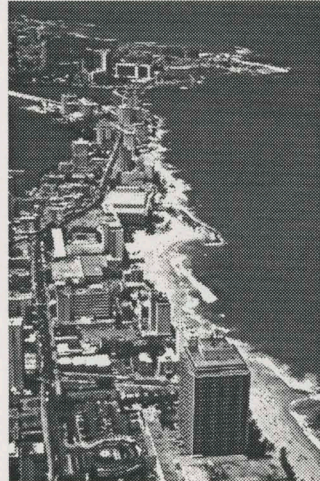
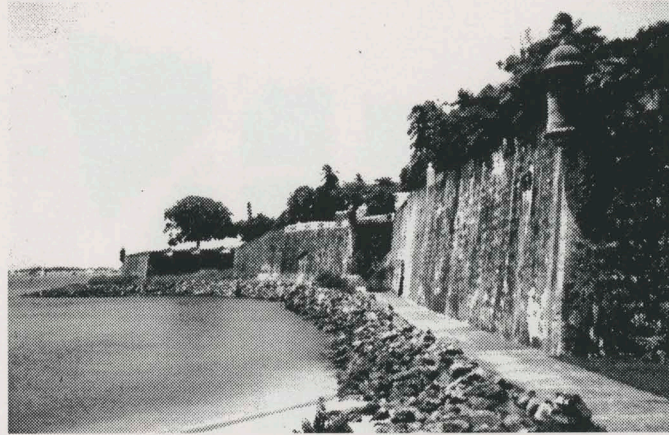
Moore, Charles. *Water and Architecture*. Abrams Publishers. 1994.

In this project, water is considered the instrument in the search for a correlation between architecture and the place.

Many examples that reinforce the relationship between water and land can be found throughout history. Itsukushima Shrine (1167) in Miyajima Island, Hiroshima, is an example of the connection between water and land created through architecture. A very strong relation with the site can be seen in these building. "Creative use of potential of the sea can add tremendously to the architectural environment.. is an example of architecture which incorporates the natural attributes of the sea in this way". In Fallingwater, two different worlds, water and land, enclose different symbol-

ism and meaning. As one is dependent upon the other there is a constant relationship. In the book *Water and Architecture*, Charles Moore states: Named Fallingwater, the structure engages our senses of sight, sound, and touch, and compels us to see, hear and feel not only the architecture but also nature beyond. Fusions, counterpoints, and tensions lead us to the meaning of the place—its connection to nature, its inhabitants, and the water." A bond between water and land is not only physical but spiritual as well. The presence of water in Kahn's Salk Institute gives identity to the land, and although it is the opposite of place, water belongs intimately to living reality. Throughout history, man has dealt in many ways

with issues regarding water-land relation. The particular scenario for this searching and experimentations exists in Puerto Rico, an island in the Caribbean Sea. Examples of the impact of water in Puerto Rico's built environment are found in the Spanish fortifications along the San Juan peninsula and the "El Condado" hotel area which defines the major industry (tourism) in Puerto Rico. They speak different architectural languages which respond historically to particular cultural moments and events. The Spanish fortifications (1600-1700) are the result of protective acts against war conflicts from the sea while the hotel area talks about the opportunity the ocean offers as an attractive feature of the island.



Top: **Old Fortifications**, San Juan, PR.
Middle: **Lighthouse**, San Juan, PR.
Bottom Left: **El Condado**, San Juan, PR.
Bottom Right: **El Castillito**, San Juan, PR.

PLACE

A site always has a distinct field of force that affects man. The field is a language, yet not a language. The logic of nature affects one subjectively, and it is made gradually clear only to those who seriously attempt to perceive it. Architecture is ultimately a question of how one responds to those demands made by the land. To put it another way, the logic of architecture must be adapted to the logic of nature. The aim of architecture is always the creation of an environment where the logic of nature and the logic of architecture are in fierce conflict yet co-exist. One logic is not subsumed by the other, nor is there a complete fusion by the two.

Tadao Ando



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Photographic image of the place
(Loiza, PR.)

First the site, and then the search. Searching for a place. The architectural approach should meet characteristics that can make the search successful. The particular approach is going to ask the site many individual questions. The place is a site with spirit. Unique and special features that the site possesses, such as orientation, views, climate, location, vegetation, surroundings among others, make it possible to become a place. Quoting a definition of Norberg Shulz from his book *Genius Loci*: "to belong to a place means to have an existential foothold, in a concrete everyday sense".

Three realms were identified: The River, "El Ancon", and the town. Each of these pose a variety of architectural questions in the making of a strong bond with this particular site. The project tries to approach these realms with a strong focus on the relationships which exist between water and land. Physical characteristics of the water bring questions concerning the behavior of the river. - How the river is going to be approached from a design standpoint? - Controlled, partially controlled or uncontrolled by the architecture? If the building meets any of these situations, how can they be concretized?

Rivers (yarimizu) may flow swiftly and bubble like a mountain stream, though more often it winds slowly as a river does across a plain. There will of course be obstructions to divert its course—large boulders or an island to divide it, or a fallen tree to make a dam. Its course may be sandy or pebbly or rocky. And there will be bridges of simple wooden planks or massive slabs of stone.

Barber, Bernard. *Water a view from Japan*. Weatherhill, NY, Tokyo, 1974

The realm of the river plays the role of the natural element: the water. It is in the river where the main ideas dealing with the meeting of the built environment with the natural environment can be perceived. The river, "El Rio Grande de Loiza" carries a lot of meaning and importance. Besides the Atlantic ocean, it is the most important body of water in Puerto Rico. It has been an inspiration for many artists and writers.



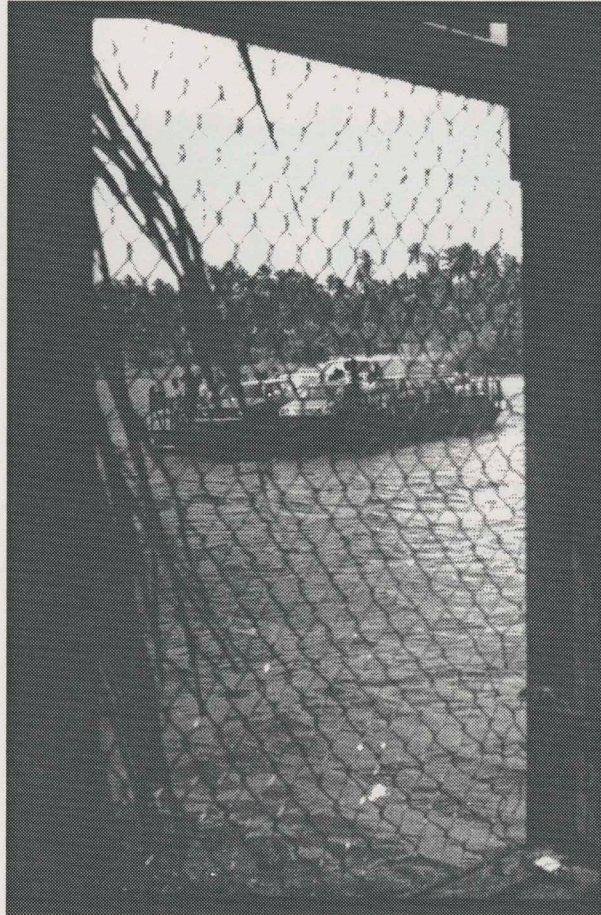
*Rio Grande de Loiza ...
Azul.
Moreno. Rojo.
Espejo azul, caido pedazo
azul de cielo;
desnuda carne blanca
que se te vuelve negra
cada vez que la noche se
te mete en el lecho;
roja franja de sangre,
cuando bajo la lluvia
a torrentes su barro
te vomitan los cerros.*

RIO GRANDE DE LOIZA
Julia de Burgos

THE RIVER

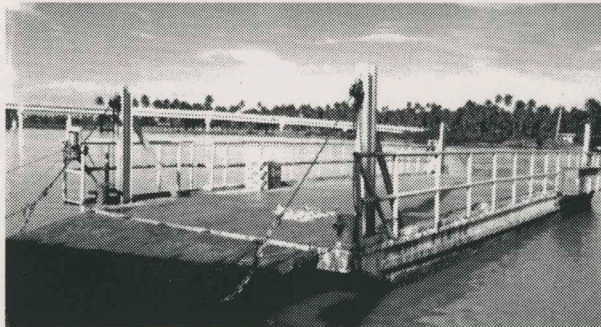
Top: River overtaken by plants
Bottom: River while flooding

EL ANCON



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Top: Ancon picture while in motion 1975
Bottom: Picture of the Ancon before departure, 1981.



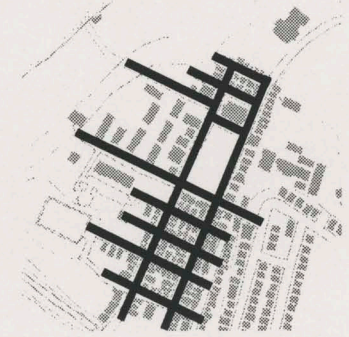
"El Ancon" is a connecting ferry that no longer exist. It had been the only means of crossing the river at this point since the 17th century. El Ancon was characterized for the primitive mechanism of poles and a rope that moved it from shore to shore. It had a vital importance for the urban development of the area, specially to the town of Loiza. It was a special place, where families used to go just to ferry their cars on the "little boat" to go to the other side. It became just a memory with the construction of a new concrete bridge- which gives access to the town in a more advance way. The experience of the Ancon and the river itself is something that should never be forgotten.

The Ancon is one of the ancient things that is still done the old way...Anyone who has ever driven through the real country that is traversed by the Vacia Talega road and then been ferried slowly but steadily across the Rio Grande de Loiza will remember the experience with pleasure.

The Island Times, Crossing the River by Rope and Pole. June 25, 1962. pag. 3

Loiza is a unique town in Puerto Rico located on the north shore of the country. Loiza was established in 1719 and was one of the first settlements in the island. It is known as a town with a lot of cultural tradition and history. Loiza is surrounded by two major bodies of water: to the east the Rio Grande de Loiza and to the north the Atlantic Ocean. The urban texture of the town is very rich but it lacks in hierarchy and order.

Like most of the towns in Puerto Rico, Loiza has a main plaza defined by the main institutional buildings. A grid is the main ordering system for the town. Consequently an unexpected urban growth also exists. The main buildings and the plaza are both part of this grid.



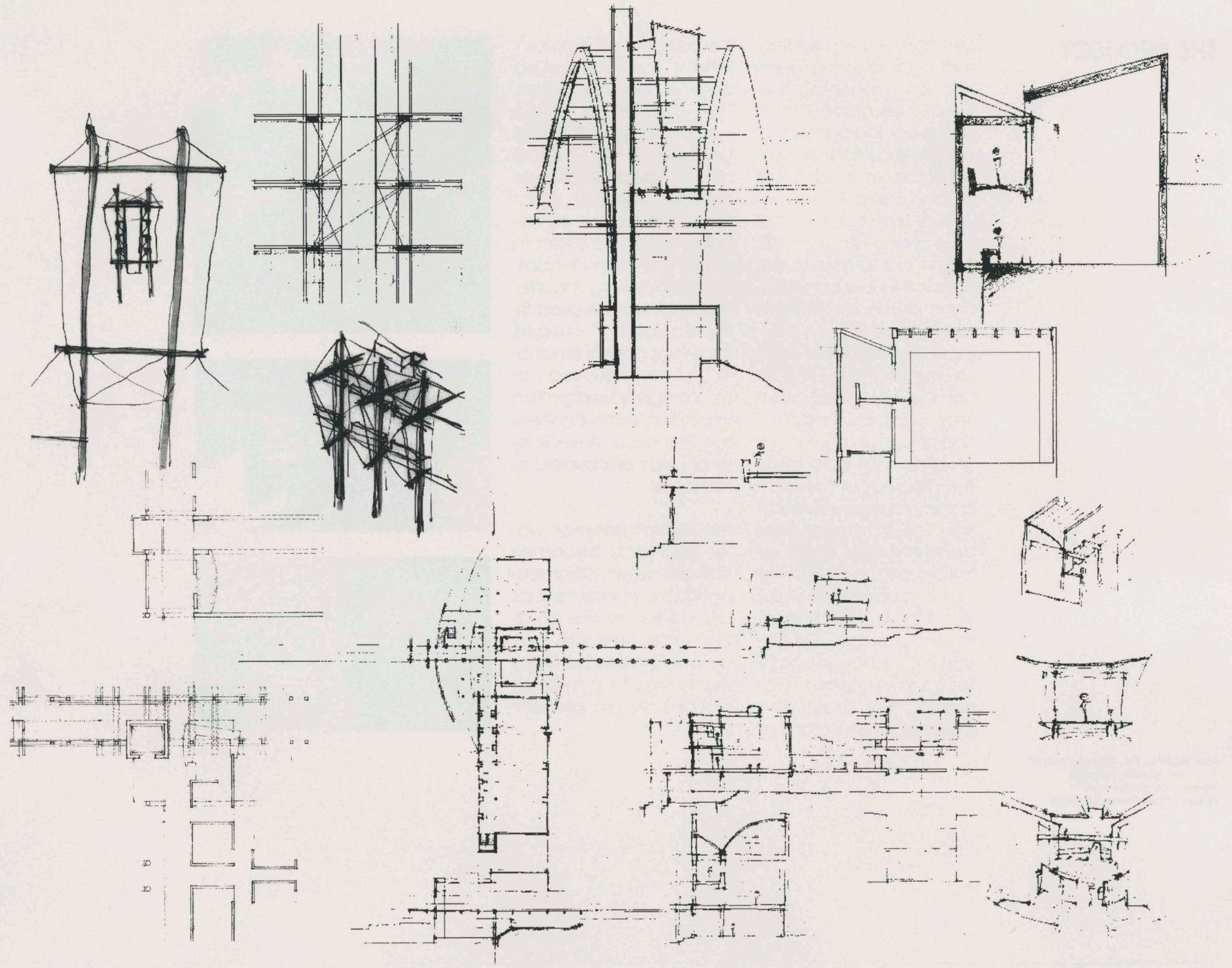
THE TOWN

Top: Loiza site plan
Left: Loiza aerial picture 1993
Top Right: Site diagram showing plaza
and main buildings
Bottom Right: Town Grid

*At the water's edge
there is a forest of cut-off
trees
stepping stones that march
across the sea
and sometimes there's
a bridge
a pier
a pleasure boat
or just a platform for the
people of the sea
to rest upon.*

Barber, Bernard. Water a view
from Japan. Weatherhill, NY, To-
kyo, 1974





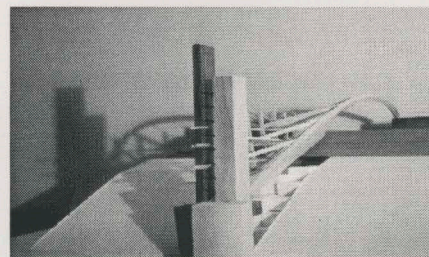
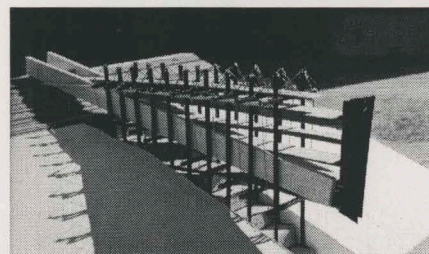
THE PROJECT

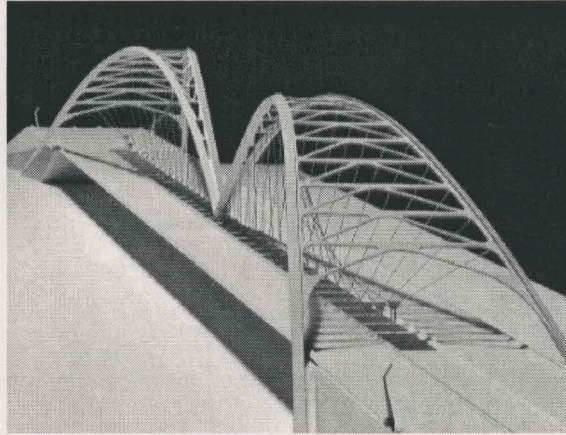
Searching for an architectural approach that deals with the relationship between water and land brings out the question of how the building will meet both: the water and the ground. Since the point where water meets the land changes constantly, many explorations are needed to find and identify a particular attitude towards the site.

Experimentations in a site characterized by its relationship with the open sea were studied first. Searching for a particular situation that belongs to the place as an intent to achieve a regional expression. The first studies were done through structural frameworks that kept the building above the water with the structure barely touching the ground. This solution, although architecturally possible, was dealing with water in a way that lacked many of

the aspects of the natural interaction which exists between water and land. The explorations of the building began to focus primarily on the structure as the main issue of investigation. It was an intent to pursue further investigations with the intent to clarify any original question concerning the site. This approach evoked tridimensional studies showing a strong emphasis on form. It evolved into an bridge investigation which truly lost its connection to the site. A weak relation was discovered in this study.

The relation between water and land becomes stronger when other recognizable characteristics are added to the situation. The new site has unique characteristics which cries for a more direct architectural intervention.



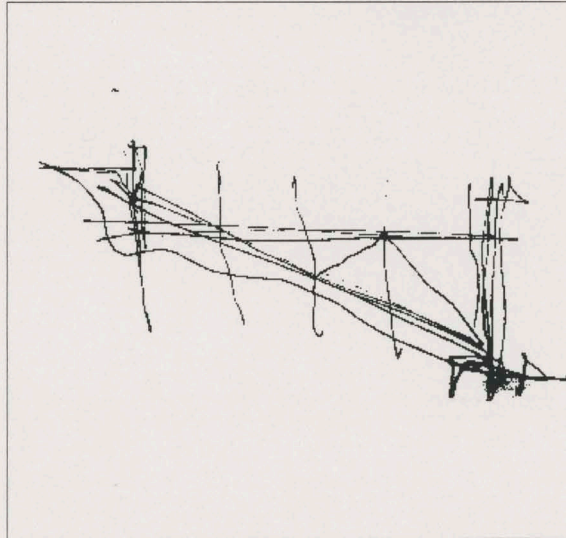
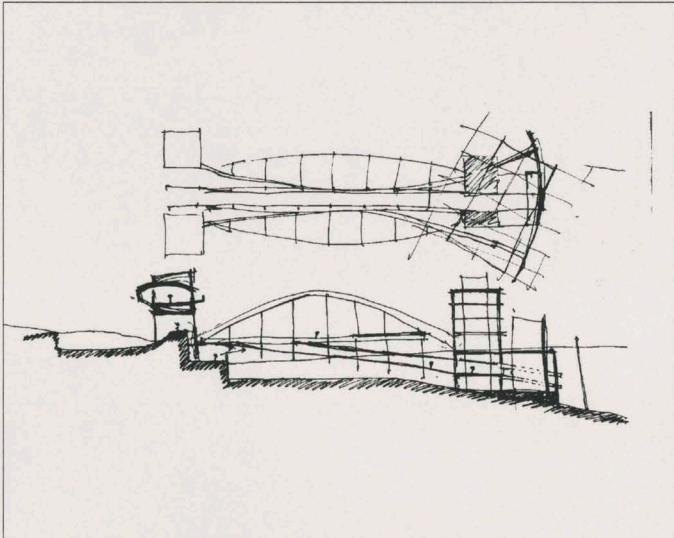


*I like a bridge-
It cries, "Come on
I'll take you there from here
and
here from there
And save you time and
toil."*

*I like a bridge-
It breathes romance;
"There's new adventure on
the further side
And I will help you cross."*

*I like a bridge-
It makes me think
That when a worry comes,
my mind will find
Somewhere a friendly
bridge.*

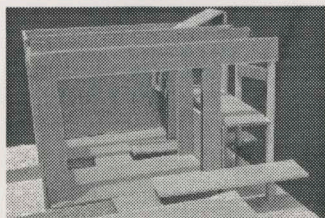
William Ganson Rose



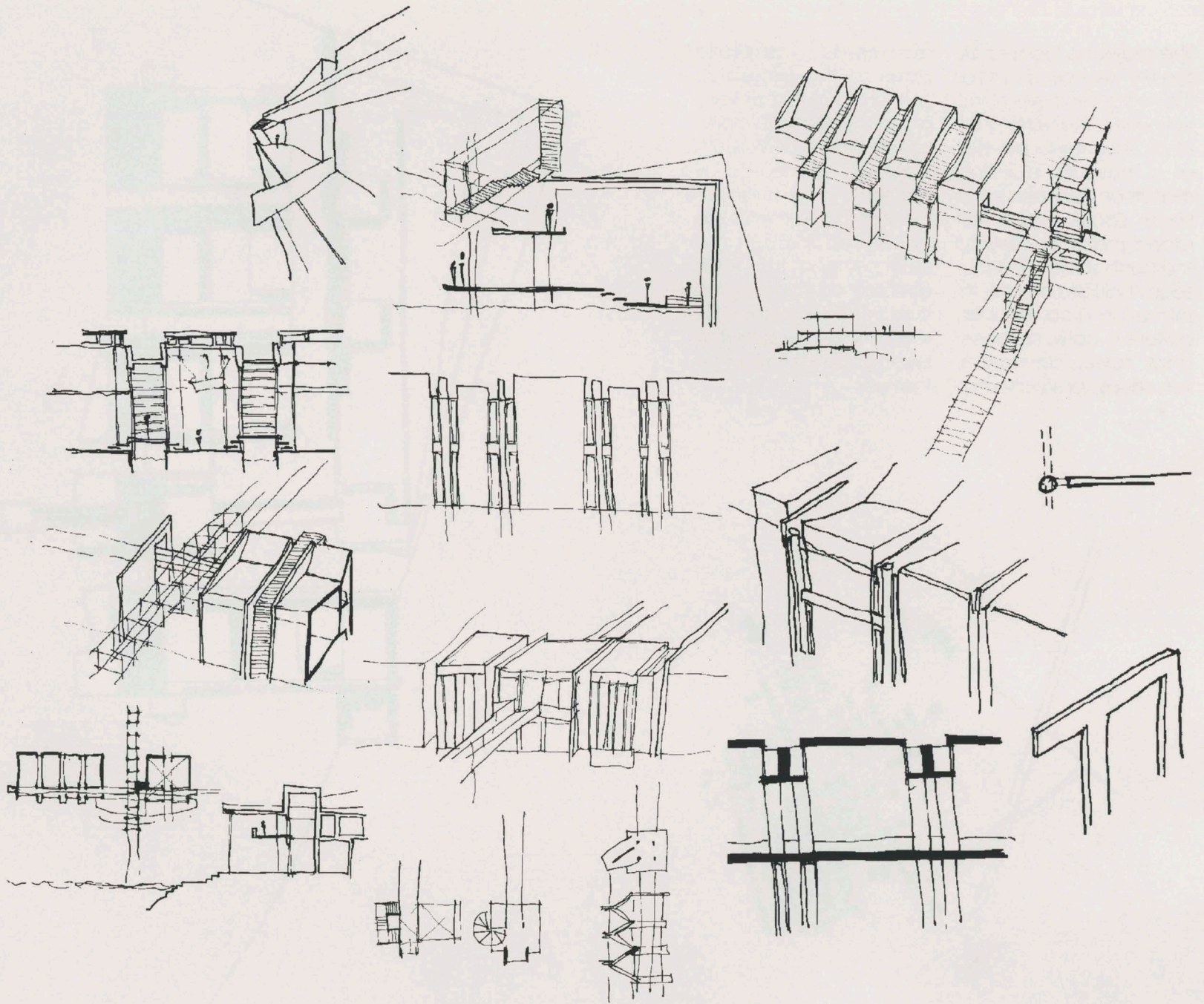
Top Left: Study model of bridge showing structural explorations on span.
Top Right: Calatrava's bridge El Cinturon de Ronda, Barcelona, Spain. (1990)
Bottom: Conceptual sketches of bridge idea

*Some places get their identity from a particularly interesting location, whereas the man-made components are rather significant. Others, instead, maybe situated in a dull landscape, but poses a well-defined configuration and a distinct character. When all the components seem to embody basic existential meanings, we may talk about a **strong place**.*

Christian Norberg-Schultz

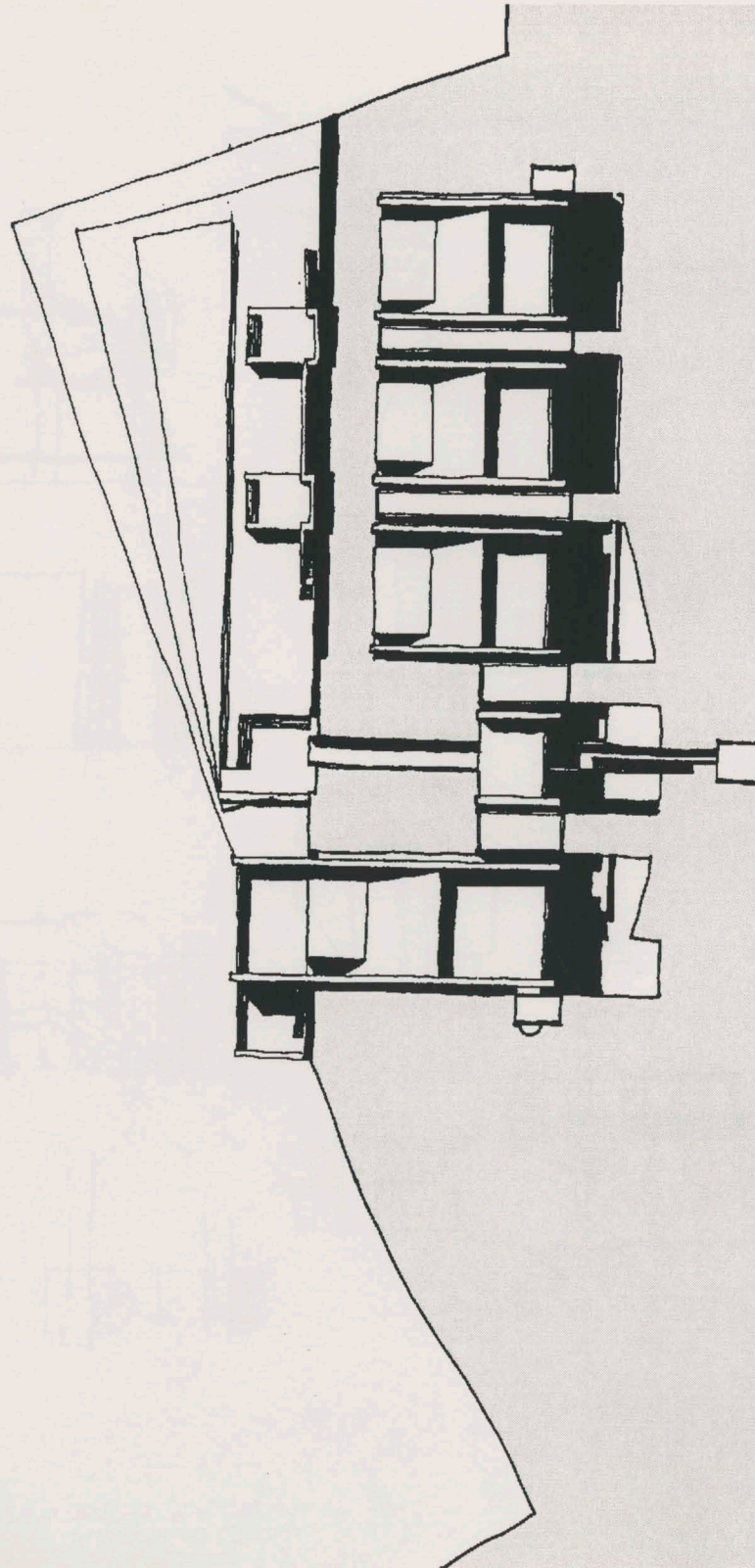


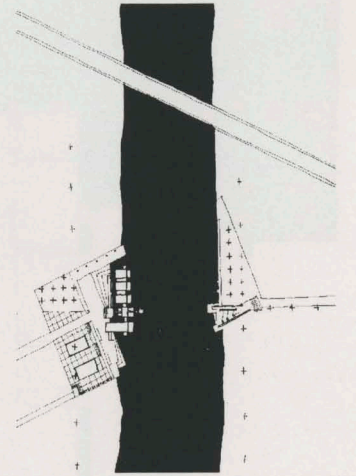
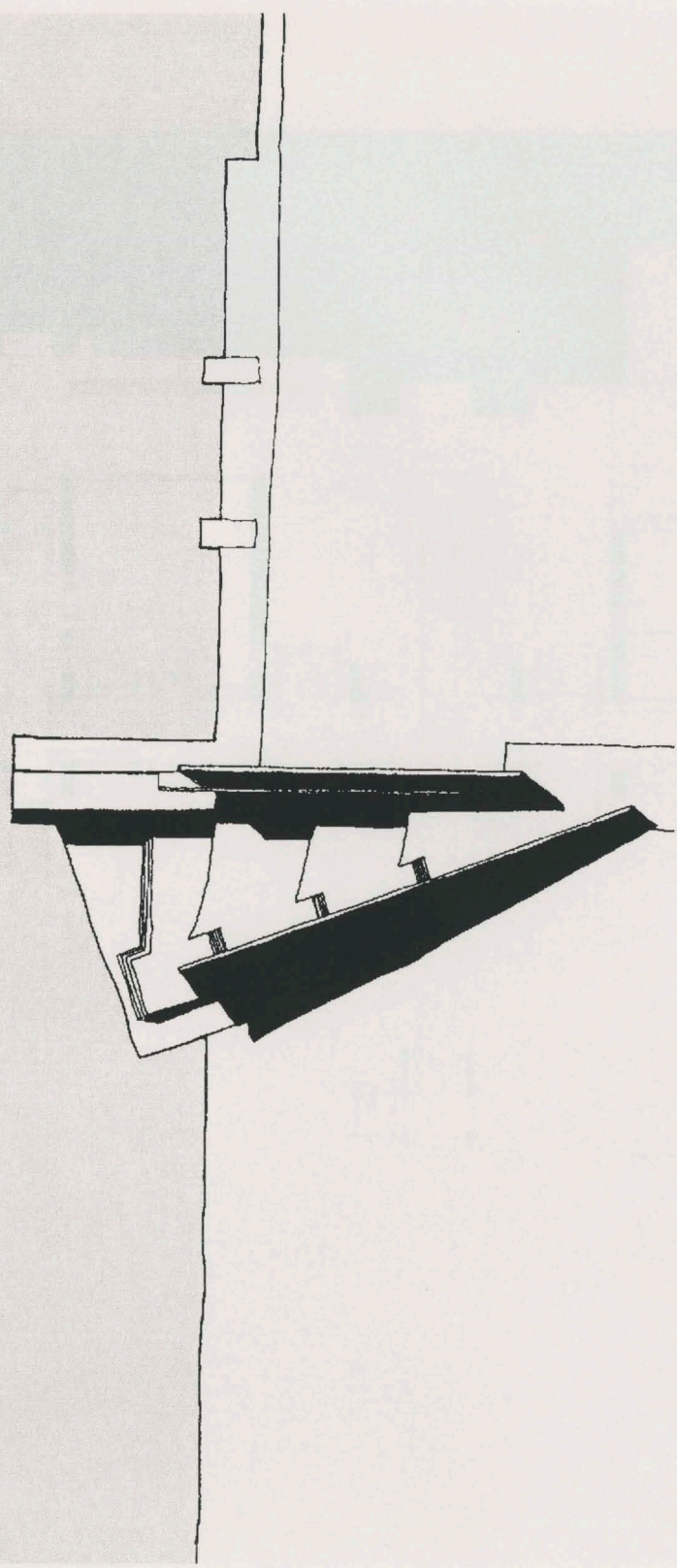
Study model showing interior water canals



The project is located by the Rio Grande de Loiza. It joins the two sides of the river where the old ferry existed. The project consists of a museum building that sits on the water in the south shore and a terraced plaza located to the north shore. The museum includes a lobby, information area, exhibits, galleries, cafe, terraces, dock, tower, administration offices, library and stor-

age areas. The plaza adds to the project a gathering and contemplation place with open spaces and a dock. Both sides are connected by the ferry. The arrangement of the elements are generated through the existing grid of the town and the direction of the river. They provide the town with a setting that allows people to experience the river.

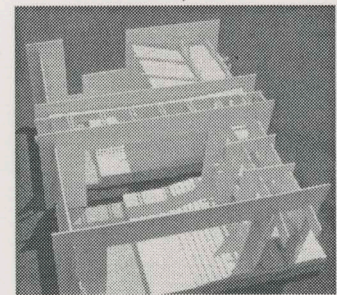




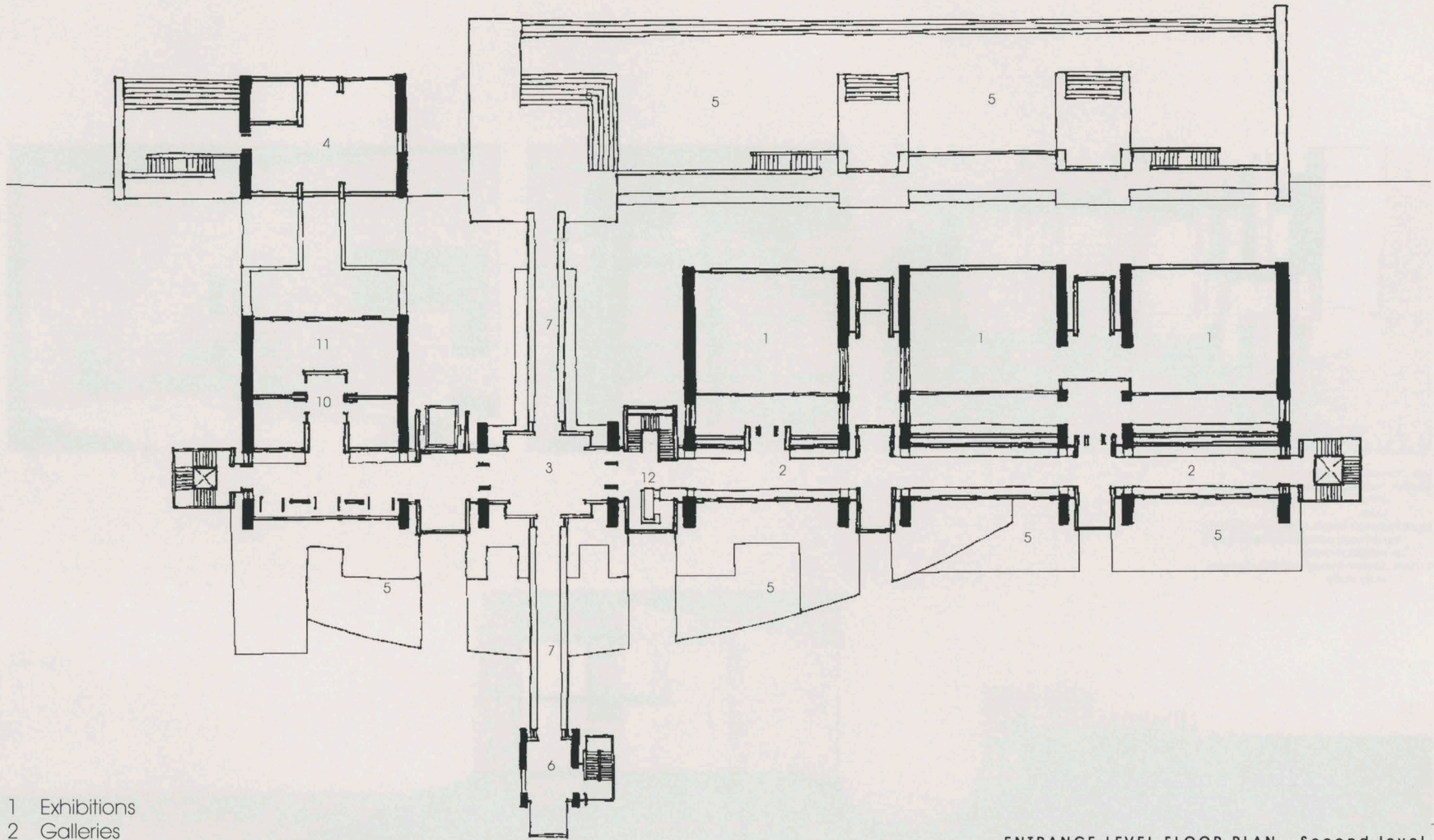
Far left: Location map of museum area
showing relationship with town.
Middle: Site plan
Right: Location map



LOWER LEVEL FLOOR PLAN - First level

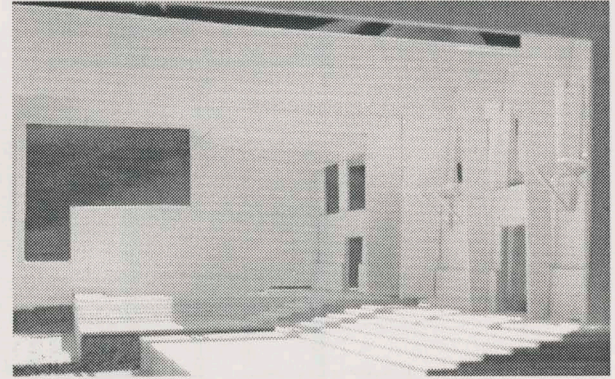
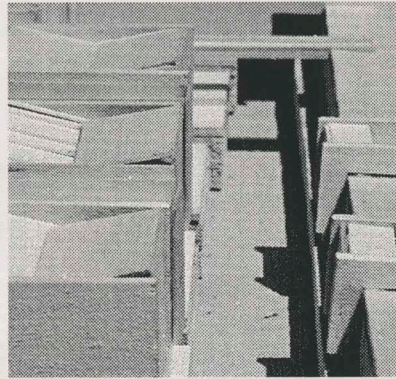
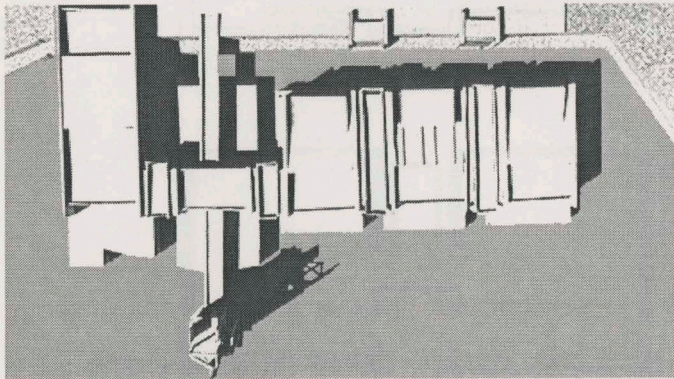


Birds-eye view of study model of exhibition areas showing floor configuration.

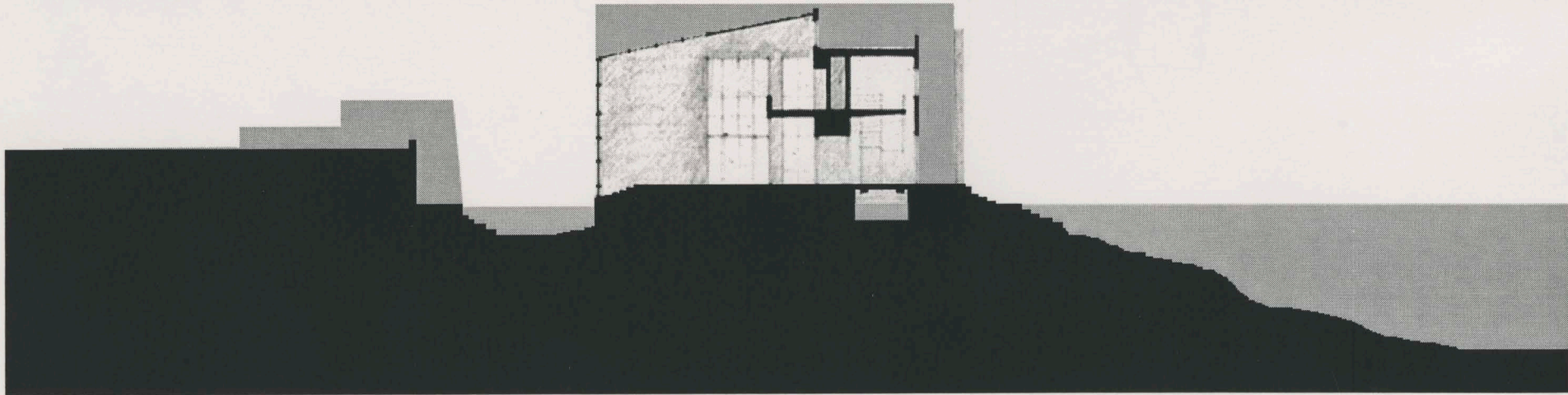


- 1 Exhibitions
- 2 Galleries
- 3 Lobby
- 4 Storage
- 5 Terraces
- 6 Tower
- 7 Bridge
- 8 Cafe
- 9 Kitchen
- 10 Offices
- 11 Library
- 12 Information

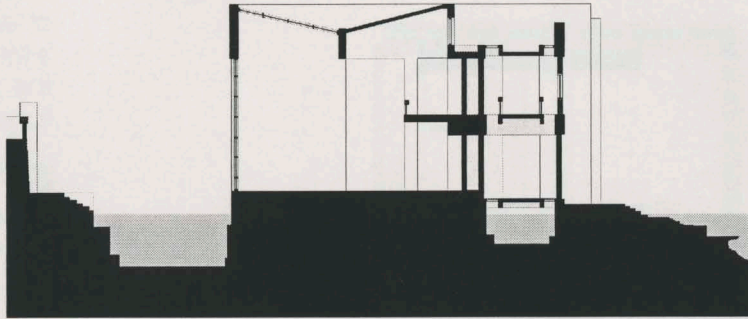
ENTRANCE LEVEL FLOOR PLAN - Second level



Left: Plan view of museum model.
Middle: Perspective view of exterior water street between building and main land.
Right: Perspective view of study model showing an early concept of interior space of exhibition areas.
Bottom: Section through exhibition space, early study.



The building evolved from being an object placed on the site to one which is part of the site. By anchoring the building to the site it attempts to achieve a physical as well as spiritual connection between land and water. Boundaries are created through a variety of surface patterns which aid in defining



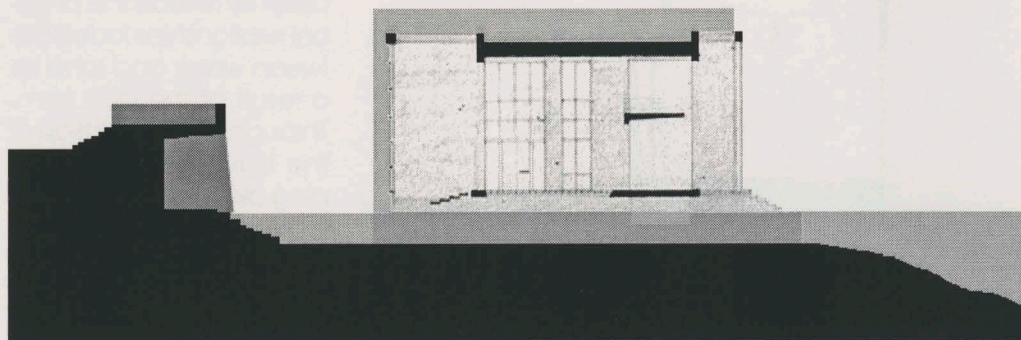
various spaces. A study of the section most successfully reveals the physical relationships found between water and land as a result of the built form. Through the articulation of the built surfaces (stepping platforms, projecting planes, connecting elements) one is allowed various sensorial experiences

with both land and water. The presence of water is felt throughout every room. The plan of the building changes with the river. As the plan of the building decreases and viceversa. The idea that design is developed

Left: Section through exhibition space.
Below: "Ancón" drawing



with nature leads to an architectural language that speaks about the natural elements that condition the site. The construction materials are typical of the island: poured concrete and concrete blocks with some wood. Spatial articulation is determined by the human scale which generates a formal

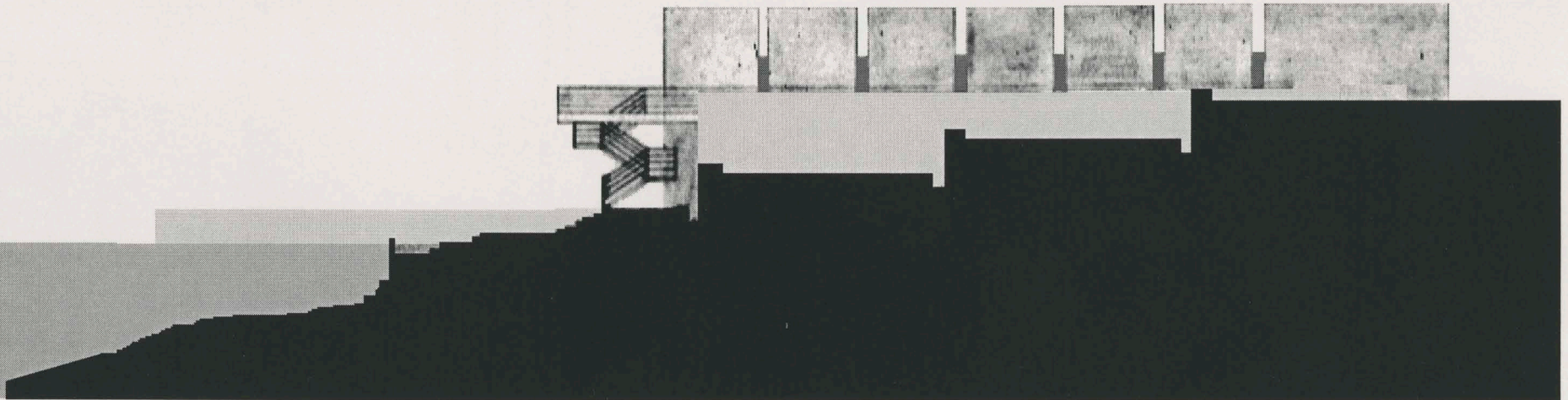
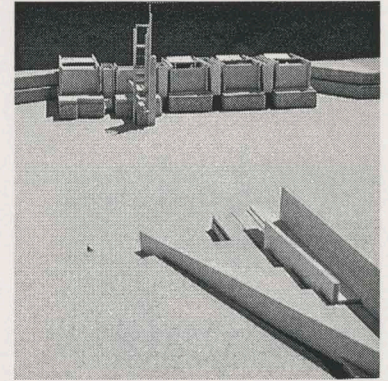
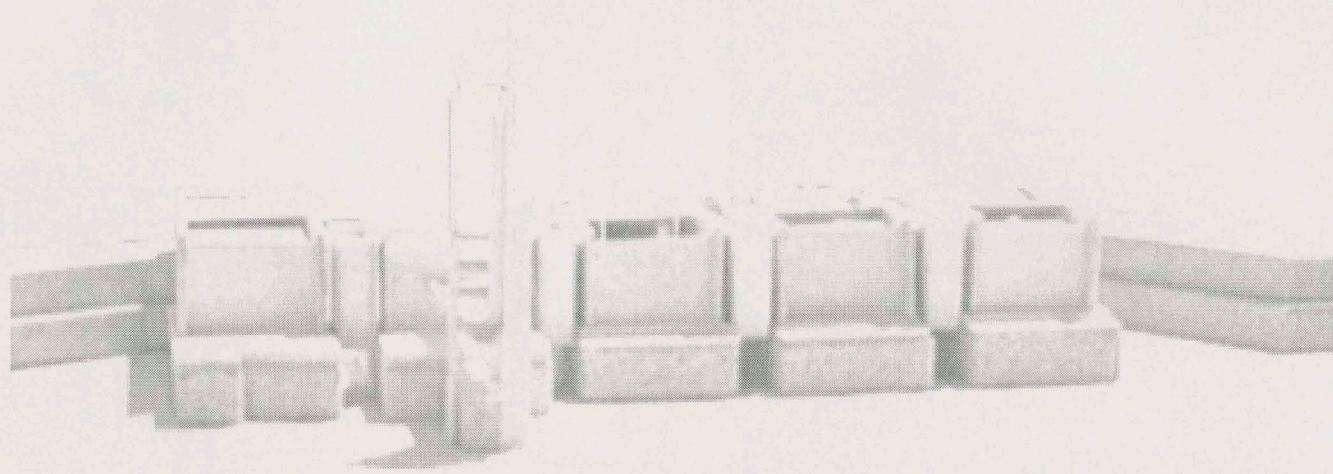


and structural vocabulary of expression. The space is clearly understood from the outside expressing its function and its reality.

Left: Section through water canal
Below: "Ancón" drawing

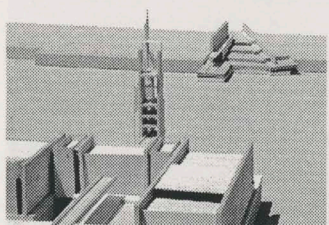
Facing page:
Top left: Perspective view of building.
Top right: Aerial view of building and plaza.
Bottom: Section of plaza



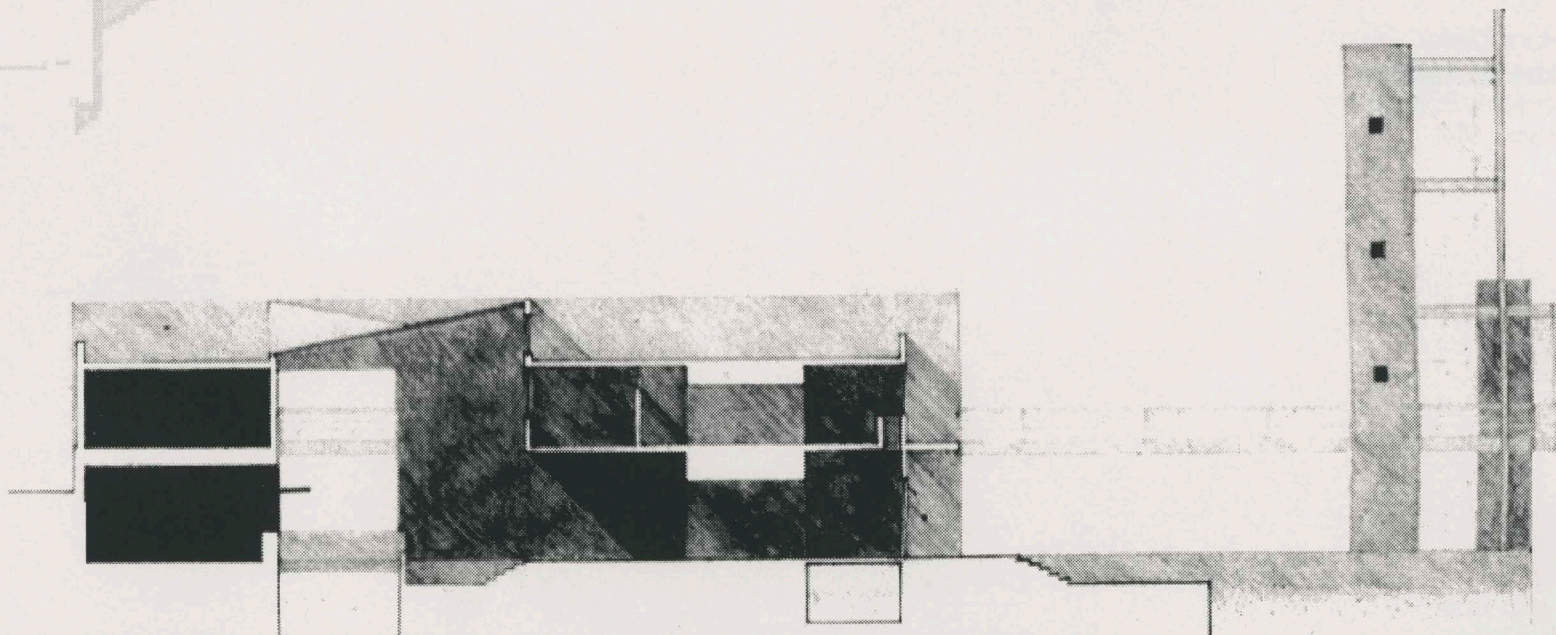


"Water very rarely contributes to the enclosure of space but it contributes heavily to man's environment, and is therefore of concern to the architect, whose job it is to design that environment!"

Charles Moore



The building is bridging two points and connecting the past to the present - giving life to a memory. It will take life with the river. It is a museum of the river, it exhibits the river.



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V I T A

birth

January 29, 1971
San Juan, Puerto Rico

education

- 1996 Admitted to the Ph.D. Program of Architecture School of Fine Arts, University of Pennsylvania - Fontaine Fellowship recipient
- 1995 Master of Architecture Virginia Polytechnic Institute and State University
- 1992 Bachelor in Arts in Environmental Design University of Puerto Rico
- Honors:
Virginia Tech Scholarship
MagnaCum Laude, UPR
Dean's list
Golden Key National Honor Society

experience

- 1996 Don Seamon, A.I.A., Architect Winston-Salem, N.C.
- 1995 Virginia Tech Assistanship with Professor Jack Davis
- 1993 University of Puerto Rico Research Assitanship with Professor E. Vivoni, PhD.
- 1993 Eduardo Sobrino, PhD., Architect Hato Rey, Puerto Rico
- 1992 Jorge del Rio, F.A.I.A., Architect Rio Piedras, Puerto Rico
- 1991 Enrique O. Garcia, Architect Guaynabo, Puerto Rico

