Graduation Plan: Architecture

Personal information:

Name: Matteo Casaburi  
Student Number: 4314697  
Address: Zuidwal 29  
Postal Code: 2611 DD  
Place of residence: Delft  
Telephone Number: +31 649171984  
Email address: matteo.casaburi@hotmail.com, M.Casaburi@student.tudelft.nl

Studio:

Studio: Heritage & Architecture  
Theme: Design & Heritage  
Teachers: Lidy Meijers (design mentor), Sara Stroux (research mentor), Jan van de Voort (building technology mentor), Annette Marx (guest architect)

Argumentation of choice of studio: The challenge to sensibly make new interventions in the historic city can trigger a series of questions that I consider very interesting to address for contemporary architects. The studio gives me the possibility to explore my interest in the upgrading of the historic city to modern standards of comfort and energy performance, reflecting upon its tolerance for change while respecting, understanding and interpreting the cultural identity of the pre-existent urban fabric.
Title:
Title of the graduation project: Sustainable upgrade of the historic city from the architectural perspective

Product:

Problem statement:

- The twofold nature of architecture

The nature of architecture can be considered as being shaped by two different characters, one more related to the rational, the objective, the efficient and the functional, the other more linked to the irrational, the subjective and the meaningful. The special quality of architecture lies in its capability to blur the lines between these two worlds and to connect them in a beautiful balance.

My personal interest in the way the discipline is capable of joining this two sides is a source of inspiration for the topic of my graduation project, which will be focused on the exploration of the architectural possibilities of sustainable upgrade.

The concept of technical upgrade of existing buildings will therefore be examined with the aim of reflecting upon the possibilities that a series of technical strategies can offer for the creation of something which escapes mere technical definition. How can they produce something meaningful? How can they shape something beautiful? How can they create atmosphere?

- The need to reduce energy demand

The discourse upon architectural sustainability is considered one of the most pressing issues of our time. In fact, phenomena such as climate change, the greenhouse effect and the harmful consequences of the use of fossil fuels suggest to reconsider the way we use our energy. In this respect, the building sector represents the biggest energy user and thus can play a major role in the reduction of global energy consumption. (*)

Therefore, a series of strategies should be used not only to ensure the sustainability and energy efficiency of new constructions, but also the upgrading of existing buildings to future technical and comfort standards. In fact, it has been proven that demolition is almost never the most suitable option, both from the economical point of view - since the extension of the building life cycle and the reuse of its structure constitute less environmental impact - and from the architectural and societal point of view, since a document of the past constituting a piece of our collective memory and identity would be lost. (*)

For this reasons, the graduation project will express the societal relevance of upgrading our historical buildings to modern standards of comfort and energy emission and will consider it as the most suitable way to preserve their important role in our lives. However, the challenge following this approach underlines the question of how to intervene on the historic city without compromising the character, the architectural quality and the beauty which define it.

- The challenge to intervene in the historic context

The need to reduce energy demand is pushing us to reconsider the way energy is used in our historical buildings to make them more sustainable. However, when intervening in the historic context with contemporary strategies of upgrade, a series of challenges arise regarding the possibility and the manner to conjugate the technical upgrade dictated by the demands of the contemporary society with the aesthetics and architectural demands of the historical city.

How can the new be inserted in the old without compromising its character? How could the architect create a new harmony between the past, the present and the future layers of the building history? How to conjugate sustainability upgrade with the creation of a beautiful ensemble?

Energy Usage by Sector Including Detail for Residential (Energy Star, 2010; Perez-Lombard, Ortiz, & Pour, 2008)
Research question:

The research question conjugates my interest in the upgrading of the historical city examined from the architectural point of view with the brief of the studio, an intervention in the historical inner city of Amsterdam, in particular on the Binnengasthuisterrein.

How to address technical problems of upgrading of energy consumption and comfort from the aesthetic and architectural point of view? How does this operation relate to the historic context and its listed status?

In particular, how could it be possible to apply strategies for building upgrade in the context of the Binnengasthuisterrein in Amsterdam?

What are the technical requirements for their application in terms of building structure and material tolerance for change?

How can the impact of these strategies be conjugated with the aesthetical and architectural demands of the historic city and the listed status of the majority of the buildings of the site?

How could this approach, apart from improving the technical performance of the considered buildings, be capable of playing a relevant role in preserving, revitalizing or enhancing the architectural quality of the site?

The design assignment will focus on the Second Surgical Clinic and the New Clinic, as emphasized on the plan. This choice is derived by a series of factors: first of all they are both historical and listed buildings; in addition, they directly influence the potentialities, in my opinion today still not explored completely, of the public void spaces - streets, external squares and internal courtyards - that they define.
Goal:

The objective of the graduation project will be to explore the tolerance for change of the existing urban fabric in a way that conjugates the technical requirements of the contemporary society - in terms of energy consumption and comfort - with the aesthetical and architectural demands of the historic city.

In particular, my aim will be to propose an approach that uses technical strategies of building upgrade in an architectural way to intervene on the historic urban fabric, trying to enhance the architectural quality of the place while understanding and interpreting its cultural value.

Therefore, the objective will be to insert my work in the broader field of the sustainability and upgrade debate and to offer my own contribution in terms of proposing an architectural reading of the technical strategies for building upgrade in a way that capable to create a meaningful insertion in the historic urban fabric.
Process:

Method description:

The research will aim at creating a strong theoretical framework on which to ground the design project, which will reflect on the possibilities and challenges derived from the application of sustainability upgrading strategies on the historical city, both from the technical and aesthetic point of view, trying to conjugate the rational base of sustainable upgrade with the architectural demands of the pre-existent site.

The first phase of the research will be to find and study a series of strategies for the sustainable upgrade of existing buildings and analyse them from the technical point of view - considering their the advantages, limitations and technical and material requirements - and from the architectural point of view, focusing on the qualities that these techniques can provide to existing historical buildings. In this respect, a series of case studies will be analysed to ground and deepen the reflection.

In the meantime, the architectural and urban analysis of the Binnegasthuis site will provide a series of motivations regarding the choice of the buildings on which to apply the strategies. These buildings - most probably the second surgical clinic and the mensa - will be then analysed in detail considering their architectural and technical qualities.

After that, the second phase of the research will focus on speculating on the advantages and disadvantages of the application of the strategies on the buildings considering their requirements in terms of architectural and technical tolerance for change.

The results and the conclusions of this process will provide inspiration and a strong theoretical and analytical basis to the design process. Therefore, the method used in the design phase will be constituted by a series of design speculations and attempts which will aim at stressing the tolerance for change of the buildings and to provide a technical upgrade of the historical city capable of preserving, revitalising or enhancing its architectural quality.

Once the right balance between all these ingredients will be found, the design will proceed to its detailing and finalisation.
Research question

Urban and architectural analysis

Strategies for building upgrade
  - Technical analysis
  - Architectural analysis

Analysis of chosen buildings

Application of strategies to chosen buildings

Programme of possibilities

Design speculations and attempts

FINAL DESIGN
Literature:


Borch, I. “Skins for buildings - The architect's materials sample book”. BIS. 2004


Dahl, T. “Climate and architecture”. Routledge. 2010


Itard L. Meijer, F. “Towards a sustainable Northern European housing stock - Figures, facts and future” Amsterdam: IOS. 2008


Petzet, M. Heilmeyer, F. “Reduce Reuse Recycle”. 13th International Architecture Exhibition La Biennale di Venezia 2012

Reflection:

Relevance:

The value of the graduation project will be to tackle the pressing issue of sustainable upgrade of the existing building stock and to reflect upon the possibilities and the challenges, both technical and architectural, of operating this upgrade in the context of the historic city.

I believe that the work could be a valid contribution to the current debate upon the position the contemporary architect should adopt in respect to the historic city and to a sustainable development that conjugates the technical and the aesthetical extremes of the discourse; an approach capable to understand and emphasize the qualities and the possibilities inherent to the historic site while preserving, revitalizing or enhancing the architectural qualities of the place.
Time planning:

1.1 - 1.5
- Architectural and urban site analysis (group work)
- Frame my assignment and research topic
- Initial readings on the research literature and personal interest
- Draw first conclusions out of the urban analysis

1.6 - 1.7
- Prepare research report for P1:
  - Urban and architectural analysis
  - Strategies of building upgrade
  - Analysis of case studies
- Analysis of chosen buildings
  - Application of strategies to chosen buildings
  - Programme of possibilities
  - Masterplan and first design directions
- Building technology analysis

1.9 - 1.10
**P1 Presentation**
- Present the research report
- P1 feedback
- Research report improvement

2.1 - 2.3
- Further research on the theoretical topic
- Further site analysis
- Explore first urban and architectural design directions
- Design of personal masterplan
- Proposals of first architectural design ideas

2.4 - 2.7
- Research methods: position paper
- Preparation for P2:
  - Conclusions from research and site analysis
  - Define personal masterplan and concept design
  - Design of the chosen buildings

2.8
**P2 Presentation**
- Final research and site analysis report
- Personal design presentation
3.1 - 3.6
Development of the overall design
Detailing of the masterplan
Detailing of the plans, sections elevations
Detailing of the structural and technical design
Detailing of the materialization

3.7 - 3.8
**P3 Presentation**
Overall design

3.9 - 4.3
Further development of design
Detailing of the plans, sections elevations
Detailing of the structural and technical design
Detailing of the materialization
Finalize the design
Finalize the graduation report

4.4 - 4.5
**P4 Presentation**
Elaborated design

4.6 - 4.9
Finalize material for final presentation

4.10 - 4.11
**P5 Presentation**
Graduation report
Final design