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Complex Projects 2019-2020

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Design Report

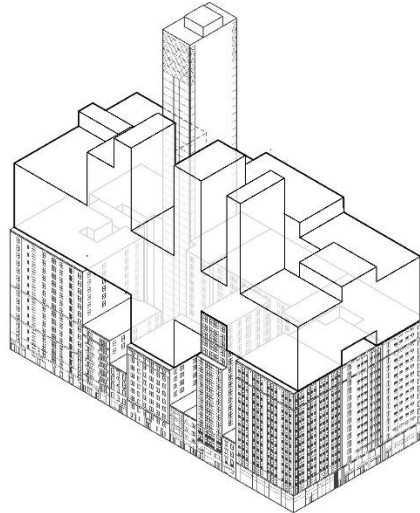
Introduction

Complex Projects is dedicated to critically study the complex forces that result in changes of any nature in worldwide settlements. Our year's studio studies the economic and political forces that shift the dwelling patterns for the residents of Midtown Manhattan. My graduation topic takes a critical look at the existing housing situation in this city and strives to develop a future combined group vision for Manhattan.

The housing affordability crisis is a real pressing issue not only in New York City but in many other highly developed cities from big economies. This crisis can also lead to further social and economic problems if any actions are not taken to counter it, and important actions can come from designers and urban developers alike. Meanwhile, I believe it is also important to study the existing patterns of dwelling and housing typologies in order to predict and possibly reconsider the future patterns of living and housing that may lead to better functioning societies. In this manner, my research questions are the following: how to effectively work with affordable housing in Midtown Manhattan within the current model of the New York housing market? And what design guidelines, urban considerations and regulations could facilitate the provision of affordable housing?

My design outcome consists of a large scale project that strives to work with underutilized air rights space (the remaining space above a building that zoning regulations allow to develop), whose development is challenging albeit possible with innovative technological or architectural solutions. However my topic's research was not only architectural but interdisciplinary and included some global context, in addition of being developed with an active participation of my fellow classmates in sharing knowledge, going along the lines of my master programme of encouraging learning from other physical and social sciences, global awareness, and peers.

My graduation project seeks to find a rather non-traditional way to approach the design of an affordable housing project. Rather than a common design development from scratch, the project is approached through the unused air space of a city block. This approach also consists of a means to increase population density – a position I stand from our substantial research, is where future construction is moving towards. Along these lines, building technology should play an important role to support this new paradigm. I believe that there have not been many projects being approached in a similar manner with this design, so the methods to develop a structure to accommodate this design should be taken to new limits, hence pushing the boundaries of technological advancements for more innovative construction methods. These are the aspects that my graduation work has worked on and the reasons why I consider that the topic will be relevant in the larger social and scientific framework.



Conceptual volumetric model of air space.

Research

To approach my research, I adopted a grounded theory methodology that consisted in data recollection from quantitative and qualitative sources on variables such as demographics, income, rent, development costs, land value, and air rights; their analysis through the use of mapping, diagrams, and graphs; and a resulting theory – the design principles and site/context considerations that I have adopted in my project development. The analysis of these variables is useful to determine relationships among the complex variables that play a role in the housing situation of Manhattan, hence aiming to come up with postulates on appropriate ways to work with affordable housing. Moreover, the design guidelines that I would implement should create an effective business model that makes the project in question affordable, based on the recollected data in financial feasibility, development costs, and rent.

The site's characteristics and limitations have provided a clear framework and shape the resulting design of the graduation project. The parameters of size, volume, and material will be set by the aspects of daylight, structural capacity, circulation, building codes, safety, neighborhood character (responding to the context and building needs); and types of affordable units and system organization (responding to the demands of the residents and tenants).

Reflection on Tutors' Feedback

During the MSc 3 phase, our main tutor, Stefan de Koning, gave a substantial guide to each member of our group into further developing our own initial interests. In my case, it was the challenge of developing affordable housing in Manhattan. He shared very relevant aspects to take into account under each subject and pushed us to ask ourselves the right questions to shape our resulting research question(s) that became the staple of our research and design development so far. This led to the formulation of my research questions and specifically design guidelines and urban considerations for affordable housing development. Very importantly, he advised me to do research on air rights space, which would become the method to employ my design.

Meanwhile, our third tutor, Alessandro Arcangeli, also gave us some brief feedbacks on our developed research and questions during our second quarter. Alessandro's feedback consisted more questioning the larger social repercussions that affordable housing and dwelling in general have had so far and how they

can change in the future, dealing more with the nature of patterns of living. I found this very relevant to take into account to not replicate past affordable housing and push innovation in newer dwelling patterns further.

From the design brief onwards, Stefan has pushed me towards the development of air space in a city block, and has given advice in some design and programmatic considerations, as well. I found it quite exciting the fact that he had pushed me into the limits of what is possible to design, given the unorthodox site. The testing of the interplay of the built/unbuilt and the overall massing composition of my design is attributed to him. Moreover, Stefan’s questions and remarks from the reviews are usually surprising but on point – touching on “loopholes” that deal with relevant subjects that sometimes us, his students, have not thought of before or making us question the nature of our own approaches, as well.

Once there was a design brief, we started to receive feedback from our Building Technology tutor, Gilbert Koskamp. Starting with pushing us to figure out how to materialize and construct our designs, Gilbert has had an extensive feedback on technical aspects such as structure, circulation systems, climate, and circularity. Due to the state of my project’s structure, Gilbert pushed me to develop this first and gave the important advice on developing timber construction for its more sustainable and light-weight structural properties. He has also made us question the values and conditions of our projects and how to develop them in accordance to the various technological systems available.

Accordingly, the tutors’ input has not only been very valuable but essential throughout my design development. Their guidance through the aforementioned subjects shaped and gave a clear direction on the stages that my project has advanced.

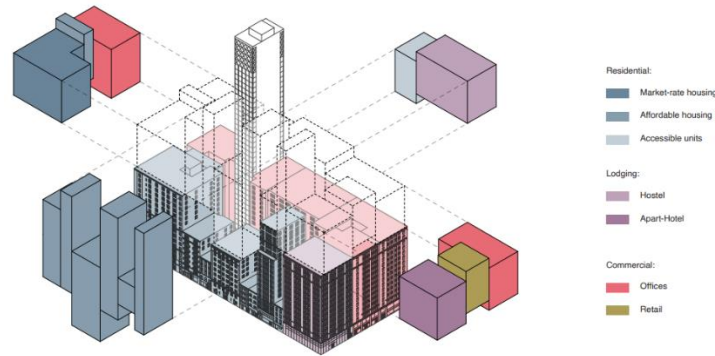
Design Outcome: Mad Heights

As a result, the final design outcome of my graduation project works as the conclusion from the research. The project consists of an elevated hybrid complex that combines commercial, residential, and recreational programs. As such, the project takes its title from its location on Madison Avenue and its heightened nature. The design concept originates from utilizing the block’s unused air rights (undeveloped space above each plot/building with potential for profit), which is essential for an affordable housing project’s financial feasibility for developing the maximum space possible. This approach has worked as the method to respond to my research question – to find out which design guidelines and urban considerations are needed to facilitate the development of affordable housing in Manhattan.



Site selection methodology: Determinant aspects for an effective affordable housing project.

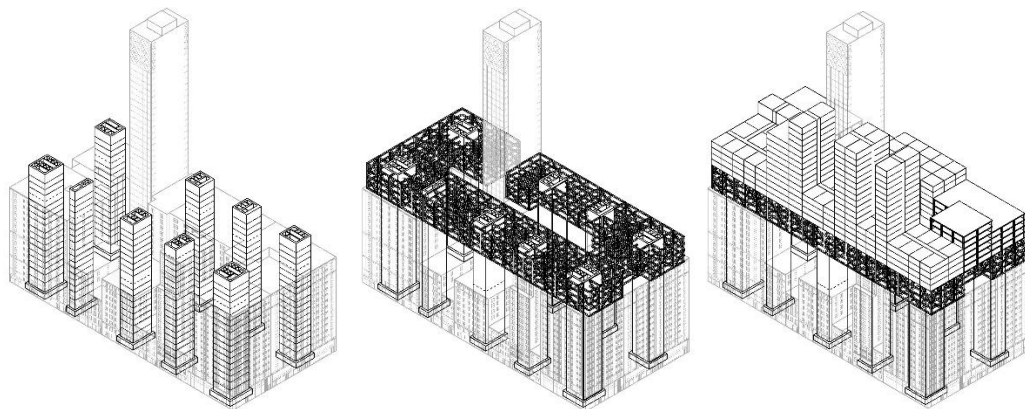
To summarize, these considerations include increasing population density, making use of New York’s policies and tax incentives for affordable housing development on certain zones, selecting a site with the lowest real-estate value, making use of the highest amount possible of underused space, adding multi-functional spaces, and minimizing construction and maintenance costs. All these are taken into consideration for the project’s financial feasibility – a very important aspect for developers in order to choose to work with affordable housing. Ultimately, fostering community engagement within and with its context becomes integral to effectively run an affordable housing complex in the long-term.



Overall program ensures financial feasibility.

These parameters have shaped the architectural decisions and materialization of the project I intend to make, starting from a proper site selection. This resulted in establishing the program and general layout of the project. However, bigger challenges have appeared in the assembly process. For working with a difficult site (the space on top existing buildings), there are structural considerations to take into account that do not necessarily go along with minimizing of construction costs. For this, I have decided to use light-weight and cheaper timber that would reduce the physical and economic load as much as possible.

Throughout the materialization process, the assembly of the resulting superstructure led me to conduct extensive research and learn about each type of construction method and material employed – concrete, steel, and timber. The study of building references and Gilbert’s feedback enabled me to design a hybrid system that implements these three main systems: Slip-forming of concrete shear service cores for cantilevered high-rises, outrigger truss system of steel beams, and prefabricated timber room modules and post-and-beam system



1. Shear concrete columns, 2. Steel belt truss, 3. Timber modular units & post-and-beam system.

In this way, the additions on top of the existing block would be supported by shear concrete service cores. This approach seemed to be the most suitable for exerting the minimal change on the existing buildings as it only makes internal changes rather than a total building transformation, as with other options like retrofitting or demolish and build from scratch. What my project intends is to “add” rather than build from anew. Furthermore, these foundations would support a steel truss across the block that would serve as the “base” for the modular housing units and the other functions. In this manner, the structural system also determines the exterior architectural look and quality of spaces.



Result.

A Possibility for New Affordable Housing Development?

A well-conjectured scenario for this project is based upon the research on the nature of the financially-driven real estate in Manhattan and, in order to come into reality, the project depends mainly on the owners of the city block itself – and its air rights. This is the reason that a project of this type should also be introduced as a business opportunity for carrying out the heavy investment and logistical procedures.

In the New York City financial market, it is common that Limited Liability Companies (LLC) own building lots in city blocks and absorb the neighboring plots, thereby merging into bigger plots of land for the prospect of bigger developments. If this case continues, a specific LLC can become the sole owner of a complete city block. Previous owners of the absorbed plots of land can also join the LLC thereby also becoming stakeholders. In this manner, all stakeholders can share investments as well as profits depending on each party's share, in the same way that a cooperative works.

Therefore, having a unified group of owners would facilitate the construction and ongoing maintenance of this complex. As such, if this is the case with our city block, this scenario can leave ground – or better put, *air* – for a multi-purpose complex with affordable housing on a large scale that would otherwise be impossible without opening up space in such a high-density area as Midtown Manhattan, thereby making use of the underdeveloped infill space to its maximum.

Conclusion

Away from “down-to-earth” interventions, this project consists of a still theoretical model for exploiting available air space in a massive unified scale rather than the current smaller-scale extensions on top of existing buildings. Accordingly, the assembly and study of its structure may lead to further studies of real-life materializations of big scale infrastructural projects in congested and compact sites.

The big question still remains on whether the method of exploiting air space is an adequate solution to housing shortages not only in New York but in other dense global cities with high demands on housing. Further research and real-life experimentation would be necessary to test this model and prove its successes or flaws, which would be determined by many factors depending on the chosen site.

This model is, however, not restricted to affordable housing but could theoretically be adapted to any function – as offices or spaces for retail. Nevertheless, there is a need to consider the programmatic aspects of this building typology to prove its efficiency, questioning which building functions would be adequate for implementing this model. Housing and offices, for instance, have always been in big demand in New York City and their functions have been effectively implemented on typologies of similar scale and heights. So the practical aspects of a model of this type, in theory, should work appropriately in Manhattan.

Even though the design and research so far has shown that it is possible to assemble such superstructure, the dilemma now consists of whether affordable housing would find in this model a “home” due to the economic repercussions that a building of such nature brings with, in addition to the everlasting option to merely develop expensive real-estate instead. This are the reasons why my proposal intends to maximize the use of the tools in favor of affordable housing development. Therefore, the final aim of the design outcome is to prove that the long-term benefits from this project can surpass construction costs and the pressure of an expensive real-estate market, ultimately proving that the inclusion of affordable housing can be an economic asset for developing multi-functional massive complexes while alleviating the housing crisis situation in a highly congested area – Midtown Manhattan.



Mad Heights – elevating the common dwelling.