Research Article

# Adaptive Re-Use and Sustainable Development for Existing Historic Buildings – Case Study: Buildings of Racetrack Horses in Sporting Club, Alexandria, Egypt

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### Abstract

The old buildings are now being seen as art treasures; they have intrinsic values and are reminders of a city's culture and complexity. One of the ways of keeping the old buildings is by adaptive reusing them to contemporary uses. Adaptive reuse has been successfully applied to many types of buildings. The adaptive reuse of historic buildings is considered as central importance to comprehensive state strategy and sustainable development in nations. Through the built heritage adaptive re-use development, countries can respect and conserve the prominence of the historic buildings meanwhile adding economic value both for the current and the future. This paper proposes a preservation and reusing project for one of a historic sports facility in Sporting club, one of the most important clubs in Alexandria, Egypt. The historic structure was part of the ancient city. This paper stresses that the practice of using the old buildings can save them from being replaced by new buildings. This practice also helps to preserve the identity of a place. The paper involved literature review of adaptive reuse, international conservation examples, and principles. Finally, we can learn from the international experiences of other countries to present a proposed principles of well adaptive reuse through the case study.

Keywords: Adaptive reuse, conservation, historical value, Sustainability.

### 1. Introduction

As the conservation practice had to deal with the adaptive reuse as a methodology towards conservation grew. There are many architects pointed to the importance of adaptive reuse within the conservation practice. Concerning reuse of historic buildings, Viollet-le-Duc stated: "The best of all ways of preserving a building is to find a use for it, and then to satisfy so well the needs dictated by that use that there will never be any further need to make any further changes in the building" (Viollet-le-Duc, E. , 1854). And Venice Charter said: "the conservation of monuments is always facilitated by making use of them for some socially useful purpose" (ICOMOS, 1964).

The old buildings can breathe new life through adaptive reuse as a well-documented strategy without needless and premature demolition. The particular context of the building and its original design are the important factors which the success of this action depended on it. Most buildings are not designed to maximize future adaptive reuse; therefore the opportunity for doing so is serendipitous (Sh. Conejos, C.Langston, J.Smith, 2011). With the staggering number of historical buildings over the world - particularly those that can't be renovated for original use and how these sites are adapted to satisfy the new requirement for their community.

"Historical buildings are the expression of a huge accumulation that reflects the cultural, social and economic structure of the past periods. These values managed to survive until today. Protecting these values from extinction will cause the re-gaining of the historical buildings for public use by renewing them to the modern comfort level and making the required functional changes." (Ulusoy. M., E. Erdogan, H.A. Erdogan, M.Orala., 2013).

This paper will explore the evolution of adaptive reuse in order to provide context and understanding of the subject at hand. Next, a proposal will examine the cultural and architectural significance of the racetrack horses' at Sporting club, Alexandria. It will outline the history of the structure, from its life as a racetrack horses to the cosmetic, structural, and functional changes it has undergone in its transition; and its present contribution as it has taken on a new life.

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### 2. Methodology

In order to achieve the stipulated aim, the study presented in this paper traces the following steps:

1. Defining the adaptive reuse of buildings

2. Review principles of the adaptive reuse of buildings according to some of the international institutes of Architects.

3. Review selected international examples have applied these principles

4. Present a proposed principles to well adaptive reuse the buildings

5. Case study / Analysis and recommend a proposal to adaptive reuse this building

## 3. Adaptive Reuse

"Historic preservation is the practice of protecting and preserving sites, structures or districts which reflect elements of local or national cultural, social, economic, political, archaeological or architectural history." (T. R. Hazen., 2002) There are many ways to describe those activities which are typically performed under the general umbrella of "historic preservation", including restoration, rehabilitation, renovation, and adaptive reuse (Bond. Christina, 2011). Adaptive re-use for historic building, structure or site is the most ideal approach to save it which interfaces the past to the present and projects into the future. Adaptive reuse is the conversion of a building, site or district from one use to another. When the heritage site has been reused, the new use should support the ongoing interpretation and understanding of the heritage value while as well as fitting new functions. Instead of seeking to freeze historical building or site, adaptive reuse can give new life to it. It searches the alternatives between the extremes of demolition or turning a site into a museum. Adding a new layer without removing earlier layers, an adaptive reuse project becomes part of the long history of the site. It is another stage, not the last "Although result (J.Clark 2013). different to preservation and interpretation works aimed at making a museum of the site, adaptive reuse includes both within its scope. It provides an opportunity to maintain heritage fabric, spaces, and sites that might otherwise be lost and to make them available to new generations." (NSW. ,2008).

# 4. The benefits of adaptively reusing heritage buildings

The adaptive reuse adjusts a heritage building or site to a new use that protects its heritage values. Adaptation may incorporate the presentation of new services, or new functions, or changes to preserve historical site. A good adaptation is one that is well-disposed to the existing building and its historic context, as well as introduces a new function or makes changes which improve and also, supplement the historical values of the heritage place. It provides the term sustainability for the heritage place and achieves the pillars of sustainability (Department of the Environment & Heritage of Australian government, 2004):

### 4.1 Environmental

When historic buildings have involved in the adaptive reuse, the environmental advantages are more important, as these buildings offer so much to the landscape, character, and convenience of the local communities. The maintenance of the original buildings. Embodied energy is one of the main environmental benefits of reusing buildings. "The embodied energy is defined 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. By reusing buildings, their embodied energy is retained, making the project much more environmentally sustainable than entirely new construction." (Department of the Environment and Heritage of Australian government, 2004)

4.2. Social

For the societies that value the historic buildings, conserving and reusing these buildings has long-range advantages. They attention realize that future generations will benefit from this conservation and reuse of heritage places. In addition to the retention of a heritage building, it should adapt to accessible and usable places in order to enhance the lifestyle. The adaptive reuse in existed residential areas can offer the community with new housing and commercial property opportunities. When town planners realize and promote the advantages of adaptive reuse of heritage buildings, they will be contributing to the livability and sustainability of their communities.

4.3. Economic

Adaptive reuse of historic buildings can offer some funds savings. "Embodied energy savings from not demolishing a building will only increase with the predicted rise in energy costs in the future. While there is no definitive research on the market appeal of reused heritage buildings, they have anecdotally been popular because of their originality and historic authenticity." (Department of the Environment and Heritage of Australian government, 2004)

# 5. Principles for adaptive reuse of historic buildings and sites

Architects and designers have the challenge to find innovative solutions to reuse of historic buildings and sites. According to development pressures in cities, more historical buildings are being reused, producing some excellent models of innovative designs that retain heritage value.

Many design principles and methodologies have advanced from demonstrated design solutions. The following are some guidance principles for adaptive reuse of historical buildings consistent with the aims of protection and sustainable design how to meet these new needs in existing buildings and how to improve the built environment while preserving the nation's cultural. Each principle will be illustrated by case study worked in practice regarding these principles. Each case study demonstrates a respect for the building traditions of the past, as well as the successful integration of modern technology, richness, and diversity of good architectural design solutions conserving and adapting existing buildings and sites to new uses.

# 5.1. The Royal Australian Institute of Architects principles

As indicated by the Royal Australian Institute of Architects: "a place should have a compatible use, adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place, and adaptation should involve minimal changes to significant fabric achieved only after considering alternatives". The following seven principles have been appropriated to achieve a successful adaptation (NSW.,2008):

- Understand the significance of the place
- Find a use which is appropriate to the heritage significance of the place
- Define a level of progress which is suitable to the meaning of the place
- Provide for the change to be turned around and for the spots future protection
- Monitor the connection between the setting and save critical perspectives to & from the heritage place
- Provide for the long-term management and viability of the heritage place
- Reveal and interpret the heritage significance of the place as an integral part of the adaptation project

#### 5.1.1. The Forum Health and Wellness Centre

A historic railway workshop building (Fig.1), Situated between Workshop Place and Harbour Square, in Honeysuckle, Newcastle, was adjusted for the Forum Health and Wellness Centre owned by the University of Newcastle Sport. The building had a simple form and was constructed of brick (NSW,2008).

The challenge of the reuse of this building was to protect the sense of scale and size of the internal space (Fig.2) along with an interpretation of the previous use. The acoustic and visual separation between uses in the large spaces was potentially in conflict with historical features of the building. Any new additions were to be clearly discrete from the heritage building, with little impact on the public domain (The Royal Australian Institute of Architects, 2013)



**Fig. 1** Top plan showing old railway workshop building and below plan showing the new center (NSW,2008)

"The concept of 'a building within a building' was adopted maintaining a strong axis through the building, retaining existing openings enabling a clear interpretation of previous use. Relationship of built form to context. This concept was to keep new internal structures independent of the existing fabric allowing the new development to maintain a minimum and reversible impact on the significant fabric of the building. New building work was detailed in a contemporary manner which while substantial, touches the building lightly". The external context is a unity of historical railway and modern buildings within the Honeysuckle urban regeneration areas. In addition to recent streetscape surrounded by new mixed-use buildings.



Fig. 2 Interior images for the center (NSW,2008)

The design was by separating the aerobics area on a mezzanine over the equipment areas in the main body of the building. Stopping the mezzanine structure short of the external walls and in filling with clear glass maintains the sense of scale and acoustic separation. New additions to the rear of the building, housing the new changing room areas, are clearly discrete from the heritage. The way of dealing was to use natural materials with no applied finishes within the context of the heritage masonry shell. The external ablutions area was clad in fiber cement sheet painted a dark gray to Adaptive Re-Use and Sustainable Development for Existing Historic Buildings

maintain a clear distinction between old and new. Sustainability Retaining an existing building virtually intact, with all areas having good natural ventilation via existing openings and a new roof ventilator, flexible fluorescent lighting and high ceilings contributes to the high level of overall sustainability of the building. The fit out allows for current technology with TV monitors, security, and quality sound systems on timer based controls to minimize energy requirements. The design of the health club reveals the building features and uses them to drive design character (The Royal Australian Institute of Architects, 2013)

# 5.2. The Ireland's Department of Arts, Heritage, and the Gaeltacht principles

According to the Ireland's Minister for Arts. Heritage and the Gaeltacht: "Good conservation practice allows a structure to evolve and adapt to meet changing needs while retaining its particular significance". Owners, planning organizations and all others involved in architectural conservation are facing many challenges. The major challenge is to distinguish how and where change can happen and to ensure that the heritage is not destroyed by unsuitable intervention. Extensions and any interventions should be friendly to the previous building and of quality in them and should not cause damage to the fabric of the structure, whether in the long/short range (The Ireland's Department of Arts, Heritage, and the Gaeltacht. 2004). The following twelve principles have been appropriated to achieve a successful adaptation:

- Keeping a Building in Use
- Researching and Analyzing
- Utilizing Expert preservation advice
- Securing the Special Interest
- Supporting the Least Intervention
- Concerning Prior Adjustments of Interest
- Repairing Rather than Replacing
- Evolving Fidelity of Repairs and Modifications
- Utilizing Proper Materials and Strategies
- Ensuring Reversibility of Changes
- Avoiding Incremental loss
- Discouraging the Use of Architectural Salvage from other Buildings
- Complying with the Building Regulations

#### 5.2.1. The Highlanes Gallery

The Franciscan Church, known locally as 'The High Lane' was built into a steep slope that rises from the south river quay towards Laurence Street, architecturally the most significant street in the historic town. The Franciscans decided to close the church and to gift the building to the people of the town by adaptive reusing it to be the Highlanes Gallery and house the art collection (Fig.3) (The Ireland's Department of Arts, Heritage, and the Gaeltacht, 2012).



Fig. 3 Images for the Franciscan Church (Irish Franciscans website, 2017)

There are two main challenges, firstly the main floor and nave of the church is set 4.5 meters below the Laurence Street level and the church is built on a T-Plan with galleries in each arm and the challenge was to overcome the problem of fragmented access and provide a substantial exhibition gallery floor at the Laurence Street level. The challenge was also to create a contemporary art gallery space while retaining features of the existing building including the galleries and the three-bay Tudor Gothic reredos with large moldings (Fig.4) (The Ireland's Department of Arts, Heritage, and the Gaeltacht, 2012).



**Fig. 4** Images for the Highlanes Gallery (The Ireland's Department of Arts, Heritage, and the Gaeltacht, 2012)

The concept was to overlay the galleries with a floating floor of sufficient area to serve as a large exhibition space at Laurence Street level. An adjoining residential building located on the street east of the church was purchased to accommodate the services necessary to an art gallery including a lift, toilets, kitchen stores and plant. This space now provides a cafe and craft shop at street level. The floor of the original church provided a lower gallery space which is wonderfully articulated by the existing cluster shafts that support the deep back gallery. A suspended plenum ceiling below that of the original plaster ceiling distributes services and lighting to the upper gallery. This space is normally subdivided with movable walls which provide great flexibility to gallery exhibitions. The gallery can be entered through the craft shop front on Laurence Street or through the church gates which direct the visitor across a bridge

like a ramp rising from street level to the floor level of the new gallery floor (The Ireland's Department of Arts, Heritage, and the Gaeltacht, 2012)

The original fabric has been substantially retained. The approach has been to overlay the existing and it is conceivable that the new insertions could be removed and the building returned to its original form. The interior when viewed from the front of the reredos explains the building and shows all the original church gallery fronts tucked under the new layer of floor. The existing reredos which can be viewed from both gallery floors becomes an integrated sculpture in the space and is quite at home in the redesigned space. Contemporary elements are harmonious with the traditional. The mid-nineteenth century windows record unusual saints most colorfully and also remain in place. This project alters a cherished but redundant church and returns it as a working building to the community and makes old and new coexist happily (The Ireland's Department of Arts, Heritage, and the Gaeltacht, 2012).

#### 6. Proposed Adaptive reuse principles

In order to retain the character and special interest of historical buildings and sites, Conservation is the major way of caring for them and of managing the changes. Historic structures are a unique resource. When lost or their unique qualities are corrupted, they can't be replaced and hardly be recovered. Over-consideration as by disregard can make destruction to the character of a historic structure. The unique characteristics of a building with the loss of themes of interest can be damaged by over-restoration. Materials and craftsmanship which, while sometimes appearing of little significance in them, can add to the character of the building and make it unique. The following eight principles are proposed to be used to well adaptive reuse historical buildings:

- 1) Analyzing and understanding the significance of the structure as an essential and expressive part of the adaptation project
- 2) Keeping a Building in Use by finding a new use which is suitable to the heritage value of the place
- 3) Ensuring reversibility of alterations and avoiding the use of process or materials whose future removal would damage the original historic fabric
- 4) Promoting minimum intervention based on respect for the existing building
- 5) Respecting maximum retention of fabric and the least possible loss of the original fabric
- 6) Conserving the relationship between the setting and preserve considerable views to and from the historical place
- 7) Providing for the long-range management and viability of the historical structure
- 8) Reveal and interpret the heritage significance

# 7. The case study area (horses racing track stands, Sporting club)

The Alexandria Sporting Club is one of the oldest clubs in Egypt and Africa, and it was built in 1890 (Fig.5,6). This historic club was founded on a generous piece of land donated by Prince Omar Toussoun. Influenced by British culture and traditions, the first establishing reason for the club had been to give the elite class communities living in Alexandria a place for parties and for doing physical activities. Thus, from the start, the club included a golf course, tennis courts, a clubhouse and a wooden horse racing track (ElTabbakh M., 2015).



Fig. 5 Satellite map of Sporting Club





### 7.1. History of the Structure

The colonial architecture of the club is a reminder of its glorious past and a horse track still runs around the course (Fig.7). "In 1932, when the tradition of horse racing became extremely well known among the Alexandrian elite class, the club administration selected to demolish the modest wooden stands to be changed by a more modern building. For this, the booming Italian contractors Cartareggia & Dentamaro, who contributed a lot to the making of Alexandria in the 20s and 30s were commissioned to build the design proposal by Katarincek Stephan architect." (ElTabbakh M., 2015).

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Fig. 7 Old images of horses racing track stands (ElTabbakh M., 2015)

#### 7.2. Problem Definition

Today, the tradition of horse racing is no longer practiced in the club and the building didn't use for almost 30 years (Fig.8, 9). The previous global community of the club has been obviously replaced by a rising local community. The requirement for space to provide the needs of current members is encouraging the board to consider the alternative of demolishing the enormous abandoned yet structurally sound building to make room for more services and activities. The building is listed by the local authority for its value, a means of legal protection against demolition, but the club has filed a court case to have it removed from the protection list (ElTabbakh M., 2015).



Fig. 8 Recent images for horses racing track stands



Fig. 9 Recent images for horses racing track stands

#### 7.3. Building Analysis

The horses racing track structures were constructed in two parts: main stand and a secondary one (Fig.10,11). They considered as archaeological buildings that over one hundred years of existence. The first stand which is the main one was called King Farouk stand. Each building is composed of two floors.



Fig. 10 Analysis of the main stand



Fig. 11 Analysis of secondary stand

#### 7.4 Adaptive reuse proposal

The building was empty and vandalized for many years and required extensive conservation work. The creative architectural solution was required to preserve the character of the buildings. The challenge is to retain the character of the original buildings, and the separate quality and simple character of the two buildings, while linking them to create open space along with an interpretation of the previous use. Respecting the proposed adaptive reuse principles, the proposal provides a viable model for adaptive reuse to create new uses which are appropriate to the heritage significance of the place. It advocates sustainable design and retention of heritage significance in preference to demolition, to create a richer urban environment.

The architectural philosophy guiding the proposal was to retain the memory of the building's past, respect the existing fabric, and insert strong new elements that were functional and contemporary. It would demonstrate how to adapt existing buildings in environmentally and socially beneficial ways.

The main building is proposed to be an art gallery included galleries area to serve as a large exhibition space and gift shops (Fig.12). These galleries area is normally subdivided with movable walls which provide great flexibility to gallery exhibitions. Space can be entered from inside of the club or outside gate which directs the visitor from street level to the floor level of the new gallery floor. Interpretation must be added through outstanding data show to tell the history of the horses racing track structure and the story of the development. It will become a special visitor experience, enhancing structure's appeal as a tourist destination.







Fig. 13 Adaptive reuse of the secondary building

The secondary building is proposed to be lounges and library. It will provide more spaces for the club members to practices more activities (Fig.13).

A design is needed to achieve the layering of significance and retain the external appearance and parameters of the original building but allowed for some internal reorganization. In the meantime, the original interior wall and roof needed to stay intact. Researchers used the following checklist as shown in Table 1 to ensure that the proposed adaptive reuse principles have been respected to achieve a successful adaptation.

Table 1 A checklist to ensure that the proposed
adaptive reuse principles

Adaptation Principles	Assessment
1-Analyzing and Understand the significance of the place	Using the assessment of heritage value and fabric analysis to guide the proposal.
2-New use to be appropriate to heritage significance	New use as art gallery and small library retain some commercial functions and enhance public access/ interpretation
3-Ensuring reversibility of alterations and avoiding the use of process or materials whose future removal would damage the original historic fabric	The new proposal will be simply undertaken, minimizing its impact on the structured fabric. Future works may be expanding the gallery facilities in a linked building.
4-Promoting minimum intervention based on respect for the existing building	historical structure need carefully conserve; the new use demanded only a light touch
5-Respecting maximum retention of fabric and the least possible loss of the original fabric	Wherever possible, existing structure and elements were left in place, with new elements and services fitted around them
6-Conserve relationship between significant setting and views	The streetscape quality of the structure is important and must be conserved
7-Provide for the long-term management and viability	The project puts the structure to new sustainable uses. The success of the new function will secure ongoing care
8-Reveal and interpret the heritage significance	The significance of the building and its past use is celebrated in the architectural design solution with light touch of the conservation works

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#### Conclusions

As societies change, new requirements arise and new buildings have created that suit these requirements. The buildings that lose their original function preserve their structural characteristics and therefore they are appropriate for re-use. With the spatial program that is designed by new needs by utilizing the basically old structures by means of giving them new capacities, the current structure takes shape depending on its spatial and structural qualities. A historical place ought to have a perfect function, adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place, and adaptation ought to include least changes to significant fabric accomplished only after considering alternatives.

The guiding principle in the development of adaptive reuse projects should undoubtedly be that local problems need local solutions.

Interpretation is a key element of the adaptive reuse process, as it helps people to understand how the new life of the building has added a new chapter to its story, giving a feeling of continuity from the past to the present. Interpretation can both retain key links with a place's past by conserving an important building and also provide a resource for current and future generations to recognize the historical perspective of the place where they live or work.

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