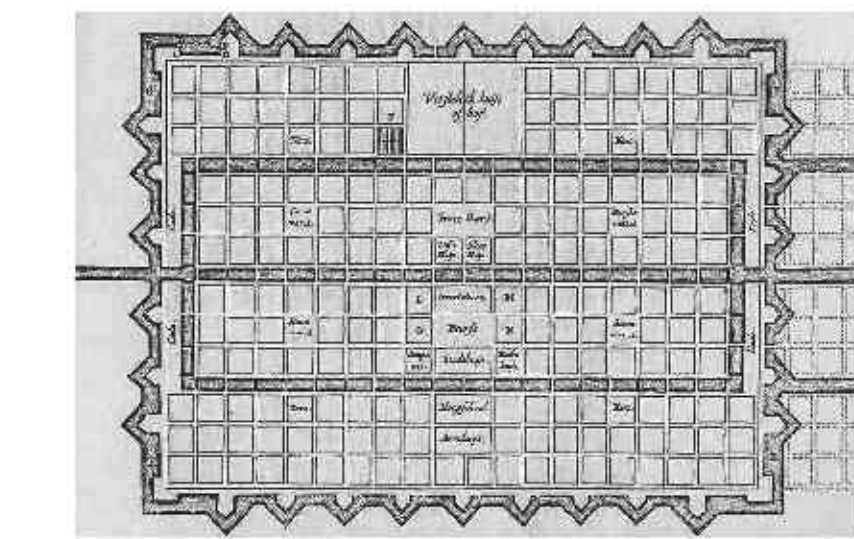
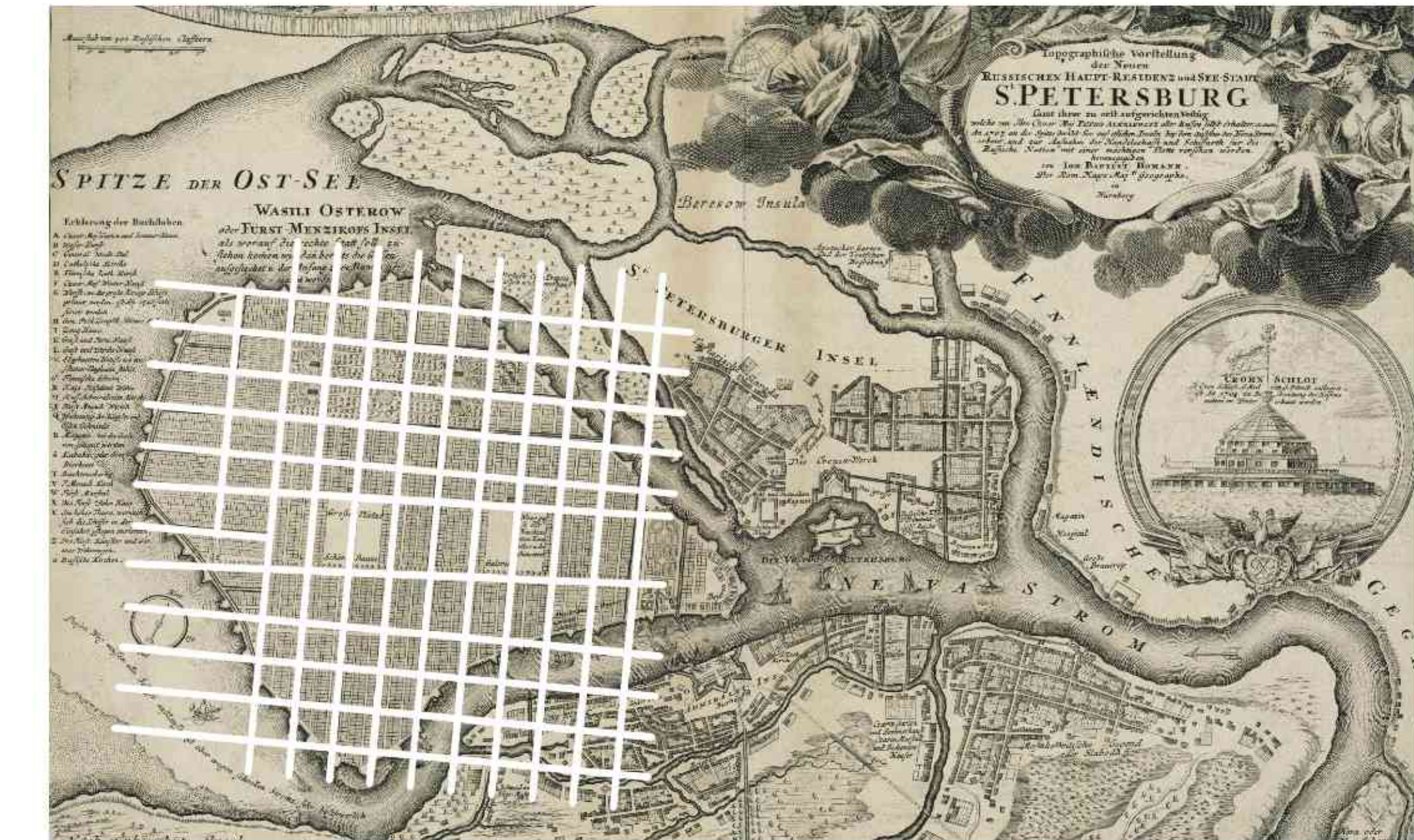


VISION AND CONTEXT



Planning of ITMO Highpark is based on the principle of a clear orthogonal urban grid. This concept of planning the so called ideal cities, takes its origins in the Roman times, and is continuously used until modernity, due to its efficiency and potential of growth. On the left: «Ideal City» by Dutch engineer Simon Stevin.

Saint Petersburg original city plan is also based on an orthogonal planning grid, and was also designed and built «from scratch». New Campus of the ITMO University takes this as a reference and proposes to install a new city grid with a cell of 80m X 80m, applied to the core part of the site with the potential of future growth.



Historical map of Saint Petersburg, 1703. Orthogonal city grid applied to natural landscape, carved by riverbed.

In order to create a feeling of a city and productive urban atmosphere, the new ITMO Highpark is designed as a compact urban volume where the areas of dense city blocks are intermingling with big and free open spaces, squares, gardens etc. The open areas are places for citizens of Yuzhniy and students can mix and interact.



It is also referring to Saint Petersburg, where dense urban areas are interspersed by iconic city voids, such as Letniy Garden, Marsovo field and others. Another important element - water - is also brought to the project in a shape of a river, looping and connecting all the social groups, all the users of future campus together.



Map of central Saint Petersburg: dense urban blocks intermingled with squares, gardens, parks and other voids.

INTERACTION GRID

Instead of occupying all the potential area of ITMO Highpark, the project proposes to build a central «nucleus» - a compact volume which contains the DNA for the future development of Yuzhniy and for the extension and growth of University Campus. Compact and low design is inspired both by electronical microchips, as



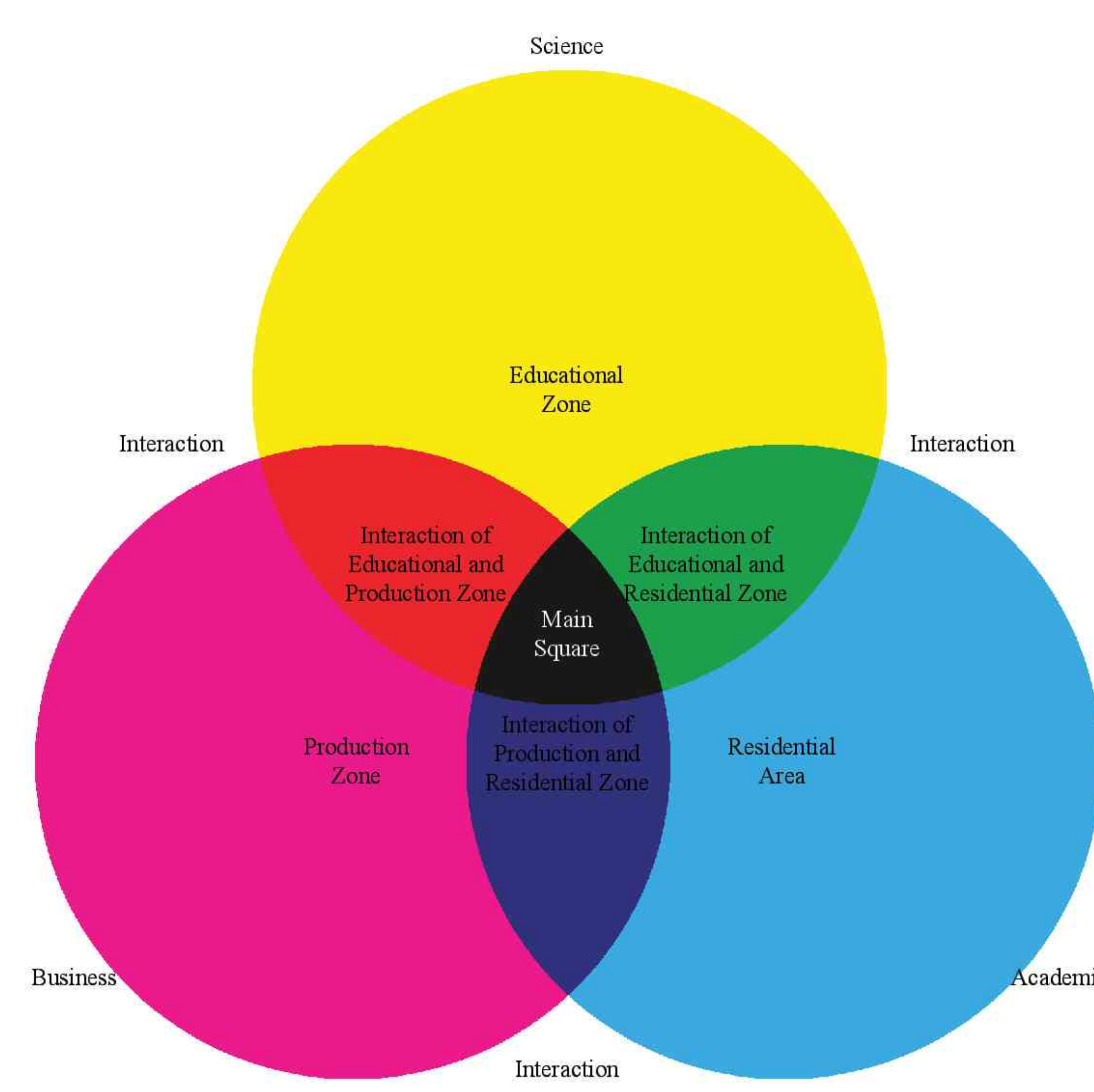
well as the traditional Saint Petersburg low horizon city image. This compactness is efficient and ecologically sustainable solution, which creates a solid university campus with short connections between functional zones, allowing to reach to any point of the campus within a 10 minute walk.



Panorama of Saint Petersburg: low horizontal skyline punctuated by local vertical landmarks of spires.

IDEAL ORTHOGONAL GRID

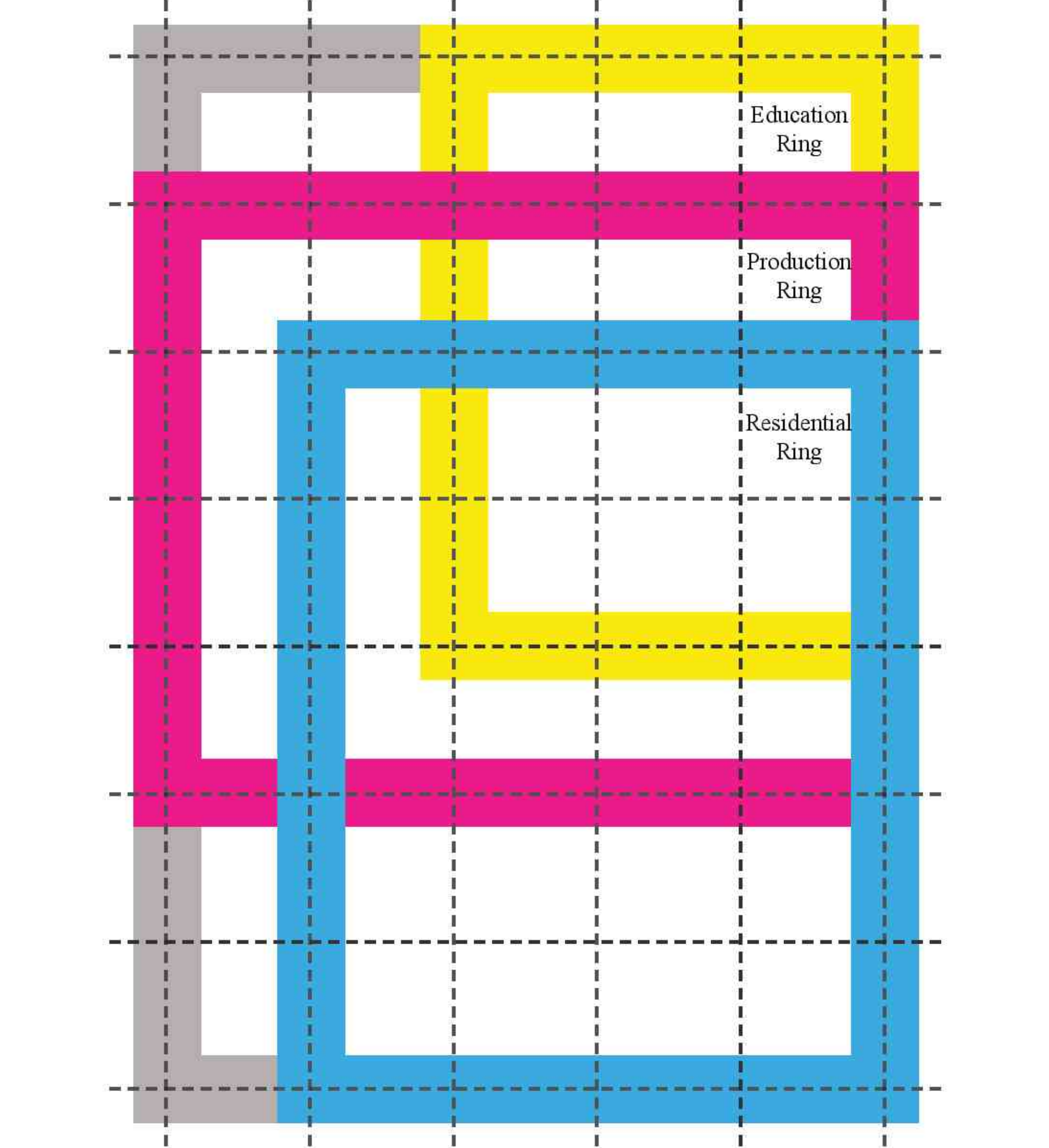
Program: core functions and overlap



Program is divided in 3 chunks: Education, Production and Residential zones. Overlap creates new functions and triggers collaboration and exchange of knowledge.

DENSITY & OPEN SPACES

3 loops: 3 different atmospheres



Each function takes a shape of a rectangular loop. The loops are organized according to urban grid, and create new areas of functional fluidity in the overlapping areas.

COMPACT & EFFICIENT

Diversity and fluidity of functions



The project proposes to a new city grid of diverse functions with a cell of 80m X 80m, applied to the core part of the site with the potential of future growth.

INTERACTION COURTYARDS

Reference: Interior courtyards of Hermitage building in Saint Petersburg.

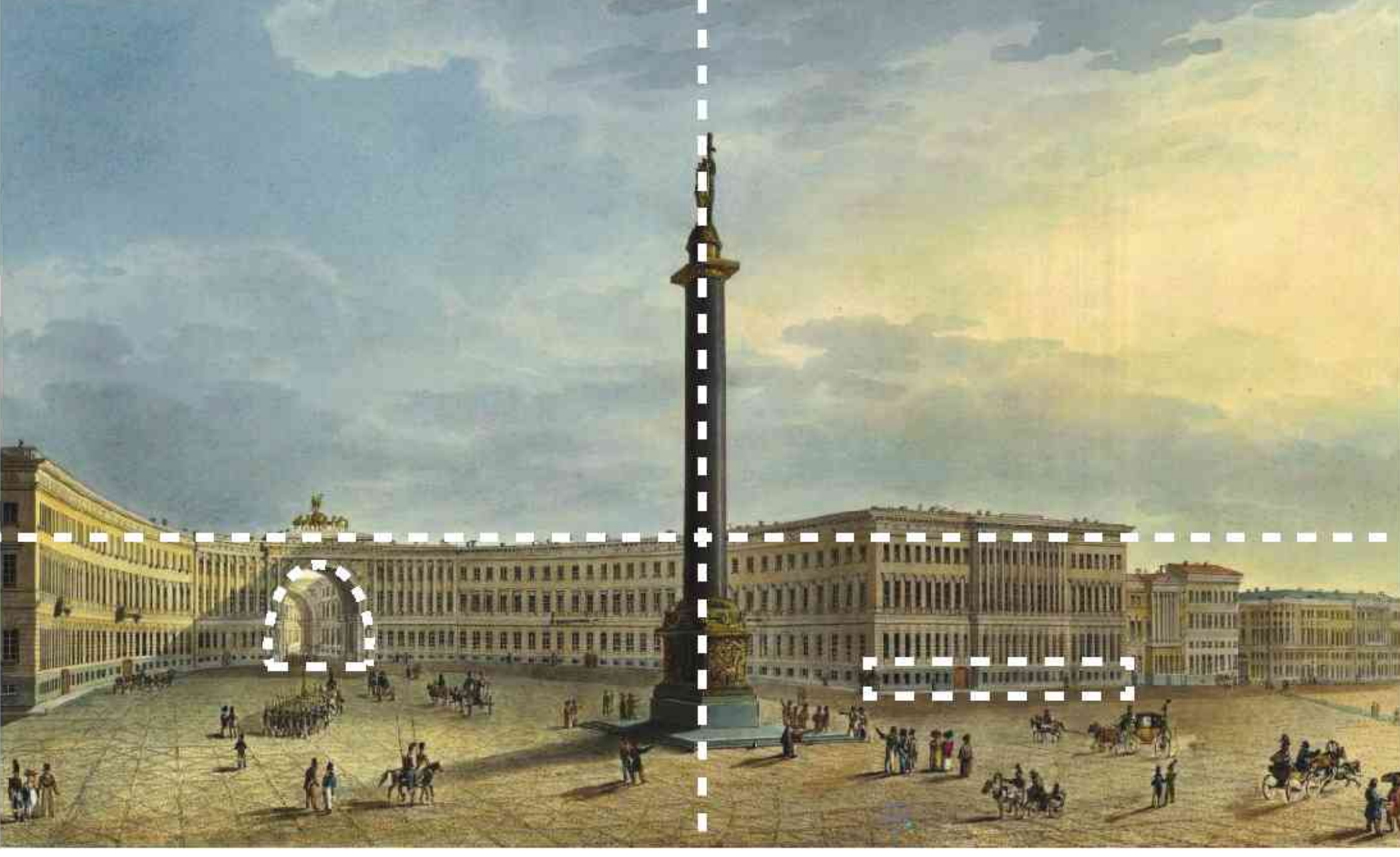


Besides big urban voids, ITMO Highpark Campus is pierced by smaller scale interior courtyards. These spaces serve as internal gathering spaces for all the campus users. They are protected from wind and noise, and can be used by the students and businessmen from production zone as open air meeting rooms.

Saint Petersburg is known for its interior courtyards: from narrow «wells» in the residential districts, to opulent courtyards of Hermitage, General Staff Building and other grand palaces. In ITMO Highpark there is a route connecting courtyards that allows people to circulate the Campus without going along the main busy streets.

SERIES OF LANDMARKS

Saint Petersburg, Palace Square, historical drawing. Arch of the General Staff and the Alexander column.



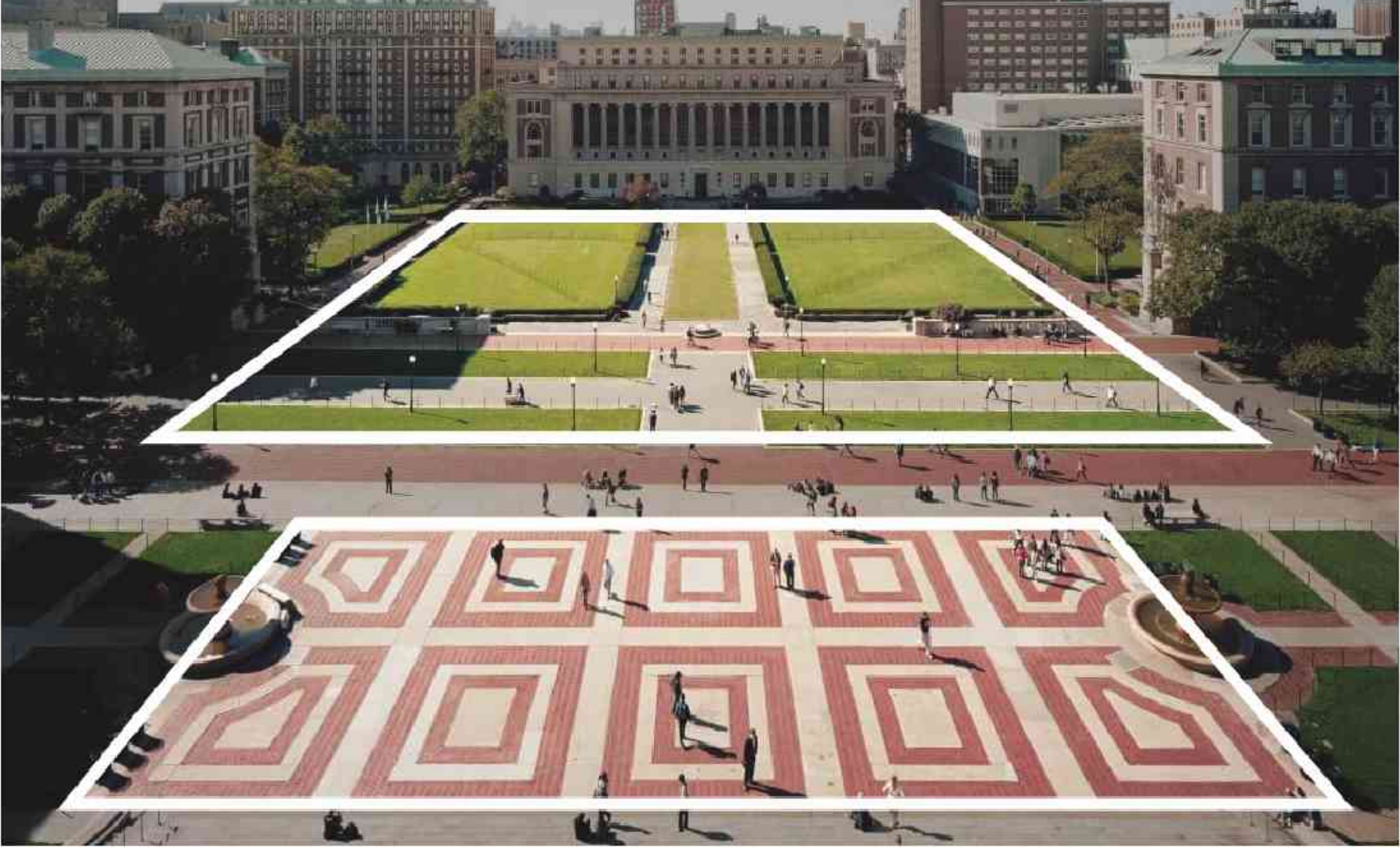
Without direct use of historical architecture references, the ITMO Highpark uses morphological elements from Saint Petersburg: a big cube on the main square, grand arch, series of bridges and public embankments, a vertical spire and others. Those iconic important elements help to navigate and orientate in the city.



The cold weather of Saint Petersburg is compensated by multiple covered galleries, canopies and covered areas under the educational slab. Covered outdoor galleries are located along the buildings of production zone and allow people to pass from one building to another without getting under the rain or snow.

PUBLIC SPACE AS A CORE

Columbia University Campus, New York, view to the main courtyard used for outdoor student activities.

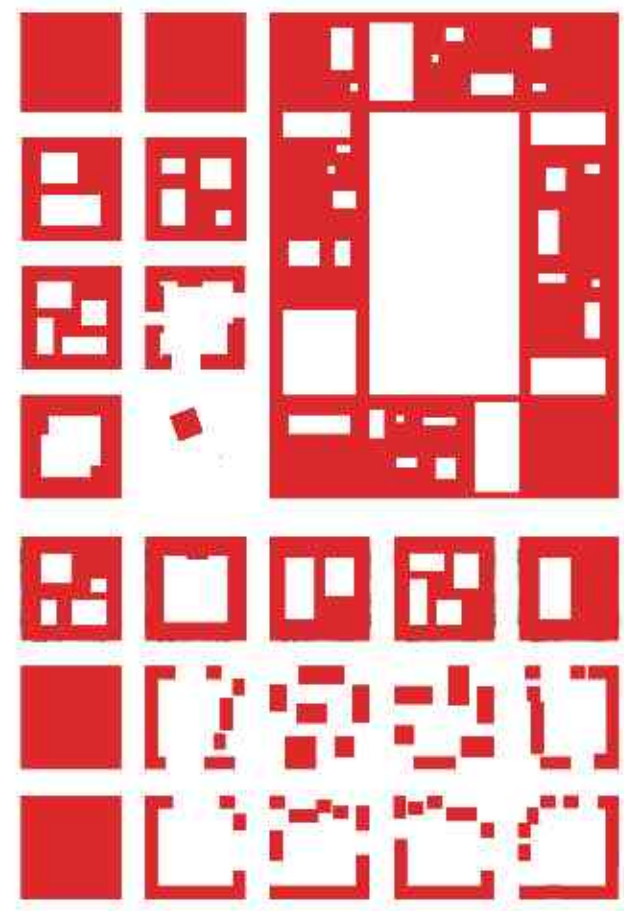


ITMO Highpark is designed according to the principles of the most well known academic campuses. The main «garden» in the Educational ring refers to «Big Lawns» and «Main Courtyards» of the most famous world universities, such as Yale, Harvard, Columbia, where the lawns work as «openspace» cores of the campus



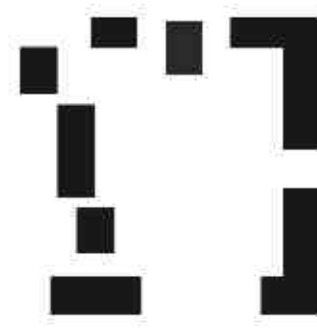
the campus. These spaces are used for leisure, public gatherings, graduation ceremonies, lectures. One of the iconic public spaces is so called «grand steps», where students enter the university, sit after classes, gather for informal public talks. Reference image: Alma Mater at the «Low Steps» of Columbia University.

CONCEPTUAL FOUNDATION

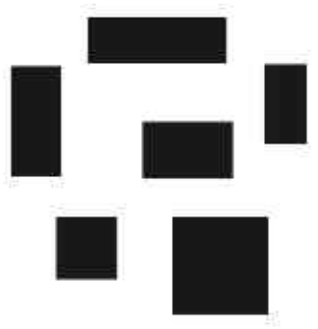


Planning of ITMO Highpark is a new smart city based on an innovative urban concept. It is organized on a base of orthogonal urban grid with a typical urban block measuring 80m by 80m. The program is divided into 3 functional rings: educational ring, production ring and residential ring. Overall height of the campus is held at one line and is equal to 14 m. The dimensions of the main area of the campus is 480 m by 690 m. Each ring has its own atmosphere, created by its urban morphology and materiality: educational building is a singular slab occupying the area of 10 city blocks. It is a hovering mat building, pierced by multiple lightwells. Production zone operates with a smaller scale of 1 city block. Each block has several interior courtyards. The residential zone has the smallest urban scale.

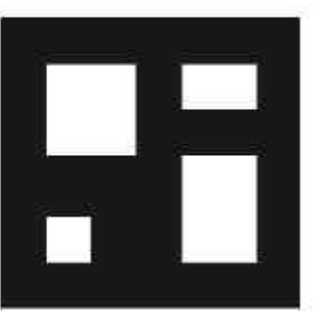
INTERACTION GRID



Urban scale «S»: residential area



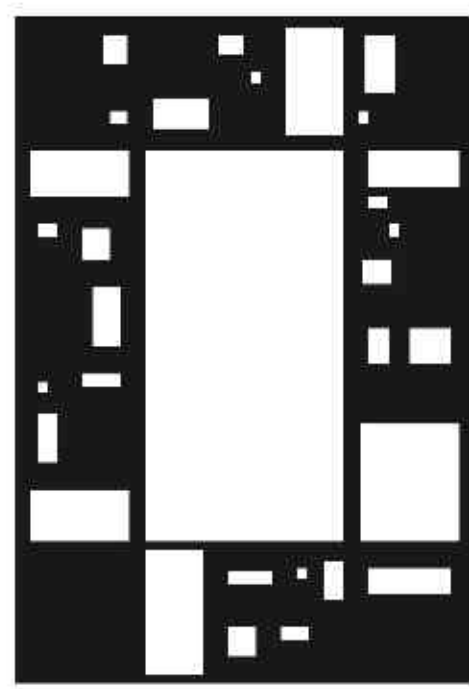
Urban scale «M»: live work units



Urban scale «L»: production zone



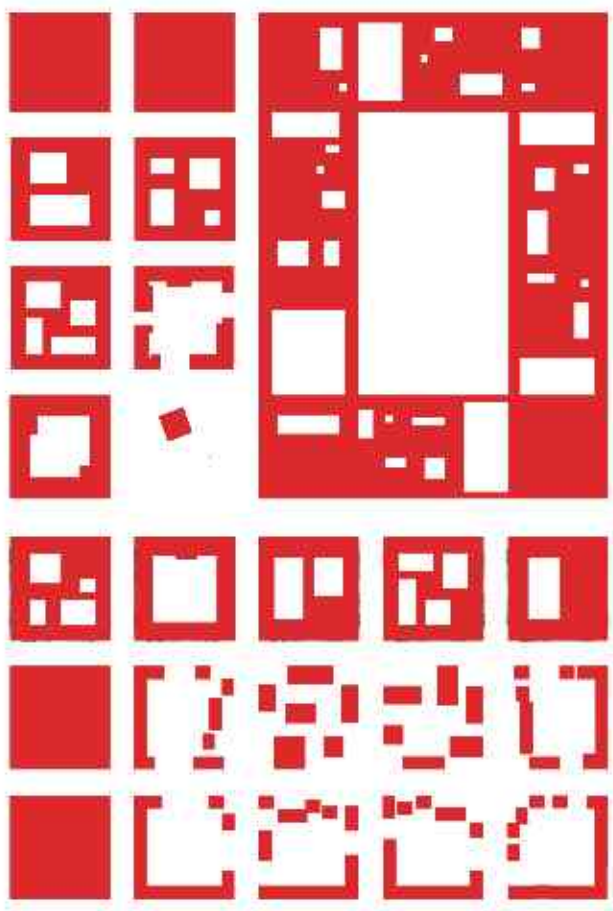
Urban scale «L»: Parking and logistics center



Urban scale «XL»: Educational slab

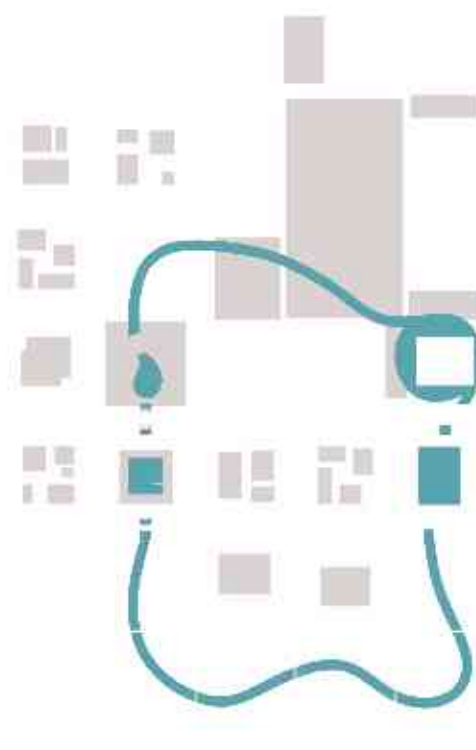


CONCEPTUAL FOUNDATION

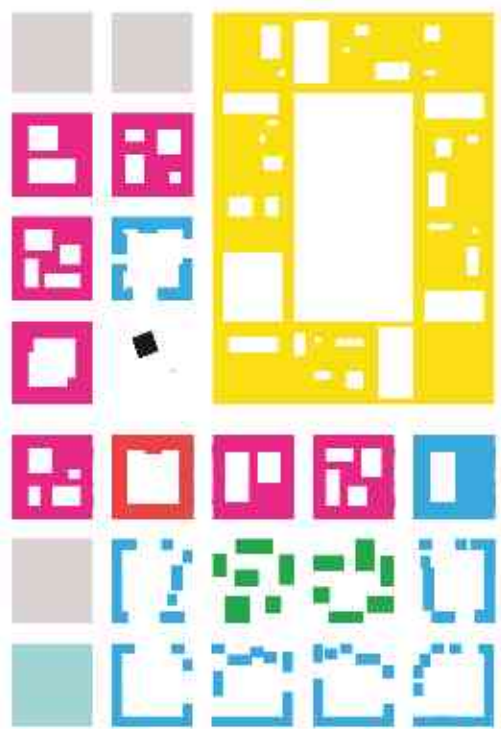


Production zone has a smaller scale of 1 city block. Each block has several interior courtyards. The residential zone has the smallest urban scale. It consists of small housing units, united into semi-open perimetral blocks with big courtyards inside. The overlap of functional loops creates functional diversity. Areas, where 3 zones overlap, new functions emerge. Besides main functions, the new functions are: the main square, main garden, 2 sports centers, livework units etc. All the areas are connected by a loop of a river, which is taking its reference from the river Neva and traditional Saint Petersburg Channels.

INTERACTION GRID



Open public spaces and the river



Program diagram: 3 functional loops



Green elements

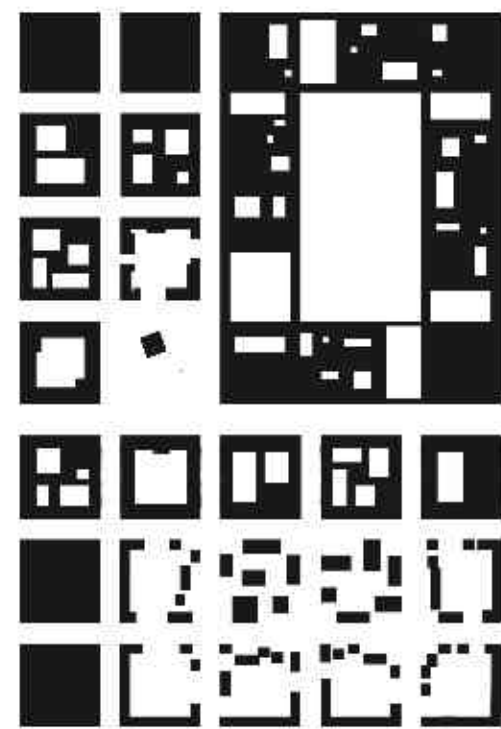


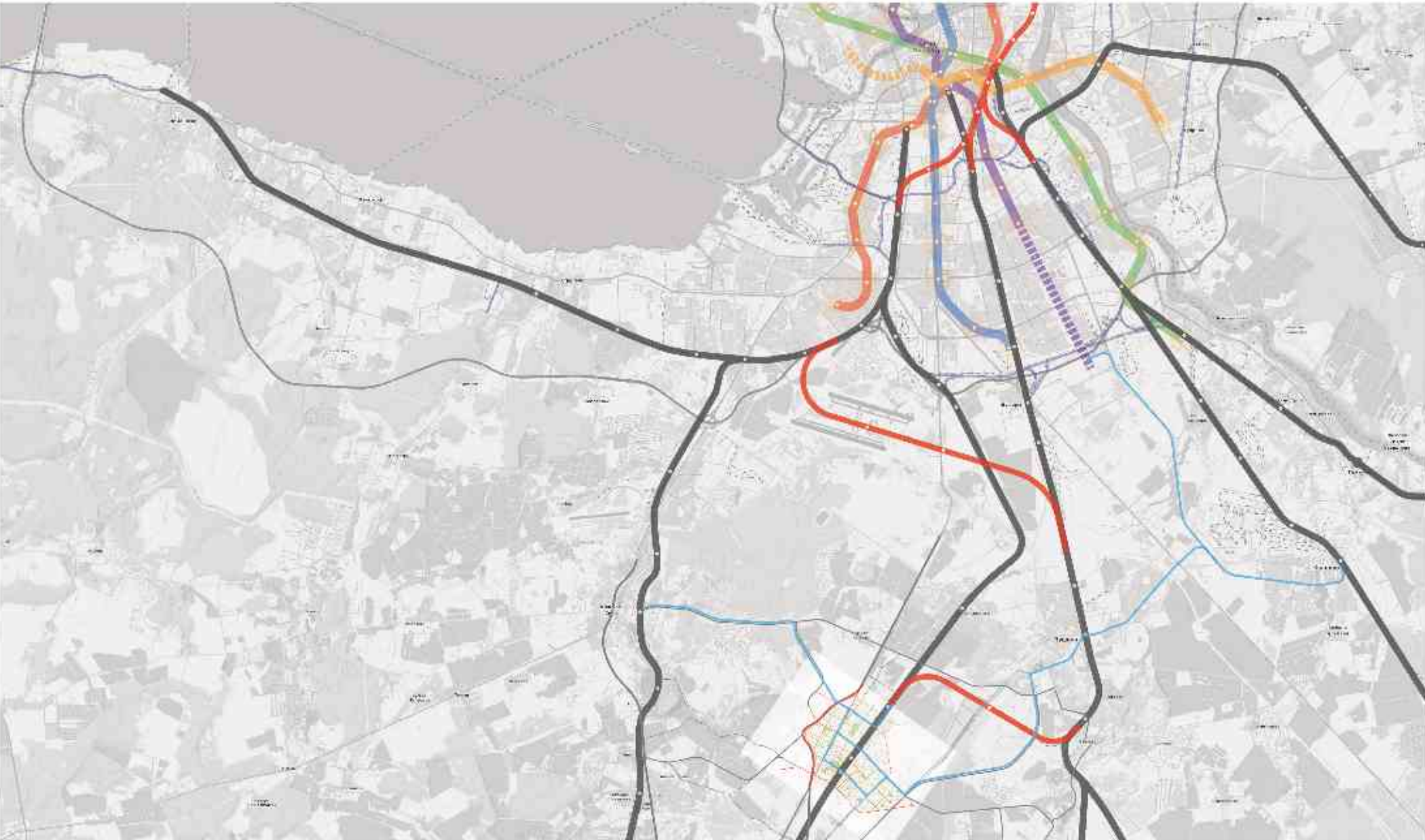
Figure ground plan (Schwarzplan)



ITMO Highpark night areal view

TRANSPORT SOLUTIONS

Saint-Petersburg does not have a comprehensive integrated transport framework on regional scale. This acts as a severe obstacle to development of new areas. Three approved future metro corridors can be utilized to merge all regional rail lines into one united urban rail system, similar to best internationally known examples, such as S-Bahn Berlin, RER of Paris, Madrid's Cercanias, Passante di Milano and many others. Said corridors are future Line 6, Pulkovo extension of Line 1, and a segment of the planned Circle line (in the area of Polyustrovo). A revised technical solution to the same rapid transit corridors shall be able to bring outstanding, unprecedented accessibility improvement to the whole region. This includes drastically improved access to ITMO Highpark: trains from Yuzhniy shall depart every 10 minutes going directly to most destination areas in St.Petersburg. Users shall get in 15 minutes to Pavlovsk, in 25 minutes to LED airport, in 40 minutes to almost any central city destination. Within 60 minutes of travel from ITMO Highpark, as well as LED airport, almost any destination will be reachable.



Transport diagram, scale of Saint Petersburg

The streets of campus are defined as a space with restricted vehicular access. Vehicular flows shall access the site from what currently is the St.Petersburg – Kiev road through two separate access roads. From those, it will be directed into the parking areas, respectively P1 and P2. Everyday access of users from P1 and P2 parking areas into the site can be done by feet, cycling, or with the mini-shuttle that will operate around the area. Internal vehicular access to the buildings is highly restricted and is arranged for only special events such as delivery of large persona items, or access of limited mobility people, or needs of servicing, or other similar occasions. In such case drivers will

Integration of the ITMO Highpark and the city of Yuzhniy is a process that must be mutual and integrated from the very beginning of the area masterplanning stage. Within this framework it is essential to foresee continuity, connectivity, and density of the urban fabric of the entire city. This requires particular attention to, and careful alignment with, the larger context, which includes the city of Yuzhniy and some other key areas such as Pushkin-Pavlovsk and Krasnoe Selo. Currently, the key barriers to sustainable development of the area are the infrastructure of the railway line and the St.Petersburg – Kiev highway. Having the railway moved inside a tunnel, and the road shifted towards the Western edge of Yuzhniy is necessary to ensure integrity, permeability, and interconnectedness of the area, which is an indispensable set of features that will lead towards creation of a liveable urban environment. The public transport framework will provide strong connections to neighbouring cities of Pushkin-Pavlovsk, and Krasnoe Selo. Local road network will be revived and accomplished to provide the missing links and direct connections.



Transport diagram, scale of Yuzhniy

use the ring road around the campus site, and then they will be able to access inside the master plan through a set of one-way driveways. Access control is managed with a set of operable automatic bollards.

With regards to parking for people with limited mobility, two options differ. Current regulations imply parking for such people be scattered all around the site and occupy a substantial amount of street space. For such conservative scenario, parking areas for people with limited mobility are allocated as indicated on the scheme. However, accessibility for such users is not only defined by where their designated

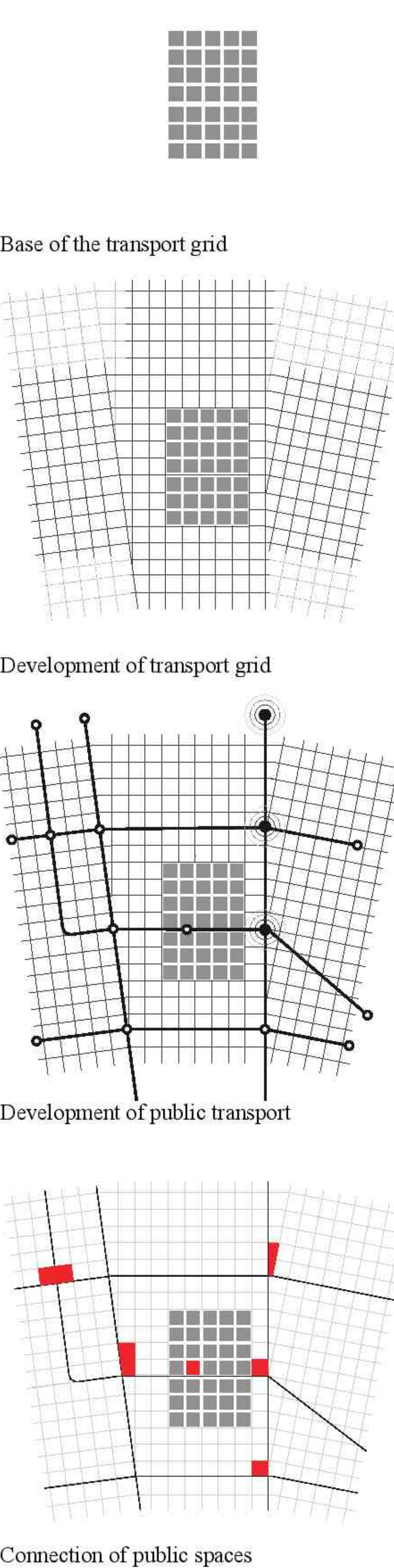
INTERACTION GRID

Immediate integration is defined by mutual relations of the ITMO Highpark master plan and the surrounding context of the city of Yuzhniy. Simple, well-structured, connected grid of streets and blocks shall spread out from the campus and define the surrounding context, to which the campus shall become heart of the activity. A wide boulevard will connect the railway station (placed in a more central location), the main academic building, and the central square of the campus. The boulevard will carry the main public transport axis of Yuzhniy providing the city residents direct access to both the railway station and the most active part of the campus area. The stretch of St.Petersburg – Kiev highway will be relocated to the Western boundary of the city. The new alignment will be accessible through four junctions with main streets of Yuzhniy which also act as local-regional roads of a wider context. The present multi-level junction will be dismantled. The remaining alignment will become a major active urban street that will incorporate the public transport axis and strive with density and diversity of urban functions along it. The current railway station will be relocated closer to the central part of the campus.

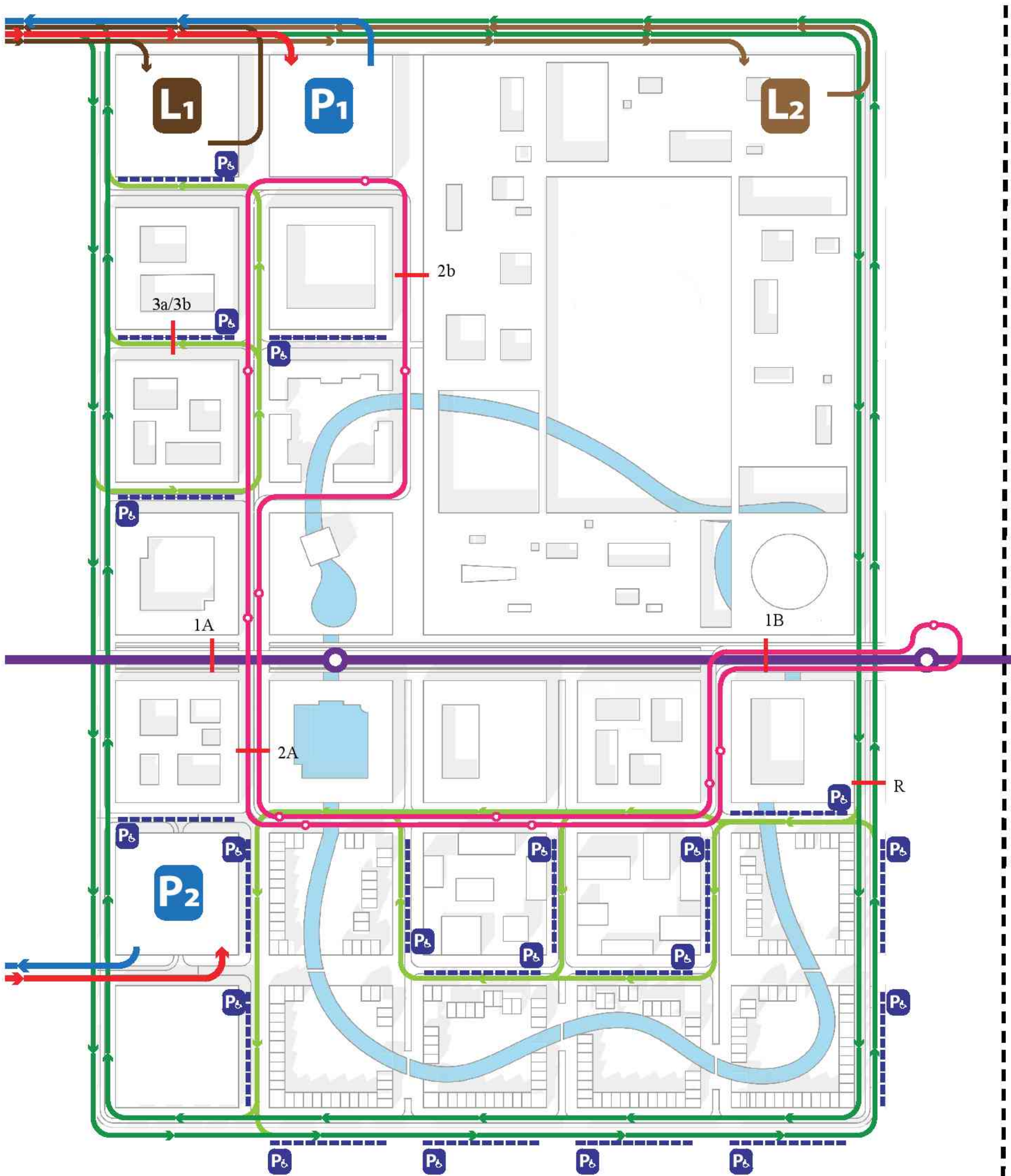


Transport diagram, scale of ITMO Highpark

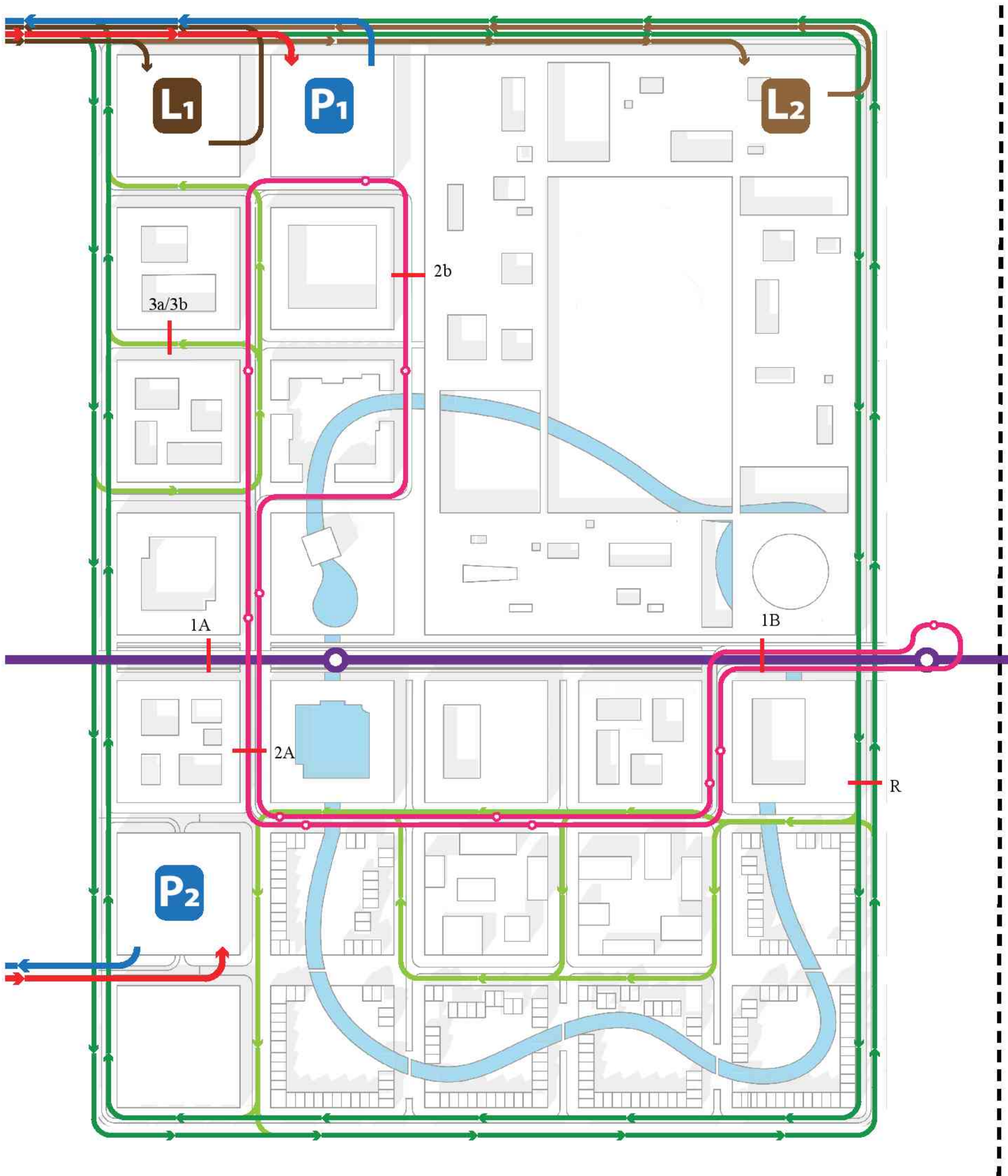
parking areas are located. Urban environment must be designed to fit the special needs of all most vulnerable groups of users. Provided they do not encounter any obstacles and are able to move freely around the campus (which requires particular attention to landscaping quality, kerbline design, and other similar issues), we suggest that they are provided with parking spaces within the areas P1 and P2, and they use the shuttle to move around the campus if necessary. The shuttle will be designed in such way anyone, including disabled people, will be able to use it. This innovative scenario works better for the quality of urban environment and helps convert more streets into shared surface and pedestrian-only designs.



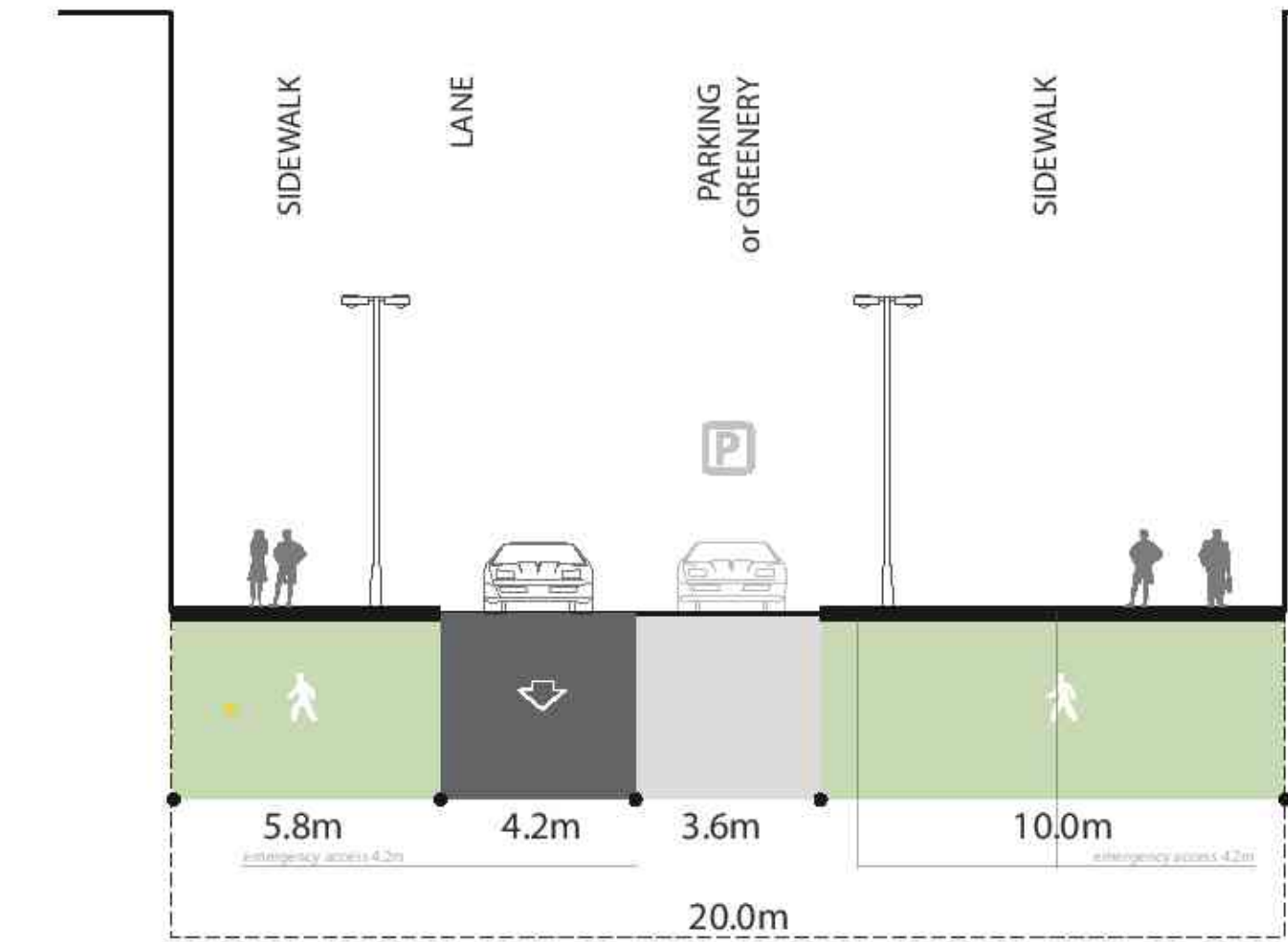
Connection of public spaces



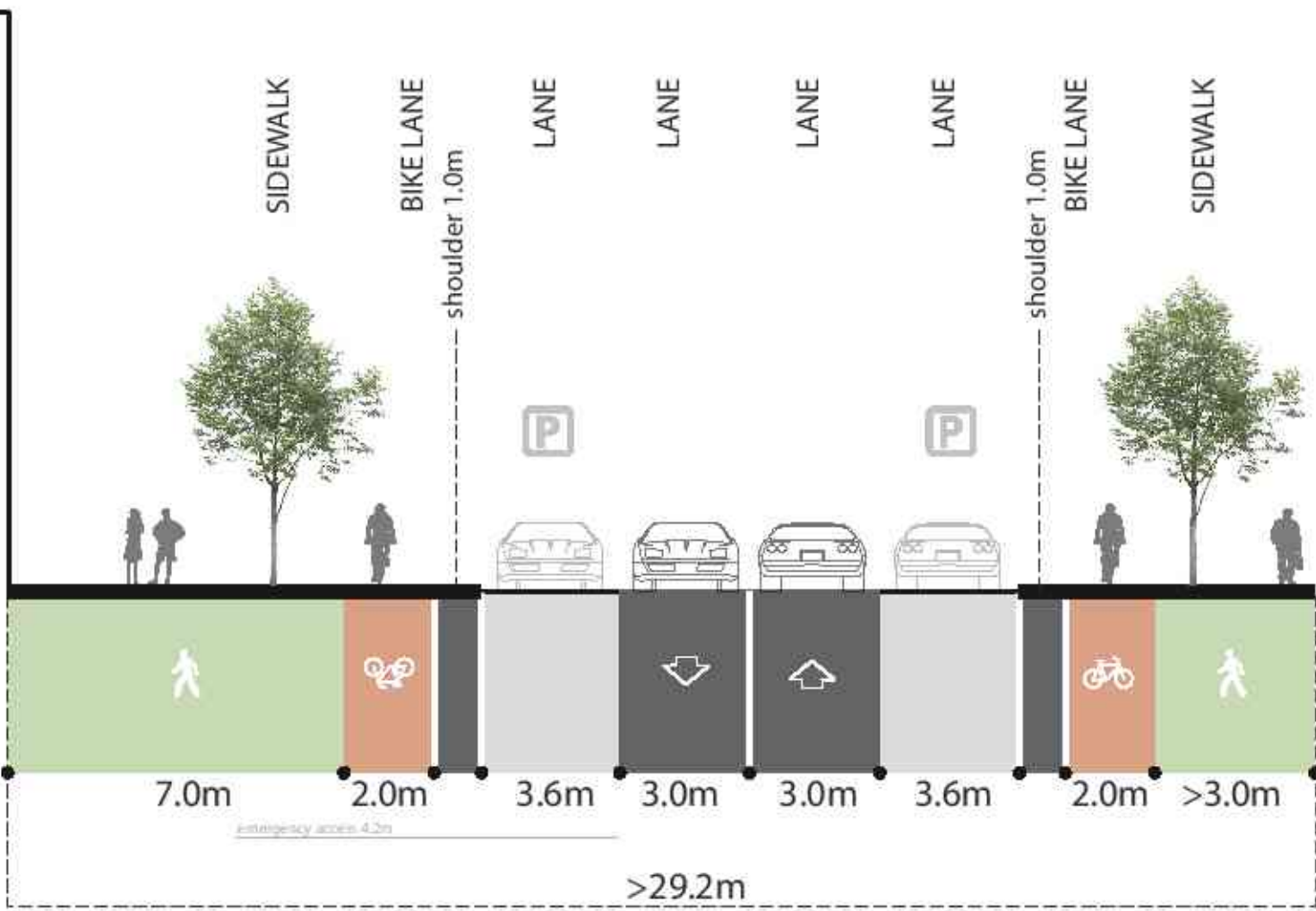
Progressive transport scheme



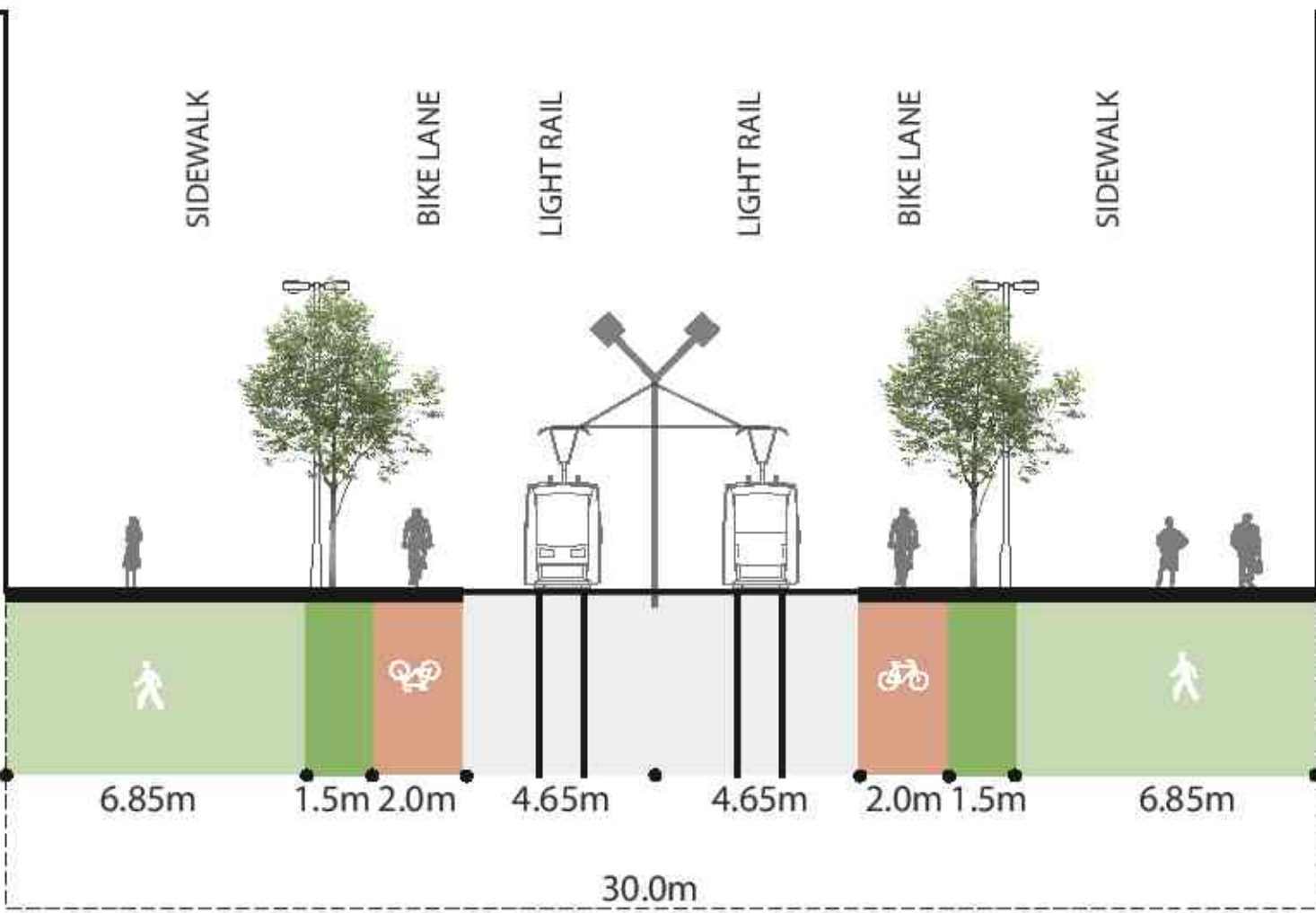
Innovation transport scheme



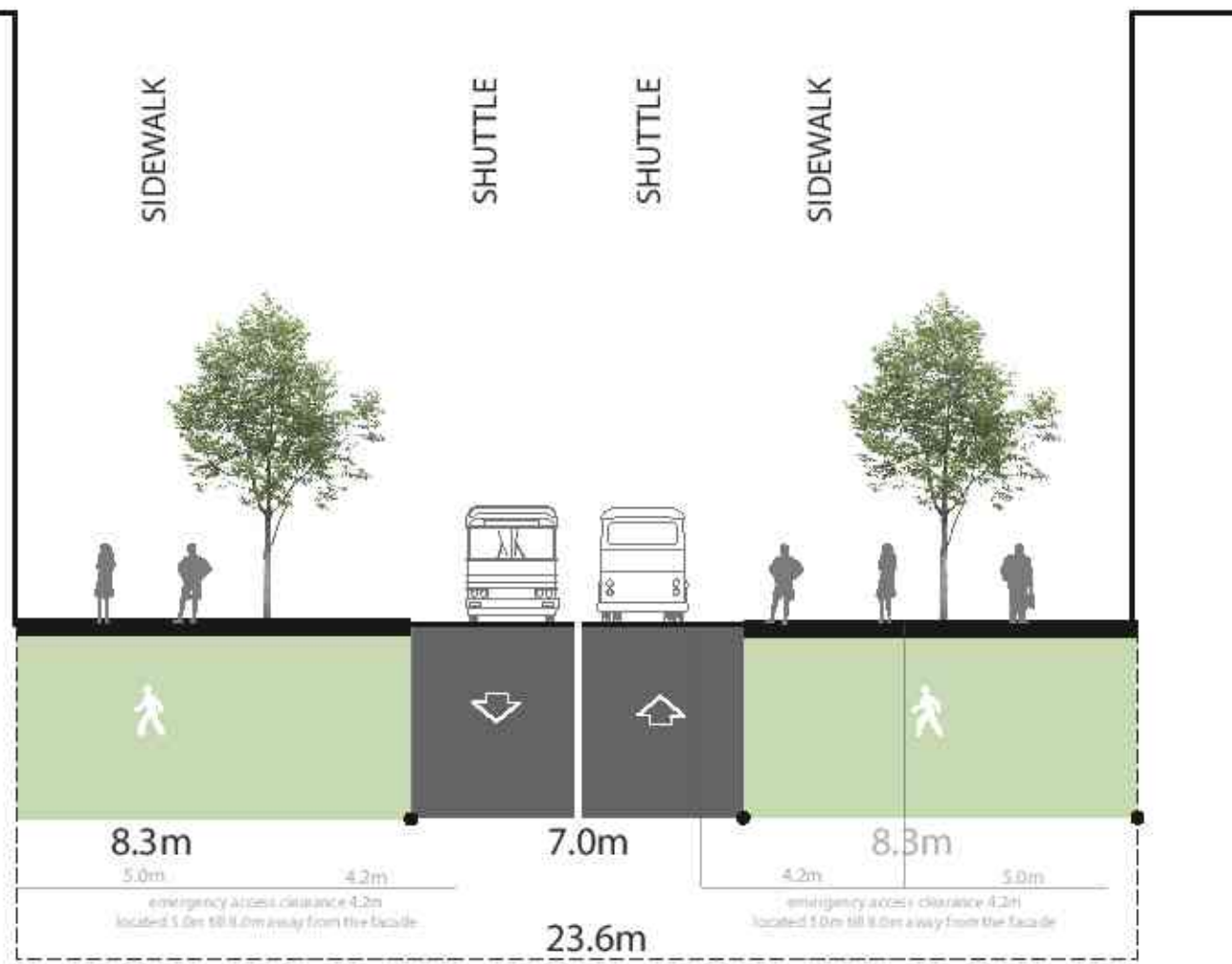
Street profile 3A



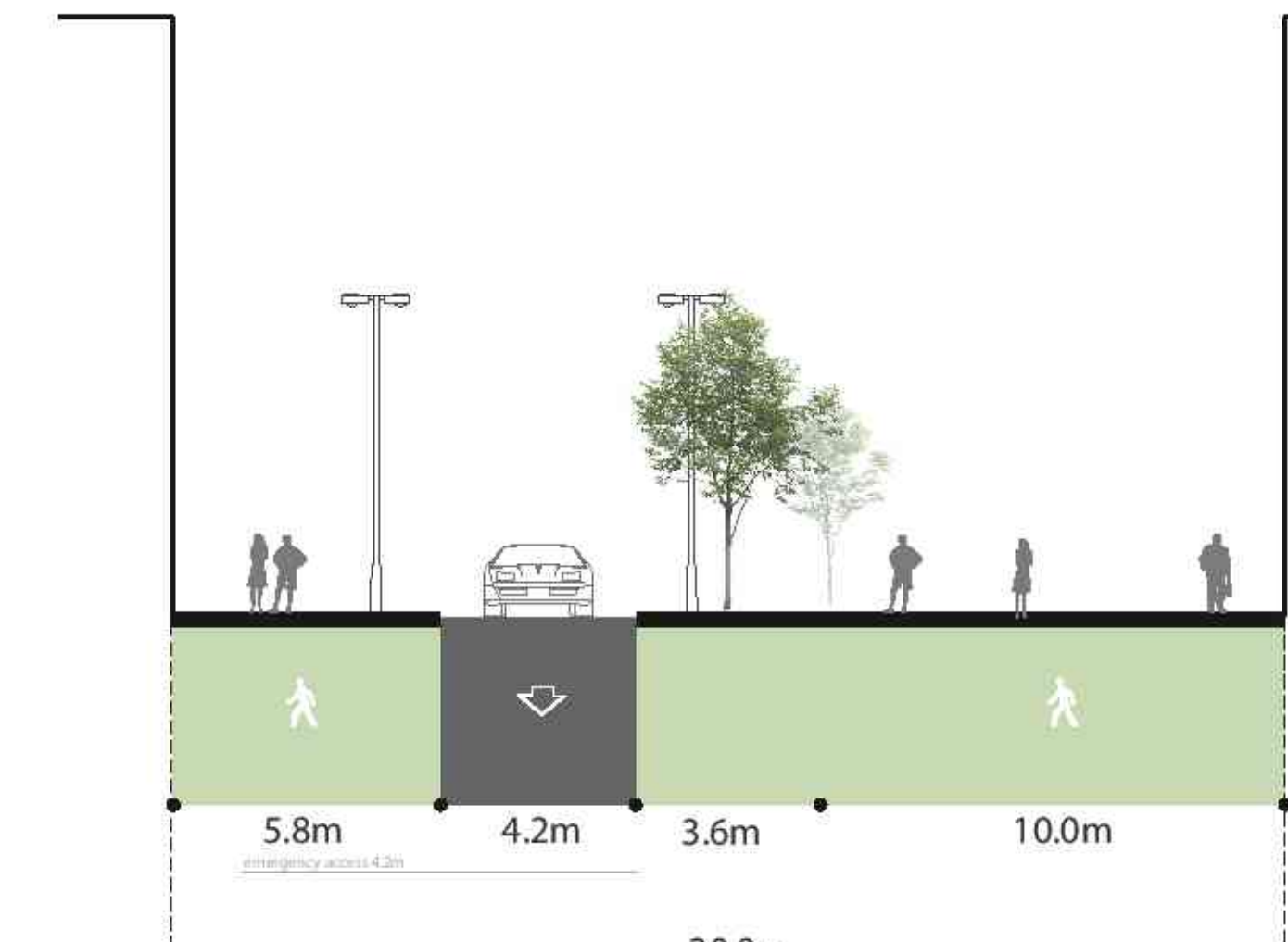
Street profile R1



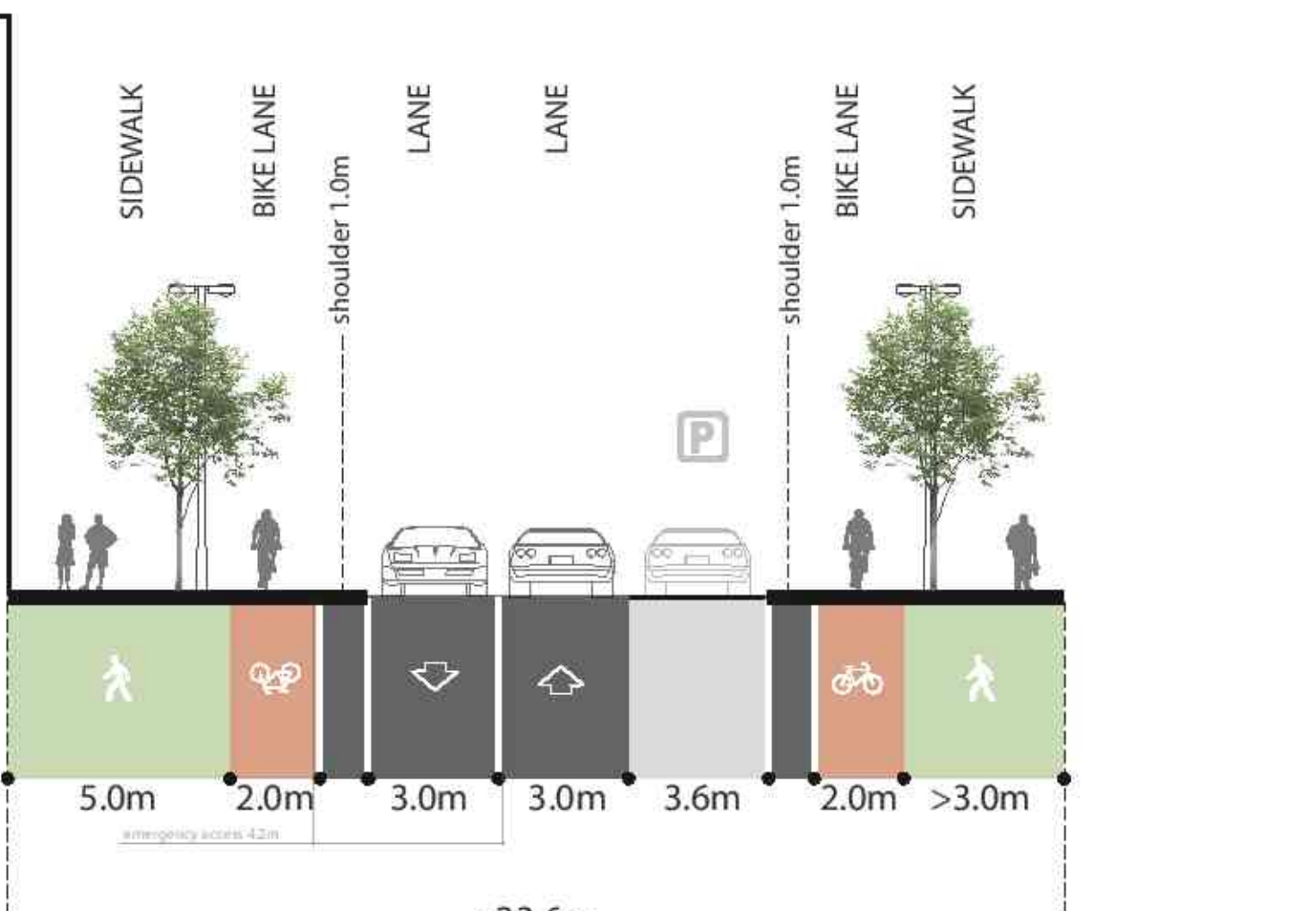
Street profile 1A



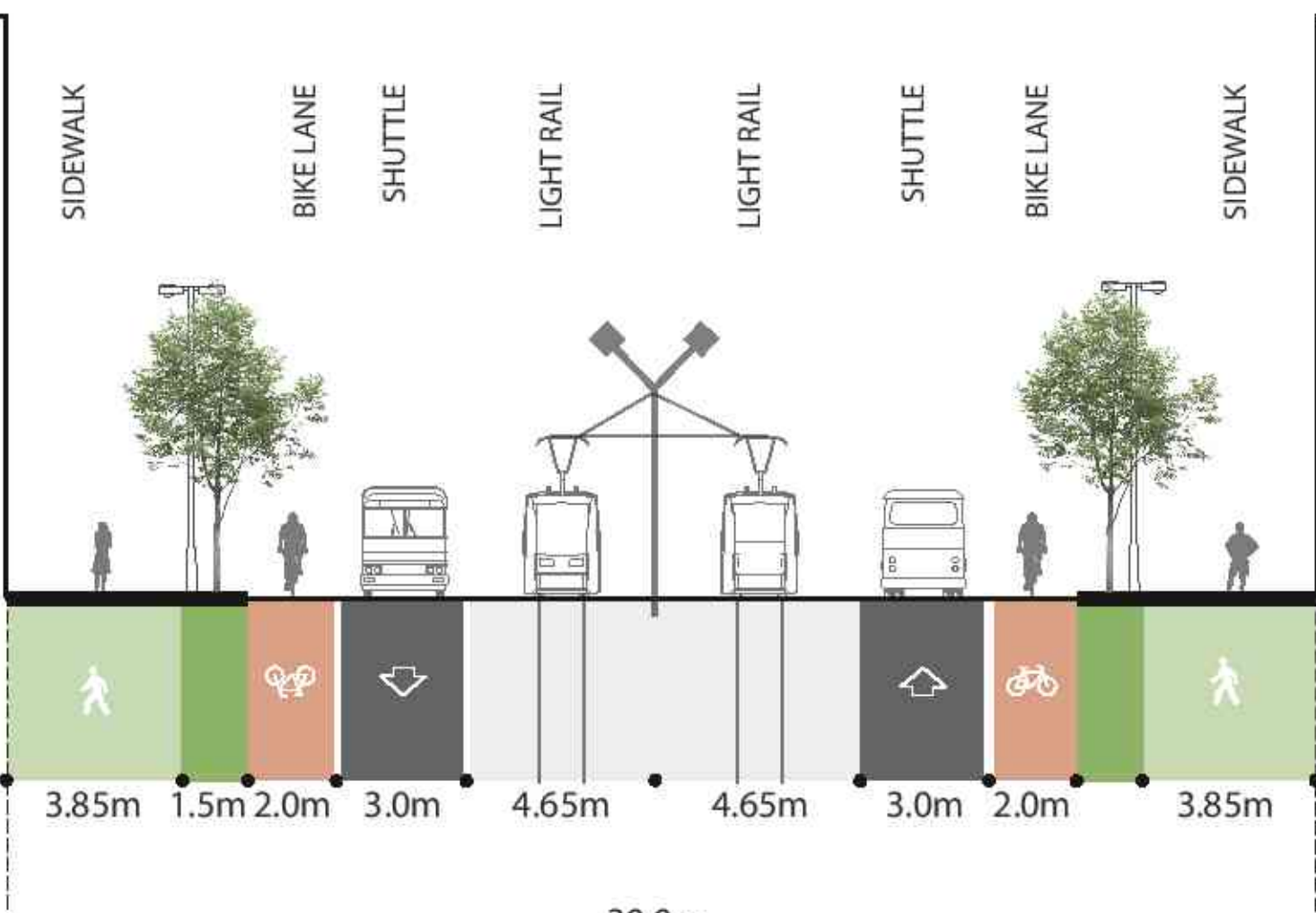
Street profile 2A



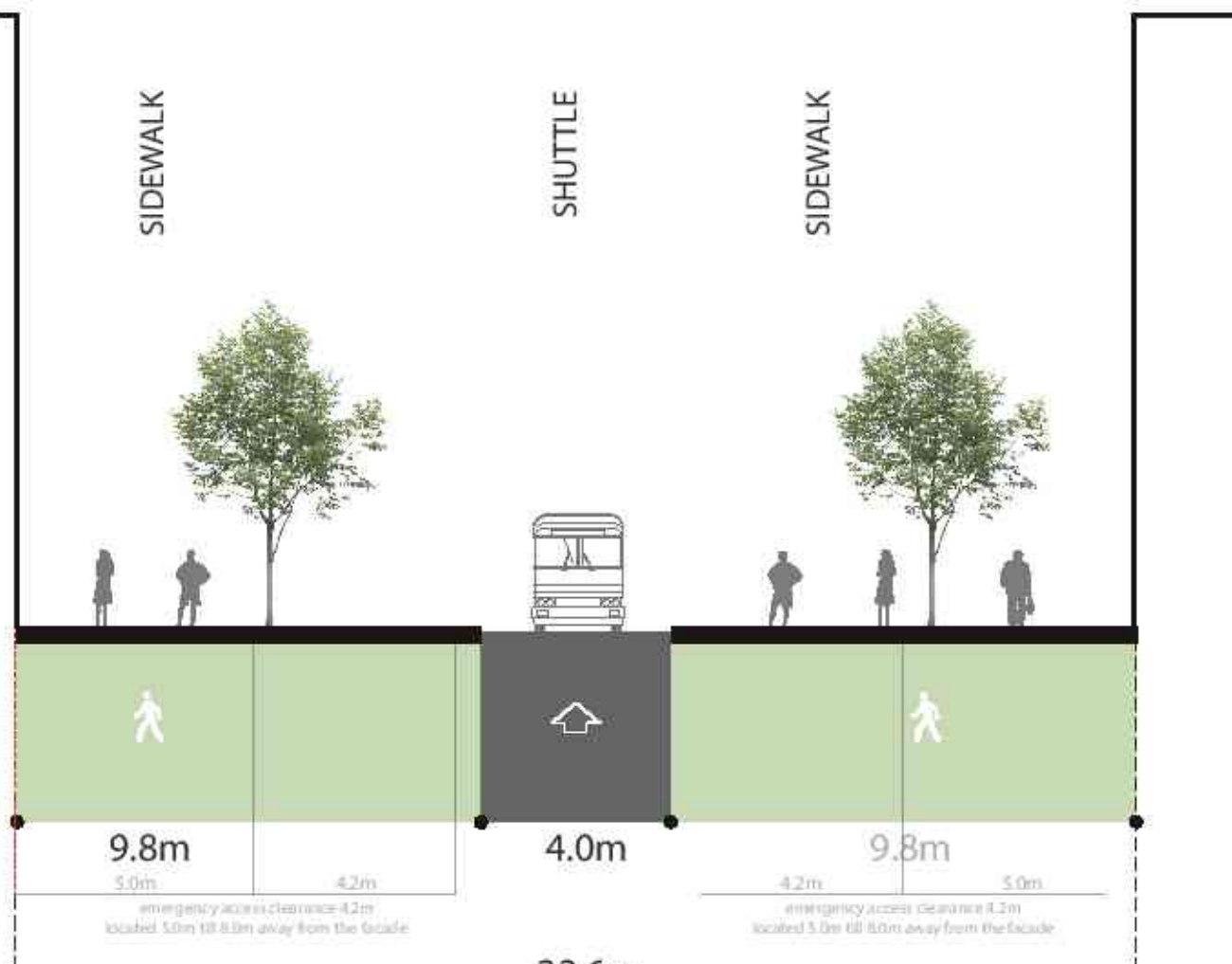
Street profile 3B



Street profile R2



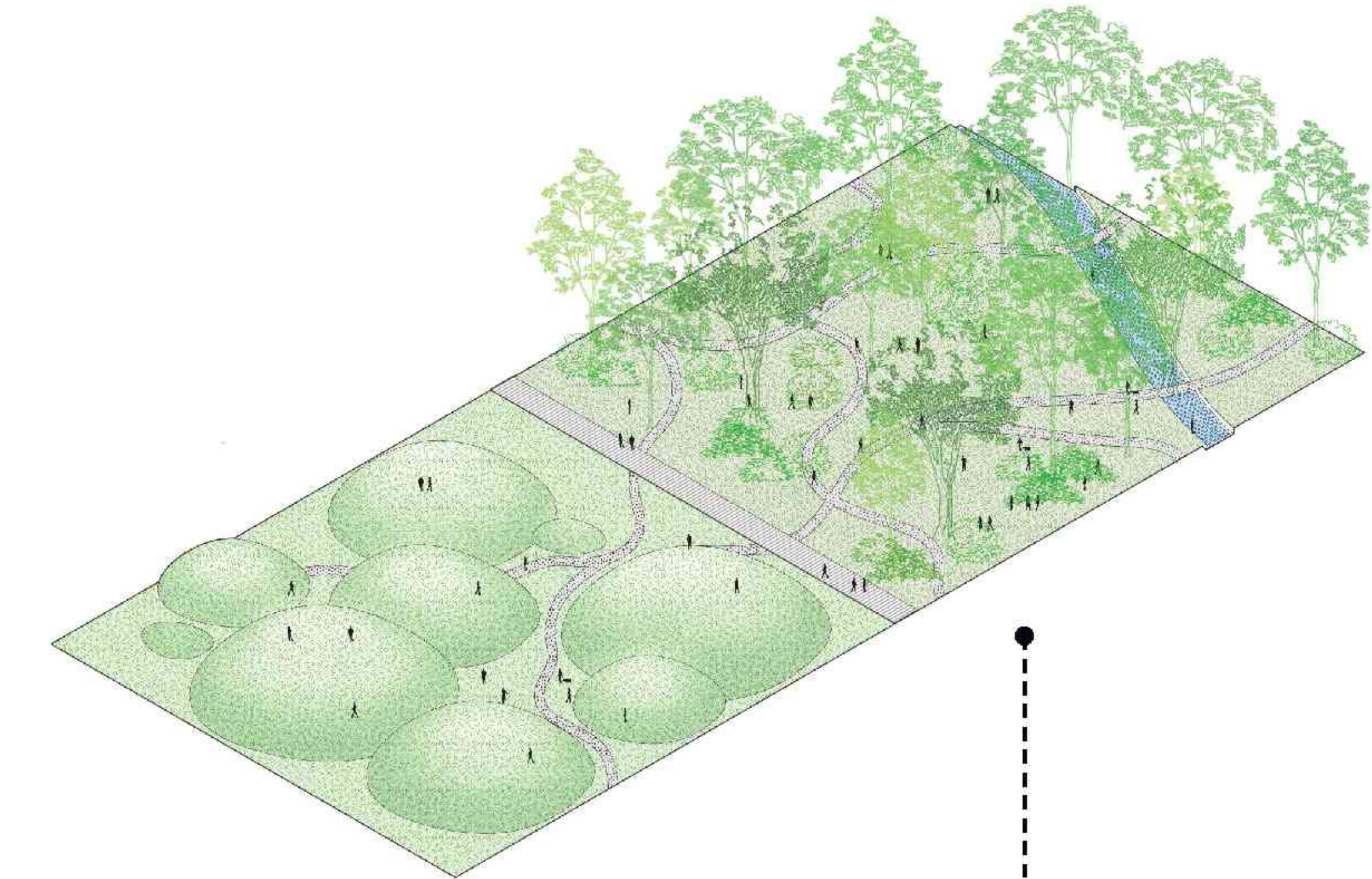
Street profile 1B



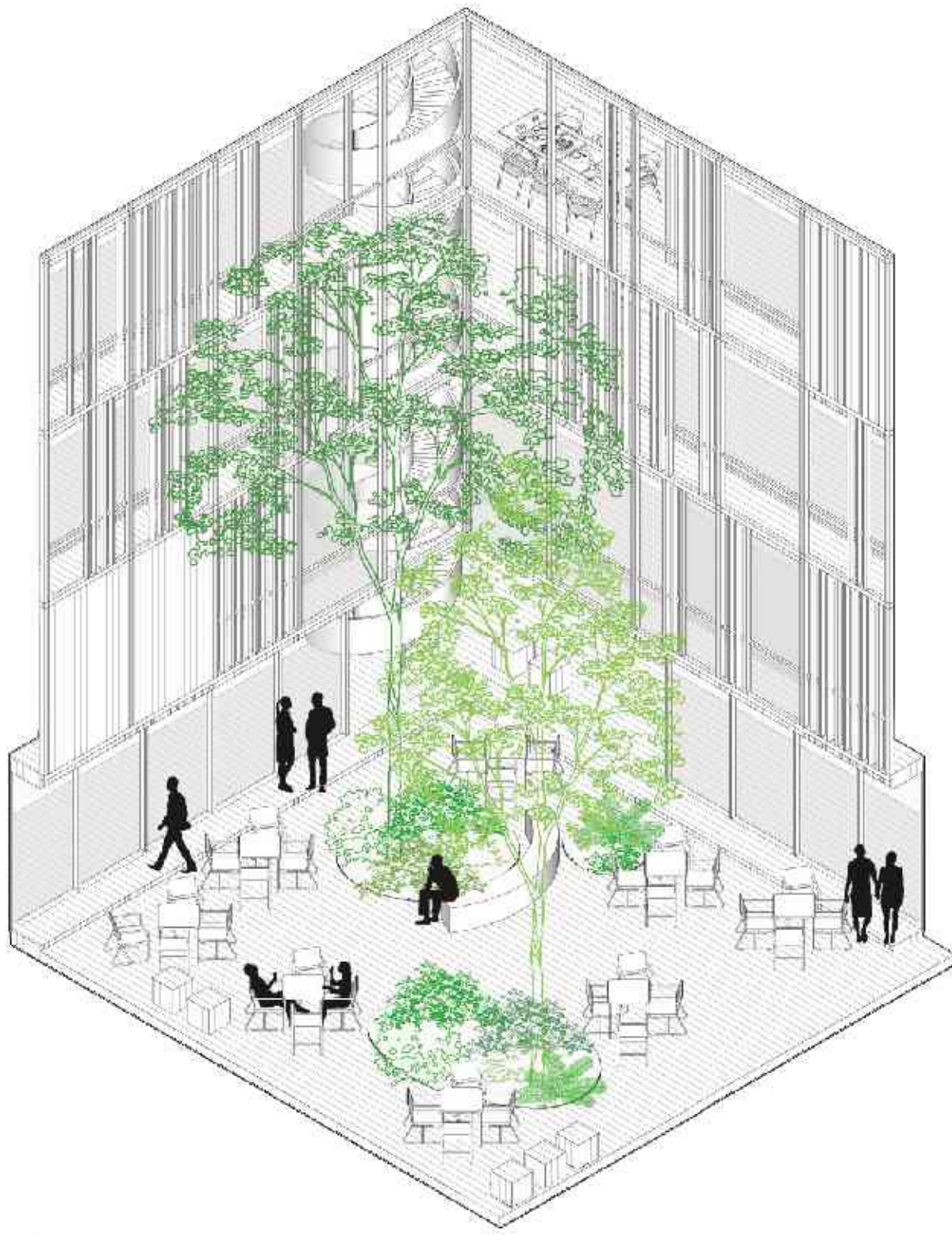
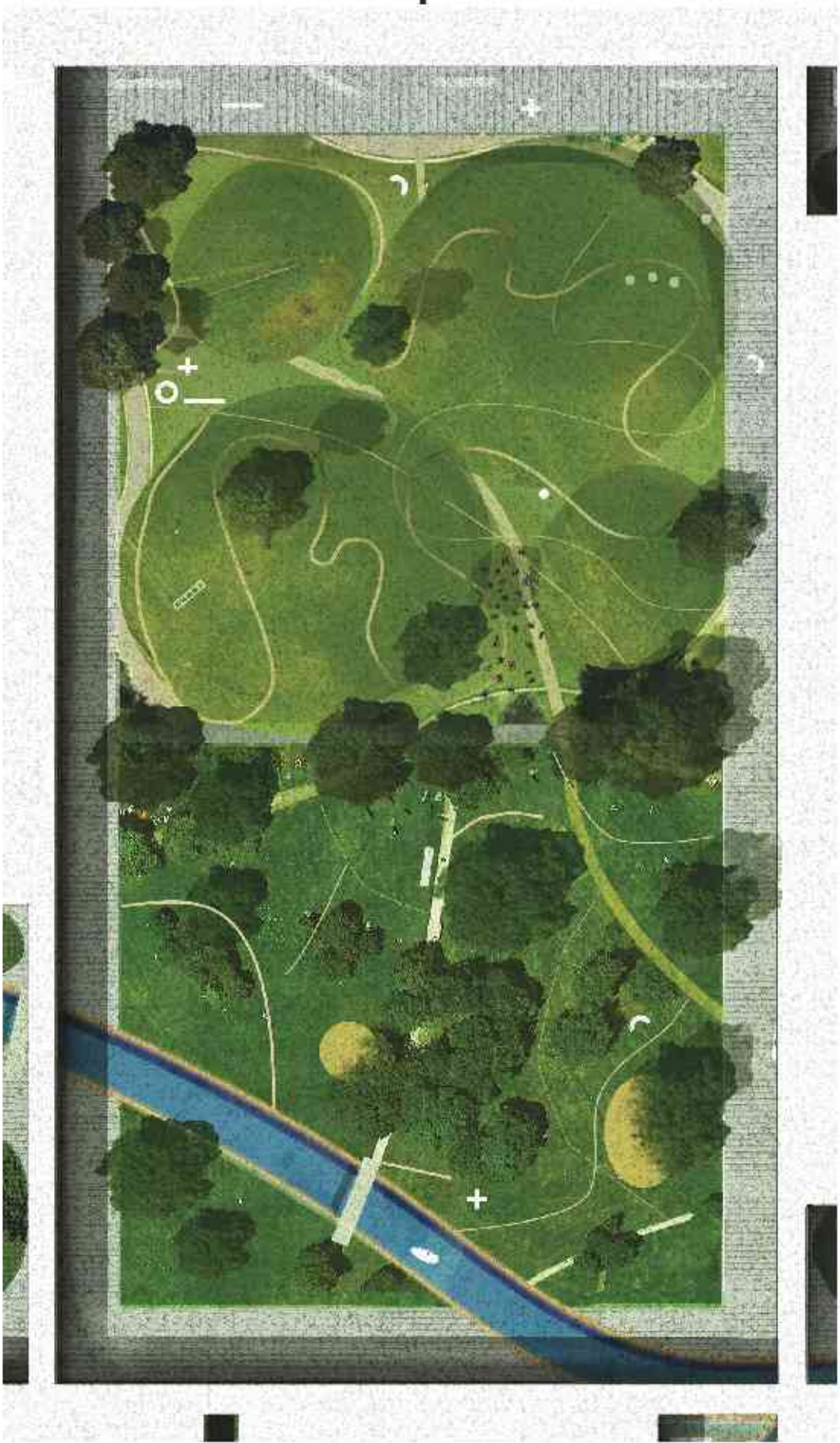
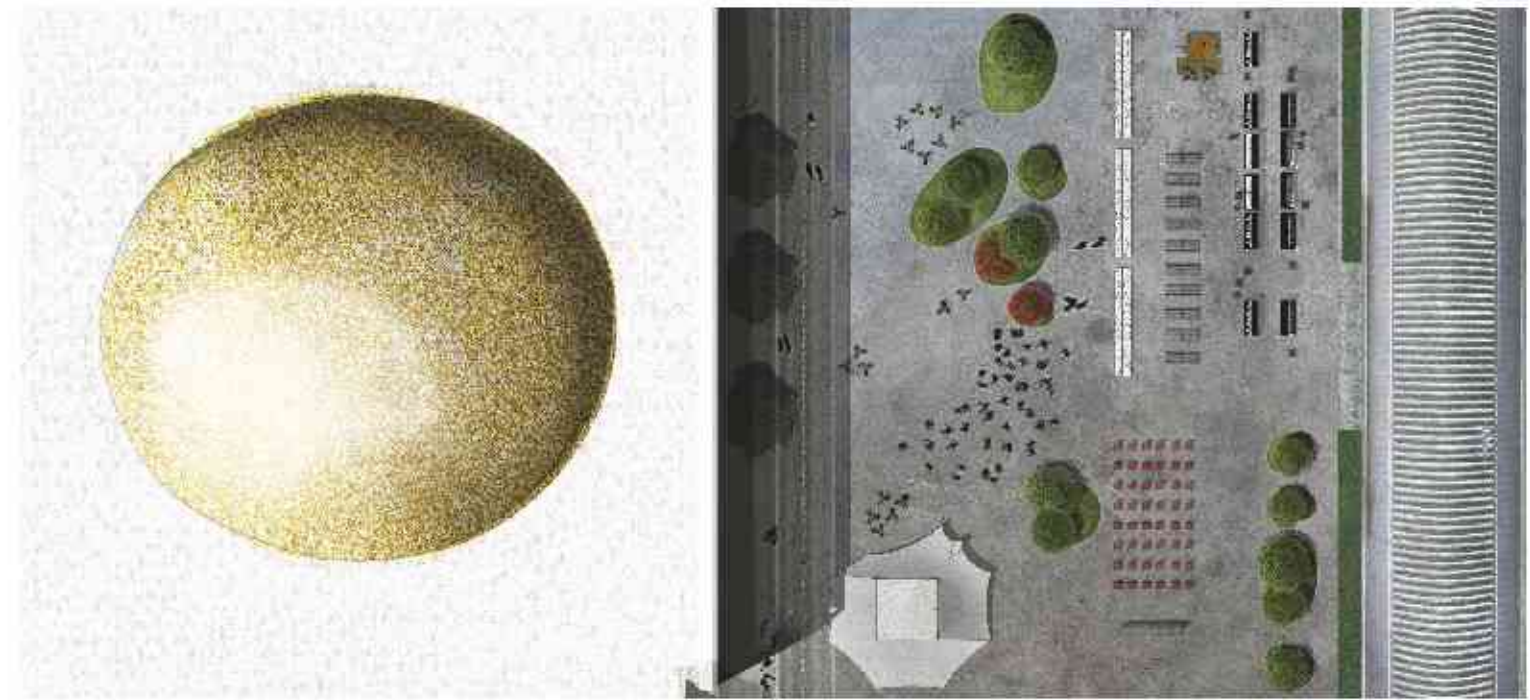
Street profile 2B

GREEN AREAS AND PUBLIC SPACES

INTERACTION GRID



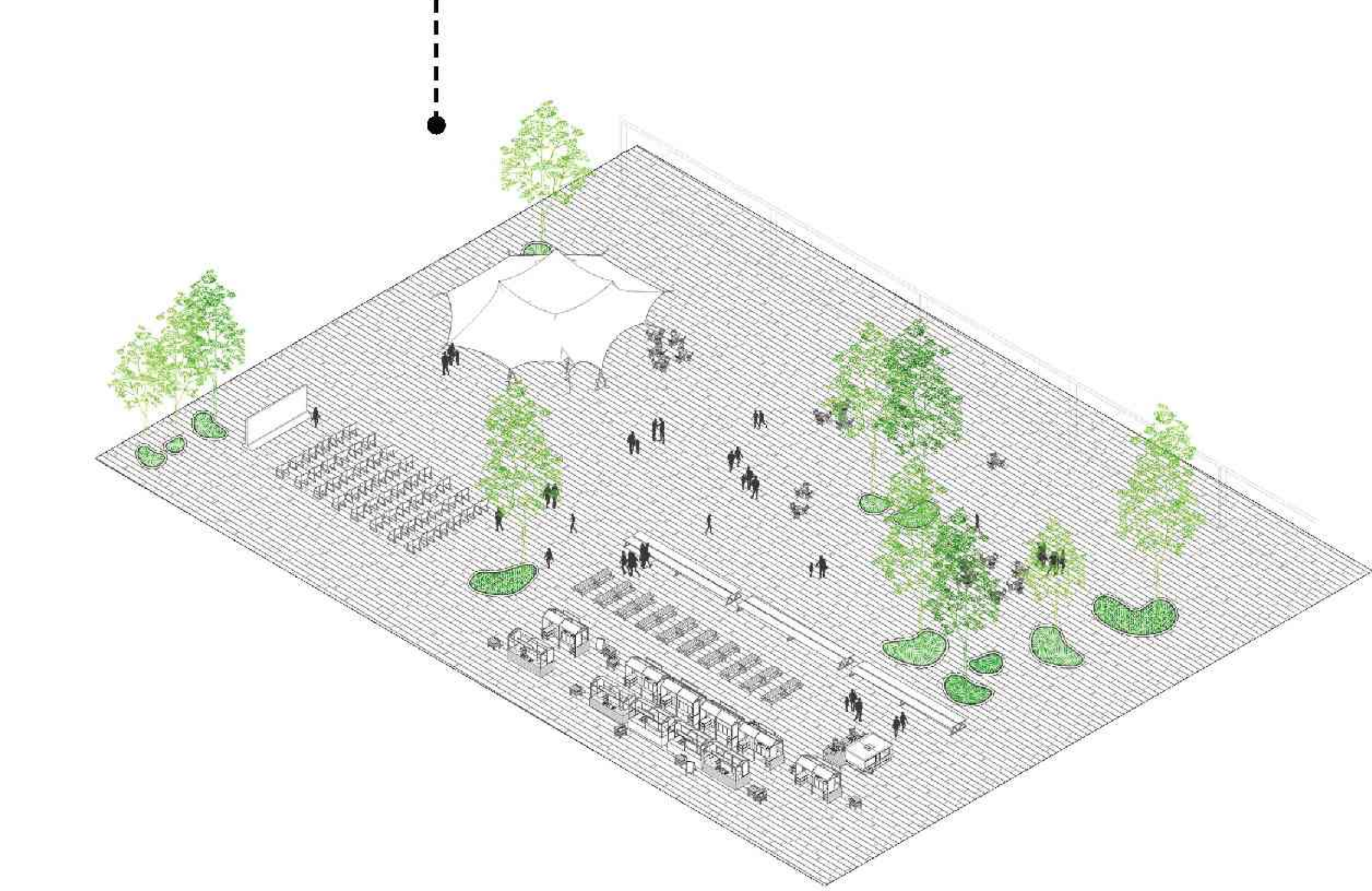
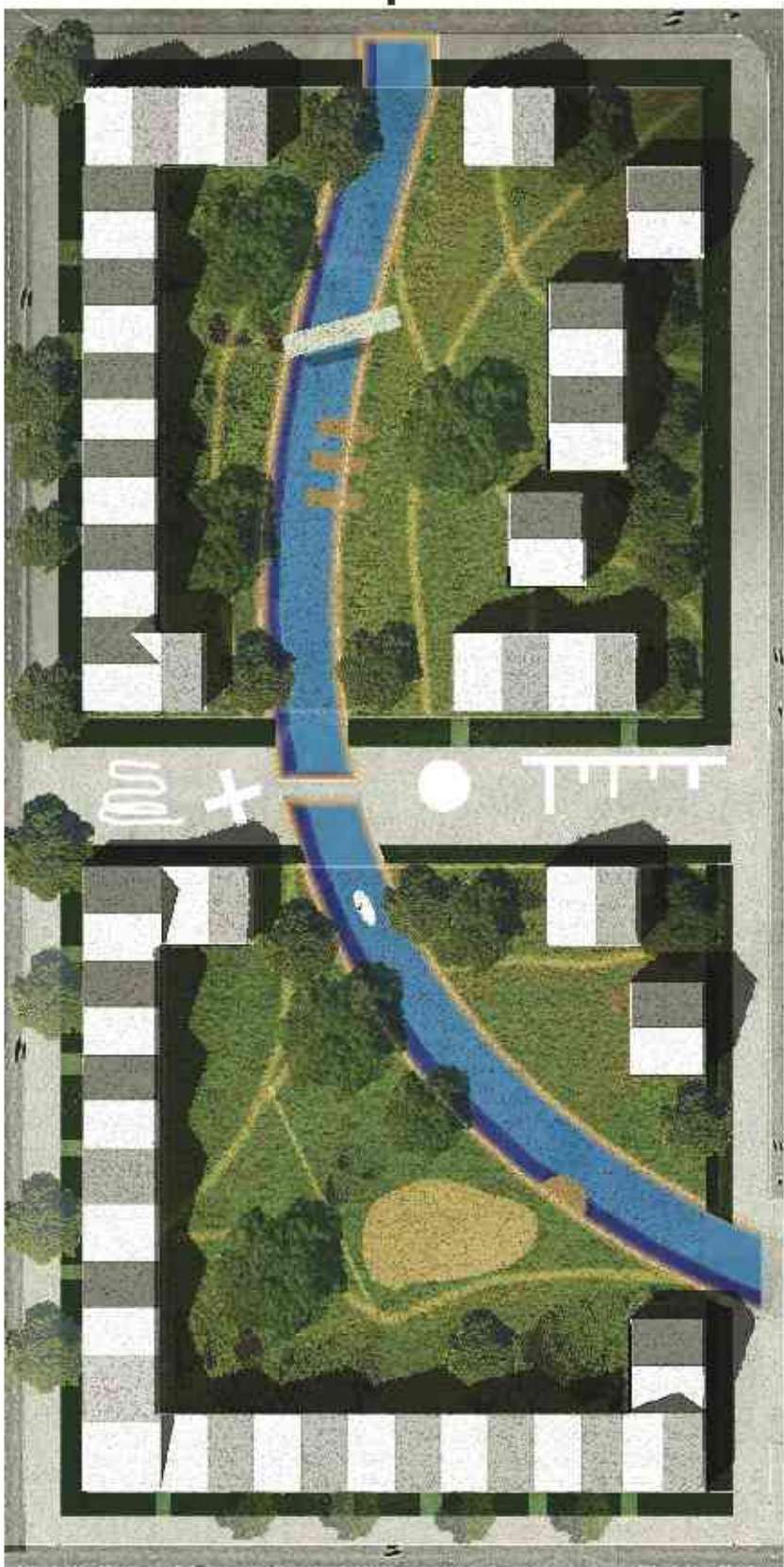
ITMO Summer Garden



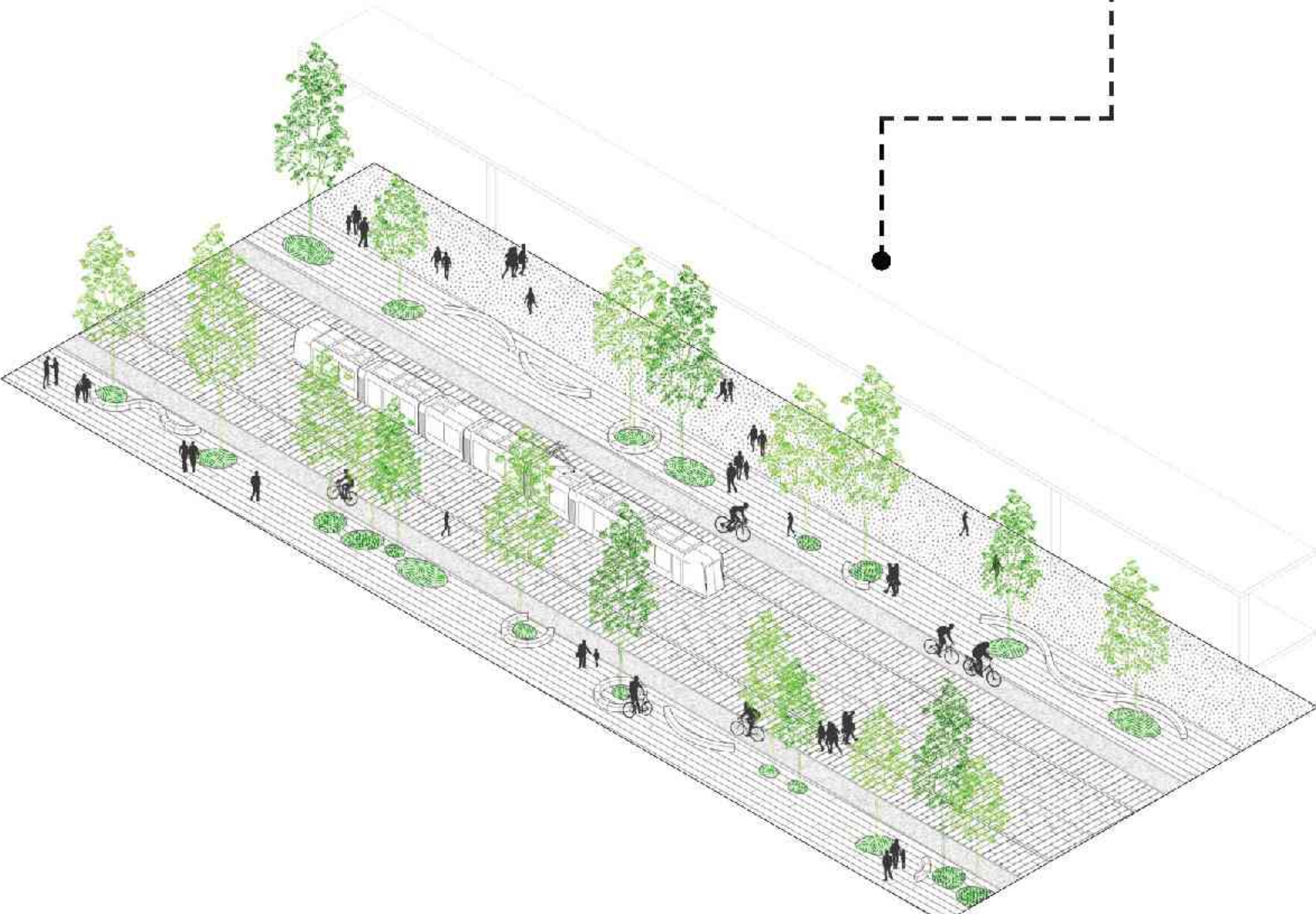
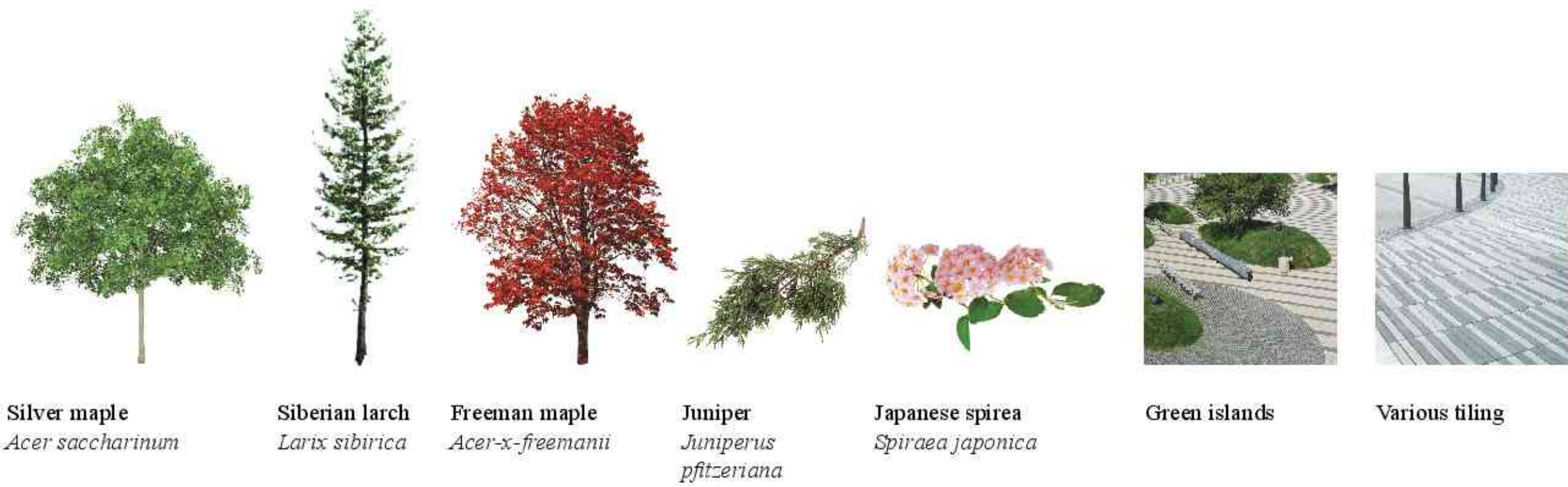
Office patio



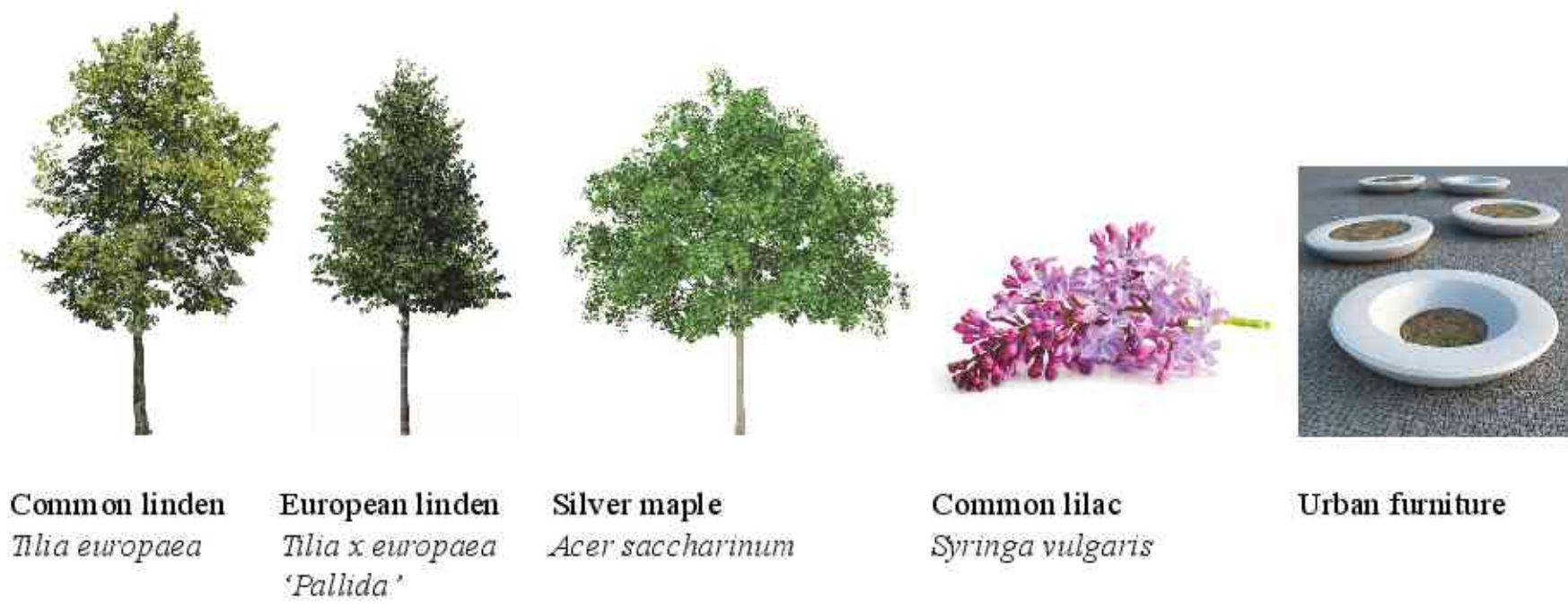
Housing gardens



Railway station entrance square



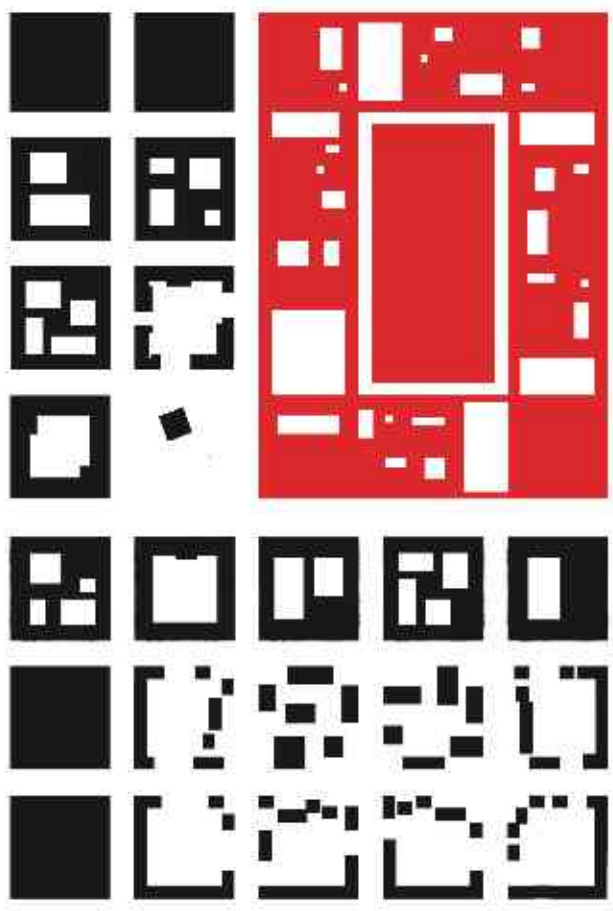
Main boulevard



Skate park



EDUCATIONAL ZONE



Main educational building is the central element of ITMO Highpark Campus and the most important building in the future Yuzhniy city. This multifunctional «mat building» is functional and efficient: it has spaces for classes, conference center, administrative offices, cafeteria, library, mediateque, data and many other spaces. Main building, measuring 280 m by 380 m is a landmark, which will stand the test of time. At the same time its 'hovering' volume as well as its «Grand steps» create iconic and diverse public spaces. These areas can be used both by students and business people as well as by the citizens of Yuzhniy.

INTERACTION GRID



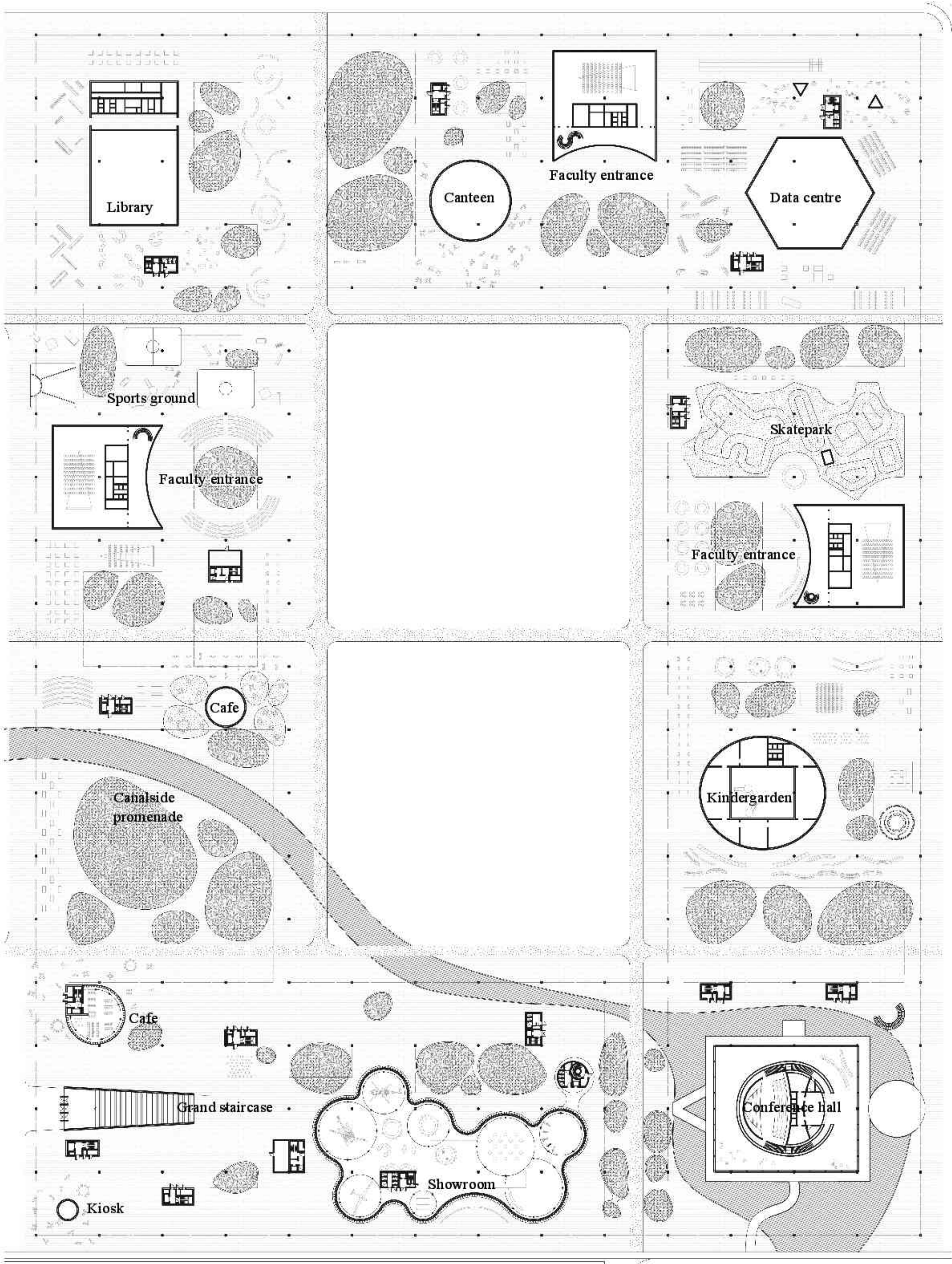
Reference: cantilevering building above the chanel, Saint Petersburg



View under the academic main building plate



Academic main building facade
Scale 1:500

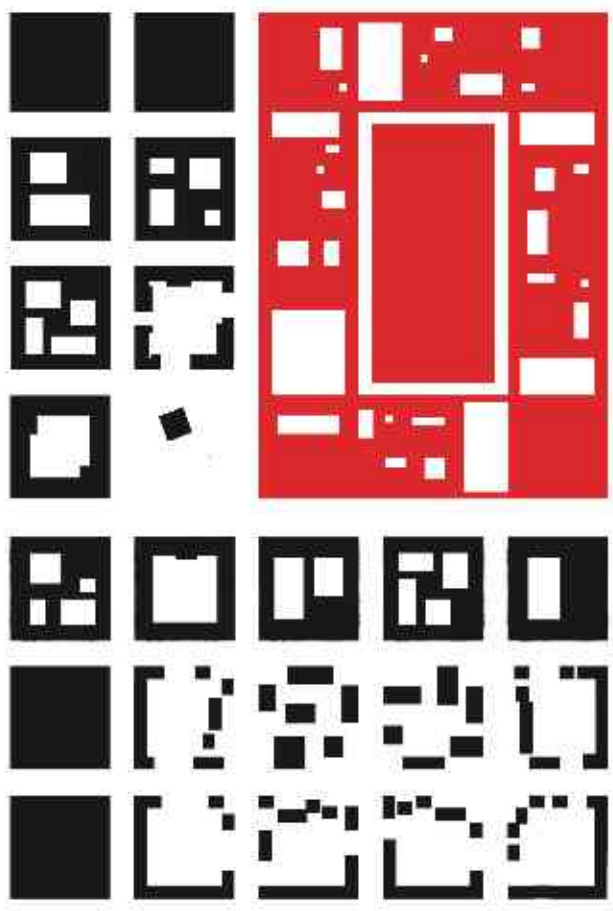


Masterplan of the educational zone
Scale 1:1 000



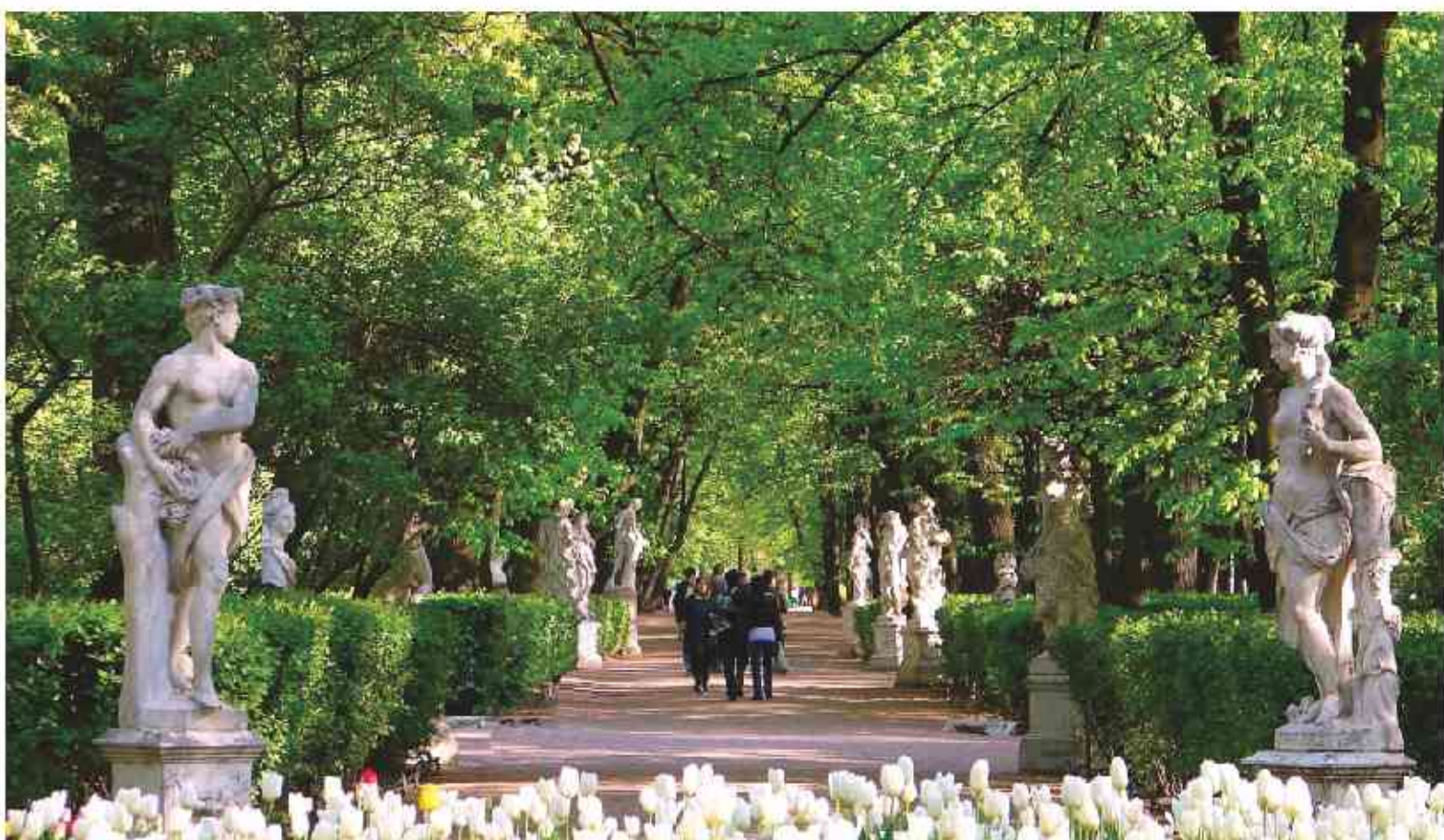
View under the academic main building plate

EDUCATIONAL ZONE



Besides all academic functions in its upper floor, the building functions as an infrastructural slab, under which a covered public space is created. The slab contains different functional elements such as heating devices, drop down screens, sprinklers etc. It as a fully functioning outdoor MEP ceiling, under which people can gather in the cold season. Besides light wells, providing light inside the building and under it, there is a main central green void: the «summer garden», for all students to gather, to read, to rest, to walk. The building rests on multiple hills and pavilions on the ground floor, which are open to the public access.

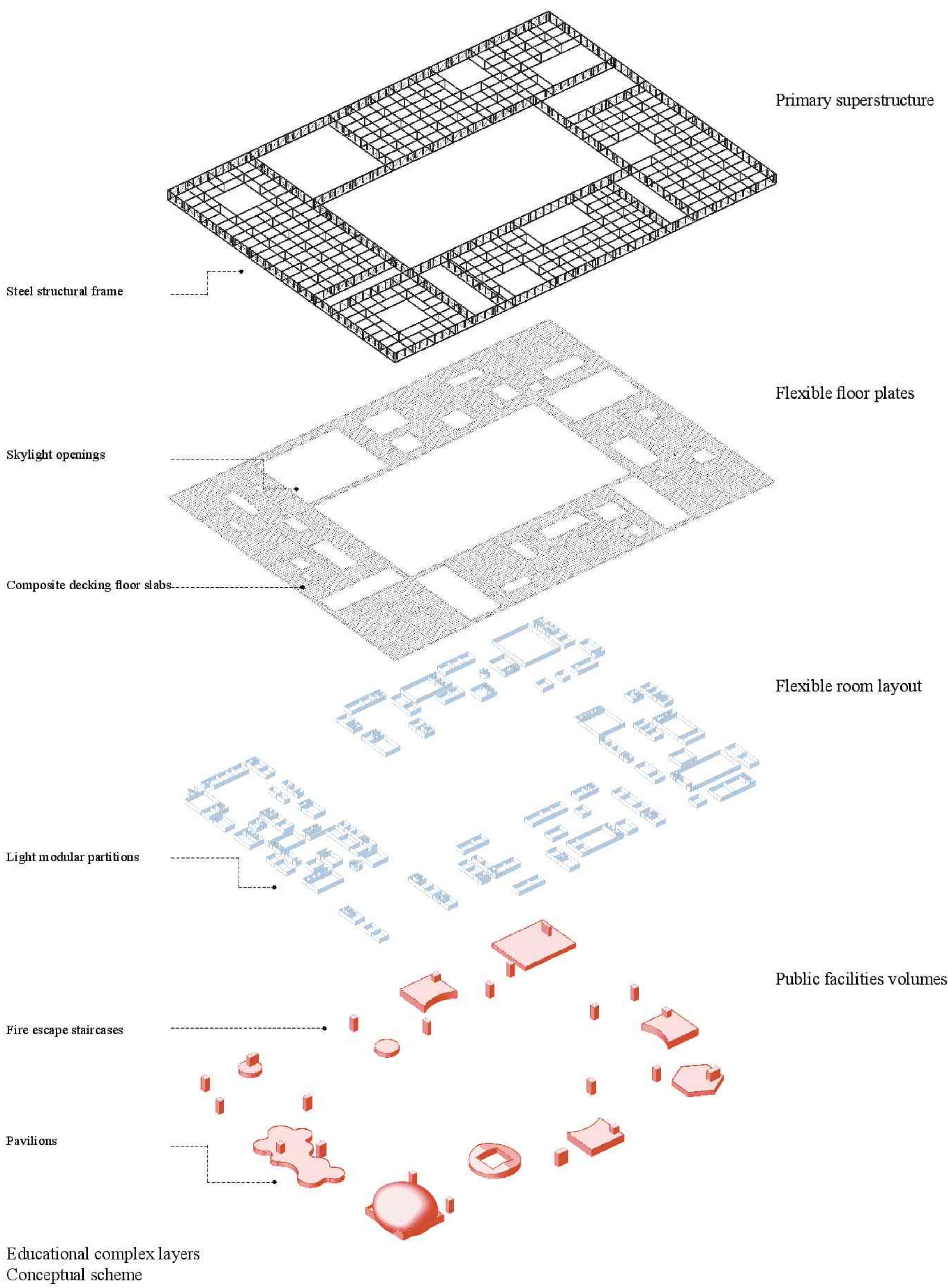
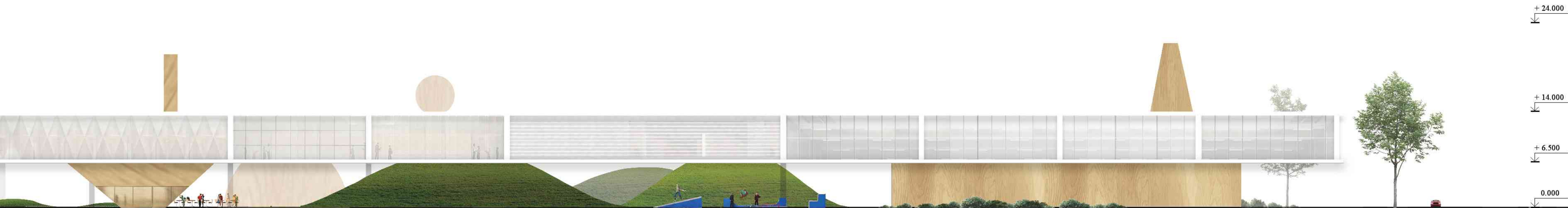
INTERACTION GRID



Reference: Saint Petersburg Letniy Garden (Summer Garden)



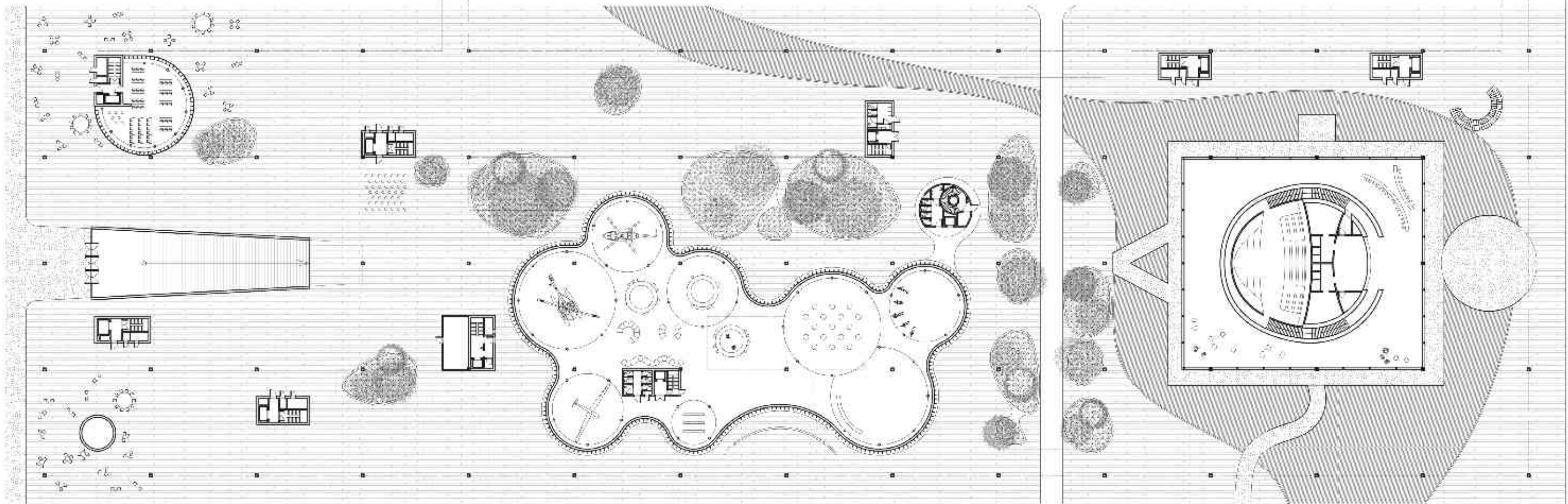
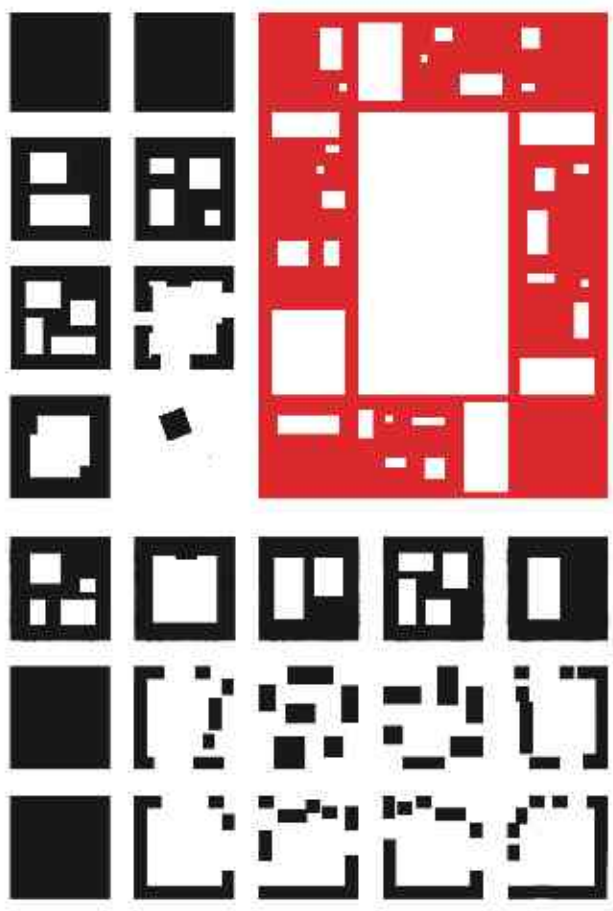
View towards the central park



Boulevard view towards the academic main building plate

ITMO HIGHPARK MAIN BUILDING

INTERACTION GRID



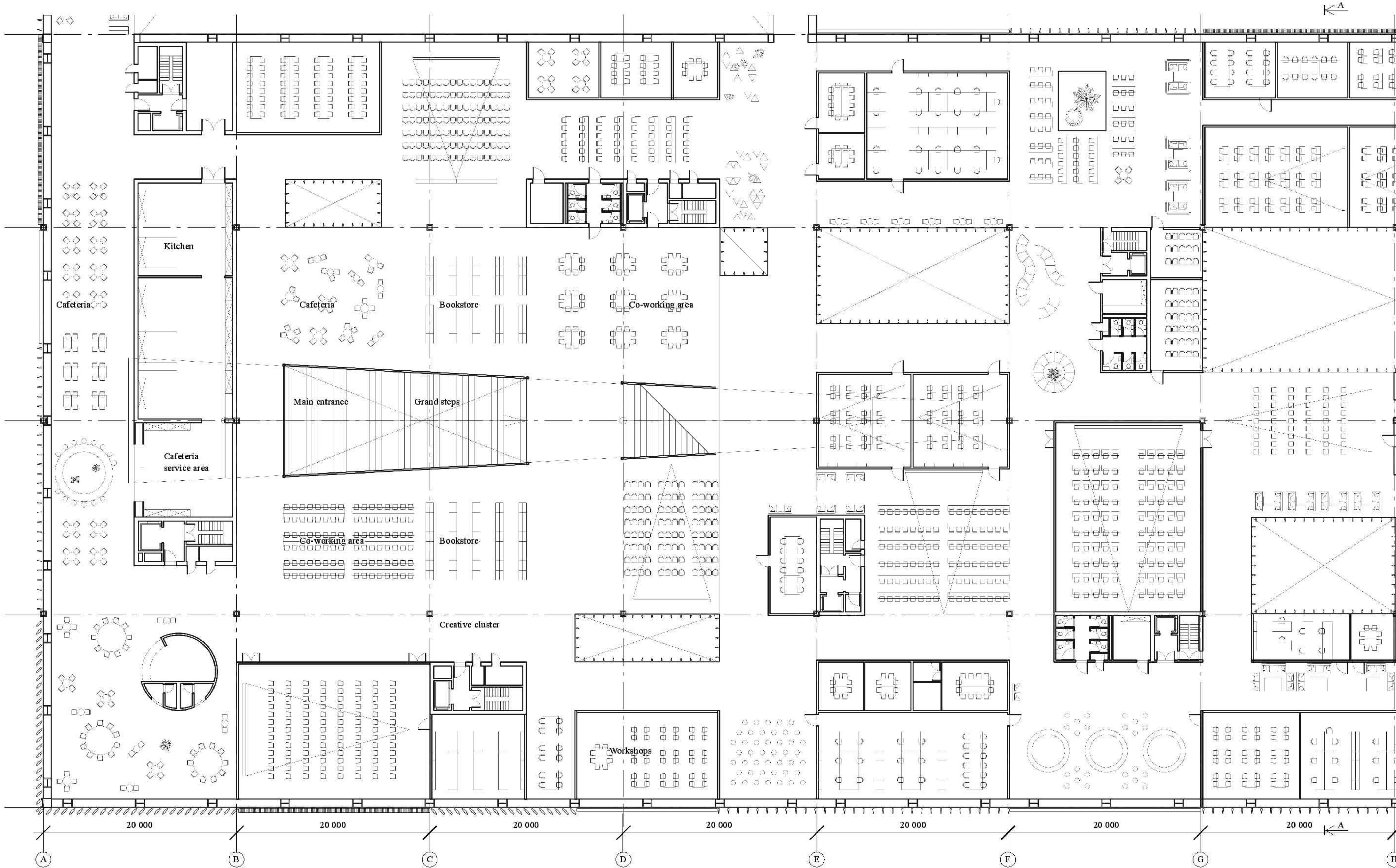
Academic main building ground level (0.000 m)



View towards the conference hall from the entrance square



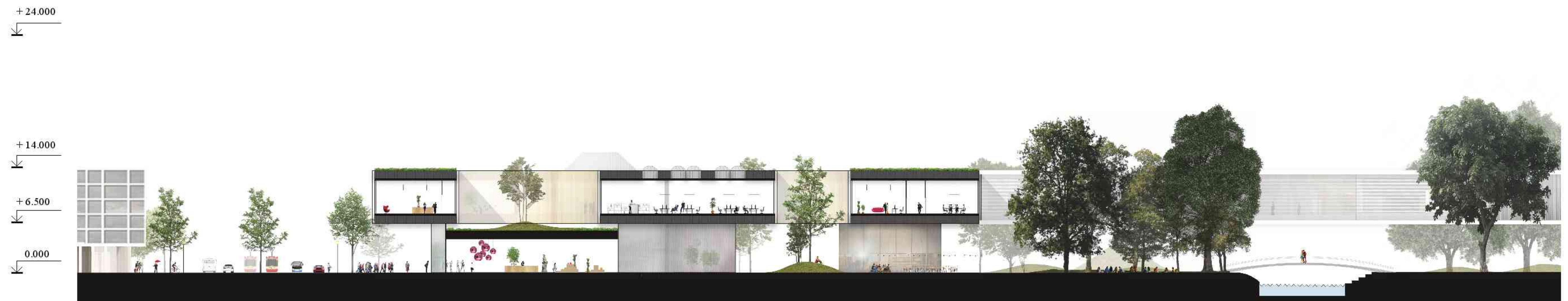
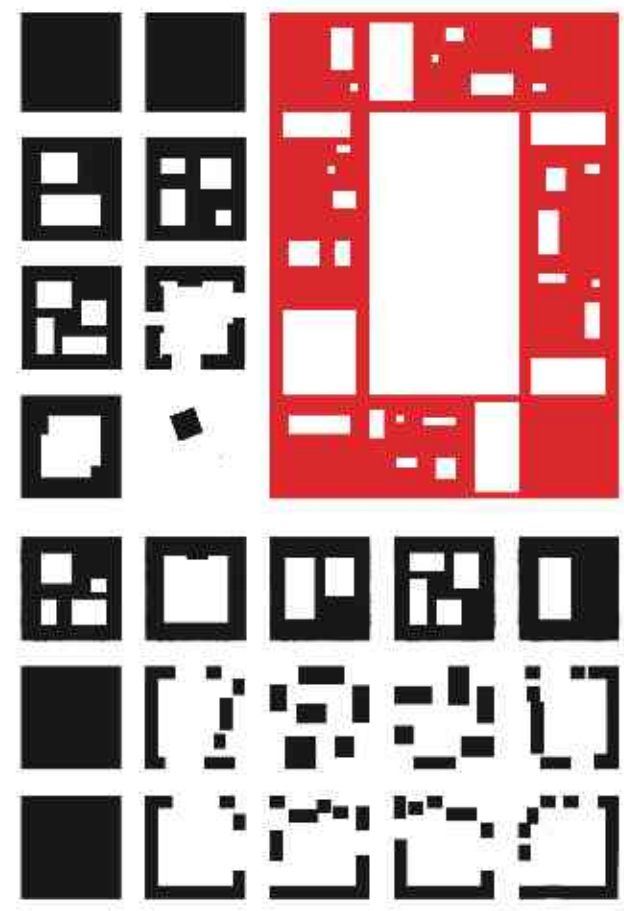
Academic main building facade
Scale 1:200



Academic main building level 1 (+6.500 m) plan
Scale 1:200

ITMO HIGHPARK MAIN BUILDING

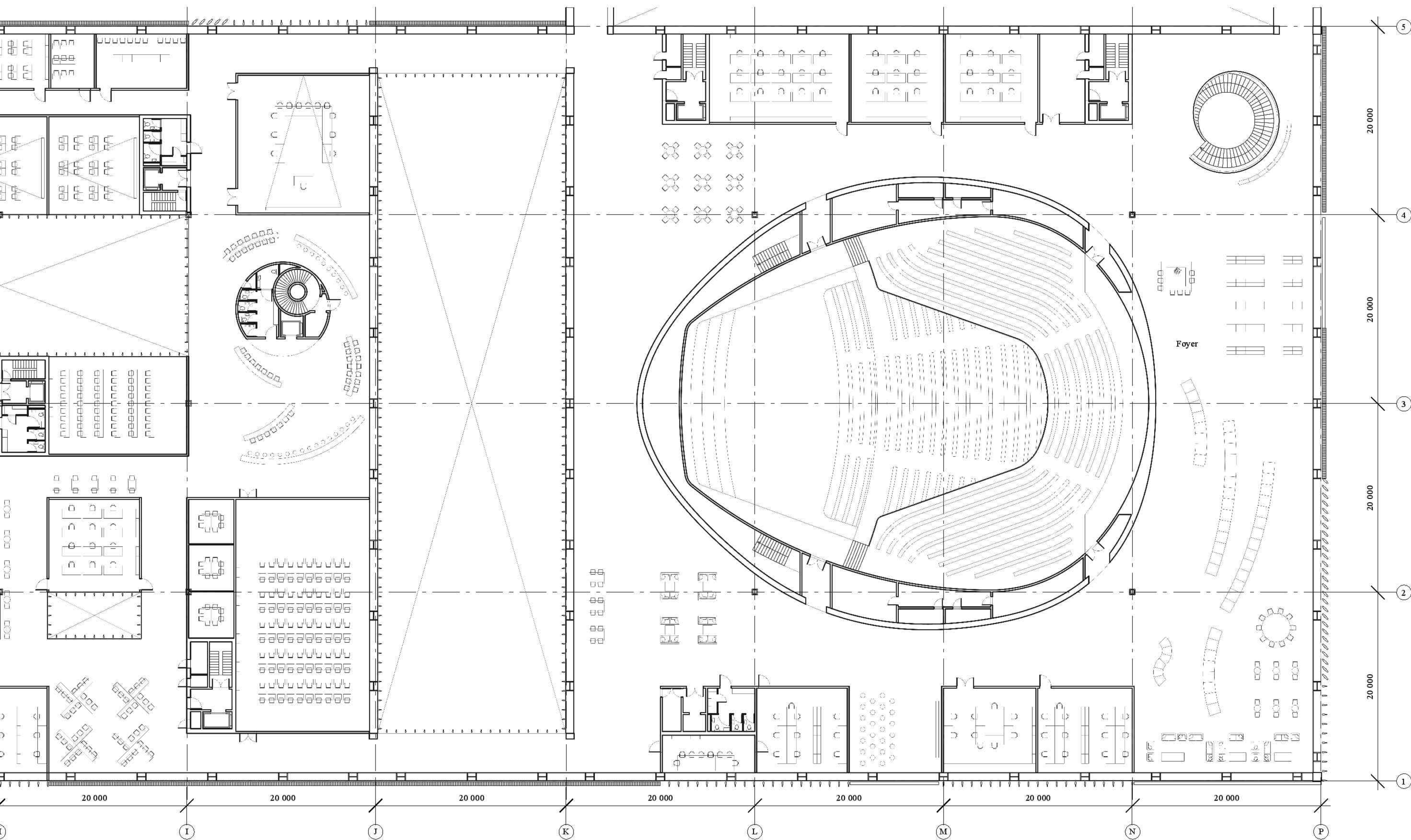
INTERACTION GRID



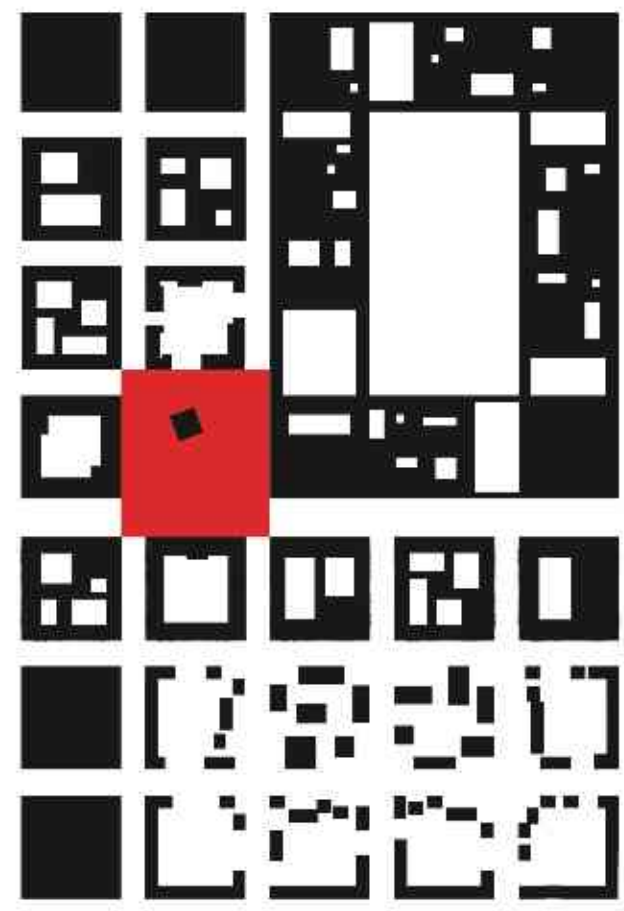
Academic main building section A-A Scale 1:250



Grand steps view

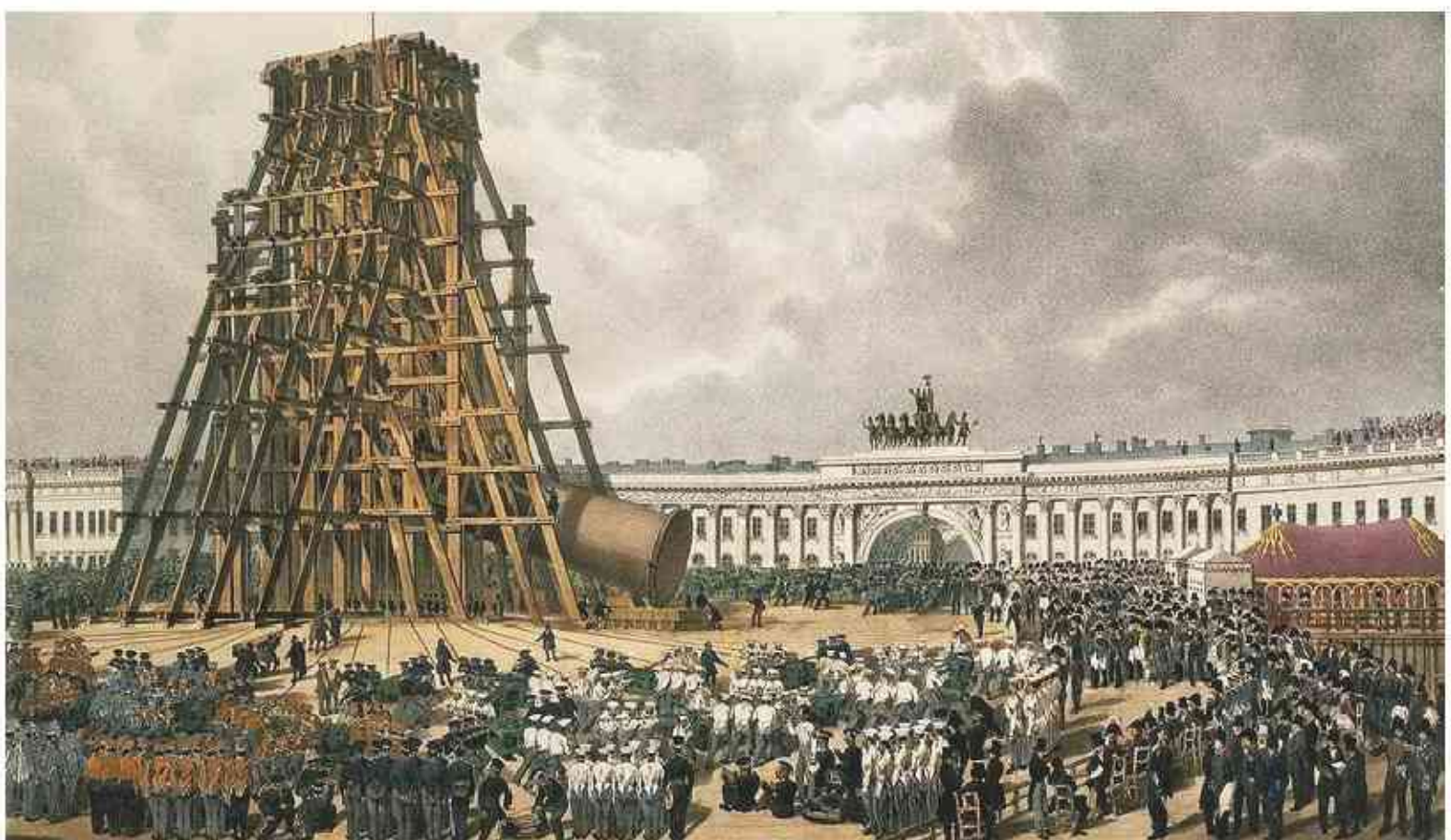


INNOVATION CENTER



Area of the Innovation Center contains the Business incubator, Urban Science Center and the Advanced Production Zone. The heart of it is the Main Square, where public events will take place. This is the meeting point of all functional loops. Buildings facing the main square are: ITMO Main Building, Hotel, Business Incubator, National Urban Science Centre. Multifunctionality transforms this square into a melting pot, where all social groups meet. River with public waterfront crosses the main square. The center of the square is the «Innovation Cube» - a sculptural volume with the exhibition of the Urban Science Center.

INTERACTION GRID



Reference: Saint Petersburg Letny Garden (Summer Garden)



Central square night view



Principal section through the office buildings

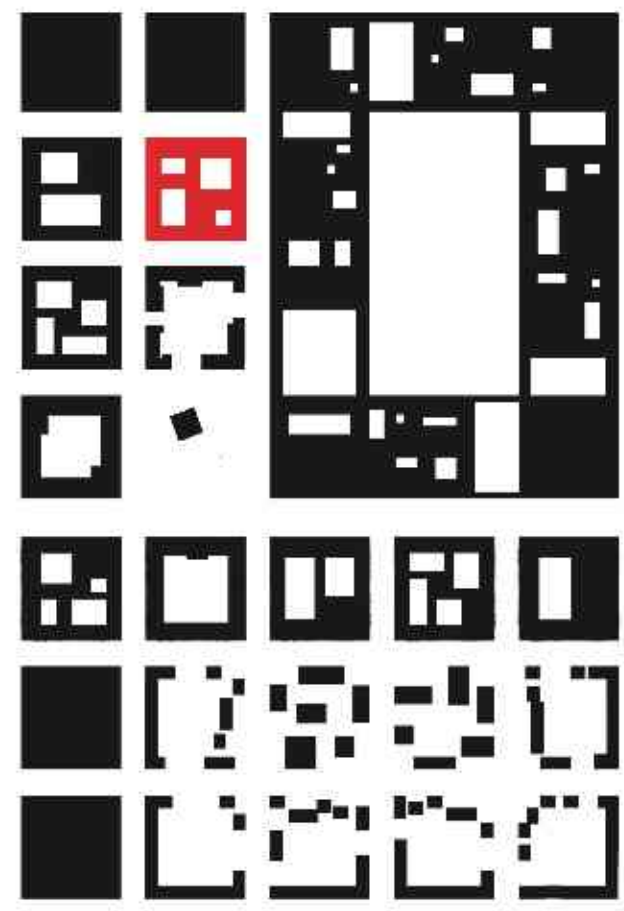


Offices area



Central square winter view

INNOVATION CENTER

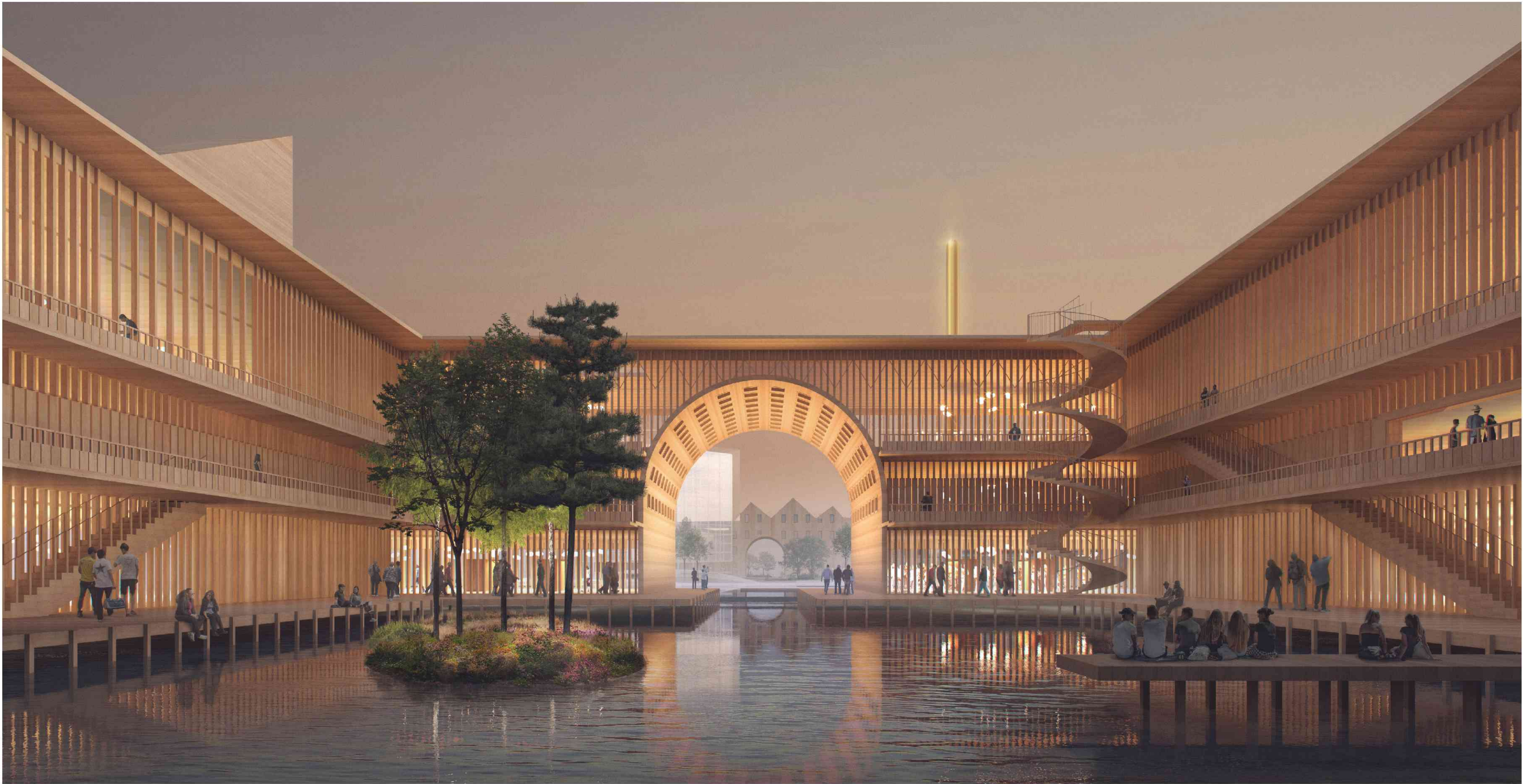


Besides interior spaces and outdoor spaces, important elements are semi-open spaces of internal courtyards. Internal courtyards of the innovation center are places where the businessmen and startup owners can meet with students in informal outdoor atmosphere. Project takes reference for those spaces from famous «well courtyards» of Saint Petersburg, iconic urban detail. River passes through some of the courtyards, turning those courtyards into beautiful «horizontal mirrors». Those spaces, enclosed from the wind, yet under the open sky, will become favourite public spaces of future campus citizens.

INTERACTION GRID



Reference: Saint Petersburg Letniy Garden (Summer Garden)



Office large courtyard view



Main boulevard facade



Offices area



Office small courtyard view

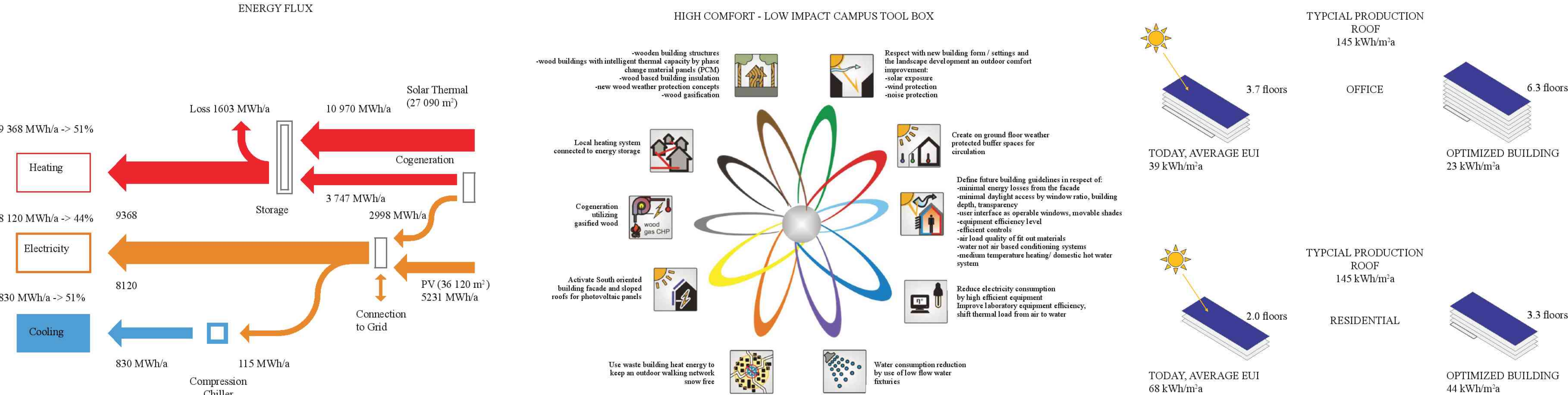
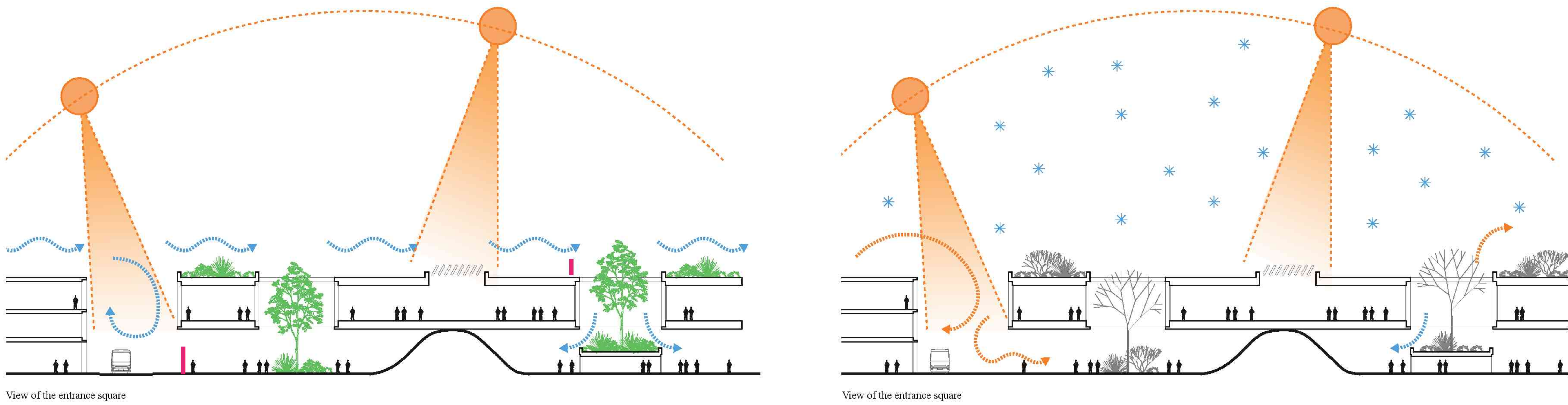
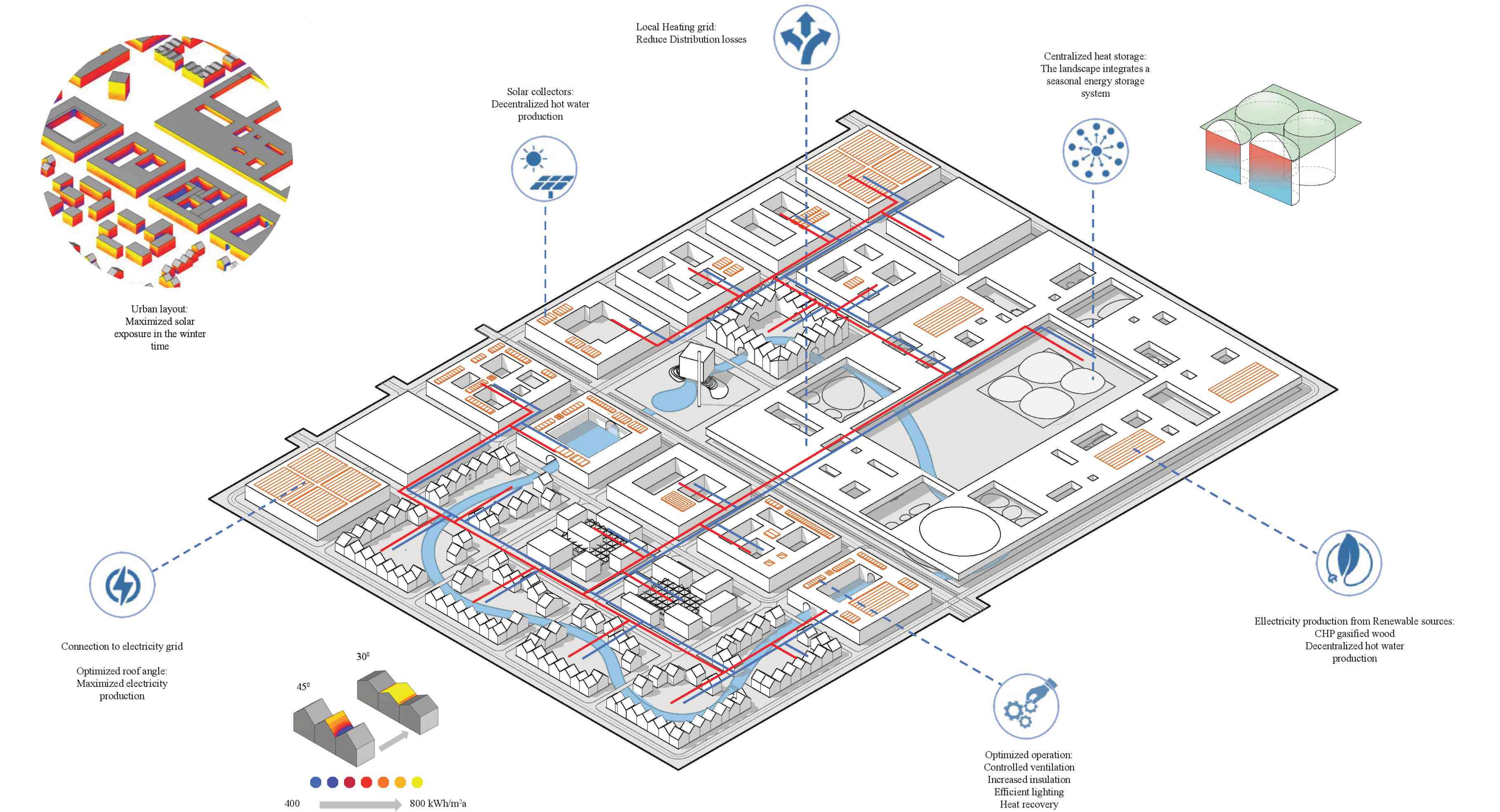
SITE ENGINEERING SUPPLY

"Carbon Zero" ITMO Highpark concept
Our respond to the energy challenge of the Agenda2050 is the Highpark as a "Carbon Zero" development. This will be a strong message motivating students and teachers to a visionary education facility with hands on the next step developments. Our targets: construction of a showcase development for an intelligent energy management as a strategy for a sustainable Highpark development and to Built "Carbon Zero" statements; creation energy self sufficient campus as an „interactive and user-oriented top environment“, vital Highpark with higher density and adjacent startup capacities. Concepts and innovation fields as key elements of the design proposal:
1.Improving outdoor comfort by solar exposure and wind/noise protection to support users interaction and a living campus. 2. Tempered buffer spaces for sheltered connections in between the buildings reducing the outdoor walking distances between the buildings on the campus. 3. Integrated design approach for all program types – lab, office, student housing and residential to improve comfort and minimize energy consumption. 4. More daylight for occupants increasing satisfaction and higher productivity, key points for a research and education facility. 5. Increased window/wall area with

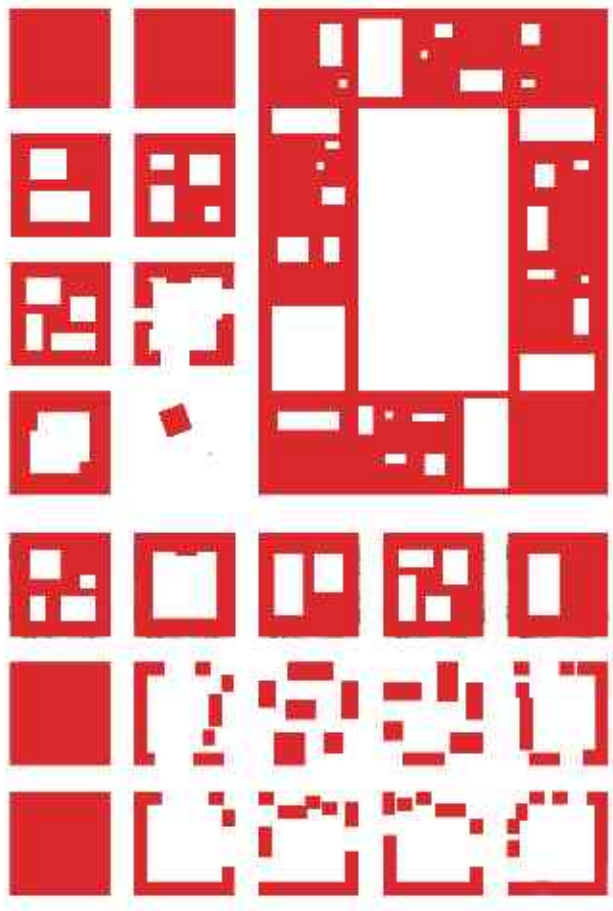
high performance triple glazing. 6. Radiant Surfaces for Thermal Comfort. 7. Low flow water fixtures. Controlled natural ventilation as basic systems for residential and office buildings and as an option for laboratory buildings to increase users impact and avoid sick building syndromes. Water cooled IT equipment to reduce air based cooling loads
Outdoor comfort
The perceived temperature in outdoor spaces is determined by biophysical parameters, such as the long-wave radiation of the surrounding surfaces as well as the sky, the short-wave radiation of the sun, and the temperature, velocity and moisture content of the air. Individual parameters such as clothing and level of activity also contribute to outdoor comfort. The universal thermal comfort index (UTCI) describes the perceived temperature or comfort level based on these biophysical and individual parameters. UTCI values were determined for St. Petersburg. This allows an analysis and optimization the outdoor comfort for the different seasons. For winter time sites with increased wind speed were identified. Accordingly, wind protection measures were used. Furthermore waste heat from the IT system will be

INTERACTION GRID

used to activate surfaces thermally, irradiating heat to the users and increasing the efficiency of the IT System. In addition, the distance between buildings has been adjusted, so that it is appropriate in the winter, higher solar exposure creates a comfortable microclimate.
In summer time, a higher air exchange rate and faster air movement is desirable. For this purpose, the gaps between houses in the east and west are exploited. The courtyards are equipped with umbrellas to reduce solar loads.
In order to mitigate urban "wind-tunnel" effect during winter period which can cause extreme discomfort, it is necessary to orient buildings in order to break the prevailing winds. Wind-protected courtyards can be created grouping buildings towards different orientations. Additionally, local building-scale solutions like vegetations or different buildings facade elements can help to improve the overall outdoor comfort. Another solution for outdoor comfort is to create dynamic spaces which allow people to use different areas, depending on the season, avoiding to have unused spaces. Mix-and-match using proposed design matrices: Since the proposed design matrices are highly flexible, there are different ways of increasing building height / street width ratio while ensuring the wind-solar principle.



IMPLEMENTATION



The implementation of the campus happens in 6 stages. At each stage, a fully functioning multifunctional city core is created. First phase implements three parts of each functional zone: educational zone with conference center, production zone, residences. Later phases gradually add functional elements from each zone: scientific centers in the academic building, advanced production centre and others. All the other functions such as health and sports center and remaining parts of residential district are added in next phases. At the end, ITMO Highpark becomes nucleus for the future growth of Yuzhniy Satellite City.

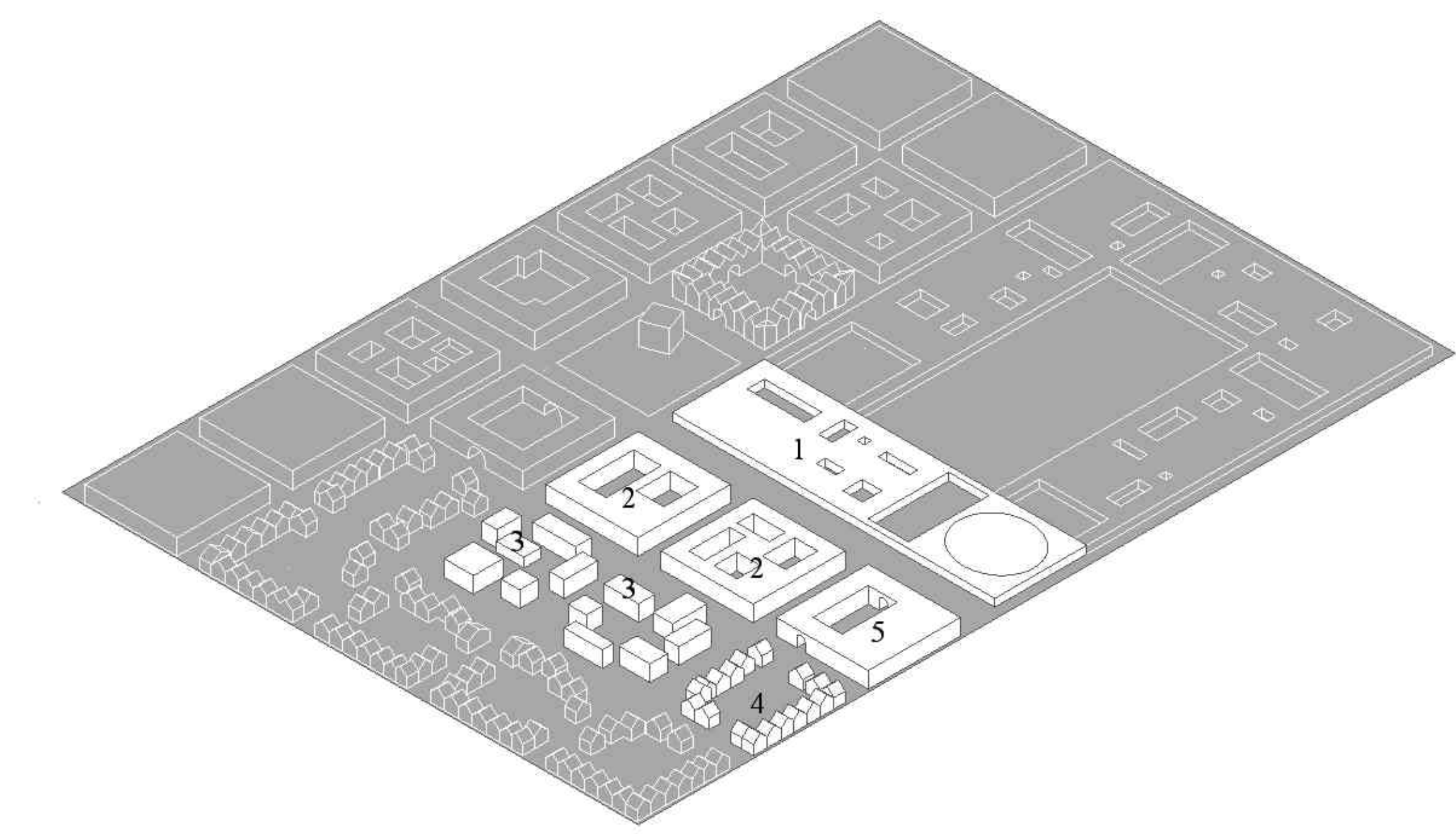
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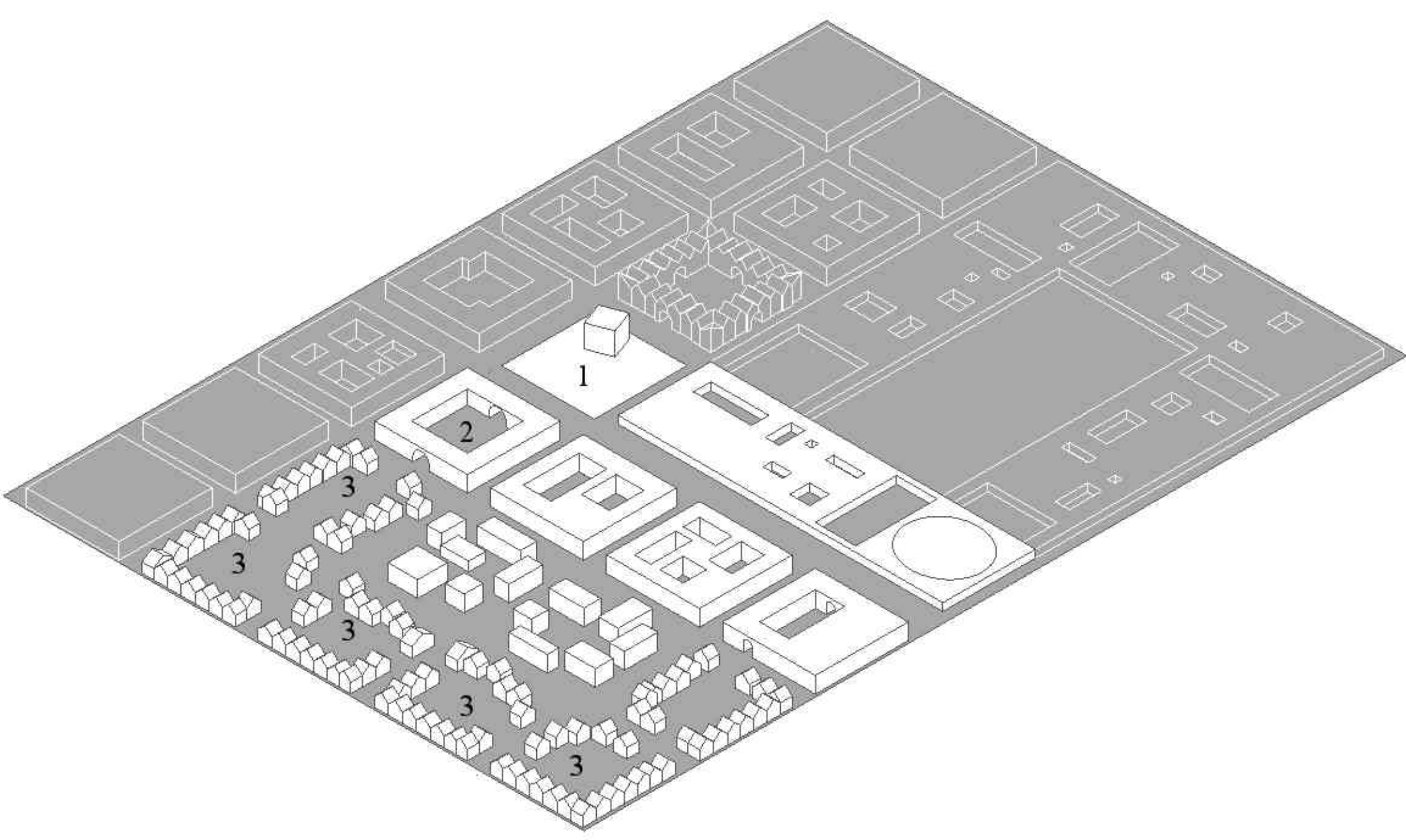
Reference: Saint Petersburg Letny Garden (Summer Garden)



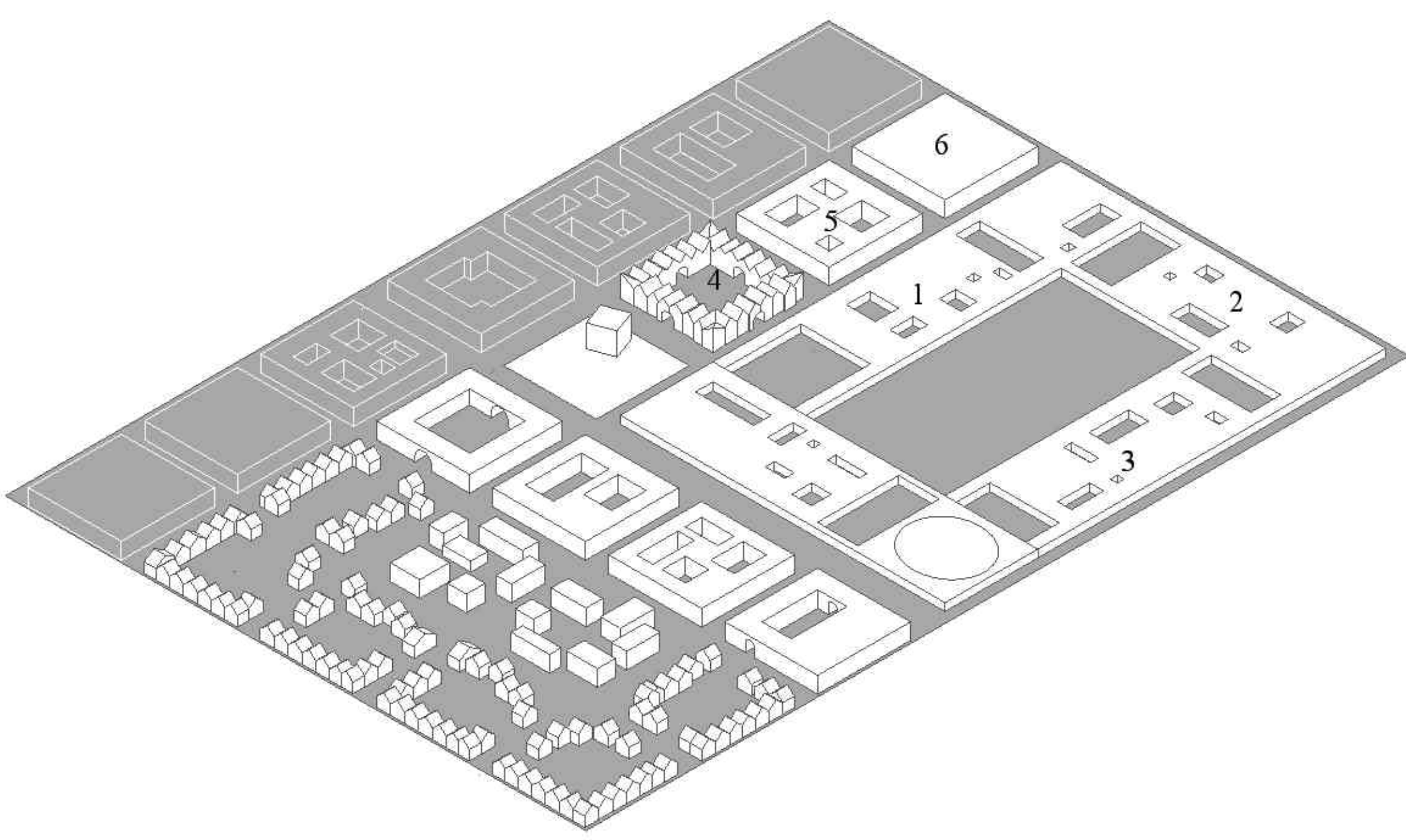
Educational area plate general view from the approaching train



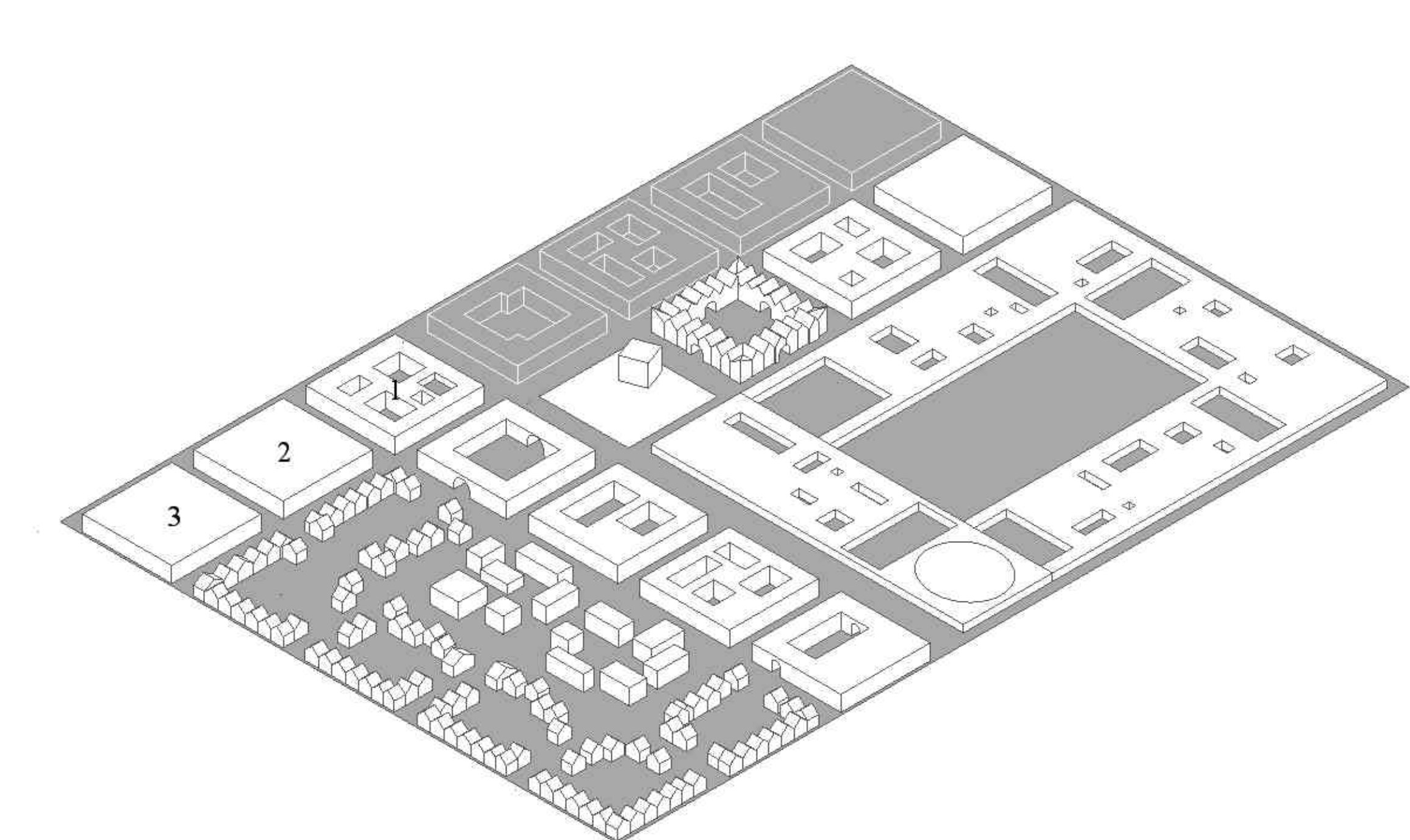
ITMO Highpark campus development
Stage 1
1. Academic (main) building
2. Advanced Production Zone
3. Live-Work Units
4. Student Dormitory with Dining Unit
5. Sport Center



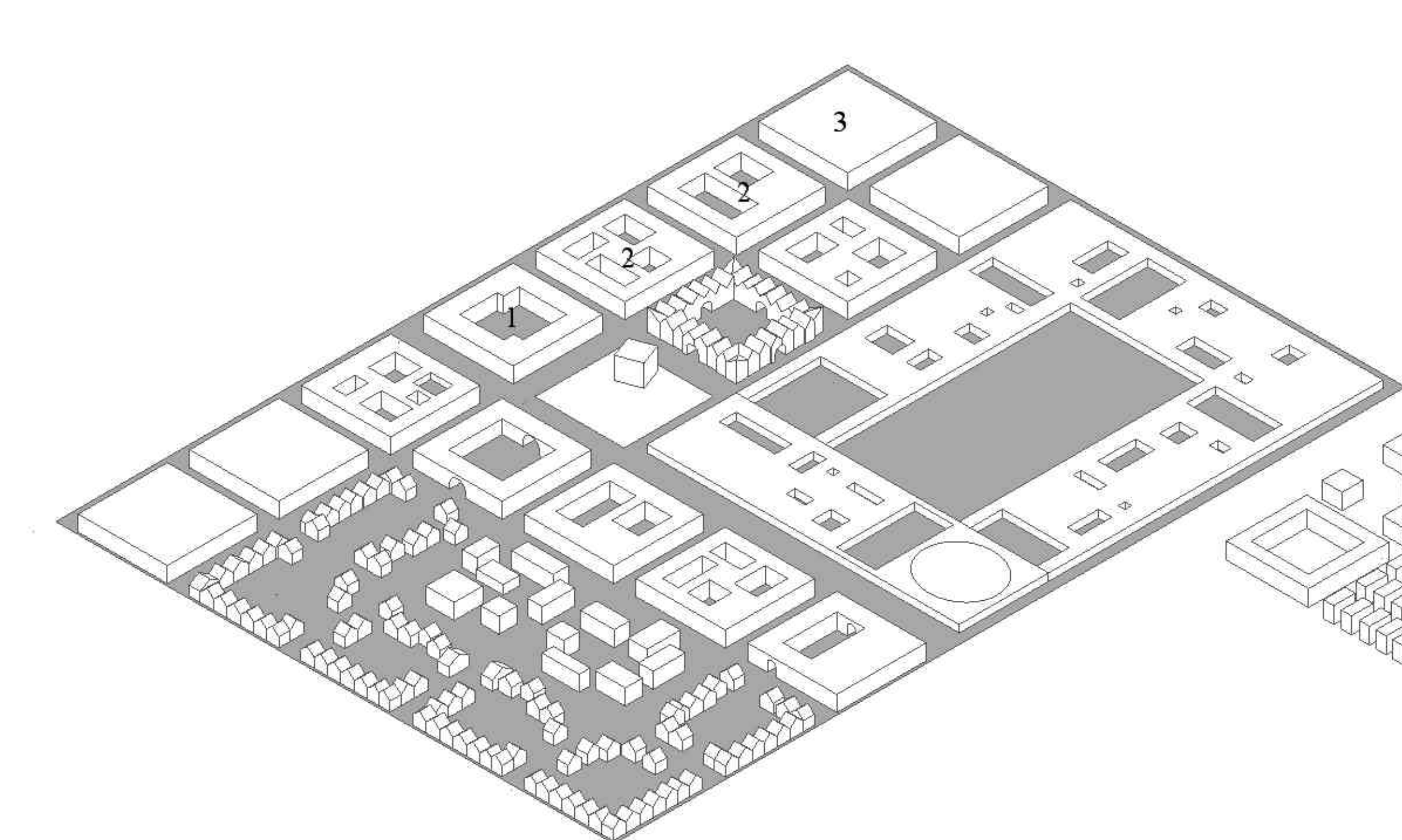
ITMO Highpark campus development
Stage 2
1. Main Square with Multipurpose building
2. Business Incubator
3. Student Dormitory



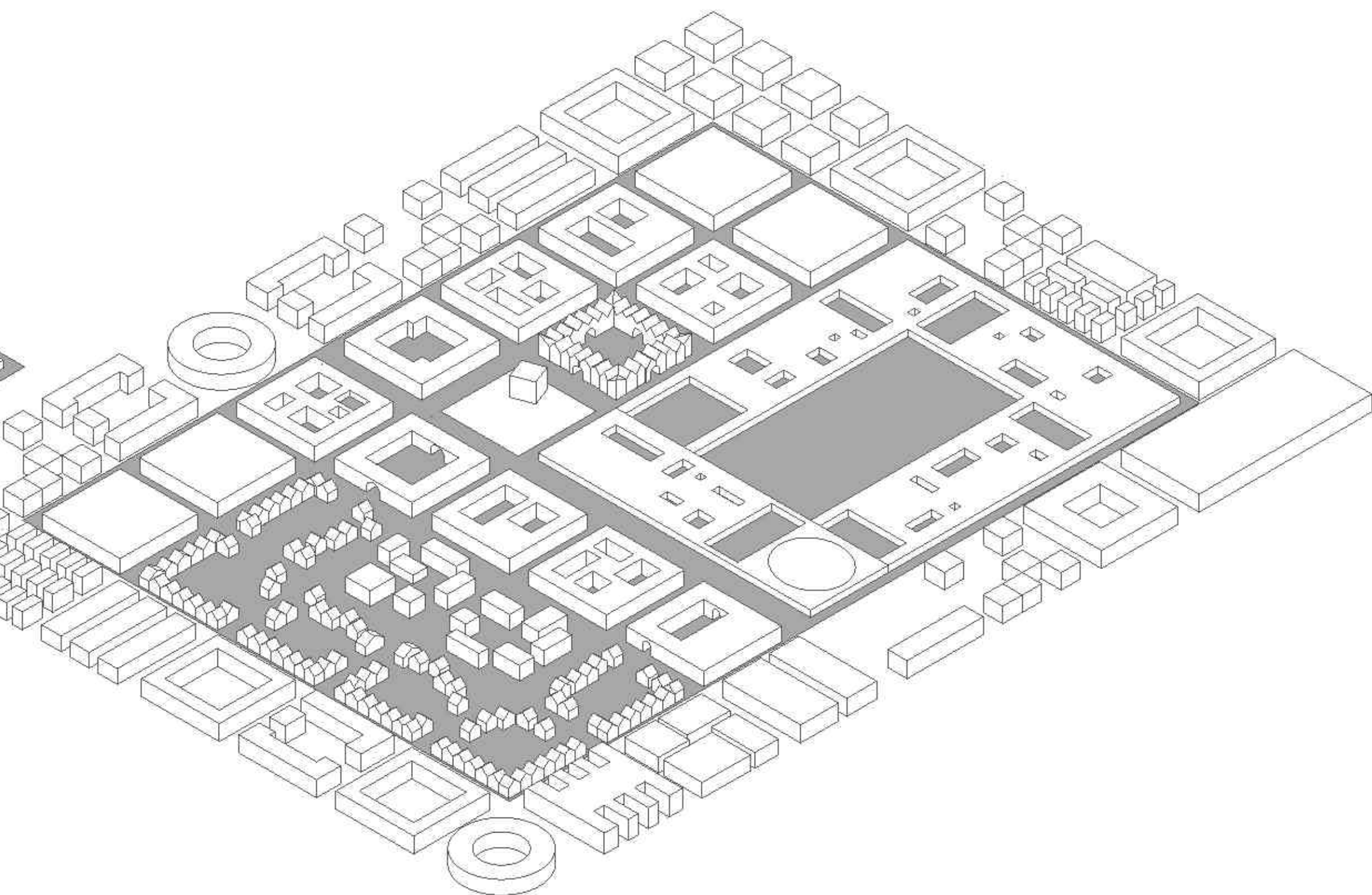
ITMO Highpark campus development
Stage 3
1. Centre For Photonic And Quantum Technologies
2. Centre For Health And Life Sciences
3. Centre For Information Technologies
4. Hotel
5. Advanced Production Zone
6. Parking



ITMO Highpark campus development
Stage 5
1. Advanced Production Zone
2. Parking
3. Sports Centre And Cafeteria

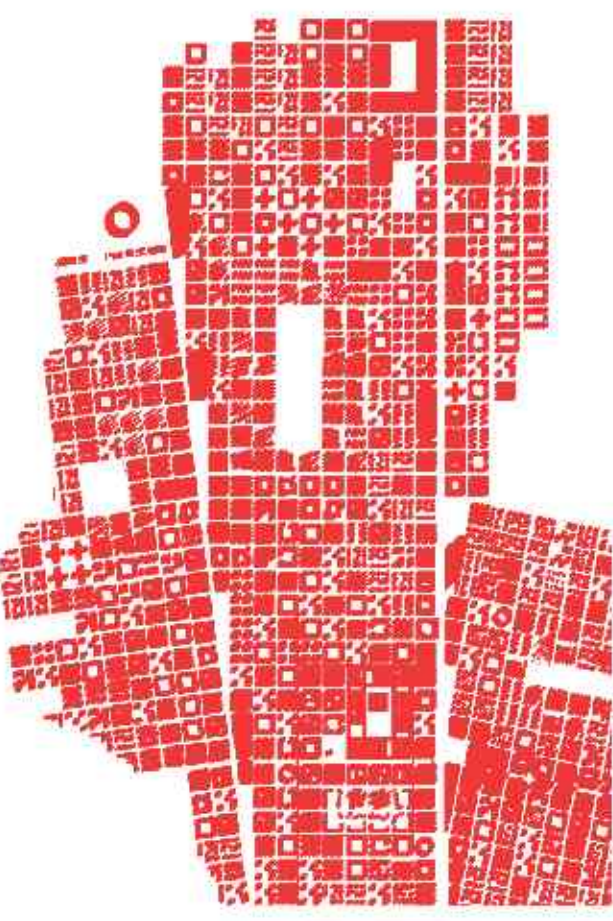


ITMO Highpark campus development
Stage 5
1. National Urban Science Center
2. Advanced Production Zone
3. Logistic center



ITMO Highpark campus development
Stage 6
Surrounding development

PROSPECTS



The future development of the surrounding satellite city Yuzniy happens along the new transport lines and takes as an urban nucleus the ITMO Highpark.

Future development principles are:

- 1) Clear city grid with similar square urban blocks.
- 2) System of open public spaces of different functions.
- 3) Diversity in the morphology of Urban block.

Developing city incorporates the existing villages and small cities: they affect the axis and the directionality of the urban grid. On the right are the three consequential phases of the urban growth.

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Yuzniy city development
Stage 1



Yuzniy city development
Stage 2



Yuzniy city development
Stage 3

