



**2001 Technical Review Summary**

2295.ALG

*by Ashraf Salama*

## **400 Units Housing Project**

*El Oued, Algeria*



**Architects**

*Hany El Miniawy  
Aldel Rahman El Minawy*

**Client**

*Biskra Governorate*

**Design**

*1981*

**Completed**

*1986 - 1992*

## I. Introduction

The public-housing project comprises 400 units in the city of El Oued, located in east-central Algeria, 350 kilometres from the Tunisian border. It is set in a mountainous desert area, characterized by scattered settlements and small villages, and serves a wide variety of middle-class families. The project as it was finally realized is the result of collaborative efforts between the architects and the local authority. With the clear aim of being responsive to the culture and environment of the region, the design and construction were developed over a period of more than ten years, based on social studies and surveys and a strong awareness of the regional identity. The technology adopted for the project is simply a reinforced concrete construction system. Through sensitivity to the climate and to the cultural traditions of the inhabitants, the reinterpretation of socio-spatial needs into built form for public housing has resulted in a residential environment that is both functional and efficient. The incorporation of traditional climate-control techniques into the construction system paves the way for developing aesthetic standards for public-housing schemes and results in a visually appealing residential environment.

## II. Contextual Information

### a. *Historical background*

The earliest known inhabitants of the region that is now Algeria were Berber-speaking nomads who had settled there by the second millennium BC. In the ninth century BC, it became a province of Carthage, then in 106 BC a province of Rome. With the decline of Rome in the fifth century AD, Algeria was conquered by the Vandals, and became part of the Byzantine Empire in the sixth century.

Early in the eighth century, Algeria was opened up by the Arabs, whose introduction of Islam injected new values and altered the overall identity of the region. Spain captured the coastal cities in the fifteenth century but was expelled in the mid-sixteenth century with the help of the Ottoman Turks. In 1830, Algeria became a French colony. It achieved independence from France in 1962 after years of warfare in which a million Algerians died. Since independence, there has been little political change, however, and in recent years it has witnessed threats and assassinations resulting from civil conflict and violence.

In the early 1980s, the Algerian government initiated a decentralization policy, the purpose of which was to encourage local governments to build new communities so that the population did not concentrate in the capital, Algiers, and new regions in the south could be developed. Under ~~the~~ this policy, the government would donate the land and make funds available to encourage the construction of moderate-cost housing projects. In turn, each local housing authority would be responsible for organizing and overseeing the processes involved in these projects in terms of design, construction and project management. For this project, Hany and Abdel Rahman El Miniawy (El Miniawy Brothers), who had first worked in Algeria in the mid-1970s, were invited by the regional government of Biskra to develop the project in three stages: conceptual design, design development and supervision.

The El Oued Housing Project was seen as an opportunity to give local populations from different scattered settlements a place to live, as one of their rights stated in the Algerian constitution, and to develop a new community in a desert environment. Most of these people did not possess the means to purchase a decent home. The target users were expected to be mainly from the indigenous population. However, a wide range of people with different cultural backgrounds, coming from small desert settlements within the region, was also expected. The population from around El Oued has distinctive religious traditions, evident in their cultural practices; most people are immigrants from the Arabian peninsula, and, following migrations from Yemen at the end of the nineteenth century, are particularly of Yemeni origin.

The El Oued Housing development was one of a number of projects carried out in the region from the early 1980s to the mid-1990s by El Miniawy Brothers in collaboration with the regional government of Biskra. The aim of these initiatives was to create and develop residential environments that were responsive to local needs, in a manner that allowed for replication in other locations with similar conditions.

It is important to note that, at the time of the commission, El Oued was one of the cities that fell under the jurisdiction of Biskra regional government. Now, the El Oued area has become a separate regional government that has its own administrative body and its own human and material resources.

*b. Local architectural character*

The original settlement of El Oued was called the City (*medina*) of a Thousand Domes. The vernacular architecture was largely built from plentiful local materials, the most common being *tuffa*, a kind of desert mud that can be shaped into bricks of varying dimensions. Until the early 1970s, most buildings in the area were made almost entirely from this material, along with local limestone and gypsum. Often the roofs were constructed as domes or brick vaults. Later, it became common to build a concrete skeleton, infilled with *tuffa* bricks and roofed with reinforced concrete. The construction of domes and vaults over the flat concrete roofs is still dominant.

Many of the buildings in the city are in poor condition. The prevailing use of arches and arcades in the first floor of most residential buildings in the El Oued and Biskra regions is indicative of the need for shaded open spaces, while the extensive and dense use of domes, vaults and arcades speaks of the developed architectural language of the area. Most of the buildings are finished in shades of yellow, a feature that complements the natural environment. The use of these devices has strong cultural roots and reflects a distinguished visual heritage.

*c. Climatic conditions*

This part of Algeria experiences extremely dry weather, with a very low percentage of relative humidity. Winter temperatures range from 0 to 12°C and night temperatures drop to -5°C. Summer temperatures soar to between 35 and 45°C, with night temperatures of 22°C.

Seasonal winds (*khamasin*) cause sandstorms in the region from mid-March to mid-May. The area enjoys a very short rainy season in December, but in recent years the rainfall has been

minimal. Usually, during the rainy season, there are moderate downfalls but not enough to sustain any kind of agricultural activity.

*d. Site context*

The site of the El Oued Housing Project originally lay in the south-eastern part of the Biskra governorate, approximately 230 kilometres from the city of Biskra and 350 kilometres from the Tunisian border, in an area characterized by desert settlements and small villages. The site is entirely surrounded and penetrated at certain points by roads that did not exist until the project was erected.

The area is distinguished by high, plentiful sand dunes. Nearby, there are a number of palm tree nurseries; the site itself originally had several palm trees but these became saturated by the underground reservoir. Previously, the site was used for shooting practice and training by the Algerian Army. The immediate surroundings of the site are dominated by residential buildings constructed during the last decade. Few of these are private apartment buildings but several are social housing projects, which vary in scale and capacity.

The site can be accessed by vehicles from all the surrounding streets. The El Oued Housing Complex itself has created a commercial spine that penetrates the site. Plant life is non-existent, but a minimal number of tiled walkways and pavements have been developed for pedestrians.

*e. Site topography*

The site was composed entirely of high sand dunes that were levelled for the construction of the project. It slopes from the north to the south with a variance of 2.5 to 3 metres, and from the west to the east with a variance of approximately 3.5 metres.

### **III. Programme**

*a. Objectives*

The main goal of the social housing programmes developed by the government was to satisfy the constitutional laws. The decentralization policy, the need for public housing, and the growing population of the small desert settlements all led to the decision by the Central Ministry of Housing of Algeria to enable local authorities to develop housing projects in desert areas. As a result, the land was donated by the government, a budget allocated, and the project commissioned in collaboration with the housing authority of Biskra regional government.

The public housing project of El Oued was part of a larger programme that sought to accommodate the growing desert populations and create semi-urban environments. In addition, the government aimed to encourage the relocation of an educated section of society and to develop the region in urban terms. The goal of the programme was to construct a large number of housing units, varied in surface area and contextually appropriate, in order to encourage people to move away

from the crowded cities and/or to relocate other strata of society living in poor, primitive conditions in the nearby small desert settlements.

*b. Functional requirements*

The lasting impact of French rule in Algeria is apparent in the model of apartment types proposed for the project by the Ministry of Housing, the same standards used in social housing schemes in France. The four types put forward were F2, F3, F4 and F5, the number indicating the quantity of closed rooms. All of the dwellings were to have utilities and a living space. Due to the limited budget, the target for the floor areas of the apartments was set at no less than 60 square metres and no more than 115 square metres.

Following the conceptual design studies, El Miniawy Brothers proposed modifications to the programme that initially seemed to be standardized and not to relate to the socio-cultural backgrounds of the expected inhabitants. They proposed trimming the areas of the closed rooms and adding 10 per cent more floor area in order to realize a domestic space that incorporated peoples' general needs.

In fact, the architects' intention was to introduce an environment that was similar to the one the inhabitants were used to. As a consequence, a guest room (*madiafa*) was added, with direct access from the entrance. In addition, two patios were added: one central and directly connected to the family living area, the other called the women's (*harim*) patio and directly linked to the utility spaces. Sixty split-level (duplex) units were proposed to satisfy the needs of large families.

Apparently, the architectural programme proposed by El Miniawy Brothers was based on social studies they had conducted in the early 1980s. The results of these studies were used in this project as well as in other social housing schemes they ~~have~~ developed in the region. In essence, they ~~have~~ paved the way for exploring ways in which elements of the traditional architecture of the region can be incorporated into public-housing programmes. Therefore, the use of domes and vaults was proposed in addition to the added patio spaces.

#### **IV. Description**

*a. Project data*

The El Oued Housing Project comprises 402 units that vary in surface area. All the units are raised – most are three storeys above ground level – the ground floor being used as a covered space for children to play, with some commercial activities. The complex is a staggered massing of cubic volumes with minimal articulation other than narrow openings for windows. Public spaces and walkways spatially separate the clusters of units. The total site area is 40,000 square metres, the ground footprint being 24,000 square metres, and the total combined floor area is 60,000 square metres.

According to the authorities of El Oued city, the project includes four apartment types. The smallest unit is F2, which is 57.14 square metres + 13.3 square metres for patios, of which 60 units were constructed. The most common unit type was F3 at 68.2 square metres + 13.5 square

metres for patios, of which 282 units were constructed. The F4 unit type was 89.8 square metres + 16.2 square metres for patios, and only 20 units of that type were constructed. The largest unit type was F5 at 102 square metres + 16.25 square metres for patios, of which 40 units were constructed.

*b. Evolution of design concepts*

Initially, the architects conducted social surveys and met with some of the expected users to investigate their cultural traditions, lifestyles and spatial requirements. This was motivated by the request of the Biskra regional government to develop a preliminary conceptual design study for housing programmes within the region. The result of this process was that the architects were able to determine and define an architectural programme that met the standards imposed by the housing authority while at the same time satisfying the requirements of the expected users.

The project location was determined by the regional government of Biskra. Notably, climate was the most influential factor on the design. This was addressed by staggering the masses of the complex and projecting the rooms on the upper floors to maximize shade. The small, narrow openings allowed for minimal thermal gain. Some large openings were covered by a local device called a *claustra*, composed of densely overlapping gypsum screens of traditional shapes. The staggered units and the close proximity of the clusters supplied the idea of developing hierarchical spaces and creating shaded walkways.

Apparently, the modifications to the initial programme made by the architects seem to have increased the quality and quantity of social spaces. The intention was to provide a more responsive spatial organization that corresponded to the socio-spatial requirements of the expected users.

Façades are mostly solid with minimal voids. The exterior patios serve as public spaces between the volumes and are intended for general social interaction. Different levels of privacy were conceptualized in the design of the individual units to sensitively accommodate the local traditions of this Muslim community. Evidently, limited attention has been paid to landscaping. The pavements and some pedestrian paths are tiled with inexpensive steel-crete tiles which are readily available and are durable. Cement tiles are used for the flooring of some walkways. Outdoor spaces are devoid of any soft-scape elements and are often articulated with hard surfaces such as pavements and tamped sand.

In the context of developing design concepts for the El Oued Housing Project, the architects attempted to develop a desert urban fabric in two directions: the first is the social fabric of public spaces, including patios, pedestrian pathways, covered and open play areas for children, and spaces for women's activities; the second is a climatically appropriate fabric with densely shaded areas and direct ventilation to help combat the summer heat.

Significantly, the El Oued Housing Project has created a new image for the city. Several more recent projects have introduced the same architectural features and elements, namely massing, domes, vaults and arcades. The complex is often called by the name of the architects, Qasbet El Miniawy (the Oasis of El Miniawy).

c. *Structure, materials, technology*

The structural system is a concrete skeleton. All structural members are constructed of reinforced concrete, as are the roofs, floors and staircases. Arches and arcades are also made of reinforced concrete. The basic infill material is cement brick, 25 centimetres thick, for both interior and exterior walls, although in some cases *tuf* bricks are used instead. Cement mortar is used for brick bonding, while cement tiles with coarse pebbles are used for flooring.

The choice of this construction technology is logical since the El Oued region is an earthquake zone. Due to the nature of the area, with its high sand dunes, many parts of the site were levelled and foundations were extended to a depth of 4 to 5 metres.

Vaults and shallow domes are constructed of *tuf* bricks over the concrete roofs. In a few cases, domes replace the concrete roofing. Painted plaster is used as a finish for interior walls, while fired gypsum mixed with sand has been applied on the exterior walls in a manner that creates a harsh, lined texture.

Natural gas has been supplied to only a few of the units. However, interviews with the local authorities reveal that the service department is planning to provide all the units with natural gas before the end of 2002. Electricity and sewerage are provided to all the units and are linked to the existing local networks. Underground reservoirs are the only source of water in the region. These reservoirs exist at two levels, one 15 metres below ground and the other much deeper down. The former has been partially polluted by inefficient drainage systems so the latter is used. Water is pumped up from the reservoirs and stored in municipal tanks that are linked to the units. The water is unpurified and unfiltered and so is only used for washing, bathing and for the removal of sewage. Reportedly, water comes out of taps at 50 to 60°C and there is no piped cold-water supply. For drinking, bottled water is used.

d. *Origins of technology, materials, labour force, professionals*

The origins of the technology utilized in the El Oued Housing complex seems to be driven by the desire to construct social housing projects suitable to the climate and the natural and cultural context. The occurrence and frequency of localized earthquakes prompted the use of reinforced-concrete construction technology; it should be noted that this technology does not relate to the construction traditions of the region.

Visual links between the architecture of this project and the vernacular architecture are evident and seem intentional, exemplified by the repeated use of locally developed architectural devices such as domes, vaults and arcades.

*Labour force*

The labour force consisted entirely of workers from the region.

## *Professionals*

The client, the housing authority of the El Oued regional government (previously Biskra regional government), was represented by Abdel Aziz Merrakchi. The architects were Egyptians, El Miniawy Brothers. At the beginning, a government contracting company was in charge of the project, but was soon replaced by private companies. Three Algerian firms carried out the construction work throughout the different phases of the project, those of Shehani Djamal, Sherifi Moamer and Aiashi Al Akhdar.

## **V. Construction Schedule and Costs**

### *a. Project history*

Since the early 1970s, the ~~Central~~ Ministry of Housing of Algeria had planned to construct public\_housing projects in different desert regions; however, this intention was not realized until the mid-1980s. The El Oued Housing Project was conceived among other housing developments in the region. The government donated the land for the project in 1980 and the housing authority of the Biskra regional government was assigned to carry out the technicalities for the project at that time. In 1981, El Miniawy Brothers were commissioned to develop design proposals and construction documents, a phase that took nine months to be completed.

According to Bishir Kahla, the site supervisor and the representative of the local authority of El Oued, construction work was planned in four phases, each of which included a specified number of units. The first construction phase started in 1983 and 90 units were completed in 1986, followed by 100 units in 1988. In phase three, 134 units were constructed and were received by the client in 1990. The final construction phase that ended in 1992 included the completion of 78 units. Parallel to the construction phases, occupancy began in 1987 after the completion of the first phase of the project. Occupancy occurred successively, with full capacity achieved in 1992 on the completion of the project.

### *b. Total costs and main sources of financing*

According to Sherifi Mohamed Al Abd, the director of the El Oued Housing Authority, the El Oued project was completely funded by the government of Algeria, which allocated an amount equivalent to approximately 4.5 million USD. However, it has been impossible to determine the actual cost of the project since records were not accessible from the Algerian authorities involved in the project nor from the El Oued authorities. According to the architects, the budget breaks down as follows:

Infrastructure:	525,000 USD.
Labour:	1,330,000 USD.
Materials:	1,330,000 USD.
Landscaping:	660,000 USD.
Professional fees:	100,000 USD.
Other:	385,000 USD.
Total:	4,330,000 USD.

c. *Comparative costs*

The initial cost per square metre was 75 USD and the initial cost per housing unit ranged from 5,500 to 8,500 USD, according to the unit surface area. It is not particularly relevant to present direct comparisons between the cost of the El Oued project and other schemes of a similar nature in the region because the project was the first to be erected in the area and other projects were constructed at a later period in the mid-1990s. Since the budget of the project was estimated in 1983 and its completion was in 1993, it is believed that the actual costs increased dramatically because of inflation, illustrated by the changing prices of materials and the increasing costs of labour. Bishir Kahla supports this statement, and he confirmed that in the last phase of the project the cost per square metre was twice that estimated.

d. *Maintenance costs*

Maintenance and ongoing costs were available from neither the architects nor the local authority of El Oued. Some destruction and damage in public staircases and on exterior walls can be seen, caused by inappropriate use.

## VI. **Technical Assessment**

a. *Functional assessment*

The planning scheme of the El Oued Housing complex appears to follow a rational approach to deal with public-housing. The conception of the exterior structures seems to be a classical adoption of a rigid modular system. The planning of the project employs traditional concepts appropriate to desert environments, epitomized by a number of semi-hierarchical public spaces. On the one hand, semi-covered spaces and walkways are realized in order to provide shaded areas for public gatherings and social interaction; on the other, the texture and the natural colour of the yellow fired gypsum applied to the exterior walls achieves a pleasing visual integration into the setting. In this respect, it is critical to note that, based on a decision by the governor of El Oued, most of the clusters were poorly painted in white.

The design of the interior environment follows the standards imposed by the housing authority. It is, however, significant to note that the architects applied their intellectual input based on the social studies undertaken at an earlier stage. The spatial organization of internal spaces and the two patios seem to relate successfully. The central patio establishes the desired circulation needed for privacy, while the other patio designated for women seems to match the needs of most inhabitants. The clustered structure that both visually and physically links these patios provides more opportunities for social interaction in a manner appropriate to the users. Thus, privacy appears to be one of the most important determinants of the design. It is also achieved by either horizontal or vertical isolation of living spaces and the *madiafa* in one zone, with family bedroom spaces in the other.

There are always difficulties inherent in the design and planning of any public-housing project where the needs of the target population cannot be comprehensively defined: one can argue that the precise societal needs and social aspirations of the inhabitants, with their different and varied backgrounds, cannot be fully understood. In some of the units surveyed in the El Oued

complex, the inhabitants had altered and extended their units in order to provide more room and additional facilities, thereby accommodating their changing needs. In this context, several new activities were added to the ground floor of the whole complex, which was originally designed to accommodate a children's play area, public gatherings and some commercial services. Currently, the ground floor of the whole project is occupied by apartments, government offices and shops. These alterations and changes should be addressed, although they do not affect design issues since they represent a change to the intended public nature of the project.

*b. Climatic performance*

In addition to social issues, climate was one of the most influential factors determining the design. The staggering of masses that provided a considerable amount of shade on the exterior walls, the close proximity of the units, and the minimal and narrow openings coupled with the quantity of solid areas in the façades were all capitalized upon to allow for minimal thermal gain. All of these devices have contributed to the creation of a comfortable domestic environment. The most striking feature in the El Oued project is the use of double roofs. Over the concrete flat roofs, vaults were constructed of *tuf* bricks and were opened from both sides to allow for efficient cross ventilation, thereby achieving natural cooling of the ceilings of the upper floors. The use of air conditioning is limited; only a small number of inhabitants have installed window units. Electric fans are used in most of the units during the summer season, while few inhabitants use electric heaters since the winter season is only two to three months long.

Overall, the climatic performance of the complex is efficient and rather successful in this harsh and extreme climate. Natural lighting in the interior spaces is very good. Due to the use of a concrete skeleton infilled by cement or *tuf* bricks, one cannot predict the level of acoustical privacy. However, from surveying some of the units, it can be argued that certainly partial acoustical privacy is achieved.

*c. Choice of materials, level of technology*

The design of the project integrates traditional construction techniques into a modern mode of construction. This is achieved by the use of a concrete skeleton and the introduction of domes and vaults from the architectural vernacular. The use of *tuf* bricks in the complex is common to the architecture of the area. In this respect, it can be argued that this integration asserts a sense of place in the project while at the same time reflecting the technology of the times. The technology and materials utilized match the nature of a public-housing project and reflect a good level of execution and supervision. Overall, the choice of materials and the level of technology used are fundamental to the project and can be regarded as components of an exploratory process towards the search for a local identity. They are among the most successful aspects of the project.

*d. Ageing and maintenance*

To date, the structure and most of the physical elements of the complex appear to have survived well in the face of the harsh climate and the inhabitants' demands. Nonetheless, one cannot predict to what extent physical problems might arise in the absence of maintenance that should be provided by the local authority of El Oued. Very limited maintenance is provided, as shown

by the fact that rubbish collection does not occur on a daily or regular basis. According to the housing authority of El Oued, maintenance is only provided in emergencies, such as repairing the water supply or the drainage systems.

Although some attempts have been made by individual inhabitants to maintain the quality of their units, much damage has occurred due to improper maintenance and illegal modifications. It is important to note that, in physical terms, the appearance of the public aspects of the project are well maintained.

e. *Design features*

The overall massing of the complex responds to the socio-spatial needs of the inhabitants. Although the complex is a staggered massing of cubic/geometric volumes, the heights and the original colours of the exterior walls allowed the project to blend in with the natural landscape of the region. This is based on the assumption that architectural forms should not compete with natural environments but should complement them. In this context, the change of the exterior colour to white could be seen as jarring as it produces glare in the sunny environment of El Oued.

To summarize, a number of design features can be identified:

- the dramatic use of arches, arcades, domes and vaults
- the staggered effect of volumes
- the minimal articulation of façades, coupled with the amount of solid surfaces
- the use of narrow openings
- the introduction of interior patios
- the utilization of external staircases as links between the units
- the introduction of a climatically appropriate semi-urban fabric via shaded walkways and exterior spaces.

## VII. Users

a. *Beneficiaries of the programme*

The housing complex of El Oued serves a wide variety of the population of the El Oued and Biskra regions. It also serves other populations coming from different regions, some of them formerly inhabitants of small desert settlements, others from semi-urban areas. Although there are no official records of the population profile, a general impression suggests that the users are from the educated middle class, working in local government administration or as schoolteachers or engineers, with some manual workers. The average age is about forty-five years old. Average income is approximately 170 USD per month.

b. *Users' and professionals' response*

Despite the modifications and alterations made by the users to the units, their response was positive. Some argue that the project has successfully solved the problem of housing, while

others claim that they did not like the project at the beginning but they gradually came to like it. Overall, it appears that a high degree of user satisfaction has been achieved.

The response of the professional community is also positive. Although they like the project, some of the professionals argued that the government standards did not satisfy the users' needs, even after the modifications and additions made to the programme by the architects. Few professionals claimed that the design of the project is marvellously articulated in visual terms, since emphasis on visual/formal aspects has taken less priority than meeting functional needs and socio-spatial requirements.

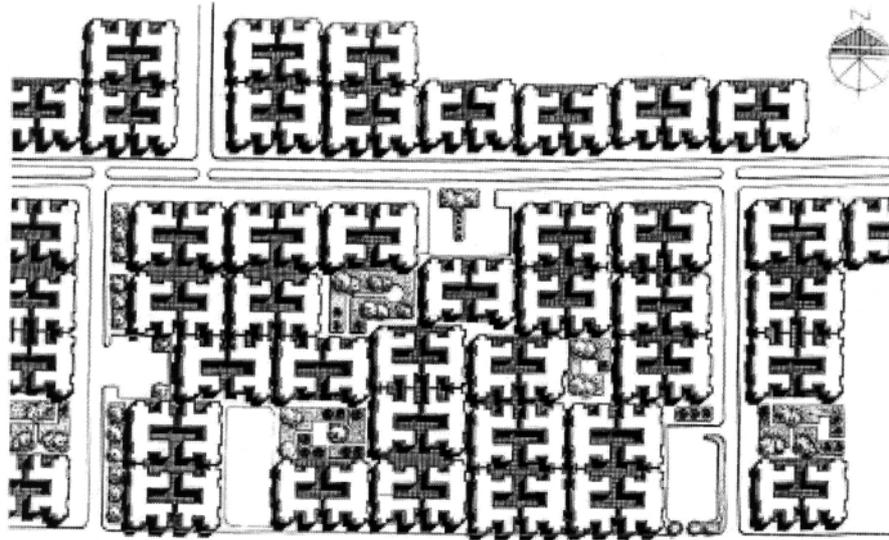
It is significant that several of the design features have been replicated in other more recent schemes. This can be seen as a direct indication of its success. It is also significant to note that the project has been featured in international publications.

### **VIII. Persons Involved**

The client of the project was the regional government of Biskra, represented by Abdel Aziz Merrakchi. The architects were Hany and Abdel Rahman El Miniawy, and Bishir Kahla was the site supervisor on behalf of the architects.

**Ashraf M A Salama**  
**May 2001**

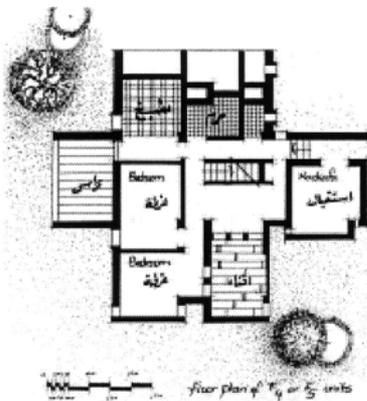
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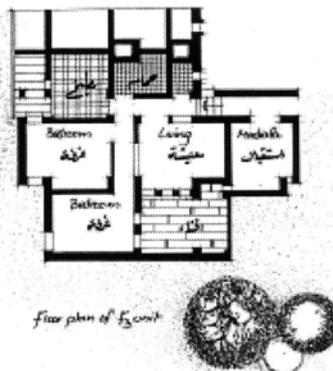
Main plan of a cluster

موقع مخطط 1/1

SITE PLAN



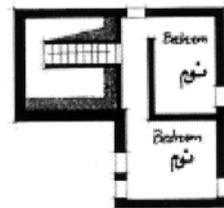
Floor plan of  $F_1$  or  $F_2$  units



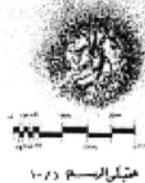
Floor plan of  $F_3$  unit



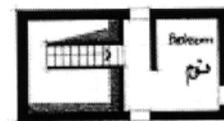
Floor plan of  $F_4$  unit



Upper floor of  $F_5$  unit

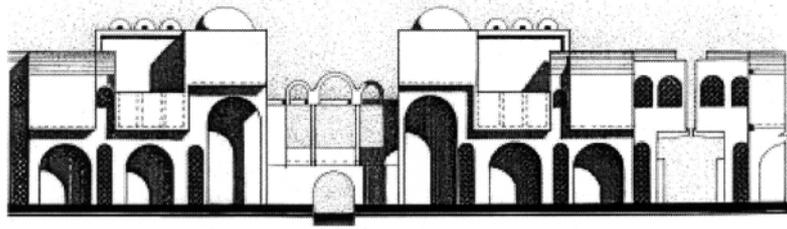


مخطط الوحدة 6-1

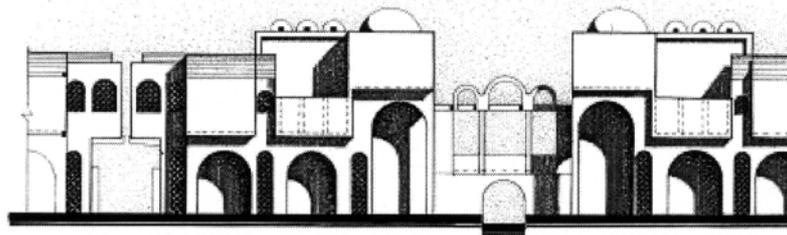


Upper floor of  $F_6$  unit

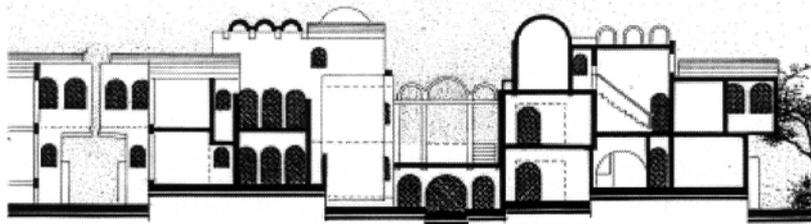
PLANS OF DIFFERENT UNITS



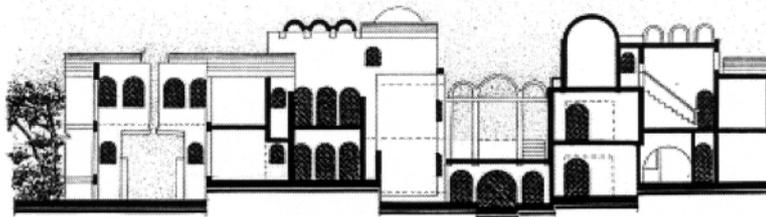
ELEVATION



ELEVATION



CROSS SECTION THROUGH A CLUSTER



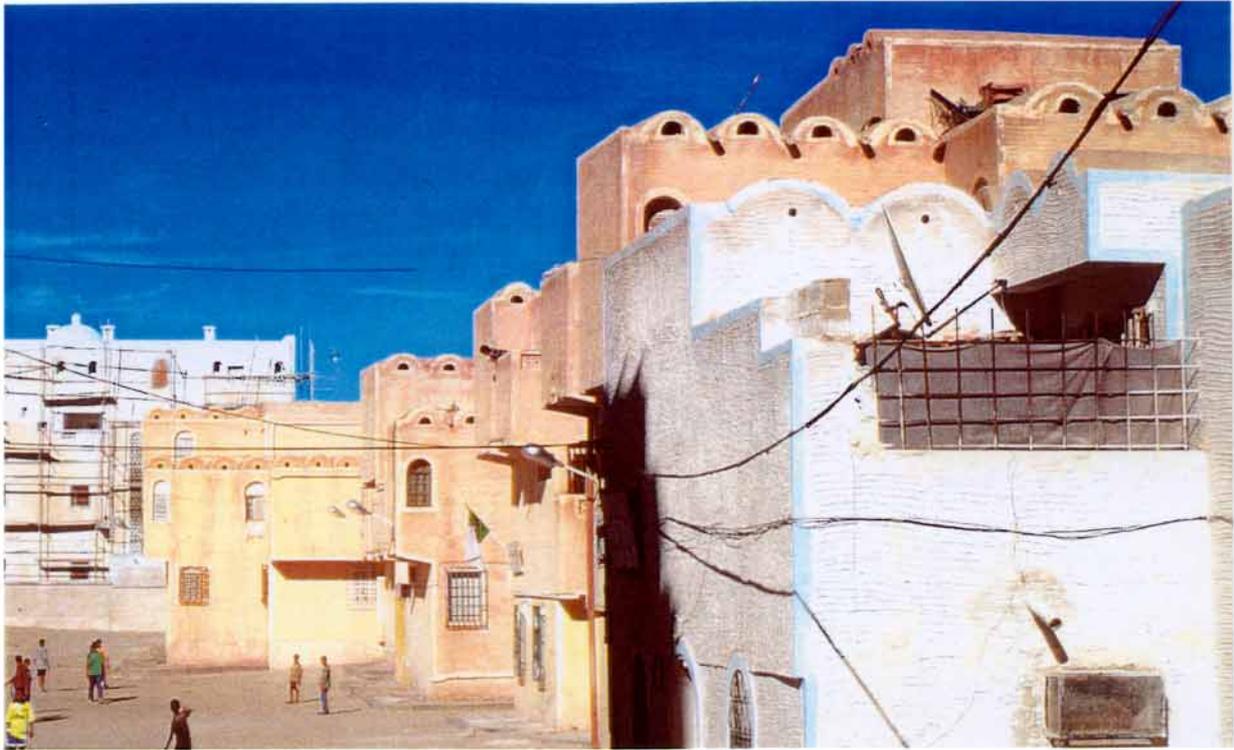
CROSS SECTION THROUGH A CLUSTER



*Above: General view of the complex; the project comprises 402 units.*

*Below: The site can be accessed by vehicles from all the surrounding streets. The El Oued Housing Complex itself has created a commercial spine that penetrates the site.*





*Above: The structural system is a concrete skeleton. All structural members are constructed of reinforced concrete, as are the roofs, floors and staircases. Vaults and shallow domes are constructed of tufla bricks over the concrete roofs.*

*Below: Climate was the most influential factor on the design. This was addressed by staggering the masses of the complex and projecting the rooms on the upper floors to maximize shade. The small, narrow openings allowed for minimal thermal gain.*





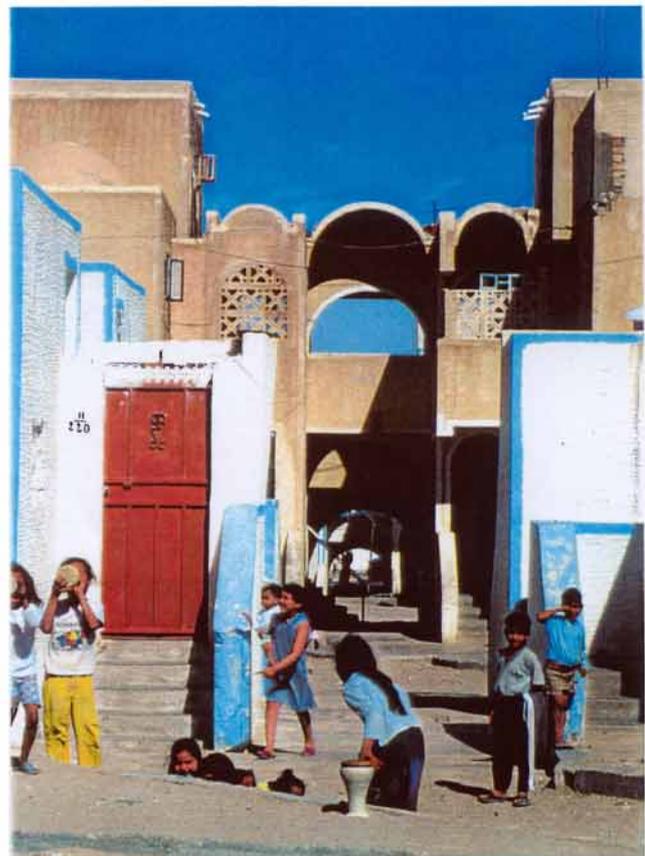
*Above: The public housing project of El Oued was part of a larger programme that sought to accommodate the growing desert populations and create semi-urban environments.*



*Below: By staggering volumes and projecting rooms on the upper floors, shade is maximized in the public areas.*



*Above: With the clear aim of being responsive to the culture and environment of the region, the design and construction were developed over a period of more than ten years, based on social studies and surveys and a strong awareness of regional identity.*



*Below: All the units are raised – most are three storeys above ground level – the ground floor being used as a covered space for children to play, with some commercial activities.*



*Above: The complex is a staggered massing of cubic volumes with minimal articulation other than narrow openings for windows. Public spaces and walkways spatially separate the clusters of units.*

*Below: Fired gypsum mixed with sand has been applied to the exterior surfaces in a manner that creates a harsh, lined texture.*





*Above: A covered passageway connects open public spaces between the various clusters.*

*Below: Visual links between the architecture of this project and the vernacular architecture are evident, exemplified by the repeated use of locally developed architectural devices such as domes, vaults and arcades*

