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Designing & Revitalizing Hashem Nagar Residential Area: Strategies for Creating Vibrant and Sustainable Neighborhood

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Abstract

A community that is planned, developed, and maintained in a way that minimizes its negative effects on the environment while enhancing the well-being of its members is known as a sustainable residential area. Prioritizing environmental, social, and economic sustainability, sustainable residential zones work to strike a balance between these three pillars. The study aims to propose strategies for transforming the Hashem Nagar residential area into a vibrant and sustainable community. The study's objectives are to provide a properly developed residential area with facilities in compliance with the standard private residential land development rule, 2004. The study employs a mixed-methods approach, including area selection, and reconnaissance surveys, to gather information about the current state of the neighborhood, identify its strengths and weaknesses, and develop recommendations for improvement. The "Hashem Nagar Residential Area" has been designed based on economic factors and includes 57.36% of land for residential plots. The area offers three different plot sizes, including 3, 5, and 7 katha plots. The residential area also includes community facilities, commercial facilities, open space, and transportation facilities to ensure the well-being of its residents. All plots have road access, and the entire residential area is designed according to the Private Residential Land Development Rule, 2004. The outcome of this study will ensure that the citizens of Chattogram have access to a well-planned and developed residential area, promoting a higher standard of living. This study will help to promote social interaction, improve the quality of life for residents, and create a more sustainable and resilient community. Overall, the study provides valuable insights into the design and revitalization of residential areas and highlights the importance of community involvement in creating vibrant and sustainable neighborhoods in Chattogram.

Keywords: *Sustainable;, Residential Area; Community Facilities; Environment, Plot.*

1 Introduction

Planning a residential area is crucial for efficient and sustainable development, providing numerous benefits such as improved quality of life, efficient resource utilization, enhanced safety and security, increased property value, and environmental sustainability. A residential area refers to a designated area within a city or town that is primarily meant for residential purposes, where people live in homes or apartments (Zhu et al., 2021). Planning a residential area is crucial for several reasons. Firstly, it ensures the efficient utilization of land and resources, preventing chaotic development and promoting orderly growth. Proper planning allows for the provision of essential infrastructure and amenities, such as roads, water supply, sewage systems, and electricity, which are necessary for comfortable living (Yigit, 2021). Additionally, well-thought-out planning can help create a balanced and sustainable community with a mix of housing types, open spaces, and facilities that cater to the needs of residents. The benefits of a planned residential area are numerous. It can lead to an improved quality of life for residents, as planned areas often provide access to amenities such as parks, playgrounds, schools, and community centers, which contribute to a higher standard of living (Yang et al., 2020). Proper planning also results in efficient use of resources, as it optimizes land use, infrastructure, and resources, leading to more sustainable and organized development. Moreover, a planned residential area can enhance safety and security by incorporating measures such as proper lighting, pedestrian-friendly design, and security measures, creating safer neighborhoods. Increased property value is another benefit, as well-planned areas with good infrastructure and amenities often result in higher property values, benefiting homeowners and investors alike (Hadavi et al., 2015). Lastly, planned residential areas can promote environmental sustainability by incorporating green spaces,

conservation areas, and sustainable design practices, contributing to a greener and more eco-friendly community. On the other hand, unplanned residential areas may face consequences such as haphazard development, inefficient land use, and ad-hoc infrastructure development. This can result in congestion, poor connectivity, and a lack of basic amenities for residents. Inadequate infrastructure, including poorly developed roads, water supply, sewage systems, and electricity, can also be a consequence of unplanned residential areas, leading to substandard living conditions (Hussain et al., 2014). Safety and security issues may arise due to lack of proper planning, such as poorly lit areas, inadequate pedestrian infrastructure, and insufficient security measures, resulting in higher crime rates and decreased safety for residents (Gong et al., 2012). Additionally, unplanned residential areas may contribute to environmental degradation, with lack of green spaces, conservation areas, and unsustainable development practices, resulting in negative impacts on the environment (Sakip & Abdullah, 2012).

The concept of sustainable residential areas, which are planned, developed, and maintained in a way that minimizes negative impacts on the environment while enhancing the wellbeing of their residents, has gained increasing importance in urban planning. In this study the area named Hashem Nagar in Chattogram, where efforts are being made to transform it into a well-planned and developed community. This study aims to propose strategies for revitalizing the Hashem Nagar residential area and creating a more sustainable and resilient community. By employing a mixed-methods approach, including surveys, interviews, and design workshops, the study seeks to identify the strengths and weaknesses of the neighborhood, gather information about its current state, and develop recommendations for improvement. The success of the project has the potential to promote social interaction, improve quality of life, and create a more sustainable and vibrant residential area in Chattogram. This study highlights the significance of sustainability and community involvement in the design and revitalization of residential areas, and provides valuable insights for urban planners and policymakers in creating vibrant and sustainable neighborhoods.

2. Study Area

The study area for this research is located adjacent to the Chadgaon residential area in Chittagong City Corporation, with coordinates of 22°22'54" N and 91°50'24" E, spanning a total area of 70.6 acres (Akter et al., 2020). It is surrounded by Kamrabad to the north, Jangalpara to the south, Shamsherpara to the east. The selection of this site was based on several criteria, including its potential for development, availability of good transport facilities such as rickshaw and bus services, proximity to civic services like water supply, drainage sewers, and electric lines, and a suitable size for ensuring ample light and air for the buildings. Although there is haphazard development present in this area, with some irregular and unplanned roadway pattern, the site is away from busy commercial roads and located far from workshops and factories to minimize continuous noise. These factors make the study area suitable for the research focus on affordable housing.

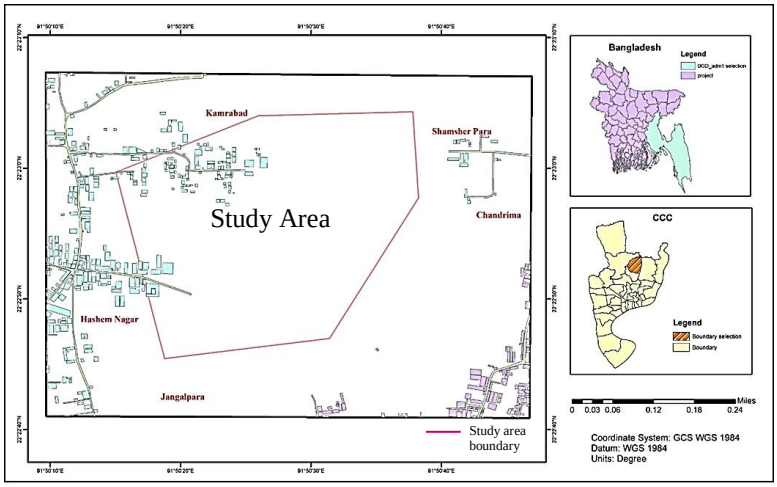

Figure 1 Study area map of Hashem Nagar

3 Data & Methodology

3.1 Key Concepts and Subdivision Patterns

In the design of the residential block, the concept of the "visual block" as introduced by Kevin Lynch in 1971 is employed. The visual block refers to the smaller area that is perceived from a street corner, and it is within this area that the unique character of the block can be described. The arrangement and nature of objects within this visual block work to establish or enhance a particular quality, such as providing a sense of comfort, safety, and beauty to the residents. This concept ensures that people can see the sky above, nothing is towering over them, and necessary shops and services are nearby, as stated by (Yankovskaya et al., 2022).

The neighborhood concept is also utilized in the design, which defines a neighborhood unit as a predominantly residential geographic area bounded by thoroughfares or collector streets, or other natural or manmade features. This neighborhood unit is designed to meet the needs of family life and is characterized by several factors, including the provision of a centrally located elementary school within easy walking distance, convenient

shopping areas, transportation to and from the workplace, scattered neighborhood parks and playgrounds, and a residential environment with harmonious architecture and careful planting, as well as a well-defined internal street system that deflects through traffic, as outlined by various sources (Hawkins, 2014).
The subdivision pattern is another concept used in the design, with six types of patterns identified, including the grid layout plan, modified grid layout plan, bay layout plan, cul-de-sac layout plan, "P-loop" layout plan, and curvilinear layout plan. Each of these patterns has its own advantages and disadvantages in terms of ease of layout, maintenance, traffic flow, safety, privacy, and cost of services, and they are chosen based on the specific topographic conditions and design goals of the residential block (Ghosh, 2021).
Lastly, the concept of road network accessibility is considered in the design of the residential block. The arrangement of streets, intersections, and loops in the subdivision pattern, as well as the location of thoroughfares and collector streets in relation to the neighborhood unit, are carefully planned to ensure easy accessibility for residents and efficient circulation of vehicular and pedestrian traffic (Tsigdinos et al., 2023). This concept aims to create a well-connected road network that promotes safe and convenient movement within the residential block and its surrounding areas.

3.2 Rules and Regulation Followed

The Private Land Development Rule 2004 in Bangladesh governs private land development projects and requires developers to obtain prior approval from the relevant authority. It outlines guidelines for land use, infrastructure development, and environmental considerations. Developers must ensure that their projects comply with designated land use, construct necessary infrastructure such as roads, drainage systems, and water supply, and conduct environmental impact assessments. This rule ensures that private land development projects in Bangladesh are carried out in a safe, organized, and environmentally responsible manner, promoting sustainable development and adherence to regulatory standards (*The Private House Land Development Rule, 2004 - Chancery Law Chronicles*, 2004.).

3.3 Strategies Taken for the Plan

The design strategies adopted for the Hashem Nagar residential area in Bangladesh are categorized into different aspects. For residential facilities, plots are divided into three sizes of 3 Katha, 5 Katha, and 7 Katha based on income class and living standards. Block-A is designated for 3 Katha plots, Block-B for 7 Katha and 5 Katha plots. The number of 3 Katha plots is higher, catering to the lower income class and providing minimum community facilities. 5 Katha plots are for the middle class, while 7 Katha plots are for the higher income class, with more extensive facilities such as green spaces, parks, schools, and parking facilities. Community facilities like schools, mosques, clinics, and community centers are mandated for private residential communities, with better facilities provided for larger plots. Commercial facilities like small business hubs, shopping complexes, and local markets are also incorporated into the residential area for convenience. Open spaces such as green spaces, parks, and playgrounds are essential in the residential area, with specific emphasis on more open spaces in Block-B for the high-income class. Transportation policies involve the provision of main roads, secondary roads, and access roads of varying dimensions, with footpaths for pedestrians and roundabouts at conflict points. Overall, these policies ensure the planned and organized development of Hashem Nagar residential area in compliance with residential, community, commercial, open space, and transportation requirements.

4 Results and Discussion

4.1 Design Proposal for Residential Facility

The fig 02(a) focuses on the planned development of three types of residential plots in Hashem Nagar, with 347 plots of 3 Katha, 163 plots of 5 Katha, and 85 plots of 7 Katha. The total area of residential plots is 1041 katha for 3 Katha plots, 163 katha for 5 Katha plots, and 595 katha for 7 Katha plots. The land use for net residential plots is calculated based on the standard facility requirement of 1.714 acres per 1000 population, resulting in a total requirement of 42.348 acres for the expected population of 24,703 in Hashem Nagar. The design proposal allocates 40.5 acres for residential purposes, which accounts for 57.36% of the total area. The chapter outlines the layout and design considerations for these residential plots to meet the population's needs in Hashem Nagar, ensuring a well-planned and organized residential facility development.

4.2 Design Proposal for Community Facility

The fig 02(b) outlines a comprehensive plan for the development of various community facilities in Hashem Nagar. The proposal takes into account the standard facility requirement per 1000 population in acres, and the corresponding requirement for the estimated population of 24,703 in Hashem Nagar. The provided area for each

community facility, expressed in acres, is also included in the proposal, along with the percentage of area utilized for each facility. The community facilities covered in the proposal include primary school, high school, college, parking space, community center, hospital, library, mosque/mondir, clinic, and dustbin. The proposal allocates a total area of 4.065 acres for these community facilities, which constitutes 5.76% of the total area. The chapter details the design considerations for each community facility, ensuring that they are well-planned, accessible, and cater to the needs of the population in Hashem Nagar.

4.3 Design Proposal for Commercial Facility

The fig 02(c) presents a comprehensive plan for the development of commercial facilities in Hashem Nagar. The proposal takes into account the standard facility requirement per 1000 population in acres and calculates the corresponding requirement for the estimated population of 24,703 in Hashem Nagar. The provided area for commercial facilities in the design, expressed in acres, is 2.74 acres, which constitutes 3.88% of the total area. The commercial facilities covered in the proposal include shopping complex, small shops, super shops, and restaurants. The chapter outlines the design considerations for each commercial facility, ensuring that they are strategically located, well-designed, and meet the commercial needs of the population in Hashem Nagar. The proposal aims to create a vibrant and functional commercial environment that enhances the quality of life for the residents and promotes economic growth in the area.

4.4 Design Proposal for Open Space Facility

The fig 02(d) outlines a comprehensive plan for creating open space facilities in Hashem Nagar. The proposal takes into account the standard facility requirement per 1000 population in acres and calculates the corresponding requirement for the estimated population of 24,703 in Hashem Nagar, which is 8.89 acres. The provided area for open space facilities in the design is 8.53 acres, constituting 12.08% of the total area. The proposed open space facilities include parks, green spaces, play fields, and open spaces, which are strategically designed to provide recreational opportunities, promote community engagement, and enhance the quality of life for the residents. The chapter presents the design considerations, layout plans, and amenities for each open space facility, ensuring that they are accessible, well-maintained, and contribute to the overall aesthetics and sustainability of the community

4.5 Design Proposal for Transportation Facility

The fig 02(e) presents a comprehensive plan for the road network in Hashem Nagar Residential area. The proposal includes three types of roads: Main entrance road (50 feet), Secondary entrance road (40 feet), and Access Road (25 feet). The standard facility requirement for residential roads per 1000 population is 0.84 acres, which translates to a requirement of 20.75 acres for the estimated population of 24,703 in Hashem Nagar. The provided area for residential roads in the design is 14.76 acres, accounting for 20.92% of the total area. The chapter outlines the design considerations, road widths, road hierarchy, and connectivity among different types of roads, ensuring safe and efficient transportation within the residential area. The proposal aims to create a well-planned and accessible road network that caters to the needs of residents, promotes connectivity, and enhances the overall livability of Hashem Nagar.

4.6 Overall Design of the Hashem Nagar Residential Area

The fig 02(f) provides a comprehensive overview of the design proposal for the entire residential area, spanning a total land area of 70.58 acres. The estimated population of 24,703, based on the standard population density of 350 people per acre as per PRLD 2004, is taken into consideration for planning various facilities. The table 01 outlines the minimum standard requirements for different facilities such as education, health, community organization, recreation, commercial, and roads, and compares them with the provided area in acres and the percentage of area used in the design.

Table 1 Area Distribution of the Designed Residential Area

Facilities	Minimum (acre)	Provided (acre)	(%)	Facilities	Minimum (acre)	Provided (acre)	(%)
EDUCATION				**Recreation**			
Primary School	1.97	0.35	0.49	Play-Ground/	1.97	2.94	4.16
High School	2.47	0.24	0.34	Play-field, Open space			

College	1.97	0.7	1	Green Space	1.97	4.06	5.76
HEALTH				Park	2.96	1.53	2.17
Clinic	0.9	0.41	0.58	**COMMERCIAL**			
Hospital	0.9	0.36	0.51	Shopping Complex, Small Shop/	1.97	2.74	3.88
COMMUNITY Facilities				Super Market/ Restaurant			
Community Center/Mosque	1.8	1.08	1.54	**ROADS**			
Library	0.9	0.09	0.13	Residential Roads	20.75	14.76	20.92
Parking Space	0.9	0.69	0.98	Net Residential Area	42.348	40.5	57.36
Dustbin	0.24	0.13	0.19				
				Total	**70.58**	**70.58**	**100**

The proposed design includes facilities such as primary school, high school, college, clinic, hospital, community center/mosque, library, parking space, dustbin, play-ground/play-field, open space, green space, park, shopping complex, small shop/supermarket/restaurant, and residential roads. The percentage of area used for each facility is calculated in relation to the standard requirements, with the aim of providing adequate facilities for the residents of Hashem Nagar. The table 01 provides an overall picture of the proposed design, showcasing the planned allocation of space for various facilities to ensure a well-planned and balanced residential area that caters to the needs of the population.

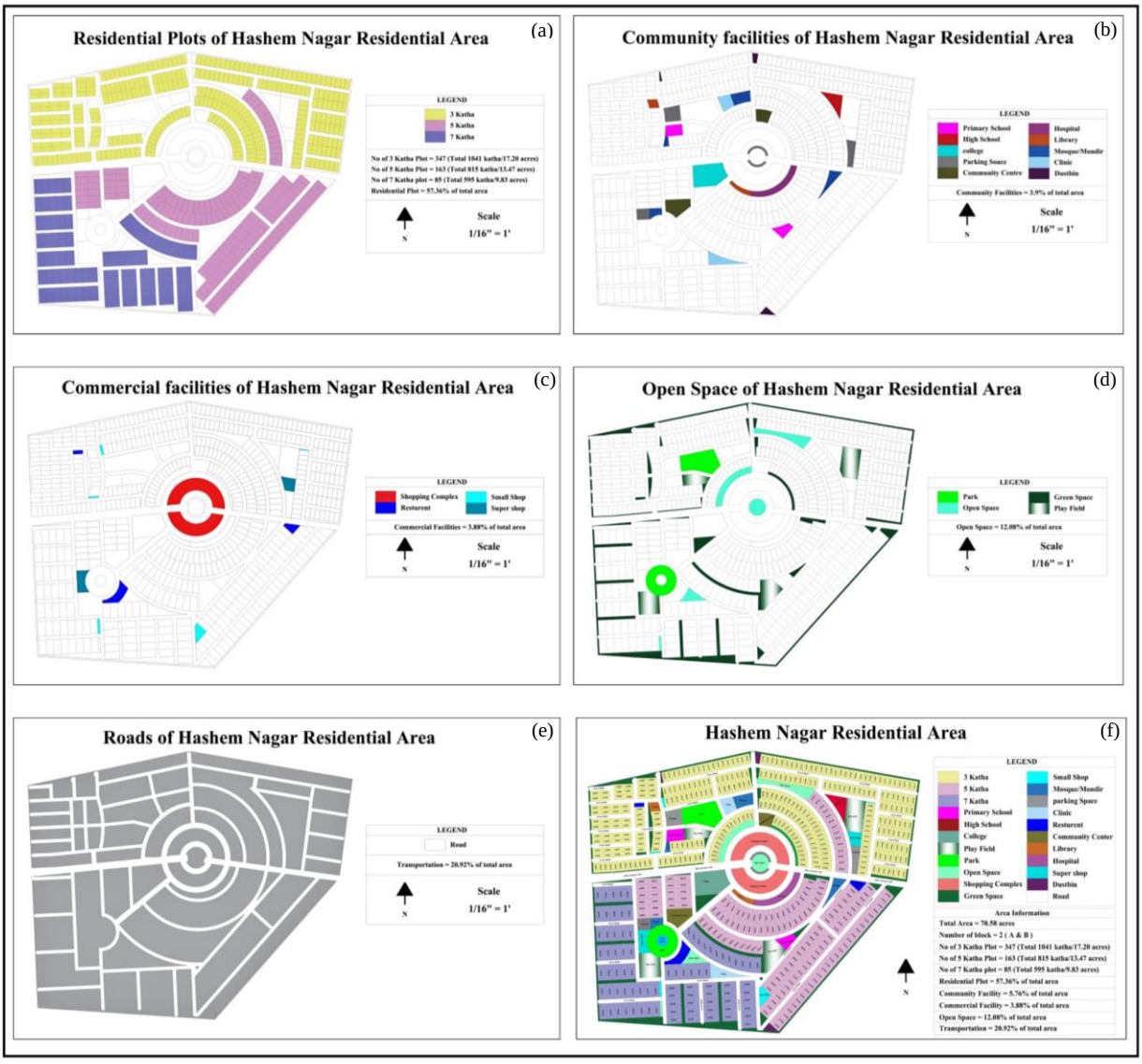

Figure 2 Design Proposal of (a) Residential, (b) Community, (c) Commercial, (d) Open Space, (e) Transport Facility, (f) Overall Design of the Hashem Nagar Residential Area

5 Conclusion

This study highlights the key findings and outcomes of the design proposal for the Hashem Nagar Residential Area. Based on the analysis of the standard requirements and the provided area for different facilities, it is evident that the proposed design aims to meet the minimum standards set by PRLD 2004 for a population of 24,703. The study reveals that careful consideration has been given to providing essential facilities such as education, health, community organization, recreation, and commercial spaces to cater to the needs of the residents. The proposed design includes primary and high schools, a college, clinics, hospitals, community centers/mosques, libraries, parking spaces, dustbins, play-grounds/play-fields, open spaces, green spaces, parks, shopping complexes, small shops/supermarkets/restaurants, and residential roads, among others. The percentage of area used for each facility in the proposed design has been calculated and compared with the standard requirements, indicating that efforts have been made to ensure a balanced distribution of space to meet the needs of the population while adhering to the guidelines. The design proposal for the Hashem Nagar Residential Area aims to provide a well-planned and balanced community that meets the minimum standard requirements for various facilities. It caters to the needs of the residents and ensures that essential amenities and services are readily available to create a sustainable and livable environment. Further studies and evaluations can be conducted to monitor the implementation and effectiveness of the proposed design in meeting the needs of the growing population of Hashem Nagar.

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