

THE CONSERVATIVE DIMENSION IN THE REGENERATION PROJECTS OF MILITARY URBAN BROWNFIELDS: THE CASE OF THE HISTORIC CITY OF TLEMCCEN

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Abstract

The Regeneration of urban brownfields is currently one of the strategies for densification and urban sustainability. However, as an architectural intervention, it is not an easy task and usually leads to two opposing dilemmas; demolition and/or conservation. This difficulty was observed in the regeneration projects of the colonial military brownfields in the city of Tlemcen, where the actors involved adopted different approaches, some of which damaged the existing architectural heritage and its values. The aim of this article is therefore to analyse the transformation processes of the military brownfields studied and to assess their conservation dimension. The latter is considered to be an indicator that makes it possible, on the one hand, to detect the modality of appropriation of the colonial architectural heritage within the projects analysed and, on the other hand, to assess their sustainability from a heritage perspective. This research was therefore based on the following scientific methods: in-situ observation, historical analysis, comparative analysis and semi-structured interviews. The results obtained for the two main study cases showed that the regeneration of the Bedeau barracks has a higher conservative dimension than that of the African hunter's barracks and can consequently be considered more sustainable in heritage terms.

Keywords: Military brownfield; Military heritage; Colonial heritage; Urban regeneration; Mutation process; Conservative dimension; Appropriation; Tlemcen.

Introduction

The city is characterised by spatial processes that largely reflect changes in economic activities and social values. These processes are threatened by the problem of urban sprawl currently faced by the majority of North African countries, which must counteract it and deal with its negative effects, particularly in environmental, economic and social terms. In order to overcome these difficulties and to be in line with the concept of sustainable development, a consensus has emerged in recent years to encourage densification within already built-up areas [1].

Thus, several forms of densification strategies coincide with the model of the sustainable and compact city: urban renewal, vertical extension of buildings, construction on vacant parcels of urban land, or urban brownfields regeneration [2]. This article focuses on the latter aspect with particular reference to the typology of military urban brownfields. The problem of their regeneration is generally similar to that of other types of urban brownfields [3], but differs in relation to their original function, which allows the military brownfield to be seen with a

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mistrust often linked to the lack of knowledge of the site, which was totally enclosed at the time of its military activity [4].

Although former military sites are now seen as a possible antidote to urban sprawl through the land, economic and social benefits they offer [5], and their regeneration is a sustainable and rational land use solution, their transition to civilian use and the possibilities of reconverting or not post-military landscapes are in reality not easy tasks [6].

The mutation of military brownfields as a project of architectural reflection thus refers to two opposing alternatives of intervention: demolition and/or conservation. These two actions constitute the two sides of the same process of reinterpretation and permanent appropriation of urban heritage [7].

In the international context, the analysis of the existing literature on the subject shows the abundance of scientific works that have addressed the problematic of regeneration and renewal of urban brownfields.

These include factors influencing the regeneration of urban brownfields [8, 9], the role of brownfield development in sustainable urban regeneration [10], and social preferences for the revitalisation of these areas [11].

Of this extensive literature review, a limited part was devoted to military brownfields and the problems inherent to their transformation [6]. Former military sites are therefore opportunities for the competitiveness and urban sustainability of cities, particularly in the case of England, Germany and Jordan [12]. They are also seen as spaces for business opportunities and innovation in a post-socialist context like the Czech Republic [13]. The approach to conservation and restoration in military brownfields was also discussed in the context of the United States, and highlighted the presence of several constraints, particularly of a physical and socio-political nature [14].

The national context of Algeria is qualified as restricted, being particularly limited to scientific works on the category of urban and industrial brownfields, which are considered to be the support for the development of local attractiveness at the level of a metropolis like Algiers [15]. Industrial brownfields are also seen as an urban and architectural heritage that needs to be upgraded in the case of the historic city of Kenadsa [16, 17]. As a result, it is apparent that the military brownfields of the French colonial period in Algeria and the transformations carried out on their built heritage are not explored in the scientific resources and therefore need to be analysed.

In the case of the historic city of Tlemcen, the actors involved in the regeneration projects of the colonial military brownfields have adopted different approaches, some of which have damaged the existing architectural heritage and its values. The aim of this article is therefore to analyse the mutation processes of the studied military brownfields and to evaluate their conservation dimension. The latter is considered to be an important indicator for detecting the appropriation of the colonial architectural heritage within the projects analysed, especially as this category is not registered in its integrity on the list of protected local heritage and has been gradually devalued and demolished in recent years. On the other hand, it will allow to assess the sustainability of these interventions on the heritage level.

The concepts of brownfield, regeneration, renewal and urban mutation

The concepts of brownfield, regeneration, renewal or urban mutation are recurrent notions in the framework of this work, and their definitions are therefore necessary.

The concept of brownfield or wasteland, initially reserved for the field of agriculture, was transposed in Europe, particularly in the field of the environment and industry, from the beginning of the 1990s under the Anglo-Saxon term "brownfield" [18]. The latter was particularly referring to abandoned industrial sites where reuse or redevelopment is quite complex [16].

The term brownfield was later generalised to include all types of formerly used sites, mainly in urban areas, which are now abandoned, vacant, underused or contaminated [19], and therefore require intervention to return them to beneficial use [20].

Although considered as natural and secular phenomena that have always taken place in the constitution of the city, urban regeneration and renewal as intervention strategies on existing fabric, have grown considerably over the past two decades, and have benefited from a truly conceptual framework [21].

Their associated meaning has therefore evolved from the bulldozer approach, which aims to eradicate slums and mitigate the physical deterioration of certain sites, to the approach of renewal, which focuses on improving devalued neighbourhoods and social well-being [21]. The notion of urban mutation is more specific and manifests itself in a reorganisation and introduction of a new form which affects not only the physical space, but also the social, functional, economic [22].

Thus, urban regeneration and renewal currently take the form of planned urban mutations that aim to improve the physical, socio-economic and environmental aspects of deprived urban areas through various actions including redevelopment, rehabilitation and preservation of existing heritage [23].

The regeneration of urban brownfields therefore aims at the reintegration these abandoned and degraded sites into their economic environment [24], and can contribute to environmentally, economically and socially sustainable urban development [2].

Materials and Methods

The analysis of the mutation process of urban and military brownfields refers to the analysis of three different and successive temporalities that structure it; the pre-brownfield, the waiting of brownfield and the post-brownfield [4, 25] (Fig.1).



Fig. 1. Mutation's process of urban brownfields

The pre-brownfield phase is a transitional period characterized by a gradual decline in site activity, but the initial function of the area concerned remains unchanged. This phase is important in the sense that it constitutes the historical framework for the brownfield that will preserve the site's memory and associated heritage attachment [4, 25].

The standby or waiting phase of the brownfield can be considered as the longest period of the process. It corresponds to the transitional phase between the abandonment of the site and its reuse project [26]. It is a time of reflection on the possibilities of evolution, but it is also precisely a time of waiting, of management or absence of management of the brownfield site.

The post-brownfield phase corresponds to the period of regeneration of the site through the project itself where the different actors readjust the parameters from the waiting phase to the realities of the moment. The wasteland then becomes an object of interest and a land resource for a sustainable city which rebuilds on itself [4, 25].

Since the military brownfields which are the subject of this study have a historical and secular character due to their appearance during the French colonial period (dating from the second half of the 19th and the beginning of the 20th century), the pre-brownfield phase will be divided into two sub-phases, namely the first one, called the historical sub-phase, which corresponds to the initial period of the construction of the military site, and the second one,

called the sub-phase of the decline of the activity of the site, which corresponds to the period of the regression of its use.

In order to answer the problem previously posed, this article was based on general scientific methods; the in situ observation carried out to highlight the regenerated colonial military brownfield; the historical analysis in order to analyze the history of the mutation's process of military brownfield according to the three temporalities cited above-on; comparative analysis with the aim of comparing the various phases in the process of mutation of military brownfields for each project studied on the basis of two main criteria, namely form and function, this will make it possible to evaluate the conservative dimension and also to compare the projects studied among themselves.

This article also makes use of the semi-structured interview, which is a qualitative investigative tool designed to answer open-ended and precise questions in order to understand, in our case, the opinion of the local population regarding the transformations carried out on the military brownfields studied in Tlemcen and their perceptions of the parts that have been conserved there. Sampling was carried out using the non-probabilistic quota method and divided between two categories of the population: citizens and professionals (a total of 150 people interviewed, with 75 people in each category). The sample size (n) is calculated according to *Cochran's formula* [27]:

$$n = (t)^2 \cdot (p) \cdot (q) / d^2 \quad (1)$$

were: t - confidence level, according to the normal distribution for a confidence level of 95%, t - 1,96; p - estimated proportion of the population (when unknown, p = 0.5 is used); q = 1 - p; d = margin of error tolerated in this case is 8%; $n = (1.96)^2 \cdot (0.5) \cdot (1-0.5) / (0.08)^2$; $n \approx 150$

Old archival maps, survey and intervention documents on the studied military brownfields as well as photographs were used as basic materials for the elaboration of this article.

Presentation of military sites in Tlemcen

Tlemcen, located in western Algeria, is a city characterised by both historical continuity and a remarkable urban stratification, due to the succession of different civilisations from the Roman Empire to the French colonisation [28], which has given the city its historical and cultural character and its status of regional metropolis.

The definitive occupation of Tlemcen by the French conquerors in 1842, whose concerns were initially of a defensive nature [29], had as its main impact the metamorphosis of the urban structure of the city by the military engineering, notably through; the improvement of existing old fortifications, the construction of new military buildings, and the opening and piercing of straight streets [30].

The urban configuration of the town of Tlemcen in 1942, shown in figure 2, reveals the French military facilities that were built there from the second half of the 19th century onwards, namely *the cavalry quarter*, also known as *the Isly barracks* or *the African hunters barracks*, *the Bedeau barracks*, also known as *the Train barracks*, *the Gourmalah barracks* and the *gendarmerie*. These constructions were spread over large areas of land whose location was eccentric in relation to the city's intramural perimeter, with the exception of the Gourmalah barracks, which were more or less centrally located near the medieval citadel of El Mechouar.

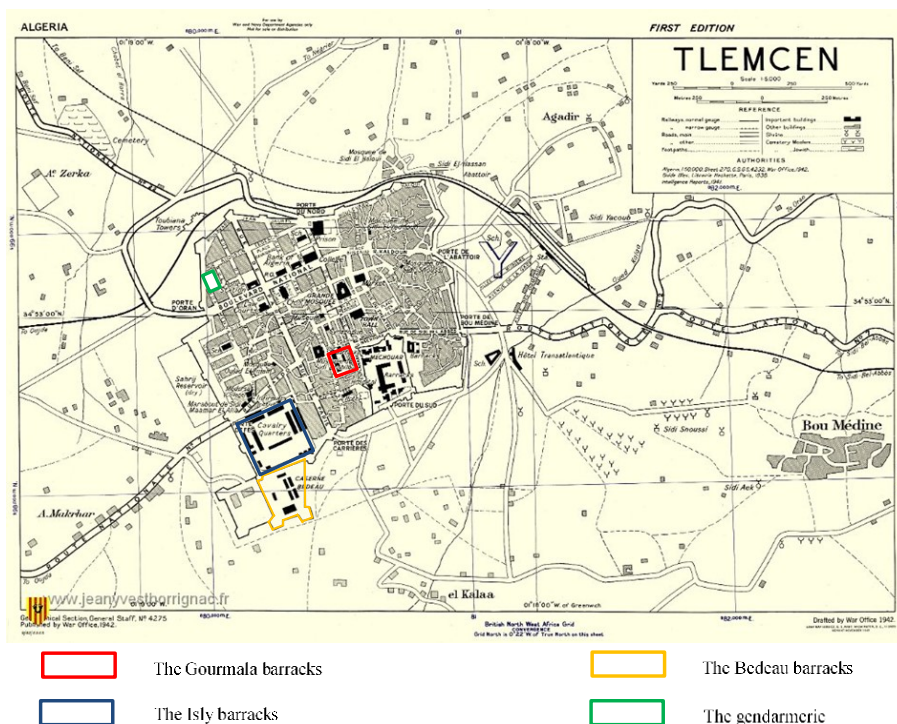


Fig. 2. Military sites visible on the urban configuration of the city of Tlemcen in 1942 -Plan from the archives of the municipality of Tlemcen treated by the authors

Context of emergence and characteristics of military brownfields in Tlemcen

Since the independence in 1962, and more precisely from the beginning of the 1970s, the city of Tlemcen has experienced new urban dynamics characterised by a considerable sprawl of its fabric, essentially due to an intensification of housing construction programmes, mainly collective [31]. These processes of spatial mutation, the evolution of the way of life and socio-economic requirements [32] as well as the restructuring carried out at the level of the defence sector are factors that have favoured the enclavement of the military sites mentioned above-and their gradual transformation into underutilized/abandoned spaces qualified from the urban point of view as brownfields.

These military wastelands have various characteristics, all of which are summarised in Table 1.

The Gourmalah barracks (Fig. 3), whose initial function was maintained after independence, gradually became devalued as a result of its enclavement in the urban fabric of the city, and was transformed into a brownfield at the beginning of the 1970s after the cessation of its activity and the departure of the military to the periphery.

In 1974, the institutions responsible for urban planning in the city have established an intervention strategy on the site, based on the destruction of all the buildings and the recovery of the land [33]. The former barracks were replaced by a new civil facility with a cultural vocation; the house of culture the city of Tlemcen, which is still in existence and functional today (Fig. 3).

The Bedeau barracks (Fig. 4) also retained its original function after independence and later served as a police academy before becoming an underused urban space in the late 1960s.

In 1968, the institutions responsible for urban management of the city have decided to transform the barracks into a polyvalent high school through the demolition of some old buildings and the conservation of others (Fig. 4).

Table 1. Characteristics of military brownfields from the French colonial period in Tlemcen

Military site	Gourmalah barracks	Isly barracks (African hunters)	Bedeau barracks	Gendarmerie
Situation	Intramuros (city centre)	Intramuros (South-west)	Intramuros (South-west)	Intramuros (North-west)
Area (Hectares)	0,95	4,8	3,1	0,45
Construction period	French colonial period (1847)	French colonial period (1857)	French colonial period (1903)	French colonial period (late 19th century)
Use of the site after independence	Military barracks	Military barracks	Military barracks then police academy	Gendarmerie
Temporality of the abandonment of the site	Early 1970s	Late 1980s (1985-1986)	Late 1960s	2016
Intervention on the military brownfield	Yes	Yes	Yes	Yes
Function after intervention	House of culture	Faculty of medicine	Polyvalent high school	Empty field
Temporality of the intervention	Late 1970s	Early 2000s	Early 1970s	2020



Fig. 3. The Gourmalah barracks during the French colonial period (left) [34], The former barracks transformed into a house of culture (right) in 2022



Fig. 4. The Bedeau barracks during the French colonial period (left) [35]. The former barracks transformed into a polyvalent high school (right) in 2022

The barracks of the African Hunters (Fig. 5) retained its primary function after independence and was named the Miloud Barracks. However, the considerable urban evolution of the city has diminished the strategic value of the site, which has become enclosed by the old historical fabric. The departure of the military to the outskirts of the city accentuated this situation and transformed the site into a real urban wasteland towards the end of the 1980s.

The urban intervention strategy for the city in 1998 proposed the transformation of the former barracks into a faculty of medicine [33]. This proposal was implemented on the ground

through the demolition of most of the former barracks buildings and the conservation of some of them (Fig. 5).



Fig. 5. The barracks of the African hunters during the French colonial period (left) [36].
The former barracks transformed into a medical faculty (right) 2022

The gendarmerie (Fig. 6), considered the least important military building in terms of surface area, functioned as such after independence and has become an underused structure with the passage of time. The equipment was disused and totally abandoned in 2016 to become an urban military brownfield in the historic centre of the city. The end of 2020 was a turning point for the site, as the actors in charge of urban planning in the city of Tlemcen opted for the demolition of all the buildings that make up the site and the recovery of the land with a view to the construction of a new facility that has not yet been defined (Fig. 6).

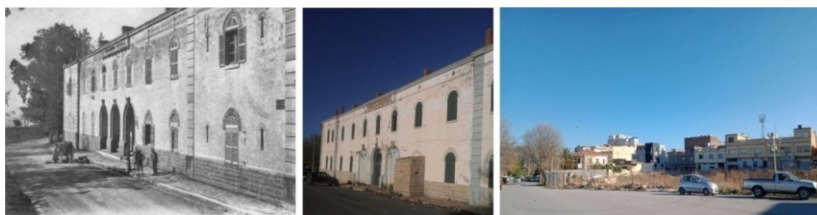


Fig. 6. The gendarmerie during the French colonial period (left) [37].
Its transformation into a military brownfield (centre) 2020.
The demolition of all the buildings on the site (right) 2022

The analysis of what has been mentioned above shows that the regeneration's projects of the Gourmalah barracks and the gendarmerie have opted for brutal and progressive approaches making a clean slate of the existing, which directly gives them a zero-conservative dimension. The appropriation in these cases was carried out by demolishing the colonial architectural heritage and consequently in a logic of erasure and memorial negation. This finding qualifies the two projects as unsustainable in terms of heritage.

In the case of the Bedeau Barracks and the African Hunters regeneration projects, the approaches were different, combining demolition with conservation of the existing with different degrees, so that their conservation dimension cannot be assessed directly. This finding makes these projects the two main cases of study adequate in relation to the objectives of this article.

Results and Discussions

Analysis of the mutation's process of the Bedeau barracks

• Pre-brownfield phase

Historical sub-phase

The site of Bedeau Barracks is a land located geographically at the southwest end of the inner city of Tlemcen and initially limited by the Hunters' Barracks of North Africa and by

vacant lots on the other sides, it was initially surrounded by various bastions 18, 19, 22 and 23 (Fig. 7).

During the second half of the 19th century, the site was an undeveloped land belonging to the military domain and used as a forage park (Fig. 7).

At the beginning of the 20th century, French military engineers wanted to consolidate the defensive infrastructure already existing in the city. For this, he chose this site for the construction of a new large barracks from 1903. The latter housed various buildings and hangars for administrative, military and accommodation purposes, including the remarkable dormitory block built in the neo-Moorish architectural style imposed on public facilities at the time (Figs. 7 and 8). A new forage park took place by adjoining the west wall of the barracks.



Fig. 7. The configuration of the Bedeau Barracks site in 1867 (left) [38]
The ground plan of the barracks in 1958 (right) [38]



Fig. 8. General view of the Bedeau barracks after its construction [39]

Sub-phase of declining site activity

Following independence, the barracks maintained its original function until it ceased and was directly replaced by a similar activity, the Tlemcen national police academy in 1964. To this end, the site has undergone minor modifications to accommodate the new use.

The police academy continued until the late 1960s, by which time its activity had been considerably reduced.

• **Waiting phase of the brownfield**

The abandonment of the site took place in a relatively short period of time, since the local decision-makers in the city immediately decided to decommission it from military use in 1968 in order to convert it into a civilian facility for secondary education, known at that time as the polyvalent high school.

• **Post-brownfield phase**

The transformation of the former barracks and its regeneration into a secondary school was a local initiative based on the various assets of the military brownfield in question; its strategic central location within the existing urban structure, the extent of its landholding and its pavilion architectural configuration which could be adapted to the functional needs of the planned new school. Two different interventions in time marked the transformation process of the military brownfield: the first was global (1968-1974) and concerned the whole site, the second was local (1996-1997) and concerned only the dormitory block. Table 2 summarises the main architectural actions carried out in the framework of these two interventions.

Table 2. Various actions carried out in the framework of the two interventions at the Bedeau barracks

First intervention (global)	
Architectural actions carried out	
<p><i>Demolition -reconstruction</i></p> <p>Demolition of the steel sheds and the first administration block</p>	 <p>Views on the new teaching blocks</p>
<p><i>Rehabilitation - reconversion</i></p> <p>Conservation and rehabilitation of the dormitory and the two accommodation blocks in their original use</p>	 <p>Views of the conserved parts: Dormitory (left), Accommodation (right)</p>
<p>Conservation and rehabilitation of the shed on the north-western side of the site and the second administrative block and their conversion into a sport hall and prayer room for the school</p>	 <p>Views of the conserved parts: Metal shed converted into a sport hall (left), Former perimeter wall (right)</p>
<p><i>Redevelopment</i></p> <p>Redevelopment of the various existing outdoor spaces and their adaptation to the spatial needs of the new high school (roads, recreation and traffic areas, sports fields, parking spaces, etc.). The vegetation of the site is partly preserved</p>	 <p>Views of the redeveloped outdoor spaces</p>

Second intervention (local)
Architectural actions carried out

Rehabilitation

Repair of roof waterproofing and consolidation of damaged structural components

Division of the dormitory spaces by adding light partitions to create individual rooms for the school's boarding students



Views of the dormitory after the rehabilitation work

Evaluation of the conservative dimension

The objective of the present work is to analyse the processes of mutation of the colonial military brownfields under study and to assess the conservation dimension. Referring to the above methodology, and considering that the former Bedeau barracks did not undergo any changes during the waiting phase, we will make a comparative analysis between the pre-brownfield and post-brownfield phases based on the criterion of the conservation of the form and function of each architectural type (Fig. 9 and Table 3).

The assessment will be based on a numerical value ranging from 0 to 1 point; conservation: 1, non conservation (demolition): 0.



Fig. 9. Current ground plan of the former Bedeau barracks

Table 3. Evaluation of the conservative dimension in the regeneration project of the Bedeau Barracks

Architectural type	Pre-brownfield phase	Post-brownfield phase	Evaluation
Enclosure wall		Form	1
	High height and thickness/irregular tracing Built of stone and bastioned on all four sides	The original form of the wall is conserved	
		Function	1
	Protection and defence of the barracks and its environment	The original function of the wall is conserved	
Administration		Form	1
	Two buildings of rectangular shape/similar dimensions Height of one level Classical architectural style	The administrative block located near the dormitory is preserved in its initial morphology with slight interior changes The second block is demolished	
	Construction system consisting of load-bearing stone walls, floors with metal beams and solid brick vaults, and a flat roof Interior space organised into different offices and other utility spaces		
		Function	0
	Management of the barracks as a military structure	The original function of the conserved administrative block is changed (converted into a prayer space for the new high school)	
Accommodation		Form	1+1
	Two rectangular housing blocks/different sizes Height from one level to two Classical architectural style Construction system similar to that of the administrative blocks Interior space consisting of three to four room dwellings	The two housing blocks are conserved in their original form with no interior modifications	
		Function	1+1
	State houses for senior officials of the barracks	The original function of the two housing blocks is preserved	
Dormitory		Form	1
	Dormitory of rectangular shape, it is the largest building of the barracks in terms of dimensions Height in three levels Neo-Moorish architectural style inspired by local architecture Construction system similar to that of the administrative blocks Interior space with five dormitories per level	The original form of the dormitory is conserved (slight interior partitions are added to create individual rooms for the school's boarding students)	
		Function	1
	Accommodation for army troops working in the equipment	The original function of the dormitory is preserved	
Hangar		Form	1
	Various rectangular hangars Nine large and four smaller sizes Height of one level Construction system consisting of stone walls, metal frames with sloping double-sided roofs Spacious and open interior spaces without dividing walls	Demolition of all the hangars except the largest one located on the north-west side of the site The original form of this hangar is conserved (addition of a new building next to it serving as changing room)	
		Function	0
	Multiple uses: refectory, storage areas, armoury depot, training areas, etc.	The original function of the preserved hangar is modified (converted into a sport hall for the new high school)	

Analysis of the mutation's process of the African hunters barracks

• *Pre-brownfield phase*

Historical sub-phase

The site of the African Hunters Barracks is a land located geographically at the southwest end of the inner city of Tlemcen and initially limited by the Bedeau Barracks to the south, by a vacant lot to the west, and by the old urban fabric existing on the north and east side (Fig. 10). It is also located between two old gates, namely the Fez gate and the quarry gate, and includes within its perimeter on the south-east side a building of high historical value in this case the medieval tower called Essafarine (Fig. 10).

The second half of the 19th century was marked by the desire of the French military engineers to provide the city with a strong defensive infrastructure. To this end, the site was chosen for the construction of a new large barracks from 1857 [40]. Architecturally, it consisted of three administrative blocks, two dormitory blocks and several hangars and other annexed buildings [40] in a classical style of construction (Fig. 11). When the barracks were built, the old tower was preserved and reused for the same purpose.



Fig. 10. The configuration of the site of the African hunter's barracks in 1867 (left) [38].
The ground plan of the barracks in 1958 (right) [38]



Fig. 11. General view of the African hunter's barracks after its construction [41]

Sub-phase of declining site activity

After independence in 1962, the site was still used as a barracks by the National Liberation Army. It has since been named "Miloud barracks".

The military function was maintained until the beginning of the 1980s, when the activities of the establishment had considerably diminished following the enclavement of the site within the historic centre of Tlemcen and the restructuring of the military sector.

• ***Waiting phase of the brownfield***

The site was abandoned around 1985-1986 after the relocation of the army to the periphery and its decommissioning from the military domain to the civilian domain. It has gradually become a marginalised space and a real urban wasteland marked by a long waiting period and a lack of management on the part of the city's officials.


It was only towards the end of the 1990s that local decision-makers showed renewed interest for this wasteland by developing various ideas about its future (tourist vocation, housing development, public utility facilities). The final option was to convert the former barracks into a facility for higher education "Faculty of Medicine", given the need for such a facility during that period.

• ***Post-brownfield phase***

The transformation of the former barracks and its regeneration into a medical faculty was a local decision based on the various assets of the military wasteland in question; its strategic central position within the existing urban structure, the size of its land area, as well as its pavilion architectural typology that can be adapted to the functional needs of the planned new facility. This decision was approved legislatively by Executive Decree No. 98 – 391 of 02 December 1998 establishing the University of Tlemcen and its organization into six faculties, including the Faculty of Medicine [42].

The transformation process of the military brownfield is marked by three different interventions in time: the first one of a global nature in (1998-1999) concerned the whole site followed by a study and expertise phase, the second one of a global nature also (2002-2006) and the third one of a local nature (2013-2016) concerned only the north-western area of the site. Table 4 summarises the main architectural actions carried out in these three interventions.

Table 4. Various actions carried out within the framework of the three interventions on the African hunters barracks

First intervention (global)	
Architectural actions carried out	
<i>Demolition</i> Demolition of the stone enclosure wall, the various metal hangars, the two administration blocks, and other annexed buildings	
<i>Conservation</i> Conservation of the two dormitories known as blocks "A" and "B" dated 1859 and 1858, the third administrative block and the Essafarine tower	
<i>Expertise</i> Technical study carried out on the preserved buildings mentioned above apart from the medieval tower Results: load-bearing stone walls in good condition and advanced degradation of wooden floors	
Elaboration of the rehabilitation project of the buildings in question following this diagnosis	

View of the Essafarine tower

Second intervention (global)
Architectural actions carried out

Demolition-reconstruction

Demolition of the dormitory "block A" and the remaining administrative block

Construction of the new parts of the project in their place: two pedagogical units, refectory, foyer and an auditorium located on the highest part of the site



Views on the pedagogical entities



Views of the new buildings: auditorium (left), refectory (right)

Rehabilitation-reconversion

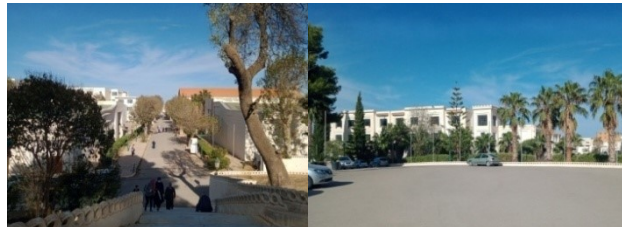
Rehabilitation of the conserved dormitory "block B" on the basis of the project already established during the first intervention and its reconversion into administration for the new medical faculty



Views of the dormitory« block B» rehabilitated and converted into administration for the new faculty

Redevelopment

Redevelopment of the various existing outdoor spaces and their adaptation to the spatial needs of the new faculty (roadways, plazas and gathering spaces, steps and ramps, parking spaces, etc.)
The strong vegetation characterising the site is partly preserved



Views of the redeveloped outdoor spaces

Third intervention (local)
Architectural actions carried out

Construction

Construction of the new teaching block dedicated to the industrial pharmacy course, built on the site of the dormitory "block A" demolished during the second intervention and which remained unoccupied



Views on the new pedagogical entity

Evaluation of the conservative dimension

Since the former African Fighter Barracks did not undergo any changes during the waiting phase, the evaluation of the conservative dimension will therefore be carried out using the same method adopted for the Bedeau barracks (Fig. 12 and Table 5).

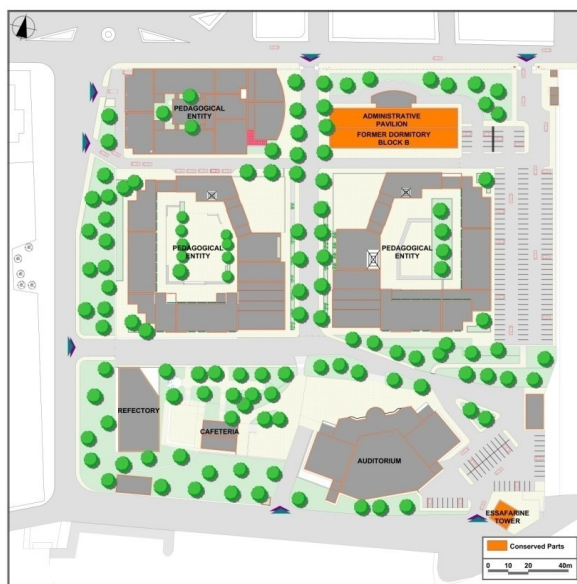


Fig. 12. Current ground plan of the former African hunters barracks

Table 5. Evaluation of the conservative dimension in the regeneration project of the African hunters Barracks

Architectural type	Pre-brownfield phase	Post-brownfield phase	Evaluation
Enclosure wall	Form		0
	Medium height and thick/regular tracing Built of stone	The enclosure wall is demolished	
	Function		0
	Protection and defence of the barracks		
Tower	Form		1
	Square tower with three levels, adobe walls and wooden floors	The original form of the tower is conserved	
	Function		0
	Control and surveillance of the south-western part of the old town	The original function of the tower has disappeared	
Administration/annex	Form		0
	Three administrative blocks and three annex buildings of rectangular shape/different dimensions	The three administrative blocks and three annex buildings are demolished	
	Height from one level to two		
	Classical architectural style		
	Construction system consisting of load-bearing stone walls, wooden beam floors, and pitched double-sloped tile roofs (the annexes have a flat roof)		
Interior space organised into different offices/rooms			
Function		0	
	Management of the barracks as a military structure/ dependencies		

Accommodation	Form	0
	Two rectangular housing blocks/ different sizes Height from one level to two Classical architectural style Construction system similar to that of administrative blocks with flat roofs Interior space consisting of three to four room dwellings	The two housing blocks are demolished
	Function	0
	State houses for senior officials of the barracks	
Dormitory	Form	1
	Two rectangular dormitory blocks/ identical dimensions Height in three levels Classical architectural style Construction system similar to that of administrative blocks Interior space with six dormitories per level	The original form of the dormitory "block B" is conserved (slight interior partitions are added as well as a glazed element projecting from the façade) The second dormitory "block A" is demolished
	Function	0
	Accommodation for army troops working in the equipment	The initial function of the dormitory is modified (reconverted into administration for the faculty)
Hangar	Form	0
	Various rectangular hangars Three large, three medium and six smaller Height of one level Construction system consisting of stone walls, metal frames with sloping double- sided roofs Spacious and open interior spaces without dividing walls	Demolition of all hangars
	Function	0
	Multiple uses: refectory, storage areas, armoury depot, training areas, etc.	

Interpretation of results

The analysis of the mutation processes of the Bedeau barracks and the African Hunters barracks, followed by the evaluation of the conservation dimension, showed that the approaches to intervention and thus to appropriation vary considerably from the first case study to the second. Concerning the Bedeau barracks, we found that the pre-brownfield phase was marked by the existence of (05) architectural types classified according to their main vocation and composed of a total of (19) buildings, of which (06) have conserved their initial morphology and (04) have conserved their initial function during the post-brownfield phase. Table 3 shows that the form criterion obtained a score of 6/19 points or a conservation rate of 32% while the function criterion obtained a score of 4/19 points or a conservation rate of 21%.

Concerning the African Hunters barracks, the observation is different since the pre-brownfield phase was marked by the existence of (07) architectural types composed of a total of 24 buildings of which only (02) have conserved their initial morphology and none of them has conserved its initial function during the post-brownfield phase. Table 5 shows that the form criterion obtained a score of 2/24 points, or a conservation rate of about 8%, whereas the function criterion obtained a score of zero and therefore a conservation rate of zero.

The conservative dimension profiles for each regeneration project are shown in figure 13.

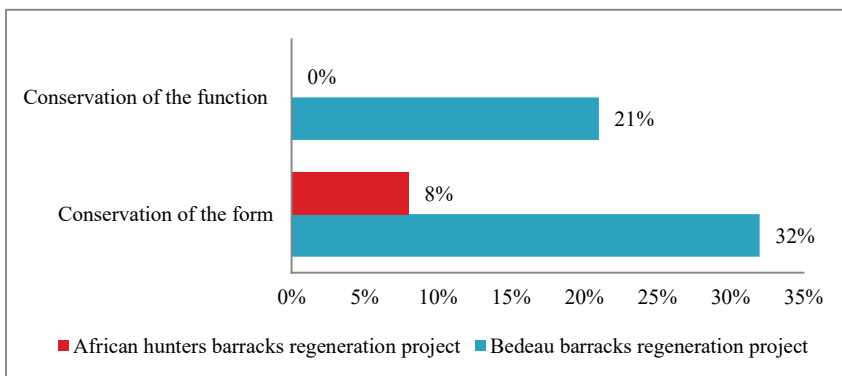


Fig. 13. Profiles of the conservative dimension of the regeneration projects of the two military brownfields studied

The comparison of the profiles of the conservative dimension of the two projects studied allowed us to distinguish a clear divergence, which shows that the interventions carried out did not have the same approaches.

The intervention approach on the Bedeau barracks has a conservative dimension described as low (32%) but which can be considered satisfactory since most of the buildings demolished were metal sheds which had no real architectural and aesthetic value. In addition, the buildings conserved were compatible with the spatial and functional needs of the new high school. The enclosure wall, the accommodation, and the dormitory are therefore preserved and rehabilitated in logic of functional continuity (21%) while the administration and the large hangar are preserved and rehabilitated with a view to functional reconversion. Thus, we note that the actors of the project have more or less adapted the new function of the high school to the architectural characteristics of the barracks.

The conservative dimension assessed within the Bedeau barracks regeneration project means that the appropriation was done through a rather conservative approach allowing for the recognition of the architectural heritage and its values and thus the affirmation of the colonial and military memory.

The social perception of this transformation is shown in Table 6, which summarises the results of the semi-structured interview.

Table 6. Results of the semi-structured interview with citizens and professionals: the case of the regeneration of the Bedeau barracks

Criterion		Citizens		Professionals
Compatibility of the new function	Yes	84%	Yes	60%
	No	16%	No	40%
Perception of the conserved parts	Colonial and military history of the site	68%	Colonial and military history of the site	44%
			Local architectural identity	28%
	Old building of the site	32%	Memory of place	28%
Perception of the site after regeneration	Colonial history of the city	36%	Colonial history of the city	44%
	Heritage and identity of the city	32%	Collective memory of the city's inhabitants	28%
	Large and renowned high school in the city	32%	Architectural identity of the city	28%

Based on the analysis of Table 6, we find that the vast majority of the citizens interviewed (84%) approved the transformation of the barracks into a high school while the rate is a little more than average for the professionals questioned (60%). The representation of the preserved parts of the former barracks by civil society is significant by the attribution of certain values to different degrees. Thus, the historical value is the most dominant, shared by both social categories interviewed (68 and 44%). The values of antiquity and architectural/artistic value were then added by 32% of citizens and 28% of professionals respectively. The latter also mentioned the memorial value (28%). The social perception of the whole site after its regeneration still underlines the same values: historical (36 and 44%), cultural/ identity (32%), awareness value (32%), memorial (28%) and architectural/ artistic (28%).

The evaluated conservative dimension, the appropriation based on conservation followed by rehabilitation and reconversion of the significant architecture as well as the various values attributed by the local population, reveal that the project in question has preserved part of the colonial architectural heritage of the city of Tlemcen which gives it a satisfactory heritage sustainability profile.

The approach of intervention on the barracks of the African hunters has a conservative dimension qualified as very weak (8%) since the actors involved in the project opted for the demolition of the majority of the buildings composing the site. The demolition was carried out in two phases: the first concerned all the metal hangars which had no real architectural and aesthetic value, as well as the accommodation and administrative blocks; the second concerned the remaining administrative block and dormitory "block A", whose technical expertise revealed the possibility of their rehabilitation and reuse for new uses. Only two structures were conserved; the Essafarine tower relegated to the back of the site with no specific function and the dormitory "block B" reconverted into administration for the faculty.

Thus, we note that the actors of the project did not adapt the new function of medical faculty to the architectural specificities of the barracks since they demolished a large part of the old building with the aim of facilitating the integration of the new equipment on the site.

The conservative dimension assessed within the regeneration project of the African Hunters barracks means that the appropriation was done through a rather progressive approach based on demolition, thus leading to the negation of the architectural heritage and its values and thus the erasure of the colonial and military memory. Demolition applied to built heritage generates damage to urban memory and a decrease in the sense of belonging to the city [43]. The appropriation for this case was also made by the conservation of the two buildings mentioned above, which allowed a heritage recognition and a memorial affirmation although they are very small.

The social perception of this transformation is shown in Table 7, which summarises the results of the semi-structured interview.

Table 7. Results of the semi-structured interview with citizens and professionals: the case of the regeneration of the African hunter’s barracks

Criterion	Citizens		Professionals	
Compatibility of the new function	Yes	72%	Yes	87%
	No	28%	No	13%
Perception of the conserved parts	Colonial history of the site	48%	Colonial history of the site	52%
	Old building and heritage of the site	40%	Heritage and identity of the site	24%
	Memory of place	12%	Memory of place	24%
Perception of the site after regeneration	Colonial history of the city	44%	Colonial history of the city	36%
	Disfigured site	28%	Disfigured site	36%
	Collective memory of the city's inhabitants	14%	Collective memory of the city's inhabitants	28%
	City's heritage	14%		

From the analysis of Table 7, we can see that a large part of the population surveyed approved the transformation of the barracks into a medical faculty (72% and 87%). The representation of the preserved parts of the former barracks by the civil society is also significant by the attribution of a number of values at different levels. The historical value is therefore in the majority and shared by 48% of the citizens and 52% of the professionals questioned. The values of antiquity/cultural/identity (24 and 40%) and memorial (12 and 24%) are cited respectively by the two social categories interviewed. The social perception of the whole site after its regeneration conveys practically the same values: historical (44%, 36%), memorial (14% and 28%) and cultural (14%). Nevertheless, it highlights that the intervention has disfigured the initial architectural landscape of the site, has erased part of its built heritage and has not sufficiently enhanced the conserved parts (28 and 36%). The site is perceived by this part of the population as having no current role in the cultural identity of the city of Tlemcen.

The evaluated conservative dimension, the appropriation based on the demolition of significant architecture as well as the negative perception of the regenerated site by a part of the professionals and citizens questioned, show that the project in question has destroyed part of the colonial architectural heritage of the city of Tlemcen. The preservation of the two buildings and the different values attributed to them by the local population still give the project a slight profile of heritage sustainability, but less than the previous case study.

Conclusions

This article deals with the appropriation of architectural legacies in the regeneration projects of Tlemcen's colonial military brownfields and is based on the assessment of the conservative dimension for each case study.

The comparison between the results obtained showed a clear divergence in terms of approaches since the regeneration of the Bedeau barracks, although older in time, has a higher conservative dimension than that of the African Hunters barracks. This explains that the appropriation of the first case study was carried out mainly through the conservation, rehabilitation and reconversion of the existing architecture, which allowed its heritage recognition and memorial affirmation. For the second case study, the appropriation took place mainly through the destruction of the existing architecture, which generated its heritage negation and its memorial erasure.

The regeneration of the Bedeau barracks has preserved the site's significant old buildings whose values are recognized by the local population, which designate them as a real military colonial heritage. Conversely, the regeneration of the African hunters barracks destroyed various important built traces of the site; only two buildings have been preserved. The first intervention is therefore described as more sustainable from a heritage point of view than the second, as it allowed the preservation of the colonial architectural identity of the site and of the city.

The regeneration of urban and military brownfields is considered today as a lever for the sustainability of cities, provided that it is carried out in an appropriate way.

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