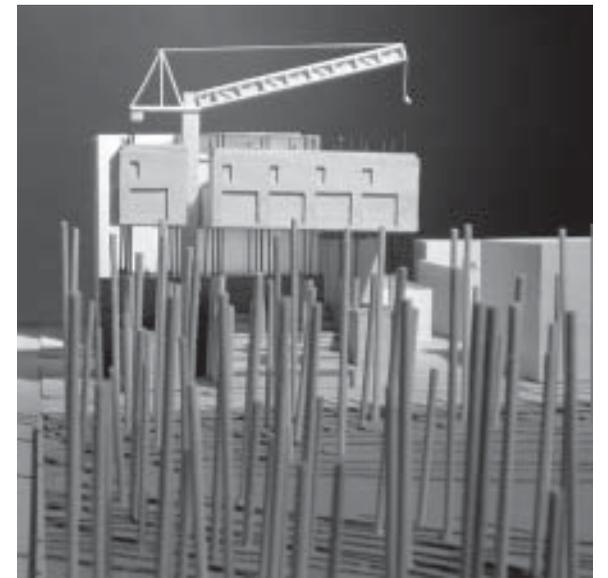


the nature of building

A Public Arts Complex in Washington, DC



the nature of building

A Public Arts Complex in Washington, DC

by
Heather Grutzius

A design thesis submitted to the Graduate Faculty of
Virginia Polytechnic Institute and State University
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Master of Architecture

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Alexandria, Virginia

Paul Emmons, Chair

Jaan Holt

Susan Piedmont-Palladino

abstract

“Construction is the art of making a meaningful whole out of many parts. Buildings are witnesses to the human ability to construct concrete things. I believe that the real core of all architectural work lies in the art of construction. At the point in time when concrete materials are assembled and erected, the architecture we have been looking for becomes part of the real world.”

-PETER ZUMTHOR

The human experience of construction is the subject of this thesis. Through study of the materials, methods and tools of constructing, this work aims to reveal the nature of building through form, materials and detail.

acknowledgments

My thanks and appreciation to Jaan, Paul, Susan, Joe, Marco, and Nigel for pushing me beyond my expectations and for convincing me that I finally chose the right profession.

Thank you Scott, Joelle, Anna, Anita, Akiko, Charles, Matt, Evan, Jon Z., Jimmy, and Greg for all of your effort, criticism, humor and support... and special thanks to John for keeping me grounded.

Eric and Danielle, best of luck.

Finally, thank you Mom, Dad, and Gram for your unconditional love and selfless support. This is for you.

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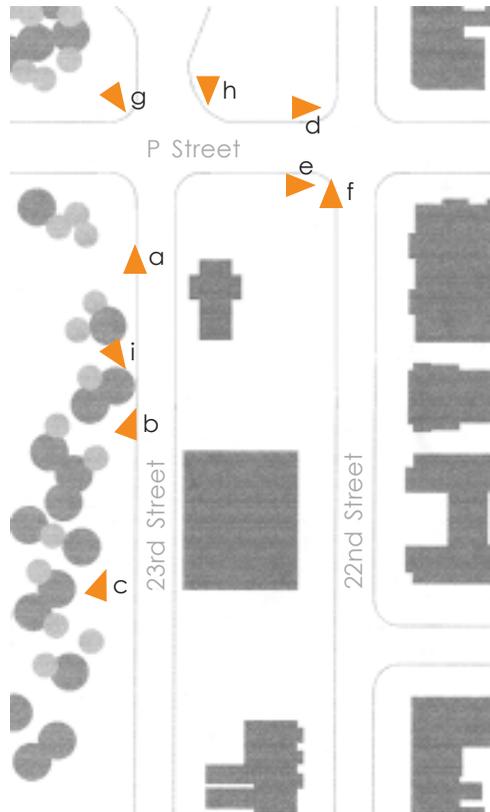
site

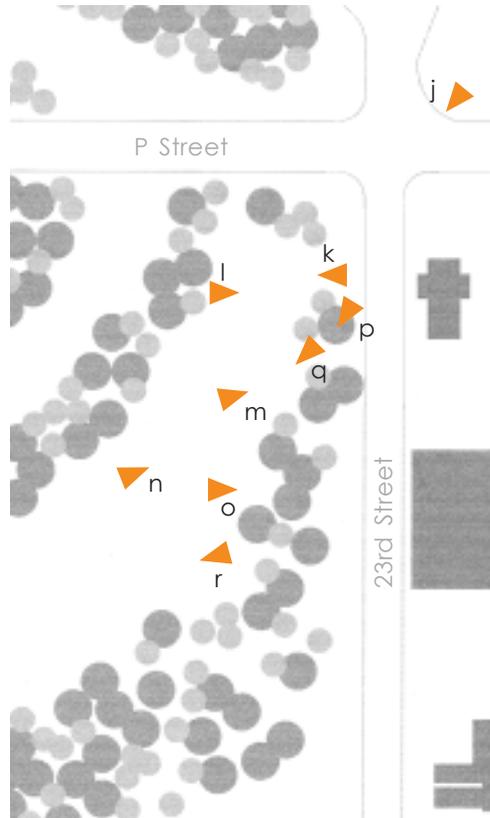


The site is located at 23rd and P Streets in Northwest Washington, DC. Blocks to the east, north and south of the site support an urban scene including retail shops, bars, cafes, office buildings, row houses and high rise apartments. To the west of the site, the grade drops rapidly to a small portion of Rock Creek Park.

When descending into the park, the sights and sounds of the surrounding city are momentarily forgotten. A sense of peace and solitude replaces the energy of city life. The concrete pavement turns to open green space and maple tree branches conceal the buildings and automobiles beyond. The abrupt edge that exists where the city meets the park has the potential to evolve to become a better threshold to serve the two environments.







j



m



p



k



n



q



l

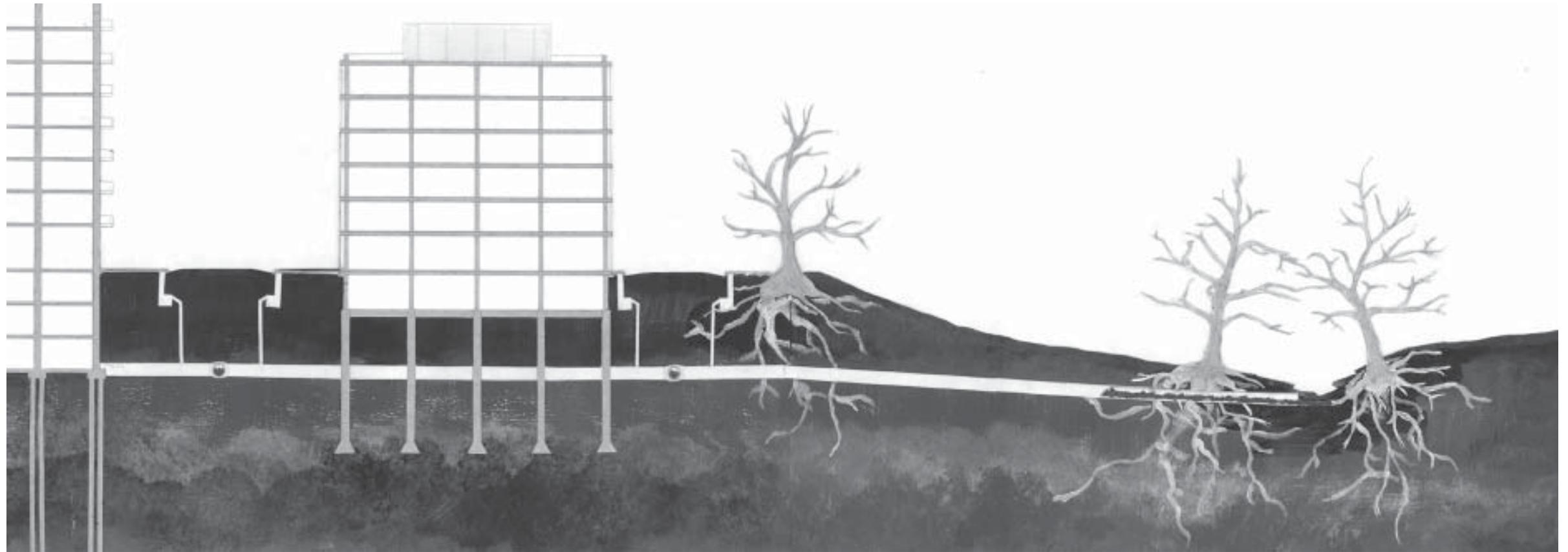


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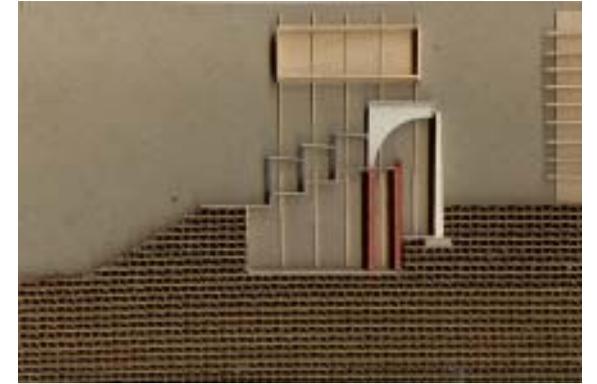
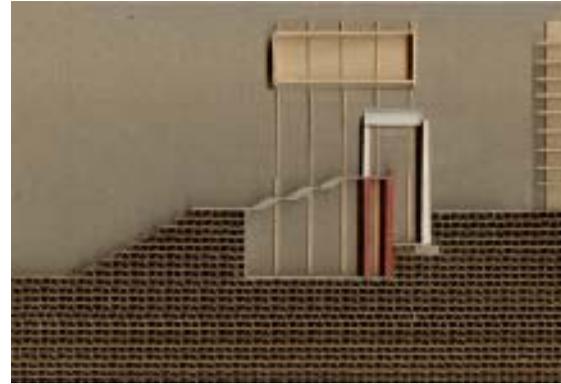
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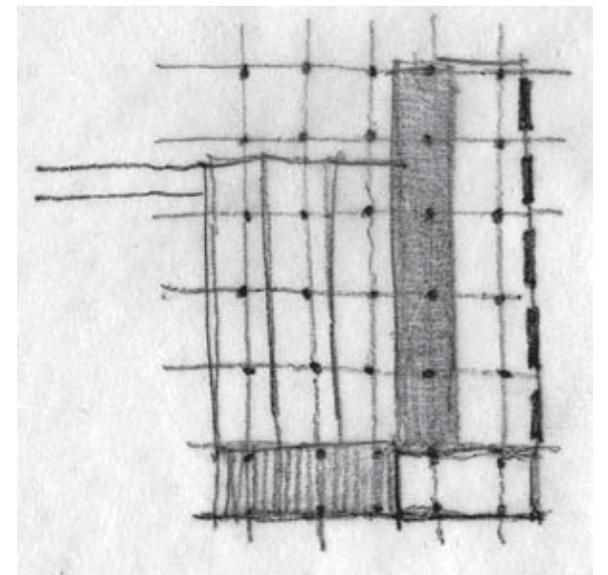


On the street surface, park and city are divided. Below the ground, a system of storm drains and flow of rain-water connect the city streets with Rock Creek. The aim is to bring the connection of the two environments to the surface.

The transition between park and city begins by blurring the line that divides them. Elements of park extend into the built city. The trees become columns. The hill becomes roof.



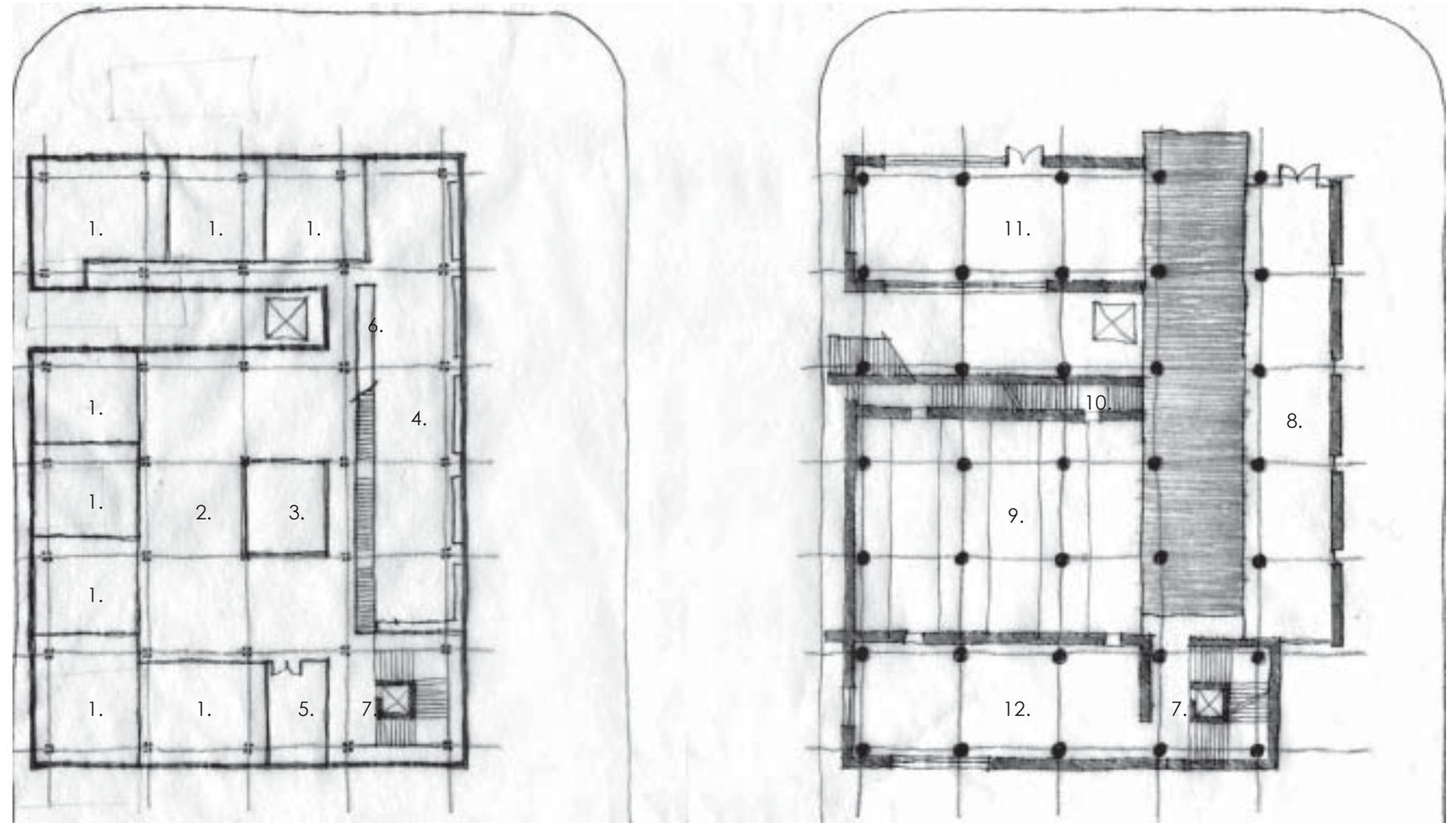
program



The location of the site and life of the adjacent areas suggest the need for a public building that can be inhabited on weekdays and weekends throughout the day and evening hours. The architecture needs to engage the various age groups and interests of the urban community, integrate the use and appreciation of the adjacent park, and ease the transition between park and city, both in its form and function. The resulting program is a public arts complex that supports a small community of artists.

The private functions include loft apartments and studio spaces for 8 to 12 resident artists, rentable studio space for non-resident artists and an arts library/media room. These functions are housed in a canopy structure suspended high above street level.

The ground buildings house the public functions necessary to support the artists' activities. These include an art gallery, an experimental theatre, a wood shop, community classrooms, an administrative office and a small retail shop to sell the artists' work.

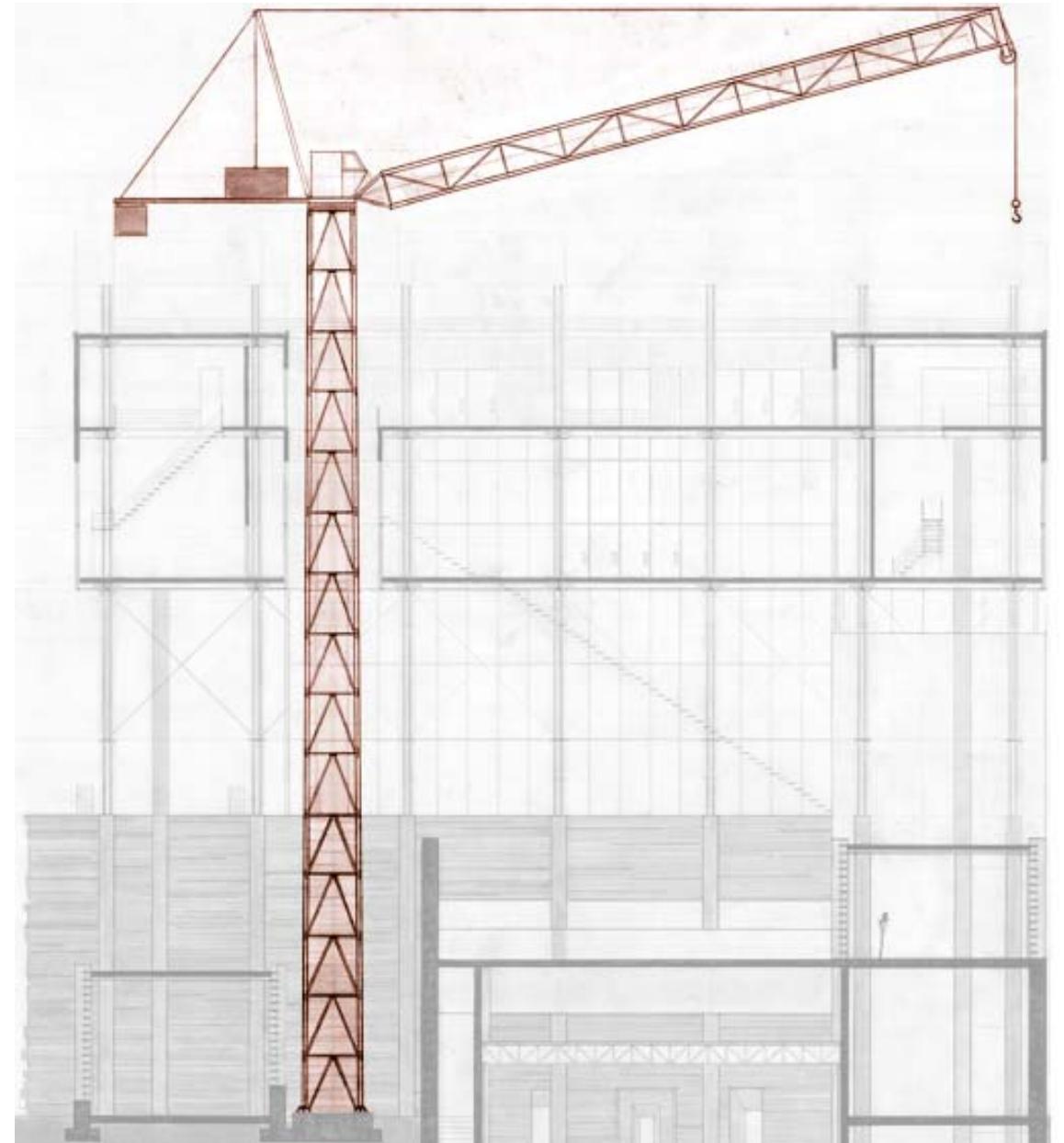
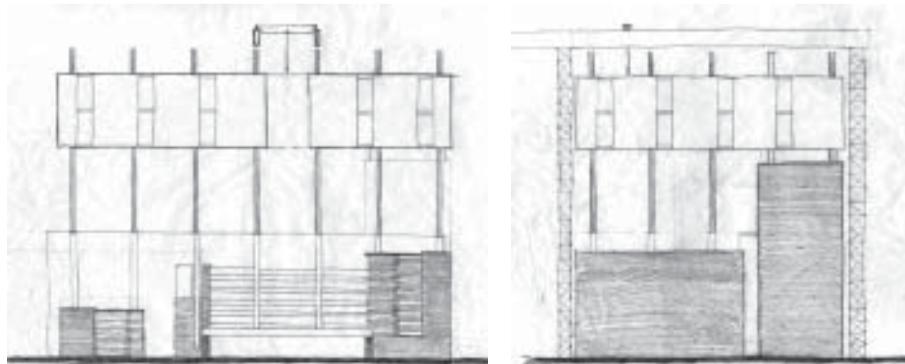


- 1. studio/loft apartment above
- 2. open studio space
- 3. outdoor courtyard
- 4. arts library/media room
- 5. storage
- 6. secondary stair

- 7. main stair/elevator
- 8. art gallery
- 9. theatre/wood shop below
- 10. stair to theatre platforms
- 11. retail shop
- 12. administrative office/classrooms above

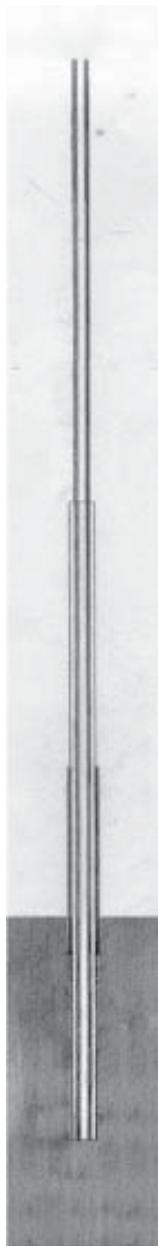
Luffing Boom Crane

The program requires a lifting device to transport materials from street level to studio level. The luffing boom crane set in place at the start of construction will remain on the site and in use throughout the life of the building. Artwork and materials may be lowered or lifted to the gallery or rooftop garden. The swing of the boom allows for art in the park or sidewalk displays.



columns





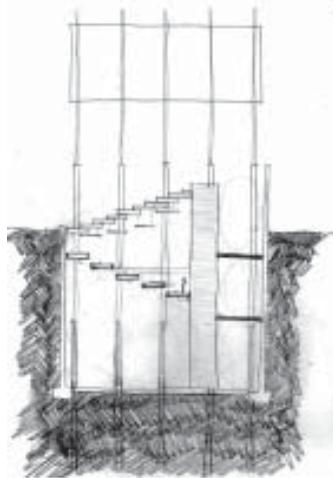
Canopy Structure

The canopy structure that holds the studio and loft spaces is made up of a grid of columns, 20 feet on center, with a steel I-beam frame. The columns penetrate every main space in the public realm of the building, reminding visitors at all floors below of the rooms suspended high above them. At the base of the columns, the cylindrical steel forms and ties remain permanently to serve as protection from activities taking place in the shop, and as a reminder of the sequence of placing concrete. Sleeves, at every horizontal plane the columns pass through, express the independence of the light, suspended canopy structure from the heavy building structure at ground level. At the highest point of the ground structure, the concrete of the column base stops and steel pipes continue up to reveal the composite nature of the column. Exposed cross bracing and solid stair towers help to stabilize the light frame structure.



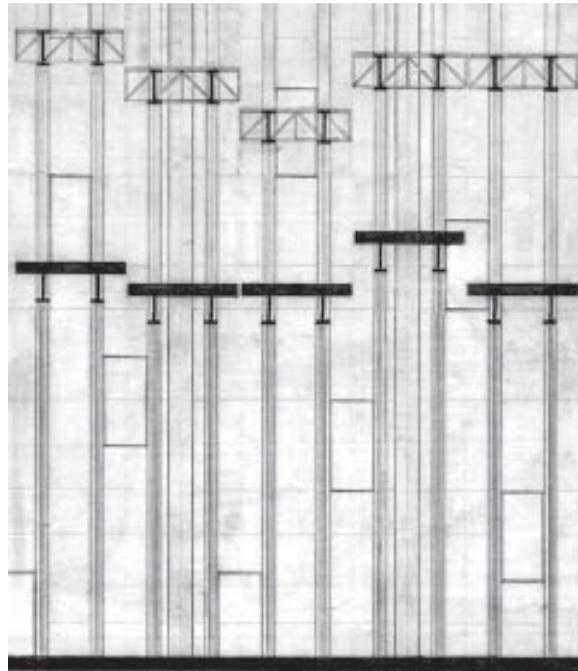
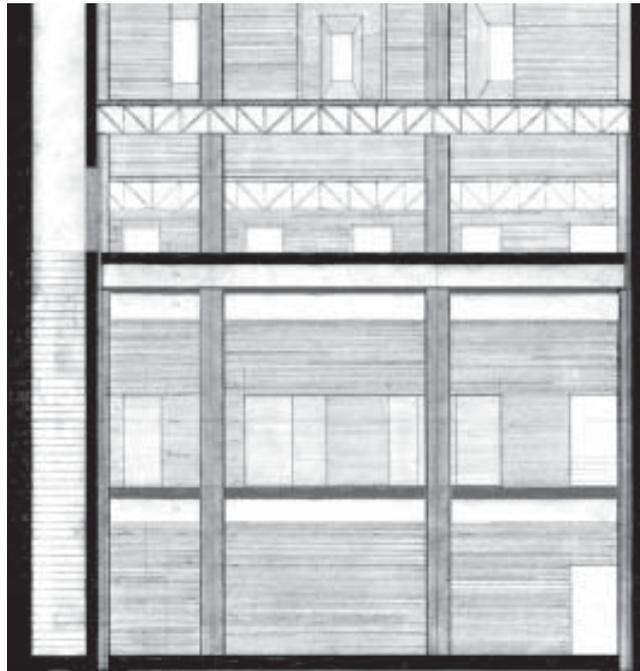
floors





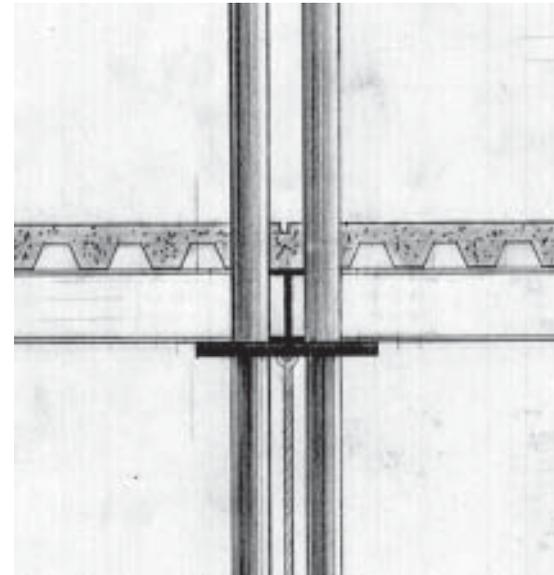
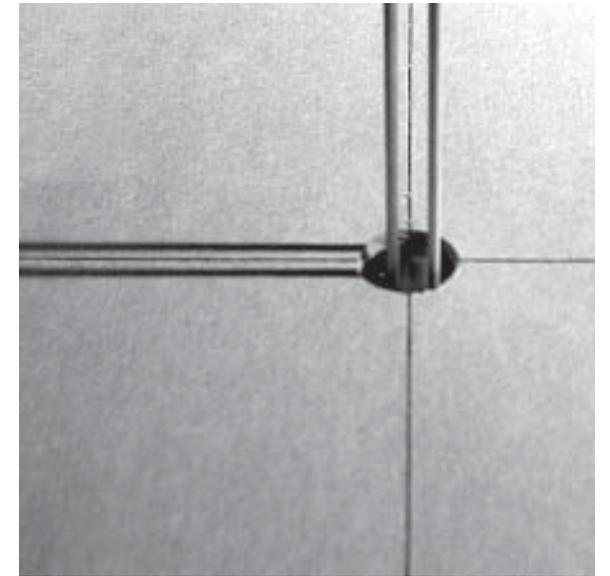
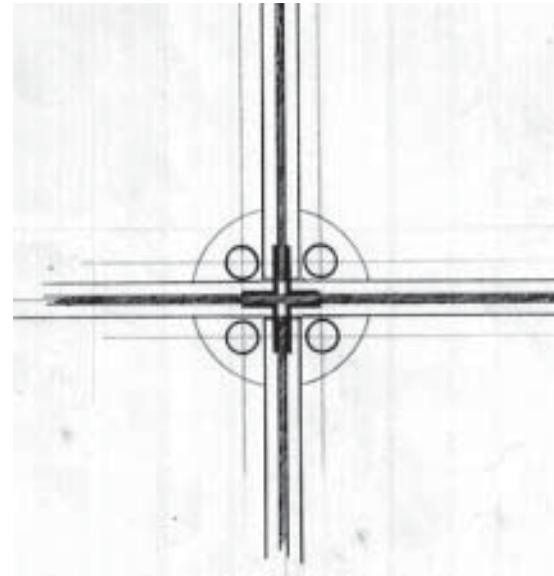
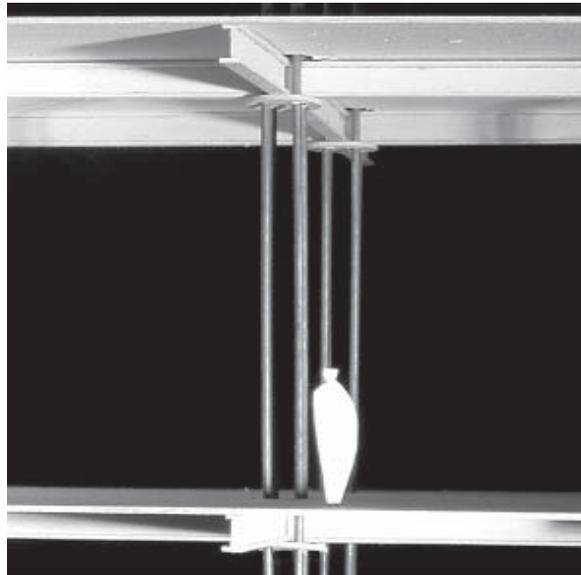
Theatre Floor

The experimental theatre is to have as few constraints as possible. Floors and catwalks that can be lowered or elevated free the artists from conventional sets. The concrete floor slabs are poured in place on pairs of steel I-beams. Metal floor grids and tube steel trusses form catwalks. The units move up and down independently from one another by hydraulic lifts set in the theatre walls. A system of stairs beyond the north wall leads to doorways into the theatre at varying levels, allowing the audience accessibility in almost any configuration. Actors and stagehands move through the levels on sliding ladders that hang beyond the south wall.



Studio Floor

Steel I-beams form the frame for the canopy and express the structure's column grid. From the ground looking up, the grid of I-beams and exposed corrugated steel can be seen revealing its construction at a large scale. At the studio and loft levels, sleeves in the concrete floor slabs reveal the connection between column, beam and floor at a human scale.



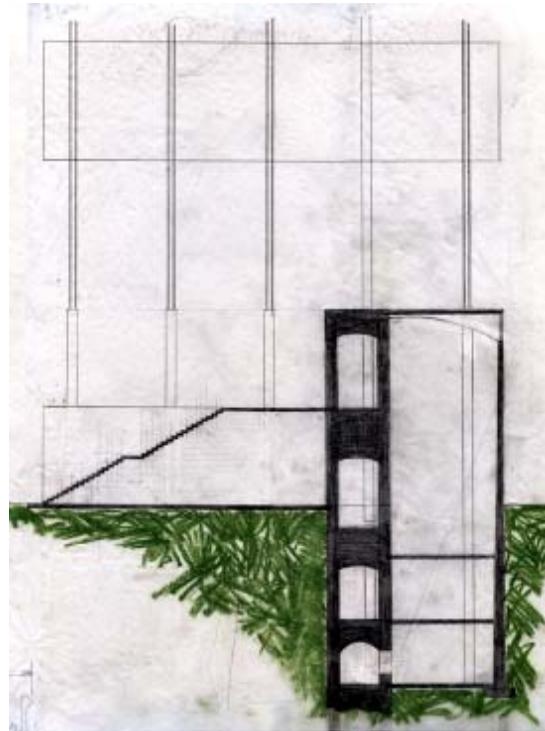
walls



Rammed Earth Wall

At its lowest level, the basement floor sits 55 feet below grade. To express the quantity of soil removed and the magnitude of human effort involved, the excavated earth is compacted into a huge volume of rammed earth, 20 feet deep by 100 feet long and 95 feet tall. The formwork for the rammed earth is made up of various lengths of lumber stacked at random angles to give the wall a texture expressive of its construction. Concrete retaining walls stand 3 feet away from the perimeter of the wall and support cantilevered walkways. Slight gaps between the earth wall and walkways allow a small amount of light to illuminate the walkways and irregular texture of the wall.

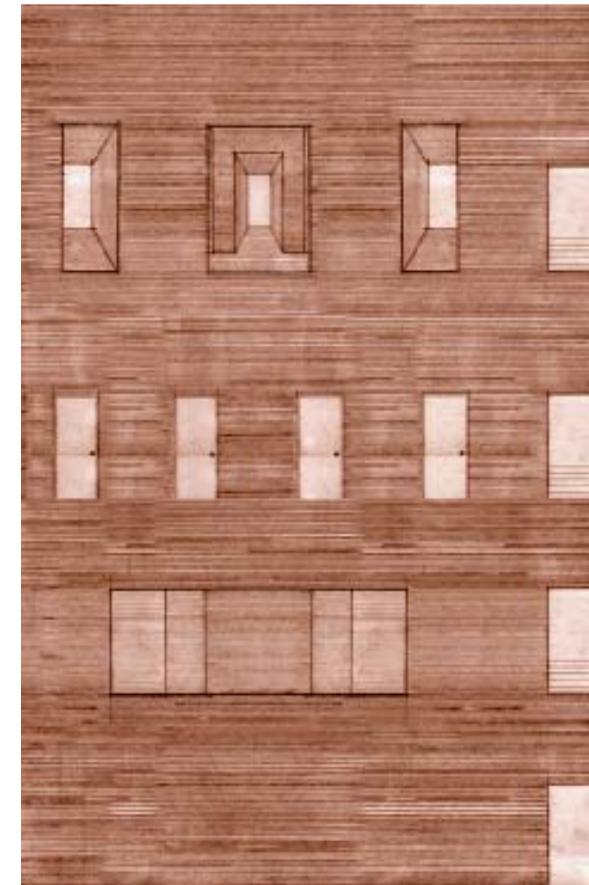
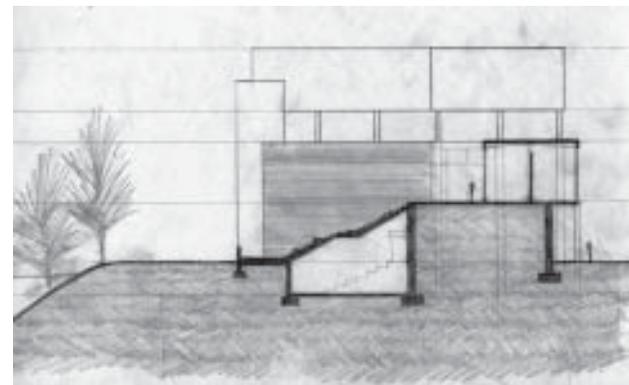
One face of the wall provides a backdrop for the theatre. The wall's depth allows for portions to be carved out forming habitable spaces within for the actors and stagehands. At the deepest levels, a system of ducts allow air to circulate through and cool or heat to the constant temperature of the earth. Kilns for firing glass and ceramics are cut into the wall to take advantage of its insulating properties.

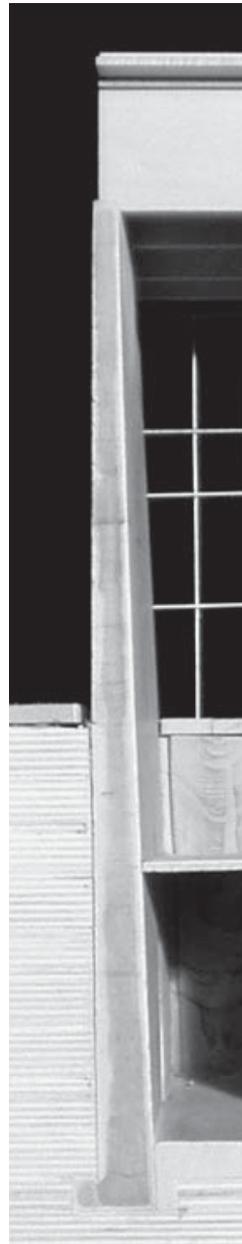
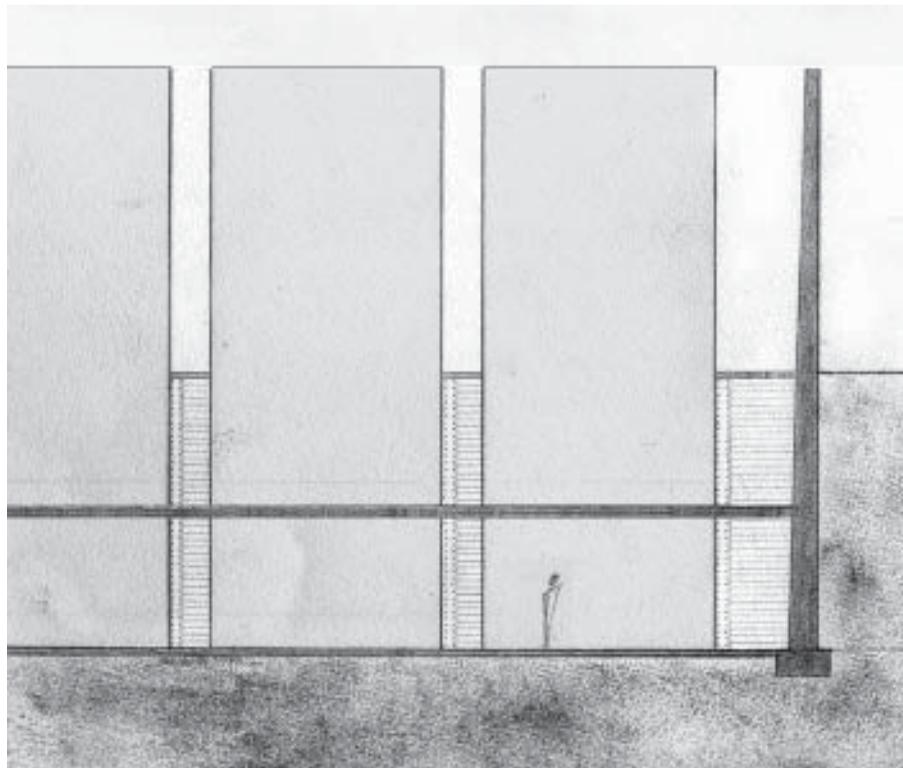
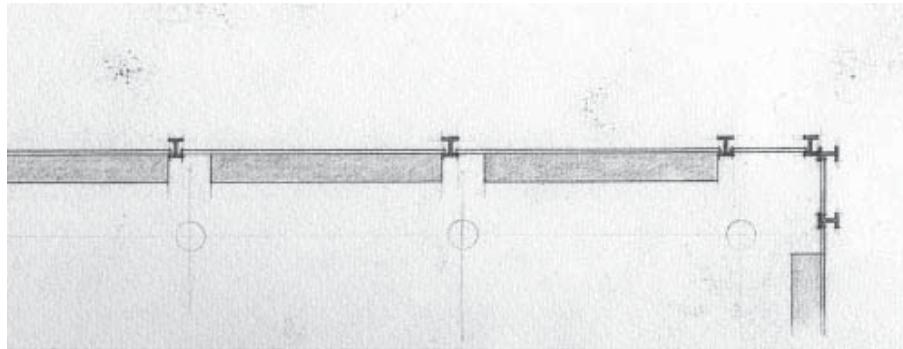


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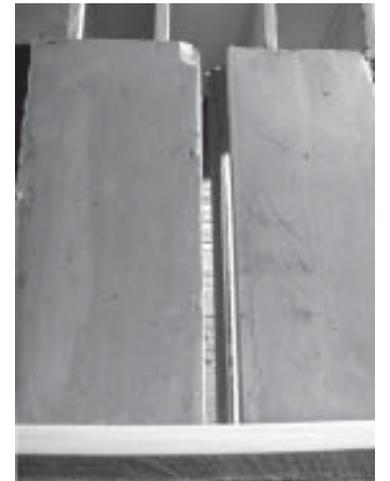
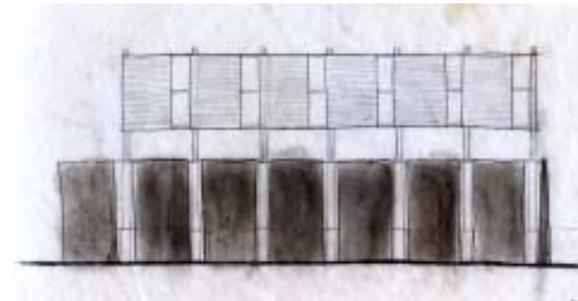
2. Rick Joy, 400 Rubio Avenue, Tucson, Arizona.

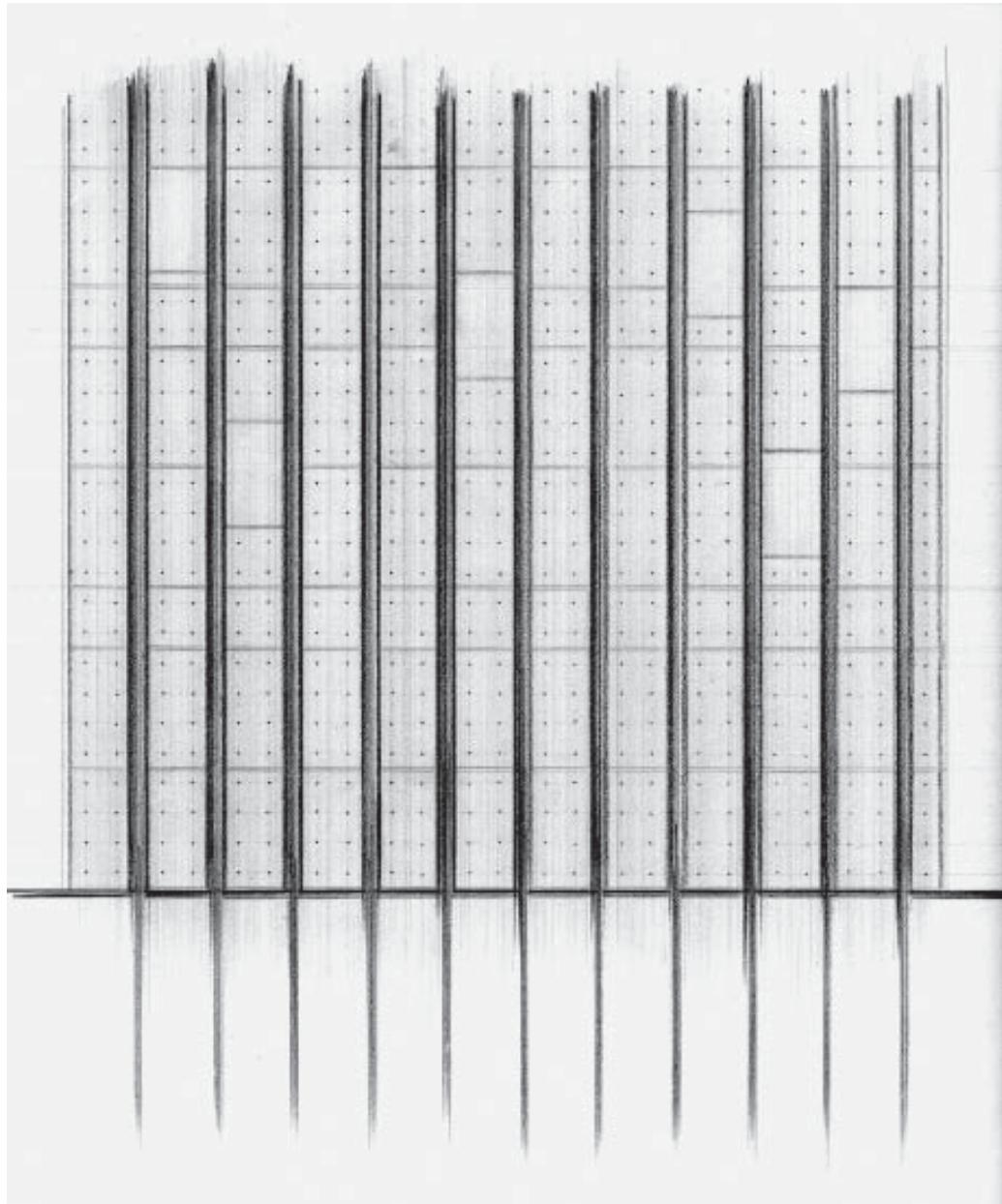




Retaining Wall

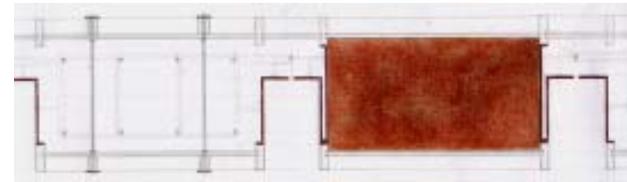
As excavation progresses, soldier piles and lagging retain the earth before canted concrete walls are placed. Along 22nd Street, the concrete retaining walls continue above grade to form display walls for the Gallery. In line with the columns on the Gallery floor, separations between retaining walls allow light into the space and a view from outside. The separations continue below grade, exposing portions of the soldier piles and lagging, now a permanent detail of the building.





Channel Wall

At the north and south walls of the theatre, deep vertical channels formed into the concrete house the hydraulic lifts that raise and lower the theatre floors and catwalks. A system of 4'x8' and 4'x4' plywood panels are reused at each concrete pour as the material sets and the walls are built upward. At the door openings and channel faces, cortin steel acts as permanent formwork. Before the walls are under roof, the steel will weather leaving a lasting image of the sequence of building.



roofs





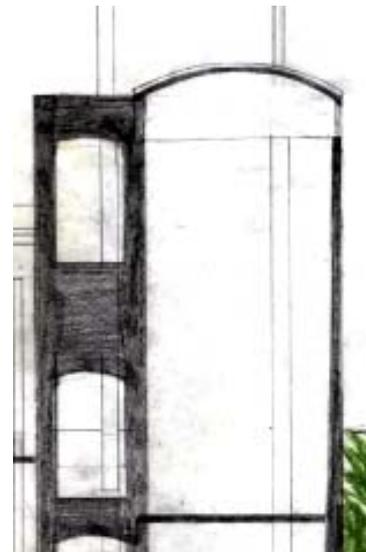
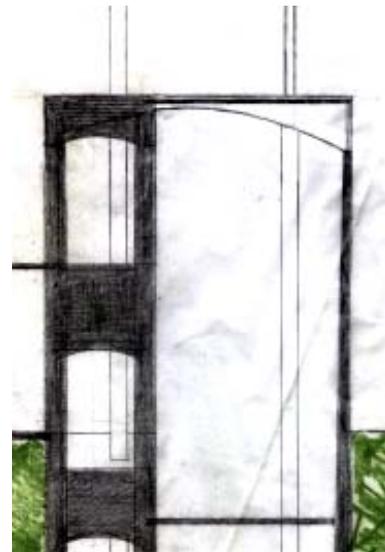
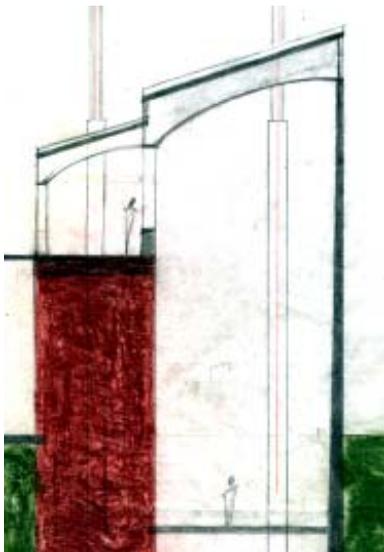
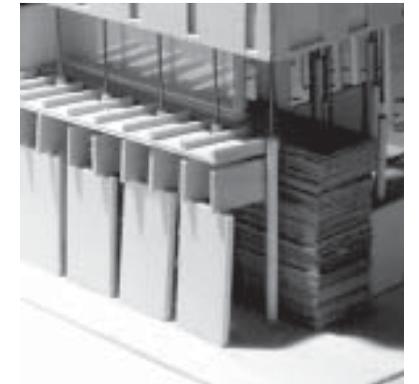
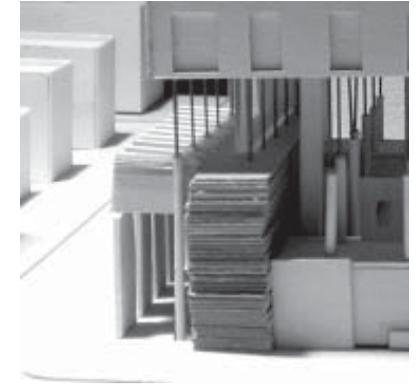
3. Louis Kahn, Performing Arts Center, Fort Wayne, Indiana.



4. Louis Kahn, National Assembly Bldg, Dhaka, Bangladesh.

Gallery Roof

In keeping with the massive concrete construction of the ground buildings, deep concrete beams that span from the exterior gallery walls to the rammed earth wall support the roof of the gallery. The precast beams are set before the upper layers of earth are compacted, securing the beam in place as the earth compresses. Flat roofs span from beam to beam and form clerestory windows to wash the polished concrete display walls with indirect natural light.

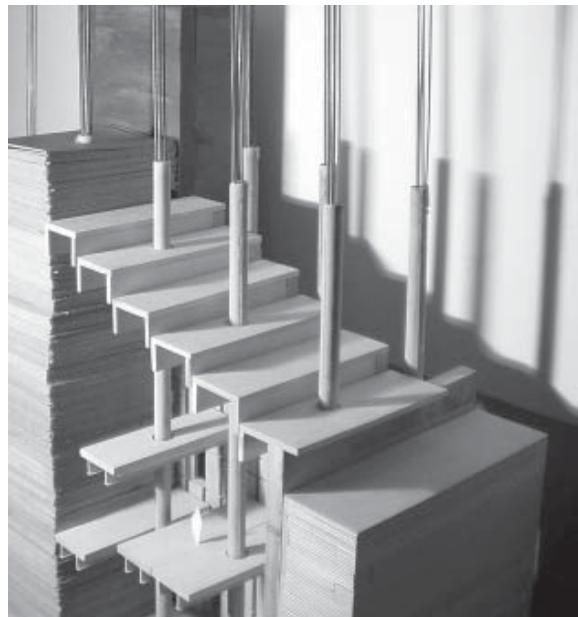
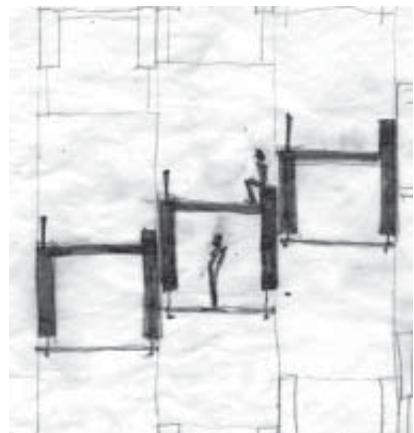
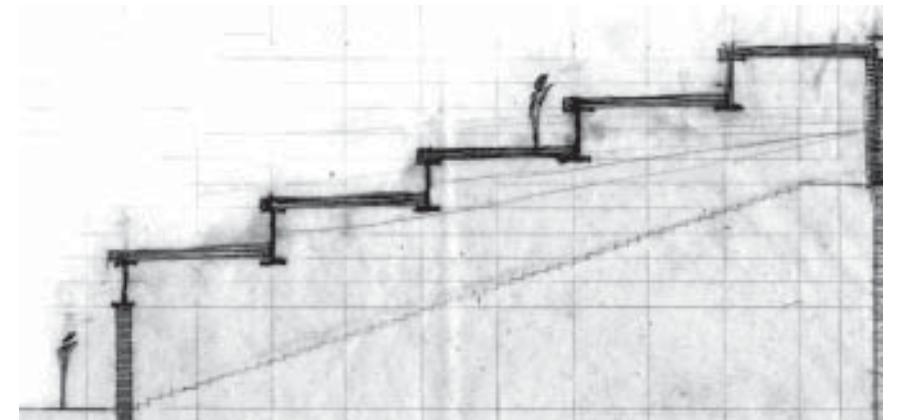
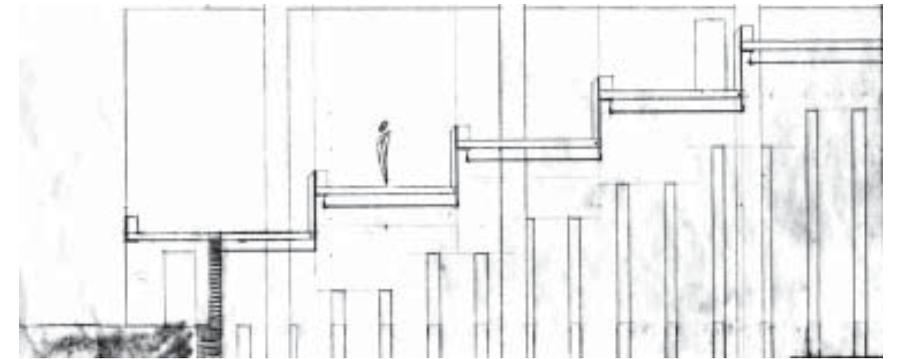
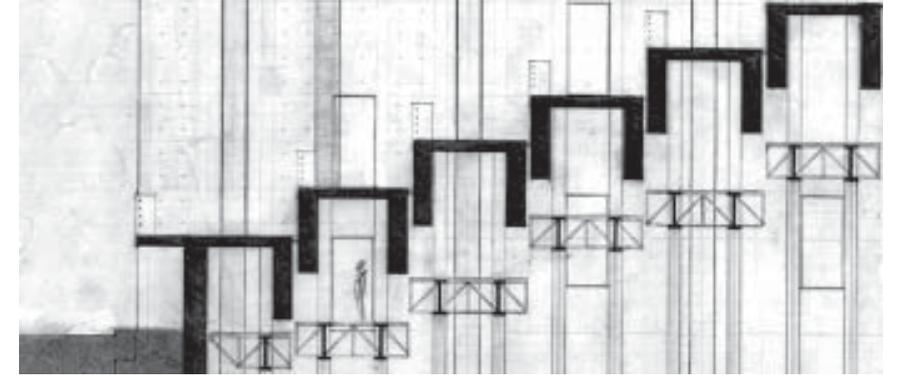




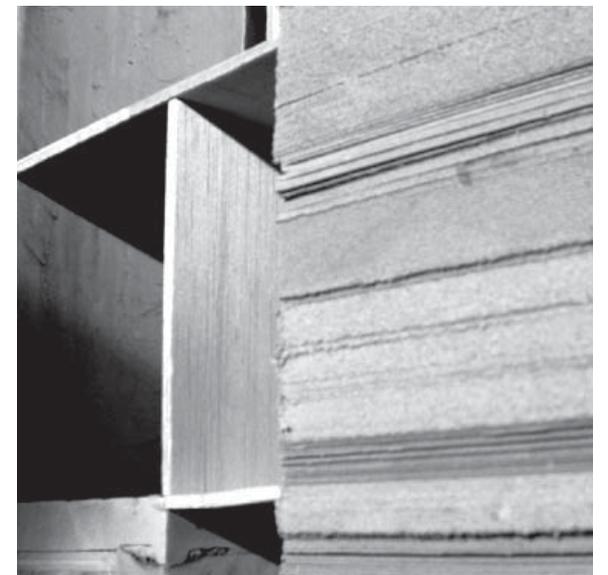
5. Tadao Ando. Rokko Housing I. Kobe, Japan.

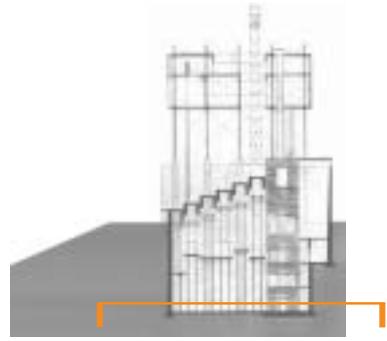
Theatre Roof

The back of the theatre faces Rock Creek Park to the west. The natural, dramatic change of grade in line with the theatre continues within the building as an extension of the hill. This creates a visual and physical connection between park and city. The habitable roof terraces are outdoor classrooms and studios. Public access onto the terraces offers city dwellers a comfortable place to enjoy a meal, read a book or look out onto park activities. In summer months, a screen may be set up in the park as an impromptu, outdoor movie theatre. Within the theatre, deep concrete beams span 50 feet to free the space below while supporting the stone-faced terraces. When the catwalks are raised, the actors and stagehands inhabit the massive structure.



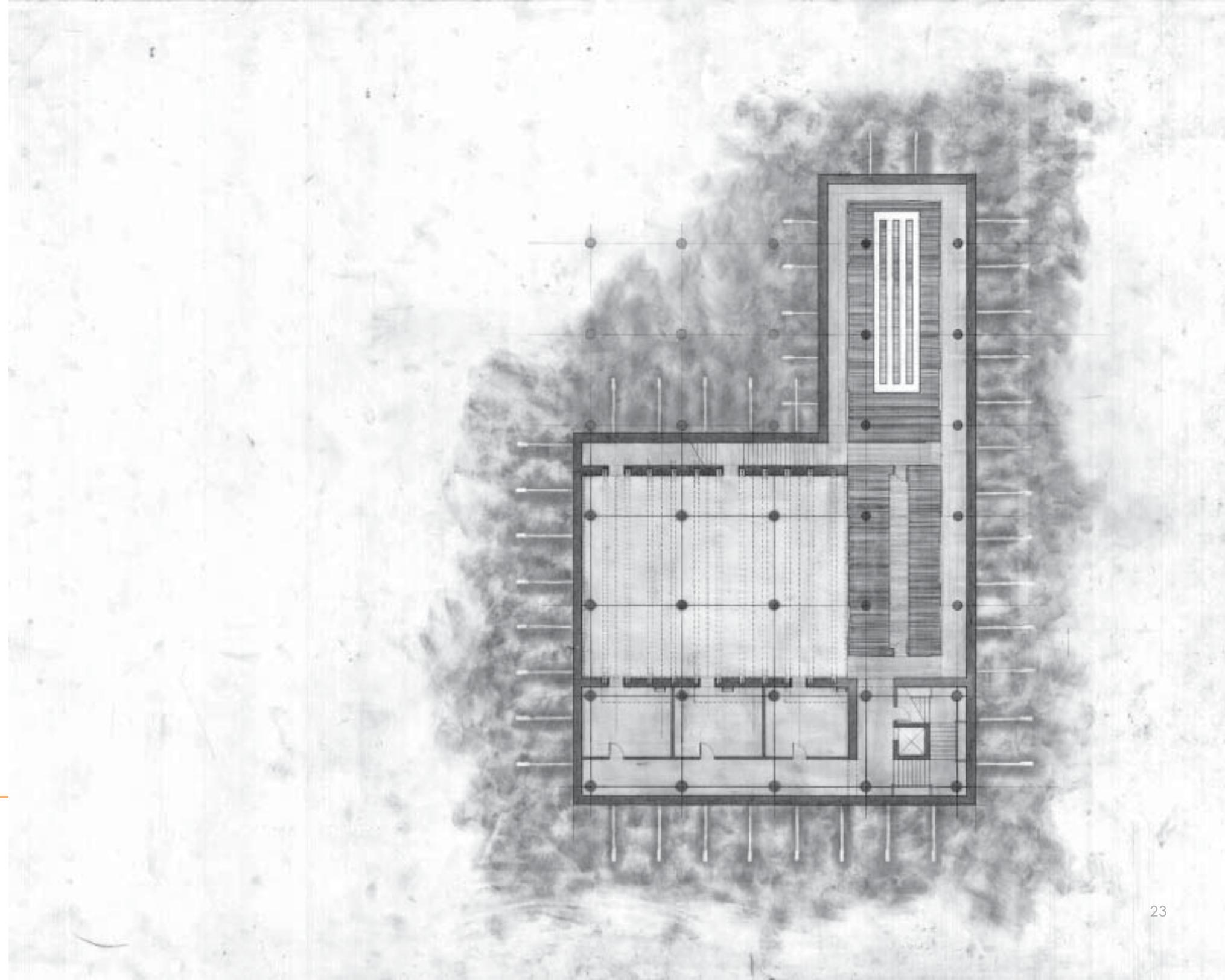
final design

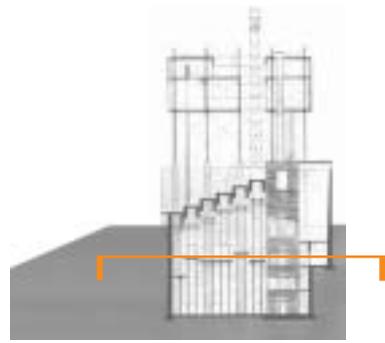




floor plan

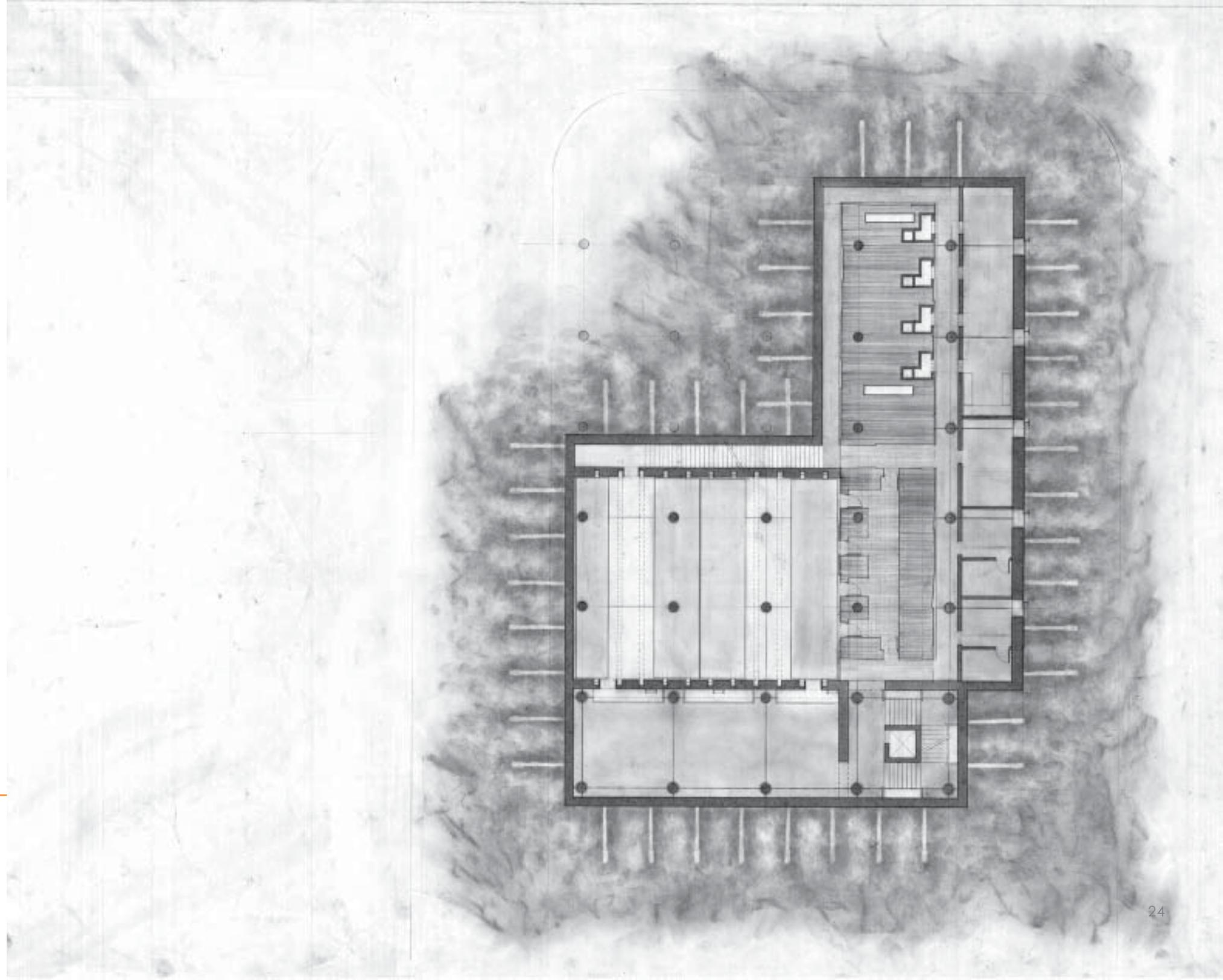
-55 feet

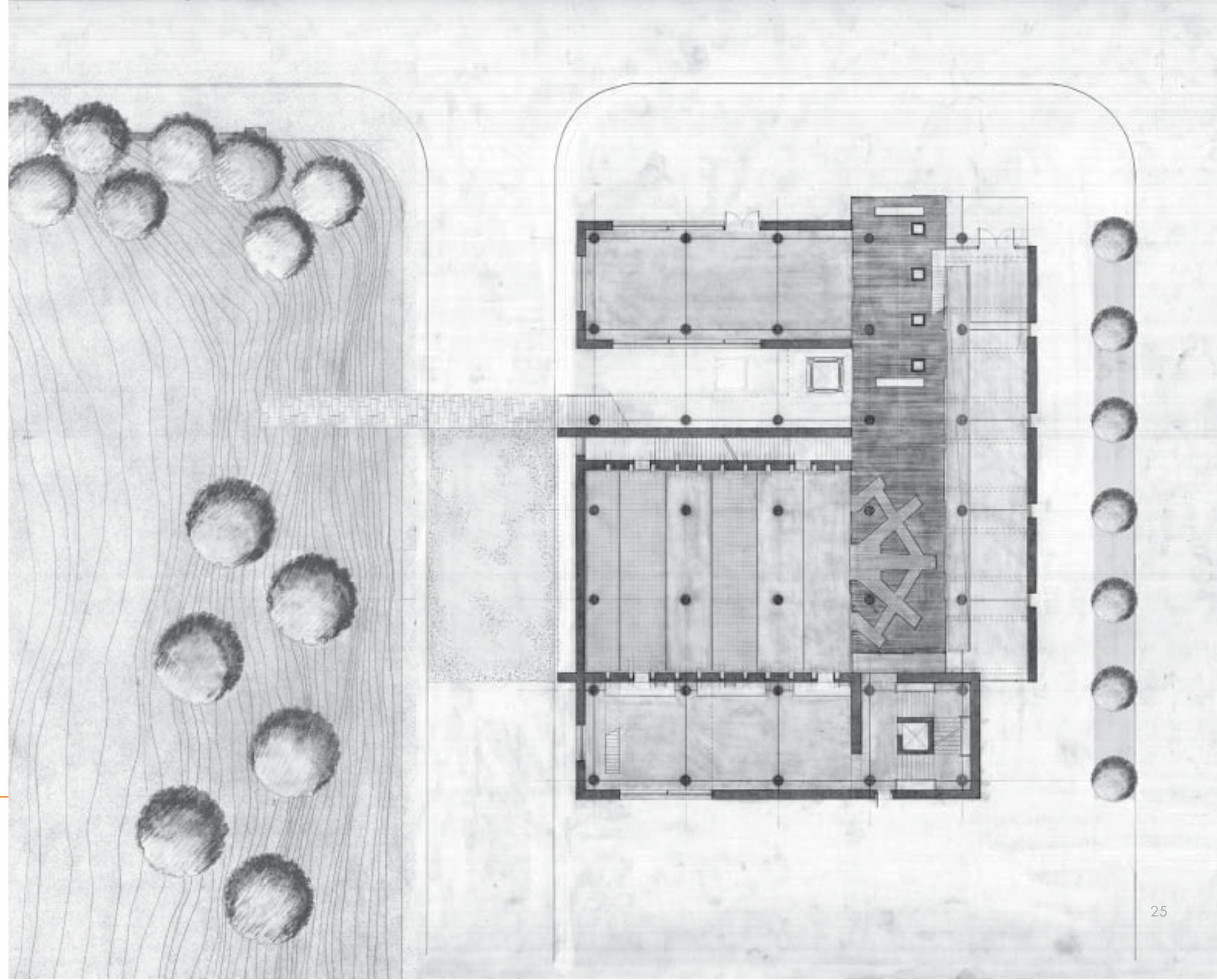
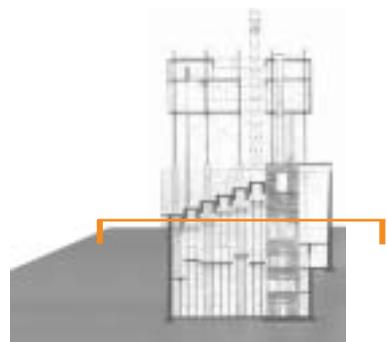




floor plan

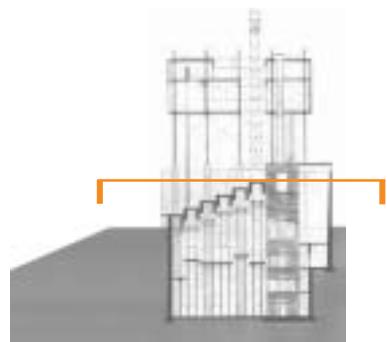
-20 feet





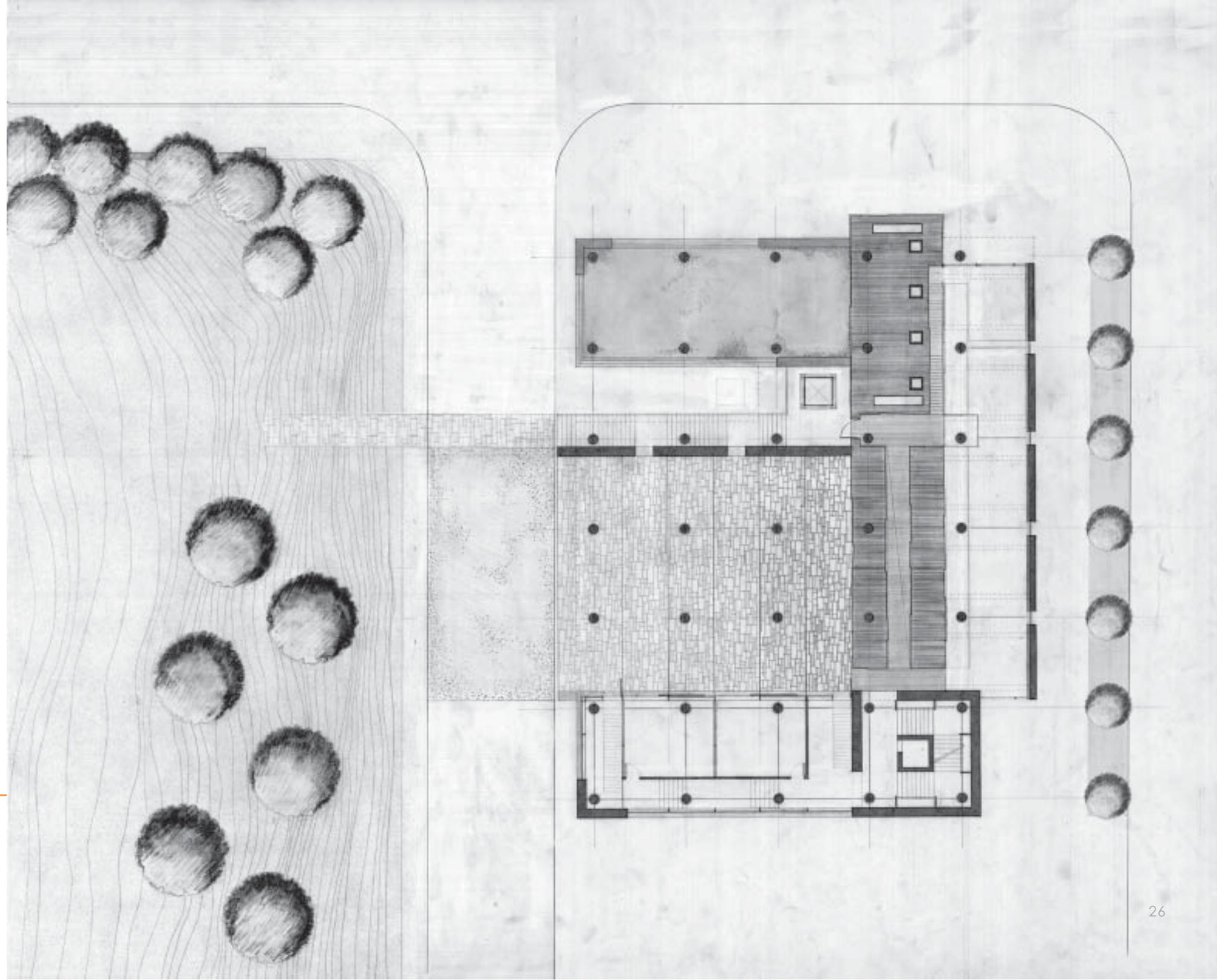
floor plan

@ grade

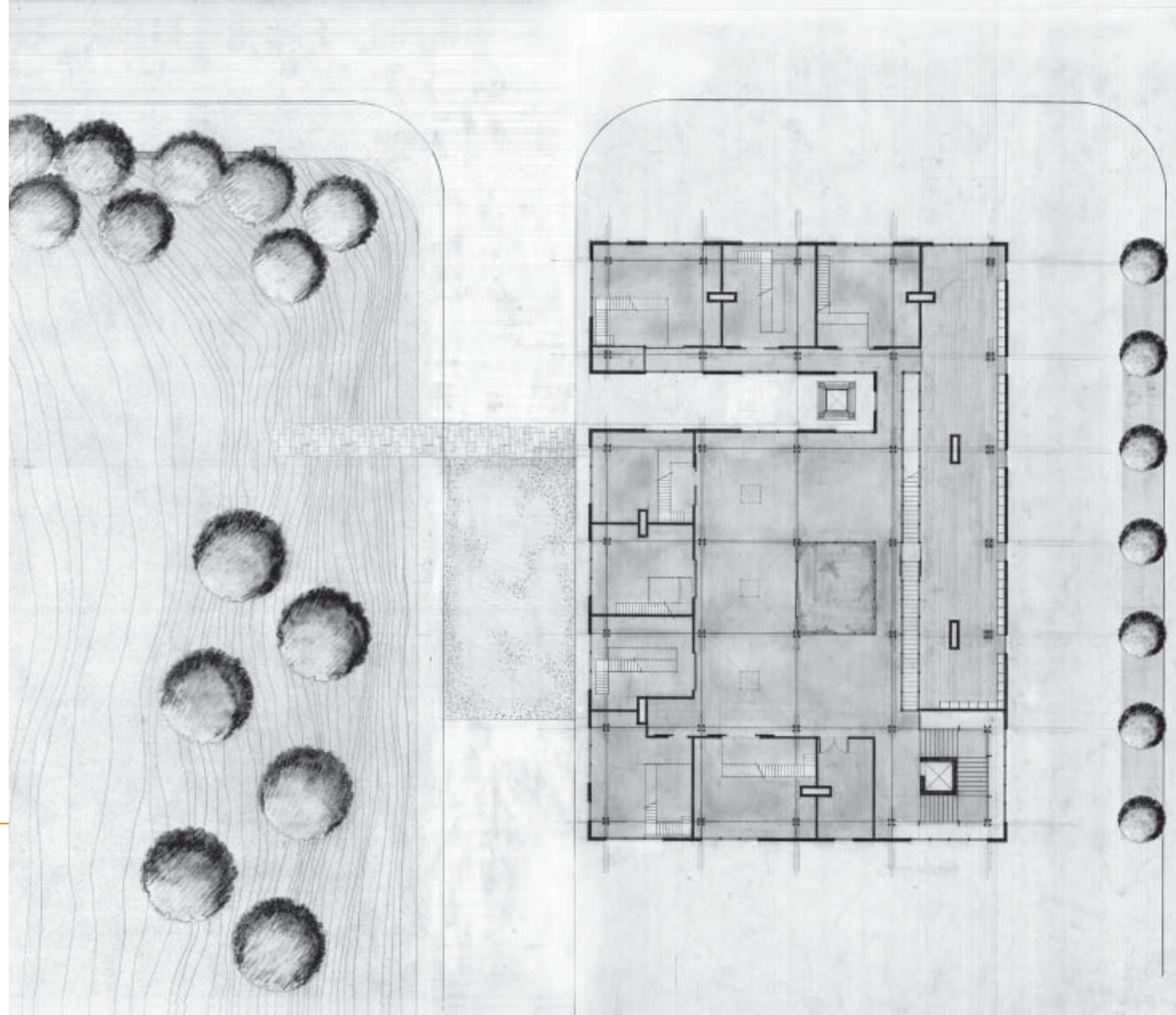
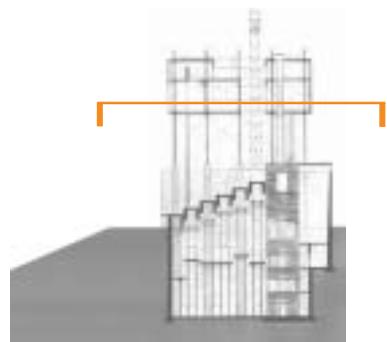


floor plan

+20 feet



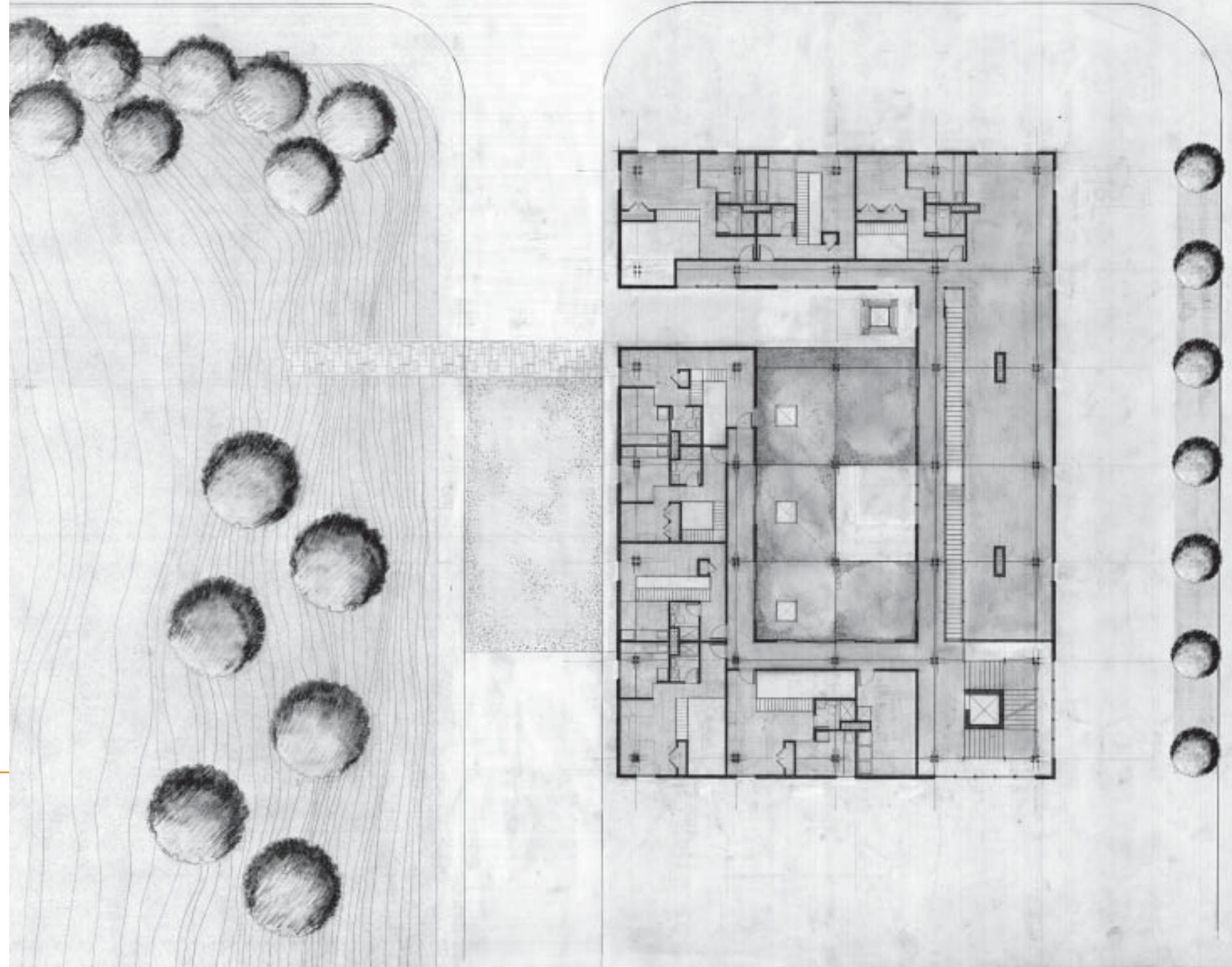
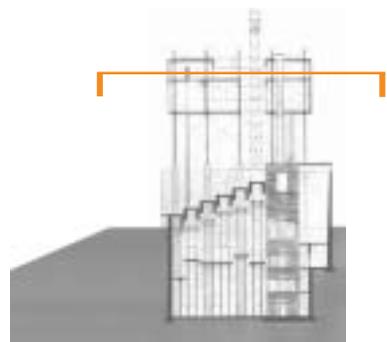
0 10 20 40 ▲ N



floor plan

+60 feet

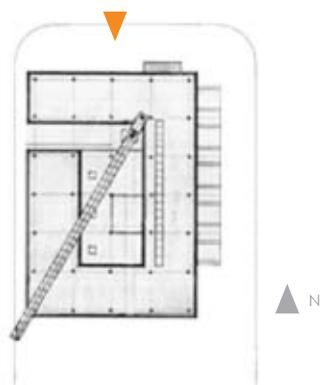
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floor plan

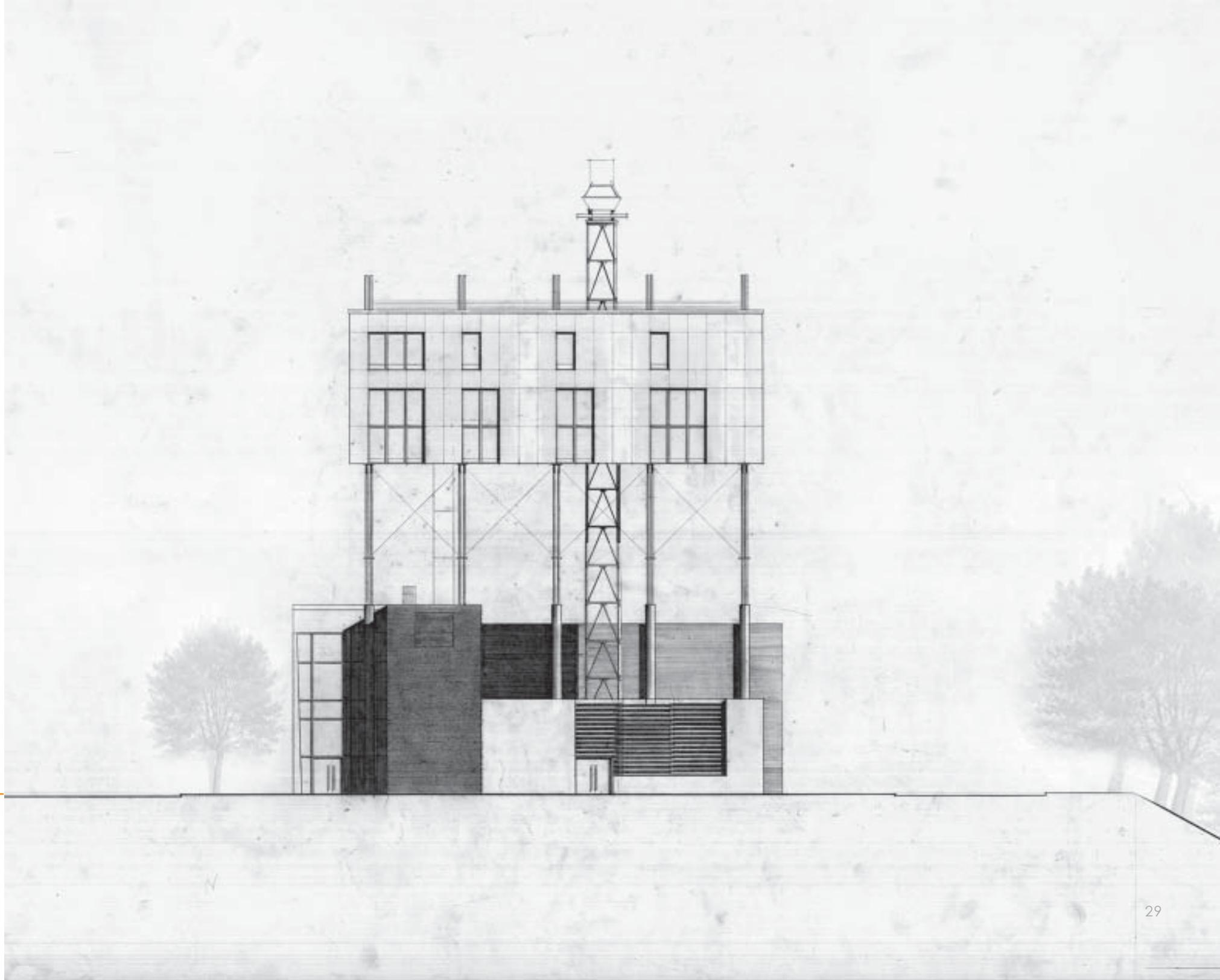
+75 feet

0 10 20 40

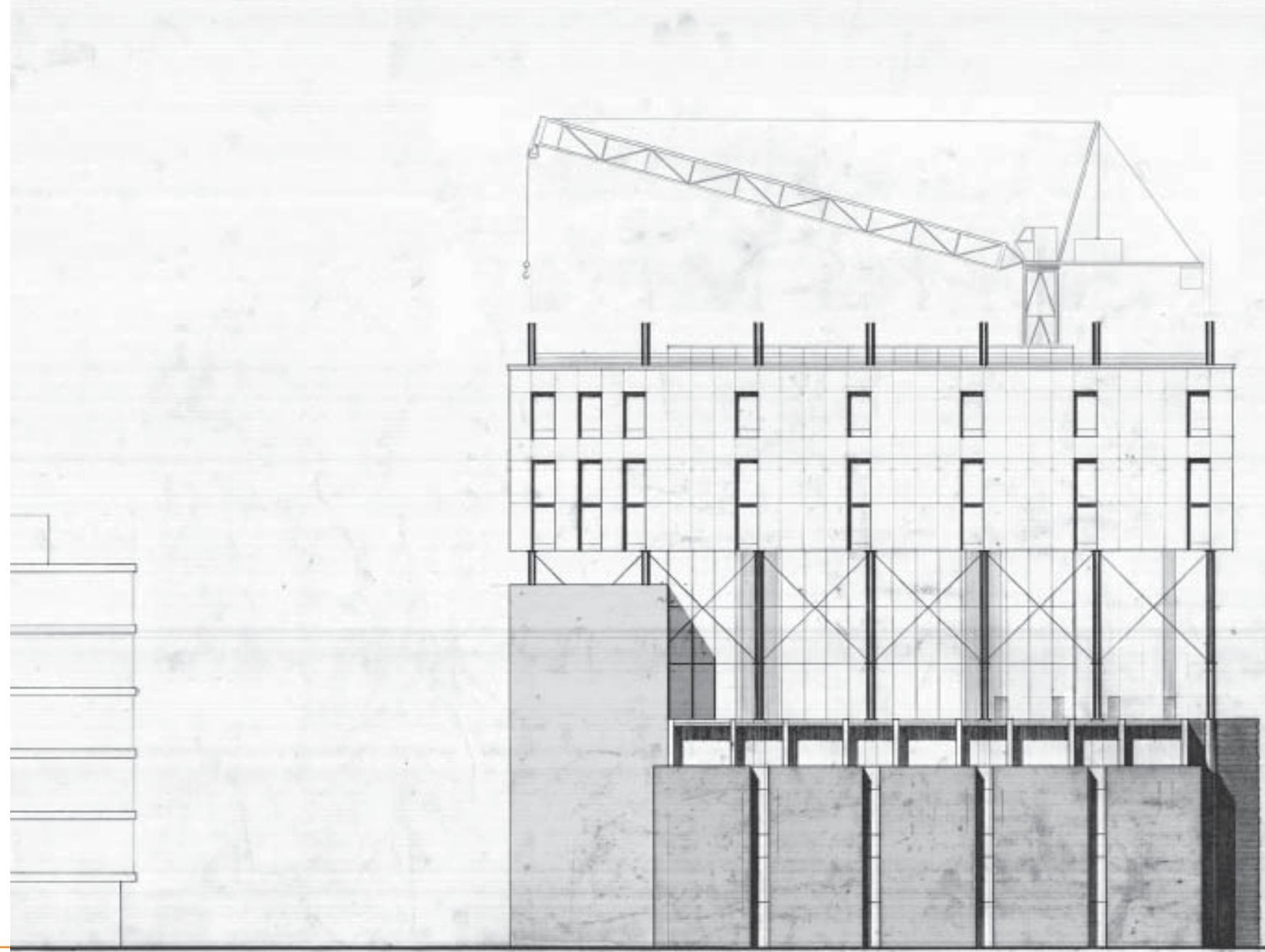
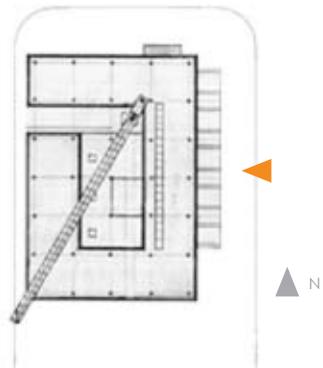


elevation

P Street

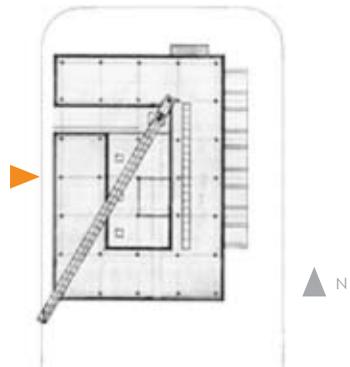


0 10 20 40

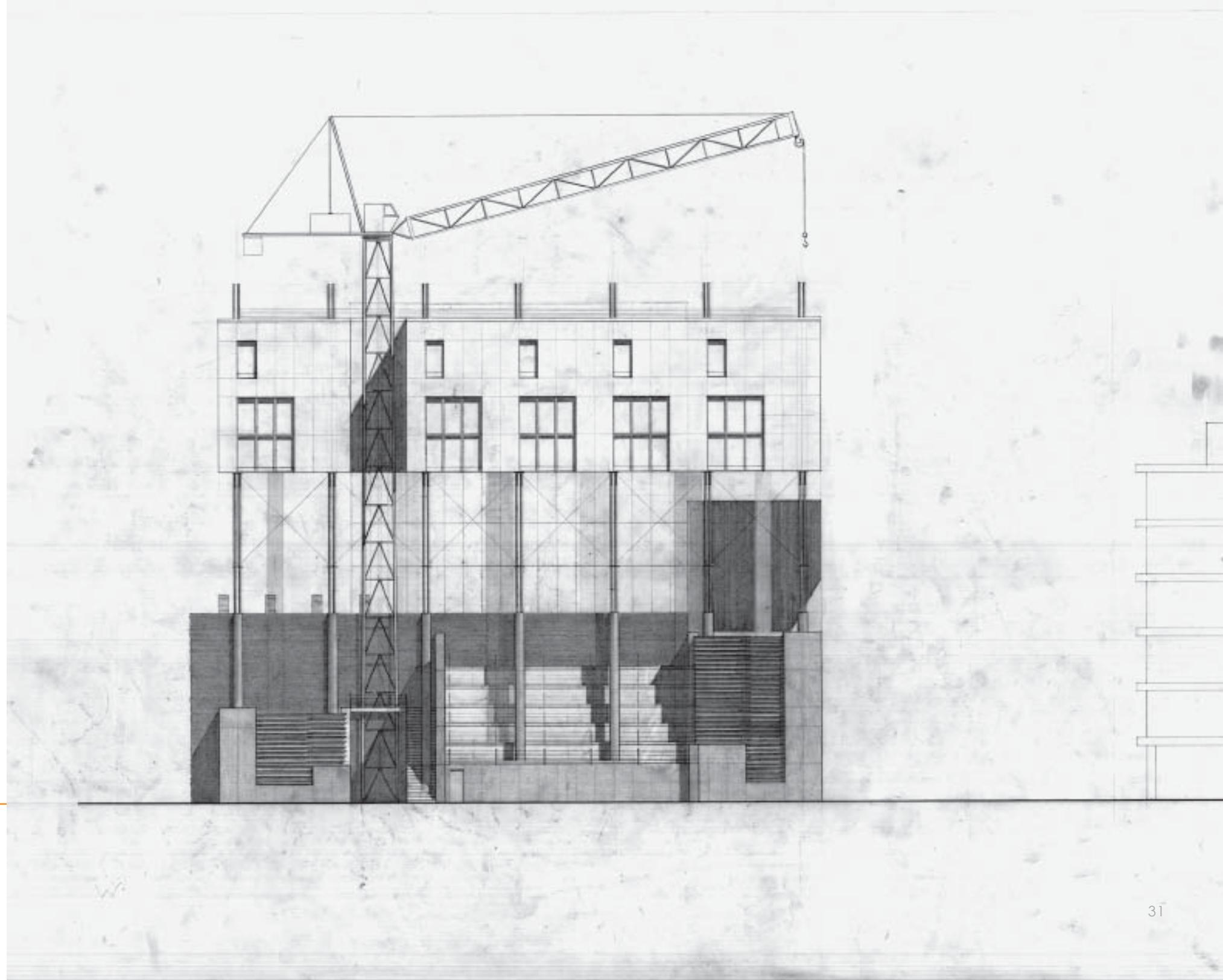


elevation
22nd Street

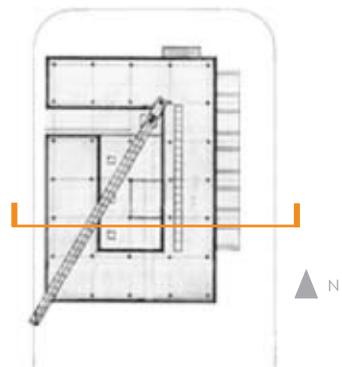
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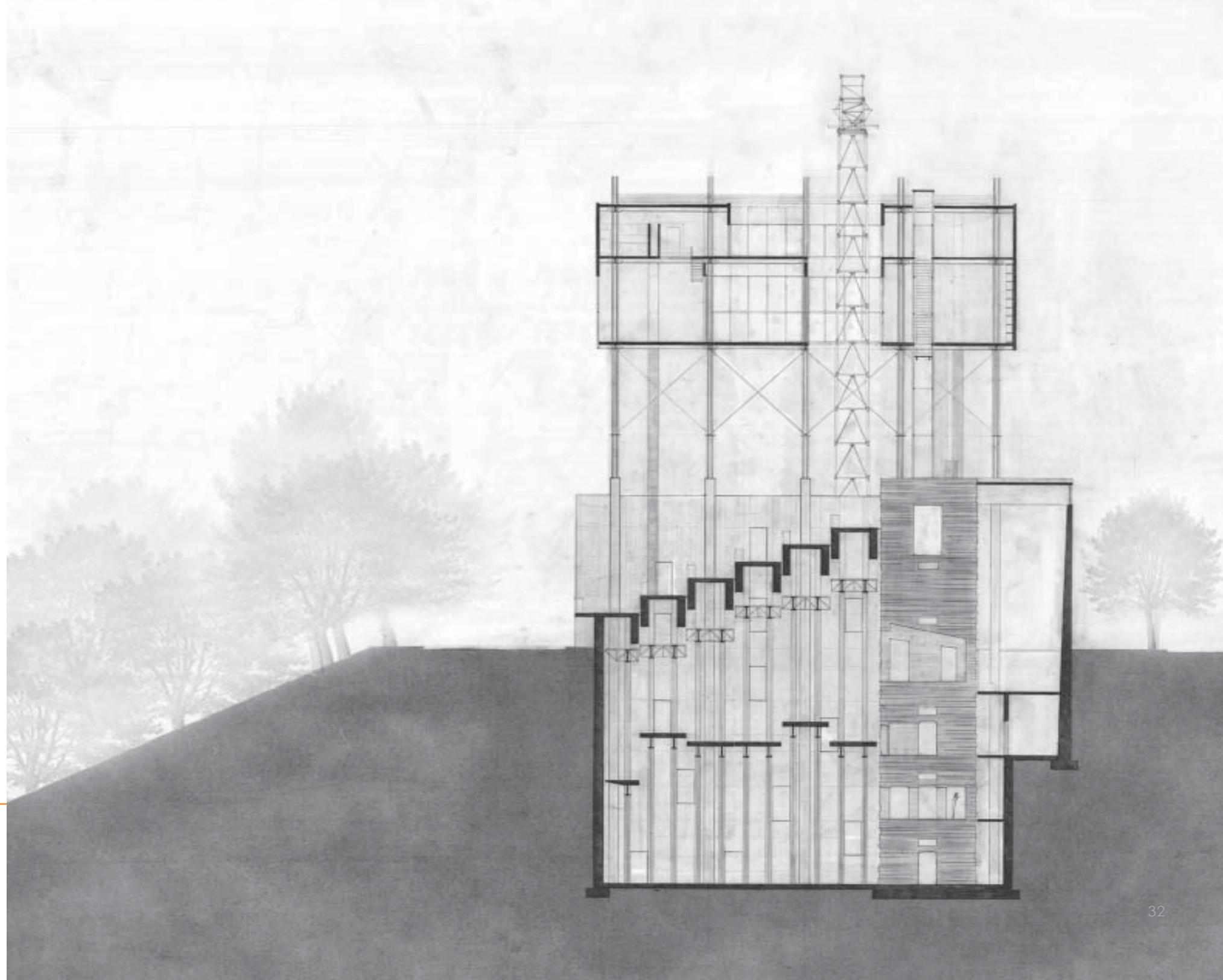
elevation
23rd Street



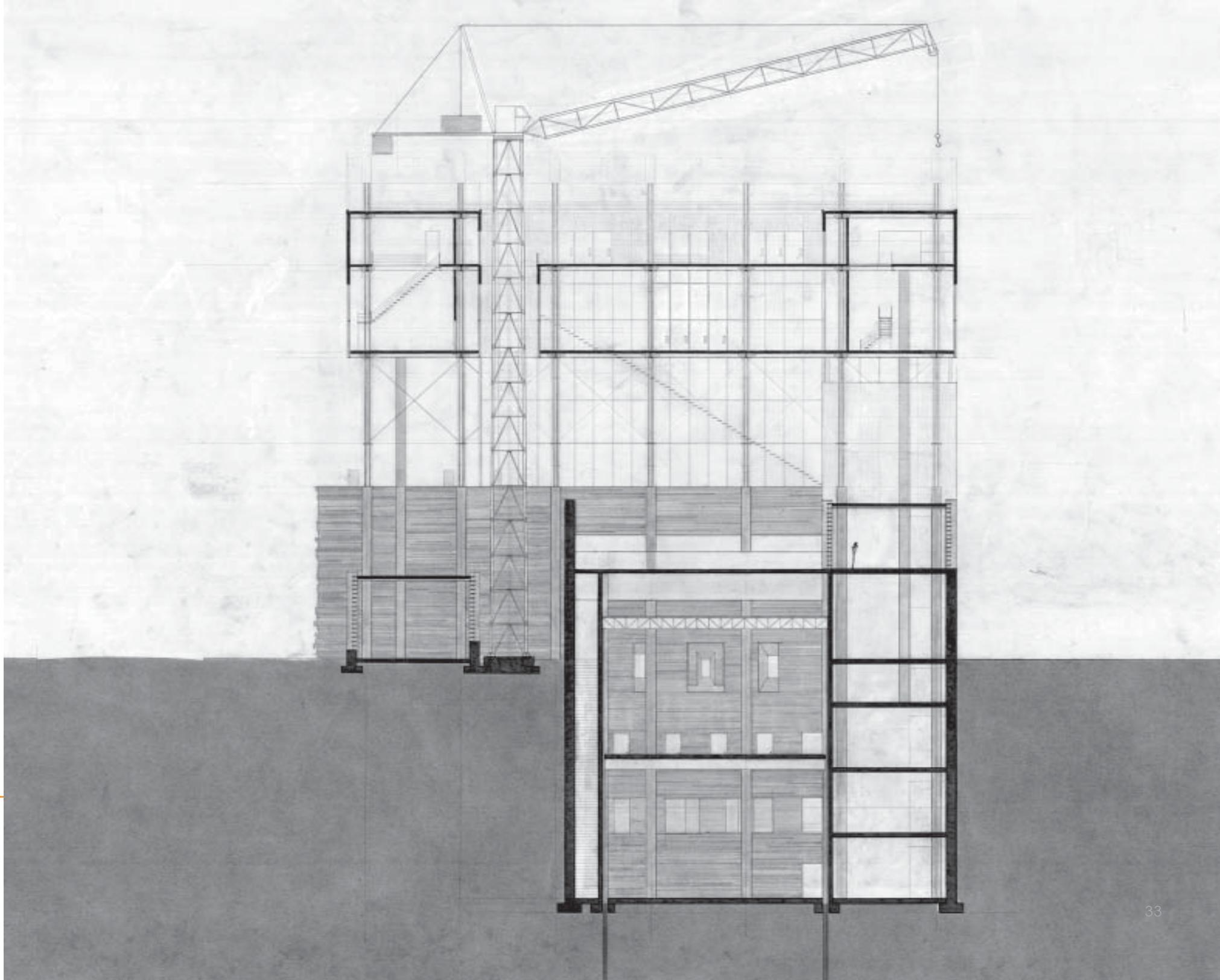
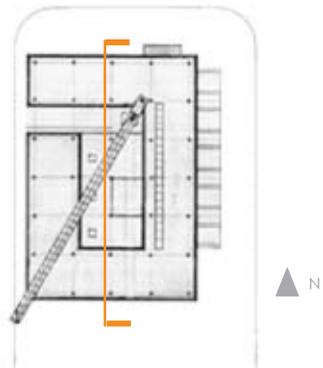
0 10 20 40



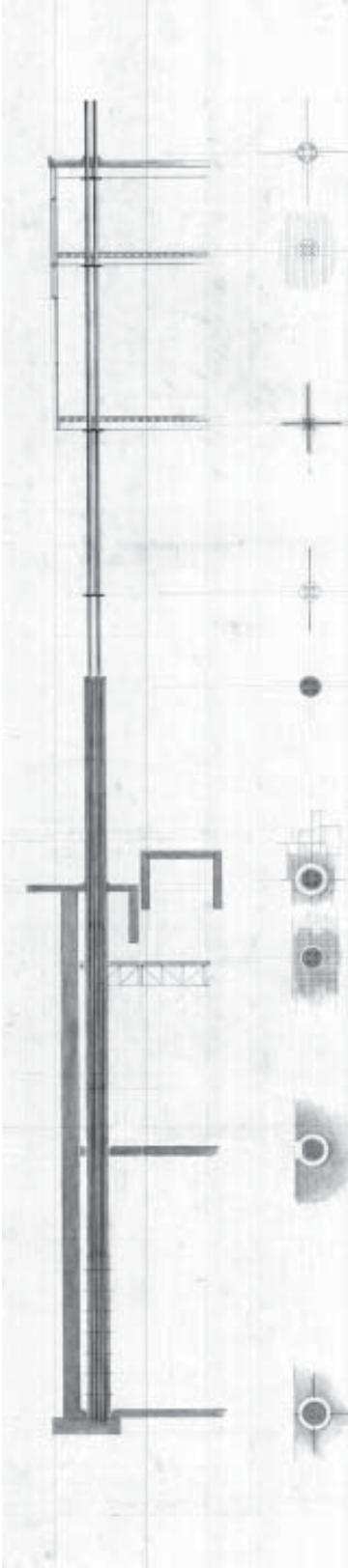
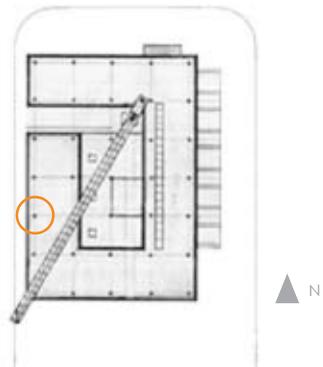
section
transverse



0 10 20 40

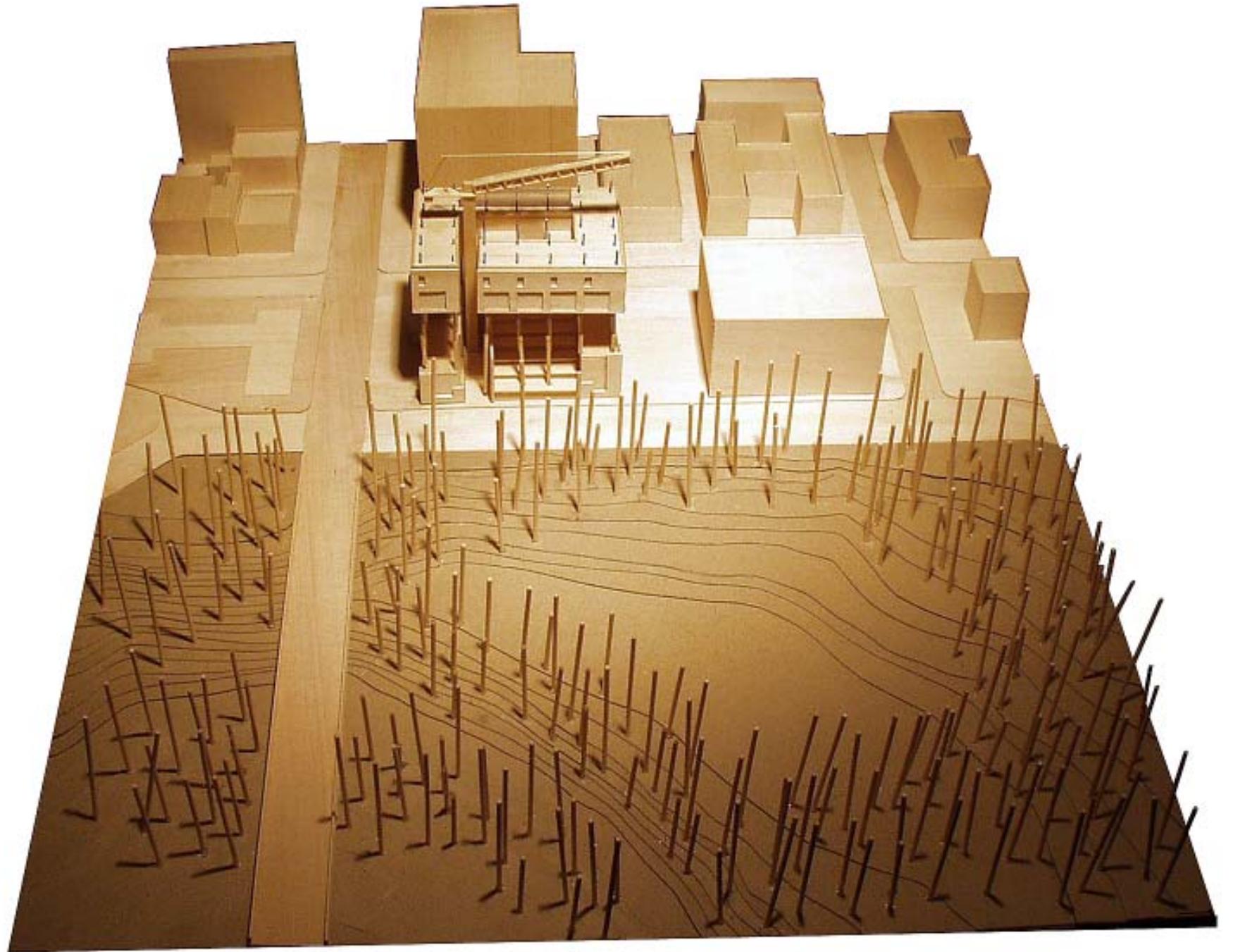


section
longitudinal



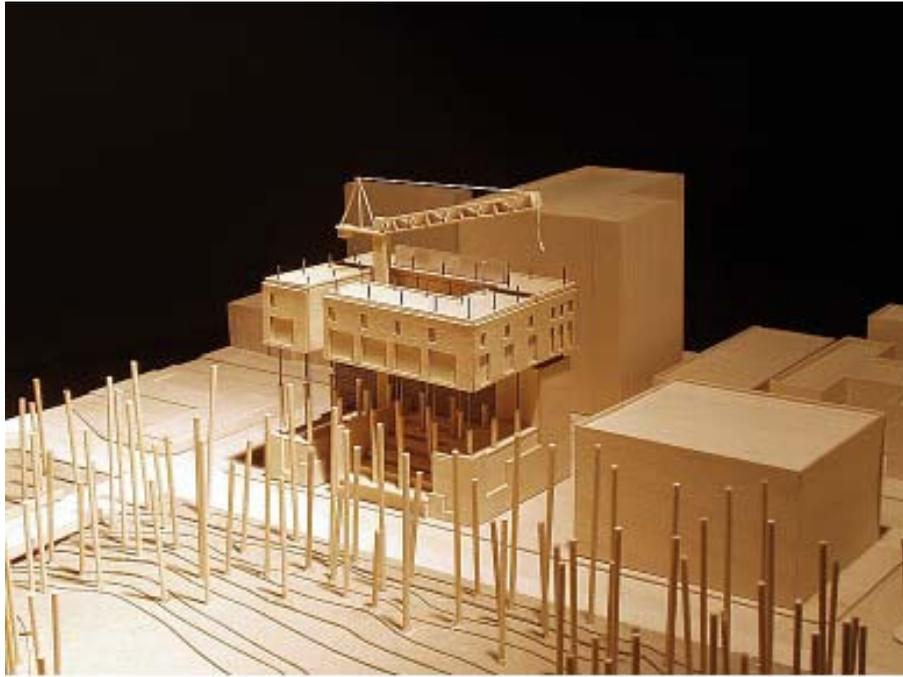
wall section

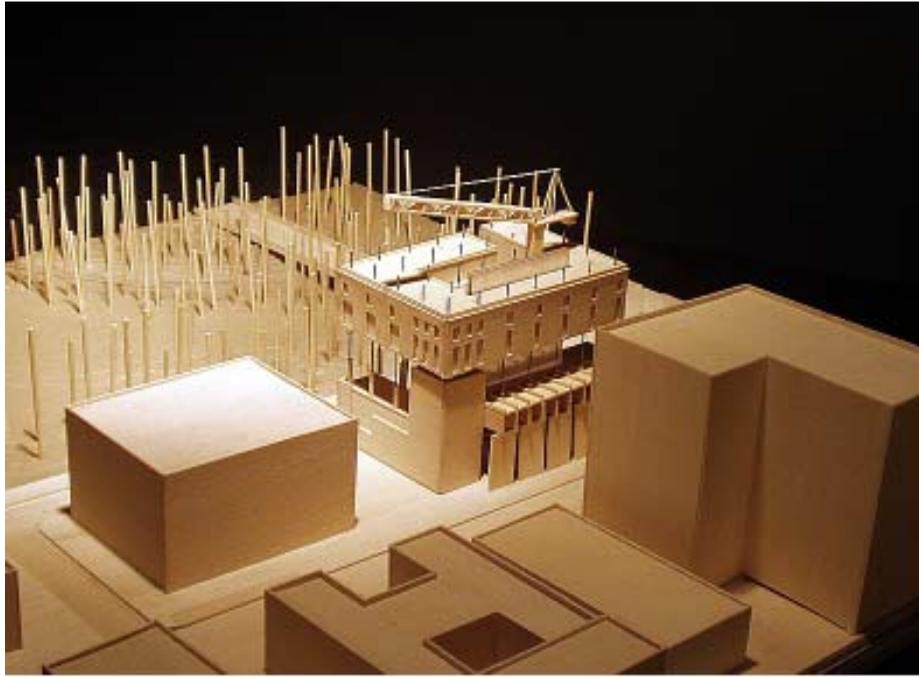
@ exterior column



site model

built @ 1 inch = 30 feet

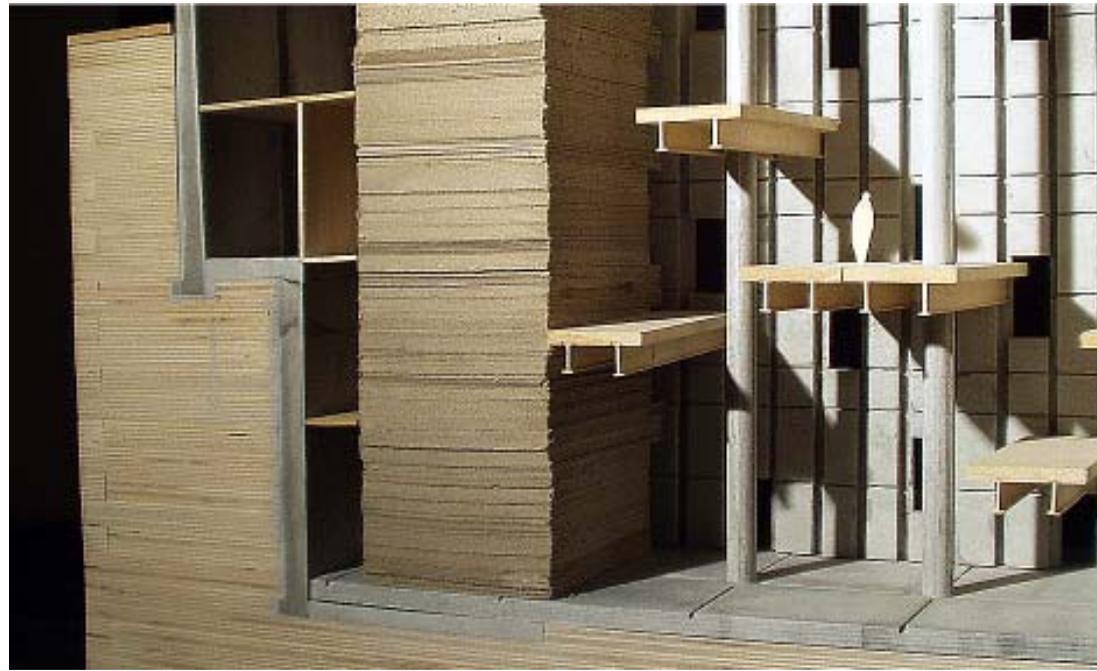




section model

built @ 1/4 inch = 1 foot











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