

# **An Assessment on A Model of Self-Sufficient Neighbourhood Planning Based on Sustainability in Rajshahi**

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## **Abstract**

A planned neighborhood can ensure better opportunities for living. A neighborhood is a self-sufficient residential unit that accommodates residents with all necessary facilities and services. Rajshahi is one of the major urban, commercial and educational, administrative, cultural and business centers in Bangladesh which is located north side of the Padma River. Rajshahi does not have sufficient planned residential neighborhoods. The objective of this study is to develop the area, make it a neighborhood for a large number of people, provide necessary utilities and community facilities and make the area self-sufficient. So, the area is located 7.2 km distance from CBD and ward no. 499 is selected for neighborhood planning which covers a total area of 307 acres. Before selecting this area, a reconnaissance survey and SWOT analysis are completed. Finally, a well-planned aesthetic residential neighborhood is designed to provide all necessary facilities, which are free from noise, pollution, sustainable, and secured for living. This study will be helpful for the government and relevant authorities to create a planned residential neighborhood providing all necessary utility services and also for the urban planners to upgrade the design for creating a more planned residential neighborhood.

**Keyword:** *Neighborhood; Residential unit; Utility service; SWOT; Sustainable.*

## **1. Introduction**

Rajshahi is one of the biggest cities in Bangladesh. It is a city situated in the Northern parts of Bangladesh. Being an educational hub for the northern regions of Bangladesh, Rajshahi has experienced a massive migration from the nearby districts. This caused the population of Rajshahi to grow every year. Due to rapid urbanization and centralization, people of different classes came into the center of the city and crowded the city a lot. This influx of mass population has created problems little by little, the development process started to halt.

Kashiadanga is a mouza situated on the periphery of Rajshahi. It is a mouza of **Nowhata Pouroshova, Paba Upazila**. It is the **499<sup>th</sup>** ward. (Khan, 1978) The mouza lies just on the north side of the Rajshahi-Chapai Nawabganj highway. It has a total area of **307 acres (1,242,384.92 km<sup>2</sup>)**. (Khan, 1978) Being decently away from the city center, Kashiadanga can be marked as a potential area for major planning as it may offer the opportunity for decentralization. The overgrowing population of the city center can be decentralized and moved to Kashiadanga to keep the environmental balance of Rajshahi intact. The elaborate justification of choosing the site will be highlighted in the further topics of the report. This study includes the present conditions of the area, details of the existing problems that the people of the area face every day, details of the potential development procedures, the existing development plan of the area in the Rajshahi Masterplan, GIS map of the existing area, 2D design of the development plan made by the authors, 3D model of the development plan made by the authors, details of the functionality of the plan made by the authors. There are some limitations of the study that may include: Lack of time to collect data from the survey site, Difficulties in secondary data collection, Lack of continuity of the study due to COVID-19.

## 2. Materials and Methods

### 2.1 Study Area Profile

Kashiadanga mouza can be found in the Darshan Para union, Paba Upazila at the outskirts of Rajshahi City. Kashiadanga mouza is a small piece of land lying just on the outer edge of Rajshahi City Corporation. It has a land area of **307 acres** where **999 households** reside. (Khan, 1978) A total population of **4346 people** lives here. (Khan, 1978) The location of the Kashiadanga mouza from CBD (Shaheb Bazar) is **7.2 km**. The place is also accessible by the Rajshahi-Chapai Nawabganj bypass in which case the place is on the Northside of the Arterial way. Kashiadanga intersection is where roads start to lead towards Chapai Nawabganj to the west, Aam Chattar intersection to the east, Haripur Union to the south-west and Shaheb Bazaar to the south-east. (Khan, 1978)

### 2.2 Methodology

Two types of data were collected for the study. All the primary data were collected from the field survey and secondary data was collected from several sources. Through the Reconnaissance survey, the study area was visited and observed up to the eyes to find the suitability to propose a complete plan on the site. The available and unavailable services present on the site were also noted which can be helpful to accomplish the site planning. The Key findings from the reconnaissance survey are as follows: about **7.2 km**. from CBD, about **22.9 km**. from Rajshahi Medical College Hospital. After collecting all valuable data, planning a sustainable neighborhood area according to calculating total population, population density, total area size and far-set back. Proposed different sizes of the plot, health, school, community, education and commercial facilities in this plan for high class & middle-class people. After the detailed planning has been done, the information gathered from there has been implemented in the layout in 2D formation. It contained the spatial locations and properties of every land use proposed in the site. After the completion of the layout map in 2D, it was then designed in 3D to visualize the complete plan.

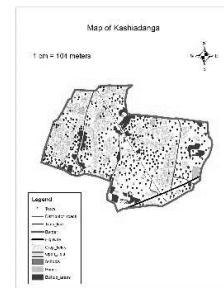


Fig 2.1: Existing Map of Kashiadanga (Source: Authors' Preparation, 2020)

### 3. Discussion & Analysis

#### 3.1 Division of land uses of the area

The total area for the high-class residential area is **154 acres**. **40%** or approximately **61.6 acres** was considered for residential housing purposes. **30%** area was considered for road networking purposes which are approximately about **46.2 acres**. This **107.8 acres** of land will be used for a solid built-up area. The rest of the **46.2 acres** will be used for different community facilities such as primary schools, high schools, colleges, markets, religious centers, community centers, water stations, surveillance stations, electrical substations, etc. The total area for the middle-class residential area is **122 acres**. **40%** or approximately **48.8 acres** of the total **122 acres** was considered for residential housing purposes. **25% area** was considered for road networking purposes which are approximately about **30.5 acres**. This **79.3 acres** of land will be used for a solid built-up area. The rest of the **42.7 acres** will be used for different community facilities such as primary schools, high schools, colleges, markets, religious centers, community centers, water stations, surveillance stations, electrical substations, etc.

#### 3.2 Road Networking

In the high-class area, **46.2 acres** of land was selected for constructing roads for the seamless movement of the dwellers of the area. Two types of roads were implemented in the area. These are:

1. **Distributor roads:** These roads will take the vehicles from the Rajshahi-Chapai Nawabganj highway in the area and show them different ways to reach different parts of the area. The width of these roads is **8 meters**.
2. **Access roads:** These roads will take the vehicles from the distributor roads to the front of different buildings in different parts of the area. The width of these roads is **6 meters**.

#### 3.3 Residential Purpose

For the residential housing, the allotted area in the high-class part is about **61.6 acres** and **48.8 acres** in the middle-class part. This area will be developed for high-class people and the design of this area will focus on spacious and luxurious housings and sub-division patterns.

#### 3.4 Population Calculation

High Class	5 Katha	7 Katha	9 Katha
Total area (%)	25	55	20
Total area (acre)	26.95	56.29	21.56
Set back (m)	front = 1.5 rear = 2.0 side = 1.25	front = 1.5 rear = 2.0 side = 1.25	front = 1.5m rear = 2.0 side = 1.25
FAR	3.75	4	4
MGC (%)	60	60	60
Plot dimension (m)	20m x 16m	24m x 20m	27m x 22m
No. of Stories	7	7	8
No. of plot	$(154 \times 0.4 \times 0.25 \times 60.5) / 5 = 186$	$(154 \times 0.4 \times 0.55 \times 60.5) / 5 = 293$	$(154 \times 0.4 \times 0.2 \times 60.5) / 9 = 83$
Population	$186 \times 12 \times 5 = \mathbf{11160}$	$293 \times 12 \times 5 = \mathbf{17580}$	$83 \times 14 \times 5 = \mathbf{5810}$

(Khan, 1978)

Middle Class	4 Katha	5 Katha	6 Katha	8 Katha
Total area (%)	30	50	15	5
Total area (acre)	23.79	39.65	11.89	3.96
Set back (m)	Front=1.5 rear = 2.0 side =1.25	front = 1.5 rear = 2.0 side = 1.25	front = 1.5 rear = 2.0 side = 1.25	front = 1.5 rear = 2.0 side = 1.25
FAR	3.5	3.75	3.75	4
MGC (%)	62.5	60	60	60
Plot dimension	19m x 14m	20m x 16m	22m x 18m	20m x 27m
No. of Stories	6	7	7	7
No. of plot	$(122 \times 0.4 \times 0.3 \times 60.5)/4 = 221$	$(122 \times 0.4 \times 0.5 \times 60.5)/5 = 295$	$(122 \times 0.4 \times 0.15 \times 60.5)/6 = 74$	$(122 \times 0.4 \times 0.5 \times 60.5)/4 = 18$
Population	$221 \times 10 \times 5 =$ <b>11050</b>	$295 \times 12 \times 5 =$ <b>17700</b>	$74 \times 12 \times 5 =$ <b>4440</b>	$18 \times 12 \times 5 =$ <b>1080</b>

**Total Population: 34550 + 34270 = 68820**

(Khan, 1978)

### 3.5 Facilities

Facilities	Category	Number of Establishments	Area per Establishment (Acre)	Total Area Occupied
<b>Educational</b>	School	7	1.79	12.53
	College	4	1.79	6.88
	<b>Total</b>	<b>11</b>		<b>19.41</b>
<b>Health</b>	Hospital	4	.089	3.56
	<b>Total</b>	<b>4</b>		<b>3.56</b>
<b>Community</b>	Mosques	6	.89	5.34
	Community Centres	4	.89	3.56
	Parks	5	2.68	13.4
	Playground	4	1.79	7.16
	Parking	2	2.59	5.18
	<b>Total</b>	<b>21</b>		<b>34.64</b>
<b>Commercial</b>	Markets	4	.89	3.56
	Corner Shops	11	.89	9.79
	<b>Total</b>	<b>15</b>		<b>13.35</b>
<b>Maintenance</b>	Surveillance	2	1.79	3.38
	Electricity	2	1.93	3.86
	Water Station	2	2.30	4.45
	<b>Total</b>	<b>6</b>		<b>11.89</b>

## 4. Results

### 4.1 Proposal for Safety Measures

The Surveillance Station in the high-class residential area provides the overall security in the area. Some of the tools they use are:

1. Street lights that keep the distributor and access roads lit up at night.
2. Closed-circuit cameras that keep the roads and the building premises under professional supervision.
3. Check posts with active personnel within the regular interval in the area.
4. Firefighters who can help the people of the area in case of a sudden fire.
5. Road signs for giving accurate direction to common people. (Nabi, 2012)

### 4.2 Proposal for Waste Management

To keep the area neat and clean, a waste management system has been proposed with active assistance from the Nowhata Pouroshova. The surveillance station will provide a garbage truck with two collectors who will collect from every household twice a day. This truck will then be taken to the Pouroshova waste disposal zone. Also, there will be roadside trash cans where the pedestrians can throw away the trash. These trash cans will also be emptied by the collectors of the surveillance station. (Nabi, 2012)

### 4.3 Proposal for Sustainable Development

In this study, the residential areas are developed sustainably so that their functionality can also be used in the future. Some steps that are taken for Kashiadanga Residential Area are:

- **Rooftop Gardening:** It can be described as an effort to bring back the greeneries in a modern urban area. Besides providing green in the urban landscape, it can also be used for decorative purposes and it may provide foods as well for the residing people.
- **Solar Panels:** Solar panels on rooftops will gather renewable energy and then supply it to the flats of the buildings. Solar panels can also be used to cut some of the electricity waste. (Nabi, 2012)

### 4.4 Proposal for Sanitation

In Kashiadanga Residential Area, wastes need to be controlled and managed for proper livelihood. Managing wastes, they should be properly collected, transported, recovered and disposed of.

**Collection:** First of all, these wastes should be collected from pit latrines or septic tank from the residential zone and place them in these plants. The Pouroshova authority is responsible for the monthly or yearly collection of these wastes. (Nabi, 2012)

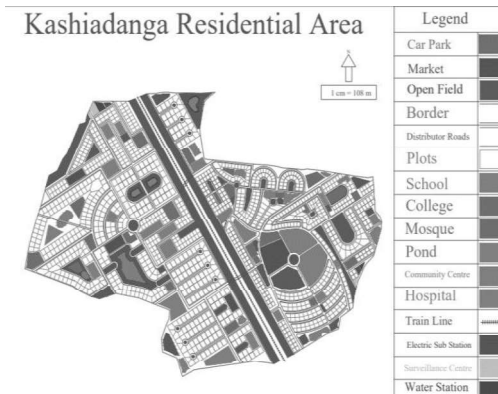
**Transportation:** The wastes should be transported by truck to carry them.

**Recovery:** These should be recovered to use as fertilizers in the cultivation of seasonal crops.

### 4.5 The Proposed Designs

The Proposed 2D Design shows:

- High-class residential area on the left side of the train line.
- Middle-class residential area on the right side of the train line.
- A 30-meter buffer zone for development in proximity to the train line including a noise cancellation buffer.



**Figure 4.1: The Proposed 2D Design for Kashiadanga (Source: Authors' Preparation, 2020)**



**Figure 4.2: The Proposed 3D Design for Kashiadanga (Source: Authors' Preparation, 2020)**

- Implementation of different patterns and sized plots with different sized buildings.
- Implementation of different community facilities for the dwellers of the residential area.
- Implementation of new and improved road networks for ease of access.
- Distribution of electricity, water supply and other utilities for the dwellers.
- Distribution of greeneries, parks and water bodies in the area will serve both environmental and decorative purposes.

The 3D representation shows:

- Proposed elevation of residential buildings in the area.
- Implementation of FAR and MGC while designing the plots and different patterns.
- Road network for the ease of access & Distribution of greeneries in the area.

## 5. Conclusion

The study area is planned as a neighborhood unit. All the services and facilities proposed for the neighborhood will be able to accommodate the mass population of the area to be facilitated at the highest extent. Providing facilities are community facilities, easy road network, daily necessities, prayer hall, police box, parks, clinics, etc. Each detailed plan has covered all the requirements which are needed for successful planning of the neighborhood. The proposed designs and plans will be able to stretch the hands of development in upcoming prospects. The implementation of the plan will make the area more developed and comfortable for suitable living for the citizen of the area. After implementation, it will be a complete neighborhood area with a nice aesthetic view.

## 6. References

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