

● Category Sustainable Housing Building
● Case Study 26 Social Housing in Sevilla



Project cofinanced by



European Regional
Development Fund



Lead Partner



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Client EPSA (Public Department for Ground of Andalucía)
Design Solinas-Verd Arquitectos
Constructor Sanrocom SL.
Anno April 2008

Context

Umbrete, a village in the province of Seville, has a Mediterranean climate that characterizes Andalusia, with the uniqueness of being located on the platform of Aljarafe, where temperature variations are less pronounced and slightly lower than in the rest of the Guadalquivir area, due to the cool breeze that comes from the elevation of this area.

The project is located in the Northern area of the town of Umbrete, in a place where empty spaces and built urban frameworks meet.

Description

The idea for the project is based on the prototype of social housing, proposing a sequence of empty and full spaces following the examples of the traditional Andalusia domestic architecture.

As for the morphological characteristics of the architecture of Umbrete, the vast majority of buildings are single-family types houses in the form of party cube-shaped and elongated buildings in which the outer parts of the plot are as important as the built spaces. This type of architecture which always keep the human scale and domestic program together is developed on two levels: low, for proper housing and the high for solarium, warehouse, barn, ...

The constructed area shows a serie of volumes, solids and voids, which are related and connected to each other forming and occupying



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the entire field. From the beginning the project tried to transmit a picture of unity, more a single block PB +1 than a sum of terraced houses, located one after another. With a plot width of 6 meters (most common in terraced housing in recent years in Andalusia) the project proposes a house where most of the domestic program turns into the inside of each property.

The construction of this type of houses repeats until reaching limits of the plot. In the corners, the building are modified, in order to adapt the appearance to the land shape of the area.

These houses offer a high degree of privacy by opening the mayor parts towards the interiors and by building facades with large gaps, which offer a perfect transition between outside and inside.

From the street side the houses are accessible via a covered space leads to a first courtyard which is shaded by a canopy. From this area you have direct access to the living room. This courtyard separates and defines a second more private patio called the courtyard of the lemon. These spaces are proposed as the natural expansion towards the outside of the proper building, typical for traditional Andalusian houses.

Evaluation

- Climatic characteristics of the environment.

The climate of this region has three key features: moderately cold wet winters, dry summers and abundant solar radiation throughout the year. Winters usually last from November to April, with minimum temperatures ranging between 1 ° C and 7 ° C and maximum 14 ° C to 23 ° C. The average annual rainfall is around 500 l / year. Even though winter frosts occur occasionally. It never snows. Summer extend from May/June to September-October.

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Daytime temperatures range from 25 ° C to 38 ° C, and night temperatures drop to 12 ° C-21 ° C.

In summer the rain is rare. Spring and autumn are extremely comfortable, with maximum temperatures ranging from 20 ° C to 26 ° C. It has an average radiation of 3,000 sun hours per year.

The vernacular architecture of this climatic zone is characterized by the use of high-mass building materials like brick, able to soften the temperature difference between day and night, so as to accumulate solar heat in winter for later release during the night.

This project shows a traditional architecture with elongated buildings that are open during winter sun and protected from sunlight and heat during summer months by offering shaded spaces with overhangs and awnings.

- Strategies for bioclimatic design raised.

These homes have been designed and built with minimal costs very specific for this type of promotion. Improved comfort and energy savings have been achieved with the same costs as a conventional social home. Those economic aspects prevented the installation of active systems, turning all the effort, in the passive solar system design of the homes.

The lighting and ventilation of the living room is done primarily achieved through the back yard of the house. In addition, it also opens into the first entrance courtyard (whose views are screened from the outside through a lattice of deploye).

The living room and master bedroom do have a double orientation, by always opening one side to the south, and a perfect cross-ventilation



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encouraged by the willingness of the courts. This strategy allows that to the north facade receives exactly the same amount of light as to the south facade.

The construction, described in this case study, is considered the cheapest in accordance with the technology and the usual labor in the area. The system is formed by reinforce concrete pillars, precast concrete beams and a traditional andalusian cover with a ventilated chamber. All facade walls get a reinforced isolation chamber.

The simple construction materials, know and handled by the local constructors since years, easy to use and economical, ensured costs of € 526.22 / m2. All this within high quality of those materials and construction as well as a good durability.

Small structural spans as well as the and height of the two plants do not require any other class of auxiliary resources.

As for the passive solar design have been adopted the following strategies:

In winter,

1. Let in the sun, in order to reduce heating demand,
2. Keep the heat inside and the cold outside,
3. Soften the thermal difference between day and night,
4. Protection against cold wind to reduce heat loss
5. The house has been isolated in order to reduce heat loss but also has been built with materials of high thermal mass as a slab foundation with a special thickness and an arches vaulted roof capable of storing internal heat, obtained during the day and release it during the night, like a heating mode.



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In summer,

1. protection of the summer sun (and shade of the lemon tree canopy)
2. use of cross ventilation to ensure cooling by natural means,
3. cooling capacity by using processes of evaporation and, for example, washing down of the courtyards at the end of the evening (very common practice in Andalusia). The use of the shade provided by vegetation, This sequence of overlapped spaces is sought for the interior of the house. The dining room has been set as the masterpiece of these house, to profit not only from indoors but also from outdoors, everything revolves around this room. The double height of the dining room an the stairs communicate and related all rooms.

On the expansion top floor, the terrace between the two courts allows where a possible new bedroom, or solarium, could be build, always hidden from outside view without altering the appearance of the dwelling from the street.

These sequences of full and empty spaces, indoors as well outdoors, play with the volumes, lights and shadows that glide on the walls.

The open space and covered entry offers the possibility, among, others, to park a vehicle. The lounge has a double orientation, always opening one side to the south, and cross ventilation aided by the willingness of the courts.

The design of housing has attended at all times to the more rational and constructive economy, so as to ensure the quality and appropriateness of costs to economic caps. Architects have chosen a structure of reinforced concrete frames and unidirectional wrought, This structure system is considered the most economical solution for this type of housing.

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Potential for transferability

Clearly, the low economic cost which has been achieved with this work and the fact to be able to implement all passive systems of sustainability, is the main attraction for the implementation of these systems in coastal areas and especially rural areas, due to the lack of technological resources need, which is more expensive.

The Use of typical parameters of vernacular architecture, materials and construction systems, with a precise knowledge of the place (orientation, environment, climate, prevailing winds) do not require high financial investment, though, it takes only the knowledge and use of some basic concepts.

In this sense the potential to transfer of these systems to other countries of the Mediterranean area is maximum.

On the other hand, these principles are a good basis on which to deploy other active systems that substantially improve the energy efficiency of buildings, so use common sense seems forced.

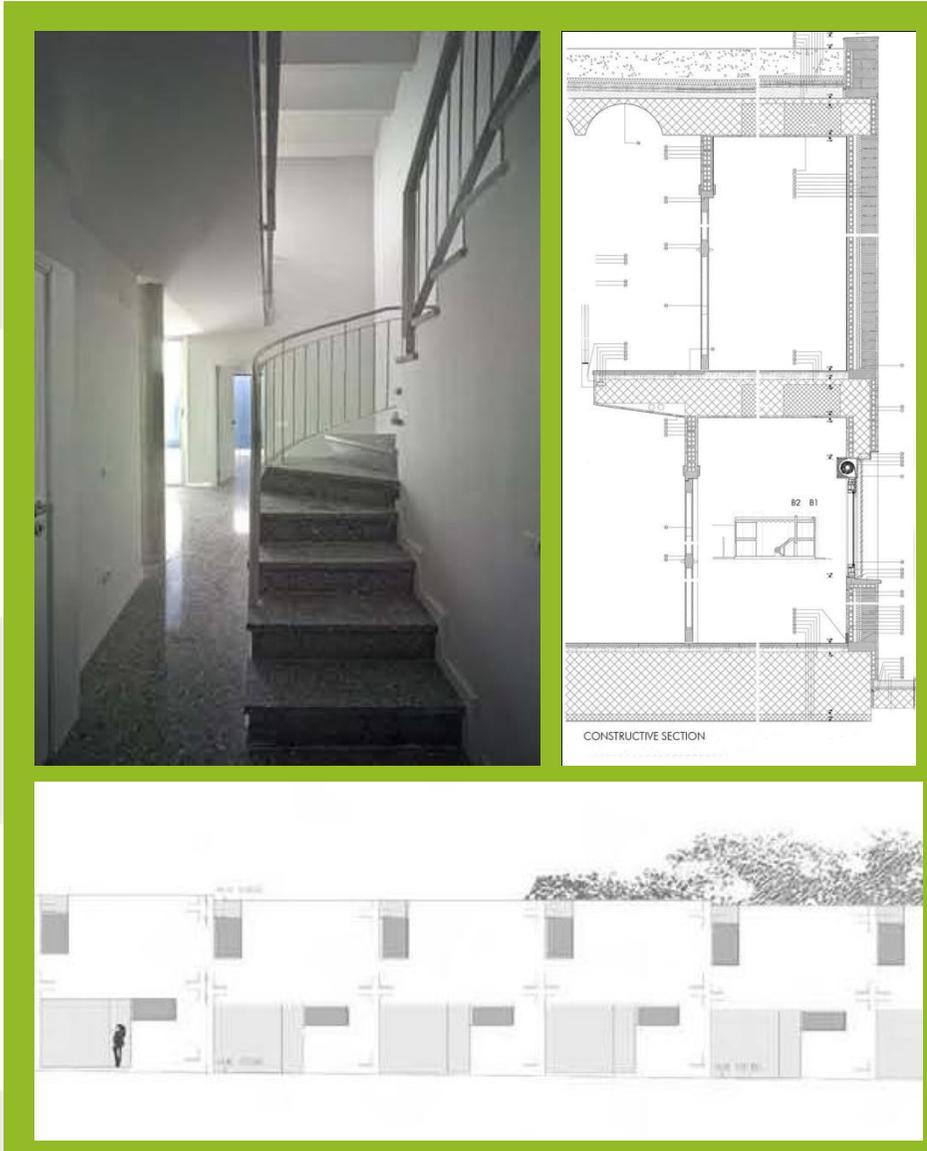
Others

This project was the winner in the national competition for Young Architects in Andalusia (J5) 2002, and has received the International Prize for Sustainable Architecture Fassa Bortolo in 2009, awarded by the University of Ferrara ..

At Construction Fair in Munich, BAU 2009, the architect received the Jury Prize in the category of Sustainable Housing, and in 2008 received a special nomination by the National Association of Public Housing Developers (AVS).



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