

## Open Space Criteria for Residential Complexes Evaluation and implementation of urban housing standards

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### Abstract

Globally, urban pieces in the form of Residential Cities are rising in an enormous rate since the beginning of the 2000s. The spread of this new trend is mainly due to urban population growth and to manmade crisis. In Kurdistan region of Iraq, particularly since 2003, major housing shortages lead to the appearance of so many small residential communities (called villages) which were considered at the time as a quick solution to the problem. However, although these projects were designed and built by qualified companies, it remained to be questionable whether the planning and design criteria set by the State Commission of Housing have been implemented and if any of dweller's feedback, whether positive or negative, have been evaluated.

With respect to the question of "to what extent the designers of the residential projects took the urban housing standards of the ministry of construction of Iraq into consideration" "this study is to focus on the criteria of open spaces ratio in three existing urban housing projects in Sulaimany city in Iraq by taking into account the hypothesis which state that there is a significant ignorance of such criteria in the existing and upcoming urban residential projects. The study adopts a methodology of direct comparison between the existing open areas ratio and the one required by the above mentioned planning and design criteria. The results show the residential projects have low level of implementation of the regulation, with comparatively small differences between the projects added to that is the fact that the inhabitants had low level of satisfaction

### المخلص

تزايد معدلات تصميم و تنفيذ المجمعات السكنية على الصعيد العالمي بشكل واضح منذ بداية الالفية الثانية. الانتشار السريع لهذا النوع من المجمعات السكنية يعزى الى الزيادة في عدد السكان من ناحية والى التغيرات الاجتماعية والاقتصادية الحاصلة بسبب الحروب و الازمات السياسية في المنطقة من ناحية اخرى. في إقليم كردستان العراق وتحديدا منذ عام 2003 عملت تلك التغيرات على نشوء مجمعات سكنية صغيرة (يطلق عليها اسم القرى) كمشاريع إسكان، كحل سريع لمشكلة زيادة الطلب على السكن الحضري داخل المدن. على الرغم من ان تلك المشاريع منفذة بالكامل من قبل شركات مؤهلة الا ان التساؤل يبقى مفتوحا فيما إذا كانت تلك الشركات قد اخذت بنظر الاعتبار المعايير السكنية التي حددتها الهيئة العامة للإسكان في العراق وفيما اذا كانت تلك المشاريع قد قيمت من الناحية التخطيطية والتصميمية لمعرفة مدى رضى الساكنين فيها ومدى استجابتها لمتطلباتهم الحياتية. السؤال المطروح هنا "إلى أي مدى التزم مصممو المشاريع السكنية بمعايير الإسكان العمراني لوزارة الاسكان العراقية؟". يهتم هذا البحث بالتركيز على معيار نسبة المساحات المفتوحة في ثلاثة مشاريع إسكان حضري منفذة في مدينة السليمانية في العراق من خلال الأخذ بنظر الاعتبار الفرضية التي تنص على وجود اهمال كبير يمثل هذا الموضوع في المشاريع السكنية الحضرية القائمة والمستقبلية. تتبنى هذه الدراسة منهج المقارنة لغرض تقييم الفروق بين نسبة المساحات المفتوحة في تلك المشاريع

السكنية والنسبة التي تطلبها معايير التخطيط والتصميم المذكورة أعلاه. لقد أظهرت نتائج البحث بأن المشاريع السكنية التي تم تقييمها قد حوت على أماكن مفتوحة بنسب متدنية، الأمر الذي يؤدي الى تراجع نسب رضا السكان بالتصميم اجمالاً.

### پوخته

له سه رهتای سانه کانی هه زاره ی دووهمه وه ریژه ی دیزاین و جیبه جیکردنی شوینه کانی نیشته جیبوون له سه راستی جیهان به شیوازی کومه لگای بچووک په ره ی سه ند وه فراوان بووه. نه م فراوانبوونه ده گهریته وه بو دوو هوکار یه که میان زوربوونی ژماره ی دانیشتوانی ناو شاره کان وه دووهمیان گورانکاریکانی له روی کومه لایه تی و نابوووریه وه و قیرانه کانی که هاتوته بهرده م کومه لگاکانی ناوچه که. نه و گورانکاریکانی روویدا له هه ژیمی کوردستان له سالانی 2003 بونه هوی دروستبوونی کومه لگایه کی تازه ی نیشته جیبوونی بچووک که له شیوه ی گوندیکی بچووکدا خوی ده نوینی وه ک چاره سه رکردنیک ی خیرا بو کیشه ی داخوازیه کانی کومه لگا بو شوینی نیشته جیبوون له ناو شاره گه وره کان. له گه ل نه وه شدا که نه م گوندانه له ریگای کومپانیا به تواناکانه وه جیبه جیکراوه. به لام نایه نه و کومپانیانه ره چاوی رینمایه کانی وه زاره تی نیشته جیبوونی عیراقیان کردوه؟ وه تا چ راده یه له رووی پلاندانان و دیزاینه وه هه لسه نگانندیان بوگراوه پاش ته واو بوونیان به مه به سستی پیوانی ریژه ی ره زامه ندی دانیشتوانی گونده کان .

پرسیاری سه ره کی نه م توژیینه وه یه نه وه یه " تا چ راده یه ک دیزاینه ی نه و پروژانه پابه ند بوون به رینمایه کانی وه زاره تی نیشته جیبوونی عیراق" نه م توژیینه وه یه جه خت نه خاته سه ر پیوانه ی ریژه ی رووبه ری کراوه له سی پروژه ی جیبه جیکراوه له شاری سلیمانی. هوکاری سه ره کی نه نجامدانی نه م توژیینه وه یه نه گهریته وه بو گریمانه ی بوونی که مته رخه می له نه نجامدانی رینمایه کان. لیکوئینه وه که پروگرامی به راوردکردن نه گهریته نه ستو له نیوان ریژه ی رووبه ری کراوه ی دروستکراوه له ناو پروژه کاندان وه نه و ریژه یه ی وه زاره تی نیشته جیبوونی عیراق داوایده کات. نه نجامی لیکوئینه وه کان ده یسه لینییت بونی رووبه ری کراوه به ریژه یه کی زور که مه که بوته هوی ناره زامه ندی له نیوان هاوالاتیانی دانشتوی گونده کان ..

### 1- Introduction:

In large city centers in Iraq in general and in Kurdistan region in particular, there are problems of major housing shortages, these are clearly evident from the scale of continues migration from villages to the big cities and as a consequence the apparent overcrowding of dwellings and the subdivisions of the residential units carried out on existing dwellings. The prevailing shortage crisis caused by decades of wars were relatively solved by introducing a new series of residential cities (villages) that offer good quality accommodation for middle income household. These (villages) usually provide the need for specifically targeted citizens with respect to affordability and compatibility. To achieve these goals, the Ministry of Housing and Construction established various departments such as the State Commission for Housing whose task was to publish the general policy for housing based on the resolution no.39/2001 for the purpose of fully providing sufficient housing for citizens. However, on one hand, the master plan of these small (villages) were designed by foreign companies who mostly were not aware of the Iraqi Urban Housing Standard of the Housing & Construction Commission requirements and on the other hand the World Health Organization (WHO) required that living conditions in any urban environment must comply with health and well-being of its population [1], because it is found that a fundamental relationship exists between outdoor spaces available around any district residential unit and the level of inhabitant's physical activity to improve the quality of life in a healthy environment. Open space criteria, among others, should be based on the provisions stated by the Urban housing regulations and policies of any country to meet the social, economic and physiological needs of their inhabitants, this can be done by proposing different categories of proper open spaces that will help to increase the social

interaction among the families in order to support their well-being, this is so because, nowadays people look at their areas of residence not just as a sanctuary to seek protection from stresses of everyday life but to look at them as a life style that will improve the quality of their life and furthermore, it is possible to achieve this when the concept of home and housing move beyond a mere architectural design considerations so that the perception of the environmental quality of the surroundings are included [2].

The methodology chosen for this research is the comparison evaluation of a specific criteria named the open spaces ratio of a group existing residential projects in the city of Sulaimani (one of major cities in Iraqi Kurdistan Region) for the period of (2010-2017) .For this purpose, several design aspects will be considered, all related to the recommended plot size of three categories of open spaces per each inhabitant, and the maximum distance of access from dwellings to the open spaces.

**2- Research problem and hypothesis:** According to the Urban Housing Standards publication of October 2010, the state commission of the Housing Studies Section highlighted open space areas as follows [11]: -

1. Fields for children as playgrounds from 6 years up to 11.
2. Sport squares for youths from 12 years up to 18.
3. Community parks for all inhabitants.

Each type of these facilities or open spaces is to be planned, designed and classified according to ages. The maximum distance between the residential blocks and each type of facilities are also considered according to (table 1) which provide a planning indicator for open spaces required in any new housing project implemented in Iraq.

The study's main task is to check whether the new residential projects are in accordance with the ratio of the open spaces criteria as required by the Iraqi standards and to check the validity of the hypothesis that there is a significant ignorance of such implementation in the new urban residential projects. It is worthwhile to mention that spaces were found in the design but they were found to be out of reach because they are either at a long distance away from the dwelling hence making them inaccessible to the families, or because of the fact that they are strictly categorized as garden.

**3- Literature Review:** According to Romain C. "Urban open space: is the land that consists predominantly of unsealed, permeable, 'soft' surfaces such as soil, grass, shrubs and trees" it is the term for all these areas, whether they are publicly available or managed in general. It includes all areas of parks, children playgrounds and other green areas specifically intended for recreational use and other facilities like car parking and streets inside the urban area [3].

Neighborhood as an essential urban unit is the social context in which individuals derive satisfaction and live out of it. The characteristics of neighborhood affect resident's quality of life; this was retrieved by several studies [4]. Furthermore, researchers believe that neighborhood satisfaction is an intermediary of individual well-being and a starting point for understanding the quality of life. They also pointed out that there are many factors with respect to the living environment that contributes to the satisfaction of the population and can be defined in terms of physical and social characteristics. In housing literature, the concept of housing includes more than shelter, it contain access to social infrastructure that promotes indicators of living in individual homes, shops, schools and open spaces, employment to physical infrastructure such as roads,

electricity, water, security, waste disposal and communications [5]. Hence, whether designing or filling a residential unit to maximize satisfaction, environmental quality must achieve a balance with many essential elements that ensure welfare, one of which is the environmental balance [6].

In the same sequence concept of sustainability as a new planning paradigm has emerged as a theme in environmental enhancement. It is a term that cannot be used without referring to sustainable development that take place in the good relation and interaction between human and its surrounding environment. Sustainable development in the context of housing is the development that coordinates the social, economic and environmental objectives linking infrastructure technologies and facilities development with commitment to the long-term vision of poverty eradication and local economic development goals [7]. In urban planning, environmental quality can be achieved from a holistic point of view. This is when the resident in the housing unit derives satisfaction in terms of the overall quality of life in a given physical space.

Most of urban planning authorities consider urban open areas, urban green spaces, playground as a part of the required infrastructure of the urban district development of any new district creation to insure the health and welfare of its population. The lack of open spaces in urban neighborhoods and poor quality can seriously constrain the well-being of the population, as it does not support the development of healthy lifestyles, including time spent outdoors, walking, playing, etc.

**4- Criteria of Iraqi urban housing standards:** The Iraqi Ministry of Housing and Construction has many criteria for such residential projects provided by several authorities; one of them is the Housing Directorate [8]. The first urban housing standards in Iraq was submitted by a polish firm (PolSERVICE Company) on 1983 [9] and revised several times until the final version published by the Iraqi Ministry of Housing and Construction in 2010. According to the resolution no.39/2001 [10] the Directorate set and published the general policy of housing. The main mission of that Commission among other things is: Setting a manual of Urban Housing Standard as a guide line for housing projects in order to ensure the execution of programs according to the principles and standards conformed by the Commission in a way that the required quality is adapted. In addition, the Commission evaluate any project submitted by investors of private sector or investors of state entities and provide approval of dwellings and services networks designs of the housing project sites [11].

**5- Research methods and case study:** In this study, three randomly selected projects of residential villages built in the city of sulaimany in the period of (2010-2017), namely: Garden City project, Saib City project, and Darwaza City project. These are to be evaluated on the basis of availability of community open spaces and the required categorizations. Three categories of open spaces will be considered in the evaluation comparing with those aspects related to square meters of area per inhabitant, recommended plot size and maximum distance of access from dwellings to the open spaces.

Table.1: The planning indicators of community open spaces are presented in the Urban Housing Standard report [9, section (1-5) p.22]

Facility	Age group of users	Area in sq. m. per 1 inhabitant	Recommended plot size in sq. m.		Max. distance of access from dwellings/in m
			Total	Field	
Playfield	Children from 6 up to 11 years	0.75	600-900	400-600	200-300
Sport Field	Youth from 12 up to 18 years	0.50	900-1500	600-1000	500-800
Community park	for all inhabitants	5.00	-	-	800

The three randomly chosen projects were chosen among 12 projects, all built in Sulaimani city. Post occupancy evaluation and analysis were carried out according to the survey covering these projects in order to calculate:

- 1-The total number of inhabitants.
- 2-The total area of all Residential Blocks, Open spaces, Services and Circulations.
- 3-The total area of each type of the following open space: Play fields, Sport fields & community parks.
- 4-The maximum walking distance from those open spaces to each dwelling Block.

**5-1- Saib City Project:** A residential project in Sulaimani City near Cihan University & Kurd City residential project [12], with a total area of 11, 1504 hectare (figure 1) Designed by Dar Iwan Engineering Company, and executed by Saab Construction Company in 2012, consist of 30 multifamily houses building differentiated with two types of apartments. The total numbers of accommodations are 660 serving 3360 inhabitants (Table 2).



Figure.1: Land use map of Saib City Project (researchers)

Table. 2: Indicator of land uses in the Saib City Project with the ratios related (researchers)

Land uses	Indication	Area	Ratio
Residential		19,350m <sup>2</sup>	%17.35
Open Area		38,634 m <sup>2</sup>	%34.65
Services		25,645 m <sup>2</sup>	%23
Circulation		27,875 m <sup>2</sup>	%25
Total		111,504m <sup>2</sup>	%100

The analysis shows that all buildings are surrounded by enough open space area, but these areas are mostly without any indicator of categorising or distinguishing as recommended in the standards (Table 3). Even with the availability of the open spaces, these spaces don't serve a certain activity like youth sport or children gaming. This means that in the absence of such identification, shortage in the design or in the execution of these facilities in a proper way is more likely.

Table.3: Indicator of Saib City Project open area analysis (researchers)

Facility	Standard sq.m./Inhabitant	Actual quantities sq.m./Inhabitant	Total Area For 3360 Inhabitant	Evaluation
Playfield	0.75	1.04	3,500	Above
Sport Field	0.5	0.44	1,480	Under
Community park	5	10	33,654	Above



Figure.2: Saib City Project walking distance analysis (researchers)

Table.4: Indicator of Saib City Project open areas walking distance analysis (researchers)

Facility	Standard Max. distance of access to dwellings/in m	Actual quantities in m	Evaluation	Indication
Playfield	200-300	35-165	Above	
Sport Field	500-800	60-244	Above	
Community park	800	52-247	Above	

Moreover, the analysis indicates that the ratio of the sport field per inhabitant is under the standard, the ratio of the playfield & community park per Inhabitant is above the standard as shown in (Table 4). The maximum distance from those three facilities and the most far residential block are above the range of standard walking distance (Figure 2).

**5-2 Darwaza City Project::** This Residential project [13] located near the Sulaimani Governorate Building built on an area of 13, 2000 Hectare (Figure 3). designed and executed by Darwaza Group, with 21 multifamily houses of more than seven apartment types. The numbers of accommodations are 1050 serving 5250 inhabitants (Table 5).

Table.5: Indicator of land uses in the Darwaza City Project with the ratios related (researchers)

Land uses	Indication	Area	Ratio
Residential		22,800m <sup>2</sup>	%17.27
Open Area		27,720m <sup>2</sup>	%21
Services		20,160 m <sup>2</sup>	%15
Circulation		61,683 m <sup>2</sup>	%46.73
Total		132,000m <sup>2</sup>	%100

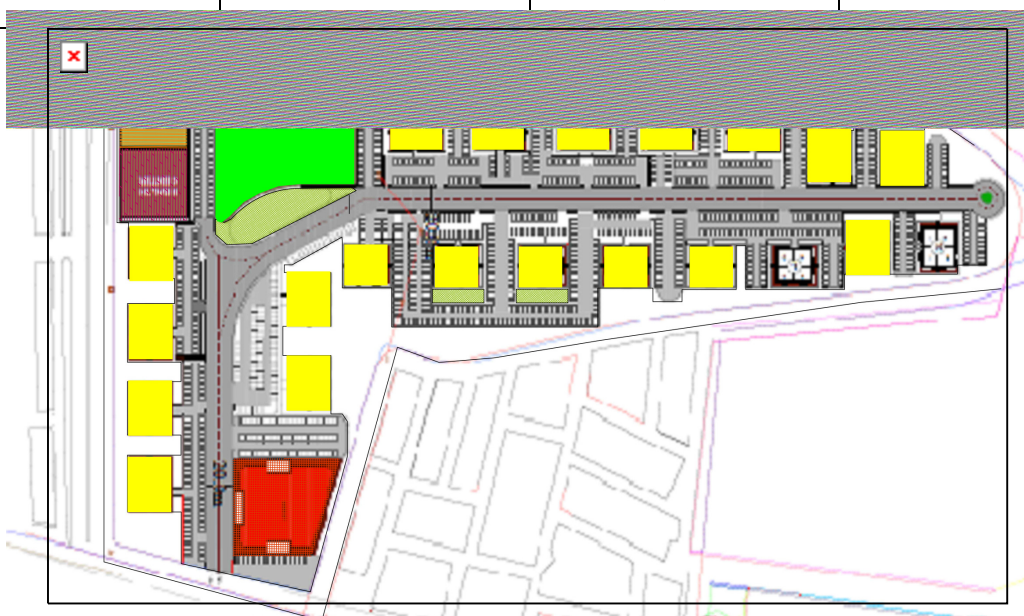


Figure.3: Land use map of Darwaza City Project (researchers)

The analysis shows that there is no enough open space area around the buildings, and most of the spaces are designed as streets and cars parking area (Table 6).

Table. 6: Indicator of Darwaza City Project open area analysis (researchers)

Facility	Standard sq.m./Inhabitant	Actual quantities sq.m./Inhabitant	Total Area For 5250 Inhabitant	Evaluation
Playfield	0.75	0.45	2,400	Under
Sport Field	0.5	0.15	800	Under
Community park	5	4.67	24,520	Under
Table -5				

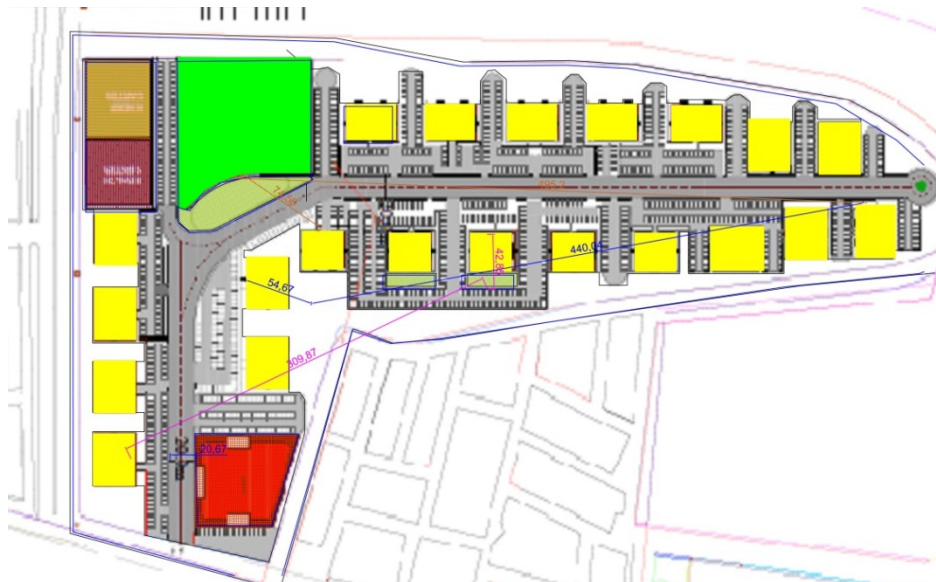


Figure.4: Darwaza City Project walking distance analysis (researchers)

Table.7: Indicator of Darwaza City Project open areas walking distance analysis (researchers)

Facility	Standard Max. distance of access to dwellings in m	Actual quantities in m	Evaluation	Indication
Playfield	200-300	75-495	Under	
Sport Field	500-800	42-310	Above	
Community park	800	55-440	Above	



Results from analysis shows that the ratio of the sport field, playfield & Community Park per Inhabitant are all under the standard as shown in (Table 7). The maximum walking distances from playfield to the furthest residential block are under (lower) standard but the maximum walking distances from sport field and Community Park to the furthest residential block are above (higher) standard (Map 4).

**5-3 Shahin City Project:** A residential project situated in Sulaimani City at Qularaisy with a total area of 10.8868 hectare (Figure 5). Designed and executed by Hamkar Company, the residential buildings differentiated with five types including 3 high rises building, 8 low raises building, 82 single family houses, 4 villas and 16 corner houses [14]. The numbers of accommodations are in total 326 serving 1844 inhabitants (Table 8).

Table.8: Indicator of land uses in the Shahin City Project with the ratios related (researchers)

Land uses	Indication	Area	Ratio
Residential		24,575 m <sup>2</sup>	%22.57
Open Area		10,000 m <sup>2</sup>	%9.18
Service		18,960 m <sup>2</sup>	%17.42
Roads		55,333 m <sup>2</sup>	%50.83
Total		108,868 m <sup>2</sup>	%100

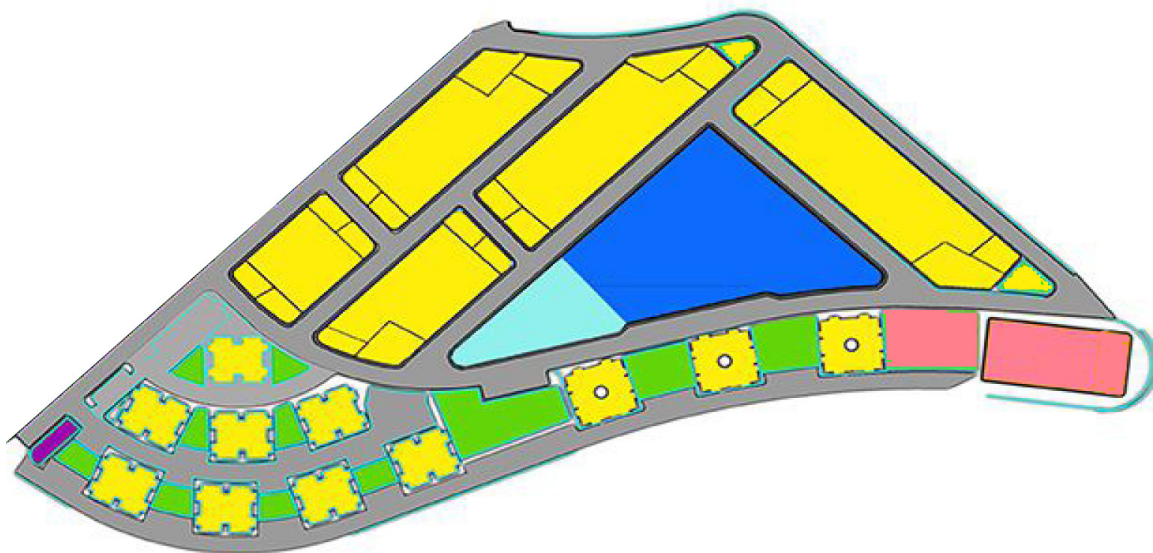


Figure.5: Land use map of Shahin City Project (researchers)

The analysis shows that there is no enough open space area around the single-family buildings, and despite this existence around the multifamily buildings but there is no sign of using them as playfields or as a sport area (Table 9).

Table. 9: Indicator of Shahin City Project open area analysis (researchers)

Facility	Standard sq.m./Inhabitant	Actual quantities sq.m./Inhabitant	Total Area For 1844 Inhabitant	Evaluation
Playfield	0.75	0.67	1,250	Under
Sport Field	0.5	0	0	0
Community park	5	4.7	8,750	Under

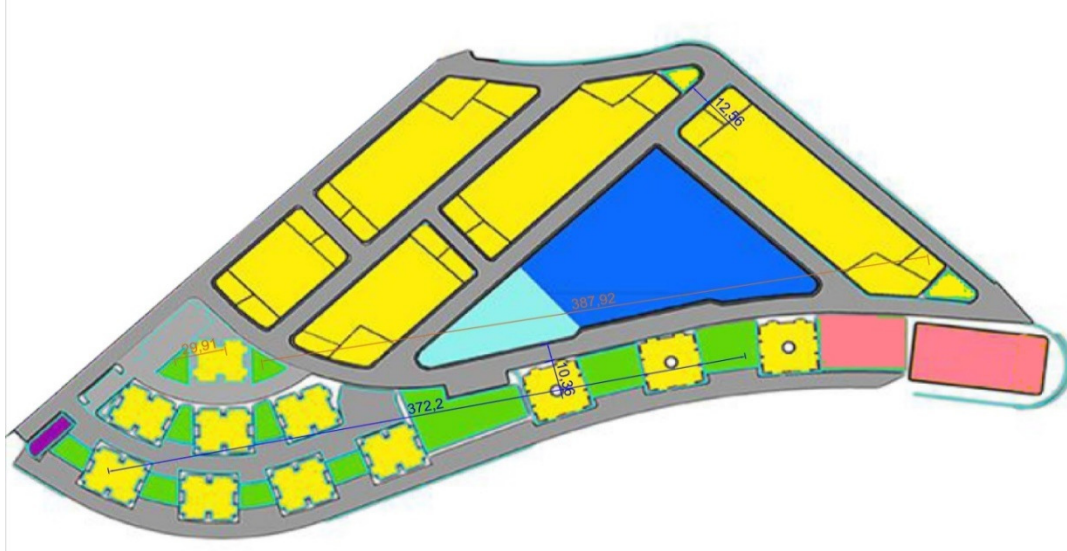


Figure.6: Shahin City Project walking distance analysis (researchers)

Table.10: Indicator of Shahin City Project open areas walking distance analysis (researchers)

Facility	Standard Max. distance of access to dwellings/in m	Actual quantities in m	Evaluation	Indication
Playfield	200-300	30-388	Under	
Sport Field	500-800	0	0	
Community park	800	372	above	

The ratio of the playfield and community park per inhabitant are out of standard, the ratio of the sport field per inhabitant is zero because there is no sport field in the project (Table 10), the open area is neglected completely for the single-family houses. The maximum walking distance from playfield for the most far residential block is out of standard too, except the Community Park which is in range (Figure 6).

## **6- Conclusion and Recommendations:**

The results obtain from the open area analysis of the above new residential projects shows several facts:

1. Most of the projects are out of the standards with respect to minimum requirements stated in the urban housing design standards.
2. Although these open areas are provided in some projects but they are designed to serve other functions such as car parking, streets or just as green area without categorizing or distinguishing them as required by the urban housing standards, it is possible that the investors in the sector of urban housing projects did not pay much attention to the use of those open areas. These areas should have been categorized to take into account the possibility of turning them in future into children playground, or sport fields, or even as parks for supporting the life and welfare of the families.
3. Furthermore, although some areas seemed to be allocated for open spaces in the master plan, it seems that those areas are far away from the maximum walking distance that required by the standards, and that cause a significant limitation in the use and benefit of such areas.
4. It is not acceptable to consider streets and car parking at any urban housing project as an open area because these areas do not have the potentiality to contain any of those activity needed by the population and families to achieve a healthy urban environment

### **Our recommendation is that:**

- 1- the local authorities which are responsible for giving the official permission to construct such projects to check the qualification of those companies whom designed the projects to be according the recommended criteria performed by the Ministry of Construction & Housing State Commission of Housing Studies Section which are used in Iraq.
- 2-It is highly recommended that the authority arrange quality control teams that will frequently check these projects during and after execution. And that those spaces are categorized and utilized according to their specific design.
- 3-There should be regular enquiries in the form of feedback for the inhabitants to have a say or to raise their concerns about the whole recreation activities and the facilities to be provided to improve their lifestyle.
- 4-Although it's too late for making drastic changes in the urban planning of the existing complexes, however, it's possible to make certain improvements to the life style of the inhabitants according to feedback results and more feasible ideas can also be considered such as proper walking and bicycle lanes as well as making gardens, greeneries and plantations on the roofs for recreational purposes in case ground spaces are scarce.



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