# NEW SUSTAINABLE AND SELF-SUFICIENT CAMPUS OF STU BRATISLAVA


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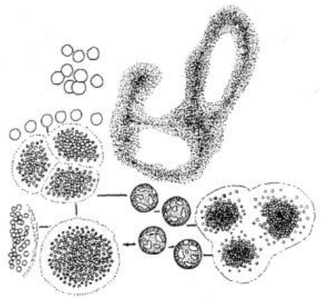
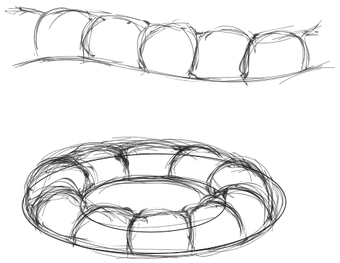
SUMMER TERM 2020/21

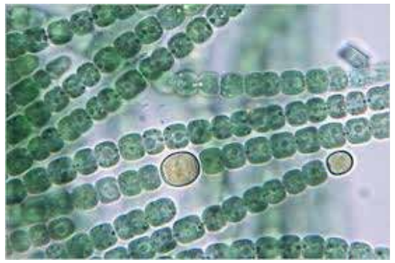
## INSPIRATION BY NATURE



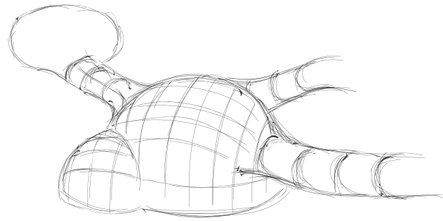
CELLS OF CYANOBACTERIA



OBJECT DIVISION INTO SELF-SUFICIENT UNITS



THE BIGGEST SEGMENT - HETEROCYST

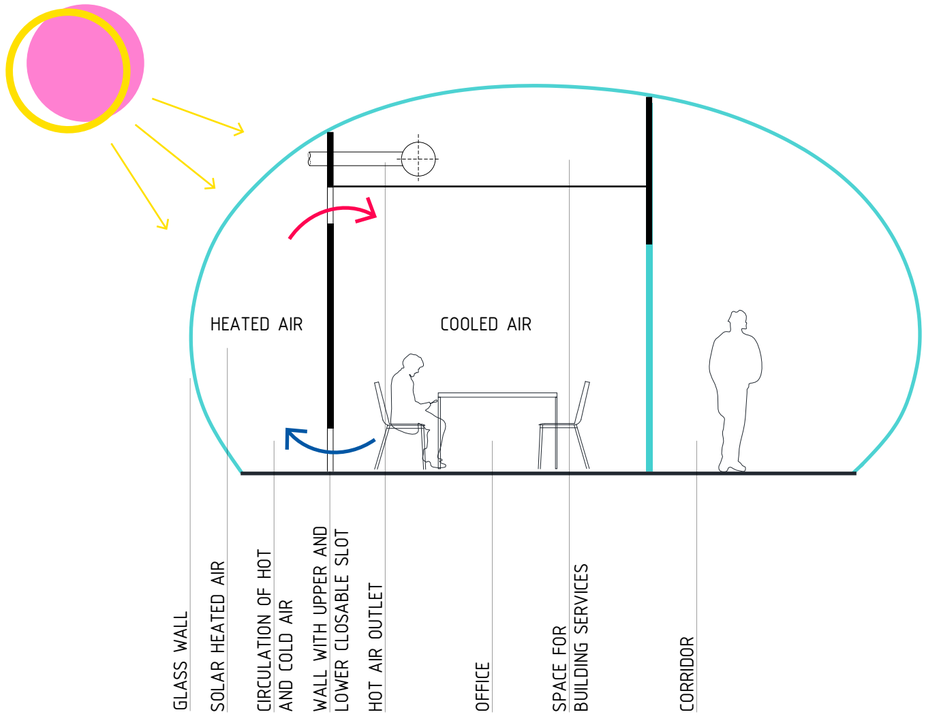


THE CORE OF THE BUILDING



THE MAIN THEME OF MY PROJECT IS A SELF-SUFFICIENT, ENERGY-SAVING AND SUSTAINABLE BUILDING. THE SHAPE IS INSPIRED BY CYANOBACTERIA'S CELLS - I CONNECTED THE APPEARANCE OF THE BUILDING WITH CYANOBACTERIA BECAUSE THEY CAN PRODUCE ELECTRICAL ENERGY THAT WE CAN USE (BACTERIAL FUEL CELL). SO AS SAME AS CYANOBACTERIA, MY BUILDING CAN ALSO PRODUCE ENERGY, PLUS IT RECYCLES HEAT AND WATER, AND USE ENERGY OF THE SUN. THE MAIN UNITS OF WHOLE PROJECT ARE SPECIAL CELLS FOR ADMINISTRATIVE, RESEARCH AND START-UP PURPOSES. THESE UNITS DO NOT NEED ENERGY FROM NON-ECOLOGICAL POWER PLANTS, THEY ARE HEATED BY THE SUN. HEATING OF THE CELLS WORKS ON "TROMBE WALL" PRINCIP - HOT AIR CIRCULATE IN THE SPACE AND HEATS IT. IF THERE IS TOO HOT IN THE OFFICE, THE UPPER AND LOWER SLOTS IN THE TROMBE WALL WILL BE CLOSED TO PREVENT OVERHEATING. IN THE SAME TIME, HOT AIR IS DRAINED OUT BY THE PIPES IN THE CEILING AND IT CAN BE USED ELSEWHERE OR LATER. THE SPECIAL CELLS NEED ACCESS OF LIGHT FROM BOTH SIDES, THEREFORE THEY ARE SOLVED AS A RING THAT SURROUNDS THE ENTIRE CAMPUS. AS SAME AS CYANOBACTERIA CELLS, MY PROJECT ALSO HAS THE MAIN PART- THE LARGEST ONE - CORE OF THE ENTIRE BUILDING WITH ENTRANCE HALL, CAFETERIA, RELAX ZONE AND INFO SERVICES. IN ADDITION TO THE NEW BUILDING, MY PROJECT ALSO INCLUDES A RECONSTRUCTION OF THE PART OF THE HEAVY LABORATORIES - RENEWAL OF THE FACADE AND THE EXTENSION OF ONE FLOOR ABOVE THE ENTIRE LABORATORIES. OTHER ASPECTS OF SUSTAINABLE ARCHITECTURE THAT MY PROJECT INCLUDES ARE: RECYCLABLE COMPOSITE MATERIAL "SHAPESHELL" (WHICH IS MADE BY WASTE PLASTICS), SOLAR GLASS, RETENTION BASINS AND SUBSEQUENT WATER MANAGEMENT, ACCES OF DAYLIGHT TO ALL SPACES (TO SAVE ENERGY FOR LIGHTING), LARGE GREEN AREAS ETC. THE INITIAL COSTS FOR THE REBUILDING THE ENTIRE CAMPUS WILL BE REPAYED IN THE FORM OF HUGE ENERGY SAVINGS, NOTWITHSTANDING THE BIG STEP TO BETTER AND HEALTHIER ENVIRONMENT .

## CELL WITH TROMBE WALL



INSPIRELI AWARDS | STU BRATISLAVA

# SITUATION PLAN

FACULTY OF ARCHITECTURE

FACULTY OF CHEMICAL AND FOOD TECHNOLOGY

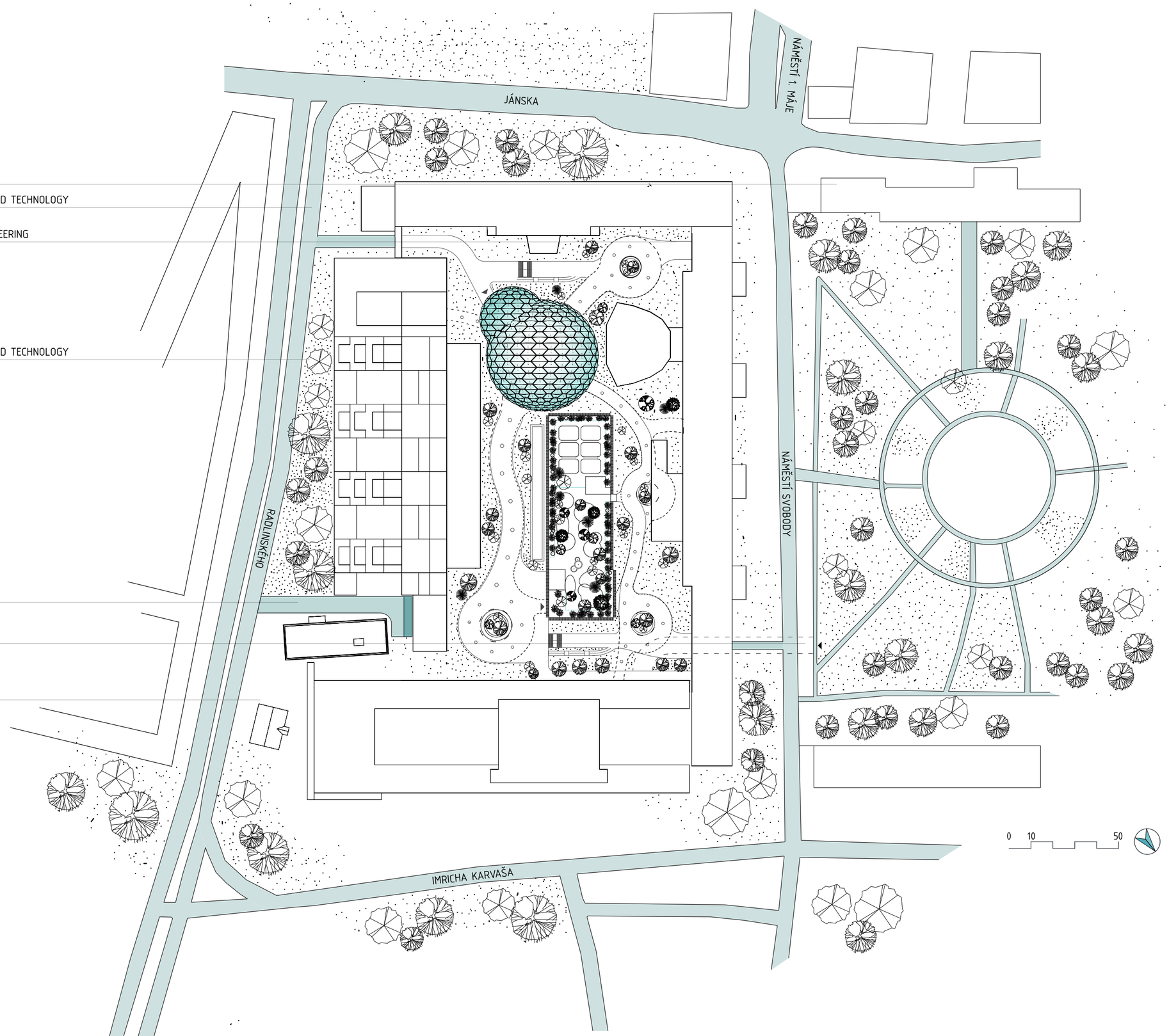
FACULTY OF MECHANICAL ENGINEERING

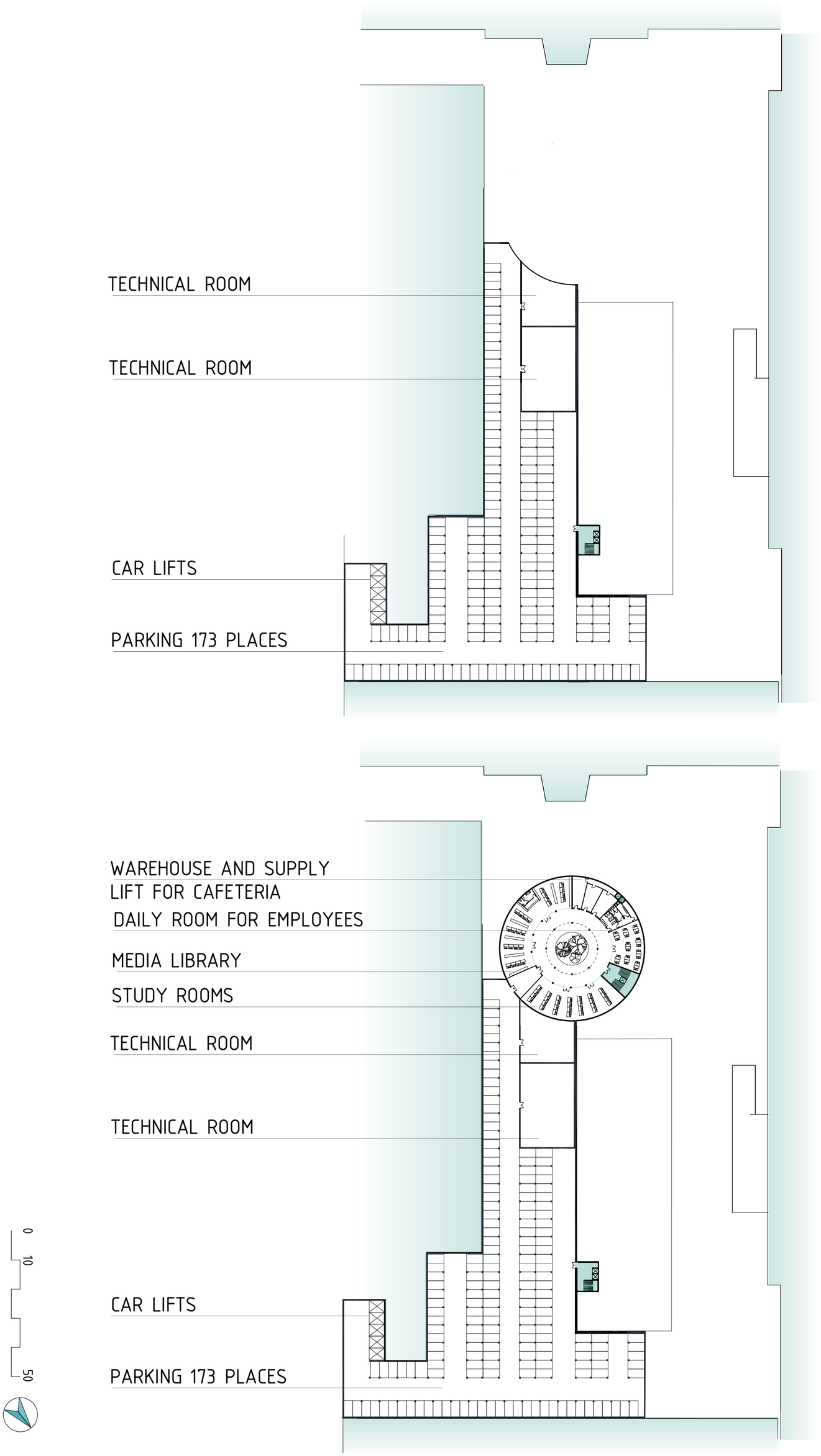
FACULTY OF CHEMICAL AND FOOD TECHNOLOGY

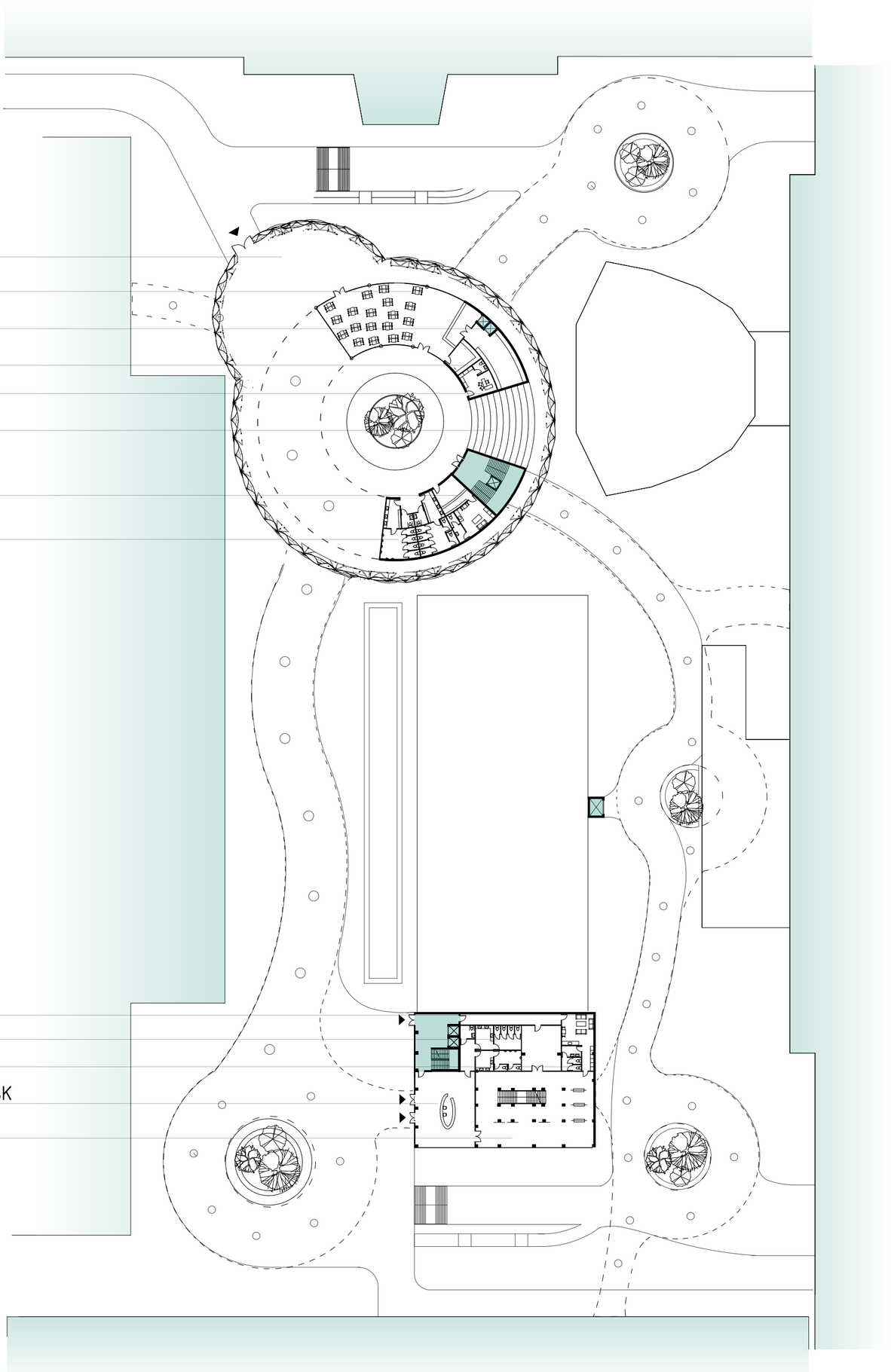
ENTRY TO THE UNDERGROUND GARAGES WITH CAR LIFTS

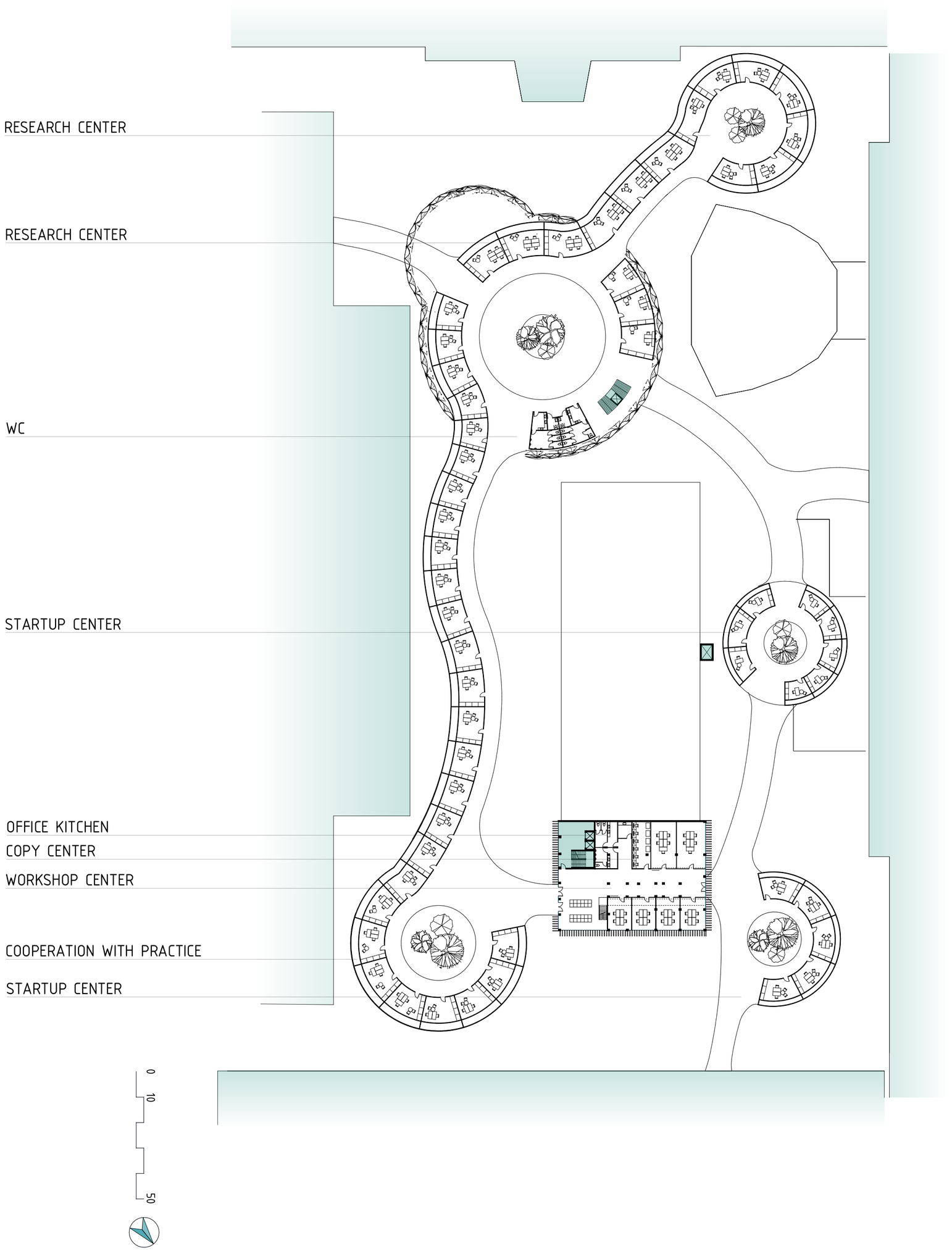
UNDERPASS TO CAMPUS FROM THE SQUARE

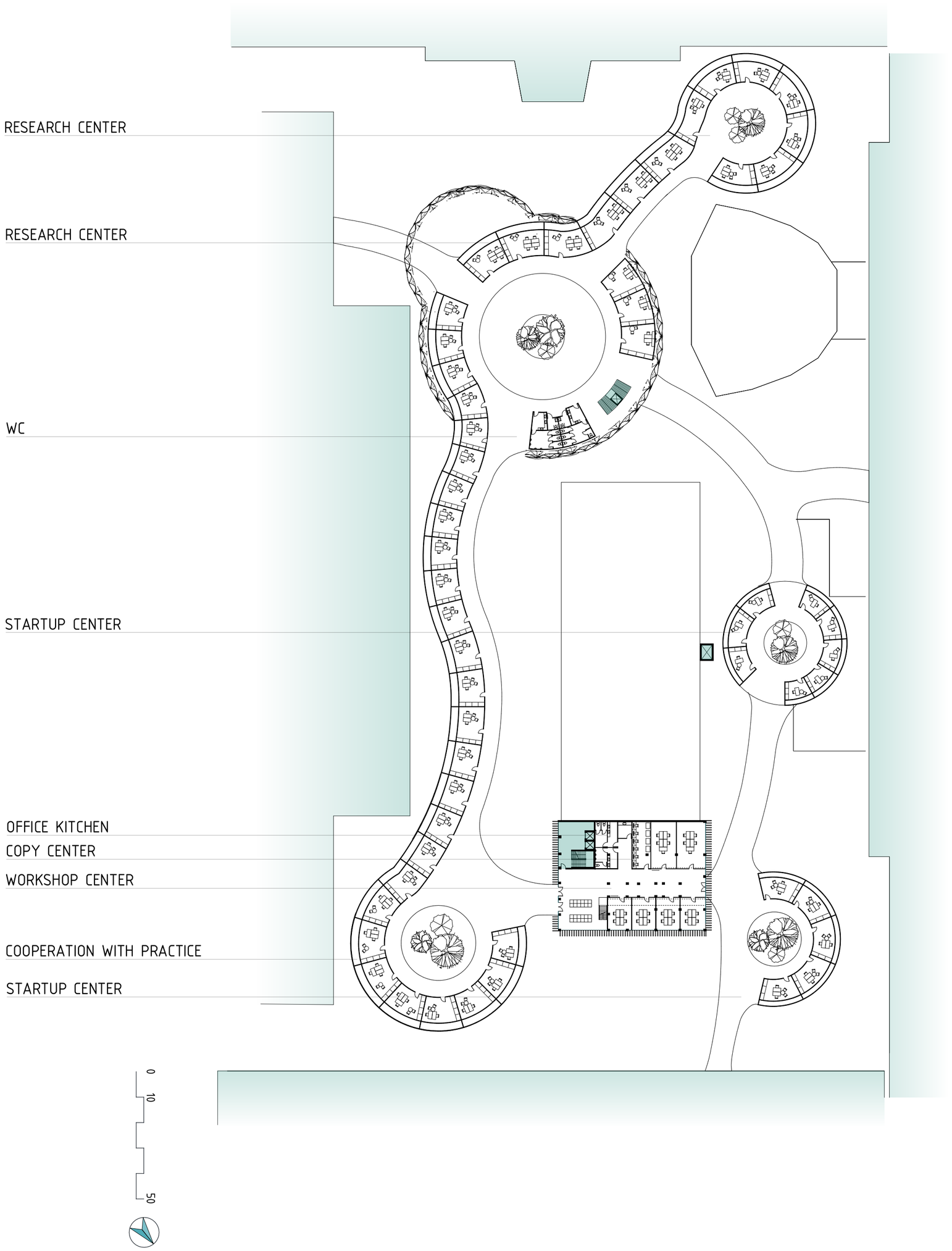
FACULTY OF CIVIL ENGINEERING




TECHNICAL ROOM
TECHNICAL ROOM
CAR LIFTS
PARKING 173 PLACES
WAREHOUSE AND SUPPLY
LIFT FOR CAFETERIA
DAILY ROOM FOR EMPLOYEES
MEDIA LIBRARY
STUDY ROOMS
TECHNICAL ROOM
TECHNICAL ROOM
CAR LIFTS
PARKING 173 PLACES
0
10
50


ENTRANCE HALL
CAFETERIA
PREPARATION OF FOOD
DISH WASHING
OFFICE FOR SNACK BAR
RELAX ZONE "SITTING STAIRS"
INFO SERVICE + DAILY ROOM
WC
DAILY ROOM FOR EMPLOEEYS
WC
WAREHOUSE
ENTRANCE HALL AND CASH DESK
PRESENTATION CENTER
OF SCIENCE AND RESEARCH
0
10
50


RESEARCH CENTER
RESEARCH CENTER
WC
STARTUP CENTER
OFFICE KITCHEN
COPY CENTER
WORKSHOP CENTER
COOPERATION WITH PRACTICE
STARTUP CENTER
0
10
50


RESEARCH CENTER
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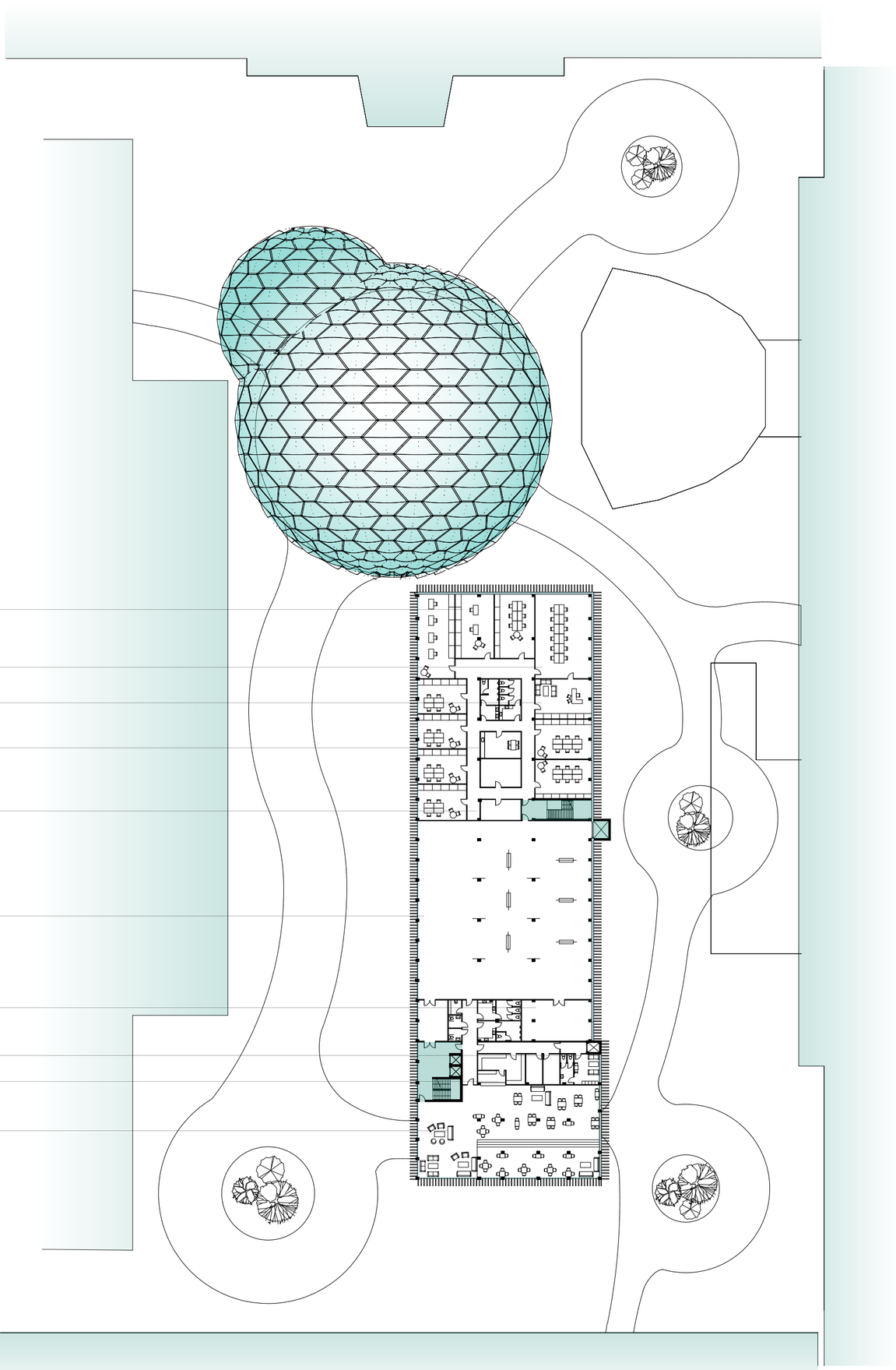
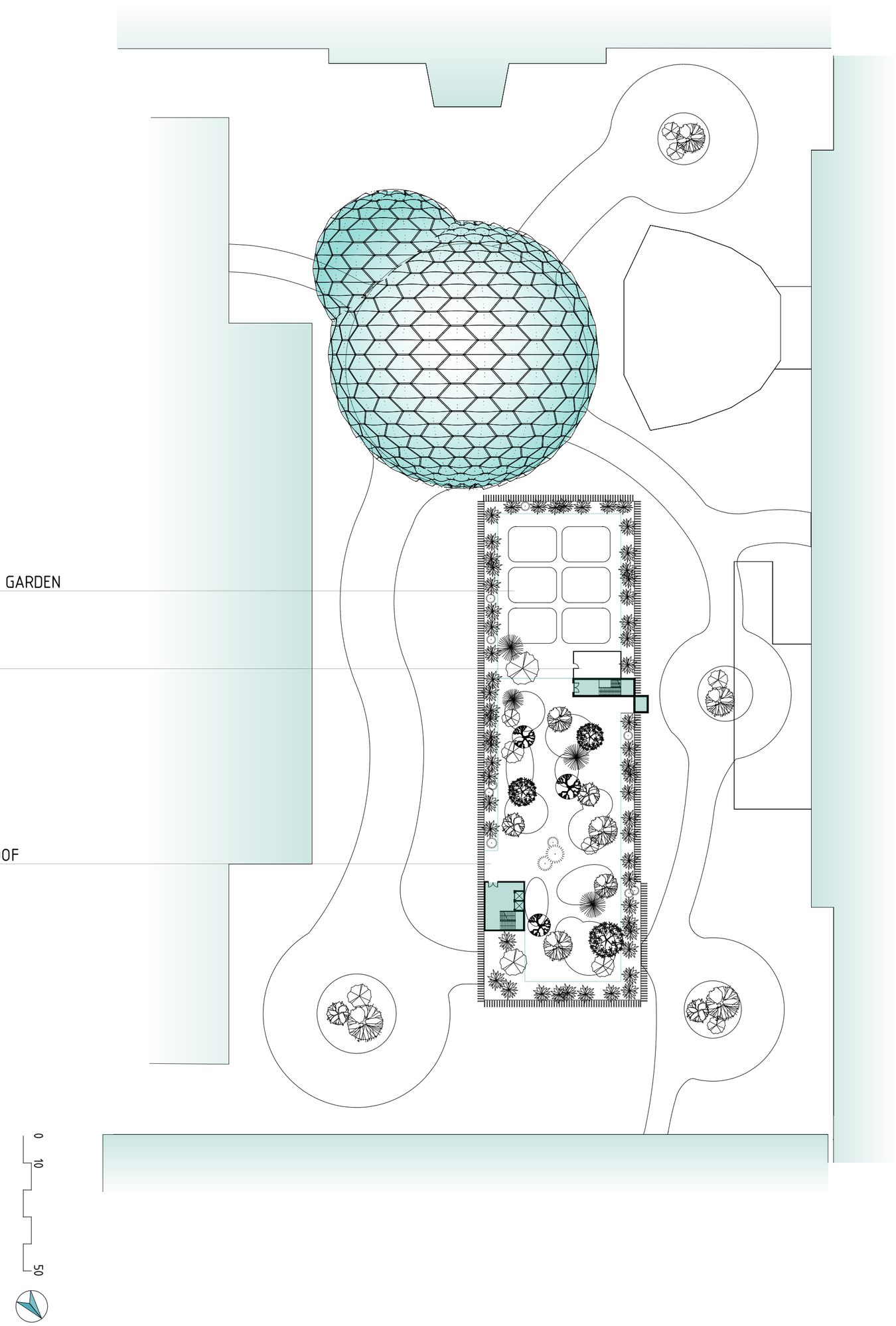
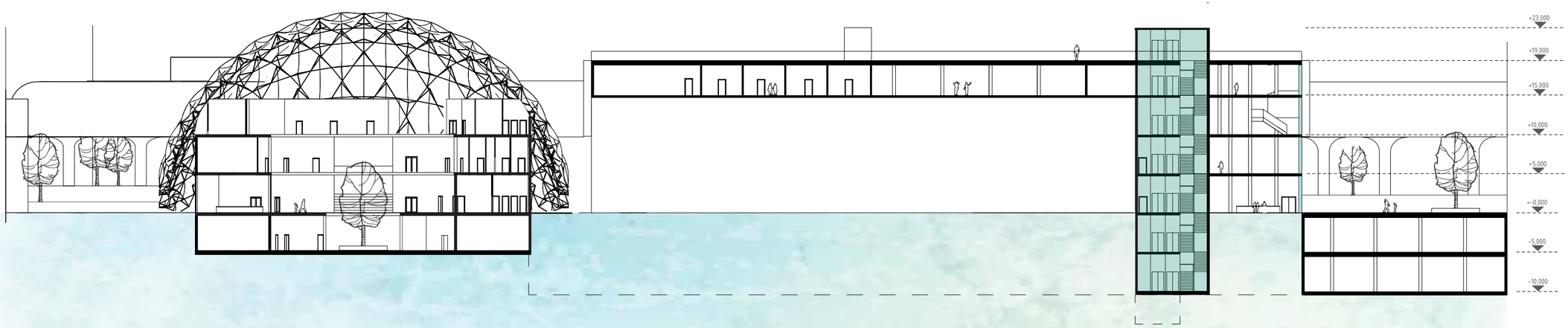
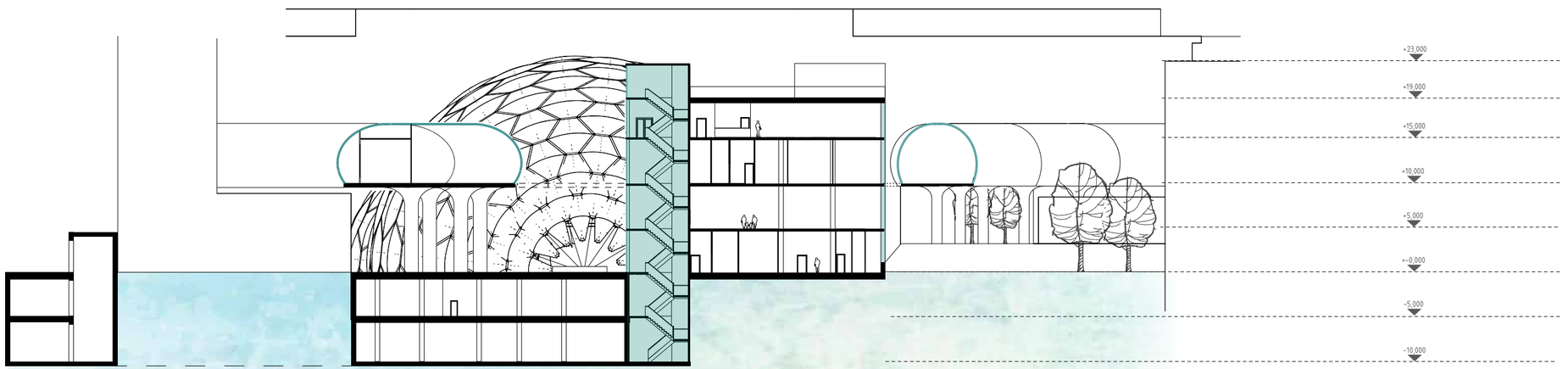
WORKSHOP CENTER
COOPERATION WITH PRACTICE
STARTUP CENTER
0
10
50


ADMINISTRATIVE OFFICES
OF RECTORATE
MEETING ROOM
OFFICE OF THE PRINCIPAL
OFFICE KITCHEN
WAREHOUSES
EXHIBITION AND
MULTIPURPOSE SPACE
WAREHOUSE
DAILY ROOM FOR EMPLOYEES
FOOD PREPARATION
AND WAREHOUSES
CAFÉ
0
10
50

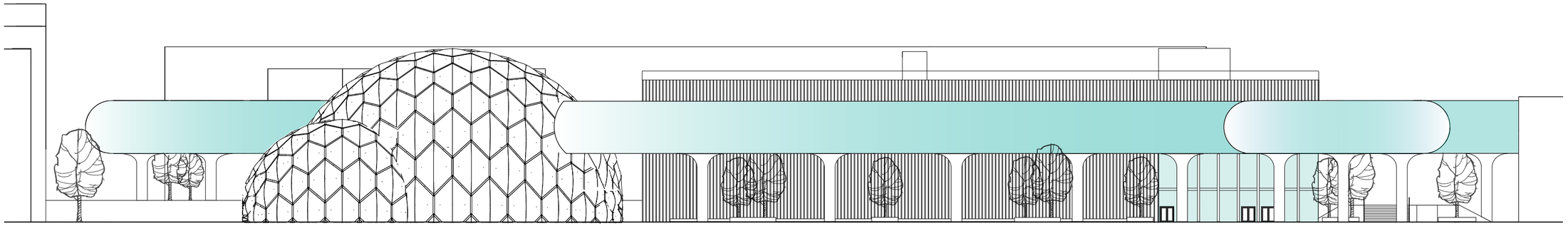

EXPERIMENTAL GARDEN
FOR STUDENTS
WAREHOUSE
ACCESSIBLE ROOF
GARDEN
0
10
50



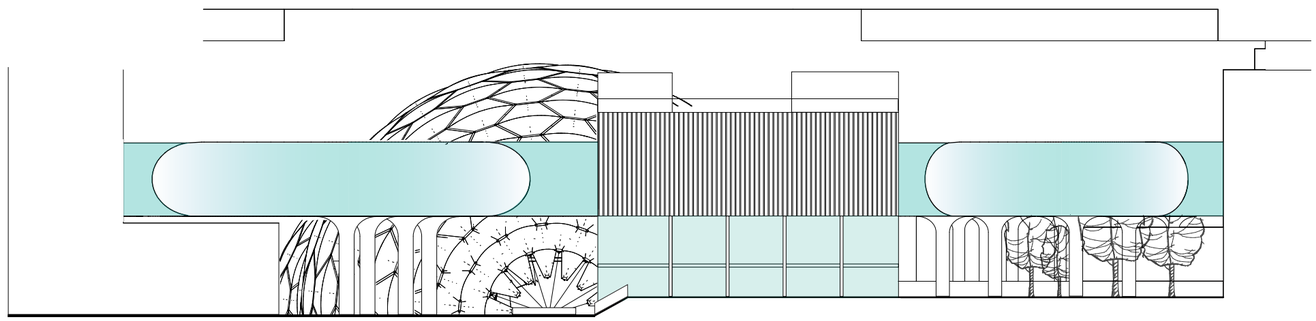

LONGITUDINAL SECTION 0 10 50




CROSS SECTION 0 10 50

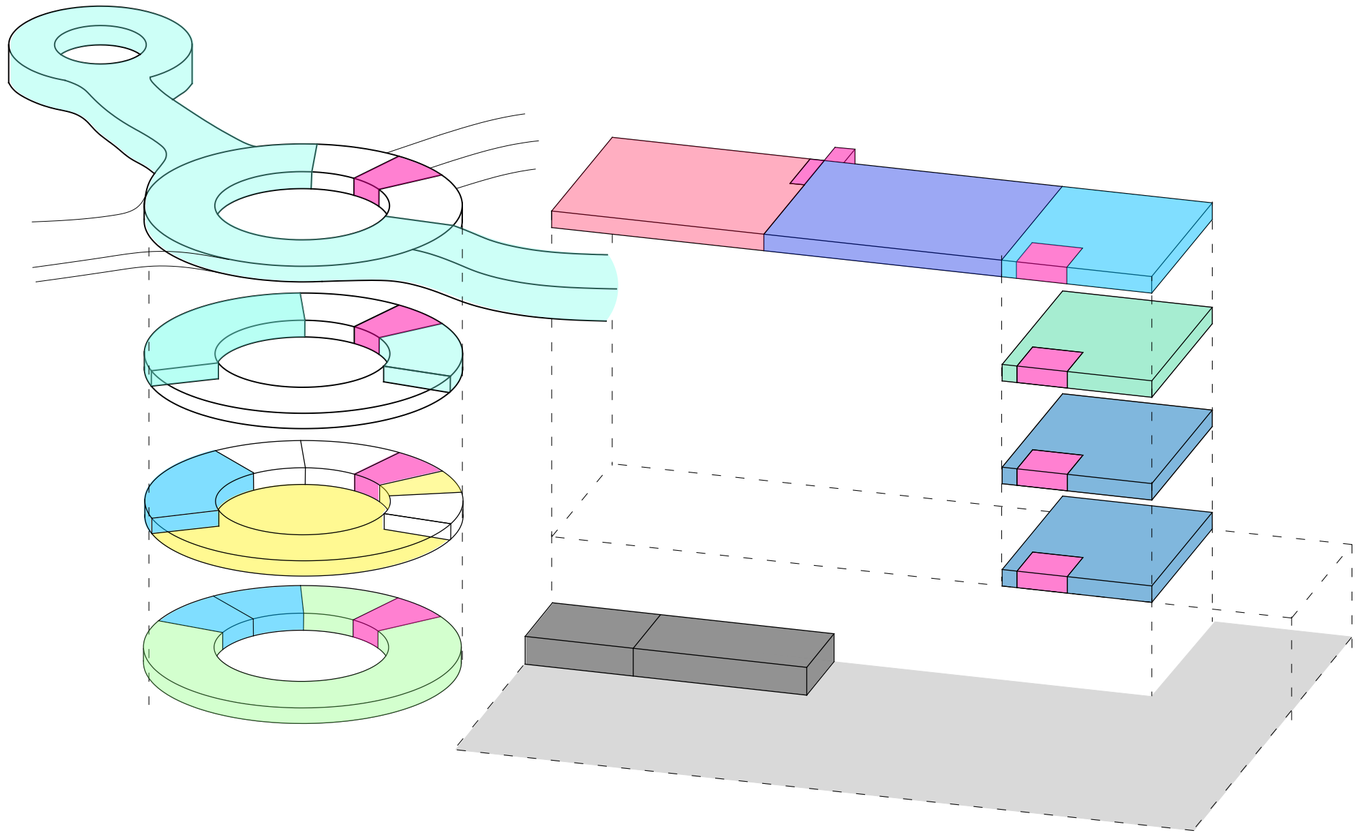


EAST ELEVATION 0 10 50

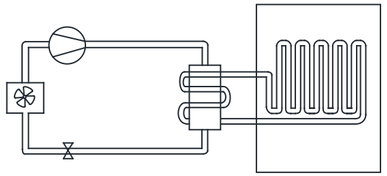


NORTH ELEVATION 0 10 50

# SCHEME OF THE REQUIRED SPACES

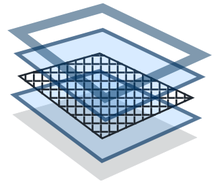


| | AREA |
|---|---|
| Innovative interdisciplinary research center STU, startup center, cooperation with practice | 3800m2 |
| Presentation (experiential) center of science and research | 970m2 |
| Administrative offices of the Rectorate in connection to research | 800m2 |
| Social, exhibition and multipurpose spaces | 950m2 |
| Media library, study rooms | 800m2 |
| Workshops | 500m2 |
| Info services, entrance area | 700m2 |
| Catering, restaurants, cafes | 600m2 |
| Technical background | 650m2 |
| Underground garage | 346 places |
| Communications | |



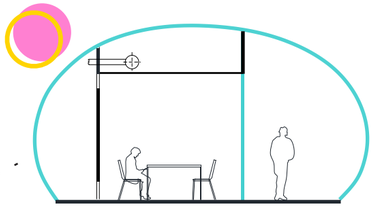
HEAT PUMP

A heat pump is an efficient way to obtain renewable geothermal energy that can be used for water and room heating.



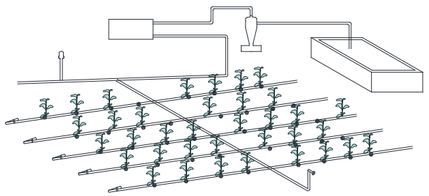
SOLAR GLASS + SOLAR CONTROL GLASS

Special glass that contains transparent solar cells that can capture the energy of the sun and prevent the room from overheating in warm days. Thanks to a special surface treatment, the glass is completely clear, but it does not let solar heat permeate into the romm .



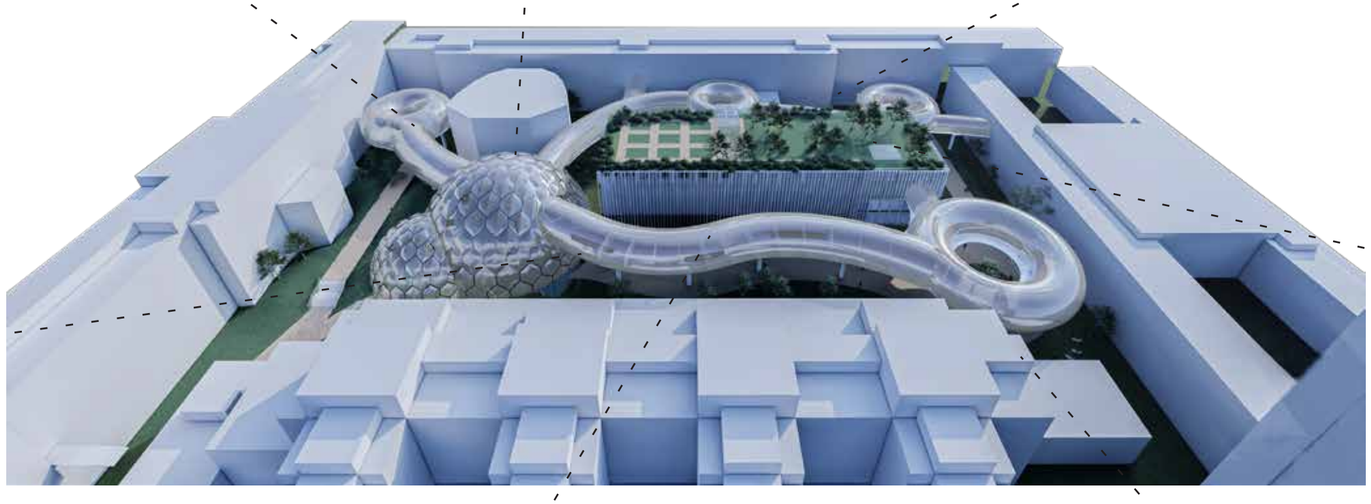
SUSTAINABLE CELLS WITH TROMBE WALL

Cells provides thermal comfort completely without heating, only on the basis of the circulation of heated air from the sun.



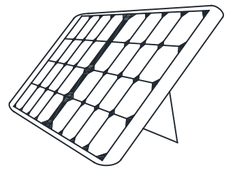
DRIP IRRIGATION

A system of pipes in the ground in the entire campus, which allows economical irrigation of plants. It irrigates plants literally by drops, but all day long, which is much more suitable for verdure and water saving than disposable jet irrigation. The irrigation tank also serves as a water element in the ground floor to make hot days more pleasant.



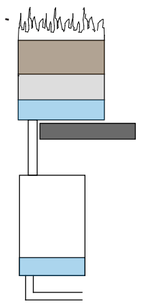
MATERIAL SHAPESHELL

Shapeshell is a composite material made of recycled plastic, moreover it is recyclable for 90% by itself. It has high strength and the required fire resistance, so it can be used on load-bearing structures too. Thanks to its formability, I use this material for columns and as a supporting structure of all round shapes.



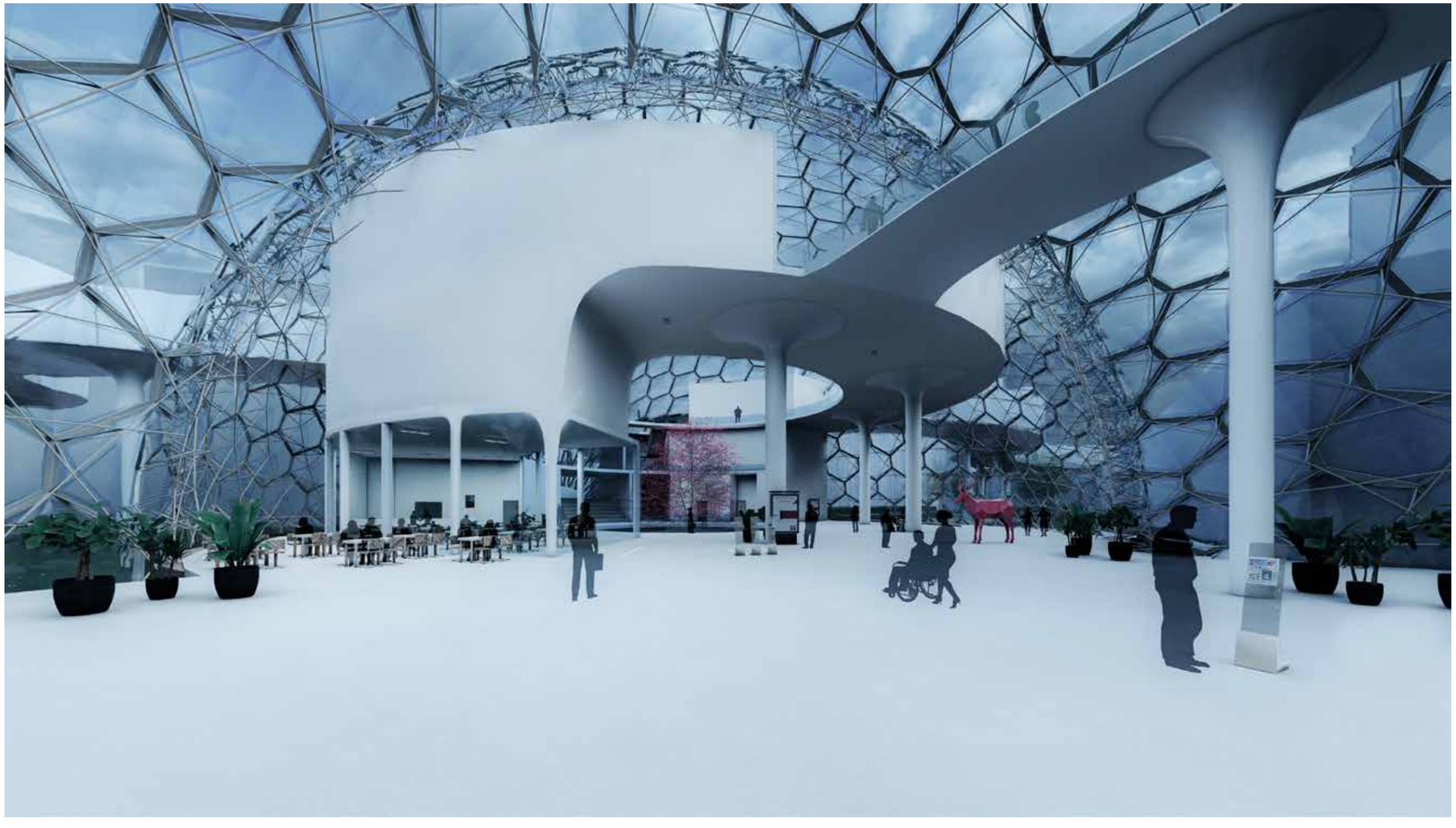
SOLAR PANELS

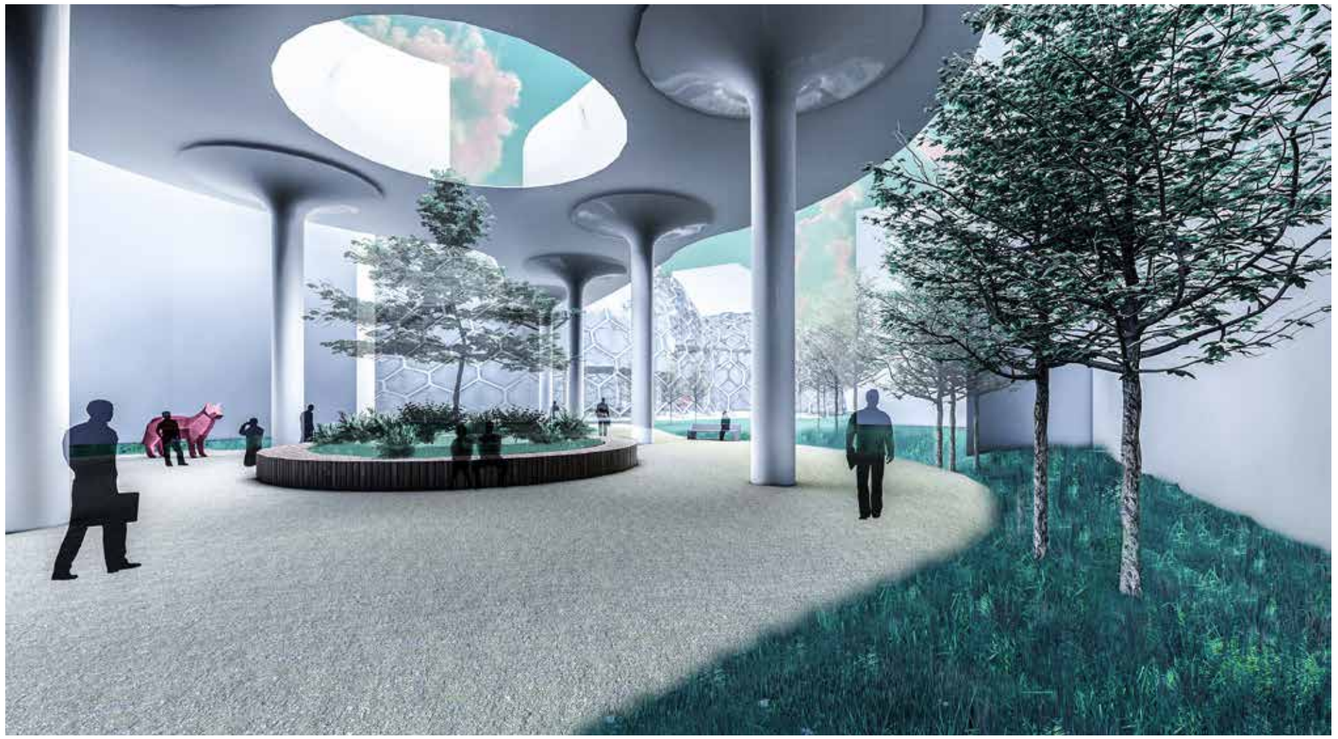
All current buildings in the campus have completely unused rooftop. Therefore, I would place solar panels there. In the rooftops, they will not interfere with aesthetic and the vast area of the roofs will be used to gain energy.



WATER RETENTION BY ROOF GARDEN

In addition to underground retention tanks, rainwater can be effectively retained from roofs to. Rainwater is drained into the tanks using slopes and a special composition of roof cladding. The accumulated rainwater can be used later in very dry days for irrigation and maybe for flushing one day. Even though hygienic standards do not allow us (yet) to flush with rainwater, I think it will be a necessity in a few years.






LUMION