

# Green Adaptive Reuse of Historic Buildings

## A case study: Wekalet El-Lamoun, Alexandria, Egypt

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**Abstract:** Adaptive reuse is a prerequisite for achieving improvements in the quality of life in environmental, cultural, and economic aspects. It is a powerful alternative to building demolition or destruction. It refers to the process of reusing an old site or building for a purpose other than which it was built or designed for. Reusing building saves 50% from the building cost needed to create a new building; also it is friendly to environment when the main aim is the recycle use of the old materials in existing buildings, also it reduces the urban sprawl. It also refers to Sustainable development that has become a goal for the entire world seeking to balance the health of the environment with the health of the economy. The predominant vision of a sustainable built future is of state of the art buildings utilizing energy efficient design and materials. This paper discuss the process of adaptive reuse project based on reviewing some examples such as The high line park, New York, Batersia power station, England and Whychwood barns, Canada, then a case study application proposal of wekalet el-Lamoun building in wekalet el-Lamoun street, Alexandria, Egypt.

**Keywords:** green architecture, adaptive reuse, intervention, sustainability, existing buildings, and property management.

### 1. Introduction

*“The greenest buildings are the ones we already have”. (Langston, G.)*

This research is concerned with the task of implementing adaptive reuse of old buildings; this is achieved through: First; examining the literature review of adaptive reuse, its goals, values, objectives and the opportunities, its advantage, its influence on the development of the place.

Second: Analyzing examples that focus on adaptive reuse of buildings and public open spaces. Thus to create a self supporting contextual framework, not only in the physical terms, but also in the social, economic and institutional terms, in order to be used as a criteria in analyzing the case study of wekalet el-Lamoun building which is located in wekalet El-lamoun street in the Turkish town of Alexandria, Egypt, as this area is the core of the touristic city and represent the historical identity of the city and this street is one of the most potent public places for social activities to occur, and the most effective elements in linking separate entities.

The main aim of the research is to analyze the existing situation of the building thus to be able to identify the problems and to conclude recommendations to apply adaptive reuse that sustain the rehabilitation of the historical building and strengthen the cultural and historical identity of the street.

### 2. Research Objectives

Recycling has become second nature to modern communities as we strive for environmental sustainability. Adaptive reuse is a process that changes a disused or ineffective item into a new item that can be used for a different purpose, aiming to reduce, reuse and recycle waste, new life in everything. Sometimes, nothing changes but the item's use.

The adaptive reuse of a historic building should have minimal impact on the heritage significance of the building and its setting. Developers should gain an understanding of why the building has heritage status, and then pursue development that is sympathetic to the building to give it a new purpose. Adaptive reuse is self-defeating if it fails to protect the building's heritage values.

The most successful built heritage adaptive reuse projects are those that best respect and retain the building's heritage significance and add a contemporary layer that provides value for the future. (Australian government, 2004)

### 3. Adaptive Reuse Implementation

Adaptive reuse differs from restoration as it provides greater 'license' for change, such as extension and integration of new build components, or even selected demolition. (Davis Langdon)

It is generally regarded that the following conditions must be met:

- The existing function or purpose of the facility has become inappropriate due to changing social expectations and/or market demand.
- The facility has significant embedded physical life (or residual value) and structural integrity.
- There is some compelling cultural, heritage, or environmental value in the facility to support its retention.
- An argument can be mounted to show that the proposed new use delivers a higher value for money ratio than alternative new build or sale options. (Langston, G.)

Design criteria have to be applied on the reused project, thus could be implemented thru several points as:

- Social: sense of place and social life through neighborhood, human scale, history, landscape, amenity, and aesthetic aspects.
- Technological: low energy through orientation, glazing, insulation and shading, natural light, natural ventilation, solar access, complexity and building management systems.
- Economic: location importance through population density, market proximity, transport infrastructure, site access, exposure, and planning constraints.
- Functional: through flexibility, disassembly, spatial flow, convertibility, structural grid, services and ducts.
- Political: through adjacent buildings, ecological footprint, conservation, community interest, urban master plan, zoning and ownership.
- Legal: quality standard through standard of finish, fire protection, indoor environmental quality, occupational health and safety, security, comfort, disability access, energy rating and acoustics.
- Physical: through structural integrity, material durability, workmanship, maintainability, design complexity, prevailing climate and foundation.



Fig 1: design criteria diagram  
Source: analytical diagram by the researcher

Standard criteria to help ensure that an adaptive reuse project has minimal impact on a building's heritage values, include

- Discouraging "façadism"—that is, gutting the building and retaining its façade
- Requiring new work to be recognizable as contemporary, rather than a poor imitation of the original historic style of the building
- Seeking a new use for the building that is compatible with its original use.

## 4. Process of Adaptive Reuse Project

- **Stages A-B: appraisal and strategic brief**

During these stages, the designers for the building project should incorporate the principles of reuse and recovery of materials, and design for deconstruction and flexibility.

Designers should also assess whether deconstruction and flexibility can be considered, or is a priority.

- **Stage C: outline proposal**

At this stage, designers can apply the principles of reuse and recovery of materials, and off-site construction.

- **Stage D: detailed proposals**

At this stage, designers should have decided upon and incorporated detailed solutions into the project, as part of the building's form, materials and space requirements.

Waste reduction proposals made at this stage should therefore be incorporated into the design's development, and detailed waste-reduction discussions should take place with other consultants, contractors and suppliers.



Fig 2: Process of a re-use project diagram  
Source: analytical diagram by the researcher

## 5. Case Study: Wekalet El-lamoun Historic Building

### 5.1. Building Selection

This historic building was selected, because it is located in Wekalet El-Lamoun historic street, Alexandria, Egypt. Surrounded by many registered monuments from the governorate of Alexandria in June 2007, most of them are wekalat and mosques. Also it is accessible from tow main historic covered market streets called, souk el-midan and Faranca Street

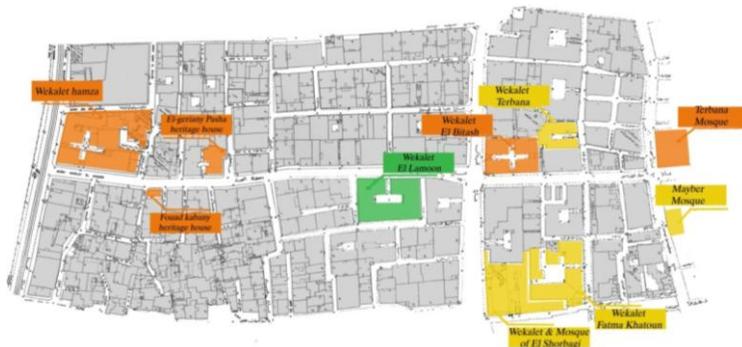


Fig 3: location of the building  
Source: analytical diagram by the researcher

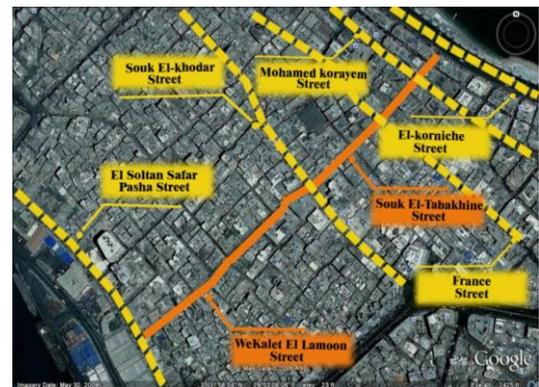


Fig 4: diagram representing the main streets conducting to wekalet el-Lamoun st.  
Source: Google earth, edited by the researcher

### 5.2. History

The building was owned by “Alfred Blon Metkass” registered under (n.121 Sheykha souk el-Samak). A Greek Jewish family constructs it in 1835. (Naguib I., 2011)



Fig 5: Picture of wekalet el-lamoun  
Source: Alexandria and Mediterranean research center BA

### 5.3. Description

The building has four storeys; the ground floor occupied by shops and storerooms. The internal courtyard is reached by two symmetrical entrances from two sides of the building those entrances have no doors in the original design.

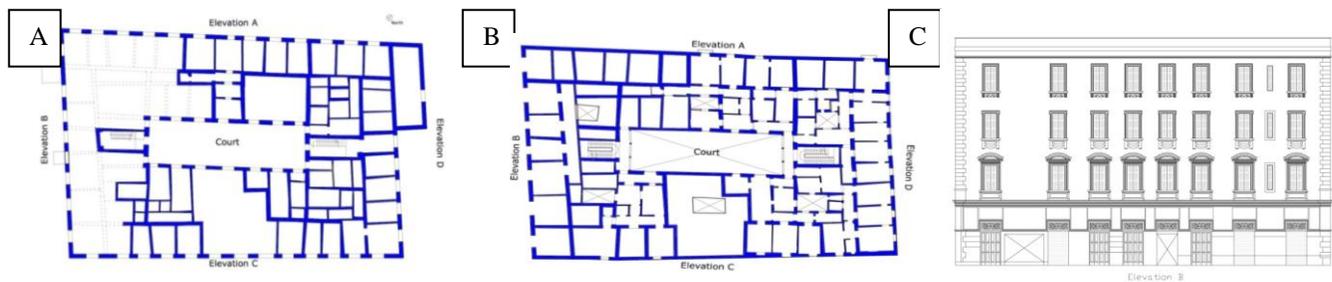


Fig 6: A: Ground floor plan B: Typical floor plan. C: Elevations of wekalet el-lamoun  
Source: Alexandria and Mediterranean research center BA edited by the researcher

The upper floors occupied by residential dwellings, two staircases from the two sides of the building can reach the upper floors but they can only be reached from the courtyard.



Fig 7: Pictures representing the staircases conducting to the upper floors.  
Source: Alexandria and Mediterranean research center BA



Fig 8: Pictures representing the storefront of the building.  
Source: Alexandria and Mediterranean research center BA

The walls are constructed of limestone and brick, the ceilings are made of steel I-beams with brick vaults in between, this construction method was called jack-arch, and it shows the developing European influence.

The present condition of the building; *although the function of the building has not been very much changed, the physical fabric has obviously been altered* (HANAFI,M. 1994 P.281)

Storefront: most of the stores still have their original front style but they are much damaged, different finishing materials and colors are used regardless of the existing fabric of the building and many of them are not currently active business just closed doors.



Fig 9: Pictures representing the entrances of the courtyard.  
Source: Alexandria and Mediterranean research center BA

Alteration of entrances: one of the entrances is partially closed to increase the storing area of a shop and the other one is totally closed and used as a store.

### 5.4. Proposal

Based on the discussion above, the proposal is presented in order to implement building reuse process on a historic building in order to achieve green and sustainable development. The building is used as residential units, mostly for low-income families, although the design of the building could help to be a good hospital serving the area while there is no medical care placing near the area. So government could insure a replacing residential property for the residence of the building and restore it then transform it to a hospital.

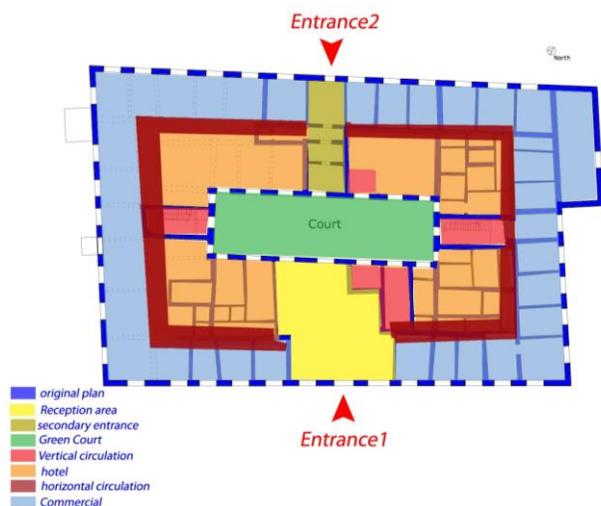


Fig 10: Proposal zoning ground floor plan  
Source: Zoning diagram by the researcher

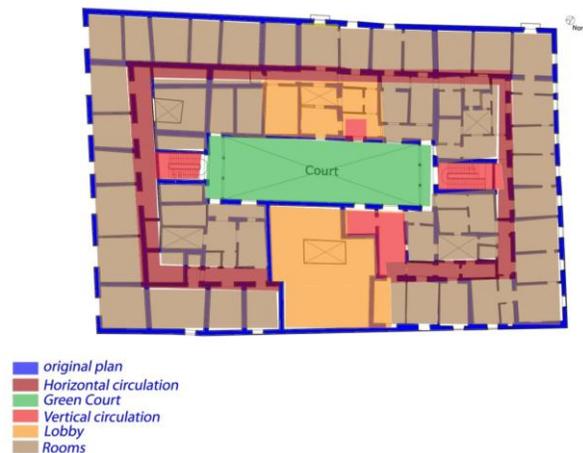


Fig 11: Proposal zoning typical floor plan  
Source: Zoning diagram by the researcher

### 5.5. Opportunities and Constrains

STRENGTH	WEAKNESS	OPPORTUNITIES	THREATS
<p>This Building has a unique socio-economic character; it is related to the navy port and to the central business district of Alexandria. It has historical and architectural value.</p>	<p>The building has been badly reused in the past from a residential wekalet in the origin to residential block then to low income residential rooms. So there are many elements have been added to plans, regardless of its architecture</p>	<p>The location of the building gives the idea to use it as a hospital and that is because there is a need of healthcare buildings in the area. Also the structure of its plans is in grid and help applying a good use. Also it could be used as a hotel.</p>	<p>The building is still used by residence so it is necessary to get them replacing apartments to take the building and applying the new proposed use.</p>

Fig 12: S.W.O.T table  
Source: by the researcher

## 6. Conclusion

### 6.1. Wekalet el-lamoun:

Based on the research above, Adaptive reuse offers several advantages over normal refurbishment where an existing functional purpose has become obsolete. Wekalet el-lamoun historic building has a great potential to be reused, as it is sited in an area that include many historic places, and also it is connected to Alexandria port; all that confirm on its location importance from accessibility side and also from cultural side. Many uses could be implemented on this building because of its good plan and good structure that need only minimum intervention for restoration.

### 6.2. General recommendations:

The benefits of building adaptive reuse could be classified under three main categories:

- **Environmental:**

Adaptive reuse of buildings has a major role to play in the sustainable development of communities. When adaptive reuse involves historic buildings, environmental benefits are more significant, as these buildings offer so much to the landscape, identity and amenity of the communities they belong to.

One of the main environmental benefits of reusing buildings is the retention of the original building's "embodied energy". By reusing buildings, their embodied energy is retained, making the project much more environmentally sustainable than entirely new construction. New buildings have much higher embodied energy costs than buildings that are adaptively reused. (Australian government, 2004)

- **Social**

Keeping and reusing historic buildings has long-term benefits for the communities that value them. When done well, adaptive reuse can restore and maintain the heritage significance of a building and help to ensure its survival. Rather than falling into disrepair through neglect or being rendered unrecognizable, heritage buildings that are sympathetically recycled can continue to be used and appreciated.

Increasingly, communities, governments and developers are seeking ways to reduce the environmental, social and economic costs of continued urban development and expansion. We are realizing that the quality and design of the built environment in our towns and cities are vital to our standard of living and our impact upon natural resources.

Communities increasingly recognize that future generations will benefit from the protection of certain places and areas, including heritage places.

- **Economic**

There are several financial savings and returns to be made from adaptive reuse of buildings. Embodied energy savings from not demolishing a building will only increase with the predicted rise of energy costs in the future.

Costs may be related to minimizing resources and environmental impact. Adaptive reuse can be cost effective as a result of the reuse of expensive building elements and time for completion can be shorter.

Compliance with building regulations can be more difficult for adaptive reuse projects compared to new build, and can lead to increased costs. Compliance could relate to fire safety and egress, insulation and energy performance, disabled access, asbestos removal, occupational health and safety, car parking and the like. Planning controls may prohibit some alternative new uses or require time and effort in negotiation. Many new developments also have these problems, but with adaptive reuse any discovered (latent) conditions during construction can introduce additional problems, and therefore it may be concluded that adaptive reuse increases the risk of time and cost overruns. (Langston, G.)

It is generally regarded that high performance environmental buildings cost more than traditional solutions. Nevertheless, it is also held that most adaptive reuse projects cost less than new build solutions of the same size.

The cost efficiency of adaptive reuse for most projects can be used to offset the (often) higher capital costs of sustainable development. (James P., 2004)

## 7. Appendix

The CSIRO defines embodied energy as the energy consumed by all of the processes associated with the production of a building, from the acquisition of natural resources to product delivery, including mining, manufacturing of materials and equipment, transport and administrative functions. (Australian government, 2004)

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