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Pocket Park Design in Informal Settlements in Cairo City, Egypt

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Abstract: The present study focuses on transforming leftover spaces and deserted streets into pocket parks, in order to enhance the quality of life in distressed neighborhoods. The aim of the study is to design a pocket park that meets the users' needs and behaviors. The first step is to identify key design parameters for designing a successful pocket park, which would provide a space for recreation, socialization in addition to adding greenery to the condensed neighborhood. A space is selected in a high-density district, In Cairo City. The research methods included a survey of the physical environment, observation and a questionnaire. The local residents are asked to assess the current problems in the space, and express their priorities. Moreover, the participants suggested the design components of the new park and what types of activities should the park host. The findings show that safety, lighting, and maintenance are the main priorities for the nearby residents. Furthermore, the society's social and cultural norms have a profound impact on the final product.

Keywords: Pocket Parks, Parks in Cairo, Public Participation, Mini Park

1. Introduction

The densification and the rapid urbanization have led to less open green space in the cities. The scarcity of the open spaces suggests that the creation of new large green areas would be very challenging [1]. Therefore, an innovative way is introduced to increase urban greenery in the city, a network of small green spaces serving neighborhoods, offering a potential for a variety of people to access them easily. Urban pocket parks are generally placed in high populated areas, utilizing vacant building lots or small irregular pieces of land. Functions include spaces for relaxation, meeting friends, taking lunch breaks, reading a book, play areas for children etc. [2].

Pocket parks have proven to have a positive effect on the urban microclimate, human health, and it can promote socializing and restitution [3, 4]. Researchers concerned with designing pocket parks claim, a successful park should revive the neighborhood pride, support the possibility of gathering, and create a feeling of belonging where people can feel safe and can enjoy art and nature [5, 1]. Moreover, the park design should consider achieving sustainability, accessibility and flexibility [6]. Pocket parks are a unique opportunity to create drops of urban green close to where city residents live especially in informal areas.

2. Pocket Park Definition

When searching the work "Pocket Park", also known as mini- parks or vest-pocket parks, lots of definitions are found. Mostly the pocket parks are described as open spaces, accessible to the general public, created on vacant lots or small irregular pieces of land [7, 8]. Some added being in dense city areas surrounded by multi-story buildings and only open to one side [3]. The area is sometimes included to distinguish pocket parks as Sinou and Kenton defined the area around 0.125 acres [5], others stated that it ranges from 0.7 acres to 3 acres [9]. Seymour, 1969 declared that pocket parks can vary in size, but they are normally smaller than a half-acre [10]. Cooper Marcus further defines a pocket park as one that serves up to a four block radius, with most of the users coming from within a one-two block radius [7]. The City of Copenhagen releases another definition, 2009 "Maximum size of 5000 m^2, some vegetation should be

present, and it should have its own entrance and distinguishable boundaries which separate it from the surrounding public space [11]". The functions of pocket parks include spaces for relaxing, playing, celebrating festivals, resting, enjoying the nature and interacting with other people.

3. Benefits of Pocket Parks

Pocket parks possess enormous potentials in influencing the social fabric and the health of community members, as they provide opportunities for interaction, learning and expressing opinions. Such parks are also appreciated for their role in supporting the overall ecology of the surrounding environment.

3.1. Social Life and Health Benefits

Base on National recreation and park association [12], a well-designed pocket park can:

- Reduced crime rates and perceived safety
- Promote exercising
- Lower rates of health complaints
- Enhance the mental health of users
- Empower local residents to make decisions that affect their community
- Make communities more sociable by connecting people in the same neighborhood.
- Reinforce relationships with local authorities and communities

3.2. Environmental Benefits

- Reduce pollution, traffic, and consumption of resources, such as oil. Communities with parks that meet their needs within walking distance are less likely to drive out of the city for nature experiences, thereby reducing pollution and traffic [11]
- Regenerate run-down areas
- Increase the amount of permeable surfaces throughout the city [8]
- Function as patches for some animals, particularly birds [13]

Despite the fact that pocket parks are able to offer various benefits to the community, some concerns may arise due to limited space, as activity conflict, and creating disturbing noises. Moreover, small parks might attract and invite unwanted visitors as homeless people or thugs [14].

4. Pocket Park Components

Pocket parks are not all the same; they could include various elements starting from a couple of seats up to equipped playgrounds. The location, the size of the park and the needs of the local community shapes the park design. Commonly, the pocket park will accommodate decorative plantings; benches and tables; shade shelters, Lawn terraces and trees; garden beds; picnic tables; colorful playgrounds or a small half-court; and fountains [12, 15]. Nontraditional uses may include play equipment designed for elderly users, community gardens, art sculptures, edible herbs and fruit trees, or even dog parks [1, 16].

5. Pocket Park Design Criteria

To create a successful pocket park many dimensions are involved, such as a selecting a suitable location, connecting the park with other recreational facilities, a good design, local support, funding and maintenance. Concerning the park design, it should be able to accommodate the local user's vision and needs, be accessible, flexible, inviting, safe and other many criteria. Generally pocket parks are created through a participatory approach. An approach which mainly reflects the idea that those who are affected by a decision should be given the opportunity to influence that decision [17]. The synergy between landscape architects offering technical support, as well as the users providing feedbacks and ideas, will make the design process of public parks a truly holistic process [18]. The job of the designer is to find the balance between the different views and reflect back decisions so that the public understands how its different inputs were considered. The level of participation varies, sometimes the opportunity for influence is quite small, while at other times the public can have lots of influence. The public participation may be featured in: [19]

a). Informing the public by providing information to help them understand the issues, options, and solutions.
b). Consulting with the public to obtain their feedback on alternatives or decisions.
c). Involving the public to ensure their concerns are considered throughout the decision process, particularly in the development stage.
d). Collaborating with the public to develop decision criteria and alternatives and identify the preferred solution.
e). Empowering the public by placing final decision-making authority in their hands.

Despite the preceding benefits, the participatory approach may not be able to achieve its goals due to many barriers such as inadequate representativeness, the public not being involved in the critical stages of planning, design and assessment. Additionally, users might not have the required technical knowledge to understand the different perspectives; uncoordinated management of the various stakeholders; the lack of transparency in decision making; and finally the additional cost [18].

After reviewing researches, case studies and several lecturer reviews interested in pocket park design, it is found that there are common design criteria found almost in each pocket park. On the other hand, there are other less mutual elements mentioned by fewer researchers. The following table comprises both design criteria (Table 1).

Table 1. *Pocket park design criteria.*

	Pocket park design criteria	Danish Architecture Centre, 2015	Triman, 2012	Leflore, 2012	Shirley, 2013
Area and Location	Must not exceed 5000m^2				√
	Parks should serve a resident population of approximately 500-1000 persons.				√
	Pocket park is 5 to 10 minutes walk from target users				
	Place the park in front of active rooms in adjacent buildings				
	Use vacant land, on small, irregular pieces of land, forgotten and unused spaces.	√	√	√	√
	Use non-traditional locations: roof tops, building facades or foyers				
Accesses and Linkage	Easy and equitable access with multiple points of entry /No barriers between the street and the park	√	√		√
	Convenient and safe pedestrian access that is buffered from moving vehicles	√	√	√	
	Connect the park to the greenway network and place it in high-density housing areas	√			
	Accessible by both foot and bike, and should not require the use of a car	√	√	√	
	Link to other recreational, cultural and community amenities	√		√	
Space Design	Defined edges and a focal point	√	√	√	
	Ensure clear sightlines across the entire site	√			
	Opened to the street on 2 to 4 sides.				
	Welcoming and appealing design to a diversity of users/ offers variety and choice	√	√	√	√
	Defined identity and represent local communities		√	√	
	Adaptable / comfortable spaces	√		√	√
	Space walls can become vertical lawns				
Uses and Activities	Provide spaces for physical fitness as basketball courts /tot lots / climbing structures	√		√	√
	Provide space for mental improvement, and relaxing	√	√		
	Recreate through playgrounds, opportunities for sitting, and open grassy areas	√	√	√	√
	Add activities that will activate the park at all times		√		√
	Add small event spaces, spaces for meeting friends, taking lunch breaks and social interaction	√		√	
	Add educational spaces as children can gain a better understanding of and appreciation for nature	√			√
Environmental	Use pervious surfaces, bio-filter landscaping beds, high-efficiency lighting (LED), and solar powered amenities				
	Provide ceiling with tree canopy	√	√		√
	Provide weather protection, rain garden, and swales	√	√		√
	Spaces should provide sufficient sunlight and ventilation			√	√
	Use recycled materials				
Landscape Elements	Avoid blank walls in the space perimeter				
	Add water features, gazebos, individual seating, benches, drinking fountains, bicycle racks, trash receptacles, heat lamps etc.	√	√	√	√
	Maximize the amount of natural shade		√	√	√
	Provide adequate lighting during night time		√	√	√
	Provide opportunities for public art and attractive hardscape		√		√
	Possibility to include edible gardens			√	
Participation and Maintenance	Involve the neighborhood in the design process, both for build form and for artistic enhancement	√	√	√	√
	Provide support from the local government to make the project possible		√		√
	Preserve a positive image	√	√	√	√
	Reduce maintenance requirements			√	√

Table 1. *Continued.*

	Pocket park design criteria	Lamontagne & Cavan, 2008	National Recreation and Park Association, 2012	Smith, 2005	Sinou & Kenton, 2013
Area and Location	Must not exceed 5000m^2		√	√	
	Parks should serve a resident population of approximately 500-1000 persons.		√		
	Pocket park is 5 to 10 minutes walk from target users				√
	Place the park in front of active rooms in adjacent buildings	√			
	Use vacant land, on small, irregular pieces of land, forgotten and unused spaces.	√	√	√	√
	Use non-traditional locations: roof tops, building facades or foyers		√		√

	Pocket park design criteria	Lamontagne & Cavan, 2008	National Recreation and Park Association, 2012	Smith, 2005	Sinou & Kenton, 2013
Accesses and Linkage	Easy and equitable access with multiple points of entry /No barriers between the street and the park	√			
	Convenient and safe pedestrian access that is buffered from moving vehicles	√		√	√
	Connect the park to the greenway network and place it in high-density housing areas		√		√
Space Design	Accessible by both foot and bike, and should not require the use of a car	√	√	√	√
	Link to other recreational, cultural and community amenities		√		
	Defined edges and a focal point				
	Ensure clear sightlines across the entire site	√		√	
	Opened to the street on 2 to 4 sides.	√			
	Welcoming and appealing design to a diversity of users/ offers variety and choice	√	√	√	√
	Defined identity and represent local communities			√	√
	Adaptable / comfortable spaces			√	√
	Space walls can become vertical lawns		√		
Uses and Activities	Provide spaces for physical fitness as basketball courts /tot lots / climbing structures		√	√	√
	Provide space for mental improvement, and relaxing	√	√	√	√
	Recreate through playgrounds, opportunities for sitting, and open grassy areas	√	√	√	√
	Add activities that will activate the park at all times	√			√
	Add small event spaces, spaces for meeting friends, taking lunch breaks and social interaction	√			√
	Add educational spaces as children can gain a better understanding of and appreciation for nature				
Environmental	Use pervious surfaces, bio-filter landscaping beds, high-efficiency lighting (LED), solar powered amenities		√	√	√
	Provide ceiling with tree canopy	√	√		
	Provide weather protection, rain garden, and swales				
	Spaces should provide sufficient sunlight and ventilation		√		
	Use recycled materials	√			
Landscape Elements	Avoid blank walls in the space perimeter	√			√
	Add water features, gazebos, individual seating, benches, drinking fountains, bicycle racks, trash receptacles, heat lamps etc.	√	√	√	√
	Maximize the amount of natural shade	√	√	√	√
	Provide adequate lighting during night time	√	√	√	√
	Provide opportunities for public art and attractive hardscape		√		√
	Possibility to include edible gardens		√		
Participation and Maintenance	Involve the neighborhood in the design process, both for build form and for artistic enhancement	√	√	√	√
	Provide support from the local government to make the project possible				√
	Preserve a positive image	√	√	√	√
	Reduce maintenance requirements	√	√		√

Source: Researcher after: [1, 5, 7, 10, 11, 12, 20, 21]

6. Case Study: Left Over Space in Rod El Farag District

Rod El Farag District is one of the most populated and poor districts in Cairo city. Density reaches 74,000 inhabitants per square kilometer [21]. It is a high density, informal, mixed use area, where daily retail stores and some services blend within the old, dilapidated residential buildings. The vehicular traffic penetrates the area, interfering with pedestrian paths, and creating safety concerns. As for the green space availability in the area, it is 0.74 m^2 /person [21], which is considered very low, even when compared with the average in Cairo city. This district was chosen as it suffers severely from the lack of recreational areas, despite it comprises unused spaces as narrow streets and leftover parcels that could be reused, with the hope that this research would be a catalytic project leading to implementing the idea in this district and other areas.

6.1. Methods and Tools

The aim of the research is to engage a sample of the local community in the design process of transforming a neglected space in a pocket park that would be able to serve the nearby residents therefore, improve their perceived quality of life. A small dumpster and a narrow street are selected to be

transformed, as the dumpster presents a source of contamination and the adjacent street is deserted. Three methods were adapted by the researcher to gather the desired information. The site was visited in September 2016 for five days (throughout the month), three days at working days and two days at weekends. Firstly, observation was conducted to record the space characteristics and the activities occurring in it, the site was visited two times daily, from 10-11 am and from 5-7 pm, tools as photography and behavior maps were utilized. Secondly, a closed-ended questionnaire was conducted during the five days to children using the space, residents around the site and shop-owners adjacent to the space. The questionnaire intended 30 persons, but only 25 cooperated. The questionnaire was divided into four sections, the interviewee characteristics; the desire to create a pocket park; the current problems in the space; and the needs, required elements and activities in the new park. Lastly, focus groups were used to gather feedback on the proposed design. The demographic of the interviewees is illustrated in the following table (Table 2).

Table 2. *The interviewee demographic.*

	Number of respondents	Gender		Age group		
		Male	Female	10-19	20-35	36-70
Questionnaire	25	63%	37%	12%	37%	51%

Source: Researcher

6.2. Space Characteristics

A leftover space attached to a narrow street is selected to be transformed into a pocket park; the total area is 310 m^2 [Figure 1]. The location can be accessed by car from the north by Nazeaf Street (a main street in the area) and accessed by foot through Ali Farahat Street. Currently, the space is used to collect solid waste (garbage), ruins, and construction remains. The narrow street is used as a parking spot by car owners living in the surrounding buildings, and raising pets.

The floors are asphalt, and a tent is installed to provide shade for shops' extension and kids playing in the area. The space lacks seats, water features and planting. The main street sidewalk is occupied by retail stores displaying their merchandise, and the street is lighted by hanging lights, while the narrow street lacks a sidewalk and is deprived of light at nighttime, which diminishes the opportunity of performing activities after sunset. The main users of the space are children playing hide & seek around the wreckage, and house- wives meeting to chat in the morning [Figure 2].

Source: Researcher

Figure 1. *The selected location to be transformed into a pocket park.*

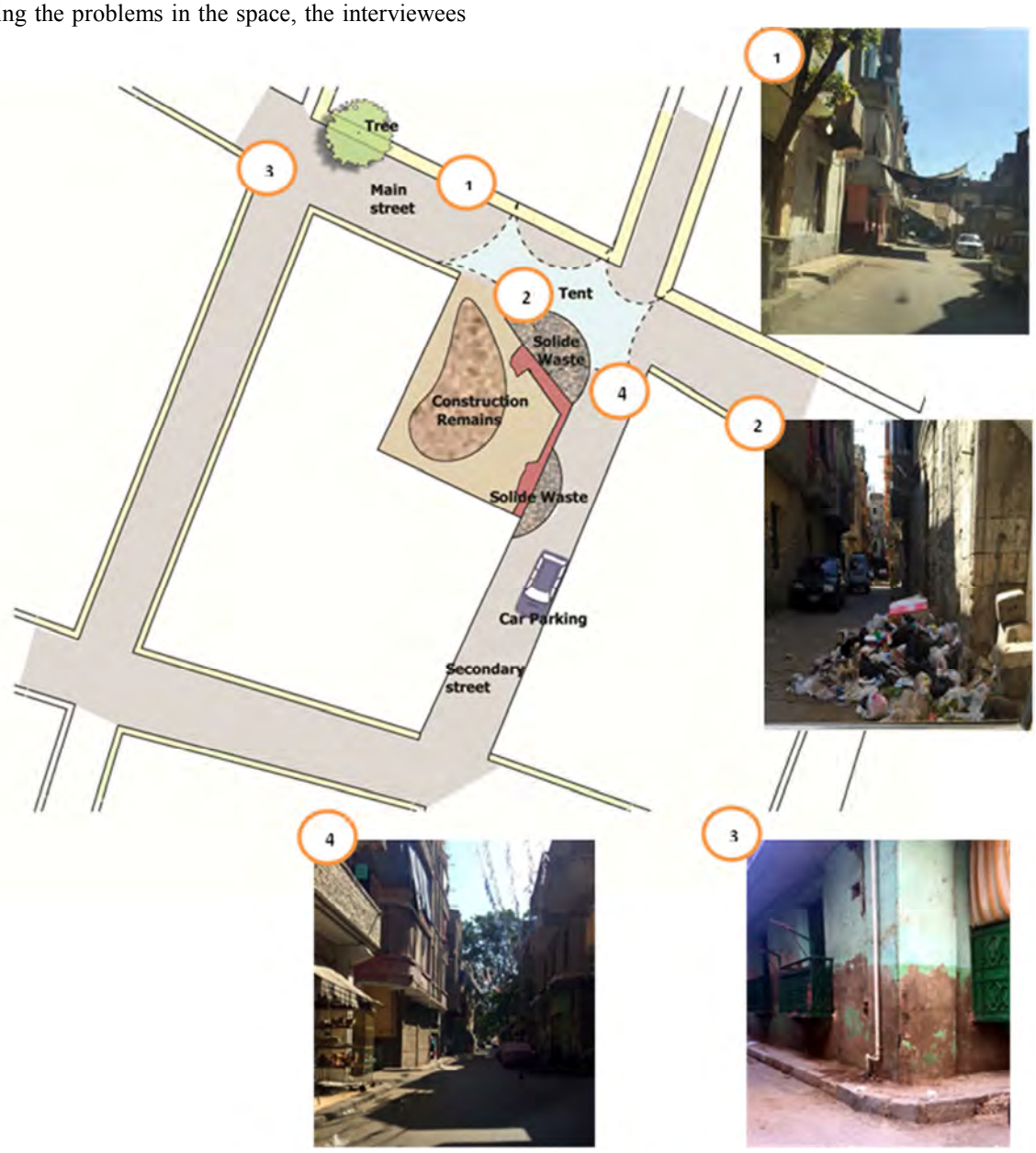
6.3. Local Community Input

The Community Outreach in the design stage is considered to result in a better outcome, as the timing allows embracing the public ideas since the project is not finalized yet [18]. Community participation should increase the use of such areas as the design would be more appealing to users, as it would support their demands, actions [23]. Therefore, the local community was asked to share the evaluation of the current space and express their opinion towards the suggested design. It is important to address the research limitations represented in the small number of the interviewed dwellers and not including all parties concerned with the design

process (local government). Moreover, applying only two levels of participation (Informing the public by providing information to help them understand the project and consulting with the public to obtain their feedback). Interviewees were welcomed to express their worries and constraints.

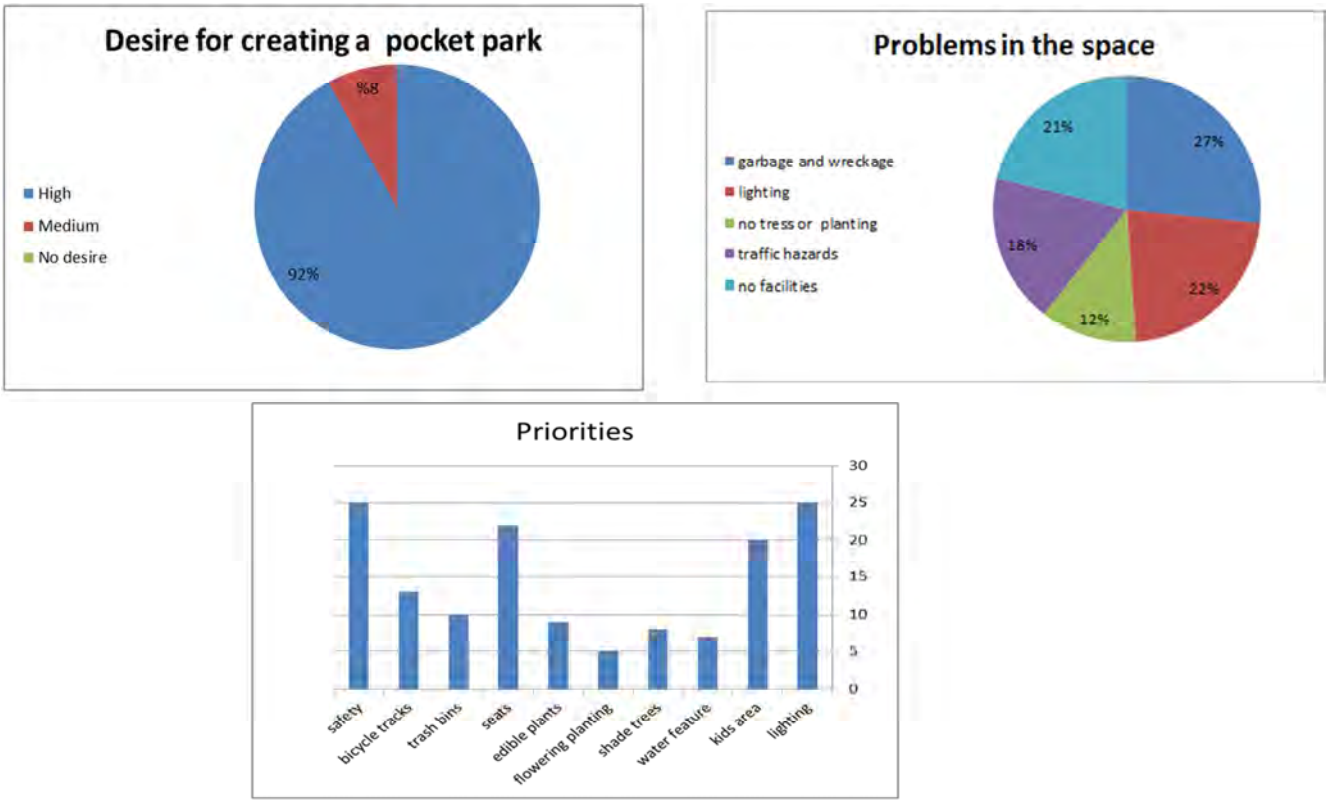
The questionnaire conducted in the study area showed that:

a. Residents (especially women with small children) supported the creation of the pocket park as they explained that it would provide a safe place to play and meet. When asked about transforming the street into a park, the only concern was expressed by car owners, who stressed on having their cars parked near their homes to keep an eye on it, to prevent theft or vandalism.
b. Concerning the problems in the space, the interviewees stated that the piled garbage and construction remains are the most important issue. Afterwards, they complained of the lack of lighting/facilities and traffic intersecting with pedestrian movement.
c. Residents stressed that there must be a separation between areas assigned to young men and zones for women and young girls. Women welcomed the edible garden concept as they may benefit economically, and demanded space for raising domestic pets. Young men suggested adding recreational games as billiard tables.
d. Lighting, separation from traffic and maintenance are the most important factors in developing the space, later comes the seats, kid's playground and bicycle tracks. The rest of the space furniture elements were mentioned less frequently, as the residents as not costumed to have such features in the area [Figure 3].



Source: Researcher

Figure 2. *The current situation of the proposed pocket park location.*



Source: Researcher

Figure 3. *Local residents' questionnaire analysis.*

6.4. Proposed Pocket Park Design

A preliminary conceptual design of the park was discussed with the local residents living adjacent to the space; a drawing was presented to three focus groups (Table 3). Some alterations were performed to meet the user's needs, satisfaction and the cultural background. The proposed park design which is developed with the local community incorporates the following: [Figure 4]

Table 3. *Characteristics of focus group members evaluating the park design.*

	No.	Characteristics	Examples of the Input
Group 1	4	14-17 years old boys	Area to play football
Group 2	4	30-40 years old women and men	Area to perform house chores Near parking areas
Group 3	3	50-60 years old males	Separate youth boys zone

Source: Researcher

Location: The park location provides easy and safe access into the park for all users either by car or on foot.

Activity in the space: The main aim of the park is to provide multi- functional spaces, which could be used by different age groups in different hours, accommodating the neighborhood needs. The kid's playground location and design strengthen natural surveillance to allow monitoring children while playing. Moreover, it is separated by a sitting area from the main street, to increase safety. The playground accommodates, a sandbox, recycled tires, recycled wood climbs, multi- use space for informal games such as football, marble balls and hide & seek.

Another space is for teens to meet near the main street. The last space is for young girls or housewives to socialize; furthermore, it could be used in social occasions like wedding and engagement ceremonies.

Planting: Planting is essential in the new design to enhance the natural qualities and add green into the area. Firstly, selecting the trees must consider the space available. In the narrow and deep spaces, shade trees are no required, as the buildings create enough shade. Deciduous trees are proposed in the sitting area to allow sunlight penetration in the winter. Evergreen trees are proposed in wide streets. Colorful groundcovers are recommended to be planted in the raised planter to protect them and add color to the space. All selected plants should require low maintenance. Finally, a small edible garden is placed to be used by locals to plant herbs in order to promote a sense of community, a sense of stewardship.

Hardscape: Interlocking pavers are proposed to be used in

the space, in order to allow rainwater penetration in winter. Colorful pavers are recommended in the kid's play area.

Seats: Two types of seats are proposed. The first type is wood raised planters (recycled) exposed to the main street dedicated to youth and teenagers. The other type is concrete seats inside the space, to serve housewives socializing in the morning. All site furniture must be anti-vandalism.

Walls: Walls are purposed to be colorful, and children in the neighborhood would participate in the painting theme.

Lighting: Three lightings are proposed, street light poles in the street, and 3m pole light for pedestrian paths, and hanging lights in narrow spaces.

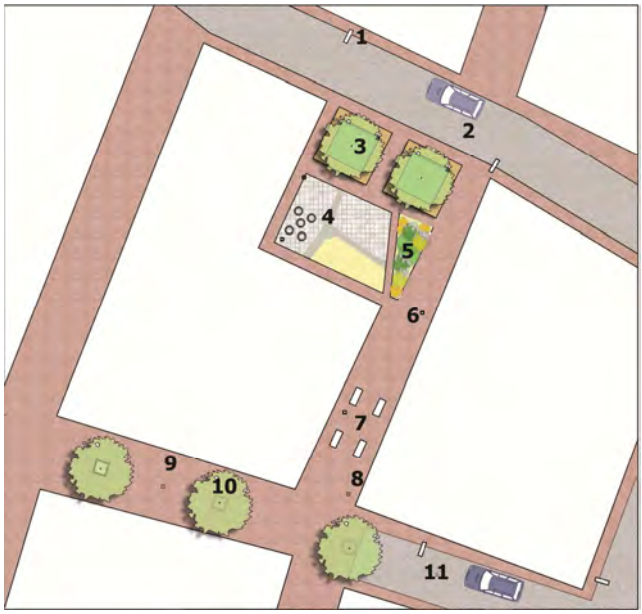
Water features: Water features were not included, as they demand high maintenance, may cause drown and hygiene hazards.

Tents and trash bins: A tent is proposed to shade the kid's playground in summer. Trash bins are added near the main street to facilitate their unloading process.

Sidewalks: Provide a sidewalk to the main street to create a safe environment for recreation in the space and prevent vehicle entry.

Pedestrian path: A street transformed to a pedestrian path due to low traffic flow and narrow right of way. The proposed path includes a lane for cycles, either adults using bikes to move around or kids playing with their bikes.

Parking lots: A closed end street is proposed to be used as a parking lot.



Source: Researcher

Figure 4. *Proposed design for the new pocket park.*

Table 4. *Design elements of the proposed pocket park.*

	Design proposal
1	-Provide street light through pole light.
2	-Redesigning streets to achieve minimum 6 m right of way -Separating pedestrian movement from vehicular traffic through sidewalks.
3	-Add raised planters to provide a seating area for youth to socialize and increase natural elements (trees/ ground cover) in the site.
4	-Provide kid's playground easy to monitor, contains a sandbox, multi-function area and recycled tires (game zone) shaded by tents.
5	-Planting beds, with the possibility of an edible garden.
6	-Maintain open frontage for building entrances (1m) / trash bins.
7	-Providing facing seats to be used by women to socialize, raise pets and perform domestic duties and light the space with hanging lights.
8	-Provide 3 m lighting poles in the path and parking lot.
9	-Transforming the street to a path to be used by pedestrians, children using bicycles.
10	-Adding easily maintained trees to soften the harsh environment, reduce pollution, and enhance the visual image.
11	-Using narrow streets for parking cars.

Source: Researcher

Table 5 illustrates the most common pocket park design criteria[1] and their implementation in the proposed park design.

Table 5. *Relation between the proposed park design and the essential design criteria.*

	Pocket park design criteria	**Proposed pocket park**
Location	Use vacant land, on small, irregular pieces of land, forgotten and unused spaces.	The site is used to collect garbage and construction remains.
Accesses and Linkage	Easy and equitable access with multiple points of entry /No barriers between the street and the park	Accessed by a main and a secondary street.
	Convenient and safe pedestrian access that is buffered from moving vehicles	Available through added sidewalks and a pedestrian path.
	Accessible by both foot and bike, and should not require the use of a car.	Available to nearby residents.
	Welcoming and appealing design to a diversity of users, offers variety and choice	Accommodate activities catering for youth, young children and housewives.
	Adaptable / comfortable spaces	Offers multi-use spaces with different privacy levels.

1 Most common criteria are criteria mentioned by more than four researchers in the comparative study (table 1)

	Pocket park design criteria	Proposed pocket park
Uses and Activities	Provide spaces for physical fitness as basketball courts /tot lots / climbing structures	Offers kids area to play, a multi-use space to play football or informal games and a bike lane.
	Provide space for mental improvement, and relaxing	Hosts social interaction venues and coloring planting.
	Recreation through playgrounds, opportunities for seating, and open grassy areas	Offers sitting areas for different groups, kids play area, a multi-use space and a bike lane.
	Add small event spaces, spaces for meeting friends, taking lunch breaks and social interaction	Hosts social interaction venues for youth kids and adults to socialize and bond.
Environmental	Provide ceiling with tree canopy	Shade trees are integrated into the design.
Landscape Elements	Add water features, gazebos, individual seating, benches, drinking fountains, bicycle racks, trash receptacles, heat lamps etc.	Lighting, seats, trash bins and a tent are added.
	Maximize the amount of natural shade	Shade trees are integrated in the design.
	Provide adequate lighting during night time	Pole lights and hanging lights are proposed.
Participation and Maintenance	Involve the neighborhood in the design process, both for build form and for artistic enhancement	Done through a participatory approach to formulate the design and collect feedback.
	Preserve a positive image	Through involving the users in construction and maintenance.
	Reduce maintenance requirements	Durable flooring, furniture and planting are recommended.

Source: Researcher

7. Conclusion

This research aims at identifying the parameters contributing to the design of a successful pocket park through a participatory approach. A theoretical background was gathered to illustrate the pocket park design criteria. The criteria encompassed the location, accessibility, space design, activities, environmental considerations, landscape elements and maintenance issues. A questionnaire, focus groups and observations were undertaken in a leftover space situated in a high-density residential area in Cairo City. The observation indicated that the pocket park, preferably should include trees and green surfaces, as the area lacks green areas. Trees should not be necessarily used for shade, as adequate shade is available from the buildings. As for the results of the local residents' questionnaire, they highlighted the desire of the local community to develop the space into a pocket park, due to the current use of the space as a solid waste dumpster. Residents furthermore stated that safety, lighting, and regular maintenance are imperative factors. Seats, kid's playgrounds were rated highly. Shade trees, edible garden, bicycle tracks came in second place in their importance. Water features and flowering plants were not considered significant; nevertheless, it must be taken into consideration that the residents are not costumed to such elements, which may affect their perception. The cultural and social norms appeared strongly in the desire to separate male from female zones and to designate spaces as extension areas to their houses. Interviewees saw the park mainly as a place for their kids to have an opportunity to play. A design was developed and discussed with the local residents to produce a park compatible with their needs. More research is needed to include other stakeholders as local authorities, in order to address possible conflicts and obstacles that may face implementing such designs. At the end, It could be concluded that while pocket parks are small in area, this by no means limits their significance. In fact, their size makes it easier to locate them in close proximity to large numbers of urban residents to relax, socialize, be active and interact with nature as part of their daily life.

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