

ARCHITECTURE STUDENT CONTEST

21st INTERNATIONAL EDITION, BELGRADE 2026

Team N°2



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Silesian University of Technology
Team N°2, POLAND

A black and white photograph of two birds perched on a dark, gnarled branch. One bird is perched higher on the branch, looking to the right. The other bird is perched lower, looking to the left. The background is plain white.

GNEZ-DOM

The Balkan Nest of Sports

Silesian University of Technology
Team N°2, POLAND



Even though they are far apart, Poland and Serbia share a similar soul and a tough history. Both nations have a strong spirit, shaped by wars and the need to always rebuild from ruins. Our culture is built on community, staying strong, and a great energy for life. Understanding these similarities is the starting point for our work. It helps us design buildings that truly fit the place and the people who live there.

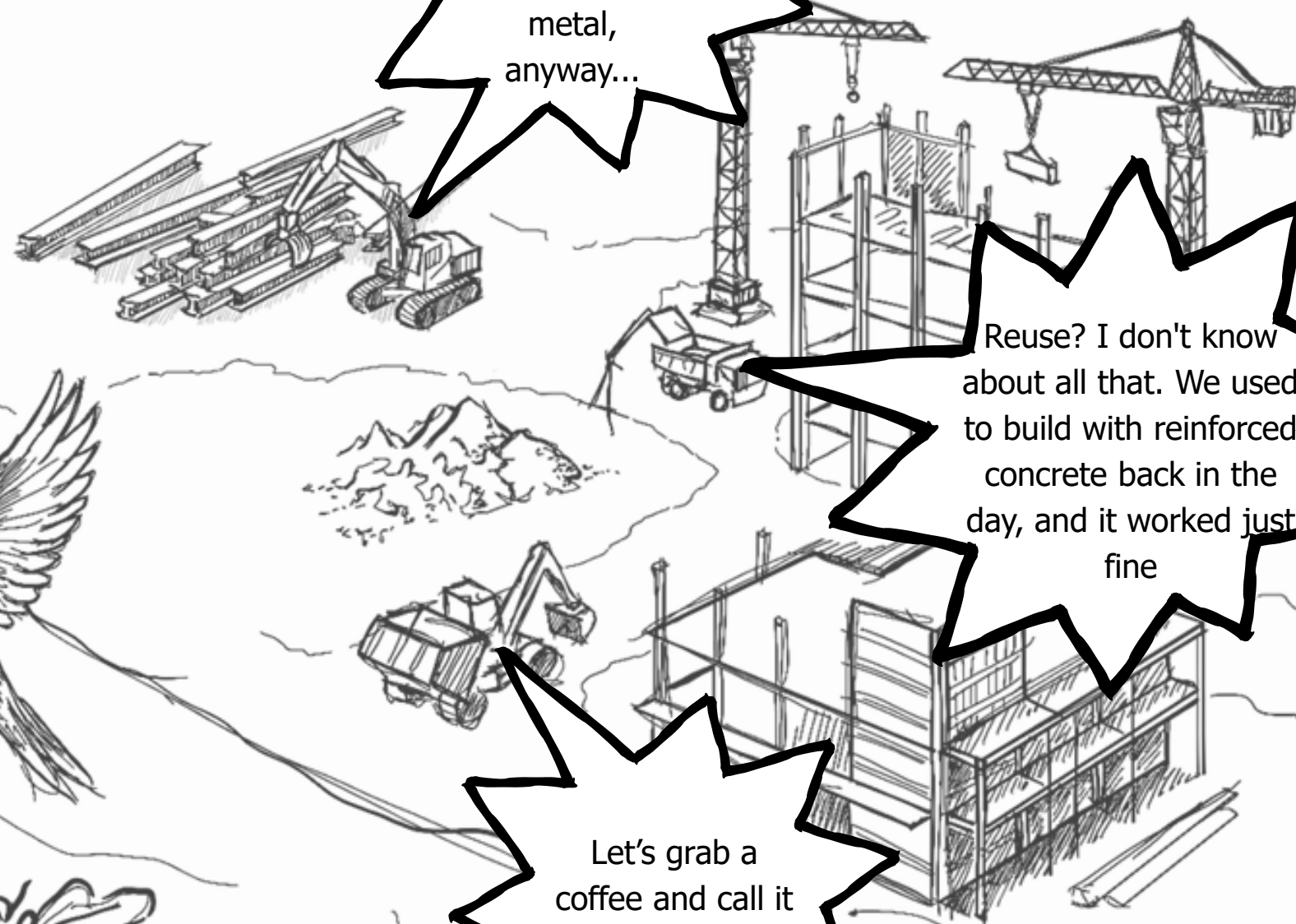




Just one more branch,
honey, and the shell is
complete! 100% natural
materials

SRB. **GNEZ**
ENG.-NEST

Whose bright
idea was it to
collect scrap
metal,
anyway...



Reuse? I don't know
about all that. We used
to build with reinforced
concrete back in the
day, and it worked just
fine

Let's grab a
coffee and call it
a day!

PL. **DOM**
ENG.- HOUSE

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ANALYSIS



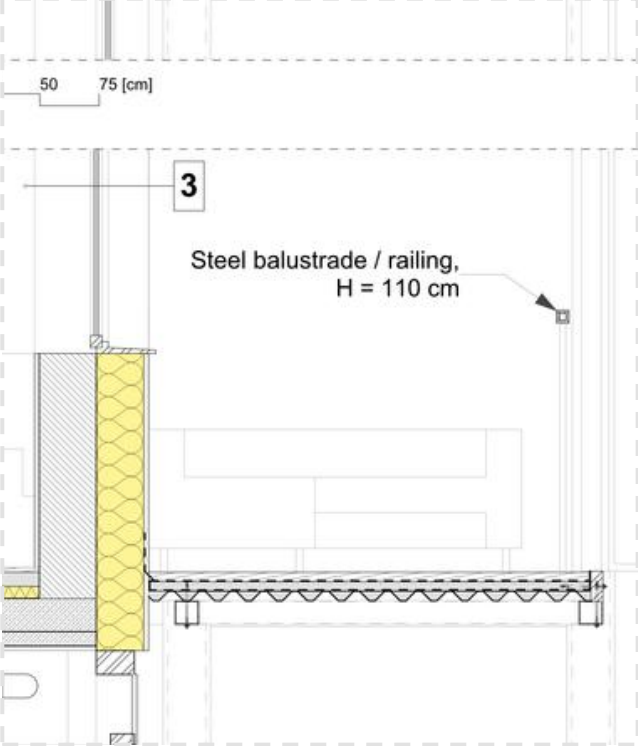
URBANISM



NEW CONSTRUCTION



RENOVATIONS

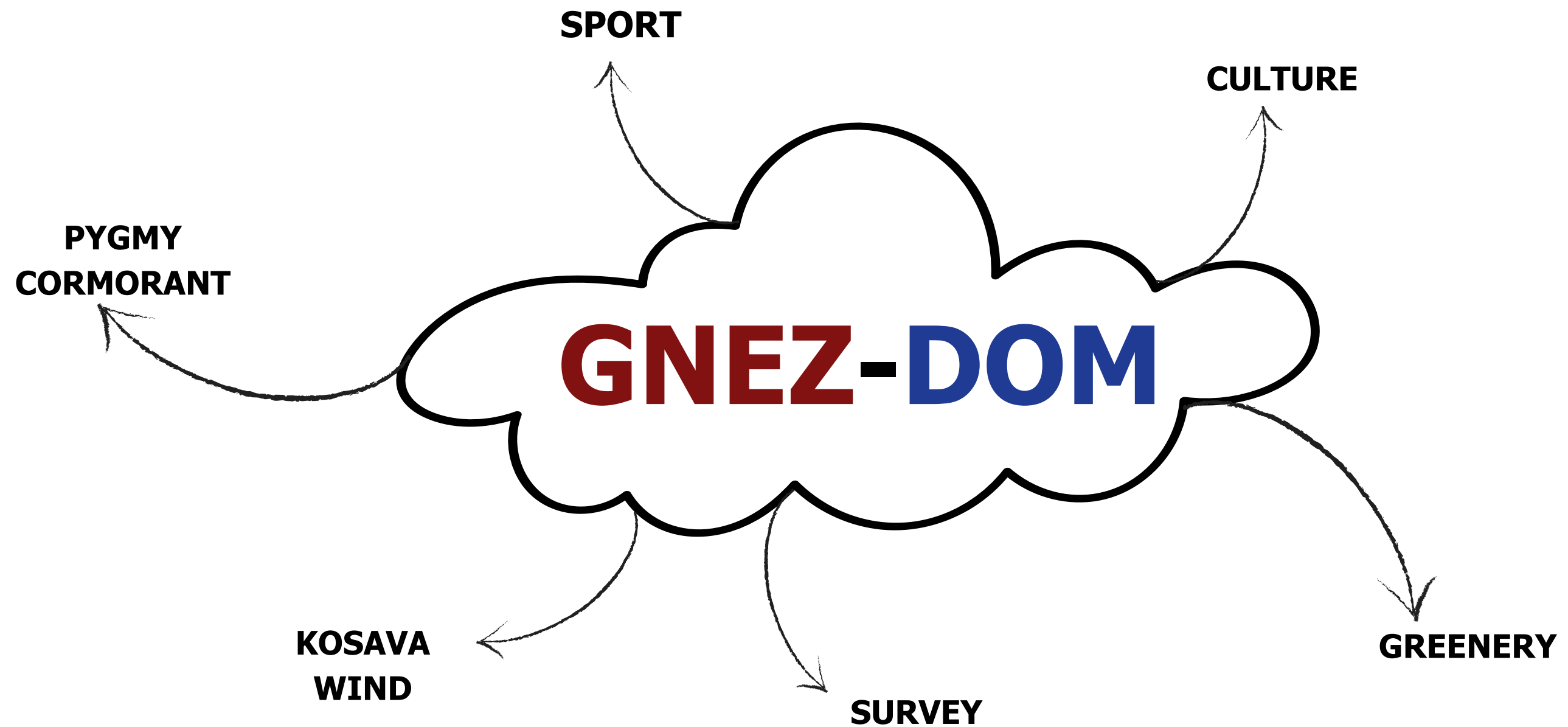


DETAILS



ANALYSIS

CONNECTIONS WITH THE CITY



STRUCTURE OF THE CITY



greenery

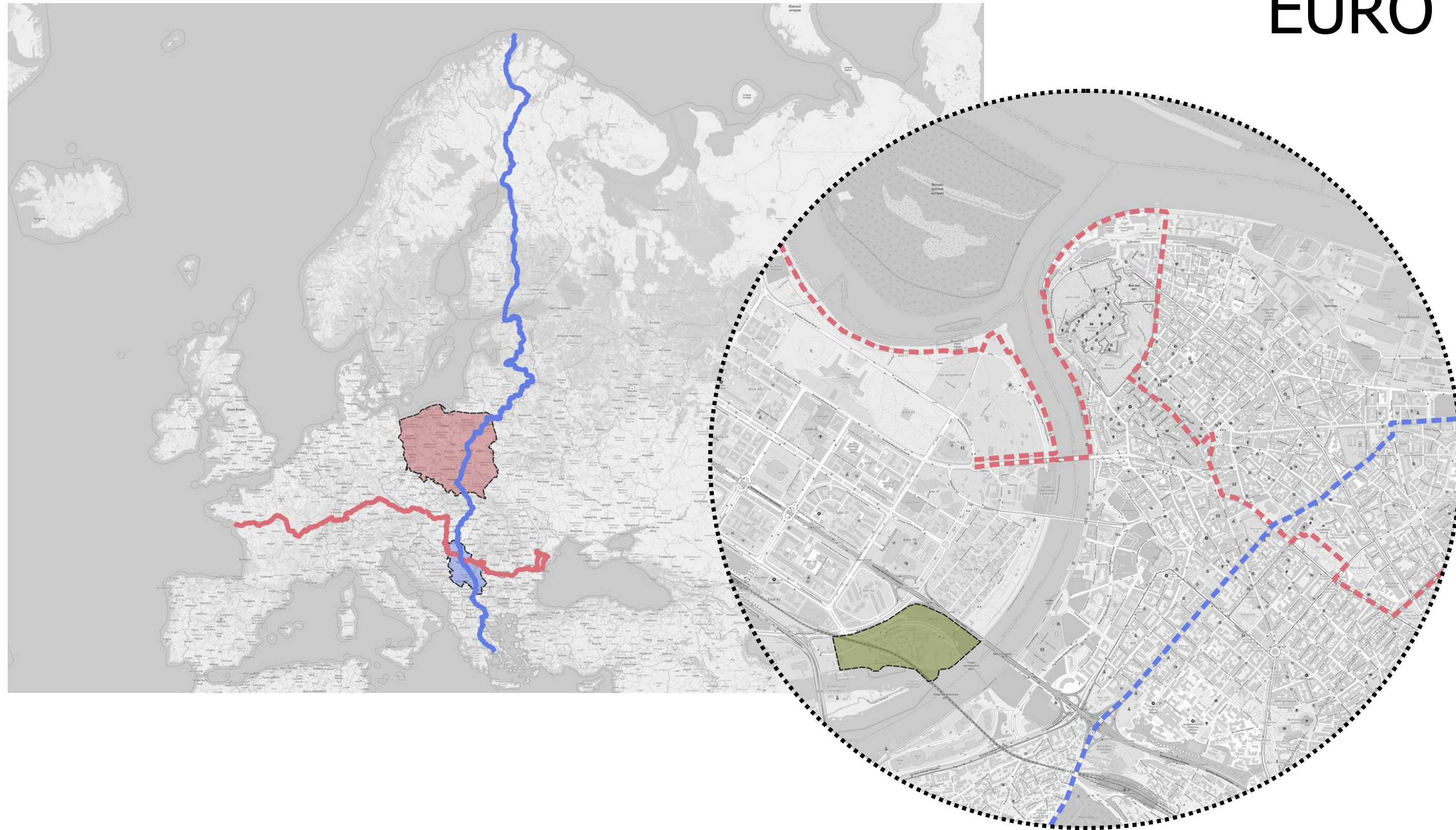
buildings

comunication

Belgrad

Belgrade's green spaces currently make up about 12% of the city, with a strategic goal to reach 22%. Following this direction, we focus on developing new green areas and increasing their integration into the city's structure.

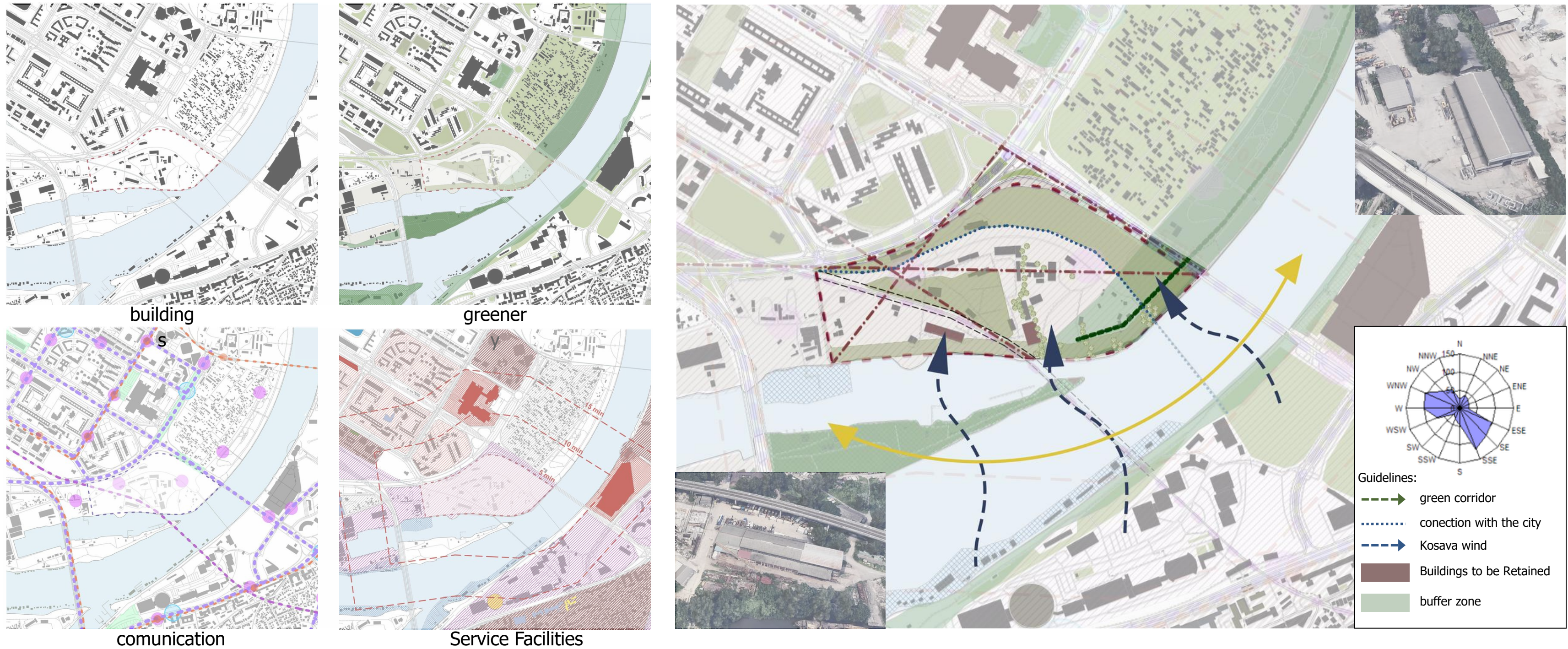
EURO VELO



Belgrade serves as the intersection for two major routes of the European cycle network: EuroVelo 6 (red) and EuroVelo 11 (blue). This makes the city a central hub for cycling, enabling travelers to switch from the North–South corridor to the East–West direction.

ANALYSIS

GUIDELINES



Analysis highlights a neglected waterfront site with vast potential, ideal for realizing Belgrade's green space expansion. Positioned where dense neighborhoods meet post-industrial areas, this highly accessible plot is designed to function as an open ecological buffer, creating a fluid connection between the city and the waterfront.

ENVIRONMENT PROTECTION



Ecological Priority

Challenge & Responsibility:

- Ecosystem: Wintering ground for **10%** of the global Pygmy Cormorant population.
- Protection: Preserving an untouched shoreline and implementing buffer zones to protect the species' habitat.



The project utilizes vegetation as a non-invasive tool to "manage the flow" of local fauna:

SANCTUARY ZONE (Riverside – Habitat)

- Vegetation: Dense, native species favored by the Pygmy Cormorant, such as White Willow (*Salix alba*), reeds, and rushes.
- Purpose: This area provides a tranquil roosting and nesting site for birds, ensuring they remain undisturbed by human activity.

BUFFER ZONE (Building Interface – Resident Protection)

- Objective: To naturally discourage birds from approaching residential areas and the promenade without the use of artificial deterrents.
- Vegetation: Implementation of "Biological Barriers" – aesthetically pleasing but thorny and spiny shrubs, such as Wild Rose (*Rosa canina*), Hawthorn (*Crataegus*), and Barberry (*Berberis*).
- Effect: These plants are visually attractive to people but create a physical boundary that birds instinctively avoid.

The project harmonizes social expectations with the responsibility for 10% of the global Pygmy Cormorant population. Through a 'Smart Planting' strategy, the architecture does not combat nature but guides it, creating secure habitats by the water and employing natural biological barriers near the built environment

CORMORANT

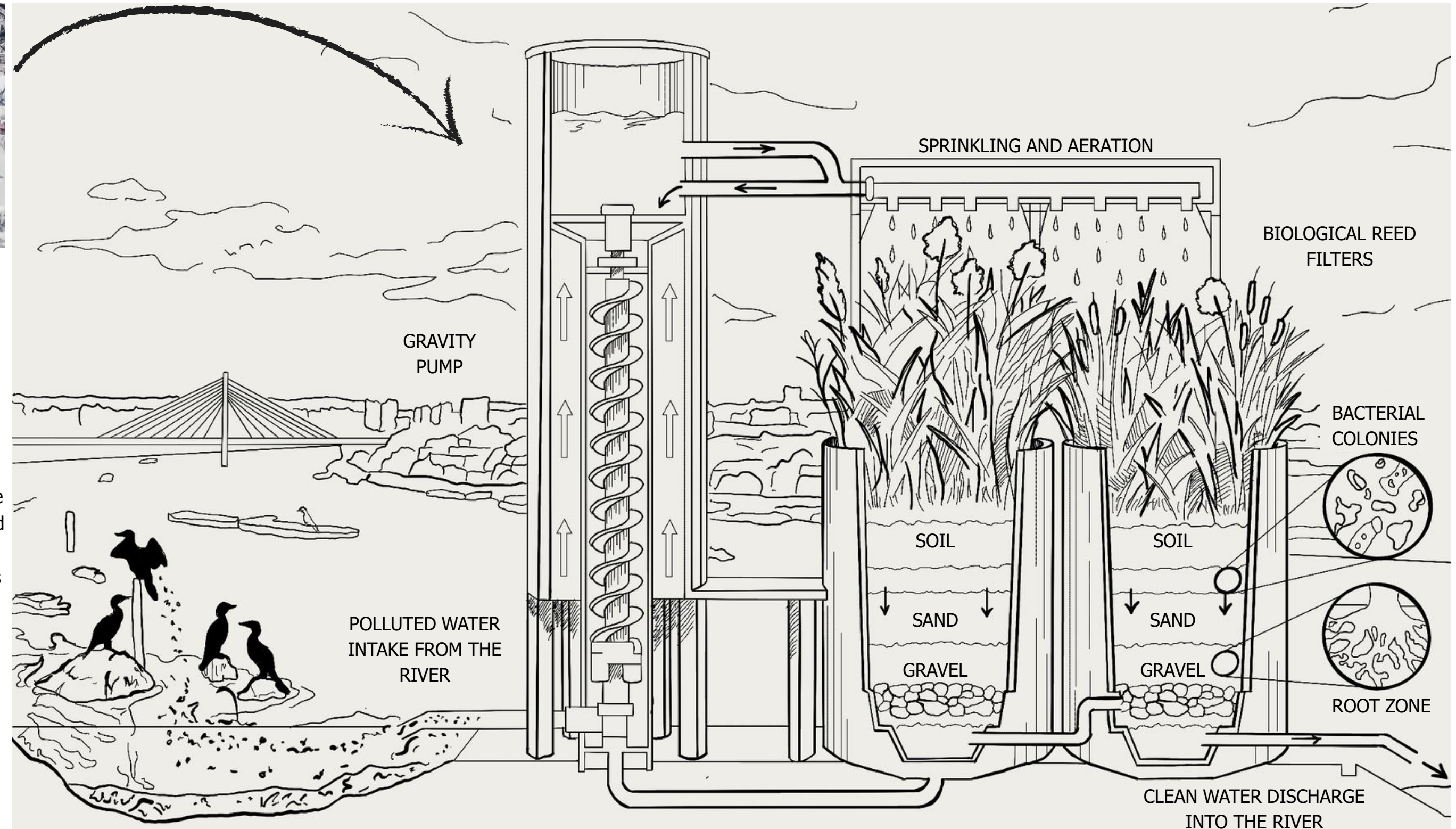
ENVIRONMENT PROTECTION



The project repurposes abandoned silos, transforming them into an ecological river filtration system. To address the issue of water pollution caused by excess nutrients from cormorant guano, water is drawn directly from the riverbed. It is then lifted by an Archimedes screw to an upper reservoir and dispersed via a sprinkler system, providing essential aeration for the process. This pre-treated water enters reed bed filters in adjacent silos, where a nature-based purification mechanism takes over: as water seeps through layers of sand and gravel, symbiotic bacterial colonies in the root zone (rhizosphere) decompose organic pollutants. Finally, the purified water returns to the river by gravity, completing a fully sustainable ecological cycle.

SILOS

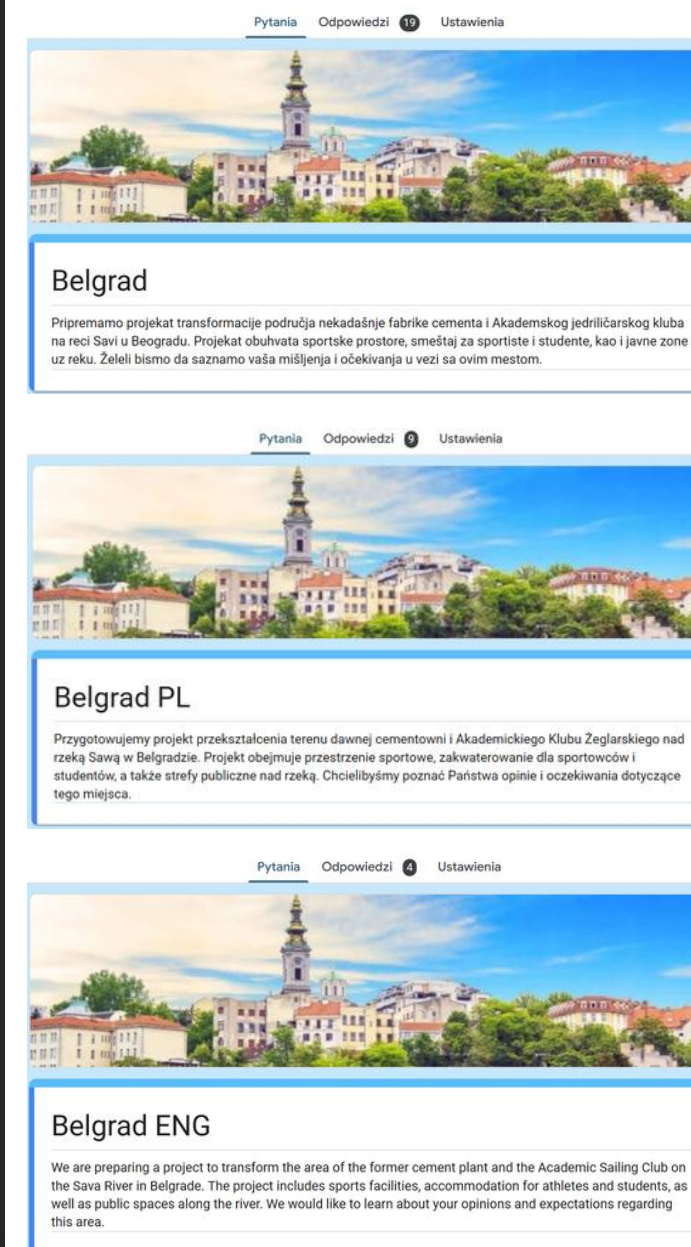
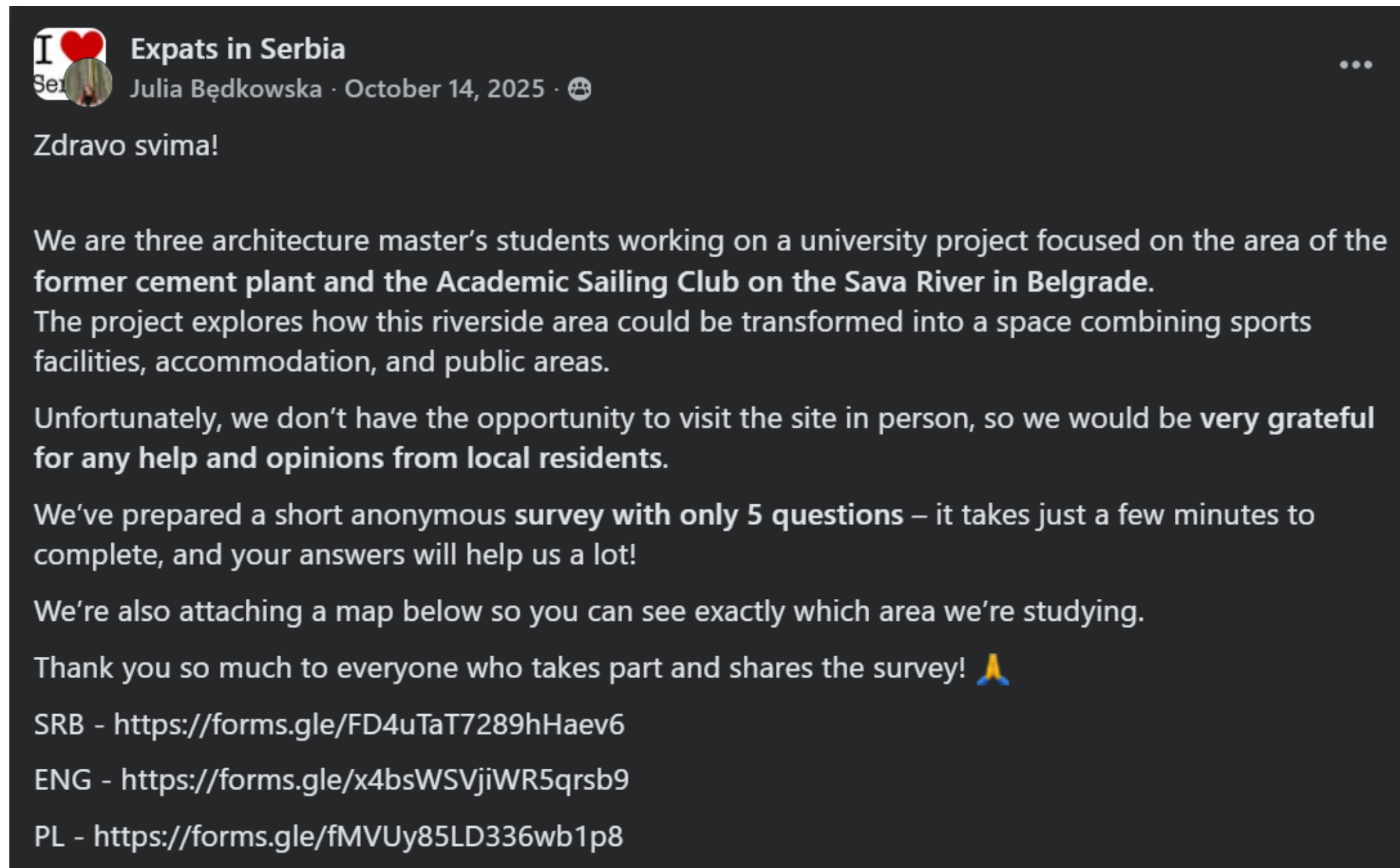
Analysis



SURVEY

MEDIA

Responsible design through dialogue: to meet the real needs of the Serbian community, we used social media and surveys as a foundation for our concept. By listening to authentic local voices, we identified environmental gaps and built a space that resonates with its future users and fosters a true sense of belonging.



Research Methodology and Data Analysis

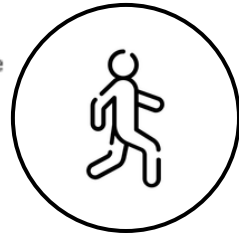
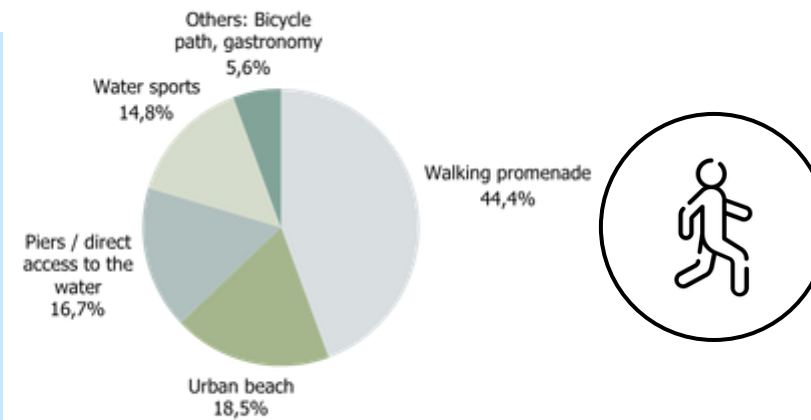
To ground our project in reality, we collaborated with a University of Belgrade graduate and engaged directly with international groups across Serbia. From these **32** in-depth responses, we built a reliable analytical framework. This process enabled us to turn subjective experiences into practical design directives, guaranteeing that our architectural responses meet the actual, lived needs of the community.

Survey

STRUCTURE AND RESULTS

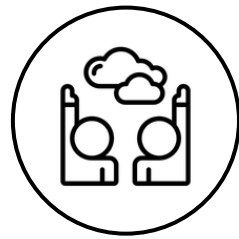
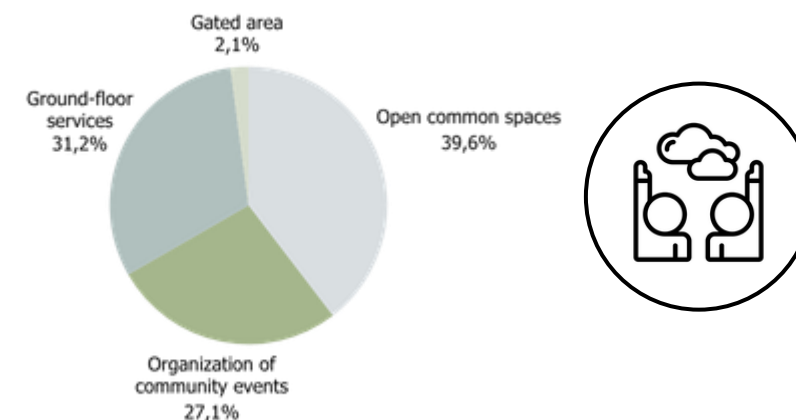
What forms of using the river would be most attractive for you in this place? *

- Walking promenade
- Piers / direct access to the water
- Urban beach
- Water sports (sailing, kayaking, SUP)
- Inne: _____



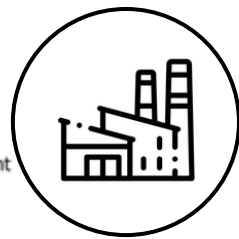
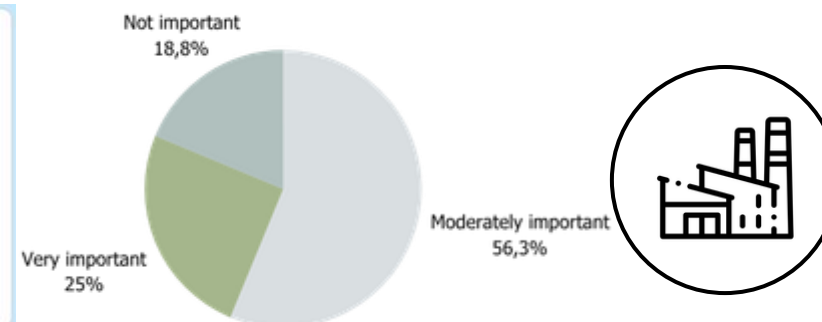
In what way could the accommodation for athletes/students also serve the local community? *

- Ground-floor services (shops, cafés)
- Open common spaces (squares, courtyards)
- Organization of events connecting local residents
- Important that the space is only for the accommodation users
- Inne: _____



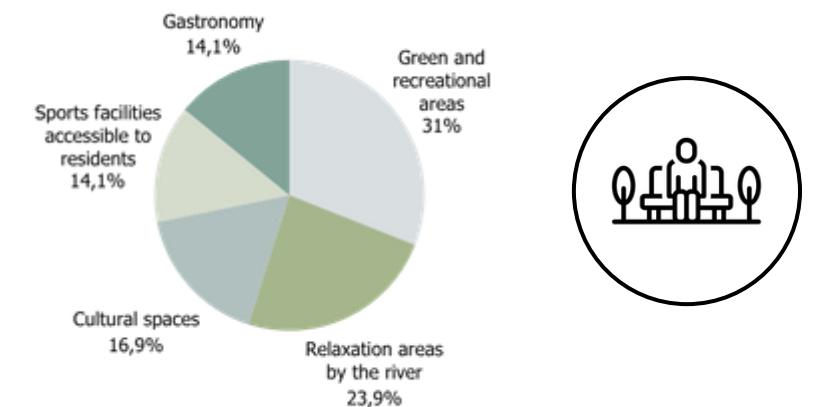
How important is it for you to preserve traces of the industrial history (e.g., elements of the former cement plant)? *

- Very important – they should be highlighted
- Moderately important – symbolic fragments can be preserved
- Not important – the area should be completely transformed



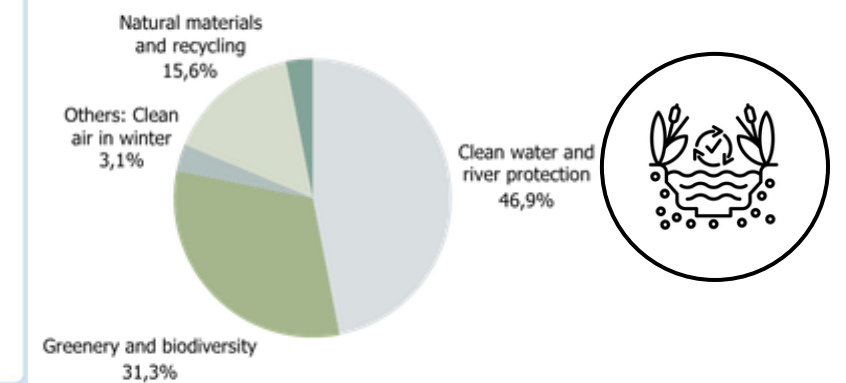
Which public spaces would you most like to use in this area after redevelopment? *

- Green and recreational areas
- Sports facilities accessible to residents
- Cafés, restaurants, gastronomy
- Cultural spaces (workshops, exhibitions, events)
- Relaxation areas by the river (benches, deckchairs, picnic spots)
- Inne: _____



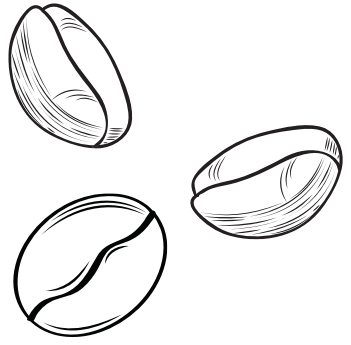
Which ecological aspects are most important to you in the new development? *

- Greenery and biodiversity
- Energy efficiency of buildings
- Natural materials and recycling
- Clean water and river protection
- Inne: _____



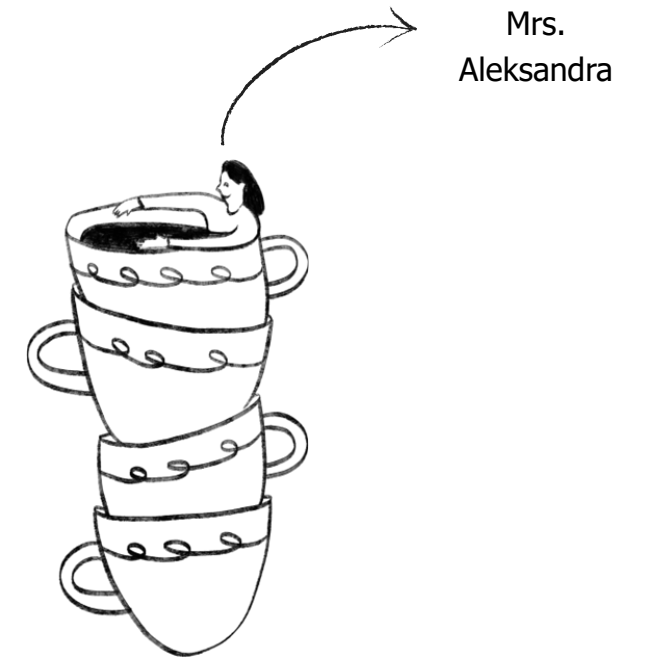
Key Design Guidelines Based on Survey Results:

- **OPENNESS:** The design must integrate rather than divide – **54%** of respondents favor public plazas between buildings.
- **ACCESS TO NATURE:** **67%** identify green space as the most important element, while **71%** expect a pedestrian promenade.
- **WATER ECOLOGY:** River protection is prioritized over building technologies (cited by **54%** of respondents).
- **SPORTS AND CULTURE:** A significant increase in demand for sports infrastructure while maintaining dedicated venues for cultural events.



URBANISM

CREATIVE PROCESS



Mrs.
Aleksandra

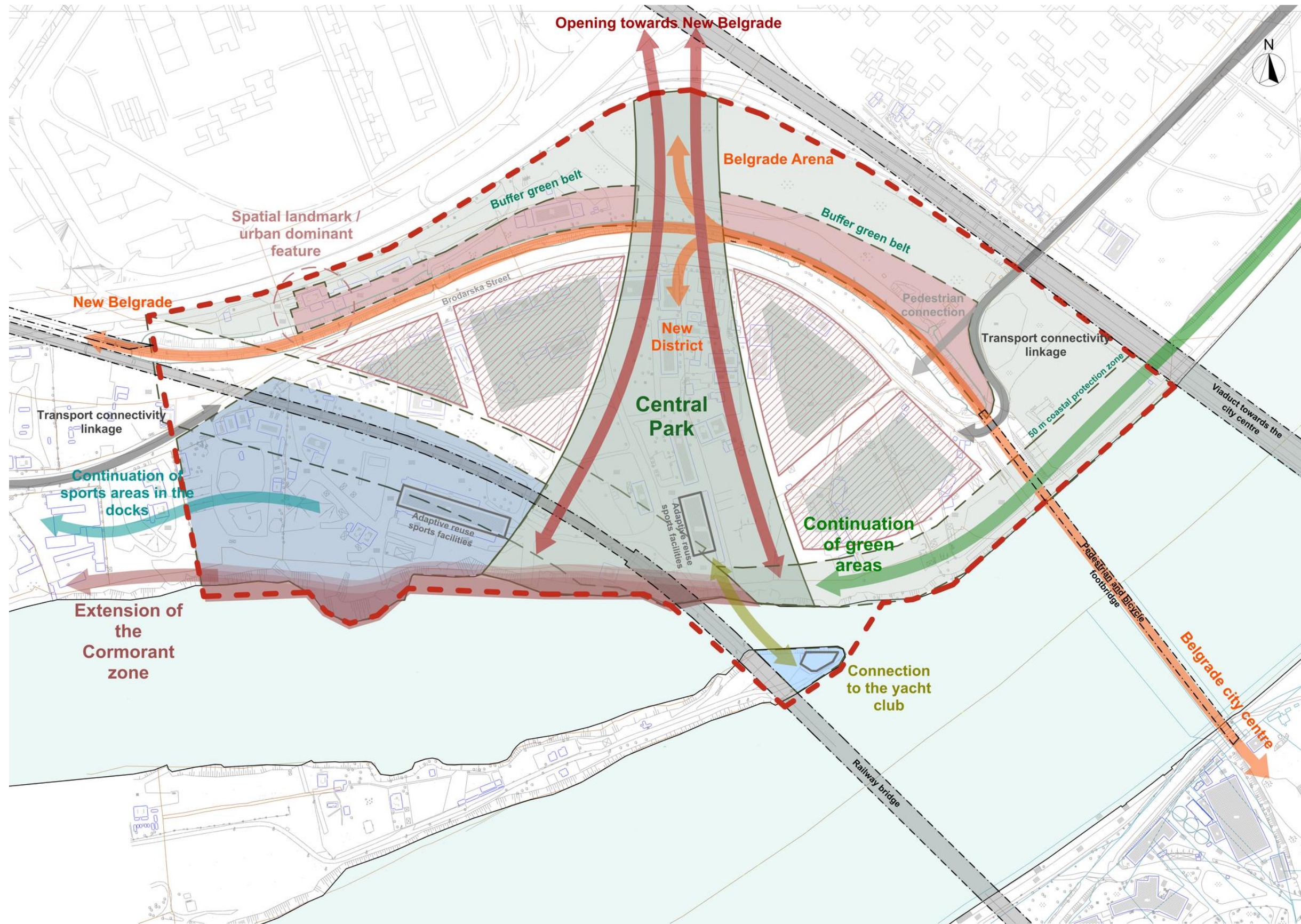


Julia

Daniel

Paulina

REGULATION PLAN



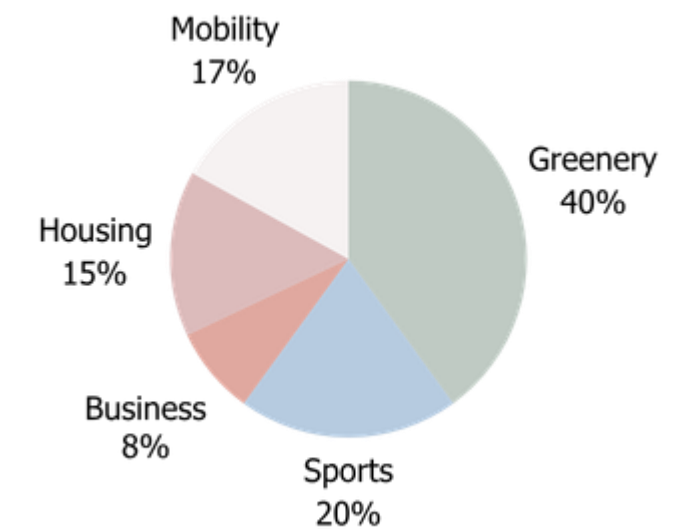
Legend – Regulation Plan

scale 1:2000

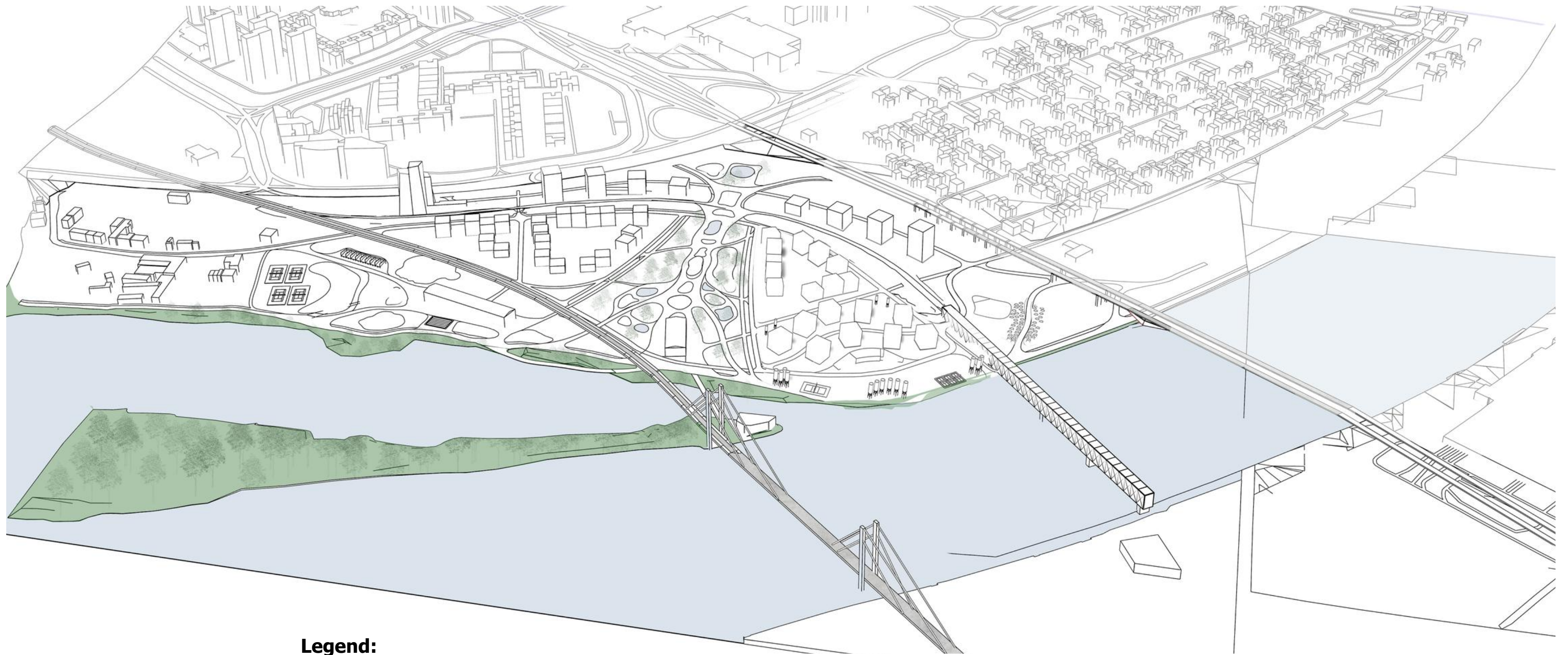
- Masterplan boundary
- Residential zone
- Service and office zone
- Sports and recreation zone
- Protective green zone
- Green and recreation zone
- Yacht club zone
- Cormorant protection zone
- Existing buildings to be preserved
- Existing bridges and viaducts

Regulation Plan Balance

| | |
|--------------------------|---------------------------------------|
| Green areas | 40% - 122 920m ² |
| Sports areas | 20% - 61 460m ² |
| Business services | 8% - 24 584m ² |
| Residential areas | 15% - 46 095m ² |
| Transport infrastructure | 17% - 52 241m ² |
| Total area | 100% - 307 300m ² = 30,7ha |



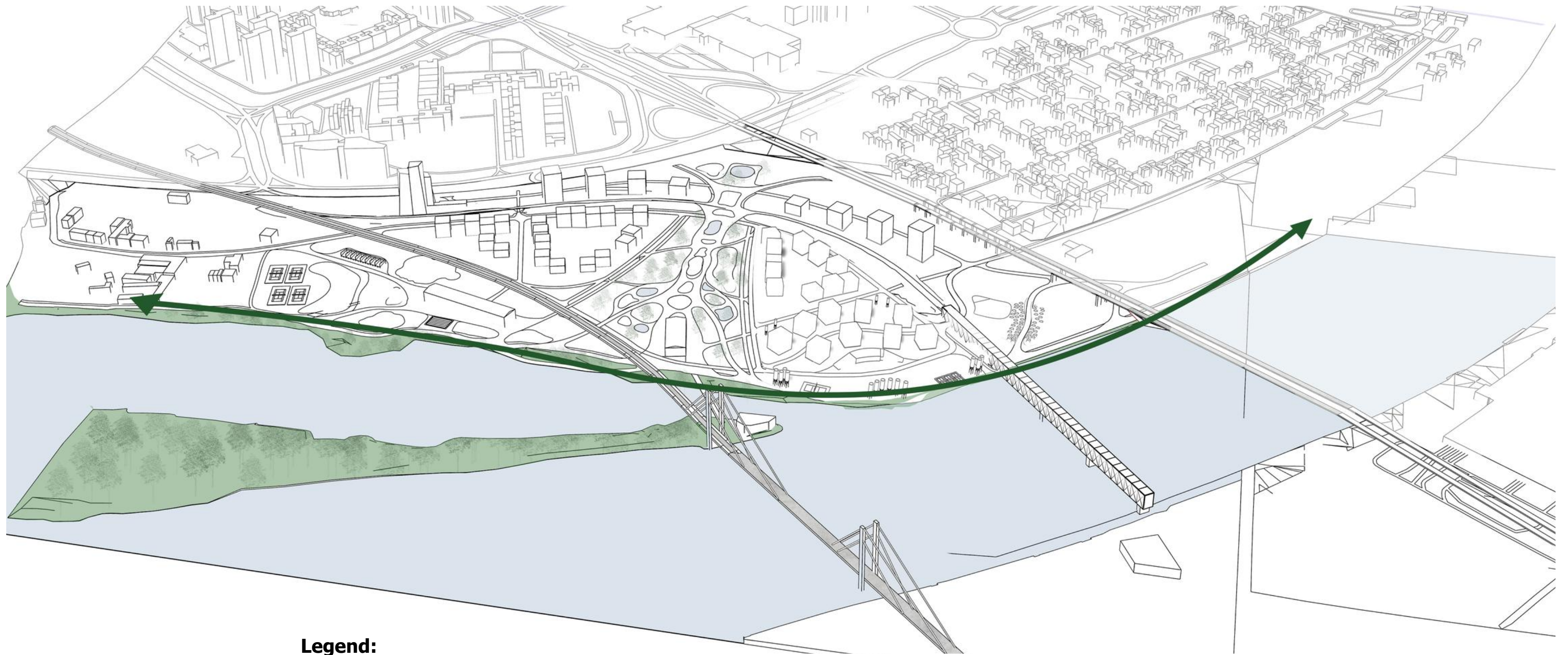
SHORELINE PRESERVATION



Legend:

 buffer zone

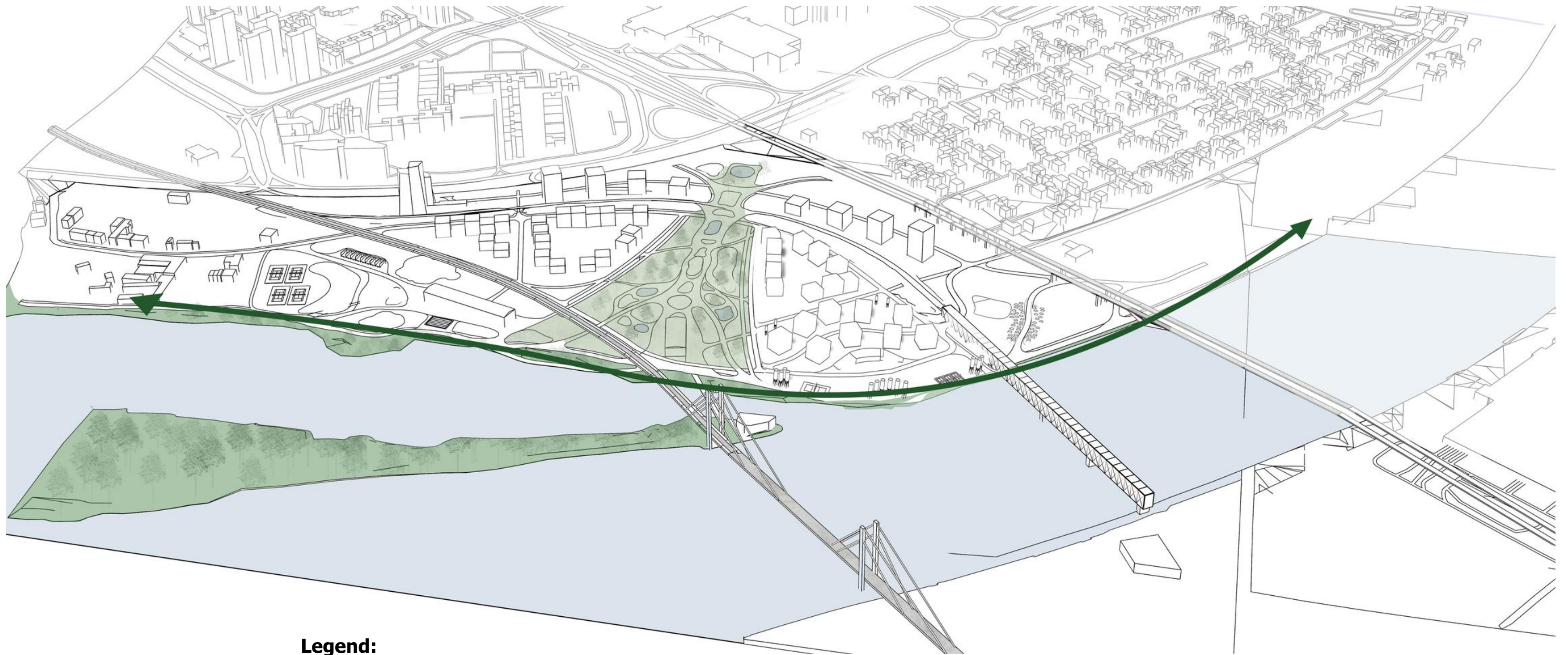
SHORELINE PRESERVATION



Legend:

 buffer zone

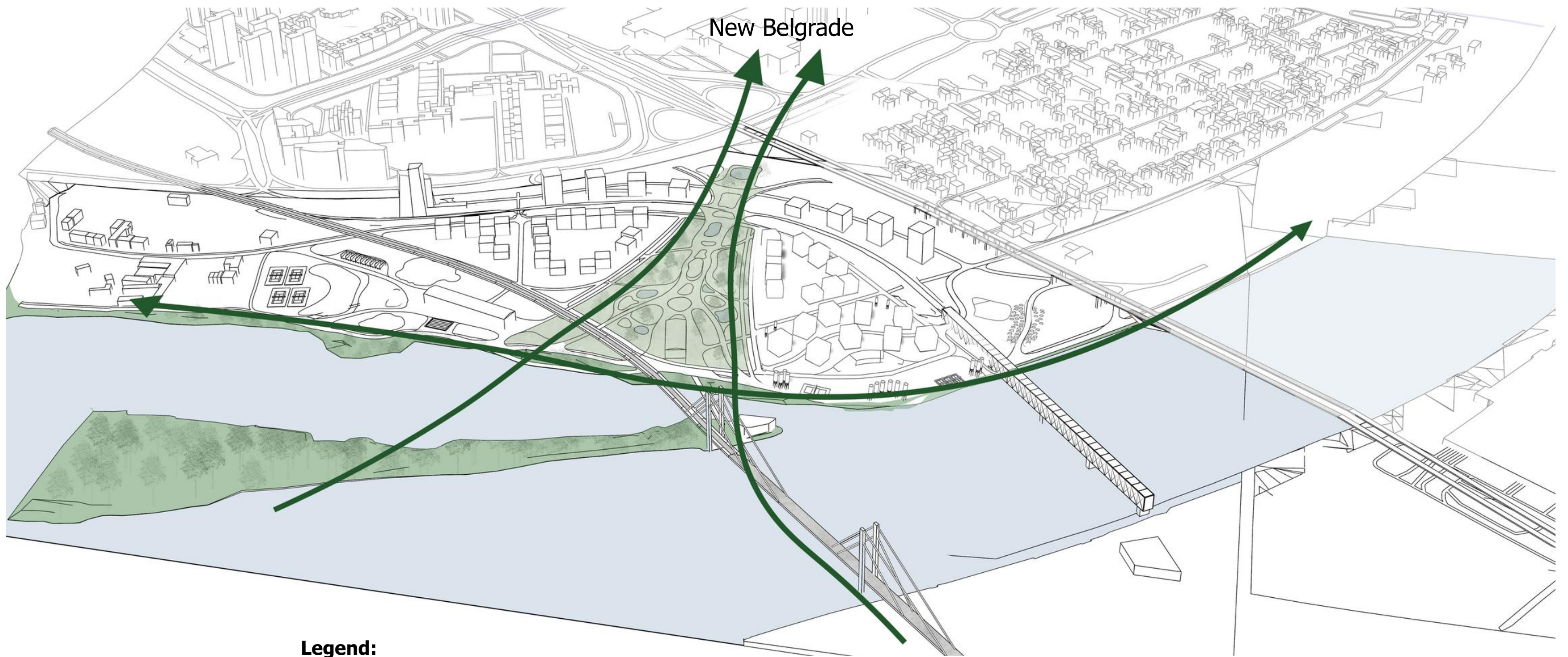
GREEN CORRIDOR



Legend:

 buffer zone

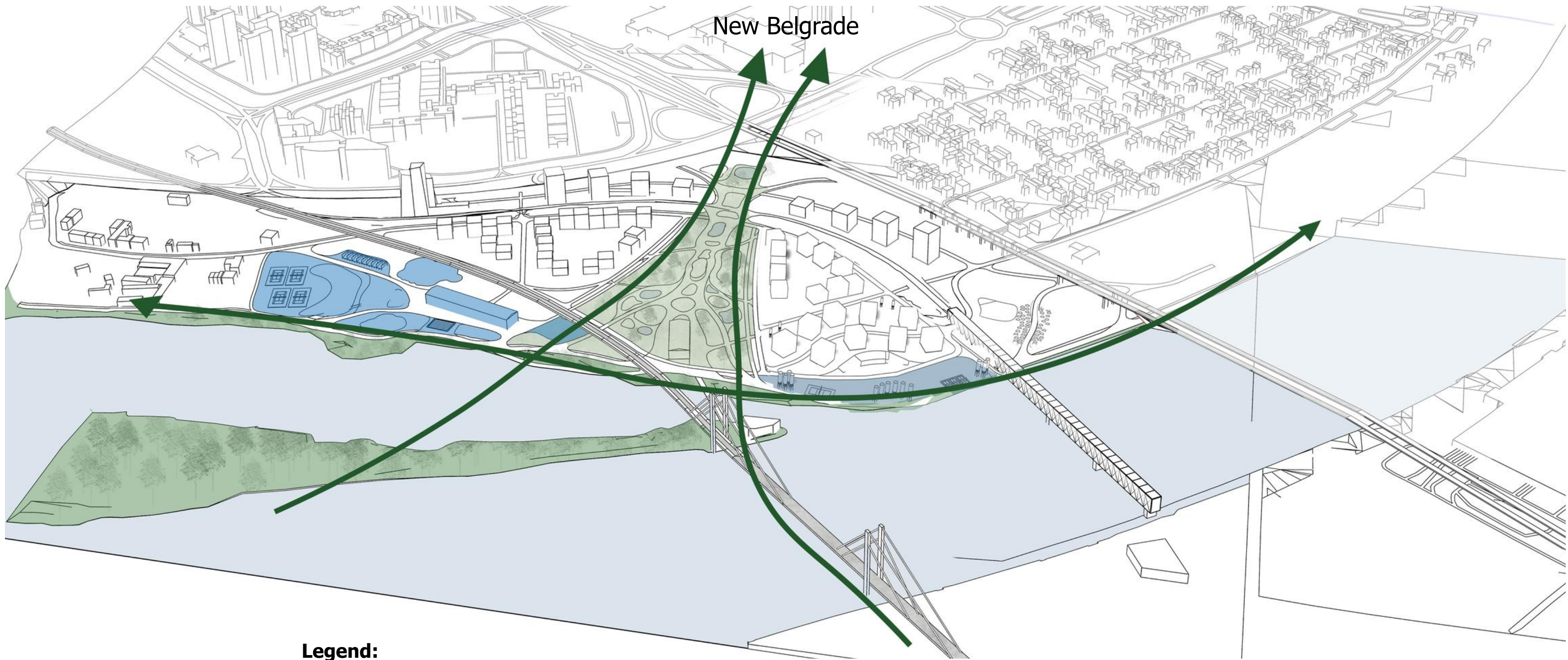
GREEN CORRIDOR



Legend:

 buffer zone

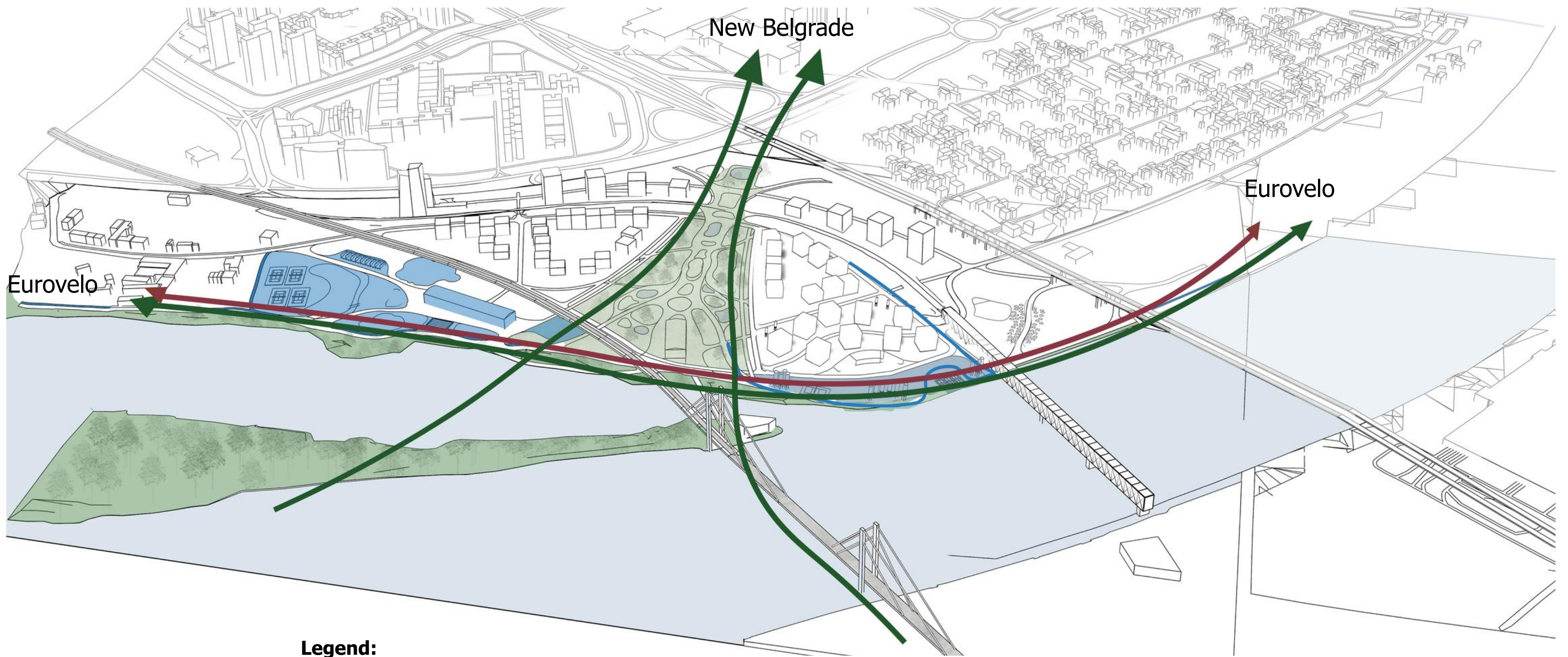
SPORT ELEMENTS



Legend:

- buffer zone
- sport elements

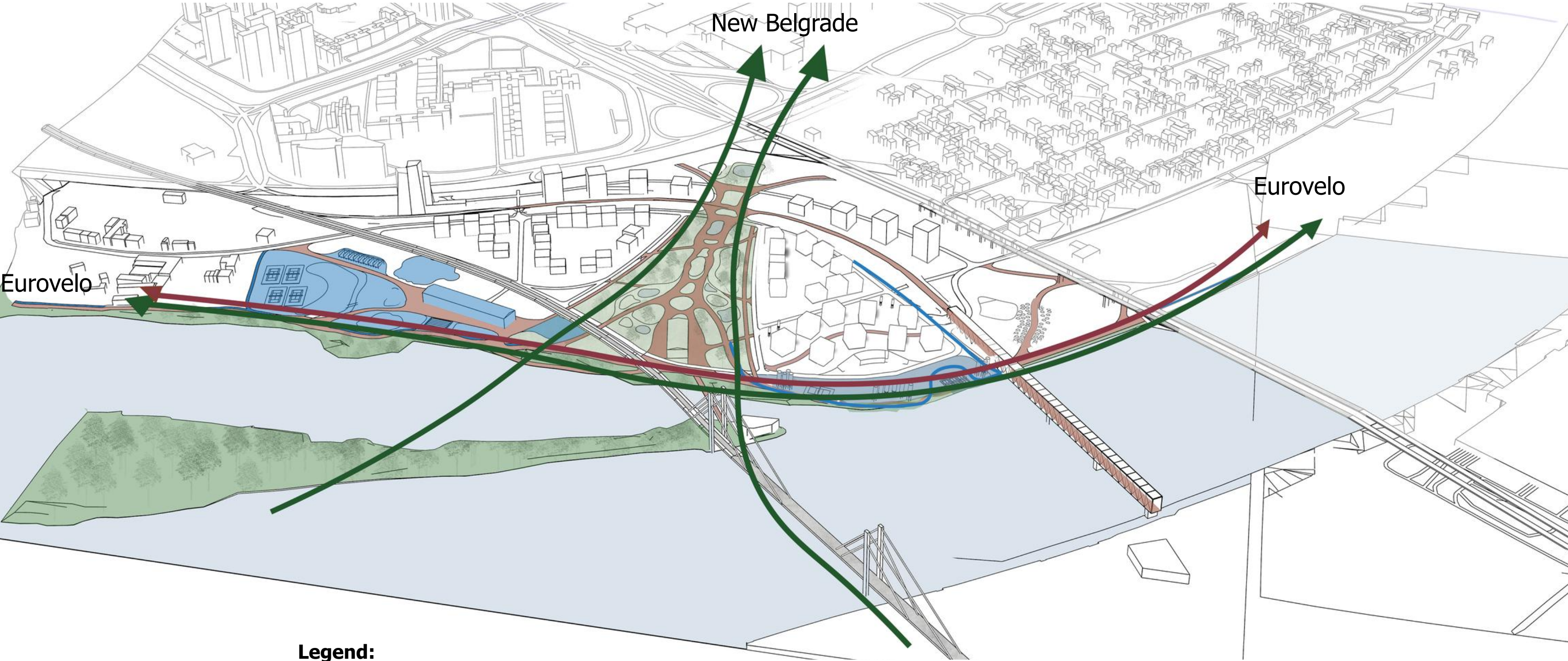
CYCLING PATHS



Legend:

- buffer zone
- sport elements
- cycling paths

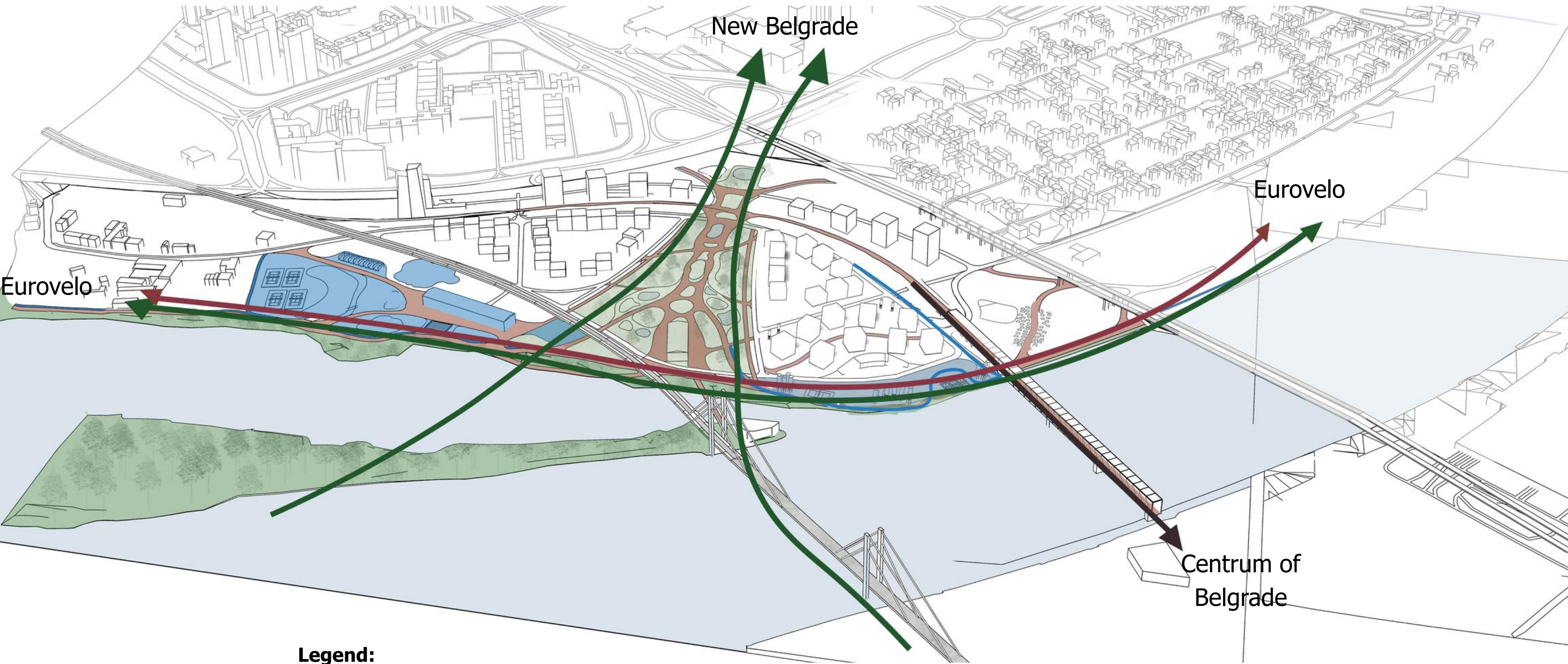
WALKING PATHS



Legend:

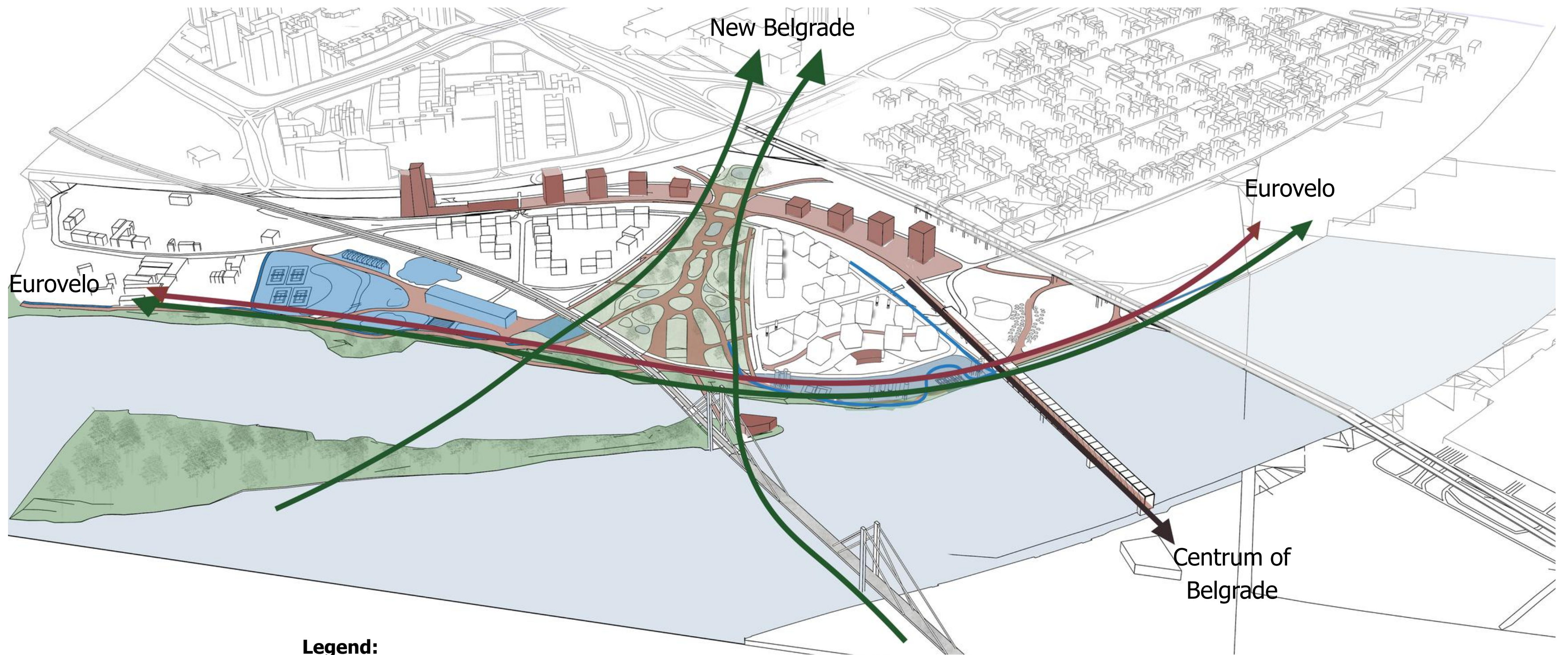
- buffer zone
- sport elements
- cycling paths
- walking paths

WALKING PATHS



- Legend:**
- buffer zone
 - sport elements
 - cycling paths
 - walking paths

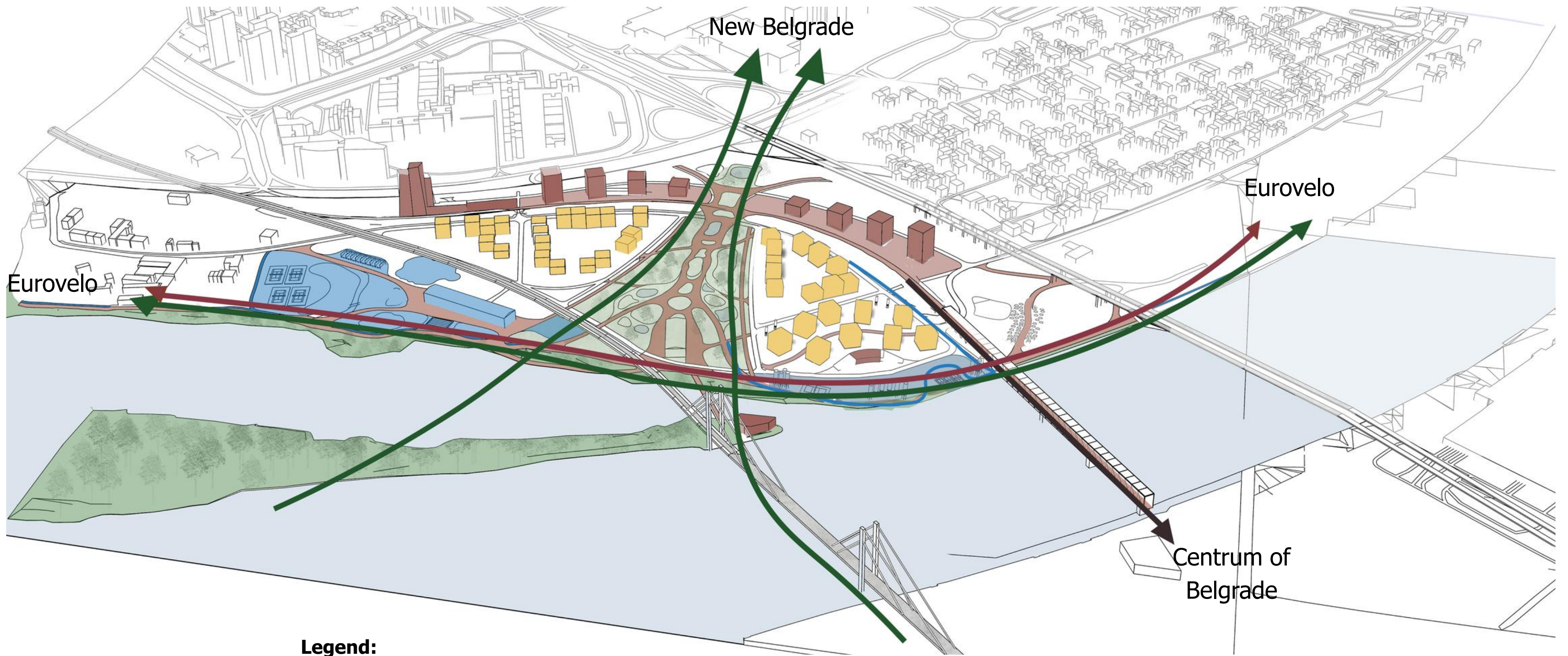
SERVICE FACILITIES



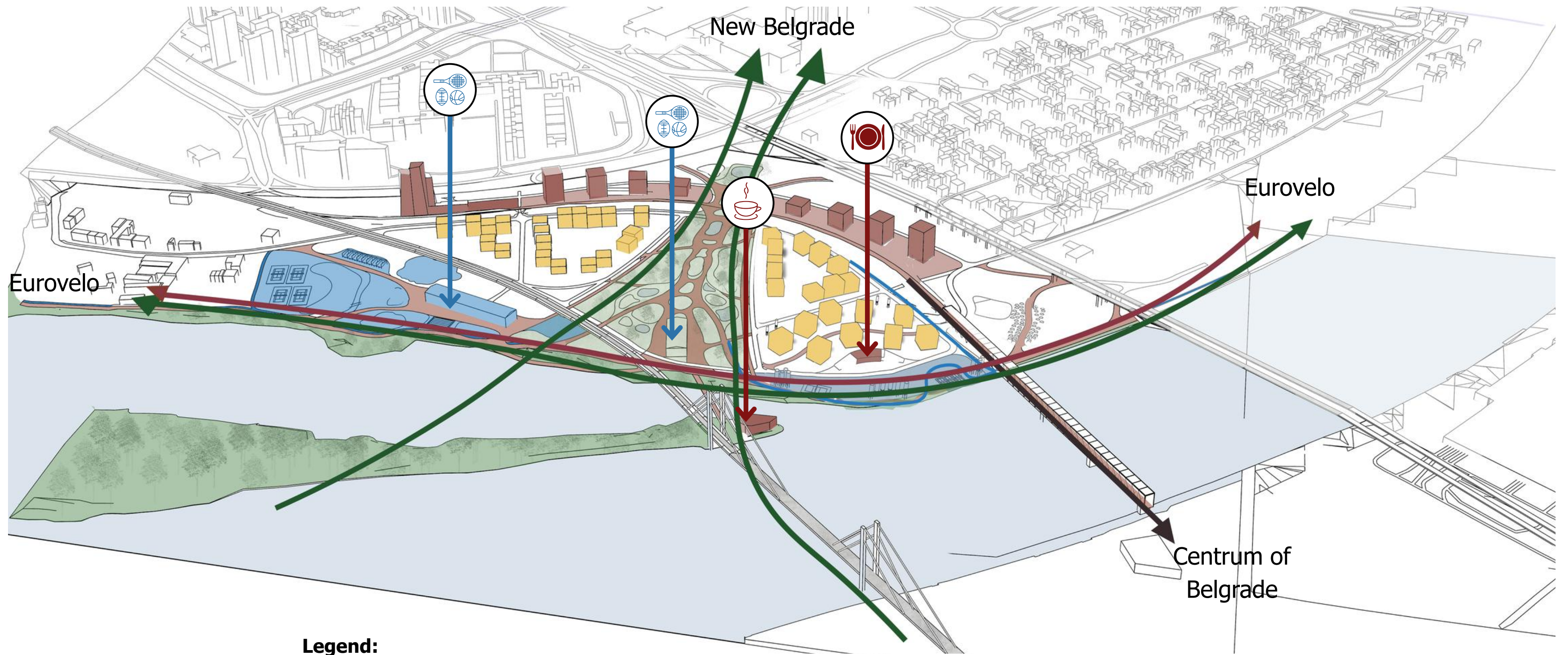
Legend:

- buffer zone
- sport elements
- cycling paths
- walking paths
- facilities

BUILDINGS



NEW FACILITIES



Legend:

- buffer zone
- sport elements
- cycling paths
- walking paths
- facilities
- new construction



MASTERPLAN



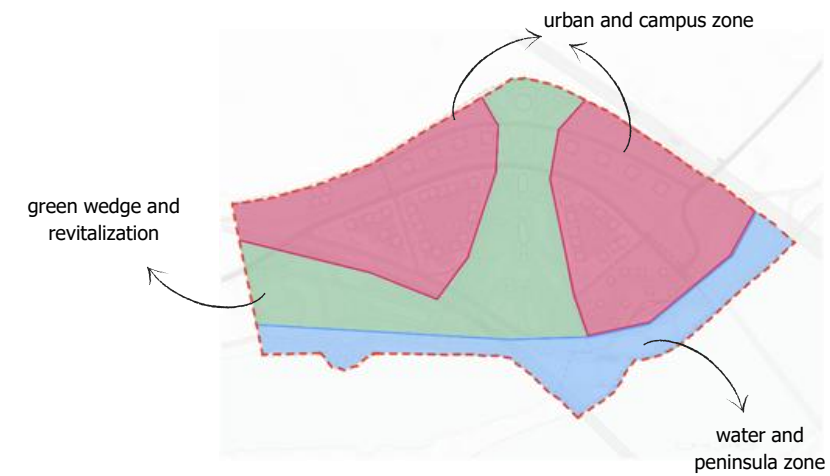
Legend - Masterplan scale 1:1000

- | Masterplan boundary
- | Spatial Development Plan boundary
- | Proposed building
- | Existing building
- V | Number of above-ground storeys
- | Proposed access road
- | Proposed internal road
- | Proposed cycle path
- | Proposed pedestrian and cycle path
- | Recycled sports surface
- | Low greenery – meadow
- | Low greenery – quarter greenery
- | Private garden greenery
- | High greenery – trees
- | Rain gardens / wetlands
- | Existing bridges and viaducts
- | Under-viaduct parking

1. Tennis courts
2. Roller skating track
3. Squash courts
4. Athletics
5. Skatepark
6. Indoor swimming pool
7. Water slides
8. Outdoor swimming pool
9. Outdoor gym
10. Learning zone
11. Play zone
12. Activity zone
13. Sports Museum
14. Pedestrian bridge
15. Rowing stands / bleachers
16. Reed cultivation in silo-based planters

PHASES OF REVITALIZATION

| No. | Action | Objective | Social | Economic | Spatial | Environmental | Beneficiaries | Result Indicator | Cost [EUR] | Funding Source | Timeframe |
|--|---|---|---|-------------------------------------|---|---|---|--|---|---|-------------|
| WATER AND PENINSULA ZONE (The Peninsula, Sailing Club, and Wetlands) | | | | | | | | | | | |
| 1 | Construction of a pedestrian and cycling bridge connecting the peninsula to the main part of the city | Ensuring accessibility | | | | | Cyclists, sailors | Number of bridge users (people/year) | 0,6-1M | City of Belgrade Budget (Secretariat for Investments) | Short-term |
| 2 | Revitalization of the historic Sailing Club | Preservation of post-war development of the peninsula | | | | | Students, sailors | Area of the revitalized facility (m ²) | 1,5-2M | Public-Private Partnership (PPP), Corporate sponsorship | Medium-term |
| 3 | Construction of light floating docks near the peninsula (small-scale infrastructure) | | Kayakers / Canoeists | Number of mooring/kayak spaces | 80-120k | JKP "Beogradvode" (Public Utility Company), Sports associations | Short-term | | | | |
| 4 | Creation of urban wetlands and marshlands | | The ecosystem, the city | Area of newly created wetlands (ha) | 300-500k | WBIF (Western Balkans Investment Framework), UNDP Serbia | Short-term | | | | |
| 5 | Implementation of natural retention basins and bioretention swales | | | | | Residents | Volume of retained water (m ³) | 200-400k | EBRD (Green City Action Plan), Ministry of Environmental Protection | Short-term | |
| 6 | Designation of a quiet zone and protection of pygmy cormorant habitats | Restoration of the ecological balance of the Sava riverbank | | | | | Number of protected species observed | < 10k | City Budget (Secretariat for Environmental Protection) | Immediate | |
| 7 | Preliminary cleanup of the Sava riverbank (concrete removal, renaturalization), utilization of silos as infrastructure for river water purification | Environmental education and contact with nature | | | | | Length of renaturalized shoreline (linear meters) | 400-800k | Srbijavode (Serbian Waters), IPA Funds (Cross-border) | Short-term | |
| 8 | Installation of birdwatching hides in the nature zone | | Number of visitors/school groups (annually) | 30-50k | NGO Grants (e.g., Young Researchers of Serbia), Corporate CSR funds | Short-term | | | | | |



| GREEN WEDGE AND REVITALIZATION (Central Park + Expo Halls) | | | | | | | | | | | |
|--|--|--|--|--|-----------|--|---|--|---------------------|--|-------------|
| No. | Action | Objective | Social | Economic | Spatial | Environmental | Beneficiaries | Result Indicator | Cost [EUR] | Funding Source | Timeframe |
| 9 | Creation of a "Green Wedge" – a linear park connecting the city to the river | | x | | x | x | All residents | Area of new landscaped green spaces (ha) | 1 - 1,5M | City Budget, "Zelenilo Beograd" (Green City) | Short-term |
| 10 | Distribution of outdoor sports courts along the park (tennis, basketball) | Creation of the main recreational axis (the district's lungs) | | | x | | Youth, Athletes | Number of sports infrastructure users | 400 - 600k | Ministry of Sports, City Budget | Short-term |
| 11 | Adaptation of the natural terrain for running and cross-country trails | | Runners | Length of designated running trails (km) | 50 - 100k | Sponsorship (e.g., Belgrade Marathon sponsors), City | Short-term | | | | |
| 12 | Adaptation of post-industrial halls (light blue) into the EXPO Sport center | | Visitors, Exhibitors | Usable floor area of the exhibition center (m ²) | 10 - 15M | Republic of Serbia Budget (EXPO 2027 Program) | Medium-term | | | | |
| 13 | Transformation of silos into "Activity Towers" (climbing walls) | Industrial transformation and promotion of innovation | x | x | x | | Climbers | Number of climbing routes / wall height | 0,5 - 1,2M | Private investor, Concession | Medium-term |
| 14 | Adaptation of selected silos into rainwater harvesting tanks (technical retention) | | EIB Loans (Municipal infrastructure), City | Short-term | | | | | | | |
| 15 | Creation of a coworking space for startups in smaller buildings | Supporting local entrepreneurship and economic activation of the district | | x | | | Science Technology Park Belgrade, VC Funds | Medium-term | | | |
| 16 | Installation of park street furniture made from recycled materials | Promotion of the circular economy and enhancement of user comfort | x | | | | Local initiatives, Environmental grants (e.g., Eco-package) | Short-term | | | |
| 17 | Preservation of major visual axes from the park to the river and landmarks | Protection of spatial order and integration of new development with the surroundings | | | x | | Pedestrians | Number of preserved visual axes | Covered by planning | Urbanistički zavod Beograda (Urban Planning Institute) | N/A |

| URBAN AND CAMPUS ZONE (New Development) | | | | | | | | | | | |
|---|---|---|------------------------------------|--|---|---|---------------------|--|---------------------|---|-------------|
| No. | Action | Objective | Social | Economic | Spatial | Environmental | Beneficiaries | Result Indicator | Cost [EUR] | Funding Source | Timeframe |
| 18 | Construction of the Athletes' Village | Provision of residential facilities for sports personnel | x | x | x | | Athletes, Students | Number of accommodation places (beds) for athletes | 8 - 12M | State Budget (national infrastructure), Loans | Medium-term |
| 19 | Construction of a residential estate | Development of permanent urban fabric and social mix | | x | x | | Families, Residents | Usable residential floor area (NSA) | > 30M | Private capital (Developers, e.g., Eagle Hills) | Long-term |
| 20 | Construction of office buildings with a high-rise landmark | | Companies, Employees | Class A office space (GLA) | > 40M | Commercial investors / Investment funds | Long-term | | | | |
| 21 | Introduction of "Cool Yards" between buildings | Improvement of microclimate and living comfort | x | | x | x | Residents | Reduction of ambient temperature on hot days (°C) | Covered by planning | Private investors (Green Building standards) | Long-term |
| 22 | Organization of insulating green buffer zones adjacent to developments | Revitalization of public spaces | | | | | | Ecologically active area within the buffer zone | 150 - 300k | Belgrade Land Development Public Agency | Phased |
| 23 | Introduction of retail and dining on ground floors (opening to the park) | | Commercial spaces on ground floors | Borne by tenants | SME Sector (Small and Medium-sized Enterprises) | Long-term | | | | | |
| 24 | Construction of an integrated transit hub (eco-hub) at the entrance | Improving accessibility and prioritizing pedestrian traffic | | | | | | Number of passengers / transfers per day | 4 - 6M | EBRD/EIB Loan (Public transport), City Budget | Medium-term |
| 25 | Concealing vehicular traffic in parking lots under overpasses and utilizing existing parking spaces | | Drivers | Number of parking spaces | 0,5 - 1M | Parking Servis (Municipal company), PPP | Phased | | | | |
| 26 | Installation of photovoltaic panels on roofs (especially high-rises) | Energy efficiency and Smart City | | x | | x | Housing communities | Installed capacity of PV panels (kWp) | 500 - 800k | Grant programs of the Min. of Mining and Energy, Prosumer loans | Long-term |
| 27 | Implementation of a smart motion-controlled lighting system | | Residents | Reduction in electricity consumption (%) | 100 - 200k | "Smart City Belgrade" project, Technology partnership | Short-term | | | | |



SITE PLAN



Legend – Site Development Plan scale 1:500

- | Masterplan boundary
- | Site development plan boundary
- | Proposed building
- | Existing building
- | Number of above-ground storeys
- | Main building entrance
- | Proposed access road
- | Proposed internal road
- | Proposed cycle path
- | Proposed pedestrian and cycle path
- | Proposed sidewalk
- | Proposed parking spaces
- | Recycled sports surface
- | Low grass greenery
- | Low greenery – shrubs
- | High greenery – trees
- | Riverside greenery
- | Water retention / rain gardens
- | Existing bridges and viaducts
- | Adaptation of existing silos

Functional Legend

- 1. Outdoor gym
- 2. Exercise bars
- 3. Yoga
- 4. Stretching area
- 5. Relaxation area
- 6. Boules
- 7. Climbing silos
- 8. Table tennis
- 9. Slackline walking
- 10. Amphitheatre
- 11. Badminton
- 12. Calisthenics
- 13. Barbecue / picnic area
- 14. Volleyball
- 15. Rowing stands
- U - Food service venue
- M - Pedestrian bridge
- Z - Yacht club

Ground Floor Service Legend

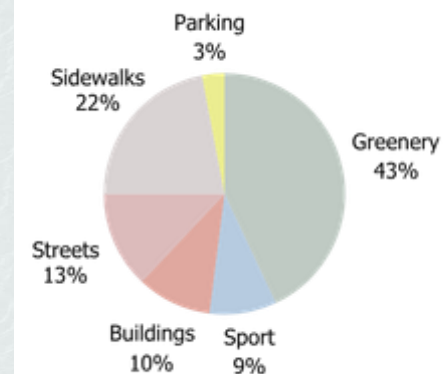
- A - Physiotherapist
- B - Doctor
- C - Gym
- D - Hairdresser
- E - Café
- F - Bakery
- G - Shared space with a 24/7 nano-store
- H - Bicycle repair service
- I - Physiotherapist

Site Area Balance

| | |
|----------------------------|-------------------------------------|
| Biologically active area | 43% - 14 278m ² |
| Sports areas | 9% - 3 039m ² |
| Building footprint | 10% - 3 171m ² |
| Paved surfaces – roads | 13% - 4 434m ² |
| Paved surfaces – sidewalks | 22% - 7 524m ² |
| Parking areas | 3% - 1 142m ² |
| Total area | 100% - 33 589m ² = 3,3ha |

Project Parameters

Number of residential buildings: 9
 Number of residential units: 117
 Number of parking spaces: 70 + 3 accessible spaces
 Number of parking spaces for buses: 3



SITE PLAN



Legend – Site Development Plan

scale 1:500

- | Masterplan boundary
- | Site development plan boundary
- | Proposed building
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- | Number of above-ground storeys
- | Main building entrance
- | Proposed access road
- | Proposed internal road
- | Proposed cycle path
- | Proposed pedestrian and cycle path
- | Proposed sidewalk
- | Proposed parking spaces
- | Recycled sports surface
- | Low grass greenery
- | Low greenery – shrubs
- | High greenery – trees
- | Riverside greenery
- | Water retention / rain gardens
- | Existing bridges and viaducts
- | Adaptation of existing silos

Ground Floor Service Legend

- A - Physiotherapist
- B - Doctor
- C - Gym
- D - Hairdresser
- E - Café
- F - Bakery
- G - Shared space with a 24/7 nano-store
- H - Bicycle repair service
- I - Physiotherapist

Functional Legend

- 1. Outdoor gym
- 2. Exercise bars
- 3. Yoga
- 4. Stretching area
- 5. Relaxation area
- 6. Boules
- 7. Climbing silos
- 8. Table tennis
- 9. Slackline walking
- 10. Amphitheatre
- 11. Badminton
- 12. Calisthenics
- 13. Barbecue / picnic area
- 14. Volleyball
- 15. Rowing stands
- U - Food service venue
- M - Pedestrian bridge
- Z - Yacht club

Surveys:

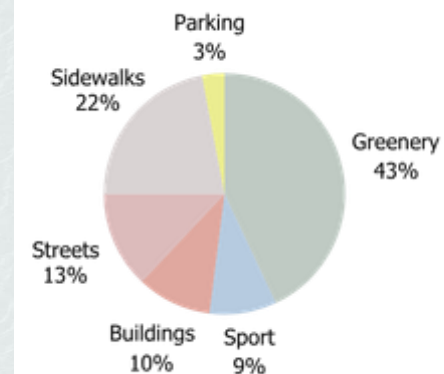
- Promenade
- Open social spaces
- Approach to industrial history
- Green and recreational areas
- River cleanliness and protection

Site Area Balance

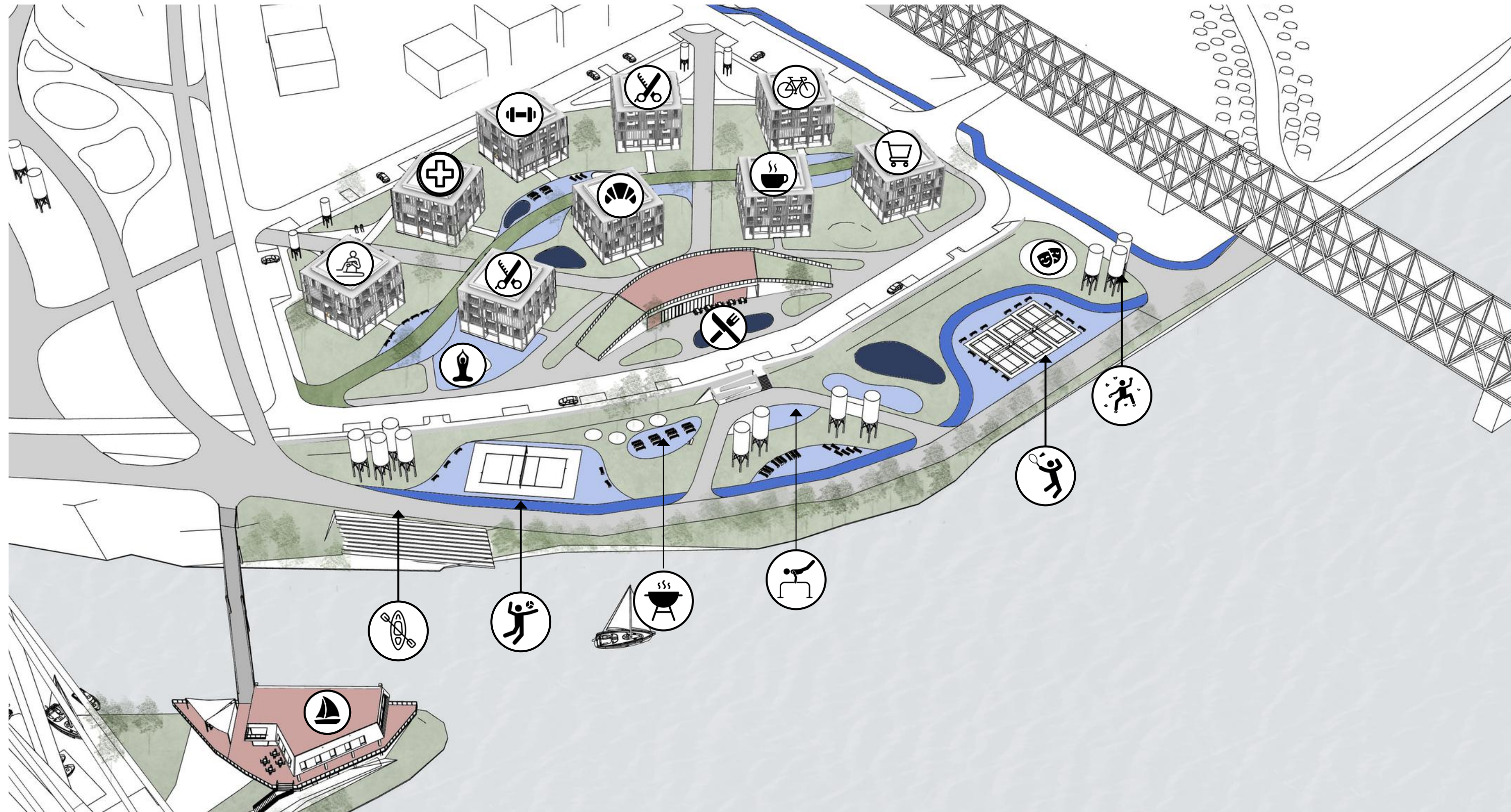
| | |
|----------------------------|-------------------------------------|
| Biologically active area | 43% - 14 278m ² |
| Sports areas | 9% - 3 039m ² |
| Building footprint | 10% - 3 171m ² |
| Paved surfaces – roads | 13% - 4 434m ² |
| Paved surfaces – sidewalks | 22% - 7 524m ² |
| Parking areas | 3% - 1 142m ² |
| Total area | 100% - 33 589m ² = 3,3ha |

Project Parameters

Number of residential buildings: 9
 Number of residential units: 117
 Number of parking spaces: 70 + 3 accessible spaces
 Number of parking spaces for buses: 3



SITE PLAN - SCHEME



Legend:

- green areas
- sports areas
- recreational areas
- commercial facilities
- woonerf
- bicycle path

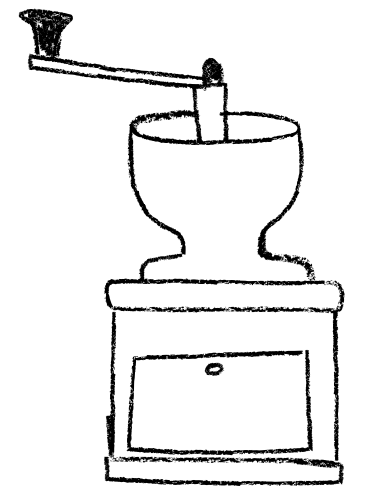
Functional Legend

-  1. Outdoor gym
-  2. Exercise bars
-  3. Yoga
-  4. Stretching area
-  5. Relaxation area
-  6. Boules
-  7. Climbing silos
-  8. Table tennis
-  9. Slackline walking
-  10. Badminton
-  11. Badminton
-  12. Calisthenics
-  13. Barbecue / picnic area
-  14. Volleyball
-  15. Rowing stands
-  U - Food service venue
-  M - Pedestrian bridge
-  Z - Yacht club

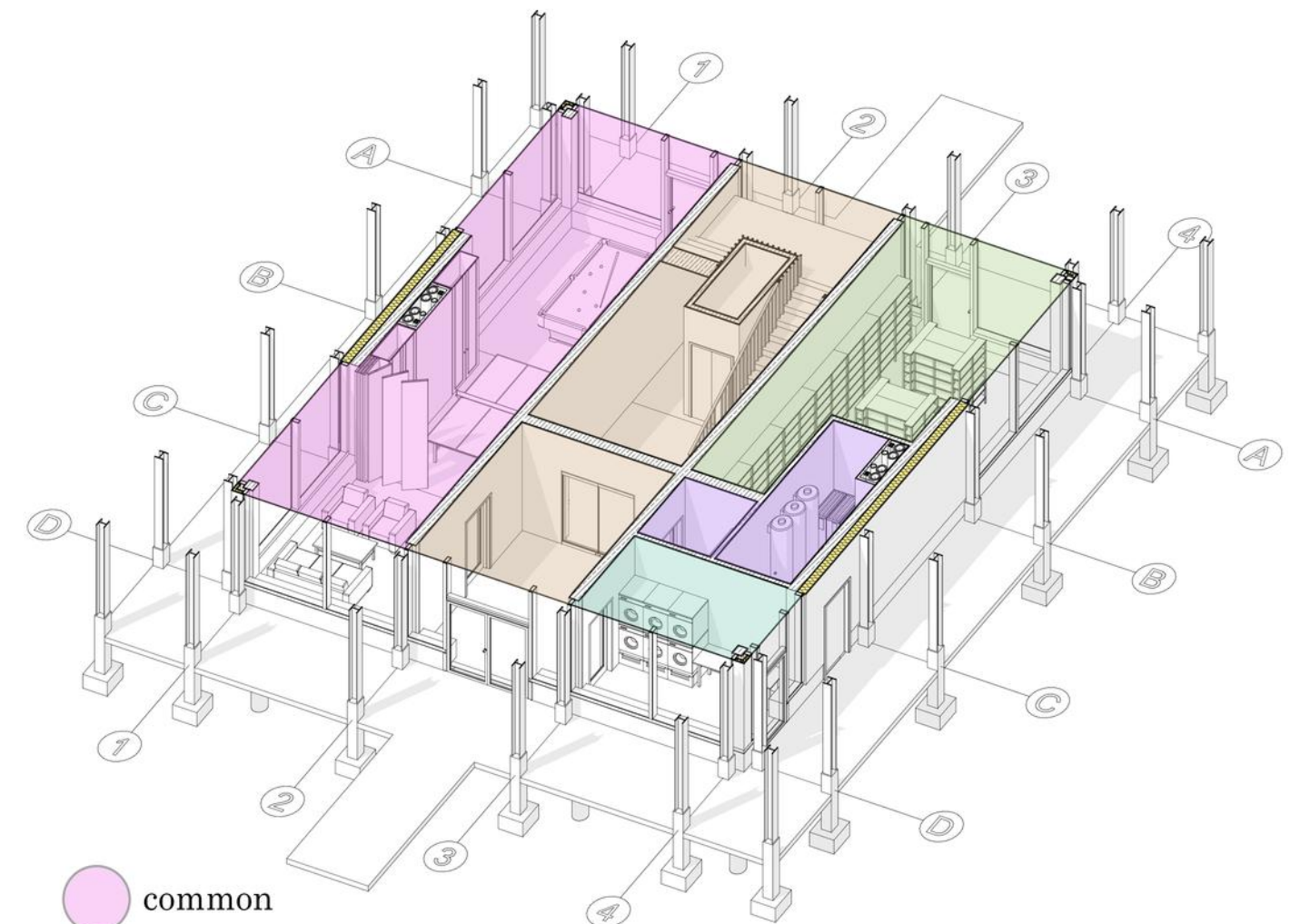
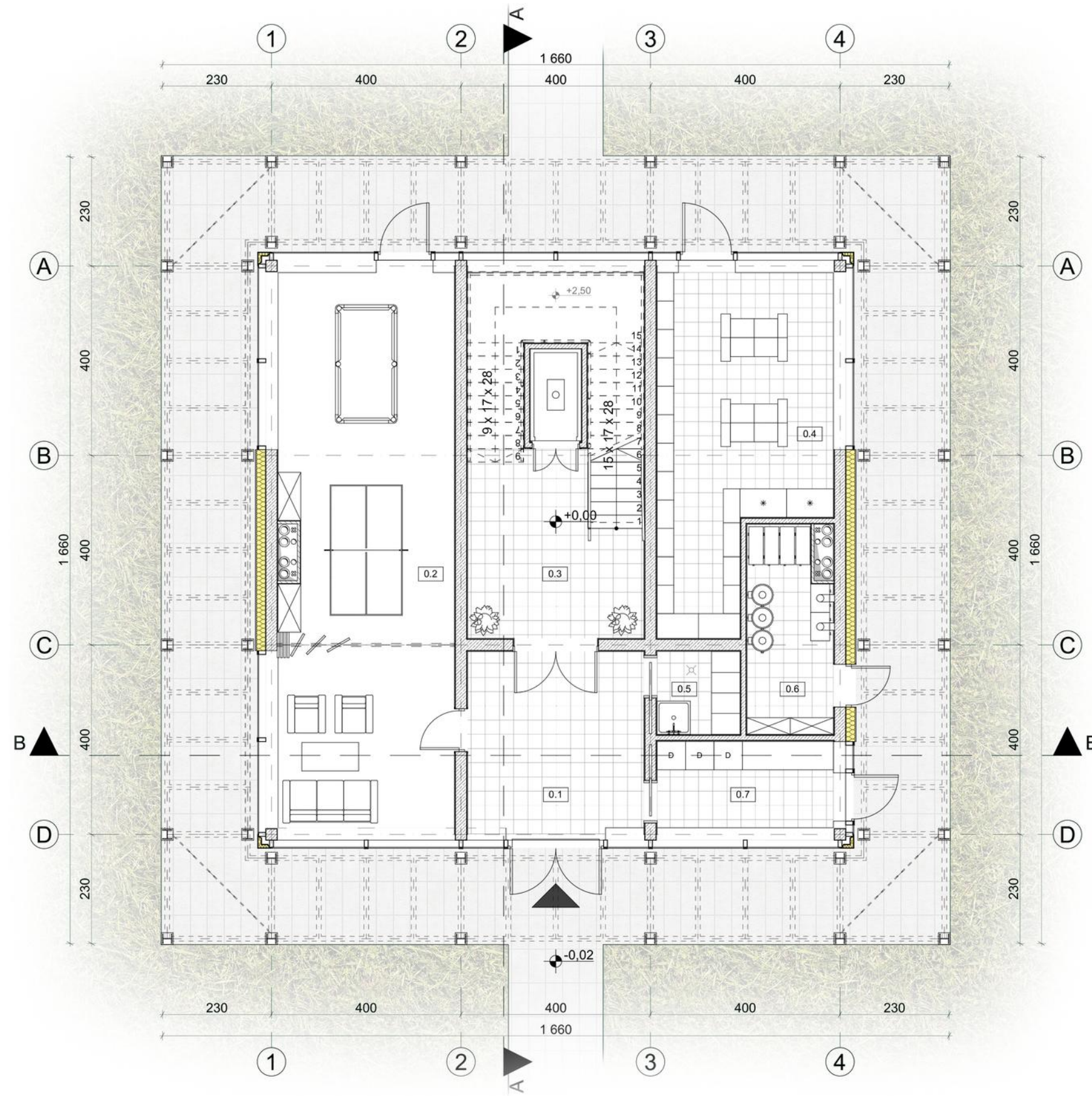
Ground Floor Service Legend

- A - Physiotherapist
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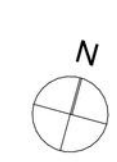
NEW CONSTRUCTION



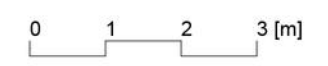




- common area
- circulation
- laundry room
- staff rooms
- self-service shop (nano)

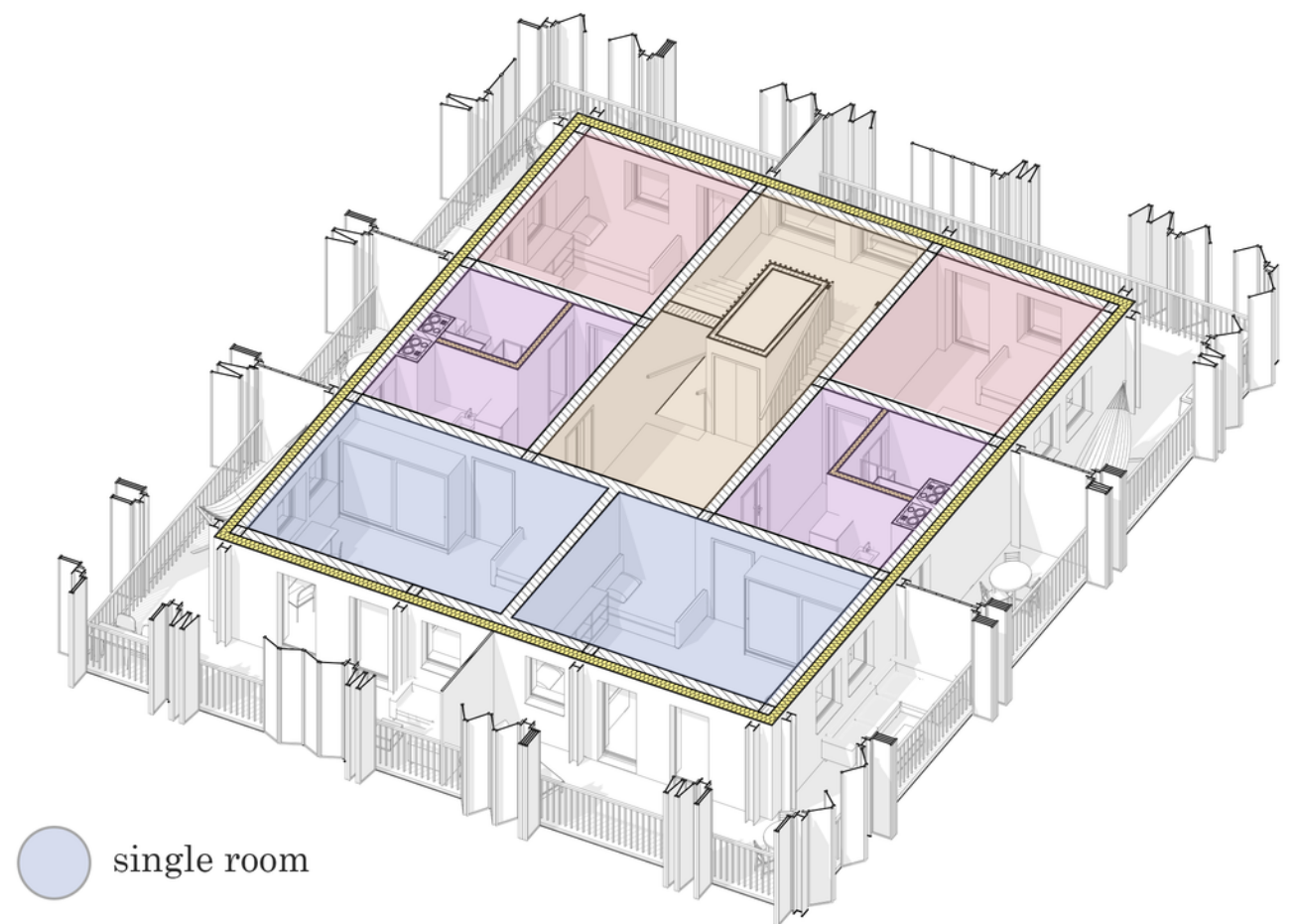
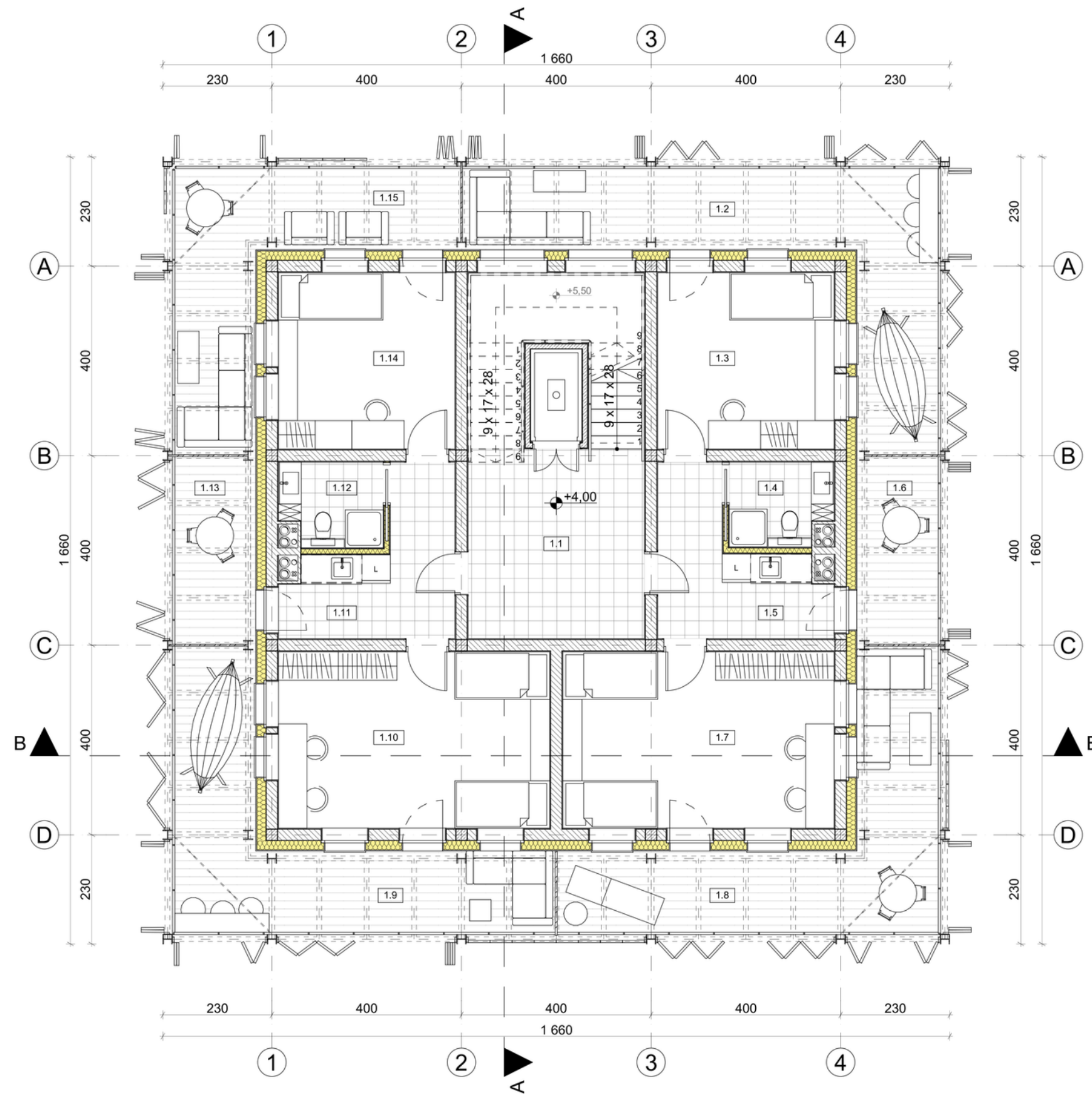


Ground floor plan, scale 1:100
Usable area: 131.0 m²



+1


Building G




- single room
- common area: kitchen and bathroom
- double room
- circulation

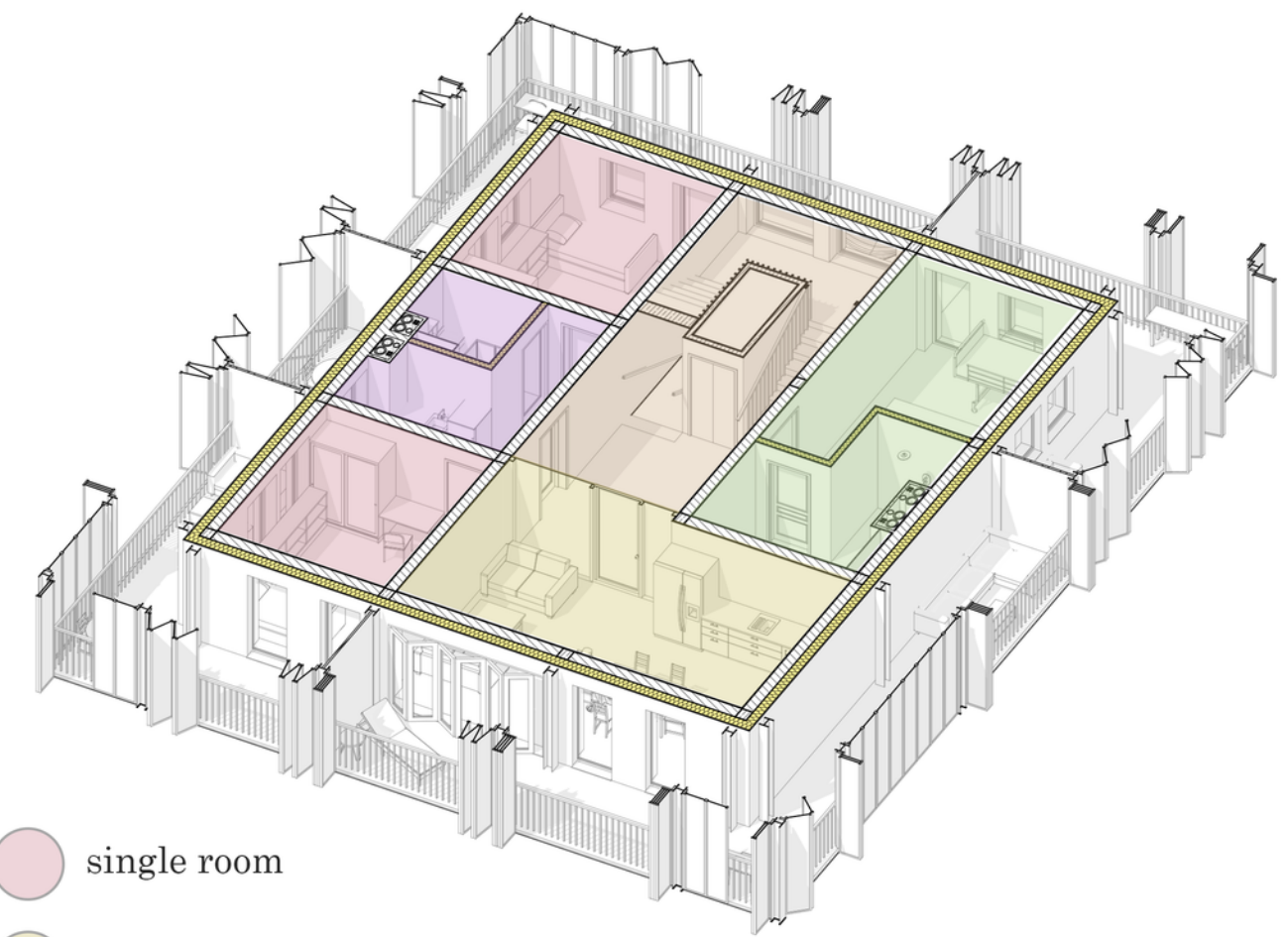
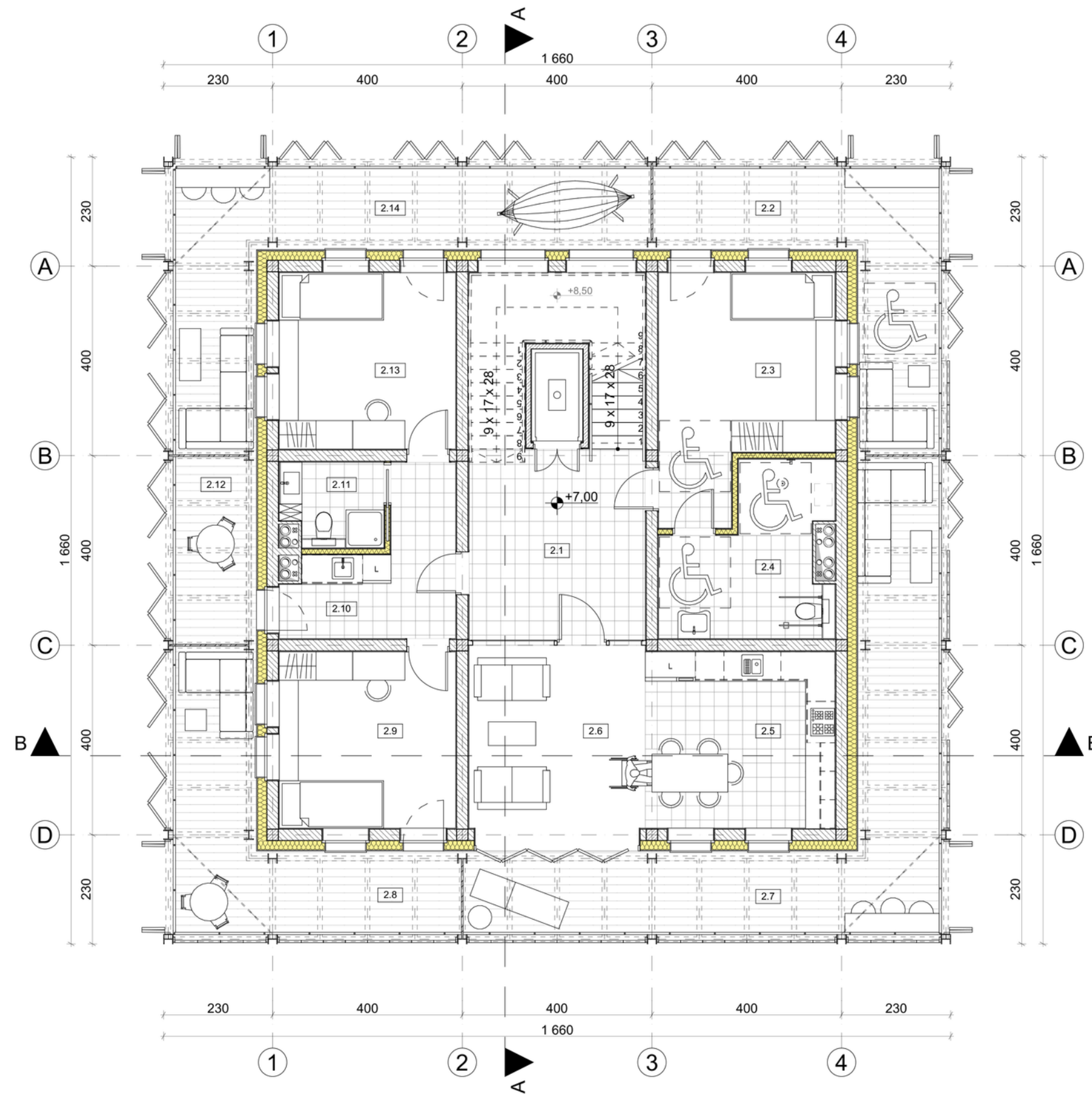
First floor plan (+1), scale 1:100
 Usable area: 208.2 m²

N

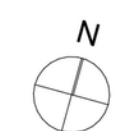


0 1 2 3 [m]

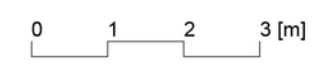




- single room
- common area for all residents: kitchen and living room
- common area: kitchen and bathroom
- accessible room with bathroom
- circulation

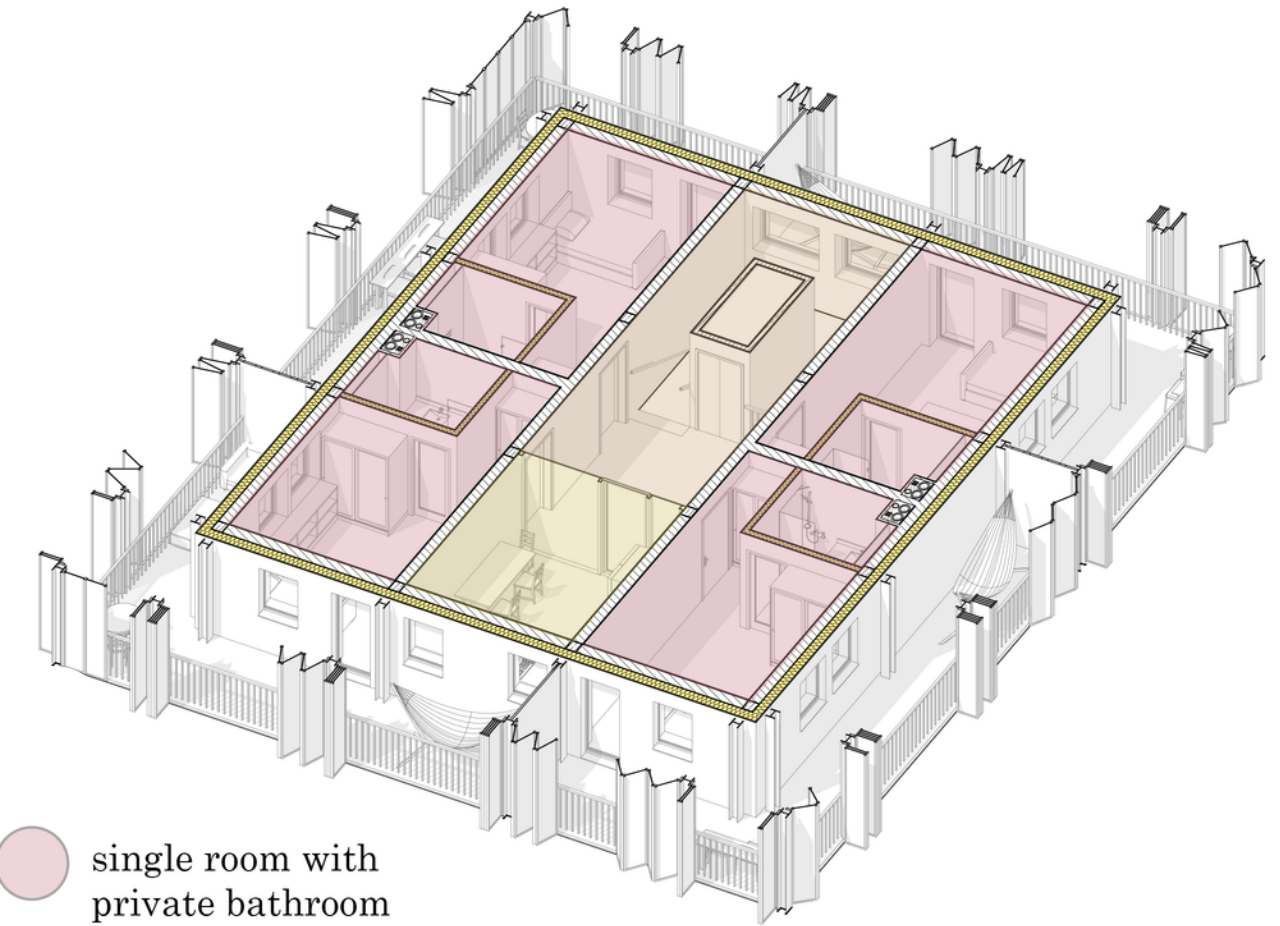
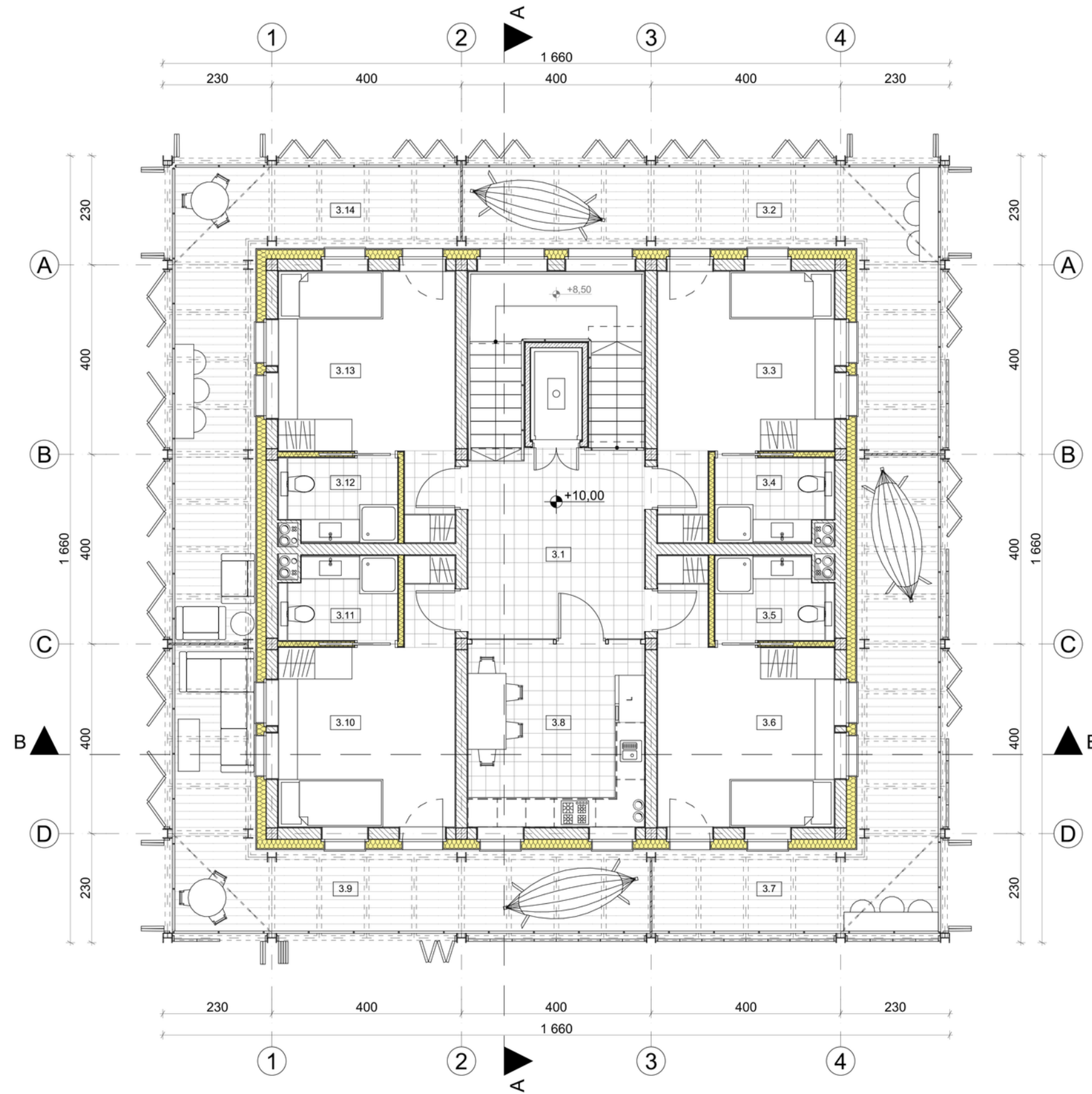


Second floor plan (+2), scale 1:100
Usable area: 210.6 m²



+3


Building G



- single room with private bathroom
- common area for all residents: kitchen
- circulation

Third floor plan (+3), scale 1:100
 Usable area: 208.8 m²

N

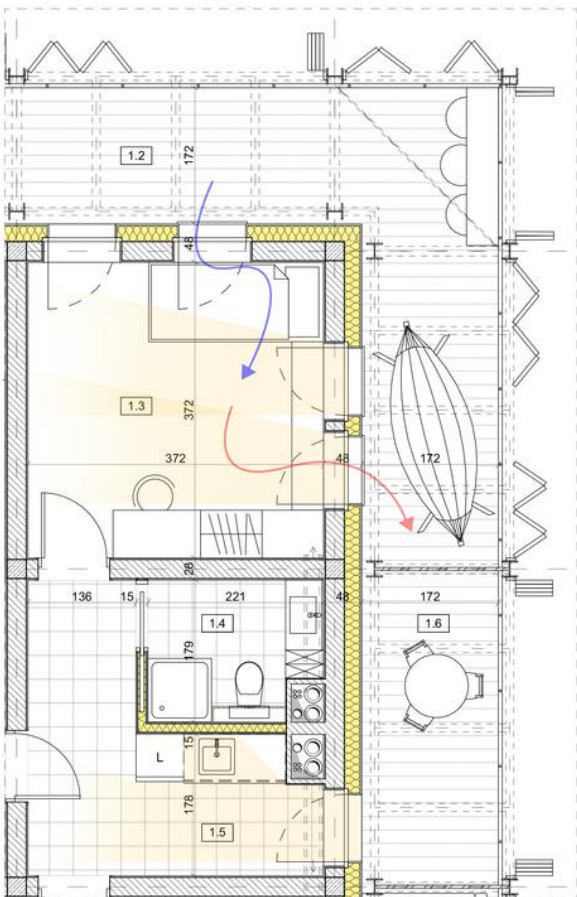


0 1 2 3 [m]



TYPES OF ROOM

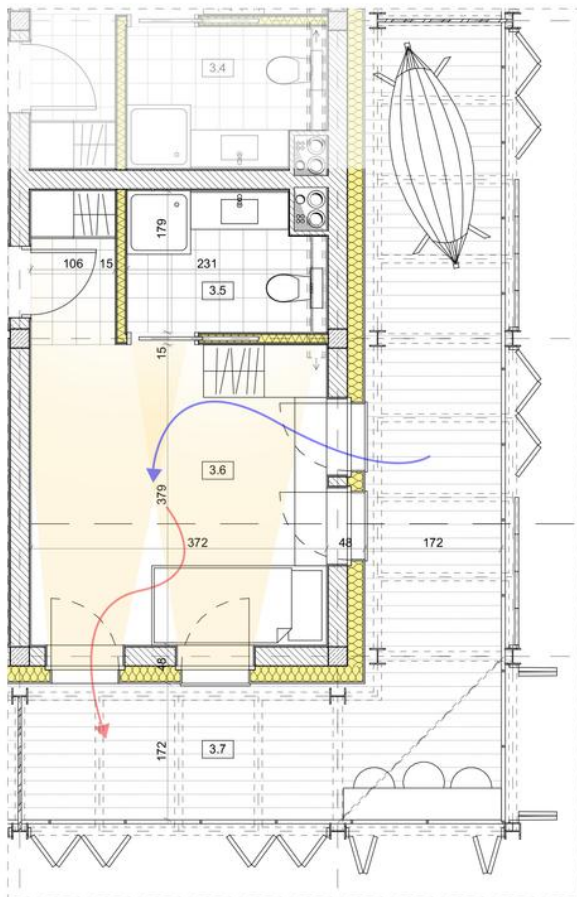
Daylighting and cross ventilation



P1 Single Room, scale 1:75
 1.3 Room area: 13.8 m²
 1.2 Gallery area: 24.7 m²
 1.4 Bathroom area: 3.5 m²
 1.5 Shared area: 9.4 m²
 1.6 Shared gallery area: 6.8 m²



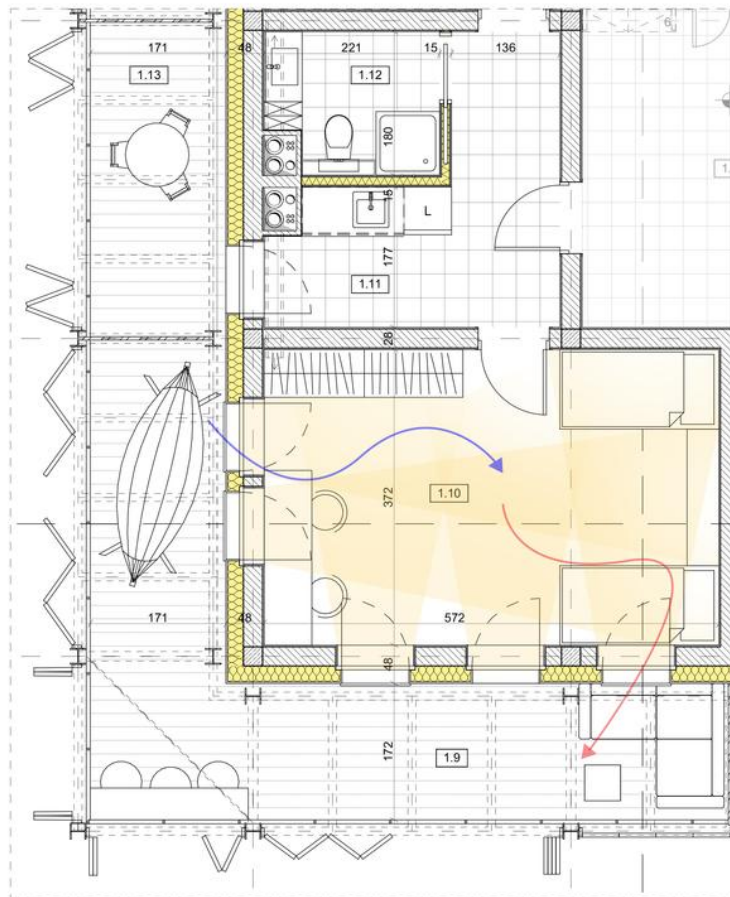
Single room within a segment
 They make up about 30.7% of the total rooms in the building.



P2 Single Room, scale 1:75
 3.6 Room area: 16.1 m²
 3.7 Gallery area: 24.7 m²
 3.5 Bathroom area: 4.0 m²



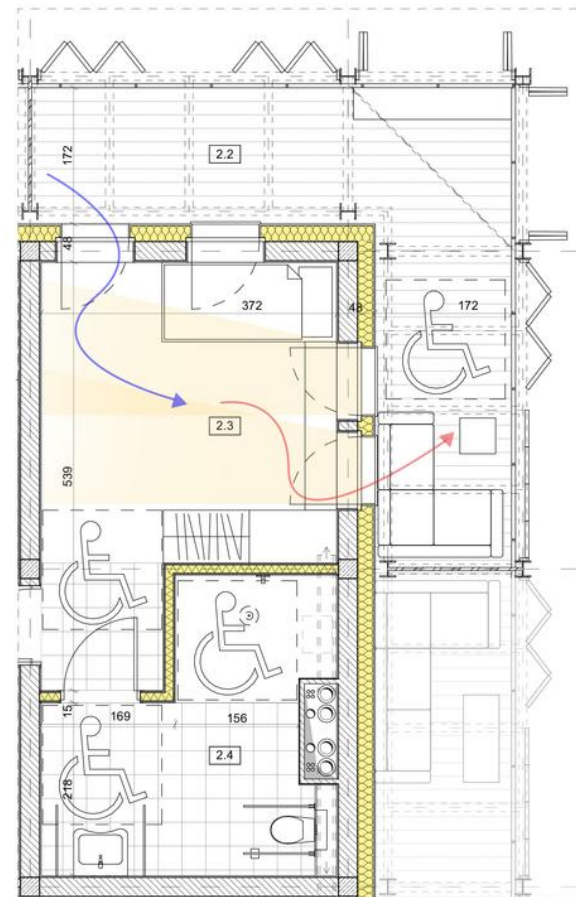
Private single room
 They make up about 30.7% of the total rooms in the building



P3 Double Room, scale 1:75
 1.10 Room area: 21.3 m²
 1.9 Gallery area: 21.2 m²
 1.11 Shared area: 9.2 m²
 1.12 Bathroom area: 3.5 m²
 1.13 Shared gallery area: 6.8 m²



Double room
 They account for approximately 30.7% of all rooms in the building.



P4 Accessible Room, scale 1:75
 2.3 Room area: 16.8 m²
 2.2 Gallery area: 17.8 m²
 2.4 Bathroom area: 10.4 m²

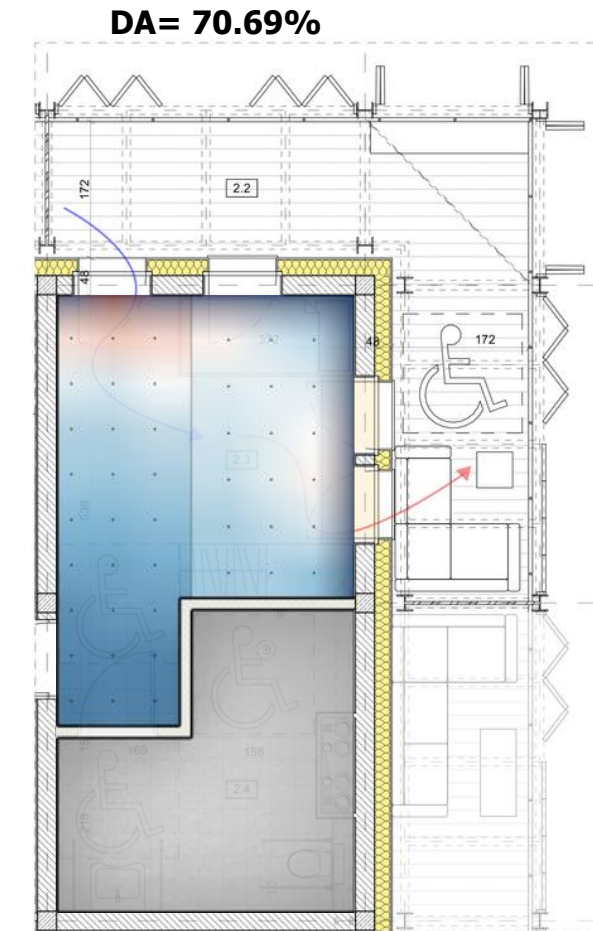
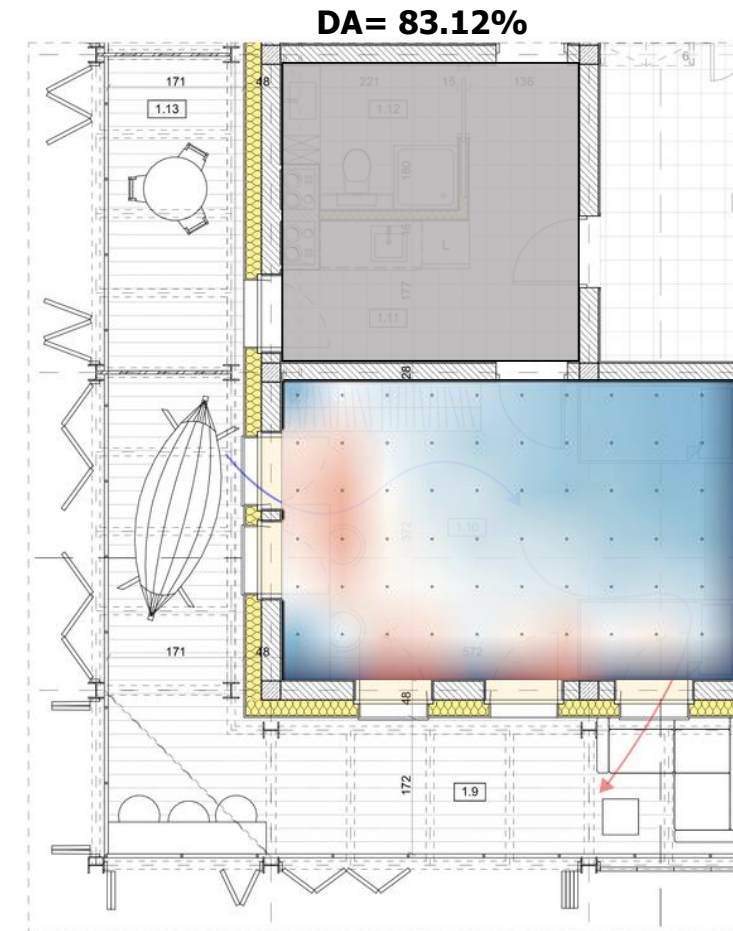
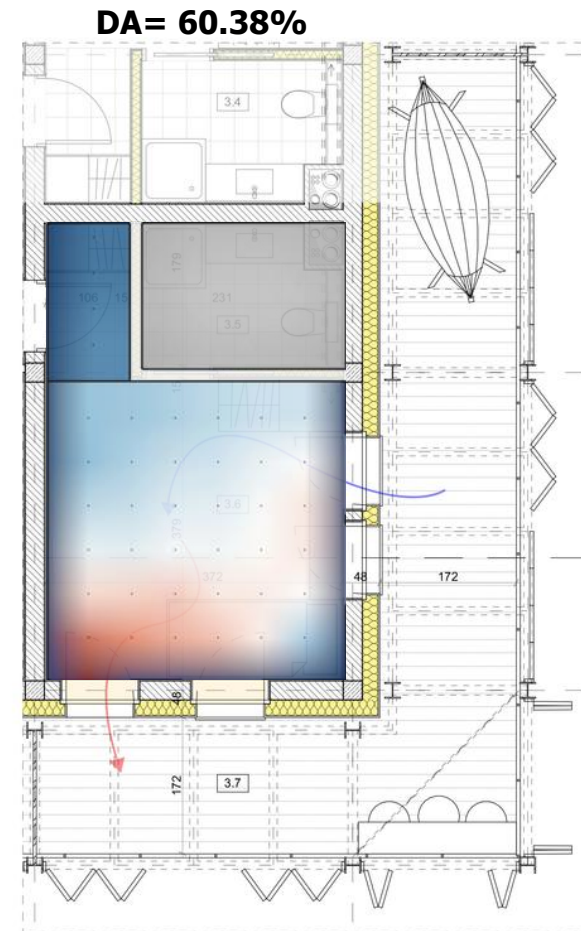
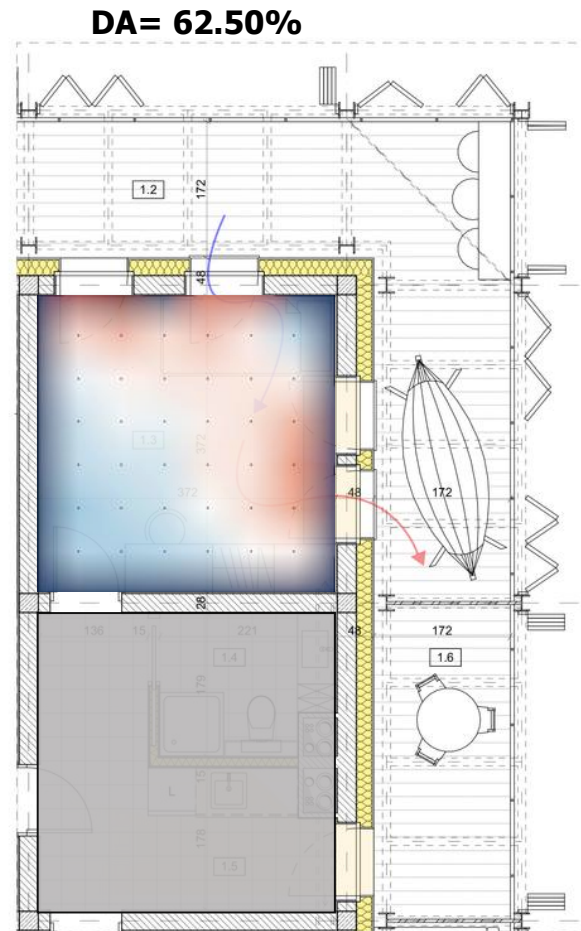


Accessible single room
 They account for approximately 7.7% of all rooms in the building

Single rooms account for nearly 70% of all rooms in the facility (including just under 8% accessible rooms). The remaining 30% are double rooms. The rooms achieve a 1:7 daylight ratio through the use of Saint-Gobain triple-glazed windows with special coatings and meet a minimum of 60% daylight autonomy. Natural cross-ventilation further supports indoor comfort and reduces the load on the mechanical ventilation system, thanks to the corner placement of the rooms within the building.

TYPES OF ROOM - DAYLIGHT AUTONOMY

average DA=69.17%

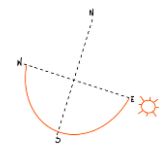


Calculations and model: ClimateStudio

P1 Single Room, scale 1:75

- 1.3 Room area: 13.8 m²
- 1.2 Gallery area: 24.7 m²
- 1.4 Bathroom area: 3.5 m²
- 1.5 Shared area: 9.4 m²
- 1.6 Shared gallery area: 6.8 m²

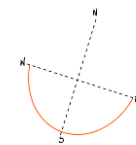
0 1 2 3 [m]



P2 Single Room, scale 1:75

- 3.6 Room area: 16.1 m²
- 3.7 Gallery area: 24.7 m²
- 3.5 Bathroom area: 4.0 m²

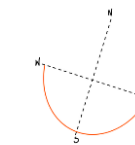
0 1 2 3 [m]



P3 Double Room, scale 1:75

- 1.10 Room area: 21.3 m²
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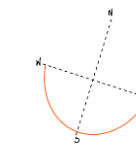
0 1 2 3 [m]



P4 Accessible Room, scale 1:75

- 2.3 Room area: 16.8 m²
- 2.2 Gallery area: 17.8 m²
- 2.4 Bathroom area: 10.4 m²

0 1 2 3 [m]



Single room within a segment

They make up about 30.7% of the total rooms in the building.



Private single room

They make up about 30.7% of the total rooms in the building



Double room

They account for approximately 30.7% of all rooms in the building.



Accessible single room

They account for approximately 7.7% of all rooms in the building

average lux: 659 (annual)

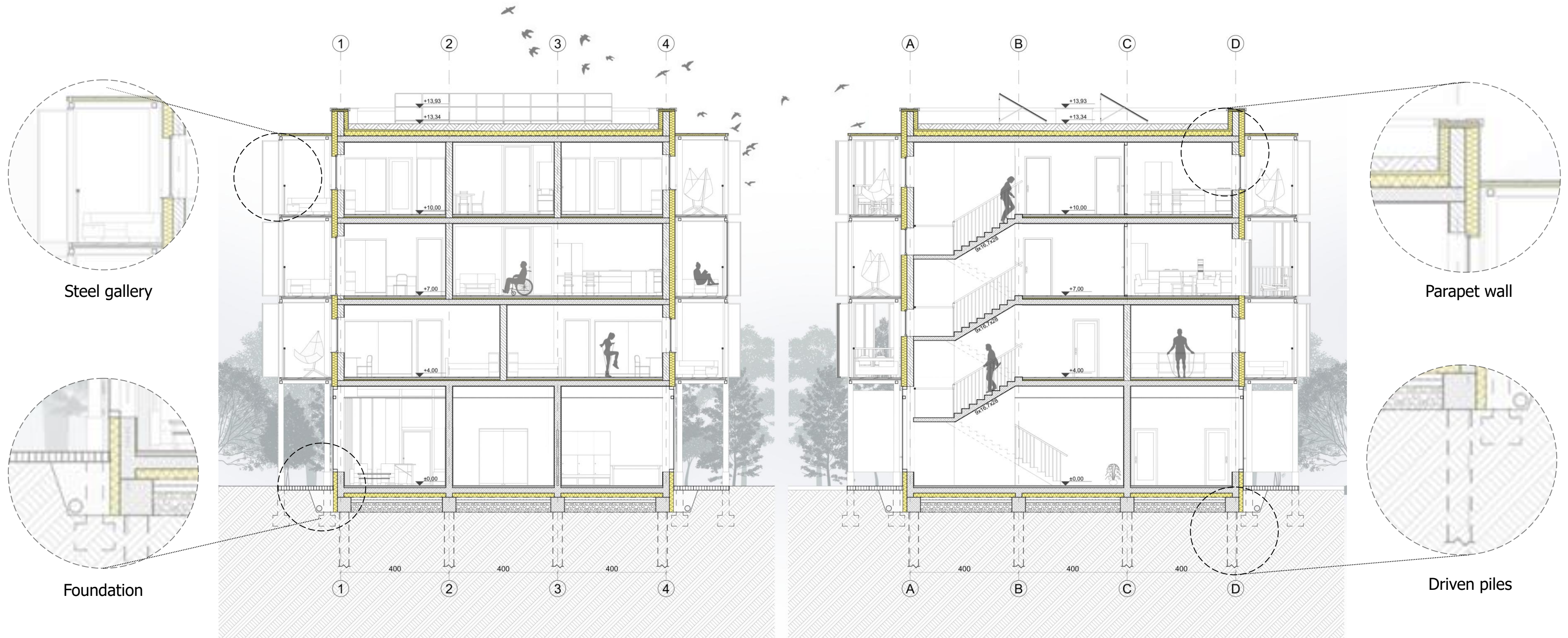


SECTIONS

Building G

Section B-B

Section A-A



Steel gallery

Parapet wall

Foundation

Driven piles

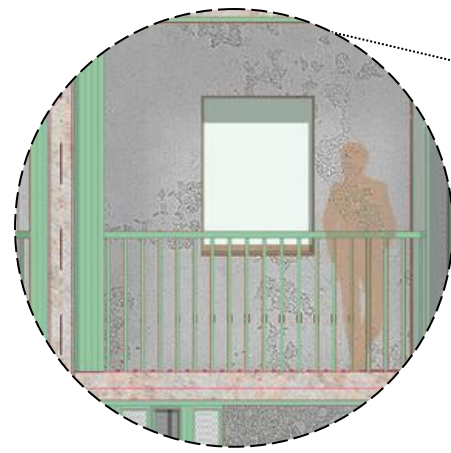
New construction

ELEVATIONS

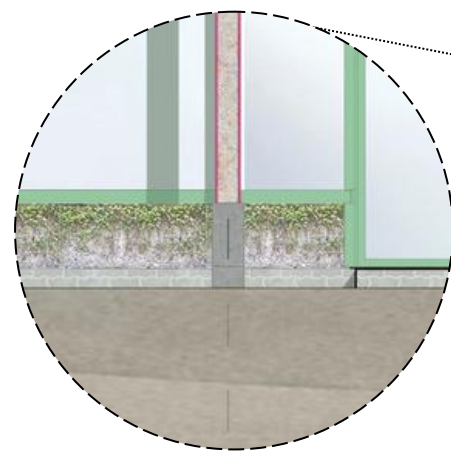
Building G

Front elevation

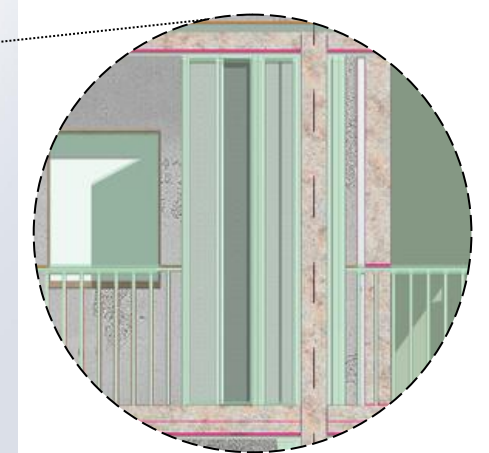
Side elevation



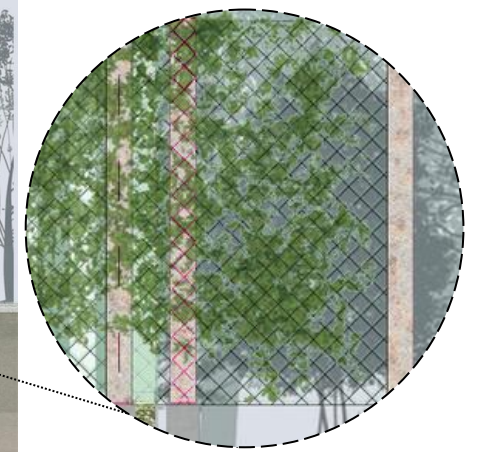
Steel railing



Concrete plinth



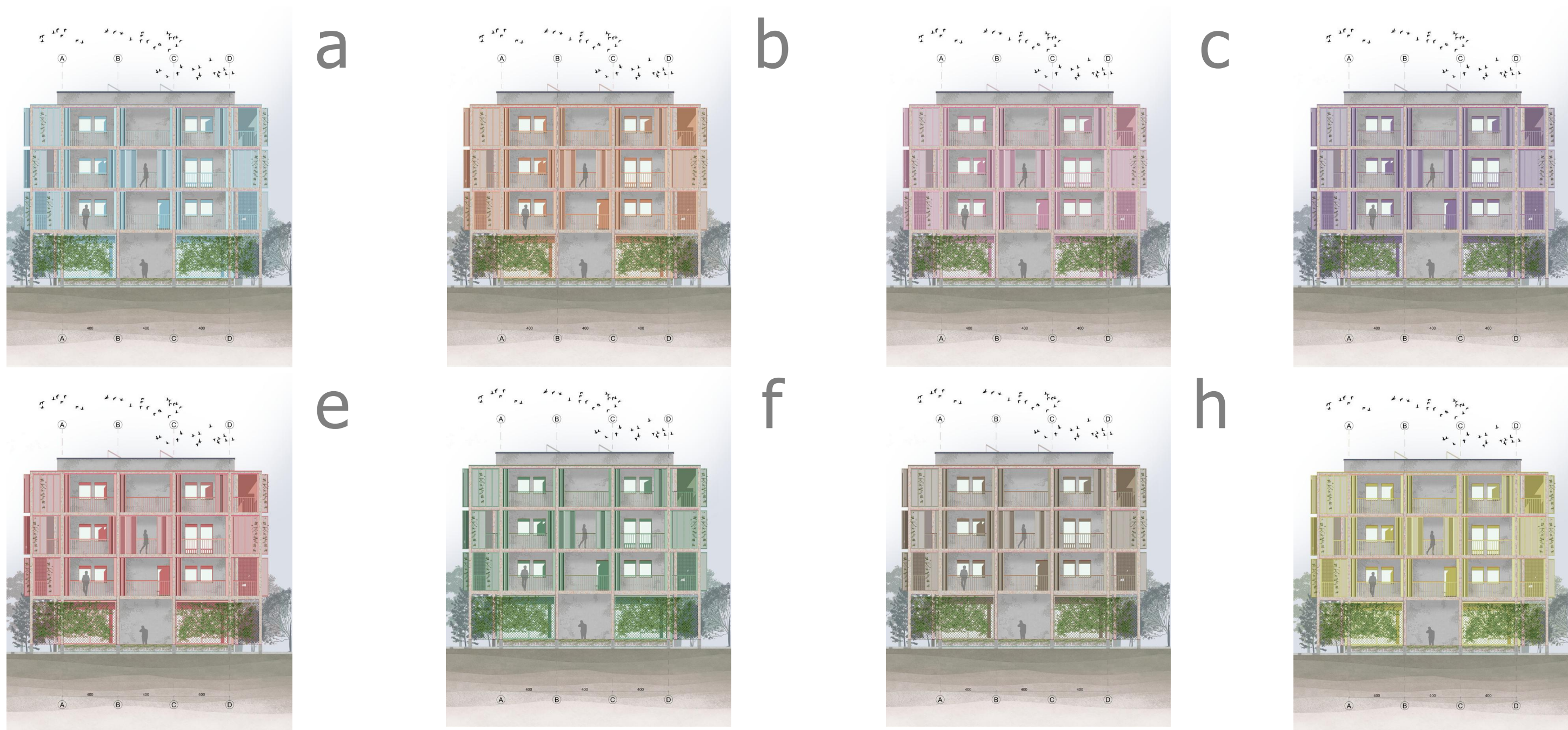
Steel frame



Framed mesh

New construction

COLOR VARIANTS



Despite the use of a repetitive, modular building structure based on a uniform external steel frame and a consistent facade layout, the design incorporates visual diversification across the complex. Nine color variants of the movable facade shutters and railings lend an individual character to each building while serving a shading function. This approach breaks the monotony of the repetitive architecture and strengthens the residents' identification with their own building and its surrounding space.

PREFABRICATED STRUCTURE

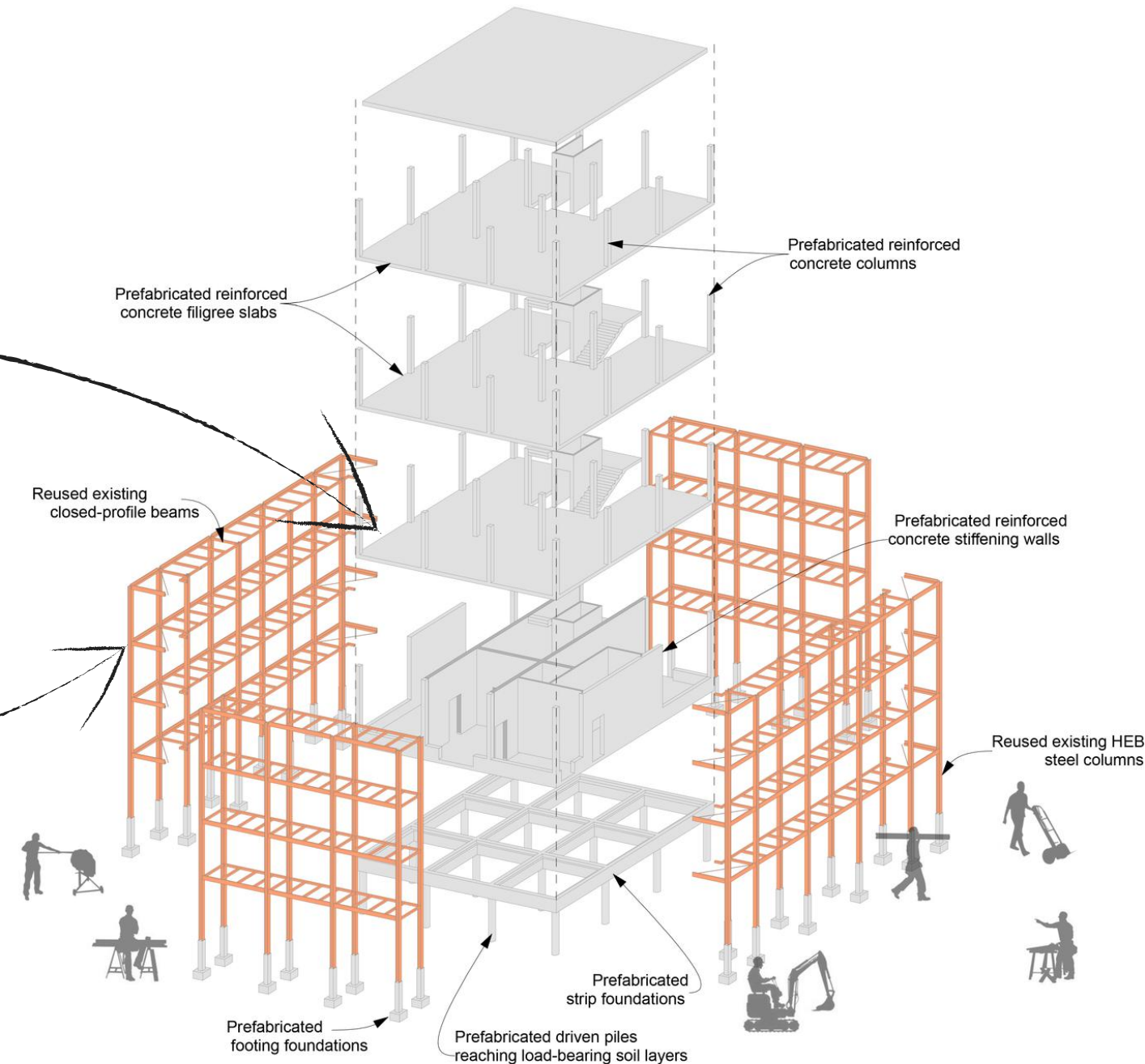
Building components located on the project site:



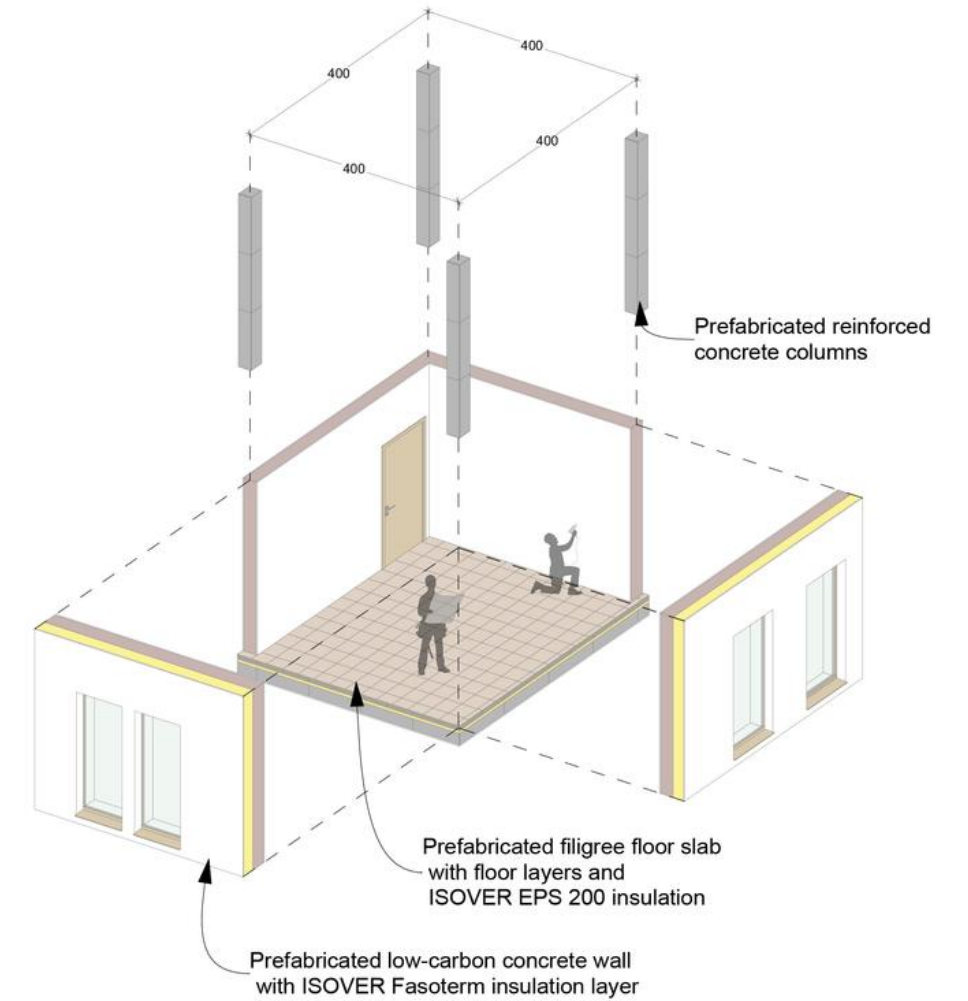
Casting molds



Steel profiles



AXONOMETRY OF CONSTRUCTION

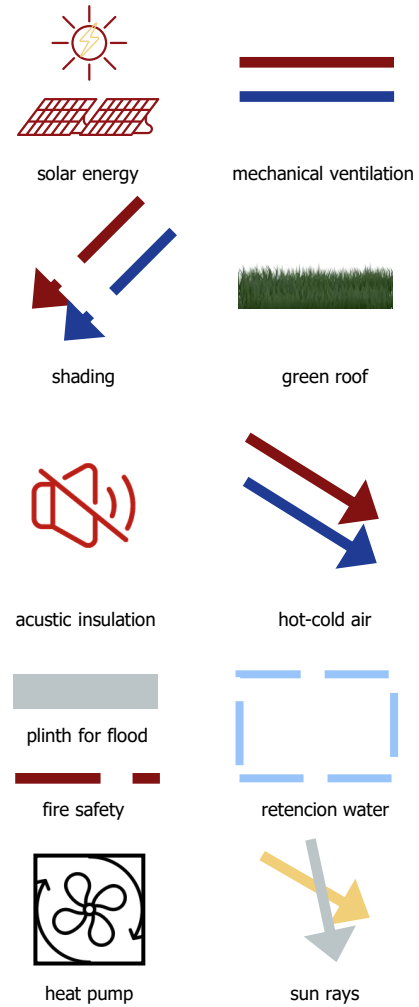


AXONOMETRY OF MODULE

The project combines the tradition of reinforced concrete with innovative low-carbon precast concrete and the reuse of local steel, drawing on Belgrade's industrial heritage by repurposing an old cement plant for the recycling of steel and iron. Traditional concrete methods are complemented with lightweight, low-carbon prefabricated elements, creating a hybrid system that makes construction faster, lighter, and safer, while reducing transport costs and carbon emissions. The concept is inspired by bird nests, built from materials found in their immediate surroundings.

SUSTAINABLE ELEMENTS

Used elements:

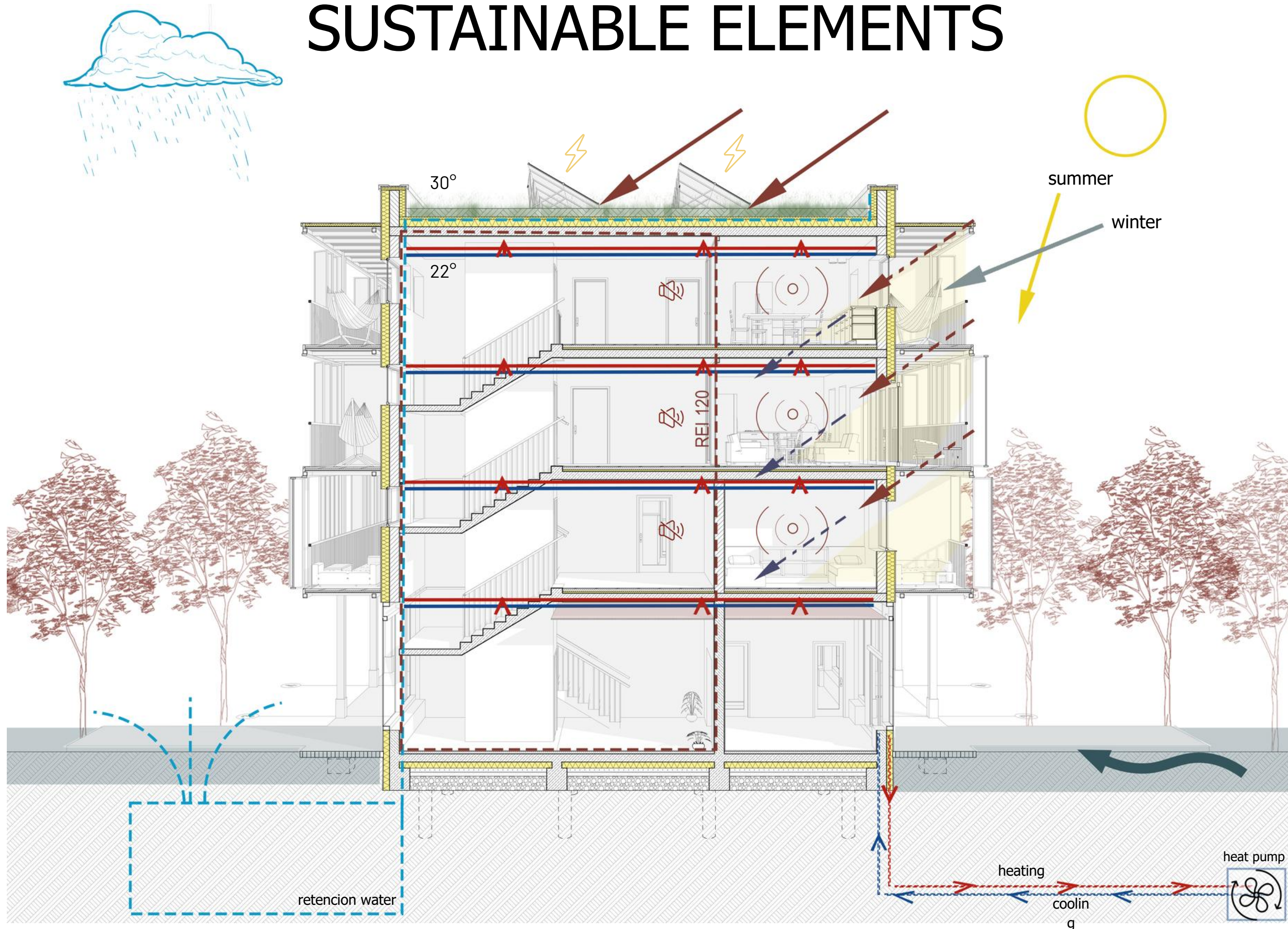


CLIMAVER[®]

ISOVER
SAINT-GOBAIN

ecophon
SAINT-GOBAIN

New construction



Fire safety 120 REI

Prefabricated elements made of low-carbon concrete.

Mechanical Ventilation:

rate: 30m³/h

Thermal comfort: Heating:

90% heat recovery efficiency

Cooling:

Green roofs enable water retention and closed-loop rainwater harvesting, while galleries act as a solar buffer.

Electricity:

photovoltaic panels generating electricity

Acoustic comfort:

60dB - integrated acoustic solutions dampen and reduce noise, ensuring user comfort.

Retention:

Rainwater collection and storage in a tank.

SHADING SYSTEM



100% Open:

Full, direct access to sunlight (100% sun exposure).

50% Open:

Light is partially blocked by the facade, reducing sun exposure to approximately 60%.

Closed Facade:

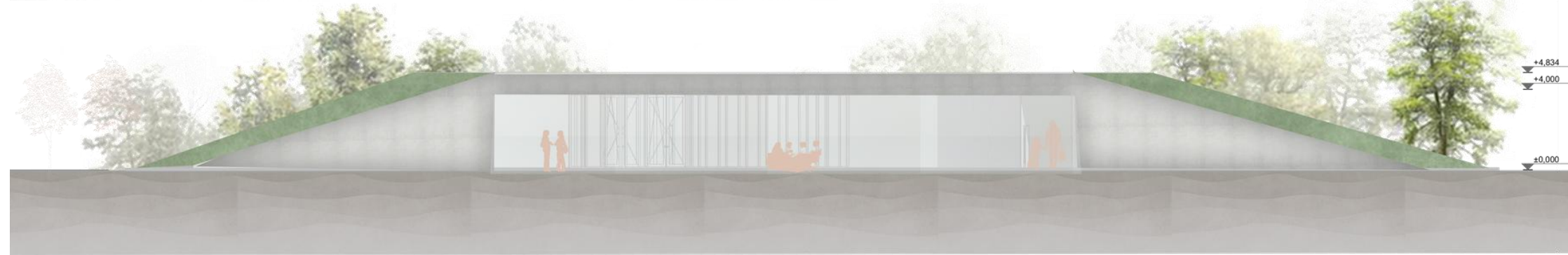
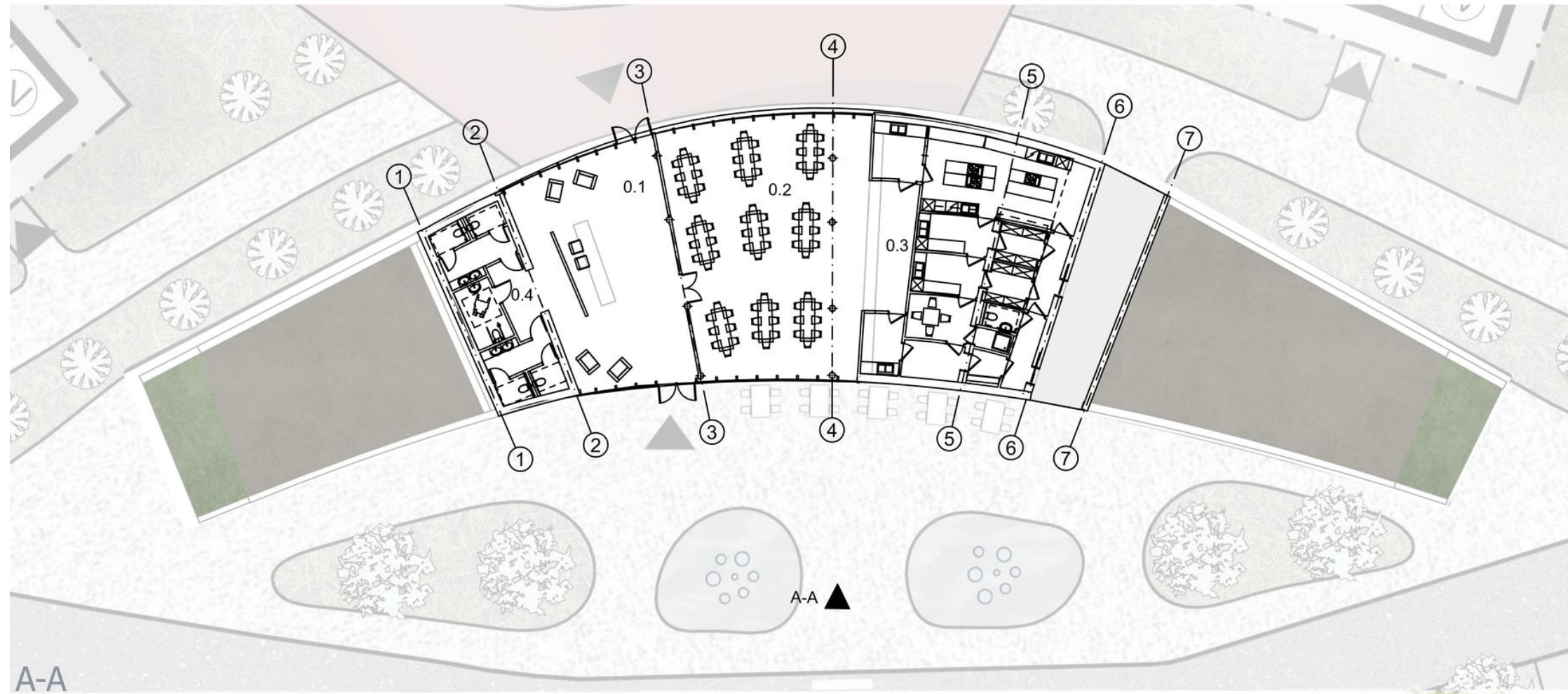
The thin metal mesh permits only a minimal amount of light, providing approximately 10% sun exposure indoors.

The integrated shading system significantly reduces cooling energy demand. Moveable panels prevent summer overheating while allowing for passive solar gain in winter. This climate-resilient design is a proactive response to projected rising temperatures.

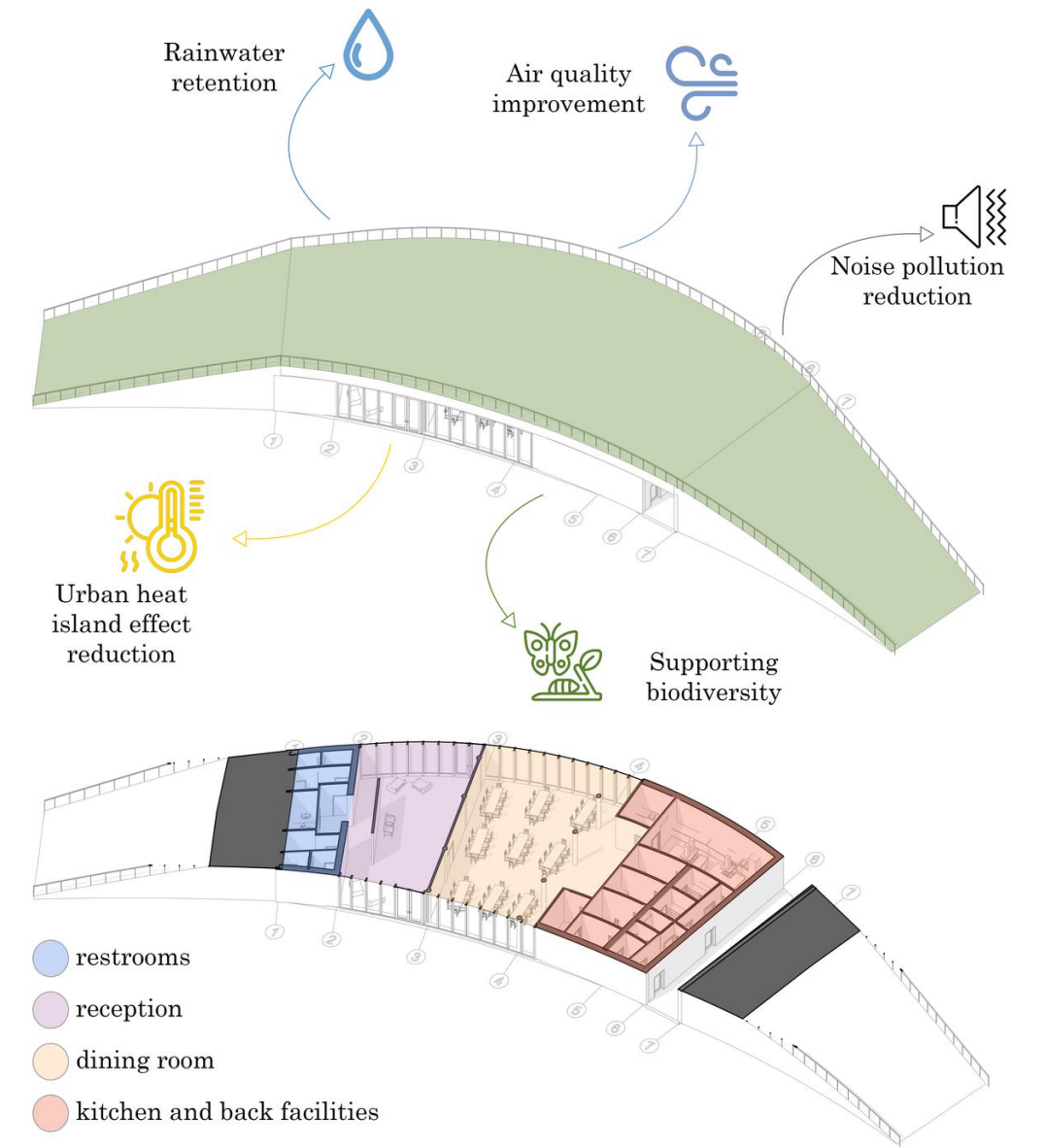




CANTEEN

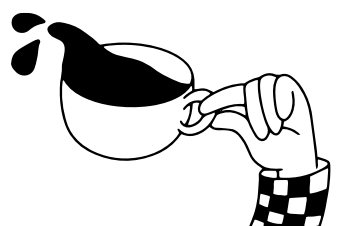


Commercial building floor plan
 scale 1:200
 Usable area: 480 m²
 0 1 2 3 [m]





RENOVATION





Renovation

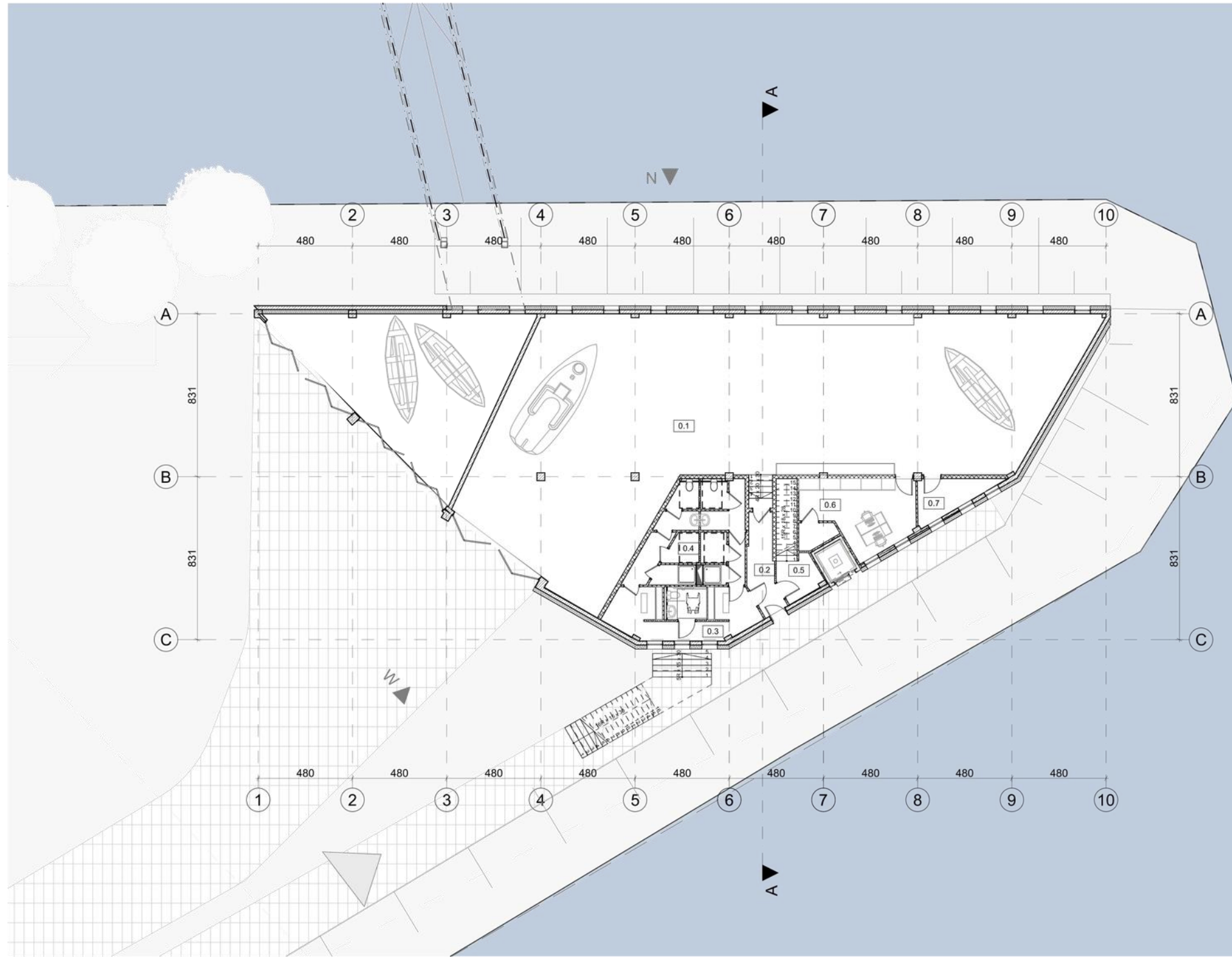
CYCLICAL SAILING REGATTAS



Location: Academic Sailing Club "Belgrade"
(Akademski Jedriličarski Klub "Beograd")

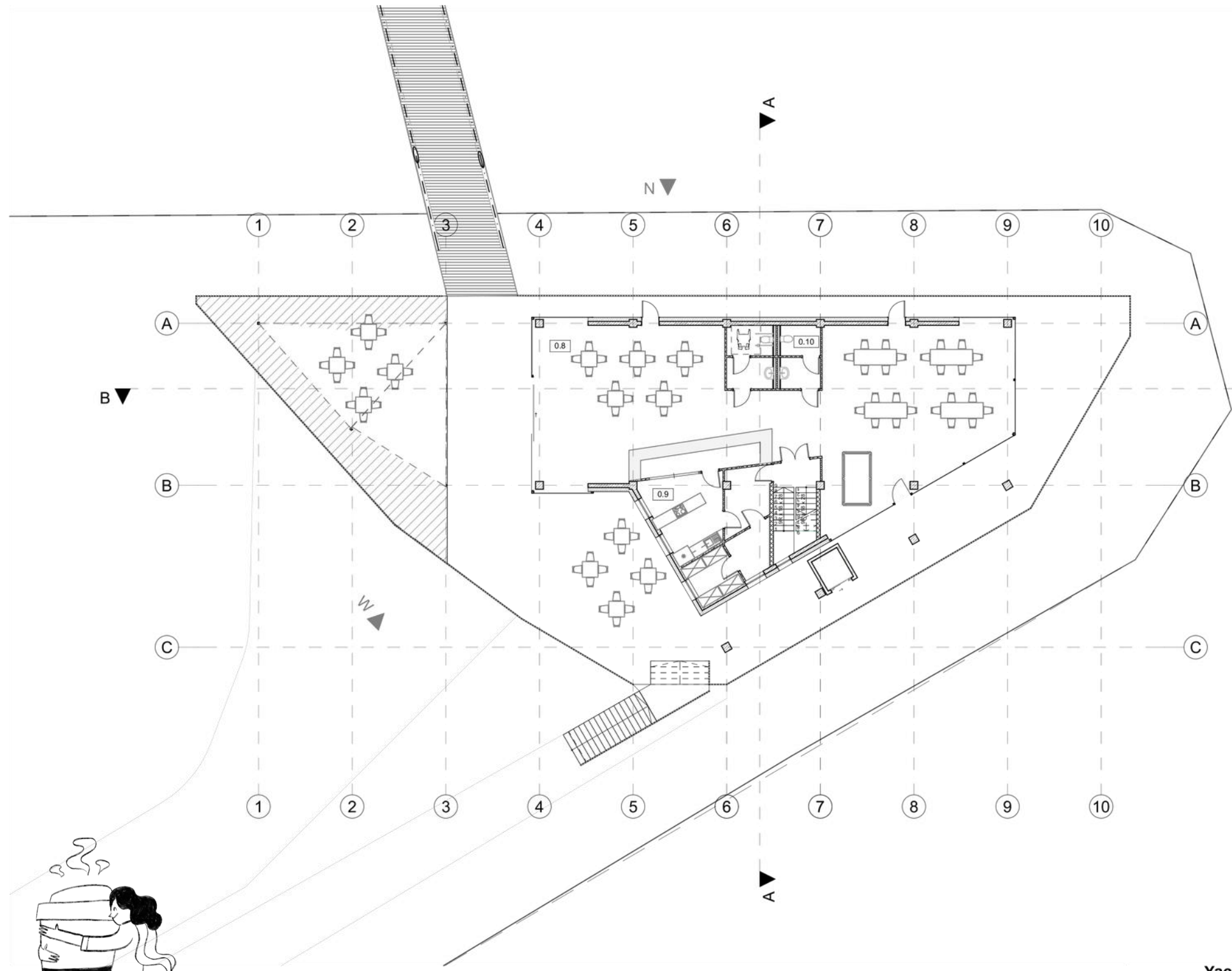
- **MAY | Zoran Radosavljević Memorial** One of the largest and most prestigious regattas in Serbia.
- **AUGUST / SEPTEMBER | Sava Cup** A spectacular competition against the river's strong currents.
- **LATE OCTOBER | Belgrade Open Championship** The traditional event marking the end of the sailing season.





- watercraft hangar
- new watercraft hangar
- restrooms
- circulation
- ancillary rooms

Yacht club building
 Ground floor
 scale 1:200
 Usable area: 480 m²
 0 2 4 6 [m]

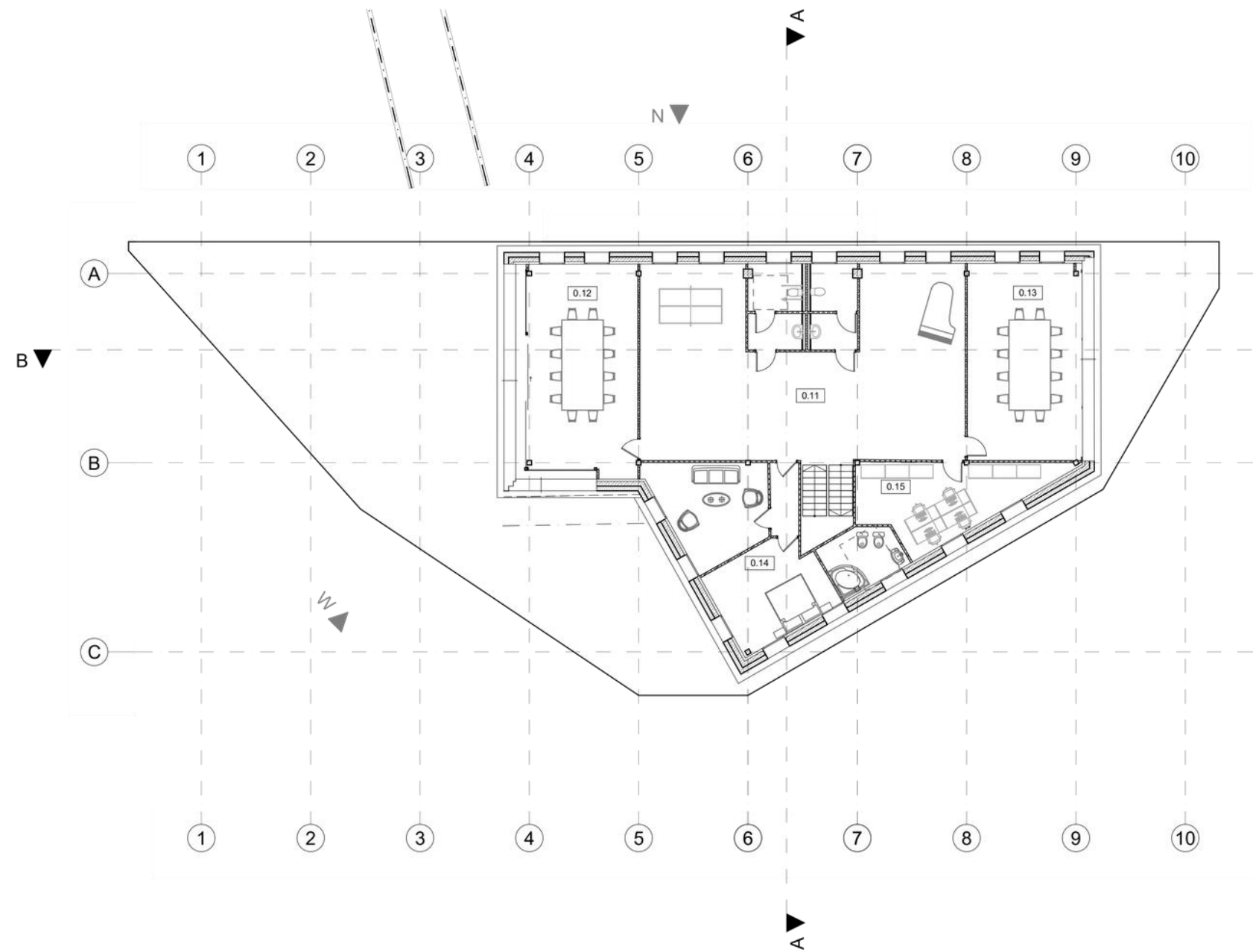


- dining room
- restrooms
- kitchen
- circulation
- usable terrace

Yacht club building
First floor
scale 1:200
Usable area: 480 m²
0 2 4 6 [m]



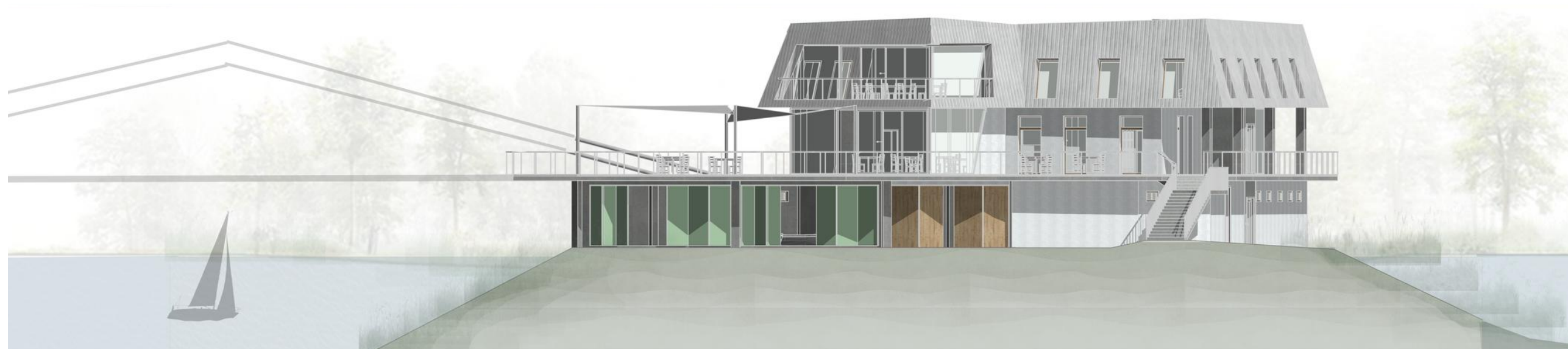
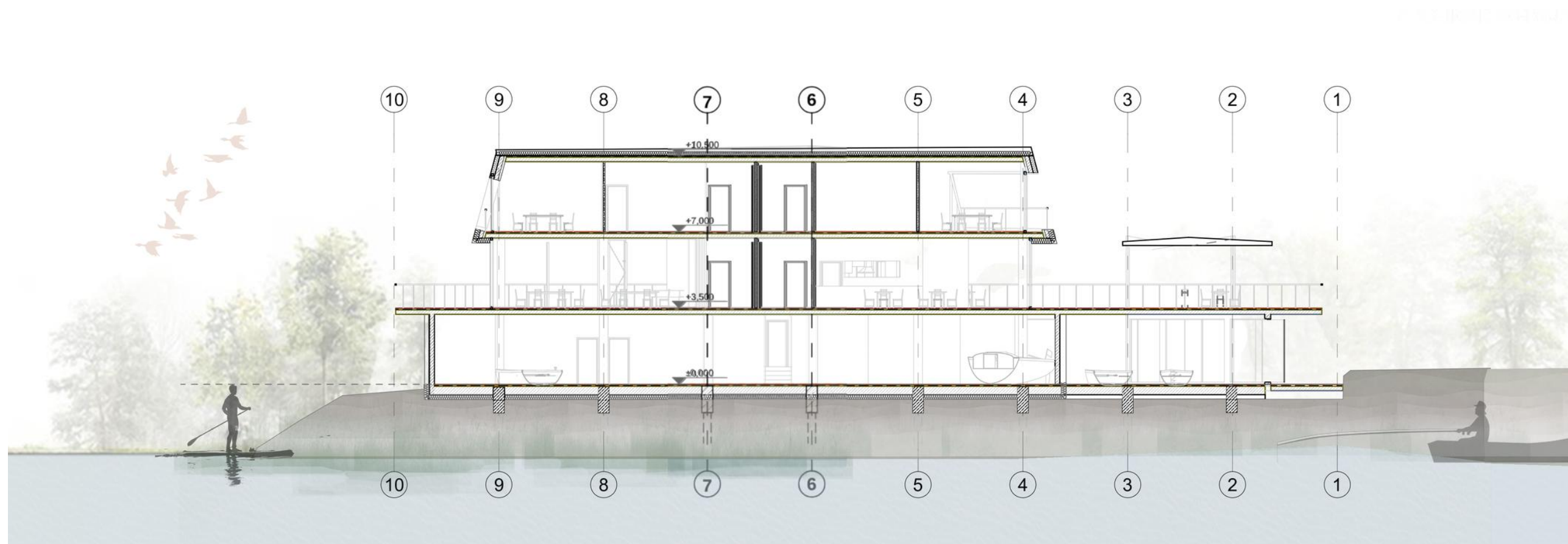
Renovation



- conference room
- relaxation area
- restrooms
- skipper's quarters
- circulatoin
- office

Yacht club building
Second floor plan
scale 1:200
Usable area: 480 m²
0 2 4 6 [m]

SECTION AND ELEVATION

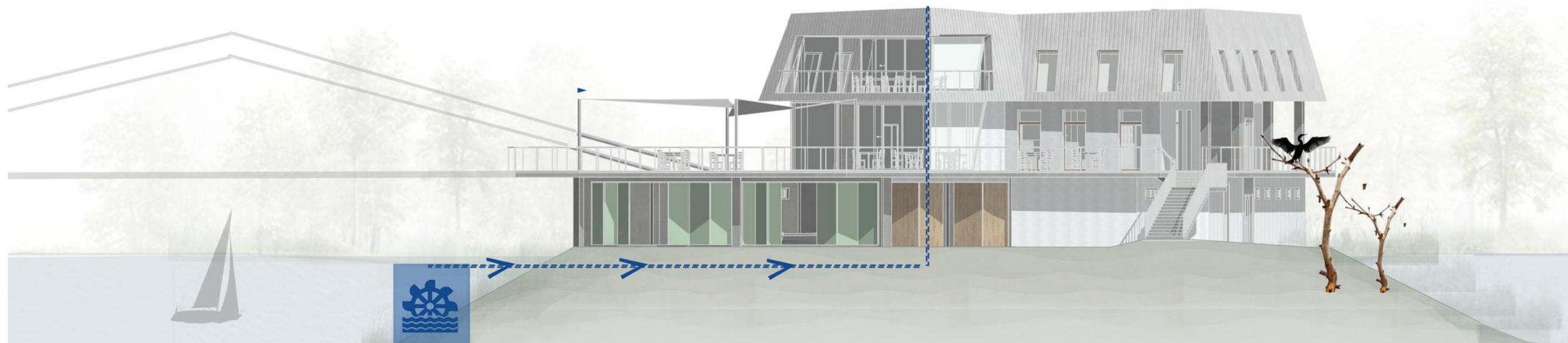
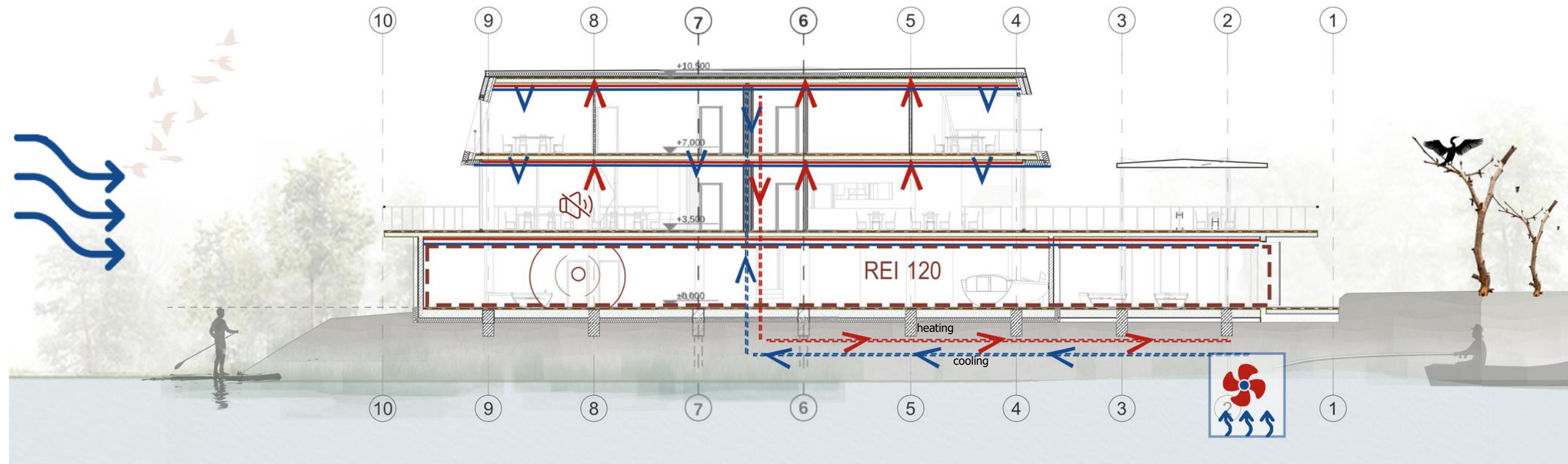
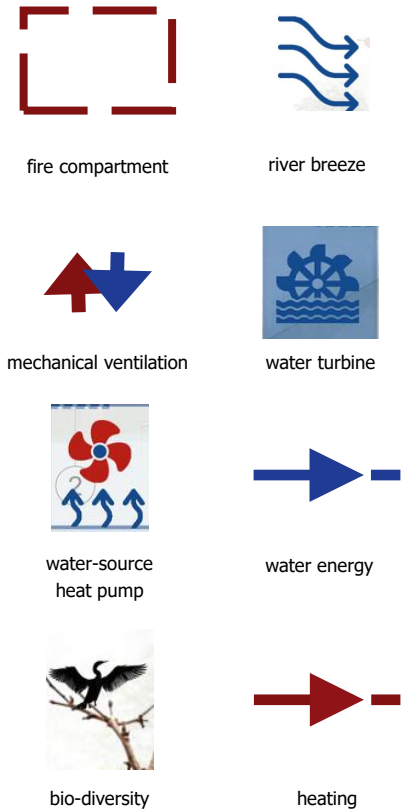


Section and elevation
of the yacht club building
scale 1:200

0 2 4 6 [m]

SUSTAINABLE ELEMENTS

Used elements:



Fire safety 120 REI

The garage has higher REI, to protect from explosion

Added Insulation: 20-35cm

Thermally upgraded with minimal structural change.

Mechanical Ventilation

rate: 36m³/h

Thermal comfort: Heating:

90% heat recovery efficiency

Cooling:

Natural river ventilation and ground-source heat exchange.

Electricity:

The river's current powers water turbines that help energize the whole neighborhood.

Acoustic comfort:

60dB

Biodiversity:

The selected vegetation supports the development of **cormorant habitats** while preserving biodiversity.

CLIMAVER[®]

ISOVER
SAINT-GOBAIN

ecophon
SAINT-GOBAIN

Renovation

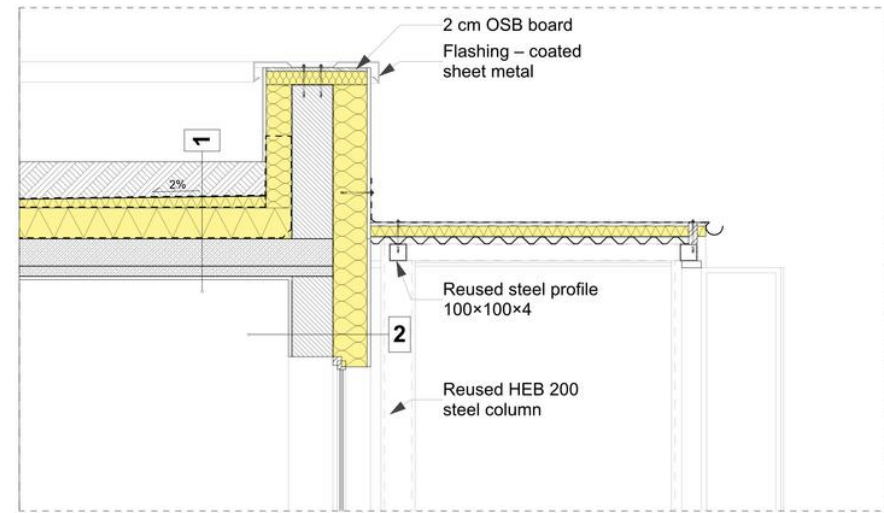
Section and elevation of the yacht club building scale 1:200

0 2 4 6 [m]

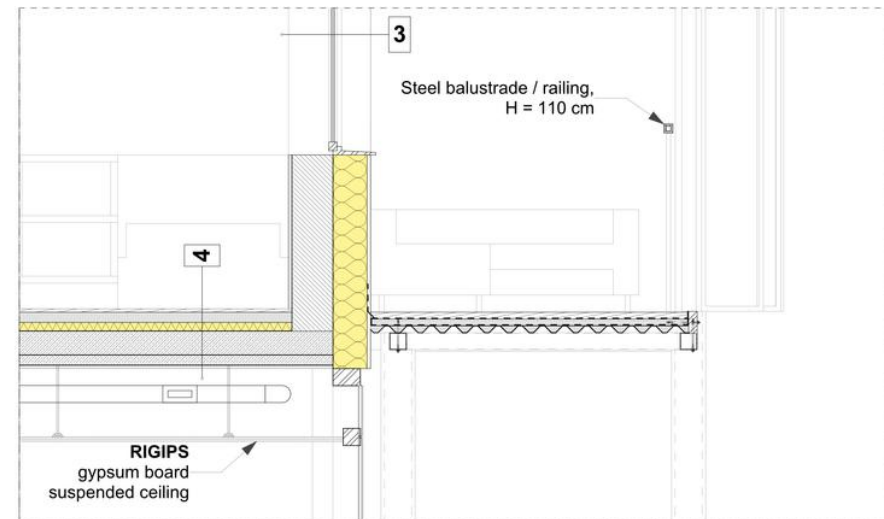
DETAILS

NEW CONSTRUCTION

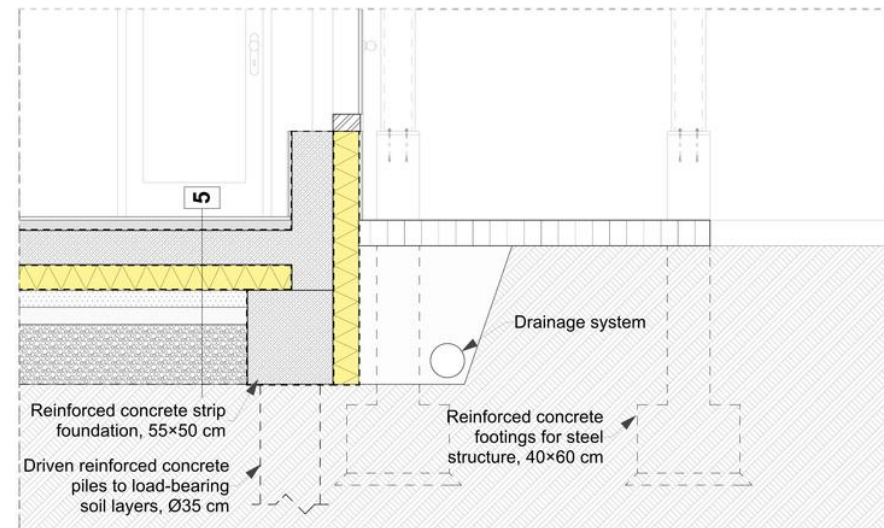
Keep the concrete, cut the carbon footprint with Chryso & GCP CONCRETE → LOW-CARBON CONCRETE



Detail D1, scale 1:25



Detail D2, scale 1:25



Detail D3, scale 1:25

1. GREEN ROOF

$U = 0,10 W/m^2K$ | $R_w = 65 dB$ | $REI 120$

Hydrosowing with roof substrate 20 cm
Anti-root bituminous waterproofing membrane
Self-adhesive underlay membrane
Slope wedge – ISOVER PIR 2%
Thermal insulation ISOVER PIR 18 cm
Vapour barrier ISOVER Vario KM Duplex UV
Reinforced concrete slab with CHRYSO Fluid Optima 22 cm
Gypsum plaster RIGIPS Rimano Glet XL 2 cm

2. EXTERNAL WALL

$U = 0,14 W/m^2K$ | $R_w = 60 dB$ | $REI 120$

Decorative concrete-look plaster WEBER Webermin Beton 2 cm
Natural reed mat mesh 5 mm
Insulation mineral wool ISOVER Fasoterm 35 20 cm
Low-carbon concrete wall with GCP ADVA admixture 24 cm
Gypsum plaster RIGIPS Rimano Glet XL 2 cm

3. TRIPLE GLAZING UNIT

$U_g = 0,3 W/m^2K$ | $g = 0,41$ | $LT = 74%$

SAINT GOBAIN GLASS:
outer pane solar control COOL-LITE SKN 176
middle pane float PLANICLEAR
inner pane low-emissivity PLANITHERM ONE II

4. INTERFLOOR SLAB

$R_w = 59 dB$ | $REI 120$

Oak parquet flooring 2 cm
Reinforced cement screed with fibre underfloor heating 6 cm
Insulation thermal-acoustic ISOVER EPS 200 5 cm
Separation foil ISOVER PE foil
Reinforced concrete slab with CHRYSO Fluid Optima 20 cm
Gypsum plaster RIGIPS Rimano Glet XL 2 cm

5. GROUND FLOOR SLAB

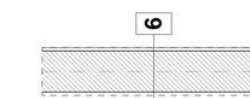
$U = 0,13W/m^2K$ | $R_w = 60 dB$ | $REI 120$

Porcelain tiles 2 cm
Reinforced cement screed with fibre underfloor heating 6 cm
Separation foil ISOVER PE foil
Reinforced concrete slab with CHRYSO Fluid Optima 20 cm
Waterproof thermal insulation ISOVER XPS 300 15 cm
Heavy-duty waterproofing WEBER weber.tec Superflex D2
Lean concrete 10 cm
Sand bedding 10 cm
Compacted aggregate 35 cm
Natural subsoil

6. INTERNAL PARTY WALL BETWEEN APARTMENTS

$R_w = 59 dB$ | $REI 120$

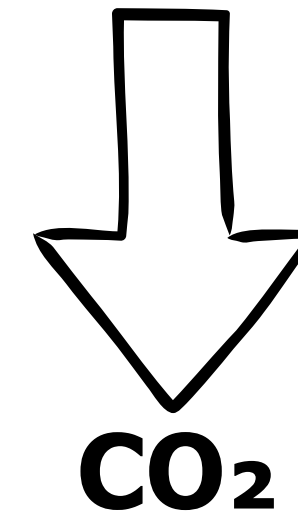
Gypsum plaster RIGIPS Rimano Glet XL 2 cm
Low-carbon concrete wall with GCP ADVA admixture 24 cm
Gypsum plaster RIGIPS Rimano Glet XL 2 cm



Selected wall details, scale 1:25

WHY LOW-CARBON CONCRETE?

- Lower CO₂ emissions
- Reduced clinker content
- Better workability & pumpability
- Lower water/cement ratio
- Improved mix stability



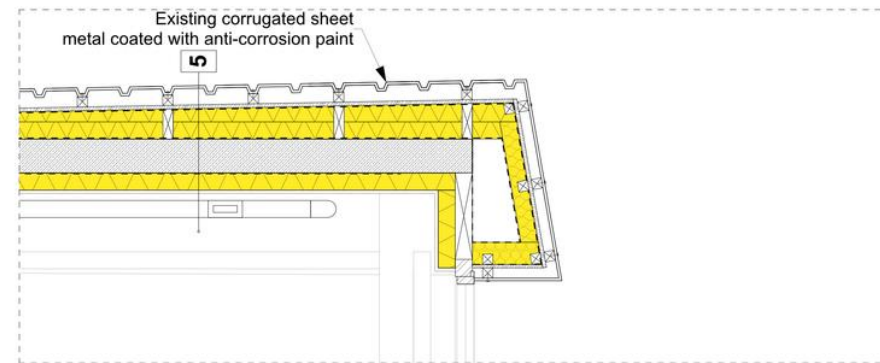
75%* of a building's carbon footprint is due to its construction (grey energy)

50%* of the construction's carbon footprint is due to the concrete

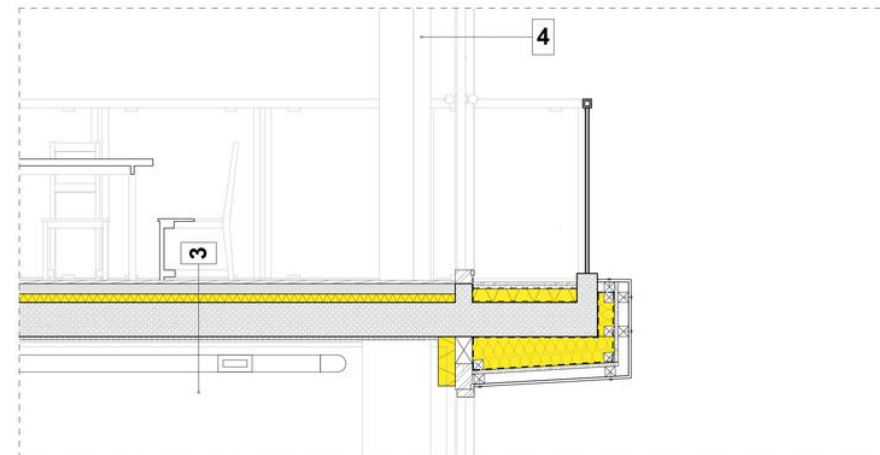
50% reduction of CO₂ emitted for concrete with CHRYSO®EnviroMix® solution and more than 50% with CHRYSO®EnviroMix® ULC (Ultra Low-Carbon)



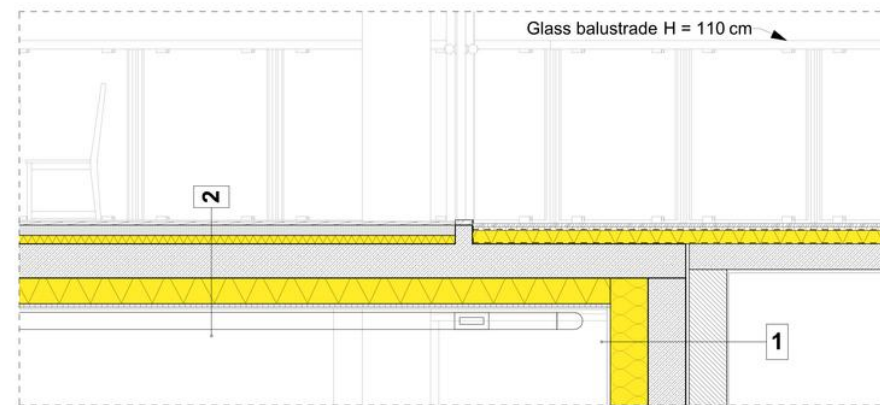
RENOVATION



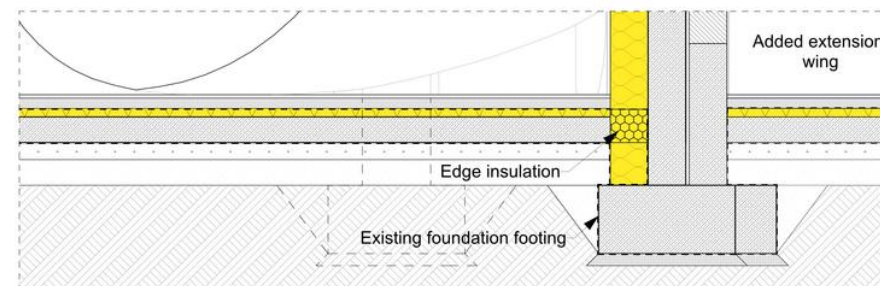
Detail D1, scale 1:25



Detail D2, scale 1:25



Detail D3, scale 1:25



Detail D4, scale 1:25

1. INSULATED HANGAR WALL

$U = 0,13 \text{ W/m}^2\text{K}$ | $R_w = 60 \text{ dB}$ | $REI 180$

Gypsum plaster **RIGIPS** Rimano Glet XL – 2 cm
 Natural reed mat mesh – 5 mm
 Insulation – mineral wool **ISOVER** Fasoterm 35 – 20 cm
Existing layers (assumed approximately):
 Reinforced concrete wall – 20 cm
 Expansion joint – 2 cm
 Low-carbon concrete wall with **GCP** ADVA admixture – 24 cm
 Gypsum plaster **RIGIPS** Rimano Glet XL – 2 cm

2. FLOOR SLAB HANGAR

$R_w = 72 \text{ dB}$ | $REI 120$

Oak parquet – 2 cm
 Reinforced cement screed with fibre reinforcement (underfloor heating) – 6 cm
 Thermal and acoustic insulation **ISOVER** EPS 200 – 5 cm
 Separation foil **ISOVER** PE foil
Existing layers (assumed approximately):
 Reinforced concrete slab – 20 cm
 Thermal and acoustic insulation **ISOVER** Aku-Plyta – 15 cm
 Acoustic panels **ECOPHON** Solo Premium – 2 cm
 Gypsum board **RIGIPS** Pro – 1.25 cm
 Finishing filler **RIGIPS** Rimano Glet XL

3. INTERFLOOR SLAB

$R_w = 65 \text{ dB}$ | $REI 120$

Oak parquet – 2 cm
 Reinforced cement screed with fibre reinforcement (underfloor heating) – 6 cm
 Thermal and acoustic insulation **ISOVER** EPS 200 – 5 cm
 Separation foil **ISOVER** PE foil
Existing layers (assumed approximately):
 Reinforced concrete slab – 20 cm
 Acoustic panels **ECOPHON** Solo Premium – 2 cm
 Gypsum board **RIGIPS** Pro – 1.25 cm
 Finishing filler **RIGIPS** Rimano Glet XL

4. TRIPLE-GLAZED UNIT

$U_g = 0,3 \text{ W/m}^2\text{K}$ | $g = 0,41$ | $LT = 74\%$

SAINT-GOBAIN GLASS:
 External panel, solar control: **COOL-LITE** SKN 176
 Middle panel, float glass: **PLANICLEAR**
 Internal panel, low-emissivity: **PLANITHERM ONE II**

5. CORRUGATED METAL ROOF

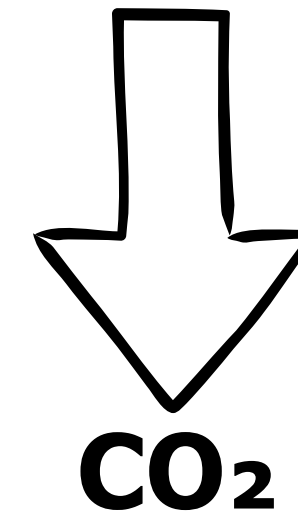
$U = 0,12 \text{ W/m}^2\text{K}$ | $R_w = 58 \text{ dB}$ | $REI 120$

Existing layers (assumed approximately):
 Painted corrugated sheet metal with anti-corrosion coating 0.7mm
 Counter battens
 OSB sheathing – 2.2 cm
 Wind- and waterproof membrane
 Slope-forming EPS layer
 Thermal insulation **ISOVER** EPS – 10 cm
 Vapour barrier
 Reinforced concrete slab – 20 cm
 Thermal insulation **ISOVER** Komfort Roll – 10 cm
 Gypsum plaster **RIGIPS** Rimano Glet XL – 2 cm

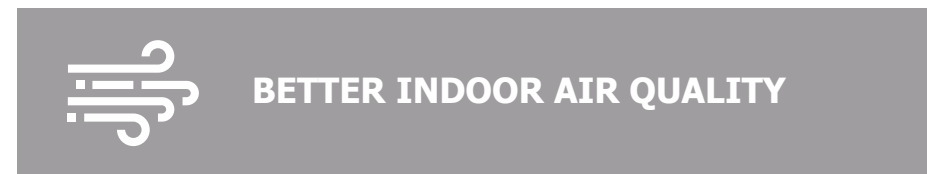
Minimal intervention, maximum performance – cut energy use, cut carbon in existing buildings

5 key factors for successful renovation:

- replacement of windows and doors
- thermal upgrading of external envelope
- improved roof and damp-proof insulation
- enhanced acoustic performance
- modernization of building systems (MEP)



LOWER ENERGY DEMAND



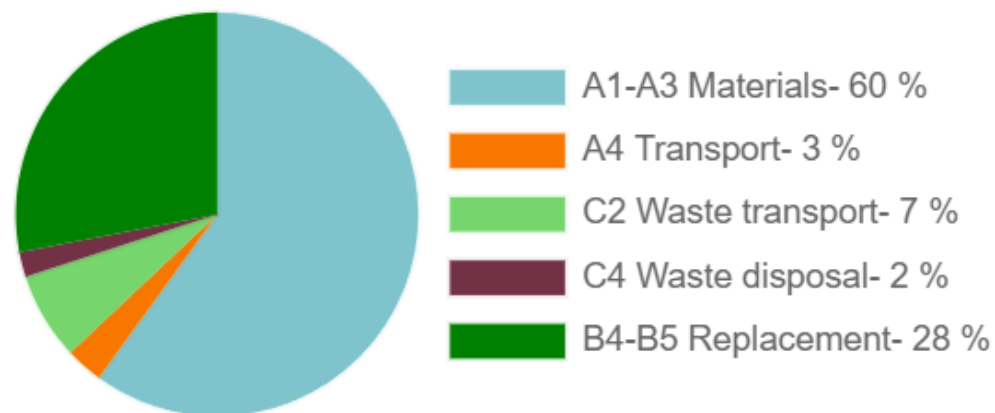
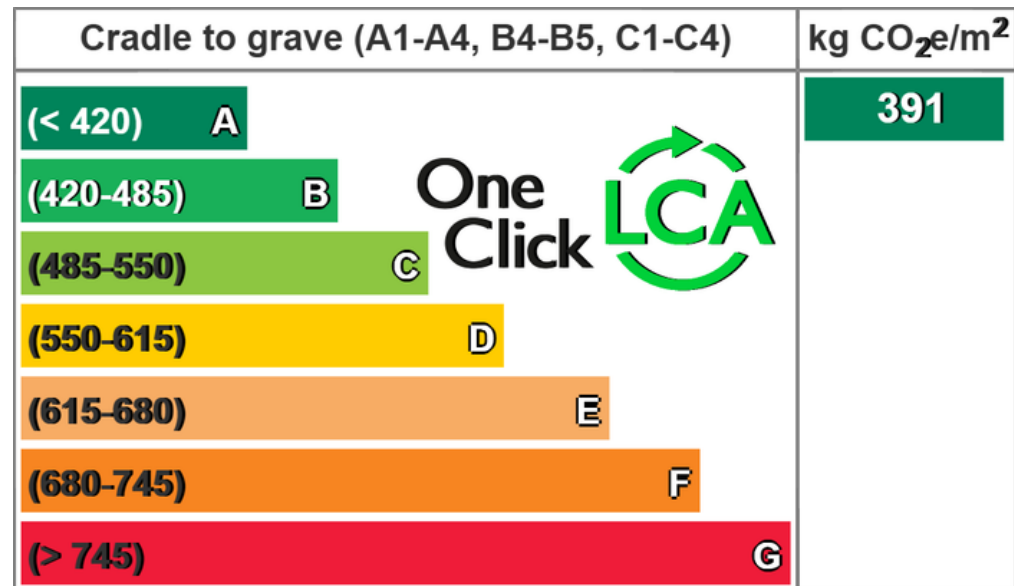
BETTER INDOOR AIR QUALITY



LOWER CARBON EMISSIONS



NEW CONSTRUCTION



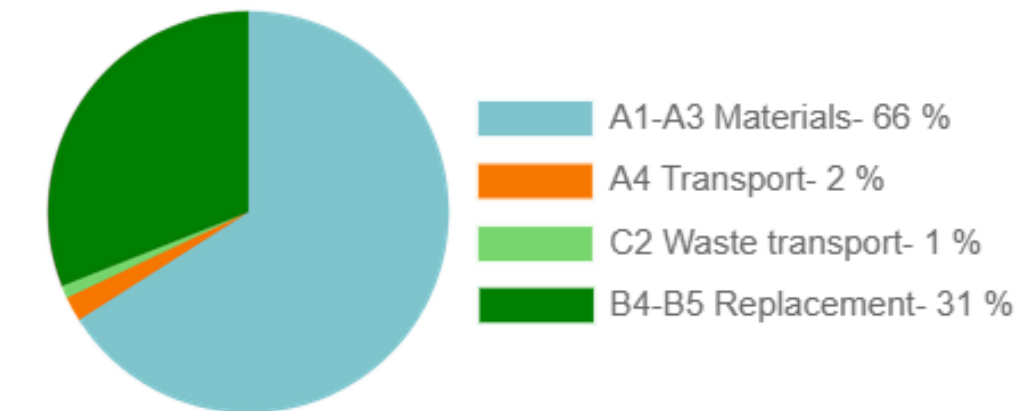
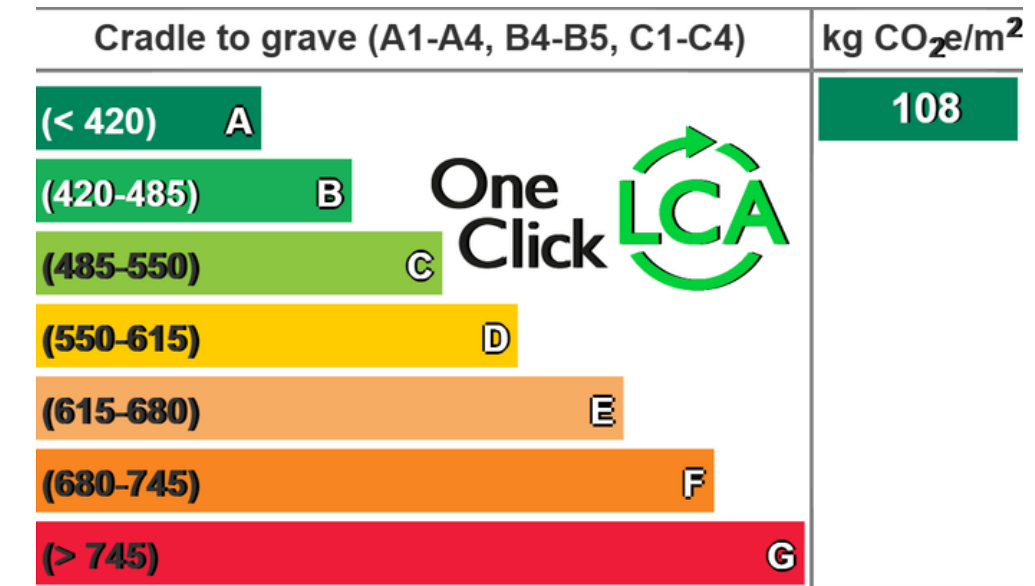
NEW CONSTRUCTION

The calculations include the full building structure (external and internal walls, slabs, columns, foundations, windows) as well as all building systems: electrical, plumbing, ventilation, heating, cooling installations and renewable energy systems. The use of prefabrication and low-carbon concrete solutions (including Chryso and GCP), together with recycled construction aggregates, significantly reduces the building's carbon footprint. All applied solutions consciously optimize the building structure and lower CO₂ emissions.

Time assumptions:

- building lifespan: 50 years
- building systems lifespan: 30 years

RENOVATION



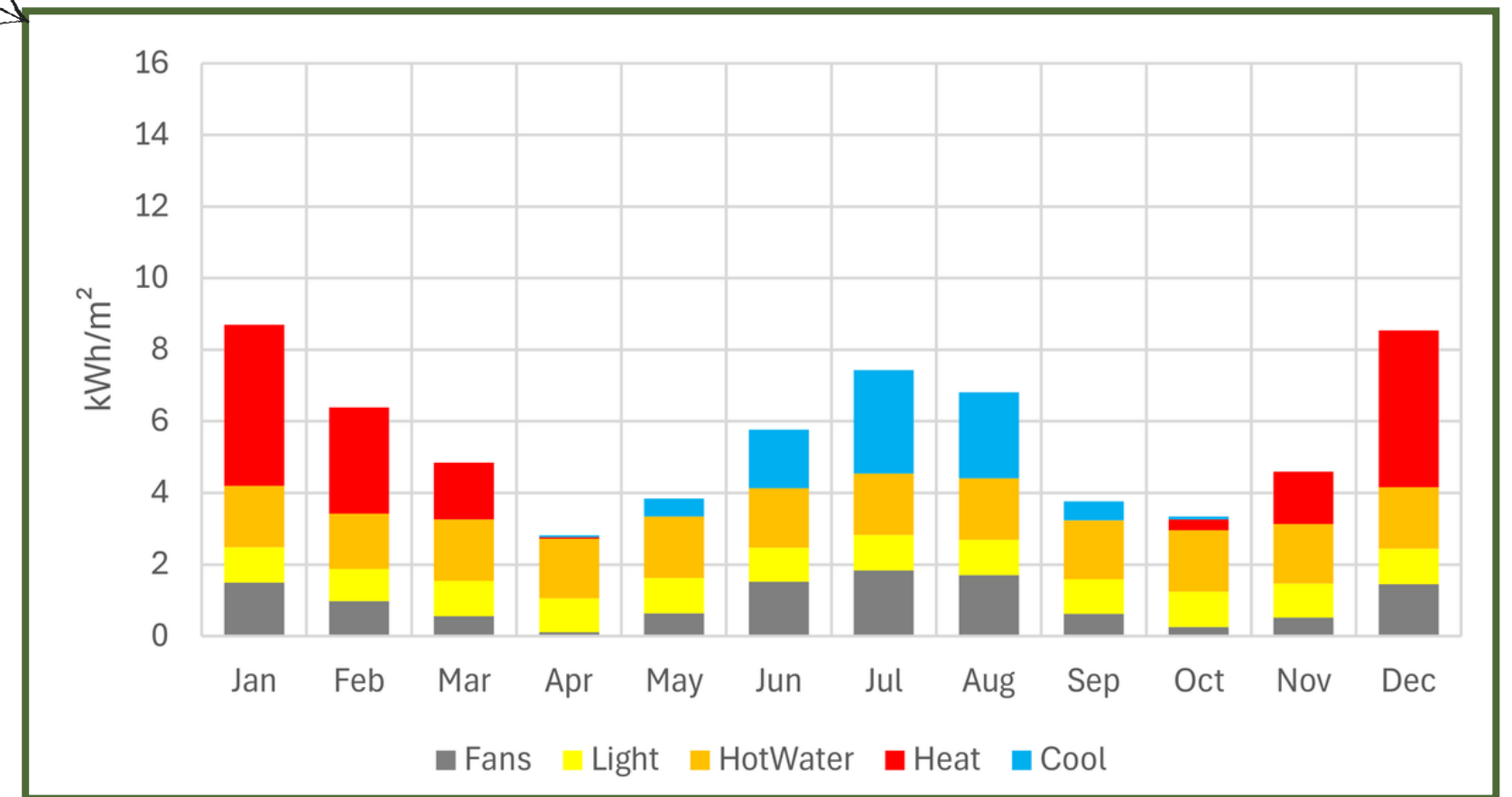
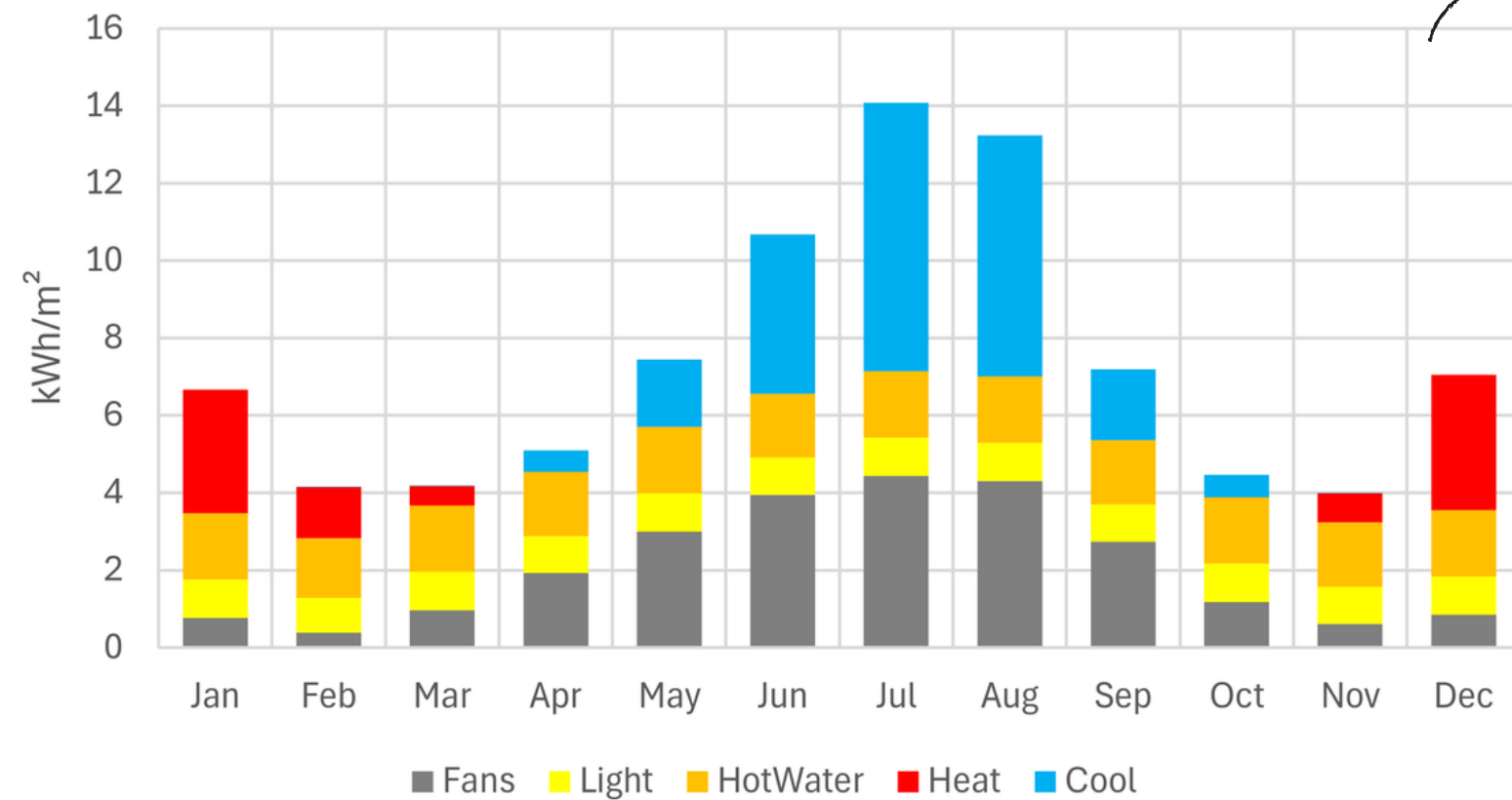
RENOVATION

The calculations include the newly added hangar structure extension as well as new building systems: electrical, plumbing, ventilation, heating, cooling installations and renewable energy systems. Due to minimal intervention in the existing structure, the design approach significantly reduces CO₂ emissions. The scope of work mainly includes the extension of the ground-floor hangar area, thermal upgrading of the external envelope, and replacement of insulation and windows to improve the building's energy performance.

Time assumptions:

- building lifespan: 50 years
- lifespan of new building systems: 30 years

ENERGY CALCULATIONS FOR NEW CONSTRUCTION



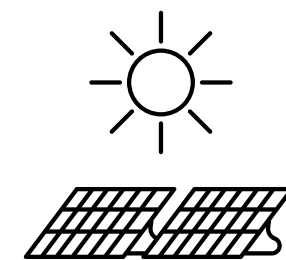
Variant 1 – building without shading and heat recovery

The energy balance includes energy consumption for heating, mechanical ventilation without heat recovery, domestic hot water preparation, cooling, lighting, and fan energy use.

The building does not include shading elements or a heat recovery ventilation system, resulting in higher cooling energy demand.

- Heating and ventilation demand: **8.5 kWh/m²/year** (below 15 kWh/m²/year due to significant solar gains)
- Cooling demand: **23 kWh/m²/year** (high due to the lack of shading)

Total energy demand (heating + cooling): **31.5 kWh/m²/year**



The use of shading systems and heat recovery ventilation significantly improves the building's energy performance, particularly by reducing cooling demand while maintaining an acceptable heating demand level.

Photovoltaic panels are planned on the rooftops to generate electricity. Approximately **8 kWp** is required to cover the energy balance of each residential building. The available roof area allows for a larger PV installation, capable of supporting the energy demand of both residential buildings as well as service and recreational functions.

Details

Variant 2 – adopted project solution: building with shading and heat recovery

The energy balance includes energy consumption for heating, mechanical ventilation with heat recovery, domestic hot water preparation, cooling, lighting, fan energy use, and shading strategies.

- Heating demand: **14.5 kWh/m²/year** (higher than in Variant 1, but still below 15 kWh/m²/year due to reduced solar gains during the heating season; with proper louver control during colder months, energy consumption could be reduced by several percent through increased passive solar gains. This value represents the maximum expected demand and may be lower in practice.)
- Cooling demand: **8.5 kWh/m²/year** (significantly reduced thanks to shading and overheating protection)

Total energy demand (heating + cooling): **23.0 kWh/m²/year**



GNEZ-DOM



Special Thank You to
PhD. Michał Stangel, prof. PŚ
PhD. Krzysztof Gerlic
PhD. Alina Pancewicz, prof. PŚ

THANK YOU FOR YOUR ATTENTION



HANDING OVER LAND TO THE CITY



Project powered by

1127

**cups of
coffee**

Consult Dr. Witeczek before use. Side effects may include extreme project progress.
Coffee used improperly may be hazardous to your project.