

CONSTRUCTING AUDIO

A renewed analogy

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to my family, for their unwavering faith, support, and love;
to my mentors Inês Lobo, Joaquim Moreno, and Telmo Cruz, for rekindling my curiosity and passion for architecture, time and again;
and to my dearest *partners-in-crime*, for teaching me everything else.

ABSTRACT

[EN]

Our relationship with music changed radically throughout the past century. Once a fleeting and unrepeatable experience, it was captured by modern technology—sounds have become commodities ever since. The music of today is conceived as such: the production chain of modern soundscapes extends into the increasingly technological realm of recording, mixing, and mastering. Design, rendering, and execution are closely interwoven in the broader creative process. A new analogy emerges— one between sonic and tectonic production.

Constructing Audio revolves around this subject matter: rather than indulging in the cosmic links between music and architecture as regards their composition, one further step is taken into the contemporary realm of the process. Being neither the account of some abstract relationship between spatial and sonic composition, nor any kind of literal juxtaposition of theirs (e.g. architectural acoustics), it aims but to call the attention to the affinities between the production of a soundscape and the construction of an architectural episode. By means of comparison and contrast, the linkage between the two is exposed first and foremost, an parallel forms of thinking are speculated thereafter.

The narratives established in the theoretical part are only sparingly translated into demonstrations in the ensuing practical chapter, and intentionally so; the focal point of this thesis is a specific mindset that permeates the creative process as a whole, and not applied principles. It is only expected for its manifestations to be tacit in nature— their inherent qualities lie therein.

Keywords: sound, tectonic, production, media

[PT]

A nossa relação com a música mudou de forma radical durante o século XX. Ao capturar esta experiência fugaz e irrepetível, a tecnologia moderna fez com que os sons se tornassem commodities. A música hodierna é concebida como tal: a sua cadeia de produção estende-se nos âmbitos cada vez mais tecnológicos de gravação, mixagem, e masterização. Os atos de projetar, renderizar, e executar entrelaçam-se intimamente no processo criativo mais amplo. Emerge uma nova analogia— entre produções sonora e tectónica.

Constructing Audio desenvolve-se em torno a esta temática: ao invés de se entregar a equiparações cósmicas entre música e arquitetura no que diz respeito às suas vertentes compositivas, vai um passo além, e entra no domínio contemporâneo dos processos. Não sendo um relato sobre conexões abstratas entre composições espaciais e sonoras, nem de algum tipo de sobreposição literal entre som e arquitetura (ex. acústica arquitetónica), esta dissertação pretende somente chamar a atenção para as afinidades entre a produção de uma paisagem sonora e a construção de um episódio arquitetónico. Através da comparação e contraste, expõe-se antes de mais a ligação entre os dois, e especulam-se seguidamente formas paralelas de pensar.

Sendo o foco desta dissertação um quadro mental específico que permeia o processo criativo na sua totalidade, e não princípios aplicados, as narrativas estabelecidas na parte teórica raramente se transladam para o projeto de forma explícita. É apenas de esperar que tais manifestações sejam de natureza tácita— as suas qualidades intrínsecas residem aí.

Palavras-chave: som, tectónica, produção, media

INDEX

	Front Matter	
0.1	Acknowledgements	i
0.2	Abstract	iii
0.3	Index	v
	Modern Sound and Architecture: An Introduction	
1.1	Modernity	3
1.2	Warfare	7
	Sonic and Tectonic Production: Three Analogies	
2.1	Sampling	13
2.2	Distortion	21
2.3	Reference	27
	The Bazaar of Martim Moniz: An Intervention	
3.1	Context	35
3.2	Diagnosis	41
3.3	Strategy	47
3.4	Architecture	49
	Renewing the Analogy: A Manifesto	
4.1	Manifesto	63
	Back Matter	
5.1	Bibliography	64
5.2	Sitography	65
5.3	Image References	66

1

MODERN SOUND AND ARCHITECTURE

An introduction



MODERNITY

La musique, de par son essence abstraite, est le premier des arts à avoir tenté la conciliation de la pensée scientifique et de la création artistique. Son industrialisation est fatale et irréversible.

(Iannis Xenakis, 1963)

Images:

(Opposite)

[1] EMI Archive Trust— Catalogue of Chinese Records.

(Right)

[2] Logo of “His Master’s Voice” (unofficial title for the major record label of The Gramophone Company).

(Below)

[3] Tinfoil Phonograph, invented in 1877 by Thomas Edison.

References:

[1] KITTLER, Friedrich A. (1999). *Gramophone, Film, Typewriter* (p. 4). California: Stanford University Press.

[2] ATTALI, Jacques. (1985). *Noise: The Political Economy of Music* (Brian MASSUMI, Trans.). Minneapolis: University of Minnesota Press.

[3] KITTLER, Friedrich A. (1999). *Gramophone, Film, Typewriter* (pp. 11–12). California: Stanford University Press.

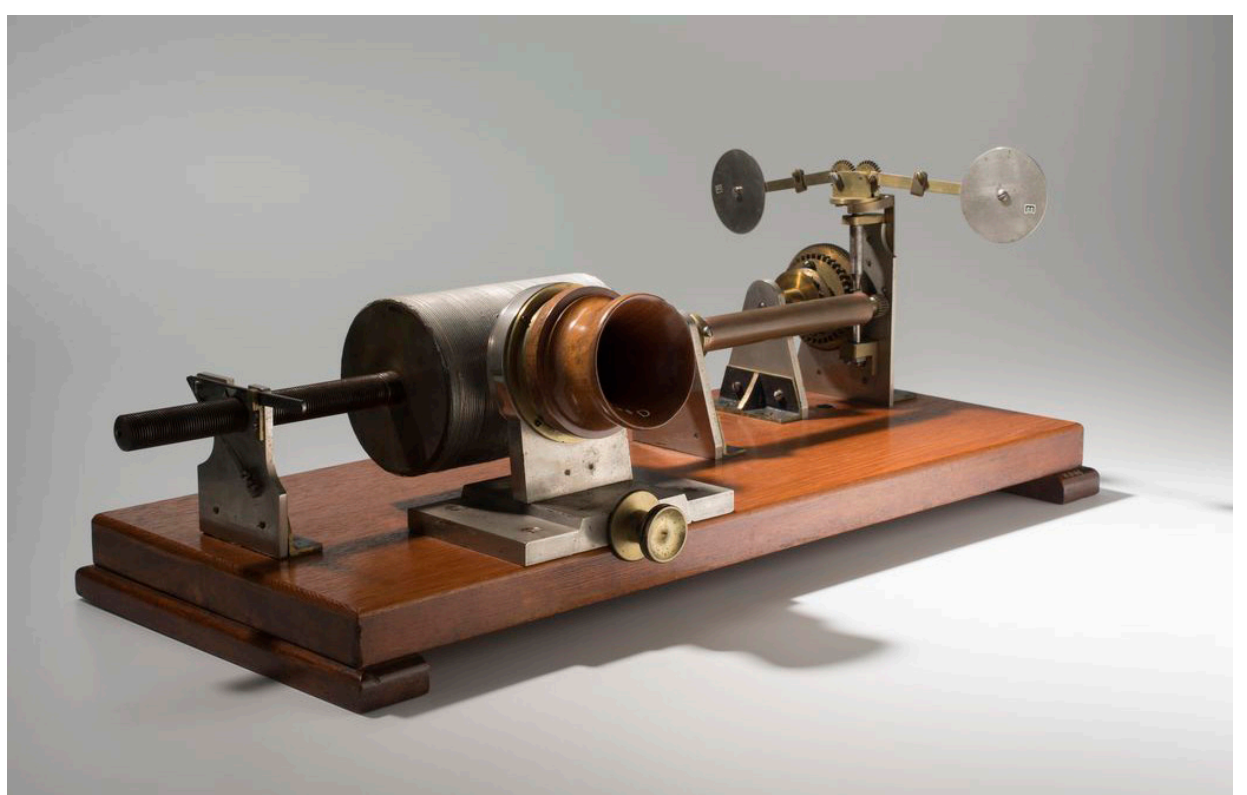
[4] FRITH, Simon. (1988). *Music for Pleasure* (p. 11). New York: Routledge.

The XX century revolutionized our experience of music, completely and irreversibly. Prior to the advent of proper means to tame, contain, and stockpile sounds, music was limited to the fleeting instant of its performance—text and scores are but graphic representations of time-based arts, whose time is symbolic (in the Lacanian sense), codifying sound intervals over time.¹ There existed no possibility of any *reproductions* of the original work, only reenactments that follow a given script— in other words, before *media*, there were no means to store time. Modern technology made possible the entrance of music into the commodity chain; like architecture, music is now *produced*.²

At the beginning, stored sounds replaced texts and scores by mechanical means, such as the phonograph of Edison, or the gramophone of Berliner that optimized it into the form of a flat disk. These enabled the first true *reproductions* of sound: in contrast with their symbolic precedents, they went beyond a mere resemblance



to the original sound object, becoming “products of the object in question [...] by being mechanically produced by it”.³ Records replaced live musicking, and music-as-commodity replaced music-as-expression.⁴ Sound became stockpiled in disks and reproduced



Images:

(Bottom)

[4] László Moholy-Nagy, *Gramophonpalette* (1925).

References:

[5] KITTLER, Friedrich A. (1999). *Gramophone, Film, Typewriter* (p. 95). California: Stanford University Press.

[6] THOMPSON, Emily. (2002). *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (p. 107). Cambridge: The MIT Press.

[7] (n.d.). Weissenhof Estate, Stuttgart. Retrieved from: <https://www.bauhaus100.com/the-bauhaus/works/architecture/weissenhof-estate-stuttgart/>

[8] FRITH, Simon. (1988). *Music for Pleasure* (pp. 18–19). New York: Routledge.

[9] Ibid. (pp. 11–12).

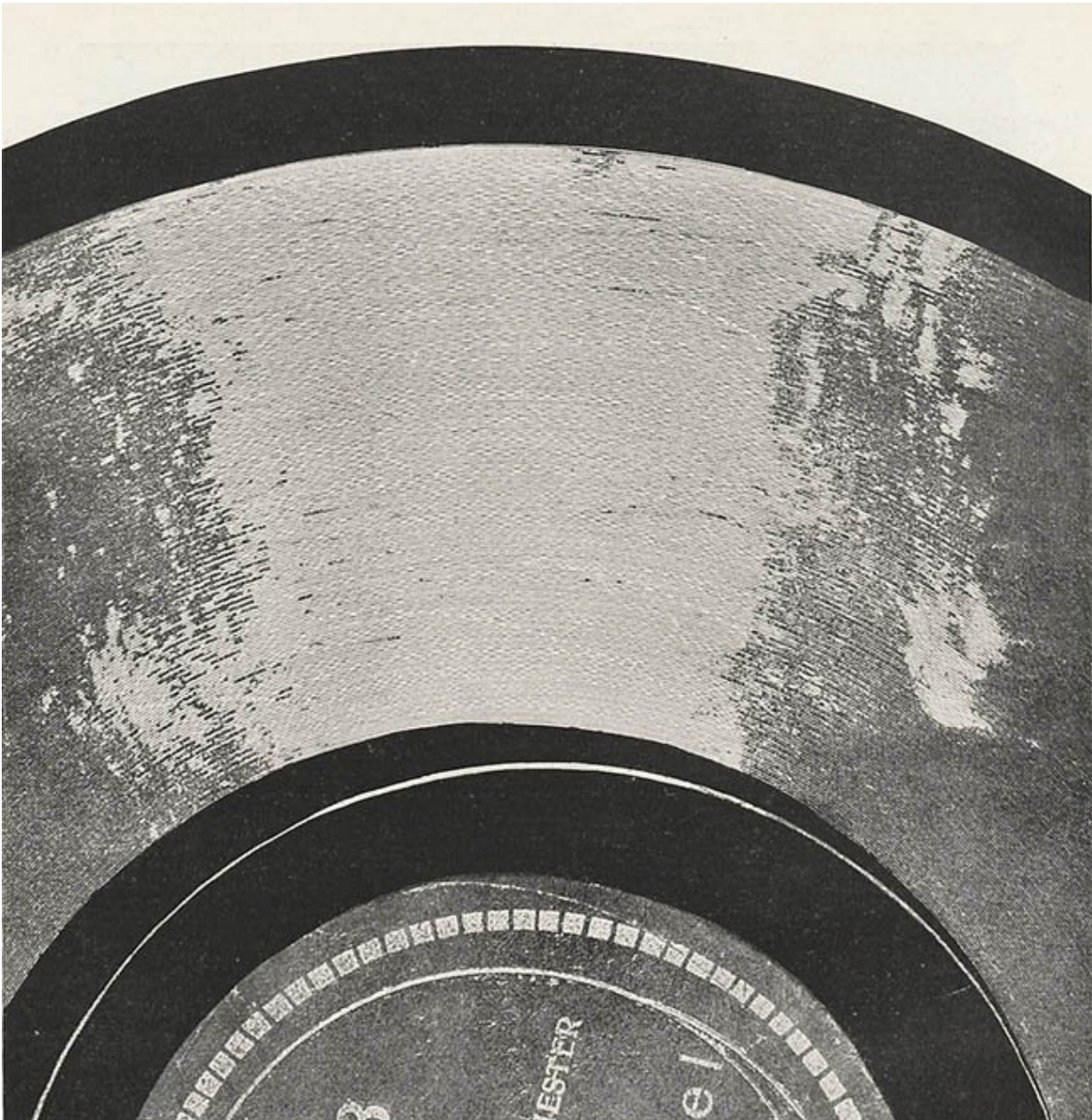
[10] THOMPSON, Emily. (2002). *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (pp. 3–4). Cambridge: The MIT Press.

by gramophones, it became an industry— records assumed an exchange-value. In the processes of mechanization and industrialization, modern architecture and commodified music developed similar symptoms.

They spawned heroes: Enrico Caruso rose to international stardom as a recording artist as early as 1902.⁵ Physicist Wallace Sabine is immortalized as the father of modern architectural acoustics, whose heritage inspired a new generation of acoustic engineers, and helped reshape our listening culture.⁶ In 1927, the Weissenhof estate featured prototype housing by a wide range of “starchitects”— such as Le Corbusier, whose books and CIAM congresses revolutionized modern architecture; and Walter Gropius, a pioneering figure of industrial methods of production in architecture, who founded Bauhaus.⁷ Bing Crosby became the first multimedia star, capitalizing on the potentials of recording, radio, and film.⁸ Both industries are still largely driven by the international star system. Iconic architects, with their signature styles, are capable of wielding the power

to transform entire cities (such as Frank Gehry, whose Guggenheim Museum in Bilbao gave birth to the term “Bilbao effect”); and rock bands like Dire Straits possess boundless fame that reaches “into every First, Second and Third World household, like Coca-Cola (and with the same irrelevance to real needs)”.⁹

They championed efficiency: rapid changes in technology, coupled with a competitive market, made of sound quality a selling point. In turn, the consumer who “exercised choice in a market filled with aural commodities”, tuned their ears to inform their judgment— audiophiles were born.¹⁰ When acoustical phenomena were reconceptualized as electrical, modernity waged war on noise— a war on the increasingly noisy conditions of the XX century, equipped with an arsenal of scientific instruments, eradicating the unwanted artifacts from the signal (as in reverberation, resonance, distortion, and extraneous sounds). Music and architecture were sterilized, disentangled from everything deemed unnecessary— “less was more”.



Images:

(Left)

[5] Charles Edouard Jeanneret (a.k.a. Le Corbusier), heralded as one of the most important pioneers of modern architecture.

(Right)

[6] Bing Crosby, the first multi-media star that rose to fame through recording, radio, and film.

(Bottom)

[7] Thomas Edison with his invention, the tinfoil phonograph.





WARFARE

The entertainment industry is, in any conceivable sense of the word, an abuse of army equipment.

(Friedrich Kittler, 1963)

Images:

(Opposite)

[8] "Sound locators" used in WWII to locate aircraft, prior to the invention of radar.

(Bottom)

[9] Japanese sound locators, being inspected by emperor Shōwa.

References:

[11] KITTLER, Friedrich A. (1999). *Gramophone, Film, Typewriter* (p. 49). California: Stanford University Press.

[12] GOODMAN, Steve. (2010). *Sonic Warfare: Sound, Affect, and the Ecology of Fear* (p. 41). Cambridge: The MIT Press.

[13] KITTLER, Friedrich A. (1999). *Gramophone, Film, Typewriter* (pp. 106–107). California: Stanford University Press.

[14] FRITH, Simon. (1988). *Music for Pleasure* (pp. 21–22). New York: Routledge.

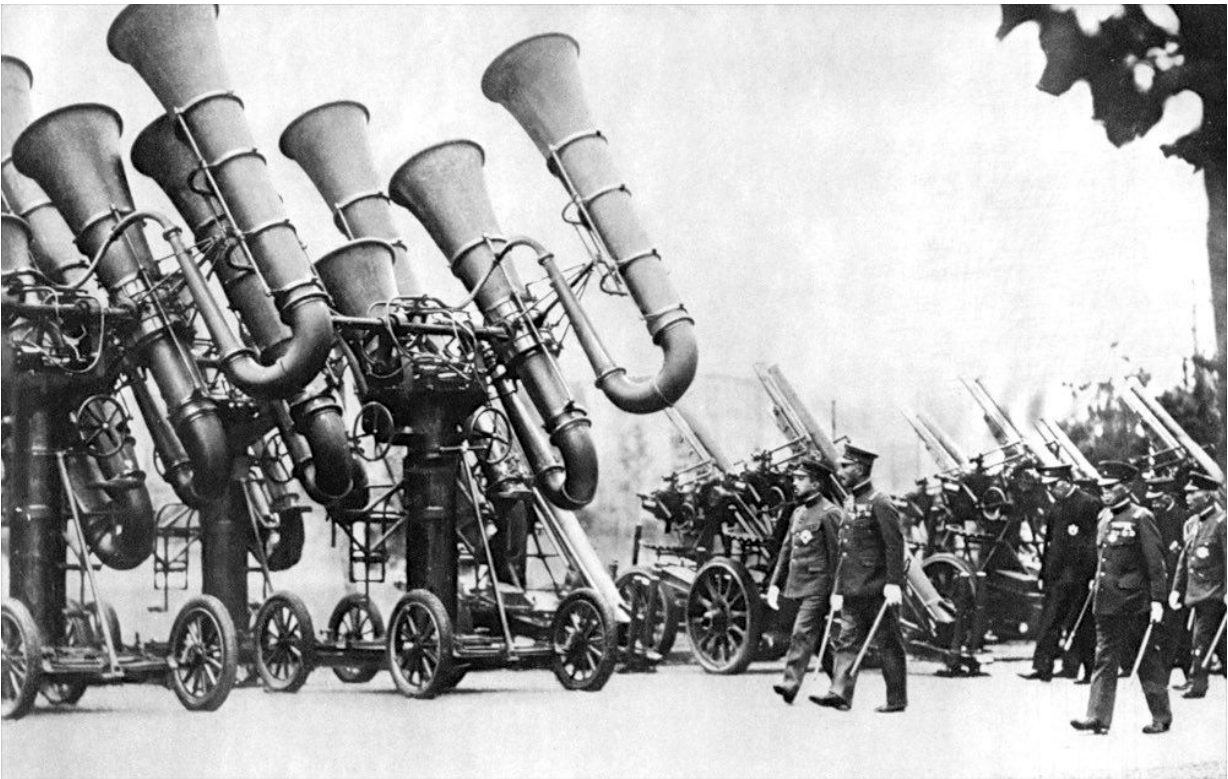
[15] OWSINSKI, Bobby. (2006). *The Mixing Engineer's Handbook* (p. 2). Boston: Thomson Course Technology PTR. (Original work published 1999).

As the war on noise escalated, so did the noise of war—the greatest breakthroughs governing sonic media are indebted to military equipment (and their subsequent *abuse*, as pointed out by Kittler). The battlefield was increasingly *listened* to, as concrete ears warned against aircraft, microphones were used for locating artillery, and even the soldiers themselves relied on their ears to “distinguish the myriad sounds of different kinds of incoming shells”. In the process, wars catalyzed new media: radio beams guided Luftwaffe diving bombers, the more advanced VHF radio made its use possible on tanks, vocoders protected secret correspondence from enemy interception.¹¹ Even today, these are indispensable elements for the production and distribution of contemporary music.

Among all these wartime inventions, two specific developments revolutionized audio and set the new paradigm for the many decades to come: the Magnetophon of AEG (magnetized tape recording machine), and a

new stereophonic system invented by Harold Burriss-Meyer.¹² The significance of these two to sonic production is comparable, one might argue, to that of steel and reinforced concrete to tectonic production; in a sense, they enabled contemporary expression.

Tape, developed by German scientists in the ‘40s for use in the war, revolutionized combat reports, broadcasting, and secret transmissions through its crushing technical superiority compared to disc— its large frequency bandwidth, its flexibility of use in combat conditions, and its reduced cost.¹³ For similar reasons, it was first picked up by radio and film, and by ‘50, it had replaced disc recording entirely.¹⁴ However, the main reason why tape is the cornerstone of modern music production lies elsewhere: by its use as an intermediary, the focal point of the practice shifted from “capturing an unaltered musical event to one entirely created through overdubs”.¹⁵ Furthermore, owing to the flexible nature of the medium, editing operations (such as cutting and splicing) en-



Images:

(Top)

[10] Jack Mullin, looking over two Ampex model 200 tape recorders, ready to splice.

(Middle)

[11] EMI Magnetic Recording Tape advertisement.

(Bottom)

[12] Demonstration of the Bell Labs' Vocoder.

References:

[16] FRITH, Simon. (1988). *Music for Pleasure* (pp. 21–22). New York: Routledge.

[17] IZHAKI, Roey. (2008). *Mixing Audio: Concepts, Practices and Tools* (p. xiii). Oxford: Elsevier.

[18] GOODMAN, Steve. (2010). *Sonic Warfare: Sound, Affect, and the Ecology of Fear* (p. 42). Cambridge: The MIT Press.

[19] GIEDION, Sigfried. (1995). *Building in France, Building in Iron, Building in Ferroconcrete* (p. 95). Santa Monica: The Getty Center for the History of the Art and the Humanities. (Original work published 1928).

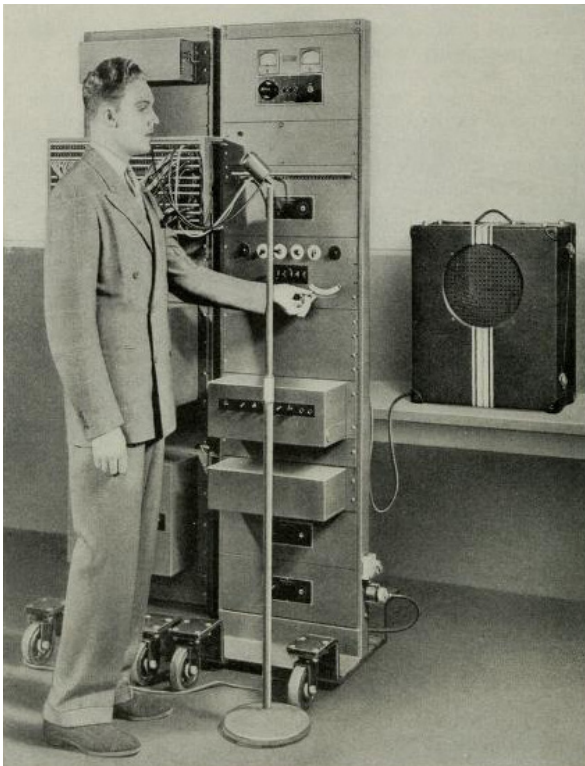
[20] THEBERGE, Paul. (1997). *Any Sound You Can Imagine* (p. 4). Hanover: Wesleyan University Press.

abled crafting ideal not real events¹⁶, and the invention of multitrack tape machine took things further by making it possible to “play, time and again, the recorded material before committing sonic treatment”.¹⁷ The judgment and skill of recording and mixing engineers came into the limelight— whose significance now pars with that of musicians.

In parallel, the U.S. army approached sonic deception in a different way: its 23rd Special Troops experimented with, among other things, sonic illusions to mislead and confuse the enemy troops in the battlefield. One such strategy intended to fool the enemy by creating an imaginary army— in sound only, through a meticulously crafted mix of effects played through two separate speakers, mounted on moving vehicles. By taking advantage of the nature of “binaural hearing” —that is, the way our ears “serve as two input channels for sound and together create a whole virtual field”—¹⁸ they succeeded in fabricating a phantom army lingering somewhere in between the two speakers. Stereophony today forms the very basis of sound design as it allows for the free placement of sound objects in a virtual three-dimensional space.

As the dust of these postwar developments sets, the foundations are laid, and the playing field between sonic and tectonic production is level. Boundaries overlap: the constructor encroaches upon the field of the architect,¹⁹ and the producer upon that of the musician. Changes in technology imply new forms of practice, and the conventional dividing line between consumption and production become increasingly blurred.²⁰ The digital revolution unlocks both the potentials and the setbacks of mathematical precision. As home studios and individuals gain the power to compete through the power to compute, the oligopoly of big recording studios and architecture firms slowly breaks down. Concepts that seem straight out of science fiction movies gradually become commonplace— robots print houses and AI offers fully automated mastering services. Internet drives both consumption and productivity into a frenzy. New building materials and VST plug-ins hit the market on a daily basis.

The analogy between music and architecture is ever more relevant, this time in the form of sonic and tectonic production.



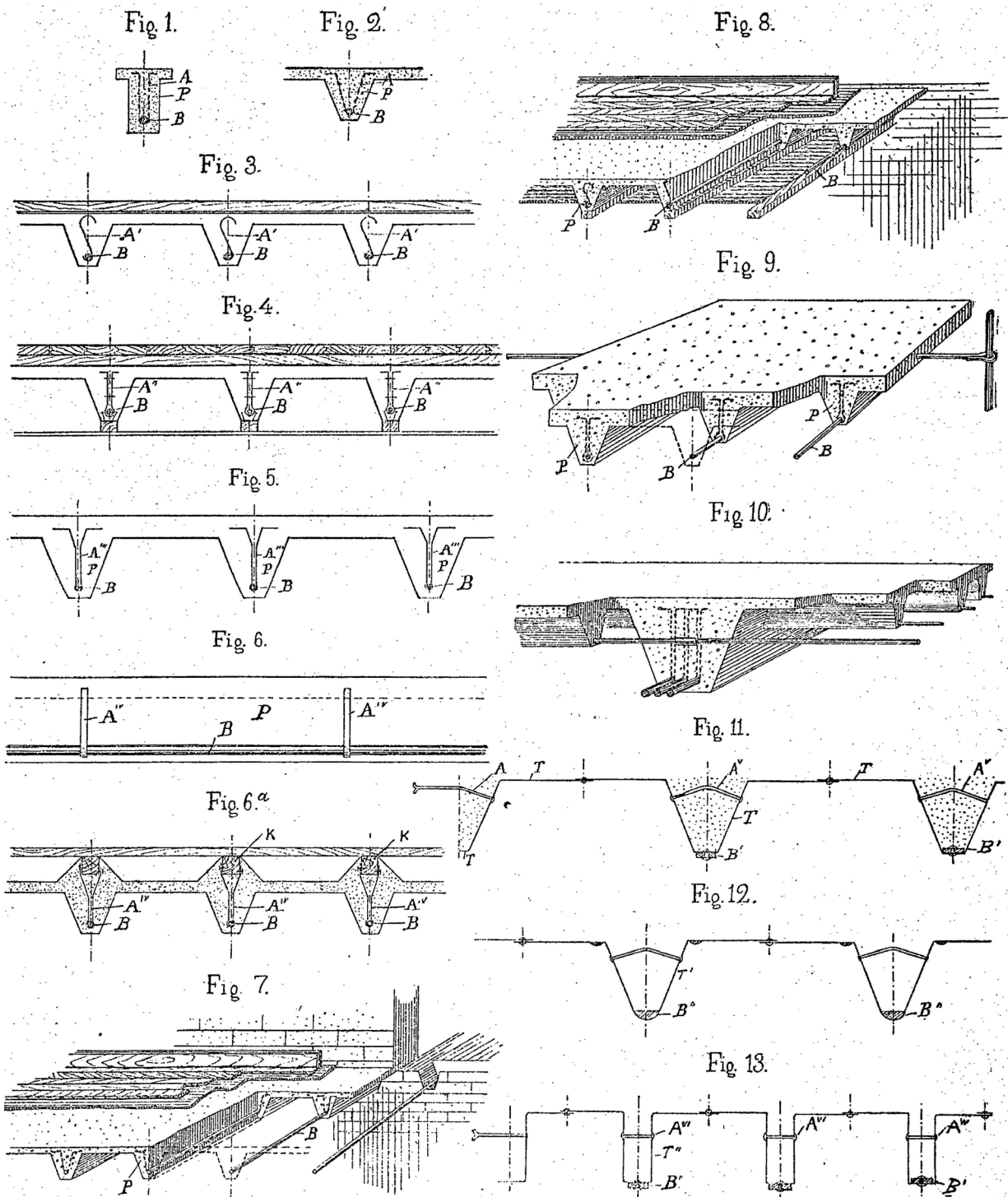
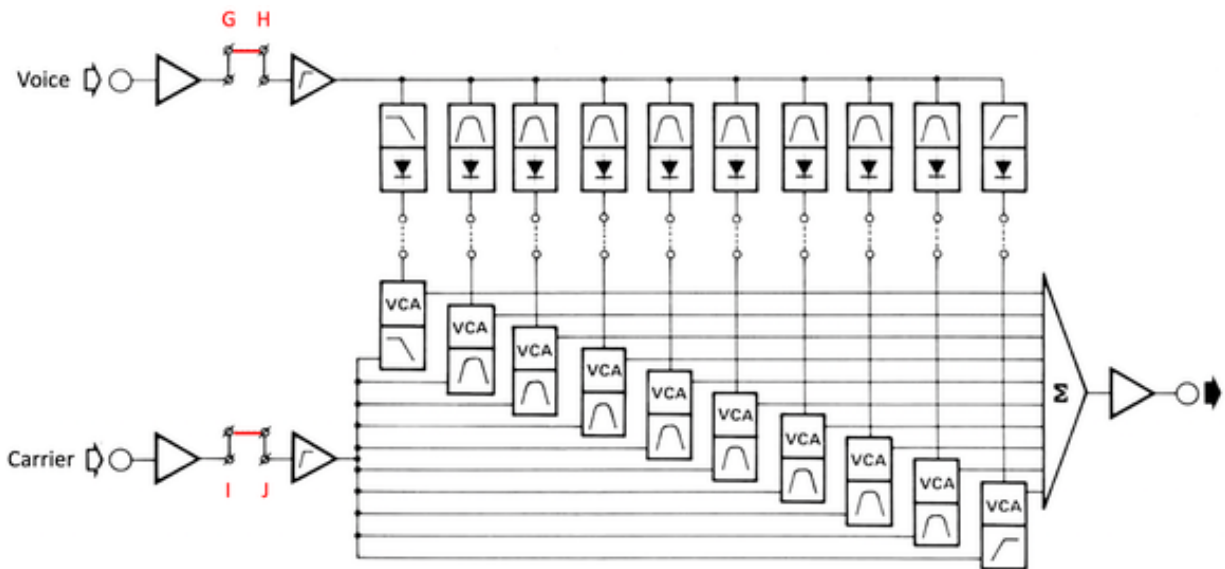
Images:

(Top)

[13] Homer W. Dudley's patent drawings for signal transmission, now known as the Vocoder.

(Left)

[14] François Hennebique's patent drawings for reinforced concrete beams.



2 SONIC AND TECTONIC PRODUCTION

Three analogies



SAMPLING

I believe that the use of noise to make music [...] will continue and increase [...] until we reach a music produced through the aid of electrical instruments which will make available for musical purposes any and all sounds that can be heard.

(John Cage, 1961)

Images:

(Opposite)

[15] Carla Juaçaba + Bia Lessa, Humanidade Pavilion, Rio de Janeiro (2012).

(Bottom)

[16] Spillman Echsle Architekten, Freitag Flagship Store, Zürich (2006).

References:

[21] Estudio Chão. (n.d.). Pavilhão Humanidade Rio+20. Retrieved from: <http://estudiochao.com/Pavilhao-Humanidade-Rio-20>

[22] Spillmann Echsle Architekten. (n.d.). freitag flagship zürich: new commercial premises and observation platform. Retrieved from: <http://www.spillmannechsle.ch/wp/?p=140>

Fort Copacabana, Humanidade Pavilion, 2012. An ephemeral construction —assembly, if you will— that lets through both light and matter: rain, wind, sunlight, reflections, people. Its exposure to the elements evokes a sense of vulnerability, “reminding man of his frailty when comparing to nature”.²¹ Five planar nets of scaffolding structure are erected parallel to the coastline and to each other, with functional spaces and walkways suspended in between, which occasionally interrupt the structure and serve as bracing elements. Every connection, every construction detail, reflects the nature of the material.

The choice of scaffolding, a readily available, industrial apparatus, becomes the conceptual move that kicks off the creative process. The means become the seed that generates the form, rather than a tool with which to safely deliver a preconceived plan. The flying walkways, the pavilions, either fit or override the grid. In any case, they exist in relation to it.

Zürich, FREITAG Flagship Store, 2006. A tower of nine previously used international shipping containers stacked on top of each other stands “as a landmark in the midst of the international rail and road traffic axis”, offering at the same time views over the city.²² The nineteen containers used in the project were selected in Hamburg and transported to Zürich by rail. Housing in it bags made out of discarded and recycled materials such as the inner tubes of bicycle wheels and truck tarps, the underlying logic of its design principles openly reflects the conceptual identity of the brand itself.

Here, too, the creative process starts off with a premise. The containers, once vehicles for the international shipping industry, are removed from their original context and given new meaning, as part of a new whole. Their integrity as containers, however, are deliberately preserved. The parts that form them, their building blocks, are of secondary importance— they are chosen by the architects as building blocks *in their entirety*. Any further







Images (Previous spread):

(Left page)

[17, 18] Carla Juaçaba + Bia Lessa, Humanidade Pavilion, Rio de Janeiro (2012).

(Right page)

[19, 20] Spillman Echsle Architekten, Freitag Flagship Store, Zürich (2006).

Images (This page):

(Top)

[21] The classic Technics SL-1200 turntable.

(Bottom)

[22] DJ Kool Herc setting up the famous 1973 bloc party in the Bronx, New York.

References:

[23] SCHLOSS, Joseph G. (2004). *Making Beats: The Art of Sample-based Hip-Hop* (pp. 31–32). Middletown: Wesleyan University Press.

[24, 25] Idem.

breaking down, and we’d be missing the woods for the trees.

Two projects worlds apart in terms of scale, proportion, distribution. What connects them conceptually is the architects’ realization of the possibilities offered by a preexisting system by which to override the traditional composition. The ready-made object, as a starting point, is at once guiding and constraining the rest of the design process. They abandon the conventionally linear interconnection between the composition and production stages in favor of a dynamic creative process, where technical specifications and construction details precede formmaking.

A similar form of rupture can be observed in sonic production, with a rather humble tool for playing musical records at its center: the turntable. A playback device, it allows its user to reproduce the sounds engraved on a record. A vehicle, in other words, for the consumption of music, stockpiled and sold in the form of vinyl disks. Two of these devices combined, joined with a mixer, become the system that is the backbone of a form of entertainment we know as deejaying— it enables the DJ to prepare a new record while another is playing away, thus allowing for a seamless transition.²³

This unassuming apparatus of reproduction, however, took the ‘70s by storm as a musical instrument proper when DJ Kool Herc famously put it into use in an unprecedented way. The role of party DJs up until then was still conceived mainly as a form of musical consumption— as the DJ plays the records, the consumption takes place by audience and DJ together.²⁴ Kool Herc’s creative use of this system, though, entailed loading two copies of



the same record in separate tables. By back-cueing and switching back and forth between the copies, his “Merry-Go-Round” technique made it possible to isolate and extend indefinitely the “breakdown” of a song.²⁵ The good old record hunt took on a whole new meaning— it was now a hunt for *breaks*.

As these bits were isolated and repeated over and over again, they were stripped of their contextual significance in relation to the original track, and became meaningful in their own right. This new attitude of removing an entire musical phrase from its context became the foundational aesthetic of hip-hop— repurposing preexisting records to create something else was acknowledged as a new music form rather than an activity, or mere reproduction.

This breakthrough found its ultimate expression with a game-changing technology that ushered the sonic up-cycling into the realm of production: the sampler. The freedom to use any sound to one’s own ends, combined with the newfound breakbeat aesthetic, translated into an artistic vision in which the act of choosing played a lead role.



Images:

(Left)

[23] R. Mutt, Fountain (1917).

(Right)

[24] Shin Takasuga, Railway Sleeper House, Miyake Island (1970).

References:

[26] DETRICK, Ben. (2007, November 6). The Dirty Heartbeat of the Golden Age. Retrieved from: <https://www.villagevoice.com/2007/11/06/the-dirty-heartbeat-of-the-golden-age/>

[27] DEPLAZES, Andrea (ed.). (2005). *Constructing Architecture: Materials Processes Structures* (pp. 107–108). Basel: Birkhäuser.

Back to 1917, New York. A urinal, rotated 90 degrees from its intended position of use, placed on a pedestal, signed “R. Mutt”. An art piece originally submitted for an exhibition of the Society of Independent Artists, its photo was now printed full-page in a magazine named *The Blind Man*. The next page of the magazine read:

Whether Mr. Mutt with his own hands made the fountain or not has no importance. He CHOSE it. He took an ordinary article of life, placed it so that its useful significance disappeared under the new title and point of view— created a new thought for that object.

(1917, May). The Richard Mutt Case. *The Blind Man*, 2, p. 5.

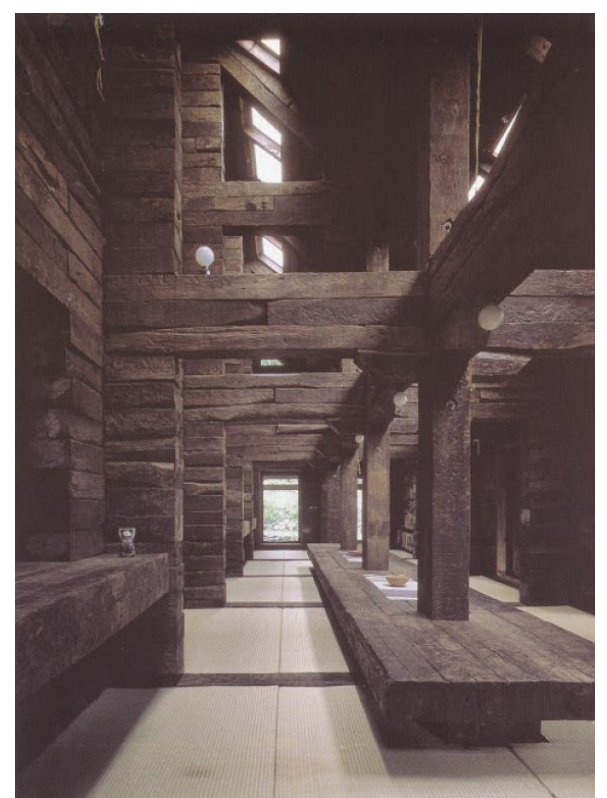
The artistic expression here unfolds not by the act of creating, but by the inventive appraisal of an otherwise insignificant object. Rather, perhaps, the appraisal itself was the creation, the materialization of artistic intent.

Indianapolis, 1990. While on tour with his group Heavy D & the Boyz, hip-hop musician Troy “Trouble T-Roy” Dixon passed away following a freak accident that involved falling off the exit ramp of the venue. Depressed by the unfortunate event, his close friend Pete Rock chanced upon a record called “The Honeysuckle Breeze” by Tom Scott and the California Dreamers and discovered in it something that touched him, bringing him to tears. Building a beat up from the bassline and various other bits of the track no. 7, “Today”, he co-produced the song “They Reminisce Over You (T. R. O. Y.)” with CL Smooth in 1992 in tribute to his deceased friend.²⁶

Estranged from its original context and reconceived in a circular fashion, the bass and sax lines of “Today” was imbued with new significance under Pete Rock’s appraisal. The producer removed entire musical phrases as building blocks and reimagined them as the breaks of “They Reminisce Over You”— so conceptually, he *created* the breaks in retroactive fashion, just like R. Mutt *created* the fountain. In other words, it was sound objects that became *objets trouvés*. Hip-hop emerges as sonic ready-made.

Tokyo, 1970. In a forest on the island of Miyake, a wooden structure with a steep gabled roof is perched on top of a concrete substructure. A residential space for communal living, it is erected by the inhabitants themselves, in the face of financial difficulties. Inside, the various spaces are compactly arranged, its dimensions dictated by a tight matrix. A single construction element pervades across the whole structure— the floor, the wall, the roof, and even the furniture. This rather unusual element, the railway sleeper, constrains and per consequence guides the global configuration per its predetermined shape and size.²⁷

Unlike the tower of shipping containers, and the song “They Reminisce Over You” which makes use of musical phrases as building blocks in their entirety, the Railway Sleeper House samples only a part of the larger whole, and uses it simultaneously as material and system that informs the design process. The operations of stacking and jointing are at the forefront of the production, dictated by the double-premise that lead the process as a



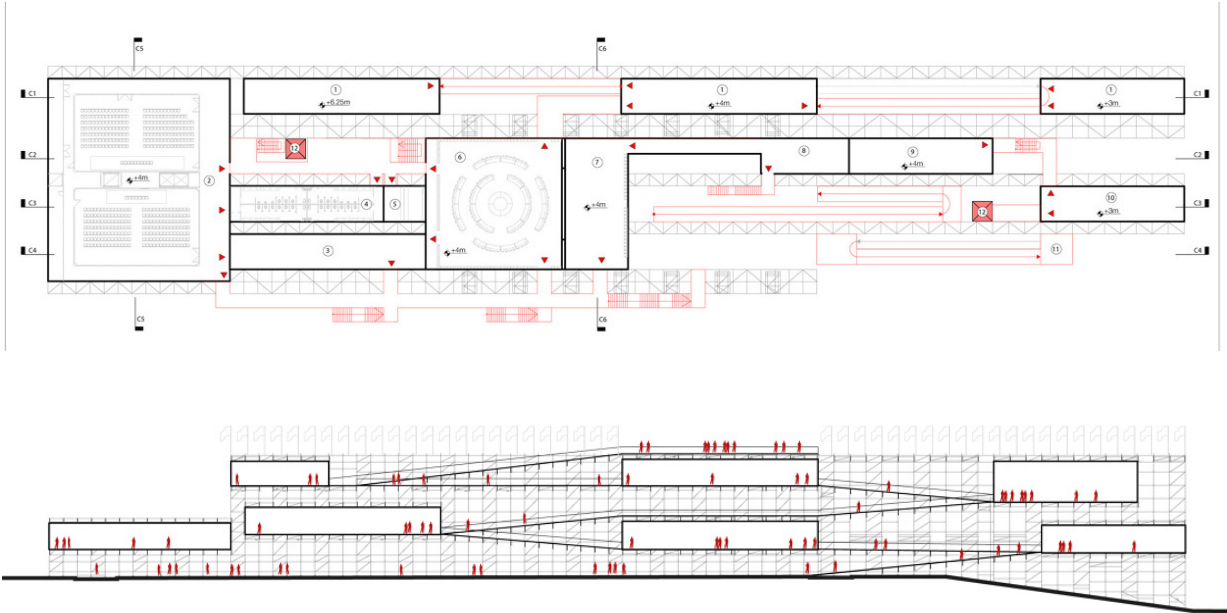
Images:

(Top)
[25] Carla Juaçaba + Bia Lessa, Humanidade Pavilion, Rio de Janeiro (2012).

(Bottom)
[26] Shin Takasuga, Railway Sleeper House, Miyake Island (1970).

(Opposite)
[27] Ensamble Studio, Hemeroscopium House, Madrid (2008).

References:
[28] Ensamble Studio. (n.d.). Hemeroscopium House. Madrid, 2008. Retrieved from: <https://www.ensemble.info/hemeroscopiumhouse>



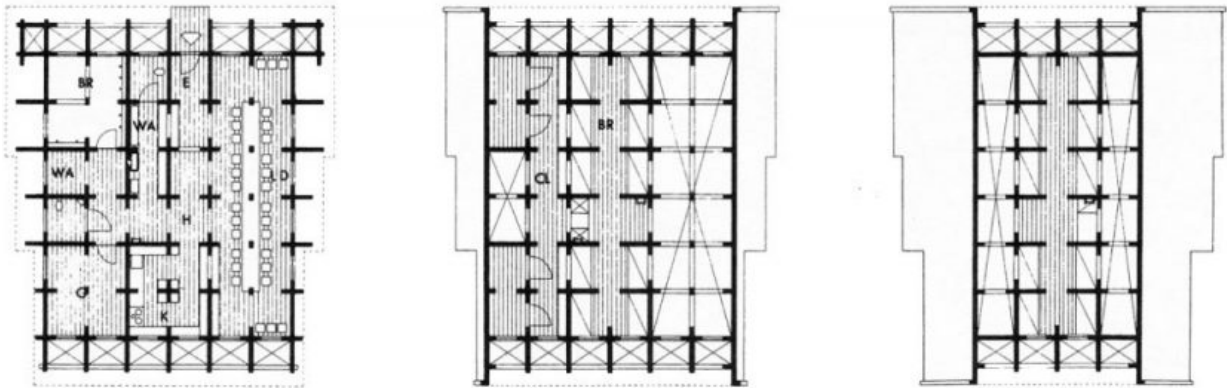
whole: the use of railway sleepers, and self-construction by traditional means— in this context, Japanese carpentry.

The Humanidade Pavilion in Fort Copacabana, in this respect, shares similarities with the Railway Sleeper House on a conceptual level. Much like building a beat out of a sliced-up drum sample, it makes use of the base element —the scaffolding— as a system, whose repetition and sequencing are assured through operations that serve the specific purpose of erecting a scaffolding structure. The resulting spaces are the highest expression of that system.

Technology evolves and the means multiply at an ever-increasing rate. New drum machines, sequencers, synthesizers, sample packs keep hitting the market in a mind-boggling pace of competition and innovation, and these tools become more and more accessible— both economically and logistically. The tiniest synthesizers, like the OP-2 of Teenage Engineering, can be used as self-sufficient systems for entire songs and sets to be

created on the fly, and there are samplers with two-digit price tags that can be safely used to deliver a solid beat. Hemeroscopium House, by Ensamble Studio, constructs an exquisite balance out of seven standard precast elements otherwise commonly used in large construction projects, topped off with a granite block on the peak that serves as counterweight.²⁸ Albums like “DAMN.” from Kendrick Lamar or “IGOR” from Tyler, The Creator rely heavily on highly creative sampling, from news clips to ‘60s soul and funk records.

As we reach these new moments of invention in tectonics and in sound, as we explore new systems, new tools to play around with, the critical determinant that is the interdependence between the composition and the production stages comes to the forefront. The sequence in which the various steps are played out, the relative attention given to each, and other such factors can be manipulated to attain different results. Boundaries easily overlap and linear creative processes, confronted with the complex reality of space- and sound-making, are re-conceived as circular.







DISTORTION

Sound [...] has become for our ear what for the eye is a too familiar sight. Noise instead, arriving confused and irregular from the irregular confusion of life, is never related to us entirely and always holds innumerable surprises. We are certain, then, that by selecting, coordinating, and controlling all the noises, we will enrich mankind with a new and unsuspected pleasure of the senses.

(Luigi Russolo, 1913)

Images:

(Opposite)

[28] RCR Arquitectes, Rural House, La Garrotxa (2007).

(Bottom)

[29] Ensemble Studio, The Truffle, Costa da Morte (2010).

References:

[29] Ensemble Studio. (n.d.). The Truffle. Costa da Morte, 2010. Retrieved from: <https://www.ensemble.info/thetruffle>

[30] PALLASMAA, Juhani. (2017). Meaning in Abstraction. *El Croquis*, 190, pp. 313–315.

Costa da Morte, The Truffle, 2010. What looks like a big stone covered in dirt, or maybe an oversized truffle as its name suggests, blends with the landscape as it overlooks the sea. A vague blob, without definite shape; with two sides sliced as though with hot knife, exposing the white concrete interior of the same material. A razor-like metal frame is violently inserted on each side to accommodate a door and a window. This cavernous, tight space provides a mysterious condition for living in the midst of nature.

On the outside, it is rough and dirty, as a result of the exchange between the liquid concrete and its container—earth. It is realized by pouring white concrete in a dike, adding stacks of hay to materialize the negative space that is to become the hollow interior of the stone. An extra level of imprecision is therefore provided by the hay stacks that are squashed flat by the concrete. The materiality of the interior —revealed by Paulina, the calf who

ate away the supercompressed hay— thus achieves a rudimentary quality different from the exterior camouflage, yet coherent.²⁹

La Garrotxa, Rural House, 2007. By the edge of a meadow overlooking the landscape of the Pyrenees, an embankment divides the land into two levels with a dramatic diagonal. On top of it, rusty metal boxes resembling oversized matchbox sleeves stick out in an ordered and rhythmical manner. A gravel path curls up underneath, concluding in a dark in-between space reminiscent of a highway underpass, its Cor-ten walls occasionally washed with a weak light that seeps through the gaps between the boxes overhead. This first episode ends in a north-facing lift, that with the same rustiness, this time filled with indirect light, leads once more to the somberness of the corridor aloft. Everything is clad in raw steel— wall, ceiling, floor, everything.³⁰



Images:

(Top)

[30] RCR Arquitectes, Rural House, La Garrotxa (2007).

(Bottom)

[31] Ensemble Studio, The Truffle, Costa da Morte (2010).

References:

[31] Ensemble Studio. (n.d.). The Truffle. Costa da Morte, 2010. Retrieved from: <https://www.ensemble.info/thetruffle>

[32] VENTURI, Robert. (1977). *Complexity and Contradiction in Architecture* (pp. 118–119). New York: Museum of Modern Art. (Original work published 1966).

Up until this point, the indirect light adds a pearly-white twist to the brown surfaces, creating an ambiance somewhat cold and industrial. When the sunlight reaches inside the boxes, however, it imparts a powerful warmth on contact, and bounces around to fill the space with a new quality. The gritty dark panels, now reddening, speaks to all senses at once.

Again, we are confronted with two projects where the medium, the approach, the scale, the technologies involved are all as different as they come. Inherent to both, however, are the elements of imprecision and impurity that convey a particular type of warmth, a pleasant error of some sorts. The Truffle, by Ensemble Studio, is like a big experiment, a simulacrum of the natural processes of mineral formation:³¹ it is an exercise that entails giving up control and precision in search of the unpredictable, raw qualities of the cave-like interior and the dirty shell. On the other hand, in the Rural House designed by RCR Arquitectes, the emphasis is placed on the decaying steel, intensifying the experience of varying degrees of light

and shadow, of artifact and nature, of cold and warmth. These are all orchestrated flaws: creative decisions that seek after the corrosion in potentially slick media, deviations from precision in order to provoke excitement.

Philadelphia, Vanna Venturi House, 1962. In a location isolated from an urban context, a chimney and a symmetrical gabled roof constructs an elongated version of the symbolic image of a house, almost as in a child’s drawing. The overall form appears at once symmetrical and unbalanced— the life-like complexity of the interior are reflected in the elevation with an off-center chimney and asymmetrical windows. The gesture is simultaneously big and small: or as the architect himself puts it, “a little house with a big scale”.³²

A different kind of distortion. In his seminal 1966 book, *Complexity and Contradiction in Architecture*, Venturi elaborated on themes introduced in his Vanna Venturi house: welcoming the manifestations of the uneasy pluralism of life’s information, rather than the easier whole



Images:

(Bottom)

[32] Robert Venturi, Vanna Venturi House, Philadelphia (1962).

References:

[33] FLUSSER, Vilém. (2002). *Habit: The True Aesthetic of Creation*. In STRÖHL, Andreas (ed.), *Vilém Flusser: Writings* (Eric EISEL, trans.). Minneapolis: University of Minnesota Press.

[34] RUSSOLO, Luigi. (1986). *The Art of "Noises"* (Barclay BROWN, trans.) (p. 27). New York: Pendragon Press. (Original work published 1913).

[35] FRISKICS-WARREN, Bill. (2018, May 25). Glenn Snoddy, 96, Accidental Inventor of the Fuzz Tone, Dies. Retrieved from: <https://www.nytimes.com/2018/05/25/obituaries/glenn-snoddy-96-accidental-inventor-of-the-fuzz-tone-dies.html>

attained through their selection or exclusion. It can be said in retrospect that, in speaking up against the “puritanically moral language of orthodox Modern architecture”, he came to terms with noise as opposed to pure signal-like aesthetic:

I like elements which are hybrid rather than “pure,” compromising rather than “clean,” distorted rather than “straight-forward,” ambiguous rather than “articulated,” perverse as well as impersonal, boring as well as “interesting,” conventional rather than “designed,” accommodating rather than excluding, redundant rather than simple, vestigial as well as innovating, inconsistent and equivocal rather than direct and clear. I am for messy vitality over obvious unity. I include the non sequitur and proclaim the duality.

VENTURI, Robert. (1977). *Complexity and Contradiction in Architecture* (p. 16). New York: Museum of Modern Art. (Original work published 1966).

Noise constitutes an integral part of critical discussion in the digital age. Vilém Flusser, in 2002, accommodated noise in the framework of aesthetics by constructing a parallel between art criticism and the second law of thermodynamics, building a hypothetical future where artfulness is quantitatively calculated by its *newness* (in here, new defined as “objectively any situation that emerges from the tendency toward ever-increasing probability”). Ugliness is associated to pure noise, and as the signal-to-noise ratio goes higher, art gradually moves into the realm of beauty. As it approaches the other extreme, however, it becomes kitsch.³³

Similarly, the futurist Luigi Russolo also associated the familiarity of musical sound with an inability to surprise and provoke emotion.³⁴ Art, in this context, aspires to include noise; in extreme cases, it *becomes* noise— it becomes ugly.

The idea that communication should be maximally clear is an ideological notion. Often, art privileges the disruption of the “signal” or the difficulty of extracting signal from “noise.” This could even be the definition of art in the Information Age.

MARKS, Laura U. (2013). A Noisy Brush with the Infinite: Noise in Enfolding-Unfolding Aesthetics. In VERNALLIS, Carol; HERZOG, Amy; RICHARDSON, John (eds.), *The Oxford Handbook of Sound and Image in Digital Media* (p. 107). New York: Oxford University Press.

Nashville, 1961. Country legend Marty Robbins’ song “Don’t Worry” is being recorded, with studio engineer Glen Snoddy at the controls. To engineer Glen Snoddy’s pleasant surprise, the failure of a preamp causes a fuzzy distortion that he and producer Don Law agree on keeping— as a result, a bass solo of unprecedented nastiness invades the otherwise innocuous country tune at the 1:26 mark. Snoddy went on to reverse-engineer the sound, creating the basis of the revolutionary Fuzz-Tone guitar pedal released by Gibson in 1962.³⁵ Keith Richards of The Rolling Stones used the Fuzz-Tone to deliver the classic “(I Can’t Get No) Satisfaction”; Jimi Hendrix used another —the Fuzz Face— along with a reverb and an octaver, making them “integral parts of his chaotic



Images:

(Left)

[33] Jimi Hendrix and his pedals, left to right: VOX wah pedal, Mayer Octavia octaver, Arbiter Fuzz-Face fuzz pedal.

(Right)

[34] Jimi Hendrix, burning his guitar in one of his “chaotic live shows”.

References:

[36] ANSELM, J. J. (2017, February 23). Ride the Feedback: A Brief History of Guitar Distortion. Retrieved from: https://www.vice.com/en_ca/article/wn7ja9/ride-the-feedback-a-brief-history-of-guitar-distortion

[37] DIDOMENICANTONIO, Micaela. (2017, January 30). Forte di Fortezza. Retrieved from: <http://www.archidiap.com/opera/forte-difortezza/>

[38] SLESSOR, Catherine. (2010, April 1). Il Forte di Fortezza by Markus Scherer and Walter Dietl, Fortezza, Italy. Retrieved from: <https://www.architectural-review.com/today/il-forte-di-fortezza-by-markus-scherer-and-walter-dietl-fortezza-italy/5217893.article>

live shows, using those technologies as instruments themselves”.³⁶ The fuzzy sound soon transformed the soundscape completely, and there was no going back.

Distortion pedals, by their nature, involve a direct interference with the clean signal to saturate and damage it. An analogous way of treating originally clean material can be observed in the Rural House by RCR Arquitectes where, as discussed earlier, a special type of weathering steel is employed to accommodate rust. The steel is directly corroded, or more specifically, oxidized— which gives it the rough and warm texture these architects sought after in many projects. The Truffle, however, embodies a different approach— it extracts the non-linear characteristics inherent to the medium and to the construction method themselves. As such, it can be compared to the harmonic distortion generated in sound media and instruments such as tube equipment, tape, and even the very circuitry of analog gear:

Tube equipment tends to produce a very appealing distortion up to a specific point where the system seems to ‘break’ and produce very undesired clicks. Tapes can be overloaded on the very same principle by boosting the input signal. Bipolar transistors, FET, tube and tape distortion all have different flavors as they all produce different harmonic content. Also, the more each system overloads the more compression occurs, which makes the overall effect even more appealing.

IZHAKI, Roey. (2008). *Mixing Audio: Concepts, Practices and Tools* (p. 454). Oxford: Elsevier.

Alto Adige, Franzensfeste Fortress, 2008. The cloudy texture of galvanized, patinated steel blends in with the bare roughness of the 19th century fortress. A reinterpretation of the historical building method saw the construction in an unusual concrete construction: layers of sand between each section were subsequently flushed out, and the surface of the concrete was then sandblasted,³⁷ all in order to produce the “feel of a modern ruin”.³⁸

The concrete, an inherently rough medium (whose roughness is further accentuated by the planned irregularity of the sand layers), is directly tampered with to add various layers of distortion, and used in conjunction with the corroded metal. The innate roughness is first emphasized in a gesture akin to what we find in Ensemble Studio’s Truffle, then layered with more, added damage. Much like the signal from a Telecaster, first passing through an overdrive pedal, then to a tube amp, to be finally mastered on tape. Different degrees and modes of distortion coexist.

Today, absolute precision and signal-like clarity has become easily attainable— ironically, a pleasant noise is often harder to achieve, in both sonic and tectonic means of production. Computers dissociated sound from matter itself; rather than capturing or generating electrical signals that represent or produce sound, it became possible to compute them, annihilating any and every unwanted artifact— be it the noise inherent to the medium or the distortion caused by the inevitable lack of precision in the circuitry. A synthesized sine wave, a dynamic processor— when calculated mathematically, they are



Images:

(Bottom)

[35, 36] Markus Scherer & Walter Dietl, *Franzenfeste Fortress, Fortezza* (2009).

References:

[39] IZHAKI, Roey. (2008). *Mixing Audio: Concepts, Practices and Tools* (p. 274). Oxford: Elsevier.

[40] CURTIS, William J. R. (2017, May 30). RCR Retrospective: “the quest for a poetic re-foundation in landscape”. Retrieved from: <https://www.architectural-review.com/essays/rcr-retrospective-the-quest-for-a-poetic-re-foundation-inlandscape/10020124.article>

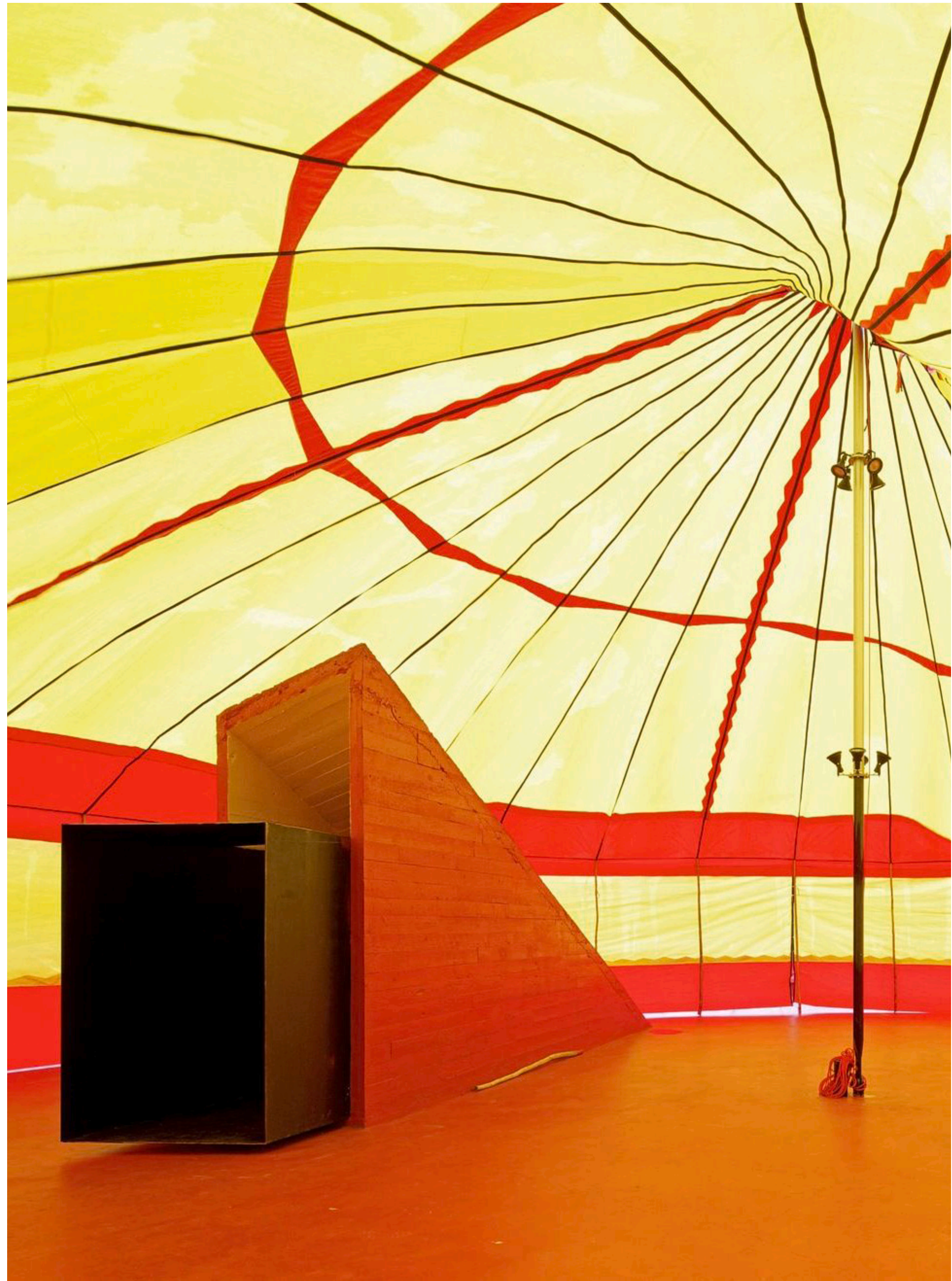
perfectly linear.³⁹ Nowadays even our most basic computers can easily handle tens —even hundreds— of instances of equalizers that alter the frequency content of waveforms with absolute mathematic precision. The same goes for the architectural counterparts: parametric architecture gives us meticulous drawings otherwise unimaginable, metals and concrete can be processed in infinite different ways, including 3D printing.

Yet somehow, our analog technostalgia doesn’t seem to go away. Tube saturation plugins simulate the “limitations” of their real-world counterparts; the hiss and crackle of vinyl is intentionally added to many songs, sometimes through sampling, sometimes through emulation. Beach House crafts a refreshing, retro sound

in *Space Song* with tasteful amounts of grit; Portishead squishes the drums flat for a dizzying, dark ambiance in *Mysteron*; Tricky goes for an aggressive, in-your-face compression in his song *Parenthesis*. This attention to noise translates equally well to the raw concrete architecture of Le Corbusier, Tadao Ando, Valerio Olgiati, Vector Architects, to name but a few. They all operate with different levels and types of distortion to achieve one of the most sought-after effects of contemporary art: immersion. There arises a hyperreal experience of the senses, through “an abstraction that is parallel to the natural world but which intensifies the experience of it”.⁴⁰

Everything we hear and see is, to some degree, distorted.





REFERENCE

Immature poets imitate; mature poets steal.
(T. S. Eliot, 1920)

Images:

(Opposite)

[37] Smiljan Radic, NAVE Performance Arts Center, Santiago (2014).

(Bottom)

[38, 39] Stills from Smiljan Radic’s film, *Orange Noise*, showing fragile constructions.

References:

[41] WALKER, Enrique. (2013). A Conversation with Smiljan Radic. *El Croquis*, 167, p.259.

[42] Idem (p. 7).

[43] Studio Mumbai. (2011). Palmyra House. *El Croquis*, 157, p. 123.

Santiago, NAVE Performance Arts Center, 2014. In a protected district at the center of the city, the clean, restored façade of a 1940s housing block hides a completely gutted interior of a pitch-black performance hall. Apart from the façade, hardly anything touches the ground: only a staircase, a lift, two oblique pillars that support the master beam, and a wall. The suspended catwalk, together with the stairs, folds into itself in an 8-shaped configuration, and ultimately leads to the terrace without ever touching the ground again. During its course, it builds unique relationships with the free space right below, with tall red panels and a net that act as a visual filter. The final staircase, enclosed by concrete walls painted bright yellow, lets in a similarly tinted light from above. Like sudden silence that follows a crescendo, it all ends with a red-and-yellow circus tent that spans overhead, standing alone at the empty terrace (save for the benches that line the parapet).

“A circus”, states Smiljan Radic, “is the most primitive and austere space for spectacles, the first one that comes to mind”.⁴¹ The ephemeral nature of its construction and its stature as an archetype form a dialogue with the black box underneath. It is an overt nod to what he calls “Fragile Constructions”— *ad lib*, non-referential solutions to immediate necessities that he meticulously photographed over the years and internalized.⁴² Ironically, these non-referential solutions become a reference themselves for NAVE.

Alibag, Palmyra House, 2007. Nestled in the midst of a coastal coconut plantation full of local hardy palm trees, two slim wooden structures sit atop stone plinths, with a similarly proportioned stone pool in between. The structure of each volume is manually constructed of local hardwood, and covered entirely by handmade louvers made of Palmyra bark. Tradition informs the whole construction— interlocking wooden joinery, hand-worked copper and aluminum, artesian wells, aqueducts.⁴³

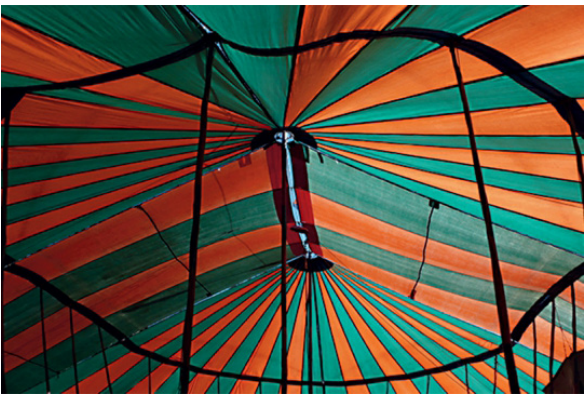
By working with a large group of local craftsmen, Studio

Mumbai displays a sensibility for traditional processes across virtually all of its work. Bijoy Jain’s studies, published in the second monograph of *Croquis* on Studio Mumbai, present a striking resemblance with the fragile constructions of Radic:

During our travels in India, we come across conditions where spatial qualities arise out of the need to function in restricted environments. It is a spontaneous act to resolve all basic requirements where available space and resources are limited. These spaces are considerate to human interaction. They are modest and free.

Studio Mumbai. (2019). Studies. *El Croquis*, 200, p. 23

In the work of both architects, however, there’s more than initially meets the eye. Beyond the most explicit references that we observe in the final products scrutinized above, references also manifest in much differ-



Images:

(Bottom)

[40] Studio Mumbai, Palmyra House, Alibag (2007).

References:

[44] RADIC, Smiljan. (2019). Prism House + Terrace Room. *El Croquis*, 199, pp. 337–338.

[45] ZARDINI, Mirko. (2019). It's About Architecture, But It's Not About Architecture. *El Croquis*, 200, p. 19.

[46] KUROKAWA, Kisho. (1977). *Metabolism in Architecture* (p. 188). London: Studio Vista.

[47] Idem (pp. 171–187).

ent ways in the creative process, and often remain under-the-radar for their tacit and elusive nature. That is, unless we redirect our attention from the single object toward the more complex *practice*.

Digging a little deeper in the reference palette of Radic, one is confronted with a complex mesh of interrelations, stretching from external references to a network of cross-references with his previous projects. Shinohara's Prism House, for instance, informs the homonymous project of Radic on a spatial and organizational level,⁴⁴ whereas the technological details of the latter find precedent in the House in Chiloé Island, which in turn borrows from Chilean vernacular and the aforementioned fragile constructions. His later work, such as the Corral Taller de Escultura, indicate a further continuity with these themes.

Bijoy Jain, on the other hand, approached Japan from a different perspective, learning about traditional methods from the Japanese master carpenters, informing his local, craft-heavy projects on a technical level. The practical references of Studio Mumbai reach many directions, such as the archives of the Public Works Department, which are put to use as sources of genuinely efficient building technologies— projects with frugal budgets that yield good results.⁴⁵

Tokyo, 1975. Set back from the street by some 20 meters, a gray-cladded monolith stands at the same height of the buildings that surround it. The virtually blind

façade that overlooks the street is evocative of a gateway, and the street passes through it accordingly to become a semi-public square. The building itself sits on the site in an L-shaped configuration, with a pillar on the corner of the rectangle in which it is inscribed. From the ninth floor on, the building covers the whole rectangle, spanning over the in-between space underneath.

An uncommon gesture for corporate architecture— its supposedly semi-public space presents no enclosures, unlike the most part of its kin. Its configuration and scale are similarly ambiguous, and the overhang asserts its undeniable presence, marking the covered area as at once inside and outside, as if defying any possible *either-or* situation. Trees, benches, sculptures are in continuity with the urban, and the music hall underneath is directly accessed from this space.⁴⁶

Different ways of using references come to the surface when comparing the three architectural practices discussed above. Kurokawa chooses to apply the *engawa* on a conceptual level,⁴⁷ Jain absorbs traditional ways of working with wood, and Radic invokes the spatial qualities of Shinohara's work through imitation. Their schemes, upon proving their usefulness, become recurrent themes. Consciously or not, architects constantly reference their own projects.

On May 1980, Peter Gabriel released his third eponymous album, often referred to as *Peter Gabriel III* or *Melt*. Right off the bat, the album kicks off with a cymbal-less,



Images:

(Left)

[41] Smiljan Radic, House in Chiloé Island, San Miguel (1997).

(Right)

[42] Kishō Kurokawa, Bank of Fukuoka, Tokyo (1975).

References:

[48] BOWMAN, Durrell. (2016). *Experiencing Peter Gabriel: A Listener's Companion* (p. 75). London: Rowmann & Littlefield.

[49] WOMMACK, Kenneth. (2017). *The Beatles Encyclopedia: Everything Fab Four*. Santa Barbara: Greenwood.

[50] Retrieved from: <https://www.officialcharts.com/search/singles/apache/>

[51] Retrieved from: <https://www.grammy.com/grammys/artists/steve-reich>

in-your-face drum pattern played by Phil Collins, introducing the revolutionary gated reverb that opened up new possibilities in contemporary sound.⁴⁸ Panned to the extremes left and right, the marimba makes its first appearance with Morris Pert's solo on the 2:20 mark, creating an almost disorientating soundscape. The eerie opening track is followed by "No Self Control", which opens with distorted instrumental sounds that are cut abruptly and alternated to create an unconventional atmosphere. Marimba again floods the soundscape 18 seconds into the song, this time with minimalist repetition and overlapping pulses.

It was an album full of new experiments, and many of the ideas developed there became recurrent themes in Peter Gabriel's work. One of these, the particular use of the marimba to create a pulse-driven texture, owes to the influence of the minimalist music —particularly, "Music for 18 Musicians" by Steve Reich— that charted new territory in the realm of sound:

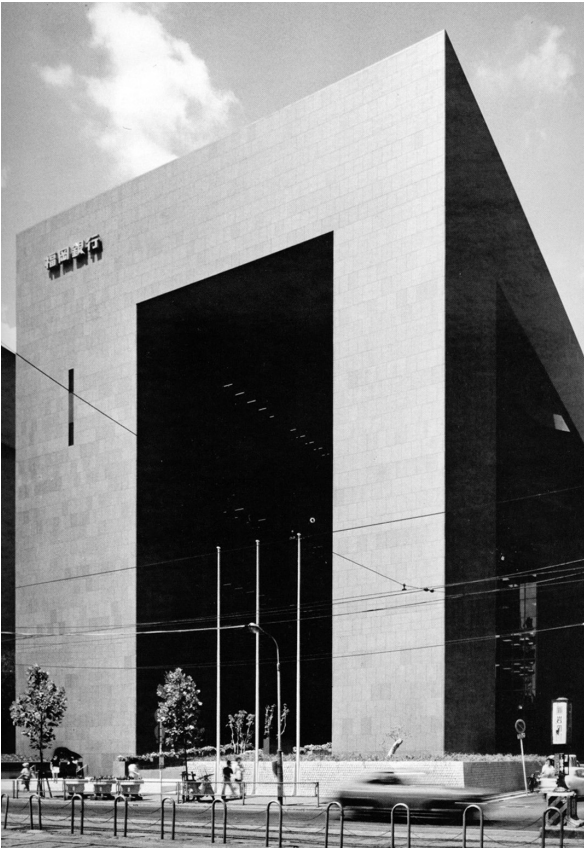
One of the other influences at that time was some of the "Systems Music" that was beginning to evolve. Steve Reich had done this wonderful record called "Music for Eighteen Musicians", which involved marimbas and I think, of all the 'systems' composers, his work had a lot of textures and colours and grooves to them that I really responded to. So I tried to involve elements of that in the work.

(n.d.). Peter Gabriel. Retrieved from: <https://petergabriel.com/release/peter-gabriel-3/>

Listening, imitating, and *learning-from* form the backbone of Gabriel's approach to *Melt*. A similar, though more tongue-in-cheek attitude can be observed in The Beatles' 1961 instrumental, "Cry for a Shadow". A pun on the name hints at its conception: George Harrison and John Lennon delivered a parody of the Shadows, whose instrumentals enjoyed much success at the time. Harrison's imitation of Hank Marvin, and Lennon's Jet Harris-esque bass melodies referenced explicitly their song "Apache", which they played in their live performances in Hamburg.⁴⁹

If we change our perspective from the songs we're scrutinizing, and instead compare the models that they exploit (and the ways in which they're exploited), these two cases reveal a new set of parallels. They are, first and foremost, successful songs of their time: "Apache" reached #1 in UK charts on August 1960,⁵⁰ and the 1976 "Music For 18 Musicians" is, among other things, a Grammy winner.⁵¹ They are also roughly contemporary to the songs they've been imitated by: "Cry for a Shadow" was recorded one year after "Apache" was released, and "No Self Control" came out 4 years after "Music for 18 Musicians". The instruments (and their application) were also analogous, from the Rickenbacker of John Lennon to the marimba patterns of Morris Pert.

There can be observed minor differences in how these references were put to use: The Beatles imitate the playing style of The Shadows, whereas Peter Gabriel copy the marimba pulses on a conceptual level. One aspect,



References:

[52] GOODMANSON, John. (2003, May/June). John Goodmanson: Why Use Reference CDs While Mixing?. *Tape Op*, 35.

[53] OWSINSKI, Bobby. (2006). *The Mixing Engineer's Handbook* (p. 144). Boston: Thomson Course Technology PTR. (Original work published 1999).

[54] WEISS, David. (2017, April 24). Next-Gen Reference Tracks: 12 Top Engineers Share Their Essential Reference Mixes. Retrieved from: <https://sonicscoop.com/2017/04/24/reference-tracks-next-generation>

[55] IZHAKI, Roey. (2008). *Mixing Audio: Concepts, Practices and Tools* (p. 25). Oxford: Elsevier.

[56] PUGA, Cecilia. (2010). Country House, Marchigue. 2G, 53, p. 14.

[57] BLOCK, India. (2017, October 17). Diébédo Francis Kéré says school that launched his career is “not a traditional African building”. Retrieved from: <https://www.dezeen.com/2017/10/17/movie-diebedo-francis-kere-gando-school-burkina-faso-interview-video/>

[58] BUSKIN, Richard. (2012, December 13). Justice Tells the Story of D.A.N.C.E.. Retrieved from: <https://www.attackmagazine.com/features/long-read/justice-tell-the-story-of-d-a-n-c-e/>

[59] PERRY, Kevin EG. (2016, November 12). King Gizzard & The Lizard Wizard: can the psych band release five albums in one year. Retrieved from: <https://www.theguardian.com/music/2016/nov/12/king-gizzard-and-the-lizard-wizard-5-albums-in-2017>

however, ties them together— they are both musical references. As such, they are explicit; they can be easily inferred or verified upon listening to the final *product*, like their architectural counterparts discussed earlier. On the contrary, there exists a largely uncharted world of sonic references, where the light of mass media does not reach so easily. Mainly because they are practical and tacit; they disappear once the job is done.

Some references serve technical purposes, others creative; composers, producers, mixing and mastering engineers all listen to different aspects of music. Producer John Goodmanson refers to such tracks as “guideposts”— by having a CD of “records that you know intimately” always handy, one can safely evaluate the sound of their own mix.⁵² Others constantly listen to new sounds: Jimmy Douglass defines his approach to making records as “tuning his ears”, where by listening to new records in the particular genre he’s working in, he can stay up to date with the constantly changing contemporary sound.⁵³ Some look for emotional content, some for tonal and spatial balance, some simply for

inspiration.⁵⁴ Some, on the other hand, refer to their own past mixes,⁵⁵ not unlike the architects discussed above who continuously rework their past solutions.

Deliberately or not, these resources constitute an inseparable part of the creative process. Cecilia Puga, in Casa de Campo, used XIX century traditional Chilean building technologies;⁵⁶ Hassan Fathy, the “architect of the poor”, investigated ancient Egyptian architecture to make adobe vaults; and Francis Kéré, in his community-driven projects in Burkina Faso, combined traditional building knowledge with modern engineering methods. ⁵⁷ French dance music duo Justice, inspired by a Larry Levan remix of the Celestial Choir’s “Stand on the Word”, used a choir in their hit single “D.A.N.C.E.”;⁵⁸ and King Gizzard & the Lizard Wizard explored microtonal music in their “Flying Microtonal Banana”, named after their custom-built guitar whose core concept lies in the Turkish *bağlama*.⁵⁹ References are everywhere, even if we can’t see or hear them. Imitation forms the core of invention— monkey see, monkey do.



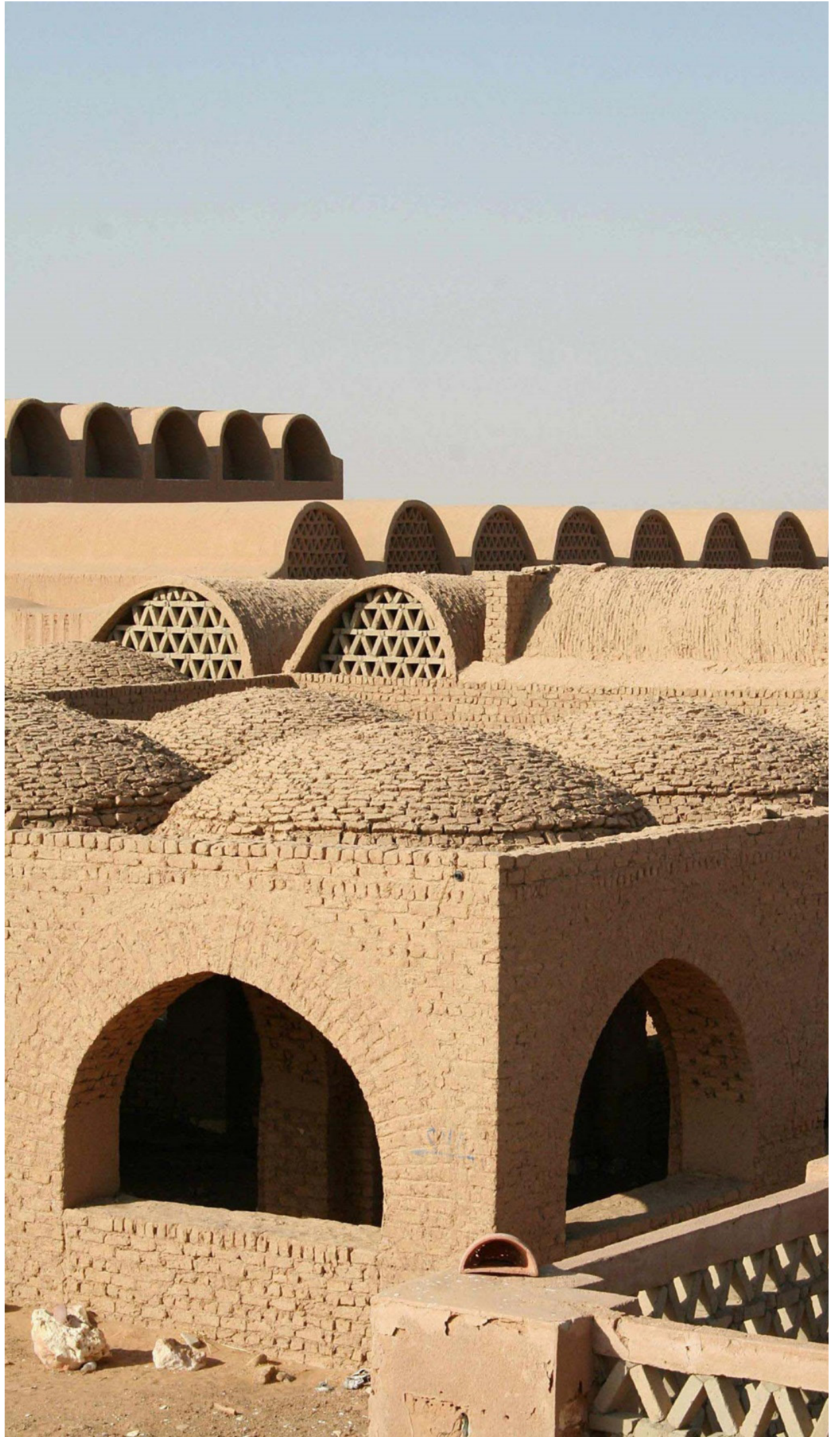
Images:

(Opposite)

[43] Album cover of Flying Microtonal Banana, King
Gizzard and the Lizard Wizard.

(This page)

[44] Hassan Fathy, New Baris public buildings (1967).



3

THE BAZAAR OF MARTIM MONIZ

An intervention



RECTANGULOS						
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CONTEXT

Architects don’t invent anything, they transform reality.
(Álvaro Siza Vieira, n.d.)

Images:

(Opposite)

[45] Topographic survey of Lisbon (1856–1858) under the direction of Filipe Folque, published in 1871.

(This page)

[46] George Vivian, Passeio Público de Lisboa (colored lithograph), XIX century.

References:

- [60] DOS SANTOS, Maria Helena Ribeiro. (2001). *Arquitetura pombalina, temas e variações*. In BARREIROS, Maria Helena (ed.). *Lisboa: Conhecer, Pensar, Fazer Cidade* (pp. 36–37). Lisbon: Centro de Informação Urbano de Lisboa.
- [61] DA SILVA, Raquel Henriques. (2001). *Planear a cidade burguesa, 1777–1900*. In BARREIROS, Maria Helena (ed.). *Lisboa: Conhecer, Pensar, Fazer Cidade* (p. 53). Lisbon: Centro de Informação Urbano de Lisboa.

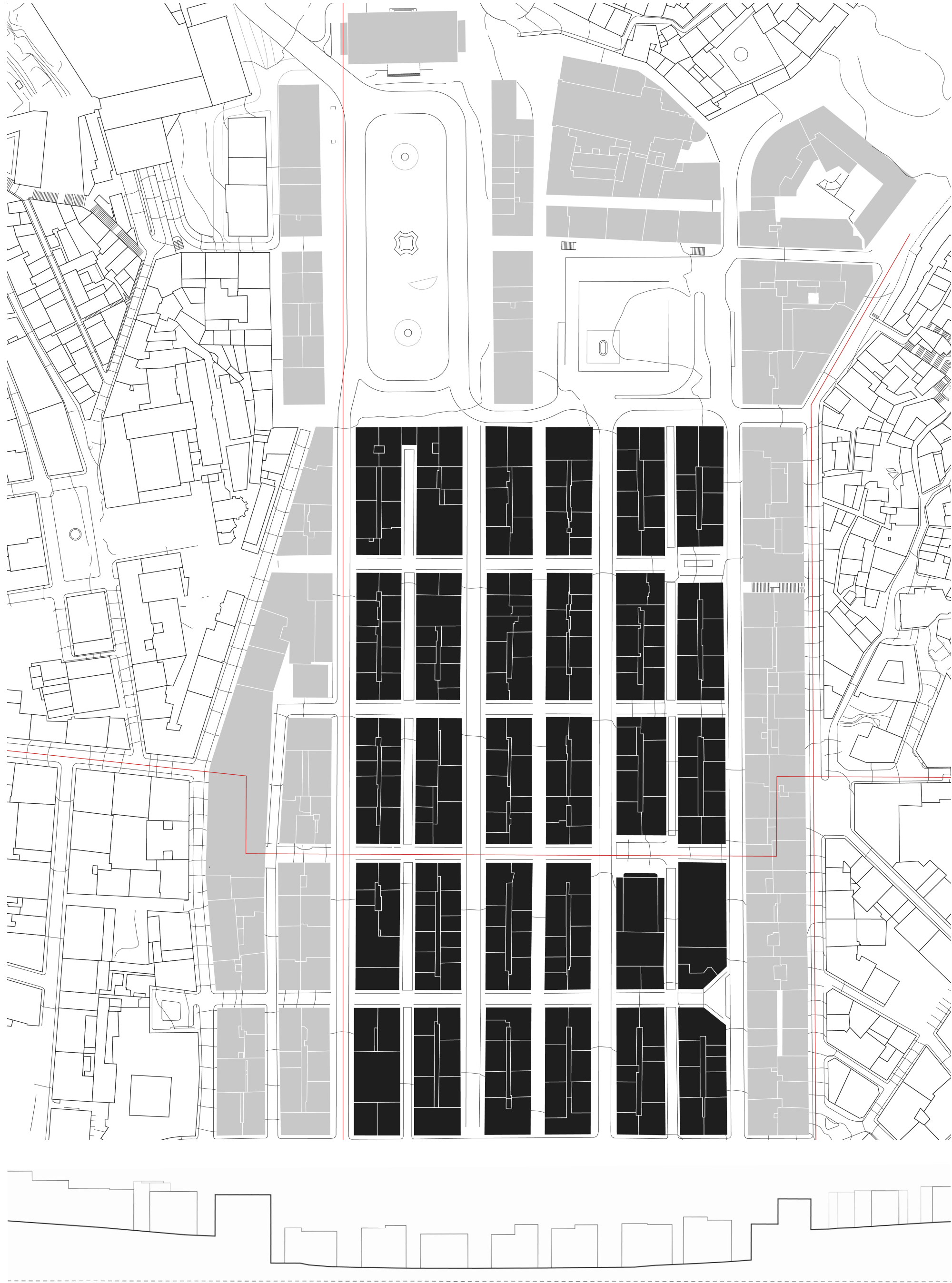
Lisbon, 1755. The port city facing the Atlantic confronted a natural disaster that would be remembered as, arguably, its greatest moment of cataclysm in history. An earthquake, followed by a violent tsunami and raging conflagration across the city, razed Lisbon to almost total destruction, leaving a deep mark in the collective memory and ushering the town into a new era of reconstruction and urbanization.

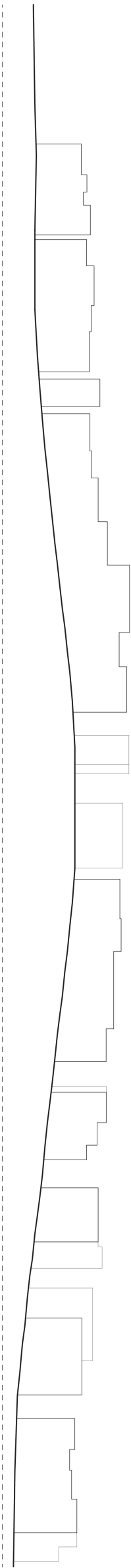
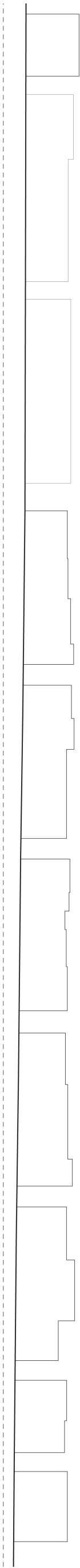
Revolving around the central figure of Marquês de Pombal (hence the designation *Baixa Pombalina*), the reconstruction of downtown Lisbon overwrote the ruins of the old city in the form of a rectangular matrix. Dictated by 5 parallel streets (*ruas*) stretching from Terreiro do Paço northwards, and smaller alleys (*travessas*) that cross them orthogonally, the plan prescribed an irregular rhythm corresponding to preexisting connections while simultaneously establishing an unmistakable hierarchy; the main streets, based on their varying functions and correspondences, assumed different dimensions. The edification itself was carried out with a standardized and

prefabricated structure, the *gaiola*, whose anti-seismic and anti-fire properties reflected the bitter memory of the disaster.⁶⁰

For the city designed by its relationship with the river, whose development so far took place along the waterfront, the reconstruction of Pombal implied the first introduction of a strong axial movement toward the interior. It inherited two consolidated public spaces from before the earthquake —Terreiro do Paço and Rossio— and connected them through the main streets in linear fashion. In 1764, this gesture culminated in the construction of Passeio Público, the first park of Lisbon to be conceived by an architect (José Manuel de Carvalho Negreiros). Its central axis aligned with the valley of Valverde, it pointed toward the inland and formed peculiar relationships with the topography, thereby laying the foundations of a new paradigm that would later be taken up by another key figure in Lisbon’s history of urbanization, Frederico Ressano Garcia.⁶¹







Images:

(Opposite, top)

[47] Lisbon, downtown area plan (1:5000 scale).

(Opposite, bottom)

[48] Transversal section (1:5000 scale).

(This page, left)

[49] Longitudinal section passing through Rua Áurea
(1:5000 scale)

(This page, right)

[50] Longitudinal section passing through Rua da
Madalena (1:5000 scale).

Images:

(Top)

[51] Aerial view of Paris, showing the avenues connecting to the Arc de Triomphe.

(Bottom)

[52] Charles Marville, *Construction of the avenue de l'Opéra: The Butte des Moulins (from the rue Saint-Roch)*, December 1876.

References:

[62] BLAKE, Eddie. (n.d.) Bringing down the house: demolishing myths. Retrieved from: <https://www.architecturalreview.com/essays/bringing-down-the-house-demolishing-myths/10039655.article>

[63] DAVIES, Paul. (2016, June 1). Georges-Eugène Haussmann (1809–1891). Retrieved from: <https://www.architecturalreview.com/essays/reputations/georges-eugene-haussmann-1809-1891/10006998.article>

Fast forward to XX century Paris. The exponential increase in productivity and population brought about by the Industrial Revolution acted as a catalyst to the rapid growth of the city. Crammed in the already scant dimensions of the medieval town, shabby and hurried construction spawned the horrors of overpopulation—disease.

The convictions of Napoleon III of a reformed Paris, already apparent in his scheme for its rehabilitation, reached their full expression in the hands of the Prefect for the Seine, Georges-Eugène Haussmann. Wielding destruction as a civilizing tool, the self-proclaimed “artist-demolitionist” gutted the medieval fabric and the slums to facilitate the movement of people, capital, and more importantly, air.⁶² The sewage system ran under the boulevards of the bourgeois.

An operation of destructive nature, it involved a brutal overwriting of the existing medieval fabric, demolishing thousands of buildings in the process; per consequence, it also burned away substantial amounts of capital, invoking social and political controversy. The legacy of Haussmann has since been regarded with an



uneasy duality— one of sanitizing modernity, and imperialistic megalomania. It is simultaneously lauded for its revolutionary nature, and disparaged with allegations of social engineering by rearranging arrondissements in function of economic class— the generosity of their dimensions also unlocked their potential as suppressive tools, allowing the rapid deployment of troops through boulevards simply too large to barricade.⁶³

Back to Lisbon, 1874. Imbued with the principles of the Parisian *école*, Frederico Ressano Garcia assumed the position of Engenheiro da Câmara Municipal, where he would undertake the plan for the northward expansion



Images:

(Bottom)

[49] Penha da França seen from Avenida Almirante Reis (1890–1945 ca.).

References:

[64] DA SILVA, Raquel Henriques. (2001). Planear a cidade burguesa, 1777–1900. In BARREIROS, Maria Helena (ed.), *Lisboa: Conhecer, Pensar, Fazer Cidade* (pp. 59–60). Lisbon: Centro de Informação Urbano de Lisboa.

[65] FERNANDES, José Manuel. (1989). Alguns Apontamentos sobre Urbanismo Alfacinha. In DA SILVA, Raquel Henriques (ed.), *Lisboa de Frederico Ressano Garcia 1874–1909* (p. 49). Lisbon: Fundação Calouste Gulbenkian.

of Lisbon. Suggesting a strong *haussmannian* influence, Ressano Garcia elaborated a plan consisting of a boulevard-roundabout binomial, in the form of a fragmented spine that stems from Avenida da Liberdade; capitalizing on the convenient preexistence of the Passeio Público, overwriting and extending it, concluding only upon reaching an orographic obstacle. It was further articulated with two more fragments: Avenida Fontes Pereira Melo that climbs further northeast, and Avenida da República that connects to Campo Grande. The joints of these articulations materialized as roundabouts, which served not only to redirect the axes on occasion, but also to establish a formal language like its Parisian counterpart.⁶⁴

It differed from the original insofar as it consisted of an operation of expansion and not reform; it prescribed construction, not destruction. Furthermore, this development took into account the preexisting order of Lisbon, planning and building in accordance with it, inflecting the *haussmannian* binomial of boulevard-roundabout to the *lisboeta* condition. Aligning itself with the topography, it formed peculiar relationships with the historical fabric, where sinuous paths of the past and uncompro-

mising straight boulevards of the present intertwined. The newly urbanized areas generated their blocks — each of them according to a rectangular matrix aligned with their respective avenues— forming a patchwork of distinct neighborhoods that suggested a formal continuity with Lisbon’s downtown. Many streets of the past were inherited by these new neighborhoods— exceptions proved the rule. It was also spared the political and financial controversy— its modest scale respected both the preexisting fabric and financial resources.⁶⁵

In a parallel development, Avenida Almirante Reis unfolded on the opposite side of the hill of Sant’Ana, extending northeast in an obstinately straight line of almost comical proportions: a total width of 25m, with roughly 6 meters of pavement on each side, and a tidy row of planted trees separating the two lanes. It presents all the inflections discussed so far— in its alignment with the topography, climbing tirelessly the valley; in its moderate dimensions; and ultimately, in its relationship with the historical Rua do Benfornoso, generating moments of tension such as Largo do Intendente and Regueirão dos Anjos.



Images:

(Top)

[54] Avenida da Liberdade, intersection with Rua do Salitre (1955 ca.).

(Bottom)

[55] Avenida da Liberdade, interaction with historical streets (1:2000 scale plan).



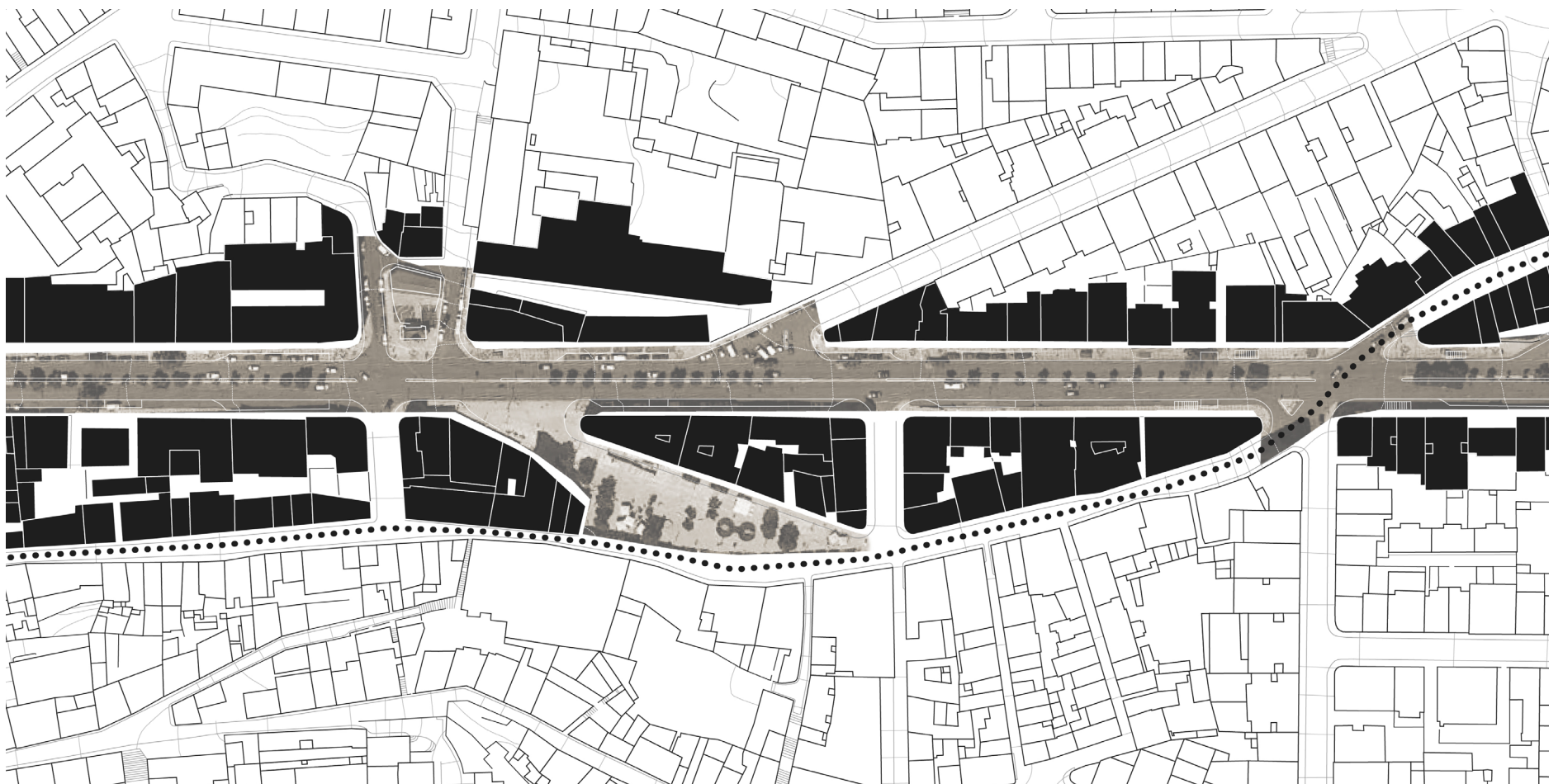
Images:

(Top)

[56] Avenida Almirante Reis, intersection with Rua dos Anjos (1960).

(Bottom)

[57] Avenida Almirante Reis, interaction with historical streets (1:2000 scale plan).





DIAGNOSIS

Most of our beautiful European squares suffer from cars. Buildings that “spoke with each other” across a square, either in axis systems or in balanced composition, are not corresponding any more because of the traffic flow. The height of the cars, their speed and surprisingly noisy behaviour make us seek away from squares, which used to be restful spaces for walking.

(Jørn Utzon, 1963)

Images:

(Opposite)

[58] Praça Martim Moniz, Arco do Marquês de Alegrete (1949).

(This page)

[59] Aerial view of Lisbon, where the relationship between Avenida da Liberdade, Rua das Portas de Santo Antão, and Praça Dom Pedro IV (Rossio) can be clearly seen.

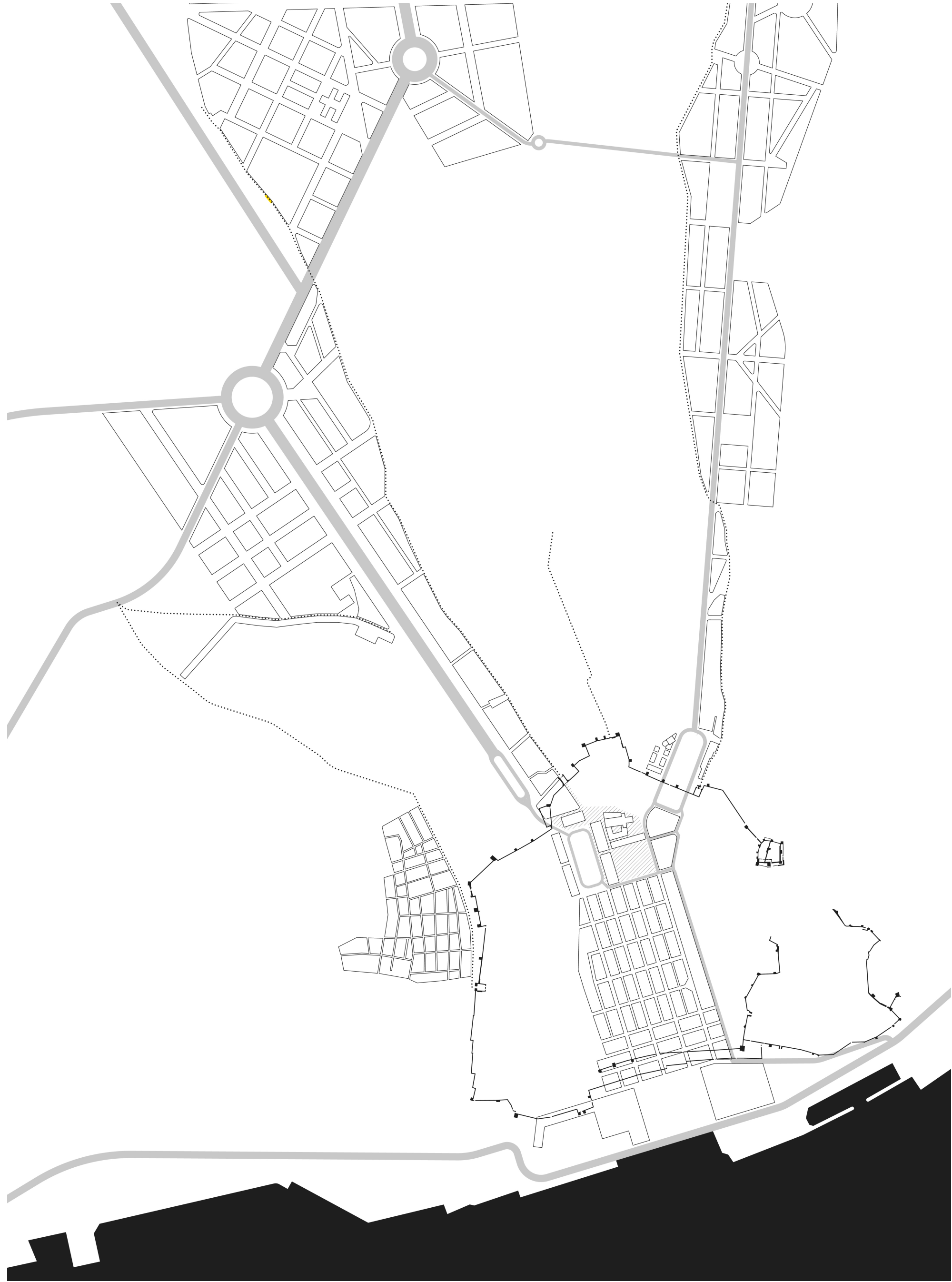
A specular relationship characterizes Avenida da Liberdade and Avenida Almirante Reis— outbursts from the city’s historical downtown, parallel to the historical streets that climb their respective valleys. Just as Rossio functions as a moment of transition between Baixa Pombalina and Avenida da Liberdade, Martim Moniz is one such moment of encounter; more specifically, a point of convergence between Avenida Almirante Reis, Rua do Benfornoso, and the downtown.

A further affinity between the two can be inferred from their relationship with a preexistence that is common ground to both: the traces of the *fernandine* city walls. Rather than a visible structure, however, it consists of an extinguished element that remains only as a palimpsest, arching over both fabrics. It comes in handy as a document both for reading the status quo and for informing our decisions.

Considering their nature as historical streets, it comes as no surprise that both Rua do Benfornoso and Rua das Portas de Santo Antão correspond to the gates of the city walls. They leave the downtown from these points and venture northwards. As lateral developments, the avenues inevitably create a rapport with the starting points of these streets, and they eventually dissolve into each other in the downtown.

In the case of Avenida da Liberdade, the tension between the historical street and the boulevard solves itself in a graduated manner. In close proximity to Largo do Rossio, the final episode where the avenue and the street come together, Rua das Portas de Santo Antão reaches a point of culmination: Largo São Domingos. The strictly linear street explodes into the public domain of the downtown and comes to a conclusion right before dissipating into Rossio, where it coalesces with the avenue.





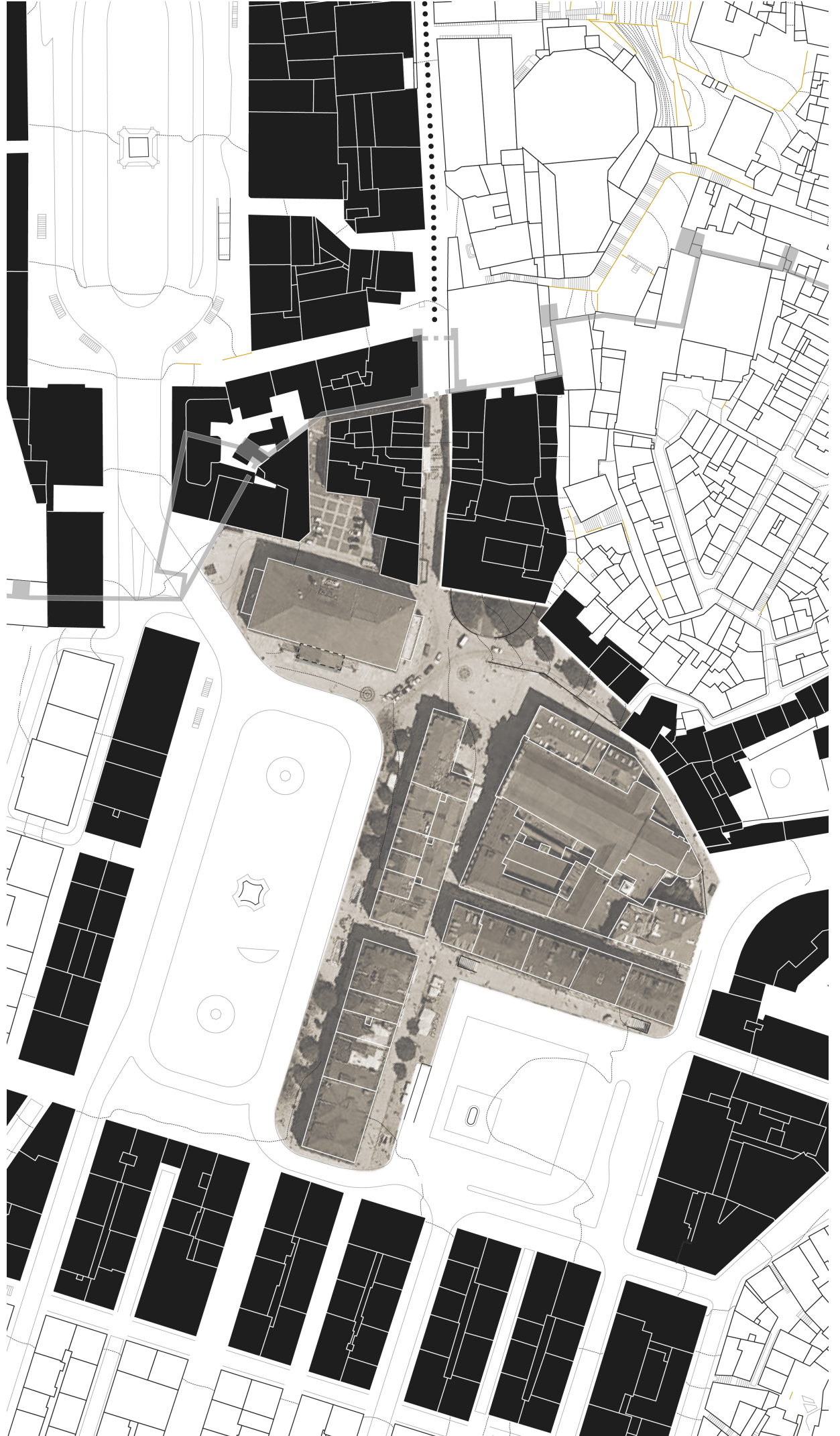
Images:

(Opposite)

[60] Lisbon, avenue-street relationship (1:10000 scale plan).

(This page)

[61] Lisbon, downtown area buffer zone (1:2000 scale plan).



Images:
(Bottom)
[Praça Martim Moniz (1950–1970 ca.)

Martim Moniz, on the other hand, consists of a single void that devours every input and staggers any possible articulation. It involves a trigger-happy spree of abrupt interruptions: the avenue, the historical street, the built environment all vanish into one big chasm. An *anti-tour-de-force* in two ways: one that refuses to become articulate, and that denies everything else by the sheer weight of its presence. The void outmatches its surroundings by such a huge margin that hierarchy doesn't hold up— the subtle differences in scale of the elements around it are rendered meaningless.

That is not to say that the elements themselves do not exist. The historical street (Rua do Benfornoso), the chapel right outside the city gates (Capela da Nossa Senhora da Saúde), the stairs renovated as part of the accessibility plan of Castelo de S. Jorge (Escadinhas da Saúde), and Salão de Lisboa all converge to a single point, indicating a potential centrality. Furthermore, the buildings bordering the void become big in an attempt to assert their presence over it: the repetitious residen-

tial complex, the towering Hotel Mundial, the detached Centro Comercial da Mouraria, and the peculiar Centro Comercial de Martim Moniz all compete in their own way to mitigate the situation.

The question of the transition between the avenue/street pair and the downtown, however, remains unresolved. Upon reaching the clearing, the vehicular traffic of Almirante Reis is channeled around it— the current square in Martim Moniz essentially acts as an oversized roundabout, which only adds to the dramatically uneventful nature of its center. Attempts to bring life inside it result in added awkwardness— in the avenue-roundabout binomial, life happens around the roundabout, not inside it. Because the vehicles circling them are serious deterrents, like sharks circling a desolate island. Rua do Benfornoso, on the other hand, ends up meeting the same clearing without any buildup or transition unlike its counterpart, Rua das Portas de Santo Antão— it lacks a terminal.



Images:

(Top)

[63] Praça Martim Moniz, prior to demolition works (1947).

(Bottom)

[64] Praça Martim Moniz, after demolition works

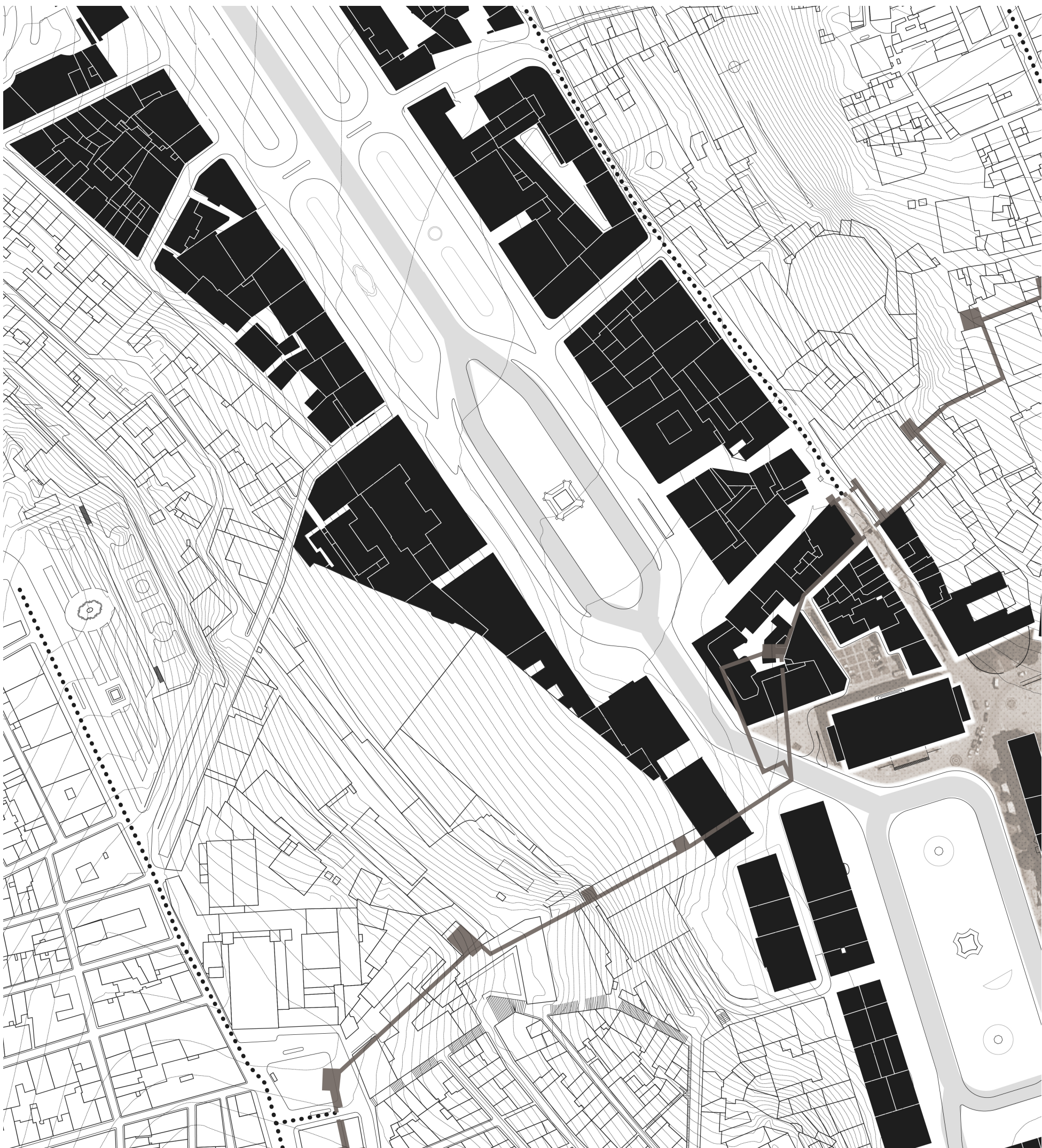
(1950–1960 ca.)

(Next spread)

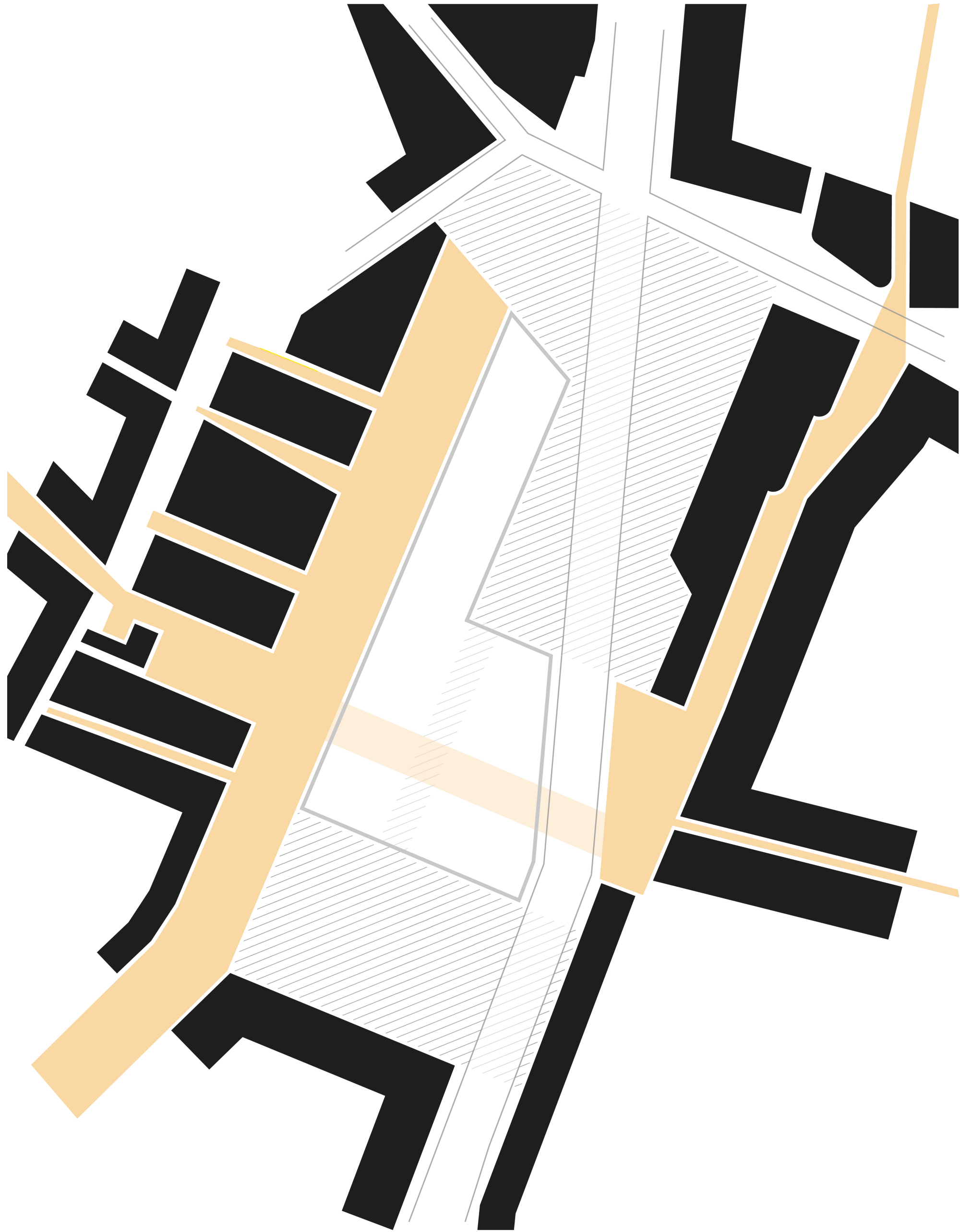
[65] Lisbon, downtown area buffer zone proposal

(1:2000 scale plan).









STRATEGY

Standing on the defensive indicates insufficient strength; attacking, a superabundance of strength.

(Sūnzǐ, ca. 5th cen. B.C.E.)

Images:

(Opposite)

[66] Bazaar of Martim Moniz, strategy drawing (1:1000 scale plan).

(Bottom)

[67] Bazaar of Martim Moniz, strategy drawing (1:1000 scale cross-section).

Challenging the chasm, given the circumstances, implies challenging its scale first and foremost. A duality emerges: depending on the perspective, it can mean either competing with it by providing a proportionate mass, or sabotaging it by dividing the void into various parts, thereby reducing it.

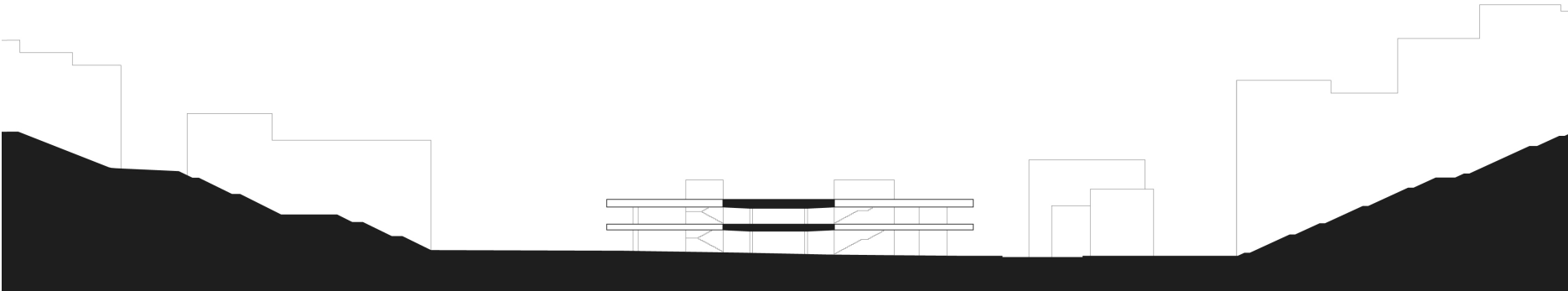
The foundational approach of the following intervention scheme is about taking a both-and stance, not unlike Sūnzǐ’s concept of tactical dispositions: ensuring the conditions of a successful intervention by dividing the void into parts, and engaging with it through architecture. In other words, it involves the simultaneous mitigation of its overwhelming nature and insertion of a critical mass capable of regenerating a cohesive and coherent urban fabric.

Devouring the toxins that are offered by an opponent defangs their powers. And it sidesteps the deadlocked fight along a path with few obstacles and many resources. Rather than engaging and fuelling that fight, the chemist of problems finds use in its by-products— in the detritus left on the field of combat.

EASTERLING, Keller. (2019, February 4). A losing game: harnessing failure. Retrieved from: <https://www.architectural-review.com/essays/a-losing-game-harnessing-failure/10039536.article>

The initial gesture for this dual action is an act of reversal: the interrupted Almirante Reis is once again extended, this time until it reaches an important focal point—the location where the city’s gates used to stand (for the sake of convenience, this location will be referred to as “Largo da Saúde” from now on). The straight line of the avenue bends consequently to follow the built environment it comes in contact with, thereby being incorporated into the framework of the downtown. The moment of inflection becomes the terminal point of Rua do Benfornoso— it generates a dialogue between the historical street, the chapel, the staircase, and the old Salão Lisboa. The two sides of Largo da Saúde square diverge into two distinct domains: the main axis pertains to Almirante Reis, and the redirected line to a new square (the new Praça do Martim Moniz) to be defined by the bazaar and the surrounding buildings.

The first operation, therefore, provides the framework for the mass to be inserted in. The disappearance of the circular motion around the clearing pedestrianizes the west side of Martim Moniz, opening up new possibilities for the public domain. It also clears the area surrounding the Centro Comercial da Mouraria, and establishes a line of reference on the carta bianca for the architecture to hinge on.





ARCHITECTURE

All the platforms in Mexico were positioned and formed with great sensitivity to the natural surroundings and always with a deep idea behind. A great strength radiates from them. The feeling under your feet is the same as the firmness you experience when standing on a large rock.

(Jørn Utzon, 1963)

Images:

(Opposite)

[68] Bazaar of Martim Moniz, "reds & yellows" drawing (1:1000 plan).

(Bottom)

[69] Bazaar of Martim Moniz, photo insertion.

(Next spread, left)

[70] Longitudinal cross-sections and façade (1:500).

(Next spread, right)

[71] Ground floor plan (1:500).

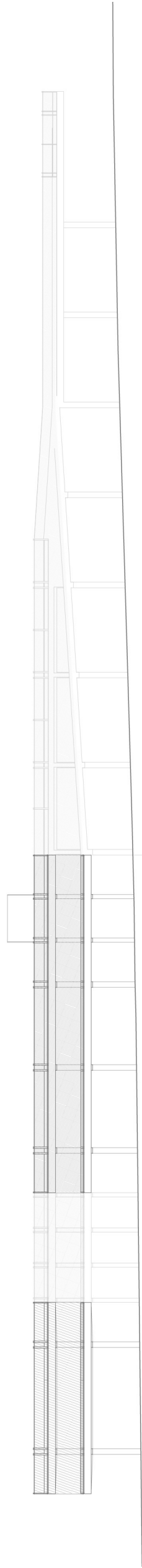
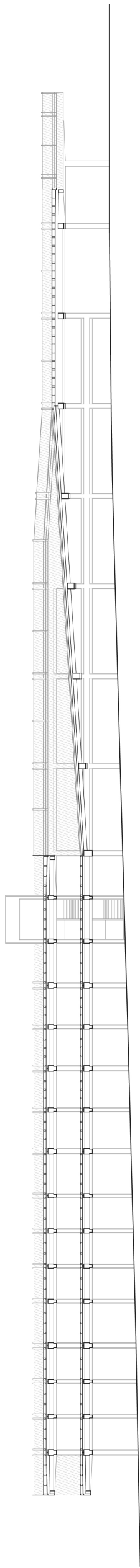
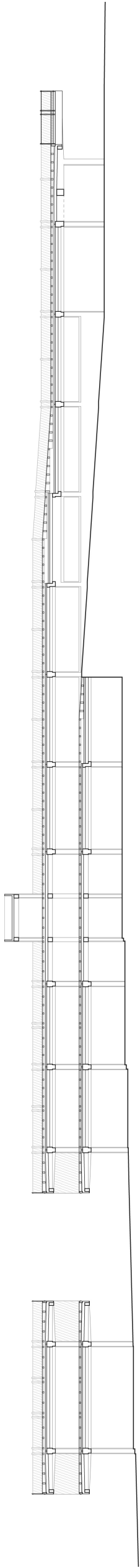
The extension of Almirante Reis weakens the overwhelming status quo of the void that is Martim Moniz, and generates the conditions for an architectural intervention that further articulates the public domain. The act of reversal defines the terminal for Rua do Benfornoso; the act of building defines a new square where the avenue and the street dissipate into the framework of downtown Lisbon. By erecting a rigid front with Hotel Mundial, the void is reduced and contained in a rigid frame— the bazaar can relate to it and to the buildings surrounding it.

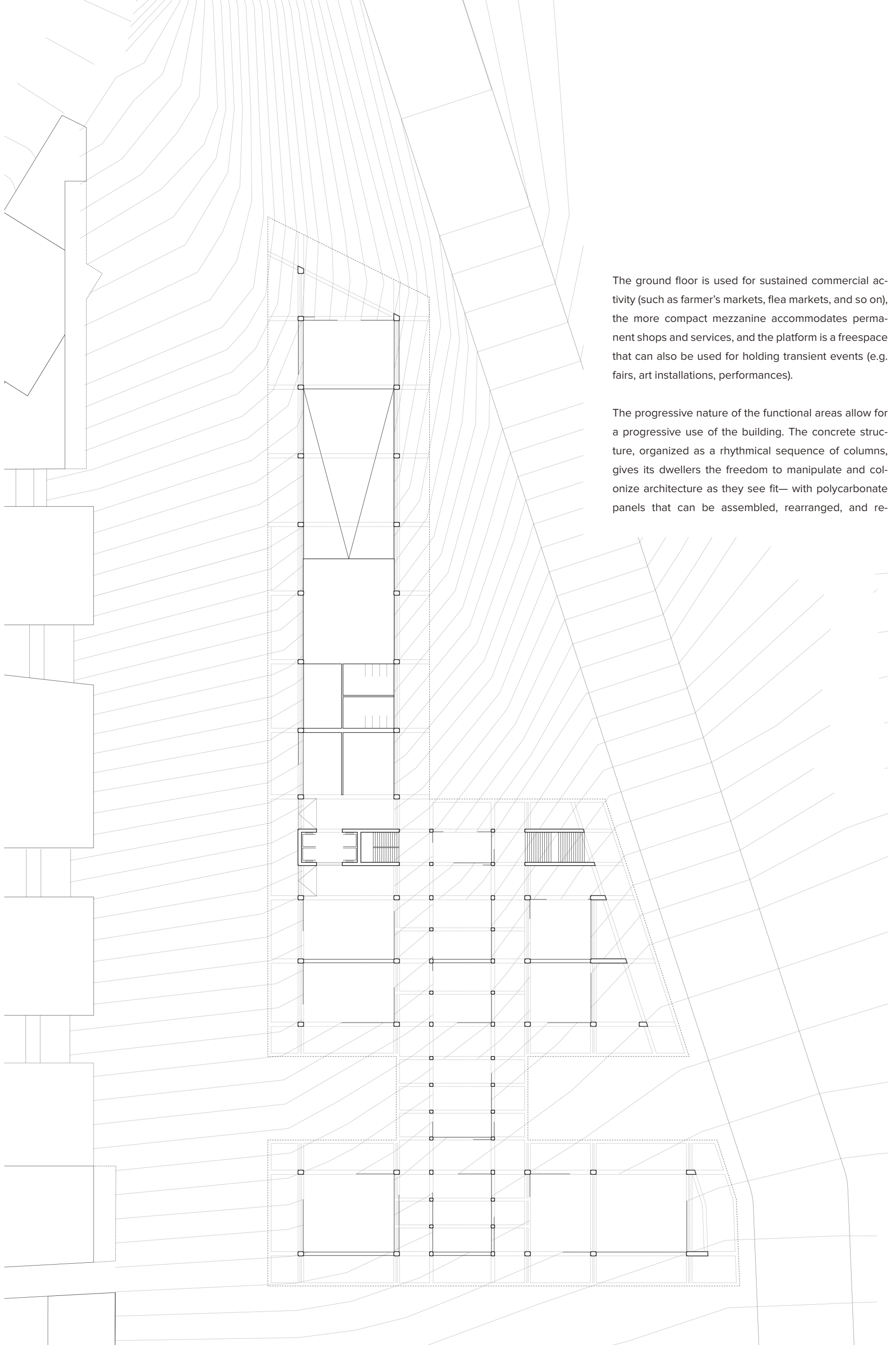
On the opposite side of the chasm, now freed from traffic, the same approach produces a different result: building a front with the residential complex creates an

open space of linear nature, one that rises gradually as it progresses northwards.

Capitalizing on this subtle characteristic, a gentle counterslope becomes the initial gesture that lifts the urban ground to a higher location, and doubles as an auditorium on occasion. From the urban condition of the street, one reaches a compact in-between space— a mezzanine floor that accommodates permanent shops and services. The slope comes to a halt at the core of the bazaar, where stairs and elevators form immediate vertical connections between the various parts of the public domain. From there, the slope folds out and resumes its ascension, culminating at the top of the platform. Levitation reinvents the cityscape.







The ground floor is used for sustained commercial activity (such as farmer's markets, flea markets, and so on), the more compact mezzanine accommodates permanent shops and services, and the platform is a freespace that can also be used for holding transient events (e.g. fairs, art installations, performances).

The progressive nature of the functional areas allow for a progressive use of the building. The concrete structure, organized as a rhythmical sequence of columns, gives its dwellers the freedom to manipulate and colonize architecture as they see fit— with polycarbonate panels that can be assembled, rearranged, and re-

Images:

(Bottom)

[72] Transversal cross-sections (1:500).

(Opposite)

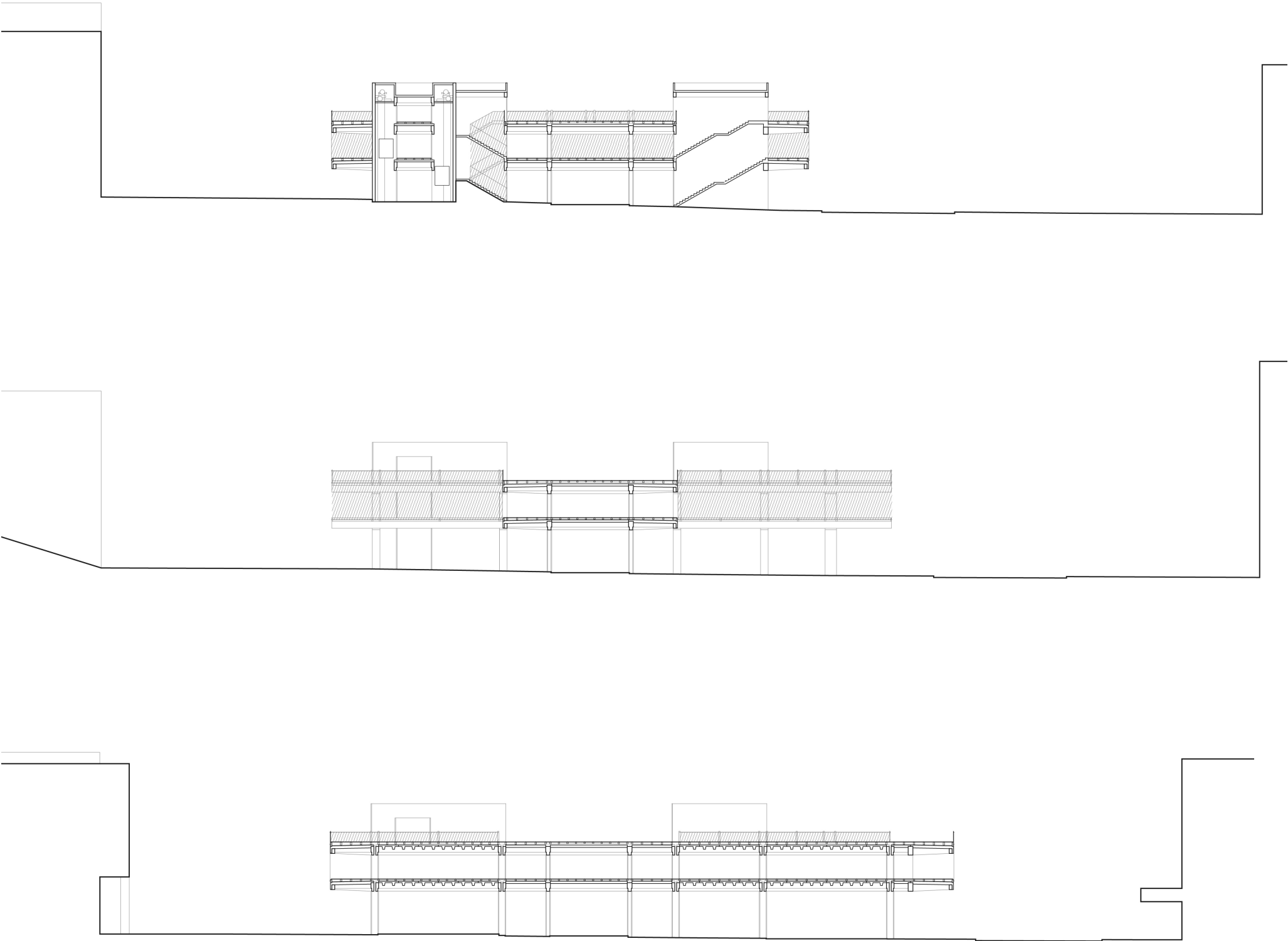
[73] Mezzanine floor plan (1:500).

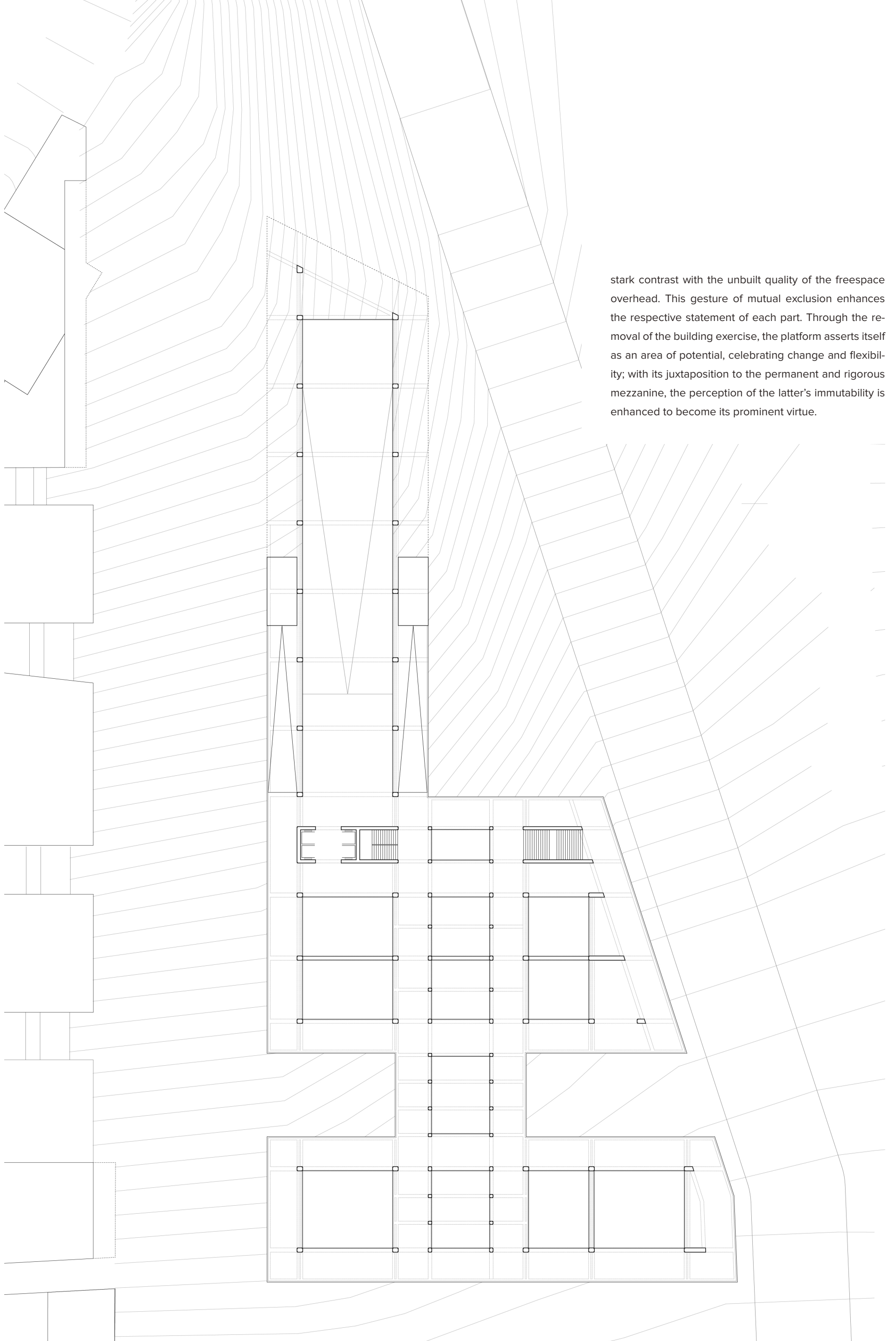
moved in response to changing conditions. This particular approach also allows for closing and opening various parts of the complex without additional effort, accounting both for temporary functions with different capacity demands and for a dynamic programming of recurring cycles (day/night, weekdays/weekend, etc.). In addition to space, time is exploited as a dimension to design in.

Time is an inescapable dimension in sonic production—it can be controlled, guided, or left to its own devices, but it must exist for sound to exist. Owing to its time-critical nature, the terminology borrowed from the domain

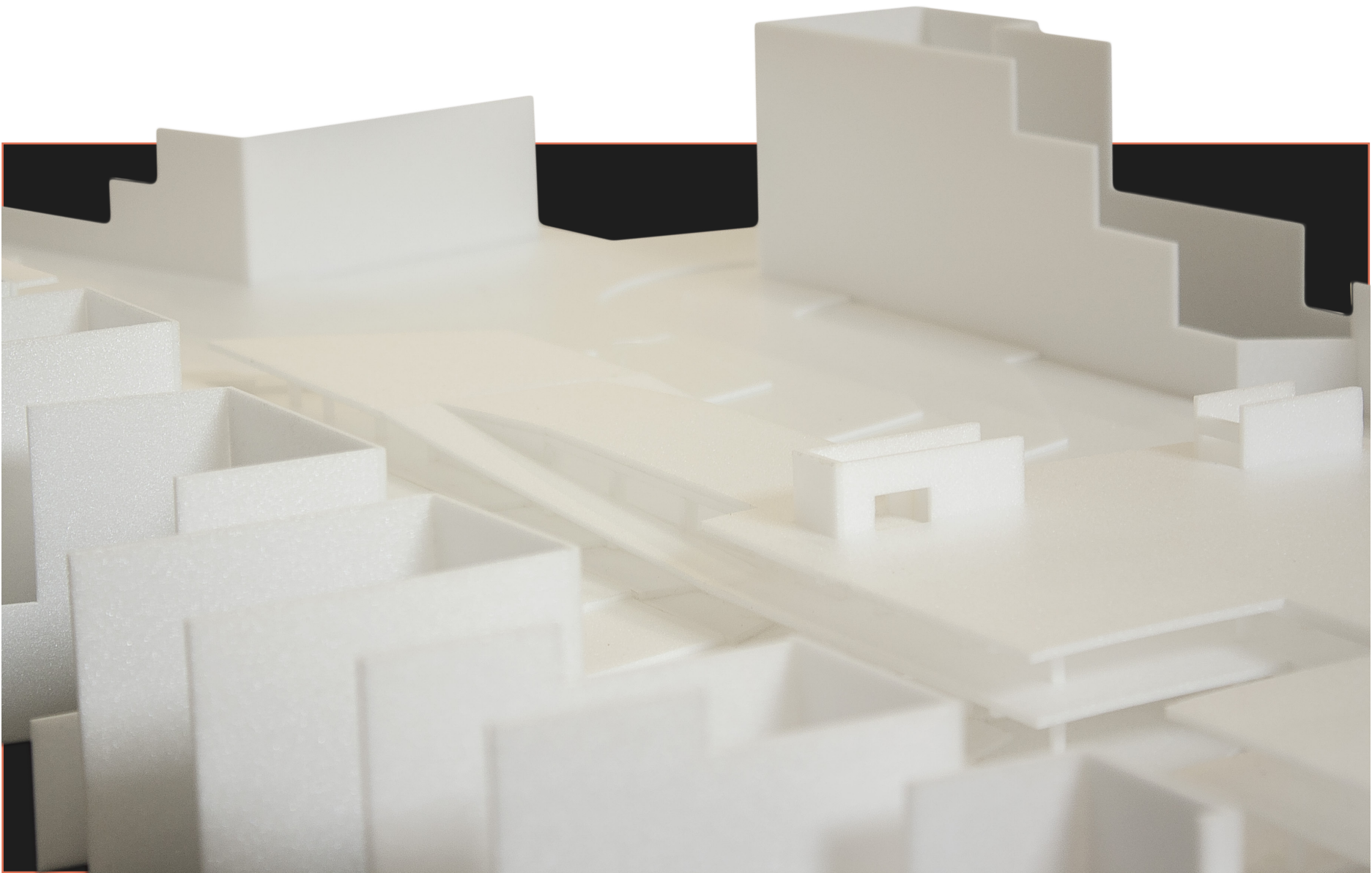
of audio lends itself well to thinking architecture in terms of time. Transient and sustained energies are juxtaposed and manipulated to achieve the desired effect. Perceived loudness is a matter of dynamics, dictated not by the absolute intensity of its parts, but rather by the contrast in their relative amplitudes.

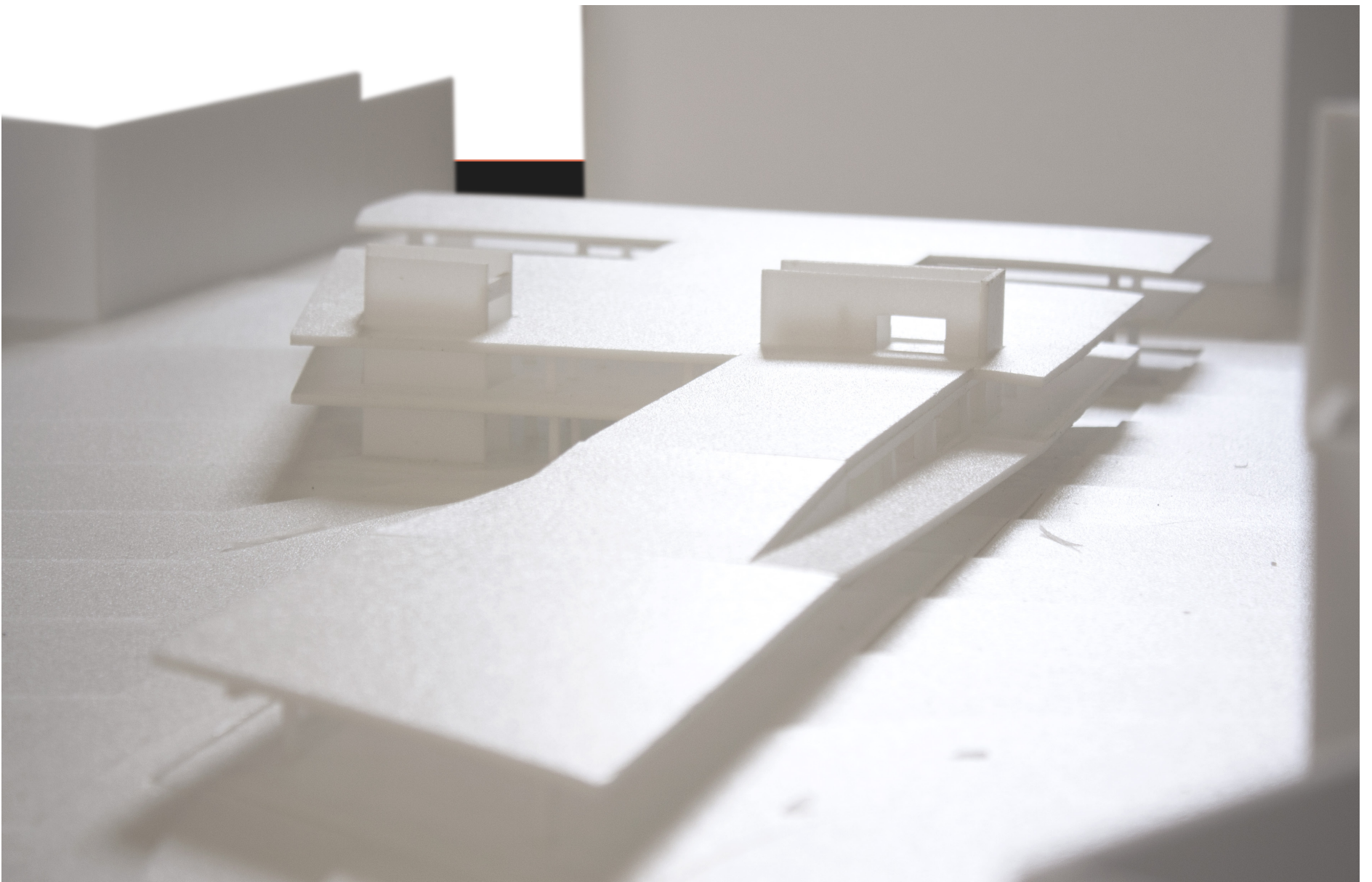
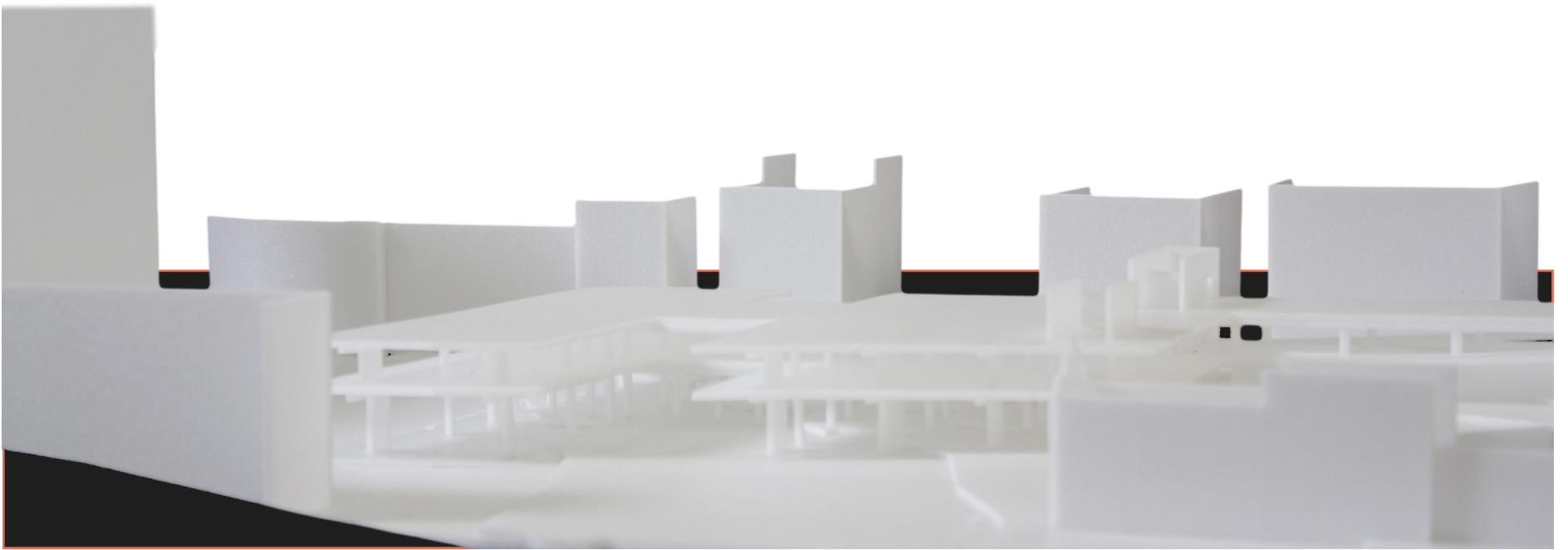
In an operation similar to performing side-chain compression between a kick drum and a bass track, where the removal of the transient energy of the kick from the bass augments the perceived loudness of each, the permanent and built nature of the mezzanine is placed in

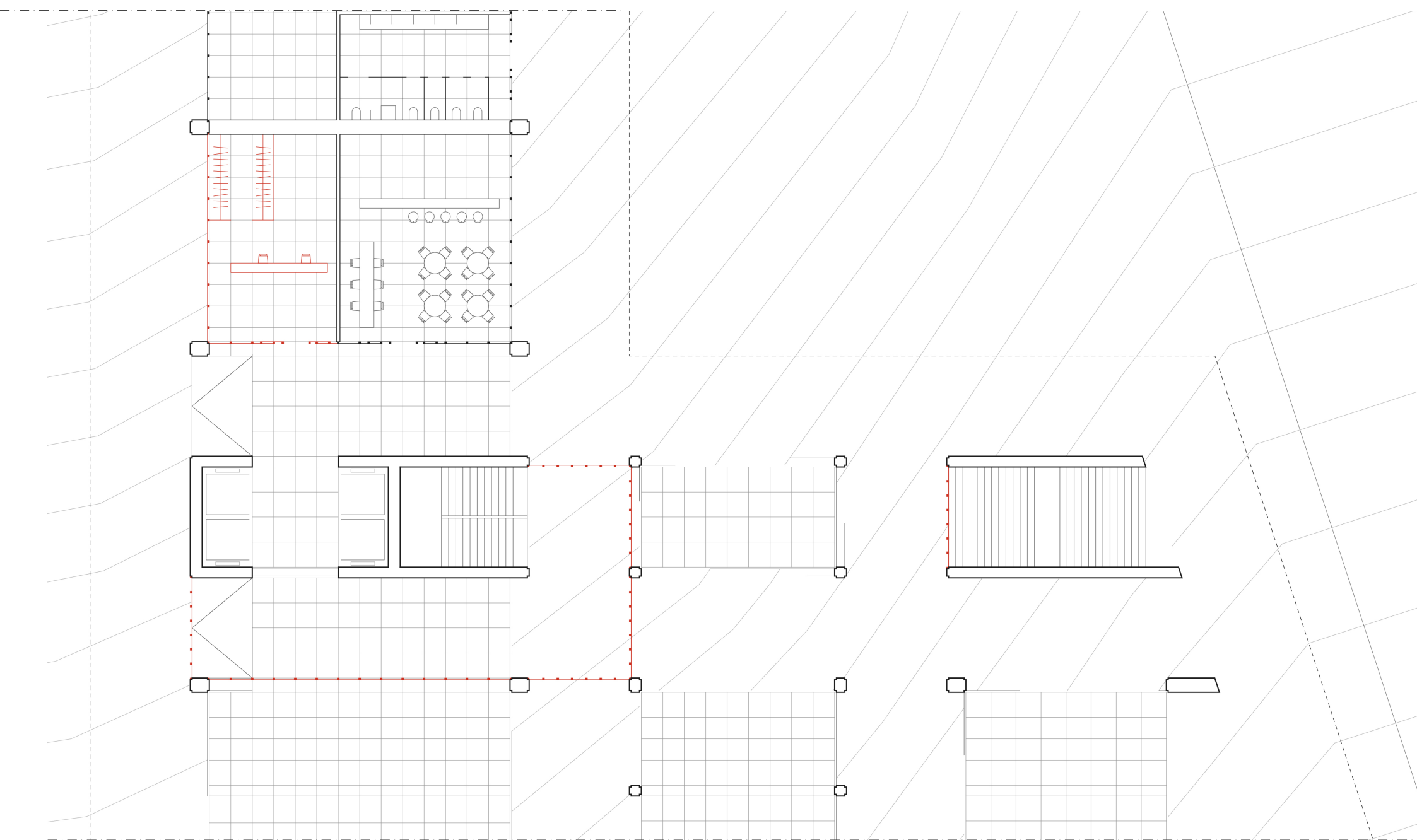
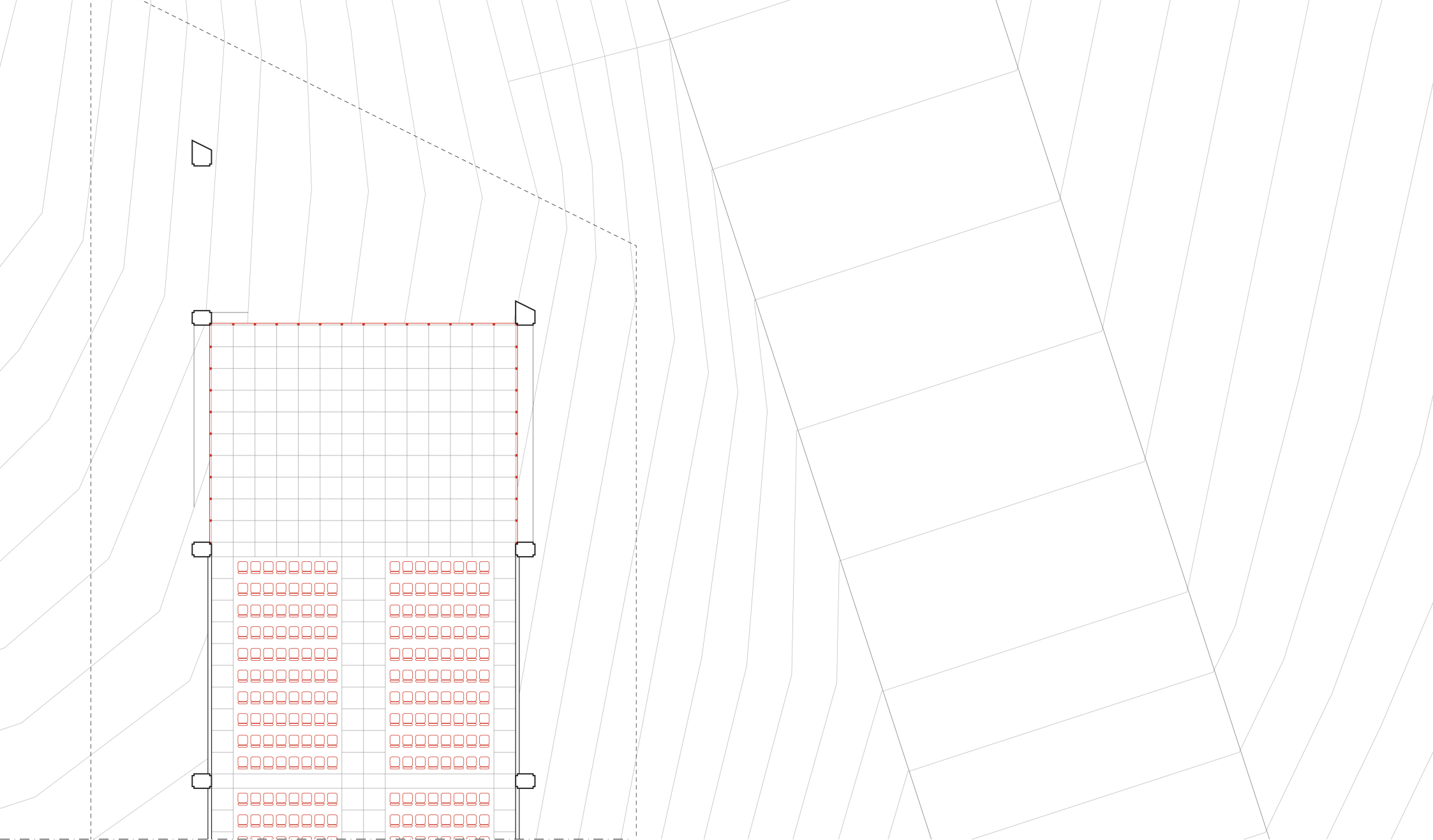


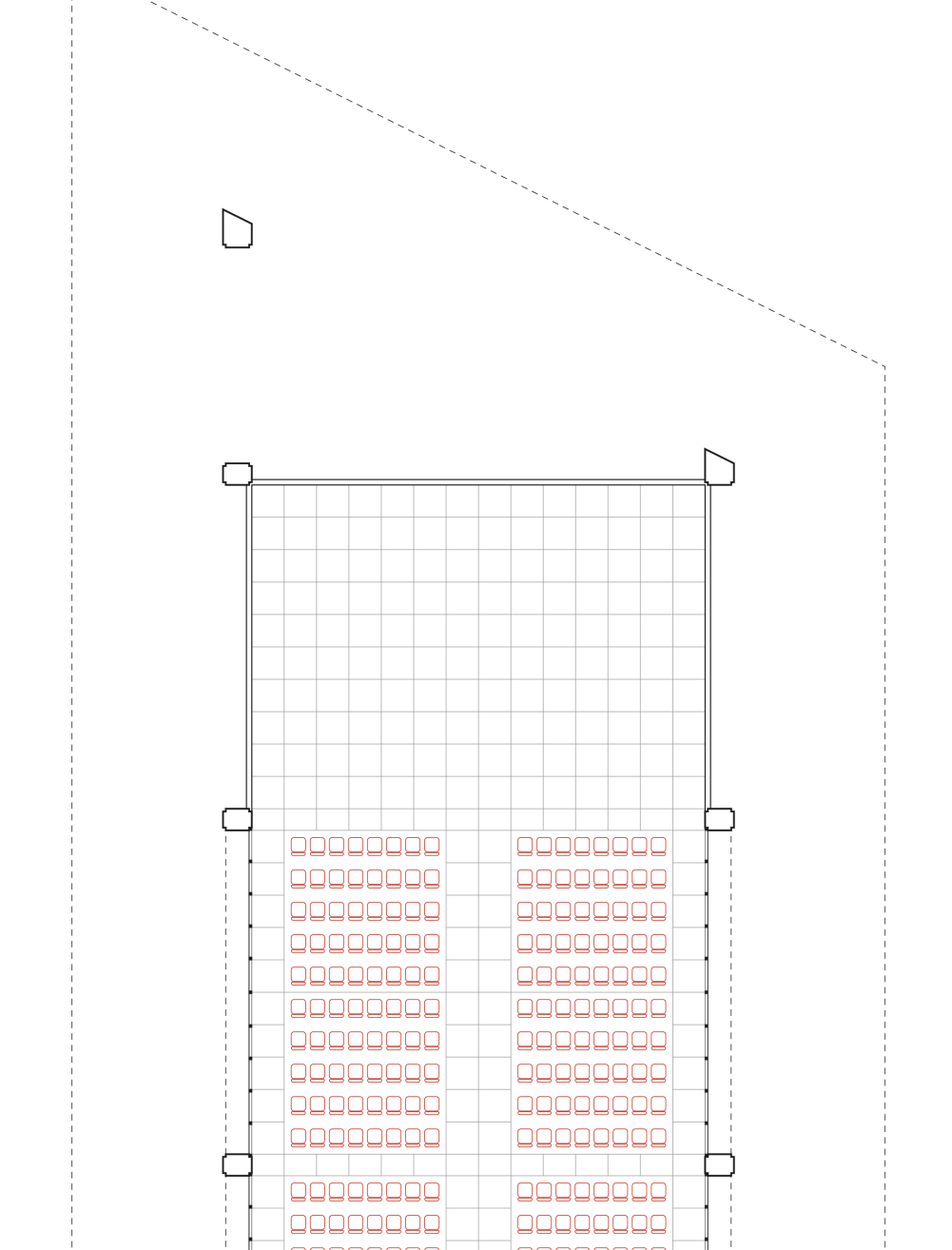


stark contrast with the unbuilt quality of the freespace overhead. This gesture of mutual exclusion enhances the respective statement of each part. Through the removal of the building exercise, the platform asserts itself as an area of potential, celebrating change and flexibility; with its juxtaposition to the permanent and rigorous mezzanine, the perception of the latter's immutability is enhanced to become its prominent virtue.









Images (previous spread):

(p. 58, top)

[74] Bazaar of Martim Moniz model (1:200 scale, southeast view).

(p. 58, bottom)

[75] Bazaar of Martim Moniz model (1:200 scale, southwest view).

(p. 59, top)

[76] Bazaar of Martim Moniz model (1:200 scale, east view).

(p. 59, bottom)

[77] Bazaar of Martim Moniz model (1:200 scale, north view).

The floor plans on these page represent a hypothetical situation where the mezzanine access ramp is being used as an auditorium, and the rest of the building is closed off. The red color indicates temporary installations, adapting the building to the requirements of a specific program without substantial modifications on the structure.

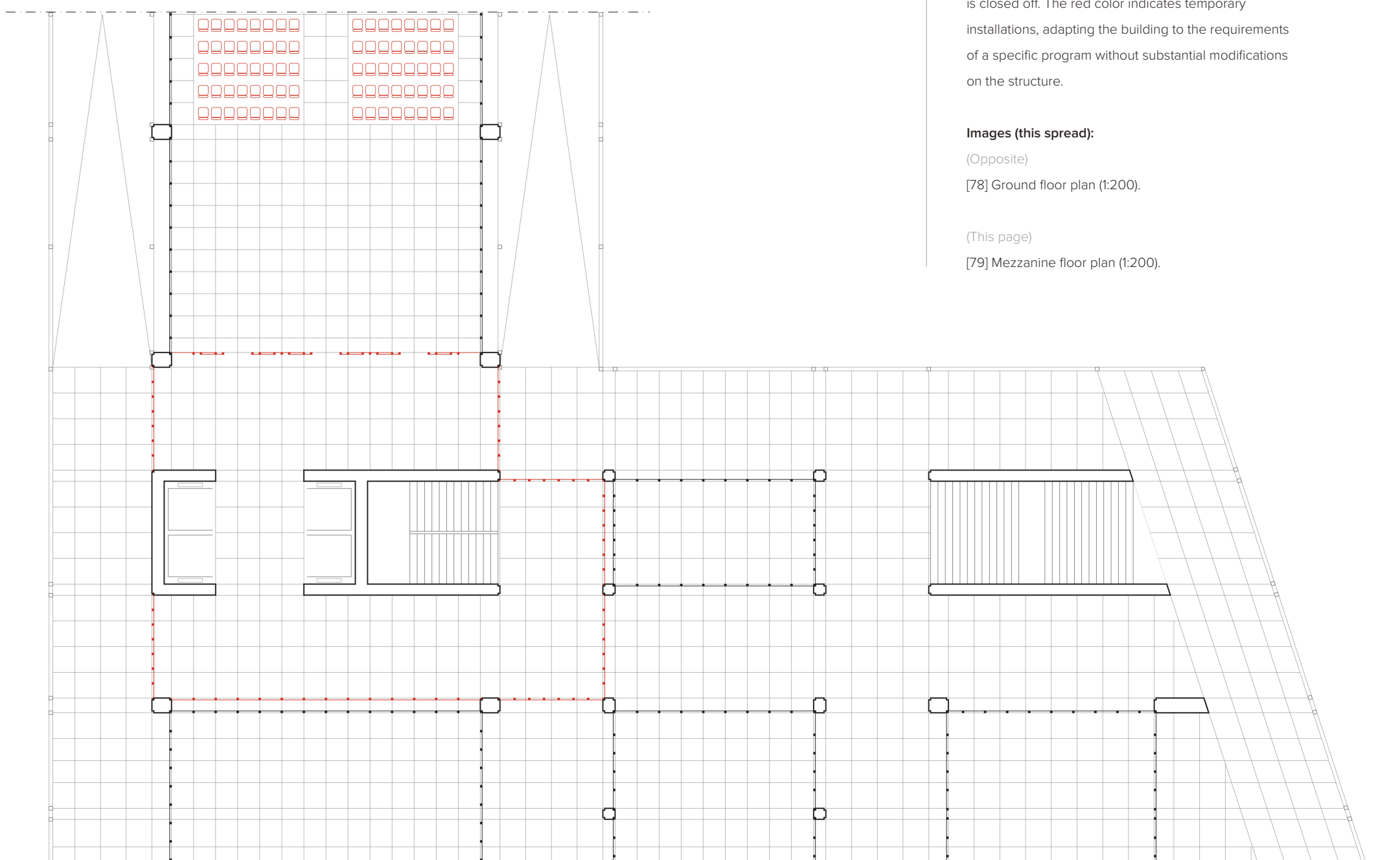
Images (this spread):

(Opposite)

[78] Ground floor plan (1:200).

(This page)

[79] Mezzanine floor plan (1:200).



The red color represents elements of additive nature: they adjust and remodel the architectural qualities of the structure in response to changing needs.

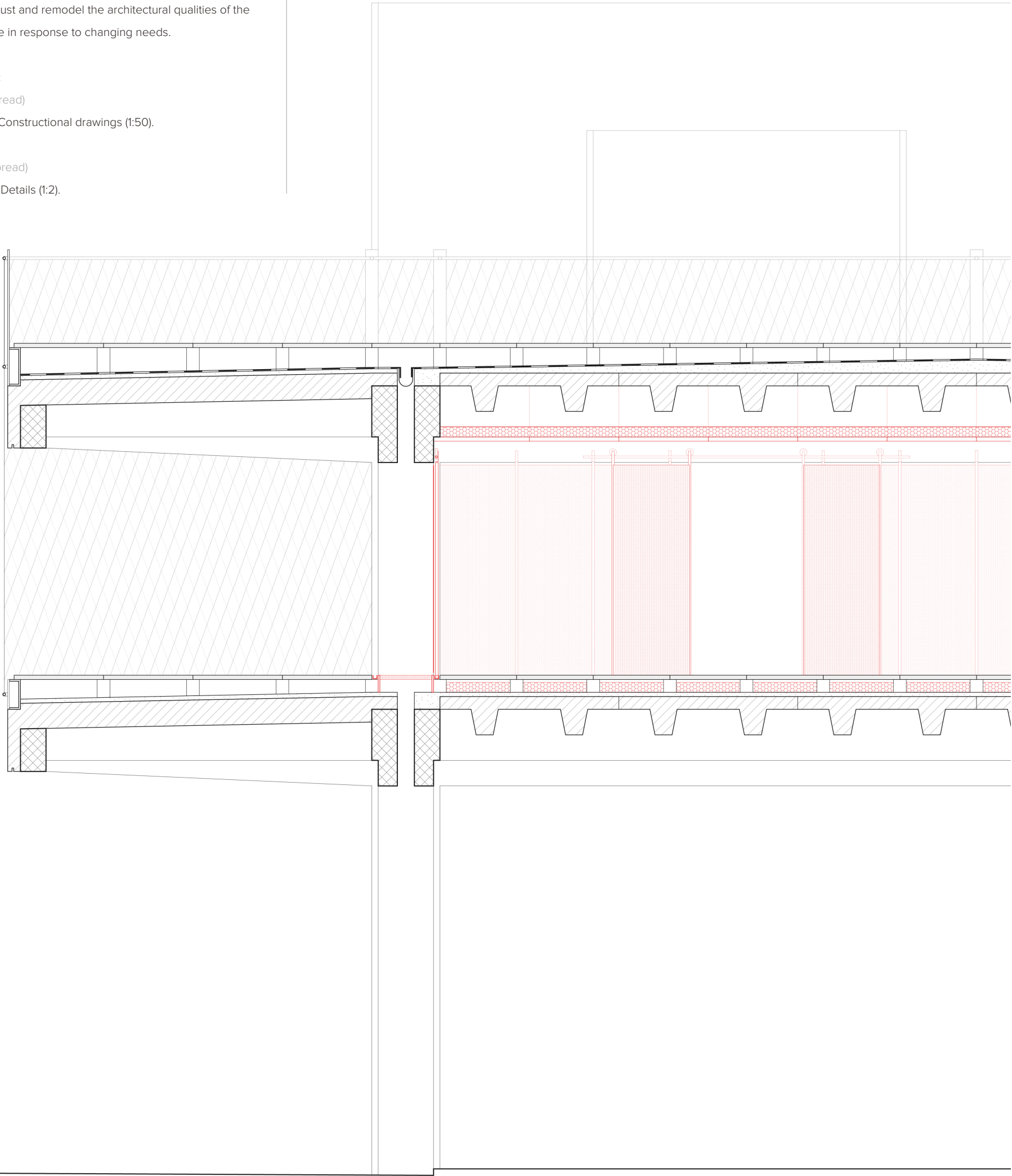
Images:

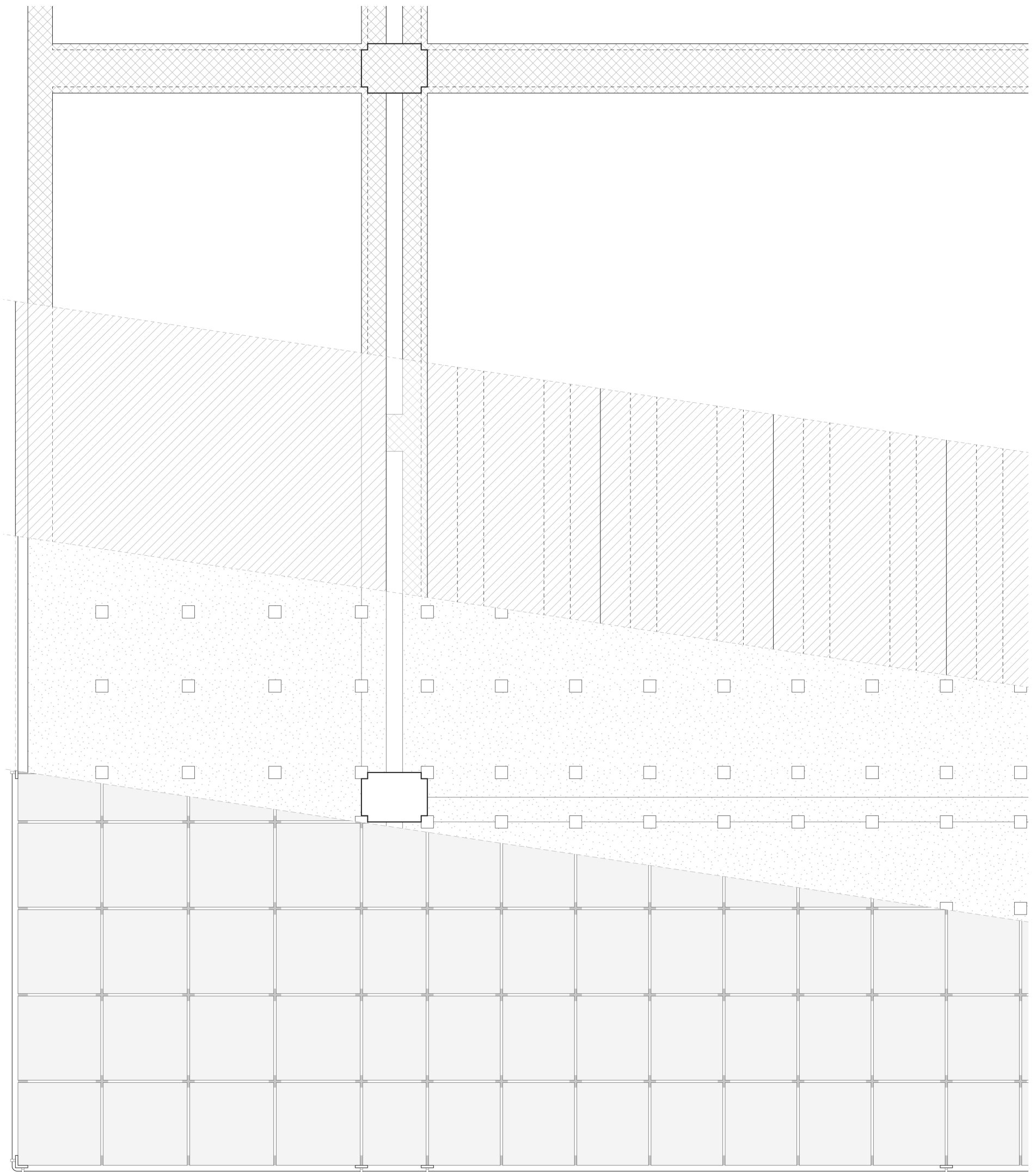
(This spread)

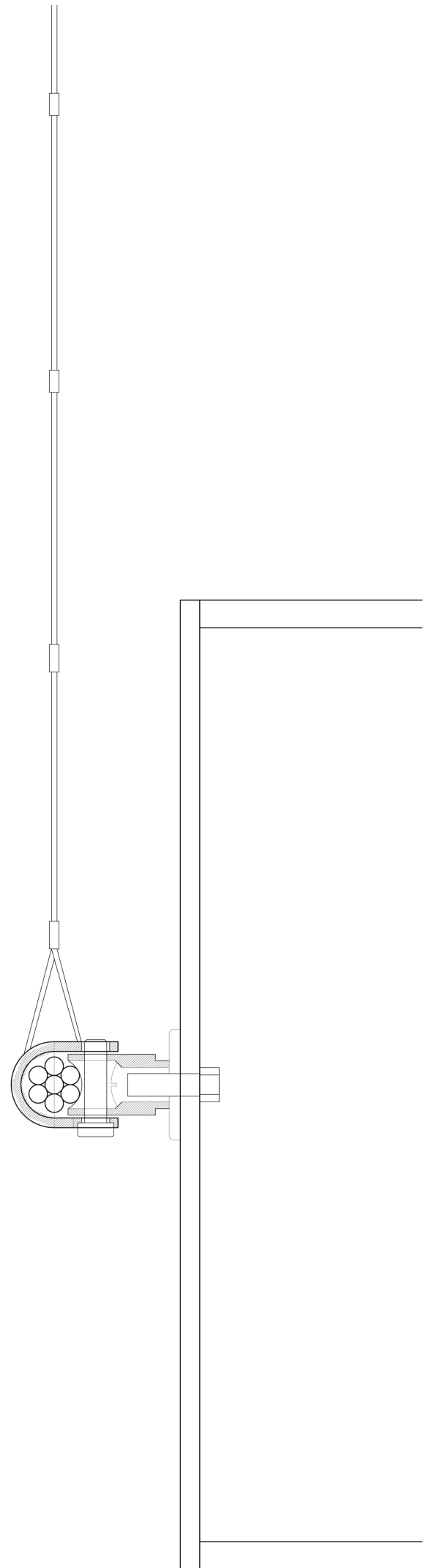
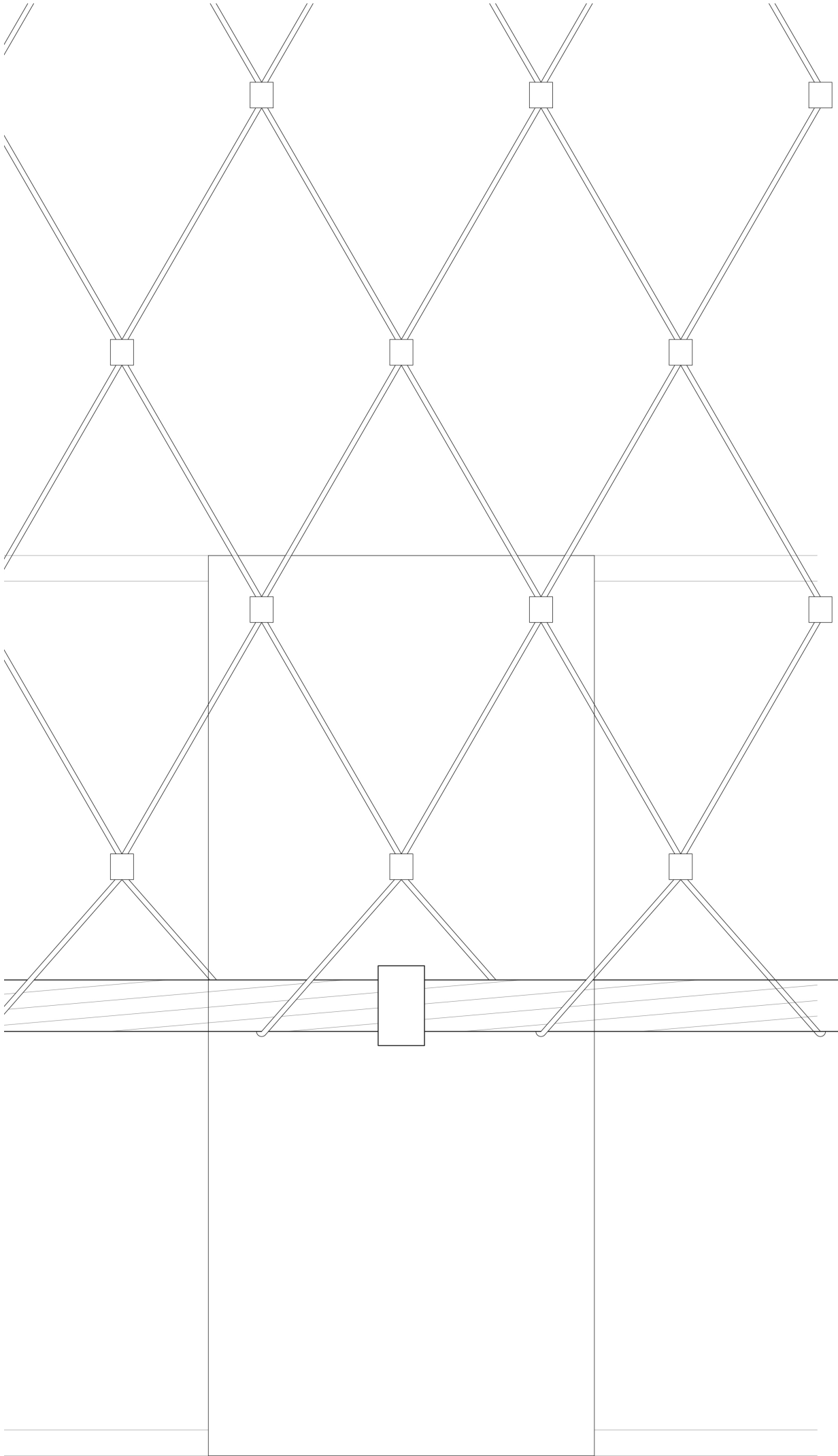
[80, 81] Constructional drawings (1:50).

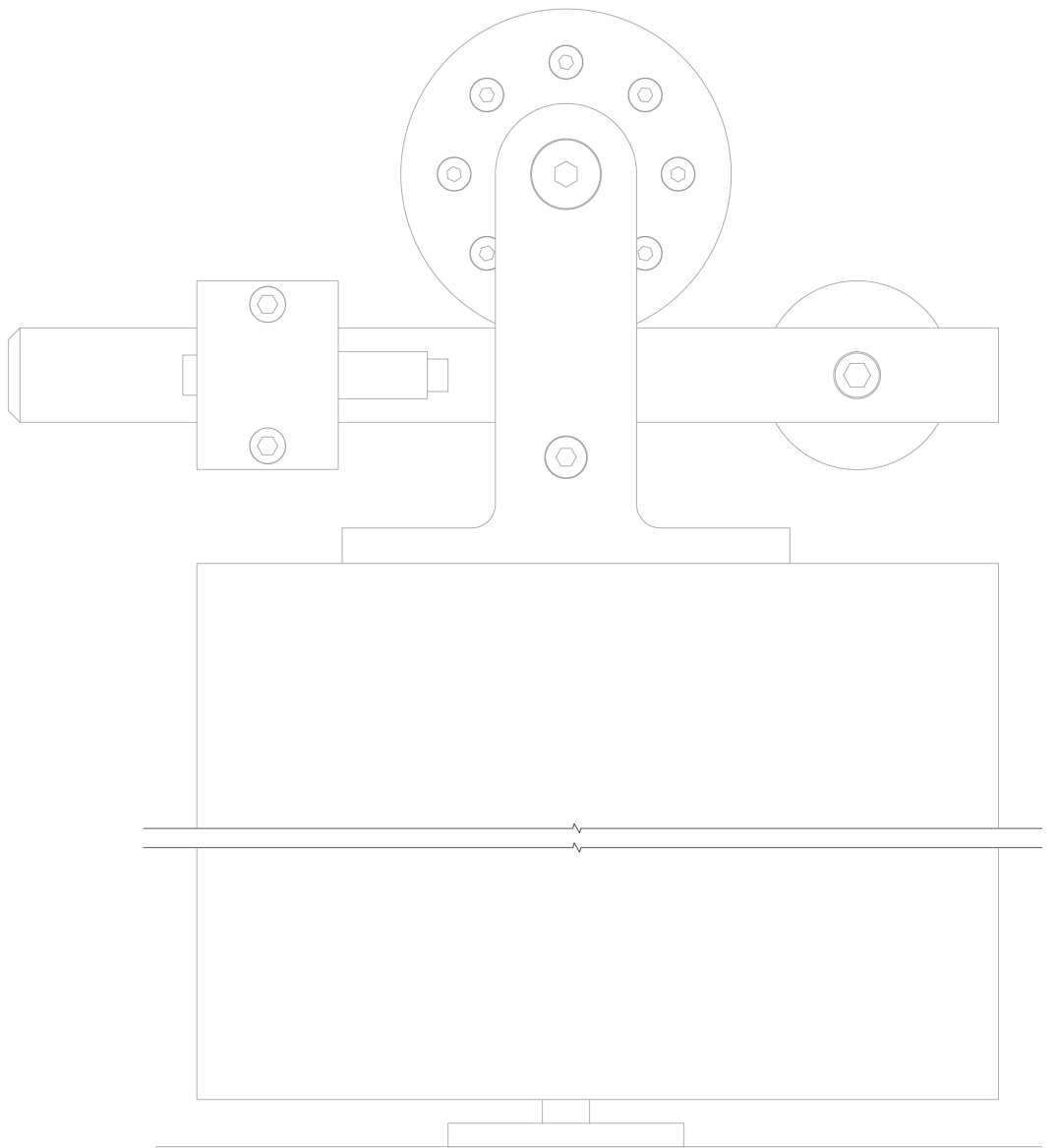
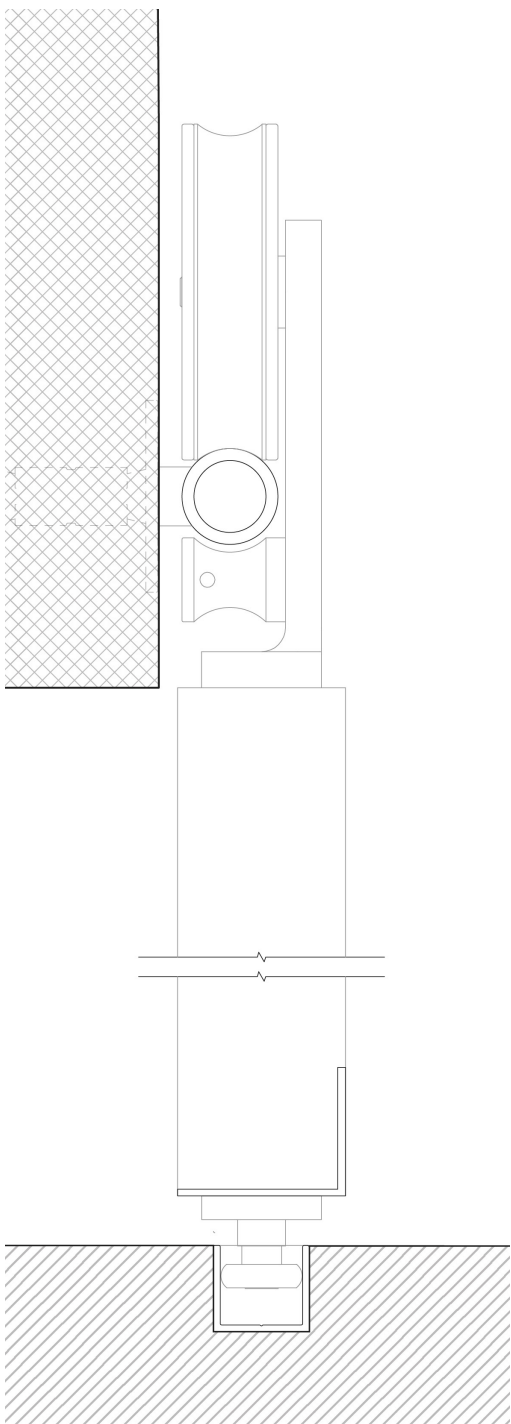
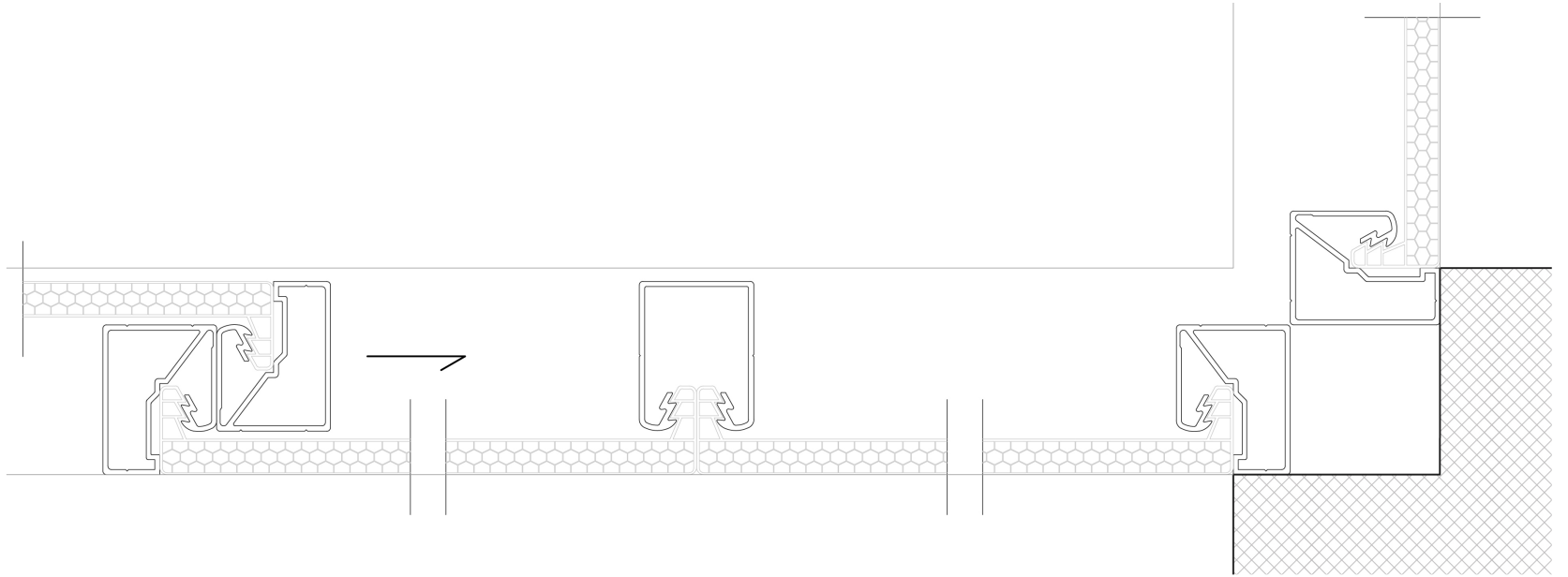
(Next spread)

[82, 83] Details (1:2).









4 RENEWING THE ANALOGY

A manifesto

MANIFESTO

All art constantly aspires to the condition of music.

(Walter Pater, 1877)

The music we hear today is fundamentally different from what it used to be prior to the advent of recording. The possibility of replaying transformed both our soundscape and our relationship to it. The new technological media changed it forever.

The same happened with painting, we called it photography. It happened with acting, we called it film. They all explored the new potentials unlocked by their respective media, and asserted themselves as distinct forms of art. Music hasn't been renamed, but that doesn't make its revolution any less valid. By constructing audio, we entered the realm of production.

The early age of recorded music and calculated structures saw the birth of the engineer who encroached

upon the domain of the musician and the architect. The modern musician and the modern architect survived by redefining their boundaries with their respective invaders. In the end, we've come full circle— contemporary musicians and architects sharpen their senses and inform their creative decisions by encroaching upon the domain of the engineers.

This thesis does not aspire to make a conclusion. It aims rather to start a new conversation, renewing and refreshing the long tradition of parallelisms between music and architecture, casting aside cliché and obsolete statements that no longer account for the new music of our wired society.

Through technology are music and architecture reborn.

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[70] Bazaar of Martim Moniz, longitudinal sections [1:500 scale cross-section]. (Own work).

[71] Bazaar of Martim Moniz, ground floor [1:500 scale plan]. (Own work)

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[73] Bazaar of Martim Moniz, mezzanine [1:500 scale plan]. (Own work).

[74–77] Bazaar of Martim Moniz, 1:200 scale architectural model [Photograph]. (Own work)

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[79] Bazaar of Martim Moniz, mezzanine [1:200 scale plan]. (Own work).

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[81] Bazaar of Martim Moniz, constructional drawing [1:50 scale plan]. (Own work).

[82] Balaustrade construction detail [1:2 scale drawings]. (Own work).

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