MINISTERUL SĂNĂTĂȚII
AL REPUBLICII MOLDOVA

SERVICES FOR THE ELABORATION OF THE TECHNICAL DOCUMENTATION (DESIGN PHASE), AUTHOR SUPERVISION AND DESIGNER'S TECHNICAL ASSISTANCE FOR THE CONSTRUCTION OF THE BALTI REGIONAL HOSPITAL

JV Leader

manens

JV Member

Engineering

Working methodology

a) Overall description of the approach proposed by the tenderer for the provision of services

In this chapter we intend to describe the main themes that characterize the services required for the construction of the New Regional Hospital of Balti, deduced from the project documents, from the analysis of the site and from the important previous experiences of the Group. The precise and complete identification and understanding of both the performance requests expressed by the Contracting Authority allow the definition of a clear and shared clinical management needs framework that can be satisfied by various design solutions, consistent with the morphological characteristics of the project site. All possible typological models must satisfy some design invariants, highlighted by the tender documents and totally shared by the JV, such as:

- Compliance with the identified clinical management model;
- Respect for the constraints given by the context and current legislation;
- Definition of the most effective methods of connection with existing roads with a real separation of access;
- Identification of a typological model highly integrated with the context;
- Definition of a functional model that combines the resolution of current performance requests with a high internal flexibility to satisfy future ones;
- Resolution of accesses and internal routes in relation to the different user flows;
- High technological efficiency of the structure
- High level of comfort and humanization of the environments;
- Respect for the defined surfaces and economic budget.

The correct definition of the clinical management model is, therefore, preparatory and necessary for the effective resolution of the architectural, structural and plant design areas in order to conduct a timely Value Engineering action on the various possible concepts.

The process of construction/refunctionalization of a New Regional Hospital originates from the moment in which it is noted that it is possible to satisfy the need for reorganization and efficiency of the assistance delivery network of a given territory, through the implementation of a constructive intervention. The Operation represents a strong change from a social, cultural and infrastructural point of view for the entire community, as well as constituting a complex technical planning moment of great impact from a clinical, organisational, economic, building, urban planning and environmental perspective. It is therefore essential to conceive the Opera as a resource to be used appropriately according to health needs, the offer of hospital and local services and economic and management efficiency, verifying its correct inclusion in the planning, administrative and institutional framework and current legislation and providing for the correct balance between clinical effectiveness and economic and management efficiency.

This assumption - fundamental and increasingly essential to implement in today's healthcare and as in the specific case of the New Balti Hospital, the investment compatible with the objectives defined by the Administration in terms of quality, costs and time - finds in this offer a concrete and effective implementation through the development of a design focused on three main assets, two of which are known and well codified, corresponding to the building-architectural and plant engineering components and one more innovative and of greater importance in the case of design of healthcare facilities corresponding to the CLINIC (evaluate the hypotheses of "clinical" use of the structure and define the functions that best respond to the diversified demand for health of the territory, ensuring respect for the role of the unit in time-dependent networks and the sustainability of the Intervention in relation to the catchment area and its prospects for change)
MANAGEMENT, analyze the productivity and performance levels of each service of the New Hospital to lay the foundations and trace the development directions of the organizational-functional concept of the spaces, volumes and architectural layouts, objectifying with analytical evidence all the choices that best satisfy what are and will be, once the Work is built and functioning, the concrete operational needs of the activities and provision of services;
ECONOMIC, estimate the costs and revenues and the potential impacts on the system overall, to support clinical, organizational and service management choices, with the aim of reducing spending, improving the governance of resources and optimizing planned investments.
The tenderer's approach to providing design services for the Regional Hospital in Bălți Municipality is structured to ensure compliance with Moldovan legislation, particularly the Urbanism and Construction Code No. 434/2023, Law no.

411/1995 regarding health protection, Government decision no. 663/2010 regarding sanitary requirements, notice no. 1059/20.12.2024 regarding admission sections, NCM A.07.02-2012, NCM C.01.12.2018 and other norms and standards in force. The methodology emphasizes legal conformity, efficiency, and stakeholder collaboration, ensuring that the project is executed with precision and within stipulated timeframes.

Phasing of design activities

The project will be started with pre-design activities such as analysis of existing documents (e.g. Feasibility Study) and elaboration of topographical and geotechnical surveys in order to evaluate site suitability, ensuring alignment with urban planning criteria.

The Design activities will be started based on the provisions set in the Urban Planning Certificate (Certificate de Urbanism), issued in accordance with the provisions of art. 107 of the CUC 434/2023. The issuer of the Urban Planning Certificate (UBC) will attach to the UBC the required notices from Public Health, Fire Protection, Environment and Road Administration authorities. Provisions of such notices will be considered at the pre-design and design phase of the project.

Conceptual and preliminary layouts, zoning plans and architectural sketches will be developed and proposed for preliminary approval to the stakeholders.
Following the approval of the conceptual and preliminary layouts, will be initiated the development of comprehensive calculations and plans for structural, mechanical, electrical, and plumbing systems, considering integration of the sustainable and energy-efficient solutions to align with environmental regulations. Based on the comprehensive calculations for MEP systems will be required the technical requirements/connection permits (conditii tehnice/avize de racordare) from the respective utility owners (water and sewer, heating, gas and electricity). The technical requirements/connection permits will set the technical requirements and connection points to the utility systems as well as pressures, flows, temperatures, diameters, powers, short circuit parameters, etc., and are mandatory for the design activities of the external networks/branches of WSS, Heating, Gas and Electricity networks.

After issuance of all permissive documents can be continued with development of the Design Package.
Following the completion of the design package, it will be submitted for approval to the stakeholders, to the utility's owners and to other relevant authorities, as set in the design notices or connection permits.

After getting the approval of design by the interested parties the entire design package will pass the verification process as described further.

Approval/Verification of the design by the certified auditors (verificarea documentatiei de proiect)

A mandatory activity for getting the construction permit is the obtaining of the expertise / verification of design documentation. The expertise / verification process will be followed in accordance with the provisions of art. 129 of the CUC no. 434/2023.

Specifications for "Design-Build" Stage

The Tenderer will develop the design drawings (in Design Phase) and will contain all the information necessary for the execution documentation stage and will contain the itemized and general cost estimates.

Design package content, legal provisions and standards

In accordance with the provisions of NCM A.07.02-2012 the content of design documentation will be at minimum as follows:

1. General explanatory note;
2. Architectural and structural solutions;
3. Technological solutions (sanitary requirements for medical premises);
4. Technical installations, networks, and systems (HVAC, WSS, ELE, AUT, Fire safety, etc);
5. Energy efficiency of design solutions;
6. Organization of construction works (including demolishing of 3 existing buildings);
7. Environmental protection;
8. Fire safety measures (MASI);

9. Basic operation and maintenance requirements;
10. Cost estimates and bill of quantities.

The Consultant intends to provide the design documentation with specific detailed drawings for each and every section, place and installation methodology where required.

Preliminary list of design compartments are as follows:

- Explanatory note (ME)
- General layout (PG)
- Technological / process (TP)
- Architectural solutions (SA)
- Structural solutions (C, CBA, CM)
- HVAC and Thermo-mechanical solutions (IVC, SM, RT)
- Electrical (EEF, IEI, PT)
- Automation (APT, A…)
- Water supply and sanitation (RAC)
- Low current systems, communication and access control (TS, SPA)
- Fire signalization, fire extinguishing and automatic fire extinguishing, if required (SI, SIn)
- Medical gases supply (AGI)
- External networks for WSS, Natural Gas, Electricity and Heating networks (REAC, AGE, AEES, RT)
- Connection to existing road or access road (DA)
- Cost estimates and Bills of quantities (D)
- Other as may be required

Taking into account own experience in executing similar projects in the region as well as globally, the specific attention will be paid to providing details and specifications of:

- All equipment, furniture, fixtures and fittings within medical rooms, as well as bathroom and toilet areas.
- All required medical equipment (fixed medical equipment, major mobile medical equipment, minor mobile medical equipment, architecturally significant equipment, furniture, and IT equipment) in line with the latest technology and medical procedures, including names, quantities, main characteristics, room designation/function and estimated cost.
- Façade insulation material, energy efficient closing elements (windows, doors, glazing), with specific attention to details of installation and avoidance of thermal bridges.
- Roof insulation and waterproofing, considering avoidance of thermal bridges on parapets and other roof details.
- Installation of photovoltaic plant
- Lighting protection equipment.

The documents will comply with the national and international regulations. The main standards and codes to be considered are listed in the Annex to this methodology.

Fire safety concept

Development of the fire safety concept will be developed in several phases:

I. *Understanding Hospital Environment and Operations:*
   - Conduct a comprehensive analysis of the hospital's layout, infrastructure, and operations.
   - Identify critical areas such as patient wards, operating rooms, intensive care units, emergency departments, and medical storage facilities.
   - Understand the flow of patients, staff, and visitors within the hospital premises.

II. *Regulatory Compliance Assessment:*
   - Review relevant building codes, fire safety design regulations (NCM E.03.02-2014, NCM E.03.02-2014, NCM E03.05-2004), and healthcare facility guidelines specific to hospitals.
   - Ensure compliance with national and local fire safety regulations, including IBC, and European standards.
   - Identify specific requirements related to fire protection systems, emergency exits, evacuation routes, fire-rated construction, and fire department access.

III. *Risk Assessment and Hazard Identification:*

- Conduct a thorough risk assessment to identify potential fire hazards and vulnerabilities within the hospital environment.
- Evaluate risks associated with patient care equipment, medical gases, flammable materials, electrical systems, HVAC systems, and kitchen facilities.
- Consider the presence of high-risk populations such as patients with limited mobility, infants, elderly individuals, and patients with medical conditions affecting evacuation.

IV. *Fire Protection System Design:*

- Design appropriate layouts of rooms using appropriate materials, as well as propose appropriate fire protection systems tailored to the hospital's needs.
- Include fire detection and alarm systems, foreseen fire separation walls and provide appropriate zoning, automatic sprinkler systems where necessary, fire suppression systems, smoke control systems, and fire extinguishing equipment.
- Ensure redundancy and reliability of fire protection systems to minimize the risk of system failure during emergencies.

V. *Compartmentation and Passive Fire Protection:*

- Design the hospital layout to incorporate compartmentation and passive fire protection measures.
- Implement fire-rated barriers, walls, floors, and doors to contain fire and smoke spread. Barriers will be provided also at the wall and floor crossings of designed systems (channels, piping etc.)
- Ensure proper sealing of penetrations to maintain compartment integrity.

VI. *Means of Emergency Exit and Evacuation Planning:*

- Design clear and accessible means of emergency exit for patients, staff, and visitors in accordance with building codes and regulations.
- Plan multiple evacuation routes with adequate signage, lighting, and directional indicators.
- Consider the use of fire-rated stairwells, ramps, and horizontal exits for safe evacuation.

b) Resources (human and material) and their corresponding activities

For an adequate performance of the service covered by this tender, it is essential to rely on Architecture and Engineering companies capable of assisting the Institution in the various choices to be undertaken, providing all the necessary experience in all design disciplines and therefore guaranteeing continuous support to the Institution. It is therefore essential to rely on companies such as **Manens S.p.a** which for over 50 years has allowed organizations to conceive, plan, design, build and inaugurate important healthcare facilities throughout Italy and abroad, and **Sigma Engineering** a local design company with high knowledge of local procedures and regulations and extensive experience in implementaiton of infrastructure projects financed by diverse IFIs.

Manens S.p.a is an architecture and engineering company specialized in the sectors of architectural design, sustainability, energy and advanced building systems. The methodological approach considers **integrated design between architecture and systems** as the essential premise for the creation of highly innovative complexes, where each construction element actively participates in the final performance, giving substance to the concept of the **"architecture-systems-environment"** system aimed at Sustainability. Manens is today among the **top 10 engineering and architecture companies in Italy** with around 450 collaborators distributed between the Italian operational offices in Padua, Verona and Bari and the branches in Saudi Arabia, Serbia and Romania. Manens is able to offer the Client all services related to architecture, structural and plant engineering at all levels of design, management and works supervision, acting as the sole interlocutor, from the first phases of design up to testing and the delivery of the work.

Manens' interest covers all construction sectors, with particular attention to healthcare construction, where the company is the protagonist in many of the major interventions carried out or underway in Italy in recent years. Since 2013 the company has been permanently present in Saudi Arabia following the acquisition of a Project and Construction Management contract for the construction of two medical cities for the Ministry of the Interior in Riyadh and Jeddah (Security Forces Medical Cities Project in Riyadh and Jeddah) . The Riyadh branch, which currently has around 150 employees.

Abroad, Manens is developing large health projects in Kazakhstan for the construction of the new National Scientific Center for Infectious Diseases in Almaty, the National Coordination Center for Emergency Medicine and the new Oncological Center in Nur-Sultan, the latter in advanced construction phase.

Among the latest foreign acquisitions in terms of relevance, the new **Iasi Regional Emergency Hospital (REH) in Romania** should be highlighted, a 150 thousand m2 structure with 1200 beds for an investment of over 570 million euros, in which Manens developed all the phases from the concept to the design build. REH Iași is a "green hospital", the main features of this project being **nZEB building** (building with near-zero emissions) aimed at energy sustainability based on a 30% increase in energy from renewable sources, a photovoltaic park on a surface large, geothermal heat pump, lighting efficiency, heat recovery chiller.The Ministry of Romania in very satisfied about the achieved goals.

In Italy, however, the latest acquisitions in the healthcare sector concern the Works Management of the New Emergency Center of the Cittadella Hospital (PD) and the Works Management of the new San Giovanni di Dio and Ruggi d'Aragona hospital complex in Salerno with a works cost of approximately 345 million euros. In the planning field, however, the latest acquisitions concern the following projects: the New Battipaglia Hospital (SA) the new Nord Barese Hospital in Bisceglie (BA), the seismic and fire prevention adaptation of the San Dona and Portogruaro (VE) hospitals, the restructuring and regulatory adaptation of the entire hospital area of the historic San Giovanni e Paolo hospital in Venice. In addition to the aforementioned new acquisitions in the hospital sector, the following projects can be mentioned: the new Hospital of Este – Monselice (PD), the new Hospital of Bergamo, Alba Brà (TO), the new Hospital of Garbagnate (MI), the new Hospital Galliera in Genoa, the new hospital in Mestre Venice, the new hospital in Vibo Valentia, the renovation and expansion of the Borgo Roma hospital in Verona, the renovation and expansion of the hospitals of Cittadella and Camposampiero (PD), the expansion of the Polyclinic of Bari – Asclepios, the new DEU of Siena, the new health district of Favero Veneto, the new hospital of Novi Sad in Serbia, the new hospital of Nis and Kragujevacin in Serbia, the new Pordenone Hospital, the new Treviso Hospital, the new Vibo Valentia Hospital, the new Hospital Monopoli Fasano (Bari SUD), the new hospital in Cosenza, the new hospital in Narni, the new maternal and child hospital in Modena, the new hospital in Fermo, the expansion of the Morelli hospital in Reggio Calabria, the new hospital in Rieti, the new Healthcare Citadel of Treviso, the new biomedical research laboratories of Bellinzona in Switzerland.

Sigma Engineering (**SE**) has its headquarters in Moldova and having secured several years of the experience in region, brings strong knowledge of conditions and solutions best suited to Moldova. SE specializes in providing services for the Public Infrastructure Projects, as well as for Private Sector Projects.

The expertise of Sigma core team with Public Infrastructure Projects is covering more than 10 countries. Given that such Projects have Contracts with specific requirements towards the Construction and the Consulting Companies, our main goal is to provide professional engineering and consulting services in accordance with the Contracts provisions, as well as to direct and educate the local partner firms in following the Contracts requirements for the job implementation procedures and the elaboration of documentation.

Our core team, which includes experts from Italy, Moldova and Romania has a great experience in Consulting and Managing International Contracts, such as FIDIC Contracts and World Bank Contracts. SE have expertise in such Project as: Urban Planning, Residential and Industrial Buildings & Structures, Hydro-technical and Water Management Project and Roads Infrastructure Projects. SE employ the latest technology and the most advanced software solutions to optimize the work procedures and to facilitate the sharing of information between the involved parties.

We provide all of our services in three languages that is English, Romanian and Russian. Communication is also available in Italian and French. We are constantly updating the work methodologies to integrate state of the art techniques and software solutions which includes building information modelling and database-oriented project management solution to enhance productivity, improve collaboration and limit the number of potential requests for information. We make professional reports that include very accurate information, clean design, meaningful content and suitable style enhancements to deliver regular, comprehensive updates to all the stakeholders. We guarantee full transparency, comply with on-demand audits and have established an advanced management information system.

SE provided the technical expertise, reconstruction sketch and Detailed Design for re-planning and roof reconstruction of the Republican Stomatology Clinic Building located on Vlaicu Parcalab street, Chisinau. The services rendered here included reviewing the available archive documents and detailed design, performing building survey and technical assessment, elaboration of the 3D model of the rehabilitated architectural heritage building, performing calculations considering actual seismic requirements, elaboration of the 3D model of the rehabilitated architectural heritage building among others. Sigma also developed the Feasibility Study for renovation of the medical building for premature babies, part of the Public Medical Institution Mother and Child Institute. The activities comprised of survey of current situation and justification of the investment, preliminary technical assessment of the existing building, analysis of scenarios and determination of optimum, elaboration of investment description, cost benefit analysis and risk evaluation, as well as the provision of additional medical equipment.

It is worth mentioning that Sigma Engineering is currently developing the Detailed Design for Improving the Energy Efficiency of several medical institutions from Chisinau municipality with the total surface of more than 40 thousand m^2. Among them are the Republican Diagnostic Centre, Phtysyopulmunology Institute, Republican Microbiology Laboratory, Cardiology Institute and Cardiology Dispensary, with an estimated investment of over 15 million euro.

In addition, SE has been responsible for detailed design of the logistics complex in frame of the International Giurgiulesti Port wherein the services rendered development of all design compartments (architectural, structural, HVAC, WSS, electrical, low current systems and all external utility networks, including the WWTP), supervision of construction works for improvement of energy efficiency of Holercani Lyceuem (Holrecani village), Mihai Eminescu Lyceum (Ungheni town) and Ion Vatamanu Lyceum (Straseni town) buildings, design of the main transmission pipe (50 km) from Chisinau to Straseni and Calarasi towns in frame of the Water Supply and Sanitation in Moldova Center project, environmental impact assessment for the Chisinau Waste Water Treatment Plant rehabilitation, adaptation of the detailed design for the rehabilitation of the Chisinau Waste Water Treatment Plant (water supply, sewer, heating and gas installations and networks), detailed design of Chisinau water supply networks.

Thanks to the experiences previously described, the Joint Venture will be able to tackle the project in the most appropriate way.
Below is an organizational chart conceived by inserting the most brilliant and qualified technical figures present within the various companies that make up the working group, in order to offer the administration a staff of the highest technical level, highly qualified in all disciplines, all highly specialized in healthcare design with several years of experience.

The project group has an operational capacity **of over 300 workstations**, all rigorously equipped with constantly updated operating systems, software and hardware. All the software used is based on interoperable platforms using non-proprietary open formats, capable of reading, writing and managing, in addition to the proprietary format, also open format files.

The entire design of the new Balti hospital will be developed through the use of the most modern software technologies applied to architectural design and engineering**, developing the entire design process in BIM with the use of Autodesk Revit software.**

For the development of the various design disciplines, specialist software will also be used, which can be **interfaced directly with Revit**. For the structural part, **Trimble Tekla Structures** interfaced with **SAP 2.000** (structure calculation) will be used; the structural model will then be imported into the architectural model through the "Import from **Tekla Structures**" application developed by **Tekla for Revit**. For the plant engineering part, **Autodesk Revit MEP** will be used with the "**MagiCAD for Revit**" plug-in and highly specialized software such as: Climate analyzes - Meteonorm (climate data), Grasshopper (visualization); Energy decarbonization - ENERGYPLUS (calculation), IES-VE (integrated environment), DesignBuilder (interface); Thermal comfort - Ansys Fluent, OpenFOAM; Daylighting - RADIANCE (calculation), Diva4Rhino; Environmental acoustics - SOUNDPLAN; Passive acoustic requirements - BASTIAN, INSUL, ECHO; Acoustic comfort - RAMSETE; Lighting efficiency - DIALUX, RELUX, RADIANCE; Fire prevention engineering - FDS, EVAC. Coordination between the various disciplines will be carried out, throughout the entire project development, automatically through the Autodesk Navisworks Manage SW.

Coordination between the various disciplines will be carried out, throughout the entire project development, automatically through the Autodesk Navisworks Manage SW (or alternatively with Solibri). These SW allow you to carry out "clash detection", exporting the results in BCF format (BIM Collaboration Format); the reports in BCF format will be readable via plug-ins directly from the various BIM SWs, for the exchange and visualization of issues, proposals and change requests between the designers of the various disciplines. The information from the BIM models will subsequently be imported in IFC formats onto the STR Vision work management software, for the development of programming (4D time level) and computation (5D cost level). In any case, the procedures, formats and development rules for BIM design will be defined before the start of the activities with the drafting of the BEP (BIM Execution Plan); the subsequent rigorous application and management of the procedures contained therein, which are fundamental to guarantee the correctness and possibility of managing the computerized model of the project, will be the responsibility of the BIM Manager. The Grouping proposes a data sharing environment (ACDat) managed by the BIM Manager that is accessible, traceable, transparent (in reference to the UNI 11337-4 standard), through the Autodesk BIM360 solution, which will incorporate models, documents and documents, allowing a great profit in terms of streamlining the BIM workflow: this environment must be available to the entire design group from the definitive to the executive phase.

During the various design phases, the **search for interferences (clash detection)**, and geometric inconsistencies (model and code checking), between the various categories of BIM elements, will be performed with **Autodesk Navisworks,** daily on the models of the individual disciplines and on a weekly basis on the federated model exported in **IFC format.**

c) Timing, sequence and duration of activities proposed for the execution of the contract

The tenderer proposes the following timeline for each phase:

1. Pre-Design Phase: 2 months
   - Analysis of existing information and Feasibility study: 1 month
   - Needs assessment, site analysis topographical and geotechnical surveys: 2 months
2. Obtaining Permissive documents: 2 months
   - Support in obtaining the Environmental, Sanitary, Fire department and Road Administrator notices: 1 month
   - Support in requesting the Urban Planning Certificate: 0,25 month
   - Issuance of the Urban Planning Certificate: Milestone (30 days after request)
3. Conceptual Design Phase: 2 months
   - Development of initial architectural concept: 2 months
   - Elaboration of the technical theme for the design: 0.5 months
   - Approval of the Architectural concept by the stakeholders: Milestone after 2 months
4. Detailed Design Phase: 6 months
   - Elaboration of design drawings for Architectural and Structural sections: 5 months
   - Preliminary calculations necessary for obtaining of the technical requirements/connection permits from utility owners: 1 month
   - Obtain technical requirements/connection permits: 1 month
   - Elaboration of design drawings for engineering systems, including energy and system integration: 4 months
   - Specifications for the stage Design-Build: 1 month
5. Approval Phase: 2 months
   - Submission and regulatory review: 2 months
     Final adjustments and permit acquisition: 1-2 months
6. Author supervision and Taking Over of construction works: During the period of execution of the construction works
   - Author supervision during construction works: During the period of execution of the construction works
   - Final adjustments and permit acquisition: At the taking over period, after substantial completion of the construction works

Implementation sequence of activities is presented in the attached Work Program.

d) Tools for monitoring and verifying the quality of services

The assigned activity will be subject to **Quality System Procedures**. The JV **Quality Control Manager**, will verify the application of processes and procedures for checking the **quality of the works.**
Below is the **design management process** within the JV in order to guarantee the quality of the work provided by the group.

Order opening. Once the positive outcome of the tender has been received, the Integration Manager and the Project Manager (P.M.), and the Coordinator of Specialist Services, will evaluate the resources necessary for the specific order. The PM will coordinate the quality procedures of the other companies forming part of the project team, standardizing them into a single specific procedure for the job order. The PM, interfacing with the CDE Manager, will set up an ACDat data sharing environment for the management of documents and internal communications and with the SA, relating to the specific order.

Process setup and programming. In conjunction with the opening of the order, the process setting and planning activities for its completion will be carried out. These activities will be completed by the Project Manager with the involvement of the technicians responsible for the various disciplines identified in the organization chart. This will allow each discipline manager to monitor the quality of the work carried out by their sector of expertise. The Project Manager will also draw up the "Quality Plan" and a detailed timetable for the specific job which he will send to the Administration.

Execution of the process. The process will be carried out by the assigned resources according to what is planned in the organizational chart and subsequently acquired by the Project Manager, who will have the responsibility of coordinating and supervising the various activities, as well as verifying, in the ways and times foreseen, the process progress and related design quality. Any problems that may emerge during the design activities will be analyzed and discussed during specific meetings, the minutes of which will be archived in the "Project Notebook" of the Project Manager, and in the "Designer Notebook" of the Designer in charge.

Initial check. In the design start-up phase, the Project Manager will schedule a meeting with the designers responsible for the various disciplines. In this phase the PM will implement the following checks: documentation that still needs to be requested, objectives of the SA and its specific requests, delivery times and methods, including intermediate ones, budget available to the customer, any necessary opinions and/or authorizations, expected quality.

Intermediate check. This control phase will generally be scheduled by the PM at 60% of the design progress and will be carried out by the PM with the designers responsible for the various disciplines. In this phase the following checks will be carried out: established delivery dates and the progress of the order, budget indicated by the customer and the amount (even forecast) resulting from the calculations, any corrections/modifications to be made in the individual graphic and descriptive documents, topics that need to be explored further and missing opinions or authorizations, verification of the quality level with the quality level expected in the planning phase.

Review. The Review will be carried out at pre-established times in the planning of the order, following the verification described above. The representatives of all the sectors of expertise involved in the specific phase participate in the review. The review will be managed by the Project Manager who will involve the various designers responsible for the various disciplines of the design group and, when necessary, the RUP of the University Hospital of Padua. During the Review, the PM will verify: the effective resolution of the technical problems that emerged, relating to the design, any discrepancies between the result of the design and the result expected by the Contracting Authority, the internal spending budgets planned for the order.

Final check. For each main design phase, a final check will be carried out, with the aim of evaluating the completeness of the documents, their adherence to the graphic and formal standards, the compliance with the requirements specified by the contract that generated the contract, the overall quality of the work done. The checks will be conducted by the Project Manager, generally in collaboration with all the various technical figures interested in the project as a whole. In particular, any necessary corrections/modifications will be made to the graphic and descriptive documents,

Changes. Any changes to the project will be controlled, reviewed and verified with the same methods used for the controls, reviews and verifications already described. It will be the responsibility of the Project Manager to evaluate the extent of the changes requested, through a review meeting with the Coordinator of specialist services and all the various Designers responsible for the various disciplines. At this meeting the following will be taken into consideration: the impact of these changes on the project solutions presented, also taking into account the provisions and economic amounts of the contract; compliance with laws and regulations regarding the possibility of introducing variations.

Non-Conformity. Any negative outcome of reviews or checks will constitute a "Non-Conformity" and therefore must be treated as provided for in the "Non-Conformity Management" Procedure.

Validation. In this phase the PM will verify that the final product meets all the wishes of the client as well as that the quality level complies with the quality standards adopted. The validation coincides in time with the final internal verification, conducted by Manens, for each main design phase.

The **quality control** of the project will also take place through automated checks given by the use of **BIM technology** in the design phase. The output quality of the project will therefore also be guaranteed by the application of automated procedures aimed at validating the model through data **coherence verification steps**, previously highlighting real interferences between construction elements (**Clash Detection**) and design inconsistencies **(Model Checking**). This process will allow the errors of the virtual model to be resolved in advance, eliminating subsequent implementation problems attributable to this, with obvious repercussions in terms of design quality.
In order to increase the quality of the design, the following checks will be carried out on the design models on a **weekly basis**:

- **BIM validation,** to check the correct modeling procedures, the presence and location of each component, the absence of interpenetrations or "duplications" which would affect the quantity take-off phase with repercussions on quantities and costs.
- **Clash Detection,** control of interference between the different disciplines. It will be possible to periodically interrogate the model under different aspects and priority levels, which can highlight anomalies or, if of a more advanced nature, allow the detected interferences to be distinguished and classified differently. The use of plug-ins internal to the modeling software will allow the control of preliminary interferences, while specialist software, capable of interoperating with the BIM model, will be adopted for more advanced checks.
- **Code Checking**, to verify the project's compliance with the reference regulations and codes. The same procedure can, if necessary, be applied by the Client for an independent verification of the design.

e) Description of the coordination and reporting system

In order to guarantee effective interaction/integration with the Contracting Authority, JV Manens will activate, starting from the project phase, a **Project Portal**, based on the **Microsoft Sharepoint Services** platform.

The Project Portal will constitute the container for the orderly archiving, sharing and consultation of all project and subsequently construction site documentation. The Portal will be organized with a **tree structure**, differentiating the "**work area**" and the "**archive area**"; The "work area" will allow the exchange of files between different offices, while in the "archive area" the basic data, the reference regulations, the reference price lists, etc. will be progressively archived.
In particular, the Portal, with reference to the design phase, will contain the following data: Order Quality Plan (PQC) with subsequent revisions; BIM Execution Plan (BEP) with subsequent revisions; basic project data; results of investigations and preliminary findings; photographic documentation of the state of fact; reference regulations; reference price lists and any offers from suppliers, obtained during the design phase; coordination and review minutes with the Client; internal check-list for verifying the design of the various phases; official in/out correspondence with the Client; correspondence and authorization procedures with the relevant bodies; certified copy of all the descriptive and graphic documentation constituting the different design levels.

Before starting the design activities, the PM (Coordinator of Specialized Services) will prepare the **Job Quality Plan (PQC)**, which will take the Manens company quality system (UNI EN ISO 9001 certified) as a reference. It effectively represents the manual of management rules for the design process and together with the BEP (BIM Execution Plan) (see previous point) it constitutes the key tool for the integrated and coordinated development of the entire project. The document, which will be subject to periodic reviews, defines in detail the management methods of the following main aspects: project organization chart with responsibilities matrix;
assignment of resources and job description of each member of the work group; communication plan/method between all parties involved: customer/ procedure manager, institutional bodies; timetable of design activities; definitive and executive design plan: defines in detail the list of graphic and descriptive documents to be issued; validation of the various project phases: intermediate verification checklist and final validation checklist before issuing; non-compliance management and corrective actions; coordination and reporting: definition and frequency of coordination meetings and methods of issuing minutes and periodic reports. All project activities will be carried out in close relationship with the RUP and the users, according to the following organizational scheme:

- **Coordination Meetings:** with the procedure manager and users to share functional, distribution, technological aspects, etc;

- **Review Meetings:** with the procedure manager for the progressive validation of the various phases, the identification of any critical issues and the verification of their solution.

Furthermore, **internal meetings** of the project group will be systematically held, managed by the Project Manager (PM), aimed at coordinating the various disciplines and verifying the progress of the project in terms of time and costs and compliance with the performance requirements and functional requests posed by the Client.
Project Progress Reports will be prepared periodically by the PM, at least monthly, summarizing the progress of the activities/issues awaiting resolution, which will be sent to the RUP and all project managers. All the above meetings will be minuted: the minutes will contain the topics discussed and the decisions taken, as well as the list of any documentation received/delivered.

The above **reports**, the **graphic diagrams** and in any case **all the documentation received and developed** will be archived and shared in the **Project Portal**, according to the criteria and rules that will be defined by the Portal Management manager.

The **design phase** represents, in itself, a phase distinct in content and requires an integrated approach, in order to allow control over the entire design process and to be able **to coordinate the activities of different work groups**.

The design of the New Balti Hospital will be developed by the JV in phases, for each of which different activities and specific output products will be envisaged, as well as a well-defined time frame. At the end of each of these phases, a check will be carried out on the results achieved and the compatibility of the activities carried out in the various design sectors. This organization will allow better planning of available resources and **continuous coordination** of the design activity.

Based on **many years of experience** in the field of healthcare planning, this working group operates in **relations with the Public Administrations** in such a way that, from the early planning stages, there is an involvement of all interested parties and a direct relationship and immediately with the competent bodies. The work to be carried out with the bodies responsible for issuing the opinions necessary for the validation of the project will have the aim of preventing any requirements during the examination phase of the project.

The creation, management and coordination of the design activity and checks will take place through the use of electronic methods and tools aimed at developing a virtual model. The approach adopted is that of BIM, understood as a collaborative design method, capable of integrating, in a single virtual model, the information useful in each phase of the design: architectural, structural, plant engineering, energy and management.
The **use of BIM models** will allow project management, simultaneously, by all the professionals forming part of this JV, with a consequent reduction in design times and the elimination of inconsistencies in the various documents requested, as could happen through methods of traditional designs.
Once the first analysis of the context has been carried out, all the findings and investigations listed below must be carried out:

- **Photographic documentation**: complete documentation of the intervention area extended to the adjacent areas and of the elements considered particularly significant;
- **Instrumental survey of the intervention area,** in order to promptly detect the intervention area.
- **Cartographic documentation**: thematic maps reporting data relating to environmental constraints, cadastral maps and extracts from the urban planning regulations;
- **B.O.B. check:** clearance intervention from ordnance to be carried out before the start of the works.
- **Geological and hydraulic investigations**: before starting the design phase, the investigations and soundings of the geological and geotechnical report must be acquired.
- **Acoustic investigations**.
- **Analysis of environmental factors**.
- **Electromagnetic pollution analysis**.

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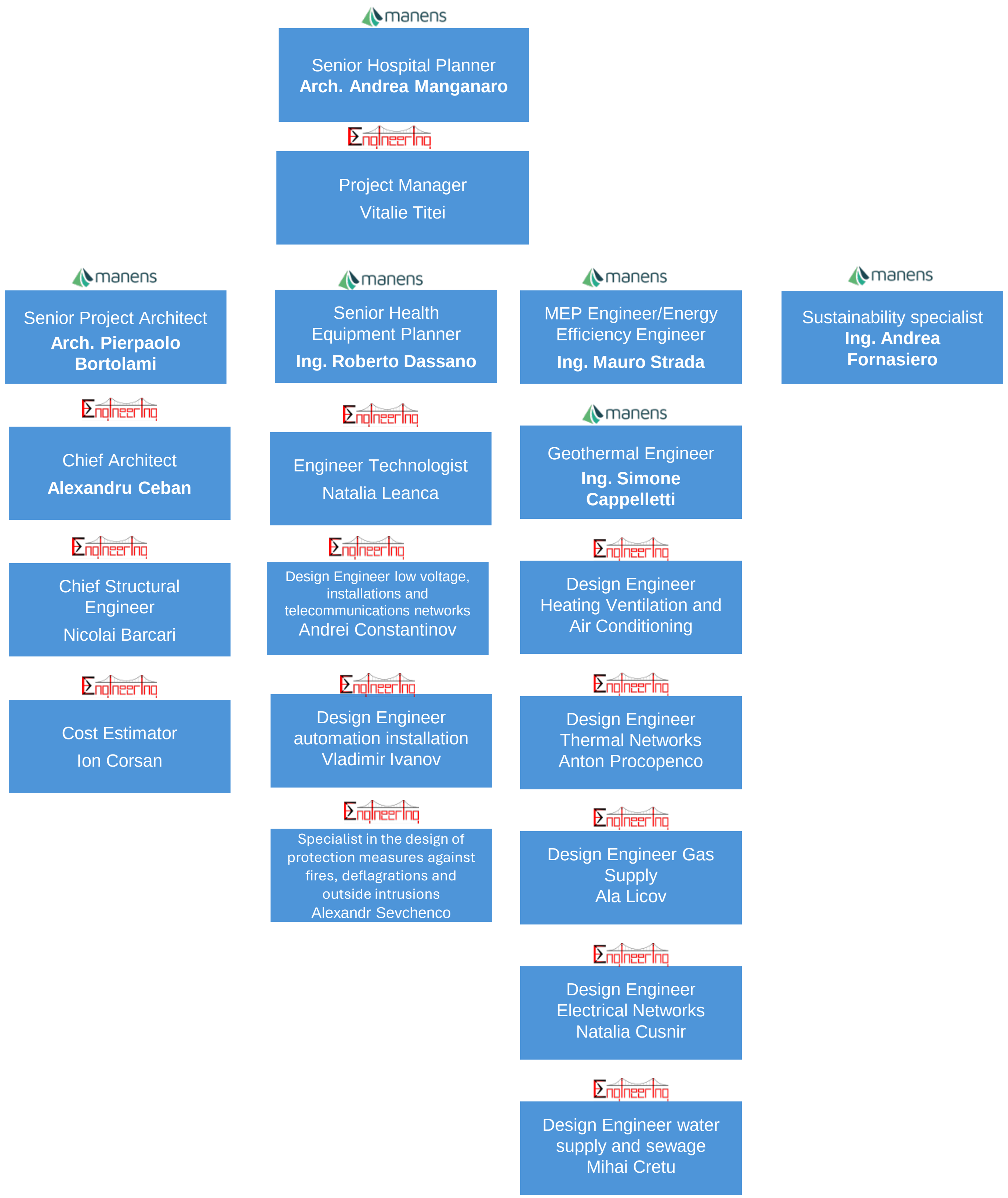


PROGRAM DE LUCRU / WORK PROGRAM

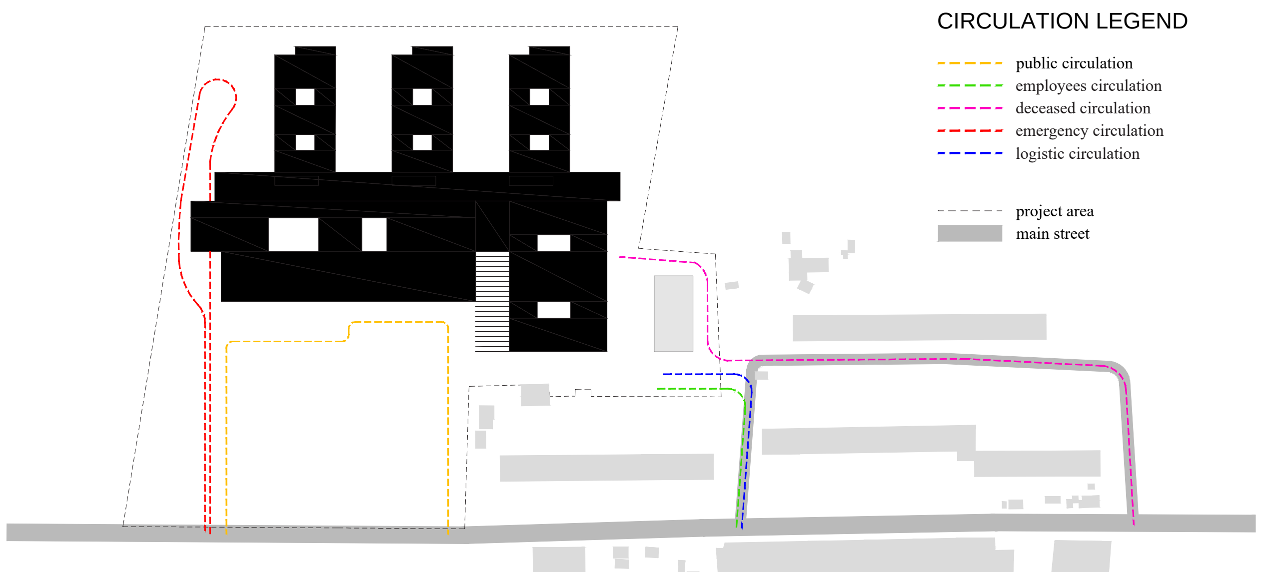
pentru elaborarea documentației tehnice (Faza Proiect), supraveghere de autor și asistență tehnică pentru construcția Spitalului Regional din Bălți

for elaboration of the technical documentation (Design phase), author supervision and designer's technical assistance for the construction of the Balti Regional Hospital

No.	Activitate / Activity	Luni / Months (1 – 12)
I	**Analiză preliminară / Preliminary analysis**	
1	Analiza Studiului de Prefezabilitate, a terenului și componența SR Bălți. Analysis of the Prefeasibility Study, the plot of land and the structure of the Balti Regional Hospital	
2	Analiza legislației și a reglementărilor în vigoare Analysis of legislation and regulations in force	
3	Studiu topogeodezic și geotehnic Topography and geotechnical survey	
4	Examinarea soluțiilor de eficiență energetică (geotermale) Examining energy efficiency solutions (geothermal)	
5	Raport de sinteză Inception/Synthesis Report	
II	**Obținerea documentației permisive / Obtain Permissive documents**	
6	Asigurare suport în obținerea acordului de mediu, aviz sanitar, avizul serviciul pompieri și savatori și prescripții tehnice de la administratorul drumului Support in obtaining the Environmental, Sanitary, Fire department and Road Administrator notices	
7	Suport în obținerea Certificatului de urbanism pentru Proiectare Support in requesting the Urban Planning Certificate	
8	Emiterea Certificatului de Urbanism pentru Proiectare Issuance of the Urban Planning Certificate	30 zile după solicitare
III	**Concept Arhitectural / Architectural concept**	
9	Schița arhitecturală Architectural sketch	
10	Elaborarea temei de proiectare Elaboration of the technical theme for the design	
11	Aprobarea conceptului arhitectural de către părțile interesate Approval of the Architectural concept by the stakeholders	
IV	**Faza Proiect / Design Phase**	
12	Elaborarea compartimentelor Arhitectural și structural Elaboration of design drawings for Architectural and Structural sections	
13	Calcule preliminare pentru obținerea condițiilor tehnice / avizelor de branșare de la furnizorii de utilități Preliminary calculations necessary for obtaining of the technical requirements/connection permits from utility owners	
14	Obținerea condițiilor tehnice/avizelor de branșare Obtain technical requirements/connection permits	
15	Elaborarea documentației de proiect pentru sistemele inginerești Elaboration of design drawings for engineering systems	
16	Caiet de sarcini pentru faza design-build Specifications for the stage Design-Build	
V	**Faza de aprobare / Approval Phase**	
17	Aprobarea/Coordonarea documentației de proiect de către autoritățile relevante Approval of the design drawings by the relevant authorities	
18	Verificarea documentației de proiect șieliberarea Avizului de verificare Verification of the design drawings package and issuance of the Verification notice	
VI	**Supravegherea de autor și recepția lucrarilor de construcție / Author supervision and Taking over of construction works**	
19	Supravegherea de autor în timpul executării lucrărilor de construcție Author supervision during construction works	**ÎN PERIOADA EXECUTĂRII LUCRĂRILOR DE CONSTRUCȚIE** **DURING THE PERIOD OF EXECUTION OF EXECUTION OF THE CONSTRUCTION WORKS**
20	Emiterea avizului proiectantului (punctului de vedere) la recepția la terminarea lucrărilor de construcție și participarea la recepție Issue the designer's notice at the end of works and attend at the taking over	**LA ETAPA RECEPȚIEI, DUPĂ FINALIZAREA SUBSTANȚIALĂ A LUCRĂRILOR DE CONSTRUCȚIE** **AT THE TAKING OVER PERIOD, AFTER SUBSTANTIAL COMPELCTION OF THE CONSTRUCTION WORKS**

Laws and Government Decisions		
1.	**CUC no. 434 of 28.12.2023**	**Urbanism and Construction Code**
2.	Law no. 86 of 29.05.2014	on environmental impact assessment
3.	Law no. 209 of 29.07.2016	on waste
4.	Law 1515 of 16.06.1993	on the protection of the environment
5.	Law no. 523 of 16.07.1999	on the public property of administrative-territorial units
6.	Law no. 436 of 28.12.2006	on local public administration
7.	Law no. 121 of 04.05.2007	on the administration and denationalization of public property
8.	Law no. 1543 of 25.02.1998	on the real estate cadaster
9.	Law no. 488 of 08.07.1999	on expropriation for public utility reasons
10.	GD no. 361 of 25.06.1996	on the quality assurance of the constructions
11.	GD no. 360 of 25.06.1996	on the state control of quality in constructions
12.	**GD no. 663 of 23.07.2010**	**for the approval of the sanitary regulation regarding hygiene conditions for healthcare institutions.**
13.	**GD no. 696 of 11.07.2018**	**for the approval of the sanitary regulation regarding the management of waste resulting from medical activity.**
14.	GD no. 285 of 23.05.1996	on the approval of the Regulations for the reception of constructions and related installations
National Codes and standards		
1.	NCM A.07.02-2012	The procedure for elaboration, endorsement, approval, and the content – framework of the design documentation for construction. Main requirements and provisions
2.	NCM A.07.04:2015	Regulation on project administrator
3.	NCM A.07.06:2016	The composition and content of the "Environmental Protection" section in the design documentation
4.	NCM A.08.01:2016	Construction organization
5.	NCM A.08.02:2014	Safety and health at work in construction
6.	NCM A.09.02-2005	Technical service, repair, and reconstruction of residential, communal, and socio-cultural buildings
7.	NCM A.09.03:2015	Examination of load-bearing construction elements and foundations of buildings and edifices
8.	CP A.09.04:2014	Construction and demolition waste management
9.	NCM B.01.05:2019	Systematization and arrangement of urban and rural localities
10.	NCM B.01.06:2019	Norms regarding the framework composition of the "Environmental protection" compartment within urban plans"
11.	NCM B.02.01-2006	Parking
12.	NCM C.01.06-2014	General security requirements for construction objects their use and accessibility for people with disabilities
13.	NCM C.01.12:2018	Buildings and public constructions
14.	CP C.01.02:2018	General design provisions with ensuring accessibility for people with disabilities
15.	CP C.01.10:2018	A living environment with accessible systematized elements for people with disabilities. Design rules
16.	CP C.01.12:2018	Buildings and rooms with workplaces for people with disabilities. Design rules
17.	CP C.01.13:2018	Urban environment. Accessible design rules for people with disabilities
18.	SP C.01.14 :2017	Social-sanitary containers for equipping construction sites
19.	NCM C.04.02:2017	Natural and artificial lighting
20.	NCM C.04.03:2015	Roofing covers. Design rules
21.	NCM C.04.04:2015	Flooring. Design rules
22.	NCM C.04.05:2016	Insulation and finishing coatings
23.	CP C.04.02-2011	Closing elements made of plasterboard
24.	CP C.04.03-2011	Plasterboard elements with grooving and tonguing
25.	CP C.04.04-2012	Design of safety lighting systems in buildings and constructions
26.	CP C.04.06-2013	Regulation regarding the issuance of technical approval, that certifies the degree of execution of the construction and compliance of construction works with design documentation
27.	CP C.04.07-2014	Hydro isolation of underground parts of buildings and constructions. Design recommendations
28.	CP C.04.08:2015	PVC window and door blocks. Installation work
29.	NCM E.01.02:2019	Regulation regarding the establishment of categories of construction importance
30.	CP E.01.04:2019	Evaluation of the level of anti-seismic protection of existing buildings
31.	NCM E.02.02:2016	Reliability of building elements and foundation lands. Basic principles
32.	NCM E.03.01-2005	Fire protection of buildings and installations. Terminology
33.	NCM E.03.02-2014	Fire protection of buildings and installations
34.	NCM E.03.03:2018	Signaling and fire warning installations
35.	NCM E.03.04-2004	Determination of explosion-fire and fire hazard categories of rooms and buildings
36.	NCM E.03.05-2004	Fire extinguishing and signaling installations. Normative for design
37.	NCM E.03.06:2020	Designing the enterprise for alcoholic beverages production. Fire protection
38.	CP E.03.01:2019	Ensuring fire resistance of constructions
39.	CP E.03.02:2018	Methodology for the elaboration of the design compartment. Measures to ensure fire safety and carry out technical expertise (fire safety audit) of the protected object
40.	NCM E.04.01:2017	Thermal protection of buildings
41.	NCM E.04.02:2014	Protection against noise
42.	NCM E.04.04:2016	Design of anti-corrosion protection of constructions
43.	CP E.04.01-2001	Instructions regarding the execution of hydro isolation and anti-corrosion protection with varnishes and paints of the internal concrete surfaces of drinking and industrial water tanks
44.	CP E 04.02-2013	Technical rules for the execution of external and internal thermal insulation systems of buildings
45.	CP E.04.03-2005	Anticorrosive protection of constructions and installations
46.	CP E 04.04-2005	Execution of insulation, protection and finishing works in constructions
47.	CP E.04.05:2017	Designing thermal protection of buildings
48.	CP E.04.07:2016	Sound insulation design of closing elements for residential and social buildings
49.	NCM F.01.01-2007	Geophysics of hazardous natural processes
50.	NCM F.01.03-2009	Execution rules, quality control and reception of foundations and foundations
51.	CP F.01.01-2007	Design and construction of foundations on piles
52.	CP F.01.02-2008	Design and construction of foundations and foundations for buildings and installations
53.	NCM F.02.02-2006	Calculation, design, and composition of construction elements from reinforced concrete and pre-compressed concrete
54.	NCM F.02.04-2007	Precast concrete elements, reinforced concrete, and pre-compressed concrete. Execution, quality control and reception
55.	CP F.02.03:2019	In-situ evaluation of the compressive strength of concrete in structures and precast elements
56.	NCM F.03.02-2005	Design of buildings with masonry walls
57.	NCM G.01.02:2015	Design and installation of electrical installations in residential and social buildings
58.	NCM G.01.03:2016	Electrotechnical devices
59.	NCM G.03.03:2015	Indoor water supply and sewage systems
60.	NCM G.04.03-1999	The design and execution of underground thermal networks without a channel from pipes pre-insulated with expanded polyurethane and a polyethylene sheath
61.	NCM G.04.08:2018	Thermal insulation of the equipment and pipes
62.	NCM G.04.10:2015	Central heating
63.	CP G.04.11-2013	The methodology for calculating heat losses, the unrecorded volume of hot water, hot water losses in communal domestic hot water supply systems. Part 1. Calculation of losses and unrecorded volume of hot water in communal domestic hot water supply systems
64.	CP G.04.11:2017	The methodology for calculating heat losses, unrecorded hot water consumption, hot water losses in communal domestic hot water supply systems. Part 2. Calculation of heat losses in communal domestic hot water supply systems
65.	CP G.04.13:2016	Design of thermal points Design of thermal points
66.	NCM K.01.01:2015	Terminology in construction. Lifts
67.	NCM L.01.07-2005	Regulation regarding the substantiation of construction investment projects
68.	NCM L.01.08-2012	Regulation on planned preventive repairs to elevators
69.	CP L.01.06-2013	Instructions regarding the preparation of estimates for start-up adjustment works using the resource method
70.	NCM M.01.01:2016	Minimum energy performance requirements for buildings
71.	NCM M.01.02:2016	Methodology for calculating the energy performance of buildings
72.	NCM M.01.03:2016	Energy performance of buildings. Terminology
73.	NCM M.01.04:2016	Methodology for calculating optimal levels from a cost perspective, of minimum energy performance requirements for buildings and their elements
74.	SNiP II-7-81*	Construction in seismic areas
75.	SNiP 2.01.01-82	Building climatology and geophysics
76.	SNiP 3.05.01-85	Internal sanitary systems
77.	SNiP 2.04.05-91	Heating, ventilation, and air conditioning
78.	**SN 515-79**	**Instructions for the design of buildings and structures, adapted for medical institutions**
79.	SN 531-80	Instructions on the composition, procedure for the development and approval of heat supply schemes for settlements with a total heat load of up to 116 MW (100 Gcal / h)
80.	SNiP 3.05.07-85	Automation systems
81.	SNiP 2.02.01-83*	Foundations of buildings and structures
82.	SNiP 2.02.03-85	Pile foundations
83.	SNiP 2.02.05-87	Machine foundations with dynamic loads
84.	NCM A.07.03-2002	Regulation on monitoring of construction objectives by the design author

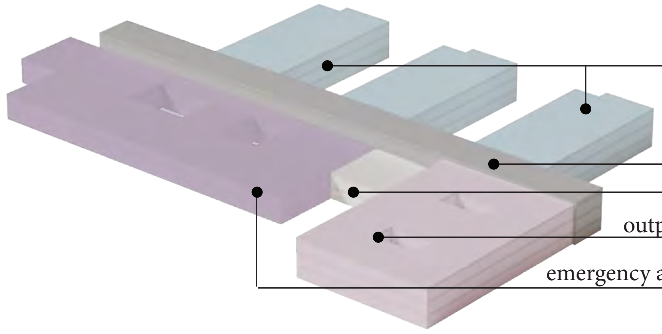
View of the main entrance public square with the large cantilevered roof



external circulation scheme

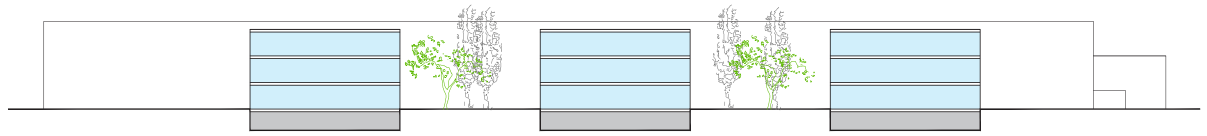
general plan

The building takes the form of an organism that adapts to the surrounding area without losing its functionality and rationality. A large central spine divides the recovery area from the plate. The building with only three floors above ground integrates with the surrounding landscape and relates to the human scale.
The wards are arranged in such a way as to be protected from noise pollution coming from the street, while the outpatient services and more public areas overlook the street and the main entrance. The car parks are divided between staff and visitors, thus keeping flows and access separate to avoid mixing.

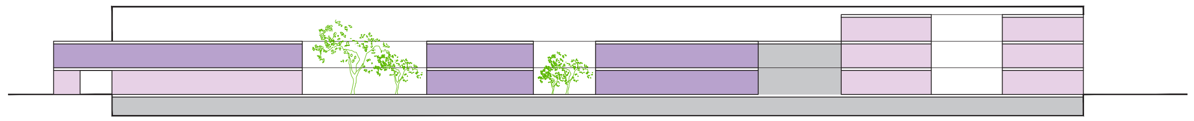


aereal view of the hospital complex

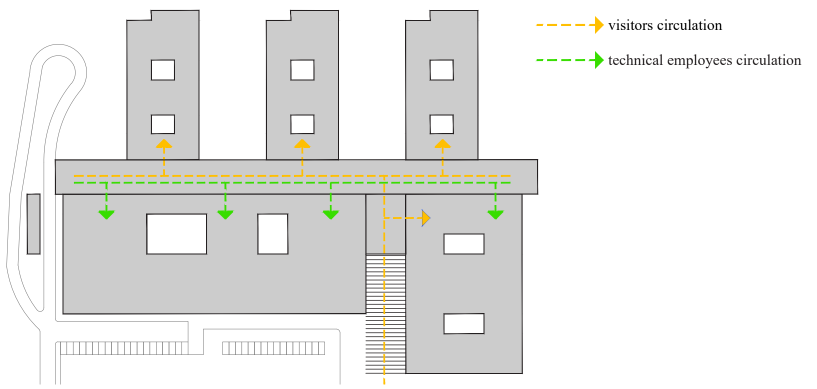
view of the hall from the outpatient area



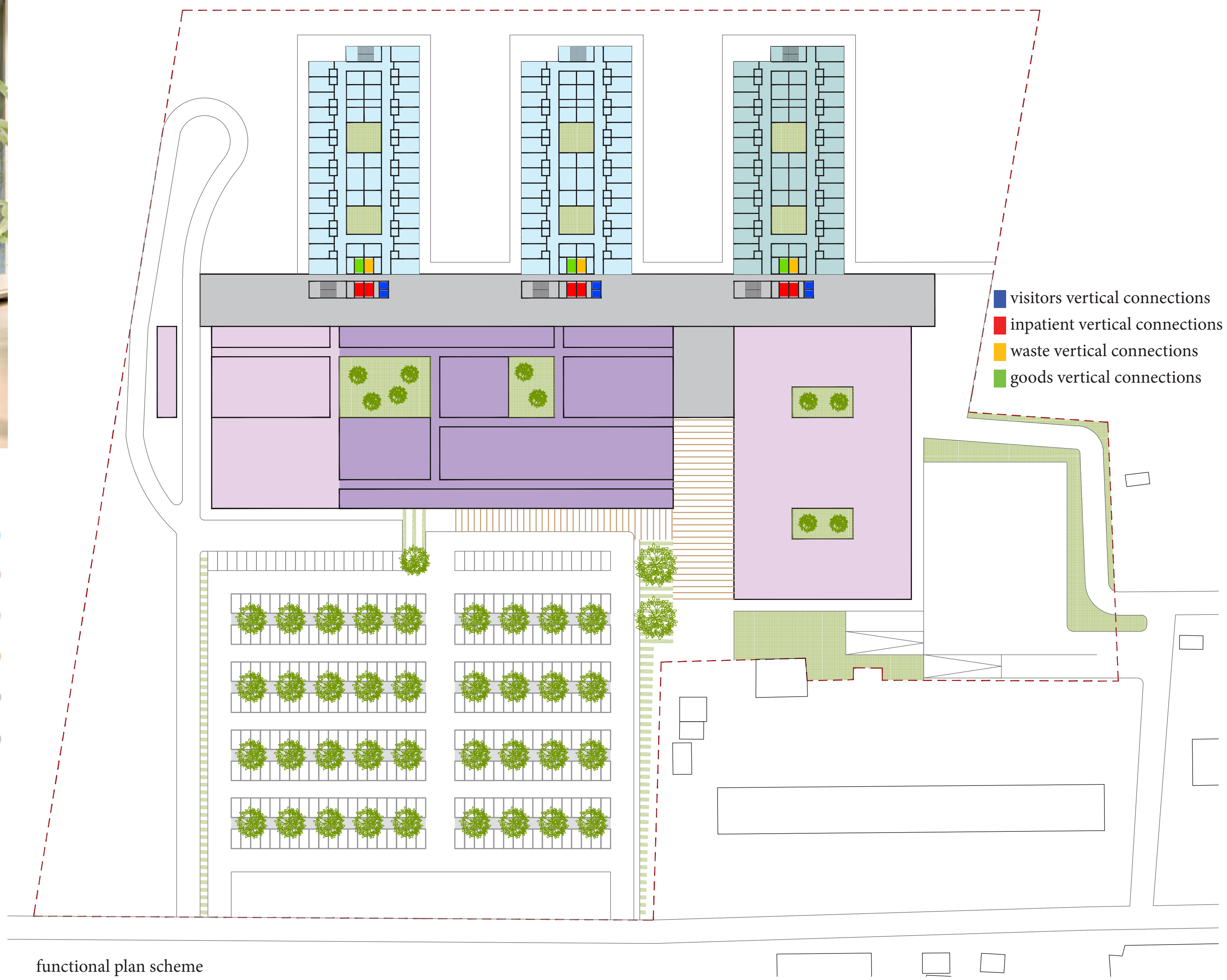
Section BB



Section AA



INPATIENTS UNITS	13302 mq	
AMBULATORY CARE SERVICES	9376 mq	
DIAGNOSTIC AND THERAPEUTIC SERVICES	10400 mq	
CLINIC SUPPORT SERVICES	885 mq	
HOSPITAL SUPPORT SERVICES	3726 mq	
ADMINISTRATIVE SERVICES	1003 mq	
TOTAL HOSPITAL	38692 mq	



functional plan scheme

INTERNAL CIRCULATION

The main access of the building is characterized by a large shelter that welcomes visitors from the outside. A large hall distributes the flow in different directions, the first towrd a large corridor, which allows access to visits for patients and to the waiting rooms; the second towards the outpatient clinic area; the third towards the outpatient area and the more public functions.
The main goal of this project is to minimize travel times and simplify routes.
The lift cores are arranged along a main axis but are diversified according to their functions.
Direct links are guaranteed between the main services, avoiding re-entry into general corridors.

view of the public main entrance

In order to ensure an optimal experience for patients, staff and healthcare professionals, the following key points are highlighted:

Natural lighting: The fundamental role played by natural lighting in promoting the well-being of patients and staff is recognised. The spaces were designed to maximize access to natural light, thus creating a welcoming and soothing environment.

Healthy materials: Particular attention is paid to the use of internal materials that are safe for health. Paints with low emissions of volatile organic compounds (VOC), floors and walls that are easy to clean and resistant to pathogens, and the use of materials free of harmful or allergenic substances have been considered to guarantee a healthy environment.

Ergonomics and comfort of the furnishings: Attention was paid to the ergonomics and comfort of the furnishings used within the hospital, in order to reduce fatigue and improve posture. Ergonomic armchairs, beds, chairs and desks contribute to the comfort of patients and staff.

Welcoming and relaxing design: Importance has been given to the design of the interior spaces in order to create a welcoming and relaxing atmosphere. The use of soothing colors, artwork, plants and decorative elements help reduce stress and promote a feeling of overall well-being.

Privacy and quiet spaces: Attention has been paid to creating private and quiet spaces within the hospital, offering a place of rest, reflection and privacy for patients and their families.

Welcoming and comfort: Great emphasis is placed on a welcoming and reassuring atmosphere upon the arrival of patients in the hospital. By dedicating attention to the furnishings, colors and organization of the reception spaces, the aim is to create an environment that promotes tranquility and puts patients at ease from the first moment.

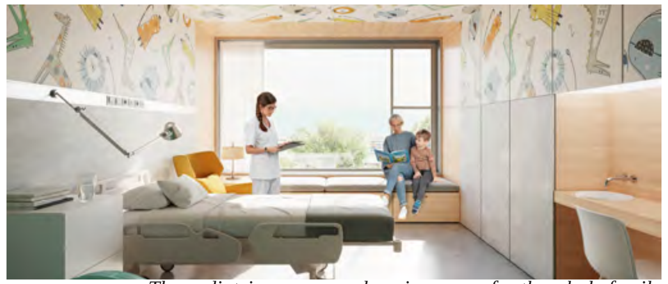
Socialization spaces: The importance of spaces dedicated to socialization and interaction between patients, family members and healthcare workers is recognised. Welcoming waiting rooms, common areas and manicured gardens are designed to foster human relationships, encouraging a sense of community and mutual support within the hospital.

Biophilia: The integration of green spaces, such as internal gardens or terraces, allows patients and staff to enjoy the benefits of nature within the hospital. The presence of natural elements promotes relaxation, reduces stress and improves the psychophysical well-being of those who attend the hospital.

Clear and intuitive signage: Adequate and well-positioned signage within the hospital is of fundamental importance to guide patients and staff

Air quality: Particular importance is attached to clean and healthy air inside the hospital. We have invested in a high-quality ventilation system, including the use of HEPA filters and adopting regular maintenance practices to reduce the presence of allergens, dust and pathogens in the air.

Noise reduction: Targeted measures have been taken to minimize noise within the hospital. The use of sound-absorbing materials and the implementation of acoustic shielding help to create a quiet environment. It is recognized that a quiet environment promotes the comfort and well-being of patients and staff.

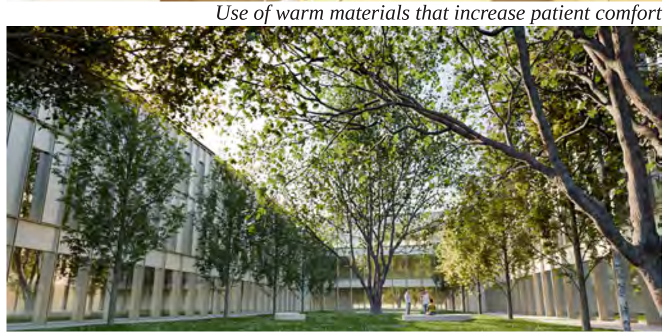

The pediatric room, a welcoming space for the whole family


The pediatric hospital corridor, with interactive elements


The surgery room combines big data and intelligent lighting


The MRI decorated with elements of humanization


Use of warm materials that increase patient comfort


The building in direct contact with nature


Aerial view of the main public entrance


The courtyards illuminate the internal spaces and bring nature into the building

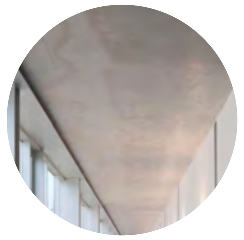
Used materials

Interior materials

Ceilings

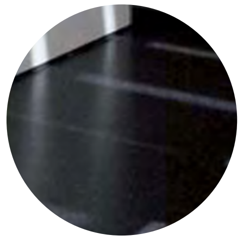
Acoustic ceilings
Improvement of the acoustic performance of the rooms
Continuous false ceilings or elements in plasterboard or other material, with surfaces treated in such a way as to guarantee a high level of sound absorption.

Adjustable false ceilings
Maintainability, flexibility
Adjustable false ceilings in panels or metal slats with different finishes depending on the requirements to be met.



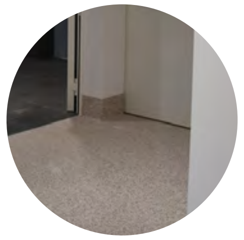
Exposed ceiling
*Recognizability of the public space, continuity with the outside*Continuous false ceilings or elements in plasterboard or other material, with surfaces treated in such a way as to guarantee a high level of sound absorption.

Floors



Stoneware flooring
High wear resistance
Fine grain artificial stone floor mixed with mortar and then polished; 40x40 cm slabs installed in staggered sections.

Continuous linoleum flooring
Cleanability, heat
Natural linoleum flooring for hospital environments and low-intensity treatments.



Resilient plastic flooring
Asepticity
PVC flooring for high-care environments. Coving on the walls, hot welded joints to guarantee the monolithic nature of the element.

Claddings

Wooden cladding
Warmth, domesticity
Wooden plank cladding for public environments such as entrance halls, waiting rooms, internal public paths.

PVC covering
Asepticity
Continuous sanitizable covering to ensure material continuity with the floor in cases where perfect asepticity and waterproofness is necessary.

Ceramic coating
Cleanability, waterproof
Covering suitable for all humid environments such as changing rooms, walls above sinks, bathrooms and showers.

Exterior materials

Stone paving with insertion of greenery
High wear resistance, permeability
Large stone floor suitable for outdoor spaces that allows rainwater to permeate.

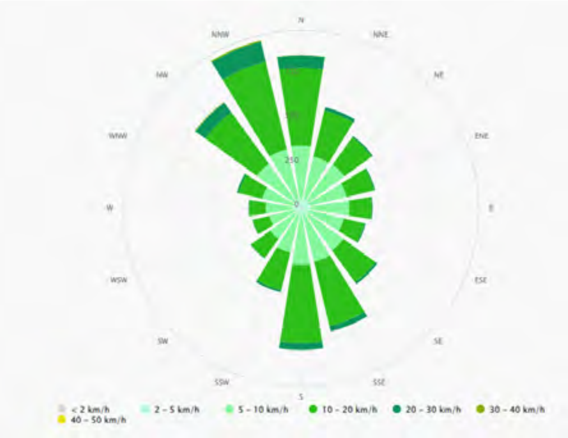
Photovoting shelter
Sustainability, shading
Large access shelter with transparent photovoltaic elements.

Natural wood ceiling
Sustainability, warmth, nature
Fireproof wooden claddings and shading systems that connect the building with the surrounding nature.

Roof Garden
Sustainability, therapeutic
Green roof for use by hospital users with paths and activities for therapeutic purposes.

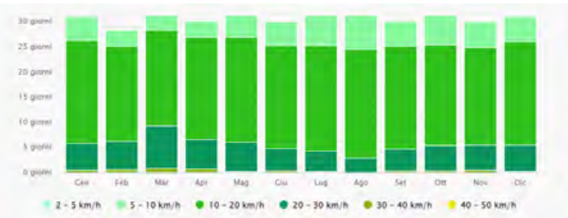
Facade in prefabricated elements
Modularity, construction speed
Elements that guarantee the modularity of the facades and interiors and which guarantee greater construction ease.

Climatical and metereological analysis



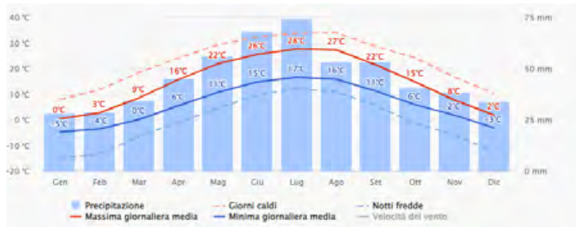
Windrose

The wind rose for Bălți shows how many hours per year the wind blows from the indicated direction. Example SW: Wind blows from South-West (SW) to North-East (NE). Cape Horn, the southernmost point of South America, has a strong westerly wind, which makes east-west crossings very difficult especially for sailing boats.



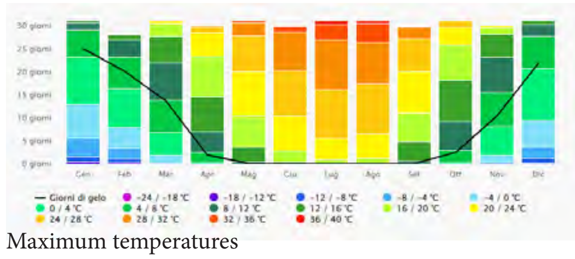
Wind speed

The diagram for Bălți shows the days when the wind reached a certain speed during a month. An interesting example is represented by the Tibetan Plateau, where the monsoon generates strong and constant winds from December to April and calm winds from June to October.



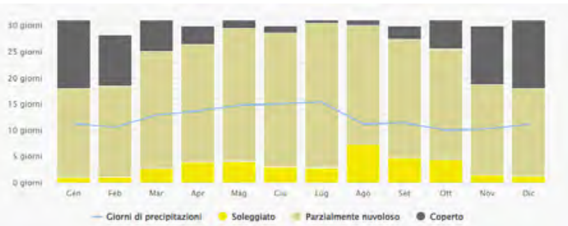
Average temperatures and rainfall

The "average daily high" (solid red line) shows the maximum temperature of a typical day for each month in Bălți. Likewise, the "average daily minimum" (solid blue line) indicates the average minimum temperature. Warm days and cold nights (dashed red and blue lines) show the average of the warmest day and coldest night of each month over the past 30 years. Wind speeds are not displayed by default, but can be toggled at the bottom of the graph.



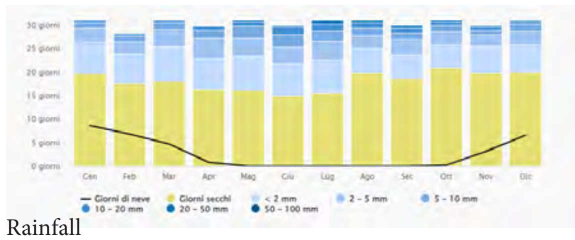
Maximum temperatures

The maximum temperature diagram for Bălți shows the number of days per month that reach certain temperatures. Dubai, one of the hottest cities on earth, has very few days below 40°C in July. It is also possible to see the cold winters in Moscow with a couple of days not even reaching -10°C as a daily maximum.



Cloudy, sunny and rainy days

The graph shows the monthly number of sunny, variable, overcast and precipitation days. Days with less than 20% cloud cover are considered sunny, with cloud cover between 20-80% as variable and with more than 80% as overcast.



Rainfall

The precipitation diagram for Bălți shows on how many days per month, a certain amount of precipitation is reached. In tropical and monsoon climates, precipitation may be underestimated.

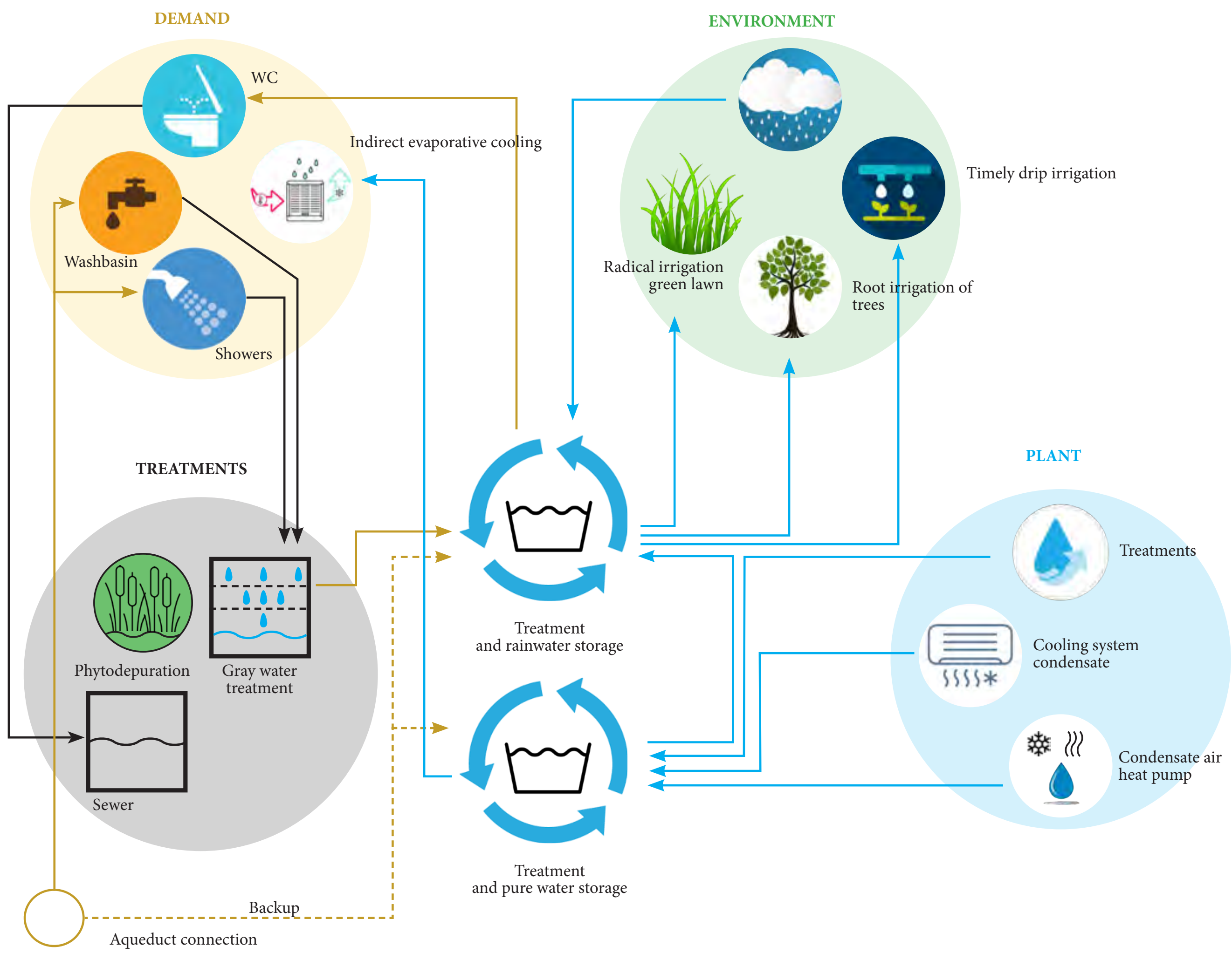
WATER CYCLE MANAGEMENT.

The water management strategy aims to minimize withdrawal from the public aqueduct by exploiting and reusing the water available throughout its cycle which goes from the state of drinkability to disposal, diversifying its uses based on its degree of quality. In addition to a lamination tank for the management of rainwater and careful planning of the greenery to increase the permeability of the site, the collection of rainwater in a tank and its reuse for irrigation and non-potable uses is envisaged . Gray waste water can also be collected and treated for reuse in irrigation and for non-potable uses, such as feeding toilet waste. Most green areas are designed not to require irrigation except for the initial period of establishment of tree species.

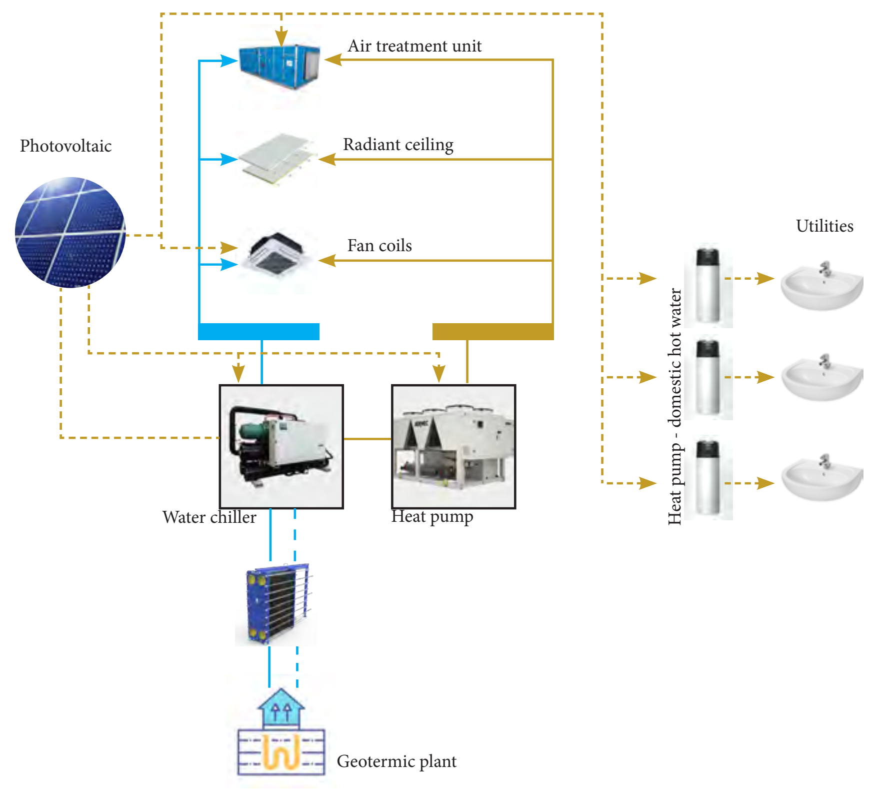
ENERGY SUPPLY.

The air conditioning of the buildings will take place starting from the generation of heat transfer fluids using heat pumps (geothermal and air) within the Energy Center, which will be connected to the individual buildings via dedicated substations. The roofs of the buildings will be dedicated to the production of energy from solar photovoltaic, with large exceeding of legislative requirements.

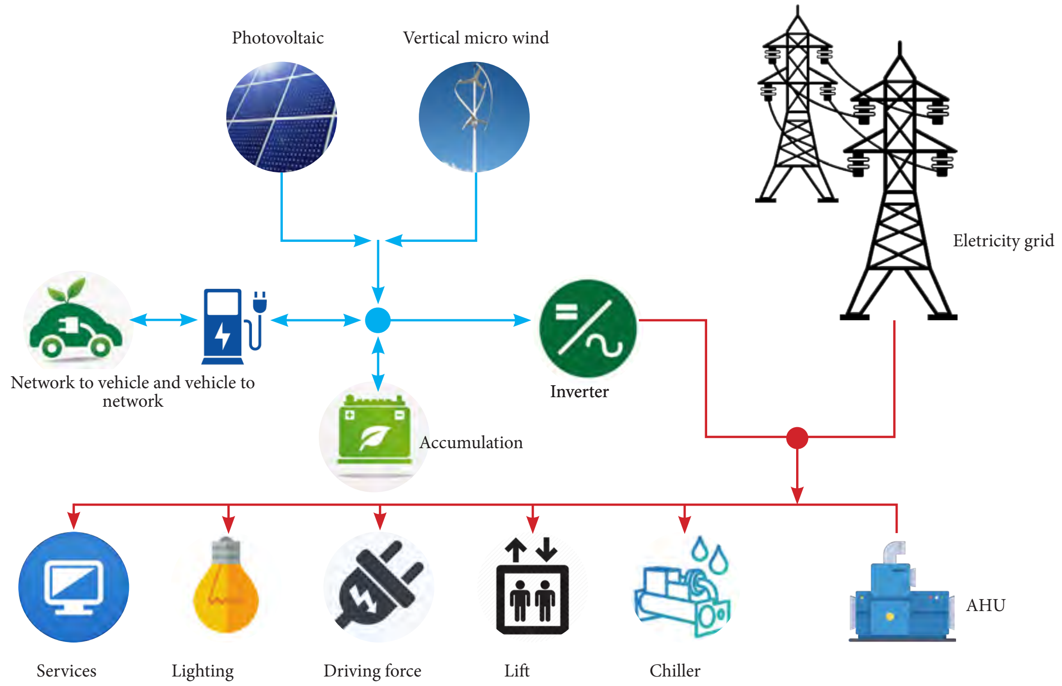
Use and re-use of water

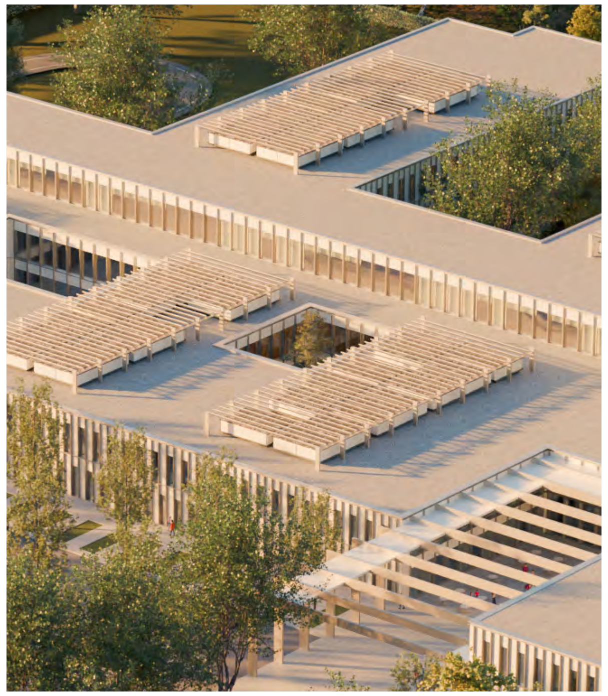


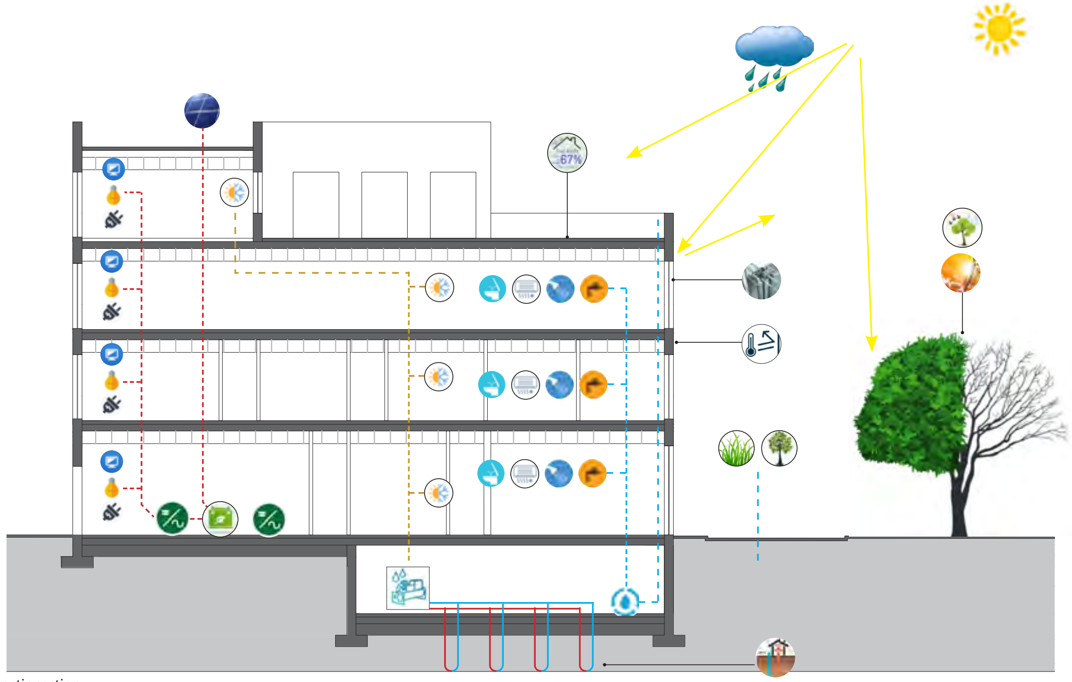
Energetic concept



Electric plant scheme





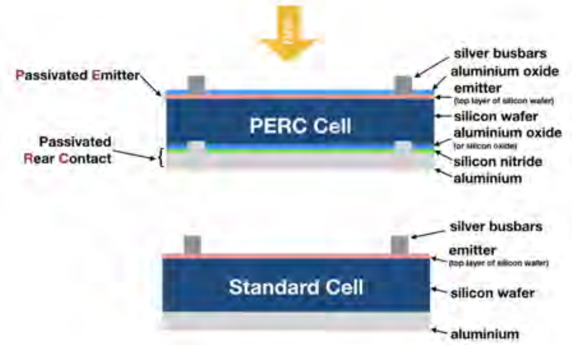


Typical energetic section

Energy efficiency and autonomy

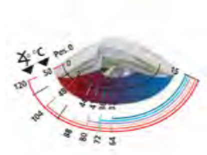
PHOTOVOLTAIC WITH PERC CELL TECHNOLOGY

PERC technology (acronym for Passivated Emitter and Rear Cell) is used for photovoltaic cells in order to increase their performance and efficiency. The constant research towards more innovative photovoltaic modules has allowed, in recent years, to obtain notable improvements regarding the performance of the systems. Today, the main players in the photovoltaic market are investing more and more in modules made with PERC technology, to increase the lifespan and performance of the cells and benefit from advantages not only from a reliability point of view but also from an economic point of view: modules with PERC technology are made with monocrystalline silicon cells and, above all, are characterized by a passivating back layer, capable of reflecting and recovering the light not absorbed by the wafer. In this way it is possible to optimize the capture of electrons, exploiting as many as possible for each cell and transforming a greater quantity of solar energy into electricity. The allocated availability of 1240 m² intended for photovoltaic coverage guarantees a peak power equal to approximately 193 kW equivalent to an annual production of 224,463 kWh/year and coverage of overall consumption (including summer and winter air conditioning, auxiliaries, lighting and driving force of process) by approximately 50%.



WATER SAVING EFFICIENCY.

Water savings will be achieved by adopting all possible measures: the dispensers will be equipped with an aerator and the handles will have a brake which will allow the delivery of the maximum flow rate only if forced. The public taps will be timed with simple mechanical systems, free from delicate maintenance, and the levers of the single-lever mixers will deliver hot water only in the left sector. The toilets will be characterized by low water consumption and the absence of rims, an element that will greatly improve the hygiene of the bathrooms.



Progressive single lever mixer

Lamellar flow aerator

Brake blocking the flow of water at mid-flow

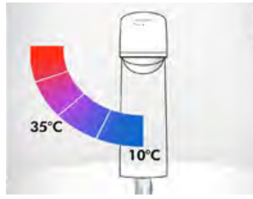
Timed tapware for external users

Operation of the toilet with rim

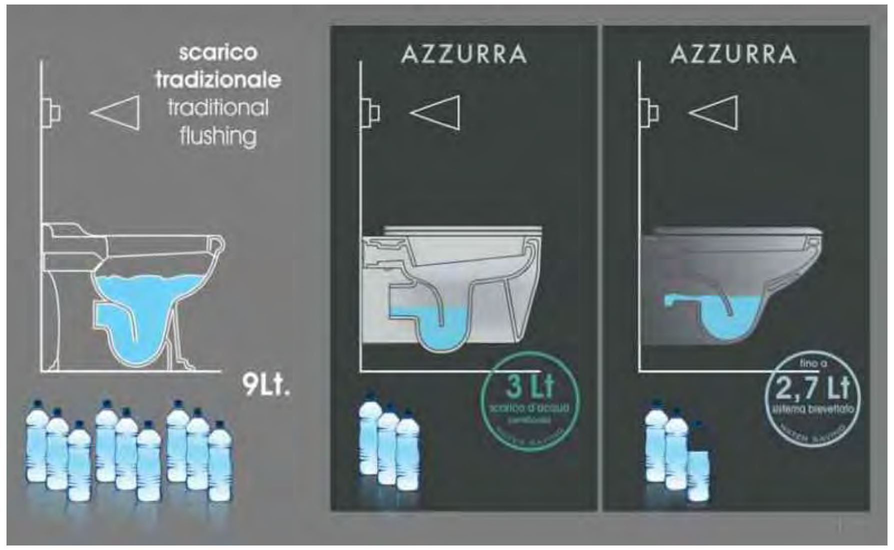
WC - Cistern with two flush volumes

Rimless toilet

Thermostatic cartridge (temperature limiter)



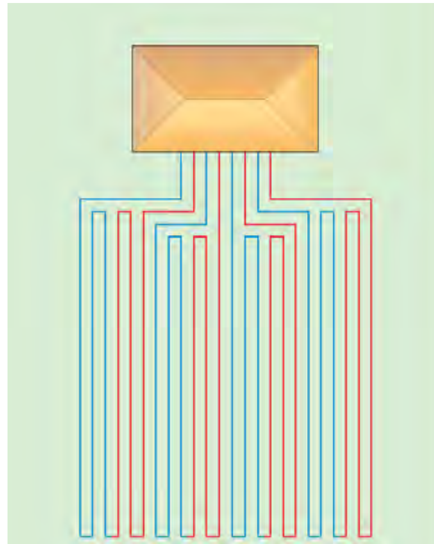
Limitation of water temperatures



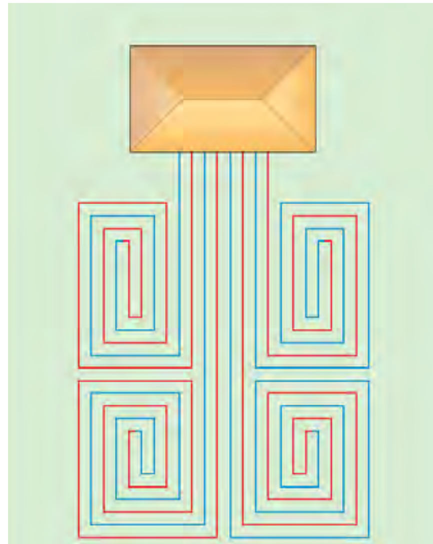
Water saving in toilet flushing

HORIZONTAL GEOTHERMAL

The geothermal solution with horizontal probes requires lower initial investments than the solution with vertical development due to the lack of drilling costs. Experimental investigations and good practices have contributed to defining a standard depth at which to lay the collectors: the maximum depth of the excavations varies between 2 and 3 m so that even seasonal temperature variations are attenuated. The system will be built with polyethylene pipes with internal diameters between 16 and 26 mm. The installation depth will be estimated between 0.8 and 2 m. The sizing of these collectors will be carried out based on the thermal yield of the soil which mainly depends on 3 parameters: (1) the nature of the soil, (2) its density and (3) the humidity level.



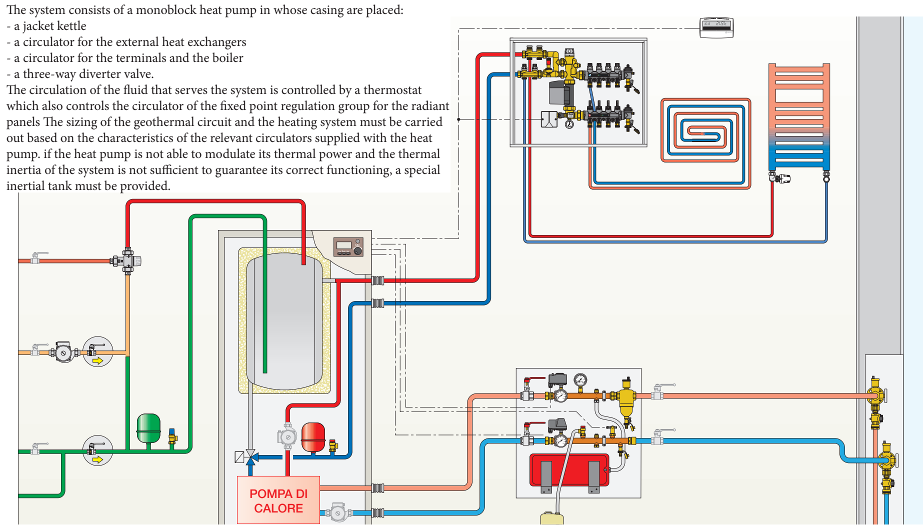
serpentine exchanger



spiral exchanger

The system consists of a monoblock heat pump in whose casing are placed:
- a jacket kettle
- a circulator for the external heat exchangers
- a circulator for the terminals and the boiler
- a three-way diverter valve.

The circulation of the fluid that serves the system is controlled by a thermostat which also controls the circulator of the fixed point regulation group for the radiant panels The sizing of the geothermal circuit and the heating system must be carried out based on the characteristics of the relevant circulators supplied with the heat pump. if the heat pump is not able to modulate its thermal power and the thermal inertia of the system is not sufficient to guarantee its correct functioning, a special inertial tank must be provided.

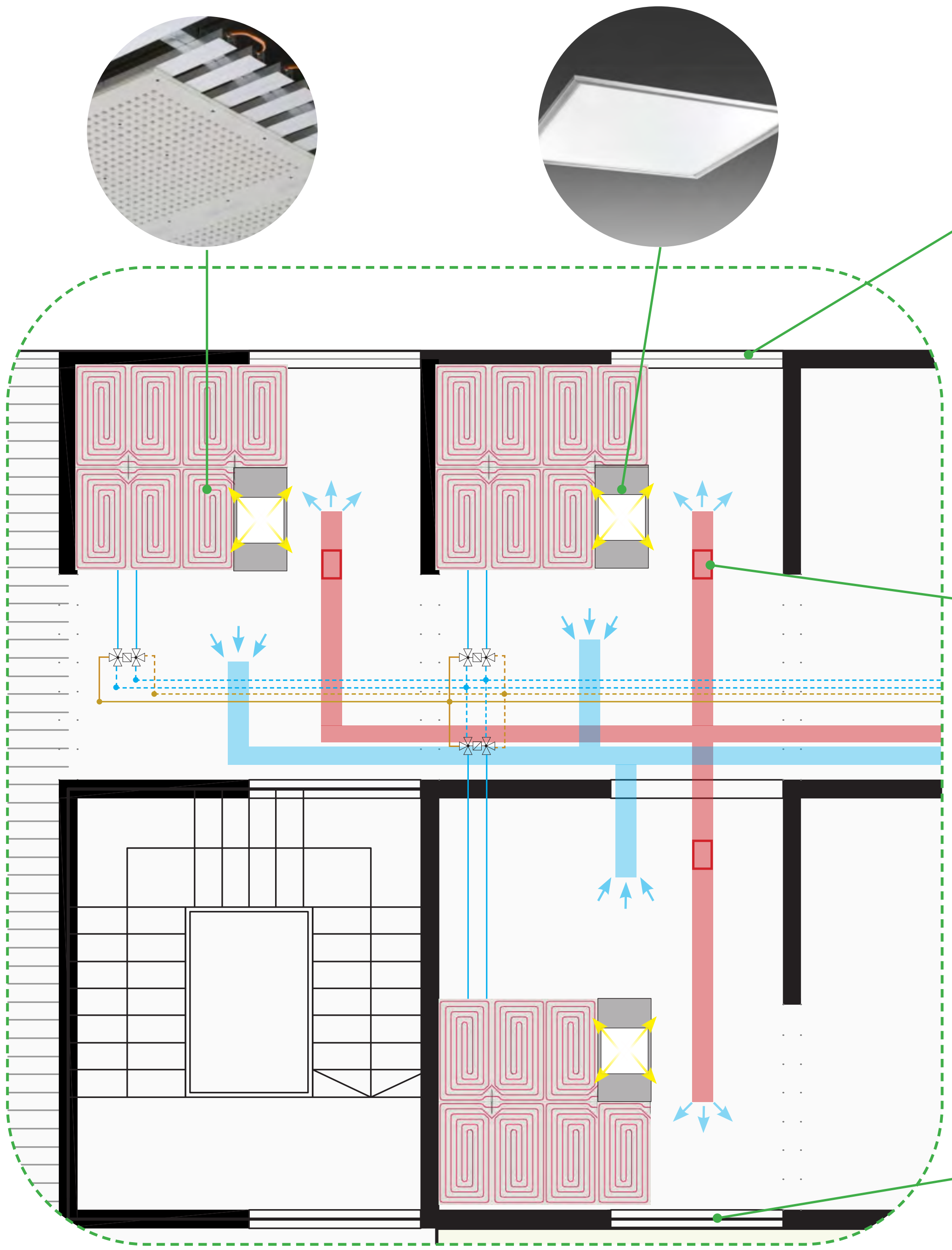


Tipologycal plant scheme

The rooms will be equipped with a radiant ceiling with sound-absorbing function, this solution will allow simultaneous achievement of very high level climatic comfort and efficient control of reverberation noise.

The lighting system will use highly energy efficient and anti-glare LED fixtures throughout, all associated with a DALI management system.

Visual comfort will be guaranteed by the large thermo-insulating windows which will allow a broad and natural perception of the external spaces.



Each room will be equipped with a presence sensor which will allow intelligent management of the systems.

In addition to the external screens, each window will be equipped with internal motorized insulating curtains which will allow better thermal insulation at night and which during the day, thanks to system control, will guarantee the correct supply of natural light.

Check score for LEED GOLD qualification

LEED (Leadership in Energy and Environmental Design) is the world's most widely used green building rating system. LEED certification provides a framework for healthy, highly efficient, and cost-saving green buildings, which offer environmental, social and governance benefits. LEED certification is a globally recognized symbol of sustainability achievement, and it is backed by an entire industry of committed organizations and individuals paving the way for market transformation. This preliminary analysis shows that the new Balti hospital could obtain LEED gold certification

LEED v4 for BD+C: Healthcare
Project Checklist

Y	?	N			
Y			Prereq	Integrative Project Planning and Design	Required
1			Credit	Integrative Process	**1**
6	**0**	**12**	**Location and Transportation**		**18**
		9	Credit	LEED for Neighborhood Development Location	9
		1	Credit	Sensitive Land Protection	1
		2	Credit	High Priority Site	2
1			Credit	Surrounding Density and Diverse Uses	1
2			Credit	Access to Quality Transit	2
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1
4	**0**	**5**	**Sustainable Sites**		**9**
Y			Prereq	Construction Activity Pollution Prevention	Required
Y			Prereq	Environmental Site Assessment	Required
1			Credit	Site Assessment	1
		1	Credit	Site Development - Protect or Restore Habitat	1
		1	Credit	Open Space	1
2			Credit	Rainwater Management	2
1			Credit	Heat Island Reduction	1
		1	Credit	Light Pollution Reduction	1
		1	Credit	Places of Respite	1
		1	Credit	Direct Exterior Access	1
9	**0**	**2**	**Water Efficiency**		**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1			Credit	Outdoor Water Use Reduction	1
7			Credit	Indoor Water Use Reduction	7
0		2	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1
22	**10**	**3**	**Energy and Atmosphere**		**35**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
6	0		Credit	Enhanced Commissioning	6
10	10		Credit	Optimize Energy Performance	20
		1	Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2
9	**2**	**8**	**Materials and Resources**		**19**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
Y			Prereq	PBT Source Reduction- Mercury	Required
3	2		Credit	Building Life-Cycle Impact Reduction	5
2			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
		2	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
		2	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
1			Credit	PBT Source Reduction- Mercury	1
		2	Credit	PBT Source Reduction- Lead, Cadmium, and Copper	2
		2	Credit	Furniture and Medical Furnishings	2
1			Credit	Design for Flexibility	1
2			Credit	Construction and Demolition Waste Management	2
12	**1**	**3**	**Indoor Environmental Quality**		**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
		1	Credit	Thermal Comfort	1
1			Credit	Interior Lighting	1
2			Credit	Daylight	2
		2	Credit	Quality Views	2
2			Credit	Acoustic Performance	2
3	**0**	**3**	**Innovation**		**6**
2		3	Credit	Innovation	5
1			Credit	LEED Accredited Professional	1
4	**0**	**0**	**Regional Priority**		**4**
1			Credit	Rainwater Management	1
1			Credit	Outdoor Water Use Reduction	1
1			Credit	Indoor Water Use Reduction	1
1			Credit	Renewable Energy Production	1
70	**13**	**36**	**TOTALS**	Possible Points:	**119**

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110