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Mechanisms for preserving archaeological areas, a case study of the archaeological site of Zemmouri el-Bahri, Boumerdes

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Abstract. Cultural heritage expresses the identity and privacy of the previous societies, as it represents great importance to researchers in this field, and countries have taken steps to preserve it through legislative and technical mechanisms and procedures represented in protection schemes, and Algeria was among the first countries in protecting its archaeological sites, especially after the issuance of Law 04/1994 related to the protection of cultural heritage, Which gave a strong impetus in defining and protecting these sites, and the archaeological site of Zammouri al-Bahri is considered among the very important sites, as it includes several periods of time from prehistoric times to the present time, passing through the Roman and Islamic periods, this study came according to two stages, the first stage was the use of a georadar device to detect the boundaries of the site, and the second stage was the diagnosis and the most important appropriate solutions to treat the deterioration.

Keywords. Archaeological sites - Zemmouri ElBahri - Protection - Easement area

Introduction

The historical heritage in Algeria constitutes a very diversified urban heritage through the regions making up the national territory (Arab-Muslim, Roman heritage, etc.). The latter is a concrete witness to the originality of a civilization through the history of its existence; [1] it plays a vital determining role on the urban and historical dimension. The intended claim through the study of such a kind of project is the understanding of the foundations and principles of formation of human settlements and these reflections on the economic, social and cultural environment. [2]

The awareness of the Algerian State towards the conservation of heritage, both as an asset and a legacy for the current and future generation, is materialized by the promulgation of law 98-04 of June 15, 1998; relating to the protection of cultural heritage. The purpose of this law is to define the cultural heritage of the nation [3], to enact the general rules for its protection, safeguarding and enhancement, and to set the conditions for their implementation. [4]

The archaeological site "Mers Eddadjad" (port-aux-poules) in Zemmouri Marine (Boumerdes) is one of the most prestigious sites discovered in recent years, due to its valuable remains that bear witness to the different civilizations that have succeeded one another there, where the need to ensure its protection and its revaluation to avoid its decline and decadence.

One of the major problems encountered in the study of sites and monuments is the lack of bibliography, and the meager exploitable data are ancient and medieval historical sources, we have spared no effort to collect the documentation of this site but our efforts have been in vain, only archaeological research will undoubtedly make it possible to fill in these gaps in the history of the region.

Further the significant extent of the site leads one to believe that it was a human settlement of a local population that flourished in ancient and medieval times; [5] but all of this remains hypothetical without archaeological data that will dispel the thick brown that hangs over the history of this region; for this purpose we will limit ourselves to the physical description of the site.

Methodology

Like any qualitative research, this paper adopted an analytical and descriptive approach to study the archaeological site of Al-Zamuri Al-Bahri from the historical side to highlight its historical importance, in parallel with that searching for the most important problems affecting it, and finding appropriate solutions with the help of experts and relying on the directives of Law 04-1998.

Data collection tools

The data was collected from the field survey of the study area by Geo-radar, also relying on a group of historical books that highlight the importance of the site historically.

As well as seeking, help from discussing some experts in the field of heritage to accurately determine the most important problems that the site suffers from.

Introducing the study area:

The site of Zemmouri el-Bahri is 15 kilometers east of the administrative center of the wilaya of Boumerdès. It is bordered to the north by houses and a mosque (the imam abdelhamid ibn badis), to the south by a military barracks and agricultural land, to the east by the CW 220, to the west by agricultural land and dwellings.

We wanted to ascertain the exact boundaries of the archaeological site using the Georadar device, and this was done as follows:

On 01-27-2020 the GeoEXplo team traveled to Zemmouri El-Bahri to carry out GPR tests and see if this geophysical method is well suited for this problem.



Fig. 1. Location of the Zemmouri El Bahri site (Source: Authors, 2022)

We did tests in 4 places (A, B, C & D) and passages with the GPR on a wall that appears on the surface.



Plan n01: GPR trial areas (Source: Authors, 2022)

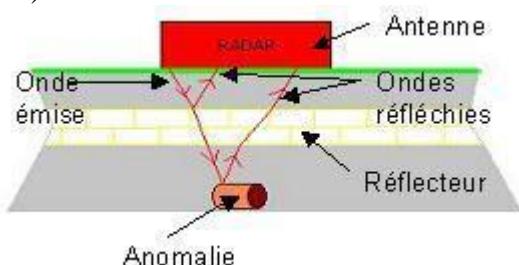


Figure 2 : Principle of radar measurement (Source: Authors, 2022)

Unfortunately, this technique did not succeed after the intervention of two geophysicists (HYDRO-ENVIRONNEMENT and GEO-EXPLO). Our double objective of confirming the current limits of the site by new means of prospecting, and drawing up a master plan for excavations have not been reached because the ground is electrically conductive.

Remains the classic method of excavation which can confirm the real extent of the site, for that we are satisfied with the classified area which is of the order of 5.94 hectares.

Presentation of the Zemmouri El Bahri Site

The site of Zemmouri el-Bahri, known in the Muslim Middle Ages under the toponym of Mersa Dadjadj (Port-aux-poules), covers the remains of an ancient medieval city which was built not far from the shore of the sea. medieval ceramics, bricks and tiles on the site attest to the existence of a medieval city on the spot.

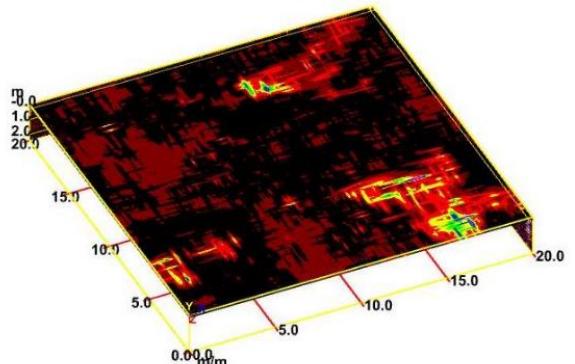


Figure 3 : 3D image Zemmouri el bahri – Zone 01 at 40cm depth

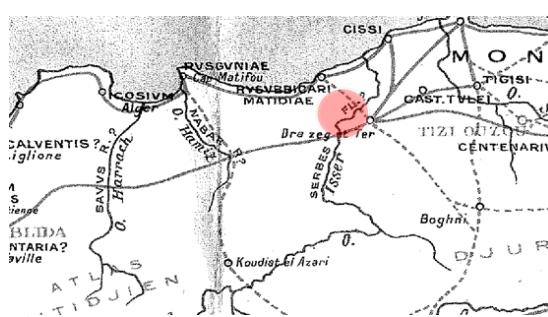


Fig. 4. Antonine's itinerary (Source: Authors, 2022)

Since the sixth century BC with the advent of the Phoenicians on the coasts of Tunisia, the Mediterranean basin has known a great commercial prosperity of exchange and trade nourished by these skillful sailors and traders who were the Phoenicians, a number of trading posts throughout the along the Algerian coast were the point of exchange and which evolved into a port of supply and passage. [6]

The port of Zemmouri was one of these trading posts which remained prosperous through the centuries of antiquity and the Middle Ages. [7]

The excavations of the site:

The intervention consisted in carrying out surveys at different points of the site for an optimum evaluation of the archaeological potential that could be found there. The choice of sectors to be surveyed was determined beforehand by the presence of partially visible built structures on the stratigraphic walls.



Picture 01: Archaeological site (Source: Authors, 2022)

Results

This phase consists in highlighting the repercussion of the agents of vulnerability on the sustainability of the heritage. For this purpose, the first step of this phase proves by the knowledge of these agents as well as their influences constitute the means of edge before passing to the ground.

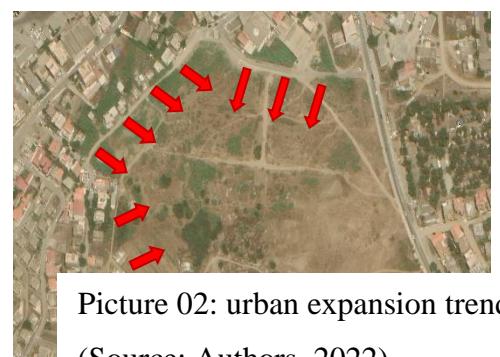
The second step is the prospecting of the site in order to discern the state of the archaeological site.

We can identify and classify vulnerability agents into two broad classes; natural hazards related to the various phenomena inherent to the climatic conditions and the natural data of the site, such as landslides, erosion, freeze-thaw cycles, the proliferation of vegetation as well as anthropogenic agents such as the action of man on these monuments.

➤ **Human hazards**

By its situation seaside resort of a coastal wilaya with tourist vocation, the area of Zemmouri Elbahri the land reserves are subject of covetousness and frenzy of often illicit and uncontrollable urbanization, and which are summarized in:

- Illicit extensions of private waterfront housing estates as evidenced by several attempts to monopolize the site which is clearly legible in our analysis of satellite photos from 2003 to 2019.
- The programming of new subdivisions which does not respect the directives of the planning instruments (PDAU, POS).
- Visual impact of the site by the ZEST program
- Use of the site as an unlawful dump.
- The indiscriminate exploitation of agricultural land.



Picture 02: urban expansion trend
 (Source: Authors, 2022)

➤ **Natural hazards**

- Presence of vegetation.
- Humidity.
- Runoff.
- Collapse of the walls.

Discussion of results

Our heritage is a legacy that we have received from our ancestors, so we are bound by the obligation to maintain and conserve it in order to leave it to future generations.

And the Algerian state has developed a set of laws to protect archaeological sites, the most important of which is Law 04-1998, which stipulates the methods of preserving these sites.

And among what the law stipulates is the establishment of a scheme for the protection of archaeological sites as a legislative aspect and at the same time a technical aspect, as it imposes urgent protection represented in quick protection measures, as well as the establishment of an easement area to protect the environment in which the site is located by imposing legalization of the area.

The easement area is determined according to the law using two criteria: the vision criterion, which is mainly associated with the archaeological site, and the engineering criterion, which specifies a distance of 200 meters starting from the boundaries of the site.



Plan n ° 02: easement area subsectors (Source: Authors, 2022)

The archaeological site is unstable in nature. Its specific intrinsic value and the possibility offered by its use makes the question of its presentation to the public unavoidable more than ever. The intentions and approaches of those involved in immovable archaeological heritage (decision-makers, specialists, citizens, etc.) are often divergent. But in reality, they all share the same objective: to know, protect, preserve, enhance in order to transmit this heritage.

Indeed, the practical issues relating to our study of ZEMMOURI EL BAHRI are economic, cultural, social and educational. We explain them respectively as follows:

•The increase in the added value of the site:

The exploitation of the archaeological site as a tourist potential is a valuable resource. Its management can only develop a good appreciation whether it is among the public or among institutional and economic actors. This action will certainly provide local communities with tangible economic benefits. We believe that an archaeological site of such value, when its development is successful, will improve the quality of life of the citizen, promote socio-cultural development, play an educational role and consequently increase profitable economic activities.

•Dissemination of heritage values through educational action:

The integration and participation of schoolchildren, students, researchers and other categories of the public in the activities of the archaeological site through special programs, events and temporary jobs during school holidays.

We have recommended the different stages of this procedure, as follows:

- What are the criteria that allow us to set the indicators for evaluating the strengths and weaknesses of the archaeological site.
- A set of normative prescriptions defining a practical regulation, useful for planners when designing the project. The directives that we will have to propose must overcome the conflict of interest between the necessities of the conservation of the remains and the opening to the public of the archaeological site, for a better apprehension of the latter.

Program for the development of the archaeological site of ZEMMOURI EL BAHRI.

Objectives :

- a. Develop the site into an Archaeological Park to ensure its permanent protection and enhancement.
- b. Encourage research and excavations.
- c. Citizen awareness
- d. Develop tourism.

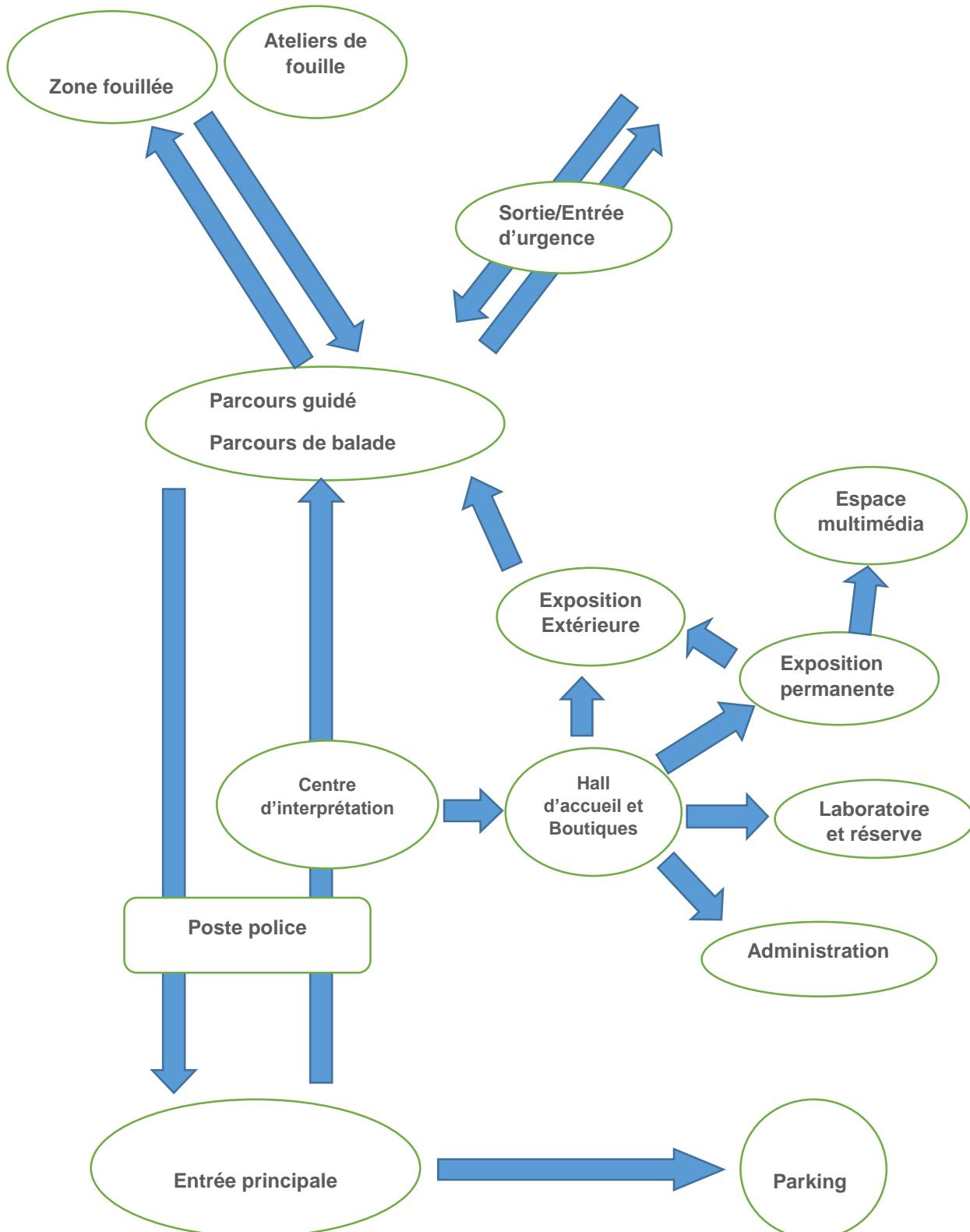


Fig 05: Archaeological site development program (Source: Authors, 2022)

Conclusion

Heritage is now recognized as an integral part of our living environment and a constituent element of our identity; [8]it helps us to define ourselves as a society, it is the guarantor of what we will pass on to our children. It reflects the way in which successive generations have taken advantage of their habitat and have both exploited and enriched it. Sites and landscapes, buildings and objects, knowledge, know-how and beliefs shape our way of being and tell visitors what the inhabitants of these places are like.

The protection of our heritage deserves to be ensured by the efforts of society as a whole. It is therefore appropriate to seek the participation of the public authorities, to give the population a voice, to grant local and regional elected representatives the power to act, in short, to take charge of the protection and transmission of cultural assets that bear witness to our history, our values and our identity. [9]

The conclusion of the study had included on the one hand a proposal for the delimitation of the perimeter of protection of the archaeological site of Zemmouri El Bahri which was articulated in two distinct but corresponding parts. It is:

- The first part which consisted of an analysis and a state of affairs, having led us to the delimitation of this zone of protection and servitude.

- A second part which consisted of a diagnostic assessment of the state of vulnerability of the archaeological remains which led us to the determination of emergency measures.

The entities cleared through the various excavations have always been full, which has in a sense made it possible to preserve the remains. Nevertheless, it is wise to think about the strategy of expanding the investigative work so as not to deprive the thirsty public of this heritage to restore and at the same time sensitize and alarm the local authorities on its importance of an archaeological site with a port character. The site of Mersa Eldadjadj is among the sites that have almost fallen into oblivion and threatened by the extension of urbanization since its land base is coveted because of its location in a seaside resort.

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