



THE EFFECT OF INFILL ARCHITECTURE ON THE HERITAGE CONTEXT OF HELIOPOLIS

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ABSTRACT

This research discusses the problem of designing new buildings located within the context of heritage sites.

Considering that, the privacy of these areas requires adherence to certain controls and standards to ensure the preservation of the homogeneous heritage character of the context and the protection of the unique characteristics of the place from any visual distortions that may detract from its value and advantages.

As well as a review of the most important local and international charters and agreements related to world historical sites to identify the common rules and agreed principles.

The research relied on the inductive approach to find out different points of view held by group of experts, critic, architectural designers and academic specialists in this field- to reach a set of appropriate design strategies for designing new buildings in that heritage area with comparative analysis of a selected group of in-between buildings recently constructed in Heliopolis.

KEYWORDS: Heritage Sites, Context, Infill architecture, Heliopolis.

تأثير المباني المضافة على السياق التراثي لمصر الجديدة

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المخلص

يناقش هذا البحث مشكلة تصميم المباني الجديدة الواقعة ضمن سياق المواقع التراثية باعتبار أن خصوصية هذه المناطق تتطلب الالتزام بضوابط ومعايير معينة لضمان الحفاظ على الطابع التراثي المتجانس للسياق وحماية الخصائص الفريدة للمكان من أي تشوهات بصرية قد تنتقص من قيمته ومزاياه.

وكذلك مراجعة أهم المواثيق والاتفاقيات المحلية والدولية المتعلقة بالمواقع التاريخية العالمية من أجل التعرف على القواعد المشتركة والمبادئ المتفق عليها.

اعتمد البحث على المنهج الاستقرائي لمعرفة وجهات النظر المختلفة التي يتبناها نخبة من الخبراء والنقاد والمصممين المعماريين والأكاديميين المتخصصين في هذا المجال - وذلك للوصول إلى مجموعة من الاستراتيجيات التصميمية المناسبة لتصميم المباني الجديدة في تلك المنطقة التراثية مع تحليل مقارنة لمجموعة مختارة من المباني البيئية التي تم تشييدها مؤخرًا في مصر الجديدة.

الكلمات المفتاحية: المناطق التراثية، السياق، المباني المضافة، مصر الجديدة

1. INTRODUCTION

Countries around the world are interested in preserving their heritage sites, which represent an integral part of the cultural and historical memory of society. The preserving of the mental image of those sites among people constitutes a great burden on architects and planners to maintain that image within the heritage context when adding or replacing any new buildings. Existing buildings. As it is known, the city as a living organism that starts small and grows gradually until it reaches old age. Thus, the urban context of the city develops with it accordingly until the buildings reach their end and are demolished then new buildings are constructed instead.

Otherwise, Architecture is always evolving due to economic, social and cultural conditions, in addition to the development of building materials and industry. When designing buildings located in heritage areas, architects always face the problem of preserving the context, and here the question is whether we design buildings as a copy from the surrounded context, are we satisfied with simply picking up some existing architectural vocabulary, or do we design contemporary buildings that rebel against the surrounding context.

2. RESEARCH PROBLEM

Recently, a group of new buildings was constructed in Heliopolis, in place of old buildings whose life span has ended, or in vacant plots of land. These buildings are located within the context of the historical buildings that forms a major part of the visual image of that heritage site. So, the research question is: whether the new buildings in the urban context of Heliopolis integrated with its distinct urban character or they distort it visually?

3. RESEARCH GOALS

- Reviewing the concept and methodologies of architectural infill design through context.
- Studying the mutual effect between the new constructed buildings and the context of Heliopolis heritage area.

4. METHODOLOGY

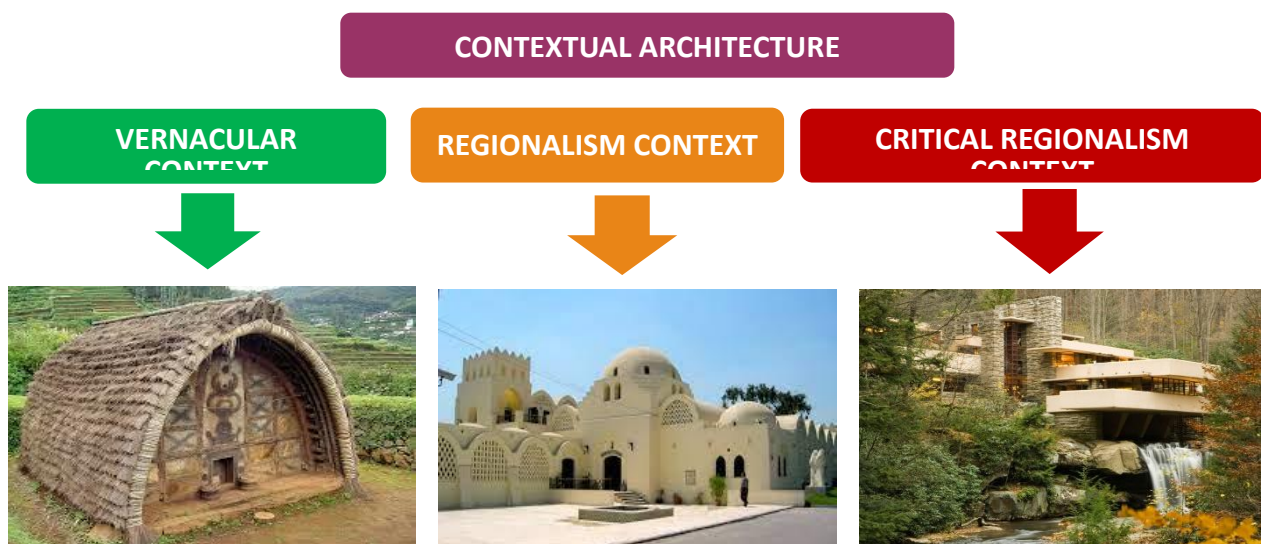
- The theoretical part deals with the concept of Infill design in the context of the heritage areas and the various approaches to achieving this, with a historical study of Heliopolis region and the nature of its distinctive architectural and urban context.
- The applied part deals with an analytical study of a group of newly constructed buildings in Heliopolis, with a study of the conformity of those buildings to international and local standards, as well as methodologies for infill design into heritage context.

5. THE CONTEXTUALISM IN HERITAGE SITES

Each location within the city characterized by a set of determinants and distinctive characteristics that give it a character, personality and create a context that distinguishes it from other sites. Through these characteristics and with the development of the city through the different eras and the accompanying political, economic and historical events, the context for each region is formed in particular, which are integrated with each other and form the context for the city in general. There is a mutual relationship between new constructed building and its surrounding context, both of which influence the other. Architects bear a great burden when designing buildings located within the context of heritage areas, and they face the challenge between tradition and

modernity. Contextual Architecture or Contextualism is the Architecture that responds to the physical and meta-physical characteristics of the site, it is a design philosophy rather than an architectural design style [1]. The urban pattern of the different areas within the city is an integral part of its context. For example, some historical areas are characterized by narrow streets, which is reflected in the shape of the buildings overlooking those streets. The buildings within context can be likened to the single family, which is similar to each other in a set of formal and moral traits and legacies that distinguish it from other families, and each member into the family has his own personal characteristics that distinguish him from the other family members. Design through context is an attempt to link the past with the present, so that each added building is an extension of the existing old buildings that carry the same values and features in a spirit that expresses the features of the current era, as if the new building is a newborn for the family. Contextualism in architecture is a design approach that take into consideration and respond to the place circumstances and conditions. International regulation for urban heritage started in 1964 (Venice Charter) and since then the scope, methods and means for regulation of new architectural objects in conservation areas have been deepened and revised by the UNESCO [1]. Contextualism in architecture refers to a building's visual relationship to its surroundings. Architecture is a single unit woven into the fabric of the city. When these interconnected units are added together, they engage in a dialogue about a place's culture, time, and history. Contextualism creates an environment where memories of a place are collected together. The context of a region is the distinctive architectural character, which is a set of characteristics prevailing in the formation of building facades, such as heights, materials, colors, openings, proportions, and rhythm. Contextual architecture is usually divided into three categories: vernacular architecture, regional architecture, and critical regionalism [2]. **Fig. 1** shows the different types of the contextual architecture.

Fig. 1: Contextual Architecture, By Author, Source: <https://www.google.com/>



5.1. Vernacular Context

It is an architecture without architects, where the residents of the region design and build themselves according to cultural, social and economic legacies and depend directly on the available local materials. Vernacular architecture is a local construction that using traditional materials and resources from the area in which the building is located. As a result, this architecture is closely

related to its surroundings and is aware of its specific geographic features and cultural aspects, which have a strong influence on it. As a result, they are unique to different parts of the world, and have even become a means of affirming one's identity. Vernacular architecture has been addressed and revisited in many contemporary architectural practices and playing an important role in today's society. As these Vernacular buildings provide great bioclimatic characteristics and prove to be real examples of architectural sustainability. For this reason, ancient architectural approaches examined and replicated in projects that aim, for example, at maximizing energy efficiency with passive noise and thermal control, while reducing CO₂ emissions to the environment [2]. **Fig. 2** showing two examples of vernacular architecture.



Fig. 2: Vernacular context, left: Siwa Oasis, Egypt - right: Reed Mosque, Iraq
Source: <https://www.re-thinkingthefuture.com/>

5.2. Regionalism Context

A design philosophy that aims to merge traditional local architecture with its distinctive features with international architecture with its components of concrete and glass. It can be said that it is local architecture in a modern context that adheres to the traditional constants while keeping pace with the spirit of the era. This context is appropriate for developing countries and poor local regions, where the preservation of the local context with the gradual transformation of the global in line with the economic and social conditions. One of the most important examples of the local context is New Gournia, which was built in the late 1940s and early 1950s by the Egyptian architect Hassan Fathy to house the people living in the old uninhabited Gournia.

New Gournia was added to the 2010 World Monuments List of Most Endangered Sites to draw attention to the site's importance for modern town planning and local architecture due to the loss of much of the village original form since its establishment. **Fig.3** shows new gournia village.



Fig. 3: New Gournia Village, source: <https://www.archdaily.com/>

5.3. Critical Regionalism Context

Critical regional architecture not only depends on regional vocabulary and local traditions but also attempts to fuse the global and the local by integrating local construction methods and building materials with their global equivalents. Through this methodology, many architects

became global by local iconic projects they designed. Architectural theorists Alexander Tzonis and Liane Lefaivre in their 1981 essay “the grid and the pathway” first used the term ‘critical regionalism’. [3] In 1983, the architectural critic Kenneth Frampton wrote an academic article named “toward a critical regionalism: six points for an architecture of resistance” in which he dealt with the dialectic of the conflict between modern architecture and nostalgia for the past, with its legacy. The article analyzed and studied the relationship between the built and the natural environment and the transition of architecture from the local and regional to the global in the postmodern style [5]. Among the pioneers of the critical regionalism school are Tadao Ando, Geoffrey Bawa, Alvaro Siza, Charles Correa, Alvaro Aalto and Michael Graves. **Figs. 4&5** showing two examples of critical regionalism architecture.



Fig. 4: Steigemberger Golf Hotel, El Gouna, Egypt.

by Michael Graves., source: <https://www.michaelgraves.com/>



Fig. 5: Modern Art Museum of Fort Worth, USA.

by Tadao Ando, source: <https://www.archdaily.com/>

6. INFILL DESIGN INTO THE CONTEXT OF HERITAGE SITE.

Vacant plots of land located within the heritage sites are among the most sensitive places when building in them, and require adherence to special design controls and standards. Negligence in monitoring and regulating construction activities in those places may lead to architectural designs that are inconsistent with the surrounding context, which causes distortion of the character of historical areas, interrupts their homogeneity, distorts their distinctive features, and wastes their value. On the other hand, the exaggerated strictness in setting requirements that define the styles and vocabulary allowed to be used may restrict architectural creativity and trap designers in imitation and repetition of historical buildings, which leads to monotony, stereotypes, and mixing the authentic and the precious with the copied and imitated. This requires studying the issue from its various aspects in order to determine an appropriate methodology for dealing with these contexts. The recommendations of the UNESCO Conference (1976) stressed that the immediate danger of destruction of Heritage areas is relative to another indirect danger, which is the distortion of its architectural context with the new buildings and neighborhoods being built around it.

Therefore, architects and planners must take care to preserve the character of heritage areas while integrating them into contemporary context in a compatible manner. With the steady increase in the number of population around the world and the economic and social changes, the need to construct new buildings in vacant plots of land or instead of collapsed buildings within the heritage areas to replace the existing historical buildings appeared which is known as: “Infill Design”. The introduction of contemporary architecture into ancient groups of buildings is feasible as far as the town-planning scheme of which it is a part involves acceptance of the existing context [1].

Architectural character is meant due to external formation characteristics prevailing in the formation of building facades, such as height, scale, proportions, formation, details, building materials, texture, colors, porosity, proportions of openings, and vertical and horizontal rhythms.

The ways that different architects engage with infill design into heritage sites is vary. Some of them, like Raymond Erith and Norm Tyler, see that any changes to the heritage area should be respectful of the location and the spirit that define it. Otherwise, some architects believe that regardless of the spirit of the heritage sites, the best way to development these sites that the new constructed buildings must express there era. Frank Gerry and Daniel Lipskind completely separate the infill design from its historical context. [6] Many critics and theorists blamed the modern architecture because it called for a departure from the old classic patterns and avoidance of ornamentation with the aim of reaching a simplified global architecture commensurate with the spirit of the era.

6.1. The Visual Compatibility between New and Old Buildings in Heritage Sites

Compatibility between new and old buildings in heritage sites is achieved by taking into account the heritage context of the area and not disturbing its distinctive features, which is mean that contemporary must integrates with the Originality and does not compete with it. There are many theories and methodologies for designing new buildings into the context of historical areas, and they can be summarized in the following four Strategies [7]:

I. Literal Replication.

It aims to achieve homogeneity with the existing historical buildings by direct imitation of its vocabulary. Many Critics refused this methodology because the new buildings can cause visual confusion on the old ones and induce a state of maze between the old and the new and the design of new buildings in the same shape and style of the historical context causes a state of tedious repetition and confusion in distinguishing between modern and historical buildings.

II. Invention within a Style.

It does not reproduce the historical style, but rather rephrases it in an innovative manner, presents variations on it and adds new elements to it, taking into account the context of the place, but achieving a degree of differentiation for the new building.

III. Abstract Reference.

It aims to take the historical surroundings context as a reference for the new design, but with the abstraction and simplification of its vocabulary. By reducing or removing some details and motifs and contenting itself with respecting general features such as scale, elevations, vertical and horizontal divisions, rhythms and proportions, in a modern image that derives its roots from a historical background.

IV. Intentional Opposition.

This methodology aims to achieve contrast between the new building and its historical surroundings, but this can cause distortion of the visual image of the urban context.

Intentional Opposition believes that architecture should express the spirit of the era and be in line with modern developments in terms of materials and technologies. **Fig. 6** shows examples for the methodologies of infill design in heritage sites.

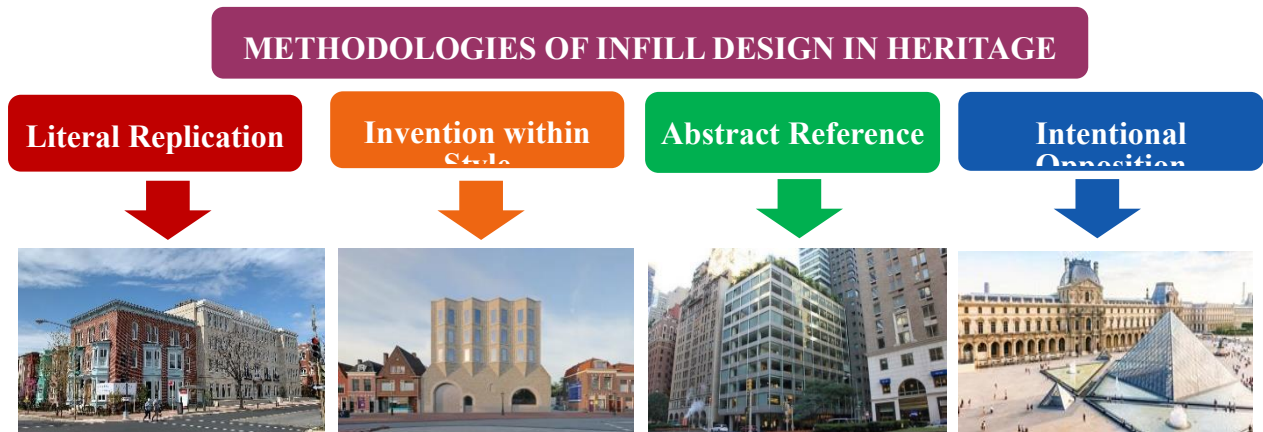


Fig. 6. Visual patibility between Buildings in Heritage Sites. Bv Author. Source: <https://www.google.com/Com>

6.2. Elements of Compatibility between New and Old Buildings

Compatibility between old and new buildings in heritage context refers to the design criteria and vocabularies that achieving a visual and aesthetic connection between the old and the new. When considering the infill design within the heritage areas, thinking about achieving compatibility is often considered. Compatibility does not mean the perfect match between the old and the new, as this contradicts the comprehensive development in all aspects of life, including architectural engineering, of course, which is considered a reflection of each time. However, compatibility means preserving the distinctive context of heritage areas while developing them over the ages according to economic, political and social conditions. So the Integration or difference between modern and old buildings into heritage context can be achieved through the following [8]:

I. The area of the land plot

In most cases, the areas of the plots of land are equal within the same area, which makes the buildings equal in dimensions within the same context. New buildings may be constructed on two plots of land that are joined in one plot, which creates a state of lack of compatibility between the existing buildings and the new building established between them.

II. The height of new building

The height of the new buildings must be consistent with the existing height of the context in order to avoid distorting the skyline. Heritage area requirements and building laws specify specific building heights that may not be exceeded.

III. Facade materials

To achieve compatibility between new and old buildings within the heritage context, the materials used in construction must be standardized as much as possible, while not neglecting new materials that contribute to the development of the building's performance.

IV. Façade colors

The prevailing color scheme of the buildings within the historical context must be respected so that the contrast between them and the colors of the new buildings does not distort the visual image of the area.

V. Relationship between the Solid and Void

It is one of the most important elements that form the architectural context of the heritage areas, which results in the distinctive shape of door and window openings, terraces and rhythm that configured by that elements. Therefore it must be taken into consideration in new buildings.

7. THE HISTORICAL VALUE OF HELIOPOLIS

Heliopolis is the reception hall for those coming to Cairo from all over the world due to the presence of Cairo International Airport. It is the eastern front of Cairo and one of its most prestigious neighborhoods. This quiet, aristocratic neighborhood grew out of the desert sands.

In the early twentieth century, specifically in 1905, the Belgium Empire Baron Edouard Empain (1852-1929) had the idea of creating a new urban community in the desert far from Cairo, similar to the garden cities that arose in Europe under the slogan "a healthy and clean society".

Heliopolis was founded far away because of downtown Cairo's overcrowding, which was accompanied by an increase in land and rent prices. Heliopolis is renowned for its unique blend of Islamic and European styles, which is reflected in its architecture. Heliopolis architecture has its special features and details. These mainly include large terraces and balconies that are supported by columns and pillars. Besides galleries with colonnades. Heliopolis architectural style developed in the early 20th-century. At that time, the Belgian Cairo Electric Railways and Heliopolis Oases Company created this style to distinguish Heliopolis buildings.

Heliopolis style characteristics are mainly about revival of the of Moorish, traditional Arabic, Persian, and European Neoclassical architecture styles. Heliopolis architecture has unique characteristics and details. These primarily consist of large terraces and balconies supported by columns and pillars. The main characteristics of Heliopolis style are the revival of Moorish, traditional Arabic, Persian, and European Neoclassical architecture styles, which formed a new style called neo Islamic architecture. **Fig. 7** shows Heliopolis location in relation to the Greater Cairo.

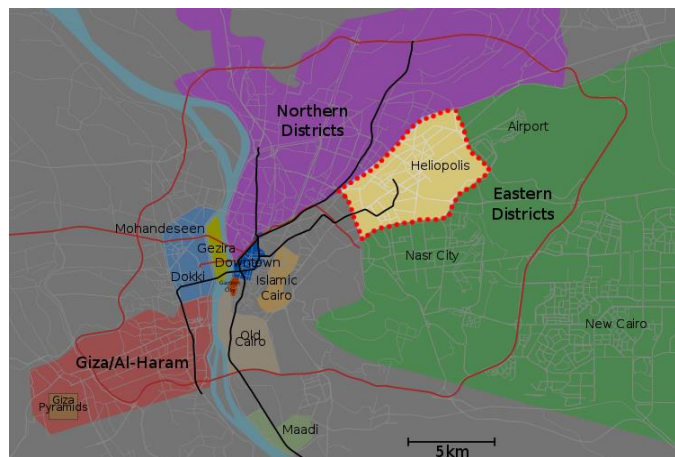


Fig. 7. The location of Heliopolis in relation to the Greater Cairo region, By Author. Source:

7.1. Limits and foundations for preserving Heliopolis heritage value

Infill architecture in the heritage context of Heliopolis requires a thoughtful and sensitive approach that balances respect for the district's architectural heritage with the need to create new, sustainable buildings that fit within the surrounding context.

The national organization for urban harmony (NOUH) is a governmental institution established to providing a public spaces permit and aims to applying the values of beauty to the exterior image of buildings, urban and monumental spaces, the bases of visual texture of cities and villages and all the civilized areas of the country including the new urban societies.

The National Organization for Urban Harmony has classified Heliopolis into three zones according to their historical importance and architectural context with the aim of preserving its

architectural heritage, thus ensuring that Heliopolis continues to be a harmonious blend of historical importance and contemporary urban development, as shown in **Fig. 8**

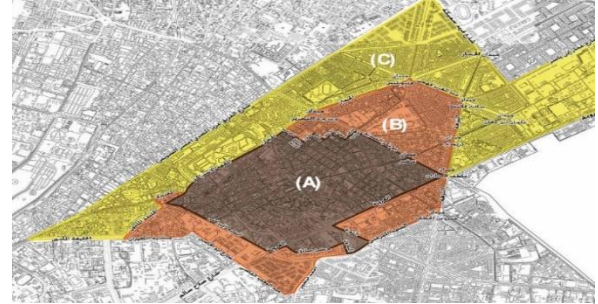


Fig. 8 Heliopolis Heritage Zones.
Source: <http://urbanharmony.org/>

• **Zone (A):**

It includes el Korba heritage area, which was built at the beginning of the establishment of Heliopolis. Its buildings are characterized by a mixture of European and Islamic designs reflecting the cultural exchange that took place in the early twentieth century. A complex facades, ornate balconies and distinctively shaped arches that create shaded pedestrian paths. The Korba area is characterized by the Palace of Baron Empain and the Heliopolis Palace Hotel, which has become the seat of government for Egypt. **Fig. 9** shows the context of zone (A)



Fig. 9: The Architectural Context of Zone (A)
Source: <http://www.google.com/>

• **Zone (B)**

It includes the areas that represent an extension of el Korba zone, which was established starting from the thirties of the twentieth century, and its buildings are characterized by the same distinctive context for the Korba zone, with some simplification, according to what characterized the architecture of that period. The infill architecture design of this zone is a Literal Replication which achieving homogeneity with historical existing buildings in el korba by direct imitation of its vocabulary.

Fig. 10 shows the context of zone (B)



Fig. 10: The Architectural Context of Zone (B)
Source: <https://lines-hub.com/>

• **Zone (C)**

This area represents the eastern extension of Heliopolis, it appeared at the beginning of the fifties of the twentieth century, and its architectural context is characterized by the direction of modernity that spread in the world during that period.

The Cairo International Airport building is the nucleus that led to the domination of modernity architecture in this part of Heliopolis.

Fig. 11 shows the context of zone (C).



Fig. 11: The Architectural Context of Zone (C)
Source: <https://lines-hub.com/>

Throughout the 20th century, Heliopolis experienced ongoing growth, expanding eastward from the Korba district to the border of Cairo International Airport as shown in **Fig. 12**

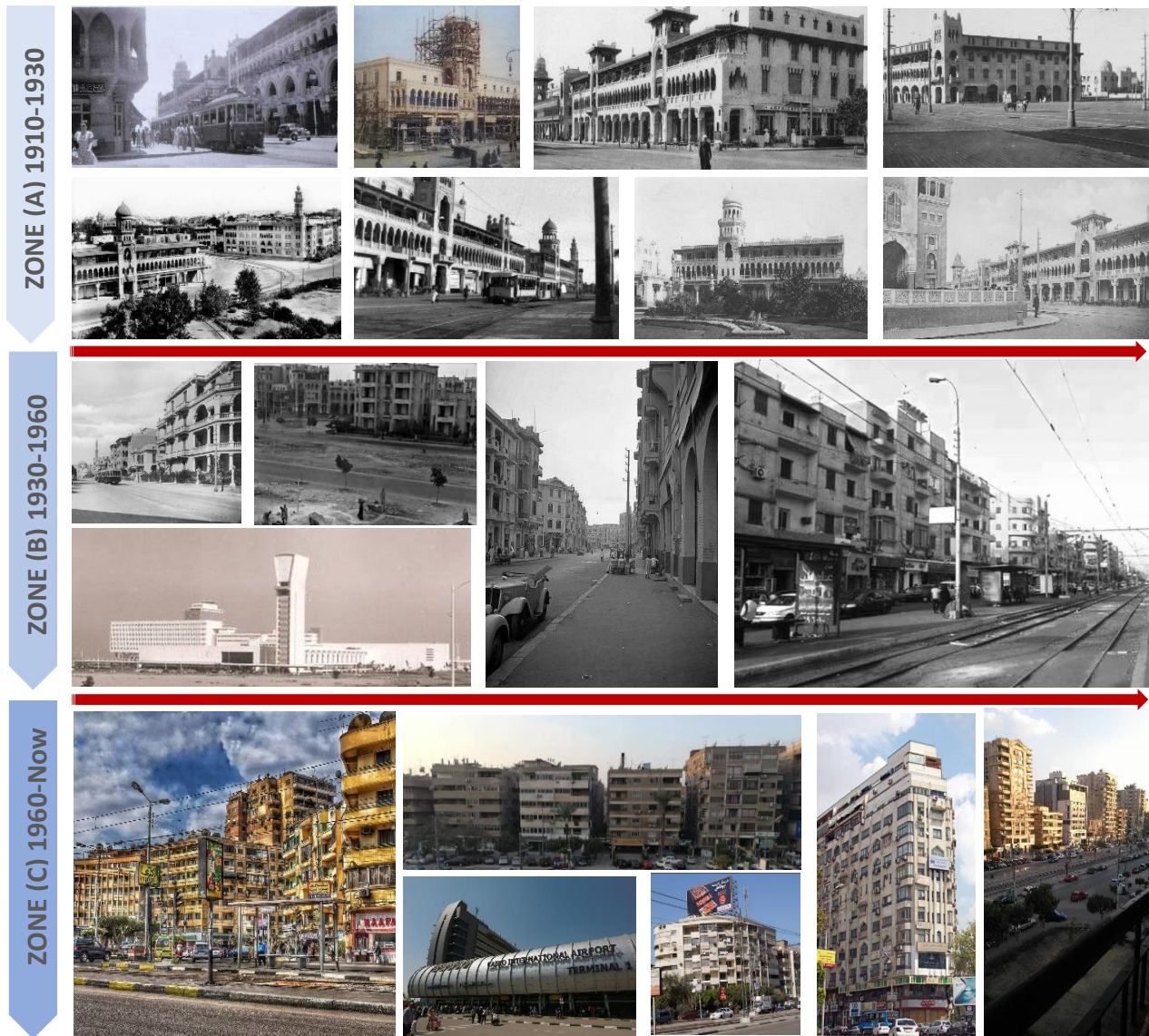


Fig. 12. timeline for the progress in the Context of Heliopolis Zones, By Author, Source: [http:// www.google.com/](http://www.google.com/)

In the year 2022, the Organization issued the final version of the requirements for the foundations for preserving the Heliopolis region of distinguished value, which outlined the following point:^[10]

1. The area of the openings may not be more than half of the façade area.
2. The window openings in the main facades are in the vertical direction.
3. The colors of the glass and frames are unified throughout the facade of the building, it is preferable to use transparent glass or brown smoked glass and it is not allowed to use reflective or colored glass.
4. It is not allowed to use the openings in the aboveground and mezzanine floors in the commercial display.

These recommendations dealt with the general context of Heliopolis, but did not specify special requirements for each sub zone according to its own context resulting from the presence of

a distinct historical building, such as the area surrounding the Baron's Palace and the area surrounding the city of Granada, for example.

7.2. The Architectural Context Of El Korba Area (Zone A)

El Korba district is one of the oldest neighborhoods in Heliopolis, as it was established in 1906 when Baron Empain established Heliopolis. It is considered one of the unique areas in terms of the architectural and urban context, as it contains a variety of architectural styles. It contains a group of unique buildings that are part of Heliopolis' historical, cultural and urban heritage, which characterized by a fusion of Islamic and European architectural elements that create a unique and eclectic aesthetic. El Korba is an architectural gem located in the heart of Heliopolis and the most famous areas of the suburb. The area was designed so that the height of the buildings should not exceed three floors. Recently, the area witnessed a change in the architectural context and a distortion of its distinctive visual image in terms of the variation in heights and uses, which may constitute the risk of losing the identity and distinctive character of that heritage area.

Today, El Korba is a popular destination for tourists who are interested in the history and architecture of Cairo. The neighborhood's streets are lined with cafes, restaurants, and shops, which offer visitors a chance to experience the vibrant culture of Egypt. El Korba is a unique and beautiful example of the fusion of Islamic and European architectural styles. The neighborhood's buildings are a testament to the vision of Baron Empain, who sought to create a modern and cosmopolitan town in the heart of Egypt. Many of the buildings in El Korba were designed by the most famous engineers of that time: "Belgian architect Ernest Jaspar and French architect Alexandre Marcel" who was appointed by Baron Empain to oversee the construction of the new town. Jaspar's designs were heavily influenced by the Art Deco and Art Nouveau styles that were popular in Europe at the time, as well as Islamic motifs such as geometric patterns and arches. The most notable buildings in El Korba are El Baron Empain Palace, Heliopolis Palace Hotel and Basilique Church. Each of these buildings is a strong focus of influence on the surrounding architectural context. **Fig. 13** shows the most important iconic buildings affecting the architectural context of EL Korba.

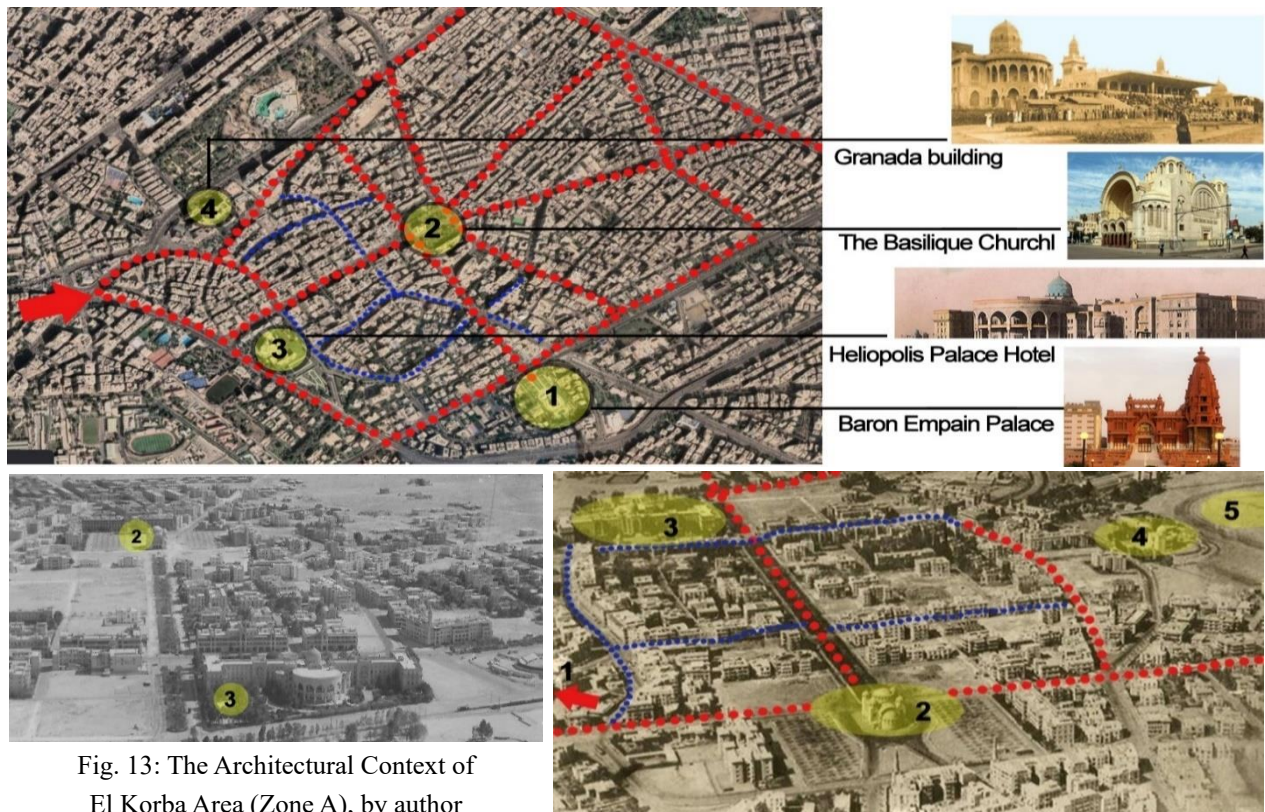


Fig. 13: The Architectural Context of El Korba Area (Zone A), by author

7.2.1. Baron Empain Palace

Among the most important landmarks and iconic building in El Korba and the heart of Heliopolis of all is the Baron Empain Palace, which was designed by Alexandre Marcel (1860 - 1928) in the style of Indo-European architecture. IT IS THE FIRST BUILDING IN THE HELIOPOLIS DISTRICT, BUILT BY THE EARLY 20TH CENTURY IN 1907. The structural Skeleton is reinforced concrete, which at that time was considered one of the latest construction methods. The palace is a blend of different architectural styles, including Indian, Islamic, European and Art Nouveau style. The palace featuring intricate carvings, ornate detailing, and its most distinctive feature is its onion-shaped dome, which is reminiscent of traditional Indian architecture as shown in **Figs 14, 15 & 16**.



Fig. 14: Baron Palace, source: <http://www.egy.com/>



Fig. 16. Baron Palace under construction 1905, source: <https://lines-hub.com/heliopolis-the-land-of-history/>

Despite the unique character of the palace and the rich vocabulary found in the facades, but the context surrounding it is very poor compared to it. Where in recent years, the surrounding area has undergone a significant transformation which reflected on the architectural context around Baron Empain Palace caused by construction of several high-rise buildings nearby. These buildings, which include luxury apartment complexes, office towers and hotel which designed in a modern style and offer stunning views of the palace and the surrounding area. While some have criticized these buildings for being out of place in the historic neighborhood, others see them as a symbol of the area's growth and development. In addition to the new high-rise buildings, there have also been several major renovation and restoration projects in the area surrounding the palace. Many of the historic villas and palaces in el korba have been restored to their former glory, with their facades repainted and their gardens and courtyards landscaped. These renovations have helped to preserve the character and charm of the neighborhood. Overall, the new architectural context around Baron Empain Palace is an exciting and dynamic one. While the area has changed significantly in recent years, with the construction of new buildings and the renovation of historic

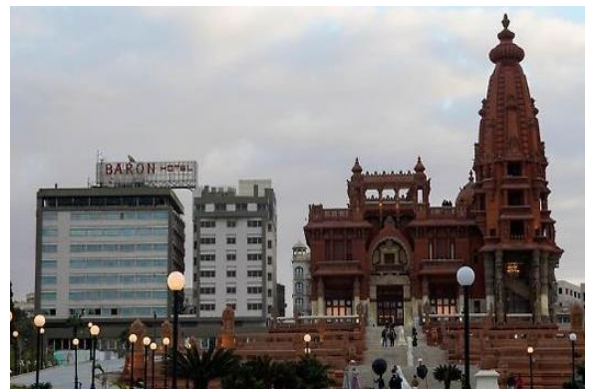


Fig. 15. The buildings surrounding Baron Palace, Source: <http://google.com/>

structures, it has managed to retain its unique character and charm. **Fig. 17** shows the infill design around El Baron Palace.



Fig. 17. Infill Design Around El Baron Palace, By Author.

7.2.2. The Basilique Church

The Church is a prominent landmark and a popular tourist attraction in the heart of Heliopolis, it is Designed by Alexandre Marcel in the Art Nouveau style and influenced by Gothic architecture, its construction was completed in 1913. Luxurious entrance distinguishes it and the huge spherical dome based on polished granite columns, as well as its beautiful glass windows, the artwork that decorates its ceiling and contains the tomb of Baron Empain, the founder of Heliopolis. **Figs. 18 & 19** showing the church and its surroundin infill architecture.



Fig. 18: The Basilique Church, by Author, source: <http://www.egy.com/>

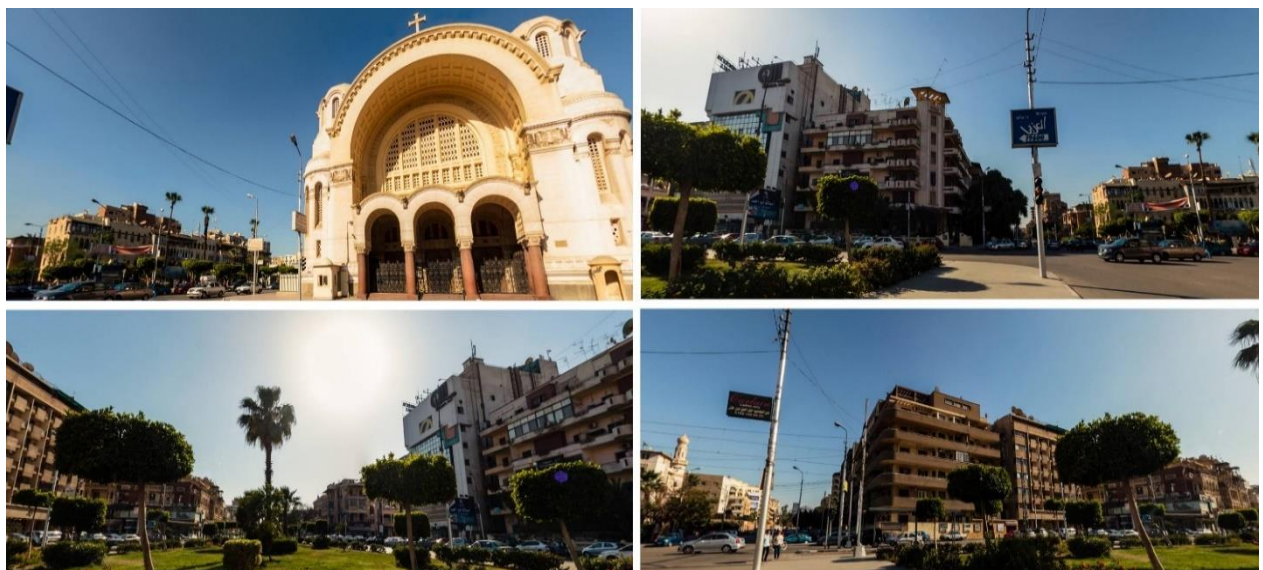


Fig. 19. Infill design in the zone of the Basilique Church, by author.

7.2.3. Heliopolis Palace Hotel

Ernest Jasper and Alexandre Ramcel designed the Heliopolis Hotel, which had an area of about 6,500 square meters and was considered one of the largest hotels in Egypt at that time. The hotel consists of 455 rooms and characterized by its unique architectural style, which was influenced by the architecture of France at that time in the nineteenth century. In addition, turned into the seat of the presidency of Egypt in the eighties of the last century. This building is the western boundary of the Korba area. **Figs. 20** shows Heliopolis Palace Hotel, **Figs. 21** shows its surrounding context.

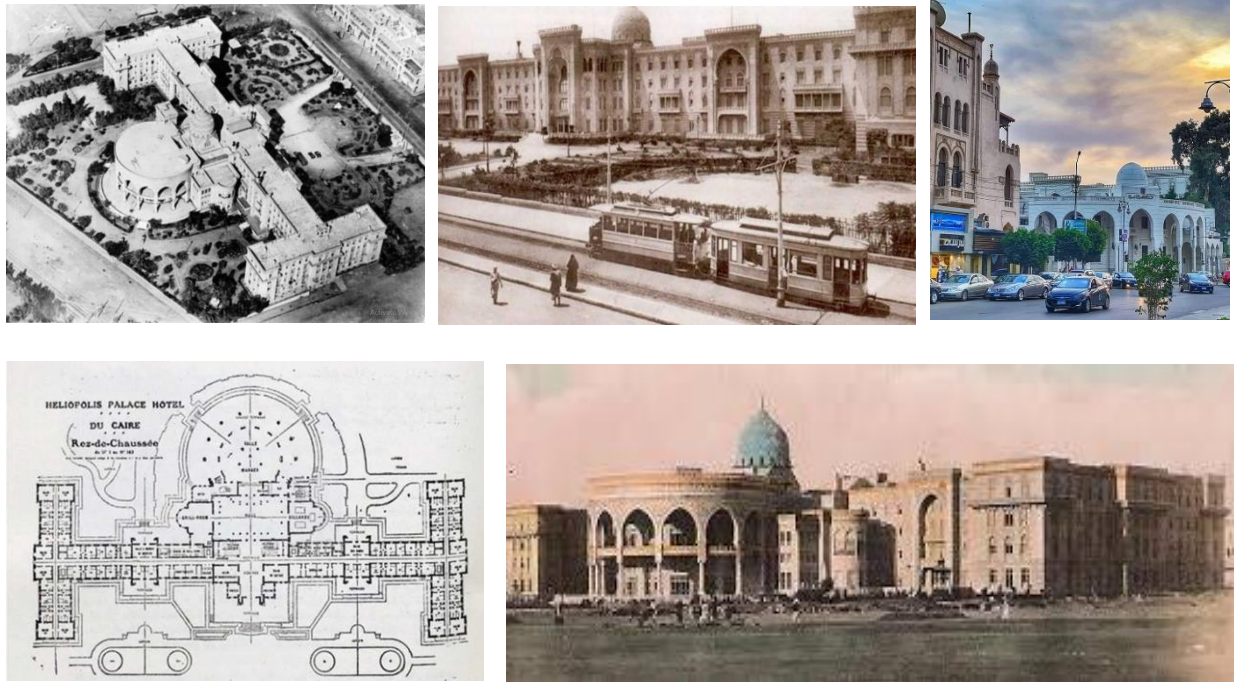


Fig. 20. Heliopolis Palace Hotel, source: <http://www.egy.com/>



Fig. 21. Architectural context in the zone of the Heliopolis Palace Hotel, by author, <http://www.egy.com/>

7.2.4. Granada Building (Heliopolis hippodrome)

The city of Granada was founded by Baron Embarn in 1905 on an area of 4 acres, its buildings were built in the Andalusian style, with stands to watch horse races, and there were competitions in which different nationalities such as Armenians, Circassians, Jews and English participated, in addition to ambassadors, artists and guests from Arab countries.

The city was neglected over the years and the condition of the buildings deteriorated, recently it was restored and returned to its original condition as shown in Fig. 22

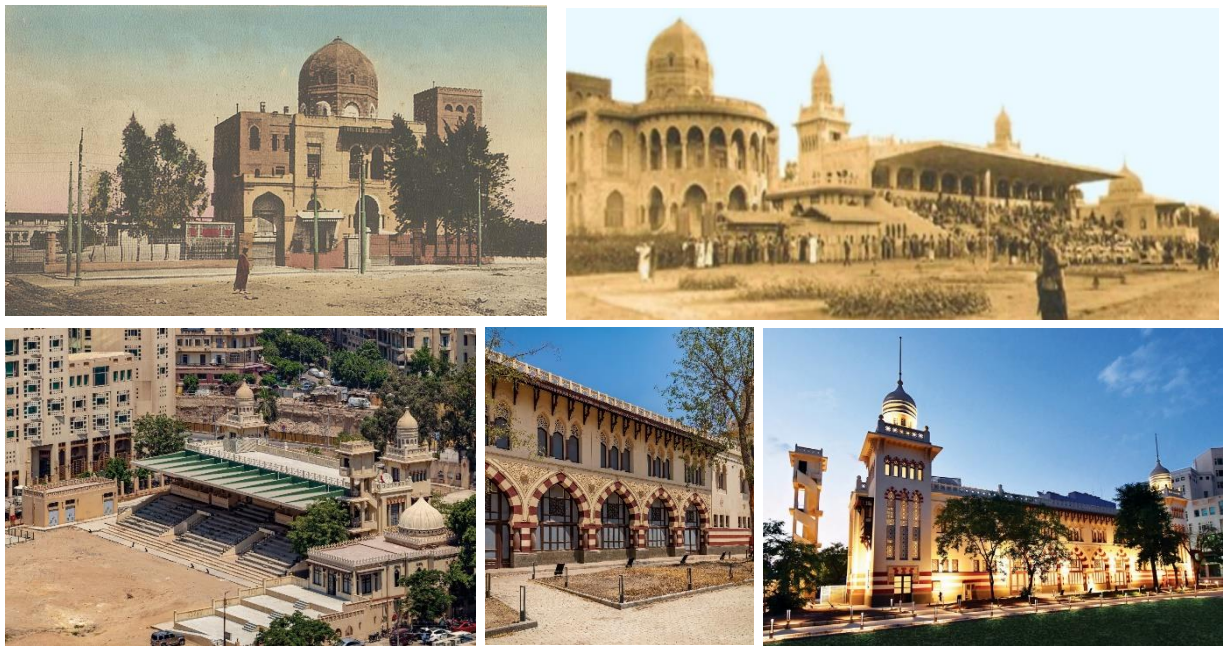


Fig. 22. Granada Building, source: <http://www.egy.com/>

8. Examples of infill architecture in el korba area (zone a)

A group of newly constructed buildings was selected within and around the Korba area, which varied between residential, commercial and administrative. The diversity of these buildings was taken into consideration in terms of their proximity to one of the four iconic buildings: the Baron's Palace, the Basilica Church, the Heliopolis Palace Hotel and the city of Granada. Fig.23 shows the locations of the selected examples and Table 1. Shows a comparative analitic study of them.

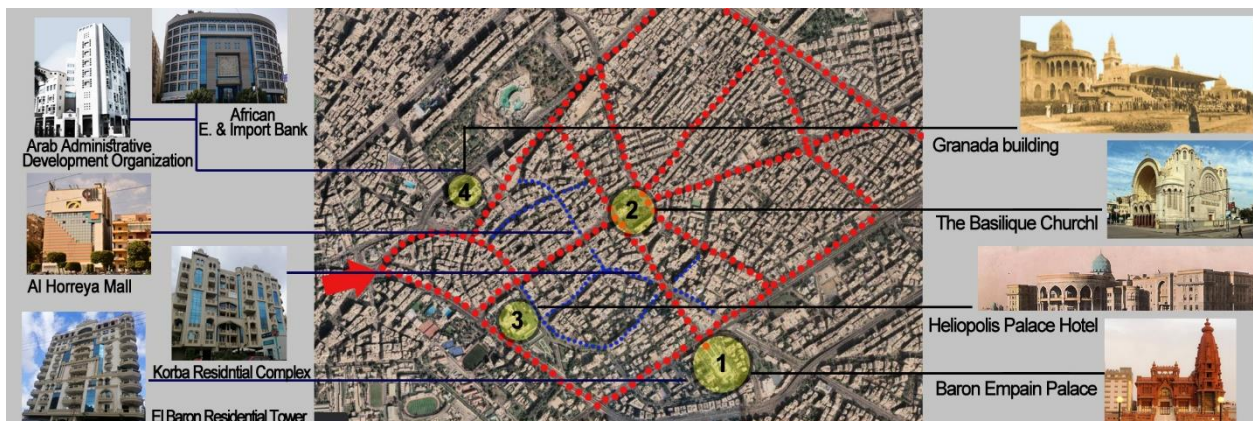


Fig. 23. the location of the selected examples, by author.

TABLE 1. The Case Studies For Infill Design In El Korba Herforge Zone

CONTEXT ZONE				TYPE			COMPATIBILITY														
Baron Empain Palace	The Basilique Church	Heliopolis Palace Hotel	Granada City	Residential	Commercial	Admin.	Literal Replication	Invention within Style	Abstract Reference	Intentional Opposition											
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%;"></td> <td style="width:33%;"></td> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%;"></td> <td style="width:33%;"></td> <td style="width:33%;"></td> </tr> </table>												●	●	●				●			
	●	●	●				●														
<p>1. Korba Residntial Complex 2016</p> <p>The building is located at the entrance to the Korba area, on the side of the Baron Palace. The location is distinguished by being on a main corner inside the area, which makes the building a distinctive landmark in the middle of the historical area. The number of its floors is 8 floors, it is 4 floors higher than the surrounding buildings.</p>																					
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%;"></td> <td style="width:33%;"></td> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">●</td> <td style="width:33%;"></td> <td style="width:33%;"></td> <td style="width:33%;"></td> </tr> </table>												●		●				●			
	●		●				●														
<p>2. El Baron Residential Tower Dr. reda abdallah - 2018</p> <p>The building is located in the back street of the Baron Palace. It is characterized by a facade that contains classic vocabulary and archs derived from the elements of the palace facades. The building is distinguished by its uniqueness and distinction from the context surrounding the historic palace. The building hight is Same as the Surrounding Context</p>																					

<p>3. Al-Horreya Mall Dr. farouk Elgohary - 1998</p> 	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td>●</td> <td>●</td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>●</td> </tr> </table> <p>It is one of the first buildings that deviated from the heritage architectural context of el Karba area, by following the style of contrast in the infill design architectural. it is a commercial building built in place of the Horreya Cinema, which was a landmark in Heliopolis. the designer said that "the building evokes the 'abstract forms of Islamic mannerism in pure corbelled forms".</p>  												●	●			●						●
●	●			●						●													
<p>4. Arab Administrative Development Organization Dr. Abdelhalim Ibrahim</p> 	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>●</td> </tr> </table> <p>One of the most distinguished buildings in Heliopolis. overlooking the heritage city of Granada directly. The building combines tradition and modernity, as it combines heritage vocabulary in an abstract way, and the white color in the facades creates a state of harmony between the building and the surrounding architectural context.</p>   																●						●
				●						●													
<p>5. African Export-Import Bank. ECG. 2015</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>●</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>●</td> </tr> </table> <p>The building comprised ground and 10 typical floors. According to the project consultant's description The building was designed to reflect the heritage, culture and spirit of the African nations Which means that the design avoided compatibility with the local historical context and concerned with the African heritage in general.</p>																●						●
				●						●													

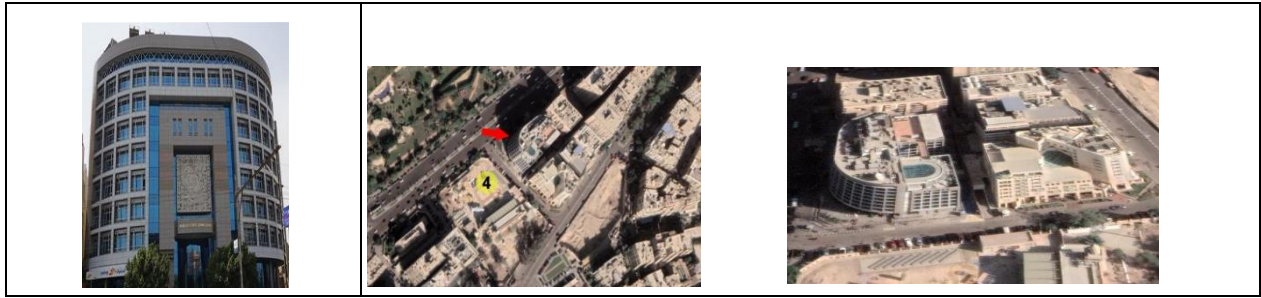







Table 2. Shows Elements of Compatibility and difference between Case Studies and surrounding context through both of Infill Design Methodologies and the Requirements and foundations of National Organization for Urban Harmony.

Table 2: Elements of Compatibility and difference between Case Studies and surrounding context

	Korba Residential Complex	El Baron Residential Tower	Al-Horreya Mall	Arab Admin. Development Organization	African Export-Import Bank	
						
METHODOLOGIES OF INFILL DESIGN	infill design methodology	Literal Replication	Invention within Style	Intentional Opposition	Abstract Reference	Intentional Opposition
	Land Plot Area	Double of Surrounding plots area	Same area of Surrounding plots area	Double of Surrounding plots area	Same area of Surrounding plots	Double of Surrounding plots area
	Building hight	4 Stories Above The Surrounding Context	Same as the Surrounding Context	2 Stories Above The Surrounding Context	5 Stories Above The Surrounding Context	
	Facade materials	Curtain walls - GRC Units - Paint		Curtain walls. Ceramic Tiles. Paint	Aluminum windows. Paint.	Curtain Walls. Metal Cladding
	Facade Colors	Beige Color as surrounding context. Blue glass.		White Color. Orange Color. Light Blue Glass.	White Color. Light Blue Glass.	Gray color. Blue Glass.
	Solid and Void	Mass - Archs – Motifs -Windows		Corbelled Forms Between Solid & Void	Mass. Windows shapes.	Mass - Motifs. Windows
REQUIREMENTS OF NATIONAL ORG. FOR URBAN HARMONY	Area of Openings	Less than Half of the Façade Area.			More than Half of the Façade Area.	
	Openings in the Main Facades	In the Vertical Direction.	In the Vertical Direction.	Not in the Vertical Direction.	In the Vertical Direction.	Not in the Vertical Direction.
	Glass Color	Glass is Reflective not Transparent Not In Brown Smoked Color				

9. PROPOSED INFILL DESIGN METHODOLOGY FOR EL KORBA AREA:

Through the previous discussions, an integrated methodology can be proposed for designing the facades of new buildings within the heritage context of EL Korba zone as shown in Fig. 24:

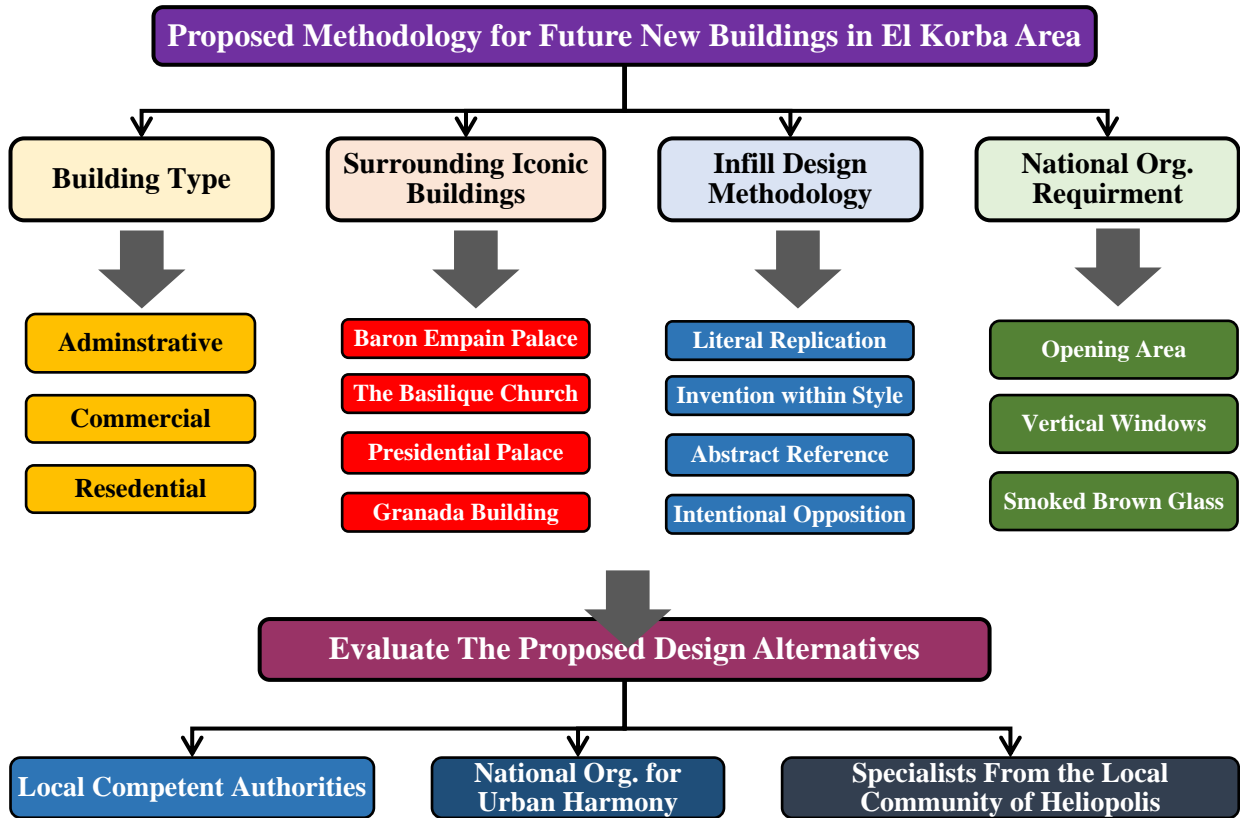


Fig. 24: Infill Design Methodology for El Korba Area

CONCLUSIONS

Through the theoretical part and reviewing the methodologies for added buildings within the context of heritage sites and analysis of study models, the following conclusions can be derived:

- 1) The main challenge for architects designing new buildings in heritage areas is striking a balance between avoiding monotony caused by repetitive designs and preventing the distortion of existing buildings due to the contrast between old and new structures.
- 2) Heliopolis' architectural development hasn't harmonized well with the region's unique landmarks, like the Baron's Palace, due to a lack of contextual richness.
- 3) The recommendations of the national organization for urban harmony addressed the urban context of Heliopolis in general, but did not specify special requirements for each sub-area according to its own context resulting from the presence of a distinct historical building, such as the area surrounding the baron's palace and the area surrounding the presidential palace and the city of Granada, for example.
- 4) In heritage areas, creativity goes beyond preserving the past. Contemporary designs like those in Al-Horreya Mall and the African Export-Import Bank contrast modernity with history.

- 5) The selected Case Studies feature white and beige facades, aligning with the surrounding context and requirements of national organization for urban harmony guidelines. However, the glass color chosen is blue, whereas the organization specifies brown, which better matches the surrounding context.
- 6) In general, the selected Case Studies developed inside and around the Korba area distinguished with a distinct and contemporary architectural design and compatible with infill design methodologies.
- 7) Sustainability should be considered in the new constructed buildings in Heliopolis to adhere to the city's modern, forward-thinking design principles. This might entail using sustainable building materials, integrating energy-efficient technology, and creating buildings that can adapt to shifting urban needs.
- 8) The research proposes a special design methodology for new buildings added to the heritage context of Heliopolis, based on the infill design methodologies and the requirements of the national organization for urban harmony, with the involvement of experts and specialists from the residents of Heliopolis in evaluating design alternatives and arriving at the optimal solution compatible with the heritage of Heliopolis.

10. REFERENCES

- [1] E. Navickiene. "Infill Architecture: Chasing Changes of Attitudes in Conservation Of Urban Heritage", Vilnius Gedimino Technical University, Vilnius, Lithuania, 2019.
- [2] L. Bianco "Contextual Architecture: The Regional and the Vernacular", University Of Malta, Faculty for the Built Environment, 2014.
- [3] M. Leen , V. Linda & D. Jan. "Regionalism and Modernity, Architecture in Western Europe, 1914-1940", Leuven University Press, 2013
- [4] F. Ashwaq, T. Tahrir. "The Impact of Urban Infill: A Study of Contemporary Malls in Baghdad", Diyala Journal of Engineering Sciences Vol.15, No 2, June 2022.
- [5] K. Frampton "Towards a Critical Regionalism; Six Points for an Architecture of Resistance" in Hal Foster, Anti-Aesthetic, Washington: Bay Press, 1983, pp. 16-30.
- [6] Z Faisal "Infill Design in Heritage Sites Study of Experts, References and Attitudes, Journal of Engineering and Applied Science, 2019, Vol. 66. pp. 451-463
- [7] S Semes, S. "Differentiated and Compatible: Four Strategies for Additions in Historic Setting"s. Journal of National Trust for Historic Preservation Forum, 2007
- [8] B Stavreva. "New vs Old: New Architecture of Purpose in Old Settings", faculty of the Virginia Polytechnic Institute and State University, 2017
- [9] M Elbih, M "Restoring the dead spaces underneath the elevated highways to the public realm: a case study in Cairo, Egypt." Unpublished M.Sc, 2020
- [10] Urban Harmony Organization, Guide to the Boundaries and Basis of Preserving Heliopolis with Distinguished Value, second edition 2022.
- [11] ARCHDIALY. (2023, JUNE. 12), <https://www.archdaily.com/951667/what-is-vernacular-architecture/>
- [12] LINES-HUB. (2023, AUG. 9), <https://lines-hub.com/heliopolis-the-land-of-history-and-architecture/>
- [13] RE-THINKINGTHEFUTURE. (2023, AUG.9), <https://www.re-thinkingthefuture.com/materials-construction/a6424-vernacular-architecture-egypt/>