HOSPITAL

Staff-Centric: Navigating Care Aleksandra Michalik 04/06/2025 - P5 Presentation

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DESIGN

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INTRODUCTION



ASSIGNMENT

TRAIN STATION



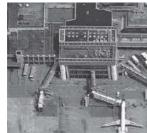
Stazione Centrale, Ulisse Stacchini, 1930-1931





Universita Luigi Bocconi, Grafton Architects, 2008

AIRPORT



Aeroporto Linate, 1937 + 1993 LIBRARY



Fondazione Feltrinelli, Herzog de Meuron, 2013





Clinica La Madonnina Eugenio ed Ermenegildo Soncini 1957-1959 **THEATRE**



Teatro alla Scala, Giuseppe Piermarini 1776 - 1778, Mario Botta 2004, 2023





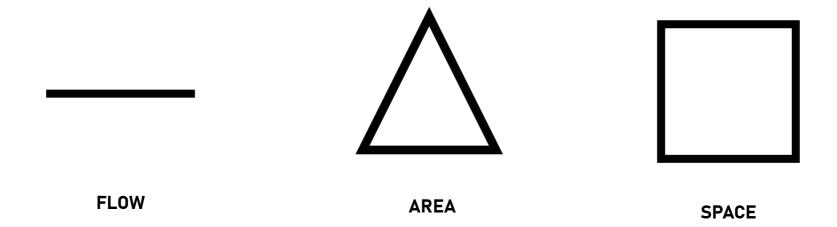
Palazzo di Giustizia, 1929-1947 **MUSEUM**





Fondazione Prada OMA, 2015

Introduction ASSIGNMENT



ASSIGNMENT

TRAIN STATION



SCHOOL



AIRPORT



LIBRARY





HOSPITAL





Clinica La Madonnina Eugenio ed Ermenegildo Soncini

THEATRE

















projects complex

ASSIGNMENT

TRAIN STATION











LIBRARY







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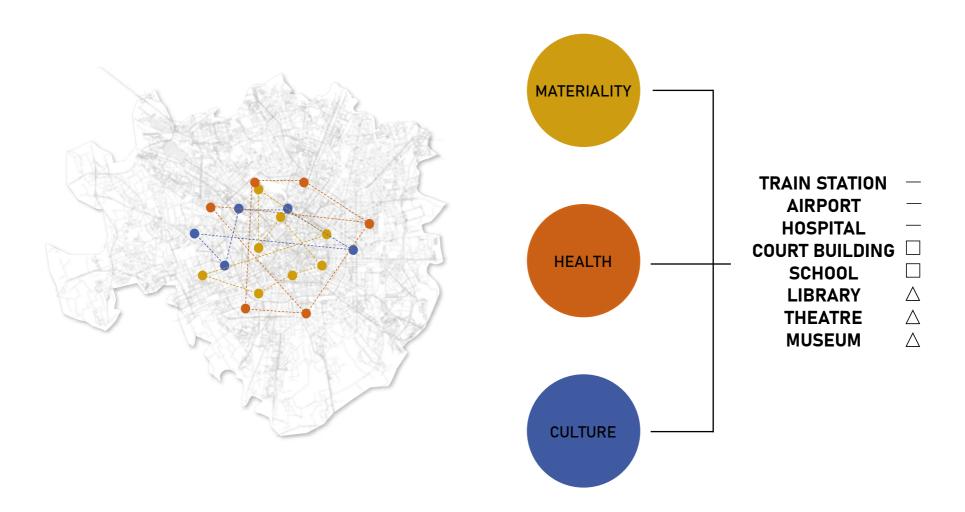


MUSEUM

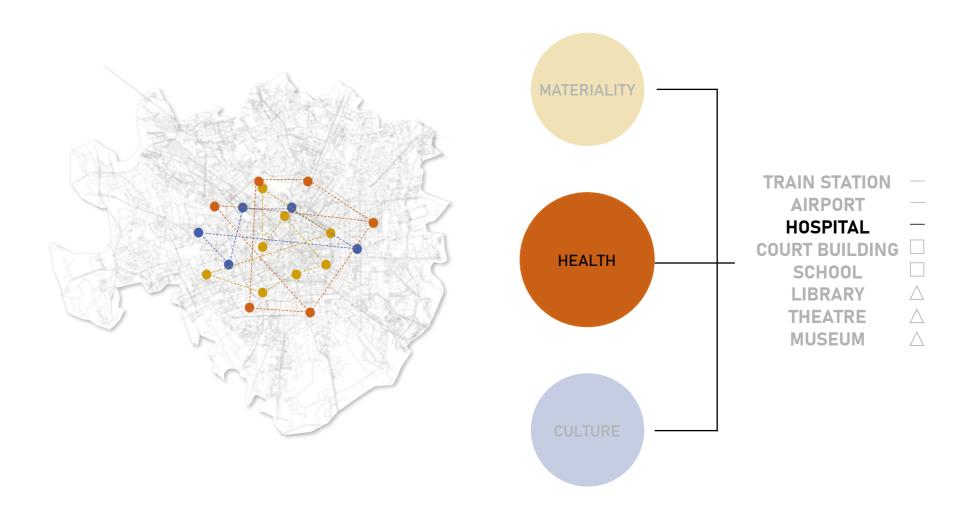




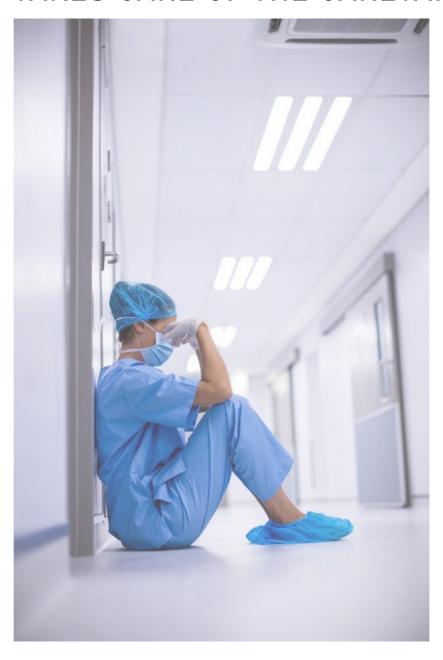
ASSIGNMENT



ASSIGNMENT



WHO TAKES CARE OF THE CARETAKER?





12 HOURS. NO NATURAL LIGHT. NO SILENCE. NO PAUSE.





5 MINUTES IN DAYLIGHT. BREATHING ROOM. MENTAL RESET.



STAFF WELL-BEING IS A SPATIAL ISSUE — AND A DESIGN OPPORTUNITY.

Introduction AMBITION



Creating a medical facility that prioritizes the well-being of medical staff to improve the general quality of heathcare



HOW MUCH DOES A NURSE WALK WEEKLY?

Introduction SIGNIFICANCE

Up to 8 km a day, which over a span of the week can add up to a marathon length



Introduction RESEARCH QUESTION

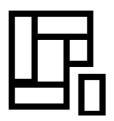
How can hospital design positively influence staff well-being?

WHAT THE EVIDENCE TELL US ABOUT SPACE AND STRESS



Physical access to green space reduces fatigue





Various resting spaces help reduce physical and mental restrain

WHAT THEY NEED







Access to daylight



Outdoor release points



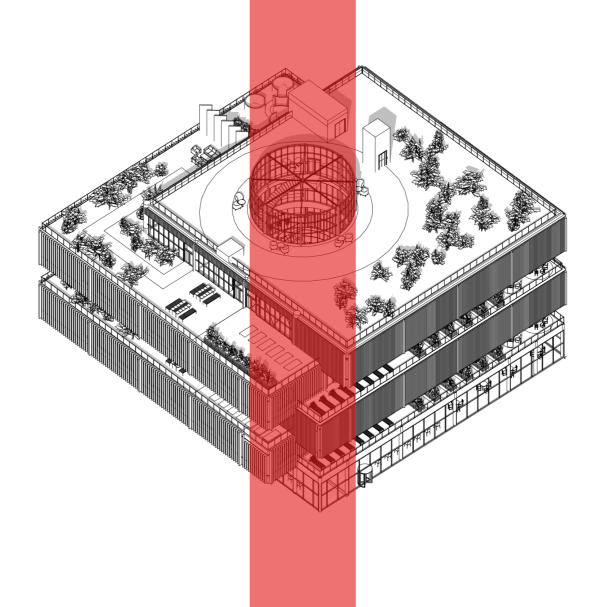
Predictable spatial logic



Acoustic calm

IF THE HOSPITAL IS A MACHINE FOR HEALING, IT MUST ALSO SUPPORT THE PEOPLE WHO MAKE HEALING POSSIBLE.

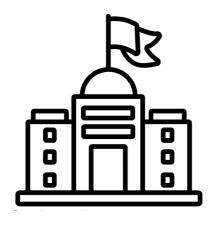
THIS PROJECT PLACES STAFF NEEDS — PHYSICAL, EMOTIONAL, SPATIAL — AT THE CORE OF ITS DESIGN

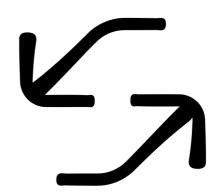


RESEARCH



Introduction THE BEVERIDGE MODEL





THE BEVERIDGE MODEL

MIXED HEALTHCARE SYSTEM

WHAT IS A HOSPITAL?

Hospital, an institution that is built, staffed, and equipped for the **diagnosis** of disease; for the **treatment**, both medical and surgical, of the sick and the injured; and for their housing during this process. The modern hospital also often serves as a centre for **investigation** and for **teaching**.

Fralick, P. C., Piercey, . W. Douglas and Scarborough, . Harold (2024, October 17). hospital. Encyclopedia Britannica. https://www.britannica.com/science/hospital



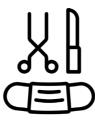
Aleksandra Michalik

WHAT MAKES A HOSPITAL?

Patients



Staff



Flows



Functional zones

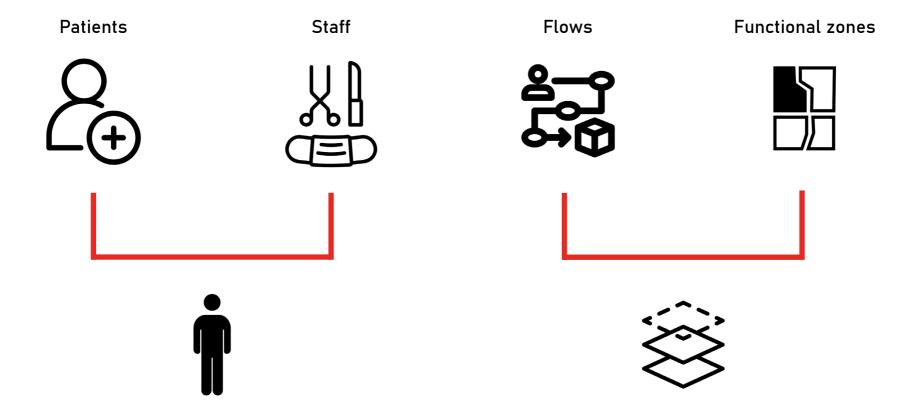


https://www.healthdesign.org/ https://healthcaredesignmagazine.com/ https://www.who.int/



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WHAT MAKES A HOSPITAL?



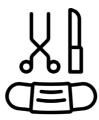


WHAT MAKES A HOSPITAL GOOD?

Patients



Staff



Flows



Functional zones



ACTORS OF THE FACILITY







TIME SPENT IN THE FACILITY

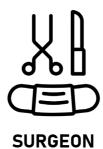


5 AND ½ DAYS



NURSE

UP TO 240 HOURS A MONTH



UP TO 320 HOURS A MONTH

ROUTE COMPARISON



Patient

Patient room

Procedure room/

radiology/laboratory

Counseling room

Dining area



Nurse

Changing rooms

Nurse station

Inpatient rooms

Operating room

Lounge

Restaurant

Examination rooms

Ophtalmologist

darkroom

Discharge area

Entrance area



Surgeon

Changing rooms

Doctor's office

Surgeon preparation

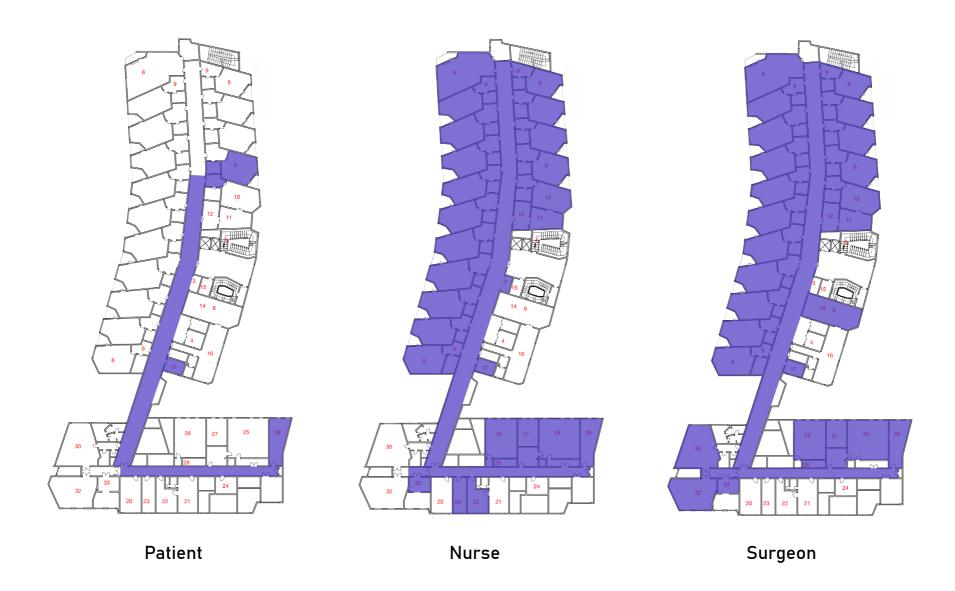
area

Operating room

Visitor area

Inpatient area

SPATIAL AND FLOW COMPARISON



HOW MUCH DOES A NURSE WALK WEEKLY?

Research SIGNIFICANCE

Up to 8 km a day, which over a span of the week can add up to a marathon length



SIGNIFICANCE



SIGNIFICANCE



► Diseases. 2022 Aug 3;10(3):50. doi: <u>10.3390/diseases10030050</u> ☑

Work Conditions of Italian Nurses and Their Related Risk Factors: A Cohort Investigatory Study

Elsa Vitale 1

Editor: Domenico De Berardis¹

► Author information ► Article notes ► Copyright and License information

PMCID: PMC9397050 PMID: <u>35997355</u>

Anxiety, Depression, Body Mass Index, Physical Activity in Nomophobic Italian Nurses: A Chronic Latent Inflammation?

Elsa Vitale ¹, Rocco Mea ², Angelo Benedetto ³, Donatella Capizzello ⁴, Simone Zacchino ⁵, Melania Zaminga ⁶, Matteo Russo ⁷, Filippo Ingrosso ⁸, Chiara Mazzarella ⁹, Giovanni Scupola Maria ⁹, Teresa Buccolieri ¹⁰, Roberto Lupo ⁷

Affiliations + expand

PMID: 36896904 DOI: 10.2174/1871530323666230310152747

How shift work influences anxiety, depression, stress and insomnia conditions in Italian nurses: an exploratory study

Elsa Vitale ¹, Roberto Lupo ², Giovanna Artioli ³, Rocco Mea ⁴, Pierluigi Lezzi ⁵, Luana Conte ⁶, Giorgio De Nunzio ⁷

Affiliations + expand

PMID: 37092618 PMCID: PMC10210562 DOI: 10.23750/abm.v94i2.14230



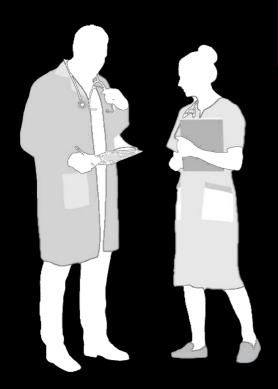
Research

QUESTIONNAIRE HIGHLIGHTS

"There isn't enough space for both staff and patients in the ward, which slows down our ability to care for them efficiently"

"The night room is too small and uncomfortable for staff to get proper rest between shifts"

"Walking long distances between floors because the single elevator for staff is always busy wastes valuable time"



Medical errors, including healthcare-related adverse events, occur in 8–12% of hospitalisations in Europe

At least 50% of hospitalized patients' harm could be preventable

Reduction of the medical errors will lead to reduction of overall healthcare costs

"HOSPITAL OF THE FUTURE" - POLITECNICO DI MILANO

WHO COLLABORATING CENTER

A TECHNICAL BRIEF | KEY MESSAGES

Objective: to support the European Region in planning, programming and design new hospitals and redevelopment of existing healthcare facilities with innovative strategies.

- STRATEGIC LOCALIZATION **INDOOR AIR QUALITY**
- FLEXIBILITY AND RESILIENCE SAFETY AND SECURITY
- **FUNCTIONAL DESIGN**
- NUCLEUS HOSPITAL
- SINGLE PATIENT ROOM (+1) ■
- **SUSTAINABILITY**
- HEALING GARDENS
- HEALTHY WORKING SPACES •

- **INCLUSIVE DESIGN**
- DIGITALIZATION
 - TERRITORIAL HEALTH
 - **NETWORK**
- EVIDENCE BASED DESIGN
 - **FUTURE CHALLENGES**

Stefano Capolongo - 'Hospital Design and Urban Health', Politecnico di Milano, 2023



Aleksandra Michalik P5 Graduation Presentation 04.07.2025

"HOSPITAL OF THE FUTURE" - POLITECNICO DI MILANO

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- INCLUSIVE DESIGN
- NUCLEUS HOSPITAL
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- TERRITORIAL HEALTH

SUSTAINABILITY

NETWORK

- HEALING GARDENS
- **EVIDENCE BASED DESIGN**
- HEALTHY WORKING SPACES
- **FUTURE CHALLENGES**

Stefano Capolongo -'Hospital Design and Urban Health', Politecnico di Milano, 2023

Research

GLOBAL SIGNIFICANCE







Employee wellbeing is defined as the overall mental, physical, emotional, and economic health of your employees. It's influenced by various factors such as their relationships with co-workers, the decisions they make, and the tools and resources they have access to. Hours, pay, and workplace safety also have a significant impact on employee wellbeing.

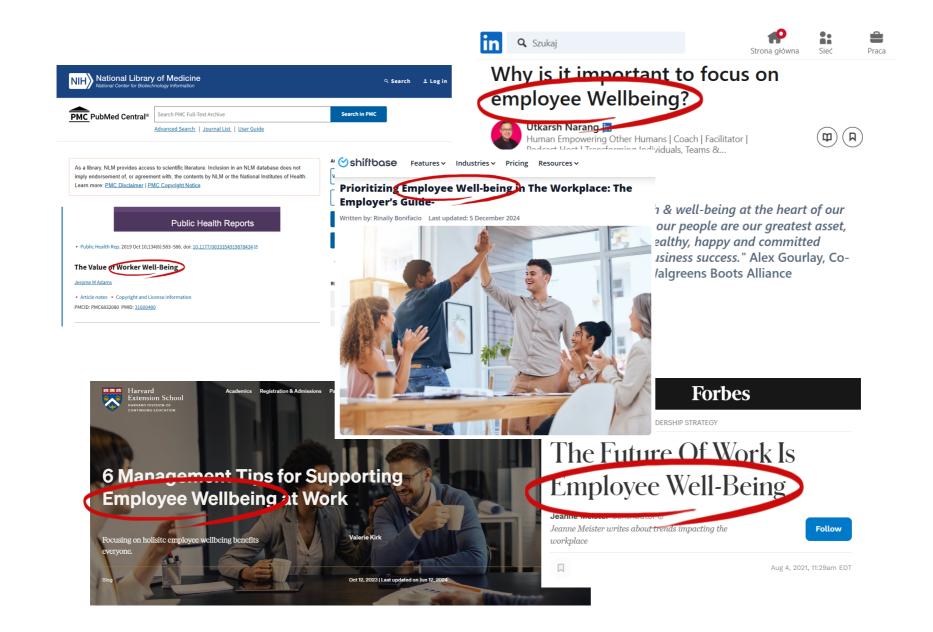
https://www.linkedin.com/pulse/why-important-focus-employee-wellbeing-utkarsh-narang-8 etcc/



Aleksandra Michalik
P5 Graduation Presentation 04.07.2025

Research GLOBAL SIGNIFICANCE





projects

complex

Research RESEARCH QUESTION

How can hospital design positively influence staff well-being?

DESIGN BRIEF



PROGRAM ANALYSIS - OTHER HOSPITALS



Rigshospitalet North Wing (Copenhagen, Denmark)



Lunder Building at Massachusetts General Hospital (Boston, USA)



Erasmus Medical Center (Rotterdam, Netherlands)

PROGRAM ANALYSIS - OTHER HOSPITALS







DECENTRALIZED CLINICAL UNITS

NOISE REDUCTION

NATURAL LIGHT

EFFICIENT WORKFLOWS

EFFICIENT WORKFLOWS

CLEAR SEPARATION

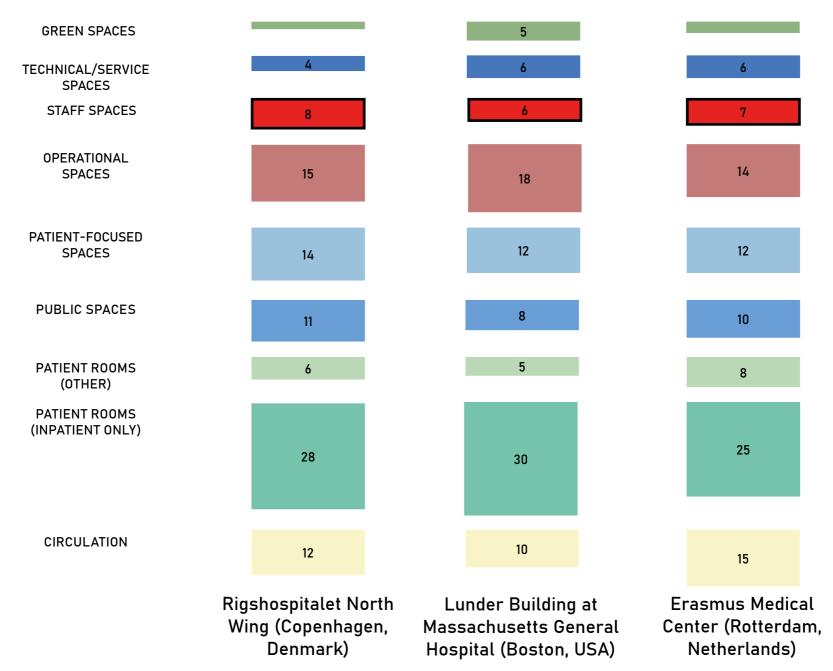
STAFF LOUNGES

AUTOMATED LOGISTICS SYSTEMSW

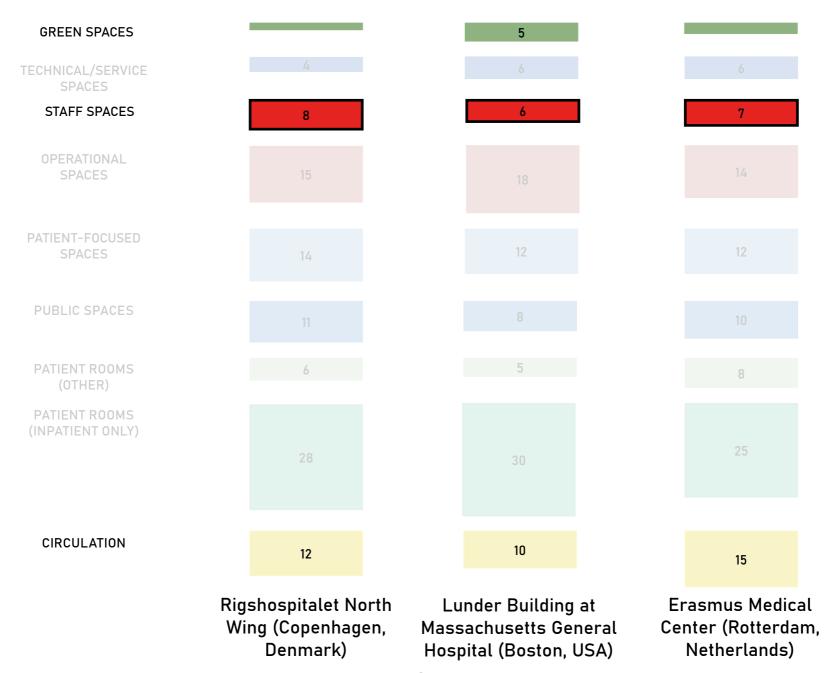


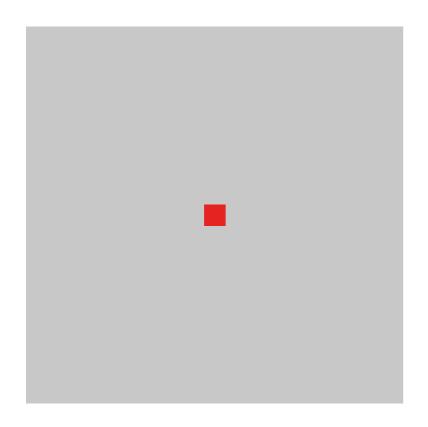
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PROGRAM ANALYSIS - OTHER HOSPITALS



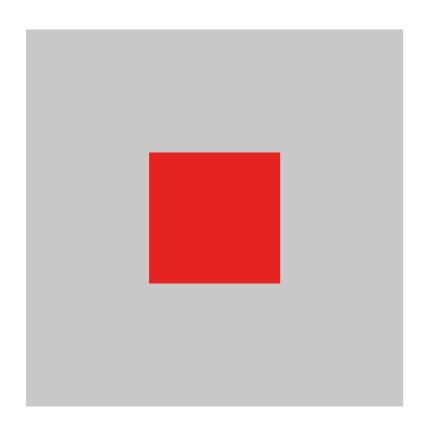
PROGRAM ANALYSIS - OTHER HOSPITALS





Staff spaces still being a very small fraction of the area





What if they have more space?



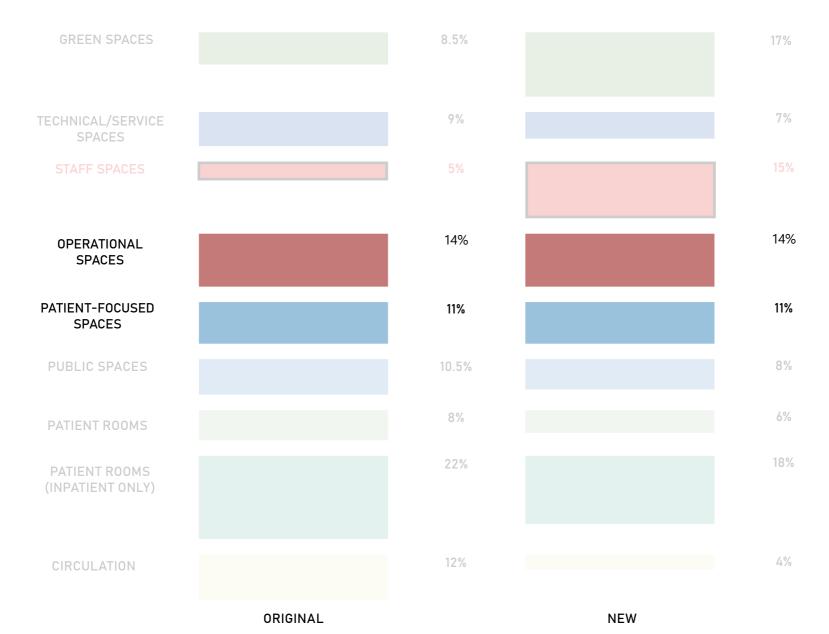
ENLARGED



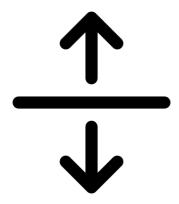
REDUCED

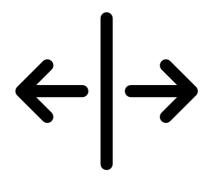


EQUAL



Design Brief UNDERSTANDING TRAFFIC IN HOSPITALS





VERTICAL

HORIZONTAL

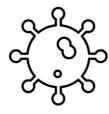
Design Brief CHALLENGES



Emergency Situations



Diverse Traffic Streams

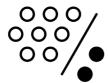


Infection Control

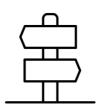


Building Layout and Design

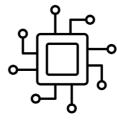
BEST PRACTICES



Strategic Segregation



Advanced Signage and Wayfinding System

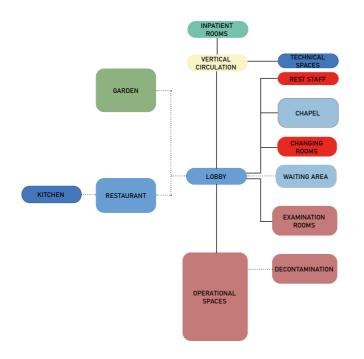


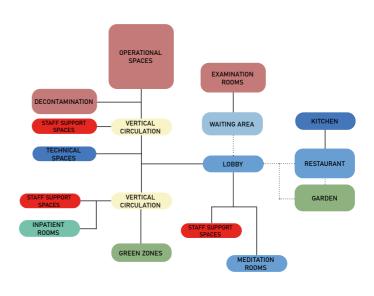
Technology Integration



Timed Access Control

SPATIAL COMPARISON







Design Brief HEALTH LENS



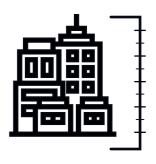
Human Scale



Building Scale

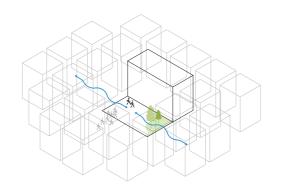


Neighbourhood Scale

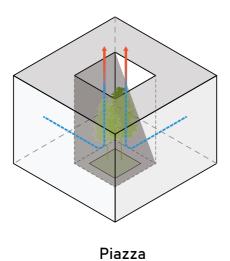


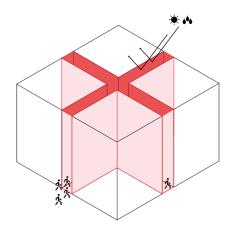
Urban Scale

4 SOLUTIONS

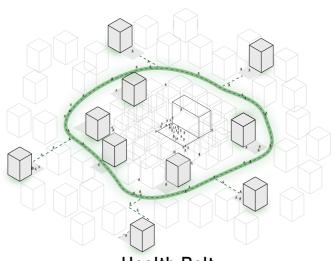


Patio



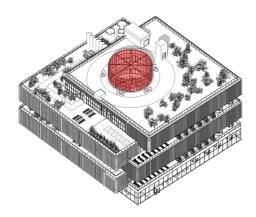


Public Passage

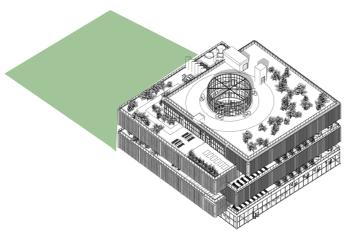


Health Belt

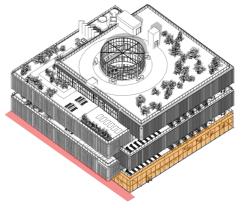
HEALTH IN THE HOSPITAL



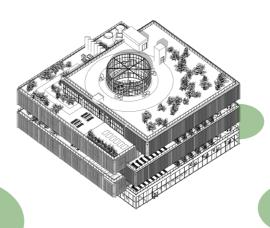
Atrium



Park behind the facility



Passage under the overhang, open ground floor



Green spaces of various scales intertwined within the urban fabric

DESIGN



Design

EARLY DEVELOPMENT & CONCEPT

Design VOLUME - 9 ITERATIONS















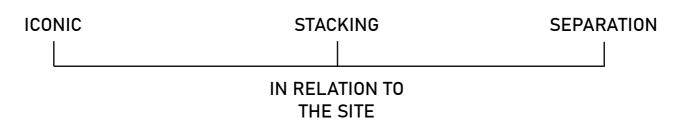




Design VOLUME DEVELOPMENT









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Design VOLUME STUDIES





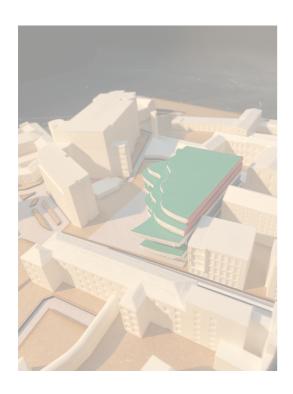


ICONIC

STACKING

SEPARATION

Design VOLUME STUDIES

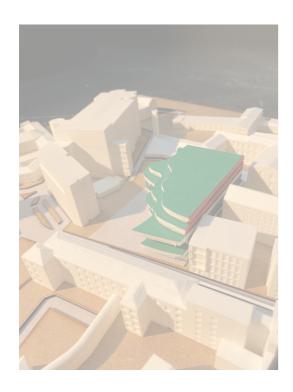


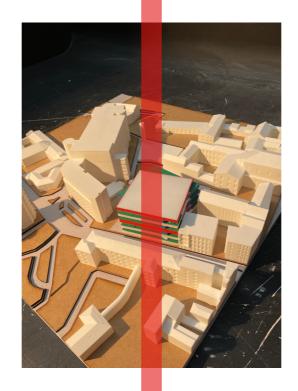




STACKING

Design ADDING AN OPENING







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Design

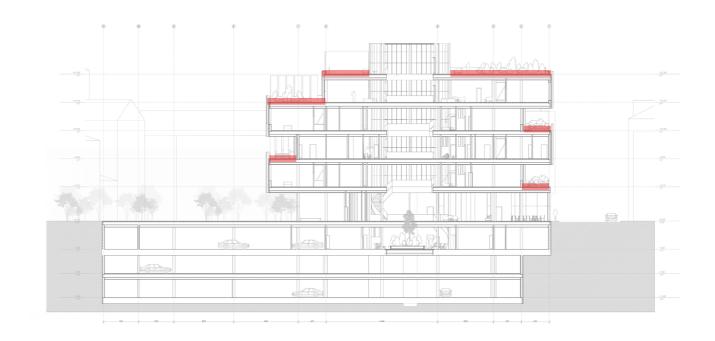
VOLUME STUDY - FIRST CONCLUSION







Design WHY STACKING

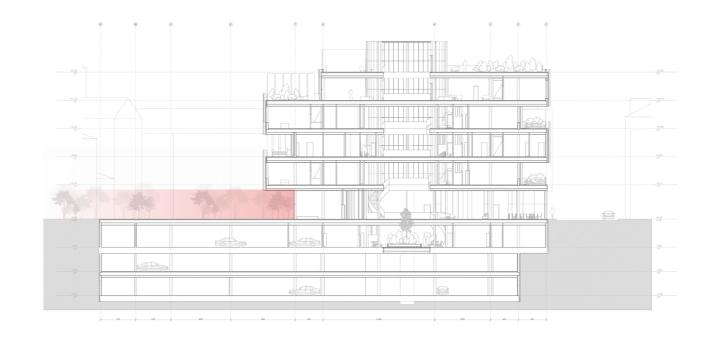


Potential of implementing green spaces at different levels



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Design WHY STACKING



Fits the program and leaves space for a public park



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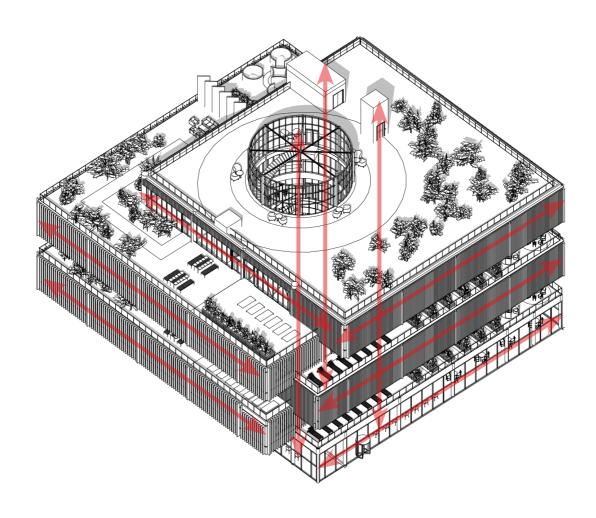
Design WHY STACKING



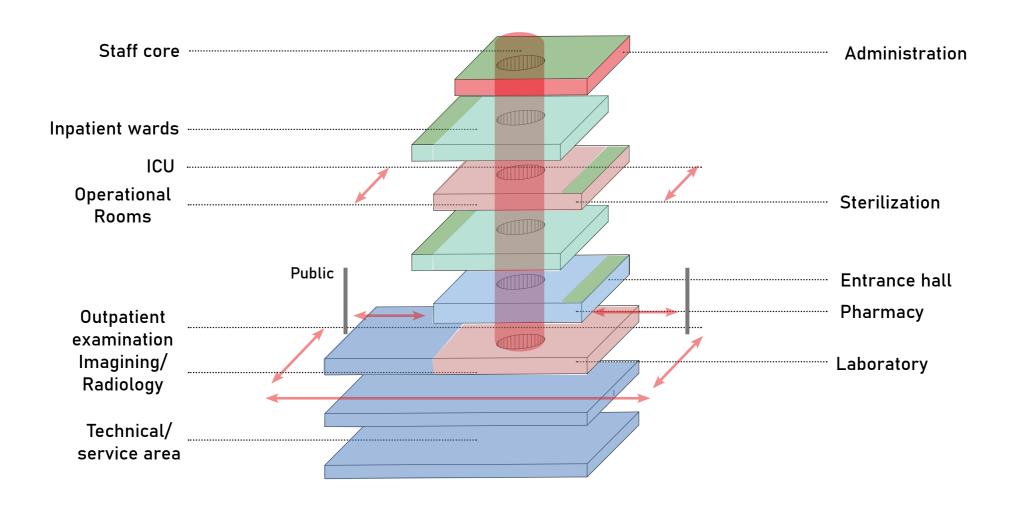
Promotes the efficiency of flows

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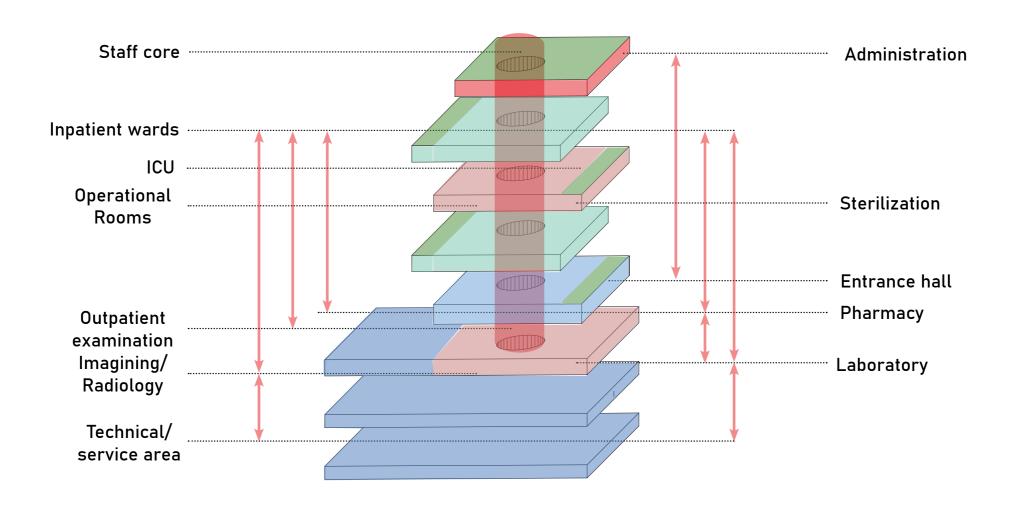
Design MACHINE CUBE



HORIZONTAL CONNECTIONS



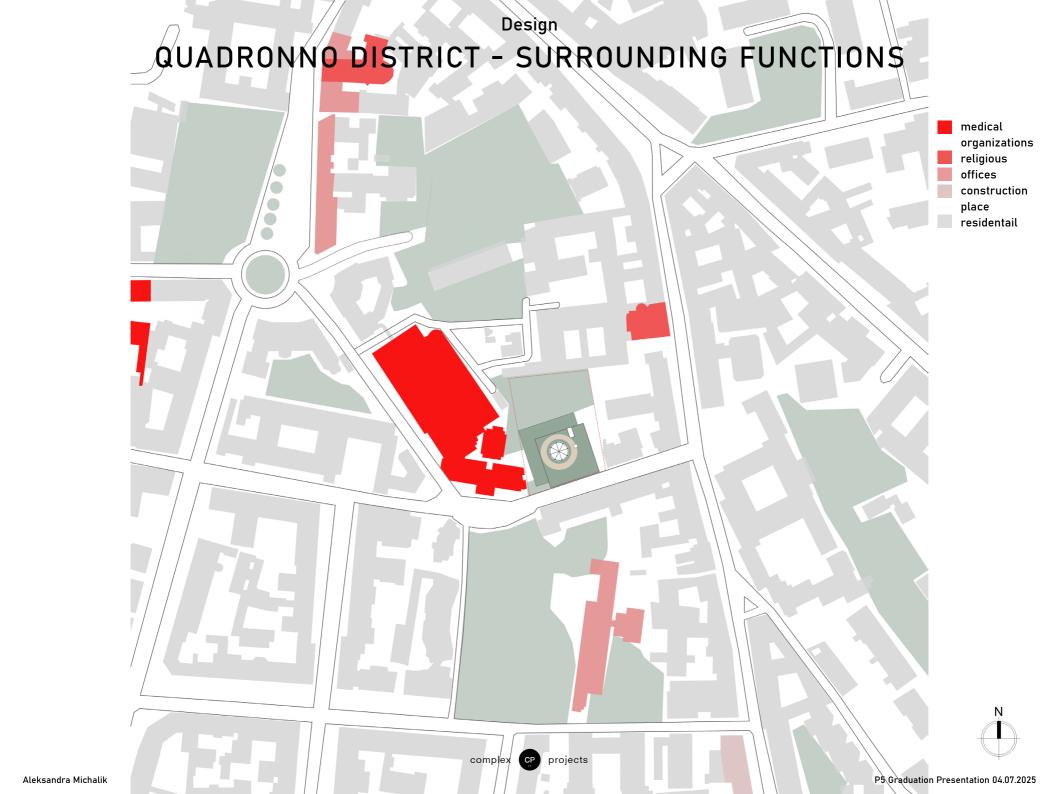
Design VERTICAL STACKING



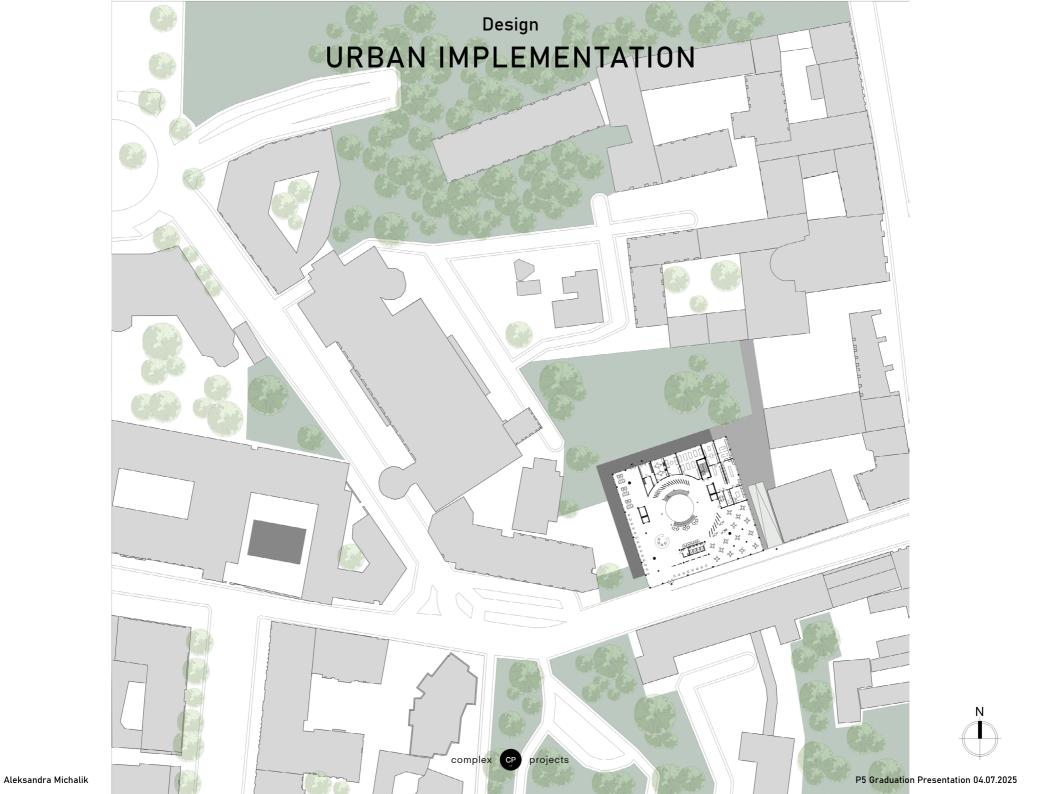
Design SITE LOCATION

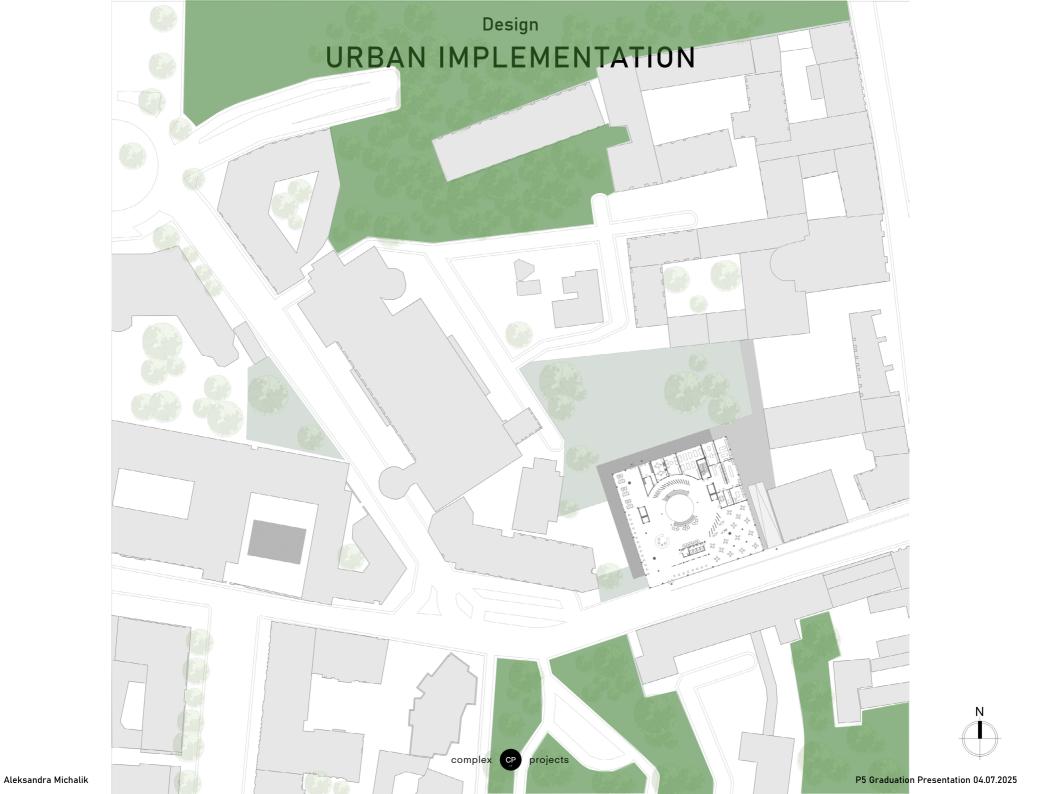


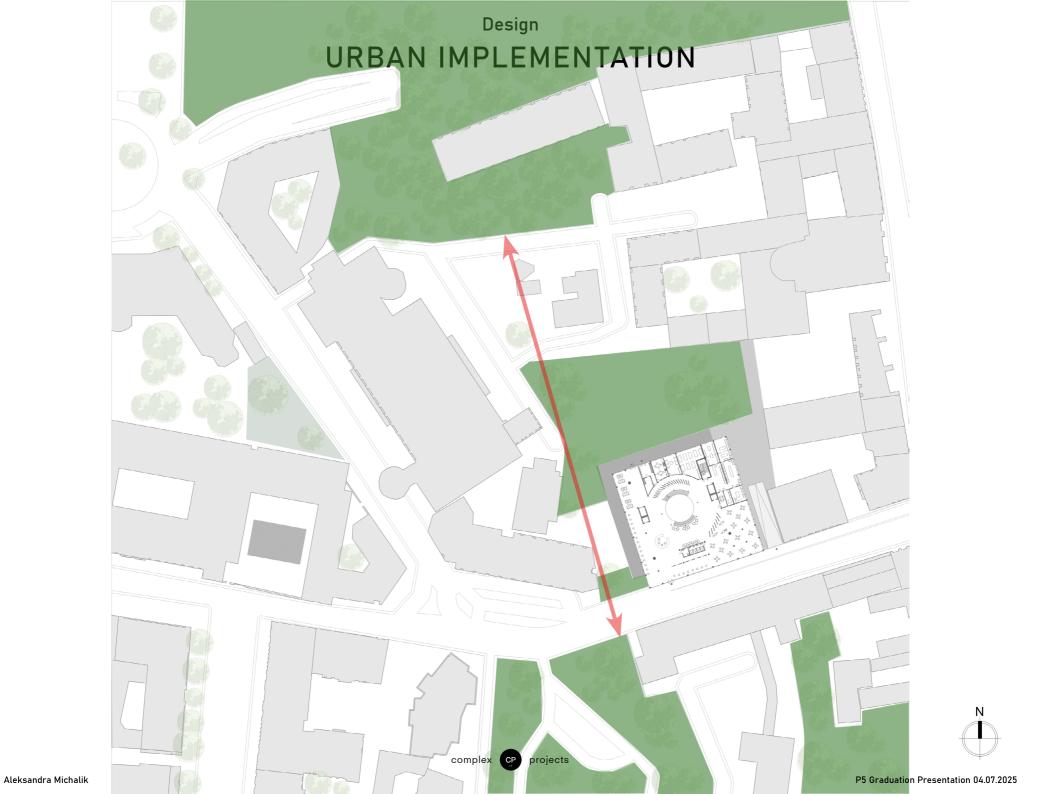


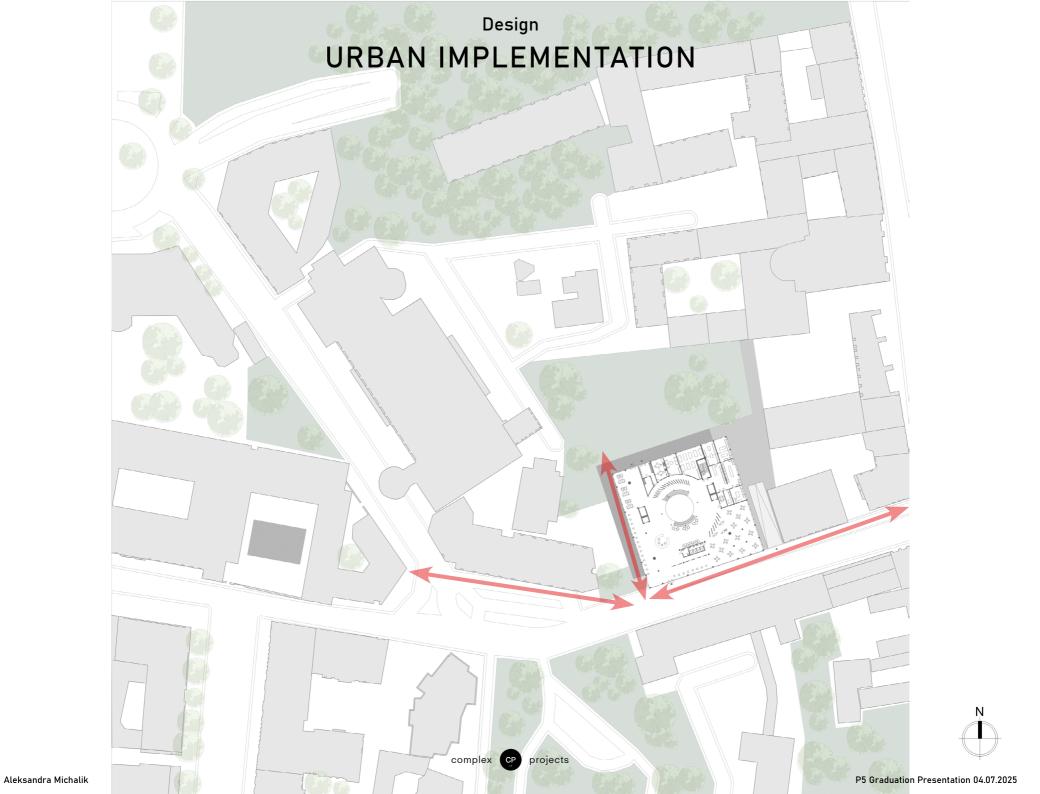


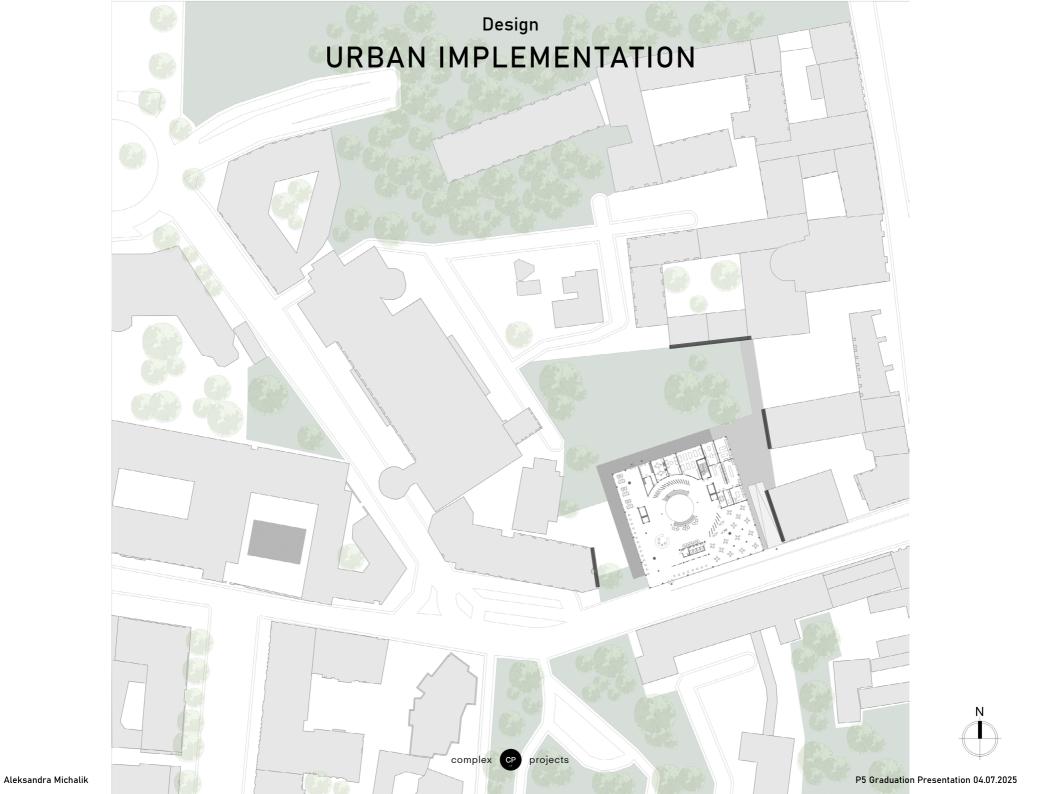


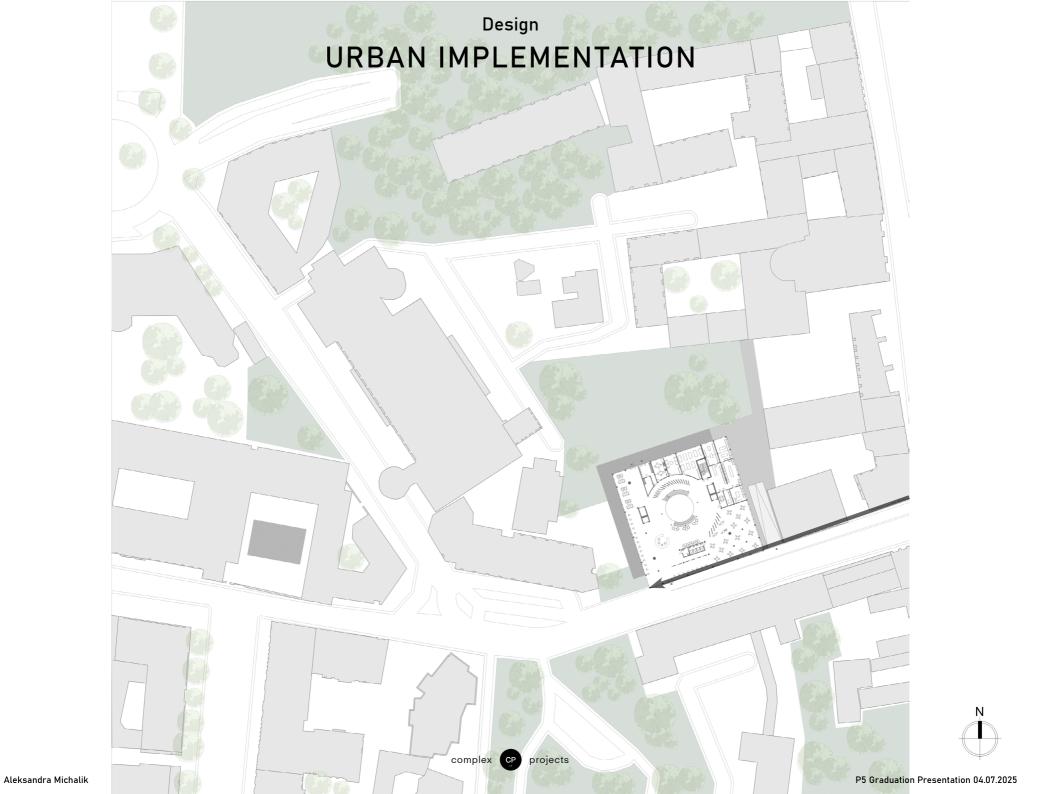












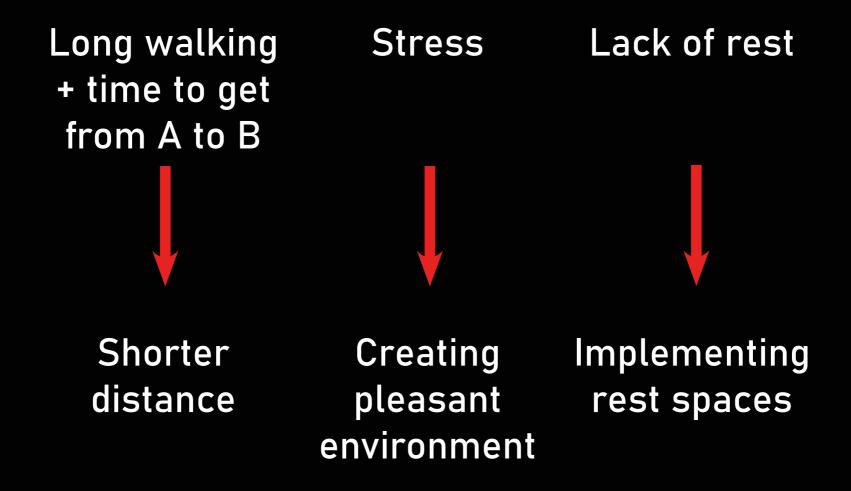


STAFF PROBLEMS

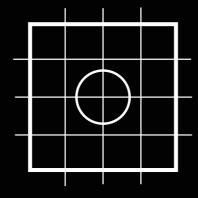
Long walking + time to get from A to B Stress

Lack of rest

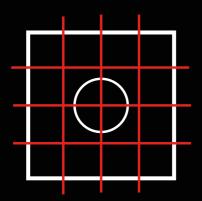
SOLUTIONS

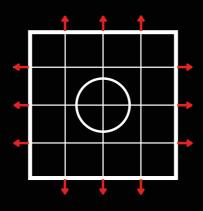


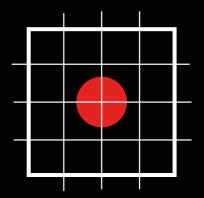
BUILDING'S GRID



ARCHITECTURAL TRANSLATION







Efficient flows

Materiality and views

Staff spaces as a core

PROGRAM

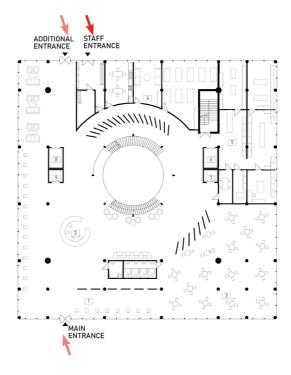
PERFORMS AND CONNECTS

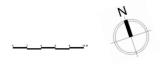






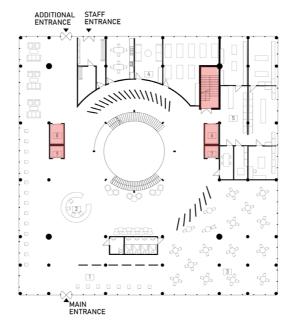
- 1 self registration
- 2 lobby
- 3 restaurant
- 4 staff rooms
- 5 pharmacy
- 6 service elevator
- 7 staff elevator
- 8 clean elevator
- 9 public elevator







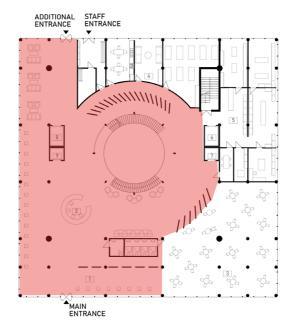
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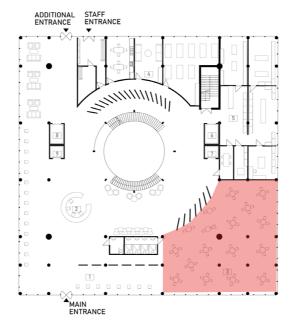
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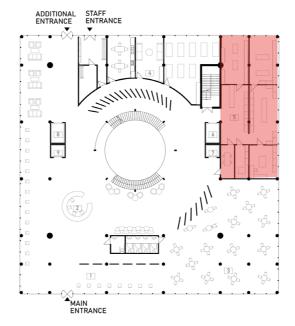
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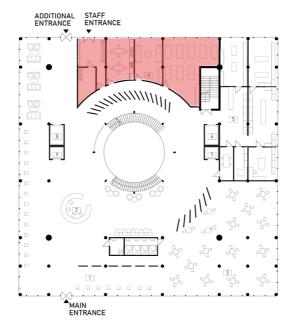
- 1 self registration2 lobby
- 3 restaurant
- 4 staff rooms
- 5 pharmacy
- 6 service elevator
- 7 staff elevator
- 8 clean elevator
- 9 public elevator







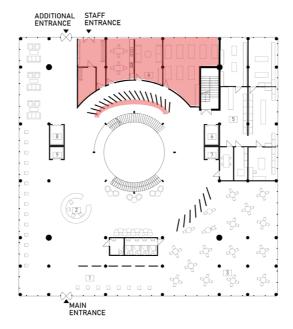
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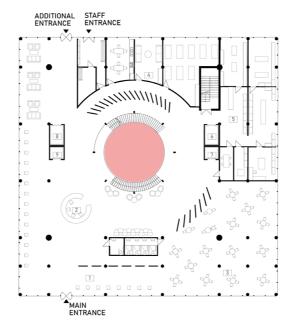
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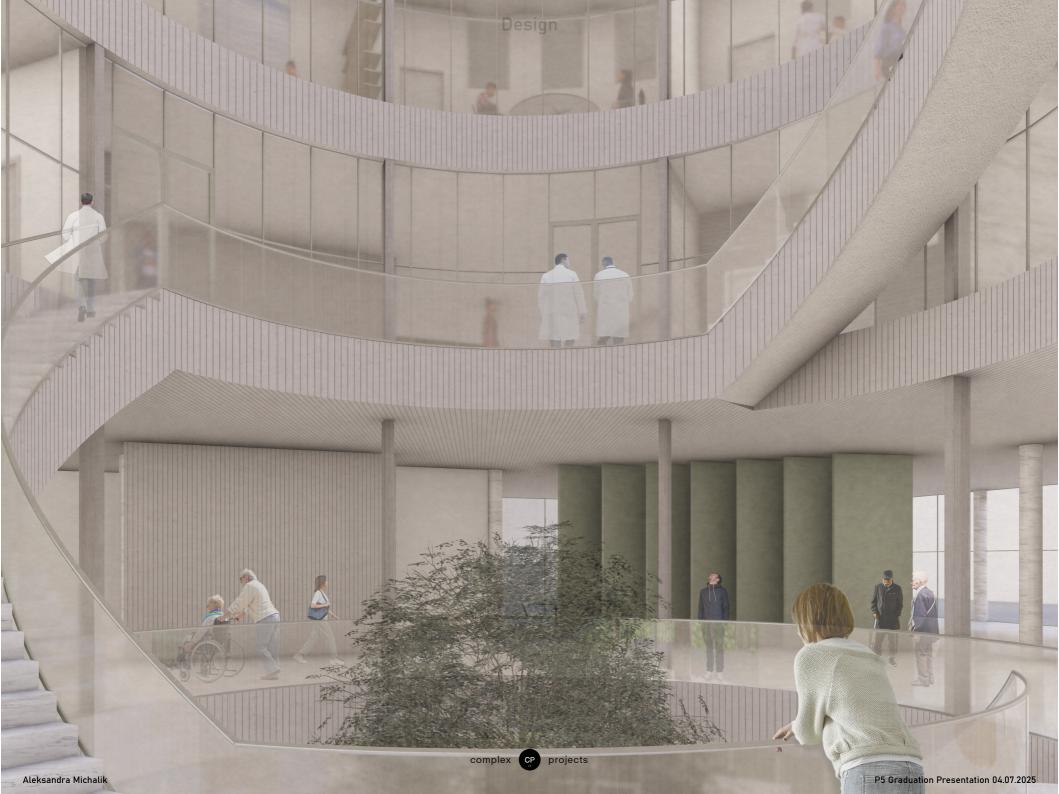


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FL00R -1

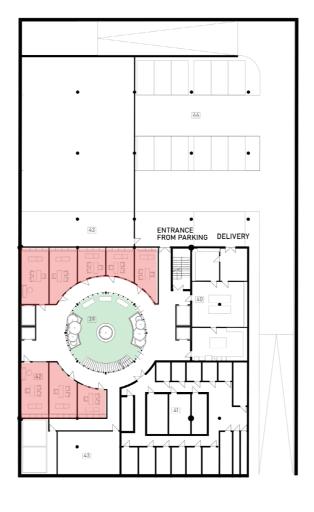
39 - atrium

40 - kitchen 41 - radiation

42 - examination

rooms

43 - technical spaces 44 - parking garage







FL00R -1

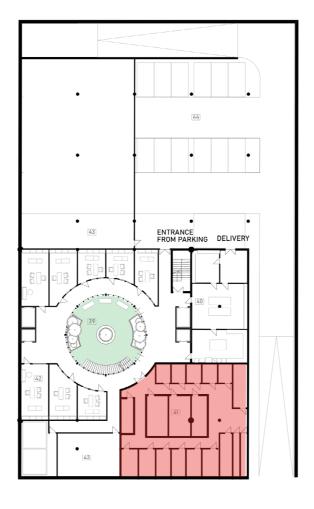
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FL00R -1

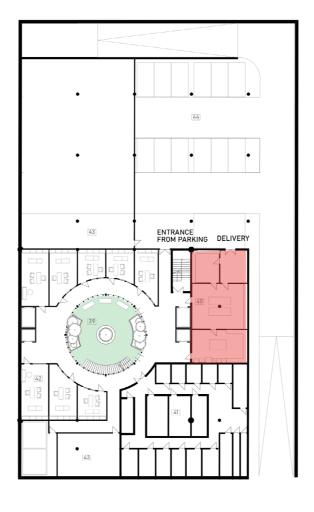
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FL00R -1

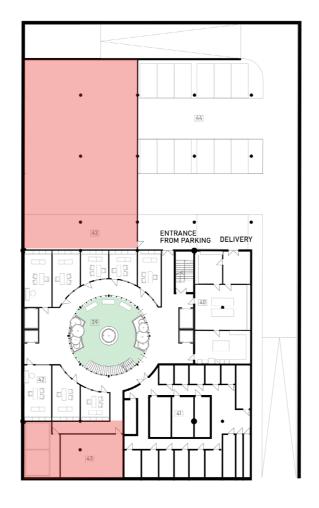
39 - atrium

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FL00R -1

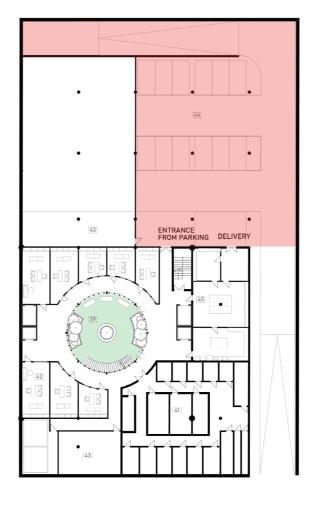
39 - atrium

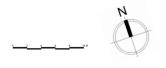
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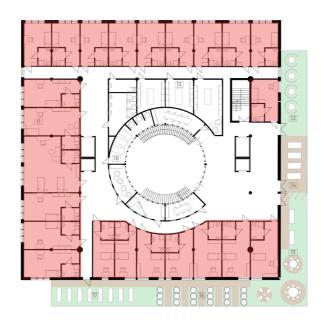






- 10 staff rooms
- 11 inpatient wards
- 12 storage 13 meditation pods

- 14 yoga zone 15 meeting zone 16 healing gardens 17 rest spot

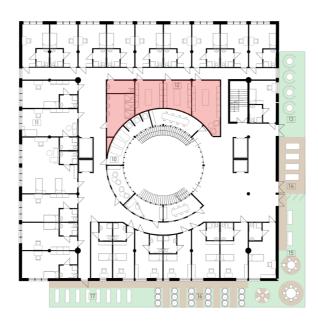






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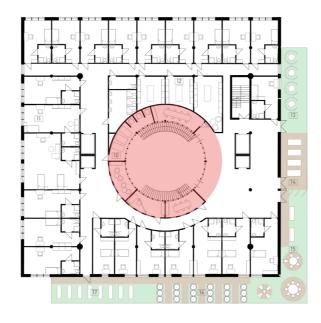






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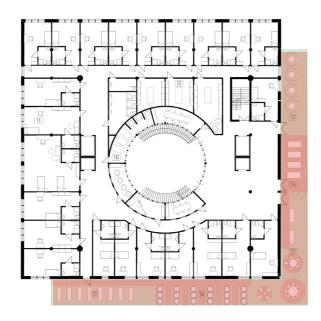
- 14 yoga zone 15 meeting zone 16 healing gardens 17 rest spot







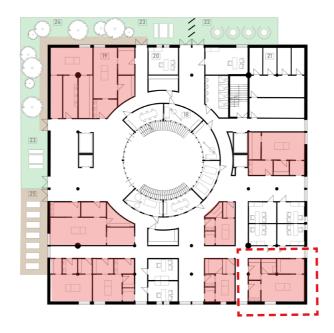
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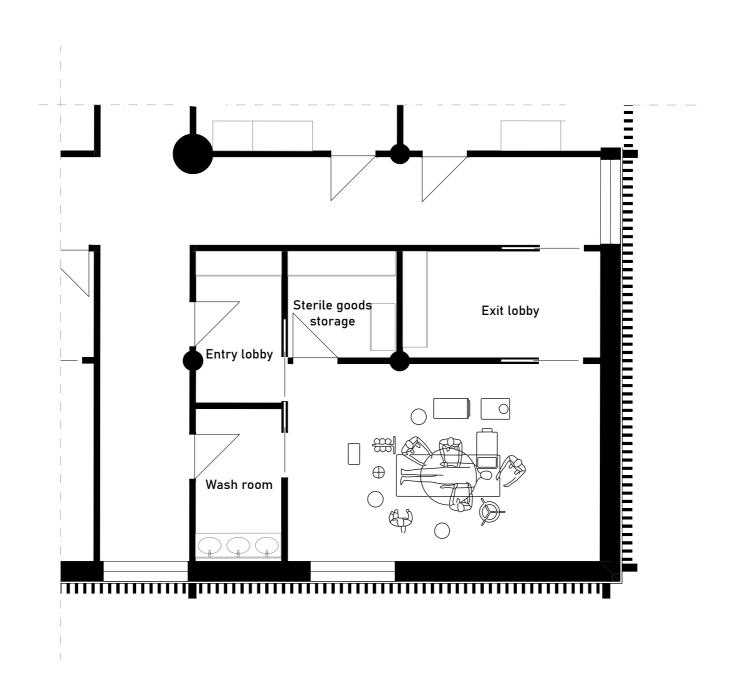


- 18 staff rooms
- 19 operational blocks 20 examination
- rooms
- 21 morgue 22 meditation pods 23 resting spots 24 garden loop 25 yoga zone

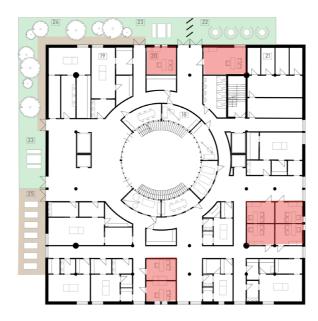








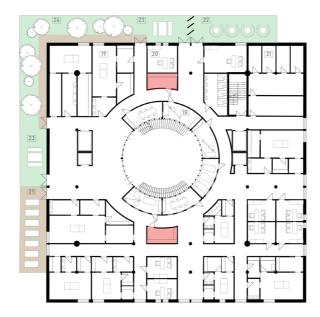
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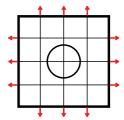
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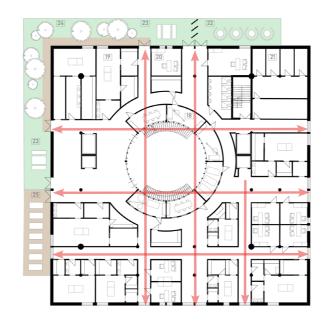






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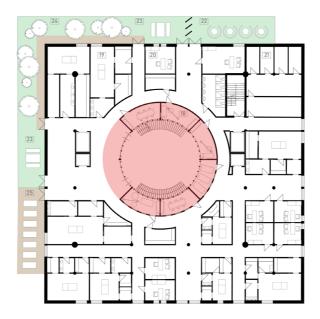








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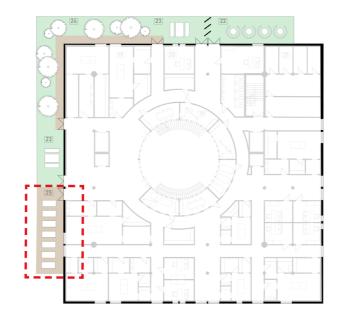








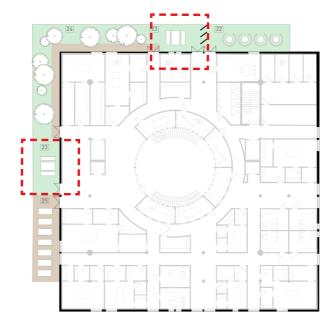
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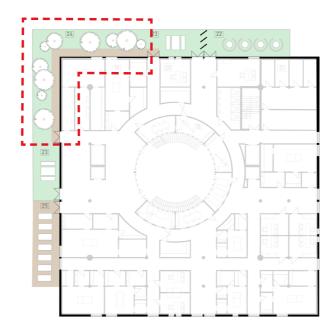
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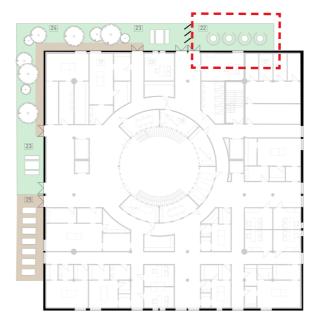
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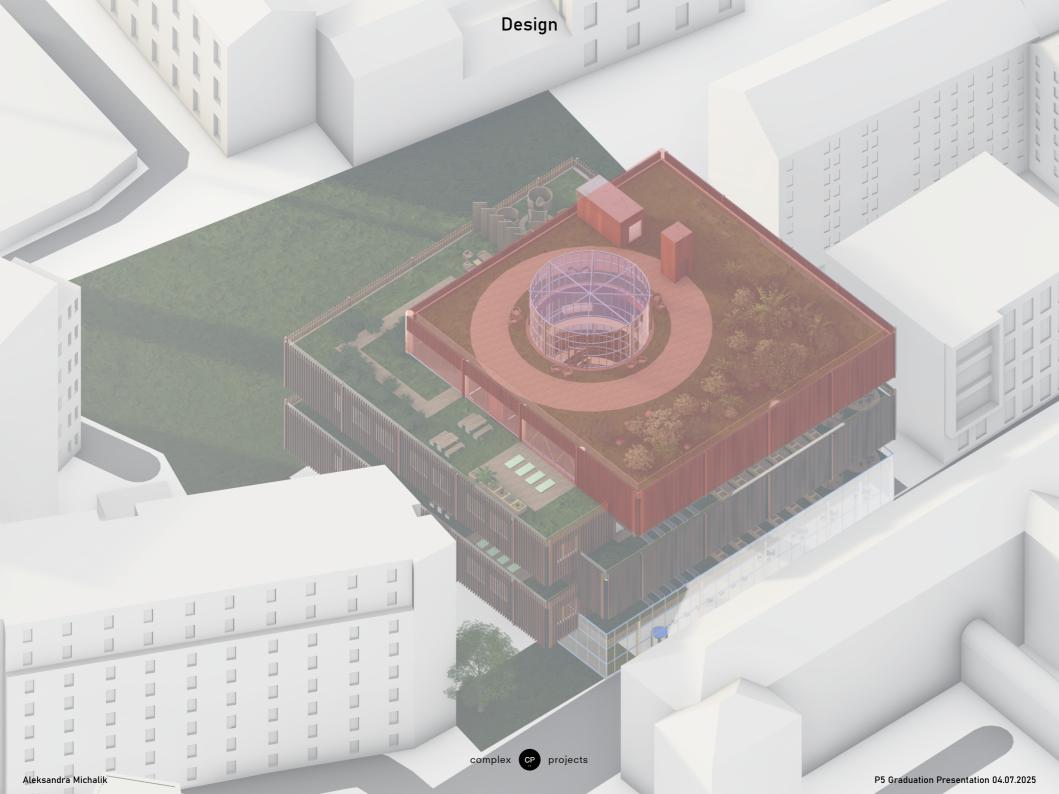
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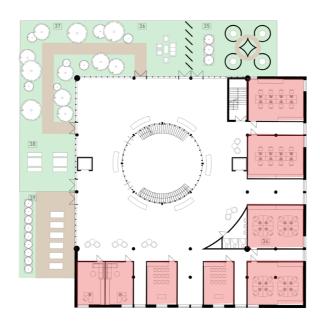




FL00R +4

34 - administration

35 - meditation pods 36 - resting spots 37 - garden loop 38 - yoga zone



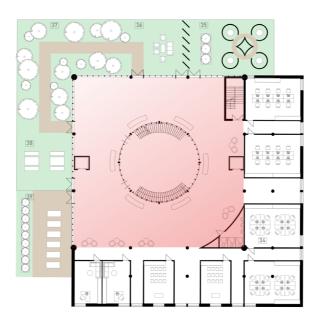


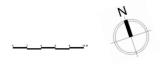


FL00R +4

34 - administration

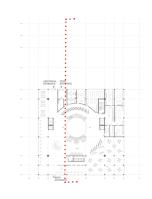
35 - meditation pods 36 - resting spots 37 - garden loop 38 - yoga zone

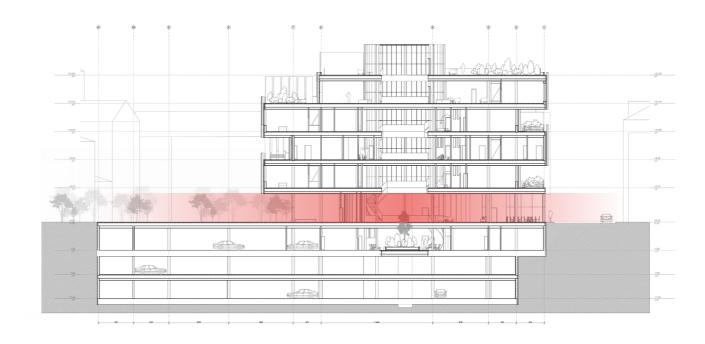


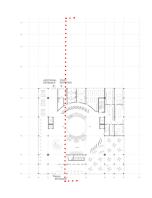






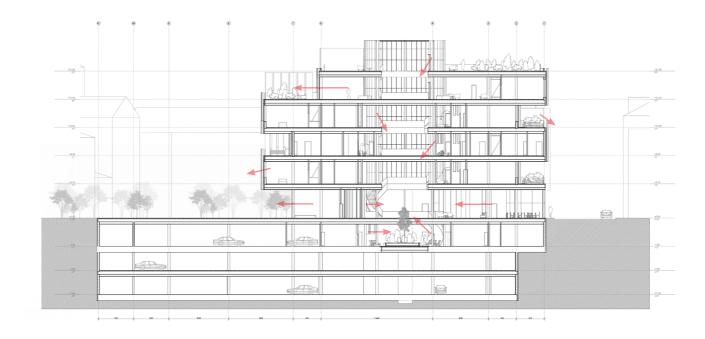


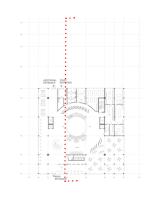






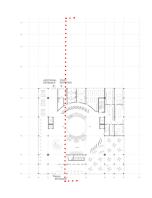




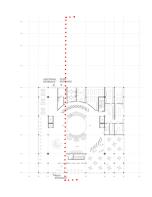


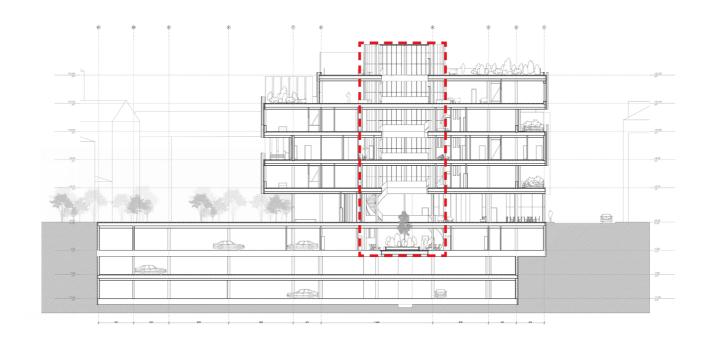








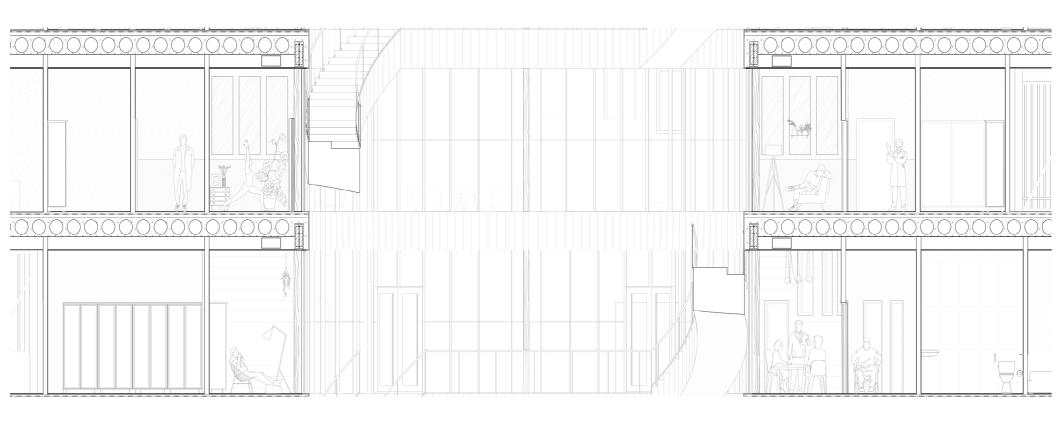




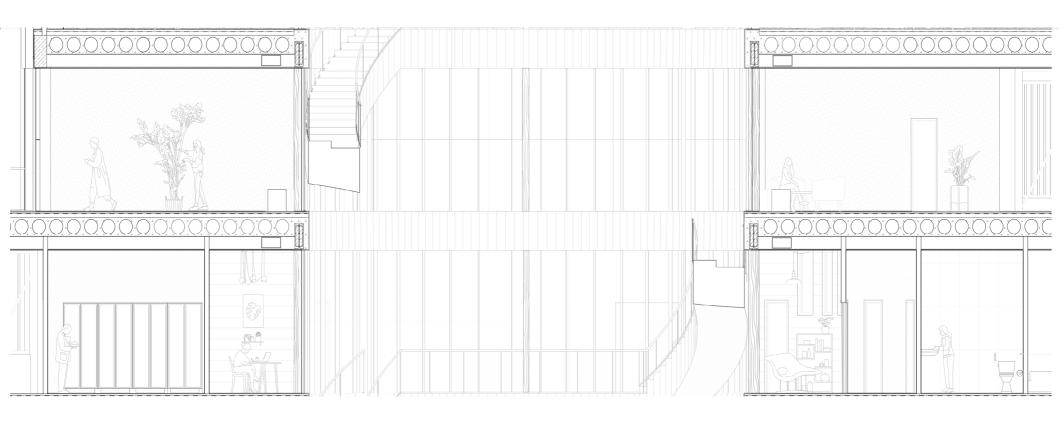
Design FRAGMENT DRAWING



Design FRAGMENT DRAWING



Design FRAGMENT DRAWING



Design **KEY DRAWING**

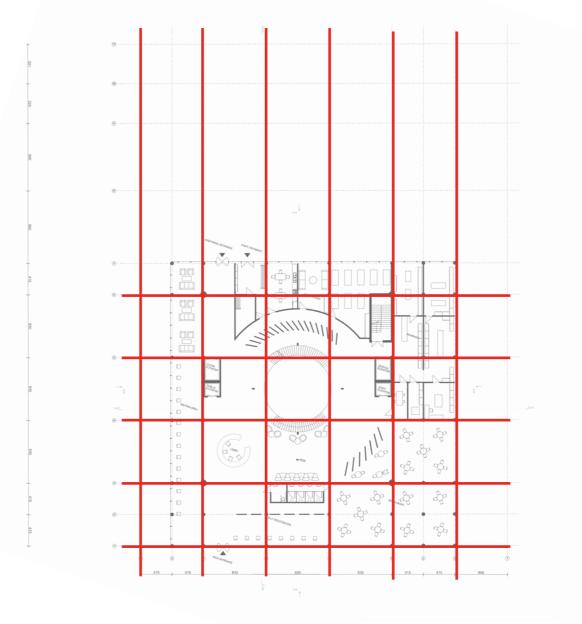


STRUCTURE

HOLDS AND SUPPORTS

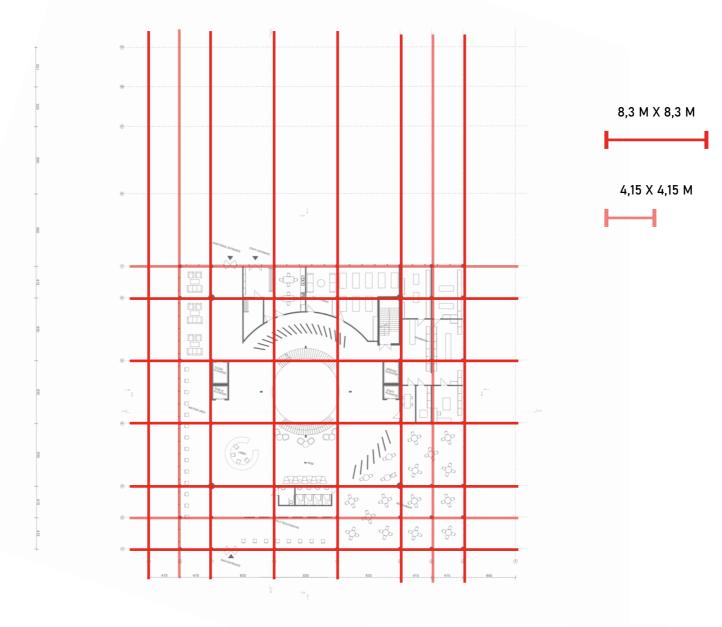


PRIMARY GRID

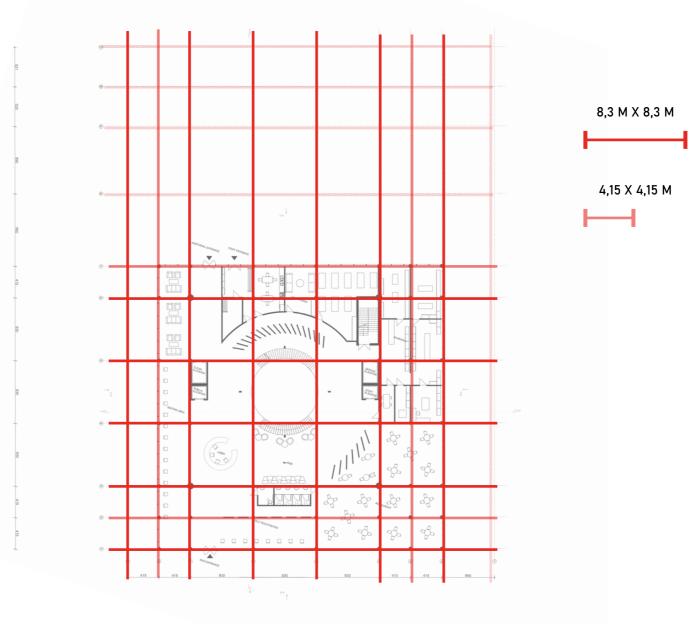


8,3 M X 8,3 M

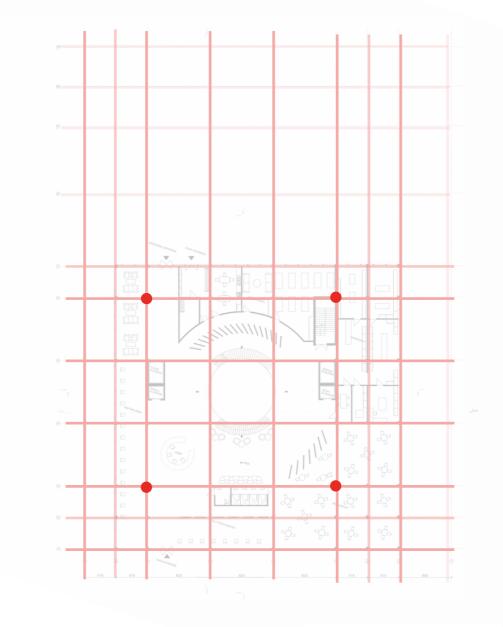
Design SECONDARY GRID



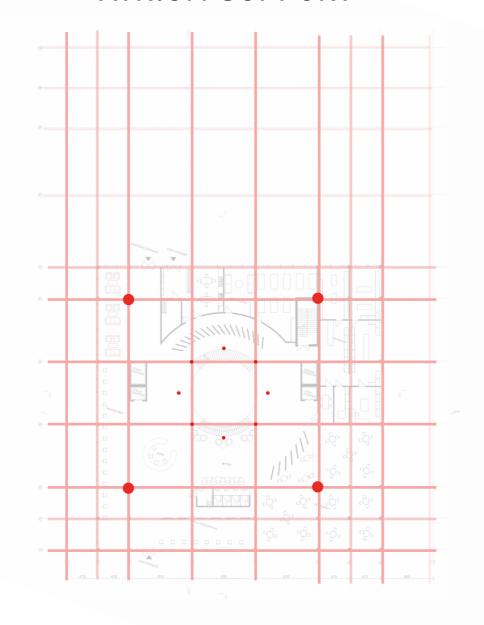
PARKING GARAGE GRID



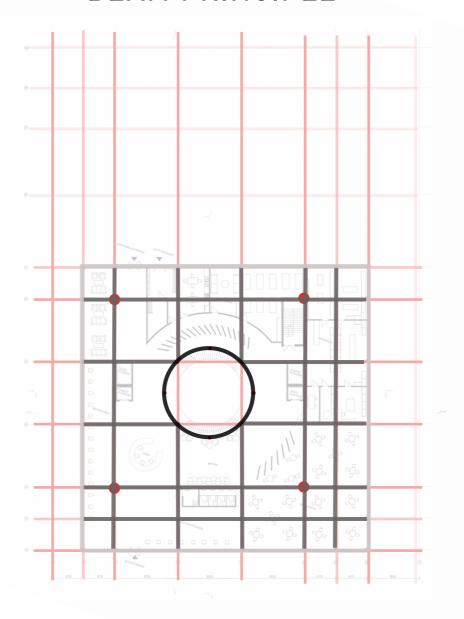
Design SUPER COLUMNS



Design ATRIUM SUPPORT



Design BEAM PRINCIPLE

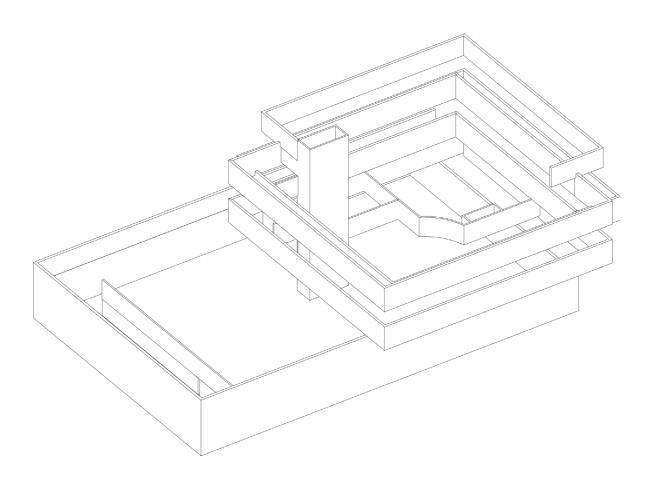


Exterior concrete beam

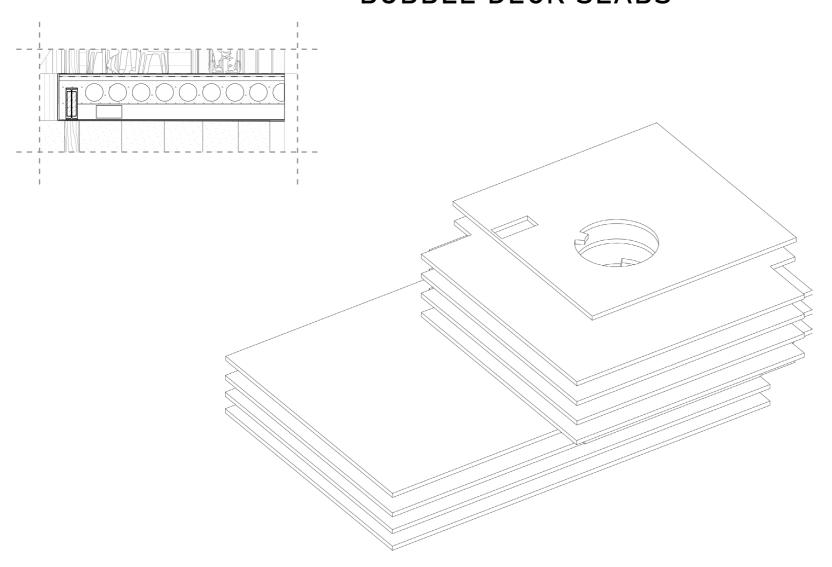
I beams partially encased in concrete slabs

Curved I beam supporting the atrium

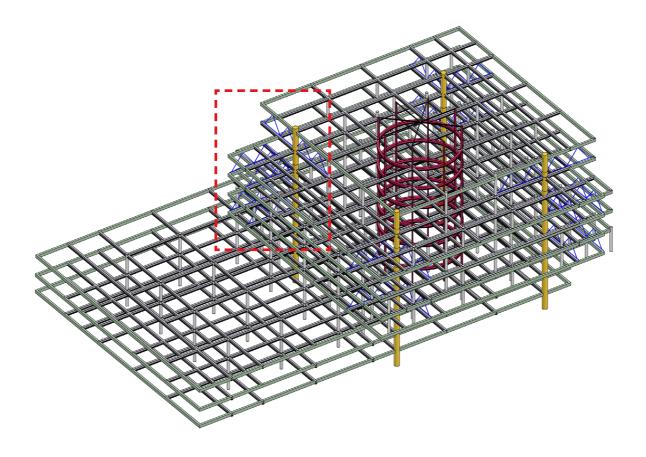
Design LOAD BEARING WALLS



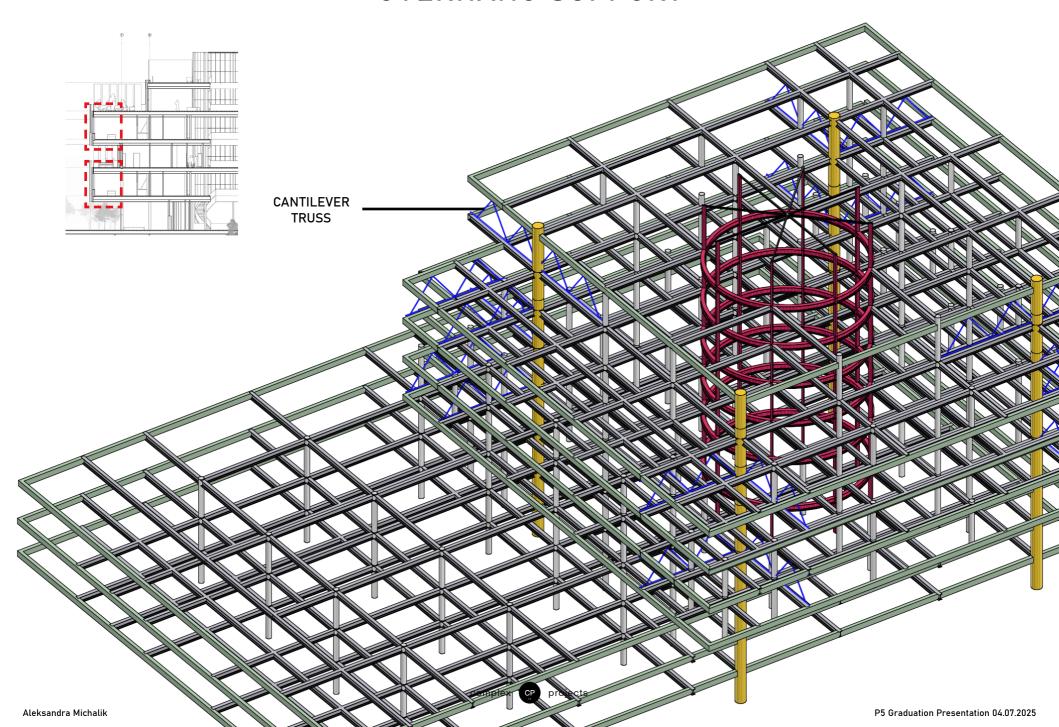
Design BUBBLE DECK SLABS



Design **SKELETON**

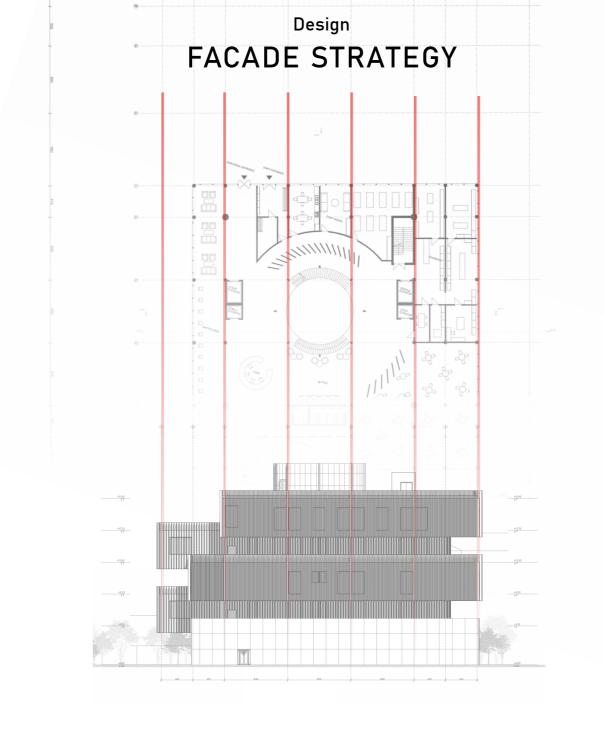


Design OVERHANG SUPPORT



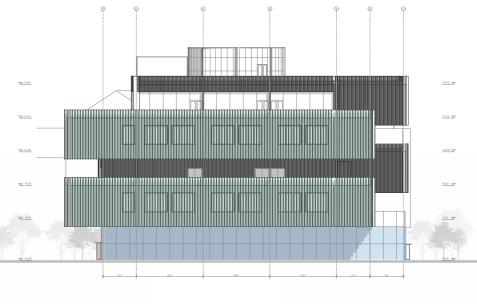
FACADE

COMMUNICATES AND PROTECTS



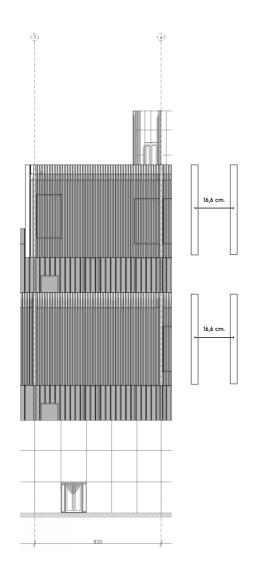
REFLECTING THE PROGRAM

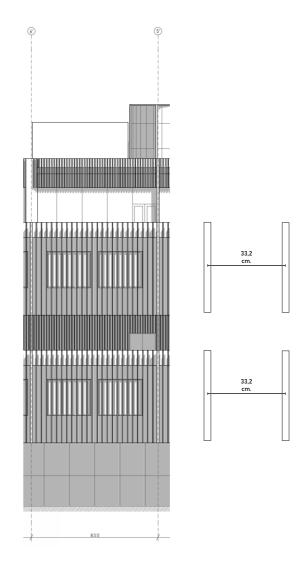




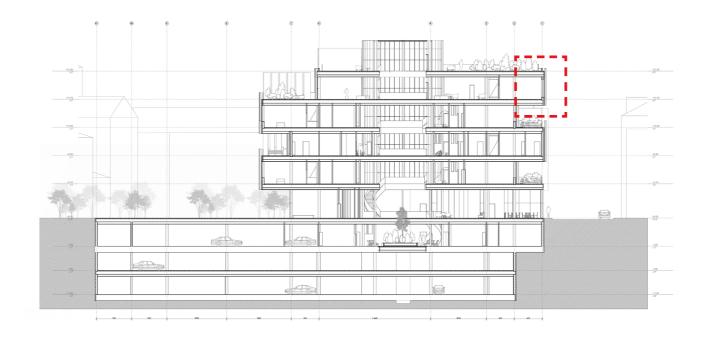
SOUTH-EAST SOUTH-WEST

Design LEVELS OF PRIVACY

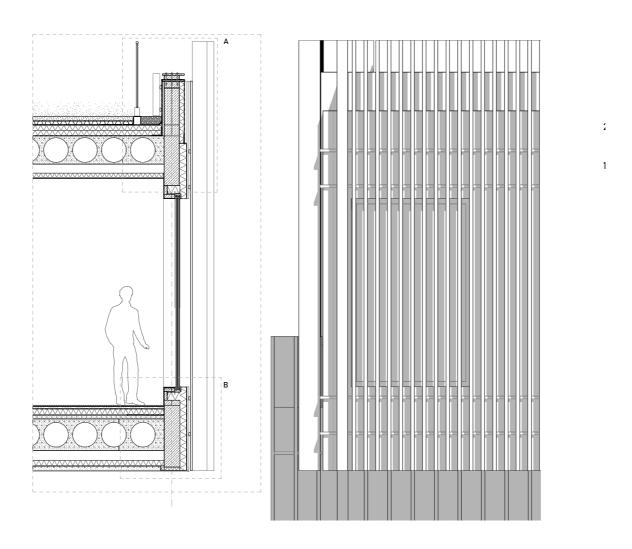




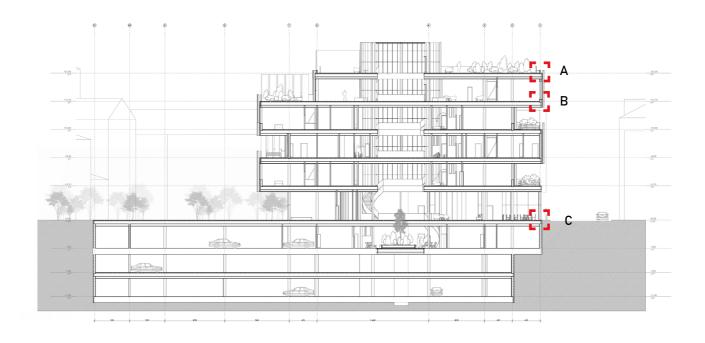
FACADE FRAGMENT



Design FACADE FRAGMENT

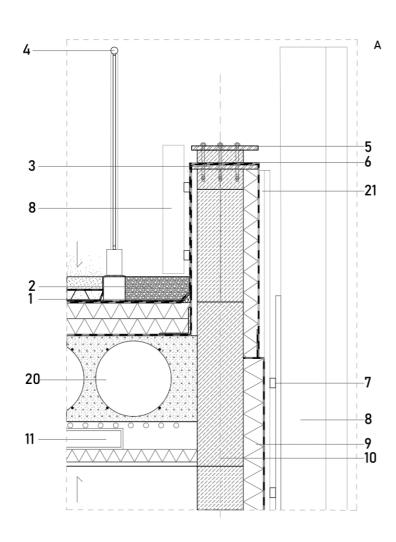


DETAILS



ROOF TERRACE

A



60 mm - Extensive green roof substrate

3 mm - Filter fleece

50 mm - Drainage layer - expanded clay

3 mm - Root barrier

3 mm - EPDM membrane (2 × 1.5 mm layers)

150 mm - Rigid wood fibre insulation (2 x 75 mm, STEICO)

3 mm - Bituminous membrane

460 mm - Reinforced Concrete Structural Slab with bubbledeck

flooring and embedded HE 600 B I-beam

13 mm - Installation zone

50 mm - Mineral wool insulation

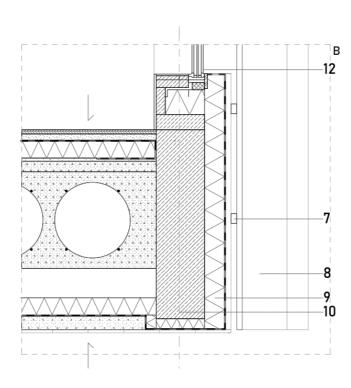
22 mm – Clay board Lemix

10 mm - White clay plaster

- 1 XPS insulation wedge
- 2 Gravel strip
- 3 Steel capping panel
- 4 Wood railing
- 5 Parapet flashing profile
- 6 Concrete block
- 7 Substructure rails for the facade
- 8 Fundermax NT Panel cladding 50 mm x 20 mm, 150 mm x 300 mm
- 9 XPS 100 mm
- 10 reinforced concrete beam
- 11 HVAC flat duct
- 12 window: triple glazing with 2× 4 mm laminated safety glass + 14 mm cavity + 6 mm float glass + 14 mm cavity + 2× 4 mm laminated safety glass 130/60 mm aluminium mulliontransom system
- 13 RHS 200 × 100 × 10 mm (S355J2H)
- 14 Fischer FSA-B Ø6 × 60 mm
- 15 RC 0400 Column
- 16 Insulated Glazing Unit (IGU): 10 mm low-iron tempered glass / 16 mm argon-filled spacer / 6+6 mm laminated safety glass with PVB interlayer
- 17 Foam glass thermal insulation
- 18 120 mm XPS Rigid Insulation
- 19 HE 600 B I-beam (602 mm high, 300 mm flange width)
- 20 bubbledeck flooring
- 21 glued facade pannels



DETAIL - END OF THE OVERHANG



B 20 mm - Porcelain Stoneware Tiles

30 mm - Flexible Tile Adhesive Mortar

5 mm - Liquid-Applied Waterproofing Membrane

80 mm - Extruded Polystyrene (XPS) Insulation Board

15 mm - Polyethylene Acoustic Mat

50 mm - Fibre-Reinforced Cementitious Screed

460 mm – Reinforced Concrete Structural Slab with bubbledeck flooring and embedded HE 600 B I-beam starting 140 mm below slab top

80 mm - Mineral wool insulation

2 mm Vapor control membrane

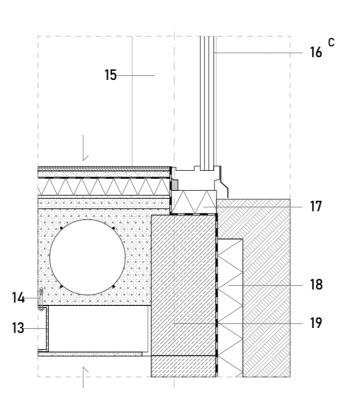
65 mm - Concrete layer

15 mm - wood cladding

- 1 XPS insulation wedge
- 2 Gravel strip
- 3 Steel capping panel
- 4 Wood railing
- 5 Parapet flashing profile
- 6 Concrete block
- 7 Substructure rails for the facade
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- 18 120 mm XPS Rigid Insulation
- 19 HE 600 B I-beam (602 mm high, 300 mm flange width)
- 20 bubbledeck flooring
- 21 glued facade pannels



DETAIL - EXTERIOR-INTERIOR THRESHOLD



C | 20 mm - Porcelain Stoneware Tiles

30 mm - Flexible Tile Adhesive Mortar

5 mm - Liquid-Applied Waterproofing Membrane

80 mm - Extruded Polystyrene (XPS) Insulation Board

15 mm - Polyethylene Acoustic Mat

50 mm - Fibre-Reinforced Cementitious Screed

460 mm - Reinforced Concrete Structural Slab with bubbledeck

flooring and embedded HE 600 B I-beam

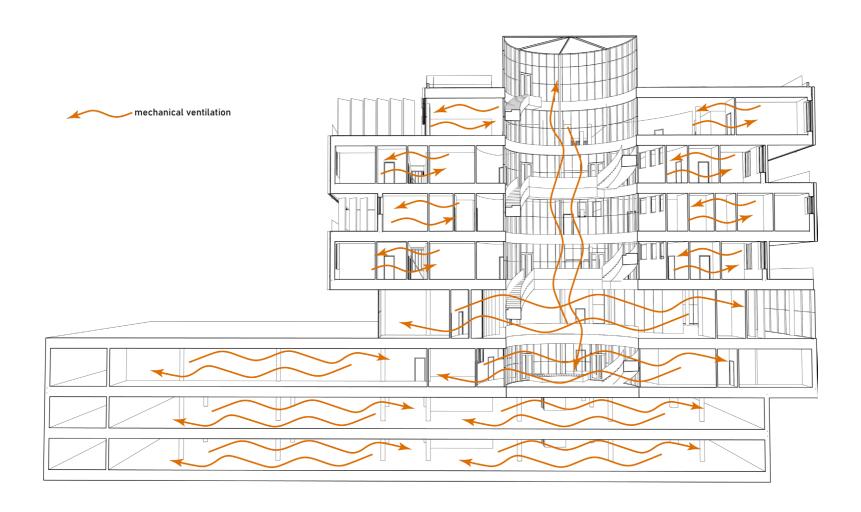
140 mm - Suspended Metal Frame Ceiling with Acoustic Panels

- 1 XPS insulation wedge
- 2 Gravel strip
- 3 Steel capping panel
- 4 Wood railing
- 5 Parapet flashing profile
- 6 Concrete block
- 7 Substructure rails for the facade
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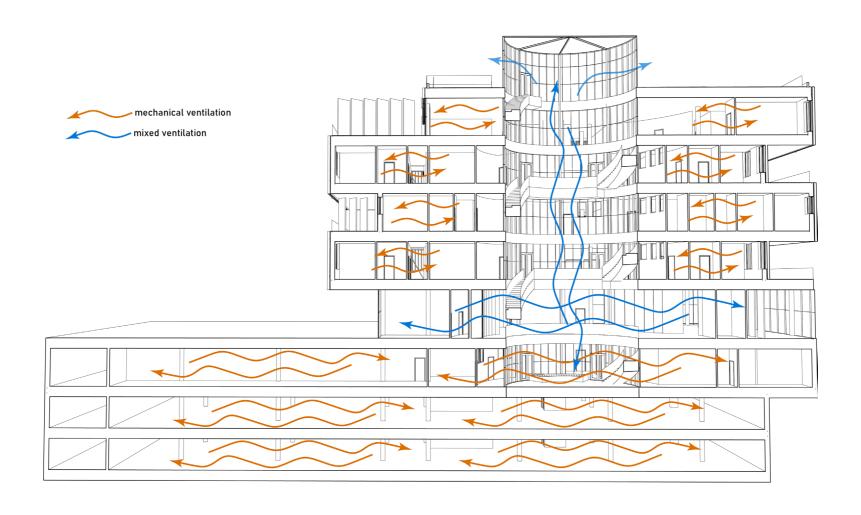




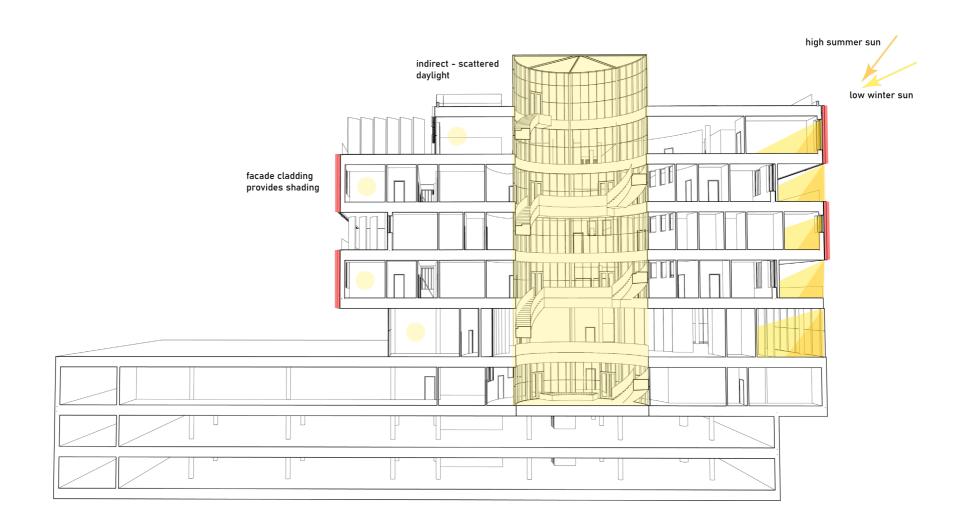
CLIMATE - WINTER VENTILATION



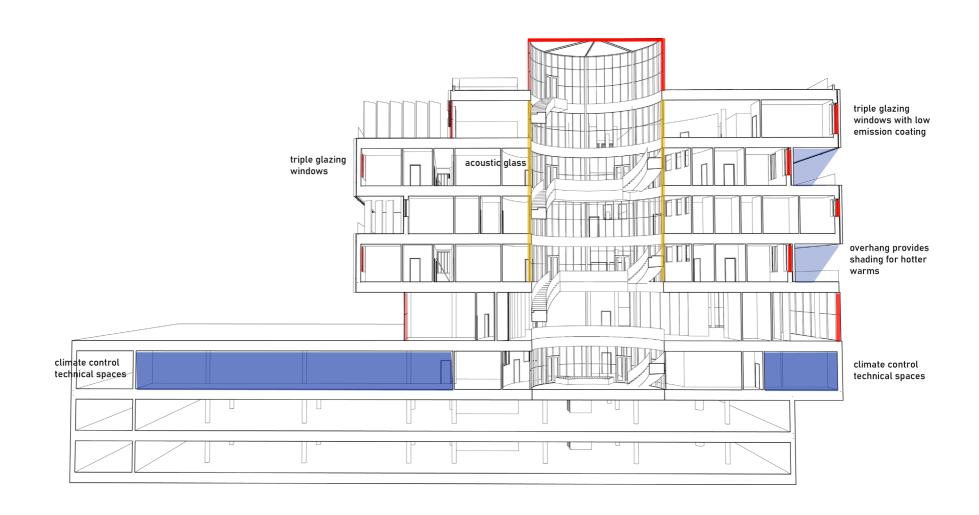
CLIMATE - SUMMER VENTILATION



CLIMATE - SUN EXPOSURE

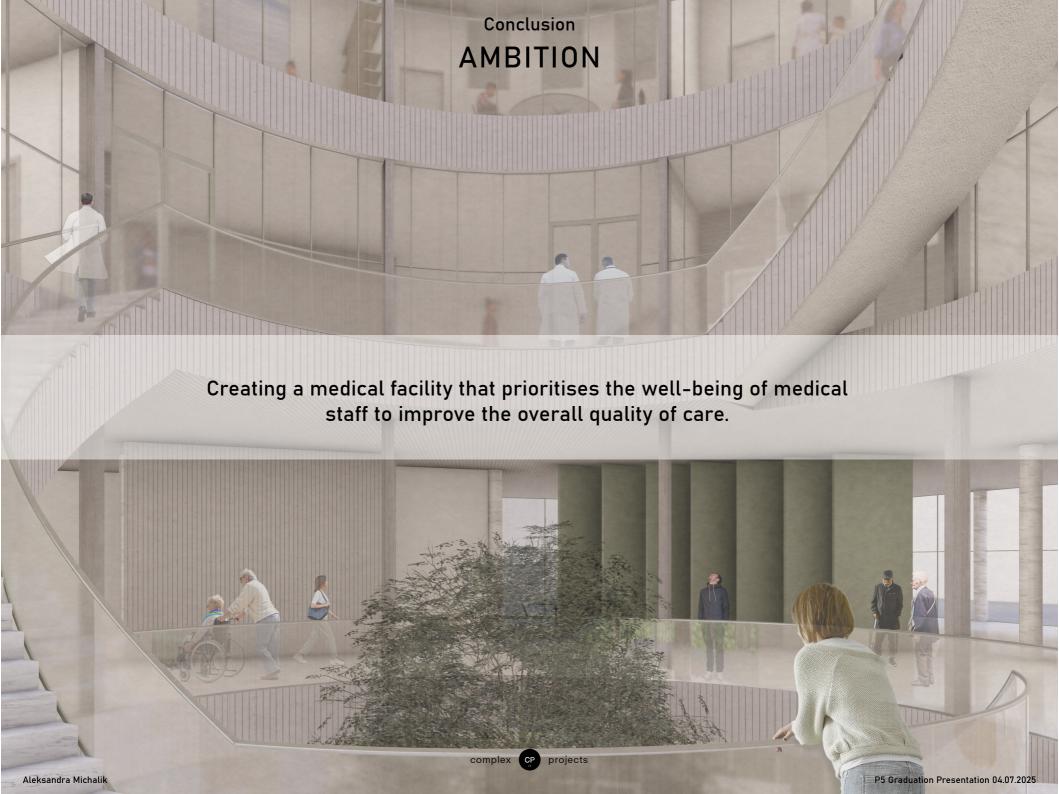


CLIMATE - TEMPERATURE CONTROL

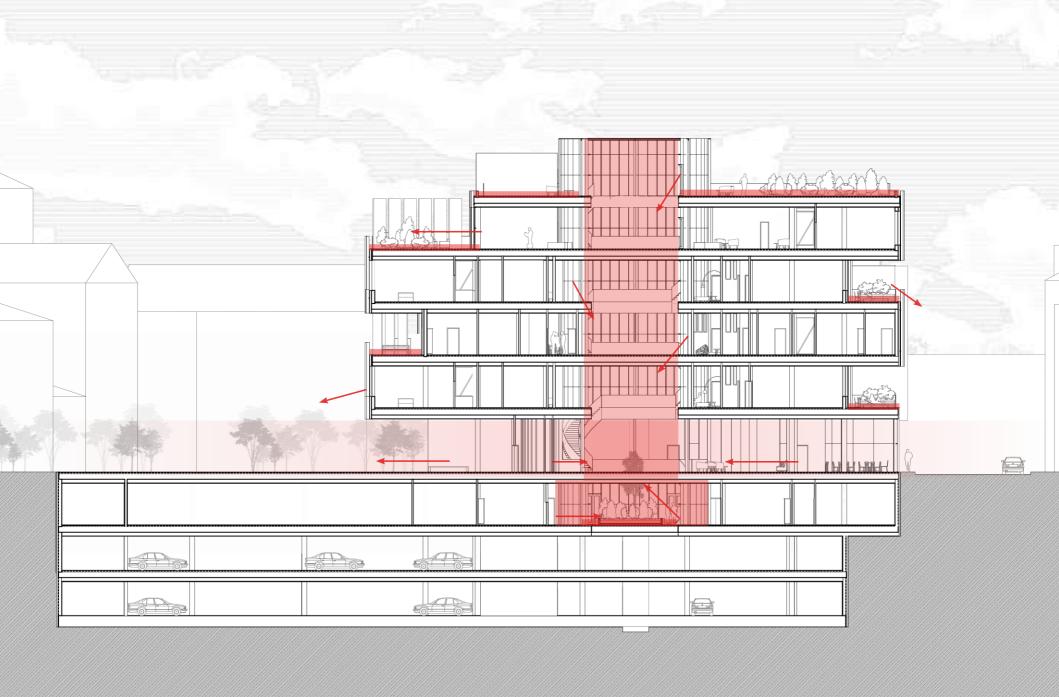


CONCLUSION









This project is part of a larger shift — where care environments are being reimagined through the lens of empathy.

But designing for staff also raised a question:

Can architecture that's so rational still feel human?

Aleksandra Michalik

Conclusion

BACK TO THE BEGINNING





A building that listens. That breathes. That protects, not just performs.

Aleksandra Michalik P5 Graduation Presentation 04.07.2025

