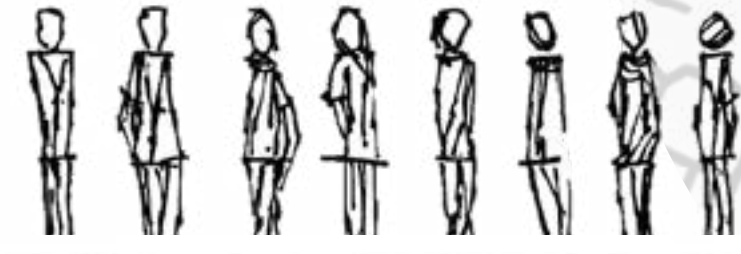
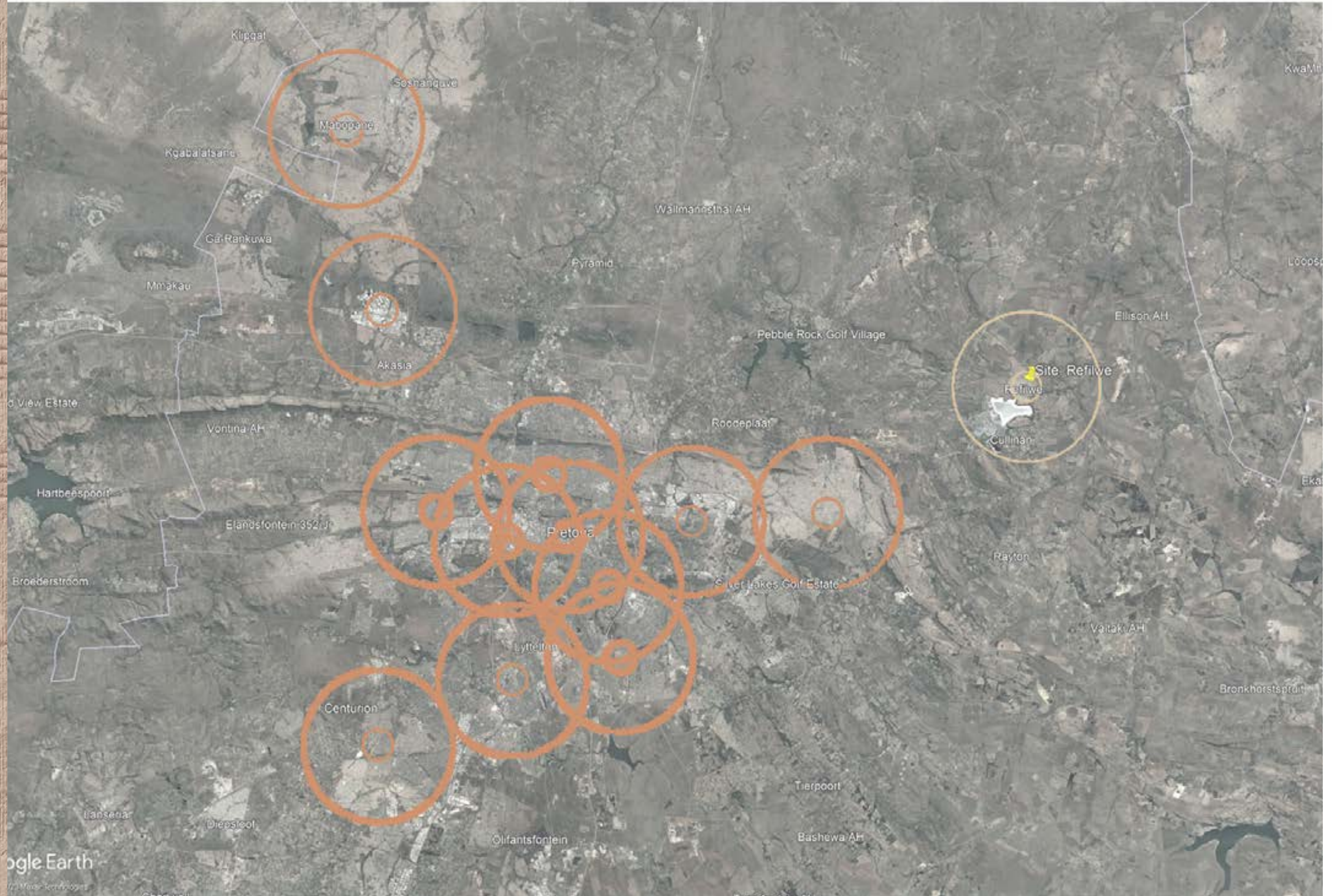


COMMUNITY-CENTRED MULTI-PURPOSE FIRE STATION

PROJECT INTENTION



RESPOND TO REAL
WORLD ISSUES



5km AND 1km RADIUS OF EXISTING FIRE STATIONS IN CITY OF TSHWANE METROPOLITAN

RISK- PERCEPTION ANALYSIS

REMOTE AREAS WITH
THE GREATEST
DISASTER IMPACTS
VULNERABILITY IS THE
MEASURE OF RISK

REFILWE, CULLINAN REGION 5, CITY OF TSHWANE

General question

How can emergency services be improved to better serve outlying communities and respond to various types of emergencies?

The design intention is to create a modern and efficient FIRE STATION that is responsive to the needs of the community in Refilwe and addresses the challenges faced by emergency services globally.

The design considers the local context, cultural sensitivities, and the unique challenges faced by the community. It aims to be accessible, functional while also incorporating sustainable design principles to minimize the impact on the environment.



REFILWE, CULLINAN
REGION 5, CITY OF TSHWANE



REFILWE IN RELATION TO
PRETORIA: 35KM







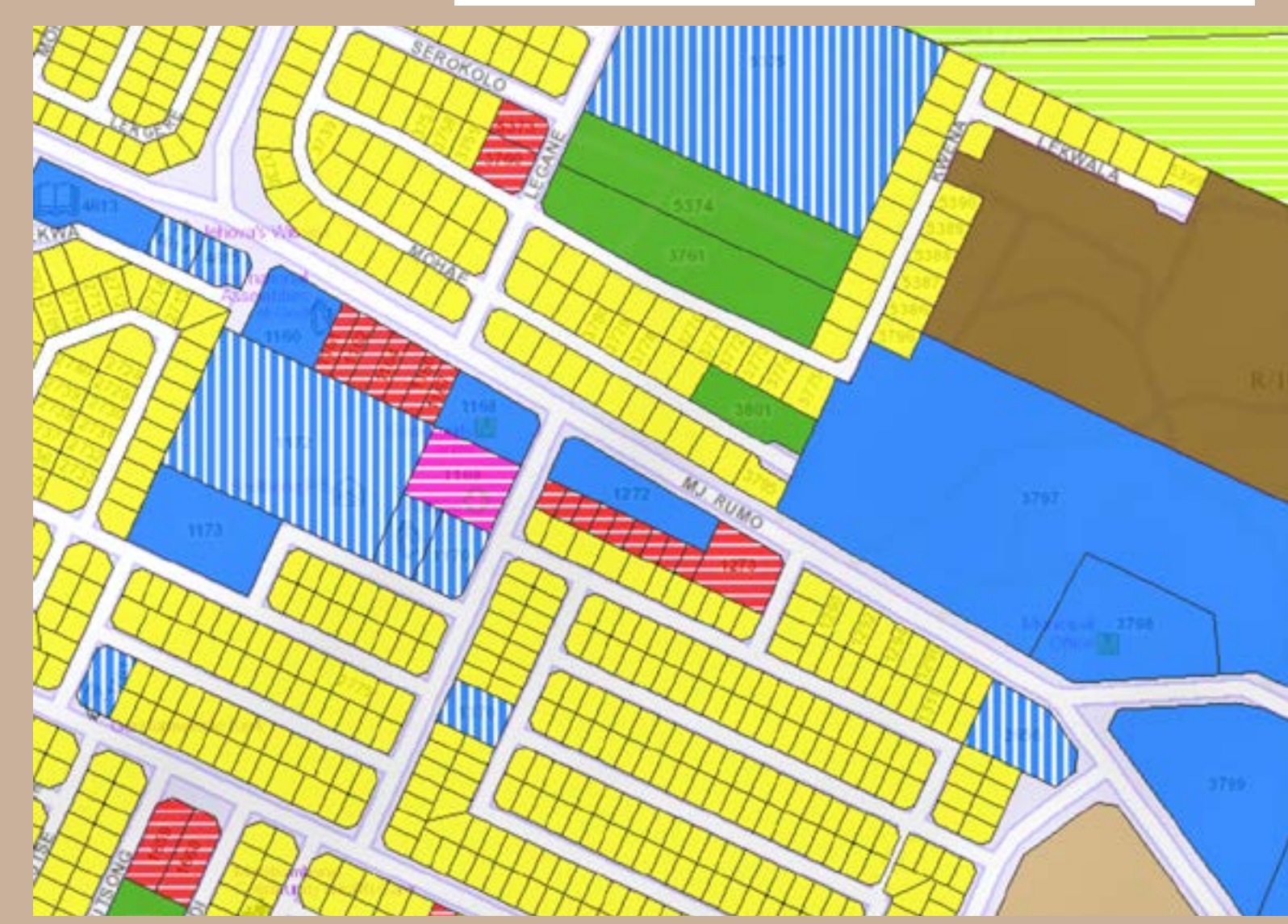
- SITE
- COMMUNITY CLINIC
- COMMUNITY HALL
- SHACK TYPOLOGY
- INFORMAL RETAIL
- GREEN NODES
- REFILWE PRIMARY SCHOOL
- TAXI RANK

SITE SURROUNDINGS



RSDF

- | | | | |
|----------------|--------------|---------------|-------------------------------|
| Special | Business 1 | Educational | Public Open Space |
| Zoning Tshwane | Business 2 | Institutional | Private Open Space |
| Residential 1 | Business 3 | Municipal | Existing Streets |
| Residential 2 | Business 4 | Government | Proposed Streets and Widening |
| Residential 3 | Industrial 1 | Agricultural | Aerodrome |
| Residential 4 | Industrial 2 | Public Garage | S.A.R. |
| Residential 5 | Commercial | Undetermined | Cemetery |



ZONING



2004



2008

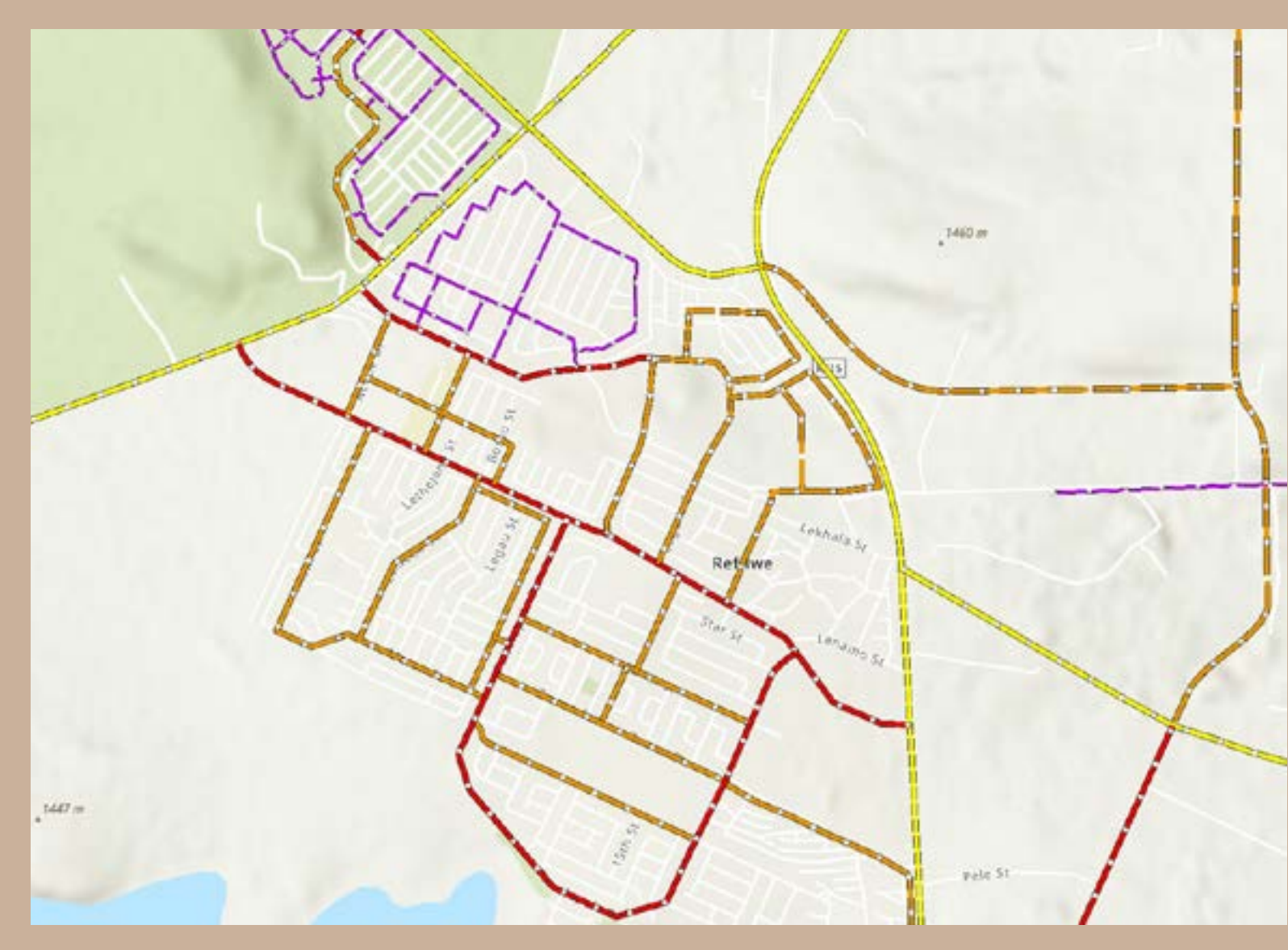
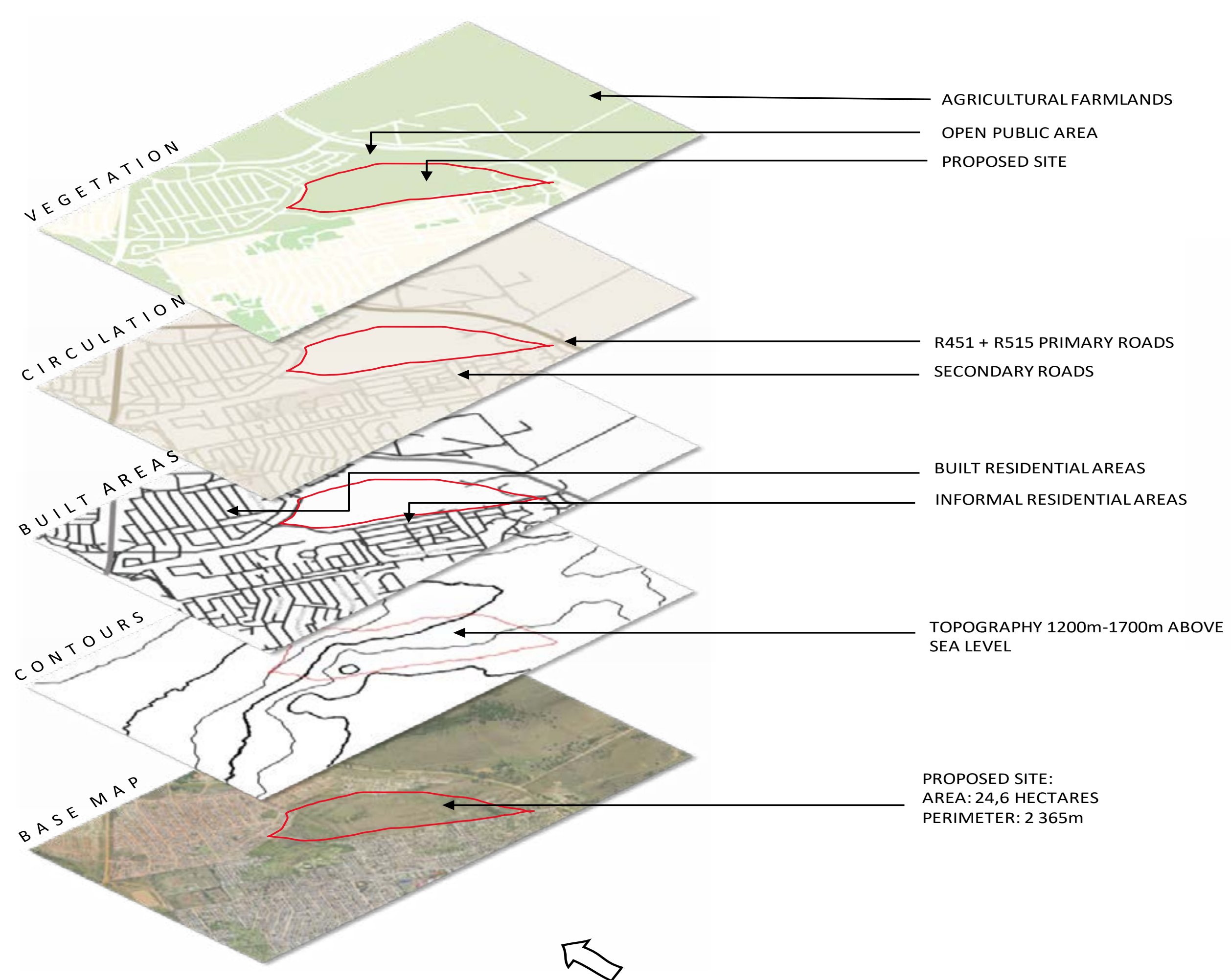


2014

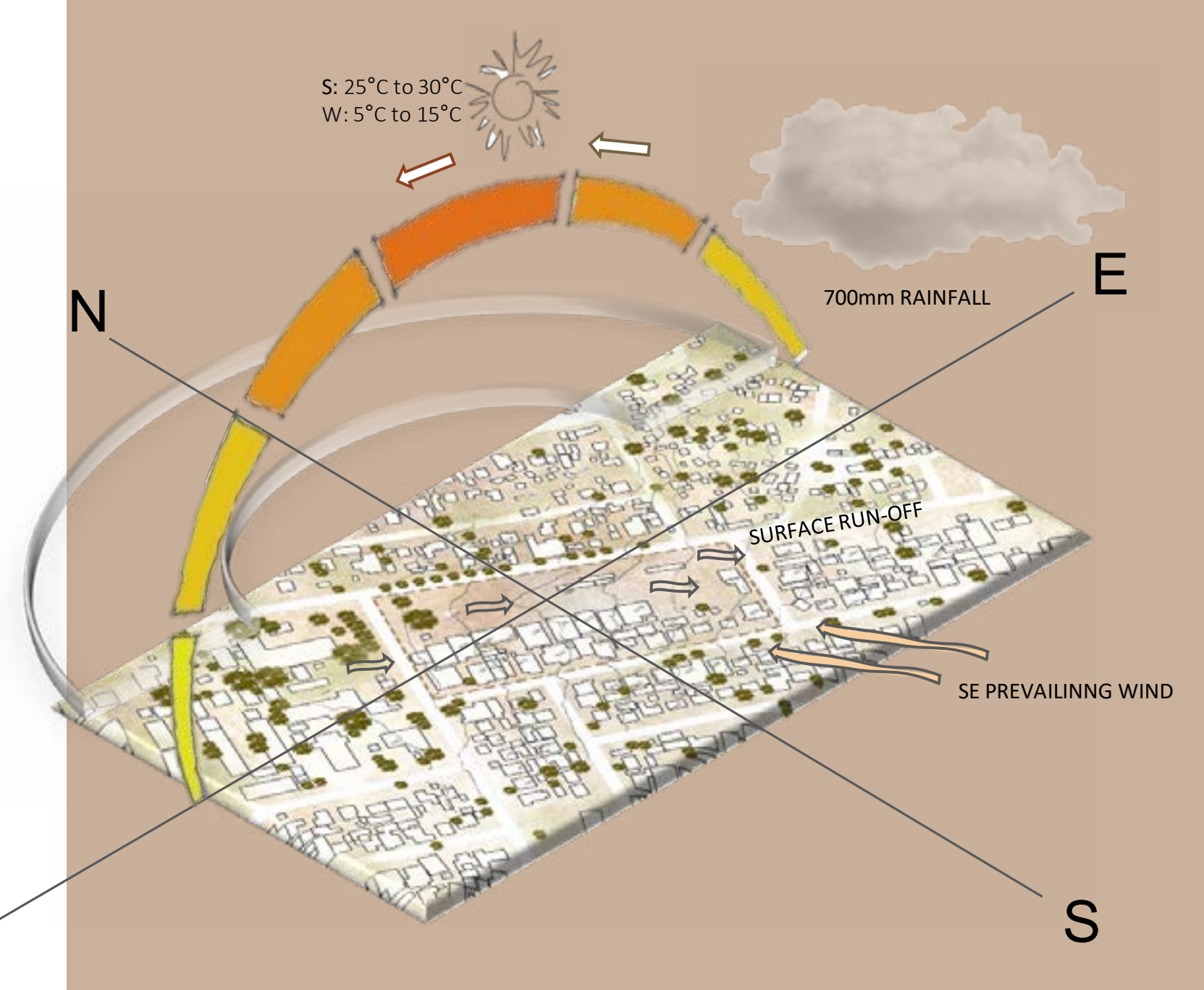


2023

SITE HISTORY



VEHICULAR ROUTES





adaptive re-use

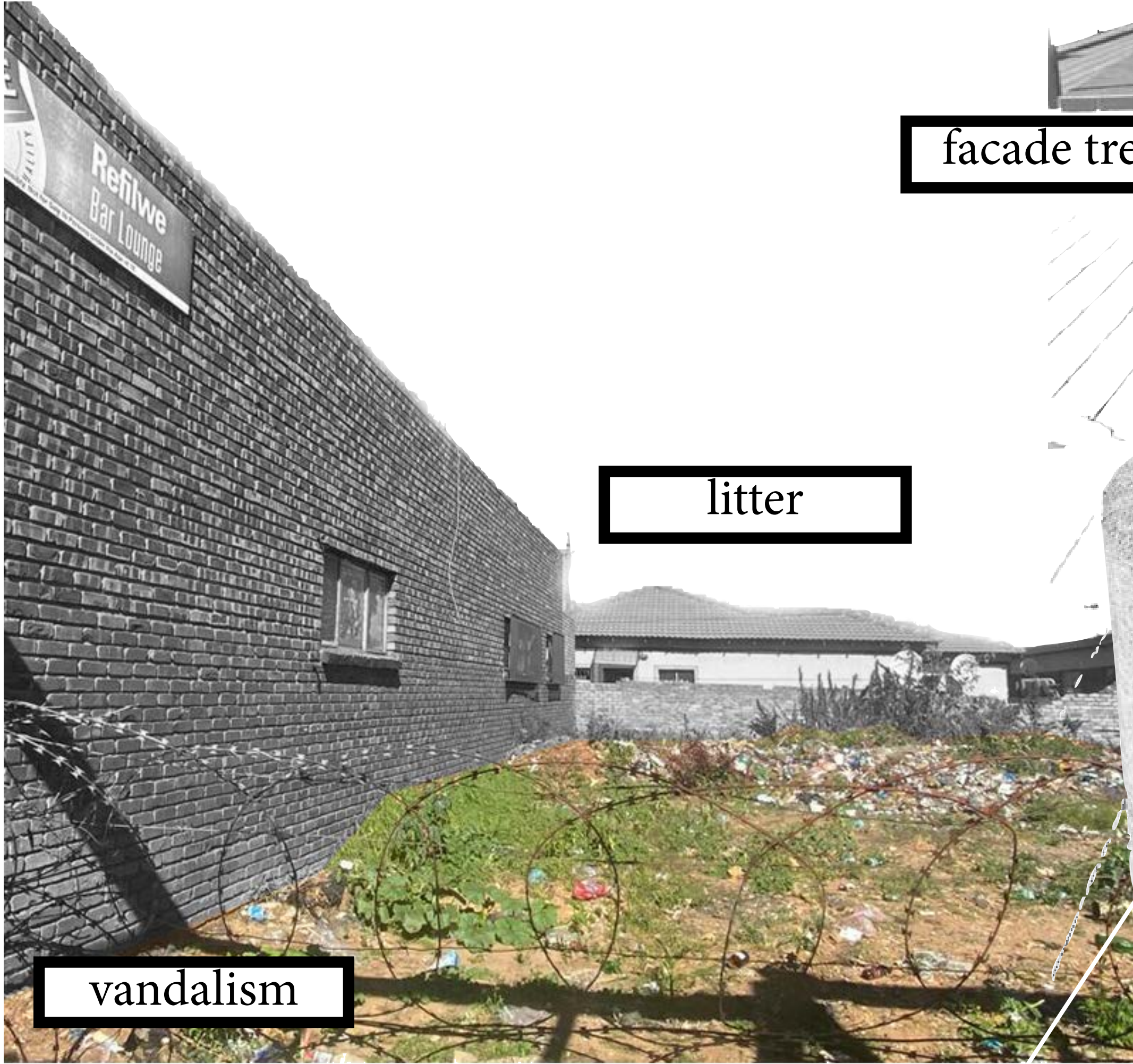
community tree



highly social

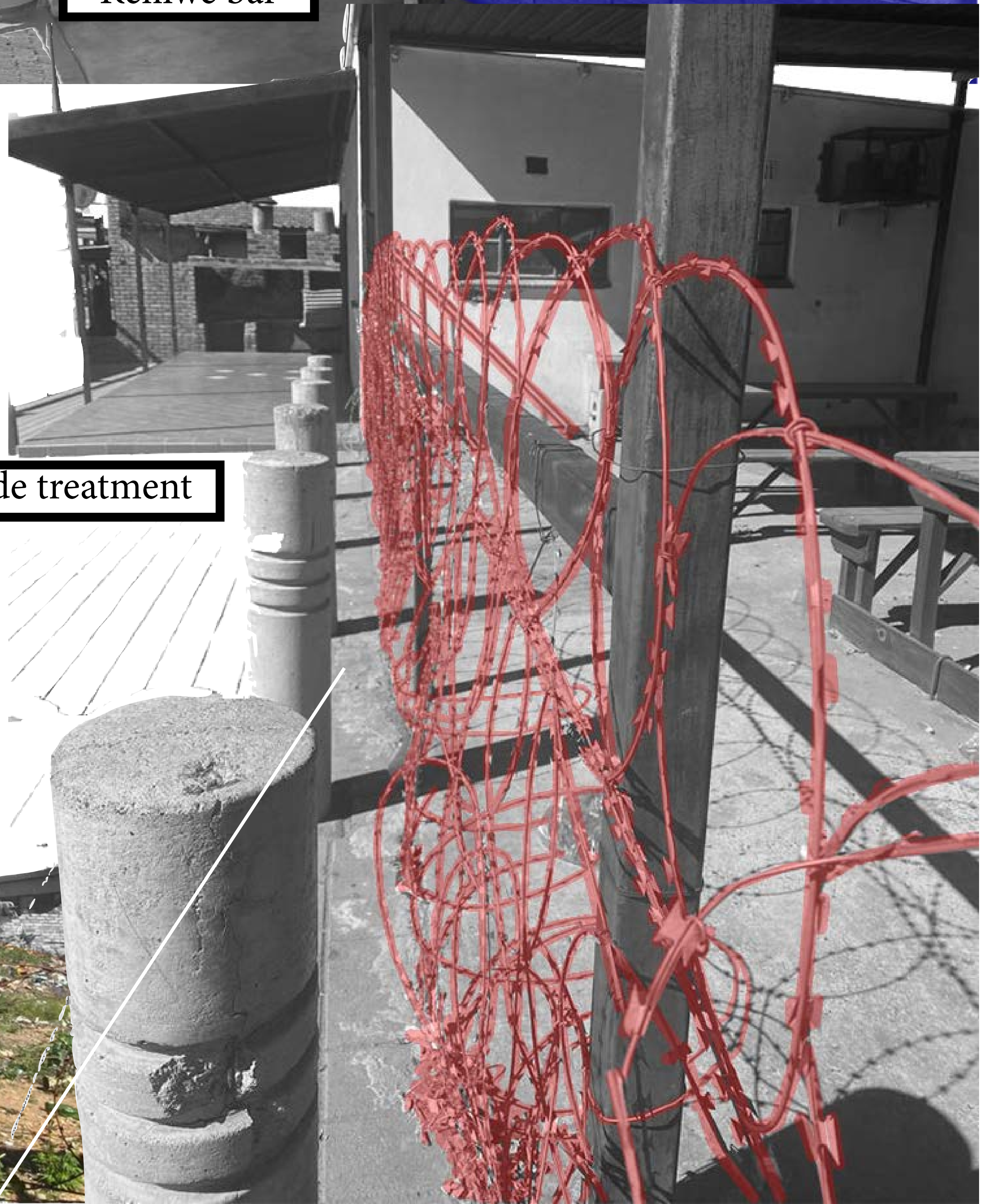
Refilwe bar

Site analysis: micro

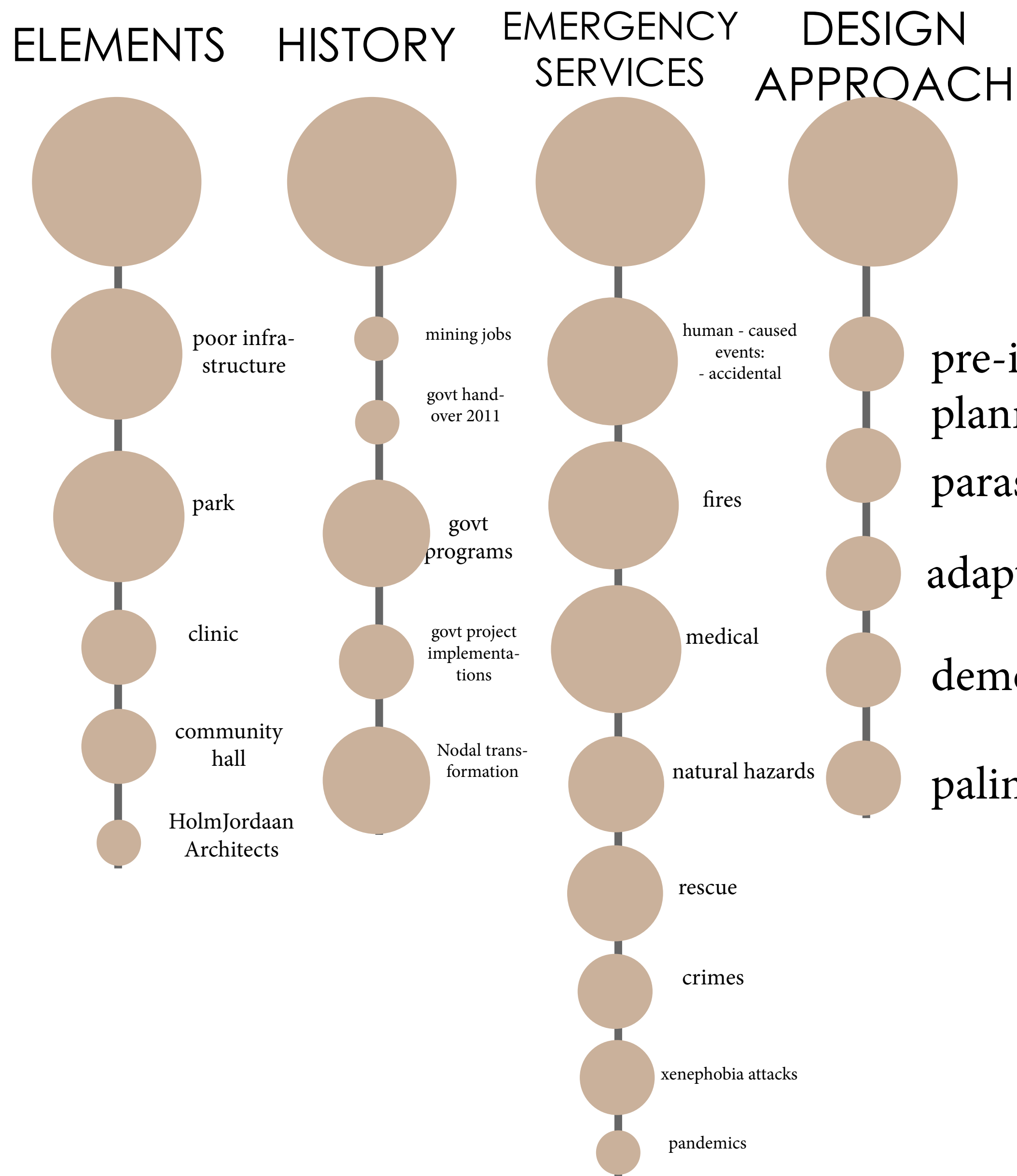


vandalism

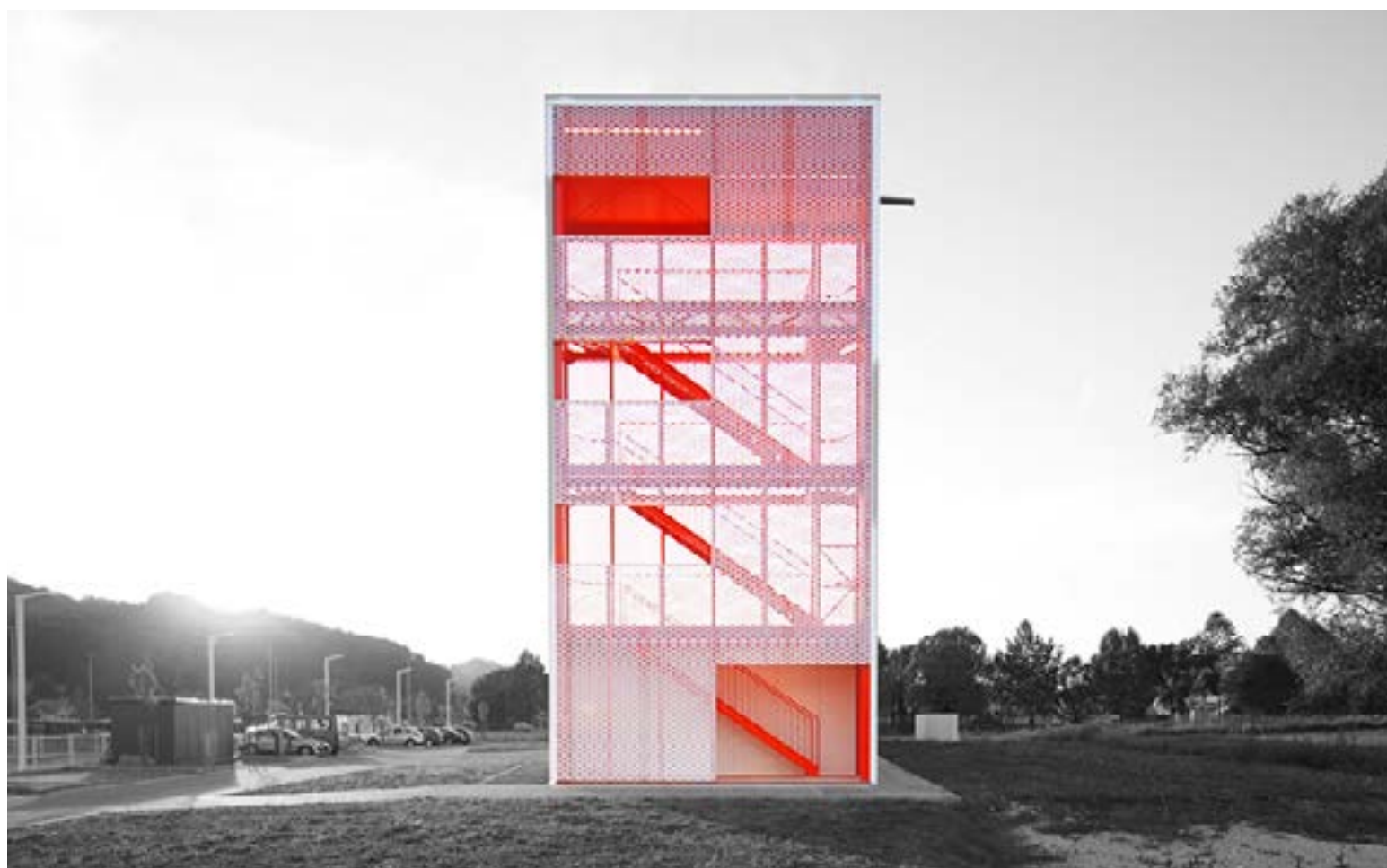
litter



facade treatment

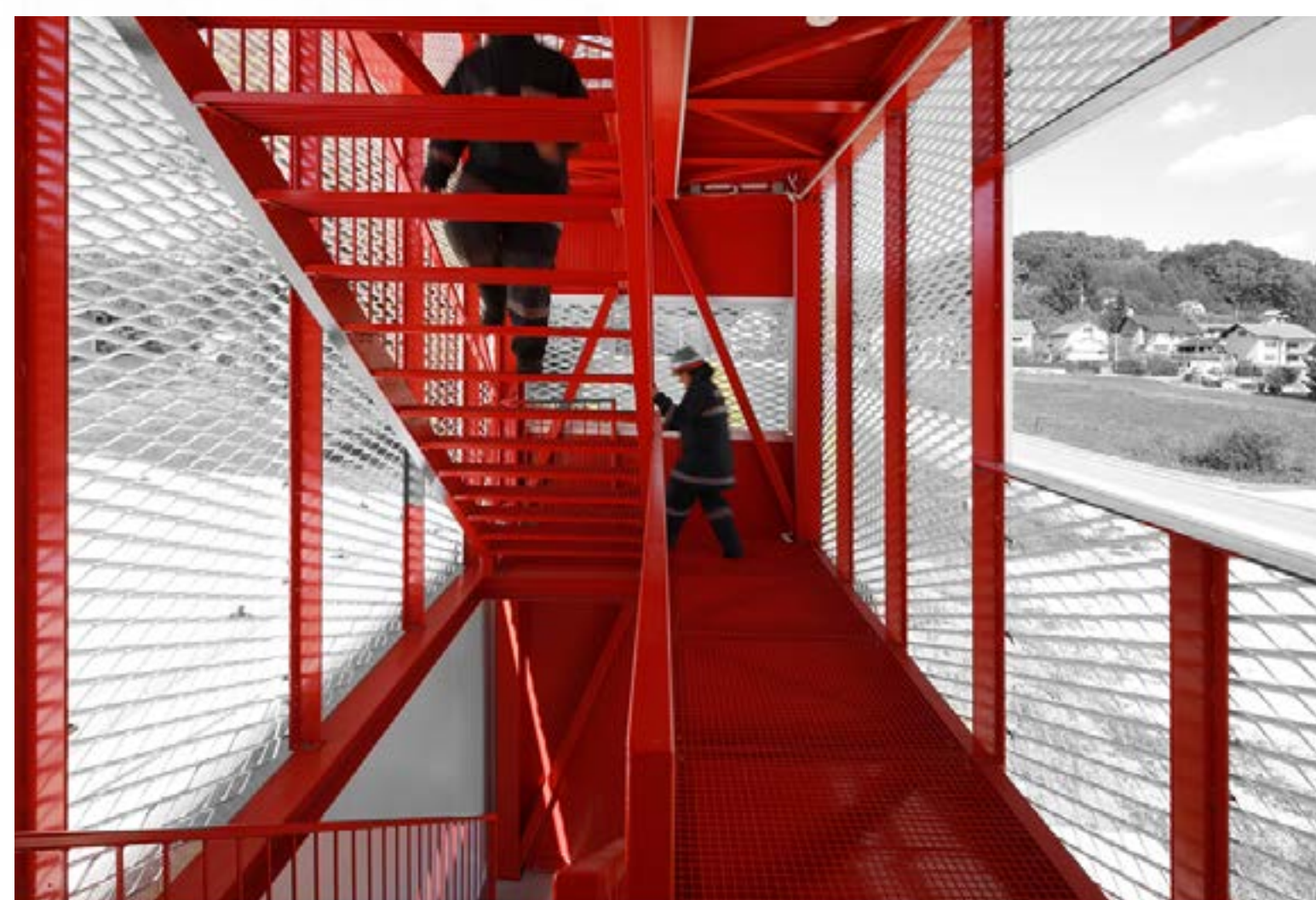
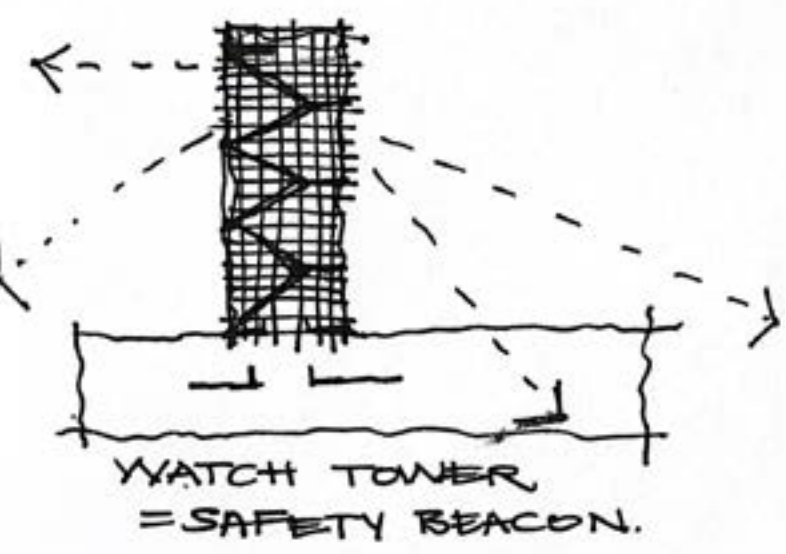
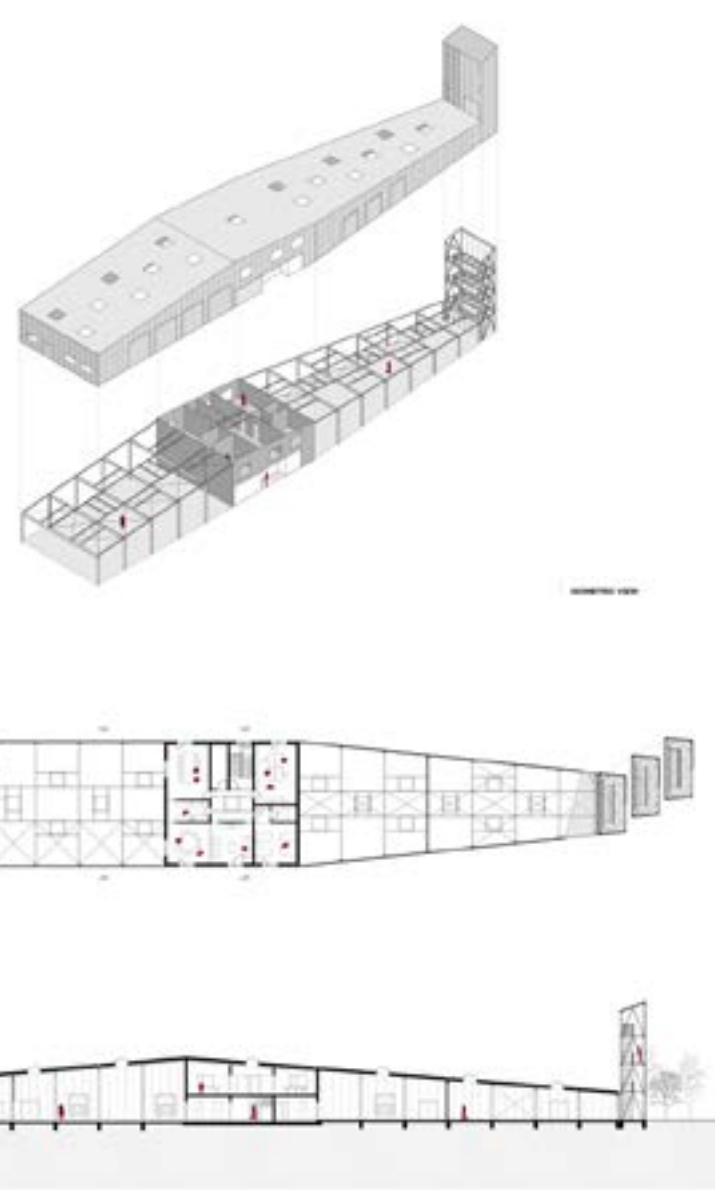


THEORETICAL FRAMEWORK



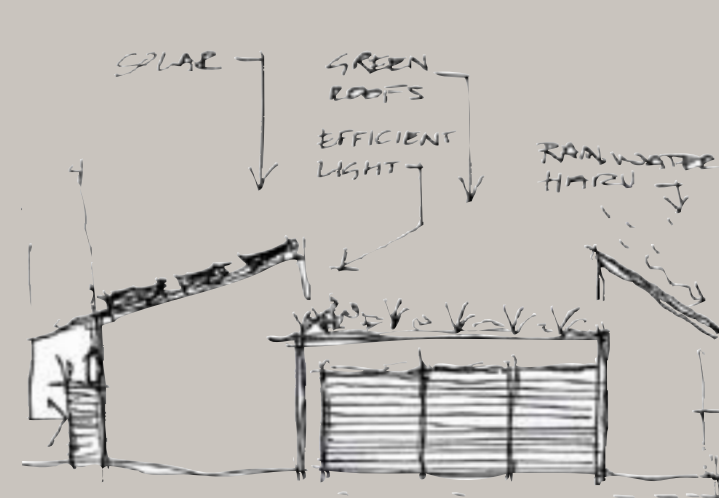
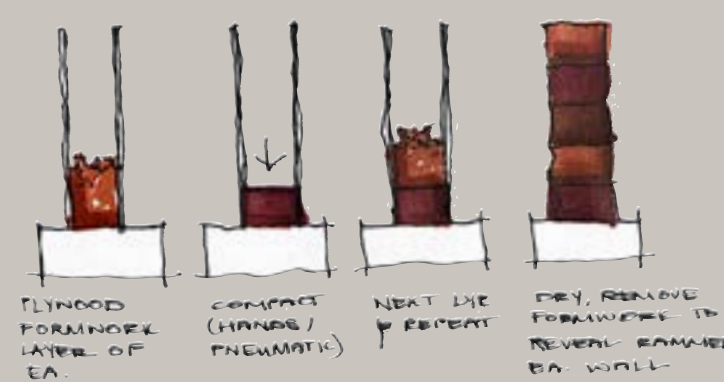
Center for Environmental Protection / MVA, KRAPINSKE TOPLICE, CROATIA

The tower is used for firefighters' training but is also a landmark, a sign in the landscape. Its steel structure, visible through the metal mesh 'curtain'.



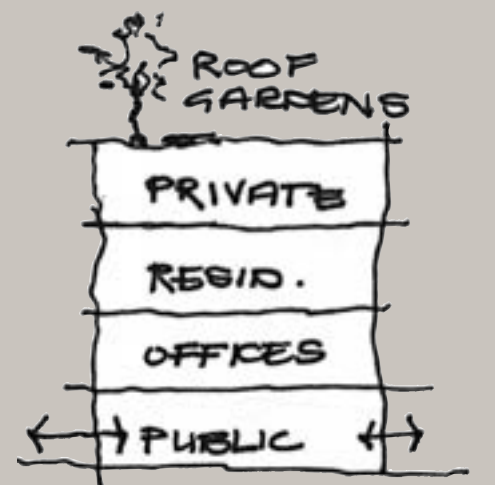
Nine Major Trends Shaping Modern Fire Station Design

1. Technological precision for fire station site selection
2. Dedicated training facilities
3. Rising construction costs; smarter planning
4. Involving fire departments in city planning
5. Green fire station design
6. Designs inclusive of all genders
7. Co-location
8. Performance-forward fire station design
9. Focus on community and community education



Post-Pandemic Practice "Meta Trends"

1. Live-work connection
2. Building transformation
3. Office-as-destination
4. Experienced-based design



How to create infrastructure that is ACCEPTED & RELEVANT

Questions + Issues = Design

General question
How can emergency services be improved to better serve communities and respond to various types of emergencies?

Urban question
How can emergency services be efficiently integrated into urban planning and design to improve emergency response times and increase community safety?

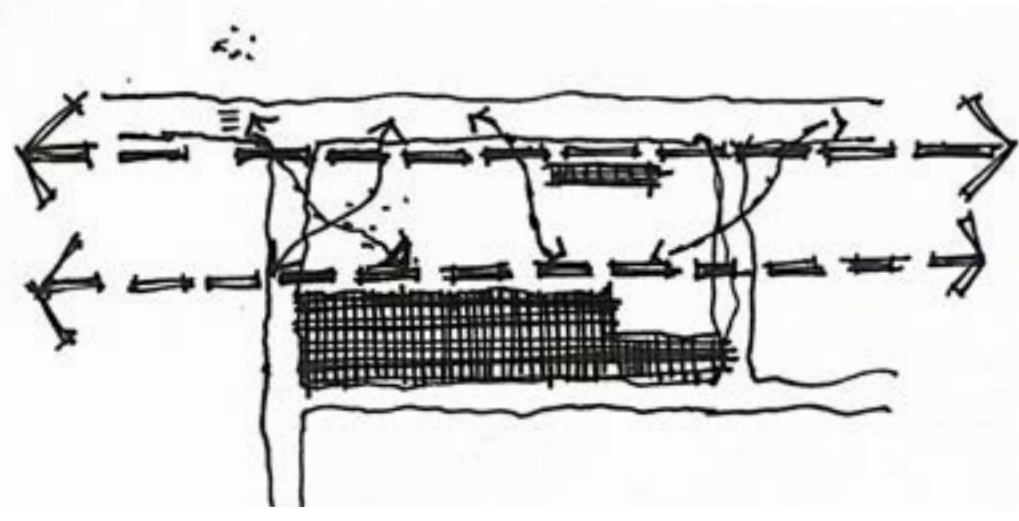
Architectural question
How can emergency facilities be designed to optimize functionality and promote a sense of safety and security for both emergency personnel and community members in rural and lower-income areas whilst being accepted for the benefit of the community?

PROJECT INFORMANTS

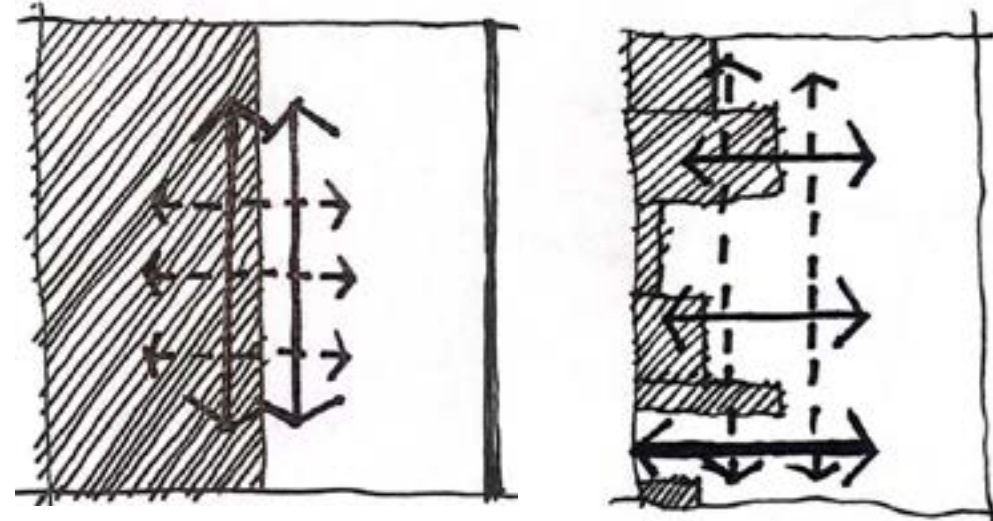


FRAMEWORK APPLIED TO SITE

The Refilwe nodal transformation



MOVEMENT



PUBLIC INTERFACE

WHY WAS THIS PROJECT UNSUCCESSFUL?



ITHUBA COMMUNITY COLLEGE
S2ARCH and RWTH Aachen University
JOHANNESBURG

A skills college where local participation takes place during the design and construction phases. It is a platform for architecture and construction research, making use of local resources and community involvement to develop alternative building techniques.

An Adobe wall with straw-light-clay infill, load bearing wall.

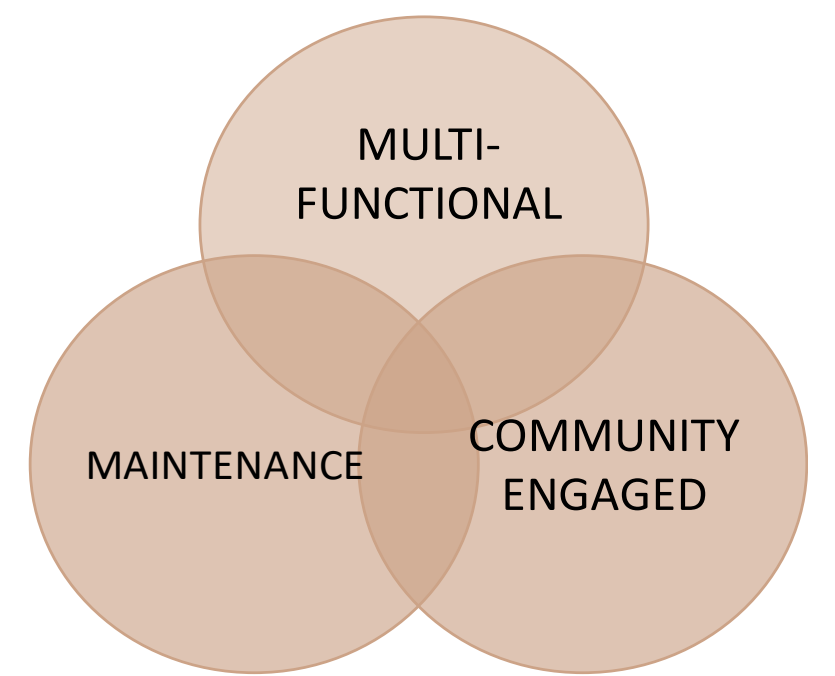
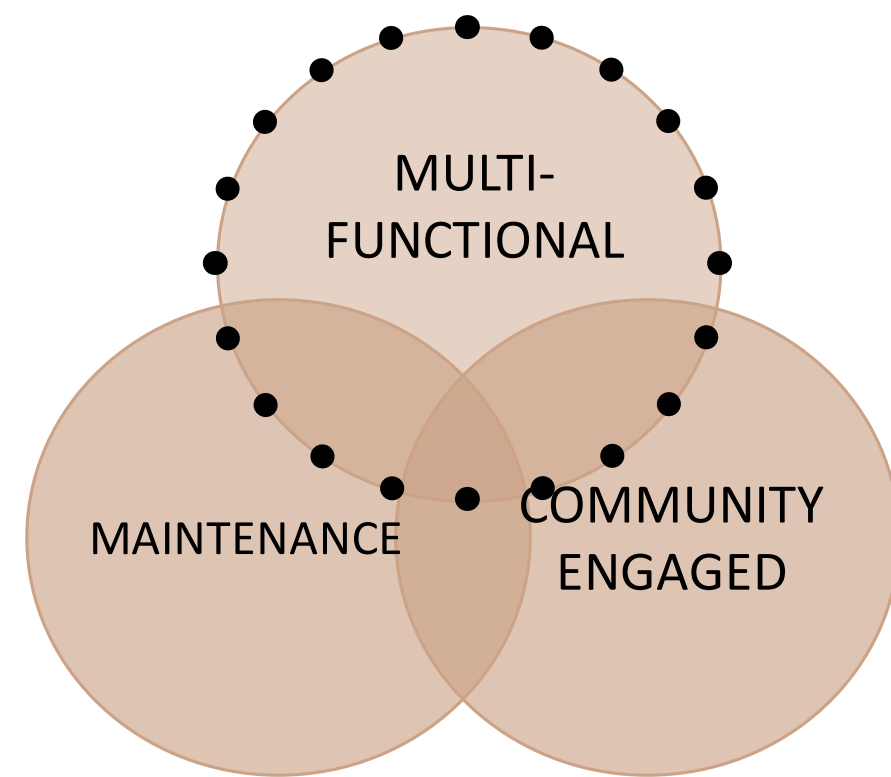
Traditional hand-based methods of construction. Adobe wall infill is done by hand and basic mixing machinery on site.

Unskilled labour and low tech equipment .

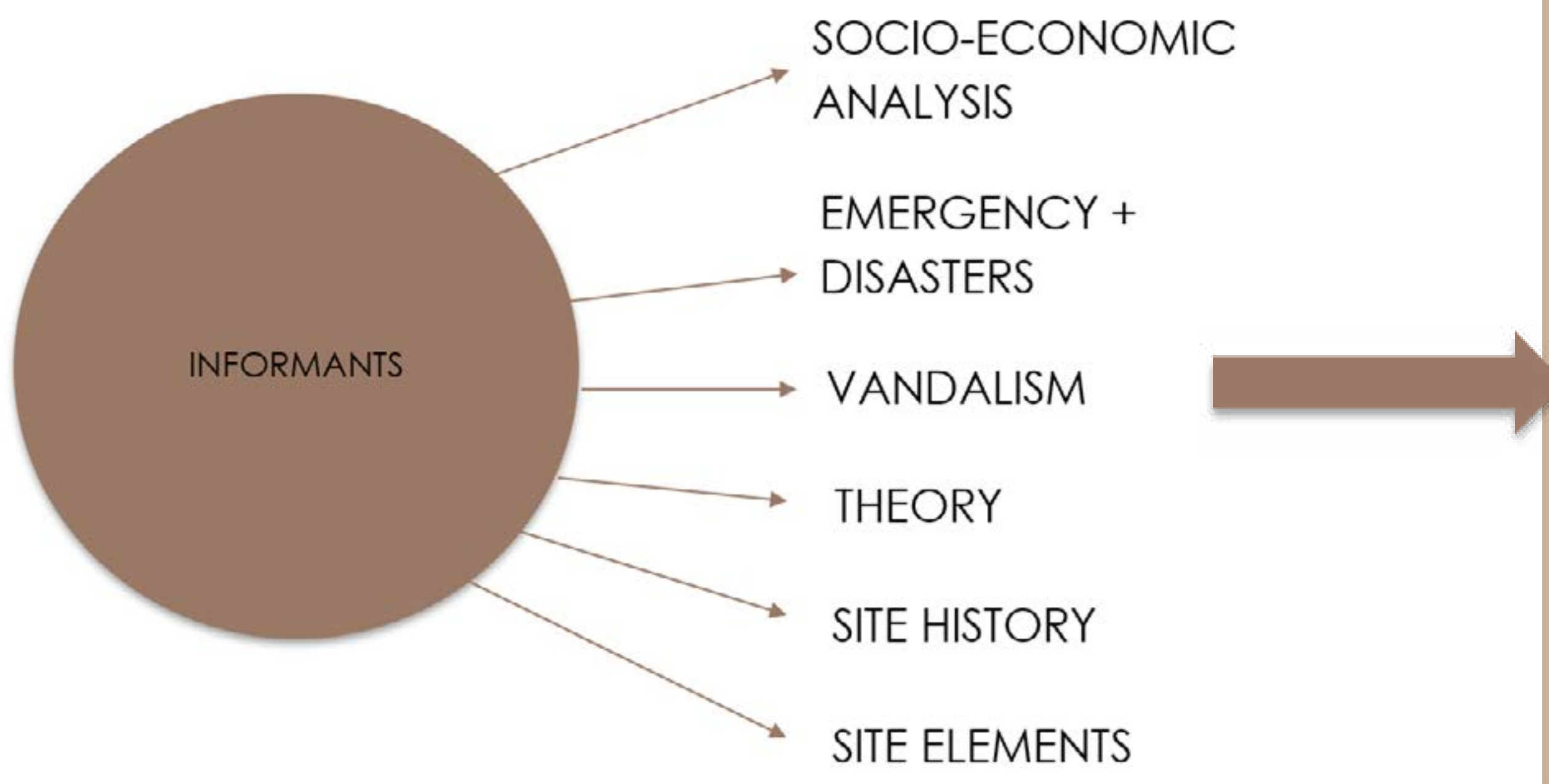
Uplifting the community's identity as well as their capabilities to contribute as working individuals.

The materials used are low cost since they can be sourced from surrounding natural landscapes and the equipment and time used to manufacture the materials and the structure is not too extensive., making it economical.

The materials are suited to the context's climatic conditions and makes use of appropriate passive heating and cooling systems with the materials used, making it contextually responsive to the area.



FRAMEWORK APPLIED TO COMMUNITY



CONCEPTUAL APPROACH

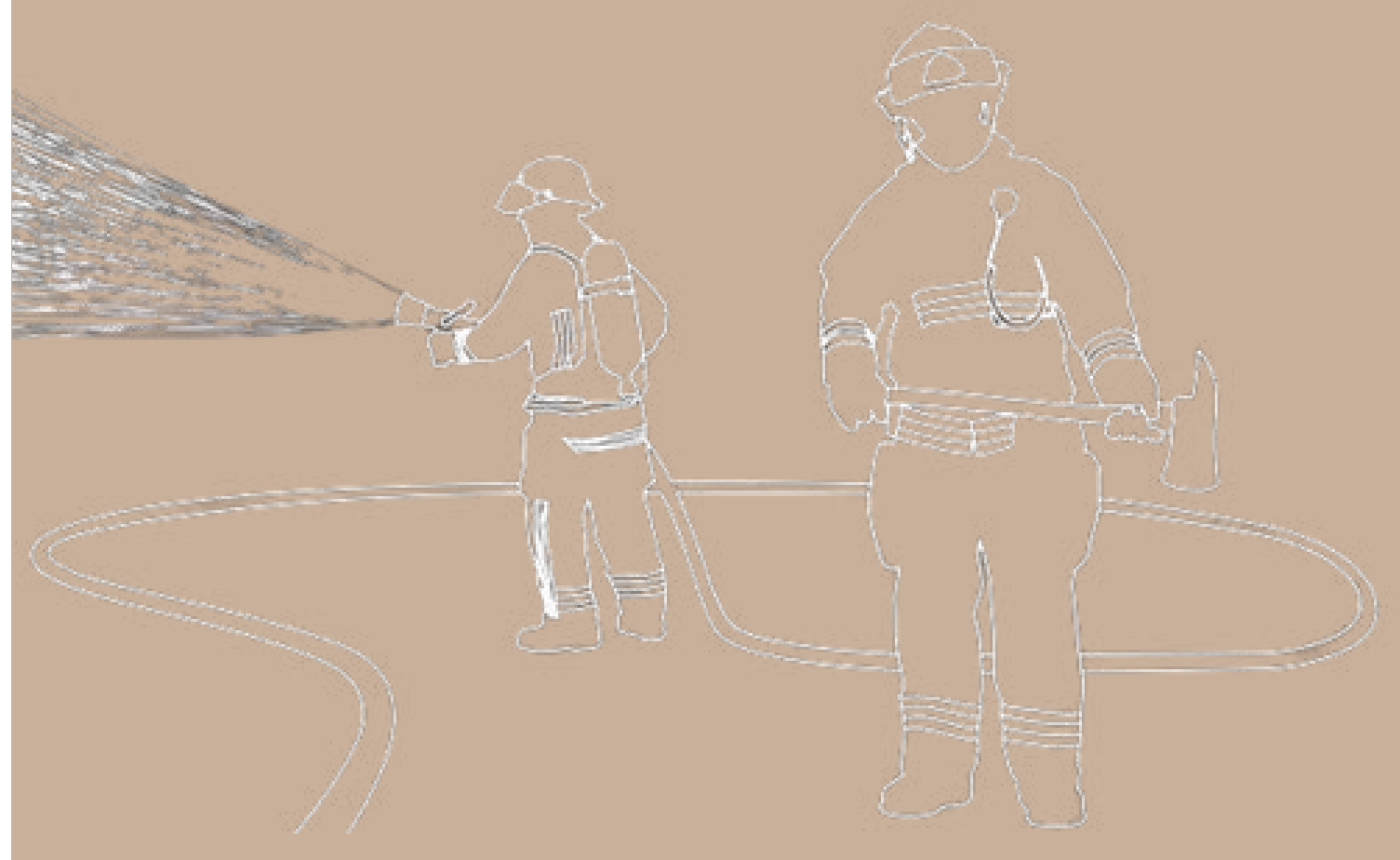
FAST RESPONSE TO DISASTER THROUGH INNOVATIVE DESIGN STRATEGIES, WITH INTENTION OF RENEWING SITE HISTORIES, PREVENTING ISSUE OF VANDALISM AND PROMOTING SAFETY AND WELL-BEING TO COMMUNITY OF REFILWE.

KEY THEMES

RESILIENCE + RELEVANCE
 Multi-functional
 Adaptive capacity
 Social networks & collaboration
 To overcome vandalism

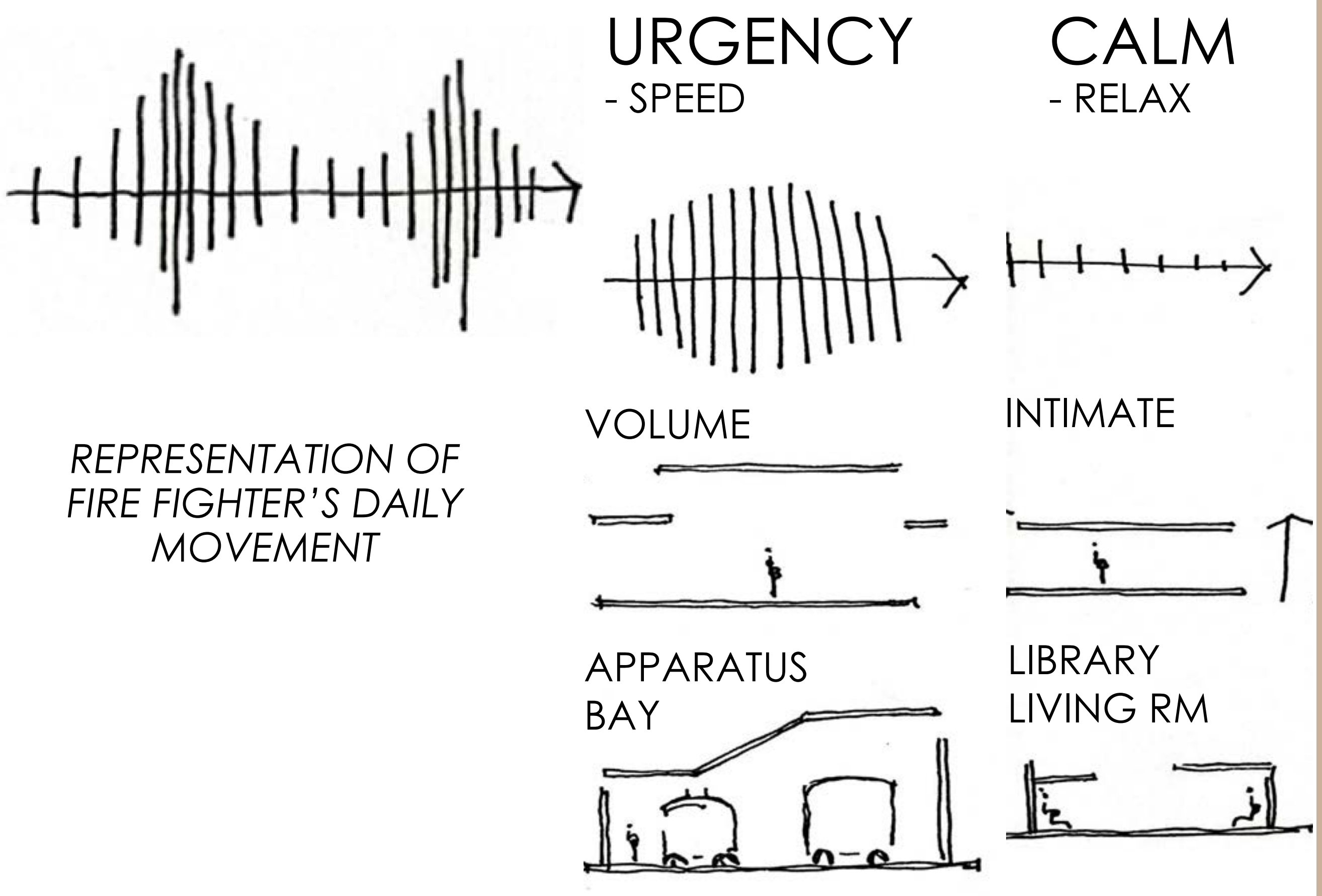
COMMUNITY-CENTRIC DESIGN
 Prioritizing the needs and engagement of the local community in every aspect of the fire station's design and functionality.
 Sense of safety, security, pride

MATERIAL INNOVATION
 EBTs
 Traditional building techniques
 Locally sourced adobe
 Social, environmental, economic sustainability



IMMEDIATE RESPONSE
COMMUNITY ENGAGEMENT
SAFETY + WELL-BEING
CONCEPT

CIRCULATION
BUILDING PROCESS + MULTI-FUNCTIONALITY
BEACON OF SAFEETY
STRATEGY



REPRESENTATION OF FIRE FIGHTER'S DAILY MOVEMENT

The user's journey through a space, surpasses the mere physical structure of a building. This notion became integral in choreographing the experience within the fire station. It required envisioning how firefighters would navigate through the station, fostering feelings of safety, inspiration, and engagement.

This approach encapsulated the urgency and speed inherent in emergency response, while also providing moments of respite for reflection and rejuvenation.

PROJECT INFORMANTS

DESIGN DEVELOPMENT

ITTERATION 1



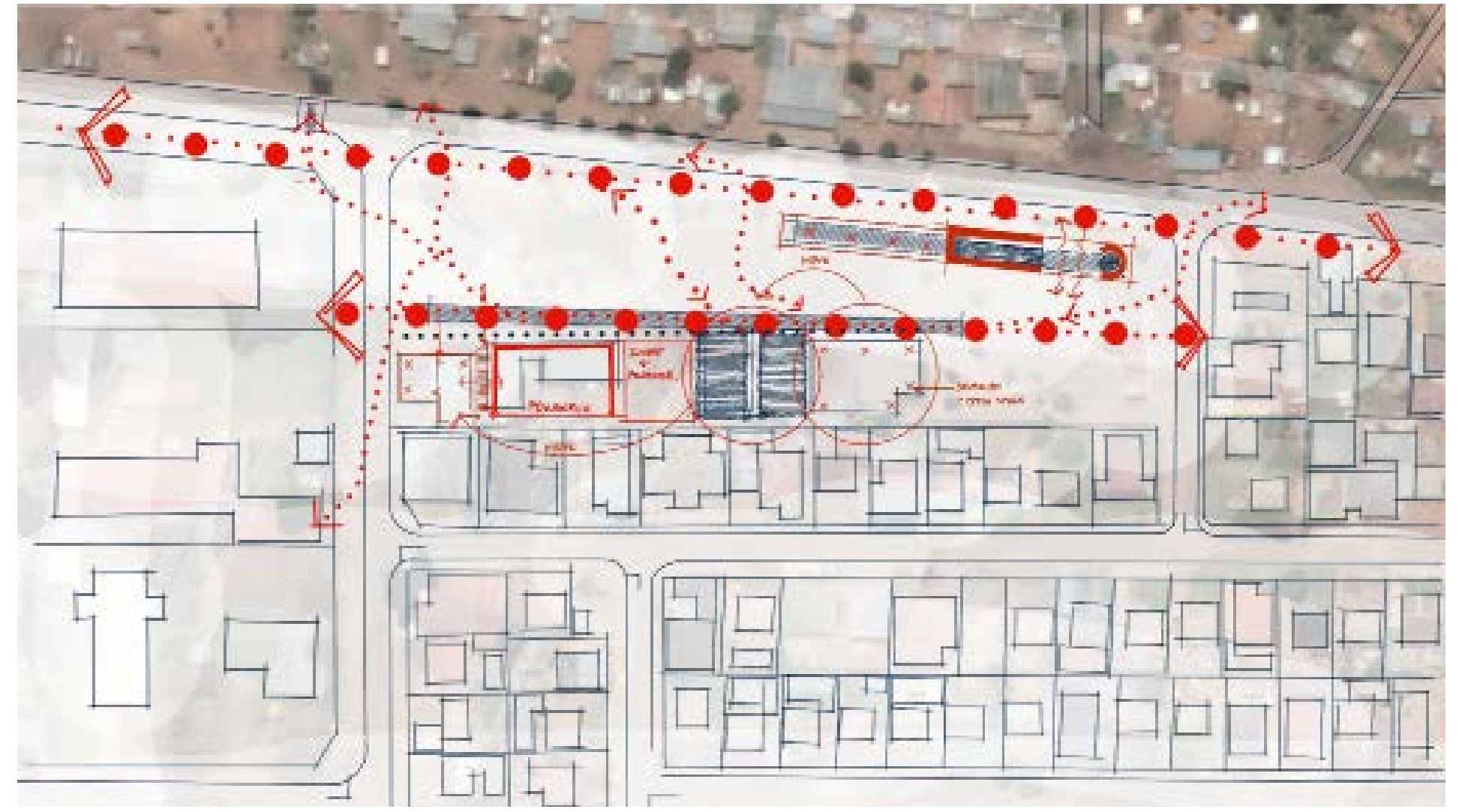
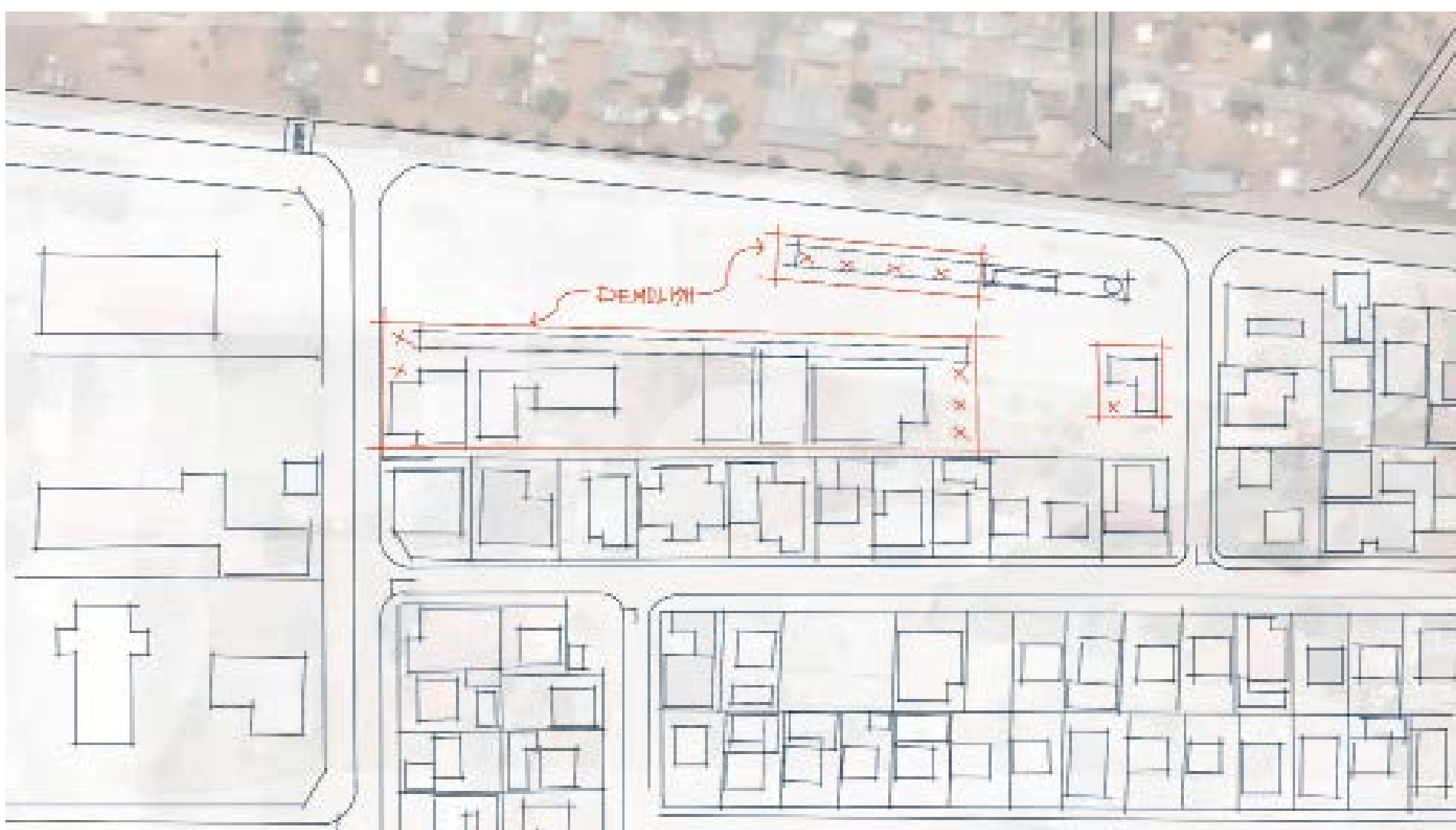
- GREEN NODES OPPORTUNITY
- PEDESTRIAN MOVEMENT
- VEHICULAR MOEVEMNT



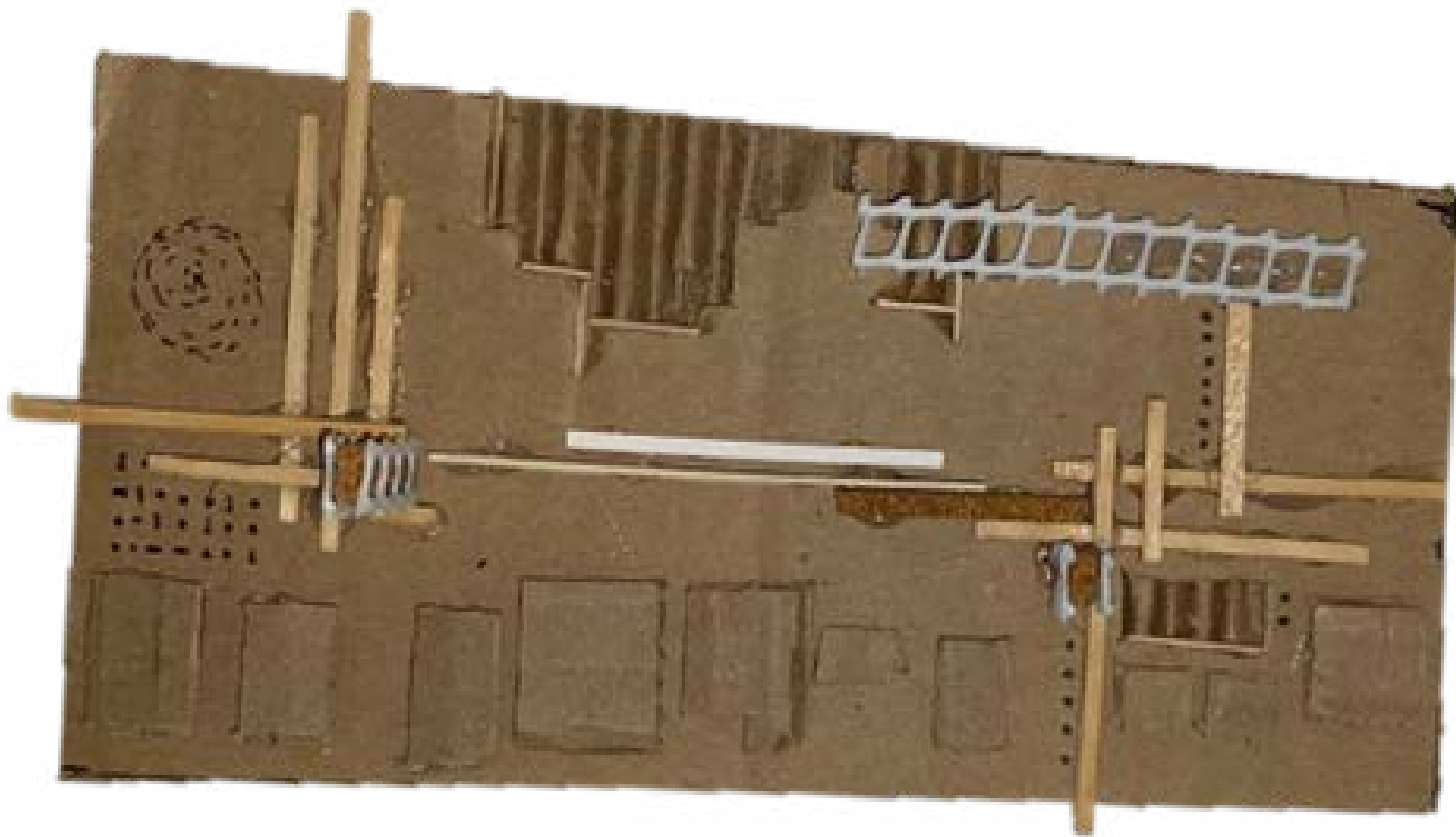
PARK HISTORY: CONNECTING GREEN ZONES

Exploration responding to conversations with local community members.

Responding to site history and physical conditions.



ITTERATION 2



MODEL SHOWING THE 2 TYPES OF MOVEMENT



Taking the concept of rush and relax + dividing the site according to possible best locations for fast/ easy fire truck exits.



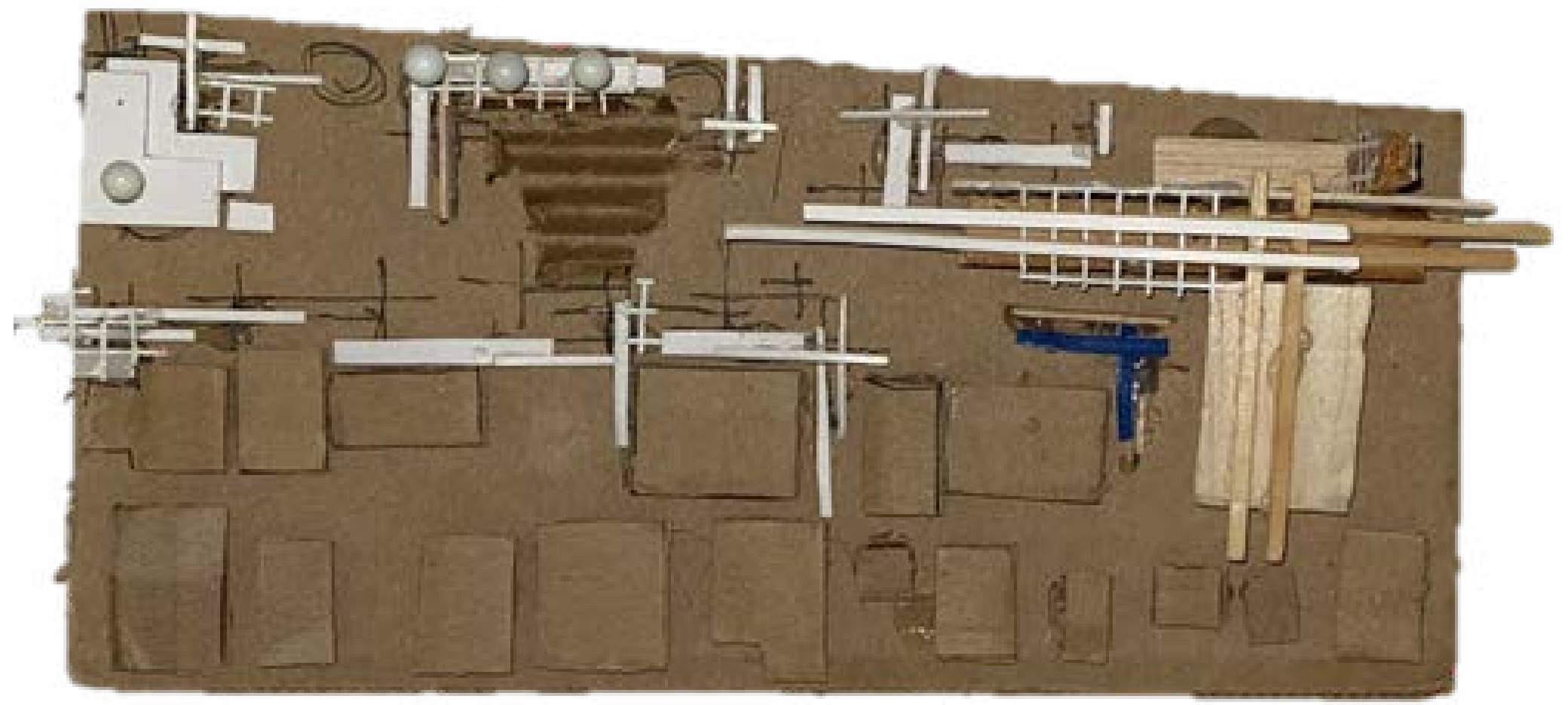
VISUAL REPRESENTATION OF RUSH + RELAX:

LONG LINES = FAST MOVEMENT
SHORT LINES = SLOW MOVEMENT

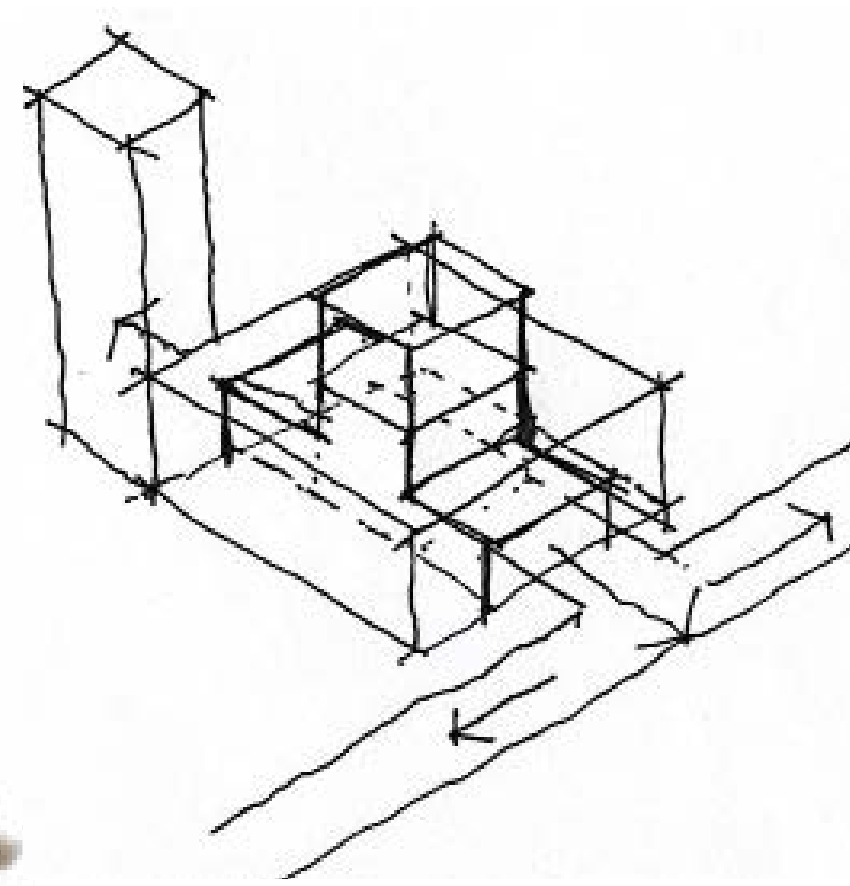
ITTERATION 3



ZONING + MASSING ON EAST PORTION



MASSING ON EAST PORTION



Massing exploration of the fire station and park.

Exploring the different programs within the station as well as the street interface to the park and the building.

- Watch tower
- Apparatus
- Public multifunctionality
- Private quarters



FLOW OF MOVEMENT

First note at pedestrian movement across site



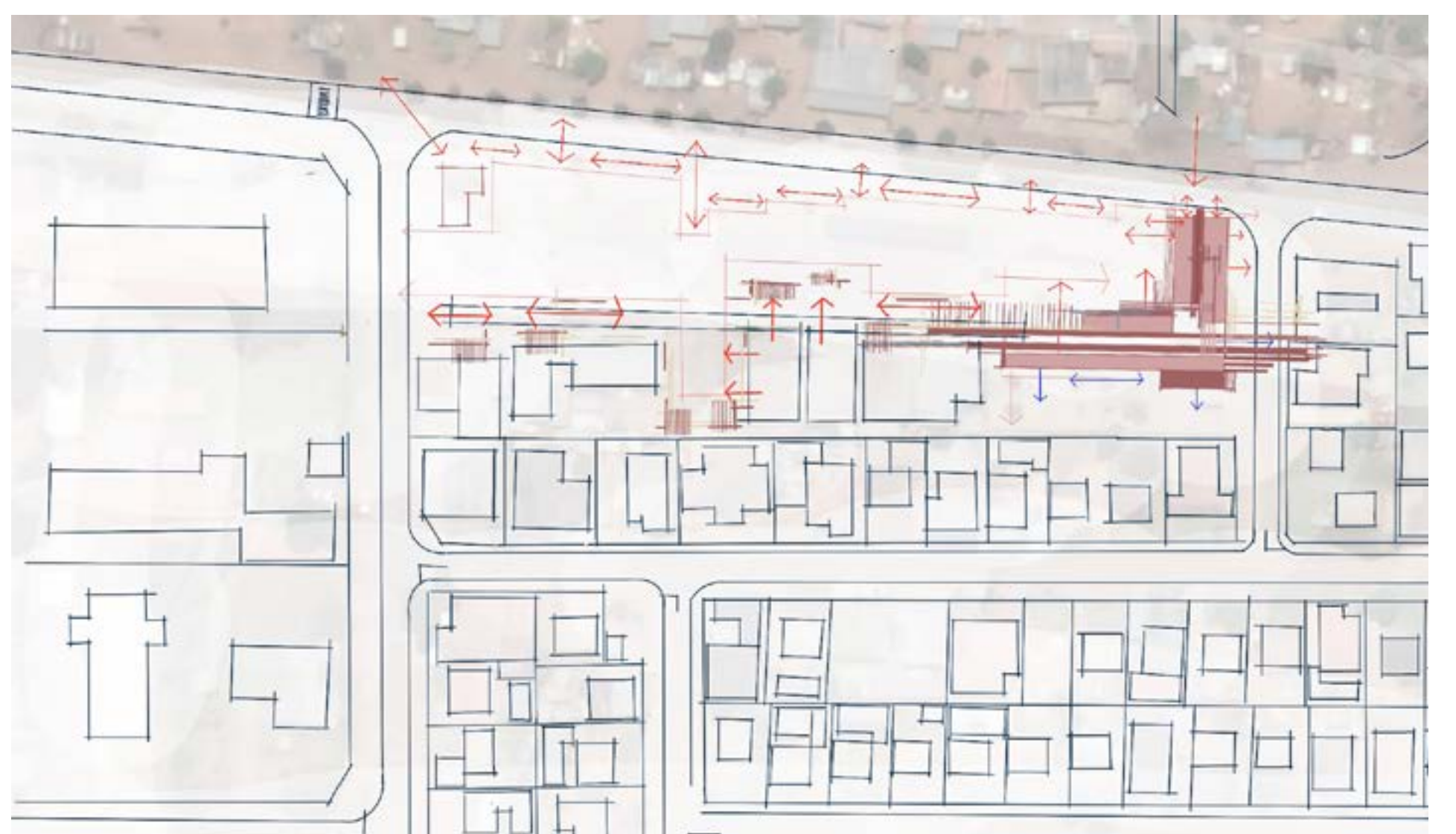
FORMING CORRIDOORS

- DESIRE LINES



PROMENADE DESIGN

Connect & collect = Public spine



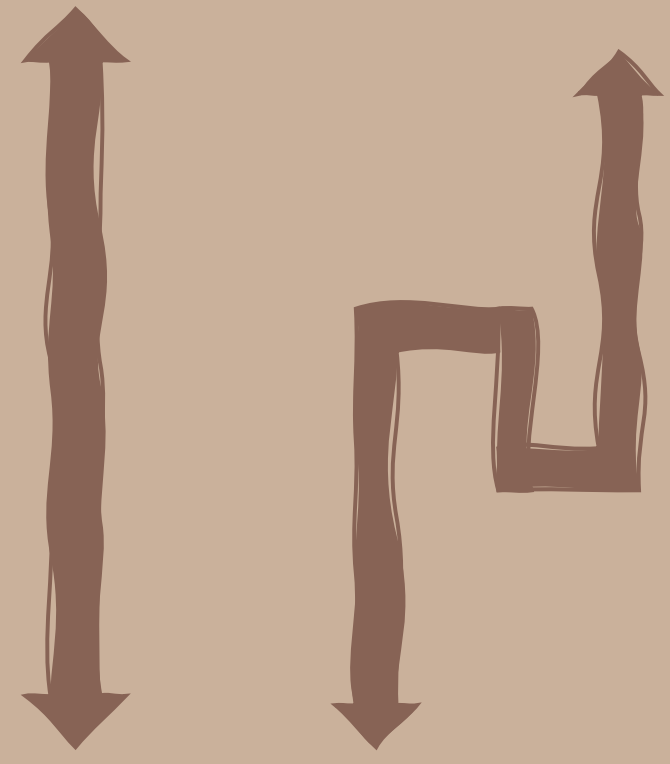
PUBLIC STREET INTERFACE

-Draw public in with building

ITTERATION 4

Further programming the site to accommodate for multifunctionality + archetypes.

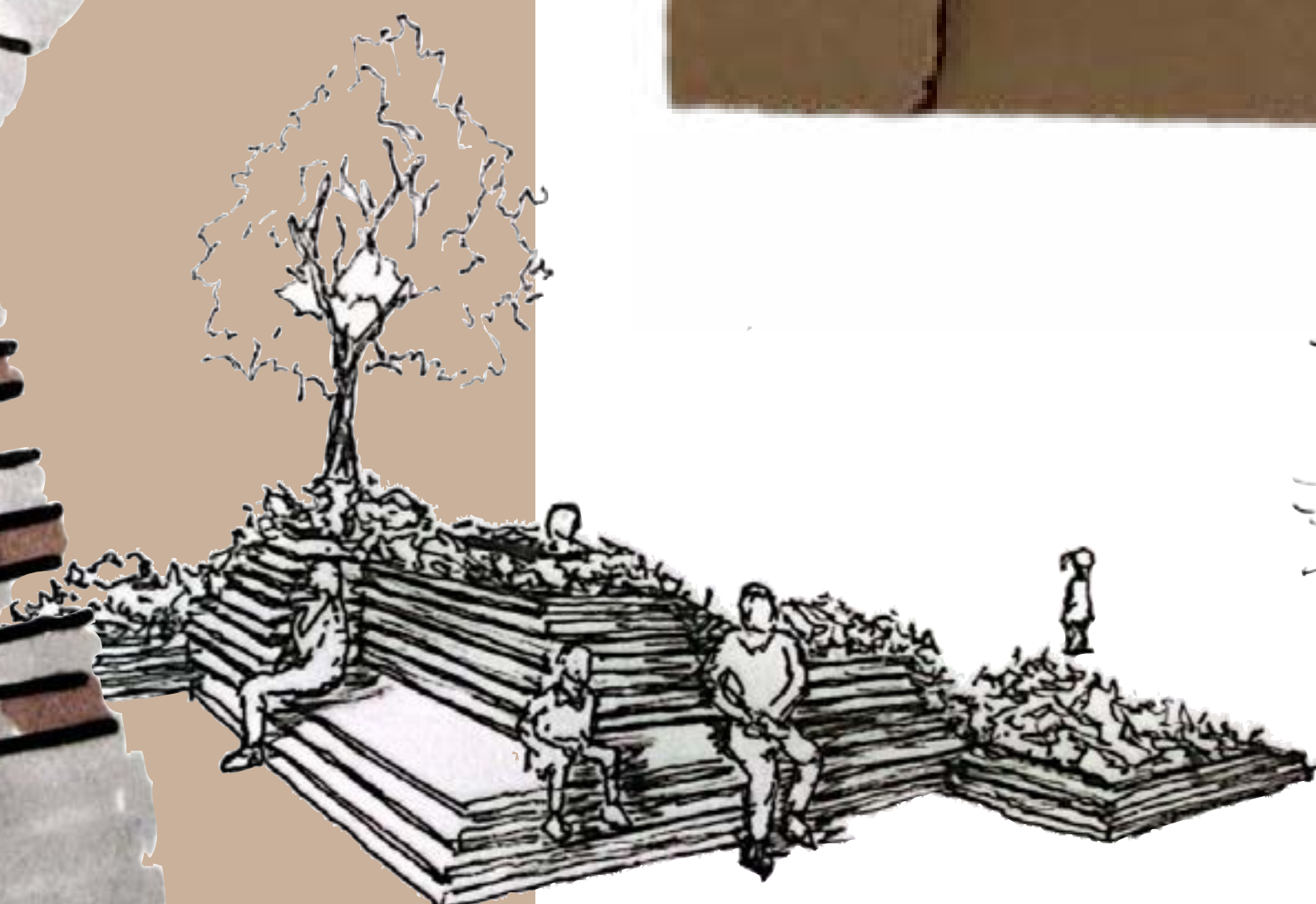
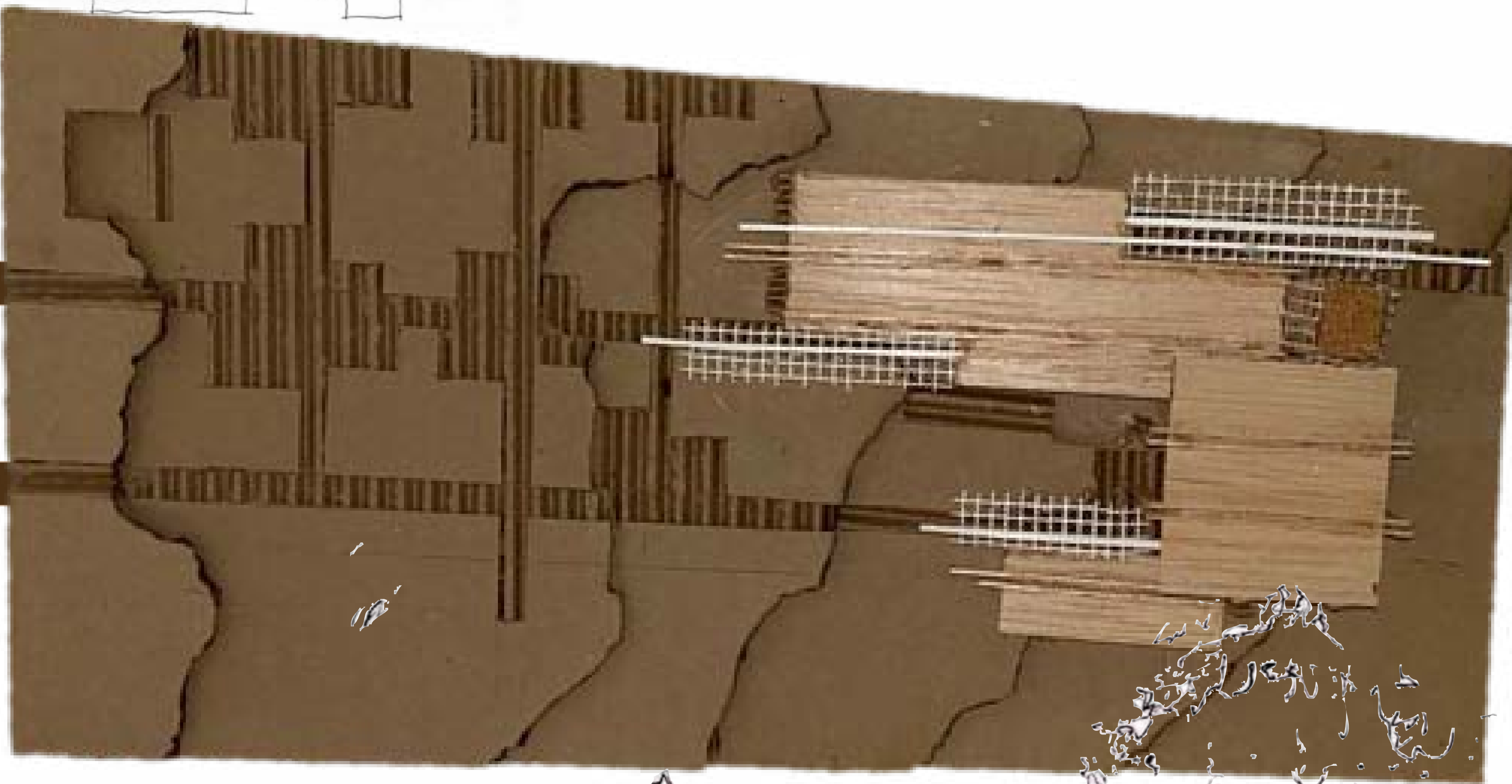
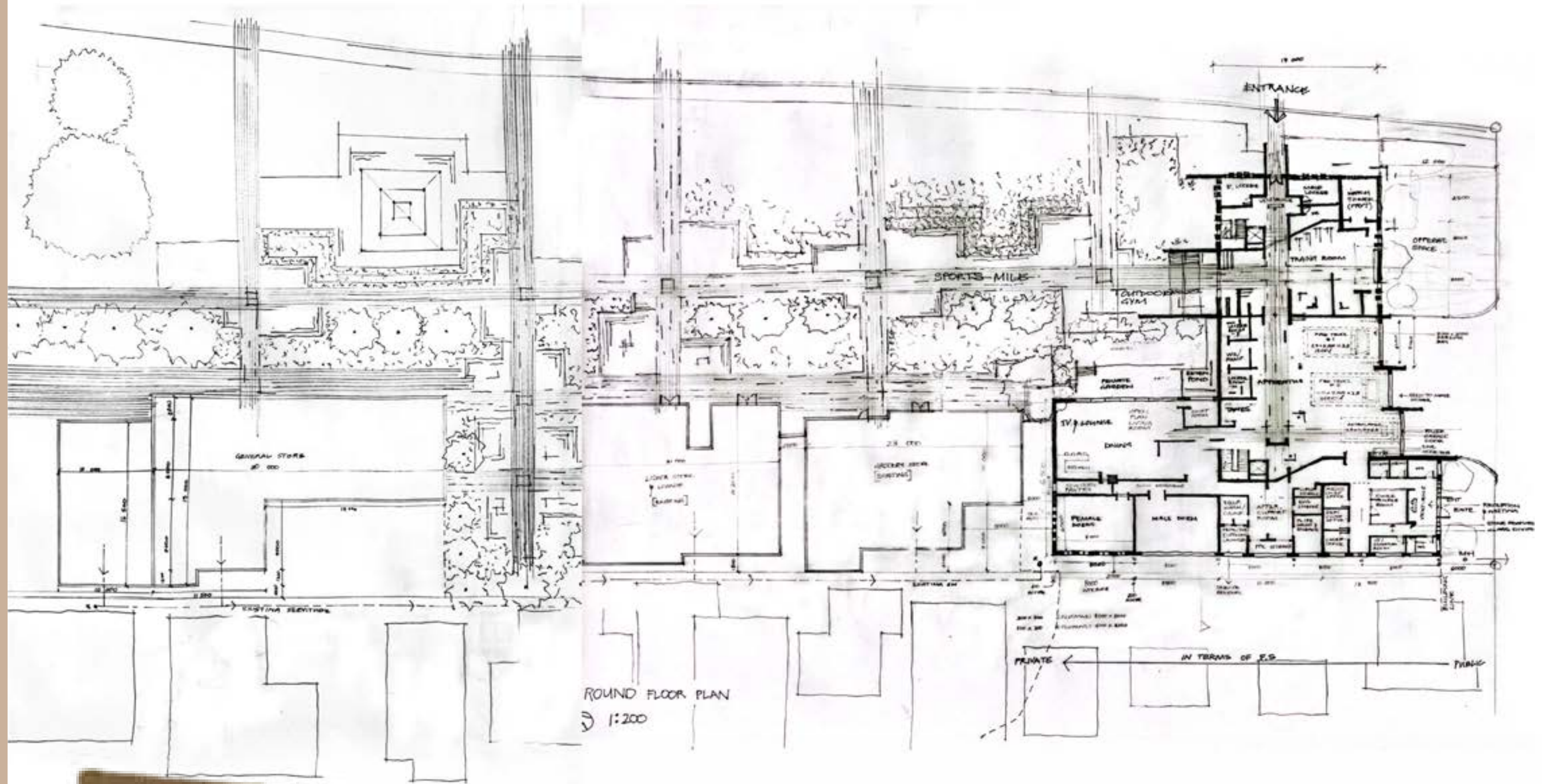
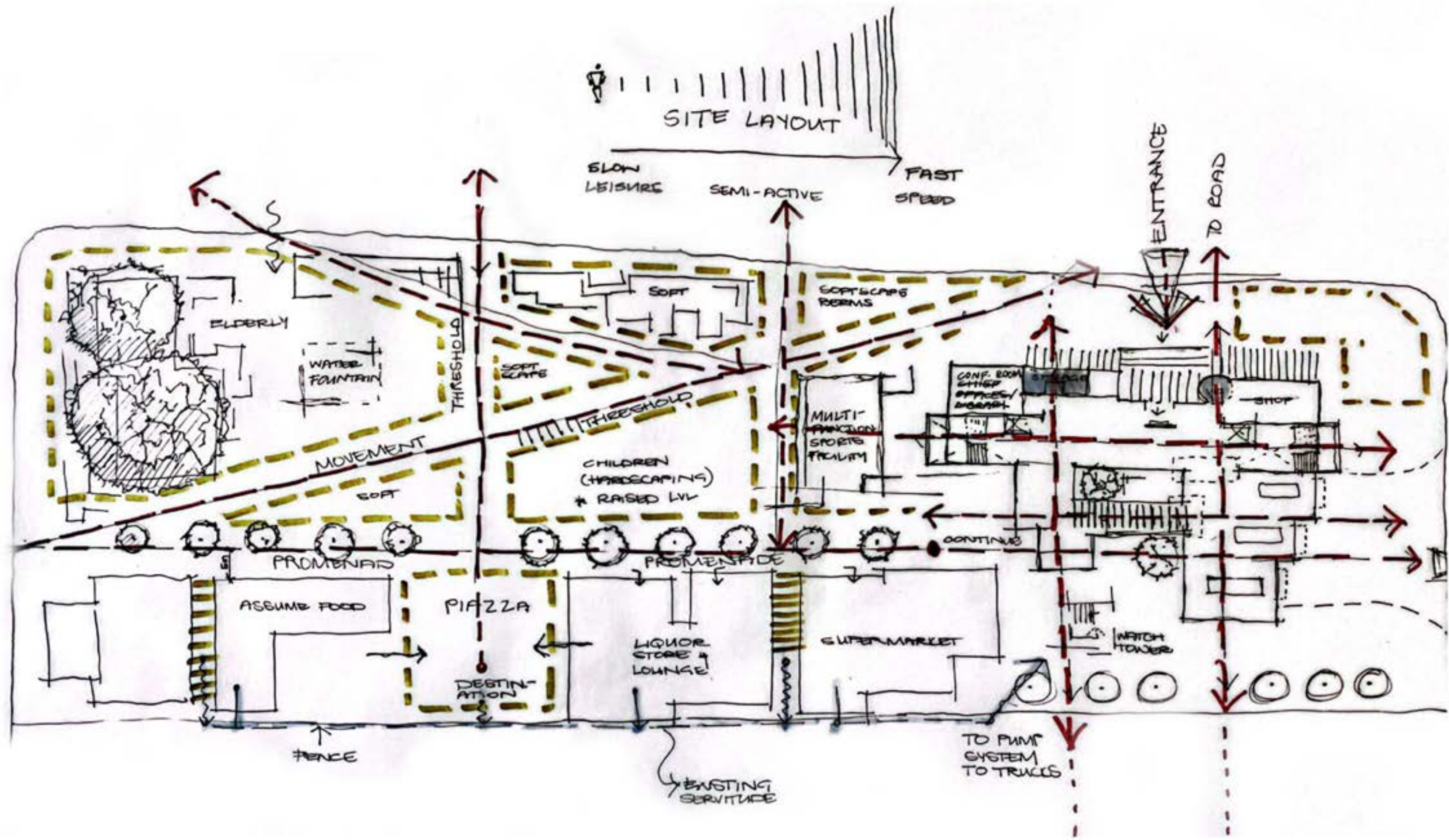
- Public: gym + library
- Apparatus
- Pvt quarters
- Shopfront promenade
- Sports mile
- Children marabaraba



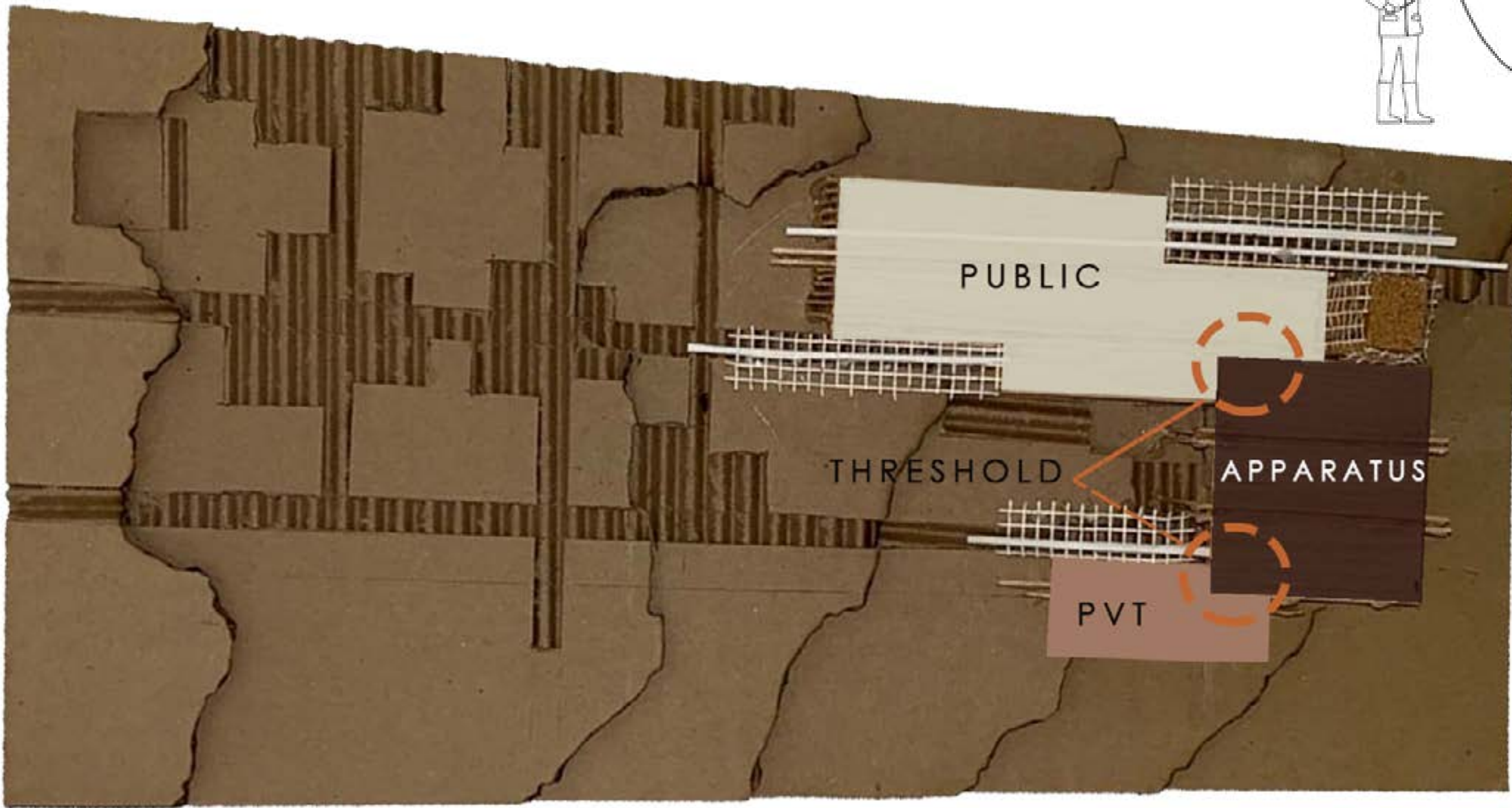
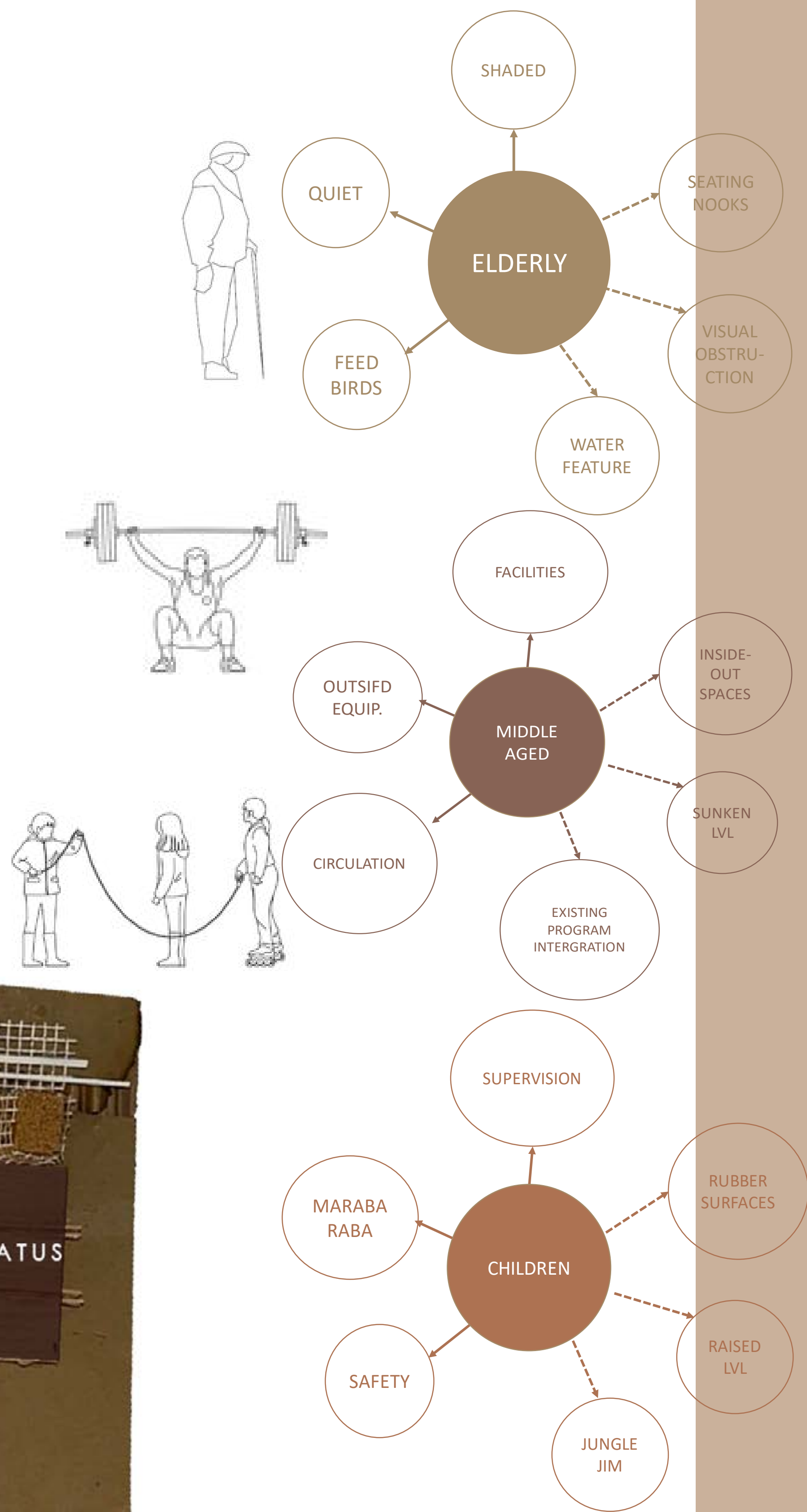
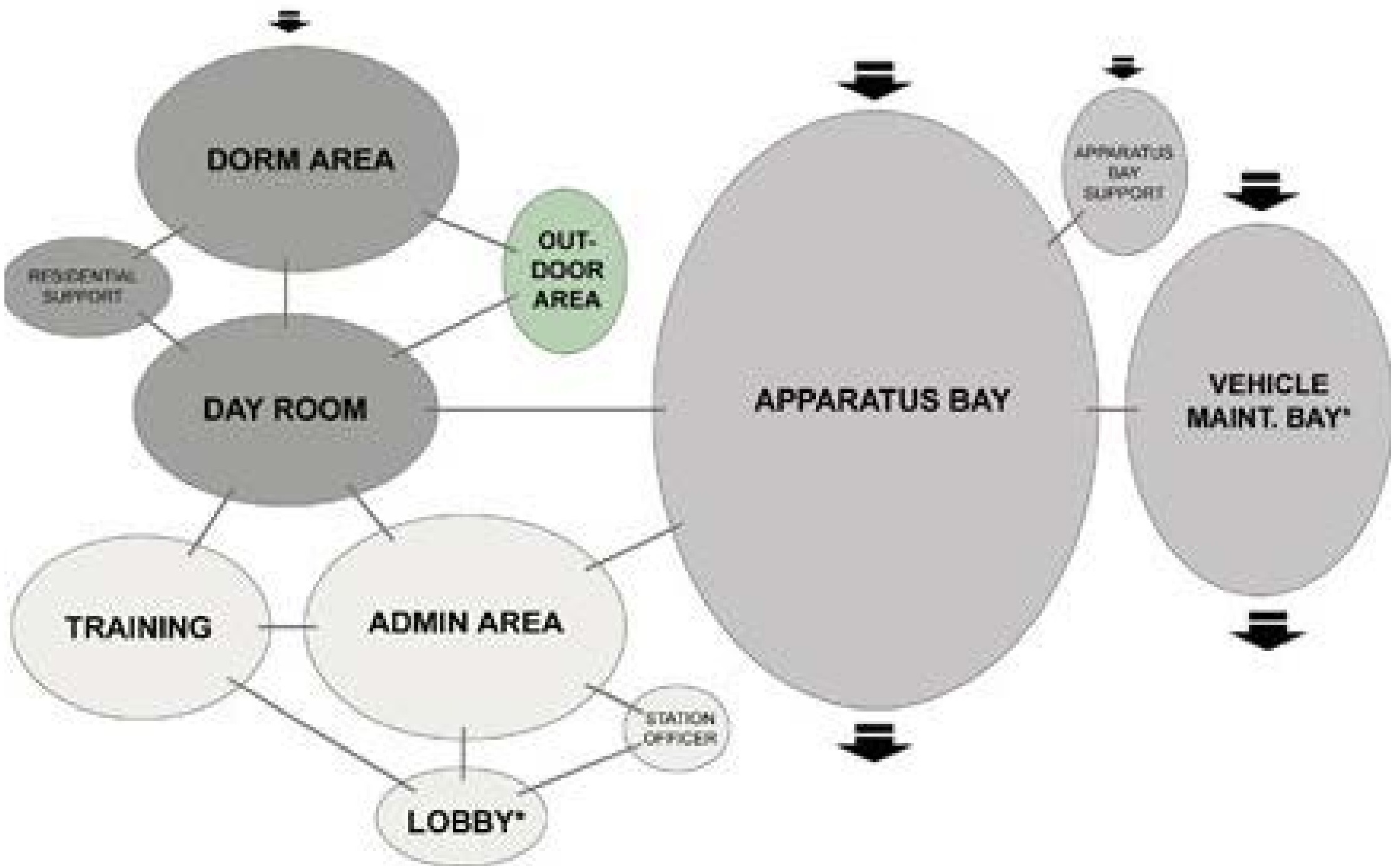
DIRECT

LEISURE

Fast vs Slow
Movement across site



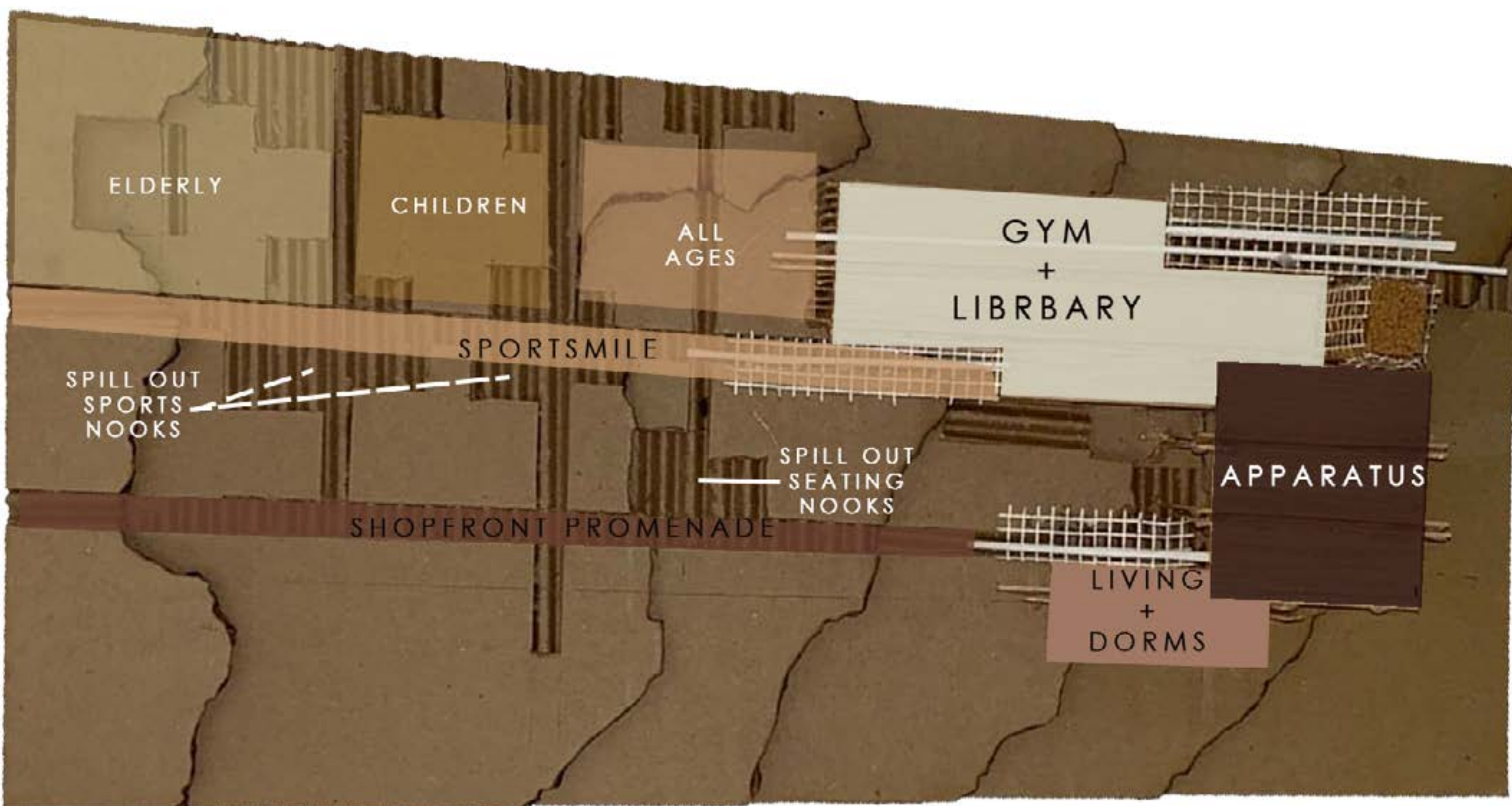
PROGRAM ARCHETYPE = programs



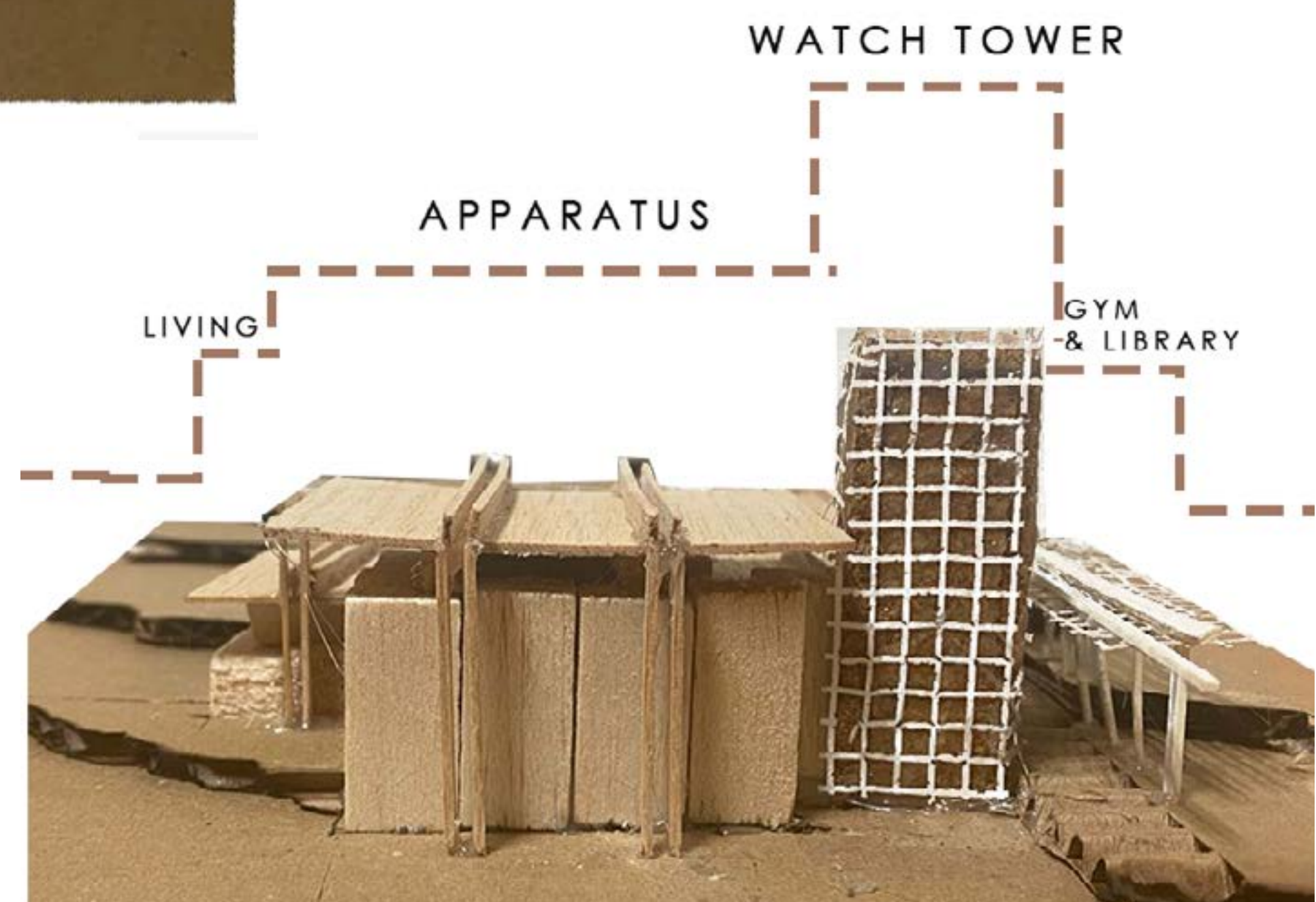
PUBLIC PVT



HEIRACHY



LANDSCAPE



PROJECT INFORMANTS

DESIGN DEVELOPMENT

TECHNOLOGICAL DEVELOPMENT

MEMBERS OF SAFETY

ADOBEBRICK: CLAY, STRAW, WATER

Emerging Building Technology

MATERIAL
OUTSOURCING



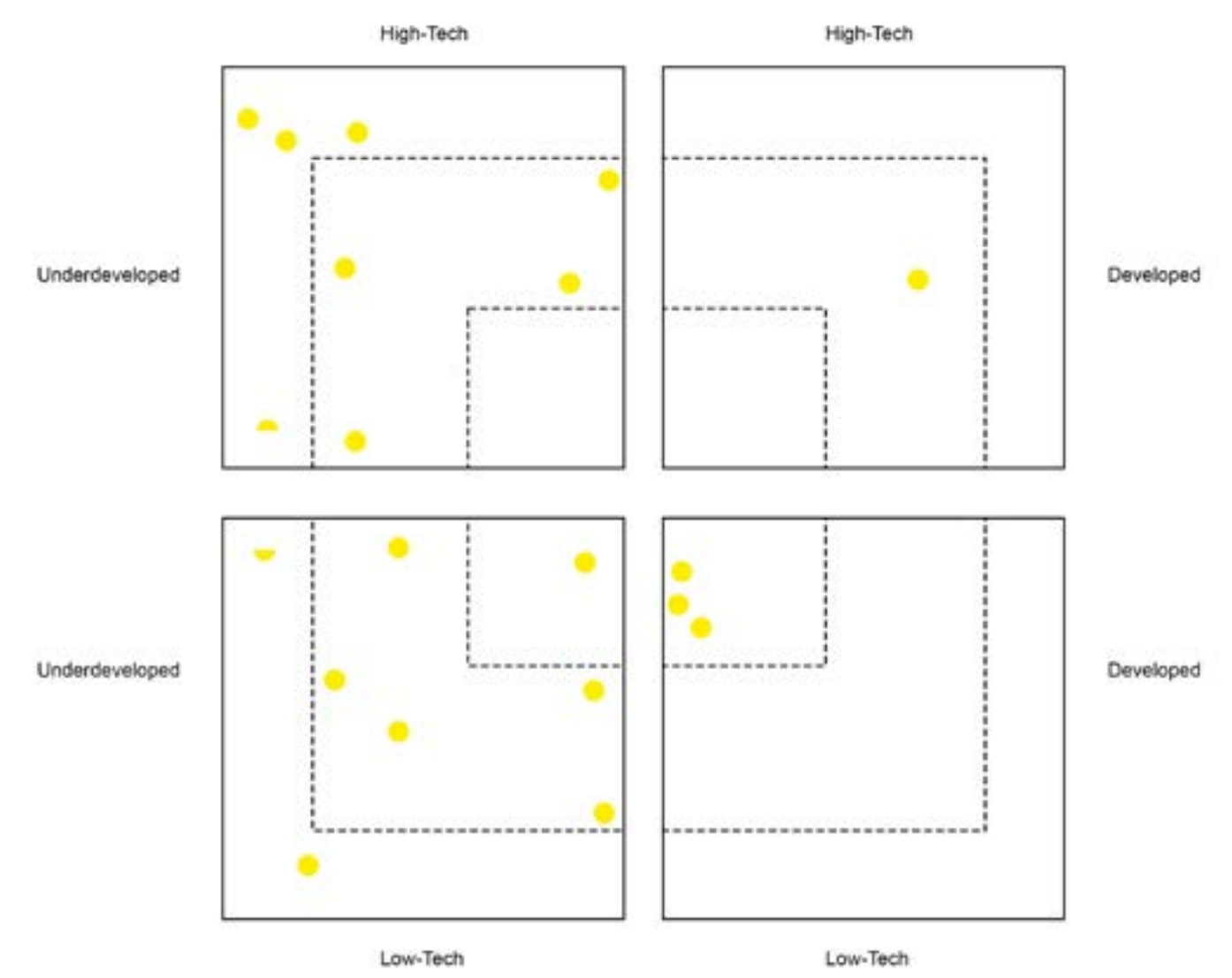
- straw
- rocks
- soil
- waterVV- landscaping
- steel small business

Within 3.6km

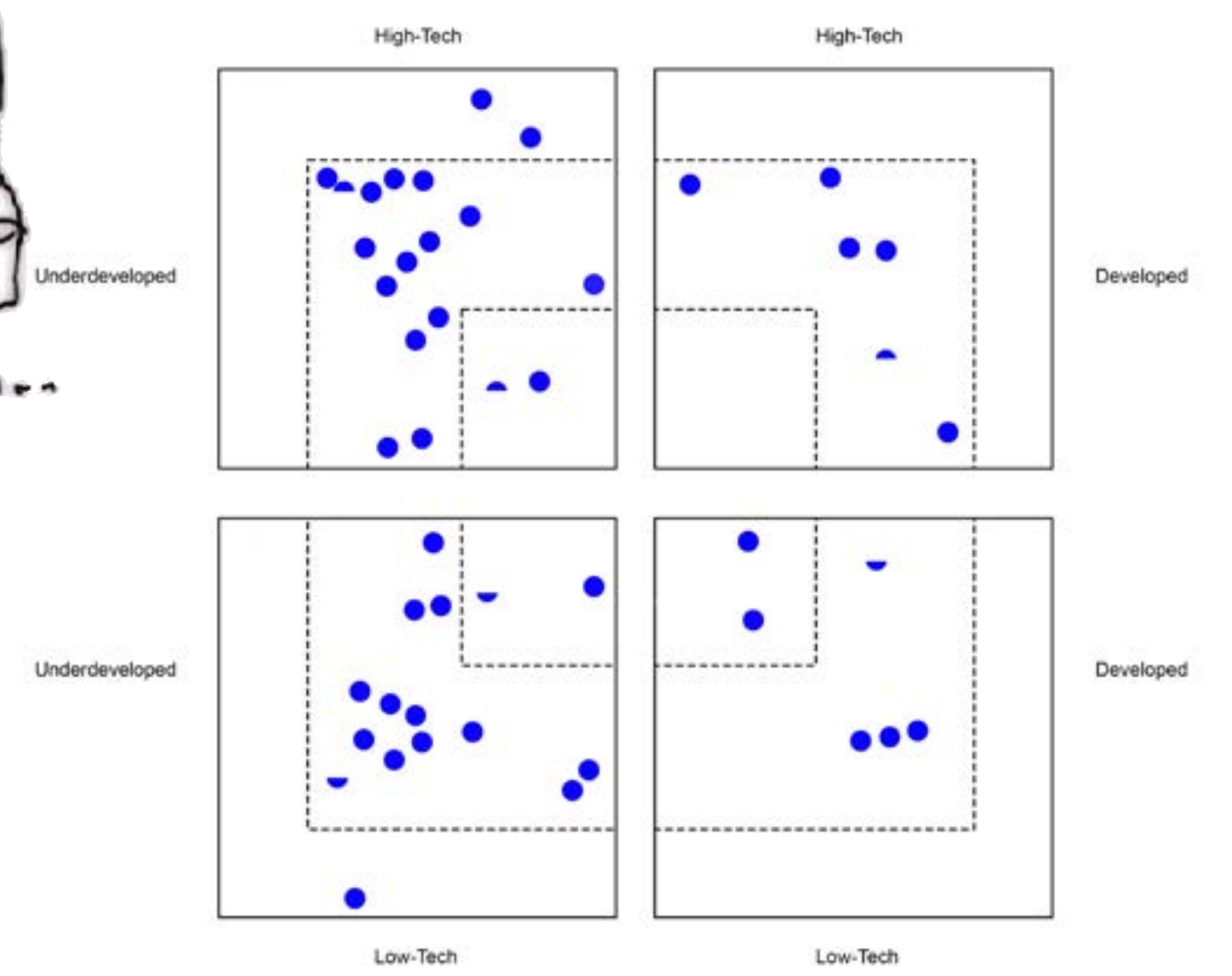
- Adobe bricks
- Natural stone
- Concrete
- Steel



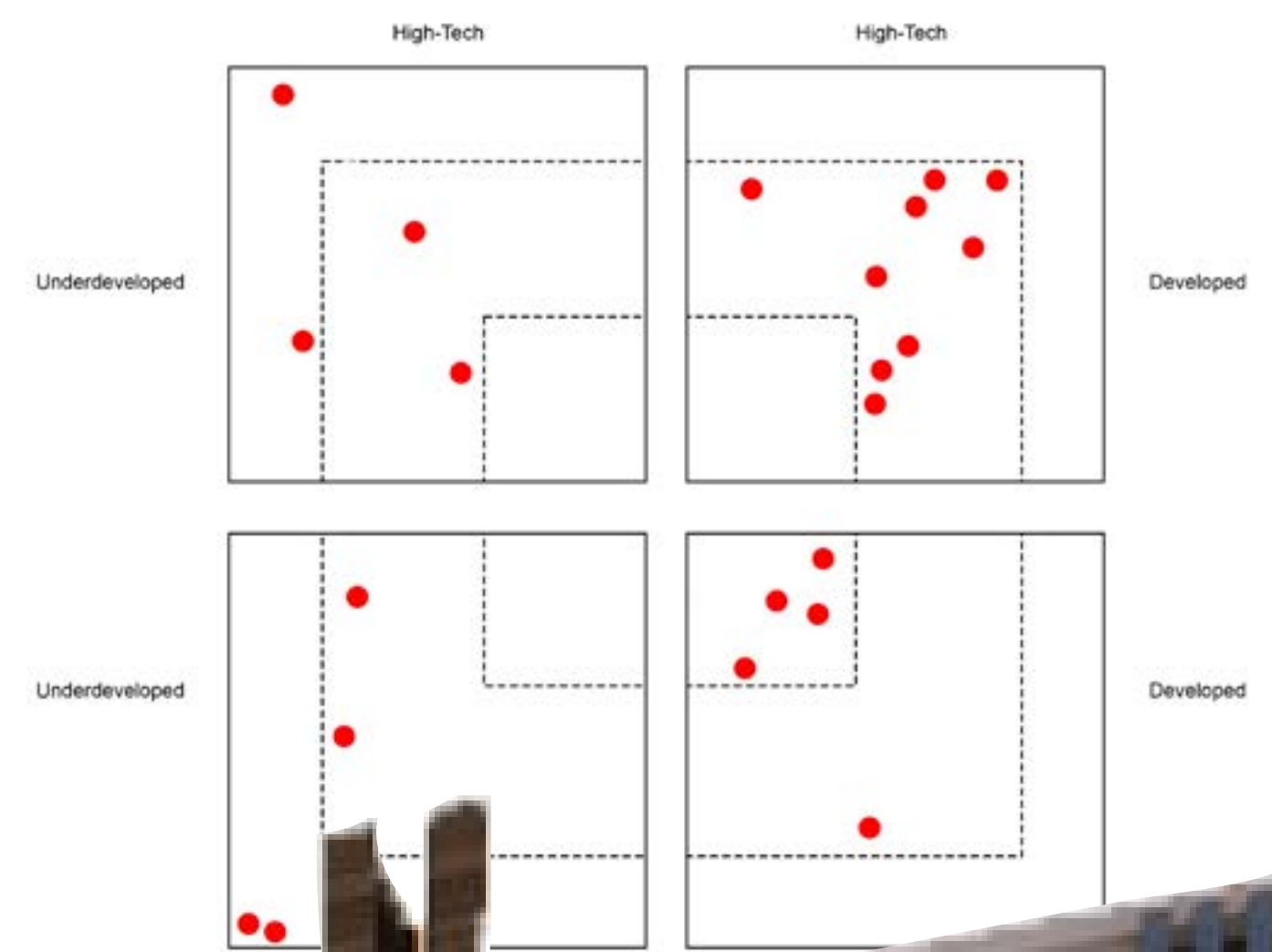
Building materials



Structural system

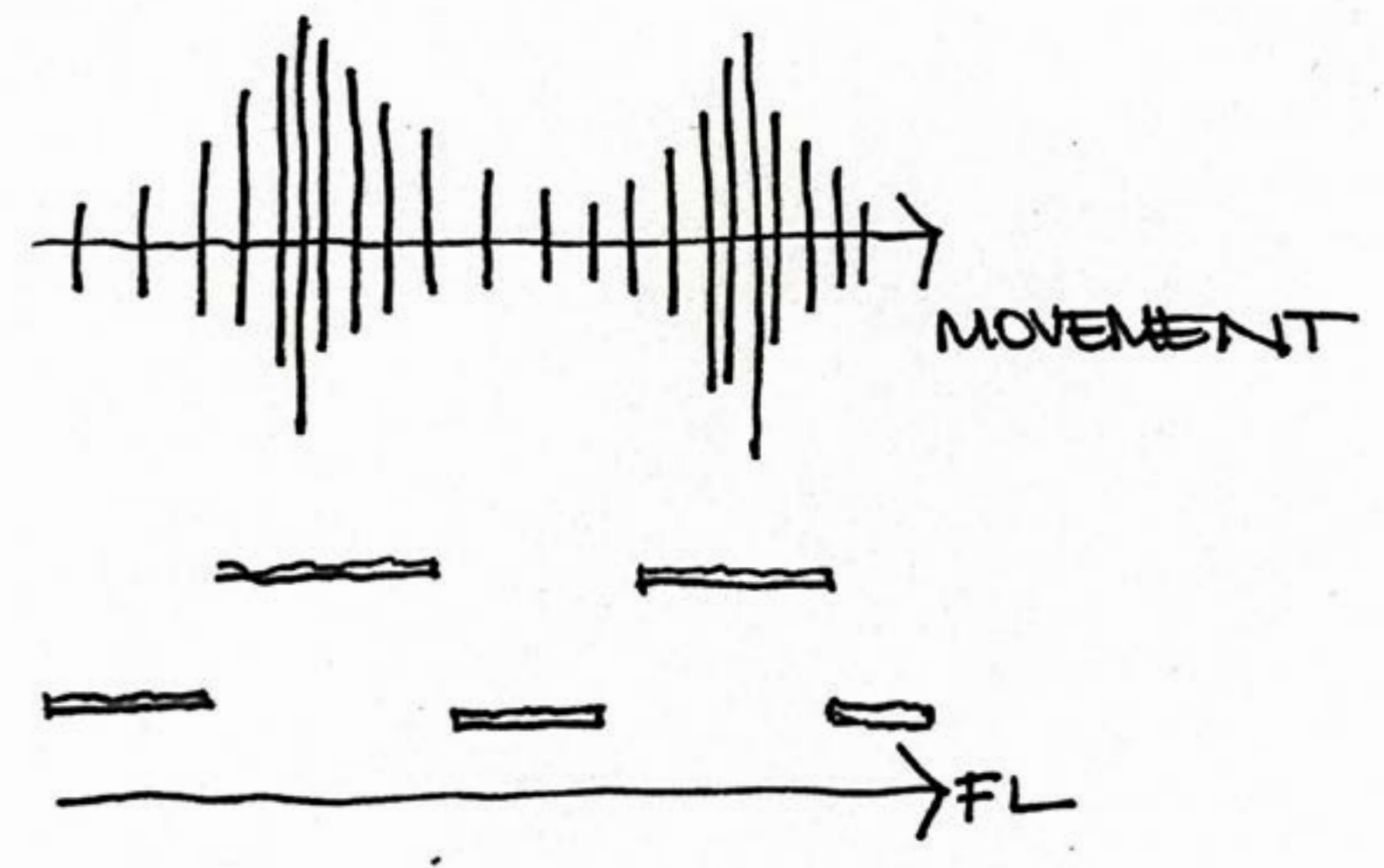


Construction process

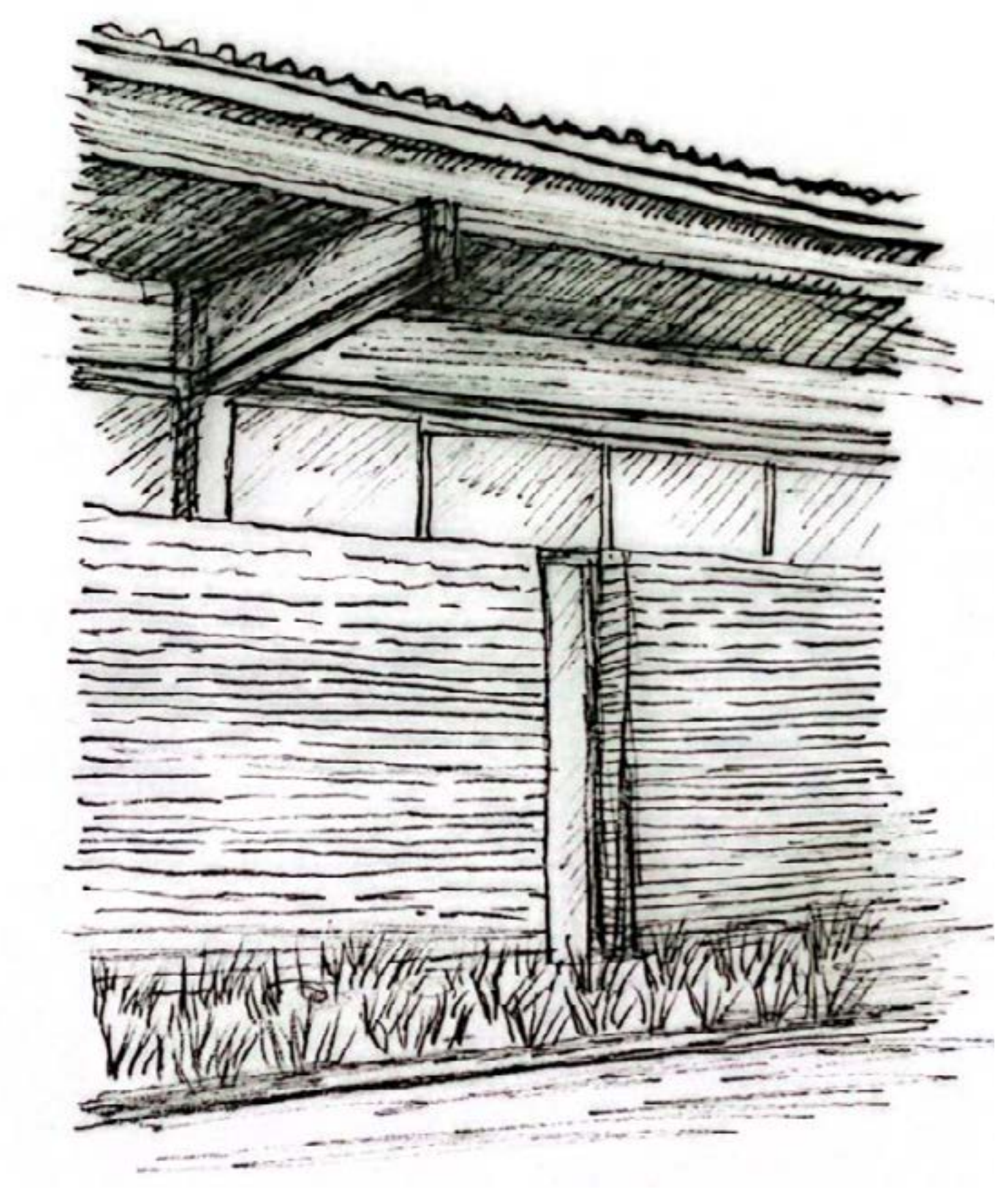


Structural System

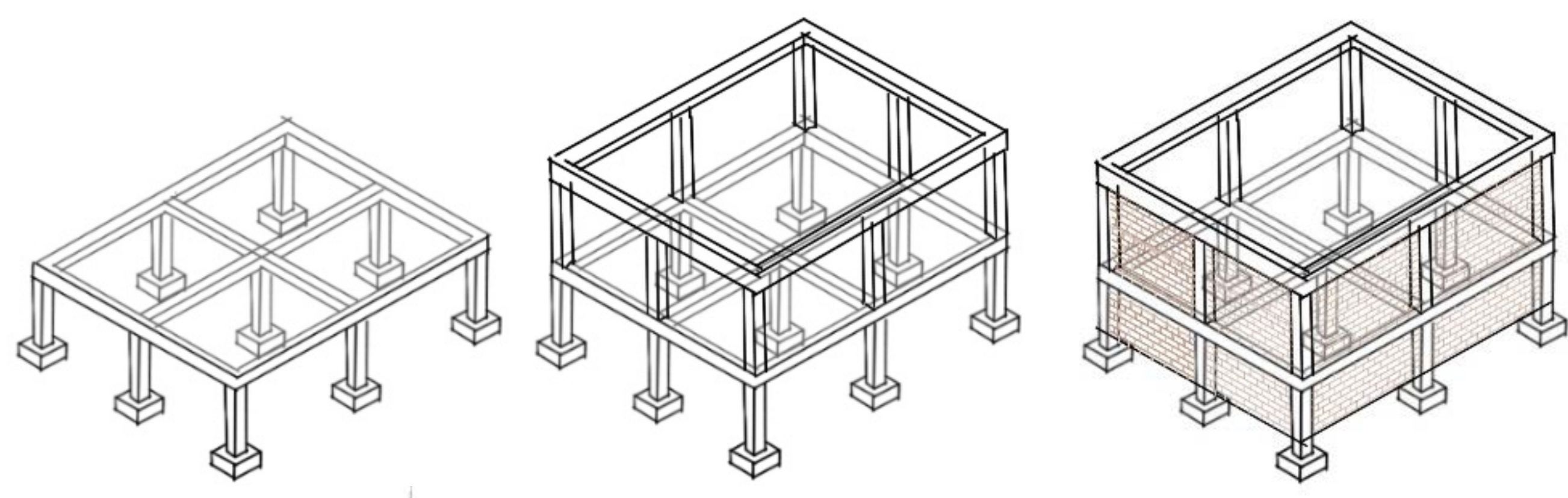
Concept



The design employs varying roof heights to communicate the level of urgency and speed needed in different areas. Higher roofs insinuate the space is meant for quick and urgent activities. Lower roofs indicate spaces where a slower and more relaxed pace is appropriate.

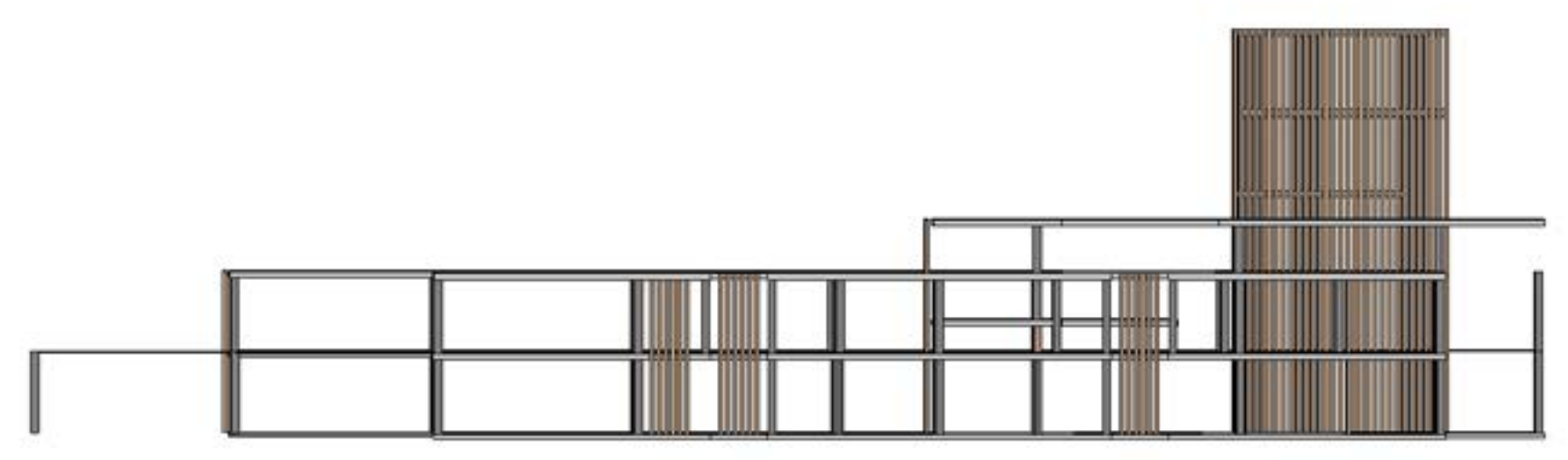
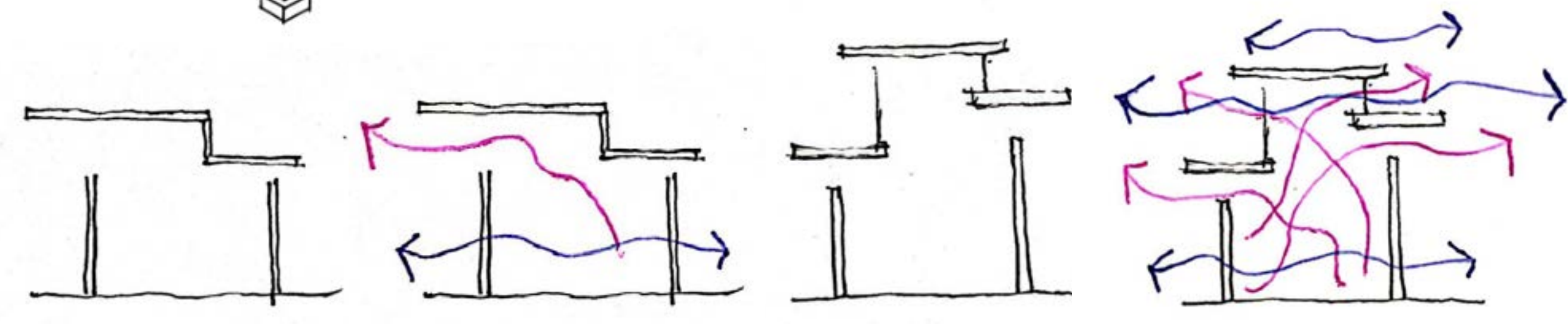
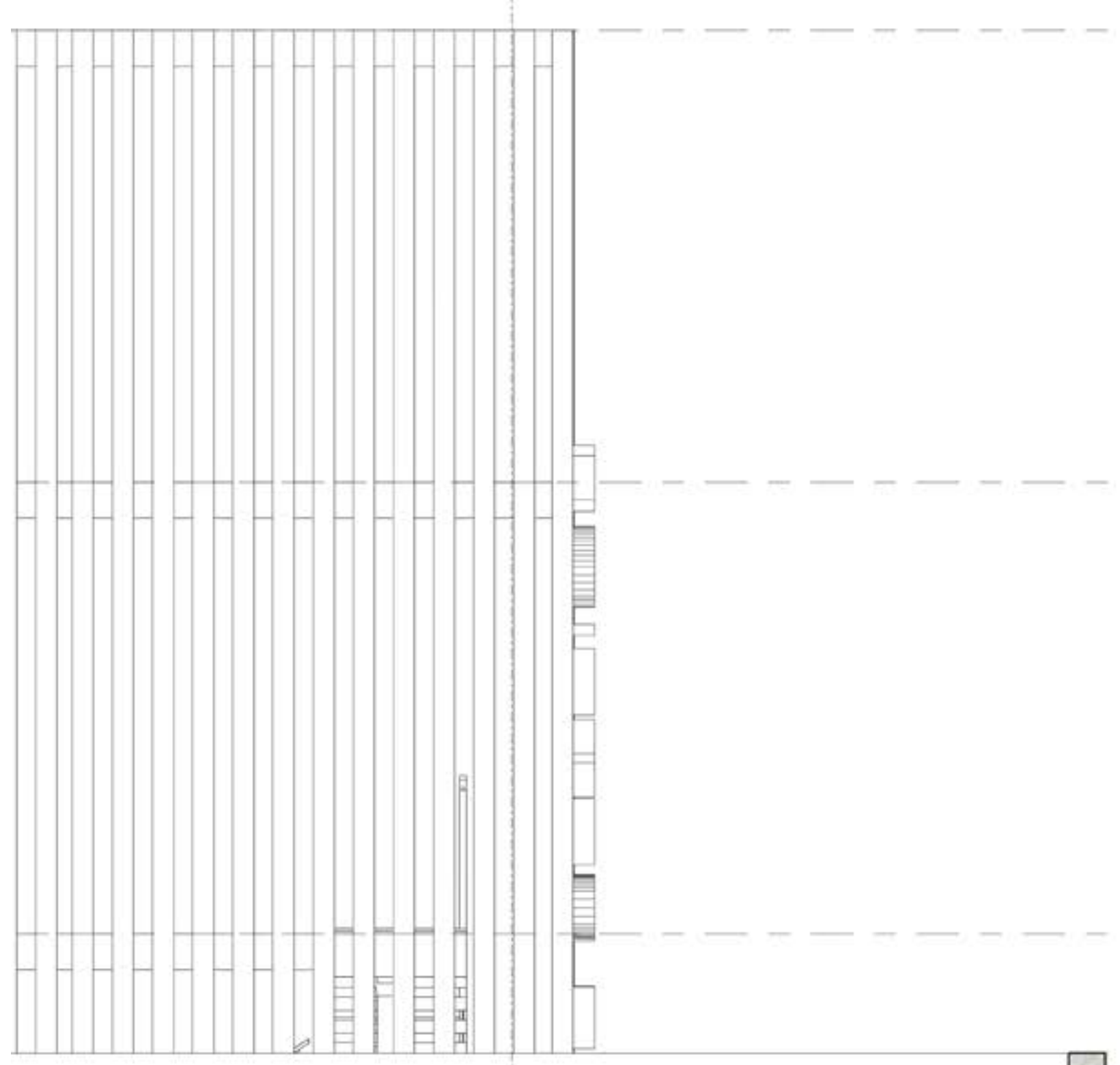


Technology

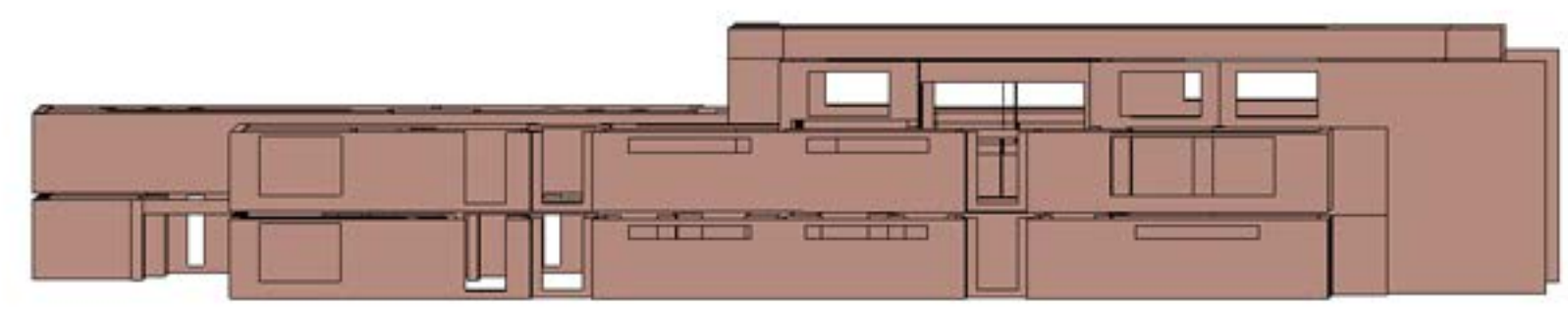


Reinforced concrete column and beam structure with adobe brick infill. Stone will be used for the foundation walls.

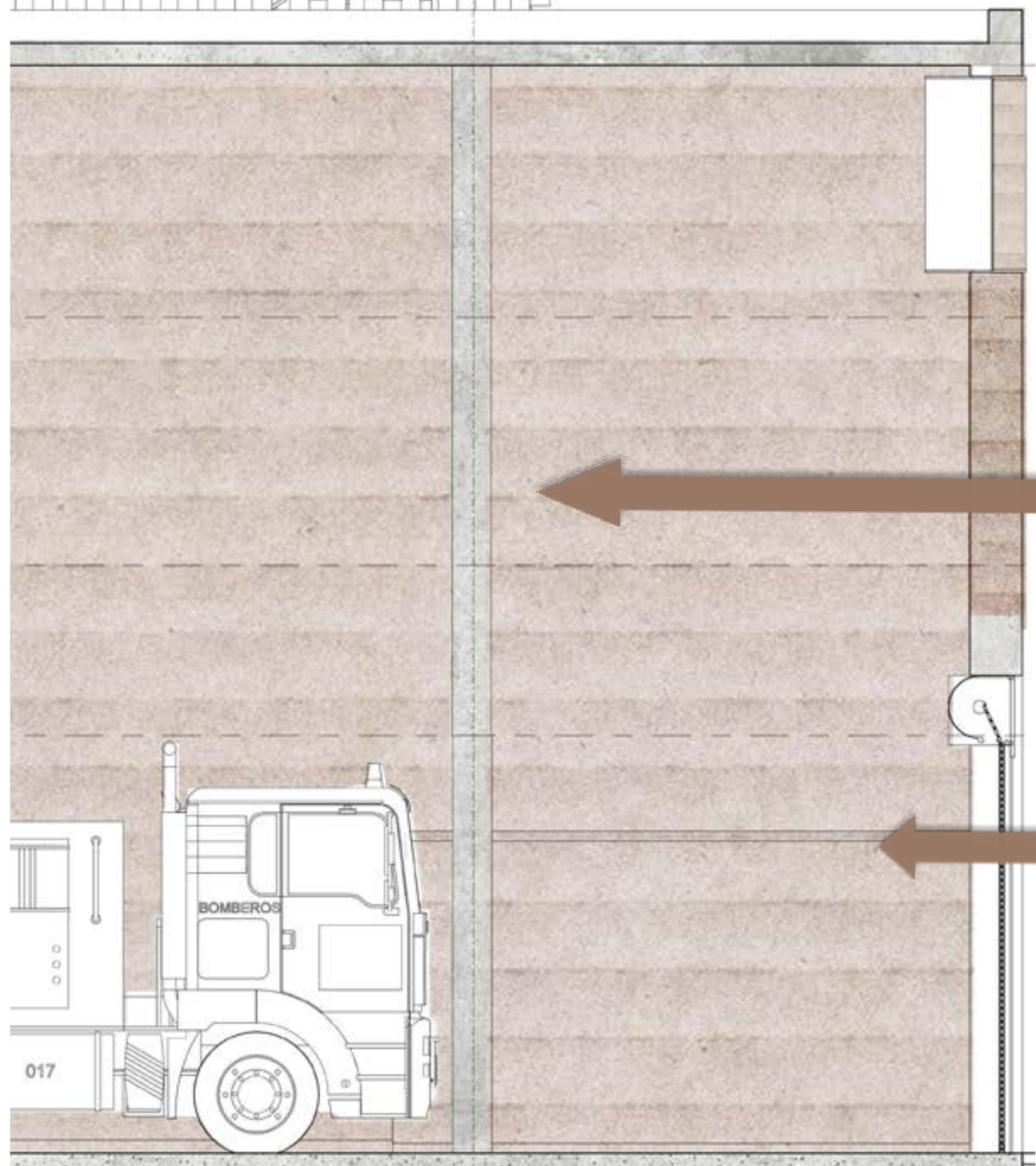
As this is three heavy materials, the elevation of the building will be done in such a way to "elevate" the roof, making it appear to be floating.



PRIMARY STRUCTURE

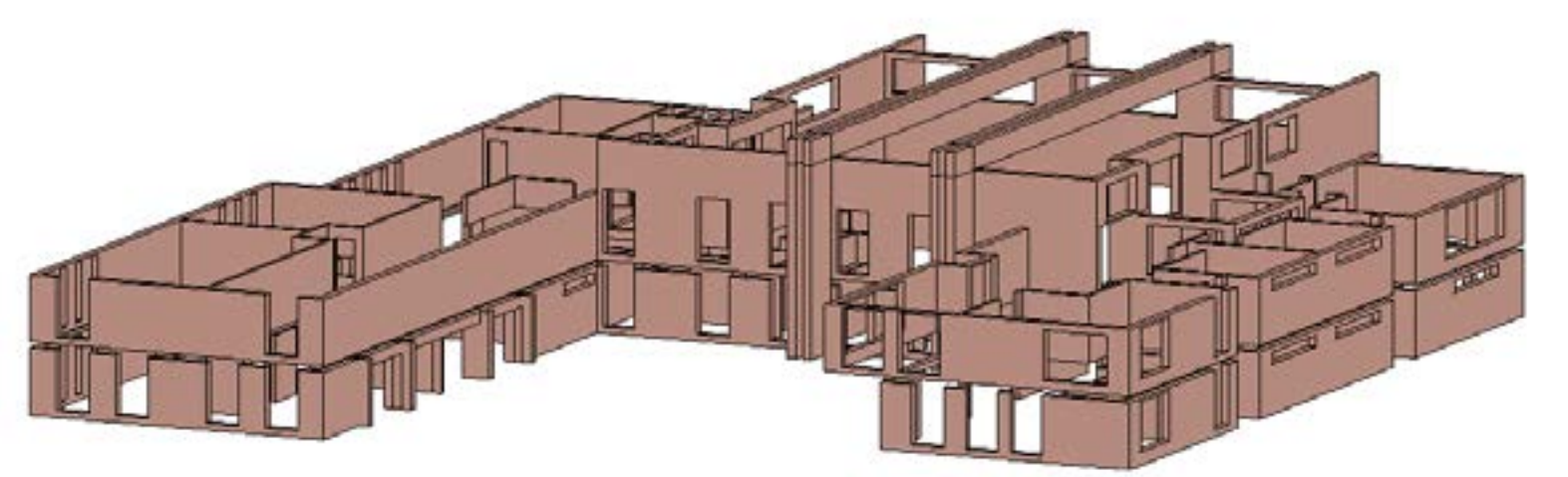
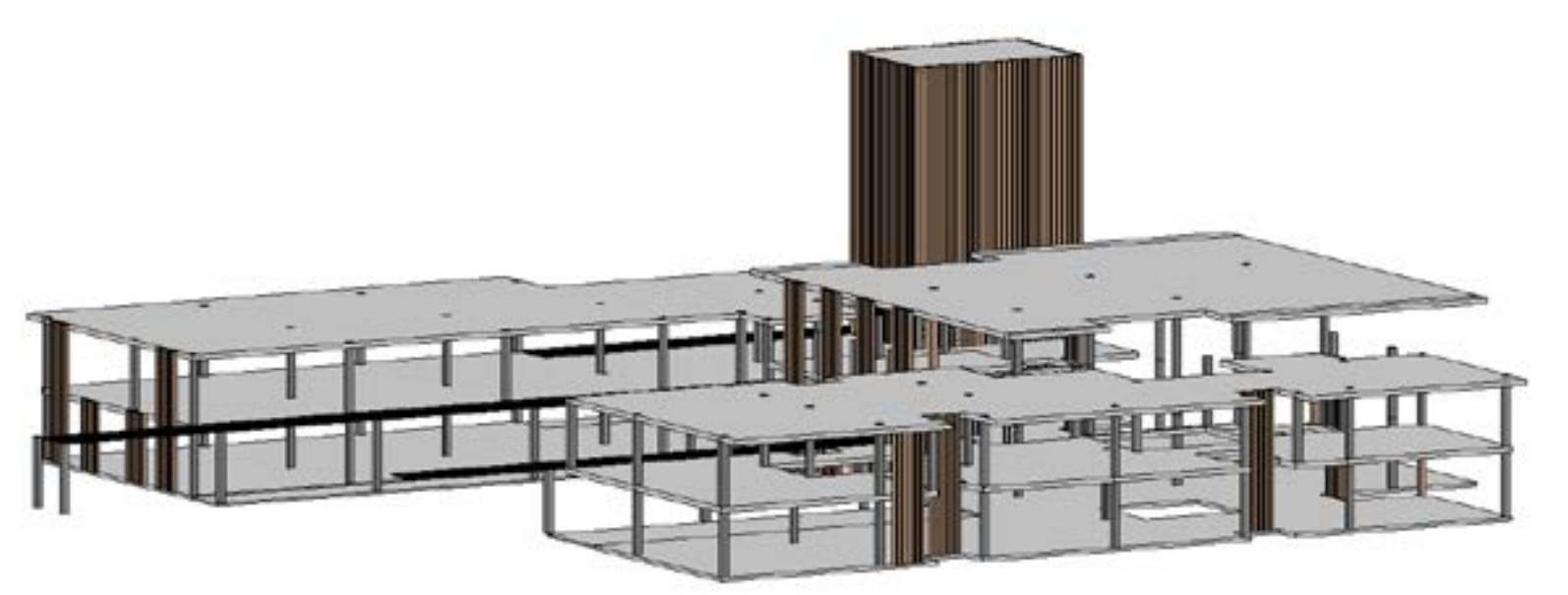


SECONDARY STRUCTURE



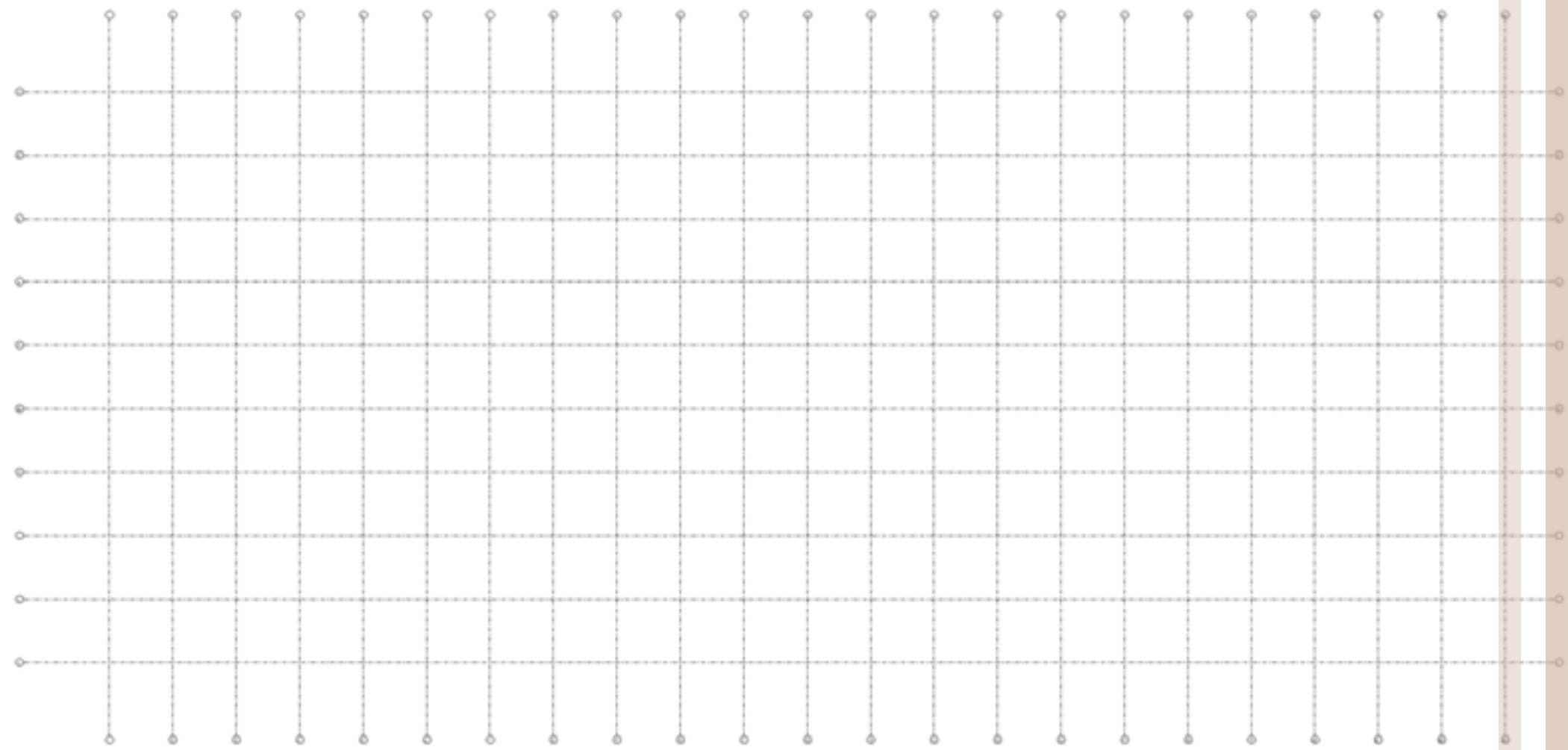
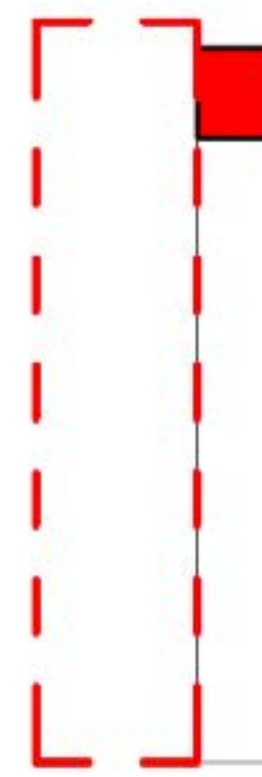
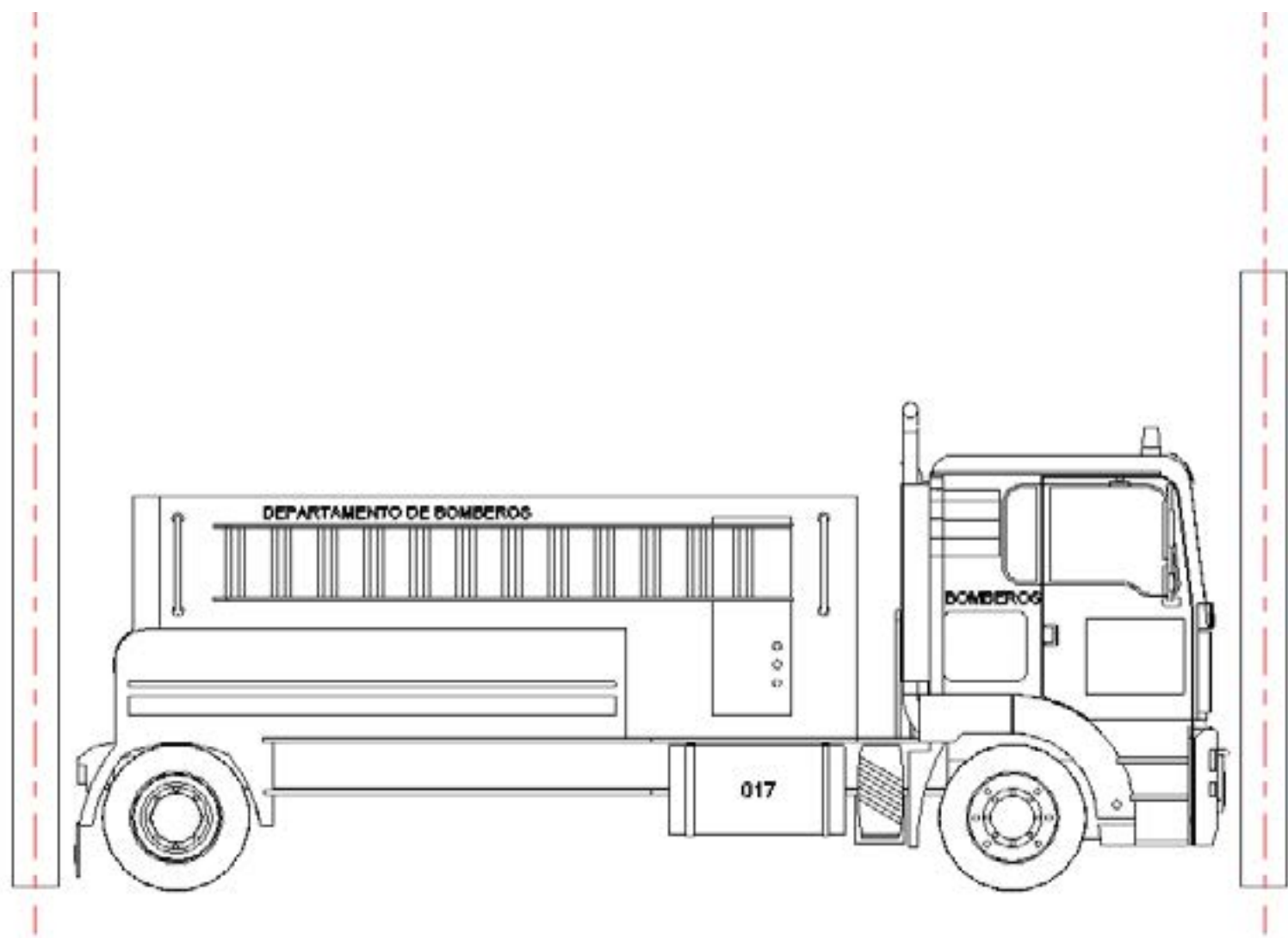
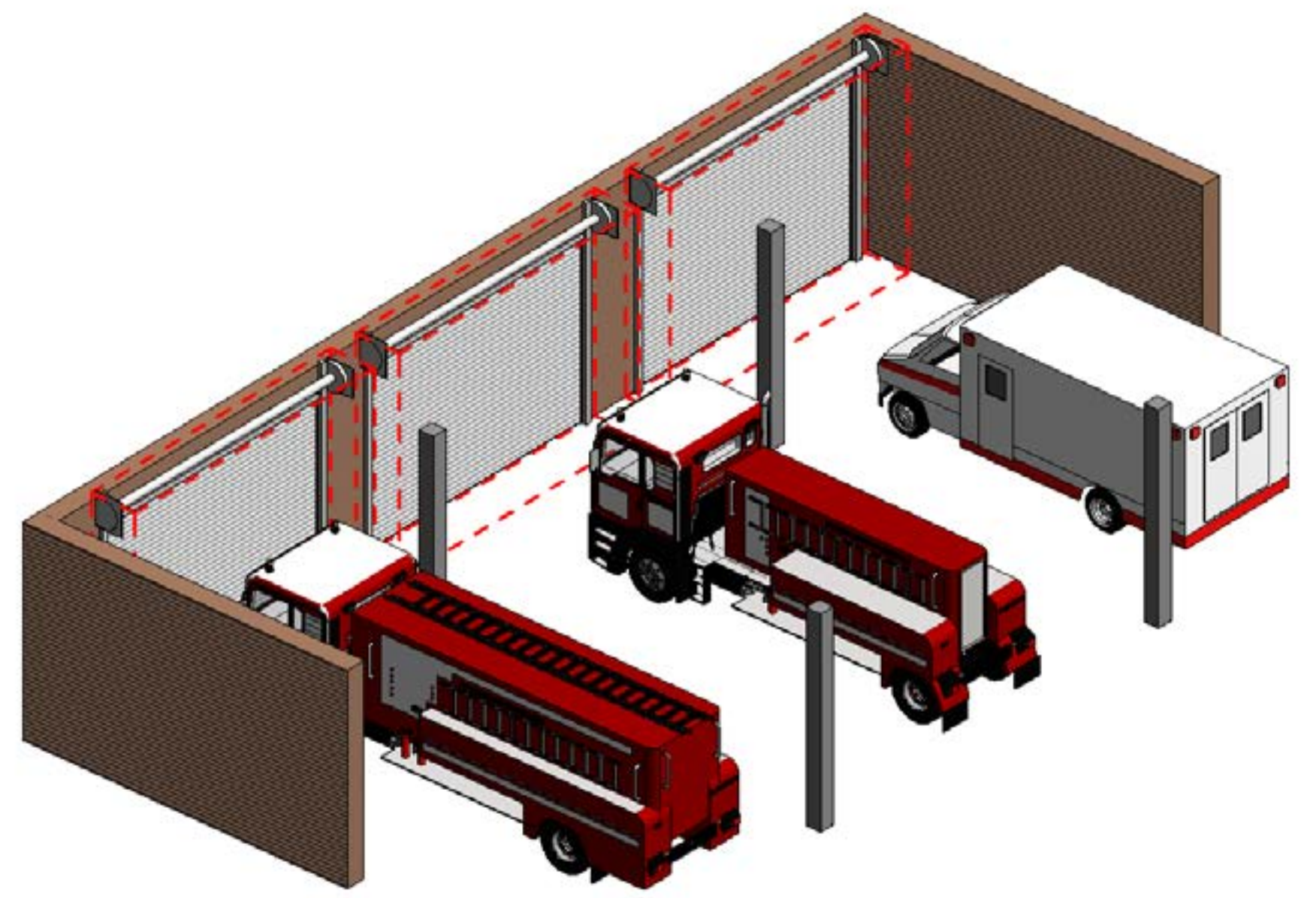
300X300mm REINFORCED CONCRETE COLUMNS @8000 ctc

400x200x200mm ADOBE BRICK WALL

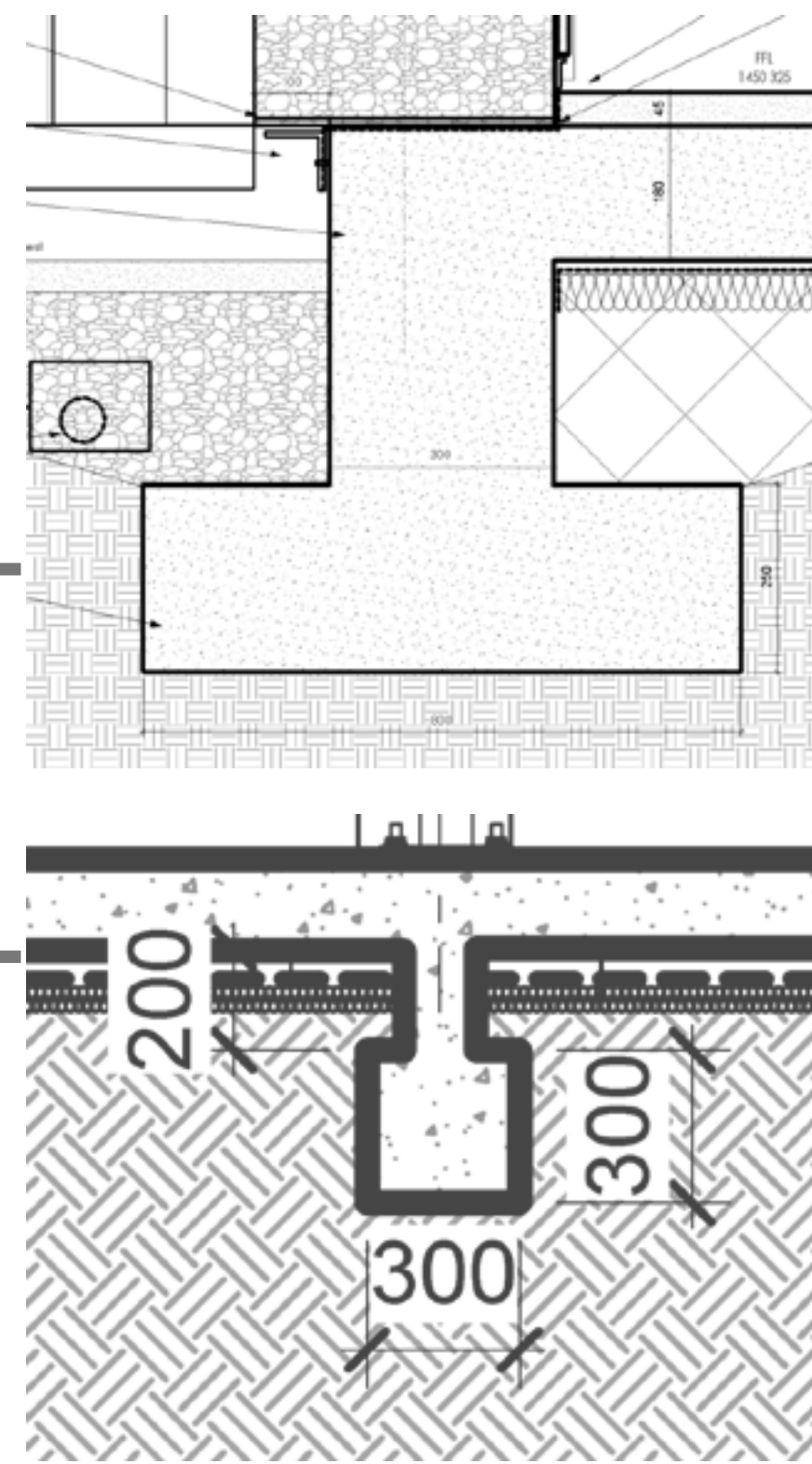
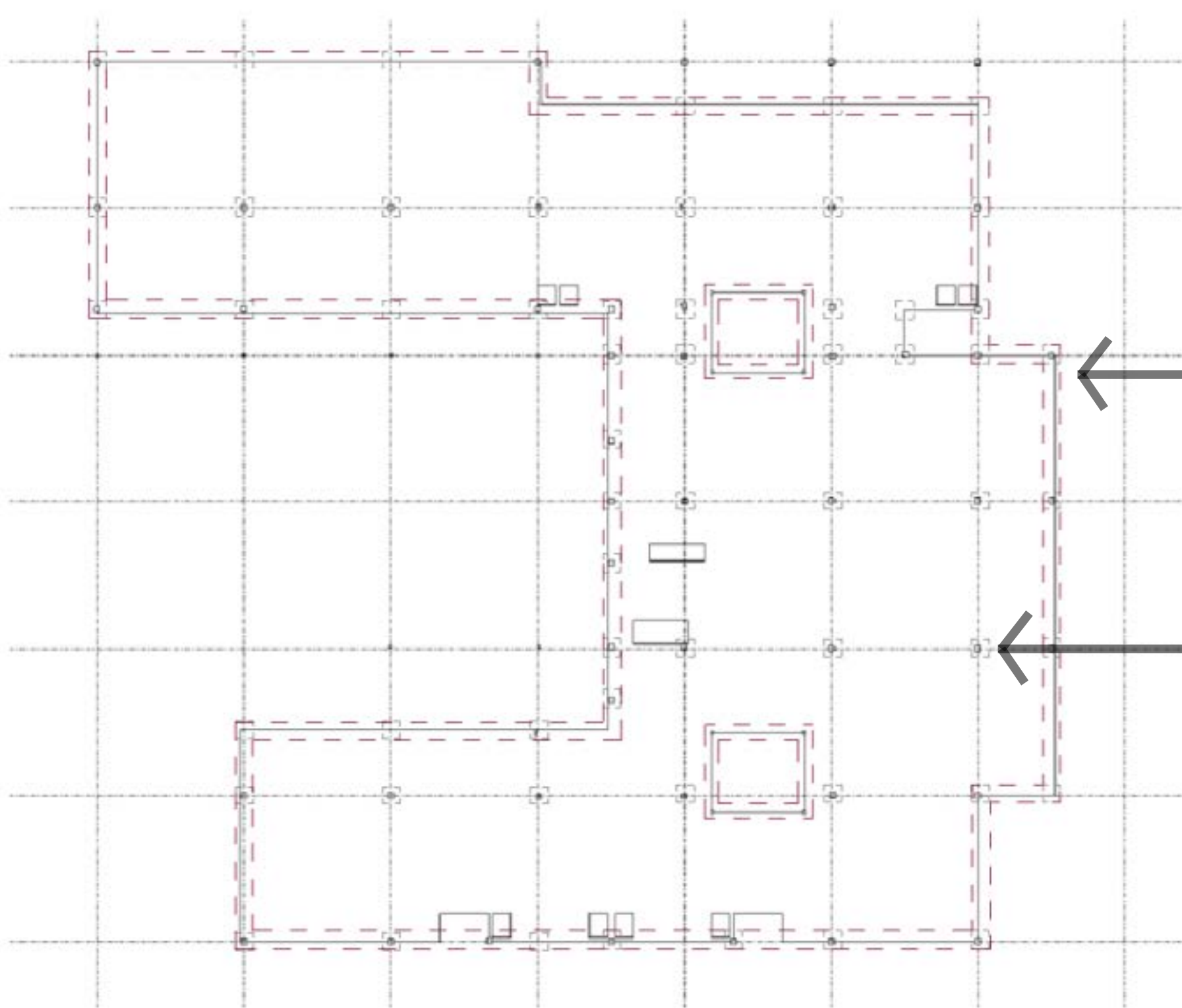


FIRE TRUCK PARKING BAY 8000 X 8000 mm

An 8m x 8m grid is employed to direct the positioning of the 300mm x300mm concrete columns. The grid is based on the fire truck parking bay sizing, emphasizing the design orbiting around the fire trucks, a symbol for safety.



This configuration establishes an organized 8x8 grid, providing structural stability and influencing the overall layout of the building.



REINFORCED CONCRETE STRIP FOUNDATION AS PER DETAIL

REINFORCED CONCRETE PAD FOOTING EVERY 8000mm

STRUCTURAL STRIP FOUNDATIONS WITH REINFORCED CONCRETE PAD FOOTINGS EVERY

DESIGN-TECHNICAL INTERGRATION

