Evaluating the Efficiency of Sustainable Neighbourhood Planning and Design Criteria in New Housing Projects

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Abstract: The residential neighborhood is considered the basis of the city's urban construction. Contemporary trends have focused on the possibilities of developing residential neighborhoods to achieve a high quality of life for their residents. On this basis, many international criteria for sustainable neighborhoods have emerged. Given that the local criteria of the Iraqi Housing Authority are still within the traditional criteria, the research resorted to filling the knowledge gap through a theoretical framework based on discussing the basic concepts of the residential neighborhood, modern trends, and academic studies for developing the residential neighborhood while studying international criteria and recent studies in the criteria of sustainable residential neighborhoods. The theoretical framework resulted in extracting the basic criteria for planning, designing and testing their applicability in the local reality, achieving the research goal of addressing and developing local criteria and their applicability. The research was directed at application to the local reality within the practical framework while following the descriptive and quantitative approach in analysing data for selected samples of new residential projects. To conclude the possibilities of achieving design and planning criteria in modern projects, the research reached the most important recommendations for developing and amending the local criteria of the Housing Authority to suit the requirements of the current population and achieve quality life.

Keywords: sustainable residential neighborhood, residential diversity, neighborhood planning, contemporary planning trends, urban planning, and design criteria.

1. Introduction

The residential area represents the foundation of city development, which determines people's quality of life and well-being, and is the basis for enhancing residents' requirements. The residential neighborhood also constitutes the main influence on residents' daily lives, coinciding with the contemporary trend in sustainable urban planning in housing and new concepts in residential planning and urban development. The research stems from the importance of planning new neighborhoods according to contemporary planning criteria for sustainable planning, which have been used globally and in the Arab world to create residential neighborhoods that meet social, economic, environmental, and urban requirements. Therefore, the research will focus on building a knowledge base to derive criteria for sustainable planning in residential neighborhoods by defining the concept of the residential neighborhood and its most important aspects, reviewing neighborhood planning theories, and introducing the idea of developing residential neighborhoods by addressing that most of the critical intellectual trends in sustainable residential neighborhoods depend on studying previous literature. International, Arab, and local issues discussed the idea of sustainable residential neighborhoods, and the final criteria were tested by residents and specialists to determine the extent to which it is possible to approach or move away from sustainable planning Criteria, given that the

city of Basra is witnessing a new urban trend to create modern residential neighborhoods that meet the contemporary requirements of residents. Hence the research problem arises, which is that the city's neighborhoods planned according to local Criteria do not meet societal and environmental requirements in particular and urban and economic requirements in general, in addition to the weakness of local criteria and their lack of updating. In keeping with the current era. Therefore, the research study aims to present a study that contributes to the development of criteria. Current local planning is moving towards sustainable planning criteria for new residential neighbourhoods. The goal of the research is to address the theoretical framework that represents the knowledge base in formulating criteria for the sustainability of residential neighborhoods and to extract the basic vocabulary necessary for sustainable planning criteria, as evidenced by the methodology adopted in the research. The structure of the study is as in the following section.

2. Research Methodology

The research methodology was based on building a theoretical base for sustainable planning Criteria in residential neighborhoods through a theoretical framework that included introducing the main research concepts from the concept of the residential neighborhood and the most important theories that dealt with residential neighborhood planning, with an orientation to studying the development of residential neighborhoods and identifying the most critical intellectual trends and their actual implications on the formulation of Criteria. After presenting the basic concepts, the research shows the most important previous studies that studied the relationship of residential neighborhood planning to sustainability and urban development of residential neighborhoods in cities. To formulate the final criteria for a sustainable residential neighborhood, the research dealt with the most important studies that discussed sustainable planning Criteria for the residential
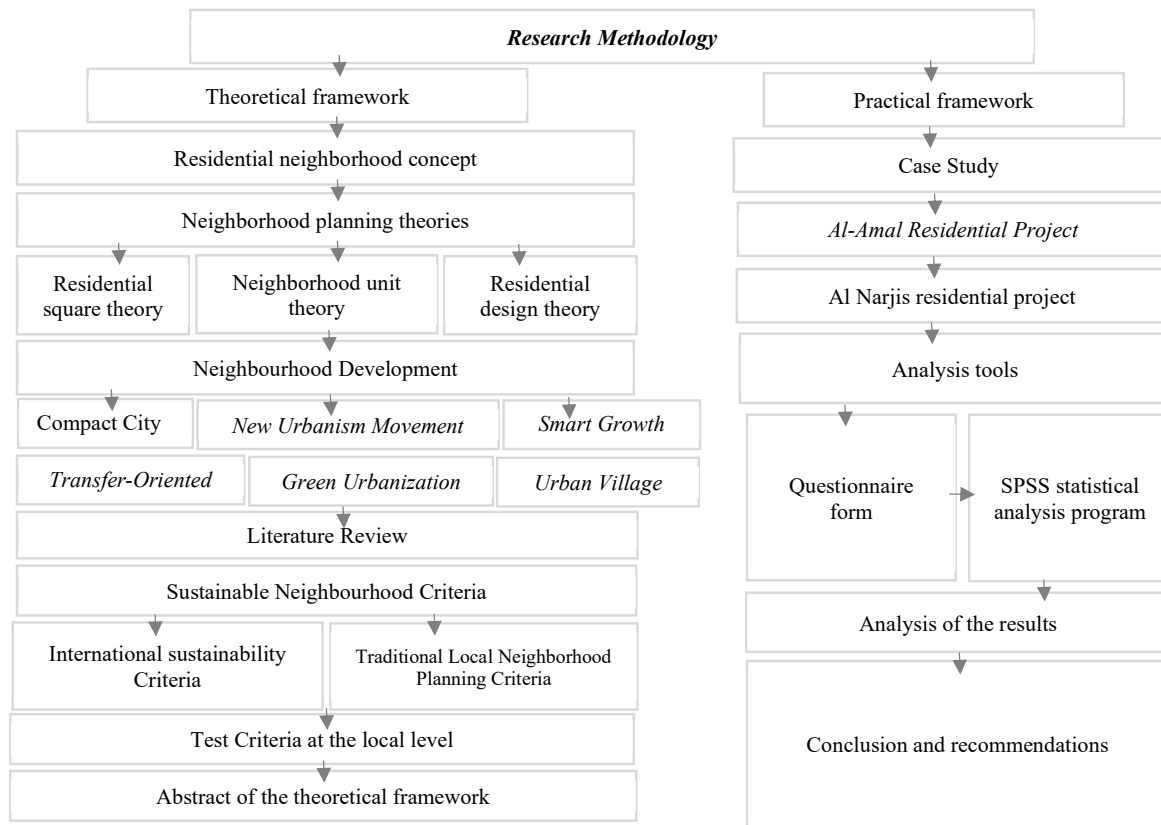

Figure (1). illustrates the methodology - researcher

neighborhood, including international sustainable planning, in addition to reviewing the local Criteria of the Iraqi Housing Authority and extracting weak points and the extent to which local Criteria are directed towards the sustainability of residential neighborhoods. This theoretical study aims to remove the final criteria for the possibility of planning a sustainable neighborhood, enhancing the extracted Criteria in the theoretical framework, and testing their suitability for application in the city of Basra so that they can be adopted in addressing local Criteria. The research directed to conducting a survey of random samples from several traditional areas in the center of Basra and measuring the extent to which the extracted criteria are far or close to application to the new reality of Basra, as the extracted criteria are the extracted criteria. As a result of several studies and Criteria in different places and times, and to enhance the theoretical aspect, the research methodology addressed a practical framework that includes the functional element of new urban residential neighborhood projects: hope. Residential projects and the Narjis residential project, measuring the extent to which Criteria of sustainable residential neighborhoods are achieved in the new planning direction of Basra in residential projects by measuring the satisfaction of residents and specialists in urban planning and the practical framework methodology is implemented. Through a questionnaire form for residents, random samples of 50 for each residential neighborhood within the projects, and specialists with 20 samples to evaluate each project, a three-way Likert scale was used to conclude the Evaluation and statistical analysis using the SPSS program in addition to arriving at conclusions and recommendations that achieve the primary goal of the research.

3. Neighbourhood Planning

Clarence Perry described a residential neighbourhood as an urban area with 5,000-6,000 residents (Golubchikov. et al.,2012). It offers facilities related to the requirements of daily life, including a primary school accommodating 1,000-1,200 students (Parolek et al., 2008). The residential neighbourhood also has activities related to the daily needs of residents, including markets and a health centre, as well as green spaces and entertainment places (Singhal .M, 2011). The concept of the residential neighbourhood is also linked to urban life, and its importance is integrated

with city planning. Therefore, each residential neighbourhood ideally consists of a specific and identifiable centre that includes various markets, entertainment centres, and public services for daily requirements. The housing units are distributed around the centre, and the walking time from the units to the centre should be 4 to 10 minutes (Amorim, 2005); several theories have emerged that explain the concept of the residential neighborhood:

3.1. Residential square theory

The theory proposed a rectangular land area with dimensions (180,200 meters long - 60 meters wide) intended to house 1,200 families. This theory was applied in 1972 in the Sunnyside complex in New York, which was designated for the city's working class and included 1,200 families. The residential complex was designed with various residential styles, horizontal and vertical residential units, and open green spaces (Walters DR,2007), as shown in Figure 2.
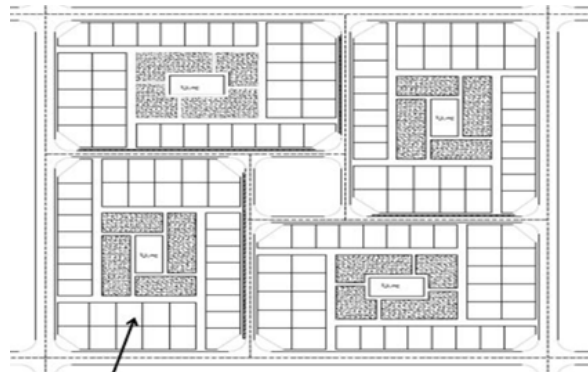

Figure (2). Master plan for the Sunnyside residential complex in N. Source: https://www.rehla.academy/post/residential-neighborhood

3.2. Residential neighborhood unit theory

The theory was proposed by urban planner Perry and is based on the existence of a residential neighbourhood that includes several uses that meet the population's requirements for social, educational, and health services, with movement planning in a way that places the residences together within a radius of 400-800 meters. The presence of a street network surrounding the residential neighbourhood reduces transit traffic. To maintain more privacy for the residents, the number of residents was set at 5,000-9,000 people,
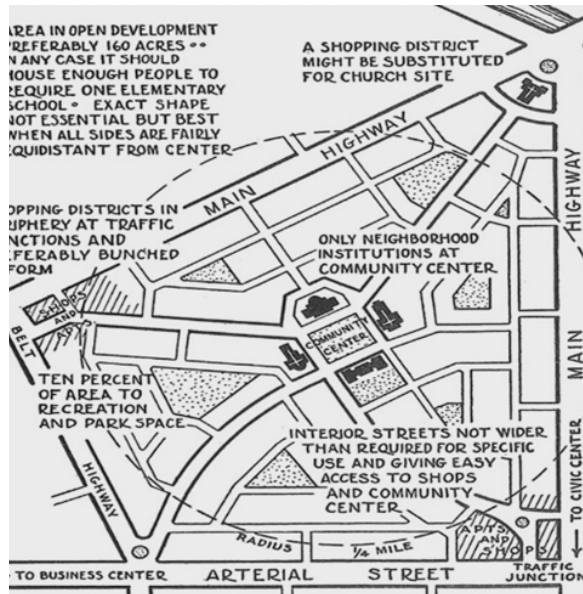
Figure (2). Master plan for the Sunnyside residential complex in N. Source: https://www.rehla.academy/post/residential-neighborhood

with the availability of primary services for the residential neighbourhood, and the basis of services is the presence of the primary school (Afifi,2000). as shown in the Figure3.

3.3. The theory of residential area design

The theory discussed the development of solutions for urban growth in cities and the problems generated by growth. It proposed dividing residential neighborhoods into graded residential clusters interspersed with green spaces and the area's commercial center, with internal movement systems in a grid that are isolated from external movement systems that are radial to achieve independence for the residential neighborhood. It also proposed the distribution of uses. Land that serves the number of residents and a specific area (Afifi,2000).

The theories generally focused on planning the residential neighborhood in a way that is commensurate with the population requirements and the daily and future needs of urban growth within the theoretical proposals for planning the residential neighborhood, based on several criteria, including the necessary uses for the residents to achieve a quality of life, the population density in the residential neighborhoods in proportion

to the residential spaces, as well as It focused on movement and isolating movement inside the residential neighborhood from outside the residential neighborhood to facilitate the process of transportation and ease of access, as well as achieving privacy for residents. It focused on the environmental aspect within its proposal of green spaces interspersed with residential areas, so the residential neighborhood is a gathering of several residential units. The main uses are recreational, educational, and health in a specific area of land whose basis is to meet the daily and future needs of the residents. Therefore, the research is directed at discussing the possibility of achieving the everyday and future requirements in the residential neighborhood within the concept of residential neighborhood development.

4. Neighbourhood Development

The concepts of development and sustainability are linked within three dimensions, social, economic, and environmental (Kohon, 2018) that achieve interaction and continuity of societies, growth and efficient financial performance, and the natural and artificial environment's ecological balance within the city, respectively (Al-Zubaidi MS, 2007). Many new trends have emerged in residential neighbourhood development and sustainability.

4.1. Compact City

A specific area of land wherein building blocks are organized centrally and vary in densities from the centre towards the periphery, rising and falling towards the central nodes of the city and residential areas, respectively (Westerink et al., 2012). The compact city approach focuses on diverse and mixed uses of land, residential communities being located outside the centre but within a distance that can be covered in 15–20 minutes by walking, high densities of residential communities, and the grouping of main activities within the centre (Moughtin C, et al, 2005).

4.2. New Urbanism Movement

This first appeared in the United States in 1980 (Walters David, 2007), stipulating brilliant growth direction and environmental protection in residential communities and limiting the unplanned

urban spread of residential areas (Corbett & Corbett, 1999). The focus was on promoting walking between spaces in residential complexes by providing safe and healthy movement paths spreading through open spaces and places of daily activity (Watson, 2003).

4.3. Smart Growth Movement

This movement stipulates several urban indicators encountered in countries, cities, and residential neighbourhoods: for example, mixed-uses, consolidating building blocks by grouping the densities within regions, encouraging pedestrians with clear movement paths (Sharma, 2011) like urban spaces designated for them to feel safe and secure within their neighbourhoods, and offering Diversity and multiplicity in choosing between vertical and horizontal housing units (Samoin, 2016).

4.4. Transfer-Oriented development

Traditional neighbourhood development has been directed towards a new urban and design planning context, linking existing places using light rail technology (Al-Haidari, 2010). Each transport gathering station has a 400–800 m radius, stimulating the neighbourhood through mixed-use and high density (Walters .et al, 2004).

4.5. Green Urbanization

This idea focuses mainly on city planning within the concepts of renewable energy, environmental preservation, and disposal of environment-polluting emissions to increase green spaces and mixed-use land and develop public transport systems to improve the residents' quality of life (Lehmann, 2011).

4.6. Urban Village

This planning model was used to develop residential communities in British neighbourhoods in the late 1980s; it applied ideals such as limiting the number of residents in residential complexes to 3000–5000, mixed land use, safe and healthy transportation using bicycles and mass public transportation, average urban density, and open dense green spaces (Towers, 2005).

5. Sustainable Neighbourhood

The concept of a sustainable neighborhood is the focus of a number of previous studies, which the research will address in order to clarify the concept. According to a guide by the Federation of Canadian Municipalities (Canadian Municipalities.2016), sustainable neighbourhoods are neighbourhoods of the future, highly efficient in resource use and supporting a high quality of life by achieving diverse housing, mixed use of land, and a variety of recreational green and open spaces. They encourage walking and create unique paths for walking and cycling with neighbourhood services. The study highlighted the general principles in the design of sustainable neighbourhoods, such as a well-defined and easily accessible commercial centre's presence in the neighbourhood, people-friendly streets and open spaces, schools, recreational areas, cultural and social centres, pedestrian and cycling streets and diverse housing units such as residential towers and horizontal housing units (Labin,2022). she described them as neighbourhoods of the future that preserve the environment for future generations. It is based on the extraction of eight urban design and future planning criteria: regional issues, mixed-use, connectivity, Diversity, cohesion, pedestrian-oriented buildings, walking, and houses being economically accessible. According to the (United Nations- Habitat 2014) report, a sustainable neighbourhood's primary goal is the population's quality of life and well-being, achieved through five principles. The first is Adequate space for streets and an efficient street network. The second is the population density of the residential neighbourhood, which should be high, at least 15,000 people per square kilometre. The third is Mixed land use. The fourth is a social mix among the population by creating gatherings and open green spaces to increase social interaction. The fifth is Limited land-use specialization.

After discussing the concept of residential neighbourhood planning, the requirements for residential neighbourhood development, and contemporary trends that focus on sustainability in the residential neighbourhood and the importance of moving toward sustainable planning, the research will discuss the most important studies that examined the sustainable residential neighbourhood.

6. Literature Review

The research in this paragraph addresses the most critical previous literature that discussed the possibility of achieving sustainability in developing residential neighbourhoods to achieve the quality of life for residents and ease of life requirements within the residential neighbourhood. Suppose the study (Jasim,2018) discusses a sustainable neighbourhood and the possibility of achieving it in the new planning approach for cities, given the dominance of cars as the means of transportation and movement and the unsustainable construction methods in residential neighbourhoods that caused the waste of resources and poor quality efficiency in achieving quality of life for residents in the current residential neighbourhoods in exchange for the weak achievement of development indicators Sustainable residential neighbourhood. Another study discussed the development potential of the residential neighbourhood, given that the residential neighbourhood is the fundamental nucleus of the city and is linked to the lives of residents. Development is integrated by achieving the social, economic, and environmental dimensions. Another study also discussed the principles and characteristics of development for the residential neighbourhood through cohesion, interconnectivity, the orientation of buildings, transportation, and ease of access (Abbas, 2019). A study (United Nations -Habitat, 2012) discussed the principles of residential neighbourhood planning by thinking more about the sustainability of the residential neighbourhood instead of focusing on the design and the general form of design for a single building. The way of living of the occupants in the residential neighbourhood must be thought about because people do not only live in homes but also a residential system. To link it to public services that achieve a decent quality of life, such as encouraging public transportation instead of private cars that pollute the environment, the spatial organization of green spaces, facilitating

Table (1). summarised of previous literature

	study	idea of the study	summary of the study
1	Jasim2 018	The study focused on the fundamental indicators in planning a sustainable residential neighbourhood and achieving quality of life and contemporary lifestyles, including the dominance of cars and high building density.	The study concluded that local Criteria applied in planning new residential neighbourhoods could be more robust.
2	Abbas, 2019	The study proposed developing residential neighbourhoods by contemporary planning trends regarding the residential neighbourhood's relationship to sustainability.	The study concludes that the development of residential neighbourhoods is achieved by integrating the social, economic and environmental dimensions.
3	UN-Habitat 2012	The study focused on achieving quality of life for residents in the residential neighbourhood by focusing on the comprehensive planning of the neighbourhood and not the design at the section level.	The conclusion of the study gave indicators, which are encouraging public transportation instead of private cars that pollute the environment, the spatial organization of green spaces, facilitating communication and social interaction within neighbourhoods, creating clean energy systems for homes by employing solar energy, and providing pure drinking water,
4	Dühr 2023	The study proposed the idea of sustainability in the neighbourhood by achieving the social dimension.	The study's conclusion confirmed the possibility of social interaction in the neighbourhood through green squares and gathering areas for all age groups.
5	Larco 2015	The idea addressed urban design that contributes to the city's development with better social and urban sustainability goals.	The study's conclusion emphasized the importance of the social and environmental aspects in the sustainability of the residential neighbourhood, including achieving safe and green spaces for social and urban interaction, in addition to the spatial memory and urban identity of the communities in the centre of the neighbourhood.
	Previous literature focused on neighbourhood development and the trend toward adopting sustainable planning in residential neighbourhoods because it improves residents' quality of life. Each study also showed several fundamental indicators for achieving sustainability within the main social, economic, and environmental dimensions. To achieve sustainability in a residential neighbourhood, several Criteria must exist for each dimension. Sustainability, which will be clarified in the next paragraph within the Sustainable Neighborhood Criteria section		

communication and social interaction within neighbourhoods, creating clean energy systems for homes by employing solar energy, and providing pure drinking water, that is, reducing Energy-consuming resources with resources that guarantee the rights of future generations. Another study confirmed that residential areas can make a city efficient by planning sustainable neighbourhoods with social dimensions that enhance social and economic interaction by efficiently using resources and environmental dimensions by improving green spaces and water bodies, as well as providing separate streets for pedestrians and public transport, using neighbourhoods to organize the city rather than introducing complexity in design (Dühr, 2023). The study (Larco, 2015) focused on urban design that enhances the city's continuity with environmental, economic, social and urban sustainability goals. Regarding urban design, vision, and sustainability, starting from the city's central residential neighbourhood, it enhances movement design to achieve safe and green spaces for social and urban interaction, along with spatial memory and city identity for the gatherings in the centre of the neighbourhood. Previous literature can be summarised in Table 1

7. Sustainable Neighbourhood Criteria

7.1. Studies that addressed the possibility of sustainable residential neighborhood criteria

The study (Al-Hagla,2008) addressed the sustainable neighborhood in the social dimensions, enhancing interaction and communication in neighbourhood development, and the environmental dimension in the design of gathering spaces and green spaces within residential areas, which are considered necessary additions to social interaction, along with the role and Responsibility for open spaces in and communication between residents after the interruption of spatial communication in modern planning in residential neighborhoods. The study discussed the dual role of social and environmental dimensions in developing neighborhoods and clarifying personality traits. A distinction has been made between green and grey spaces in public places, promoting green areas such as parks, children's playgrounds, and gathering spaces for activities. (Najim,2016) Moreover, others dealt with contemporary sustainable neighbourhood planning Criteria,

defining sustainable neighbourhoods within basic sustainability dimensions (social, economic). The social criteria included safety, privacy, clarity, and permeability, while the financial criteria included construction costs, housing options, Diversity, empowerment, and economic facilitation of owning housing units. The study measured the Criteria of selected projects, determining the extent to which sustainability was achieved. (Jasim,2018)

Moreover, others discussed in the survey the urban requirements in sustainable neighbourhood planning as a basis for the fact that the residential neighbourhood is an urban complex that reflects the features and character of the city. The urban dimension was addressed within the concepts of urban Diversity between residential units and building density, along with the cohesion of the residential complex and easy access to the public activities of the residential neighbourhood, while adopting means of transportation and sustainable planning, Mixed land uses. (Abbas,2019) The Criteria for developing social residential neighbourhoods were extracted and defined in terms of community empowerment and residential Diversity.

At the same time, the economic Criteria were determined by examining the purchasing power of housing units and real estate loans for different income groups. Environmental Criteria for energy efficiency, green areas, and pedestrian encouragement were set. The study added to the values of developing neighbourhoods that consider the urban context of the residential neighbourhood and design Criteria, including clarity of movement and connectivity paths and Diversity in residential units and built materials. (Labin,2022) The researcher studied sustainable neighbourhood Criteria and design methods in Jordan by comparing two residential neighbourhoods and measuring the Criteria they reached. The criteria included mixed-use, the regional aspect, connectivity within the Criteria of connectivity and clarity of the residential neighbourhood, the general centre of the neighbourhood and the vitality of the activities it needs, the possibility of walking around the neighbourhood through motor paths and their clarity and ease of access, ease of access, the orientation of buildings to pedestrians, green spaces and interaction. (Dühr,2023) studied sustainable housing in neighbourhoods, applying in Sydney, Australia, focusing on:

- Land use: Ensuring effective land use, density, infrastructure, and access
- Community spaces: Providing gardens, green spaces, social and cultural centres, and gathering squares.
- Designing Safety and Security
- Residential units: Providing horizontal and vertical units, Diversity and flexibility in space and design.
- Environmental aspect Criteria: Site planning, reducing negative global warming-causing designs from building orientation, installing ventilation, and shading. Green and blue
- infrastructure: Providing vegetation cover and green spaces between residential building spaces and public gathering squares and designing fountains in public squares.
- Service participation: Reducing and recycling waste in the neighbourhood.
- Renovation in the neighbourhood: Using recycled material such as recycled aggregates in concrete for streets and pedestrian paths.
- Transportation: Encouraging walking in the neighbourhood by designing street systems with high safety and security, memorable streets for pedestrians and bicycles, and easy access to the various neighbourhood facilities, such as schools, markets, religious places, parks, and health centres.

7.2. International Criteria in sustainable planning for residential neighbourhoods

7.2.1. (UN-Habitat,2014): Discussed a new strategy for sustainable neighbourhood planning that included five basic principles for new planning housing projects that stipulated the following:

- Transportation network efficiency: The road network's area must not be less than 30 %, and the length must be 18 km2 of the residential neighbourhood area.
- Residential density: There should be approximately 15,000 people per km2, with 150 or more people per ha.
- Mixed land use: At least 40 % must be allocated for economic use.
- Social cohesion: 20–50 % of the housing units must be allocated for low-income groups, and possession must be limited to no more than 50 % of the residential neighbourhood.
- Land use: The area for any use should

be at least 10 % of the total residential neighbourhood area.

7.2.2. LEED Criteria: Leadership in Energy and Environmental Design appeared in the United States by the Green Building Council to classify green buildings with environmental and energy leadership. The goal is to produce environmentally friendly buildings with a better economic system. (Al-Anbari,2013) They included the following Criteria:

- SMART LOCATION & LINKAGE
- NEIGHBORHOOD PATTERN & DESIGN
- GREEN INFRASTRUCTURE & BUILDINGS
- INNOVATION AND DESIGN PROCESS
- REGIONAL PRIORITY CREDIT

Design criteria related to the main research topic included the following Criteria: Mixed-Use Neighbourhood Centres, Mixed-Income Diverse Communities, Reduced Parking Footprint, Street Networks, Transit Facilities, Transportation Demand Management, Access to Civic and Public Spaces, Access to Recreation Facilities, Visit ability and Universal Design, Community Outreach and Involvement, Local Food Production, Tree-Lined and Shaded Streets, Neighbourhood Schools

7.2.3. Iraqi Housing Criteria Manual 2010:
The Iraqi Public Housing Authority specified a special booklet for residential Criteria for planning residential neighbourhoods for the year 2010, as it addressed several objectives related to the method of designing residential neighbourhoods based on the growth rate and family size. It also focused on the importance of providing social services for the population through health, educational, recreational, cultural, and public service activities. For daily needs, taking into account the availability of green spaces in residential neighbourhoods (Iraqi Ministry of Housing. 2010), The planning indicators for the residential neighborhood included the following:

- Design indicators for residential units include areas for separate dwellings 400-600 m2, semi-attached dwellings 400-350 m2, and attached dwellings 350-200 m2.
- Land use indicators focused on the balance between uses according to the horizontal and vertical housing, with the importance of distributing uses according to population density within one neighborhood.

Table (2). A summary of the criteria - The researcher based on the above theoretical basis

No	The study	The central concept of the study	Study summary
1	Al-Hagla (2008)	The study focused on the social and environmental dimensions in the development of a sustainable residential neighbourhood and the dual role of the two dimensions in post-discontinuity social communication in modern planning of residential neighbourhoods, focusing on green spaces in residential areas and activating the environmental role in the sustainable design of the neighbourhood.	The study concludes with essential recommendations regarding integrating the environmental and social dimensions as the main criteria in neighbourhood development, emphasizing green squares and promoting walking within the neighbourhood.
2	Najim (2016)	The study focused on the social and economic dimensions, as the social dimension included design with privacy and accessibility. In contrast, the economic dimension focuses on costs and the Diversity of housing options.	The most important recommendations of the study are the economic facilitation of ownership of housing units for all societal groups, with the need for consensus and focus on the social and economic dimensions of neighbourhood development.
3	Ihsan. A. (2018)	The study dealt with the urban dimension as a basis in the residential area, as it is an urban complex that reflects the features of the city's planning and design.	The study's conclusion indicates the necessity of activating urban criteria instead of traditional criteria in developing modern neighbourhoods. The most important recommendations are paying attention to the urban dimension in planning and designing local residential neighbourhoods, approving sustainable Criteria in the city's local legislation and laws, and emphasizing the criteria of Diversity, density, and ease of access.
4	Abbas and Najat (2019)	The study addressed the dimensions of social sustainability and defined them in terms of community empowerment, residential Diversity, and the economic dimension of real estate loans for different income groups. Environmental Criteria for energy efficiency, green areas, and pedestrian encouragement were set.	The study's recommendations are to integrate the social, economic and environmental dimensions into the fundamental development of a sustainable residential neighbourhood.
5	Labin et al. (2022)	It focused on sustainable neighbourhood Criteria and design methods in the Jordanian city, measuring urban Criteria in particular, which are mixed-use, regional aspect, connectivity, the general centre of the neighbourhood, the possibility of walking around the neighbourhood, ease of access, the orientation of buildings to pedestrians, green spaces and interaction.	The most important recommendations of the study are the necessity of focusing on urban requirements in planning new residential neighbourhoods.
6	Dühr, Berry (2023)	The study focused on sustainable housing in neighbourhoods in Sydney, Australia, and the comprehensive urban dimension in planning. Land use, Community spaces, Safety and security design, Housing units, Environmental aspect Criteria, Infrastructure, Service participation: Neighbourhood regeneration: Using recycled concrete aggregate for streets, pedestrian paths, and transportation.	The study focused on sustainable housing and the approach to urban and environmental planning for urban sustainability, which aligns with the leading research direction and objective.
International Criteria in sustainable planning for residential neighbourhoods			
7	UN-Habitat,2014	It discussed a new strategy for sustainable neighbourhood planning and identified five basic principles for new residential planning projects, such as transportation network efficiency. Residential density, Mixed land use, Social cohesion Land uses.	The study's conclusion reinforces the importance of moving toward sustainable planning for residential neighbourhoods, aligning with the leading research direction and objective.
8	LEED	The criteria addressed the three dimensions of environmental, social, and economic sustainability in the design of the ecological residential district, focusing on the social and economic dimensions of compact development, connected and open communities, and multiple neighbourhood centres. Usage, Diverse mixed-income communities, Low parking, Street network, Transportation facilities, Visitability and universal design, Community outreach and engagement, Neighbourhood schools	The LEED criteria focused on the main criteria for sustainability in the residential neighbourhood and at the design and planning level, which aligns with the leading research direction and objective.
Local Criteria			
9	Iraqi Housing Criteria Manual 2010	The criteria for planning the residential neighbourhood were determined based on the size of the Iraqi family, which amounts to 6 people as a general average. The available services of the residential neighbourhood were selected, including education, health, culture, and entertainment. The residential areas were also determined according to the residential patterns and the balance in the distribution of uses within the residential neighbourhood with the possibility of easy access to events.	The booklet for residential neighbourhood planning Criteria discusses the Criteria in general. It does not address the possibility of moving toward sustainable dimensions or specify and consider the internationally approved criteria.
The research finds from previous studies of the Criteria that the sustainability of the residential neighbourhood is completed within the basic dimensions of sustainability, which are environmental, social, economic, and urban, in addition to the design Criteria for the residential neighbourhood. Therefore, the research will clarify the summary of the main points for each dimension at the planning and design levels based on previous studies of the Criteria in particular and the theoretical framework in general, in addition to the Criteria. International and local Criteria to reach the Criteria			

- Indicators for social services, from the ease of access to housing to public activities in the residential neighborhood.
- Indicators for climate treatments focused on guidance for hot and dry areas and the need to consider the building orientation.

The Iraqi Ministry of Housing also specified the possibility of amending the planning Criteria for housing by 20%, according to the requirements that residents need by contemporary requirements.

The Housing Authority's local Criteria did not focus on the importance of moving toward sustainable planning in residential neighborhoods in a way commensurate with the contemporary requirements of residents. They should have addressed the main dimensions of sustainability.

Instead, the criteria are general and, for previous years, need to be commensurate with population numbers and contemporary life requirements.

Based on the theoretical framework, the research concludes the possibility of classifying sustainable neighbourhood Criteria into two types of Criteria:

- The first type summarises the planning Criteria in the environmental, economic, social, and urban dimensions.
- The second type summarises the most important points of the residential neighbourhood design Criteria, as illustrated in Table 3.

Table (3). Criteria Sustainable Neighbourhood-researcher

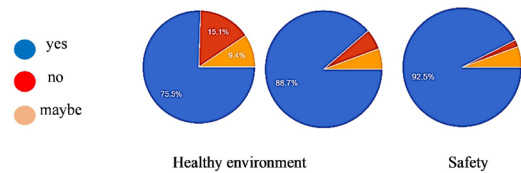| Criteria		Main indicator	Secondary indicator
Planning Criteria	Environmental	Healthy environment	Environment-friendly Transportation (bicycles and modern buses)
			Green spaces between housing units
		Safety	Safe movement paths
	Social	Social connectedness	20–50% of housing units for low-income groups
		Social interaction	Open spaces within neighbourhoods
			Space between residential units for children to play and adults to interact
		Social Justice	Diversity in housing (income, age and education)
	Economical	Facilitation	Flexible real estate housing project loans
		Empowerment	Building materials at low cost and with the possibility of future expansion
	Urban	Mix land use	Integration of commercial, residential, and recreational use
			Multiple activities within the neighbourhood centre
			Accessibility
		Sustainable Transportation	Public transportation within the neighbourhood
			Encouraging cycling
		Residential density	Approximately 15000 people
Design Criteria	Neighbourhood formation	Solidarity	Organizing the neighbourhood with a clear centre
			Points of indication (public squares and fountains)
			Clear neighbourhood demarcation
		Pedestrian-oriented shape	The human scale of housing units
			Defining neighbourhood kinetic paths through buildings
	Diversity	Miscellaneous spaces	Villas (400–350 m²)
			Medium size dwellings (300–250 m²)
			Tiny houses (200 m²)
		Residential styles	Horizontal units
			Vertical units
	Associative	Network of connected paths	Safe pedestrian paths
			Enhanced walking paths - Green and wooded areas shaded from the sun
			Easy access to activities
			Various paths (pedestrians, cars and bicycles)
	Intelligibility	Spaces	hierarchy of spaces
		Blocks (residential units - buildings)	Respecting the spatial identity of housing
	Vitality	Neighbourhood Centre	Confirmation of yards and gathering areas for residents
			Emphasis on vital facilities (cafes - restaurants - markets)
			Building Diversity

8. Testing the extracted Criteria and measuring the possibility of their application in the city of Basra

The research aims to conduct a test of the selected Criteria by the summary of the theoretical framework on the extent to which they can be applied in the local reality of the city of Basra, given that the Criteria and studies are different in terms of place and time, in addition to studying the nature of the culture of the community living in the city of Basra. Therefore, the test was conducted according to the following mechanism:
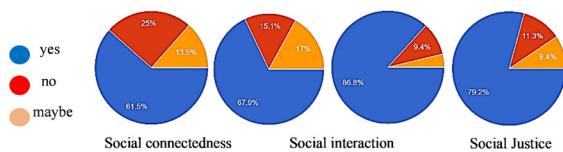
8.1. Testing the first type of planning Criteria

The test was done by taking a random sample of 50 questionnaires in the centre of Basra city (Al-Ashar area), a commercial centre and a major destination for all residents of Basra city, meaning cultural and educational Diversity and different age groups. The results indicated the following:
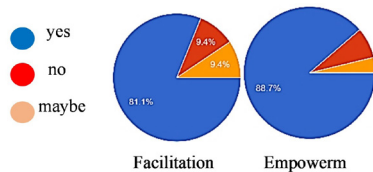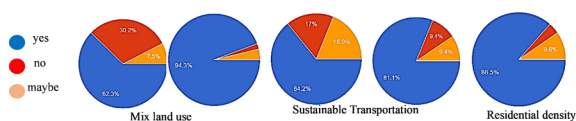
- Environmental criterion testing

Healthy environment   Safety

- Social criterion testing

Social connectedness   Social interaction   Social Justice

- Economical criterion testing

Facilitation   Empowerm

- Urban criterion testing

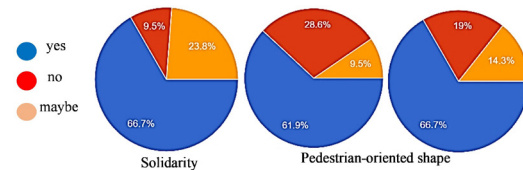Mix land use   Sustainable Transportation   Residential density

From the above results, it is clear that it is possible to apply the planning Criteria for a sustainable neighbourhood in the city of Basra according to the percentage of acceptance by the community for the indicators for each of the residential neighbourhood sustainability Criteria Table (4). Shows the final results

Table (4). Shows the final results

Criteria	SMA		
	Acceptance rates	Rejection rates	Neutral proportions
Environmental criterion testing	86%	8%	6%
Social criterion testing	74%	20%	6%
Economical criterion testing	85%	10%	5%
Urban criterion testing	78%	8%	14%
SMA	80.75%	11.5%	7.75%

8.2. The second type of sustainable design criteria for the residential neighbourhood was tested according to several specialists in architecture and urban planning. 21specialists with different academic degrees were selected if the results indicated the following:

- Formation criterion test
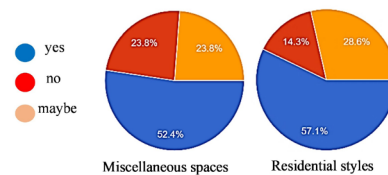
Solidarity   Pedestrian-oriented shape

- Diversity criterion test

Miscellaneous spaces   Residential styles

- Associative criterion test

Safe pedestrian paths   Enhanced walking paths - Green and wooded areas shaded from the sun   Easy access to activities   Various paths (pedestrians, cars and bicycles)

- Intelligibility criterion test

Spaces   Blocks (residential units - buildings)

● Vitality criterion test

yes
no
maybe

Confirmation of yards and
gathering areas for residents

Emphasis on vital facilities (cafes -
restaurants - markets)

Building Diversity
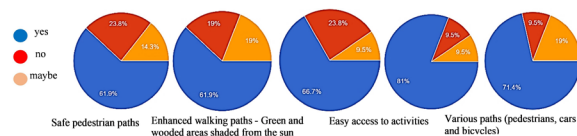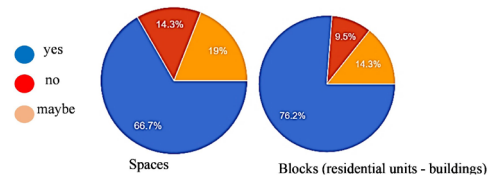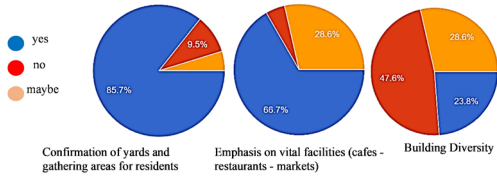
From the results, it is clear that specialists accept most of the design Criteria for a sustainable neighbourhood, except for the indicator of Diversity in construction and local materials within the vitality criterion. The rejection rate indicated the highest value, amounting to 47.6, compared to the acceptance rate of 23.8, so this indicator will be excluded from the vitality criterion in the measurement. Table 5 shows the final results.

Table (5). Final results

Criteria	SMA		
	Acceptance rates	Rejection rates	Neutral proportions
Formation criterion test	%65.1	19%	33.1%
Diversity criterion test	55%	19%	26.2%
Associative criterion test	69%	16%	15%
Intelligibility criterion test	71%	12%	17%
Vitality criterion test	58%	21%	21%
SMA	**64%**	**17%**	**20%**

The acceptance rate for the design Criteria for the sustainable residential neighbourhood was 64%, the rejection rate for the Criteria was 17%, and the neutral percentage between acceptance and rejection was 20%. Therefore, we find that

acceptance rates exceeded 50%. Thus, the research will conclude with the possibility of applying sustainable design Criteria for the residential neighbourhood to the local reality of Basra. Therefore, the research aims to propose two models for new residential projects in Basra, which were planned according to the population's requirements for 2019. Thus, the research tests the criteria proposed for the research, which were tried before application in the residential neighbourhoods of the new housing projects, and evaluates the extent to which the results are close to and far from the application of sustainability Criteria.

9. Case Study

Two new residential project models, the Al-Amal and Al-Narjis, were studied, and their neighbourhood's sustainability was assessed, adopting the Criteria extracted from the previous literature, comparing which, between the two, better achieves sustainable neighbourhood Criteria. Both are modern models and some of the first to be designed as new residential complexes with integrated requirements and high residential orientation. Such projects will likely be repeated in the city of Basra-Iraq.

9.1. Al-Amal Residential Project: The project is located in western Basra, Iraq, next to a sports city, and it was implemented for residential use in 2019. It consists of three sections: the first, second and third hope. Each section extends over
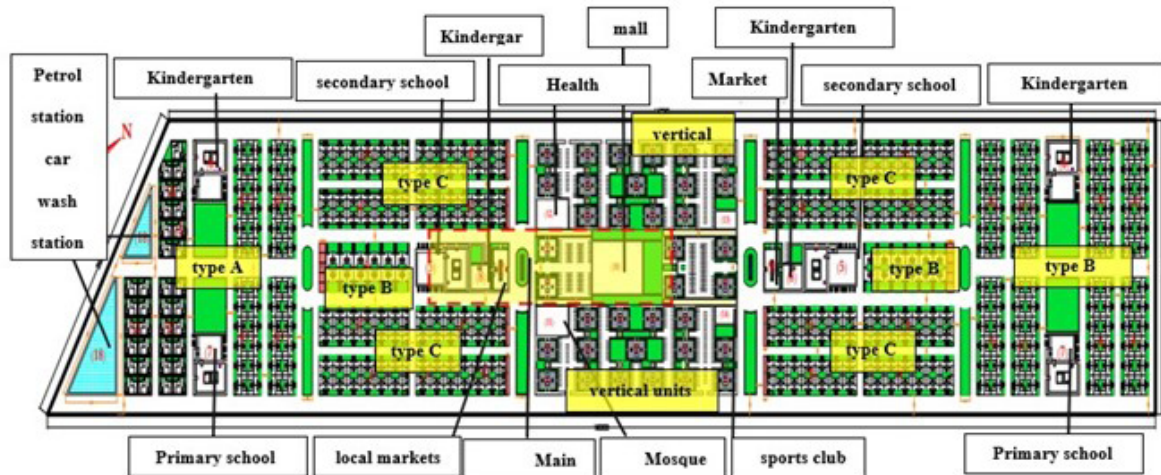

Figure (3). The Master Plan for Al-Amal Residential City- The researcher's clarification based on the file of the company implementing the project

Figure (4). Horizontal Housing Units in Al Amal Residential City- https://iq.arabplaces.com/basra/al-amal-residential-complex

Table (6). Types of Horizontal Housing Units in Al-Amal Residential City

Type of horizontal units	Area of the residential unit	Number of housing units
Type A1-four story blocks	405 m²	34
Type A2-three story blocks	405 m²	20
Type B1-villa	400 m²	20
Type B2-villa	400 m²	15
Type C	250 m²	48
Type D	200 m²	354
Type E	200 m²	175
Type F	200 m²	175

18.1 hectares and includes commercial, residential, and recreational uses. Green spaces are concentrated around residential buildings, and the Horizontal Unit neighbourhood has a main gathering square. Each residential neighbourhood has a commercial centre with a commercial strip for residents' daily needs and a kindergarten, nursery, and primary and secondary schools. Each neighbourhood consists of recreational activities such as video games for children, cultural centres and cafes for adults, a fuel-filling station, a car wash station, a sports club, and a mosque, as shown in Figure 3. The master plan of the project includes several horizontal and vertical residential units. One thousand three hundred fifty-five housing units (787 horizontally and 568 vertically). as shown in Table 6 and Figure 4.

9.2. Al-Narjis residential project: This project is located east of the Shatt al-Arab, Basra, Iraq, and was completed in 2021. Along with the Hope Project, this project is considered one of the

Table (7). Types of Horizontal Housing Units in Al-Narjis Residential City

Type of housing units	Area of the residential unit	Number of housing units
Type A1	360 m²	115
Type A2	300 m²	123
Type B	270 m²	594
Type C2	250 m²	505
Type H	200 m²	46

first projects in Basra. The project extends over 32.27 hectares and includes 1,383 residential units. There are five types of horizontal units since the project consists of only flat housing, as shown in Table 7. The master plan also includes types of horizontal residential units with recreational, commercial, and educational activities in Figure 5&6, focusing on green spaces.

10. Analysis tools and results

10.1. Analysis tools

The research methodology in the practical framework was based on measuring the final criteria extracted from the theoretical framework after they were tested to be applied to two new local projects in the city of Basra, the Al-Amal Residential Complex and the Narcissus Complex, and measuring each criterion to know the degree of closeness or distance from each planning and design criterion using descriptive and quantitative analysis tools. By selecting 50 random samples from the population for both projects, the residents measured the planning criteria, which are environmental, social, economic and urban. In comparison, 20

Figure (5). The Master Plan for Al Narjis Residential City- The researcher's clarification based on the file of the company implementing the project

Figure (6). The Horizontal Residential Units of Al Narjis City -Project field visits

samples were selected for urban design and planning specialists, and a questionnaire form was used for residents and specialists. The Questionnaire was based on a three-way Likert scale in classification (3- Agree, 2-neutral, 1-disagree). The questionnaire results were analyzed using the advanced statistical analysis program SPSS.

10.2. Results

The results of the field study are shown in Tables 8 and 9. The questionnaire conducted on the residents of Al-Amal and Al-Narjis. Tables 10 and 11 show the results of the questionnaire survey conducted on the specialists in the first and second projects.

The results of the Questionnaire by residents in the first project, Al-Amal Residential Complex,

indicated higher satisfaction rates in the complex than in the second project, Al Narjis Residential Complex. The environmental criterion for the first project showed rates closer to achieving environmental planning Criteria, as the arithmetic rates ranged between 1.36-2.46; that is, they exceeded the unacceptable threshold set at a value of 1. The criterion deviation also indicates the presence of harmony and agreement among the members of the population sample, and this is evident from the lack of the value of criterion deviations and coefficients of variation. In contrast, the social criterion indicated great satisfaction with the direction of social interaction in the residential neighbourhood to achieve the interaction criteria for the presence of gathering squares and children's playgrounds. The social cohesion and social justice criteria indicated average acceptance rates, as they

Table (8). Statistical Analysis of the Al-Amal Project Residents' Questionnaire

Main indicator		Secondary indicator	Mean	Criterion Deviation	Variation coefficient
Environmental	Healthy environment	Environment-friendly Transportation (bicycles and modern buses)	1.36	0.5082	37%
		Green spaces between housing units	2.46	0.5718	23%
	Safety	Safe movement paths	1.9	0.3882	20%
Social	Social connectedness	20–50% of housing units for low-income groups	1.36	0.48	35%
	Social interaction	Open spaces within housing neighbourhoods	2.02	0.4227	21%
		Space between residential units for children to play and adults to interact	2.06	0.5529	27%
	Social Justice	Diversity in housing (income, age and education)	1.24	0.3671	30%
Economical	Facilitation	Flexible real estate loans for housing projects	1.24	0.3576	29%
	Empowerment	Building materials at low cost with the possibility of future expansion	1.64	0.6024	37%
Urban	Mixed land use	Integration of commercial, residential and recreational use	2.12	0.5522	26%
		Multiple activities within the neighbourhood centre	1.78	0.3976	22%
		Accessibility	1.72	0.5365	31%
	Sustainable Transportation	Public transportation within the neighbourhood	1.36	0.4941	36%
		Encouraging cycling	1.46	0.5412	37%
	Residential density	Approximately 15000 people	1.36	0.5082	37%

Table (8). Statistical Analysis of the Al-Nargis Project Residents' Questionnaire

Main indicators		Secondary indicators	Mean	Criterion deviation	Variation coefficient
Environmental	Healthy environment	Environment-friendly Transportation (bicycles and modern buses)	1.96	0.87	45%
		Green spaces between housing units	1.90	0.74	39%
	Safety	Safe movement paths	1.80	0.56	31%
Social	Social connectedness	20–50% of housing units for low-income groups	1.24	0.21	17%
	Social interaction	Open spaces within housing neighbourhoods	1.96	0.48	24%
		Spaces between residential units for children to play and adults to interact	1.94	0.70	36%
	Social Justice	Diversity in housing (income, age and education)	1.74	0.67	39%
Economical	Facilitation	Flexible real estate loans for housing projects	1.48	0.32	22%
	Empowerment	Building materials at low cost with the possibility of future expansion	1.18	0.27	23%
Urban	Mixed land use	Integration of commercial, residential and recreational use	2.06	0.64	31%
		Multiple activities within a major centre of the neighbourhood	2.24	0.46	21%
		Accessibility	2.48	0.49	20%
	Sustainable Transportation	Public transportation within the neighbourhood	1.72	0.15	9%
		Encouraging cycling	1.72	0.38	22%
	Residential density	Approximately 15000 people	1.96	0.87	45%

were partially but not wholly achieved, according to percentages that ranged between 1.36 and 1.24. As for the economic criterion, it indicated weak population satisfaction with enabling and facilitating the ownership of housing units in the housing project and the lack of loans to help in owning building or low-cost materials, as the arithmetic mean values indicated 1.64-1.24, and the criterion deviation ratios in the answers showed small percentages, Which means that the percentages of variation

Table (10). Statistical analysis of the Questionnaire Administered to Specialists About the Al-Amal Housing Project.

Main indicators	Secondary indicators		Mean	Criterion deviation	Variation coefficient
Neighbourhood formation	Solidarity	Organizing the neighbourhood with a clear centre	2.13	0.73	34%
		Points of indication (public squares and fountains)	1.79	0.46	26%
		Clear neighbourhood demarcation	2.04	0.40	20%
	Pedestrian-oriented shape	The human scale of housing units	1.71	0.71	41%
		Defining neighbourhood kinetic paths through buildings	1.79	0.46	26%
Diversity	Diversity of spaces	Villas (400–350 m^2) Medium-size dwellings (300–250 m^2) Small housing (200 m^2)	2.29	0.71	31%
	Diversity of residential styles	Horizontal units Vertical units	2.21	0.59	27%
Associative	Network of connected paths	Safe pedestrian paths	1.79	0.81	45%
		Enhanced walking paths-Green and wooded areas shaded from the sun	1.33	0.47	35%
		Easy access to activities	2.00	0.67	33%
		Various paths (pedestrians, cars and bicycles)	1.54	0.68	44%
Intelligibility	Spaces	A clear hierarchy of spaces	2.46	0.59	24%
	Blocks (residential units - buildings)	Respecting the spatial identity of housing	2.29	0.65	28%
Vitality	Neighbourhood Centre	Confirmation of yards and gathering areas for residents	2.38	0.63	26%
		Emphasis on vital facilities (cafes - restaurants - markets)	2.58	0.59	23%

Table (11). Statistical Analysis of the Questionnaire Administered to Specialists About the Al-Nargis Project

Main indicators	Secondary indicators		Mean	Criterion deviation	Variation coefficient
Neighbourhood formation	Solidarity	Organizing the neighbourhood with a clear centre	2.33	0.67	29%
		Points of indication (public squares and fountains)	1.96	0.48	24%
		Clear neighbourhood demarcation	1.92	0.69	36%
	Pedestrian-oriented shape	The human scale of housing units	1.71	0.65	38%
		Defining neighbourhood kinetic paths through buildings	1.04	0.08	8%
Diversity	Diversity of spaces	Villas (400–350 m^2) Medium size dwellings (300–250 m^2) Small housing (200 m^2)	2.00	0.42	21%
	Diversity of residential styles	Horizontal units Vertical units	1.58	0.63	40%
Associative	Network of connected paths	Safe pedestrian paths	1.75	0.44	25%
		Enhanced walking paths-Green and wooded areas shaded from the sun	1.25	0.38	30%
		Easy access to activities	2.50	0.50	20%
		Various paths (pedestrians, cars and bicycles)	1.54	0.59	38%
Intelligibility	Spaces	A clear hierarchy of spaces	2.21	0.73	33%
	Blocks (residential units - buildings)	Respecting the spatial identity of housing	2.33	0.56	24%
Vitality	Neighbourhood Centre	Confirmation of yards and gathering areas for residents	1.75	0.63	36%
		Emphasis on vital facilities (cafes - restaurants - markets)	2.33	0.67	29%

Table (12). The difference in Residents' Satisfaction between the Two Residential projects

Criteria		Levene's test for equality of variances			t-test for equality of means			Results
					t	Sig. (2-tailed)	Mean difference	
Healthy environment	Environment-friendly Transportation (bicycles and modern buses)	Equal variances assumed	15.065	0.000	3.852	0.000	0.600	Differences between the two samples exist, and residents' satisfaction in the first project is more significant than in the second.
		Equal variances are not assumed.			3.852	0.000		
	Green spaces between housing units	Equal variances assumed	6.453	0.013	-3.674	0.000	-0.56000	Significant differences exist between the two samples, and residents' satisfaction in the second project is more critical than in the first.
		Equal variances are not assumed.			-3.674	0.000		
Safety	Safe movement paths	Equal variances assumed	9.015	0.003	-0.742	0.460	-0.10000	No significant differences exist between the two samples.
		Equal variances are not assumed.			-0.742	0.460		
The social criterion Social cohesion	Low incomes and the availability of affordable housing	Equal variances assumed	6.359	0.013	-1.197	0.234	-0.120	No significant differences exist between the two samples.
		Equal variances are not assumed.			-1.197	0.235		
Social interaction	Squares and green area presence within the neighbourhood help residents interact	Equal variances assumed	2.232	0.138	-0.425	0.672	-0.060	No significant differences exist between the two samples.
		Equal variances are not assumed.			-0.425	0.672		
Social interaction	The presence of playgrounds for children.	Equal variances assumed	0.650	0.422	-0.782	0.436	-0.12000	No significant differences exist between the two samples.
		Equal variances are not assumed.			-0.782	0.436		
Social justice	Diversity in housing units based on age, income and education	Equal variances assumed	37.822	0.000	3.620	0.000	0.50000	Differences between the two samples exist, and residents' satisfaction in the first project is more significant than in the second.
		Equal variances are not assumed.			3.620	0.001		
Economic Facilitation	Providing real estate loans to purchase housing units	Equal variances assumed	18.910	0.000	2.049	0.043	0.2400	No significant differences exist between the two samples.
		Equal variances are not assumed.			2.049	0.044		
Economic empowerment	A lower-priced housing unit with low-cost materials and the possibility of future expansion	Equal variances assumed	32.552	0.000	-4.096	0.000	-0.460	Significant differences exist between the two samples, and residents' satisfaction in the second

Continued Table (12). The difference in Residents' Satisfaction between the Two Residential projects

		Equal variances are not assumed.			-4.096	0.000		project is more critical than in the first.
Urban Criterion	Land use - Integration of commercial, residential and recreational uses	Equal variances assumed	0.179	0.673	-0.404	0.687	-0.06000	No significant differences exist between the two samples.
		Equal variances are not assumed.			-0.404	0.687		
	Land use - multiple activities within a significant neighbourhood centre	Equal variances assumed	6.715	0.011	3.811	0.000	0.46000	Differences between the two samples exist, and residents' satisfaction in the first project is more significant than in the second.
		Equal variances are not assumed.			3.811	0.000		
	Land Use - Accessibility	Equal variances assumed	1.428	0.235	5.635	0.000	0.760	Differences between the two samples exist, and residents' satisfaction in the first project is more significant than in the second.
		Equal variances are not assumed.			5.635	0.000		
	Sustainable Transportation - The presence of public transportation, such as buses for movement within the neighbourhood and events	Equal variances assumed	1.678	0.198	3.275	0.001		Differences between the two samples exist, and residents' satisfaction in the first project is more significant than in the second.
		Equal variances are not assumed.			3.275	0.001		
Urban Criterion	Sustainable Transportation -The existence of bicycles and mobility paths designated for transportation within the neighbourhood	Equal variances assumed	0.007	0.934	2.074	0.041	0.260	No significant differences exist between the two samples.
		Equal variances are not assumed.			2.074	0.041		
	Residential density - Approximately 15,000	Equal variances assumed	5.592	0.020	1.835	0.069	0.300	No significant differences exist between the two samples.
		Equal variances assumed			1.835	0.069		

in the answers are small, i.e. dissatisfaction with the economic criterion, meaning that the criterion is far from being verified within the Criteria of planning sustainable residential neighbourhoods. In contrast, the urban criterion indicated high and moderate acceptance rates, i.e. partial fulfilment of the criterion between rates of -1.36. 2.12. Some sustainable neighbourhood planning criteria, such as environmental and social criteria, have come close to verification. In contrast, the economic criterion has moved away from verification by partial verification. to the urban level. As for the results of the specialists' Questionnaire, the percentage of satisfaction with the Criteria, in general, indicated

an achievement rate of 2.02, with an average degree close to the degree of acceptance, which was set at a value of 3, while non-acceptance was set at a value of 1, which means partial fulfilment of the Criteria. The highest values indicated the building form criterion with rates of 2.13-2.29 and the clarity criterion with rates. 2.29-2.58, the vitality criterion 2.38-2.58, and the diversity criterion 2.21-2.29. As for the lowest values achieved according to the specialists' answers, it was a penny with an acceptance of 1.33-2.00 for the communication criterion. However, the criterion deviation and variance rates indicate small values, meaning that the specialists agree on the possibility of closeness. The residential neighborhood of Al Amal Residential Complex. It is of verification because most criteria indicated rates close to the specified acceptance score of 3.

The results of the Questionnaire for the residents of the second project, the Narjis Residential Project, indicated lower satisfaction rates than the Al Amal Residential Project, indicating a slight achievement of the sustainable planning Criteria in the project. The environmental criterion indicated rates of 1.96-1.90, meaning an average fulfilment of the criterion, while the social criterion indicated rates of 1.24- 1.94. As for the economic criterion, the highest percentages indicated the fulfilment of the sustainable transportation criterion - the presence of public transport, such as the bus for movement within the neighborhood and events, with a percentage of 2.48, which indicates the presence Public transportation within the residential neighborhood achieved the highest percentage for the land use-accessibility criterion at a rate of 2.24. The answers, in general, indicated weak percentages achieved for the requirements of sustainable urban planning. As for the results of the specialists' Questionnaire, the overall percentage indicated an arithmetic average in the answers of 1.99, i.e. double the fulfilment of the sustainable design Criteria for the Narjis residential project. If the building configuration criterion indicated the highest percentage in the significance points (public squares, fountains) of 2.33, while the diversity criterion indicated percentages Low for the criterion of Diversity in patterns between horizontal and vertical, with percentages of 1.04, which means weak achievement of the criterion because the project was limited to horizontal residential units. However, the vitality criterion gave high achievement percentages, 2.21-2.33.

To know the degrees of variation between the two projects and the extent of the population's satisfaction with each criterion, the following table shows the significant differences in the degree of satisfaction.

11. Conclusions and recommendations

The residential neighborhood is the foundation of the urban city structure and is responsible for residents' quality of life and meeting life requirements. The development of residential neighborhoods lies in integrating the main dimensions of sustainability within the environmental, social, economic and urban dimensions.

International Criteria and studies on Criteria focus on environmental aspects, including green spaces that reduce carbon to achieve safety and health security by providing environmentally friendly movement paths represented by bicycles and encouraging walking within the neighborhood. The social dimension study focused on achieving interaction and cohesion within the residential neighborhood, which is what it provides. The presence of community squares. Social services, children's playgrounds, and green spaces, with a balance of urban uses, Diversity of uses, and easy access to activities. The economic dimension focused on the right to own residential units, while the urban Criteria focused on Diversity and ease of access. As for the design Criteria for the residential neighborhood, they are the basis for the sustainability of the residential neighborhood and its integration with the urban context of the city and include the formation of residential units, the clarity of the center of the residential neighborhood, and enhancing ease of access, with a focus on points of importance within the main gathering squares, including fountains and the way the residential units are oriented, in addition to achieving Diversity between residential unit spaces, and Diversity in residential styles between vertical and horizontal. The steep, precise sequence of spaces on the plane. Public and private, emphasizing the interconnectedness of residential units and providing safe pedestrian corridors to add vitality and activity to residential neighborhoods to achieve residents' quality of life.

Local Criteria focused on the service aspects of the residential neighborhood, including the availability of health, educational, cultural, and

recreational uses, as opposed to not focusing on moving towards sustainability in residential neighborhoods or giving updated Criteria, but instead relying on and maintaining the old Criteria of Iraq for the year 2010. As for the conclusions of the practical side, it has been shown that sustainability Criteria are close to being achieved in the environmental, social, economic, urban and design dimensions and the role of the new requirements of the population in the demand for modern residential complexes.

12. Recommendations

- The research recommends amending and developing the local criteria of the Iraqi Housing Authority and directing them towards sustainable criteria for residential neighborhoods.
- Emphasis on integrating sustainable neighborhood planning and design Criteria into the planning of new residential neighborhoods
- The research recommends emphasizing the role of the environmental aspect within the residential neighborhood in improving the climate in Basra through afforestation and green spaces and encouraging public transportation and walking.
- Emphasizing social interaction and cohesion by creating main gathering spaces, integrating uses, and organizing their distribution within the residential neighborhood.
- Emphasizing the enabling role of real estate loans in facilitating ownership of housing units and reducing the housing crisis in Basra.
- The research recommends emphasizing the structural laws for designing residential neighborhoods to achieve the formation of residential neighborhoods that suit the functional and formal requirements, as the neighborhood is the basis of the virtual structure of the city.

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Supplementary material

Links to the Google Form to survey residents and specialists regarding testing the sustainable planning and design Criteria extracted in the theoretical framework and before their application to the selected projects.

https://forms.gle/ymCJbJ7mUySnnFAA7

https://forms.gle/RP2mWiA9qm92dSvw7

Questionnaire form (residents - specialists)

Resident form				
The question		The answer is according to the three-point Likert scale.		
		agree	neutral	disagree
Q1	Environmental health - the presence of buses for transportation within the neighbourhood with the use of bicycles			
Q2	Environmental health - Presence of green areas between and within residential units			
Q3	Environmental Health - Street safety and safety			
Q4	Social cohesion - availability of affordable housing for low-income earners			
Q5	Social interaction - the presence of squares and green areas within the neighbourhood that help interaction between the residents			
Q6	Social interaction - the presence of playgrounds for children			
Q7	Social justice - Diversity in housing units based on age, income and educational attainment			
Q8	Facilitation - Providing real estate loans to purchase units in the complex			
Q9	Economic empowerment - the cost of a housing unit at a lower price and with low-cost materials, with sustainability in future expansion			
Q10	Integration of commercial, residential and recreational uses - land uses			
Q11	Land uses - multiple activities within a significant neighbourhood centre.			
Q12	Land Uses - Accessibility			
Q13	Sustainable transportation - the presence of public transportation, such as buses, for movement within the neighbourhood and events			
Q14	Sustainable transportation The existence of bicycles and mobility paths designated for transportation within the neighbourhood			
Q15	Residential density - a density of around 15,000			
Specialists Form				
The question		The answer is according to the three-point Likert scale.		
		agree	neutral	disagree
Q1	Solidarity - Solidarity organization of the neighborhood with a clear center			
Q2	Points of indication (public squares, fountains)			
Q3	Buildings oriented to encourage walking.			
Q4	Determine the movement paths of the neighborhood through the buildings.			
Q5	Diversity criterion Variety of villa spaces (400-350 square meters) Medium-sized residences (300-250 sqm) Small dwellings (200 sqm			
Q6	Diversity of residential styles in horizontal housing units vertical units			
Q7	Connectivity criterion Safe footpaths A network of connected paths			
Q8	Improved Walks - Green and woodland areas to cool off from the sun A network of connected paths			
Q9	Itineraries enhance easy access to events A network of connected paths			
Q10	A network of connected paths Various lanes (pedestrians - cars - bikes)			
Q11	clarity criterion Spaces - A clear hierarchy of spaces			
Q12	clarity criterion Blocks (residential units - buildings) Respect the spatial identity of housing			
Q13	Vitality with me Neighborhood Center- Confirmation of squares and gathering areas for residents			
Q14	vitality criterion Neighborhood Center - Emphasis on vital activities (cafes - restaurants - markets)			
Q15	vitality criterion Diversity in Construction			

تقييــم كفــاءة تخطيــط الأحيــاء المســتدامة ومعايــير التصميم في مشــاريع الإسـكان الجديدة

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ملخص البحث. يعتبر الحي السكني أساس البناء الحضري للمدينة. وقد ركزت الاتجاهات المعاصرة على إمكانيات تطوير الأحياء السكنية لتحقيق جودة حياة عالية لقاطنيها، وبناءً على ذلك ظهرت معايير عالمية عدة في الأحياء المستدامة. وبالنظر إلى أن المعايير المحلية لهيئة الإسكان العراقية لا تزال ضمن المعايير التقليدية؛ فقد لجأ البحث إلى سد الفجوة المعرفية من خلال إطار نظري يعتمد على مناقشة المفاهيم الأساسية للحي السكني، والاتجاهات الحديثة والدراسات النظرية لتطوير الحي السكني، مع دراسة المعايير العالمية والدراسات الحديثة في معايير الأحياء السكنية المستدامة، والتوصل إلى استخلاصٍ لأهم المعايير التخطيطية والتصميمية، واختبار مدى تطبيقها في الواقع المحلي. ولتحقيق هدف البحث المتمثل في معالجة وتطوير المعايير المحلية وإمكانية تطبيقها؛ تحول البحث إلى التطبيق في الواقع المحلي ضمن الإطار العملي، مع اتباع المنهج الوصفي والكمي في تحليل البيانات لعينات مختارة من المشاريع السكنية الجديدة، واستنباط إمكانيات تحقيق معايير التصميم والتخطيط في المشاريع الحديثة. وتوصل البحث إلى أهم التوصيات لتطوير وتعديل المعايير المحلية لهيئة الإسكان بما يتناسب مع متطلبات السكان العصريين ويحقق جودة الحياة.

الكلمات المفتاحية: حي سكني مستدام، التنوع السكني، تخطيط الحي، التوجهات التخطيطية المعاصرة، معايير التخطيط والتصميم الحضري.