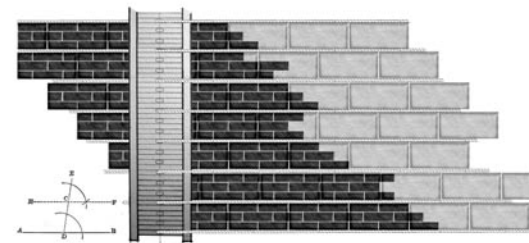


# WEAVING ARCHITECTURE

AN EXPLORATION OF OLD AND NEW MATERIALS AND  
CONSTRUCTION METHODS IN WASHINGTON, D.C.



JOSHUA JAMES KEITH HOUSDAN

# WEAVING ARCHITECTURE

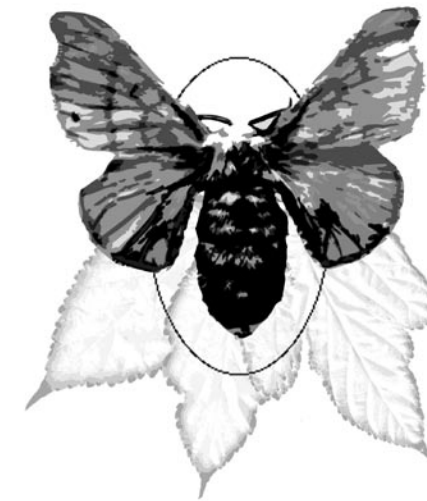
AN EXPLORATION OF OLD AND NEW MATERIALS  
AND CONSTRUCTION METHODS IN WASHINGTON, D.C.

Joshua Housdan

## ABSTRACT

This is an architectural thesis on weaving. The city is a massive textile, a patchwork of buildings, infrastructure and people. We alter the urban environment within the confines established by lot lines, streets and zoning similar to the weft on a loom, conforming to the rules of the warp. The proposed design aims to incorporate the demands of a globalized world while retaining the identity and scale of the traditional Washington building type - the rowhouse.

The architectural project, located near Fourteenth and U Streets, Northwest, in Washington, DC is a hybrid of programs - a textile school, a gallery and bar for the Textile Museum, artist studios, a restaurant, leaseable space for offices and residences as well as a public garden. This complex design reflects the evolving nature of cities and a building's ability to adapt to new demands and technology; similar to the ancient art of weaving's ability to transcend centuries of evolution while retaining its inherent qualities.



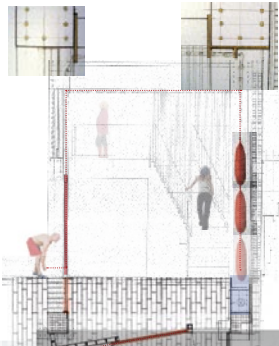
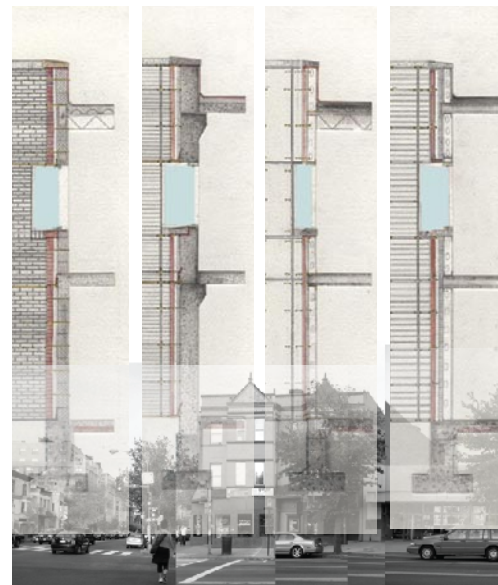
ideogram - bombyx mori - the origin of the thread / idea

a



# WEAVING ARCHITECTURE

AN EXPLORATION OF OLD AND NEW MATERIALS AND  
CONSTRUCTION METHODS IN WASHINGTON, D.C.



**JOSHUA HOUSDAN**  
MASTER OF ARCHITECTURE  
THESIS DEFENSE

VIRGINIA TECH  
WASHINGTON-ALEXANDRIA ARCHITECTURE CENTER  
1001 PRINCE STREET, ALEXANDRIA, VA 22314

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# WEAVING ARCHITECTURE

AN EXPLORATION OF OLD AND NEW MATERIALS  
AND CONSTRUCTION METHODS IN WASHINGTON, D.C.

Joshua Housdan

Thesis submitted to the faculty of the Virginia Polytechnic  
Institute and State University in partial fulfillment of the  
requirements for the degree of: Master of Architecture.

PAUL F. EMMONS  
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Defense Date:  
August 28, 2009  
Washington Alexandria Architecture Center  
Alexandria, Virginia

Keywords:  
local\_materials  
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weaving

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## ACKNOWLEDGEMENTS

This thesis would not be possible without the support from countless individuals. My architectural education began many years ago and coming back to school for my Master of Architecture degree was an exciting decision. Returning from the professional world, the WAAC embraced me with open arms. The program gave me more than I could ever give back, and I am forever indebted to the center for its love and wisdom.

I would like to thank my thesis committee - Paul Emmons, Susan Piedmont-Palladino and Jaan Holt - for believing in my little project on Fourteenth Street and all its details that somehow turned into a building.

A special thanks to Henry Hollander for keeping the center afloat - somehow.

To my friends and colleagues - Lesley Golenor, Beth Barrett, Sarah Mailhot, Dave Nath, Andrew McBride, Megan Lazzari, Ellen Sullivan, Carolina Dayer, Leo Salom, Steven Siebers, Elizabeth Waites and Nick Jessee - who kept architecture imaginative, engaging and, most importantly, entertaining.

And to my friends outside of the WAAC for getting me out of the studio as a reminder there is a world beyond 1001 Prince Street.

And lastly, but most importantly, to my parents and family for their love and support of my endeavors - however silly they may be.

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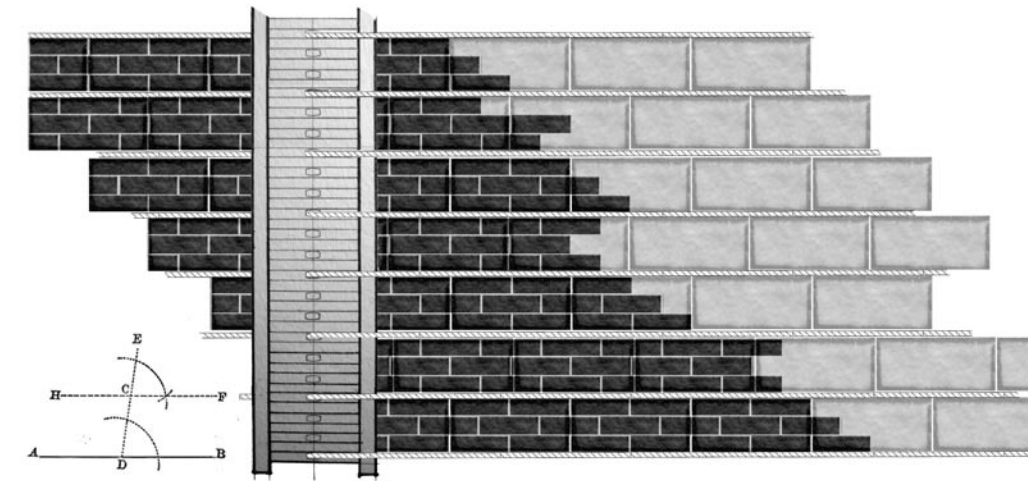
## WEAVING ARCHITECTURE

This is an architectural thesis on weaving. It is a study on the influence of the world's most ancient craft and its relationship to the craft of building. As skilled labor decreases and demand for efficiency increases, what is lost in the process? Through global markets and the simplicity of purchasing through the click of a mouse, what is happening to local and regional architectural identities? Just as automated high-speed looms produce flawless duplicates, mass-produced building materials leave no mark of human creation while imitating and oftentimes insulting their crafted neighbors.

The city is a massive textile, a patchwork of buildings, infrastructure and people - both historic and contemporary. We alter the urban environment within the confines established by lot lines, streets and zoning requirements similar to the weft on a loom - conforming to the rules of the warp.

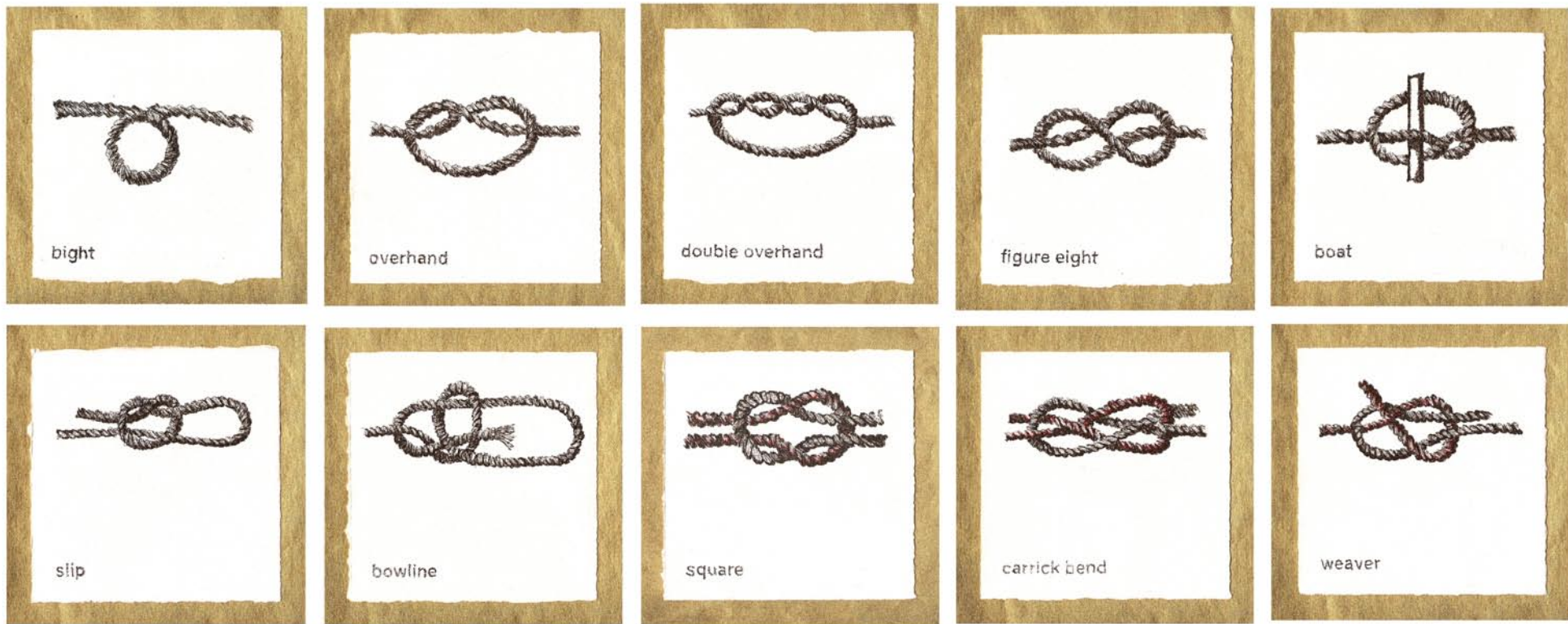
This thesis aims to incorporate the demands of a globalized world while retaining the identity and scale of the traditional Washington building type - the rowhouse.

The architectural project, located near Fourteenth and U Streets, Northwest, in Washington, DC is a hybrid of programs - a textile school, a gallery and bar for the Textile Museum, artist studios, a restaurant, leaseable space for offices and residences as well as a public garden. This complex design reflects the evolving nature of cities and a building's ability to adapt to new demands and technology; similar to the ancient art of weaving's ability to transcend centuries of evolution while retaining its inherent qualities.



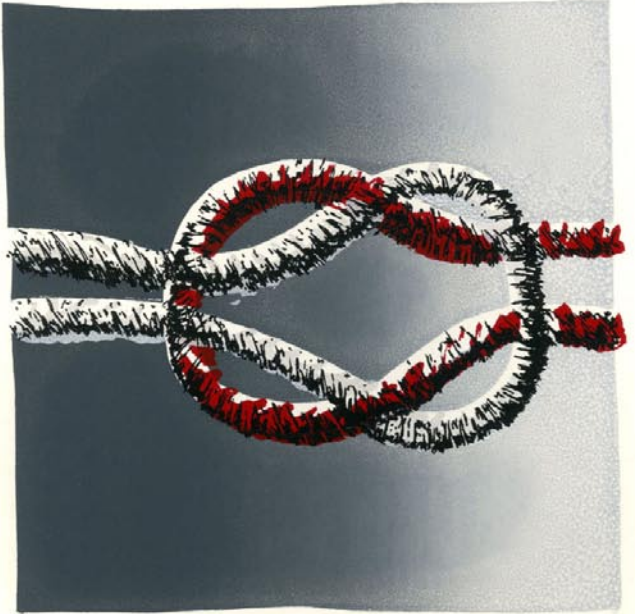
ideogram - weaving architecture - coursing as weft through the evolution of the city

b



knots as changes in material / program

c

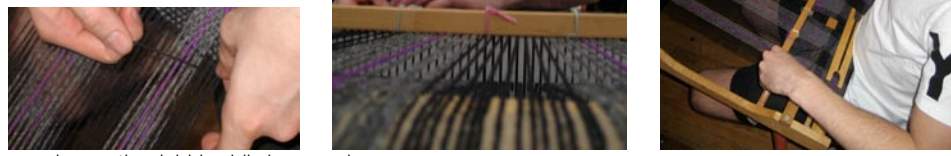
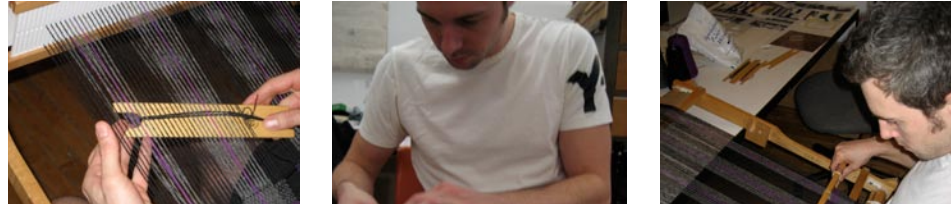


knots as changes in material / program

d



setting up the rigid-heddle loom



weaving on the rigid-heddle loom series

e



scarf woven on the rigid-heddle loom



shibori pocket square



shibori scarf



shibori scarf

f



## LOCAL MATERIALS

A major professional goal and part of my thesis is researching local and regional materials. While LEED currently requires the majority of materials originate within 500 miles of the construction site, my goal was to find the majority within 100 miles. Historically, development has occurred near abundant natural resources; building materials were found adjacent to their homes and businesses.

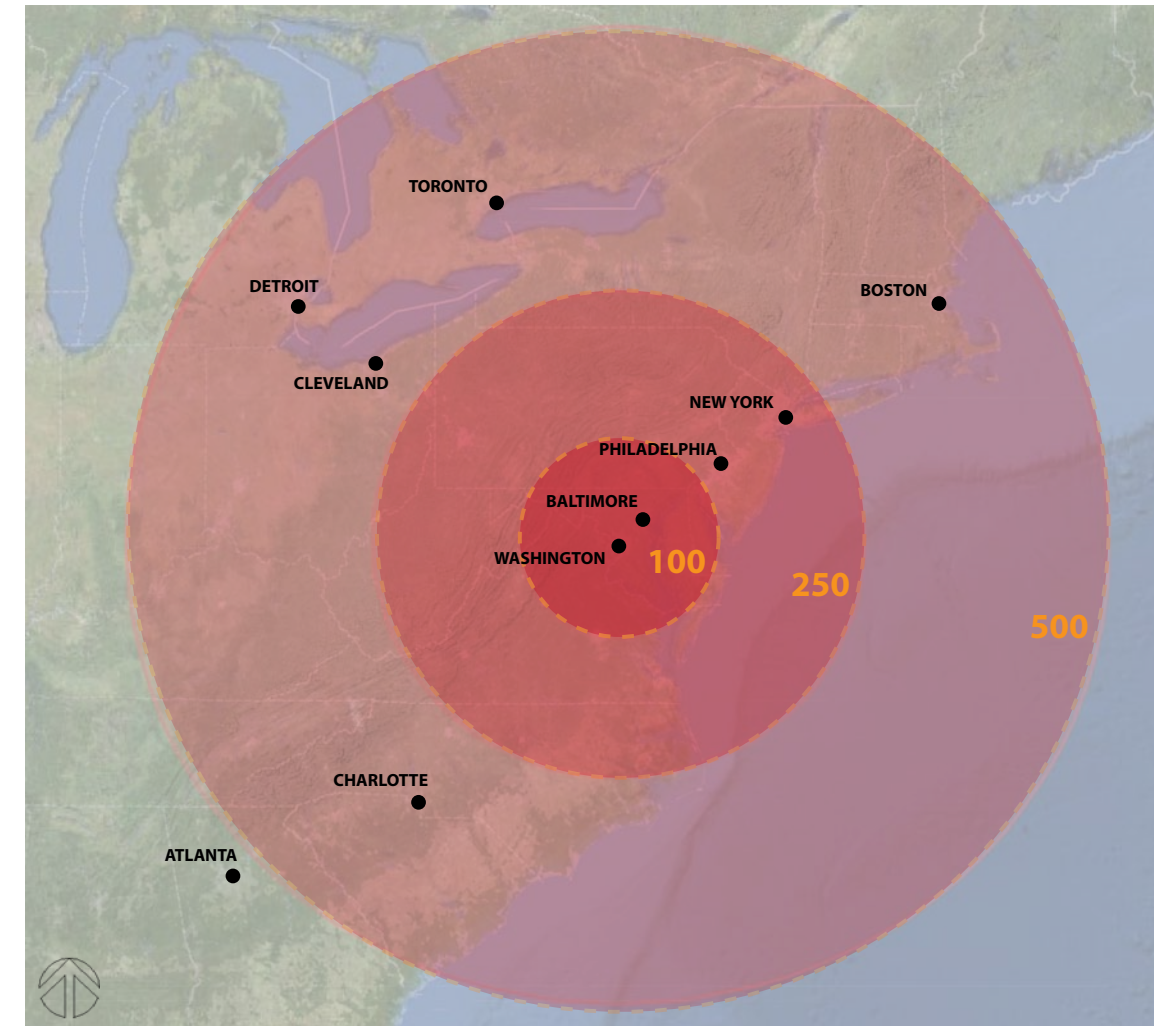
Through technological advances and subsequent globalization, we have moved farther away from our resources. While we can't strive to live in the past and return to an old way of living, there are plenty of local and regional resources that are easily found through online searches and consultants, such as the following:

- [www.buildsite.com](http://www.buildsite.com)
- [www.ecobusinesslinks.com](http://www.ecobusinesslinks.com)
- [www.greendepot.com](http://www.greendepot.com), and
- [www.natureneutral.com](http://www.natureneutral.com)

The Washington, D.C. metropolitan area also has a number of architectural salvage warehouse as well as recycled lumber and other materials yards. A few examples are the following:

- Community Forklift in Hyattsville, MD
- Caravati's Architectural Salvage in Richmond, VA
- Recycled Aggregates in Washington, DC

While not every material in the following list can be located within the 100 mile goal I initially set, the majority are local and regional. I expanded the search to three categories: 100, 250 and 500 miles. This list is certainly not complete, however, as a professional goal, this spreadsheet will only continue to expand as my experience increases.



100-500 mile radius map

MATERIAL	MANUFACTURER	LOCATION	DISTANCE FROM 1927 14th ST. NW	100/250/500 MILES
MASONRY/STONE				
Concrete Block				
Gray Block	Hagerstown Building Products	Hagerstown, MD	70 miles	100
Gray Block	York Building Products	York, PA	90 miles	100
Ground Face Concrete Block				
	Betco Supreme	Manassas, VA	35 miles	100
	York Building Products	York, PA	90 miles	100
Terra Cotta	Hunter Douglas/Telling Architectural	Orchard Park, NY	350 miles	500
Brick				
	Redland Brick	Hagerstown, MD	70 miles	100
	York Building Products	York, PA	90 miles	100
Slate Tiles				
	Luck Stone	Throughout Virginia	10-150 miles	100-250
	Buckingham Tiles	Buckingham, VA	100 miles	100
Precast Concrete	Shockey Precast	Winchester, VA	78 miles	100
Aggregates/Crushed Stone	Vulcan Materials	Alexandria, VA	15 miles	100
	York Building Products	York, PA	90 miles	100
Local Stone	Luck Stone	Throughout Virginia	10-150 miles	100-250
GLAZING				
Float Glass				
	Guardian Glass	Floeffe, PA	240 miles	250
	AGC	Abingdon, VA	360 miles	500
	Cardinal	Mooreville, NC	380 miles	500
Channel Glass	Bendheim Glass	Passaic, NJ	230 miles	250
	Pilkington Prolift	Germany	thousands!	!
Laminated Glass	Depp Glass	Long Island City, NY	230 miles	250
WOODS				
Recycled Lumber	local salvage yards	Throughout VA	10-250 miles	100-250
Lath/Framing/Studs/Trim	Marinoware	South Plainfield, NJ	205 miles	250
New Lumber	Georgia Pacific	Gladys, VA	90 miles	100

MATERIAL	MANUFACTURER	LOCATION	DISTANCE FROM 1927 14th ST. NW	100/250/500 MILES
METALS				
Rebar	Rockingham Steel	Harrisonburg, VA	130 miles	250
Structural Steel	Cives Steel	Winchester, VA	75 miles	100
Cables	Continental Cable	Hinsdale, NH	423 miles	500
Aluminum Storefront	local extruders	DC/VA/MD	5-100 miles	100
Metal Screens	Cambridge Mesh	Cambridge, MD	85 miles	100
MEMBRANES/SYNTHETICS				
Drainage Boards	Owens Corning Grace	Delmar, NY Cambridge, MA	365 miles over 500 miles	500 !
Roofing Membranes	Polyglass, USA	Hazleton, PA	200 miles	250
Asphalt Shingles/Vapor Barriers	CertainTeed	Valley Forge, PA	150 miles	250
OTHERS				
Sand	Luck Stone	Throughout, VA	10 miles	100
PVC Piping	CertainTeed	Valley Forge, PA	150 miles	250
Gypsum Board	CertainTeed	Baltimore, MD	38 miles	100
Masonry Ties	Dur-O-Wall	Dayton, OH	485 miles	500
Caulks/Sealants	DAP	Baltimore, MD	38 miles	100
Grouts	Laticrete	Hamlet, NC	371 miles	500
Solid Surface Counter	Alkemi	Baltimore, MD	38 miles	100
Ornamental Metal	Highland Ornamental	Berryville, VA	65 miles	100

## PROGRAM AND PRECEDENTS

Through researching craft and weaving, the program automatically lent itself to textiles and galleries. While also researching local versus global building materials and construction methods, the program expanded into a relatively recent building typology: the blurring of public and private spaces through museums and embassies attaching condos and other private functions in order to finance their projects. Two recent examples in Washington are the Swedish Embassy in Georgetown as well as the Newseum in the Pennsylvania Avenue corridor just blocks from the Capitol Building.

As the research further developed a site was chosen, the program expanded exponentially into several different programs mashed into indistinct zones: a gallery/bar for the Textile Museum to display and pay for exhibitions; a craft school/studio spaces for local artists to interact with the community; a public garden/courtyard for the aforementioned programs to interact with the city as a whole; a restaurant with leaseable office space above; a residence/studio for a visiting artist associated with the Textile Museum; and finally a series of duplex apartment units to afford the museum further income.

The evolution of the program was similar to that of weaving, where, though chronologically there is a structure - the warp attached to the loom, the resulting object or program varies and is oftentimes blurred as the weft conceals the structure snaking through its perpendicular guides.

# PROGRAM COMPONENTS

CREATING

STORING

SLEEPING

COOKING

CLEANSING

RESEARCHING

ORGANIZING

RELAXING

EXHIBITING

DRINKING

TOUCHING

EXAMINING

STUMBLING

SOCIALIZING

LOUNGING

SCHMOOZING

LEARNING

CREATING

ENCOURAGING

REACHING OUT

COMMUNITY BUILDING

MASTERING

EXAMINING

RESEARCHING

BREATHING

GROWING

SOCIALIZING

TENDING

RELAXING

LEARNING

COMMUNITY BUILDING

INTERACTING

## STUDIO | RESIDENCE

To provide housing and studio space for a visiting master textile artist.

The artist would come to Washington, D.C. through a grant from the Textile Museum located at 23rd and S Streets, Northwest.

The Facility provides a direct link between the museum, its archives and research initiatives and the planned arts corridor along Fourteenth Street between P and U Streets.

## GALLERY BAR

To provide exhibition space, an empty shell, allowing the visiting artist to manipulate/transform the space into his or her own laboratory/promotion.

Located on a busy street with numerous existing bars, clubs and galleries; strengthening the connection to the existing context.

The functions link the busy nighttime activities associated with the Dupont Circle neighborhood, Fourteenth and U Street corridors.

Textiles are all about the touch. Galleries are all about the do not touch; this is an attempt to blur the lines between the two.

## SCHOOL | STUDIOS

To increase community outreach and involvement through classrooms to teach various textile and allied arts techniques.

The classrooms, entered from a large storefront along Fourteenth Street, provides direct access to the community, acting as an inclusive link between the private institution and the public city.

Artist studios located on the upper levels provide work space and facilities for artists who otherwise would not have a place or resources to master weaving techniques.

These classrooms and studios would also be open to the public through monthly gallery openings commonly found along the Fourteenth Street arts corridor.

## GARDEN | COURTYARD

The garden/courtyard provides a visual break from the hustle and bustle of the Fourteenth and U Street corridors.

Since there are currently no public parks or gardens along the Fourteenth Street corridor, the garden provides a place for the community and artists to interact outdoors.

It allows for direct access from the street into the classrooms.

It also allows for spillover space from the gallery/bar area for receptions and revelry.

## NEIGHBORHOOD WALK

I chose to examine this stretch of Washington from Dupont Circle heading East on P Street, then North on Fourteenth Street and East on U Street for several reasons.

Firstly, I am interested in the ways cities change from one neighborhood to another and how cities evolve over time. I was curious to explore the transitions from one extremely successful neighborhood center (Dupont Circle) crossing into a transitional neighborhood (the Fourteenth Street corridor) then continuing onto a vibrant, historically African American neighborhood (U Street-Cardozo).

This journey revealed a few clues into what works and what does not on an urban design scale. Having lived in the Washington, DC area for several years, I am familiar with these neighborhoods but had not examined them under the same microscope until now. Also, my thesis site is located along the walk at the intersection of Fourteenth Street and Wallach Place, Northwest.

This walk takes you through several very distinct districts. Dupont Circle has very well defined zones, from the inner and outer tree-lined rings of the circle itself, to the peripheral buildings that frame the park. Continuing East along P Street from Dupont Circle, there is a distinct tree canopy and the scale of buildings is clearly dominated by residential structures. When you reach 16th Street, the scale becomes larger and the tree canopy is less defined. The construction in this area is also newer than most closer to Dupont Circle. There, the facades of the buildings are mostly curtain walls over concrete structural systems as opposed to parti walls with brick facades and smaller, punched openings for windows and doors.



mapping the walk: Dupont Circle, P Street, Fourteenth Street to U Street

h



fourteenth street photomontage

i

On the 1400 block of P street, Whole Foods becomes a neighborhood-defining anchor. The Studio Theater, at the corner of 14th and P streets also reinforces this intersection as a neighborhood center. The DC Planning Office has designated the 14th Street corridor and U Street as an arts district and is encouraging rapid growth along this thoroughfare.

Being a quickly evolving neighborhood, there are some positive elements as well as some failing parts. The sidewalks are relatively wide, at about 20 feet deep, they encourage heavy pedestrian traffic. Unfortunately the street is wider since it is a major thoroughfare and it also lacks consistent street lighting as well as a consistent, mature tree canopy.

Being an arts corridor, I would also encourage the city to develop a more distinctive paving pattern or other street element to establish an identity for the neighborhood. Subtle clues like these help orient visitors and also help strengthen the continuity between buildings around the 14th and P beginnings of the arts district all the way up to U Street and around to 7th Street.

Other issues along 14th Street is the lack of development from Corcoran Street up to U Street. This creates a void, completely disconnecting one vibrant district

(near Whole Foods and the Studio Theater) from another (the U Street Corridor). While public service buildings like the Whitman Walker Clinic and the Central Union Mission are essential to the city, the buildings around them are either abandoned or at such a low scale they allow the street wall to disintegrate. Hopefully, these vacant or under utilized lots will be built up in recent years to come.

At the Northwest corner of 14th and U Streets, the Franklin D. Reeves Center for Municipal Affairs is a prominent figure in the city's fabric. The corner plaza is large and nicely paved in brick but it is severely under utilized. I would propose introducing a farmer's market similar to those found in Columbia Heights or adjacent to Dupont Circle. While the nearest markets are not a great distance away, these spaces allow for uses unintended by the designer but generated and sustained by the community. It would also allow for other community functions, be it performances, festivals or rallies. Currently, it's occasionally used by employees brown-bagging their lunches but is mostly used to enter and leave the building or when waiting for a bus to pick you up.

Continuing East along U Street, on the North side of the 1200 block, the historic Lincoln Theater as well as the famous Ben's Chili Bowl restaurant provide community anchors relating to the corridor's historic African American roots. They help to

provide reminders of the neighborhood's past in the face of rapid gentrification as seen in the mega-mixed-use building called "The Ellington" apartments on the 1300 block of U Street.

Another observation along U Street is the narrowness of the sidewalks. While they measure twenty feet at their widest, they are eaten up by steps up to shops that were previously row houses and by planting boxes for trees or bike racks. While these obstacles can be a nuisance late at night when the sidewalks are crowded, they also contribute to the vibrance and life associated with this nightlife district. I would encourage the city to provide more consistent plantings as well as a more distinct paving pattern on the sidewalks to link this corridor back to Fourteenth Street.

Continuing East along U street, the gentrification dies down and the street wall begins to rapidly disintegrate. Finishing the walk at the African-American Civil War Memorial, the scale of the buildings is two to three-story row homes and a banal looking school. Having lived in the city for seven years, I had never actually examined this memorial. The plaza where it lies is largely eaten up by the Tenth Street entrance to the city's Metro rail system. I observed people walking around the area and all but a handful went immediately in or out of the station entrance.

Those who did linger were either pausing to make a phone call or were waiting to meet friends to head into the station or to venture elsewhere in the neighborhood.

I would propose a few design changes to this plaza. The first would be to provide a more established green wall of plantings to help frame this triangular space. Currently, there is a low berm and small plantings, completely exposing this space to the wide span of Vermont Avenue and the modest row homes across the street. The West side of the plaza, however is nicely anchored by a monolithic building housing a CVS (a typical neighborhood anchor store) at the ground level, with offices above. I would also encourage more variety of materials, particularly with regard to seating. Currently, the entire site is covered in stone or concrete. The introduction of warmer materials, such a wood or even recycled plastic, for seating would encourage people to linger just a little bit longer and provide a more inviting plaza.

While I have walked this route countless times over the past several years, I had never examined it as a whole until now. It is clear which neighborhoods are more successful than others and I hope my observations and recommendations provide some insight and direction to encourage further study of this area and its importance to the city as a whole.

## SITE

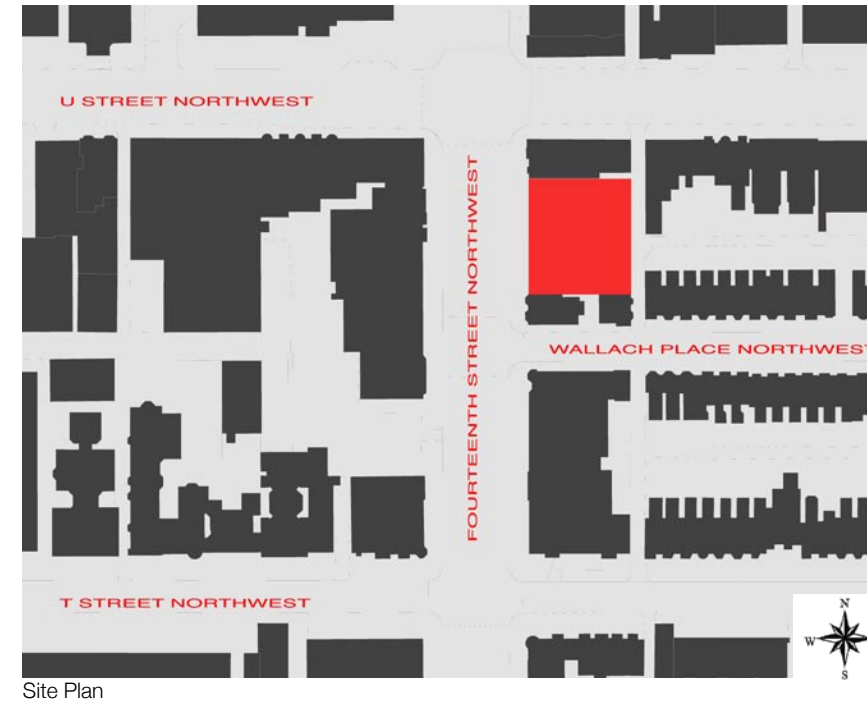
*Like all big cities, it consisted of irregularity, change, sliding forward, not keeping in step, collisions of things and affairs, and fathomless points of silence in between, of paved ways and wilderness, of one great rhythmic throb and the perpetual discord and dislocation of all opposing rhythms, and as a whole resembled a seething, bubbling fluid in a vessel consisting of the solid materials of buildings, laws, regulation, and historical traditions.*

*-Robert Musil*

The location of the project site is along the east side of Fourteenth Street, Northwest between Wallach Place and U Street. While currently along the DC Planning Commission's Arts Corridor initiative, the site is at a historical crossroads.

With Fourteenth Street a historical automobile service corridor and U Street a traditionally black neighborhood and the epicenter of DC's early 1900's jazz renaissance, the area is now under threat of gentrification and privatization. Another factor is the significance that the intersection of Fourteenth and U Streets marks the beginning of the infamous riots in response to the assassination of Martin Luther King, Jr.

Given the rapid gentrification of the neighborhood, the project theoretically snatched up one of the few remaining lots available as an attempt to blur the lines between public versus private, desires versus codes, and traditions versus trends.





site archaeology model - evolution of the site from 1888 to 2008



k



site block photomontage



## DESIGN PROCESS

My research began with a seemingly simple concern involving truth in materials. How did we as a society find it acceptable to mimic the past through cheap imitations? From architecture's origins in the ancient craft of weaving, to stacked stones, to masonry cavity walls, we've transitioned into an architecture of veneers: skins.

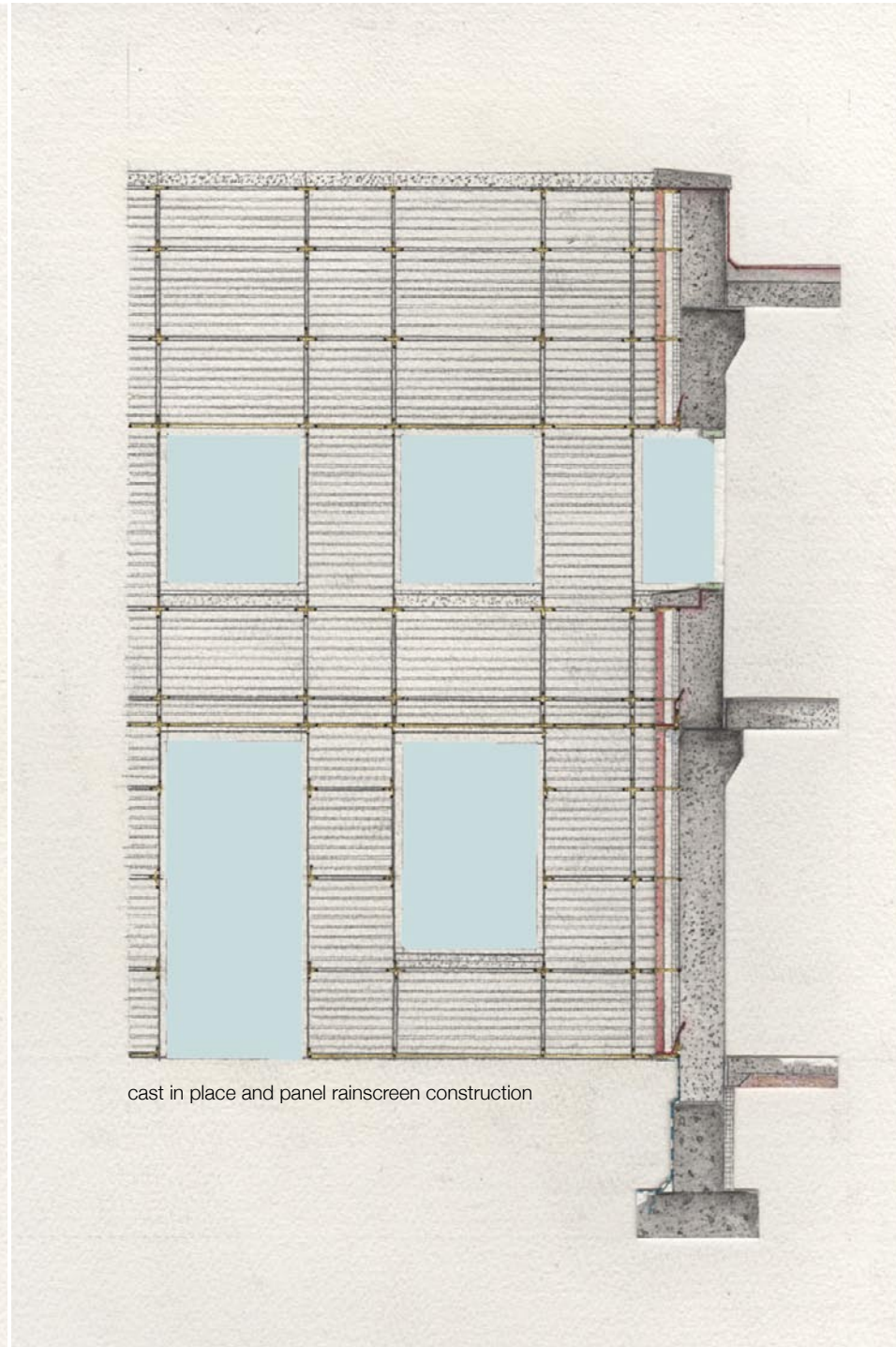
This thesis never attacked the idea of thinness; in fact, it embraced it. Rather, the process focused on details revealing the thinness of today's exposed materials.

Focusing on Washington, D.C., the project explored the city's most iconic building typology - the row house. As described earlier, the project is situated between two historic structures. While in need of repair, the adjacent properties represent a older method of building; of bearing walls, short spans and masonry cavity walls, versus the precast concrete, curtain walls and shelf-angle-supported brick walls of today.

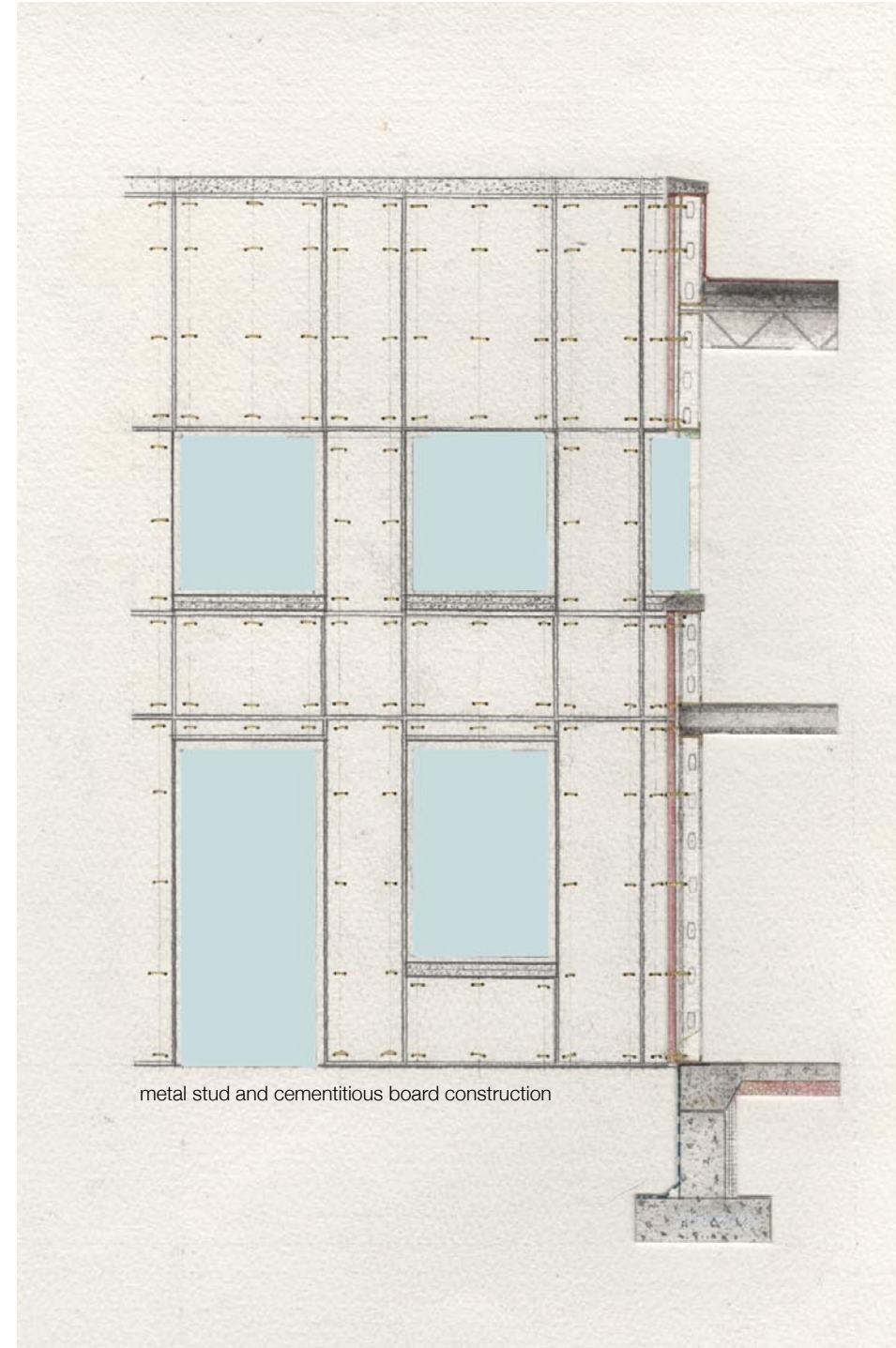
The aim was to explore the craft of building rather than printing a copy of the older neighbor nextdoor.



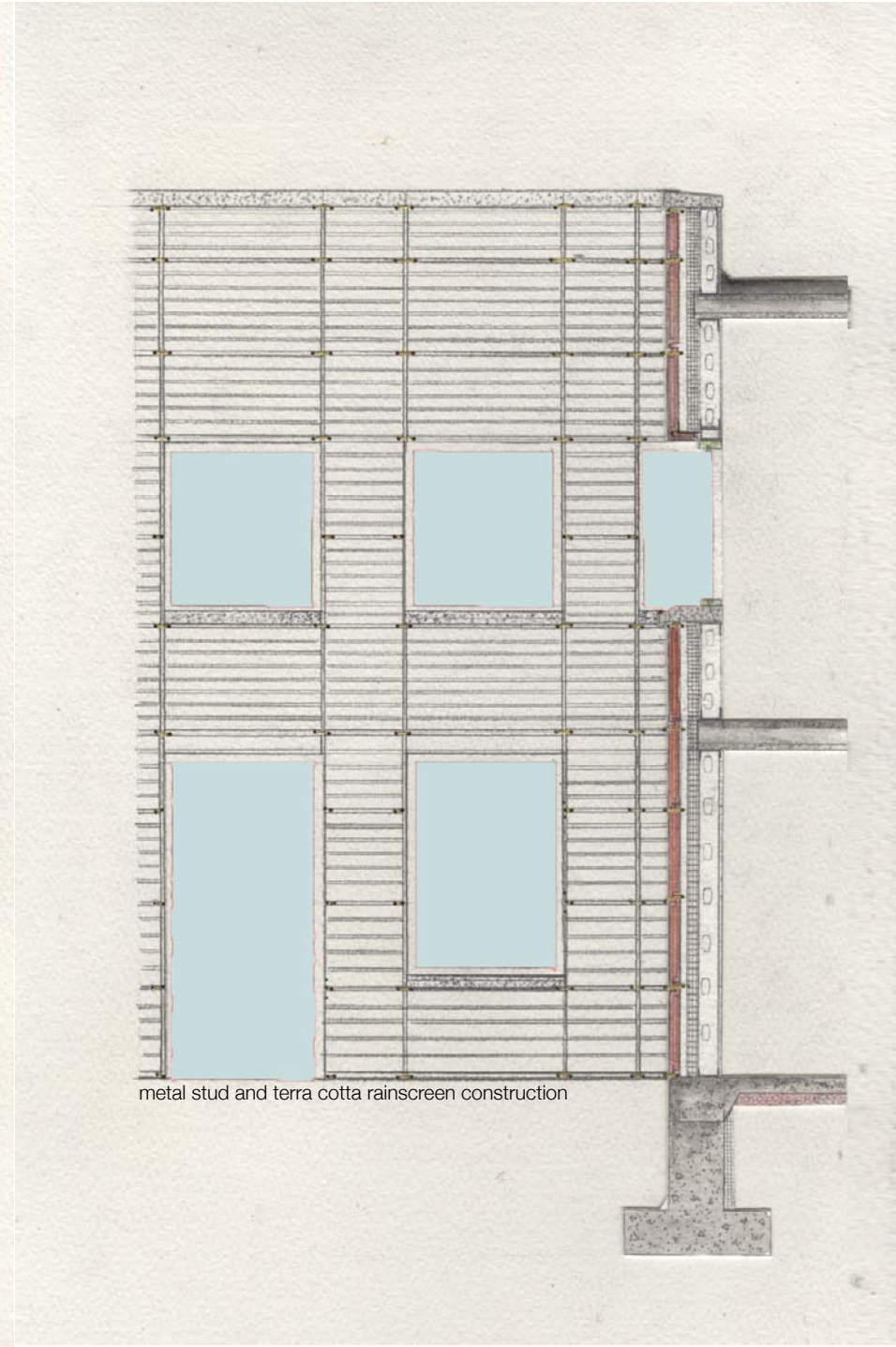
concrete block and brick cavity wall construction



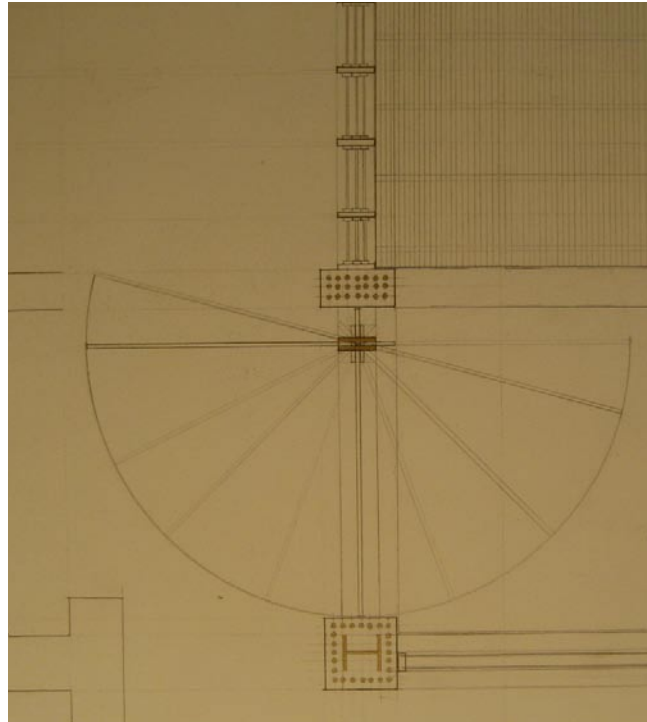
cast in place and panel rainscreen construction



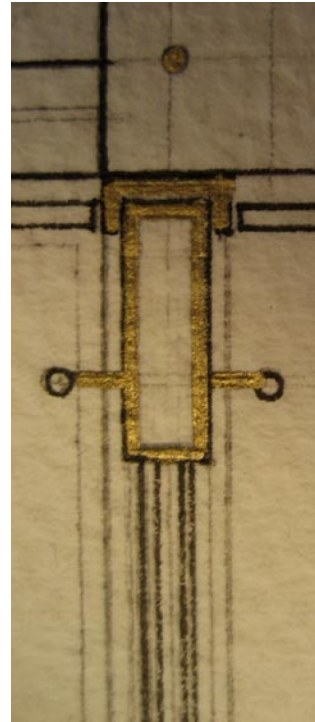
metal stud and cementitious board construction



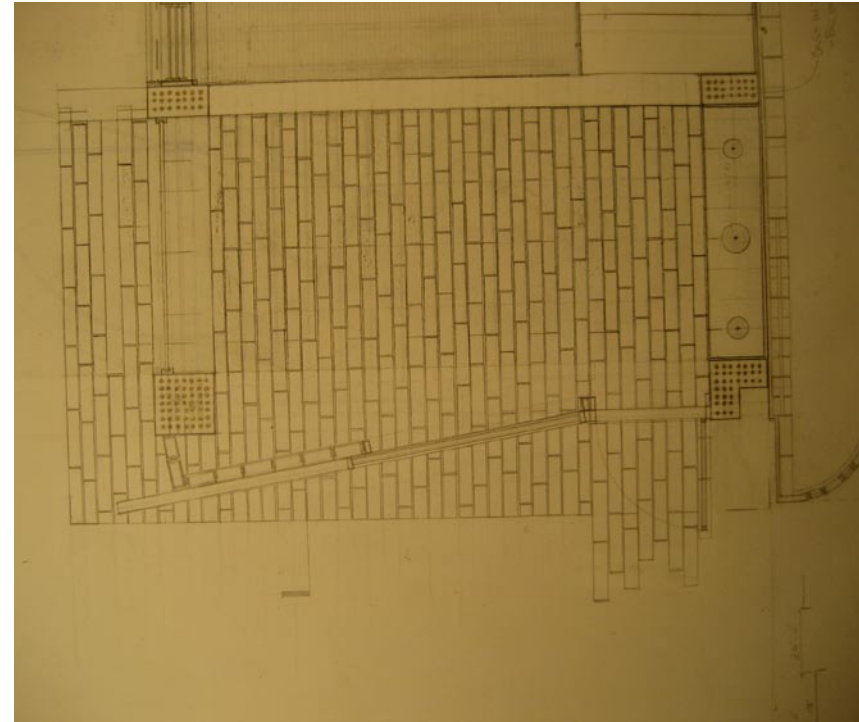
metal stud and terra cotta rainscreen construction



pivot door gallery entry plan



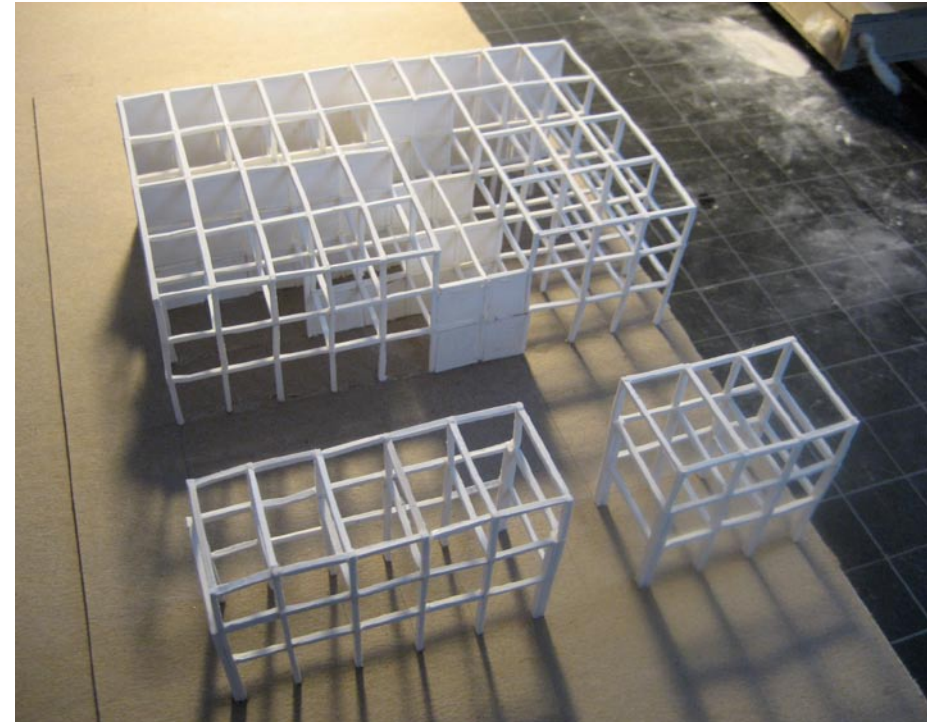
gallery door handle detail



gallery entry threshold plan

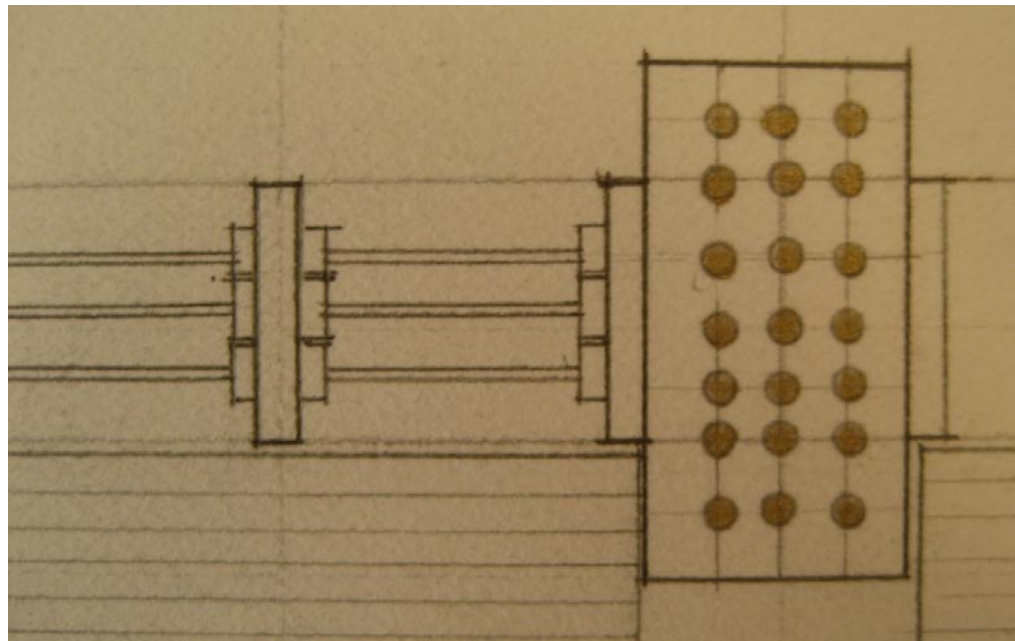


model - the historic city - bearing walls



model - the contemporary city - columns and beams

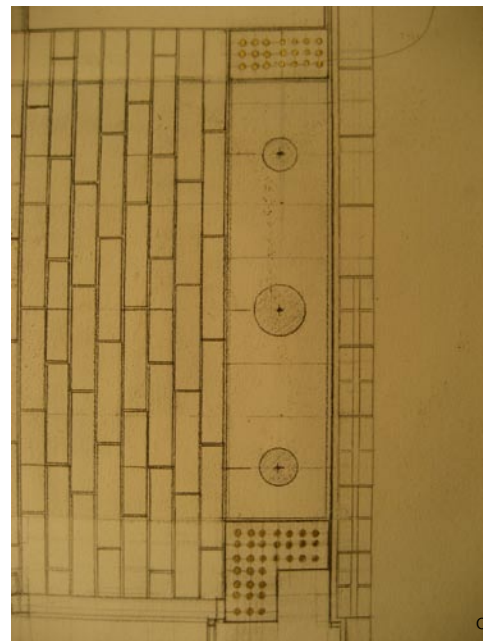
p



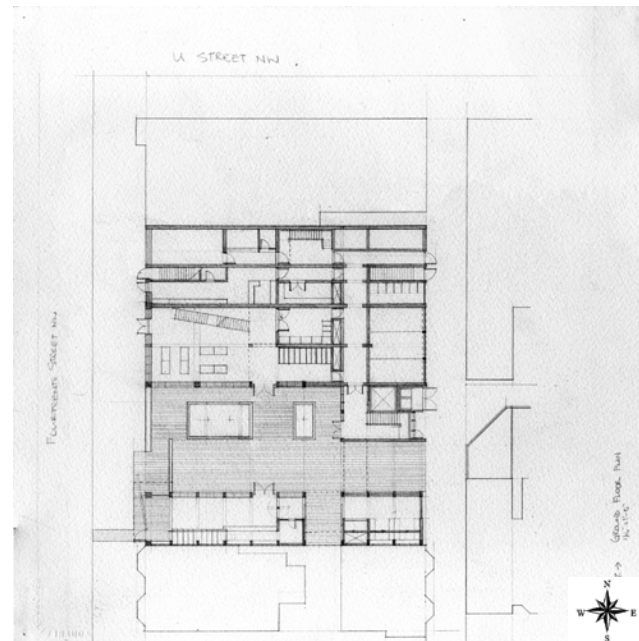
gallery triple-hung sash window to column detail



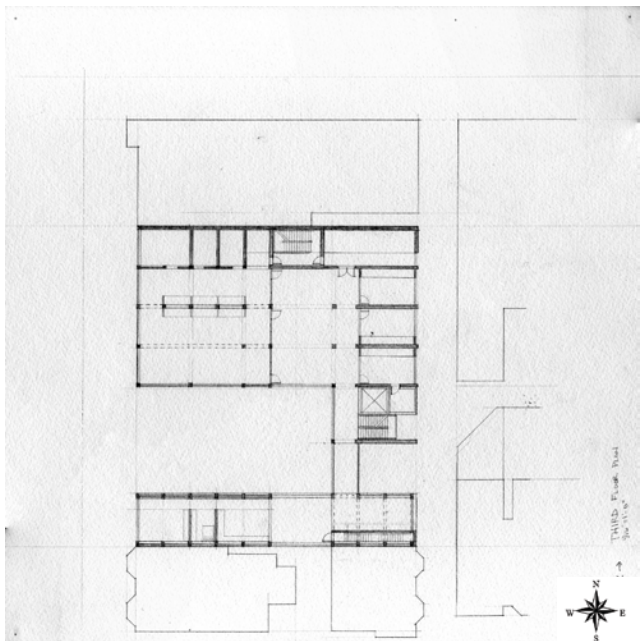
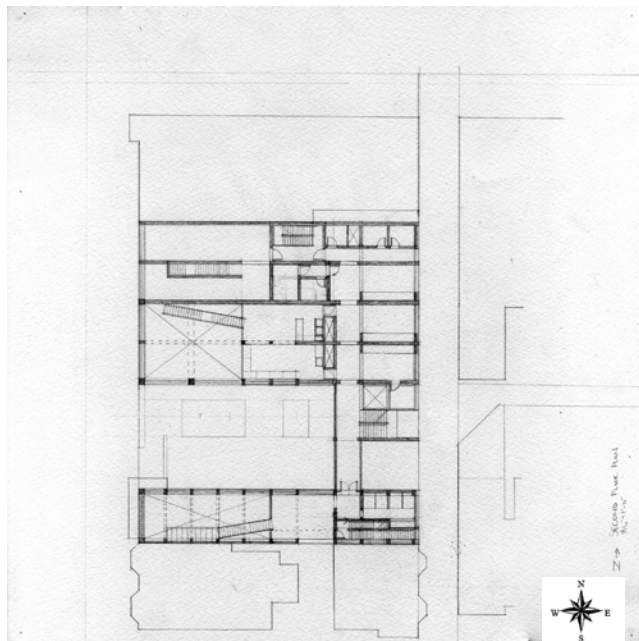
window corner detail



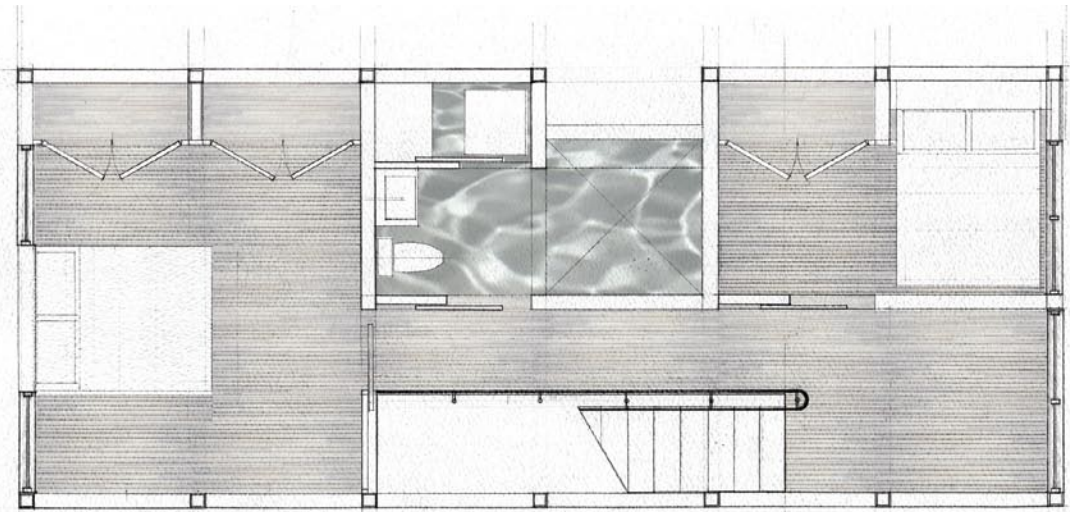
gallery plan - door counterweights between columns



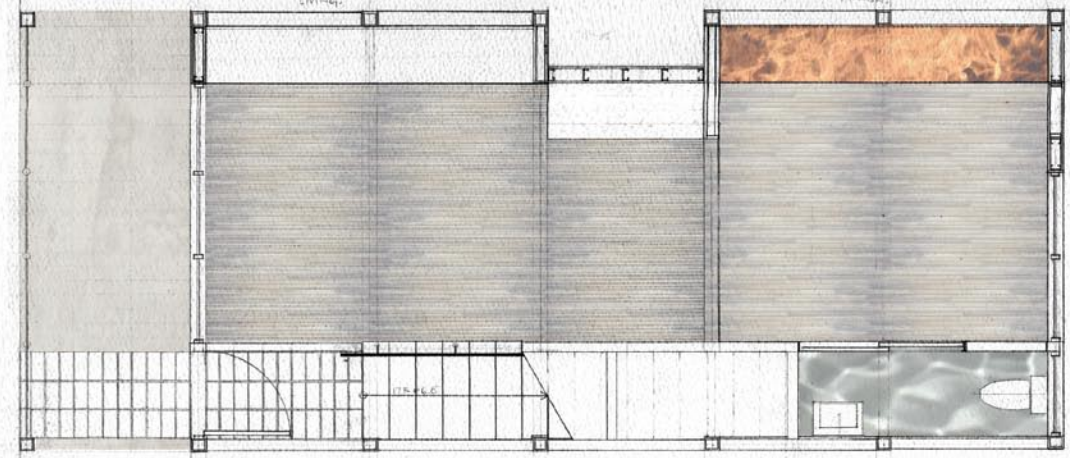
preliminary plans - first, second and third floors



q



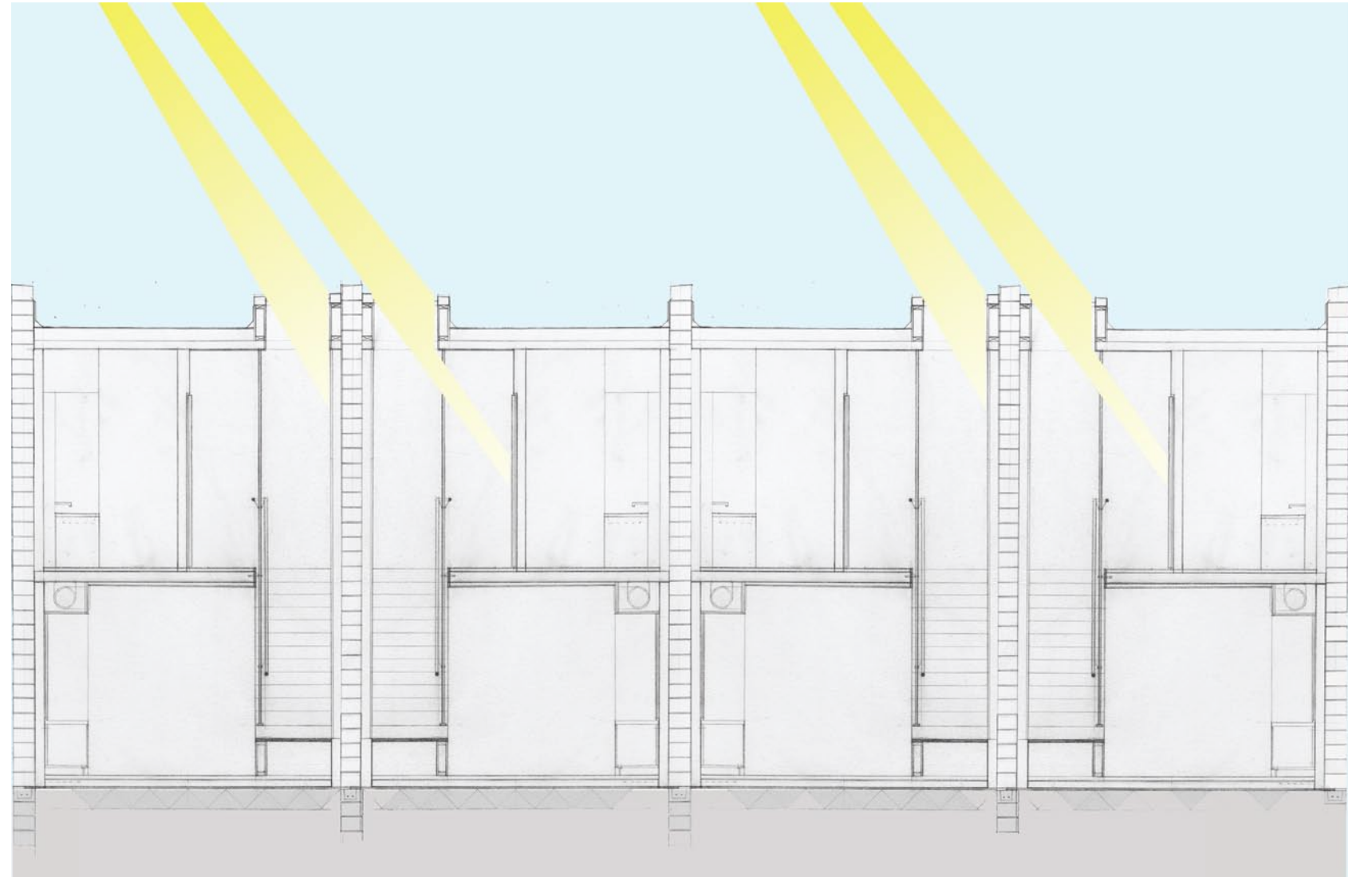
upper level plan



lower level plan



preliminary duplex apartment plans

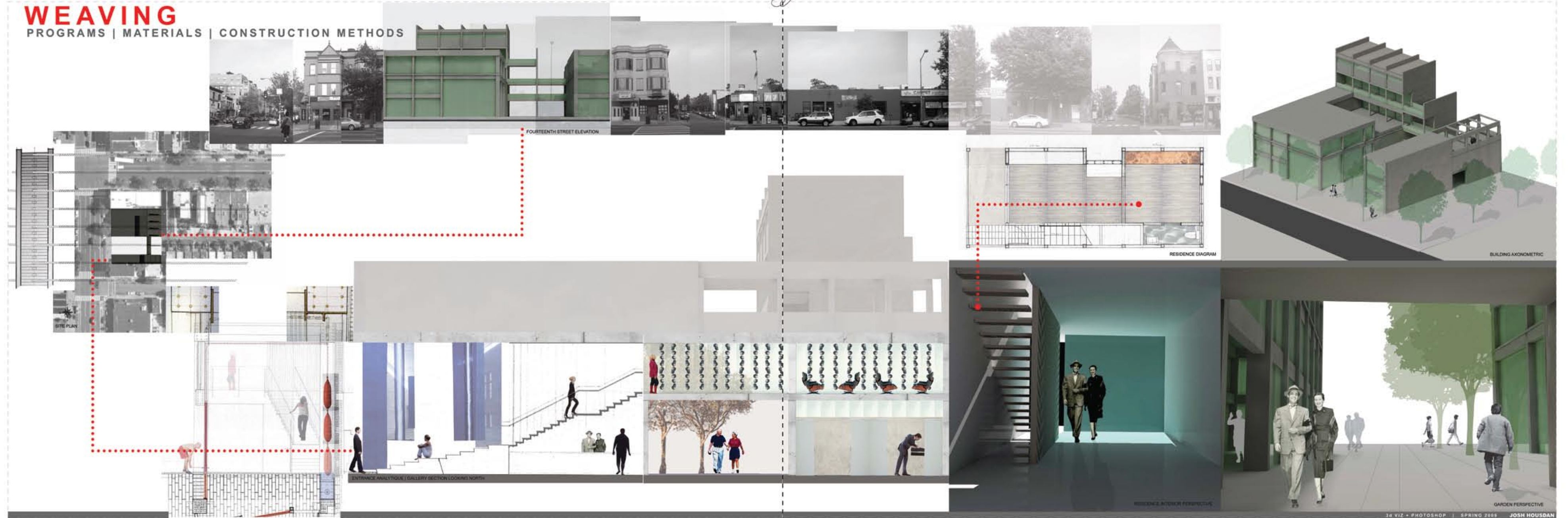


transverse section - duplex apartments

S

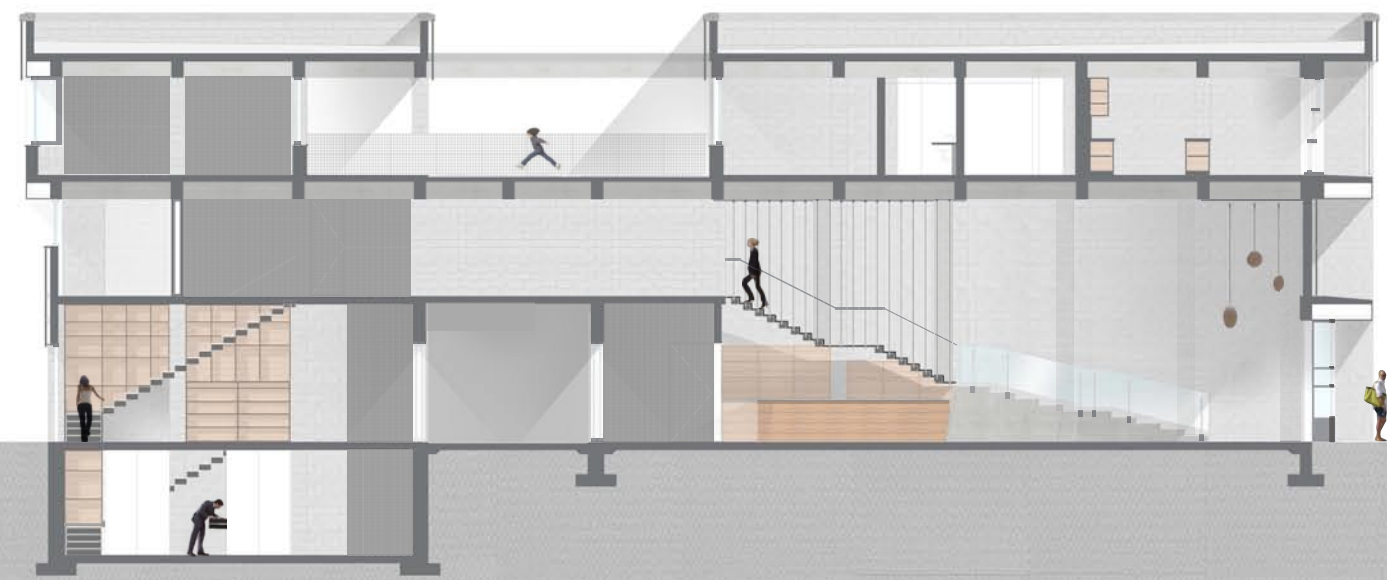
# WEAVING

PROGRAMS | MATERIALS | CONSTRUCTION METHODS



digital montage - design process

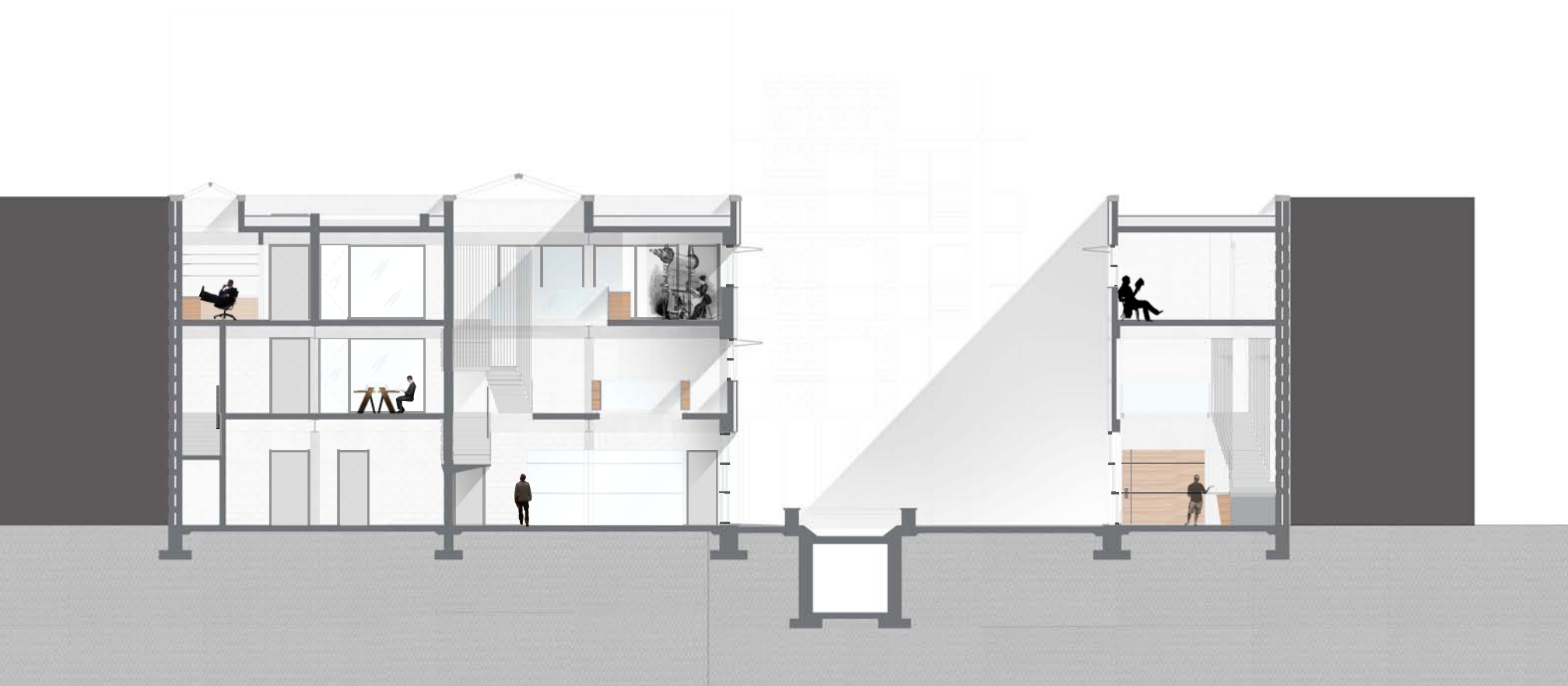
FINAL DESIGN



building section one - gallery/bar and visiting artist residence/studio

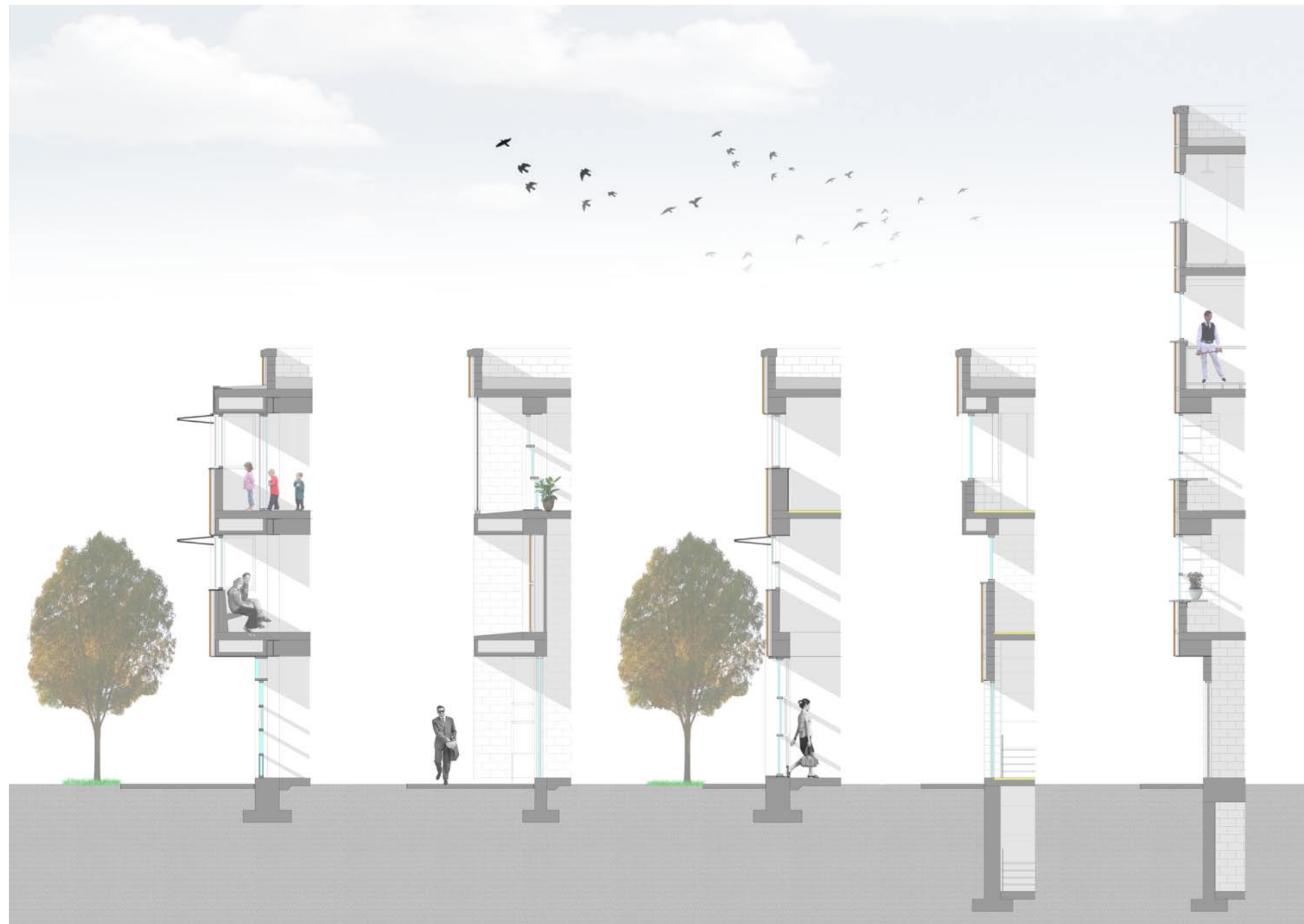


building section two - school/studios and duplex apartments



building section three - restaurant/leaseable space/school, courtyard and gallery/bar/artist residence

u



wall sections

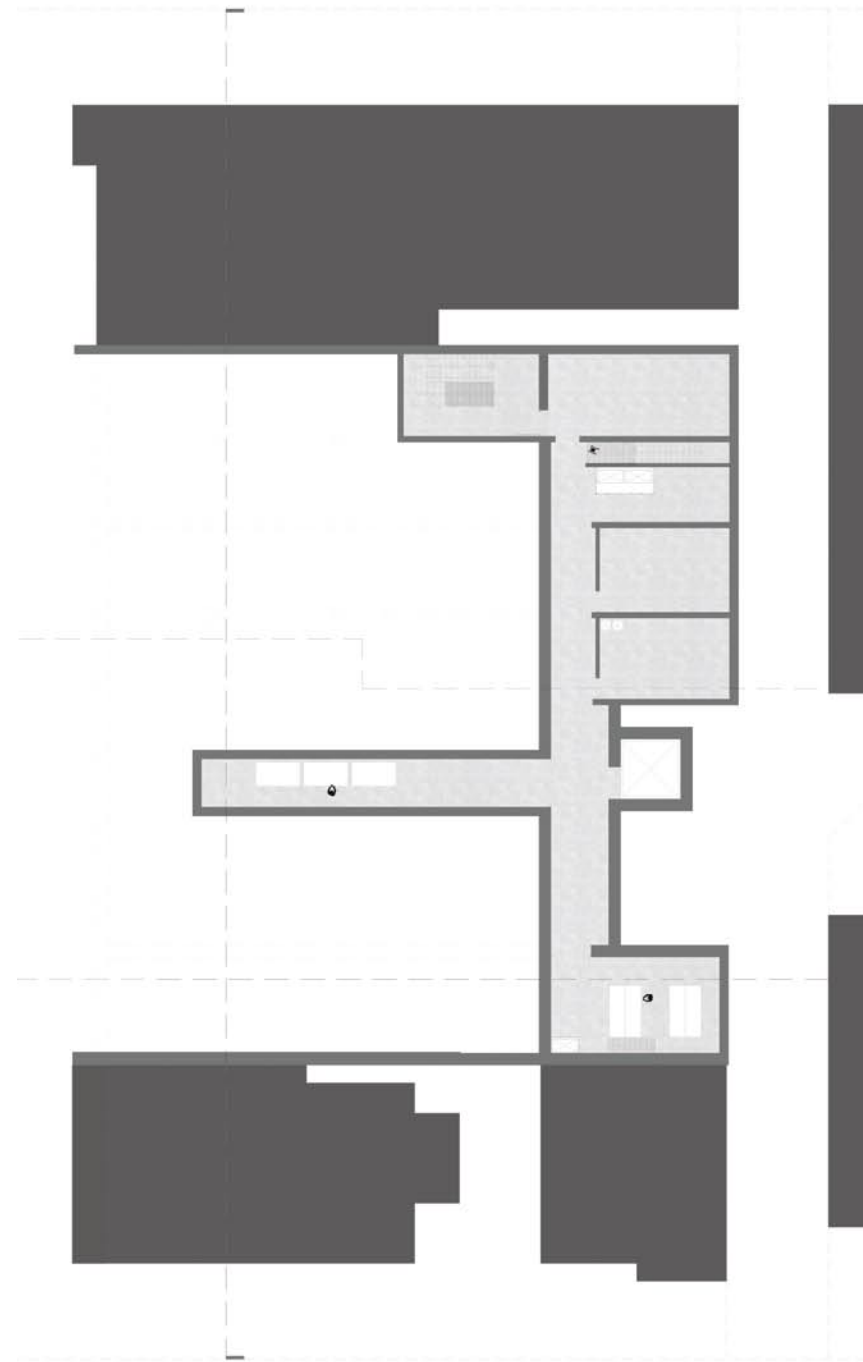
v





fourteenth street elevation

w



basement floor plan



ground floor plan



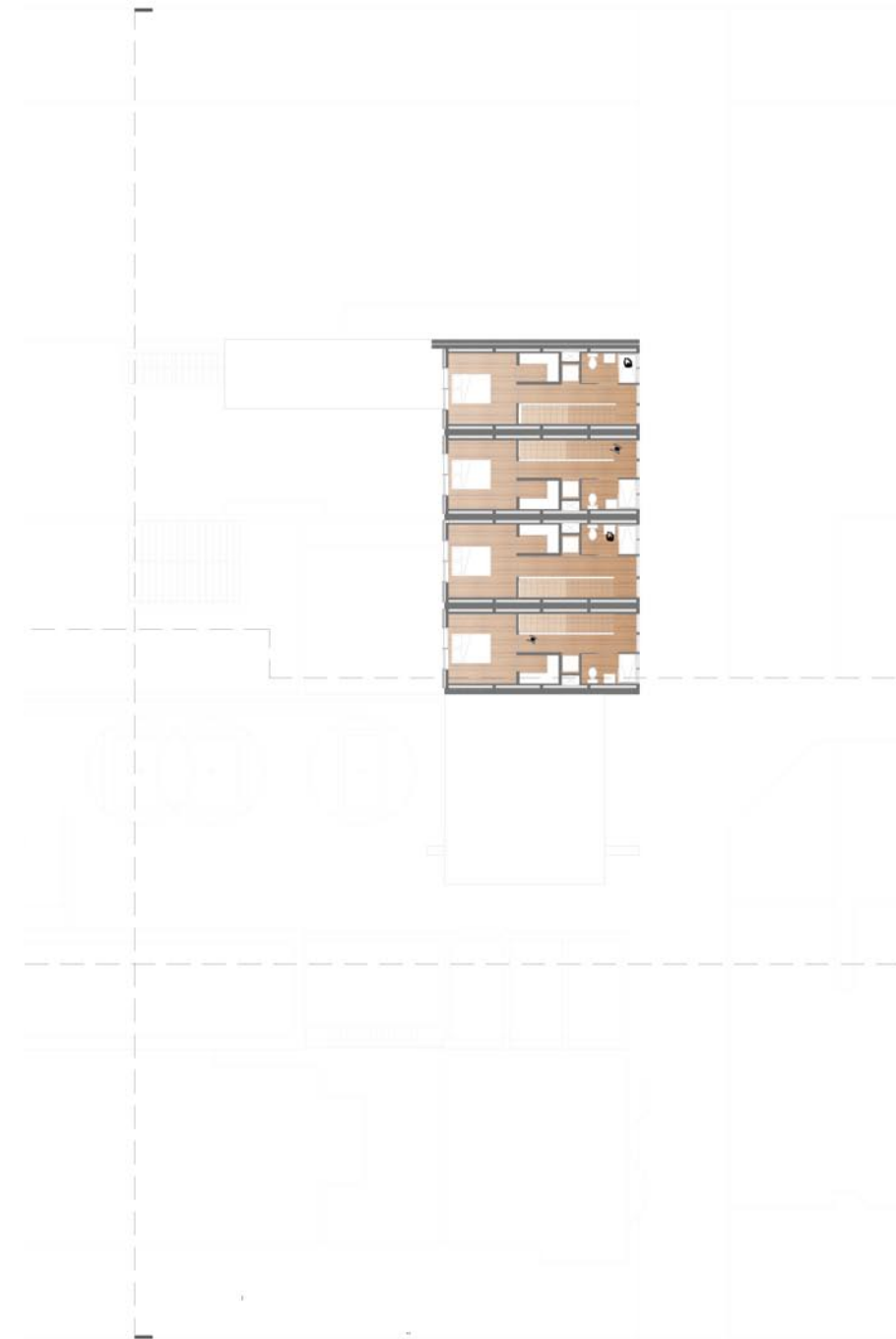
second floor plan



third floor plan



fourth floor/roof plan



fifth floor plan



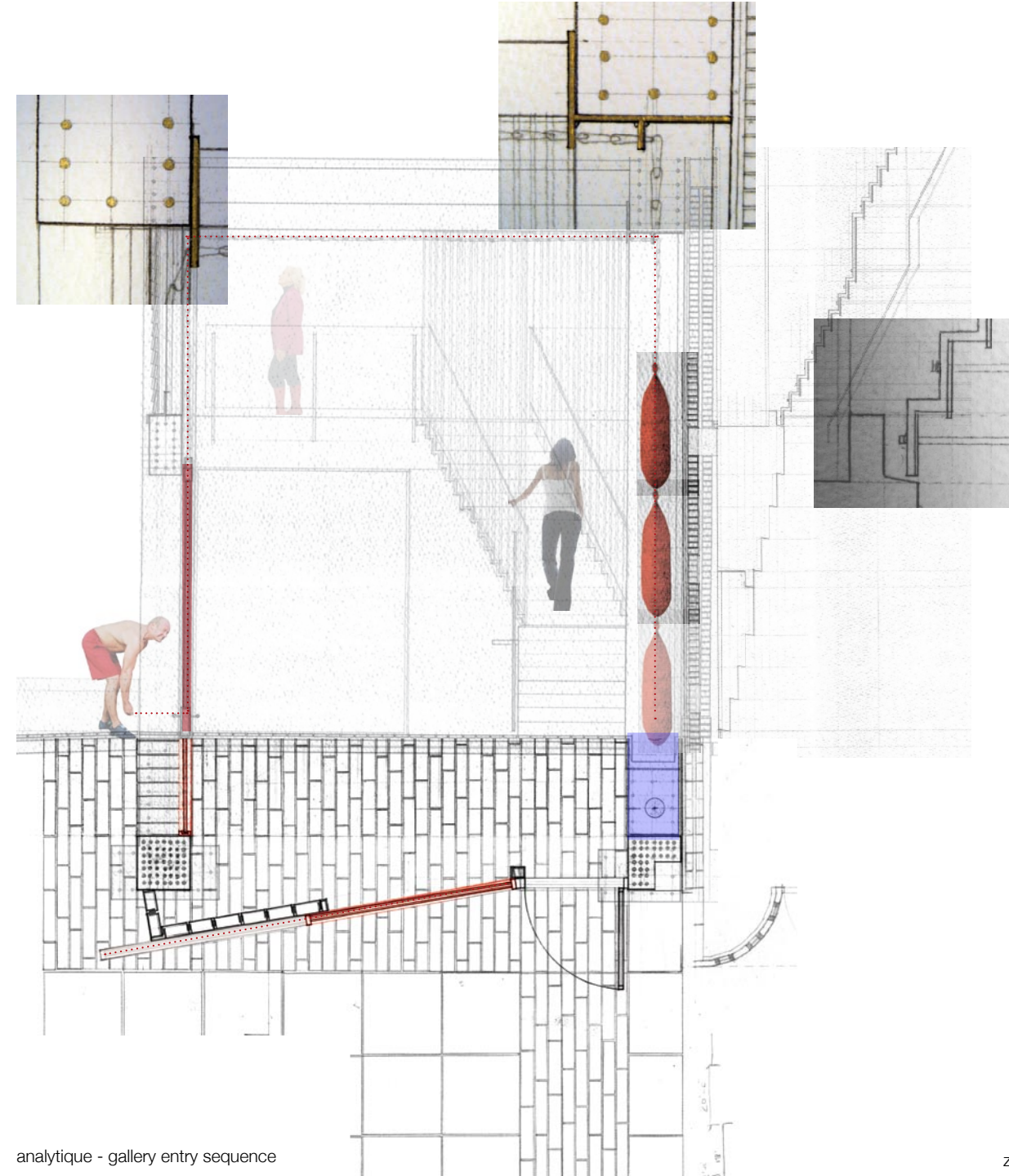


model - fourteenth street elevation



model - view from southeast rear corner

y



analytique - gallery entry sequence

z

## DEFENSE

Friday, 28 August, 2009 | 6:00 pm | Red Room



mid-defense

aa



presentation layout - north wall



presentation layout - northeast corner



presentation layout - east wall



weaving sampler cc

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## IMAGE CREDITS

- a ideogram - bombyx mori - the origin of the thread / idea  
hand drawings and manipulation by Joshua Housdan
- b ideogram - weaving architecture - coursing as weft through the evolution of the city  
hand drawings and manipulation by Joshua Housdan
- c knots as changes in material / program  
hand drawings and manipulation by Joshua Housdan
- d knots as changes in material / program  
silkscreen prints by Joshua Housdan
- e setting up the rigid-heddle loom / weaving on the rigid-heddle loom series  
photographs by Joshua Housdan and courtesy of David Nath
- f scarves woven on the rigid-heddle loom and scarves dyed using various shibori techniques  
scarves woven and photographed by Joshua Housdan
- g 500-mile radius map; map courtesy google®, digital manipulation by Joshua Housdan
- h neighborhood walk route; map courtesy google®, digital manipulation by Joshua Housdan
- i fourteenth street photomontage by Joshua Housdan
- j site autocad drawing with digital manipulation by Joshua Housdan
- k site archaeology model based on historical sanborn maps of the site block by Joshua Housdan
- l site photograph by Joshua Housdan
- m not used.
- n typical wall sections and facades - analyzing contemporary construction methods through drafting, watercolor and thread; stitching the connections of skin to facade by Joshua Housdan
- o preliminary gallery plan and section; drafting by Joshua Housdan
- p preliminary structural models - walls versus columns / the old and new city by Joshua Housdan
- q preliminary floor plans; drafting by Joshua Housdan
- r preliminary duplex apartment plans; drafting, photos and digital manipulation by Joshua Housdan
- s preliminary section of duplex apartments; drafting and digital manipulation by Joshua Housdan
- t digital collage of research and design; drafting, renderings and most photographs by Joshua Housdan; other photographs used are free use.
- u section drawings and digital manipulation by Joshua Housdan with help from David Nath
- v wall section drawing and digital manipulation by Joshua Housdan with help from Leo Salom
- w fourteenth street elevation drawing and photos by Joshua Housdan
- x floor plan drawings and digital manipulation by Joshua Housdan with help from Carolina Dayer
- y final model by Joshua Housdan with help from Sarah Mailhot, Andrew McBride, Nick Jessee, Megan Lazzeri, Adrianna Torres and Jessica Turin.

## IMAGE CREDITS, continued

- z analytique - weaving the entry sequence of the gallery / bar; drafting and digital manipulation by Joshua Housdan
- aa mid-defense presentation; photo courtesy of David Nath
- bb thesis presentation layout; photomontages by Joshua Housdan
- cc the sampler; woven by Joshua Housdan