



AUSPICIOUS GENERATION: THE BAMBOO LIFECYCLE OF A CHINESE CULTURAL CENTER

Eric Wade Potterfield

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

Committee Chair – Paul F. Emmons

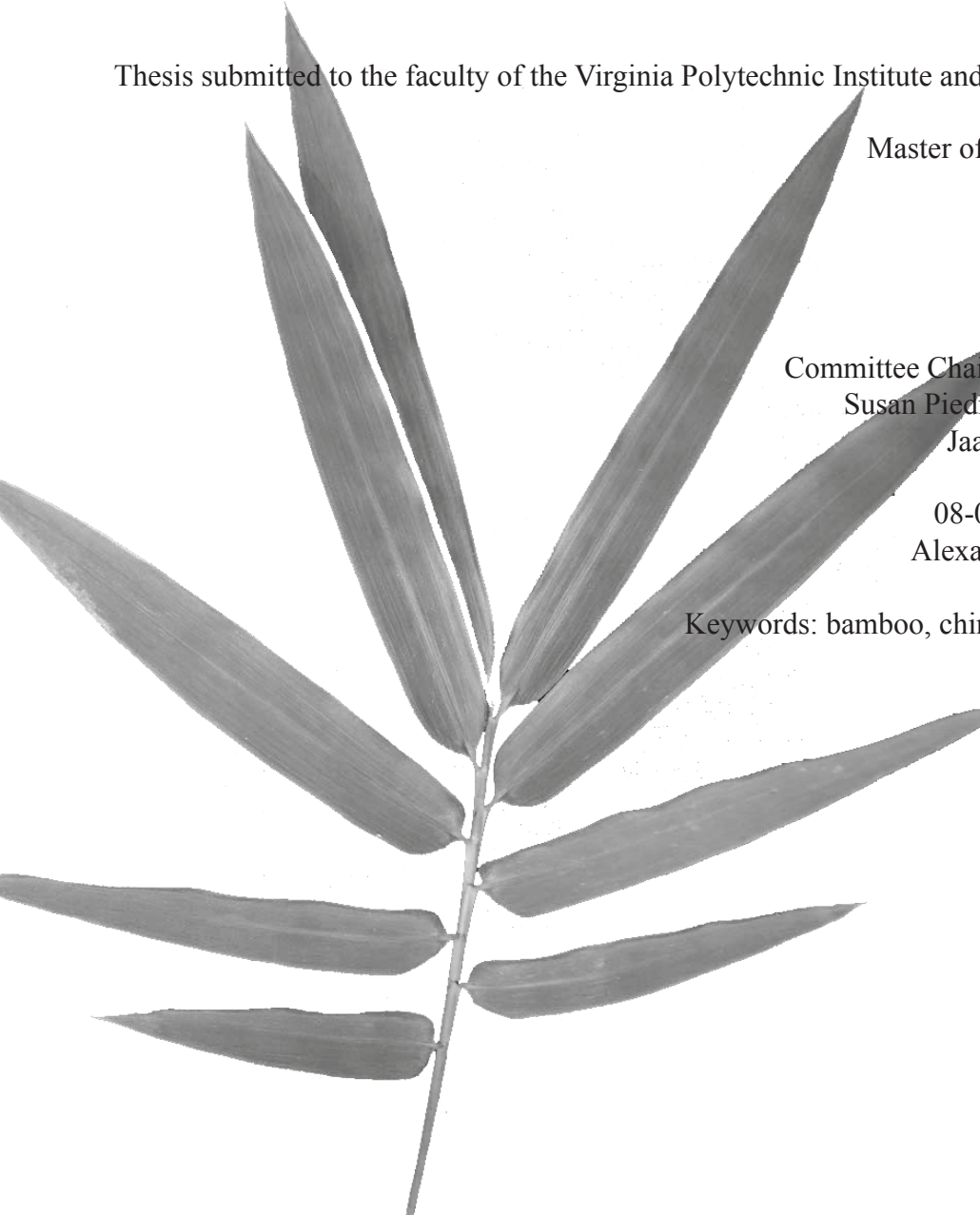
Susan Piedmont-Palladino

Jaan Holt

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Alexandria, VA

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AUSPICIOUS GENERATION:

THE BAMBOO LIFECYCLE OF A CHINESE CULTURAL CENTER

ERIC W. POTTERFIELD

ABSTRACT

This is an architectural thesis exploring bamboo not just as a material, but asking what the temporal nature of the material could mean for design. While bamboo is often considered sustainable because of its considerable growth rate, few really embrace the nature of bamboo. To exhibit this concept this project follows the line from source to destination, and from germination to structure; not representing a finished object in single moment, but an idea that spans time. To do this, bamboo acts as a catalyst for a cultural center. It grows and matures and is harvested, it changes the space; and as it is used, degrades, and finally taken down, it changes the design. From seed to opera house and back again to the earth, the cycle breaths continuous life into the site.

The project, located near 7th and H Street, NW, in Washington, DC is a dual program - both cultural center and public garden. The “bookends” or exterior buildings on the site are a balancing force to the ephemeral nature of the bamboo. The terracotta bearing walls buffer the peaceful inside from the outside. Their roles serve as stage to the street, gatehouse to the garden, and armature for the bamboo structures to be built upon. Their solidity holds in and allows the movement of time to ebb and flow with that of the bamboo grove.

Acknowledgements

Thank you:

To the Universe for listening

To my parents and family who have always been proud of me no matter what path I decided to take:

To my friends who have been there for criticism as well as moral support;

To my committee members; Paul Emmons, Jaan Holt, and Susan Piedmont-Palladino. Thank you so much for hanging in with me during this experience; at school and in life.

To my son, Everett, whom has made this endeavor that much harder to obtain, but that much sweeter when getting there;

And lastly my wife, Suzanna, whom has been there through thick and thin, putting me through school and putting up with copious amounts of paper products, razorblades, and sleepless nights.

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Figure 1



Figure 2



I began my thesis investigation by questioning the assumed “greenness” or “sustainability” of bamboo as a building material in the eastern United States. Even though bamboo is known for its fantastic growth rate (reaching full height in 90 days) and its ability to continue to quickly produce material after cultivation, lumber quality bamboo does not natively grow anywhere in the United States with the exception of canebrake (a small bamboo found around streams). For building in the temperate D.C. area, bamboo has to be shipped in usually, if not exclusively from other continents. The next part of the thesis investigation led me to want to create a design using more hearty bamboo species that would grow in the Mid-Atlantic area, such as Moso and Madake. These adaptive species are not native to North America, but are the largest species that capable to weather the colder winters.



Figure 3



Figure 4



Figure 5

The use of the transplanted bamboo became a sort of study of the adaptations and modifications that occur when you translate something from one culture to another. There is usually a perceived dichotomy of the two different cultures at first, and gradually, the environment becomes more hospitable, the element becomes more comfortable, and there is a sort of harmony or qi that is achieved with the balance between structure and design element. Eventually, the element becomes at home in the present surroundings, and there is no longer a sense of “other”.



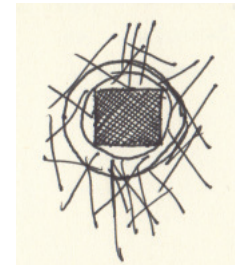
Inspiration from
Hiroshi Teshigahara works in bamboo.



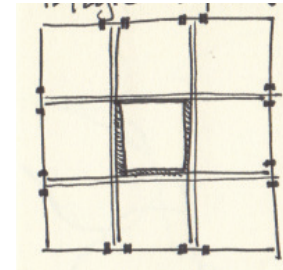
Inspiration of “path through bamboo grove”



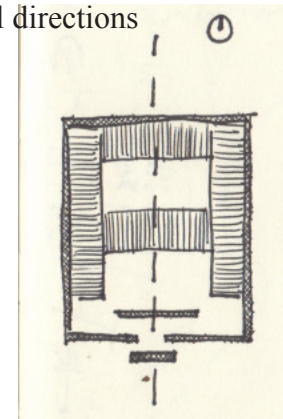
The walled city inside “nei”, and the the barbaric outside “wai” represent one of the great polarities in Chinese culture. This defined furrow between the within and the without represents not only cultural implications, but moral states, literal location such as residents of the middle kingdom and foreigners. Some have even alluded to it being embedded in Chinese standardization of the seal character; its deliniation regulated by a perfect square. My interpretation of this order is put on its head where the circular stamp within is a poetic inscription of the reversal of the generally wild bamboo found outside the gates within, it serves as both garden and structure.



Walled city surrounded by “barbarian” exterior

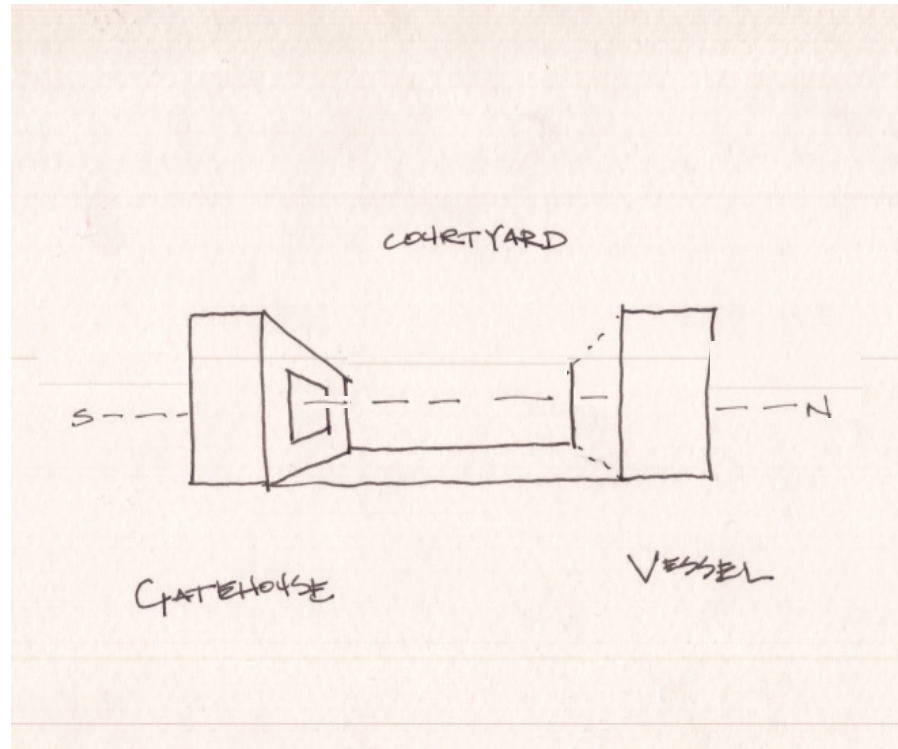


Perfect city - Mystical 9 square with center elevated, main streets seperating sections and gates oriented in four cardinal directions

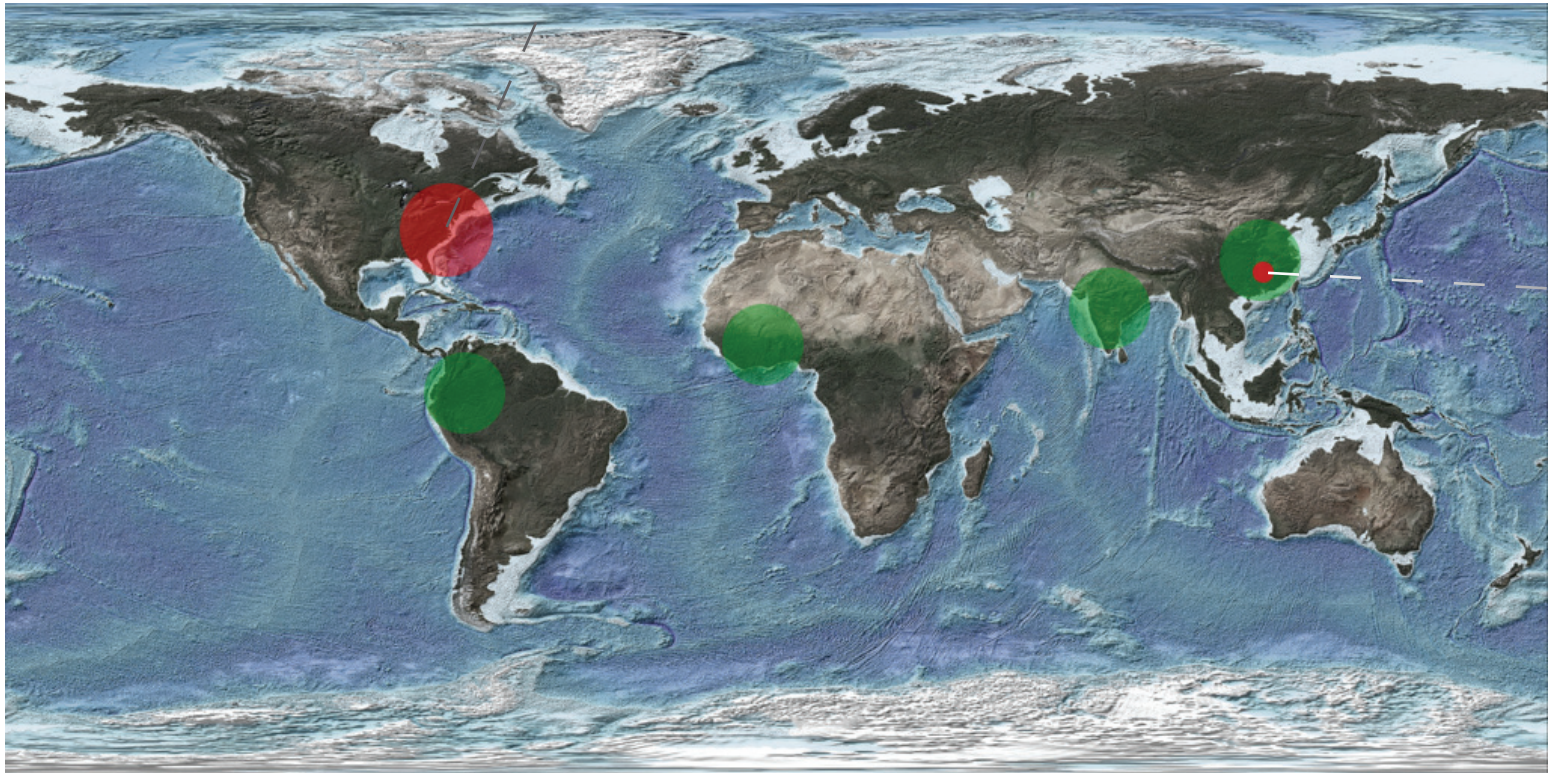


Traditional Chinese family complex. Entrance facing south with screens diverting direct access from intruding “ghosts”. Forecourt and backcourt are defined by walls and buildings.

Theoretical Concepts and Parti Precedents

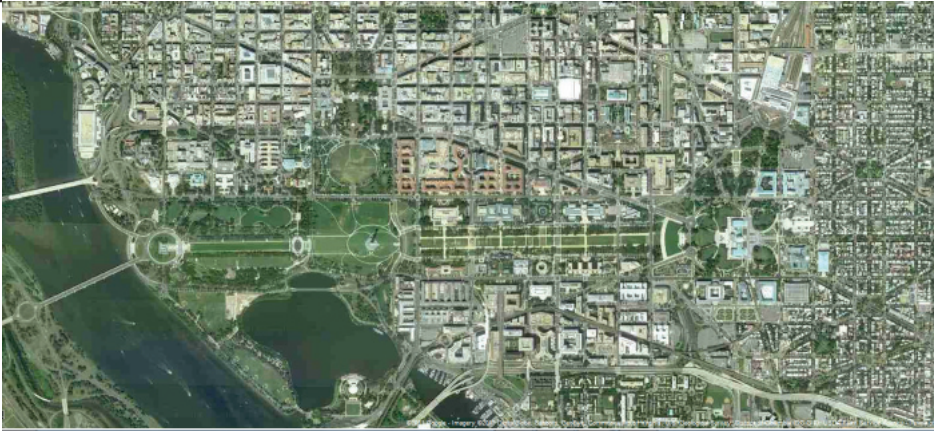


Design Parti



World locations of timber grade bamboo.

Figure 6



Washington D.C.

Figure 7

Bamboo has a long history of use in Chinese culture. Not only does its use permeate the mundane aspects of life, but it is used in parts of buildings and sometimes used to construct whole buildings such as the Cantonese opera houses in south China. As our own economies become more and more enmeshed with that of China, a cultural center is a necessary environment in which we find common understanding of our own humanity and that of the world we inhabit. Chinatown in D.C. becomes an obvious location for the program given its neighborhood identity, proximity to the Metro, and the National Mall.



Chinatown - Site indicated by red

Figure 8

Chinatown Friendship Arch



7th and H Street serve as an important intersection in the midst of DC's Chinatown. The "Friendship Gateway" span delineates the area most central to the cultural epicenter of Chinatown. The street is mostly protected by historic designation. The cultural center's street facade serves both as entrance, stage, and portal. The layers of the front mimic Chinese iconic building imagery while also enfusing modern building techniques and material to convey more modern conventions.



H Street

Book of Songs: selected poem

**“The North Window:
Bamboo and Rock”**

A cold, trembling sliver of stone;
Counting lush black-green bamboo.

You face me as if to know me,
Yet, to be seen is not enough.

I gaze down through the
north window
to look for you near the crooked
west embankment.

I wake to the sound of the culms
quivering in the mist shrouded wind.

My wife and I, feeble,
Childless, alone.

No one shutters the window.
Our companion is the night.¹

-Bai Juyi

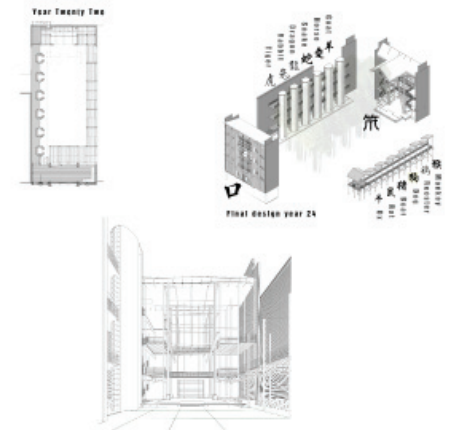
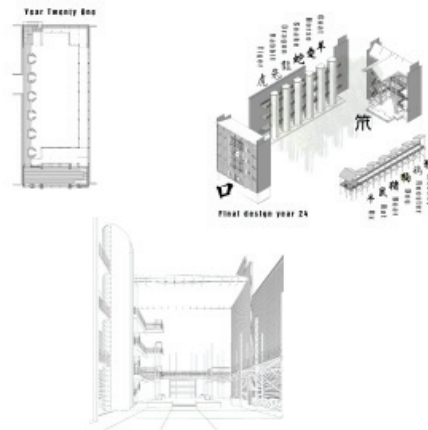
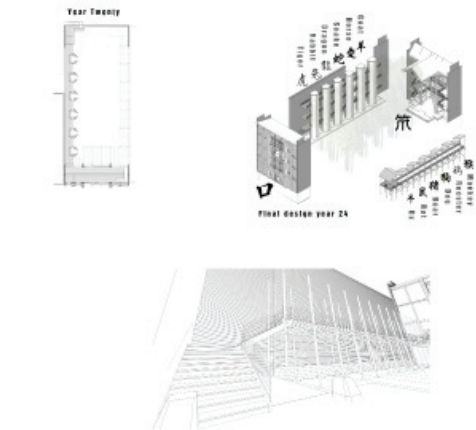
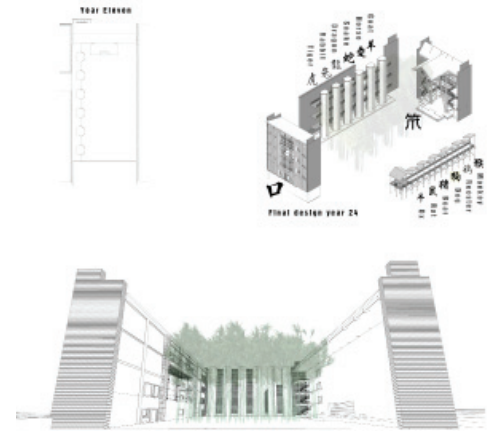
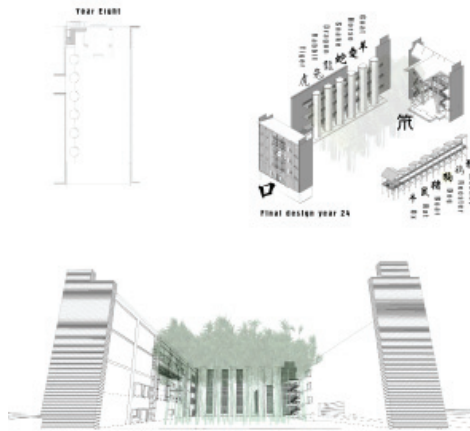
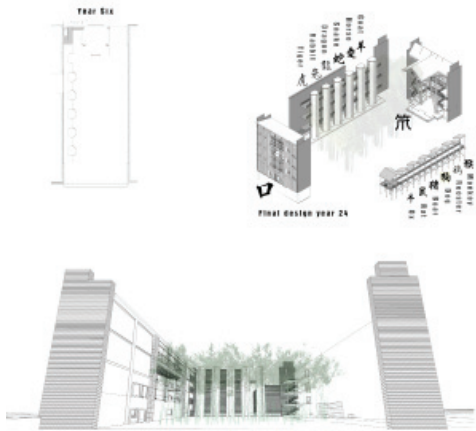
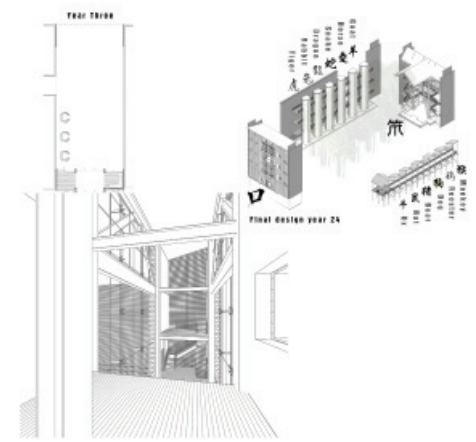
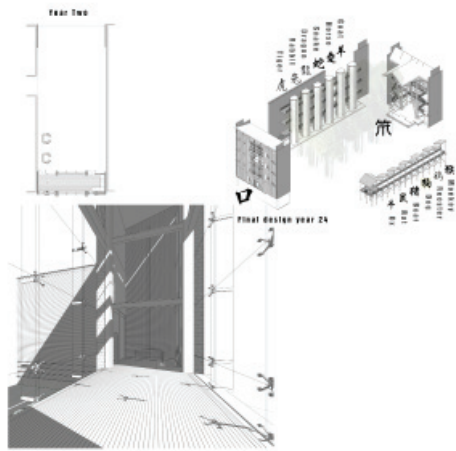
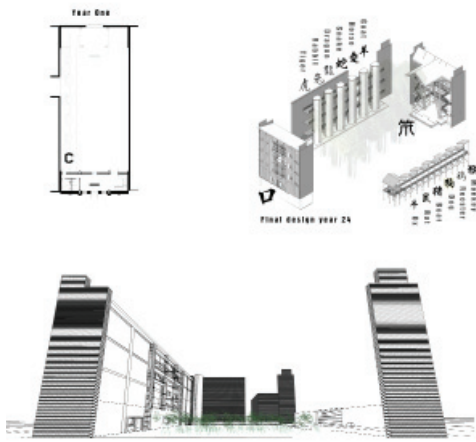
Bamboo Growth, Cultivation, and Assembly



Though there are many species of bamboo, typically this record setting grass reaches its full growth potential in 90 days; its full maturity of height and thickness in 18 years; its full lifespan of a grove can last longer than 120 years, after which will seed and die en masse. Unknown as to why, culled shoots from a grove planted in other places (including other parts of the world) will also die within a couple of years of the mother plant.

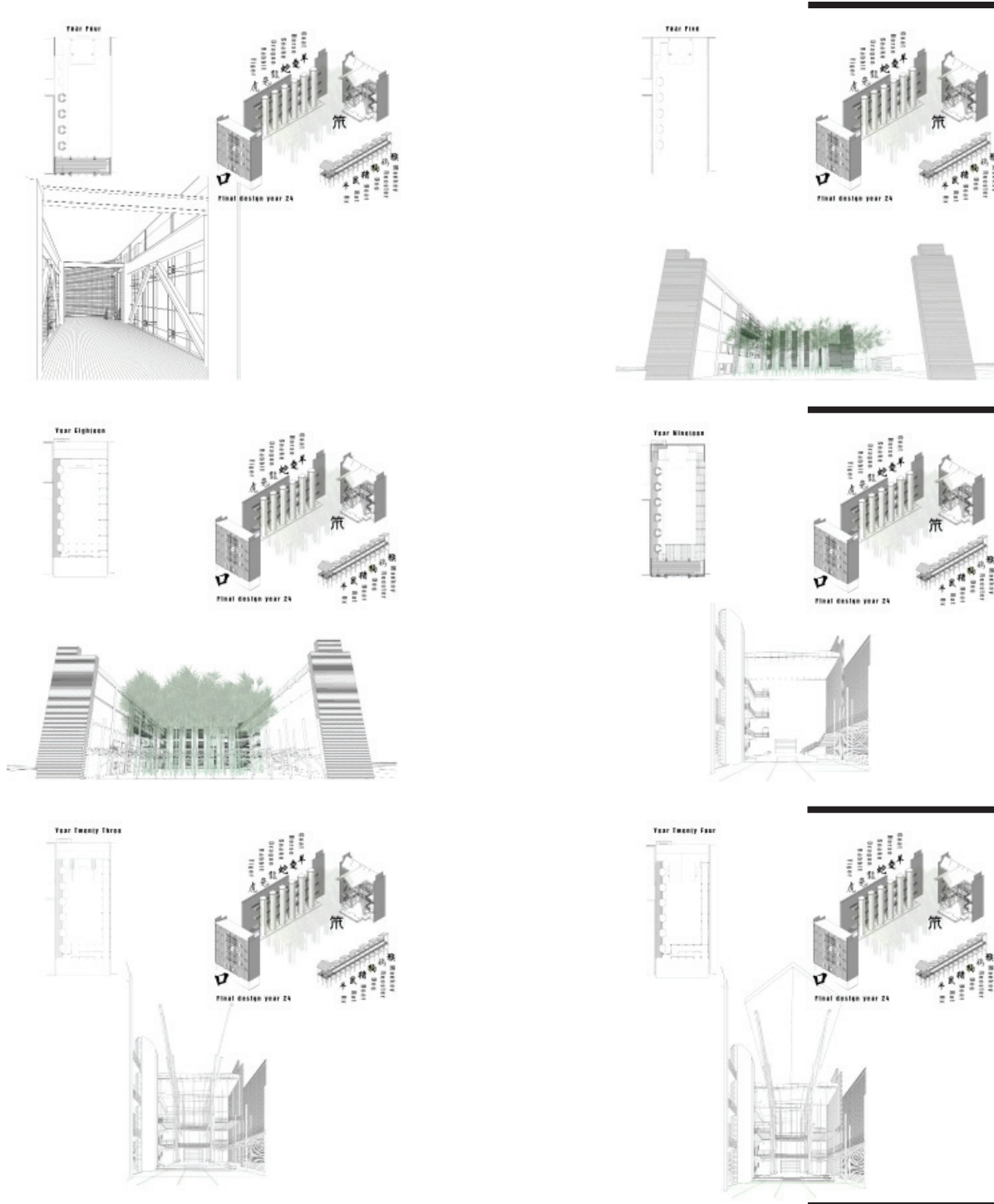


There are several ways in which to treat bamboo to withstand decay from mold and insects. One, is soaking water mixed with boric acid. Another, to pneumatically push chemicals through the bamboo culms. And, lastly, to smoke the bamboo poles. This last treatment I find to be the most intriguing because of humans primordial fascination with fire and the ability to use the smoke chambers for various other tasks when not active.



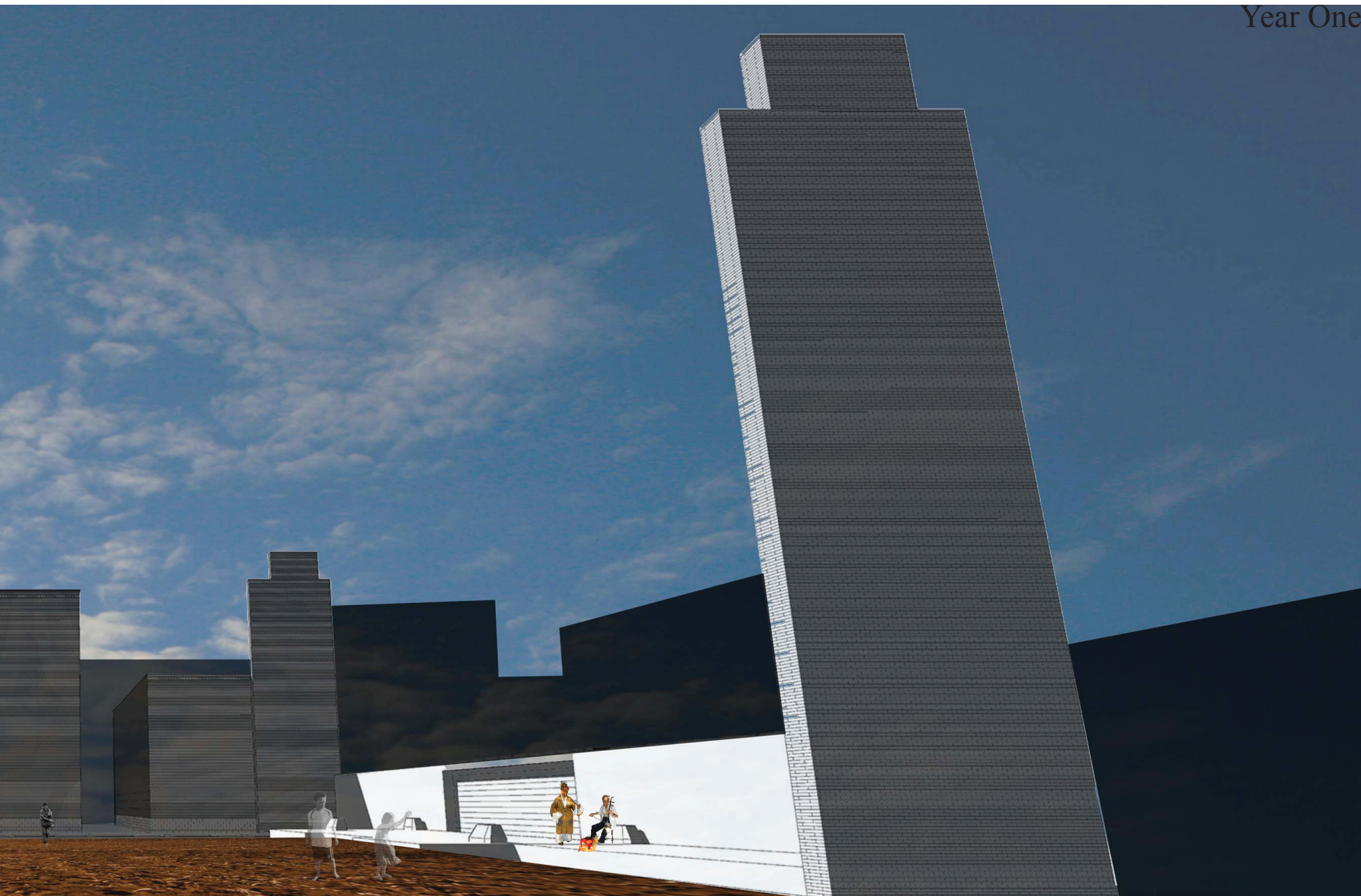
24 Year Growth Cycle

My goal with designing the Chinese cultural center was to create a conversation between the bamboo (the embodiment of the transplanted culture) and the structure (the environment). The bamboo would grow in the central courtyard, be cultivated, harvested, and installed, eventually be torn down, and begin the process all over again. One entire cycle would take 24 years, a culturally significant amount of time (two cycles of the Chinese Zodiac), and then begin again. The design is not fixed – it is a living breathing conversational life cycle between the bamboo (the element) and the structural environment. It is a place where the bamboo grove serves as garden and meditative space, and as a temporary building environment including platforms, sculptural built forms, and a Chinese opera house.





Year One - sov



wing bamboo seeds



Eleventh Year Bamboo Structure Iteration

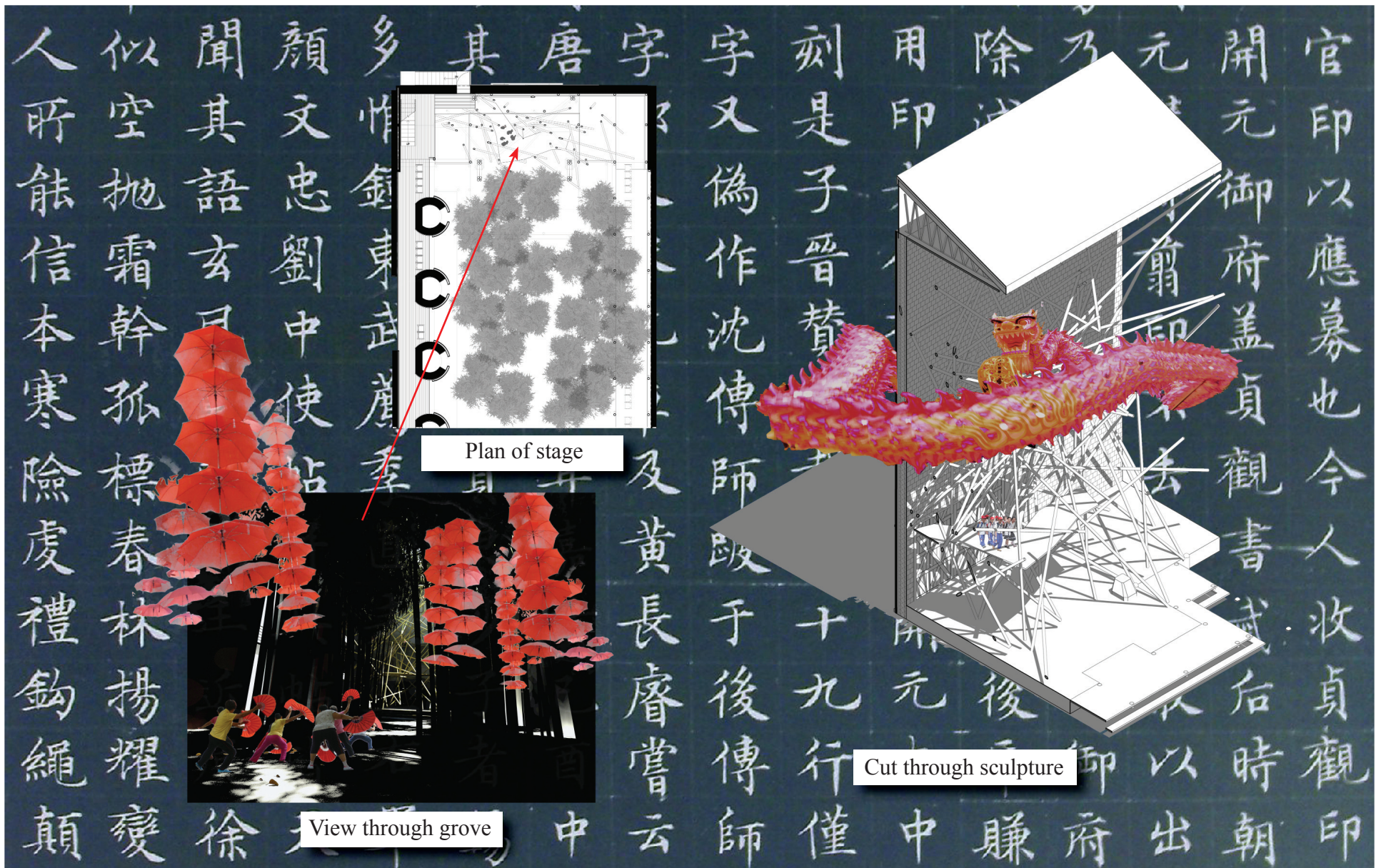
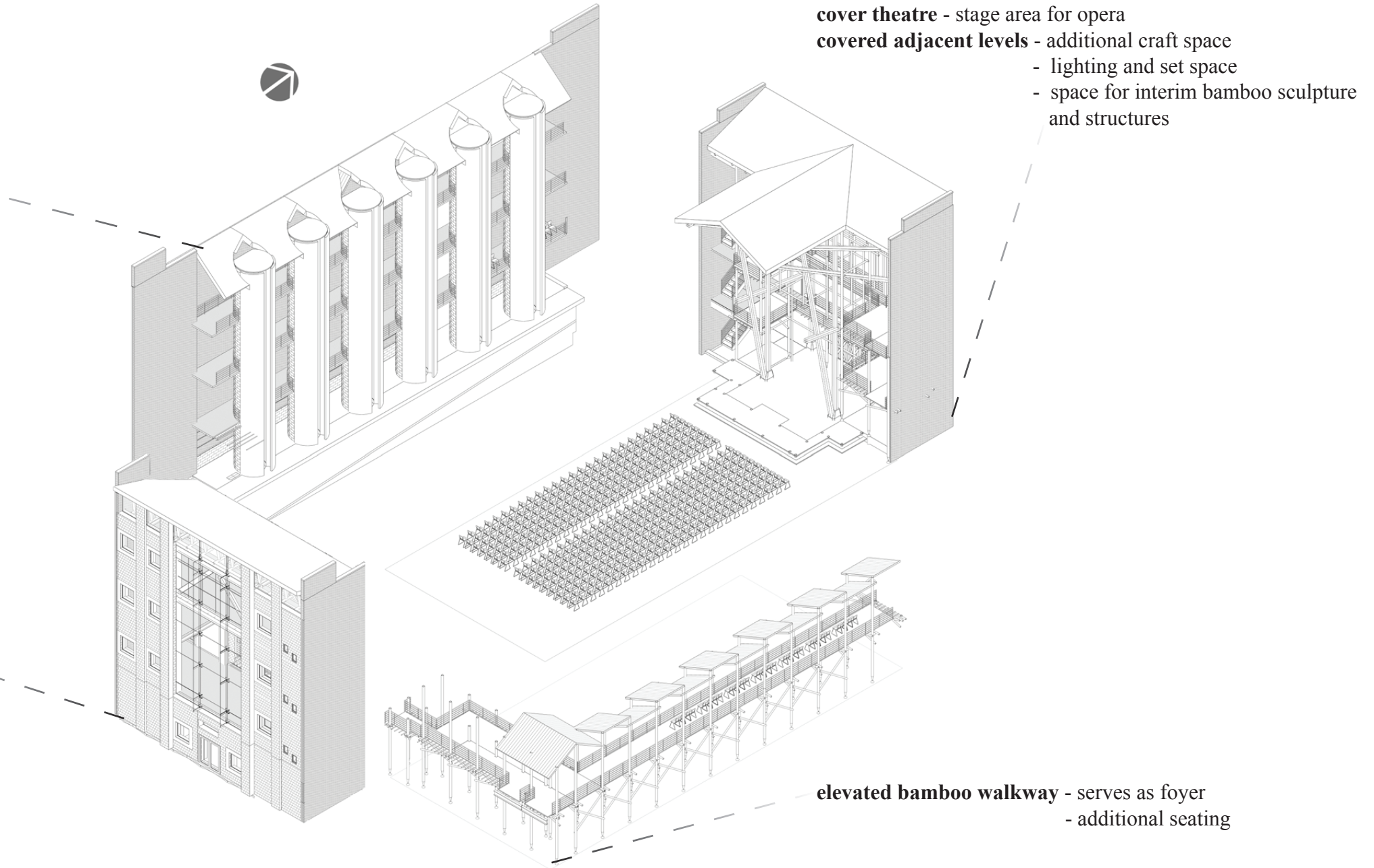


Figure 12

smoke silos - curing and storing bamboo poles
covered walkways - connection between North and South building, and elevated view of bamboo grove

south building - acts as gatehouse
- central window frames bamboo grove
- acts as stage to street

Fully Mature Site - Final Stage



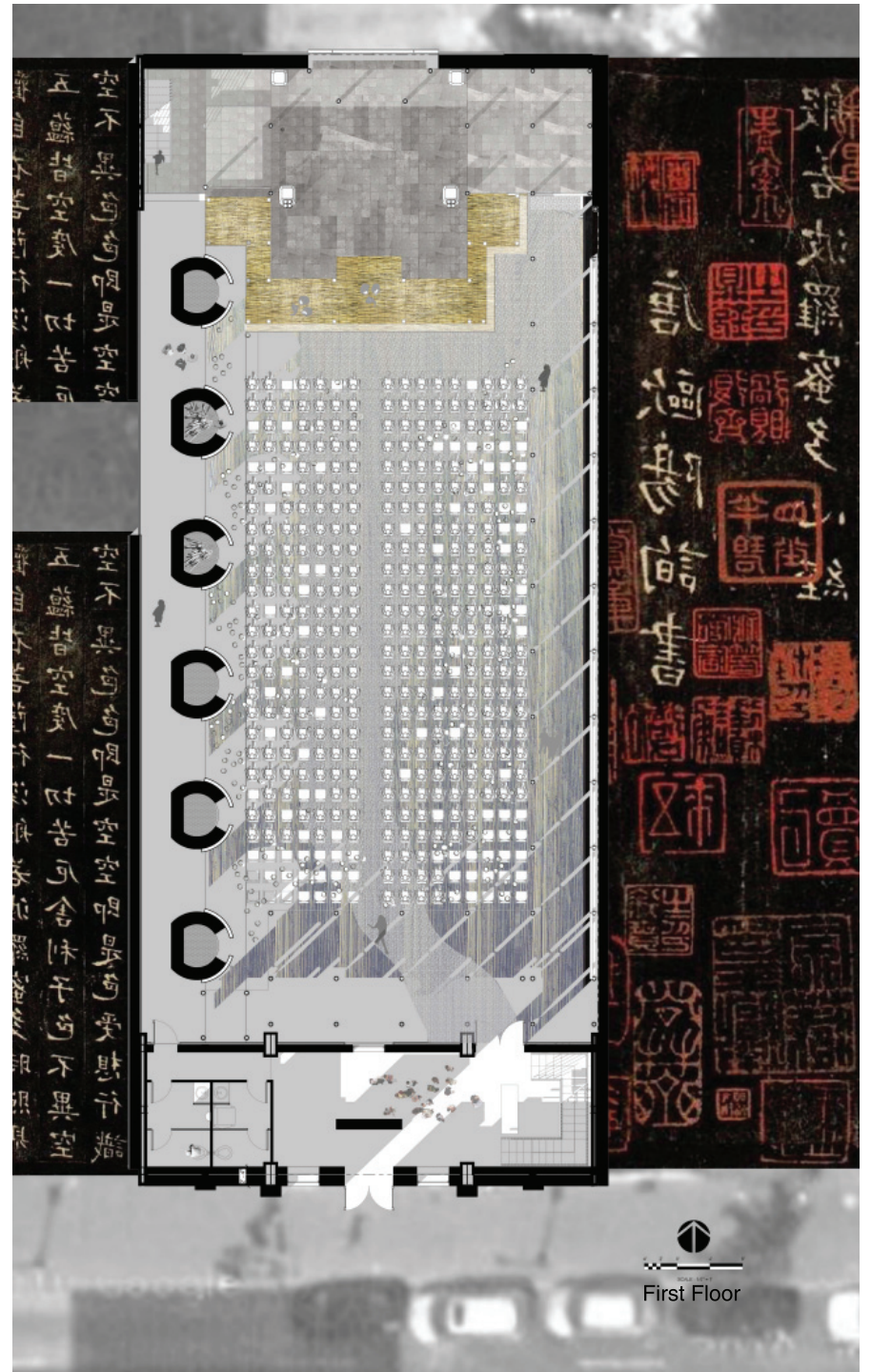
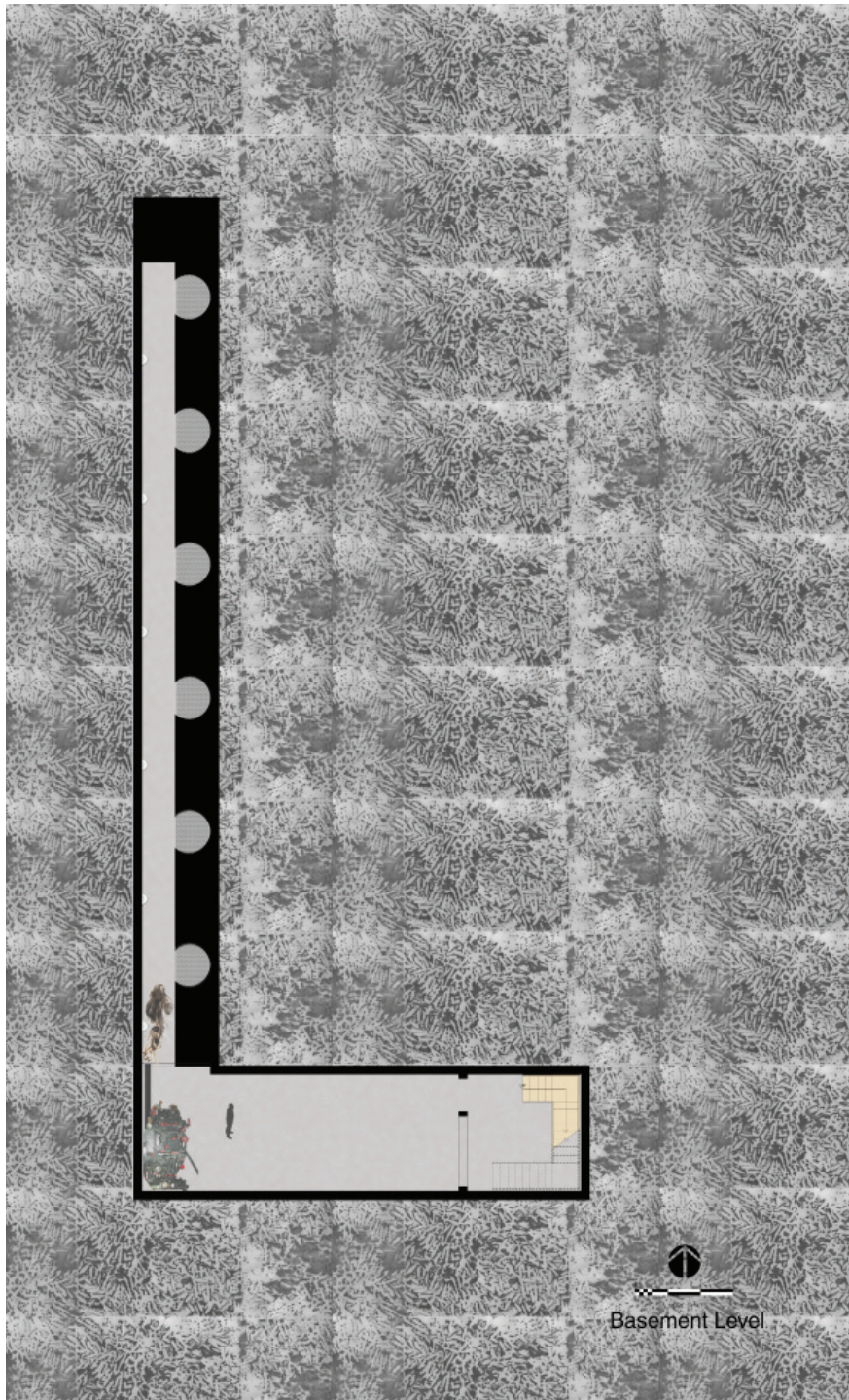


Figure 12, 13

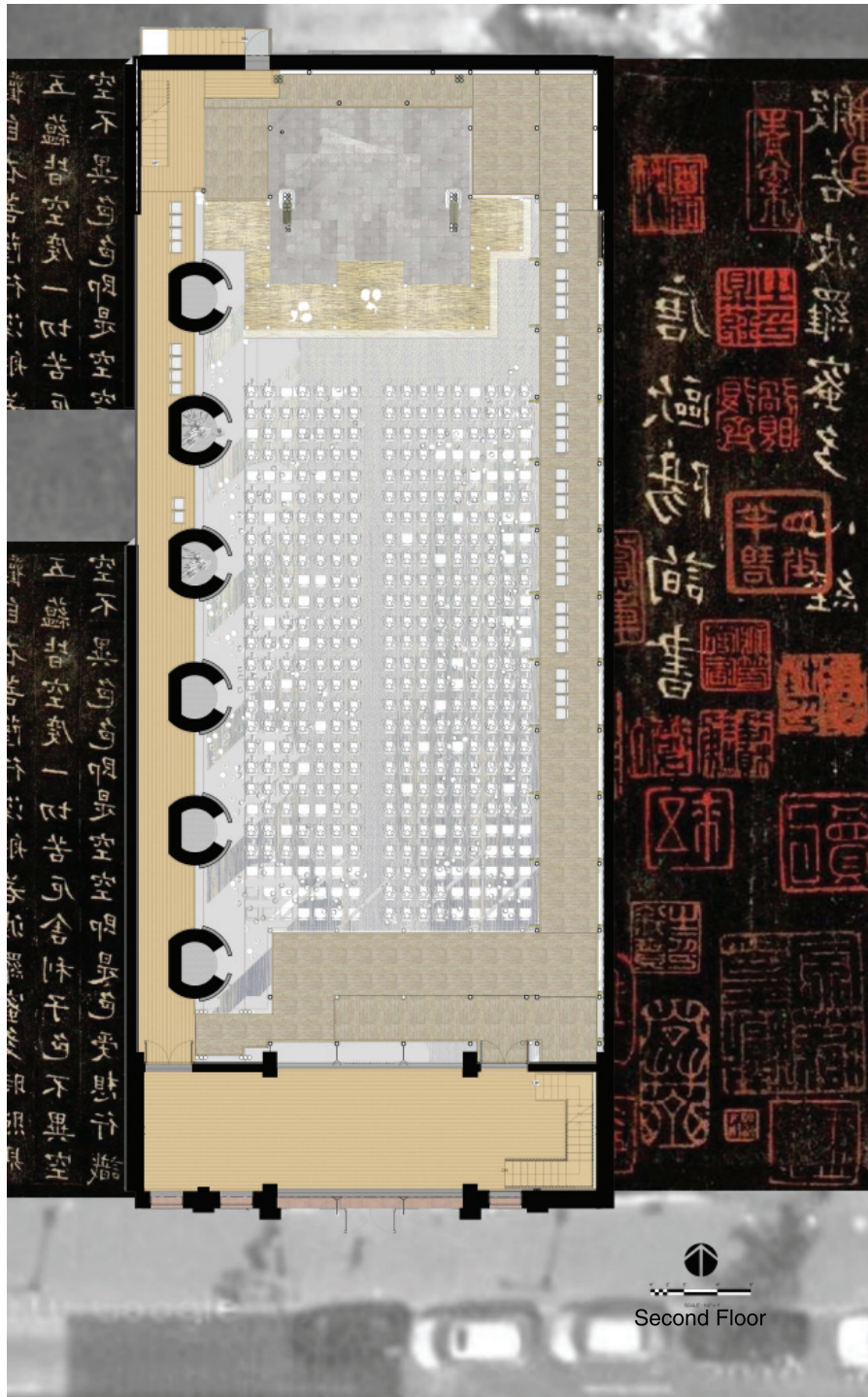


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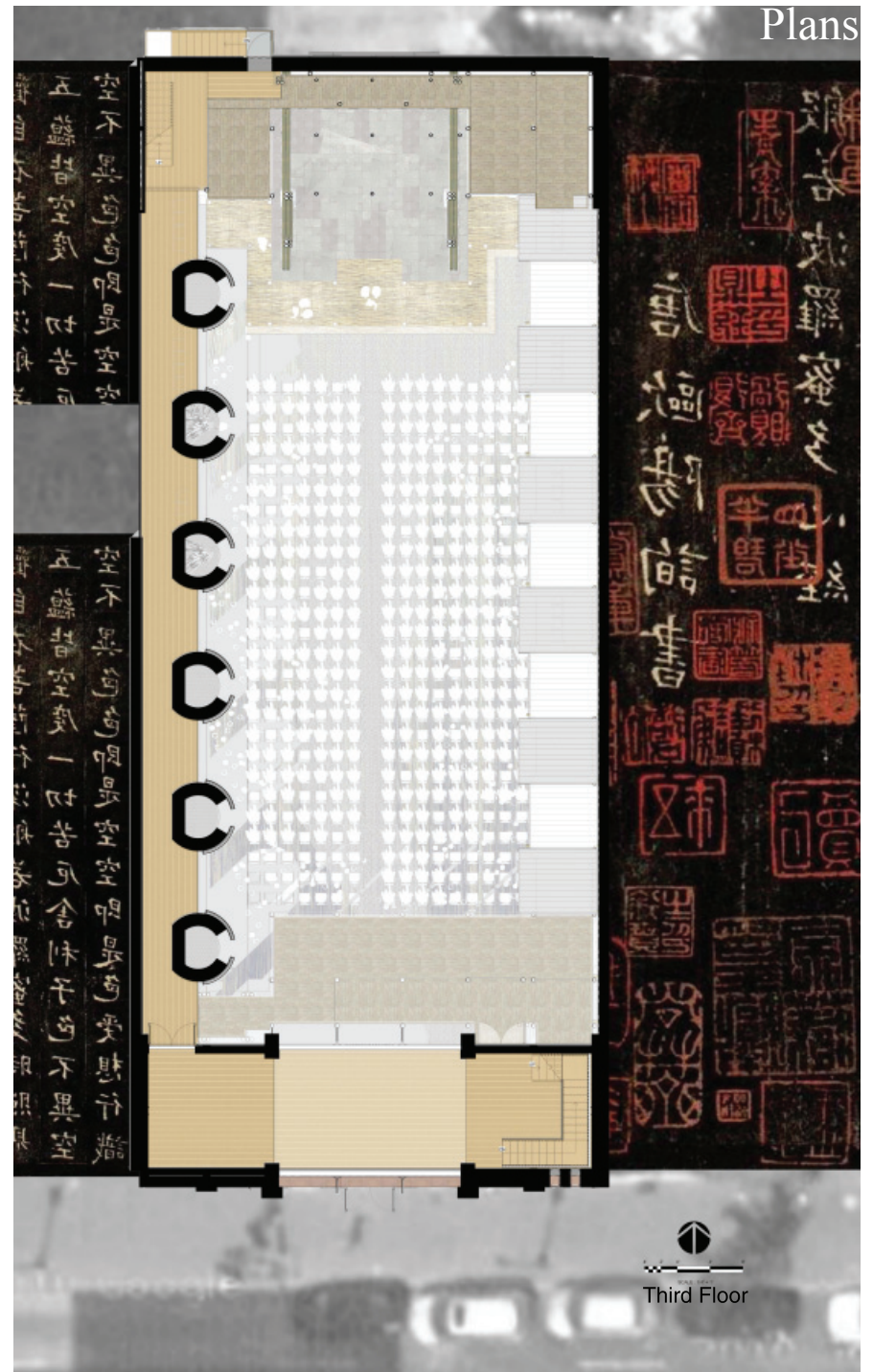


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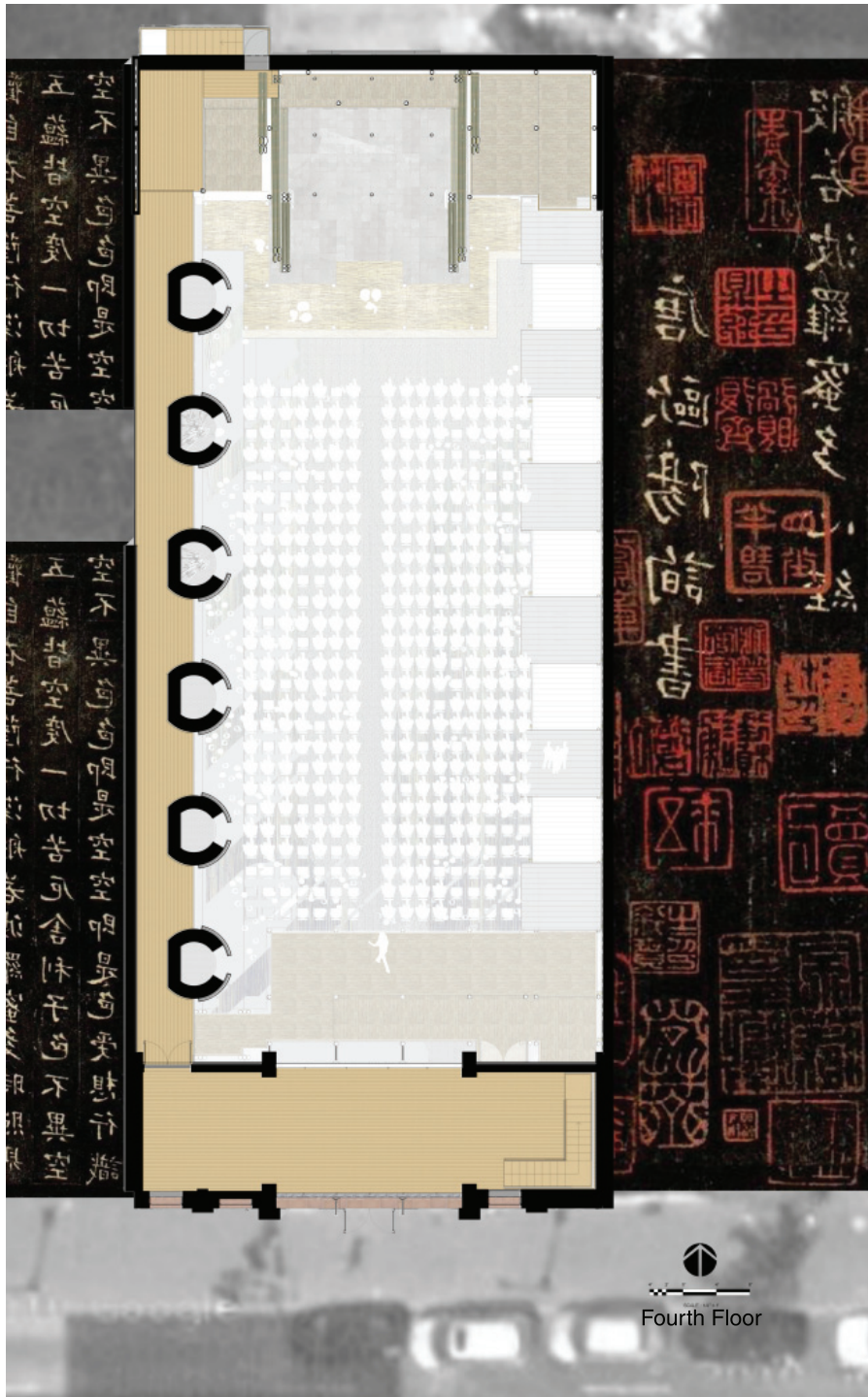


Figure 12, 13

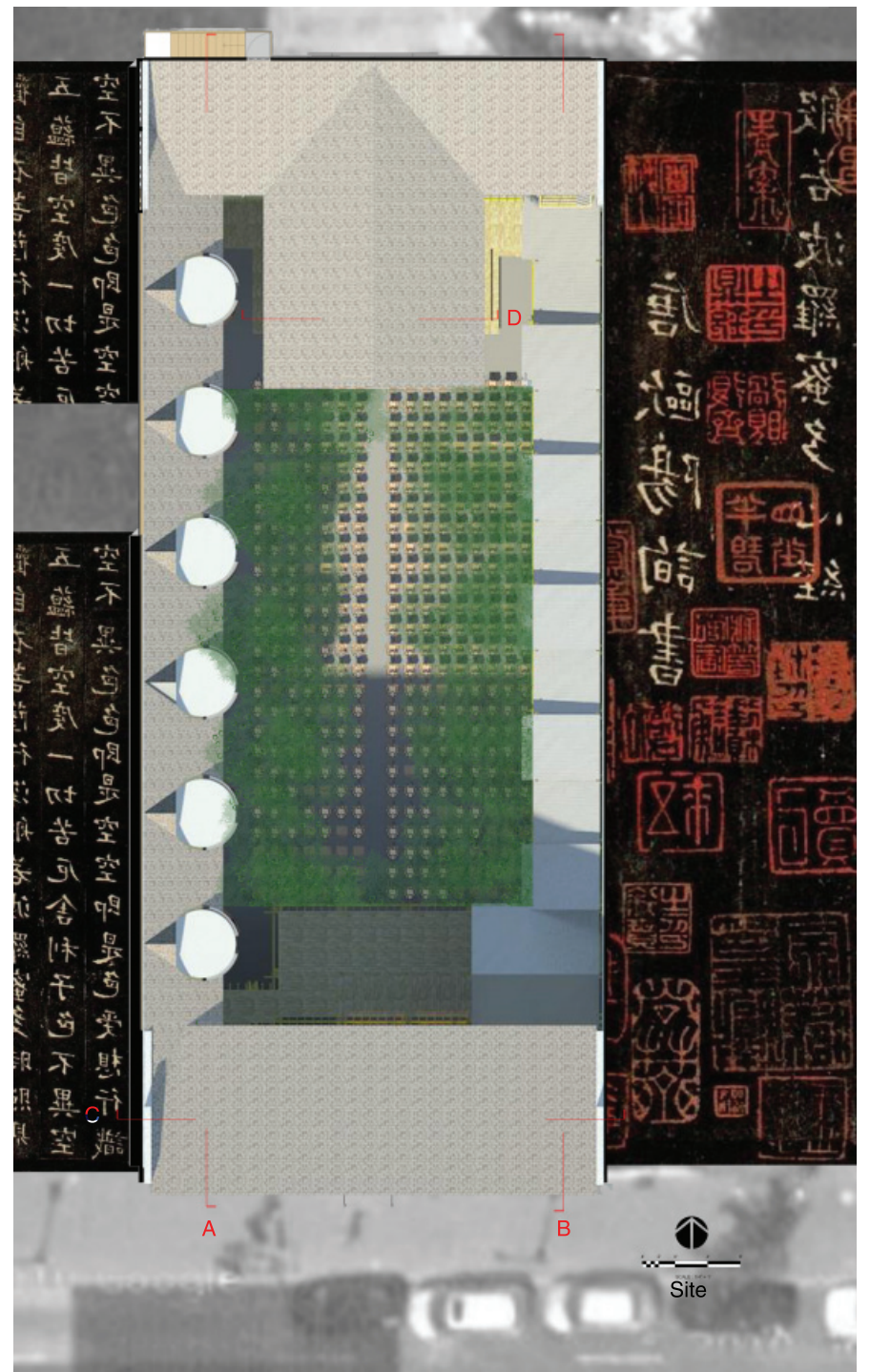
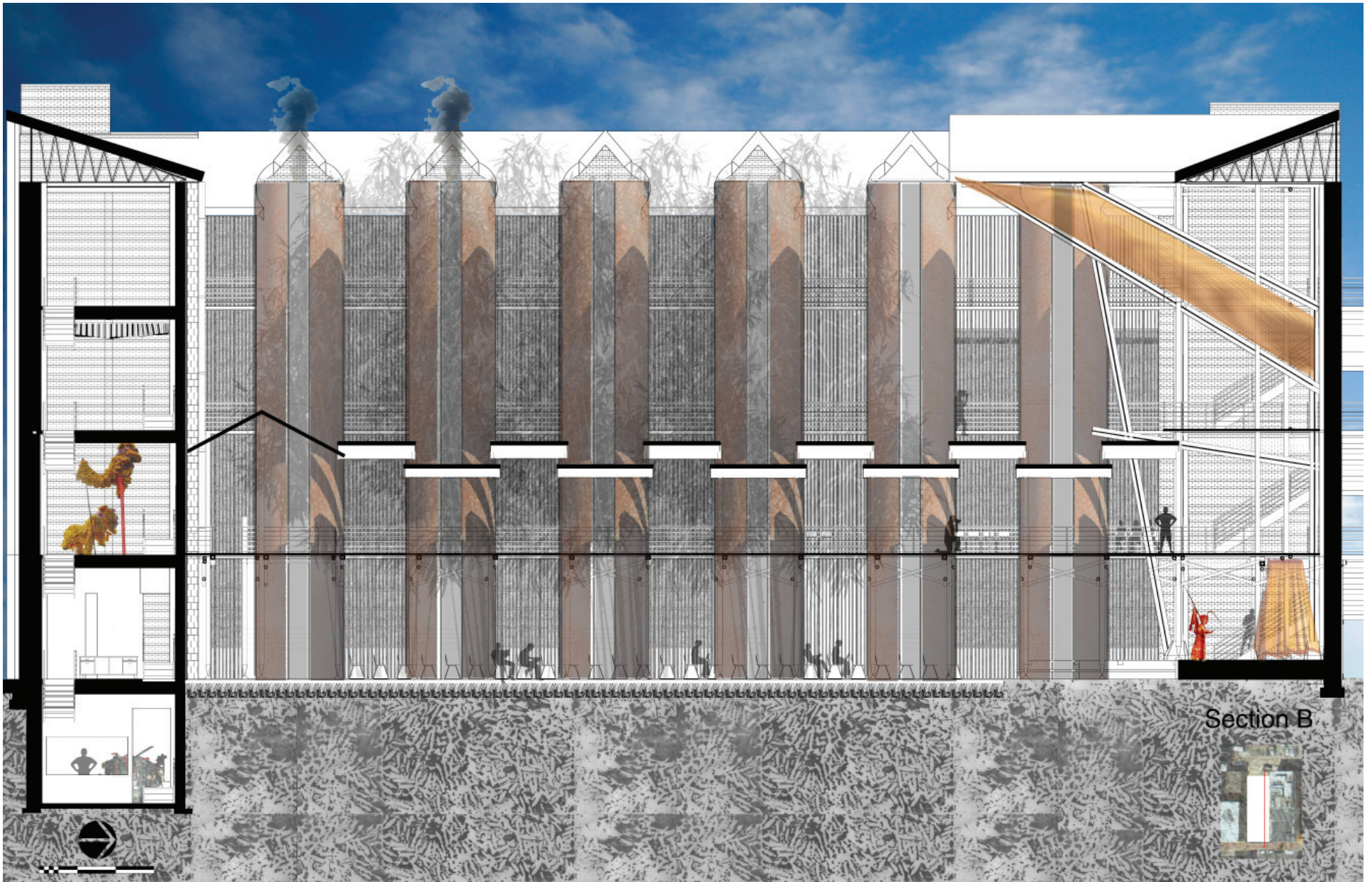


Figure 12, 13

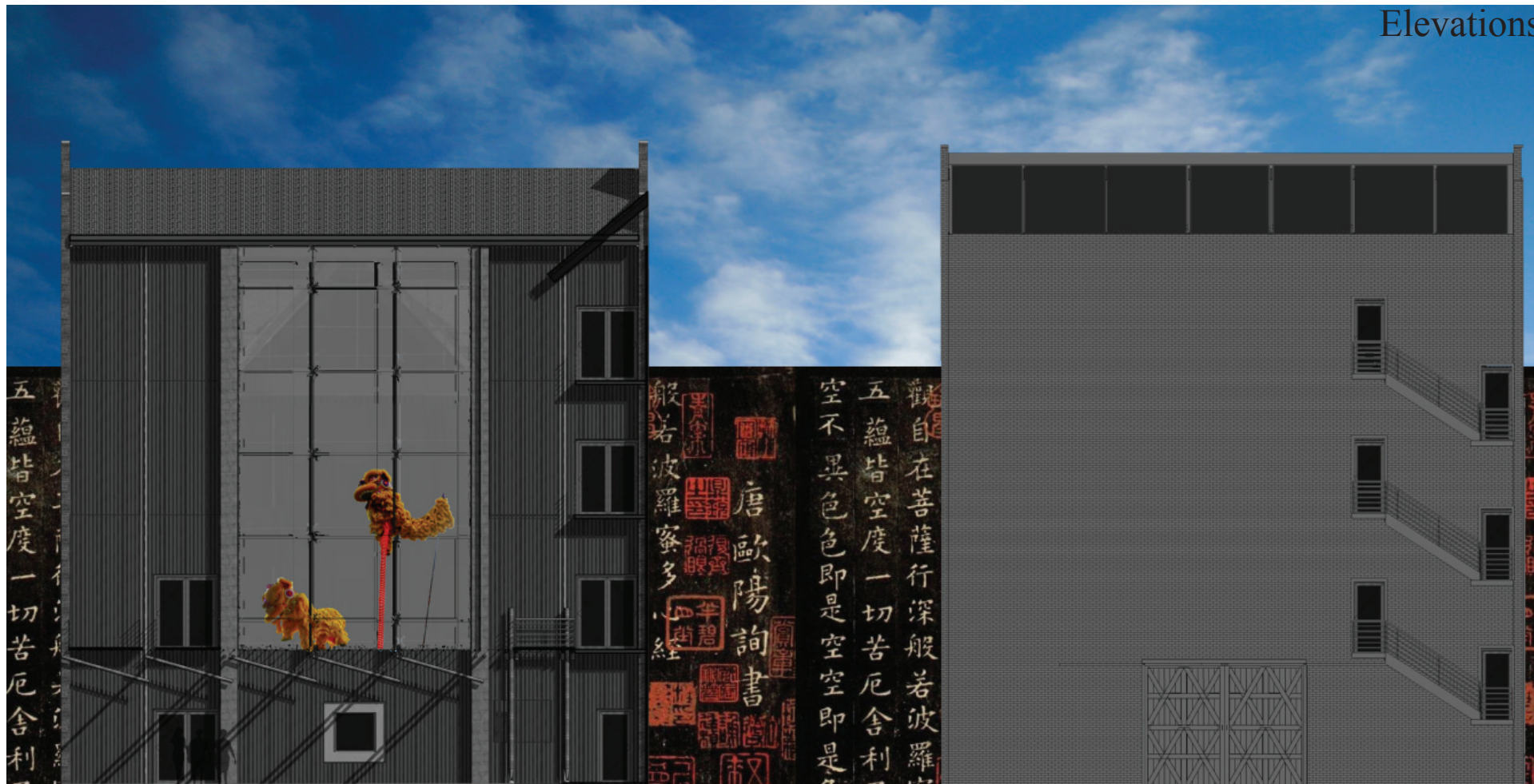




Sections



Figure 13



North Elevation - Gatehouse

North Elevation - Shell

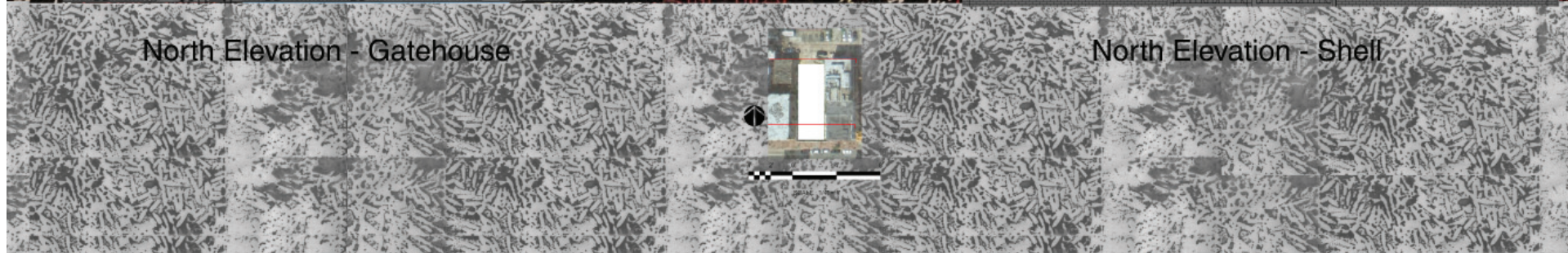
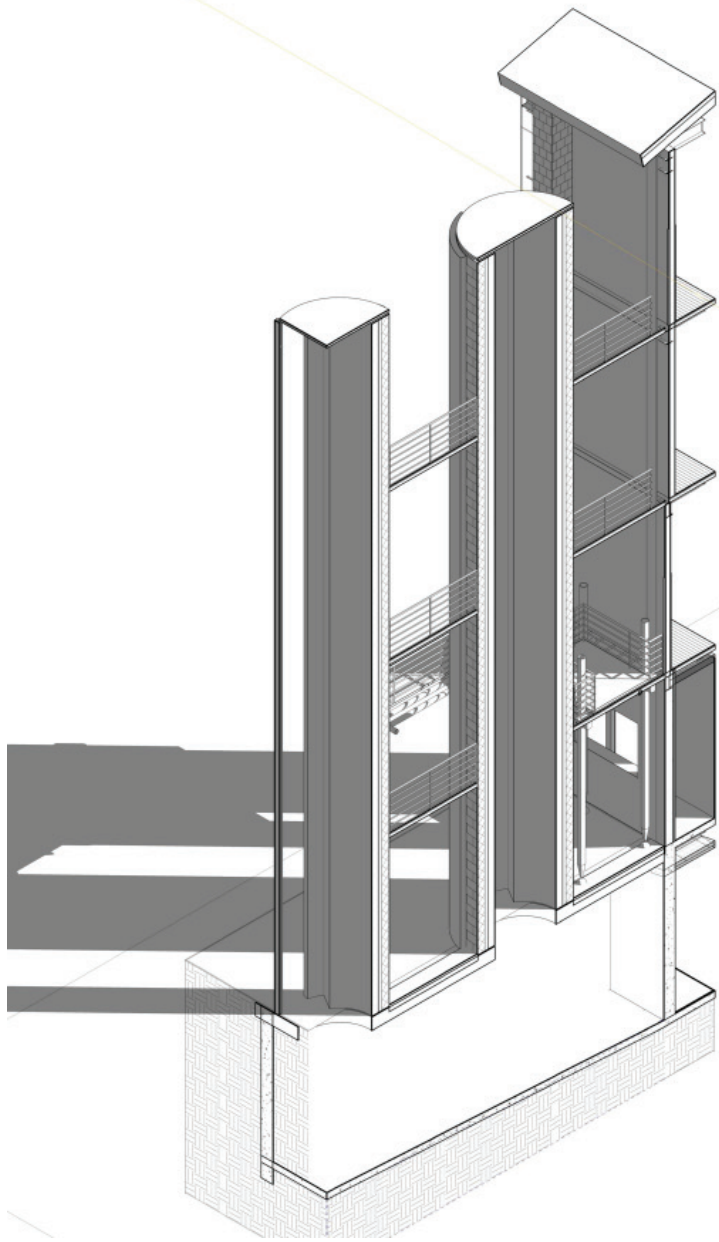
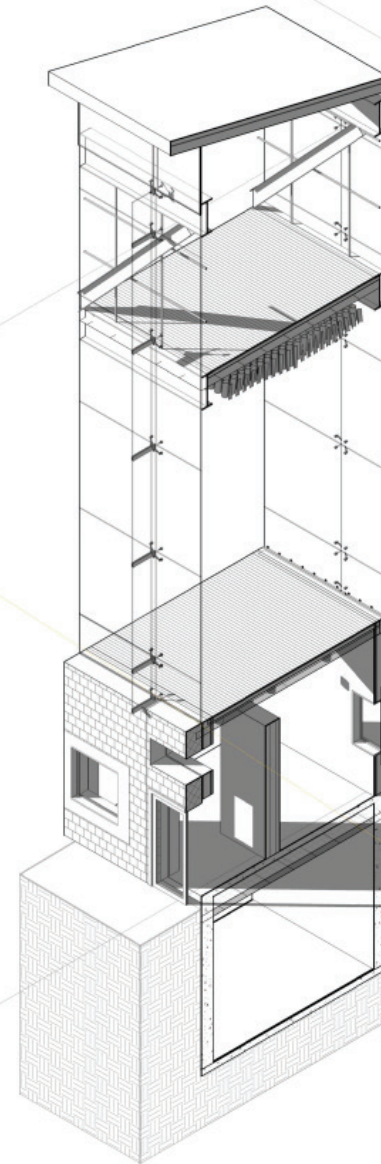


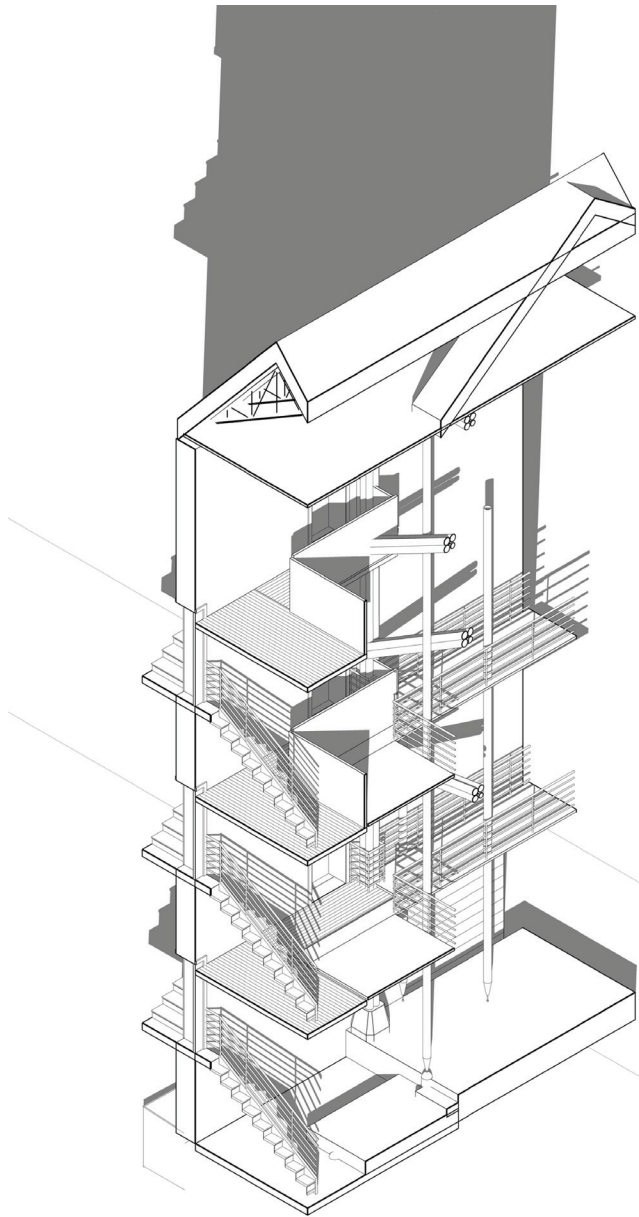
Figure 13



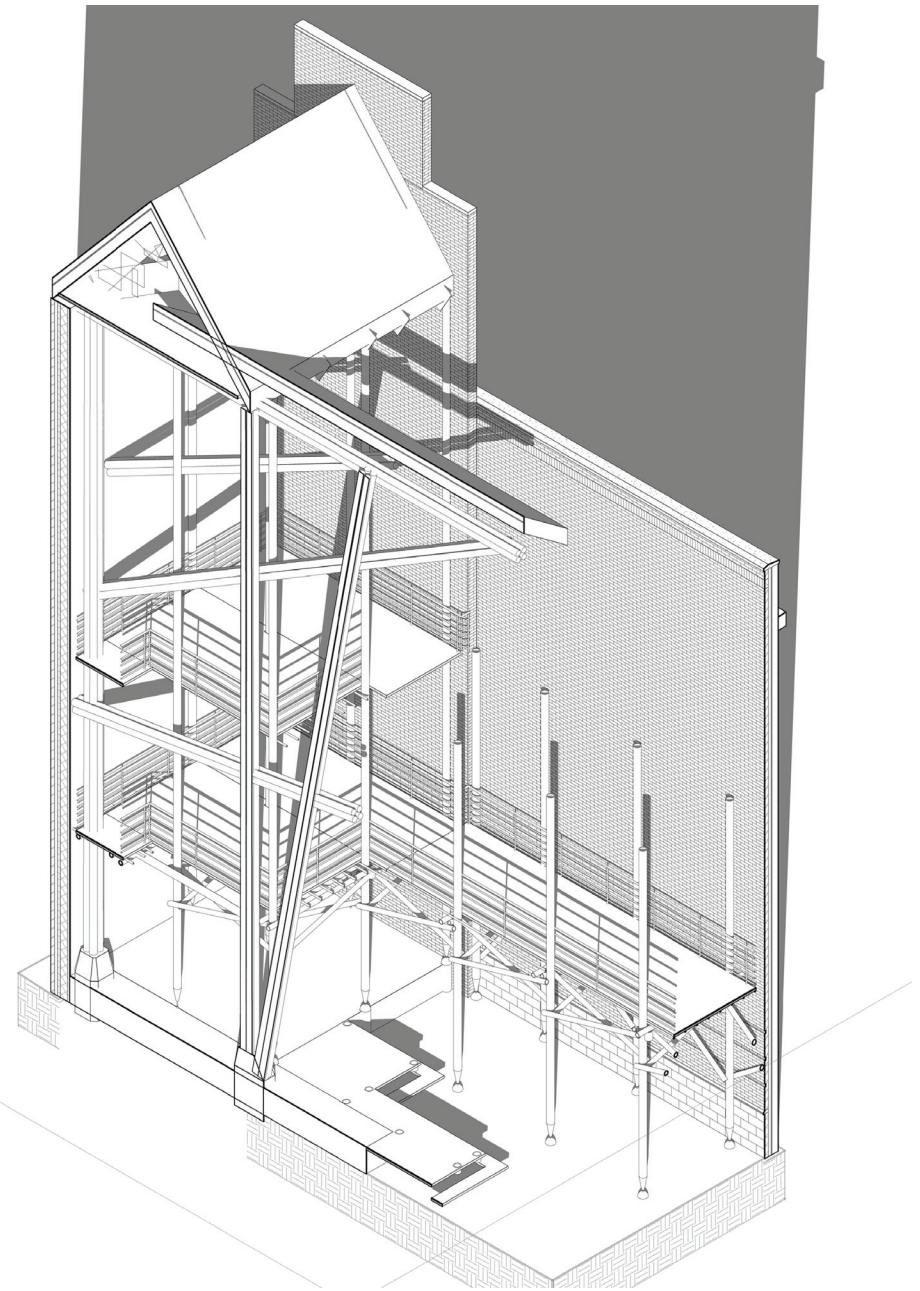
Bamboo smoking silo and subterranean smoke chamber



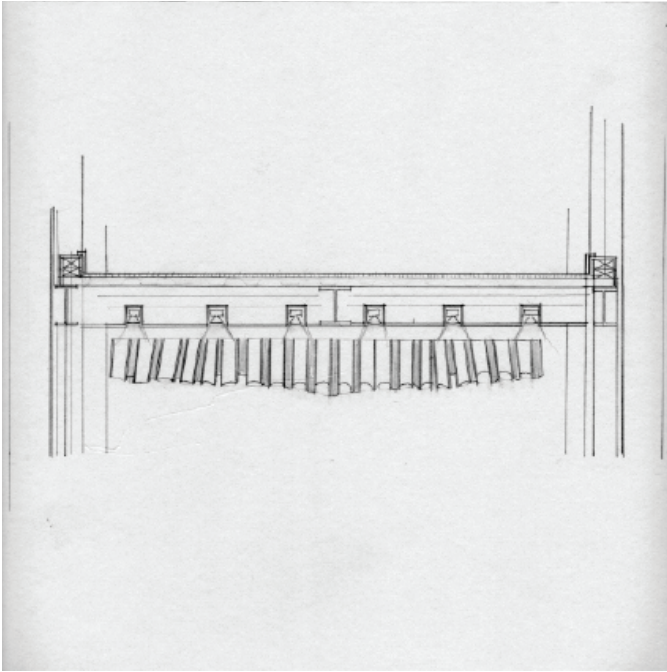
Entrance to South building and double height floor



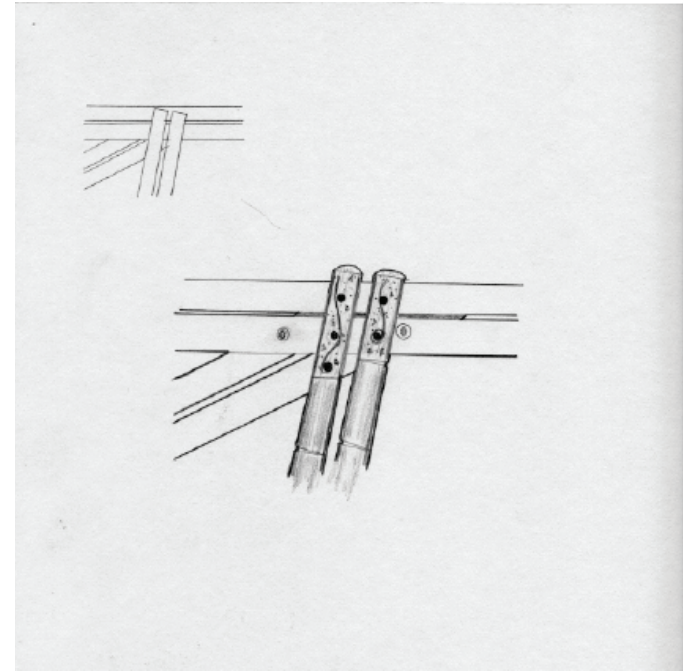
Northwest corner of North Building. Stairs and stage cutaway



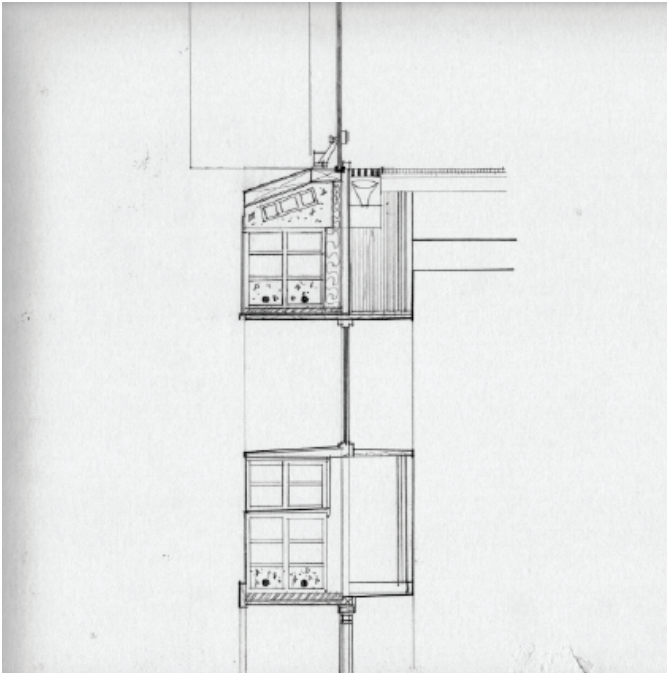
Northeast corner of North Building. Bamboo support structure and stage cutaway.



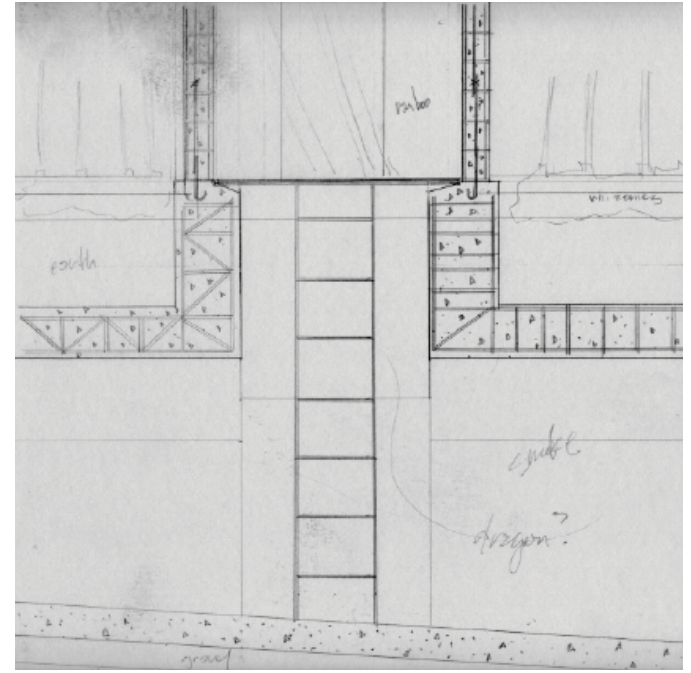
Bamboo Light Filter - Level 2 Ceiling - South Building



Bamboo Roof Support Connection - Opera House

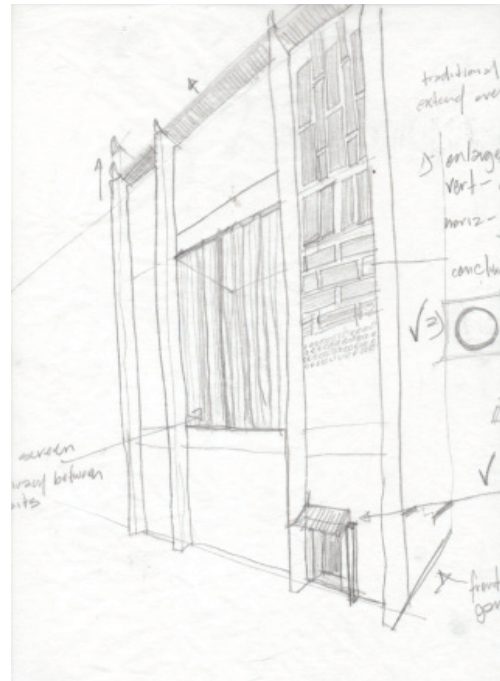
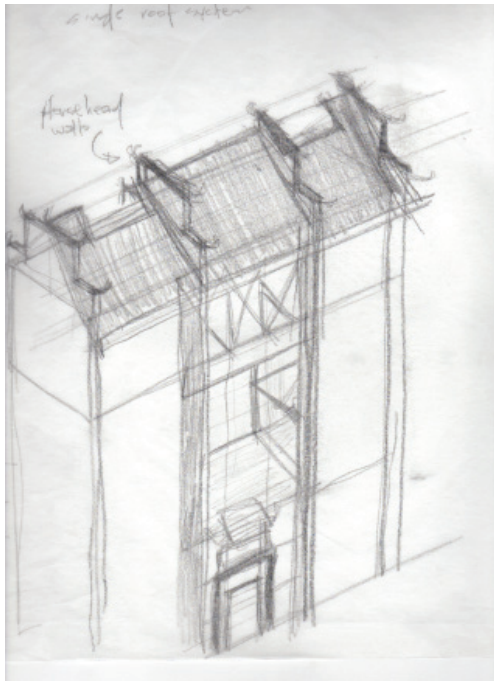


Terracotta Bearing Wall Section - Level 1 - South Building

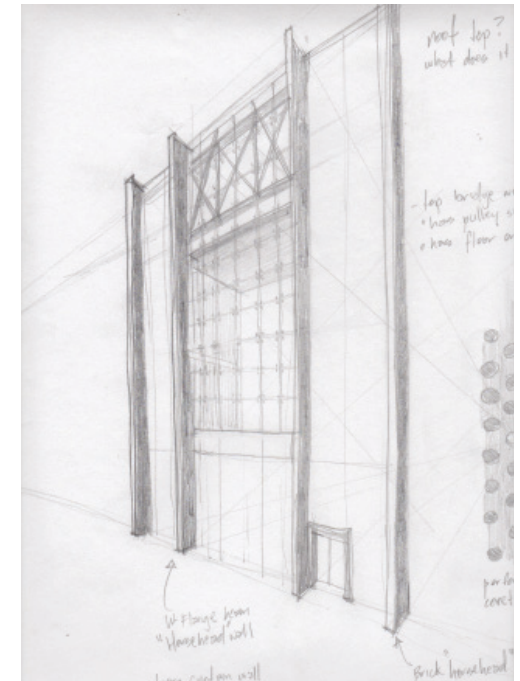


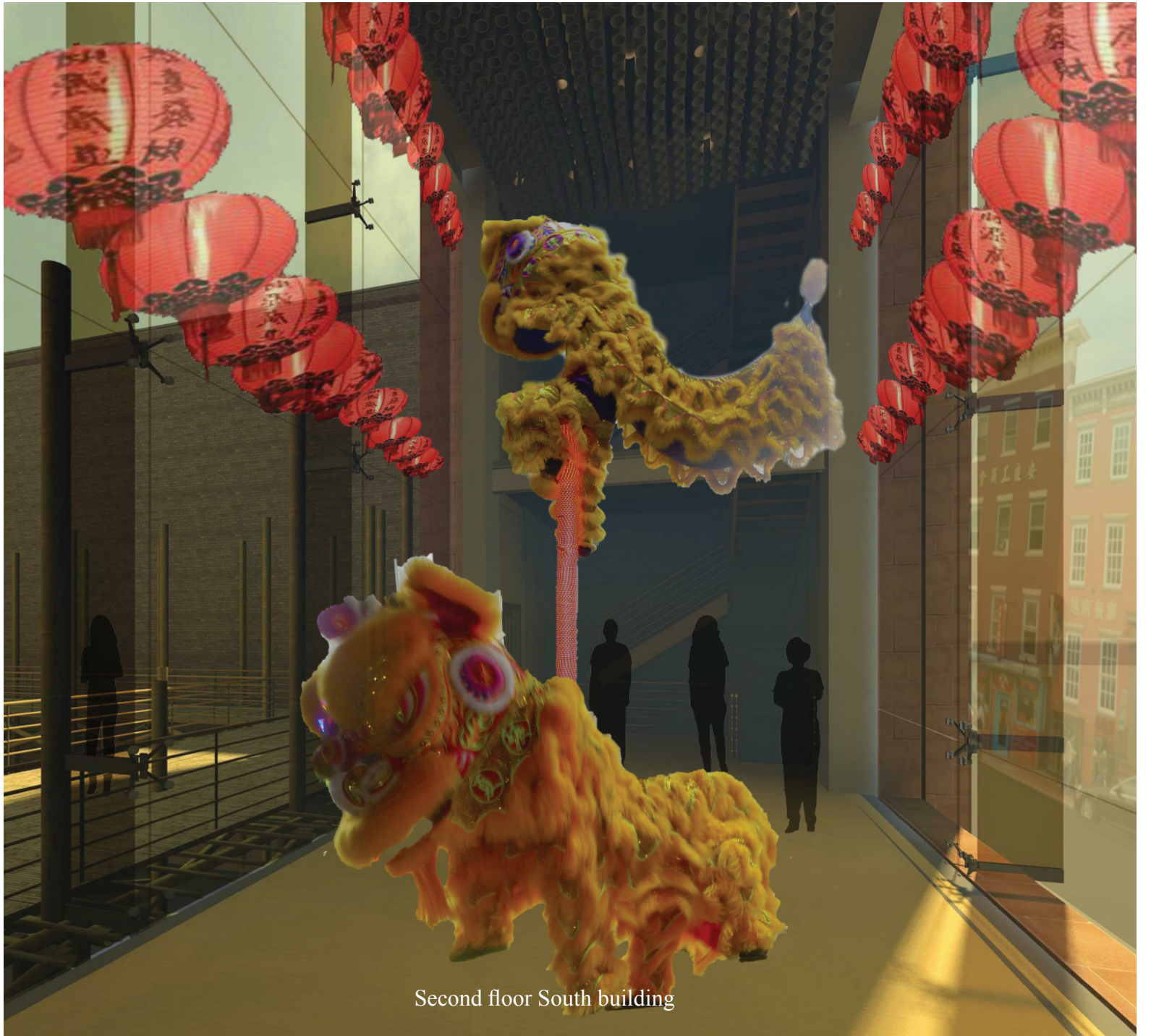
Smoke Chamber and Silo Section

Details and Facade Sketches



South Street Facade Development

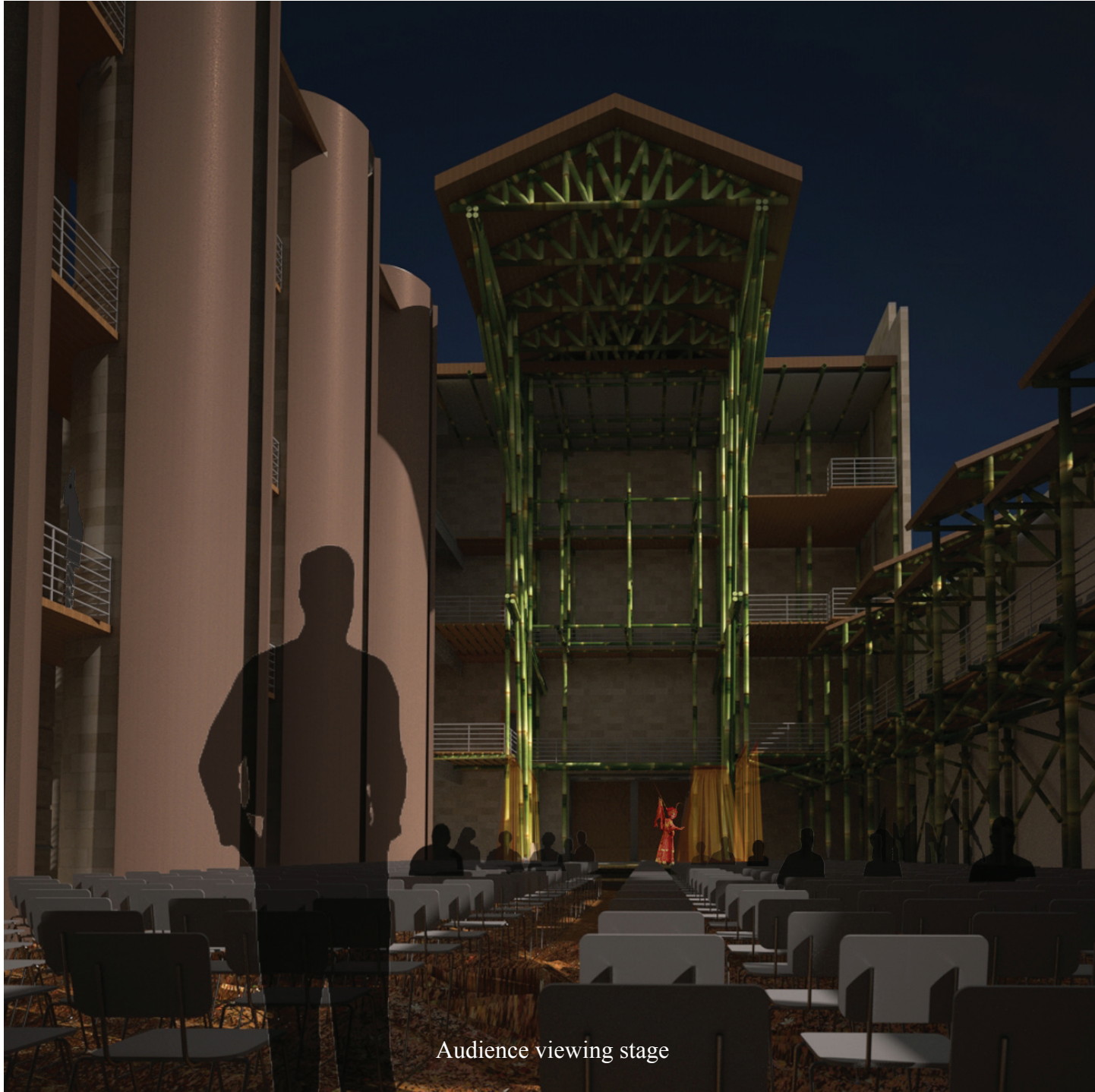




Second floor South building



Entrance into South building



Audience viewing stage



Under walkway facing stage



On Stage


Image Credits

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-p. 1 (L to R) Figure 1 rhizomes - Bruce, Seattle Bamboo source: <http://seattlebamboo.com/cultivating.html>, **Figure 2** bamboo -Eric W. Potterfield (author); **Figure 3** split bamboo culm - bamboo -Eric W. Potterfield (author), ; **Figure 4** bamboo leaves - bamboo -Eric W. Potterfield (author), **Figure 5** bamboo -Eric W. Potterfield (author)

- p. 7 Figure 6 World Map - Kevin M Gill source: <http://www.flickr.com/photos/53460575@N03/6478645561>,  Attribution-ShareAlike 2.0 Generic (CC BY-SA 2.0)

-p. 8 (L to R) Figure 7 Google Maps (2012) represents the location of the Chinatown to that of the National Mall. Retrieved from http://maps.google.com/maps?hl=en&q=washington%20dc&ion=1&bav=on.2,or.r_gc.r_pw.r_qf,.cf.osb&biw=877&bih=882&um=1&ie=UTF-8&sa=N&tab=il; **Figure 8** Google Maps (2012) represents the location of the author's site to that of Chinatown. Retrieved from the aforementioned Google Map

- p. 15-16 Figure 9 Chinese school children - SnoShuu, source: <http://www.flickr.com/photos/35478170@N08/4118512361>,  Attribution-NonCommercial-NoDerivs 2.0 Generic (CC BY-NC-ND 2.0) **Figure 10** Man throwing rice - By IRRI Images source:<http://www.flickr.com/photos/ricephotos/6663890605/> .  Attribution-NonCommercial-ShareAlike 2.0 Generic (CC BY-NC-SA 2.0) **Figure 11** Man planting seed - Hubei May June 2011 - By Remko Tanis source:<http://www.flickr.com/photos/remkotanis/5790059234/> .  Attribution-NonCommercial-ShareAlike 2.0 Generic (CC BY-NC-SA 2.0)

- p. 18 Figure 12 (Calligraphy background texture) - Colophon to Zhang Shui's Poems in Tsao Shu. source: <http://www.art-virtue.com/styles/kai/SmallScale2.jpg>

-p. 21-28 Figure 13 (Calligraphy background texture) - Heart Scripture (Ou-Yang Shuen, Tang Dynasty). source: <http://www.art-virtue.com/introduction/OuYangSheun.JPG> - Citing all reproduction of calligraphy is the basis for the art.

Hi Eric:

After reading <http://www.art-virtue.com/FAQ/FAQ.htm#11> , you may understand you don't need my permission.

Regards,

Joshua Hough

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Commercial use must be given explicit consent.

This entire work, including all parts, is may not be used without reference.

For referenced material, please see cited sources

page.

Footnotes

1) Juyi, Bai or Chu-i, Pai. “The North Window: Bamboo and Rock.”
Book of Songs c. 772–846AD

Interpreted/Translated by:
Eric W. Potterfield and my wife Suzanna Sitomer.

I chose this poem originally because it not only described bamboo, but also oriented one to the world, the other-world, and the senses. However, after having lived in China and reading “The Chinese Written Character as a Medium for Poetry”, I contemplated Ezra Pound’s use of stripped down interpretation for poetry and decided to give it a go myself. The poem, as with most, is metaphorical in many cases: The cold rock is the old man; the bamboo stand is the children; the night is death.

The “professional” translation/interpretation can be found at Poemhunter.com, and was created by David Hinton or Arthur Waley. Both have the same interpretation.

I believe ours is better yet!

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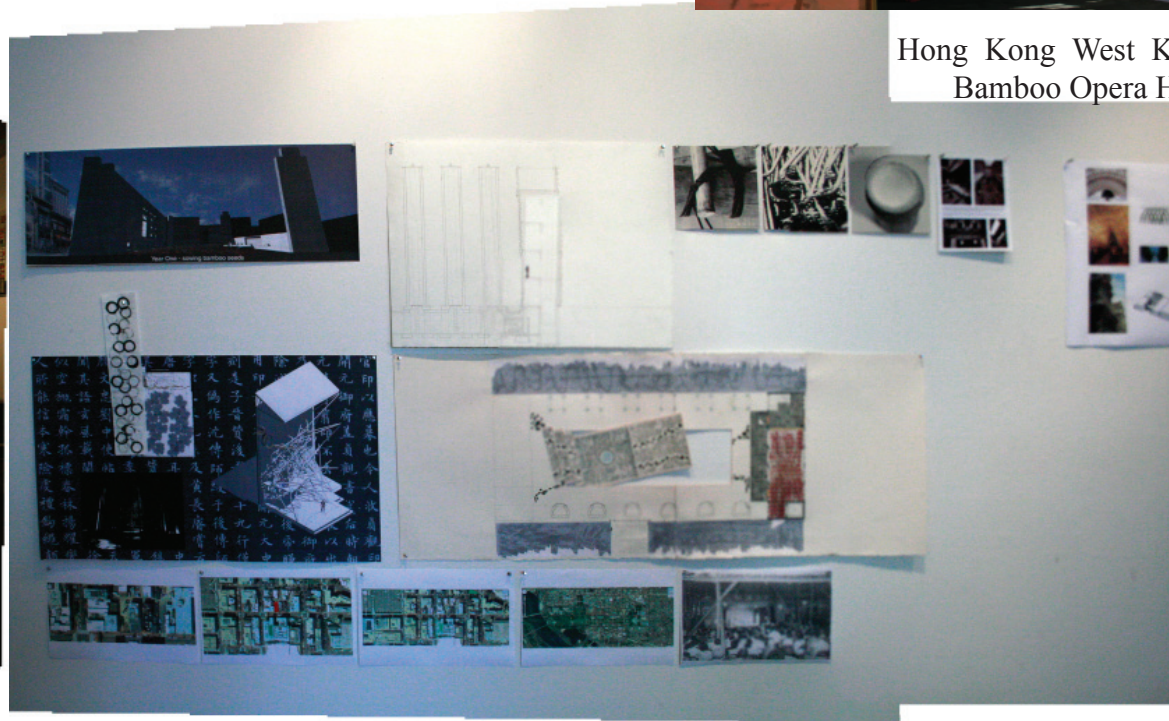


Me and my family in Yuexiu Park
Guangzhou, China. 2013. We now
live in Tai Wai, New Territories,
Hong Kong.





Hong Kong West Kowloon Opera
Bamboo Opera House 2013



Thesis Presentation