

ONE MINERVAHAVEN

METROPOLITAN HIGH RISE LIVING IN AMSTERDAM

Reflection Report

Dutch Housing Graduation Studio
Casper Kraai

TU DELFT FACULTY OF ARCHITECTURE AND THE BUILT ENVIRONMENT
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CHAIR OF ARCHITECTURE & DWELLING
DUTCH HOUSING GRADUATION STUDIO

STUDENT NAME
Casper Kraai

GRADUATION COORDINATOR
Pierijn van der Putt

MAIN TUTOR
Theo Kupers

RESEARCH TUTOR
Pierijn van der Putt

BUILDING TECHNOLOGY TUTOR
Ferry Adema



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PREFACE

This report serves as a reflection on the Dutch Housing Graduation Studio *Between Standard and Ideals: The future of housing in the Netherlands*.

The question posed at the very start of the graduation track was: how do we want to live and what kind of buildings do we need to allow for that?

Over the past 10 months I have sought to answer this question through the research and design for a residential building in Haven-Stad, a city intensification plan on Amsterdam's former industrial waterfront.

In this report I will reflect on the relationship between research and design in my graduation project, specifically the methods and tools I have used to do research, their implications for the design process and what I could have done differently.



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INTRODUCTION

Research, naturally, is an important part of the discourse at TU Delft, as is to be expected from an academic institution. At the Faculty of Architecture and the Built Environment in particular, research is juxtaposed with the architectural design practice.

In his book *Research Methods for Architecture*, Ray Lucas defines research and architecture as, respectively, “the process by which you understand the world in a verifiable and consistent manner” and “an ever-developing body of knowledge concerned with how we use space” (Lucas, 2016, p.7).

For designers and architects, to adequately know how to approach a project or what to design, design processes, both academically and professionally usually start with research.

During the design process, research can serve as a catalyst for design decisions. If done correctly, research gives validity and justification to the design.

In the Dutch Housing graduation studio, I have used research to investigate how to design a building that embodies a metropolitan living environment for urbanites with a

metropolitan lifestyle. In this report I will reflect on the methods and tools that I have used towards the design of my building.

The first section of this report is a reflection the relationship between research and design.

In the first chapter of this section I will discuss the relationship between research, design and scientificity in the field of architecture according to some scholars and I will reflect on this with my own observations and experiences in mind.

The second chapter of this section is a recapitulation of how I did research during my graduation. Here, I will discuss in an epistemic format the various research methods and tools I used in the Dutch Housing graduation studio. Using examples from my own thesis and design project, I will reflect on why I chose each method and what I sought to accomplish with it. I will then discuss how the methods were conducted, what findings they produced and how I implemented these in my design. For each method I will also reflect on how it can be improved.

The third chapter is a retrospect on research and design during my graduation and studies in general.

The second section of this report is a commentary on the other four aspects on which graduates are required to reflect, as outlined in the graduation manual.

Here I will first discuss the relationship between my graduation project, the studio topic, my master track, and my master program.

Subsequently, I will elaborate on the research method and approach chosen in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of my work.

Then, I will reflect on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

Lastly I will discuss the ethical issues and dilemmas I have encountered in doing the research, elaborating the design and potential applications of the results in practice.

RESEARCH, DESIGN & SCIENTIFICITY

As I mentioned in the introduction, For designers and architects, research is an intrinsic part of the design process, used both as a catalyst and a verification for design decisions.

Moreover, graduating from the Faculty of Architecture and the Built Environment at TU Delft gives a person a Master of Science Degree and makes them an engineer by title. As Van der Voordt (1998, p. 1) states, an architectural engineer, where possible, is expected to make decisions in professional practice based on the results of *scientific* research and “not only rely on personal experiences, intuition and ideals and carry on working by trial and error.” In addition, engineers are expected to be able to make an inspiring contribution to the development of their field and the scientific research that is required for this.

However, this position carries with it the notion that architectural research should be scientific and that design should be based on science. To qualify as scientific, according to Van der Voordt (1998, p. 2), research has to

meet a number of criteria.

The first requirement of scientificity is for the research to be conducted methodically, i.e. the researcher examines in advance how they efficiently and effectively determine the answer to the research question. This requires a thorough analysis of the problem, exploration of available resources and consideration of the most appropriate methods for collecting and analyzing data.

Objectivity is a second requirement for scientific research. This means the researcher must eliminate personal views and value judgments from their research as much as possible. If done by another researcher using the same method, the research should produce the same results.

A third criterion is controllability or verifiability. In order to purport scientificity, the applied research design, the analysis of the material and its interpretation for third parties should be made transparent so that it is clear how the researcher came to their conclusions.

The fourth requirement for scientific research

is the validity and reliability of measuring instruments.

Validity means that the researcher measures what is meant to be measured. Reliability means

that if the measurement is repeated in unchanged circumstances, it will produce the same results.

The last criterion for scientific research is for it to be scientifically relevant. Scientific research should contribute to further developing the subject and adding to the field of expertise. Renewing or intensifying research can contribute to the development of theories, new research methods and techniques, policy instruments and product development.

Lucas (2016, p.7) echoes this by stating that “research in architecture has the potential, to contribute to the overall body of knowledge and not just continue with what’s existing and established.” He argues that in order for architecture to advance, research into its history as context and precedent must continue, as well as the social role of buildings and the theory of what it means to build and dwell.

In summary, to do scientific research is to methodically, verifiably, objectively, validly and reliably collect, edit and analyze data in order to better understand and make sense of reality, thereby making it more manageable.(Van der Voordt, 1998)

Judging by the requirements for scientific research, I can say that from my personal experience, research in the field of architecture, especially the type conducted during the design process, is rarely scientific.

Architecture lies at the interface between technology, exact sciences, humanities, arts and design. These last fields in particular make it difficult for architectural research and design to conform to scientific norms and criteria. There is a distinction between architectural design and engineering. They certainly overlap, but where engineering is an exact science, design is not. A physicist or mechanical engineer will always seek to determine an exact answer to a question or an exact solution to a problem. Architects, however, often operate in a grey area where justification for a design decision is not as black and white as in other fields. That is why the notion of objectivity in architectural research is especially ambiguous to me.

As Van der Voordt (1998, p.2) even notes: "In research into concepts that are difficult to measure, such as architectural quality, the influence of different actors in the building

process, or the importance of a specific urban development intervention, full objectivity is hardly feasible."

While architects can be methodical in their approach, the decision making process is often not as methodical and objective. It is determined by other, more subjective factors. It is subject to personal preference, contextual conditions, as much as know-how and tacit knowledge. In housing design for example, a student from Hong Kong might use a research method similar to that of a Dutch student, but due to the aforementioned factors, the implementation of the results will more likely than not result in a very different residential building.

Research in architectural design, then, often does not lead to a singular solution or an unequivocal answer, but serves more as a backbone or a foundation upon which the design can be built, leaving some room for the interpretation of the individual designer.

The same can even be said about companies specifically geared to architectural

research. Some of the larger and more established architecture firms, such as OMA, UNStudio and 3XN have their own research departments. While their research conforms to most scientific parameters, the resulting design solutions tend to be distinguishable by the style and identity of their respective architecture firms.

That being said, it is certainly possible for research in the field of architecture to be truly scientific, but this hinges largely on its ability to be objective. If the goal of the research is to produce new theoretical knowledge, scientificity is attainable. If the goal is to support and verify design decisions, not so much.

In my own design processes I believe research can be a point of departure or a tool to provide a set of constraints and principles upon which to build the design.

However, as was the case during my graduation, the specific methods I use already influence what information is considered, studied, assessed, and converted. The choice of doing research in a certain way influences which knowledge is generated and which is left out. In the next chapter I will reflect on some

of the research methods I have used and how they influenced my design process.

RESEARCH METHODS

According to Van der Voordt (1998, p.12) architectural research can be subdivided into six primary forms:

Literature research: systematically exploring, analyzing, comparing and evaluating the research results and interpretations of others.

Analysis of statistical material, for example from the Central Bureau of Statistics. This often concerns aggregated data, e.g. characteristics of neighborhoods, areas, cities, age groups, business types.

The survey: research into (usually) a large number of characteristics of (usually) a large number of re-search units. Often use is made of surveys, sometimes also of observation methods and open interviews.

Content analysis: analyzing written documents (articles, architecture criticisms), spoken text (lectures, radio broadcasts) or visual material (photo, film, video), for example, to track visions or to chart developments.

Secondary analysis: renewed analysis of existing research material, with other methods or from other questions.

The experiment: a form of research in which measurements are taken, then a change is made to the situation and measurements are taken again.

Most of the research methods I have used during my graduation can be placed within these primary forms, with an emphasis on literature research, content analysis and the experiment. In this chapter I will describe how and why I used each method, to which form it belongs and how it influenced my design and decision making process. I will also reflect on the (scientific) validity of my research and what I could do to improve my methods.

LITERATURE STUDY & OTHER READINGS

One of the primary research methods I have used during my graduation, especially in the research phase up to the P2 presentation, is the study of literature, papers, essays, and other written forms of information. Within the six primary forms of architectural research, this method is characterized as literature research and content analysis, with analysis and evaluation of sources like academic papers and books belonging to the former and analysis of other written sources like newspaper or web articles to the latter.

While my graduation topic of metropolitan high-rise living in Amsterdam was not clearly delineated from the start, it did originate and evolve out of a pre-existing personal fascination with high-rise buildings and dense urban environments. In the initial exploration and investigation of the assignment, its location and societal context, my research was therefore already narrowed down to topics and content directly or indirectly related to my personal fascination.

In order to get a grasp of the assignment and find a possible thesis topic rooted in actuality, my first research method was to read a variety

of newspaper articles, web pages and policy documents such as the municipality's vision for the project area. This gave me a broader scope of current trends and issues relevant to housing design, the graduation assignment and Amsterdam. At the same time I filtered the results to articles and topics that I deemed relevant for my personal fascination.

Amsterdam groeit vooral door komst van expats

In je eentje huren in de woontoren, dat is de toekomst

Amsterdammers kunnen het tempo niet bijbenen

'Wil Nederland ertoe doen, dan moeten steden als Amsterdam flink groeien'

01 Newspaper headlines from Parool and NRC highlighting the relevant trends and developments

Using this approach, I observed a few trends and developments pertaining to the future of housing in Amsterdam and my own suspicion:

1. The city's favorable global position, reputation as an international economic and cultural center, as well as its livability and entertainment offerings, make it a popular destination for young professionals and expats to live and work. As a result, Amsterdam is becoming an increasingly international, expensive and cosmopolitan city.

2. There is a push by the municipality and urban planners and developers to accommodate this growth mainly by densifying within the existing city limits, with a special interest in high density high-rise developments.

3. Both trends are important subjects in the debate over the future and identity of Amsterdam and what kind of city it should strive to be. With detractors arguing the city's livability and accessibility are being threatened, and advocates calling for Amsterdam to embrace this new reality and become a more populous and metropolitan city if it wants to remain relevant and prosperous in a highly competitive global economy.

In forming my graduation topic, I chose to take this latter position, seeing it as more aligned with my personal inclination.

To further develop my topic, I read Rem Koolhaas' book *Delirious New York* (1978), which was recommended by my graduation tutors. This made me link the Amsterdam's actuality and my interest in high-rise buildings and density to the theme of the metropolis and the metropolitan living environment. In the book, Koolhaas analyzes Manhattan's urban development of the late 19th and early 20th century and formulates it into a theory, which he calls 'Manhattanism'. The skyscraper is a defining element of this ideology. Especially his passage about the Downtown Athletic Club is what inspired the choice of my graduation topic:

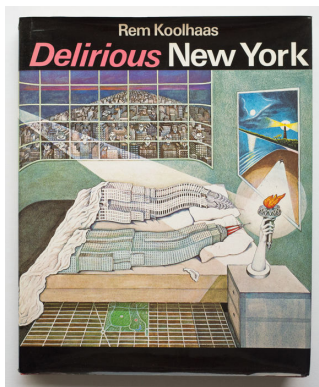
"Bastions of the antinatural, Skyscrapers such as the Club announce the imminent segregation of mankind into two tribes: one of Metropolitanites – literally self-made – who used the full potential of the apparatus of modernity to reach unique levels of perfection, the second simply the remainder of the traditional human race."(Koolhaas, 1978)

In short, the research method of exploring, analyzing and correlating literature and other written documents helped me turn a personal fascination into a graduation topic.

While I found justification for the relevance of the topic in the aforementioned newspaper articles and the statistics some of them were based on, metropolitan high-rise living is a theme that is more narrative-driven than rooted in a clearly demarcated societal issue like sustainability or the accessibility of housing for vulnerable groups. Hence, using the method of

literature research to support this narrative, the sources I analyzed to write my thesis are more literary and historical than scientific.

To define the meaning of 'metropolitan living' my primary source of inspiration was *Delirious New York*. I also examined visual material, for example the movies *Metropolis* by Fritz Lang and *Breakfast at Tiffany's*. The manifestation of this concept into built form was found in some of the examples highlighted by Koolhaas, as well as historical examples from other periods and places. To synthesize this historical and literary research into a contemporary



02 Original book cover of *Delirious New York* (Koolhaas, 1978)



03 Still from the film *Metropolis* (Lang, 1927)



04 Still from *Breakfast at Tiffany's* (Edwards, 1961)

design brief, I did research into the needs and preferences with regard to the living environment of my primary target group, expats and young professionals. I also did some case studies into precedents, which I will describe in the next chapter.

Reflection on the method

As previously noted, my internal motivation and personal fascination already geared my literature research to topics and content related to high-rise buildings and densification. In doing so, I filtered out other topics and information that might have been equally or more pressing and relevant. Going back to Van der Voordt's definition of scientific research, by having a personal interest, my research and the chosen method became subjective and unscientific. Had I looked at the assignment objectively, I would have possibly come up with a completely different graduation topic. However, while not having a personal motivation facilitates objectivity, it also brings with it the risk of wandering around aimlessly, especially in something as self-motivated as a graduation studio, where having a topic that interests oneself is of paramount importance.

Hence, the conundrum between scientificity and architectural design.

Although the types of sources I have used have origins in literature, journalism and academia and are in themselves plausible, verifiable and relevant, they are not necessarily scientific. Objectively, *Delirious New York* is not a scientific source. A retroactive manifesto is bound to be somewhat idealistic, its evidence somewhat fabricated to support the narrative. The same can be said about much of my own research. Since the purpose of research in my design process is to support the design itself, rather than produce scientific knowledge, it is often done with a certain confirmation bias, a tendency to search for, interpret, favor, and recall information in a way that affirms one's prior beliefs or hypotheses (Plous, 1993, p. 233).

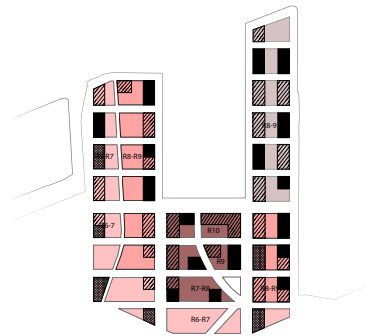
Albeit this more difficult to do when it is a narrative driven topic, one thing that could improve the way I do literature research and perhaps make it less prone to confirmation bias, is working more methodically and systematically.

CASE STUDY & PRECEDENTS

Another research method that was essential for my graduation process was the use of case studies and the investigation of precedents. Case studies and precedents are a form of Content analysis. In my graduation process this meant the exploration and analysis of buildings, dwelling types and other aspects by examining architectural drawings and other visual material such as photo and film. Where literature study and other readings had the most influence on my thesis topic and research, case studies and precedents were the most consequential for the functional and formal aspects of my building design.

Case studies and precedents analysis were done at various stages of the research and design process. In the early stages of the graduation studio, an urban framework had to be developed for the project location in Minervahaven, Amsterdam, using an existing urban plan as a basis. The urban framework I worked on was based on Manhattan. The objective was to analyze the existing plan and define its key elements, then transfer these to our design location. The essential elements of the Manhattan plan are its regular grid

and zoning laws determining the function, density and maximum building heights. For the urban framework these characteristics were incorporated and adjusted to fit the geography, context and local regulations of the site.



05 Case study of Manhattan informed urban framework

Another form of precedent study is the plan analysis. A mandatory part of the graduation studio structure, the plan analysis is an in depth case study of existing residential buildings. Each project is analysed on the same characteristics, using the same methods and drawing techniques. As such, this analysis could qualify as scientific. However, there are some possible flaws in the selection of the projects and aspects to analyze. The purpose of the plan analysis in the Dutch Housing studio is to gain insights into certain aspects of a building that are relevant for your graduation topic and that can inform your design brief and initial concept.

For my own plan analysis I analyzed three residential towers that each represent metropolitan high-rise living in a different context, two are part of the luxury segment and one is mid-priced rental. It is difficult to catch a subject like 'metropolitan living' in analytical drawings, as is not characterized by clear spatial, formal and functional aspects, but more by expression and atmosphere. Hence, I decided to focus more on the technical and functional aspects of the residential towers. Each project was analysed on four aspects:

urban context, building entrance, vertical stacking, and dwelling floorplans.

While I question the scientificity of my method, namely due to the somewhat arbitrary selection of projects that I deemed 'metropolitan', the systematic and methodical analysis and comparison of different projects on similar aspects did lead to valuable insights for my design. Skimming through a book or a scrolling down a web page to look for precedents can provide a lot of valuable examples, but it also produces scattered and disorganized information. By deconstructing each project and only extracting the information that you need, it becomes easier to draw explicit conclusions from precedent projects. Something from my plan analysis that I used in my design is the difference in layout, dimensions and location within the tower of apartments in different market segments.

Throughout the design process I also did less structured precedent studies. In my design process, moving from research to a designed form usually requires some extra input and inspiration. To gather this inspiration I generally examine precedents. In the earlier

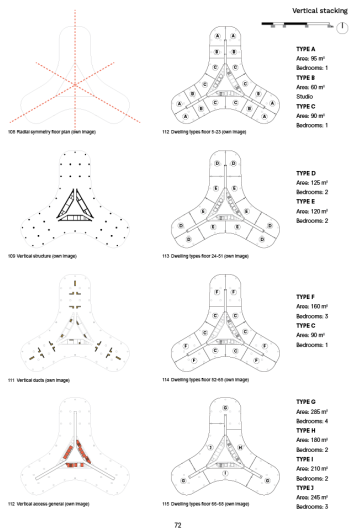
stages of the design these are mostly related to urban context in relation to massing. Later on the focus shifts to spatial and functional organization, then expression and materiality. The way I organize this is either by using pinterest and making visualization boards with specific themes, or I save images and drawings on my computer in topical folders.

In the graduation studio this process of precedent studies went similarly. Knowing my building would be a high-rise on a waterfront location, I searched for similar projects in places like Rotterdam and New York and investigated their massing and urban context, sometimes testing how they would fit on the project site by means of a quick sketch. After establishing the massing I started looking into and testing functional aspects like exact dimensions, dwelling types and core layout. The materiality and atmosphere of my final design is also inspired by studying precedents in this way.

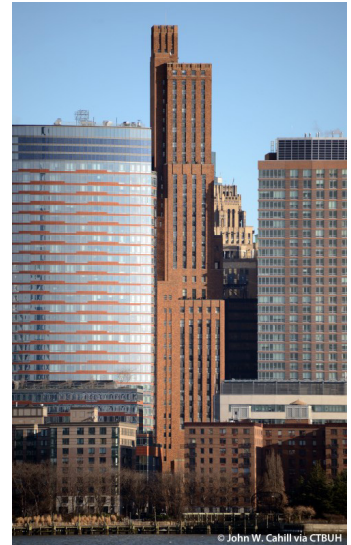
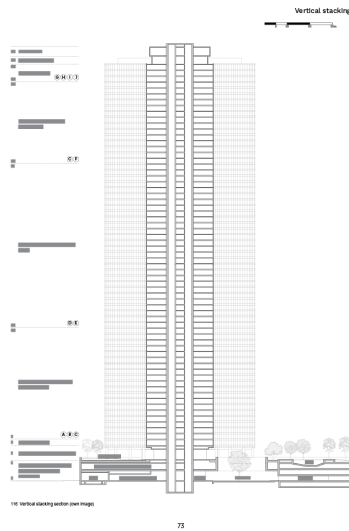
The unstructured and subjective nature of these studies make them unqualified to be labeled 'research'. Hence, the terms inquiry and inventarisation are more suitable.

While this method of inquiry is essential to my design process, there is a risk in its lack of structure. Applying elements of precedents in my own design is often based on implicit design decisions. The initial idea for the facade of my building, for example, was subconsciously inspired by the rhythmic and sculpted facades of classic New York skyscrapers. Looking back at an image of the Downtown Athletic Club mentioned in *Delirious New York*, there is a clear correlation. In hindsight, I can justify this design decision because it fits well with my graduation theme and the robust and stately expression that I want my design to have.

However, even though I can formulate clear justifications for these decisions in hindsight, adding more structure would benefit my decision-making process and make my design choices more explicit.



06 Typical plan analysis (own image)



07 Subconscious inspiration for my facade design (John W. Cahill)

SITE VISIT & ANALYSIS

Essential to every architectural design project is understanding its location and context.

In the Dutch Housing graduation this understanding of the project location was dual, initially through a site visit and later through analysis.

The goal of the site visit at the very start of the studio was to form an initial impression and suspicion about our design location. There was no structure or method in this visit, but there was one deliverable afterwards: *a pars pro toto*. This is an image meant to convey the very essence of the site. In my case this was an photograph of a Car2GO in front of an old industrial shed, with contemporary architecture and a construction crane in the background. To me this symbolized the essence of this former industrial area transforming into a contemporary mixed district, the dock workers and mechanics being replaced by young, tech-savvy, professionals.

Although rather subjective and hardly scientific, this method of analyzing the site gave me an immediate impression of the site and served as a point of departure for the rest of my research, having already established a possible identity and target group for my graduation project.

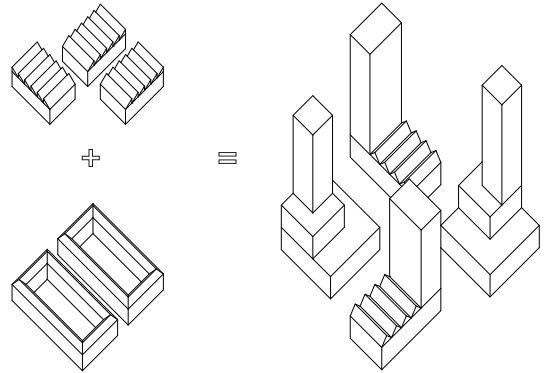
Aside from the subjective impression of Minervahaven, there was also a more objective analysis of the area's geography and history, as well as the municipal visions and policies affecting the project location and informing the project brief.

While this analysis was useful to understand the location, it did not carry the same weight as it does normally. The reason for this is twofold. Normally there is a lot of historical context to build on and existing structures to consider, but in Minervahaven almost all the original context has been replaced by contemporary office buildings. The structure of the graduation studio also played an important role in the existing context being of secondary importance. The starting point was a 'quick-and-dirty' masterplan, overlaying an existing urban plan on the project site. For the sake of consistency, anything existing that did not fit was disregarded.

Typically my design decisions have a strong contextual basis, especially with regard to massing and expression. Basing these decisions on an expeditiously composed urban scheme at times caused some dilemma's for me in regard to the validity of my design.



08 Pars pro toto (own image)



09 Municipal strategy for densifying the area (own image)



10 Master plan based on Manhattan (own image)

HAND DRAWING

Hand drawing is a tool I often use in my design process to quickly test an idea or hypothesis. Within the primary research forms previously outlined it is part of the *experiment* category, described by Van der Voordt as a form of research in which measurements are taken, then a change is made to the situation and measurements are taken again.

In my own design process hand drawing or sketching is the first instrument I use to put my ideas into form or to make my thoughts explicit.

Sometimes these ideas derive from random flashes of thought, sometimes from my personal frame of reference and other times from precedent analysis or a reference image.

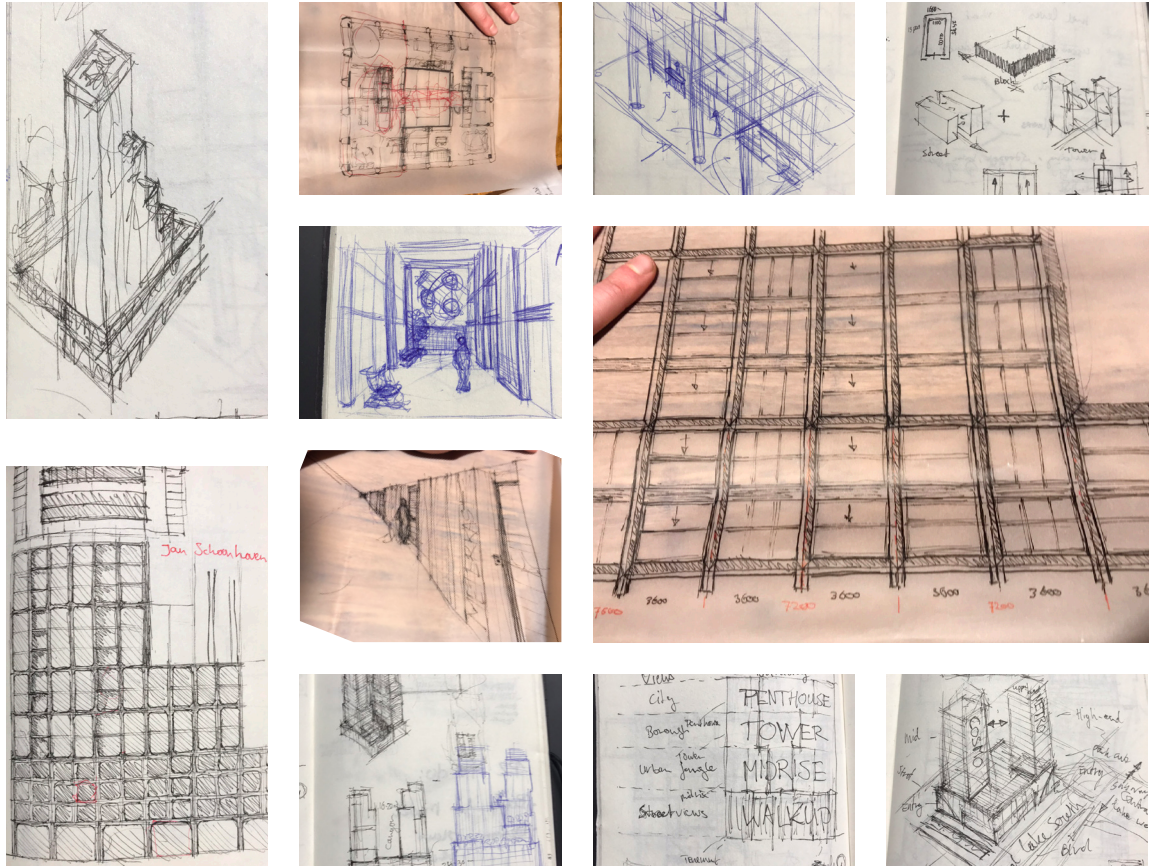
In my graduation studio I used sketches in all different phases, on all different scales and on all aspects of the design, ranging from conceptual diagrams to floor plans, elevations and eye-level experience. Sketches also serve as a foundation for other methods like physical and digital modeling, or they can be used in combination, for example to quickly test an idea on a printed cad drawing that would otherwise take a long time to draw in the computer.

While the value of hand drawing as a tool in my design process is evident, its validity as a research method is still dubious. The methodical, structured and verifiable way of working is usually absent from my design process.

For sketching to become more valuable as a research method and not just a design tool it would have to be more methodical and, like a scientific experiment, measurable. This would mean testing different options with the same parameters and evaluating them.

In reality, when I sketch I usually continue with the first option that I deem valuable, so I rarely complete the experiment. Another factor making hand drawing less suitable as a research tool is its lack of accuracy.

As I have noticed often in my design process, sketching works well as a starting point, but it is a distorted representation of an idea. To make it truly plausible, more accuracy and detail is needed, at which point I switch to CAD. The same can be said for sketching as a research method. If you want to do an experiment with minor variable changes, sketching is too inaccurate, since no two sketches are the same.



11 Various hand drawings from my design process

PHYSICAL MODEL MAKING

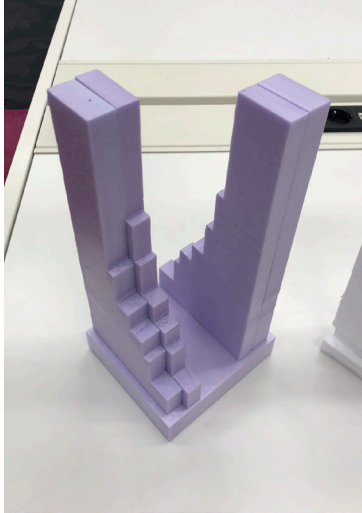
Another method involving experiments is the use of physical models. During my architecture studies I have often used models as representative final products for presentations, but rarely as a research tool during the design process. One reason for this was my lack of skill and speed, combined with a tendency to go too much into detail. Another reason was I did not see the purpose of making physical models if I could achieve the same result (I thought) using my computer. In my graduation process, however, I discovered the value of model making as a research method.

Using a foam cutter you can quickly and accurately produce multiple variations of the same model to research the effect of tweaks and changes. It is also a good tool to compare the different options, because the models can be placed in a row and viewed from every angle. This is something you cannot achieve with a sketch or a computer model.

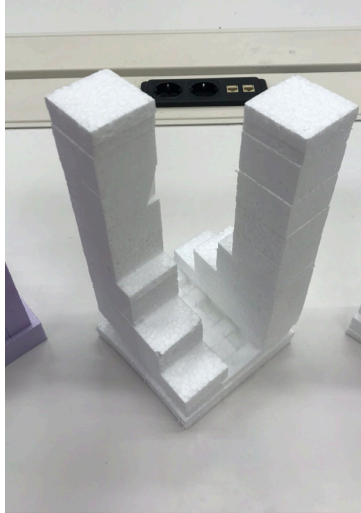
During the graduation studio I found physical models especially helpful in developing my building mass. For the P2 presentation I had quickly developed a building form with a jagged edge, to provide collective outdoor terraces. After the summer period I wanted to further

develop these collective spaces, together with my overall building mass, using physical models. As I had little experience working with foam models and wanted to do a few quick studies, I decided to work with coarse rectangular blocks. This is another instance where my research method influenced my result. The practical choice of working with simple blocks gave me a new insight into my building mass. When seeing the different variations (13-15) I started to question my initial choice for a double jagged edge (12). The simplified forms were not only more coherent, but also more structurally efficient. As a result I decided to abandon my original design and continue refining the new building mass I had discovered (image 16).

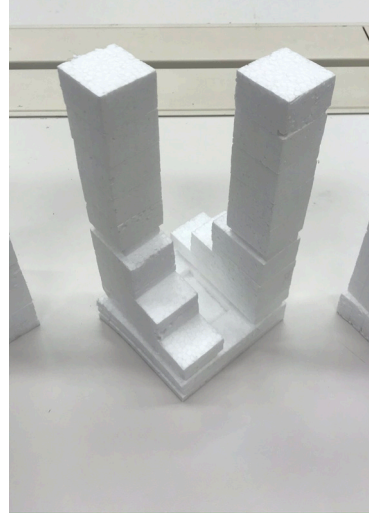
While the value of physical models as a tool for research has become more apparent to me during the graduation studio, there are still some improvements I can make in my method. Setting clear parameters in advance can make the process more structured and explicit. Although this lack of a clear structure did by chance lead to new insights. This is again the dichotomy between the rigidity of research and the openness of design.



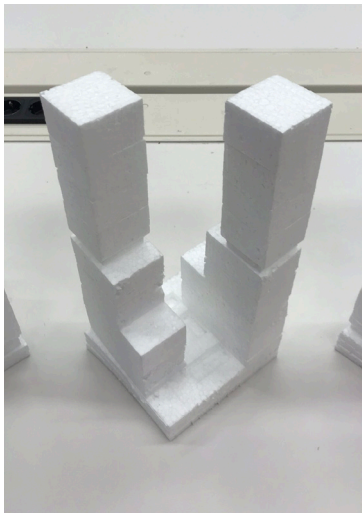
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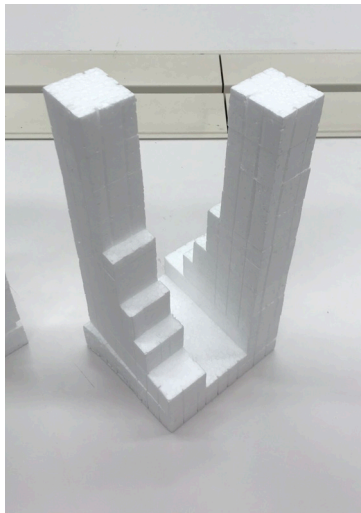
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DIGITAL DRAWING & MODELING

Digital modeling is a tool that I often use to do research in my design process because of the freedom that it gives a designer to work in every scale and detail level possible. It also allows me to produce and compare a variety of options quickly and accurately.

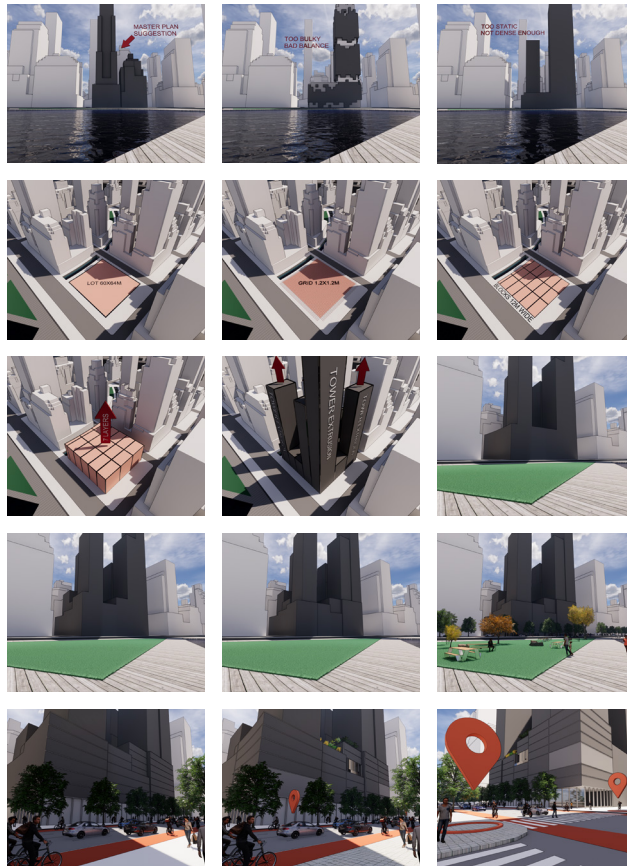
During my graduation process I used digital modeling to study everything from my urban plan to my building mass, facade and interior spaces.

The option to create different views and turn on and off different layers makes it quick and easy to test different variations of a design aspect. I applied this method for example to test the rhythm and materiality of my facade, or the layout and of my lobby.

While the accuracy of digital modeling is beneficial on many levels, it also has its disadvantages. Whereas in a sketch or physical model you usually work at a scale that leaves out certain irrelevant details, a digital model is always in a 1 to 1 scale. This brings with it the risk of getting distracted from the essence of what you are trying to achieve with your research or design. For example when I was researching the rhythm of my facade: In my

sketch everything is simplified to its essence, with a window frame being a simple square or double line. In my digital model, I made curtain wall mullions, and glass a certain thickness and transparency. In researching aspects that are less prone to excessive detailing, such as my building mass, I found digital modeling more valuable.

Another drawback of digital models is that they raise the notion of being three-dimensional but only show two-dimensional images on a screen, while a physical model shows actual depth. One way this difference can be mitigated is by using virtual reality.



17 Virtual reality massing studies

RETROSPECT

After reflecting on the relationship between research and design and juxtaposing this with the research I have done in the past year, a few conclusions can be drawn.

Having done research in one way or another at various stages of my architecture studies and realizing its value, I have nonetheless been largely unaware of the precise workings of the different methods I used, not to mention the influence these methods had on my design process and outcome. This lack of awareness has often resulted in ineffective research that was either too broad, too narrow, too shallow or too astray.

While I cannot say that my way of doing research in a design process has vastly improved during my graduation year, I can say that I have become much more aware of how I do research and how this informs and influences my design decisions.

The realization that a preference of certain research methods over others in the design process directly impacts the design is important. Especially in my own design

process, which is often characterized by fixation on a specific aspect of the design. In retrospect this was heavily informed by my way of doing research or lack thereof and my preference for the use of computer programs to test ideas and designing. This is a lesson I can apply to future design processes: broadening my research and trying different methods can help preventing this fixation.

While I am still doubtful whether scientificity of research in a design process is attainable or even desirable, reflecting on my own research and design process and its deficiencies, I can attest that a clearly defined method and structure is essential.

REFLECTION ON OTHER ASPECTS

The last section of this report is a reflection on five different aspects of research and design, based on the graduation manual.

Aspect 1: Relationship between research and design

The reflection on the relationship between research and design can be found in the previous section.

Aspect 2: The relationship between your graduation (project) topic, the studio topic, and your master programme

The central question of the Dutch Housing graduation studio *Between Standard and Ideals - the future of housing in the Netherlands* - is

‘How do we want to live and what kind of buildings do we need to allow for that?’

The assignment is to develop a housing scheme that embodies the future of housing in The Netherlands, that can be visionary and idealistic, but should also be relevant and rooted in actuality.

In an ever more competitive and globalized market, Amsterdam's best chance for economic progress and future growth is to go along with the rest of the crowd of global cities. In order to do that the city needs to continue to attract and retain young and international talent that wants to work and live there. Naturally, this also requires adequate housing. This project seeks to add a different type of housing to Amsterdam that is specifically dedicated to this new metropolitan demographic. In doing

so, I believe it is both relevant for the current and future situation in Amsterdam. In adding a new housing concept to Amsterdam my project aligns with my master's programme's focus on innovation and future issues.

Aspect 3: Elaboration on research method and approach chosen by the student in relation to the methodical line of inquiry, reflecting thereby upon the scientific relevance of work

Compared to other graduation studios, the Dutch Housing graduation studio has a fairly rigid structure to which students are expected to adhere to. Since housing design is a somewhat practical issue concerned with affordability, precise dimensions and realism, the studio wants to avoid bombastic and unrealistic proposals. Hence, the structure up to the P2 presentation is largely predefined. The research should be about a topic that is rooted in a relevant contemporary issue. While most forms of research are encouraged, there are mandatory deliverables in the form of a research report supported by literature research and a plan analysis of a number of projects relevant for the graduation topic.

In the second semester students are more free to use other methods of research. While my project is supported by various forms of research, much of the final design is also a result of more subjective and personal motivations. A more detailed elaboration of this can be found in the previous section of this report.

Aspect 4: Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results

My graduation project proposes a new housing concept to Amsterdam: Metropolitan high-rise living. This form of living is specifically designed for the growing demographic of expats and young professionals with upward mobility, looking to live in a high density urban environment.

The city is historically characterized by low-to midrise architecture with a small grain size in its core and functionalist apartment housing in its periphery. It features very few high-rise buildings, let alone residential towers. This project seeks to introduce a specific form of high density high-rise living to Amsterdam, but the concept can also be applied elsewhere. My research is largely based on historic and existing examples of metropolitan or high-rise living that are more common in places like New York, London and Paris. Some of the results from my research are transferable to practice, especially in the Netherlands.

While the design has a rather unusual form of two terraced towers connected by a 5-story podium, some of the principles I applied to create a very high density (500 dwellings on a 4000 m2 plot) living environment can be also be useful in other projects. For example the core & corridor access system and the large number of collective amenities to compensate for the relatively smaller dwellings.

Aspect 5: Discuss the ethical issues and dilemmas you may have encountered in doing research, elaborating the design and potential applications of the results in practice

Most graduation projects in housing design are about solving a societal problem or helping the vulnerable. This one is not. Instead it is about embracing and designing for the new reality of Amsterdam becoming an increasingly international, wealthy and expensive city.

The obvious ethical issue I encountered is that while housing in Amsterdam is becoming more and more expensive and difficult to find for Dutch people with an average income, I'm designing for an international target group in a higher market segment. When people have to wait a decade to become eligible for social housing, my graduation topic of metropolitan high-rise housing might not have the highest priority.

However, even though there are more socially urgent topics to graduate in, the topic I chose is just as relevant, as it creates housing specifically catered to Amsterdam's growing population of expats and high-earning young professionals. It also fits within the global boom of high-rise construction. As an architect I believe you should be able to design for any situation or target group. And while you do not have any influence on market forces, policies and demographic changes, you are able to influence the way these forces manifest themselves in the built environment.

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