

Design Thinking, A Strategic Approach To Urban Transition: The Case Of The Thazir District In Ain Smara, Constantine, Algeria

Nait Amar Nadra^{1,*}, Hammou Malak¹, Seghiri Meriem², Benzagouta Yasser Nassim², Keddari Dounia², Farah Mohamed Ikkal², Alliouche Ahmed²

Abstract

The sustainable urban planning approach is a unique opportunity to create dynamic cities that respect both people and the environment. In fact, the quest for sustainable development that is more economical with material resources and respects the environment calls on specialists to articulate their thoughts on planning and new fundamental knowledge aimed at the future development of sustainable urban planning. Algeria's cities have undergone profound economic and social change, accompanied by rapid urbanisation, particularly those in the east, such as the colonial village of Ain Smara, which has proven assets thanks to its original natural setting and the diversity¹ of its existing urban infrastructure. This study sheds light on the application of the principles of sustainable development through the urban transition of the Thazir development to an eco-district project. To this end, a year's worth of fieldwork was carried out, supported by surveys using a variety of techniques, such as on-site observation of Ain Smara. The SWOT analysis was also applied to the Thazir district, in order to evaluate and establish the strategy to be followed in this urban transition. The Design Thinking approach, which is a first in Algeria, was also used in the field of urban planning, in order to bring into play the three founding factors of the eco-district: the human, institutional and innovative technological factors. The results show that design thinking provides innovative ideas for developing new sustainable and ecological design methods. In fact, this approach enables the city to become more open to creativity, and to give residents and local authorities the benefit of a stronger.

Keywords: sustainable development - Eco-District- Constantine- Thazir promotion- Design thinking.

1. Introduction

Over decades, the sustainable city has been the dominant paradigm for urban development. According to ideologies and discourses, sustainable urbanism, as a global approach, is a unique opportunity to create dynamic cities that respect both people and the environment, and mitigate climate change. Ecological or sustainable urban planning is a new way of understanding the relationship between the urban environment and nature. It aims to be more respectful of the environment by using new construction methods, new materials and new modes of transport (Rey, et al. 2021). Algeria has been faced with a phenomenon of accelerated urbanisation, and its development needs have increased as a result of strong population growth in recent decades. Faced with this alarming urban, social and, above all, environmental situation, Algeria is having difficulty controlling its needs by implementing urban policies. For almost half a century, Algerian cities have undergone profound economic and social change, accompanied by strong urbanisation, with an urban population that exceeds 70% of the country's total population. In 2023, Algeria's population was estimated at 44,177,969 (ONS 2018). Throughout this period, small towns have sprung up

¹"Architecture, Urbanism, Technique, Space and Society Laboratory", Faculty of Architecture and Urbanism, Constantine University 3, Algeria.

²Centre de Recherche en Aménagement du Territoire (CRAT), Campus Zouaghi Slimane, Route de Ain el Bey, 25000 Constantine, Algeria

*Corresponding author: nadra.naitamar@univ-constantine3.dz

around major cities such as Constantine, as a result of the rural exodus, galloping demographics and the postponement of urban growth by the latter.

Taking account of the environment and the impact of human activity in Algerian urban policies is a fundamental concern, particularly in order to make the principles of more rational development operational through the eco-district, given that Algeria is a member of the Tokyo agreements and the Grenelles for sustainable development, the objectives of which are set out in various agendas, including Agenda 21 (Belkhemsa. 2009). Ain Smara, our case study, is a former colonial city located to the east of the city of Constantine. It was built up gradually from 1980 to the present day. Its urban development began with ZHUN (Zone d'habitation urbaine nouvelle - new urban housing zone) programmes, followed by small individual housing estates, and then by a proliferation of housing estates of various types: communal, land agency, property development. The city of Ain Smara has a number of proven assets. Its dual urban and rural character, the original natural setting, the presence of vast areas of woodland within the urban fabric, the urban infrastructure and the various commercial facilities give it a relative autonomy (Cherrad. 2022). In addition, daily frequentation of the public and residential areas of Ain Smara has revealed a number of dysfunctions linked to the environment and the impact of human activity on the town, such as the lack of green spaces, gathering places and play areas. Hygiene and cleanliness, essential elements in preserving the health of the population, are far from being properly taken care of by the services concerned. In spite of the fact that private promoters have taken the initiative, the housing developments in Ain Smara are, compared with other areas, neighborhoods that offer a good quality of life. The Thazir district is a real estate promotion located in the centre of the city of Ain Smara. Built around 1990, it has undeniable urban and human potential. Built on a human scale compared with other housing estates, this residential area offers a pleasant urban living environment. In fact, it is characterised by "high standing" homes and owners with a high social status who seem to respect both nature and the urban environment. The presence of wooded areas marks the landscape identity of our case study and reinforces its ecological character. It should be emphasised that the forest is a sensitive, complex and rich ecosystem. An invaluable asset to the neighbourhood, it purifies the air, stabilises the soil and reduces erosion. The aim of this article is to simultaneously exploit the natural and urban potential of the city of Ain Smara and the Thazir district, with a view to designing a model eco-district. With this in mind, we pose our main research question: "How can we develop an eco-district project in Ain Smara, through the Thazir real estate promotion, in line with the sustainable development principles of the Agenda 2030, while respecting the reality of the Algerian context?"

To this end, we are going to apply two methods: the SWOT analysis, which will enable us to define the strengths, weaknesses, opportunities and threats relating to the case study mentioned above; and the design thinking method, which will enable us to identify the most appropriate strategies.

DT has evolved considerably since the concept was first created. Overall, it is a method or approach centred on the user/human being and geared towards innovation. Whatever the field of application, empathy, creativity, co-creation, iteration and the right to make mistakes are at the heart of this innovation methodology (Le Bœuf. 2011).

2. Materials

The City of Ain Smara was chosen from among all the satellite towns created around Constantine for: the presence of vast wooded areas within the urban fabric, as well as the diversity of urban infrastructures and facilities, giving it relative autonomy. The choice of the Thazir district over other developments in Ain smara is justified by its urban and human potential, which is an asset for the transition to an eco-district model.

2.1. Description of Ain Smara

The city of Ain Smara is located 15 km from Constantine, between latitude 36.16°N and longitude 6.30°E, south-west of Constantine. It is located almost in the centre of the municipality, which is bordered to the north by Ibn Ziad, to the north-east by Constantine, to the east by El Khroub, to the south by Oued Athmenia (Wilaya de Mila) and to the south-east by Oued Seguen (Wilaya de Mila). The agglomeration of Ain Smara is located in a virtually flat topographical area (with a gradient of less than 5%) corresponding to the high and medium alluvial terraces of the Rhummel. It is in the western part that rocky features

emerge in the form of small elevations. The Rhumel, the only river in the area, runs along the eastern edge of the urban area (Cherrad. 2017). The city of Ain Smara grew up around its original colonial nucleus, which dates back to 1854. This small farming village was built in the broad Rhumel valley (fertile soil and available water) (Table1).

Table 1: Urban evolution of Ain Smara’s City (Source: Authors 2023)

Year	Features and observations
Until 1962	It was only a small rural centre with orthogonal layout and surface area 30 hectares Low buildings (ground floor / ground floor + 1 floor) with small gardens. The RN5 is the main road running through Ain Smara. Population Under 2,000 pesons.
1960-1970	Low population density Creation of a 260-hectare industrial estate (mechanical complex "shovels and crane designers"), which changed the course of its development.
1980	Creation of a ZHUN of 1,650 collective housing units to the north-west Individual housing developments to the north-east and south of the city Ain Smara is one of Constantine's satellite cities (due to the saturation of the Constantine site) This decade has seen unprecedented demographic and urban development. An area of 100 hectares
1990	Continued demographic and spatial development of the city Creation of numerous housing estates of different types (municipal, land agency, property developments, etc.) to the north, south-west and south.
2000	Creation of different housing programs (social, LSP, individual and collective property developments...) for the inhabitants of Constantine's main city and also for the local population. The city has expanded in its south-western part and the last land pockets have been consumed.
2008	6,825 homes, including 3,515 collectives (apartment, buildings) The city is elongated, running north-east-south-west Area 328 hectares
2022	Creation of new infrastructure (secondary school, CEM, youth Centre, etc.)

2.2. Description of the case study: Real Estate development Thazir

The Thazir project is located in the Centre of Ain Smara (Fig 1), covering an area of 100 hectares. The number of residences is: 346 homes, the project consists of an R+15 tower and two buildings; A building R+8 floor, of 176 apartments. Most of the apartment are F5. The other building R+10 floor, of 140 apartments.

The ground floors of the buildings are used for shops, two beauty salons, a cakeshop, a travel agency, a cafeteria, a taxi phone, a photographer, and two premises for additional courses, etc. The promotion is very easy to access: the main boulevard of Ain Smara to the north; the RN 05 to the south; the main boulevard of H'richa Amar to the west.

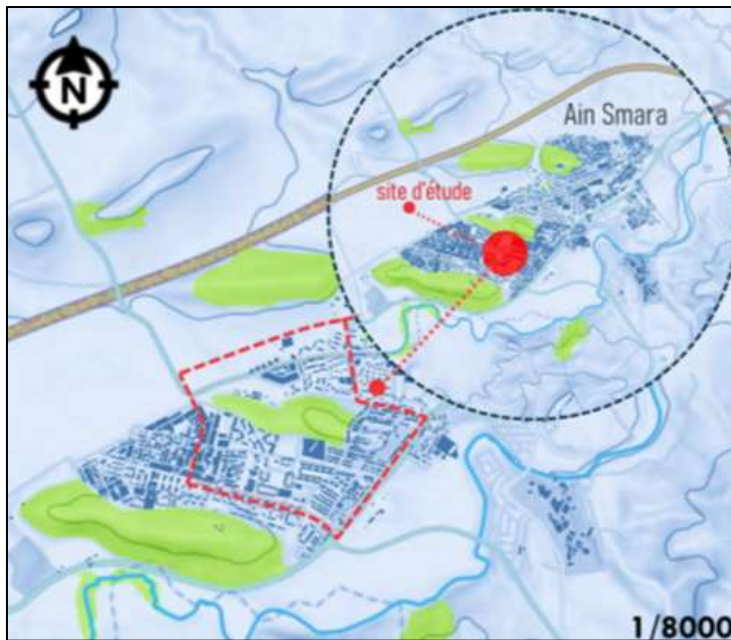


Fig 1: Localisation of Thazir’s district (source: Authors 2023)

3. Methodology

In this study, our approach is based on fieldwork that lasted almost a year (September 2022-July 2023); conducted through qualitative and quantitative surveys with residents (Anadón. 2019), which were also based on daily observation of practices and habits. To this end, we applied the SWOT analysis to the entire site (Thazir's promotion), and then proceeded with the Design Thinking method.

3.1. Application of SWOT analysis

Firstly, we used SWOT analysis to evaluate a project and identify its strengths, weaknesses, opportunities and threats in order to draw up a strategic action plan for promoting Thazir (Phadermrod, et al. 2019). The SWOT analysis method is very simple to implement and interpret (Coman and Ronen. 2009). It is presented in the form of a table. The points cited are ranked in order of importance under each heading (Table 2).

Table 2: SWOT analysis

Strengths	Weaknesses
Strategic geographical location. Presence of a main axis (crossroads in the middle). Presence of the forest as a green lung. The natural contribution of the forest. Presence of an enlightened socio-professional category open to consultation and innovative ideas. Favorable land for building. Relative availability of land. The site is well supplied with various networks. Residents live in acoustic comfort (little noise). The site is accessible from different entrances. The buildings are recent and in good condition. Pedestrian walkways. The presence of neighborhood associations. Walking is a popular means of transport for residents.	Bad waste management Non-uniform external appearance (facades, shops, etc.). Insufficient play areas Insufficient public spaces. Those that do exist have deteriorated. Lack of green spaces Absence of equipped meeting areas Inaccessibility to PRMs Absence of selective sorting of household waste The total failure to install a rainwater recovery system. No housing in the district that uses renewable energy Public space not maintained Total absence of cycle paths.

<p>Social mix / Functional mix. A predominantly young and working-age population. Infrastructure. Security through the presence of the gendarmerie.</p>	
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Opportunities	Threats
<p>Create continuity between the forests of Ain Smara, with a leisure trail. Connecting Ain Smara with Constantine and the other satellite cities through a tramway extension project. Create a project that reintegrates our relationship with nature and energy consumption (use of renewable energies, innovative systems) Exploiting the forest as a social, educational and teaching environment Creating an intergenerational facility to encourage conviviality and community life Developing nightlife The opportunity to introduce new information and communication technologies.</p>	<p>Risk of forest fires due to its proximity to residential areas. Ain Smara is crossed by a seismic fault.</p>

3.2. The application of design thinking

The DT method is a human-centered design approach, developed by the Institute of Design and consisting of five stages (fig 2). The aim of this approach is to stimulate the creativity of the residents of Ain Smara and to enable the creation of an environment that meets the needs and aspirations of the occupants, taking into account the ecological, aesthetic and sustainable aspects of the design (Dym et al. 2005).

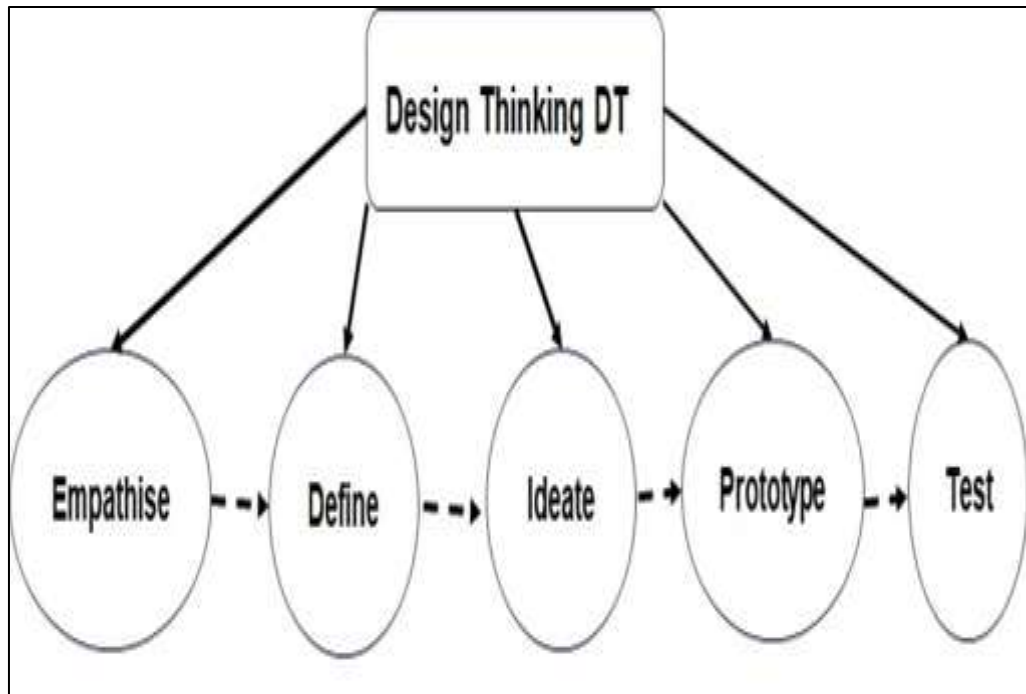


Fig 2: Design Thinking process guide (Source: Authors 2023)

To achieve this, we carried out fieldwork based on the survey method, using a variety of techniques such as in situ observation using the surveying method (Angers. 1997). The questionnaire is separated into 2 sections (general information and needs), divided into the two phases of the DT method. This investigative work stimulates creativity and leads to better results (Table 3).

a. Empathise

This step emphasises empathy with residents. It enables us to anticipate the needs of residents (Table 3), and to respond to their expectations using the means available (Vandenbussche-Masclat, 2019: 140). The results of this stage are expressed in the form of an empathy map.

b. Define

This phase consists of identifying problems and needs, based on the empathy work carried out previously. These needs are classified in a hierarchical logic, security needs, belonging needs, esteem needs and fulfilment needs. This phase is crucial to the design process. The results of this stage are expressed in the form of a problem tree (Stanford d.school. 2014).

Table 3: survey carried out with local residents, section1 and 2 (Source: Authors 2023)

Information	Number of answers	statistics	Information	Number of answers	statistics	
Gender	30 answers	43,3 women 56.7 men	frequented places	30 answers	40% main road 10% sports field 60% forest	
Age	31 answers	29% 60 years, over	existence of public spaces	31 answers	15,6% Yes 65,6% No 18,8% Deficient	
		25.8% 20 à 30 years	feeling safe		31 answers	77,4% Yes 22,6% No
		19.4% 30 à 40 years				
		16.1% 40 à 50 years				

		9.7% 50 à 60 years	evaluation of the health department	31 answers	7% Excellent 16,1% Good 45,2% Mediur 35,5% insufficient
Social status	31 answers	53.1% employed 28.1% retired 9.4 % unemployed 9.4% students	Transport assessment	31 answers	9,7% Excellen 29% Good 45,2% Mediur 16,1% insufficient
Function	31 answers	64.5% married 35.5% singles			
Residence time	31 answers	12,9% 2 to 5 years 16,1% 5 to 10 years 71% More to 10 years			

c. Prototype

This phase consists of brainstorming, in other words thinking about the possibilities and means of meeting the needs expressed. The aim of this phase is to move on from identifying problems to exploring solutions for local residents (Langevin et al. 2009). The results of this stage are expressed in the form of an idea table.

d. Ideate

This phase consists of concretising a representation or formalisation of the proposed solutions, in the form of a simple prototype, which is built on the basis of the data collected and ordered previously, (Rebours and Paul. 2016). The aim of this phase is to respond to the needs of local residents on the basis of innovative ideas. The results of this phase are presented in the form of two scenarios.

e. Test

This phase involves testing prototypes with residents to understand their real impact on the neighborhood. This may include evaluations and feedback from residents to determine whether the proposed solutions are viable. The aim of this phase is to feed the physical or immaterial object.

4. Results and discussions

4.1. Swot analysis

To help define a development strategy, we have combined a study of the strengths and weaknesses of the Thazir promotion with that of the opportunities and risks (threats) of its environment (Fig 3).

Categories	statist ics	strategy
1. strengths	43.2 %	- The presence of a socio-professional category opens to consultation and in a strategic location due to the presence and natural contribution of the forest and a main road leading directly to the forest novative ideas. -Creating continuity between the forests of Ain Smara by means of a leisure trail.
2. weaknesses	34.1 %	
3. opportuniti es	18.2 %	

4. Threats	4.5%	<ul style="list-style-type: none"> -Establishing a tramway extension to connect Ain Smara to Constantine and the other satellite cities. -Exploiting the forest as a social, educational and pedagogical environment and using the presence of the forest to give the site a distinctive identity. -Developing nightlife -Opportunity to introduce new information and communication technologies.
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Figure 3: Adopted strategy (Source: Authors 2023)

4.2. Design thinking

a. Empathy map

According to the questionnaire carried out, we established an empathy map, where we listed the main needs and problems related to listening, vision, feelings and actions to be taken proposed by the inhabitants. (Fig4).

The majority of the inhabitants of H'richa Amar have been living there for more than 10 years, thus creating an attachment and an identification with the place, while aspiring to attribute to their city a spatial-functional, energetic and ecological evolution of the city.

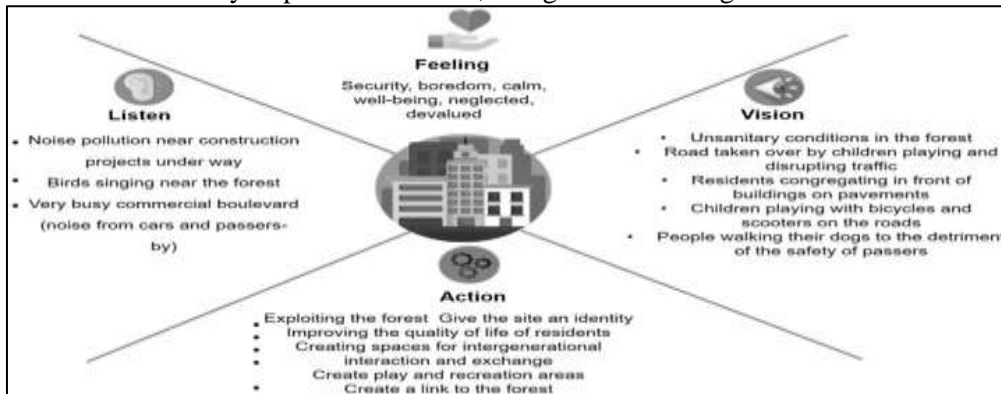


Figure 4: Empathy Map (Source: Authors 2023)

b. Problem Tree

Apart from their occupations, the inhabitants devote themselves to other activities which consist in frequenting the spaces: the forest, the sports grounds, the main boulevard, the mosque. Although most inhabitants regularly visit the forest, insecurity and dirt deter some people from going there (Fig 5).

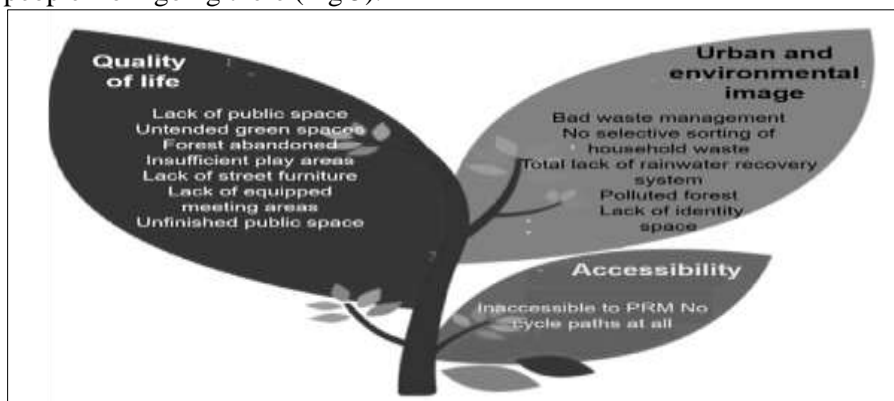


Figure 5: problem Tree covering the most important problems (Source: Authors 2023)

Residents have put forward recommendations to improve travel conditions, including extending the tram line, building a mechanical access road from H'richa Amar to the motorway, adding bus routes and increasing the number of taxis. The needs expressed by

residents include the development of sanitary facilities, the creation of an intergenerational space, the establishment of a shopping centre, the creation of recreational areas, the installation of a sports hall, improved waste collection and sorting, guaranteed safety, the upkeep of green spaces and public areas for (Table 4).

Table 4 : recommendation's residents (Source: Authors 2023)

Information	Number of answers	statistics
desired activities for children	20 answers	80% sport 20% games
proposal to improve transport	31 answers	83,3% tramway line extension 25,8% addition of bus lines 19,4% increase the number of taxis 29% develop a road linking the motorway
needs and services	31 answers	32,3% Health 32,3% Shopping centre 38,7% Meeting space 35,5% Gym 25,8% waste collection and sorting 38,7% green space maintenance 19,4% Security 9,7% public transport

c. Ideation

The results of the two previous phases (the empathy map and the problem tree) have led us to develop innovative ideas that meet residents' expectations and encourage creativity, such as: redevelopment of the main thoroughfare; forestry development; creation of an intergenerational space; application of eco-neighbourhood principles; development of a community and public garden; creation of sports fields; creation of a health facility; development of an urban park; creation of a plant tower; creation of a shopping centre. Nearly all residents (96%) say they would like to be kept informed about current projects in their neighbourhood, either via a dedicated website or social networks.

d. Prototype

The development operations selected after the three previous phases have enabled us to establish two scenarios, applying the main foundations of the eco-district; the needs, shortcomings and expectations expressed by the residents (Fig 6.1) (Fig 6.2).

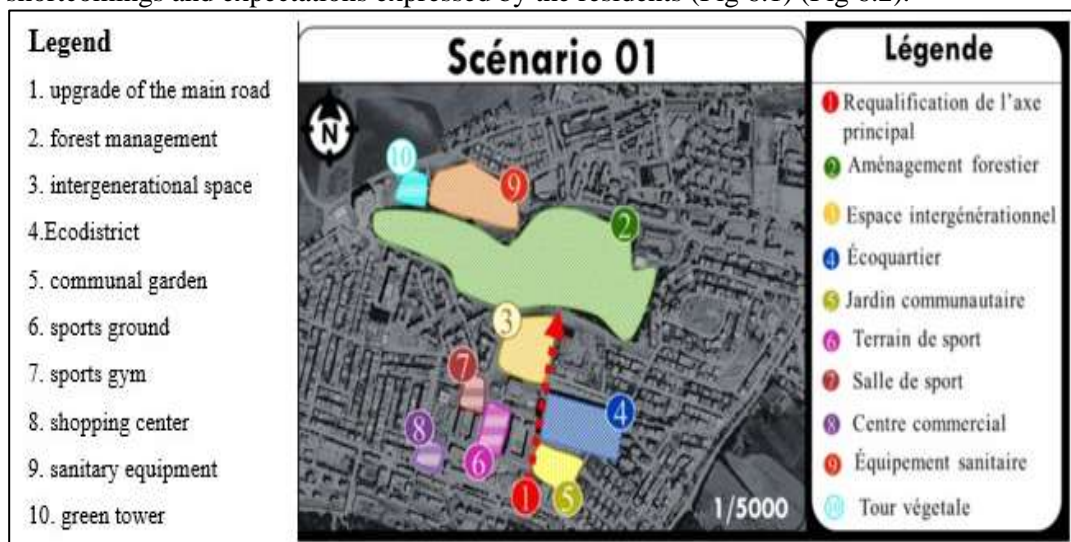


Figure 6.1: suggested scenario 01 (Source: Authors 2024)

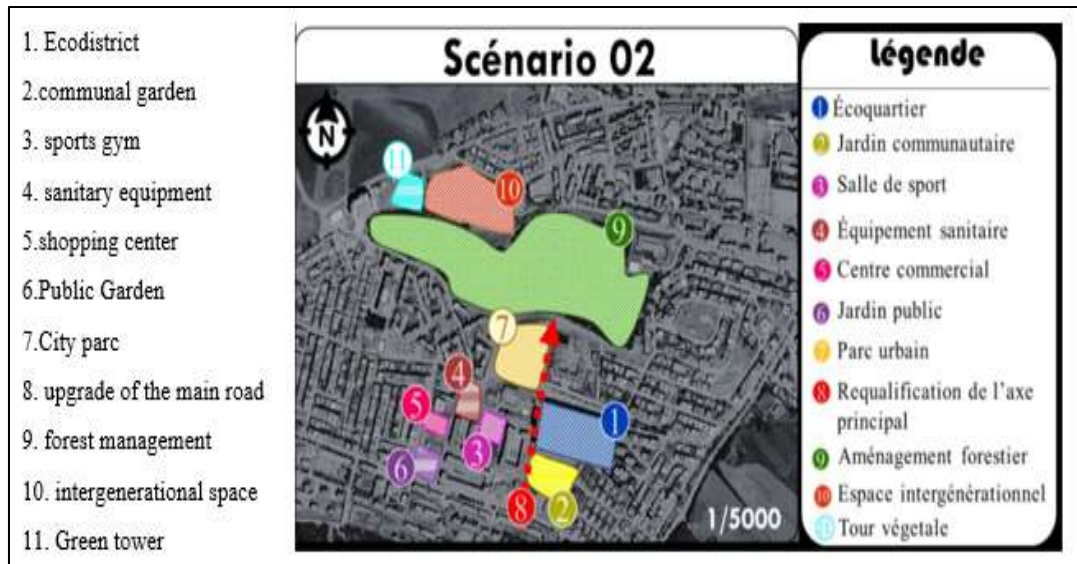


Figure 6.2: suggested scenario 02 (Source: Authors 2024)

e. Test

For our case study, we have chosen the second scenario (results of the 5th stage of the test) because it seems to correspond better to the practices of the residents observed on the site. It should also be pointed out that the other two scenarios do not contradict each other, since the same options were involved.

The choice of the second scenario was guided by one of the principles of transition concerning its effects on the relationship between people and their living spaces. The aim of this choice is to improve residents' quality of life while preserving for them the feeling of retaining psychological control over their relationship with their living space. This choice also refers to transition, as certain operations help to assert the identity of the space. Cities are increasingly facing a number of challenges and issues, including climate change. New guidelines for sustainable urban planning and the development of eco-neighbourhoods are having a constant impact on the reorganisation of towns and cities, and on the involvement of residents in the various initiatives undertaken to ensure their well-being. To this end, DT is contributing innovative ideas for developing new sustainable and ecological design methods (Fig 7).

The DT approach not only puts residents first, but can help to create an eco-neighbourhood that respects sustainable development and energy sources.... It allows cities (the district) to become more open to creativity; to give residents and local authorities the benefit of a stronger collaborative culture; to run projects more efficiently; to make decisions (Boutaud. 2009).



Figure 7: proposed site design based on DT (Source: Authors 2024)

Book studies on Design Thinking have shown that it is possible to Preserve the living environment and sustainable development, Use advanced environmental technologies and ICTs, Preserve biodiversity and vary the urban and landscape ambience, Encourage soft modes of transport, Ensure a mix of uses: housing, shops and services, etc. Use the forest as a social space (a space for inter-generational exchanges), and an educational and teaching space (to raise awareness of the local fauna and flora), Create a space for dialogue for citizens and local businesses. An important aspect of the contribution of Design Thinking for residents and those in charge (designers, local authorities) is that it enables problems and challenges to be clearly defined, as well as identifying appropriate and feasible solutions. In other words, it increases the involvement of local people in finding innovative solutions to the problems raised .

5. Conclusion

The city is at the heart of contemporary concerns about sustainable development, ecology and climate change. Ecological urban planning is a new concept that aims to understand the relationship between the city (the urban) and nature, and to create dynamic cities that take into account the aspirations of the population to ensure the well-being to which they aspire.

Cities are increasingly facing a number of challenges, including climate change. The new orientations of sustainable urban planning and the development of eco-district are having a constant impact on the reorganisation of towns and cities, and on the involvement of residents in the various initiatives undertaken to ensure their well-being.

Like other Algerian towns, the town of Ain Smara, a former colonial settlement belonging to the city of Constantine, despite having an inescapable urban and natural territory, has undergone increased urbanisation and is experiencing problems linked to the environment and the influence of human activity. The lack of facilities (transport, health, green spaces, leisure, etc.) reflects the shortcomings in the application of sustainable development and eco-district principles.

The aim of this research is to develop a model eco-district, in keeping with the Algerian context (natural, urban and legal), which is the Thazir development, located in the centre of the city of Ain Smara, a place of experimentation and innovation. The study created synergy between the three main factors taken into account in the study: human, technological and institutional factors.

To this end, the DT is contributing innovative ideas for developing new sustainable and ecological design methods. The DT's approach has put local residents at the forefront,

identifying needs, shortcomings and wishes, and proposing a model eco-district that respects the principles of sustainable development and energy. Design Thinking enables towns and cities (the district) to become more open to creativity; to enable residents and local authorities to benefit from a stronger collaborative culture; and to manage projects more effectively. It is also a tool that facilitates decision-making (Project Nomura 2010). Lastly, this research aims to open up the field to other studies that could use a method for solving urban problems that allow for innovation and improving living conditions for citizens. This tool, design thinking, could be applied in Algeria to develop and apply the principles of the eco- neighborhood, enabling citizens to live in a healthy and ecological environment.

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