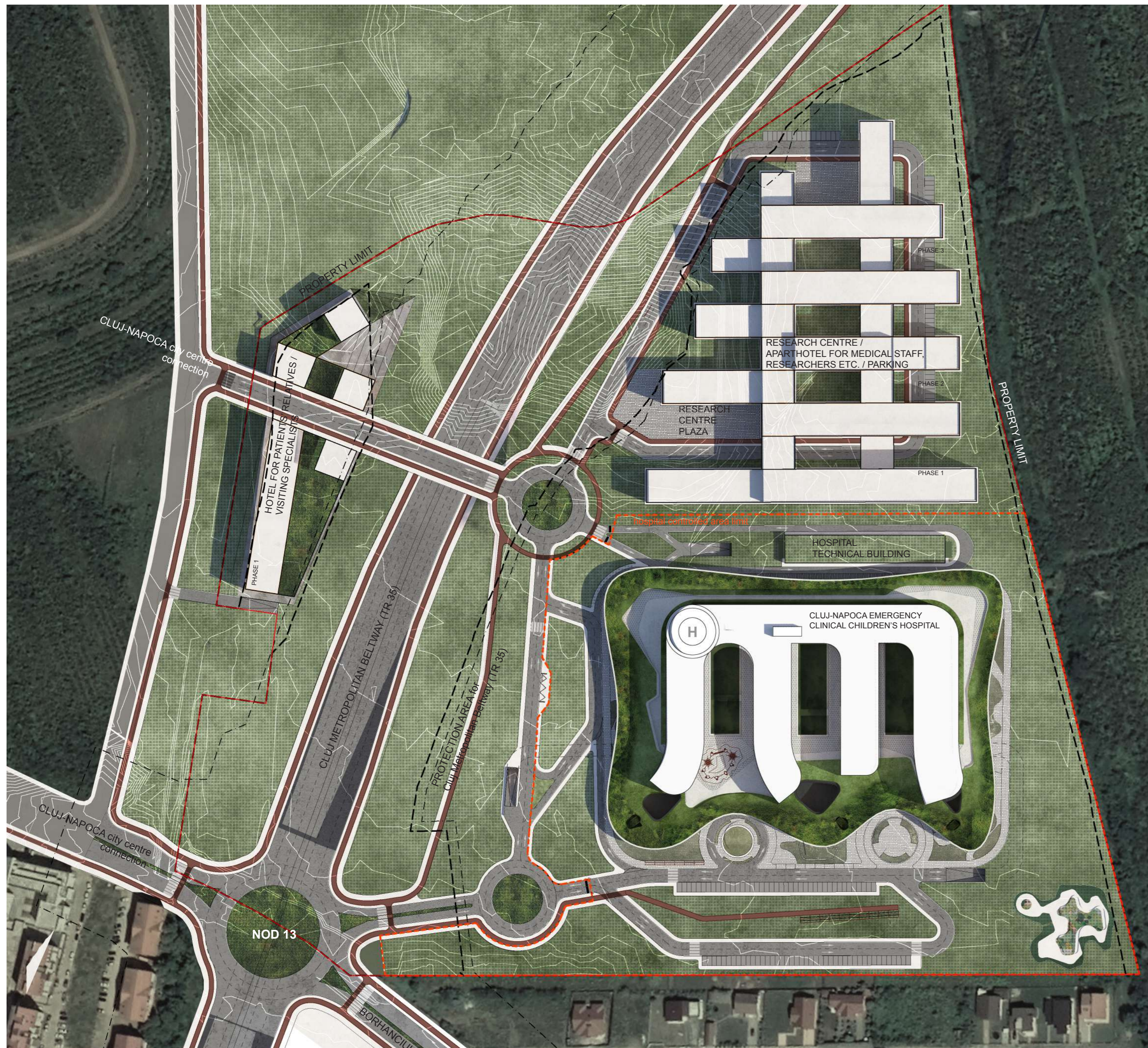


CLUJ-NAPOCA CHILDREN'S HOSPITAL – DESIGN COMPETITION



BIRD EYE VIEW PRESENTING THE SYSTEMATIZATION PROPOSAL ▲



SITE PLAN 1:1500 ▲

GENERAL INTRODUCTION

Hospitals are the most complex of the building types. Their constant functional and physical adaptation over time, due to the technological renewal of equipment and facilities, the dynamics of care management models and the changing demands of professionals and users, increases this complexity even further. Good hospital design must allow potential changes and extensions without compromising the efficiency of the daily medical activities.

Due to this complexity in form, function and evolution, considerable information has been published on how a hospital project should be approached. While there is no unique hospital model, key factors in choosing the best design option are size, range of services, sustainability and integration within the environment.

During our extensive practice in hospital design we found a recurring pattern common to all successful models, which is based on the fulfillment of two guiding principles:

- The user (patient, medical staff and family) is the center of the system.
- The building must be technically and functionally efficient.

The design of contemporary hospitals does not orbit exclusively around the needs of the doctors, architects or authorities, but takes into account all their users' needs.

The hospitalization process is a source of severe stress for the patient, and therefore the quality of its environment is crucial, even more so when the patients are children, since their minds and body can be deeply affected during their visit or stay in the hospital.

In paediatric hospitals, special attention must be given to internal facilities and leisure spaces, playgrounds and educational areas for children and their families. These are complementary spaces, specific to the paediatric hospitals, which have unique physical characteristics.

Contemporary hospitals are more than just places for the provision of healthcare services. Usually they are the most important buildings in the city and the main point of reference for an entire society and time.

THE URBAN DESIGN

The concept of the urban design is structured as a response to the particular condition of the site, which is situated at the intersection of two main axes:

- The west - east axis accommodates a transition from the urban fabric of Gheorgheni neighborhood to the beautiful landscape of the Palocsay Orchard.
- The northeast - southwest axis, situated along the future ring road, will connect in a form of linear park all future suburban developments from Sopor to Borhanci, becoming an important recreational infrastructure.

The site is divided in three main areas which respond to their different environments:

- The Hospitality section (dedicated to the patient's relatives and visiting specialists) is situated on the west limit of the site, adjacent to the city, as is the most public of the complementary programs.
- The Future Developments section (dedicated to the research center, apart-hotel, above-ground parking garages etc...) is situated in the north east quadrant, in the vicinity of the hospital, easily accessible from the city through the new beltway and the connecting roads, as it will be addressing both external researchers and medical staff.
- Cluj-Napoca Emergency Clinical Children's Hospital is situated in the south-east quadrant of the site, protected by an afforested buffer, in between the new beltway and the hill of the Palocsay orchard; to the south of the hospital, the access area is protected from the exterior is maximized, the intention was to separate it from the urban and suburban environments and infrastructures and to immerse it into the nature.

While perfectly linked through an efficient connectivity scheme, the spatial segregation of the three functional areas allows for further stages of development without generating discomfort and hinder the daily operations within the buildings.

As shown in the adjacent diagram the urban design goal was to create two different environments in which the hospitality and research areas are connected spatially to the linear park, while the hospital is nested in an extension of the orchard.

The main orientation of the hospital to the west-south-east, takes advantage of natural light, and offers pleasant views of the surrounding landscape.

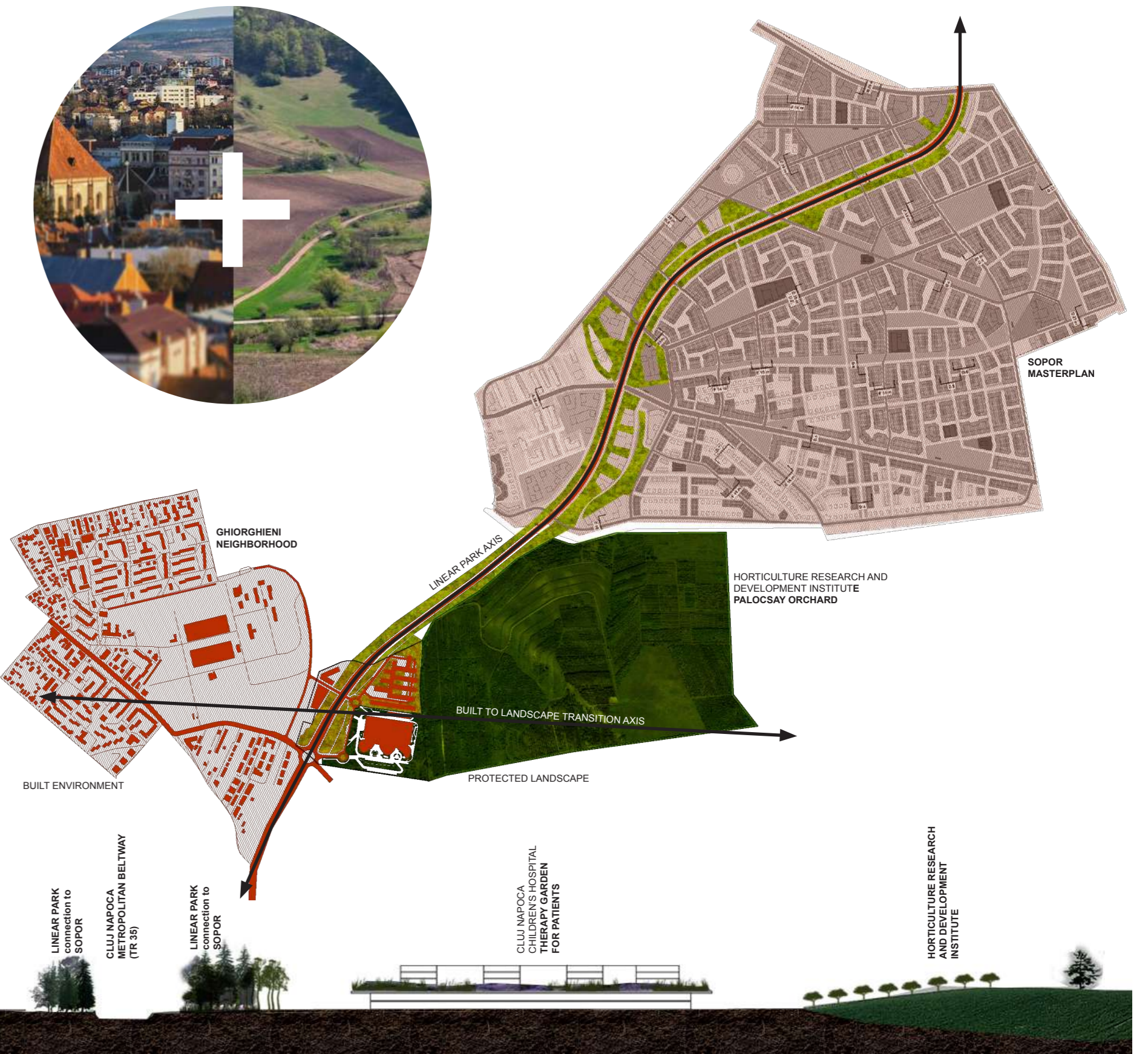
The access points are distributed along the building edge in a manner that allows complete visual and spatial separation between the different types of users (patients and patient relatives, emergency, medical staff, logistic operators).

DEVELOPMENT STAGES

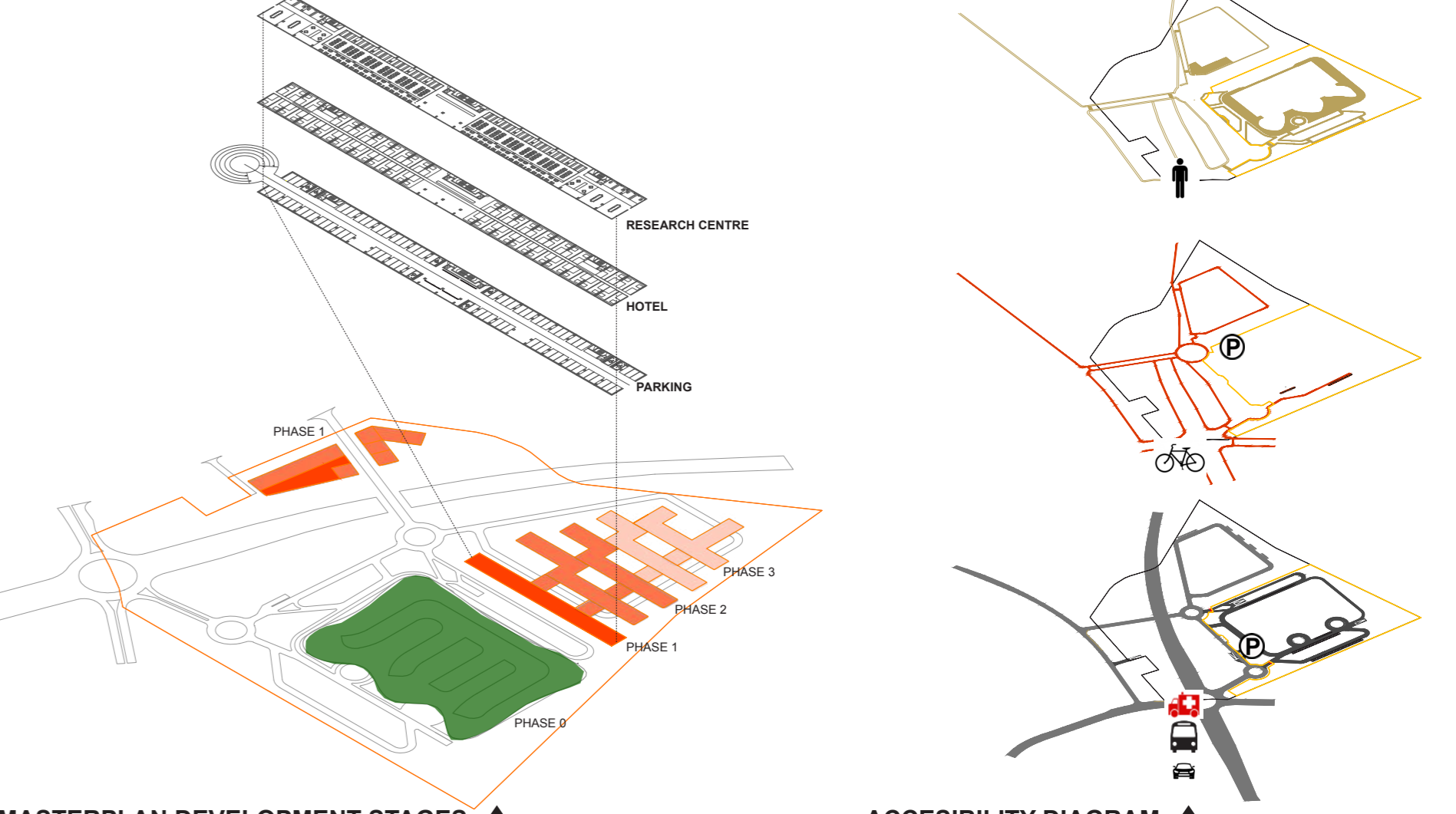
The urban design concept provides at least 3 development phases (phase 1, 2 and 3) after the construction of the Cluj-Napoca Emergency Clinical Children's Hospital (phase 0), that are dedicated to complementary programs such as hospitality, research facilities and parking.

While for the hospitality program a standalone separate building is provided at the west limit of the site, for the rest of the complementary programs we created a modular building typology, which is adaptable to various uses that could change over time. The final assembly of these flexible modular units will look like a lattice with inner courtyards that extends into the surrounding landscape.

The flexibility of the scheme allows for a multiplication of development phases and a variety of use of the different moduls if needed.

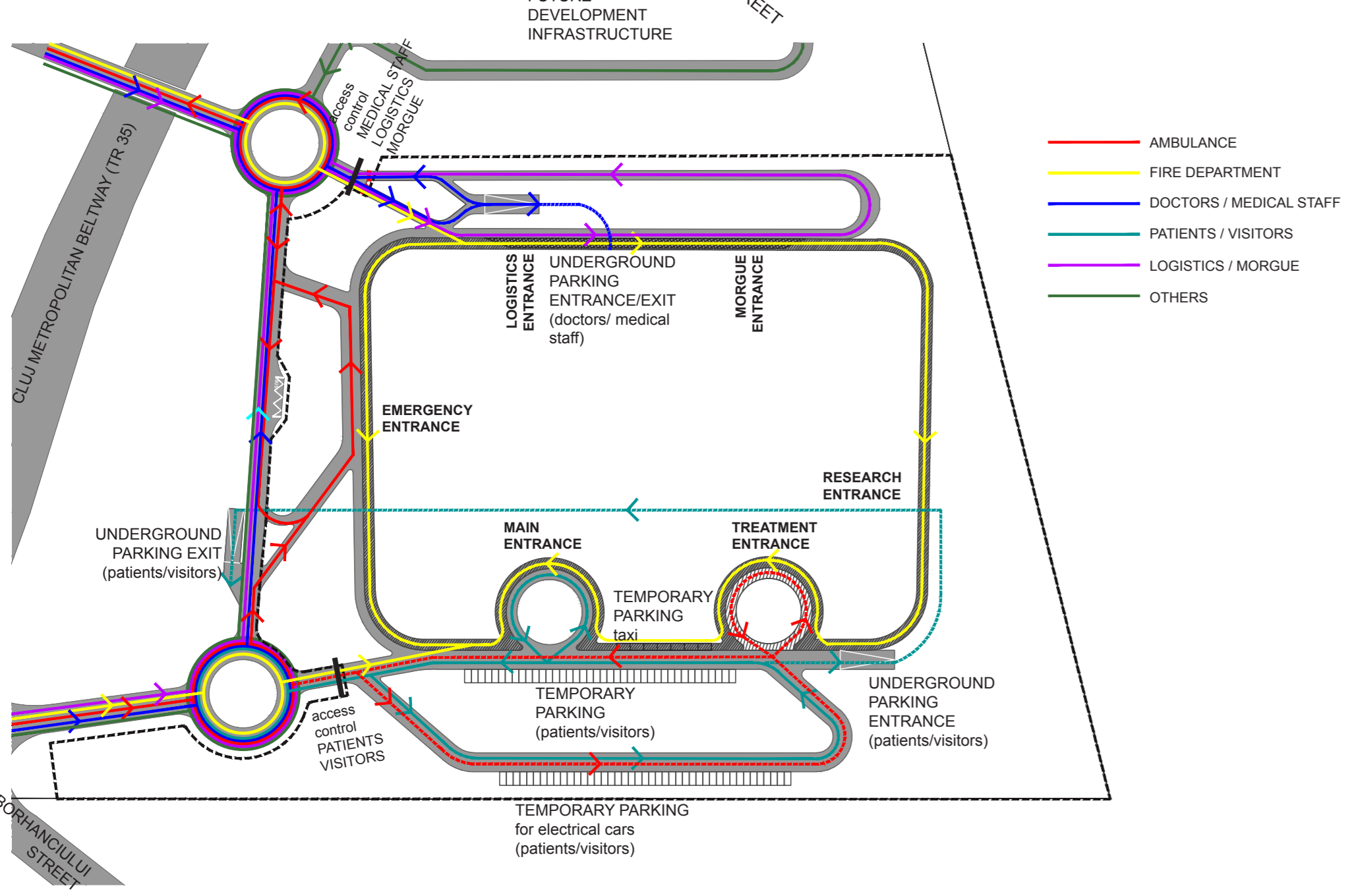


HOSPITAL AREA IN BETWEEN PALOCSAY ORCHARD AND THE LINEAR PARK ▲



MASTERPLAN DEVELOPMENT STAGES ▲

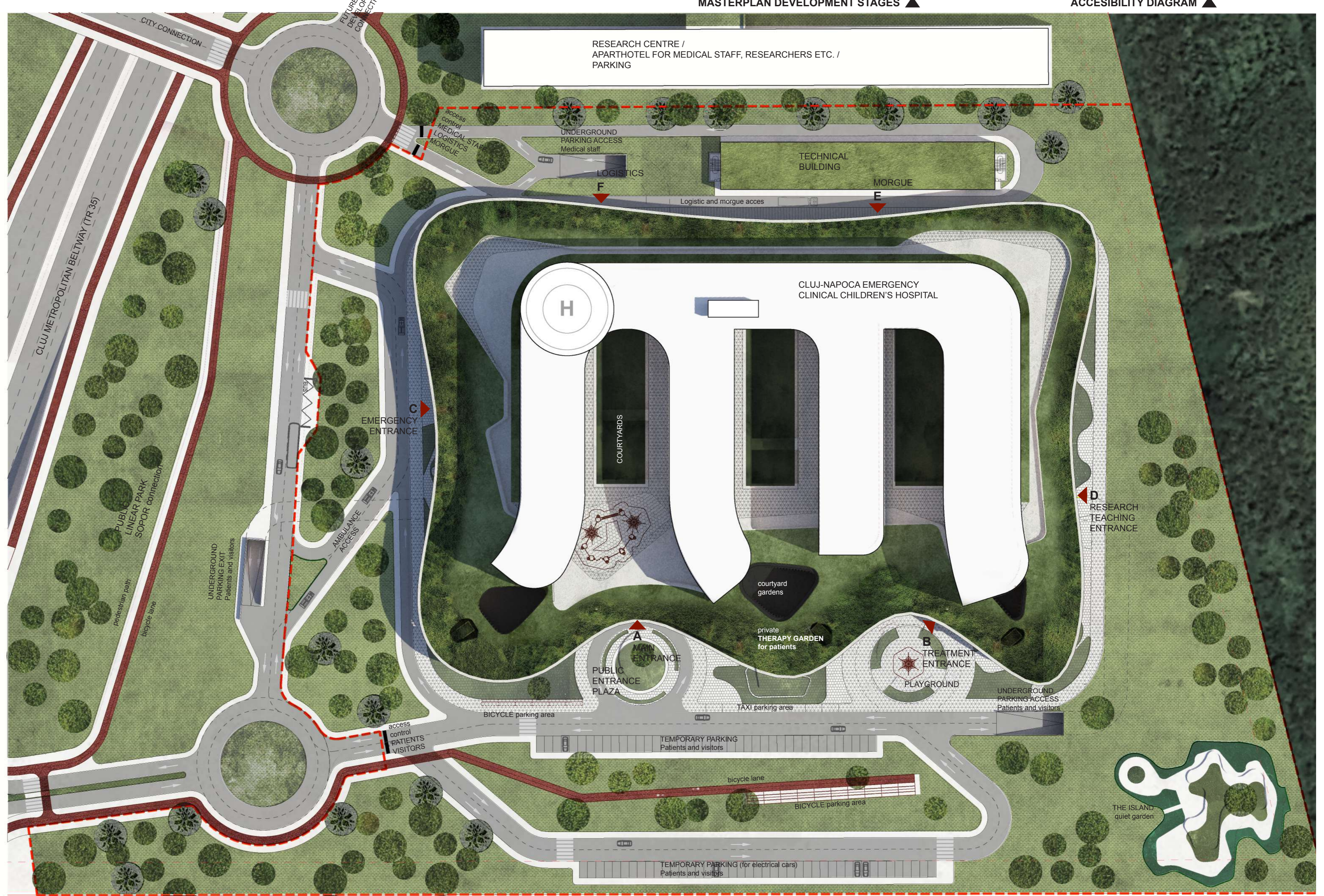
ACCESSIBILITY DIAGRAM ▲



ACCESSIBILITY DIAGRAM ▲
The circulation scheme is designed to maximize accessibility, minimize intersections and separate flows in three separated closed loops (visitors - patients and patient's relatives, emergency access and medical staff / logistics operations) which are managed through two interior roundabouts linked through a shortcut road. The emergency access loop is placed in the west, from and to the shortcut road on the fastest route. The visitors access loop and the logistics / medical access loop are monitored through control points. A bus stop is provided on the shortcut road linking the interior roundabouts. Bicycle access is provided from the adjacent roads and the linear park to the visitors access area.



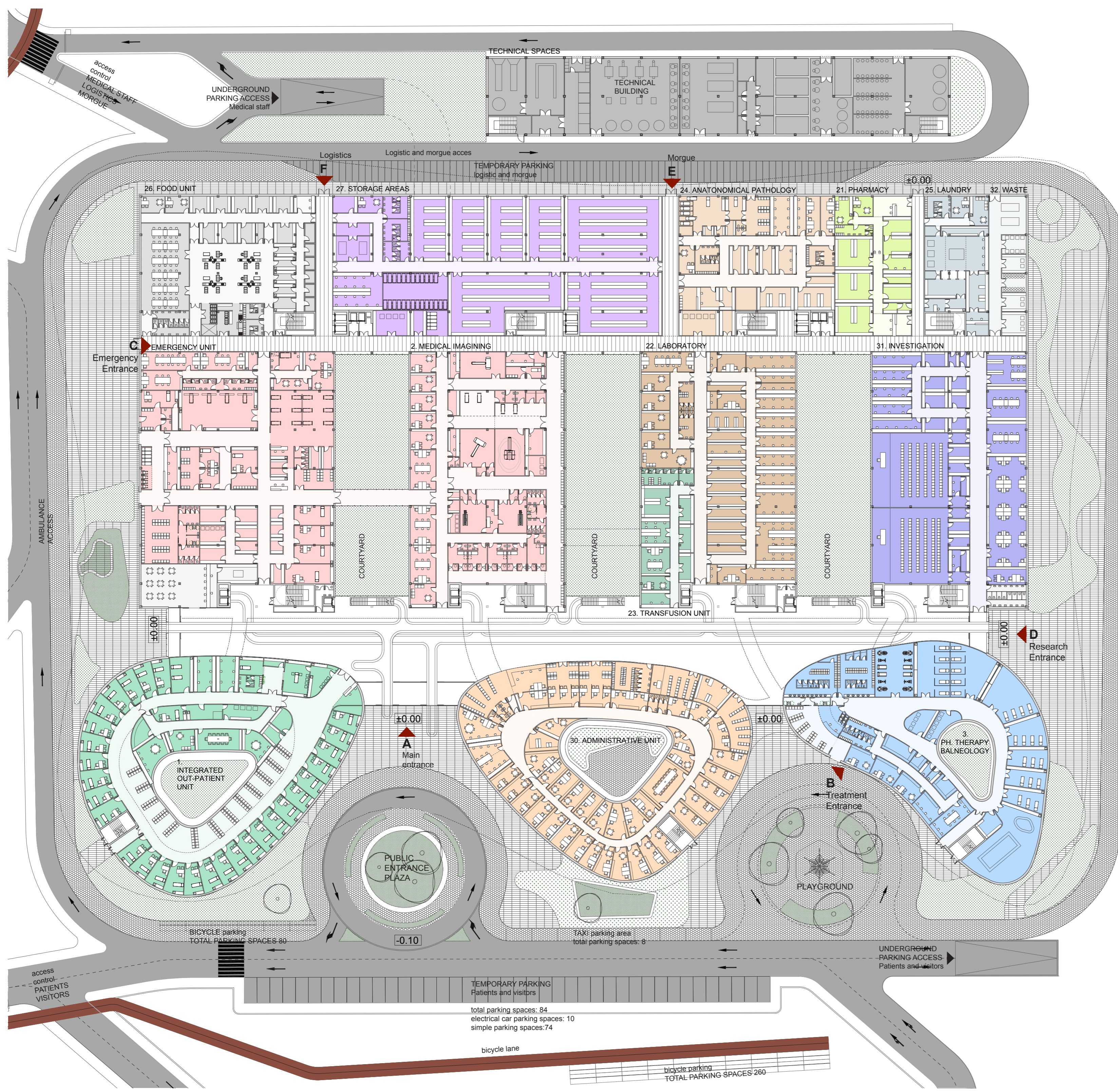
THE GARDEN ▲
The garden provides several roles within the design of the hospital. While acting as a protection buffer (from noise, pollution and sight) on all sides segregating the structure from the surrounding built environment, the garden connects the hospital to the surrounding landscape providing therapeutic comfort and contributing to the welfare of the young patients. The interior courtyards are landscaped providing recreational areas for the medical staff. The organic shaped roof above the hospital base becomes a suspended garden reserved to patient use, offering spectacular views of the surrounding hills and the city.



SITE PLAN 1:750 (area dedicated to the CLUJ-NAPOCA EMERGENCY CLINICAL CHILDREN'S HOSPITAL) HOSPITAL PLOT AREA = 70.800sqm



▲ PERSPECTIVE FROM THE SOUTHERN ROUNDABOUT LOOKING TOWARDS THE FRONT GARDEN AND MAIN ACCESS



▲ GROUND FLOOR (±0.00) 1:500

- 0. HALL
- 1. INTEGRATED OUT-PATIENT UNIT
- 2. EMERGENCY UNIT AND MEDICAL IMAGING
- 3. TREATMENT UNIT
- 21. PHARMACY
- 22. LABORATORY
- 23. TRANSFUSION UNIT
- 24. ANATOMICAL PATHOLOGY
- 25. LAUNDRY
- 26. FOOD UNIT
- 27. STORAGE AREAS
- 29. TECHNICAL SPACES
- 30. ADMINISTRATIVE UNIT
- 31. INVESTIGATION
- 32. WASTE AREAS

PROPOSED SCHEME

The main objective of our design proposal is to achieve the maximum efficiency of the entire complex, bringing together form and function, combining the values of both to produce an efficient and responsive hospital model, achieving the optimization of all care processes at the service of users (patients, professionals and visitors). The major challenge is to provide maximum functional precision within the proposed building volume, delivering an efficient, modern, sustainable design concept, based on the criteria of functional organization, segregation of circulations and routes, a solution that reflects contemporary values and the social importance of this type of building, the challenge is much more than just delivering a building, it is to provide a comprehensive response to a social need.

The volumetric concept of the hospital is based on a two floor base topped by a large overhanging green roof and a superior detached volume which overlooks the surrounding landscape, a model that we believe to be appropriate for the site and size of this hospital.

The model is simple and easily readable, while the base hosts the clinical and general services, the superior volume is dedicated to hospitalization. The hospital specialties are distributed in the four arms of the superior volume. A perfectly hierarchical and independent access system has been planned for outpatient, public, clinical and service uses, in addition to the specific ones for underground parking.

THE BUILDING
The building follows a deliberately simple layout. The hospital base is structured in three well-differentiated functional areas:
• The southern block accommodates the outpatient area, consisting mainly of a large double-height lobby, to which the outpatient areas (consultation, rehabilitation and administration) and the hospitalization visiting areas are connected.
• The northern block hosts the clinical area which is divided in clinical use (on the first floor) and services (on the ground floor).
• The intermediate area connecting the first two consists of 4 clinical blocks arranged perpendicularly to the previous ones and separated by spacious courtyards, which allow access either to outpatients (through the outpatient area), or to the medical staff (through the clinical area), depending on the needs.
A large roof with curved edges is placed on top of the base, providing open-spaces for leisure activities, games and walking for the children and their families, away from the public areas.
Hospitalization units are placed above the base, connected to the base through separated accesses: the clinical units with the clinical corridor on the lower floors, the service units also with the ground floor service corridor and the outlets-visits with the main lobby.

THE ACCESSSES
Inside the building, the public access and circulation areas have been segregated from the clinical and service areas. In addition, the underground car park is directly connected to the main lobby by dedicated stairs and lifts, which act like functional connections of direct use, without sacrificing the rest of the vertical connections, especially in cases of evacuation needs. This means that, except for emergency evacuation needs, the car park is connected directly to the main lobby only, providing enhanced access control to the building.
Outside the building, the service, ambulatory, public and emergency accesses have been separated, as well as the 3 entrances to the car park. A perimeter alley integrated

in the garden provides access to the fire brigade on all sides of the building. Connections to the outside are provided by two major roundabouts that will absorb and channel traffic from the exterior.

BUILDING SERVICES

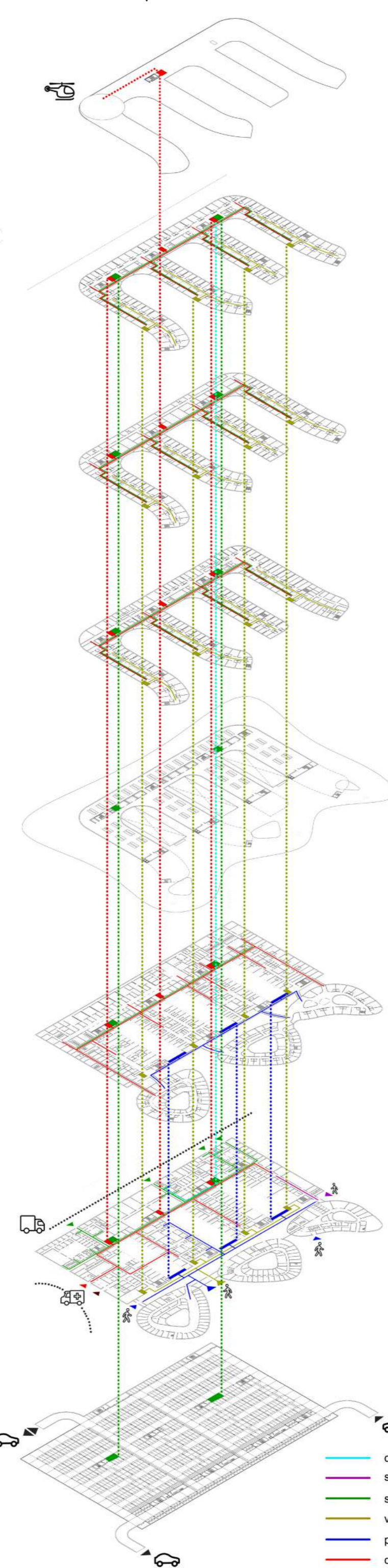
The general facilities have been separated from the main building, and placed in an adjacent independent volume, thus improving the safety and maneuverability in the area: one side of the street is planned as logistical access and the other as access to the facilities building. In addition to the above mentioned technical volume, a technical floor is placed between the two-floor base and the superior volume of the on the level of the green roof, housing sub-central units and air-conditioning equipment for highly specialized technical areas such as the surgical block and ICU. By implementing this technical floor, we are able to free the hospitalization volumes' roof PV panels and improved heliport access.

STRUCTURĂ FUNCȚIONALĂ ȘI SUPRAFEȚE PROPUSE

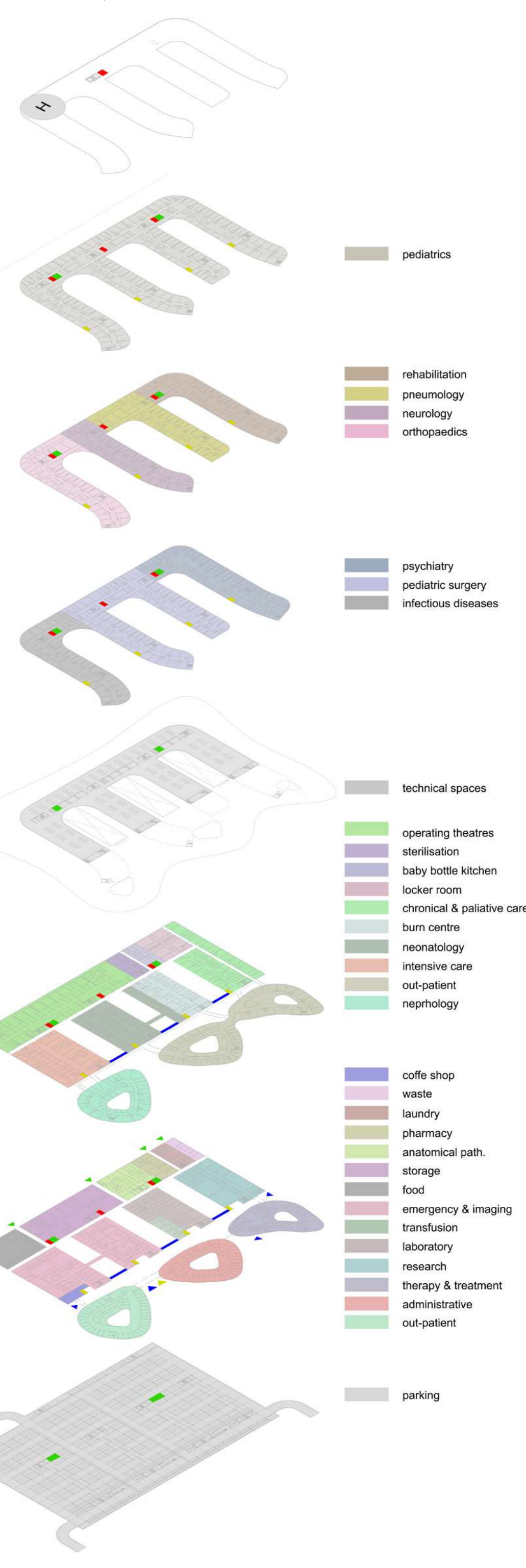
FUNCTIONAL STRUCTURE AND AREA – PROPOSAL

Număr de etaje / Number of floors	Temă / Brief (required)	Concurs (propunere) / Competition (proposal)
Număr total de paturi / spitalizare continuă, în cure / Total number of beds / inpatient units (out of which):		
	510	510
Secți medicală / Medical Wards		
	385	385
Secți chirurgicale / Surgical Wards		
	95	95
Anestezie Terapie Intensivă / Intensive Care Unit		
	30	30
Număr total de paturi / spitalizare de zi / Total number of beds / outpatient unit:		
	50	50
Suprafețe / Areas		
	Temă (estimară) / Brief (estimated)	Concurs (propunere) / Competition (proposal)
Suprafață utilă / Usable area (estimated)	42.190 mp	42.938 sqm
Suprafață ocupată / Occupied area (estimated)	9.372 mp	14.168 sqm
Suprafață construită destinsă pacienților / Total built area (estimated)	61.874 mp	65.444 sqm
Suprafață construită destinsă pacienților / Total built area / hospital beds (estimated)	121 mp/pat	128 sqm/bed

CIRCULATION AND ACCESS

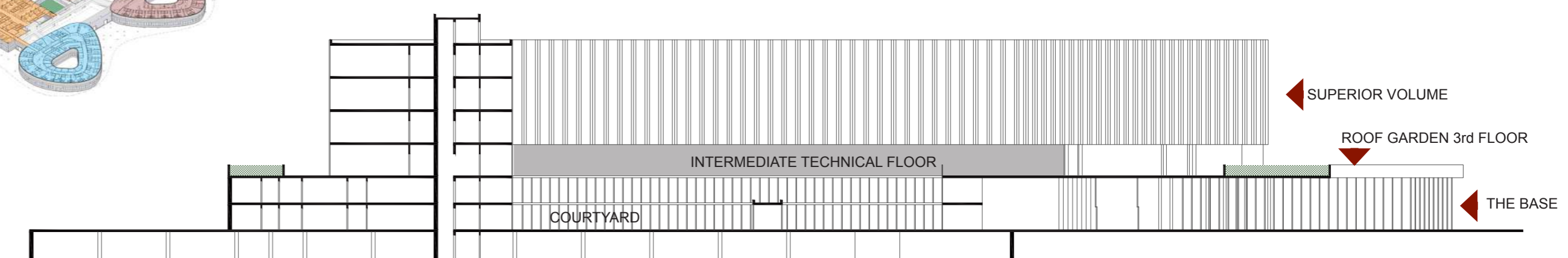
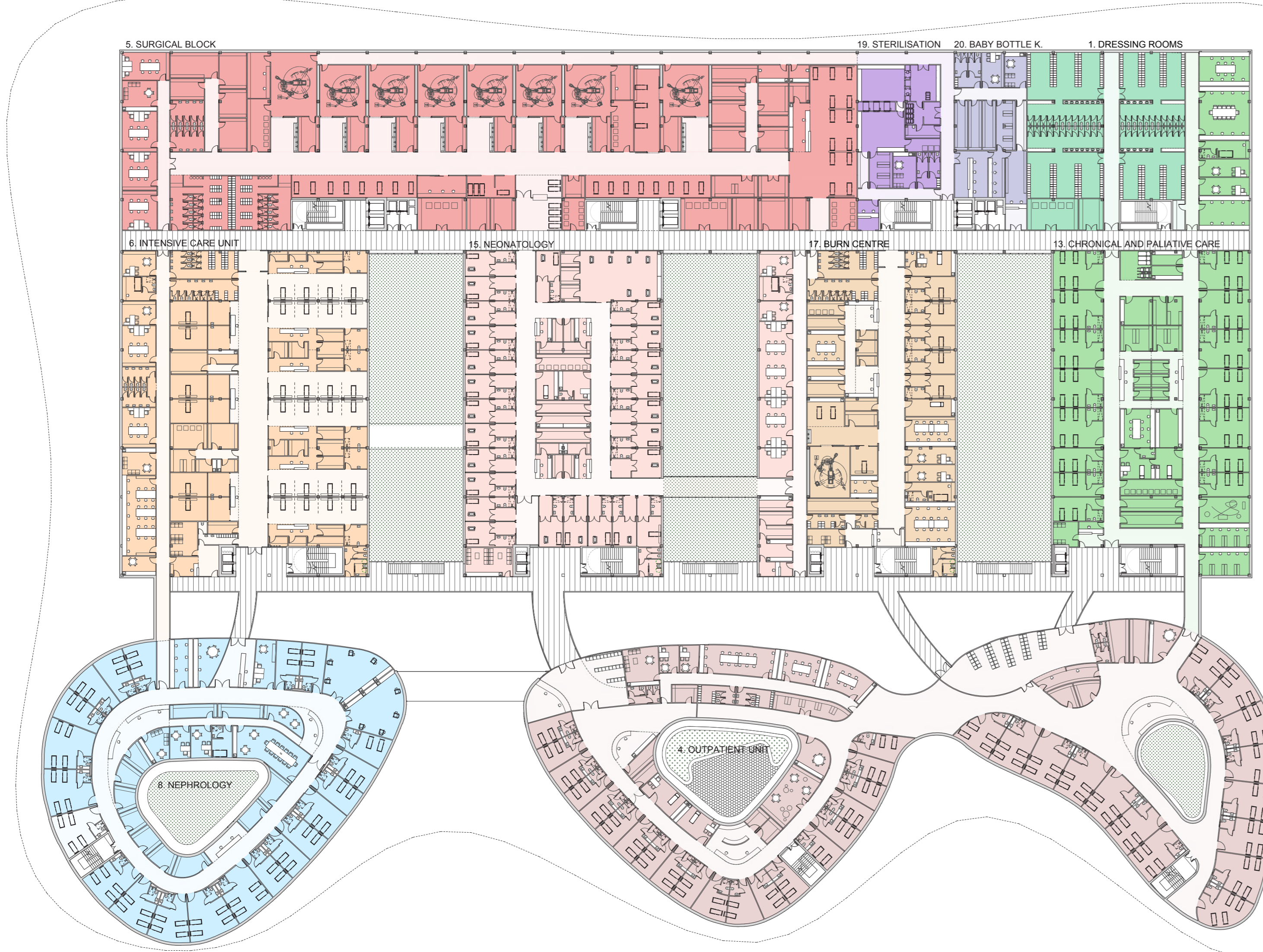


AREAS AND ZONING



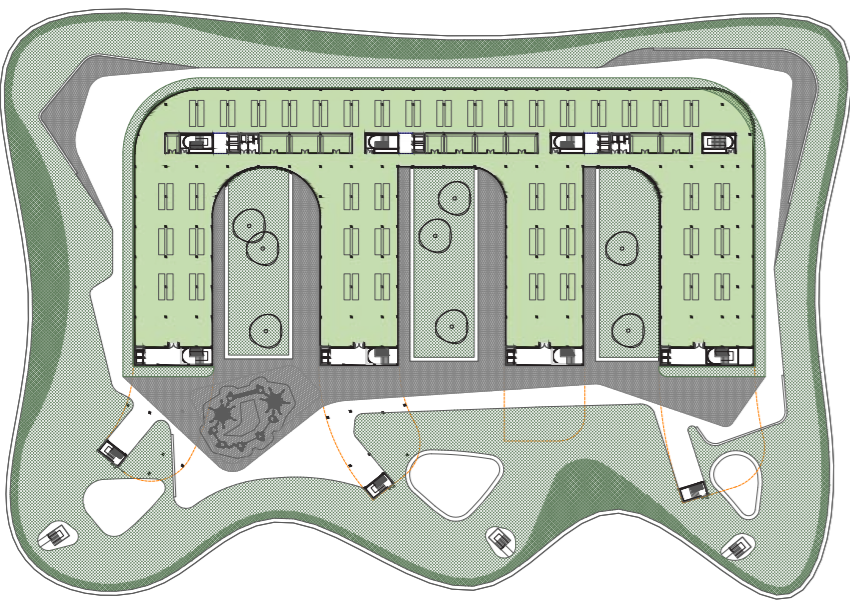
▲ 1st FLOOR (+3.96) 1:500

- 1. INTEGRATED OUT-PATIENT UNIT
- 4. OUTPATIENT UNIT
- 5. SURGICAL BLOCK
- 6. INTENSIVE CARE UNIT
- 8. NEPHROLOGY
- 13. CHRONICAL AND PALLIATIVE CARE
- 15. NEONATOLOGY
- 17. BURN CENTRE
- 19. STERILISATION
- 20. BABY BOTTLE KITCHEN





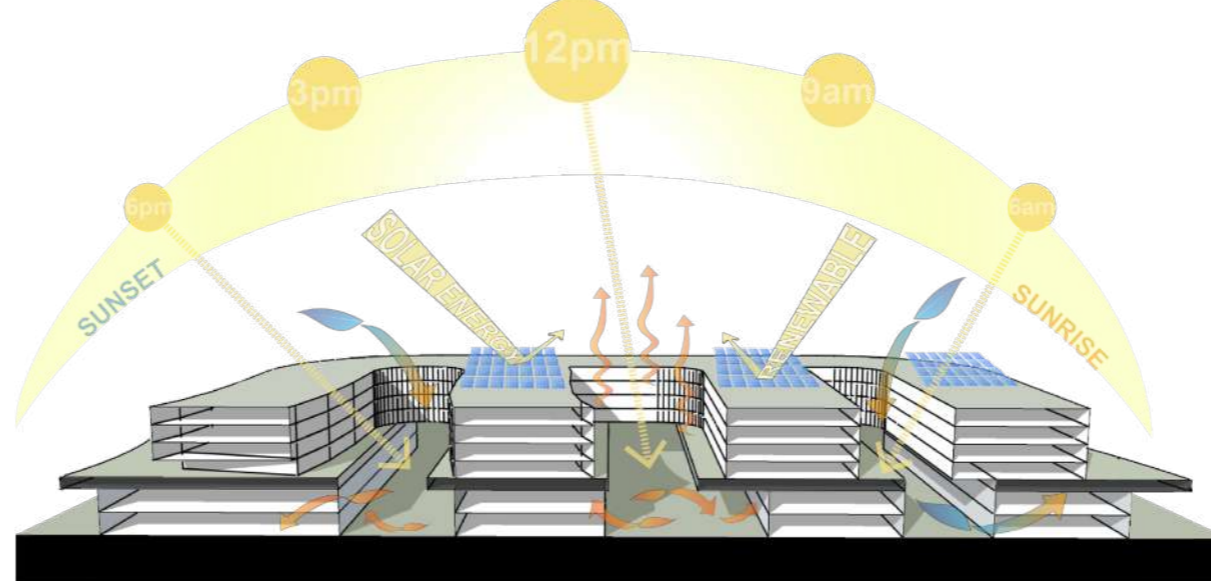
2nd FLOOR (+7.92) - TECHNICAL



GREEN ROOF

The presence of vegetation is essential in healthcare facilities as it is well known for its evaporative function that promotes temperature regulation, as well as providing shade, wind protection and visual comfort.

Therefore, green spaces are incorporated throughout the different levels of the project, so that they can be used by local residents and visitors as well as by patients, family members and hospital staff. In order to achieve this, a wide variety of green spaces are proposed: from an urban garden at the base of the building, to private roof gardens with large open areas of leafy vegetation and protected terraces, complemented by a system of green courtyards that run along different floors of the building.



BIOCLIMATIC APPROACH

The proposed design is based on an analysis of the boundary conditions surrounding the building site as well as a clear commitment to take advantage of these conditions in order to obtain a building that respects its location and offers appropriate responses to local factors.

SOLAR ANALYSIS

The proportion, orientation and arrangement of the main building volumes, as well as the proposed interconnected courtyards, provide a high level of sunlight throughout the year. The building is completely open to the south, with the main towers appearing to be the fingers of a hand opening out to embrace the sun. Moreover, the shadows cast on the courtyard system are minimized not only because of the suitable orientation of its longitudinal axis, but also thanks to the study of its aspect ratio, a factor that relates the depth of the courtyard to its height.

PERSPECTIVE FROM THE BICYCLE LANE LOOKING TOWARDS THE MAIN ACCESS

TRANSITION SPACES - COURTYARD SYSTEM - MICRO-CLIMATES

The building presents a series of semi-open spaces that regulate indoor temperatures. This proposed system of semi-open spaces provides micro-climates inside the building, especially the connection of interior courtyards as the use of vegetation and the protection they provide make them a unique bioclimatic tool.

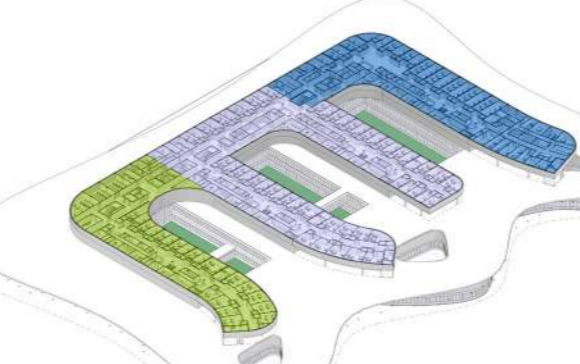
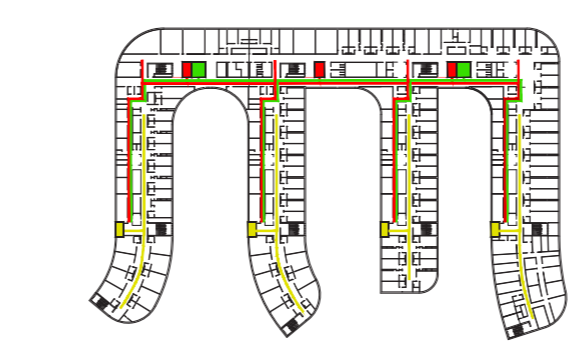
The configuration and aspect ratio of the courtyard system allows the interior of the courtyard to receive direct solar radiation throughout the year, with greater incidence during the central hours of the day, resulting in the heating of the air inside the courtyard, which is subsequently used by the internal ventilation system. The use of naturally pre-heated air is enormously beneficial as it can be directly incorporated into the interior of the building during the milder months, but also during the colder months the use of pre-heated air leads to considerable energy savings.

Generally, courtyards maintain mild temperatures throughout the year which is extremely beneficial to the internal spaces of the building as they can be naturally ventilated, as well as providing natural light and visual comfort to the user.



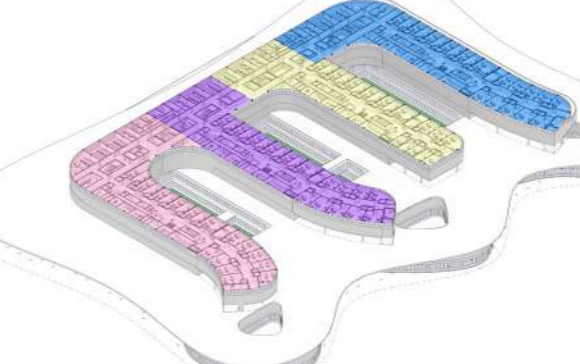
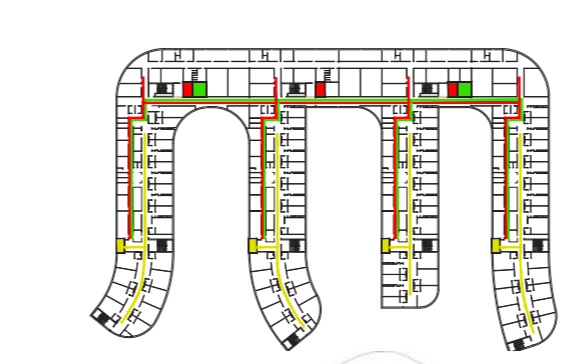
3rd FLOOR (+10.89) 1:500

- 10. PSYCHIATRY
- 12. INFECTIOUS DISEASES
- 16. PAEDIATRIC SURGERY



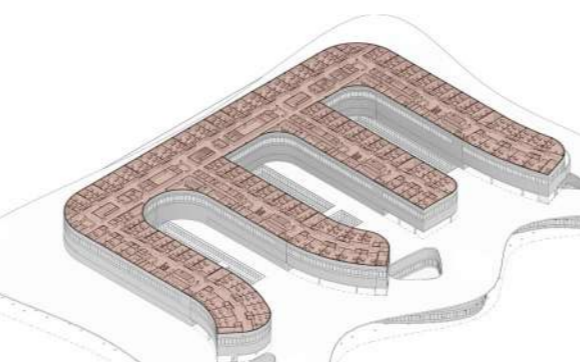
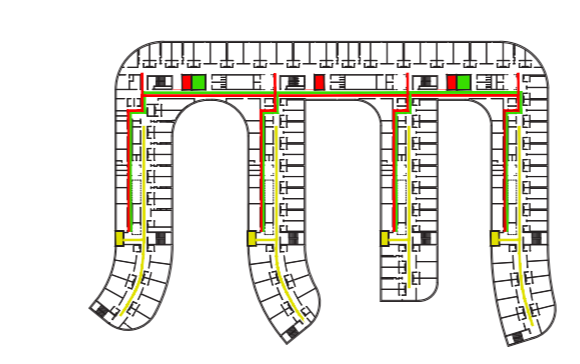
4th FLOOR (+14.52) 1:500

- 9. NEUROLOGY
- 11. PNEUMOLOGY
- 14. REHABILITATION
- 18. ORTHOPAEDICS

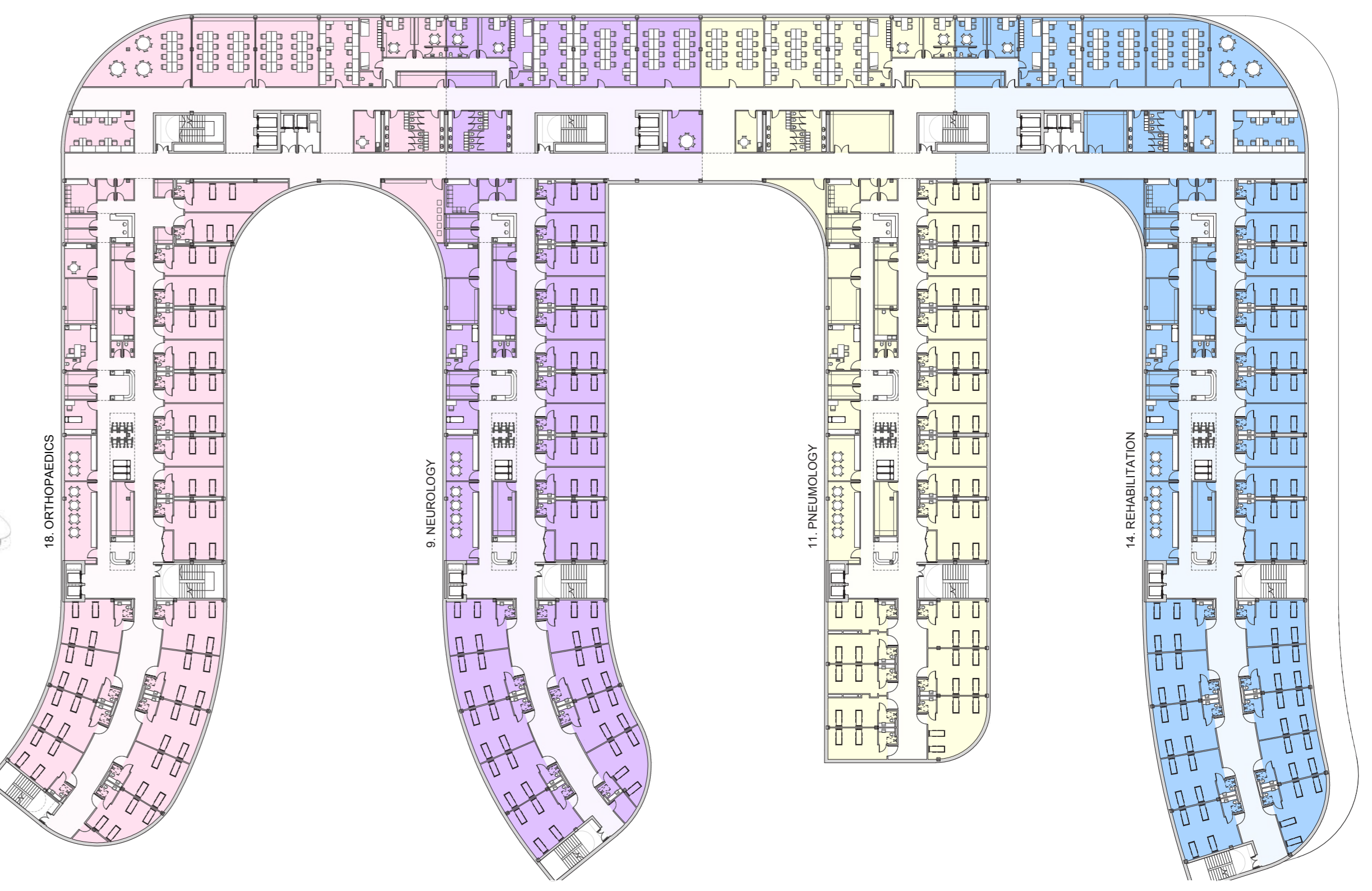


5th FLOOR (+18.15) 1:500

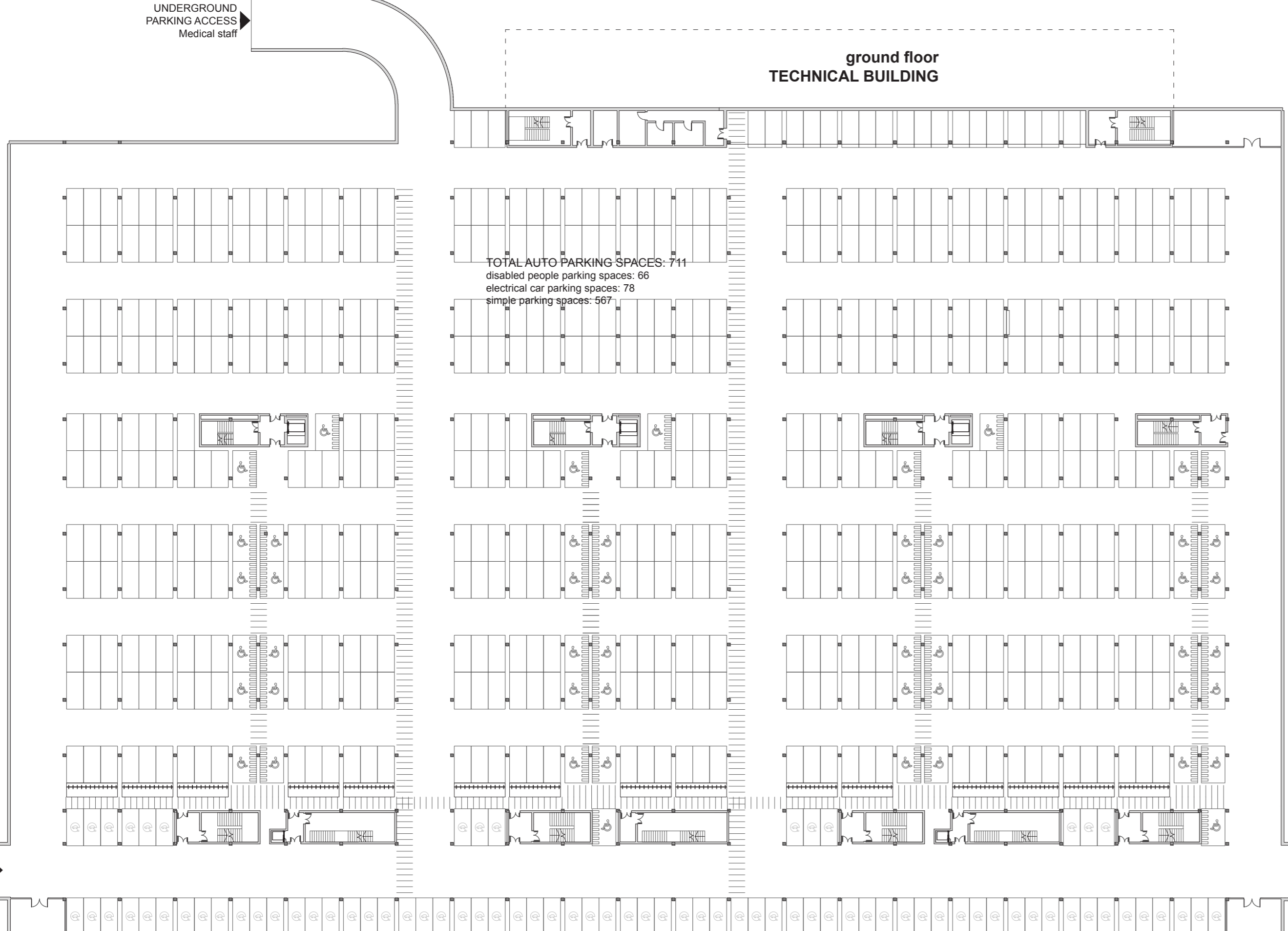
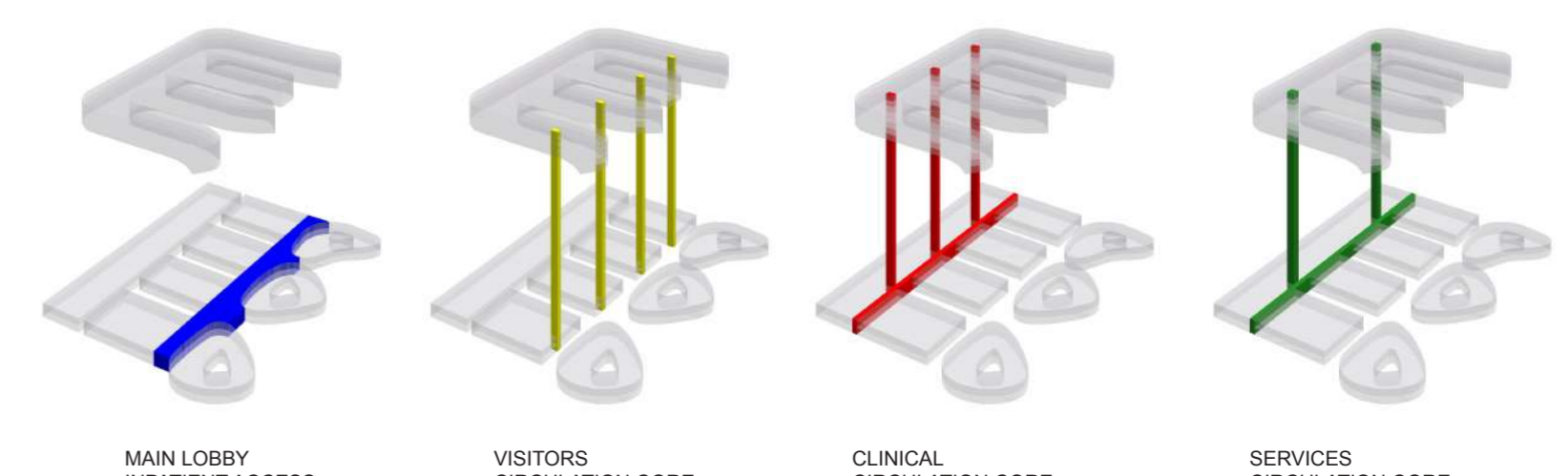
- 7. PAEDIATRICS



UNDERGROUND FLOOR (-3.96) 1:500



INNER CIRCULATION DIAGRAMS



ground floor TECHNICAL BUILDING

TOTAL AUTO PARKING SPACES: 711
 disabled people parking spaces: 66
 electrical car parking spaces: 70
 single parking spaces: 967

UNDERGROUND PARKING ACCESS Patients and visitors

UNDERGROUND PARKING EXIT Patients and visitors

UNDERGROUND PARKING ACCESS Patients and visitors

UNDERGROUND PARKING EXIT Patients and visitors

SOUTH ELEVATION

SOUTH ELEVATION

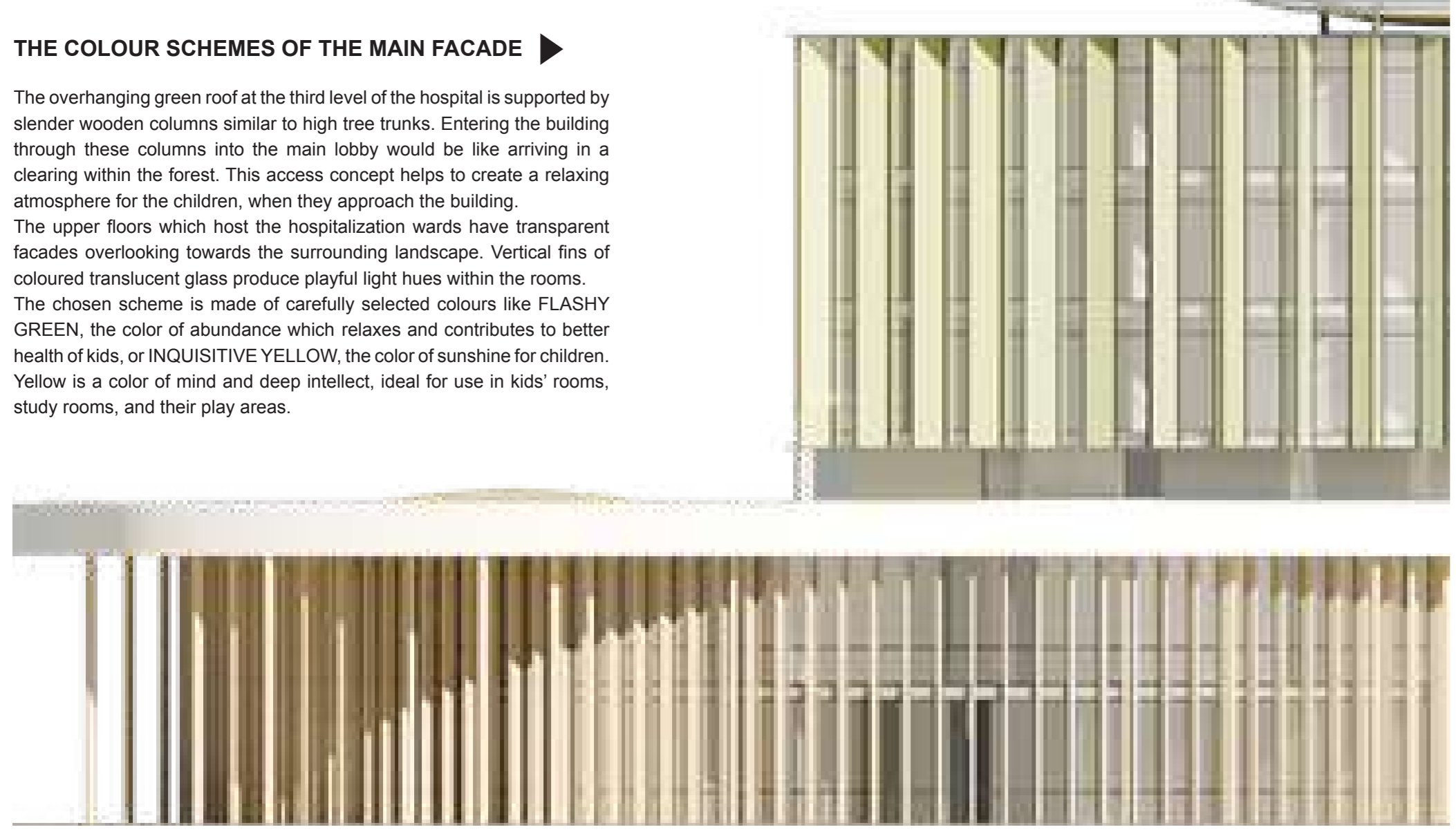




▲ FRONTAL VIEW OF THE MAIN ACCESS

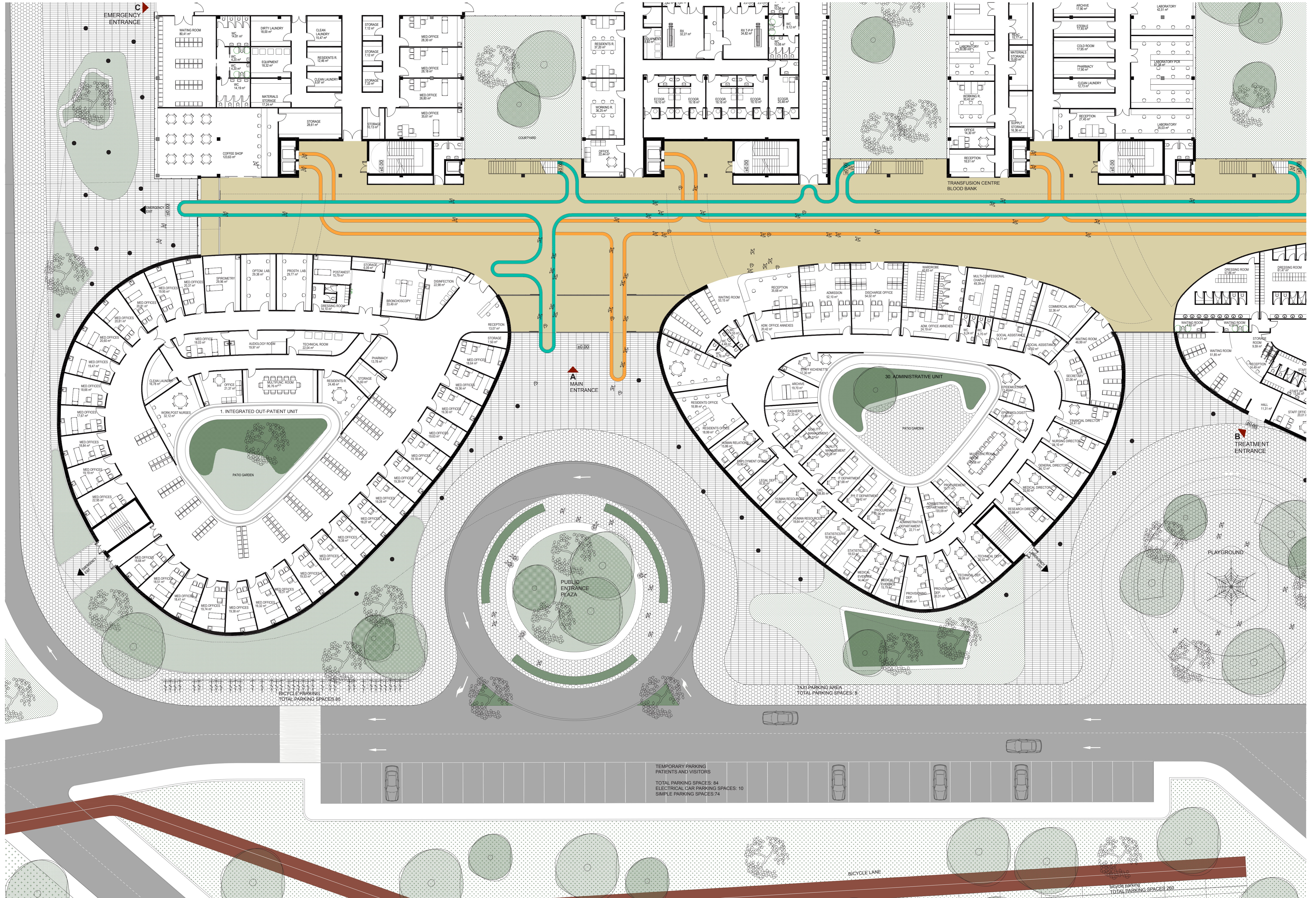
THE COLOUR SCHEMES OF THE MAIN FACADE ▶

The overhanging green roof at the third level of the hospital is supported by slender wooden columns similar to high tree trunks. Entering the building through these columns into the main lobby would be like arriving in a clearing within the forest. This access concept helps to create a relaxing atmosphere for the children, when they approach the building. The upper floors which host the hospitalization wards have transparent facades overlooking towards the surrounding landscape. Vertical fins of coloured translucent glass produce playful light hues within the rooms. The chosen scheme is made of carefully selected colours like FLASHY GREEN, the color of abundance which relaxes and contributes to better health of kids, or INQUISITIVE YELLOW, the color of sunshine for children. Yellow is a color of mind and deep intellect, ideal for use in kids' rooms, study rooms, and their play areas.



▲ EXCERPT FROM THE MAIN FACADE 1:200 DETAILING THE ACCESS AREA TO THE BUILDING

▼ EXCERPT FROM THE GROUND FLOOR PLAN (±0.00) 1:200 DETAILING THE ACCESS AREA TO THE BUILDING



◀ LOBBY / HALL

The lobby is the main entrance to the building, stretching along its entire width, between the outpatient area and the clinical area. In this place the exterior and interior spaces are blended in perfect continuity, integrating the organic volumes with the rest of the hospital.

In this double-height space, crossed by walkways at the first floor, all public accesses are channelled from three sides of the building: on the front the main visitors entrance, and treatment area access, to the east the teaching staff access and to the west the cafeteria access.

The main lobby brings together all the entrances to outpatient, hospitalization, teaching areas and underground parking area as follows:

- Outpatient area: the rounded-shaped volumes that make up the outpatient consultations, admission and treatment unit on the ground floor, and nephrology and outpatient unit on the first floor and the longitudinal medical imaging bands, blood transfusion unit and laboratory.
- Hospitalization area: through the vertical cores inserted in the longitudinal bands, it is possible to access both the conventional hospitalization of the superior volume and the special units of ICU, Neonatology, Burn Unit and Palliative Unit that are on the first floor.
- Research and Teaching area: it can be accessed directly from the outside or from the vehicle through the wind-shelter that regulates the flows to said area.
- Parking: to prevent direct access to conventional hospitalization from the parking lot, specialized circulation cores are generated at the end of the interior courtyards, linking the underground parking with the lobby.

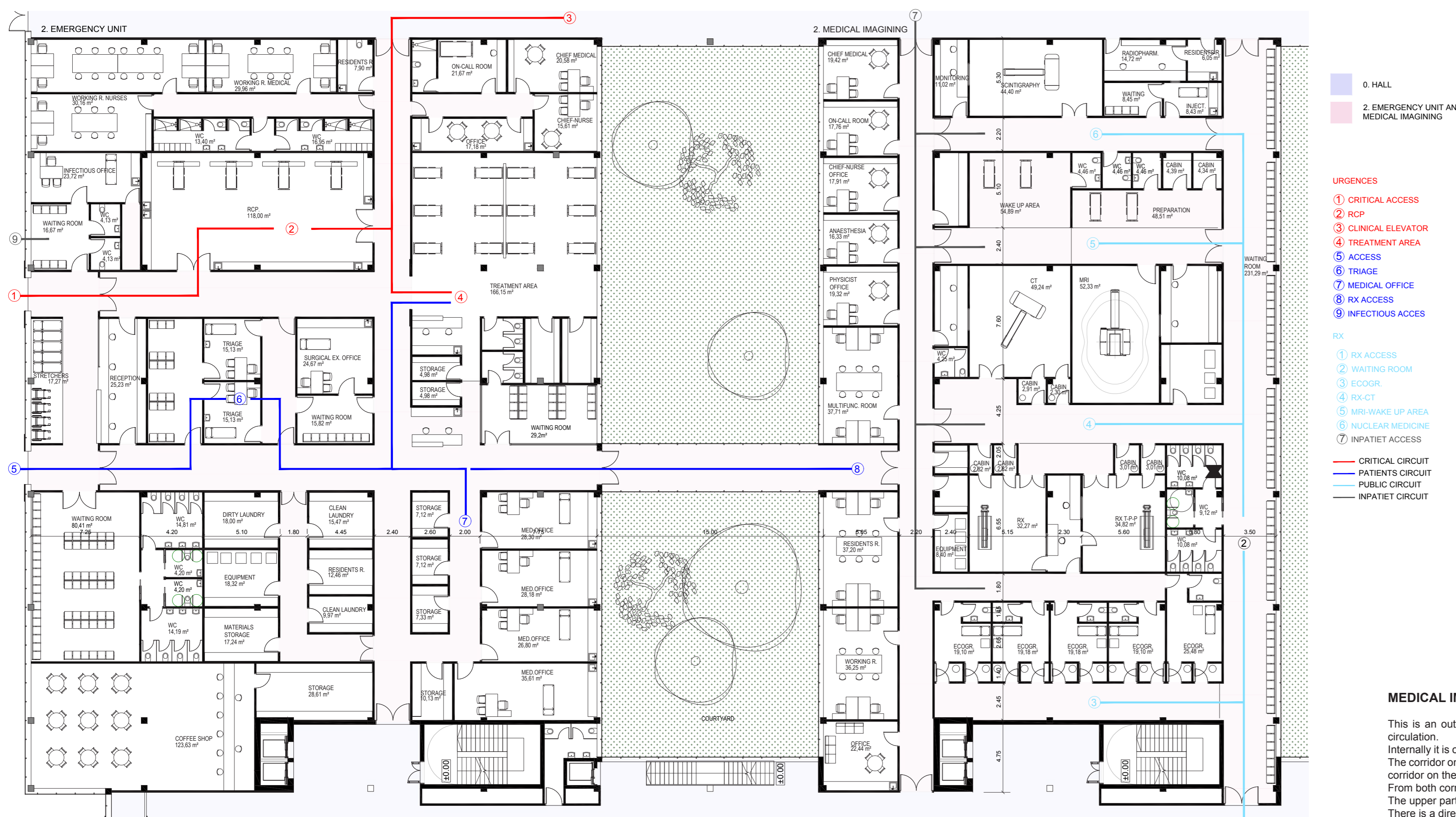
This area flooded with natural light can be configured as a multifunctional space where exhibitions, playgrounds, recreation areas can be developed. It contains commercial areas, chapel, resting and waiting areas.

The extended green roof above the second floor, combined with the curved shape of the outpatient volumes and the continuity of the pavement to the exterior, contributes to blurring the boundaries between interior and exterior.

▲ INNER PERSPECTIVE FROM THE ACCESS AREA



▲ VIEW OF THE "FOREST" OF WOODEN COLUMNS SUPPORTING THE OVERHANGING 3RD FLOOR ROOF GARDEN

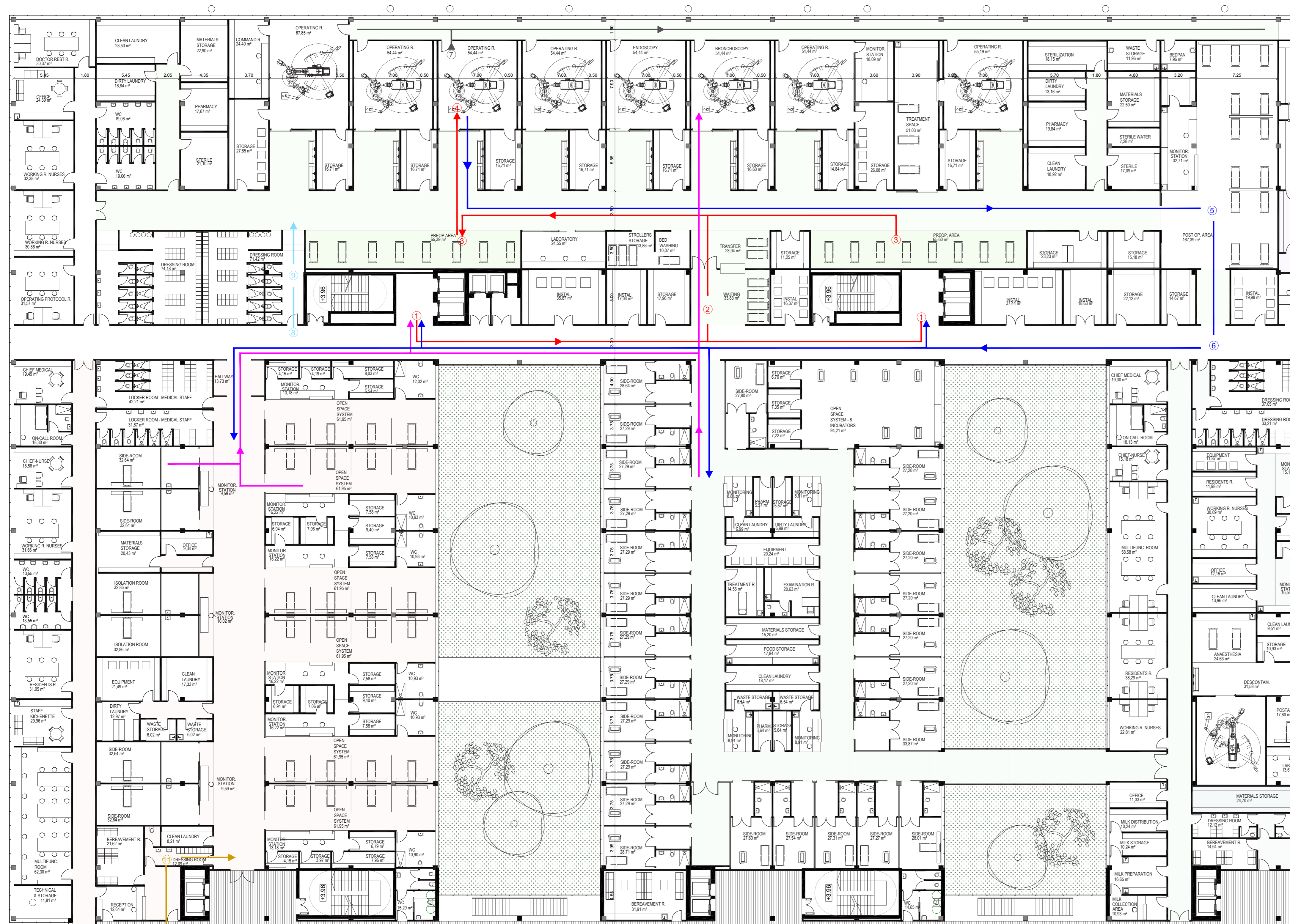


▲ MEDICAL IMAGING

This is an outpatient area, which must be connected to both the hospital lobby and the clinical circulation. Internally it is organized through two longitudinal corridors with the diagnostic pieces between them. The corridor on the right contains the patient waiting rooms and is accessible from the lobby, and the corridor on the left contains the staff areas and connects to the clinical corridor. From both corridors you can access the diagnostic spaces. The upper part of the area is occupied by nuclear medicine. There is a direct connection with it through an internal connection with the emergency department.

▲ EXCERPT FROM THE GROUND FLOOR - IMAGING AREA

▼ EXCERPT FROM THE 1ST FLOOR - OPERATING THEATRE, ICU



- 5. OPERATING THEATRES
 - 6. INTENSIVE CARE UNIT
 - 15. NEONATOLOGY
 - 17. BURN CENTRE
 - 19. STERILIZATION
- OPERATING THEATRES**
- 1. CLINICAL ELEVATOR
 - 2. TRANSFER
 - 3. CLINICAL ELEVATOR
 - 4. OPERATING R.
 - 5. POST OP. AREA
 - 6. EXIT OPERATING THEATRES
 - 7. DIRTY OUT
 - 8. PERSONAL ACCESS
 - 9. DRESSING ROOM
 - 10. FAMILY ACCESS
 - 11. DRESSING ROOM
- ICU**
- 1. MEDICAL CIRCUIT (ENTRY)
 - 2. MEDICAL CIRCUIT (EXIT)
 - 3. PERSONS CIRCUIT
 - 4. WASTE CIRCUIT
 - 5. CRITICAL CIRCUIT
 - 6. PUBLIC CIRCUIT

▲ SURGICAL BLOCK

The surgical block is located in a strategic position within the hospital, in a purely clinical area, with a direct connection with the intensive care units (ICU, Neonatal, Burn Unit and Chronic and Palliative Care) and with the clinical circulation cores that connect it with the emergencies and the helpport. The surgical area accommodates the operating theatres of all specialties. They are organized around two circulations, a clean lower one (patient entrance and medical staff) and a dirty upper one (waste storage) that connects with the sterilization area. The operating theatres are distributed linearly, each one having its own washing and storage area. On the far right we have the wake-up area, with direct exit to the outside, and on the far left the personnel area. The entrance to the area for patients is carried out in a controlled way, through a transfer with change for stretchers, while the medical staff access is organized through changing rooms that perform also as locker rooms.

▲ ICU

The ICU is developed in a longitudinal band whose use is purely clinical. However, its position allows direct but controlled access by family members and patients at the same time, being located between the surgical block band and the main hall of the hospital. Its organization is herringbone, with a clean central corridor on which the different observation areas are distributed, either in individual isolated rooms or in group rooms with 4 beds. Each 4 open-bed space has its own control and support area. The single rooms have a checkpoint every two units. The personnel area is adjacent to the observation area. Access to the observation area by staff is made through the medical changing rooms, which have a locker function.

▲ NEONATOLOGY

Its position follows the principles of the ICU, that is, a purely clinical area, with direct controlled access for family members. Like the ICU, neonatology has a direct connection to the surgical block. This area is organized with the observation pieces forming a ring around the tablet, leaving the control and support zone in the center. The staff area is right next to the observation area.

▲ EMERGENCIES

The emergencies are located on the west facade of the building, with an independent road access. This area has three inputs, controlled by a reception, with a specific circuit for each of them:

- Access for 'autonomous' patients, who go through triage, from which they are referred either to the consultation area or to the observation area to monitor their condition.
- Access for patients in critical condition, which is used for patients who come in a state of shock, who go directly to the resuscitation space that is adjacent to the entrance.
- Access for infectious patients, with direct access from the outside to an area set up with a waiting room and a medical office for this type of patient.

 The emergency area is connected to the surgical block and the helpport through the clinical centers that are beside this area, while being directly connected to the radiology area.



▲ ICU



▲ OPERATING THEATRE



▲ RENDER

▼ LAYOUT OF THE 3TH FLOOR (+10.89) 1:200 - PSYCHIATRY, INFECTIOUS DISEASES, PEDIATRIC SURGERY WARDS



HOSPITALIZATION ▲
Hospitalization is situated on the last 3 floors, which make up the entire superior volume. They are organized through 4 longitudinal wings where the functional program of the rooms, monitoring zones and other supporting areas are located and a transversal block which connects the four arms hosting the staff and technical areas.
The hospitalization area must have both public (patient's relatives) and clinical (staff and patients) access. A public circulation core is inserted in each one of the 4 "legs" connecting these with the main lobby. The clinical circulation cores are placed in horizontal position, each one of them giving access to every two wings.

▼ TREATMENT SPACES



▼ ACOMODATION AREA



▼ ACOMODATION AREA - SIDE ROOM 1+1

