

Received 1 September 2022: accepted 15 December 2022.

Available online 16 January 2023

Re-Shaping Urban Regeneration After the Pandemic, Historic Cairo (Case Study)

Dr. Dalia Shebl Said¹, Dr. Kariman Ahmed Shawky²

Associate Professor, Architecture Department, Faculty of Engineering, Kafr El-sheik University¹

Assistant Professor, Urban Design Department, Faculty of Urban & Regional Planning, Cairo University²

dr.daliashebl2020@gmail.com¹, kreman.ahmed@cu.edu.eg²

ABSTRACT

The spread of COVID-19 has impacted the shape and use of public spaces today and will presumably influence how we approach urban planning, design, and management in the future. Particularly in the urban dense areas with limited public space. Urban historic centers are considered high-density employment hubs, as they host valuable and cultural services, according to UNESCO historic urban landscape (HUL) intends to enhance the sustainability of planning and design interventions. Therefore, the paper aims to investigate the relationships between historic urban landscape, health, and well-being post COVID-19 using geospatial measures of the urban built environment. The paper addresses two research questions: How do historic urban landscape characteristics relate to health and well-being post COVID-19?, What are the best practices for developing historic urban spaces post-pandemic in the dense urban fabric?. Historic Cairo as a case study is empirically examined using spatial analysis tools. The paper ends with design guidelines for Historic urban spaces using HUL approach, which could be applied in urban development policy design and planning.

KEYWORDS

Historic Urban Landscape, Post Pandemic, Urban regeneration, (COVID-19) Pandemic, Culture Landscape, open spaces, Historic Cairo.

إعادة تشكيل سياسة التجديد الحضري لعصر ما بعد الوباء، دراسة حالة القاهرة التاريخية

أثر انتشار وباء كوفيد ١٩ على شكل واستخدام الفراغات العامة بوقتنا الحالي بالإضافة إلى أنه سوف يؤثر على كيفية تعاملنا مع التخطيط والتصميم وإدارة العمران في المستقبل. وخاصة بالمناطق الحضرية ذات النسيج المتضام وفراغات عامة محدودة. تعتبر المراكز التاريخية مراكز عمرانية مرتفعة الكثافة حيث تشمل على خدمات ثقافية، وفقاً لمدخل تنسيق المواقع التاريخية لليونسكو (HUL) والذي يهدف إلى تعزيز استدامة التخطيط والتصميم. لذلك، تهدف الورقة البحثية إلى دراسة العلاقات بين تنسيق المواقع التاريخية وبين الصحة والرفاهية لمرحلة ما بعد وباء كوفيد ١٩ باستخدام المقاييس الجغرافية المكانية للبيئة الحضرية المبنية. تتناول الورقة البحثية سؤالين بحثيين: كيف ترتبط خصائص تنسيق المواقع التاريخية بالصحة والرفاهية لعصر ما بعد الوباء؟، وما هي أفضل الممارسات لتطوير تنسيق المواقع التاريخية بعد الوباء في النسيج الحضري المتضام؟ القاهرة التاريخية كدراسة حالة يتم دراستها باستخدام أدوات التحليل المكاني. تنتهي الورقة البحثية بمبادئ توجيهية لتصميم تنسيق المواقع التاريخية باستخدام نهج HUL، والذي يمكن تطبيقه في تصميم وتخطيط سياسات التنمية الحضرية.

الكلمات الدالة: تنسيق المواقع التاريخية- التجديد الحضري- وباء كوفيد ١٩- الفراغات العامة- مرحلة ما بعد الوباء- القاهرة التاريخية.

INTRODUCTION

The current situation of old and compact city policies leads to redefining and reshaping the urban greenery. Urban areas have been almost unprepared for the COVID-19 pandemic, the COVID-19 pandemic will change the future urban areas

developing strategies as previous pandemics and epidemics did. (MIR, 2020). Developing strategies for urban areas should be as flexible and adaptable as possible and to be more inclusive, greener and smarter. In historical centers like Cairo with compact urban pattern, urban landscape play a vital role in urban regeneration by their environmental, recreational, and socio-economic benefits, especially post pandemic era. (Ramírez & El Habashi, 2020) Therefore, the challenge will be to balance the ideals of the compact pattern and the ability to cope with similar health situations in the future. This raises a range of issues regarding urban landscape planning, design and management. (Finnsson, 2021)

COVID-19 pandemic places our society in front of the need to:

- promote strategies or rather long-term action plans;
- identify and coordinate preventive and/or curative actions. (Pinto, Viola, Fabbicatti, & Pacifico, 2020)

The paper aims to promote heritage landscape as an effective solution in the dense urban fabric post-covid-19, through offer a practical set of urban guidelines. As there is a need to develop flexible practices for the development of urban landscapes, especially in dense areas.

This study is based on qualitative data by reviewing existing knowledge on the impact of pandemics on the Historic Urban Landscape, and the role of Historic Urban Landscape in developing historic centers. In addition to a case study research methodology, the study determines "Darb El-Labana" area as a case study. Urban analysis tools are site visits, observation, mapping, photography, and available data.

The proposed strategies and urban interventions in historic Cairo area in this research aimed to help heritage managers, public administrators, and other actors in the field to develop flexible concepts for the development of historic urban landscape plans. to improve the resilience of historic areas post-pandemic.

1. PANDEMICS IMPACT ON THE URBAN AREAS (HISTORICAL BACKGROUND)

In fact, the fight against infectious diseases is responsible for considerable urban innovations. In ancient Rome, the first sewage system was built in response to diseases such as dysentery and typhoid fever. The expansion of the streets in Paris and the spectacular expansion of the sewer system helped in part to fight the cholera epidemic. And access to daylighting was presented by modern movements as a cure for tuberculosis. (Teller, 2021) COVID-19 pandemic is about to transform the face of the city in the same way: to redevelop its infrastructure, enhance living standards and improve the quality of life. (MIR, 2020)

In the most violent epidemics, there are four intervention strategies on the urban historical landscape that return for infection containment. (Pinto, et al, 2020):

- design and construction of new infrastructures;
- creation of open spaces for collective use;
- reorganization of urban accessibility;
- integration of technical devices and furnishings.

Nowadays, there are temporary initiatives for COVID19 pandemic changes that could summarize as follows:

- **Linear Parks:** COVID19 calls for redefining the rule of density in public spaces, there may also be an increase in the development of linear parks in urban cities as available strips of public land is being converted into leisure spaces. (Caballero, 2016) stated that Greenways in America have done this successfully for more than a century, even before the HUL approach was identified. These linear parks have performed as multi-functional pedestrians and biological links, weaving a city's stories together.

- **Pocket Parks:** Moreover (Liu & Wang, 2021) mentioned that transforming vacant lots into pocket parks can contribute to reducing the health issues and risks that occur with them. Vacant lots or abandoned properties in a neighborhood can generate a variety of issues, including public health concerns, as they may provide a temporary shelter for rats and other pests that can carry and spread diseases to humans. (Liu & Wang, 2021) Pocket parks can promote inhabitants' health and social cohesion in typically underserved high-density urban neighborhoods.

- **Redesign of Urban Streets:** During the COVID19 pandemic, cities replaced cars, increasing space for active transportation, and beginning to raise bicycle lanes and fares. Many of these initiatives began before the COVID 19 pandemic, but were raised during the pandemic. (Nieuwenhuijsen, 2021) These temporary short-term initiatives for pandemic changes could eventually become permanent.

2. HISTORICAL URBAN LANDSCAPE DEFINITION AND CHARACTERISTICS

Historical urban landscape is the contemporary usage of a past and is consciously shaped from history (Ashworth & Tunbridge, 1999). Historical urban landscape and open areas which Proximity to monuments and historical sites generate much higher significance than any public areas. This is return and reflected its values property and old dense districts. The green areas are played a great role in enhancing community resilience and could contribute as a natural vaccine during stressful and epidemics times. Urban green spaces provide many benefits to the cities as general determinedly in dense urban fabric and historical core of old cities, and have a positive effect on communities, and individuals Where it forms an important component of the environment and of people's surroundings (Keleg, 2018), fig. (1) show the parameters that affect on shaping historical culture landscape.

Historic Urban Landscape is recognized as a crucial way to increase both social interaction and infection control. The COVID-19 pandemic provides a special chance to test urban initiatives that may minimize environmental health risks and inequality (Rojas-Rueda & Morales-Zamora , 2021). Urban regeneration should provide mutual benefits to both the heritage conservation process as well as the local community's quality of life. The Psychological resilience of landscape has defined a process of an individual dealing with adversity, trauma, tragedy, challenges, or stress-related issues (American Psychological Association, 2012)



Fig. (1)
The Current Parameters affect on
Historical urban landscape
Source: Authors

Today the open and green spaces especially in dense and compact urban fabric are suffering from rapidly growing and living conditions much worse than before and facing many descending problems day by day, as a result of special morphology of physical urban characteristics, social behavior, and cultural patterns. (Stanley, et al, 2012).

3. HISTORIC URBAN LANDSCAPE POST-COVID-19

There is a profound and dependent relationship between urban landscape and the spread of disease by analyzing the relation between the incidence of COVID19 and several urban indicators, finding that the Streets with a higher density of green space had the weakest impact on viruses (Mercader-Moyano, Estable-Reifs, & Pellicer, 2021). Where **green spaces** play a pivotal role as an environmental lung and natural vaccines for protect urban from epidemics. This emphasizes the importance of preserving all green and open public spaces, especially in dense cities, where public spaces are small in size in dense fabric. Small and micro accessible such as pocket parks, parks, neighborhood streets, squares, plazas, and other incidental spaces are all examples of public spaces that play a vital role in welfare promotion. Furthermore, small-scale public spaces allow for social connections between people at the community level. In a post-pandemic scenario, small-scale public spaces might decentralize public places and establish limited access for users. (Tejendra, 2021).

Prior to the pandemic, Urban and transport planning have been suggested as critical indicators for enhancing environmental health and equality. Current mobility trends and built environment need to emphasize the public health benefits of urban and transportation design during the pandemic. (Rojas-Rueda & Morales-Zamora , 2021). Figure (2) is clarifying the intervention example on a sample road that was rehabilitated with the addition of new trees and bike lanes.



Fig. (2) Reimagine the intervention process in dense street in Cairo
Source: students work, 2018

In general, **population mobility** and transport infrastructure that increase connectivity between and within the city are considered to be the main factors contributing to the spread of infectious diseases and their role in epidemics. Previous outbreaks (e.g. Ebola) have been demonstrated (Sharif & Khavarian-Garmsir, 2020) This clearly indicates that non-motorized transport systems are more resilient to pandemics. Investing in such systems can not only help prevent the spread of the virus, but can also increase the accessibility of services and relieve pressure on overcrowded transport systems during emergencies.

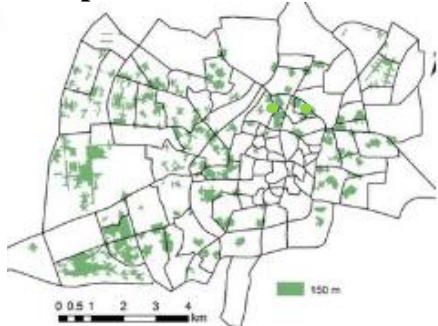
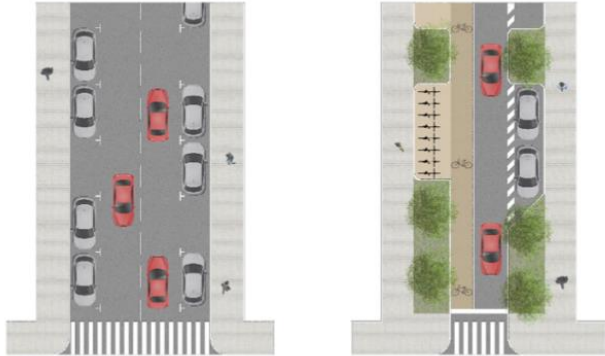
Squares seem to be a good alternative for public space, as they are more accessible and less crowded, thus healthier and more democratic (Garcia, 2020). Reactivate squares and plazas through crowd management techniques such as staggered hours, limiting the number of people at any given time, maintaining social distancing measures between people and extending hours for areas that have regulated access. (Khandelwal, 2021)



Create a network of natural spaces and green lungs across urban areas, including not just parks, gardens, and playing fields, but also bike and pathways, green roofs and walls, and street trees. Improving the quality, quantity, and accessibility of these elements in our urban environments increases community quality of life while also making spaces more enjoyable and safer to pass through. (LUC, 2020)

3.1. Design Interventions Can Broadly Be Suggested as Follows

The current situation of old and Compact city strategies result in the redefinition and reshaping of urban greenery. Table (1) shows Suggested interventions in dense urban areas

Table (1). Suggested interventions in dense urban areas according to literature review

Intervention type	Suggested spatial design changes
<p>Pocket parks</p> 	<ul style="list-style-type: none"> • Transforming small abandoned and vacant spaces • Introducing in dense urban areas • Minimum design elements • Limiting public access • Design should promote play and social interactions
<p>Redesigning Streets, and sidewalks</p> 	<ul style="list-style-type: none"> • Prioritize pedestrians, freeing the streets of automotive, and increase the number of urban trees to promote habitability and the environment.

Intervention type	Suggested spatial design changes
<p data-bbox="236 248 863 286">Temporary functions for Squares and Plazas</p> 	<ul data-bbox="900 248 1362 360" style="list-style-type: none"> • Flexibility and equitability of spaces to be used for temporary functions
<p data-bbox="236 517 448 555">Green network</p> 	<ul data-bbox="900 517 1299 801" style="list-style-type: none"> • Providing green open spaces nearby residential areas • Revitalizing abandoned and unused spaces • Introducing physical activity options for varied user groups • Whenever possible, create a network of green spaces

Source: (Mercader-Moyano, Estable-Reifs, & Pellicer, 2021), (Tejendra, 2021) Edited and modified by authors.

4. POTENTIALS FOR HISTORIC URBAN LANDSCAPE ADAPTIVE REUSE IN HISTORIC CAIRO.

Urban interventions in historical districts confront significant challenges in reconciling the historical value of these districts on the one hand, and preparing their urban environment to meet changing conditions on the other. (El-Basha, 2021)

Recently Compact urban patterns are being supported because they are assumed to be more sustainable and healthier due to a higher land use variety and shorter and better mobility alternatives. However, compact urban patterns are not without drawbacks if public space is not effectively used. (Nieuwenhuijsen, 2021). For example, the pattern of compact city and the old and historical district is so sensitive where characterized by Fine urban grain has small blocks and the layout design of routes, public paces of uses are so sensitive for the convenience accessibility the pedestrians and cyclists, and it is surrounded by numerous activities and mix of use, mix of ownership, mix of business in the urban center. (figure 3) by analyzing the open spaces from the construction, use, and social significance that serves as a counterpoint to an overemphasis on buildings in urban fabric, where found people and merchants or local craftsmen use street space nearby to their buildings. (Stanley, et al, 2012)

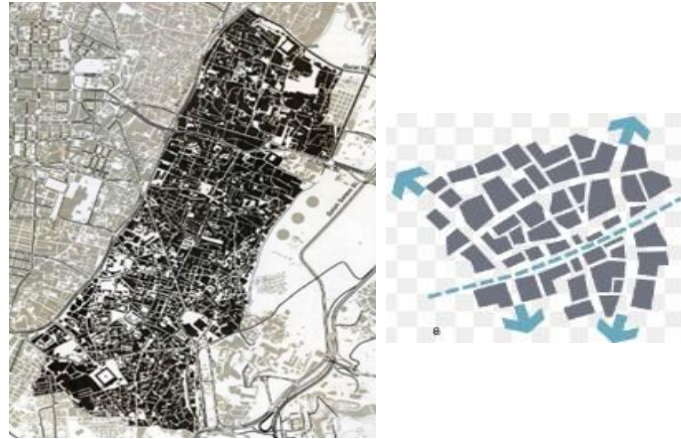


Fig. (3) Fine grain of urban fabric in old historic Cairo
Source: (The Essex Design Guide, 2018) (URHC,2012)

The urban is meaningful and valuable in terms of culture and social senses and details, the inhabitant ignores the value of culture and natural resources, and they are continuous infringements on public spaces by throwing the garbage and reusing it for other uses. the old and historical core city suffered from weakness of infrastructure and the state of roads networks and abuses of open public spaces and the lack of awareness of preserving the ecological footprint. spaces as an environmental lung and natural vaccines for protecting urban from epidemics.

The reactivation of vacant and abandoned spaces in historic Cairo is crucial in the initiative to improve urban health safety. These areas might be residents' preferred locations, carriers of well-being, where the community can engage in outdoor activities, strengthening its immunological defenses. (Pinto, et al, 2020)

The design for Squares and Plazas should induce a sense of safety by decongesting and controlling access by restricting the number of users, modifying furniture spacing, adding physical distance signs, and ensuring continuous sanitation. (Tejendra N. , 2021)

A change is possible and would certainly result in a new and higher quality of urban life in historic Cairo, there are some elements could be reused adaptively for enhancing Historic Urban Landscape in historic Cairo;

- Abandoned or unused building
- Abandoned or unused spaces
- Open spaces pertaining to buildings (courtyards, gardens, etc)
- Open spaces, squares, green areas
- Redesigning Streets, sidewalks

The following list points out the types of proposed urban interventions in historical districts in line with the situation of their urban fabric and the environmental context.

Ephemeral heritage events

- events and performances
- street art
- digital art and projections

In addition to using temporary materials:

- non-permanent materials
- temporary art installations (Gravagnuolo & Girard, 2017).

With regard to health security requirements such as; signage, social distancing markers, hand sanitizer stations and personal protective equipment (PPE). Table (2) shows the health security requirements at the scale of the Historic Urban Landscape and design solutions.

Table (2). Health Safety Requirements for the Historic Urban Landscape.

Requirements	Indicators
Physical distancing between users	- presence of signs for the direction of the paths - presence of distance markers. - decentralized distribution of services (food bars.. etc).
Flexibility of spaces to be used for temporary functions	- Avoid crowding by informing and establishing visiting hours for different population groups
Control of health- hygiene conditions	- fountains and wash-bashers for personal hygiene in public spaces. - providing more waste facilities and more frequent rubbish collection - Increase the number of deciduous trees in public spaces. - Increase in green surfaces
Cleanability of the surfaces and systems	- presence of external finishing elements that can reduce the time of stay of the virus. - Cleanability of the terminals and plant networks - Implement green area management and maintenance practices.

Source: (Pinto, et al, 2020), (Rojas, 2020),

5. EMPIRICAL STUDY (CASE STUDY SELECTION- SPATIAL ANALYSIS)

Case study selection criteria:

Darb El-Labana is one of five main areas¹ where development and revitalization efforts are ongoing by the Egyptian government. (Sameer, 2021) Thus, case study findings are expected to be useful to state and local governments in the suggested development plans.

The geographic location of Darb El-Labana has a strategic location due to the nearing of the Refai Mosque and the Citadel, hence the development in this location may be a good example to follow.

In addition, a key criterion for the case study selection is the availability of data.

The research attempted accessing the possibilities and challenges to build a historic urban landscape in Darb Al-Labana district through; Its built environment; Its

¹ The five main areas: the area surrounding Al-Hakim Mosque, the area south of Bab Zuweila, the area of Haret al-Roum and Bab Zuweila, the area surrounding Al-Hussain Mosque and the Darb al-Labana area.

infrastructures; Its open spaces, its land use patterns, and spatial organization. Urban analysis tools are site visits, observation, mapping, photography, and spatial analysis.

5.1. Case Study Area

From Cairo Citadel, one can see Sultan Hassan and Al-Rifa'i Mosques. However, next to the Citadel, there is Darb Al-Labana district. (MENAFN, 2019). The area is facing both Sultan Hassan and Al-Refa'i Mosques in the historic district Al-Khalifa fig (4), (5).

Darb El-Labana contained several vacant lands of different types, ruins of buildings that are demolished or collapsed, vacant lands used as solid waste dumps, causing a real Environmental Risk, Fig (6).

Open public spaces are a healing environment that promotes connectivity between humans and nature while also improving social cohesion. (El Khateeb & Shawket, M., 2022)



Fig (4) case study location "Darb El-Labana area",
Source: Google earth



Fig (5) Ariel view of "Darb El-Labana area", Source: Google earth



Fig. (6) abandoned and unused buildings, spaces in Darb El-labana area.
Source: (Prime Ministry, 2021)

Therefore, the physical condition of spaces in Darb El-Labana is scarce and suffers from privatization, negligence from the local authorities, lack of maintenance, and dwellers' interest. Vacant lands used for garbage dumping causes land, air, water, biological & visual pollution, (El Zafarany, 2011)

The land-use Analysis of Darb El-Labana shows that this neighbourhood is mainly residential with some workshops and industrial activities. The area has historic buildings such as El-mahmudya Mosque, In addition to the built area and unused buildings, there are vacant lands as well. Fig (7).

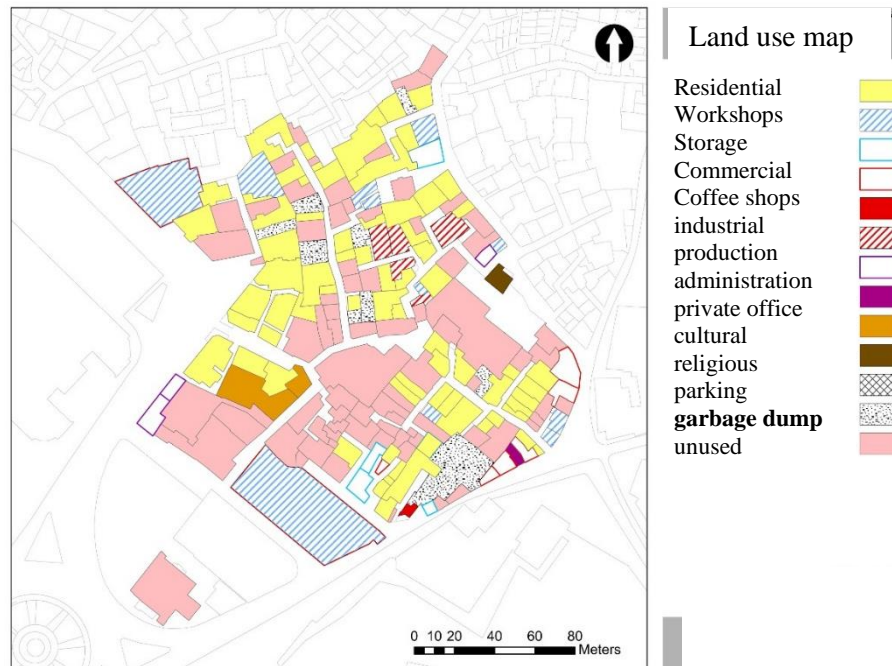


Fig (7) land-use of Darb El-Labana, Source: (Prime Ministry, 2021)

Unused buildings and vacant lands in the study area percentage is 53,3% (Prime Ministry, 2021) which consider a good potential for regeneration plans. Open spaces, pocket parks, and temporary uses could be suitable options in HUL development.

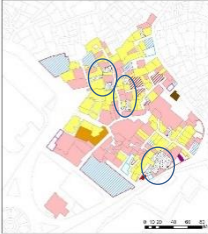



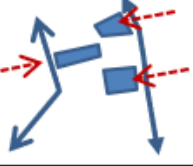
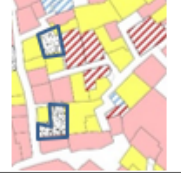
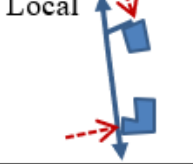

Squares and Plazas at the edge of the study area could be used in temporary activities as needed. The area of existing spaces is 0.84, 0.21, 1.43, 0.60 acres for the spaces 1,2,3,4 shown in fig (8) respectively.



The inner street network is pedestrian oriented which consider a potential to turn these streets to a green network. Table (3) shows the Potentials for Historic Urban Landscape adaptive



Fig (8) Squares and Plazas in Darb El-Labana, Source: google earth

Table (3) Potentials for Historic Urban Landscape adaptive reuse in Darb El-Labana.

Intervention type	Suggested spatial design changes			
<p>Pocket parks</p> 	<ul style="list-style-type: none"> Transforming small size abandoned and vacant spaces to pocket parks 			
	<p>location</p> 	<p>size</p> <p>828m²</p>	<p>shape</p> <p>Irregular</p>	<p>Exposure</p> <p>Main road</p> 
		<p>90m² 82m² 116m²</p>	<p>Regular</p>	<p>main local</p> 
		<p>72m² 140m²</p>	<p>Regular</p>	<p>Local</p> 
	<p>Vacant lands used for garbage dumping can be converted from abandoned spaces that attract undesired or illegal activity into community assets. That strengthens the overall health of a community.</p>			
<p>Redesigning Streets, side walks</p>	<p>Redesigning streets to better meet the needs of pedestrians and cyclists, and provides ample greenery and open space to meet the needs of citizens for sports and outdoor recreation. (Sharif & Khavarian-Garmsir, 2020)</p>			
				
	<p>In this context, walking is the most common form of recreational physical activity available to most people of all ages and socioeconomic spectrums.</p>			

Intervention type	Suggested spatial design changes
Temporary activities at Squares and Plazas	 <p data-bbox="459 575 1362 678">open public space appearing in open plazas in front of key buildings can be used in temporary activities. (Events and performances, digital art and projections... etc.)</p>
Green network	 <ul data-bbox="459 1252 1383 1346" style="list-style-type: none"> • Creating a network of green spaces, taking into consideration that the trees planted near buildings should have safe roots that do not make a threat in the long term.

Source: Authors.

5.2. El Remila Square

The proposed design for Medan El Remila Park in the Darb al-Labana area, which looks down to Al-Rifai and Al-Mahmoudia mosques, and many ancient buildings, will involve a recreational garden, entertainment center, restaurants, and a small theatre, for art and cultural performances, to be a cultural educational complex, as shown in Fig (9). (Sameer, December, 2021).

El Remila square has a strategic location and unique character due to the overlooking view to the Castel. The square is an Instrument of Urban Transformation, that restoring, and enhancing open spaces in historic Cairo is not only ecologically and socially desirable. It is also economically viable.



Figure (9) proposed design for Medan El Remila or Masjed Elmahmoudeya Garden. Source: (Prime Ministry, 2021)

According to the analytical review in the previous section, There are some design elements that could enhance the Health Safety at the proposed design for Medan El Remila as shown in table (4):

Table (4). Proposed design elements for Health Safety in Medan El Remila.

Requirements	Proposed design elements
Physical distancing between users	<ul style="list-style-type: none"> - signs for the direction of the paths - distance markers. - decentralized distribution of services.
Flexibility of spaces to be used for temporary functions	<ul style="list-style-type: none"> - establishing visiting hours for different population groups
Control of health- hygiene conditions	<ul style="list-style-type: none"> - wash-bashers for personal hygiene in the space. - providing more waste facilities and more frequent rubbish collection - Increase the trees in the space with species that do not make a threat to the surrounding historic buildings

Source: Authors after (Pinto, et al, 2020), (Rojas, 2020).

6. RESULTS AND DISSECTION

Health security requirements at the scale of the Historic Urban Landscape and design solutions have become important more than ever. Thus, The paper answered two research questions: How do historic urban landscape characteristics relate to health and well-being post COVID-19?, What are the best practices for developing historic urban spaces post-pandemic in the dense urban fabric?.

First, the policy in old and dense fabric depends on the quality of green areas rather than their quantity where the area is limited. This is why design guidelines should not provide a fixed end product. Guidelines adapt to the changing needs of users over time. This malleability and flexibility make spaces open to planned and unplanned

sociospatial practices, always becoming a sustainable entity, allowing users to tailor green elements to their needs. Regeneration in historic areas needs to be flexible and responsive through learning and actively prioritize resources for maximum impact.

Second, The HUL design guidelines were developed and aligned with the literature and the case study. As revealed, the abandoned and vacant spaces can be revitalized and turned into a useful place for users by (1) providing flexible spontaneous design, (2) connecting the space to its surrounding. Thus, eliminating incivilities, spread of diseases, and other unsanitary behavior.

Some streets can be designated as shared streets by providing walking and running lanes while maintaining distance and reducing crowding. In addition to implementing safe pedestrians' paths, and providing promenades.

The research paper then provides a practical set of urban guidelines that aim at connecting, qualifying, and enlarging open spaces and creating green corridors to enhance urban health through urban environmental passivity, as shown in Fig (10).

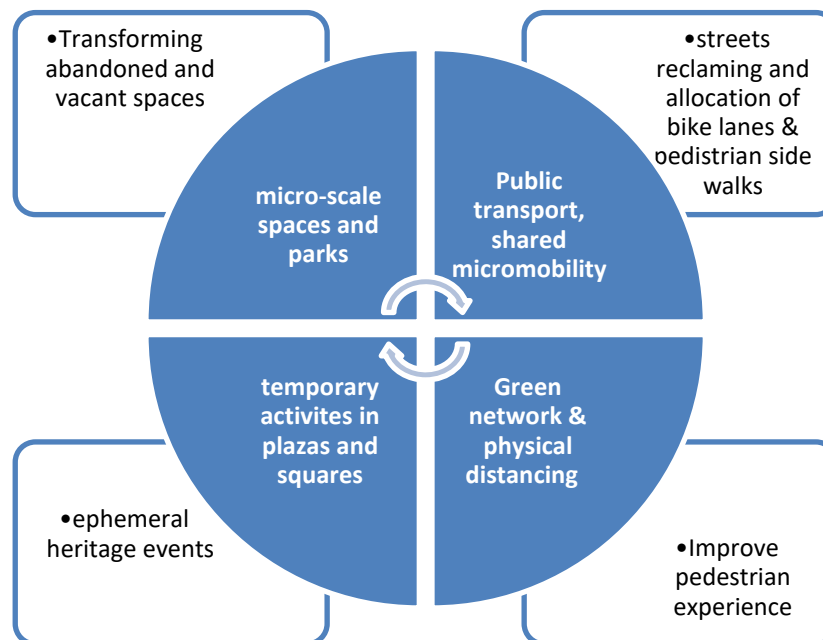


Fig (10) Matrix of guidelines for the intervention of HUL in historic Cairo post-pandemic. Source: Authors

REFERENCES

- Ashworth, G., & Tunbridge, J. (1999). Old cities, new pasts: Heritage planning in selected cities of Central Europe. *GeoJournal* 49, 105–116. <https://doi.org/10.1023/A:1007010205856>
- American Psychological Association. (2012, January 1). 2012 Impact of Stress. <https://www.apa.org/news/press/releases/stress/2012/impact>
- Boeing, G. (2019). Urban spatial order: street network orientation, configuration, and entropy. *Appl Netw Sci* 4, 67. <https://doi.org/10.1007/s41109-019-0189-1>

- Caballero, G. V. (2016). The role of natural resources in the historic urban landscape approach. *Journal of Cultural Heritage Management and Sustainable Development*, 6(1), 2-13. <https://doi.org/10.1108/JCHMSD-11-2014-0037>
- El Khateeb, S., & Shawket, I. M. (2022). A new perception; generating well-being urban public spaces after the era of pandemics. *Developments in the Built Environment*, 9. <https://doi.org/10.1016/j.dibe.2021.100065>.
- El Zafarany, A. (2011). *Urban Regeneration Project for Historic Cairo, Sector Study: Environmental Risks Facing Historical Cairo*. Cairo: UNESCO, World Heritage Centre.
- El-Basha, M. (2021). Urban interventions in historic districts as an approach to upgrade the local communities. *HBRC Journal*, 17(1), 329-364. <https://doi.org/10.1080/16874048.2021.1938892>
- Finnsson, P. T. (2021, May). *COVID19 crisis highlights the need for accessible and productive urban green spaces*. Nordregio Magazine. <https://nordregio.org/nordregio-magazine/issues/post-pandemic-regional-development/covid19-crisis-highlights-the-need-for-accessible-and-productive-urban-green-spaces/>
- Garcia, C. (2020, December 1). *City Square: Redefining Public Spaces During and After the Pandemic*. ArchDaily. <https://www.archdaily.com/952145/city-square-redefining-public-spaces-during-and-after-the-pandemic>
- Gravagnuolo, A., & Girard, L. (2017). Multicriteria Tools for the Implementation of Historic Urban Landscape. *Quality Innovation Prosperity*, 21(1), 186–201. <https://doi.org/10.12776/qip.v21i1.792>
- Keleg, M. M. (2018). Review of green spaces provision approaches in Cairo, Egypt. Conference Proceedings: Research student conference 2018, 7-12. Faculty of Technology, Design and Environment, Oxford Brookes University. <https://doi.org/10.24384/CQ7N-JT67>
- Khandelwal, M. (2021). Revival of Public squares post pandemic . Rethinking The Future. <https://www.re-thinkingthefuture.com/rtf-fresh-perspectives/a1916-revival-of-public-squares-post-pandemic/>
- Liu, S., & Wang, X. (2021). Reexamine the value of urban pocket parks under the impact of the COVID-19, 64(1), *Urban Forestry & Urban Greening*, 64(1), 127294. <https://doi.org/10.1016/j.ufug.2021.127294>
- LUC. (2020, April 27). *Green Infrastructure: Why well-connected local green spaces matter more than ever during the Coronavirus pandemic, and why change is needed after the crisis*. <https://landuse.co.uk/green-spaces-coronavirus/>
- MENAFN-Daily News Egypt. (2019, July 12). Retrieved from Bimaristan Al Muayyad, one of the world's largest hospital, is locked behind Islamic Cairo's gates. <https://menafn.com/1099385137/Bimaristan-Al-Muayyad-one-of-the-worlds-largest-hospital-is-locked-behind-Islamic-Cairos-gates>
- Mir, V. (2020). Post-Pandemic City: Historical Context For New Urban Design. *Transylvanian Review of Administrative Sciences*, 16(SI), 94-108. <https://doi.org/10.24193/tras.si2020.6>
- Mercader-Moyano, P., Estable-Reifs, A. M., & Pellicer, H. (2021). Toward the Renewal of the Sustainable Urban Indicators' System after a Global Health Crisis. Practical Application in Granada, Spain. *Energies*, 14(6188), 1-43. <https://doi.org/10.3390/en14196188>
- Nieuwenhuijsen, M. J. (2021). New urban models for more sustainable, liveable and healthier cities post covid19; reducing air pollution, noise and heat island effects and

- increasing green space and physical activity. *Environment International*, 157, 1-8. <https://doi.org/10.1016/j.envint.2021.106850>.
- Pinto, M., Viola, S., Fabbicatti, K., & Pacifico, M. (2020). Adaptive reuse process of the Historic Urban Landscape post-COVID-19 The potential of the inner areas for a “new normal”. *International Journal of Architecture Technology and Sustainability*, 5(2), 87-105. <https://doi.org/10.4995/vitruvio-ijats.2020.14521>
- Pont, M. B., & Haupt, P. (2005). The Spacemate: Density and the typomorphology of the urban fabric. *Nordic Journal of Architectural Research*, 18(4), 55-68. <http://arkitekturforskning.net/na/article/view/167>
- Prime Ministry, (2021). Historic Cairo Development Project Darb El-Labana Area [Unpublished Report]. Hampikian for Architecture and Heritage Management.
- Ramírez, N., & El Habashi, A. (2020). reGREENeration of Historic Cairo. *The Journal of Public Space*, 5(1), 51-74. <https://doi.org/https://doi.org/10.32891/jps.v5i1.1251>
- Rojas-Rueda , D., & Morales-Zamora , E. (2021). Built Environment, Transport, and COVID-19: a Review. *Current Environmental Health Reports*, 8, 138–145. <https://doi.org/10.1007/s40572-021-00307-7>
- Sameer, H. (2021, December 1). Historic Cairo regains its ancient glory, The Egyptian government is reviving Historic Cairo to make a unique tourist attraction. *Al-monitor*. <https://www.al-monitor.com/originals/2021/12/historic-cairo-regains-its-ancient-glory#ixzz7ODGUrRz0>
- Sharif, A., & Khavarian-Garmsir, A. R. (2020). The COVID-19 pandemic: Impacts on cities and major lessons for urban planning, design, and management. *Science of the Total Environment*, 749, 1-12. <https://doi.org/10.1016/j.scitotenv.2020.142391>
- Sikora, A. (2019). Possibilities for Creating Public Spaces in a Small Town: Case Study. *IOP Conference Series: Materials Science and Engineering*, 603(1), 032034. <https://doi.org/10.1088/1757-899X/603/3/032034>
- Stanley, B. W., Stark, B. L., Johnston, K. L., & Smith, M. E. (2012). Urban Open Spaces in Historical Perspective: A Transdisciplinary Typology and Analysis. *Urban Geography*, 33(8), 1089–1117. <https://doi.org/10.2747/0272-3638.33.8.1089>
- Tejendra, N. (2021). Role of Public Spaces in Promoting Urban Wellbeing in Post-Pandemic Indian Cities. *International Journal Of Engineering Research & Technology (IJERT)*, 10(10), 404-410. <https://doi.org/10.17577/IJERTV10IS100190>
- Teller, J. (2021). Urban density and Covid-19: towards an adaptive approach. *Buildings and Cities*, 2(1), 150–165. doi: <http://doi.org/10.5334/bc.89>
- The Essex Design Guide. (2018, January 1). Urban Grain, <https://www.essexdesignguide.co.uk/design-details/layout-details/urban-grain/>
- URHC (Urban Regeneration Project for Historic Cairo). (2012). First report of activities. July 2010-June 2012. Cairo. http://www.urhproject.org/Content/studies/EN_ActionPlan.pdf