

PROTECT AND PREVENT

Adaptive Reuse of Soviet-Era Buildings for Civilian Protection in Lithuania

Graduation project of Maria-Iuliana Dragan, 6286747



Supervisors: Freek Speksnijder, Ulrich Knaak





LITHUANIA

Increased defense spending to 3% of GDP and adopting a "Total Defense" approach.

Expanding military infrastructure and conscription while building major bases like Rūdninkai to host 4,000 German NATO troops.

Facing a domestic challenge of abandoned Soviet-era buildings and shrinking population in rural areas.



MILITARY, DEFENSE AND ENVIRONMENT

5.5% of total GHG emissions. - in reality this number is greater (US, Russia and China do not report)

Would be 4th largest country in the world

Ukraine 230 million tones of CO2 (Feb, 2025)

Rebuilding – more emissions!

Ultimate goal: PREVENT a conflict at all
Sustainable, circular defense structures and means of protection

STAGES OF PEACE OR CONFLICT







While we need to protect and strengthen defense, why are we approaching it from the lens of massive new construction?

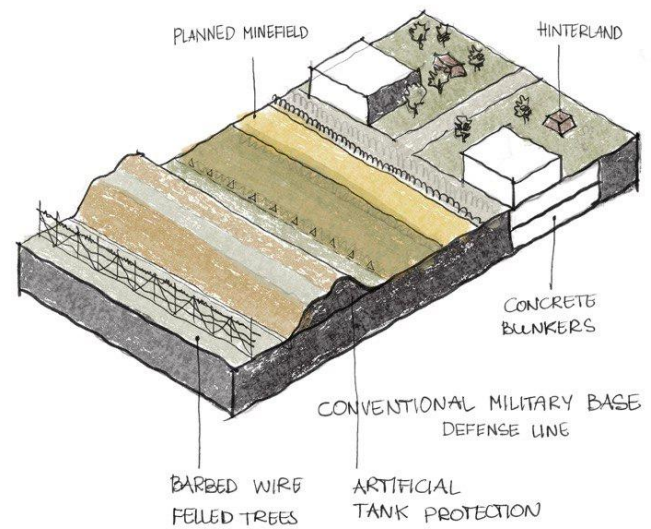
PROTECT AND PREVENT

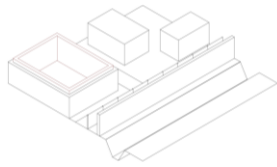


Adaptive Reuse of Soviet-era Buildings for Protection in Lithuania

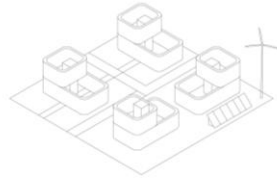
RESEARCH PHASE:

CIRCULARITY IN DEFENSE AND PROTECTION AGAINST HYBRID WARFARE

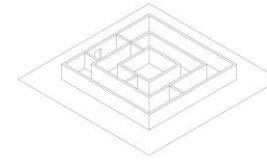




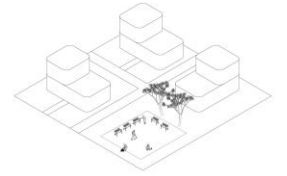
CONVENTIONAL DEFENSE STRUCTURES



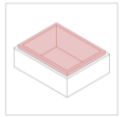
CIVILIAN PROTECTION



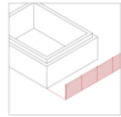
CYBER SECURITY



COGNITIVE PROTECTION



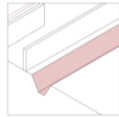
REDUNDANCY



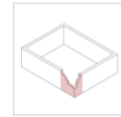
STAND-OFF
PRE-DETONATION SCREEN



COMPOUND LAYOUTS
(FORTIFIED,
SELF-CONTAINED,
ENCLOSED)



USE OF TERRAIN



ALLOW SOME DAMAGE



LOW-RISE STEPPED
BUILDINGS



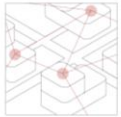
ROUNDED CORNERS



HARD CORES



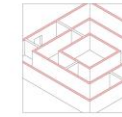
MULTIPLE NETWORK
PATTERNS



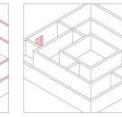
DECENTRALIZED
PLANNING



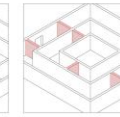
RENEWABLE ENERGY



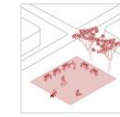
CONCENTRIC LAYERS



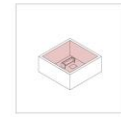
HIDDEN ENTRANCES



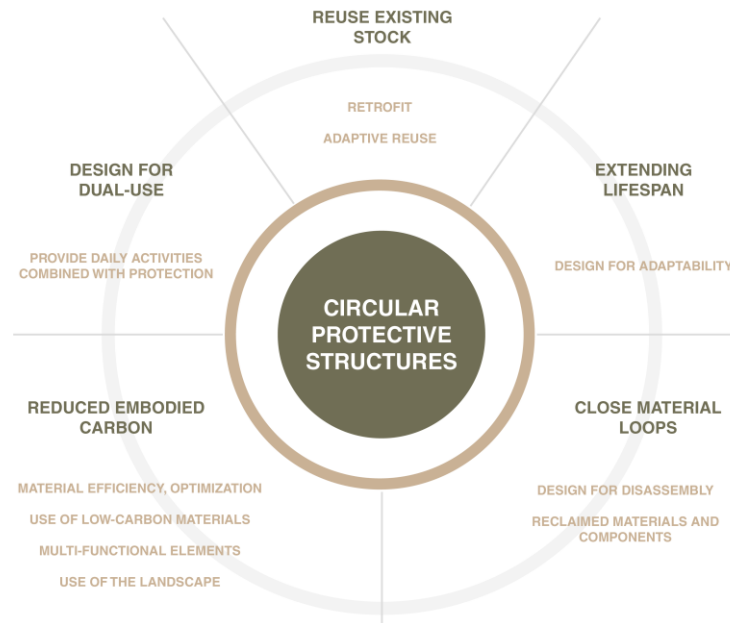
ZERO-TRUST POLICY

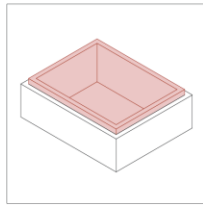


FOSTER SOCIAL COHESION

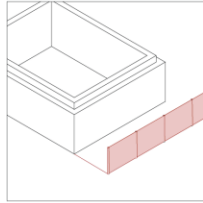


ENHANCE
CONCENTRATION

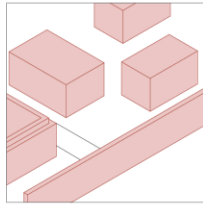




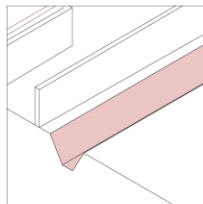
REDUNDANCY



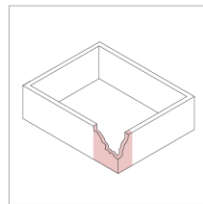
**STAND-OFF
PRE-DETONATION SCREEN**



COMPOUND LAYOUTS



USE OF TERRAIN



ALLOW SOME DAMAGE

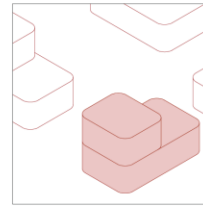
RETROFIT
MATERIAL EFFICIENCY AND OPTIMIZATION
UPGRADING PATHWAYS
RECLAIMED MATERIALS AND COMPONENTS
DESIGN FOR DUAL-USE

MULTI-FUNCTIONAL ELEMENTS
USE OF LOW-CARBON MATERIALS

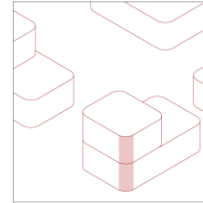
USE OF LANDSCAPE
DESIGN FOR DISASSEMBLY
DESIGN FOR ADAPTABILITY
ADAPTIVE REUSE

UPGRADING PATHWAYS
USE OF LANDSCAPE

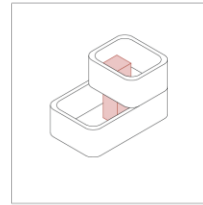
MATERIAL EFFICIENCY AND OPTIMIZATION
USE OF LOW-CARBON MATERIALS



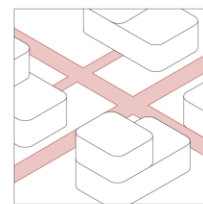
**LOW-RISE STEPPED
BUILDINGS**



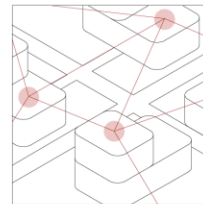
ROUNDED CORNERS



HARD CORES



**MULTIPLE NETWORK
PATTERNS**



**DECENTRALIZED
PLANNING**

ADAPTIVE REUSE
DESIGN FOR DISASSEMBLY
RECLAIMED MATERIALS AND COMPONENTS
DESIGN FOR DUAL-USE

ADAPTIVE REUSE
USE OF LOW-CARBON MATERIALS
MATERIAL EFFICIENCY AND OPTIMIZATION

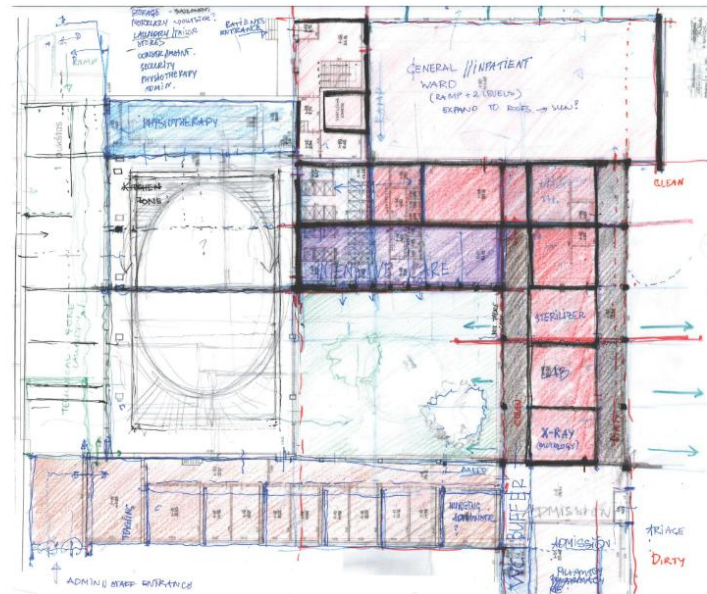
USE OF LOW-CARBON MATERIALS

USE OF LANDSCAPE
DESIGN FOR ADAPTABILITY

DESIGN FOR DISASSEMBLY
USE OF LANDSCAPE
MATERIAL EFFICIENCY AND OPTIMIZATION
RECLAIMED MATERIALS AND COMPONENTS
DESIGN FOR ADAPTABILITY
DESIGN FOR DUAL-USE

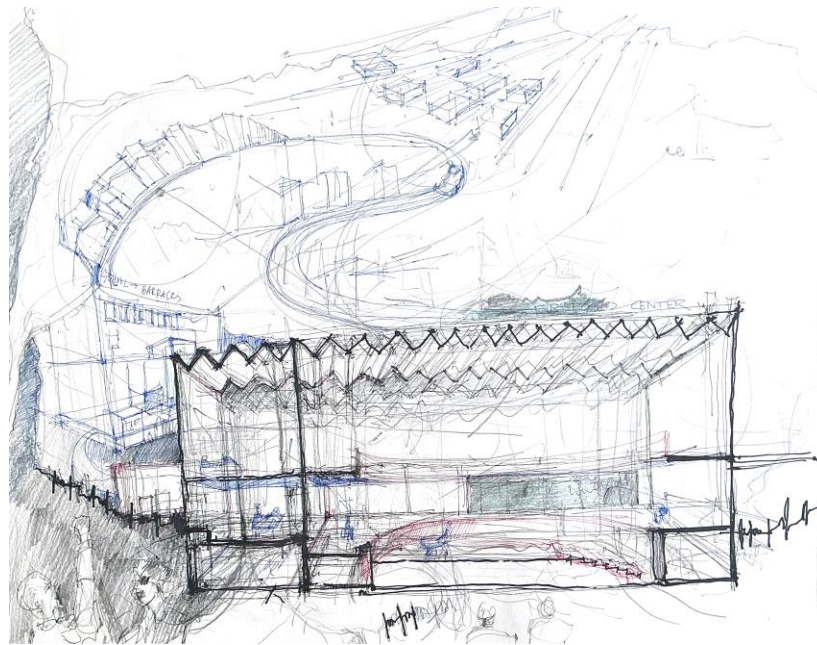
DESIGN PHASE:

ADAPTIVE REUSE OF SOVIET-ERA BUILDINGS FOR DEFENSE IN LITHUANIA



MACRO SCALE:

DECENTRALIZED DEFENSE COUNTRY NETWORK



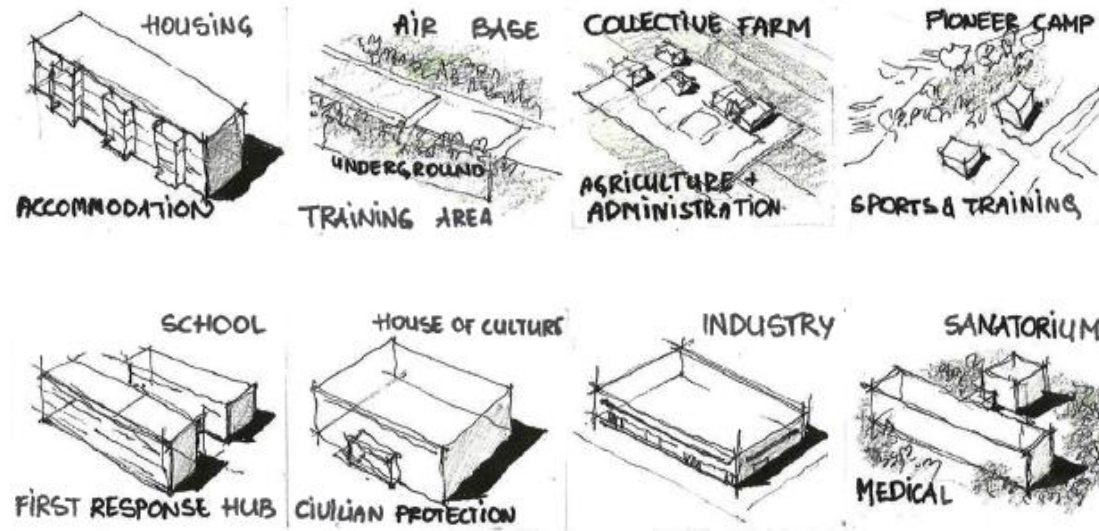


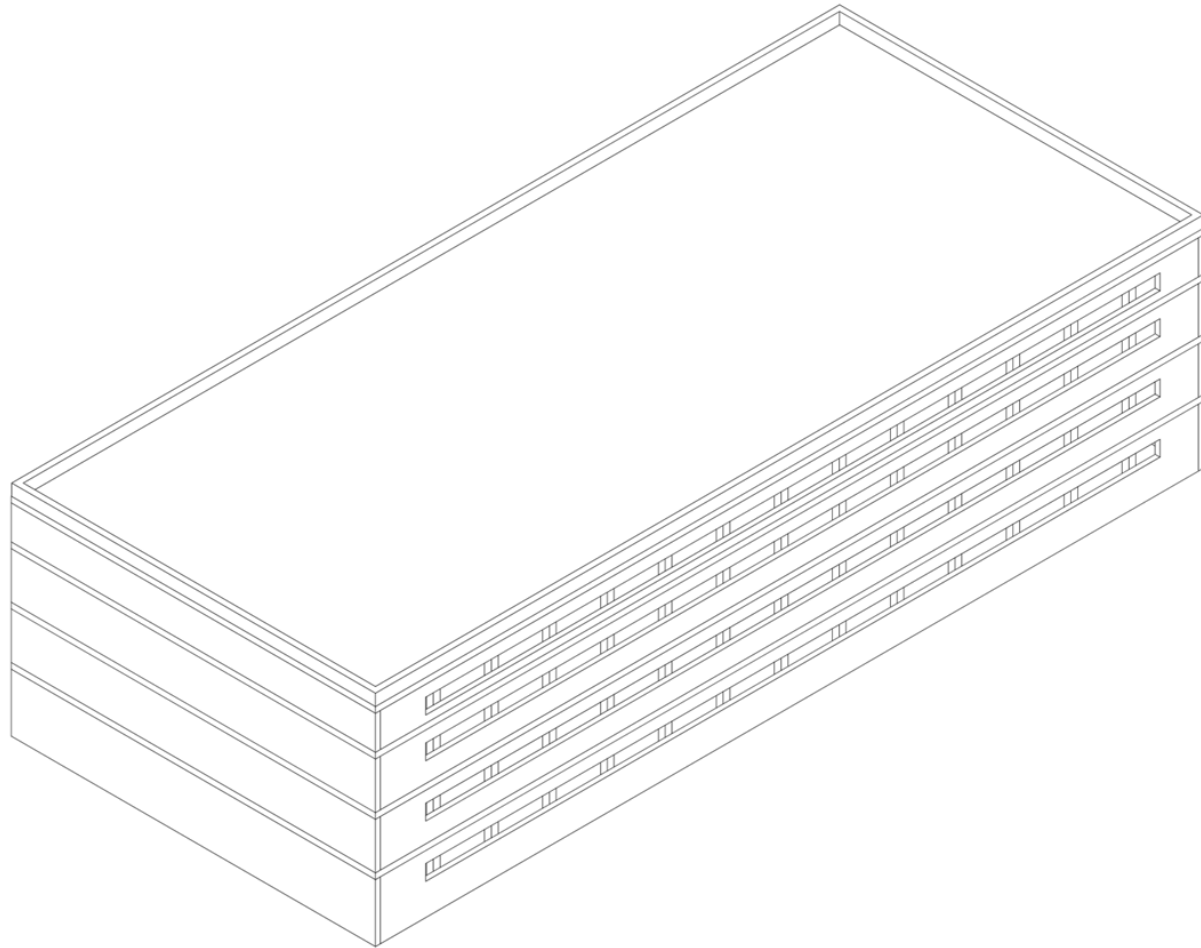


MESO SCALE:

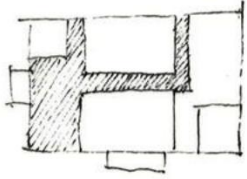
TYOLOGICAL TRANSFORMATIONS

Redefining each typology into a defense-related function





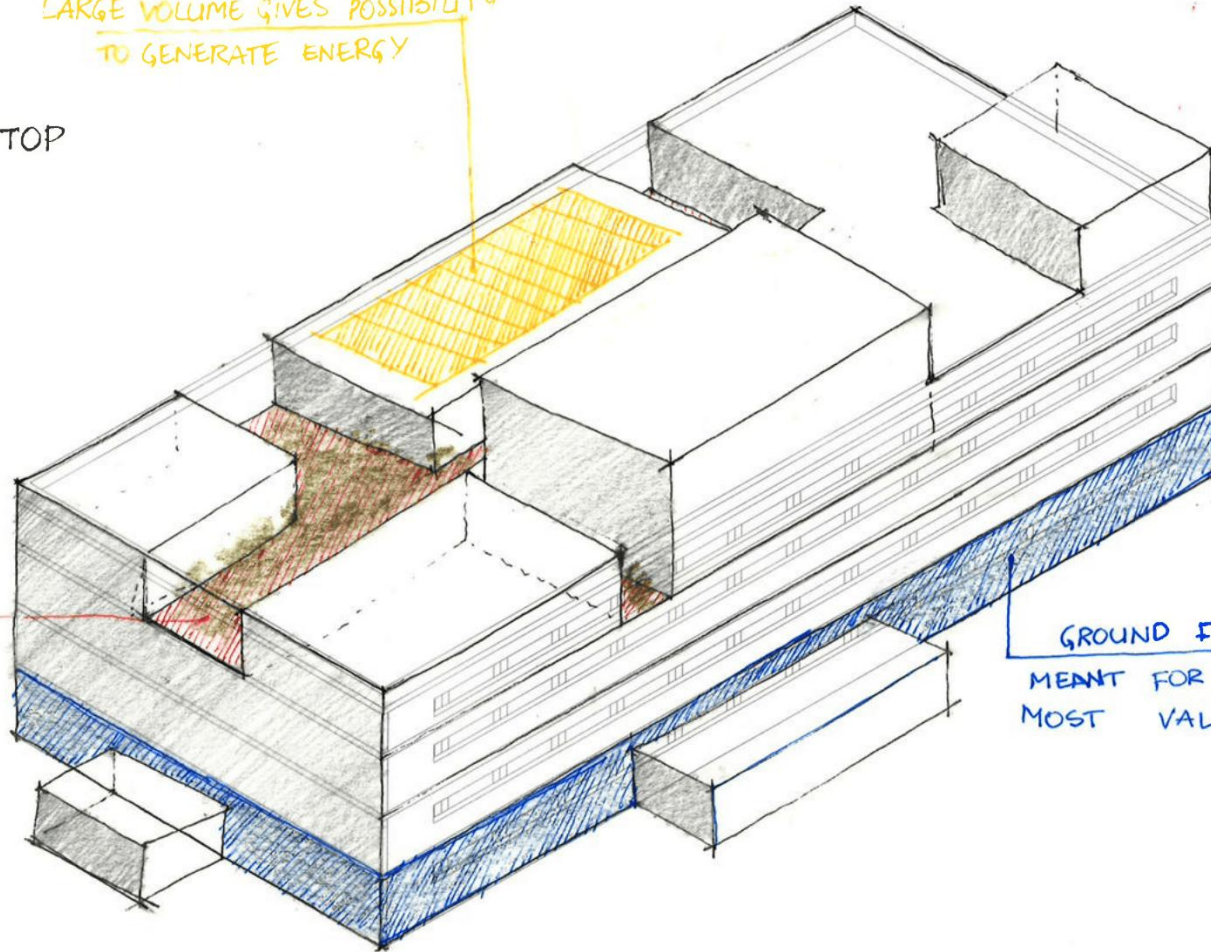
FACTORIES



MASK FROM THE TOP

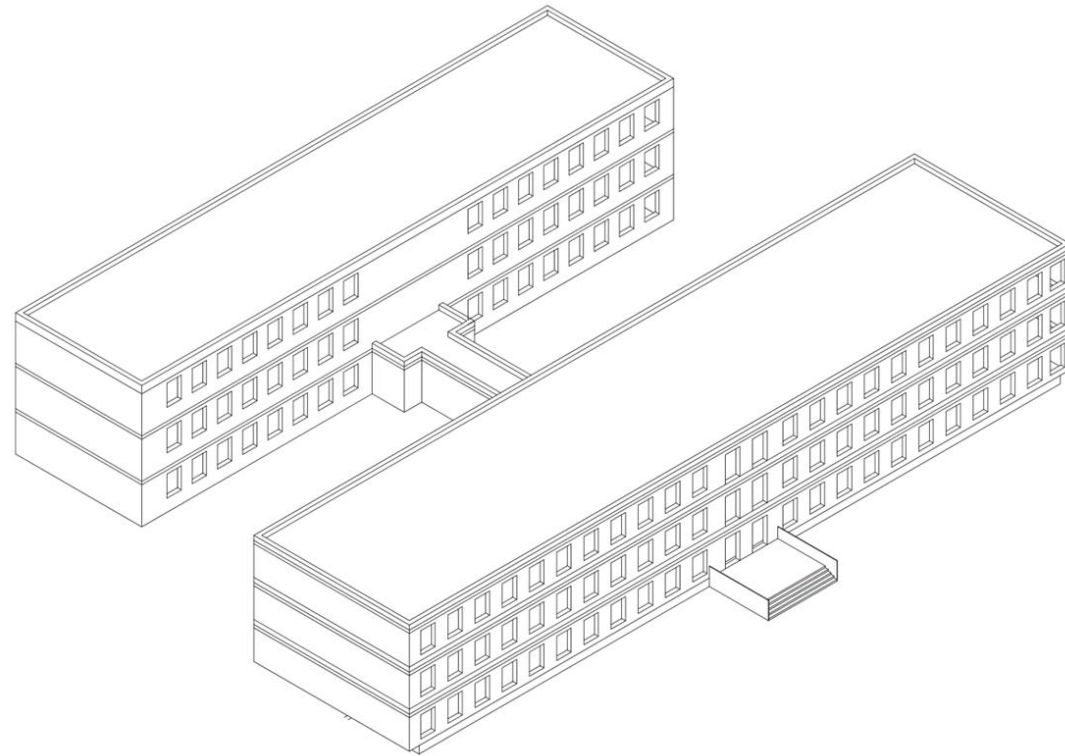
LARGE VOLUME GIVES POSSIBILITY
TO GENERATE ENERGY

MASK FROM THE
TOP WITH SMALLER
VOLUMES AND
GREENERY

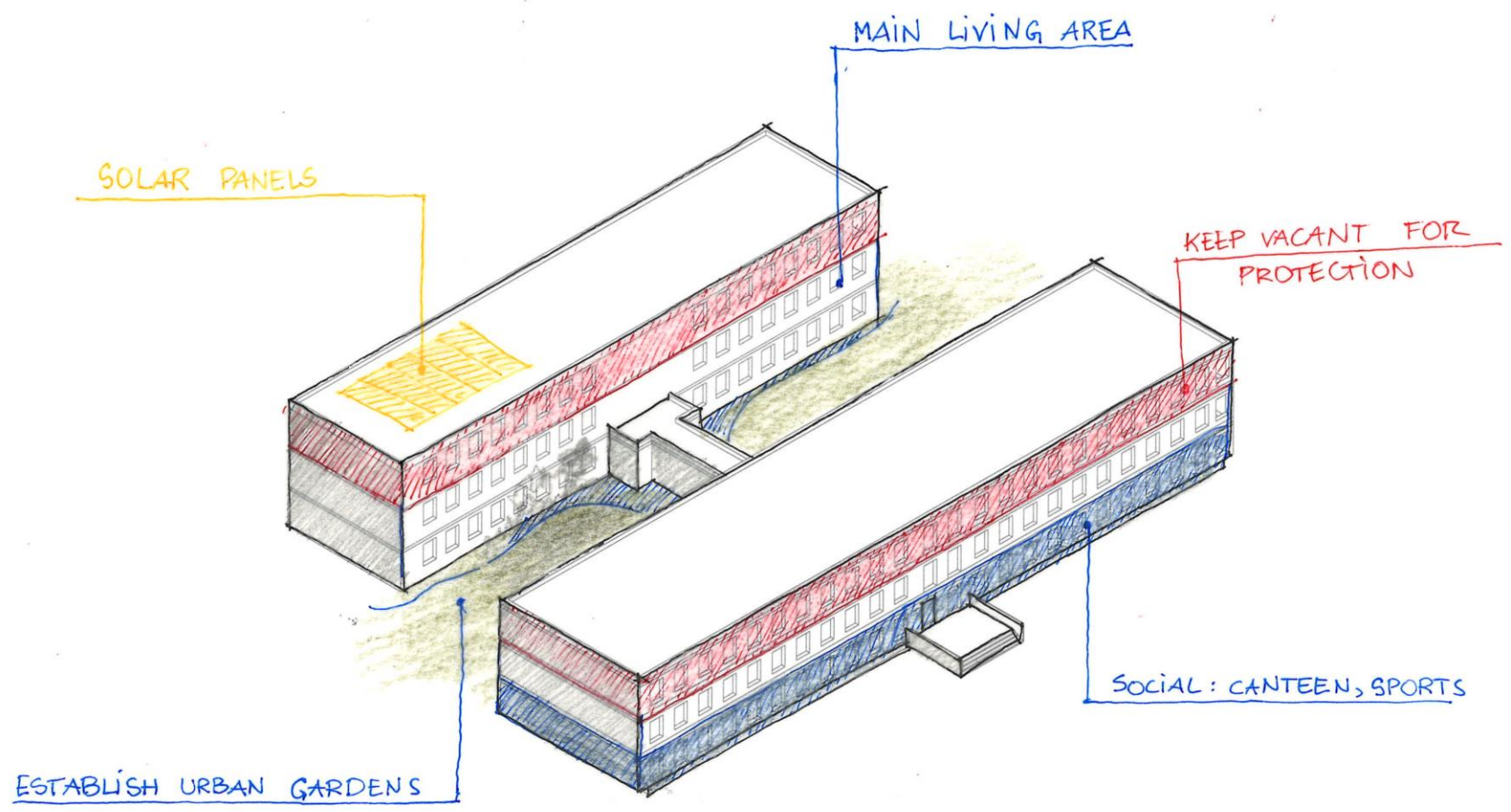


GROUND FLOOR STORAGE
MEANT FOR LARGEST AND
MOST VALUABLE OBJECTS

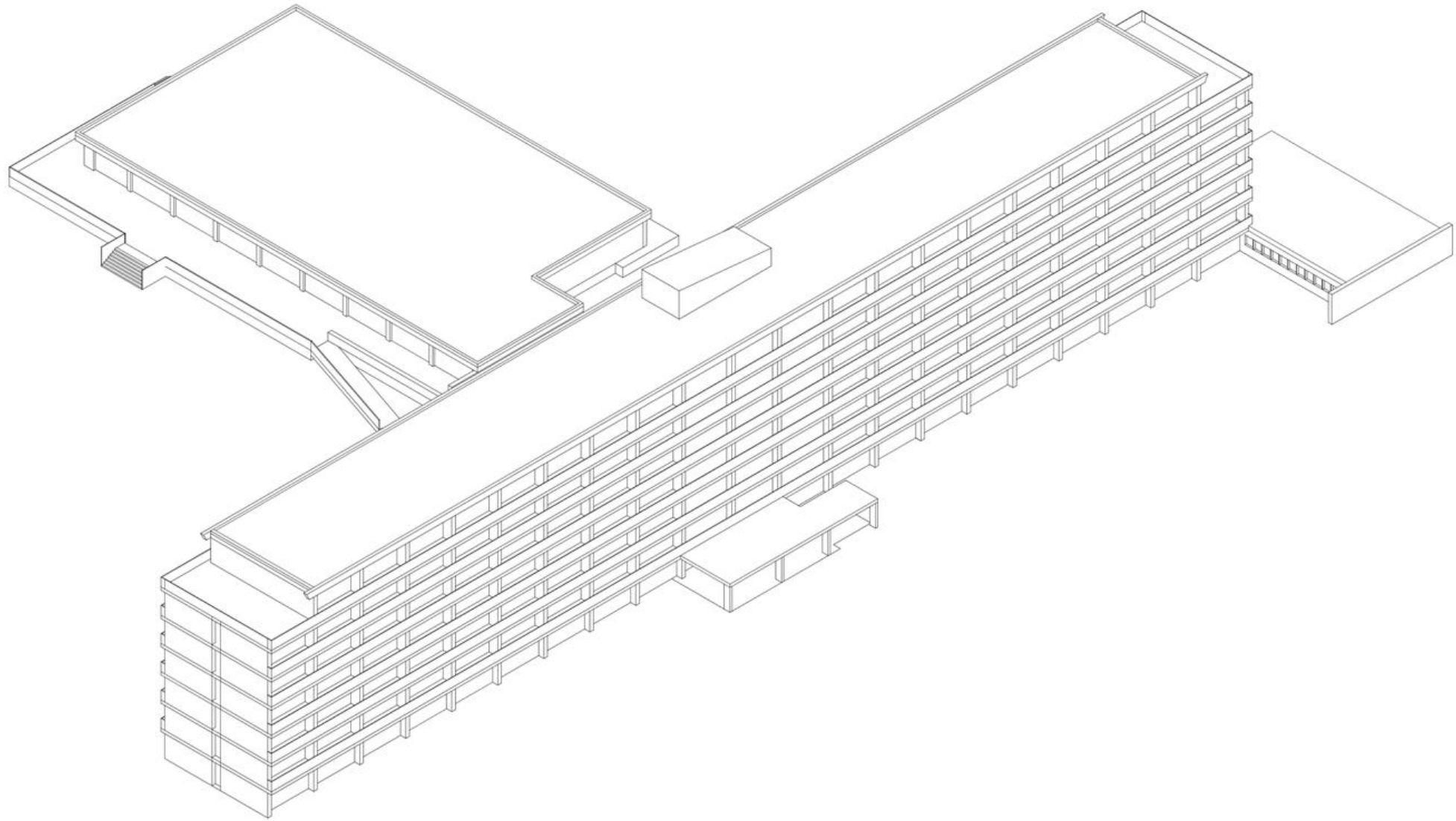
WAREHOUSES AND REPAIR



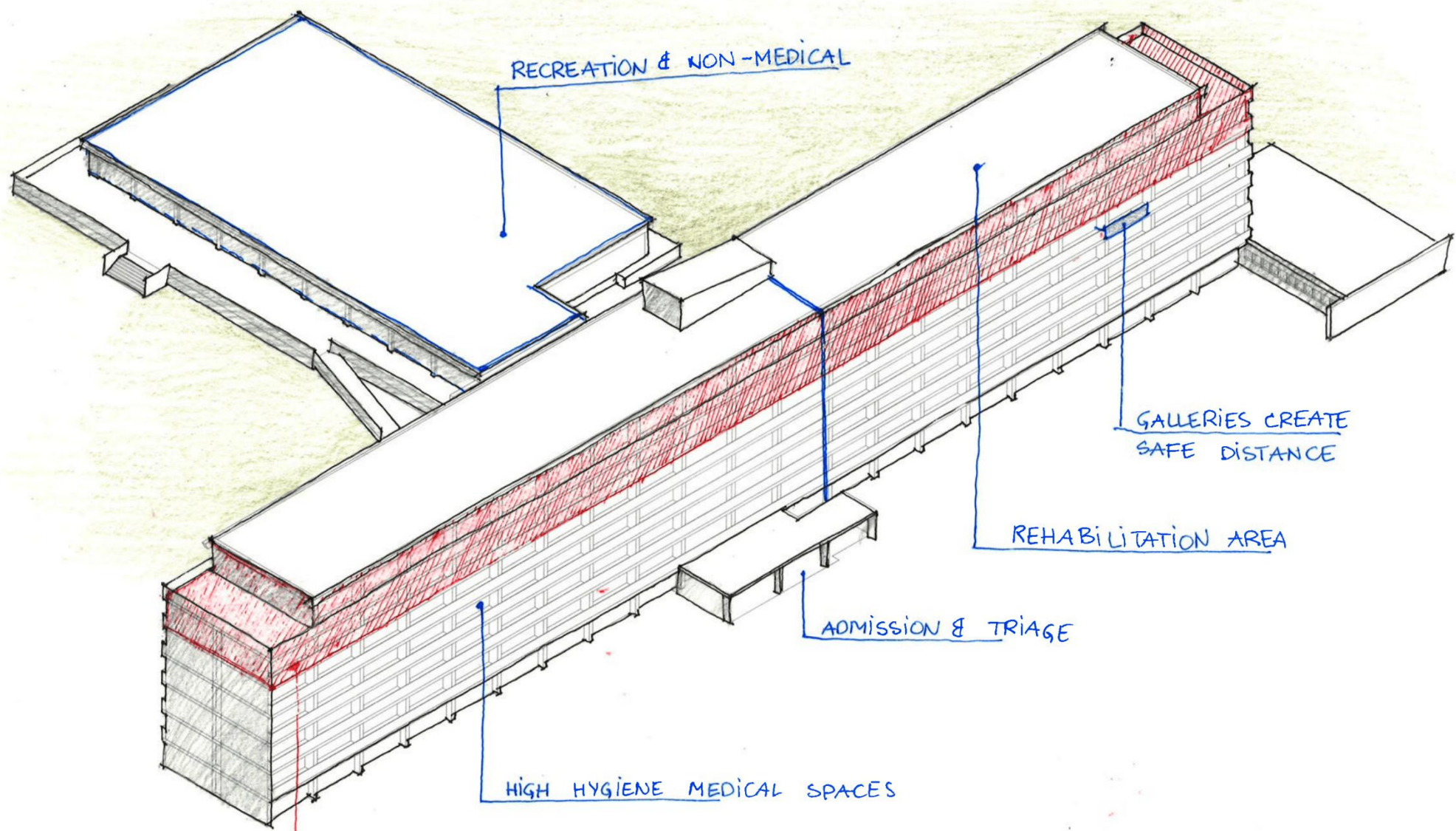
SCHOOLS



BARRACKS



SANATORIUMS



RECREATION & NON-MEDICAL

GALLERIES CREATE
SAFE DISTANCE

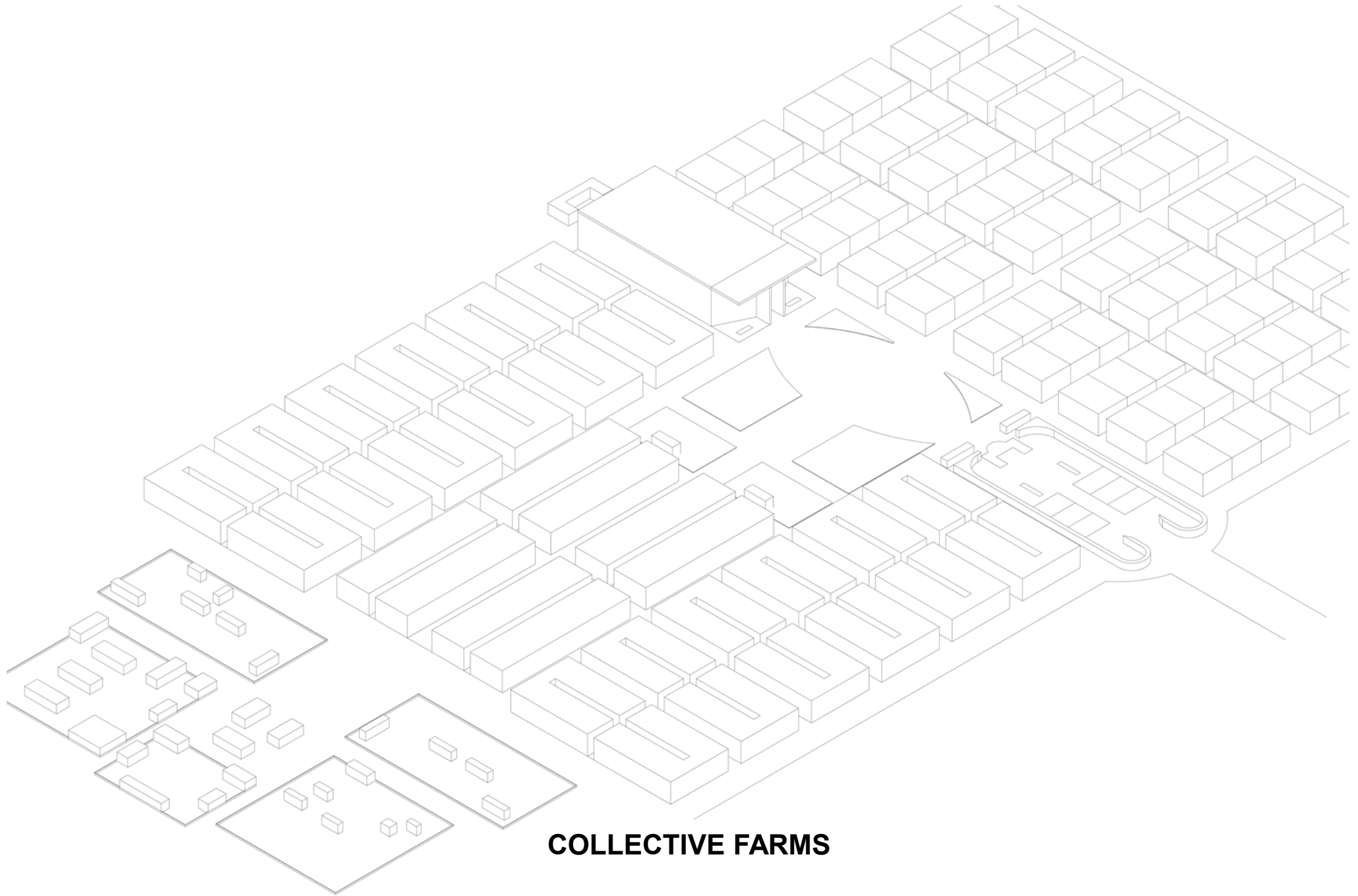
REHABILITATION AREA

ADMISSION & TRIAGE

HIGH HYGIENE MEDICAL SPACES

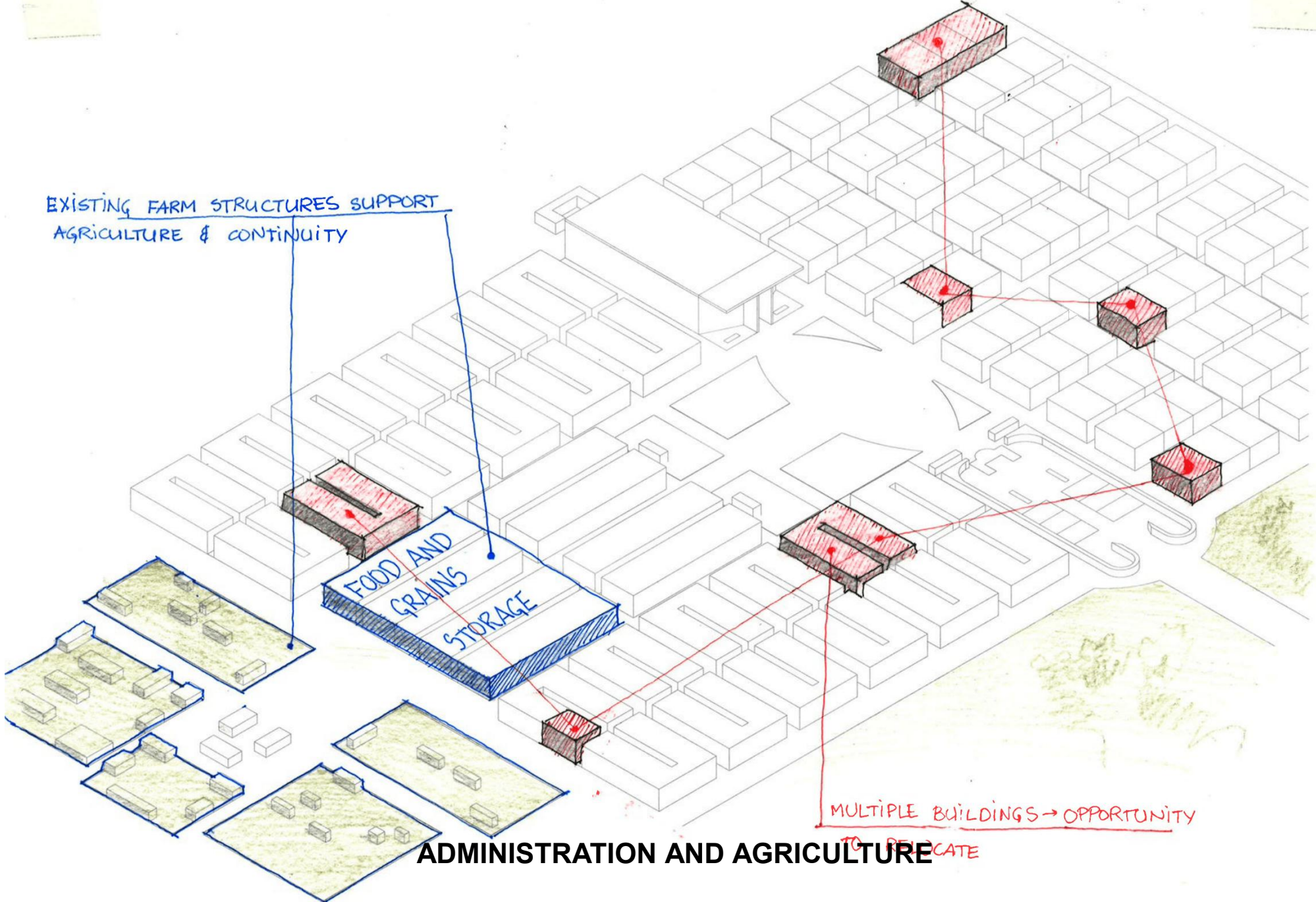
KEEP VACANT FOR PROTECTION

MEDICAL FACILITIES



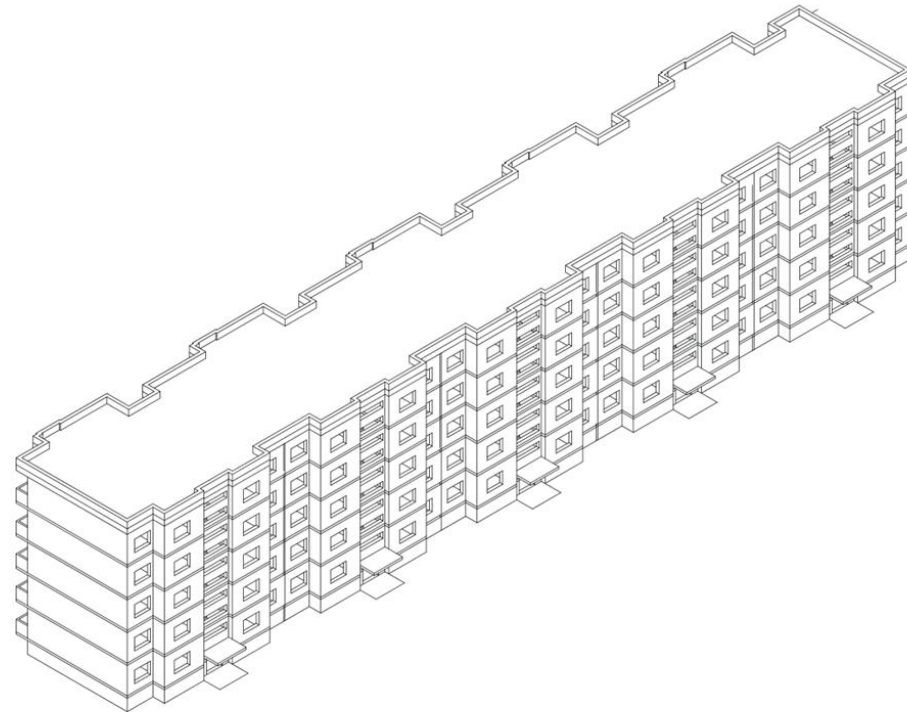
COLLECTIVE FARMS

EXISTING FARM STRUCTURES SUPPORT AGRICULTURE & CONTINUITY

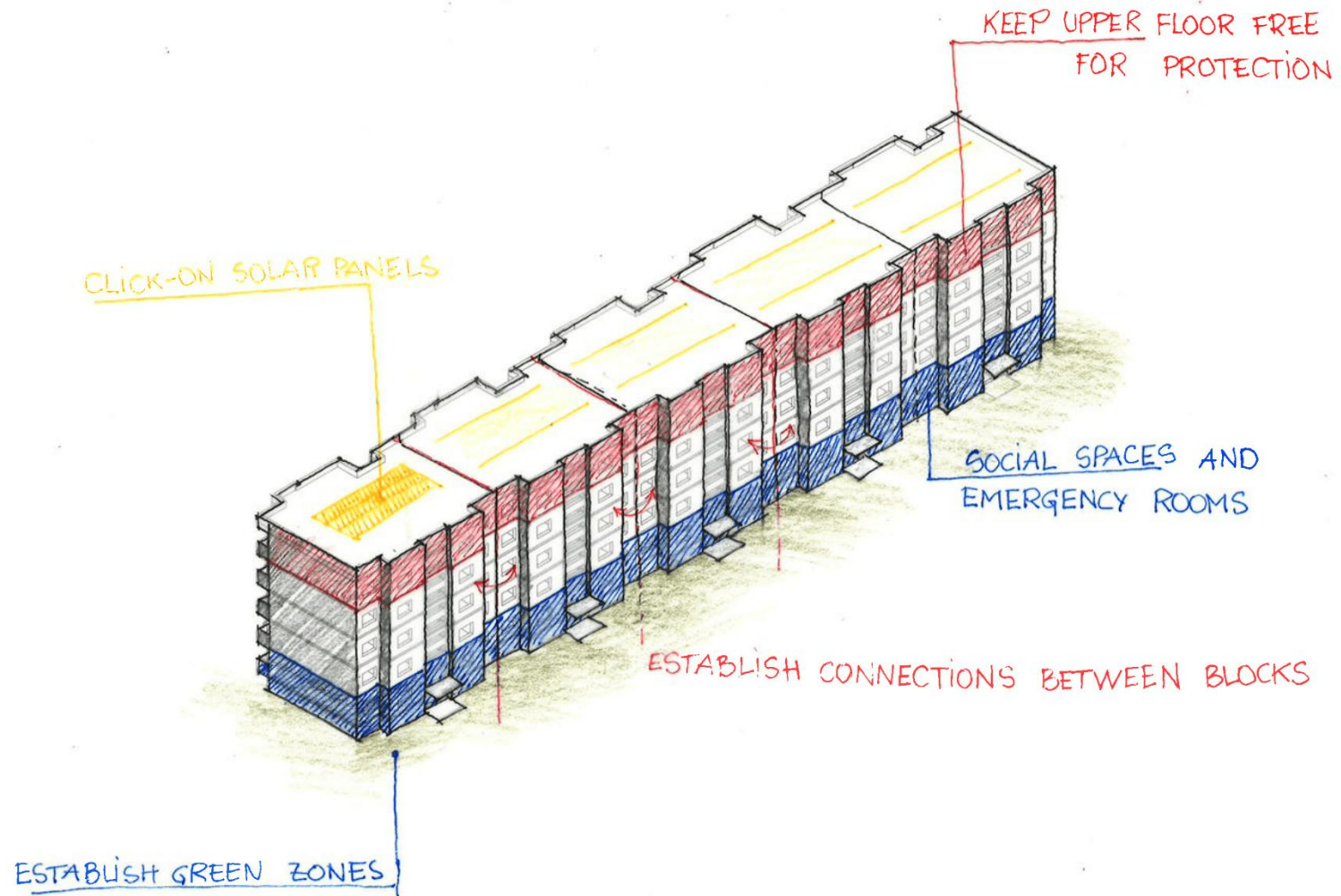


ADMINISTRATION AND AGRICULTURE

MULTIPLE BUILDINGS -> OPPORTUNITY TO REPLICATE



KHRUSHCHEVKA

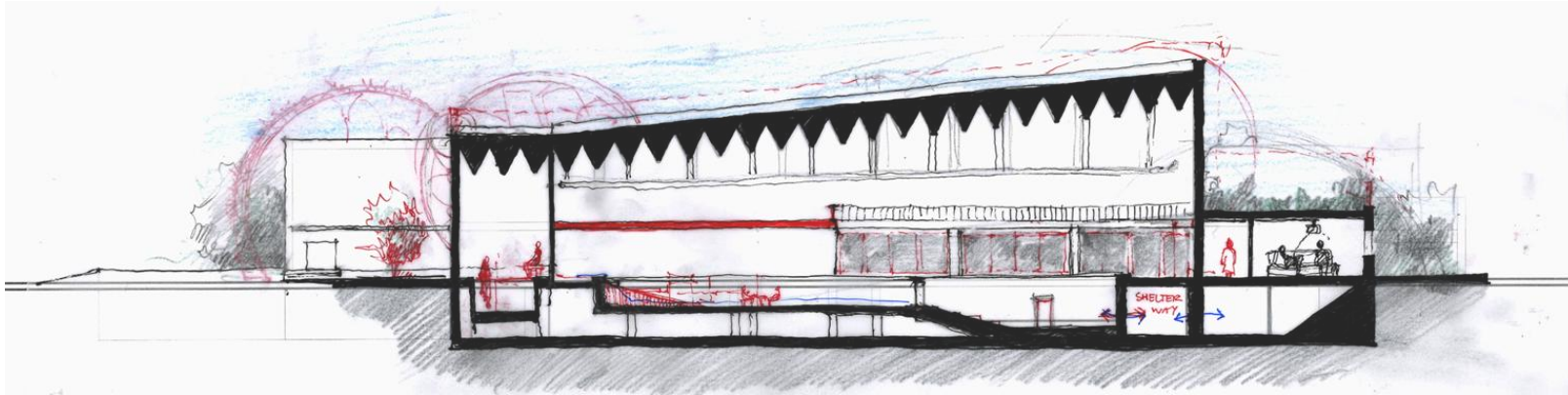


CIVILIAN SHELTER

MICRO SCALE:

COMPLEMENTARY APPROACH TO DEFENSE

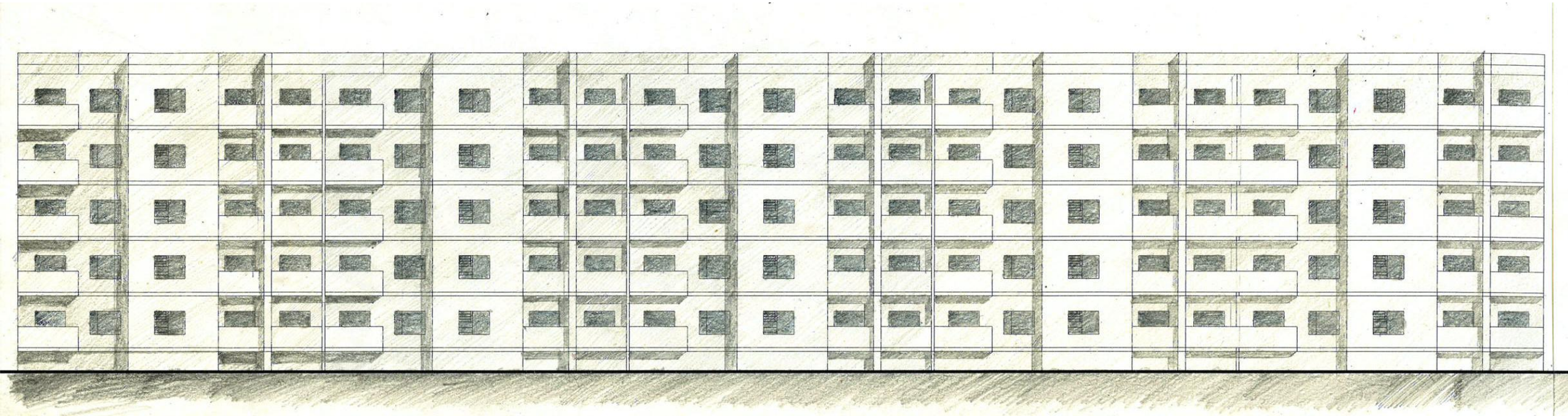
Bottom-up versus top-down approach



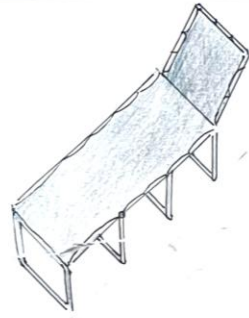
MICRO SCALE:

BOTTOM-UP APPROACH: EMERGENCY OCCUPATION

Inspired by squatting



STEP 1: ESTABLISH A SLEEPING PLACE



FOLDABLE BED

OR

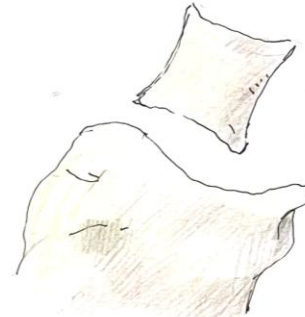


BIO-BASED/USED TENT



SLEEPING BAG

OR



PILLOW AND BLANKET

CARRIED IN HANDS



STEP 2: CHECK AND CONNECT PLUMBING



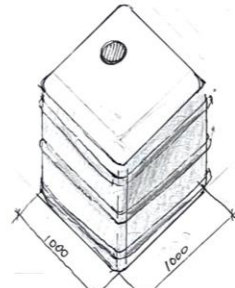
PIPE WRENCH



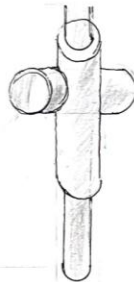
WASTE PIPE



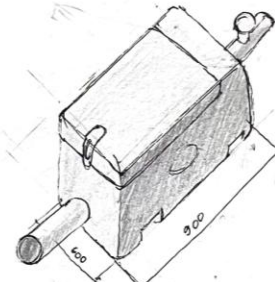
CAPS & REDUCERS



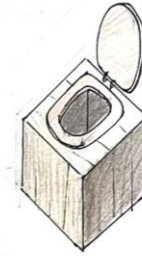
WATER TANK 1000L



DOWNPIPE DIVERGER



GREY WATER FILTER

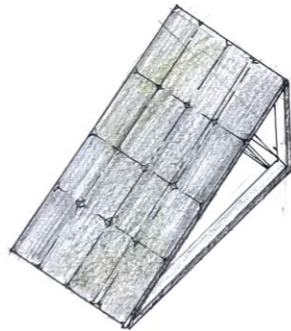


COMPOST TOILET

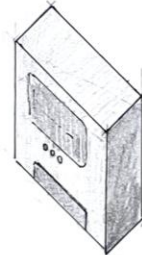


WATER PUMP

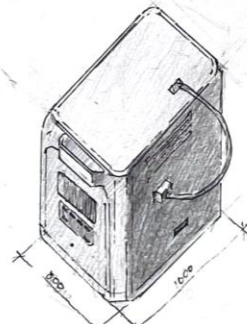
STEP 3: CONNECT ENERGY SYSTEMS



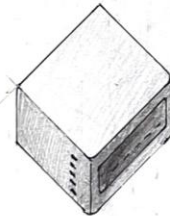
CLICK-ON SOLAR PANELS



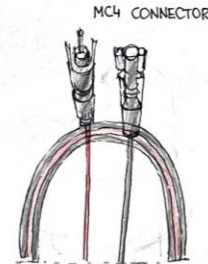
CHARGE CONTROLLER



BATTERY ENERGY STORAGE



DC-AC INVERTER



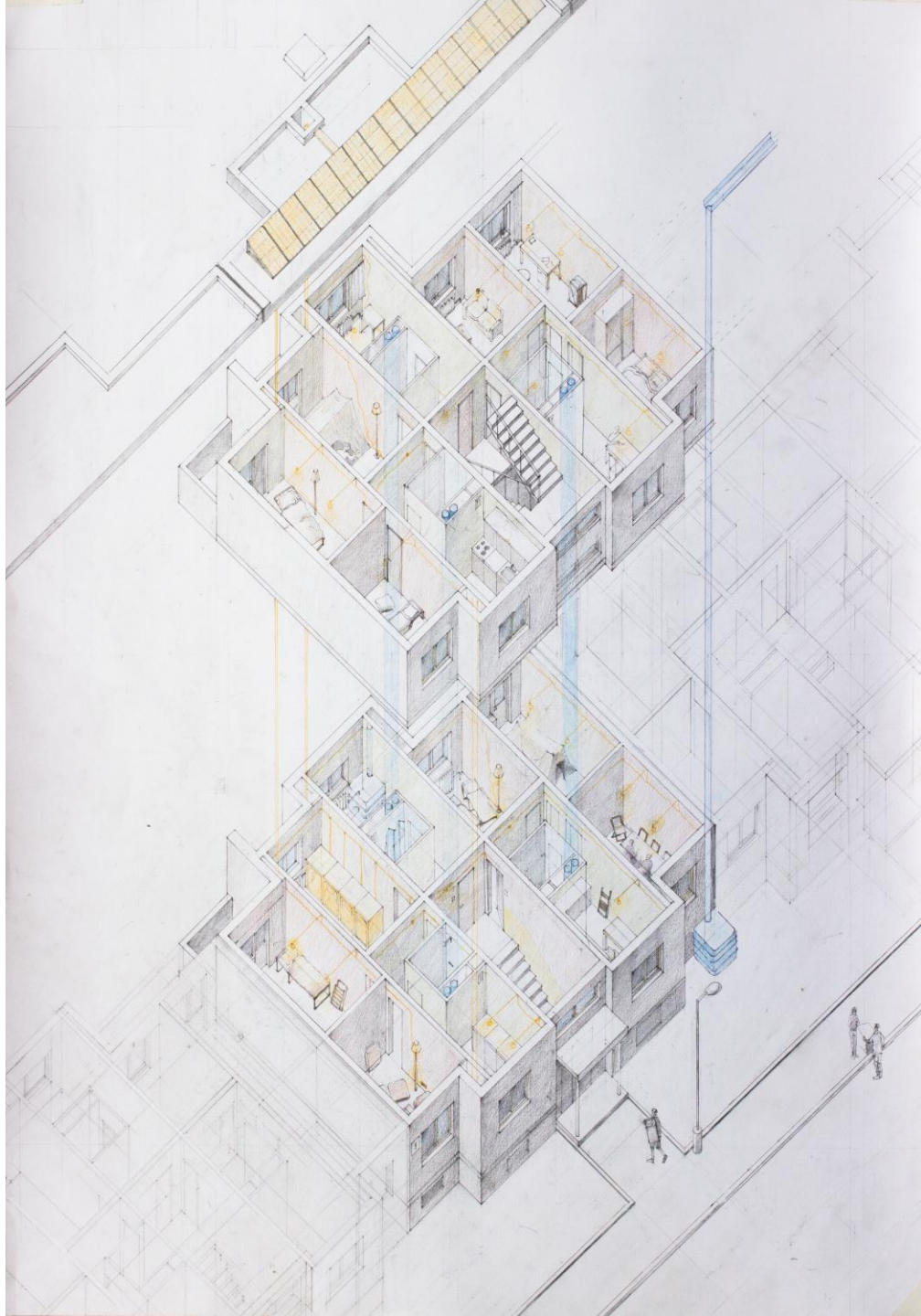
SOLAR PANEL CABLES



CABLE CUTTER



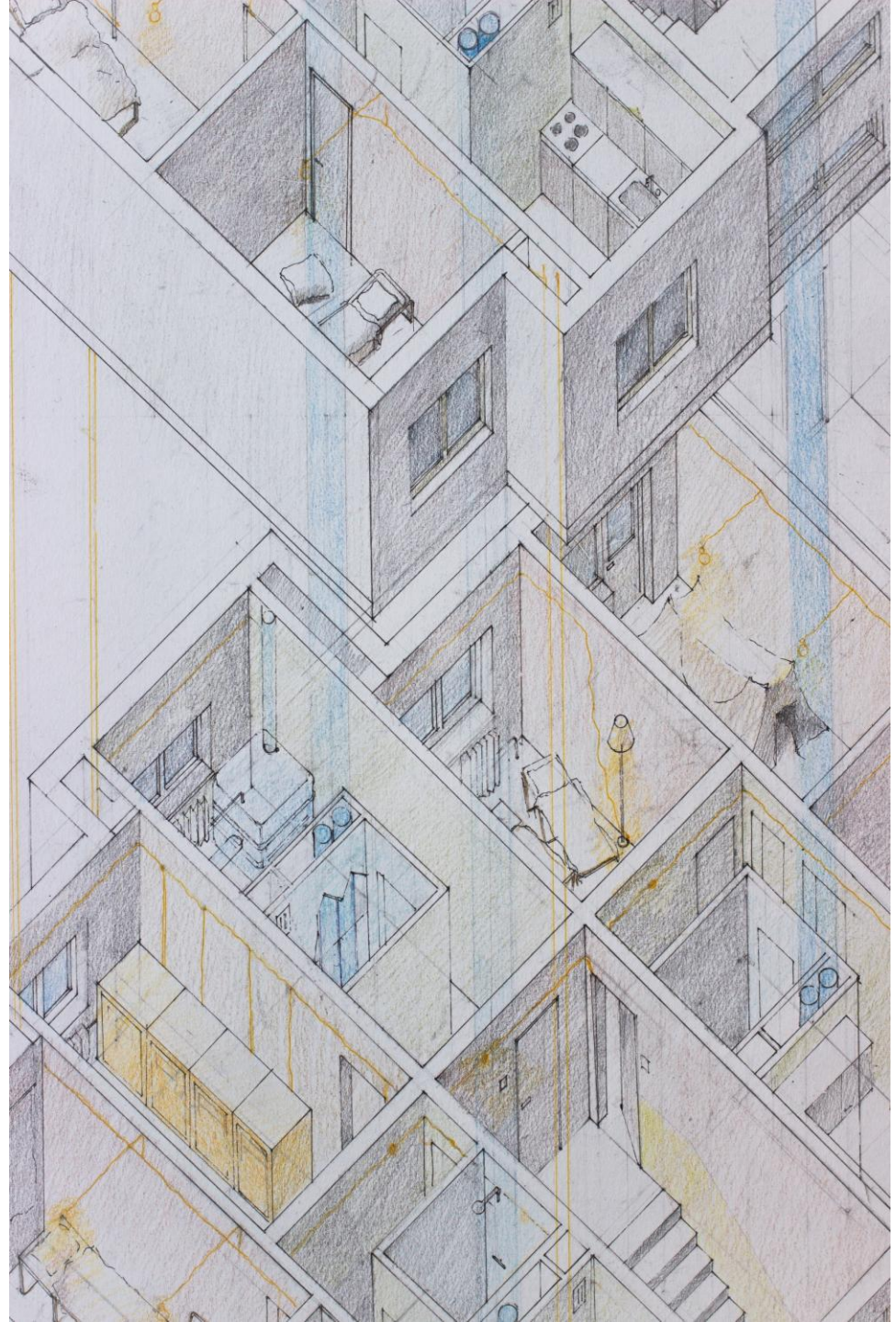
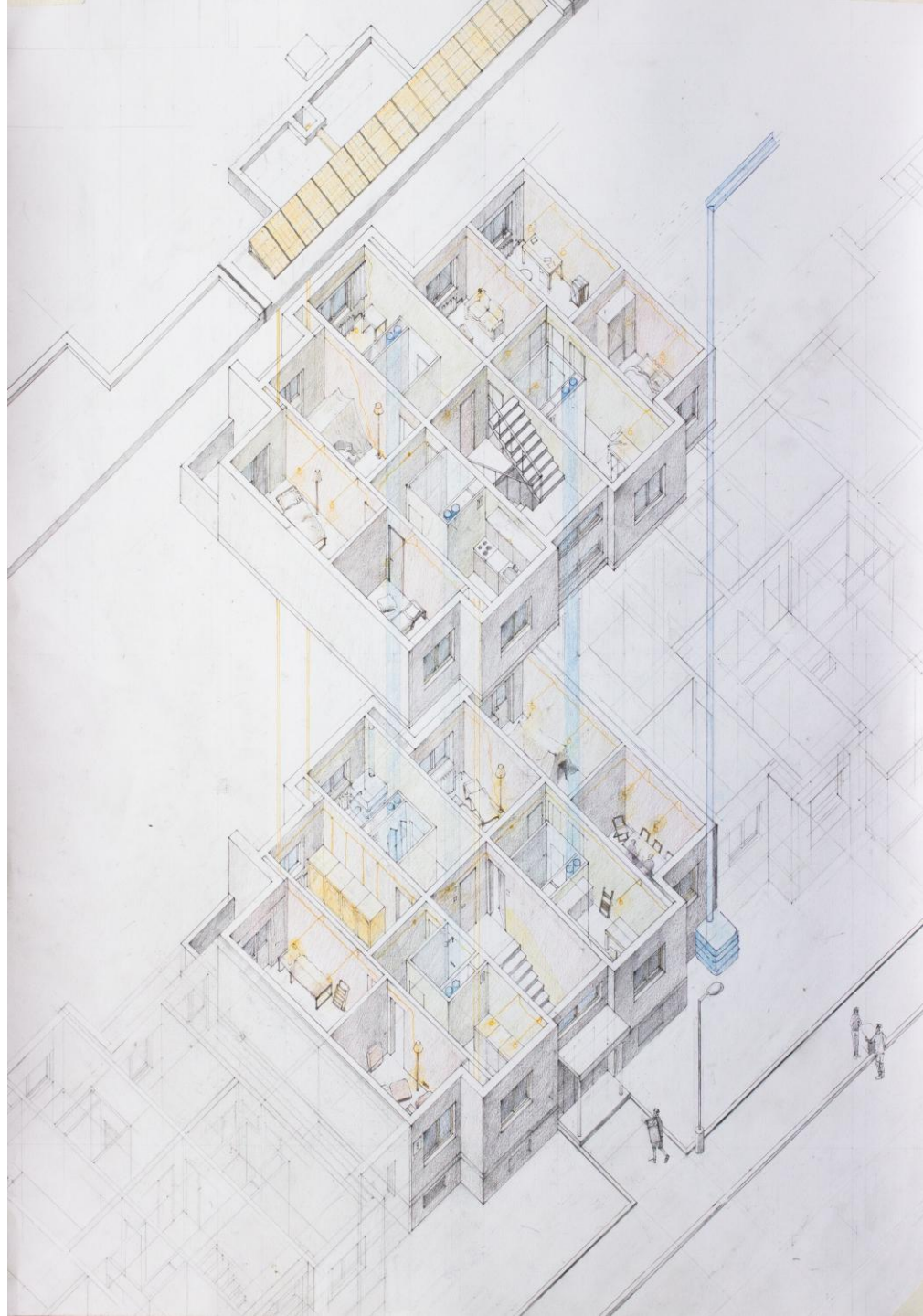
TRANSPORTED IN A TRUCK

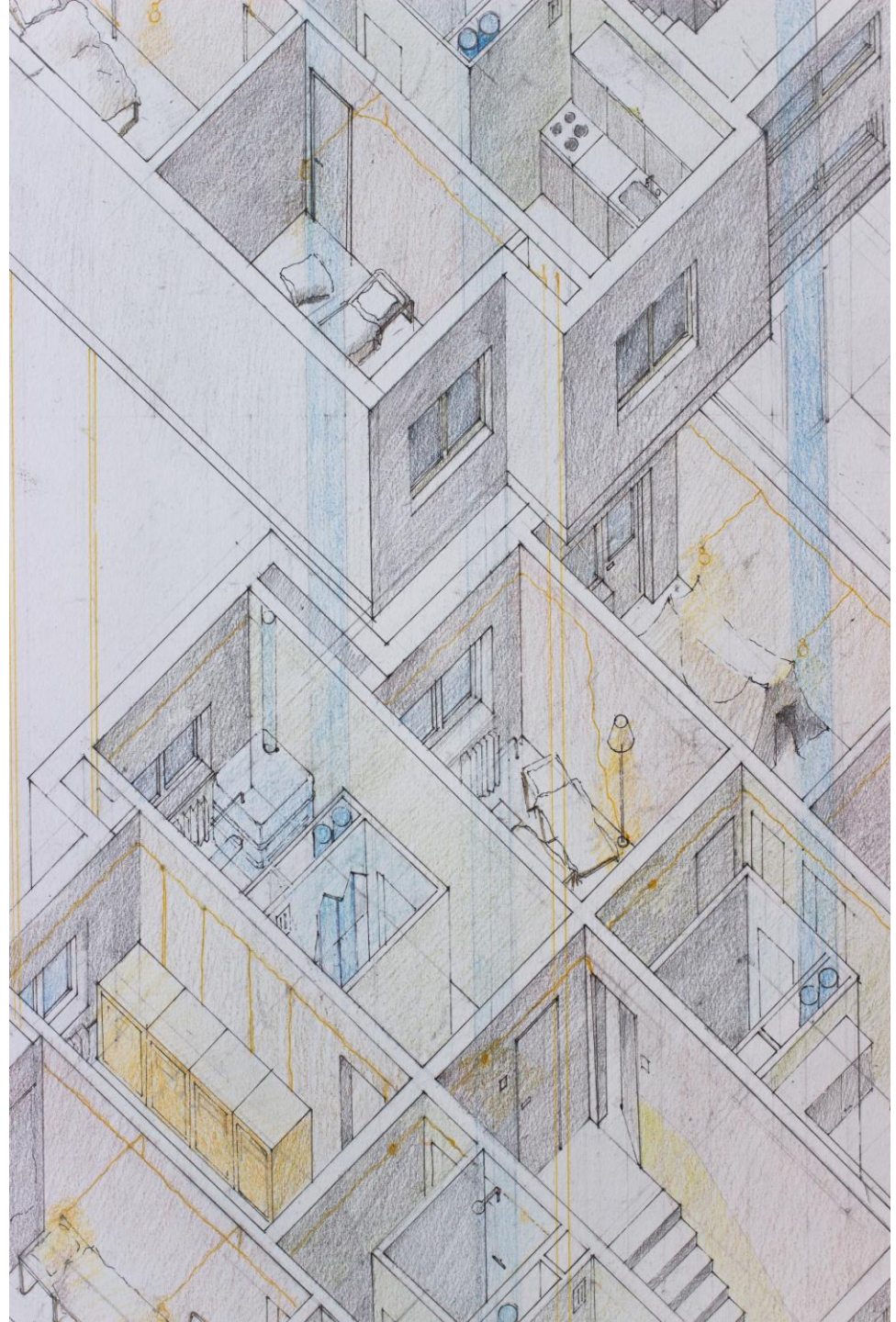


KHRUSHCHEVKA 464LI-AI6L

Most common residential typology in the USSR
Face decline in semi-urban areas due to migration

Central heating and the main grid, thus being vulnerable in blackouts or attacks on infrastructure, especially noticeable during the last winter in Ukraine





MICRO SCALE:

TOP-DOWN APPROACH: PLANNED ADAPTIVE REUSE

Controlled and centralised



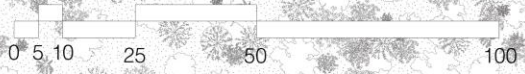
DRUSKININKAI: MEDICAL FUNCTION



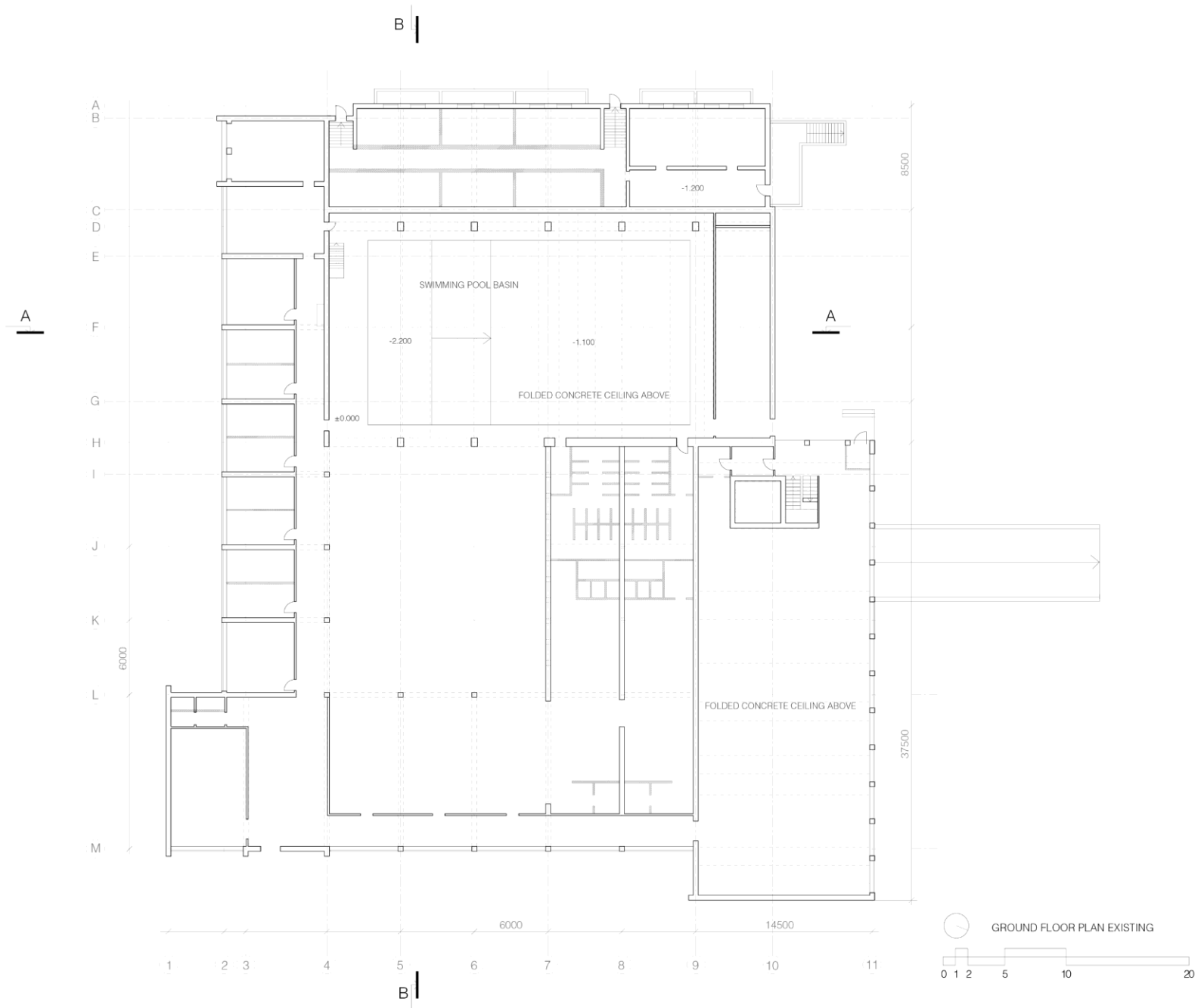
Druskininkai is a well-known Lithuanian spa town located 10 km from the Belarusian border, close to Suwalki gap. It is known for its mineral springs year-round recreation, and multiple sanatoriums in the Soviet times. Hence, Druskininkai is chosen for its potential for emergency medical aid to the people from both sides of the border.

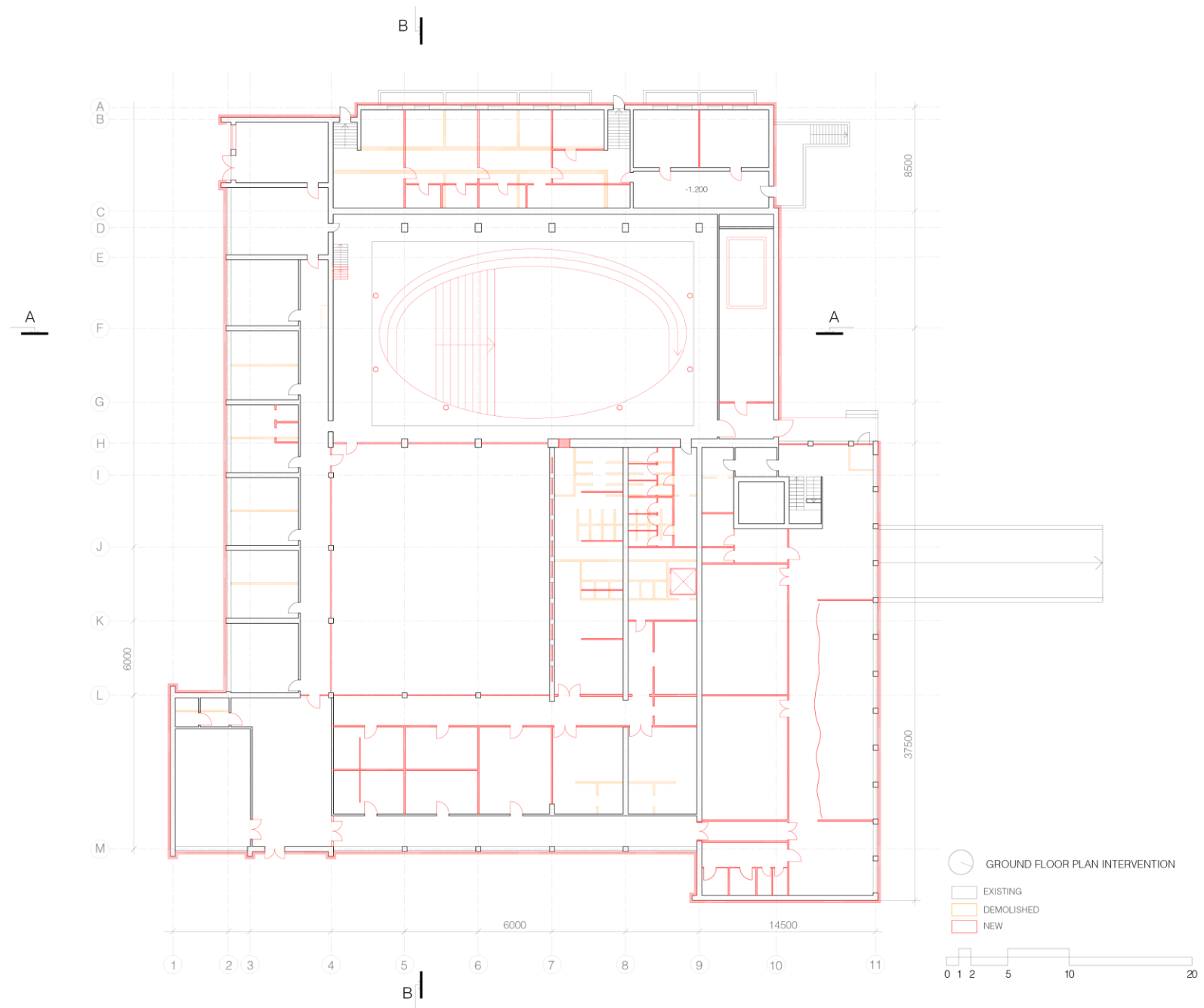


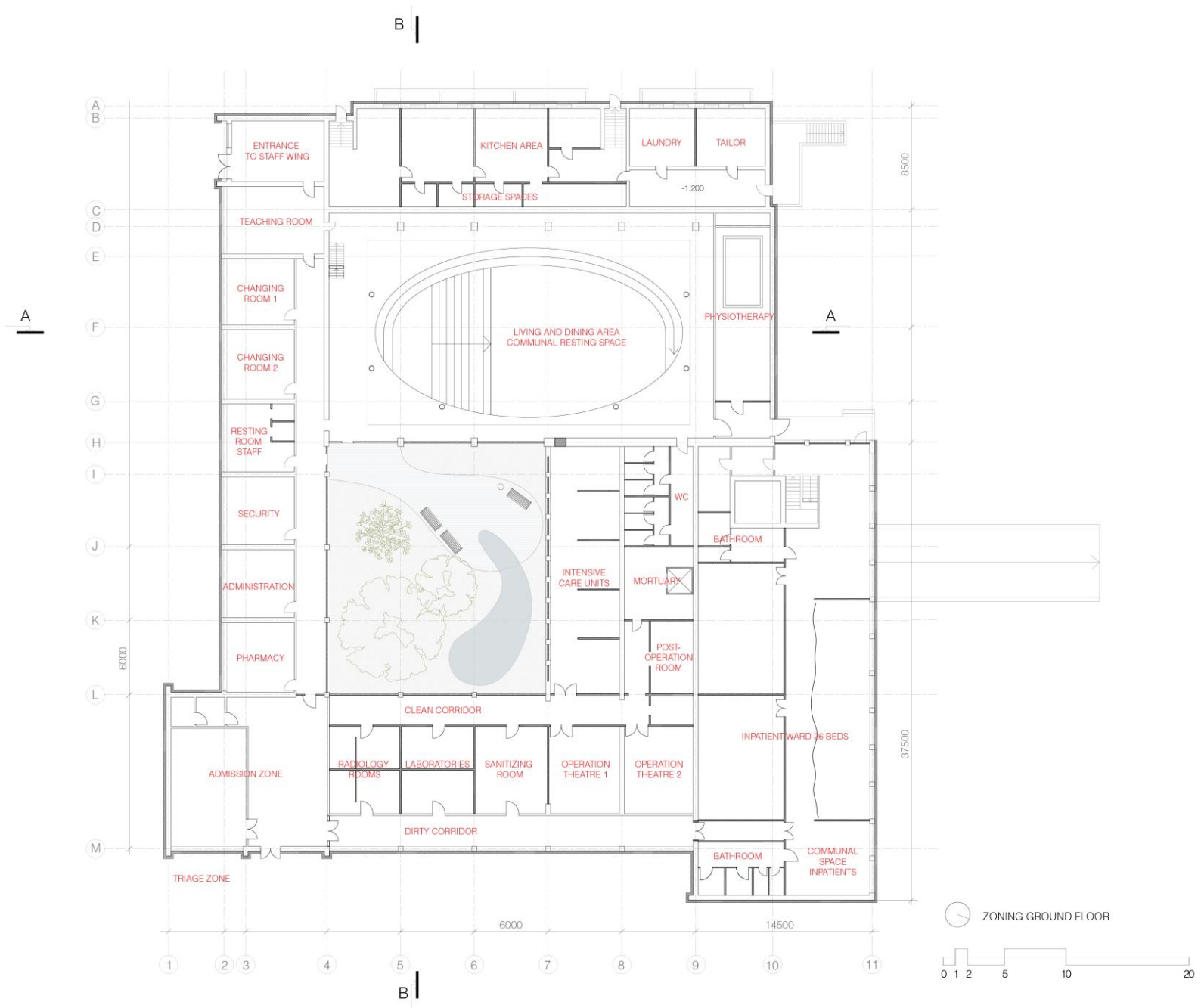
SITE PLAN

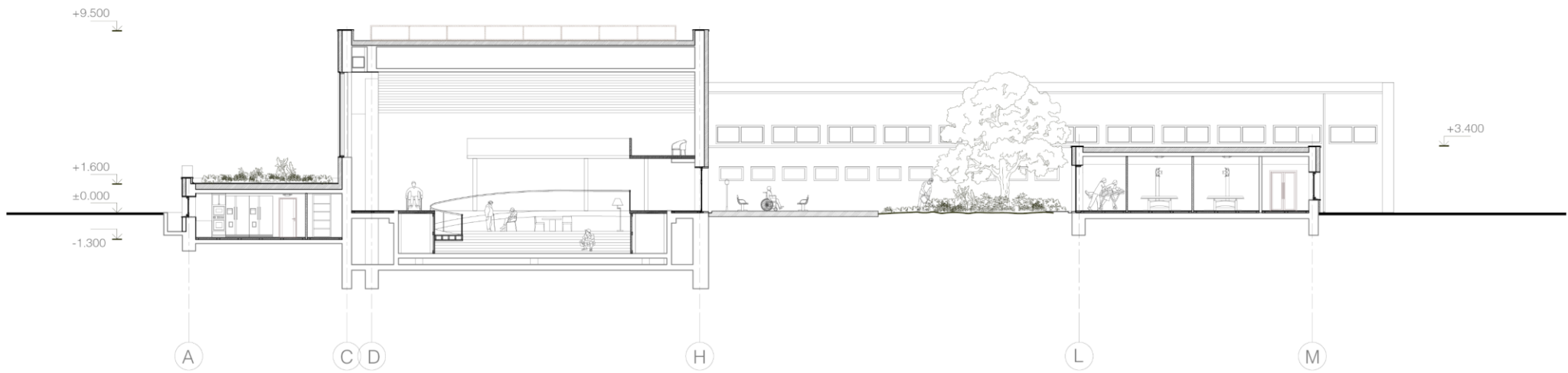






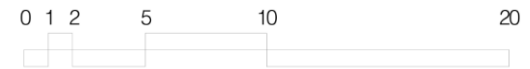


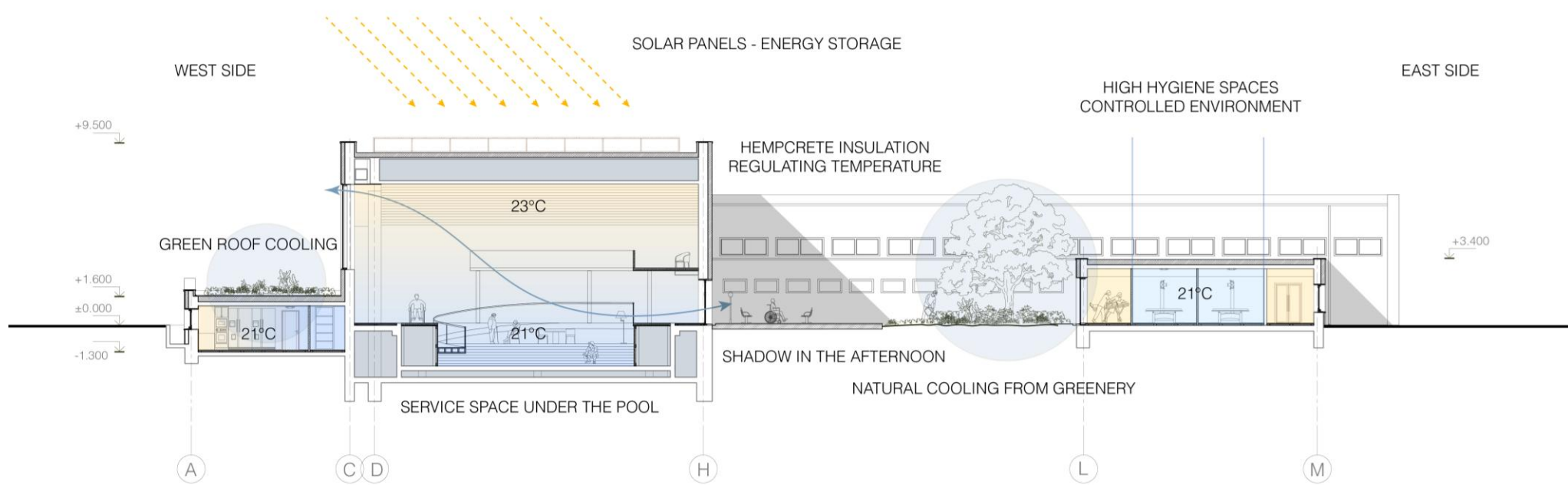




SECTION B-B 1:200

EXISTING
 NEW

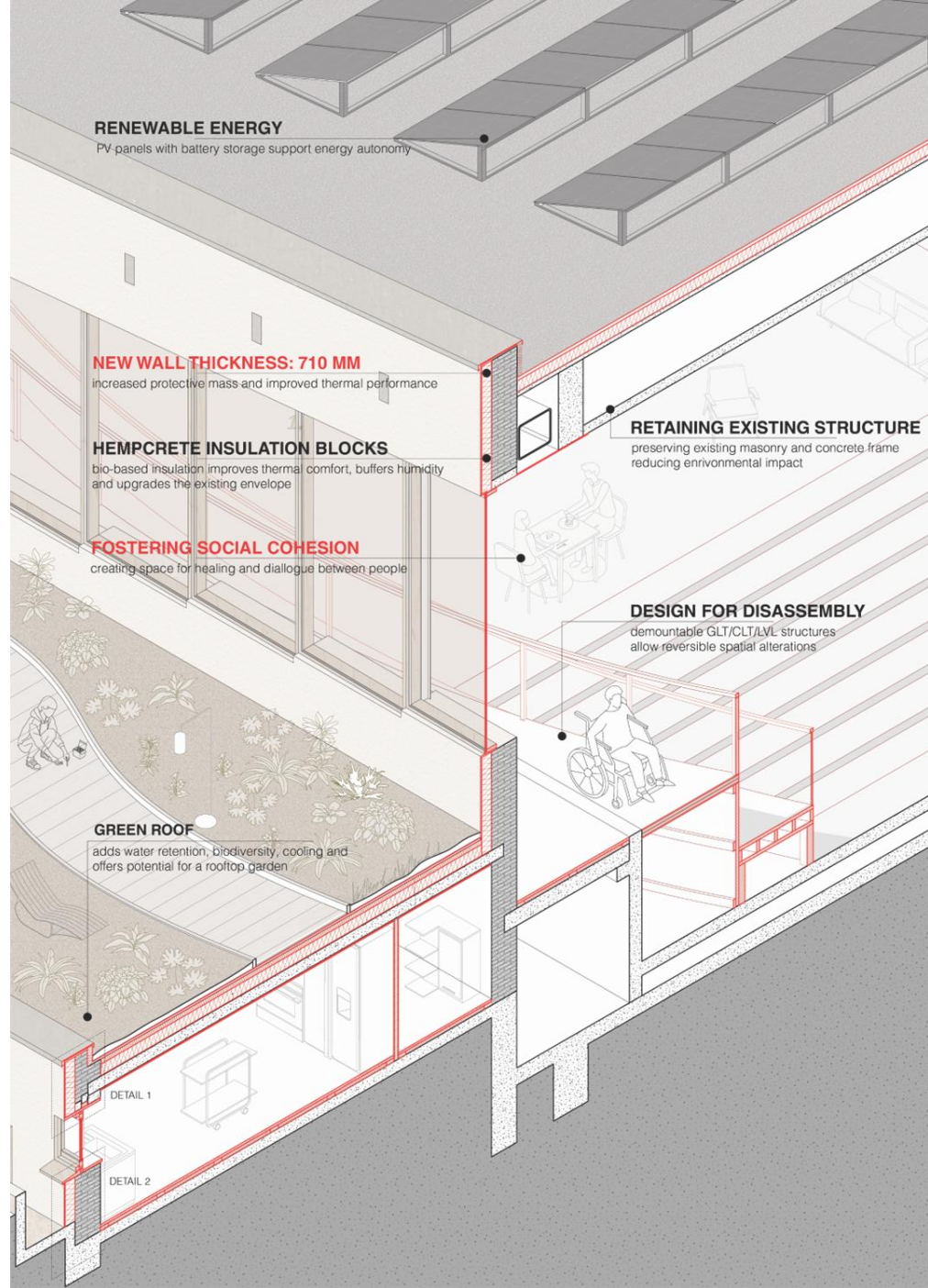




CLIMATE DIAGRAM SUMMER AFTERNOON 1:200

EXISTING NEW





RENEWABLE ENERGY

PV panels with battery storage support energy autonomy

NEW WALL THICKNESS: 710 MM

increased protective mass and improved thermal performance

HEMPCRETE INSULATION BLOCKS

bio-based insulation improves thermal comfort, buffers humidity and upgrades the existing envelope

FOSTERING SOCIAL COHESION

creating space for healing and dialogue between people

GREEN ROOF

adds water retention, biodiversity, cooling and offers potential for a rooftop garden

RETAINING EXISTING STRUCTURE

preserving existing masonry and concrete frame reducing environmental impact

DESIGN FOR DISASSEMBLY

dismountable GLT/CLT/LVL structures allow reversible spatial alterations

DETAIL 1

DETAIL 2



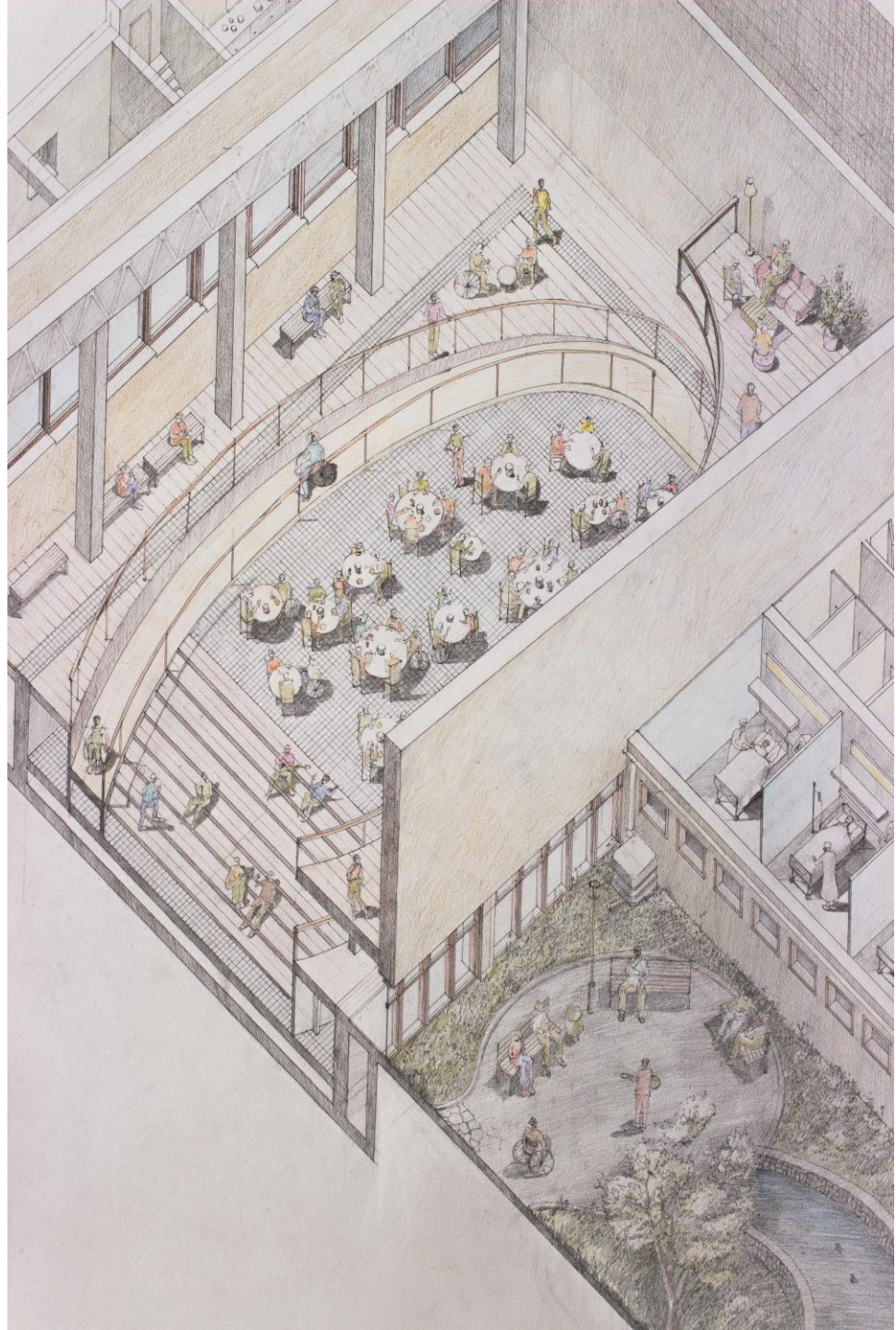


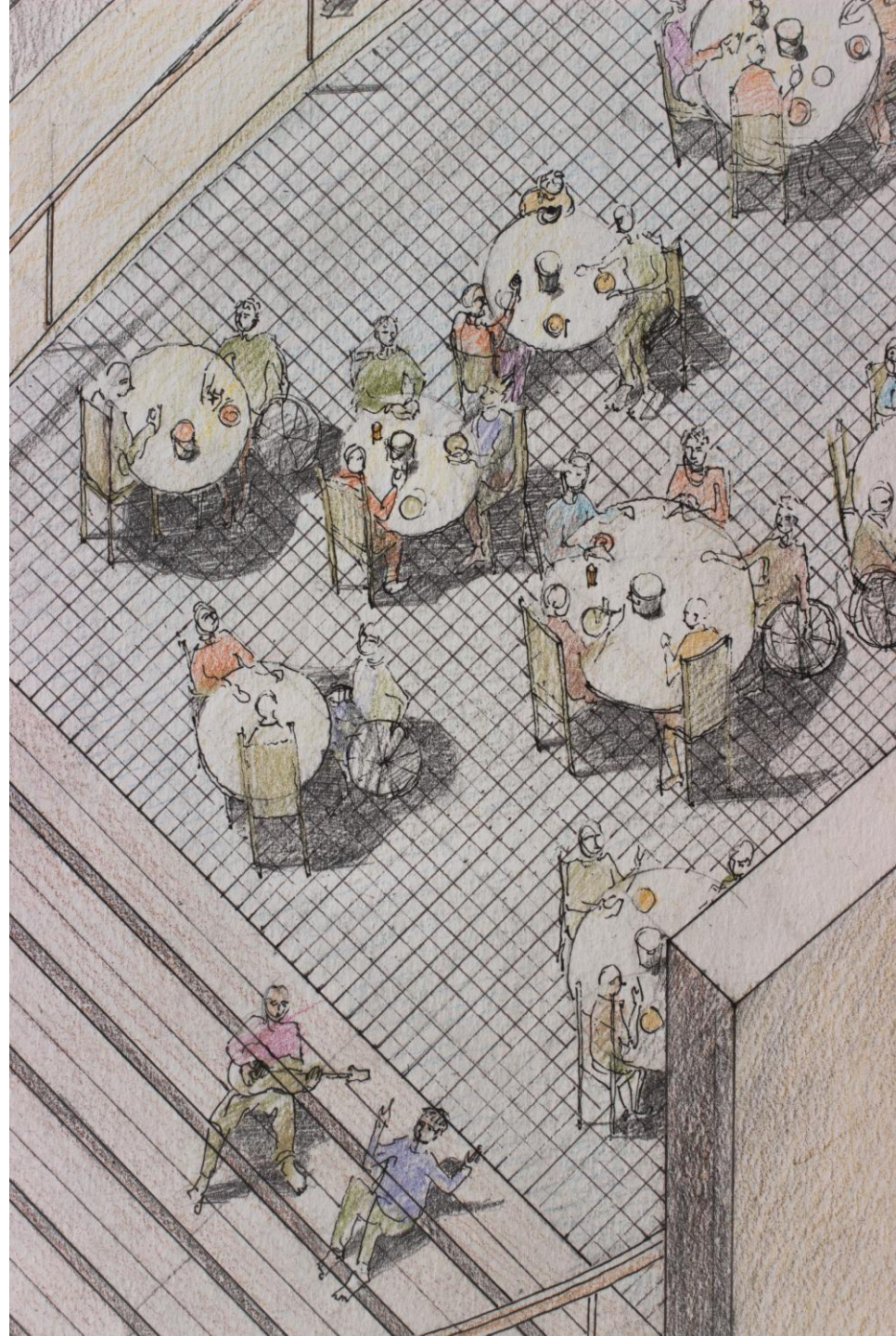
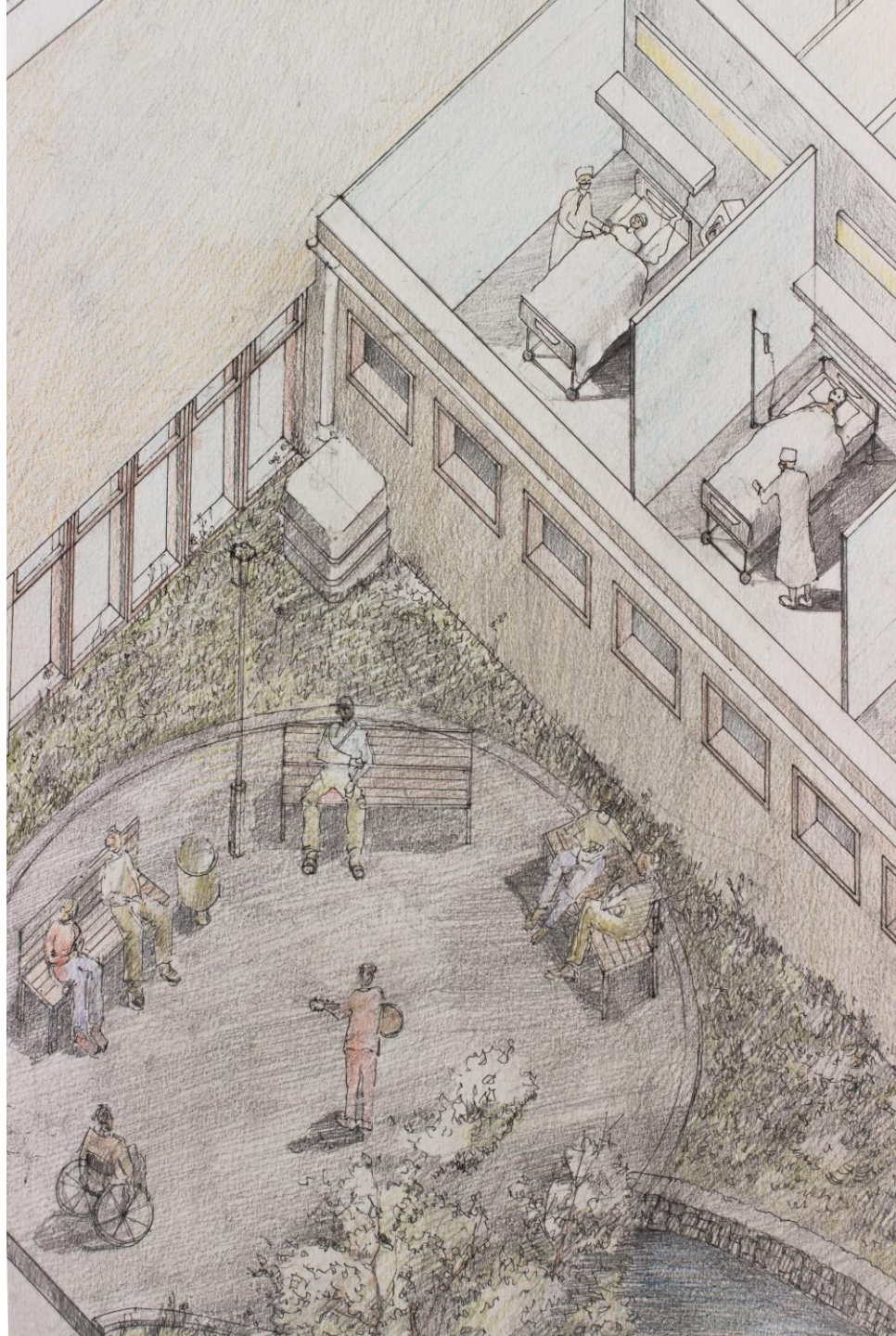












CONCLUSION

When geopolitical instability meets the climate emergency, defense and sustainability are treated as opposites. This project argues otherwise.

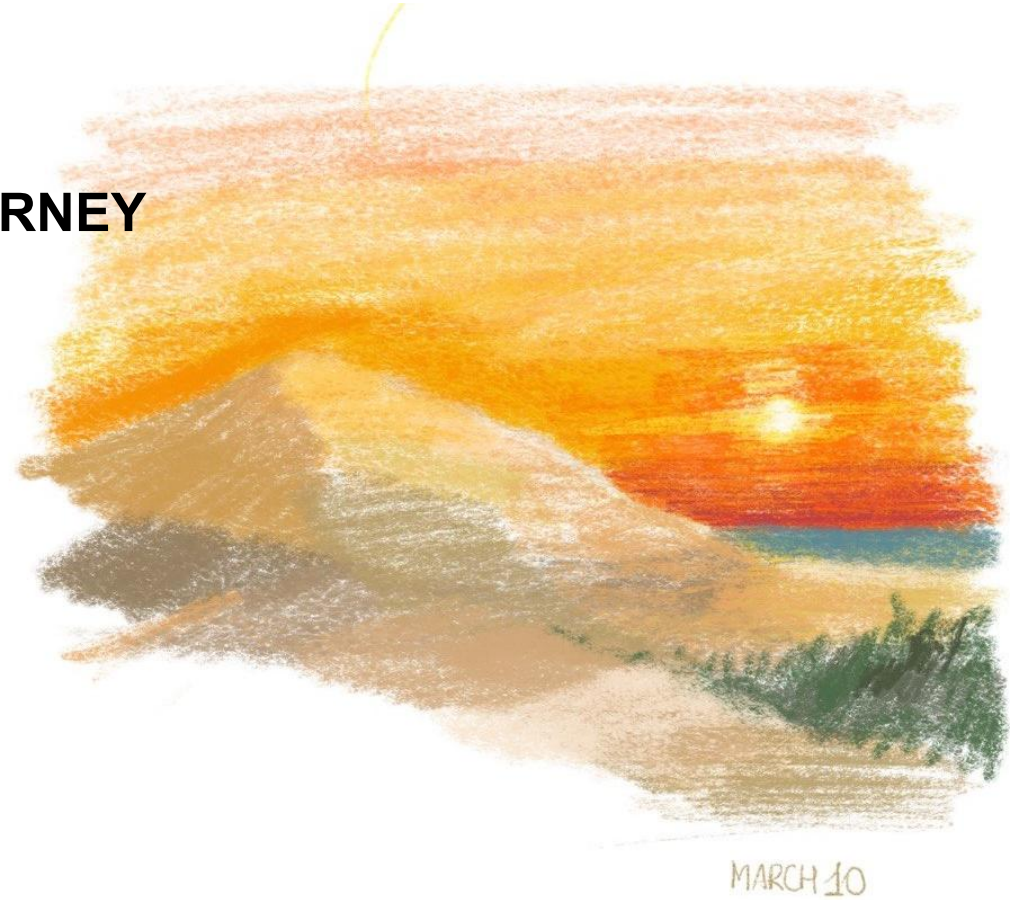
The need for protection should not equal hostility, and circularity offers a solution for care, resilience, and preparedness.

In this project, I aimed to look directly at what scares me, incorporate the complexity and establish my personal position, reminding that protection in conflict is always about people.



AFTERWORD: HERE ENDS MY STUDENT JOURNEY

Eight years after it started.



Brainstorm, also known as Prāta Vētra, is a Latvian rock band fronted by Renārs Kaupers. In 2008 they collaborated with Russian writer and playwright Evgeny Grishkovets and his band Bigudi on a cover of "Na zare" — originally recorded by Soviet group Alyans in 1987. Adaptive reuse if you ask me. Grey - existing. Black - new.

Brainstorm (Prāta Vētra) & Гришковец — «На заре» / "At the Dawn", adaptation by Yulia

Нет-нет, я уже знаю,
Я знаю, что юность закончилась.
Теперь я могу только вспоминать.
И я помню, тогда, в юности,
Я уже чувствовала себя счастливой.
Но мне казалось, что все сложно,
И дальше может быть только хуже,
Но теперь-то я знаю, что здесь и сейчас — и
есть счастье.

А тогда я ничего не знала.
Тогда так всего хотела!
Как же я ждала тогда чего-то!
И мне казалось, я слышу, что меня зовут...

На заре голоса зовут меня!
На заре голоса зовут меня!

А чего я ждала тогда?
Я ждала себе удивительной судьбы,
неповторимой жизни.
Как я хотела все почувствовать,
Все попробовать и как можно скорее.

А еще я могла до утра
Сладко думать и с трепетом чувствовать,
Что вот-вот, уже этим утром,
Уже скоро, уже скоро...

На заре голоса зовут меня!
На заре голоса зовут меня!

And there, in my youth,
When I would watch the morning mist above the
river,
Or was coming back home in a still dormant city
It always seemed to me
Or rather, I was so convinced
That they were calling just for me...
just for me...

At the dawn voices calling me...
At the dawn voices calling me...
At the dawn voices calling me...
At the dawn voices calling me...

And now, six years far from home,
This never-ending game of lost & found.
My stride is firmer, I am not alone;
And holding hands keeps me on solid ground.

This journey, which is full of hills and valleys
Will now continue on these flatter lands.
My gaze is open; this was just a premise.
A glimpse of journey that now still lies ahead.



Thank you for coming and make sure you take a postcard!