

# A Journey in Architecture.

Resource exploitation in Cuba and Norway







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## PREFACE

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## ABSTARCT

One of the most critical challenges we face today is climate change and its consequences. The building sector stands for almost 40% of the global CO2 emissions and energy use. Until recently the focus has been on reducing a building's emission during its active life. However, a buildings emission begins in the very production of its parts, with its embedded carbon. Although important, we posit that sustainable architecture needs to be about more than building new buildings with sustainable CO2 emissions. It is vital that the industry realizes the value and potential in what is already built.

We wished to discover how this was done elsewhere where they do not have the same physical and financial resources as we have here. We wanted to observe how it is possible to prolong a buildings life through different approaches, specifically in relation to reuse and recycling of buildings, and its materials. While these concepts are becoming increasingly more popular again in Norway today, we wanted to explore a country where this is, and for many decades has been, an important part of the building traditions.

Cuba is in a very particular situation; it is a country of contradictions, a third-world country with first-world indicators. By necessity they have had to adapt to a way of living that runs on few resources, in their daily lives as well as in industries. What we

discovered through our research into their building industry and through conducting a patrimonial intervention project in Old Havana, was that they have developed a system built on circular economy, consequently making reuse and recycling a natural part of their process. They dismantle, they do not demolish, and they use local resources as much as possible. The Cuban mindset and ingenuity makes them able to see multiple solutions where others see problems.

Our research into the Norwegian building industry however, showed us that it is built on a linear system where a product is produced, consumed and discarded. This system where value is measured in quantity promotes a consumer mentality. In Norway this system has resulted in a legislation that does not facilitate circular behavior as reuse and recycling.

In terms of sustainability the linear system tends to focus more on eco-efficiency; reducing our impact while maintaining the same output. This is not sufficient anymore. If we are to make our building industry more sustainable. There needs to be a change in the current system from linear to a circular. We need to aim for eco-effectiveness, not only reducing our ecological impact, but contributing positively.



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## CHAPTER I - INTRODUCTION

## RESEARCH TOPIC

A study of resource exploitation in Cuba, a country with restricted access to financial and material resources, by conducting a patrimonial intervention project in Old Havana based on our examination of their inherent planning processes, with subsequent reflections on possible transferability to Norwegian practices concerning sustainability in the building industry.

## DEFINITIONS

The definitions following in this section are sourced throughout the thesis with themes that deals with the related word. This alphabetized list is made to gather all definitions as to define our understanding and thus use of the words.

*Anthropocene:* An unofficial geological time period or epoch commencing when human activities began to have an impact altering The Earth's ecosystems and geology.

*Circular economy:* An economic system of closed loops in which raw materials, components and products lose their value as little as possible. It follows the reduce-reuse-recycle mentality.

*Conservation:* Set of maintenance or repair work carried out on a building, with the least possible changes, to prolong its useful life and its patrimonial value.

*Cradle to cradle:* The lifecycle of a product in a circular system, where it can be fully reused or recycled at the end of its lifetime.

*Cradle to grave:* The lifecycle of a product in a linear system, where it is considered produced, used and discarded as waste once arriving at the end of its life.

*Downcycle:* Converting or transforming waste into something of lesser value.

*Eco-effectiveness:* In addition to minimizing the ecological impact, the ecological, economic, and social impact is contributing in a positive direction.

*Eco-efficiency:* Minimizing the ecological impact for the same output. This will extend the period before the system becomes overloaded.

*Embodied carbon:* The carbon footprint of a material.

*Human Development Index (HDI):* measures average achievement in basic dimensions of human development: quality of life, knowledge and standard of life, measured by the Gross Domestic Product (GDP), as an economic indicator.

*Linear economy:* An economic system where value is created by producing and selling as many products as possible. Follows the "take-make-dispose" step-by-step plan.

*New insertion:* New construction. Introduce a new building in an established urban structure.

*Reconstruction:* Operations to restore or recon-



struct the original mechanical working conditions of a structure, architectural elements, the sculptural or visual finish of the building and its interior.

*Recycle:* Transforming raw materials into something that can be used again.

*Reduce:* Minimize production and consumption of resources.

*Rehabilitation:* The act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

*Remodeling:* Constructional, interior, or exterior rearrangement of a building that, by the design of new spaces from the existing property, alters its original layout or composition and introduces structural changes.

*Renovation:* Operations to restore a property or site, however it may include new techniques and additions.

*Restoration:* Action to return the lost appearance of a property or site, to preserve and reveal the aesthetic and historical values of the monument, using period techniques.

*Rethink:* Inventing new uses for what already exists.

*Reuse:* Repairing, reconditioning or re-purpose resources for being used again, in their original form.

*Sustainable Development (SD):* Meeting our current needs without compromising the ability of future generations to meet theirs.

*Sustainable Development Index (SDI):* measures the ecological efficiency of human development, recognizing that development must be achieved within planetary boundaries.

*Upcycle:* Converting or transforming waste into something of equal or greater value, prolonging the useful life of the material.

*Zero-emission:* A source that emits no climate gases or waste.

## METHODOLOGY

We have had a dual approach, and been working both empirical and theoretical.

Empirical methods:

- Observations: A general attention towards Cuban culture, and their mentality.
- Inspections: consulting damage and problem areas in a building, with possible solutions.
- Photography and video: To be able to continue our work when we are no longer present at the site or even the country.
- Interviews: Collecting information through oral sources and experiences, original sources, unpublished.
- Designing: Graphic representations

Theoretical methods:

- Study of documents: searching archives, consulting bibliography,
- Historical: placement in society and context
- Analysing information
- Reflections: connecting the dots

In collaboration with a Cuban architectural office, RESTAURA, we have inspected a given building. We have spent hours in their archives searching historic documents, we have performed interviews with key people within the building sector in Old Havana, visited building sites, and made observations of the average Cuban life and culture.

Throughout our work there we paid specific attention to how the different stages of a project work regarding reuse and recycling of building materials. And also what kind of solutions Cubans adopt when facing problems in relation to it being a country with restricted access to resources.

To complement our findings in Cuba, we did research and comparisons to the Norwegian practice to see if we could find some transferability. We have tried to link our discoveries to both national and global challenges that we are up against today.

## CHAPTER OVERVIEW

### Chapter II - Down the rabbit hole

The chapter gives an overview as to where the motivation for writing our master's degree initiated, and why this motivation is important in today's society. Some theoretical framework will be presented to put our motivation into a global context, and how our choice of working in Cuba fits into this.

### Chapter III - Havana my love

The chapter contains our motivation/curiosity towards Old Havana. The framework is being put down as to what this city is, where it has been, and its historic context. Especially familiarizing ourselves with some parameters concerning the UNESCO protection much of the city is under and what this means for working with architecture here, seeing as much of the city is of patrimonial value.

### Chapter IV

#### Part 1- Loading...

In this chapter we describe the beginning of our journey in architecture in Old Havana. We are working with an architectural office, RESTAURA, being guided through how they "attack" projects. The beginning of this process contains a dive into archives and history of both the context and the specific

building we are to work with. This method aims to broaden an understanding and root/put down a respect for what we are about to touch architecturally when conducting a project at a later stage. Inspections of the building are done as to understand its technical state and what patrimonial value it contains, we are getting to know the building we are working with, what can and cannot be touched and what should and must be done.

#### Part 2 - Loading complete

Together with the previous chapter, lays out the premises for the design and the architectural program we are putting forth in this chapter. The conceptual project performed is presented here, aiming to shed light on what the Cuban processes do to a project design, when seen from a reuse and recycle perspective.

### Chapter V - Intertwining

In this chapter we are bringing observations from our visit, their processes when conducting a project, how their building sector works, and their mindset towards reuse and recycle into a wider perspective. We are also attempting to see how some of these characteristics would and could work in a Norwegian practice to make our own

sector more sustainable. Under the premise that Old Havana, Cuba is conducting sustainable architecture.

### Chapter VI - Out of the rabbit hole?

In this chapter we discuss how all of this can be put into and seen in a societal and global perspective. Touching the horizon from one optional/possible point of view.





## CHAPTER II - DOWN THE RABBIT HOLE

## ENVIRONMENTAL BACKGROUND OF THE BUILDING INDUSTRY

One of the most critical challenges we face today is climate change. Humanity has increased the amount and types of greenhouse gases in the atmosphere.<sup>1</sup> We see an increase in the emission of carbon dioxide from the beginning of the industrial revolution, however, since 1950 these numbers have skyrocketed.<sup>2</sup> The result is that the concentration of CO<sub>2</sub> in the atmosphere today has augmented by a third compared to before the industrial revolution, and the global temperature has gone up by 1 degree Celsius.<sup>3</sup> Given the severe outcome should we continue to increase or even continue at the same level of carbon dioxide emissions, organizations such as the United Nations have set ambitious goals for the reduction of these emissions, the objective being to not raise the average global temperature by more than 1,5°C (lower limit) or at the very most 2°C (upper limit) above the preindustrial temperatures.<sup>4</sup>

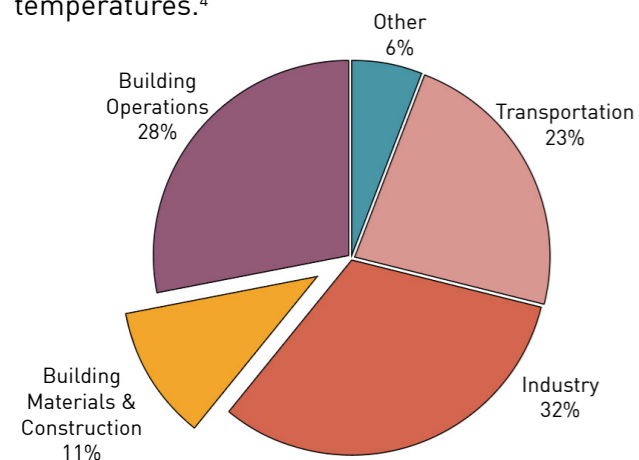


Figure 1: Global CO2 emissions by sector

Today the building sector as a whole constitutes almost 40% of the global CO<sub>2</sub> emissions and energy use. These emissions can be divided into two sections. 28% stemming from building operations, and 11% from production and transport of materials as well as construction (core and shell). If we include the industrial emission numbers of the materials used in infrastructure, this number increases to 22,7% divided only between three main culprits: concrete (11,1%), steel (10,1%) and aluminium (1,5%).<sup>5</sup>

It is vital that the building industry, being such a big culprit, takes responsibility and reduces its climate gas emissions. As the world population is growing, new construction will be required to accommodate it, and by 2060 we are projected to double our current built area. Needless to say, the building industry cannot continue the way it does today if we are to reach the 1,5-degree goal.<sup>6</sup>

The industry has begun taking some measures, adjusting to strict regulations with regards to how much CO<sub>2</sub> new buildings can emit during their operation. New technology is constantly developed to make buildings more energy efficient, and we can build zero emission buildings. Although this can certainly help lower the buildings' operational greenhouse gas emissions, it is still not enough

to compensate for the emission increases we are predicted to see in the construction sector due to the demand for growth.<sup>7</sup>

The choices made by developers, planners, architects and the construction industry today need to reflect the responsibility we have in every aspect of the building process. And especially, in our decisions regarding demolishing existing buildings. As Carl Elefante puts it: "The greenest building is the one that is already built".<sup>8</sup>

It is important to consider a building's CO<sub>2</sub> emission, not only during its active life, but from cradle to grave. When a building part or material is produced, the process will emit a certain amount of carbon dioxide. The same goes for the transportation and assemblage of a building. All the carbon going into the construction of a building combined establish the embodied carbon of said building. Today, embodied carbon makes up 11% of the global

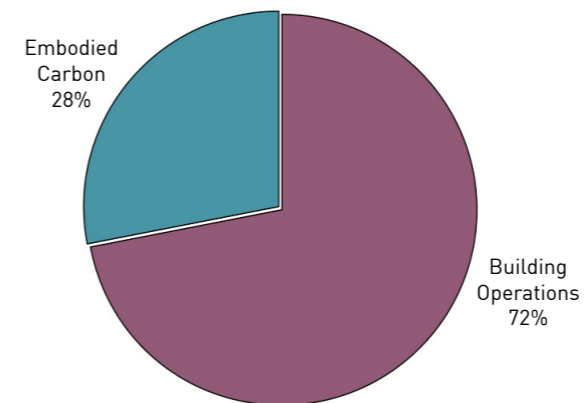


Figure 2: Annual global building sector CO2 emission

emissions of CO<sub>2</sub>, 27% of the building sectors total emission.<sup>9</sup>

*"If we're looking for quick reductions in carbon, the place that we have to look first is embodied carbon. If you start with scenarios like renovating existing buildings, then you are instantly saving carbon. (...) and it's imperative that architects wake up and make this transition from being carbon polluters to being carbon sequestrers. It will be either the saving or the demise of our profession."<sup>10</sup> - Carl Elefante*

We already have a huge building mass that stands empty, and not necessarily because they have run out their technical lifetime. Some buildings have fallen into disrepair, some discarded because they have become superfluous, having been replaced by other buildings, or simply because their use has become irrelevant for society. One way of sequestering the CO<sub>2</sub> already produced is by transforming these existing buildings, either renovating or restoring them so that they are fit to accommodate the originally intended program, or by transforming them, giving them a new one. This is what we call adaptive reuse.



## ADAPTIVE USE OF MATERIALS IN THE BUILDING INDUSTRY

By 2025 the volume of construction waste produced every year worldwide is predicted to surpass 2.2 billion metric tons. In 2015 this same number was 1.3 billion metric tons, already making it half of the world's total solid waste. If these predictions become reality, it means close to a doubling in only 10 years.<sup>11</sup> Of the yearly 1.3 billion metric tons of solid waste, Norway's construction industry alone contributes 2 million metric tons.<sup>12</sup>

*"The greenest building is  
the one that is already built"*

Reuse and recycling are beneficial to the environment since they reduce the amount of CO<sub>2</sub> emitted compared to extracting and producing new materials and building elements. Reusing is the least carbon demanding alternative requiring only the energy it takes to demount and adjust an element or building component. It also produces a minimum of waste. If the quality of the materials is sufficient and reuse is possible it should be prioritized. Recycling, both upcycling and downcycling, does require energy, as we must change the material or element in some way. Even so recycling is more environmentally valuable than producing new building components, as it decreases the total carbon emission and contributes to lessen waste.<sup>13</sup>

Other benefits of recycling include promoting and encouraging durability and environmental responsibility, improving market conditions in developing countries and the advancement of social equality in them, encouraging the use of local resources and talents, and removing much of the waste from reuse. In the search for new materials and new processes, recycling plays a positive ecological role, seeking an effective synergy between tradition and science.<sup>14</sup>

## WHY CUBA?

Cuba is a country of contradictions; a third-world country with first-world indicators. High human development, free health care, educational access etc. but with censorship, virtual impossible international travel, no freedom of speech, a dual-currency system and a clumsy bureaucracy.<sup>15</sup> They also have one of the world's only state-controlled planned economies, where the means of production are owned and run by the government and most of the labor force is employed by the state.

Nevertheless, in terms of sustainable living and development they are doing something right. They have had to figure out how to run a country on fewer resources due to the Soviet collapse and the everlasting embargo by the U.S. Maybe what they are doing right can be reflected by the fact that they were forced to become a society without a consumer luxury like the one we have had in Norway, allowing us to replace rather than repair, influencing their mentality and creativity towards reuse. "Cubans know what it's like not to throw anything away and give free rein to the imagination to give objects a second life."<sup>16</sup> - Ernesto Oroza

The Soviet collapse in 1991 led to a severe economic downturn where Soviet subsidies worth \$4-6 billion a year were stopped. This period is also known as the Special Period, caused by political

and economic factors leading to famine, fuel shortages, a collapse in food production due to the loss of imported fertilizers, pesticides, tractors, parts and petroleum<sup>17</sup>, and more than thirty thousand Cubans fleeing the country.<sup>18</sup>

There was a need to re-orient the agriculture, to aim for food self-sufficiency. No other country in the world has achieved this level of success with a form of agriculture that uses the ecological services of biodiversity and reduces transportation, energy use, and effectively closes local production and consumption cycles.<sup>19</sup> One would think that during the same period it would have been logical that the self-production process had been facilitated in other areas as well, for example small industries with other locally produced goods, but this was not done. Instead, Cuba has been accused of having its own internal blockade, with a "state monopoly capitalism", where only the government can import goods.<sup>20</sup>

The U.S embargo, or "the blockade" as Cubans themselves call it, which would be a more appropriate name since the U.S policy also aims to restrict other countries from engaging in business with Cuba, is estimated to annually cause Cuba a loss of \$685 million, but more surprisingly between \$1.2-4.84 billion per year lost in sales and exports from

*“Cubans know what it’s like not to throw anything away and give free rein to the imagination to give objects a second life.”*

the U.S themselves.<sup>21</sup> Combined with the state-monopoly, this suffocation of Cuba’s economy makes trading and buying resources from abroad difficult in the public sector, but most of all for the average Cuban.

Equity, rationality, planning and placing people and their skills in the center of development are central concepts of Cuba.<sup>22</sup> With this approach, there has been important advances in human development. Regardless of all the constraints that the socialist island is under, it has managed to provide its inhabitants with free health care of the highest standard, free university and graduate school education, and subsidized food and utilities.<sup>23</sup>

*“... an impoverished, import-dependent island that is isolated from many global economic nuclei keeps pace with some of the world’s most developed nations in categories such as literacy, infant mortality, life expectancy, healthcare quality and coverage, and educational access.”<sup>24</sup>*

The Human Development Index (HDI) measures average achievement in basic dimensions of human

development: quality of life, knowledge and standard of life, measured by the Gross Domestic Product (GDP), as an economic indicator. The political will of the Cuban government and its development model allowed for a high human development with a highly-limited GDP per capita (an average of \$40 a month).<sup>25</sup> Cuba is classified as a developing country but do still rank at number 72 on the HDI list, as a comparison Norway is number 1.

The Sustainable Development Index (SDI) measures the ecological efficiency of human development, recognizing that development must be achieved within planetary boundaries. It was created to update the HDI for the ecological realities of the Anthropocene.<sup>26</sup> The SDI divides each nation’s HDI score by their ecological overshoot: the extent to which consumption-based CO<sub>2</sub> emissions and material footprint exceed per-capita shares of planetary boundaries. Looking at this index it is interesting to see that Cuba rise to the far top with a number 1 ranking in the world, and Norway drop down to a number 158 (out of 164).

Cuba is actually the only country in the world that

meets the criteria for Sustainable Development (SD) set forth by The Worldwide Fund for Nature (WWF), where the minimal conditions are a HDI of 0.8 and an ecological footprint below 1.8 global hectares (gha) per person.<sup>27</sup>

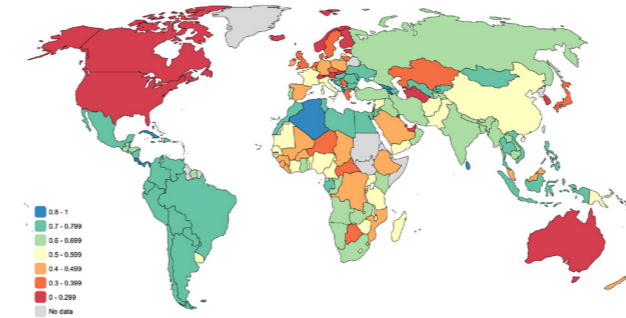


Figure 3: SDI scores of the countries in the world

Since Cuba can be seen in relation to Norway when it comes to the standard of living in terms of the human development factor, it will be interesting to see what kind of solutions they will have to problems that we solve through our economic resources and access to technology, that they cannot. We are especially interested in how they exploit the resources they do have. Although resource exploitation is not an unknown terminology in Norwegian architecture, it is a part of our history, and has, in the last decades, been overshadowed by new materials and technological solutions. Cuba on the other hand, being a country with a limited to no physical access to the same innovations as we have had here, may have maintained this knowledge. By visiting and designing architecture in Cuba, we hope to investi-

gate and (re)discover possible lost knowledge and creativity.

Furthermore, a country that is under a complete different political and economic system, and therefore surely will have different ways of organizing itself and its community, will also have a building industry and processes regarding building design that work differently from here in Norway. We are hoping that our observations may bring with them some good ideas on how to organize the sector, especially regarding sustainability.





## CHAPTER III - HAVANA MY LOVE

During big surges of immigration to cities, planning concepts have resulted in destruction of historic centers due to an encouragement of unlimited expansion.

“Havana has its problems, to be sure, but it is not burdened with the challenge of undoing misguided planning concepts that destroyed historic city centers. Havana has suffered grievously from fifty years of neglect, but at least the city’s rich architectural legacy and historic neighbourhoods were not erased by urban renewal or rampant profit-driven development.”<sup>32</sup>  
- Belmont Freeman

After the revolution much of the planned development around Havana was banned, unimproved land was expropriated, and the construction industry was nationalized. The socialist government became the only client for architects and builders, and Fidel Castro turned his attention to the countryside. Under his regime, they elevated the living standards there by constructing workers’ housing, schools, medical facilities, recreational centers and other social facilities, and by doing this, helped spare Havana the mass immigration that stressed so many other urban centers.<sup>28</sup>

Historical centers are filled with historical, cultural, social, symbolic and urban values, representing the collective memory of those who inhabit it, travel

it, enjoy it and all those who in one way or another live it. Its cultural characteristics make it a unique space where the hallmarks of a society come together. Failure to function in this way could result in the absence of a sense of belonging and recognition of the testimonial and cultural value they possess.<sup>29</sup>

The origins and foundation of San Cristóbal de la Habana have been a highly debated and studied topic as many of its historic references remain unknown. There is a consensus among historians to date the origin of the city to the sixteenth century, in the period between 1514 and 1519. The city’s existence and development were always linked to the activities of the port and its status as a commercial and service exchange center.

In 1978, the Historic Center “Old Havana” and its system of fortifications were declared a National Monument as an indissoluble whole. Later, in 1982 they were also included in the World Heritage List by UNESCO. In its historical evolution, we see the existence of several commercial axes such as Obispo, O’Reilly, Muralla and Teniente Rey among others, which maintained and still maintain this area as an important source of employment and economic income.<sup>30</sup>

Today Havana has a population surpassing 2.1 million. The city stretches over a total area of 728.26 km<sup>2</sup>, and is divided into 15 municipalities. The historic center, Old Havana, one of those municipi-

palities, has an area of 2,14 km<sup>2</sup> with 3.500 buildings from different periods. Just over 500 buildings are classified with a degree of protection I and II, associated with the highest patrimonial value, while another 2.500 are classified with degree of protection III, and define the harmonic landscape of the urban complex. Only one third of this heritage is considered to be in good technical condition, and in recent decades the number of buildings in poor and critical condition has increased, which constitutes a challenge for their conservation.



Figure 4: Old Havana and its building distribution of protection degrees

The 3.500 properties that make up the historic center belong to different eras and styles. Domestic architecture constitutes the bulk of the building stock – more than 80% of the buildings – and reflect the stylistic influences of various periods. Buildings between one and three levels with high ceilings predominate, with some exceptions. This also applies to the high compactness of the urban fabric, conditioned in the past, and to the presence of the inner courtyard, which is very distinctive of Cuban colonial architecture in the different architectural typologies among which the domestic and mixed typologies stand out. The building typology we refer to as “mixed” is divided between a domestic upper part and commercial or service premises on the ground floor, is typical for corners and the historically commercial streets.

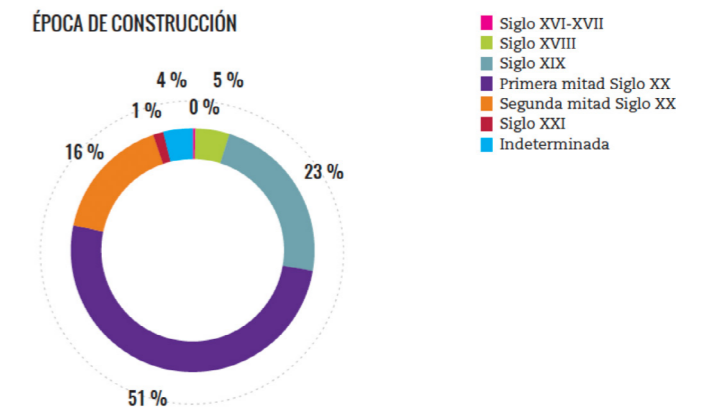


Figure 5: Percentage of buildings within different eras



A significant step for the conservation of the historic city center was the promulgation of Decree-Law 143 in 1993, acknowledging it an important sector of the City as a Priority Zone for Conservation.<sup>31</sup> This decree granted the now called La Oficina del Historiador de la Ciudad de La Habana (Cultural heritage Management Office of the City of Havana, OHCH) the power to create actions, mechanisms and forms of self-financing that contribute to the rehabilitation, administration and urban control in the priority zone for conservation, without leaving aside its sustainable model of preservation and socio-cultural attention of its inhabitants. The decrease in the deterioration of the building stock, the recovery of urban, architectural and cultural heritage, and the different strategies to revive and reanimate the image of the city, is proof of this.

Today, Raúl Castro is president, and he has initiated a variety of measures aimed to gradually dismantle fifty years of state monopoly on economic activity. Private enterprise, though tentatively and at small scale, is being encouraged, both to generate revenue and to shift workers off the state payroll. This shift, together with the increasing number of tourists entering the country, especially Havana, is affecting the living pattern of the locals, and is resulting in an immigration to the city. Nevertheless, Havana has an advantageous position, being able to learn from mistakes made elsewhere when undergoing an urban change today.

## INTERVENTIONS OF ARCHITECTURAL PATRIMONY

The desire to transmit a legacy to posterity has been present in all periods of history. Therefore, there have always been conflicts to determine what is of sufficient value to be maintained and transmitted, and what is not. Various documents and personalities have had an influence on how this is done today, including but not limited to: The Athens Charter, The Venice Charter, Eugene E. Le Duc and John Ruskin. We will however, work with the documents that OHCH is using for Old Havana and where their understanding and practice come from.

Each nation, has certain particularities, for example in governing documents. Cuba was one of the first Latin American countries to deal with the protection of cultural historical heritage, a few years after the Italian “Carta del Restauro » (1972) and the “European Charter of Architectural Heritage” (1975) were written.

Since 1979, Decree No. 55/79 has been in force, the Regulation for the Execution of the Law of National and Local Monuments. Here, when specifying the term of construction with patrimonial value in its Article 5, it is stated that:

“The Constructions comprise the building or buildings made by man from prehistory to the present time. For its determination, the current use will not

be taken into account, but its original function and for these purposes will be, according to its character, civil, commemorative, domestic, industrial, military or religious. If a certain construction originally had several simultaneous functions, it will attend to the predominant function or the one that essentially motivates its evaluation.”<sup>33</sup> (translated by us)

This extension of the concept of heritage accounts for how assets that were dismissed or not considered in previous periods are currently valued. According to this approach, it is clear that no building is “born” with a patrimonial character, but that such a quality only occurs as an added value by the community or the social group that assigns it special meaning.<sup>34</sup>

Interventions in architecture is an important aspect of a building’s history because it without it might have been erased from history. There exist several actions that can be carried out in a coordinated manner for the conservation and restitution of the original (or traditional) image of a building that has deteriorated for various reasons and is given a contemporary function.<sup>35</sup> Some of the actions that serve this purpose are: restoration, conservation, reconstruction, rehabilitation, remodeling and new insertion.

None of these forms of interventions are exclusive-

ly applied in a project, they are typically combined in some way. The application of one or another will ultimately depend on the Degree of Protection that the property has, as to intervene according to heritage protection laws, Decree no 55. The implementation of any of the aforementioned forms of intervention is consolidated with the combination and cooperation of different specialists (architects, designers, urban planners, politicians, economics, etc.) and the inclusion of the social issue as a result of a conservation plan. This is what we call integrated conservation.

In Old Havana there is, as mentioned above, a high percentage of buildings with a high heritage value. Unfortunately, many of these buildings are in critical condition, and need to be restored. In many cases the internal construction is in such a poor state that it all needs to be taken out, leaving only the facade standing. This is part of the guidelines from UNESCO; keeping the façade conserving the urban expression of the city. It is essentially the action of recovering the original image of a building with historical and cultural values that is the goal when it comes to working with architectural patrimony.<sup>36</sup>

“What we try to do here in Old Havana with all the restorations (...) is to keep the memory of the building.” (Appendix B)

“What we try to do here in Old Havana with all the restorations (...) is to keep the memory of the building. “



Picture 1: taken june 2017



Picture 2: taken february 2020, same site





## CHAPTER IV - PROJECT



Casa Don Gaspar Riveros de Vasconcelos is situated on the corner of Obrapia and Calle San Ignacio. This building is the site of our project, where we have collaborated with a Cuban architectural office, RESTAURA, under Oficina del Historiador. Following their method we have gathered information through archives for historic documents regarding the building, and performed inspections: to understand its history, context, constructive and technological state as well as its patrimonial heritage, before designing a conceptual project based on these premises, to demonstrate and highlight how their processes contribute to a project design.







Figure 6: Site plan Old Havana

## PART 1: LOADING...

### Calle San Ignacio

Crossing the entire historical city center from north to south, the axis of Calle San Ignacio stands out. Referenced by architects and historians as the finishing touch to the historic center, for “closing” the ring that forms between the 4 fundamental plazas (Plaza de Armas, Plaza de San Francisco, Plaza Vieja and Plaza Catedral) and the sections of the streets that join them, Obispos, Teniente Rey and Mercaderes. Because of its close proximity to important commercial axes, and the fact that it is connecting two of the main squares of the historic center, Calle San Ignacio is busy with pedestrians, an important element contributing to the dynamic character of the street.

Differentiating itself from other streets such as Obispos and Mercaderes, where the commercial function clearly dominates, Calle San Ignacio’s character has been residential, though many of the premises located on the ground floor have been occupied by businesses, shops and stores of various trades such as bakeries, cafes, pharmacies, hardware stores, tailoring etcetera. This shows the tradition of the “mixed typology” which guarantees a buoyant level of urban life and social coexistence in the street, a fundamental trait of historical centers.

Since the late nineteenth century and especially in the twentieth century, the Havana bourgeoisie moved to new residential areas in the city such as Vedado and Miramar. This initiated the transformation and degradation of the old mansions and palaces of Old Havana, that today have become residential complexes known as Solares. This also happened in Calle San Ignacio, where many of the wealthy families relocated. Their old homes, also the ones that were already divided up for better rental profits, were turned into multiple dwellings. Today these Solares can hold up to as many as 60 families a piece, and are the reason why San Ignacio is one of the most densely inhabited streets within the historic center, where the average population density already is 25900 inhabitants/km<sup>2</sup>



In the street segment that is bounded between Plaza Catedral and Plaza Vieja, that traditionally consisted mostly of residential buildings, there has been a transformation of numerous spaces into both state and private commercial establishments. For example, the installation of artisans in empty and improvised spaces or vendors in stairwell doors and hallways of residential buildings, and the work of the OHCH in undertaking rehabilitating actions in the street recovery process. All this introduces a variety of functions that not only generate economic well-being, but also the restoration of buildings and the urban image as well as other social improvements.

Old Havana's historic center has, over the last five centuries, seen an urban trajectory that has filled it with buildings from past centuries that still remain standing, offering a journey through the history of the city's architecture, from its foundation to the present day.

*"The Plan Especial de Desarrollo Integral 2030 (The Special Plan for Integral Development 2030) (PEDI 2030) is a new type of planning instrument that includes tools for territorial and urban planning and the comprehensive development of the Historic Center."*<sup>37</sup> PEDI 2030 lists the functions that must be considered to comply with integral development, in line with the new policies pursued by the country.

Although Old Havana is already considered to be a

center of creative activities in its whole, the collection of tourist services Calle San Ignacio contains deems it to have potential to become a nucleus for creative activities, and is therefore proposed as a pedestrian interconnecting axis with a cultural character, specializing and promoting creative development.

Located along this axis are multiple buildings with Protection Degree I and II, which means high patrimonial values. Some of these buildings have already been preserved but need new urgent interventions as they, due to their current state, run the risk of being lost. The OHCH is currently performing three constructive interventions in the street: San Ignacio 314 between Amargura and Teniente Rey, San Ignacio 211 corner with Lamparilla, and San Ignacio 305-309, between Amargura and Teniente Rey.<sup>38</sup> Casa Don Gaspar Riveros de Vasconcelos, Obrapía No. 172, our building, has been assigned Protection Degree II.

## The building's memory, historic context

Architectural history, a building's memory persisting through time. By understanding the history of a building, we will be better equipped to make an intervention keeping the building's, and thus also the city's and the country's, memories alive. Restoring architecture equals preserving history.

With a vast history embedded in its walls Casa Don Gaspar Riveros de Vasconcelos is still standing. *"... In all its details, it shows its respectable antiquity. Perhaps it is but the oldest in Havana one of the few that remain from the 17th century"*<sup>40</sup>

The following historical description is taken from research carried out by Leandro Romero, documents found in "Archivo y Centro de Documentación de la Empresa RESTAURA" (the Archive and Documentation Center of the Company named RESTAURA).

In the year 1626, Captain Julián de Estrada held the position of owner of the lot and corner house of Obrapía and San Ignacio, and is the first known proprietor. He offered the house to Captain Gaspar Riveros de Vasconcelos, a Portuguese nobleman, Knight of the Order of Christ, as a part of the marriage dowry of his daughter Doña María Estrada. To its right the house bordered to the house of Cap-

tain Jácome de Justiniani and in the back with the plot and house of Captain Julián de Estrada.

On November 27, 1630, Captain Gaspar Riveros de Vasconcelos bought his father-in-law Captain Julián de Estrada the neighbouring house located on San Ignacio Street between Obrapía and Obispo, bordering on the one hand with his own corner house and on the other with the house of Juan López de Tapia.

From 1637 to 1647, Don Gaspar rebuilt the house when he got married for the second time on December 8, 1637 to Lady Beatriz Fernández de Farias. He was the first to renovate the house, adding his own coat of arms formed by a quartered shield, with the Cross of the Christ of which he was knight, to the main entrance. He also added a carved wooden balcony, with columns supporting a tile roof, to the house. By the year 1650, it is already stated in documents of the time, that one of its premises were rented out, and in this case it defines its function and situation precisely by indicating that it was dedicated to be a "store" and that it occupied "the corner of the house of my abode", that is to say the ground floor on the corner of the streets of Obrapía and San Ignacio.

In 1685, Captain Don Esteban Riveros de Vasconcelos, son of Don Gaspar and Mrs. Beatriz, took possession of the houses as the overall heir. On February 23, 1701, the house was sold to Lieu-



tenant Don Juan Núñez del Castillo, by Mrs. Catalina Cordero de Esquivel, Don Esteban's widow.

From 1701 to 1826, a period extending for a century and a quarter, these houses, which were unified at an undetermined date of the second half of the eighteenth century, was owned by the Núñez del Castillo family. Juan Núñez del Castillo, was the founder of the City of San Felipe and Santiago del Bejucal, the first city of suffragan vassals of Cuba (1714).

In 1758, after the death of the second owner of the marquisate of San Felipe y Santiago, the house became the property of Don Juan Clemente Núñez del Castillo y Molina.

In 1762 a transitory abandonment of the Núñez del Castillo occurred during the occupation of Havana by the British invading troops, who turned this and other houses into accommodation for the English officers.

On May 14, 1830, Doña María Ignacia Espinosa de Contreras, widow of the fourth head of the marquisate of San Felipe and Santiago, writes a deed reaffirming the separation of the house Obrapía No. 170 and 172 of the marquisate. It is then that the house passes on October 27, 1838 owned by Dr. in Pharmacy Don Salvador José de Zapata until his death in 1854. During this period, it was also used by its owner as "pharmacy office", whose corner

was known until the early nineteenth century as the "corner of Zapata".



Picture 3: Corner store, through time

In 1854, according to the testamentary will of Dr. Salvador José Zapata Mrs. Florinda Betancourt and Mr. Miguel Borrás became the new beneficial owners, and were so until 1872.

On January 31, 1864, Mr. Juan del Valle, Fiscal Promoter, addressed Mr. Alcalde Mayor<sup>39</sup> requesting that a rigorous inventory be made of the assets bequeathed by Dr. Zapata to Doña Florinda, especially with regards to the house. During that time, the tax collector sought all kinds of legal resources to deprive and invalidate Mrs. Florinda's right to use the income of said legacy.

In 1873, the director of the Economic Society of Havana was authorized to process the transfer of

Dr. Zapata's legacy to themselves. After presenting all the required documentation, the company took possession of the eight houses that made up Dr. Zapata's legacy, including the one located at the corner of Obrapía and San Ignacio.

From 1925 to 1960 the source of information was the "Archivo de Amillaramiento Urbano" (Archive of Urban Assessment of Tax), of the Tax Commission of the Havana City Council. It was started in 1925, with the detection of an infraction for lack of tax declaration by the "Society" in their payments to the Municipality. It was discovered that at that time the house was sublet to Mr. José López.

In 1934, the property was described by tenant Antonio López Pescano as "[...] two floors, 20 rooms and the bodega owned by the Economic Society."

In 1936, specifically on October 28, the house was leased to Dr. Pescano, who in turn had sublet it in no less than 27 lodgings and eight storage rooms. This unmasks the tremendous, radical exploitation of the property by obtaining 10 more premises at the same cost, that is 43% more than the original area to be leased. This situation would continue until the end of the 50s. It is surprising how the "Society" hid the exploitation and overcrowding of workers and underemployed, who, given the scarcity of their economic resources, were forced to inhabit these citadels, whose radical exploitation is demonstrated both economically and socially.

Thus, the cultural and historical value of the residence of the knight of the Habit of Christ and of the potent marquises of San Felipe and Santiago, was overshadowed by the socio-economic drama led by the speculation and desire for profit of the "Sociedad Económica Amigos del País" ("Economic Society for Friends of the Country") regardless of the degradation of the building's cultural legacy.

The building as a whole did not undergo substantial interventions until 1979, when, as a result of the torrential rains caused by Hurricane Frederick, parts of its bays were damaged, and would be rebuilt and restored years later.

The property is handed over to the Federation of



Picture 4: After the Hurricane Frederick

Cuban Women (FMC), to create a socio-cultural institution called "Quitrín", a project which was created hoping to rescue Cuban traditions in clothing, linking handmade details with different techniques of manual weaving. Said project was consolidated from funds contributed by the United Nations Development Fund for Women (UNIFEM).

Between 1982 and 1986 a restoration process began aiming to reconstruct the old house as it looked in colonial times, based on a thorough historical and documentary study, directed by the Architect Jaime Rodríguez. This restoration covered the building in its entirety, including the reconstruction of elements such as the facade helped by old pictures. The same happened with the balconies and the entrance (with the participation of the sculptor René Palenzuela). The first floor of the building was proposed to function as accommodation for FMC members from other provinces visiting to participate in activities related to the organization.

In the following years and until today, the property has continued to function as a part of the "Quitrín" Project, but due to a limited use of the building, added to the lack of consequent construction maintenance, the building has reached a state of advanced deterioration that threatens both the conservation of the building itself and the loss of valuable components that it comprises.



Picture 5: Restoration in the 1980s, facade



Picture 6: Restoration in the 1980s, gallery

## Technical and constructive state of the building

Continuing with the Cuban processes, moving from the archives and the building's history, to the physical building to inspect it as to understand its constructive and technical state as well as its patrimonial heritage parts.

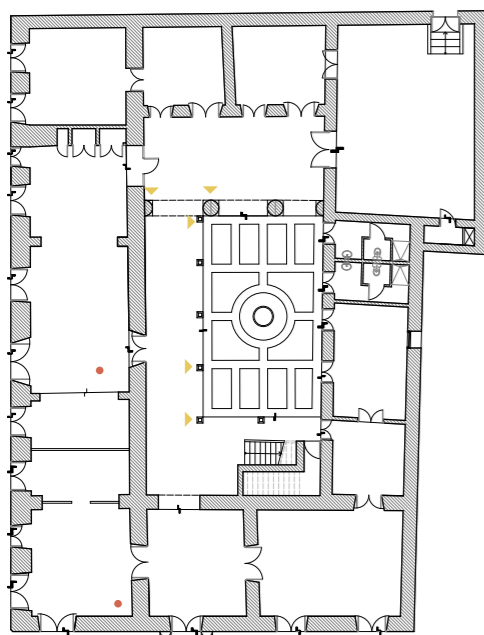
The accumulated deterioration of the property is due to a lack of maintenance and the continued disuse of its upper floor for more than 40 years. The poor state of the technical construction is obvious due to the advanced and pronounced degree of deterioration it demonstrates. The main problems are associated with the presence of humidity in the construction elements, which weakens the structural systems, and decreases the possibility of reversing the situation.

In this section, we will present our damage findings, their location, what kind of repair is needed, and possible causes for the noted damage. This work was performed under the supervision of René Gutiérrez.

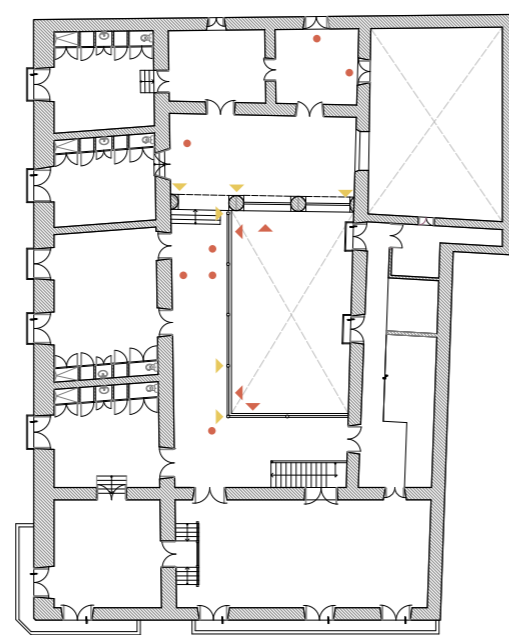
On the right page, you will find a description and on the left page there will be photos to demonstrate the type of damage and their location either on the floor plan, elevation or facade. A circle is used for locating on the horizontal axis and the arrows are used as pointers on the vertical axis.







Ground floor



1. floor

## Horizontal structure

### Concrete slab

Damage: Breakage cracking in the concrete slab, often leaving the internal structure or filling exposed.

Repair: structural

Affected areas: concrete slabs

Possible causes: poor quality of material, structural overload, impact and lack of maintenance

If serious, should be propped up as fast as possible

### Presence of funghi

Damage: Irregular spots in white, presence of basidiomycete funghi.

Repair: structural

Affected areas:

Possible causes: inadequate selection of the wood, lack of preventive treatment of the wood, lack of adequate ventilation and sunlight, presence of humidity, exposure to water and lack of maintenance.

### Xylophagous agents (insects)

Damage: attack by xylophagous agents. Defibrations, holes, loss of profile and presence of underground termite tunnels in the wooden elements are observed.

Repair: structural

Affected elements: wooden beams and planking. Therefore, the elements identified in the building are the wooden elements that make up the floors and ceilings.

Possible causes: exposure to moisture over prolonged periods due to leaks, inadequate selection of the wood used for structural elements, lack of preventive treatment of the wood, lack of adequate ventilation and lack of maintenance.

## Vertical structures. Columns

### Wood

Damage: rot at the base or at the capital of the columns. Segregation of the constituent components of the wood, softening, or rot is observed, which causes the element to lose its structural properties.

Repair: structural.

Affected elements: columns: bases and capitals.

Possible causes: high levels of concentrated humidity, a product of leaks from the roof, or leaks from the facilities, poor ventilation, sun exposure, weathering, poor selection of wood, insects and fungi, and lack of maintenance.

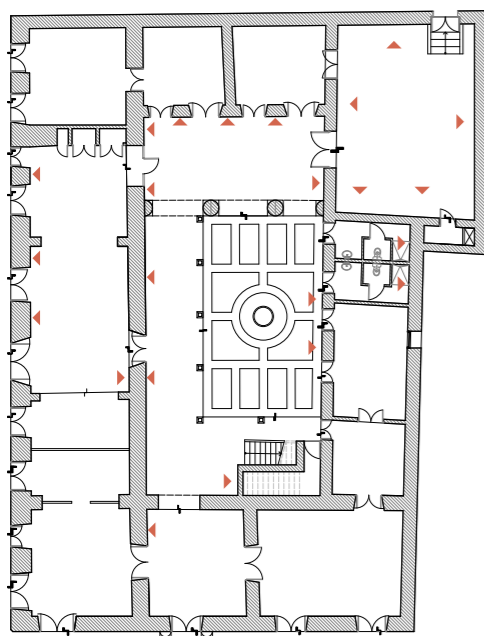
### Stone

Damage: Disintegration and chipping, A deformation or detachment of the mortar or coating is observed. In some cases, cracks appear in several directions.

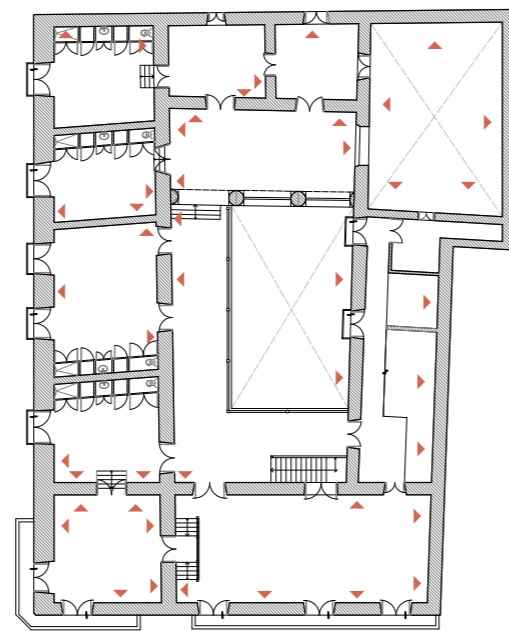
Repair: non-structural.

Affected elements:

Possible causes are: shrinkage of the mortar that generally has a greater modulus of elasticity than the material of the wall, presence of excessive moisture, lack of adhesion between support and cladding, poor execution of the cladding, poor dosing of the cladding, aggression of atmospheric agents and lack of maintenance.



Ground floor



1. floor

## Walls

### *Disintegration and chipping*

Damage: Disintegration and chipping, A deformation or detachment of the mortar or coating is observed. In some cases, cracks appear in several directions.

Repair: non-structural.

Affected elements: masonry walls, stone, mud brick and concrete blocks.

Possible causes: shrinkage of the mortar that generally has a greater modulus of elasticity than the material of the wall, presence of excessive moisture, lack of adhesion between support and cladding, poor execution of the cladding, poor dosing of the cladding, aggression of atmospheric agents and lack of maintenance.

### *Horizontal cracks*

Damage: horizontal cracks. Horizontal cracks are visible in the structure. They were found in load-bearing walls close to the floor slab or ceiling, especially under windows.

Repair: structural

Affected elements: masonry walls, stone, mud brick and concrete blocks.

Possible causes: error in the design or execution of transition elements between elements of different natures i.e. wall to steel elements, eccentric loads and flexion compression of floor slabs or roofs, lateral thrusts, absence of an enclosure element, poor design or execution thereof.

### *Inclined cracks*

Damage: inclined cracks. Inclined cracks are seen in the elements that in some cases follow the path of the joints of the elements that make up the wall, forming stairlike patterns.

Repair: structural

Affected elements: walls of masonry, stone, mud brick and concrete block.

Possible causes: differential settlement of the foundation, lateral forces from arches, vaults, frame-support roof structures: the materials that make up the wall have low resistance, concentrated loads greater than the resistance capacity of the wall, presence of higher floors.

### *Vertical cracks*

Damage: vertical cracks. Vertical cracks are seen in the lower or upper center of the wall, with the largest opening in one direction or the other. They are usually accompanied by inclined cracks normal to the direction of traction. They also usually appear at the junction between two walls or other construction elements.

Repair: non-structural.

Affected elements: walls of masonry, stone, mud brick and concrete blocks.

Possible causes: differential settlements, plant roots, incorrect mechanical connection between the elements or difference between the materials that make up the connection, presence of metallic elements affected by corrosion, earth or other elements, and thermal movement.

### *Humidity in cracks*

Damage: Humidity in the cracks. Water comes from above, rain protection is important.

Repair: structural

Affected elements: walls of masonry, stone, mud brick and concrete blocks.

Possible causes: roots, incorrect mechanical union, presence of metallic elements affected by corrosion, thermal movement, forces from the ground





## Carpentry

### *Rot*

Damage: Rot. There is a softening in the wood, with profile loss.

Repair: non-structural

Affected elements: carpentry elements such as frames, doors, windows, railings and gates.

Possible causes: humidity, a product of leaks or exposure to weather causing fungi to proliferate in the wood or insect infestations and lack of maintenance.

### *Detachments*

Damage: Detachments of elements. Wear, loss of parts and fragmentations of the woodwork elements. The pieces lose mobility or break off.

Repair: non-structural

Affected elements: carpentry elements such as frames, doors, windows, railings and gates.

Possible causes are: wood rot, poor selection or processing of the wood, poor execution of the element, lack of maintenance and too many layers of paint. Profile loss, impacts, erosion due to climate and environment attack of rodents and lack of maintenance.

## Stairs

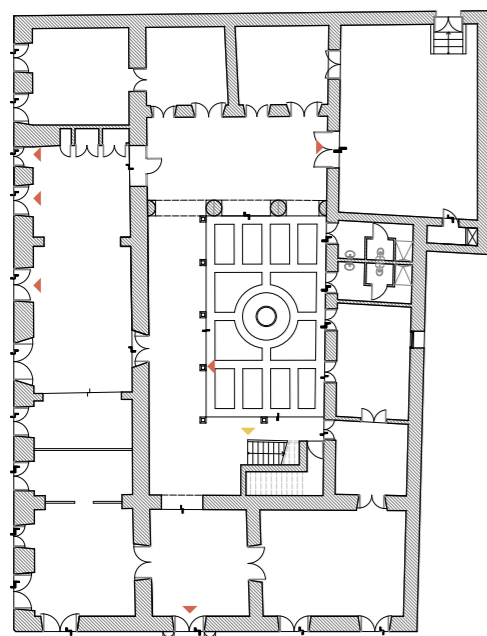
### *Rot in the supports*

Damage: rot in the supports. There are movements or misalignments in the staircase, a product of the rot in the supports of the wooden beams that make up its structure.

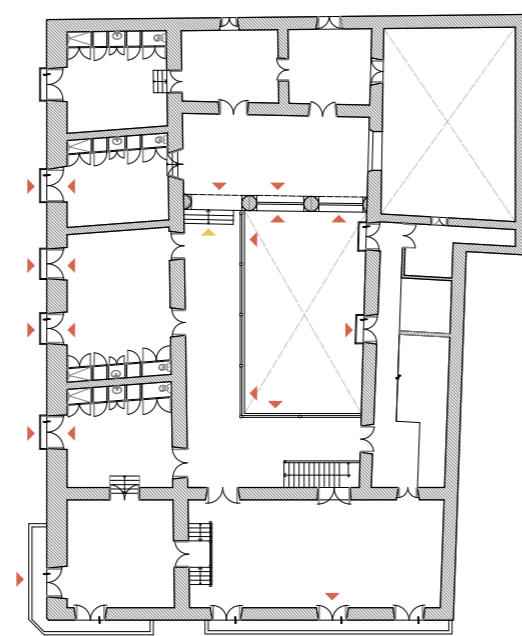
Repair: structural.

Affected elements: wooden beams forming the staircase.

Possible causes: moisture through absorption or leakage, insect and fungus infestation, poor ventilation, sun exposure and lack of maintenance.



Ground floor



1. floor



## Pavements/floors

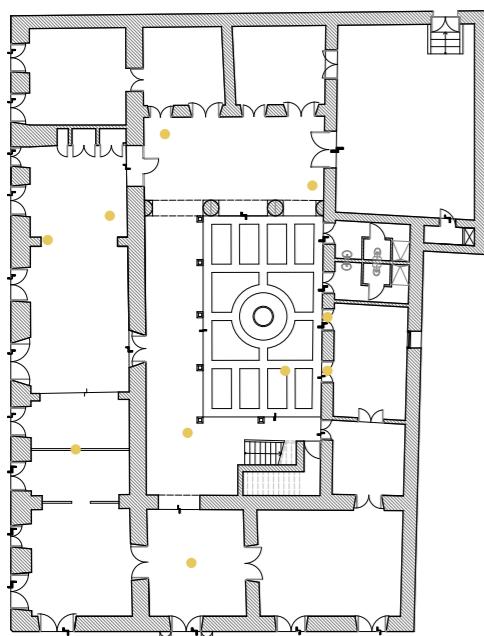
Damage: Wear on the edges of the pavement and flooring or the loss of them due to cracking. In the center of the Zaguán flooring is missing.

Repair: non-structural

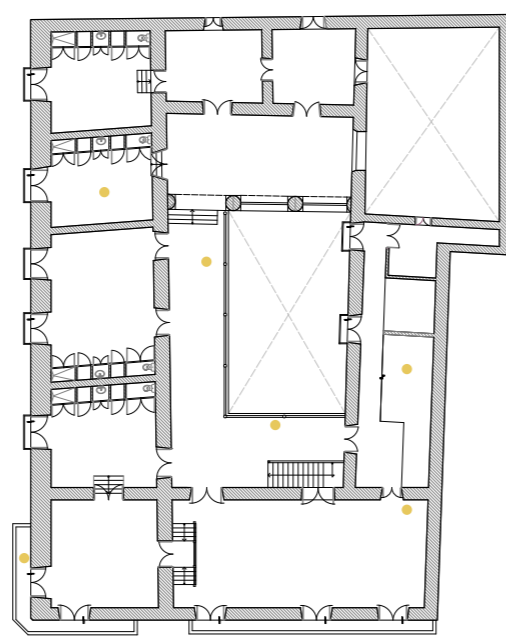
Affected elements: pavement and floors

Possible causes: wear or abrasion from use, impacts or blows, poor quality of the pieces, bad placement, lack of mortar in the joints and lack of maintenance.

In a building the floors are one of the most important elements when it comes to the finished look and image as it provides both hygienic aspects as well as beauty. Floors supports its own weight, the weight of interior and of the people moving around using the building space.

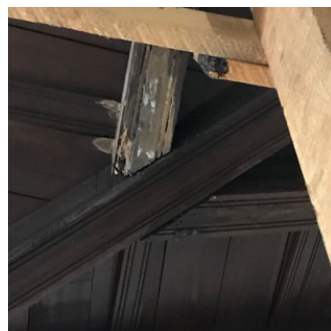


Ground floor

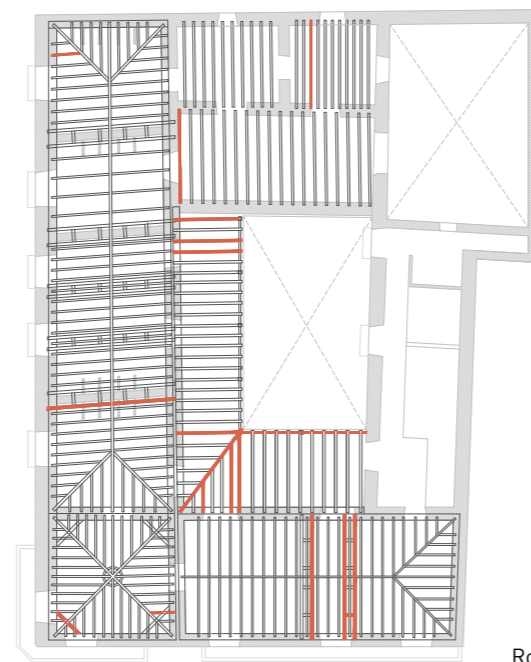


1. floor





Roof-plan



Roof-plan

## Beams

### Steel

Damage: detachment of exterior material, loss of coating and signs of corrosion.

Repair: structural

Affected elements: reinforced concrete beams  
Possible causes: humidity due to infiltration, vibrations, shocks, lack of adherence, bad execution, poor selection of material and lack of maintenance

### Deformations

Damage: excessive deformations in wooden beams.

Repair: structural

Affected elements: wooden beams. Therefore, the elements identified in the building are the wooden elements that make up the floors and ceilings.  
Possible causes: material depletion, increased load, weakening of the element caused by an invasion of insects or fungi, insufficient cross sections, leaks and lack of maintenance.

### Failure of joints – between walls and roof structure

Damage: Mismatch or separation between elements, structural roofs, braces and beams. Wooden elements can be accompanied by horizontal cracks at the top of the wall, rot in the joining elements, and horizontal cracks in the beams.

Repair: structural

Possible causes: humidity due to infiltrations, insects, fungi, excessive loads, bad execution, lack of maintenance and end of useful life

### Failure of joints

Damage: failure of the joints in wooden beams. A displacement or separation is observed in the joints between the structural elements.

Repair: structural

Affected elements: wooden beams. Therefore, the

elements identified in this building are the wooden elements that make up the floors and ceilings.  
Possible causes: humidity due to leaks, insect and fungal attacks, execution errors and lack of maintenance.

### Horizontal cracks in the beams

Damage: fissures or cracks in entire length of the beam, especially wooden beams in floors and ceilings.

Repair: structural

Affected elements: wooden beams  
Possible causes : sudden changes in humidity and temperature, increased loads, poor quality of wood or inadequate processing, inefficient drying of the wood, expired lifetime and lack of maintenance

*Commentary to the roof-plans: Both plans are from the second floor, because this is where most of the damage is. The only critical damage on the first floor when it regards to the beams are in the long room alongside calle San Ignacio where the wooden beams have been substituted by iron ones, and these need to be replaced. On the second floor, the roof-plan that shows some red beams are marking those beams that need to be completely switched out. Whereas the other roof-plan shows where there is discovered damage but in such a state that it can be repaired just partially.*



## Balconies

### Wood rot

Damage: wood rot. There are partial or total losses in the planking of the wooden structure of the balcony, leaving the internal elements visible and sometimes loss of these makes the pavement visible through the floor. There is profile loss in the protruding carved beams.

Repair: structural

Affected elements: planking, beams or ornamental elements on the wooden balconies.

Possible causes are: humidity, incorrect selection of the wood used, lack of treatment and drying of the wood, leakage, lack of sunlight in the structure and lack of maintenance.

## Facades

### Moisture stains/spots

Damage: moisture spots on eaves and cornices. Moisture spots caused by leaks in eaves and cornices are visible. As is damage to the tiles or absence of these.

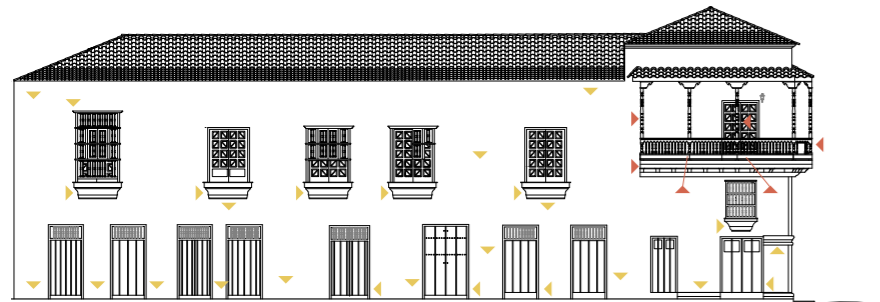
Repair: non-structural

Affected elements: eaves and cornices on walls of the facades.

Possible causes: humidity, poor quality of materials, errors in execution and lack of maintenance.



Facade south

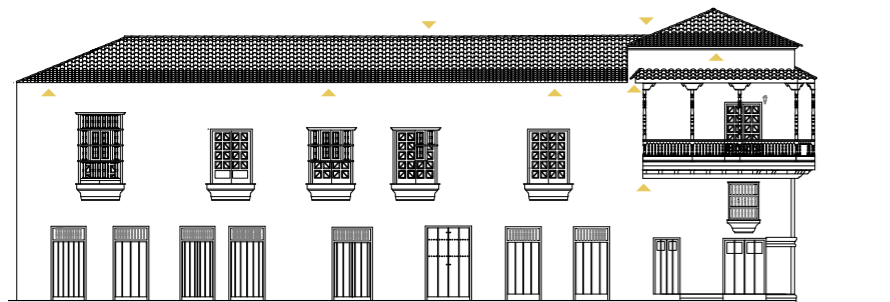


Facade west





Facade south



Facade west

## Waterproofing system

### *Sagging of roof tiles*

Damage: sagging of roof tiles. The sagging of these tiles and the accumulation of water in these areas, facilitates infiltrations and damage to the structure.

Repair: structural

Affected elements: the clay roof tiles that are part of the waterproofing system.

Possible causes: deformations or failures of the roof structure, deficiencies in placement and lack of maintenance.

### *Breakage or loss*

Damage: breakage or loss of roof tiles.

Repair: non-structural

Affected elements: clay roof tiles that are part of the waterproofing system. Broken and missing tiles have been observed.

Possible causes: erosion caused by weather and natural phenomena, improper use of the roof, impacts, fixing of antennas or other elements on the tiles, poor quality of the tiles, errors done in their placement and lack of maintenance.

### *Growth of moss, lichens and grass on the roof*

Damage: Growth of moss, lichens and grass on the roof, causing damage to the roof tiles, causing water infiltration and weaken the thermic and acoustic properties of the roof.

Repair: Non-structural

Affected elements: clay roof tiles.

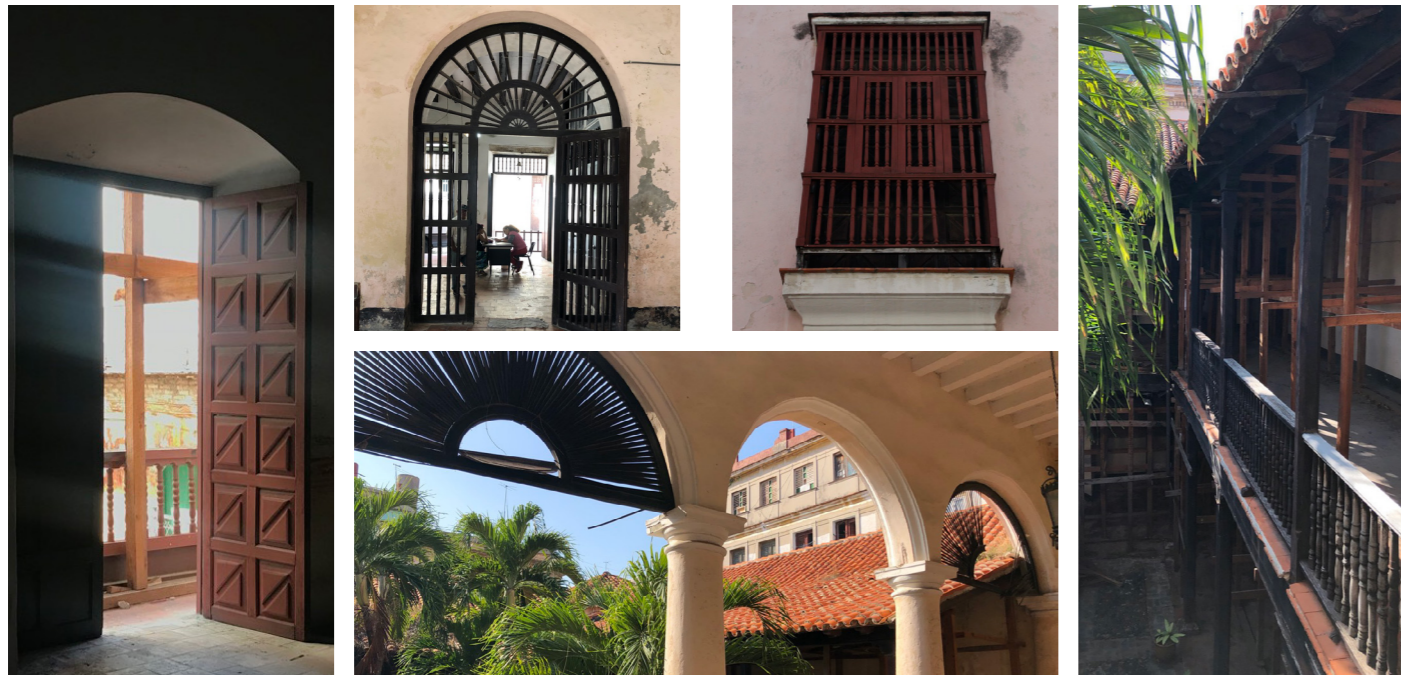
Possible causes: improper use of roof, presence of humidity, cracks and breaks in elements of waterproofing system, use of porous materials, lack of maintenance

We have been able to find different approaches towards a repair and maintenance program for the different damaged parts we discovered in Casa Don Gaspar Riveros de Vasconcelos, see Appendix A, for specifics. But the most interesting discovery we made, was that the Cubans did not just have one solution, but rather 3-4 suggestions for how to solve each problem. The persistence they expressed through different approaches that did not include changing the specific damaged part for a new one seemed based in their respect for the building's history and heritage, the need to keep as much as possible to shorten the process, and the difficulty to acquire specific materials. And with that we found a creativity, rooted in a mentality that comes from being used to not having access to resources and the consequent need to find different solutions, reusing or maintaining what is broken.

## Patrimonial value



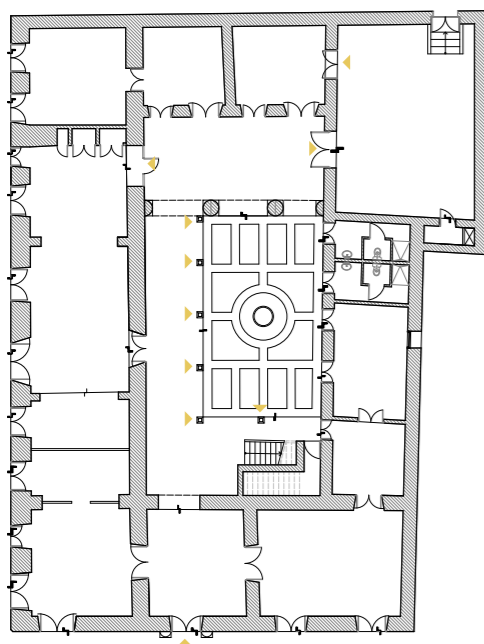




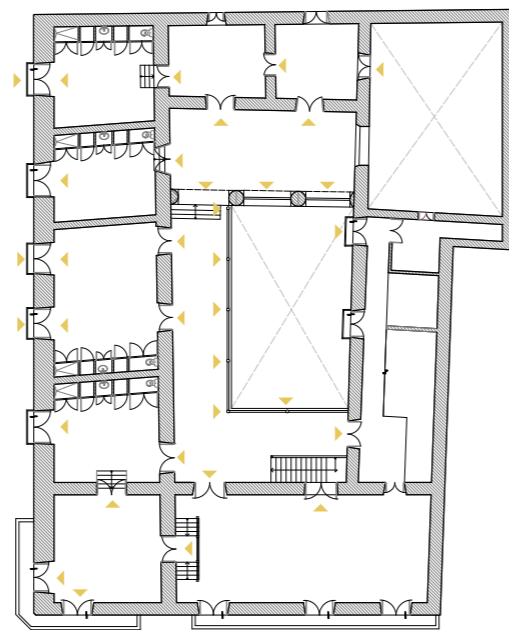
## Woodwork

Much of the original woodwork remains assigning the property with a high patrimonial value.

The doors on the second floor are mostly original, they have two 'doorsheets' and have rectangular squares arranged with six to eight squares vertically. Other woodwork which remains but are reproduced according to building referances from spain and photos are: wooden bars around the windows, wood filled arches (half sircles) and columns in the gallery of the courtyard.



Ground floor



1. floor

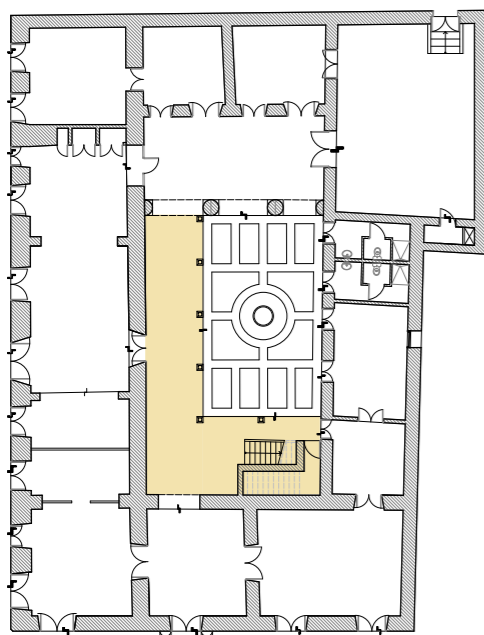


## Structural elements

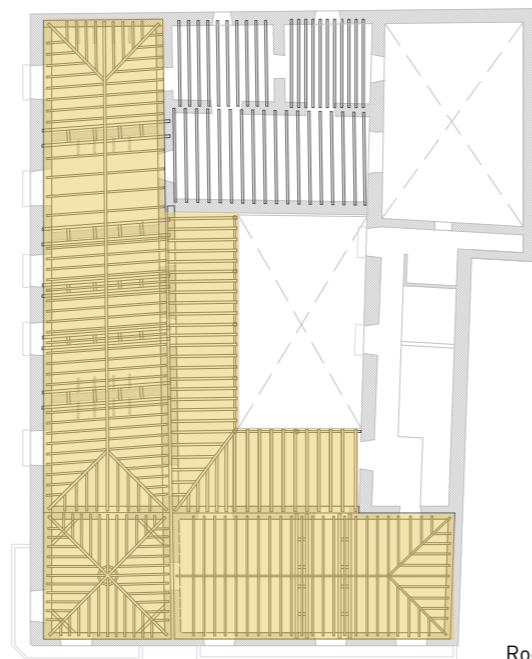
Much of the original elements providing a patrimonial value for the interior: beams, corner braces (cuadras), pair of corbels (dobles canes) and both ashlar and rubble masonry as well as the gallery in the courtyard.

The areas marked with red in the plans are the courtyard and the roofing on the second floor with patrimonial value due to the carpentry.

When looking at the roofs on the second floor some of the wooden parts are painted and some are not, those with paint on them are from before the renovations in the 1980s.



Ground floor



Roof-plan

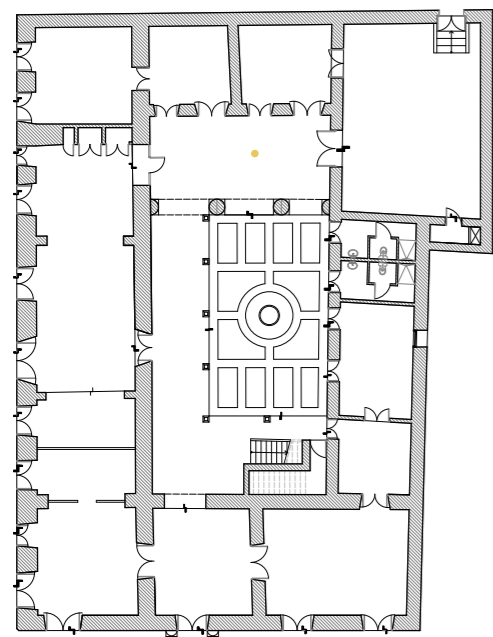




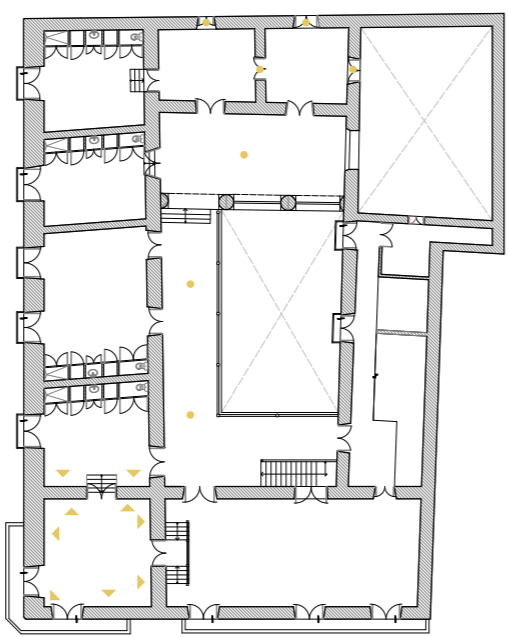
## Heritage repertoire

Some of the building's elements are unique within Old Havana's heritage repertoire

Elements within this category consists of: the unique murals, iron hanging lamps and the coat of arms above the main entrance door. worth mentioning is also the high ceilings that allows for a greater number of spatial configurations such as the use of mezzanines.



Ground floor



1. floor

## Phases of a design project

After having spent two months on the island, working with a project together with an architecture office and interviewing people in the building sector, we have tried to separate their building processes into phases. As an overview we have divided it into five: Project, planning, dismantling, building, and property occupation. Although the organization of their social living has certainly been intriguing, and the building process has been discussed throughout our work, we have focused on the first three.

In Cuba, every zone or province, including Old Havana, has an Investment Directorate, one office, that all architectural projects need to be presented and handled through (appendix C), further information will be presented under the planning phase.

### *Project*

This phase is the one presented so far in this thesis. For us to be able to fully understand and appreciate how they think and act in Cuba, we have been working with Casa Don Gaspar Riveros de Vasconcelos, as if part of a Cuban architecture practice. As you can see, this phase consists of putting the building into a historic context, analysing its constructive and technical state, and recognizing the patrimonial value of the parts of the building that needs to be restored in order to maintain the building's patrimonial heritage (appendix B). After these measures have been taken, the design of the project

takes place, before moving into the next phase "Planning". Every design in Old Havana should take the parameters set forth by PEDI, the master plan for the historic city center (guidelines concerning which type of program is wanted in the area for a successful urban development) into account. The design made is based on the constructive state analysis, the patrimonial values that the building contains, and takes the building's degree of protection into account (appendix B).

### *Planning*

All projects need to be presented at the Investment Directorate for approval. The architect, the constructor, the investor and the craftsmen will have multiple meetings to discuss all aspects of the project. When the details are set with all the technical drawings and plans, the investor and the constructor will sit down and figure out who will provide what in regards to materials. The constructor usually provides materials that can be found and produced in the country. A different branch within the Investment Directorate, who visits the building in question where the new design is planned, will make an estimate as to how much of the building's materials can be reused. This is done so that it is not necessary to order or look for too much, thus saving money. The Investment Directorate will then make a list of the material that cannot be provided locally, and hand it over to the Import Office who will order the materials needed from abroad (appendix C).

### *Dismantling*

In an interview with the Investment directorate we learned that they try to reuse every material that has patrimonial value, including all ironwork, carpentry, wooden beams, and stones used in staircases. The careful extraction of materials does not only apply to patrimonial valued elements, they also extract any other materials they come by in good condition, everything from tiles and bricks to the frames around and on windows.



When the process of disassembling the building starts, they have specialized people come in to do the job, having knowledge on what can, and what cannot be reused or recycled. This ensures that the building is disassembled in the best possible way so that as much as possible is reusable (Appendix B). The technical checks of the materials take place during this phase and are done by experts (Appendix C). This reuse or recycling normally happens directly on the building site, but sometimes parts from another house can be found - already having been reused. If this is the case, and the other building is also under restorations they will, if possible, bring it back to its original location (Appendix B).





In Old Havana around 10% of material is reused or recycled, and in the interview they explained that this “low” percentage is mainly due to the fact that when they go in for restorations it is at such a late time that most of the materials are in a poor state. Another reason is that the equipment and machinery needed for recycling some of the materials are not always accessible, and even if they are, they might be impossible to use because of the price or even lack of access to electricity (Appendix E). If they should be able to reuse more of the material of the building than anticipated and therefore have an excess of new material already paid for, they do not sell it, but keep it within their economy, using it in a different site. (Appendix C)



## PART 2: LOADING COMPLETE

### What can we do, legally?

We have tried to the best of our abilities to extract information from the Cuban laws concerning Cultural Heritage, to put together important aspects, restrictions, procedures and formalities to understand what we can and cannot do concerning interventions of Casa Don Gaspar Riveros de Vasconcelos.

In Cuba, the intervention processes and policies are based on Laws No. 1 and No. 2 of Constitución de la República (The Constitution of the Republic) referring to Protección del Patrimonio Cultural (The Protection of Cultural Heritage) and Declaración de Monumentos (Declaration of Monuments).

Law No. 2 regards national and local monuments, written August 4, 1977. The Ministry of Culture is the body in charge of specifying and declaring the assets as part of the Cultural Heritage of the Nation.

We find under chapter VI, Article 30 that: The declaration of a National Monument or Local Monument will be made according to the value or values that it presents in the historic, artistic or architectural, environmental, natural or social aspects. Defined as follows:

Historical value: If the Monument possesses, or is linked to, a personality or to a relevant event in political, social, scientific or cultural history.

Artistic or architectural value: If the Monument possesses, or presents relevant or exceptional aesthetic meaning for style elements, constructive components or decorative details.

Environmental value: If the Monument, due to its form or architectural character, has come to represent an indissoluble part of the environment of an era or a region.

Natural or social value: If the Monument is integrated in a site that due to the scientific or cultural characteristics, or due to its geological or physiographic character constitutes a habitat for animal species or vegetables of great value that are threatened by extinction, it will be of great interest to science and culture to conserve the Monument for the nature.

Decree no 118, chapter VII:

After the building is declared into The National Registry of Cultural Heritage of the Nation under the Ministry of Culture, it may not be destroyed, remodelled, modified or restored, without prior authorization from the Ministry of Culture.

In the request submitted to the Cultural Heritage Office of the Ministry of Culture to restore, modify, restore or carry out any type of change or alteration in a Cultural Heritage of the Nation building, it shall contain the following:

- Cause(s) that originated the request
- Descriptive memory of the work to be carried out
- Executing entity, technical manager and specialized personnel who will carry out the job
- Photographs of the state of the property as of today.

Another of the actions aimed at protecting and conserving historical monuments and sites is granting them a degree of protection, based on criteria related to the values mentioned above.

According to the analysis of our building's history, Casa Don Gaspar Riveros de Vasconcelos, there exists data that reveal its construction to before 1630, this, together with the building typology with the elevated corner, the wooden balcony that stretches on each side of the corner room, the high amount of carpentry, the extensive history of ownership

by important community families, and the fact that the restorations performed in the 1980s after the cyclone were based on previous drawings and pictures of the property contributes to the building possessing the "Degree of protection II".

This Degree of protection II, Law No. 2 chapter VIII, Article 39, states that: Assets whose conservation is subordinated to previous partial alterations and therefore not of an exceptional character, may undergo controlled modifications or adaptations.



Picture 7: Restoration in the 1980s, gallery

## Design premises

We understand "Controlled modifications and adaptation" to mean that we cannot change the overall structure of the floor plans if not based in the history of the house. But that alterations can be made unless they are too invasive.

During the restorations of Casa Don Gaspar Riveros de Vasconcelos in the 1980s the south-eastern corner and the gallery were built new. History also shows that the corner has been a closed room, although it today opens up towards the rooms alongside Calle San Ignacio. And that the separation of the rooms along the facades happened as a result of renting out spaces. This means that the walls separating the rooms along the streets has been put up at a later date and that it might be possible to get approval of altering these spaces by the addition or removing of walls.

We also know that wet spaces, such as bathrooms and kitchen spaces, were added at a later date, rendering it possible to also alter in these regions.

As seen in the section "Patrimonial Value" we have shown and marked all the parts that we are obliged to restore and that we by extension cannot change. The Gallery, "although new" during the 1980s is restored from photographs, and contains most of the building's carpentry and will therefore, most

likely, not be approved for interventions other than restoration, nor the ceilings or the loss of doors on the first floor.

Based on all of these premises, observations made during our visit at the site, conversations with the architect, and the history of the building, we have moved forward into an architectural program to make an intervention project in Casa Don Gaspar Riveros de Vasconcelos.

Throughout our work we have focused on their processes regarding reuse and recycling, and we have tried to demonstrate it in our project, by looking at the building as a material bank as they are forced to do, due to lack of resources. As explained above, this process does not normally happen until the late second phase of a project, (planning) or in the third phase (dismantling) when they know exactly which materials they will be able to reuse. Nevertheless, we have made some suggestions on where in the project we see that this could be done, based on the inspections done before the project design and the examined technical state of the different parts.



## Architectural program

As one of the oldest buildings in Havana, given its location, its important founder and long history, Casa Don Gaspar Riveros de Vasconcelos is undergoing planning for restorations and further use. In line with PEDI 2030 "specializing in promoting creative development" OHCH, managing these restorations, would like to make it into a nucleus for the textile reuse and recycle industry, with workshops, coloring areas, handling and especially administrative offices. They also wish that a part of the house is dedicated to its history. This is common in their restoration projects of significant buildings, and you find many examples of this around Old Havana, giving tourists an important insight to the city's glorious past.

El Quitrin has occupied the building since 1986. As mentioned above, the organisation is dedicated to the teaching of various courses for women mainly focused on hand-knitting-, sewing-, and manual weaving techniques and the rescue of Cuban clothing traditions. The projects goal is to strengthen the link with the community, incorporating theoretical and practical knowledge about current trends for textile recycling into its teaching program. When we spoke to El Quitrin directly during our stay in Havana, we asked them what they would like the program of the restored Casa Don Gaspar Riveros de Vasconcelos to be. They agreed that it is a good

location for textile recycling and workshops, especially as it connects with the building they use today. They want to keep the original floor plan and program partly as it was when they moved in in 1986. On the ground floor, they wish to continue with workshops in combination with a showroom so that people walking by can watch what they are doing inside. A gallery to expose what they are making, and an area where they can sell their products.

However, while they could imagine the ground floor to be dedicated to recycling fabrics, they thought that having a hostel on the first floor could serve them well. Today the first floor is empty, and in a poor state. The concept of having incoming students and teachers come and stay did not work, but as the tourist industry is growing in Havana, having a hostel on the first floor might, especially considering that it is located in the very center of Old Havana. A hostel would also be an income that would allow them to auto-support their organization. The guests could of course also participate in the courses and workshops offered there, as part of a Cuban cultural experience.

In our project, we have chosen to mainly follow the wishes of El Quitrin, creating a hostel on the first floor. However, we have also wanted to comply with OHCH's wish of a part of the building explaining its history. There are a few reasons for this choice, the first being that the buildings of this area are, as

mentioned before, historically of the mixed typology, having commerce on the ground floor and residential functions on the first floor.

Secondly, considering that OHCH through PEDI 2030 expresses a wish to make the whole Calle San Ignacio dedicated to creative industries, we can imagine that they will also dedicate the use of the building between the building El Quitrin occupy today and Casa Don Gaspar Riveros de Vasconcelos to this field. El Quitrin themselves also expressed interest in this building, and we can imagine that they might use it for the administrative part as well as for more workshop spaces. In this way, the ground floor, dedicated to the reuse and recycling of textiles will stretch along the whole ground floor of the street, also connecting to the building they occupy today in Calle Obispo, making this whole block dedicated to textiles and Cuban clothing traditions.

Thirdly, from personal experience it is hard to find hostels in Havana. Finding whole apartments for rent, or even casa particular (where you rent a room in someone's home) is not a problem. However, with the tourist industry growing at its present rate - today's situation with Covid-19 excluded - we can imagine that there will be a need for hostels, as many young tourists wish to live somewhere relatively cheap where they can meet fellow travellers.

The program of the house will therefore be as follows:

### Ground floor:

- Workshop spaces
- Gallery
- Commercial space
- Reception desk
- Museum
- Industrial laundry room

### First floor:

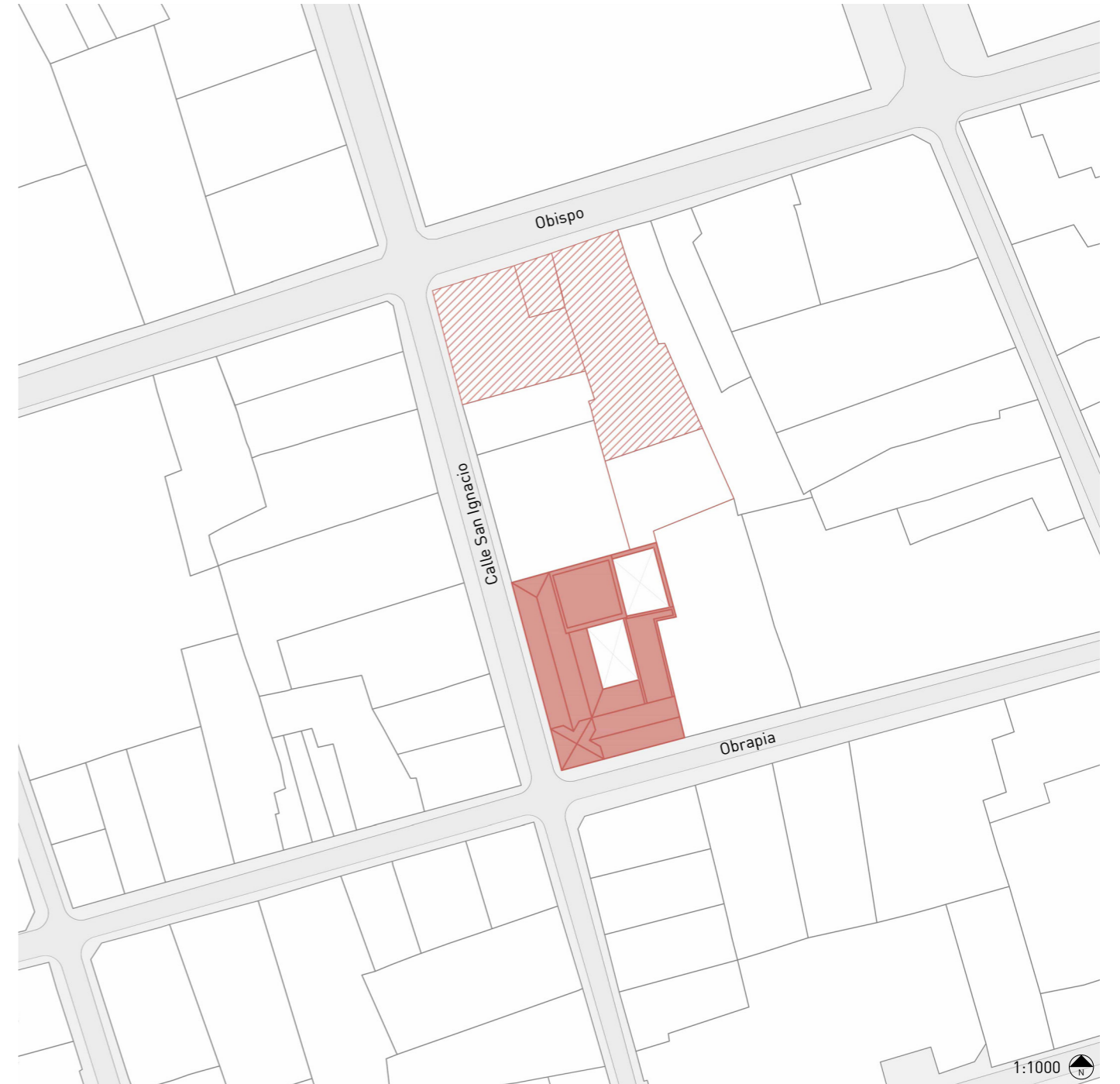
- Hostel
- Dormitories
- Bathrooms,
- Guest kitchen
- Guest laundry room
- Common areas
- Reception.



El Quitrin and Hostel Riveros



Picture 8



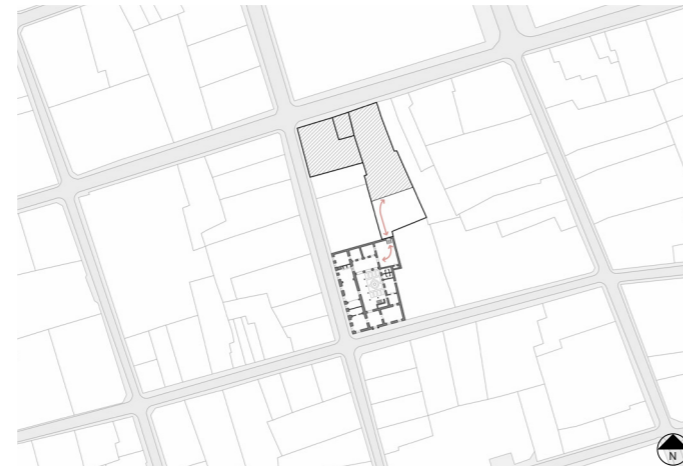


## Current situation

These are the current floor plans of Casa Don Gaspar Riveros de Vasconcelos. The historical main entrance of the building, called a Zaguán (a roofed entryway, especially one leading to the patio or courtyard of a house) lies in Obrapia Street, next to the corner unit. Today both this entrance and its adjacent room along Obrapia is completely closed from the outside. They are not in use due to decay and have become disposal areas. Today they use the multiple entrances along Calle San Ignacio to access the building. The room located farthest north in Calle San Ignacio is currently a small shop. The next rooms are used for meetings and workshops by the Quitrin organization, and the corner is a hair and nail salon only separated from the rest by partition walls. It is apparent that this part of the building has earlier been divided by thick walls into various smaller sections. The room in the corner volume, having doors opening to both streets, was historically intended, and used as a store.

The courtyard in the center of the building can be seen through the complex and had a direct link through the Zaguán that today is lost. This courtyard is, as mentioned in Chapter III, typical for Cuban Colonial architecture. It has a gallery supported by octangular wooden posts crowned by capitals. It is evident from their character that these galleries are among the oldest parts of the building. Unfortunately, as a result of the high degree of deterioration of the wooden construction, the wooden galleries are currently held up by scaffolding. The back gallery (the northern volume), formed by three arches supported by thick Tuscan columns, is more modern. Historically the ground floor of this volume was most likely used for stable purposes accommodating horses and carriages that could enter

through the Zaguán. Today the rooms in this volume are used for storage and the archway as a passageway since it connects to Quitrin's other building through a backyard. The eastern volume is vacant but contains bathrooms.



Moving to the first floor, which historically used to be the residential floor of the proprietors. The corner room stands as its own unit, the floor is elevated, and the roof of this part has four sides, with a visible construction and a central rosette. On its sides, large rooms, similarly roofed, extend along both streets. Early in the building's history these rooms on either side were both open and used as "ballrooms" and party areas for the upper class. But has since then been divided into smaller and smaller areas to fit houses for workers. At the most, during the first half of the 1900s, the building was divided into 27 lodgings and 8 storage rooms. Today the hall along Obrapia is completely open whilst the wing along Calle San Ignacio is divided into multiple rooms. Apart from the bathrooms in these rooms, stemming from the restorations done in the 1980s when the use of the second floor was to be accommodation for, participants of El Qui-

trin's projects, the first floor is completely empty and stands unused. The communications resemble the ones on the ground floor, through the gallery, and the arches of the northern gallery are repeated on this floor.

Seen in the facade drawings, the most significant element of the exterior is the wooden balcony that stretches on each side of the first floor corner room, chamfered on the angle, which contributes to imparting the character of a lookout tower to this volume. The upper supporting beams of the balcony are closed in the front, while the lower ones, shorter, have "cyma recta" moldings. The balusters rest on a board or "guardasayas," (a wider railing designed to protect ladies from pedestrians seeing up their skirts) and were carved in a series of bulbs and rings, archaic forms typical of the seventeenth century.

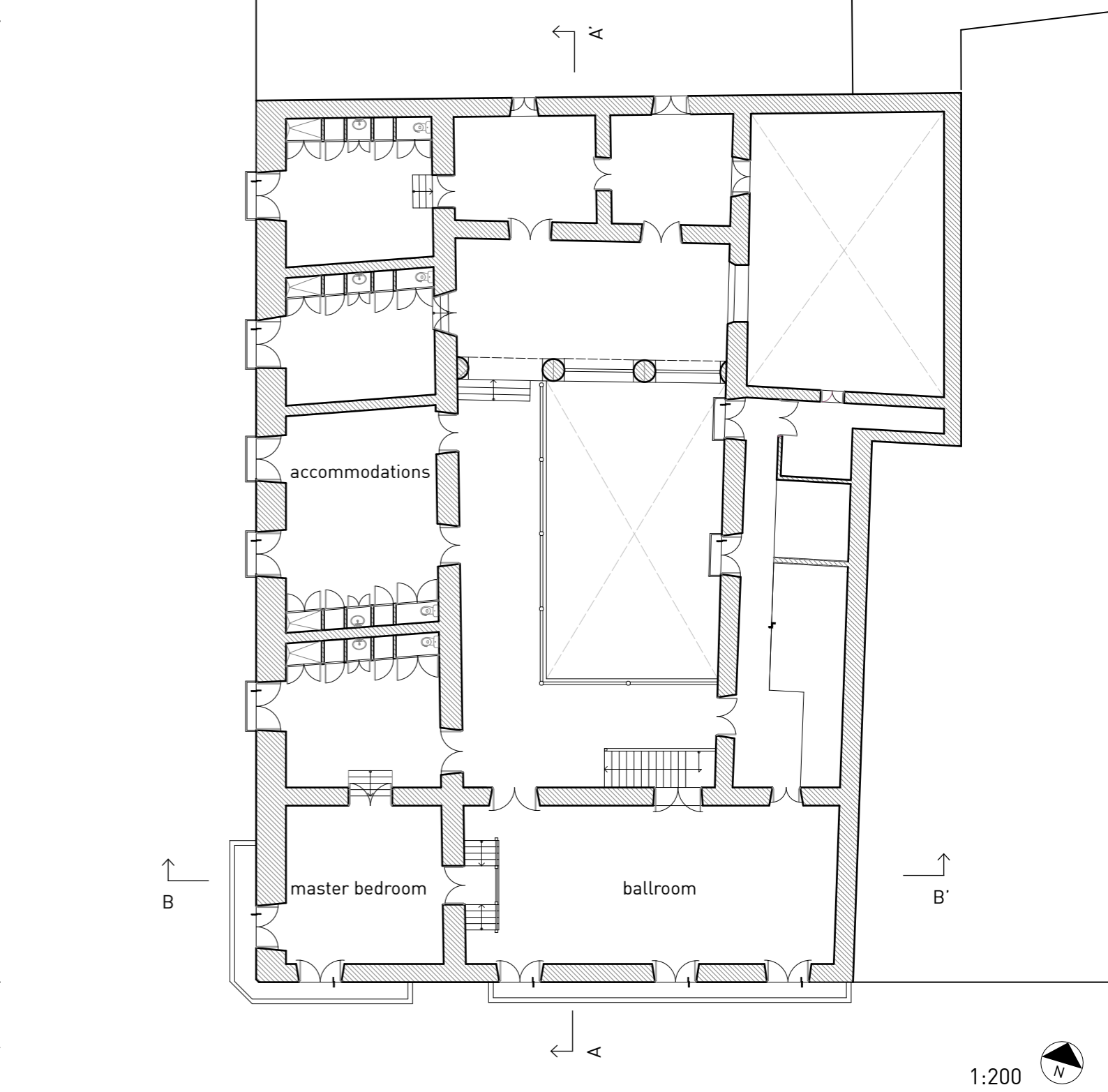
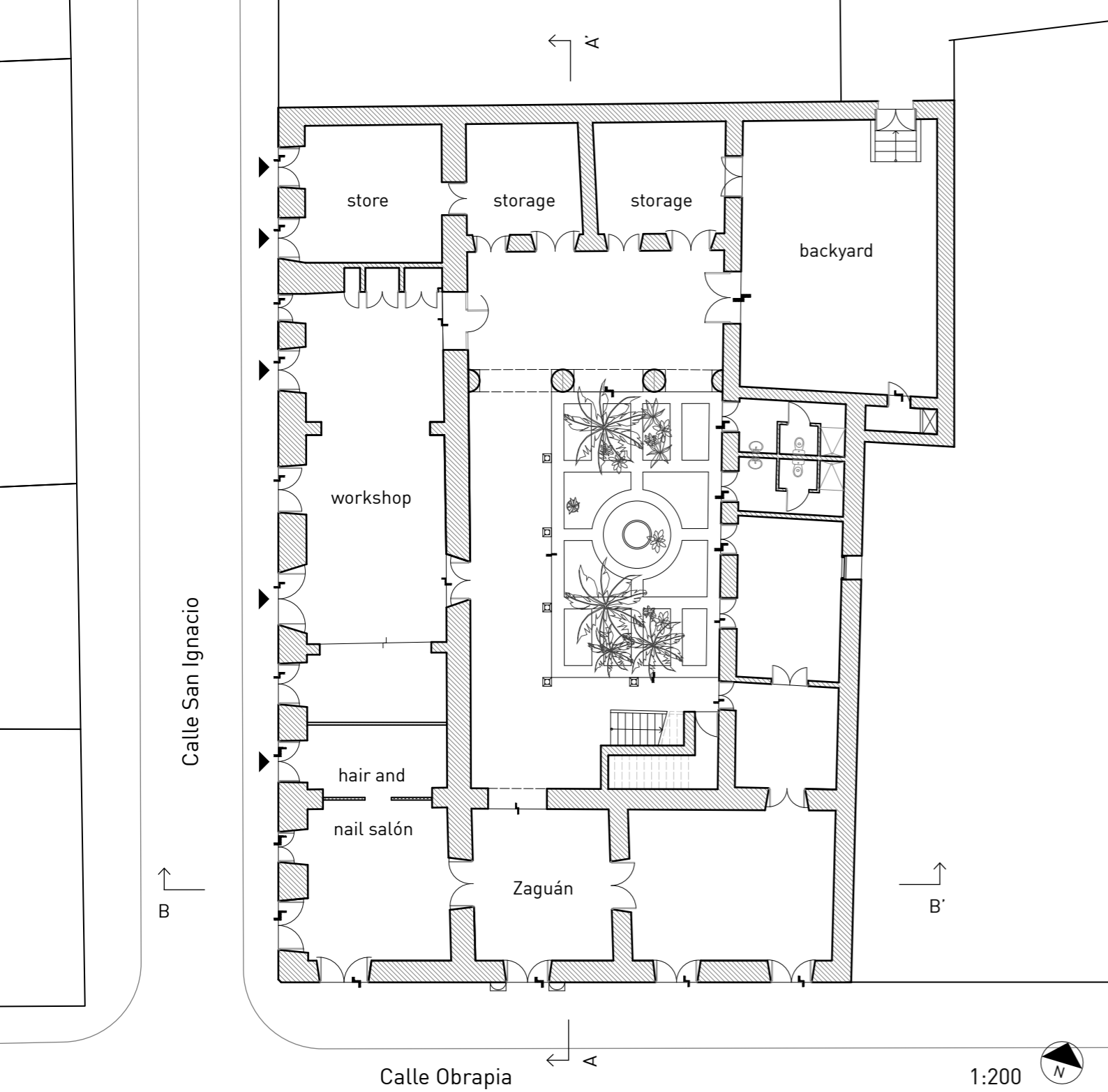
The elevated corner volume was a trait of its day, in our research we discovered that this was done before they were able to create full second floors. Since corners often contained important shops, having an elevated corner would signal this, and would allow them to be seen from far away.

Section A-A': Shows the courtyard in the center of the building. The gallery, used for circulation is shown here. The level dividing the corner room from the rest of the building, and also the union of the building mass in the north with a different level is shown here.

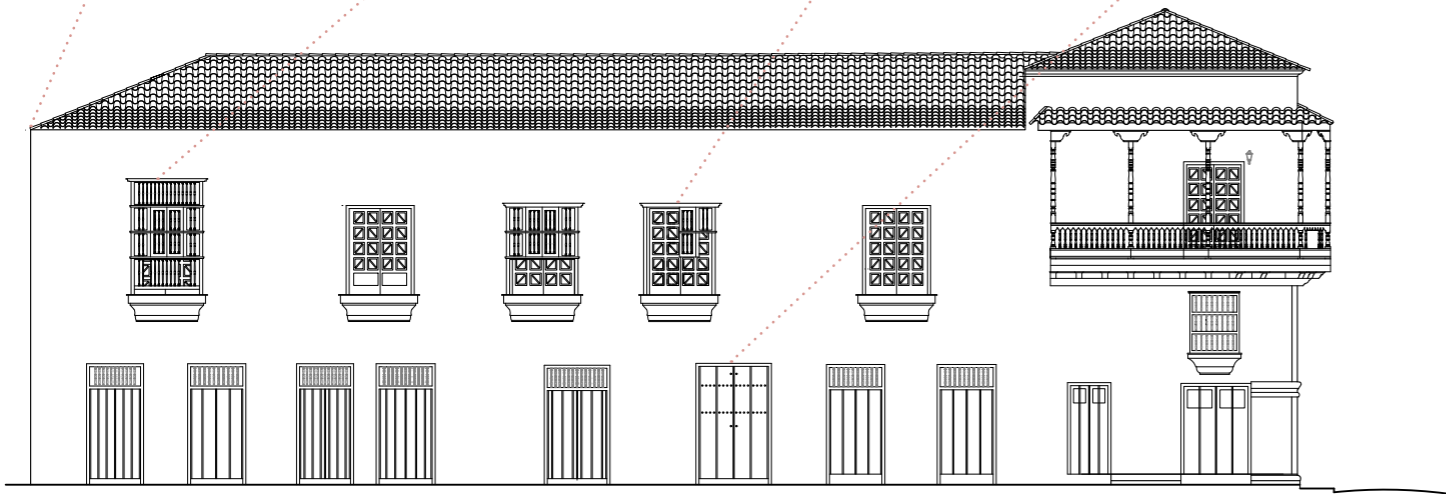
Section B-B': In this section we see how the corner volume is raised, and has different levels of floor and ceiling than the rest of the building. As mentioned, the elevated corner is a historic trait, a staple of the Cuban architecture of the time, usually

with a store in the corner room. These were common during the transition period from buildings of one floor to buildings with two floors. The extra height allowed for a mezzanine, giving the person running the store somewhere to live or it could be used for storage. However having an elevated corner on a two story building like Casa de Don Gaspar Riveros is quite uncommon, and it is the only one of its kind remaining today.

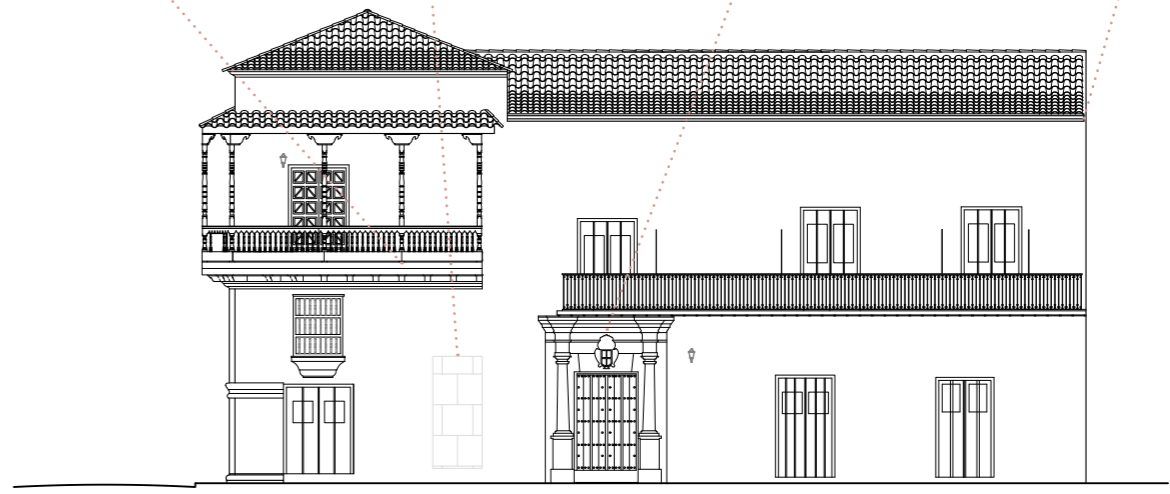
Taking the historical use of the building, its protection degree, the wishes from the client, the technical inspection, its patrimonial value and a Cuban mindset regarding an exploitation of resources into account, we will try to demonstrate how a project might look like and be executed here.



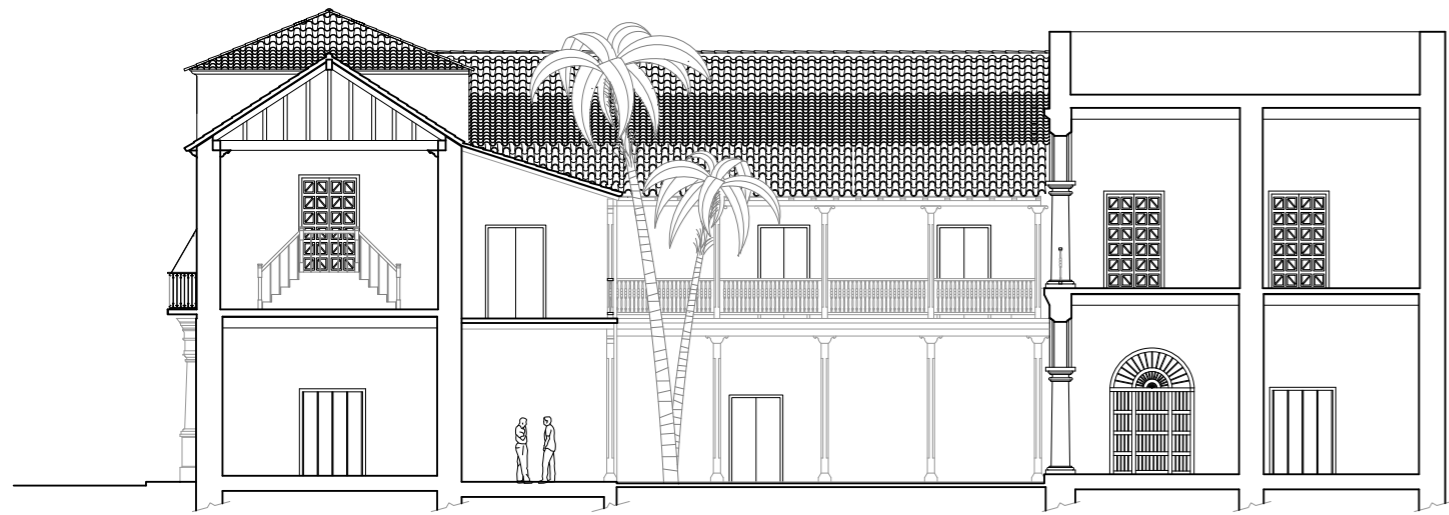




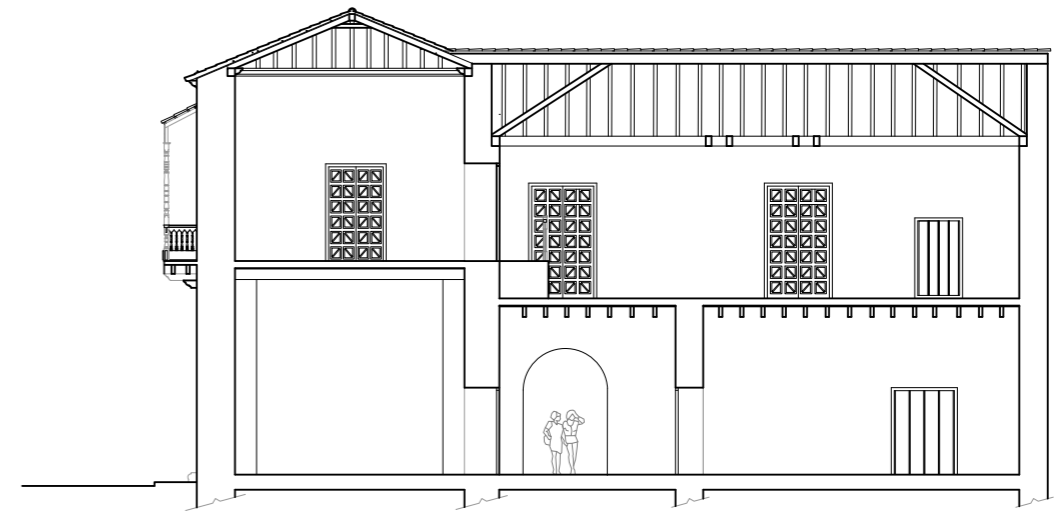
Facade west 1:200



Facade south 1:200



Section A-A' 1:200



Section B-B' 1:200



## El Quitrin and Hostel Riveros

Welcome to the new Casa Don Gaspar Riveros de Vasconcelos!

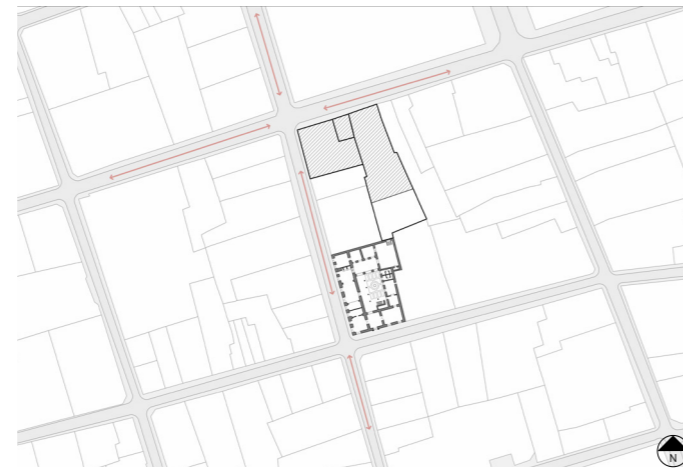
The Zaguán has been restored to its grand splendour. Walking past you will have a direct view into the lush, green courtyard. There will be a small reception in the Zaguán, and the workers at this desk will be the ones greeting the people coming into work, those who wish to see the museum and have a look at the courtyard and also passing the hostel guests on upstairs to the second reception desk.

Because we know that the corner volume historically has held a commercial use (since the 1650s), and because the volume is raised, signaling an important corner, we felt that it was only right to restore its historical function, placing El Quitrin's shop there. Though it cannot be said with certainty that the corner room has had a mezzanine, nor has there been found traces of it on the walls, we have chosen to install one. Given the buildings typology, the corner room's ceiling height, function and the extra set of higher windows, we find it reasonable to assume that there has been a mezzanine there at some point, even if it cannot be seen today.

The western part of the ground floor has been made into a flexible workshop space, that can be separated depending on the activity, while remaining open. This long room is along Calle San Ignacio which is a pedestrian street, connecting two of the four main Plazas; Plaza Vieja and Plaza Catedral, additionally the city's main 'tourist street' is also just one block down, running past Quitrin's other store and workshop area. By returning the shop to the corner, and creating a museum, we might increase the pedestrian traffic going up Calle San Ignacio and out in Obrapia street, by having some-

thing going on also along this axis. The shop is open to the zaguán, that again has a link to the museum dedicated to the building's history open to the public.

The archway with the Tuscan columns in the north has become an office space, and a workshop space/conference room that can be closed. Outside these spaces there is a long table that can be used for meetings, breaks, or other activities in an airy space. Through the archway, as before, there is a connection to the other Quitrin building through the backyard, by using this route you will enter into a shared backyard for the two buildings, where they have a small cafeteria used for socializing and having lunch. The backyard that previously only held the function of circulation between the two properties has been made into a second garden with drying areas, both for the bed linens from the hostel and the textiles they are working with on the ground floor in the laundry room they have in the eastern part, for sorting, washing and colouring recycled textiles. This area also holds bathrooms for the Quitrin workers.



The first floor has been turned into a Hostel, run by El Quitrin themselves. Not only will this give them a business that can help them become auto sufficient, to support their project, but it has allowed us to in some way return the building to the historical mixed use typology, with a 'residential' function on the first floor, typical for the street. The reception is in the main hall located to the left when coming up the stairs, this room holds its historic grandeur of being one big open room. This is also where the small guest kitchen is situated with an accompanied dining area, and where you access the common room, up the stairs, located in the corner overlooking both Calle San Ignacio and Obrapia. The common room can be found in one of the most spectacular rooms in the building, with access to the balcony that runs around the corner and murals on all the inside walls that we have chosen to protect with glass-panels as to preserve them even in a room with a high amount of people passing through. The ceiling with the central rosette also puts a specific atmosphere here. You are literally in touch with history when spending time in this room.

The dormitories are found in the western and northern volumes. The bathrooms have been removed from the rooms, and relocated the eastern one, remodeling what formerly was the kitchen, gathering all the wet functions including a guest laundry room. As for washing of bedlinen and such, we assume El Quitrin will use the laundry room on the ground floor. In this layout the hostel has a capacity of 46 people, providing that all beds are bunk beds. All the rooms are airy with 6 meters under the wooden roofs, and windows from the floor and high up on the wall. These windows were previously doors out to what used to be small individual balconies. Today these windows are covered from the outside with detailed carpentry and the doors can

be opened wide to let in fresh air and light without any risk of falling out onto the street. The height, the windows, and the thick walls together makes the rooms cool, even on hot Cuban summer nights.

Staying at this hostel you will have the option to take courses in traditional Cuban manual weaving and sewing in Quitrin's other property in Calle Obispo, or textile recycling and knitting right downstairs. In the city landscape the hostel has a prime placement in the historic center of Old Havana, being in walking distance to all the main tourist attractions. The lively Cuban street life can be heard and felt all around with music, laughter, kids playing soccer, men yelling "bocadito de helado!" - a mouthful of ice cream, vendors pushing around carriages with vegetables and bicycles filled with flowers, bicitaxis, veteran cars honking at every corner, baskets coming down from balconies to buy today's newspaper, Hola, Buenos días, Qué tal, greetings all around with a smile. The street is an extension of a Cubans living room, and every passerby a guest. Enjoy your stay!

- Workshops & Offices
- Museum
- Zaguán
- Store
- Common areas
- Accomodations
- Bathrooms

Calle San Ignacio

↑ B



Calle Obrapia

← A

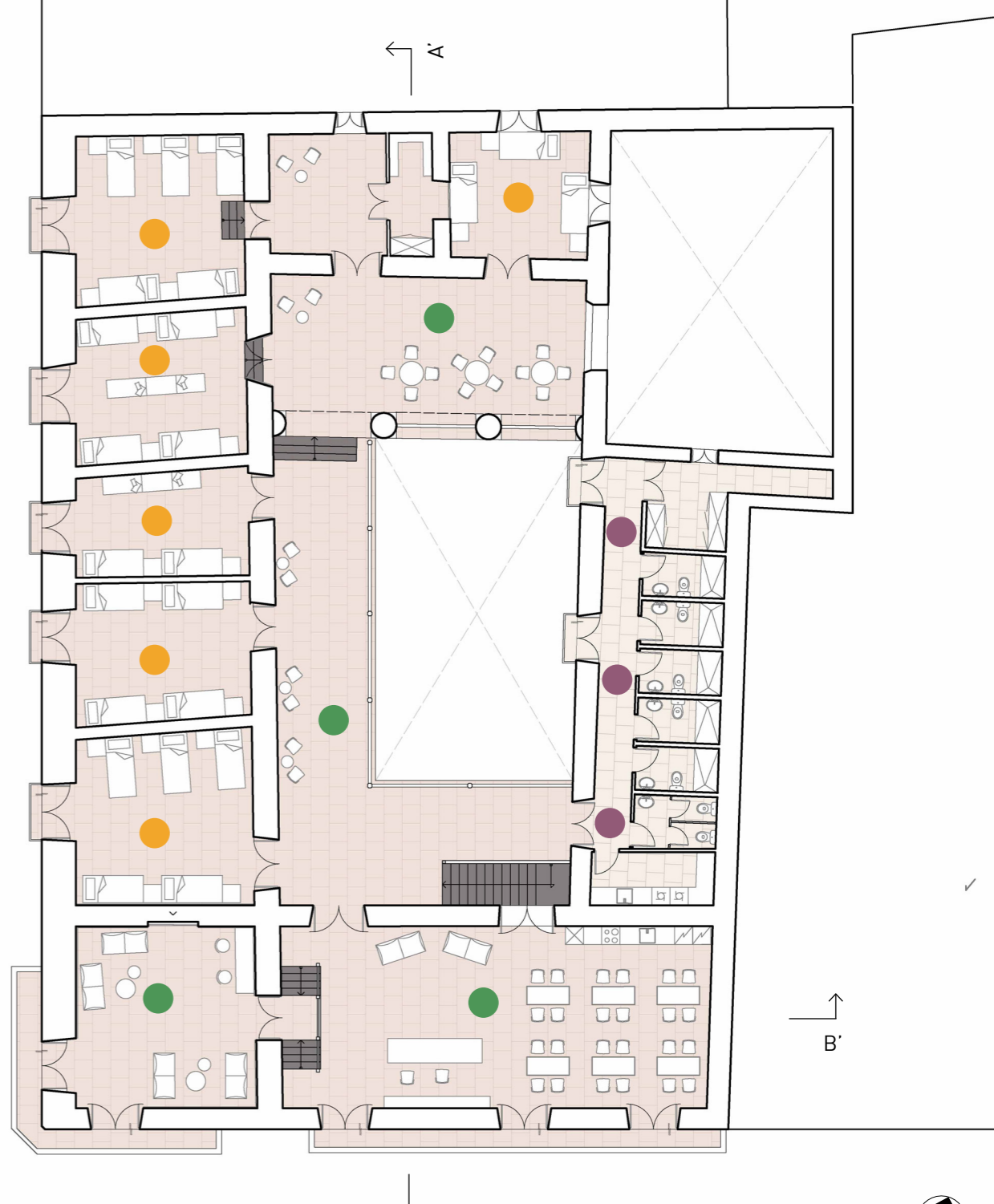
↑ B'

1:200



← A'

↑ B



← A

↑ B'

1:200







Facade west 1:200



Facade south 1:200



Section A-A' 1:200

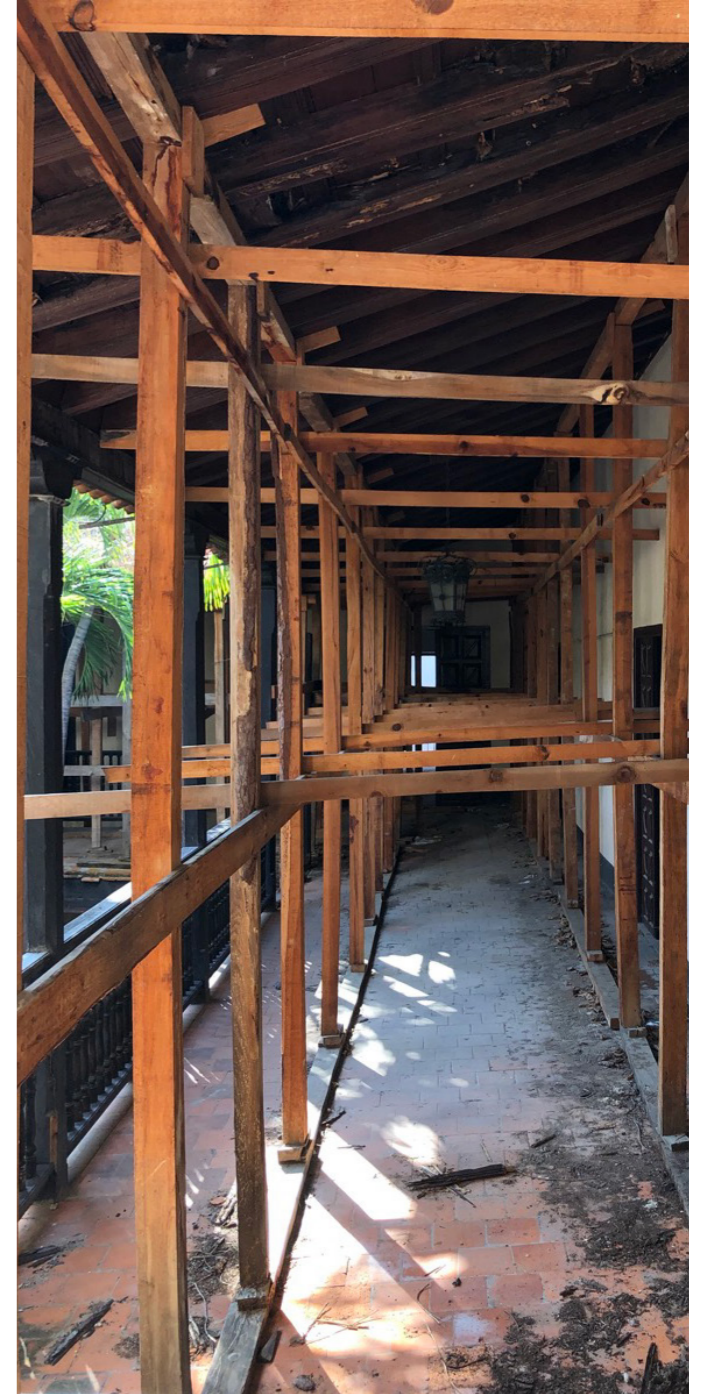


Section B-B' 1:200

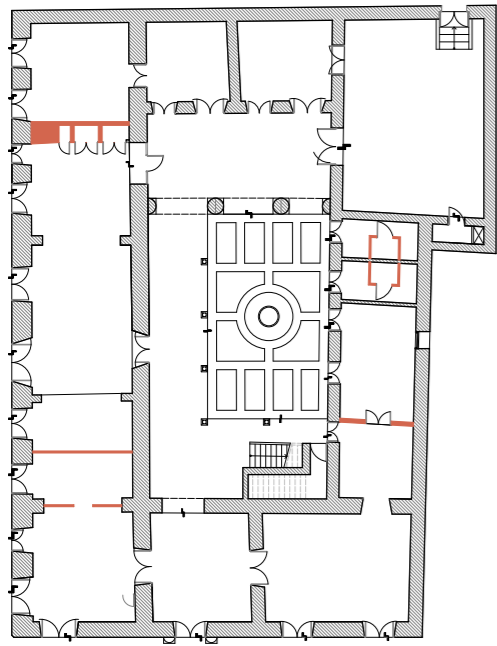


## Interventions and reuse

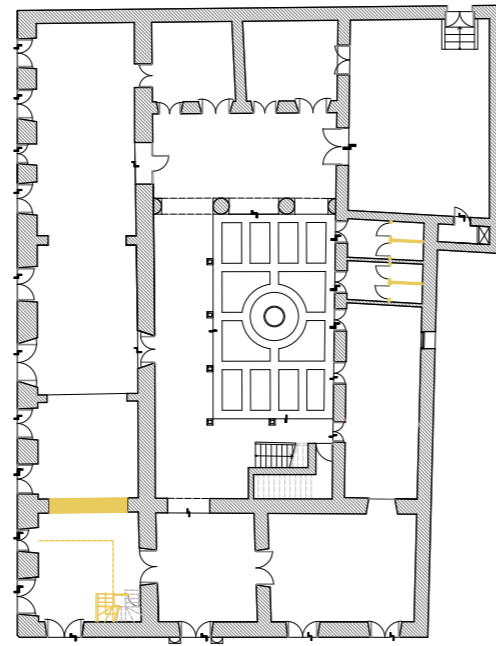
In the following illustrations we will demonstrate the interventions we are doing, and how most of what we are touching is not leaving the building. This includes; walls, tiles, doors, wooden parts, stairs and sanitary equipment. The reuse will not only be to alter the floor plans to the new program, but also to fix some of the damages discovered during the inspection of the building as presented under chapter xx, and to recycle into missing parts.



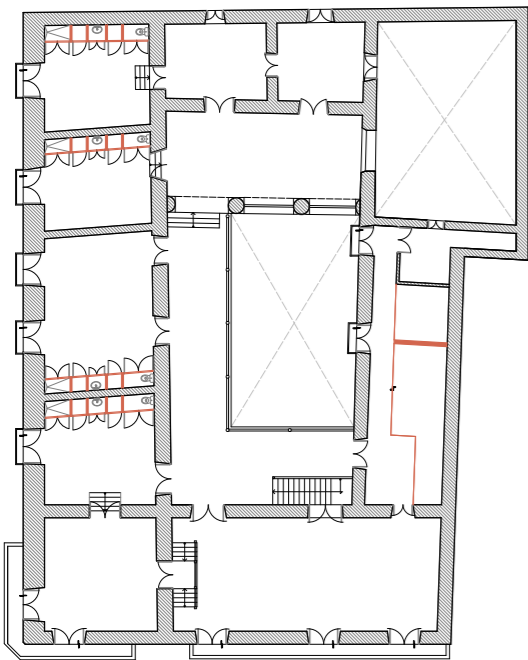




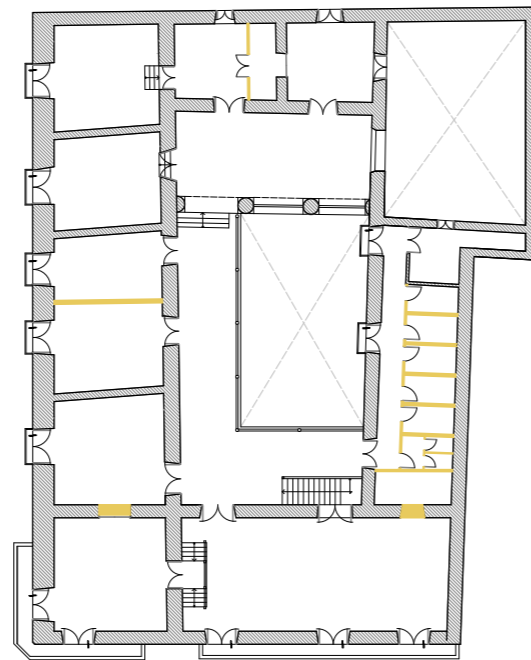
Ground floor



Ground floor



First floor



First floor

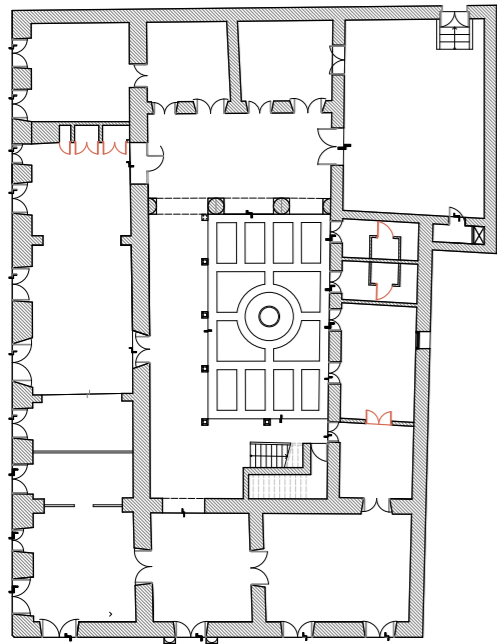


## Walls

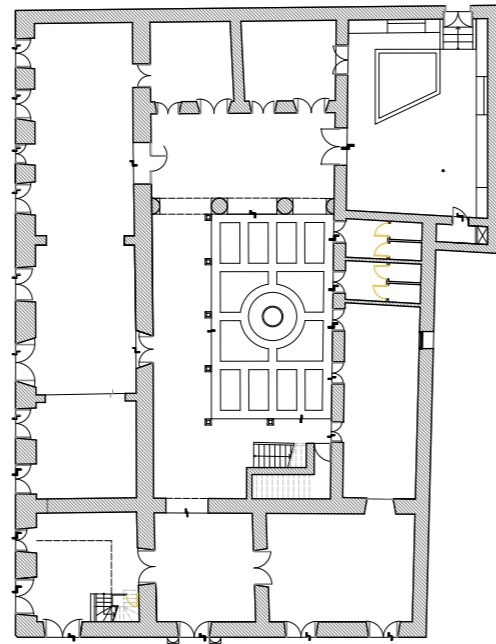
Following the principles of the Cuban project process we stipulate that as much as possible will be reused from the walls we have chosen to remove, when building the new ones. As you can see in the drawings, we plan on removing the wall that today separates the current store from the workshop volume and we are reinstalling the corner room as a store, putting up a permanent wall replacing the partition wall that stands there today. In the eastern part we are redesigning the bathrooms, removing the showers, so that it fits two toilets. The adjacent room is transformed into one big laundry area, by removing a wall between to rooms, as to have space to deal with the washing, sorting, reuse, and colouring when recycling textiles.

On the first floor we remove all the walls used to make bathrooms in the rooms along Calle San Ignacio, and the eastern part is completely remodeled into areas containing wet functions. Taking advantage of the fact that one of the bigger rooms along Calle San Ignacio had two doors, we put up an extra wall, separating it into two rooms. The corner room on this floor will be a common area, we have chosen to fill in the doorway in the wall separating it from the adjacent dormitory to avoid disturbing noise when the common room is in use. In the southern part we have also chosen to fill in a doorway, separating the wet functions from the common area containing a guest kitchen, eating area, and a reception. We also add a thin wall in the room adjacent to the northernmost room along Calle San Ignacio, creating storage room for the Hostels bed linens and other supplies.

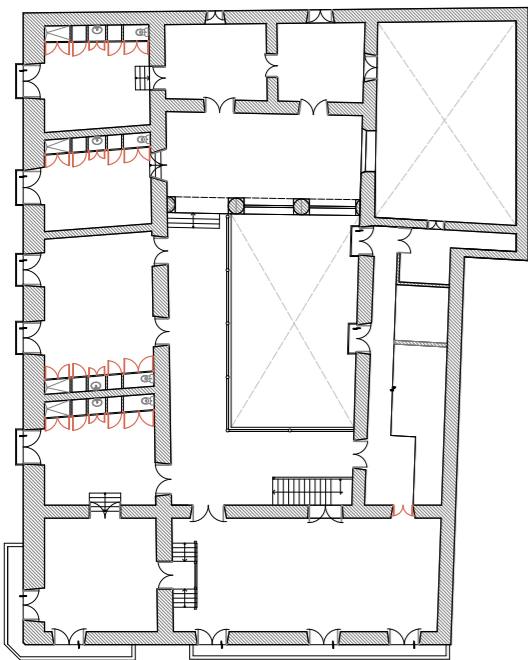




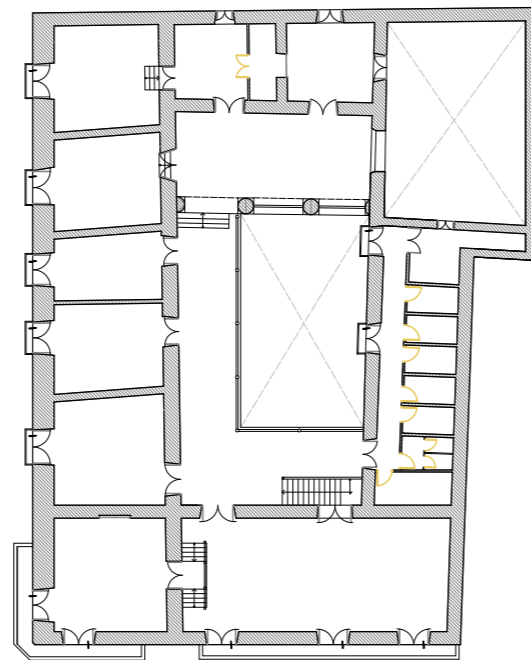
Ground floor



Ground floor



First floor



First floor

## Doors

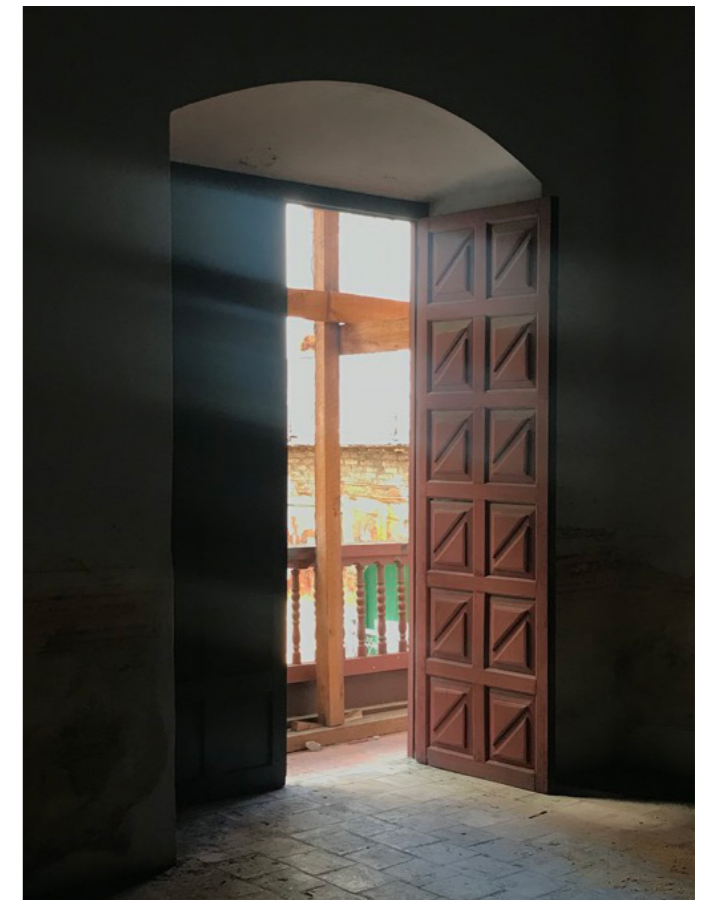
As shown in the drawings of the added walls, we are filling in two doorways, making them part of the wall. The first being the doorway on the first floor, between the common corner room and the adjacent dormitory. Because of its patrimonial value we have left the door in its place, so that it is still visible inside the corner room. This allows the corner room to stay as historically intact as possible, and also makes it possible to keep the doorway intact, should a future intervention need to reopen the connection. The second doorway we have filled in is the one between the eastern and southern part, in front of which we have placed the kitchen. This part of the building was, as mentioned above, reconstructed after a hurricane in the 80's, and it is therefore easier to get changes approved. As the door is not of the ones with patrimonial value, we have also chosen to not leave it in its place. However, it can be used as the door into the storage area we add in the northern part of the building as it will match the other wooden elements on the first floor.

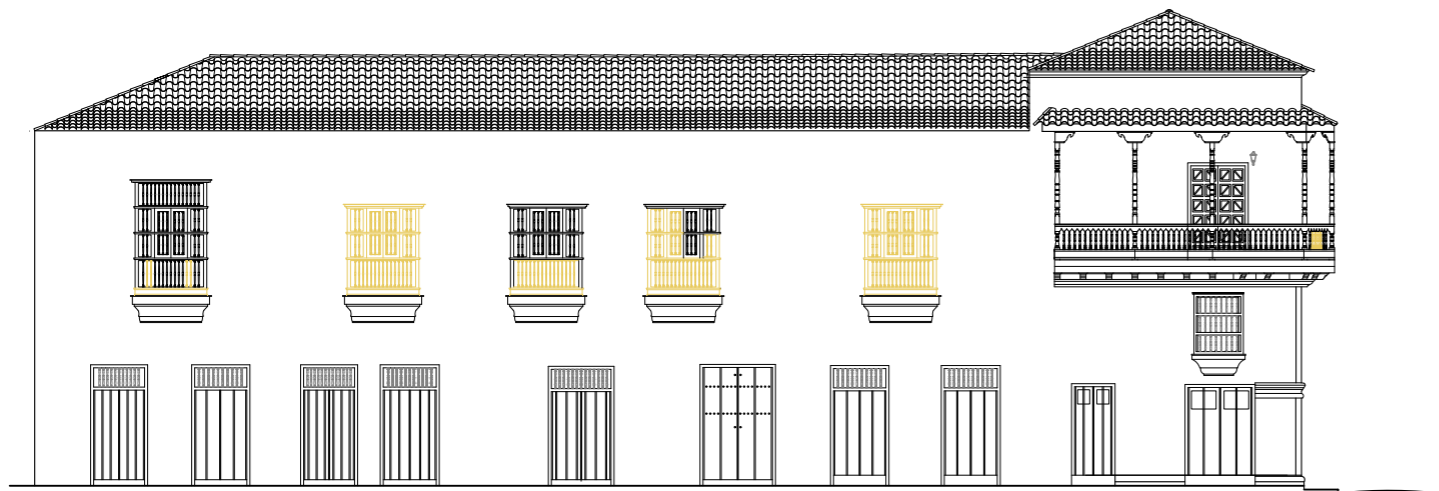
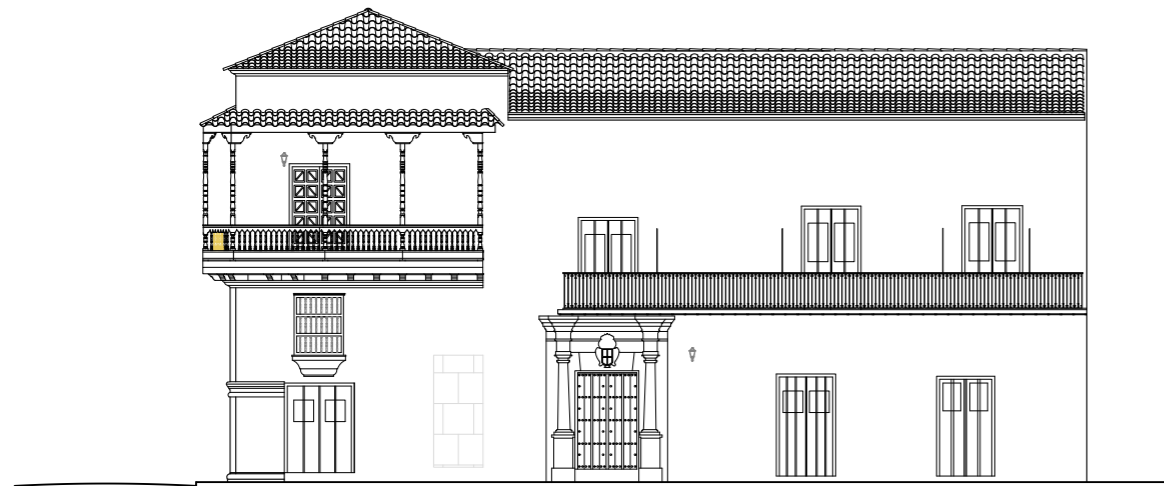
On the ground floor we have chosen to close the door connecting the museum to the laundry area, without filling in the doorway. This is done to leave it as a possible access point if it should be necessary to have a closer link to the area behind, or if the laundry area is not needed in the future, the room can be divided and still be connected to the southern volume.

As for the rest of the doors it should be possible to directly reuse or alter the ones we take out to use again where we need them in the new program. According to our plans for the building, we will need 15 doors, where one is double. Following our intervention, we have 27 old doors, whereof 16 double,

that can be repurposed. And since the quantity of the available doors are higher than the needed, the rest could be used in other projects, or repurposed for other needed parts in the building.

All the doors in the building are made of wood. Especially those on the ground floors are showing signs of some water damage. We suggest that all the doors in the building are being taken down and sanded down, treated and painted before being put back up as to prolong the life of each door.

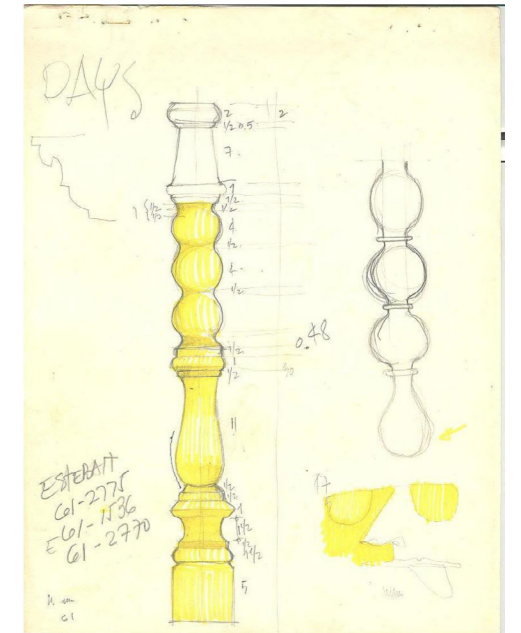




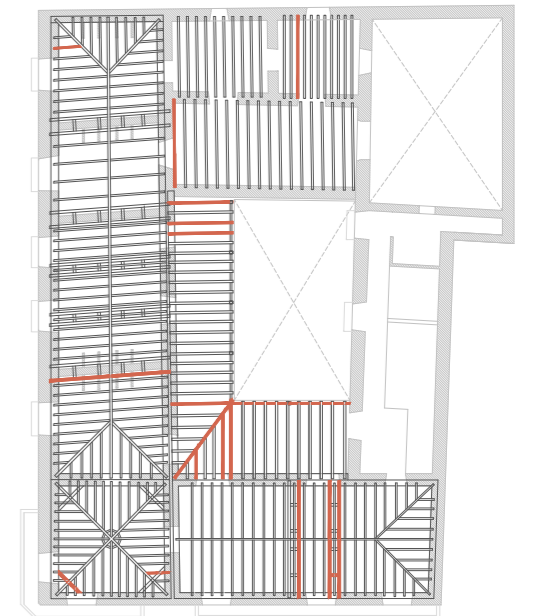
## Wood

The facades are under protection by UNESCO, and we have not made any alterations, but rather brought them back to how they were after the renovations in the 80's. Through historic research we have seen that the balcony facing Obrapia earlier has been divided in two, one above the Zaguán, and one above the two other doors. However as this part was rebuilt in the 80's and they got the intervention approved at the time, we have chosen to keep it as it is, both because it provides a continuous balcony for the common room, and because the technical state of this balcony is relatively good and easier to fix than to change. Much of the carpentry in front of the first floor windows, some balcony balustrades and other balcony woodwork have to be replaced or reconstructed. Fortunately, not all the missing pieces are gone, rather they have been stored in the rooms on the first floor. If in a good state these carpentry pieces will of course be restored to their place, but the rest will have to be made new. Because many of these were reconstructed during the renovations in the 80's, technical drawings on how the different carpentry parts were reconstructed can be found in the archives at RESTAURA.

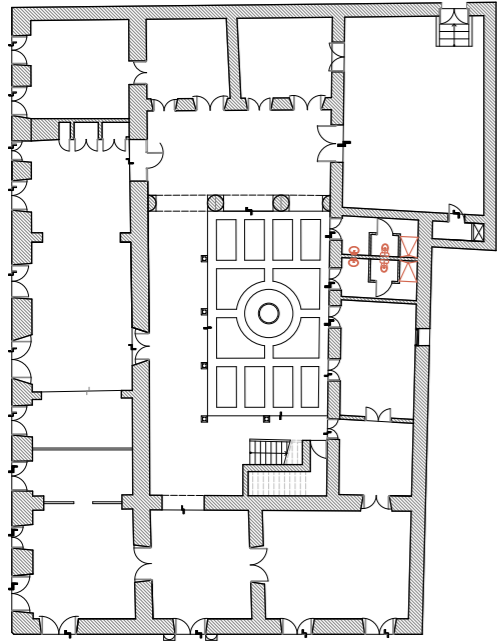
As seen in the section 'Technical state', a selection of the roof's beams, both in the main building and the gallery are damaged. This also goes for some of the columns of the gallery. These massive wooden elements have damages on their ends, but the middle parts can still be used. Unless they can be reused as shorter beams in different projects, we postulate that much of the decorative carpentry will be possible to make from these spare parts. The only needed new woodwork might thus be the big constructive pieces marked in the illustration of the roof, two pieces for the balcony, and two columns on both floors in the gallery.



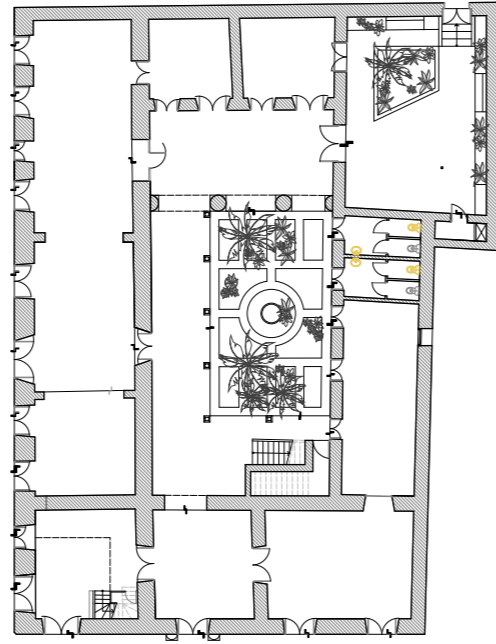
Picture 9: Carpentry details



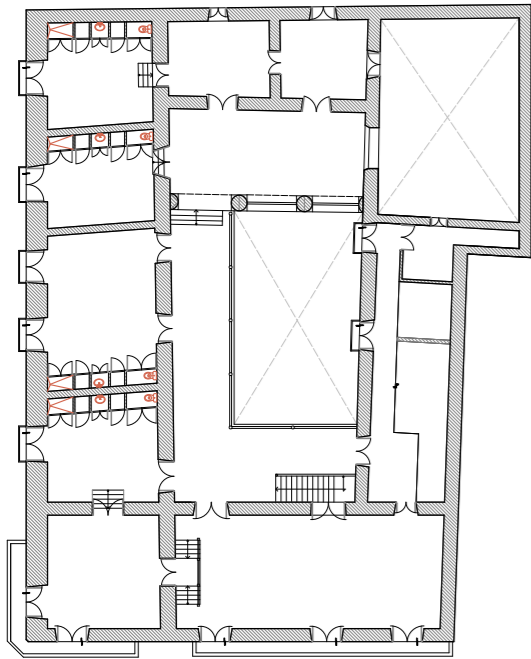




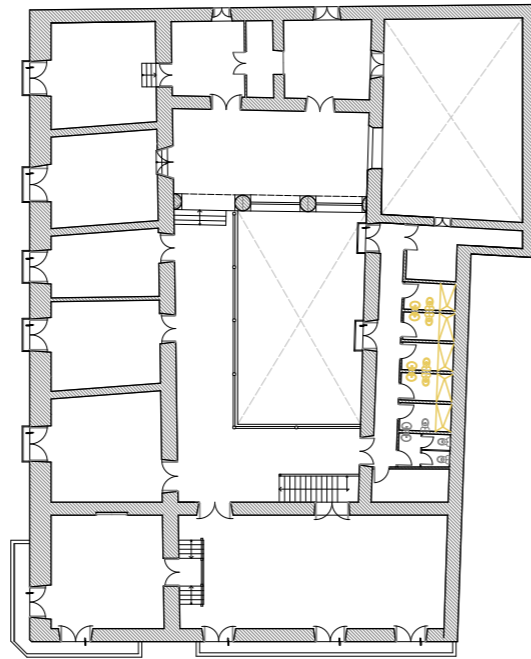
Ground floor



Ground floor



First floor



First floor



### Sanitary equipment

Assuming they are in good state, we have planned on reusing all the sanitary equipment, and will only need to further acquire five toilets and two bathroom sinks. There will also be an extra shower, that can be donated to another project, or used in a different way in one of the laundry areas.

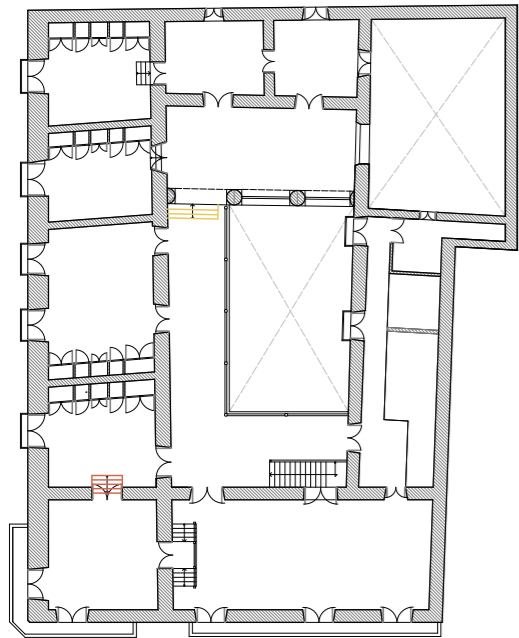


### Tiles

When removing the bathrooms in the rooms along Calle san Ignacio it should be taken great care as to remove them in such a way that the stone tiles on both the walls and the floors can be reused in the new bathrooms. This also applies to the eastern part as this whole room is covered in yellow glazed tiles.







First floor



## Stairs

The stairs coming down from the corner room into the adjacent room along Calle San Ignacio is no longer needed since we are closing up the doorway. The staircase in the gallery on the first floor, leading up to the northern volume, is experiencing a high degree of decay, and the stones from the stair we take away will be used to fix the one in the gallery. We will also need a new staircase in the corner store, since we are putting in a mezzanine. We hope that it can acquire steel from other building sites to build these stairs, since steel is one of the materials they most often reuse in construction sites. Otherwise steel is a material that they produce on the island, and can thus be acquired locally.

## Murals

The corner room has historical murals on every wall, that can be seen when the outer layer of the mortar is scraped away. In the adjacent room these murals can also be seen on either side of the staircase, and when we will fill in this wall we suggest that the restoration of the murals in this room will continue also over the wall section that we put in. In the northern part, the rooms behind the Tuscan columns have murals in all the head jambs of the windows and doors. All murals will be restored given the patrimonial value that they hold, presumably dated back to the beginning of this buildings life, although most likely altered during time, the placement is still the same, and now a restoration based on parts of what can be found behind the mortar will be carried out. To minimize future damage of these murals, we suggest that they are protected behind a mounted sheet of (plexi)glass.







## CHAPTER V - INTERTWINING

### Recap, Cuba

Cuba, a country run on fewer resources and a society without a consumer luxury. Nevertheless, as we have seen throughout our studies, Cubans still get things done. They might not have the access to the exact thing that they need to do, alter or fix something, but they have a vast creativity as for what can be used instead. Every piece of equipment has multiple uses in their minds, and because of this they have also been able to get by on fewer resources. Although we bet the average Cuban would love to have a higher consumption and access to newer technology, the economy as it is today does not support that. Those working within the tourism industry, unfortunately also highly educated people within other sectors, do stand stronger economically, but the country in general, because of the blockade both by the U.S and the state itself, does not make it easy even for the economically strong Cuban to consume excessively.

Cuba is the only country in the world that meets the criteria for SD set forth by WWF. High HDI and a low ecological footprint, resulting in a good SDI score. And as we can see in figure XX, Norway and Cuba had similar SDI scores in the 1990s, but since then Norway has had a huge rise in its ecological footprint, while Cuba has had a slight decrease, resulting in quite the difference in relation to the sustainable development over the last twenty years. While Cuba in the 1990s lost the Soviet subsidies and the U.S. blockade continued to hold strong, suffocat-

ing the Cuban economy, they figured out how to run the country on fewer resources Norway's story has roots a little further back, in the beginning of the 1900s Norwegians were fishermen, loggers and farmers, whereas today they work in services, with technology. In 1969 the oil was discovered and carefully exploited and by the 1990s, Norway had paid off its foreign debt and started accumulating a sovereign wealth fund. This can shed some light on the fast drop in the SDI index we see in figure XX. The Norwegian people had a rise not just in the government capital, but also in the private one, and the consumer mentality started to overshadow the previously careful one rooted in the collector community from the early 1900s.<sup>41</sup>

This SDI score implicates that there is a difference in how the Cuban community is organized compared to our own. The Cuban building sector, in Old Havana, is run through OHCH and the Investment Directorate. Due to the state monopoly where only the government can import goods, the economy on the island, the blockade and the fact that every project in town needs to go through the Investment Directorate, has made it both possible and necessary for them to operate within a circular economy approach.



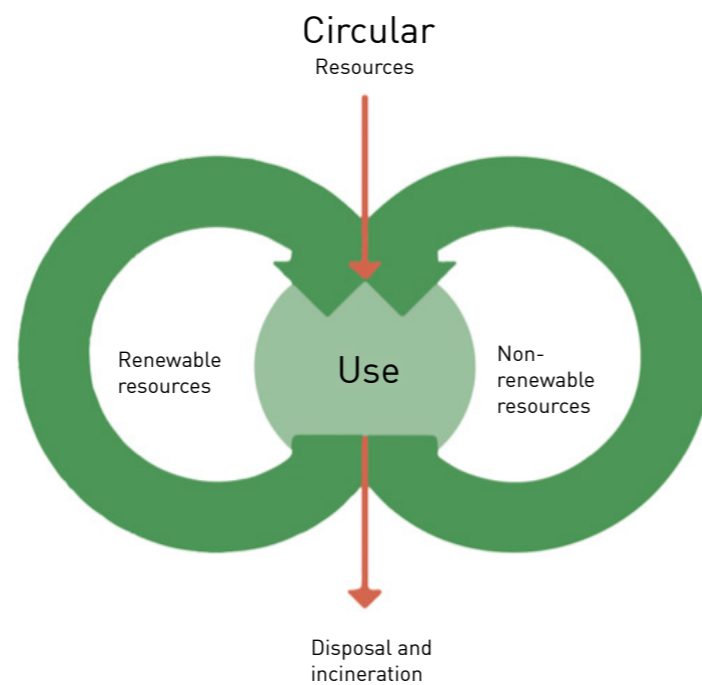
Figure 7: SDI-scores for Norway and Cuba since 1990



A circular economy is an economic system of closed loops in which raw materials, components and products lose their value as little as possible. This means that circular economy is wholly dependent on using as few materials as possible, where the purpose is to prevent waste. Resources are being processed within the reduce-reuse-recycle mentality, where the fewer processing steps a material has to go through the higher the quality of the material.<sup>42</sup> The logic behind it is that the use of resources should be minimized (reduced), the reuse of a product and its parts should be maximized (reuse) and the raw materials are being reused to a higher standard (recycle). In the end, the circular economy is more profitable and less harmless to the environment, obtained by sustainable economic growth, increased competitiveness and new jobs. To get there it is crucial to have a joint effort between society, government, entrepreneurs, lawmakers etc. and innovation within the different sectors contributing to the no waste goal and the processing of resources.<sup>43</sup>

As we have seen during our research Cubans are not only very knowledgeable, they are good at applying and sharing knowledge where it is needed. The elaborate process they have before designing a project, getting to know every inch of the building in question, is a method they use to have a better view on what needs to be done and how this might be done early in the project, so that when the project is presented at the Investment Directorate, thoughts

and solutions on how to start work on the building is already in place, but not set in stone, to give the constructor and the craftsmen a chance to provide their input on what might be the best solution. Knowledge where knowledge has value. We believe this inclusion is incredibly important, and very valuable to a project because it allows for a better design and might even lead to a more efficient building process as they possess knowledge architects do not. This can result in the building process taking less time and resources, as the techniques and solutions can be optimized, avoiding last minute changes and emergency solutions.



The circular approach in Cuba, is rooted in a weakened economy and thus also access to physical resources in the building sector. This has led to the fact that they have a forced reduced resource usage, which had led them to maximize their reuse. Additionally they have a capability of innovative rethinking when it comes to recycling parts that can't be used for their original purpose, which is the Cuban mentality. These are some of the fundamental stones of the circular economy.

It is rare to start a project on an empty site in Old Havana, usually they deal with an already existing

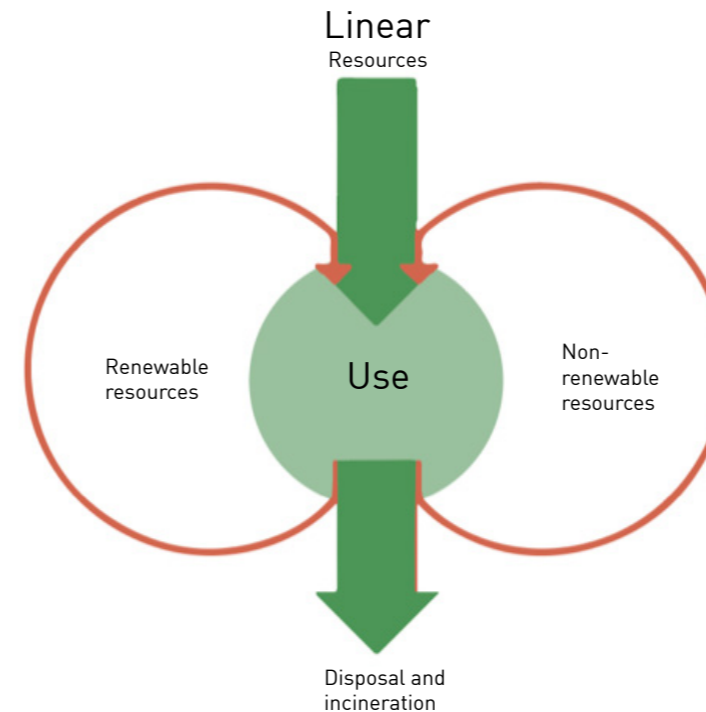


Figure 8: Circular and linear approach

building in various degrees of decay. After a project is finalized in the collaboration between the Investment Directorate the architect, the constructor and the craftsmen, the list of needed materials are set in this order: How much can be reused from the original building? What can be bought locally? And finally, what needs to be bought from abroad? They do not demolish, they dismantle, to be able to reuse as much as possible, usually storing the materials right on the building site. This reduces the amount of resources needed, because the dismantling process leads to reuse and innovative recycling, leaving as little waste as possible, and thus closing the loop.

#### What about Norway?

Unlike the Cuban economy, the Norwegian economy is based on a linear system. This system has roots back to the industrial revolution. Because our economic resources as well as our access to material resources are so high our economy has not had to make the adjustments we see in Cuba, and we have, like the rest of Europe, had a "take-make-dispose" approach. This means that raw materials are extracted, processed, used, and then discarded. This is also known as a "cradle to grave" principle, whereas the circular economy is based on a "cradle to cradle" principle.

As opposed to the circular system, a linear system creates value in quantity, rather than quality. In other words, value is created by producing and selling

as many units as possible. While this has served us well in an economic view, basing production on raw material extraction is disadvantageous in multiple ways. Of course, there is the ecological component, as production, transport and waste all have an impact on the environment. There are also economic disadvantages as we do not have an infinite amount of raw materials, for example the increase in price of raw materials, the fact that some sectors heavily rely on limited materials, and the interdependence of some countries to buy materials they need through selling others.<sup>44</sup>

Because value is created by producing and selling as many units as possible, a company will want to limit the lifespan of their product, so that consumers must buy it again. This feeds into a consumer mentality, where the products lifespan is decreasing because consumers want new products faster, meaning the quality of the product can decrease as it does not need to last for a long time anyway.

Around the same time as the cement-based mortar got popular (1950), we saw an industrialisation in the production of building components as well. Materials got cheaper, the building methods got more efficient, with lower demands to a building's lifespan. This led to reuse and recycling becoming less important throughout the sector, although it up until this point had been common to reuse e.g. beams, roof structures, windows, doors etc to lower the costs of a building project in the Norwegian

practice.<sup>45</sup>

This linear mentality is still demonstrated in this way in the building industry, where we unfortunately see many developers who build only to have the largest possible profit per m<sup>2</sup>, regardless of how they do so. The goal it seems, is to build for as little as possible, as fast as possible, sometimes seemingly only relying on the mere novelty of the project for it to sell. This does not only often result in poor architecture, it also results in buildings with relatively short life spans. In Norway this has caused the building industry alone to contribute 2 million metric tons of waste every year, and assuming an growing population, this number will only increase in the future if nothing is done.

A linear economy is based on a world with infinite access to resources. Today we know better. Because the building industry is already responsible for almost 40% of climate gas emissions we cannot continue down this path. However, as the world becomes increasingly aware of our effect on the environment, we are searching for solutions. In a linear system this usually means that we will produce new solutions, decreasing the impact on the environment, while wanting to maintain the same, or increase the output we have today. This may reduce the impact on the environment, however, it will not necessarily eliminate it nor have a positive effect on it.

Although gaining popularity in the last few years, the reduce-reuse-recycle mentality is complicated in a linear system because laws and regulations are made to fit the linear system and encourage linear use and behaviour.

#### *A lo Cubano*

The Cuban system has components that we could incorporate in our own practice to move into a more sustainable way of building. There are multiple aspects of their system, community and government that puts down some ground rules for them that makes it both necessary and possible, but what they have done within the perimeters set down before them shows how they have adapted and made the most out of the system that they are working in. Throughout this document, we have presented methods and processes they use when conducting a project, with a great emphasis on the city's and the building's memory. Some might think that this process is a bit excessive, but we believe that by getting to know the building and its urban context, and by having a focus on preserving and reusing its components instead of demolishing and building new, it enhances both social and environmental aspects.

When the memory of a building is maintained, the city's distinctive character is as well, not conforming to international architecture, preserving and using history in a modern way. The premises are different in Old Havana, given that the city is under





UNESCO cultural protection, but cities and villages in Norway also contain architecture with historic value albeit not under an official protection, does not mean that it is not worthy of it. By restoring a historic building, you also restore and keep a cultural heritage in the society and urban fabric. The urban fabric is understood and put into a mental map by its users, and this map is created based on memories.<sup>46</sup> By demolishing and building new, this understanding dissolves, building by building. Are we lowering the quality of our built environment instead of enhancing it?

By working under the philosophy of an adaptive reuse of our built environment, acknowledging that a building's function is no longer sufficient or needed, but still contains qualities usable for whatever the current situation demands, requires innovative thinking and transformation. In the end, the "new" building, emerging from the old, will still have qualities, shapes and contents that keeps part of the history, and the urban mapping is retained. Maybe this makes us feel like we know our city better? And by knowing something, we also feel more secure?

Since Cuba has been forced to operate under this philosophy, adaptive reuse with an emphasis on history because of the UNESCO protection, together with their lack of access to resources, has made them well equipped at innovative thinking. Where we in Norway, because of our economy and easy

access to anything we need in the industry, whenever we need it, may have stifled this creativity, when in reality we have a tremendous opportunity to create exceptional solutions. Imagine having a Cuban mindset with the Norwegian access to resources, especially regarding rethinking and reusing building components with access to machinery and sustainable energy, and still with the mindset of keeping a building's memory. What if we here in Norway, during a building process restricted ourselves, imagining we do not have access to anything coming from a store or a factory but only from the building site in question or other building sites in the area. Would we be able to adapt? And make good projects on a sustainable resource access? How would it affect our design process and our projects?

In Cuba, they themselves say that the reuse percentage is low at 10%, how much higher could they get it, if the buildings in question for planning was not in such a high degree of decay? And what if, additionally, they had the resources we do here, by how much would they be able to augment their percentage of recycling and reuse?

What we have seen in Cuba, regarding their emphasis on the history of a building, and how they work with changing the program while still reusing as much as possible, collaborating with all the contributors to a project, discussing details and solutions, has impressed us. However, they have



little room for changing a design during the building process, which is one of the weaknesses we discovered. We are wondering if the dismantling should be taken into account at an earlier stage of the design process. This could help avoid discoveries at the site, regarding what materials will actually be usable, during the building process, causing changes or better options to the planned solutions which they now might not be able to perform. The collaboration between all the contributors to a project is however something we stipulate would boost our own design processes. Especially when we are moving into a more circular approach in our building sector.

The last few years in Cuba, Raúl Castro has made it easier for some industries and businesses to operate privately, this is happening within the artisan sectors, including, but not limited to: carpentry, restorers, iron workshops etc. This means that the workers can get a salary outside off the state payroll and thus have a different economic capacity. The issue still lies in the access to the materials, because of the state monopoly, private actors cannot buy materials from abroad and are forced to use local resources. Although beneficial in the lines of circular economy how different would the situation be, and how much higher consumption would there be if also the private actors could order from abroad?

Given that all projects within the area needs to

run through the Investment Directorate, these are naturally also the biggest employer of artisan workforce, although when rented in through the Investment Directorate they still get the government salary. What if they were able to determine their own prize for the work that they perform also for the state? Is this maybe one of the reasons why craftsmen are not commonly used early in the projects in Norway, because the price would be too high? Wouldn't the money spent on craftsmen in the planning process be compensated for the time and cost spent on emergency solutions at the construction site?

#### Embodied possibilities

While arguments for adaptive reuse can be seen in relation to preserving historical value, it does also have a direct link to lowering the CO<sub>2</sub> emissions within the building sector. It has to be understood and appreciated that tearing down a building only to replace it with a new one is a mere waste of CO<sub>2</sub>. First of all because the CO<sub>2</sub> embodied in the building is discarded. Secondly because the waste produced by the demolition needs to be handled in some way, often in processes emitting even more CO<sub>2</sub>, or at the very least in transportation. Finally adding all the carbon dioxide emitted in the process of producing the new building.

Although reusing or transforming a whole building might be the most environmentally friendly option, there are technical regards to take into account

when deciding to do so. Not all buildings have the technical properties required to be used as a whole. Some buildings have reached the end of their technical life and need to be taken out of the building stock. However, instead of tearing them down, it is in many cases possible to disassemble them in a less intrusive way, to take use of parts of the building, giving them new life, and in this way not waste all of their embodied carbon. This is the practice we have observed in Old Havana, and that we wish to see more of here in Norway.

Although we have a practice where we have started to lower the emissions from building operations, the embodied carbon emissions become more important to reach climate goals. We already sit on an enormous bank of embodied carbon in the buildings currently surrounding us. Only 8.6% of the world's construction materials and resources remain in circulation today, this means that 91% of the resources are treated as waste after use.<sup>47</sup> This carbon burden the building stock already carries should not be ignored. To lower our emissions we need to rethink within the industry, not to only focus on the emissions when the building is in use, but to have a bigger focus on the carbon already in circulation.<sup>48</sup>

Sustainability is approached in very different ways in a linear and a circular system. The linear system focuses on reducing the environmental impact while keeping the same output, thereby extending

the time it will take before we run out of resources. This is what we call eco-efficiency. Meanwhile the circular system does not only focus on reducing the impact on the environment, but also contribute in a positive way. This is called eco-effectiveness. While in eco-efficiency the priorities lie in reducing and recycling (and downcycling), in eco-effectiveness they lie in rethinking, reusing and upcycling. This is well displayed in our research where we have discovered that the construction industry in Old Havana is using exactly these principles within their circular economy, opposed to here in Norway where the focus has been on reducing our environmental impact by producing new solutions that are less harmful or that are aimed at lowering the emissions from the building operations.

#### Trial project

We do have a current example showing that it is indeed possible to incorporate principles of a circular economy here in Norway. In a pilot project, MAD architects, in collaboration with Asplan Viak, Entra and Spaces, have designed a building in Kristian Augusts gate 13 in Oslo (KA13), consisting of a rehabilitation and transformation of an existing building combined with a new building, which is to be built with reused and recycled materials and components, stemming from waste and buildings that are under demolition or alteration. The goal for the rehabilitation was to keep as much as possible, letting as little as possible go to waste following circular economy principles.

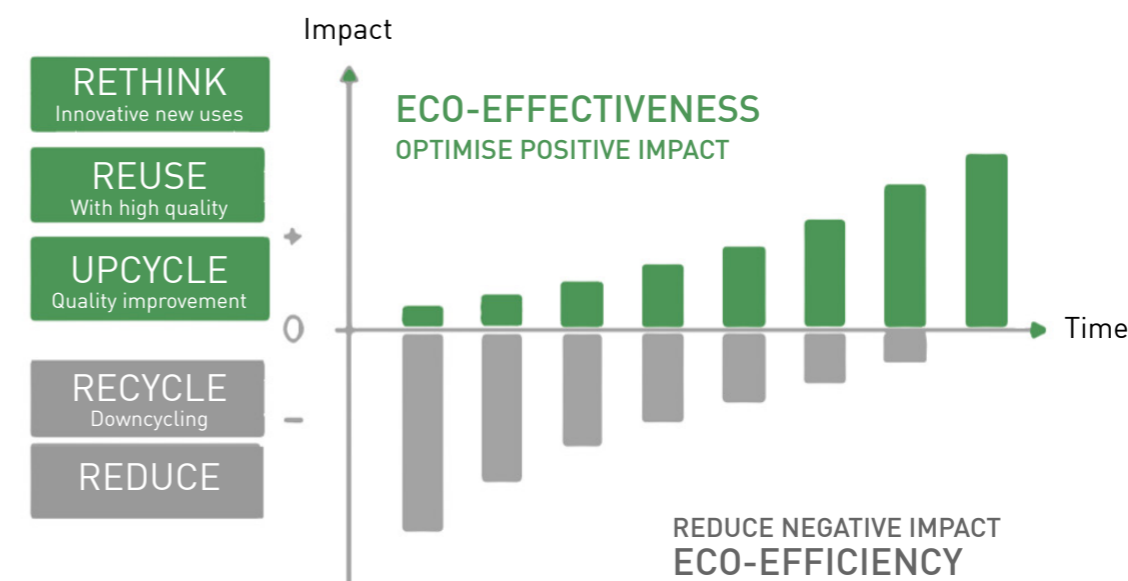


Figure 9: The difference between eco-effectiveness and eco-efficiency



Approaching it with a creative view on how and where an element could be reused, they continuously made professional assessments regarding an element's quality, cost, adaptability and potential for reuse and/or recycling, closely collaborating with the entrepreneur, the project leader, the client, the developer and advisers.

The search for material started in the early phases of the project, but because of the uncertainty concerning the material they would be able to acquire, they had to make a solid design capable of flexibility, so that it could be adjusted every step of the way. They collaborated with Resirqel and Rehub, marketplaces for the reuse of building components.

During this project they have encountered a few problems, mostly concerning logistics and the legislation regarding reuse of material, or rather the lack of this. The logistics caused problems especially when it came to transport, storage, and availability of the materials, because there is not yet a precedent for reusing material at a big scale in Norway, nor a set platform on which to do it. The legislation was also an obstacle, as it is based on a linear economy in regard to the documentation of specification and technical demands. Some elements came with their documentation from the building they were taken from (doors, outer cladding) however some components had to be tested before they could be used, to ensure that they respond to the technical requirements, including

steel and hollow core slabs.

When dealing with technical requirements for the steel parts, they have tried to put down a system for how to do these processes in any other project in the future that wishes to reuse steel. They have also focused on using methods for assembling them for easier disassembly in the future when and if the building is taken down.<sup>49</sup>

Discovering that it is possible to create such a project here in Norway we have wondered what could make it easier and more common. In Old Havana it is the Investment Directorate that orders materials and has the overview of which materials are available in Old Havana at all times. This makes reuse and redistribution of materials easy. Would it be possible to organize such a system here in Norway with so many private companies constructing buildings? Is the answer private companies like Resirqel and Rehub creating marketplace platforms and organizing the logistics of material reuse? Should or could the state organize one? Would it be possible to create a database that contains information about what materials each building put up today contains, as to make it easier for future generations to reuse the material we create today, knowing specifically what exists? The Dutch architect Thomas Rau is already working on a public database known as the Madaster database.<sup>50</sup> This database is meant to log the materials in existing buildings making reuse easier.<sup>51</sup>



Reuse of materials in KA13



Picture 10-13



### Why is this not done in all projects?

Is it possible to change the Norwegian system from a linear based one to a circular based one, and if so, how could it be done? Changing a well rooted system takes time and effort, but it is possible in theory.

One of the problems today is that there is no system for quality-documentation of used materials. The technical requirements of new buildings are very exigent because they are designed for new materials. However, since materials do not necessarily have adequate documentation it is in many cases necessary to test them to provide the necessary documentation. This can be an expensive process, maybe even an obstacle for doing it. In the KA13 projects they had materials of good quality that could not be used because they were not able to document it. In Cuba the requirements for documentation might not be as high as here, they rely on their experts' opinions regarding materials for reuse, and they are able to rely on their long experience in doing this.

In Norway, another problem they encountered in the KA13 project was the legislation regarding used materials when changing owners. Fortunately, Entra had several projects running simultaneously in different phases allowing them to move the material and building components they owned from one site to another. For reuse to be possible on a bigger scale, this legislation will have to be reviewed.

*"Today's regulations for distributing and documentation of building materials do not separate new material from used ones. Because it is often problematic to document used materials, these regulations contribute to inhibit rather than promote reuse. This is contradictory to the authorities wishes to promote circular economy and good resource exploitation."* (translated by us)<sup>52</sup>

Maybe the technical requirements for buildings here in Norway could be lowered when reusing or recycling materials and building components? What if by reusing windows for example, one would save the total carbon emissions because the embodied carbon one saves by reusing the windows is greater than what one would save during a building's life with a window that has a slightly better performance but had to be produced from raw materials? Especially considering the saved carbon from making the windows into waste?

Picture 14: Connecting a pen to an old telephone cable to use as a lighter for the stove



Picture 15: Using old train-wheels as weights for weightlifting.



Picture 16: Skrap iron as a tripod for selfies



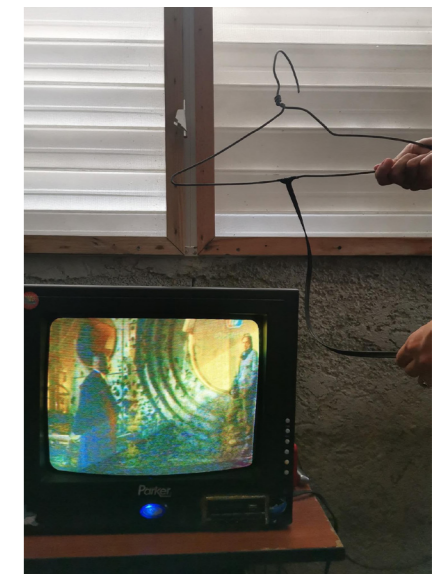
## CUBAN INGENUITY



Picture 17: Hair pins to be able to wear your flip-flops for longer



Picture 18: Transforming an old water-tank into a pool.



Picture 19: Hanger as an antenna





## CHAPTER VI - OUT OF THE RABBIT HOLE?

We live in a world with finite resources, but we are building as if they are infinite. Although we have started, years ago, constructing buildings that reduce emissions, this is not good enough. This construction relies heavily on technology and new solutions for lowering the impact new buildings are having on the environment. Although this is a step in the right direction, we believe it is crucial that we start seeing possibilities in our already built surroundings to actually work within the planetary boundaries like they do in Cuba. We could learn something from their way of building.

It has become clear to us that if the Norwegian building industry is to augment its resource exploitation it is necessary to actively make the transition from the current linear system to a circular one. We need to shift our focus from eco-efficiency to eco-effectiveness, to positively contribute to the climate-equation. As architects forming the built environment, we have the possibility to help change the approach of the future building industry. We can no longer only build new buildings. We do not only need to save carbon if we hope to reach a net-zero-emission, we must aim to create a carbon positive industry. Managing embodied carbon does not only mean that we will have to use materials with low embodied carbon, or creating zero-emission buildings, it means taking the bigger picture into account.

We need to take advantage of the building stock and the embodied carbon it represents, by reusing and transforming buildings we have built in the past in some way. This process starts at the very beginning of planning a project. What we build today should also be built to accommodate dismantling and re-use so that future generations will be able to close the loop. We have learned that having an overall system that organizes this process makes it easier, and we are sure that it is possible to create such a system also within a market economy.

In Cuba the circular system has emerged from necessity in both higher and lower levels of the society. Such a change is hard to execute if there is no understanding in the general population for why it is rational. For politicians to focus on it, it needs to have a support from the people. Fortunately, we are seeing an uproar for measures that contribute positively to the climate debate, and circular economy has been talked of in the building industry the last years. MAD told us they had been pleasantly surprised by how much positive feedback and help they had received during the process. We consider the project in KA13 to have been very important for the industry, demonstrating that reuse is possible at a larger scale, but also in exposing the difficulties they have met along the way, creating a discussion. The more projects like this are undertaken, the more experience we gather, the easier it will become to follow suit.

We also believe that reuse has another important aspect: conserving history. By performing adaptive reuse we can bring that history with us as we move forward, keeping our cities' distinctive characters alive. Walking in Old Havana is like taking a step back in time, history vibrates in the streets. Even though our buildings are not under an official UNESCO cultural protection like those in Old Havana, our architecture has its own historic and social qualities that still constitutes a part of who we are and who we have been as a nation, and it is worthy of respect. Adaptively reusing buildings whose programs are no longer relevant, materials and building components from buildings having lived out their technical lives does not only demonstrate respect for those generations who came before us, but also for those ahead. Sharing memories as well as the carbon burden.

What we have also taken with us from Cuba is their self sufficiency. As far as possible they use local resources, only ordering what they need from abroad. Although their physical resources are limited, we find it an admirable mindset, contributing to their low carbon footprint. Using local resources, both physical and in the form of knowledge, helps lower carbon emissions, transfers and maintains knowledge and traditions, and makes a country less vulnerable during a crisis. For example, the Cuban ingenuity, forced forth by lack in access to resources, might also be a tool we ourselves could profit

from in the pursuit of lowering our carbon footprint, especially when combined with our qualifications and access to physical resources.

These last few months, heavily colored by the global pandemic of COVID-19, have shown us how vulnerable the world can be, and how much power we have when we stand united. No one yet knows what the final economic outcome from this pandemic will be, but as small companies are closing around us, we should start to realize how important it is to support local businesses. Hopefully the social outcome will be positive in that we realize we all depend on each other, and maybe it will help increase consciousness even around sustainability seeing what can be achieved when everyone does their part. We have seen people all over the world exploring their creativity and finding solutions to problems they would usually solve by buying a product. Necessity births creativity. Now the world's population simply needs to realize how necessary it is to solve the global environmental crisis.

“Any idiot can see the problem, the challenge is finding a solution” Leif Løkholm

Most of all, our Cuban adventure taught us that much is possible with the right mindset, and that Cuban ingenuity might actually be a verb.





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## ILLUSTRATIONS AND IMAGES

### Illustrations:

- 1: This figure shows the global CO2 emissions by sector. Figure made from endnote 5.
- 2: This figure shows the annual global buildings' sectors CO2 emissions. Figure made from endnote 5.
- 3: This Figure shows the SDI scores of the countries in the world color-coded from best-worst. The figure is acquired from endnote 26.
- 4: This figure shows Old Havana and its building distribution of protection degree. Illustration taken from PEDI.
- 5: Percentage of buildings within different eras. Illustration taken from PEDI.
- 6: Site plan of Old Havana, highlighting Calle San Ignacio.
- 7: This Figure shows the SDI scores of Norway and Cuba since the 1990s until 2015. The figure is acquired from endnote 26.
- 8: Figure that shows the difference between the circular and linear approach in regards to resources. Figure made based on information from endnote 42.
- 9: This figure shows the difference between eco-effectiveness and eco-efficiency. Figure is made based on information in endnote 43.

### Images:

- 1-9: Archives RESTAURA, Jaimé
  - 10-13: Pictures of reuse of materials in the KA13 project by MAD-architects. Pictures taken at their project site.
  - 14: Picture taken by Maria Forsgren
  - 15: Picture taken by Duamel Napoles
  - 16: Picture taken by Jessica García Montesino
  - 17: Picture taken by Rachel Story
  - 18: Picture taken by Duamel Napoles
  - 19: Picture taken by Paulina Klimentowska
- Every other picture not noted throughout the thesis are taken by us



## CHAPTER VIII - APPENDICES



## APPENDIX A: MAINTENANCE PROGRAM

Casa Don Gaspar Riveros de Vasconcelos is a big building, 755 m<sup>2</sup> ground area, and as seen in the chapter “Technical and constructive state of the building” there is a huge degree of decay and therefore also a lot of damage. As mentioned in the “Phases” chapter, we encountered and got tips for multiple possible solutions for the different problems, here we will not present all of them, but give a selection as to what are the most common ways for them or the solutions they would most likely use on these types of damages. And to try and give an overview we will divide the different damages on objects into components for easier understanding and structuring.

- External surfaces
- Interior surfaces
- Ceilings
- Carpentry
- Pavement
- Stone elements
- Iron elements (blacksmithing)

In general, an intervention of this building will also consist of new demands to the water, sewage, and electrical system. Taking these demands into account before starting the repair or especially walls and other structural elements.

### External surfaces

The exterior surfaces suffer from humidity damage, loss of paint and some cracks in the walls.

In case of missing mortar or plaster: Determining the cause is usually done by removing the mortar or the plaster on the surface to examine the damage underneath. If the wall underneath is in good condition a new coating will be applied after a proper cleaning either with a brush or air. If the damage is critical, the area will be replaced. On all surfaces where there are some mortar or coating missing, lime mortars or low cement content dosages will be used.

In case of cracks in the walls: It has to be determined the causes of the appearance of these cracks and proceed to eradicate them to avoid further deterioration and collapse of the structure.

Possible solutions:

- Sealing the crack with mortar. Cleaning the crack and filling it in
- Stapling it with iron. Clean surface, drill holes with 10-15 cm distance and insert the metal staples, then fill the holes with mortar afterwards. Make sure to treat the metal with corrosion products before they are embedded in the wall.

Cracks due to corrosion in metal elements, assess the degree:

- If the wall is in good condition; clean it properly with a wire brush and apply corrosion products before sealing the wall with paint.
- If the corrosion is advanced; it compromises the integrity and it is recommended to dismantle that area of the wall and rebuild it with similar materials (aesthetically)

Overall on the external surfaces: any residue or paint, vinyl or oil, on the walls will be removed. Cleaning with low pressure water to remove traces of grease, dust etc. To paint again, lime-based paint will be used, colored with dyes or pigments according to the exterior color chart (Tkrom E6-44).

On all surfaces where there are some mortar or coating missing, lime mortars or low cement content dosages will be used.

### Interior surfaces

The exterior surfaces suffers from humidity damage, loss of paint and some cracks in the walls.

In case of missing mortar or plaster: see external surfaces.

In case of cracks in the wall, the same guidelines as for the external surfaces apply. Where humidity damage is found, it is imperative to find the cause of the humidity and eradicate it. One of the causes

for humidity is due to leaks (see ceilings for further elaboration).

Overall on the interior surfaces: the use of white lime based paints is recommended. In all cases where traces of mural painting are observed, they need to be rescued/restored.

Both indoors and outdoors, the use of lime based paints is decided as to make the wall breath.

### Ceilings

The wooden ceilings have some humidity issues, bad paint, termites, and loss of load-bearing capabilities in some of the beams. The roof has some sagging, loss of ceramic tiles and missing gutters.

Wooden ceilings inside:

Check the condition of the wooden trusses, the stains of humidity and structural failures that indicate rotting of the elements.

- Remove the superficial layers of paint in those areas where damage is detected and restore them with suitable materials, preferably also brush or spray the entire surface with wooden protective products.
- Take special care of the areas where there is a union between to wooden elements.
- In case of termites detected in the wooden elements of the ceiling: see section for termites under carpentry.

#### Roof/waterproofing system, outside:

One of the causes of humidity in the facade, walls and columns is due to the presence of leaks. Eliminate this problem by repairing the roof.

- When sagging of the roof is detected: Dismantle the ceramic tiles, with the aim of being able to correctly position them. All those tiles that meet the technical standards in terms of dimensions and quality of finish may be reused. Before putting the roof back together, make sure to place a waterproofing sheet on the planking as to protect the wooden ceilings underneath from leaks.
- When vegetation like mosses are found that are preventing the draining of the roof: eliminate the vegetation by combining manual and chemical methods. Make sure to also get the roots of the plants. Afterwards, apply a protective layer.

#### Finishing touches as to preserve the repairs:

- Place drainage channels/gutters along all edges, check the drippers on the edges of galleries, balconies, etc, clean and fix if problems are detected.
- Mahogany color (Tkrom E-25-35) and matte varnish will be applied to wooden ceilings, while the rest of the ceilings will be painted with white vynil.
- Do not place elements, such as antennas, etc. on the roof that damage the ceramic tiles or make it difficult to drain.

#### Carpentry

There exists and all over damage and loss of carpentry elements throughout the building. some damage is due to humidity, some to termites, some to xylophagous agents, and others to lack of maintenance. In those cases where there is an attack of xylophagous agents it is recommended to remove all the damaged pieces and saving the parts that could be reused by altering it. Reuse of the wood if possible is always recommended, unless the wood is of poor quality.

#### Doors:

- Damaged doors will be restored. This will be done by replacing the affected area. Trying to make the changed parts blend in with the old, often done by applying oil paint.
- In case the damage is so great that a restoration is not possible, as is the case with the main gate, a reproduction will be done. Based on the carpentry available on site and historic photos.

#### Columns:

- The deterioration of these elements are of such magnitude that they will have to be replaced. Carbon fiber could be used to reinforce the new columns without decreasing their aesthetic value, but this is hard to come by and very expensive in Cuba.

#### Beams:

- When the problem is in the connection point between the wooden beam and the wall

- Reconstitution with epoxy resin and rods or bars. This solution helps preserve the original wood. It is based on the reconstruction of the head, anchoring steel rods or fibers in the healthy part of the wood at one end and the wall on the other.
- Reinforcement of the head by iron. In this case, the damaged support is reconstructed using steel plates
- Support of the head in metallic profile. It is based on the placement of a metallic element, screwed or glued with resin to the unaffected area of the beam as to guarantee loading transmission by restoring the heads support surface.
- Cracks
  - The cracks can be injected with epoxy-type resin, compatible with the wood, and will work as a fin-in.
  - Reconstruct the sections with epoxy products in gel form.
  - Reinforcing the wood with steel bars, glass or carbon fibers

In all cases where new wood is being used:

- Must be of high natural durability, as this wood will be more resistant to the aggression of xylophagous agent.
- Application of a sealing laying, and then two layers of an oil-based enamel paint.

In elements where the damage is small, and simply of aesthetic matters such as gaps, grooves, fissures etc. it is recommended to fill the spaces, this can be done in different ways depending on the type of damage: a wooden piece glued in the gap, application of epoxy, or infill with sawdust with glue (more traditional).

#### Termites:

- It is recommended that the following anti-termite treatments be carried out with the required rigor using the barrier technique and the application of insecticides on wood, according to the Practical Guide for the fight against underground termites in Havana.
  - Creation of barriers so that the termites will not enter the building
    - vertical and horizontal injections
    - especially important around doors and windows on the ground floor since these are the wooden elements closest to the earth.
- Application of anti-termite treatment to all wooden elements, new and old, and fumigation of the building to prevent reinfestation whenever a new piece of wood is being brought in.

#### Pavements



The floors that are eroded and broken will be replaced, however it is dependent on the decision of the architect of the work if they are completely changed taking into account the state of affectation of the same and the degree of protection of the building.

#### Stone elements

The main staircase is in good condition. Perform pressure water cleaning to remove accumulated dirt. Stonework stepping stones with wooden railing. Both in good condition.

The stone columns are generally in good condition, no structural damage, but two of them are experiencing some aesthetic loos. Clean with pressurized water to remove accumulated dirt. Then proceed to apply new coatings with lime mortar.

#### Iron elements (blacksmithing)

Review, repair and restoration of existing elements in general.

In Blacksmithing and metal elements, anticorrosives and oil paint in black will be applied. It is specified that before the application of any treatment it will be necessary to remove the oxide layers and leave the metal surface as clean and smooth as possible.

## APPENDIX B: INTERVIEW - CUJAE

Interview at CUJAE Technological University of La Habana (with Sergio Raymant)

Informal conversational interview - no predetermined questions are asked, in order to remain as open and adaptable as possible to the interviewee's nature and priorities, during the interview the interviewer "goes with the flow". This interview and its questions has a background in a book "Buenas prácticas de proyectos participativos de viviendas sociales" where the interviewee is the author.

Can you tell us about the book?

Buenas Prácticas de proyectos participativos de viviendas sociales - Good examples of participation projects within social living (translation from spanish, Marion) is a collection book about some projects showing how a participation project might work successfully. A lot has to do with that the people living in the building, if in possession of a trade, also work on the building site when the project is being executed. This goes through the Investment Directorate, and also has a part in the Dirección de Vivienda (Housing Directorate) that works with all the families in transit. Sometimes these projects will give more apartments, and sometimes fewer, but the goal is that every apartment will increase the standard of living.

He shows us one project done in Plaza Vieja, where

there used to live 56 families, but due to the patrimonial degree of the house, it had to be restored to a previous historical state, and now only contains 15 apartments.

He also goes into explaining about the different types of social living that they have in Cuba, Solares, that are big building complexes that the state took ownership over after the revolution and divided it into smaller areas that they gave to different families with subject to them keeping maintenance of the area they had been allocated. These apartments or spaces that they are given are UsuFructo, which means that they have full right to the space, but does still not own it. This way of having social living is interesting since we can see today that there is a huge lack in maintenance and therefore deterioration that will eventually mean that the building must be evacuated as a result of hazardous living, and then restored. And since many of these buildings are in the Old Havana area, it will now go under the laws of Unesco and therefore be used in a different way later. For many of the families, this means that they will have to move outside of the Old town lines to get a new UsuFructo and so the population density in the Old Havana will therefore also subside.

The buildings will now be subject to restoration

projects and interventions to increase the living standards for the families moving back in. This process will contain first: an architectural project, that will be handed in to The Investment Directorate, an office working with approving technical details, ordering of materials, and arranging weekly meetings between the constructor, the projectist (architect), and the investor. These meetings can be more or less frequent but are used to determine all the details that will go into the project, so that everything can be preordered, and the building process will not diverge from the plans. In these meetings it's important as the architects to keep the things that matter in the project and be open to change the other things based on what the others say. And the most important things for the architect to keep are the structure and where all the pipes and electricity goes, because this has to do with the core of the design.

What kind of materials do you import, and which ones do you produce here?

I don't have the complete overview of that, it's better that you ask the Investment Directorate, but we do produce some steel, and also wood. The quality of the wood is not good enough for roofs and beams, but can be used in other parts of the building. And materials that we do have to import is cement (maxrex, maxpain) and wood for roofs and beams come from Brazil and Angola.

What about reuse of materials?

Usually the reuse is right there in the building site. The Investment Directorate has its own people that goes in to take the building apart, and then they keep what they can reuse right there. Sometimes you will also find parts from one house that has been reused in a different building. and then if we go in and want to restore a place, sometimes we take it back to where it belongs.

And the workers, the craftsmen, are they also part of the Investment Directorate?

They all used to be state-owned workers. But four years ago, the state eased up on the laws, so that craftsmen could work privately. This has led to a lot of new Talleres (workshops) of wood, restoration, steel etc...

What we try to do here in Old Havana with all the restorations, even though they lead to fewer apartments in the historical center, is to keep the memory of the building.

Our immediate thoughts after the meeting with Raymant:

Interesting that they go in with all the contributors to a project already in the planning phase, and that they plan it all the way through before they start building. The ordering of all the materials and this process is something we need to take a more detailed look into, so we will try to get a meeting at the Investment Directorate. They can't change the design during the building process because there is

not much flexibility when it comes to the access to different materials.

It's also very interesting that they have practitioners that goes into the building to find the best possible disassembly of the place so that they can reuse as much as possible. We also need to ask the Investment Directorate about this.



## APPENDIX C: INTERVIEW - DIRECCIÓN DE INVERCIONES

Interview at Dirección de Inversiones/Investment Directorate

Can you tell us about what this office does?

Every project, small or big within our area, must be approved from this office before it can start. What we do is that we are the administrators of all the projects within our area from the beginning. After a project has been made, by an architect, it will be presented to us with all the technical details and list of materials and a constructor already ready. This office will then deal with the next stages of the project where we arrange meetings between the architect, the constructor, necessary artisans and ourselves to elaborate all the details. After the project has gone through all the necessary changes, this office together with the constructor will sit down and figure out all the details regarding materials and who will provide what.

That means that the constructor has a storage of materials?

They don't necessarily have a storage, but at least they will find and provide certain materials. Usually the constructor will provide materials that are possible to encounter and produce in Cuba, and then this office will deal with all the materials that has to be ordered from abroad, since the constructor do not have the option of doing that himself, given that only state-owned companies has that right.

But sometimes the constructor has excess materials from earlier projects that they will now use. And sometimes the same goes for us. Where we, in an earlier project, have saved some of the materials already existing in a building that had such a good state that throwing it away was not an option. Therefore, we will use it again, when the possibility emerges. Or, since we are working on multiple projects at the same time will encounter some materials in some buildings that can successfully be used in other projects.

How many offices like this exists in Cuba?

In Old Havana you have two such offices, one that works with all the hotels and this one that deals with everything else. Every province will have its own office that deals with all the projects coming in in their own area.

As we have understood from earlier, this office does estimations when it comes to materials that already exists in a building, would it be possible to give an estimate of how much you reuse? (Not necessarily in the same building.)

The percentage is quite low, around 10%, and this is mostly because when we finally go in and restorations, most of the building is in such bad conditions that there is not that much to reuse or recycle. But we try to reuse at much as possible at the

building site as not to be dependent on materials coming from abroad. The reason why this still does not make the number very high is because a lot of the times, recycling materials require electricity and machinery that we do not always have access to or electricity enough to use. The process would become very expensive.

What are the most common materials to reuse?

Every material that has patrimonial value we try to reuse. This includes all the ironwork, carpentry, wooden beams and stones used in staircases. And as mentioned earlier, if we encounter some building elements that has a good condition, but that does not serve for the project at hand, we will either reuse them in another ongoing project, or save them for later.

When materials are being recycled from one building, but used in another, do you sell them?

No, since we are the office that deals with all the projects that would not make sense. Even if it is a fairly new material, we had it ordered and paid for, so reusing it at a different site is what we do, keeping it within the economy.

Which materials do you produce here in Cuba?

Although we for example can produce cement, we still order it from Mexico, because it is cheaper to buy it from there than to produce it here, because of the price of power (electricity).

And the ordering of the materials for the projects, how does that work? Which materials do you order from abroad? Are there any limitations to how much you can order? And how long does it take for them to arrive?

The only limitation is the Cuban economy, in theory we could order as much as we wanted, but the problem is the money. Also we can't order from anywhere due to the blockage from the U.S. the countries and the specific companies needs to have agreements and taxes in order to be able to deliver to us. There is a section within this office that is called the importing office, that deals with all the orders of the materials, we just hand them the list of what is needed. And all of these orders are put on the country/government, not us specifically, although we do order some with our own funds coming in from UNESCO and other international contributors of the heritage city. The arrival depends on the company that we order from, if they have the quantity that we are asking for, and how fast they can ship it. Sometimes they don't have the quantity available, and we are forced to only receive what they have at that moment and then wait until they restock and ship again, and this might take a while.

Do you have a process where you check the technical state of the materials that are going to be reused?

The materials has to be checked before being reused, especially when it comes to beams, but this

is done at the same time that they are being taken down, we hire experts that come and check the integrity of the materials for us before we use them again.

Some thoughts after the meeting:

What if the recycling thoughts and processes had been part of the project development? And not just as an afterthought where they recycle and reuse what serves for the project at hand.

## APPENDIX D: INTERVIEW - EL QUITRIN

Interview at El Quitrin

Quitrin is the company that has the rights to the property at Obrapia 172, Casa Don Gaspar Riveros de Vasconcelos, where we are doing a project proposal. We had a talk at the company to figure out what their wishes are concerning the space, and to hear a little bit about the history of the company to get to know the client a little better.

El Quitrin is a Federation of Cuban Women, and they work with textiles, sewing, knitting etc. They plan to use the space as a teaching area with courses regarding knitting and traditional Cuban clothing. They were founded in 1986, when they received money for the project through United Nations Development Fund for Women (UNIFEM). And upon foundation the space was used as a course area on the ground floor, and with accommodations on the first floor, these accommodations were meant for women that came from other cities to participate in the courses that were being held on the ground floor. But, since by this time, a lot of the courses were also being held in the other cities on the island, there were no women coming in, and therefore the first floor was never in use.

By the time that El Quitrin took over the house it was newly restored due to a cyclone that destroyed most of the eastern parts of the building in 1984.

When they moved in in 1986 they had great value of the ground floor. But since only the ground floor was in use during their residence there was a lack of ventilation and wrong use on the first floor, which in turn led to the fact that by 2004 there had to be done further work on the house as for it not to fall apart. During these restorations, some mistakes were being made as a result of lack of materials, where for example the gutters disappeared, which in turn led to huge destructions due to humidity and other water damages. Which is where we are today. The ground floor is still in use in the outer parts of the building, with some shops and some workshops going on, but the building in itself is on the point of falling apart. Because of its long history, and important founder, and since it is one of the oldest buildings still existing in Havana, it is now under planning for restoration and further use.

El Quitrin are going to continue to use the space, as of today, although the Cultural Heritage Management Office also would like to use it and therefore has their own plans for the space. El Quitrin wished to continue with the architectural floor plan that was initially planned when they took over the building in 1986, but instead of it being accommodations in relation to the courses downstairs, they wish to make a tourist hostel. And on the ground floor they wish to continue with workshops in com-



bination with a showroom so that people walking by can watch what they are doing inside. A gallery to expose what they are making and an area where they can sell their products. There was also talk about the fact that it exists a kitchen downstairs that can be used in regards to the hostel. The hostel would be a way for them to auto finance what they are doing in regards to the courses they would like to hold. The Cultural Heritage Management Office would like to make it into a nucleus for the textile reuse and recycle industry, with workshops, coloring areas, handling, administrative offices etc.

## APPENDIX E: INTERVIEW - DIRECCIÓN PROVINCIAL DE VIVIENDA

### Appendix E: Interview - Dirección Provincial de Vivienda

Interview at Dirección Provincial de Vivienda/Provincial Housing Directorate

This office deals with the provinces of Havana, with different departments, where one of them is the Investment Directorate for the provinces. Attempting to ask the same questions here as at the other office, but since the situations differ highly the interview turned more into an informational meeting about how things work outside of Old Havana.

The situation in the country in difference to Old Havana is quite remarkable. This is mostly due to the fact that the Cultural Heritage Management Office receives funds to restore buildings in the Old Town because of the UNESCO listing. Whereas it in the provinces are not that easy. Here the cheapest way is always the way to go. Sometimes it is clear that recycling is the best option if it is possible to extract the parts they need without help of electrical machinery, and thus reuse and recycling exists also here, but the percentage will be much lower than in the Old Town, since they will not have to restore patrimonial value parts, and often changing for a new part is cheaper than restoring the old. Recycling, as opposed to direct reuse, often requires the use of electrical machinery, and this is quite hard to come by in the provinces. Often the waiting lists are

long, and when they do get a hold of the machine, the access to electricity is not always guaranteed.

To understand a little bit about how it can be cheaper to use new materials, when you look at the country not being able to import material privately we have to look at the situation of how social living works. In Cuba, Cubans are given the rights to a home, they will not own this place but have all the rights to it. Sometimes these homes are in good condition, other times the government can give you a place that needs restoration, and if they do, they will also help with the payment of the workforce and the materials that are needed. A government worker will revise the space, the quantity of materials needed and the workforce, and give the resident a check that can be used to 'buy' all of these materials and book the workers. What happens then, is that the occupant will take out the whole quantity of the materials, but try to use as little as possible, and find and reuse/recycle from other places, so that he/she can sell the materials that they have gotten from the check as to obtain more money. This leads to the scenario where getting the materials can be quite cheap as opposed to the rent and use of machinery to recycle.

## APPENDIX F: SITE VISITS

### N Lopes e/ Barillo y Ave Carlos Manuel

Half way in the dismantling stage, they are still bringing materials out of the building. They have reinforced the facade by using leca-blocks instead of wood that is normally used. This due to the lack of access to wood, but also so that they can dismantle and move the blocks with them as they move further up the building, which would be a bigger process by using wood considering the height of the building. Wood is still used as reinforcement on the inside.

On the picture in the left top corner you can see the building together with a yellow one. That yellow one was renovated by the same office a few years back, and we can therefore look at it as a sort of before-and-after scenario.

We are being told that here, as in most renovation projects that goes on in Old Havana, the facade will be fully renovated, while the inside of the building will be mostly dismantled. Also here they are keeping the wooden beams, and the staircases.

The ironwork missing from the facade in these pictures is being reused in a school that they are renovation in a different location. That school was missing some ironwork, they have taken iron from the balconies at this building and used there to complete the work.

They are also waiting for some experts to come by the building site to proof-check some iron columns in the interior for further use where they are.





## Mercaderes e/ Amargura y Teniente Rey

This building site is at the dismantling stage, they have already gotten quite far at taking out almost everything inside. The state of the building was critical, and the only thing remaining after the dismantling is going to be the facade, and some building elements from the interior like tiles, story separators and staircase stones. Beside that they are also recycling as much they can of the wooden beams. They are quite rotten from termites and humidity, but some of it can still be used and those are saved at the spot for the future.

What we also encountered was a big standing filter, where they would throw through any plaster or stone that would be possible to reuse in a mixture for cement.

We also noticed that the main skeleton/structure in steel of the building was left as it were, to be renovated and (re)used where it is.





## Mercaderes e/ Muralla y Sol

At this site we were not going in, but had a talk about what keeping the facade looks like. Because at this place there were two buildings under renovation where only the facade was left and some iron columns on the inside, otherwise everything was gone. This because of the deterioration of the building. As for the facade, a lot of the building components had been dismantled to be restored, and then put back. As a part of the UNESCO listing, this is obligatory, but not possible for them to do on the whole building based on deterioration and cost, therefore it is only done on the facade. Here we were also demonstrated the search for the original color, if you have a look at the picture with a pink and a yellow building, you can see that the yellow also had green spots, that is the oldest color they can find. But since this color is hard to find at the moment, it will be left like this until further work on the building. They are still waiting for materials to come in from abroad before starting, something happened with the company that were supposed to deliver them in regards to some taxes to the United States, so for the moment work is put on hold. We asked about what our guide thought about keeping the facades, and then he sort of joked back that in the case of La Habana it was a good thing, as to being able to keep the street although the building was not really there, at least it looked like it.





## Teniente Rey e/ Mercaderes y Oficinos

This building is being used as a storage and educational space while under renovation. The renovations and building are being performed by the student as part of their courses. They also store woodwork, cement etc. here. And as part of an educational scheme, students are also being encouraged to experiment with what the materials can do, as seen in the picture with the staircase made out of slim bricks.

