Student Pavilion

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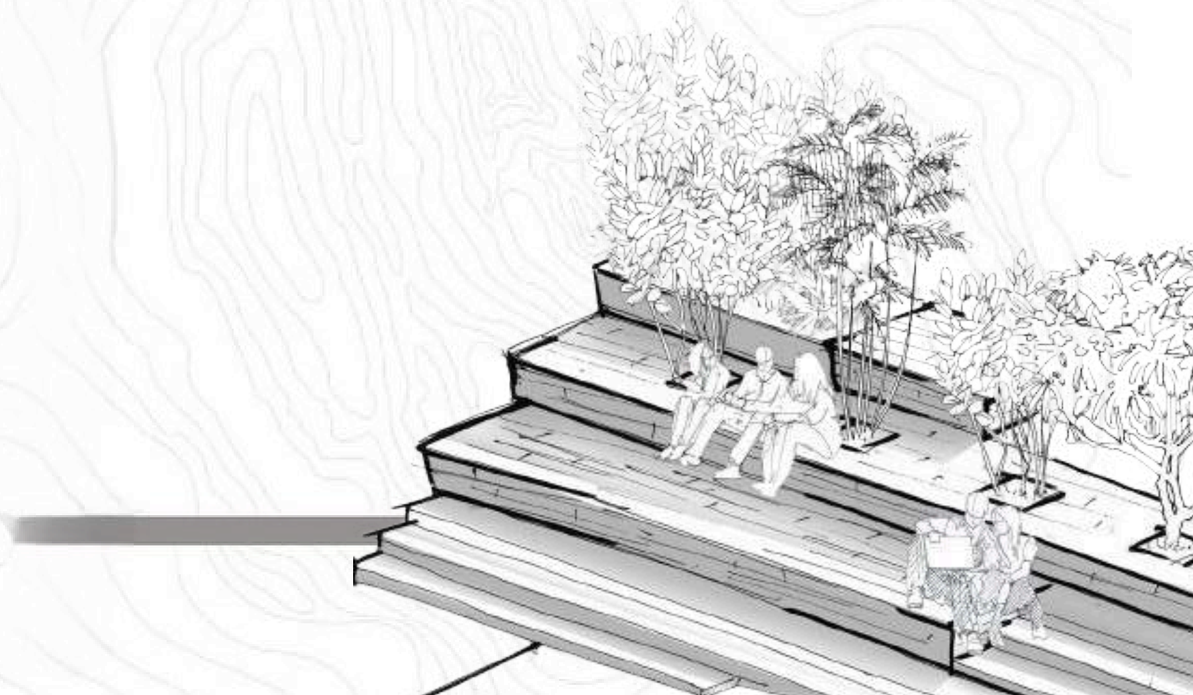
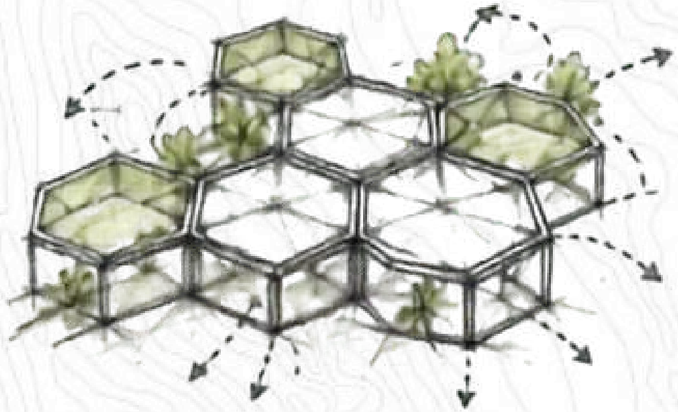
supervised by. dr saeed alhmoud



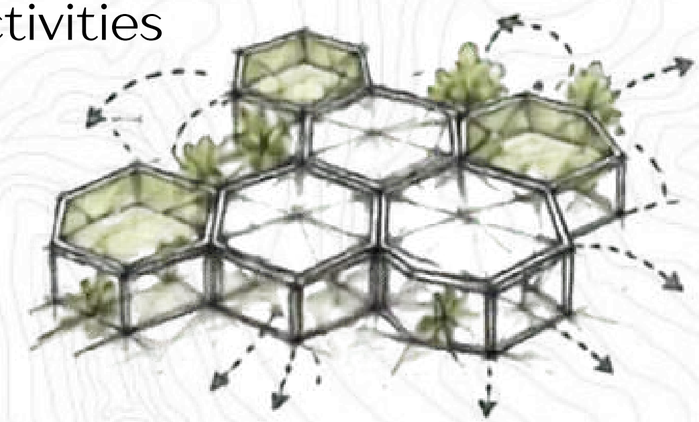
Introduction

- “This project proposes a multifunctional student pavilion at the Applied Science University in Amman. The design is driven by a modular system inspired by the internal structure of leaf stomata, allowing spaces to transform and respond to varying user needs. It integrates indoor and outdoor environments while applying sustainable and biophilic design principles to create a dynamic and comfortable student space.”



Project Overview

- Project Type: Multifunctional student pavilion
- Location: Applied Science University, Amman
- size :2,340 m
- Concept:Based on a modular hexagonal system
  - Inspired by the internal structure of leaf stomata
  - Enables spaces to adapt and transform according to different activities
- Purpose:
  - Support studying, social interaction, and events
  - Accommodate diverse user needs within one system
- Design Approach:Integration of indoor and outdoor spaces
  - Application of sustainable and biophilic strategies
  - Emphasis on adaptability and user comfort

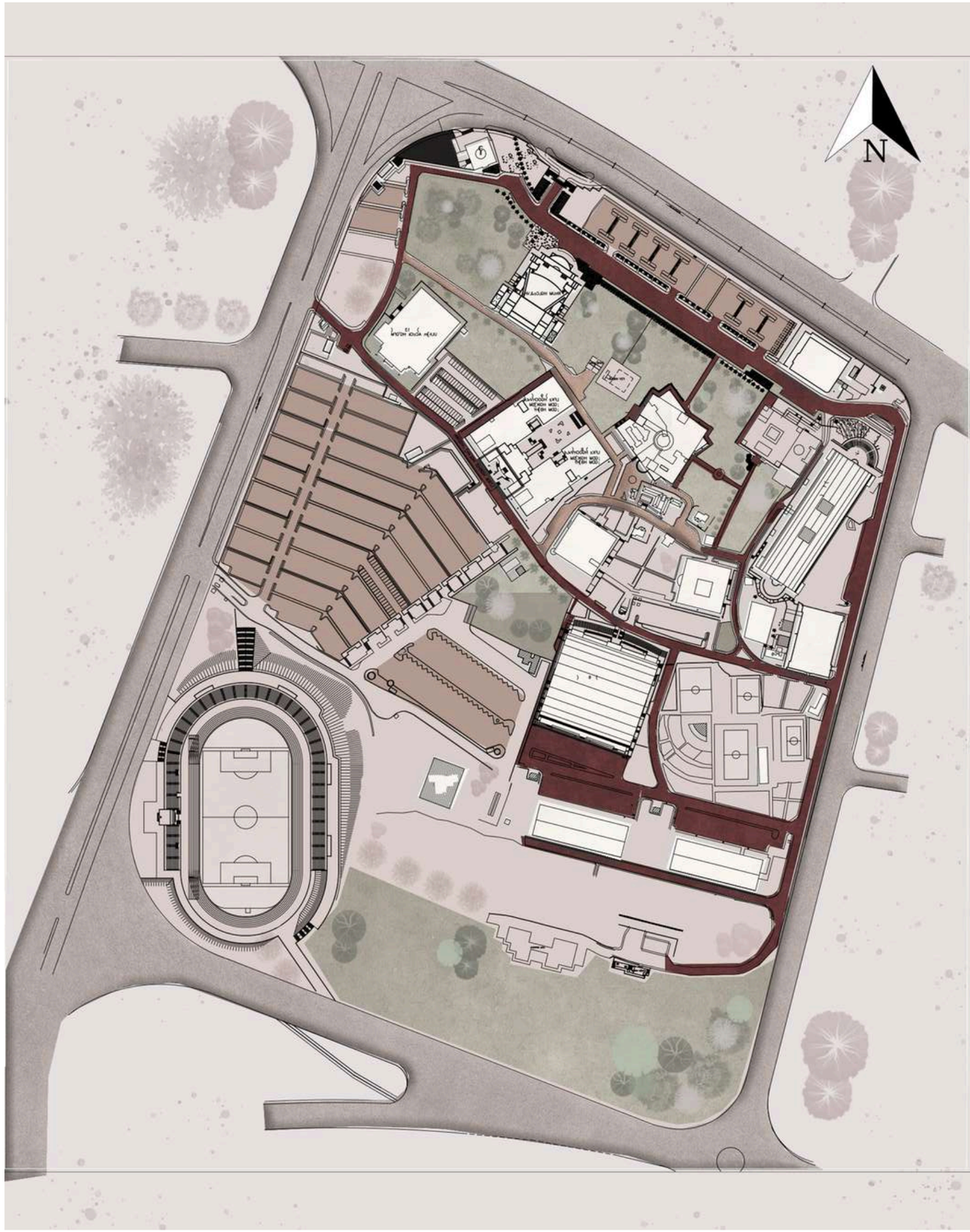


Campus Context

master plan vision :

1. defining bulit areas and major open spaces within the campus

- main high way
- campus roads (vehicle access)
- pathway between facilities
- green fields
- parking



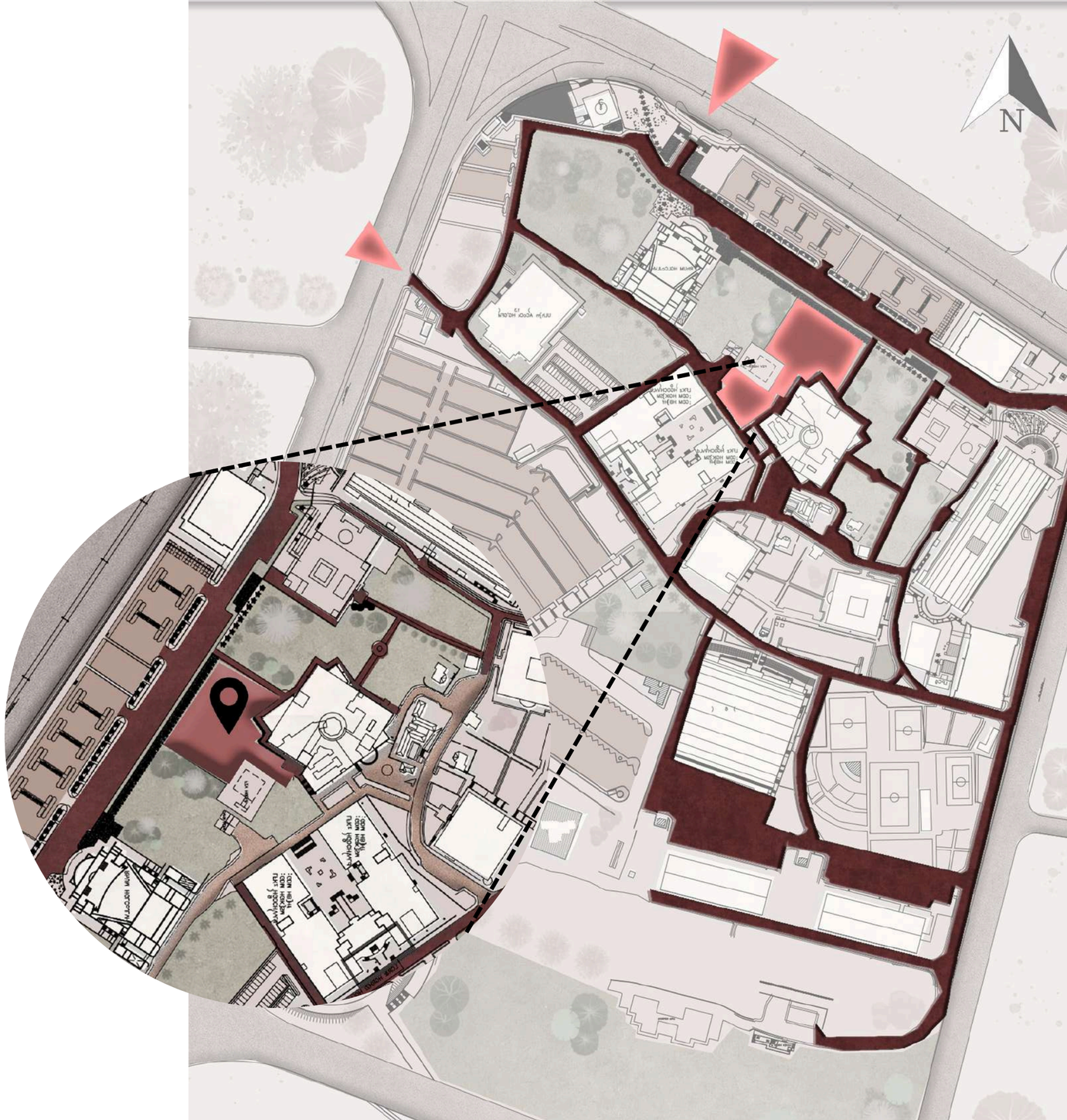
Campus Context

Access Points & Selected Land

site

main campus circulation path

campus access points from high way



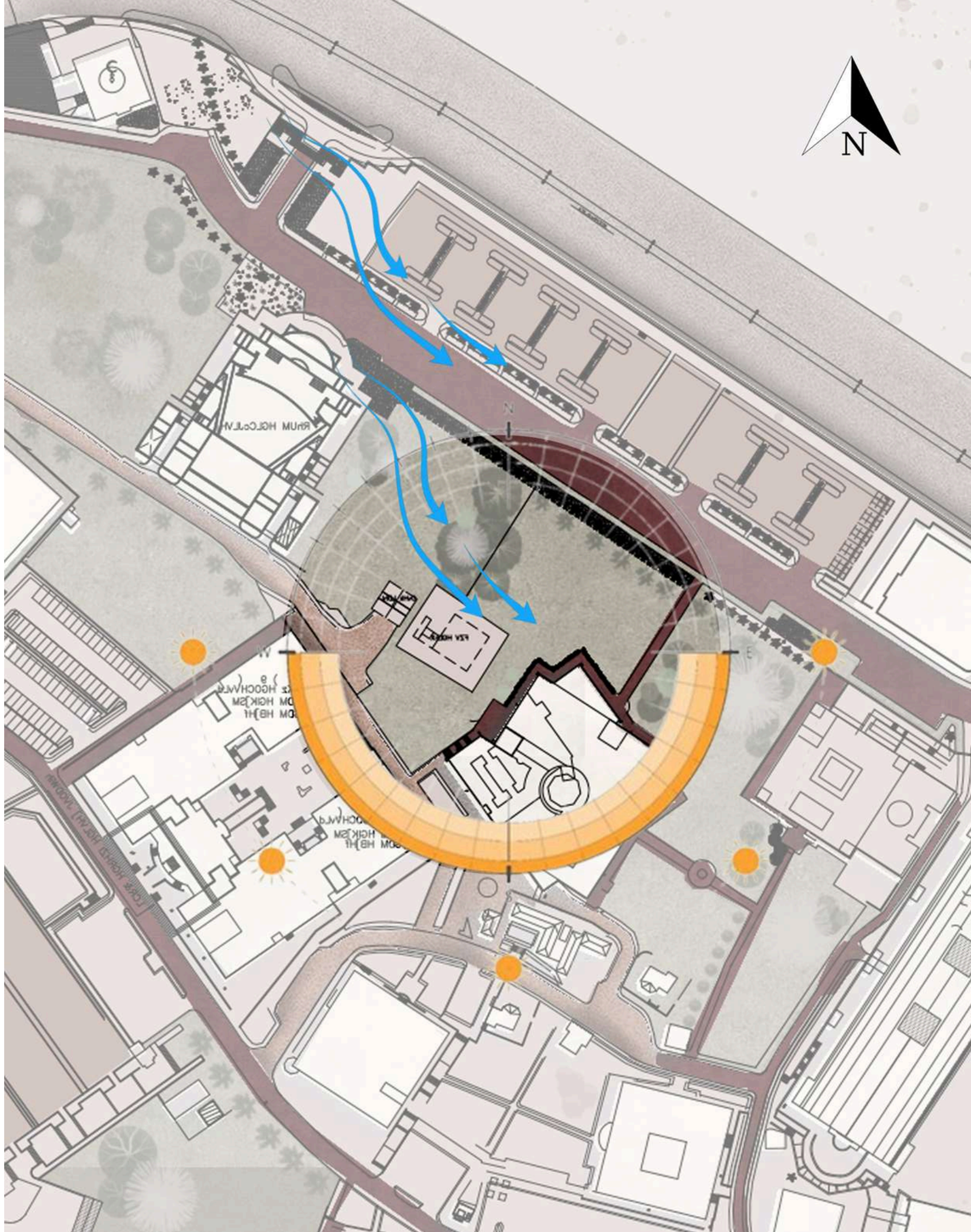
Campus Context

site analysis

- Sun: East to West, high summer exposure
- Wind: Predominantly North-West
- Climate: Hot dry summers, cool winters

site sun orientation

prevailing wind direction



Case studies

CASE STUDY COMPARISON: IMPACT ON USER BEHAVIOR

CASE STUDY 01

MELBOURNE STUDENT PAVILION

Melbourne University, Australia

- Open & permeable structure
- Strong indoor–outdoor connection
- Flexible, informal spaces
- Encourages staying & social interaction
- Multiple activities at the same time

BEHAVIOR RESULT:
ACTIVE, SOCIAL, LONG-DURATION USE

VS.

SPATIAL OPENNESS VS SPATIAL ENCLOSURE

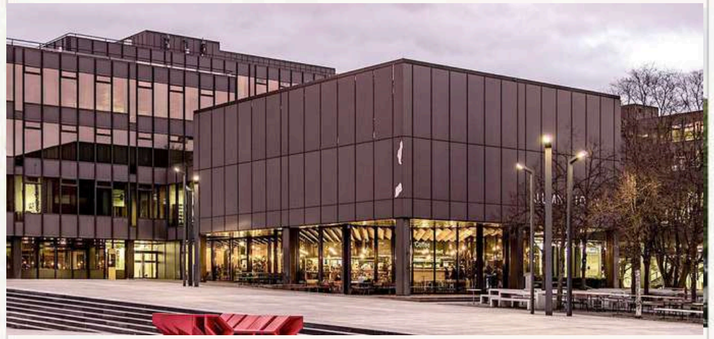
OPENNESS →
interaction, flexibility, longer stay

ENCLOSURE →
efficiency, movement, limited social behavior

CASE STUDY 02

HIL PAVILION, ETH ZURICH

Zurich, Switzerland



- Enclosed and internalized layout
- Weak connection to outdoor spaces
- Circulation-focused design
- Limited informal gathering areas
- Function-driven spaces

BEHAVIOR RESULT:
MOVEMENT-BASED, SHORT STAY, LIMITED INTERACTION

Concept & Design Approach

inspired by the internal structure of leaf stomata, which regulate gas exchange

The biological process of absorbing CO_2 and releasing O_2 is translated into an architectural concept of environmental balance and airflow

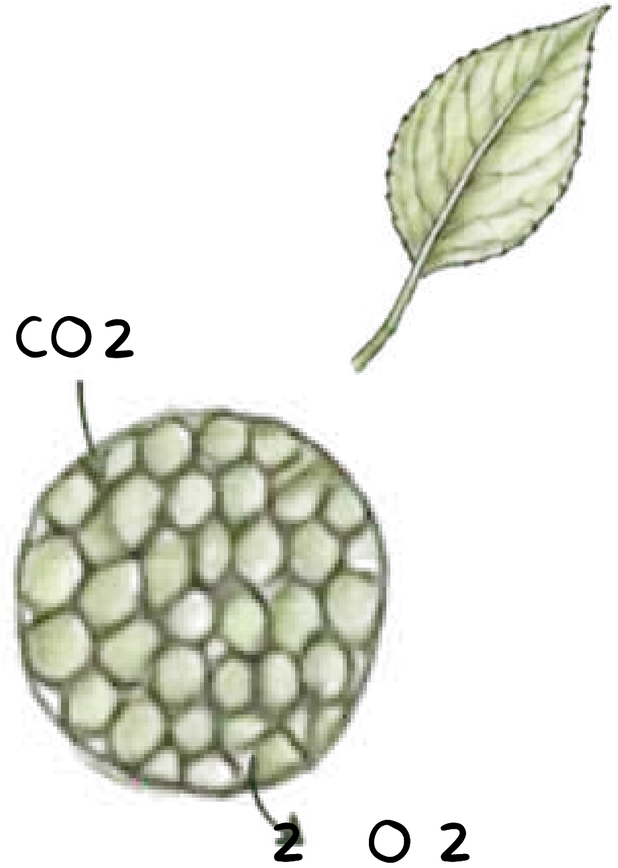
- The design is based on a hexagonal modular system

The hexagon represents:

-unity

-connectivity

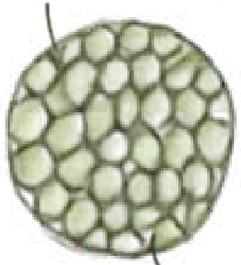
- The pavilion functions as a living system, where spaces can:
  - open
  - close
  - adapt based on user needs
-



Concept & Design Approach

Leaf sructure (stomata)

CO2



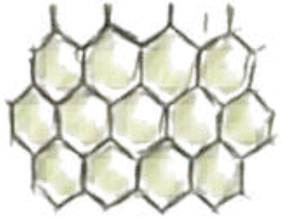
2 O 2

enviroment sustainbilty

co →  → O 2

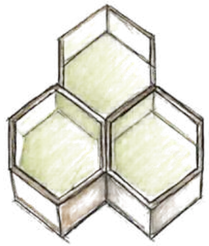
Organic cells

Simplified form

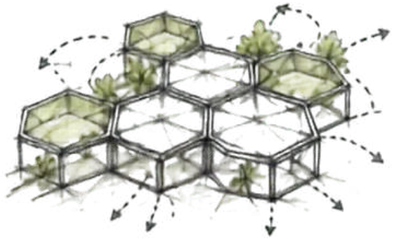


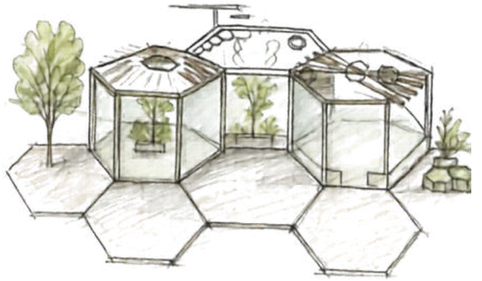
Geometric logic

hexagon module



flexible configuration





green shading device

Mood Board

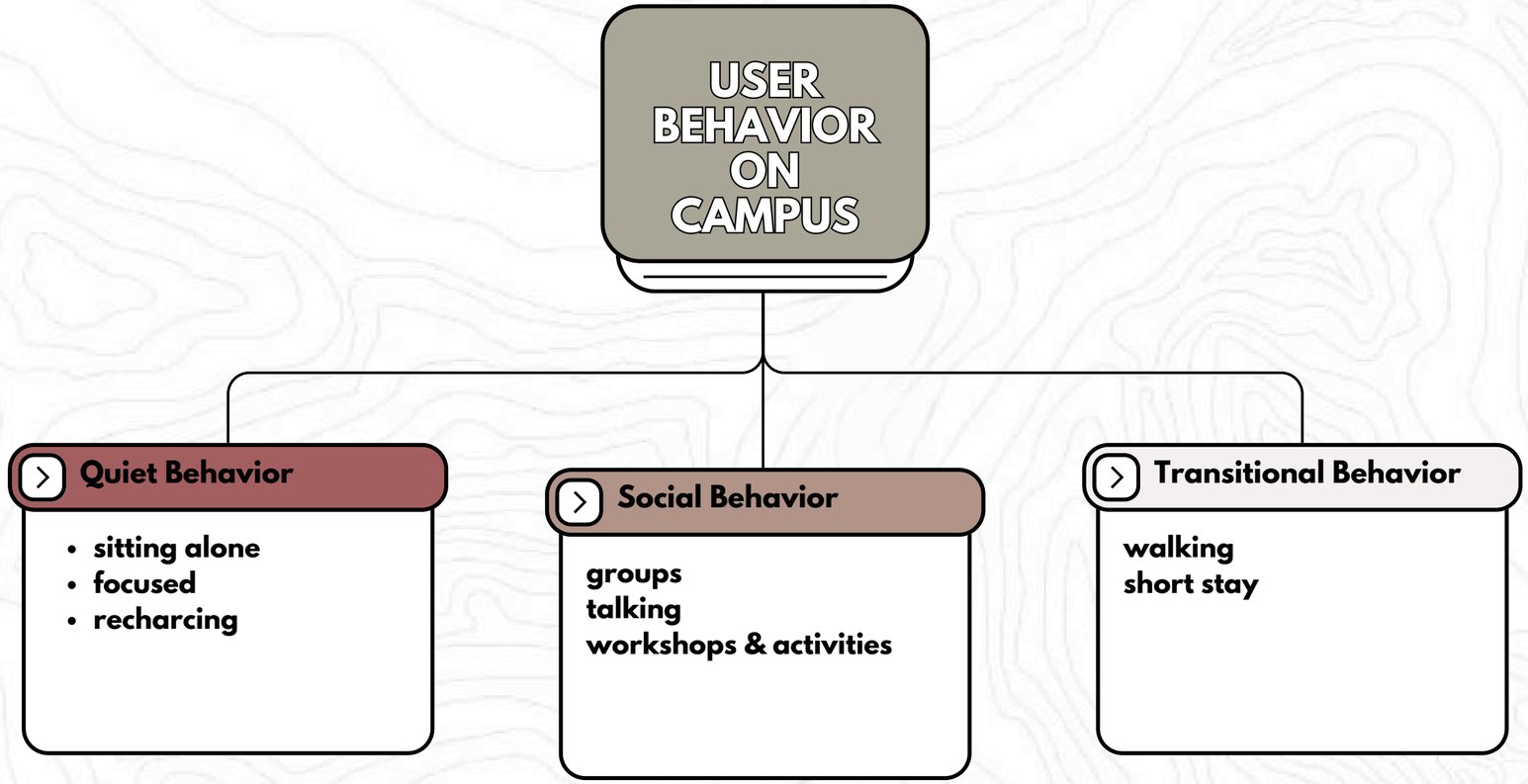

AZUL GOLFINH
BEGE ROSE
VERDE CLARO
sitting areas
Sketches
vegetation
inspo
tiling
timber
metal
glass
rattan
MATERIAL BOARD

Materials & User Behavior

- The use of timber materials creates a warm and comfortable atmosphere, encouraging users to stay longer and feel relaxed
- Glass elements enhance natural light and visual connection, supporting focus and openness
- Lightweight metal structures allow for a breathable design, improving airflow and thermal comfort
- The combination of materials reduces heat gain and provides shaded environments, improving overall user comfort

User Behavior (Analysis)

- “User behavior on campus is diverse, ranging from individual study to group interaction. Students require different types of spaces, including quiet, active, and transitional areas. Movement is informal and flexible, and the lack of adaptable spaces often leads to overlapping activities and reduced comfort.”



Behavioral Design Strategies

- Prospect–Refuge Theory

Open areas (social recharge, collaborative hub) provide visibility and interaction, while enclosed spaces (recharge capsules) offer privacy and security, allowing users to choose their preferred level of exposure.

- Attention Restoration Theory (ART)

Integration of greenery and semi-open spaces in the learning grove helps reduce mental fatigue, improve concentration, and support longer study duration.

- Territoriality & Personal Space

Modular seating and semi-enclosed capsules allow users to define personal boundaries, increasing comfort and reducing stress in shared environments.

- Behavioral Flexibility

The modular hexagonal system enables users to adapt spaces based on activity, supporting dynamic behavior rather than fixed usage.

modular system - expansion & adaptability

- The design is based on a modular hexagonal system that allows continuous expansion
- Each unit can be added or removed without affecting the overall system
- The system supports:

horizontal expansion (adding more modules)

spatial reconfiguration (changing layout based on function)

- Spaces can:

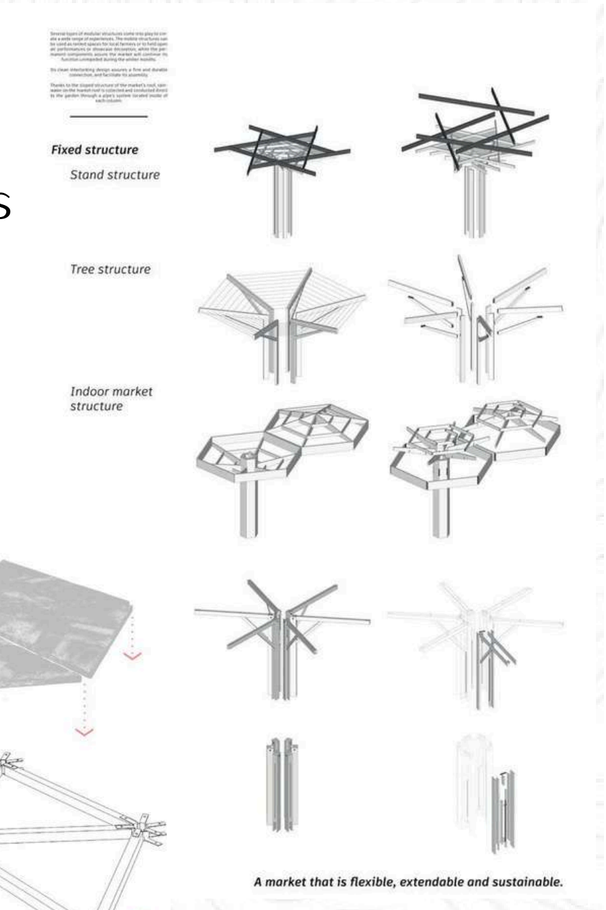
merge together for larger activities

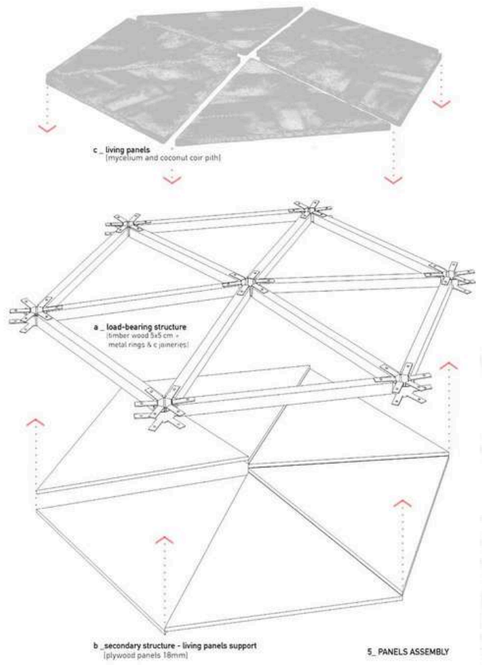
separate for smaller, private uses

- This flexibility allows the pavilion to:

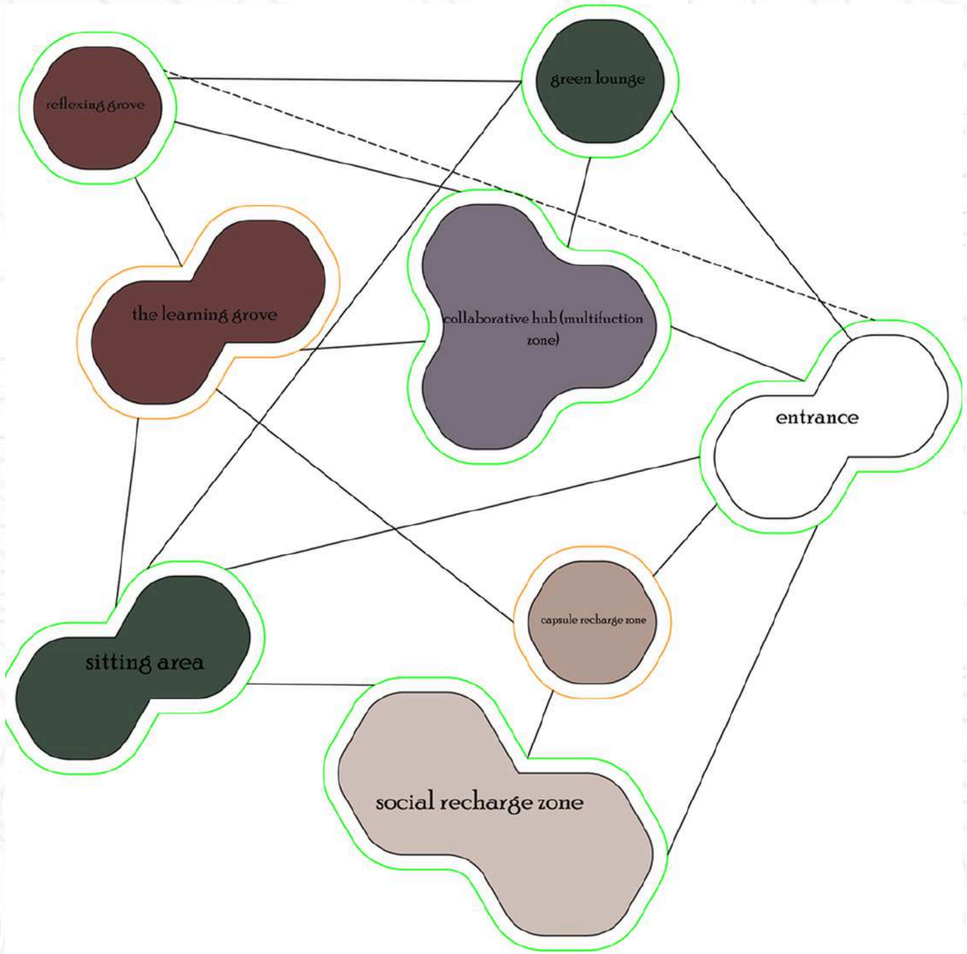
adapt to different user needs

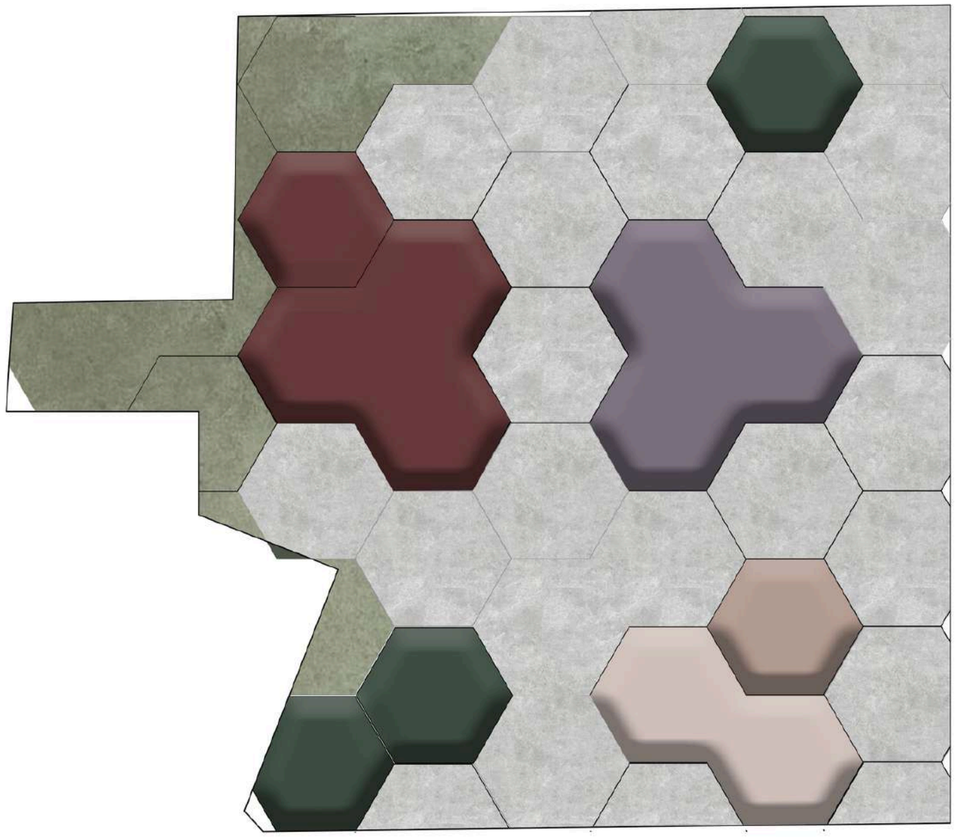
respond to changing program requirements over time





Zoning & Bubble Diagram





the learning grove

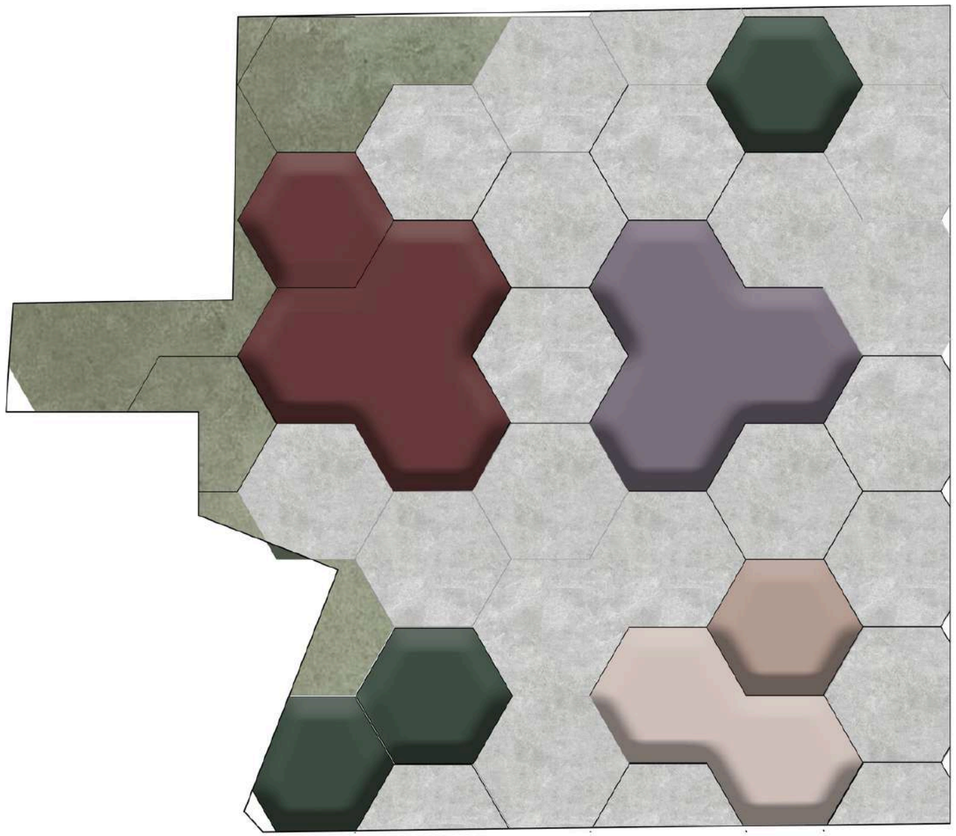
collaborative hub

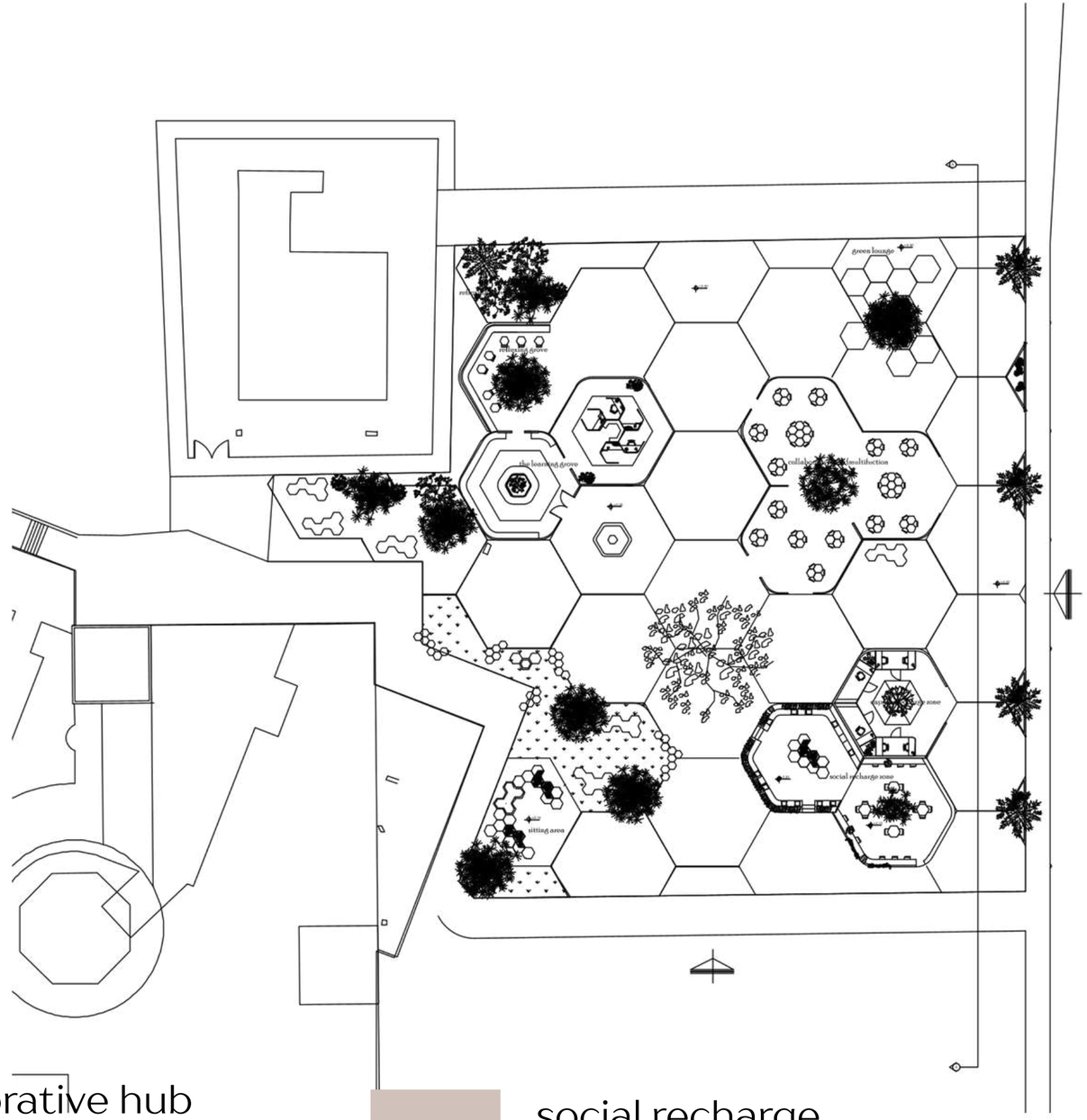
social recharge

green lounge

isolated study capsules

Plan :





the learning grove

collaborative hub

green lounge

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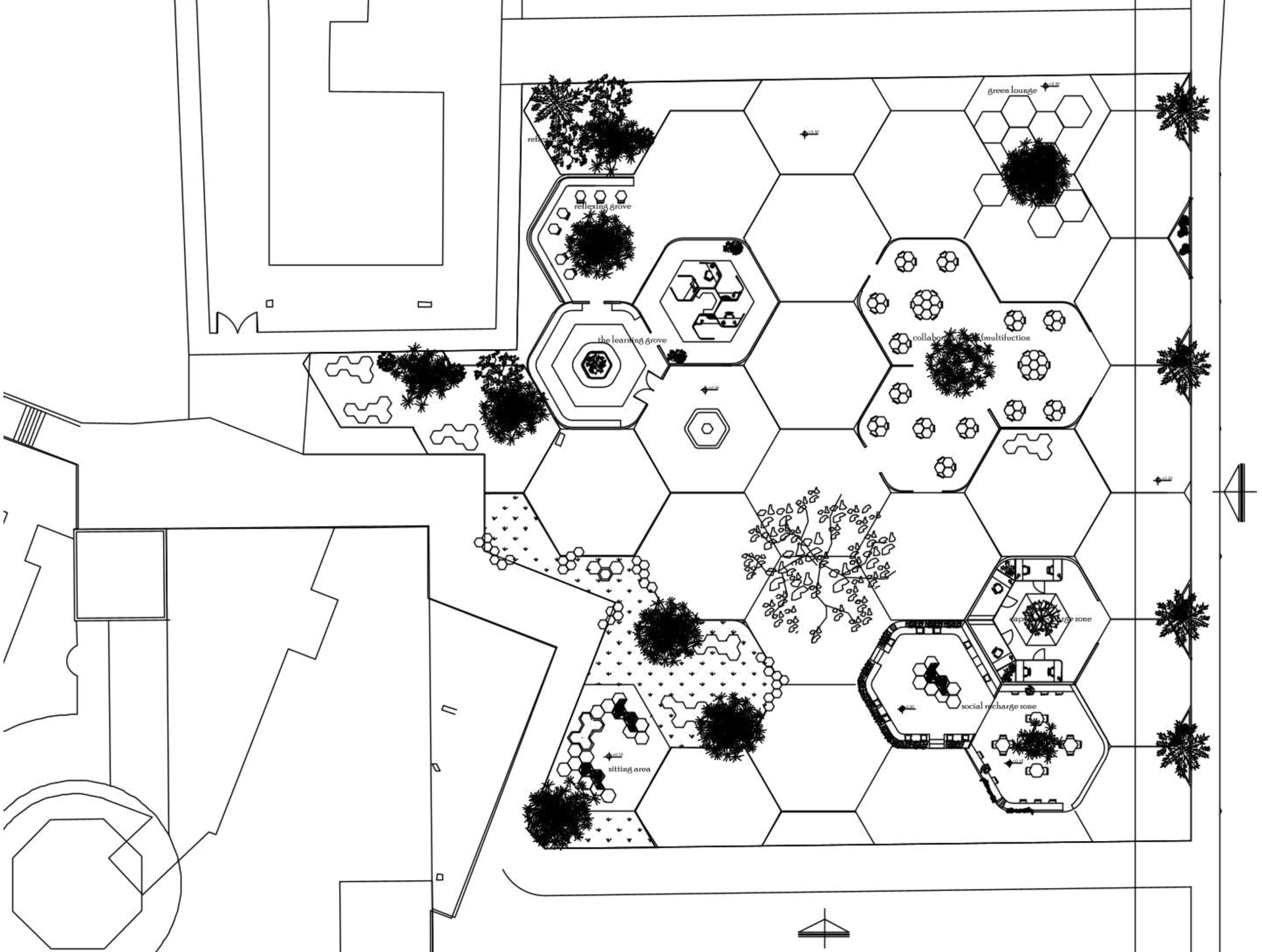
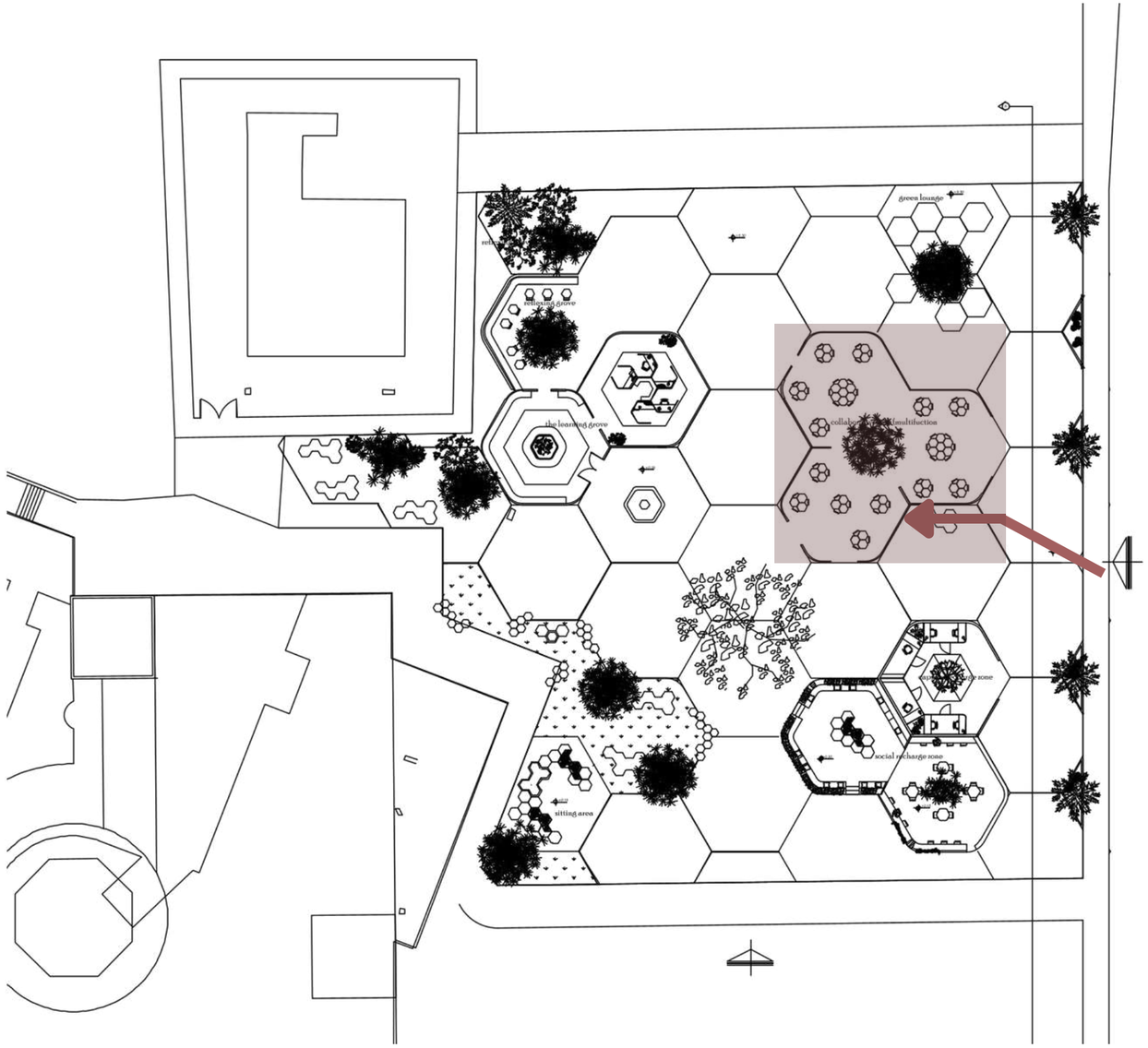
social recharge

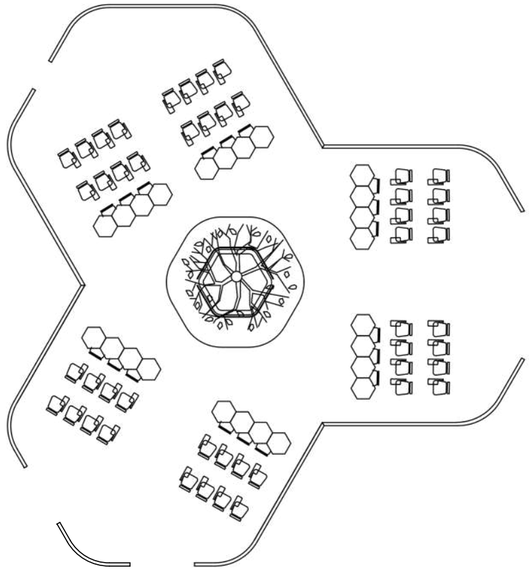

green lounge
reflexing grove
the learning grove
collaborative (multifuction
social recharge zone
sitting area

adaptive collaborative hub

- “The collaboration hub is a flexible, multi-functional space designed to accommodate different group activities, including workshops, lectures, and exhibitions.”

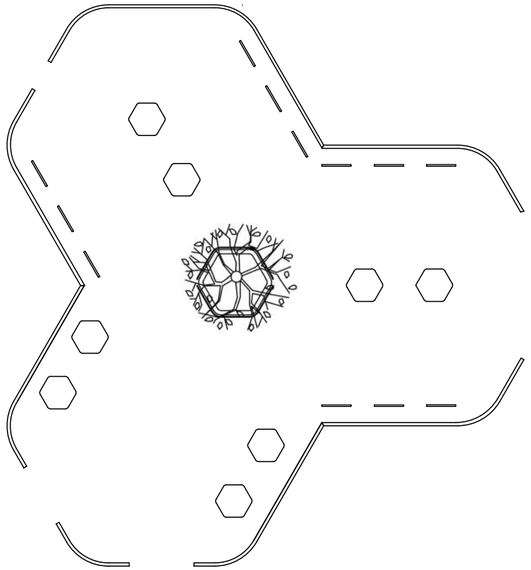


collaborative hub adaptive layouts according to the function



Workshop / Lecture Mode

“The workshop space uses modular hexagonal tables that can be easily rearranged or folded, allowing the space to adapt to different activities while encouraging collaboration.”



Gallery Mode

The space can be used as a gallery for different faculties in the campus. Its flexible layout allows different types of displays, and the open space helps people move around and explore easily.”

the learning grove

- The Learning Grove is designed as a semi-open study library that integrates indoor and outdoor seating. This environment supports focused learning while maintaining a connection to nature, positively influencing user behavior by improving concentration, promoting well-being, and encouraging longer engagement within the space.”
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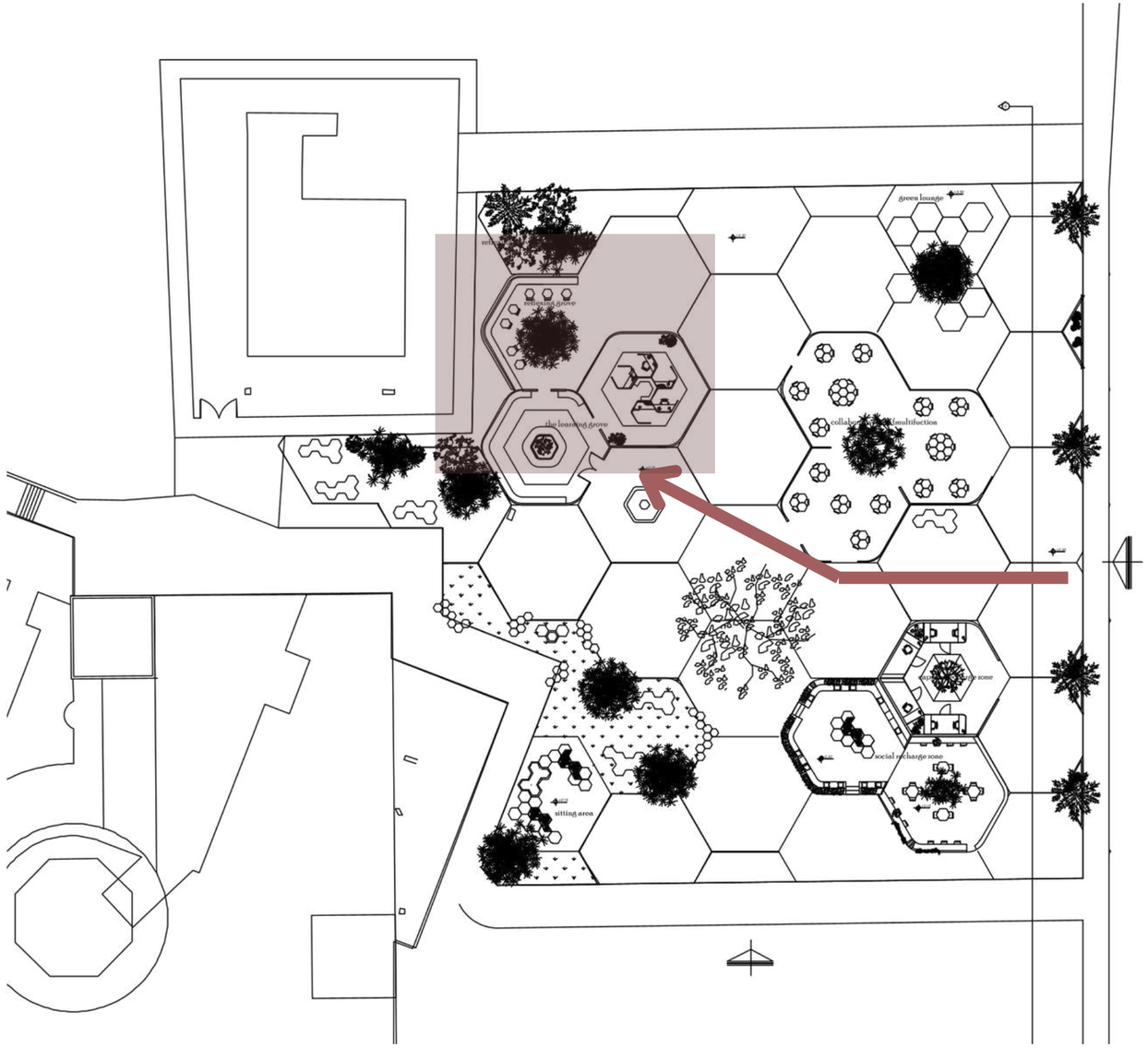
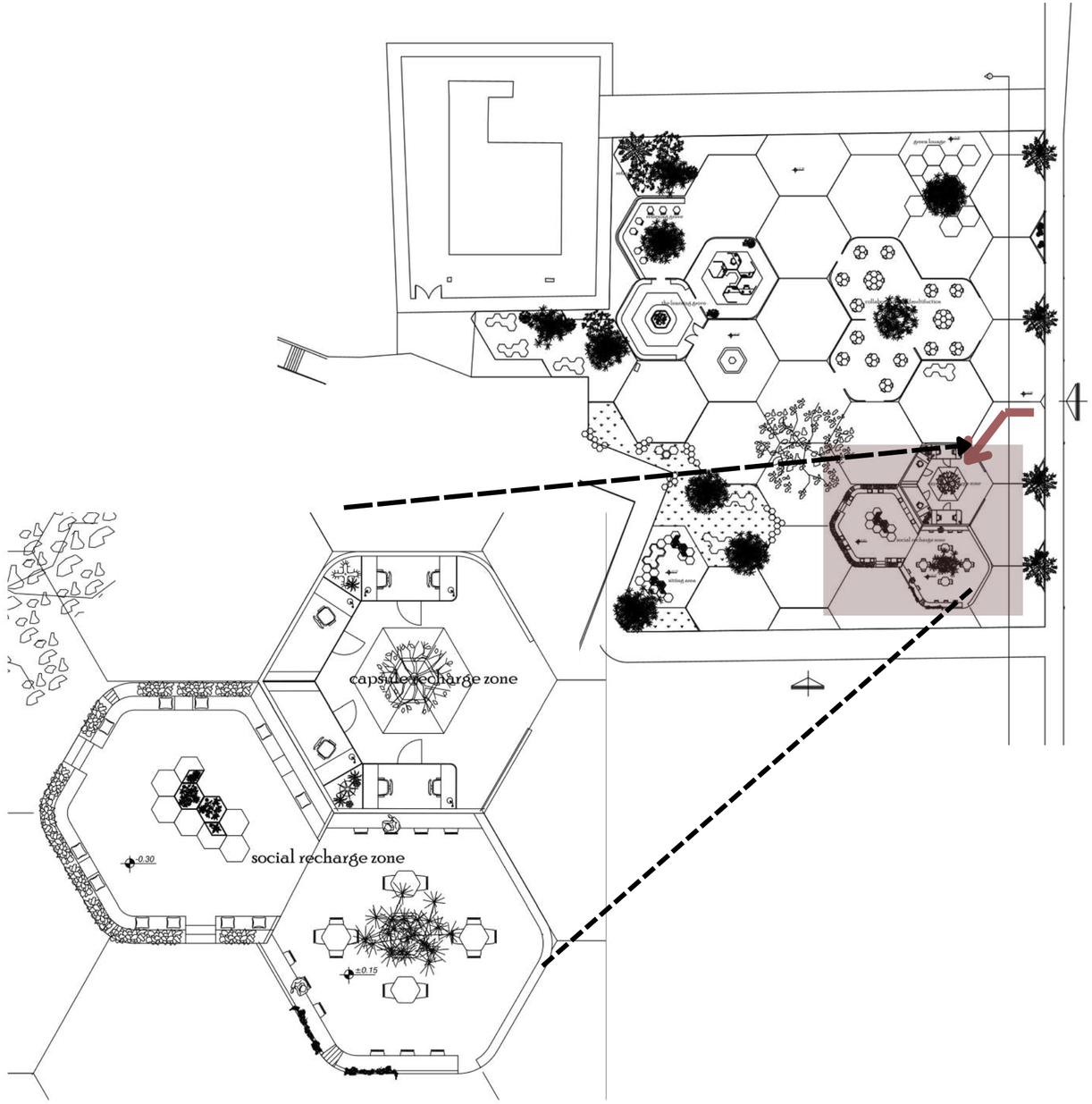


recharge capsules

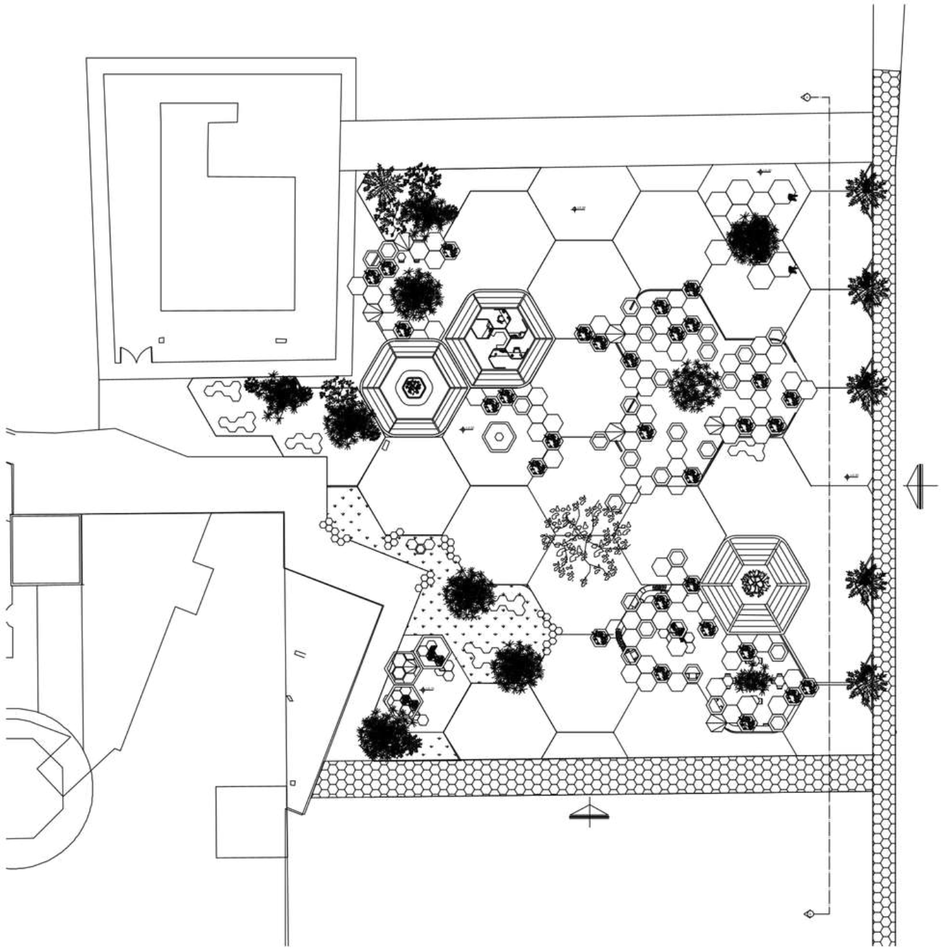
- “The recharge capsules are designed as quiet, semi-private spaces that support individual focus and rest. They positively influence user behavior by reducing distractions, enhancing concentration, and allowing students to recharge both mentally and physically.”

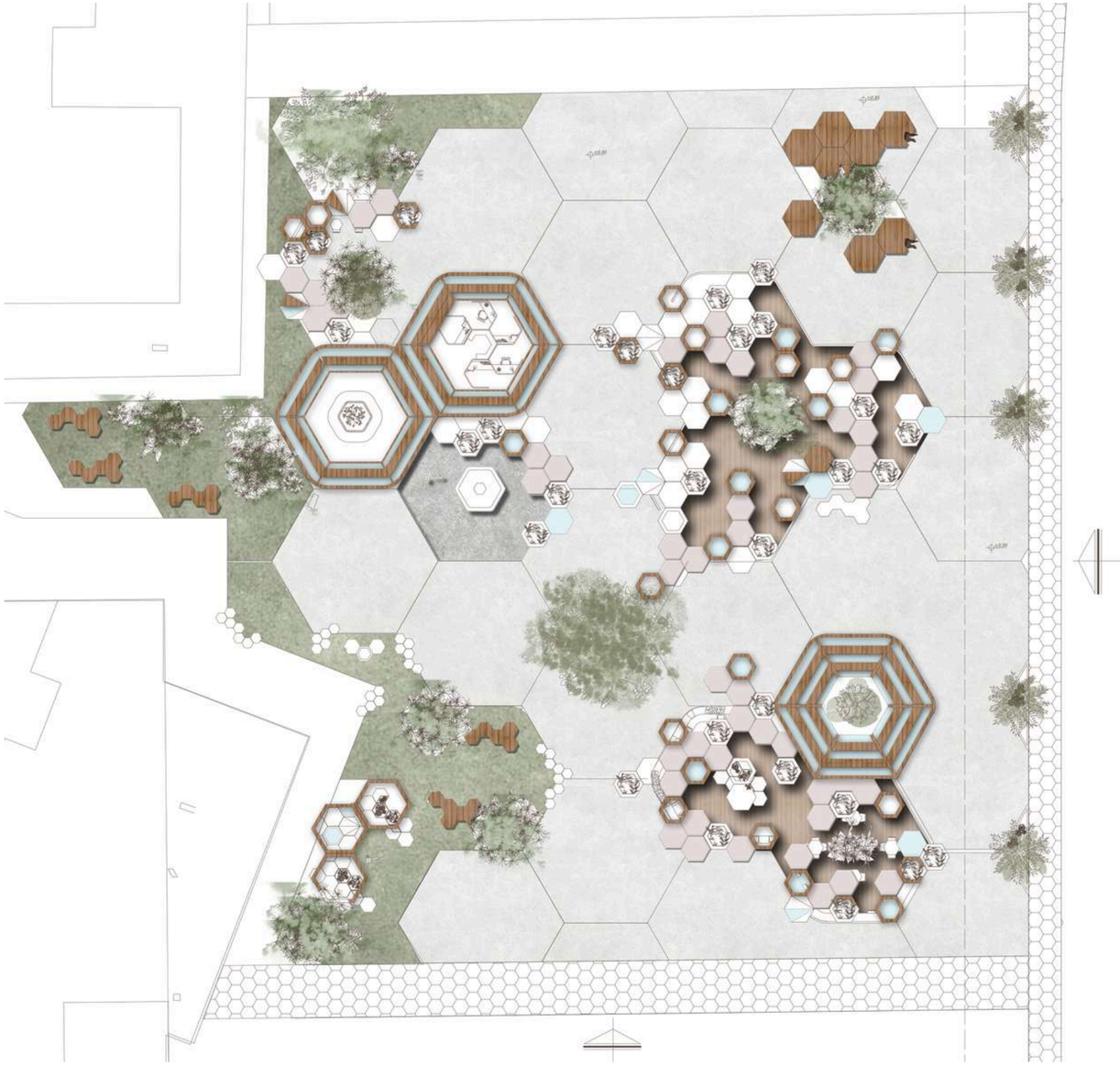
social recharge

- An open seating area that encourages social interaction, collaboration, and informal student engagement.”



Top view

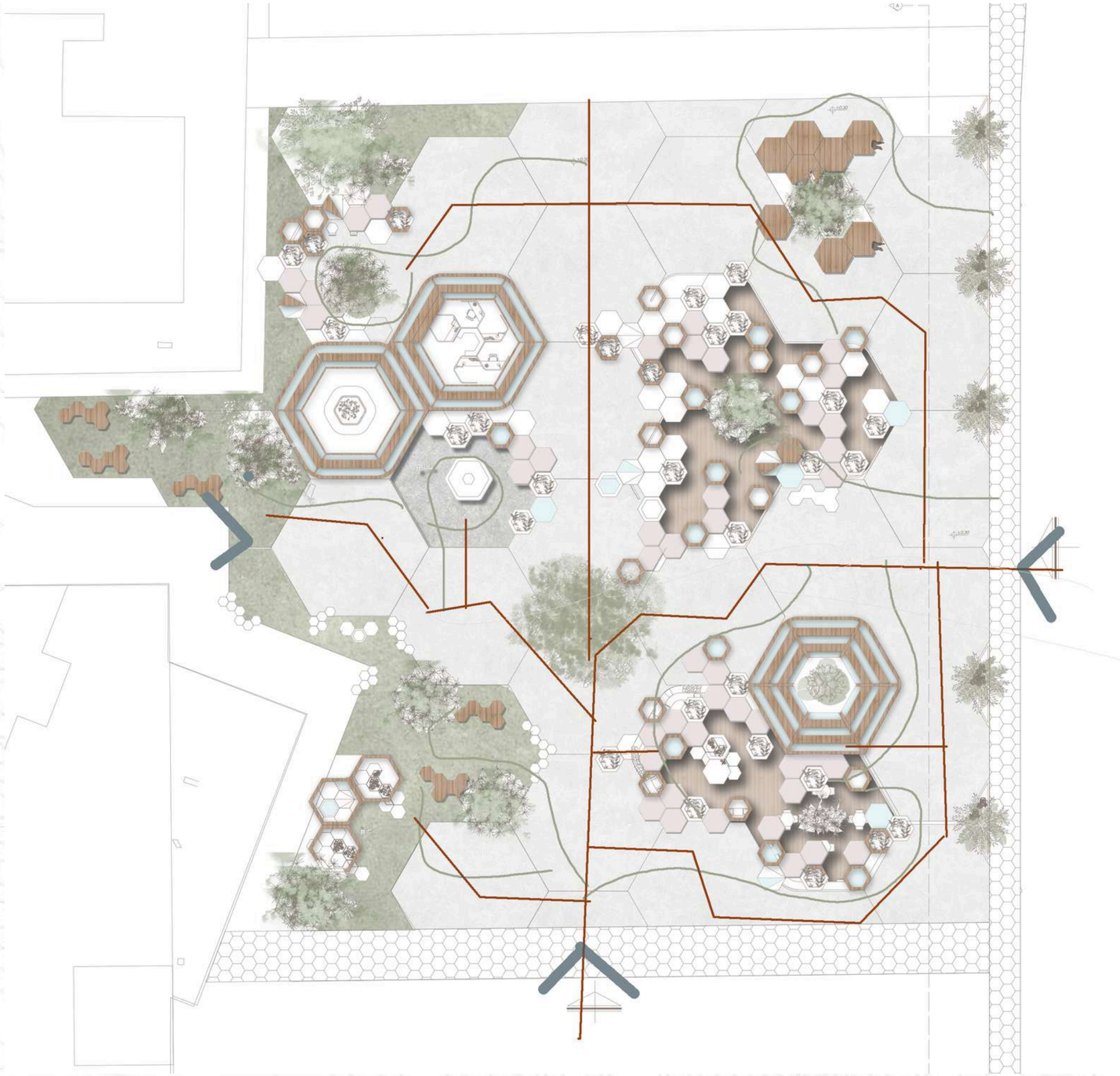




-rendered using PSH-

Circulation & Movement

- The open hexagonal layout allows movement from all sides of the site
- Circulation is flexible and non-linear, not limited to fixed paths
- The system supports smooth and continuous flow between different spaces



Behavioral Circulation Strategy

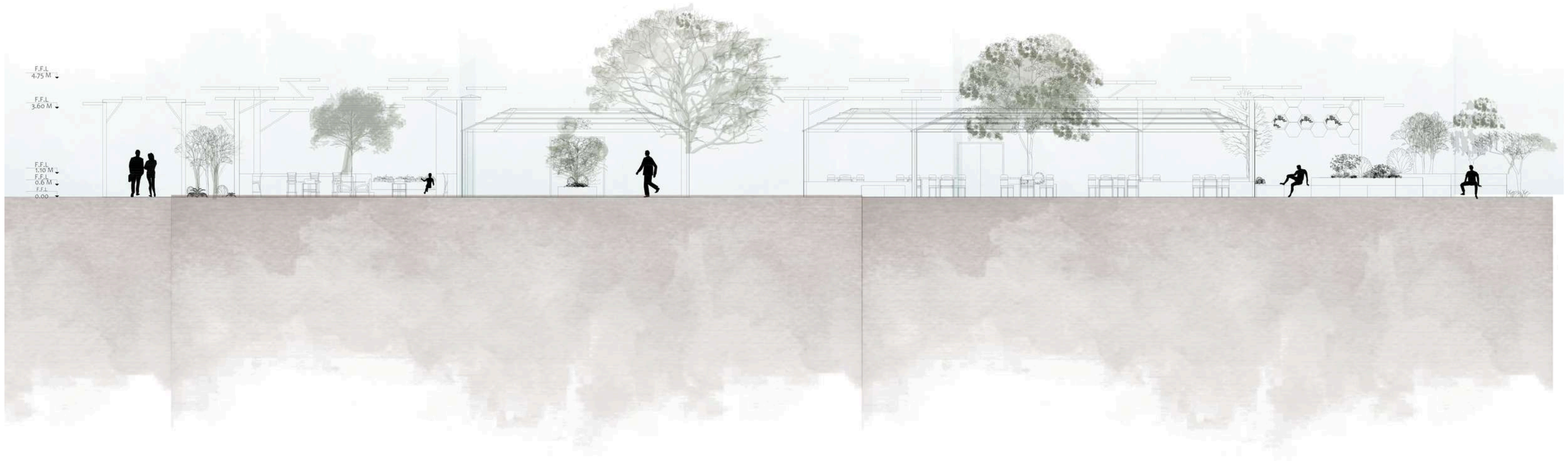
- Circulation is designed based on desire paths, allowing users to move freely rather than follow rigid routes
- Nodes (activity): placed at intersections to encourage gathering and interaction
- Edges (transitions): soft boundaries between quiet and active zones reduce conflict between behaviors
- Flow hierarchy:

Fast movement for outer paths

Slow movement for inner zones

- This creates a natural flow that aligns with user behavior patterns on campus.

Elevation (1:25)



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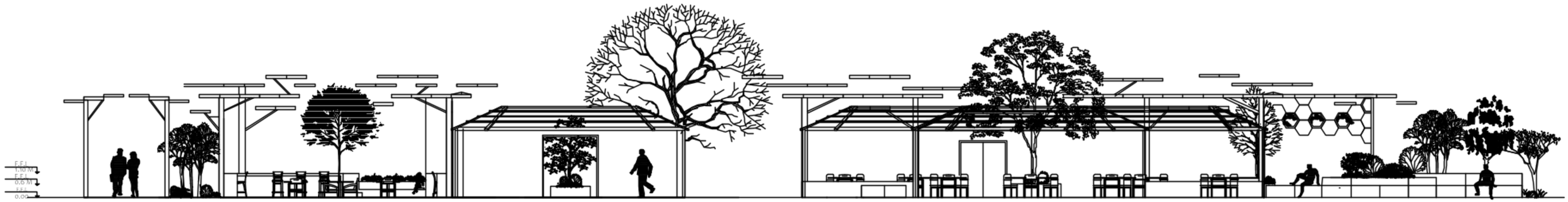

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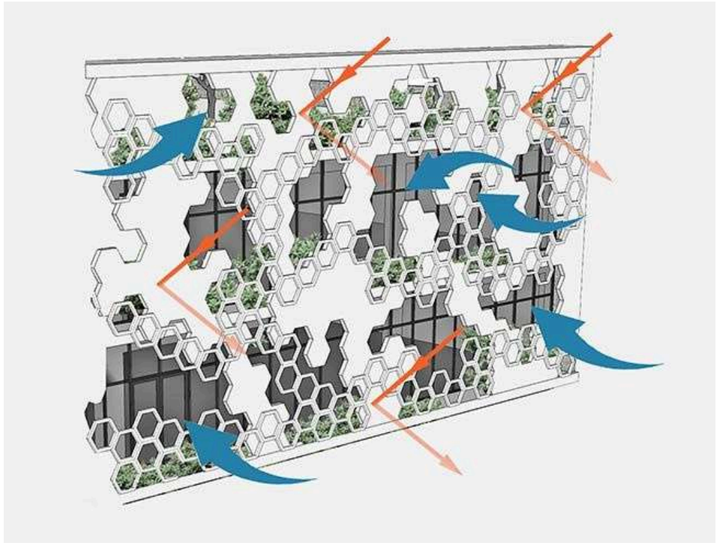
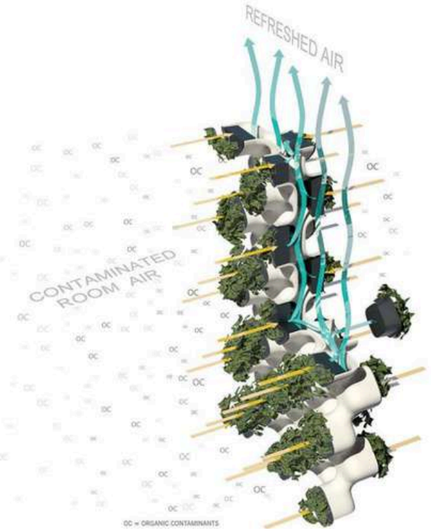
Sustainable Strategies

- Pergola shading system reduces direct solar exposure and improves thermal comfort
- Natural ventilation is enhanced through the open modular layout and prevailing wind direction
- Integration of greenery supports cooling and improves user well-being





Environmental Experience (Microclimate)

- The open modular system enhances cross ventilation, improving thermal comfort in hot climates

Pergola shading and greenery reduce direct solar exposure, creating cooler shaded zones

Different spatial conditions are created:

Shaded + enclosed → cooler, quiet spaces

Open + exposed → active, social areas

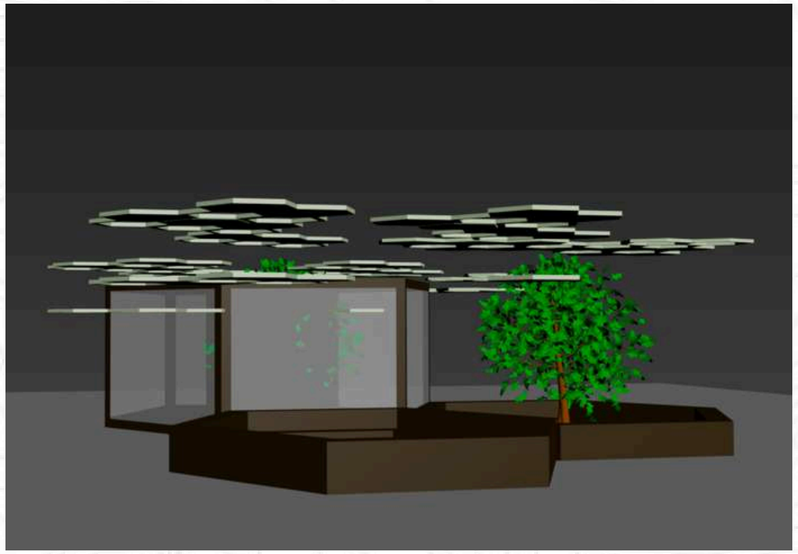
- This variation allows users to choose spaces based on comfort preferences

User Behavior (after design Application)

Space	Users	Activities	Behavior Type	Movement	Duration	Atmosphere	Design Response
Recharge Capsules	Individual students	Studying, focusing, resting	Quiet, focused	Minimal movement	Long stay	Private, calm	Enclosed pods, acoustic control, visual isolation
Social Recharge Seating	Students (groups)	Talking, relaxing, informal meetings	Active, social	Flexible, informal movement	Medium stay	Open, interactive	Open hex seating, flexible arrangement,
Learning Grove	Students (individual + small groups)	Studying, reading, light discussion	Semi-quiet, balanced	Limited movement	Medium-long stay	Calm, semi-open	Indoor-outdoor integration, shading, natural
Collaborative Hub	Students, professors, presenters, visitors	Workshops, lectures, exhibitions	Dynamic, mixed	Both seated and circulating	Medium-long stay	Active, flexible	Adaptive layout, movable furniture, expandable

3D Views / Renders

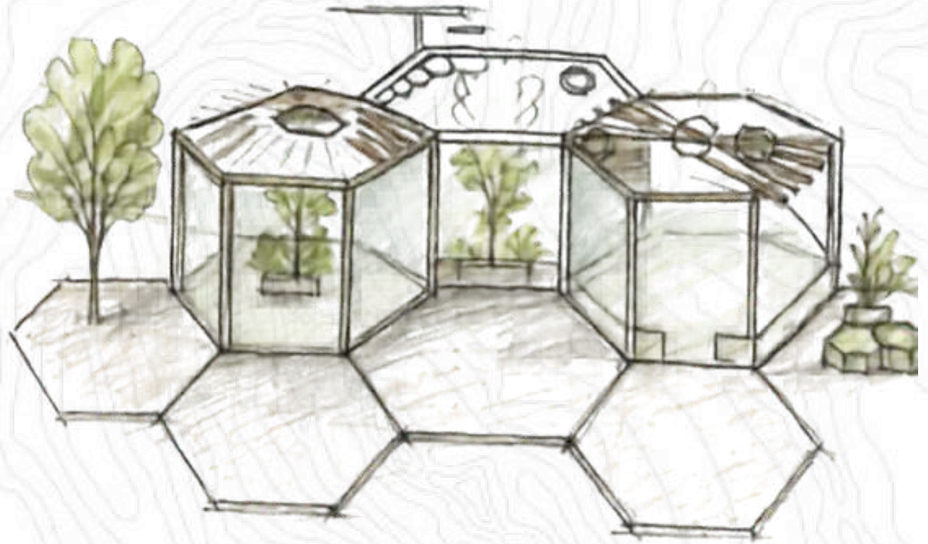
- basic modeling on 3d max



3D Views / Renders

conclusion

- This project presents a flexible and adaptive student pavilion that responds to diverse user behaviors within the campus. Through a modular hexagonal system inspired by natural processes, the design integrates indoor and outdoor environments while enhancing comfort, interaction, and well-being. The combination of sustainable strategies and user-centered design creates a dynamic and responsive space that supports both individual and collective activities.”



Thank You!