7-1-2010

A Catalyst for Urban Renewal: Reservoir Number Three Environmental History Museum

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A Catalyst for Urban Renewal

Reservoir Number Three Environmental History Museum

Independent Project Submitted to Roger Williams University, School of Architecture, Art and Historic Preservation In fulfillment of the MArch degree.

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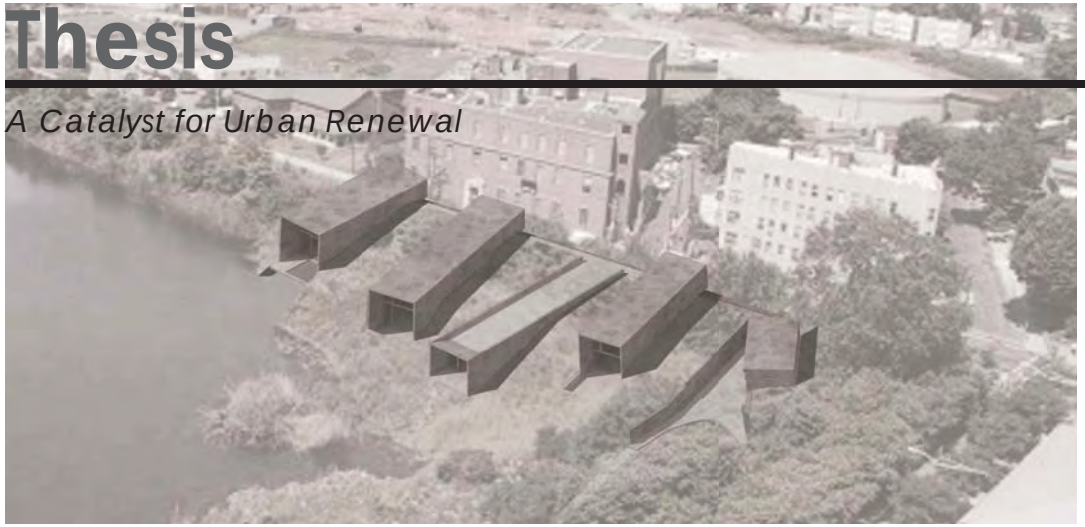


Architectural Themes and Intentions

This architectural thesis investigates how architecture can have an impact on urban renewal by strengthening communities with an architecture which promotes human interaction through spatial and programmatic interconnections, as well as promoting relationships between people, their history, and context.

Connecting people with their history through architecture provides people with a sense of identity, which is key in building a strong community. Understanding the connection between the built environment, the natural environment and its relationship to man is crucial.

The impact which the built environment has on people is critical to understand in order to spark change. The methods we use in composing and executing architecture can have an impact on human interaction, which facilitate opportunities for learning, interaction and activity. An exploration of interior and exterior relationships is a means of conveying these issues to society, essentially leading to positive change.

"The profound affinity between architecture and place results in an intensified mimesis between building and environment, between redefinition and genius loci."

-Vittorio Amagnano Lampugnani

This architectural thesis explores the following themes:

-The role of architecture in strengthening connections between people and their historical context.

-The impact that architecture has on education and awareness, resulting in social change.

-The implications of spatial relationships and human interaction.

-The exploration of the connection between architecture, man and nature.

Figure 1

Figure 2

Manifesto

Architecture is a living organism; a complex structure of interdependent and subordinate elements whose relations and properties are largely determined by their function in the whole.[1] Like all living organisms, architecture has essential needs in order to sustain life.

-It must play a positive role in its ecosystem
-It must function to better society
-It must serve multiple functions and processes
-It must adapt to change

Architecture should be regional and contextual; adapting and changing with its environment and becoming an integral part of it. It should only belong on the site for which it is designed and nowhere else. It is important for architecture to have a connection with its context and its users. It should reference and regard history, not replicate it.

Architecture should be local; built from local materials, and built by local craftsman. A sense of locality and place gives architecture a stronger meaning to those who use it.

Architecture and nature should work as one; we must give back what we take from nature to form a harmonious relationship between the natural environment and the built environment.

Architecture should be a means of connecting man with nature.

Architecture should be socially and ecologically ethical. Putting ethics at the forefront of design for humankind and the environment is essential to creating successful architecture, and therefore a successful, self-sustaining society.

Light and spatial quality must be carefully considered. How people interact in a space is of the utmost importance in creating an active architecture. The use of light coupled with strategically proportioned and interconnected spaces can allow for an environment in which promotes activity and interaction among the users.

1 Merriam-Webster Dictionary

Nature + Architecture + Man

Figure 3

Figure 4

Figure 5

Architecture influences society. The way architecture is designed, and towns and cities are planned, has an impact on how people live their lives and function in society. Architecture should become a means of changing how people live their lives for the better.

-Bettering themselves
-Bettering their communities
-Bettering nature
-Bettering the Earth

We have the ability to change the world based on how we can rethink design and how we live. Architecture can have a positive impact; Planning can have a positive impact.

Architecture alone can't fix everything, but it plays a big part in the realm of change in that it can serve as a catalyst towards a revolution; a revolution which will lead to people living more ethically and environmentally.

An architecture, an organism, designed for its ecosystem, and sustained by its ecosystem.

Problem Statement

Strengthening Community through Education, Awareness & Action

Today, it is important to reconsider the idea of building and maintaining sustainable communities from an architectural context as well as a social context. According To Stanley Hyland, author of Community building in the 21st Century,

"Community building is a continuous self-renewing, collaborative effort by community residents and professionals to engage in problem solving and enrichment. The effort would result in improved lives, greater equity; strengthened relationships, networks, institutions, and assets; and new standards and expectations for life in the neighborhood." [1]

Architecture can have an influence in the community building process if architects create opportunities through design which facilitate dialogues, conversations, and collaboration among citizens, which can lead to the identification and solving of community issues. Design problems and social solutions are linked together by programming. Therefore, developing a program which can have a positive impact allows for a stronger connection between architecture and the community it serves.

Diversity plays an extremely important role in strengthening communities. In Sustainable Communities The Potential for Eco-neighbourhoods, author Hugh Barton states,

"Well-connected communities, with a good diversity of ideas and experiences, generate creative solutions to problems which arise in their environment."[2]

Strong Community Base:

-Diversity
-Sense Of Belonging
-Interaction
-Common Goals

=

-Creativity
-Collaboration
-Action

1 Stanley Hyland, Community Building in the 21st Century
2 Hugh Barton, Sustainable Communities, the Potential for Eco-Neighbourhoods

Barton also states that,

"Communities operate best when they are in a state of dynamic equilibrium, capable of responding to changes in the environment and embracing ideas which challenge traditions and prejudices."[1]

Creating an active architecture, which facilitates increased social interaction and creativity amongst the members of a community, can lead to positive social change. Having diverse individuals at the base of a community can lead to creative solutions to the issues they face.

A Connection Between People and Place

Increasing a sense of community involves maintaining a sense of place, giving those who live in a community a stronger connection to where they are and where they come from. This speaks to the importance of regionalism in architecture. Designing regional and contextual buildings, which relate to a community's past and present, can have a positive impact on people's attitudes, feelings, and connections to a community and its architecture. Providing architecture that maintains an attention to localities and distinctive qualities of a place can will, therefore, increase the feeling of belonging which is so closely tied to communities.

Overall, architecture can have an impact on the development of stronger communities. Implementing designs which allow for social interaction, thought and education play a key role in facilitating positive social change.

Figure 6: Architecture responsive to place

Figure 7: Education through awareness

1 Hugh Barton

Project Proposal

The Reservoir Number Three Environmental History Museum

The Reservoir Number Three Environmental History Museum

The proposed project is an environmental history museum located at the Reservoir Number Three, a decommissioned reservoir located in The Heights neighborhood of Jersey City. The reservoir has a rich history and strong relationship to Jersey City and its residents. It was built in 1874 and was used until the late 1970s. Since its decommission, the reservoir has grown into a lush nature preserve with wild plants, birds and other animals not typically found in the city taking refuge.

The land was preserved by the city in 2007 due in large part to the efforts of the Jersey City Reservoir Preservation Alliance (JCRPA). Today, The Alliance provides several educational and recreational opportunities for the community, with activities ranging from nature walks, to an annual fishing derby. There are currently plans in place to restore the site and existing buildings for use as a public park.

The goal of the museum is to educate the people of Jersey City on the impact the reservoir has to Jersey City, its history and current state. Creating these educational opportunities will facilitate dialogues, interaction and collaboration amongst community members. Making connections with history and context serves as a way of bringing people together and therefore strengthening community through active learning. There are two key components to the design which will be critical in the project's success in leaving a positive impact on the community as a whole.

Figure 8: Reservoir No. 3

Figure 9: Education Through Awareness

Figure 10: Education Through Action

The first component is engagement. This project will provide a multitude of learning opportunities, including permanent exhibitions which outline the history and relationship that the community has to the reservoir and the environment. Identifying the historical relationships which the people and their community have to their environment is vital in helping them to understand their impact and connection to current issues with the environment.

The second component is advancement. Community members will have the opportunity to work together and collaborate in developing and implementing solutions for a sustainable future. Spaces will be provided within the program, which allow for these types of interactions. Giving people the opportunity to develop and test ideas together brings the educational aspect of the building full-circle. Here, education through awareness is supported by education through action.

Overall, what has developed is a project which can serve as a model for other areas which are also in need of regeneration, serving to better the community of which it is a part, and the lives of those who are a part of that community; architecture that has a positive influence on the society in which it serves, changing how people live their lives for the better.

Building Program

The Reservoir 3 Environmental Education and Visitors Center will take on a program which brings several issues to light which have a strong place in the urban community. It is the intention that this learning based program will spark awareness of social and environmental issues, while building community on the basis of reaching a common goal which will result in positive change. Below is a table, which outlines the program and breakdown of the specific spaces to be implemented in the project as well as area allocations.

The Reservoir Number Three Environmental History Museum

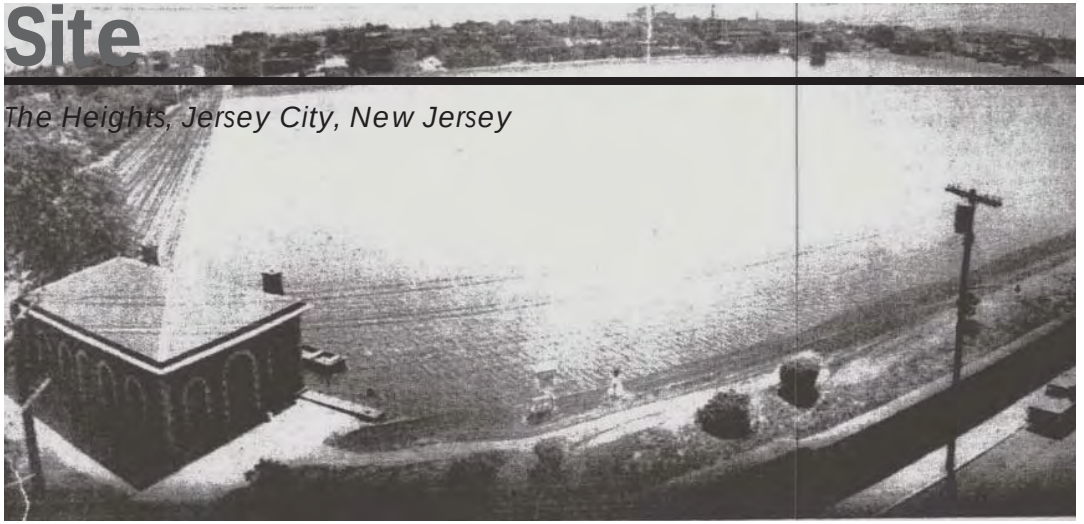
Program	*Square Footage*
Exhibition Spaces These spaces will promote self-discovery and serve as the main spaces for the members of the community to become aware of the historical significance of the reservoir to the city, as well as the environmental issues they face in their area. This will involve a combined use of interior and exterior spaces, As well as an innovative sequence of circulation.	
Main Lobby	1270 SF
Wall Gallery	1070 SF
Water Gallery	930 SF
Conservation Gallery	1280 SF
Art Gallery	1630 SF
Community Action Spaces The community action spaces are spaces where the issues that are exhibited can be discussed. Solutions and possibilities can arise through conversations, experimentations and interactions with community members as well as collaboration efforts with researchers. There is a range of spaces for both large and small group discussions.	
Lecture Hall	720 SF
Research Library	860 SF
Classroom	550 SF

Figure 11: Program Outline

Leisure Spaces Additional spaces which allow for additional interaction, thought and reflection amongst members of the community.	
Café	1110 SF
Lecture Hall Lobby	190 SF
Administration The administration will be able to coordinate community activities and educational awareness initiatives in regards to the environment and the reservoir.	
Office/Meeting Space	330 SF
Net Square Footage	**9,940**
Services	
Restrooms	250 SF
Kitchen	180 SF
Storage Spaces	150 SF
Mechanical Room	290 SF
Loading Area	160 SF
Circulation	570 SF
Gross Square Footage	**11,540**

Site

The Heights, Jersey City, New Jersey



Jersey City, NJ

The proposed site for The Reservoir No. 3 Environmental Education and Visitors Center is in Jersey City, NJ.

Jersey City grew significantly during the Industrial Revolution of the 1800s. After World War II, the city's industry began a long decline. By the 1980s the population of the city had decreased from just under 320,000 people in the 1930s to 225,000.[1] At this time, the poverty and crime rates were at an all time high for the city.

During the 1980s, the city began developing its waterfront. This helped to boost the economy as well as spark other regeneration projects throughout the city, ranging from the development of parks and open space, to the retrofitting of older city buildings into museums. Although the city's economy has improved significantly over the last 25 years, there is still room to grow and improve the inner city.

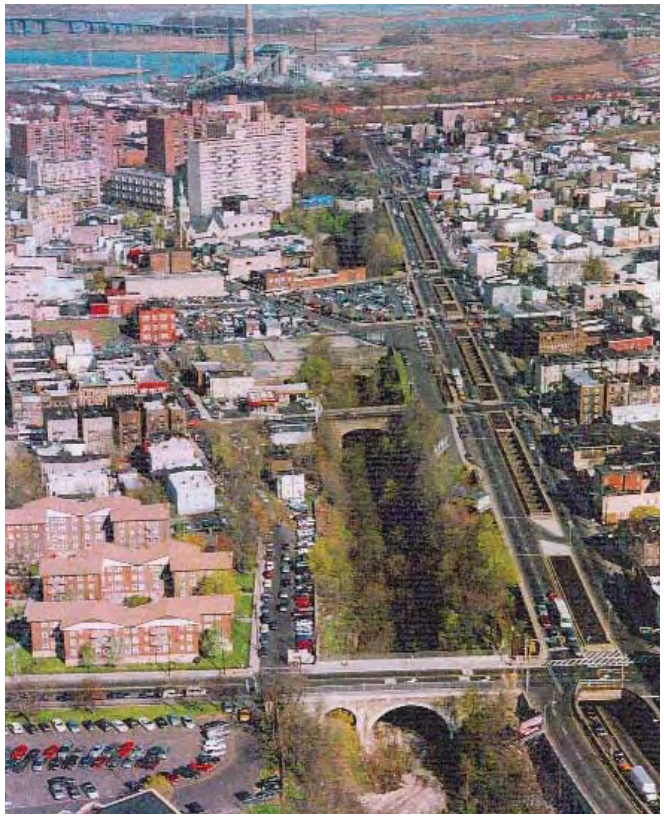


Figure 12: View Above Jersey City

City Statistics: Jersey City[2]

Location		**Demographics**
- County:	Hudson	- Black (28.3%)
- State:	New Jersey	- Hispanic (28.3%)
- Country:	United States	- White Non-Hispanic (23.6%)
		- Other race (15.1%)
Area		- Filipino (6.6%)
- Total:	21.1 sq mi	- Two or more races (5.8%)
- Land:	14.9 sq mi	- Asian Indian (5.4%)
- Water:	6.2 sq mi	- Chinese (1.5%)
- Elevation:	20 ft	- Other Asian (1.3%)
		- American Indian (1.0%)
Population		- Vietnamese (0.7%)
- Total	242,389	- Korean (0.6%)
- Density	16,045.5/sq mi	

Government

- Type: Faulkner Act (Mayor-Council)
- Mayor: Jerramiah T. Healy
- Business Administrator: Brian P. O'Reilly

1 Jersey City Economic Development Corporation
2 Citydata.com

Figure 13: Aerial View of Jersey City

Why Jersey City?

Several parts of Jersey City have been revitalized over the last two decades however, considering Jersey City is among the 100 cities in the United States with the highest poverty rates, there are still areas which are in need of regeneration[1].

Jersey City provides a great base for community building. Since it is in such close proximity to Ellis Island, there is a wide diversity of ethnicities residing in Jersey City. In fact, Jersey City is ranked number 37 in the most ethnically diverse cities in the country. [2]The diversity of the city allows for interactions and learning opportunities which involve a multitude of perspectives and points of view and can lead to creative solutions to the issues that the community is facing.

Jersey City has increased its efforts in urban revitalization in recent years, and it is likely that the city would be willing to consider moving forward with the development of this type of project.

1 Citydata.com
2 Citydata.com

Figure 14: Neighborhoods of Jersey City

Figure 15: Aerial View of The Heights

The Heights Neighborhood

The Heights neighborhood is located on the northern edge of Jersey City It is one of the most ethnically and economically diverse neighborhoods in Jersey city, providing a great opportunity for community building (see table below). The area is characterized as a primarily residential area with low-rise apartments and two family homes.

The Heights neighborhood is a high priority area of interest for regeneration in Jersey City, because of it's potential for community and economic development.

Demographics of The Heights Neighborhood

Characteristic	Total	% of Total
Population	55,578	100.0%
Age		
5 yrs and less	3,642	6.6%
6-19 yrs	11,854	21.3%
20-64 yrs	34,579	62.2%
65-74 yrs	3,070	5.5%
75+ yrs	2,433	4.4%
Race		
White	17,263	31.1%
Black	2,762	5.0%
Asian	8,803	15.8%
Hispanic or Latino	23,999	43.2%
Other	2,751	4.9%
Income		
Family Median	$43,019	
Persons Below Poverty	$ 8,348	15.0%

Characteristic	Total	% of Total
Education (Adults 25+yrs)	35,706	100.0%
Less Than HS	11,065	20.0%
HS Grad	10,145	28.4%
Some College	5,826	16.3%
College Degree+	8,670	24.3%
Total Civilian Labor Force	26,745	100.0%
Employed	24,148	90.3%
Unemployed	2,597	9.7%
Housing		
Total Units (including vacant units)	20,407	100.0%
Vacant Housing Units	937	4.6%
Owner Occupied	5,897	28.9%
Renter Occupied	13,573	66.5%
Built Last 20 Years	1,648	
Households with 1 car or more	12,472	
Other		
Born Outside the US	22,625	40.7%

Figure 16: The Heights Demographics

Jersey City Economic Development Corporation

The Jersey City Economic Development Corporation promotes economic growth throughout Jersey City through real estate development programs, business incentives and several other programs.

The Jersey City EDC has determined several challenges and opportunities as well as strategies to continue revitalizing the city.

One of those particular challenges is Environmental issues. In regards to strategies, the JCEDC recommends addressing neighborhood specific issues as a means of improving the environmental quality of urban spaces.

EXHIBIT 1. REVITALIZING THE JERSEY CITY URBAN ENTERPRISE ZONE:
CHALLENGES, OPPORTUNITIES, STRATEGIES AND PROJECTS

CHALLENGE/OPPORTUNITY	STRATEGIES	PROJECTS
1. The need to improve the education and skill levels of many Jersey City residents.	Upgrade the education and skill levels of adult residents.	1. Continue to fund the Customer Service Skill Center for job training and retraining for jobs in customer services across industries. 2. Develop job training programs for the construction industry and for the telecommunications industry.
2. A changing economy requiring a strong integration of the school	Make the City's education and job training systems more	1. Develop a "Job Shadowing Program."
8. Under-marketed City.	Better market Jersey City and its Special Improvement Districts.	1. Support the "Destination Jersey City" website with UEZ advertising. 2. Upgrade JCEDC Website. 3. Fund neighborhood shopping directories.
9. Environmental Issues.	Address neighborhood-specific environmental issues.	1. Support cleanup efforts of Brownfields. 2. Fund a City-wide tree planting program
10. Perception and reality of rising crime rates.	Address issues related to public safety.	1. Provide funding for additional police officers in the UEZ. 2. Provide funding to purchase surveillance cameras for the UEZ.

Figure 17: JCEDC Recommendations

Central Avenue Special Improvement District

The Central Avenue Special Improvement District is located in the Heights Neighborhood and is an area of interest to the city for regenerating the economy and the community. The mission of the CASID is the following:

"The mission of the Central Avenue Special Improvement District Management Corporation (CASID) is to guide and promote the positive social growth and economic revitalization occurring in the City of Jersey City by providing supplemental management, maintenance, and improvements to the Central Avenue business district also known as the "Central Avenue Special Improvement District" (Central Avenue between Manhattan Avenue and North Street)."[1]

The CASID is a not-for-profit corporation which has formed public/private partnerships between the city of Jersey City and small local businesses. It provides services such as administration, marketing, maintenance, improvements, and funding. These partnerships have been imperative to the revitalization efforts of the city in building up local businesses, and strengthening the community.

The CASID is located at the north end of the proposed site for the Reservoir Number Three Environmental History Museum, and could play a vital role in the development of the project.

Figure 18: Central Avenue SID

Figure 19: Central Avenue SID Logo

1 Jcheights.com

Figure 20: The Reservoir Number Three

Reservoir Number Three

The site is located at the south end of the Central Avenue Special Improvement District. Reservoir No. 3 was built between 1871 and 1874 in order to provide sufficient potable water for the Growing Jersey City and Ellis Island.

The site is a large urban block surrounded by a masonry wall. Within the walls is the reservoir, as well as an old pumping station and storage buildings. After 100 years of use, the reservoir was decommissioned, as it was no longer providing a sufficient amount of water for the city, and was replaced by a larger reservoir outside of the city.

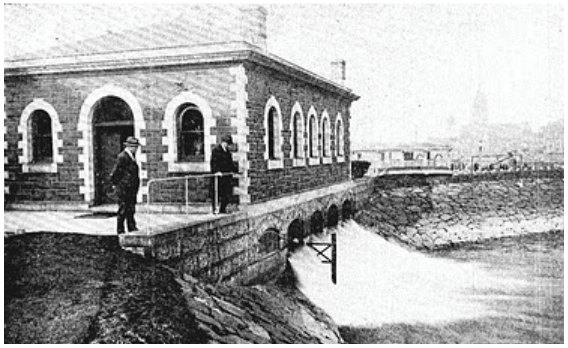


Figure 21: Troy Street Pump Station

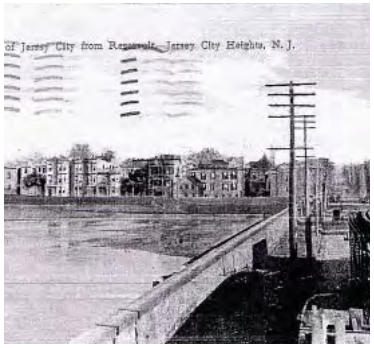


Figure 22: Reservoir and the Street

Figure 23: The Reservoir in the Urban Context

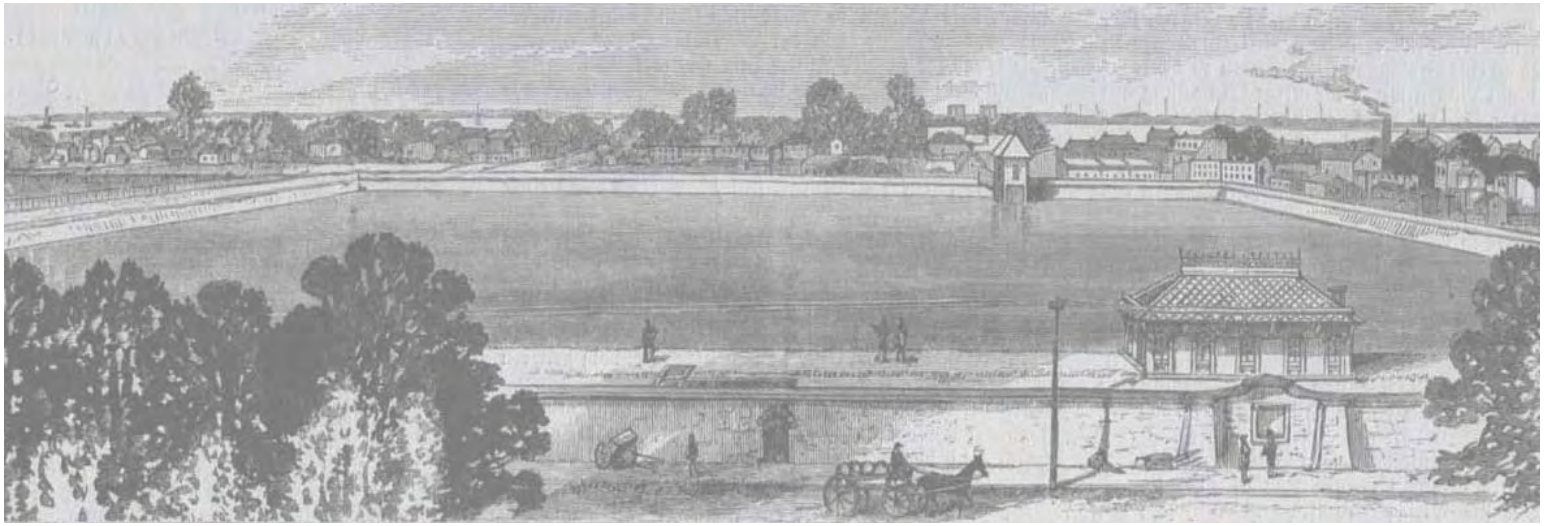


Figure 24: The Reservoir in the 1890s

Figure 25: Decommission and Excavation of the Reservoir

After the Reservoir was decommissioned, it began to deteriorate. Some vandalism occurred, old machinery from the pump stations was removed and sold, portions of the south wall were demolished by the city and even some construction companies began using it as a dumping site. Despite the degradation and neglect, over time, the site has morphed into a beautiful wildlife preserve, filled with flora and fauna which are not typically found in the middle of a dense urban area.

Today, the reservoir is widely used by the community for recreational and educational purposes. It serves as an oasis in the city, where the residents can go to escape the chaos of everyday life. This site provides a great opportunity for enhancing the community through learning experiences, and connecting the residents to an important historical landmark in the city.

Figure 26: The Site

Figure 27: Image of the Reservoir

Figure 28: Image of the Reservoir

Figure 29: Image of the Reservoir

Figure 30: The Pumping Station

Figure 31: Flora growing in on the site

Jersey City Reservoir Preservation Alliance

The Jersey City Reservoir Preservation Alliance was formed in 2002 by several citizens of Jersey City who were concerned about the potential fate of the reservoir. Over the years, they have worked to save this historic site from being destroyed by the city and developers.

The Alliance has coordinated several demonstrations on the site and at city hall both for opening the reservoir for public use, as well as preserving the land. Their hard work paid off in 2007 when the city officially declared that the site would be preserved as an open space for the members of the community to enjoy.

Figure 32: City Hall Protests

Figure 33: Community Members protesting at the reservoir

Figure 34: JCRPA Logo

Figure 35: Fishing Derby at the Reservoir

Figure 36: Educational Activities

Figure 37: Waterfront Activities

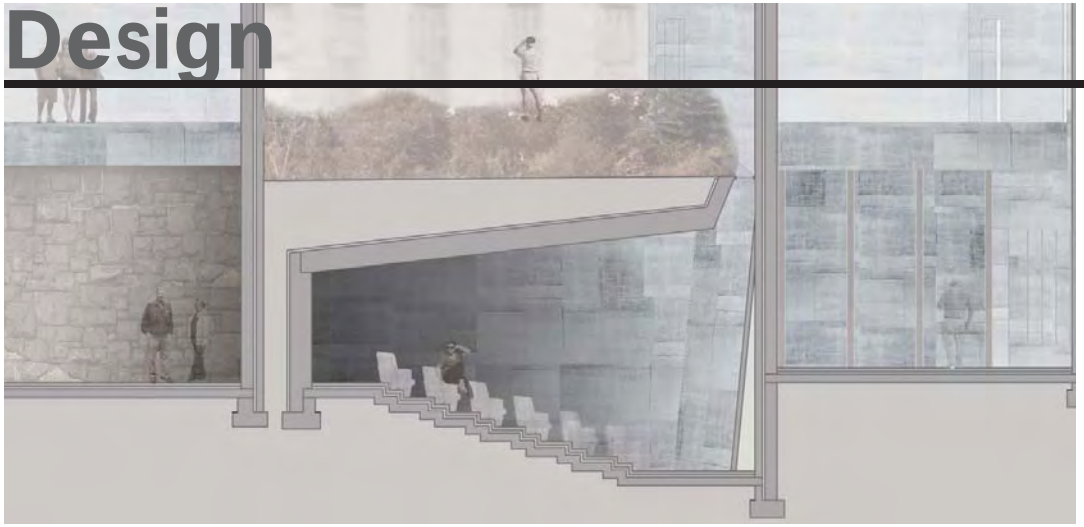
JCRPA's Aspirations

The site is currently used for multiple recreational purposes ranging from fishing, boating, nature walks and more. But it is still in need of repair in order to reach its full potential to serve as a positive space for community use and as a means for educating the public about the history and impact of the site on the city.

Below is a diagram which lays out a plan that the Alliance would like to see put in place in terms of uses and activities on the site in the future. The Alliance would like to provide a range of happenings on the site for area residents to enjoy and learn from.

Figure 38: Proposed Design Strategy for the Reservoir

Design

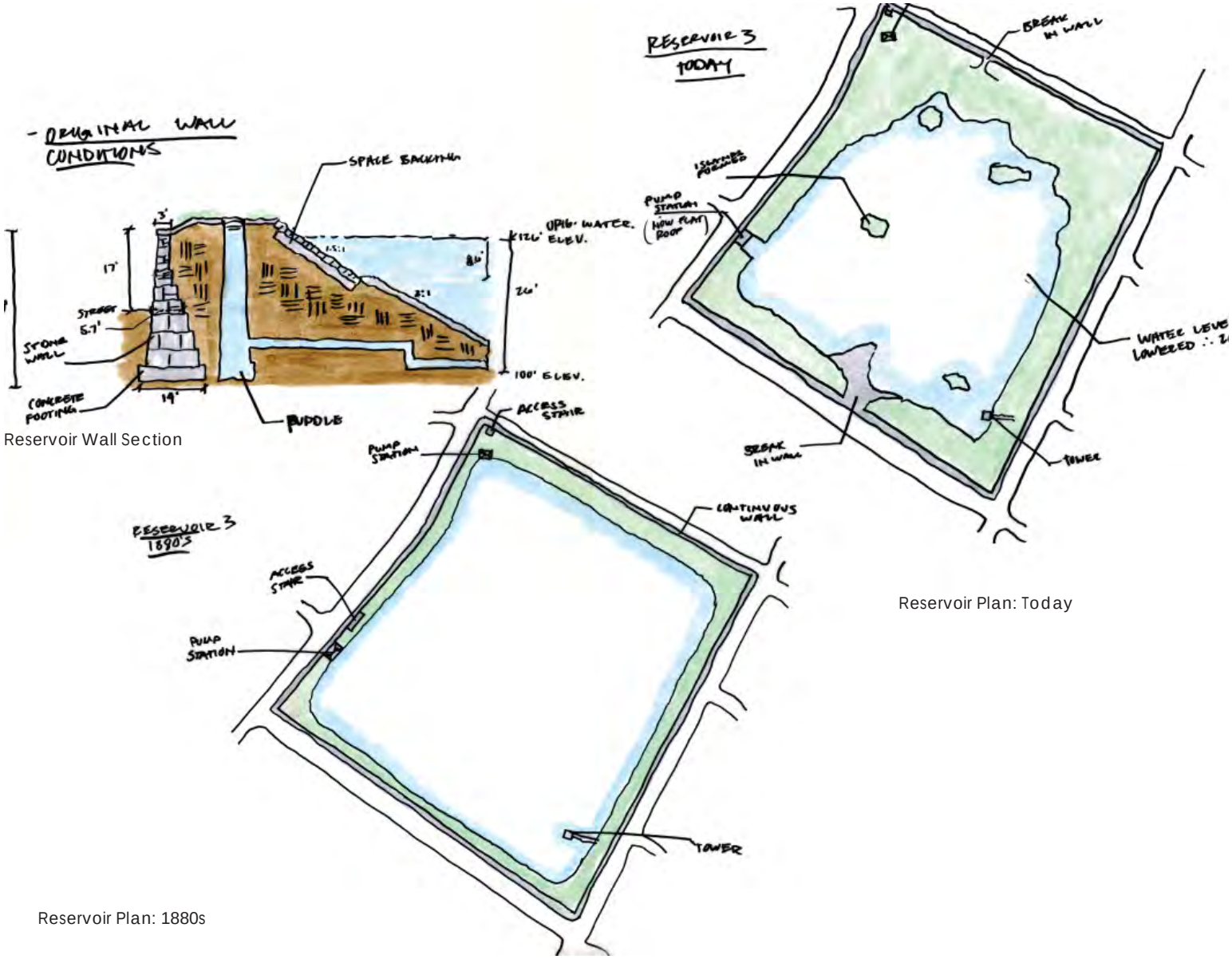


Design Concepts

The Reservoir is a green gem in the center of a dense urban area, so the preservation of the water, the landscape, and perimeter wall was a priority in the design. The design strategy involved a strong emphasis on researching the historical aspects of the site as a way of guiding design decisions in order to strengthen the relationship between the site in its current state and its history. Significant changes have occurred over the lifetime of the reservoir, most of which have occurred since the reservoir's decommission in the late 1970s.

Three significant structures were identified on the site, a small tower at the southern end of the site, and pump stations at the west and north ends of the site. When the reservoir was in use, the water level rose to the extents of the site and the pump stations, leaving a small strip of land with a path around the perimeter. The reservoir was drained upon its decommission, however, the water level naturally rose up over time to the level it is at today, leaving a significant area of land between the water and the perimeter wall.

Figure 39: Historical Site Image



Reservoir Wall Section

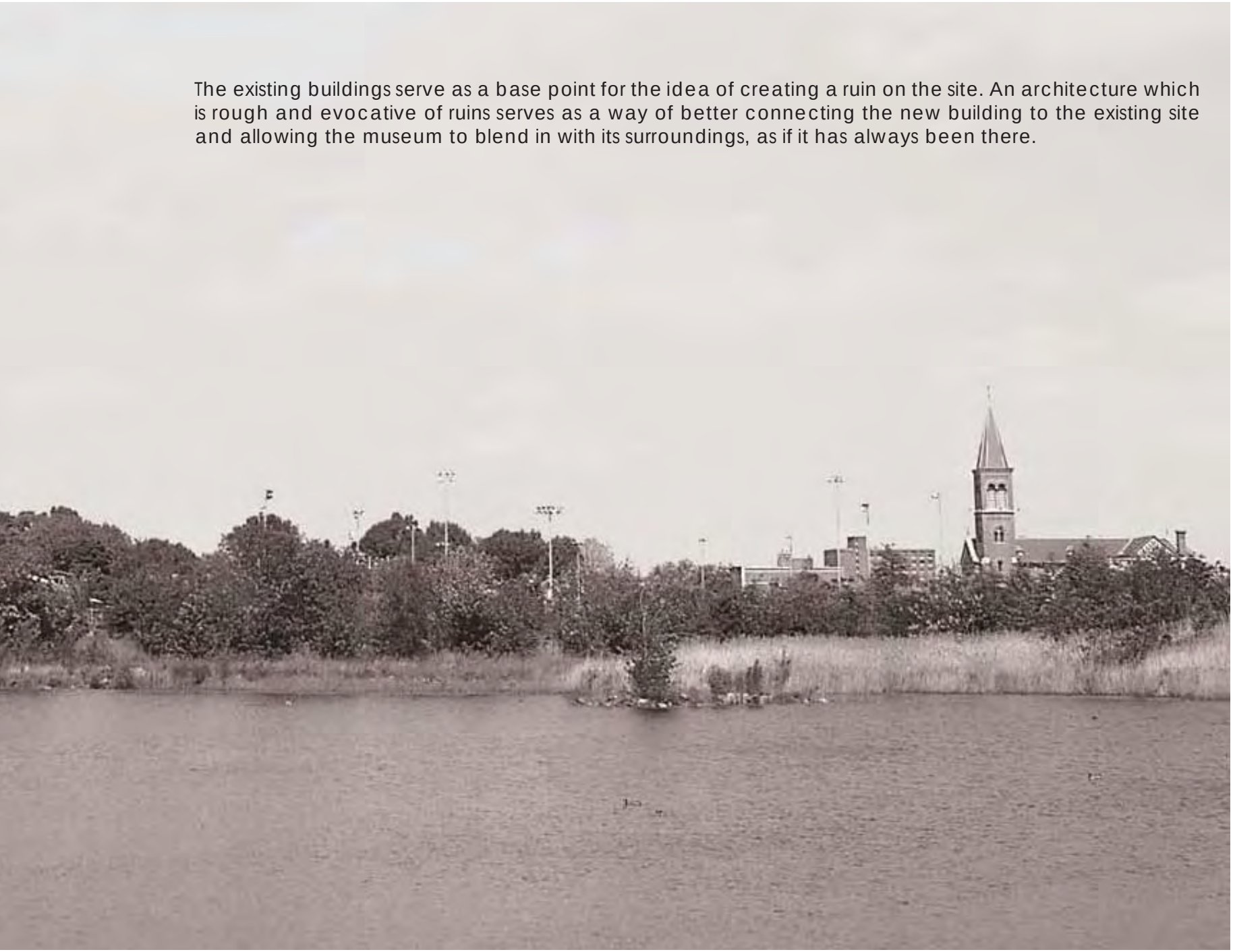
Reservoir Plan: Today

Reservoir Plan: 1880s

Figure 40: Site Conditions

Figure 41: The Museum in Context

The existing buildings serve as a base point for the idea of creating a ruin on the site. An architecture which is rough and evocative of ruins serves as a way of better connecting the new building to the existing site and allowing the museum to blend in with its surroundings, as if it has always been there.



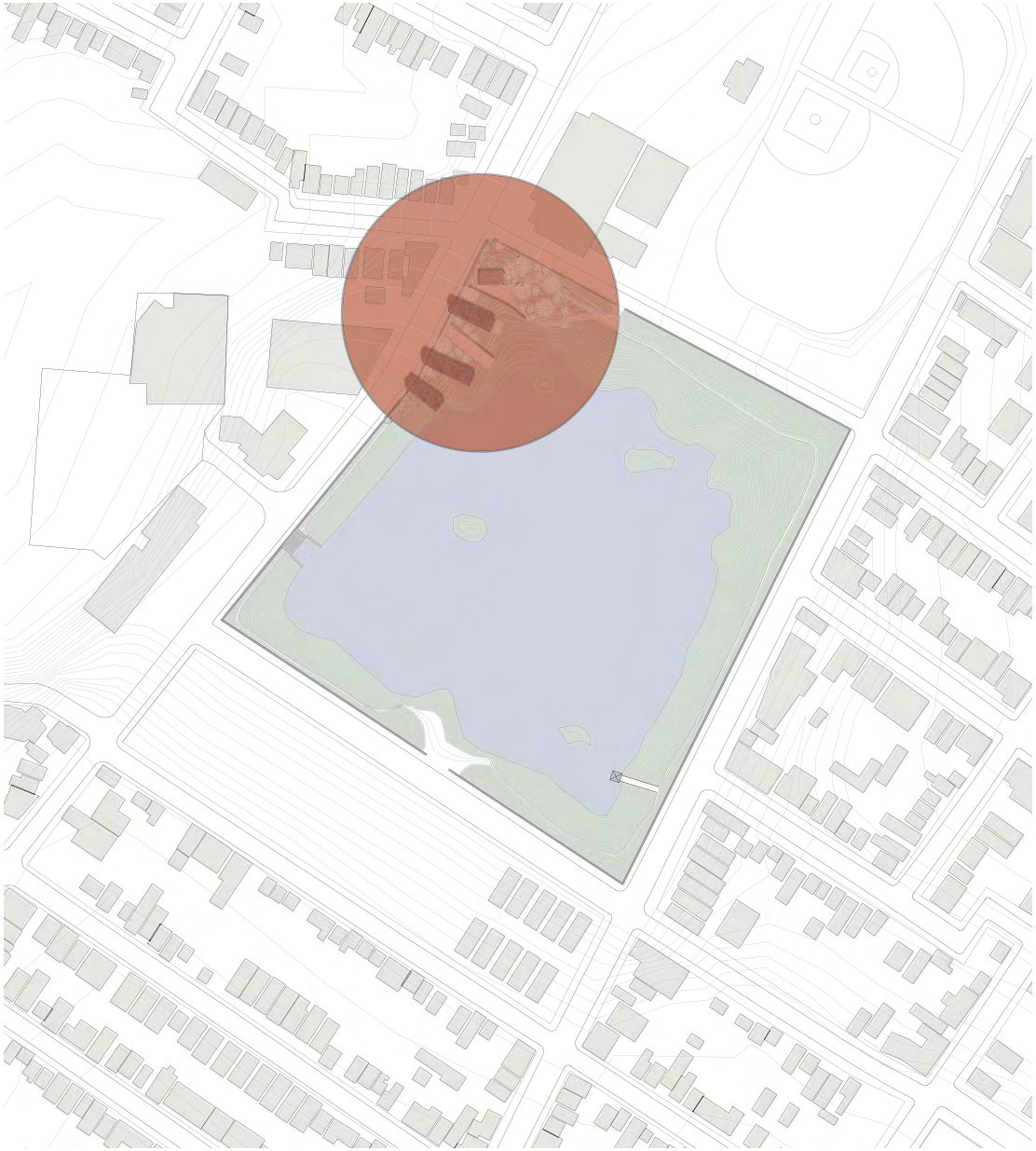


Figure 42: Site Plan

The museum is located along the northwest corner of the site, as it is the most public area on the site with its proximity to the recreation center, middle school and several other civic buildings. Locating the building here also allows for interactions to occur between the new museum and existing pump station. Creating a visual dialogue between the wall and the building draws people into the site from the street. The building hovers above the wall, never touching it, which further reinforces the idea of site preservation.

Figure 43: Site Section

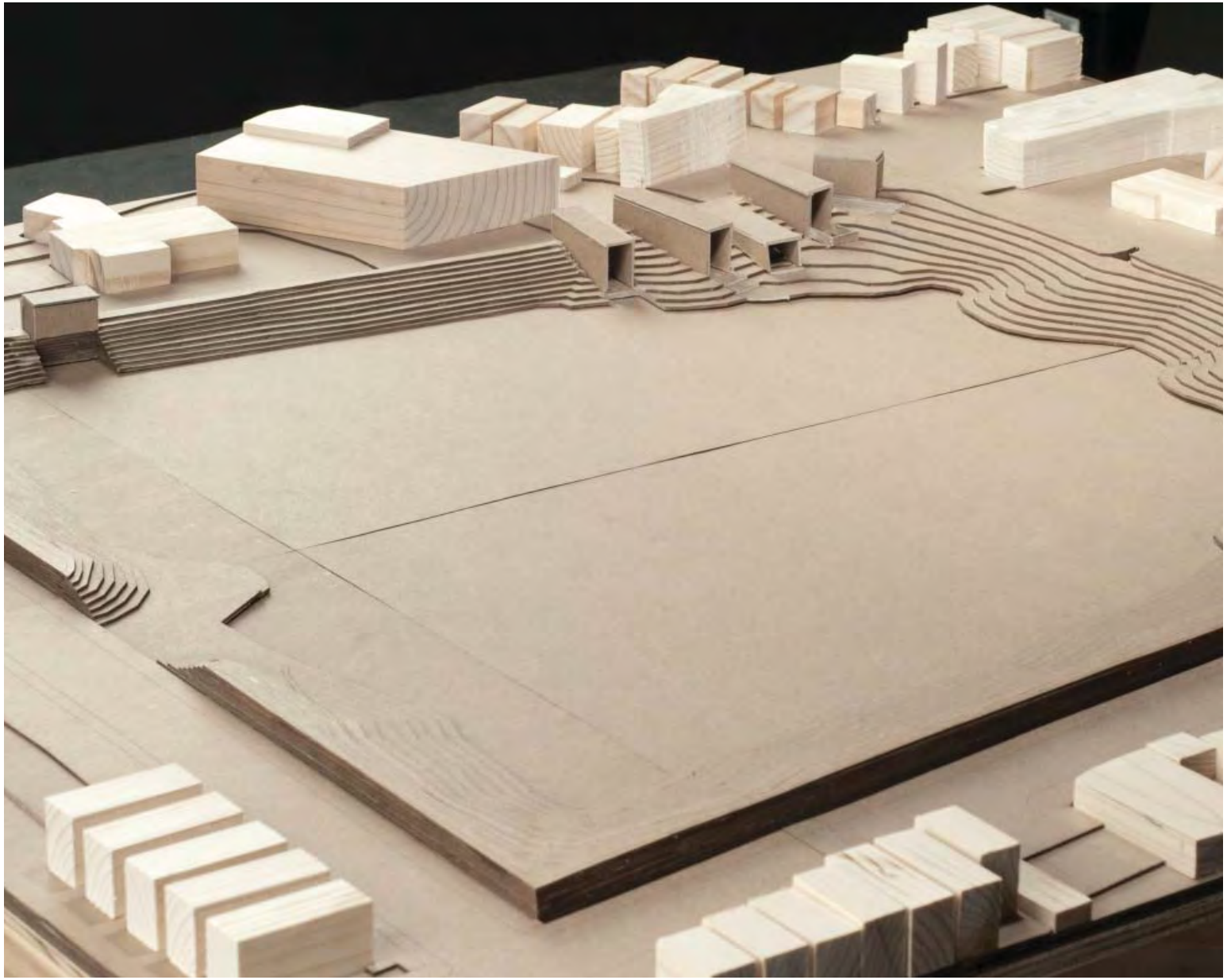


Figure 44: Site Model

Figure 45: Street Elevation

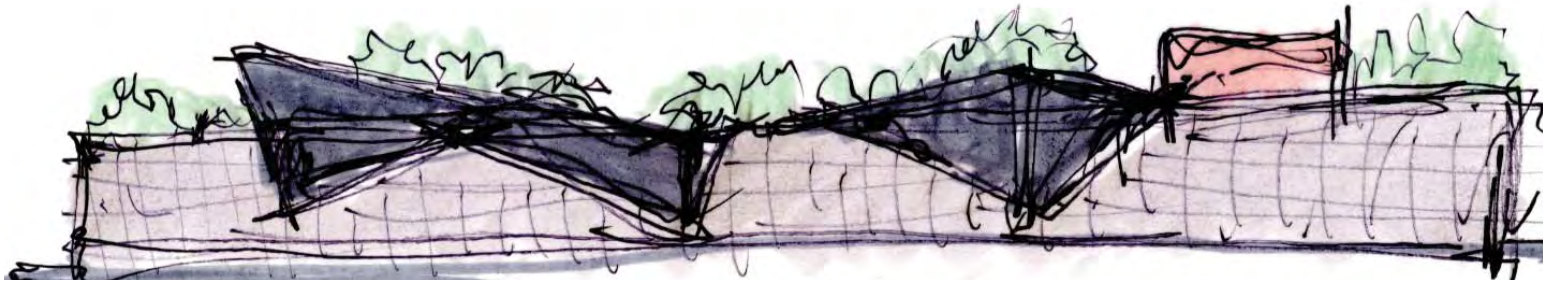


Figure 46: Interaction with the wall

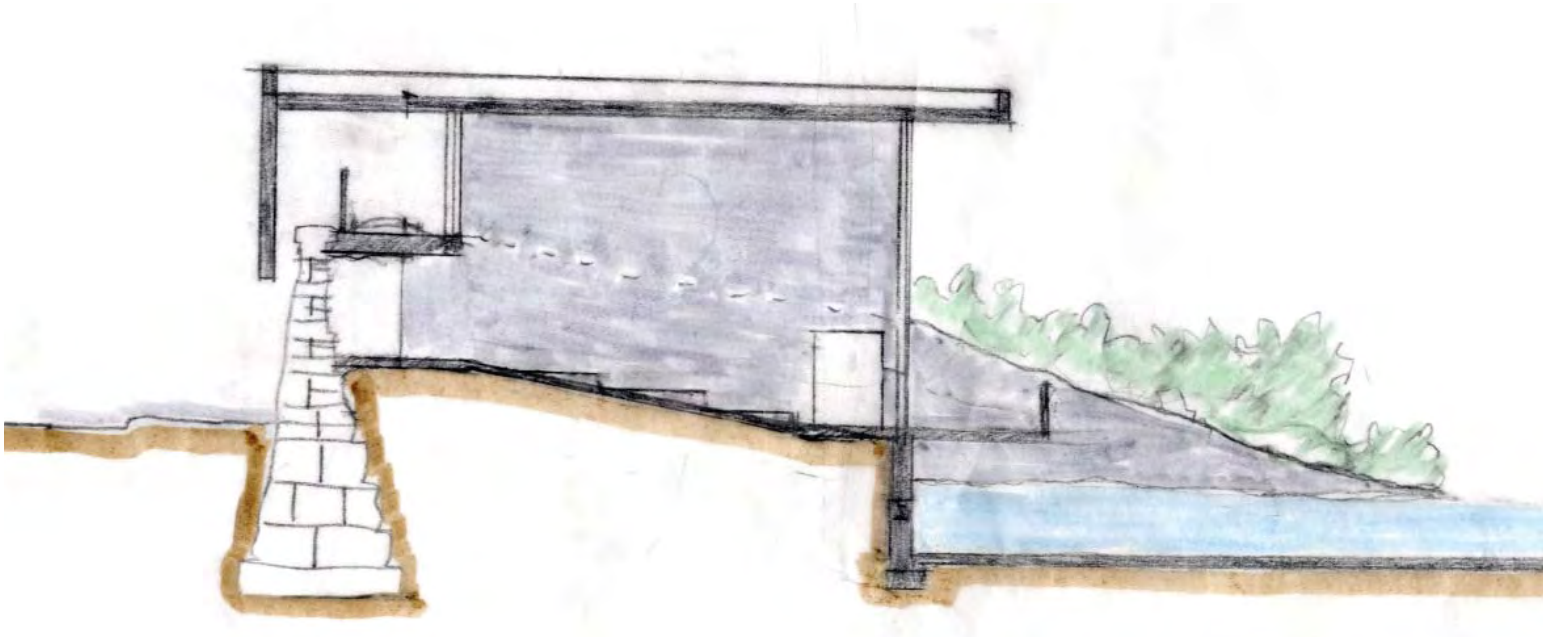


Figure 47: Relationship between the water the wall and the street

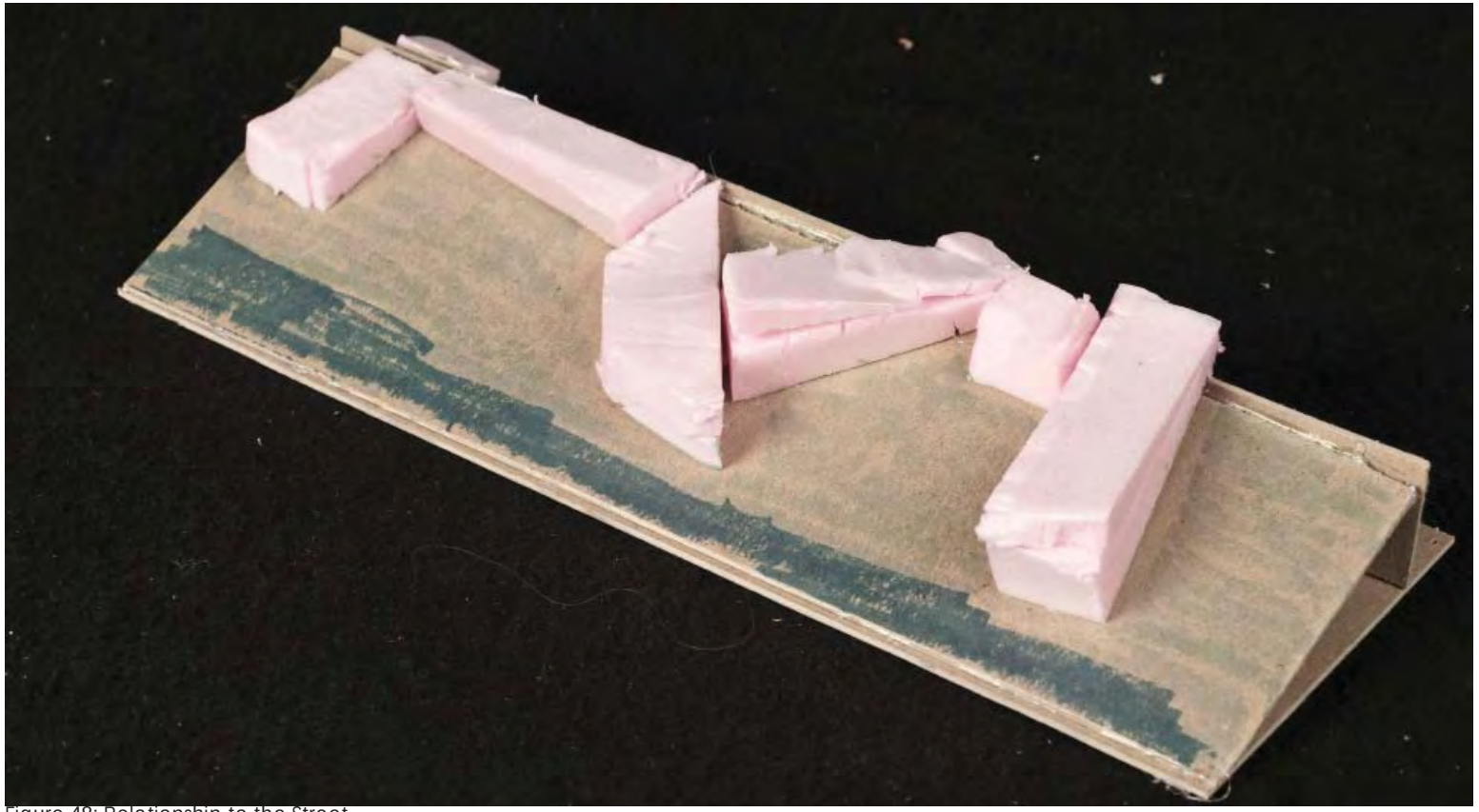


Figure 48: Relationship to the Street

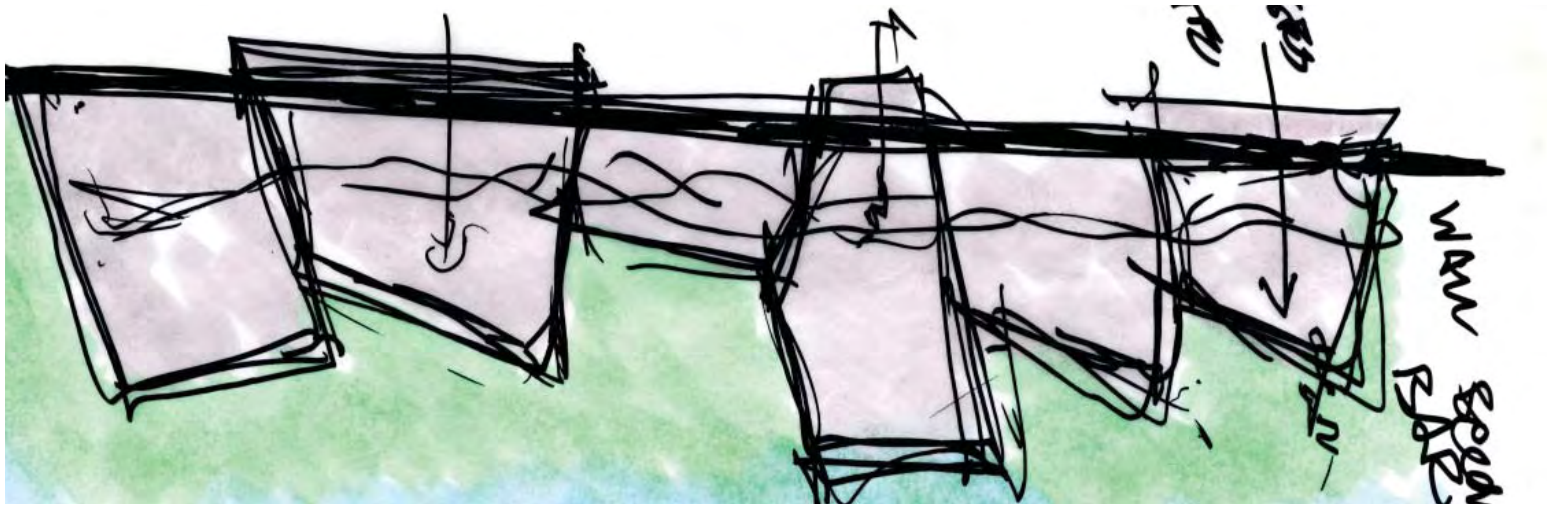


Figure 49: Relationship to the Street

Figure 50: Street Sketch

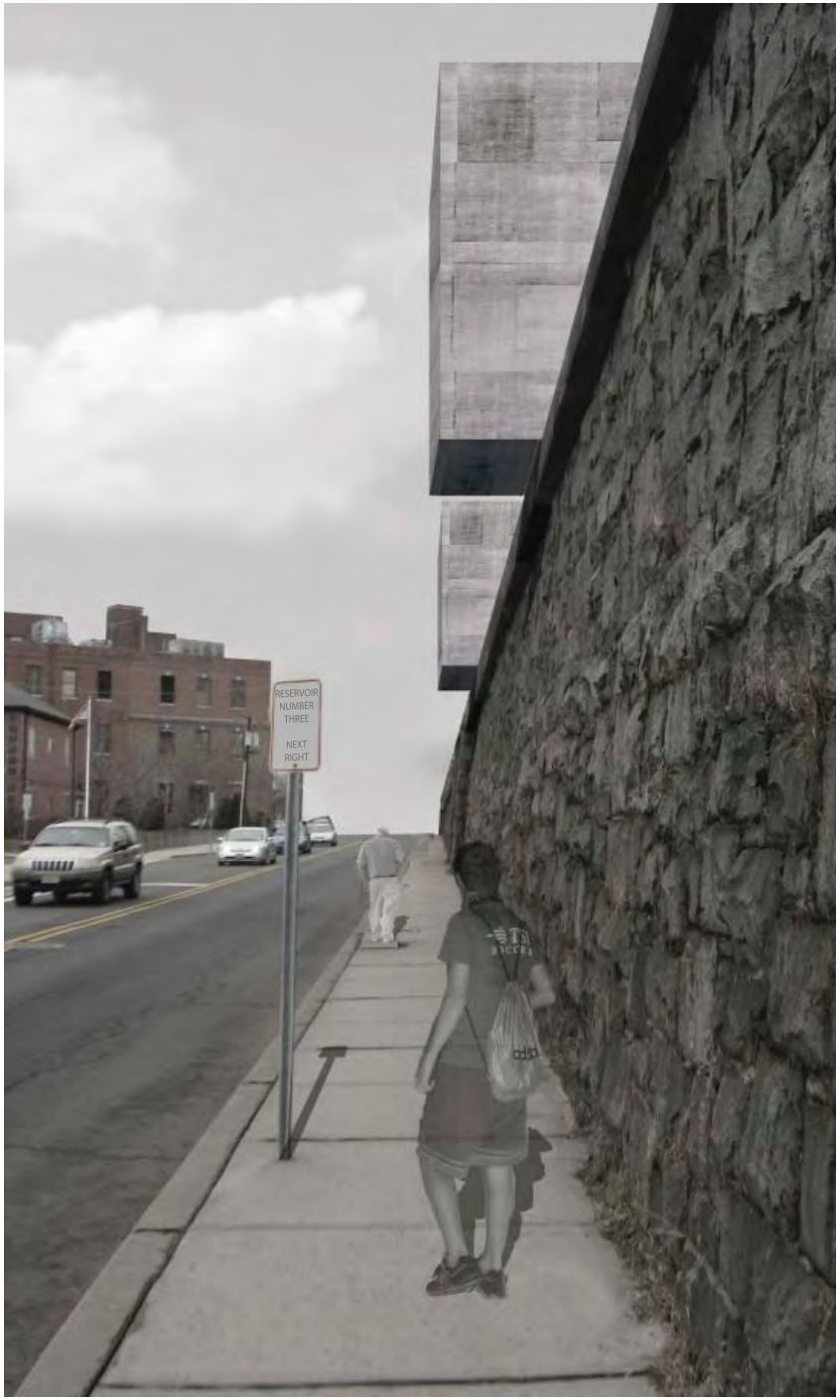


Figure 51: Street View with Overhanging Pavilions

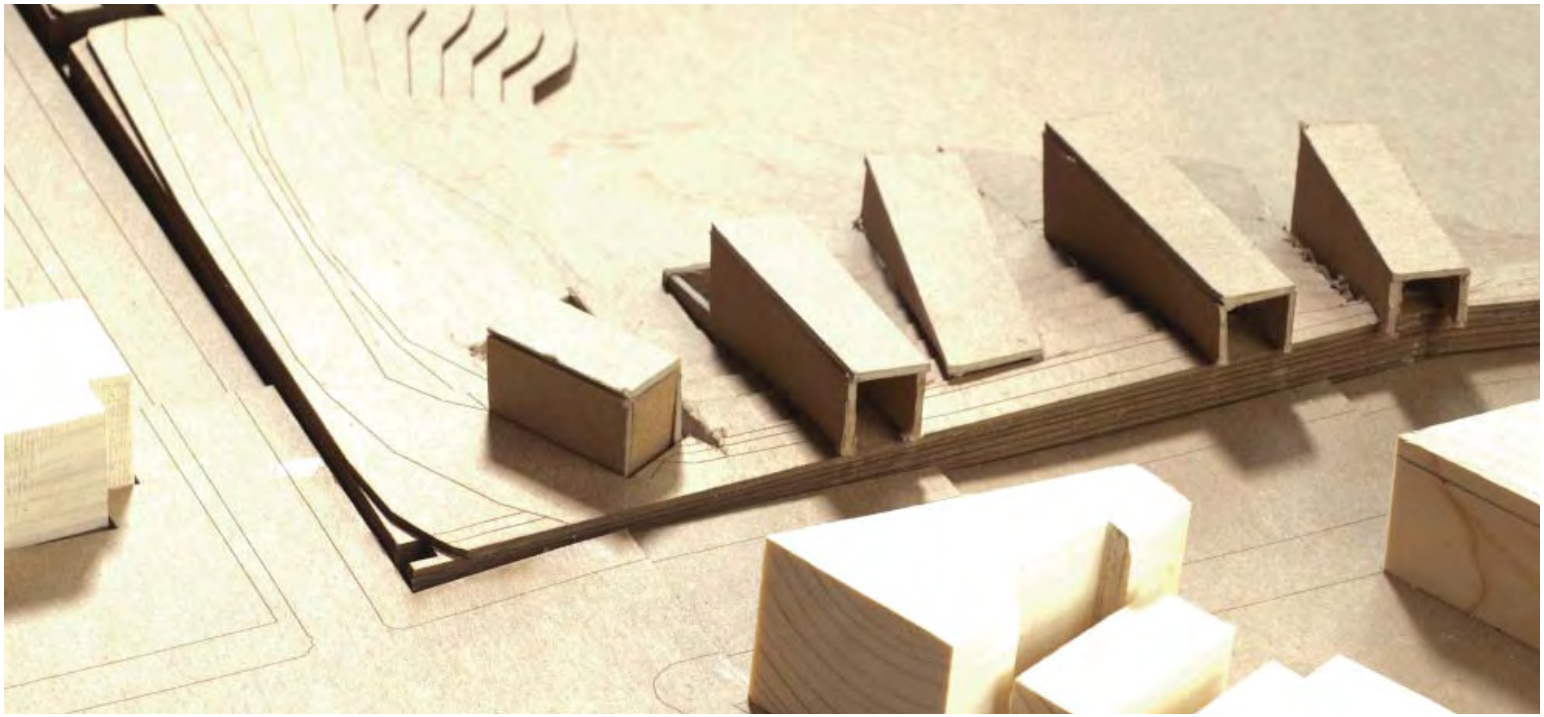


Figure 52: Building in Context

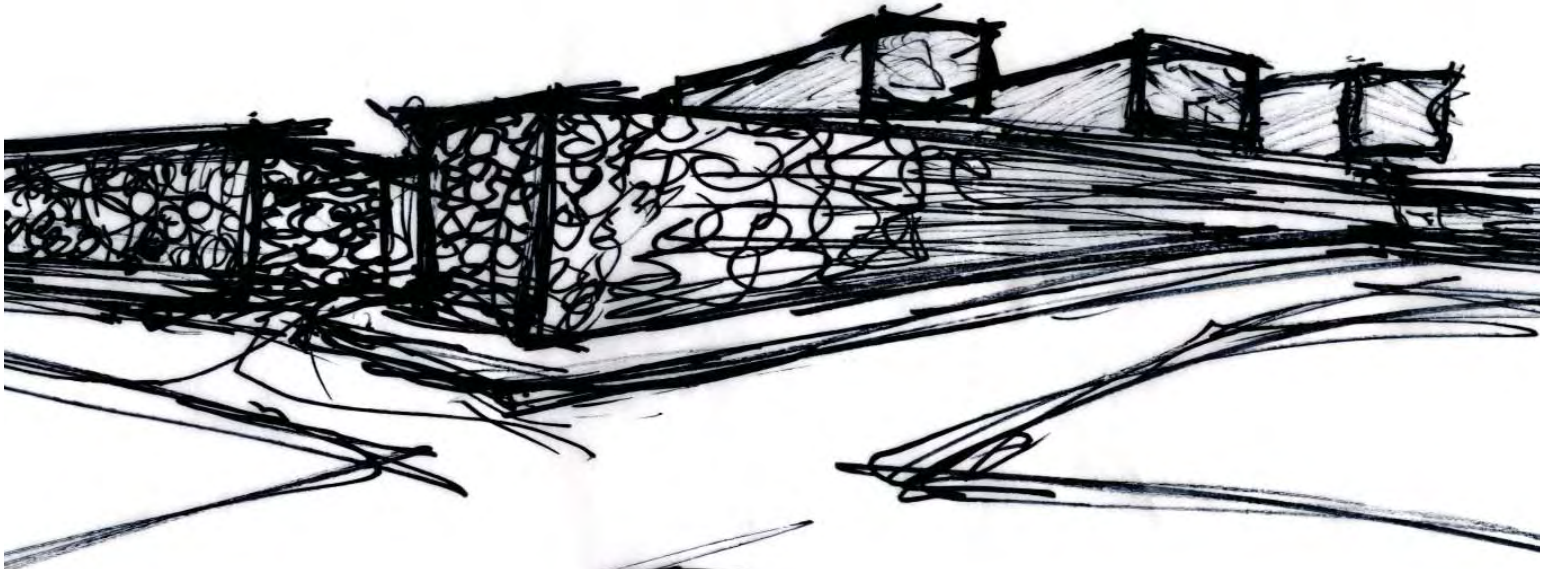


Figure 53: Street View Sketch

Figure 54: Troy Street Pump Station

Figure 55: Pump Station Sketch

The North Pump Station, disconnected from the water and partly hidden from excavation, sits like an old ruin in the site. The spillways are revealed as a way of reconnecting the space with its history, opening up a public plaza and entry into the museum. A water feature is brought into the space to visually display the original function of the building. The pump stations are small in scale, approximately 1,000 square feet each. It is important to relate the museum to the scale of the existing buildings in order to reduce the visual impact of the building on the site and to not overshadow the beauty and character of the existing buildings.

Figure 57: Reservoir Section

Figure 56: Approach to the Public Plaza

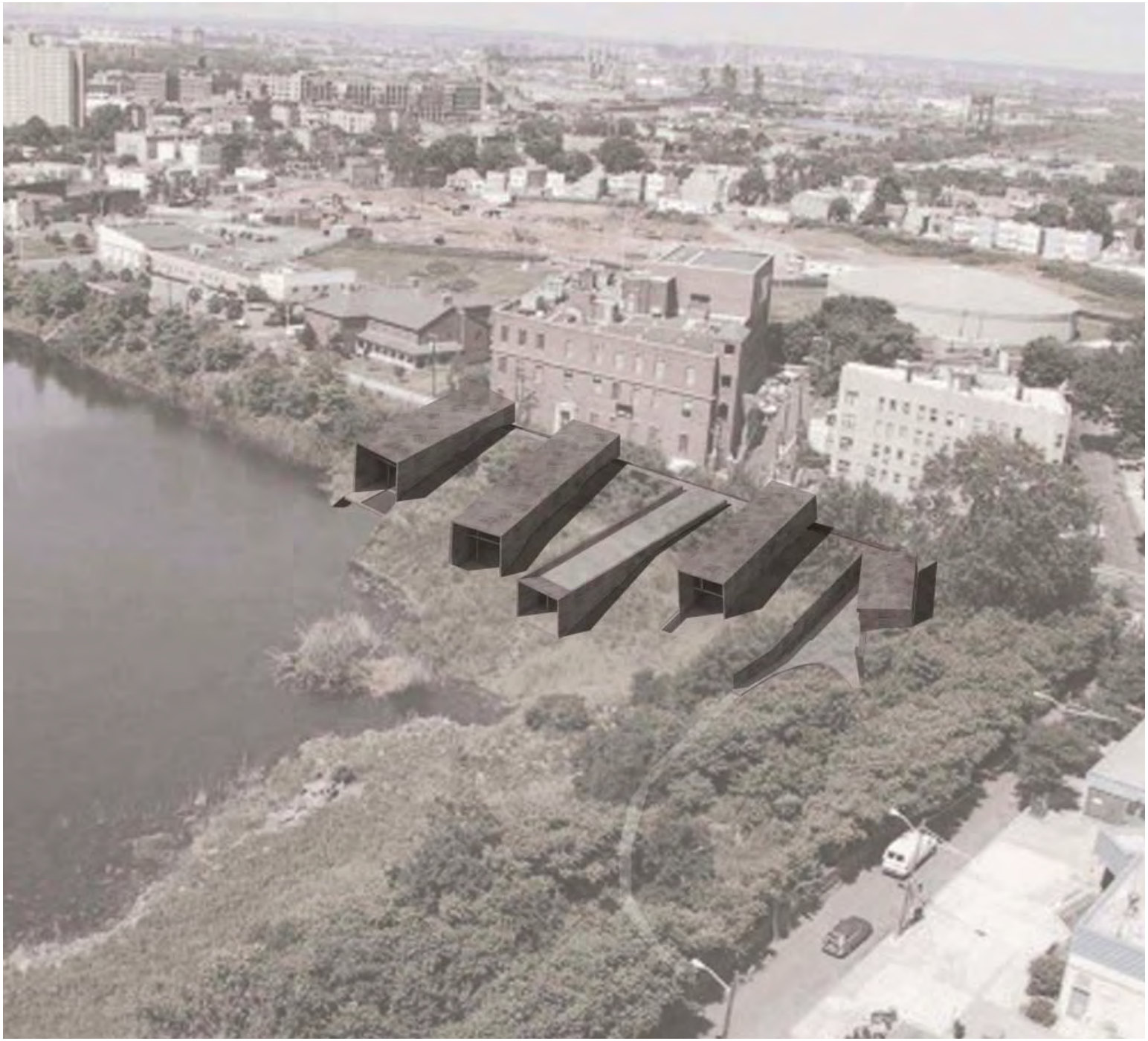


Figure 58: Bird's Eye View of the Museum

The spaces within the museum are underground, with four pavilions emerging from the ground which allow for natural light to enter the spaces, and interesting volumetric relationships. The geometries of the pavilions are related to the angles of the wall, and serve as a basis for spatial and structural organization. The pavilions also serve as viewing spaces for people who are walking along the existing path around the perimeter of the site.

Figure 59: Thermal Baths, Peter Zumthor

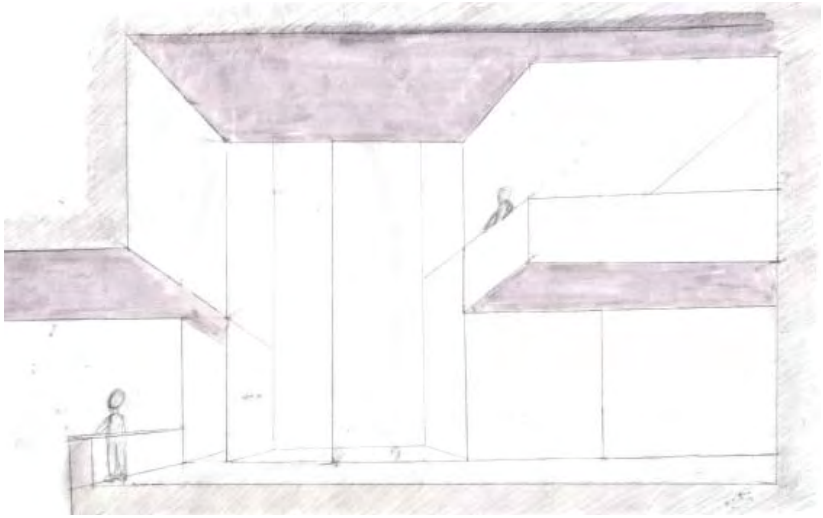


Figure 60: Underground Sketch

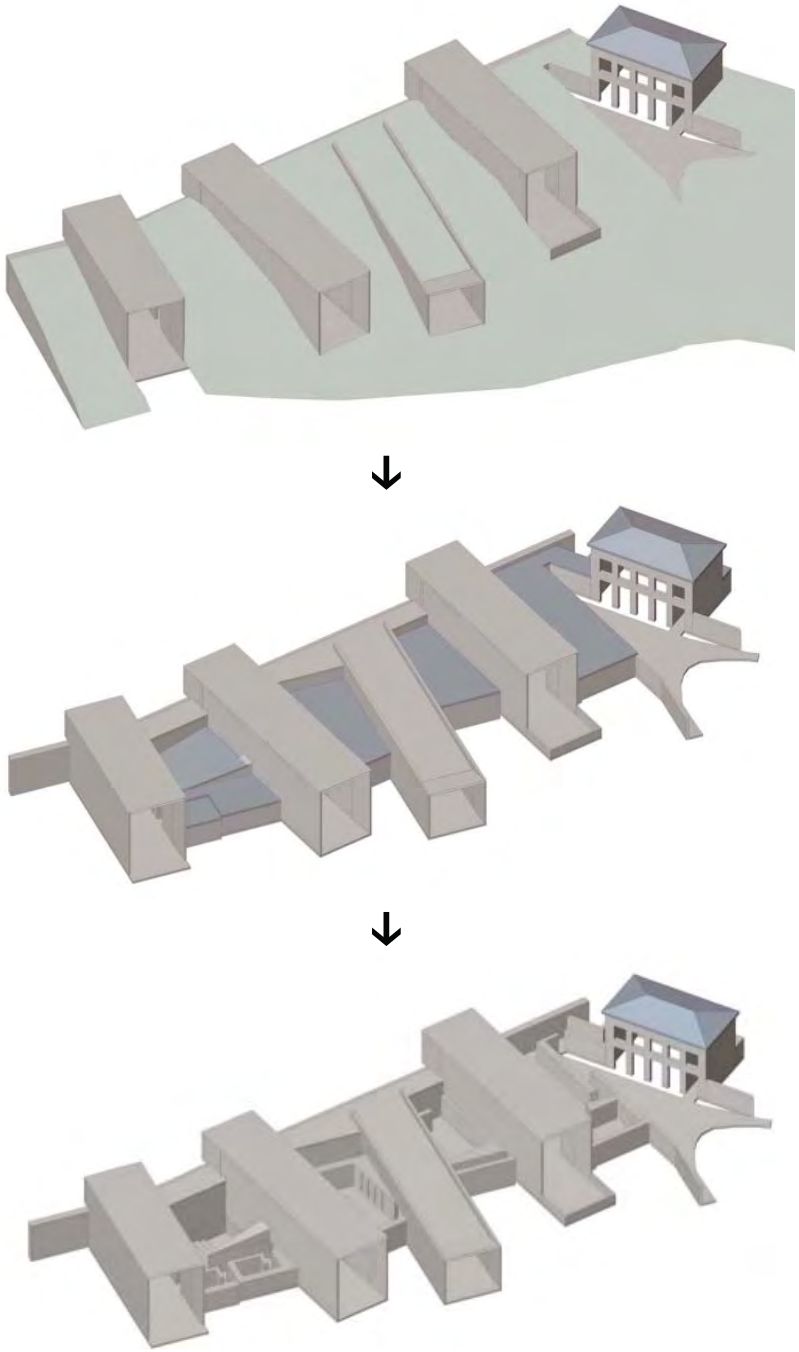


Figure 61: Concept Sketch

Figure 62: Building Model in the Landscape

Figure 63: Building Model Exposing the Underground

The underground spaces have a strong sense of depth and solidarity, a carving out of the ground. This gives a clear differentiation between the feel of being below ground and above ground in the pavilions.

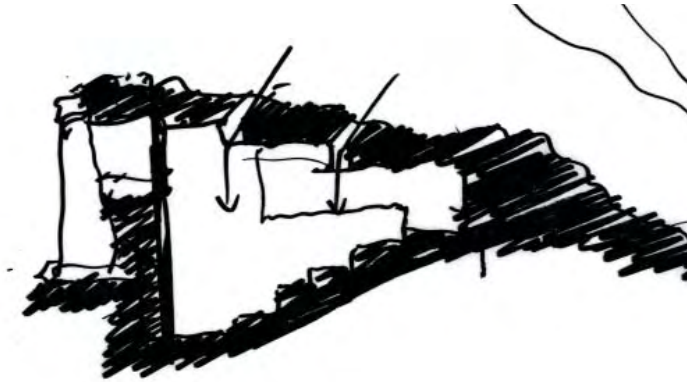


Figure 64: Sectional Study of the Underground

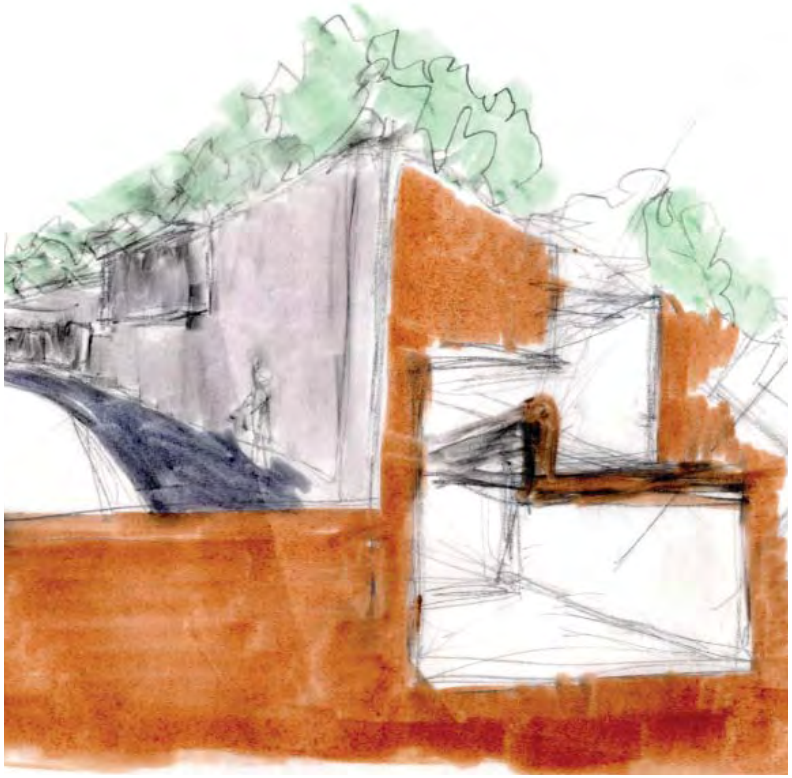


Figure 65: Sketch of the Building/Wall/Street Relationship

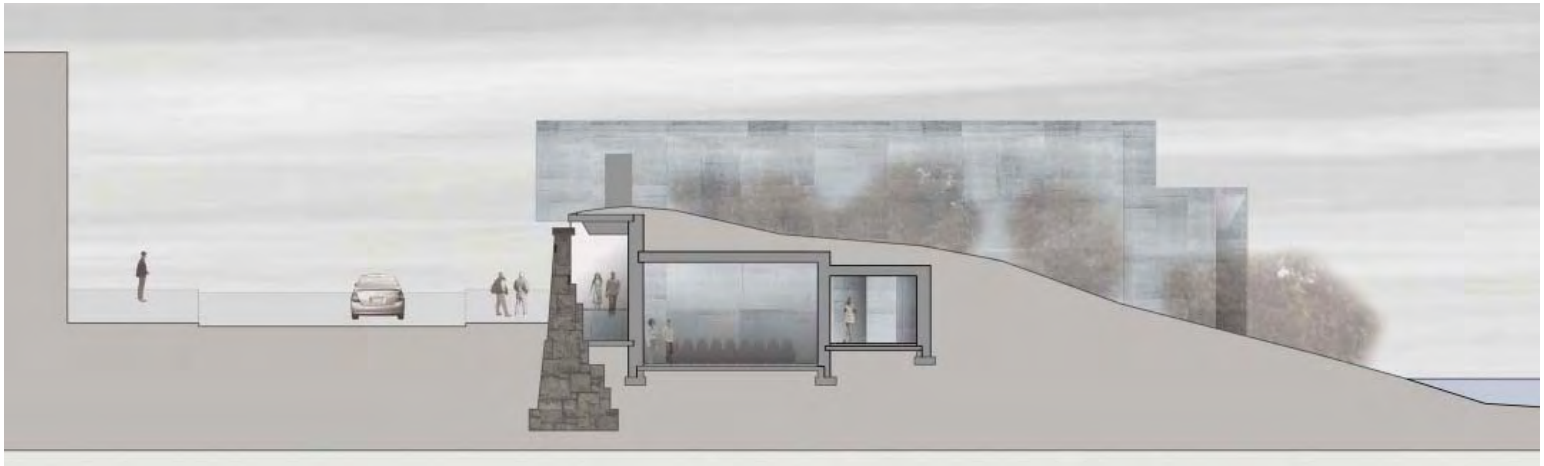


Figure 66: Underground Section Through the Auditorium

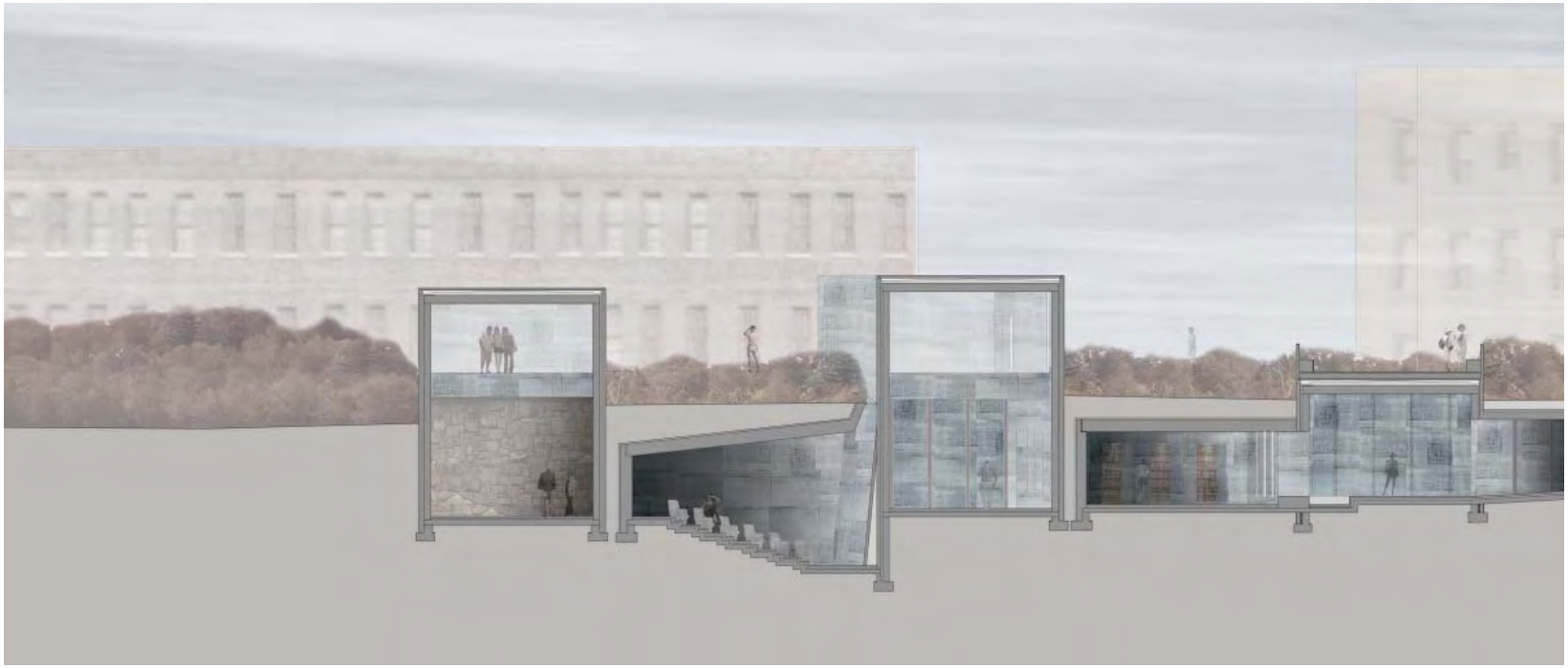


Figure 67: Longitudinal Section Through the Museum

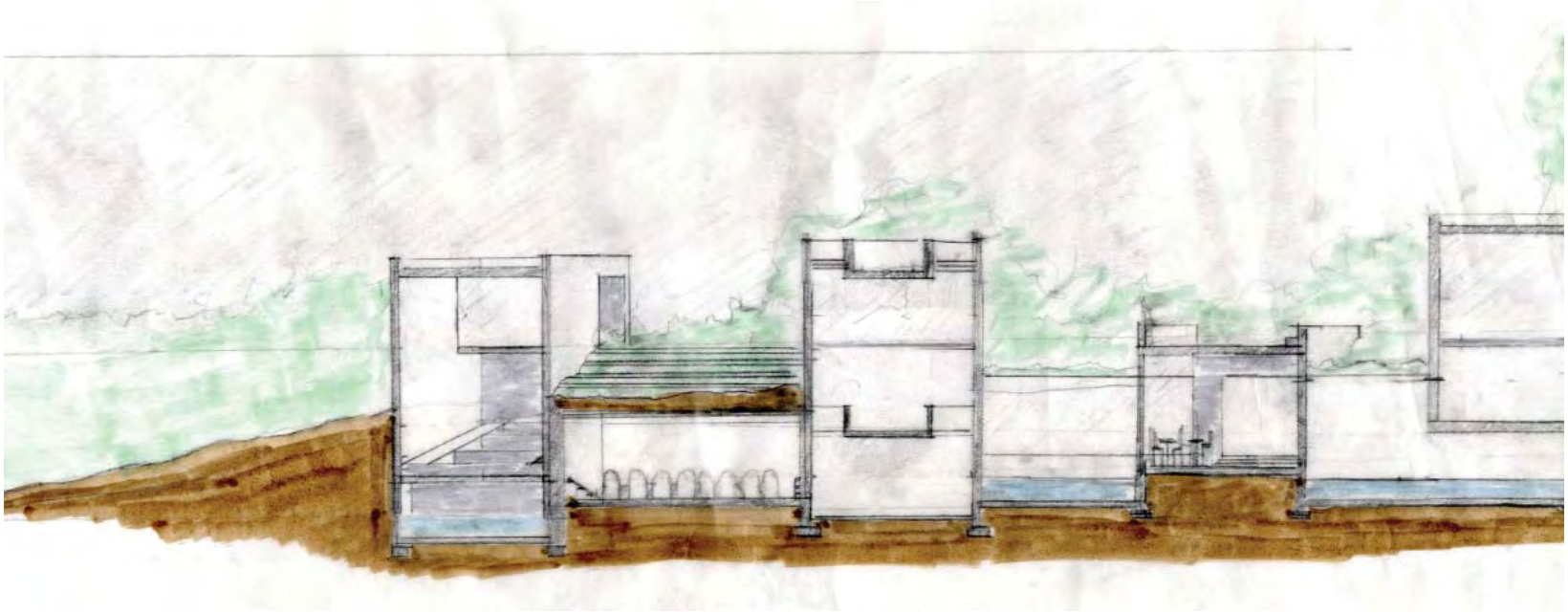


Figure 68: Sectional Study

Program

The program includes four gallery spaces related to history, wildlife and conservation, as well as a changing exhibition space. There is also a classroom, a library, a lecture hall and a cafe. The spaces are all intertwined and open to each other along a circulation path which allows for programmatic relationships between active and passive learning spaces. An administrative office is provided for the JCRPA. This project helps to enhance the educational programming that is already occurring at the reservoir.

Figure 69: Collage of Active Space

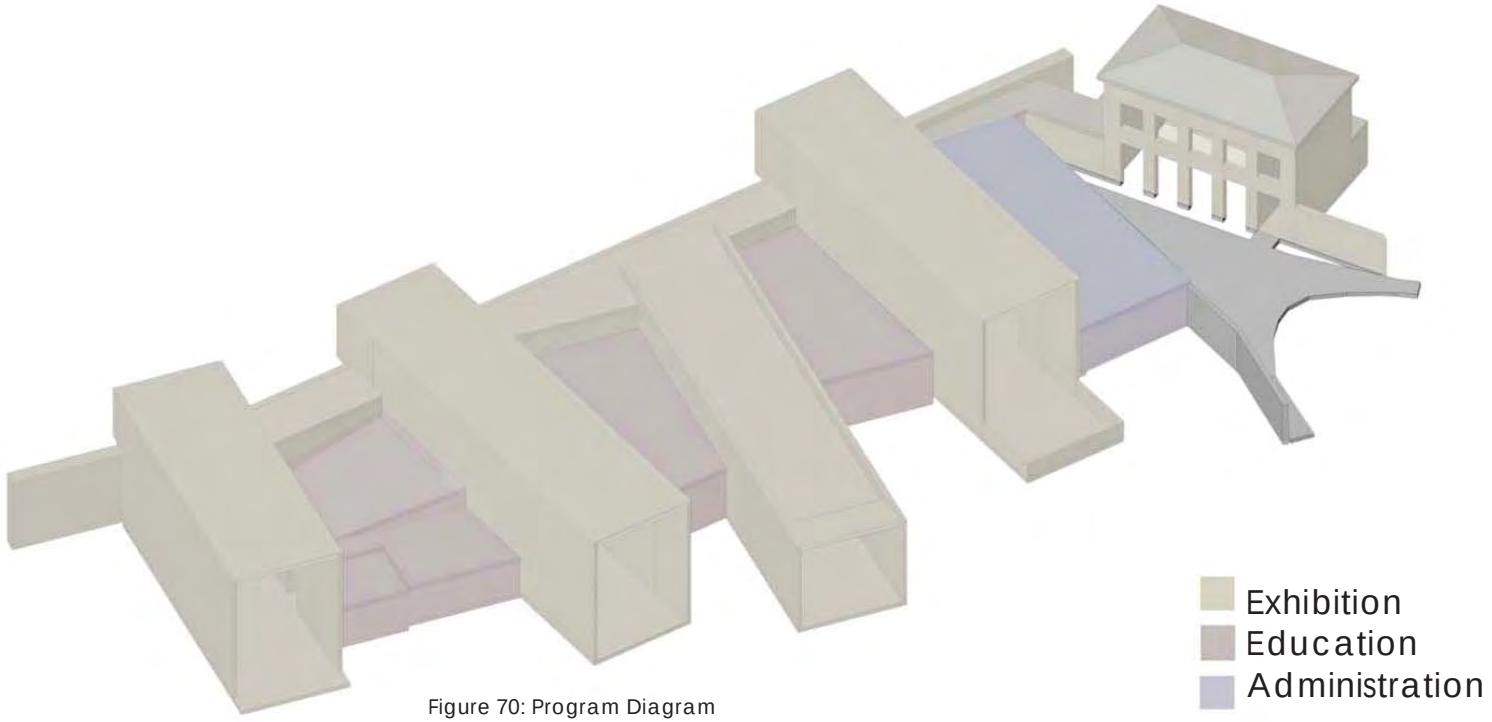


Figure 70: Program Diagram

Figure 71: Ford Calumet Center, Studio Gang, Circulation Diagram

Figure 72: Ground Floor Plan

Figure 73: First Floor Plan

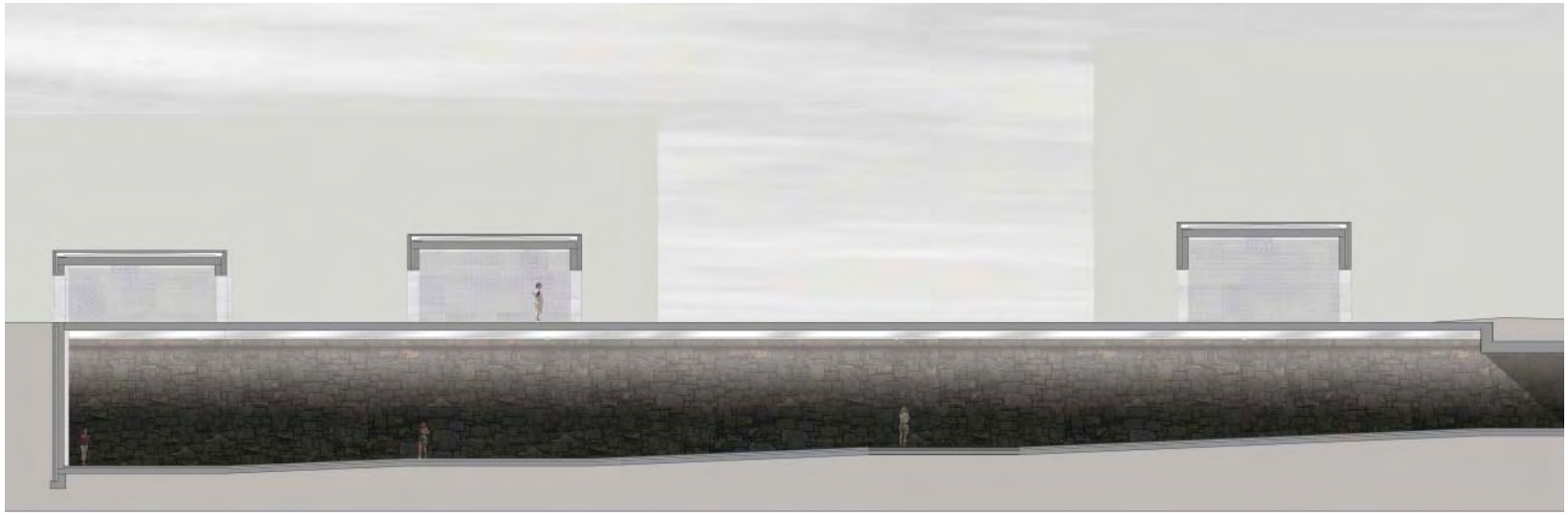
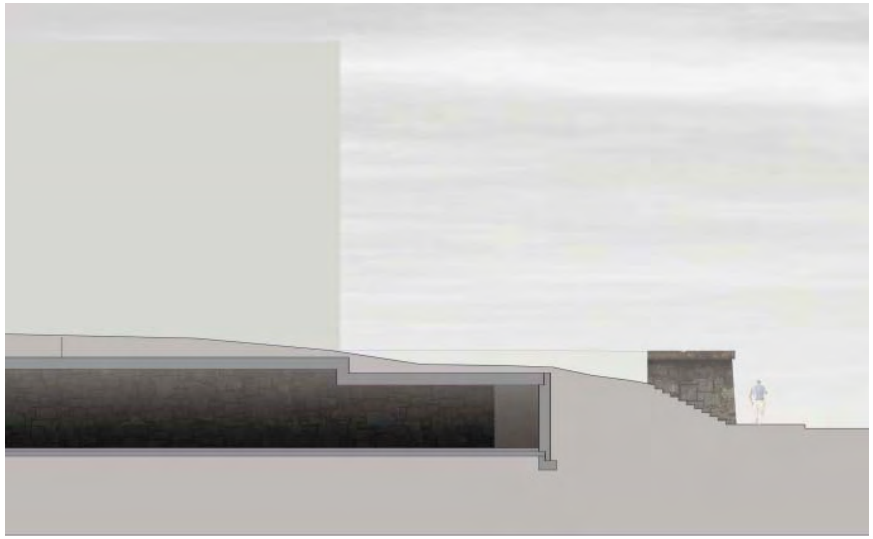


Figure 74: Section through the Wall Gallery

Movement through the museum begins in the wall gallery, a 150' long space revealing the interior of the stone wall which surrounds the site. It serves as a space where visitors can get a new perspective on the wall, its purpose and its importance. The wall gallery opens into the water gallery, and the circulation continues, meandering through the underground spaces and the pavilions.

Figure 75: Longitudinal Section Facing the Reservoir



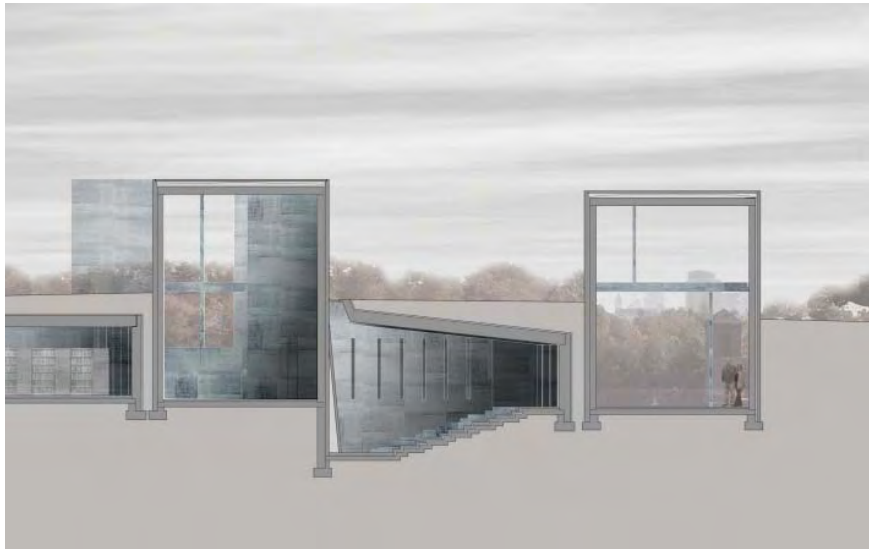
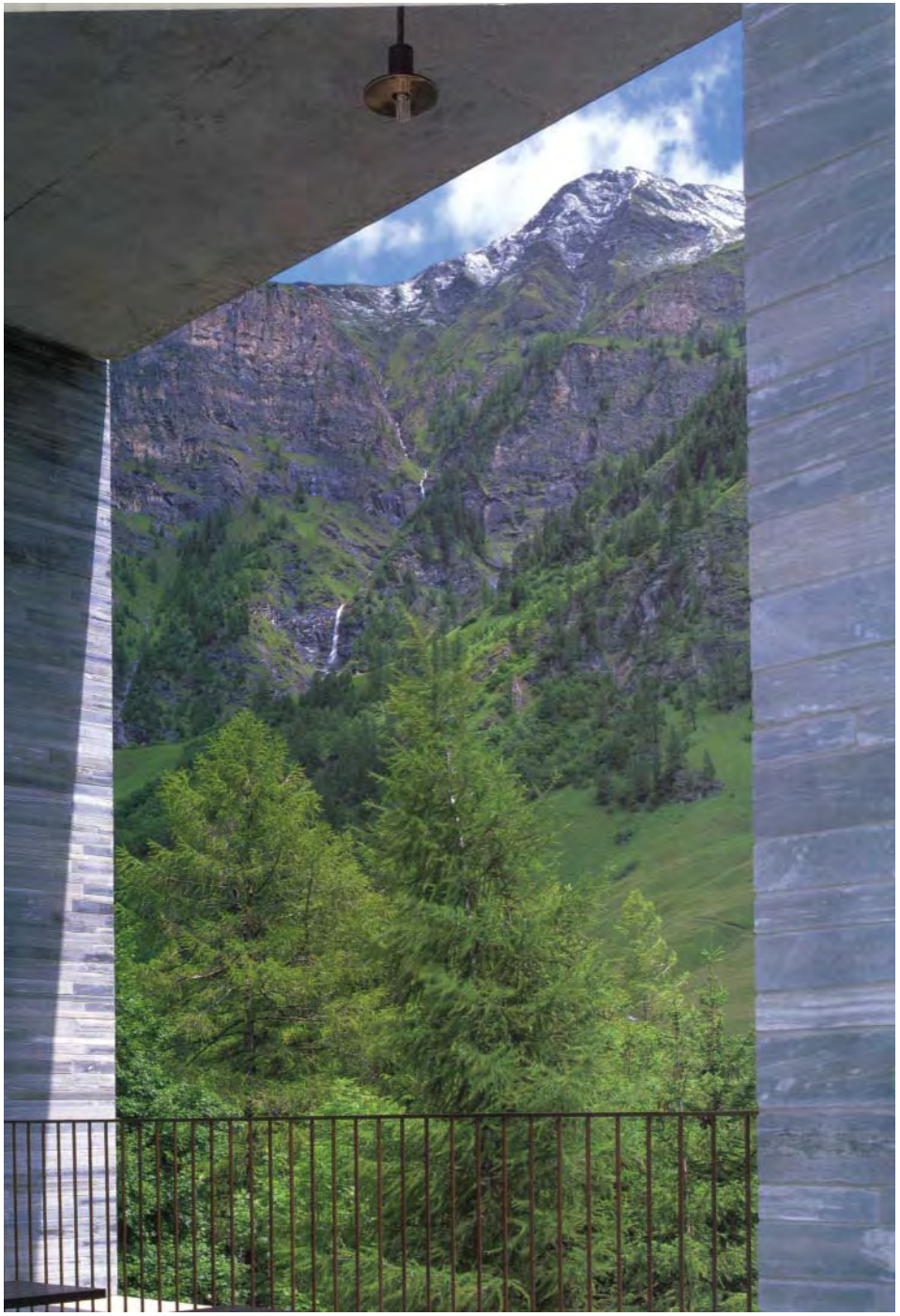


Figure 76: Image of the Wall Gallery

Figure 77: Image of the Water Gallery

The pavilions serve as gallery spaces which are meant to celebrate the unique aspects of the site. The rough concrete boxes are open at the ends, and frame views of the reservoir, the landscape and the urban context beyond.



Figures 78-79: Thermal Baths, Peter Zumthor, Framing Nature with Architecture

Figure 80: Bodegas Bell-lloc, RCR Arquitectes

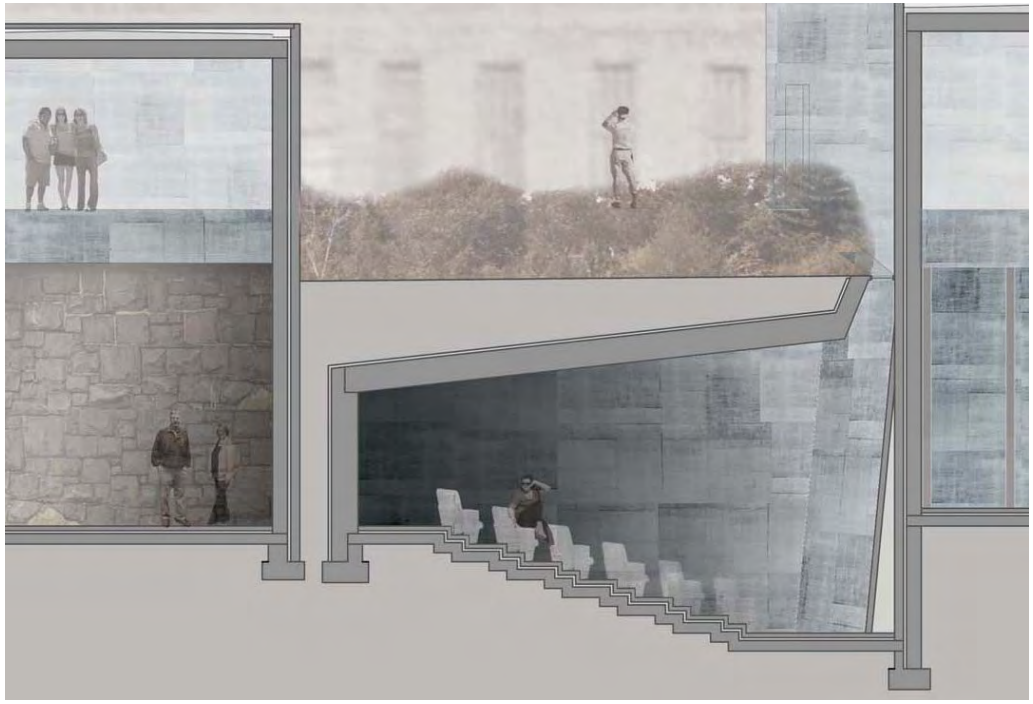


Figure 81: Section through the Lecture Hall

The underground spaces are carved into the ground and naturally lit along the peripheries of the spaces. This allows light to flood into the spaces and highlight particular moments.

Figure 82: Image of the Lecture Hall

Figure 83: Bay Model, Revealing Underground Spaces

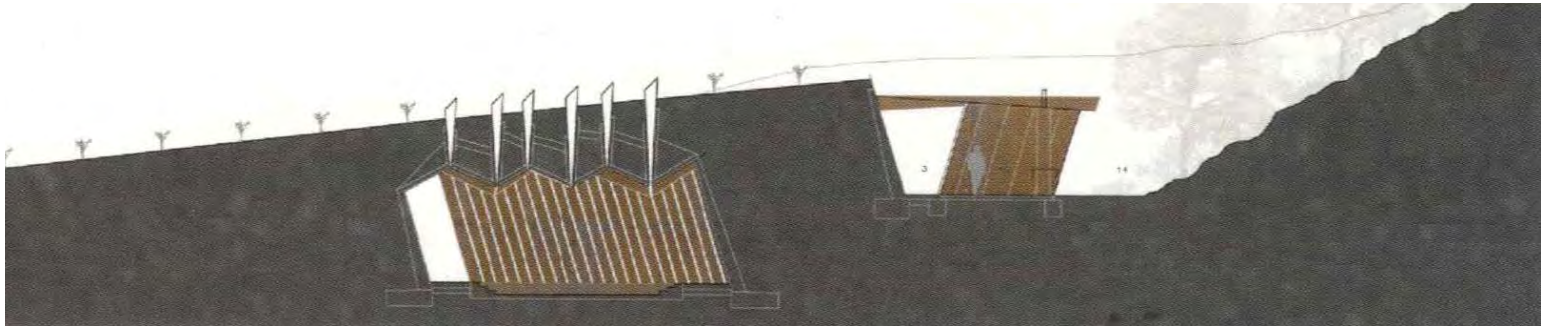


Figure 84: Bodegas Bell-lloc, RCR Arquitectes

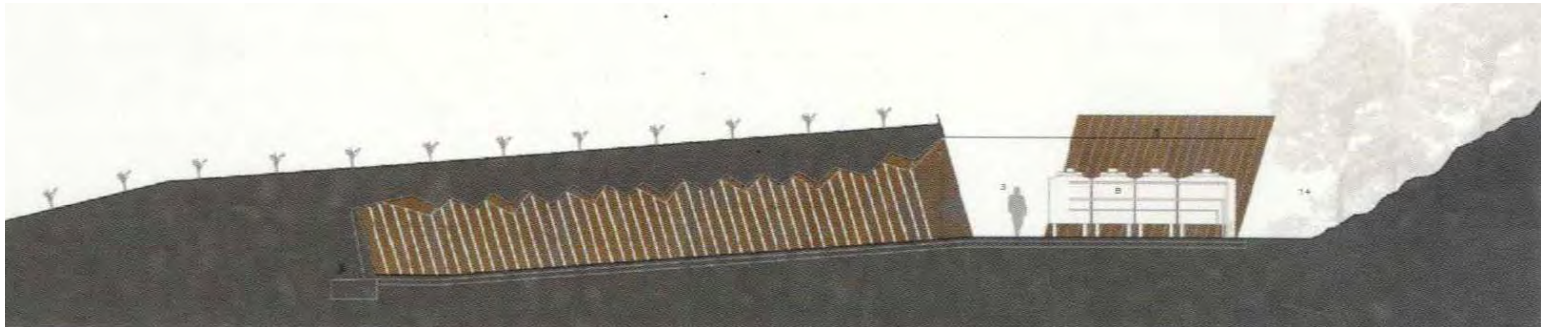


Figure 85: Bodegas Bell-lloc, RCR Arquitectes

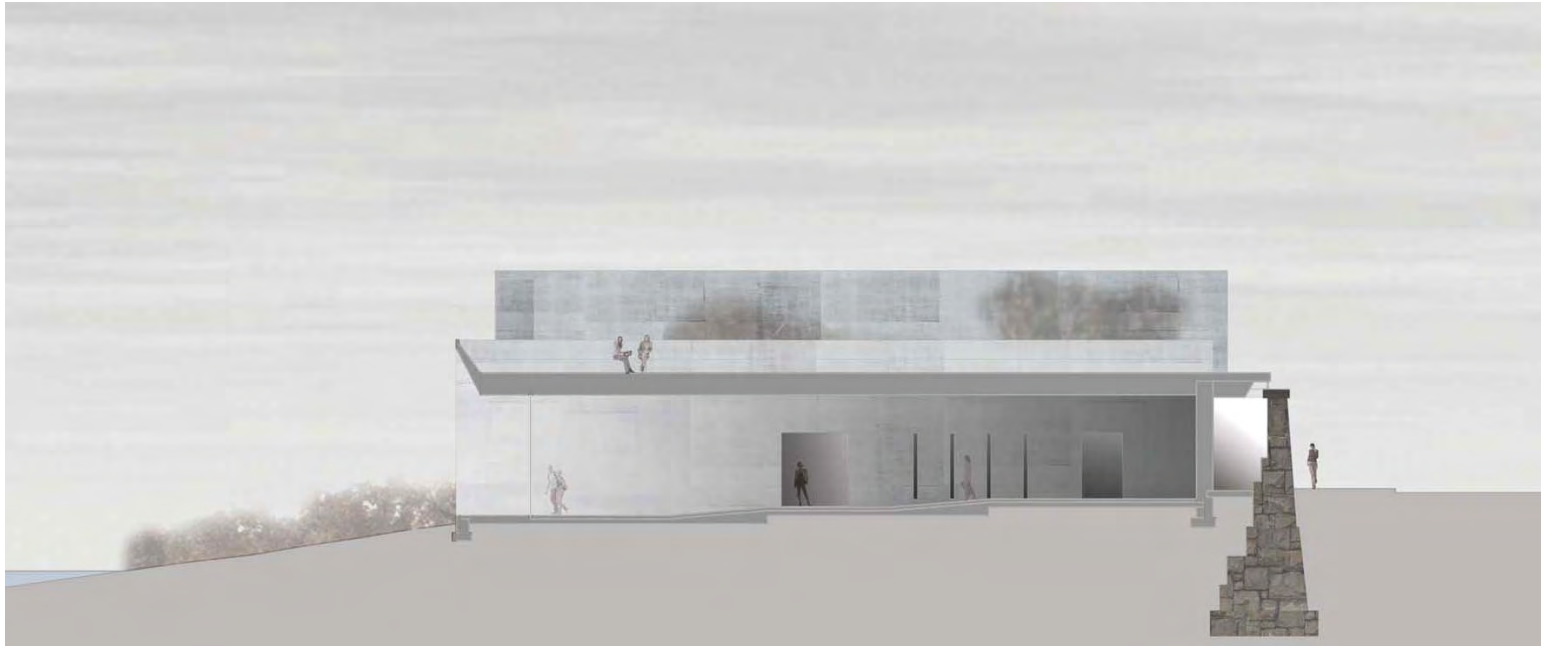


Figure 86: Section through the Art Gallery

Systems Integration

The building's main structural component is concrete due to the subterranean nature of the building. It is structured with cast in place concrete load bearing walls. Each wall is composed of 2 walls with rigid insulation between each wall. Concrete on the interior and exterior helps to enhance the framing of views to the reservoir by creating a sense of ambiguity between the interior and exterior. The roof structure is a concrete slab, which sits on the interior load bearing wall. The finish face of the concrete is rough and untreated so the building will visually age and grow into the site. The form work will be constructed in such a way to reduce gaps. The pavilions also maintain a sense of lightness, as the walls, become thin at the ends of the structure.

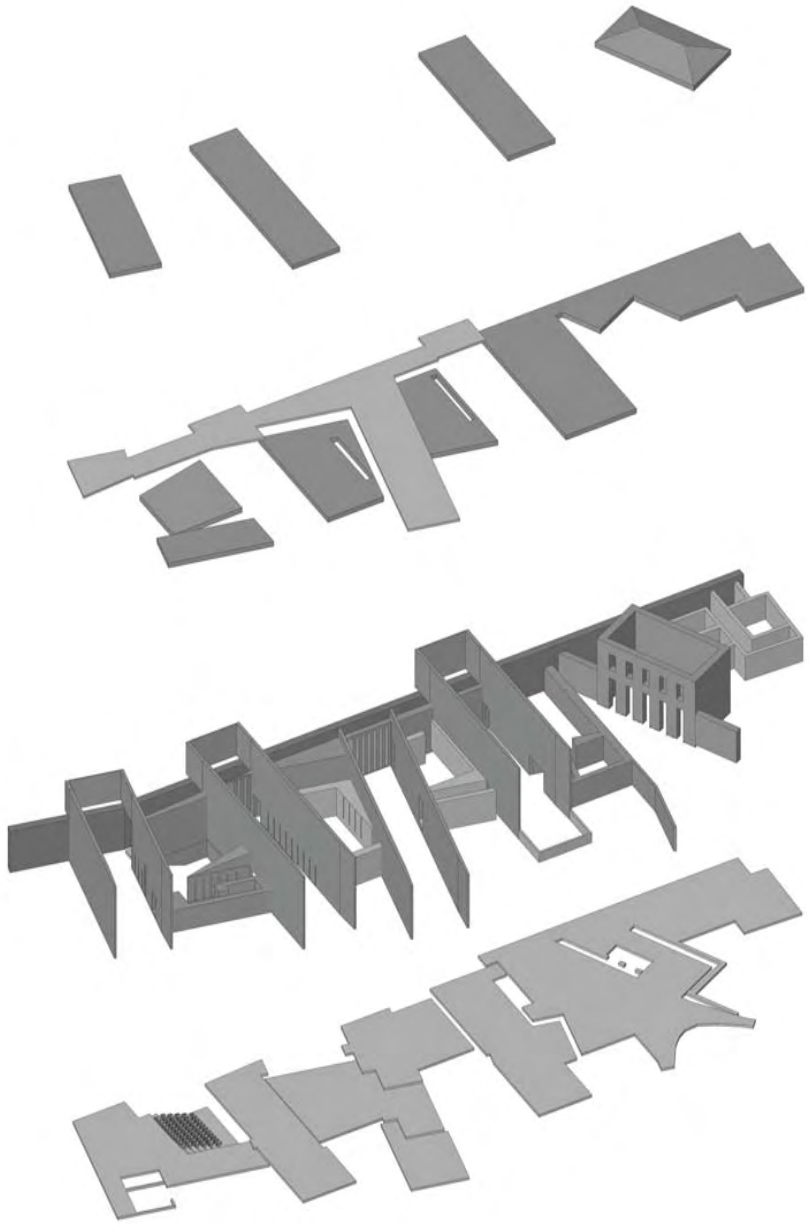


Figure 87: Exploded Structural Diagram

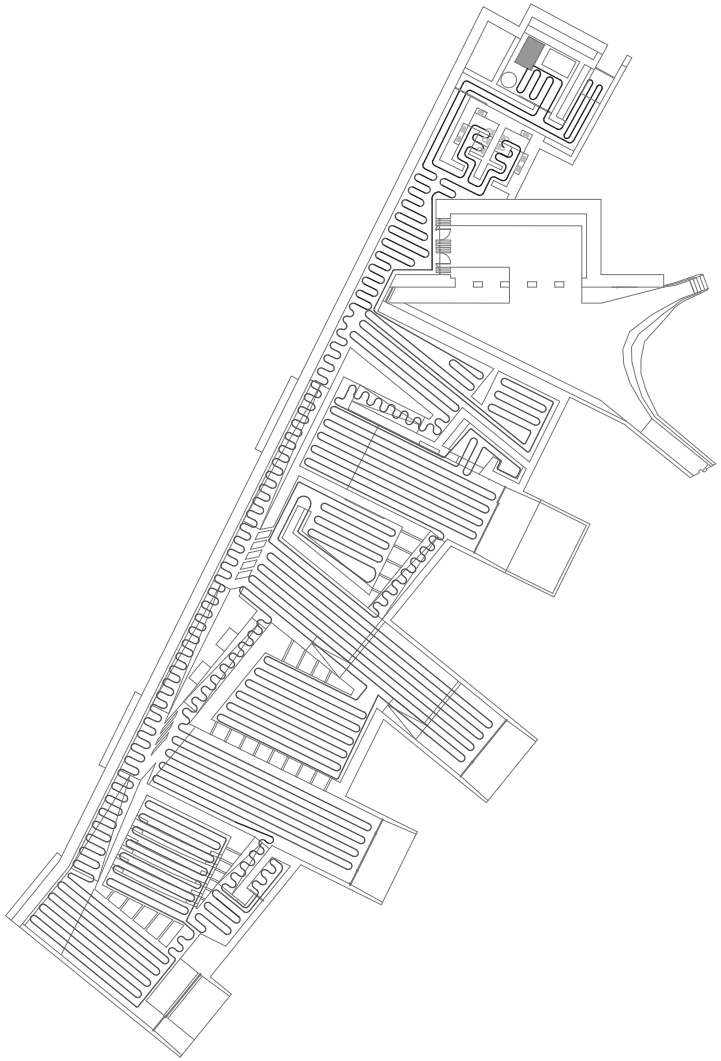


Figure 88: Radiant Heating and Cooling Diagram

Figure 89: Mechanical Ventilation Diagram

A geothermal system will provide radiant heating and cooling for the building, with vertical closed loop heat pumps to be located within the excavated areas between the pavilions and underground spaces.

A cavity above the wall gallery/corridor provides space for the main supply and return ducts to be used for air ventilation. Ducts branch off of the core to the main spaces in the building.

Assemblies

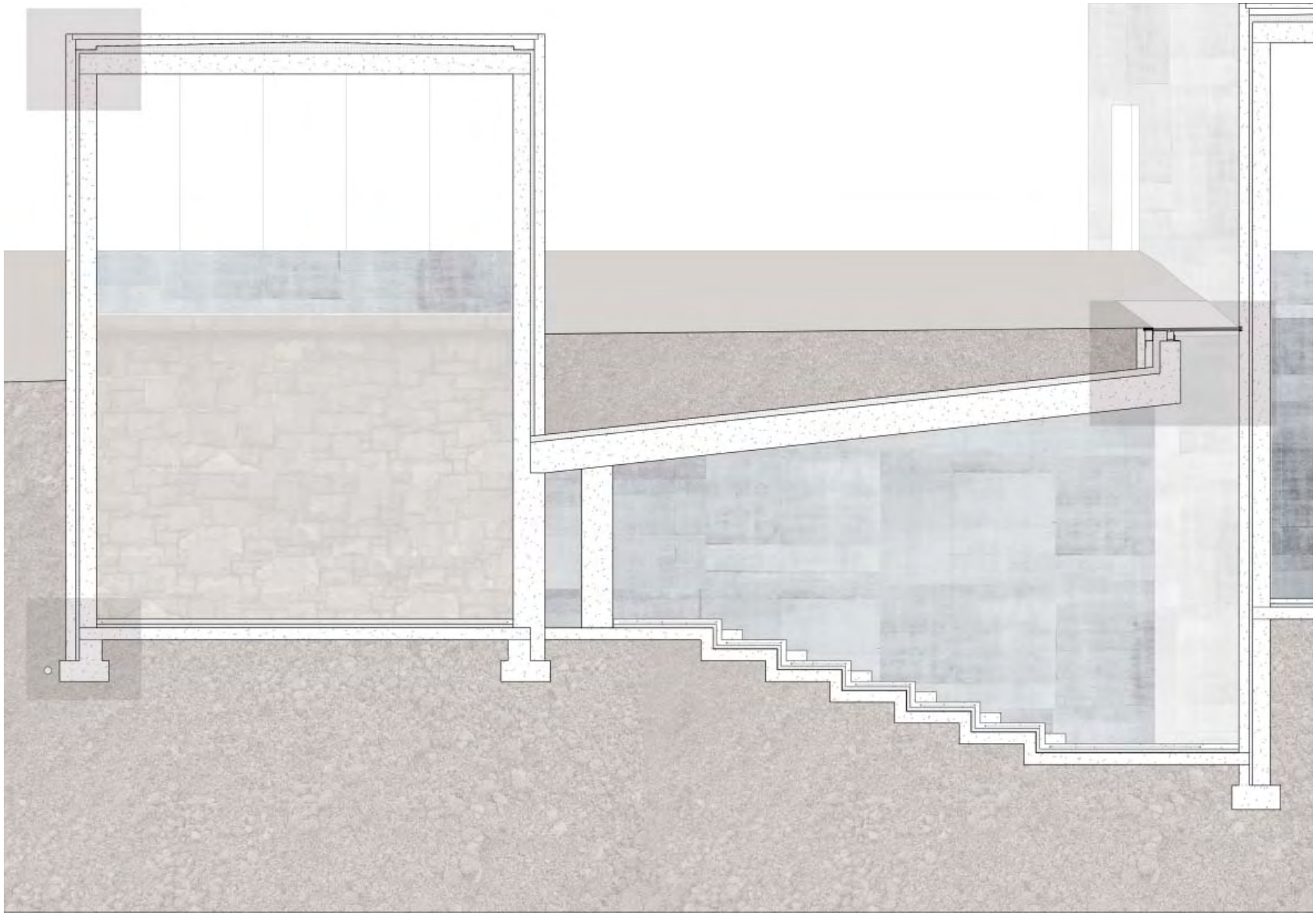


Figure 90: Assembly Section through the Water Gallery and Lecture Hall

Figure 91: Spatial Model showing Lecture Hall

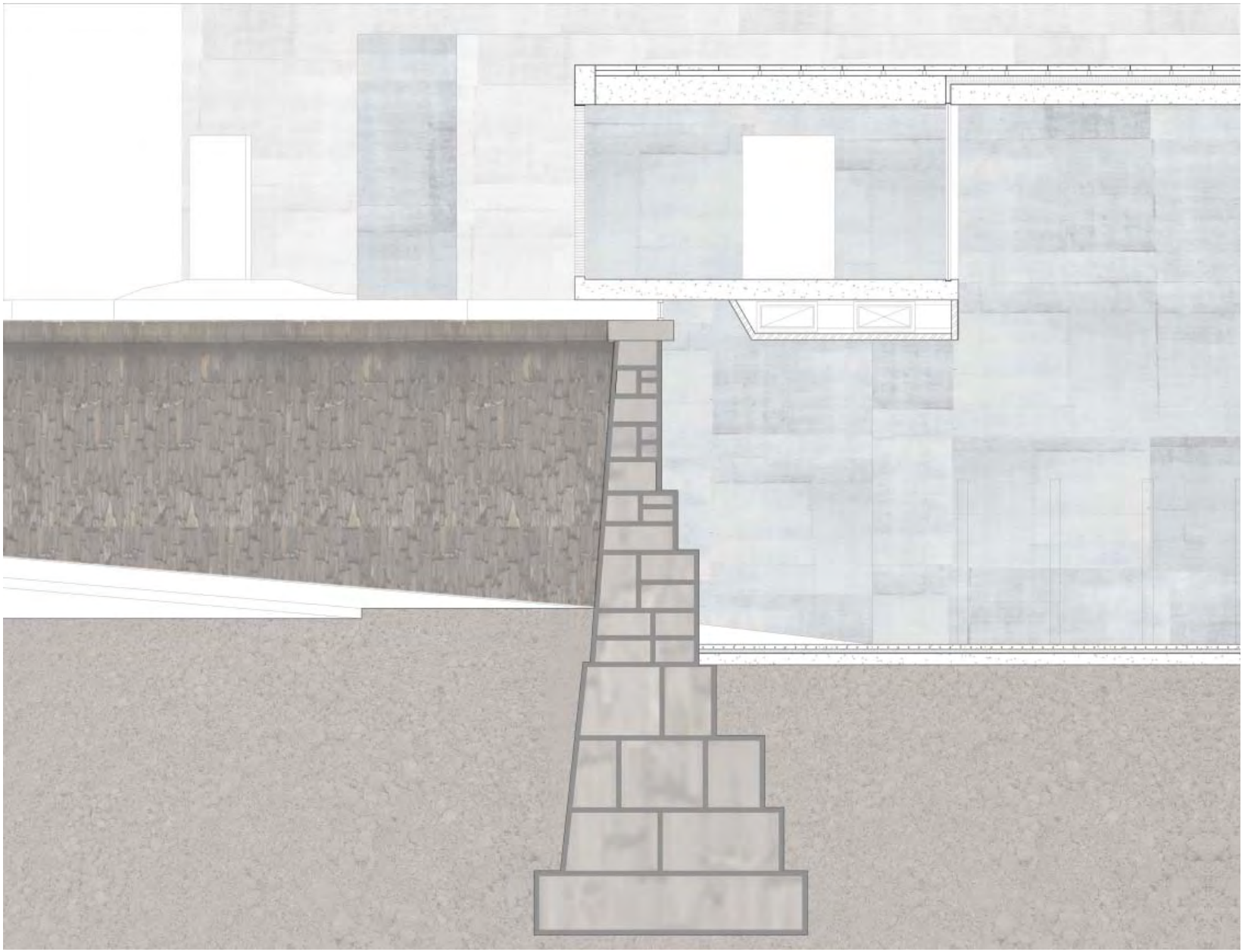
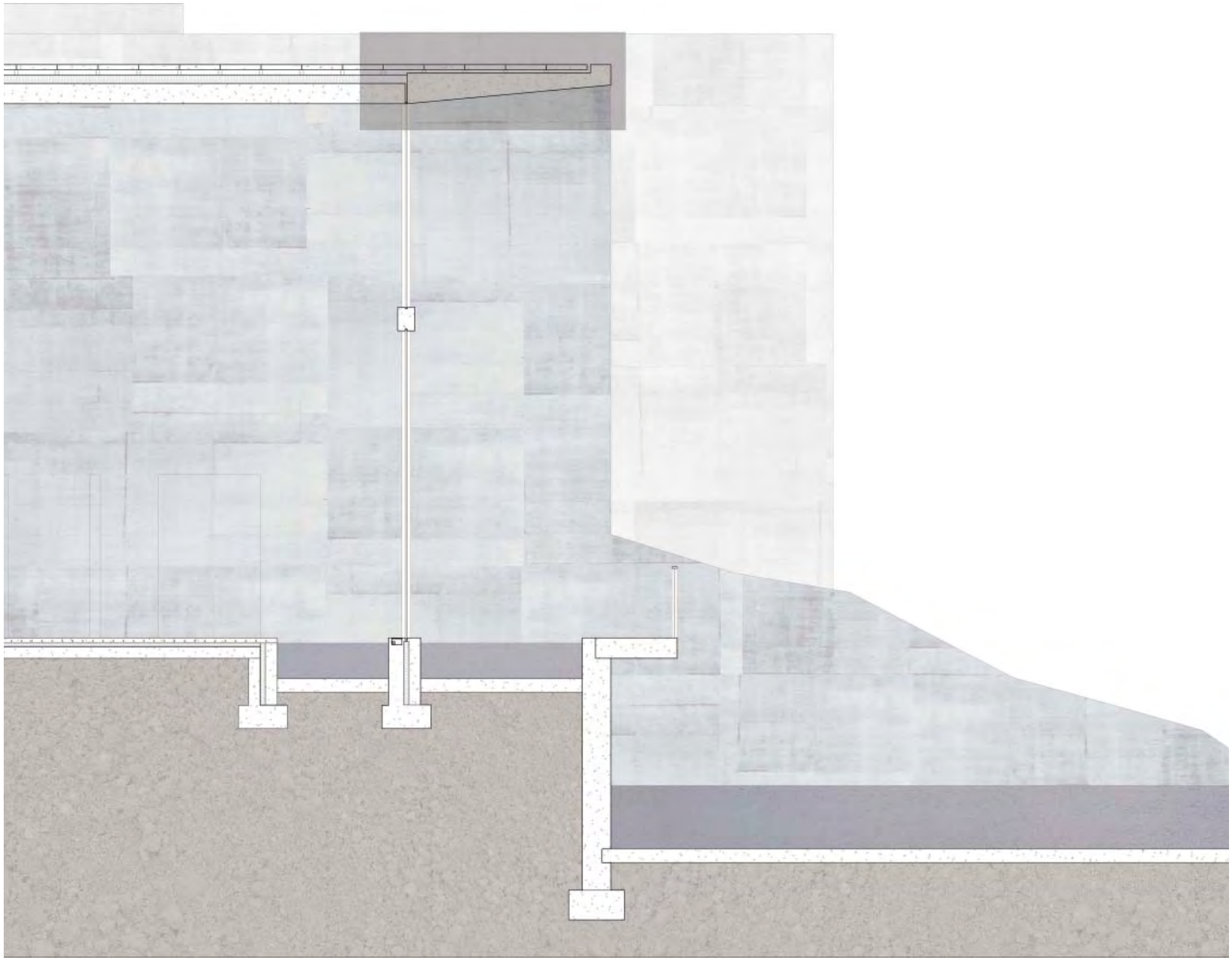


Figure 92: Assembly Section through the Water Gallery



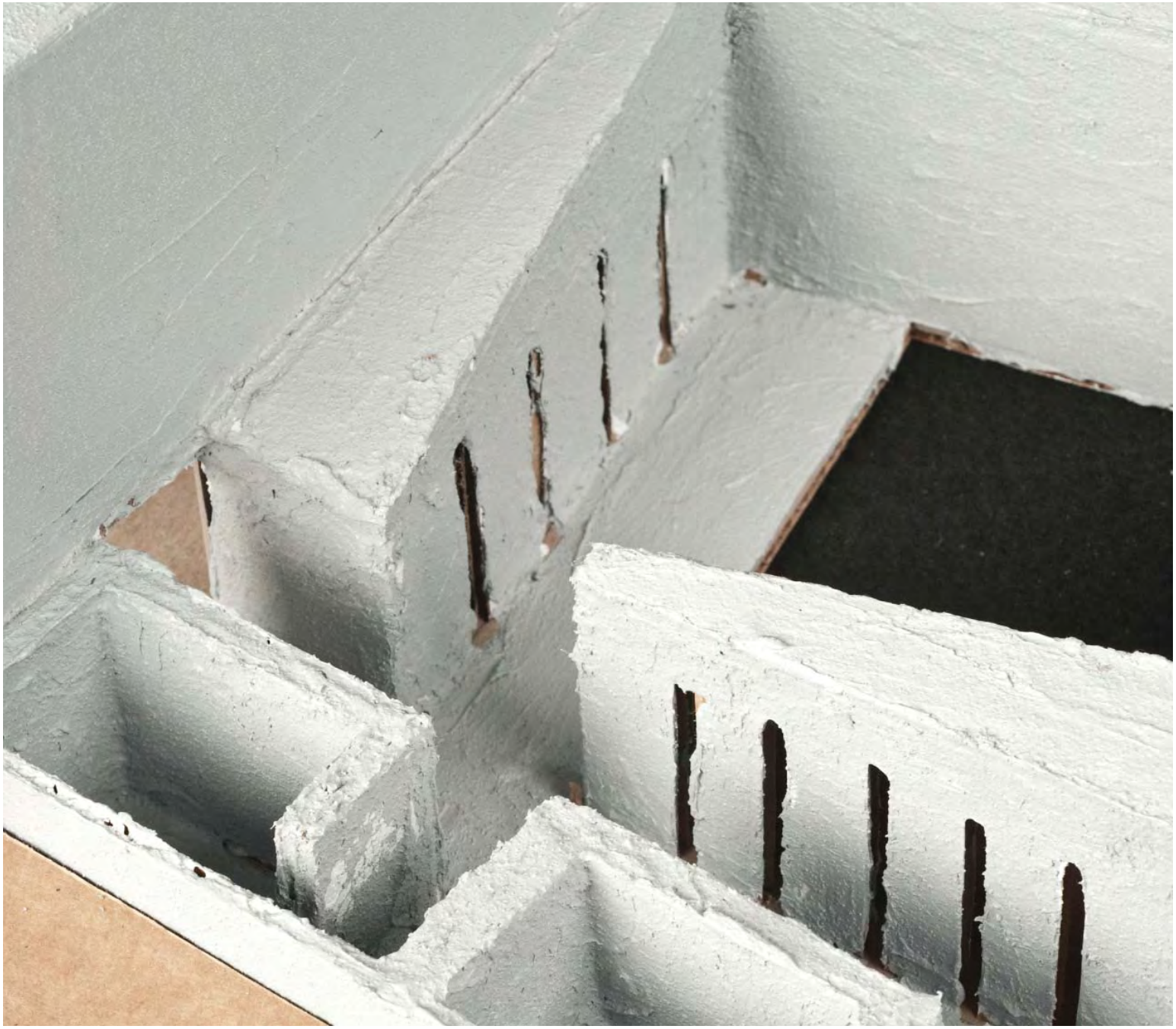


Figure 93: Structural Model showing Underground Spaces

Details

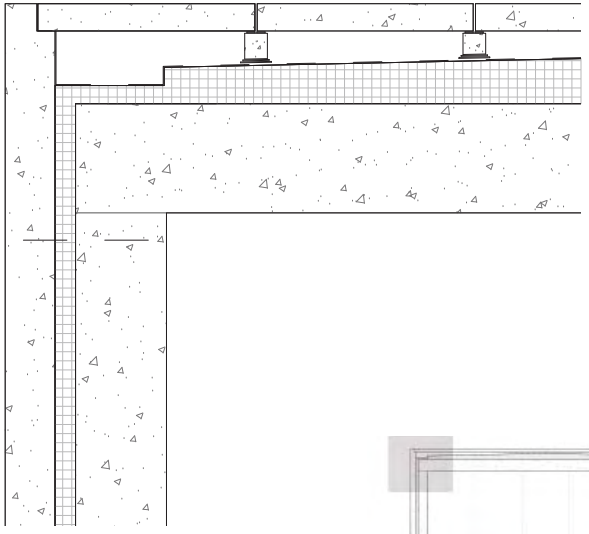


Figure 94: Roof Corner Detail

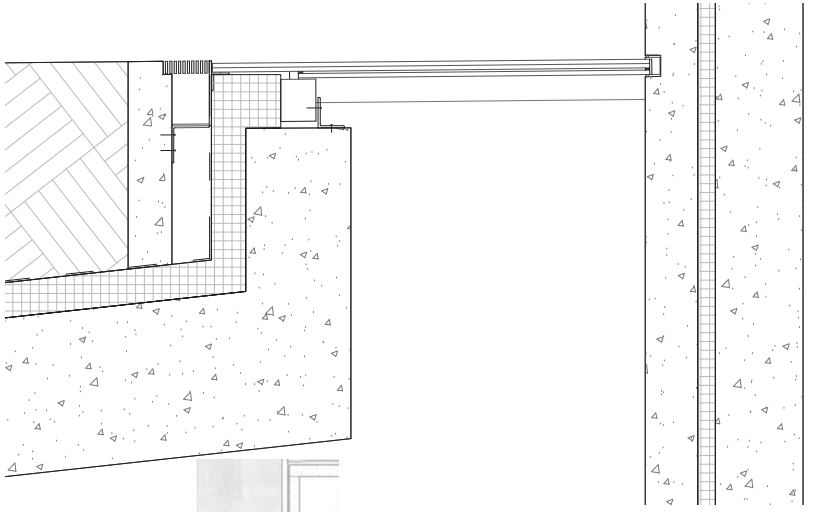
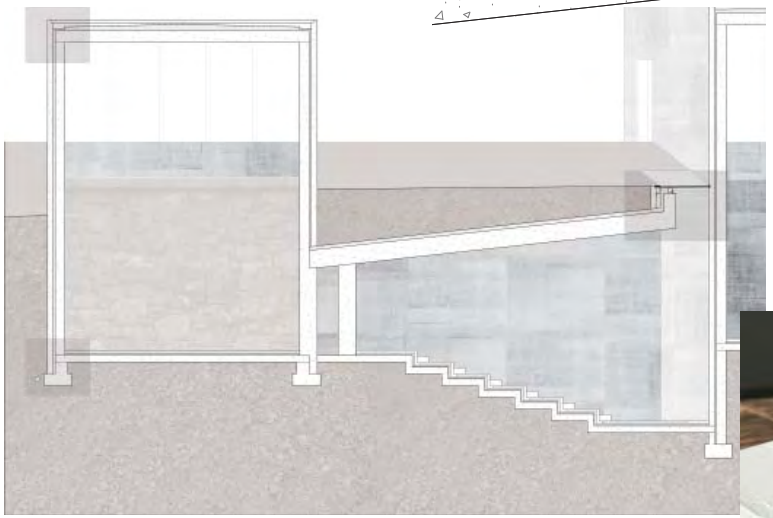


Figure 95: Skylight Detail



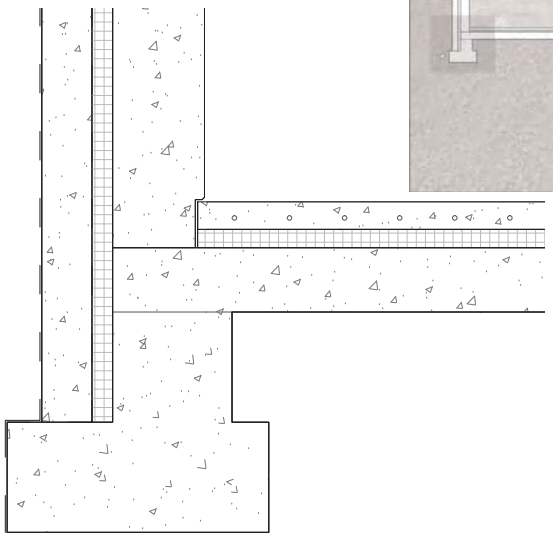


Figure 96: Foundation Detail

Figure 97: Model showing Corner Detail

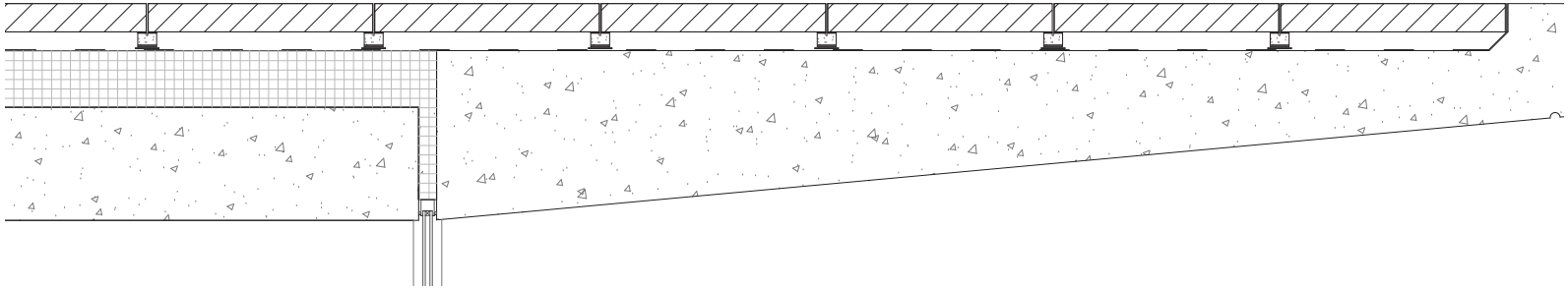
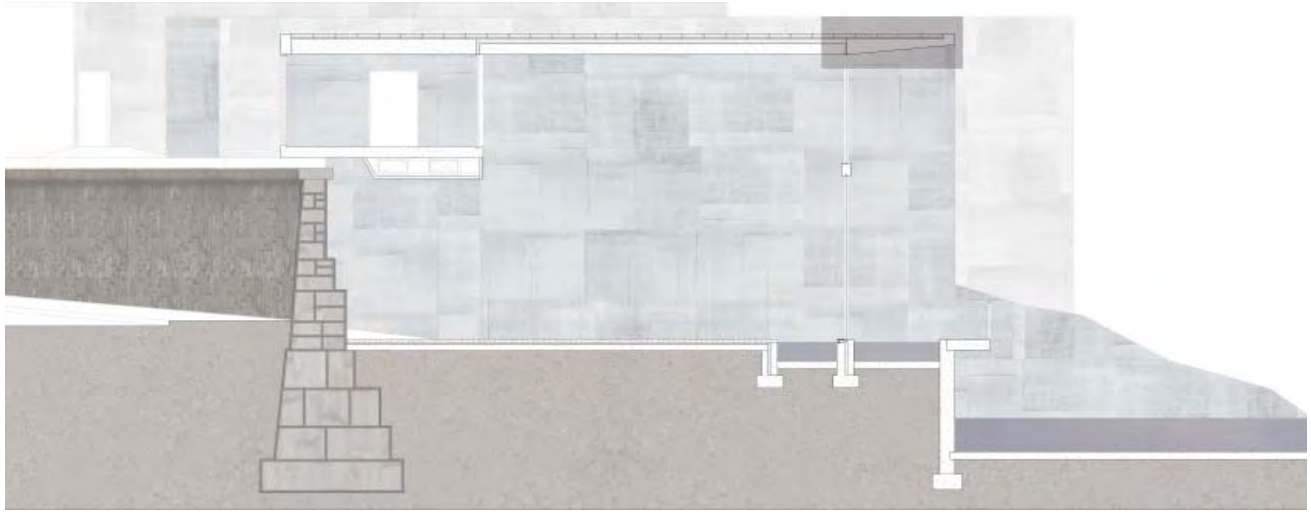


Figure 98: Roof Edge Detail



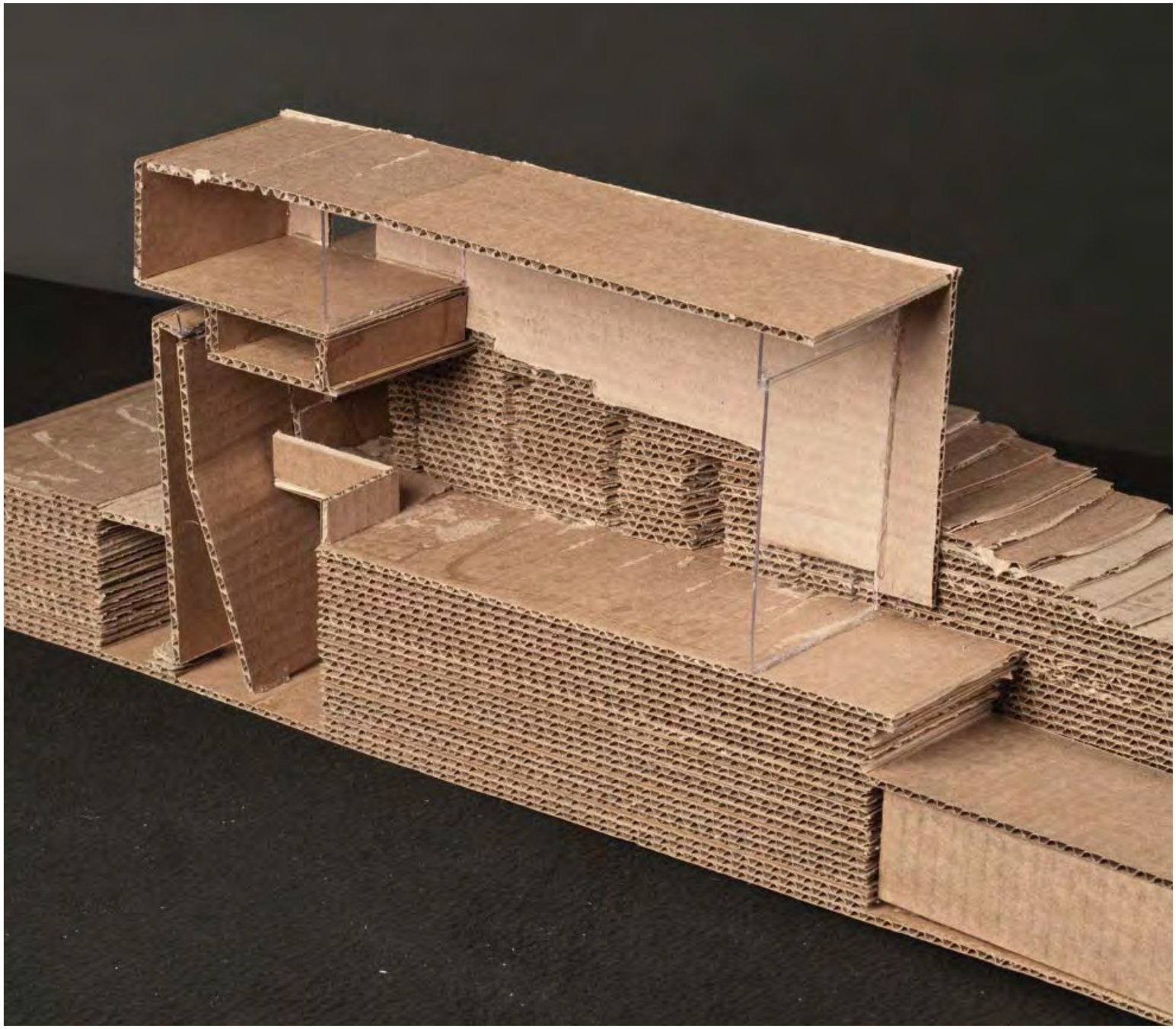


Figure 99: Sectional Model through a Pavilion

Appendices

Appendix A: Redevelopment Site

In 2008, the city redeveloped its master plan for parks and open space. The city analyzed every park and open space to determine and recommend the improvements needed in each park, what activities could happen in each park, the cost for improvements, as well as a priority list.

The Reservoir 3 site was ranked 4th in terms of a priority out of 64 sites which were analyzed (See Figure Below). In the Winter 2009, an RFP was put out by the city, for redeveloping the site and giving it a plan for regeneration to be implemented over time. With the goal of preserving the historical character of the reservoir, while making it more user friendly for engagement with the environment. The site has a lot of potential as a space which can be used by the community for recreational as well as educational purposes.

The city is working very closely with the Jersey City Reservoir Preservation Alliance, keeping the goals in mind of the Alliance during the planning and decision making process with the site.

The following two pages outline the recommendations for improvements to be made to the Reservoir 3 site. I am proposing that the Education and Visitors Center work in conjunction with the improvements that the city is planning.

PARK PRIORITIZATION SUMMARY - EXISTING PARKS WARDS A-F JERSEY CITY (YEARS 1-5)

	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		YEAR 6		YEAR 7		YEAR 8		YEAR 9		YEAR 10		PARK
Park & Ward	Renovations	New	Renovations	New	Renovations	New	Renovations	New	Renovations	New	Renovations	New	Renovations	New	Renovations	New	Renovations	New	Renovations	New	TOTALS
1. Columbia Park (A)	$142K	$1.08M																			$1.22M
2. Hackensack River Greenway (B)	0	$10.78M																			$10.78M
3. Apple Tree House (C)	Underway	Underway																			Underway
4. Reservoir No.3 (C)	0	$12.17M																			$12.17M
5. Edward Crincoli Park (D)	0	0																			0
6. Riverview - Fisk Park (D)	$1.34M	$405K																			$1.75M
7. Hamilton Park (E)	$1.73M	$3.33M																			$5.06M
8. Fitzgerald-Holata Park (E)	Underway	Underway																			Underway
9. J. Owen Grundy Park (E)	Underway	Underway																			Underway
10. York Street Park (E)	Underway	Underway																			Underway
11. Summit Cornelison Park (F)	0	$975K																			$975K
12. Audubon Park (A)			$137K	$336K																	$473K

Figure 100: Open Space Park Prioritization Summary

47. RESERVOIR No. 3 - Block 835, Lot 1S

Reservoir No. 3, encompassing 13.13 acres, is located in Ward C on Central, Summit and Jefferson Avenue. It is contiguous to Pershing Field. It was a water holding facility until it was closed in the 1970's, and is still entirely surrounded by imposing stone walls.

The City has decided that only passive recreational use of the site is appropriate, due to existing environmental conditions and regulatory agency constraints. Any proposed passive recreational development at Reservoir No. 3 will first require the preparation of a thorough natural resources inventory and environmental assessment. A freshwater wetlands delineation was completed in January 2008, and a structural assessment of the reservoir walls and buildings is currently underway. Permit applications will need to be prepared and submitted to various regulatory agencies, including the NJDEP.

This report acknowledges the considerable input and assistance by the Jersey City Reservoir Preservation Alliance, an organization of conservancies, neighborhood associations and park groups. The Preservation Alliance has prepared a concept plan of the site which proposes a wildlife sanctuary and the enhancement of existing natural habitats. The City should work closely with the Preservation Alliance throughout the design and development process of this unique park site.

Figure 101: The Reservoir in the Winter

A.	**RECOMMENDED RENOVATIONS**		Cost
1)	Perimeter wall repair		$2,000,000
2)	Pump house and gate houses restoration		$2,500,000
B.	**RECOMMENDED NEW FACILITIES**		
1)	Site work		$1,000,000
2)	Drainage		$250,000
3)	Stormwater management area		$160,000
4)	Park appurtenances (benches, trash receptacles, etc.)		$100,000
5)	Pedestrian bridge		$150,000
6)	Elevated jogging path and fencing		$1,000,000
7)	Environmental center and deck		$650,000
8)	Storage building with deck roof		$400,000
9)	Entrance ramps and gates		$65,000
10)	Boardwalk - 6’ wide		$60,000
11)	Nature trail - 8’ wide		$100,000
12)	New park signage		$12,000
13)	Fishing pier		$100,000
14)	Flower gardens		$20,000
15)	Wetlands restoration		$175,000
16)	Landscaping (trees, shrubs, lawn, etc.)		$175,000
17)	Canoe dock		$100,000
18)	Seating areas		$35,000
19)	Permits		$85,000
20)	Utilities (electric service, sewer, water, etc.)		$600,000
		Total	**$9,737,000**
21)	Contingencies (10%)		$973,700
22)	Engineering fees (survey, design, inspection) (15%)		$1,460,550
		Total Project Cost	**$12,171,250**
		Total Project Say	**$12,171,000**

Appendix B: Environmental Conditions

-Latitude
40° 44’ 24.96” N
-Longitude
74° 03’ 17.81” W
-Altitude
120’-130’ Above Sea Level

-Jersey City, NJ is located in the Northeast Region of the United States.

-The city is located between the Hudson and Hackensack Rivers.

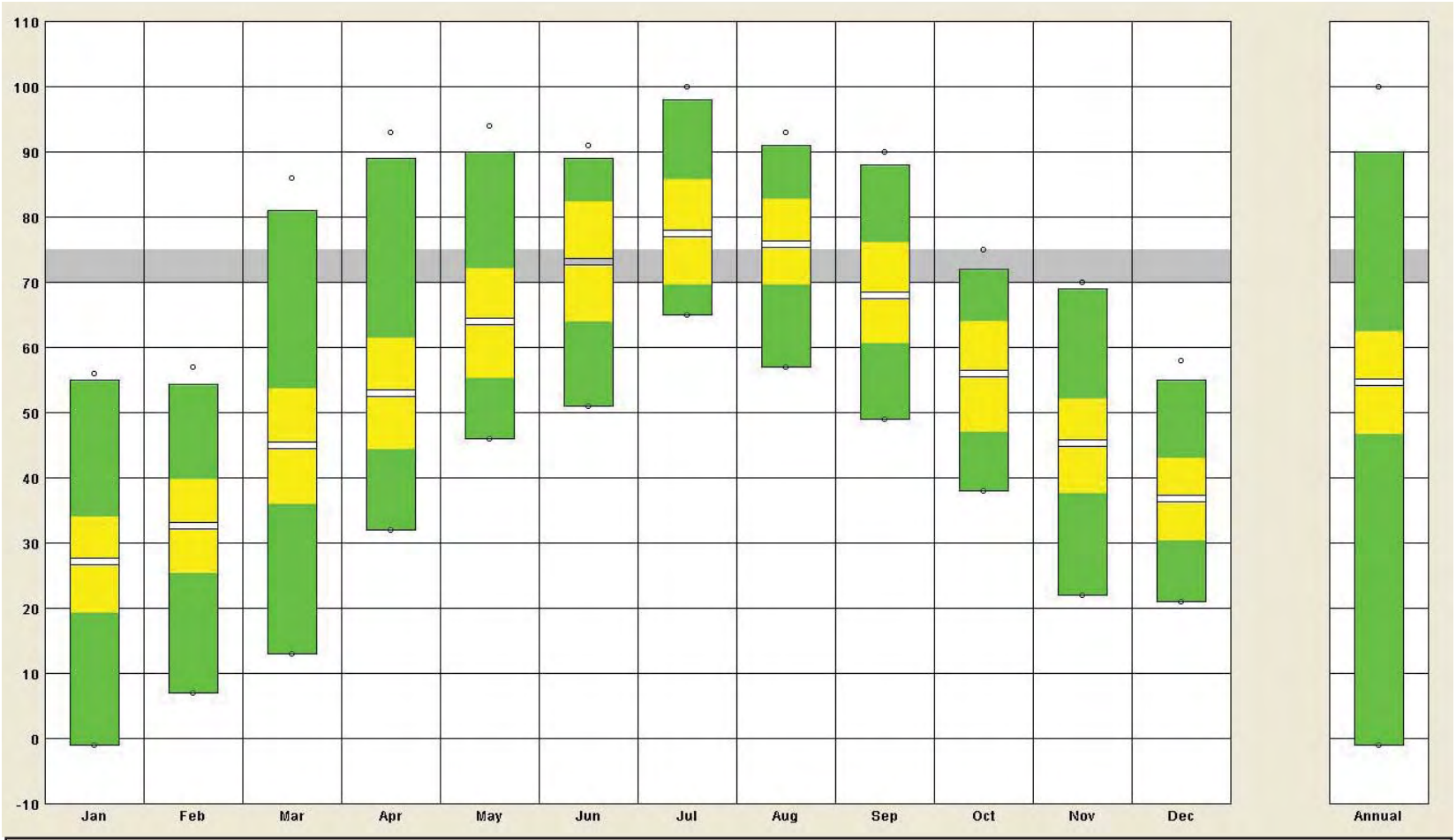
-The site is an open green space in a dense urban area, with abundant solar access.

Figure 102: Global Perspective

Figure 103: City Geographical Conditions


Figure 104: Local Site Conditions

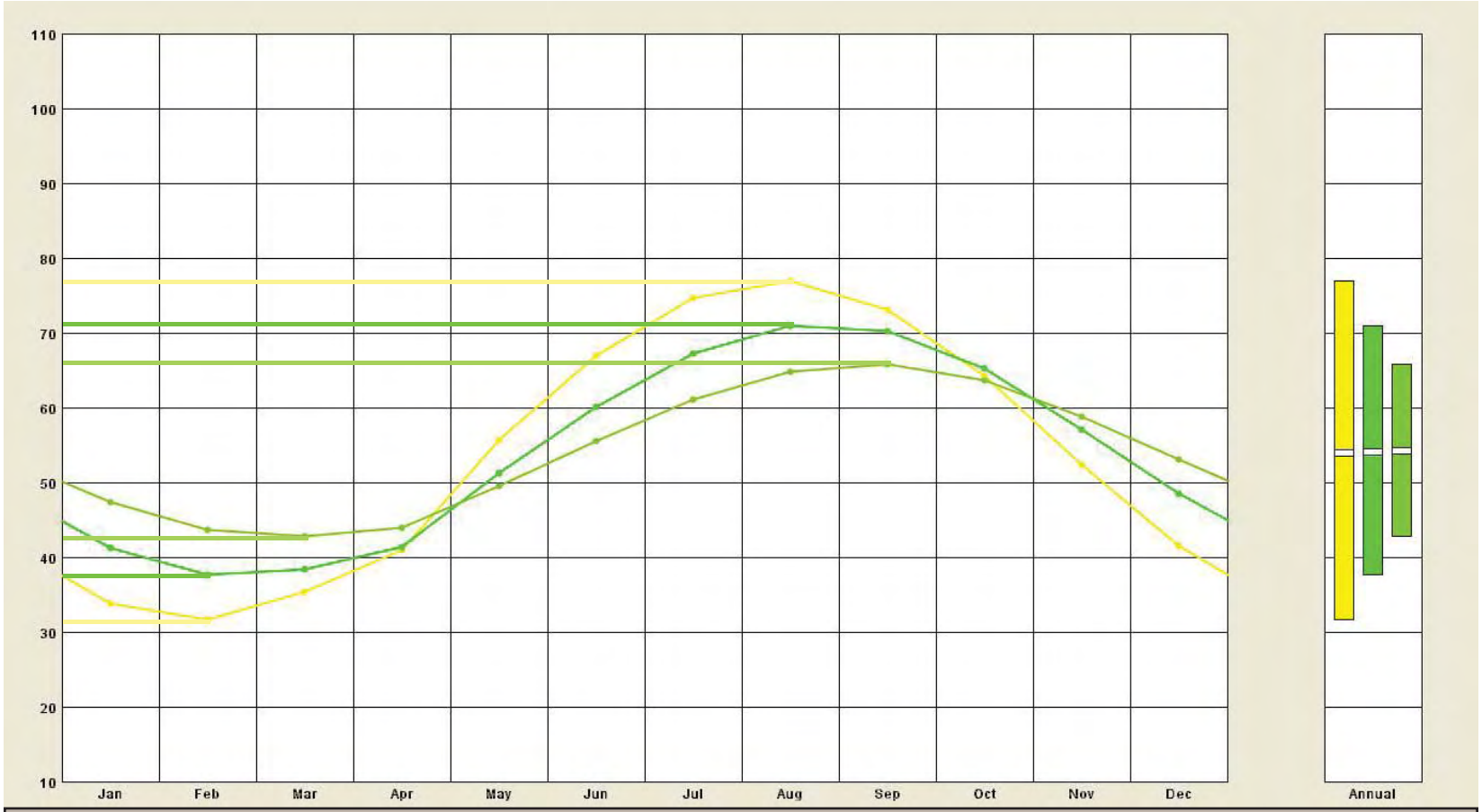
Air Temperatures



Warmest Month:	Avg. High	Design High	Record High	Mean Temp	Recod Low	Design Low	Avg. Low
July	86°	97°	100°	77°	65°	65°	69°
Coolest Month:	**Avg. High**	**Design High**	**Record High**	**Mean Temp**	**Recod Low**	**Design Low**	**Avg. Low**
January	34°	55°	56°	27°	-1°	-1°	29°
Average Month:	**Avg. High**	**Design High**	**Record High**	**Mean Temp**	**Recod Low**	**Design Low**	**Avg. Low**
Year	63°	90°	100°	55°	-1°	-1°	47°

Figure 105

Ground Temperatures



Depth	Low Temp	High Temp	Temp Swing	Average Temp.
1.64’	32°	77°	45°	54°
6.56’	38°	71°	33°	54°
13.12’	43°	66°	23°	54°

Figure 106

Heating and Cooling Analysis

-Heating is needed from October-May.

-Cooling is needed from July to August

-Heating and cooling is needed in June and September

-Average Swing Temperature is 15°

-Potential for night Flushing occurs June-September with average high and low temperatures above and below the comfort zone respectively.

-Consistent ground temperatures at depths 13' or greater allow for potential use of geothermal heating and cooling

Figure 107: Geothermal Heating and Cooling

Figure 108: Reservoir Number Three

Solar Position

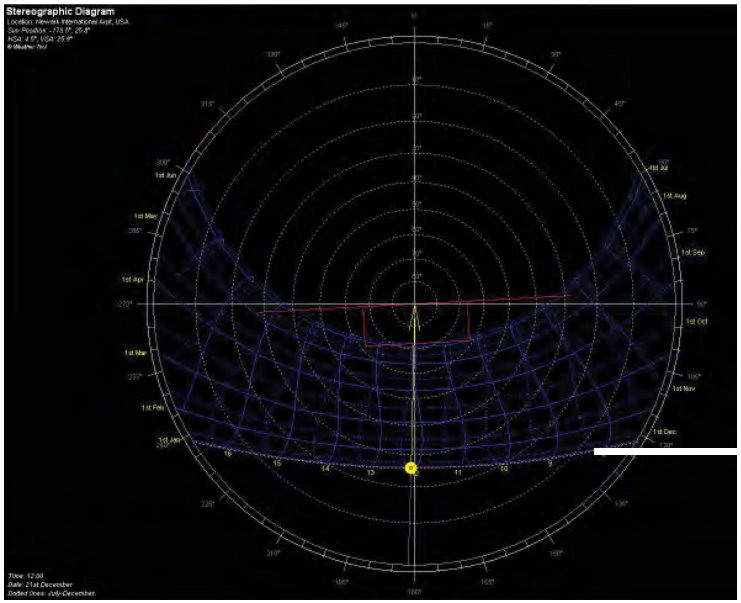
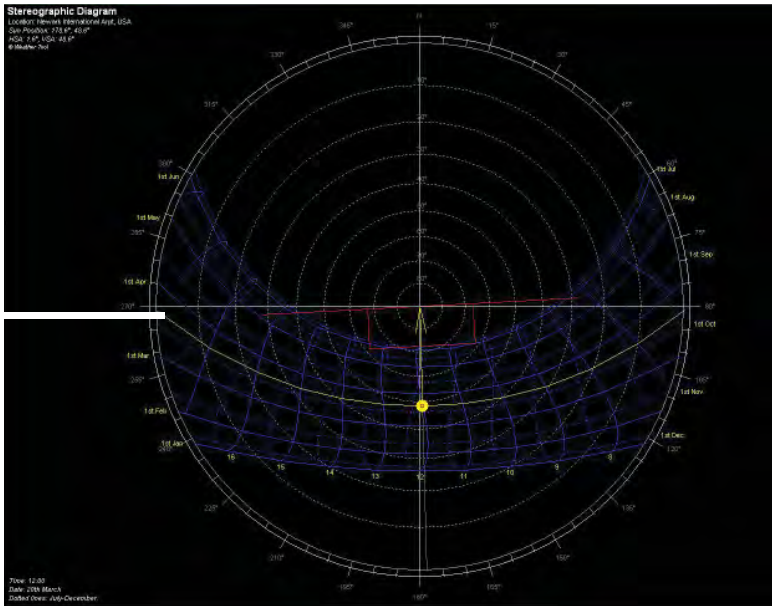


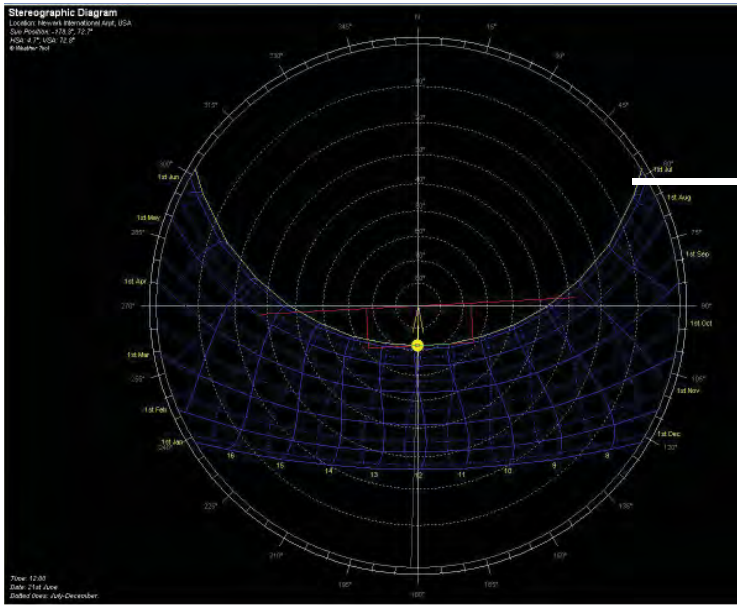
Figure 109: Winter Solstice



48°

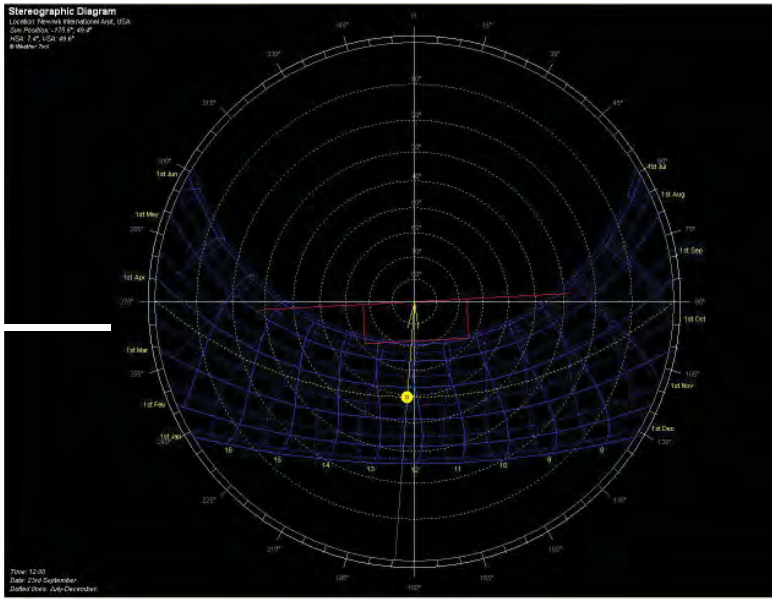
26°

Figure 110: Vernal Equinox



72°

Figure 111: Summer Sostice



48°

Figure 112: Autumnal Equinox

Solar Position Analysis

Figure 113: Bright Sun

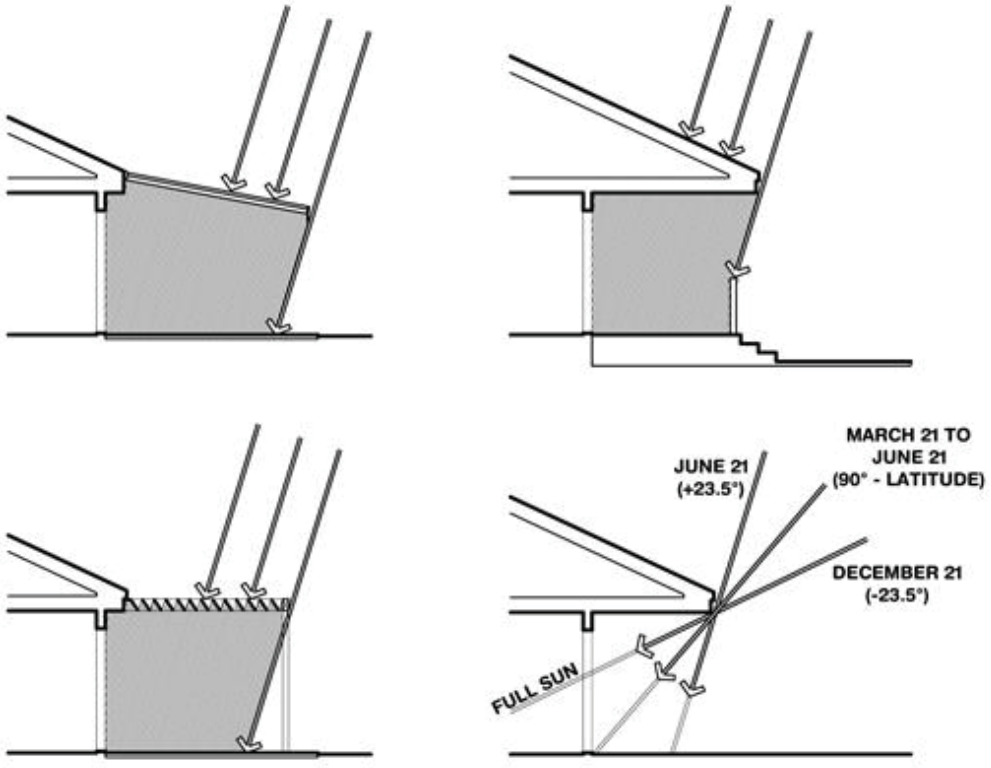


Figure 114: Examples of Sun-Shading Techniques

-With high sun altitudes in the summer months and low sun altitudes in the winter months, shading techniques will have to be taken into consideration.

-In this climate, the optimal sun shading devices would allow sunlight in during the cooler months and keep it out during the warmer months.

-The diagram below displays the best and worst orientations for this location. The best is 177.5°

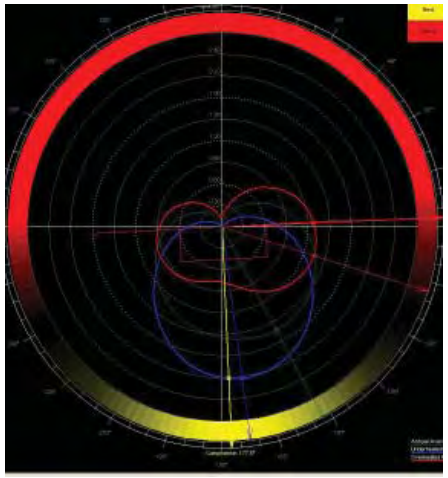


Figure 115: Best Orientation

Precipitation

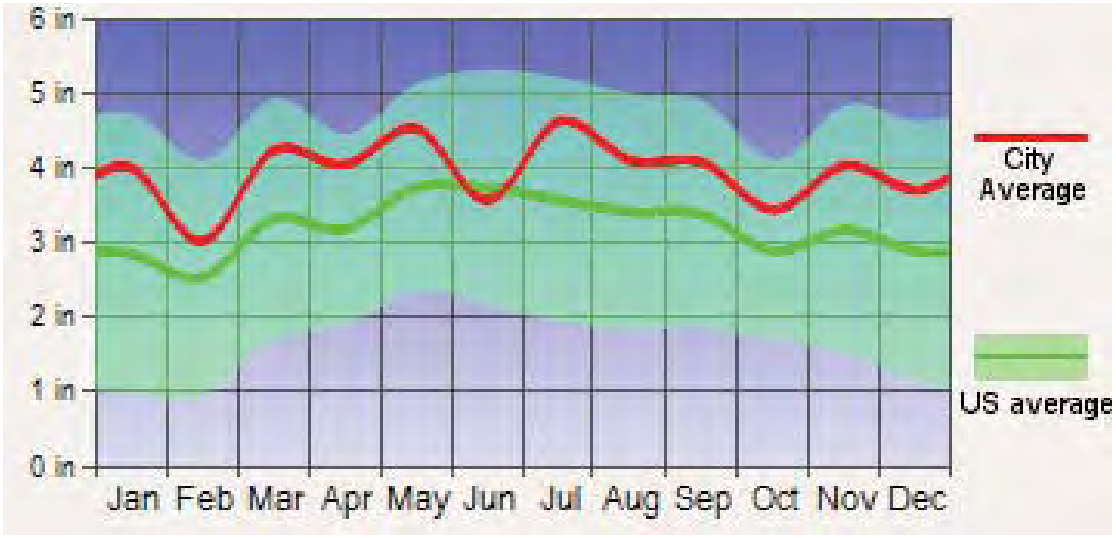


Figure 116

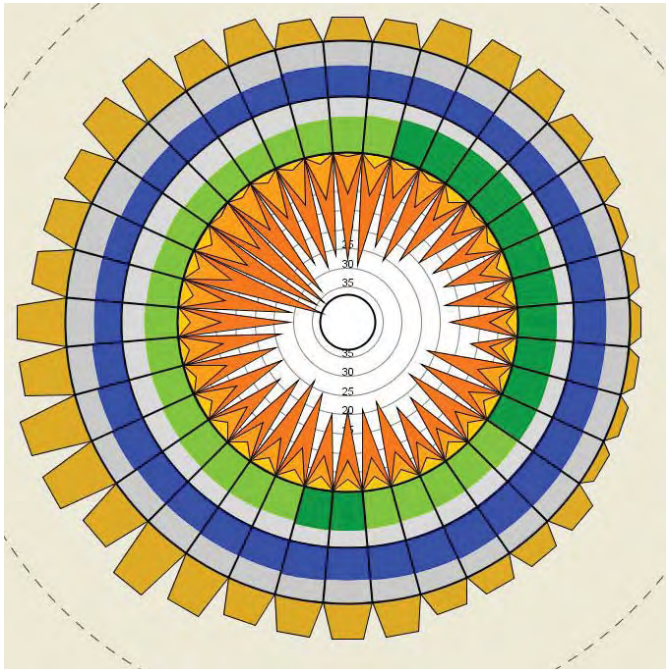
-Precipitation varies each month

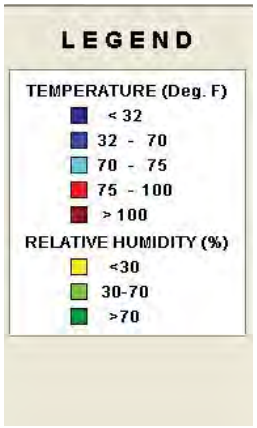
-Average of 3.5”-4” of rain per month

-Total of 47” of rain per year.

-Total 27” of snow per year.

Winds





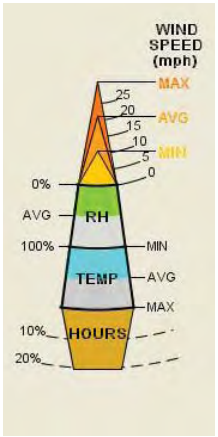


Figure 117

During the year, most wind comes from the southwest and the strongest winds come from the northwest.

Local Influence Over Winds

Figure 118

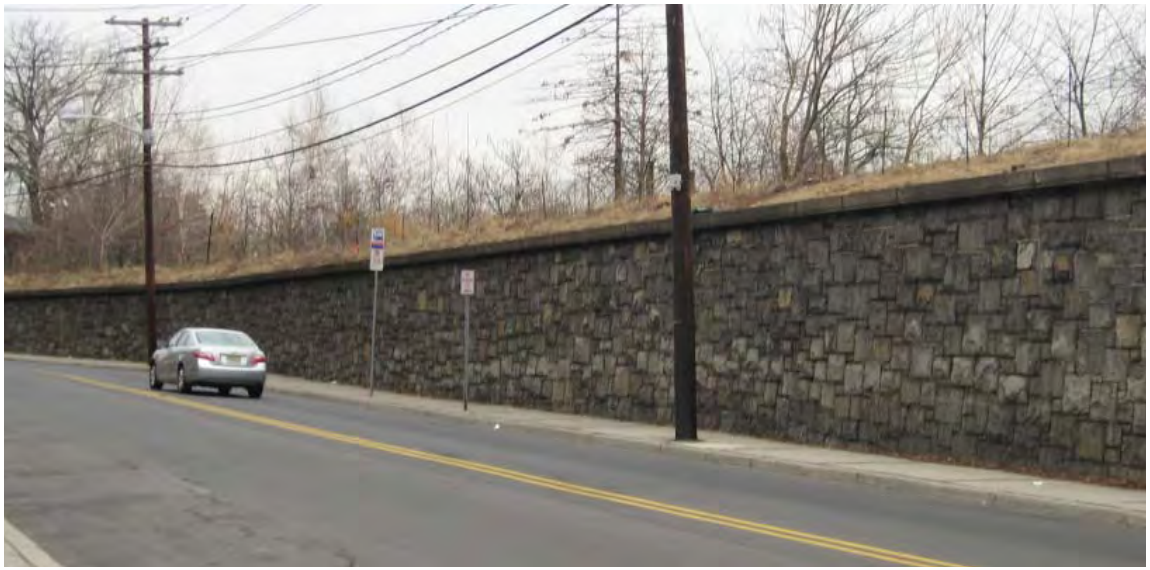


Figure 119

-The site is enclosed by a 20’ stone wall.

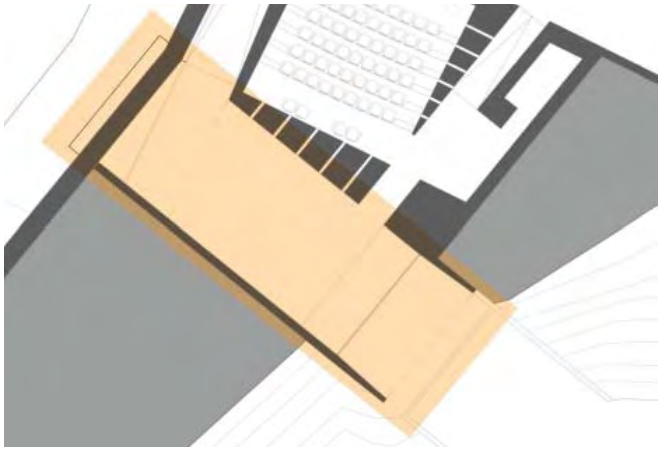
-The land filled with trees and shrubs cascades from the height of the wall down to the reservoir.

-Because of the water, the openness and the impact of the wall, wind patterns could be altered from what was given in the analysis.

Appendix C: Building Simulation

-Analyze the impact of submerging the building half underground in comparison to building above ground.
-Focus on interior comfort, peak and average temperatures.

Spatial Parameters



Floor Plan
Figure 120

- Water Gallery
  - 1000 ft²
  - Set into the slope of the landscape (half underground).

Water Gallery View
Figure 121

- Volume: W=20', L=50', H=30'
  30,000 ft³ or 850 m³
- Concrete wall construction

Simulation Parameters

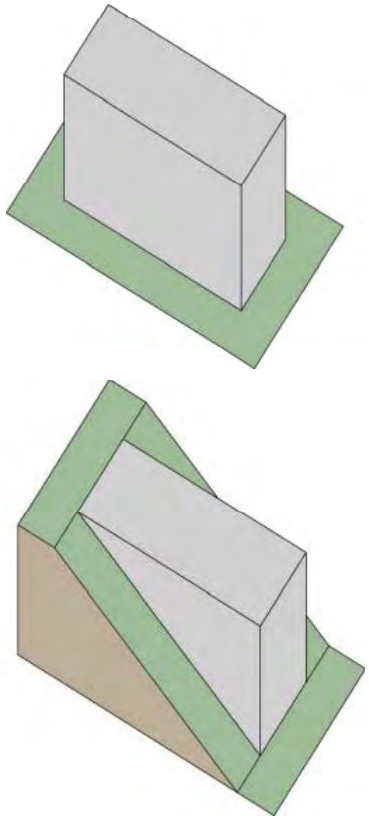


Figure 122

- Above Ground Building
  - Free floating simulation
    - Heating, Cooling, Ventilation Systems turned off
- Below Ground Building
  - Free floating simulation
    - Heating, Cooling, Ventilation Systems turned off
  - Average underground depth of walls: 2m
  - Average underground depth of floor: 4m

Building Comparison

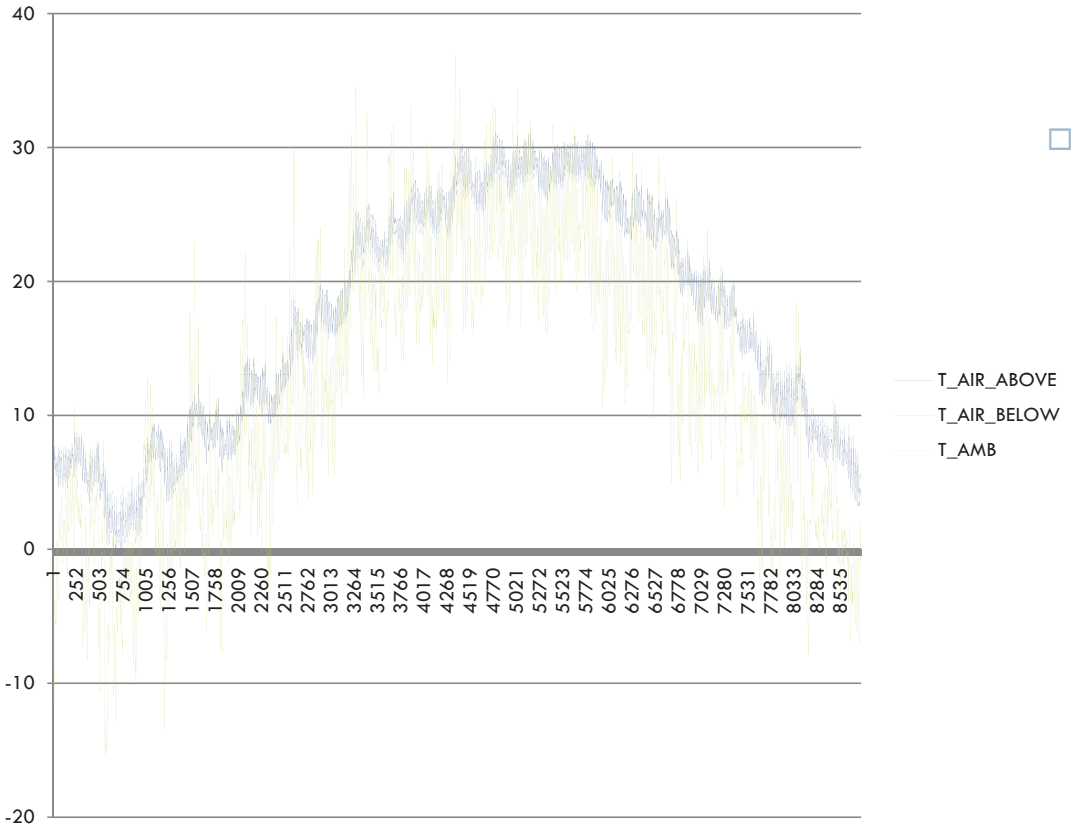


Figure 123

- The below ground concept allows for higher interior winter temperatures and lower interior summer temperatures than the above ground concept.

Building Comparison

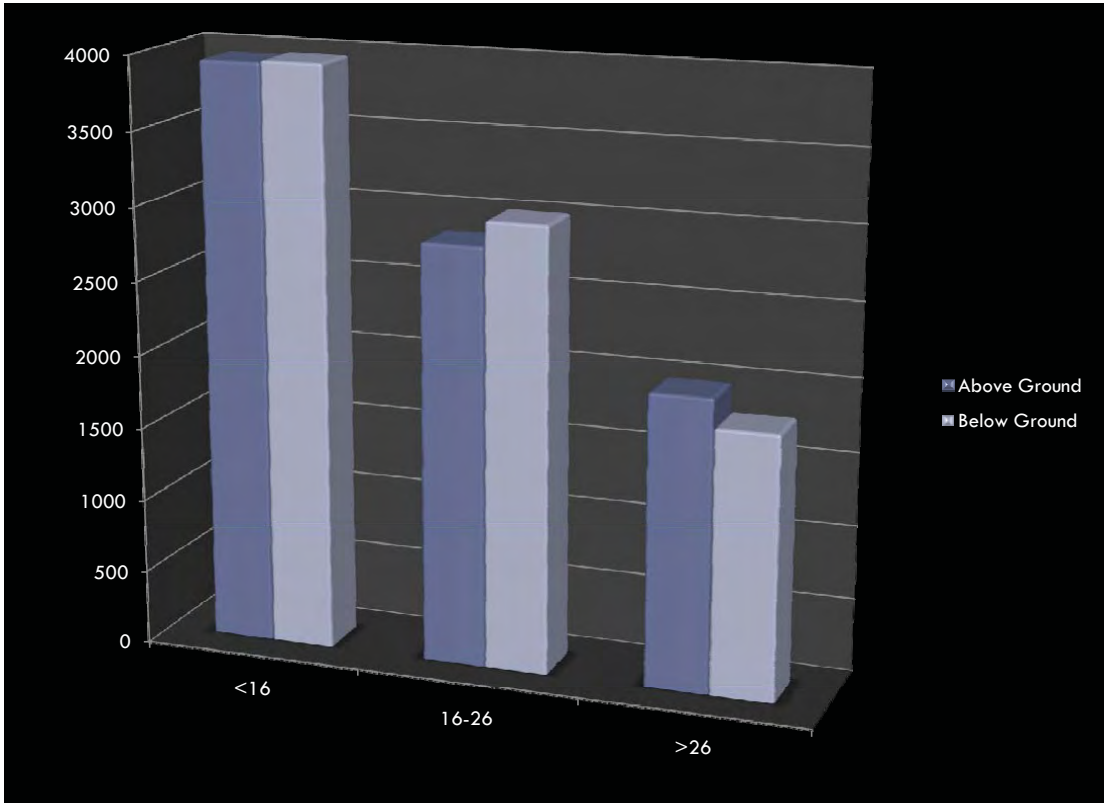


Figure 124

- The below ground concept allows for an additional 171hours within the 16°-26° temperature range.

Conclusions

- Placing the space half below ground and half above ground, is more energy efficient than building completely above ground.
- Thermal mass of the ground keeps the space warmer in the winter and cooler in the summer.
- There are more hours at comfortable temperatures when the building is submerged.

Appendix D: Transportation

Figure 125: Light Rail Routes and Stops

Jersey City has a strong public transportation system, with a light rail that connects directly to Manhattan, as well as a bus system network that connects the entire city. This allows for easy access from the proposed site for the Environmental Education Center to all areas of the city.

Figure 126: Light Rail

Figure 127: City Bus

Figure 128: City Bus Routes

Appendix E: Zoning

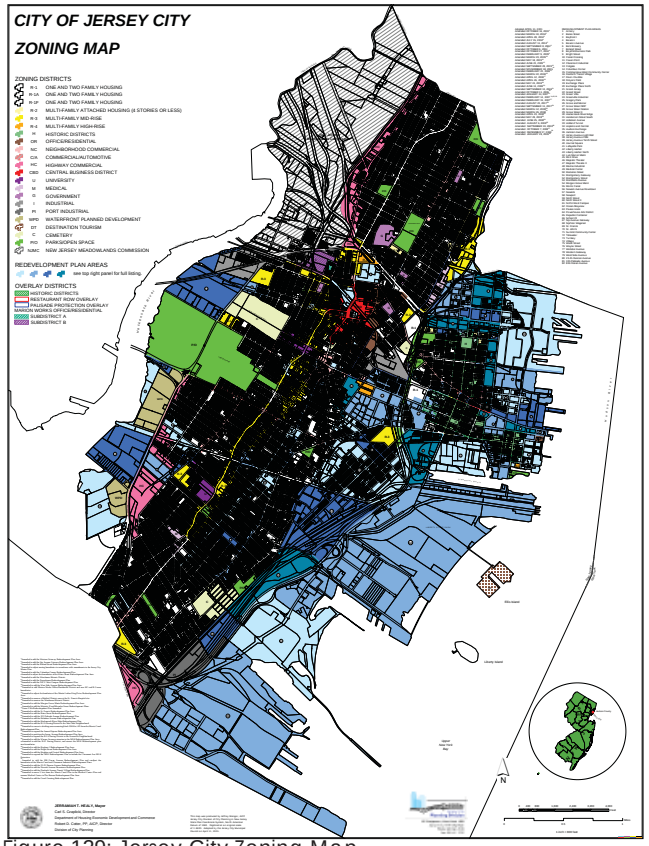


Figure 129: Jersey City Zoning Map

Site's Zone-

P/OS- Parks/Open Space

Surrounding Zones-

R-1- One and Two family Housing
R-2- Multi-Family Attached Housing
NC- Neighborhood Commercial
G- Government

The reservoir is adjacent to Pershing Park to the north, which is an active recreation space with baseball and softball fields, as well as a recreation center. To the west are the new fire department and water department headquarters, and the new Heights Middle School. This will provide for great learning opportunities for young people, since the education center is in such close proximity to the middle school. To the South and East of the site are mostly smaller scale residences, consisting of one and two family homes.

The site is a redevelopment area. There was a request for proposal by the municipality available to Historic Preservation Architecture Firms in February, 2009, to develop a strategy for regenerating the site. Because they are still in the planning process, there is no official plan set in place for the site as of now.

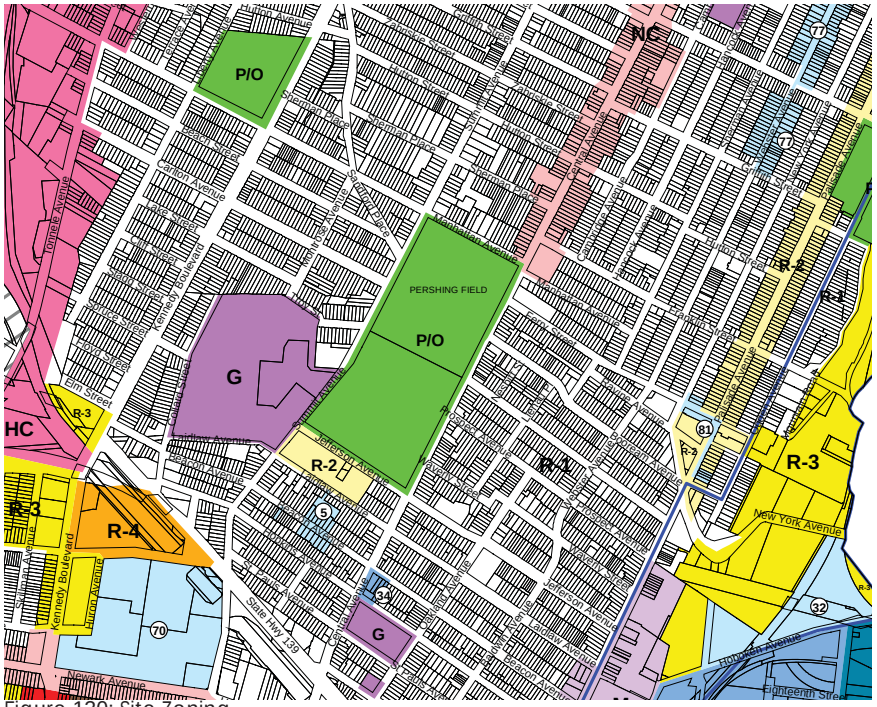


Figure 130: Site Zoning

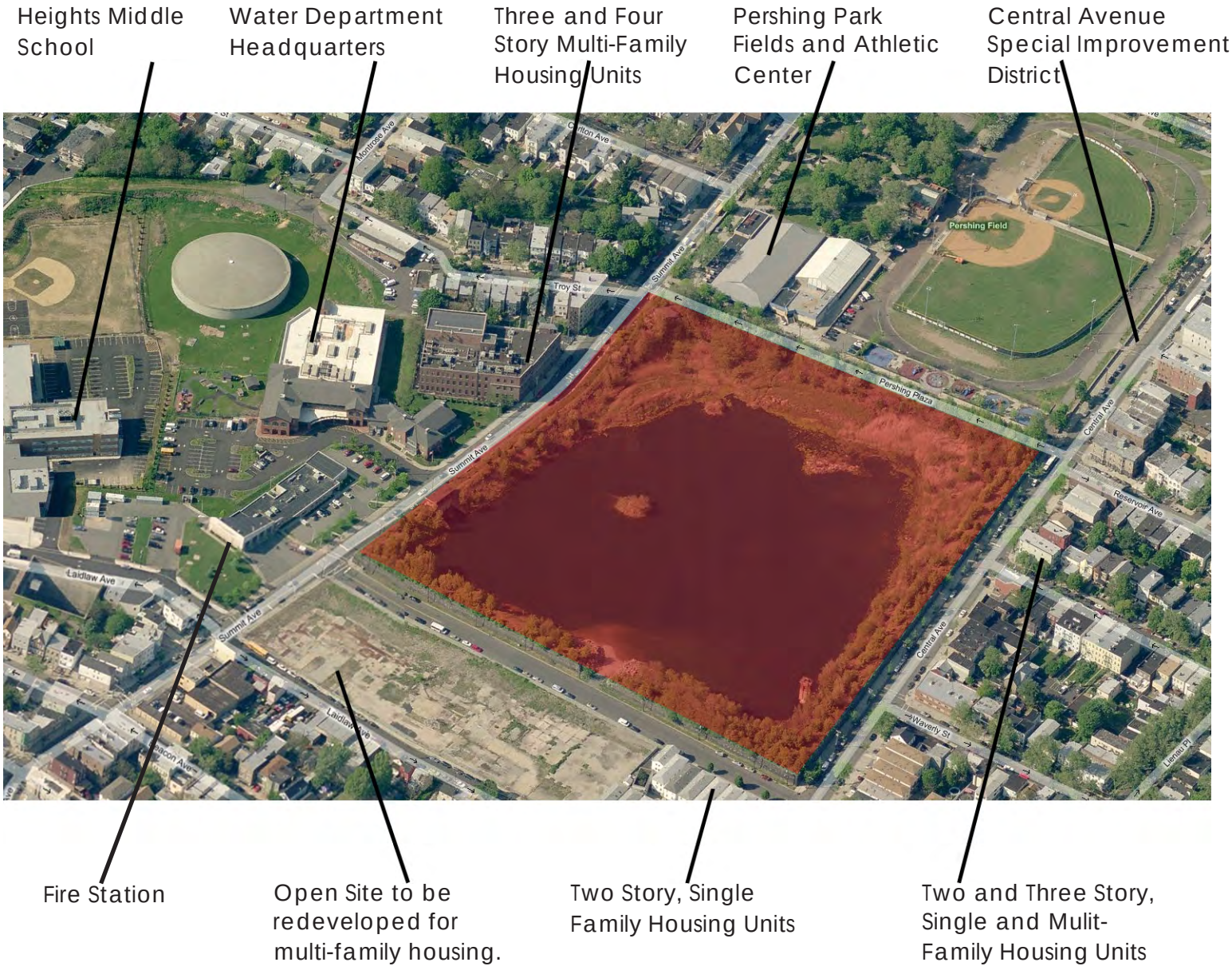


Figure 131: Aerial Site Analysis Diagram

The site is currently zoned as Park/Open Space District, but with plans to redevelop the site for recreational and educational purposes, the zoning requirements for this specific site are likely to change in order to accommodate the proposals for improving and preserving the reservoir.

Depending on the planning of the site, it is likely that a variance would need to be obtained in order to get something designed and built on the site, since it is currently zoned as Parks and Open Space. Because the project is in line with what the city is looking to do with the site, the city is likely to be willing to develop this project.

Although the site is zoned as parks and open space, the assumption is being made that for building purposes, the site could be considered neighborhood commercial, as the site anchors the edge of this zone and is a public area.

Neighborhood commercial zones permit the uses of museums, education facilities, and parks, which covers all aspects of the program.

Figure 132: Reservoir Number Three

LOT SIZE
Minimum Lot Size is 2,500 square feet.
Minimum Lot Width 25 square feet
Minimum Lot Depth: One hundred feet

SETBACKS
Front yard setback: None
Minimum Side Yard: None
Minimum Rear yard: Fifteen feet, proved that the lot depth exceeds 100 feet, the minimum rear yard shall be increased by five linear feet for every ten linear feet of increase in lot depth.

HEIGHTS
Minimum Building height: Three Stories.
Maximum Building height: Four Stories

PARKING
No on site parking is required for existing uses or for adaptive reuse of existing buildings, or for development on any lot that is located within 500 feet of a PATH station entrance

Figure 133: Site Building Area

Appendix F: Building Codes

This building falls under the A-3, Assembly Occupancy Group

Height and Area Limits

Construction Type	Floors	Area
CNST Type 1 A	Unlimited	Unlimited
CNST Type 1B	5	Unlimited
CNST Type 2A	3	15,500
CNST Type 2B	2	9,500
CNST Type 3A	3	14,000
CNST Type 3B	2	9,500
CNST Type 4	3	15,000
CNST Type 5A	1	11,500
CNST Type 5B	1	6,000

*The following codes allow for increases in size and height with the building.**

504.2- Approved automatic sprinkler system- max height increased by 20', number of stories increase is 1.

506.1
Allowable area per story=tabular area per story + (tabular area per story x Area increase factor due to frontage) + (tabular area per story x Area increase factor due to sprinkler protection)

-Increase by 200% for sprinklers

-Multiply allowable area per story by number of stories to get total

*This will be determined with a construction type is chosen during the design process.

Assembly Specific Unlimited area requirements
Type II Construction , no stage other than a platform
Equipped with sprinkler system
Assembly floors located at or within 21 inches of street or grade level and all exits are provided with ramps
Surrounded or adjoined by public ways or yards not less than 600 feet in width.

Appendix G: Precedent Analysis

Botanical Gardens
Bordeaux, France
Françoise-Helene Jourda

The Botanical Gardens are located just east of the Garonne River in Bordeaux, France. The building supplements the gardens with exhibit spaces, and greenhouses as a means of educating the public on the significance of the gardens. The building sits at the southeast corner of the site and opens up to the gardens. The size of the building is approximately 35,000 square feet. The overall form is a reflection on the abstraction of nature.

Figure 134: Aerial View of the Site

Figure 135: Approach

Figure 136: Bird's Eye View of the Site

Figure 137: Site Diagram

Figure 138: Relation to the Street

Figure 139: Scale Montage

Figure 140: Courtyard View

The building is organized around a central exterior courtyard. The forms with in the courtyard push and pull, into the natural setting. The idea of interconnectedness between the interior and exterior is apparent throughout the entire design with the use of natural materials as well as glazing

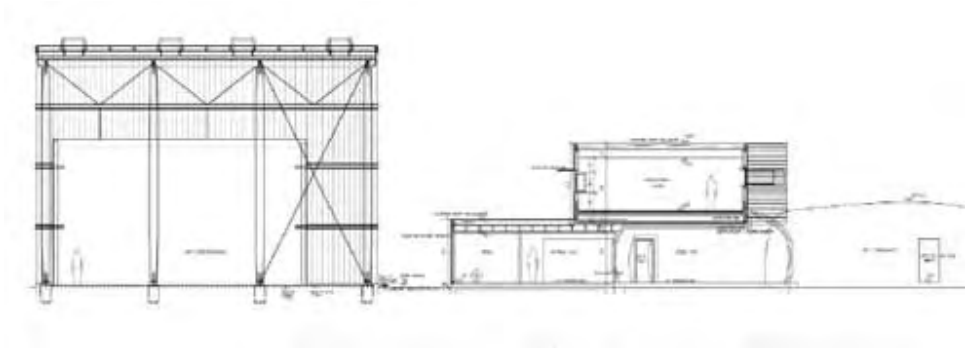


Figure 141: Building Section

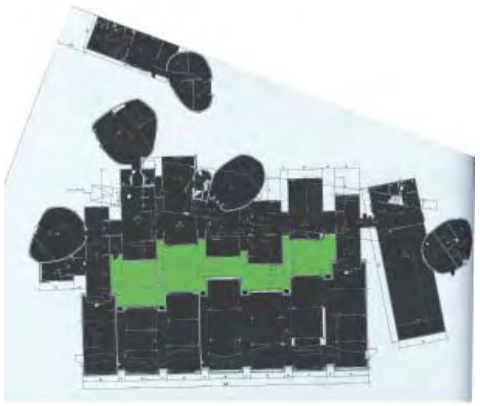


Figure 142: Organization

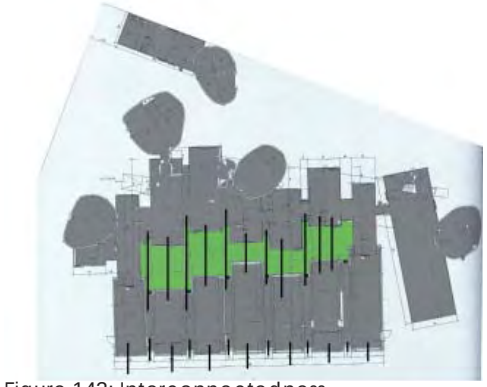


Figure 143: Interconnectedness

Figure 144: Circulation

Figure 145: Framed Moments

There are 3 different types of forms: glass boxes, wooden boxes and concrete “pebbles.” Each of those forms serve different programmatic purposes. The Glass boxes serve as greenhouses, which provide three different climatic zones with different types of vegetation for visitors to experience. The wooden boxes serve as exhibition spaces and offices, and the concrete “pebbles” hold classrooms, a store and a cafe. The points where these different forms meet allow for interesting spatial experiences.

Figure 146: Photovoltaics

Figure 147: Program

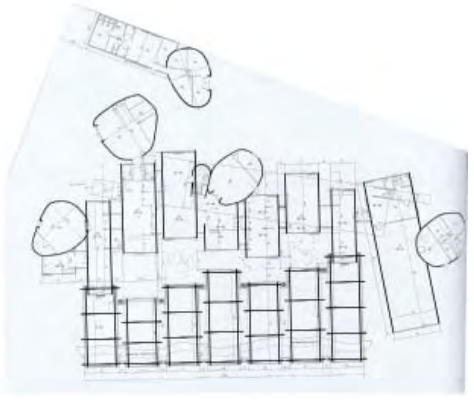


Figure 148: Structure

Figure 149: Greenhouse Interior

The overall structure is a simple column and beam system, made out of timbers which make a strong connection to nature. The building is inherently green, with the use of local materials, as well as technologies like photovoltaic panels.

Ford Calumet Environmental Center
Best Nest Building
Calumet, IL, USA
Studio Gang Architects

Center which educates visitors on past and present of the regions natural and Industrial history. It is built out of discarded and salvaged local materials. The program Program includes an outdoor classroom for observing wildlife and nature. It uses sustainable heating and cooling systems which become a part of the program's educational aspect.

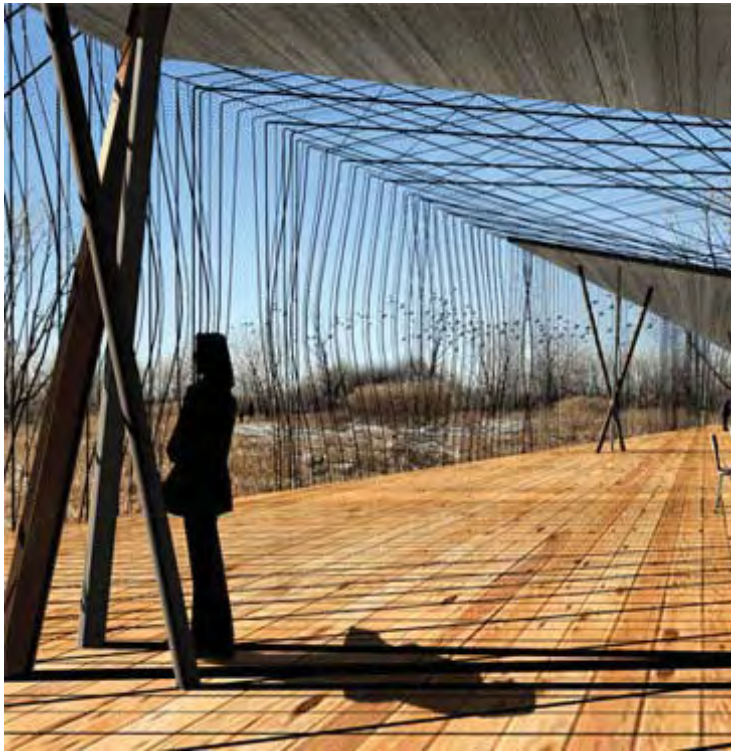
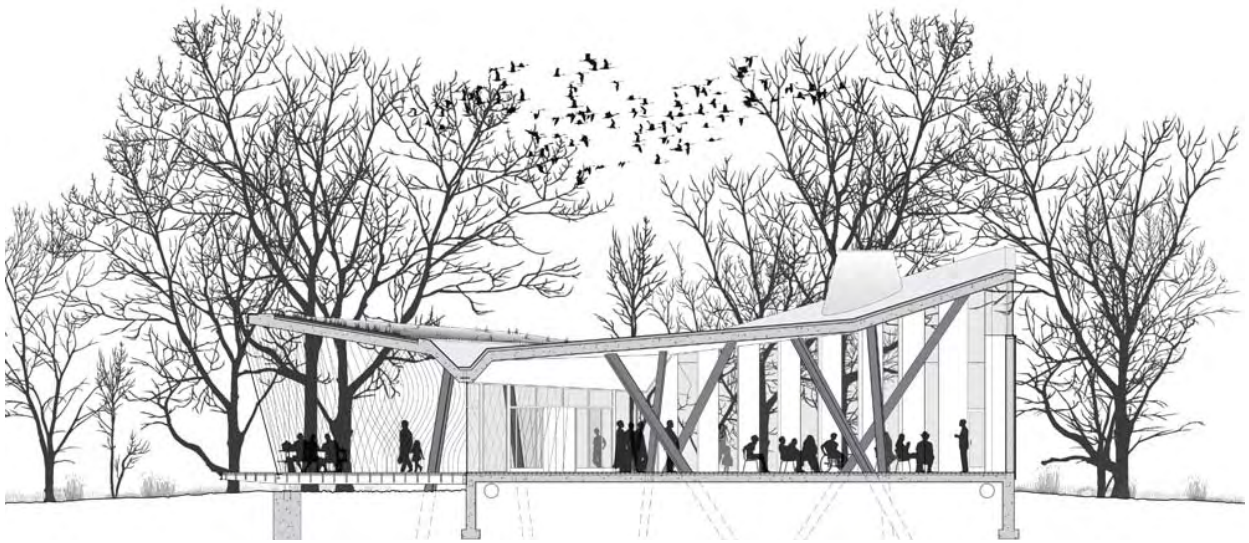


Figure 150: Interior Space

Figure 151: Building Exterior



Program
-27,000 sq ft learning center
-Classrooms
-Exhibition areas
-Labs
-Offices
-Auditorium
-Outdoor nature trails
-Outdoor Gathering Spaces

Figure 152: Building Section

The structural members are an abstraction of trees, and the overall composition is meant to fit naturally within the landscape. Interior spaces connect to nature with natural lighting techniques. Natural materials found on the site are brought in as displays to further connect visitors with nature.

Figure 153: Interior Space

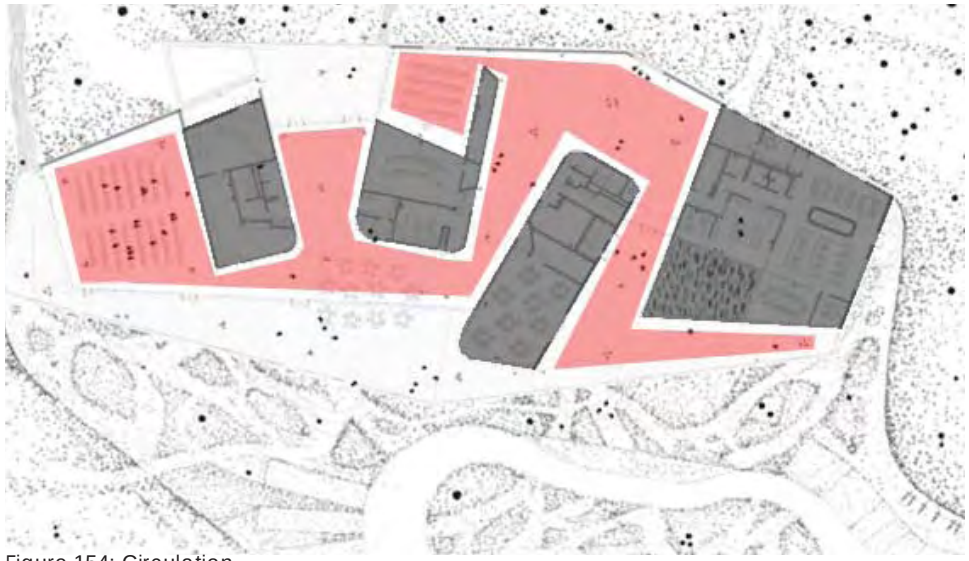


Figure 154: Circulation

Bodegas Bell-llocc
Palamós, Girona, Spain
RCR Arquitectes

This wine cellar located in Spain serves as a place for the production and consumption on wine. Most of the spaces in the building are locate underground and are connected by a promenade which is revealed above ground. The relationship between the building and landscape is explored in this project.

Figure 155: Entry

Figure 156: Relationship to the Site

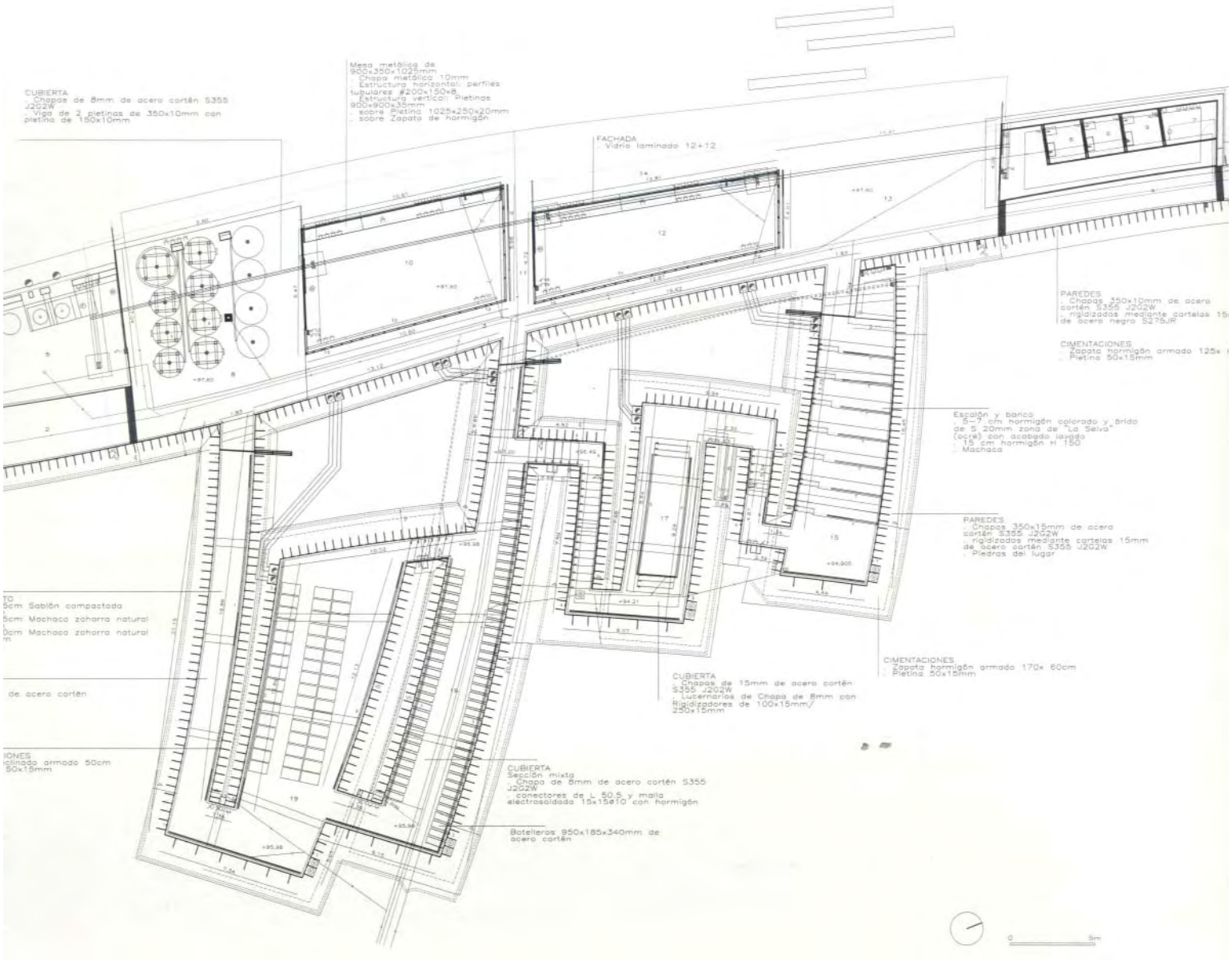


Figure 157: Floor Plan

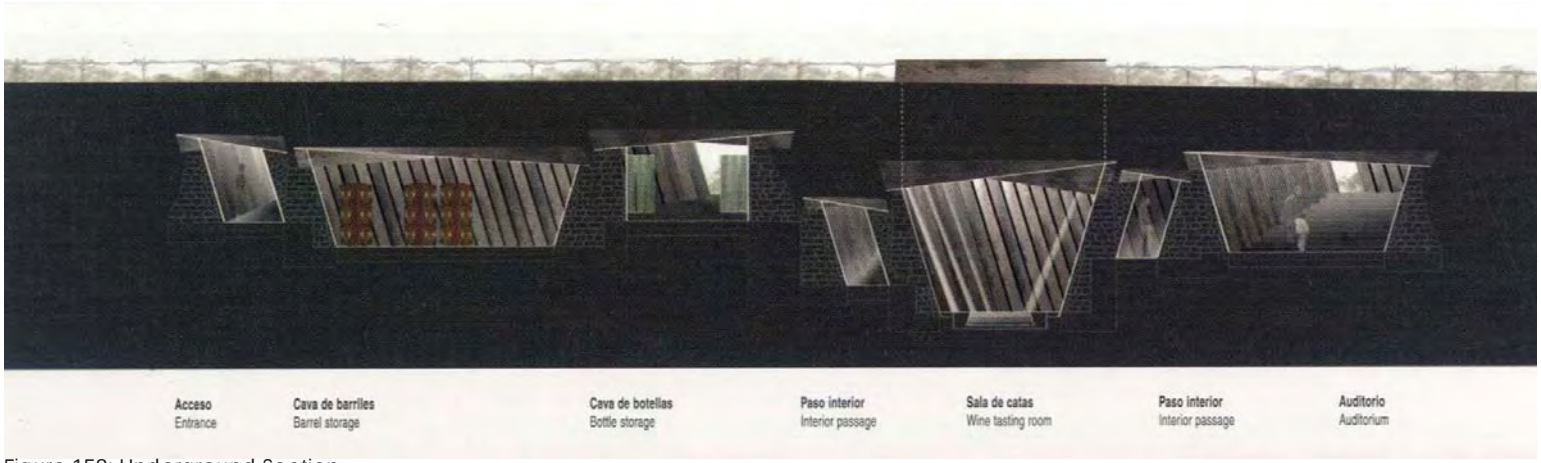


Figure 158: Underground Section

Figure 159: Lighting Underground

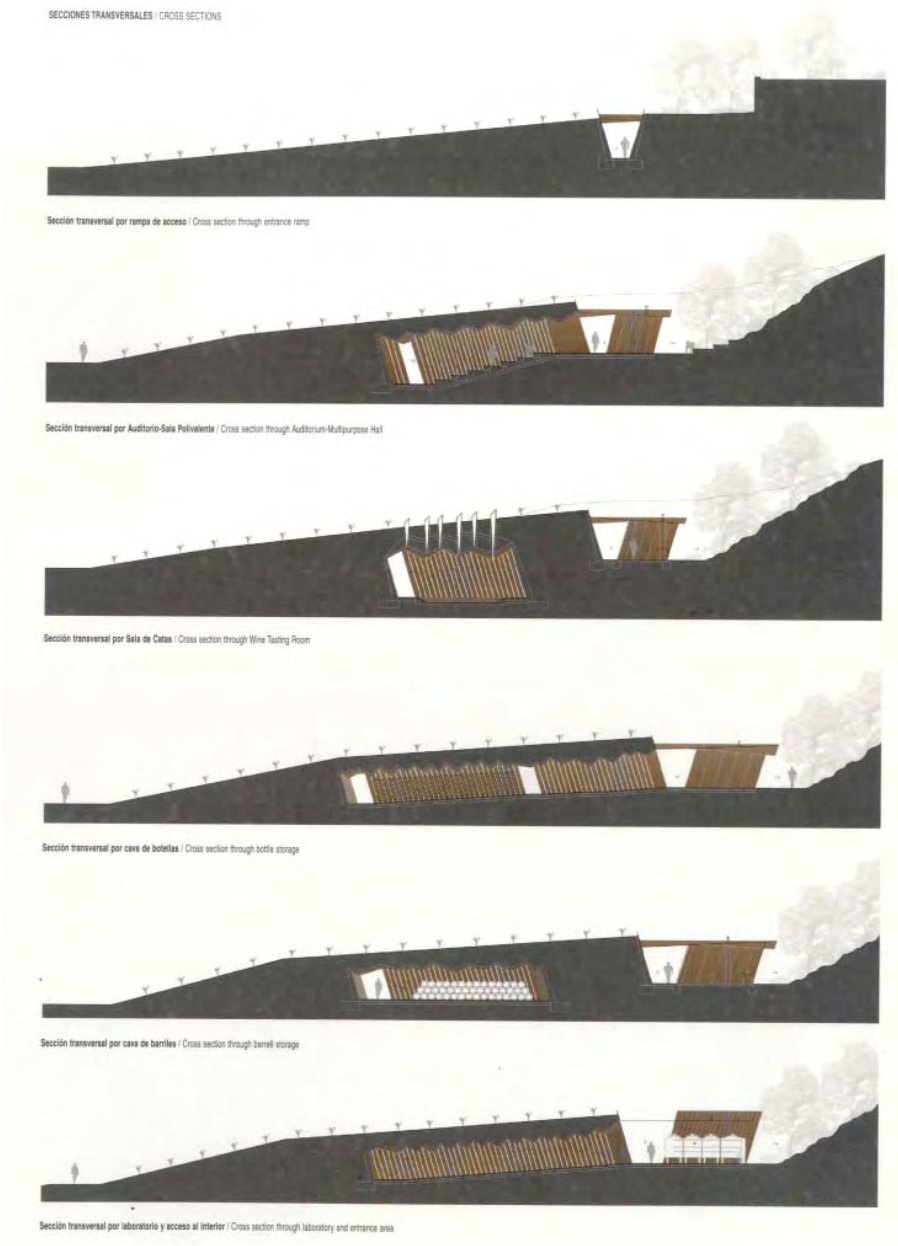


Figure 160: Series of Sections

Figure 161: Main Corridor

The sectional quality of the spaces allows for an interplay between the underground and above ground, as well as the natural and artificial landscape. The natural light is brought in from above and floods into the spaces.

Therme Vals
Graubunden Canton, Switzerland
Peter Zumthor

The Thermal Baths creates a complete sensory experience for those who visit. The design blends in with the landscape and appears as if it were always there. The interior spaces are carved out of the ground and open up to the exterior, framing views of the landscape beyond.

Figure 162: The Building becomes the Site

Figure 163: Carved Spaces

Figure 164: Architecture Framing Nature

Figure 165: Architecture Framing Nature

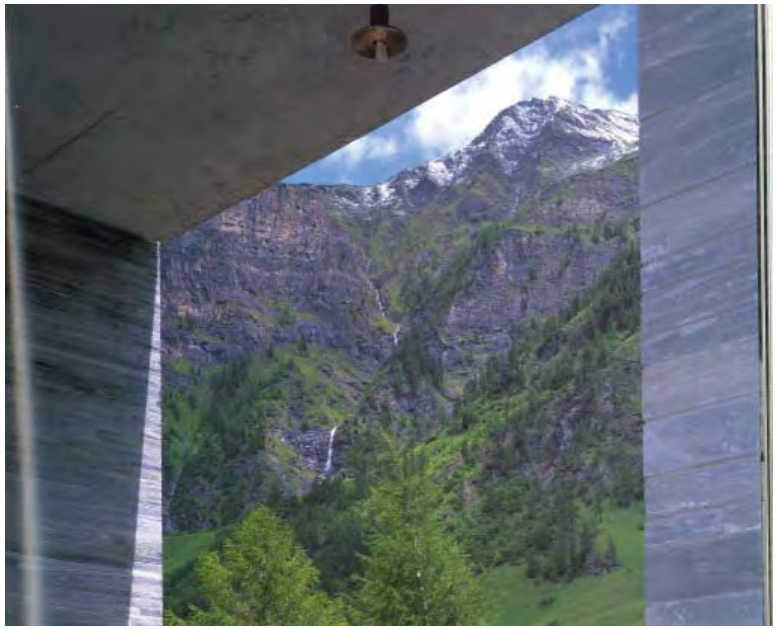


Figure 166: Architecture Framing Nature

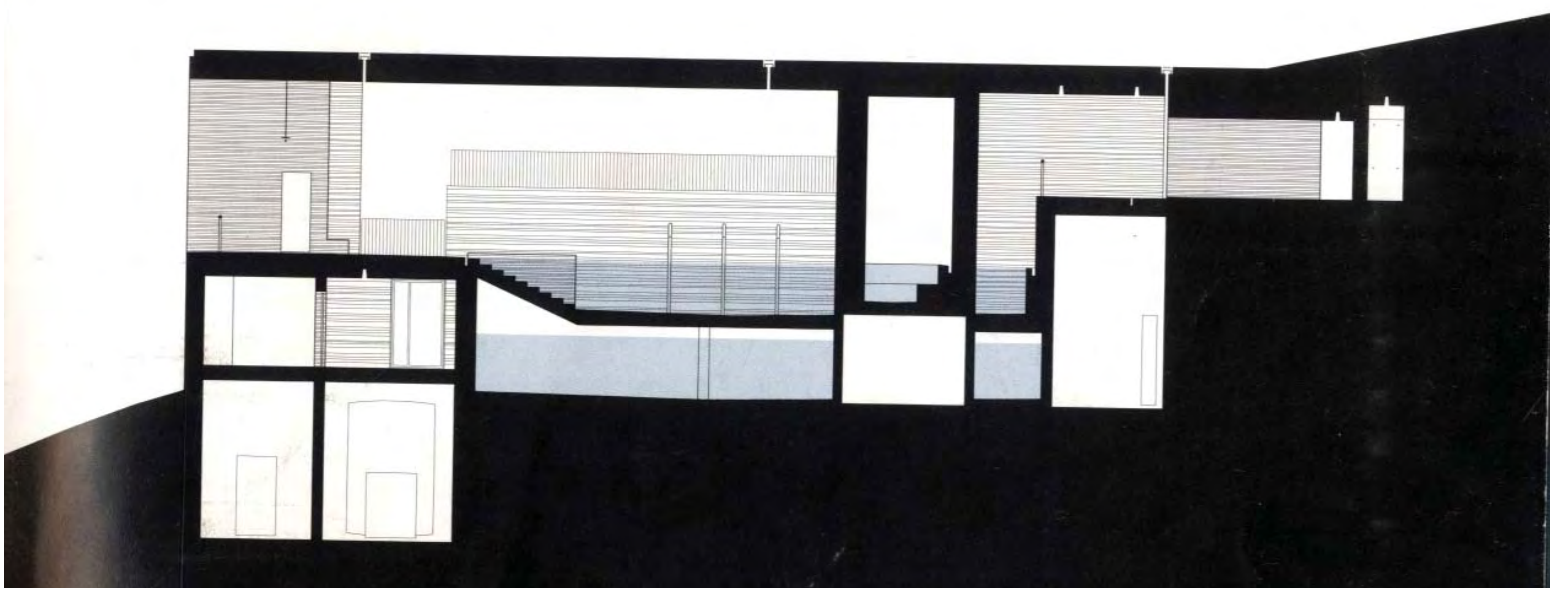


Figure 167: Building Section

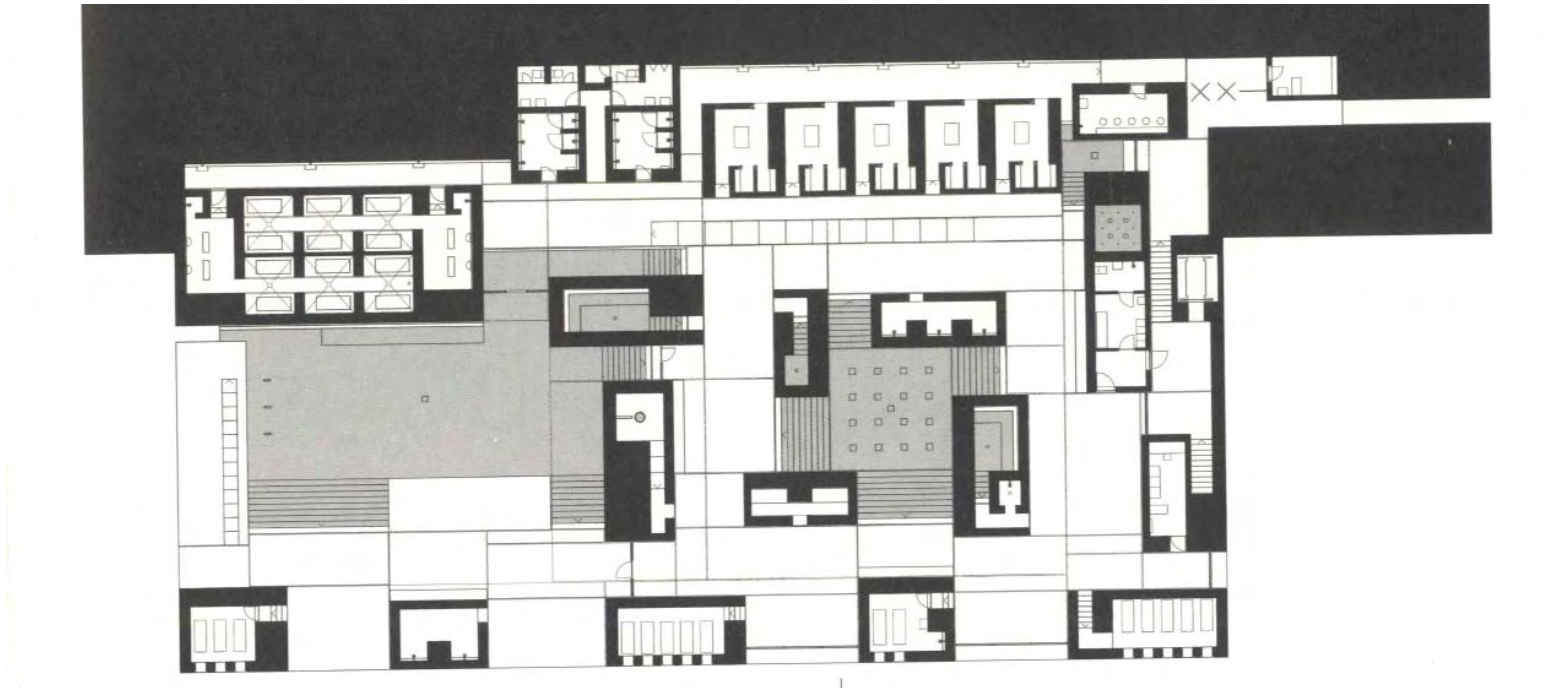


Figure 168: Floor Plan

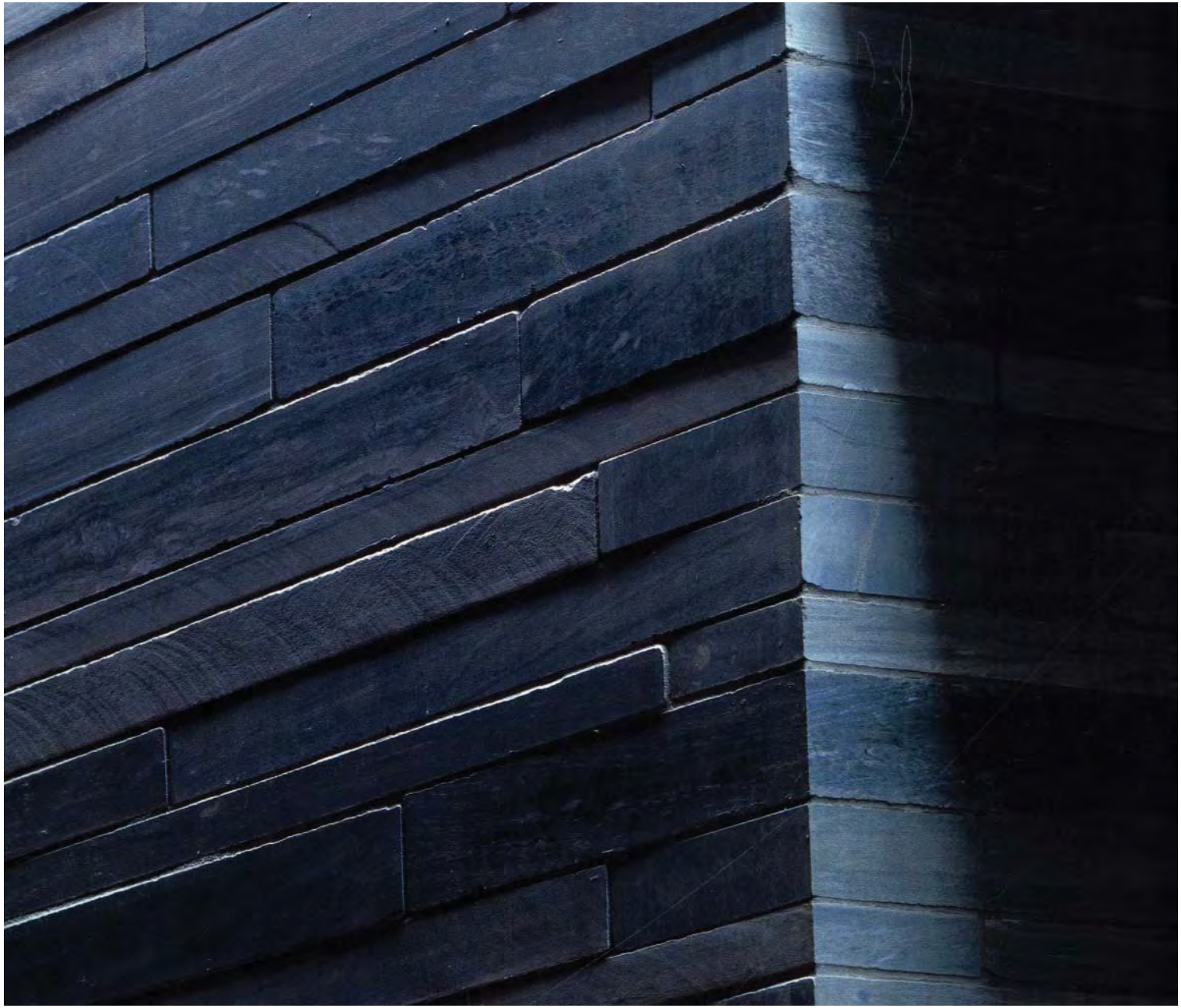


Figure 169: Rough Materiality

Appendix H: Thesis Proposal Board

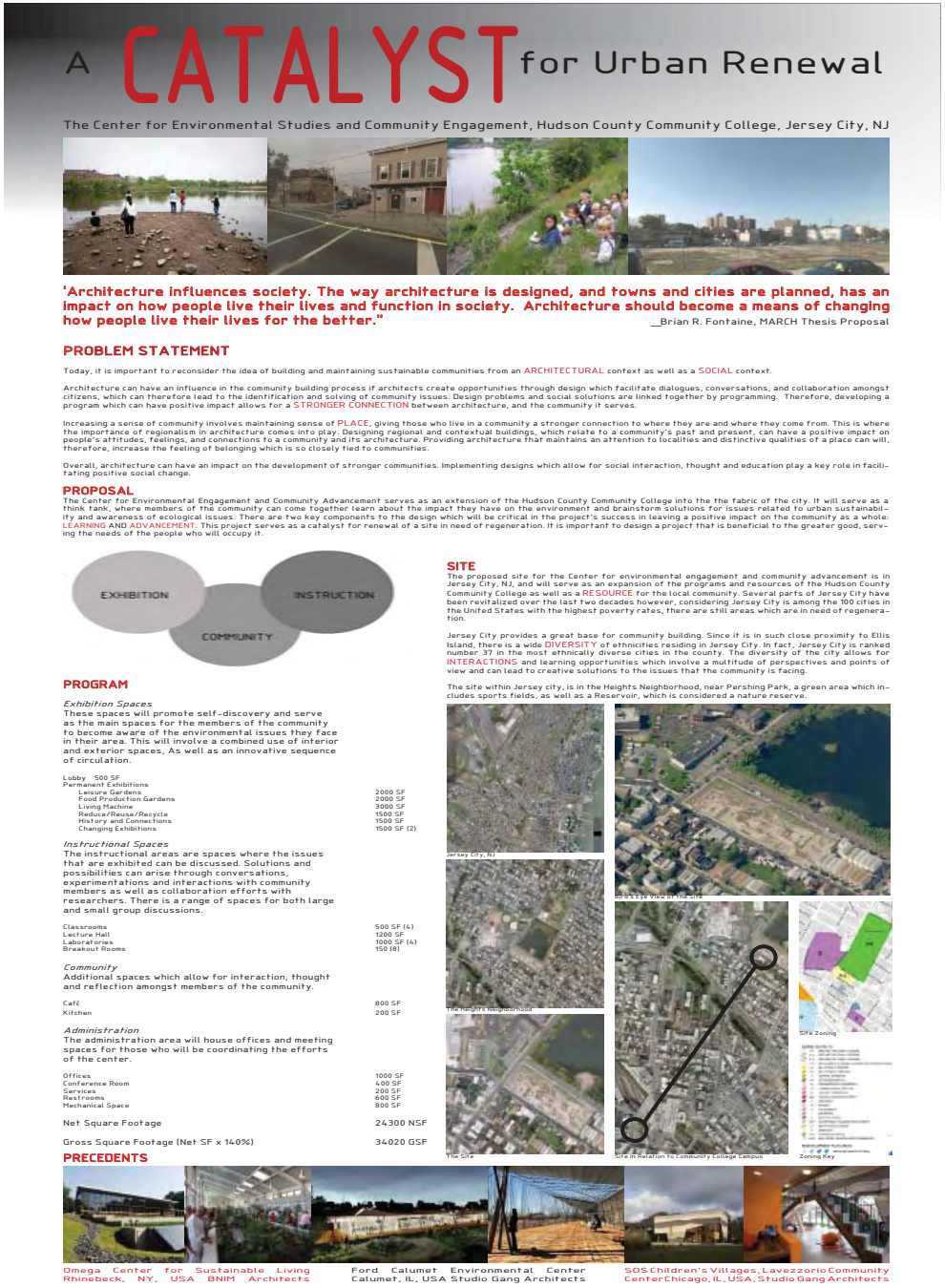


Figure 170

Appendix I: Mid-Review Boards

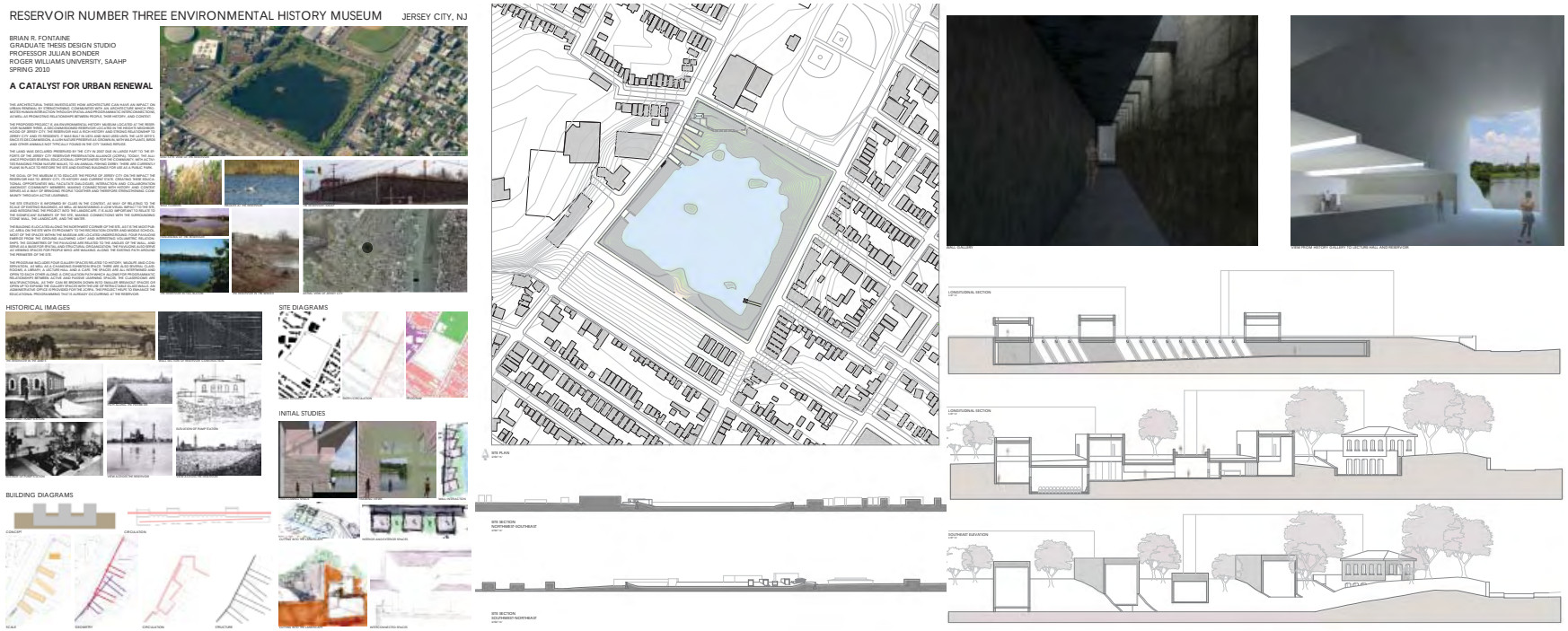
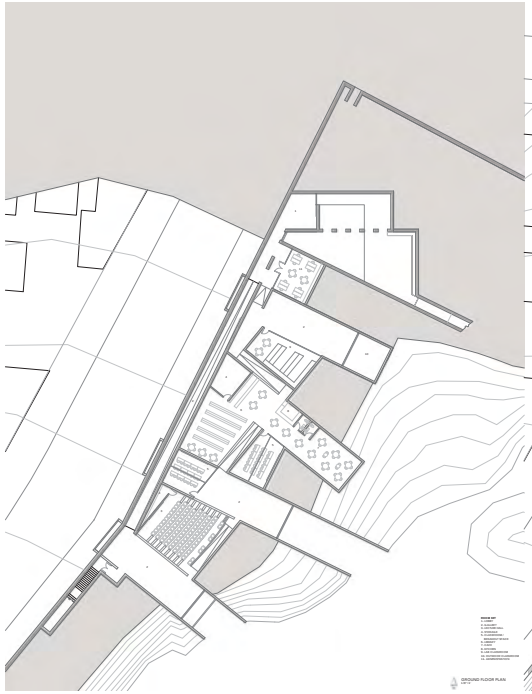


Figure 171

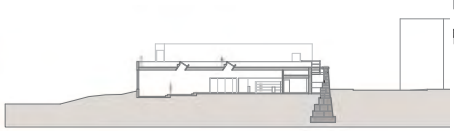


MATERIALS

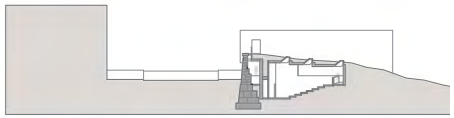
WEATHERING STEEL

COPPER

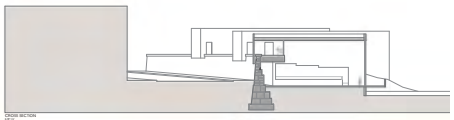
DETAIL: NANAWALL



CROSS SECTION

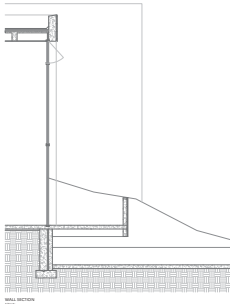


CROSS SECTION



CROSS SECTION

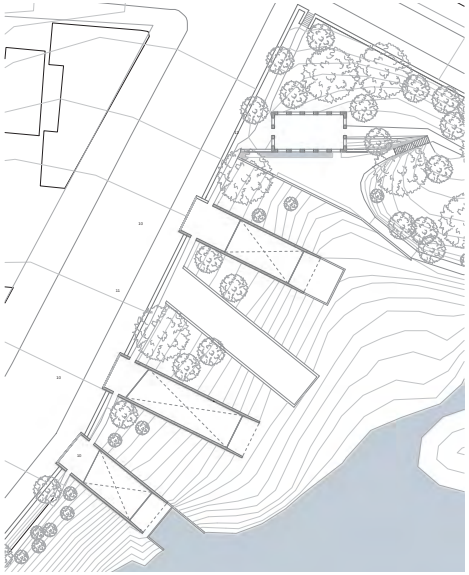
CONSTRUCTION



WALL SECTION

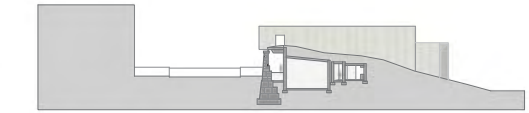
Appendix J: Gate Review Boards

Figure 172



FIRST FLOOR PLAN
1/16"=1'-0

CROSS SECTION
1/16"=1'-0



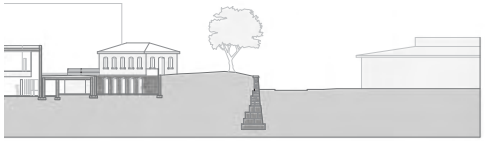
CROSS SECTION
1/16"=1'-0

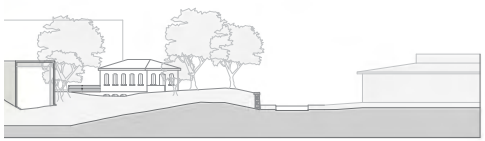
CROSS SECTION
1/16"=1'-0

WALL GALLERY

Lecture Hall

Water Gallery





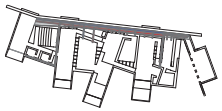
BUILDING SYSTEMS

STRUCTURAL AXONOMETRIC DIAGRAM

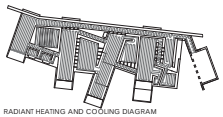
THE BUILDING'S MAIN STRUCTURAL COMPONENT IS CONCRETE DUE TO THE SUBTERRANEAN NATURE OF THE BUILDING. IT IS STRUCTURED WITH CAST IN PLACE CONCRETE LOAD BEARING WALLS. EACH WALL IS COMPOSED OF 2 WALLS WITH RIGID INSULATION BETWEEN EACH WALL. CONCRETE ON THE INTERIOR AND EXTERIOR HELPS TO ENHANCE THE FRAMING OF VIEWS TO THE RESERVOIR BY CREATING A SENSE OF AMBIGUITY BETWEEN THE INTERIOR AND EXTERIOR. THE ROOF STRUCTURE IS A CONCRETE SLAB, WHICH SITS ON THE INTERIOR LOAD BEARING WALL. TO CONTRAST THE ROUGH STONE WALL THE CONCRETE HAS A SMOOTH FINISH, AND THE FORM WORK WILL BE CONSTRUCTED IN SUCH A WAY TO REDUCE GAPS. THE PAVILIONS ALSO MAINTAIN A SENSE OF LIGHTNESS, AS THE WALLS, BECOME THIN AT THE ENDS OF THE STRUCTURE.

A GEOTHERMAL SYSTEM WILL PROVIDE RADIANT HEATING AND COOLING FOR THE BUILDING, WITH VERTICAL CLOSED LOOP HEAT PUMPS TO BE LOCATED WITHIN THE EXCAVATED AREAS BETWEEN THE PAVILIONS AND UNDERGROUND SPACES.

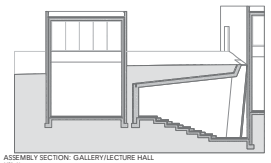
A CAVITY ABOVE THE WALL GALLERY/CORRIDOR PROVIDES SPACE FOR THE MAIN SUPPLY AND RETURN DUCTS TO BE USED FOR AIR VENTILATION. DUCTS BRANCH OFF OF THE CORE TO THE MAIN SPACES IN THE BUILDING.



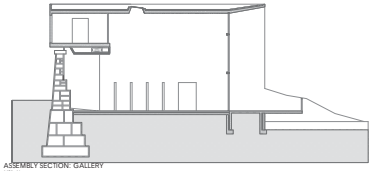
MECHANICAL VENTILATION DIAGRAM



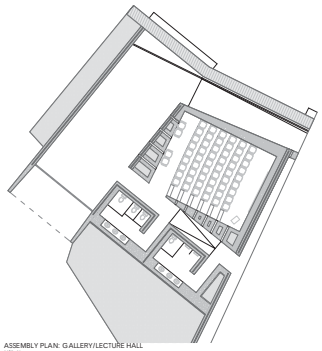
RADIANT HEATING AND COOLING DIAGRAM



ASSEMBLY SECTION: GALLERY/LECTURE HALL
1/8"=1'-0



ASSEMBLY SECTION: GALLERY
1/8"=1'-0



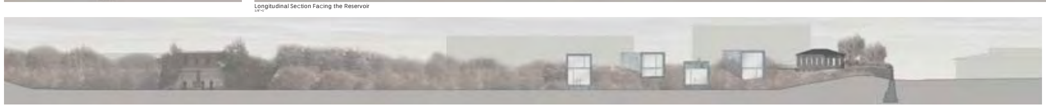
ASSEMBLY PLAN: GALLERY/LECTURE HALL
1/8"=1'-0

Appendix K: Final Review Boards

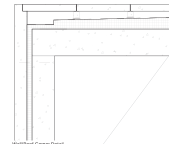
Figure 173

Longitudinal Section Facing Summit Avenue

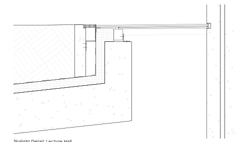
Longitudinal Section Facing the Reservoir



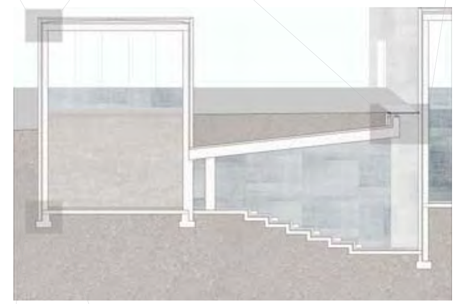
Section Key



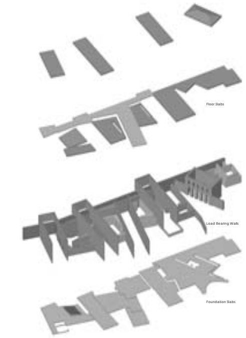
Wall/Roof Corner Detail
1 1/2"=1'



Skylight Detail: Lecture Hall
1 1/2"=1'



Wall Assembly Section: Water Gallery & Lecture Hall



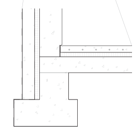
Structural System Diagram

The building's main structural component is concrete due to the subterranean nature of the building. It is structured with cast in place concrete load bearing walls. Each wall is composed of 2 walls with rigid insulation between each wall. Concrete on the interior and exterior helps to enhance the framing of views to the reservoir by creating a sense of ambiguity between the interior and exterior. The roof structure is a concrete slab, which sits on the interior load bearing wall. The finish face of the concrete is rough and untreated so the building will visually age and grow into the site. The form work will be constructed in such a way to reduce gaps. The pavilions also maintain a sense of lightness, as the walls, become thin at the ends of the structure.

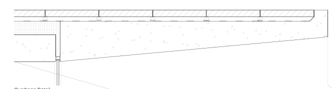
A geothermal system will provide radiant heating and cooling for the building, with vertical closed loop heat pumps to be located within the excavated areas between the pavilions and underground spaces.

A cavity above the wall gallery/corridor provides space for the main supply and return ducts to be used for air ventilation. Ducts branch off of the core to the main spaces in the building.

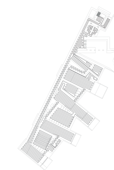
Water Gallery



Foundation Detail
1 1/2"=1'

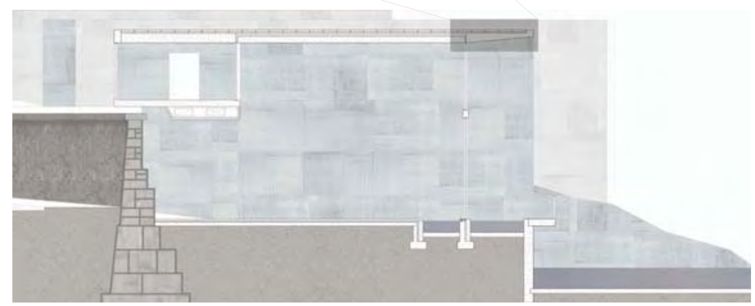


Overhang Detail
1 1/2"=1'



Radiant Floor Heating and Cooling Diagram

Mechanical Ventilation Diagram



Appendix L: Final Models

Site Model

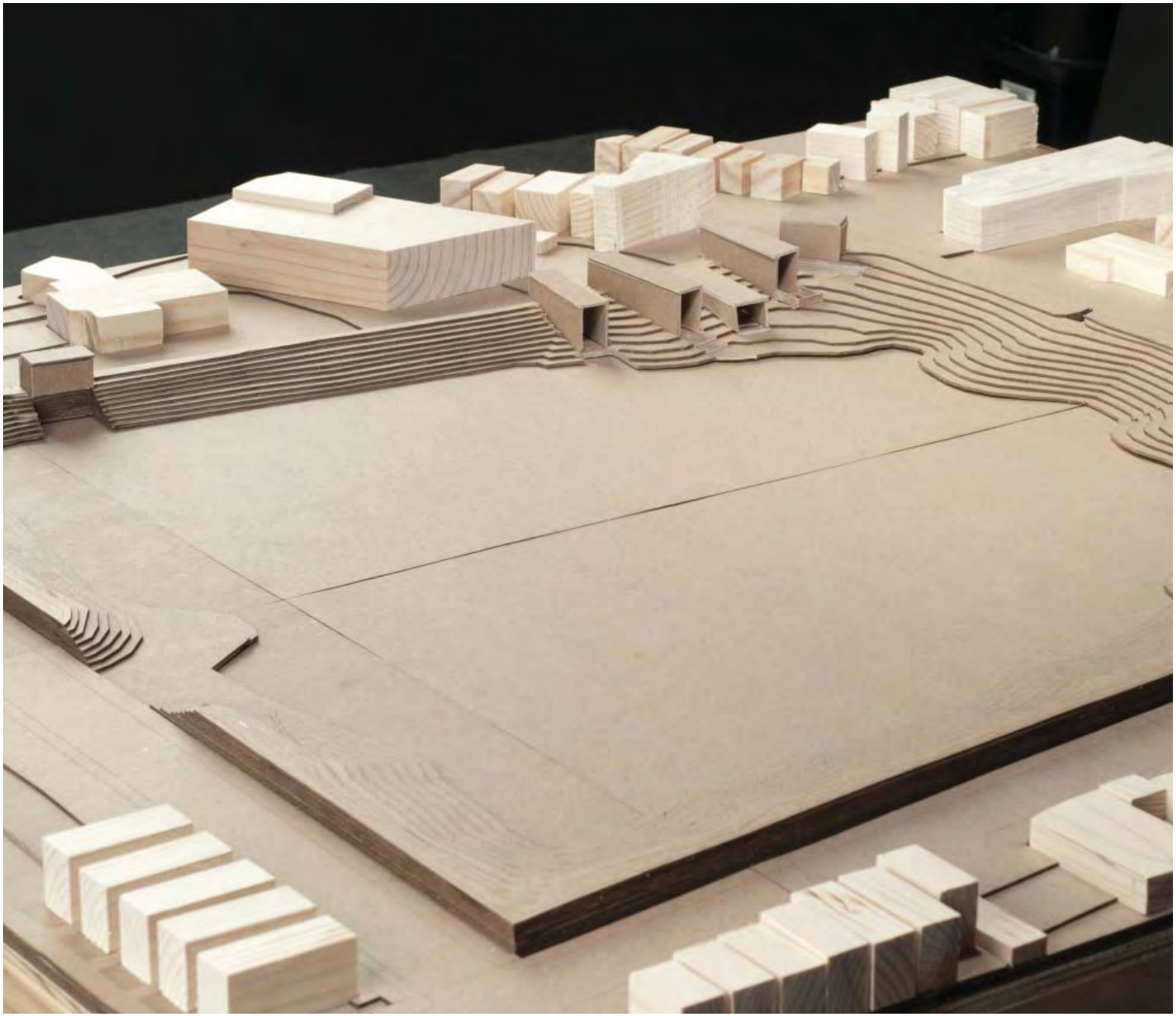


Figure 174

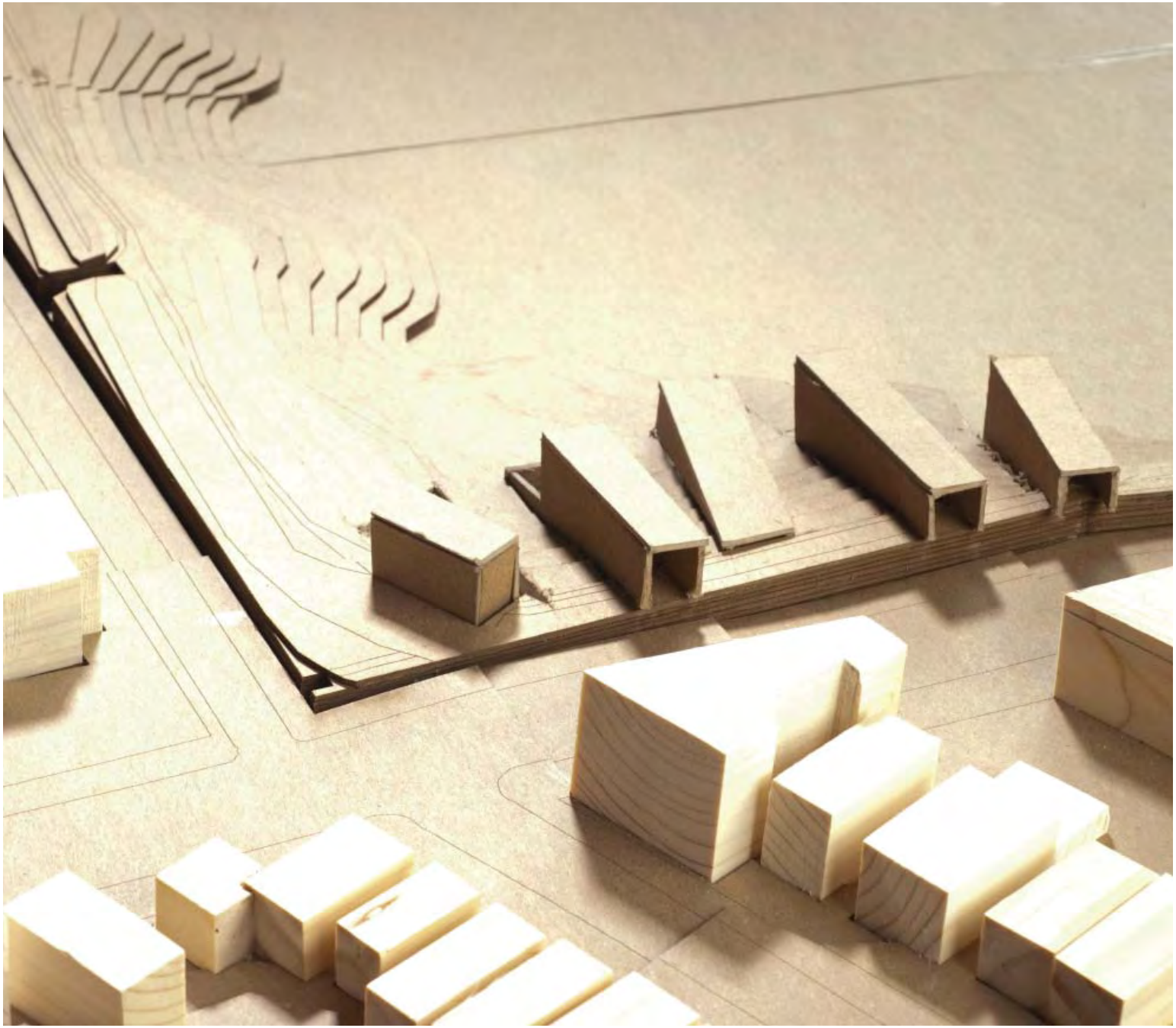


Figure 175

Building Model

Figure 176

Figure 177

Figure 178

Structural Bay Model

Figure 179

Figure 180

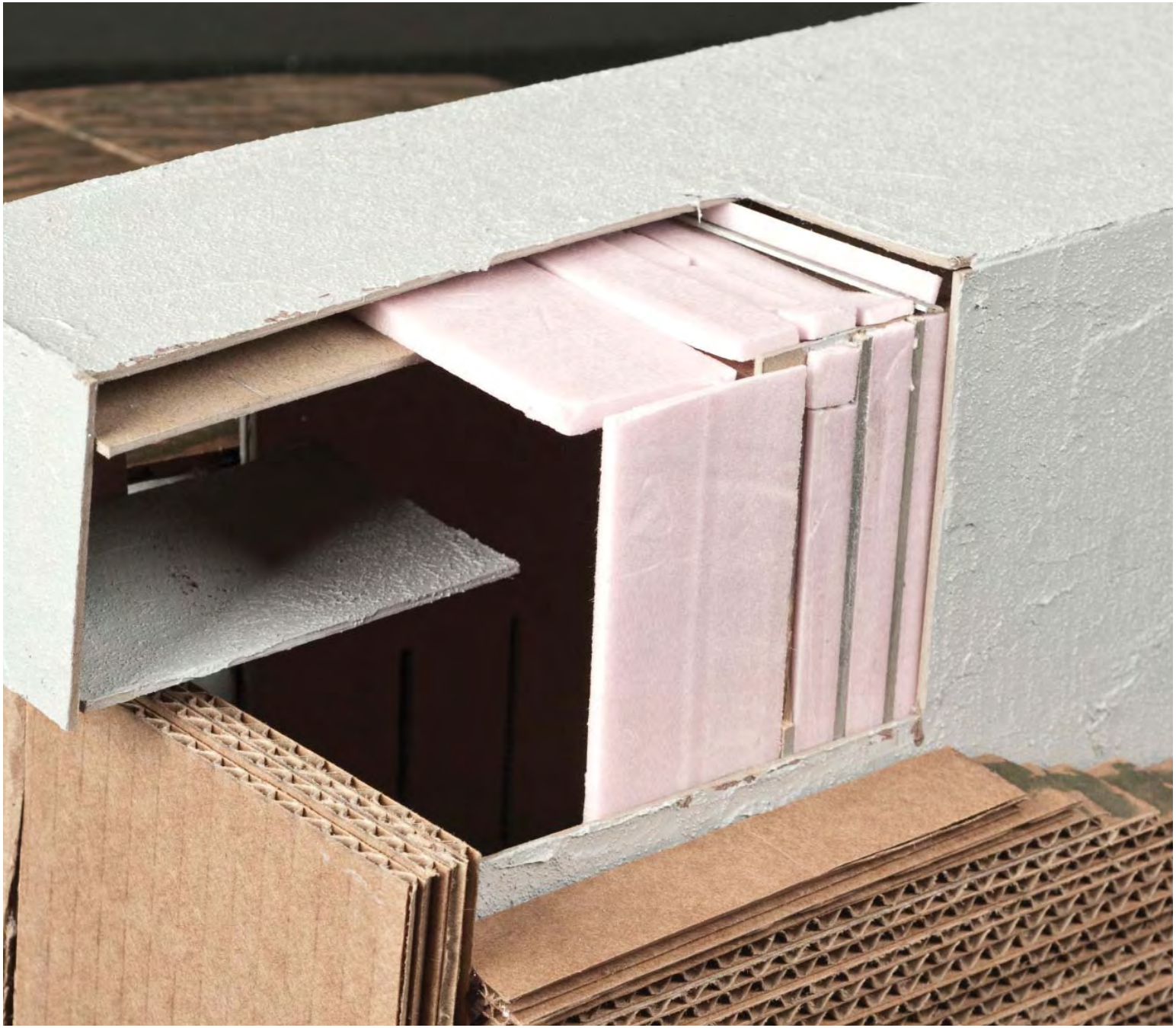


Figure 181

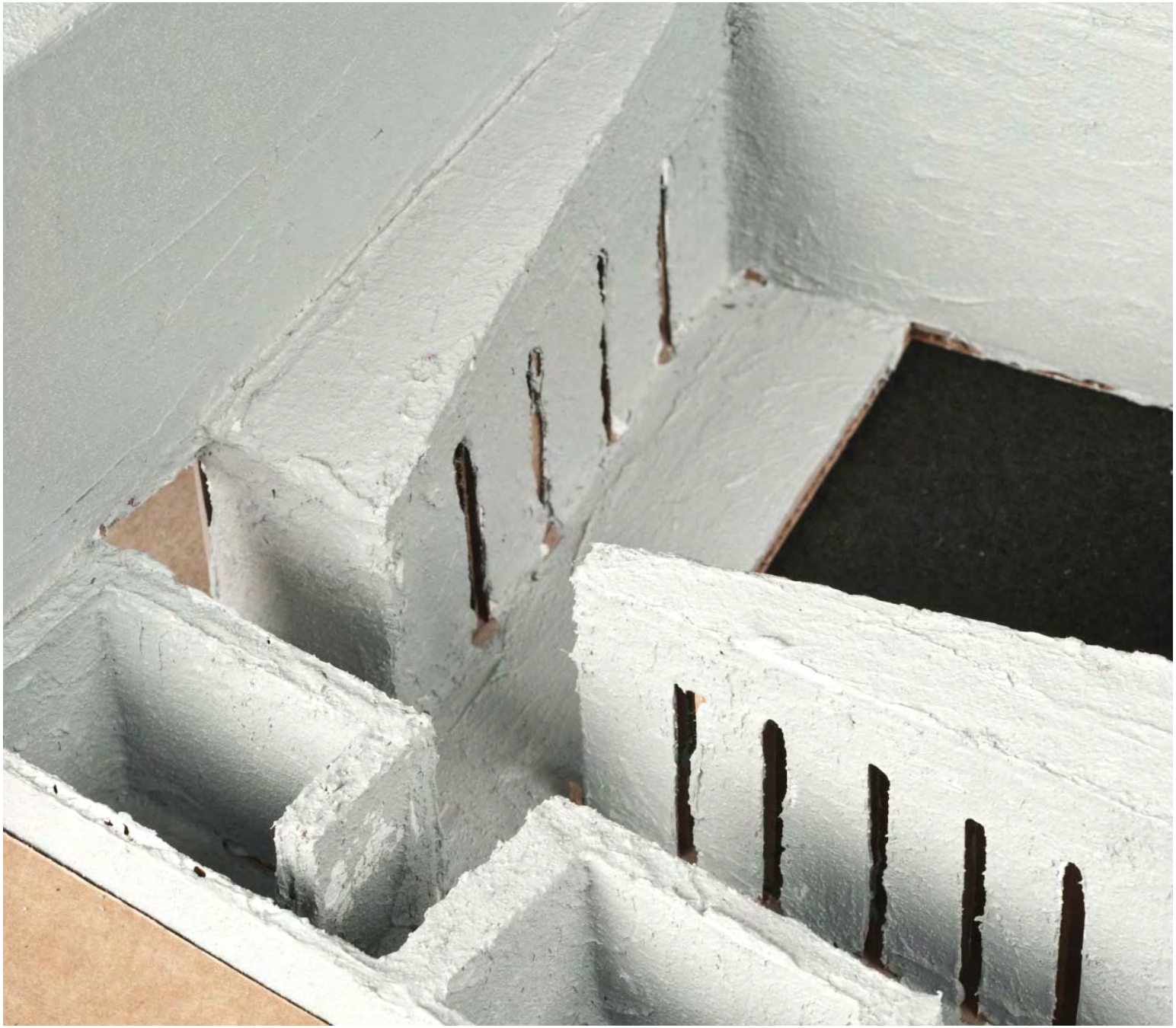


Figure 182

Sectional Bay Model

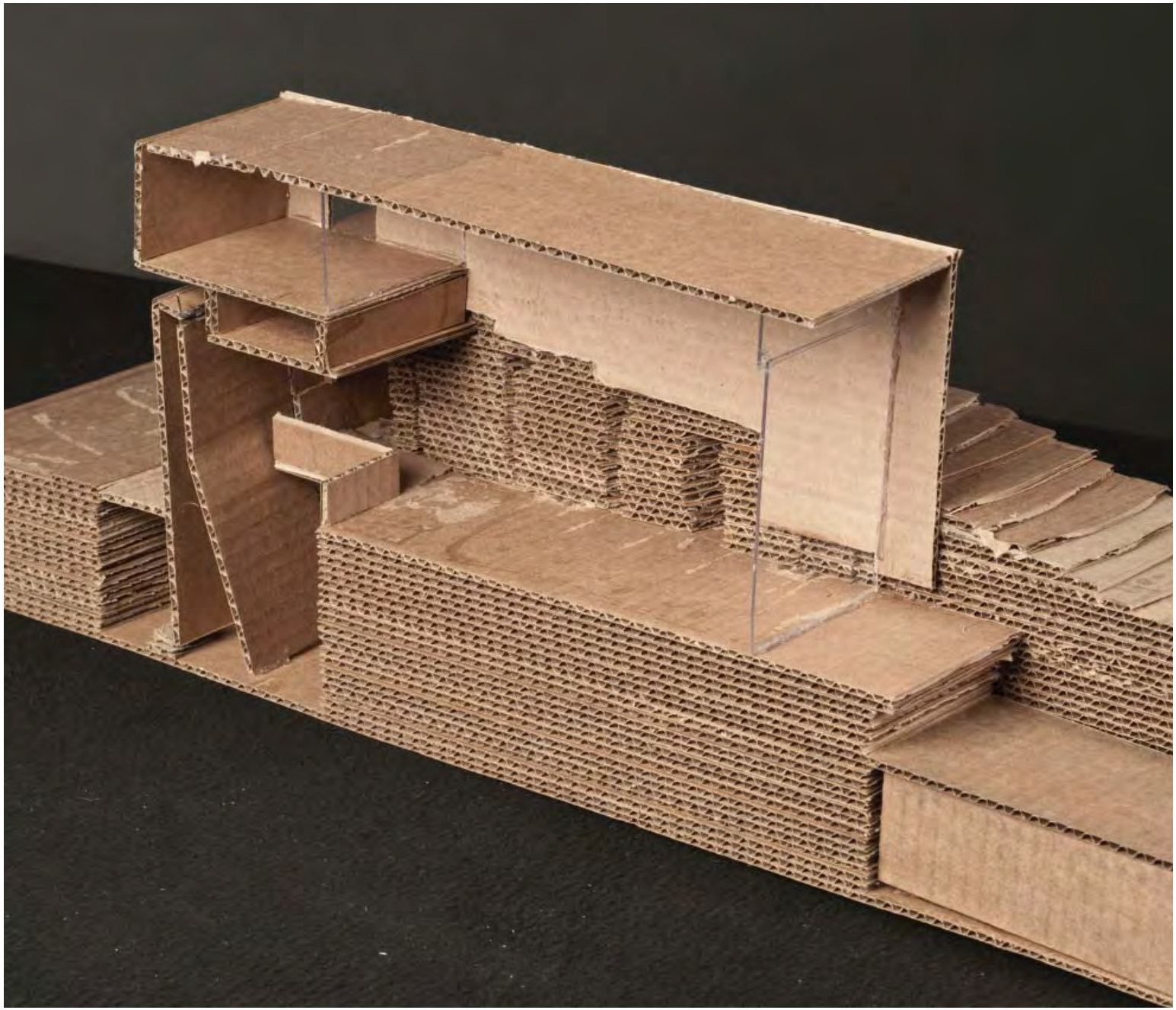


Figure 183

Figure 184

Figure 185

Documentation

Annotated Bibliography

"About Us." Jersey City Reservoir Preservation Alliance. Web. <http://new.jcreservoir.org>.

Barton, Hugh. Sustainable Communities The Potential for Eco-neighbourhoods. Minneapolis: Earthscan Publications Ltd., 2000. Print.
Hugh Barton, a consultant on sustainable settlement planning and environmental decision-making, looks at eco-community precedents, explores how we can re-think neighborhood planning and implement those ideas.

Birch, Eugenie L., and Susan M. Wachter, eds. Growing Greener Cities Addressing Urban Environmental Issues in The Twenty-First Century. Philadelphia, PA: University of Pennsylvania, 2008. Print.
Eugenie Birch and Susan Wachter, the directors of the Penn Institute for Urban Research, look at ideas for transforming our cities, and growing the economy while implementing green infrastructure and an ecological foundation.

City of Jersey City. 2009. 15 October 2009 < http://www.cityofjerseycity.com/>

"City of Jersey City Request for Proposals Reservoir No. 3 Historic Preservation Plan Project # 2007-031." Web. <http://cityofjerseycity.com/uploadedFiles/Public_Information/Res%203%20RFP.pdf>.

Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.

Evans, Richard, Regenerating Town Centres. Manchester [England]: Manchester UP, Distributed exclusively in the U.S. by St. Martin's, 1997. Print.
Richard Evans, A Senior Research Fellow at the European Institute for Urban Affairs, Liverpool John Moores University, analyses town centers in Britain. He looks at their current critical state and how they can be regenerated.

Haas, Tigran. New Urbanism and Beyond Contemporary and Future Trends in Urban Design. New York: Rizzoli, 2008. Print.
Tigran Haas, explores various factors in urban design and presents the principles by which we should design our cities of the future which will allow them to thrive and sustain life.

Hyland, Stanley E., ed. Community Building in the Twenty-First Century (School of American Research Advanced Seminar). New York: SAR, 2005. Print.
Stanley Hyland is an Associate Professor in the School of Urban Affairs and Public Policy at the University of Memphis. He Looks at concepts and practices behind community building today, and how we can rethink it in a global and technological world in order to make our communities strong and vital.

Jason, Leonard. Community Building; Values for a Sustainable Future. Westport, Conn: Praeger, 1997. Print.
Leonard Jason a Professor of Psychology at DePaul University, explores a new paradigm in sustainable community building at a physical and theoretical level.

Jersey City Economic Development Corporation Your Gateway to Opportunity: Urban Enterprise Zone Five Year Strategic Plan 2005." Jersey City Economic Development Corp. Web. 23 Nov. 2009. <Jcedc.org/Pages/uezsids.html>.

Jersey City Reservoir Preservation Alliance. 2009. 29 October 2009<http://new.jcreservoir.org/>

"Jersey City, New Jersey" City-Data.com. 2009. 29 October 2009<http://www.city-data.com/city/Jersey-City-New-Jersey.html>

"Organism." Merriam-Webster Online Dictionary. 2009. Merriam-Webster Online. 15 October 2009 <http://www.merriam-webster.com/dictionary/Organism>

Park, Kyong. Urban Ecology Detroit and Beyond. Hong Kong: Map Book, 2005. Print.
Kyong Park tells the story of Detroit and its process of decay over the last few decades.

Sarkis, Hashim, ed. Corbusier's Venice Hospital and the Mat Building revival. Munich: Prestel, 2001. Print.
Hashim Sarkis, gives an in-depth look at Le Corbusier's Venice Hospital project and the principles behind Mat Urbanism. This source provides some great insight on Mat Building, which encompasses a lot principles in architecture that I have explored as it relates to strengthening communities.

"Reservoir No. 3." Jersey City Landmarks Conservancy. Web. <www.jclandmarks.org/campaign-reservoir3.shtml>.

T & M Associates. “Jersey City Open Space Master Plan.” City of Jersey City. Apr. 2008. Web. <http://www.cityofjerseycity.com/uploadedFiles/City_Government/Department_of_Business_Administration/Jersey%20City%20Recreation%20Master%20Plan%20(Web)%20_4-2008%20REDUCED.pdf

“The Heights Section of Jersey City.” Central Avenue Special Improvement District. Web. <www.jcheights.com/community-aboutJCHeights.shtml>.

Wright, Frank L. The Living City. New York: The New American Library, Inc., 1958. Print.
The Living City by Frank Lloyd Wright provides insight on Wright’s ideas behind the ideal city for living. His ideas are pertinent today when looking at how to develop more sustainable communities

Images Cited

Figure 1: http://jclandmarks.org/photovideo/gallery.php
Figure 2: Brian Fontaine
Figure 3: http://img6.travelblog.org/Photos/55834/254543/f/2070563-pretty-tree-0.jpg
Figure 4: http://blogs.msdn.com/blogfiles/josealmeida/WindowsLiveWriter/DesigninContext_123E8/FallingwaterWright-8x6.jpg
Figure 5: http://static.panoramio.com/photos/original/1638719.jpg
Figure 6: http://www.architecture-page.com/assets/images/content/prj_ibarra_rosano_garcia_residence/1.jpg
Figure 7: http://jclandmarks.org/photovideo/gallery.php
Figure 8: http://jclandmarks.org/photovideo/gallery.php
Figure 9: http://exs.exploratorium.edu/wp-content/themes/exs/images/home/bb_home4.jpg
Figure 10: http://farm1.static.flickr.com/152/434095085_f14724a8cc.jpg
Figure 11: Brian Fontaine
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Figure 20: http://www.flickr.com/photos/lomion/2499379069/
Figure 21: http://new.jcreservoir.org/
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Figure 104: http://maps.google.com
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Figure 106: Climate Consultant 4 Software
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Figure 108: http://jclandmarks.org/photovideo/gallery.php
Figure 109: Weather Tool Software
Figure 110: Weather Tool Software
Figure 111: Weather Tool Software
Figure 112: Weather Tool Software
Figure 113: http://inthewildwithwags.files.wordpress.com/2010/03/shining-bright-sun-large-msg-1116106774-2.jpg
Figure 114: Climate Consultant 4 Software
Figure 115: Weather Tool Software
Figure 116: http://www.city-data.com/city/Jersey-City-New-Jersey.html
Figure 117: Climate Consultant 4 Software
Figure 118: Brian Fontaine
Figure 119: Brian Fontaine
Figure 120: Brian Fontaine
Figure 121: Brian Fontaine
Figure 122: Brian Fontaine
Figure 123: Brian Fontaine
Figure 124: Brian Fontaine
Figure 125: http://jcedc.org/Pages/uezsids.html
Figure 126: http://jcedc.org/Pages/uezsids.html
Figure 127: http://jcedc.org/Pages/uezsids.html
Figure 128: http://jcedc.org/Pages/uezsids.html
Figure 129: http://www.cityofjerseycity.com/
Figure 130: http://www.cityofjerseycity.com/
Figure 131: http://maps.google.com
Figure 132: http://jclandmarks.org/photovideo/gallery.php
Figure 133: http://maps.google.com
Figure 134: http://maps.google.com
Figure 135: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 136: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 137: Brian Fontaine
Figure 138: Brian Fontaine

Figure 139: Brian Fontaine
Figure 140: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 141: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 142: Brian Fontaine
Figure 143: Brian Fontaine
Figure 144: Brian Fontaine
Figure 145: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 146: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 147: Brian Fontaine
Figure 148: Brian Fontaine
Figure 149: Contal, Marie-Helene, et. al., Sustainable Design: Towards a New Ethic in Architecture and Town Planning. Boston: Birkhauser, 2009, Print.
Figure 150: http://www.studiogang.net/projects_b2.htm
Figure 151: http://www.studiogang.net/projects_b2.htm
Figure 152: http://www.worldarchitecturenews.com/index.php?fuseaction=wanappln.projectview&upload_id=11620
Figure 153: http://www.worldarchitecturenews.com/index.php?fuseaction=wanappln.projectview&upload_id=11620
Figure 154: Brian Fontaine
Figure 155: Marquez, Cecilia Fernando. RCR Arquitectes 2003 - 2007 ; Los Atributos De La Naturaleza. El Escorial U.a.: El Croquis, 2007. Print.
Figure 156: Marquez, Cecilia Fernando. RCR Arquitectes 2003 - 2007 ; Los Atributos De La Naturaleza. El Escorial U.a.: El Croquis, 2007. Print.
Figure 157: Marquez, Cecilia Fernando. RCR Arquitectes 2003 - 2007 ; Los Atributos De La Naturaleza. El Escorial U.a.: El Croquis, 2007. Print.
Figure 158: Marquez, Cecilia Fernando. RCR Arquitectes 2003 - 2007 ; Los Atributos De La Naturaleza. El Escorial U.a.: El Croquis, 2007. Print.
Figure 159: Marquez, Cecilia Fernando. RCR Arquitectes 2003 - 2007 ; Los Atributos De La Naturaleza. El Escorial U.a.: El Croquis, 2007. Print.
Figure 160: Marquez, Cecilia Fernando. RCR Arquitectes 2003 - 2007 ; Los Atributos De La Naturaleza. El Escorial U.a.: El Croquis, 2007. Print.
Figure 161: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 162: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 163: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 164: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 165: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 166: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 167: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
Figure 168: Zumthor, Peter. Peter Zumthor = Pītā Zuntō. Tokyo, Japan: U Pub., 1998. Print.
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