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# The huts of the Rocío-Doñana (Spain). Built heritage: analysis, conservation and maintenance

## Las chozas de El Rocío-Doñana (España). Edificios Patrimoniales: Análisis, conservación y mantenimiento

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### Abstract

The El Rocío settlement is a site that originally arose as a religious pilgrimage destination in the 16th century. It lies in an area of high environmental value in the current Doñana National Park in the southern Iberian Peninsula. The transformation of these temporary shepherds' shelters into an established, inhabited site occurred in the 19th century. These huts are built of local vegetation and earth, and have been barely modified to the present day. There are few remaining traditional dwellings in this style, which is why they need strong legal protection and continual maintenance. This work addresses the heritage value of this type of buildings, their relation with traditions and customs, and their influence on the urban landscape. The most notable building components were analysed with the aim of providing ideas and insights for improved conservation, considering that the ethnographic interest transcends the strictly building interest. In addition, the changes in construction style of the different hut types are analysed, cataloguing the remaining huts, the need for legal protection, and the maintenance work required.

**Keywords:** Hut, protection, maintenance, architectural heritage.

### Resumen

La aldea de El Rocío es un lugar que originalmente surgió en el siglo XVI como destino de peregrinación religiosa. Se encuentra en una zona de alto valor medioambiental en el actual Parque Nacional de Doñana, en el sur de la Península Ibérica. En el siglo XIX se produjo la transformación de estos refugios temporales de pastores en asentamientos habitados de manera estable. Estas chozas están construidas con vegetación propia del lugar y tierra, y han sido parcialmente modificadas hasta la actualidad. Aún se conservan algunas viviendas tradicionales de este tipo, por lo que es necesaria una fuerte protección legal y un continuo mantenimiento. Este trabajo aborda el valor patrimonial de este tipo de edificios, su relación con las tradiciones y costumbres, y su influencia en el paisaje urbano. Se analizan los componentes principales de estas construcciones con el objetivo de aportar ideas para su mejor conservación, teniendo en cuenta que el interés etnográfico trasciende el interés estrictamente constructivo. Además, se analizan los cambios en el estilo de construcción de los diferentes tipos chozas, la catalogación de las chozas que se conservan, la necesidad de protección legal, y los trabajos de mantenimiento necesarios.

**Palabras clave:** Chozas, protección, mantenimiento, patrimonio arquitectónico.

## Introduction

The village of El Rocío is located in the municipality of Almonte in the province of Huelva, 15 kilometers from the Atlantic coast. Its location on the edge of the Doñana National Park, declared a World Heritage site by UNESCO in 1994 and a Biosphere Reserve, makes the village the main gateway to the most important nature reserve in southern Europe. A chapel dedicated to Santa María de la Rocina dating from 1582 was a decisive element in bringing an influx of people to the site (Montoya Ramírez, 1989). Despite the attractiveness of the area, circumstances dictated that only a handful of huts for shepherds and ranchers were built locally (Murphy & González Faraco, 2002) (Pérez Cano & Mosquera Adell, 2006) forming a small population nucleus around the chapel until it developed into the present-day village of El Rocío at the close of the 19th century (Infante Galán, 1971) (Álvarez Gastón, 1981).

Subsequent urban development was gradual until well into the second half of the 20th century, when the religious event surrounding the chapel grew and prompted an expansion that ultimately resulted in very rapid growth marked by significant sprawl and an urban layout that left much to be desired (Crain, 1996) (Rambaud, 1973)(Villa Díaz, 2006). Today, the village can be considered an urban space, compact and developed, with a population of over 1,500 inhabitants in a natural locale with the high environmental and scenic value of Doñana.

A population nucleus of approximately thirty huts was established in El Rocío village in the 19th century (Figure 1); these were very basic agricultural and livestock buildings used as dwellings as well. Based on descriptions of the village over the past century, a maximum of fifty traditional huts is estimated (González Franco & Murphy, 1999). The popularization of El Rocío and Doñana coincided with the introduction of new building methods and materials such as cement, brick, ceramic tile, and even fibre cement.

**Figure 1.** First aerial view of the village of El Rocío taken from the Graf Zeppelin in 1929. The huts and more advanced dwellings with masonry roofs can be seen. Source: Sugrañes, 2014.



The transformation of the village starting in the 1970s occurred under a policy of maintaining a certain emblematic character, which some researchers call “natural-traditional-authentic” despite the obvious change to the traditional habitat (Delaigue, 1985). Therefore, conservation efforts directed at traditional buildings must identify and prioritize their different cultural values uses and traditions (Walter, 2014)(Howard & Pinder, 2003).

In the evolution of the village, as in other areas, these factors determine the impact of the huts on the overall quality of the built environment (Ojeda, 1987). Their influence on the later dwellings is significant for understanding the value of these rural buildings (Torreggiani & Tassinari, 2012). As the Declaration of Amsterdam (Consejo de Europa, 1975) points out, the important components of traditional architectural heritage will survive only if they are appreciated. From that premise comes the realization that protecting this kind of urban environment can only be conceived within a global perspective, taking into account all the buildings of cultural value, from the most prestigious to the most modest (Granados Corona & Ojeda Rivero, 1994) (Arias, Ordóñez, Lorenzo & Herraes, 2006).

The traditional huts were being discarded until they practically disappeared due to changes in building methods and demands for modern living conveniences. A few were preserved due to efforts and a certain romanticism on the part of their owners. Despite their gradual disappearance, the huts are a crucial element in shaping the identity of this rural environment, although currently they may seem out of place and caught in a conflict between conservation and development (Kianicka, Knab & Buchecker, 2010)(Sánchez, De Julián & Ordóñez, 2010)(Ordóñez Vergara, 2001). This loss of context can also be described as a process of acculturation and loss of signs of rural identity in which the city imposes its forms on the countryside and the urbanized rural environment (Rambaud, 1973). At any rate, the huts preserved in the present day must be considered as emblematic elements and should therefore be protected within the rural/urban environment of the village (Johansen, 2013)(Kianicka et al., 2010). The main problem is when conservation is linked with economic performance. That leads to the destruction of cultural heritage instead of its

long-term conservation (Morosi, Amarilla, Conti & Contín, 2008). For all these reasons, proper management of conservation and maintenance is necessary for the revitalization of the urban environment based on its symbolic elements (Antuchevičienė, 2003).

## Objectives

The main objectives of this article are to analyse the construction process of the huts and evaluate existing structural models in El Rocío and its environment. For this initial analysis, we studied documentation on existing original buildings, the need for legal protection, and the condition and maintenance of the huts. Studying the administrative documentation and land registry files is essential to understanding the significance of these buildings and to confirming the degree of legal protection applied to them. The goal is to guarantee their conservation in view of their architectural and anthropological values. The overall purpose of the paper is to present the relevance of this type of rural buildings and their conservation as references to traditional ways of life in an area of environmental significance such as Doñana.

## Methodology

The methodology for studying the huts of El Rocío village starts with a review of existing literature on the subject. The research focuses to a large extent on the existing buildings in Doñana, which are noticeably different in being more primitive and built without using masonry elements. Similar cases in other locales are also examined. The graphic work done with the Nemetschek Allplan 2013 program helps provide a greater understanding of the building system and phases involved in erecting the huts. It also allows us to clearly identify the different systems for the foundation work and structure based on the specific features of the different types of dwelling: with an interior or exterior structural system.

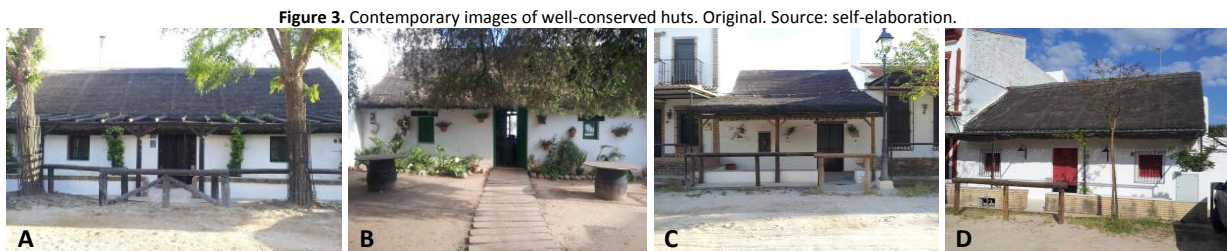
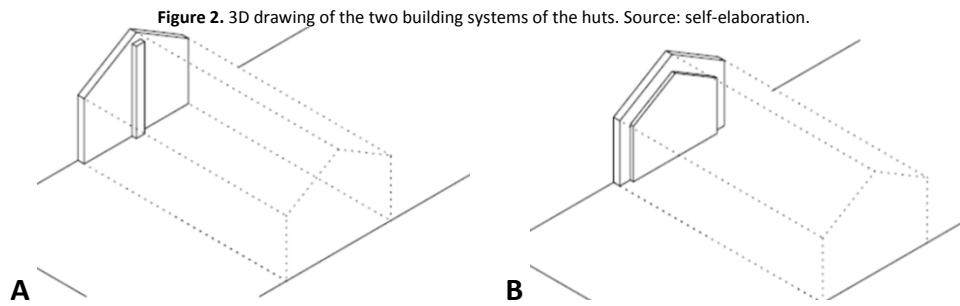
Finally, given our understanding of the significance and uniqueness of these buildings, proper maintenance is fundamental to conserving the handful of examples of this genuinely vernacular architecture. The most notable building components were analysed in fieldwork with the aim of providing ideas and insights for improved conservation.

## State of the art. Building evolution of the huts

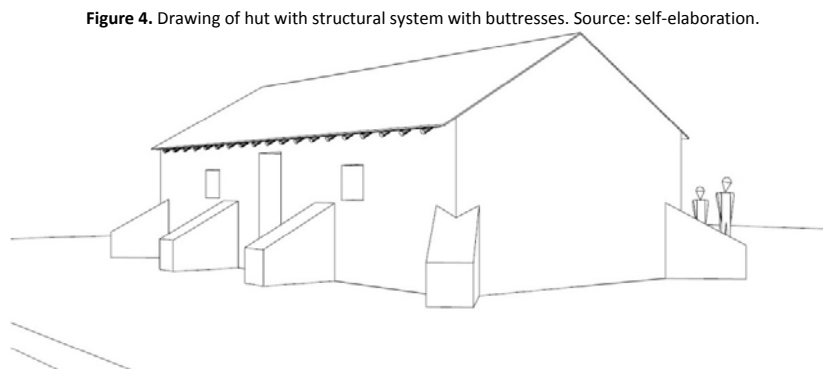
The construction of huts in the Doñana area has been studied by various researchers (García De Alvear, 1986)(García-O'Neill, 1998)(Hernández León, 2001). Originally, a common building system of thatched huts developed in Doñana based on using vegetation in the entire structure of the house. The most recent catalogue of Doñana National Park found 22 huts of this kind (Lozano, Pérez & Ruiz, 1998). This type of vernacular construction is duplicated in other locations, making use of local materials in each zone (Ramos Romero, 1981). The progressive improvement of roads during the 20th century made the transport of materials easier, which prompted the building of huts with the incorporation of adobe and brick walls. The most common model for the dwellings features two gable walls in the front and rear, creating an open living space.

The building model in the majority of El Rocío buildings, as well as the entire area by the mouth of the Guadalquivir (and still in use today), is more advanced than the original Doñana hut, combining vegetation with a basic masonry structure (Lozano et al., 1998). The structure and surface area is very similar in all these dwellings. It should be noted that urban development legislation in the village established virtually a single model for plots and half-plots of land, with similar floor dimensions for all the buildings and adapting the newer models to the style of these traditional buildings (PGOU, 2007). This regulation standardizes what had become the common practice for building the huts aligned in a row, with similar dimensions of around 10 to 12 meters for the front façade.

The masonry structure was based on a central element in the side walls that serve as pillars (Figure 2A), or a general increase in the wall width on the inside, leaving the outer perimeter wall thinner (Figure 2B). The former is the model for the huts built in the village of El Rocío itself. The front façade was composed of a central door aligned with the door accessing the corral from the hut and flanked by two small windows (Figure 3). The hut was erected as a one-floor building, and the interior layout revolved around a substantial central area for daily activities. Either two or four bedrooms opened onto that central space, separated by a waist-high wall made from sisal or fabric, sometimes not closed off and sometimes separated by a curtain. These village huts often have the same interior layout as the original, more primitive huts in the surrounding area of Doñana.



Therefore, the building method may have evolved but not the model for the dwelling itself, which endures in the area with hardly any changes. The structure of the huts built in the area surrounding the village centre, and some other locales bordering on the Park, basically differ depending on whether they are walled or free-standing buildings, but they always maintain similar building parameters (height/width/length). This factor is habitual in rural buildings in close geographical proximity that are adapted to a particular lifestyle (Tassinari, Torreggiani, Benni, Dall'Ara & Pollicino, 2011). The fundamental difference with the free-standing buildings lies in the possibility of varying the structural system by placing buttresses in the four corners of the dwelling (Figure 4).



## Development. Building phases of huts

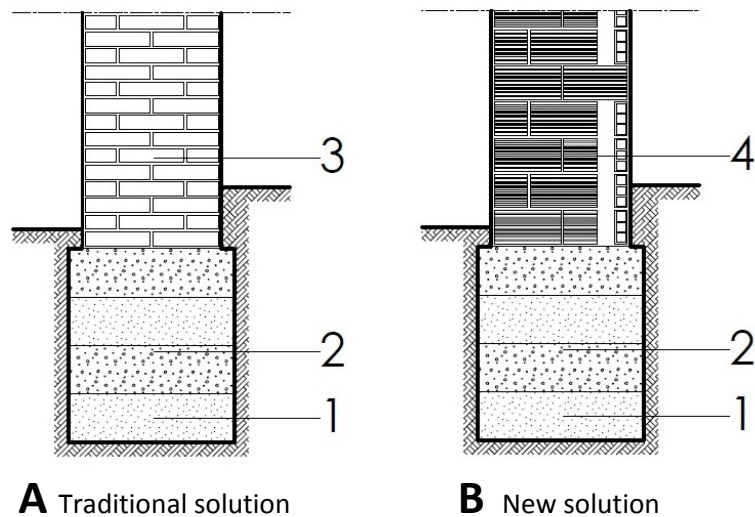
### Preparing the land

The first phase consisted in marking off the plot with stakes at the corners and then proceed to clearing and levelling the land.

### Foundation

The hut foundations were made using a continuous perimeter trench, with the foundation for the front and rear façades being wider since they support the roof. The depth of the trench is approximately 70 cm. The foundation work started by filling the trench with roughly 15 cm of sand and lime, followed by another layer of rocks or rubble, and then water to make it easier to compact the materials with a rammer. The process was repeated until it was even with the ground level of the plot (Figure 5).

**Figure 5.** Foundation systems with simple wall and more advanced wall with air chamber. 1 Lime. 2 Sand. 3 Adobe bricks. 4 Fired bricks incorporating an air chamber. Source: self-elaboration.



### Raising the walls

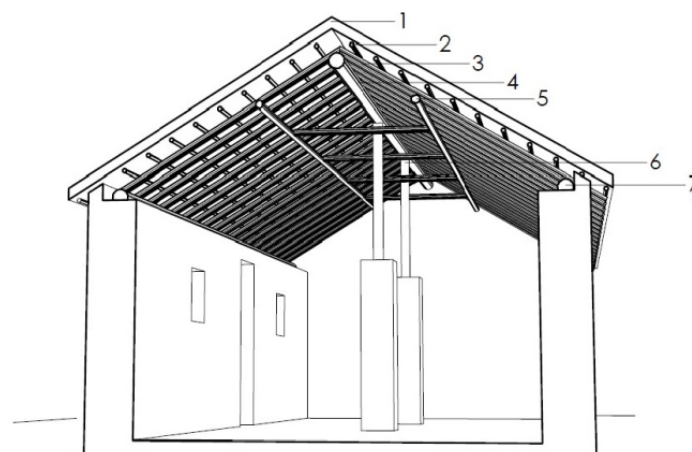
Once the foundation was levelled, the front and rear walls were raised, initially using unbaked adobe bricks and subsequently solid baked bricks anchored with lime mortar (Figure 5A). The material used and the rudimentary nature of the structural system meant they could at first erect walls that were only approximately 1.50 m in height, with small openings left for windows as well as the front and rear doors (when there was access to a corral in the latter case).

The thinner side walls were then raised, enclosing the area and forming the incline for the roof. This incline was often quite steep since the roof cover was made from vegetation and the intent was to maximize rainwater runoff, thereby avoiding penetration of the roof cover through saturation and permeation. Ongoing evolution and improvement of the systems resulted in the walls of some huts using fired bricks with a lengthwise perforation incorporating an air chamber for increased comfort inside (Figure 5B). The modification of the bonding component in the brickwork and the introduction of new materials like cement mortar in the buildings enabled the wall height to be increased to 2.50 meters. As a result, the height of the spaces for doors (up to 2.00 meters) and windows also increased.

### Roof

The lower part of the roof was supported on the load-bearing walls, topped by a wall strut (*viga riostra*) on the front and rear façades and by the main beam in the upper part to create the gable. The gable was supported by the reinforcements of the side walls and a pair of pillars in the centre of the hut, dividing the inside space into three parts (Figure 6). These pillars are necessary to provide greater stability to the dwelling, especially in the larger huts.

**Figure 6.** Interior of huts with structural systems for the interior and roof covering visible. 1 Roof covering. 2 Rafters. 3 Laths. 4 Main beam. 5 Collar ties. 6 support posts. 7 Wall strut. Source: self-elaboration.



The pillars consist of wooden posts driven into the ground and reinforced by a brickwork sleeve to the same height as the load-bearing walls. These components in turn served as support when a second floor loft was built in later styles. The main beam would therefore rest on four supports, the two pillars or thicker side walls and the twin support posts (*pontones*). The process was completed by placing supporting collar ties (*tijeras*) in the higher areas.

The woods used traditionally were those readily available in local forests that boasted the straightest, most even trunks. The most commonly used woods originally were the stone pine (*Pinus pinea*) and Phoenician juniper (*Juniperus phoenicea*) for their durability and mechanical properties. In order to preserve these species, they were later replaced by eucalyptus trees (*Eucalyptus sp.*) (Hernández León, 2001), which are very plentiful due to the reforestation plantations in the Doñana area. They were even better suited to the structural needs, allowing larger huts and better resistance against environmental factors and wood-eating insects.

## Roofing

The roof covering frequently used branches from different kinds of local indigenous plants to provide aesthetic, mechanical, and waterproofing qualities to the roof. It was customary to use club-rush (*Schoenoplectus litoralis*) for the first layer due to its aesthetic properties, since that layer is in plain sight inside the hut. A second layer was placed over the first using a plant with similar qualities like saltmarsh bulrush (*Bolboschoenus maritimus*), but which also provided a greater degree of protection. They were placed in bundles starting from the wall and proceeding towards the peak of the roof to facilitate rainwater runoff. An essential factor for the materials used for finishing the roofs was their capacity for swelling, with the aim of creating greater compactness amongst the interwoven vegetation, making it more difficult for water to seep through. The thatching was finished off with slender branches of wood to secure the thatch at the peak. Stitching joined the two sides of the gable of the roof. To improve the waterproofing of the roof, it was common practice to apply wet horse manure to compact all the components and provide the thatching with greater stability once it dried. To avoid slippage and protect the roof from the wind and birds' nests, the thatching was also covered with a fishnet, which helped to pack down the materials even more.

## Results of analysis of El Rocío huts

The ethnographic importance of these buildings around Doñana and the village of El Rocío in particular and their gradual disappearance as they were abandoned and fell into ruin had led to an upgrade in the level of legal protection for the four that currently remain standing (Andalusian Heritage Law 14/2007) (Figure 3). The full knowledge of the way which these valuable buildings were constructed, allows to understand the buildings injuries process, and both aspects turn out to be essential when the intervention projects are realized for the conservation of this Patrimony (Sánchez et al., 2010).

This last catalogue in 2007 recognized the existence of a fifth hut in a state of near-ruin that is currently not being conserved. The information in the land use records along with that provided by topographical maps, aerial photographs, and satellite images are essential for the analysis and long-term monitoring of changes in the buildings, their protection, and their conservation (Fuentes, 2010).

The level of legal protection and level of intervention are considered when identifying heritage buildings. The maximum level is applied to all of these huts, indicating the importance of their cultural heritage in representing a historical period, their scarcity in the present day, the building style and size, and ethnological, environmental, and aesthetic values. The huts are the only buildings in the village afforded the maximum degree of protection (General Plan of the Municipality 2007, GPM).

Regarding possible development and with the goal of encouraging their sustainability, use, and preservation, the building of components with a second floor attached to the hut façade is authorized by the GPM, but guaranteeing the conservation of the original values indicated by the plan. The levels of intervention allowed are “rehabilitation and refurbishing without an increase in built area” and “rehabilitation and refurbishing with an increase in built area without a change in the type of dwelling” (Fuentes Pardo & Cañas Guerrero, 2003), depending on the specific situation of the buildings defined in the individual record of the catalogue “General Plan of the municipality” (Pérez Cano & Mosquera Adell, 2006). The huts for which information is compiled in this document are:

Identification and Location. **Hut 1, Plaza del Acebuchal**; Land Use Unit: 40230; Plot: 02; Address: Plaza del Acebuchal, 20 (21); Town: Village of El Rocío; Boundaries: In front facing on the Plaza del Acebuchal, left side bordering Plot 01, right side bordering Plot 03, and in back is a view over the marshland. Description: Hut with only the outside structure



remaining. The voids in the façade are very primitive. The rest of the plot is virtually unoccupied. Currently being renovated. Note: This hut currently houses the site of a hotel industry locale.

Identification and Location. **Hut 2, Sanlúcar Street**; Land Use Unit: 40230; Plot: 25, Address: Sanlúcar, 24 (26), Town: Village of El Rocío; Boundaries: In front facing on Sanlúcar Street, left-hand side bordering Plot 24, right-hand side bordering Plot 26, and in back having a view of the marshland. Description: Hut of the “half-house” variety, with substantial changes in its interior. The voids in the façade are very primitive. Ironwork. The front porch is lower than on the neighbouring plots.

Identification and Location. **Hut 3, Sanlúcar Street**, Land Use Unit: 40230; Plot: 27; Address: Sanlúcar (30); Town: Village of El Rocío; Boundaries: In front facing on Sanlúcar Street, left-hand side bordering Plot 26, right-hand side bordering Plot 28, and in back having a view of the marshland. Description: Refurbished hut, in good state of conservation. The voids in the façade are slightly modified. The interior respects the original hut structure and highlights the original features. The dwelling has been expanded internally through a building connected to the hut. The rest of the plot is still dedicated to the traditional uses of stable and garden. Clear and open view towards the marshland.

Identification and Location. **Hut 4, Sacrificio Street**; Land Use Unit: 40256; Plot: 10; Address: Sacrificio (30); Town: Village of El Rocío. Boundaries: In front facing on Sacrificio Street, left-hand side bordering Plot 11, right-hand side bordering Plot 9, and in back bordered by the Plaza del Tamborilero. Description: Hut with only the outside structure remaining. The voids in the façade are very primitive. Several rows of tiles have been added to aid in water drainage.

Identification and Location. **Hut 5, Sacrificio Street**. (currently disappeared), Land Use Unit: 40256; Plot: 11, Address: Sacrificio (28), Town: Village of El Rocío. Boundaries: In front facing onto Sacrificio Street, left-hand side bordering Plot 11, right-hand side bordering Plot 9, and in back bordered by the Plaza del Tamborilero. Description: Hut with only the outside structure remaining at the date of the last catalogue. The voids in the façade are very primitive. Several rows of tiles have been added to aid in water drainage. The state of preservation was very poor at the time of drafting the catalogue and it has now disappeared. It is obvious that, in the past few years, the changes in rural practices in some cases and depopulation in others have caused the loss of the original purpose and subsequent abandonment of a substantial number of buildings (Klein & Grabner, 2015).

### Conservation, maintenance, and protection measures

The use of a methodology adapted for the diagnosis of the present damages in a construction, as well as its evolution and prognosis of development will have to directly repel in one better maintenance (Chávez Vega & Álvarez Rodríguez, 2005). The existing buildings have survived to the present day due to appropriate conservation and maintenance efforts. This was prompted in part by a certain romanticism on the part of the owners and, as many researchers have indicated, in part by upgrading the huts by bringing them up to present-day standards of comfort without overusing new building technologies (Ruda, 1998), and integrating them into the urban landscape (Torreggiani & Tassinari, 2012)(Fuentes, 2010)(García & Ayuga, 2007).

The maintenance requirements of the huts centre essentially on cleaning the walls, especially the inside areas affected by the soil salinity and dampness from capillary suction. Dampness is a similar concern in the area of roof joins, which also deteriorates the masonry and the wooden roofing materials. Due to the ground conditions, proper ventilation is decisive in making the inside environmental conditions as pleasant as possible. As some of these dwellings are not permanently inhabited, it is even more important to ensure proper ventilation of the walls and facilitate the loss of dampness from the ground by using porous surfaces and facilitating air circulation in the room.

As for the roof, using products to protect against wood-eating insects and nests results in a notable improvement in the preservation of the thatch and timber work. On the outside, the traditional approach for keeping the finished layer stable was to cover it with fishing nets to hold the roof covering in place and protect it from the wind as well as birds' nests. Currently, the roof is covered with wire mesh, which provides a certain degree of reinforcement in compacting the bundles. These developments prolong the overall durability of the roof, with the only necessary measure being partial restoration of the ridge, the most exposed area and therefore subject to greater deterioration.



The importance of a proper conservation of these buildings involves several aspects. The architectural heritage interest of the huts is safeguarded in the urban development legislation, which clearly defines the level of legal protection and the features that justify the conservation of this kind of building.

The ethnographic interest transcends the strictly building interest, since their location in the village of El Rocío constitutes a clear reference to the origins of the settlement, as a testimony to the lifestyles that led to the settlement. For recovery should be considered to belong to the material and the immaterial heritage, and continue to be part of a system in continuous transformation.

In accordance with the huts preserved in Doñana and the masonry huts in the surrounding area, these buildings embody a specific phase in the evolution that building technology has experienced throughout history in the rural setting of the mouth of the Guadalquivir River.

Changes in usage has allowed for the safeguarding of the huts, so proper maintenance of them and their most sensitive areas is essential for the sustainability and conservation of these four exceptional buildings as examples of the original architecture of the village in spite of the changes they have endured. The development of commercial, tourism, and cultural activities is a possible solution to encourage the conservation of this type of construction

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