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## Macro studio student projects : New Orleans

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# THE CENTER FOR MACRO PROJECTS AND DIPLOMACY

ROGER WILLIAMS UNIVERSITY

WORKING PAPER SERIES  
VOLUME NINE: SPRING 2006 (DRAFT)  
NEW ORLEANS WATER EDGES

MACRO STUDIO STUDENT PROJECTS: NEW ORLEANS



The Center for Macro Projects and Diplomacy was established at the First Macro Conference held at Roger Williams University, Bristol, Rhode Island in April 2004.

The Center fosters the interdisciplinary formulation, study, demonstration and debate of ideas contributing to human progress through the improvement of world habitat. In the increasingly globalized world, solutions to problems require a broad approach that considers an array of concerns--cultural, environmental, technical, economic, social, political and legal--as well as the communication and negotiation skills necessary to achieve agreement. Many current proposals or projects fail because they are conceived in isolation or consider relationships narrowly. With invited leaders, faculty and students concentrating on clearly-defined issues of importance to the world community— land, water, energy and food supplies; transportation, environmental quality, housing, education, health care, heritage--the Center follows through on steps needed to design, display, debate, evaluate, test, and in appropriate cases, deploy undertakings of relevance and urgency.

Current activities of the Center include:

- organization of an annual conference on selected themes involving large scale projects and their potential for positive diplomatic impact,
- publication of the annual *Journal of Macro Projects and Diplomacy*, that acts as a forum for exchange of ideas and a means to disseminate information and report research activities. The *Journal for Macro Projects and Diplomacy* is available from Roger Williams University, Bristol, Rhode Island.
- development of Preliminary Project Proposals for consideration by investors and government for implementation.
- publication of Occasional Papers by leaders in the field on selected large scale projects with urgent implications

#### MACRO PROJECTS WORKING PAPERS SERIES

The Center also publishes the Macro Project Working Paper Series. All Working Papers are the product of faculty and student research at Roger Williams University that address an annual conference theme. Papers have been grouped by subject such as international relations, architecture and planning, engineering, management, law and finance.

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## New Orleans Water Edges

The Third Annual Conference of the Center for Macro Projects and Diplomacy  
at Roger Williams University, Bristol, Rhode Island.

VOLUME 9 (*draft*): SPRING 2006

MACRO STUDIO STUDENT PROJECTS: NEW ORLEANS

### CONTENTS

1. New Orleans Water Edges	3
a. Overview New Orleans	4
b. Regional Planning Strategies	6
c. Community Consolidation	7
d. Compartmentalized levees	10
e. Historical Districts and Communities	11
f. High Density Urban Corridors	11
g. Transportation	12
h. Park and Garden Systems	12
i. Land Use	13
j. Water Management	13
k. Power Generation	14
l. Public/ Private Amenities	14
m. Lakes, Flooding and Wetlands	15
2. Design Investigations	16
a. Protected Land	16
a.1. Consolidating Communities	16
a.2. High Density River Housing	20
a.3. Elevated Housing at the Industrial Canal	24
b. Engaging the Sea Level	28
b.1. Water Canal Living	30
b.2. Lake Piers	34
b.3. Rebuilding Wetlands	38
b.4. Floating Neighborhoods	38
3. Principles and Planning	44
4. Bibliography / Internet Resources	46
5. Credits	51

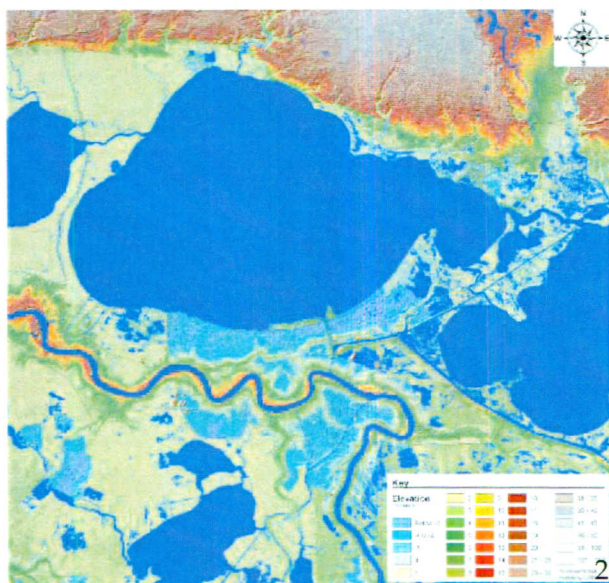
**Legend:**

1. Satellite Picture of Southern Louisiana, with New Orleans location between the meandering Mississippi River and Lake Pontchartrain.
2. Rows of Shotgun houses.
3. The large crown of these park trees provide shading to the pedestrian pathway
4. Houses wearing the inspection tags
5. French Quarter Streetscape with filigree cast iron balconies
6. Composite of CBD, French Quarter and Marigny areas with Mississippi River in the foreground as captured from the Algier bank of the River.









**Legend:**

1. Composite of Aerial pictures depicting flooded New Orleans, seventh Planning district area as of September Second 2006.
2. Digital Elevation Map of the New Orleans and Lake Pontchartrain area.
3. Levee along Mississippi River
4. French Quarter Street Scene, January 2006
5. Shotgun Houses lined tightly along the street.



## 1. New Orleans Water Edges

Different locations around the globe require different solutions and different investigations to better understand the problems related to water. The need for potable water, the special requirements for agriculture and food production, the health impact of untreated water, the low lands in coastal locations that are susceptible to natural disasters, and the rising sea levels are just a few of the complex needs related to water that raise concern and require attention.

This investigation addresses the natural disaster in New Orleans that resulted from Hurricane Katrina. The extensive devastation of a major American city and its sub centers, towns at its perimeters and its people was unprecedented in its devastation.

The Macro Studio 06 investigates possible immediate responses to the current conditions and suggests directions that involve future responses. Time is a critical factor; the plan for the immediate needs as well as the long term plans for the future of the city and the life of the people in that future city is the critical issue.

The investigation into New Orleans can suggest insight into potential problems faced in other coastal cities. The historical and cultural characteristics and the physical conditions within which this great city exists are typical of many in the world. Coastal Cities share topographical conditions that are unique but also incredible similar. Build along the water, build above the water, and only with extreme caution and as a last resort, build lower than these vast unending water sources.

The future of urban responses to building near sea level conditions and potential flood waters, where natural disasters like Katrina or the recent SE Asia tsunami can occur require a broad approach, with an understanding of climatic conditions, economics, culture, social conditions and political realities.

### a. New Orleans Overview

Katrina's path was forecasted, its route known and its intensity documented. The weaknesses and potential failure of its defense system were well known. The forecast for a disaster was, in hindsight, clear. The human response was insufficient against the high winds, storm surges and a levee system that was inadequate against those natural forces.

The power and size of the Mississippi River and Lake Pontchartrain dwarf the scale of New Orleans and its surroundings. It is clear that when an unlimited volume of water is allowed to move into flat topography below sea level, seeking and filling any area lower than its surface, the result will be unending devastation

The resulting damage that occurred was "unbelievable" and unprecedented. It is estimated that 92000 square miles of land was seriously affected by Katrina — including large tracks of land where homes, schools, shopping centers, cultural buildings, streets, power plants, oil refineries were submerged leaving literally few places where the people could find refuge and safety. The flood water devastation was followed by a disordered, uncoordinated and chaotic evacuation and the relocation of an entire population to different parts of the country. As the water lingered and the damage intensified, these flood victims reconsidered if a return to the City was worthwhile or even feasible. As time passed and the conditions in New Orleans remained bleak, temporary homes were rapidly becoming permanent homes and the potential city population projected to return after reconstruction plummeted. With a smaller city reconstruction efforts would require different options.

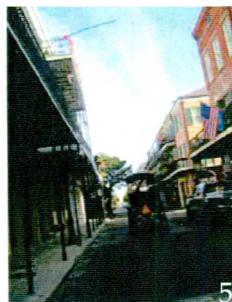
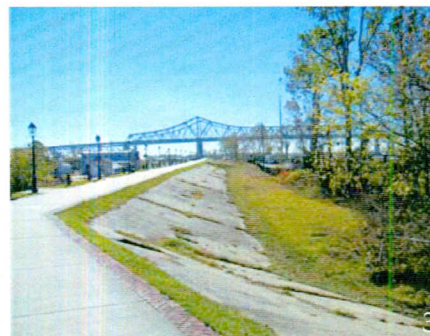
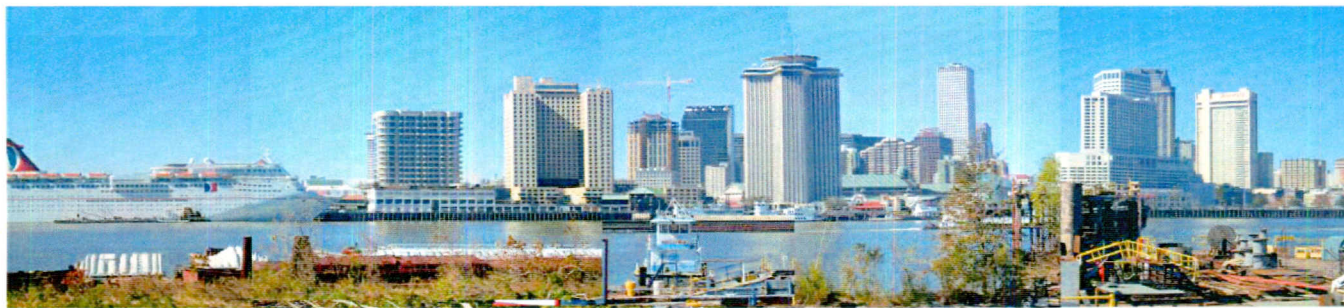
The Pre-Katrina population of New Orleans was 484674. The Post Katrina population was projected to be 272000 or 56% of the population that existed before Katrina (Rand Gulf States Policy Technical Report) and the storm destroyed an estimated 275000 to 300000 housing units. Plans to rebuild and reconstruct New Orleans for a smaller population, with some existing neighborhoods having only a few returnees, seem unreasonable. Large tracks of land have physical structures that are not salvageable for reconstruction. The infrastructure is now significantly damaged and over extended. New Orleans has exhausted its funding and is essentially bankrupt — making plans for the City unclear. What is clear is that the directions being considered must respond to the long term needs of the city and its economy, its timeframe, the culture of this place and most importantly the immediate and long term needs of its people.

How can that be accomplished and what possible criteria can apply to future planning to achieve a new and vibrant City for its people?

The RWU Macro Studio, with a clear awareness of the complexity of these many problems, attempted to investigate possible solutions for this difficult future. There are many. The possibilities suggest a City that may appear much like the past, or also could suggest a new City that will and adjust to water in new and creative ways.

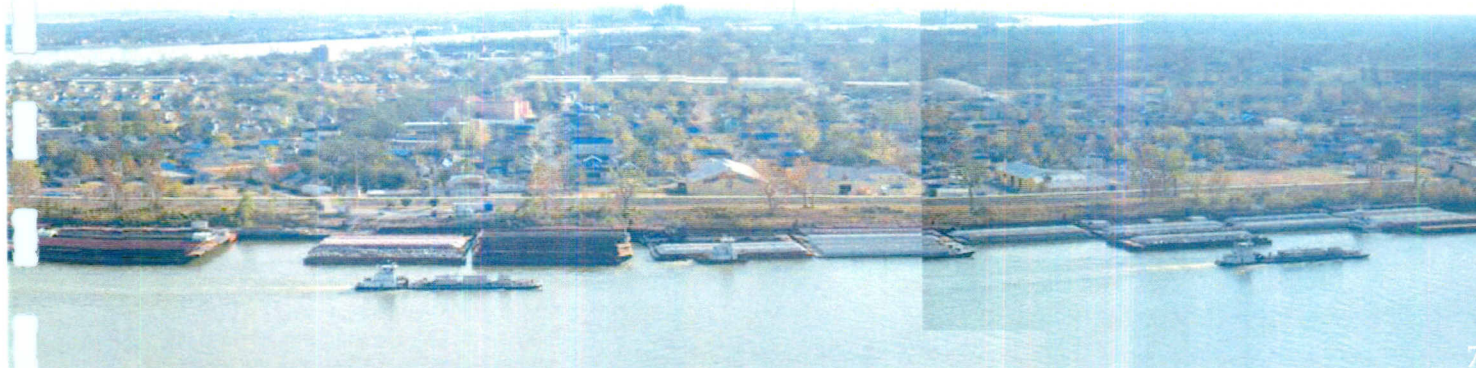




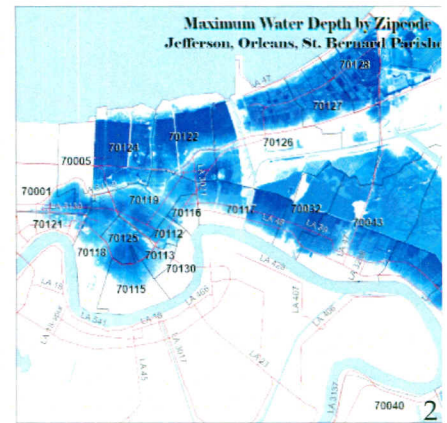
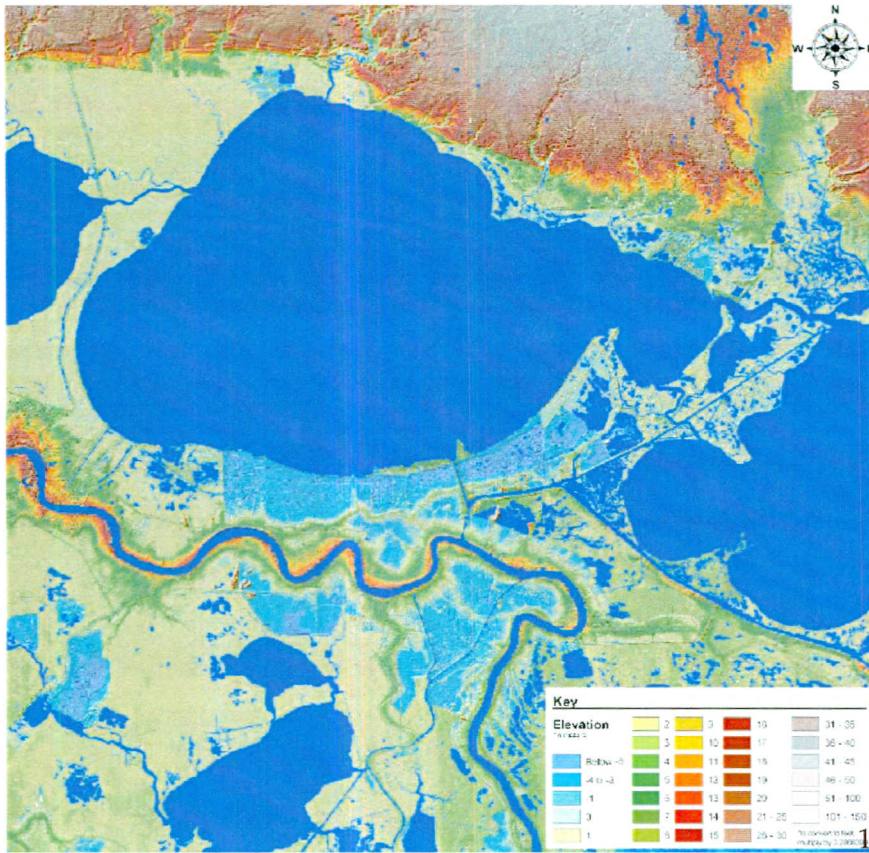


**Legend:**

1. New Orleans Central Business District skyline from across Mississippi River.
2. New Orleans elevation map reveals how the River has created natural levees that represent the highest elevation in the area.
3. Man-made levees along the River culminate at approximately twenty five feet above sea level. They protect the city from Mississippi floods.
4. Two-story house in the Garden district shaded by the trees lining the street
5. French Quarter.
6. Map of New Orleans Historic Districts
7. Looking East across the deltaic plain from a Central Business District high rise building.







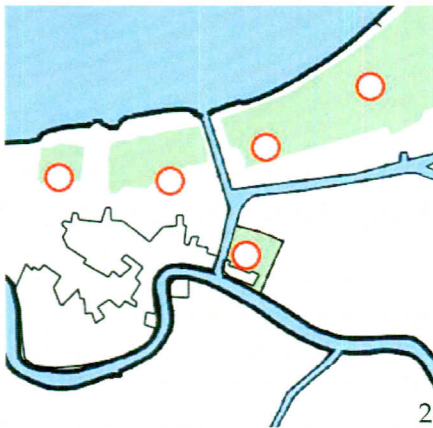
**b. Regional Planning Strategies**

Water surrounds the city of New Orleans and it defines the city’s identity: the curvilinear and meandering route of the Mississippi along the south edge, the hard edges of Lake Pontchartrain to the north and wetlands and marshes defining the east and west edges. The city, with its history of incremental land settlement, has become a topographic bowl, mostly lower than the water around it and protected by earthen and concrete walls with technical mechanical devices that are continually being tested and implemented.

**Legend:**

1. Digital Elevation Model of the Lake Pontchartrain Area
2. Map of the depth of flooding experienced in Jefferson, Orleans and Saint Bernard parishes following the failure of the levees





### c. Community Consolidation

The identity of New Orleans is in the people and in the neighborhoods. An assessment of the existing conditions is underway and within it will be the answers or guidelines of how to proceed. The establishment of criteria to proceed based on the current conditions the City is the beginning.

It seems clear that much of the city should not be rebuilt. The assessment of where that will occur and the extent to which that will occur is the major concern. The criteria recommend here is one of priority overlays.

1. Consider and document the number of people returning or who have returned by a certain date and where those properties are located.
2. Consider the quality of structures as they are established by Historic District boundaries,
3. Evaluate the extent of damage to homes
4. Evaluate infrastructure conditions and cost to repair
5. Evaluate schools, churches and city or cultural considerations.
6. Overlay depth of flood waters / ground elevations to assess the potential for future flooding.
7. Assess costs for special areas requiring additional flood protection.

Having a clear image of these conditions, overlay information and select areas for neighborhood and community consolidation and physically remove those areas that don't qualify.

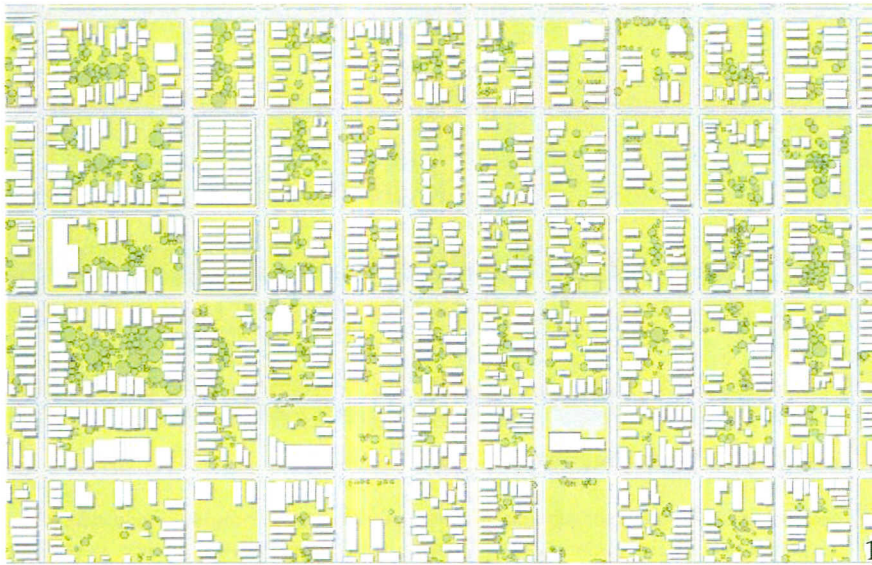
Don't rebuild where possible populations do not return in significant numbers and the resulting population seems insignificant for rebuilding. Don't rebuild where Base Flood Elevation Maps refuse insurance coverage. Consolidate these fragmented and incomplete neighborhoods to viable centers of concentrated populations. Where possible fill the land and raise the ground plain to increase refuge and special land use. For safety, health, and economic stability, the City, where necessary, should purchase existing property at pre-hurricane prices, and invite these displaced residents to live in nearby rebuilt communities. Potentially large areas of destroyed houses should be removed as part of these new communities.

#### Legend:

1. Commun
2. Map overlay depicting New Orleans historic districts and potential consolidated communities.

With a reduced population and a long rebuilding period for the City ahead, future City revenues will be reduced or exceedingly thin. Combining this fact with a diminishing population and severe damage, other options have to be considered. Simply rebuilding individual structures and the preserving of past models of New Orleans neighborhoods will not be enough.





**PRE-KATRINA**

Neighborhoods and communities  
Populated Low rise, individual homes  
Low density housing  
Historic District quality  
Infrastructure  
Parks and gardens  
Small businesses



**POST-KATRINA**

Vast destruction  
Housing destroyed  
Damaged infrastructure  
A decreased population  
Public services destroyed  
Commercial services destroyed

**Community Consolidation Process**

From Katrina to Consolidation and Development

**CONSOLIDATION PERIOD**

- Institute Criteria for consolidation
- Institute urban growth boundaries
- Rebuild infill housing
- Rebuild all homes of historic cultural quality
- Consolidate population to subcenters
- Rebuild schools and services
- Rebuild infrastructure . - roads
- Provide new transit systems and to new subcenters
- Remove structures not meeting criteria



**GROWTH AND DEVELOPMENT**

- Extend boundary
- Expand housing
- Expand services
- Protect environment



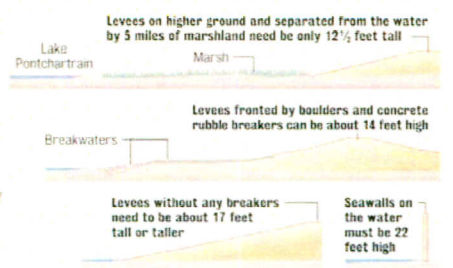


# BARRIERS OF EARTH AND CONCRETE

Levees and floodwalls that protect against flooding from both the Mississippi River and hurricanes are built by the Army Corps of Engineers and are maintained by local levee districts. The corps and the local districts share the construction cost of hurricane levees, while the Mississippi River levees are a federal project. Local levee districts also build and maintain nonfederal, lower-elevation levees with construction money from each district's share of property taxes and state financing.

## HEIGHT ISN'T EVERYTHING

Different factors permit Lake Pontchartrain levees of varying elevations to withstand an 11 1/2-foot storm surge plus several feet of waves:



Note: The height and shape of a levee is based on the roughness of the area over which waves pass to reach the structure, and the slope of the structure.

### LEVEES AND FLOODWALLS

- Mississippi River
- Hurricane protection
- Interior parish

Notes: Levee and floodwall elevations are shown with an extra 0.5 feet margin with an extra 0.5 feet margin with an extra 0.5 feet margin to reach other. Numbers on specific sections represent average heights in feet above sea level.



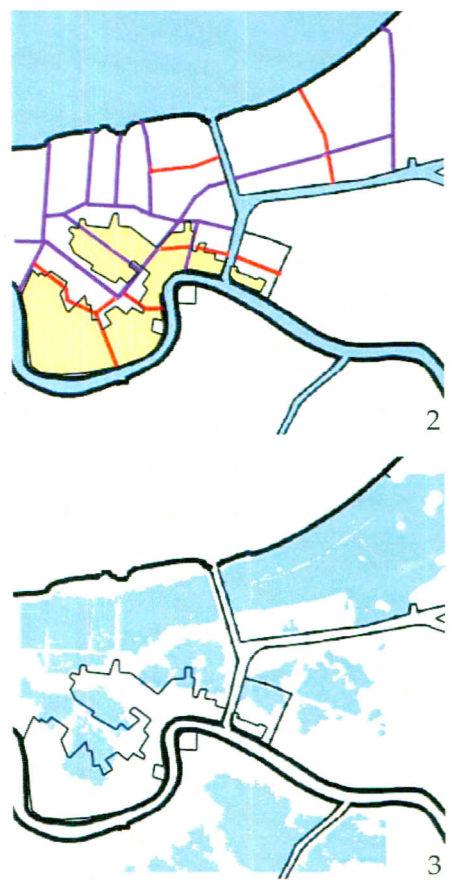
### THE LEVEE SYSTEM:



### d. Compartmental Levees

The compartmental levee system exists now but its scale and the area that each levee protects is incredibly large. A failure or breach in the system in a small isolated location allows vast and extensive flooding in all directions.

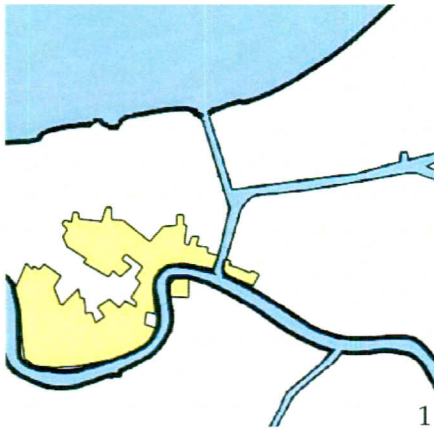
A proposed grid system of new levees should be constructed along with the upgrading of existing systems of Levees to provide a secondary level of protection. It would localize potential flooding and it seems a prudent strategy if low sea level communities are to remain. Wherever possible, it seems important to increase the width to height profile of new levees and in doing so, integrate significant new green spaces throughout this system of protection.



### Legend:

1. New Orleans levee System (source: [www.nola.com/hurricane/popup/nolalevees.pdf](http://www.nola.com/hurricane/popup/nolalevees.pdf)).
2. Existing levee system with new compartmental secondary levees added.
3. Flooded area with historic districts overlay.





1



2



4



5



**e. Historic Districts and Communities**

Protection of the Historic Districts is critical because it represents the essence of the culture and history of the city. Where damage within residential blocks has occurred, new infill low-density housing on typical sized lots that complete the fabric of the existing neighborhoods should be planned. Where devastation of entire residential blocks has occurred, the new structures should be rebuilt respecting the existing scale and character of the existing neighborhoods. In the rebuilding of these areas, consider elevating the main living spaces of houses in higher locations and service these rebuilt neighborhoods with on grade and elevated transit systems and road links. As all qualified neighborhoods get rebuilt, the concept of providing secondary protection thru new compartmentalized Levees, described above, would apply.

**f. High Density Urban Corridors and Housing**

The concept of increasing the density of housing on less land is inevitable when so much of the existing housing stock has been destroyed and the number of residents planning to return has been reduced to about 65% of pre Katrina populations. Building new structures on the high ground along the river edge that exists which strengthens the cultural and historical tie to the Mississippi, is a direction that is apparent and important. The economy and its future are tied to Tourism as it has been in the past. With high density housing comes a concern for social and equal opportunity for the integration of families of different incomes that will be addressed

**Legend:**

- 1. Map of Historic Districts of New Orleans
- 3. Aerial Picture of New Orleans in 1965. The city outward development has not reached the north-easternmost areas.
- 2,4-5. New Orleans Street Scenes...



## g. Transportation

Transportation is the infrastructure that links neighborhoods and ties communities together. It allows and invites economic opportunity and fosters cohesiveness within the total city. Improvements to and expansion of the existing transit system is a necessity. Large scale planning could link the airport and distant edges of the delta to the City of New Orleans with new high speed trains.

Preserve the major road and highway systems and adjust new construction and the levee system construction accordingly. Extend the historic streetcar system and expand the transit bus system. Integrate, over time, the new elevated light rail transit system to interconnect the city. Use existing right-of-ways assigned to trains for possible new public transit systems. De-emphasize and reduce the need for automobiles. Provide walking paths, bike paths and consider smaller neighborhood minibus systems for efficient and fast connections to the different parts of the City and its urban center. Extend the ferry system east to the Industrial Canal; consider an inner harbor commuter boat service between key locations along the river.

## h. Park and Garden systems

The City of New Orleans is known for its beautiful green spaces. Expanding the existing public park systems particularly along the high ground on the north edge of the River is essential to the long term growth of the city. It will both encourage development and be in fact the primary public space that physically ties the City's to the river. Extend this concept along the west edge of a renewed Industrial Canal and its expanded public park spaces. Provide trees along these green ways and along selected streets extending this positive and significant legacy of the city. Integrate these green strips into the new compartmental Levee systems.

Within the reconstruction planning, integrate new green spaces at the neighborhood level. Consider higher ground fill or contour modification to enrich the spatial configuration and refuge spaces for private residences.



### Legend:

1. Public transit plan as proposed in the Action Plan for New Orleans: The New American City, Urban Planning Final Report, January 11, 2006, Bring New Orleans Back Commission, Urban Planning Committee & Wallace Roberts & Todd,
2. Parc System (source: see (1))
3. Trees with generous canopies filter sun light....

**i. Land Use**

Integrated into all communities should be new or existing schools, retail sub-centers, governmental services, health facilities, and other essential services. Where they exist within the communities that are to be preserved, they should be rebuilt and elevated for protection from potential floodwaters. Build new essential services wherever possible, above potential flooding in elevated structures. Where possible connect these elevated structures to filled land to provide connected paths of refuge to higher ground.

**j. Water Management**

Protection from floodwater is essential. Since the City's founding in 1718, protective design approaches against the Lake are lengthy and extend back over time. Since the beginning, this assessment and reassessment by the Army Corp of Engineers, construction was continual with cost increases, and funding allocations, always being upgraded to provide maximum protection against a potential flood. After Katrina, this history seems to indicate that even with the implementation of the latest Barrier Plan proposals, the levee system on paper would have been breached by Katrina's floodwaters. (GAO paper).

At this point in time, plans indicate that more protection of the City is required. Increasing the quality of the existing levee system along Lake Pontchartrain to provide Category 5 hurricane protection and the storm surges that accompany it is necessary. The levee protection from the River needs strengthening.

Within this perimeter of protection additional "compartmental Levee" protection is recommended to be constructed to Category 3 level with new pumping stations and collection channels, control gates to assure protection within its perimeter. This would assure a second line of defense against breaches, and more efficiently allow the pumping of rain and floodwaters. As a strategy, if flooding occurs, the damage would be more localized.

Of significant importance is water management in an expanded New Orleans. Water collection systems included in building construction and its reuse should be mandatory. The general principles of sustainable design regarding water as a resource should be encouraged.

Wastewater treatment for new construction might be more environmental responsive in this low land if it was handled on-site rather than distributed to distant plants. Typical wastewater collector lines are subject to flood damage. With the scope of construction so large, proposals for onsite treatment of wastewater and for water conservation should be investigated.



## k. Power Generation

Other alternative sources of energy should be explored. With the edges of the Mississippi and its wetlands uninhabited down river, with adequate prevailing wind patterns, wind turbines may be a possible provider for clean power for a growing city. With the climatic conditions of New Orleans it is also recommended to integrate solar panels into the new and existing housing. As a renewable energy source, its onsite self-reliance for general power and emergency use appears reasonable.

New systems of power generation based on the water movement in the Mississippi should be explored. Hydropower generated from harnessing river currents is being investigated and tested currently with early positive results when measured in cost per kilowatt-hour. These new turbine techniques invented by Alexander Gorlov, a Professor Emeritus of mechanical engineering at Northeastern University in Boston are in the early stages of development and look promising.

## l. Amenities:

- Cruise ship with Hotel / Retail Center

In recent years, The Port of New Orleans has proposed cruise ship and support facilities at the Bywater area and the Industrial Canal entrance. The master plan outline shows this concept as a significant anchor for the development of Waterfront Park.

A new Hotel and major retail services would be integrated into the Waterfront Park. The vacated naval facility buildings could be renovated as the new Hotel / Retail Center complex with integral parking and probable conference center facilities. The hotel could connect to the Cruise Ship Facility by an elevated bridge above a raised River Park, and a secure zone for ship services could be provided.

- Locks.

The Industrial Canal Lock Replacement Project proposed by the US Army Corp of Engineers with the City of New Orleans intends to upgrade and replace much of these facilities between the River and the Lake. The relocation of the east bank industrial areas, Galvel Street Wharf, the Coast Guard facilities, new levees, locks, and bridge construction is planned. This more efficient waterway will eliminate congestion and make the process of movement more efficient and faster.

Integrating this future facility with the proposed River Park system and other public amenities is recommended. A technical Waterway Museums where the locks existed, for example, would highlight the history and the importance of New Orleans as the Cargo distribution center for the Country. The movement of ships adjacent to the new Cruise ship facility, hotel, retail center, and additional high density housing, would anchor the development growth at this east end of the City and be an important stop or arrival point for the new transit stations.



### Legend:

1. Cruise Ship at River Walk
2. Pre-Katerina Proposed Lock Replacement Project at Industrial Canal originally intended to be completed by 2013
3. Lock Inauguration in 1921...



- Entertainment and Performance Centers

The public park system along the river is a perfect location for small public performance facilities overlooking the river, as a showcase for music and local performers. This exterior space could be a vibrant link of activities for local residents and visitors as well. A new Jazz Museum of New Orleans along the River would easily continue to strengthen the City as a Jazz capital of the country.

A NOCCA amphitheatre has been proposed within the Park edges. Small performance spaces, cafes and restaurants would attract local musicians and tourists. To the west of downtown New Orleans, a new Museum and renovation of older structures for mixed use office space and retail areas are proposed, thus extending the vitality of the existing Riverwalk. In addition, a site for a new Saints football stadium and an expansion of the existing Convention Center support a master plan that over time will extend and solidify the River edge as the core of the new City.

**m. Lakes, Flood Plains and Wetlands**

With the floodwater maps following Katrina, a clear topography of the delta is visible. At New Orleans, the topography defines the raised edge of the north rim of the River and the south edge of the Lake, with a long gentle slope downward to the north toward the Lake Pontchartrain. The lowest sections of the city, in general, are along these north edges of the City.

An increased levee system would accompany these new flood plains providing protection and allowing a new urban environment to embrace the new reality of water. These ideas are also explored in this report.

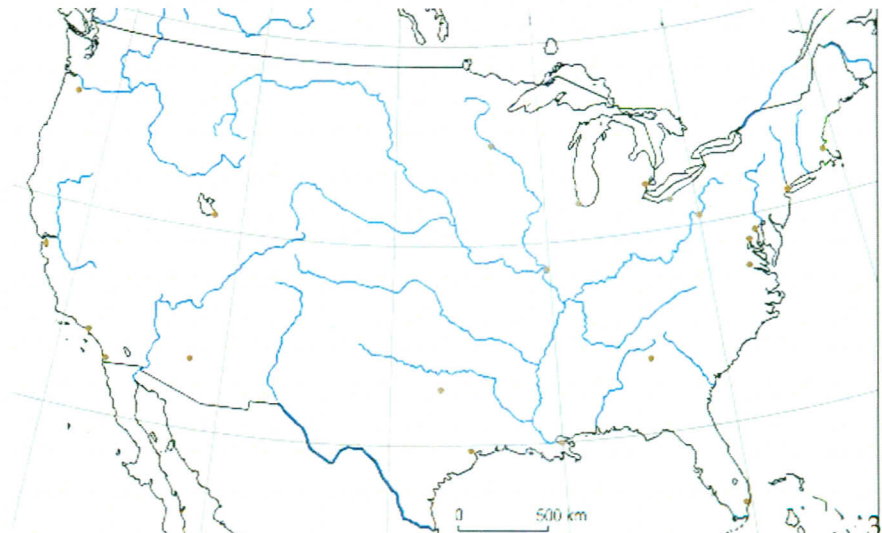
Conceptual ideas to flood the vacated land that had been flooded by Katrina seem counterintuitive at first, but perhaps not in fact. Rather than continually trying to protect the land from flooding, wouldn't the creation of new lakes be both natural to consider and be beneficial to the overall new city that will be rebuilt?

**Legend:**

- 1. Floodplain habitat: the habitat scale
- 2. Mississippi River delta plain: the regional scale
- 3. Continental US with Mississippi River Basin: the continental scale



2



3





**Legend**

- 1. Satellite image of the Bywater Area.
  - 1. Mississippi River
  - 2. Industrial Canal linking Mississippi River to Lake Pontchartrain and MR-GO
  - 3. Lower Ninth Ward
  - 4. Algier
  - 5. Marigny
  - 6. Saint Claude Avenue
  - 7. Naval Facility
  - 8. Train Tracks
  - 9. Lock
- 2-3. Shotgun Houses.



## 2. DESIGN INVESTIGATIONS

The Design Investigations for the MACRO studio are not intended to be final and conclusive nor do they suggest that these are the optimum solutions to this very complex problem. They represent directions of exploration showing a number of approaches. Some are more conservative, while others are more experimental. Together, they represent solutions that consider the many facets of a population with very complex and diverse social, ethnic and economic backgrounds. The exploration and subsequent discussions of different directions is what this studio hopes to stimulate. Through discourse of these and other ideas a common accepted solution can be achieved. These investigations involving urban growth, and new neighborhoods may be divided in general into two categories:

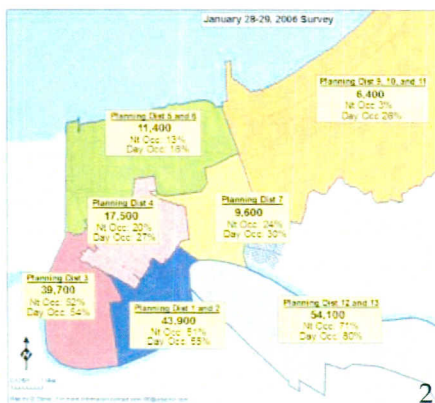
1. Protected Land
2. Engaging Sea Level

### a. Protected Land

#### a.1. Consolidated Communities



In this first investigation, “Consolidated Communities” best describe these reconstructed residential areas. This investigation involves existing neighborhoods, communities, historic districts many of which were covered with floodwater during Katrina. It’s intent is to protect those homes that are possible to rebuild. It also attempts to address those neighborhoods where damage to homes was very severe and a major percentage of the population that lived there will not return. Assessing which neighborhoods will remain and which may not, will be the subject of neighborhood discussions with City officials. See the earlier criteria presented in the overview.



It seems reasonable that some sections of the city because of health, population and destruction probably should not be rebuilt. A possible but unpopular direction that has merit, is to remove severely damaged, unhealthy, neighborhoods that are unpopulated. Is the removal of destroyed structures completely, the removal existing roads and cutting and filling the topography for new use reasonable? If undertaken, consolidating inhabitants into fewer neighborhoods that are selected for preservation and expansion could be implemented. If that were to occur, these consolidated communities would expand in population, maintain their current density and scale.

With equitable purchases by the City of their destroyed homes, these new owners could purchase unoccupied renovated houses or new houses elsewhere. These would be built with all the services, infrastructure, schools, landscape and beauty of similar neighborhoods that had been destroyed.

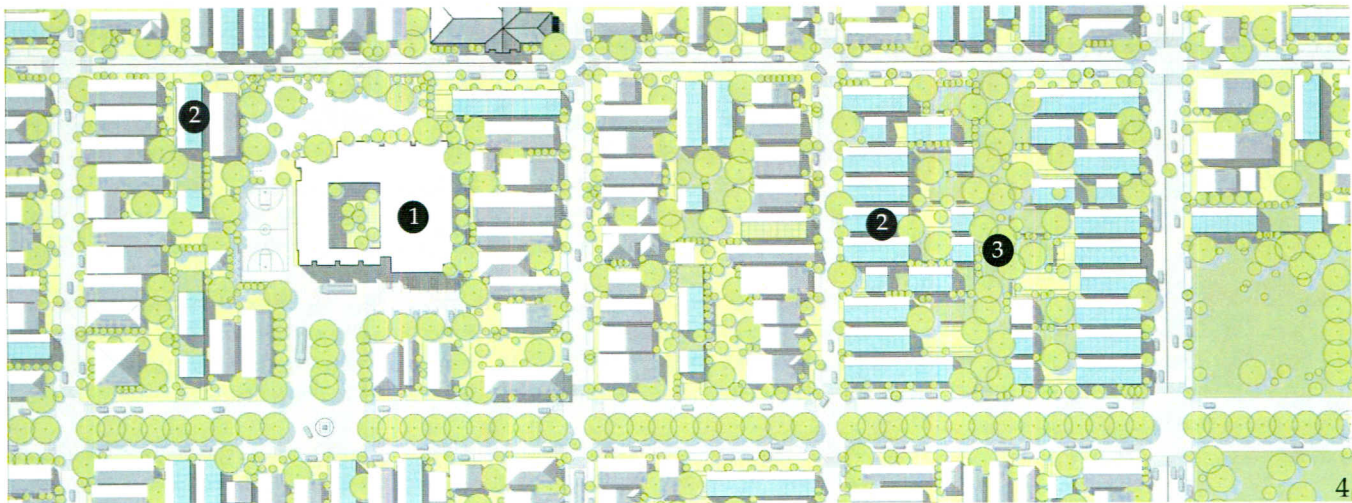
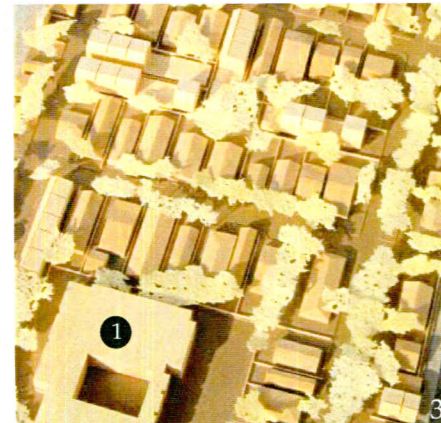
#### Legend

1. Typical shotgun houses with individualized color schemes.
2. Mapping day and night residency level in Orleans parish as of January 28-29, 2006

Within this concept would be the desire to strengthen the quality and scale and character of the neighborhood with higher density. With new levee construction flood protection would be provided.

New prototype houses would stress flexibility of design, residential material choices, and incorporate a quality of contemporary design that captures the culture and character of existing residential buildings.



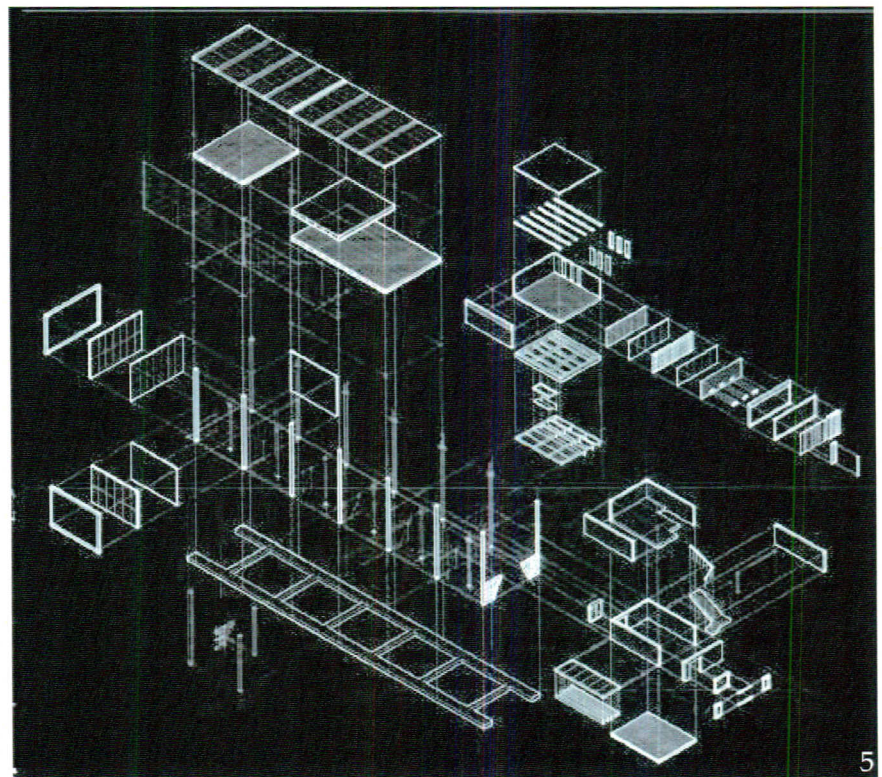
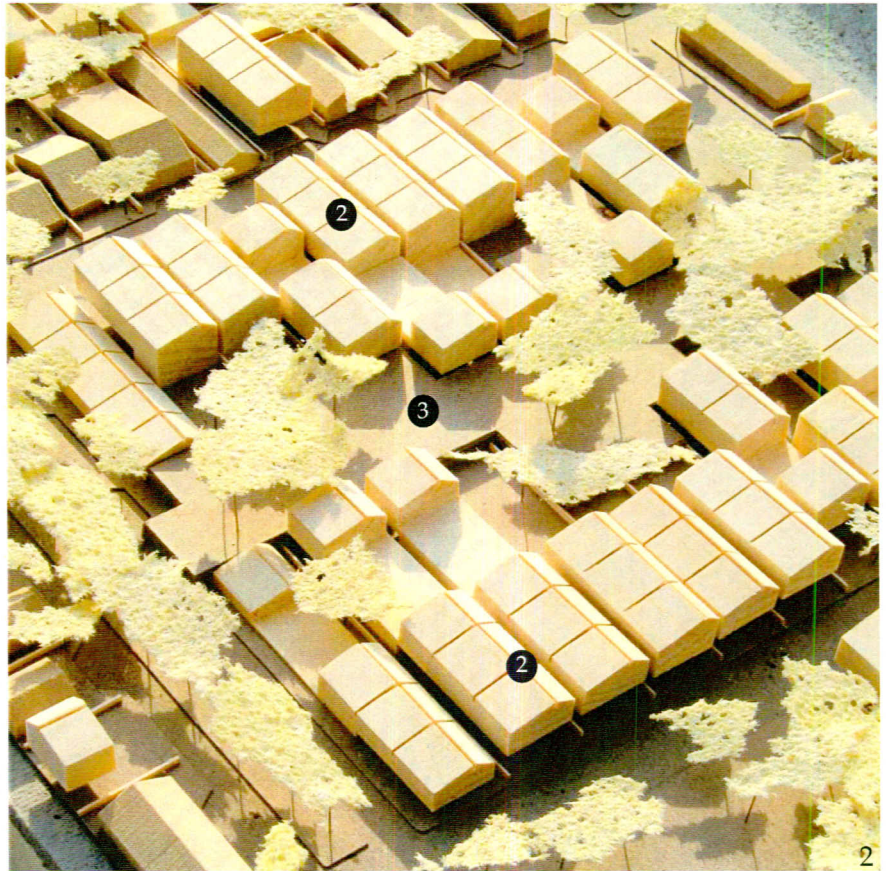
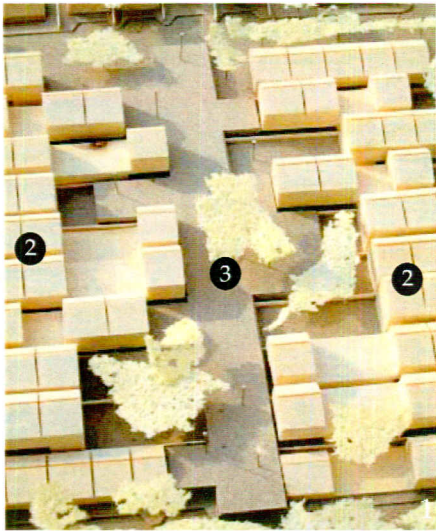


Legend

- 1. Satellite Picture of the typical urban fabric of the Bywater area with shotgun houses
- 2. Shotgun house raised above the ground with sacrificial ground floor

- 3. Neighborhood consolidation also includes the construction of schools(1) and other public buildings.
- 4-5. Site plan with new flood-ready raised house integrated into the existing fabric.





**Legend**

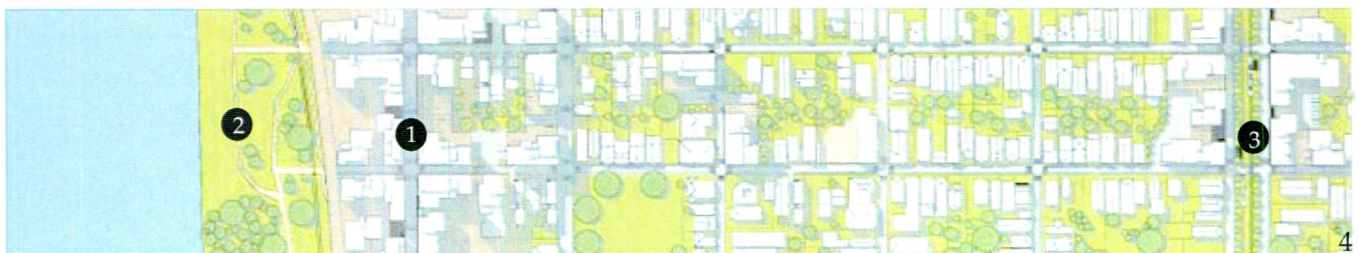
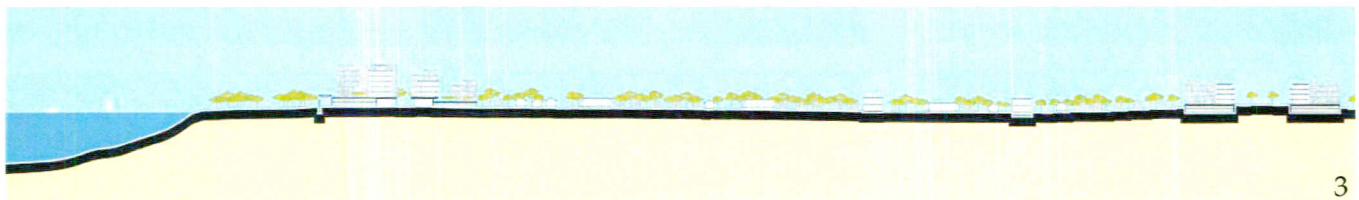
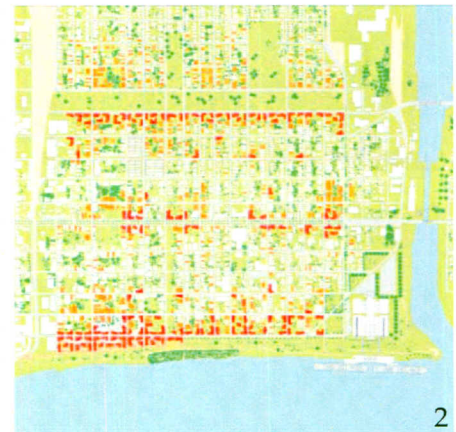
- 1-2. A newly rebuilt house (2) block with at its center a six-foot high raised garden area(3). This raised platform is used as refuge in case of flooding. It also provides for small city gardens for residents of the neighborhoods. The potential for these raised garden to be used as leaching field in a decentralized sewage system scheme could be investigated.
- 3-4. Study model of the raised house with the stilts and solar control devices playing a major role in the architectural expression.
- 5. To optimized delivery time, the House is a Kit of Parts. Exterior Treatment and Solar Control devices can be combined in multiple possible ways to accommodate the owner's preferences





**Legend**

- 1. Densification along Chartres Street (1) and the New Mississippi River Edge Park(2).
- 2. Diagram of the high-density mid rise infill (red) and high-density low rise infill in the existing fabric.
- 3-4. Section and Plan of New Orleans' Bywater area. Saint Claude Avenue (3) is raised by up to eight feet as to create an internal levee. The raised Street is equipped with a light rail system.

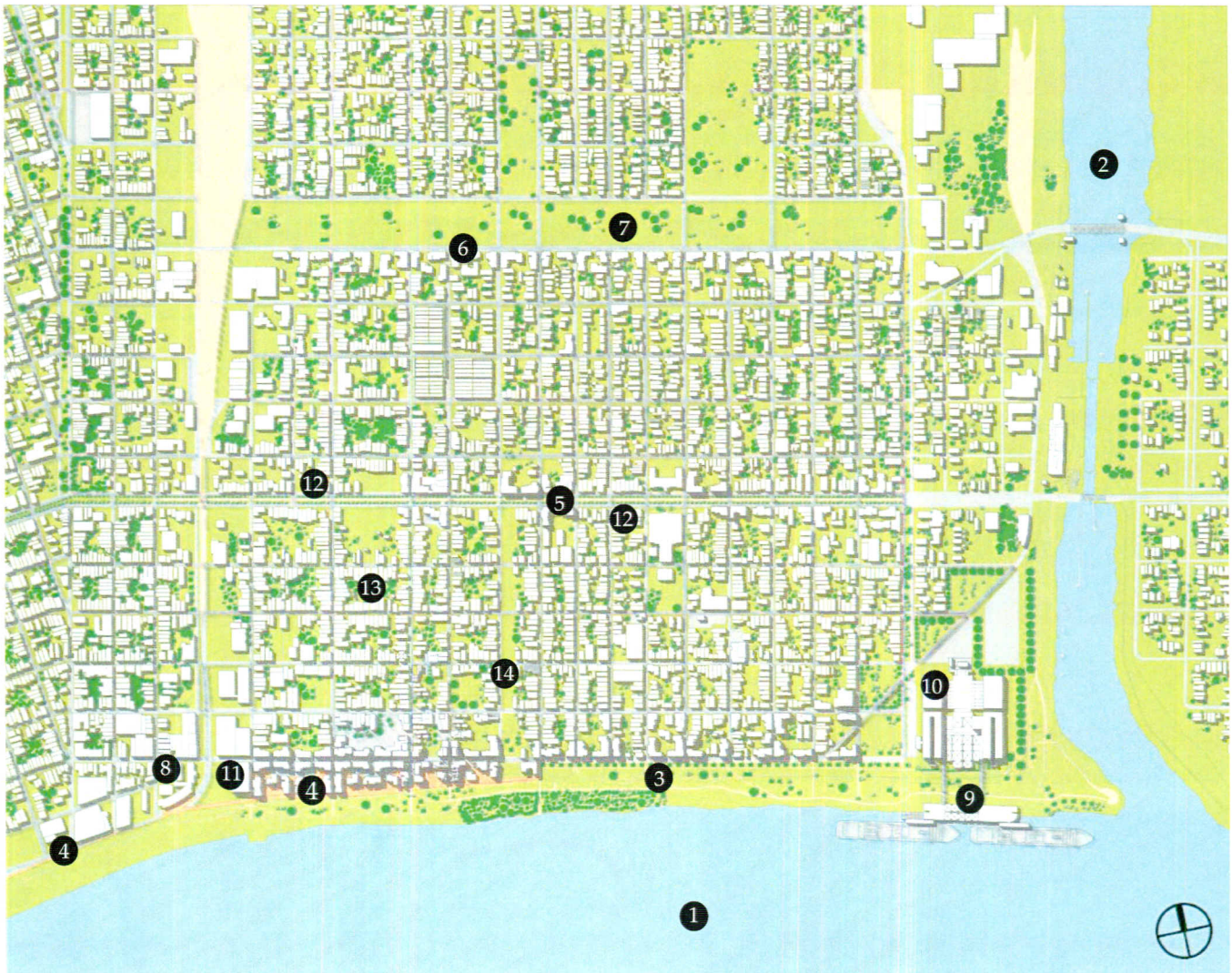


**a.2. The High Density River Housing**

In the second investigation, High density housing is placed on topography along the Mississippi and expands a few blocks north where its edges integrate in terms of scale and height with the existing housing fabric. This proposal maximizes the use of above sea level land for a maximum number of new inhabitants. Edging the River with a new and expansive public park, the closeness to the River and the urban center by various sources of transit systems, make this housing an attractive choice.

The architectural language of New Orleans has developed over a long period of time. It often responds to climatic conditions allowing ventilation to occur using overhangs for shading, balconies for air movement, and shutters for shade and privacy. These are all present in this scheme, adding a



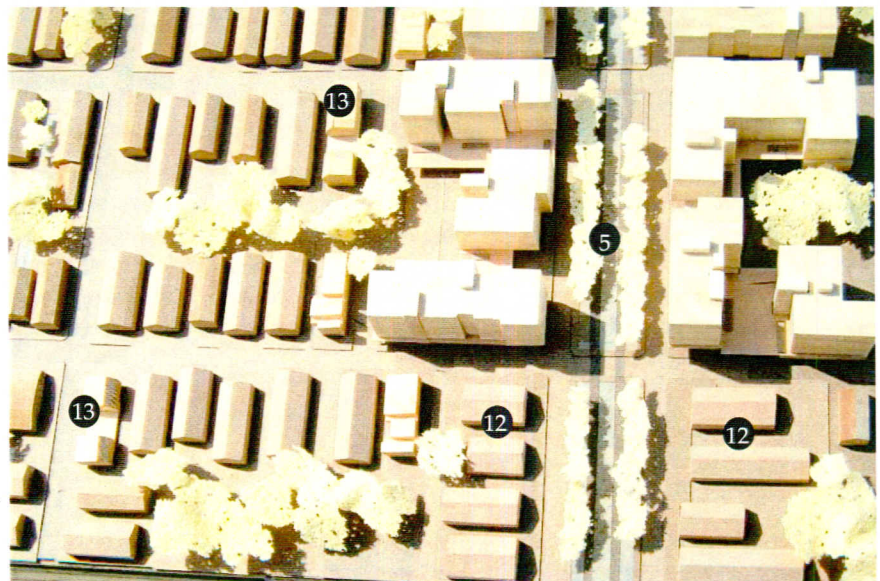


Site Plan

0 1/4 1/2 miles

Legend

1. Mississippi River
2. Industrial Canal
3. New Mississippi River Park
4. Proposed Elevated Board Walk allows views above existing flood wall
5. Raised Saint Claude Avenue as secondary levee equipped with light rail system
6. North Robertson Street
7. Green Space as New Levee at N. Claiborne Ave.
8. NOCAA (New Orleans Center for Creative Arts)
9. Cruise Ships Terminal
10. Hotel
11. Rice Mill Building
12. Existing Residential houses near raised Saint Claude Avenue are maintained but jacked up to satisfy new flood insurance criteria
13. New Infill Houses also are raised above ground
14. New Green Space linking to River Park to Saint Claude Avenue





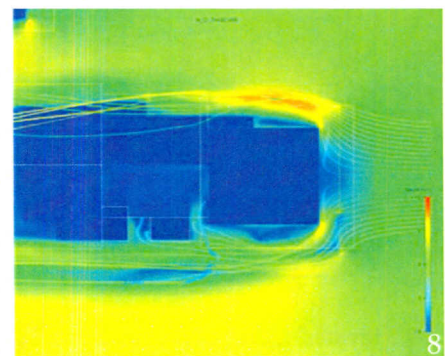
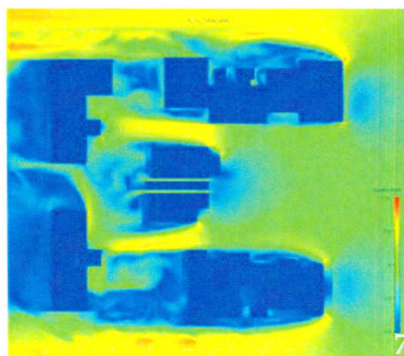
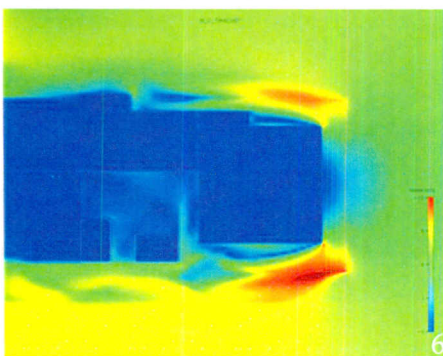
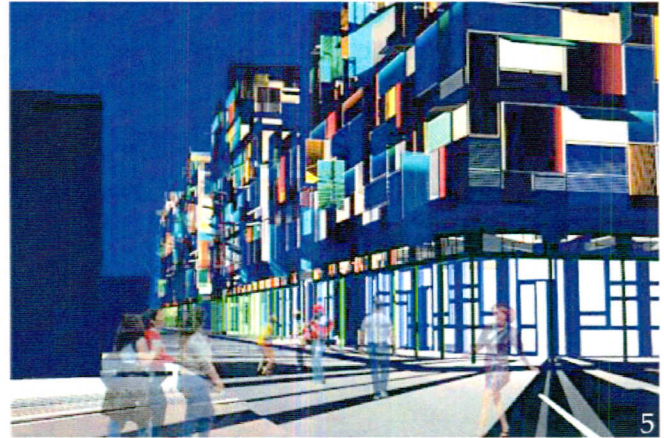
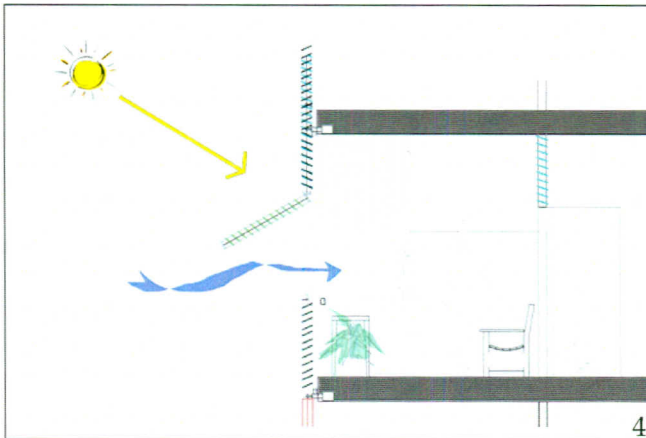


comfortable vocabulary to the buildings that respects the scale and character of the context of New Orleans. The exuberance and special character of the city is also captured through the use of vibrant color on building facades. Master planning for these Above Ground schemes includes new Green spaces integrated with new compartmental levees and boulevards with new structures for work and living and planned retail sub-centers for these developed high density corridors.

**Legend:**

1. An elevated Board Walk(1) is proposed along the Mississippi River Park(2) at the Edge of the Proposed Mixed Use Development(3). The Board Walk is raised twenty four feet above the ground to provide a public promenade above the flood wall.
2. The Board Walk at the Foot of the New Development at Mississippi River water front Park.
3. Diagrams Examining the Board Walk and the View its Affords towards the French Quarter and the Central Business District skyline across the River bend.
4. Mid-rise Housing Building are laid out so as to provide views toward the River and Downtown New Orleans from as many

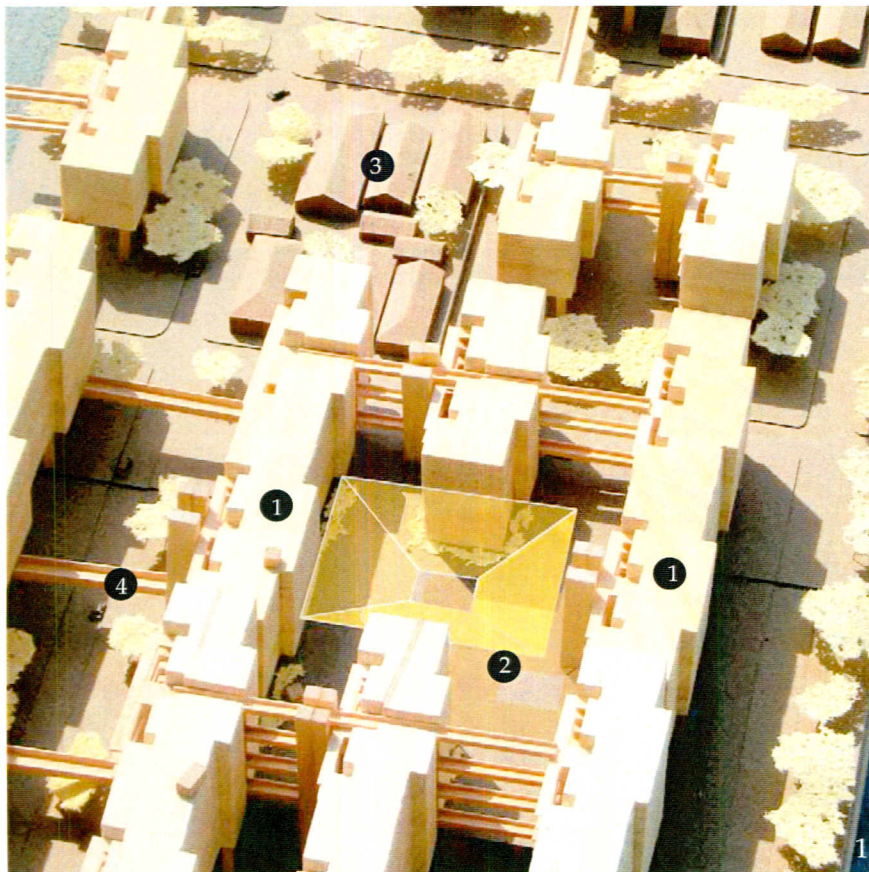




**Legend:**

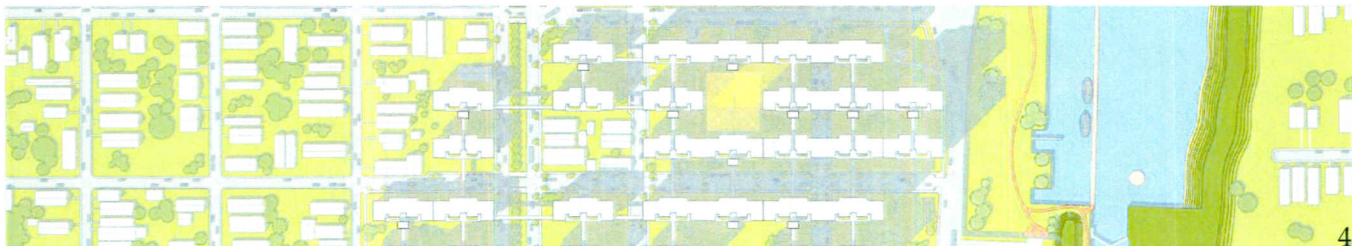
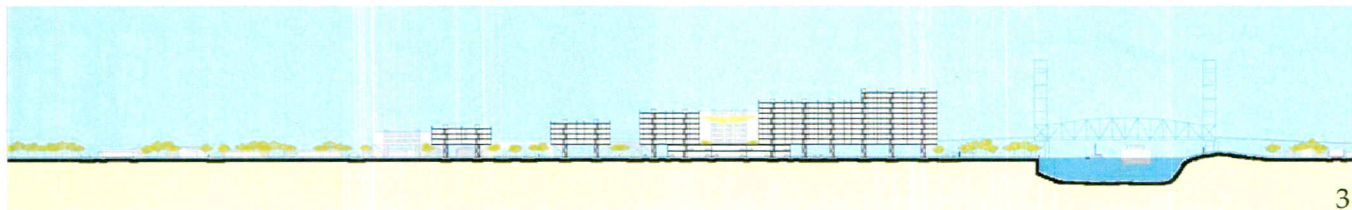
- 1. Balconies attached to the colorful facades of these French Quarter buildings create an informal arcade.
- 2. The proposed mixed use development on Chartres Street reinterprets New Orleans traditional arcaded street models. These arcade provide shade and rain protection for pedestrians.
- 3. Housing in Proposed Mixed Use Development is equipped with Solar Control Systems that acts as filters.
- 4. Dwelling units have habitable balconies equipped with adjustable louvres for privacy and sun shading.
- 5. Night character of proposed development along Chartes street. .
- 6-7-8. Computational Fluid Dynamics study used to analyze the level of comfort on upper story balconies in relation to wind exposure.





**Legend:**

- 1. Elevated Interconnected Housing (1). Shaded public Space (2) above public parking. Scale transition between old neighborhoods (3) and new development. Elevated neighborhood connections (4)
- 2.. New Orleans cityscape with elevated Infrastructure
- 3-4. Section and Plan through the proposed Bywater Elevated Housing at Industrial Canal

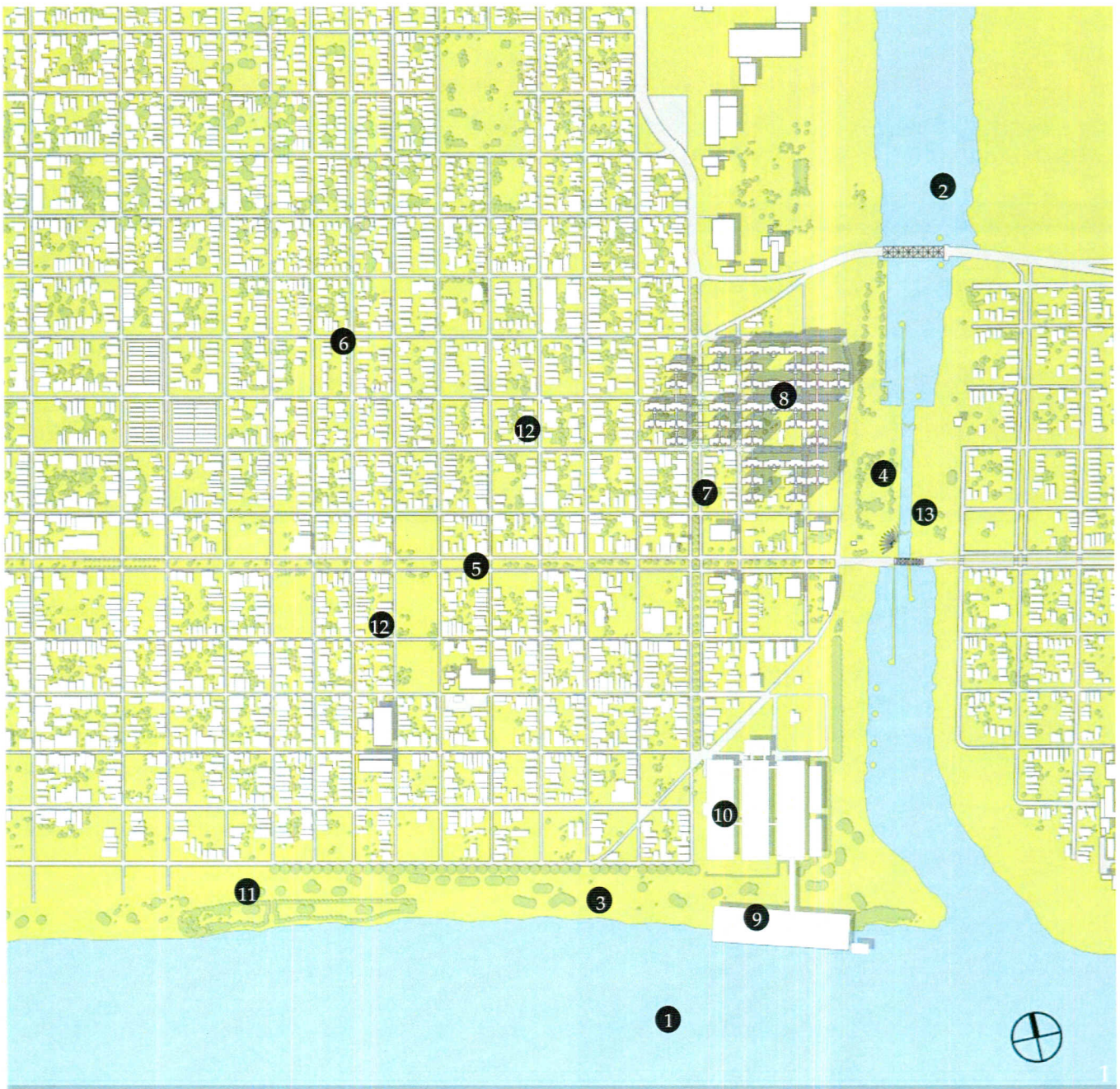


**a.3. Elevated Cities at the Industrial Canal**

The third design, referred to as “Elevated cities”, provides high-density housing on lower ground near the Industrial Canal Locks. Its upper levels are interconnected to adjacent buildings and stair and elevator towers. In strategic locations parking garages allow easy and efficient automobile use. The ground plane is a park with retail, community services and community pools below large shaded urban spaces. Upper level public bridges connect also to a new canal Levee and the public park system connecting to the River to the south.

Providing much needed housing, these tall elevated structures step down to the lower scale buildings of existing neighborhoods. Parking garages or open parking is provided. Retail shops, cafés and services partially occupy an open ground level.





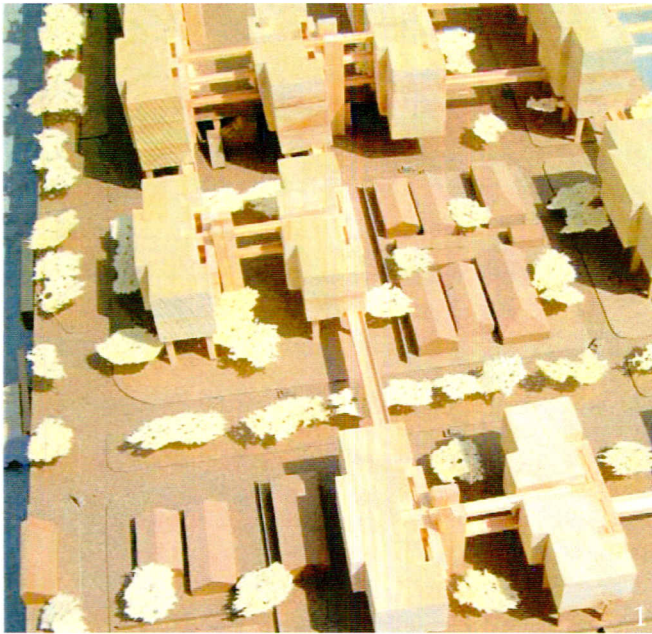
Site Plan



Legend

- 1. Mississippi River
- 2. Industrial Canal
- 3. New Mississippi Waterfront Park
- 4. Proposed green space along industrial canal
- 5. Saint Claude Avenue equipped with light rail system
- 6. North Robertson Street
- 7. Proposed Development.
- 8. Proposed development
- 9. Cruise Ships Terminal
- 10. Hotel
- 11. Rice Mill Building
- 12. Existing Residential Fabric
- 13. Existing Lock (intended to be replaced by a larger capacity one by 2013)

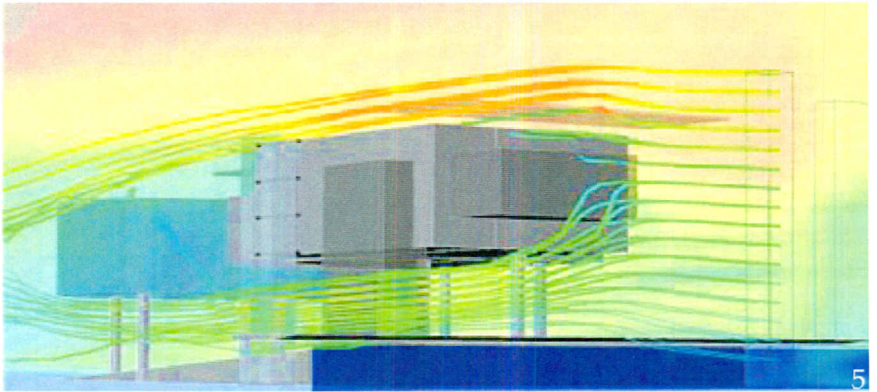




**Legend**

1. The proposed buildings are equipped with elevated neighborhood connections linking several building together as an alternate refuge route in case of catastrophic flooding.
2. Army Corps of Engineers project for an larger capacity lock at the industrial canal. A new Chartres Avenues draw bridge is seen in the foreground. This pre-Katrina project was originally intended to be completed by 2013.
3. Transition of scale between the proposed development and the existing residential fabric.

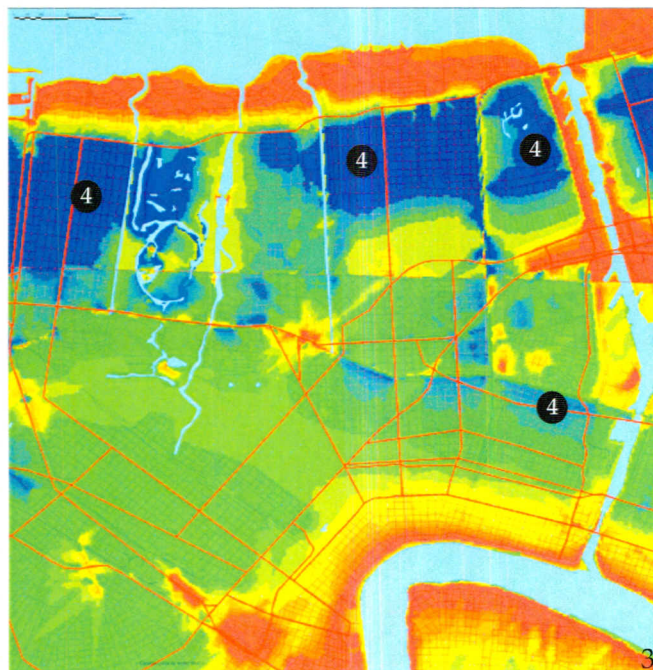
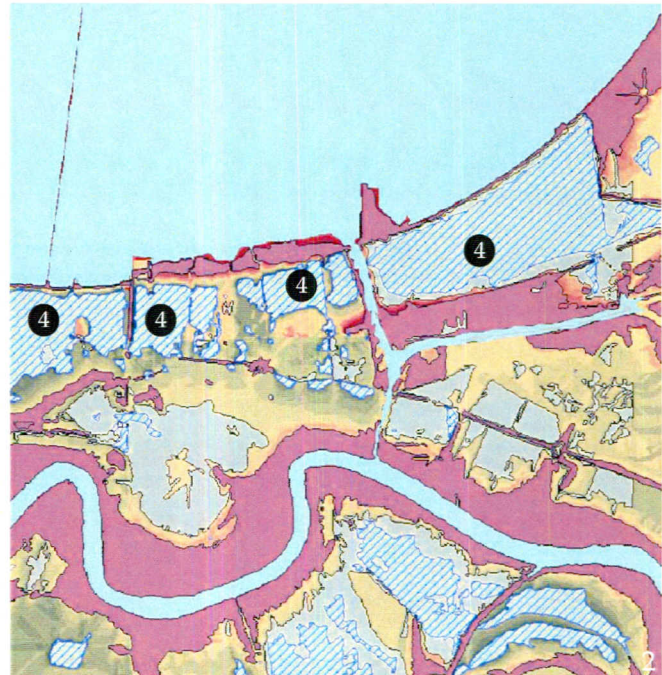
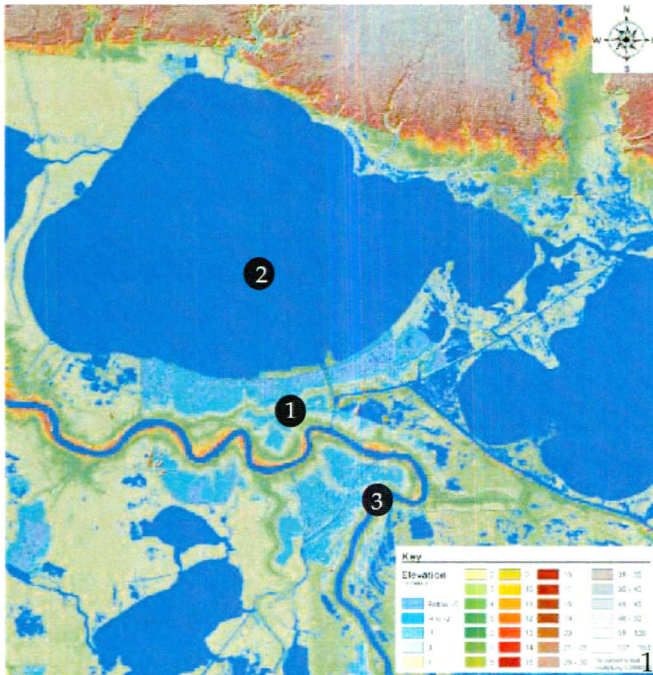




**Legend**

- 1-3. Raised buildings above public elevated platforms provide shading to pedestrians.
- 4. The verticality of the proposed development is emphasized by the elevator shafts expressed on the outside of the buildings.
- 5. Wind study for a raised public building.





**Legend**

1. Map of the water bodies that dominate the New Orleans Area
  1. New Orleans
  2. Lake Pontchartrain
  3. Mississippi River
2. Generated Contour map indicated potential areas for new urban wetlands (4)
3. Mapping New Orleans' terrain elevation. Highest elevation are show in brown. Lowest elevation (up to minus ten to fifteen feet under see level) are shown in Dark blue. Areas of potential urban wetlands (4)
4. 1895 city map showing undeveloped northern part of the Bywater area



## b. Engaging Sea Level

Avoiding floodwaters by raising the primary living conditions above potential flooding seems simple and safe. This design investigation acknowledges the potential for higher water levels in the future. The water level in these schemes is assumed to be the sea level of the Lake Pontchartrain where cut and fill topography changes are developed for higher ground.



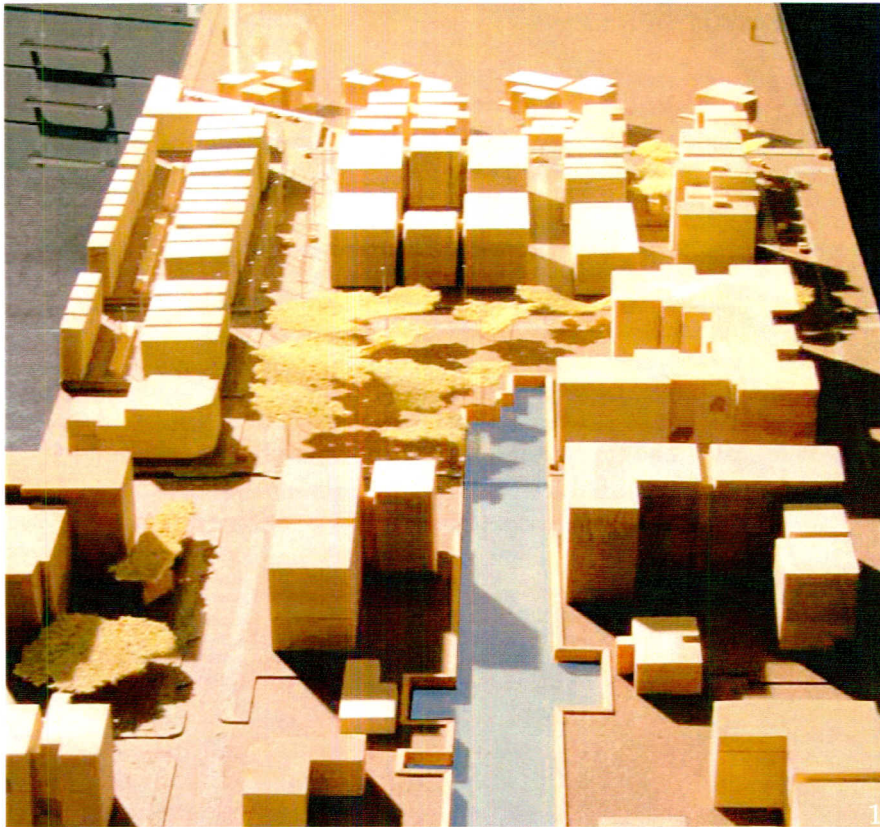
All investigations seem to suggest that the incredible loss of wetlands in Louisiana and within the expansive Mississippi River Water Shed, has resulted in serious and detrimental affects on the river ecosystem. While only a minor part of the Mississippi system, the provision here to provide more wetlands in New Orleans would be valuable. It might also suggest that states, cities and towns north of New Orleans incorporate similar approaches to assure a healthy river throughout its entire length.



### Legend

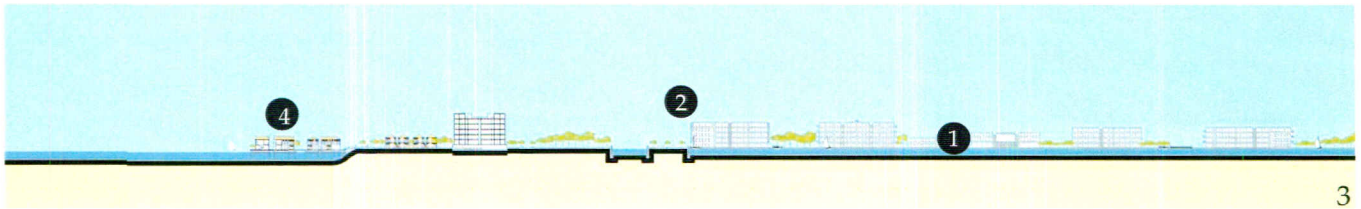
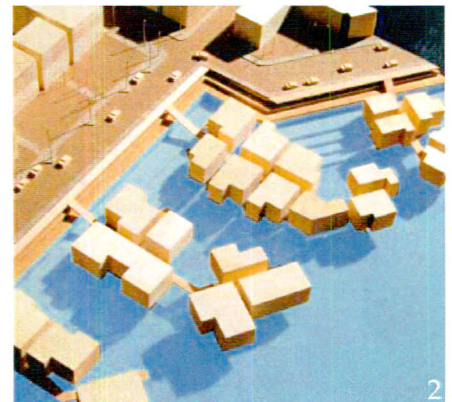
1. Mississippi River
2. House with raised porch above a sacrificial storage space.
3. Lock at Industrial canal was completed in 1921





**Legend:**

1. Mid-rise Housing have a facade to the street as well as to the canal. Public Squares and Parks are located at the intersection of the canals and primary Boulevards.
2. Pontoon houses float at the edge of a retention lake that is connected to the perimeter pumping stations at the Industrial Canal.
- 3-4. Section and Plan showing the new development along a Canal (1). Louisa Street is treated as a Boulevard (2) with shopping and services forming a Sub-center around a public square (3). Houses on Pontoons(4).

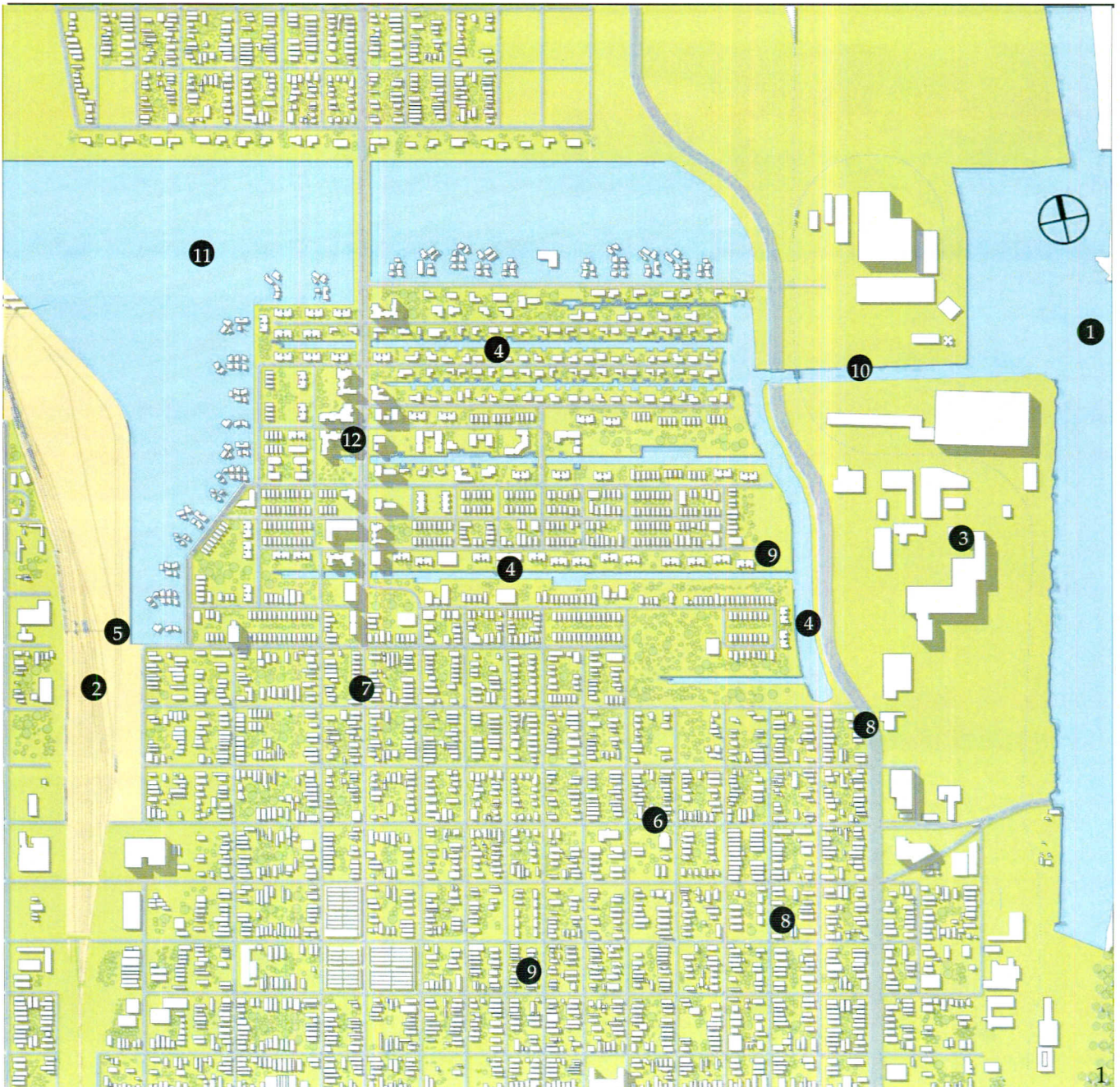


**b.1. Water Canal Housing**

A fourth design investigation more closely involved with water, housing and neighborhoods receive their identity from the canal that penetrates all properties adjacent to it. It assumes that severe damage and a reduced population will require or allow existing neighborhoods to be demolished. Residents could move to these new, higher density, smaller scale neighborhoods with different focus. The activity of these communities is focused on recreational aspects; its microclimate is cool from this nearby water.

With covered garage parking below, open exterior public spaces on land and an ability to experience the cooling and recreational facilities of the water, this new housing represents an idea of New Orleans.





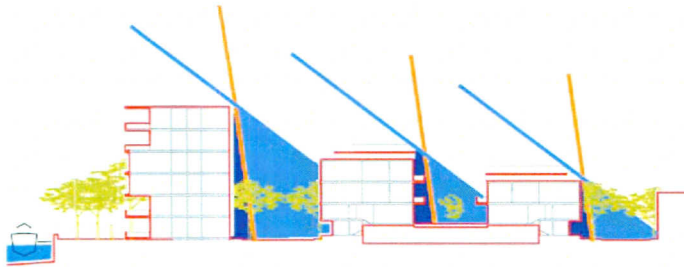
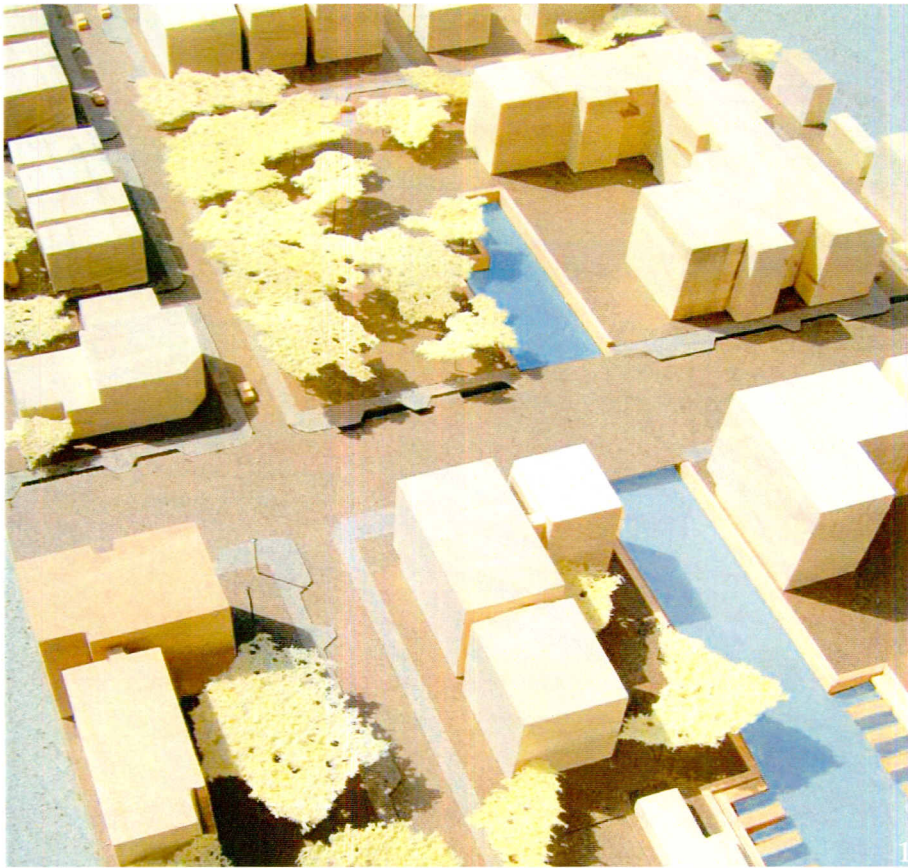
Site Plan



Legend

- 1. Industrial Canal
- 2. Train Tracks
- 3. Industrial Area
- 4. Canal
- 5. North Galvez Street overpass
- 6. N. Claiborne Ave.
- 7. New Boulevard at Louisa Street
- 8. France Street
- 9. Existing Residential Fabric
- 10. Inlet linking Canal System and Industrial canal
- 11. Pond as Storm water Buffer
- 12. Sub-center equipped with public amenities and shopping, leisure.

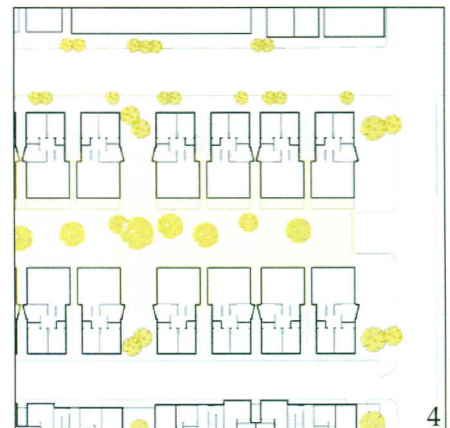
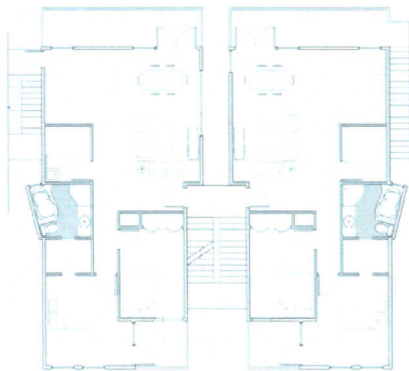
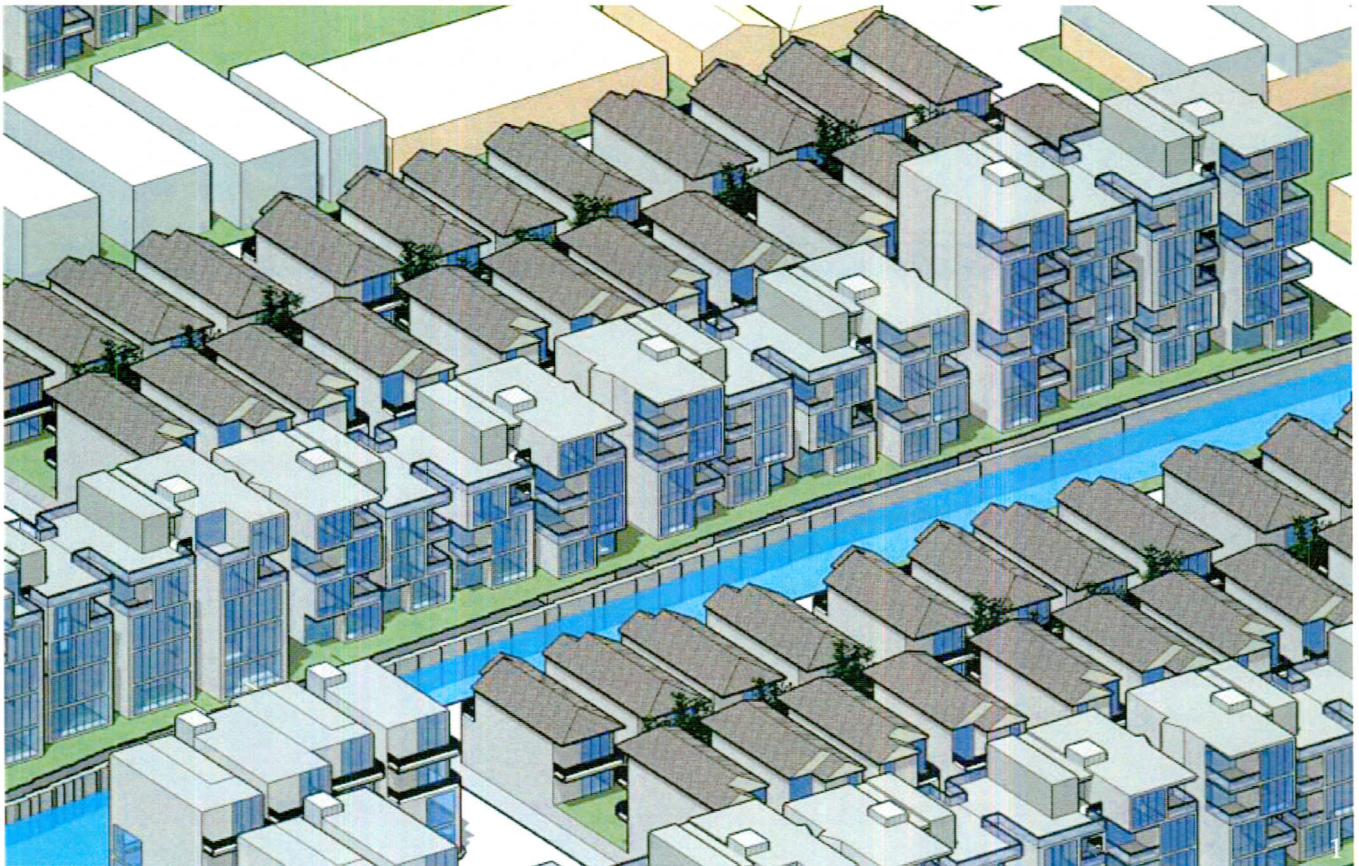




**Legend**

- 1. Public Square at the intersection of a Canal and Louisa Street.
- 2-3. Garden View between two rows of Twins Houses.
- 4. Sun angle Study.
- 5. Study for multi-family housing units.

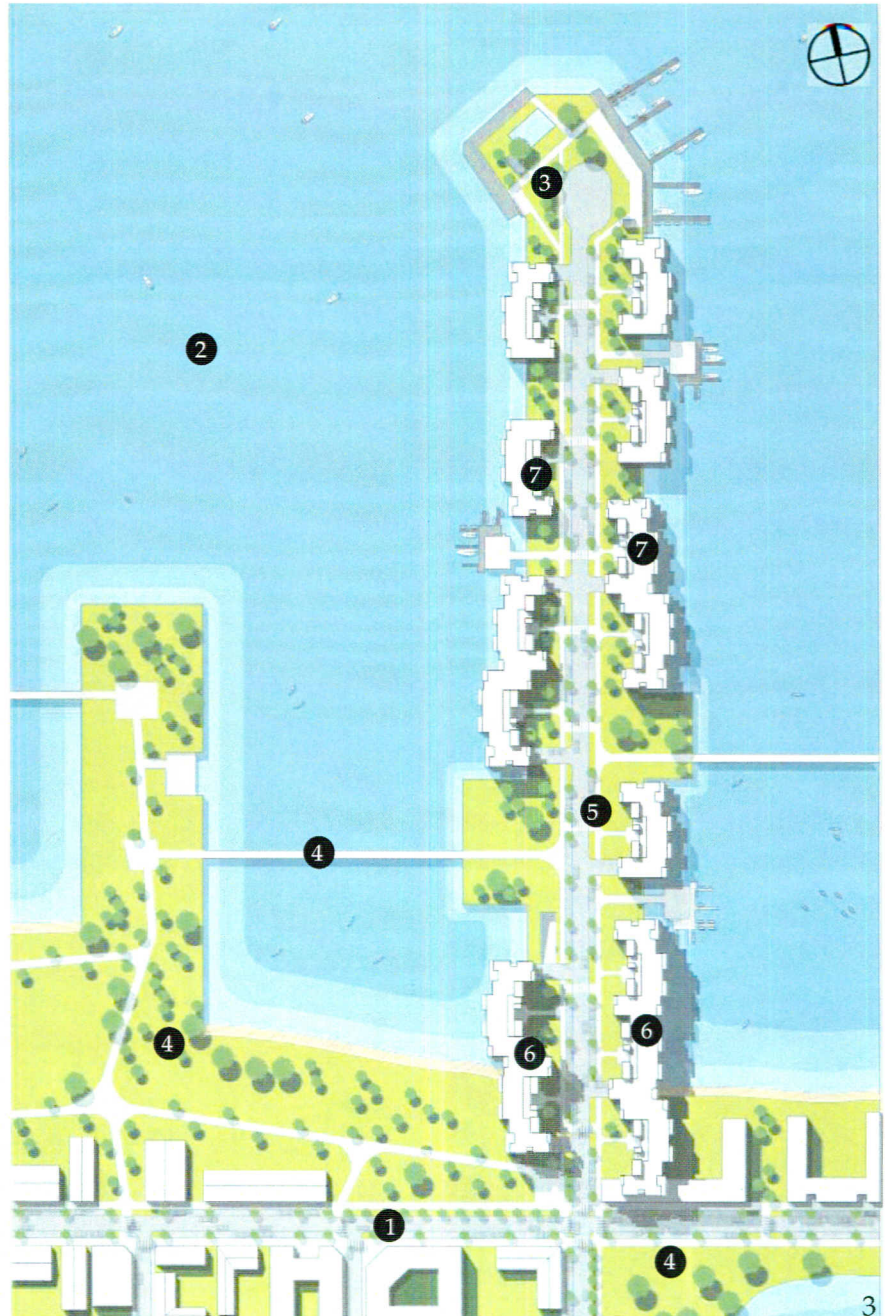
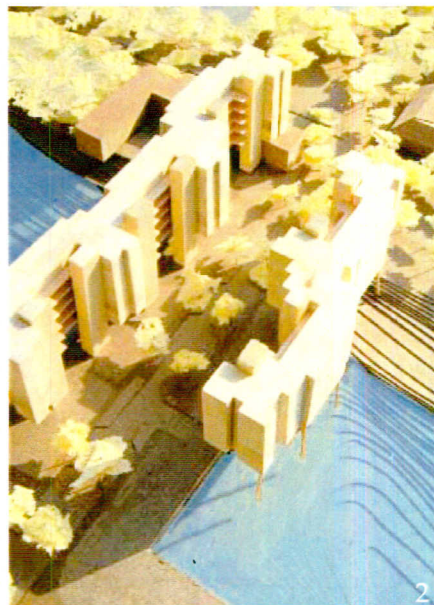
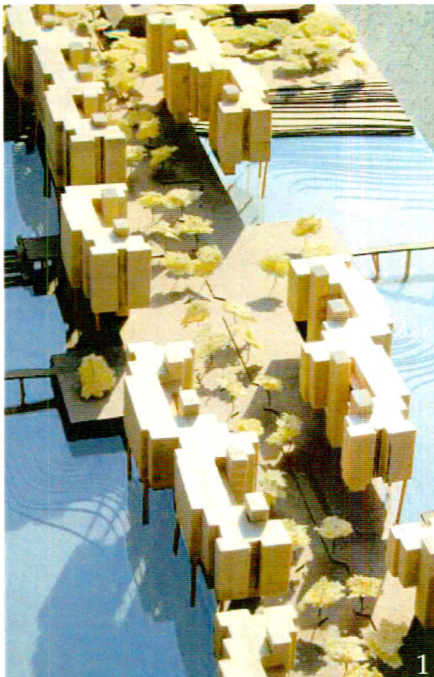




**Legend**

- 1. Study of Low rise high-density housing bordering a canal.
- 2. Street elevation study of the twin walk-up houses.
- 3. Typical second floor plan of a twin walk-up house.
- 4. The houses are clustered around a garden space on top of the parking.
- 5. At ground floor are ancillary rooms or rental studios along with efficient parking for the house cluster.





**b.2. Lake Piers**

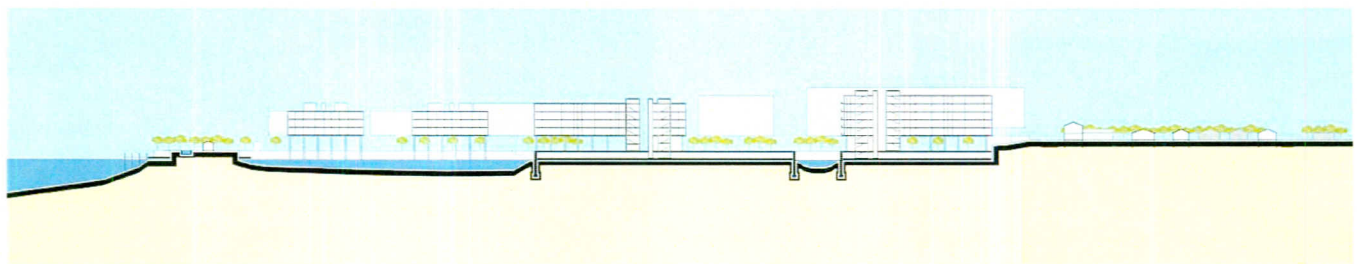
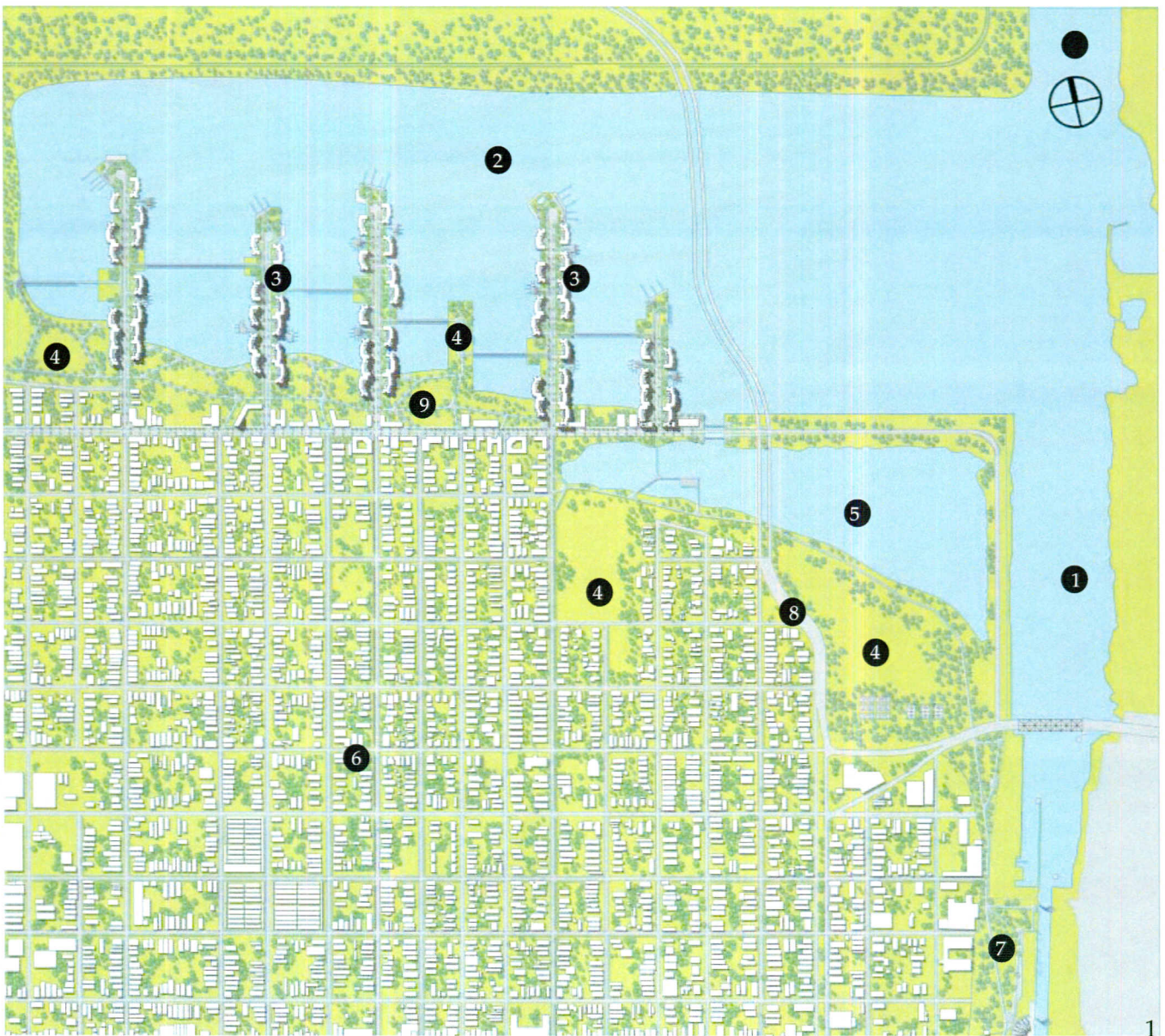
A fifth design, "Lake Piers", investigates an even closer and stronger relationship with water. Small lakes with possible wetlands allow projecting land fingers into the water edges inviting recreation, a cooler micro climate living, on- site covered parking, and close-by services like community swimming pools and boating. Cutting for landfill and allowing Lake water to enter these levee-protected areas create a new City environment with expanded wetlands.

Normally the elevated ground plane has landscaped, community spaces and upper level common use spaces allows semi-private enjoyment of sun, view and community interaction. In the event of higher flooding, these exterior elevated living spaces allow residents to be protected from floodwaters

**Legend**

- 1-2. Model of the High Rise and Mid Rise Housing Buildings built at the Edge of the Pier.
- 3. Plan of a inhabited Pier (3) at N. Glavez street(1) with public park(4) along the lake (2) shore. A central Street(5) provides access to the residential high rise (6) and mid-rise(7) housing buildings

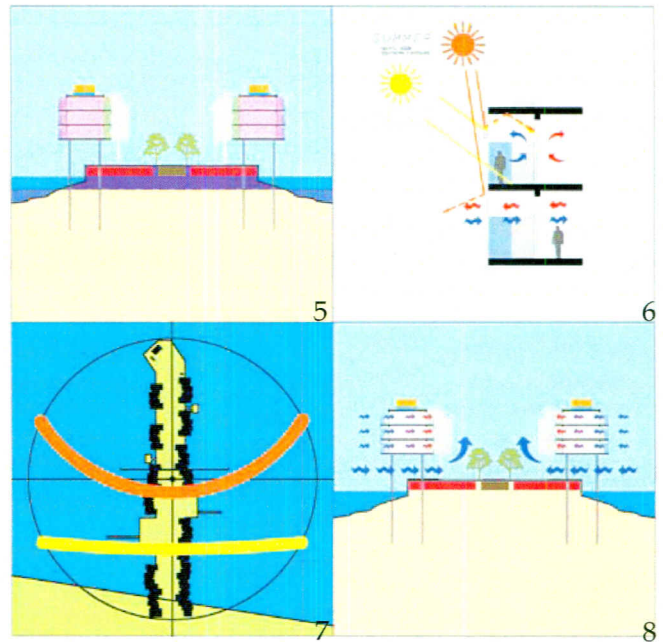
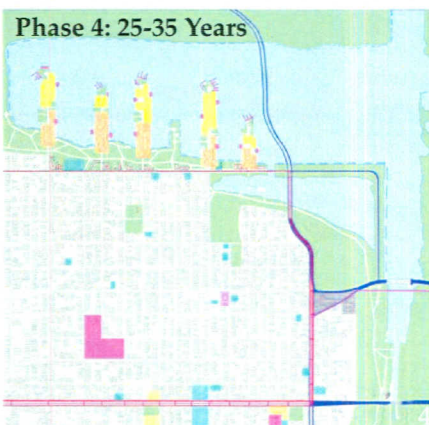
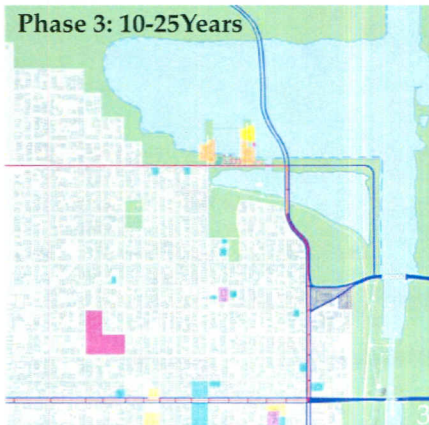
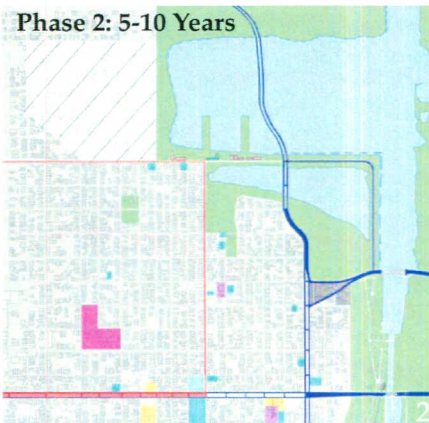
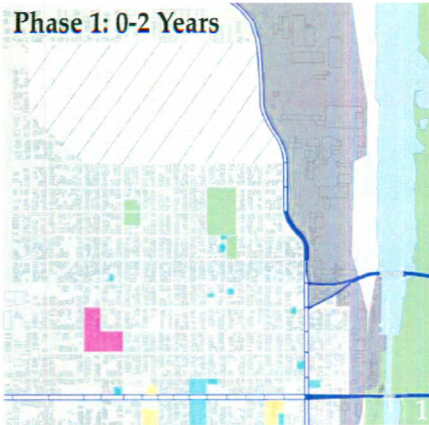




**Legend**

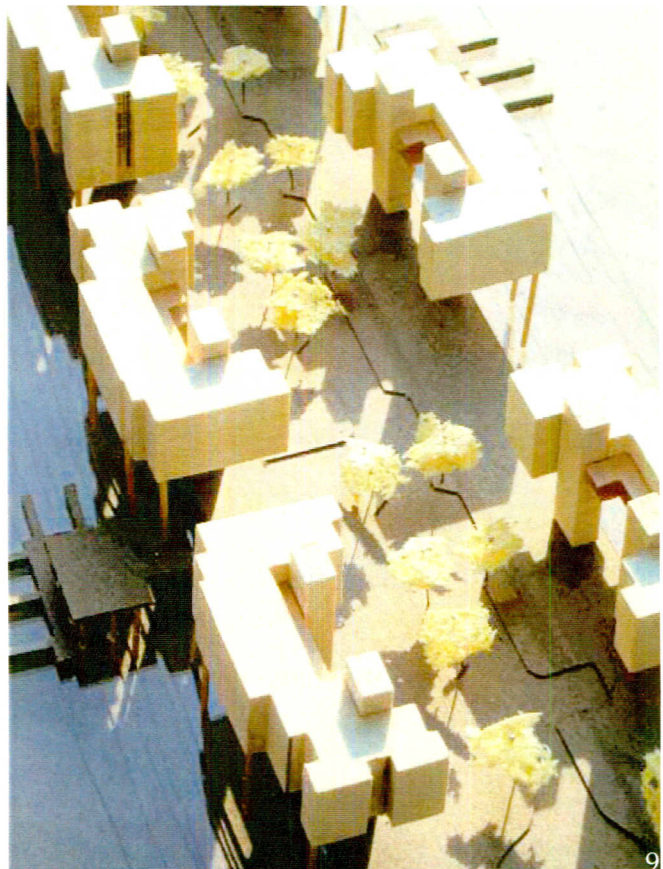
- 1. Industrial Canal
- 2. Lake
- 3. Piers
- 4. Public Park
- 5. Recreation Water Area
- 6. N. Claiborne Ave.
- 7. Connection to River Park
- 8. France Street
- 9. Existing Residential Fabric
- 10. Canal linking to Lake Pontchartrain



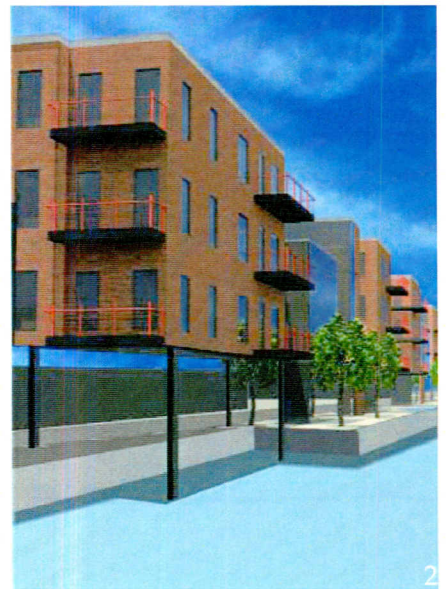
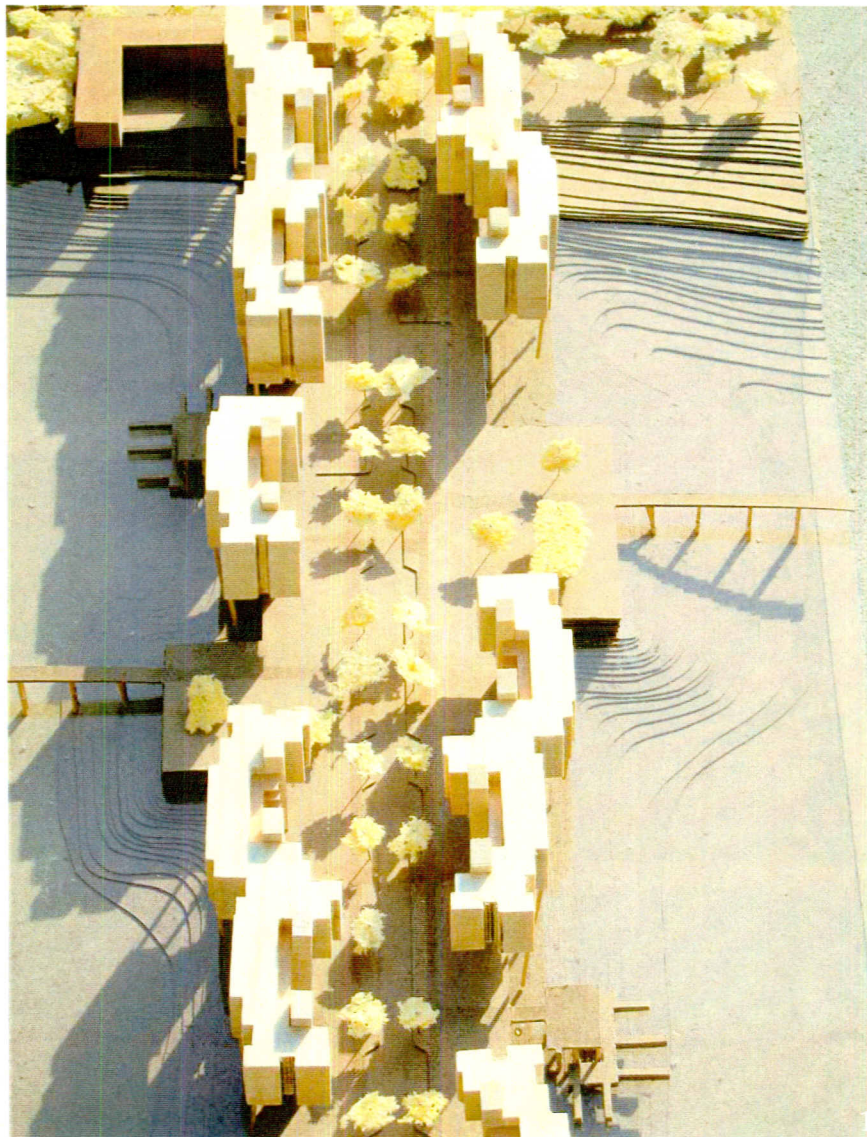


Legend

- 1-4. Phasing diagrams
- 5. Land Use and Fill: Parking, Pier, Elevated Building.
- 6. Ventilation and Solar Protection at Envelope.
- 7. Sun Path Diagram.
- 8. Ventilation, Waste water treatment, and alternate power supply.
- 9. Model of the High Rise and Mid Rise Housing Buildings built at the Edge of the Pier.



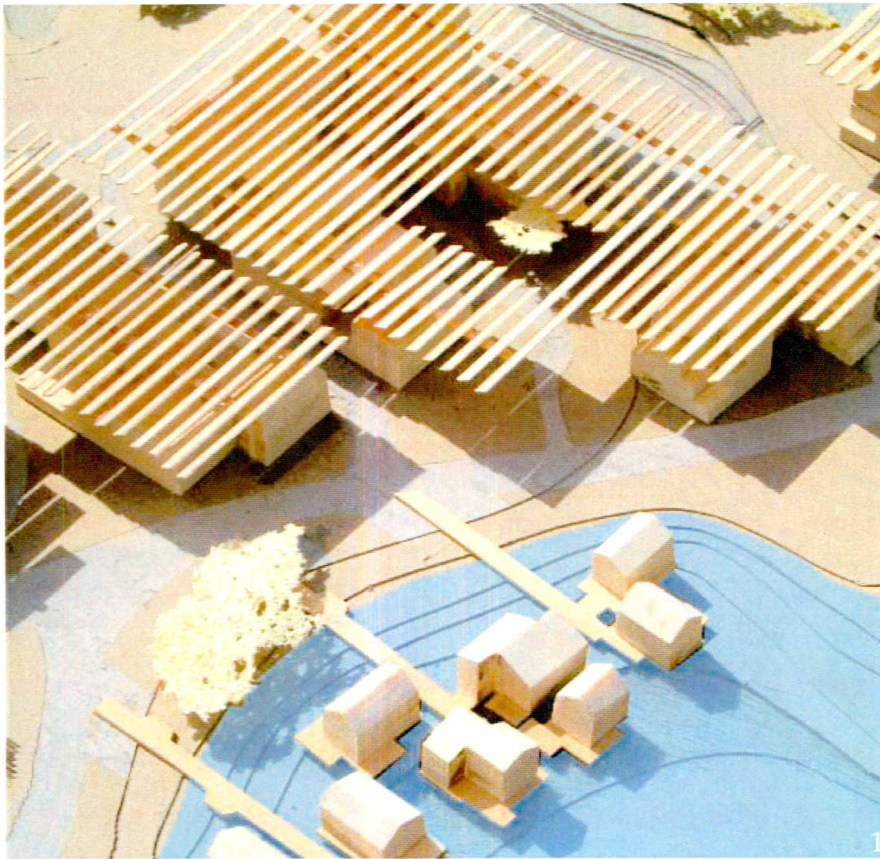




**Legend**

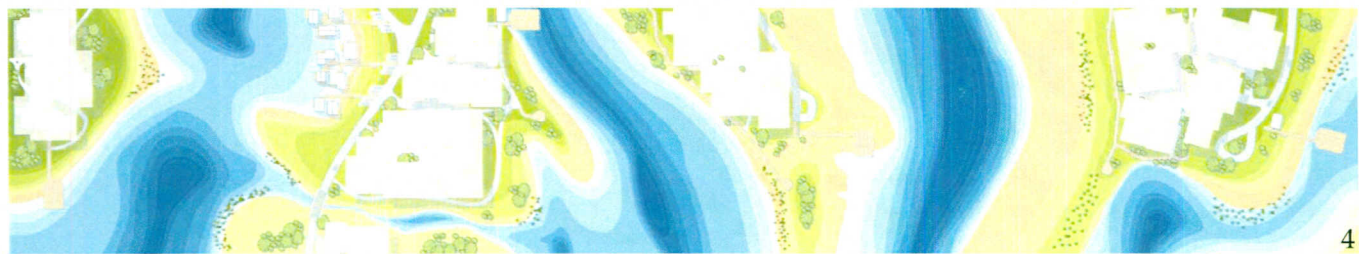
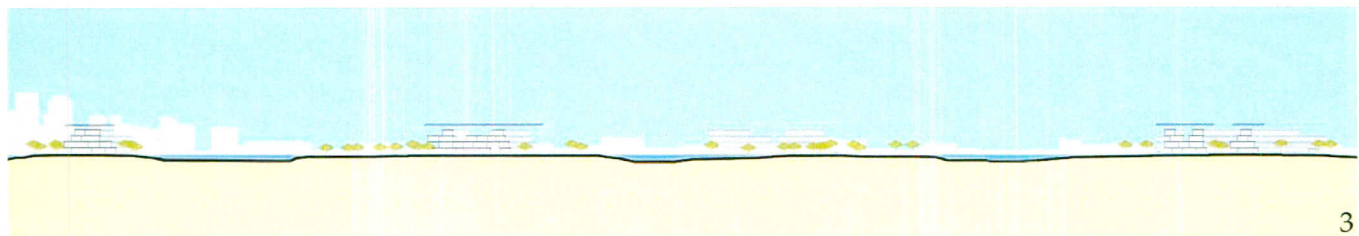
1. The central public park is shaded by alignments of trees. Breezes from the lake circulate under the raised buildings.
2. Buildings are raised above the piers to create horizontal views.





**Legend:**

1. Large sun-filtering canopies cover the multi family housing buildings. Small houses are floating on pontoons.
- 2.. Light plays with the texture of the sun shading. Jalousies filter light into dwelling while allowing breezes to flow inside.
3. Section through the constructed wetlands and the canopied housing buildings. The array of different depths of water in the wetlands is meant to provide habitat for a greater diversity of species to prosper.
4. Water flows through a series of interconnected wetlands. Area with reduced depth would be drier or wetter depending on the season.

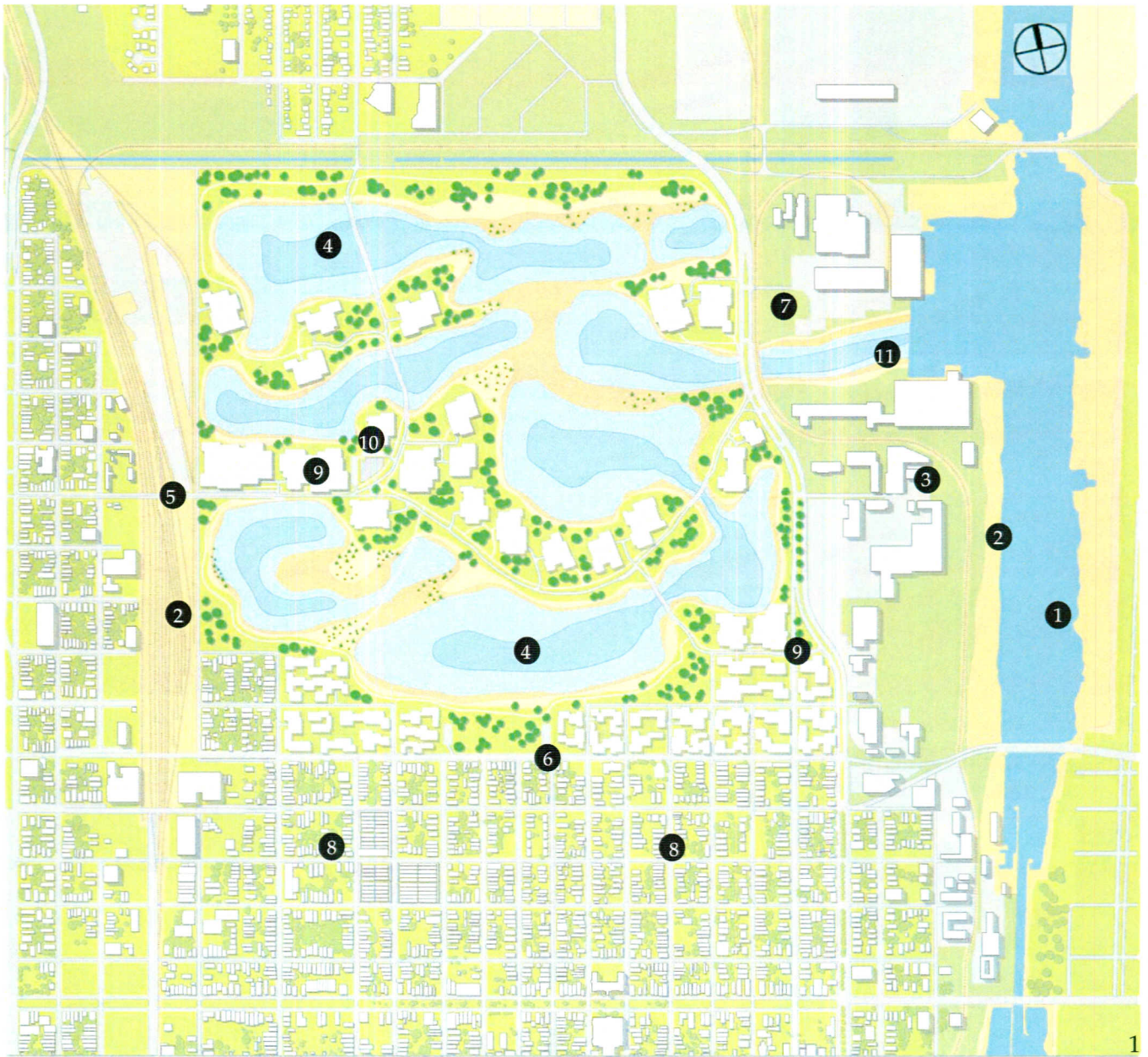


**b.3. Rebuilding Wetlands**

This sixth investigation called “Rebuilding Wetlands” is a design that explores closer responses to the environment in a positive way with high sun shading panels for cooling. Clustered below are low rise, high density housing scattered in interconnected neighborhoods of various sizes. A fluctuating level of water would be allowed to return to these areas that have been created with new filled land using cut and fill techniques.

Environmental responses include climatic shading of all community clusters, low scale housing structures closely planned for higher density neighborhood clusters. Within this overall strategy, new schools and retail centers would be planned within walking distances while parking structures/garages are planned below each of the clusters themselves. Wastewater treatment would be integrated into the plans and power services would be primarily from alternative energy sources.





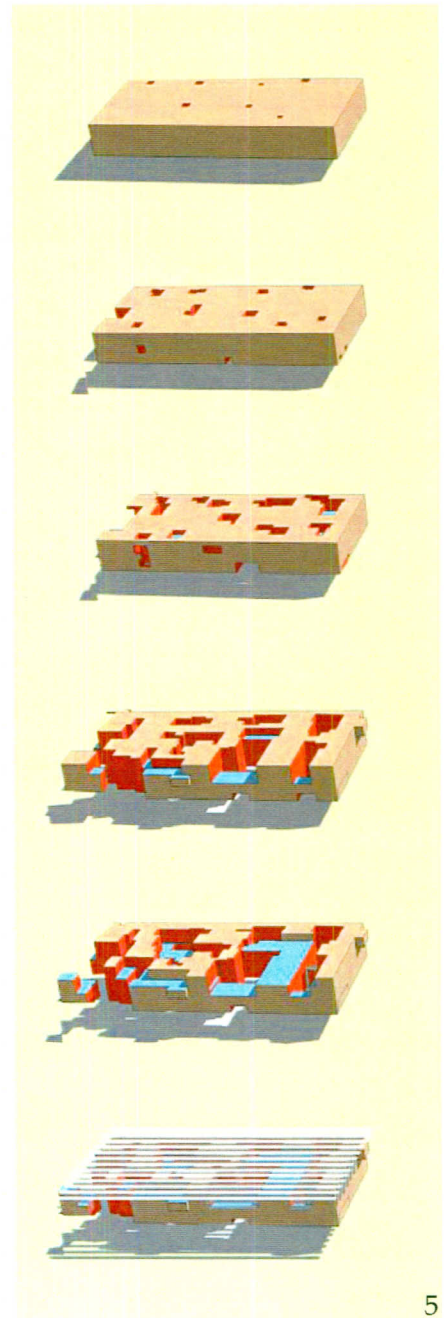
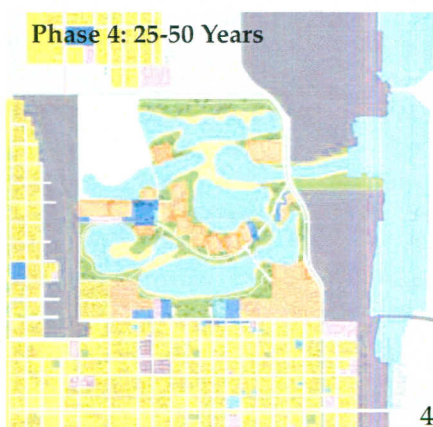
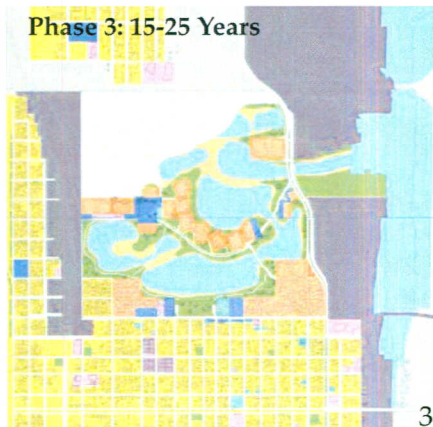
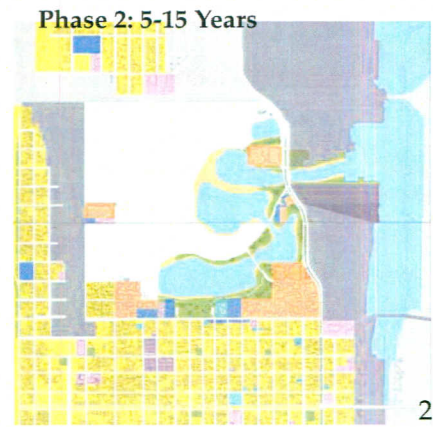
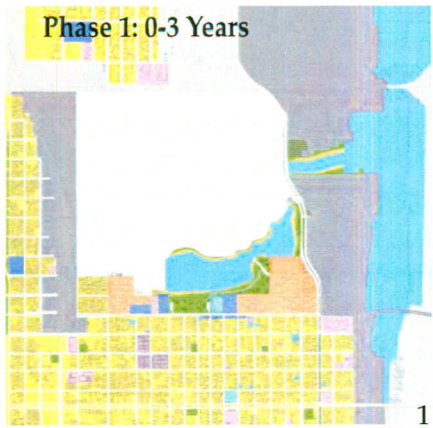
Site Plan



Legend

- 1. Industrial Canal
- 2. Train Tracks
- 3. Industrial Area
- 4. Wetland Complex
- 5. North Glavez Street overpass
- 6. N. Claiborne Ave. with park opening to the wetland area
- 7. France Street
- 8. Existing Residential Fabric
- 9. Proposed Mixed use buildings with large canopy as sun shading and wind modulator
- 10. Sub-center equipped with public amenities and shopping, leisure.
- 11. Inlet linking wetlands complex to Industrial Canal

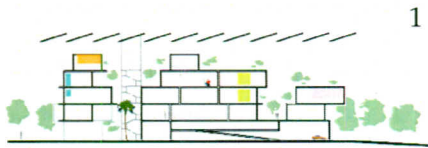




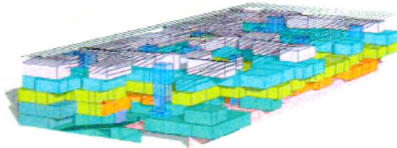
**Legend**

1. Phase I: Damaged homes to the north cleared. The edge of the existing residential fabric to the south is treated with mixed use buildings and other necessary public service buildings. Wetland construction undertaken.
2. Phase II: Louisa Street's southern section is removed to complete southernmost wetland and park on N. Claiborne Ave.
3. Phase III: development of pathways and road system and construction of the sub-center in the central area
4. Phase IV: Partial Completion of northernmost wetland area
5. Building's generative diagram.

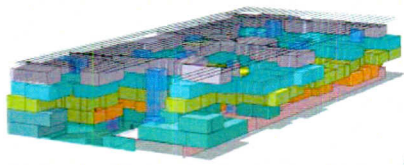




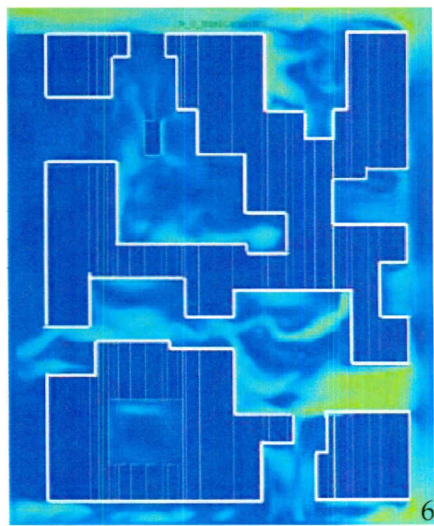
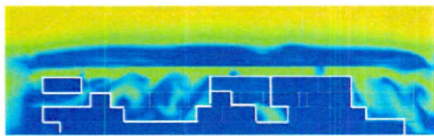
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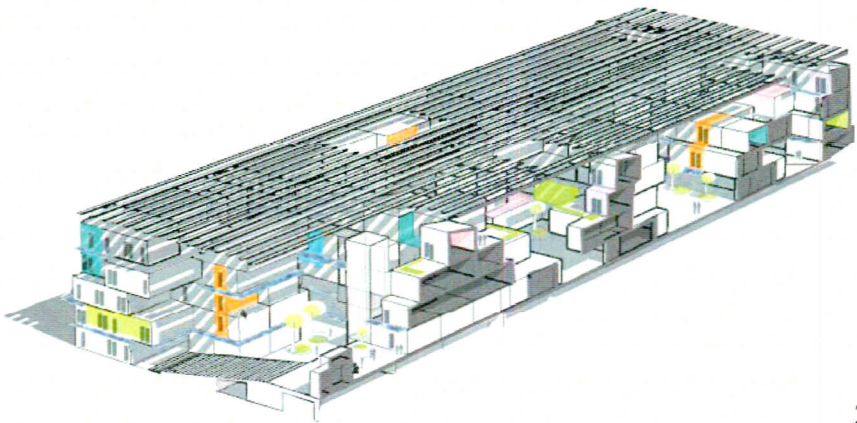
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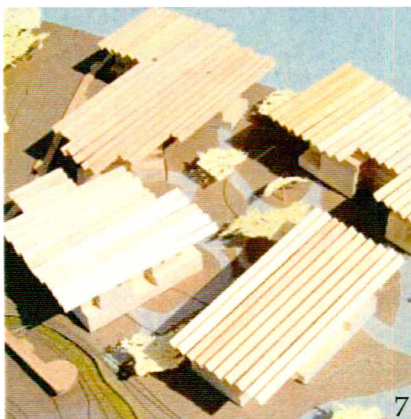
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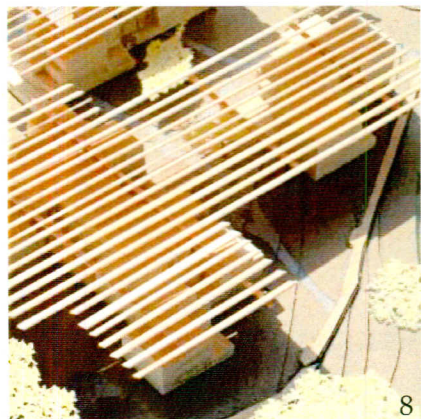
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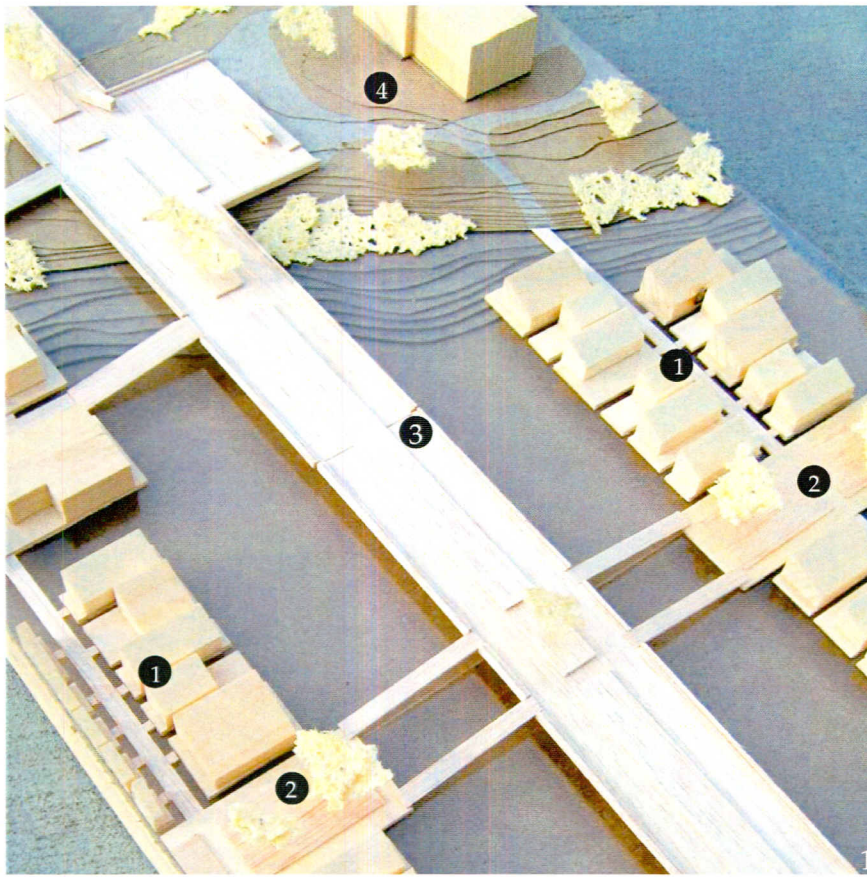


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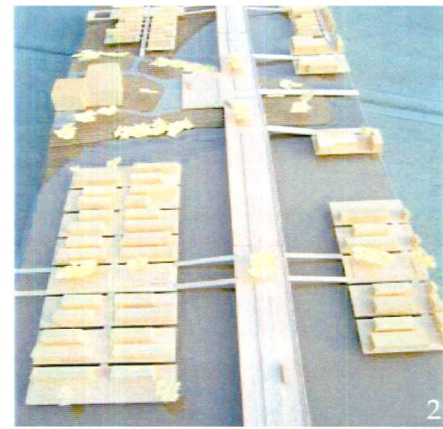
Legend

- 1-2. Section showing the relation of the porous block and the canopy over it.
- 3. Direct solar beam are let in by the canopy during winter.
- 4. Direct solar rays are blocked by the canopy during summer.
- 5-6. Computational fluid dynamics Study of wind flow through the porous block
- 7-8. Study model of a cluster of canopied mixed use buildings
- 9. Typical floor plan showing interior courtyards and dwellings with private terraces.



**Legend:**

1. Floating Barges (1) with houses are clustered around a common green space (2) that is connected to a raised boulevard (3). Public transit stops as well as bike paths are located on this elevated circulation above flood levels. A neighborhood school is constructed on an artificial island (4) serving also as a place of refuge.
2. The main artery connecting the clusters is equipped with bike paths

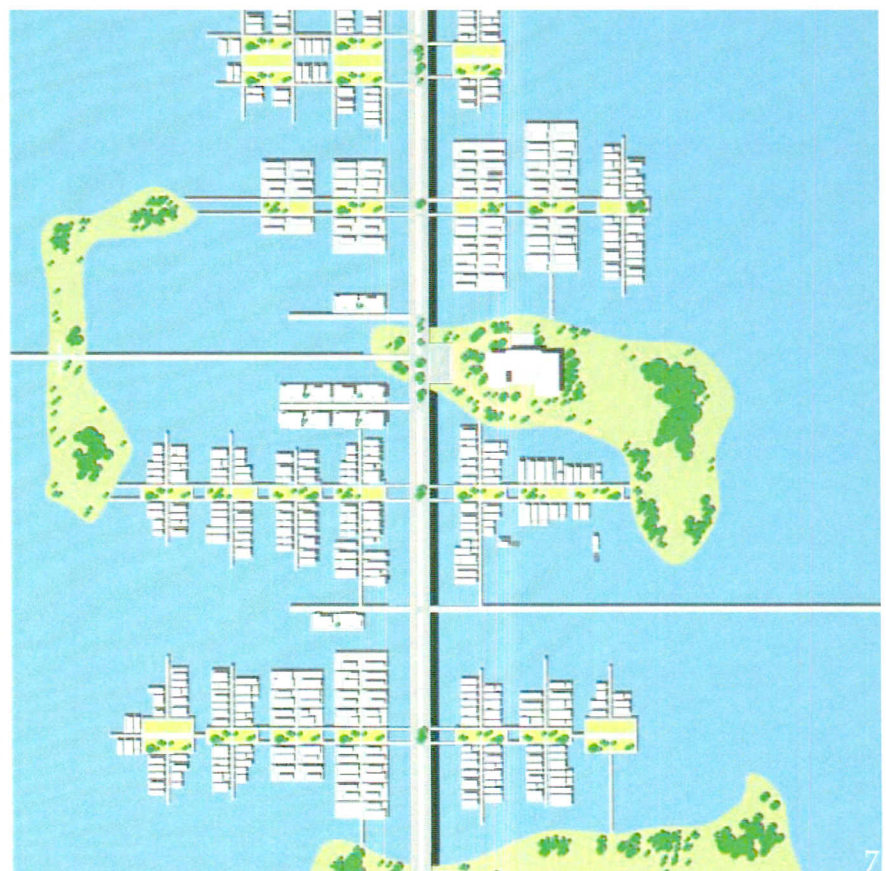
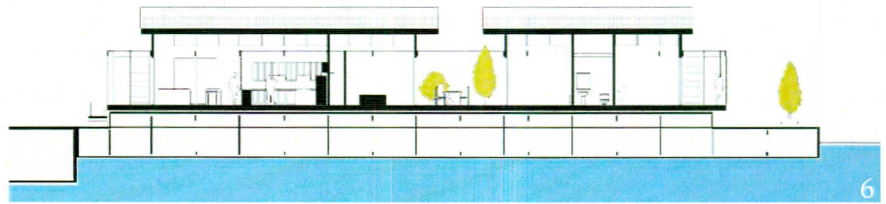
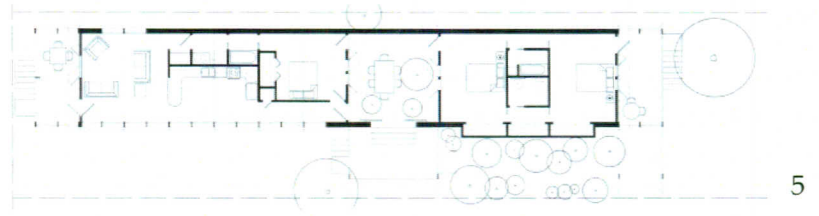
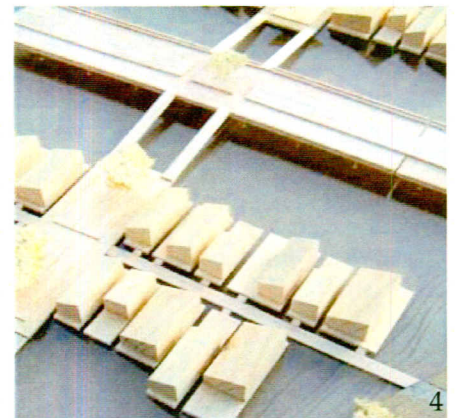
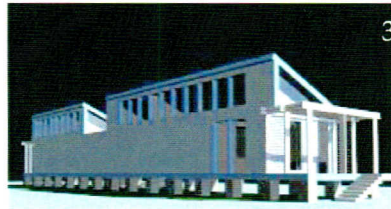
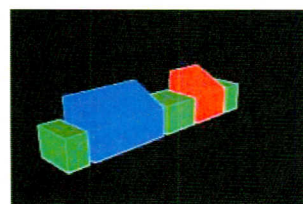
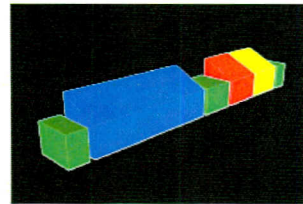
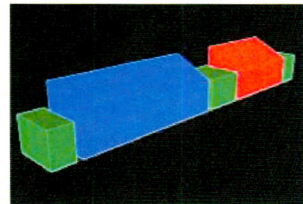
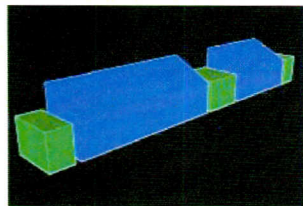
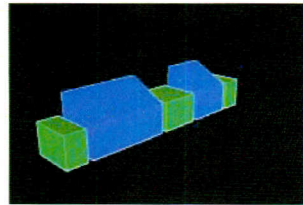
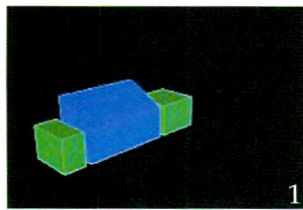


#### b.4. Floating Neighborhoods

The seventh design is unique. Located in new wetlands or lakes formed by filling the lowest and most flood prone areas, these new building areas within the city provide a living environment that is totally integrated into a water environment.

Designed as floating homes, they are constructed on standardized floating barge-like structures that are interconnected to form communities that rise or fall as surrounding water levels fluctuate. Clusters of these floating structures are connected to form floating land spaces that vary in size and complexity. New islands built with fill and clean debris form a base for Schools and other basic services above the potential flood areas. These new islands provide emergency safety for students and a place of refuge for the people who live in these communities. Roads would be constructed above the flood water lines. Rapid transit stops would connect these communities to other parts of the City. Parking garage centers would be planned but use of cars discouraged in this future plan for the city. Power would come primarily from alternative energy sources. Wastewater treatment would be localized within the floating structures themselves.





**Legend:**

- 1. Volumetric Components are Added in answer to various programmatic needs and budgets. Incremental expansion of a house around a core element can accommodate evolving family needs.
- 2-3. Floating house volumetric study.
- 4. Density Study.
- 5-6. Study Plan and Section of a Shotgun floating house resting on a barge.
- 7. Site plan.







### 3. PRINCIPLES AND PLANNING

1. **Water Designs:** Develop and implement a positive attitude toward water and its impact: reestablish wetlands, create new water areas for housing and recreation and as protected zones for reducing potential flooding
2. **Neighborhoods:** Existing Neighborhoods particularly those within historic districts, which have sufficient populations returning should be protected, restored, rebuilt, and expanded and made more dense with infill houses.
3. **Urban Boundaries:** Where existing neighborhoods have insufficient populations that have returned, where damage has been severe, where these sites are significantly below the surrounding sea level, they should be abandoned and the land vacated.
4. **Property Purchases:** Where communities have been destroyed and the sites abandoned, returning populations should be offered new home choices in consolidated neighborhoods. Properties that need to be abandoned should have those properties purchased from owners by the City at prices that existed before Katrina.
5. **New Levees:** New Orleans should construct an overlay of new levees within the existing systems to compartmentalize areas and provide additional secondary flood protection.
6. **River Edge Housing:** New high density housing zones should be developed along the Mississippi east of the City bordered by a new and extensive River Park
7. **Transportation:** Existing transit systems should be expanded and new systems developed to interconnect all part of the city and connect the city to adjacent regions by rapid transit systems.
8. **Green Spaces:** A new interconnected and expanded Park and Garden system should be established as a high priority taking advantage of sites where existing uses have been seriously damaged and removed.
9. **Urban Amenities:** Along with new housing of both low and density, advance plans for new amenities that the city has begun or planned: new Cruise ship terminal served by a new hotel, new retail center and parking structures; a new performance amphitheatre and performance public spaces within the new River Park
10. **Sustainable Design:** Develop a sustainable design, environmental friendly approach to planning and new infrastructure: Develop new alternative energy sources, enforce energy conservation measures, construct new local wastewater treatment systems, provide better transportation systems to reduce the need for cars.







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