DEMOCRATIC AND POPULAR REPUBLIC OF ALGERIA

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

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OPTION: Architecture, Environment and Technology

BIOCLAMATIC DESIGN OF SERVICED APARTMENTS IN TIPASA

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In front of the Jury

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Appreciation

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Our regards extend to the jury that accepted to evaluate our work Dr,**NAIMI** and Mr, **DERDER.** and the whole academic crew of our department especially the teachers that have been a part of our growth as architects.

we would like to show our deepest gratitude's to our families that we are forever in debt to. Without their tremendous love, support and understanding we wouldn't have made it this far.

and last but definitely not least a special thanks to all our friends that have been here for us supporting us through the good and bad.

Dedication 01:

I'd like to take this opportunity to express my deepest gratitude towards my Grandma **FELLOUS SOUHILA** and my mom **MAKRI KARIMA** to whom I dedicate this work to

Most ordinary people have one mother but I have been blessed with these two remarkable ladies that I am forever grateful to for their love and understanding and for helping me become the person that I am today. May god bless them.

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And last but not least. To my colleague **ABDERRAHMANE**, whom his patience. Wit and acceptance for new ideas made this work possible.

MOULOUDJ SARA EL ALIA

Dedication 02:

I dedicate this modest work to:

My mother **DEGAICHIA FOUZIA**, for her presence in my life, for all her sacrifice, her love, her tenderness, her support and her prayers throughout my studies, may god bless her.

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Abstract

Nowadays tourism became a catalyst for economic growth representing the main income source of many countries. yet it is held accountable for its various negative impacts on our planet which lead to shifting towards a more durable and environmental friendly alternative that is ecological and sustainable tourism. This approach aims to maximize positive impacts and minimize the negative ones by using resources responsibly.

Algeria in particular has a great potential to be a host for ecological or sustainable tourism, all while benefiting from the diversification of economical sources. And tourism offers and yet this possibility hasn't been explored to its fullest.

In this thesis we explore the notion of sustainable tourism in the framework of bioclimatic architecture in the coastal city of Tipasa. Our aim was to contribute to the economic growth of the area and to exploit its full potentials, by designing a serviced apartment that combines between the economic and environmental aspects all while providing a comfortable stay for its occupants.

Thus to reach our goal, our work has been structured by the principles of bioclimatic architecture and its multiple strategies that we have used on the different scales of our design. To reach in the end an environmental friendly building with low energy consumption that offers different lodging formulas and accommodations to attract different kinds of tourists and meet their needs.

Key words

Bioclimatic architecture, sustainable tourism, Serviced apartment, tourist accommodation, energy conservation, diversification of economical sources.

Résumé

Aujourd'hui, le tourisme est devenu un catalyseur de la croissance économique, qui représente la principale source de revenus de nombreux pays. Mais il est tenu responsable de ses divers impacts négatifs sur notre planète qui conduisent à évoluer vers une alternative plus durable et plus respectueuse de l'environnement qu'est le tourisme écologique et durable. Cette approche vise à maximiser les impacts positifs et à minimiser les impacts négatifs en utilisant les ressources de manière responsable.

L'Algérie en particulier a un grand potentiel pour accueillir un tourisme écologique ou durable, tout en bénéficiant de la diversification des sources économiques et de l'offre touristique, et pourtant cette possibilité n'a pas été explorée à son maximum.

Dans cette thèse, nous explorons la notion de tourisme durable dans le cadre de l'architecture bioclimatique de la ville côtière de Tipasa. Notre objectif était de contribuer à la croissance économique de la région et d'exploiter son plein potentiel, en concevant un appartement viabilisé qui combine les aspects économiques et environnementaux tout en offrant un séjour confortable à ses occupants.

Ainsi, pour atteindre notre objectif, notre travail a été structuré par les principes de l'architecture bioclimatique et ses multiples stratégies que nous avons utilisées sur les différentes échelles de notre conception. Pour atteindre à la fin un bâtiment respectueux de l'environnement avec une faible consommation d'énergie qui offre différentes formules d'hébergement pour attirer différents types de touristes et répondre à leurs besoins.

Mot clés

L'architecture bioclimatique, Le tourisme durable, appartements services, hébergement touristique, préservation de l'énergie, diversification des sources économiques.

ملخص

أصبحت السياحة اليوم حافزا للنمو الاقتصادي ممثلتا المصدر الرئيسي للدخل في العديد من البلدان. ومع ذلك فهي مسؤولة عن مختلف الاثار السلبية على كوكبنا مما ادى الى التحول نحو بديل أكثر استدامة واحتراما للبيئة ، وهو السياحة الإيكولوجية والمستدامة. ويهدف هذا النهج إلى تحسين الآثار الإيجابية والحد من الآثار السلبية باستخدام الموارد بطريقة مسؤولة.

الجزائر على وجه الخصوص لها إمكانيات لاستقبال السياحة الإيكولوجية أو المستدامة ، للاستفادة من تنويع المصادر الاقتصادية. وعروض السياحة ومع ذلك لم يتم التطرق لهذه الإمكانية بالكامل.

في هذه الأطروحة نستكشف فكرة السياحة المستدامة في إطار الهندسة المعمارية البيومناخية في مدينة تيبازة الساحلية. حيث كان هدفنا الإسهام في النمو الاقتصادي للمنطقة واستغلال إمكاناتها الكاملة ، عن طريق تصميم شقق مزودة بالخدمات تجمع بين الجوانب الاقتصادية والبيئية .مع توفير إقامة مريحة لمستغليها.

ومن أجل بلوغ هدفنا ، تم تنظيم العمل وفقا لمبادئ الهندسة المعمارية البيومناخية واستراتيجياتها المتعددة التي استخدمناها في مختلف مقاييس تصميمنا. للوصول في نهاية ا إلى مبنى ملائم للبيئة يتسم بانخفاض استهلاك الطاقة مع توفير صيغ مختلفة للاقامة لجلب مختلف انواع السياح وتلبية احتياجاتهم.

الكلمات المفتاحية

الهندسة المعمارية البيومناخية، السياحة المستدامة، شقق مزودة بالخدمات، الاقامة السياحية، الحفاظ على الطاقة، تنويع المصادر الاقتصادية.

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CHAPTER 1 : INTRODUCTORY CHAPTER

I.1 INTRODUCTION:

Tourism sector has experienced a significant and continuous growth over the last decades, representing one of the main income sources for many countries. It is considered as a catalyst, a global force for economic growth, through the development of infrastructures. the creation of enterprise and job opportunities. attracting investments, foreign currency and the stimulation of domestic industries.

According to **UNWTO**[1] international tourist arrivals grew 5% in 2018 to reach the 1.4 billion mark. At the same time, export earnings generated by tourism have grown to USD 1.7 trillion. (*Tourism Enjoys Continued Growth generating USD 5 billion per day | UNWTO*, no date) Although the positive impact of tourism on economic growth. It is also held accountable for its various negative outcomes on the environment including the depletion of natural resources, land degradation and different forms of pollution. a study conducted by **UNWTO** states that transport-related CO2 emissions from tourism represented 22% of all transport emissions in 2016 and that it will increase from 1,597 million tons to 1,998 million tons between 2016 and 2030, representing a 25% rise. (UNWTO and International Transport Forum, 2019)

Learning about the negative impacts of tourism and how badly it effects our planet and environment has led to the search for a more responsible and environmental friendly approach which is sustainable tourism and its various forms. According to **UNWTO** sustainable tourism is a *"Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities"*. (*UNWTO*, 2021)

This approach aims to ensure effective destination management to minimize the negative impacts of tourism, while maximizing the positive ones. It includes using resources sustainably. Reducing over consumption and waste and investing into infrastructures and accommodations that are adaptable to the environment with a lower energy consumption to help reduce the negative effects. As well as providing direct revenue for the preservation of natural environments and cultural heritages all while raising awareness and a sense of responsibility in tourists towards the impact of their activities on the targeted destinations.

[1] UNWTO : United Nation World Tourism Organization

CHAPTER 1 : INTRODUCTORY CHAPTER

Algeria is Africa's largest country. An immense area that displays a vibrant culture. Rich history and diverse landscape, holding a clear potential for sustainable tourism and for becoming a remarkable tourist destination. Yet these potentials stayed unexploited, the tourism sector suffers from a deficiency in terms of infrastructure, marketing, accommodations and services that don't meet international standards.

In 2008 the SDAT ((Schema Directeur d'Amenagement Touristique) was lunched. Aiming to increase the sector revenue from the annual average of $445.2 million to at least $621.2 by the end of 2015. while tourist arrivals are expected to rise to 3.1 million by 2023 from the 2.6 million estimated to have visited the country, (tourism review, 2021) making tourism a motor for development in Algeria, diverting economy and attracting investment and foreign currency all while taking full advantage of the country's potentials.

In 2017 and in the frame work of the technical assistance that the World Tourism Organization (UNWTO) provides to Member States, a program was conducted with Algeria. *"This three-year program, which was launched this year and is to be concluded in 2019, consists of a series of capacity-building workshops for officials from national tourism administrations, national statistical offices, central banks and Immigration Offices".* (*UNWTO*, 2021)

Yet despite these claims the country's tourism industry is still almost inexistent. in 2019 Travel & Tourism Competitiveness Report ranked Algeria in the 116th out of 140 countries in terms of competitiveness. (Rankings, 2021)

I.2 STATEMENT OF THE PROBLEM:

According to **UNWTO** "*tourism has experienced continued growth and deepening diversification to become one of the fastest growing economic sectors in the world. Modern tourism is closely linked to development and encompasses a growing number of new destinations. These dynamics have turned tourism into a key driver for socio-economic progress."* (*UNWTO*, 2021) Making it a vital element for the economic growth of several countries.

In Algeria, tourism Development Master Plan (SDAT 2025) states that *"Tourism is an alternative source of savings to the current development. And the awareness of the importance of tourism*

development is an imperative and no longer a choice, and to ensure the sustainability of resources, sources and revenues, Algerian legislation reaffirms the state's desire to preserve the environment, to improve the living environment, to enhance and above all to perpetuate our natural capital and cultural". (Rofia Abada, 2019)

Algeria is known for its touristic potentials within the Mediterranean basin for, the richness of its history the vibrancy of its culture, as well as the diversity of its landscapes and climate that can be seen in its vast Sahara, Hoggar mountain peaks, its unique fauna and flora as well the Georges of Kabyle and many other sceneries.

sitting on a coastline of 1200km that compromises 372 beaches, representing an excellent destination for Maritime and coastal tourism, which is one of the largest and fastest-growing segments in the industry. As well as playing an important role in the development of the countries on both sides of the Mediterranean basin.

Yet despite its natural potentials and assets it is still struggling to gain its place in the tourism sector, according to **UNWTO 2015** *"In 2014, the Mediterranean countries jointly recorded a significant surplus of euro 115 billion on their balances of payments thanks to international tourism. With the exception of Libya, Algeria, Palestine and Serbia, the travel balance is positive for all Mediterranean countries."* (UNWTO, 2016)

According to the world bank international tourism receipts were estimated to be 9.086 billion dollars for Morocco and 2.82 billion for Tunisia with only 172 million dollars for Algeria. (*International tourism, receipts (current US*, 2021)

Among the coastal cities in Algeria lies Tipasa located 70 km west of Algiers, bent along a stretch of rocky coastline, an area of 2166 km^2 that hosts a plethora of cultural and natural assets. that can be witnessed in its diverse landscapes, fauna and flora, mount Chenoua, el Beldj and many more.

Tipasa is also marked by its vibrant history, the city used to be an ancient Punic trading center conquered by Rome that turned it into a strategic base for the Mauritanian kingdoms. It now regroups one of the most extraordinary archeological complexes of the Maghreb, that are inscribed in the UNESCOS world heritage. It comprises indigenous monuments such as the great royal mausoleum of Mauretania alongside a group of Phoenician, Roman, palaeo-christian and Byzantine ruins, some

of which are two massive churches, the Great Basilica and the Basilica Alexander, a third church the Basilica of St Salsa is located in the eastern hill where it is accompanied by two cemeteries, roman baths, an amphitheater, a theatre and a nymphaeum. (*Tipasa – Roman Heritage in Algeria*, 2021) We also mention the authenticity of Tipasa's architecture and urban planning, the use of materials and decorations that displays its original values. All of which makes the city a vibrant canvas for tourist attraction.

Our site of intervention is located east of Tipasa. Along the coastline, situated in the center of major urban activities that are defined by the existence of business facilities. University center and tourism school which attract a great number of students and workers around the year. All while being surrounded by remarkable landscapes and the archeological park to its north western side, which give the site an extraordinary complexity and richness that can be used to attract different types of tourists to Tipasa whether domestic or international. All of which can contribute to the growth of the city's economy by the creation of different employments related to the sector and can provide direct revenue for the preservation of the archeological and natural sites, all in the frame work of sustainable development stated by the SDAT.

And under that light, we ask the questions below:

What type of tourist accommodation can meet the needs of the different kinds of tourists all while being environmental friendly and energy efficient?

I.3 HYPOTHESES:

- Designing a serviced apartment that offers different services and lodging formulas to meet the needs of different types of tourist all while exploiting the full potential of the site.
- A bioclimatic design of the building would reduce energy consumption while preserving the environment

I.4 OBJECTIVES:

- Contributing to revive tourism in the coastal region of Tipasa
- Contributing to the economic growth of Tipasa

- Exploiting the natural, cultural and historical potential of the site
- Making tourists more aware of the socio-cultural and natural environment
- Designing a tourism accommodation that meets the needs of different types of tourists. Business travelers and students
- Designing a tourism accommodation that works all around the year and not only in tourism seasons
- Providing comfort while lowering energy consumption and preserving the natural resources

I.5 RESEARCH METHODOLOGY:

To better understand the theme and find the right architectural solution, to respond to the stated problematic, we impose that the methodology followed in our work will take two directions:

Theoretical direction:

Bibliographic and documentary research which is an exploratory phase based on a state of the art consists of consulting works and books, the work and thesis already carried out on the subject, the publications of the bodies concerned (ministry of tourism …), Articles and websites. For good understanding of our subject of study, in addition to field visits and taking photos for the development of the site analysis.

Operational direction:

It consists in establishing a diagnosis on the case study which is located in the city of Tipaza, we will first present its geographical location, then we will establish an environmental diagnosis of the city and the intervention area in order to identify the strengths, weaknesses, opportunities and threats of the site, eventually leading to the design of a serviced apartment based on the principles of bioclimatic architecture.

I.6 THESIS STRUCTURE:

In order to achieve our objectives and verify our hypotheses, our work will be structured in the form of four chapters which follow and complete one another successively:

The introductory chapter:

It includes a bibliographical search on the tourism state in the world in general and specifically in Algeria, the objectives set out in this thesis, the problems found and the proposed solutions followed by a description of the methodology and structure to be used.

The second chapter: State of the art:

which consists of bibliographical research on sustainable development and bioclimatic strategies followed by thematic research on our project which is serviced apartments.

The third chapter: project development:

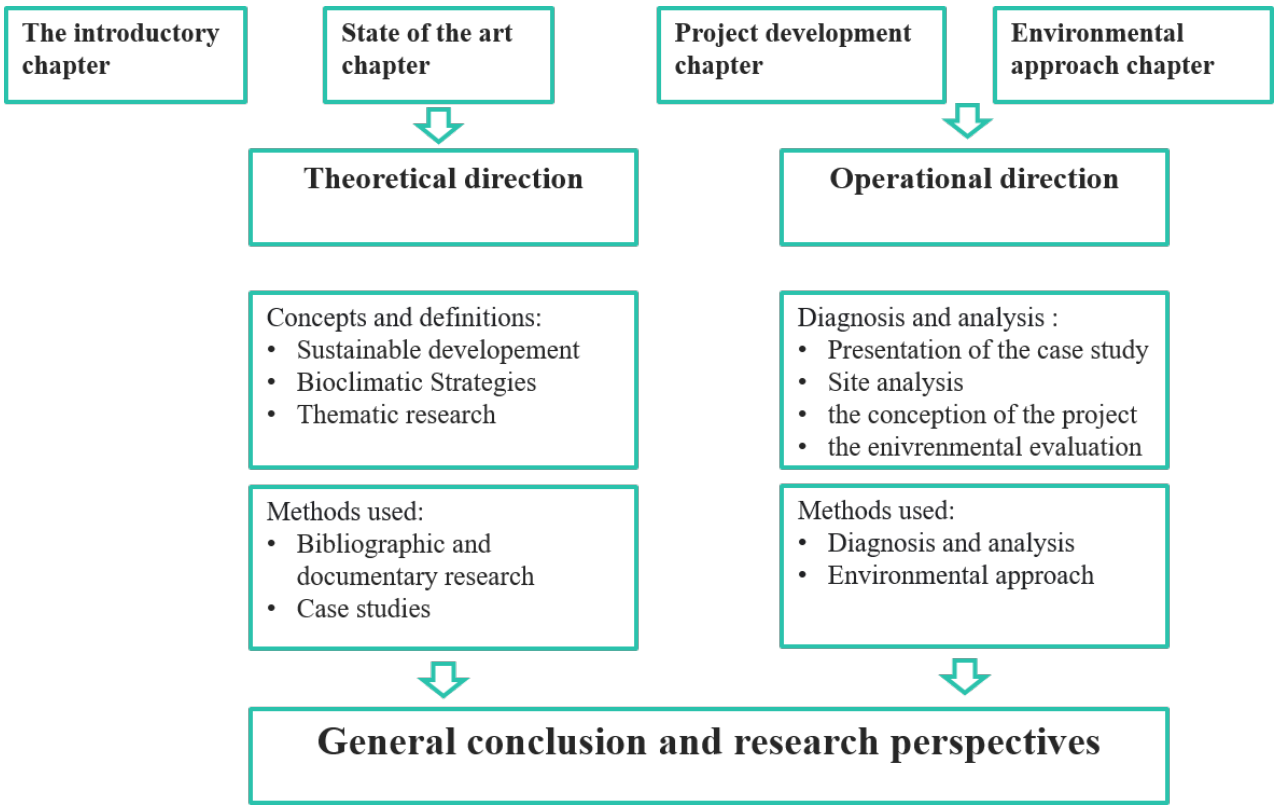
An analysis on the chosen site and a bioclimatic study of the latter (active and passive strategies necessary for our study case). Hence the results of the steps mentioned above that will be used to choose the strategies to follow in the conceptualization of the project.

The fourth and last chapter: environmental evaluation:

The design of modest scale equipment that respects the environment and integrating active bioclimatic devices, use of solar thermal energy and photovoltaic, rainwater harvesting, green roofs and use of healthy materials.

Finally, the dissertation ends with a conclusion on the final result of this research.

SUMMARY DIAGRAM:



II. CHAPTER 02: REVIEW OF THE LITERATURE

II.1 INTRODUCTION:

Thematic research is an important step in the design process architectural, it allows to know and understand the theme and define the goals and needs of the project to establish a specific program.

The aim of our research is to produce a functional, cost-effective architectural project energy, comfortable and environmentally friendly.

In this chapter we first address the aspects of the theme related to the environment, ecology, sustainable development, bioclimatic architecture and energy efficiency in indicating the different strategies and principles of each, then we will present a search theme related to tourism and accommodation and more specifically service apartments, the study of examples will allow us to identify user needs and establish the program and to begin the architectural design phase.

II.2 ENVIRONMENTAL APPROACH:

II.2.1 Definition of Ecology:

Ecology is defined as following:

In 1866, Haeckel defined it as "*the entire science of the relations of the organism to the surrounding exterior world, to which relations we can count in the broader sense all the conditions of existence. These are partly of organic, partly of inorganic nature".* (K Friederichs, 1958)

"*Ecology is the scientific study of the processes influencing the distribution and abundance of organisms, the interactions among organisms, and the interactions between organisms and the transformation and flux of energy and matter*".(Institute of Ecosystem Studies.2008)

II.2.2 Ecology and architecture:

"Thought, constructed, perceived, lived, the architecture expresses a reasoned relationship of man to his environment", report to the "genius of the place" (Norberg-Schultz,1997).

CHAPTER 2 : REVIEW OF THE LITERATURE

The Ecology Question in theories of architectural design started to show with the rise of environmental impact of architecture and urbanism. It started as an ethical issue exclusively in industrialized Western countries, sustainability, or the minimization of the use of non-renewable resources, but it has become a major technical, political, and legal focus of international debates. (Ingersoll, 2012)

II.2.3 Definition of ecological architecture:

Ecological architecture is defined as:

"*The application of ecological principles to architecture, typically in the design of buildings which promote environmental conservation and harmonize with their natural surroundings*." (*Oxford Dictionary*, 1990)

"A concern with how ecological properties impact the building, its occupants, and the

environment. The ecological elements are selected from natural or minimally processed earth reso urces biodegradable, renewable, and clean elements with low-
embodied energy. Elements consist of the soil and landscape, site selection, water resources, and w aste management." (encyclopedia.1998)

II.2.4 SUSTAINABLE DEVELOPMENT:

in 1957 the concept of sustainable development, was defined in the Brutland report as follows: "*sustainable development is development that satisfies the needs of the present without compromising the needs of the future.*" (World Commission on Environment and Development, 1987)

"*Sustainable development means ensuring dignified living conditions with regard to human rights by creating and maintaining the widest possible range of options for freely defining life plans. The principle of fairness among and between present and future generations should be taken into account in the use of environmental, economic and social resources.*

Putting these needs into practice entails comprehensive protection of bio-diversity in terms of ecosystem, species and genetic diversity, all of which are the vital foundations of life." (BFS, BUWAL & ARE ,2001)

II.2.4.1 The three pillars of sustainable development: (L'Association Adéquations, 2008)

Sustainable development implies a mode of organization based on 3 essential pillars:

a) **The environmental quality** to limit environmental impacts, to ensure the health and safety of human communities and life-sustaining ecosystems.

b) **Social equity** to meet the needs of humanity, reduce inequalities, and respect for diversity.

c) **Economic efficiency** by creating an innovative and prosperous economy, ecologically and socially responsible.

These three pillars make up the challenges of sustainable development. To create a more sustainable society, these pillars are accompanied by fundamental principles:

- **Solidarity**: the unity between all groups and classes of a society. For example: saving raw materials so that as many people as possible benefit.
- **Precaution** in decisions so as not to cause disasters when there are known risks to health or the environment. For example: limit CO2 emissions to curb climate change.
- **Participation** of all members of the community, to ensure the success of sustainable projects. For example, setting up child and youth councils.
- **Responsibility** of everyone. So that those who damage, degrade and pollute repair. For example: make industries that pollute a lot pay a tax.

II.2.4.2 history of sustainable development:

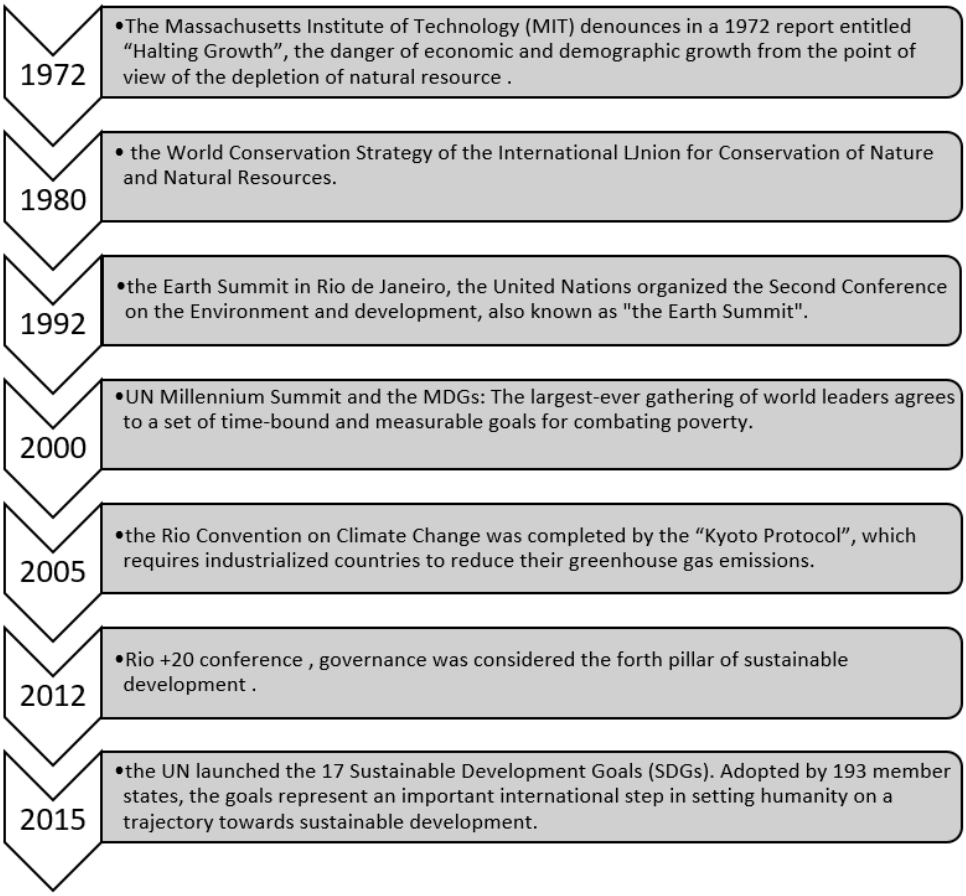


Figure 1 Outline of sustainable development history / source : (Shi, Han, Yang, & Gao,2019) Adapted by the author

II.2.5 Definition of sustainable architecture:

The French architect Helene Jourda defined *"sustainable architecture as the building that saves Resources, meaning saving the five resources: water, soil, energy, materials, and air...it's also about use of renewable, recyclable, and reusable materials".* (Helene Jourda, 2015, April 22)

"Designing "sustainable architecture" therefore means offering a habitat that establishes

a harmonious balance between man and his environment, while preserving resources

and the environment and by promoting the comfort and health of residents." (CAUE de Tarn-et-Garonne.2007)

II.2.5.1 The principles of sustainable architecture: (Whole Building Design Guide, 2018)

- **Eliminate waste and Conserve Water:** The sustainable design firms aim to utilize the full lifecycle of all products and processes to eliminate all aspects of waste, wastewater management system and attempts to collect and harvest rainwater should be central to sustainable design.
- **Optimize Energy Use:** With the increasing demand on fossil fuel resources, and with impacts of global climate change becoming more evident, it became a necessity to find ways to reduce energy load, increase efficiency, and maximize the use of renewable energy sources.
- **Optimize Building Space and Material Use:** A sustainable building is designed and operated to use and reuse materials in the most productive and sustainable way across its entire life cycle, and is adaptable for reuse during its life cycle. The materials used in a sustainable building minimize life-cycle environmental impacts such as global warming, resource depletion, and toxicity.
- **Optimize Site Potential:** site selection has to be the primary consideration while executing a green construction project, including consideration of the reuse or rehabilitation of existing buildings. The location, orientation, and landscaping of a building affect local ecosystems, transportation methods, and energy use.
- **Improve Indoor Environmental Quality:** The indoor environmental quality (IEQ) of a building has a significant impact on occupant health, comfort, and productivity.

II.2.5.2 History of sustainable architecture:

From the beginning of the 20th century there have been five influential paradigms

that shaped sustainability in architecture and the built environment.

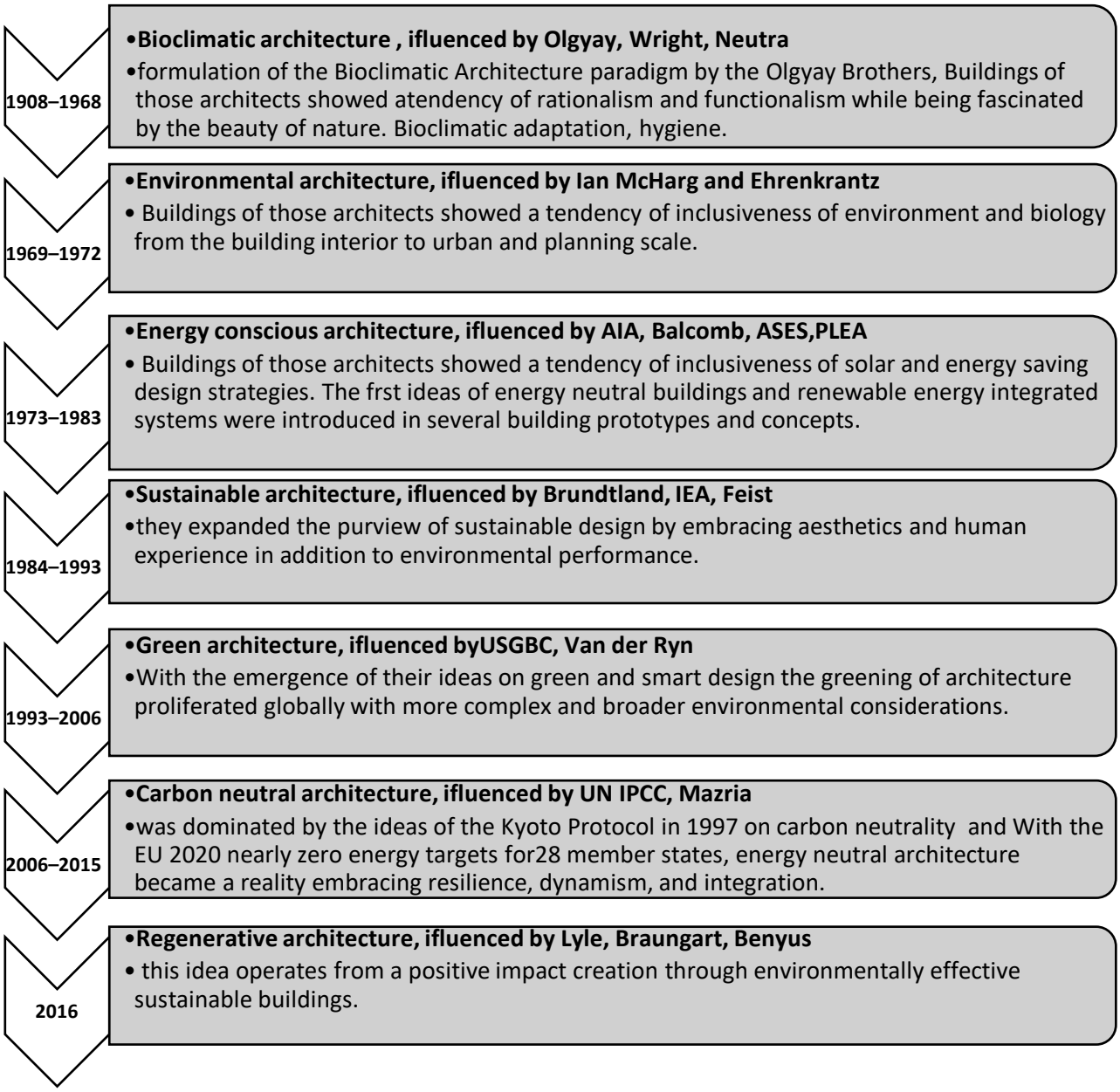


Figure 2 : Outline of sustainable architecture history / source : (Attia,2018) Adapted by the author

II.2.6 Bioclimatic architecture:

Bioclimatic architecture is defined by the "*Architecture that has a connection to Nature. Building designs that take into account climate and environmental conditions to help achieve optimal thermal comfort inside. It deals with design and architectural elements, avoiding complete dependence on mechanical systems, which are regarded as support. A good example of this is using natural ventilation or mixed mode ventilation*". (BioclimaticX, 2009)

"The first rule of bioclimatic architecture is to take advantage of local bioclimatic conditions with the benefit of the natural and built environment. That approach should always be based on multidisciplinary in-depth research of individual circumstances: from the specifics of the ecosystem through cultural factors up to the economic analysis. In final effect safe and comfortable building which is created does not harm the environment but contributes to its health and

enriched biodiversity". (Barbara Widera,2019)

II.2.6.1 concepts of bioclimatic architecture:

a) Passive Cooling and Heating Concept:

Passive cooling systems: (Barbara Widera,2019)

Bioclimatic design will ensure the movement and the recycling of air flows to the interior of the building without causing entrapment.

summer:

Among passive cooling systems based on natural ventilation and commonly applied in different parts of the world 3 basic methods can be distinguished:

- Cross ventilation based on the pressure difference across the building (Fig. 3a).
- Chimney ventilation based on the stack effect i.e. under pressure caused by the rising hot air (Fig. 3b).
- Wind towers and wind catchers based on overpressure and under pressure (Fig. 3c).

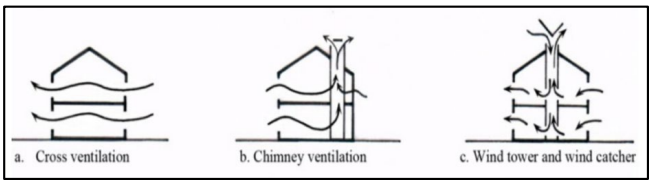


Figure 3 : Basic models of natural ventilation / source: (Barbara Widera,2019)

winter:

the cold period of the year. The main passive strategies that are traditionally used in purpose to provide indoor thermal comfort in temperate and colder climate zones are thermal massing and

sufficient insulation by using thick massive walls, big windows on the South, small on the North, natural ventilation combined with chimney heating.

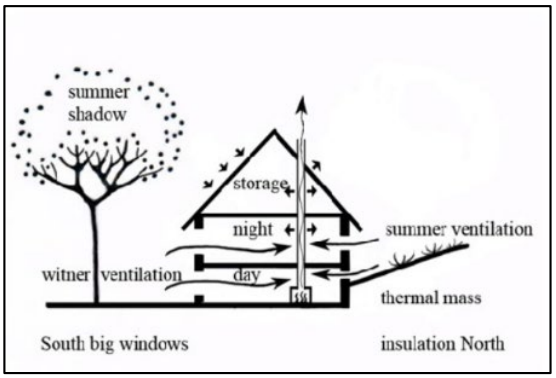


Figure 4 : Passive strategies in temperate and colder climate/ source: (Barbara Widera,2019)

Passive solar heating:

The sunlight enters the building through transparent openings and the resulting energy is stored within the mass. The choice of the right orientation of the sites is the best way to achieve maximum exploitation. The most suitable has been proven to be the south. (Manzano-Agugliaro, Montoya, Sabio-Ortega & García-Cruz,2015)

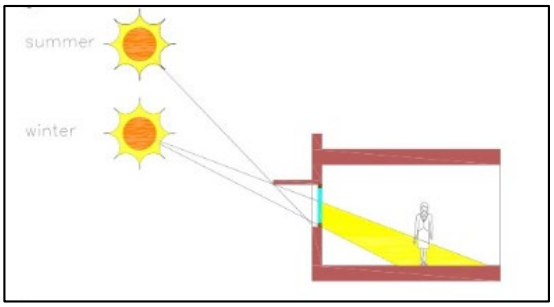


Figure 5 : The awning as a passive solar heating solution/ source: (Manzano-Agugliaro, Montoya, Sabio-Ortega & García-Cruz,2015)

b) Active solar heating concept:

The objective of active solar heating is similar to that of passive solar heating; however, in the case of active heating, a fluid is heated and later heats the interior of the home. (Manzano-Agugliaro, Montoya, Sabio-Ortega & García-Cruz,2015)

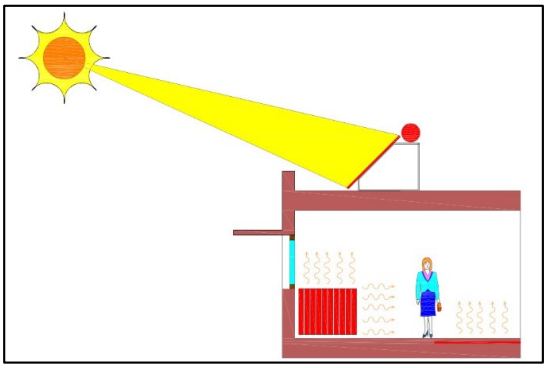


Figure 6 : Active heating techniques / source: (Manzano-Agugliaro, Montoya, Sabio-Ortega & García-Cruz,2015)

c) promoting natural lighting

Optimizing natural lighting inputs, reducing your lighting power consumption is also an essential point of bioclimatic design.

II.2.6.2 benefits of bioclimatic architecture: (Brenta, M. 2015)

- The energy savings because of the reduction of heat losses (or gains during hot periods) by envelope protection techniques
- The thermal energy production through direct or indirect passive solar systems
- The creation of thermal comfort conditions inside the buildings
- The maintenance of indoor air temperature at high levels during winter periods and at low levels at hot periods, reducing at the same time the load demands (during the startup of the building)
- The creation of favorable microclimate conditions around the building contributing to lower energy requirements.

II.2.7 ENERGY EFFICIENCY:

Energy efficiency simply means using less energy to perform the same task that is, eliminating energy waste. Energy efficiency brings a variety of benefits: reducing greenhouse gas emissions, reducing demand for energy imports, and lowering our costs on a household and economy-wide level. While renewable energy technologies also help accomplish these objectives, improving energy efficiency is the cheapest and often the most immediate way to reduce the use of fossil fuels. (*Environmental and energy efficiency institute*, 2019)

II.2.7.1 Classification of energy-efficient buildings: (Stazi,2019)

The main categories of energy-efficient buildings are:

Low-energy building: Consumes between 50 and 60% less energy than a 'normal' building and they are very often designed without traditional heating systems and without active cooling.

Passive building: Consumes hardly any energy, they use energy sources inside the building such as the body heat from the residents or solar heat entering the building,

Zero-energy building: 'Passive building' that also meets its own energy needs: the necessary energy is generated on site via photovoltaic panels or similar techniques, and a Good balanced ventilation.

Nearly Zero Energy Building: Europe uses the term NZEB buildings or Nearly Zero Energy Buildings for the almost energy-neutral building that in Belgium is still referred to as a 'zero-energy building'.

'Passive building' that provides its own energy for heating and cooling (equipped with technologies that produce renewable energy and hot water for heating and bathrooms, usually solar panels and a solar boiler)

Active building: Zero-energy building that generates more renewable energy on site than it actually consumes, the energy bill is zero. The surplus energy produced is fed into the grid in exchange for renewable energy certificates.

II.2.7.2 world consumption of energy:

on a planetary scale, the construction sector is responsible about 30-40% of the world's annual consumption of energy and nearly 30% of all gas emissions greenhouse effect (GHG). (Astrid Denker, S.M.K El Hassar, 2014)

II.2.7.3 labels and regulations:

d) Definition of energy efficiency label:

"Energy-efficiency labels are informative labels that are affixed to manufactured products and describe a product's energy performance (usually in the form of energy use, efficiency, or energy cost) to provide consumers with the data necessary for making informed purchases." (*Dictionnaire de français Larousse*, 2004)

Labels	conditions
Thermal regulation RT 2012	• The energy efficiency corresponding to the bioclimatic needs of the building. • The energy consumption of the building is modulated according to the climatic zones and the altitude of the terrain. Comfort in summer thanks to refreshment techniques.
Low Energy Building Label (BBC+)	• Improvement of the building envelope. • An energy consumption of 40 kW/m²/year. • The installation of consumption meters linked to power outlets with display of various information: CO2 footprint, bio-climatic need, annual average... • The obligation to provide on delivery of the building a log book of use, maintenance and maintenance of the equipment and the frame in order to preserve its initial performance.
high energy performance labels (HPE)	• The HPE label shows that primary energy consumption is 10% lower than conventional buildings.
very high performance energy (VHPE)	• The VHPE label can be obtained when consumption is 20% below the standard.

Table I labels and regulations of construction in France /source: actualite.seloger-construire.com

II.2.7.4 State of energy consumption in Algeria:

a) the residential and tertiary building sector:

A study conducted by the Agency for the Promotion and Rationalization of Energy Use (APRUE) and published in 2012 shows that in Algeria, the residential and tertiary building sector is the most energy-intensive sector. Its consumption represents more than 34% of the national final energy consumption, which reached 30 million toe in 2012. This consumption is divided between shops (30%); central administration (24%); tourism (3%); health (12%); education (8%); public lighting (6%) and other (18%). (Astrid Denker, S.M.K El Hassar, 2014)

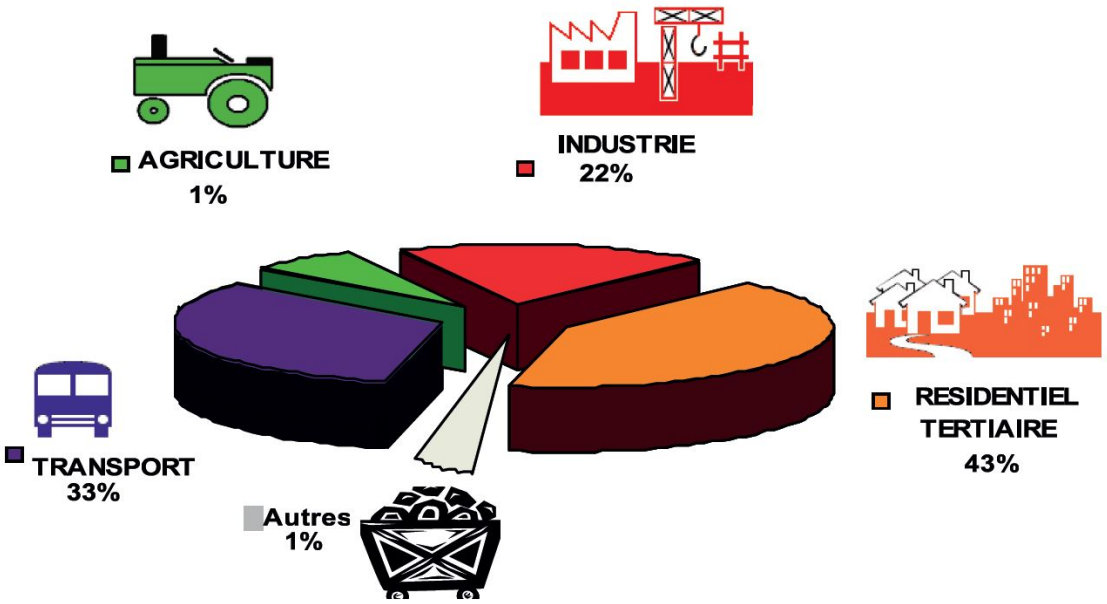


Figure 7 : Final consumption by sector of activity/ source: APRUE, 2017

e) National Energy Control Policy: (Astrid Denker, S.M.K El Hassar, 2014)

Currently, the national energy management policy is divided into three major axes:

- the introduction of energy efficiency standards and requirements, including standards for thermal insulation in new buildings and energy efficiency and energy-saving standards for electrical appliances, gases and petroleum products;
- monitoring energy efficiency, including buildings, appliances running on electricity, gas and petroleum products, vehicles and motor vehicles;

- mandatory and periodic energy audits of energy-intensive establishments in the industrial, transport and tertiary sectors.

some Regulatory Instruments relating to Energy Control:

- Law no. 99-09 of 28 July 1999 on the control of energy.
- Executive Decree No. 2000-90 of 24 April 2000 on thermal regulation in new buildings.
- Executive Decree No. 04-149 of 19 May 2004 setting out the procedures for drawing up the National Energy Control Program.
- Executive Decree No. 05-16 of 11 January 2005 laying down specific energy efficiency rules for appliances running on electricity, gas and oil products.
- Decree of 21 February 2009 on the energy labelling of air conditioners for domestic use subject to the specific rules on energy efficiency and running on electric energy.

II.3 SPECIFIC THEMATIC:

II.3.1 TOURISM:

II.3.1.1 DEFINITION:

« Tourism is a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes." (*UNWTO*, 2021)

"*It comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes, different from the exercise of an activity remunerated from within the place visited"* (*OECD Glossary of Statistical Terms - Tourism Definition*, 2021)

According to **Macintosh and Goeldner** *"Tourism is a collection of activities, services and industries which deliver a travel experience comprising transportation, accommodation, eating and drinking establishments, retail shops, entertainment businesses and other hospitality services provided for individuals or groups traveling away from home"* (McIntosh and Goeldner, 1986)

II.3.1.2 HISTORY

Travel is as old as mankind on this earth. It started with humans roaming the earth searching for food, security and comfort, then through the course of time it went through many transformations which lead to what we call tourism

modern tourism can be traced to 4 major eras

Antiquity

The invention of money and the development of trade by Sumerians around 4000 B.C laid the foundations for business travel

About 2700 b.c Egyptian pyramids (Pyramid of Djoser, the Sphinx, the three great pyramids at Giza and the pyramid complex at abusiir) started attracting a large numbers of people mainly for curiosity and religious purposes

major ancient Greek thinkers traveled frequently. Especially to Egypt, where they were interested in history, culture, nature, and peculiar Egyptian structures.

About 150 B.C the romans started building roads , a network of 80.000 km extending from Britain to the Tigris-Euphrates river system and from the Danube River to Spain and northern Africa

The romans travelled to see famous temples and monuments of the Mediterranean region. most particularly Egyptian pyramids.

during the holidays Greece and minor Asia were popular destinations, offering Olympic games. Festivals. Athletic competitions, medicinal baths, resorts and other forms of entertainment. This period in Greece included the construction of special large houses and inns in which athletes and spectators settled and rested.

The Roman wealth and curiosity to travel combined with their advanced roads network created a demand for accommodations and other tourist services and gave birth to leisure tourism. (McIntosh and Goeldner, 1986). (Stainton, 2020)

CHAPTER 2 : REVIEW OF THE LITERATURE

Middles Ages

During Hindu and Chinese civilization a movement of religion, education and culture began, the main type of travel was the pilgrimage of Europeans to holy places: Muslims to Mecca, Christians to Jerusalem and Rome. Most of the travelers stayed in monasteries, leaving donations there. Some individuals traveled to religious sites for the forgiveness of their sins or to receive a divine cure for their illnesses, they mainly traveled in groups for safety purposes. (*tourism notes*, 2018). (*travel guideline*, 2012)

Grand Tour

The grand tour was a traditional trip around Europe during the 17th and 18th Century, mainly to France, Switzerland, Germany and Italy . It was popular among Scholars, diplomats, and businessmen. The purpose of the tour was cultural enrichment. Young men traveled to see Europe to see art, architecture, science and more in countries other than their own and it was considered as an essential part of their education. (McIntosh and Goeldner, 1986). (oureducare, 2020)

18th to 19th century

The technical advancement brought by the industrial revolution and the introduction of rails and steamships made travelling more efficient and more affordable for middle and working classes. Years later, Thomas Cook, an English business man, initiated the concept of travel agency. Introducing a tour package, travel and accommodation with good and entertainment. He is regarded as the father of modern tourism and the pioneer of commercialized mass tourism. (Šnajdar, 2020)

Modern and contemporary era

In the 20 century mass tourism continued growing. George Westinghouse introduced the idea of paid vacation or paid leave from work which gave the working and middle classes a chance to travel and was responsible for a large movement of people. also after World War 2, social changes and technological progress have happened, the development of transport and communications, the revival of trade, economic, cultural cooperation between countries accelerated the development of tourism. By opening borders and providing easier access to other countries. (Šnajdar, 2020). (Stainton, 2020)

In the 21th century internet became more accessible. More borders between countries were open and the increase in mobility made tourism grow at a fast rate to become a global force with over 1.4 billion tourists. However, with the rise of number of tourists and the negative effects of tourism on the planet, a more environmental approach was introduced which is ecotourism and sustainable tourism. (Šnajdar, 2020). (Stainton, 2020)

II.3.1.3 HISTORY OF TOURISM IN ALGERIA

Romaine Byzantine period:

The romans were the pioneers of leisure tourism in Algeria, their wealth combined with their love for leisure made them develop a series of recreational facilities and accommodations. Such as thermal baths and clubs for water treatments, the construction of Arenas, theaters and amphitheaters that hosted gladiator fights. And circuses where the main characters were clowns and animals. Along the side of a complex road's network that made travelling easier and attracted a good number of visitors. (Bouanani, A). (Yegemberdiyeva,2020)

After 1962

in the mid-1960s after independence, a national tourism charter was lunched. It organized the development of a network of tourist villages in the coastal and Saharan regions. Tourism schools run by the government were opened in Tizi Ouzou, Algiers and Bou Saada between 1971 and 1976 to train hotel managers, servers and guides. The state encouraged domestic tourism so that Algerians travel their country. And it open promotion offices in several world capitals to attract foreign visitors, However, the sector started reseeding in the early 1980s because of the political and economic shifts that gave priority to other sectors. and it declined sharply in the 1990s because of the civil war and the lack of security. in 2008 authorities convened a national conference with hotel and tour operators, travel agents and other sector players to adopt a plan for reviving the industry and turn it into one of the motors of economic development. within the framework of the National Tourism Development Plan SDAT. (oxford business group, 2017)

II.3.1.4 TYPES OF TOURISM:

There are 2 types of tourism

International: "*International tourism comprises inbound tourism and outbound tourism, that is to say, the activities of resident visitors outside the country of reference*" (*UNWTO*, 2021)

- **Inbound tourism: "***Inbound tourism comprises the activities of a non-resident visitor within the country of reference on an inbound tourism trip"* (*UNWTO*, 2021)
- **Outbound tourism:** *"Outbound tourism comprises the activities of a resident visitor outside the country of reference"* (*UNWTO*, 2021)

Domestic tourism: *"Domestic tourism comprises the activities of a resident visitor within the country of reference, either as part of a domestic tourism trip or part of an outbound tourism trip"* (*UNWTO*, 2021)

II.3.1.5 FORMS OF TOURISM

They are classified under 3 categories:

By nature of the activity:

Business tourism: *"visitors travel for a specific professional and/or business purpose to a place outside their workplace and residence with the aim of attending a meeting, an activity or an event. The key components of business tourism are meetings, incentives, conventions and exhibitions."* (*UNWTO*, 2021)

Education Tourism: "Education Tourism represents a broad range of products and services related to academic studies, skill enhancement holidays, school trips, sports training, career development courses and language courses, among others." (*UNWTO*, 2021)

Cultural Tourism: *«is a type of tourism activity in which the visitor's essential motivation is to learn, discover, experience and consume the tangible and intangible cultural attractions/ products in a tourism destination."* (*UNWTO*, 2021)

Recreational tourism: It covers a wide range of recreational activities. (Ryan, C 2003)

Health Tourism: *"health tourism covers those types of tourism which have as a primary motivation the contribution to physical, mental and/or spiritual health through medical and wellness-based activities."* (*UNWTO*, 2021)

Sports Tourism:" refers to the travel experience of the tourist who either observes as a spectator or actively participates in a sporting event generally involving commercial and noncommercial activities of a competitive nature." (*UNWTO*, 2021)

Religious tourism: *"Religious tourism includes a range of activities, such as pilgrimages, missionary travel, monastery / abbey retreats, faith-based camps / events, religious conferences and gatherings"* (CBI, 2016, December)

By location preference:

Urban tourism: *"takes place in an urban space with its inherent attributes characterized by non-agricultural based economy such as administration, manufacturing, trade and services and by being nodal points of transport. Urban/city destinations offer a broad and heterogeneous range of cultural, architectural, technological, social and natural experiences and products for leisure and business."* (*UNWTO*, 2021)

Rural tourism: "*type of tourism activity in which the visitor's experience is related to a wide range of products generally linked to nature-based activities, agriculture, rural lifestyle / culture, angling and sightseeing"* (*UNWTO*, 2021)

Mountain tourism: *"is a type of "tourism activity which takes place in a defined and limited geographical space such as hills or mountains with distinctive characteristics and attributes that are inherent to a specific landscape, topography, climate, biodiversity (flora and fauna) and local community. It encompasses a broad range of outdoor leisure and sports activities"* (*UNWTO*, 2021)

Maritime tourism: "refers *to sea-based activities such as cruising, yachting, boating and nautical sports and includes their respective land-based services and infrastructure"* (*UNWTO*, 2021)

Wildlife Tourism: "*Wildlife tourism refers to the observation and interaction with local animal and plant life in their natural habitats"* (*UNWTO*, 2021)

Saharan Tourism: includes activates in the desert and Sahara region based on the values of the locals. It includes exploring sand dunes. Riding camels and staying in tents

The type of package

Selective or alternative tourism: is defined as *"the organization of different types of tourism harmonized with the natural and social values of local communities that allow its host and guests to enjoy a positive and valuable experience through mutual interactions."* (Ćorluka, Radić and Geić, 2021)

Mass tourism: *"mass tourism refers to the movement of a large number of organized tourists to popular holiday destinations for recreational purposes."* (Naumov and Green, 2016)

II.3.1.6 THE IMPACT OF TOURISM

Tourism as an industry has significant impacts on many fields. Mainly the ones below:

Economic

Positive

- generates local employment within the tourism and in resource management
- stimulates domestic industries like transportation, lodging facilities, restaurants and food services, handicrafts
- It generates foreign exchange for the country
- helps diversify the local economy.
- Generates tax revenue

Negative

- increase the price of land, housing and a range of life commodities
- establishing tourism infrastructures that come out of local tax base
- Demands on health services provision and police service during tourist seasons increase on the cost of tax revenue

Social and cultural

Positive

- The improvements of infrastructure and Recreational and cultural facilities created for tourism also benefit the local community.
- the increase of public hygiene
- Encouraging the preservation and revival of traditional customs, handicrafts and festivals
- creates a better cultural understanding among people of diverse background and can help raise awareness of issues such as poverty
- The sharing of cultural knowledge and experience for both hosts and guests and enhancing local awareness
- generates revenue for the preservation of archaeological sites and historical monuments

negative

- Interaction with tourists can lead to the erosion of traditions cultures and values.
- The authenticity of the social and cultural environment can be changed to meet tourism demands.
- the negative social influence of some tourists
- locals being displaced from their land against their will to make way for new hotels and tourist accommodations.
- tension between visitors and residents, resulting from cultural differences, leading to the exclusion of newcomers.
- Without proper planning vandalism, and crime often accompany tourism.
- It can bring overcrowding and traffic congestion.
- Historic sites can be damaged through tourism pressures.

Environmental

Positive

- Promotes the conservation of wildlife and natural resources and increases awareness
- Generates funding for maintaining animal preserves and marine parks

- reduces problems such as over-fishing and deforestation by creating an alternative source of revenue
- creating parks, nature and ecological preserves for nature-based tourism.
- Improve vast management

Negative

- increases pollution through traffic emissions and littering
- overcrowding can forever change the physical environment and ecosystems of an area.
- Degradation of preserve and change in the physical integrity of the area.
- Depletion of natural resources such as water

II.3.2 SUSTAINABLE TOURISM:

II.3.2.1 DEFINITION:

"Sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems." (Cernat and Gourdon, 2021)

" Sustainability principles refer to the environmental, economic, and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability" (*UNWTO*, 2021)

II.3.2.2 PRINCIPLES OF SUSTAINABLE TOURISM

Tourism Concern, 1991 in association with the **Worldwide Fund for Nature(WWF**) listed the principles bellow

- Using resources sustainably.
- Reducing over-consumption and waste
- Maintaining biodiversity.

- Integrating tourism into a national and local strategic planning framework
- Supporting local economies.
- Involving local communities.
- Consulting stakeholders and the public.
- Training staff.
- Marketing tourism responsibly and providing tourist with full information
- Undertaking research to help solve problems and to bring benefits to destinations, the industry, and consumers

II.3.2.3 THE DIMENSIONS OF SUSTAINABLE TOURISM:

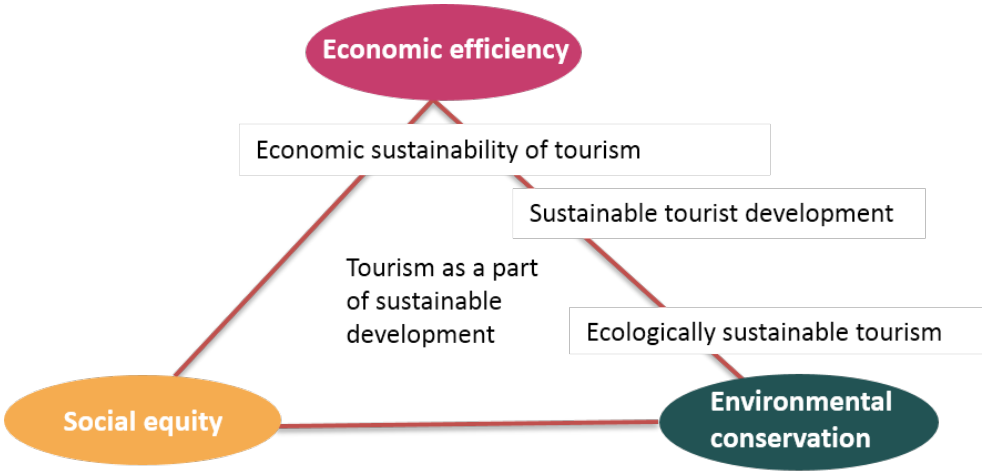


Figure 8 The dimensions of sustainable tourism/ Source: Stainton, 2020 edited by the author

Sustainable tourism aims to be a part of sustainable development, and it addresses 3 focal points that are economic efficiency, social equity and environmental conservation.

II.3.3 ECOTOURISM:

II.3.3.1 DEFINITION

Ecotourism is defined as *"responsible travel to natural areas that conserve the environment, sustains the well-being of the local people, and involves interpretation and education".(* International Ecotourism Society, 2015)

"*Ecotourism is ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation and conservation."* (Ecotourism Australia,2021)

II.3.3.2 CHARACTERISTICS OF ECO-TOURISM

According to **UNWTO** the characteristics of ecotourism are:

- Nature based tourism
- It is generally, but not exclusively organized by specialized tour operators for small groups
- Minimize negative the impact upon the natural and socio-cultural environment.
- Contributes to conservation of biodiversity
- lowest consumption possible of non-renewable energy
- Builds environmental awareness and educated tourists
- Provides direct financial benefits for conservation and environmental protections
- Provides financial benefits and empowerment for local people

II.3.3.3 TYPES OF ECOTOURISM

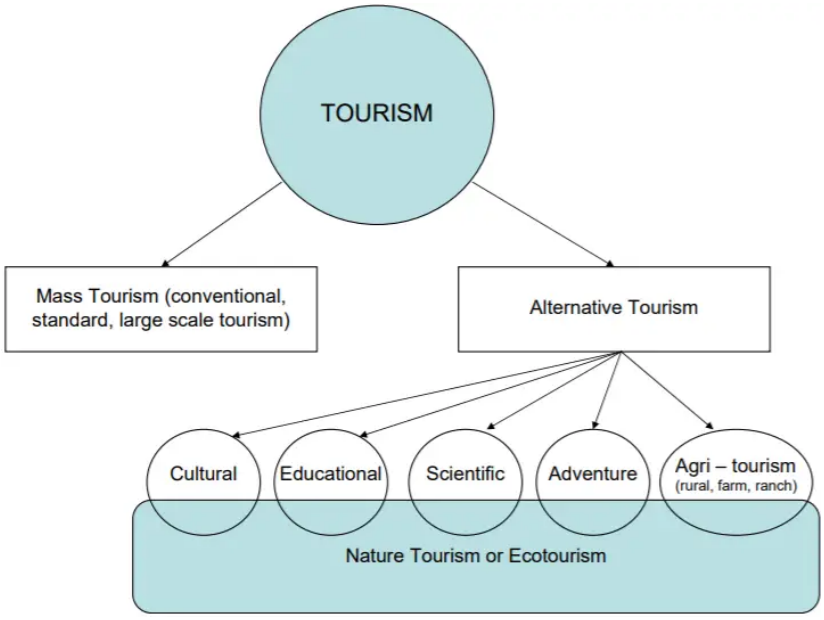


Figure 9 Types of ecotourism/ source: (Eco Tourism - Definitions, Types, History, Characteristics, and Functions, no date)

There are two types of ecotourism, mass tourism which is the more traditional form of tourism development. Its relatively clean but has many negative consequences which lead to a new

responsible approach which is alternative tourism. that became a competing paradigm to mass tourism.

II.3.3.4 PRINCIPLES OF ECOTOURISM

According to The **International Ecotourism Society (TIES)** the principles of ecotourism are :

- Minimize negative physical, social, behavioral, and psychological impacts
- Build environmental and cultural awareness and respect
- Provider direct revenue for environnemental conservation
- Aims to maximize financial benefits for both local people and private industry
- Design, construct and operate low-impact facilities
- Relies on infrastructure that has been dewlapped in harmony with the environment to minimize fossil fuels

II.3.4 TOURISM IN ALGERIA

Algeria is Africa's largest country with an area of 2 381 741 km. its, rich and diverse natural, historical and cultural assets gives it an undeniable potential as a remarkable tourist destination.

In the north The beaches and coastal attractions are a major focus of attention. The gorges of Kabyle and Chiffa are the perfect gateway to exploring natural attractions while the Sidi Fredj peninsula and Turquoise coast. We also find important Roman, Islamic and Christian historic sites and ruins that are included in the UNESCO World Heritage list, including the Roman cities of Tipaza and Timgad, and the Casbah of Algiers. Other destinations with a historical value are, the Hauts plateau with the Masourra fortress, Almohad ramparts as well as the historical town of Tlemecen and the National museum of Fine Arts.

towards the south we find the vibrant cultural display of the Algerian tribes, the area includes various heritage regions such as Hoggar and Tassli NAjjer. the Sahara also makes a major source of attraction where lies the vast treasures of historical beauty and a diverse array of landscapes, sand dunes prehistoric rock art and oasis. Separating the vast Sahara from the

coast are rugged plateaus dotted with hot springs and other features that make it an ideal ecotourism destination. (*world guides*, 2021). (tourism review, 2021). (*Tourism*, 2021)

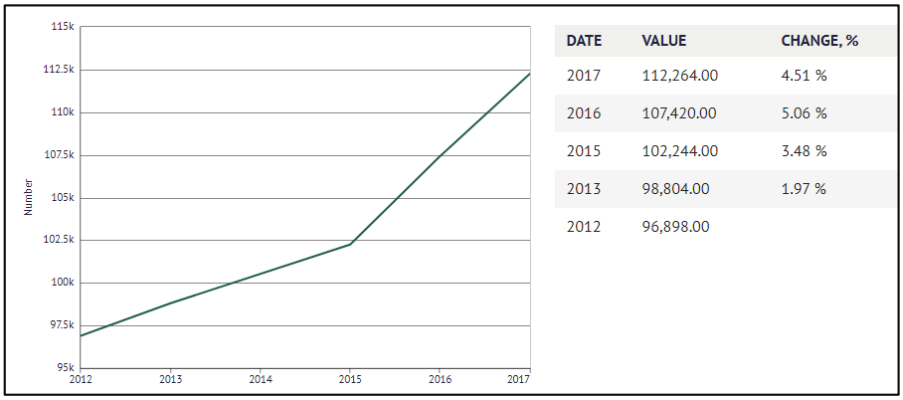
Algeria now intends to make tourism one of its economical motors in the frame work of SDAT that aims to:

- The enhancement of Algeria Destination.
- Quality Tourism Plan (PQT).
- The tourist offers development and qualification by investing in tourist and villages centers of excellence.
- The public-private partnership to strengthen the tourism chain.
- The financing mobilization.

It also states that the activities that must be developed are:

- Hotel / Catering / Resort.
- SPA tourism.
- Health tourism.
- Tourism in Mountains.
- Saharan Tourism.
- Development and diversification of tourism products.
- Quality Development / Brand / Labeling.

Current statistics shows that Algeria had 112,264,00 total of beds in 2017. (*knoema.com*, 2021)



DATE	VALUE	CHANGE, %
2017	112,264.00	4.51 %
2016	107,420.00	5.06 %
2015	102,244.00	3.48 %
2013	98,804.00	1.97 %
2012	96,898.00	

*Figure 10 Tourism Statistics of Algeria/ source: (*Tourism Statistics of Algeria - knoema.com*, 2021)*

II.3.5 TYPES OF TOURISM ACCOMODATIONS

Hotel: an establishment that provides travelers with paid accommodations. lodging, meals entertainment and various services like room service, wellness areas, swimming pools, sports facilities. They provide private rooms that range from single rooms to royal suits. hotels can be large or small, independently owned business or a part of a hotel chain or a holiday resort and they rated from 1 star to 5 stars. (veesko, 2021). (*Tourism Teacher* 2020). (*KooKooning*, 2021). (Revfine.com, 2020)

Aparthotel: is essentially an apartment building that combines the comfort and independence of an in a fully furnished and equipped private apartment with the services of a hotel. It provides a similar experience to renting an apartment with the option to check in and check out on demand, rather than signing a fixed term contract. The services offered among others are housekeeping, breakfast, laundry, meals, and access to wellness areas such as pools, saunas… (veesko, 2021). (*Tourism Teacher* 2020). (*KooKooning*, 2021). (Revfine.com, 2020)

Hostel: a hostel is an inexpensive type of accommodation where multiple guests sleep in different beds in the same living space.it provide dormitory-style accommodation, with bunk beds and common showers. hostels promote meetings and exchanges between visitors, by providing relaxation areas with games and books, as well as a shared kitchen for the preparation of meals. It's ideal for budget travelers and backpackers. (veesko, 2021. (*KooKooning*, 2021). (Revfine.com, 2020)

Motels: a form of overnight accommodation that were originally designed for motorists. they provide a number of rooms with minimal amenities**.** they are typically located by the roadside and offer ample free parking motor vehicles. (veesko, 2021). (*KooKooning*, 2021). (Revfine.com, 2020)

Bed and Breakfast (B&B): small establishments that offer guests private rooms for overnight stay along with breakfast in the morning. The accommodation is often a guesthouse which has a small number of rooms. They are independently run, Oftentimes the host lives in the same building. (veesko, 2021). (*Tourism Teacher* 2020) (*KooKooning*, 2021). (Revfine.com, 2020)

Cottages: a small, cozy vacation house that is classed as being old or traditional. typically, in a rural area or the countryside. a guest pays to use the property for a short period of time. It's a

self-contained accommodation that does not offer meals. They are especially common the UK, US and Canada. (veesko, 2021). (*Tourism Teacher* 2020). (*KooKooning*, 2021). (Revfine.com, 2020)

The riad: A traditional Moroccan house built around an open patio, often converted into an intimate hotel or guesthouse. (veesko, 2021). (*Tourism Teacher* 2020).

Resort: a full service commercial establishment That consists of a hotel and offers and offers a variety of guest services, recreational facilities and amenities on site. Guests will have access to lodgings, restaurants, bars, entertainment options, recreational activities and shops. (veesko, 2021). (Revfine.com, 2020)

Holiday Parks and Campgrounds: It's the most economic form of accommodation where visitors to pitch a tent, or use caravan or camping-car on equipped ground. Many campsites provide services and additional amenities and activities such as a bed, wardrobe, lamps a swimming pool, play areas and many others. (veesko, 2021). (*Tourism Teacher* 2020). (*KooKooning*, 2021).

II.3.6 SERVICED APARTMENT:

also known as extended stay apartment is a fully furnished self-contained apartment available to rent for short-term or long-term stay, providing hotel-like amenities and services where most taxes and utilities are included within the rental price. The apartments have private cooking facilities either a kitchenette or a full size kitchen with dishwashers and washing machines, living and sleeping areas offer more space and comfort than normal hotel rooms. Their services usually include room service, housekeeping, a laundry room, and often having access to gyms, restaurants, meeting space and other hotel-like services. They are professionally-operated apartments by real companies that have their own guest services and maintenance teams. Meaning they are not home shares.

This type of accommodation is primarily occupied by business travelers but they can also be used by the general public or university students. (Revfine.com, 2020). (forenom, 2018). (Association of Serviced Apartment Providers', 2021)

II.3.6.1 DIFFERENCE BETWEEN HOTELS, APARTHOTELS AND SERVICED **APARTMENTS**:

Hotel	VS	Aparthotel	VS	Serviced apartment
✓ Most services offered ✓ Short term stay ✓ No private kitchen ✓ often located close to airports, train stations, business centres		✓ More identical to hotels in services ✓ Short term stay ✓ Private kitchenettes with limited kitchenware ✓ often located close to airports, train stations, business centres		✓ More identical to residential buildings ✓ Short or long term stay ✓ Private Fully equiped kitchen ✓ can be found in different quarters of a city ✓ Offers most space

Table II Comparison between hotels, aparthotels and serviced apartments edited by the author

(MagicStay, 2020). (Short stay citizens, 2019). (*smartments-business,* 2021). (*SilverDoor*, 2021)

II.3.6.2 ADVANTAGE OF SERVICED APARTMENT COMPARED TO A TRADITIONAL HOTEL:

- A serviced apartment is more of a home
- has more square meters than a traditional hotel room.
- substantially cheaper than a hotel room when staying for a longer period of time.
- resembles the culture of the specific area. It gives insight into what a real local apartment would look like
- attracts clients all around the year
- introduces different lodging formulas

II.3.7 NORMES AND REGULATIONS IN TOURISM:

Global code of ethics for tourism according to unwto

- Tourism's contribution to mutual understanding and respect between peoples and societies
- Tourism as a vehicle for individual and collective fulfillment

- Tourism, a factor of sustainable development
- Tourism, a user of the cultural heritage of mankind and contributor to its enhancement
- Tourism, a beneficial activity for host countries and communities
- Obligations of stakeholders in tourism development (providing tourists with objective and honest information on their places of destination and on the conditions of travel)
- Right to tourism
- Liberty of tourist movements
- Rights of the workers and entrepreneurs in the tourism industry
- Implementation of the principles of the Global Code of Ethics for Tourism

Laws governing the tourism sector in Algeria

- Law No **83-08** of 05 February 1985 on the protection of the environment.
- Law No **84-12** of 23 June 1984 laying down general rules for forests.
- Law No **87-03** of 07 June 1987 on spatial planning.
- Law No **90-29** of 01 December 1990 on planning and town planning.
- Law No **90-08** of 07 April 1990: relating to the commune and the wilaya.
- Executive Decree No **89-09** of 07 January 1989 laying down detailed rules for determining the areas to be promoted.
- Executive Decree No **90-78** of 27 February 1990 on environmental impact assessments.
- Executive Decree No **91-177** of 28 May 1991: lays down general rules for town planning and construction.
- Executive Decree No **91-187** of 28 May 1991 laying down procedures for drawing up land use plans.
- Executive Decree No **93-167** of 10 July 1993: define the required quality of bathing water. (Bouanani,A)

Recommendations

- the establishment of more laws concerning sustainable tourism and the protection of the environment
- including suitable infrastructure in the urban planning executive decrees
- laws monitoring energy efficiency and environmental aspects of tourism facilities
- laws monitoring the pollution resulted from tourism and introducing recycling into the accommodations
- laws monitoring the use of natural resources
- promoting Sahara as a future tourist destination

II.4 CASE STUDIES

In order for us to further understand the different architectural, functional and bioclimatic aspects of our project. We have conducted a study on 4 projects of serviced apartments and apart hotels from all around the world. Which allows us to have different point of views all while referencing to reality.

The projects that follow were chosen based on different criteria that will serve us as guide lines in our architectural design.

PRADO CONCORDE APARTMENTS CASE STUDY

Figure 15 Prado Concorde apartments/ source: ArchDaily.com

TECHNICAL DATA SHEET

Name: Prado Concorde Apartments
Type: Mixed-use building
Location: Castelnau-le-lez, France
Architect : Valode & Pistre
Year: 2019
Area: 28000 m²
Program: Creation of a new mixed complex around an internal garden, Accommodation (private, social, student), shops, offices, retirement homes, teaching

LOCATION AND ACCESS POINTS

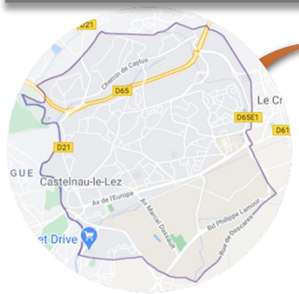
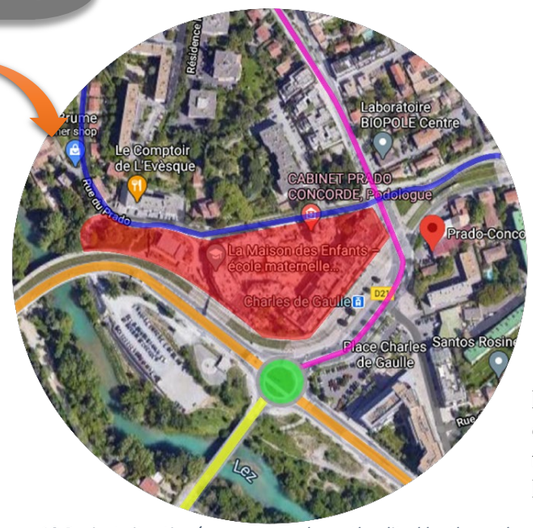


Figure 14 Castelnaule Lez situation/ source: Google earth



- The site
- Avenue de la justice de Castelnau
- Avenue Aristide Briand
- Rue du Prado
- Avenue François Delmas

Prado Concorde development is situated on the edge of the Lez river at the entry to the

Figure 13 Project situation/ source: google earth edited by the author

VOLUME AND INTAGRATION

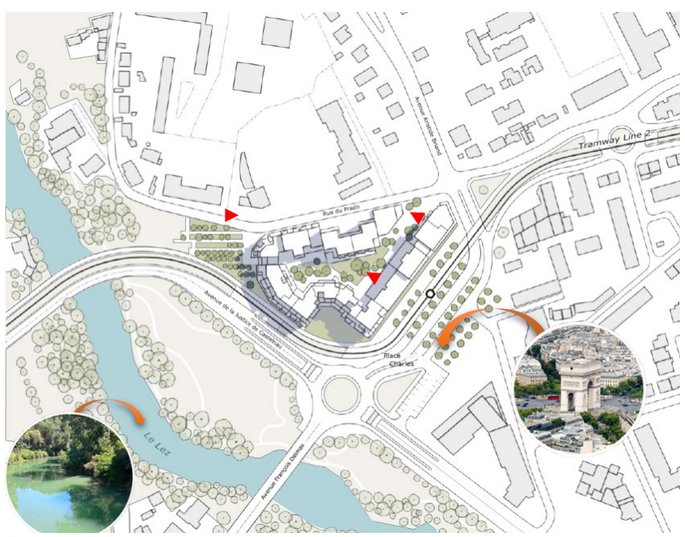


Figure 11 Site plan / source: ArchDaily.com edited by the author

- Dynamic form
- 11 blocs that vary in height from 7 to 9 level
- Panoramic views
- Adapting to the slight slop by creating
- Different levels of underground car park
- Separating the blocs on the ground level to create entrance to the courtyard

FUNCTION AND CIRCULATION

Figure 17 Ground floor plan/ source: ArchDaily.com edited by the author

Figure 16 Typical floor plan/ source: ArchDaily.com edited by the author

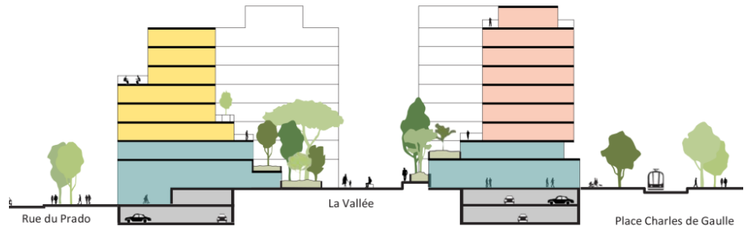


Figure 18 section/ source: ArchDaily.com edited by the author

- Central distribution
- The communal spaces are predisposed on the ground floor and the 1st level
- Apartments occupy upper floors

- Entrance to the site
- Entrance to the blocs
- Entrance to services
- Stairs & elevator
- Parking
- School, Shops, Business, Offices
- Studio
- T2
- T3

THE BIOCLIMATIC ASPECT

Figure 12 Elevation/ source: ArchDaily.com

A planted tree on each individual balcony

The particular disposition of balconies to creating movement and lightness to the façade like a flight of birds.

Figure 27 Marina towe/r source: ArchDaily.com

MARINA TOWER CASE STUDY

TECHNICAL DATA SHEET

Name: Marina Tower
Type: Hotel-apartments
Location: 6-22 Pearl River Road, Docklands, Australia
Architects: DKO Architecture
Year: 2017
Area: 37000 m
Program: 43 Levels, 461 Apartments ,268 car parks, Restaurant, café, Library, gallery

LOCATION AND ACCESS POINTS

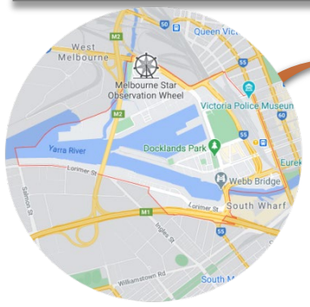


Figure 23 Docklands situation source: Google earth

- The site
- Pearl river RD
- Docklands DR
- Augusta Ave
- Leven Ave

Figure 22 Project situation source: ArchDaily.com edited by the author

The marina tower is located in the heart of **docklands**.
8 Pearl River Rd

VOLUME AND INTAGRATION

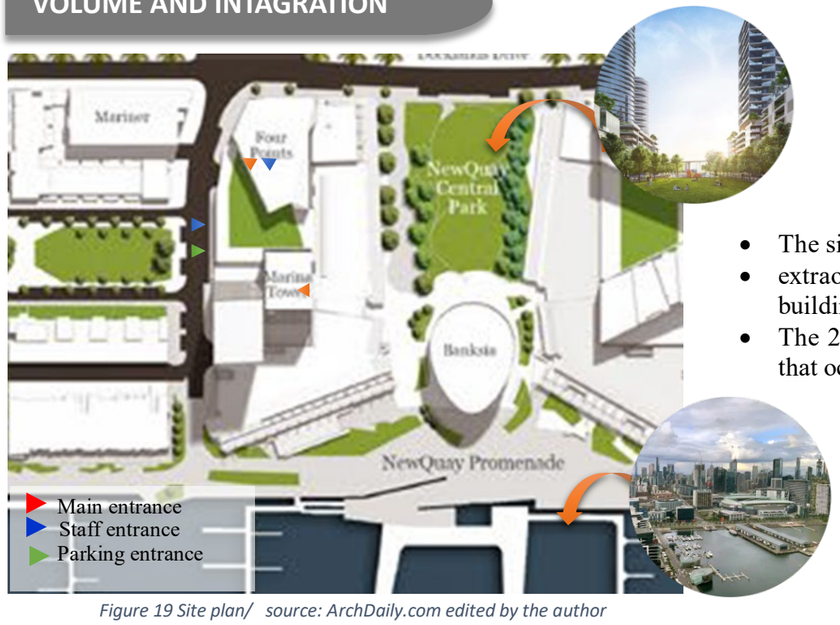


Figure 19 Site plan/ source: ArchDaily.com edited by the author

- The site has a trapezoidal form.
- extraordinary tower typology of the building
- The 2 towers rest on a major platform that occupies the whole site

FUNCTION AND CIRCULATION

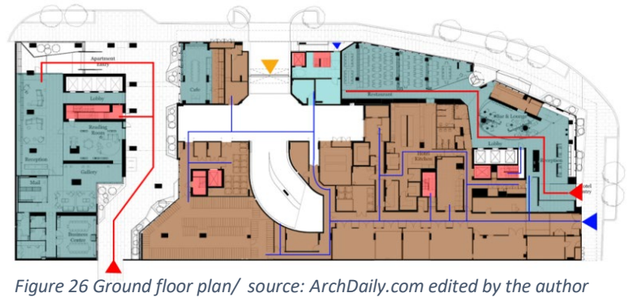


Figure 26 Ground floor plan/ source: ArchDaily.com edited by the author

Figure 21 Mezannine floor plan/ source: ArchDaily.com edited by the author

Figure 25 Typical floor pla/n source: ArchDaily.com edited by the author

- Main entrance
- Staff entrance
- Parking entrance
- Business centres and conference
- Hotel rooms
- Communal area
- Hotel staff area
- T2
- T3
- T4
- Stairs and elevators

- separation between communal spaces and apartments
- Separation between clients' circulation and staff circulation

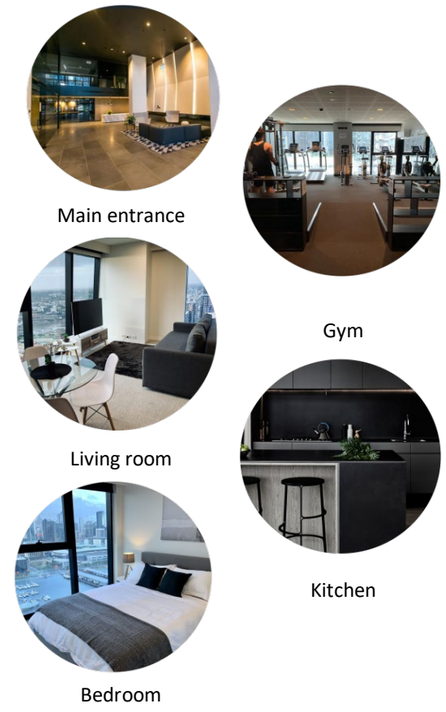


Figure 24 Interior spaces/ source: ArchDaily.com

THE BIOCLIMATIC ASPECT

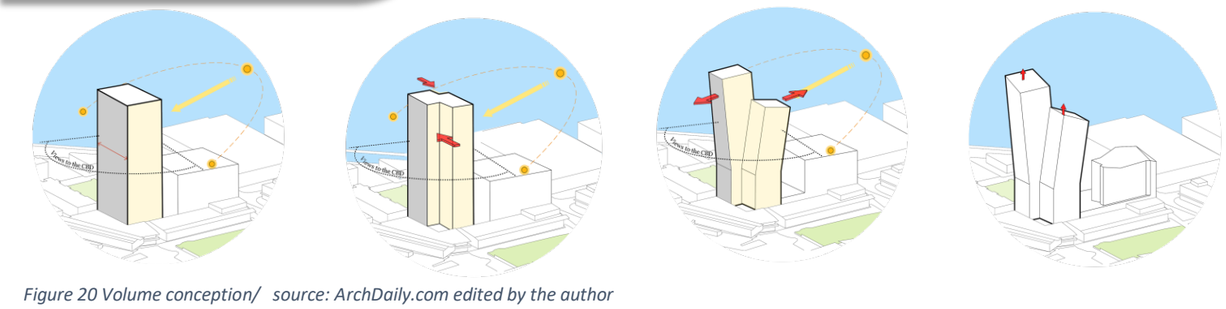


Figure 20 Volume conception/ source: ArchDaily.com edited by the author

- The split form of the tower allows additional sunlight access
- leaning towers provide greater access to cross ventilation
- The use of roof top gardens

FENIX I WAREHOUSE RENOVATION CASE STUDY

Figure39 Fenix warehouse project/ source: ArchDaily.com

TECHNICAL DATA SHEET

Name: Fenix I Warehouse Renovation
Type: Mixed use architecture, apartments, retail
Location: Rotterdam, The Netherlands
Architects: Mei architects and planners
Year: 2019
Area: 23000
Program: 45000m2 of mixed-use space and 212 apartments

LOCATION AND ACCESS POINTS

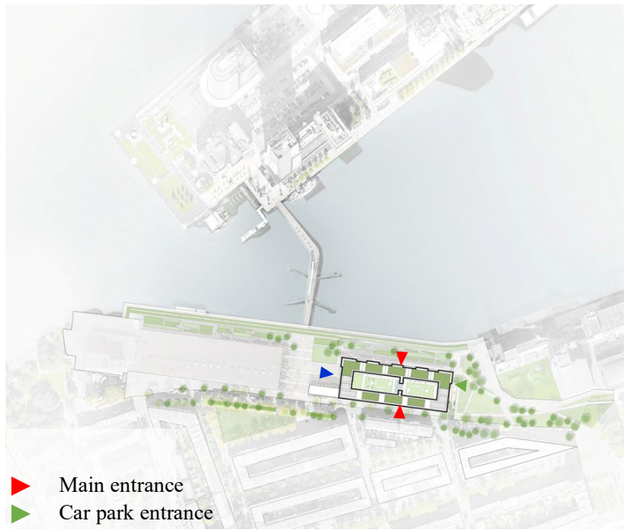
Figure 34 Katendrecht situation/ source:Gooale earth

- The site
- Rijnhavenbrug
- Veerlaan
- Nico Koomanskade
- Lombokstraat
- Sumatraweg

Figure 37 Project situation/ source: Google earth edited by the author

Fenix warehouse is located in the middle of Katendrecht
Katendrecht is a neighborhood in Rotterdam South

VOLUME AND INTAGRATION



- Main entrance
- Car park entrance

Figure 38 Site plan/ source: ArchDaily.com edited by the author

- The site has a rectangular geometry with no slops
- The building platform occupies the whole site
- the step profile of the upper volume with a central void

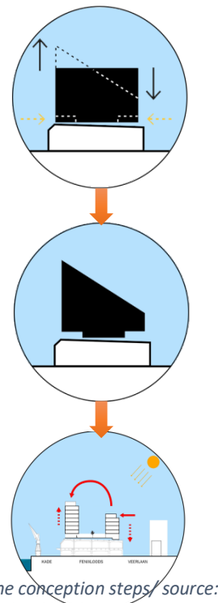


Figure 30 Volume conception steps/ source: ArchDaily.com edited by the author

FUNCTION AND CIRCULATION

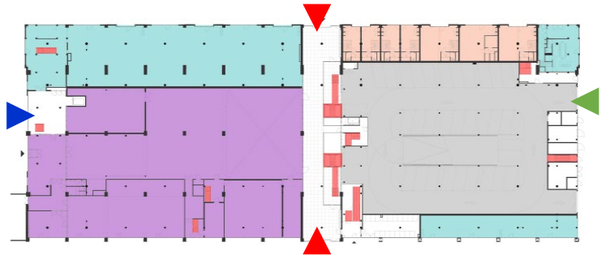


Figure 33 Ground floor plan/ source: ArchDaily.com edited by the author

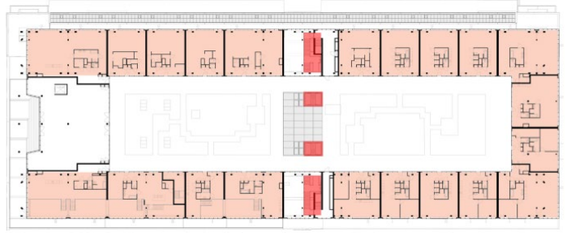


Figure 32 Incesion floor plan/ source: ArchDaily.com edited by the author

Figure 31 8th level floor plan/ source: ArchDaily.com edited by the author

- Main entrance
- Parking entrance
- Stairs & elevator
- Mixed use space
- Business
- Parking
- Residential area

Figure 36 Section/ source: ArchDaily.com edited by the author

- Distribution by gallery
- 2 floors of underground parking
- loft-style apartments, with open plan layouts

THE BIOCLIMATIC ASPECT

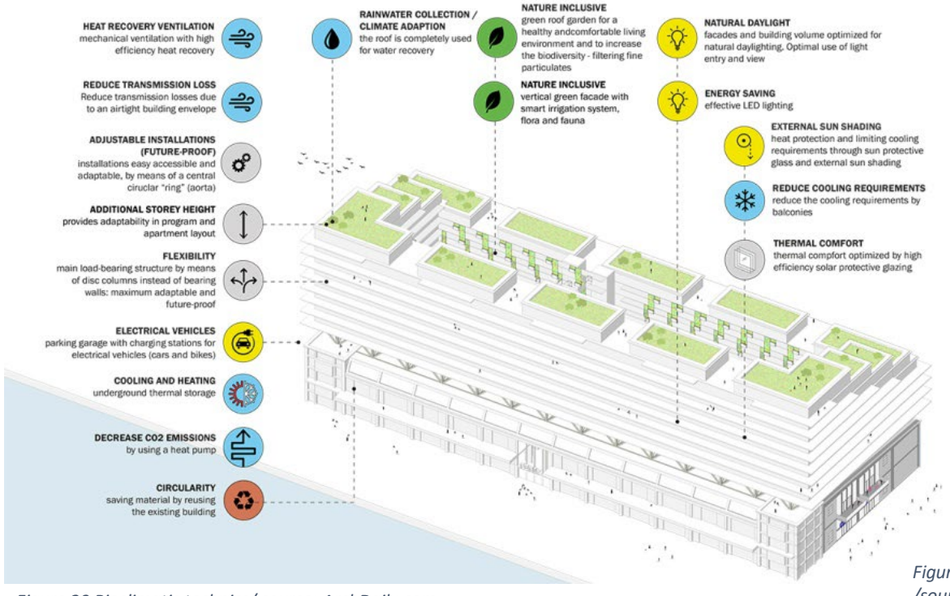


Figure 29 Bioclimatic technics/ source: ArchDaily.com

Courtyard

Mixed-use

Apartment

Figure 35 Interior spaces/ source: ArchDaily.com

Roof garden

Green facades

Protective

Figure 28 Figure 39 /source: ArchDaily.com

Figure 47 Résidence du port / Source: Booking.com

RESIDENCE DU PORT
CASE STUDY

TECHNICAL DATA SHEET

Name : Résidence du port
Type : aparthotel
Location: Algeria-Algeirs El marssa
Year: 2019
Area: 1200

LOCATION AND ACCESS POINTS

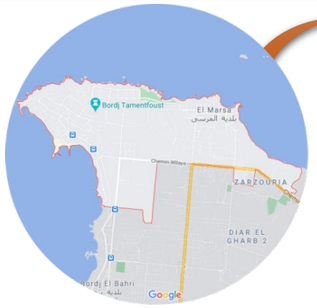


Figure 45 41 El Marsa situation/ Source: Google earth

Figure 44 Project situation / Source: Google earth

- The site
- Rue de la plage
- Rue
- Rue colonel Chorfi

The aparthotel is situated in the south east of el marssa
El marsa is located in the eastern suburb of Algiers

VOLUME AND INTAGRATION

Figure 40 Résidence du port / Source : Booking.com

- The square geometry and the flat surface of the site.
- The building is composed of 5 floors and occupies % of the site.
- The Compactness of the volume.
- Projecting Views towards the sea by:

The use of curtain walls

FUNCTION AND CIRCULATION

GROUND FLOOR /UNDERGROUND


Administration


Reception


Main entrance

Cafeteria


Pool


Parking

Figure 43 Interior and exterior spaces/ Source: Booking.com

UPPER FLOORS

Duplex


Bedroom


Living area


Shower

Figure 42 Apartment spaces/ Source: Booking.com

T3 **T4**

Figure 46 Room typologies / Source: Booking.com

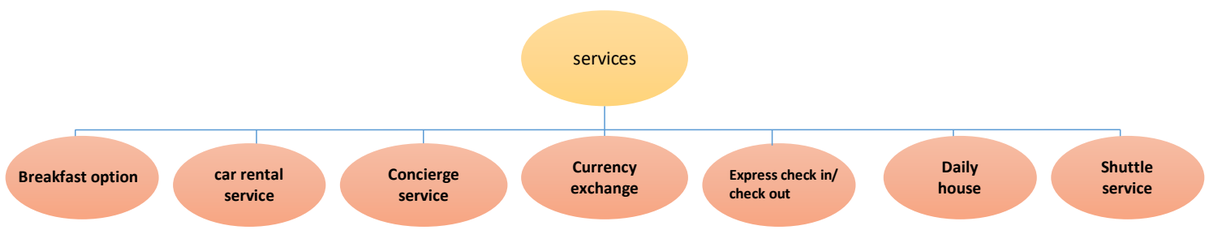


Figure 41 Bubble diagram of different services Edited by the author

SYNTHESIS

VOLUME AND INTAGRATION

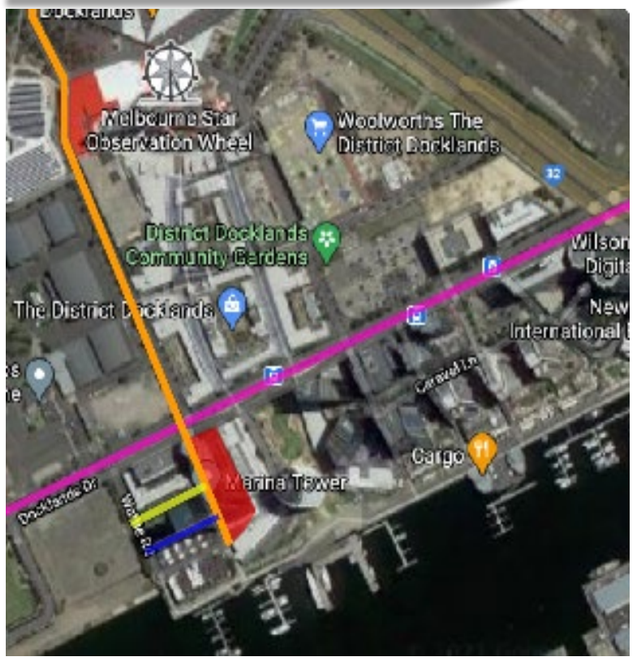


Figure 56 Project situation/ source: ArchDaily.com edited by the author

- Proximity to transportation, leisure and business centers
- Prioritizing views for the apartments

compact or around a central garden

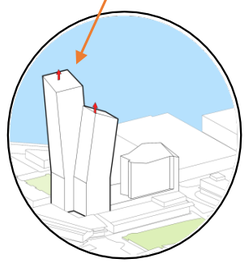


Figure 55 Volume conception source: ArchDaily.com edited by the author

Figure 54 Site plan source: ArchDaily.com edited by the author

FUNCTION AND CIRCULATION

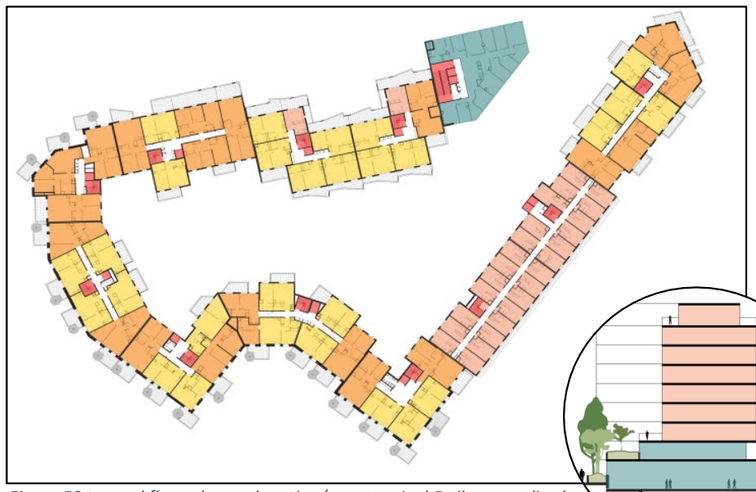


Figure 53 typucal floor plan and section/ source: ArchDaily.com edited by the author

- Communal and service areas are included inside the building
- Residential areas are separated from communal areas
- Flexibility in apartment formulas from studios to F3 to open plans layout
- Underground car park to save space

Residential area | Car Park | T2
Communal area | Studios | T3

Main entrance
- pedestrian access: more than one entrance for residents
- mechanical access: shared by residents, employees and staff

Secondary entrance
- pedestrian access: staff and employees

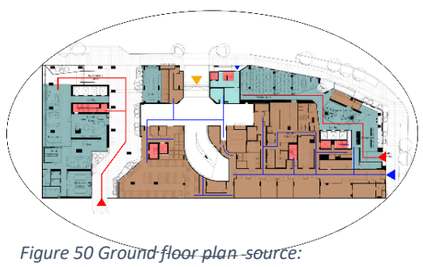
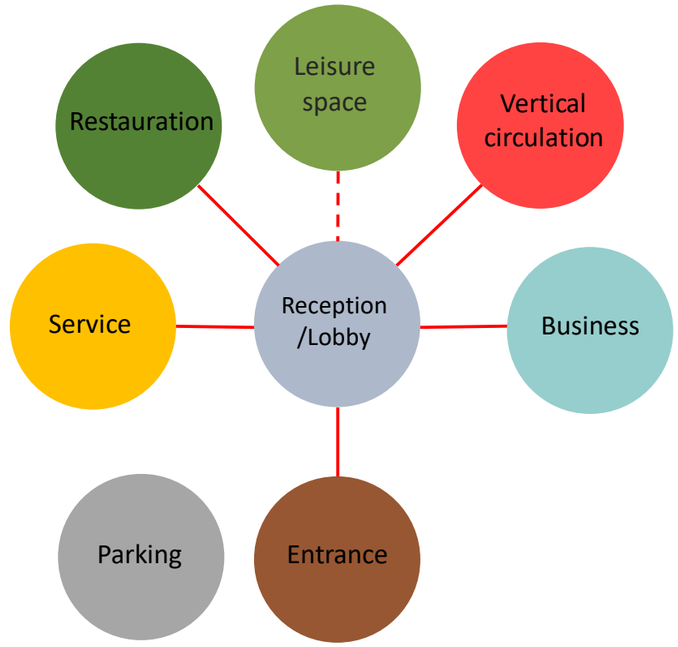


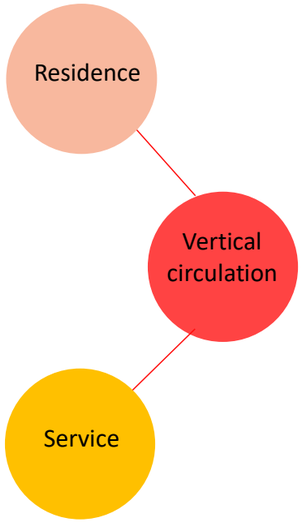
Figure 50 Ground floor plan source: ArchDaily.com edited by the author

BUBBLE DIAGRAM OF DIFFERENT FONCTIONS



Ground floor plan

Figure 52 Bubble diagram of serviced apartment functions Edited by the author



Upper floor plans

BIOCLAMATIC ASPECT

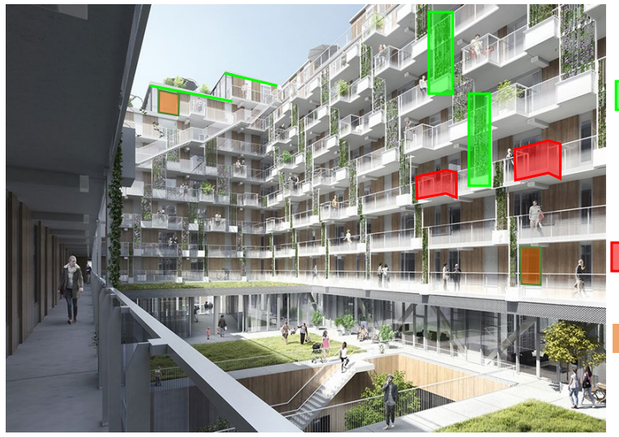


Figure 57 Fenix warehouse project/ Source: Archidaily.com

- The use of green roofs and green facades
- Rainwater collection through green roofs
- Using balconies to reduce cooling requirements
- Solar protective glazing

Manipulating the volume to provide sun rays and natural ventilation

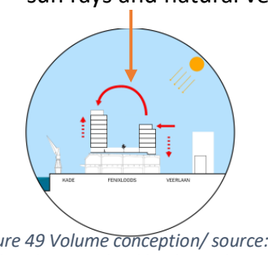


Figure 49 Volume conception/ source: ArchDaily.com edited by the author

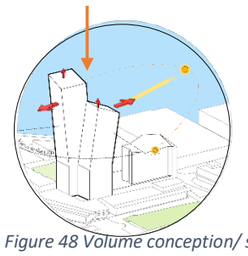
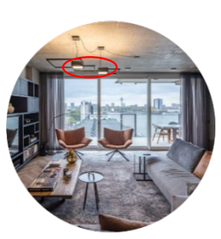


Figure 48 Volume conception/ source: ArchDaily.com edited by the author

Effective led lighting



The use of recyclable materials (wood and metal)

Figure 51 Fenix warehouse project/ Source: Archidaily.com

Synthesis

Composing this chapter has allowed us through the numerous bibliographical researches that we have led, to further our knowledge and improve our understanding of bioclimatic architecture and the different concepts of sustainability and ecology. Also the notions related to our specific thematic which is tourism. The different types of tourism, its impacts and accommodations, and how it can be a motor of sustainable development and environmental conservation.

The case studies that we have conducted provided a more detailed idea about the project we are going to design. its main functions and services, its different spaces and the relations between the latter's. also new bioclimatic aspects and solutions that we plan to use on our project.

Over all this chapter has given us a good head start for the coming chapters and a more vivid idea about our future project.

III. CHAPTER 03: PROJECT DEVELOPMENT

III.1 Introduction:

Knowing a city, its history, and its urban setting allows us to understand the relationship between the city and its environment.

the coastal city through its specific location is a point of contact "land and sea" presents an earthen laboratory of architectural and urban production, it presents also a showcase of a country.

This is how this chapter will feature an analysis of the city of Tipaza, which we will make it possible to analyze the various data of the site, and to highlight the potentialities and the conditions for a better integration of our project.

III.2 Physical environment:

III.2.1 Presentation of the case study:

III.2.1.1 Site Selection:

In the frame work of our master's thesis we have chosen a site that is located in Tipaza basing our choice on different criterias that are:

- Located along the coastline.
- Easily accessible from all sides.
- Generous area and Simple morphology.
- represents a great touristic and economical potential for Tipaza.

Riche in nature, culture and activities.

- Projecting views towards the sea and Chenoua mountain.
- The presence of the archaeological site on its north west.
- Located near major urban activities such as business facilities
  school of tourism anduniversity.

III.2.2 Site Analysis

III.2.2.1 Situation of the study area (geographical location)

III.2.2.1.1 On the territorial scale:

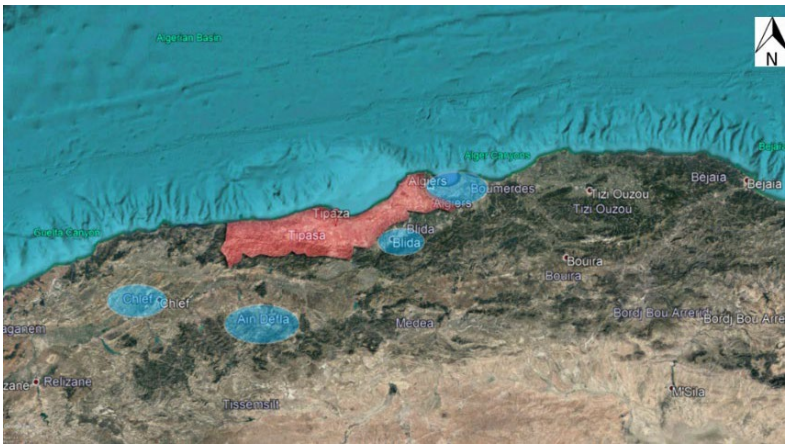


Figure 58 Location of the Wilaya of Tipaza/source: google earth, Edited by the auth...

Tipaza a coastal city located 70 km west of Algiers, covering an area of 1707km². It gathers in the tourist pole north center.

Its limited by:

- North: The Mediterranean
- South: Ain Defla
- East: Algiers
- West: Chlef

III.2.2.1.2 On the city's scale:

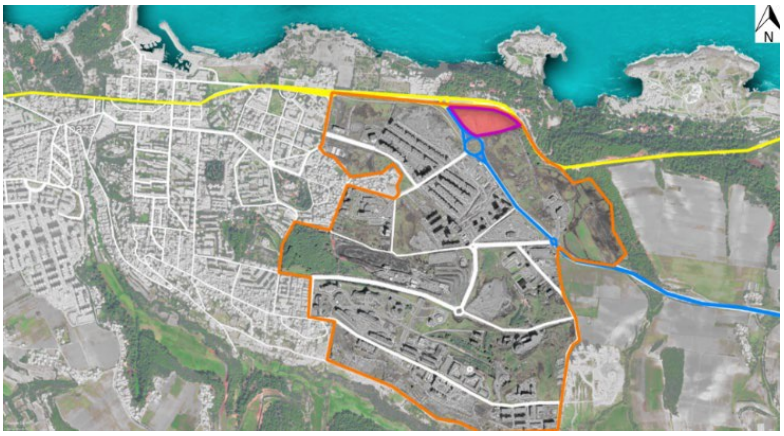


Figure 59 situation of POS AU3/source: google earth, Edited by the author

POS AU3 is located to the East of the agglomeration chief place, between the RN11 to the North and Oued Merzoug to the South, to the West Hai Rabta and Cité Oued Merzoug and to the East by the CW106.

III.2.2.1.3 Islet limits:

Figure 60 Delimitation of the site /source: google earth, Edited by the author

located at the perimeter of the city of Tipaza, 1km from the city center. It is delimited by:

- **North:** National Highway 11.
- **South:** another portion of AU3 POS
- **To the east:** the commune of the national road n°11 and a chain of pine trees.
- **To the west:** by the CW106.

III.3 NATURAL ENVIRONMENT DATA :

III.3.1 immediate environment :

Figure 61 immediate environment / source: google earth. Edited by the author

Our site is surrounded by empty space later urbanized collective housing and wilaya road CW 106 to the West and tourism school to the South, a recreation park and complex C.E.T and also national road N 11 to the north.

III.3.2 Morphology

Figure 62 Morphology of the site / source: google earth. Edited by the author

Site form: Our site has an irregular shape on three sides.

Surface:3.8 hectares.

III.3.3 Topography:

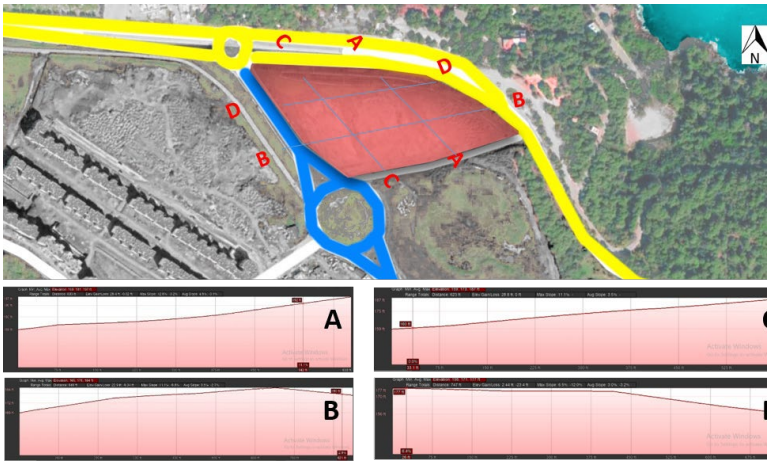


Figure 63 topography of the site / source: google earth. Edited by the author

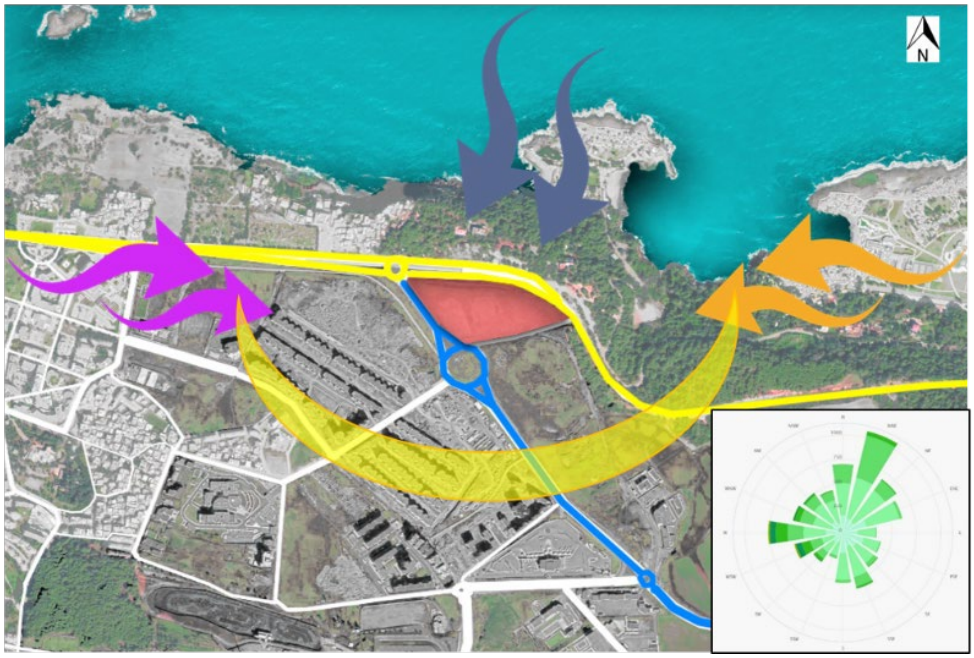
section AA: highest point 60 mabove the sea and lowest point 51.5 m.

section BB: highest point 56 mabove the sea and the lowest point 50.

Section CC: highest point 57 mabove the sea and lowest point 48 m.

section DD: highest point 53.9 mabove the sea and the lowest point 47.2 m.

III.3.4 Solar radiation and wind:



A big portion of the site is exposed to sun rays all around the year

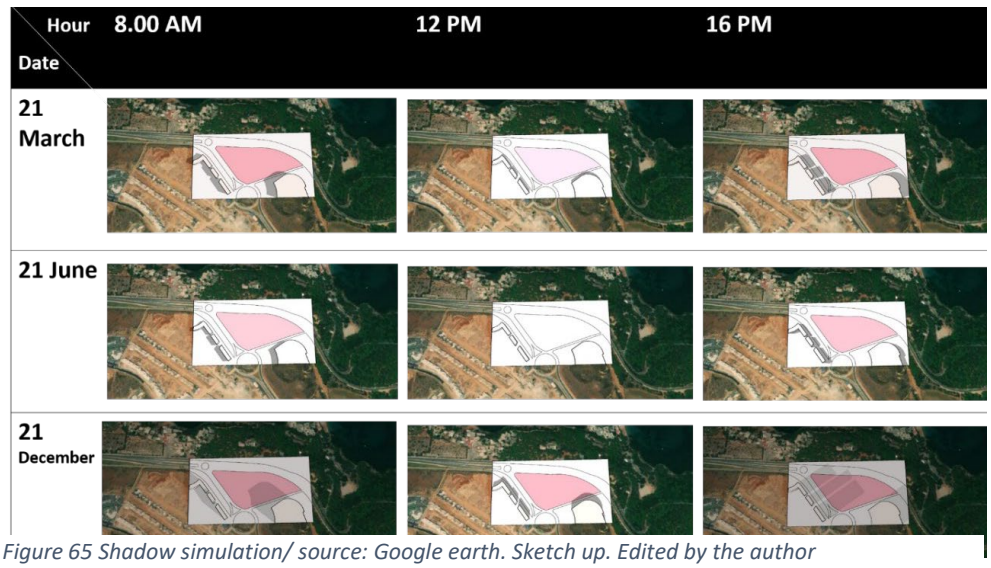
Figure 64 Solar radiation and wind/ source: Google earth. Edited by the author

Wind

Low to moderate wind. Cool and humid from the east blowing from May to October while the West wind blows from November to May bring rain. Sirocco winds occur on average 14 days/year over the period summer July and August.

The intensity of the winds is quite strong on the maritime facade the prevailing wind of direction Northwest in winter and Northeast in summer.

III.3.5 Sun and shadow:



After simulation of shading realized by sketch Up the shaded parts are located in the east and west specifically in the month of December.

Figure 65 Shadow simulation/ source: Google earth. Sketch up. Edited by the author

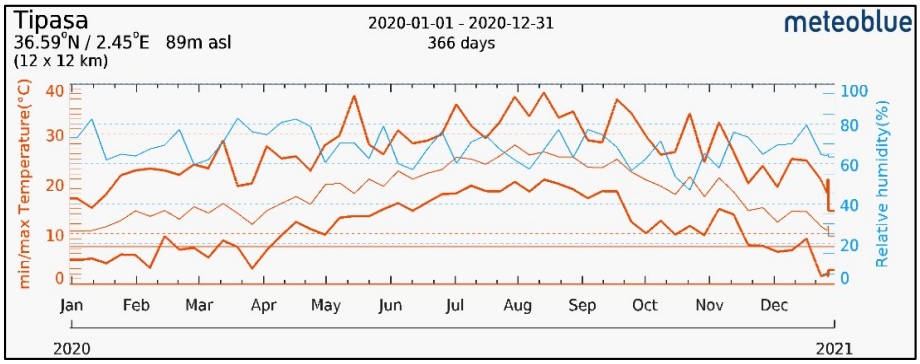
III.3.6 Vegetation cover:

Our site is surrounded by greenery, we find in the limits of the site a variety of trees, (palm trees, pine trees, shrub …)

Figure 66 Vegetation cover / source: Google earth. Edited by the author

III.3.7 CLIMAT:

III.3.7.1 Temperature:



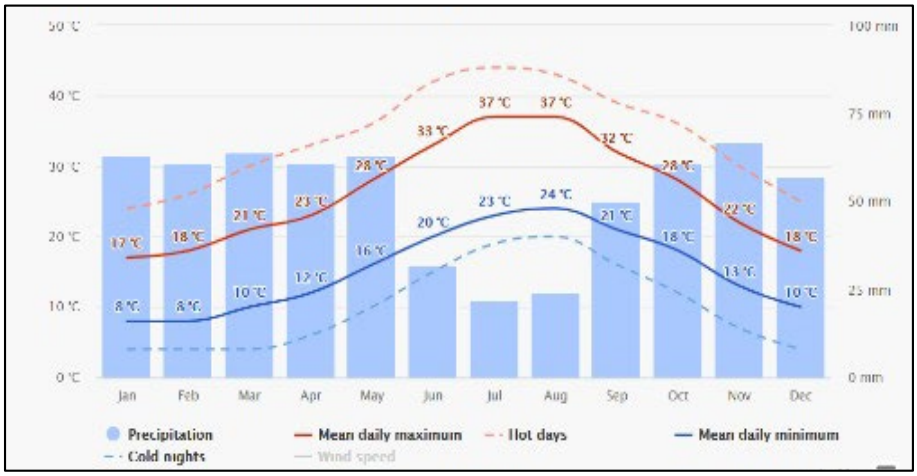
Two seasons can be distinguished:

A warm season, from June to October with a Max temperature in August 37°C

A cold season, from November to May, with a Min temperature in January 10°C

Figure 67 Temperature and humidity diagram / source:Meteo blue.

III.3.7.2 Precipitation



Rainfall is irregular and can cause significant damage to crops. The maximum rainfall is recorded from December to May with 72 mm while the minimum is in July and August with 22 mm.

Figure 68 Precipitation and Temperature diagram / source:Meteo blue.

III.3.7.3 Bioclimatic diagram of GIVONI:

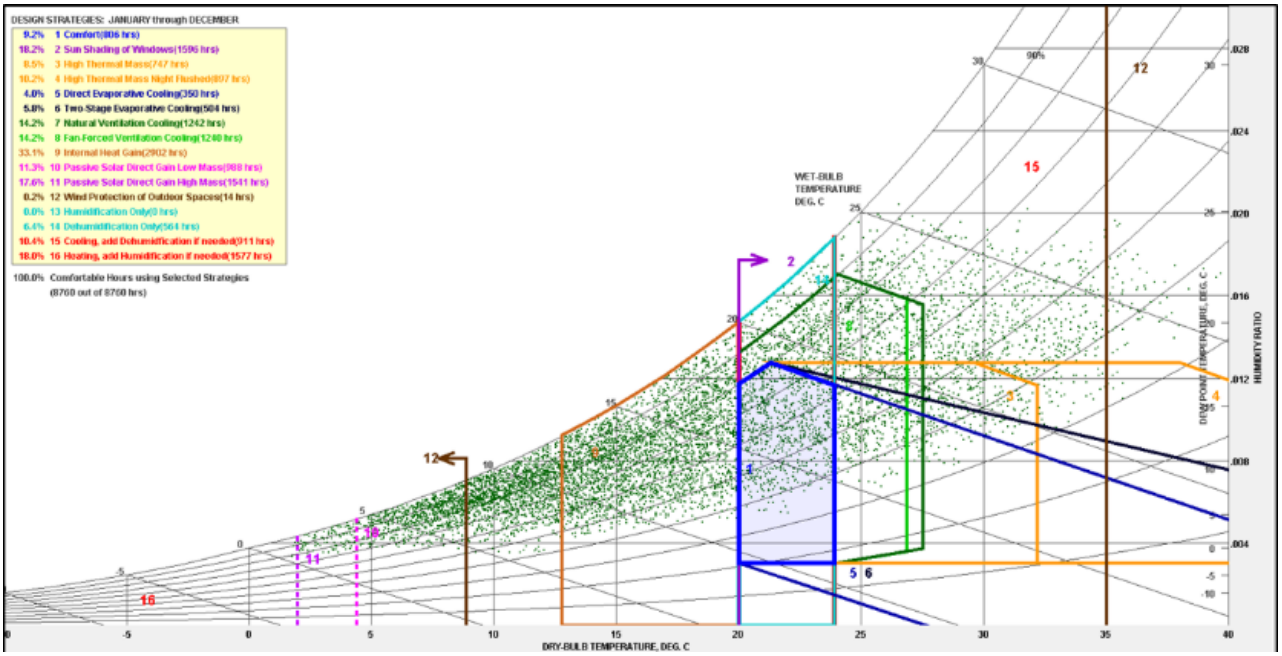


Figure 69 Givoni diagram / source:Climate consultant

Comfort zone: Set to 20° Temperature Up to 25° and 60% Humidity Up to 77% of March months and Avril and Mai.

Area under heating: Set to 12° Temperature Up to 20° and Very High Humidity 58% up to 80% from November to February.

Area on heating: Set by temperature of 25 ° or more and Very high humidity from 68% up to 85% of month July and August; September; October.

<u>Recommendations</u>

Area under heating:

- Orientation: For passive solar heating face most of the glass area south to maximize winter sun exposure, but design overhangs to fully shade in summer
- Use openings for solar capture.

Area on heating:

- Orienting the building north, to benefit from sea breeze.
- Using patio for natural ventilation.
- Using double skin façade.
- Creating an opening for sea breeze and using cross ventilation.

III.3.7.4 Natural environment data synthesis

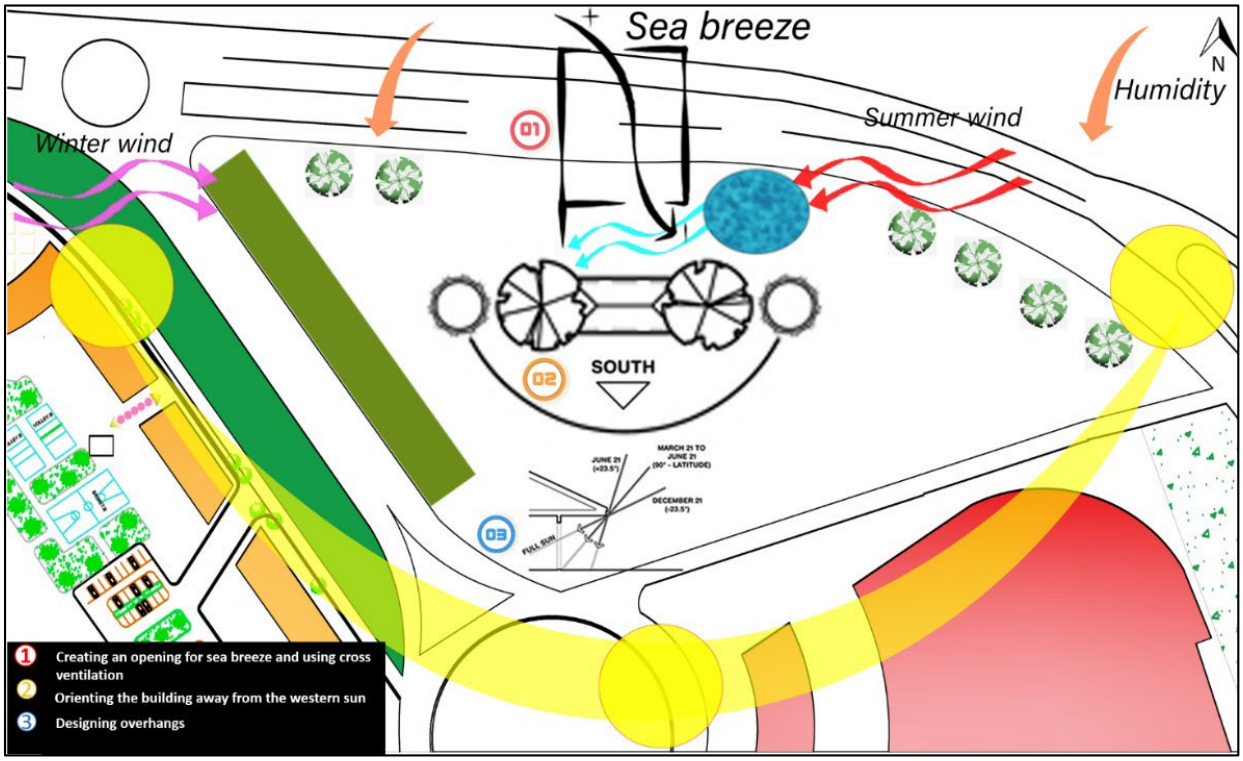


Figure 70 Natural environment synthesis/ Source author

The potential of the site:

- Good accessibility for our site of intervention RN°11 and CW 106.
- Negligible slope of 4.27%, at a height of 7 m from the RN11.
- Sunrays touch all areas of the site.

III.3.7.5 Recommendations:

- Projecting panoramic views towards the sea
- Exterior vegetation and water ponds to freshen the hot summer air and using overhangs
- Using a green barrier to protect from winter winds

III.4 Data of the built environment

III.4.1 Road system:

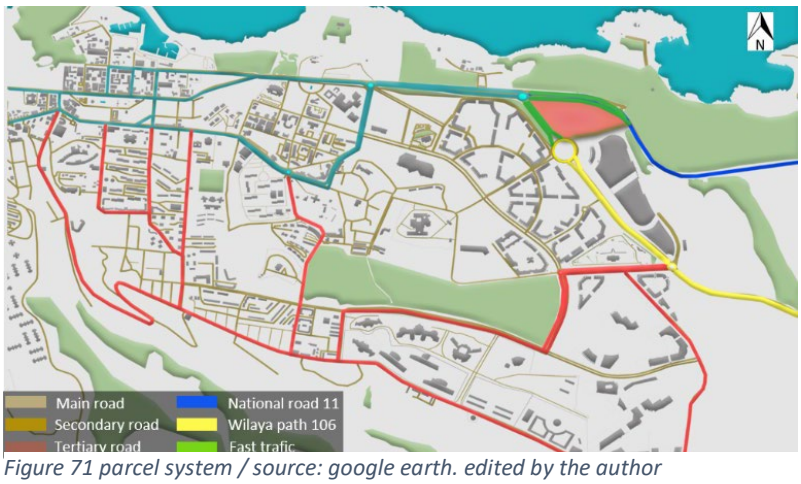


Figure 71 parcel system / source: google earth. edited by the author

The situation of the site near the national road N°11 Facilitates its access.

Our site is accessible from the east by the CW106, From the north by the N°11 and a secondary road from the west.

III.4.2 Parcel system:

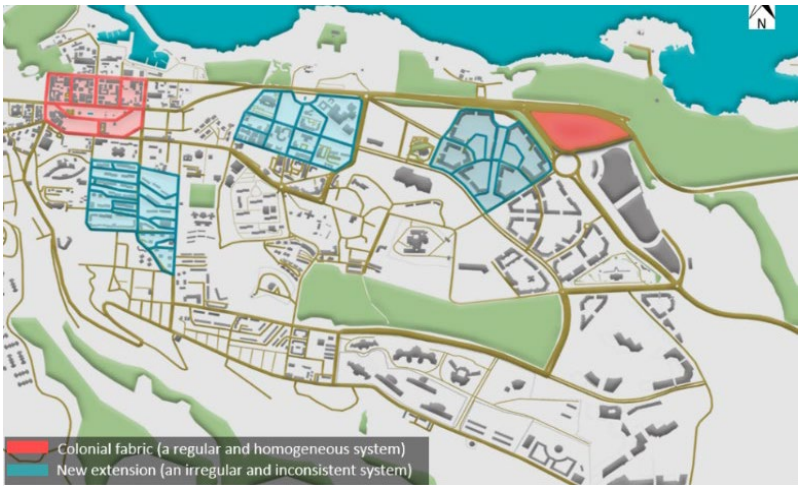


Figure 73 void and solid system / source: google earth. edited by the author

The city of Tipaza is composed of two parts:

one intramural composed of a regular and homogeneous system (Roman tissue, colonial tissue)

and the other extramural composed of an incoherent system (new extensions).

III.4.3 Void and solid system:

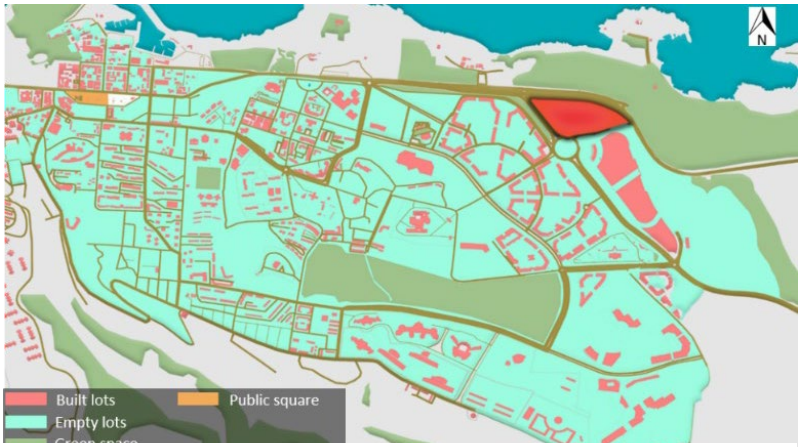


Figure 72 void and solid system / source: google earth. edited by the author

We notice the lack of public spaces especially on the west side of the city.

III.4.4 Built system:

Figure 74 built system / source: google earth. edited by the author

The majority of buildings are between 1 storey height and 3 storey height (individual housing)

R+5 and above are AADL constructions.

The fabric of the city of Tipaza, represents neoclassical buildings of a historical value, but they suffer of degredation

While the post-independence extensions is marked by AADL buildings and its groupings of equipment.

III.4.4 Synthesis of the built environment data :

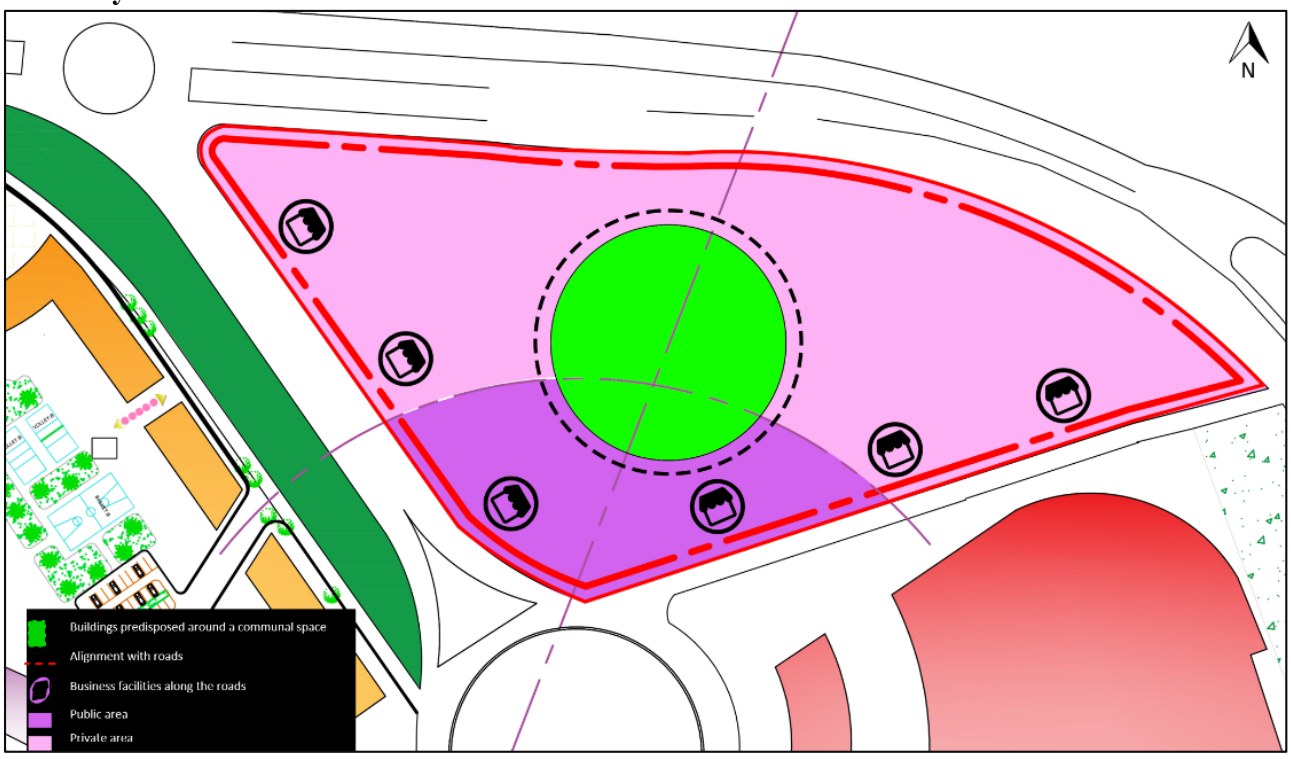


Figure 75 built environment data synthesis/ source: Author

- The creation of business facilities along the roads.
- Dividing the site into private and public areas. Around a central space for public attraction.

III.5 Regulatory environment data:

III.5.1 POS AU3 orientations:

It represents the new pole of development of the commune, this sector is destined to receive a program of high-level structuring equipment to enhance the image of Tipaza as chief town of wilaya, renowned regional, National and even international. Our site is located in islet N°7 which is an equipment area.

Orientations:

- All constructions must be located at a distance of 5 meters from the edge of the roadway (for primary roads), 2metres (for tertiary roads).
- The alignment of the frame is mandatory for the entire perimeter of the island by clearing a clear central space.
- A continuity of the facade in relation to the RN lane, the green mail and the boulevard n°=1

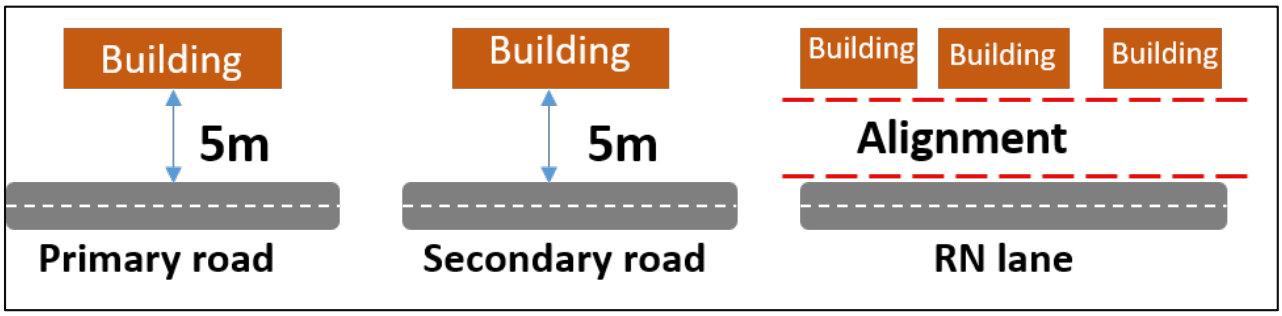


Figure 76 Implementation in relation to the tracks / source :author

Access and roads

Direct access to the area is strictly prohibited from the RN11

- Access will be from the cw106, from the RABTA road that leads to the Wilaya. and in particular the vicinal road N°2 that needs to be redeveloped.
- All roads must meet the minimum technical requirements: the minimum shall be 12.00 meters.

parking:

- Parking lots are to be provided inside each lot.
- The number of motor vehicle parking spaces within the minimum ratio is as follows:
- For two units, one parking space
- For restaurants exceeding 100m² of dining room, one place per 10 m².

Constructible surface:

- The density of the constructions to be implanted must be such that it leaves sufficient space on the ground to create planted spaces. This varies according to the areas of the plots to be developed:
- For equipment land rights-of-way vary between 30% and 50% of the parcel area Depending on the type of equipment offered.
- Building area/plot area CES maximum allowed is 40%.
- the floor area cos maximum allowed is 3.

Buildings heights:

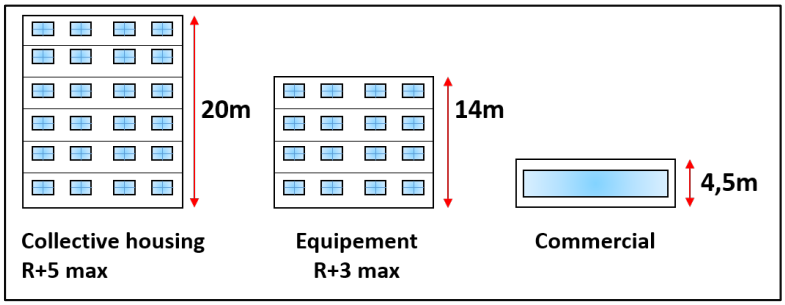


Figure 77 Building heights / source: author

- The maximum height of commercial premises and equipment is 4.50 meters. The height of the floors will be 3.06m.
- For collective habitat, the maximum expected height is 20 m (R+5)
- For equipment, the maximum expected height is 14 m (R+3)

III.5.2 Natural risks:

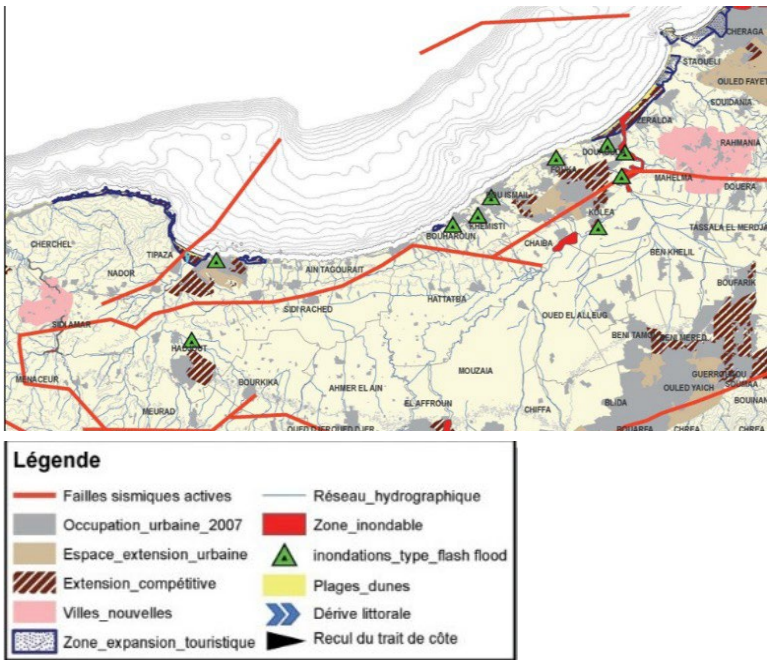


Figure 78 Natural risk map of northern Algeria,

Tipaza is located in Zone III which corresponds to a region of high seismicity.

Recommendation:

Using a metallic structure for its light and flexible properties, such as steel that can bend with the movement of earthquakes.

Using bracers.

Using strip foundations

III.5.2 Synthesis of the regulatory environment data:

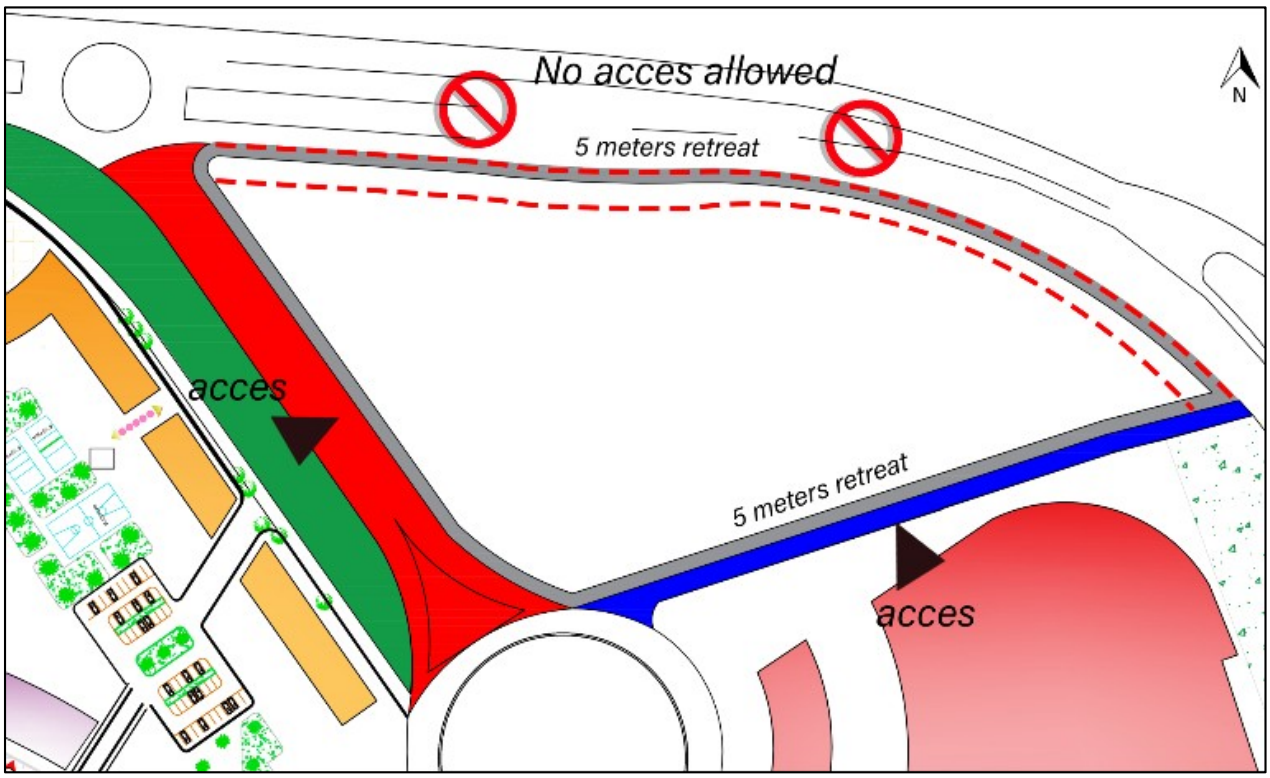


Figure 79 Regulatory environment data synthesis/ source: Author

- The alignment of buildings with road RN11.
- respecting earthquake-resistant building rules.
- Providing accessibility from the C106 road and the secondary road.
- No accessibility aloud from road RN11
- respecting 5m retreats along the roads

III.6 Socio-economic environment data :

III.6.1 Population :

The population of the Wilaya of Tipaza amounted to the 2008 census at 591,010 inhabitants. It represents 1.7% of the national total.

The population of the Wilaya of Tipaza is 694,589 inhabitants (2018 estimate), an increase of 103,579 people compared to the 2008 census in other words the population of the Wilaya increases on average by 10,000 inhabitants each year. (aniref,2018).

III.6.2 Active Population:

Active population: 201,867

Employed population: 183,709

Unemployment rate: 9.0% (aniref,2018)

Cultural and commercial facilities:

While the city is rich of touristic potentials from the coastal location to the roman ruins The city suffers from a lack of touristic infrastructure and commercial facilities

Figure 80 Cultural and commercial facilaties in Tipaza / source: Author

III.6.3 Prospects and opportunities for the economic development of the wilaya de Tipaza

Main vocations:

- Agriculture,
- Culture and tourism
- Arts and crafts

Tourism development:

The wilaya of Tipaza is distinguished by its tourist vocation. It has tourist potential and an important historical heritage. The coast stretches for nearly 123 km with the existence of 59 beaches, 43 of which are open for swimming in addition to numerous coves, bays and other cliffs offering undeniable tourist possibilities. (aniref,2018)

This sector constitutes a significant asset for the socioeconomic development of the wilaya because a significant influx of tourists is recorded there each year.

Taking into account the prospects offered for the development of this sector, several actions were launched in study and relating to 07 tourist expansion zones (ZET) with an area of 631 ha where the operation of the general cadaster has been completed, 02 zones of tourist

expansion (ZET) with an area of 438 ha where the operation is underway and 07 tourist expansion zones (ZET) with an area of 519 ha where the operation is not yet launched.

III.6.4 Synthesis of the socio economic data:

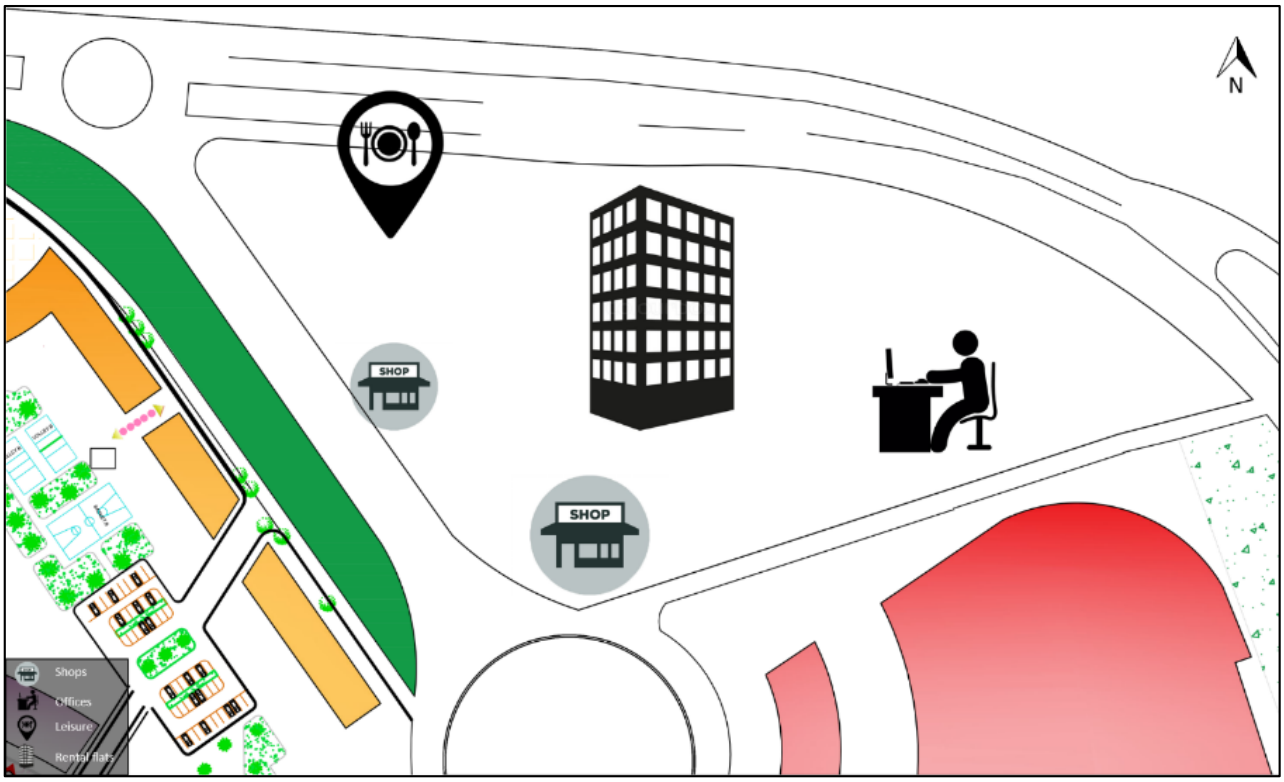
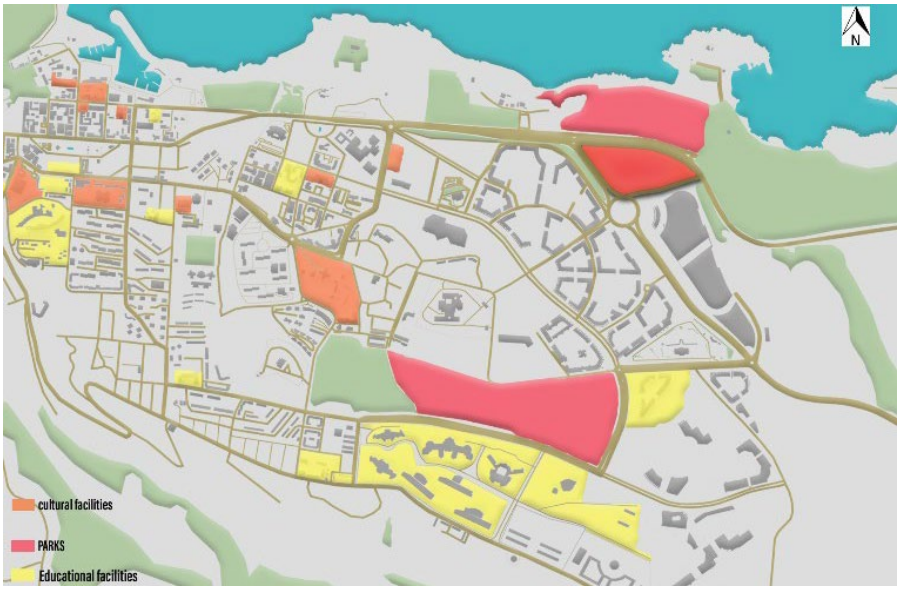


Figure 81 socio economic data synthesis/ source: Author

- A touristic project contributes in the economic development of the city.
- Creating Restaurants and leisure facilities open to the public.
- Creating job opportunities by introducing business facilities in the project.

III.7 Socio cultural data:



We notice a lack of socio cultural facilities especially on the east side of the city, the absence of public parks and gathering spaces.

Figure 82 Cultural facilities / source google earth . Edited by the author

III.7.1 Synthesis of the Socio cultural data:

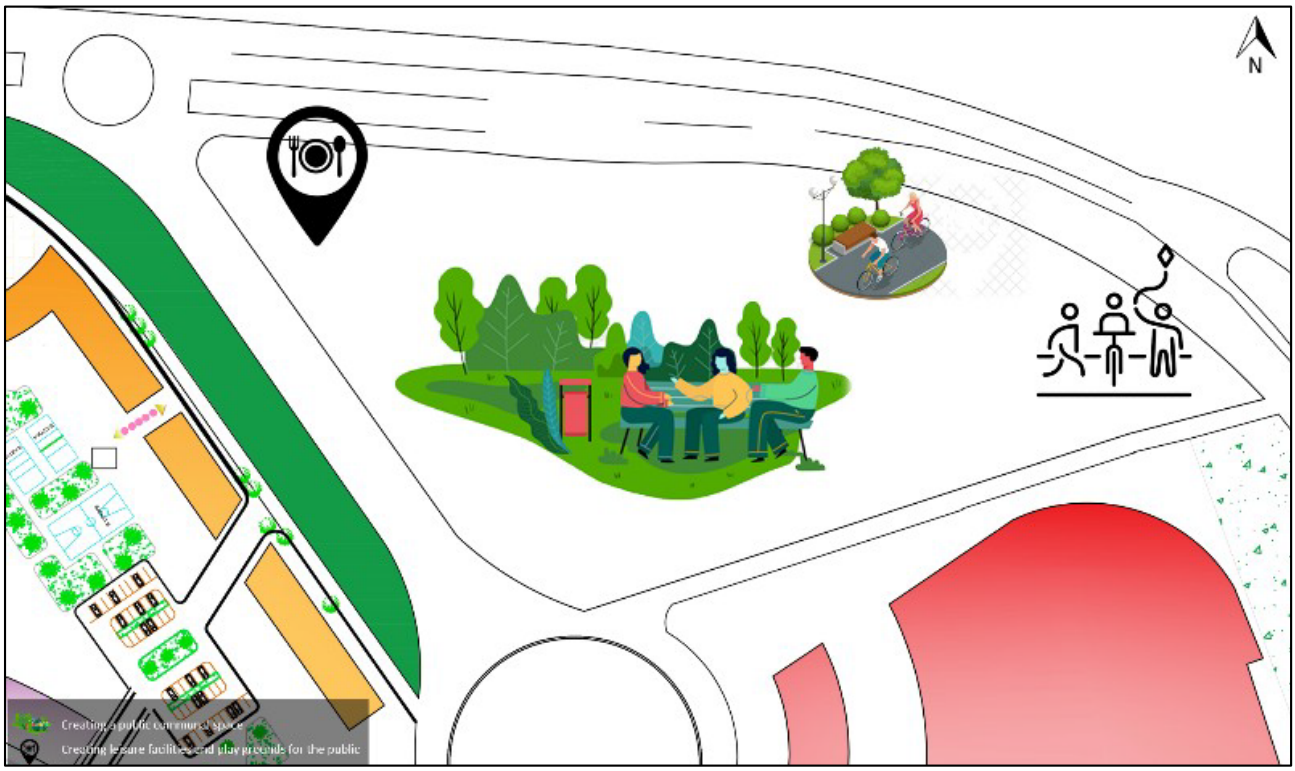


Figure 83 socio cultural data synthesis/ source: Author

- creating a public communal space in the project to attract more people.
- Creating leisure facilities and play grounds for the public.

III.8 Sequential analyses:

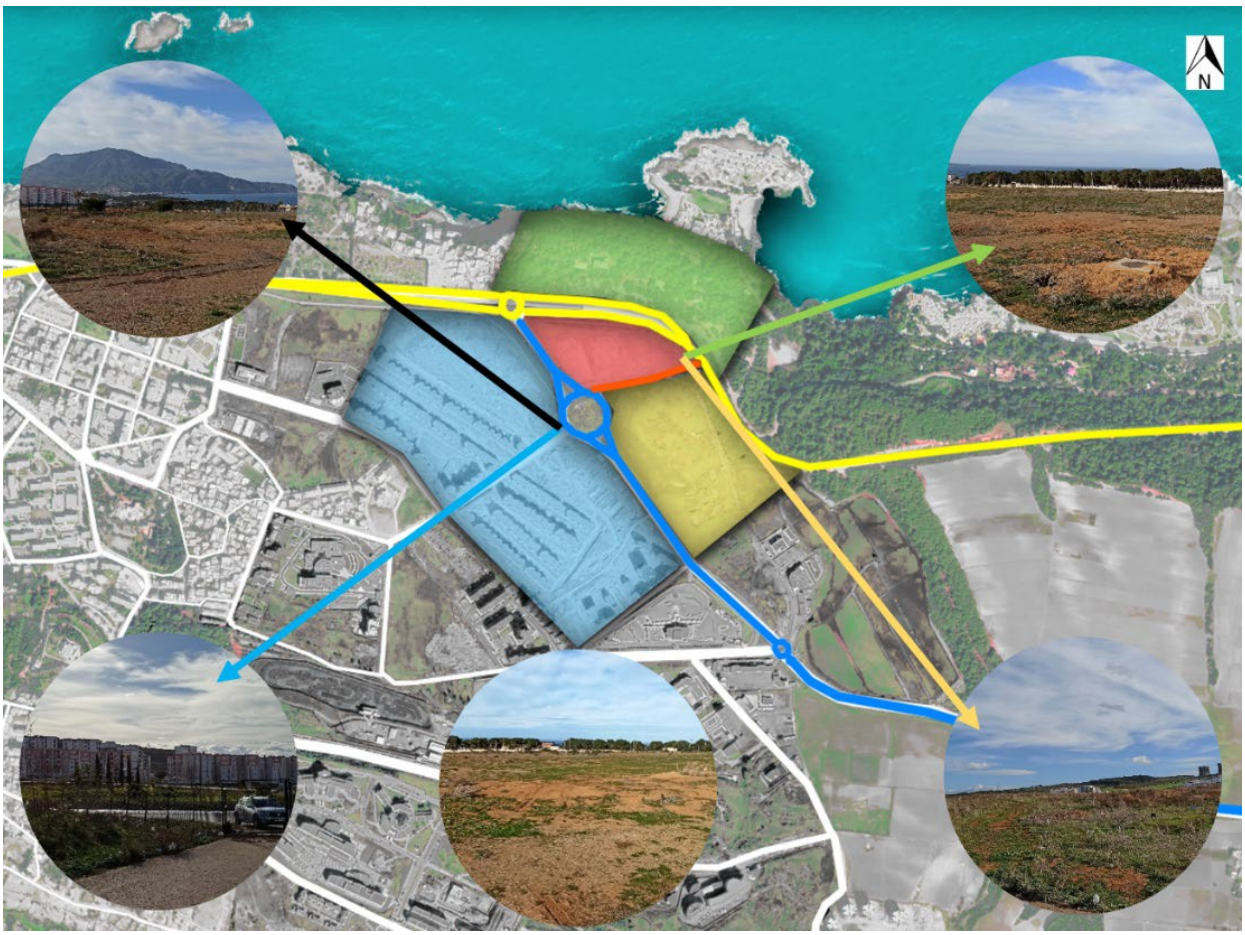


Figure 84 Views from the site and to the site / google earth . Edited by the author

Our Site has very potential views:

In the north we find the sea and the mountain of Chenoa and also with view to the agriculture fields in the south

Synthesis of sequential analysis

- Projecting views towards the sea and Chenoa mountain.

III.9 GROUND LAYOUT:

1st step

Defining the project's plate by creating retreats.

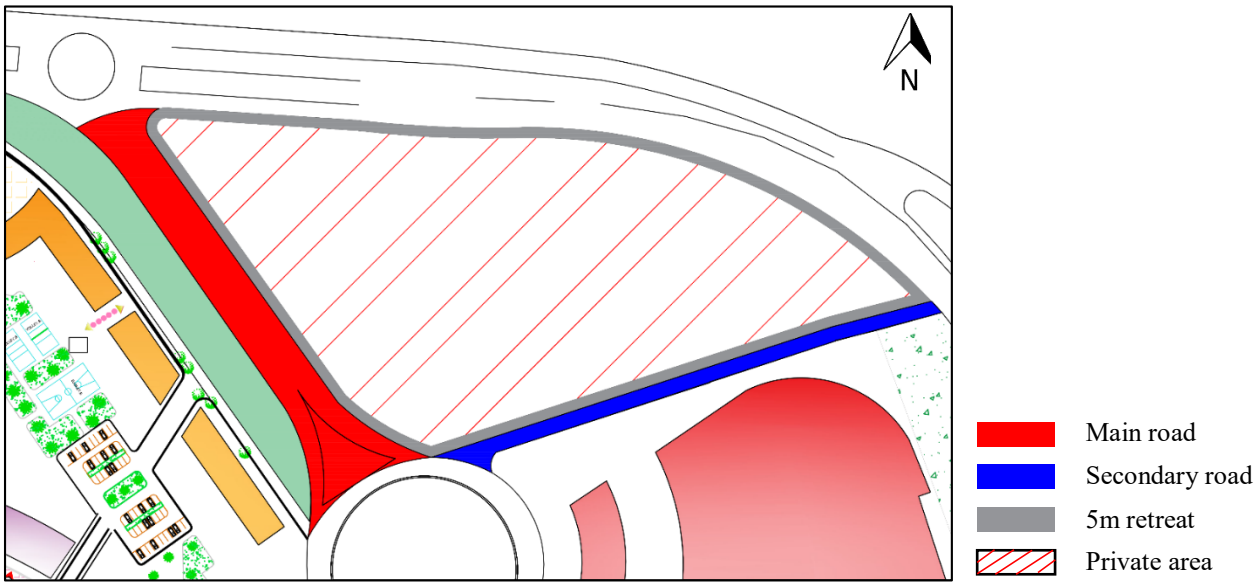


Figure 85: 1st step of the ground layout Source: author

2nd step

Creating 2 major axes.

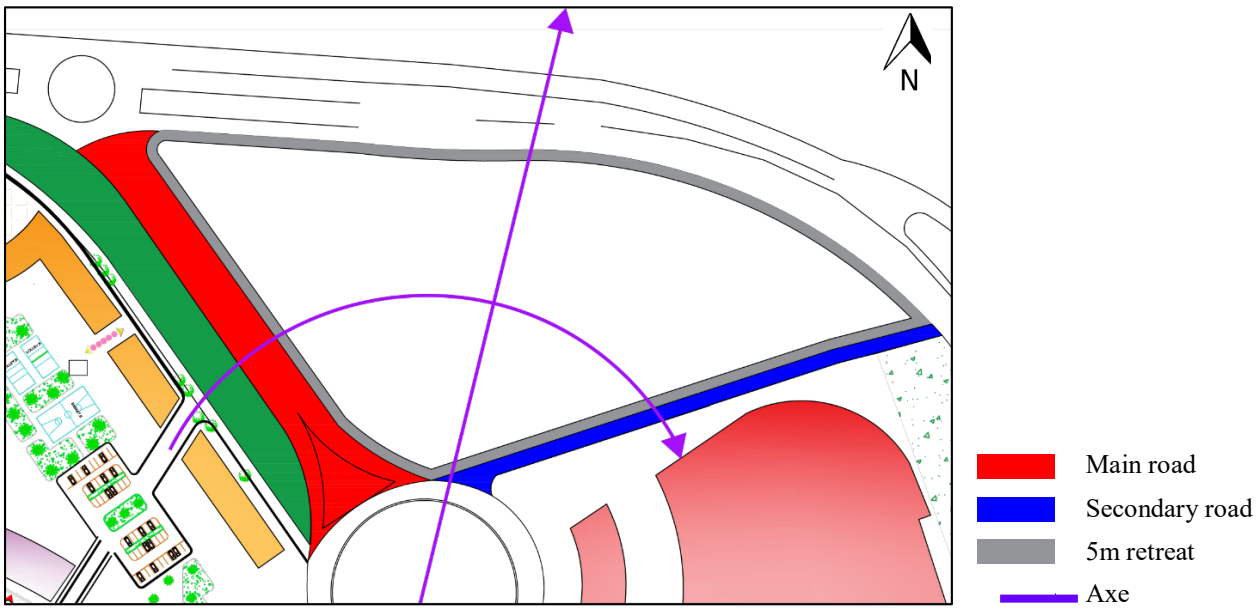


Figure 86: 2nd step of the ground layout Source: author

3rd step

Dividing the site into private, public and semi-public zones.

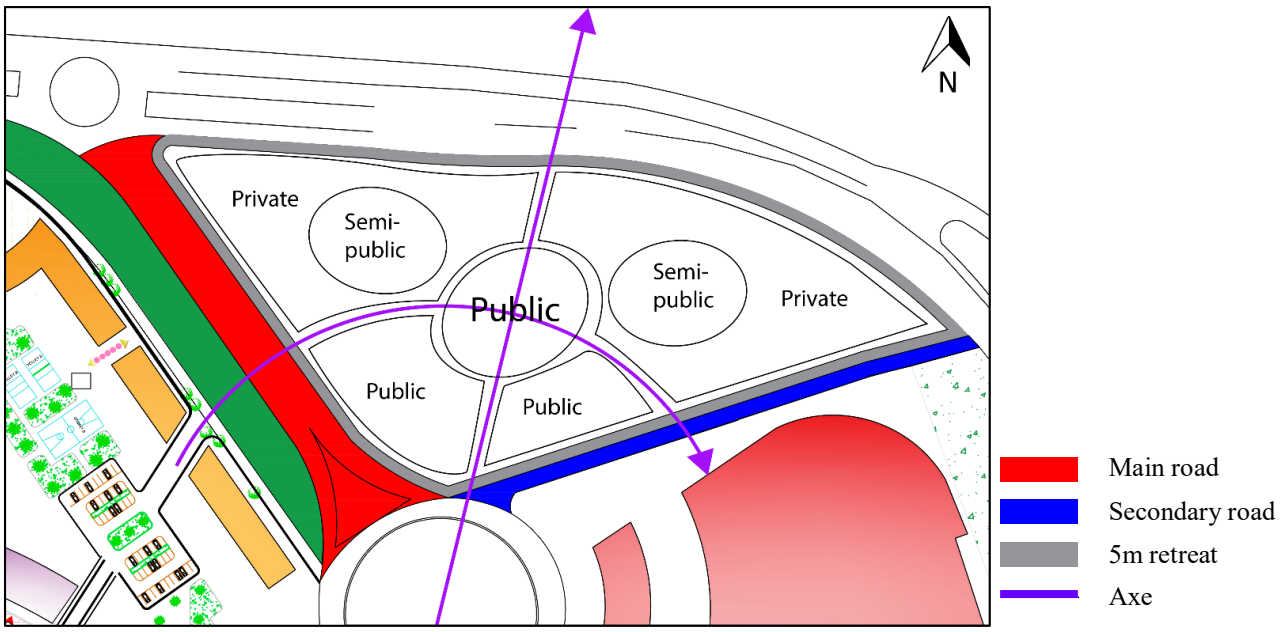


Figure 87: 3rd step of the ground layout Source: author

4th step

Defining voids and built areas.

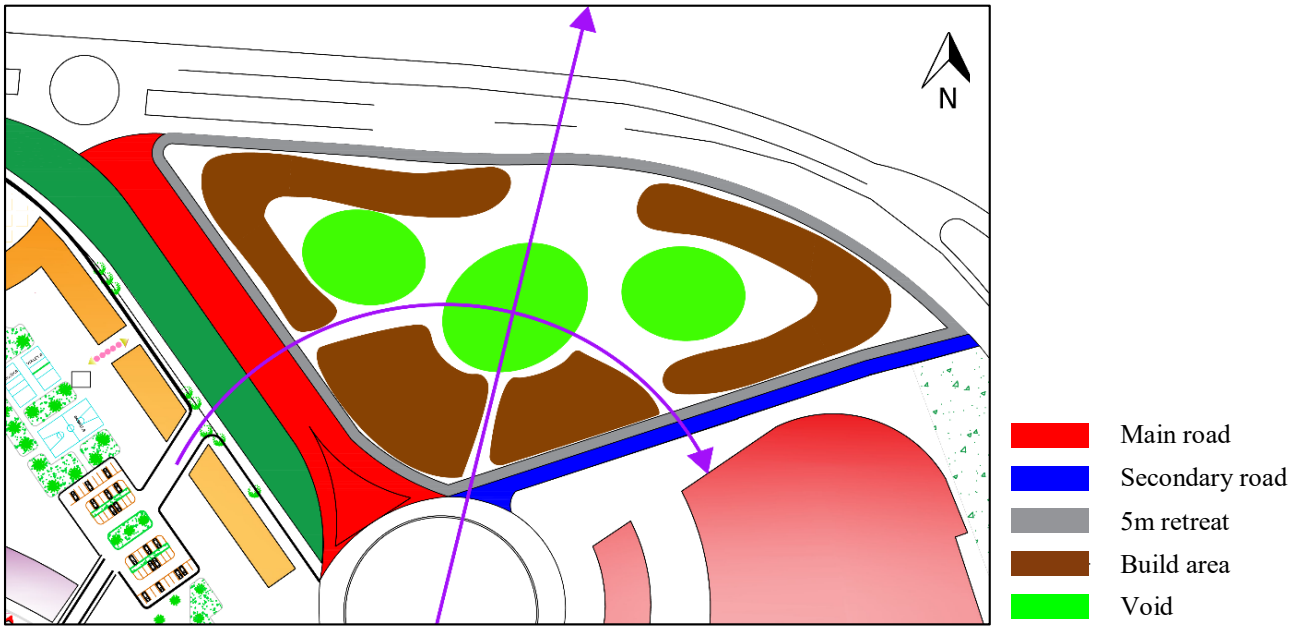


Figure 88: 4th step of the ground layout Source: author

5th step

Integrating with the natural environment of the site.

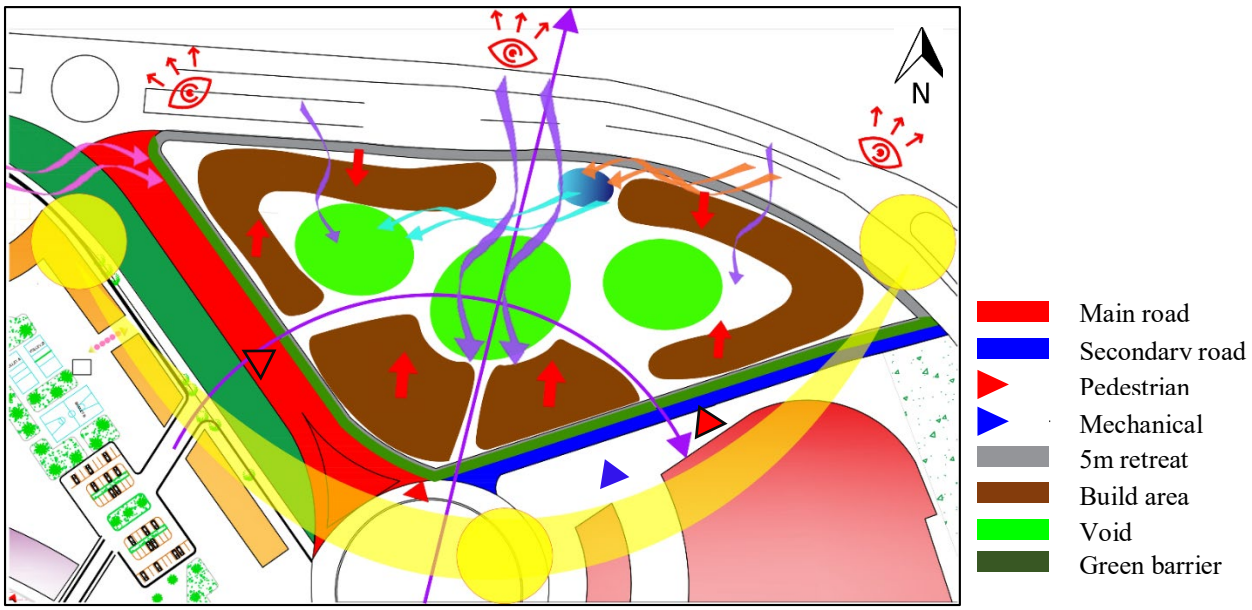


Figure 89: 5th step of the ground layout Source: author

6th step

Attributing functions to each zone.

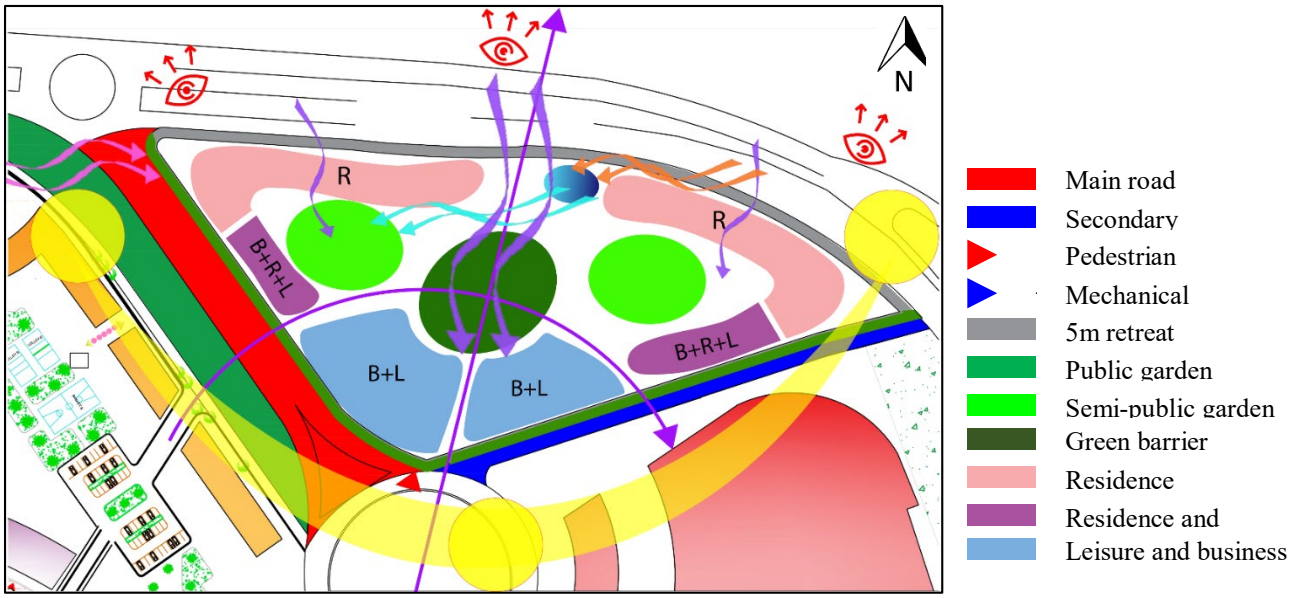


Figure 90: 6th step of the ground layout Source: author

III.10 ARCHITECTUAL PRODUCTION:

III.10.1 Introduction

Based on the researches we have conducted in the previous chapter and the conclusions we have reached from site analysis and the different case studies. We came out with a final proposition of the main functions that a serviced apartment contains, its users and the spaces and services that it offers.

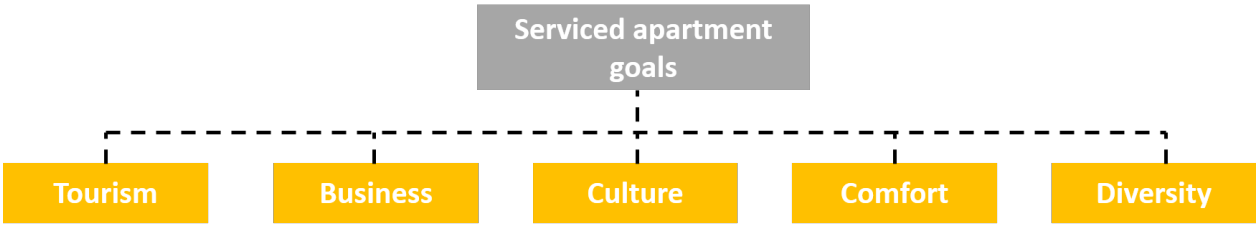


Figure 91: Diagram of the goals of a serviced apartment source: author

III.10.2 Functional production

According to the data we have collected could establish a composition of the main functions of a serviced apartment. Residence which is the main function of the project, Leisure which includes restauration and recreational spaces and activities, Business that englobes stores, offices and services offered by the building. And last but not list management and logistics that assures the proper running of the work.

III.10.2.1 Users identification:

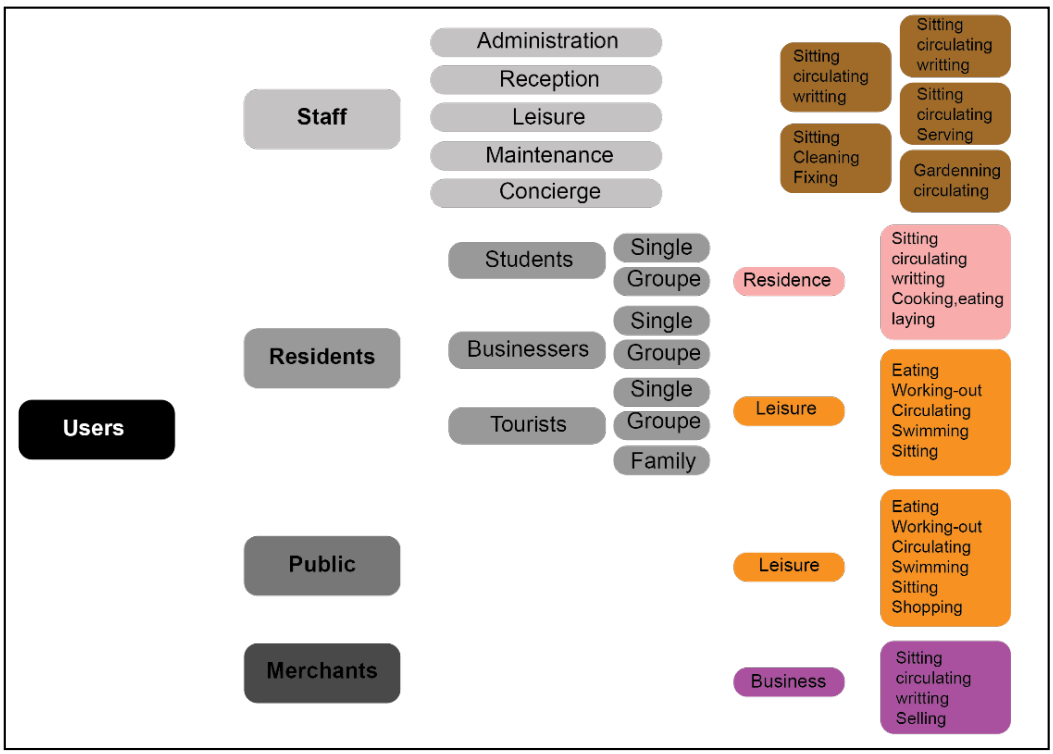


Figure 92 Users identification Diagram / source: author

III.10.2.2 Users definition:

Staff: people who work either in the administration, as officials who manage the running ofthe establishment, they do a little bit of everything according to needs: customer reception, customer service, accommodation, maintenance of premises and rooms if needed.

Residents: visitors who spend at least one night in accommodation for a reason

professional or private, it is a single person, a couple, or a whole family for a short orextended stay.

Public: tourists, visitors, people passing by, this type of public seeks a moment of relaxationand leisure, in the public spaces.

Merchants: people who occupy the shops and public stores in an establishment.

III.10.2.3 Main functions identification:

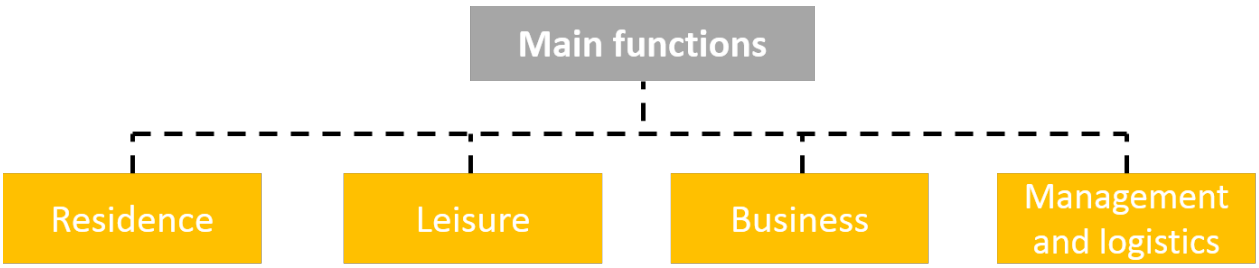


Figure 93 Diagram of the main functions of a serviced apartment source: author

III.10.2.4 Main functions definition

Residence

A fully equipped private space for residents to stay. Comes in different formulas starting from a small studio to a luxurious T4 apartment. In order to fit the needs of different types of visitors and provide maximum of comfort.

Leisure

Includes spaces of recreation and consumption. Like the gym, cafeterias, restaurants, gardens and playgrounds. Some are used by the public and some are reserved for residents.

Business

Includes different stores, offices and mixed use spaces, used by residents and the public. The stores are divided by two types. Basic needs (food, pharmaceutical products…) and luxury stores (artisanal products of the area, cosmetic, cloths…).

Management and logistics

The function that assures and controls the efficient and effective flow of works. It also includes services such as room cleaning service and maintenance.

III.10.2.5 functions bubble diagram:

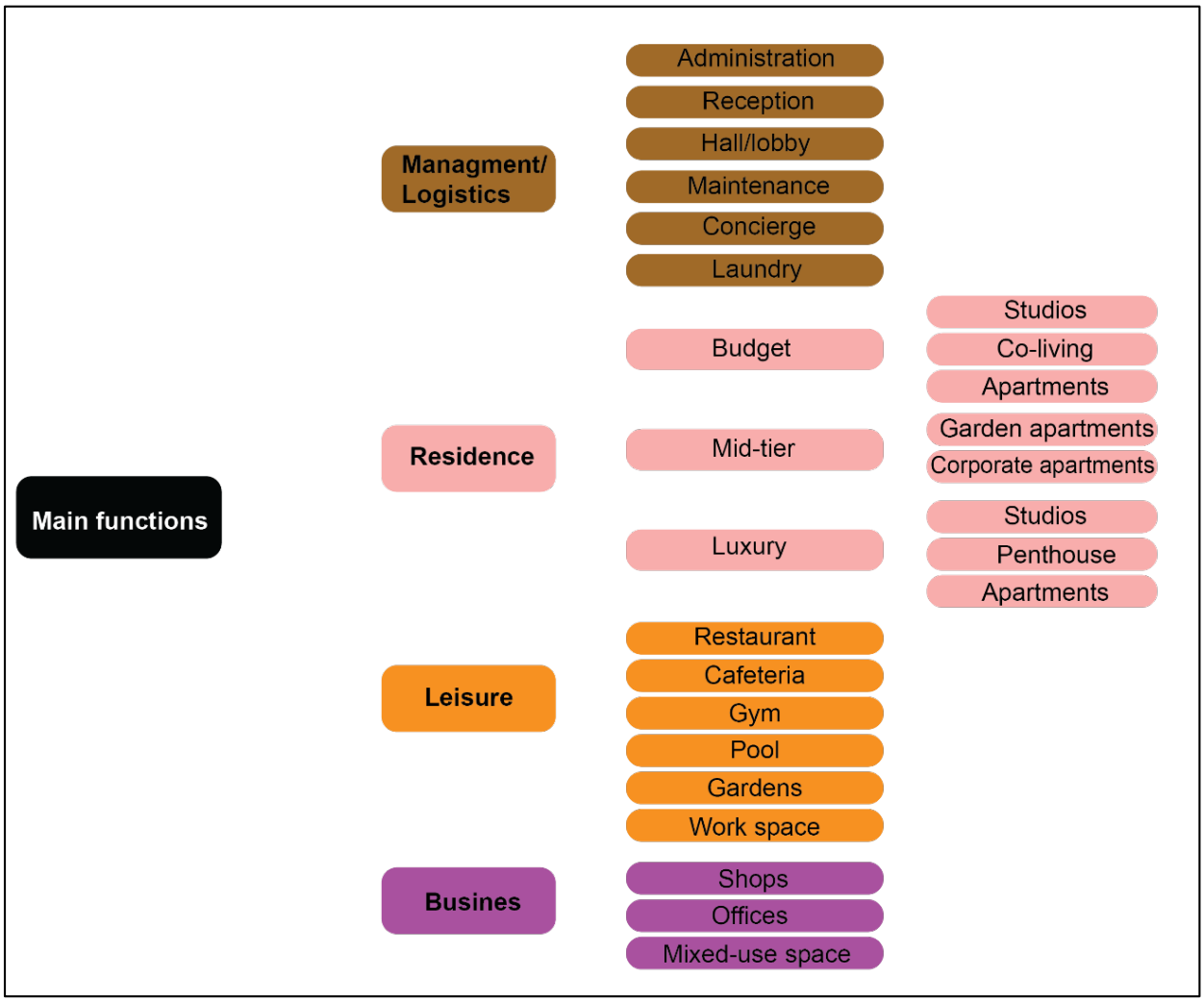


Figure 94 Main functions flowchart / source :author

III.11 Genesis of form:

The main concept of the form came from the ground layout that we have reached earlier.

1st step

The creation of three units oriented towards the sea. While creating a semi-public space for two of the them.

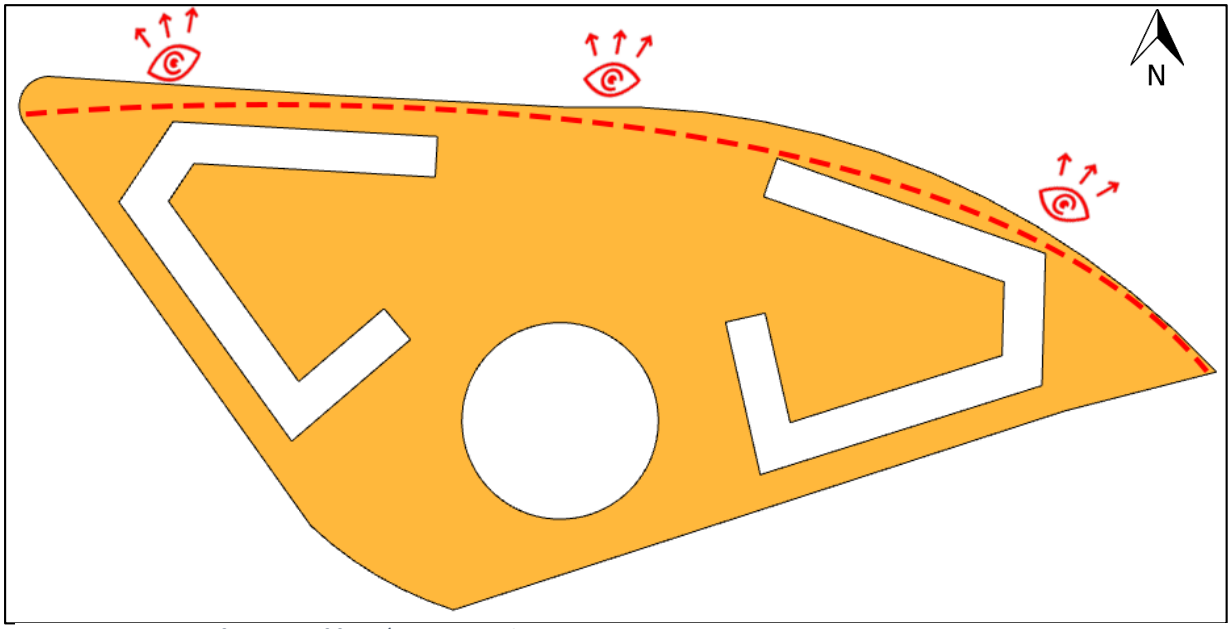


Figure 95 : 1st step of genesis of form/ Source: author

2nd step

Curving the 2 units to create a dynamic organic shape representing the sea waves.

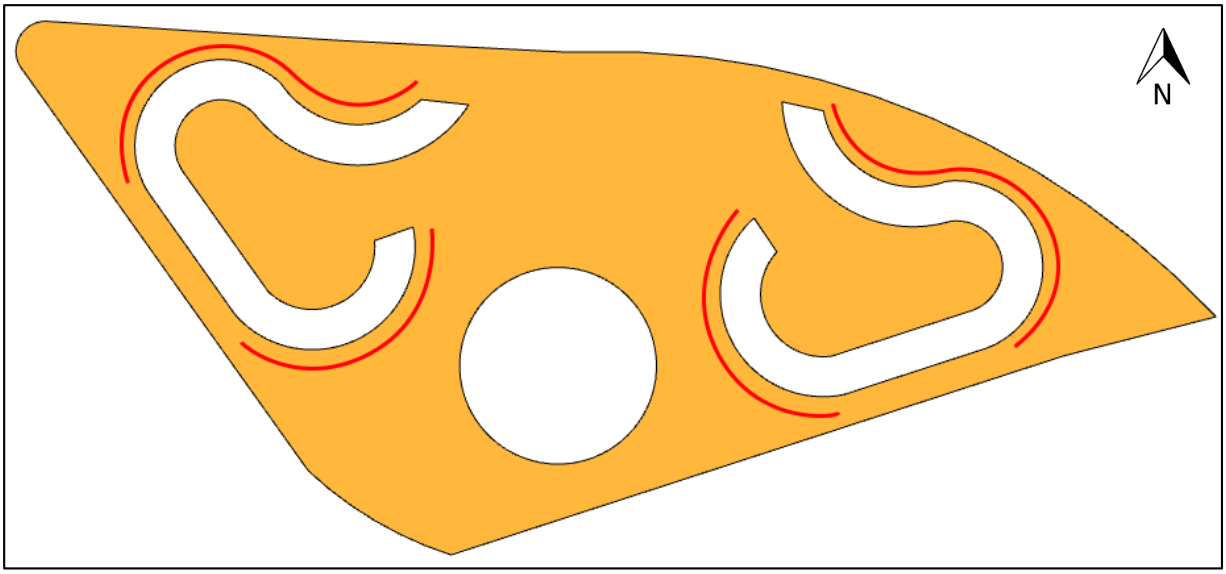


Figure 96: 2nd step of genesis of form/ Source: author

3rd step

Attributing different heights for the units. With the central units being the tallest.

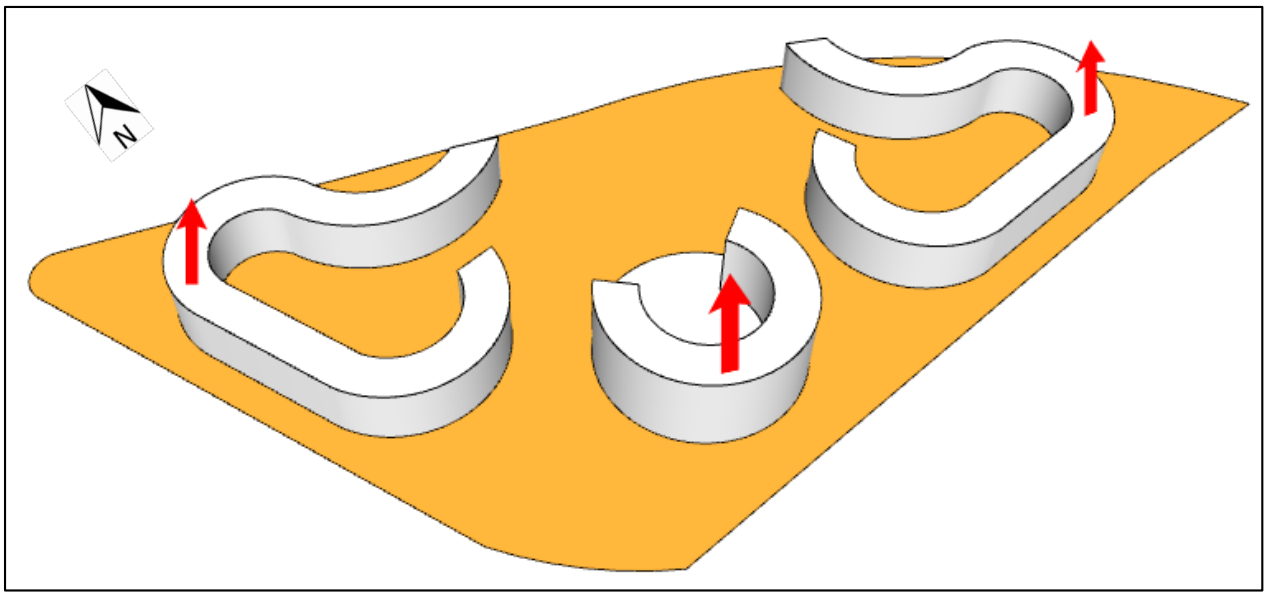


Figure 97: 3rd step of genesis of form/ Source: author

4th step

Creating a central garden to provide a micro climate for the building.

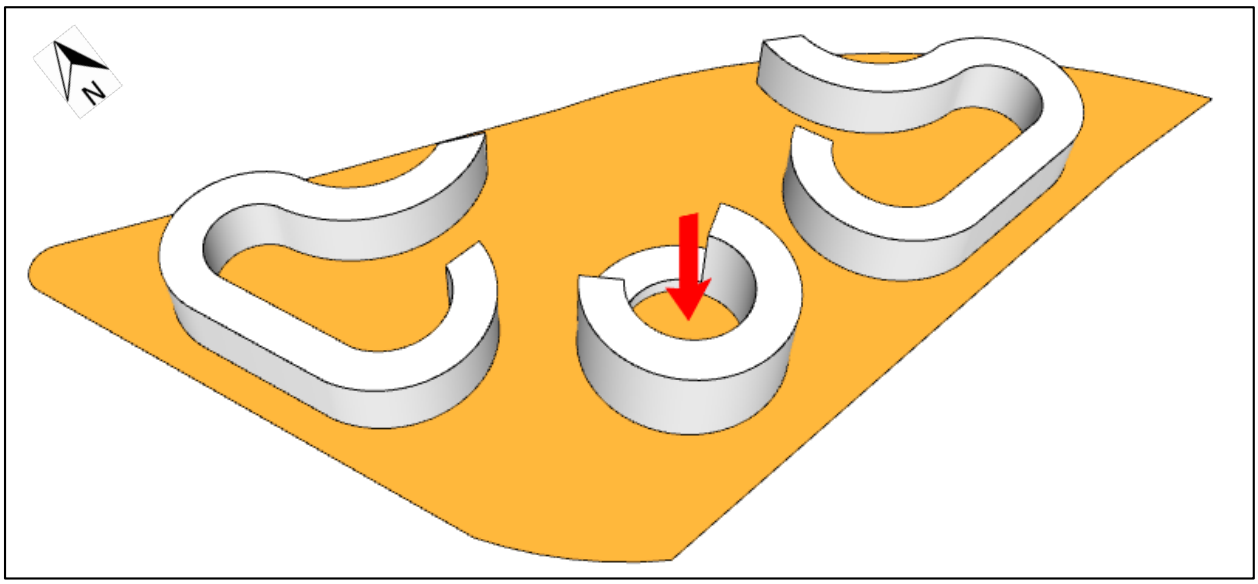


Figure 98 4th step of genesis of form/ Source: author

5th step

Difference in levels along the project. To allow maximum of views and ventilation. All while creating a walk path on the roof of the building.

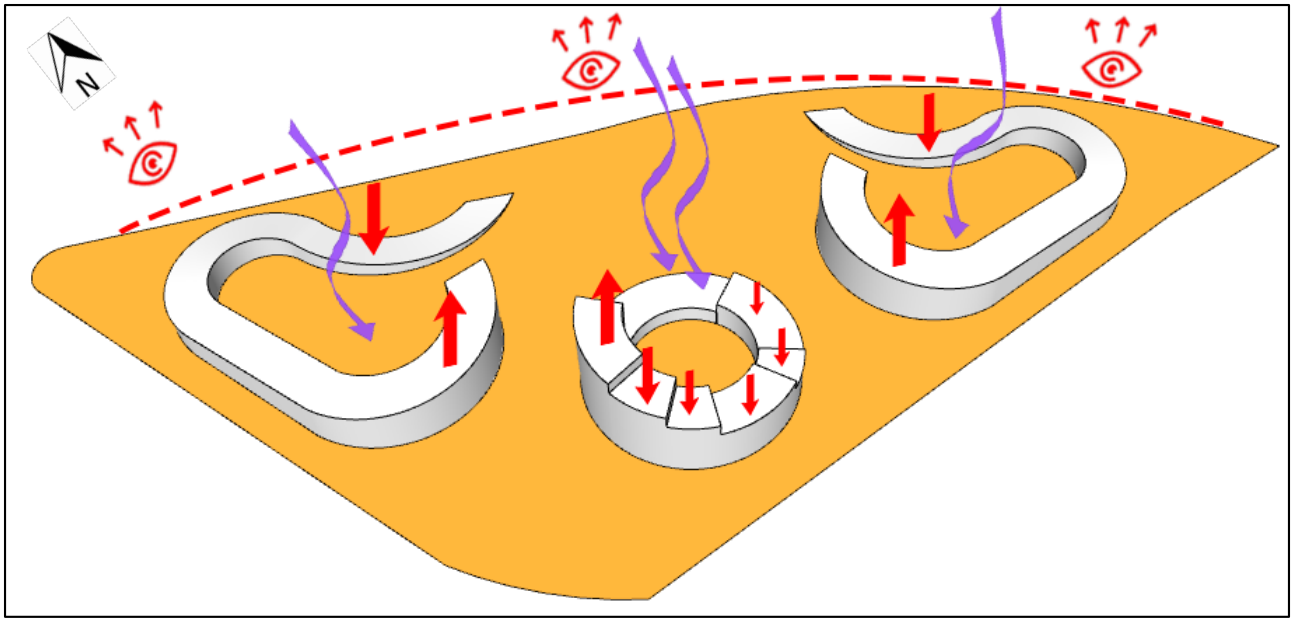


Figure 99: 5th step of genesis of form/ Source: author

6th Step

Marking the blocs entrances and accentuating the leisure spaces situated on the private areas.

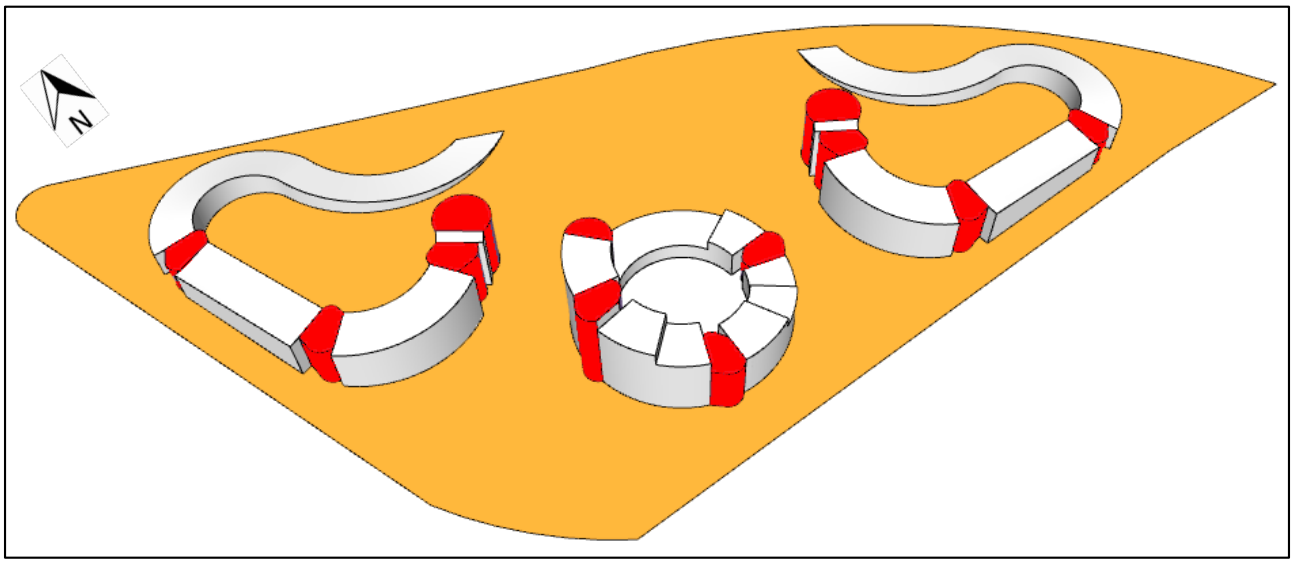


Figure 100 6th step of genesis of form/ Source: author

Final volume

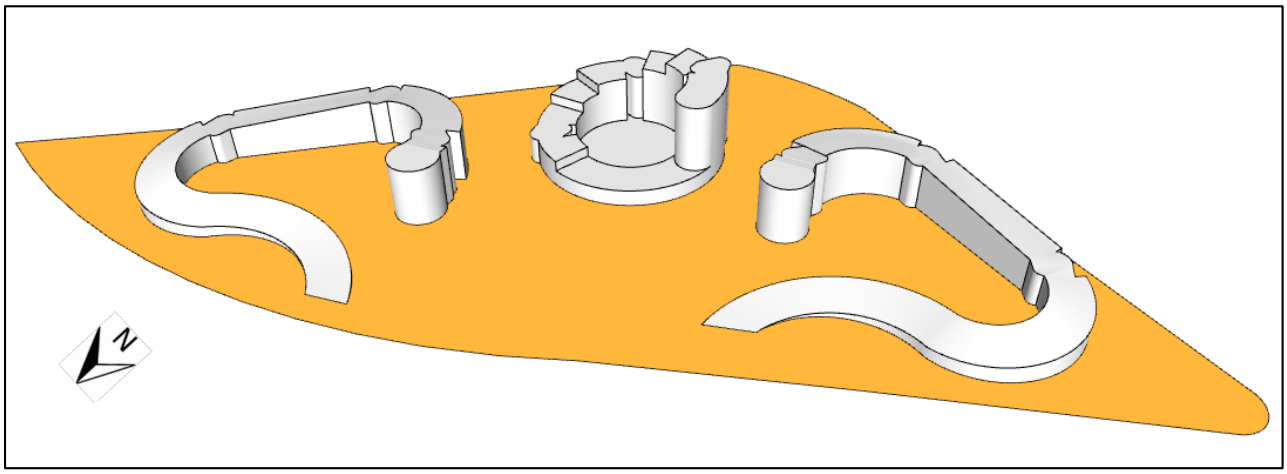


Figure 101: final volume in the genesis of form/ Source: author

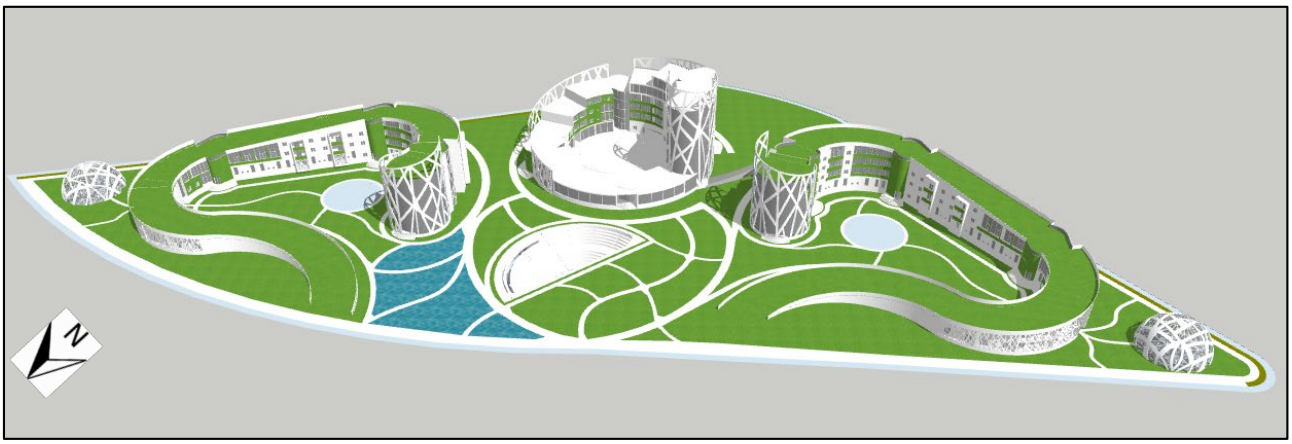


Figure 102: final volume in the genesis of form/ Source: author

Figure 103 final volume in the genesis of form/ Source: author

III.12 Genesis of the facade:

1st: The fill and void

The schemes represent the location of significant voids in our façade. Such as the stair cases or the curtain walls.

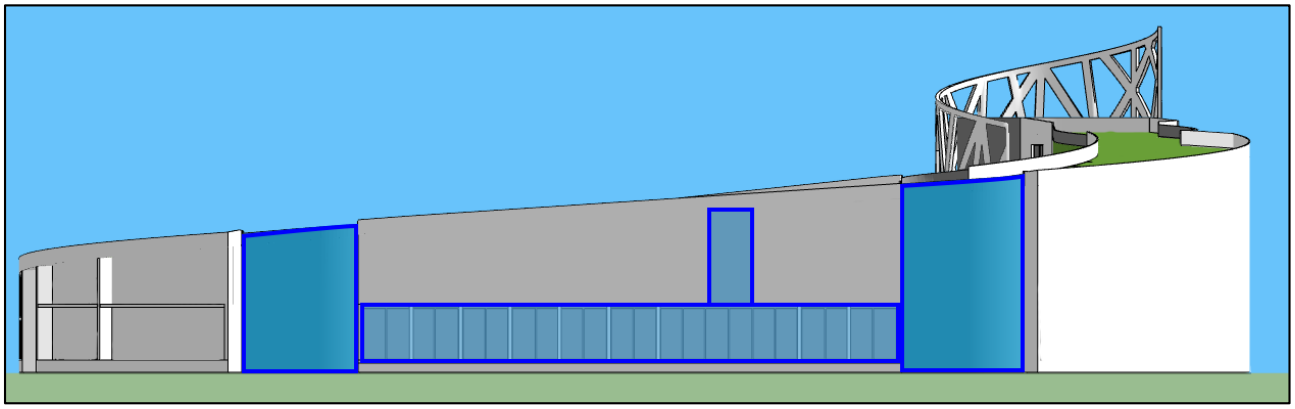


Figure 104 fill and void scheme on the East and the west facade, 1st and 2nd bloc/ source: author

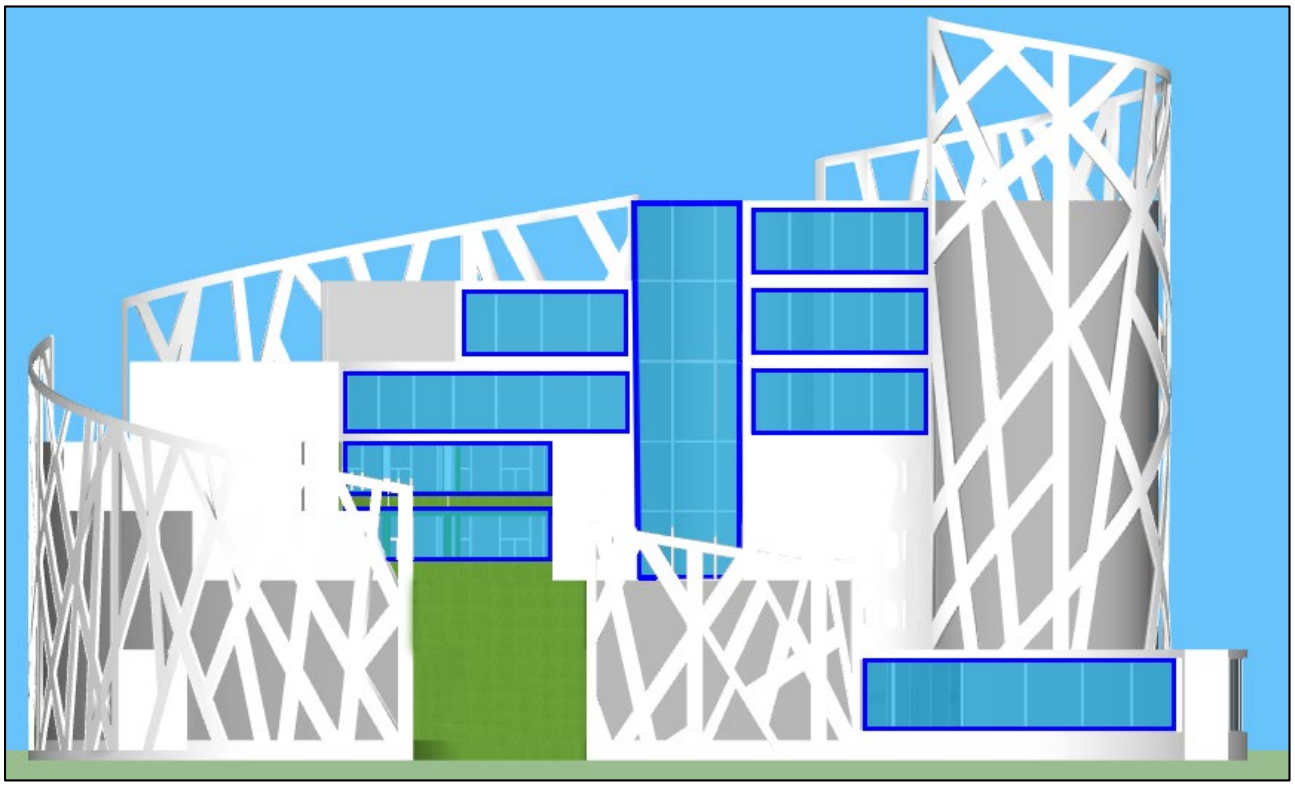


Figure 105 Fill and void scheme on the North facade, 3rd bloc/ Source author

Void

2nd: Big lines and façade composition

Verticality

- Marking the entrances and the stair cases
- Emphasizing the verticality by using covered balconies
- Hiding the shower windows behind balconies

Figure 107 verticality scheme on the East and the west facade, 1st and 2nd bloc/ source: author

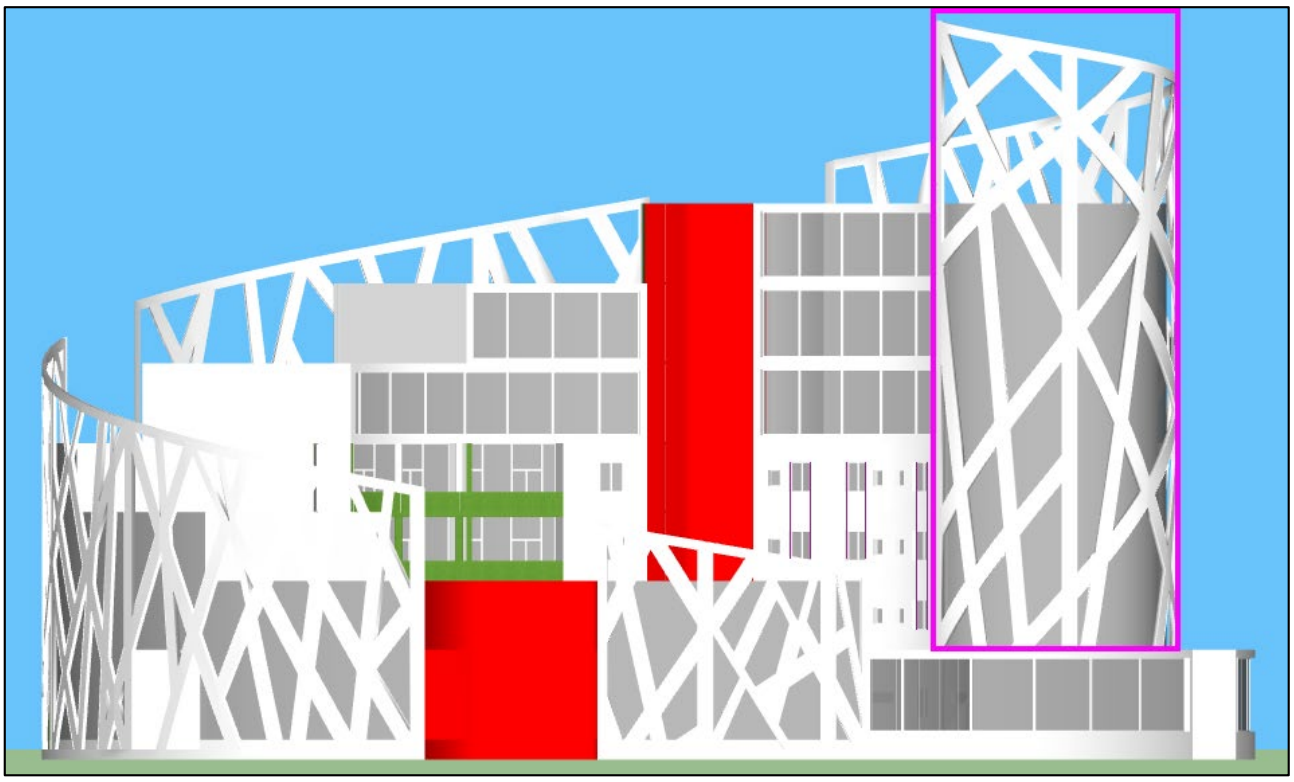
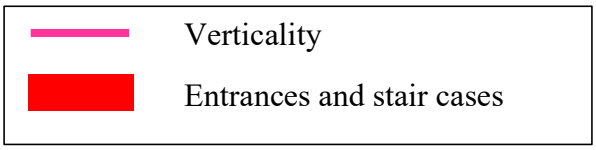


Figure 106 Verticality scheme on the North facade, 3rd bloc/ Source author



Horizontality and curvature

- Emphasizing horizontality thought using curtain walls and keeping windows on the same horizontal line
- Introducing curvature to the 3rd bloc by using a curved light shed

Figure 108 Horizontality and curvature scheme on the East and the west façade, 1st and 2nd bloc/ source: author

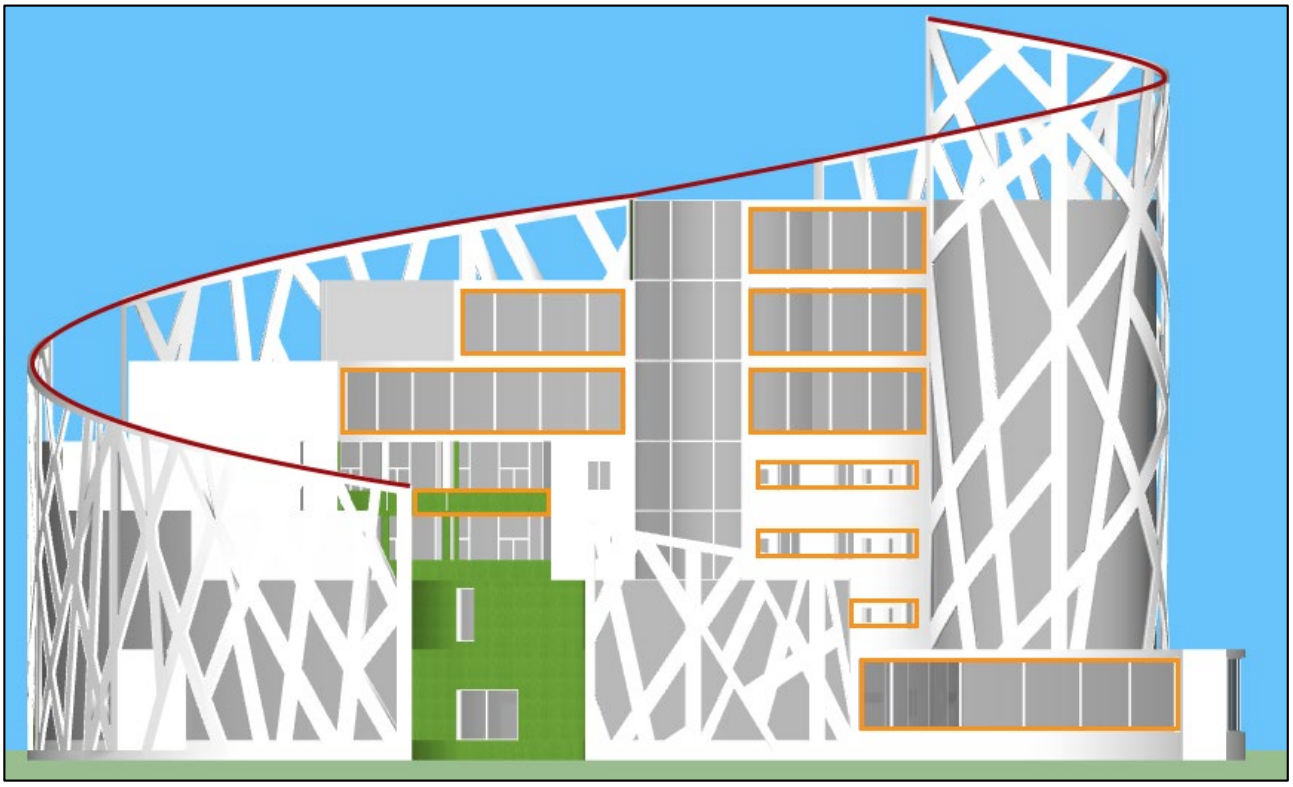
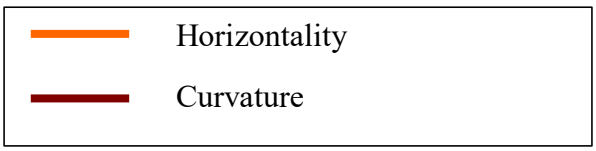


Figure 109 Horizontality and curvature scheme North facade, 3rd bloc/ Source author



3rd Light and sun ray management

- using moucharabia as light shed and to provide security for ground floor verandas.
- Using Curtain walls on the north façade to allow maximum of sun ray and to project views towards the sea
- using a double skin façade on the south side with light sheds

Figure 111 light and sun ray management scheme on the East and the west façade, 1st and 2nd bloc/ source: author

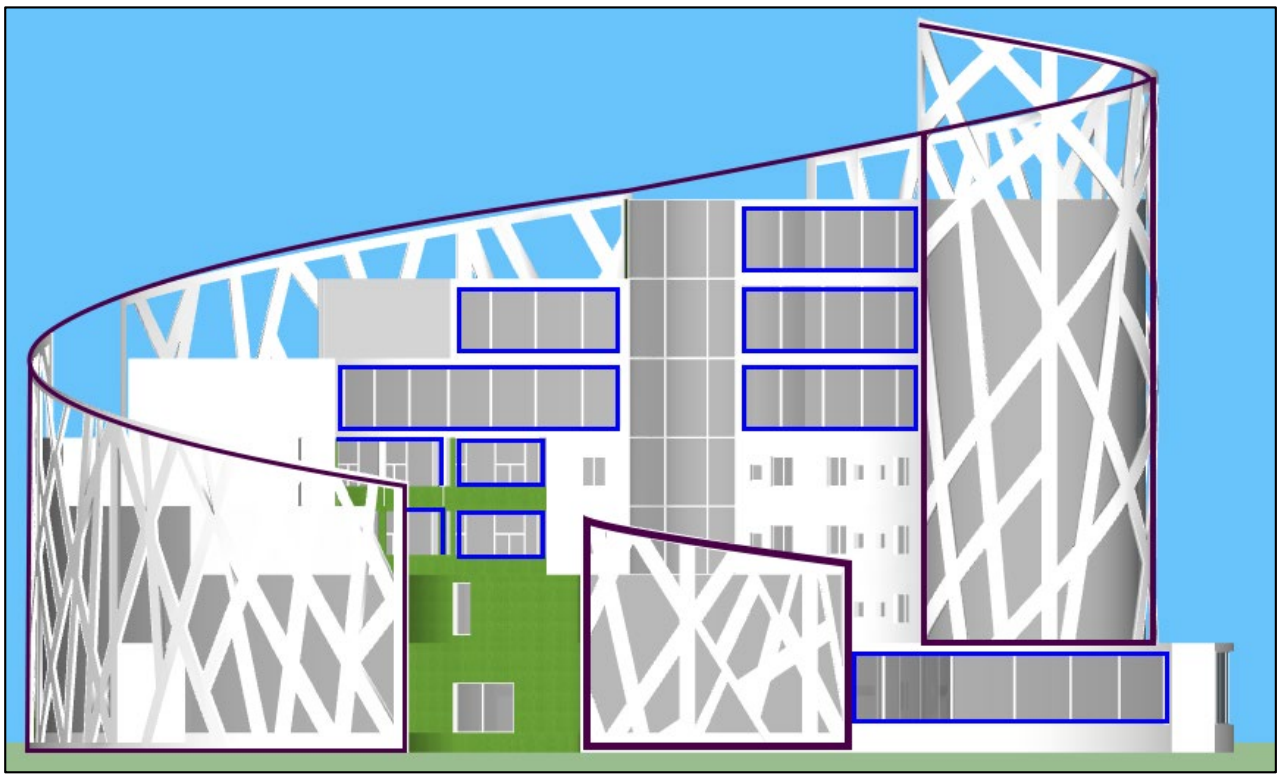
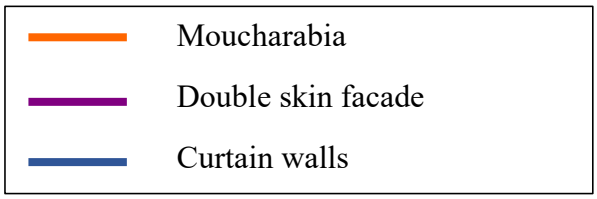


Figure 110 Light and sun ray management scheme on the North facade, 3rd bloc/ Source author



CHAPTER 3 : PROJECT DEVELOPMENT

Project Areas

Lodging

- 1-bedroom apartment…….…. 60- 70 m^2
- 2-bedroom apartment……..…. 90- 100 m^2
- 3-bedroom apartment ……..……..…120- 130 m^2
- 5-bedroom apartment (duplex)……...156- 163 m^2
- Single bed studio ……..……..…..19- 23 m^2
- Single bed studio with verandah ……..…...25- 27 m^2
- 2 beds studio ……...…….…..30 m^2
- Luxury studio ……...…….…..…31 m^2

Business

- Shops ……...580 m^2
- Offices ……...…..240 m^2

Consumption

- Cafeteria…….……..... 247 m^2
- Cafeteria and leisure space …….……..…..150x10 m^2
- Panorama restaurant …….……...…518 m^2
- Sanitaries…….……. 150m^2

Leisure

- Gym …….....……350 m^2
- Communal work space ……..…....340 m^2
- Conference rooms ……..…….…..48 m^2
- Mixed use space ……..…..……152 m^2
- Childcare ……...……225 m^2
- Library ……..225 m^2
- Kids playground ……...600 m^2

Administration

- Director……...… 34 m^2
- Accountant …….…….…...25 m^2
- Conference room…….……..…… 43 m^2
- Wc ……..….....5.5 m^2

Service

- Kitchen ……..…….....220 m^2
- Cafeterias kitchen …….……..250 m^2
- Locker rooms……..……..…. 28 m^2
- Stock …….....….60 m^2
- Technical locals…….…… 250 m^2

III.13 Constructive and structural system:

III.13.1 Structural system:

III.13.1.1Metal structure:

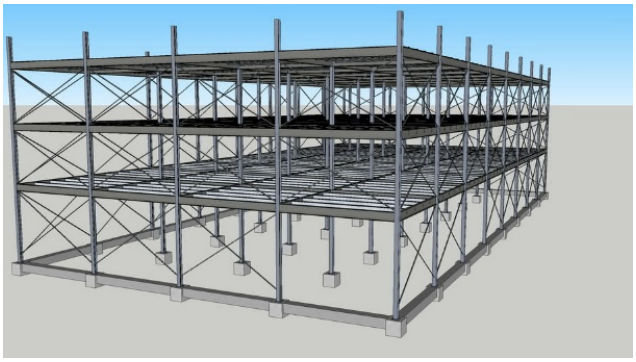


Figure 112 Metal strucrure/source: 3dwarehouse.sketchup.com

Figure 113 Metal strucrure/source: northern-weldarc.com

Tipaza being located in the Zone III which corresponds to a region of high seismicity. Therefor we opted for a Building with a structure to withstand seismic waves that starts with the right materials with the right properties, and steel is by far the most widely used material for building earthquake-resistant buildings.

- 30% faster construction.
- 0% construction waste
- 100% recyclable
- energy efficiency.
- Life span of steel roofs greater than 50 years.

III.13.1.2 Columns and beams:

Figure 114 Steel colomuns and beams /source : tboake.com

We chose steel beams and columns which are capable of withstanding heavy loads and are resistant to bending. Steel beams carry the force vertically or horizontally and work in conjunction with columns to distribute the weight evenly.

III.13.1.3 Joints:

Expansion joints: a mid-structure separation designed to relieve stress on building materials caused by building movement induced by: thermal expansion and contraction caused by temperature changes, sway caused by wind. seismic events.

Rupture joints:which is a structural joint between two distinct parts of the same construction, so that the various movements of each of them are not transmitted to the other.

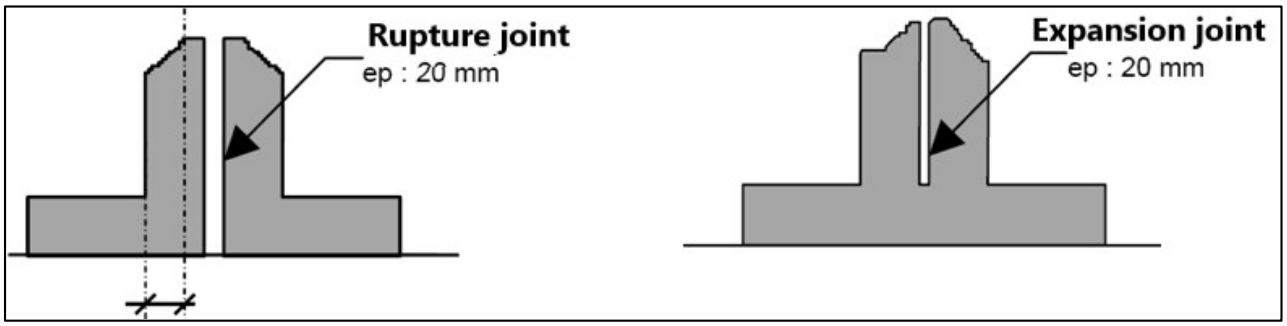
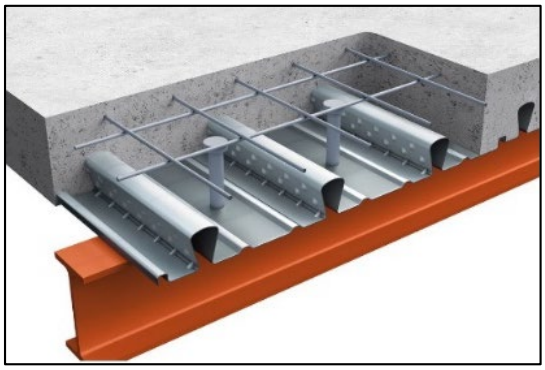


Figure 115 Rupture and expansion joints/ source: civilmania.com

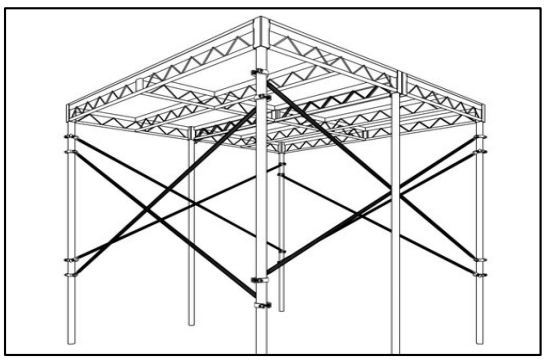
III.13.1.4 composite floors: metal structure:



We chose steel beams and columns which are capable of withstanding heavy loads and are resistant to bending. Steel beams carry the force vertically or horizontally and work in conjunction with columns to distribute the weight evenly.

Figure 116 Composite floor /source: structville.com

III.13.1.5 Bracing :



We opted for cross bracing, this method of construction maximizes the weight of the load a structure is able to support. It is a usual application when constructing earthquake-safe buildings.

Figure 117 Cross bracing /source:v.indiamart.com

III.13.2 Constructive system:

III.13.2.1Exterior walls:

Using microencapsulated PCM bricks as a building material for the exterior walls. In order to absorb heat during the day and release it during the night playing the role of a passive heating system.

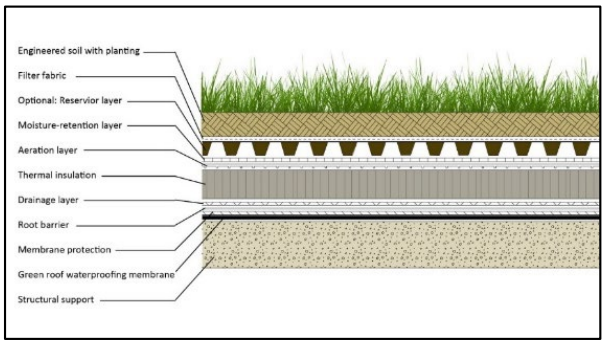
Figure 118 PCM incorporated Bricks /source: doi.org

III.13.2.2 Interior wall

We went with Monomur bricks as building materials for interior walls, which is renowned for its self-insulating side (thermal and acoustic insulation). And also being of mineral origin, it does not require reinforcement or insulating lining.

Figure 119 Monomur bricks/source:maconnerie.bilp.fr

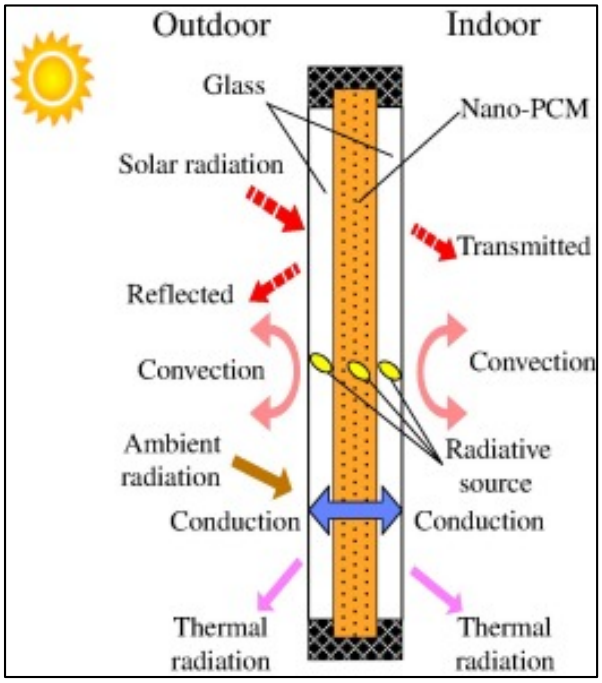
III.13.2.3 Roof:



Using Green roof that makes a harmonious relationship of buildings with their immediate environment. That is also important for thermal insulation energy management. In addition to Water Management (Rain water Harvesting).

Figure 120 Green roof section/source:/blog.architizer.com

III.13.2.4 Windows:



Double Glazing with PCM by Incorporating paraffin wax into the double glazed windows which is a novel method to reduce energy consumption and adjust indoor thermal environment of buildings.

choice criteria:

- high noise insulated.
- wind pressure resistance.
- glass not easy to explode.

Figure 121 Double glazed window with pcm incorporated/source:sciencedirect.com

III.13.3 Synthesis:

Understanding the environment of our project is an essential step in order to conceive a successful bioclimatic design. This chapter has allowed us to refine our knowledge on that regard, through a profound research and analysis of the natural. Built and regulatory environment combined with the socio cultural and economic aspects of our surroundings to fully exploit the potentials of the site and deal with its challenges.

These analyses have been materialized later on through synthesis and simplified ground layouts that laid the base of our project. Its Functions, form, structure and bioclimatic aspects that have been put to use while designing our project.

IV. CHAPTER 04: ENVIRONMENTAL EVALUATION

IV.1 Introduction:

Our project was guided by the principles of bioclimatic architecture, the goal of our work is to achieve an ecological project that is energy efficient and environmental friendly.

So this chapter represents the environmental phase of the site and the building scale in order to highlight the natural potentialities, and find solutions adapted to the constraints encountered.

IV.2 Environmental approach at the scale of the Site:

IV.2.1 Mobility:

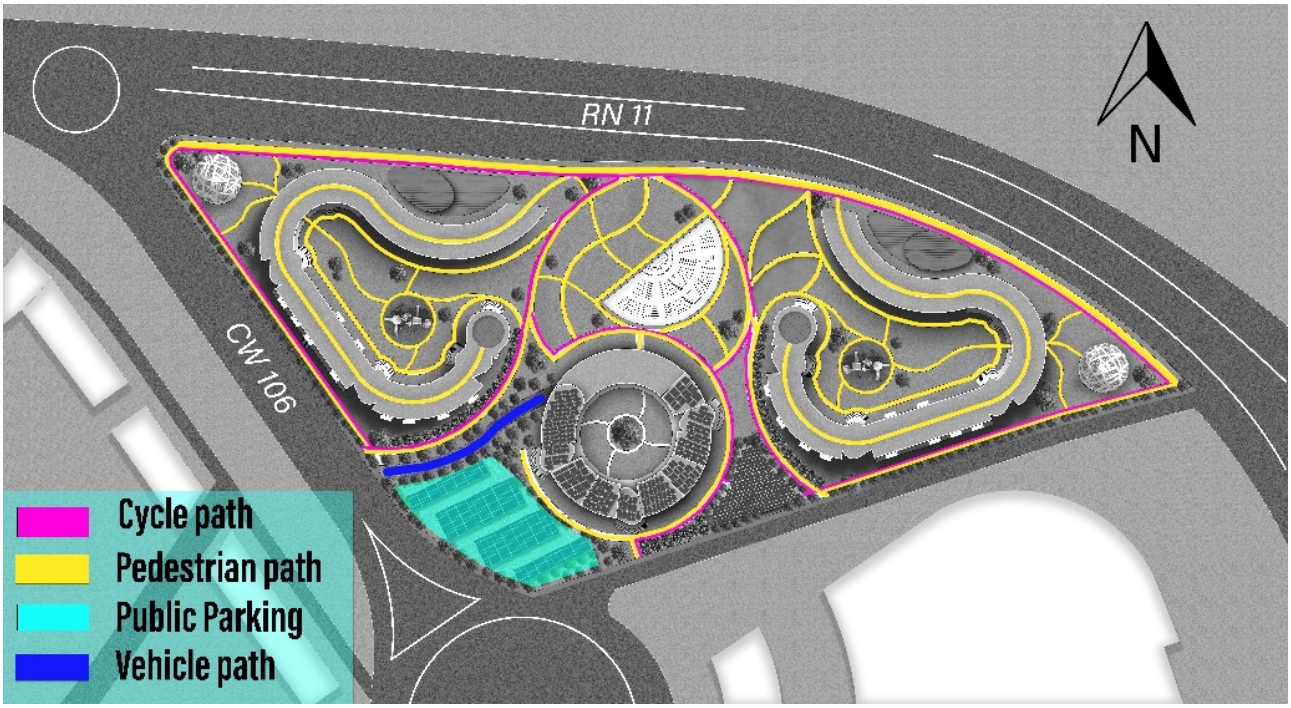


Figure 122 Mobilty distribution on the site /source: author

Figure 124Solar panel parking roof /source: .indiamart.com

Figure 123 Pedestrian and cycle path /source: author

Figure 125 Pedestrian and cycle path /source: rgbstock.com

Introducing A light mode of circulation in the site (Pedestrian paths, cycle paths) to benefit walks in the greenery and without vehicle circulation in order to reduce pollution.

IV.2.2 Functional Diversity:

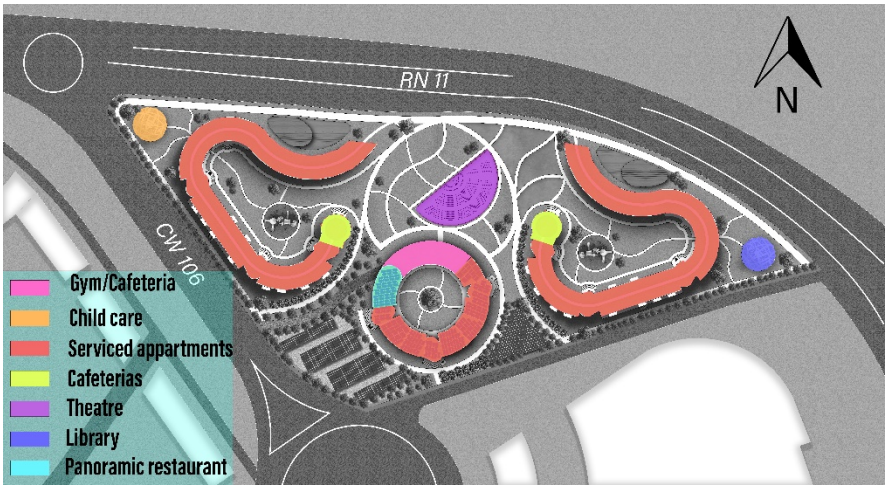


Figure 126 Functional diversity on the site /source: author

The presence of several functions (residential, cultural, sports, economic, leisure) with the aim of ensuring functional diversity and promoting a diverse and attractive place to live.

IV.2.3 Energy management:

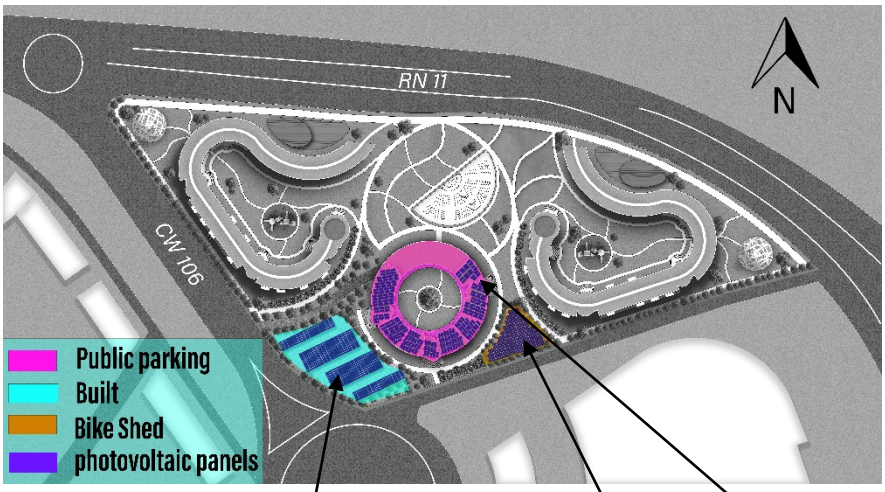


Figure 127 energy management /source: author

Harnessing solar energy to reduce electricity consumption by using photovoltaic solar panels on the roof, the bike shed and on the public parking, which capture sunlight and transform the photos received into Electric power.

Figure 130 Solar panel parking roof /source: indiamart.com

Figure 129 Bik shed with solar panels /source: station-i.de

Figure 128 Solar panels /source solarmodulemanufacturer.files.wordpress.com

IV.2.4 Social Diversity:

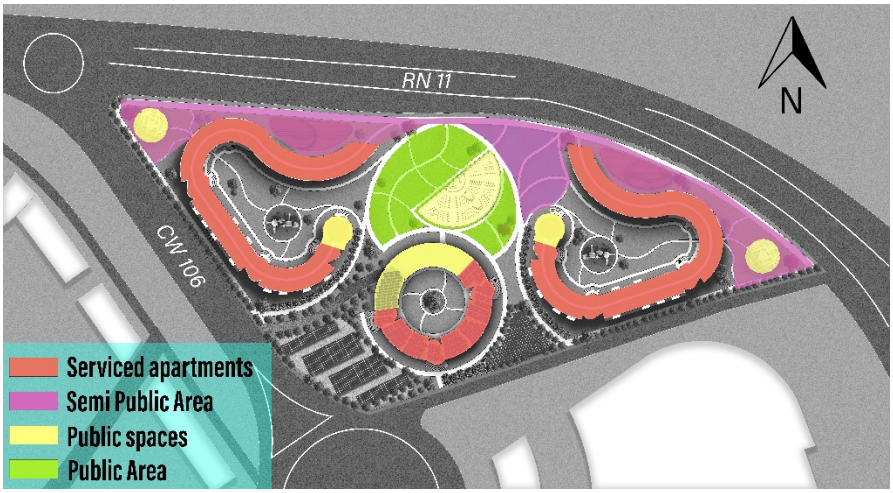


Figure 131 Social diversity on the site /source: author

Social diversity is reflected in the serviced apartments. Also by public and semi-public spaces, playgrounds, squares and green spaces are meeting places for occupants and for the public to ensure social diversity.

IV.2.5 Waste Management:

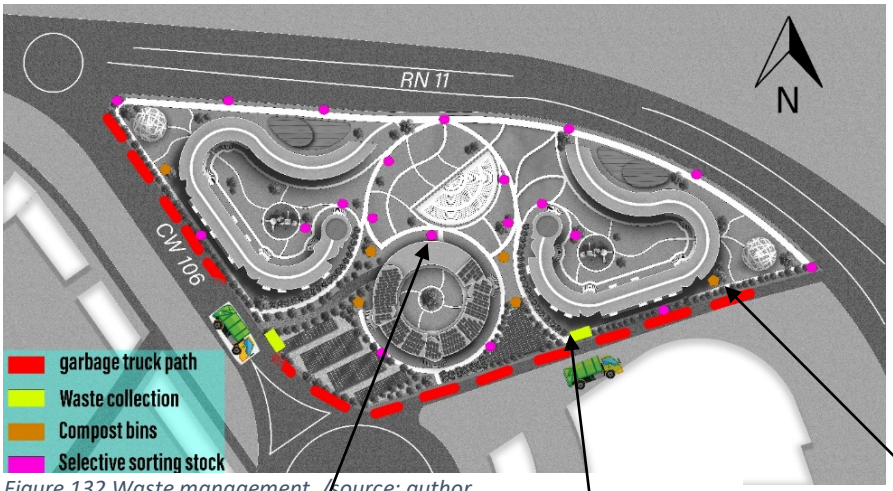


Figure 132 Waste management /source: author

For organic waste they are transported to the garden to use them as compost.

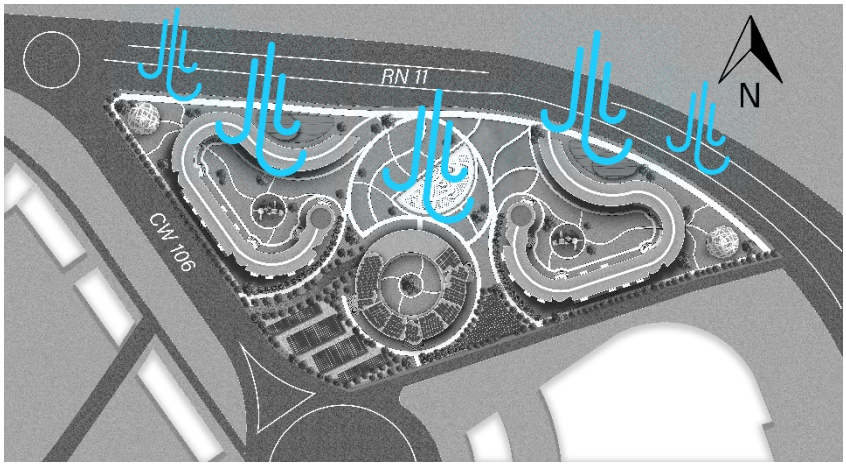
In order to facilitate the collection of waste, garbage stock have been set up with selective sorting

Figure 134 Garbage sorting stock/ source: previews.123rf.com

Figure 135 Garbage collection bin /source : lauderhill-fl.gov

Figure 133 Compost bac /source: 3f-echosresponsables.fr

IV.2.6 Natural ventilation:

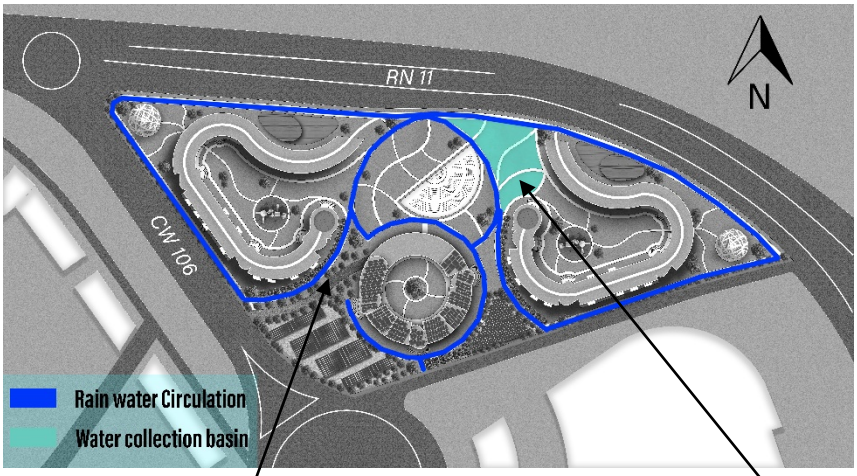


Improve the ability of our project to reduce energy needs by:

Orienting buildings to the north to provide natural Ventilation via the sea breezes.

Figure 136 Natural ventilation /source: author

IV.2.7 Water management:



To limit the flow of water, we used concrete drainage pavement which allows water to penetrate into the ground and which limit the filling of sewers in heavy rain and to be collected in a water basin to be used also for watering the plants.

Figure 137 Water management /source: author

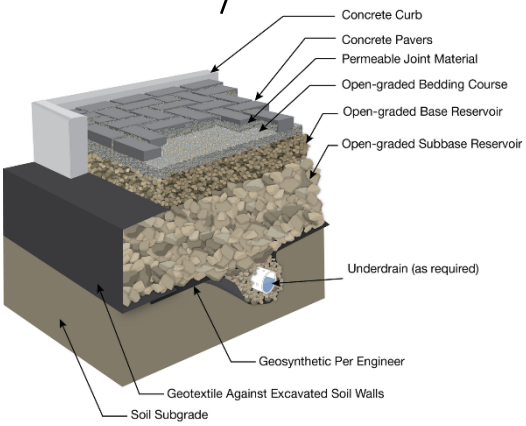


Figure 138 Permeable paving section /source : base.imgix.net

Figure 139 water bassin /source : author

IV.2.8 Natural lighting:

Figure 140 North facing patio /source: author

A north-facing patio provides natural light for the passageway.

IV.2.9 The biodiversity:

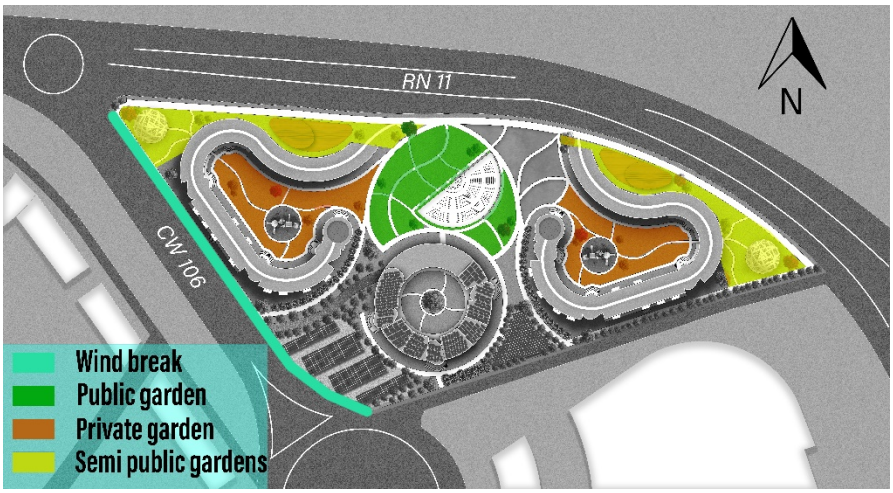


Figure 141 Biodiversity in the site /source: author

Introducing different kinds of greenery to ensure biodiversity and preserve the living environment as well as air pollution control, noise minimization, and finally protection against the elements.

Figure 142 Eucalyptuse Wind break / source : author

Figure 145 cdn.shopify.com

Figure 144 gardendesign.com

Figure 143 c8.alamy.com

IV.3 Environmental approach at the scale of the Built:

IV.3.1 Orientation:

Figure 146 Building orientation /source :Figure 21 Biodiversity in the site /source: author

The main façade faces north to project a panoramic view on the sea and to benefit from sea breez.

A fluid circular shape oriented south to avoid sirocco winds coming from this side.

Figure 147 South elevation /source :author

Figure 148Main facade facing north /source :author

IV.3.2 Natural ventilation:

Figure 149 Vertical ventilationvia patio/source:author

The natural ventilation of collective spaces in our project is provided by several elements:

The patio which provides a natural vertical ventilation.

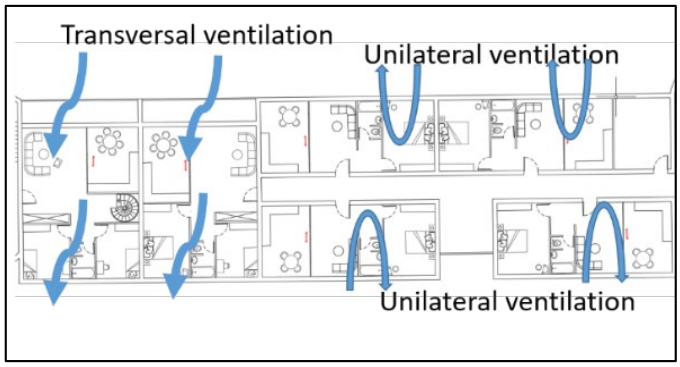


Figure 152 floor plan ventalation schem / Source: author

For apartments ventilation is provided naturally according to the configuration of the apartment (Transversal and unilateral ventilation.)

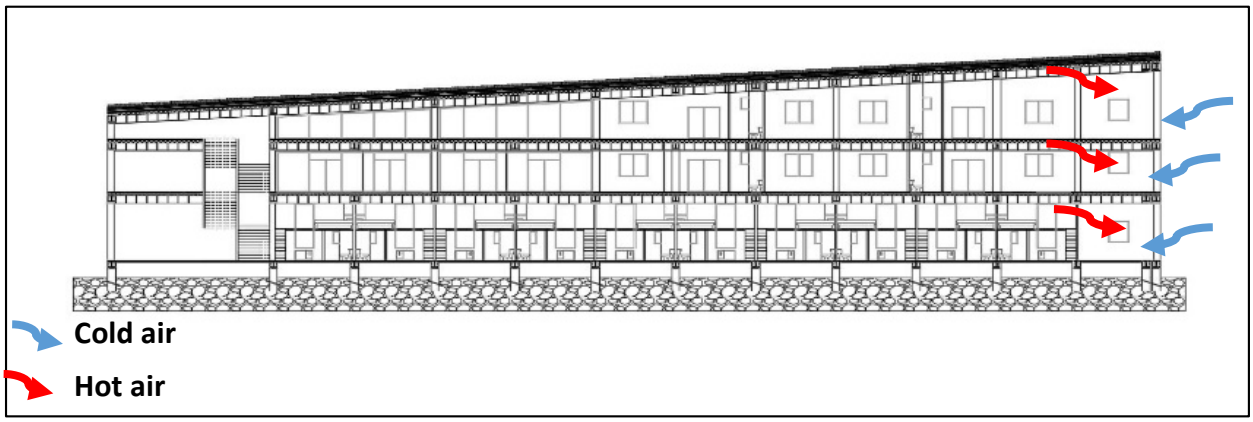


Figure 151 Section ventalation schem / Source: author

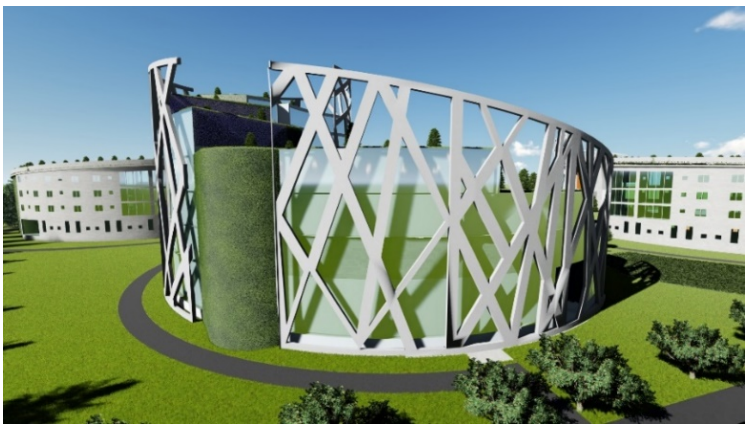


Figure 153 Double skin facade/ Source: author

Using Double skin facades for natural ventilation:

Under heating, the air buffer works as a barrier to heat loss. Sun-heated air contained in the cavity can heat spaces outside the glass, reducing the demand for indoor heating systems.

On heating, Excess heat is drained through a process known as the chimney effect, where differences in air density create a circular motion that causes warmer air to escape.

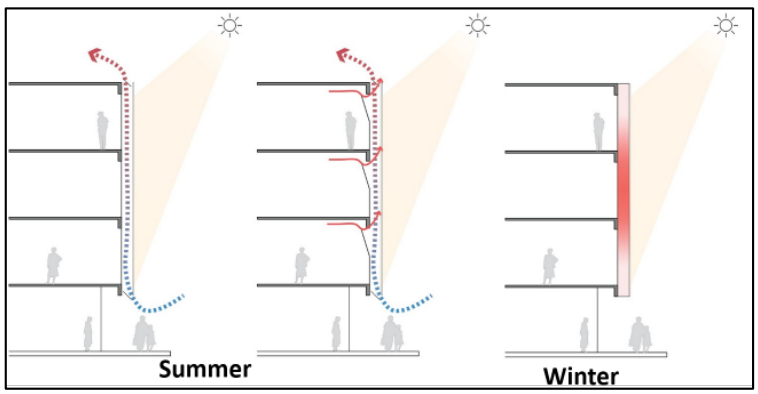


Figure 154 Double skin facade/ Source: images.adsttc.com

IV.3.3 Natural lighting:

Figure 155 North facing pation for natural light/source :author

valuing natural lighting in bioclimatic architectural design allows ensure satisfactory visual comfort while achieving energy savings:

The north-facing patio also captures natural light and transmits it to interior spaces (clearing of the accommodation part).

Figure 156 Bay windows /source: author

Placing bay windows, curtain walls in our project ensures natural lighting abundant in common spaces, including circulations, restoration space, space of work, accommodation.

IV.3.4 Thermal comfort:

Figure 157 PCM incorporated Bricks /source: doi.org

increase the thermal mass of the building elements by incorporating phase changing materials (PCMs) within the building envelope (PCM incorporated bricks) thereby, reducing the temperature fluctuation and peak temperature within.

IV.3.5 Biodiversity in the Building:

Figure 158 green facade Source : author

Integration of Vertical greenery systems (green façade, green wall, green terraces, and vertical forest.)

elevated forest through the green ramp technic which marks a harmony between the building and its environment.

IV.3.6 Water management:

Rain water Harvesting threw Eco roofs or green roofs the rainwater is collected, stored and reused for sanitary facilities.

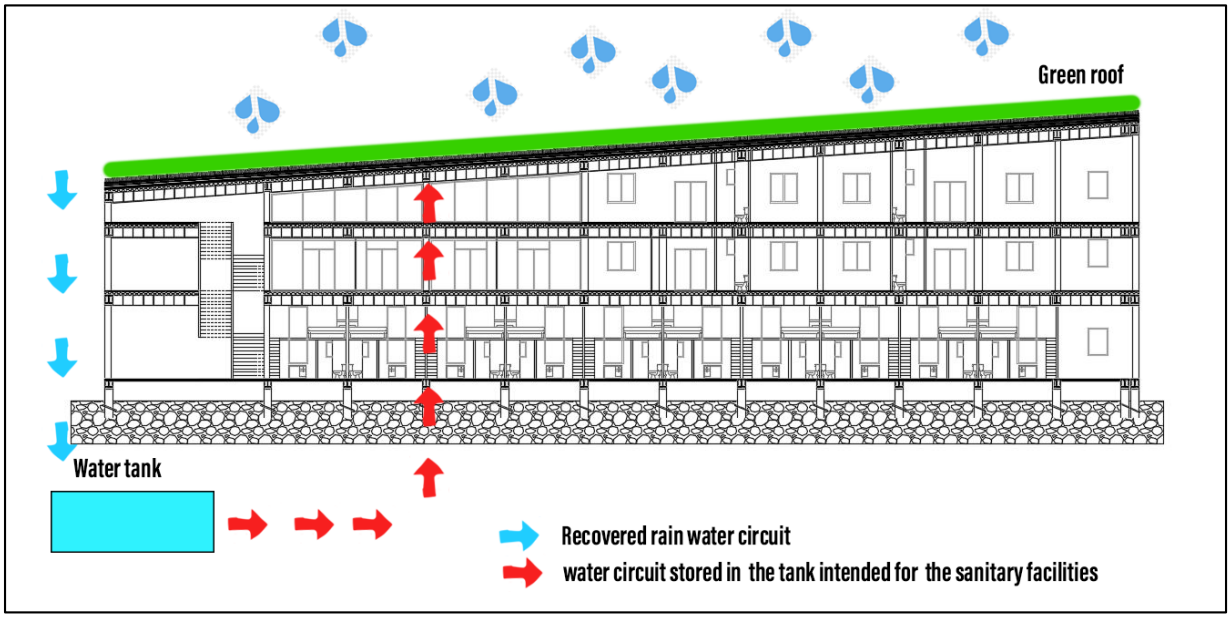


Figure 159 green roof technic section plan/source: author

IV.4 Synthesis:

The idea of the project was to design a building that is environmental friendly with low energy consumption all while providing a comfortable environment for the occupants. And in order to achieve that we have opted for a set of passive, active and natural light strategies on different scales of the project. Combined with the use of recycle materials, Insulation technics and waste management.

GENERAL CONCLUSION

GENERAL CONCLUSION:

In the last decades. The world has been leaning towards alternative economical income sources that are more profitable and less harmful towards nature. such as sustainable tourism. So this year we have chosen to take a more profound look at the tourism sector in Algeria and how it can be used in a sustainable way as a catalyst for economic growth. Analyzing its weak and strong points, the challenges that it faces and the potential that it holds.

We have chosen Tipasa as our focal studying point, a city of rich natural, Cultural and historical heritage that is poorly exploited, A living example of the wasted touristic potential in Algeria. Thus leading to our main problematic and hypotheses.

The main focus of our work was to contribute to the economic growth of the city in an environmental frame work by designing a bioclimatic tourist accommodation that also takes in consideration the social and cultural aspect.

In order to do that we had to prepare a theoretical data base to lay the ground for our design using the prior knowledge that we acquired throughout the years, And the researches that we have conducted along the thesis starting with the thematic related concepts and technics, reinforced by case studies of conceived projects to provide a more solid idea, later on we went for a detailed analysis of the site of interventions from different points of view.

In the end we have put the data that we collected to use in designing a bioclimatic serviced apartment, that is functional on the architectural level, offering different lodging formulas and accommodations for different tourists, while also being environmental friendly with low energy consumption by following the principles withdrawn from bioclimatic architecture and the case studies we conducted. A project that confirms our hypothesis.

Sadly, we did not have the time to simulate our project and put our theory to test.to get more solid results but it is something that we are looking up for in the near future.

Lastly, this project might only be our small theoretical contribution in our field of study as students. but we really wish that such projects can be acknowledged and taken in consideration in our country, And that they might be the start for something better and more considering towards our planet and environment.

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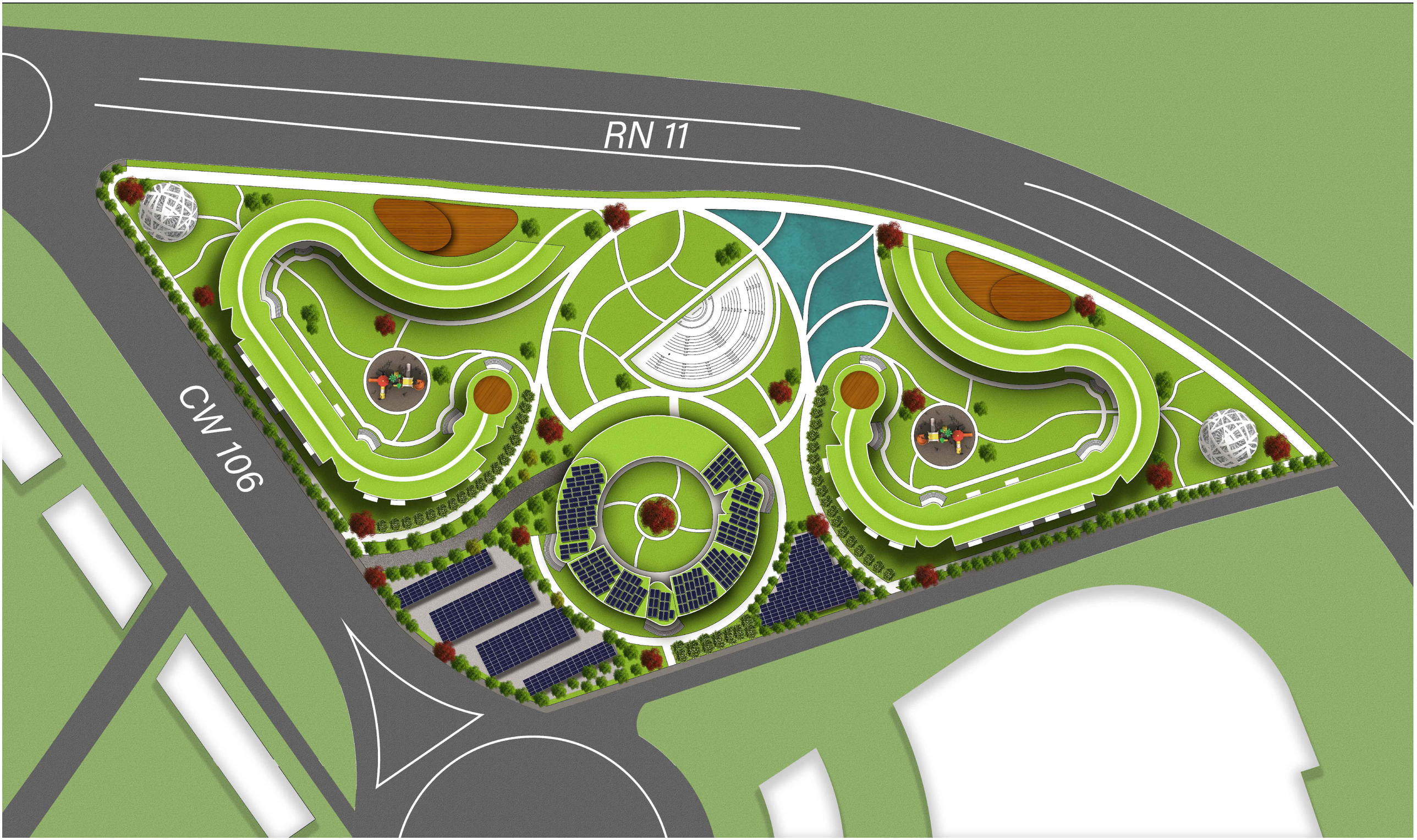
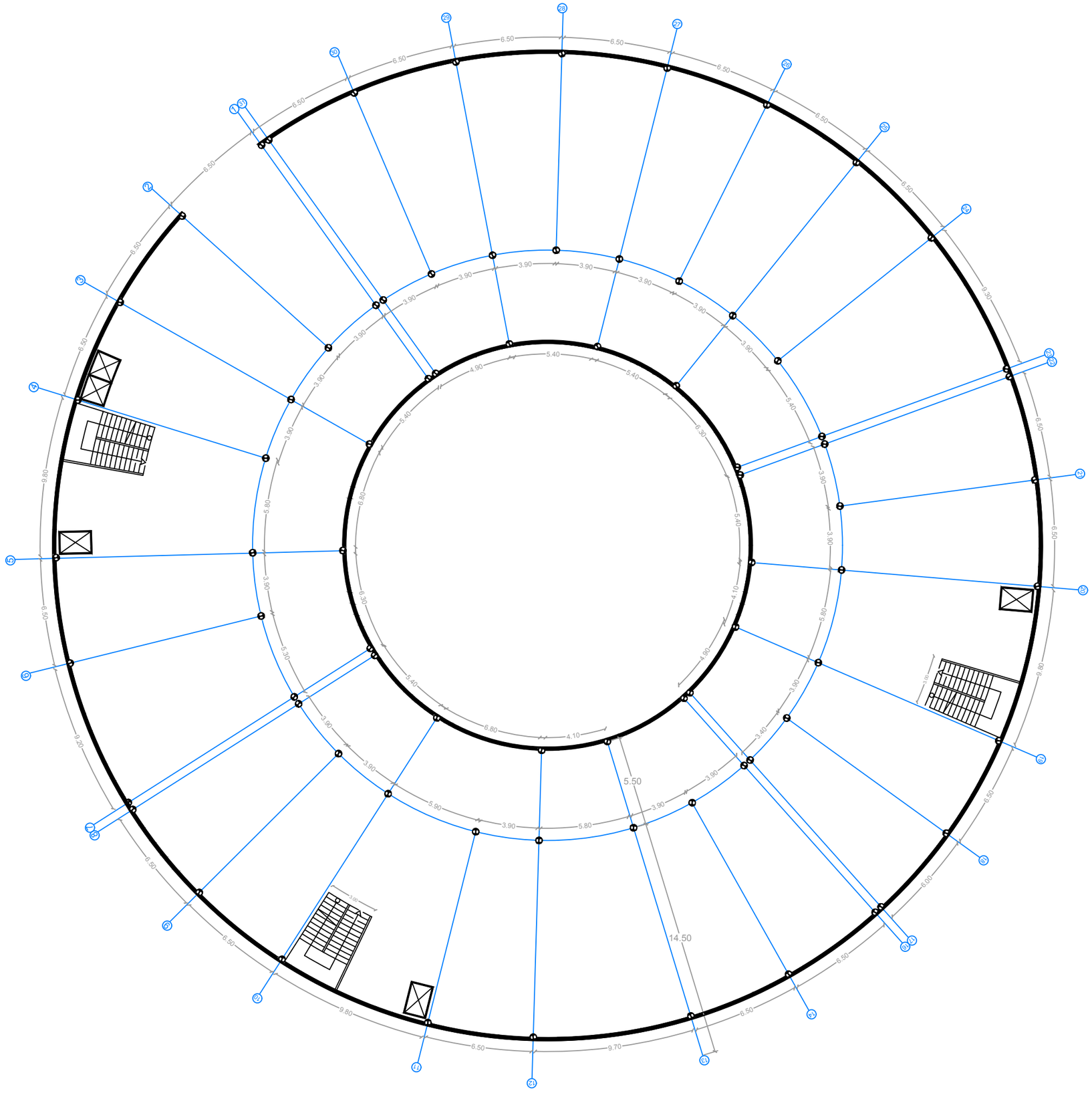
APPENDICES

Overall plan 1/1000

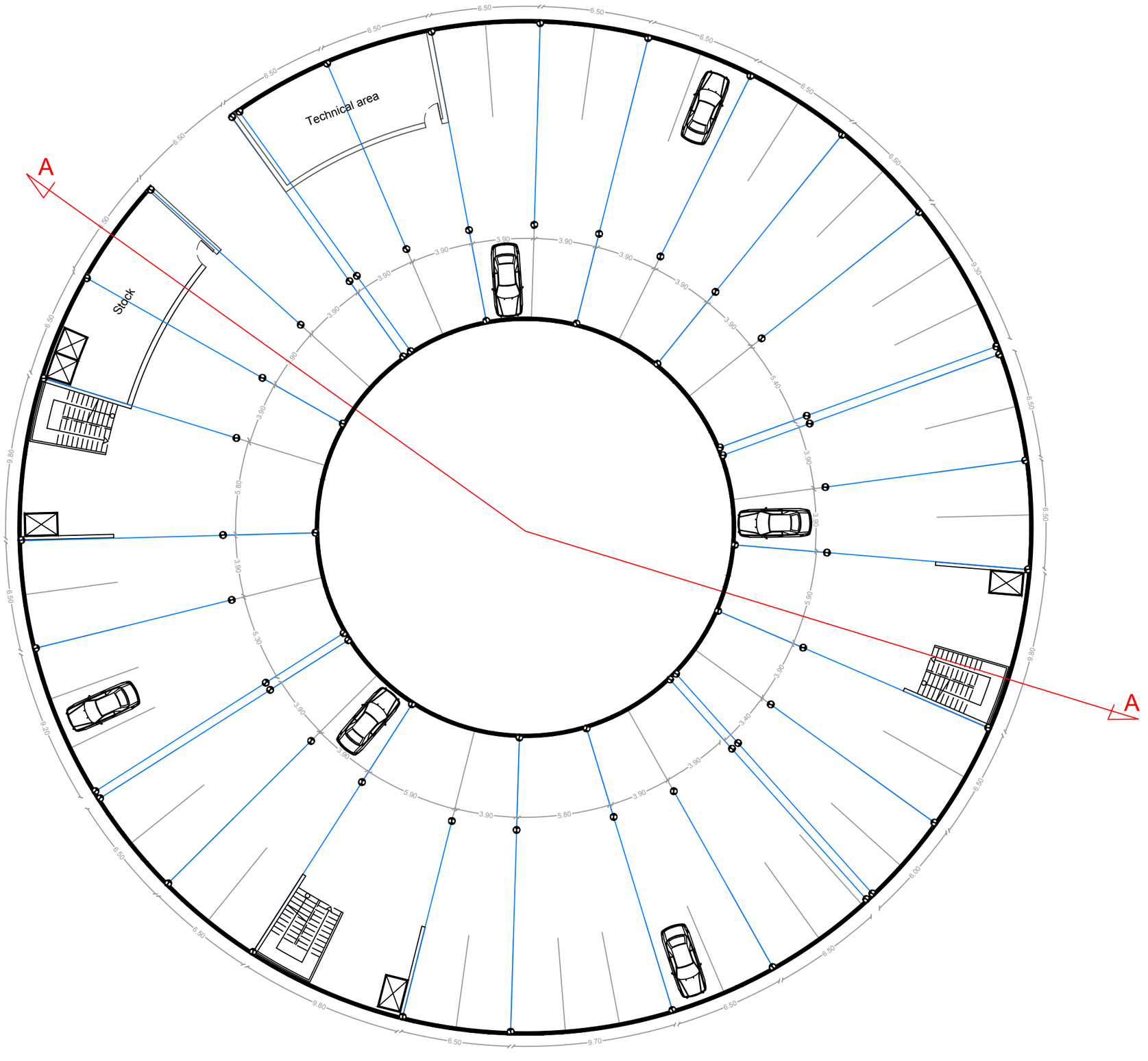


Overall plan 1/1000

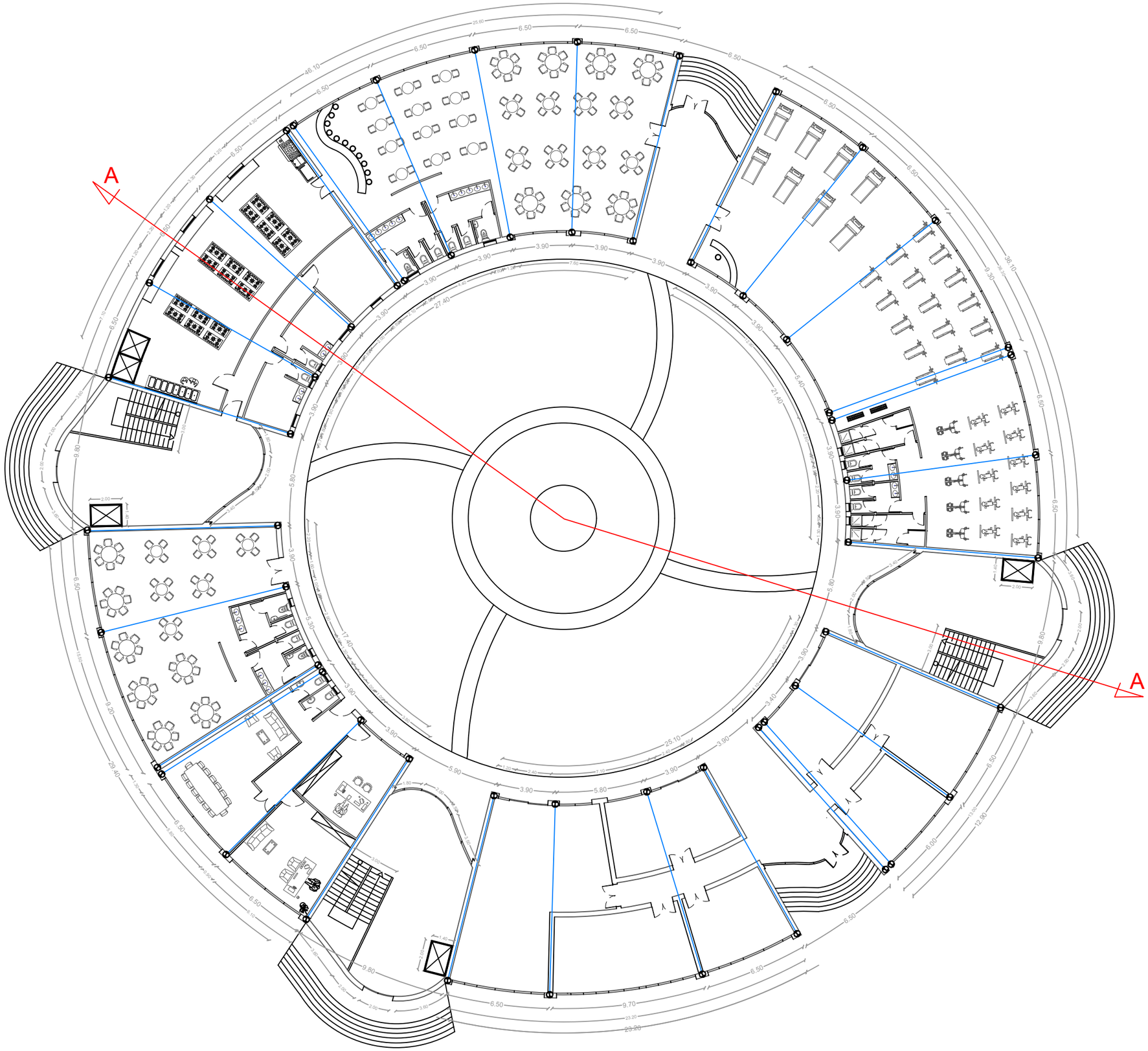
STRUCTURAL PLAN 1/250



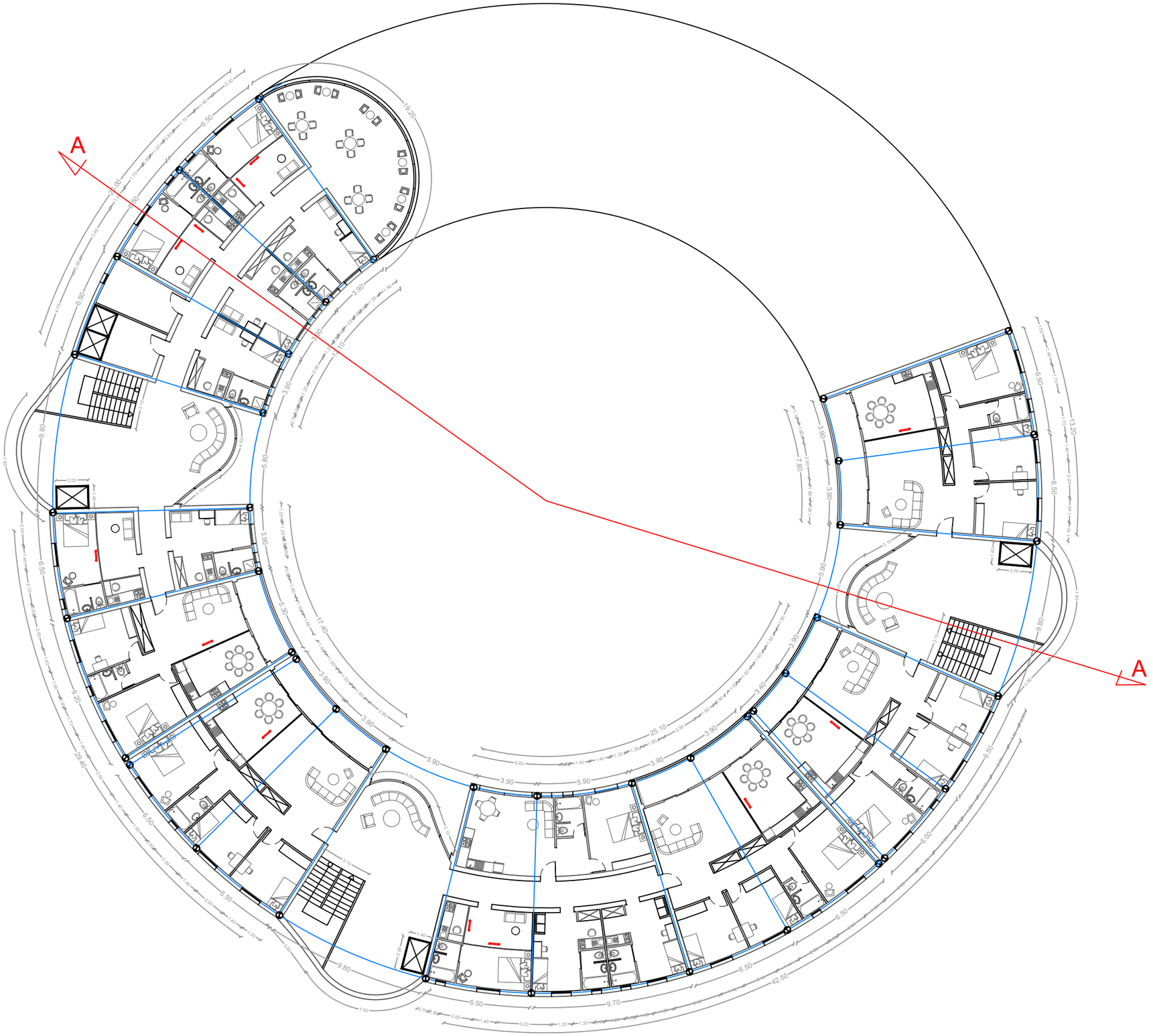
UNDERGROUND FLOOR PLAN 1/250



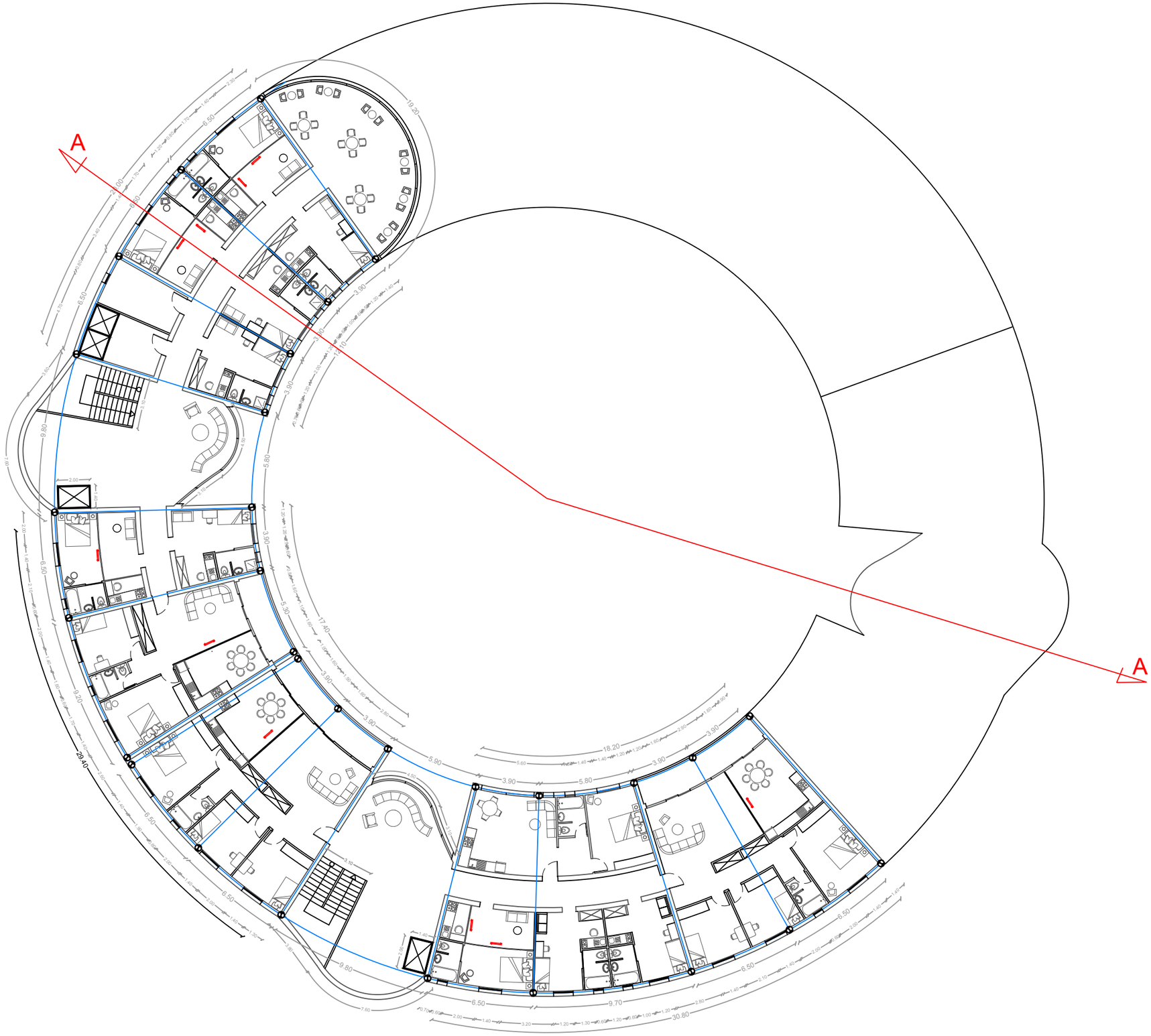
GROUND FLOOR PLAN 1/250



1ST FLOOR PLAN 1/250



2ND FLOOR PLAN 1/250



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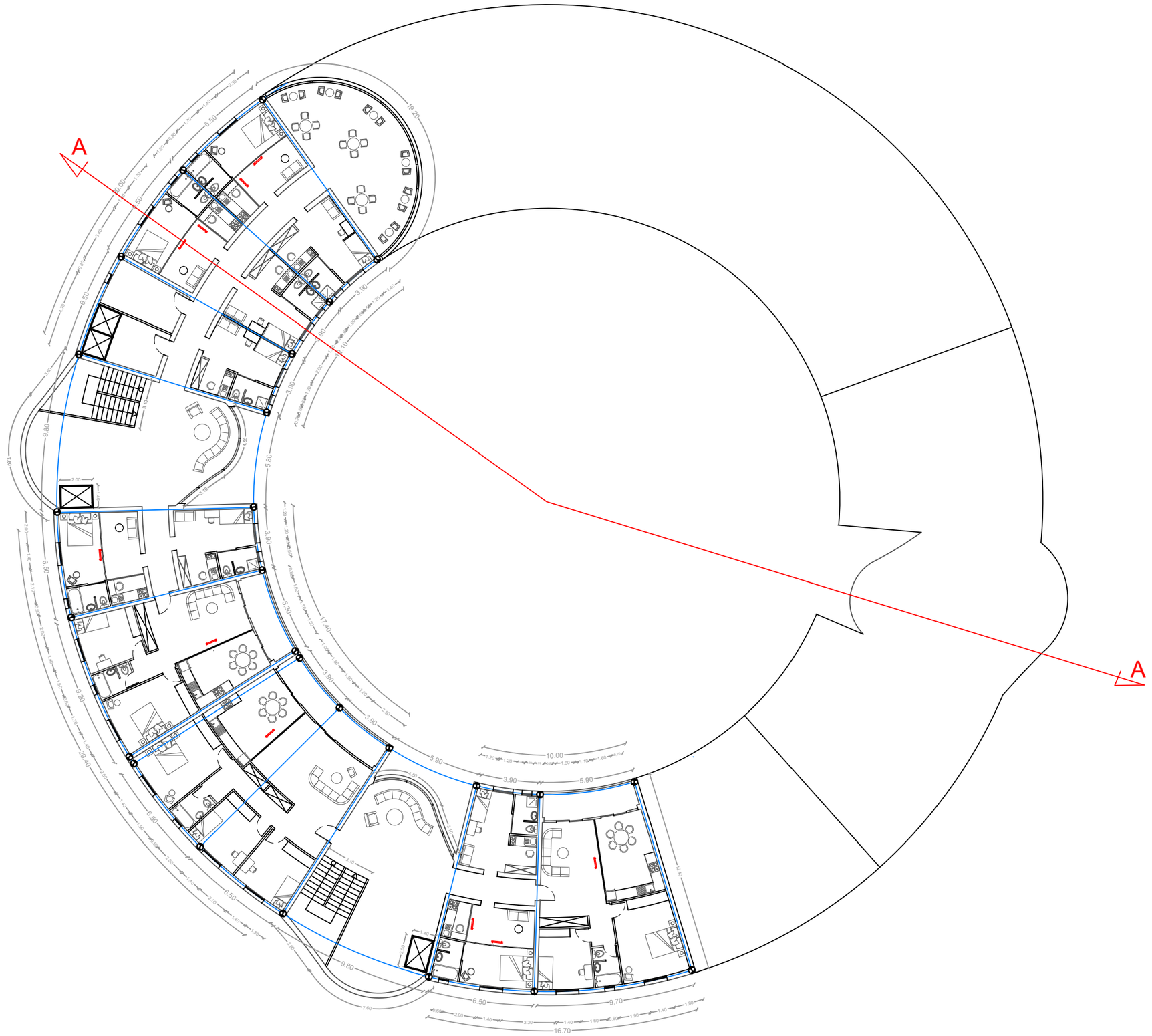

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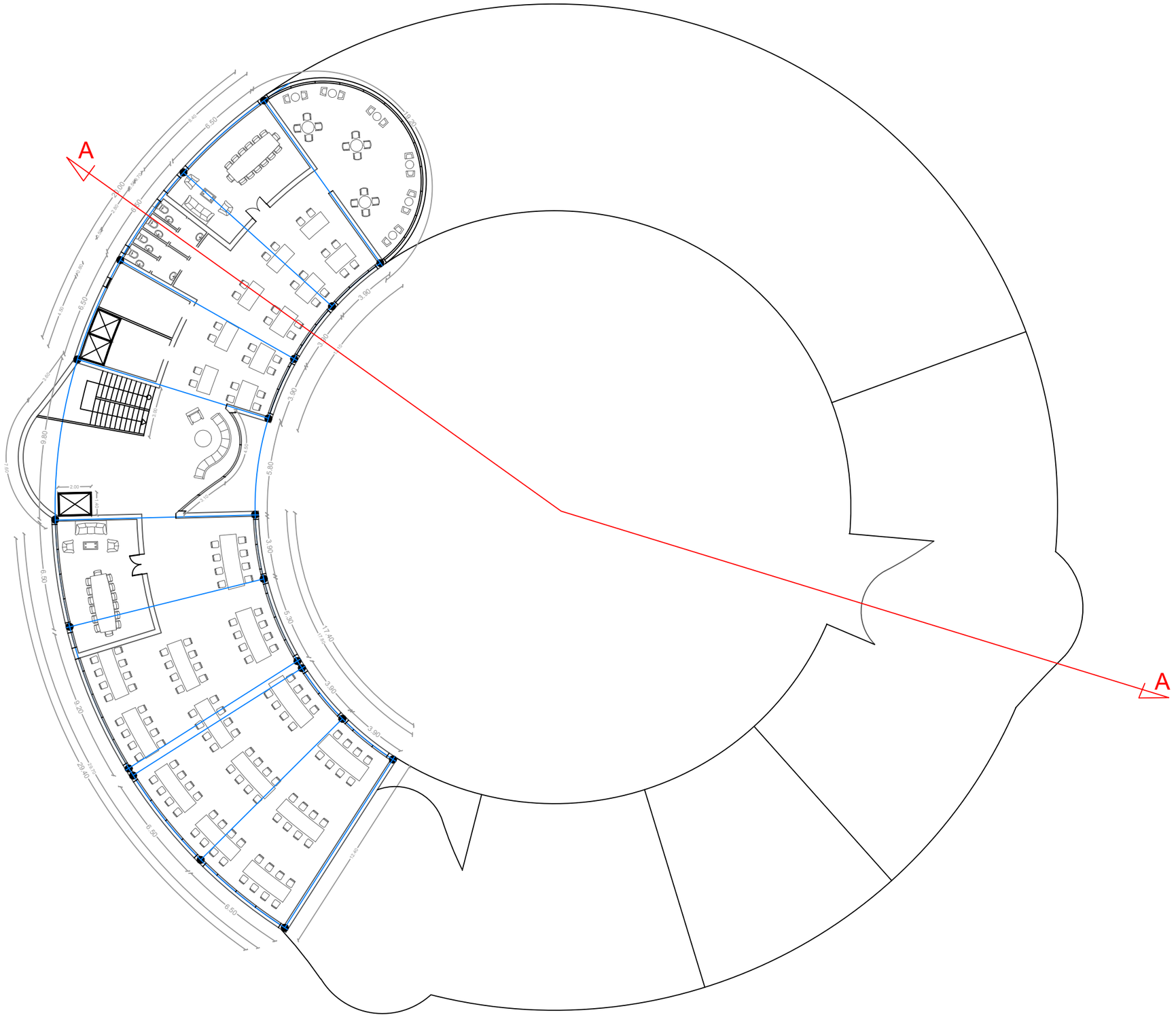

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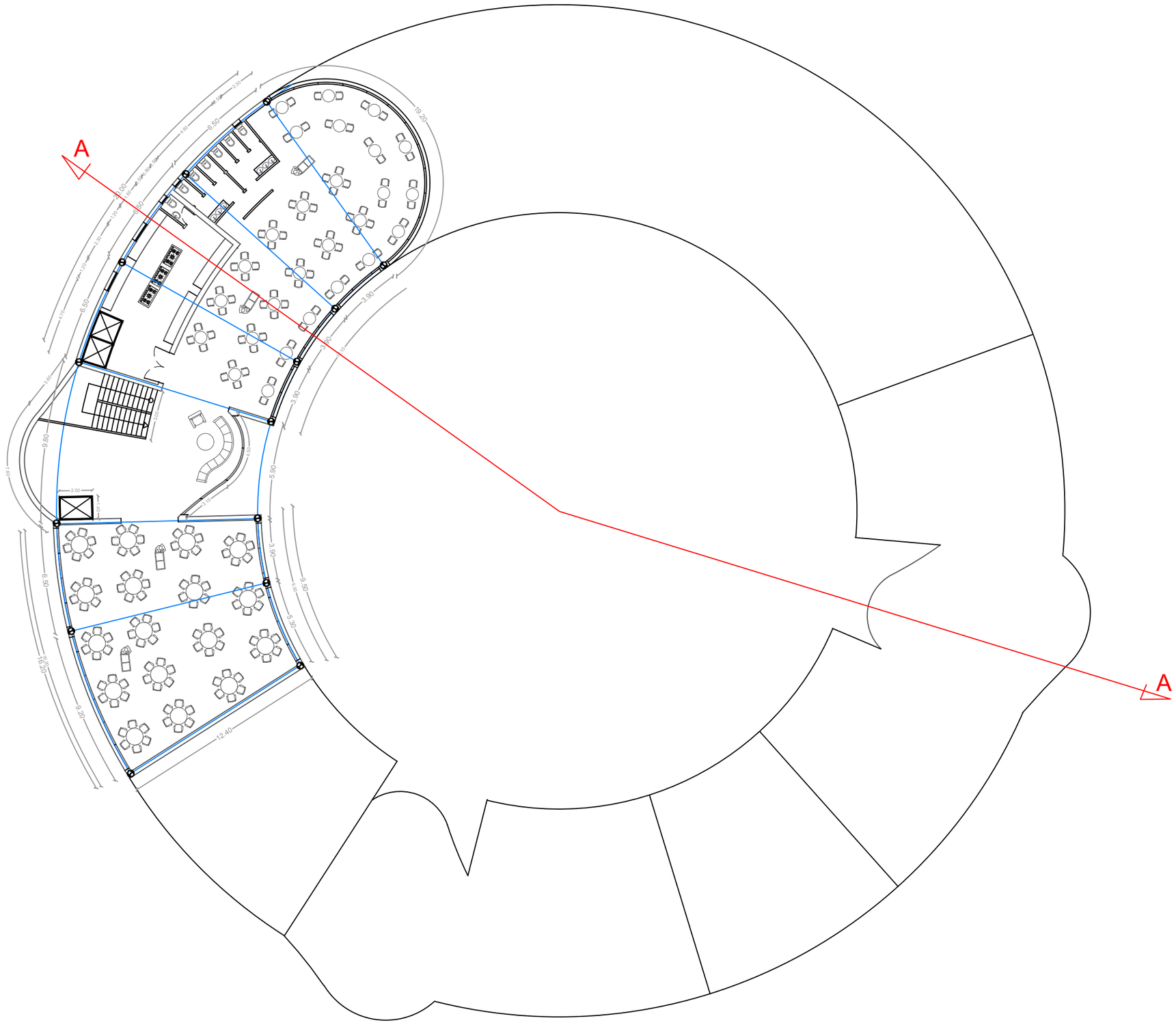

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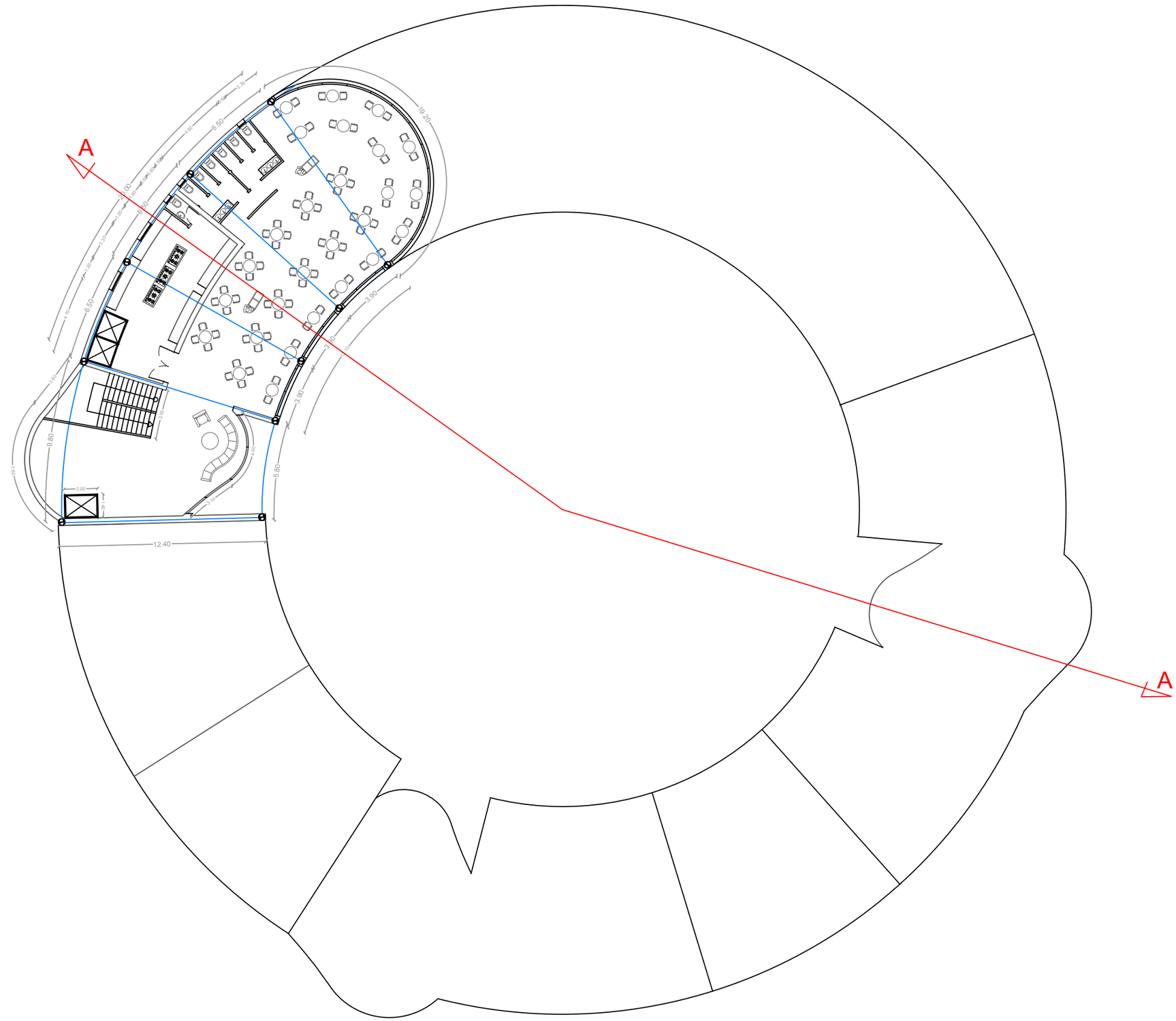
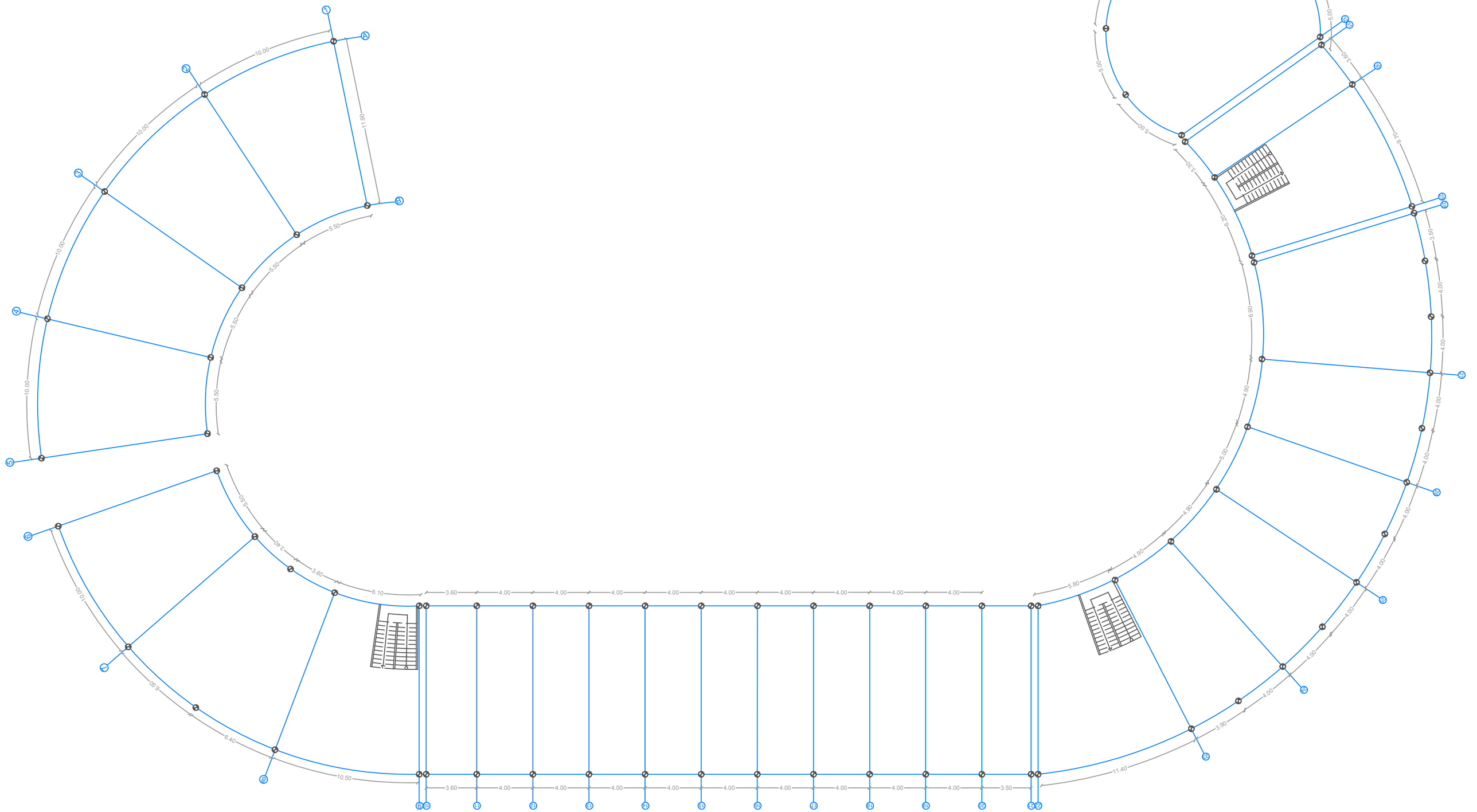
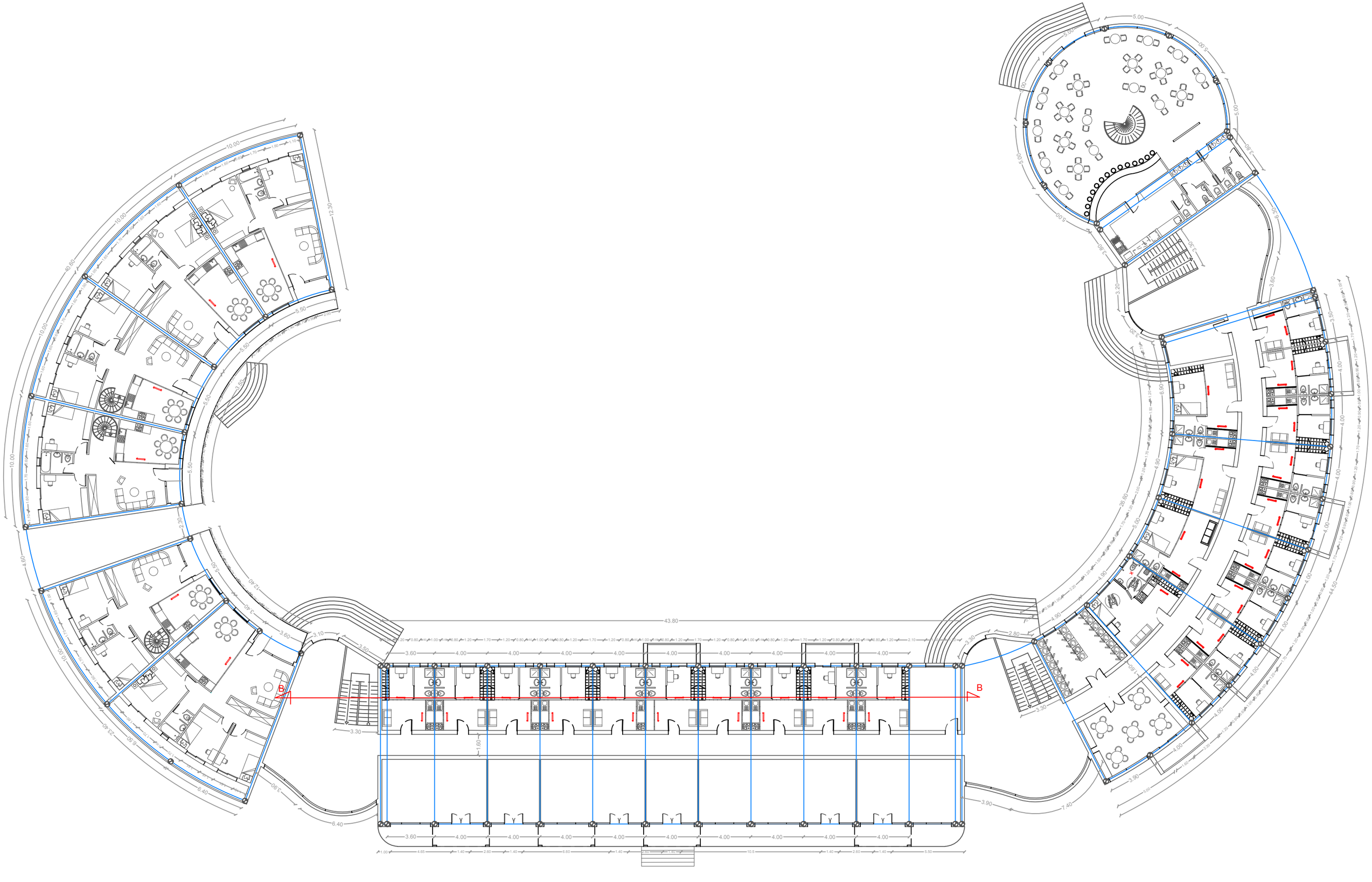


SECTION AA1/200

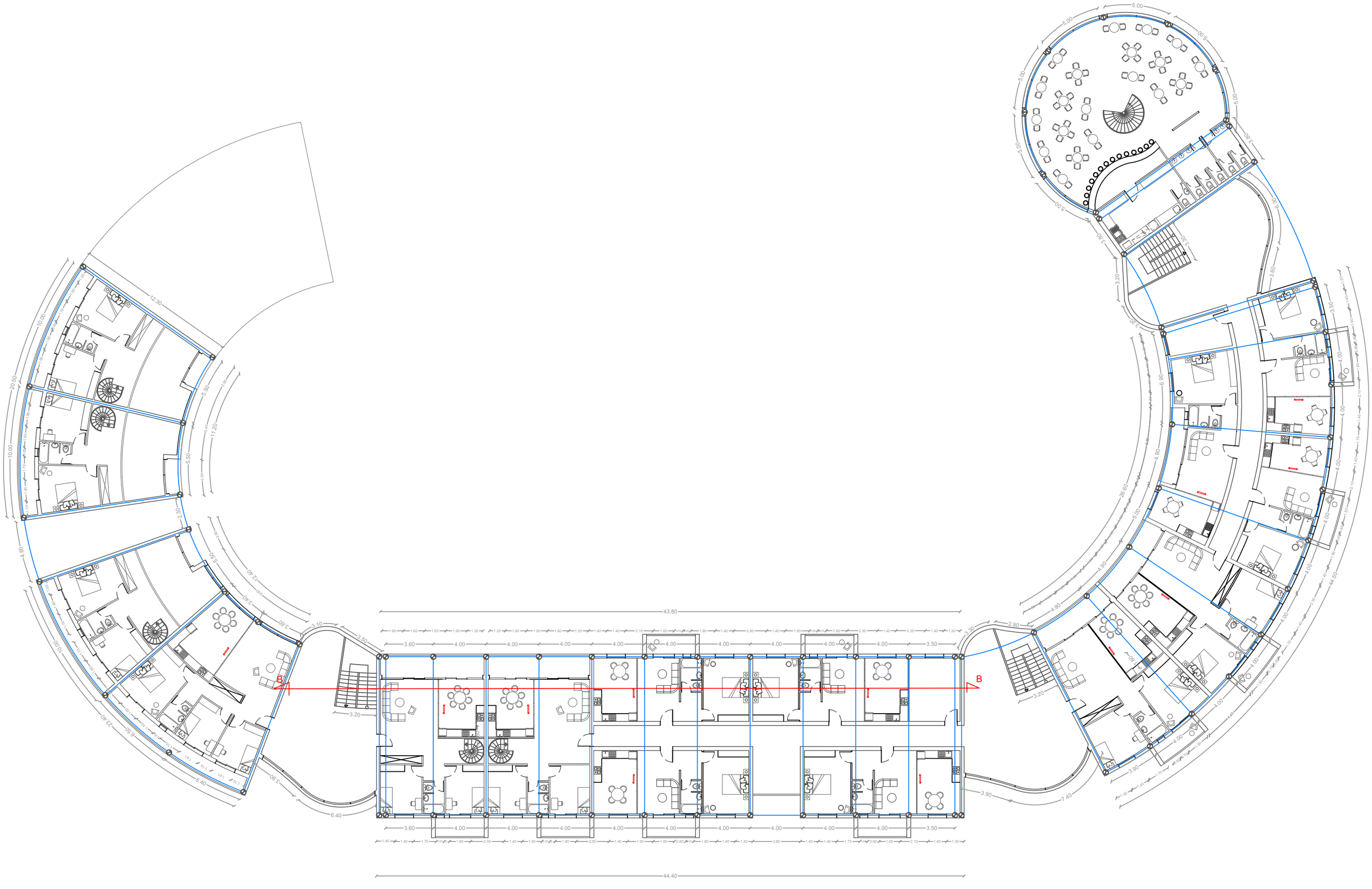
STRUCTURAL PLAN 1/250



GROUND FLOOR PLAN 1/250



1ST FLOOR PLAN 1/250



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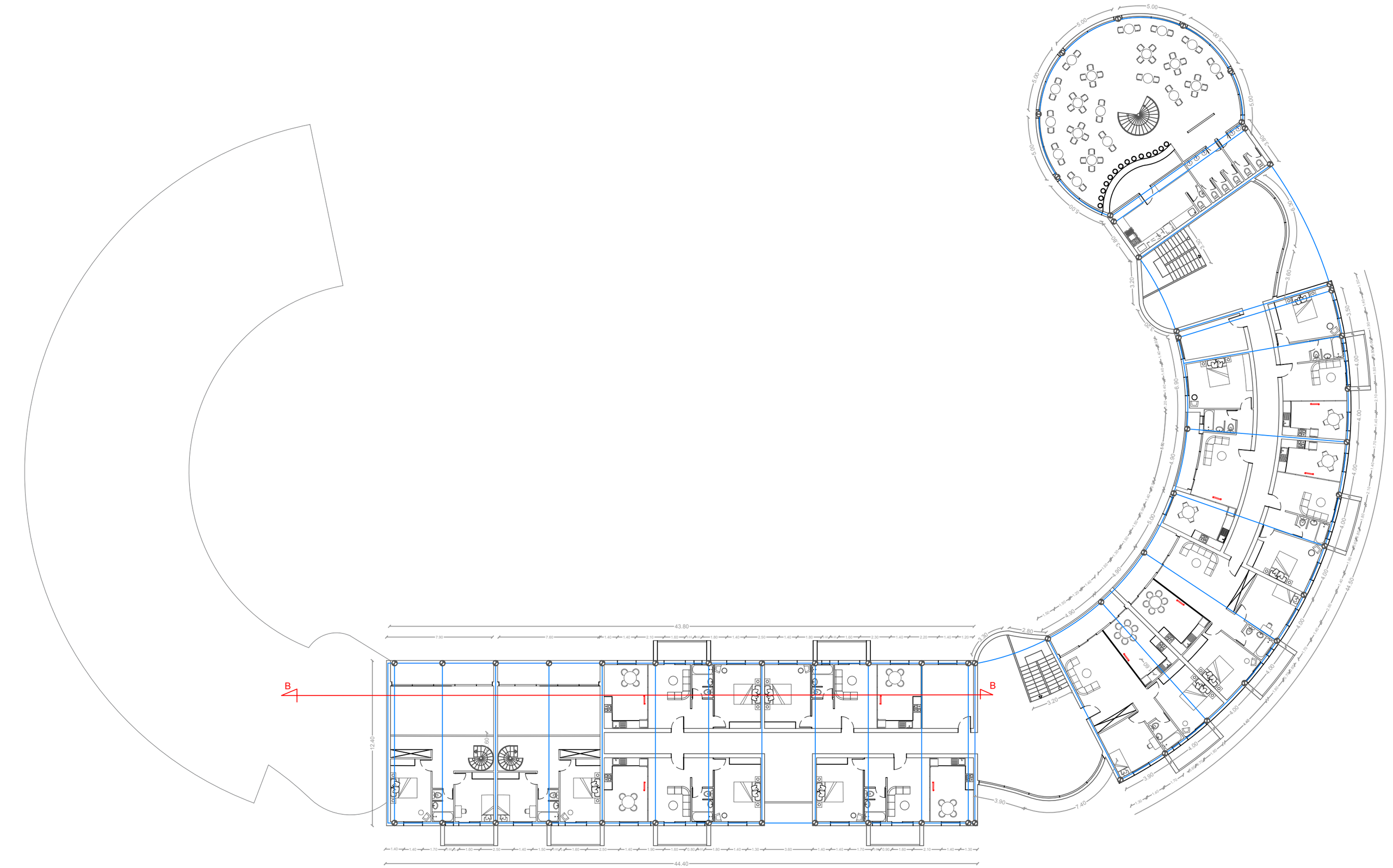

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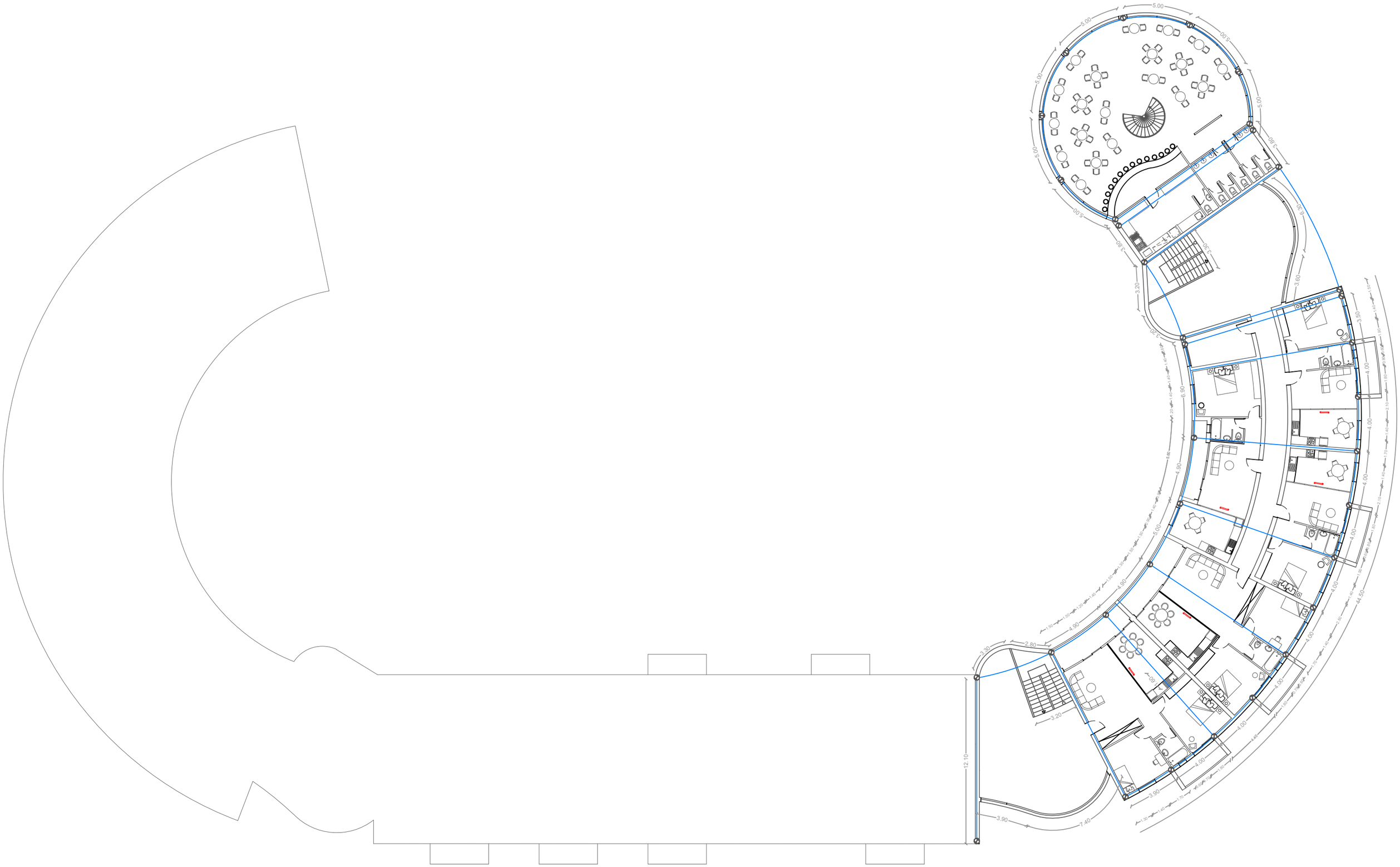

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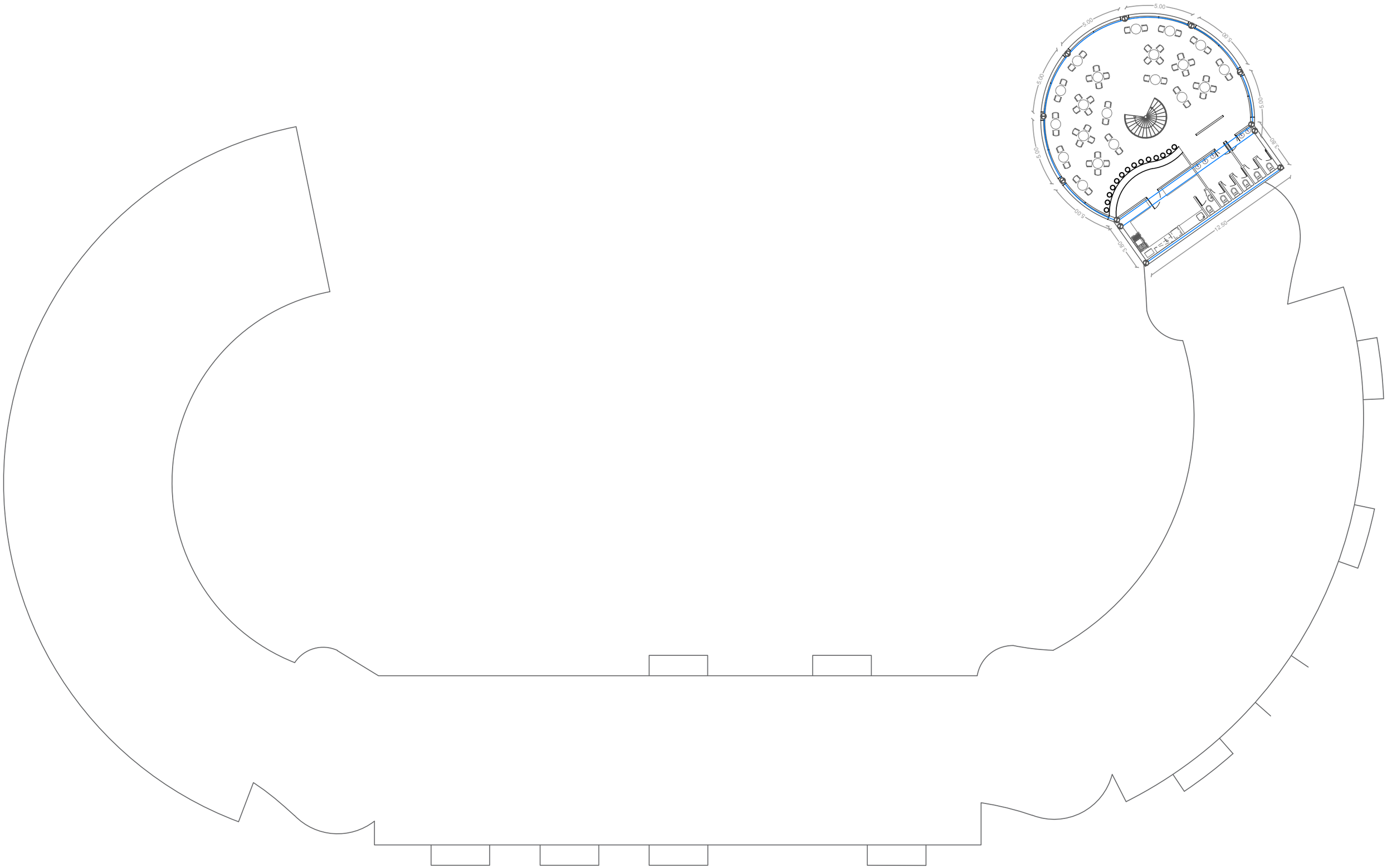

SECTION BB 1/200