

Predictions for ‘Purbachal’: Learning from ‘Dhanmondi’

M. Arefeen Ibrahim^{1*}, Ajmeri Nusrat Shoma², Saiful Hasan Tariq³

Abstract— Township planning was introduced from early ‘50s in Dhaka, the capital city of Bangladesh having a current population of 14 million approximately. To meet the demand of growing number of population, Dhaka has witnessed different new township projects from the ‘60s to ‘90s. Example of some of these similar developments by government, includes Dhanmondi, Banani, Gulshan, Uttara, Baridhara etc. Hence, old Dhaka city is expanding its civic facilities by urbanizing in the vicinity of city. Under this scenario, a new township project, Purbachal New Town, was planned by concerned government organization namely “Rajdhani Unnayaan Kortipokkha” (RAJUK) which was previously called “Dhaka Improvement Trust” (DIT). This new township is much larger than any other previously planned ones in Dhaka city. This paper aims to compare Purbachal New Town with a previous Development, Dhanmondi Residential Area, which was designed by the same Capital Development Authority (RAJUK/DIT) in early ‘50s. The comparison takes place in terms of road network and land-use. Future possible impact of traffic situation on newly designed master plan in Purbachal is also sought for. Findings from the study show some similarities in master plan of Purbachal with existing Dhanmondi, which may create similar situation of current Dhanmondi in proposed Purbachal New Town too.

Keywords— *Dhanmondi Residential Area; Purbachal new Town; Road network; Land-use; Traffic pattern; Dhaka;*

I. INTRODUCTION

Dhaka is one of the fastest growing cities of the world. With its huge population and fast growth rate, Dhaka is facing an emergency task of accommodating huge number of population every year. In response to this, a new township, Purbachal New Town, was planned by the Government which is currently being implemented on site. Creating a completely new designed township as part of decentralization of the main cities, is unlike the cities that are gradually developed and shaped over a long period according to the necessity of city’s

life, which is spontaneous. Planned city or township can be developed in drawing sheets and then built accordingly. Dhanmondi, Gulshan, Banani, Uttara are examples of this kind in Dhaka. But history shows, there are significant transformations from their original plan throughout the period. Thus, these cannot be proven to be ideal solution for a township planning for a city like Dhaka. Over the period of time, the planned township like Dhanmondi has changed in terms of land use and transformed the expected neighborhood traffic pattern to overcrowded situation, due to the increased number and accessibility of different types of vehicles. Proposed road network became inappropriate due to the change of land-use pattern and uncontrolled housing development inside the planned residential area. This study intends to study the existing road network situation of Dhanmondi along with the causes of current traffic congestion. Later, the findings are compared with proposed ‘Purbachal New Township’ to find whether, the proposed road network at Purbachal would witness the improved or similar situation like today’s Dhanmondi residential area (written as Dhanmondi R/A hereafter).

II. OBJECTIVE

The objectives of the study are as follows,

- To understand the land-use pattern and road network of Dhanmondi through literature survey and its impact on existing traffic situation through field study.
- To understand the proposed land use pattern and road network of Purbachal through literature survey.
- To compare the existing situation of Dhanmondi area with proposed Purbachal area master plan, in terms of land-use and road network, and to search for the future possible impact of traffic situation and Land-use due to proposed master plan.

III. METHODOLOGY

Total research work is divided in four steps, i.e.

Step 01: Literature survey was done to have a theoretical perspective on the land-use pattern and road network of Dhanmondi.

Step 02: Selection of observation points inside Dhanmondi R/A on the congestion points and counting the numbers and types of vehicles at different time segments.

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Step 03: Analysis of the current situation of road network and vehicular access on the basis of findings from the observation.

Step 04: Shedding light on possible positive and negative aspects of proposed road network and land-use at Purbachal from the analysis of the observation on Dhanmondi area.

IV. STUDY ON DHANMONDI R/A

A. History and Planning Principles

Dhanmondi Residential Area was one of the first planned residential communities in Dhaka. Dhanmondi was planned in the early fifties by the Public Works Department to provide residential accommodation for high and higher middle – income group of population in Dhaka city in 1952 [1].



Fig. 1. Proposed Master plan for Dhanmondi R/A in 1952.

To develop a residential area in Dhanmondi, the project was undertaken earlier in 1949. The Construction and Building Department of the government of East Pakistan acquired about 500 acres of agricultural and horticultural lands in 1950, levelled them, and according to an approved plan allocated plots to the people. Dhaka Improvement Trust (DIT) (renamed to RAJUK in 1987) later undertook the task of providing public facilities, constructing roads and other facilities [1]. The settlement of 472 acres structure centers upon a natural depression – eventually named Dhanmondi Lake. The water body was later excavated to create a somewhat gridiron system of 1000 number of quite large residential plots. Previously, the 5- meter deep, 37-hectare Lake was a navigational channel connected to the surrounding river system – which later used to function as a storm water drain through a linkage with Begunbari Khal [2].

Dhanmondi Residential Area was planned in the method of site and services scheme to provide residential area basically for the people of high and higher middle income group. Though it was residential in nature, the area was not developed considering the idea of neighborhood planning. At the initial plan of Dhanmondi Residential Area, there was no provision of commercial and community facilities except for the schools and mosques. Of the total land, about 61.4% was proposed for residential purpose, whilst the rest was proposed for roads, water bodies, parks, playgrounds, mosques and schools [3].

B. Transformation of Land Use and Plots

Initially, DIT kept the plots of Dhanmondi exclusively as residential and did not allow any plot or house for use of commercial purposes. The idea was that, in each plot, the owner would build a one or two-storey house. But as Dhaka started expanding rapidly, Dhanmondi had to accommodate the pressures of substantial urbanization. In response to tremendous pressure on city land after the year 1972, the restriction was relaxed to the point of virtual non-application [4]. There was only one school and one mosque within Dhanmondi. Even in early 80's Dhanmondi was a symbol of perfect residential area with independent homes, a lake and only a few corner shops. Though it was residential in nature, the area was not developed considering the idea of neighborhood planning. The neighborhood itself started various non-residential activities for the requirement of community and commercial facilities. Different forms of land use transformation started and the rate increased in a prominent way for the market force and the relaxation of restriction of non-residential development. Quite a good number of residential buildings have transformed into non-residential use, increasing at a very high rate. Within the last few years its status is changed to a semi-commercial area. Already the plots around the Mirpur Road, Road no 27, Satmasjid road and Road no. 2 have been converted into commercial ones. Consequently residential structures also did undergo adaptive alteration. Schools, clinics, fast food shops, banks and other commercial establishments began to crop up all over the place. Gradual invasion of non-residential uses has drastically affected the quality and changed the character of Dhanmondi. At present there are about 89 schools, colleges and universities, 88 medical centers, beauty parlors, food outlets, clubs, exhibition spaces etc. [5]



Fig. 2. Transformation of Land-use pattern in Dhanmondi R/A, Source: Nahrin. K, 2008. [1]

Dhanmondi is basically laid out on a gridiron pattern and consists of rectangular plots (1 bigha). Three types of streets

(30 meter, 15 meter and 10-15 meter), having sidewalks, are provided in Dhanmondi. [5]

The area was divided into blocks, which were in turn subdivided into individual plots measuring approximately a Bigha (0.33 acres) each [4]. The subdivision layout followed basically wide gridiron roads with some rectilinear pattern to match up with lake.

Evidence shows that to date, a good number of plots have been subdivided into more than one smaller size of plots in Dhanmondi Residential Area. The original owners sell or mortgage the title of the partial land of the plot. Afterwards, more than one building is constructed into these subdivided plots. Land developers and real estate companies make these circumstances easier. This subdivision of the plots reduces the green space of the surrounding areas (premises) of the building and induces densification. It was found that of the total 1085 plots in Dhanmondi, only 360 of them have been subdivided into 860 plots where the remaining 725 plots were not subdivided. The majority was subdivided into 2 or 3 plots respectively 80% and 13%. [1]

TABLE I. CHANGES THE NUMBER OF PLOTS IN DHANMONDI R/A

Year	1958	1984	2000	2005	2006
No. of plots	1083	1131	1382	1544	1585



Fig. 3. Dhanmondi is cut in three separate pieces by two major North-South elongated roads

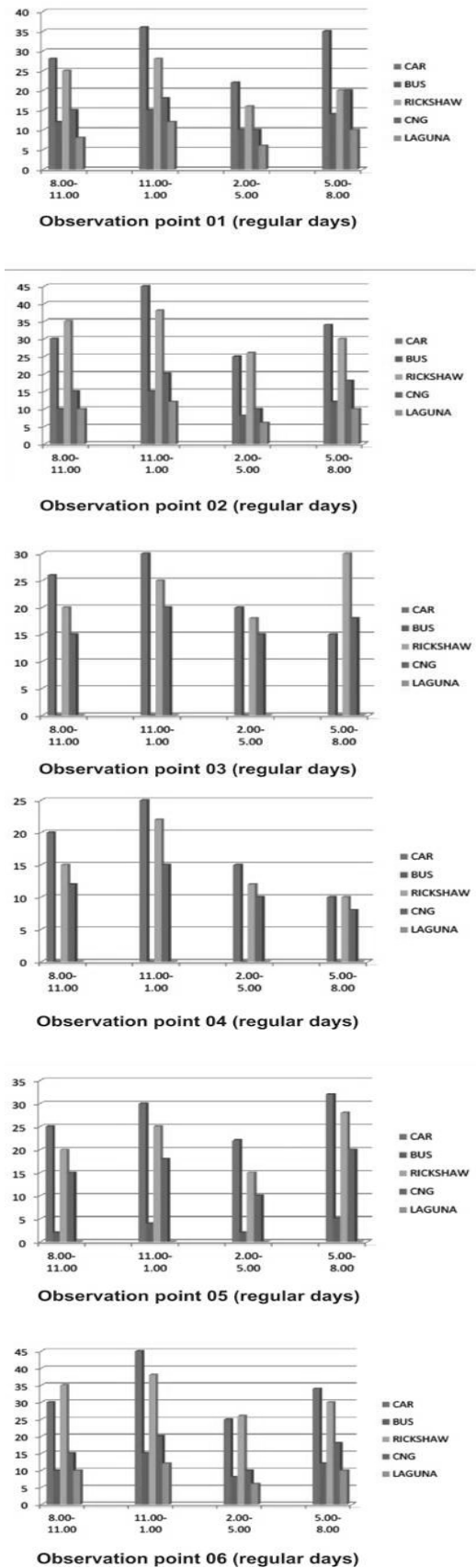


Fig. 4. Study of Observation points (OP) in Dhanmondi R/A

C. Existing road network and vehicular movement in Dhanmondi R/A

The road network of Dhanmondi is laid out on a grid iron pattern and this area is accessed by the three primary roads, i.e. Satmasjid road at west, Mirpur road at east and Road no 27 at north. All internal roads are secondary roads having sidewalks and interconnected at some nodes. However, there are no tertiary roads like other planned residential areas, i.e. Uttara or Baridhara R/A.

Dhanmondi is cut in three separate pieces (Figure 3) with the introduction of two major North-South elongated roads (both are more than 100' wide) namely mirpur road and Satmasjid Road. Due to constant heavy traffic passing through these two roads, which connect other parts of Dhaka, the communication and neighbourly bonding between these separated parts of Dhanmondi is virtually impossible. As a result, these separated parts have developed their individual identities and formed different uses other than that of whole Dhanmondi R/A. The East part accommodates a large number of medical facilities, while the west part has developed into a dense commercial zone. Presence of these two major, high density traffic roads through this planned residential neighborhood has a huge negative impact on the issue of a harmonious residential growth in the area.

To understand the traffic pattern of Dhanmondi R/A, some observation points (OP) have been randomly chosen and types of vehicular transportation has been observed at different segments of a day. The traffic pattern has also been observed on a holiday to understand the increased volume of traffic in regular working days.

Selected points are (Figure 05),

- 1) Road 2 in front of Rifles Square shopping center.
- 2) Road 15 Bus stand
- 3) Node at Bridge in Road no. 08
- 4) Node at Bridge in Road no. 32
- 5) Road 10 Node
- 6) Road 27 node

After the field survey, the observation on the traffic pattern is summarized in the followings,

- Observation point 01 act as one of the entry points to Dhanmondi area. All types of vehicles were observed here, having significant amount of private cars and rickshaws at the time when schools and offices end at 11 am to 1 p.m. and at 5p.m. it indicates that outsiders from Dhanmondi also enters for the purpose of schooling and office activities. Moreover, Satmasjid road also serves as the connecting road to Mohammadpur area.
- Observation point 02 is also one of the entry and exit points to Dhanmondi R/A. highest amount of private cars has been observed in both regular and holidays from 11 am to 1 pm, indicating that schools, which end during these hours, are the major factor of traffic congestion at this point during regular days. In holidays, highest number of private cars and rickshaw was found, indicating that, cars use the internal roads as short-cut to go from Satmasjid road to Mirpur road and vice-versa (Figure 5).

- Observation point 3, as a node and landing point of bridge on road no.8, shows significant amount of private car and rickshaw from 11 am to 1 pm, but at 5 pm, rickshaw remains the major mode of transportation through this point. It indicates the vibrant atmosphere of Dhanmondi Lake area at that point and peoples from inside and outside of Dhanmondi area use rickshaw to access through this point. During holidays cars and rickshaws were found at almost similar amount in number at 5pm, indicating that people visit this area or cross through this point more frequent in holidays also and this point remains busy just like regular days due to crowd and congestion created by high density of cars and rickshaw. The amount of car and rickshaw also indicates that bridge on road no.8 works as the connecting element to cross through Dhanmondi area.
- Observation point 4, 5 and 6 are also congestion points, but remains mostly busy from 11am to 1 pm due the movement private cars and rickshaw.

Note: The Observation points have been referred to with the old road numbering system of Dhanmondi, to relate it with the literature study, done prior to field survey.

The field study finds that, lack of tertiary road creates thoroughfare, resulting to traffic congestion in internal roads. In addition, cross sections of the internal roads also create traffic congestion in the rush hours especially from 11:00 am to 1:00 pm, when the schools ends and at 5:00 p.m., when the office and evening shift of the schools end.

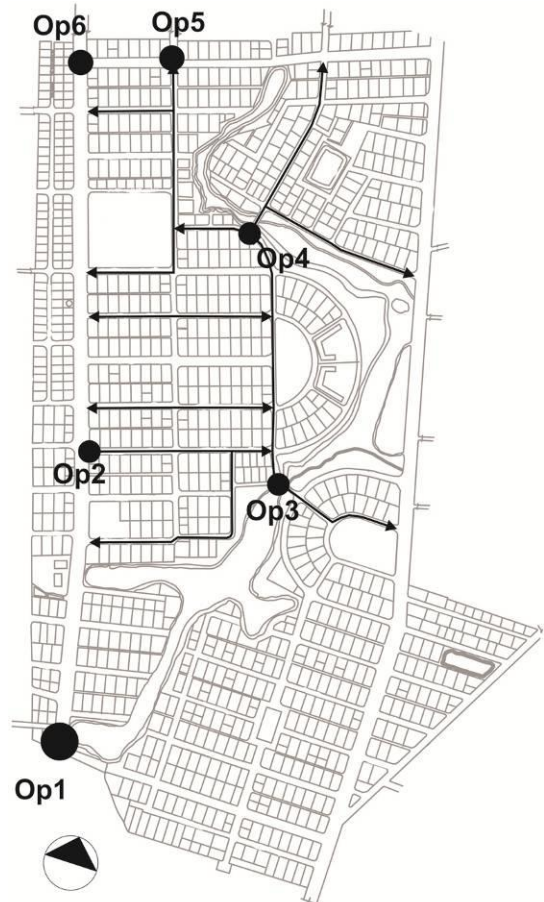


Fig. 5. Thoroughfare inside Dhanmondi R/A

V. STUDY ON PROPOSED PURBACHAL NEW TOWN

A. History and Planning Principles

Purbachal New Town is located at 16 km away from the center of Dhaka city at Rupganj Upazilla of Narayanganj District and Kaliganj Upazilla of Gazipur District. It is traversed with the Balu river at the west and Shitalakkhya river at the east. The area is characterized by flat land and low flood zone. Web of lakes penetrates the site. Before development it was low agricultural land, now with sand filling the ground has been risen up to 5'-6'. The total area of the project is 6150 acres which is divided into 30 sectors (RAJUK).

Purbachal New Town is planned to work as self sufficient townships with grid-iron pattern. There is a CBD at Purbachal, which works as its center. There are some other secondary centers like, open space, industrial areas, diplomatic zone, administrative and commercial zones. It could be defined as a polycentric model of a city, for its multiple nucleuses.

B. Zoning and Circulation

From the proposed master plan, it is evident that, smaller sectors are placed around the CBD zone. There are defined recreational, institutional, industrial, administrative, residential zones placed around the central business district (CBD). High-rise zones are placed on the periphery. Residential plots having the size of 10 katha, are placed along primary road. Industrial zones are placed on the fringe, mostly along the banks of the rivers. Unlike the northern part, the southern part lacks large scale open green space.

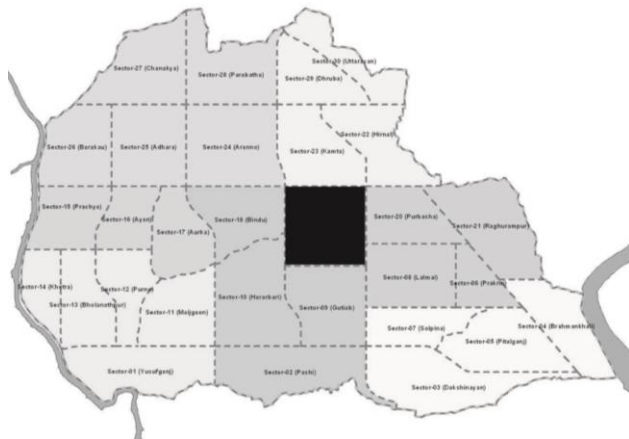


Fig. 6. Master plan of Purbachal and CBD (Black marked area)

There is the provision for the placement of social infrastructure, research and institutional zones, which ensure better recreation and breathing space. Administrative blocks were at the junctions of the main roads. The residential and commercial blocks are integrated as per proposed layout.

Commercial areas are arranged like clusters around the city to serve nearby residential sectors. Most of the administrative buildings are placed around the CBD.

C. Proposed road network

Regional road were laid out in a similar manner to Dhanmondi and Gulshan. Approximately, 25.9% of total land is used for road network. It was found that; proposed transportation network consists of 6 types of roads at Purbachal, like:

- 1) Cul-de-Sac-30' wide
- 2) Tertiary road-30' wide
- 3) Access road-30' wide
- 4) Secondary road-54' wide
- 5) Primary road-75' and 100' wide
- 6) Regional road-150' and 300' wide

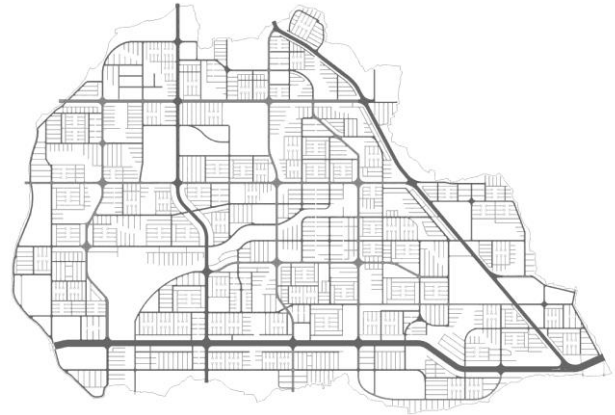


Fig. 7. Proposed road network at Purbachal new Township



Residential Plots

- Residential: CAT-I (3 katha)
- Residential: CAT-II (5 katha)
- Residential: CAT-III (7.5 katha)
- Residential: CAT-IV (10 katha)
- Residential: CAT-V (High-Rise Apartment Block)
- Residential: CAT-VI (Block for Low Income Group)
- Residential: CAT-VII (Block for Officers' Quarters)

Fig. 8. Proposed road network at Purbachal new Township

Cul-de-sac/Tertiary roads connect residential apartment buildings. Access roads connect Cul-de-sac/Tertiary road, and meet the Secondary road. Secondary road meet the Primary road and Primary road meet to the Regional road. Like Dhanmondi, Purbachal new town is also divided into two parts by its main access from 300' wide road and Northern part is substantially larger than southern part. Another major road, which is running from South-East to North-West, also sliced a small part at East from the larger part (Figure 08).

VI. OBSERVATION FROM THE PROPOSED LAND-USE AND ROAD NETWORK IN PURBACHAL RESIDENTIAL AREA

Purbachal so far is the largest land development project of Rajuk. It is approximately 13 times bigger in area than that of Dhanmondi R/A. Purbachal is yet to be ready for inhabitants and undergoes final phase of completion. Proposed master plan of Purbachal has gone through several revision processes since its first proposal. The revisions were made according to the square grid, and each grid encompasses parts of several sectors.

For the purpose of further analysis, block H2 (appendix-1) was randomly picked from latest revision done in 2012, which includes part of sector 16, 17, 24 and 25. This block includes not only residential plots, but also other commercial and administrative plots and natural features like lake, fields, forests etc. All 6 types of roads are evident in this block.

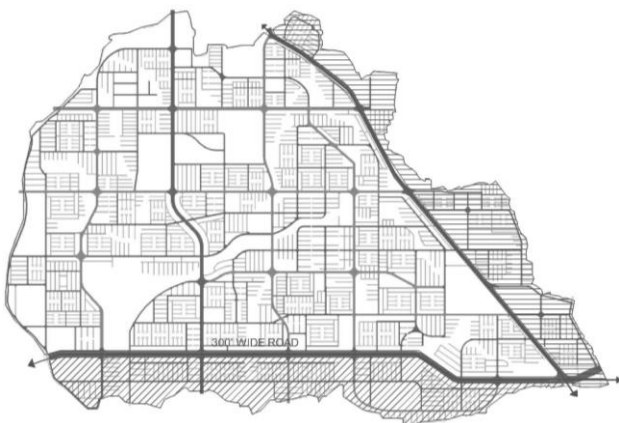


Fig. 9. Purbachal New Township is cut in three separate pieces by two major roads

A residential zone from sector 17, under block H2 was picked to analyze the land use and road network, (figure 09) as the characteristics are similar in all the sectors with in Purbachal area. The analyses and findings based on the study of proposed layout are given below, e.g.

a) Similar to the case of Dhanmondi, A major east-west elongated 300' wide high-way runs through Purbachal, connecting Dhaka with the eastern part. Another 150' wide Regional Road connects the Eastern end of the 300' wide road diagonally with the North-West part of Purbachal and extends beyond it to join the National Highways (Fig:9). These roads slice the area in three separate parts. Since there is no connection between these parts on a different level other than that of the high way; it is predicted with great alarm that, the smaller parts on south & east will develop their own identity and uses, which might not

confirm with the rest of Purbachal. The residents of the south & east part too might be much deprived from the common civic facilities and amenities provided in Purbachal. Instead of designing major connecting roads through planned residential neighborhood, it might be a better idea to incorporate peripheral roads in similar cases. If unavoidable, then keeping these highways at a different level than that of the other internal roads might also be an effective way to avoid these divisions. Overall integrity of the planned area is kept intact in this manner.

- b) Safe pedestrian circulation uninterrupted by vehicular traffic is absent in Dhanmondi which was planned in the 50's. Ironically, this provision is not introduced forty years later in the 90's, when Purbachal was planned. Dedicated pedestrian paths instead of footpaths beside the vehicular streets (that are interrupted at the corner of the blocks by vehicular circulation), are widely practiced in contemporary urban design. Dedicated pedestrian paths if introduced in Purbachal, would improve the safety and environmental quality of its neighborhood. Social interaction too will be encouraged.
- c) Smaller plots having size of 3 Katha, are provided with 30' wide tertiary access roads and Cul-de-Sacs. Except the peripheral access roads, all internal roads are provided with Cul-de-Sacs, which controls the thoroughfare of vehicular movement through residential zone, unlike the Dhanmondi R/A.
- d) Larger 5 katha and 7.5 katha plots are also accessed by 30' wide tertiary road. But unlike the smaller plots, they have no Cul-de-Sacs at the end of the road, which increases the chance of thoroughfare of vehicular movement through internal road at residential zone. The tertiary roads are directly connected with peripheral 54' and 75' wide road and having several intersections, which increases the chance of traffic congestion, much like present condition of Dhanmondi R/A.
- e) Larger residential plots having the size of 10 katha were proposed as the peripheral plots, and these are directly accessed from primary and regional road of 150' and 75' wide roads. According to current building construction act, larger plots in front of wide roads allow high-rise buildings, which accommodate a large number of families. These high-rise apartment buildings will be directly accessed from primary and regional roads. This situation may create traffic congestion during rush hours, much like the Stmasjid and Mirpur roads, in both east and west side of Dhanmondi R/A.
- f) Though plots for academic and commercial purposes are well defined and at a little distance from residential block, any future change in land-use, especially in the larger residential plots, might create the same situation as present day Dhanmondi area. Therefore, land-use pattern, density needs to be regularly checked and strictly maintained.

VII. CONCLUSION

The study was intended to find the present scenario of Dhanmondi R/A in terms of land-use and road network and their impact on traffic situation. Later the findings based on field observation was discussed and was followed by a discussion on possible positive and negative aspects of proposed road network and land-use at Purbachal from the analysis of the observation on Dhanmondi area. The observation findings suggest that, the land-use and proposed road network has little difference with that of Dhanmondi area in the case of larger plots. While, in smaller plots, the tertiary roads having Cul-de-Sacs added a new feature in residential neighborhood and might reduce the chance of vehicular thoroughfare through the residential zone. However, strict land-use policy and defining Tertiary roads only for neighborhood accessibility, introducing dedicated pedestrian paths, strict and proper maintenance of policies to control density might bring positive impacts in the proposed master plan of Purbachal area by reducing traffic congestion inside a planned residential township.

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APPENDIX – I

Square grids that accommodate parts of several sectors at Purbachal new town.

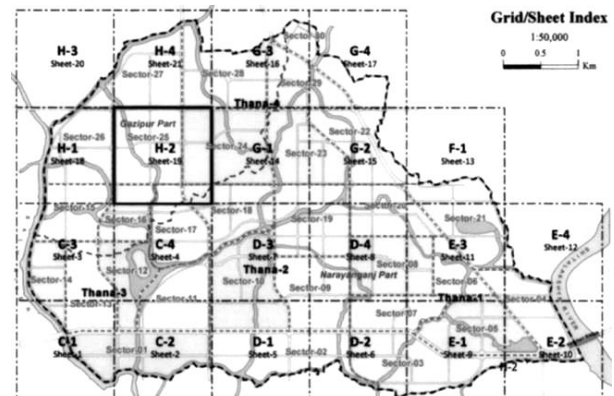


Fig. 10. Square grids of Purbachal new town

