

Time-Space:

Constructing Meaning through Temporal Phenomena

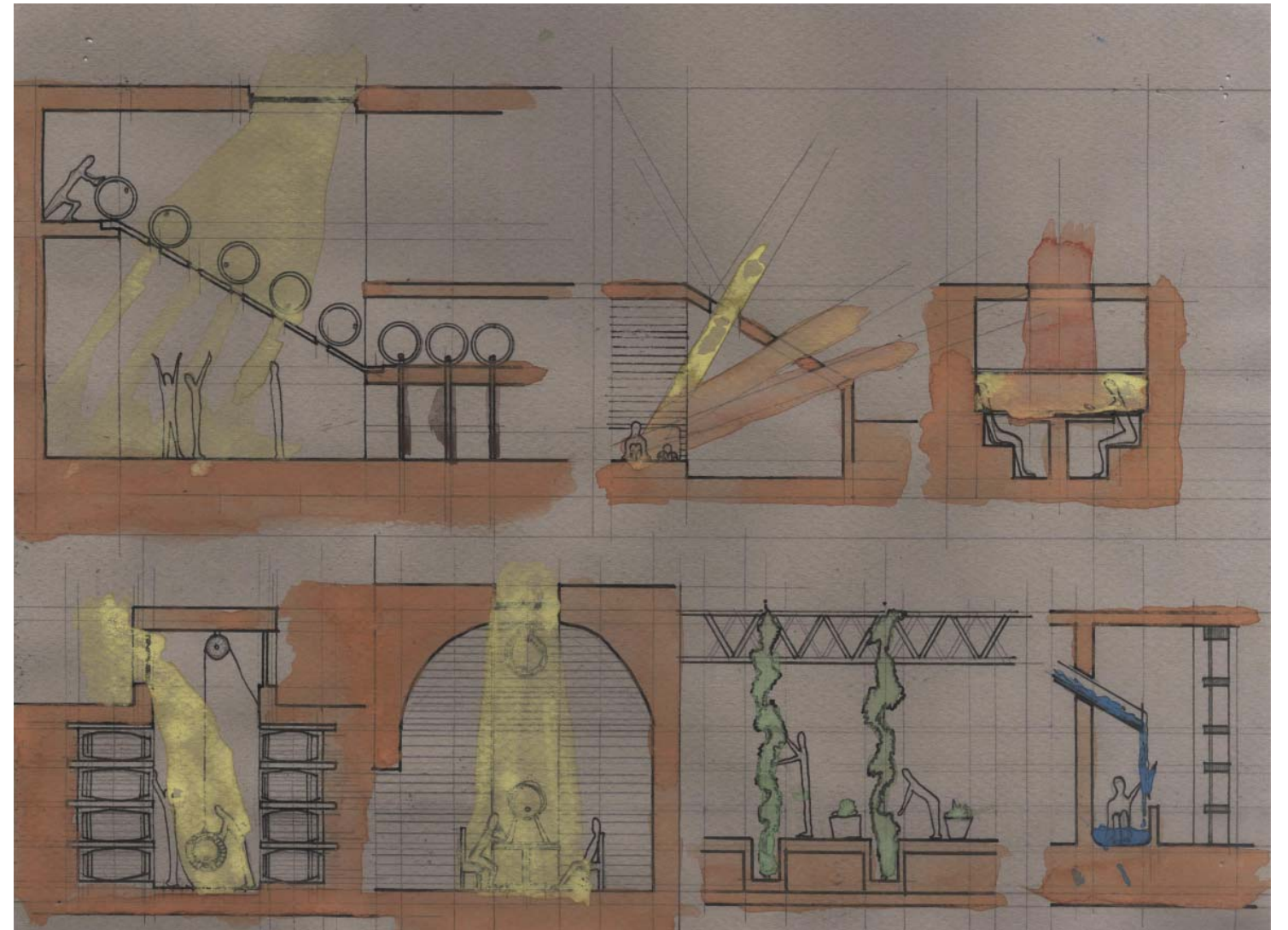
Ashley Brooke Kennedy

This thesis is submitted to the faculty of Virginia Polytechnic Institute and State University in partial fulfillment of the requirements of the degree of Master of Architecture in Architecture.

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Alexandria, Virginia
Washington-Alexandria Architecture Center

keywords:
Time Beer Event Brewery Waterfront



[1]
Events in the life of the brewery and the brewer

*“What would it change in our arts, our sciences, and our technics if time were conceived as something real?...What is it about time’s relentless fluidity, its irreducible materiality, that the modern mind finds so impossible –or repellent –to think?”
[Kwinter, 4]*

“According to my paternal grandmother, spring no longer exists, though her lament was as much sartorial as environmental: no more spring coats, you see, because no more spring weather. Actually, I suspect the change is in us rather than in the climate; our failure to recognize, let alone celebrate, the advent of spring owes rather more to the fact that we now live in centrally heated homes” [Lawson, 229].

Time-Space: Constructing Meaning Through Temporal Phenomena

Ashley Brooke Kennedy

This thesis is an examination of the significance of time and temporal phenomena in the conception and construction of the built environment. It began as a question regarding the aging and life-span of contemporary buildings, in contrast with those that have at present survived long enough to earn designation as 'historic' buildings.

The term 'temporal phenomena' is defined here as sensory experiences which make the passage of time accessible and meaningful to those interacting with the built environment.

Le Corbusier wrote that an original intent of painting was to record, to create permanent evidence of events and things that passed away with time and were forgotten, or couldn't be seen later. He suggests that the camera is a much better tool for this, and so painting has lost part of its purpose.

Buildings and cities have always had the effect of retaining memory and creating cultural meanings. Cultural reliance on continuous improvements in environmental and building technologies have obviated the building's ancient place as a datum through which human beings understand the passage of time. And perhaps it is the loss of that sacred duty that leads to short-lived, disposable buildings, and the proliferation of placeless-ness in contemporary environments.

A design for a brewery on the banks of the Potomac River in Alexandria, Virginia became the vehicle to explore strategies for making time meaningful and present through the physical reality of the building, the brewing process, and the interrelated lives of the brewer and the city.

Abstract

Abstract.....iii
Introduction.....1
Beer + Brewing.....9
Site.....17
Time.....25
Design Process.....33
Conclusion.....49

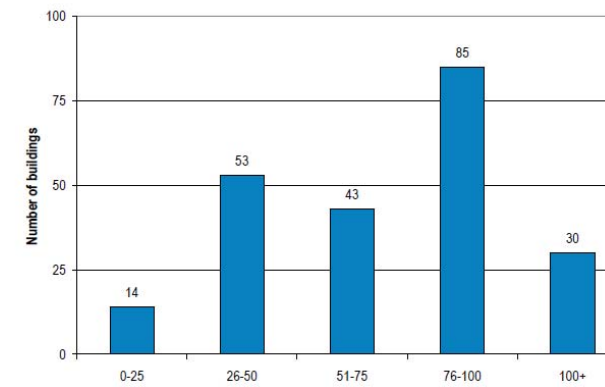
Images Cited.....65
Bibliography.....66
Acknowledgements.....68

Table of Contents

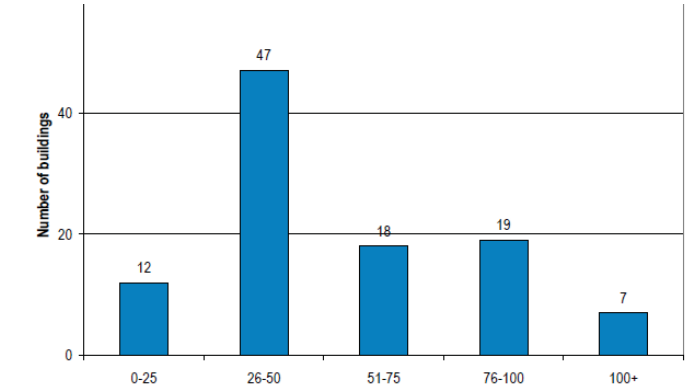


[2] "Big Box" Commercial building in Alexandria, VA

Introduction



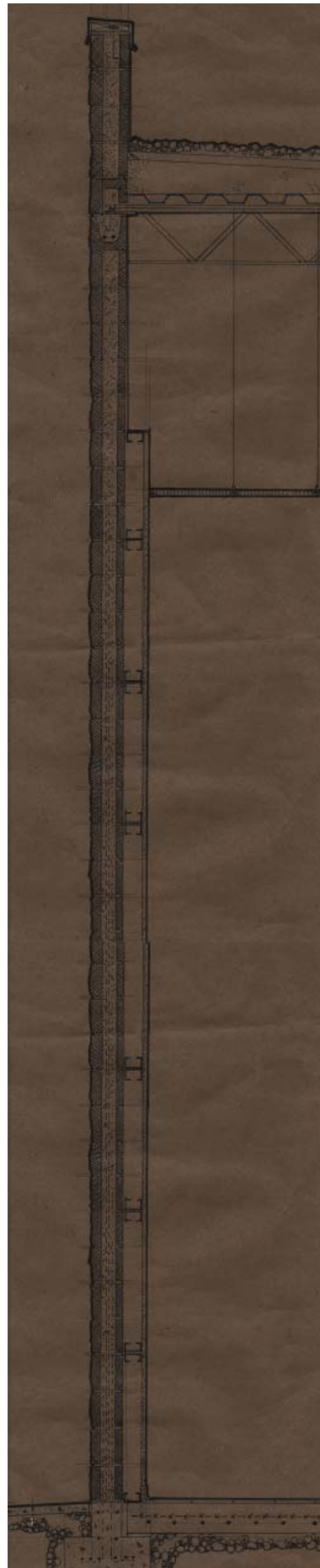
[3] Number of Buildings demolished, by age, in a survey of actual service life of buildings in Vancouver, BC. 225 total buildings surveyed. 87% of surveyed buildings did not survive the span of one human life.



[4] Number of non-residential buildings demolished, by age, in a survey of actual service life of buildings in Vancouver, BC. 105 total buildings surveyed. 57% of non-commercial buildings surveyed survived 50 years or less.

I began this project by wondering why buildings which have been constructed in my lifetime seem to have a shorter life span than buildings that were created 50, 100, or more years ago. I wondered how it is that those buildings, 'old buildings,' have come to be so old. Why, in comparison, do contemporary buildings seem insubstantial, temporary, and still; and, what will happen to contemporary buildings as time passes by? How will successful human communities grow in and around buildings that do not survive the span of one human life?

Contemporary Buildings and Stillness: I open the door of my car and swing my feet onto the oily surface of a sea of faded asphalt. My head pokes up between the endless rows of cars like a lost rodent, sniffing out the cheese, and I spy it: my destination, bright and glaring in 10 foot red letters an unsheltered distance away. Some time later I arrive at the entrance, and reach for the door handle, but the doors whoosh open before me, untouched, and compel me forward. The squeaky slippery floor reflects the artificial lights that hang far overhead in seemingly endless, undifferentiated rows. As I walk through the aisles of brightly colored packages, in a grid of similar looking columns, shelves, and trusses, I find what I'm looking for but feel oddly disoriented. Wandering still, I wonder what time it has become. I consult my cell phone, and learn it is time to make my purchases and leave.



The primary characteristic of buildings and environments such as this is an observed sense of stillness. Like a photograph, the primary force driving the conception of the building is a single moment frozen in time. In this moment, the building is complete and eternal; and, it seems, is not intended to be affected by change.

Buildings suffer from this stillness, lacking the opportunity to fully participate in the phenomena of temporal reality: the gradual growth and transformation of building surfaces, the movements of the sun and stars, the sensations of materials. When buildings lose these qualities, the opportunity for a life to develop around them diminishes, and they become disposable. They possess an over-emphasis on modular, flexible, efficient space, often lacking procession or modulation in the movement through or around the building. These buildings largely ignore the sun, the moon, and the outdoor environment; they are not specific, but rather infinitely flexible. Such contemporary buildings favor the rational over the intuitive and exhibit emphasis on transparency and dematerialization.

“The modernist work’s insistence on autonomy and self-sufficiency made of it, on the contrary and more than ever before, a mere thing among the other things of the world. Indeed the ‘dehumanization’ of the work actually bestowed upon it a new rather than a lesser intimacy: the work no longer led one back (through the representation) to the daily world; it actually comprised (some of) the world itself” [Kwitner, 44].

Kwitner cites the modern work’s ‘insistence on autonomy and self-sufficiency,’ by which I understand him to mean (in the case of architecture) buildings as objects; Shattuck also explains that modernist work claims to achieve a ‘new intimacy.’

[5] Standard wall section through a typical modern commercial building

Intimacy, I think, is a good way to describe the feeling of successful buildings. I have often heard people say that Gothic cathedrals, while vast and cavernous, and made of cold stone, have a mysterious way of not being imposing to the scale of a human. And it is true, there is a sort of comfort provided in those spaces, something about the quality of the sound, the darkness, the light, that feels oddly very peaceful and exhilarating. Modern works suffer from a desire to create a new world rather than to make a work that is rooted in the real world, which helps people to understand the world better or to have a deeper experience of actual phenomena. It tries to create experiences and phenomena that can only be understood within the work itself, rather than by humanity’s common knowledge of the world or the shared memory of a given culture.



Old Buildings and The Fullness of Phenomena: As I walked down the hall, the creaking of the floorboards beneath my feet whispered the slowness of my steps. Breathing deep, my nose let the musty spiciness of the wood fill my mind with visions of comfort and familiar. I paused at the large window, whose depth contained the sunlight in a single instant of warmth within the shadow of the hallway. I prepared myself to leave my refuge and return to the rest of the world. Leaning forward to grasp the worn handle, my opposite hand reached to the wall for support. Cool, solid, and heavy, the stones were rough but welcomed my touch. With a grumble the door swung open. The bright light of the sky, softened by the overhanging arch of the door, compelled me out into the courtyard. Nearing the street, I heard the clamor of the traffic, but felt embraced by the walls surrounding me, the blossoming trees floating above me, and the light softly glinting off the water in the river beyond. Stepping into the street, I glanced back one last time, somehow comforted as I wandered off into the city.



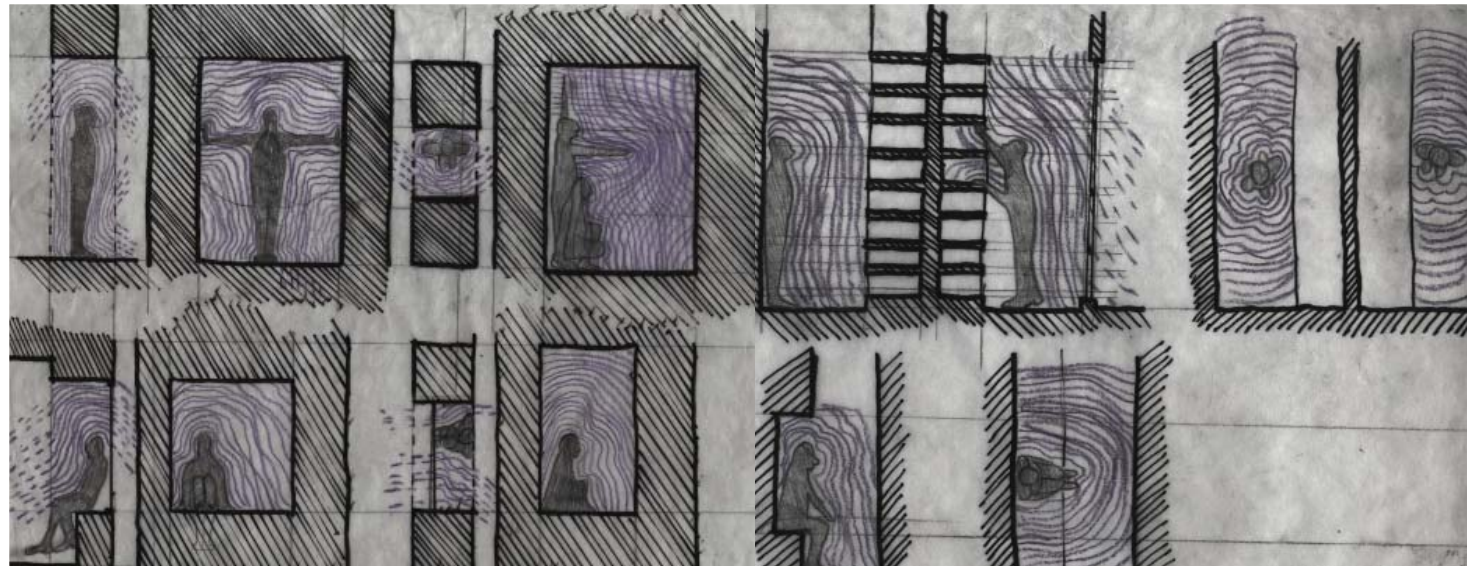
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[7]



[8]



[9] Qualities of Aged Buildings - "Thickness"



[10]



[11]



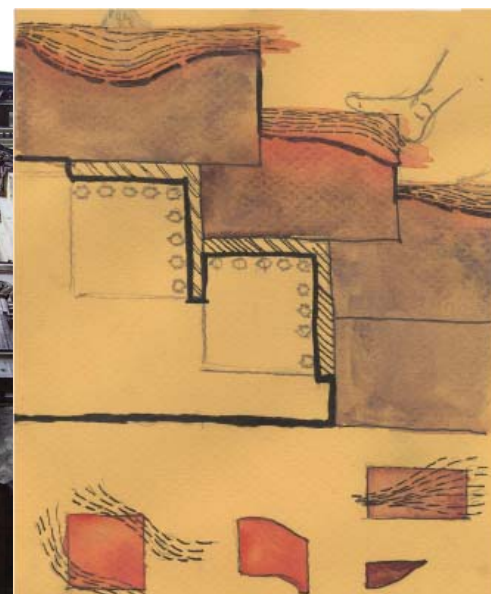
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[13]



[14]



[15]

The "Law of Ripolin" and the Eternal Present: The flat, unadorned wall requires maintenance, and the curtainwall requires periodic washing. I assumed that the inferiority of these walls in their ability to mediate the elements (the flat wall lacking 'weatherings' which control the flow of water; the white wall becoming stained; the curtain wall allowing sunlight and cold air to enter the building) meant that they reflected a desire for the building to overcome fate; and, in attempting to do so the buildings missed opportunities for transformation and life to occur in and around them. But, in fact I think the contrary is true: these buildings demand a culture of maintenance and care. It is possible that such buildings establish a life for their inhabitants and their city by requiring cyclical and habitual renewal.

"Staining, erosion, and surface faults seem to be antithetical to the modern movement's ideal of 'whiteness.' Le Corbusier, in "The Law of Ripolin: A Coat of Whitewash," faults the miser in us...the collector of material possessions. This law was put forth as a critique of the house as a museum or temple... White Ripolin walls would resist the accumulation and accretion of "dead things" on their surfaces, as these would leave "marks," whereas on decorated walls...these marks would be invisible.

Observing that accretions do mark and preserve events from the past, Le Corbusier nevertheless recommended as more lively and accurate pure memory, which he understood to be recollection without the hindrance of intermediary dead objects...

He lamented the likely disappearance of this traditional surface as a consequence of westernization of older eastern cities and the industrial production of decorative elements - "dead things". Traditionally, stones had been burnt, crushed, and thinned with water and applied to surfaces, making an "extraordinarily beautiful white" [Mostafavi and Leatherbarrow, 75].



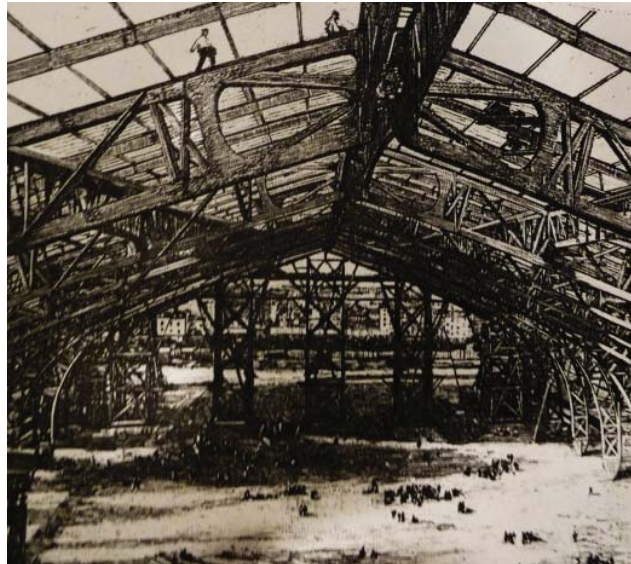
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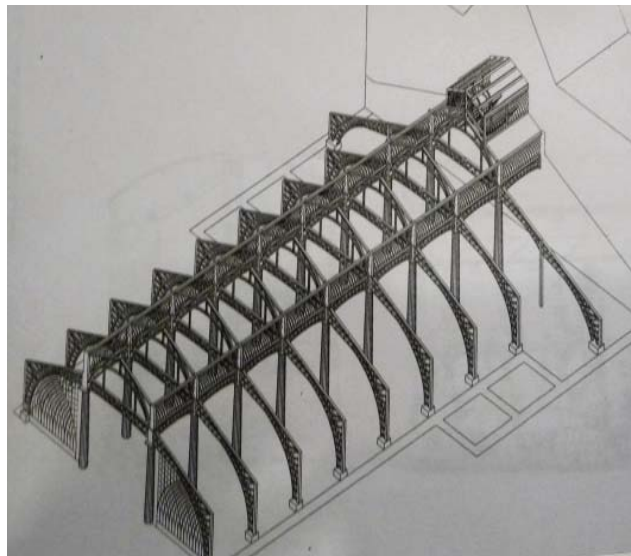
[17]



[18]



[19]
The dehumanizing scale of the machine-building



[20]
The cast iron frame of the Sayn Foundry (1830) was buttressed by surrounding masonry walls.

“The gradual progression from heavyweight to lightweight construction is also seen in the evolution from thick load-bearing building envelopes to thinner, lightweight enclosing skins. The growth of the structural frame removed the need for heavy load-bearing masonry walls and allowed the use of lightweight cladding panels...the thinness of the skin is in contrast to the deep window and door reveals which gave masonry construction its visual solidity. This sense of lightness raises another psychological problem. Is the thinness of the skin contrary to the human requirement of containment” [Strike, 193]?

Many architectural theorists have recognized the dramatic degree to which the understanding and quality of the built environment has shifted as a result of successive technological changes. I was pleased to find that James Marston Fitch had made similar observations about our contemporary built environment when he noted that we have achieved widespread wealth, safety, and health; but, relative to previous societies, everything we produce is ugly. The problem of producing sustenance is the very purpose of human life – and when we are not thusly occupied, we become less human; so, with mechanization and technology we have less work to do, but with less work become less wise, less observant, less informed, less curious.

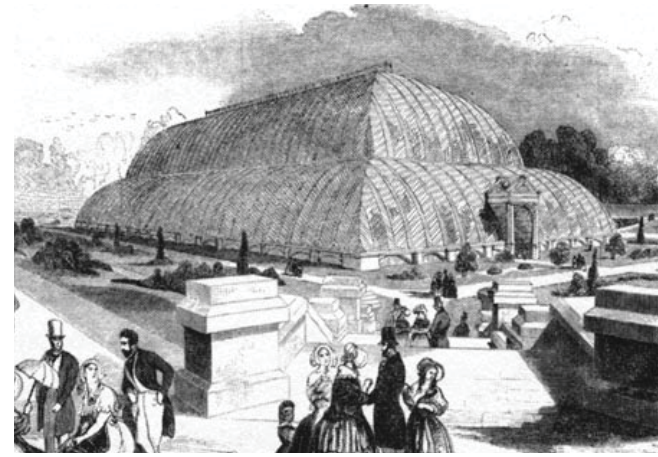
In *Architecture and the Esthetics of Plenty*, Fitch suggests three explanations for the aesthetic and tactile differences between our material culture (which includes buildings) and those of pre-modern societies. The effect of these differences is a built environment that consists of disposable buildings and the destruction of place.

First, mass production means that material wealth has been made a reality for many people for the first time in history, and this has caused a disconnect from the understanding of how things are made, where they come from, and how they work, crippling our ability to critique their practicality or their appearance. He calls the citizen an ‘ignorant consumer’ [Fitch, 269]. Stewart Brand echoes this notion in *How Buildings Learn* with his ‘irresistible forces’ that push buildings. He notes the force of ‘fashion:’ the public views change for change’s sake as a virtue and exalts in buildings which embody the image of a movement or brand, whose greatest assets are summated in a single glossy image of one moment in the building’s life on a presentation board [Brand, 5].

Secondly, Brand and Fitch observed that the industrial revolution had altered the pace and motivation of Western societies. Fitch tied his perceived ugliness of our material culture to advancements in science and technology that have increased the number of materials and processes for creating compared with pre-industrial societies, making all decisions vastly more complex. The ‘ignorant consumer’ finds it increasingly difficult to navigate this exponentially increasing complexity. Brand writes that “the march of technology is [an] inexorable and accelerating” force on buildings [Brand,7].

“Industrialization and urbanization radically altered the social and economic landscape in which architecture developed; and it simultaneously altered both the function of buildings and the structure, the very materials out of which they were fabricated” [Fitch, 107]. The structure of buildings and materials used changed due to industrial processes that could create materials that had greater spanning capability, performed better in compression, and because materials such as dimensional lumber and nails could be produced faster and cheaper. These advances in technology clashed with classical notions of Architectural form and with the craft-oriented nature of architecture.

The wide-spread adoption of artificial lighting was produced first by gas, and then by electricity. “The result was that, by the time of the Civil War, an entirely new concept had appeared in building design: that of a fixed, semi-automatic lighting system which freed the building from its historic dependence upon natural light” [Fitch, 115]. The domestic dwelling was revolutionized as a machine for the family. Fitch describes 19th century social reformer Catherine Beecher’s house plans for the “lower-middle-class suburban servant-less family” [Fitch, 33] which borrows industrial ideas of economy, compartmentalization, and assembly line.



[21]
The Great Chimney at Chatsworth

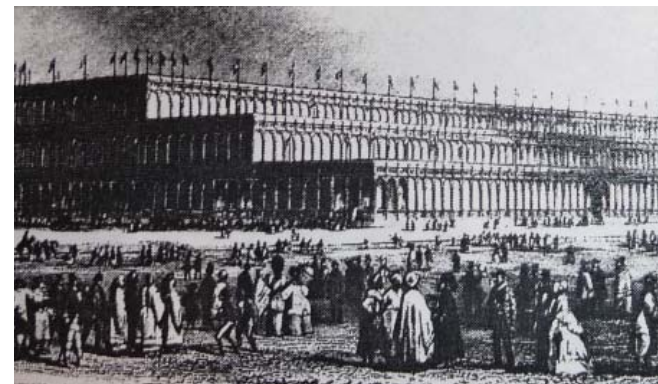
The shift from load-bearing walls and immutability to the ephemeral and assembly nature of contemporary buildings is illustrative of the new cultural paradigm created by the industrial revolution. The development of mass-produced, standardized building pieces that were created off-site, shipped, and assembled created many advantages and efficiencies; but it also changed, perhaps forever, the way that buildings are understood and conceived with respect to their weight, their joints, their context, their purpose as time-keepers, and their longevity.



[22]
The Conservatory at Syon House

“On the one hand, new demands for greater height, increased span, concentrated strength to meet concentrated load, were making obsolete the old theories of structural design. On the other, many of the new building types had little, if any, ideological function to perform” [Fitch, 124].

“This upsurge in the construction of identical buildings in the industrial areas throughout the country must have contributed to the breakdown of regional identity in the appearance of buildings. The vernacular pattern of buildings, based on local materials, geology and climate, was being replaced by large identical buildings to serve industrial growth” [Strike, 27].



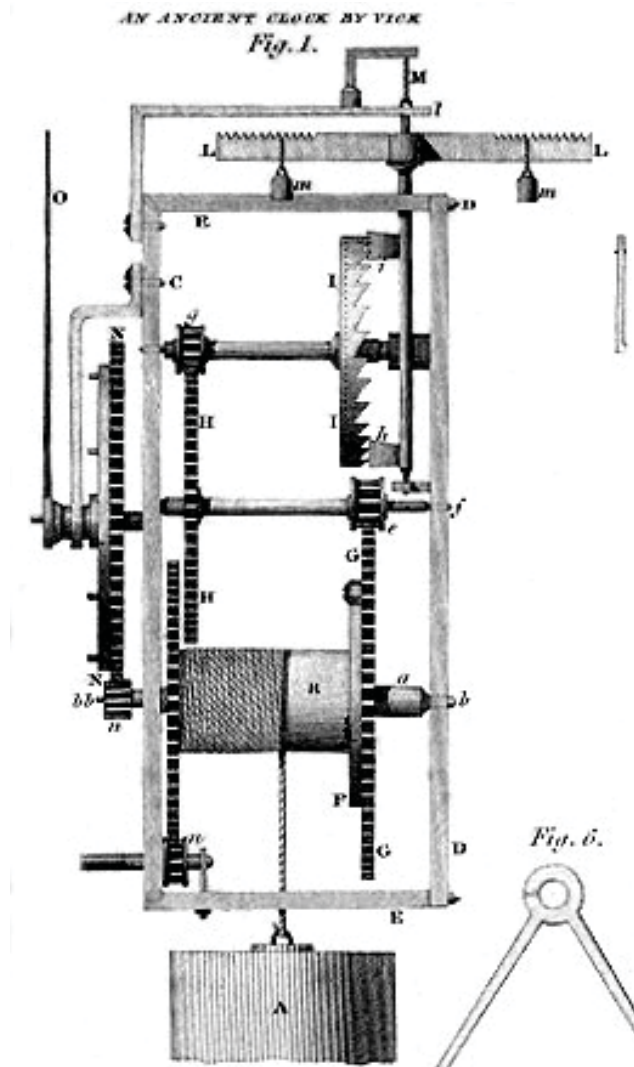
[23]
The Crystal Palace

Designs for buildings using structural cast iron, almost unintentionally, began to have an aesthetic which was fundamentally different from most preceding architectural languages of the past.

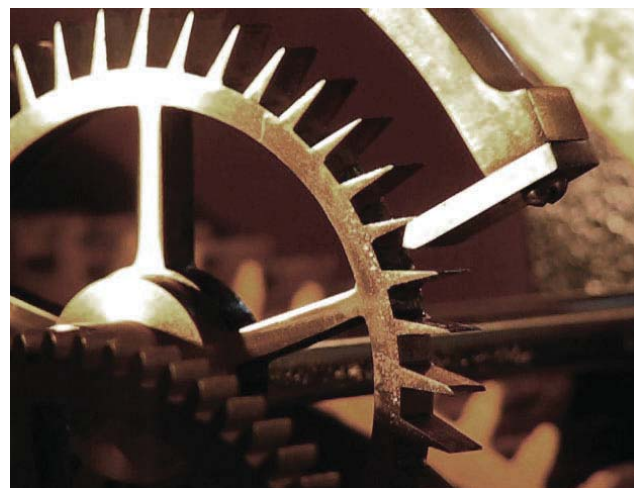
These buildings were about modularity, speed, transparency, light, aspiration; and not permanence, cultural transmittance, stability, solidity, and stalwart refuge.

In *Construction into Design*, James Strike traces the development of important modern building materials and construction methods and demonstrates the effect of those methods and materials on both the form and function of modern buildings and the societies that create them. His narrative illustrates that the need to house machines of the industrial age imputed the development of machine-like buildings for all human purposes. He suggests the development of the lightweight frame building, with glass and metal cladding, as a primary mode of construction was made possible by material experiments that were first performed with conservatories and hot houses in England in the early part of the 19th century. Prior to the construction of the Conservatory at Syon House, in Isleworth in 1827, and The Great Stove in Chatsworth in 1840, hot houses and orangeries were carefully fenestrated masonry buildings [Strike, 30]. These buildings represent early examples of the desire for lightness, transparency, and modularity in non-industrial buildings; and, the beginning of the liberation of the wall from its traditional role, the separation of the weight and mass of the building from the meaning of the building.

The design and debate over the Crystal Palace represents both the dramatic change in how architects and society thought about the relationship between building and time, and the new architectural expressions that resulted. People were concerned about the pavilions permanently scarring the park they were to be situated in – the buildings needed to be temporary, but people were also concerned that temporary buildings would not symbolize the strength and permanence of the societies they were to represent. Everything about its construction and design was related to efficiency and industry.



[24] Early escapement mechanism



[25] Verge and Foliot elements of mechanical escapement

"The controlling dimensions for the whole building came from the need to standardize the components for efficient prefabrication. The selected module of 8 feet came from the maximum spacing of the Paxton gutters in the ridge and furrow roof glazing... Charles Downes, in his full survey *The Building Erected in Hyde Park for the Great Exhibition, produced in 1852*, refers to the impact of this standardization and prefabrication:

"It not only facilitates and economizes all of the operations by the frequent repetition of the same parts, but it also produces perfect symmetry in the building, and creates beautiful effects by the long vistas which are seen between the columns in every diagonal direction as well as in the longitudinal and transverse views" [Strike, 47].

Finally, Fitch points out that the limits of space and time have been destroyed. Central to the progress of Western civilization has been the ever-more finite quantification of time, to the point of destruction of a meaningful understanding of time itself. In *In Search of Time*, Falk mentions many experts who attribute the interest in quantifying time more accurately to a general trend (rather than it being the impetus) of quantifying everything in the Western world beginning around 1300. [Falk, 60] He refers to the "quantitative revolution" (a term from historian Alfred Crosby) in which "virtually everything in the Western world became an essence to which a number could be assigned – a sea change in the very perception of reality" [Falk, 64]. Falk also points, as does architectural critic Sanford Kwinter, to the invention of the mechanical clock as being a crucial point in the transformation of the relationship between time and building.

The history of the invention of the mechanical clock in Europe is obscure, but it is linked to the Church and its monasteries (particularly Benedictine monasteries), and their need for precise timekeeping in the middle ages. The 'crucial invention' in its development was the escapement, which engaged/disengaged a continuously spinning wheel at regular intervals to make it rotate at a continuous rate.

"The wheel, in turn, can be geared to a mechanism for striking a bell at a particular hour. 'The tick-tock of the clocks escapement,' as historian Daniel Boorstin has put it, 'would become the voice of time.' And while the length of an 'hour' read off a sundial changed with the seasons, the hour measured by a mechanical clock remained fixed. An hour in summer and an hour in winter were now the same. The creation of 'equal hours,' says Boorstin, was one of the great revolutions in human experience: 'Here was man's declaration of independence from the sun, new proof of his mastery over himself and his surroundings. Only later would it be revealed that he had accomplished this mastery by putting himself under the dominion of a machine with imperious demands all its own' "[Falk, 59].

The first mechanical clocks, like that in the Salisbury Cathedral, had no face, and no hands – only their sounding bells to signify time. The Salisbury Cathedral clock, believed to be the world's oldest working mechanical clock (1300s), and its contemporaries, were not very accurate, being off by as much as 15 minutes by the end of the day. This was not a problem, however, because at the time the concept of minutes had not been established. People managed their time by the nearest hour or half hour [Falk,67]. Steam power and industrialization further altered the West's understanding of time. Most people now worked in factories, they lived and died by the schedule the steam engine kept. "Time zones developed because of the train. Before that, people only conceived of time locally, because it would take days to get someplace far enough away to have a different time. Who cared?" [Falk,70].



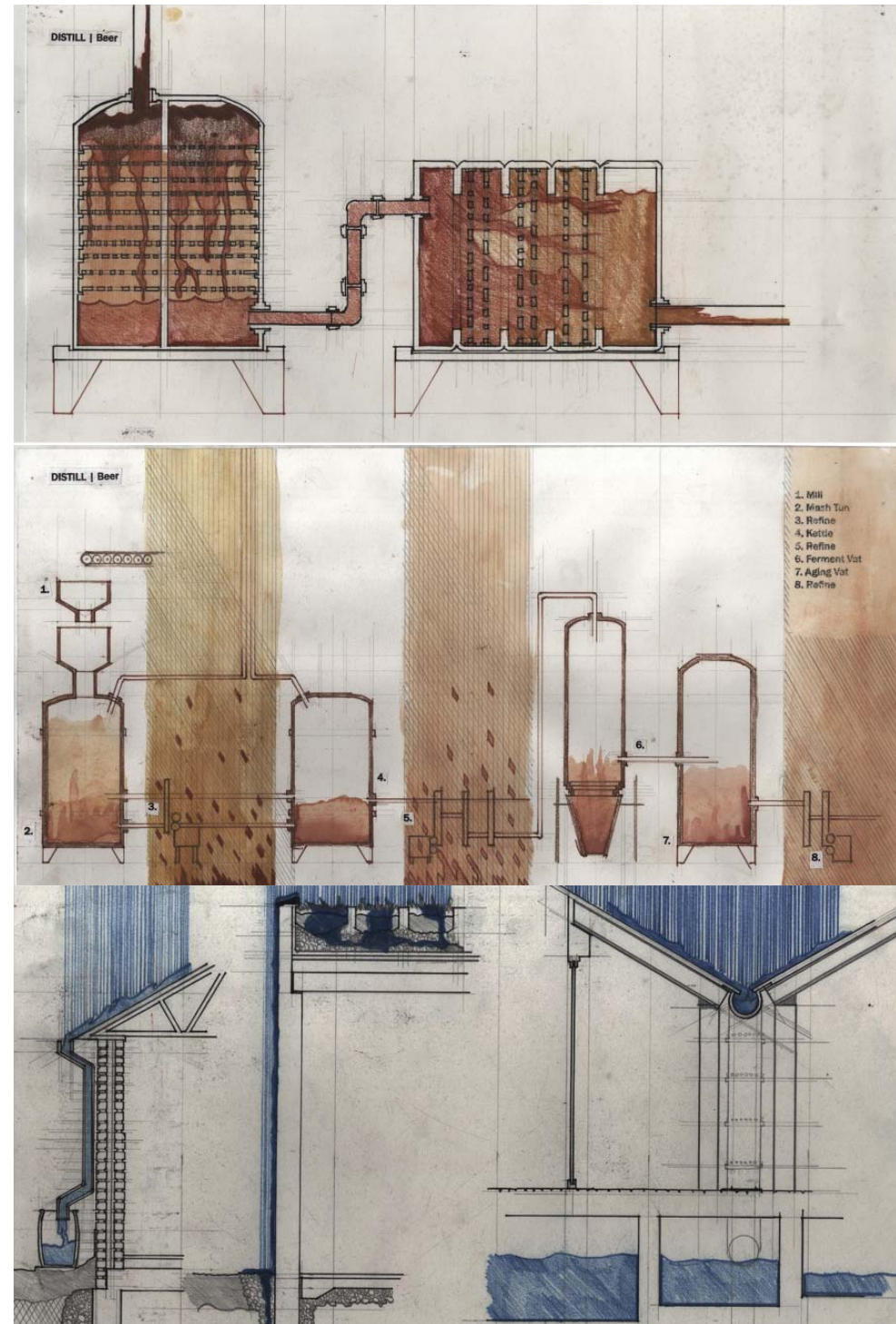
[26] Clock in Salisbury Cathedral. One of the earliest mechanical clocks.

The definition of the second changed in 1967 from 1/86,400 of the mean solar day to the duration of 9, 192, 631, 770 vibrations of a particular isotope of cesium. Once we developed atomic time-keeping devices, we found that the Earth itself is actually not all that accurate due to irregularities in its rotation. The Earth is actually slowing down. This has been revealed by our new atomic clocks. About one second is added every year. "At the time of the dinosaurs, a "day" was probably around 23 hours long" [Falk 71]. Eventually, our 'atomic' clocks will disagree significantly with solar time. "Leap Seconds" are added to the international mean time every now and then to correct for this [Falk 70-77]. In light of this shrinking and destruction of time, why should a society seek to create a building which lasts for a long time, and which can be a touchstone between many multiple generations?

I discovered that the explanation for how we have arrived at the state of our built environment is long, complex, and well-documented. The question of what happens to human societies when mechanization and the shrinking of time, space, and material become central has been answered. How can our society regain the material understandings that have been transformed by technological revolutions without abandoning the advantages of those revolutions? This question is one that has been posed by every generation. The Industrial, and many subsequent revolutions have come and gone, and that question remains unanswered by minds far greater than my own.

I spent much of the past year admiring local relics of buildings and pieces of infrastructure constructed of solid stone, and yet my modern mind found it difficult to even conceive of how my project might be replicate such forms. Perhaps by making the passage of time central to an architectural work, any type of building can develop meaning and significance which would make its disposal unthinkable.

I discovered the idea of "event-time". The African Nuer tribe has no concept for 'time' and no word for it. They associate time with activity; "the temporal logic seems to be: 'If I'm going to church, this must be Sunday, or since people are on the move between camp and village, then it must be [the month of] dwat...' Activity supersedes time in the sense that we know it." [Falk, 84]. We have these types of social clues as well – in fact, often when we are detached from our work or school or typical social circle, we lose track of days or months. My design project began to take shape as a building which might be organized by events in the lives of its inhabitants and the place surrounding it.



[27] Study of Beer Process, Filtration



[28] Home Brew

Beer + Brewing

"Fermentation and civilization are inseparable" – John Ciardi [Eames, 86]

Although the alchemical and sacred history of beer-making connects it with cyclical real time; to our culture, it is also an industrial process related to the abstracted time-keeping of machinery and the linear progression of assembly manufacture.



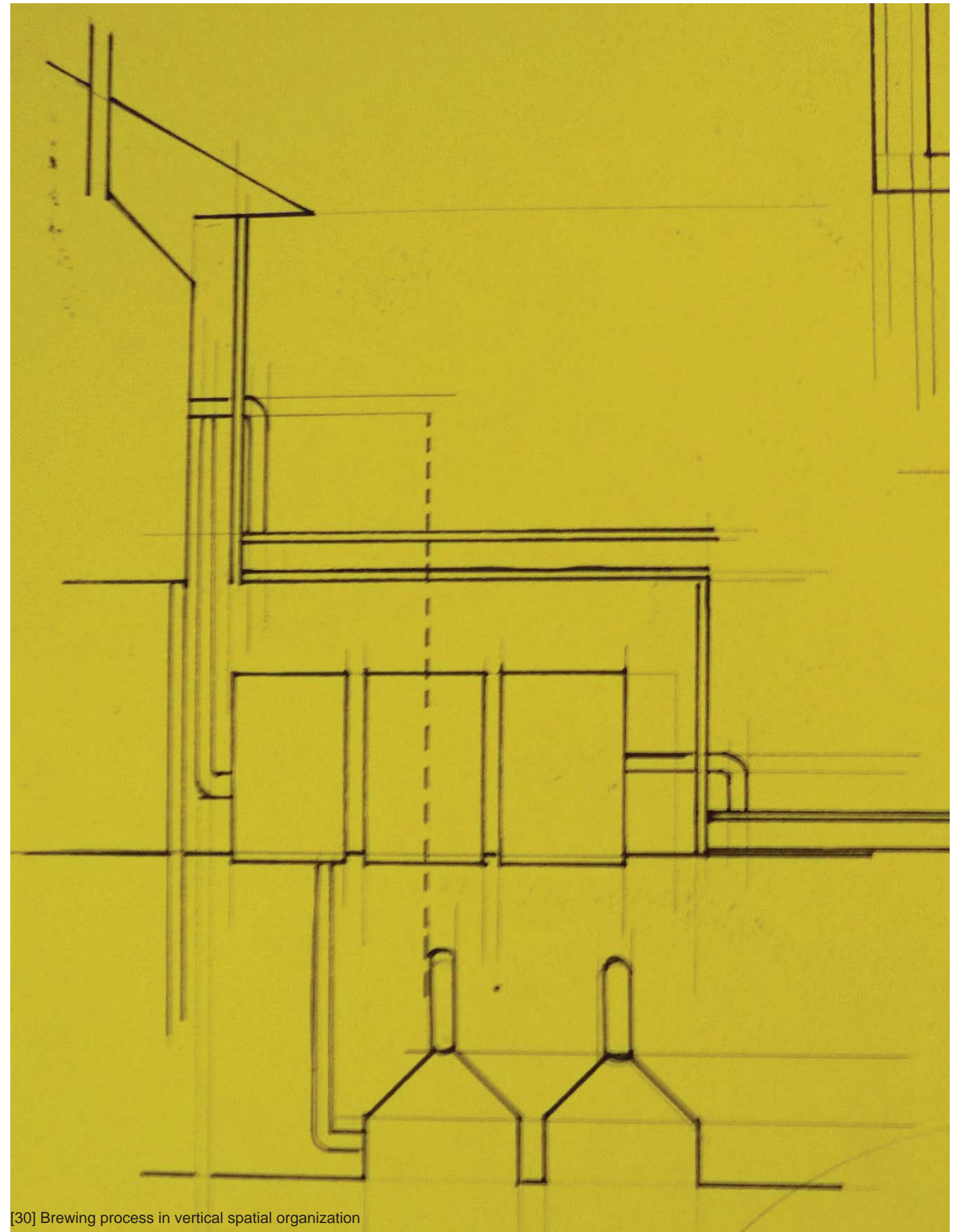
[29] Tour of Modern Mirco Brewery

“In nature, when rainwater meets grain, the seeds begin to sprout. Sprouting causes a natural conversion of starch into fermentable sugar. With time, women discovered that beer could be brewed stronger and faster if the cereals were chewed before adding them to water, because the enzyme ptyalin (found in saliva) converts cereal starch into fermentable sugar” [Eames, 39].

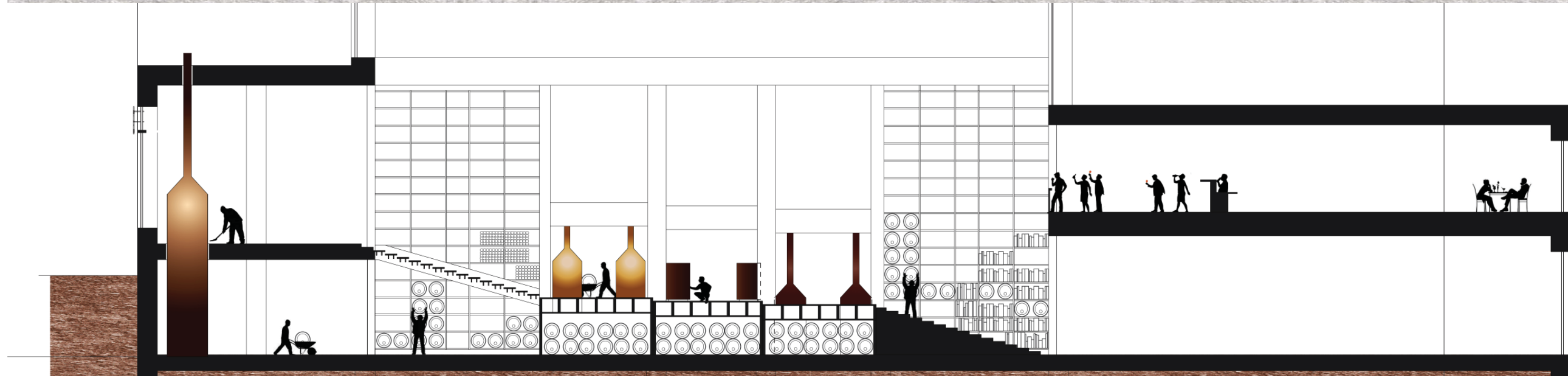
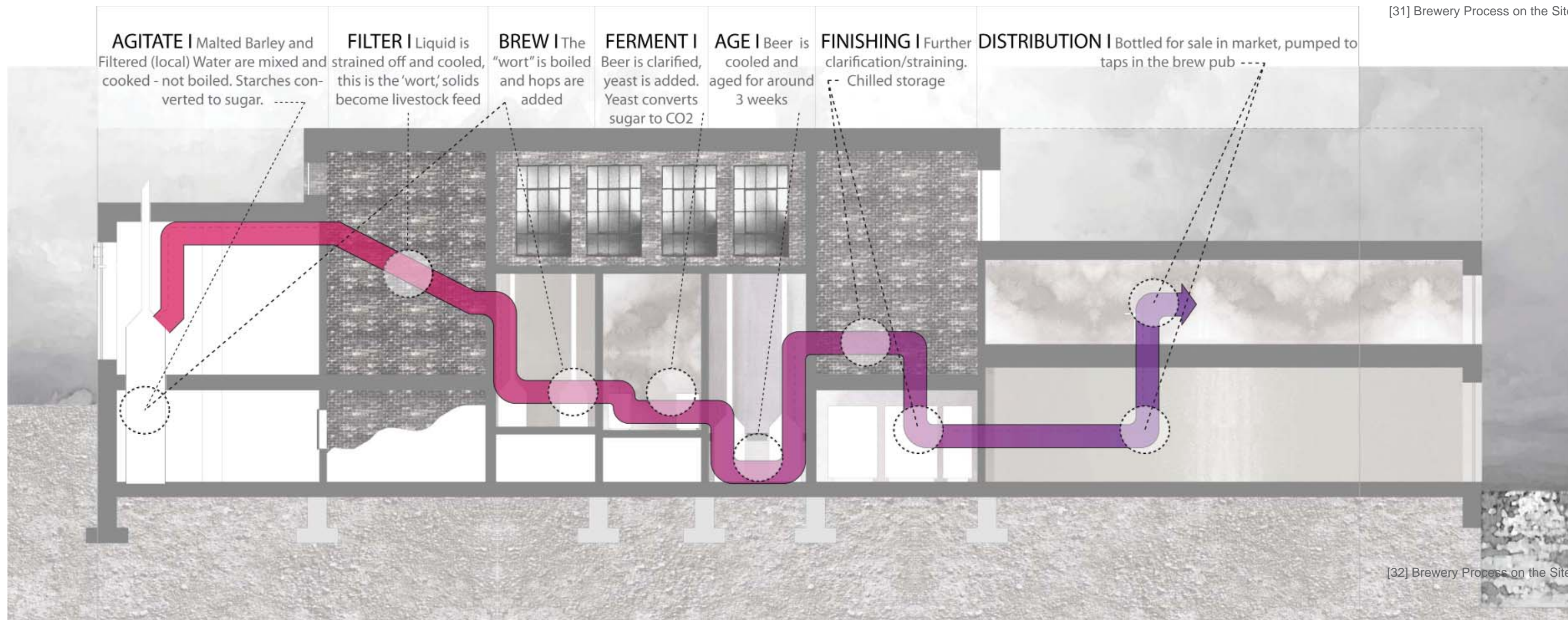
One theory regarding the early creation of beer is that ancient peoples left grains they had collected unattended in clay vessels during the rainy season. Rain soaked the forgotten grains and after a long period of time they fermented. Later societies discovered that chewing the grains produced better beer and faster fermentation.

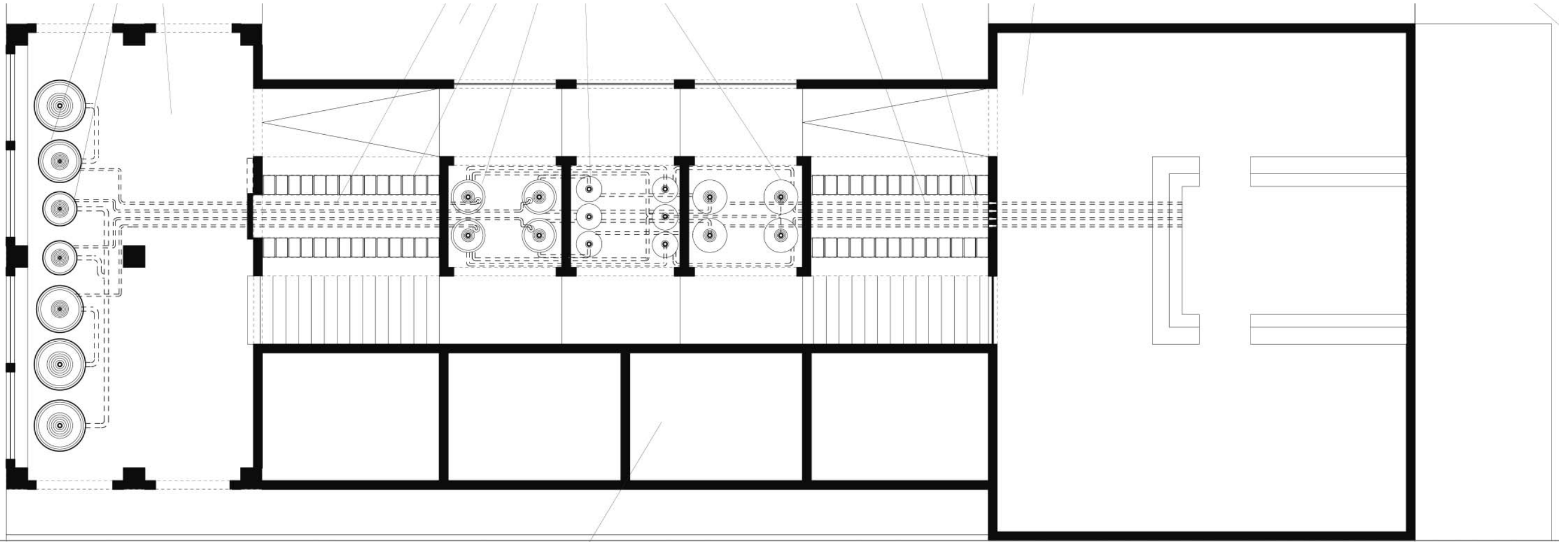
“By adding chewed mash to the beer pot, higher sugar levels created more bang to the gourd full of the local Stone-Age beer. Honey, combs and all, was an additional source of fermentable sugar. This, the oldest method of beer making, is still practiced in remote areas throughout the world” [Eames, 42].

“Brewsters quickly became priestesses and without beer, no one could commune with the goddess. Women oversaw the collective drinking of beer acting as barmaids and bouncers enforcing men didn’t injure themselves. Beer-drunken elder men became story-tellers reciting the tribal tales and histories. When the elders were in their cups, the women would awaken the children to sit and listen around the fires and in this regard beer became the single most important aspect in learning among preliterate cultures” [Eames, 33]



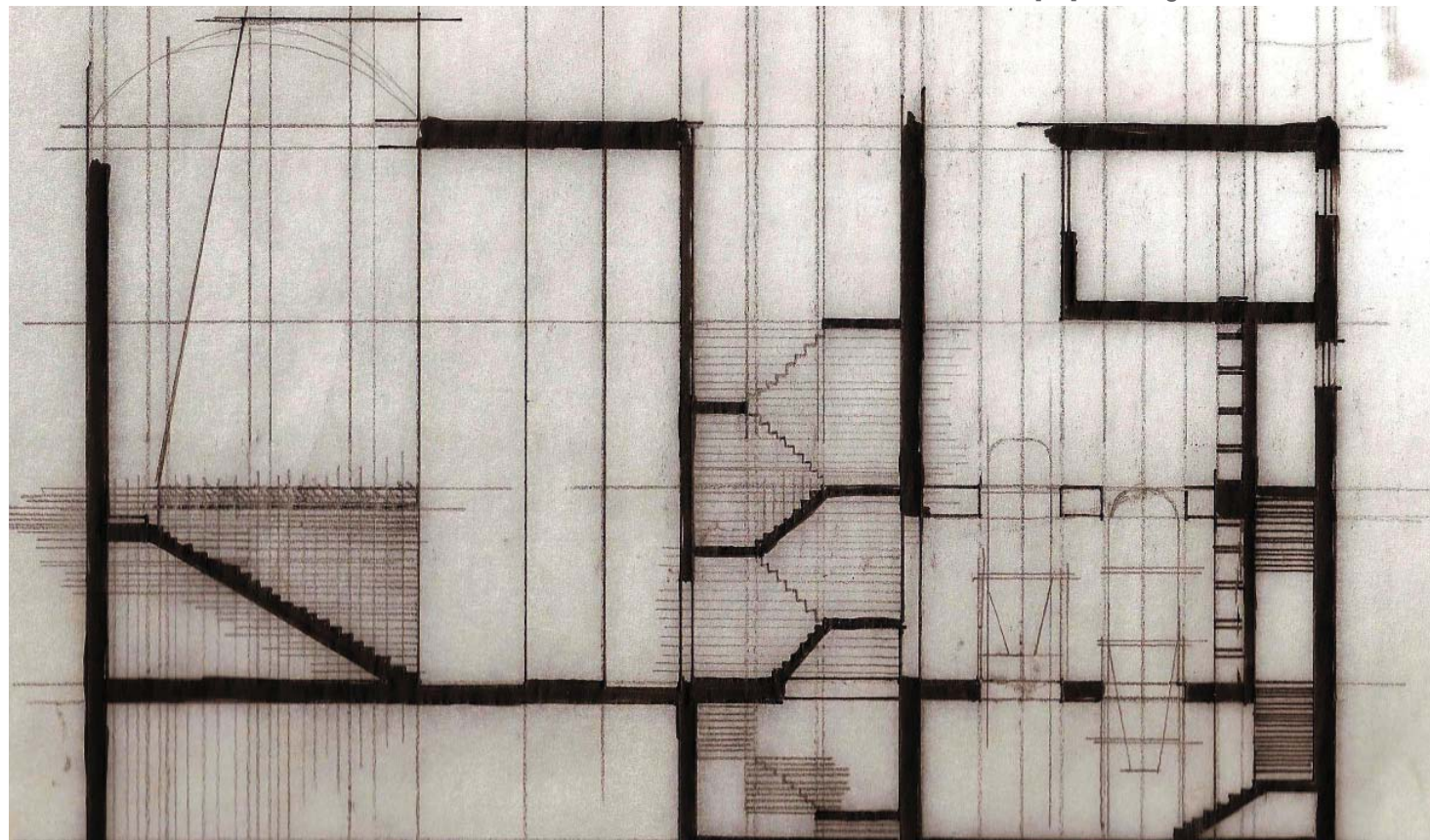
[30] Brewing process in vertical spatial organization





[33] Brewing Process on the Site

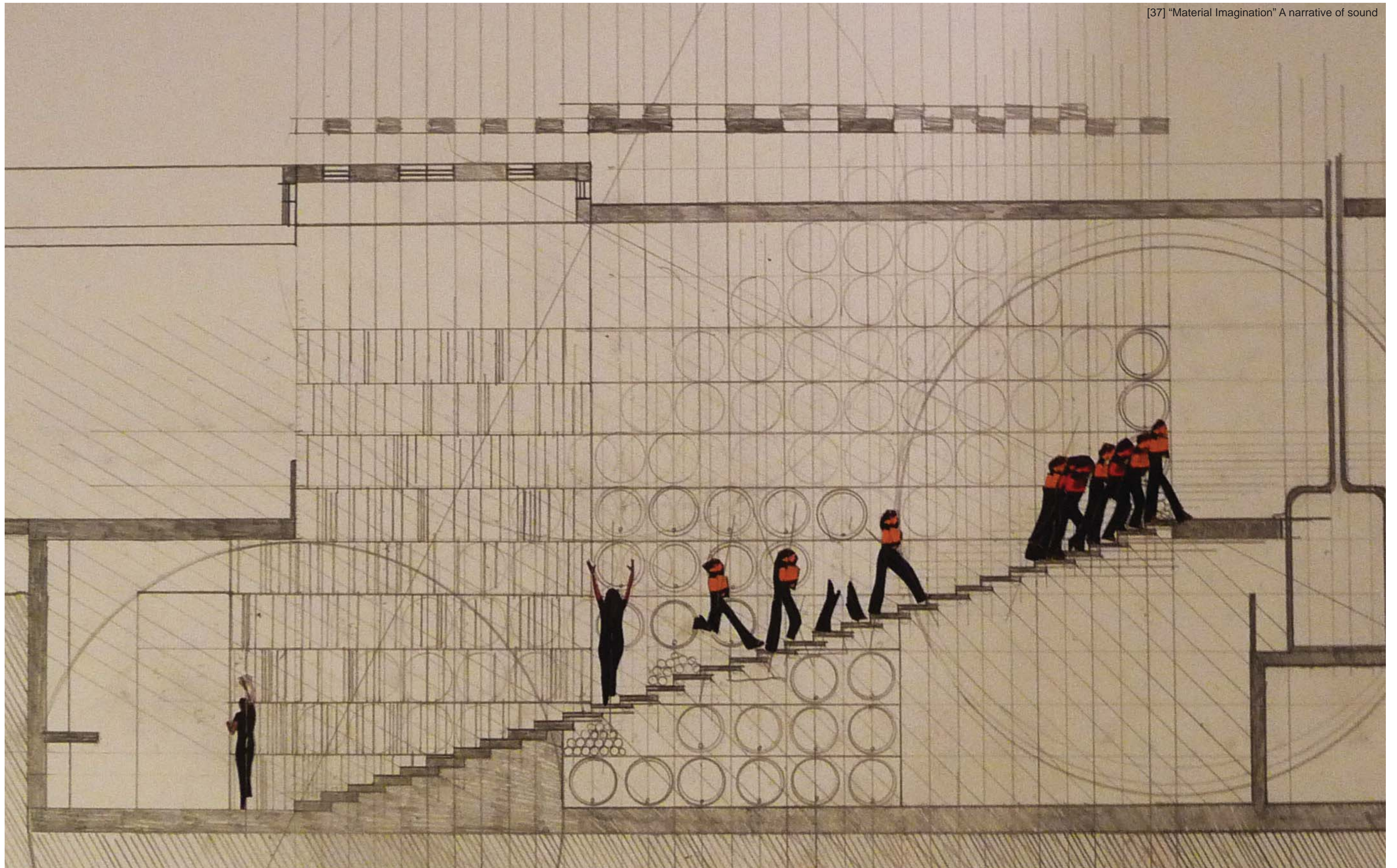
[34] Brewing Process on the Site

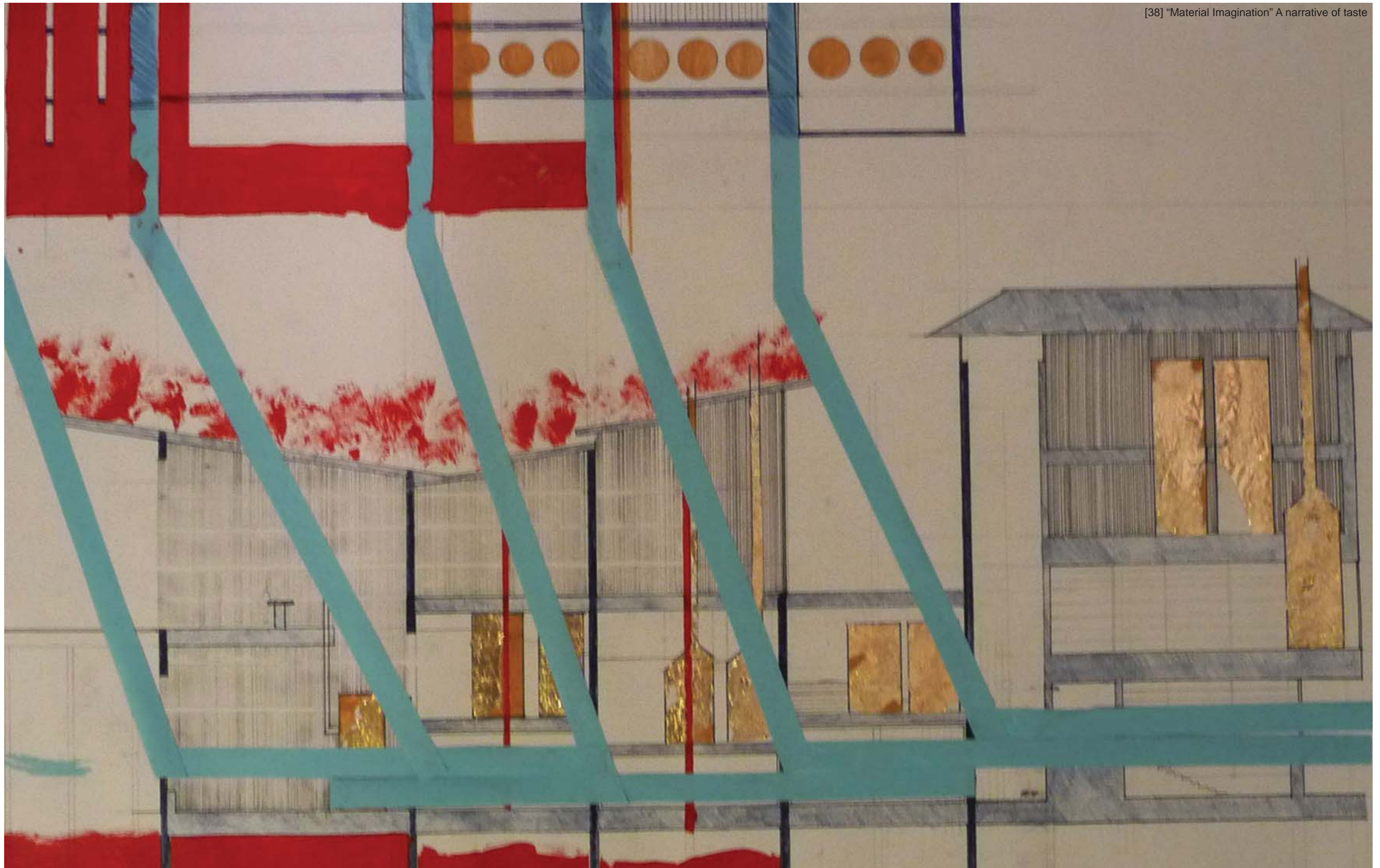


My early studies examined how this modern brewing process might be expressed spatially on the site. How could visitors to the building interact with the process through sight, touch, taste, and sound? I determined that the rhythm of the events in the brewing process should be an autonomous time-keeping device by which the brewer and his staff and guests might order their days, weeks and months; and began to explore means by which the steam of the machinery and the flow of the systematically evolving liquids could be made visible and present to the rest of the city. I also considered the possibility that gravity could be used to assist in the flow of the brewing liquids. The organization of the brewing equipment varied between a vertical tower and a linear, downward-stepping series of chambers, and sometimes a combination of both. The final design consists of a series of vertical towers housing the brewing equipment, grouped in a core which separates the brewery work and storage space from the public spaces of the building.









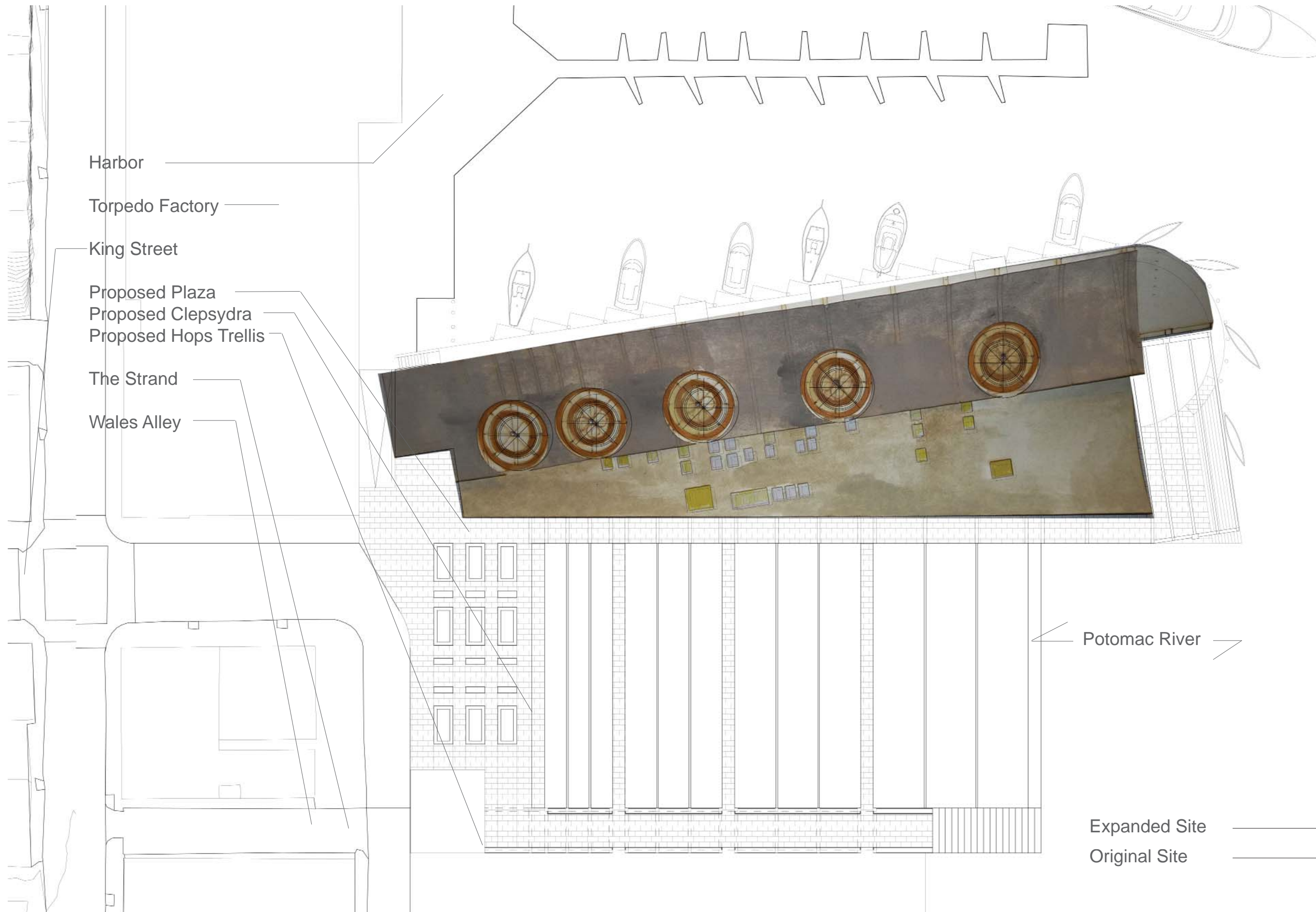
The Site

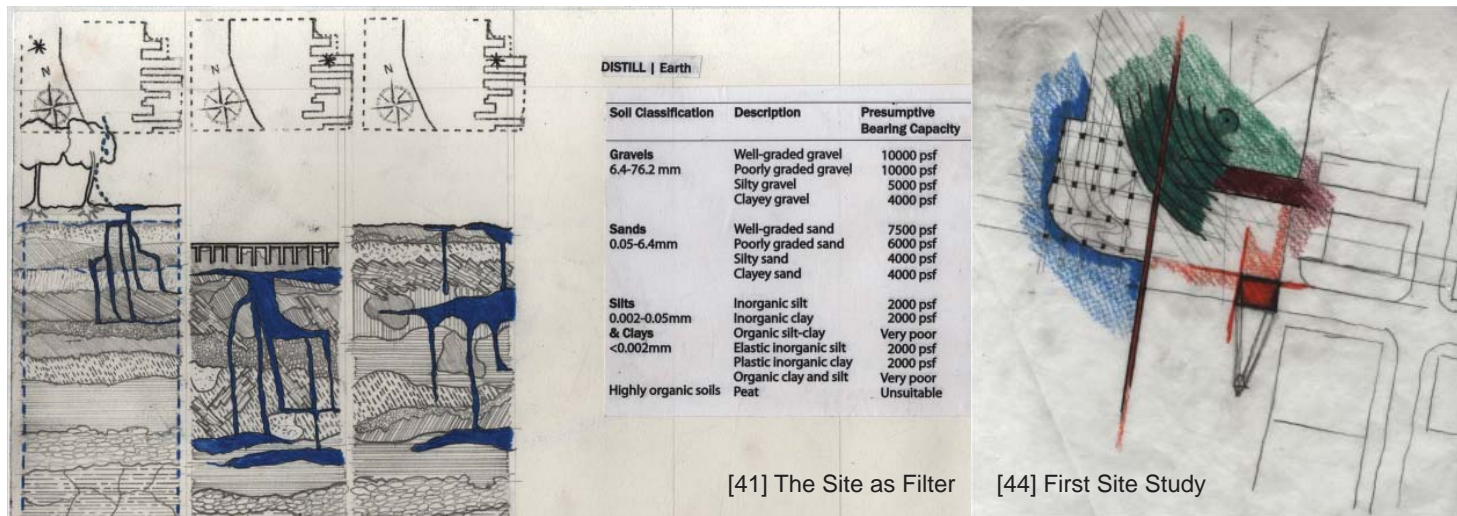
Initially, the selected site was a boat club parking lot, at the end of King Street in Old Town Alexandria, Virginia. This site presented two primary opportunities. First, the public importance of a site at the terminal end of the city's main street, and its diametric relationship with the city's primary landmark (The George Washington Masonic Memorial, at the opposite end of the street) meant that whatever intervention was made on this site would have to be in dialogue with the street and the Memorial. In addition, it should provide some public amenity as compensation to the city for filling such a prominent space.

The site is also adjacent to a city park and the city's public harbor.

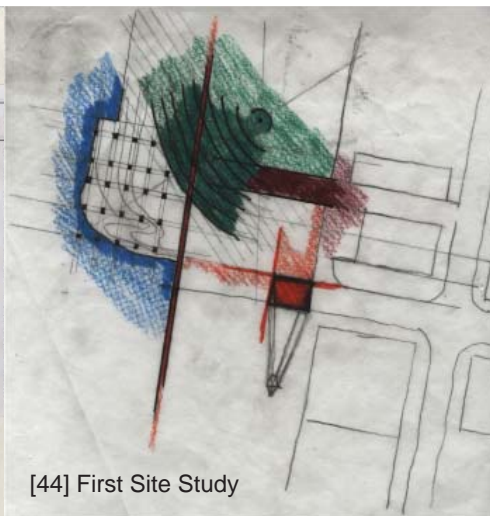
The proximity of the site to the Potomac River became an opportunity to make the river more present to the city than the current treatment of the site allows; and, to explore the relationship of the flooding, drainage, and filtering of water on the site to the process of brewing beer.

As the project progressed, the site was expanded to include the current site of the Old Town Boat Club to the north, whose spaces were relocated to the proposed Brewery building. This allowed for the King Street sidewalk and pedestrian experience to extend all the way through the building and out onto the river.





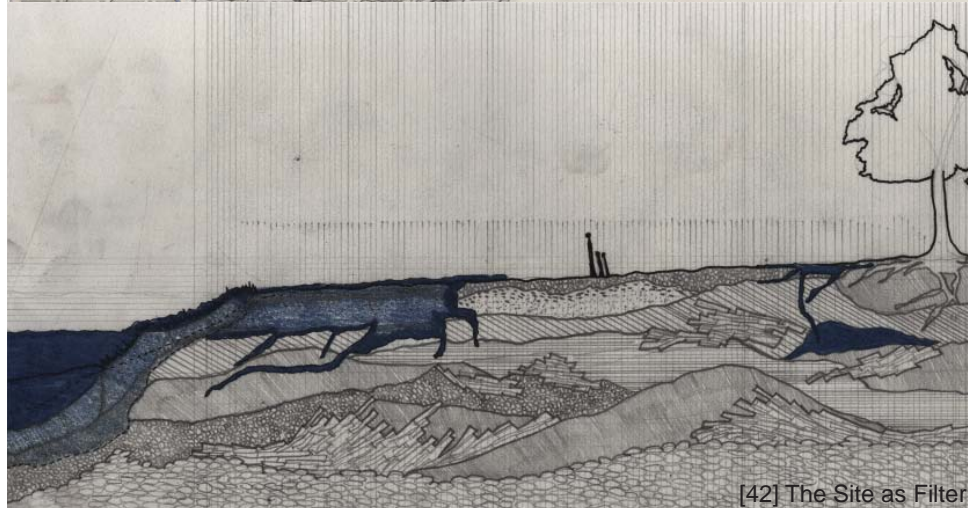
[41] The Site as Filter



[44] First Site Study



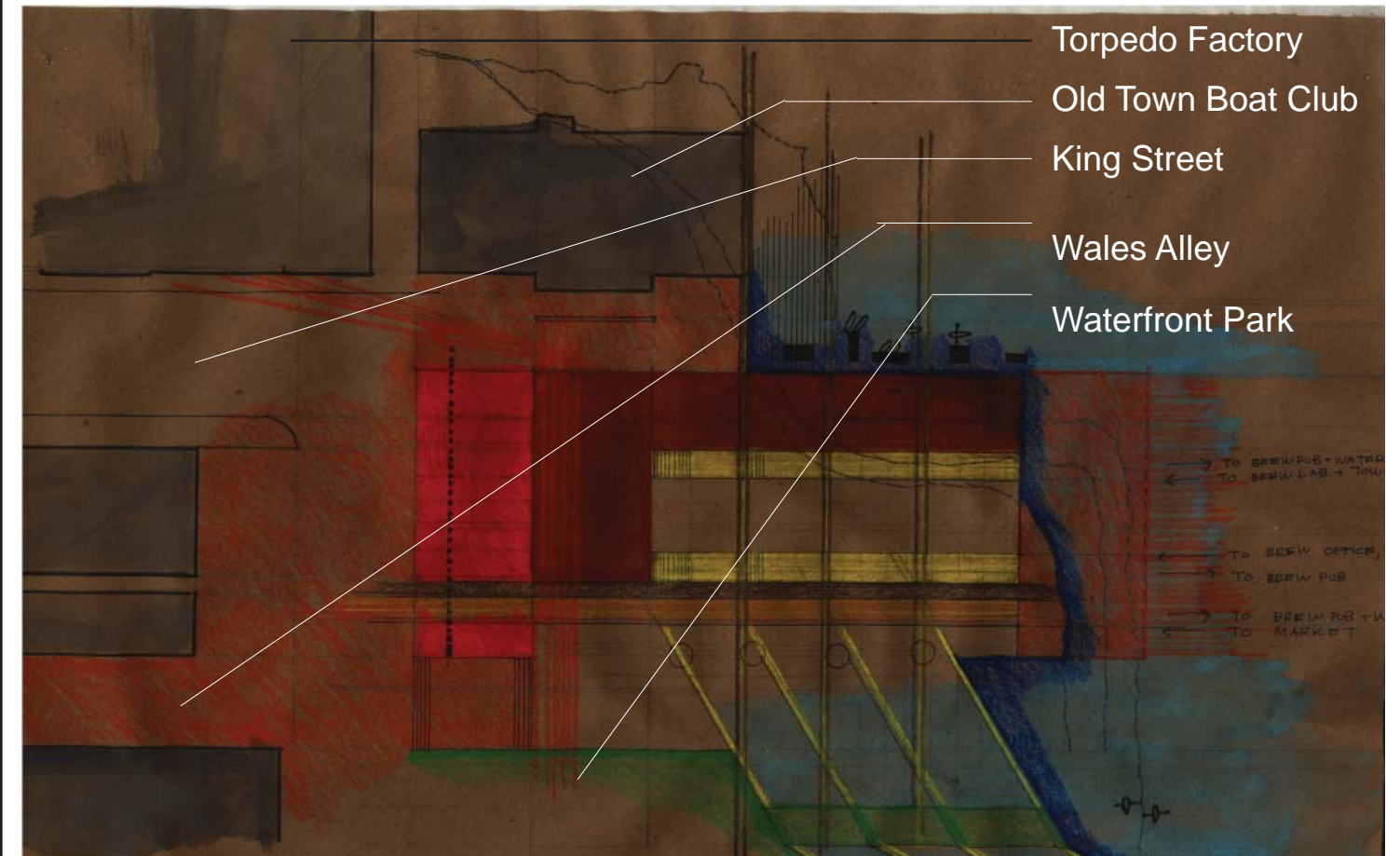
[47] Site Hydrology



[42] The Site as Filter



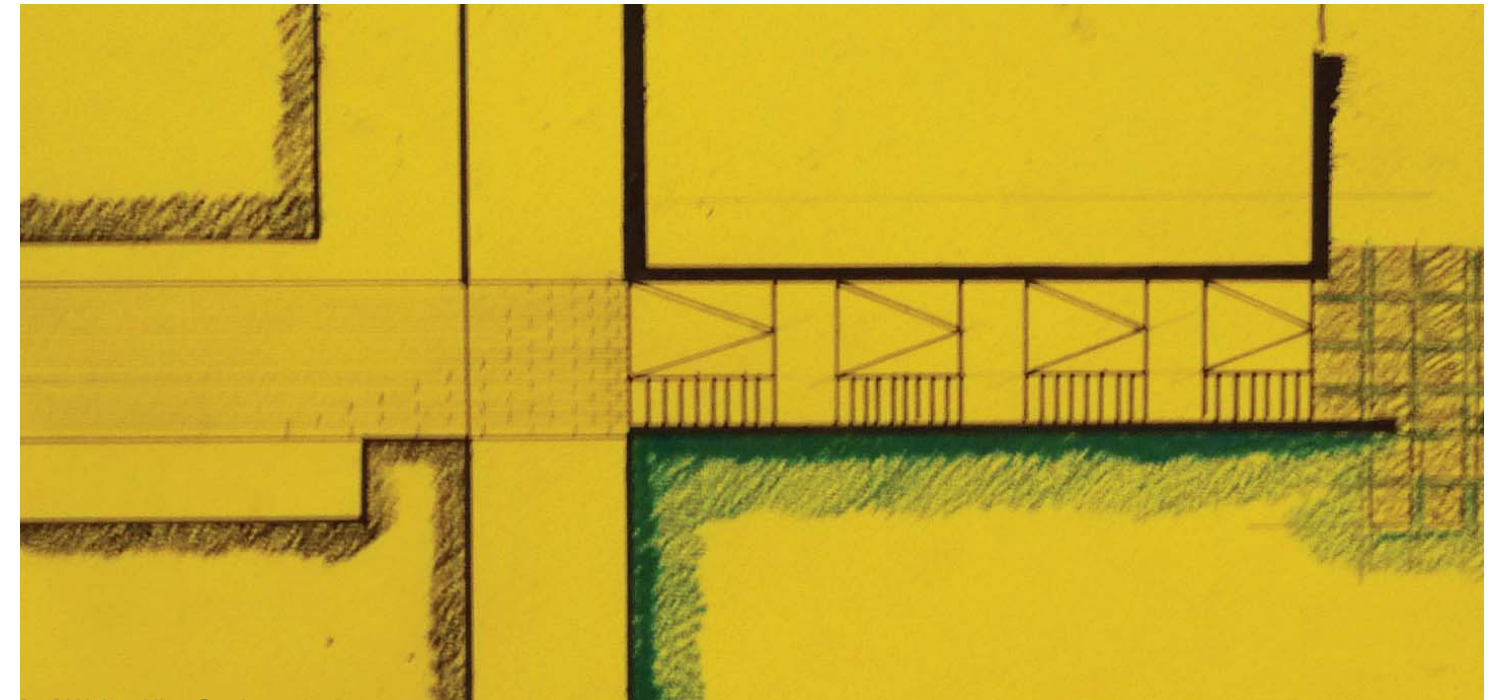
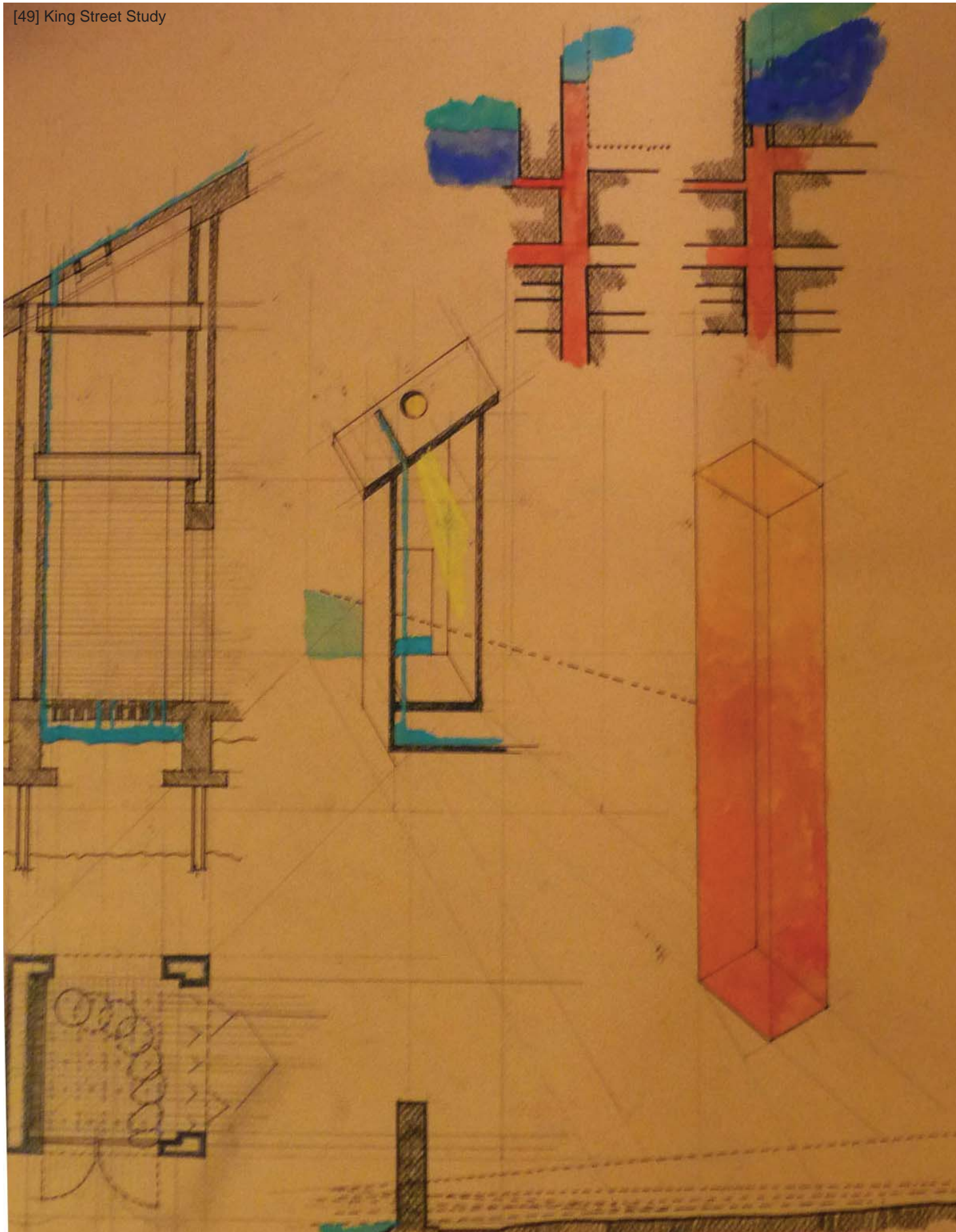
[45] First Site Study



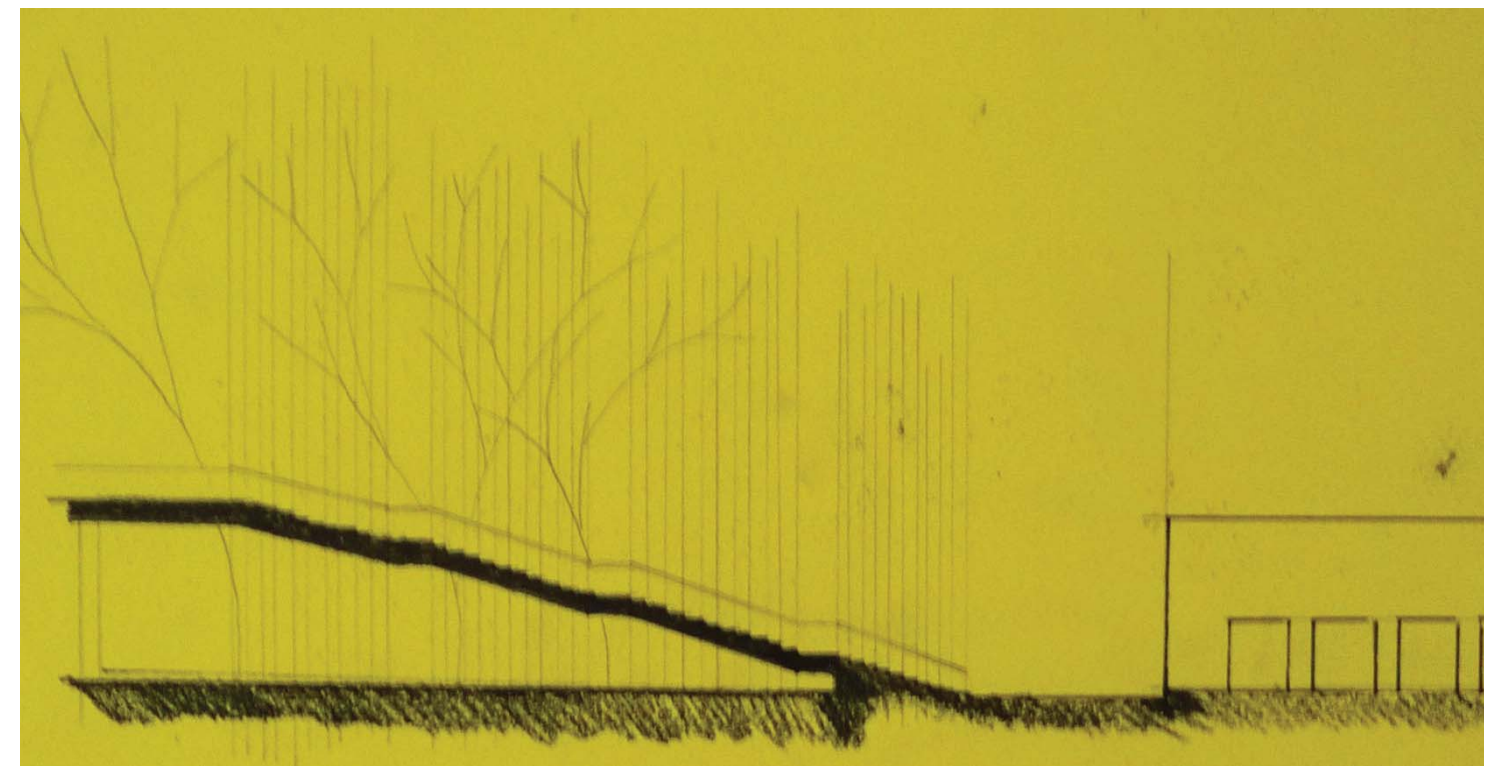
[48] Program on the Site

Prior to 1749, the site was part of the Potomac River, sitting in the middle of the natural harbor whose edge was near what is now Fairfax Street, two blocks west of the site. Between the mid-18th and mid-19th centuries the site was gradually filled with debris and rubble to create land and was home to several industrial wharfs and warehouses. Because the site had never truly been land, it seemed that the boundary between the river and the earth was malleable. My early drawings of the site explored ways that the earth might be cut away or terraced to bring water into the project or drain runoff and condensed steam from the brewing process.

[49] King Street Study

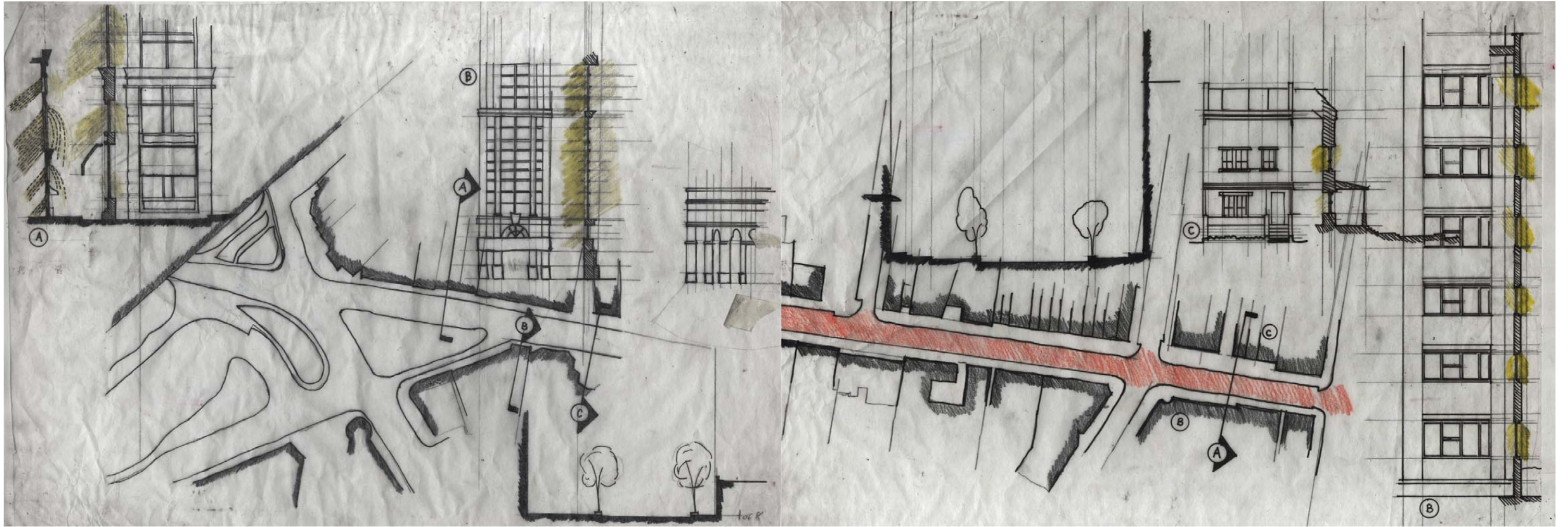


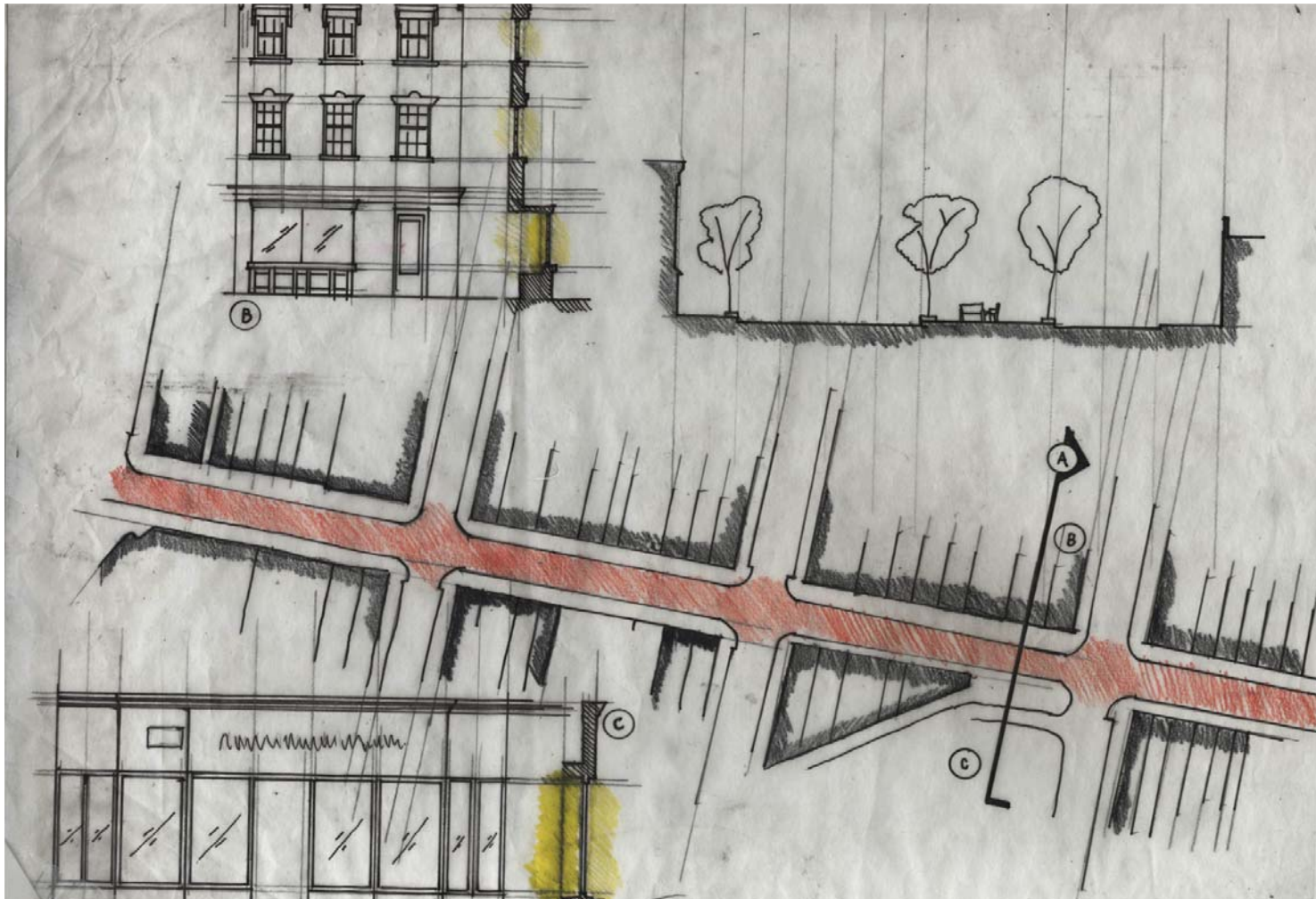
[50] Wales Alley Study



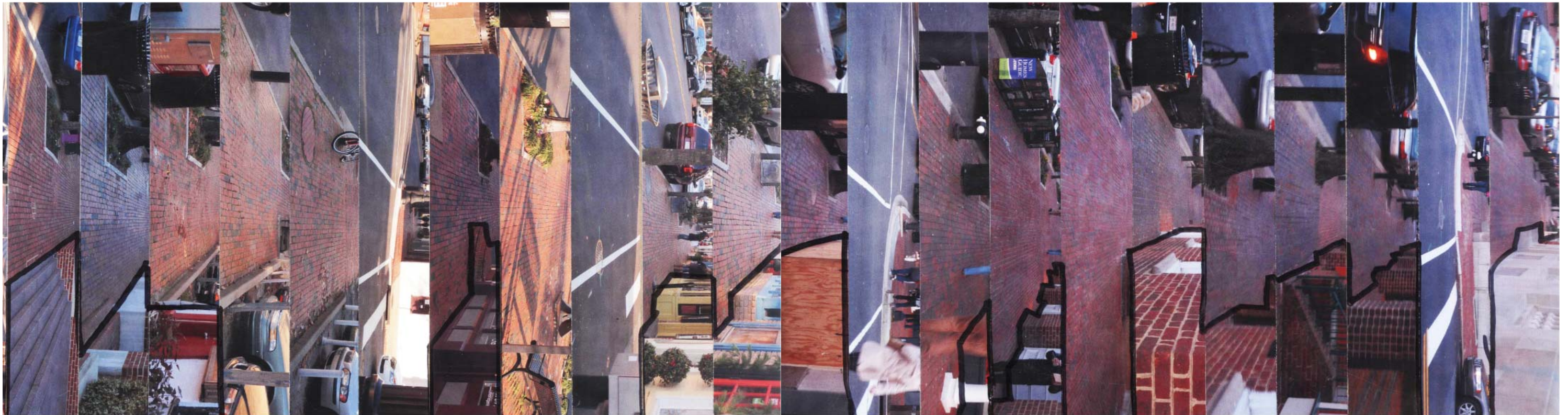
[51] Wales Alley Study

In addition to the relationship between the project and the terminus of King Street, nearby Wales Alley presented an opportunity to create an alternative pedestrian experience through the city and the site, bringing people to the river. My early studies imagined that the alley would continue across the street directly in front of the site (The Strand) and become a monumental stairway and ramp leading people over the park and up to a public terrace or deck to view the river, perhaps picking up a glass of beer on the way. Later this became an extended walkway framed by a trellis for growing hops.

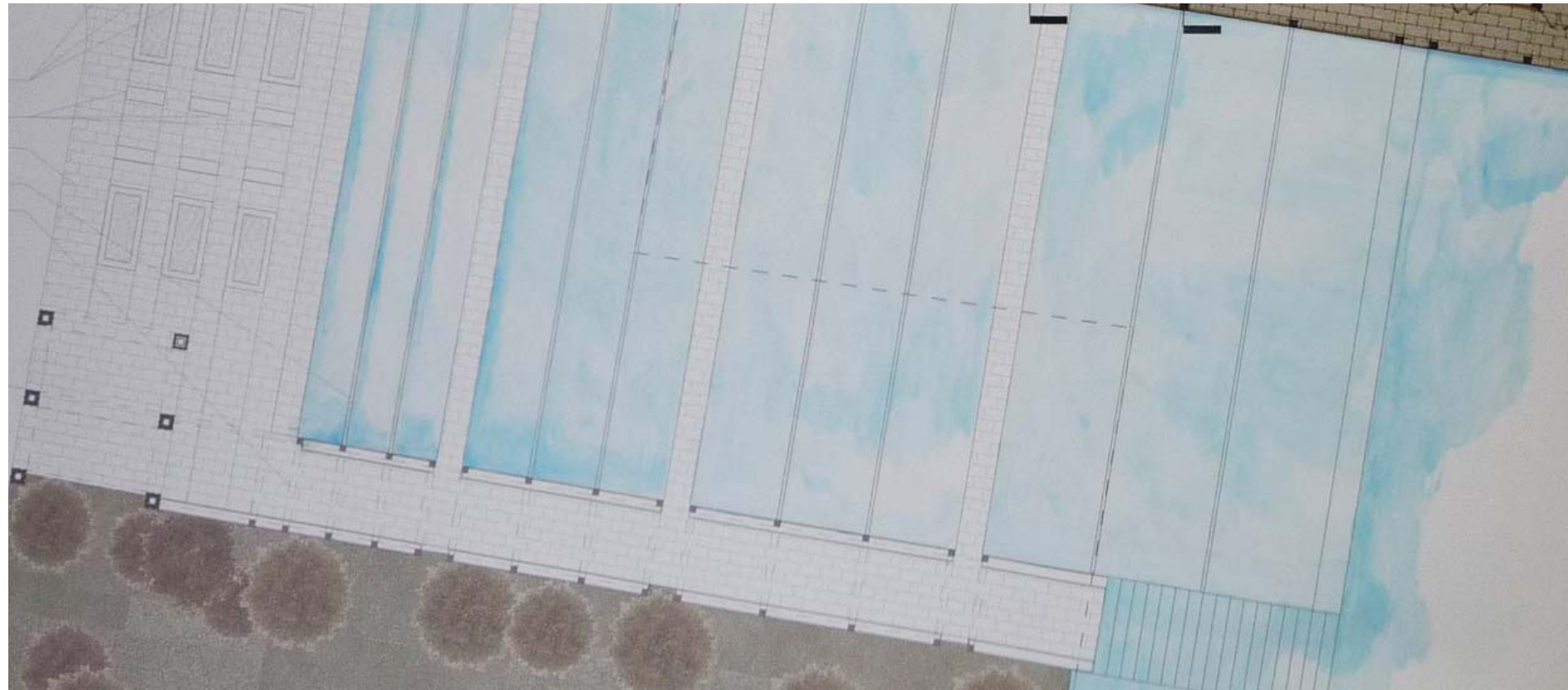




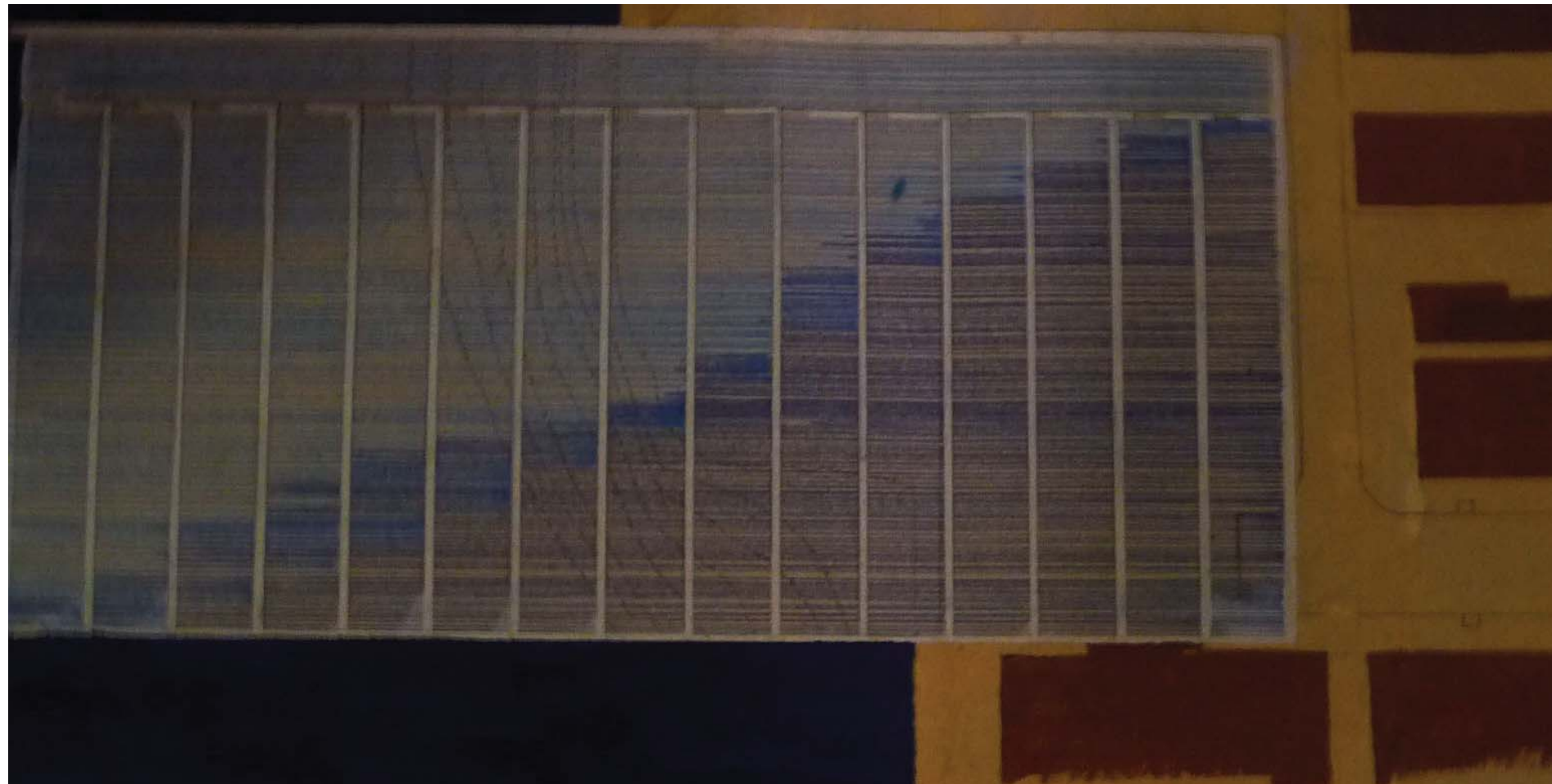
[52] King Street Study



[53] King Street Sidewalk Study



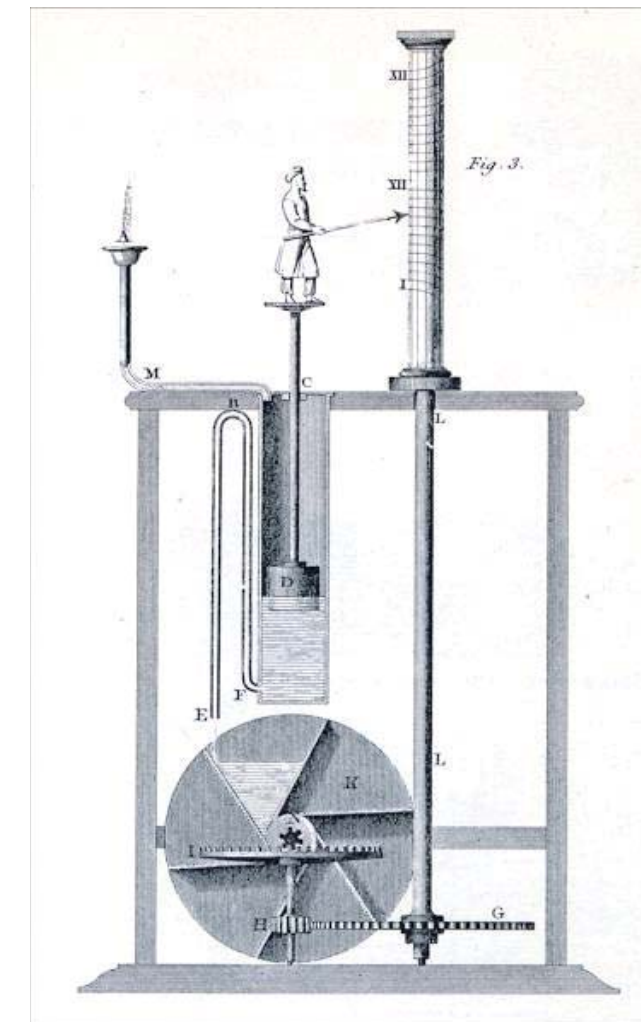
[54] Final Clepsydra Design



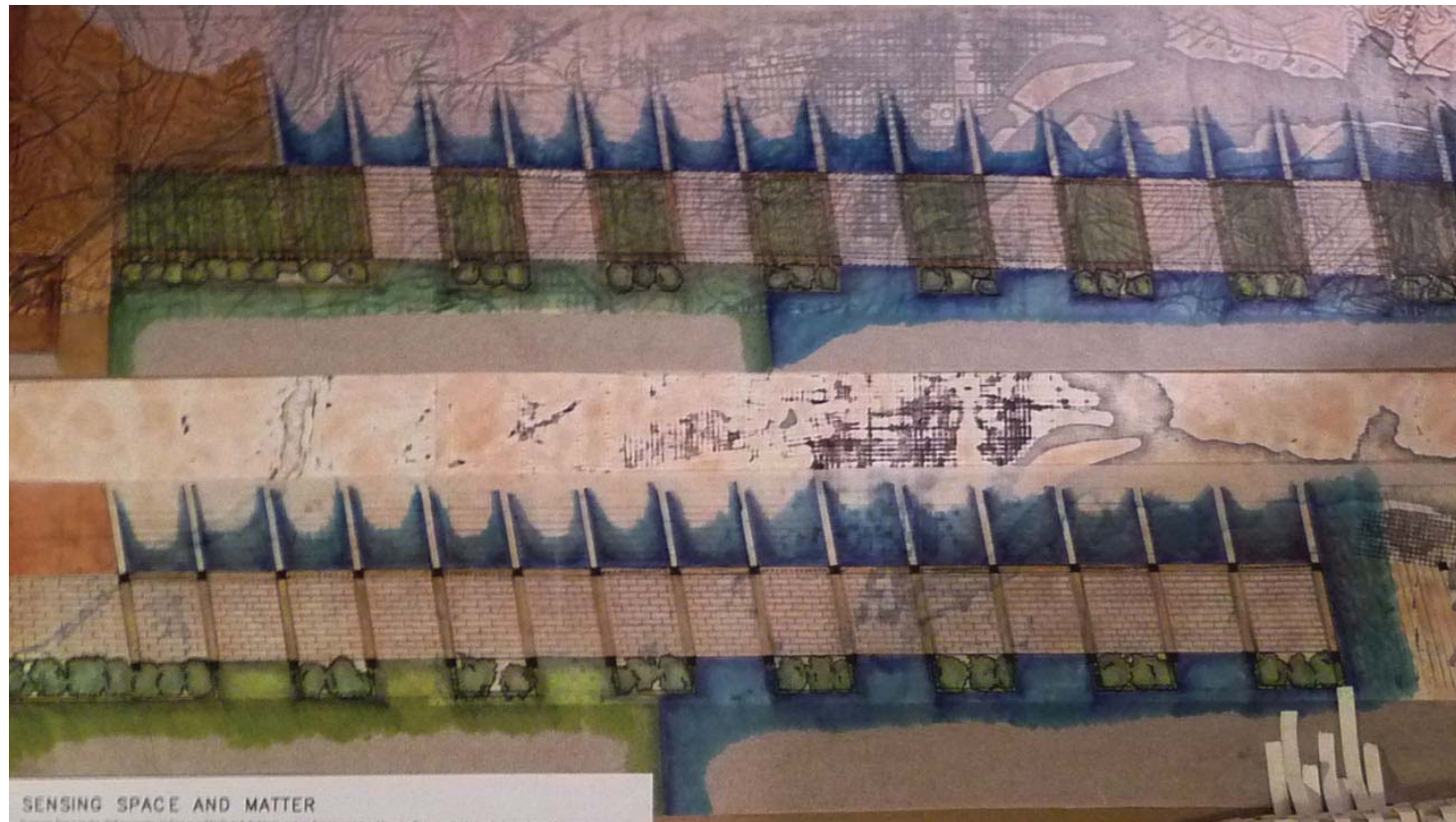
[55] First Clepsydra Design

"In the law courts of Ancient Rome, water clocks were used to regulate the period that each lawyer could speak. If people wanted to hear more, they would yell out 'aquam dare!' –'add water!' The Roman expression for wasting time was 'aquam perdere' –literally, 'to lose water' [Falk, 58]

When I first happened upon the idea of a 'Clepsydra,' or water clock, it was in Falk's description of their use in the Roman courts of law. According to Falk, in its most basic form, a clepsydra is merely a device in which water flows at a regular rate into a catch basin, and marks on the catch basin indicate intervals of time. It seemed to me that a project about time and the creation and refinement of a liquid (beer) could greatly benefit from a system in which a volume of liquid could signify an amount of elapsed time. At first I thought that the beer machinery might be detailed in a way that could make the accumulation of liquids at different stages visible - that the beer itself would be the quantifying liquid. But then, the desire to bring the river into they city insisted that the river would be a much better source.



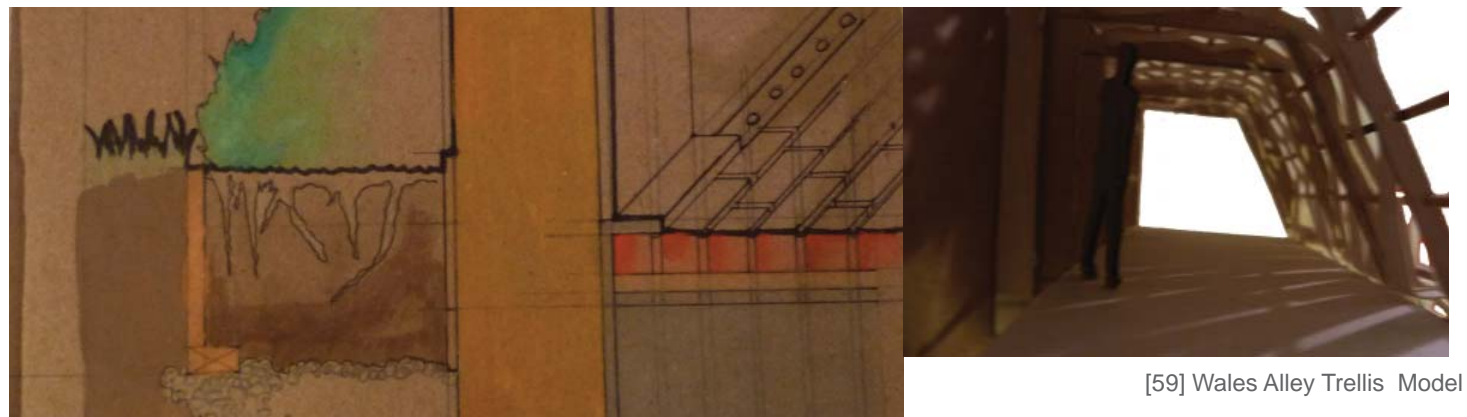
[56] Ancient Clepsydra 23



[57] Wales Alley Trellis Plan



[60] Wales Alley Trellis Details

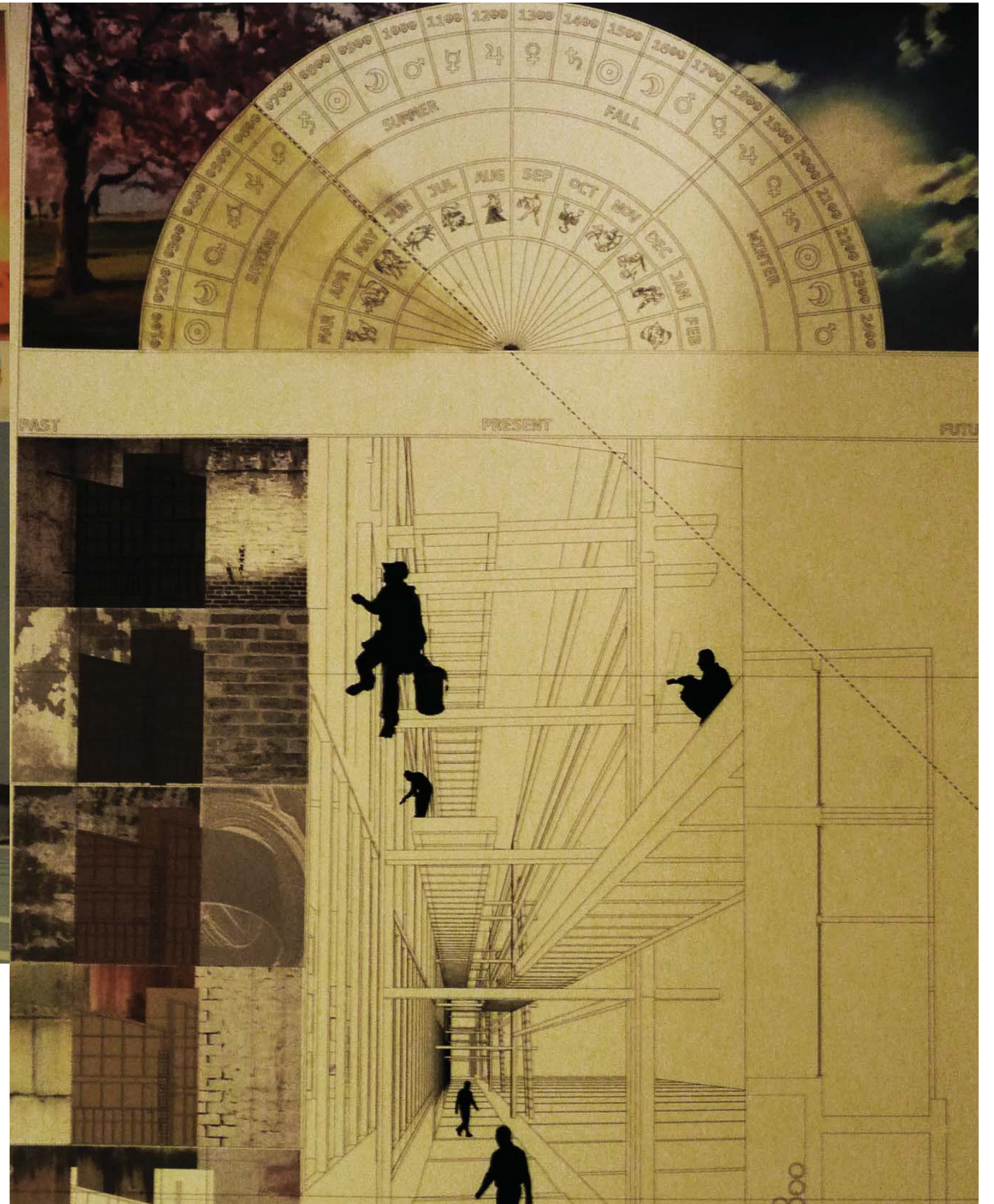
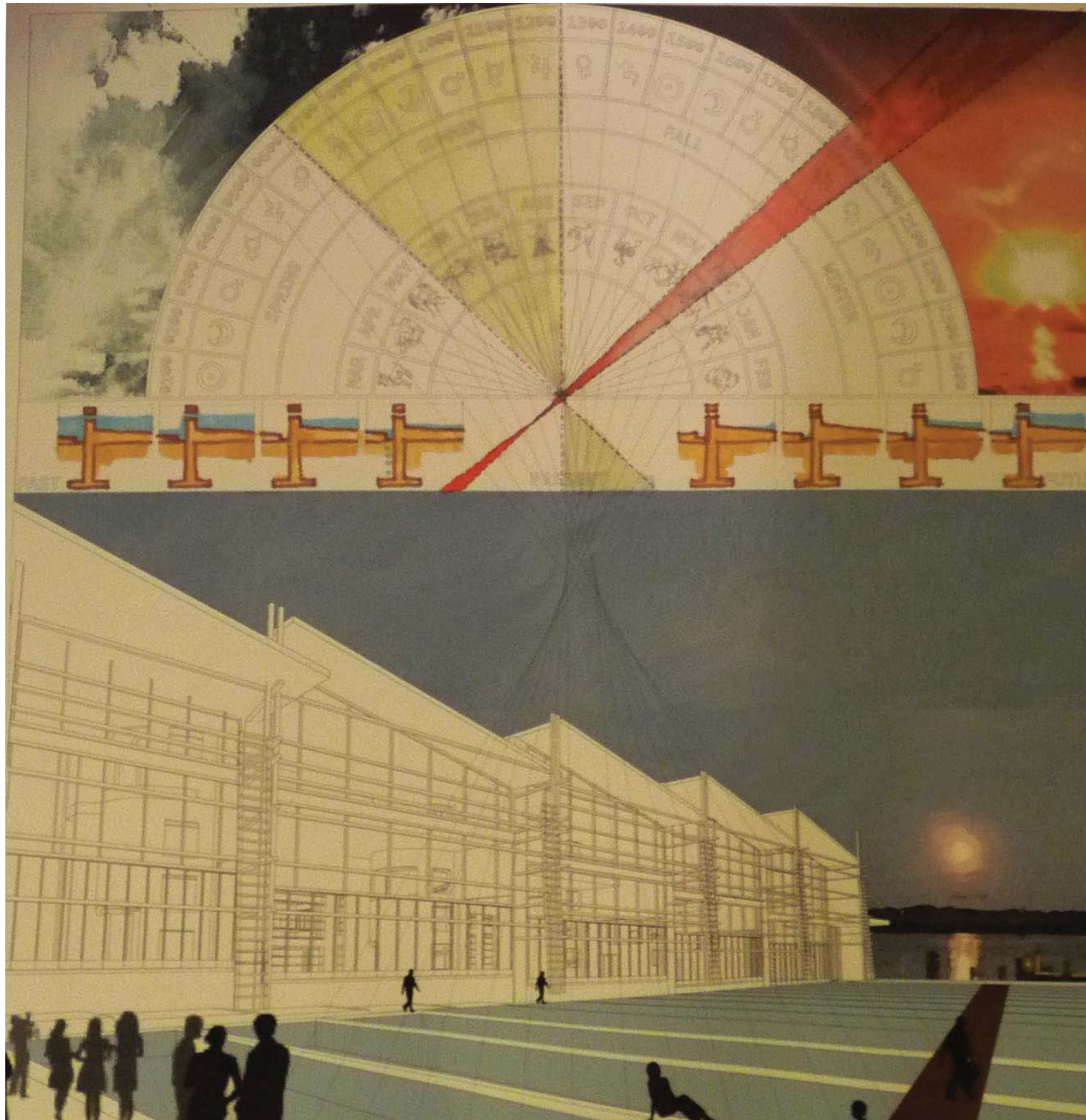


[58] Wales Alley Trellis Detail

[59] Wales Alley Trellis Model



And so the clepsydra became the first lasting organizational structure for the site. The intention was not for it to be a tidal clock that would make the natural cycles of the river present - but that it would provide an architectural and controlled manner for the site to become flooded every day. This flooding could come to be a datum by which people in the building and in the city would start to measure their days. If the volume of one basin or compartment was equal to a quantifiable amount of time (one hour was the model I used), then the filling or flooding of each basin could be linked to an event, whether singular or cyclical. The farthest basin of the final clepsydra, where the water first enters, is set below the average height of the river at low tide (-6' from the elevation at the street level of the brewery building), which should allow water to constantly flow into the clepsydra, filling each successive basin hour-by-hour. When the final basin is filled, the system would become closed for an equal number of hours while the basins drained, and then the flooding could begin again.



Time

Cultural Understandings of Time

Ancient Chinese: 'political dynasties were seen to rise and fall in concert with celestial cycles,' but also as a far-reaching fabric, where events at one time could produce wrinkles and creases elsewhere. [Falk, 81]

Hindu: "the shortest cycle, known as the Maha Yuga, lasts for 4, 320, 000 years. A thousand of these makes one kalpa, and two kalpas make one day in the life of Brahma, the chief Hindu deity. The one hundred-year life of Brahma works out to be about 311 trillion years. Cyclic time guarantees that everything will return to a former state: history and perhaps time itself – is an illusion. Nothing is permanent, and even death is merely a passage way to birth and renewal" [Falk, 82].

Buddhism: Buddhists believe one can escape the cycle of death and rebirth through meditation, reaching Nirvana, which is timeless. [Falk, 85]

Umeda (African Tribe): do not measure months or years, but weeks –with seven-day weeks, each day being relative to the middle day, called 'today'. Many African tribes have no concept of or words for the future. The past and present are real, the future is not. [Falk, 85]

Hopi: "The Hopi often use spatial metaphors to convey temporal facts" "What we would call 'past' and 'present' fall into the realm of the physical, the future falls into the realm of the mental and spiritual – which are the two halves of the Hopi concept of existence. [Falk, 85]

Amara people of South America: gesture forward for the past, backward for the future; their word 'nayra' which also means eye, front, or sight, is used for 'past', perhaps because it can be seen, whereas the future cannot. Older people refuse to speak about 'the future'. [Falk, 88-89]

Linear time: noticeably intertwined w/ the traditions of the Jewish people, one creation, one flood, one messiah. [Falk, 94]

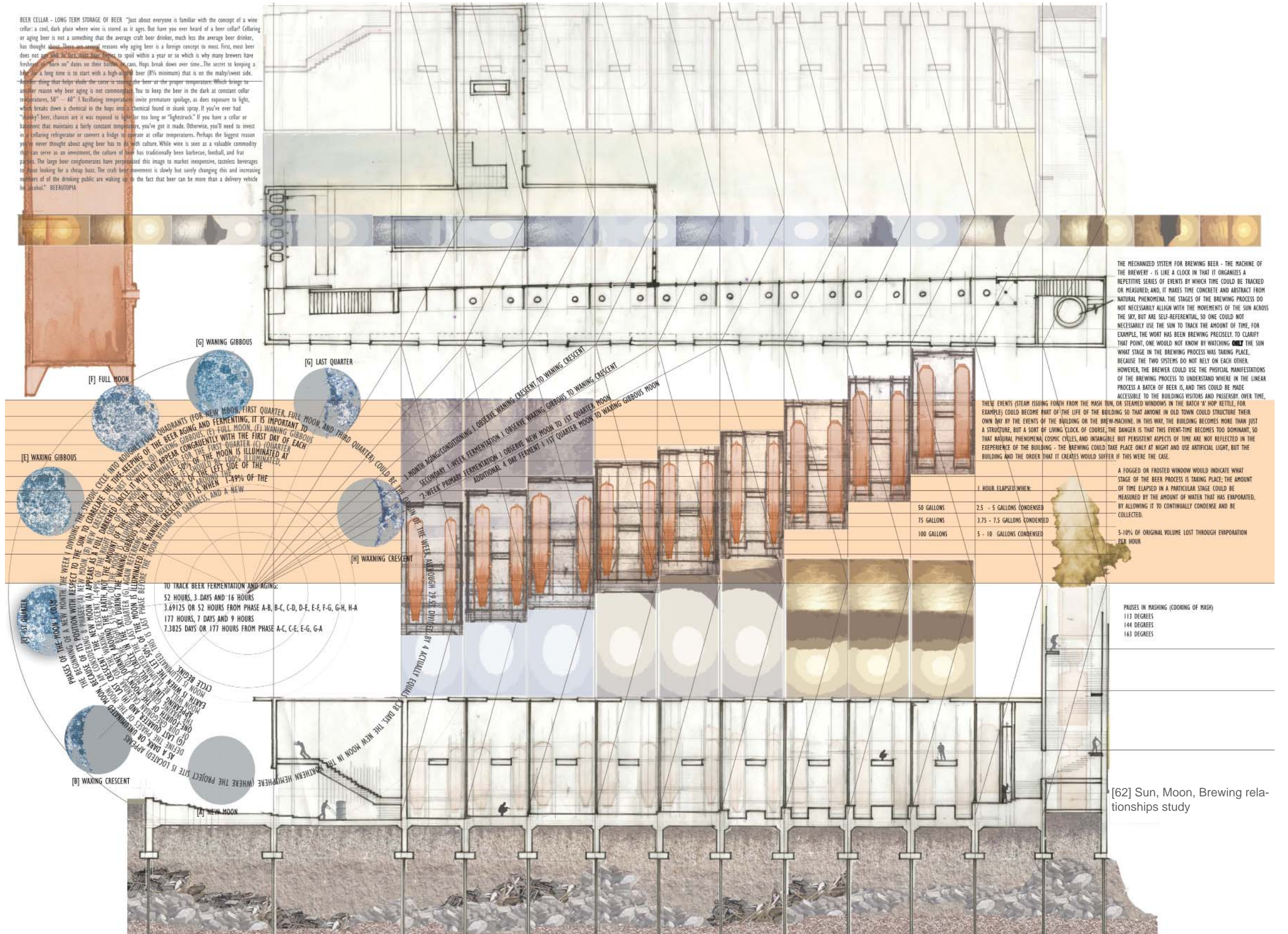
Ancient cultures ordered their lives by fixed, cyclical movements of celestial bodies, which were absolutely observable in their influence of the cycles by which such societies thrived or perished: the growth of crops, flooding of rivers, daylight to work, moonlight to rest, fixed points to aid navigation, the migrations of animals. This concept of time could be said to be both cyclical and real.

The cyclical ordering of ancient societies is for the most part unrelated to the various means by which narrative time was accounted, or not accounted. While some (such as the Mayans) imagined all of eternity in interweaving and overlapping cycles, others saw only one great, infinitely repeating and unchanging cycle. Few ancient, non-Western cultures emphasized linear time, meaning singular, non-repeating events fixed along a progressive narrative continuously moving from past to future.

The modern, Western world is largely built on concepts of time that are abstract, measurements and frameworks of time that are not observable in natural phenomena, and/or have no meaning outside of the subjective social and cultural importance we have assigned to them.

After my initial studies of the site and program, I began to search for ways that the buliding might facilitate or frame events in the life of the city and and the brewery. The East-West orientation of the project began as a diagram of connection between the city and the river; but it presented an opportunity for the daily movement of the sun to organize the building and add meaning to the events occurring within.

A linear series of rooms, from East to West would be a sort of calendar or clock based on the events of the brewery, but juxtaposed with the movement of the sun, which would sometimes be complimentary (as in the case of the Brewer's bedroom being the room farthest east, and first to fill with morning sun, while his

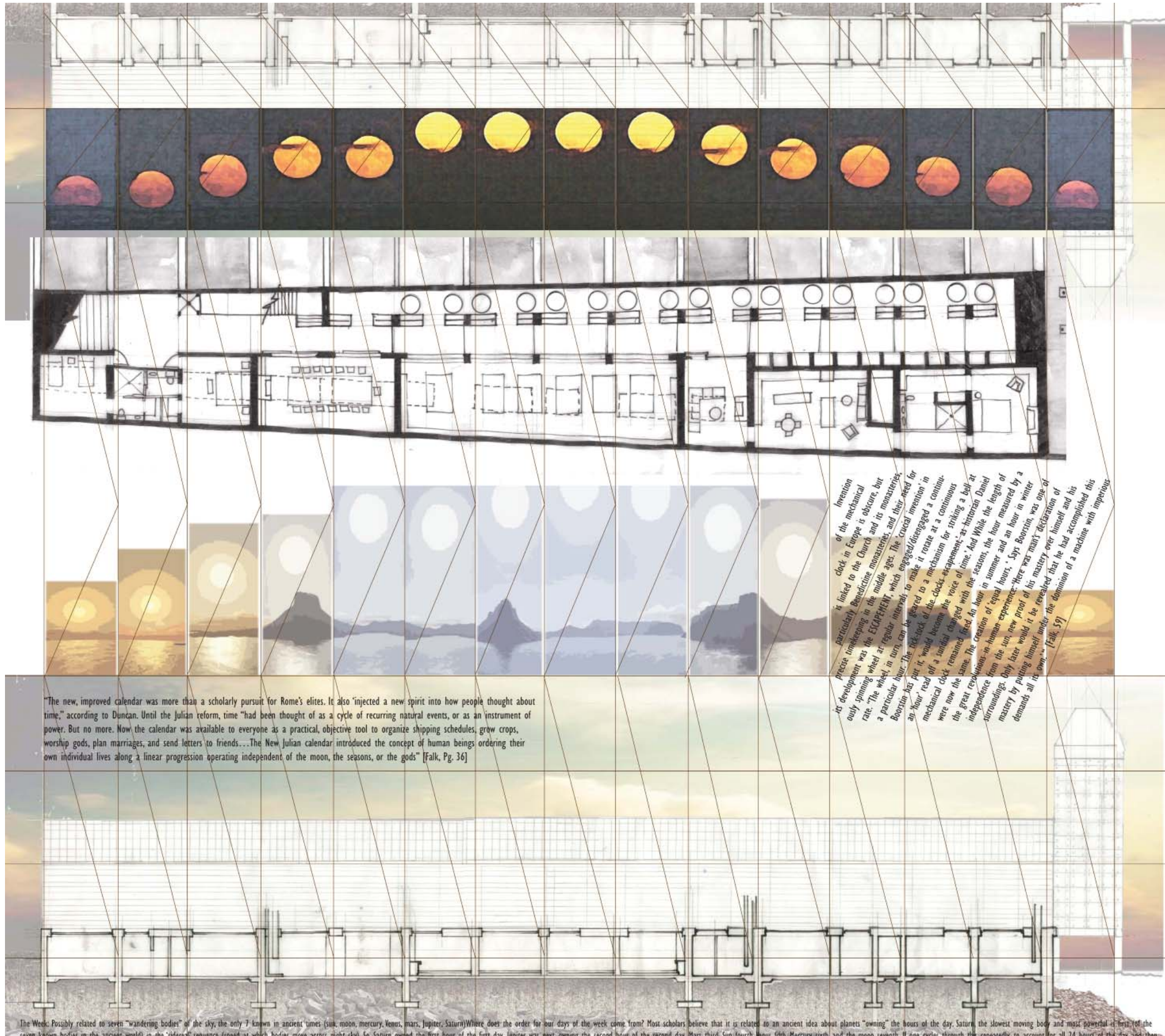


THE MECHANIZED SYSTEM FOR BREWING BEER - IS LIKE A CLOCK IN THAT IT ORGANIZES A REPETITIVE SERIES OF EVENTS BY WHICH TIME COULD BE TRACKED OR MEASURED; AND, IT MAKES THE STAGES OF THE BREWING PROCESS DO NOT NECESSARILY ALIGN WITH THE MOVEMENTS OF THE SUN ACROSS THE SKY, BUT ARE SELF-REFERENTIAL, SO ONE COULD NOT NECESSARILY USE THE SUN TO TRACK THE AMOUNT OF TIME, FOR EXAMPLE, THE WORT HAS BEEN BREWING PRECISELY TO CLARIFY THAT POINT, ONE WOULD NOT KNOW BY WATCHING ONLY THE SUN WHAT STAGE IN THE BREWING PROCESS WAS TAKING PLACE. BECAUSE THE TWO SYSTEMS DO NOT RELY ON EACH OTHER. HOWEVER, THE BREWER COULD USE THE PHYSICAL MANIFESTATIONS OF THE BREWING PROCESS TO UNDERSTAND WHERE IN THE LINEAR PROCESS A BATCH OF BEER IS, AND THIS COULD BE MADE ACCESSIBLE TO THE BUILDING'S VISITORS AND PASSERSBY. OVER TIME, THESE EVENTS (STEAM ISSUING FROM THE MASH TUN, OR STEAMED WINDOWS IN THE BATCH 'N' HOP KETTLE, FOR EXAMPLE) COULD BECOME PART OF THE LIFE OF THE BUILDING SO THAT ANYONE IN OLD TOWN COULD STRUCTURE THEIR OWN DAY BY THE EVENTS OF THE BUILDING OR THE BREW-MACHINE. IN THIS WAY, THE BUILDING BECOMES MORE THAN JUST A STRUCTURE, BUT A SORT OF LIVING CLOCK. OF COURSE, THE DANGER IS THAT THIS EVENT-TIME BECOMES TOO DOMINANT, SO THAT NATURAL PHENOMENA, COSMIC CYCLES, AND INTANGIBLE BUT PERSISTENT ASPECTS OF TIME ARE NOT REFLECTED IN THE EXPERIENCE OF THE BUILDING - THE BREWING COULD TAKE PLACE ONLY AT NIGHT AND USE ARTIFICIAL LIGHT, BUT THE BUILDING AND THE ORDER THAT IT CREATES WOULD SUFFER IF THIS WERE THE CASE.

1 HOUR ELAPSED WHEN:	
50 GALLONS	2.5 - 5 GALLONS CONDENSED
75 GALLONS	3.75 - 7.5 GALLONS CONDENSED
100 GALLONS	5 - 10 GALLONS CONDENSED

PRASSES IN MASHING (COOKING OF MASH)
113 DEGREES
144 DEGREES
163 DEGREES

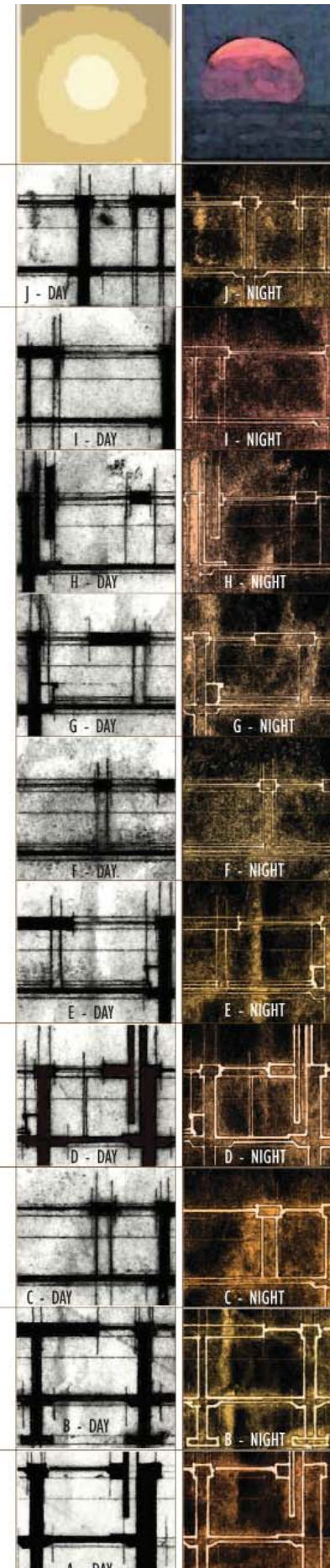
[62] Sun, Moon, Brewing relationships study



Invention of the mechanical clock in Europe is obscure, but particularly Benedictine monasteries, and their need for a particular hour. The wheel, in turn, can be geared for an hour's work. The tick-tock of the clock-escapement as historian Daniel Boorstin put it, would become a mechanism for striking a bull at the great revolutions in human experience—there was man's declaration of independence from the sun, new proof of his mastery over himself and his surroundings. Only later would it be revealed that he had accomplished his demands all his own. (Falk, 19)

"The new, improved calendar was more than a scholarly pursuit for Rome's elites. It also "injected a new spirit into how people thought about time," according to Duncan. Until the Julian reform, time "had been thought of as a cycle of recurring natural events, or as an instrument of power. But no more. Now the calendar was available to everyone as a practical, objective tool to organize shipping schedules, grow crops, worship gods, plan marriages, and send letters to friends...The New Julian calendar introduced the concept of human beings ordering their own individual lives along a linear progression operating independent of the moon, the seasons, or the gods" (Falk, Pg. 36)

The Week: Possibly related to seven "wandering bodies" of the sky, the only 7 known in ancient times (sun, moon, mercury, Venus, mars, Jupiter, Saturn) Where does the order for our days of the week come from? Most scholars believe that it is related to an ancient idea about planets "owning" the hours of the day. Saturn, the slowest moving body and most powerful of first of the seven planets in the ancient world, in the "infernal" position found at which bodies must appear night club. Saturn owned the first hour of the first day. Uranus was next, owning the second hour of the second day. Mars third. Sun fourth hour fifth. Mercury sixth, and the moon seventh. If one cycles through the celestial in sequence for all 24 hours of the day, and then...



students' dorms could be the farthest west, or last to fill with sun, late in the morning after they had presided over their batches of beer through the night); or in contrast, (as the brewery machine could churn on through the night, with no sun at all, or would start and stop according to its own time, though the sun steadily moved through building).

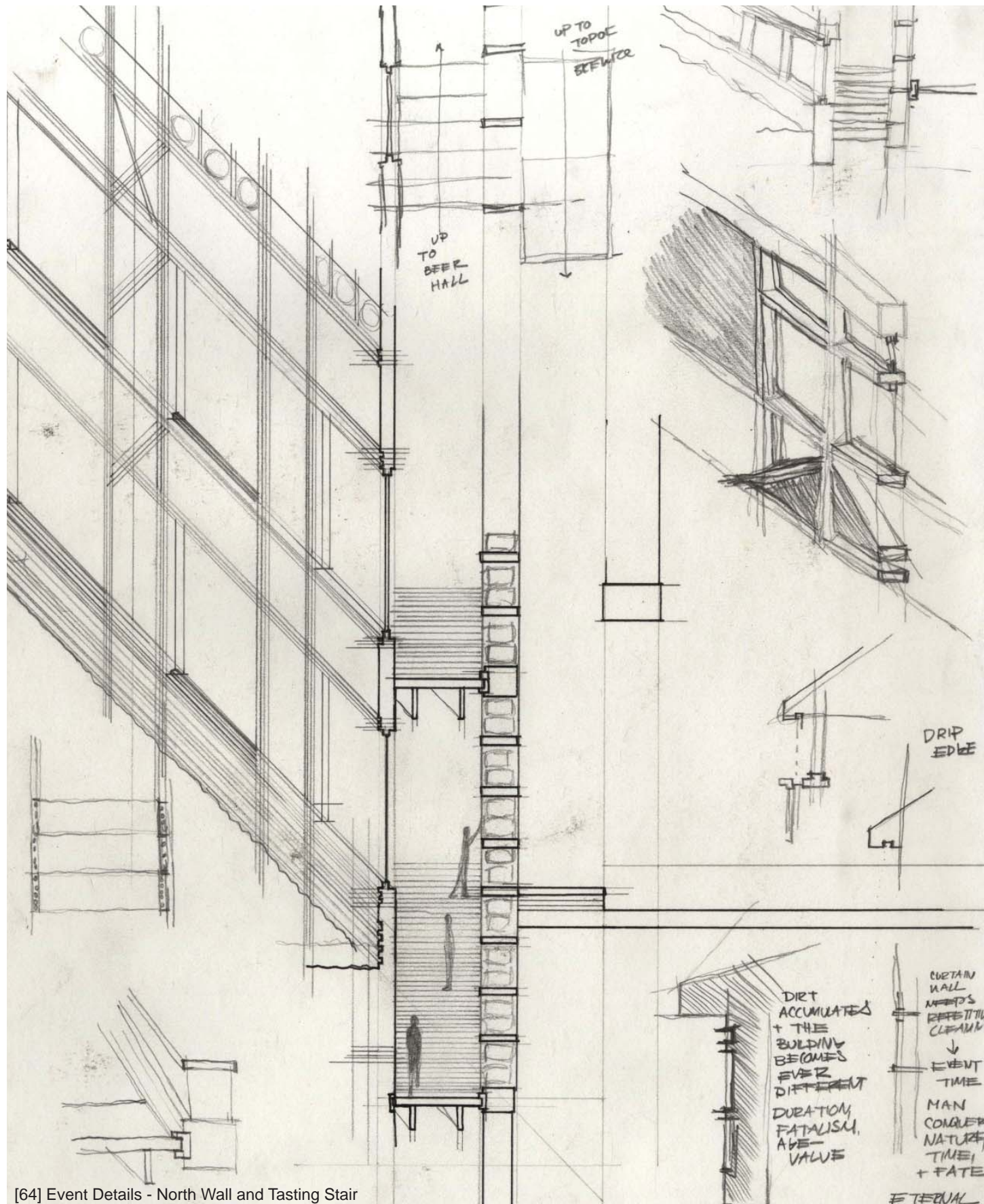
From the beginning, the idea of thickness (of old buildings) - or thinness (of new buildings) - seemed very important in determining how a building might age, and what meaning it might acquire.

One of the primary revelations of my work, though it may seem obvious to others, was that the thin and flat wall, did not necessarily surrender all of its ancient purpose to the machines that conquer fate and light and condition the space contained within the thin wall. Perhaps a south-facing thin could be augmented by a screening system that presented opportunities for other events to take shape (a trellis for cyclical hops planting and harvesting).

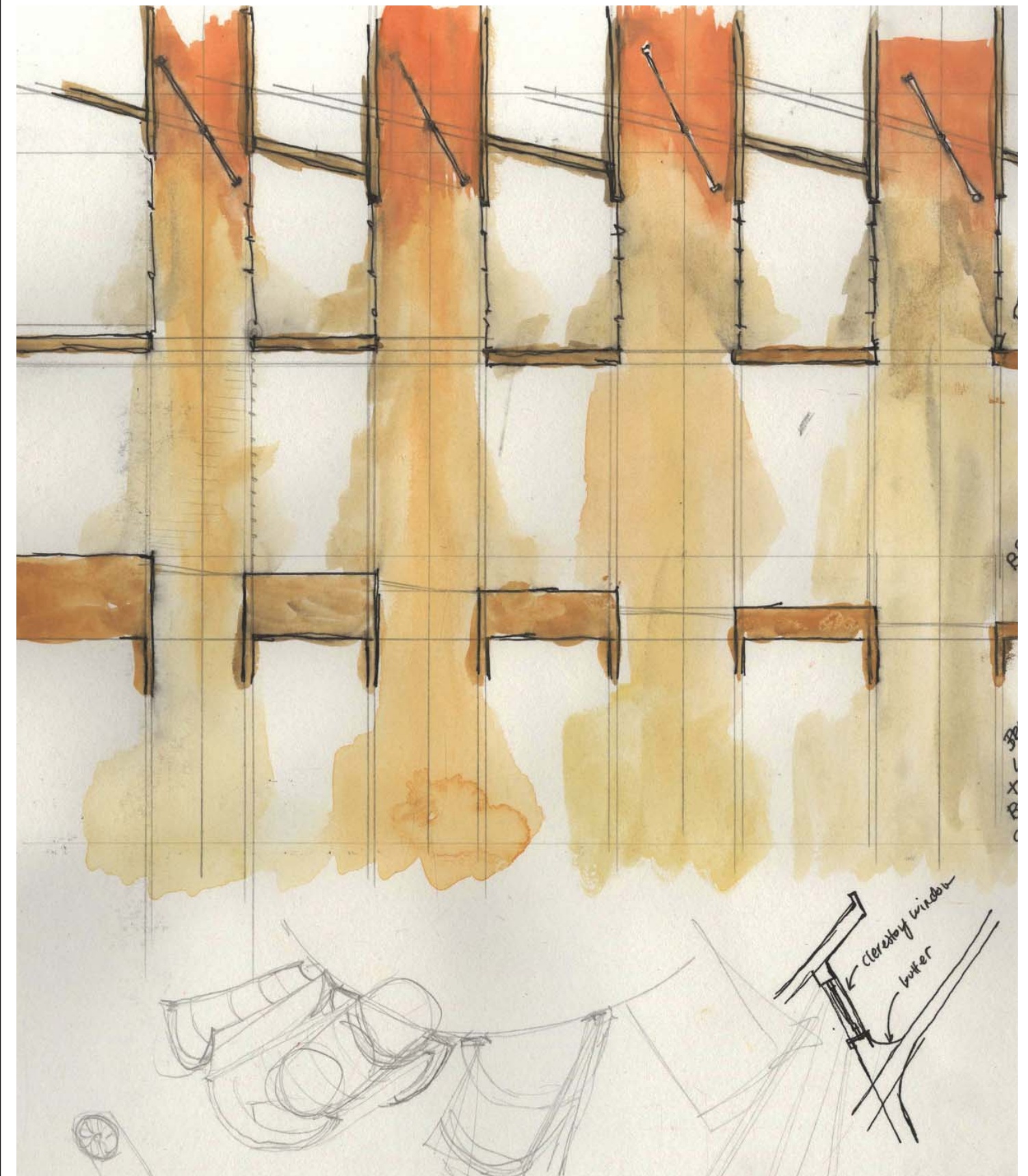
[63] Sun, Moon, Brewing relationships study

Perhaps a thin wall at a human-related scale, easily accessed by a permanent scaffold could celebrate the periodic cleaning and restoring of the building's facade. The thick wall, still, seemed to provide the best opportunity to show the passage of time, and to create a cool, shaded space within the building to protect the beer once it

left the brewery machine. These two notions of how the building might be conceived in time became the north and south walls of the brewery, framing the brewery machine that would reside in the core of the building. The North wall, related to weathering and duration, would catch and channel water over its surface, staining and

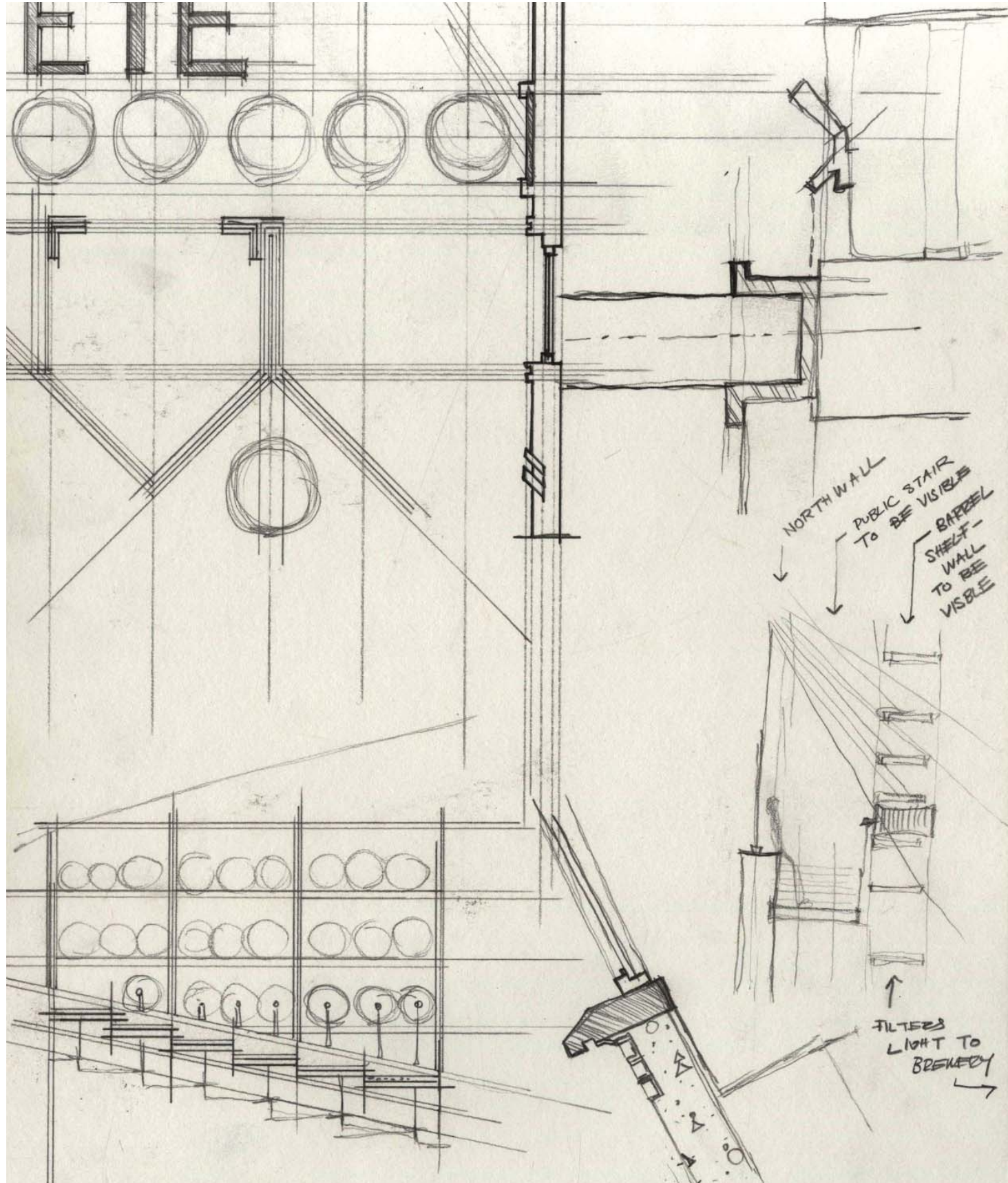


[64] Event Details - North Wall and Tasting Stair

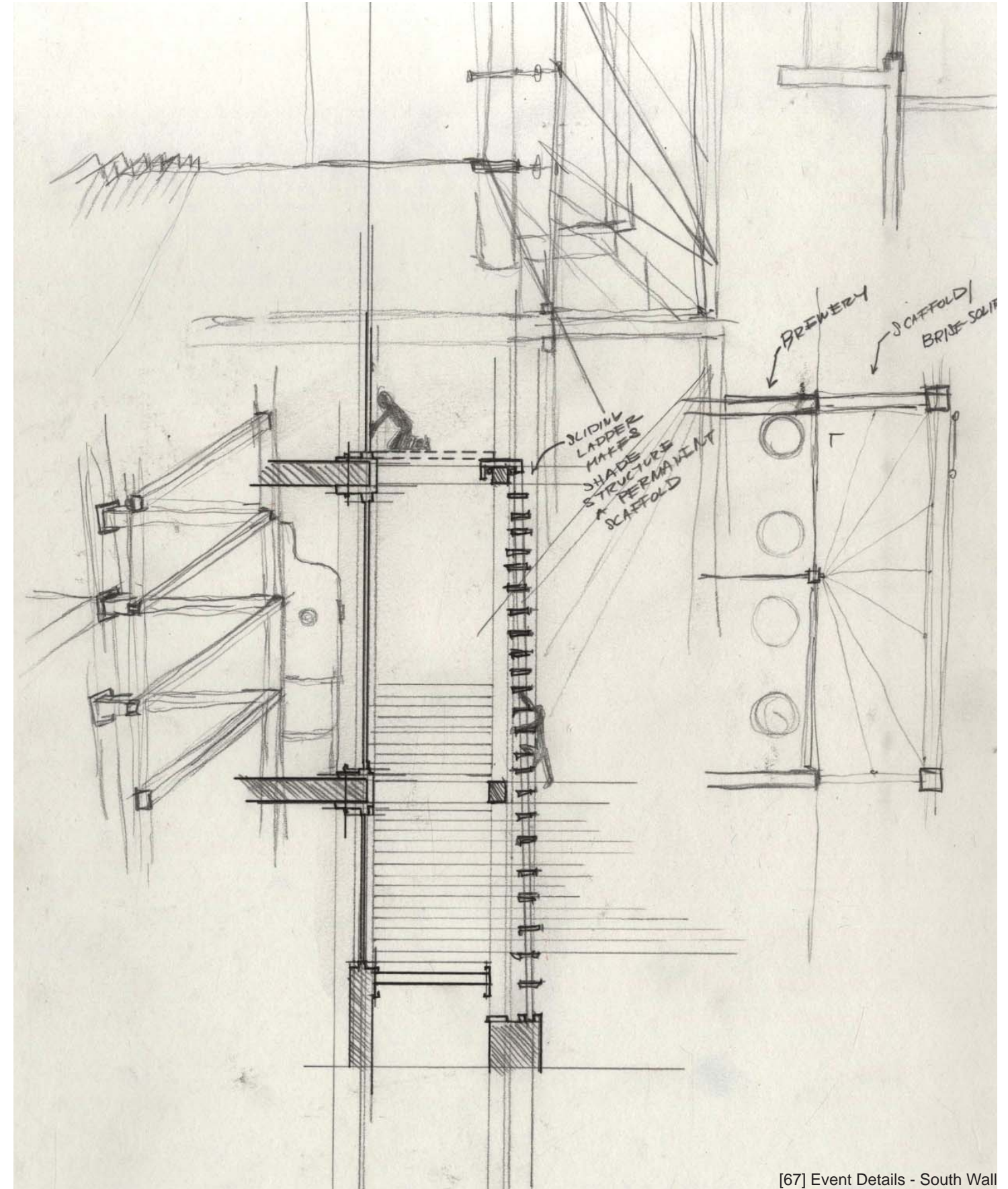


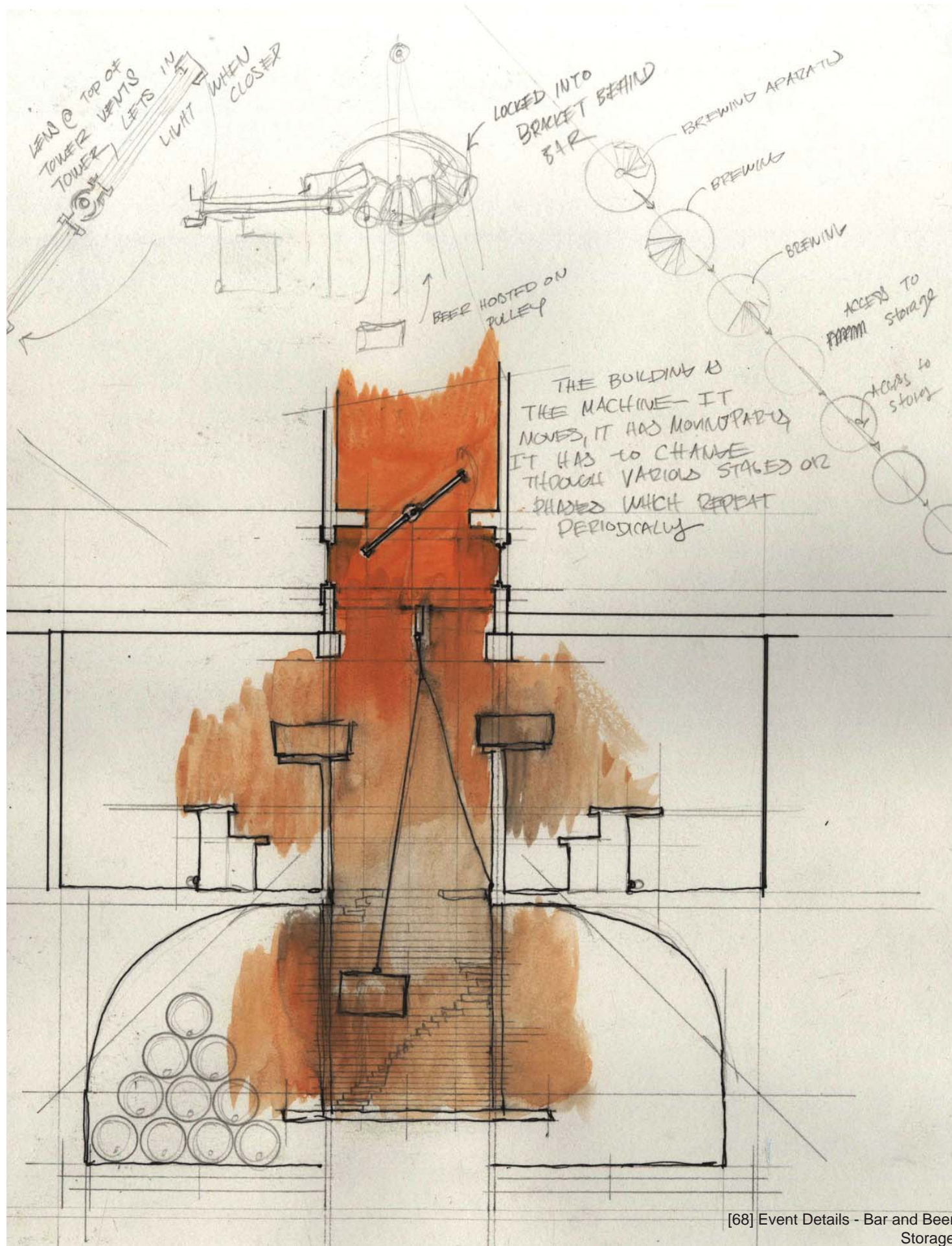
[65] Event Details - Brewing Towers

marking and mossing the face of the building and showing the passing of years. A solid masonry wall could be made thicker by supporting a massive stair, framed by still another thick wall holding kegs and barrels of beer as they age. The south wall would be a flat curtain wall, bringing light into public halls and the living areas of the

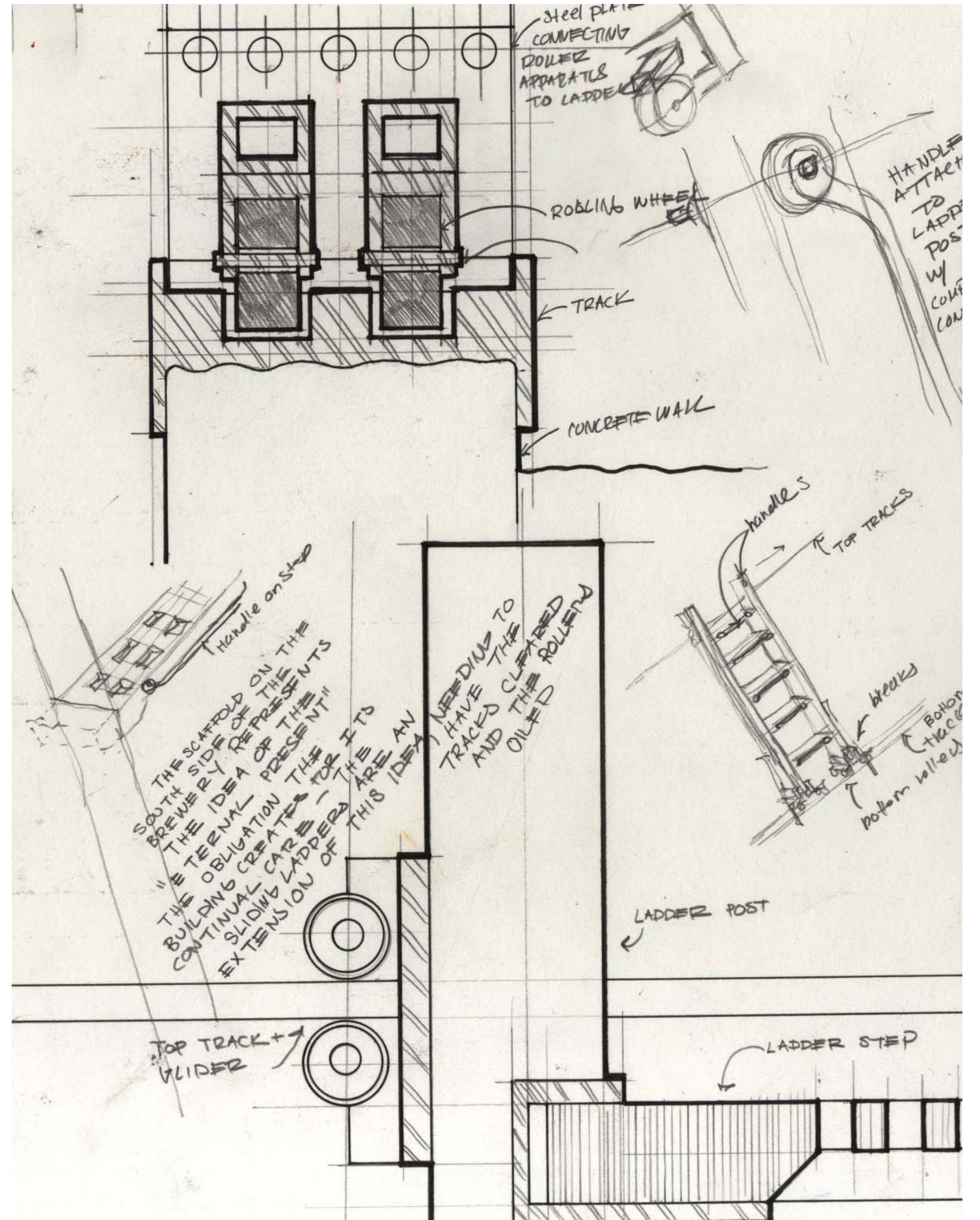


of the building, but shaded by a permanent structure on which hops could be grown and cleaning equipment could be temporarily attached.

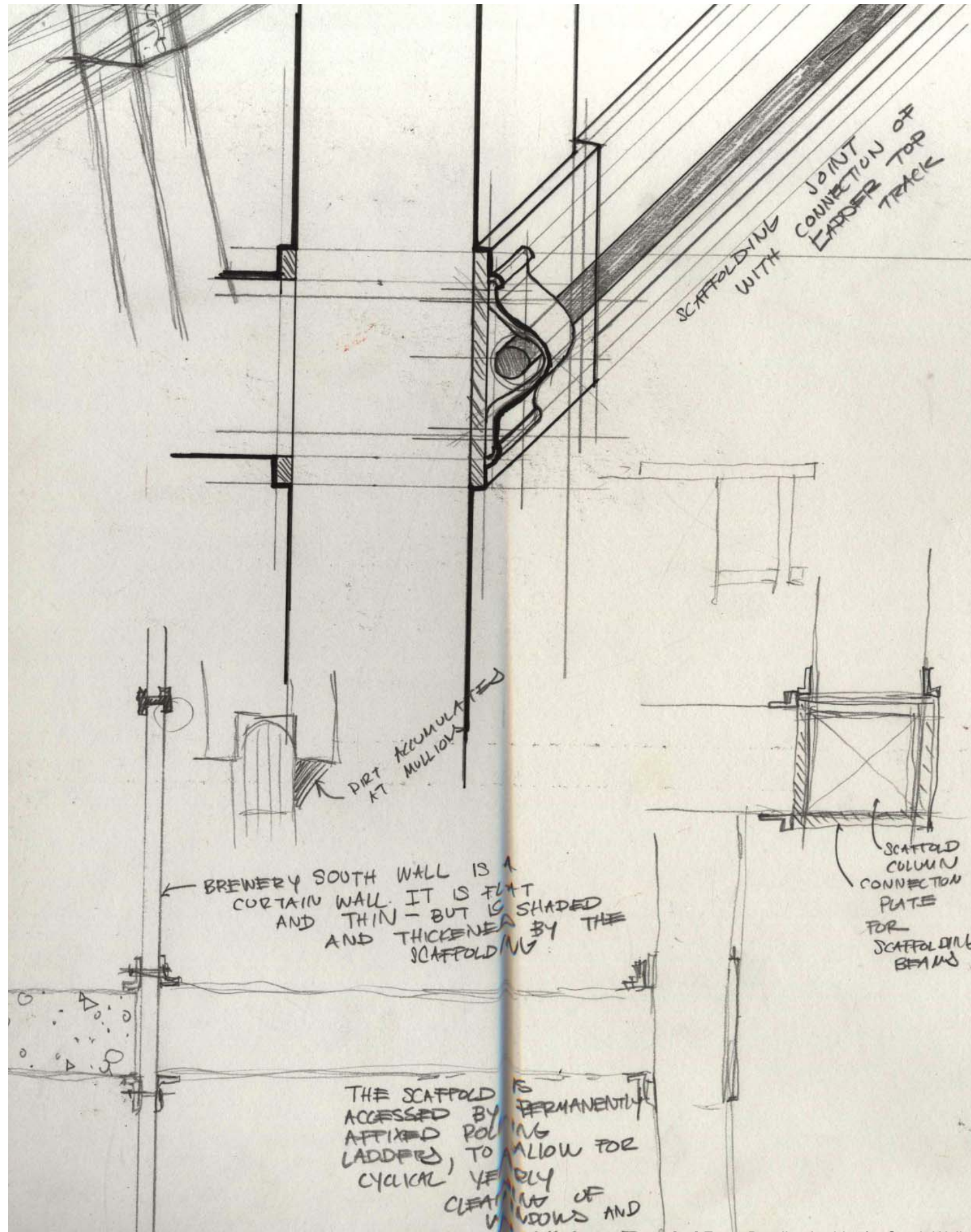




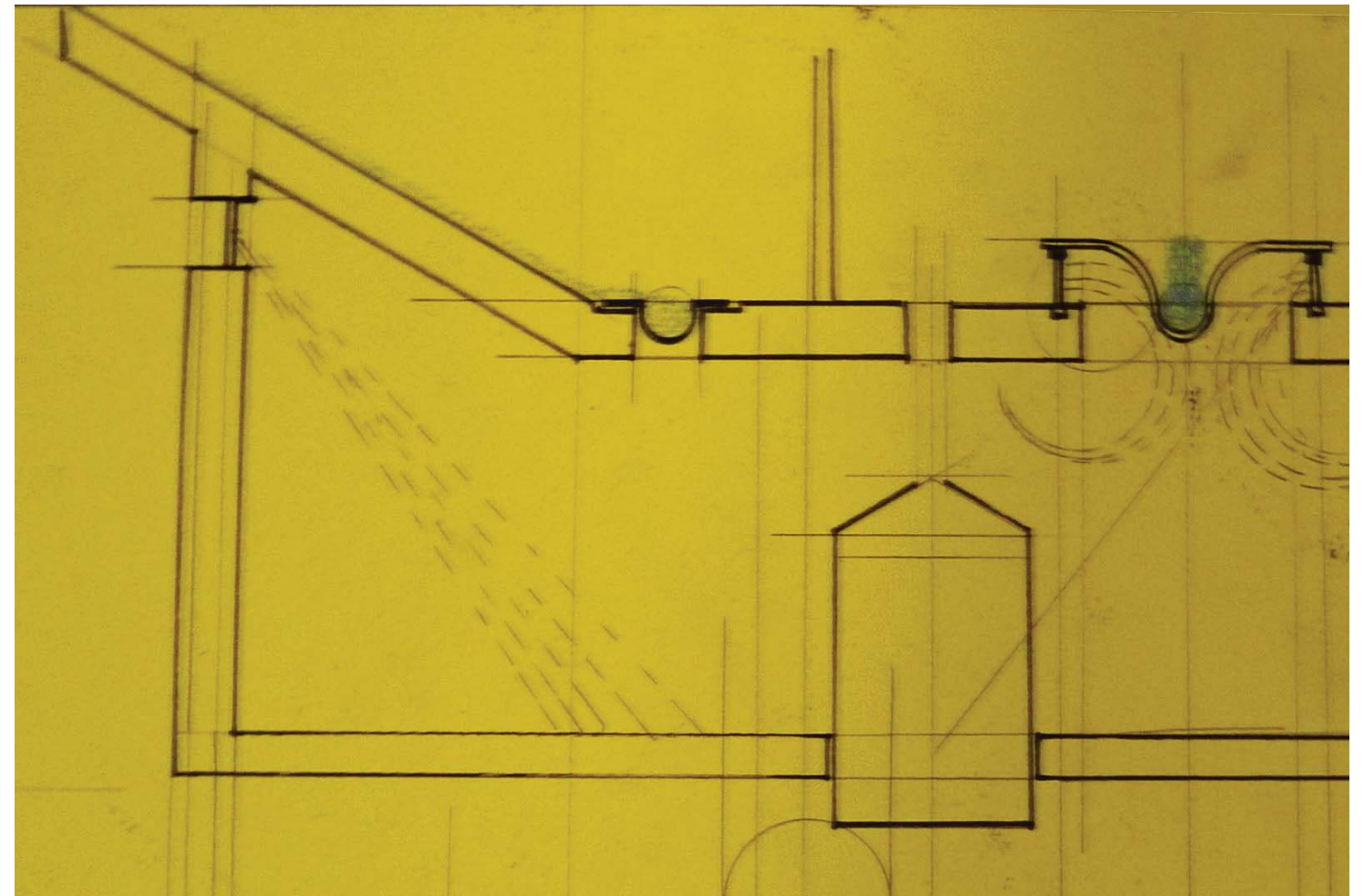
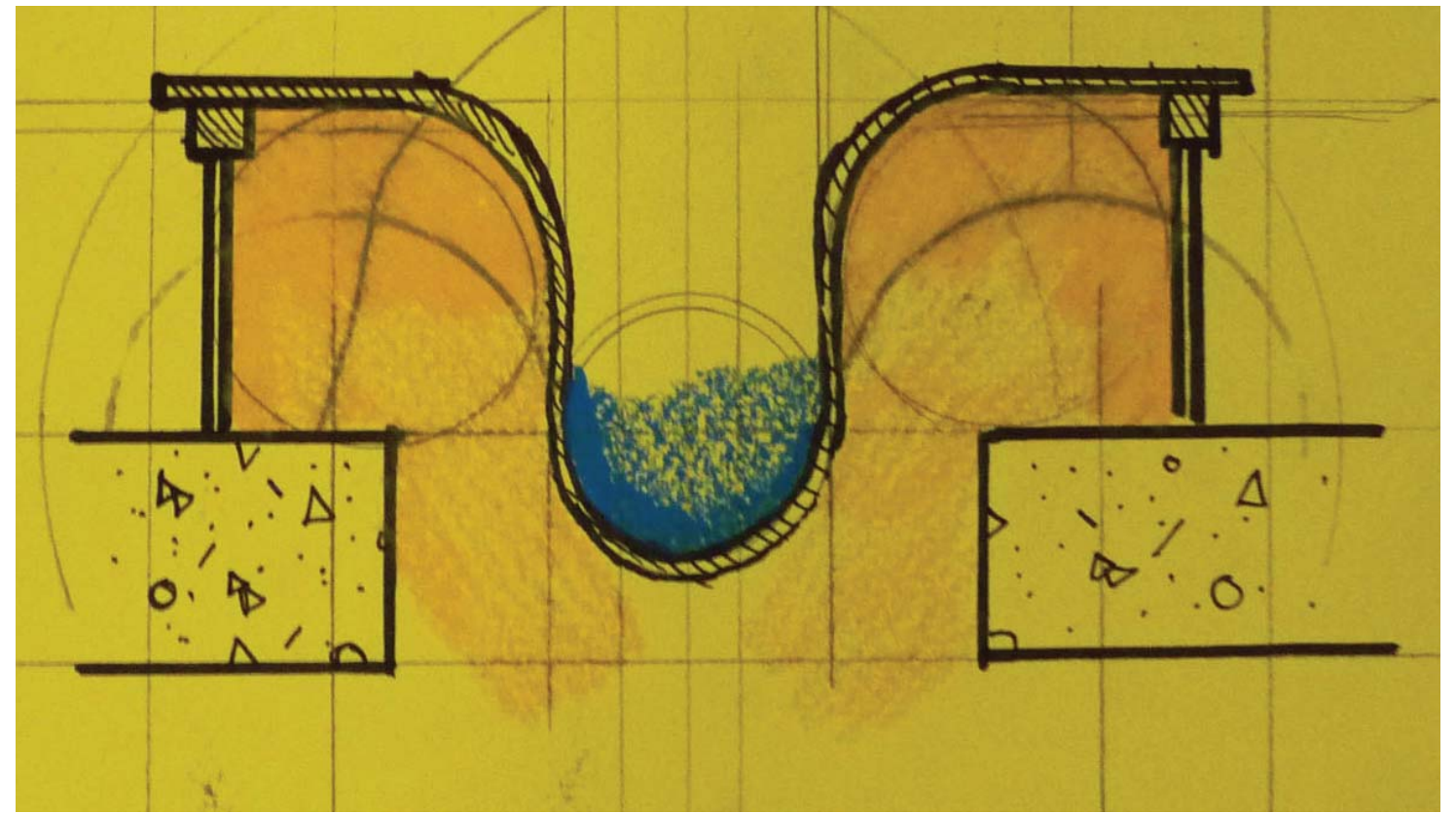
[68] Event Details - Bar and Beer Storage



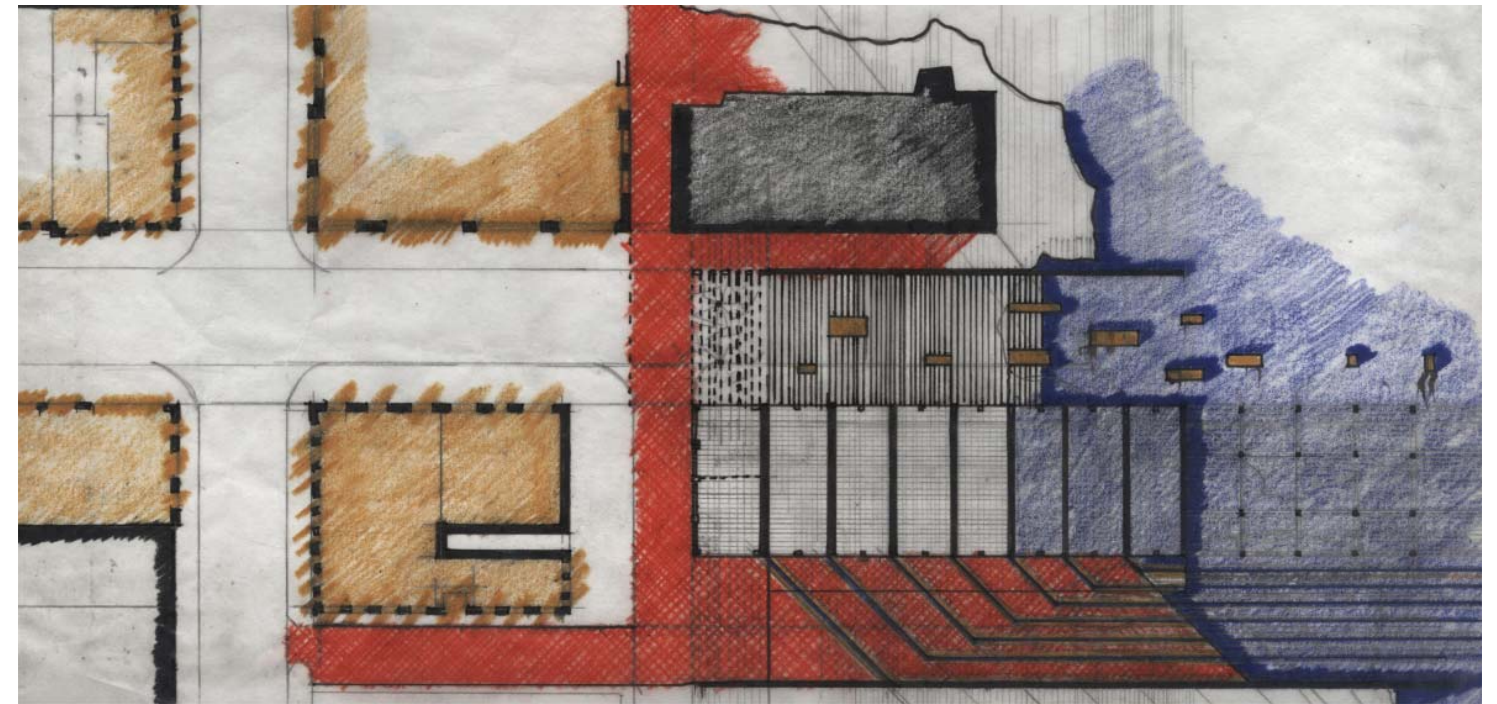
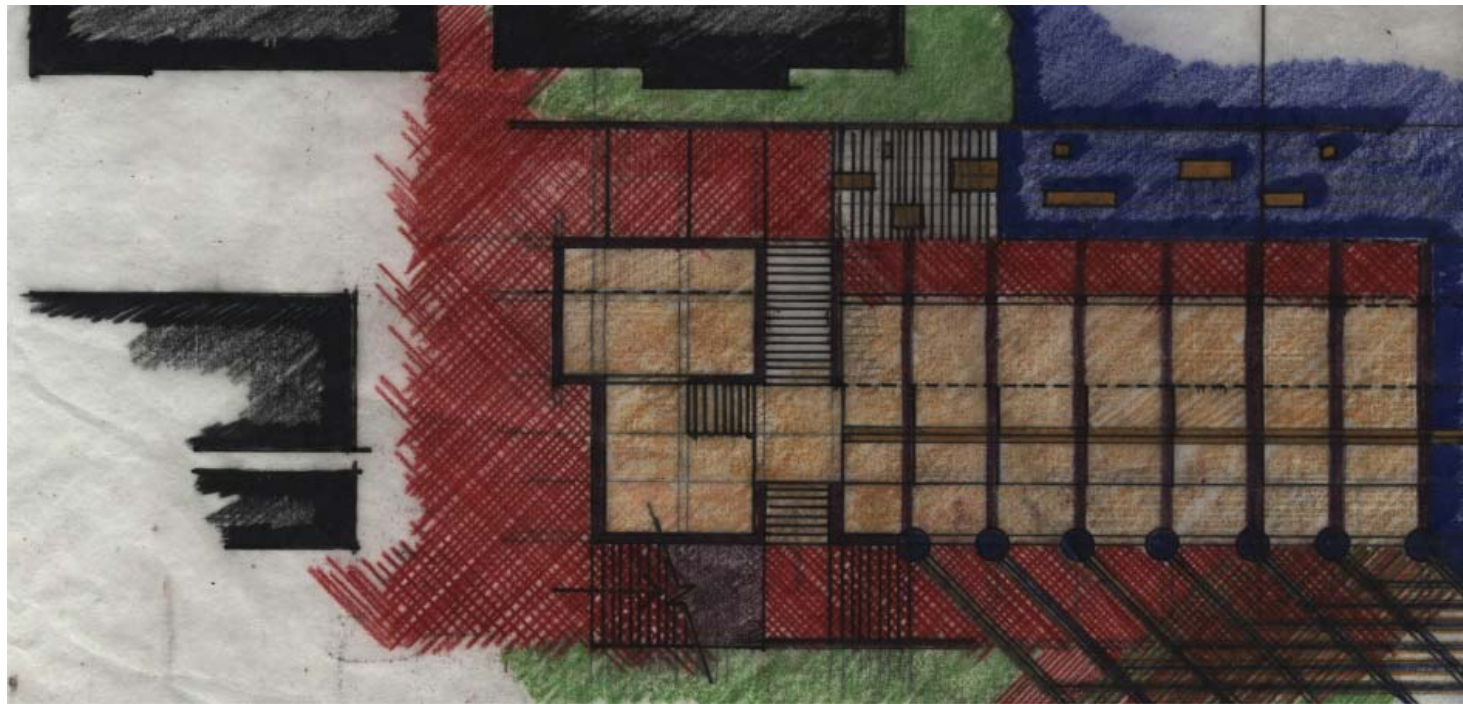
[69] Event Details - Ladder for South Wall Permanent Scaffold/Hop Trellis



[70] Event Details - Ladder for South Wall Permanent Scaffold/Hop Trellis

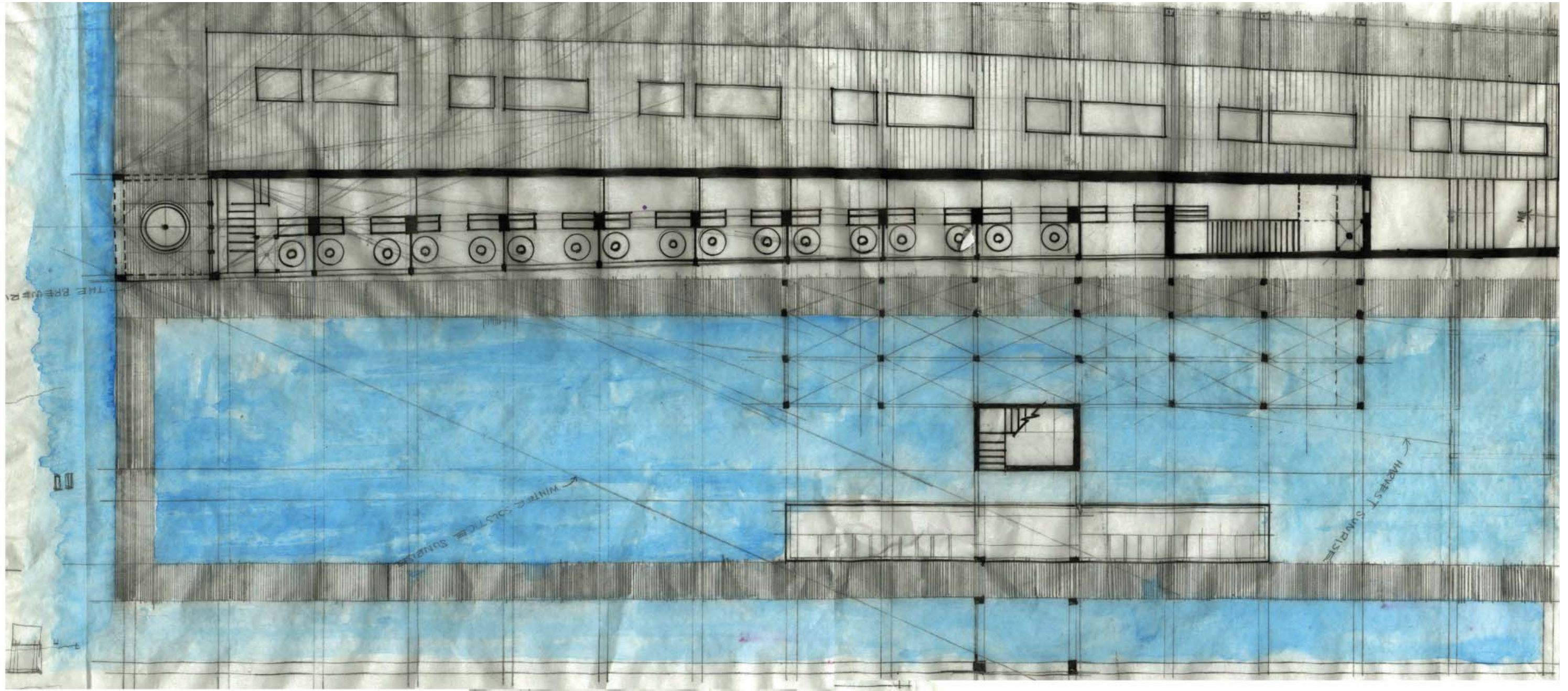


[71] Event Details - Building and Brewing hydrology

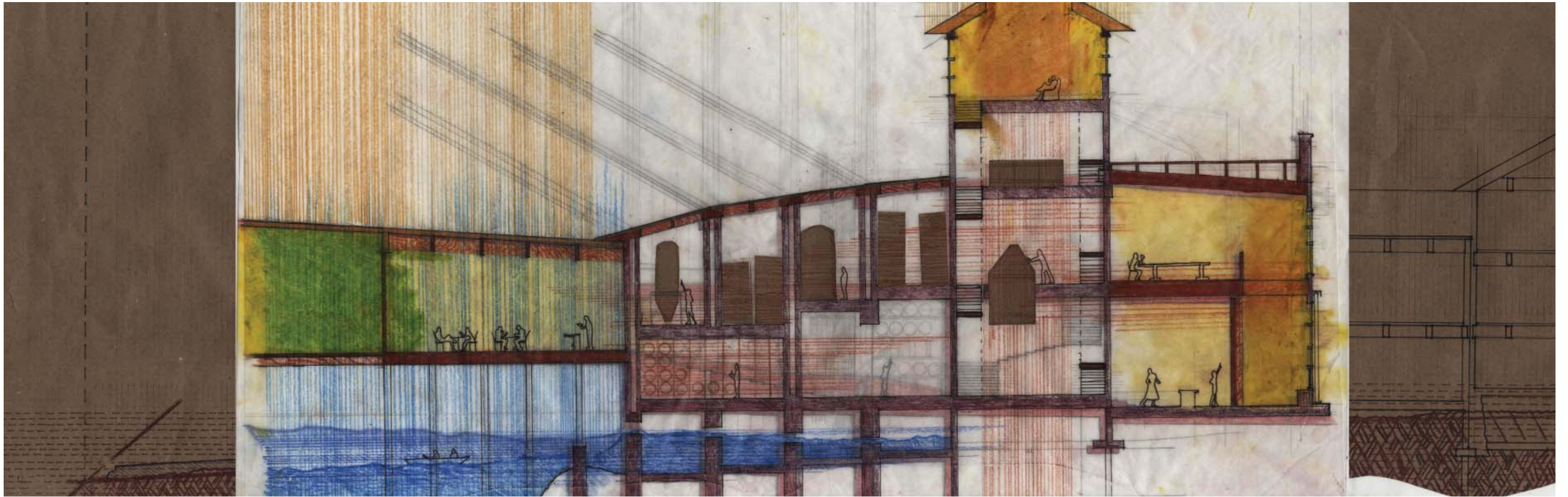


[72] Process Floor Plans

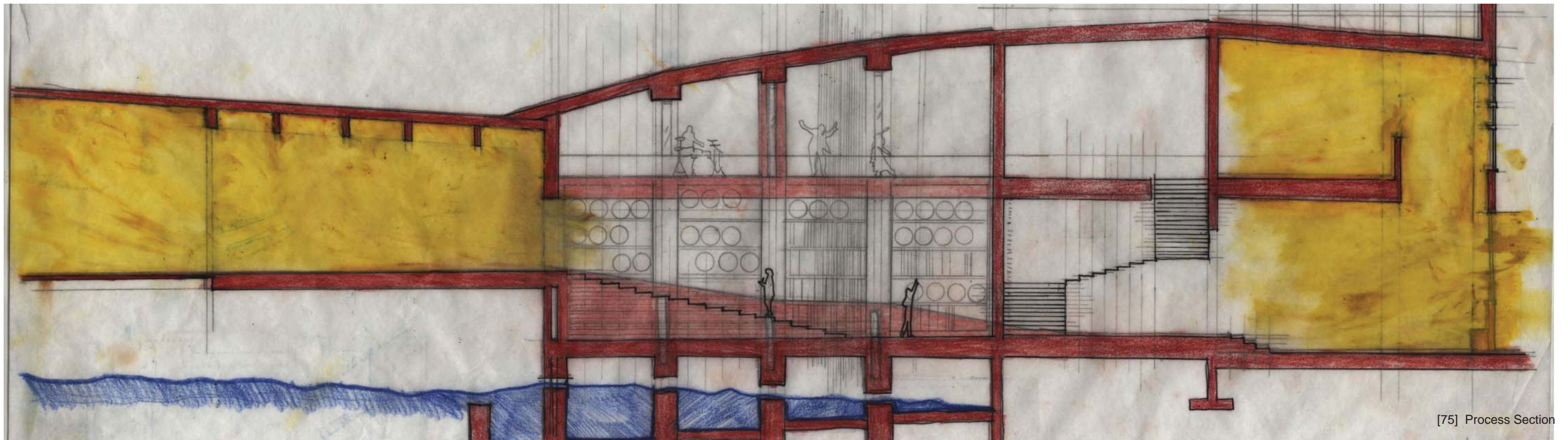
Process



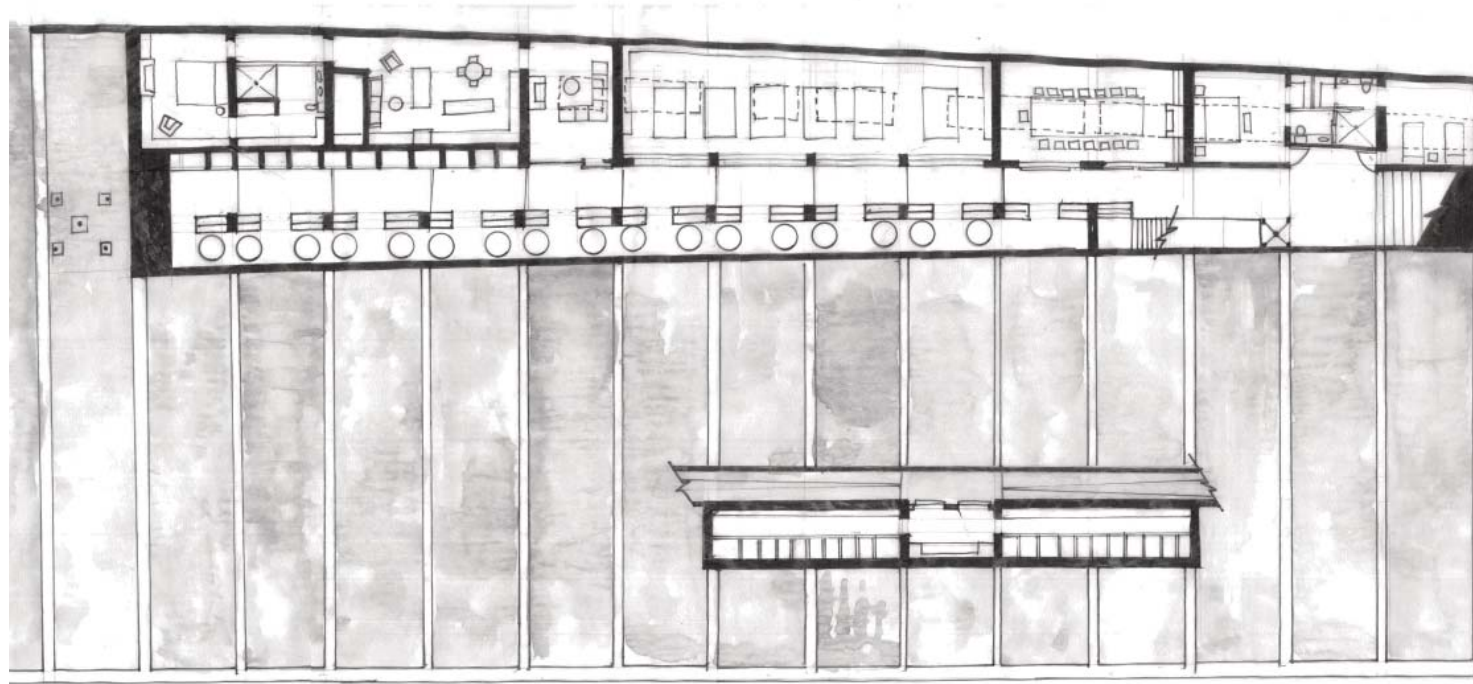
[73] Process Floor Plan



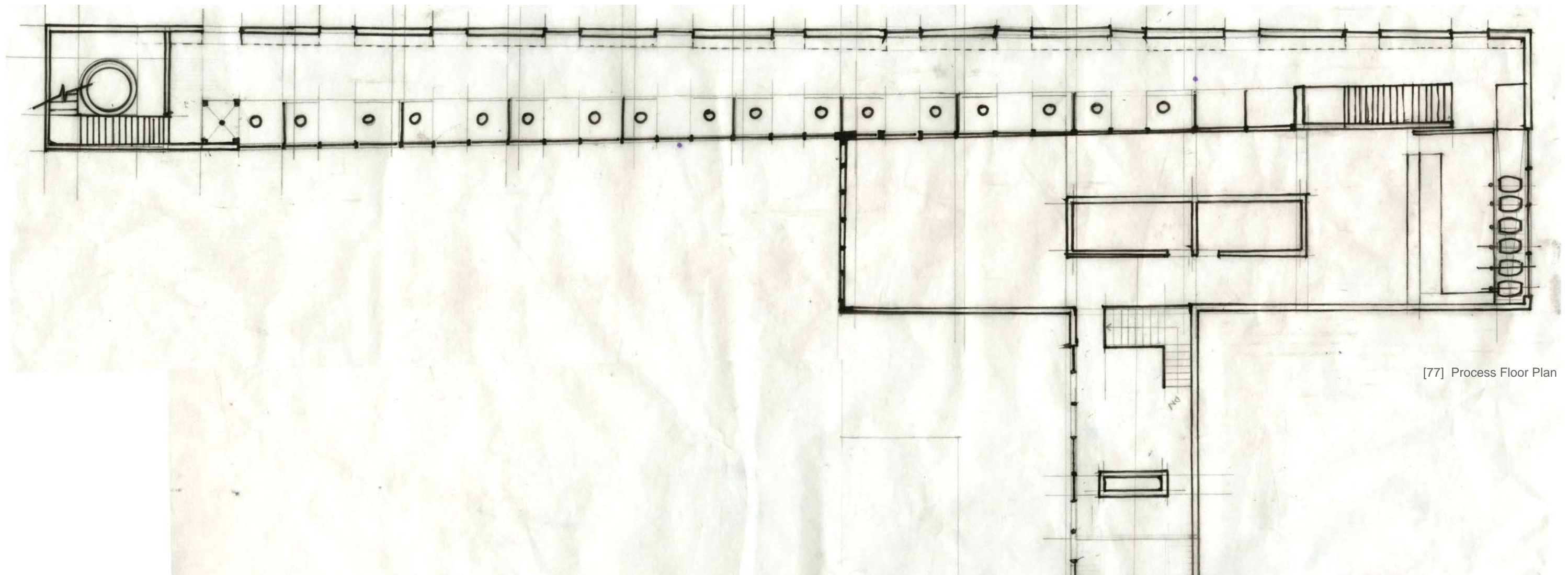
[74] Process Section



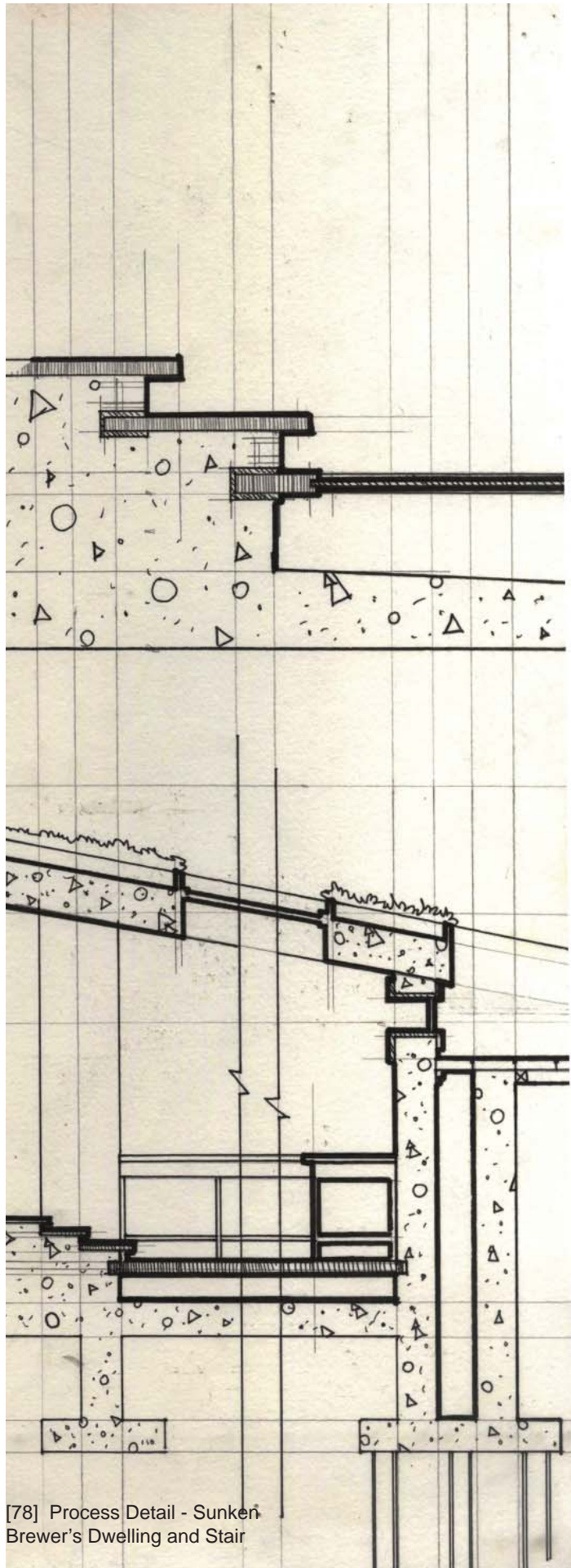
[75] Process Section



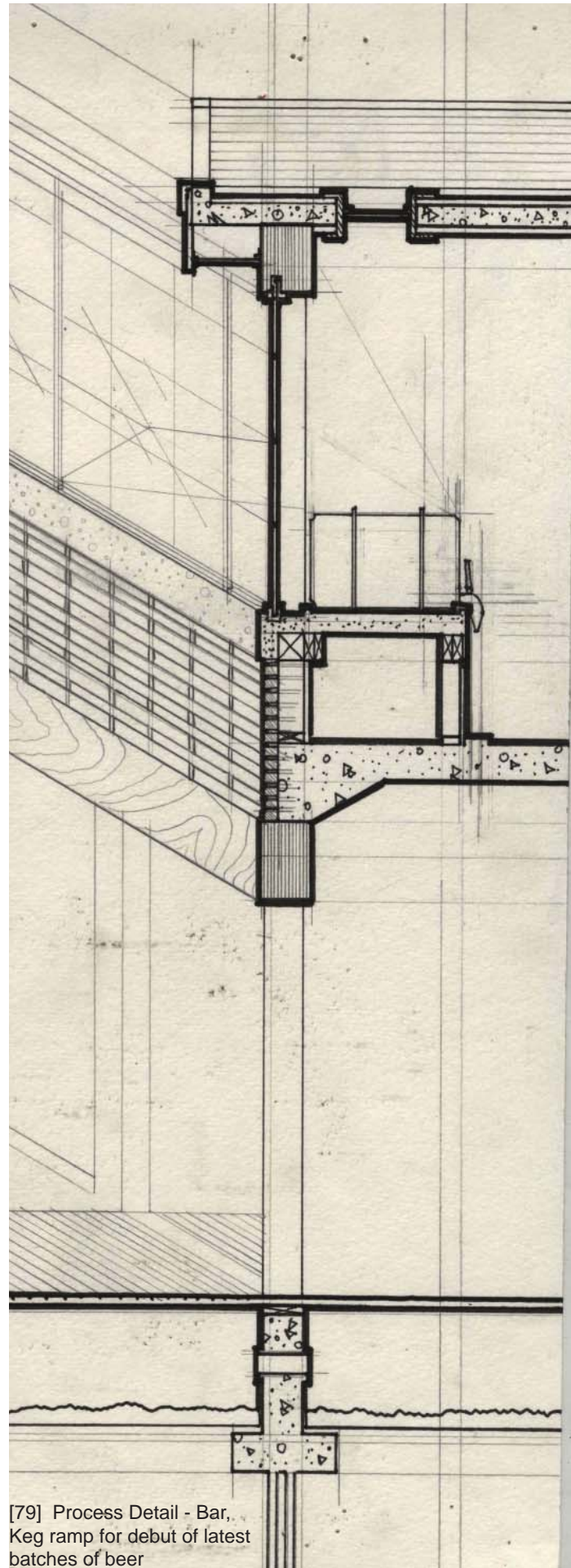
[76] Process Floor Plans



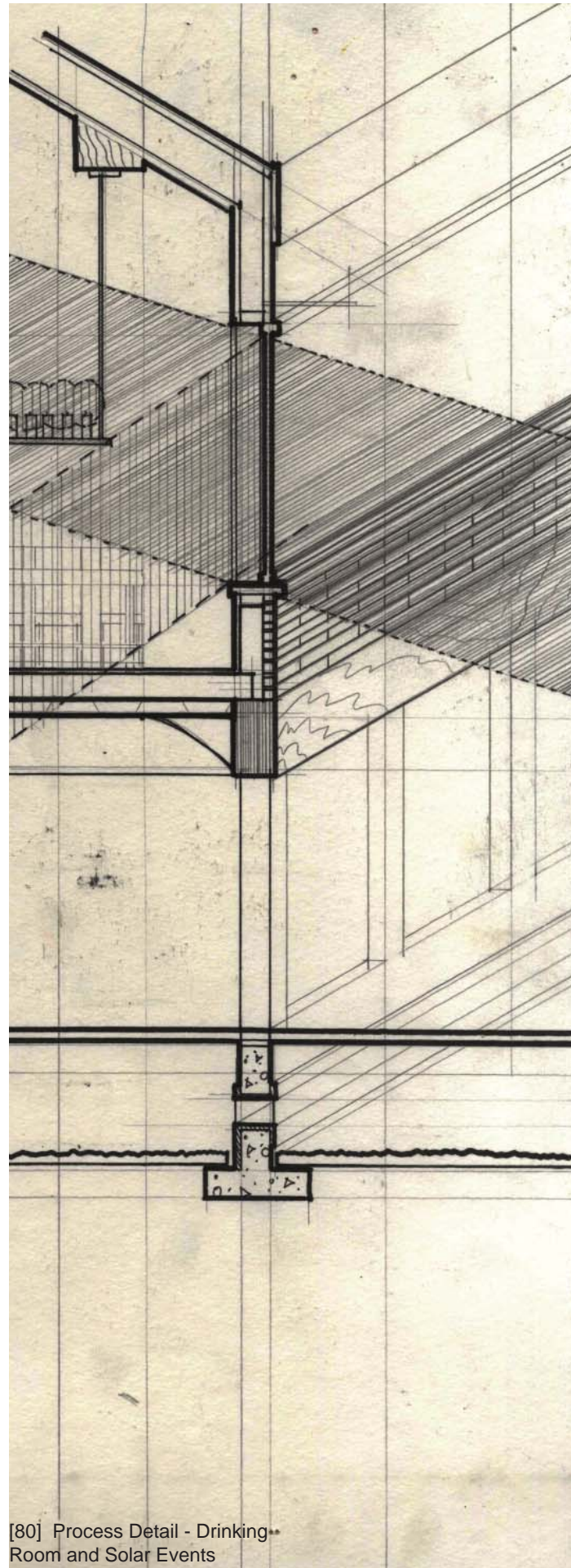
[77] Process Floor Plan



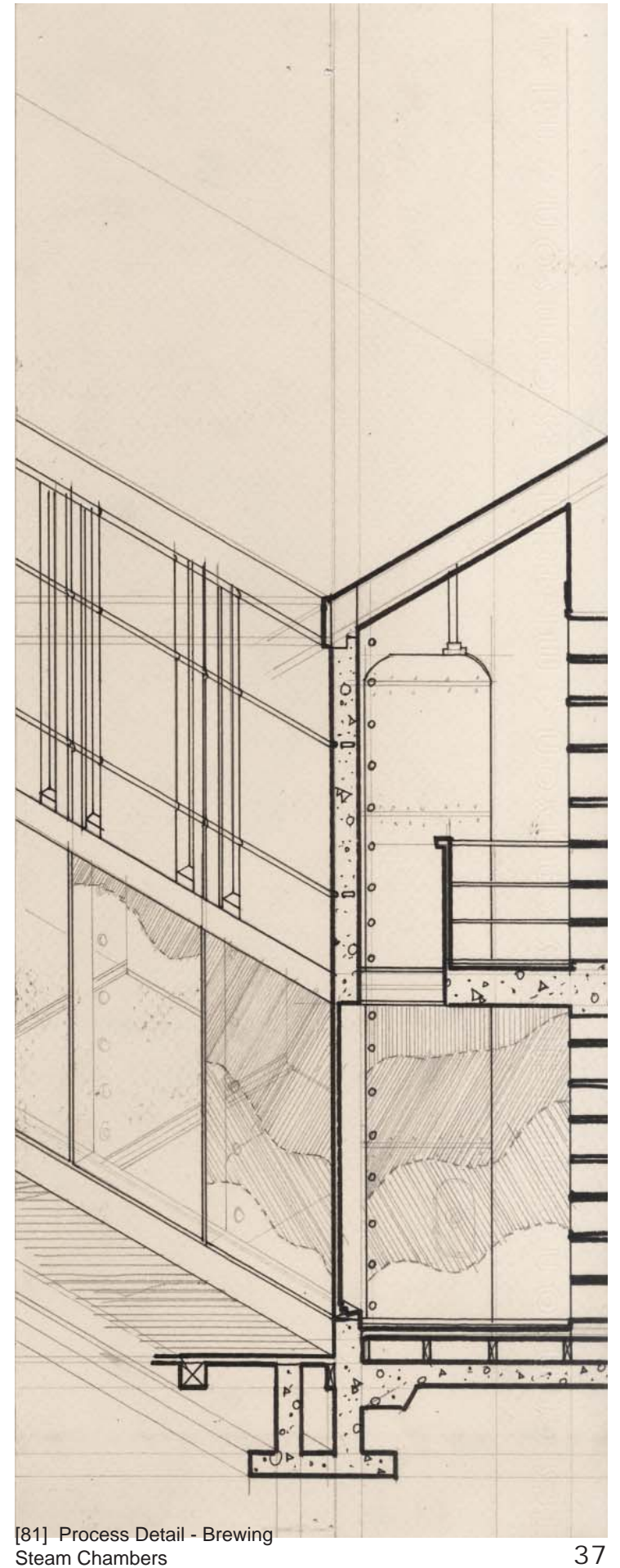
[78] Process Detail - Sunken Brewer's Dwelling and Stair



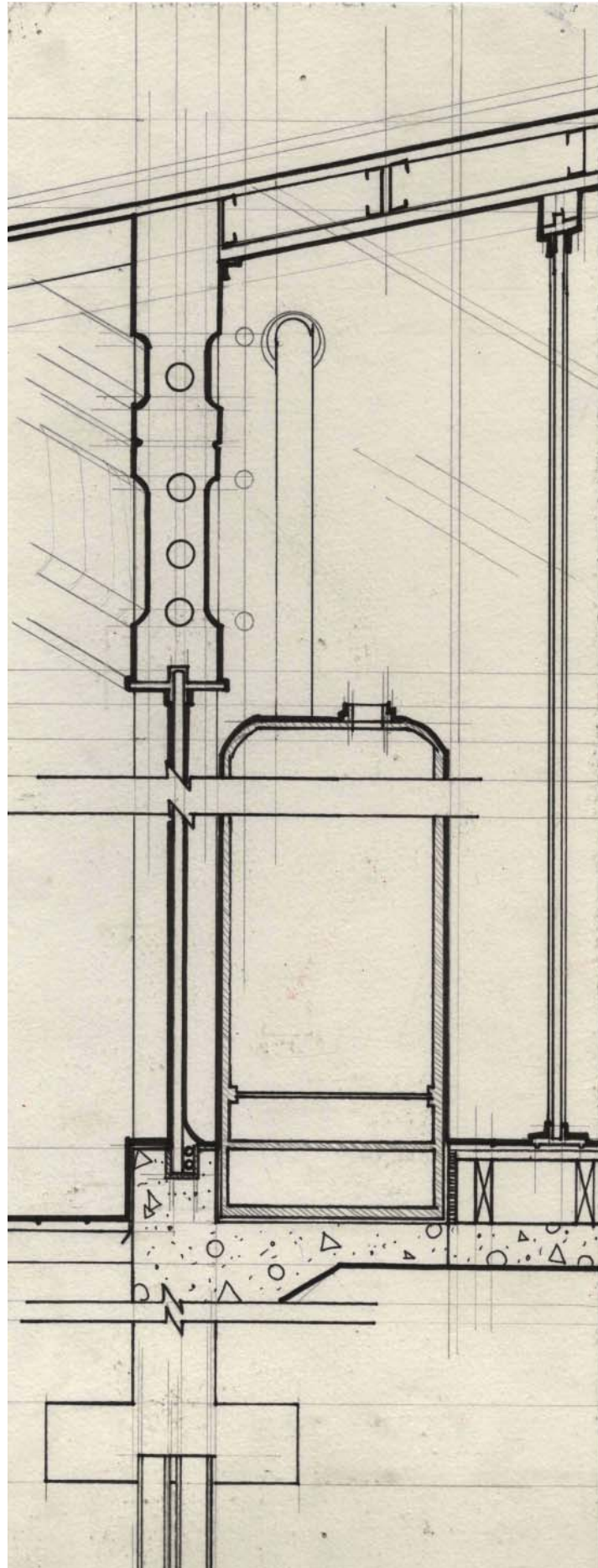
[79] Process Detail - Bar, Keg ramp for debut batches of beer



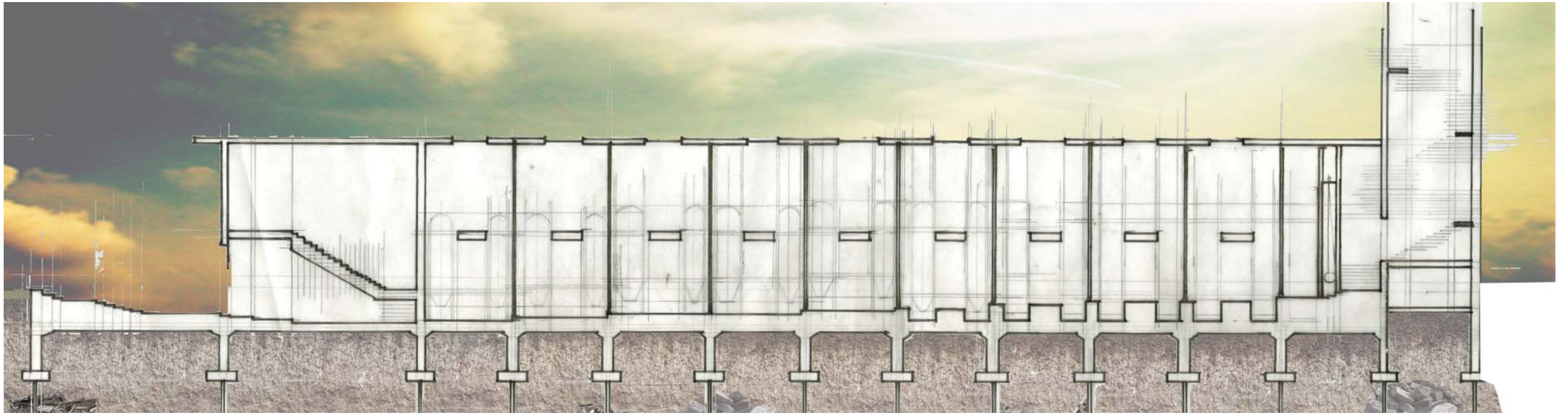
[80] Process Detail - Drinking Room and Solar Events



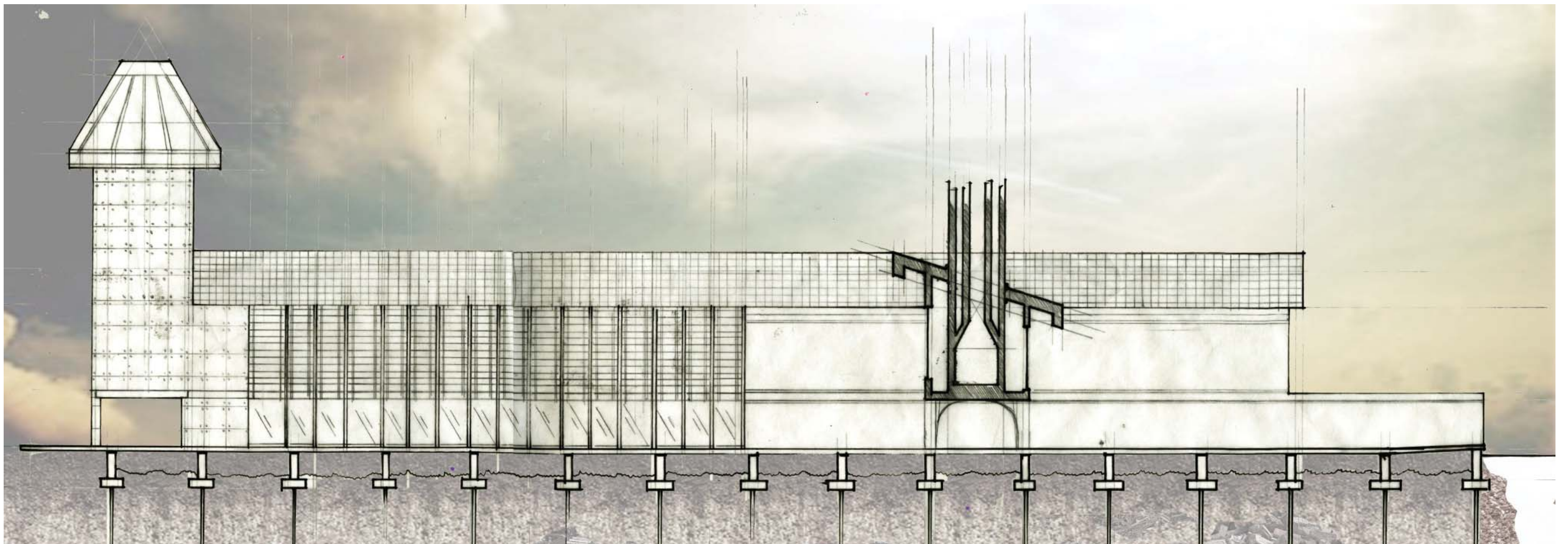
[81] Process Detail - Brewing Steam Chambers



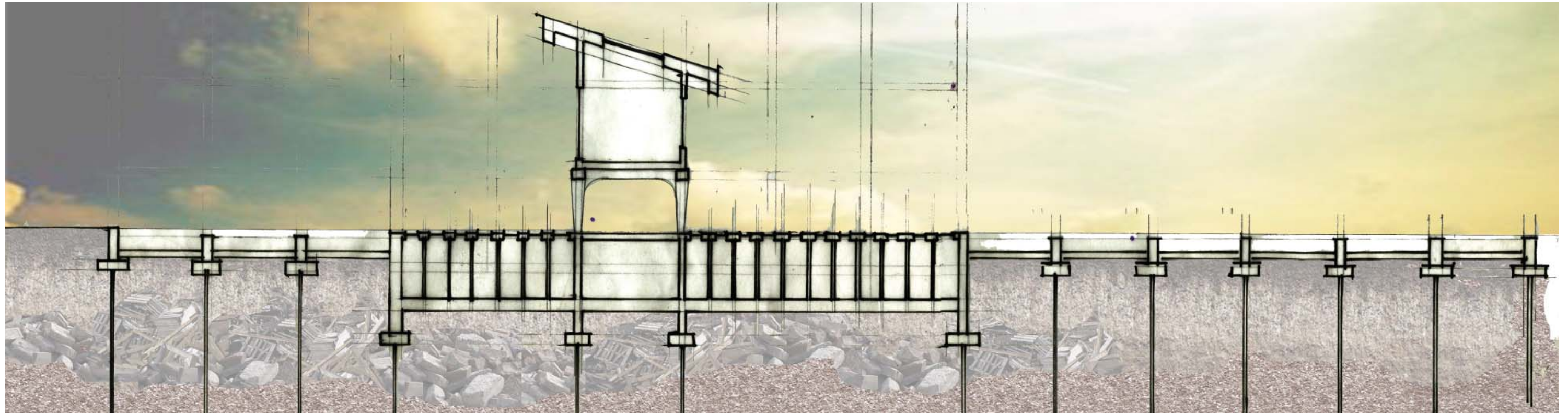
[82] Process Detail - Brewing
SteamChambers



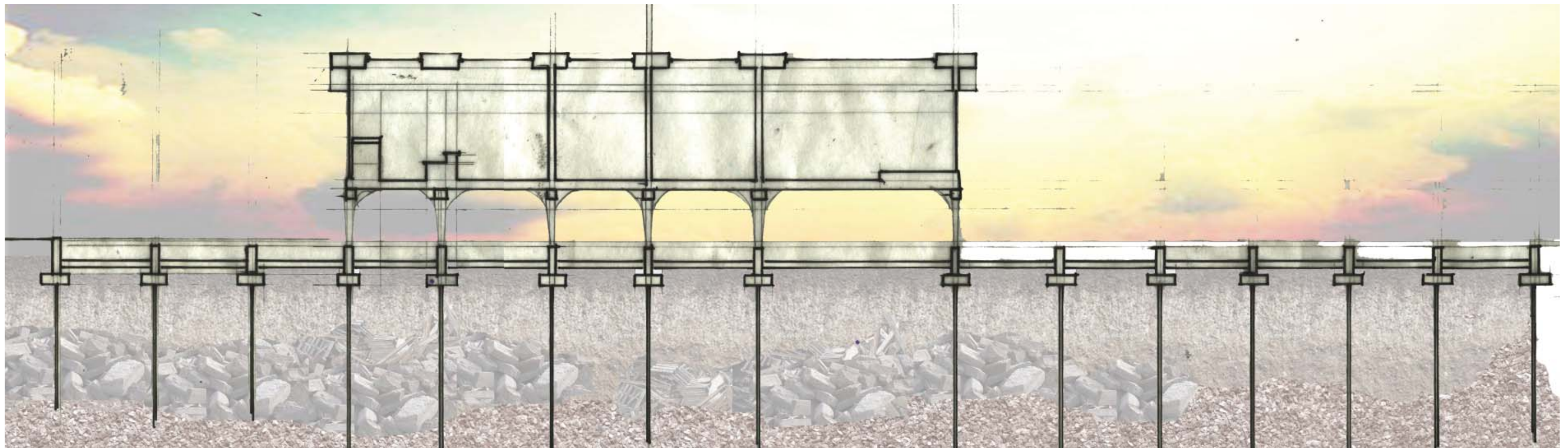
[83] Process Section



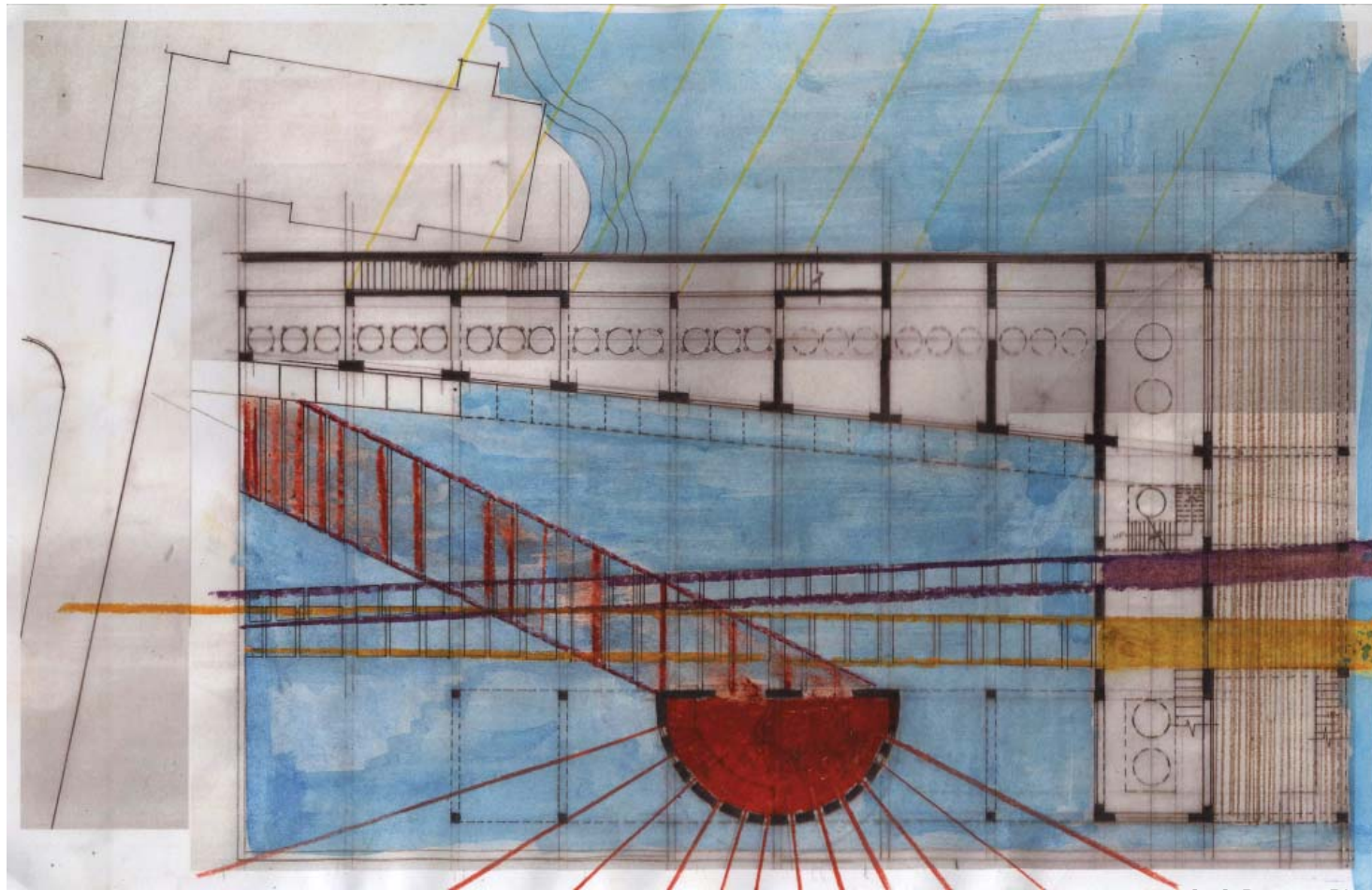
[84] Process Section/Elevation



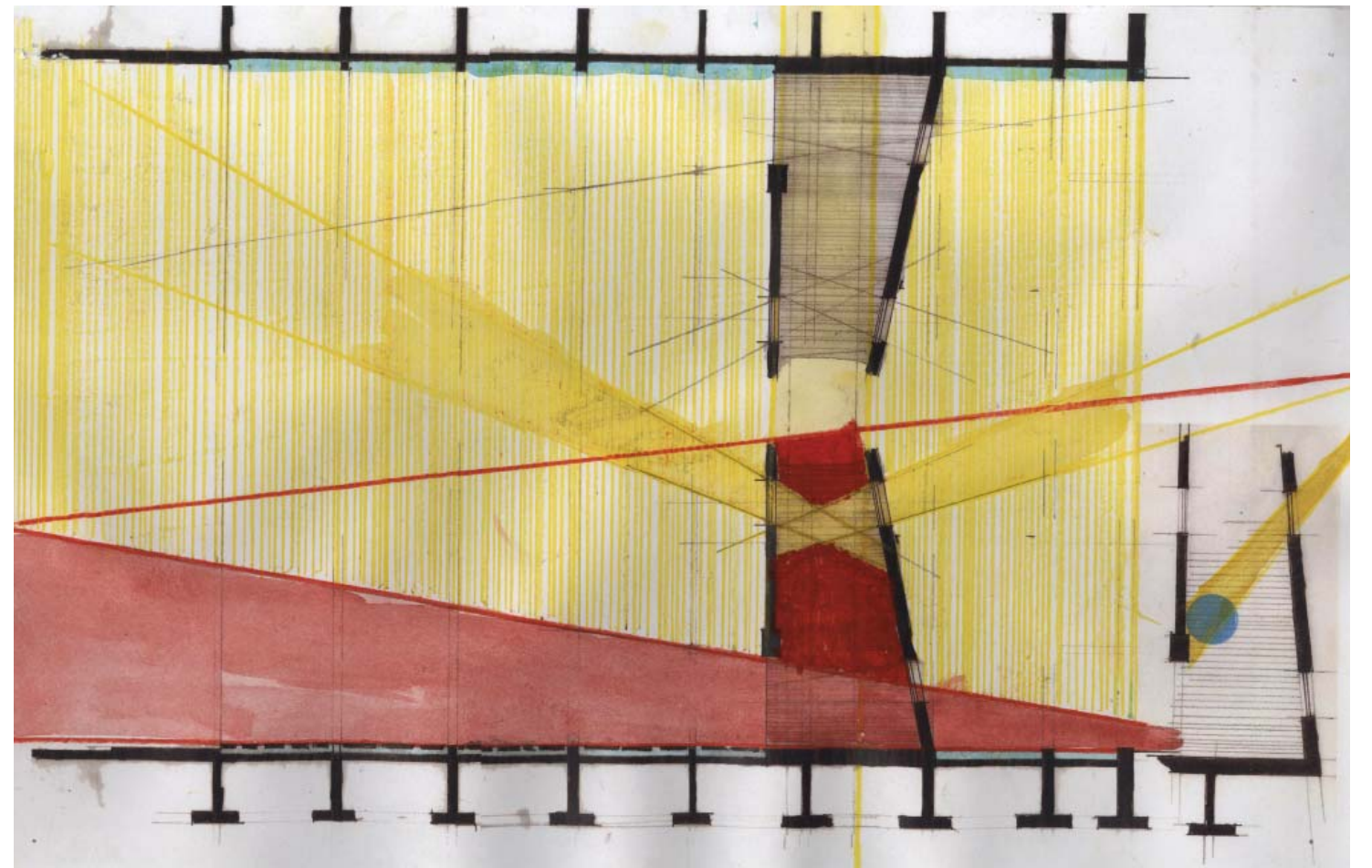
[85] Process Section



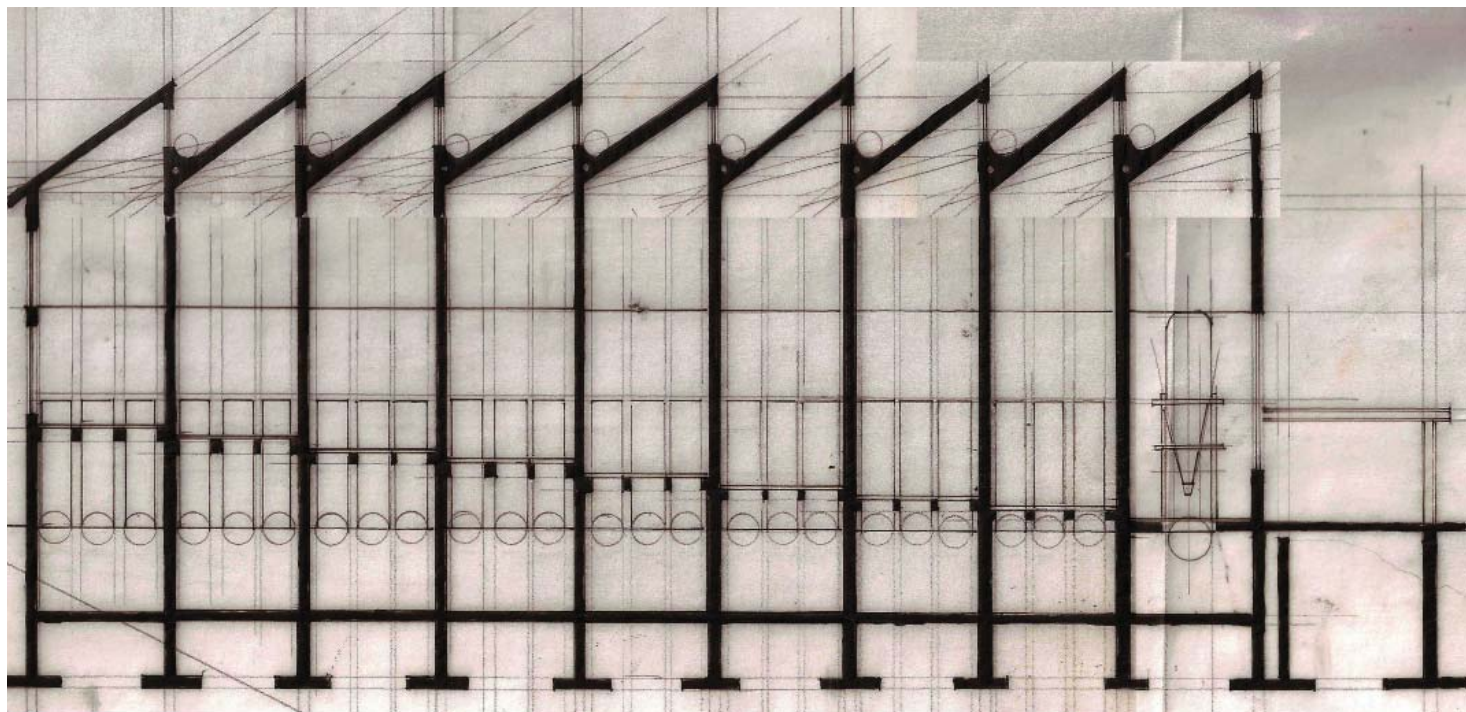
[86] Process Section



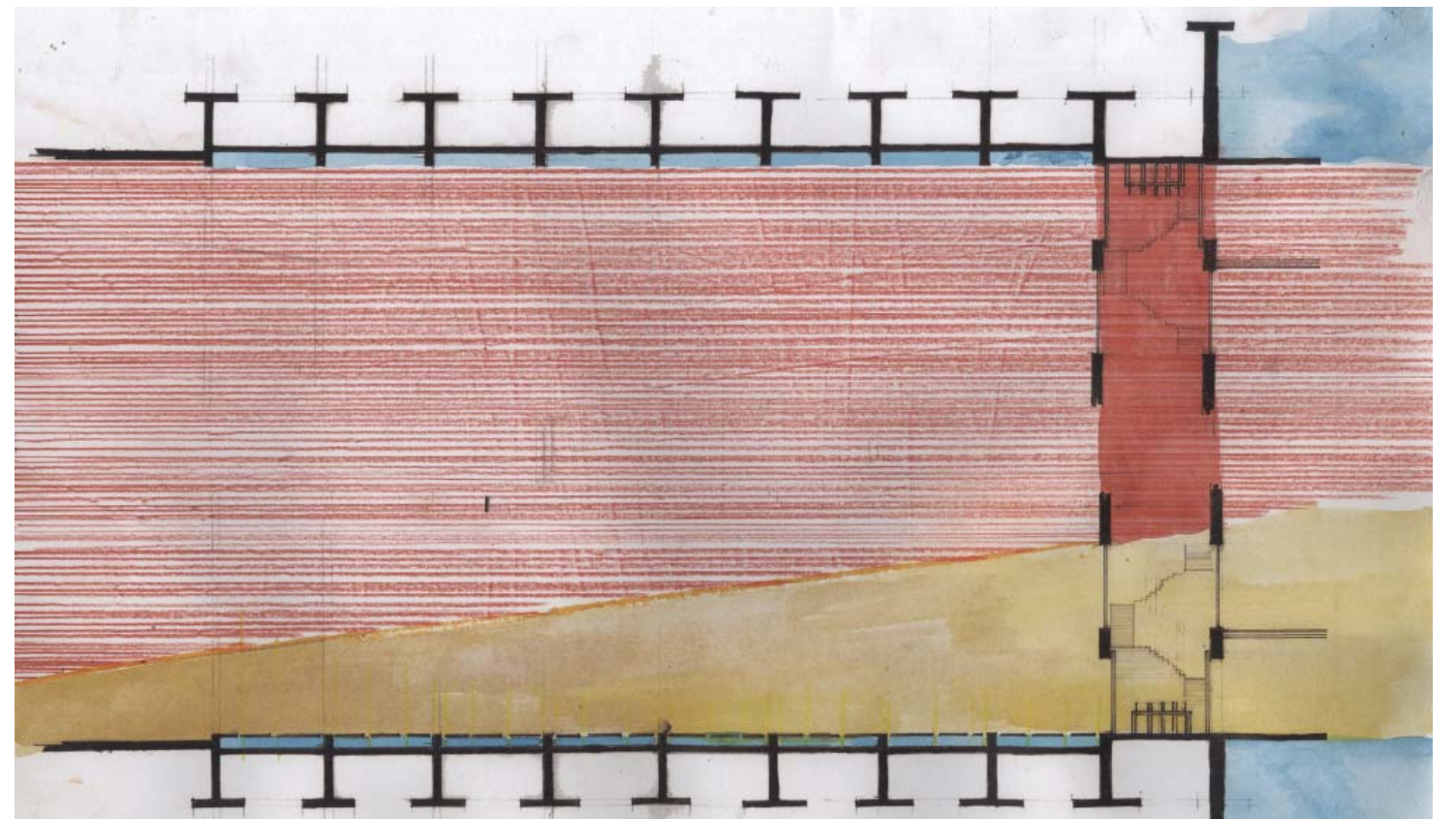
[87] Process Plan



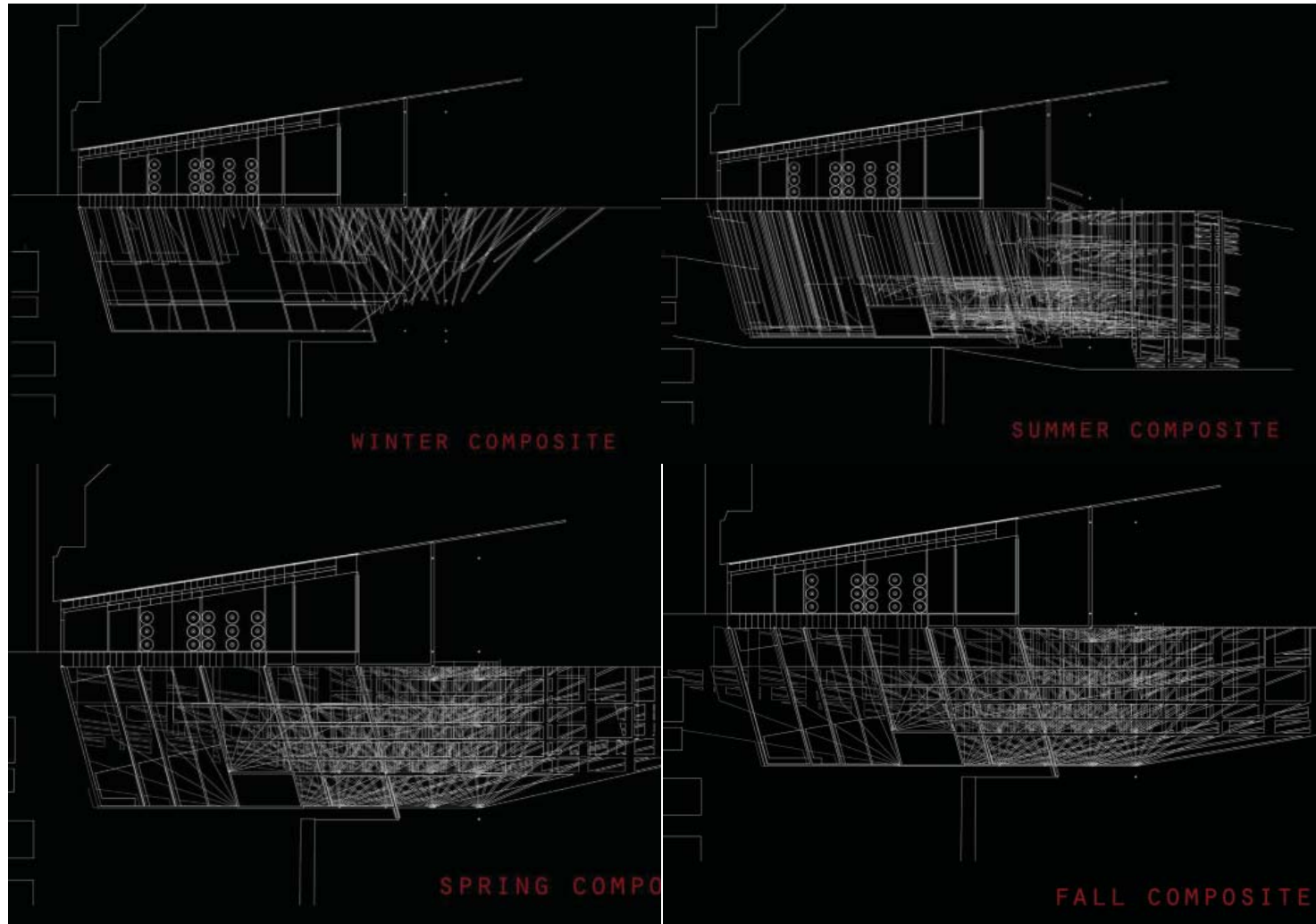
[89] Process Section



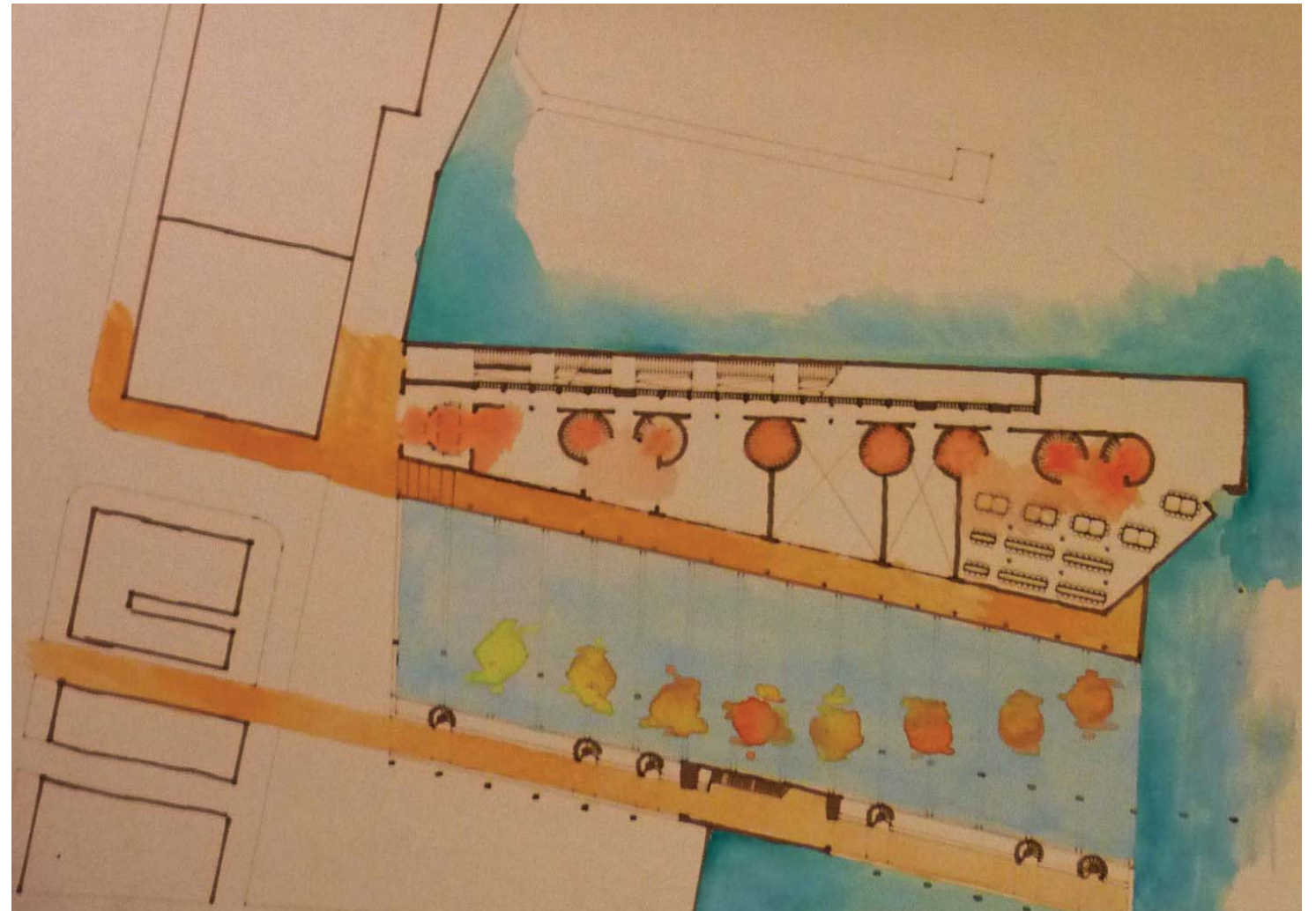
88] Process Plan



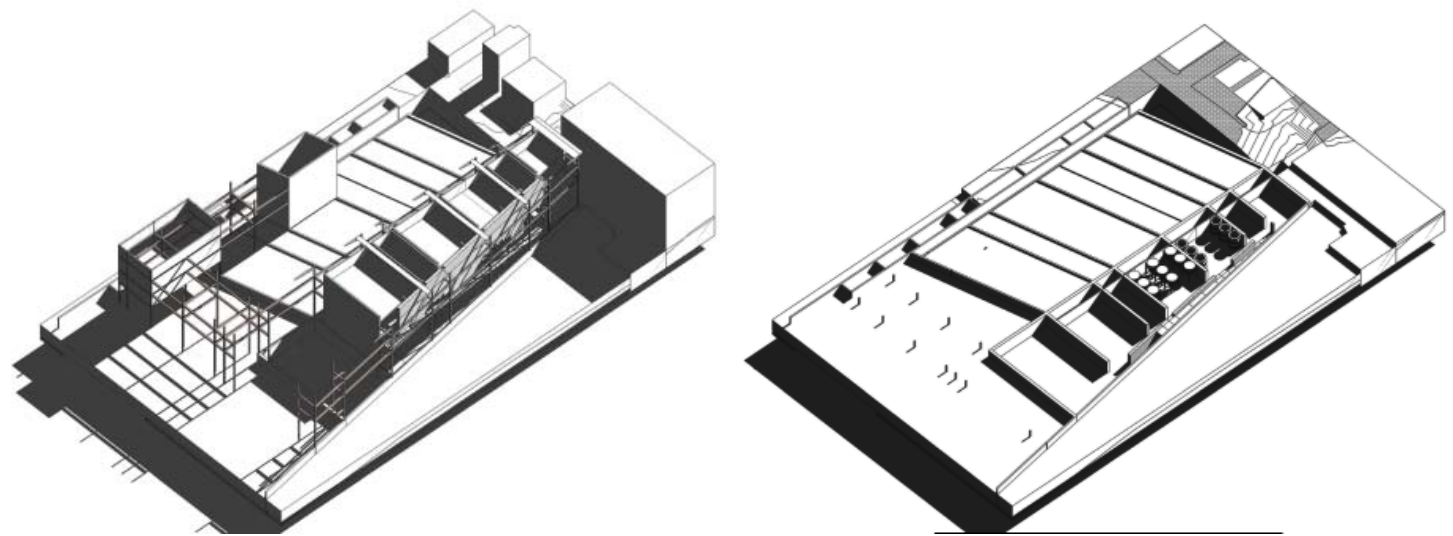
[90] Process Section 41



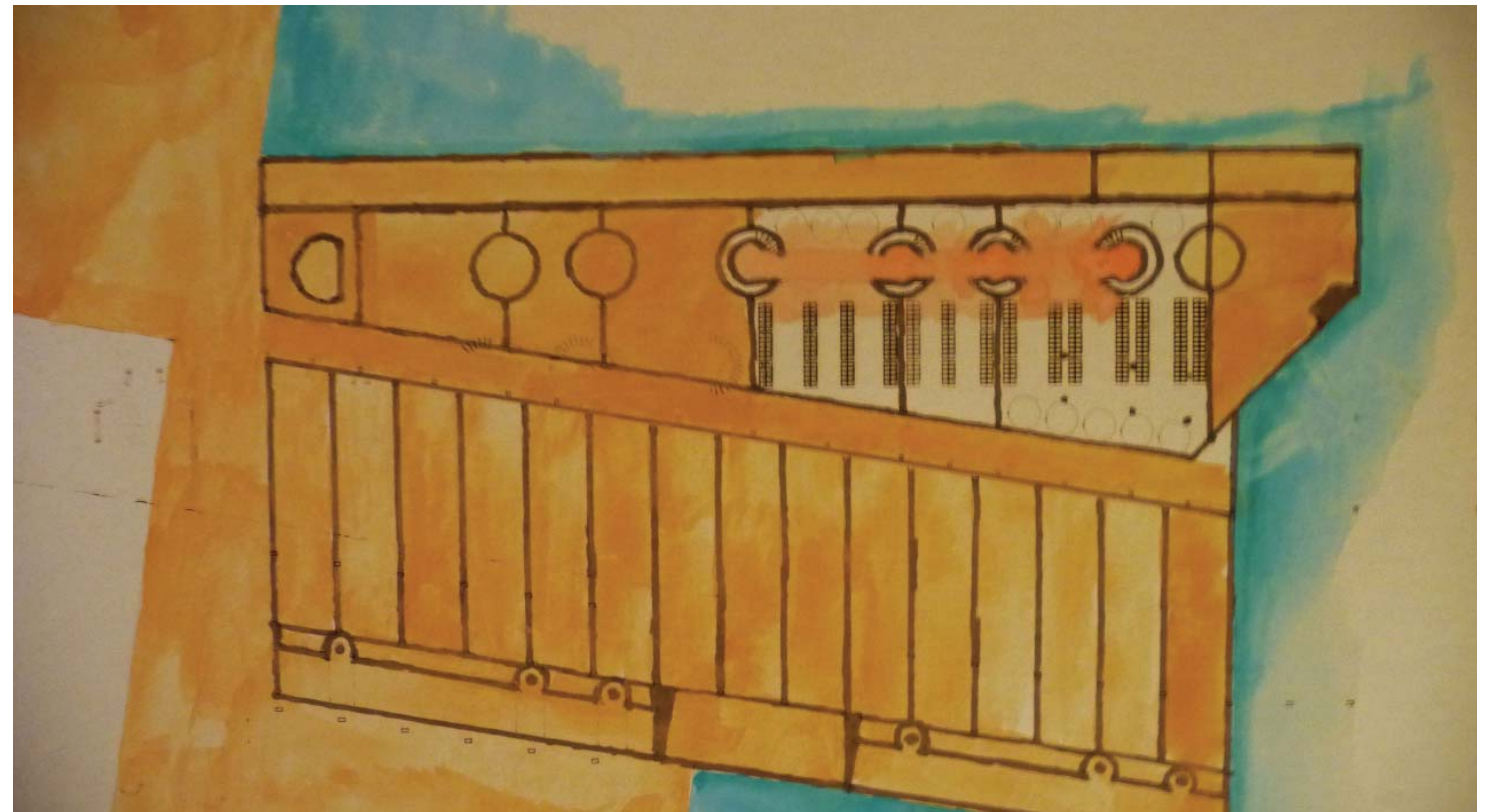
[91] Shadow Study



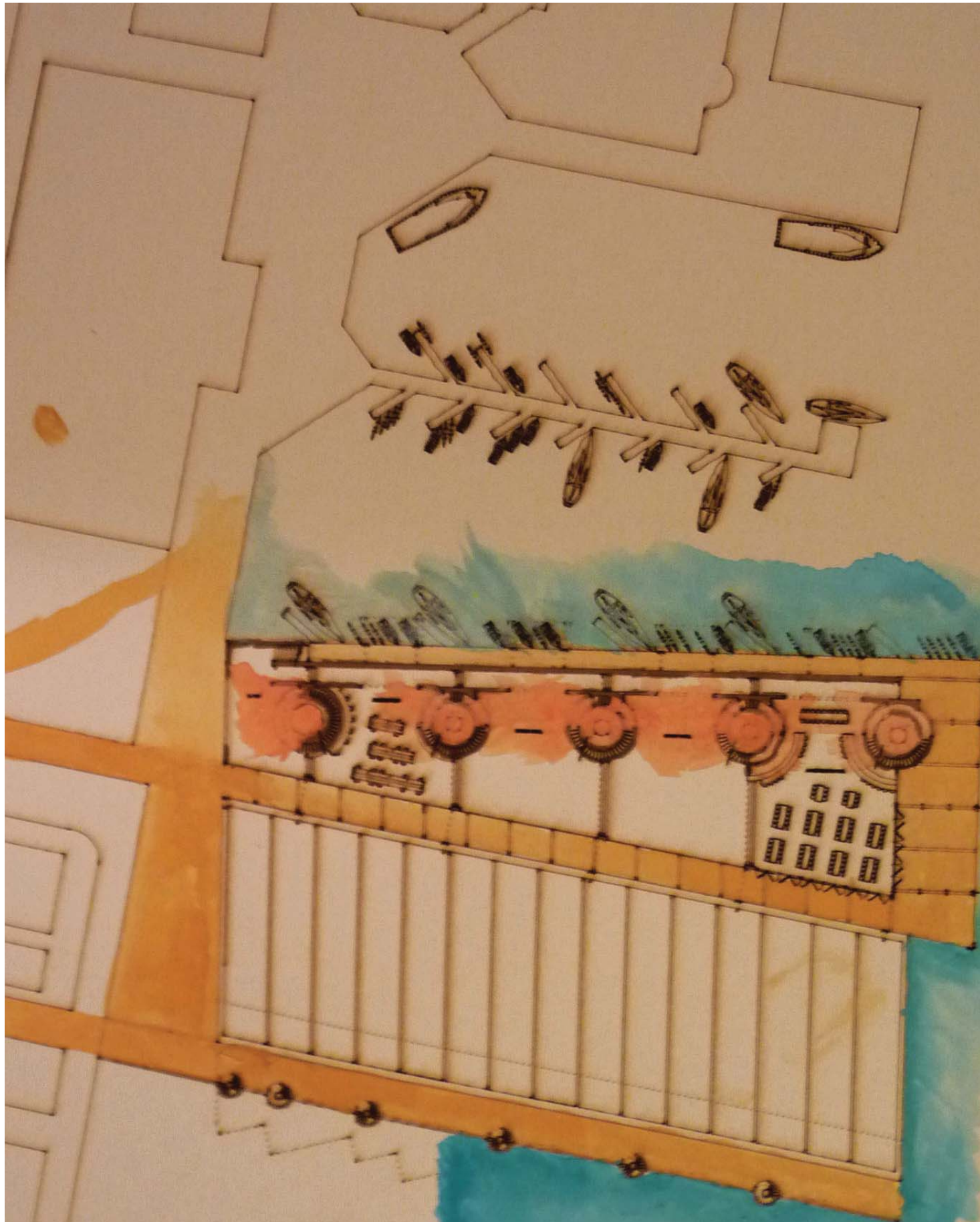
[93] Process Plan - Upper Level - The first iteration with the building moved to the North side of the site.



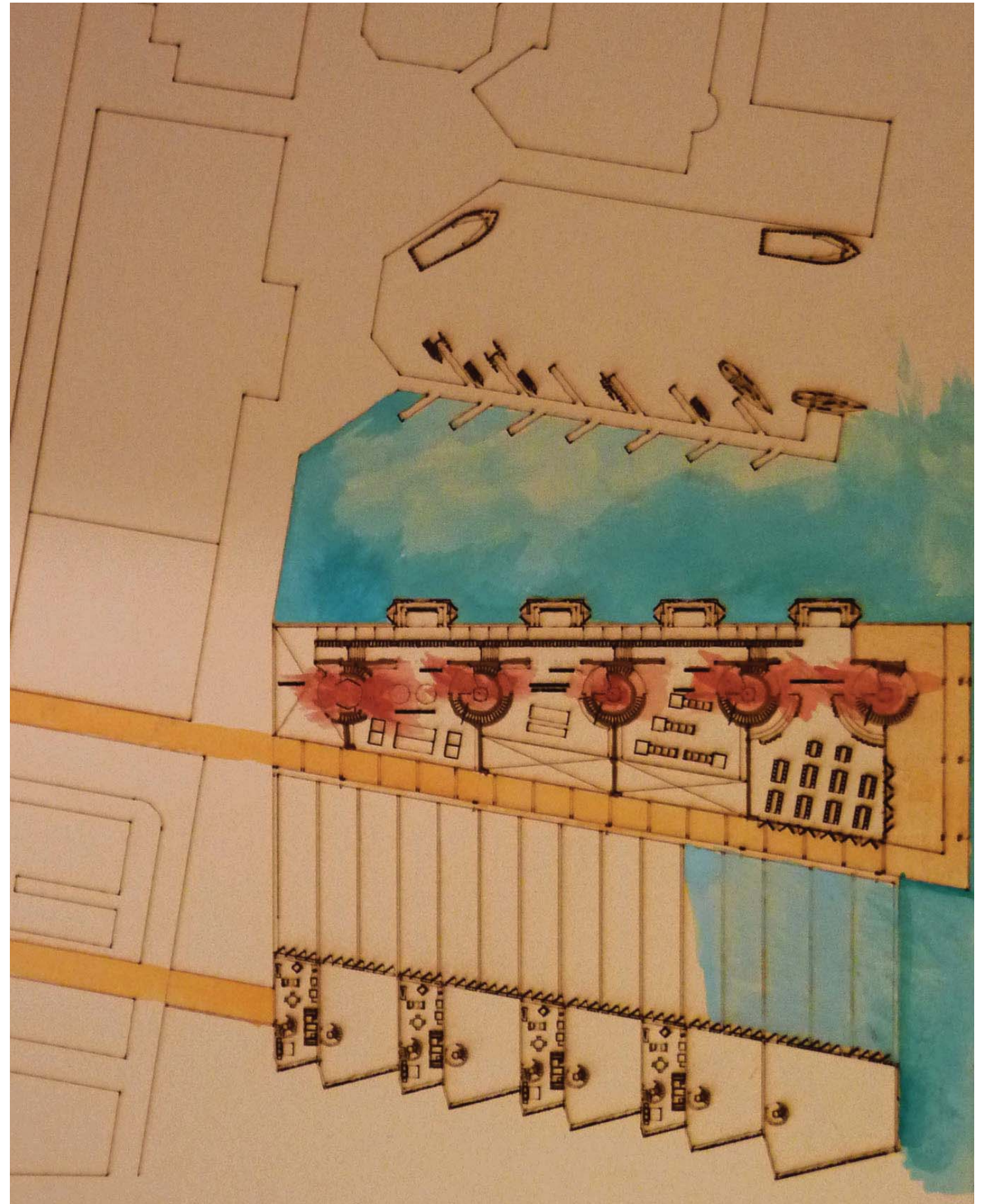
[92] Process Plan-Isometrics



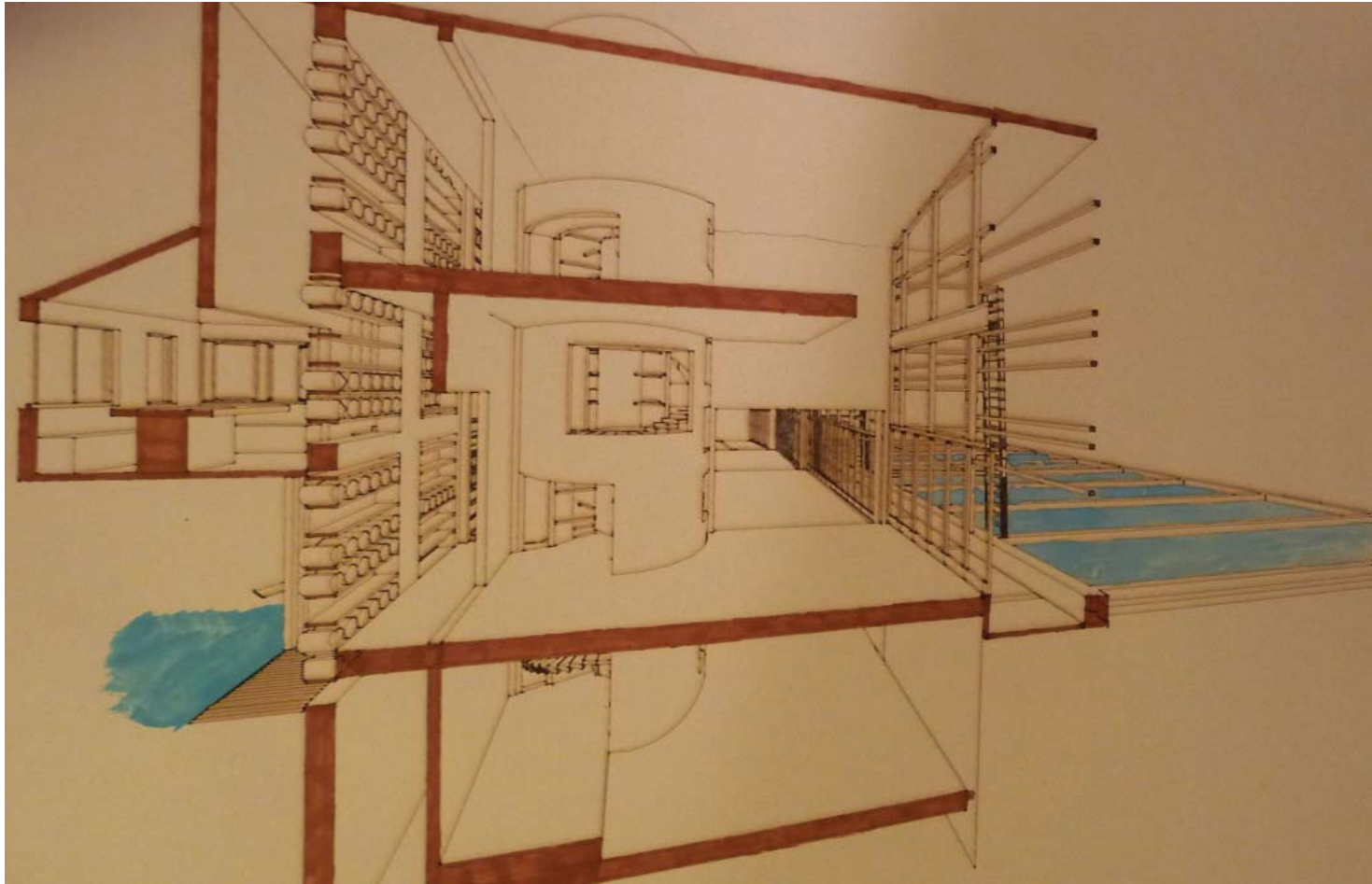
[94] Process Plan - Lower Level



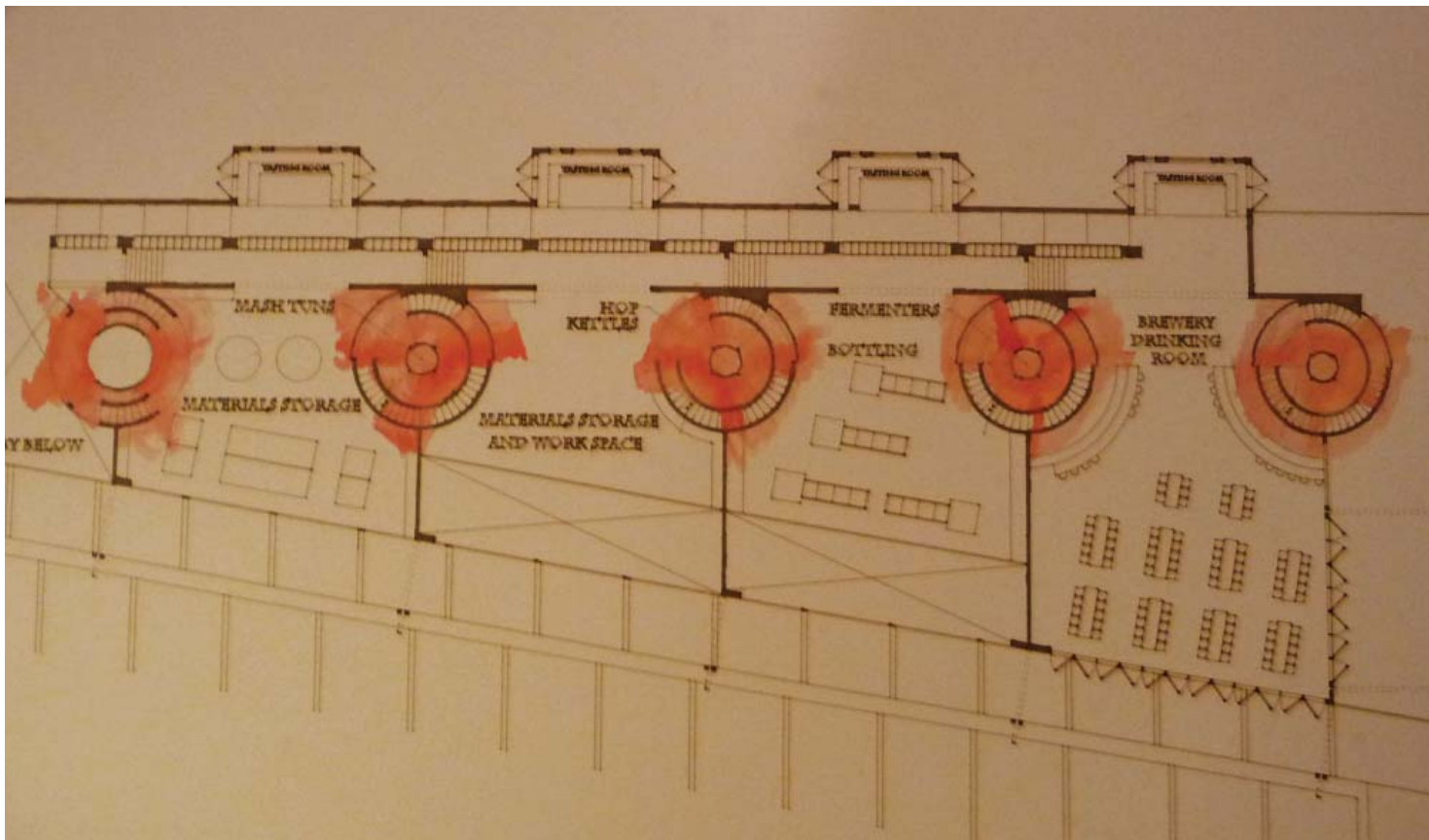
[95] Process Plan - King Street Level



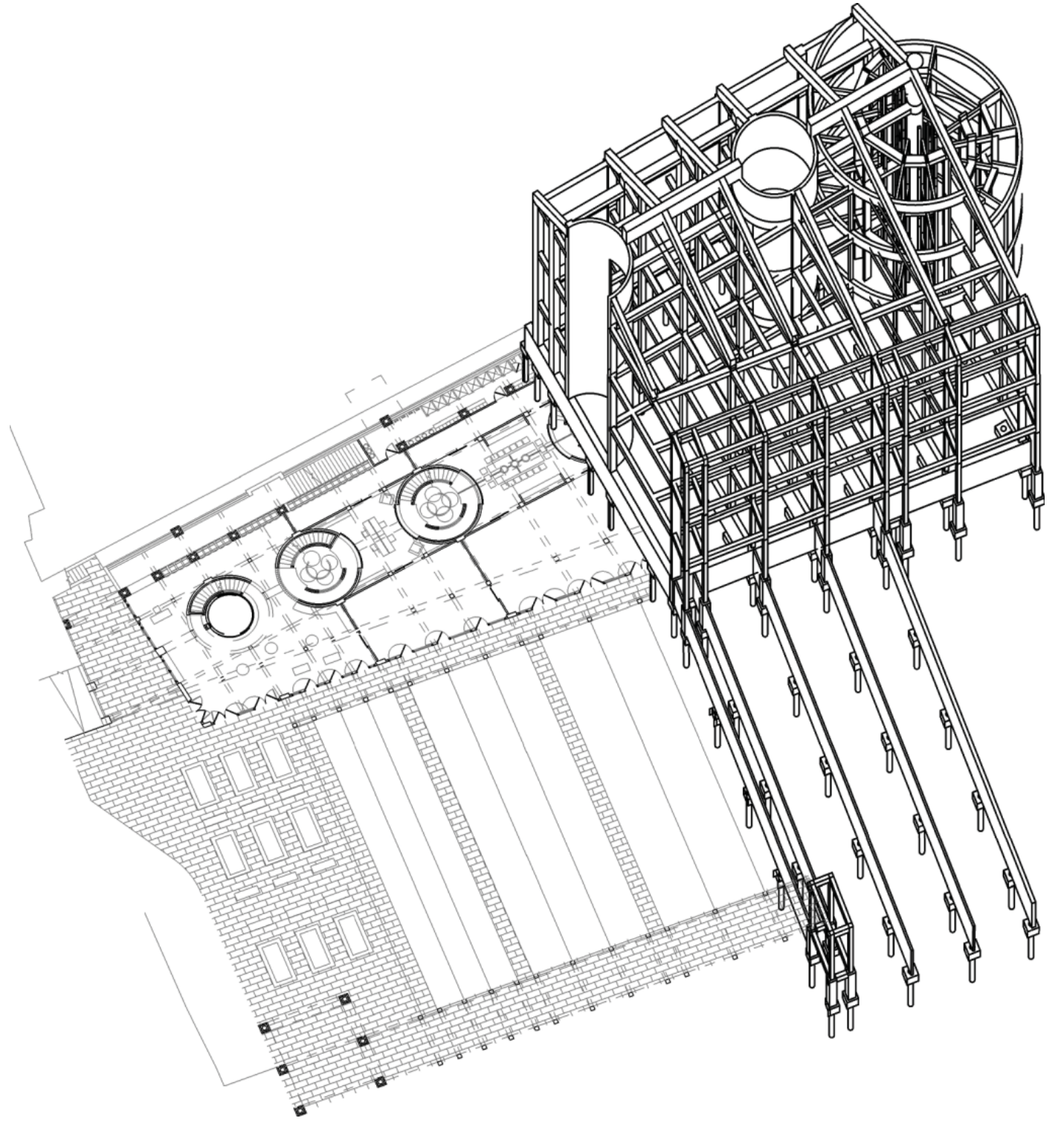
[96] Process Plan - Upper Level



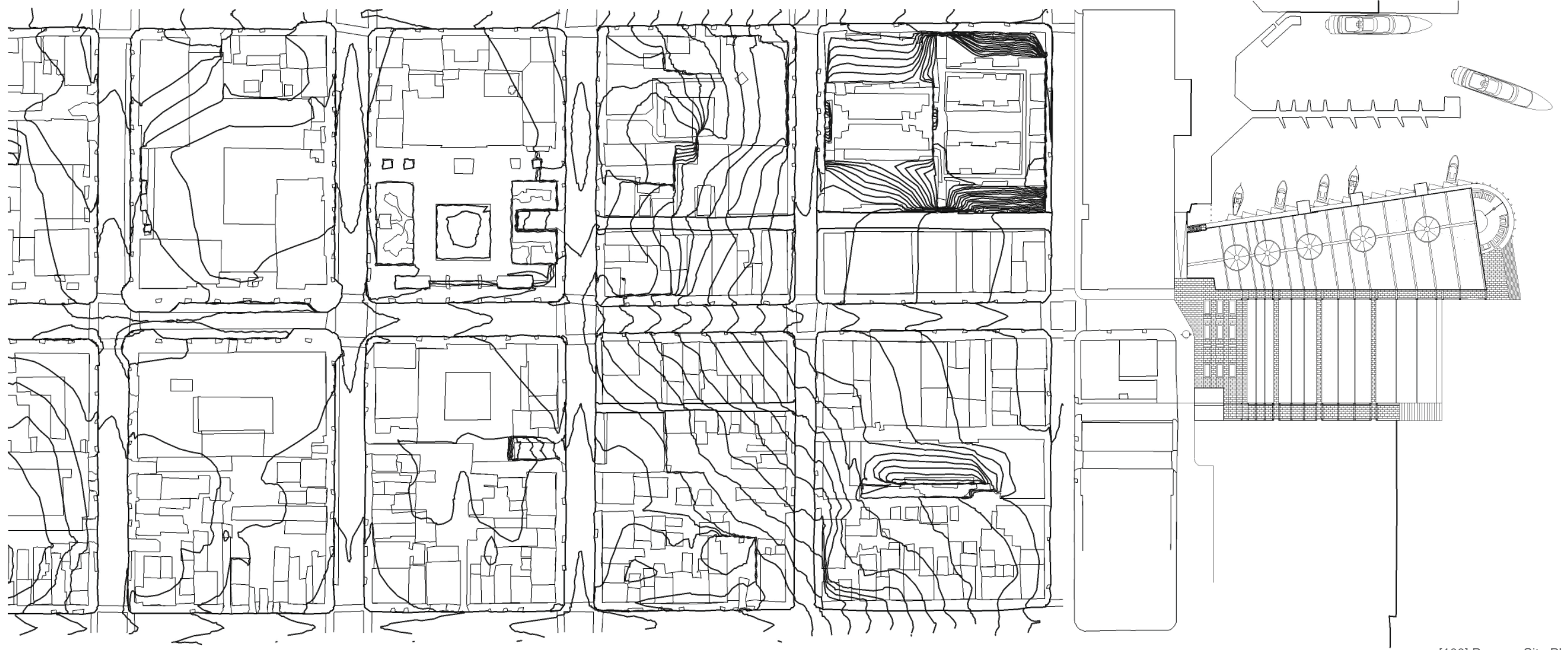
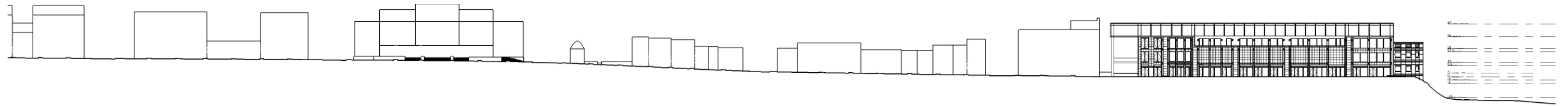
[97] Process Section-Perspective - Through Brewing Space Looking East



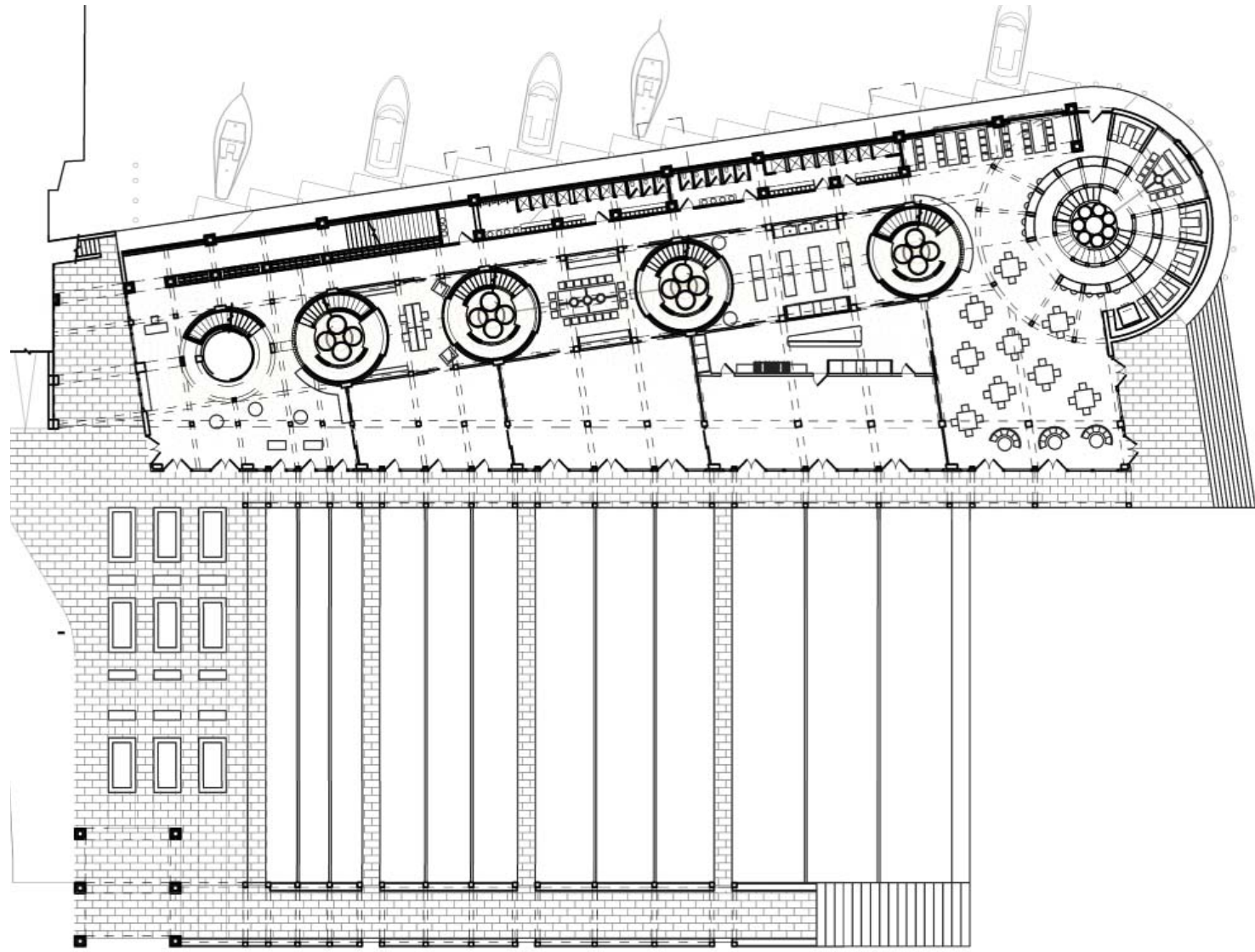
[98] Process Plan - Upper Level (Top of Tasting Stair)



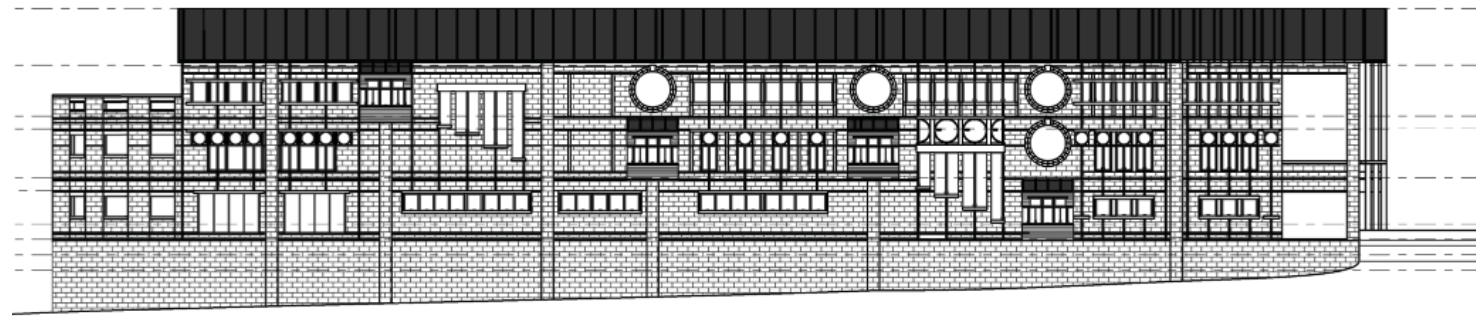
[99] Process Isometric - Structure



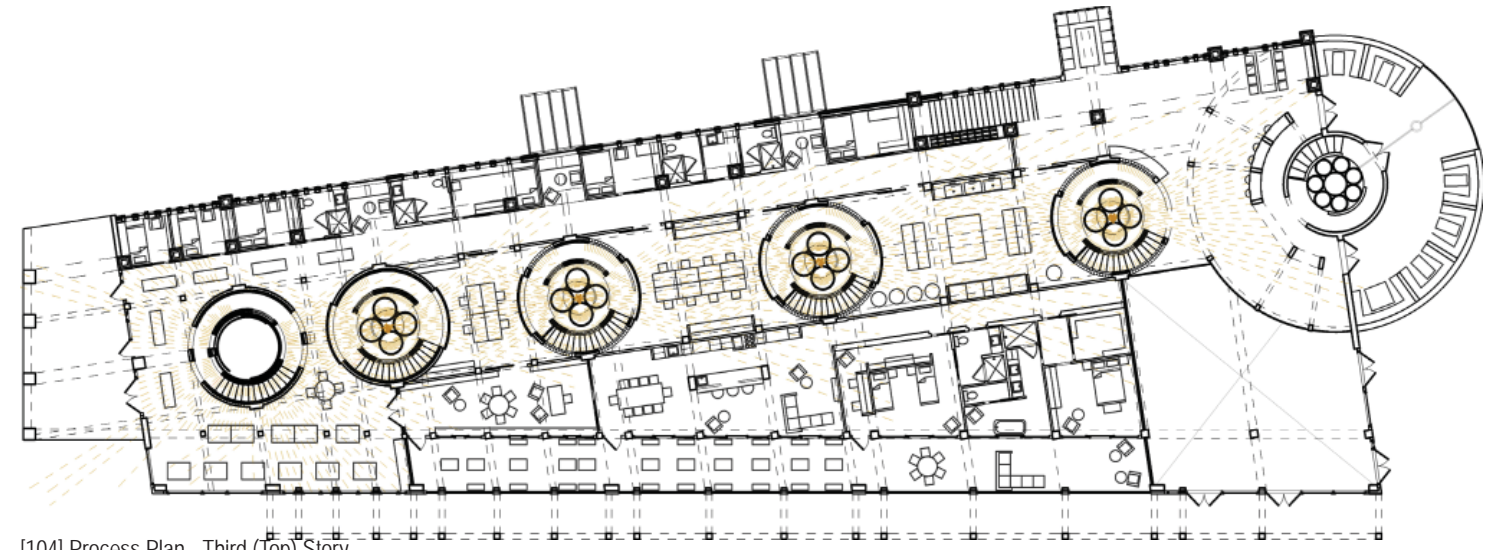
[100] Process Site Plan and Section



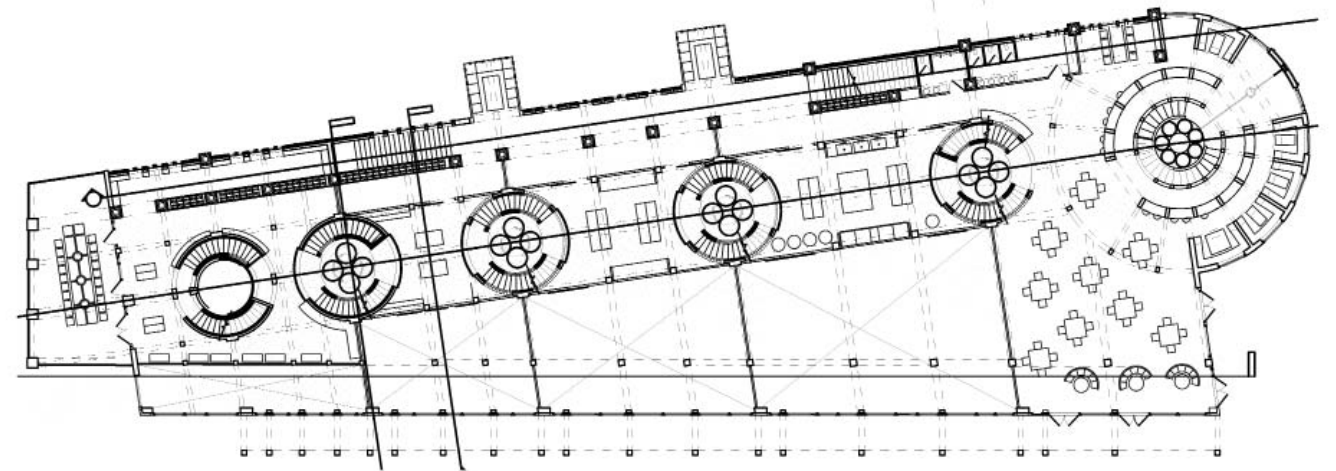
[101] Process Plan - King Street Level



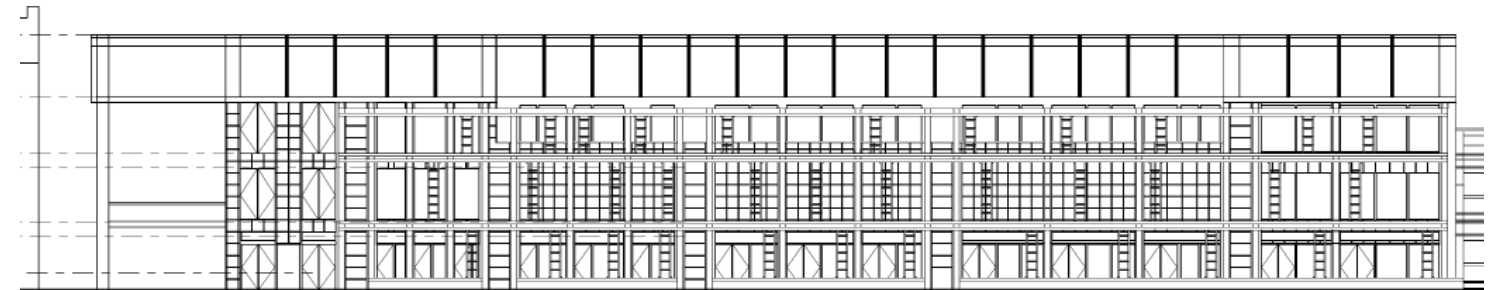
[102] Process Elevation - North Facade



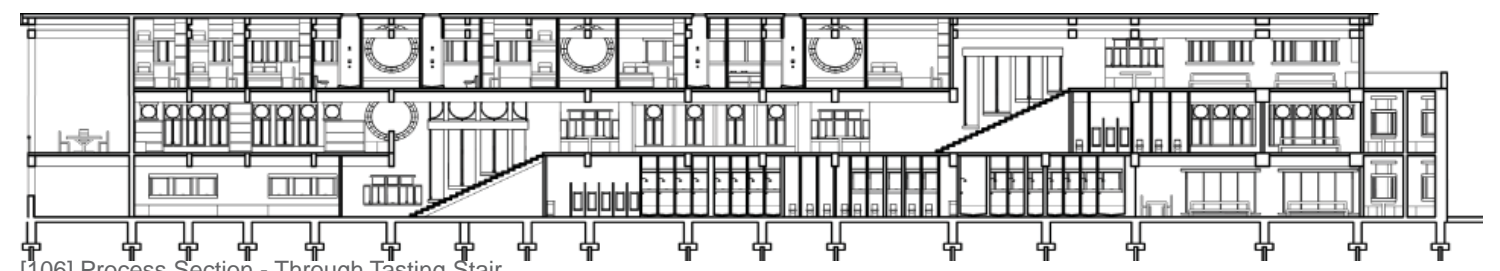
[104] Process Plan - Third (Top) Story



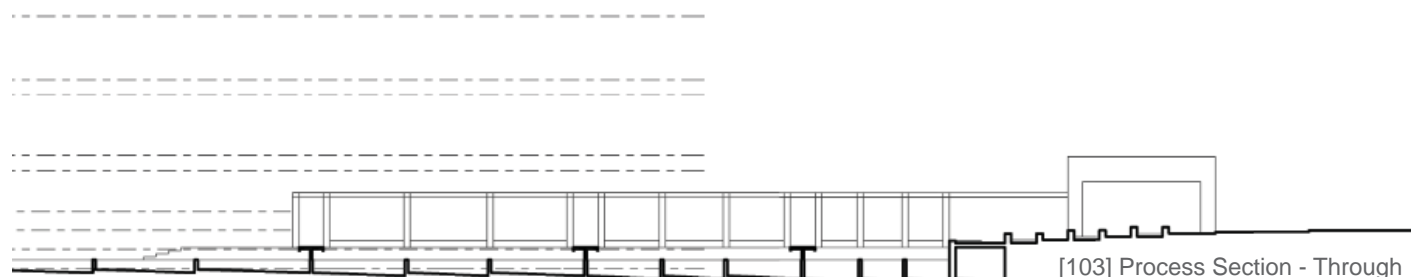
[104] Process Plan - Second Story



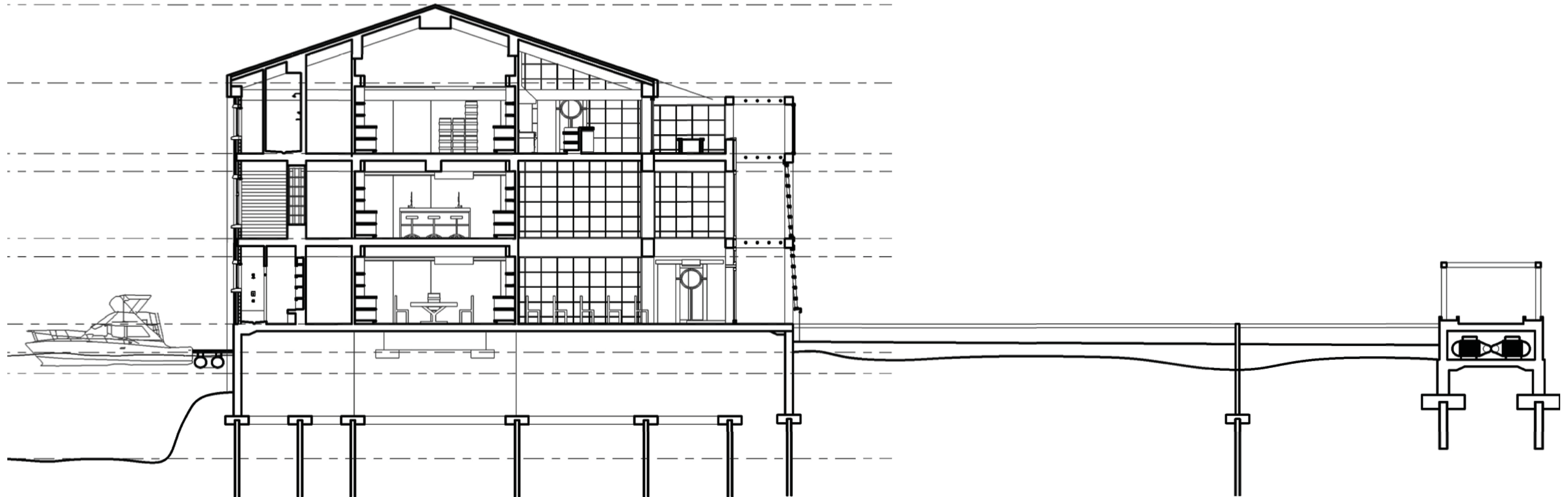
[105] Process Elevation - South Facade



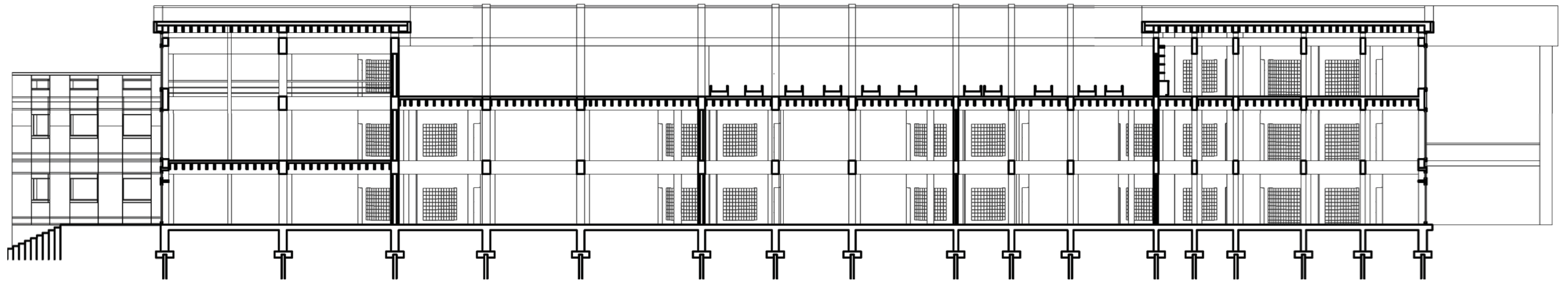
[106] Process Section - Through Tasting Stair



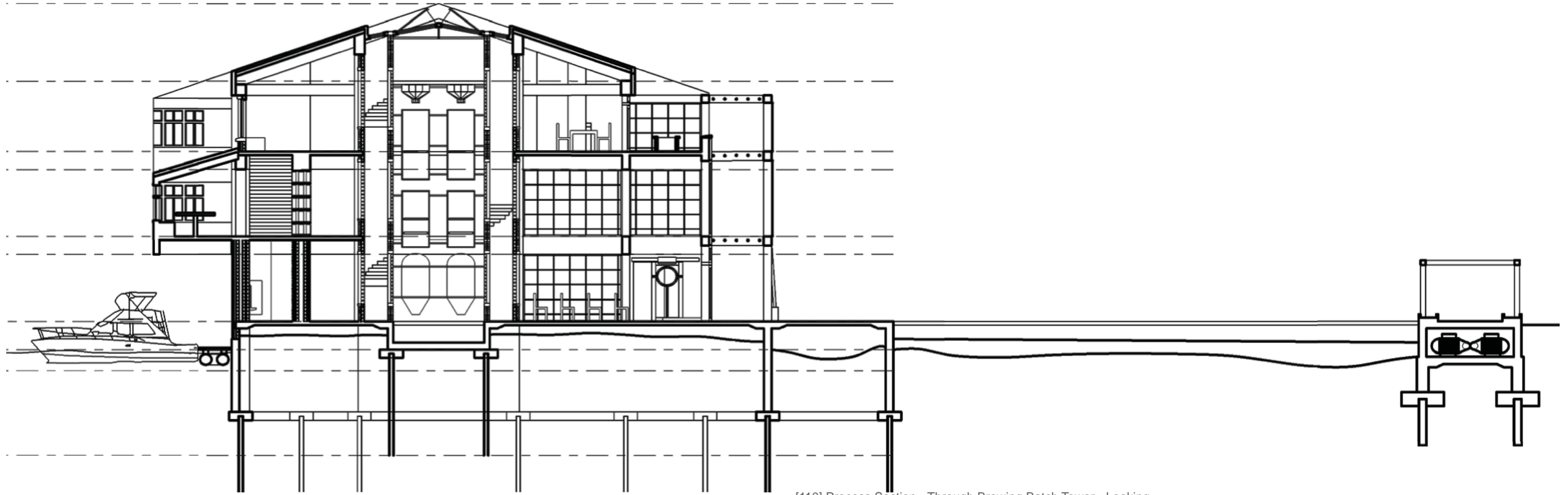
[103] Process Section - Through Clepsydra, Looking South



[107] Process Cross Section - Through Brewing Space Looking East



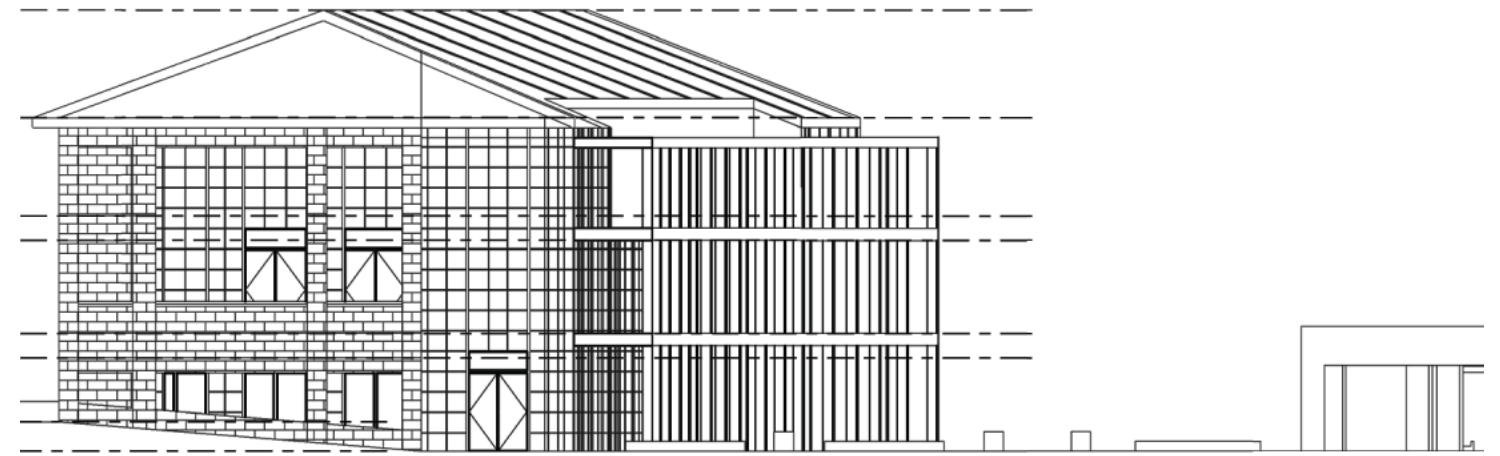
[108] Process Section - Through Brewer's Terrace



[110] Process Section - Through Brewing Batch Tower - Looking



[109] Process Elevation - East Facade



[111] Process Elevation - West Facade



As the building progressed, many ideas that had been explored were filtered out of the final design. In the end, several primary elements anchored the building, having evolved throughout the development of the project. These were, the clepsydra pool, framed by the brewery building to the north and the Wales Alley hops trellis to the south. The brewery building itself consists of the core brewery machine, housed in four masonry towers which act as both lanterns for the daily passage of the sun and internal circulation; enveloped by the north wall/tasting stair and the south wall/hops trellis.

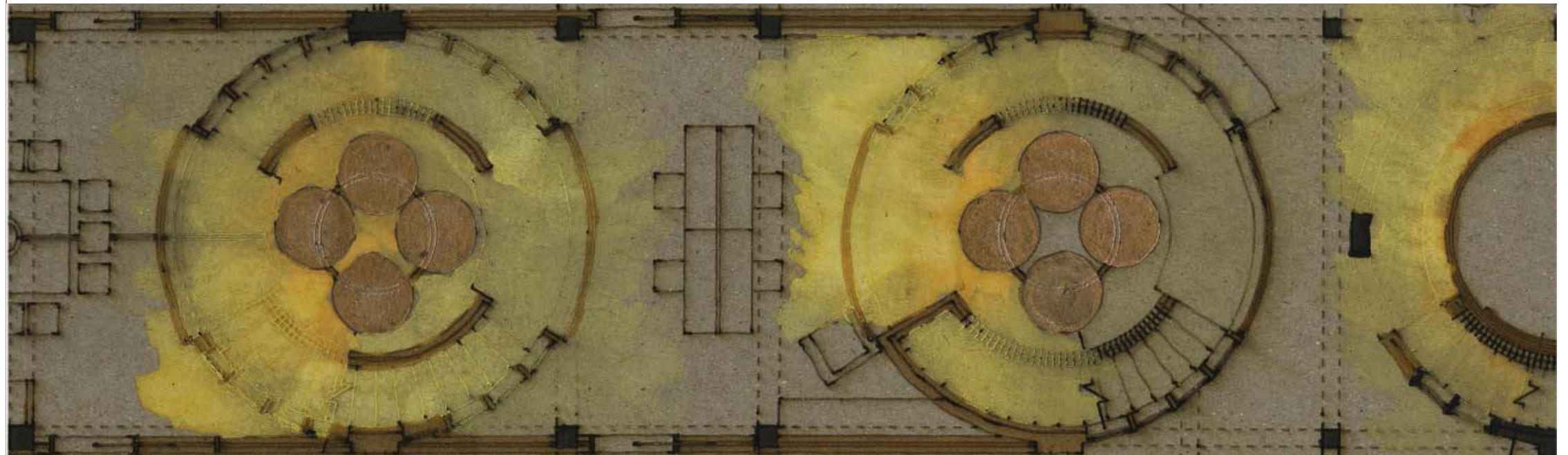
The King Street level, where the building is entered includes the Old Town Boat club's new spaces (showers and locker rooms under the North Wall tasting stair, a large drinking and meeting room on the waterfront East side of the building, and slips for the members' boats). It also includes three double-height multi-purpose spaces on the south side of the building which open up to the public walkway, and can be used by the brewery (for classes or private events), the city (for civic meetings or public events) or the boat club, and office and classroom space for the brewery inside the core that surrounds the brewing towers.

The second level of the building contains materials and storage space for the brewery on the west end, a core of work and storage space between the brewing towers, and the primary serving, drinking, and dancing space for the brewery's beer.

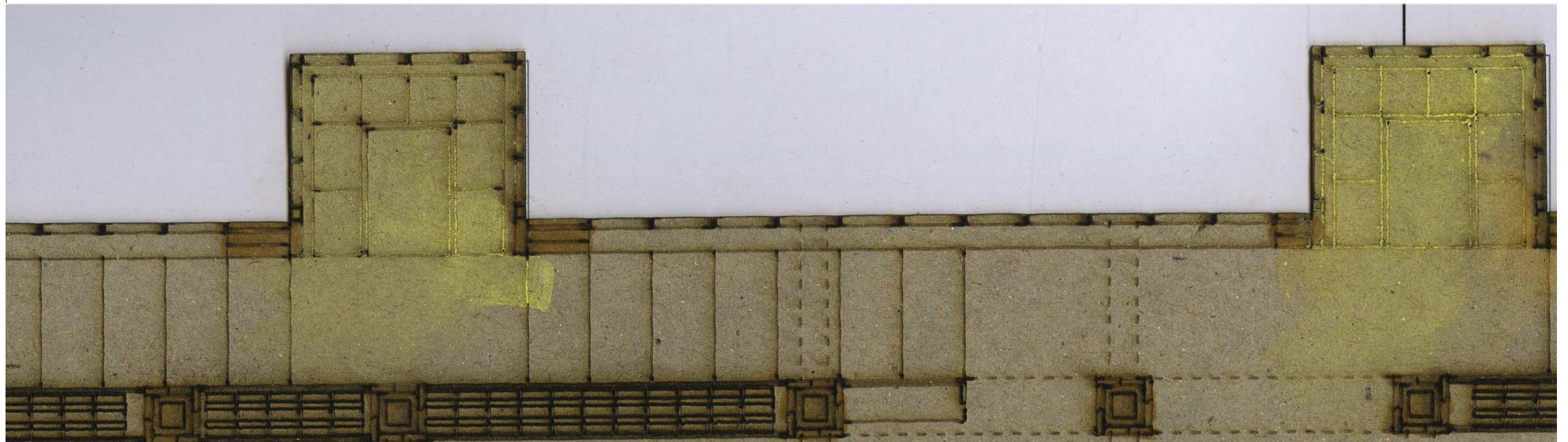
The top level of the brewery includes more work space in the core surrounding the brewing towers, the brewer's apartment, and the brewery's guest and student dormitories, as well as the upper level of the bar with an outdoor deck.

Conclusion

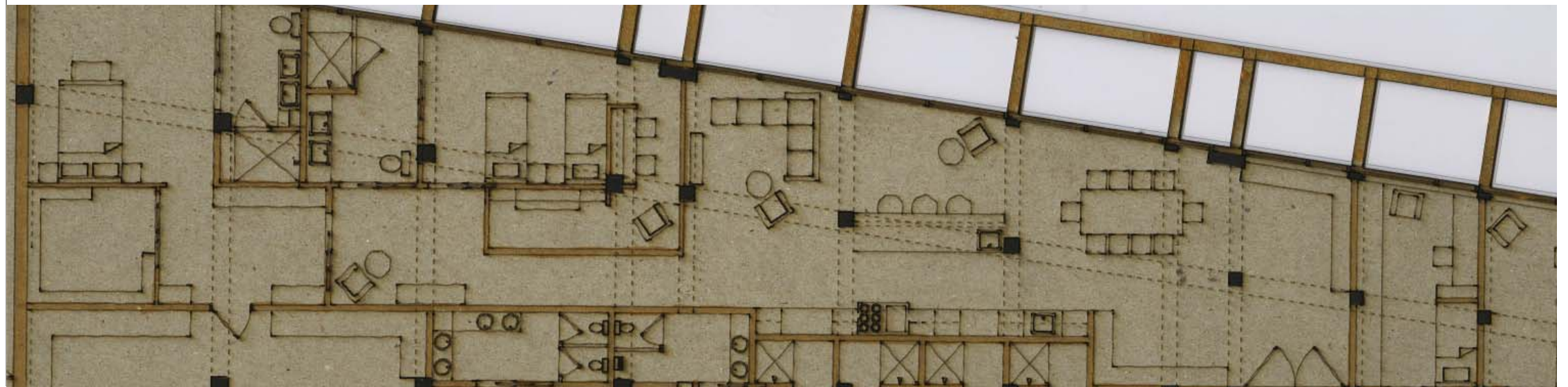
[113] Brewery Machine Towers. The struggle to make circulation between multiple levels of a linearly-arranged, downward stepping brewery space created the idea of a vertically-oriented brewing process. The double wall provides a space for a winding stair case giving access to all levels of the brewery workspace. The openings at the top allow sunlight to enter the stair space and reflect into the surrounding spaces. The top enclosure includes operable openings to vent the space of heat and steam for quick cooling of the beer before fermentation.

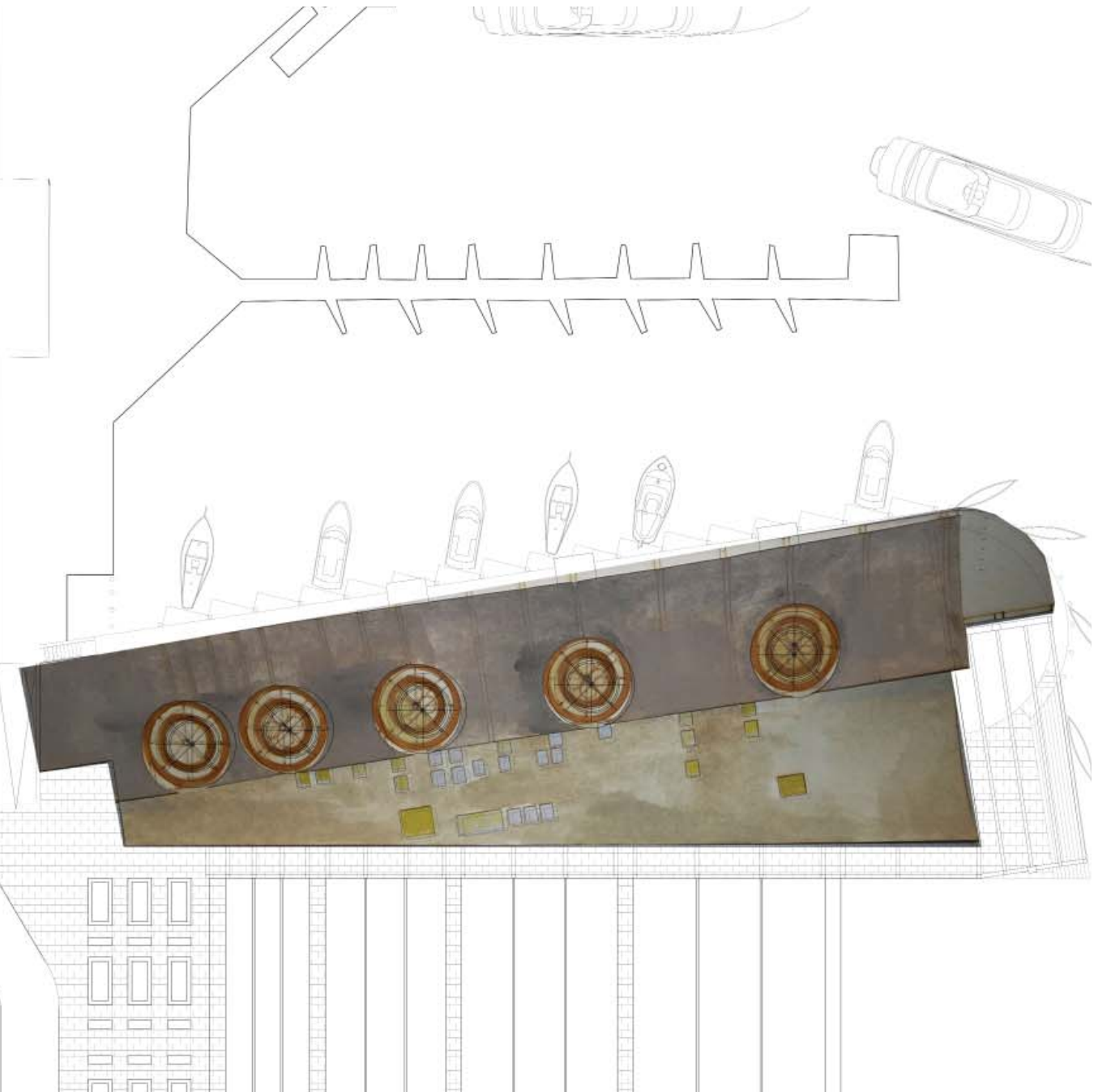
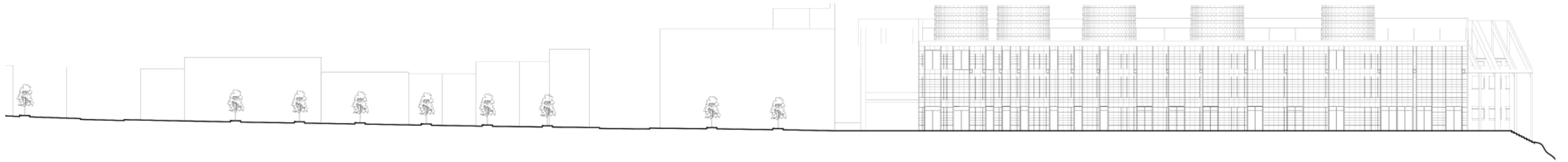


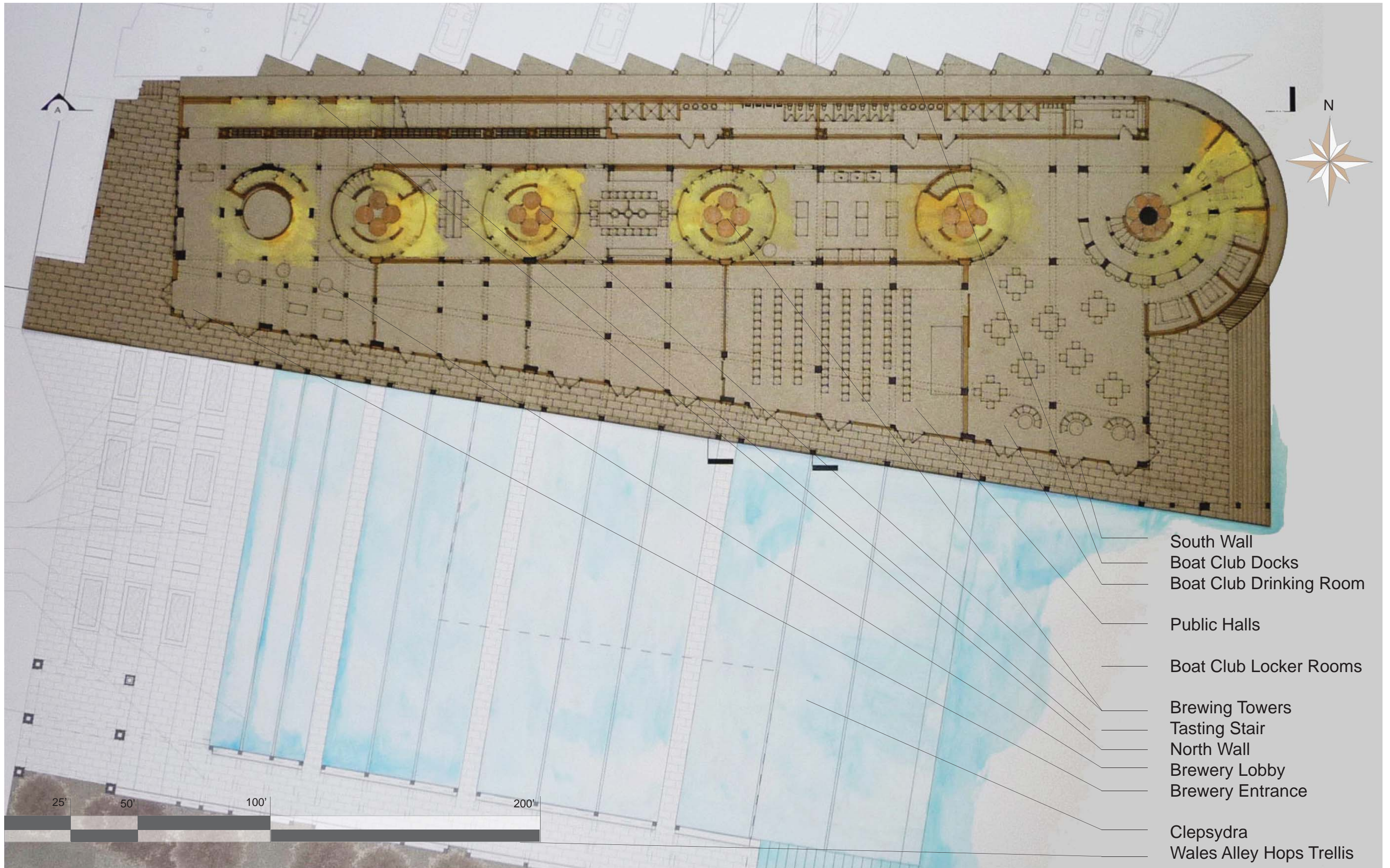
[114] North Wall and Tasting Stair. The North wall consists of a solid masonry wall, a monumental stair, and a thick wall of shelves to hold beer kegs. The stair is punctuated with landings that hold seasonal tasting rooms, where newly finished batches of beer will be tapped, tasted, and celebrated as important events in the building and the city.



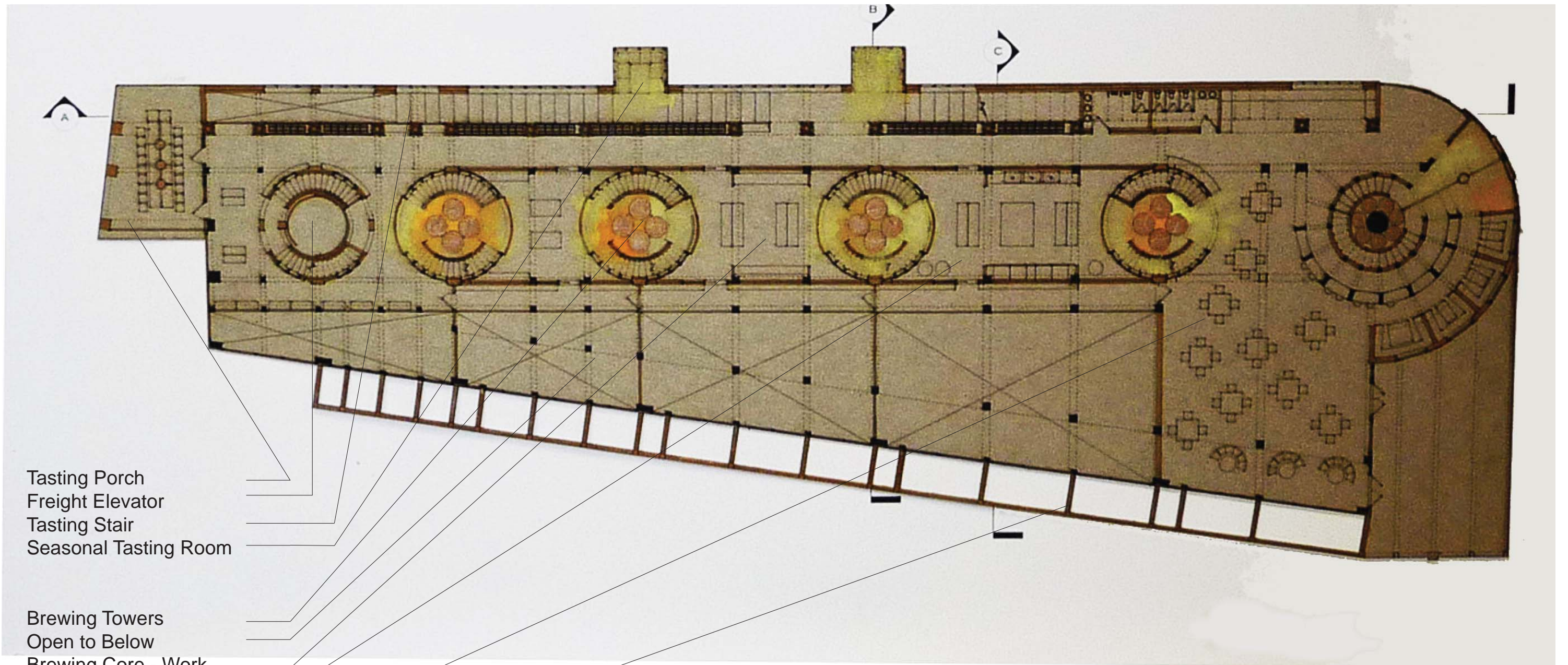
[115] The Brewery living space







- South Wall
- Boat Club Docks
- Boat Club Drinking Room
- Public Halls
- Boat Club Locker Rooms
- Brewing Towers
- Tasting Stair
- North Wall
- Brewery Lobby
- Brewery Entrance
- Clepsydra
- Wales Alley Hops Trellis



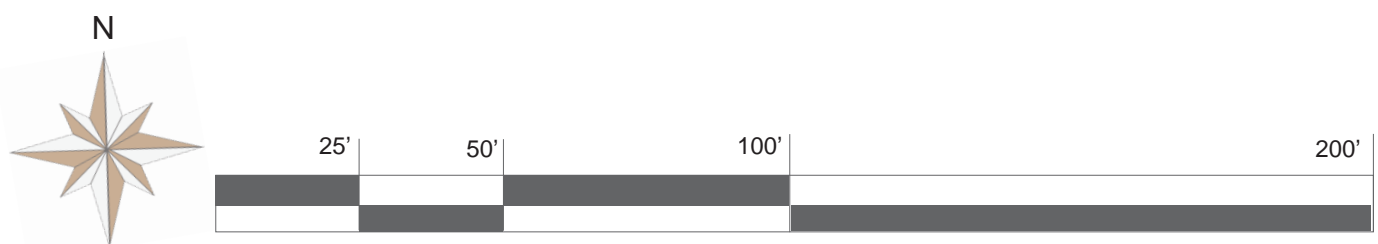
Tasting Porch
 Freight Elevator
 Tasting Stair
 Seasonal Tasting Room

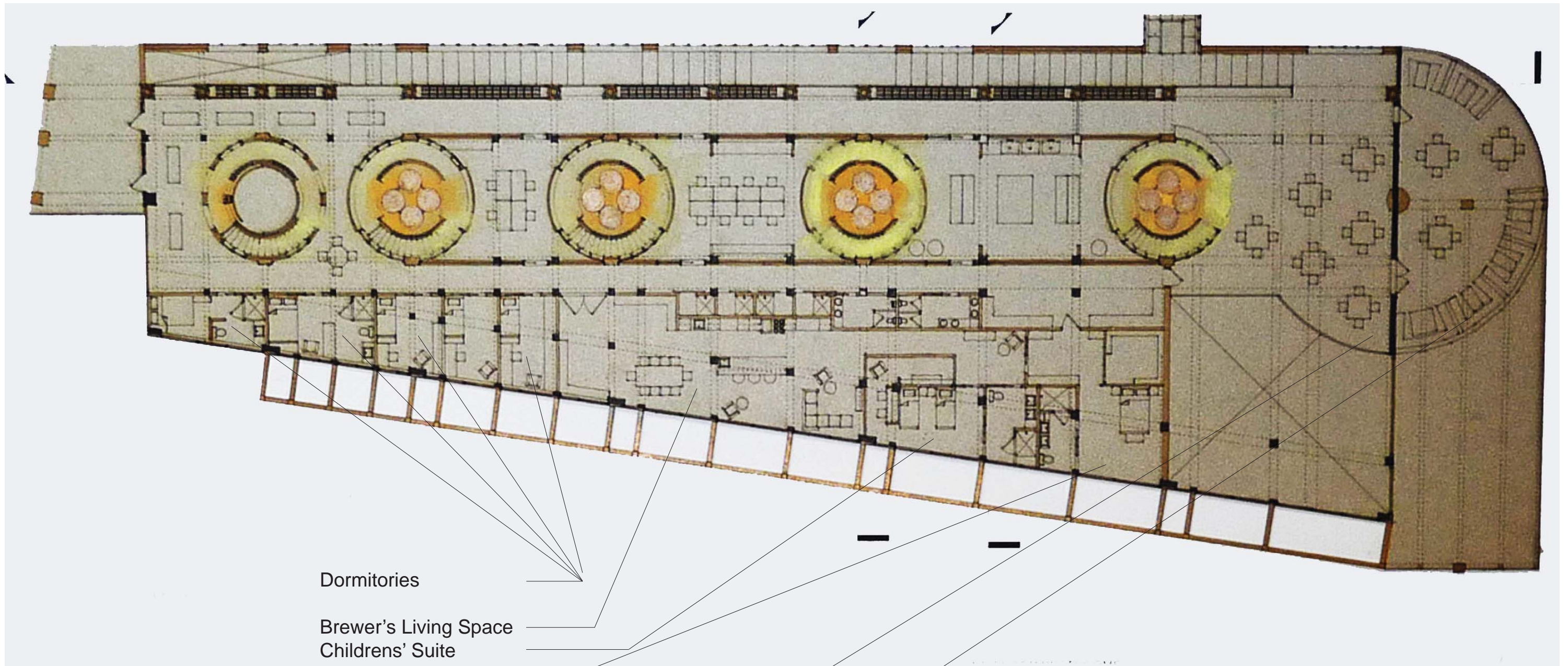
Brewing Towers
 Open to Below
 Brewing Core - Work
 Space and Classrooms

Brewery Bar

South Wall Hops Trellis

[118] Final Second Level Plan





[119] Final Third Level Plan

Dormitories

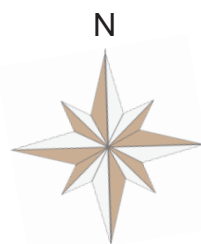
Brewer's Living Space

Children's Suite

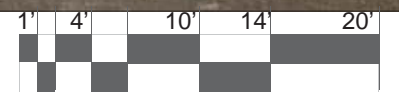
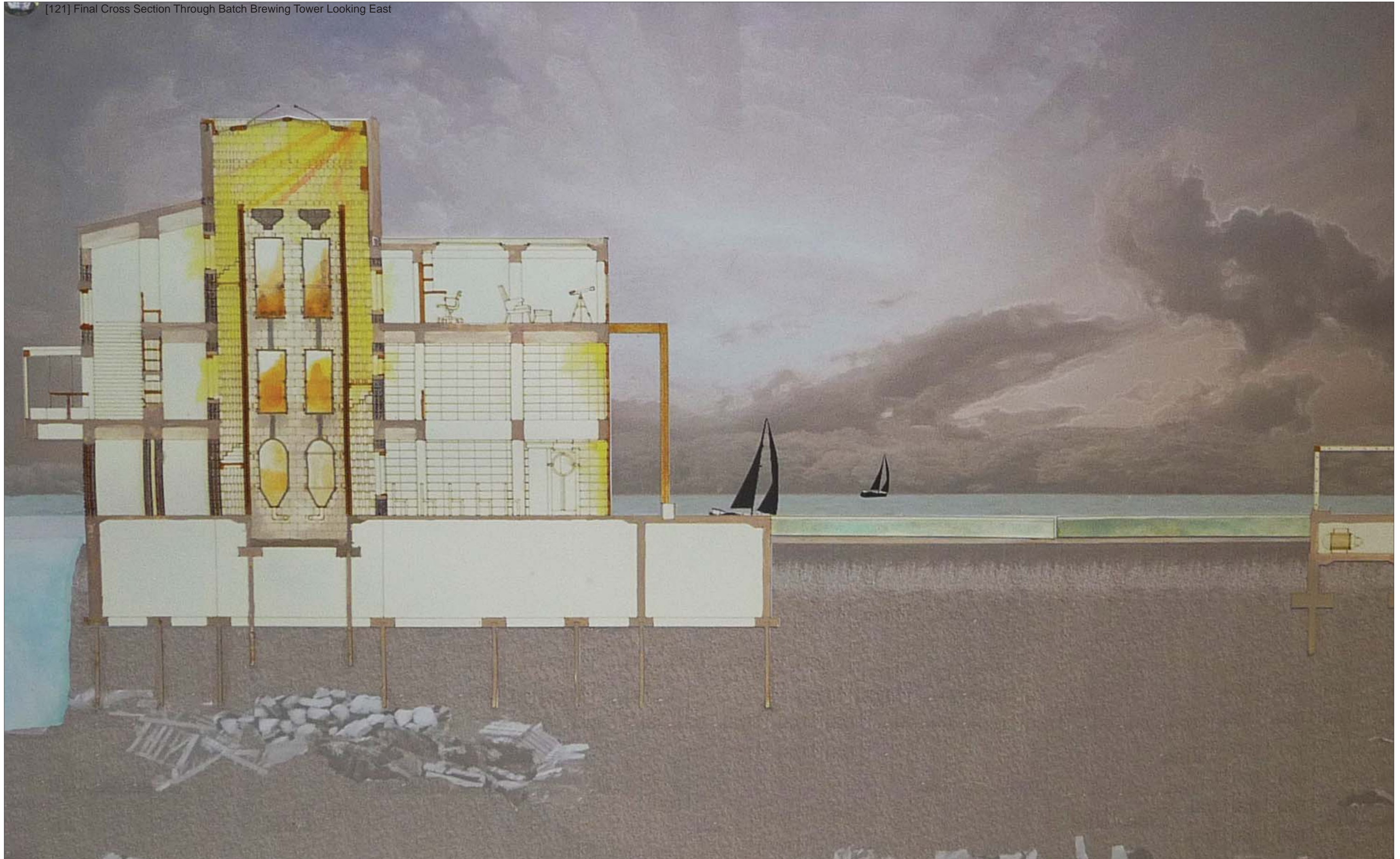
Brewer's Suite

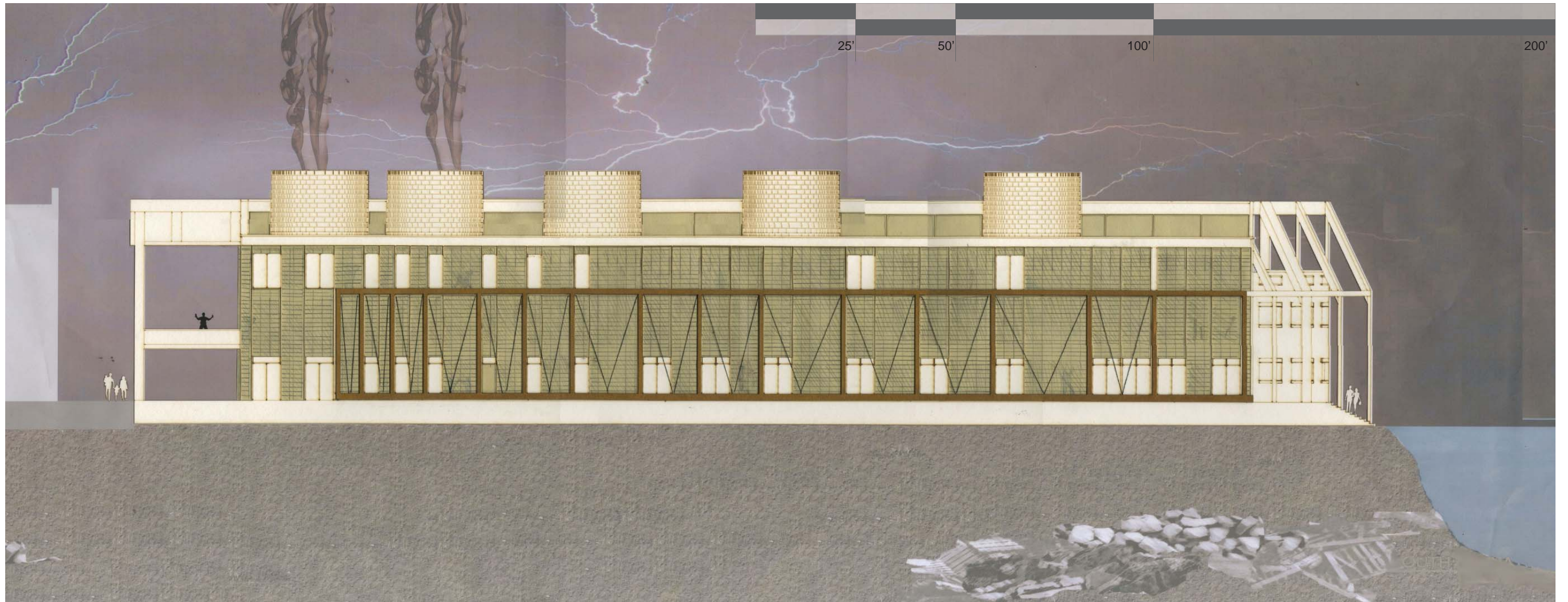
Upper Level Bar

Waterfront Deck

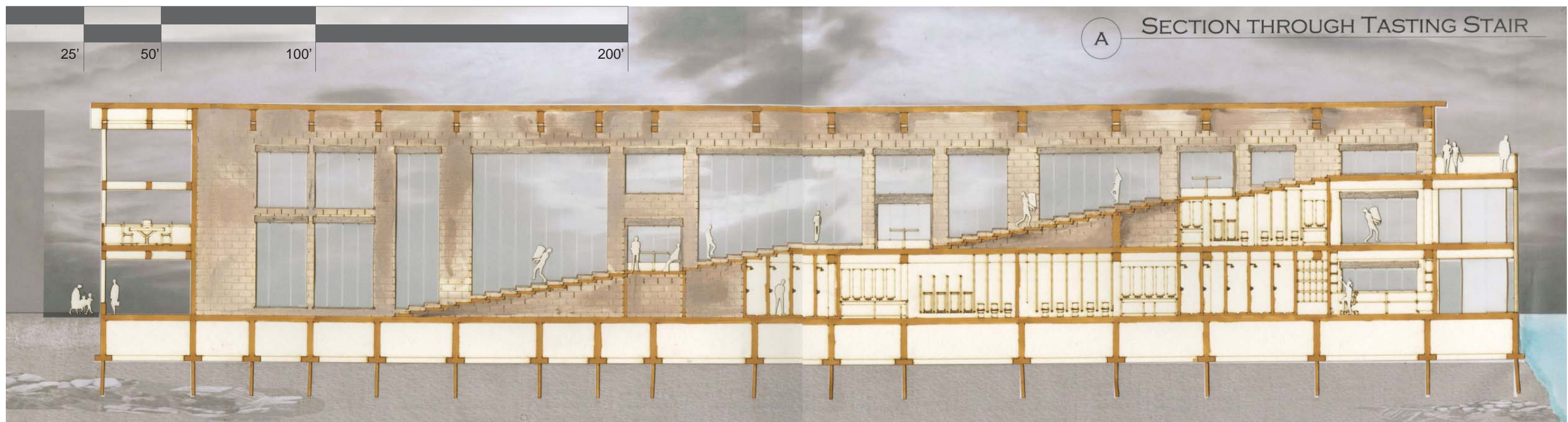








[122] Final South Elevation



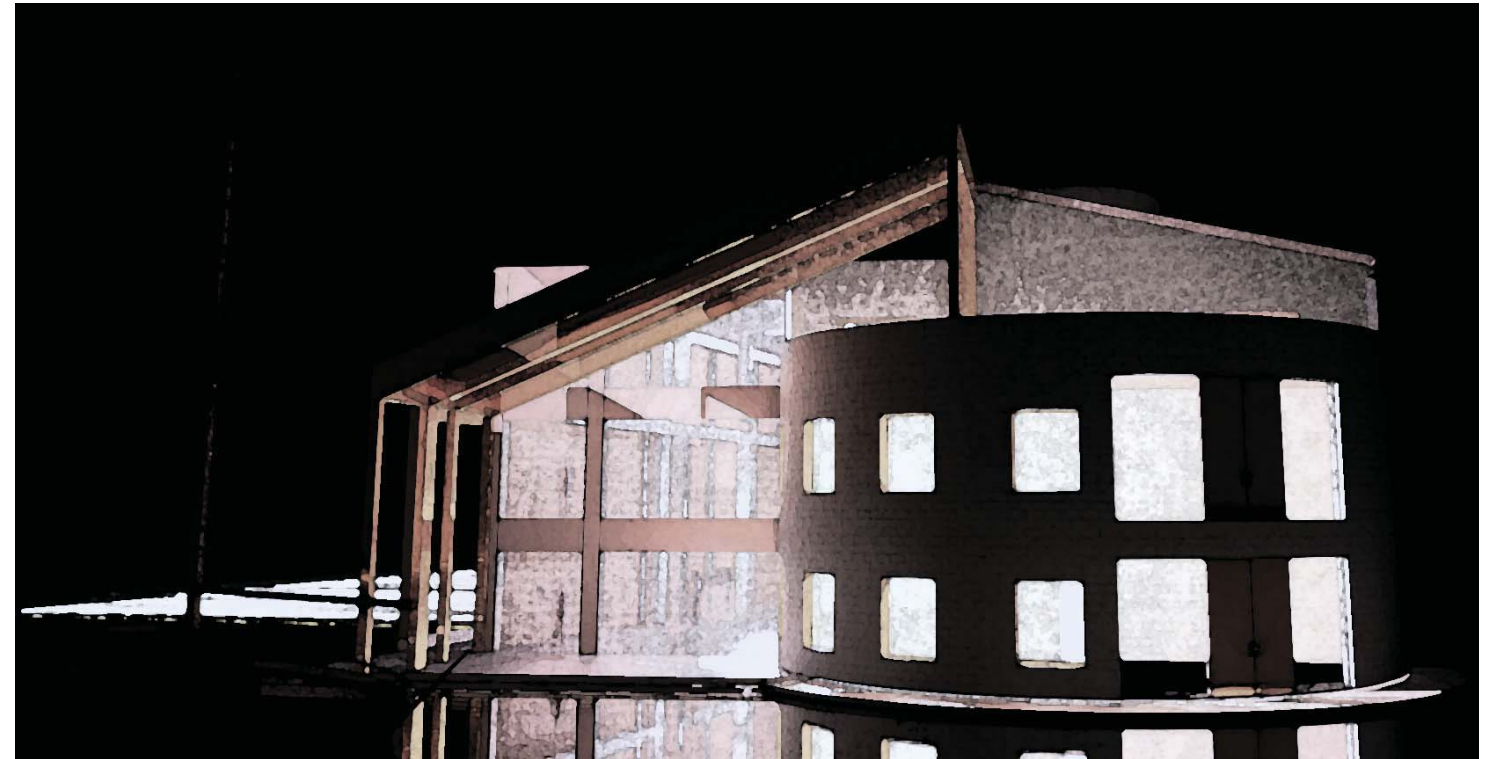
[123] Final Section



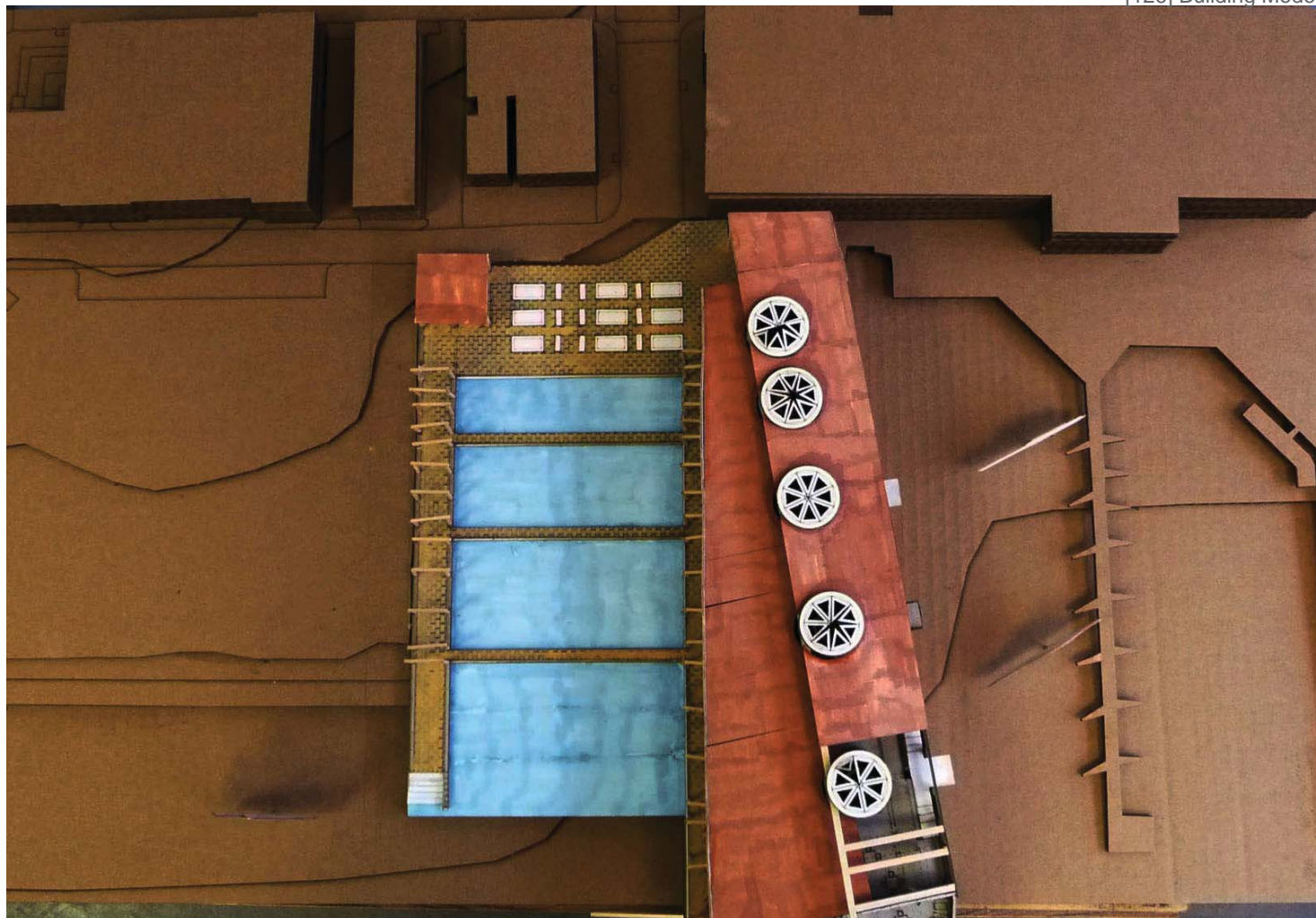
[124] Final North Elevation



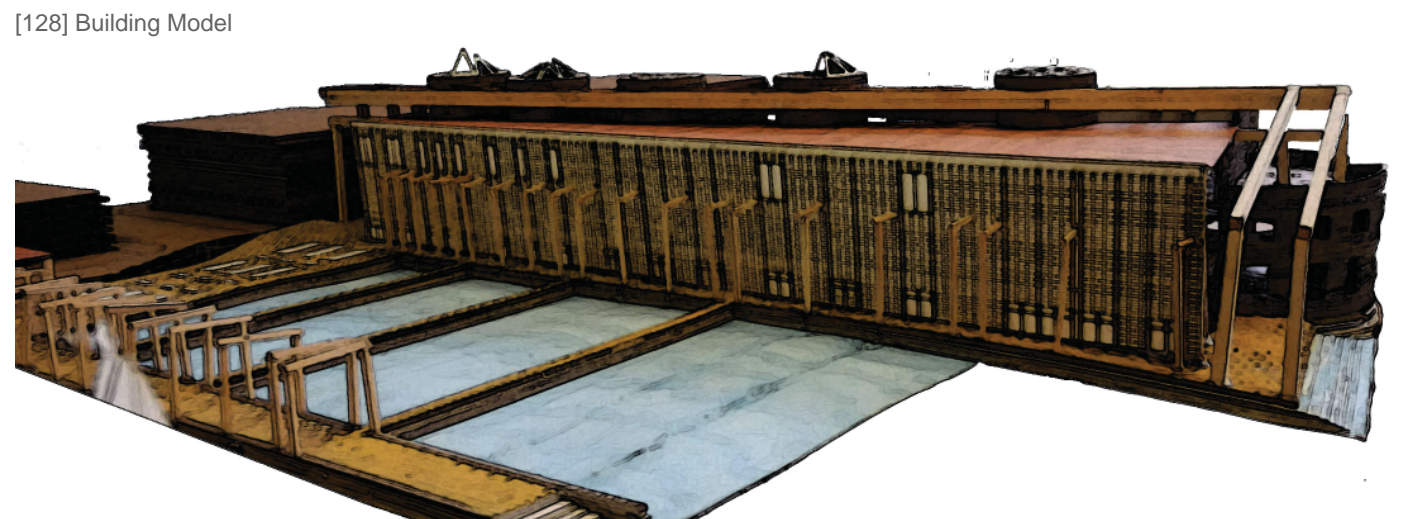
[125] Final South Elevation at Night



[127] Final East Elevation at Night



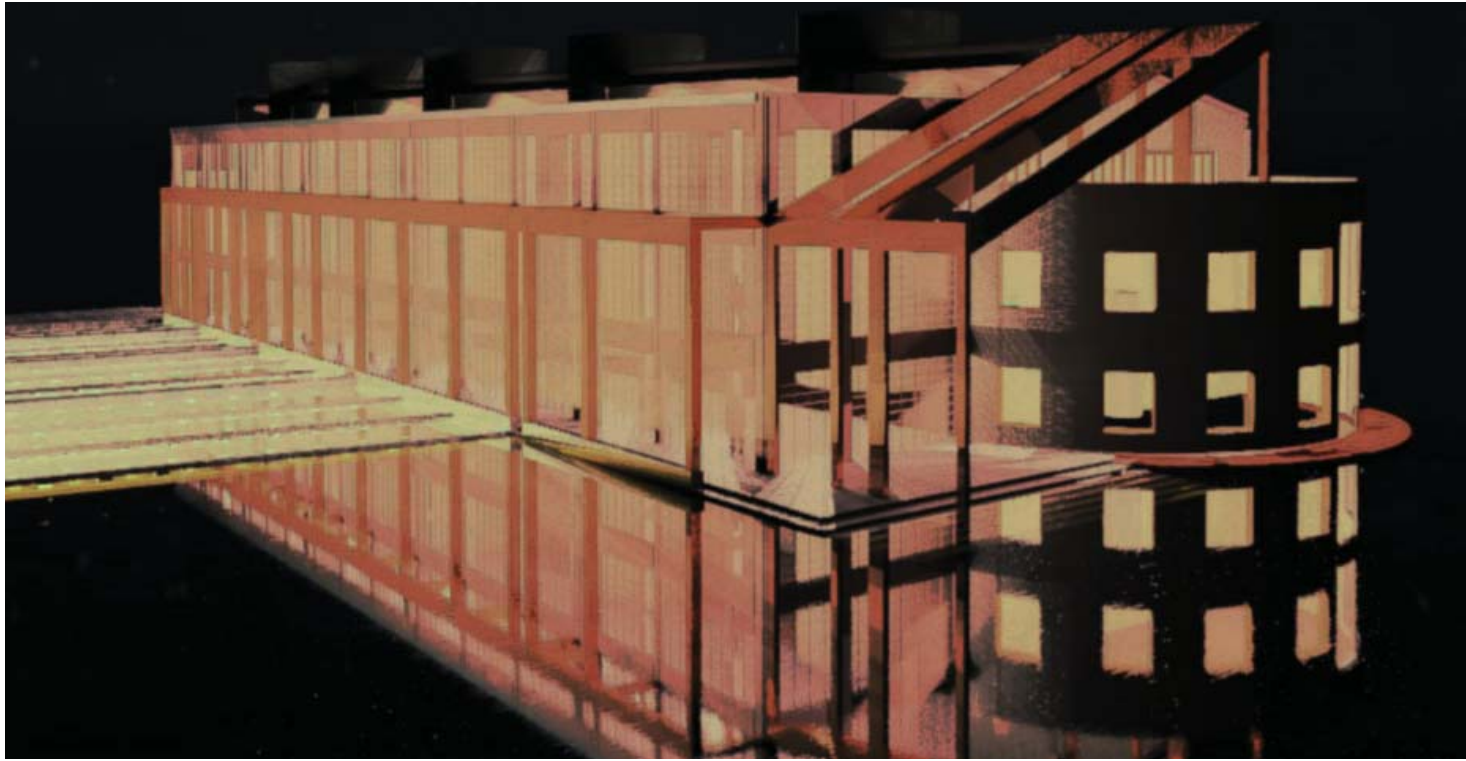
[126] Building Model



[128] Building Model



[129] Tasting Stair Model



[130] Final South and East Elevations at Night



[133] Final South and West Facade at Sunset

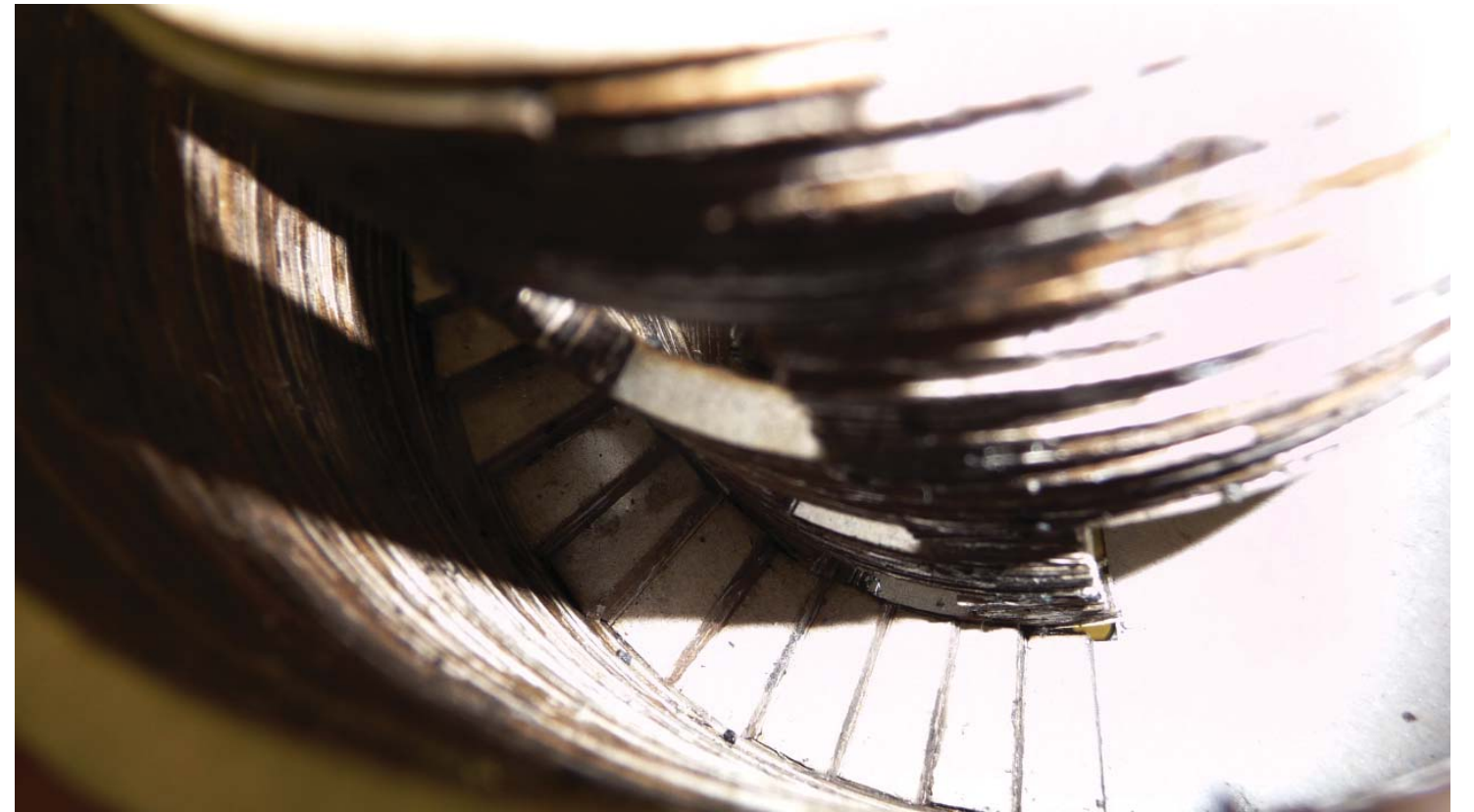
[131] Tasting Stair Model

[132] Plaster Elevation Studies

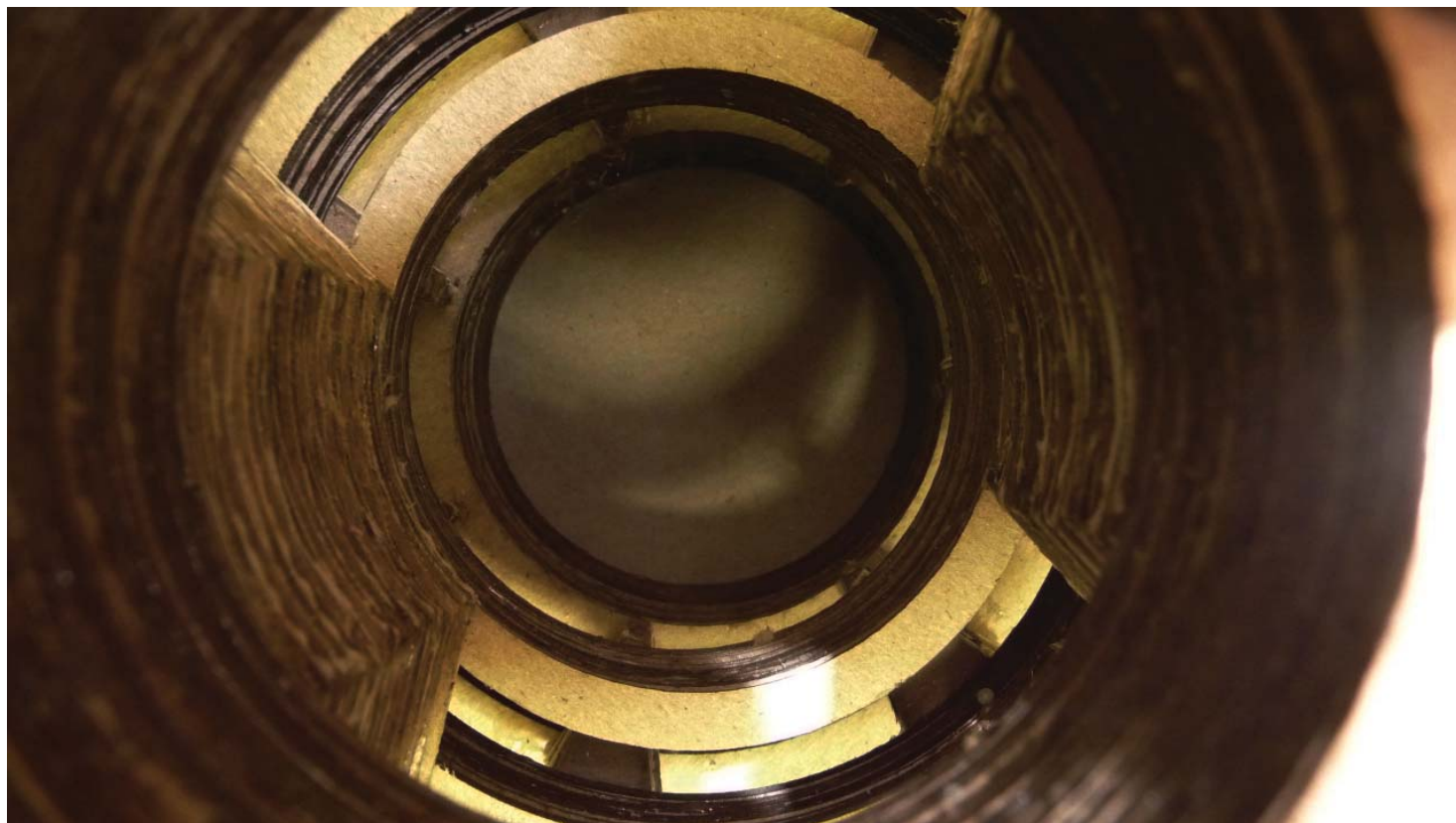




[134] Brewing Tower Model



[136] Brewing Tower Model



[135] Brewing Tower Model



[137] Brewing Tower Model



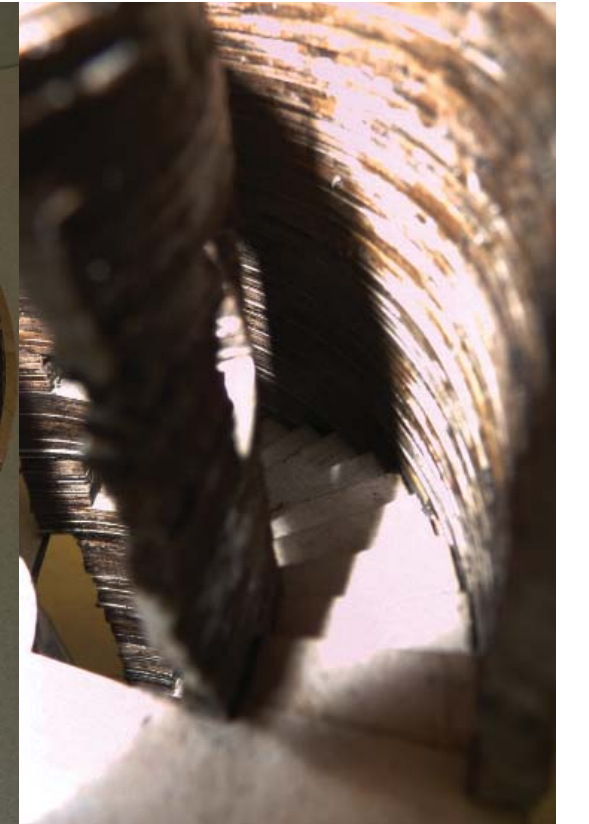
[138] Brewing Tower Model



[140] Bar Model



[143] Brewery Tower Model



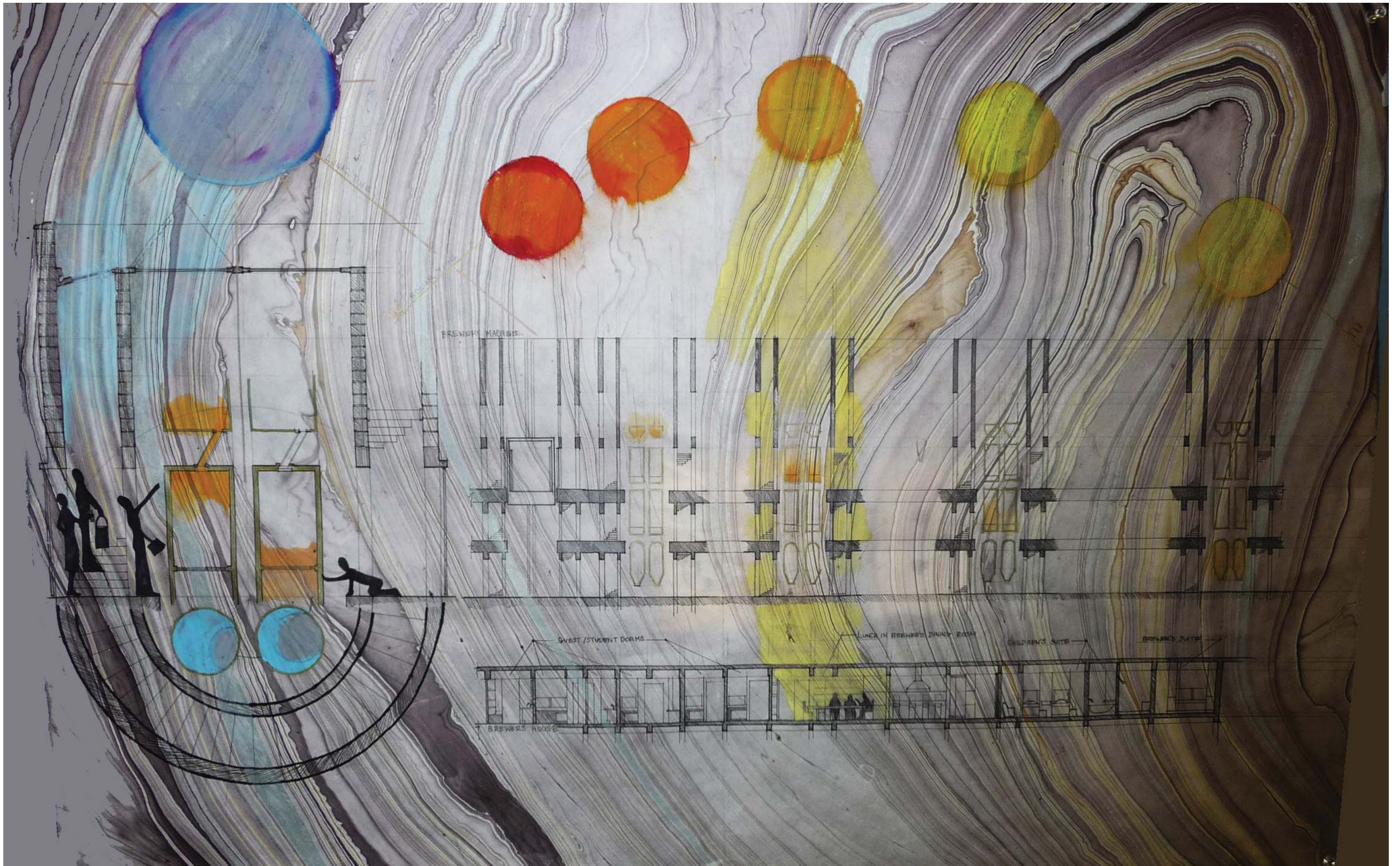
[139] Bar Model



[141] Brewery Tower Model



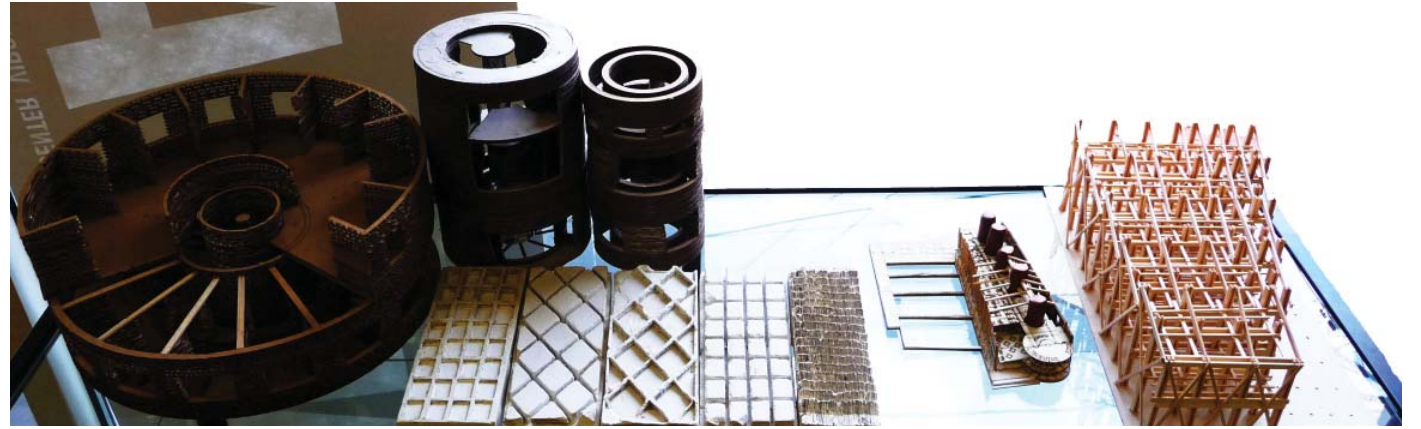
[142] Bar Model



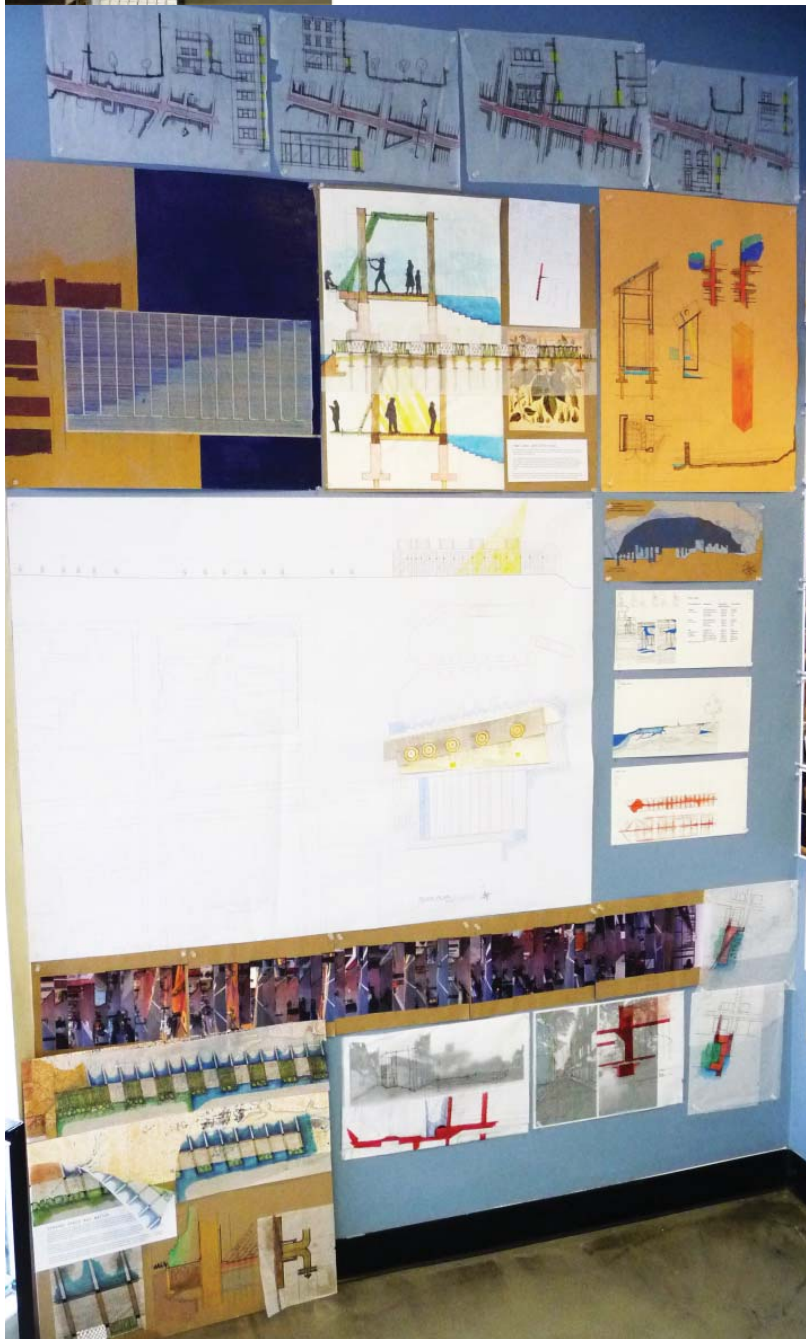
[144] Brewing Towers and Brewer's House Cosmology Section



[145] Final Defense



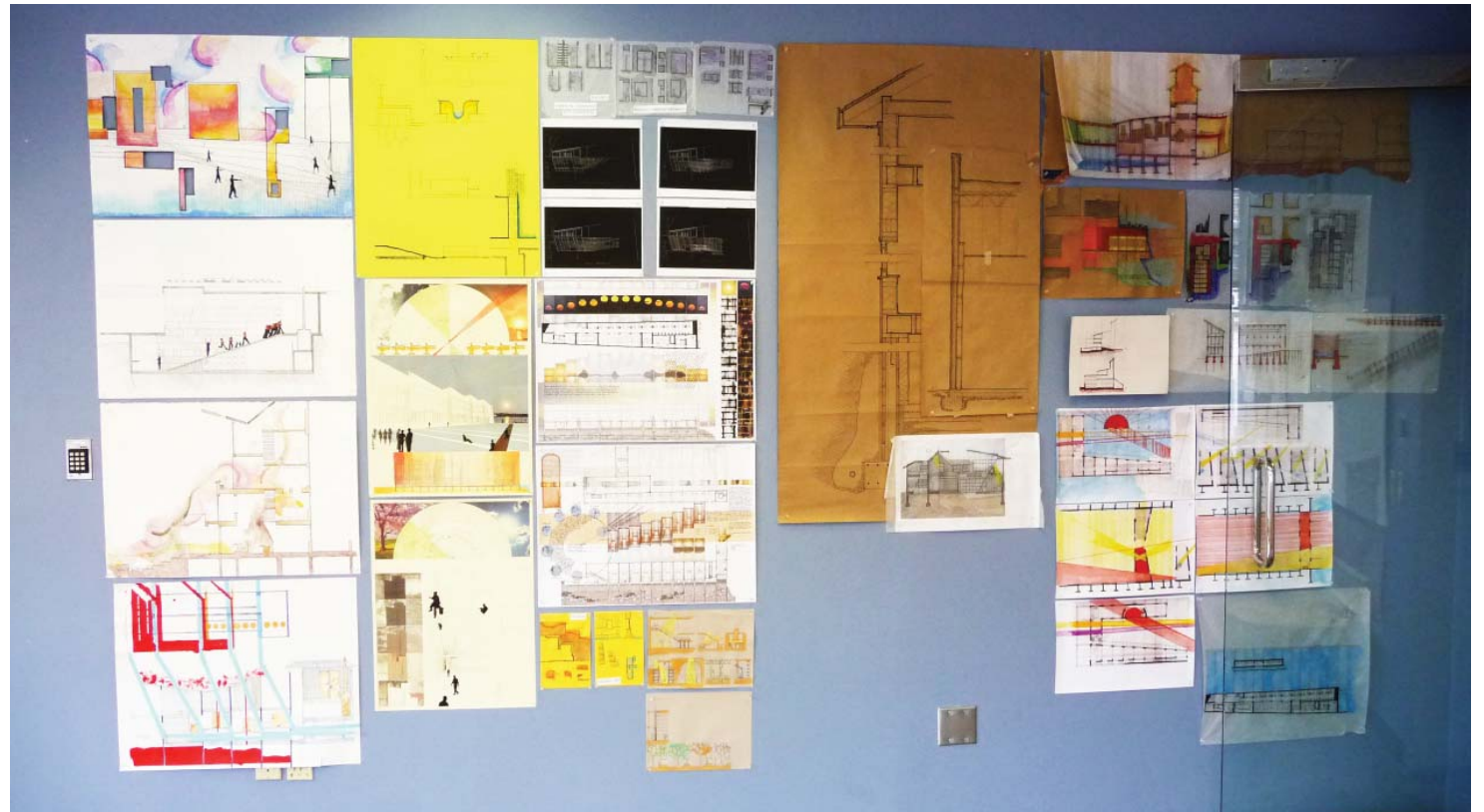
[148] Final Defense



[146] Final Defense



[147] Final Defense



[149] Final Defense



[150] Final Defense

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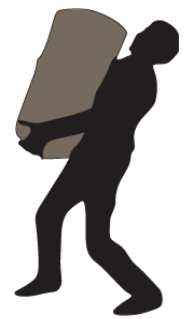
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Bibliography



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