

# Urban Consolidation Approach for Dhaka City: Prospects and Constraints

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## Abstract

*Dhaka, the capital of Bangladesh, is experiencing incessant process of urban expansion but mostly in an unplanned manner. To accommodate the growing population and various urban uses the city is experiencing vertical expansion in the inner city areas and horizontal expansion by encroaching the peripheral land. The Dhaka Metropolitan Development Plan (DMDP) 1997-2015 proposed strategies of Urban Consolidation to optimize the city growth in the established urban areas by vertical expansion and through infill development on vacant land. But there is no such organized program undertaken to implement the consolidation strategies stated in the DMDP. This explorative study is an attempt to find the potentiality of urban consolidation process in Dhaka. The research aims to investigate the qualitative and quantitative status of available amount of vacant and underutilized land for redevelopment to ensure the optimum utilization of the scarce urban land.*



Key Words: Dhaka, Urban Consolidation, Dhaka Metropolitan Development Plan

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## Introduction

Most developing countries in the world are undergoing a major demographic transition with economic, social and technological modernization leading to falling death rates and rapid population growth (Williams, 1990, cited in Jones, 2000).

Rapid population growth together with economic change due to recent globalization trend fuels the urbanization process in most of the developing countries. Dhaka, the capital city of Bangladesh, is in a continuous process of urban expansion. Dhaka emerged as an important strategic and business center along the river Buriganga at the beginning of Muslim rule in 13<sup>th</sup> century. Since after liberation till today, capital city Dhaka accommodates major share of urban population. According to 2001 census, Dhaka Statistical Metropolitan Area (SMA) accommodates 10.7 million people, which is 37.45% of total urban population of Bangladesh (BBS, 2003). Dhaka entered the mega city list attaining the rank 25<sup>th</sup> in the year 1980 with a population of 6.6 million. It is predicted by United Nations that Dhaka would be the 6<sup>th</sup> largest mega city by the year 2010 and it would continue to uplift its position as second largest mega city of the world by the year 2015 (Islam, 2005). According to the population projection of Dhaka Metropolitan Development Plan (DMDP, 1997), the population of Dhaka Mega City will be 15.57 million by the year 2015. The need to cater for high population growth and migration from rural areas theoretically reinforces government policy towards city expansion (Zaman and Lau, 2000). According to Dhaka Metropolitan Development Plan (DMDP, 1997), the 1980s was the period of major land conversion from rural to urban. It was calculated that between 1983 and 1991 more or less 5,500 hector lands were converted to urban uses. Around two-third of this total land converted in the fringe areas, and the rest in the central urban areas of the city. At the same time, the population increased only 30% in the fringe area and 70% in the central urban areas (Fatema, 2003).

It is an accepted phenomenon that a relationship exists between the shape, size, density and uses of a city and its sustainability (Williams and et.al. 2001) The issue of sustainability has emerged as a major concern for mega cities of developing countries, where high growth rate, uncontrolled development and expansion of the city is a constant threat on environment and socio-economic condition. The area of Dhaka Mega city had expanded 17.88 times from its size in the year 1951, over the same time period population had increased 25.09 folds. But such expansion was never happened in a planned way though several plans were prepared to guide and regulate development of Dhaka City. First master plan of Dhaka was done in 1959 covering an area about 829 sq. kms. But the scope of this plan became limited in the context of emergence of Dhaka as a capital of a sovereign country after the liberation war in 1971. The second effort was made by Planning Commission in 1981. Dhaka Metropolitan Area Integrated Urban Development Plan (DMAIUDP) was prepared by a foreign firm with participation of local experts (Shankland Cox and Partnership, 1981) to prepare a Strategy Plan for Dhaka but this plan was not formally approved by government and hence implementation was not possible. Finally the Dhaka Metropolitan Development Plan (1995-2015), covering about 1528 sq. km. area) was approved by the year 1997 (DMDP, 1997). The policies stated in this structure plan provided long term growth strategies for expansion of the city in the upcoming years.

The inner core of Dhaka City reveals a tendency towards high density built form, because of close proximity between place of residence and place of work. Transport sector failed to keep pace with the growth of the cities; there is insufficient provision of appropriate transport modes and inadequate infrastructure (Zaman and Lau, 2000). Dhaka City refers to the area under the jurisdiction of Dhaka City Corporation (DCC). The city had an area of only 125 sq. mile in 1974, which has expanded to an area of about 155sq. mile in 2008. Several attempts have been undertaken by government to ensure a planned development of this city. Dhaka Metropolitan Development Plan DMDP 1995-2015 was published in 1997. This plan covered an area of 590 sq mile, which is referred as Dhaka Metro Area. In all the development plans Dhaka City Corporation (DCC) area was given special emphasis because of its immense importance as the core of business, administration and home of major share of population.

The present trend of land development in Dhaka can be viewed from two perspectives:

Outward expansion in the peripheral areas of the city and (ii) more intense development in the inner city areas by replacing old low density structures by multi storied high density uses.

Due to uncontrolled development in the fringe areas, the city is losing its high value agricultural land, wetland, flood plains and other ecologically critically areas. The alarming loss of wetlands of Dhaka has been documented in the research work of Islam (2008). Unplanned development in the fringe areas is a severe threat on ecology and environment of Dhaka.

On the other hand, traditionally the housing sector was dominated by individual private initiatives but later the real estate developers undertook many projects in Dhaka to meet housing demands of the city dwellers. Such kind of initiative certainly benefited the housing sector but at the same time piecemeal kind of development on single piece of land did not consider the over all infrastructure and environmental condition of the city. As a result, on going densification process without proper planning fails to apprehend the desired benefits.

Most common characteristics of inner city areas of Dhaka are high density of population in certain locations, lack of open space, traffic congestion, poor quality of infrastructure and facilities. Especially, the current trend of redevelopment in inner city areas with higher density has created severe pressure on infrastructure and civic amenities because most of these development projects are taking place without considering the overall neighborhood context.

Observing these development trends, the Dhaka Metropolitan Development Plan (DMDP) 1997-2015 stated policies to optimize existing urban land resources in the short to medium term period. One of the strategies for optimization is the 'Consolidation' of established urban areas in Strategic Planning Zone (SPZ) 1-8 through densification by vertical expansion of built structures and infilling of vacant land within existing built up areas.

In such a backdrop, this research paper focuses the issue of 'Urban Consolidation' and its prospect of application in Dhaka City. Burgess (2000) defines 'Urban Consolidation' as the process to increase built area and residential population densities; to intensify urban economic, social and cultural activities and to manipulate urban size, form and structure. It has been observed that it is a matter of debate whether the city will be sustainable if it is compacted. City compaction has both its positive and negative consequences in case of developing country cities. In some cases, it is the process of increasing or maintaining the density of housing in established residential areas. The ultimate aim of consolidation is to reduce development on

the fringe areas of the city. It increases the accessibility provision of services and facilities and ensures high quality of life by preserving the urban open space.

Again the high densities have obvious consequences in terms of the choice of transportation modes, living conditions, congestion and pollution. Denser living environments are associated with more traffic congestion and noise, more exposure to toxic releases, more environmental pollution. These negative externalities are also aggravated by inadequate infrastructure. Besides, a common argument is that developing country cities are much more sustainable than developed country cities because material consumption per capita levels are much lower. Low income urban citizens are models of sustainable consumptions that they use very few non-renewable resources and generate very little waste. Considering the negative and positive aspects of consolidation, a careful selection of strategies can ensure positive impacts of consolidation in the cities of developing countries. Zhang (2000) describes that Hong Kong is a good example of compact city. The combination of rapid population growth and limited land resources made dispersed development unsustainable in Hong Kong. As a response, Hong Kong switched to high rise and high density development approach. Now, Hong Kong has the highest urban density in the world. His work illustrates the forces that caused Hong Kong to adopt the compact city development model and how policies are emerging in favor of high rise and high density urban development. It also looks at the advantages and disadvantages of urban compaction in the Hong Kong Context.

In case of Dhaka City, consolidation process has been started spontaneously by private initiatives about 15 to 20 years back in a most unplanned and sporadic way. Zaman and Lau (2000) describes that the city is developing to higher densities through urban consolidation by private initiatives in Dhanmondi residential area and in Sukrabad residential area. In recent years, replacement of old low story structures by high-rise apartments is a common phenomenon in most of the residential areas like Dhanmondi, Banani, Gulshan, Shantinagar, Shidhheswari, Muhammadpur, Kalabagan and many other localities. But the areas with poor accessibility to road network and other infrastructural facilities failed to attract developers for such kind of development. Though consolidation has been stated as a strategy in the DMDP Structure Plan 1997-2015 but no specific policy has yet been considered for the implementation process. There is a dearth of research work to explain the context of Dhaka in relation to consolidation process considering its physical setting, road network, infrastructure and other urban facilities. Consolidation is a complex process as it is associated with various elements like characteristics of built area and residential population densities, infrastructure and land capacity, transport, land use, intensification of activities, urban form, urban structure, activity pattern and settlement systems. This study attempts to explore the context of consolidation approach in Dhaka City. It primarily focuses on the availability of potential developable land, and its scope of development. This paper aims to focus on two objectives: (i) To estimate the amount of potential developable land which includes vacant and underutilized land (ii) To identify the characteristics of potential developable land of Dhaka City.

## **Methodology**

Consolidation strategy has been proposed in DMDP for the entire Dhaka City Corporation (DCC) area comprised of 90 wards. The primary objective of this study is to identify the

potential land for consolidation and estimation of their total amount. It has been tried to estimate the amount of land available which has potential for redevelopment and their physical characteristics. To accomplish the job, the required information was obtained from GIS Ward Maps of Dhaka City prepared by Dhaka City Corporation in the year 2001. This study has been conducted on 26 wards which includes localities with following characteristics (i) Old Dhaka (ii) Planned Area (iii) Unplanned Area (iv) CBD and (v) Industrial area. This study tried to have an idea whether the availability of the potential land for redevelopment differs with the characteristics of the area. Table 1 provides the list 26 wards included in this study with information on the characteristics of the area, names of neighborhoods covered and the population density.

**Table 1 Selected Wards with area characteristic, neighborhoods included and population density**

Type of Area	Ward No	Neighborhood	Population density (person/acre)
Old Dhaka	67	Central Jail Area	255
	68	Bangshal	541
	69	Nazimuddin Road, Agamsi Lane	689
	71	Bangshal, English Road	678
	72	Poddar Lane	562
	74	Nawabpur Road, Kaptan Bazar	477
	79	Sutrapur	356
Planned Area	23	Reazbagh	307
	24	Khilgaon	263
	49	Dhanmondi	64
	19	Gulshan	52
	20	Mohakhali	136
	22	East Rampura	163
Unplanned Area	26	Meradia	82
	34	Shahjahanpur	303
	35	1-11 Malibag, Shantibag	411
	36	Purana Paltan	143
	50	Kathal Bagan	412
	52	Jahanara Imam Saranee	148
	53	Siddeshwari	114
	54	Dilu Road, New Eskaton	302
	55	Moghbazar Chairman Goli	307
	56	Shegun Bagicha	51
	57	Paribagh	130
CBD	32	Motijheel, Dilkusha	188
Industrial Area	37	Tejgaon.	161

Source: BBS, 2001; "Bangladesh Population Census Report, 2001- Community Series"

### **Identification and Assumptions for Estimation of Potential Developable Land**

One of the major task of this research focused on estimation of developable land which includes vacant and under utilized land. As mentioned earlier there is no such research conducted on Dhaka City considering the developability issue. In such a context, it has been a critical issue to set criteria to identify potential developable land. Considering the present trend of development, a set of assumptions are made to identify the areas which would be considered as potential developable land to facilitate densification process.

In case of developability analysis, several aspects are considered to identify potential lands for development such as type of land use, topography of land, flooding condition of land, structure type, structure condition, plot size, orientation of plots, condition of infrastructure, provision of utility and others. In this research, the estimation of developable land was based primarily on considerations of structural material of existing buildings, storey of buildings and present land uses. Only these factors are considered because the potential densification process under study would take place in already built up central city areas of Dhaka.

Following assumptions are considered to identify redevelopment areas where densification can take place by utilizing vacant lands and also by replacing existing structures of low density.

*a. Structure Type (Construction Material)*- In this study it has been assumed that in future all the *kutcha* (Non-permanent Structure) and semi pucca structures have potentials to be replaced by high rise structures.

*b. Storey of Buildings*- The plot areas holding one or two storey buildings are highly potential for replacement in future.

*c. Land Use*- Considering the land use, first comes the vacant land that can be brought under development schemes. Vacant land adjacent to rail line (Outside the safety boundary) and areas encroached by slum under private ownership has been considered as potential land for future development.

This research classified the existing plots into three broad categories considering the types of built structures and nature of land uses. These three categories are: (i) Potential developable land; (ii) Existing developed areas and (iii) Categories excluded from the study.

Table 2 shows the type of structure and land uses belong to those three classified categories.

**Table 2. Classification of plots in the study areas according to structure type and land use**

Potential developable land	Existing developed land	Categories of plots excluded from calculation (others)
<ul style="list-style-type: none"> <li>▪ Vacant land</li> <li>▪ Plots are cover by <i>Kutcha</i> and semi pucca structures</li> <li>▪ One and two story pucca structure</li> </ul>	<ul style="list-style-type: none"> <li>▪ Plots under going construction.</li> <li>▪ Plots with six story and above structures.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Roads</li> <li>▪ Three to five story buildings.</li> <li>▪ Plots with religious, health facility and instituional use.</li> <li>▪ Lands belong to public ownership- Central Jail Area, BDR, Dhaka University , Government Staff Quarter, etc.</li> <li>▪ Established markets even though one storeyed.</li> <li>▪ Open space- parks, play grounds, water bodies, lakes.</li> </ul>

### Process of Estimation

The process of estimation became complex and time consuming because on an average about 60 to 70 percent plots have different categories of structures in a single plot which includes kutchra, semi pucca and buildings with different numbers of stories. Each ward on an average is comprised of 2000-2200 plots. Plots having single category of land use and built structure were easy to assign into the specified categories. But in case of plots having structures of more than one category, the process of estimation became complicated. This task has been done by selecting each plot and through detail observation each of the plot areas has been proportionally divided into areas occupied by different categories of structures and calculation was done to estimate the amount of land occupied by different categories of built structures. GIS software ARC GIS 8.3 mostly used for map preparation, calculation of plot area and for spatial analysis such as to find distance of different physical features as dimension of roads. The statistical analysis has been done by the application of software MS Excel and SPSS.

### Major Findings

The ultimate calculation presents the overall scenarion of each ward.The major outcome reveals amount of vacant land, potential developable land and land already developed shown in the Table 3.

**Table 3 The account of total developable and already developed land in 26 selected wards of DCC**

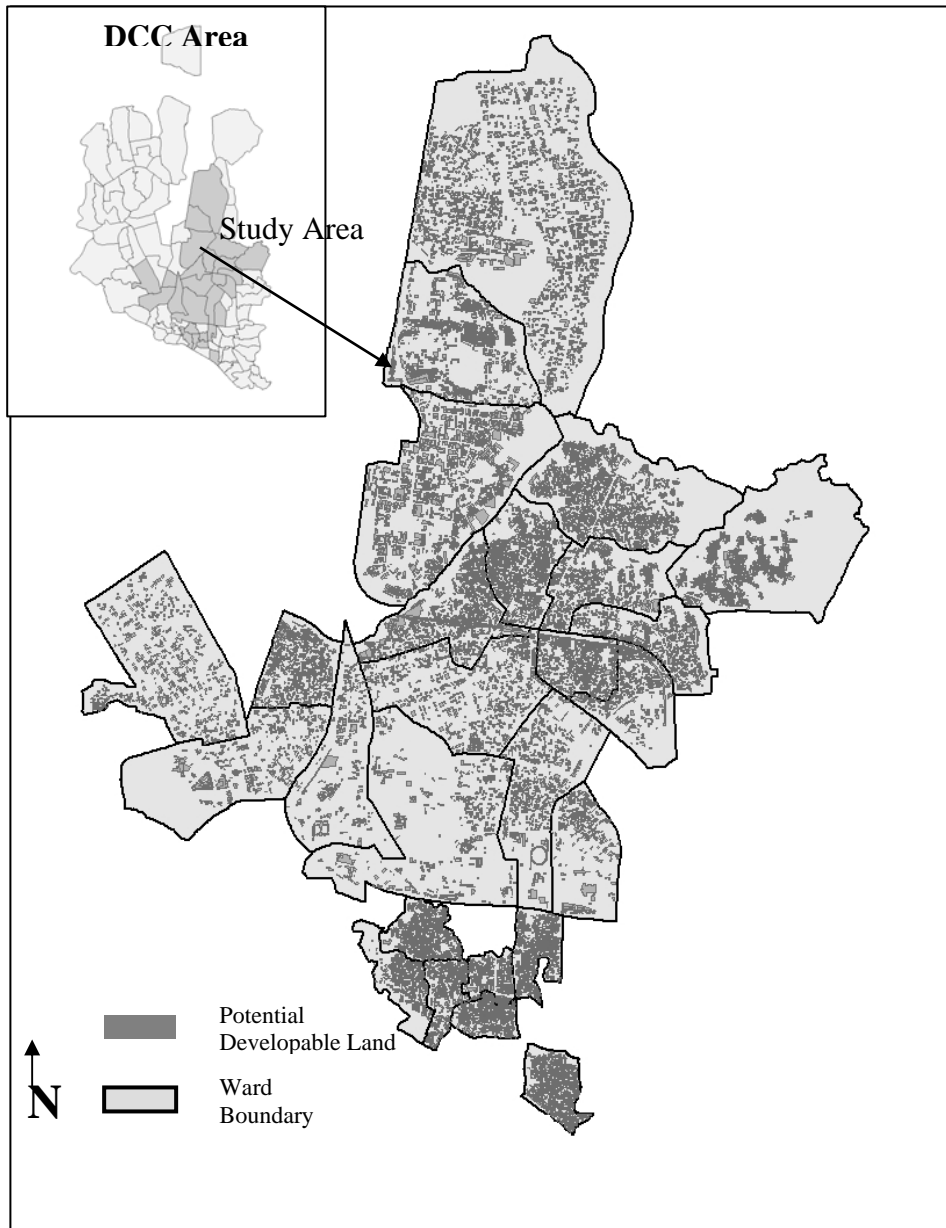
<b>Category of land</b>	<b>Area in Acre</b>	<b>Percentage of total area</b>
Total amount of potential developable land	2100.11	24.29
Total amount of Existing Developed land	532.04	6.15
Others (categories excluded from calcualtion)	6013.4	69.56
Total Area of the 26 wards	8645.44	100

*Source: Calculated from DCC Maps of Study Areas*

Preparation of maps have been given importance together with the estimation. The tabular data gives the quantitative idea of the desired outcome and map presents the overall view of locational status of potential developable lands. The connection of roads to the plots, the distribution of plots whether they are dispersed or agglomerated is cleraly revealed. Therefore maps have been prepared for wards showing the areas available for potential development through consolidation process. Figure 1 shows the potential developable land in the study area.



**Figure 1 Map showing the potential developable land in 26 selected wards of DCC area.**



**Figure 1 Map showing the potential developable land in 26 selected wards of DCC area.**

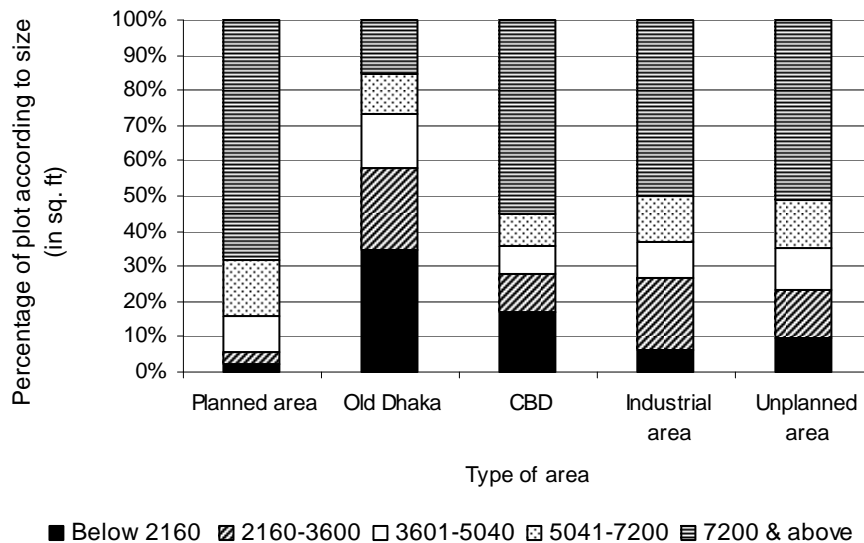
### **Characteristics of Existing Developed and Potential Developable Land**

It is evident from the land use analysis of 26 wards of DCC area that about 6.15 percent (532.04 acre) of total land area of DCC has already been developed in recent years. This estimation is based on the assumption that all buildings of six-story and above and plots under

construction belonged to this “existing developed” category. On the other hand, about 24. 29 percent (2,100 acre) of total land area has been identified as potential areas for future development. This implies that the estimated 2,100 acres of land can be brought under consolidation process according to the policy stated in the DMDP structure Plan (1995-2015).

Characteristics of these potential developable plots have been studied from two perspectives: (i) Size of plots; (ii) Variation of plot size according to different locations such as Planned areas, Unplanned Areas, Old Dhaka, Central Business District and Industrial Area.

It has already been mentioned that different parts of the city is experiencing redevelopment in a sporadic and unplanned manner, mostly in joint intervention of formal private sector and private land owners. It is important to know about the current trend of redevelopment projects. On going redevelopment is taking place by replacing old low structure buildings by high-rise apartment with modern facilities. In the year 2007, about 450 developers are involvement in real estate market and most of their projects are located in central city (Seraz 2007). Every year real estate developers supply about 5000-6000 apartment units (REHAB 2004). Most of their projects are the replacement of older buildings in existing serviced plots. Which eventually transforms Dhaka to a more dense and consolidated habitat. At the beginning of real estate era, private developers mostly concentrated on planned residential areas of Dhaka and catered the upper class clients. But they spread their venture in other parts of the city targeting the middle class residents. Whatever the characteristics of their client group, these developers prefer certain type of plots for their business venture. Following Figure 2 shows the characteristics of existing developed plots according to size and location.

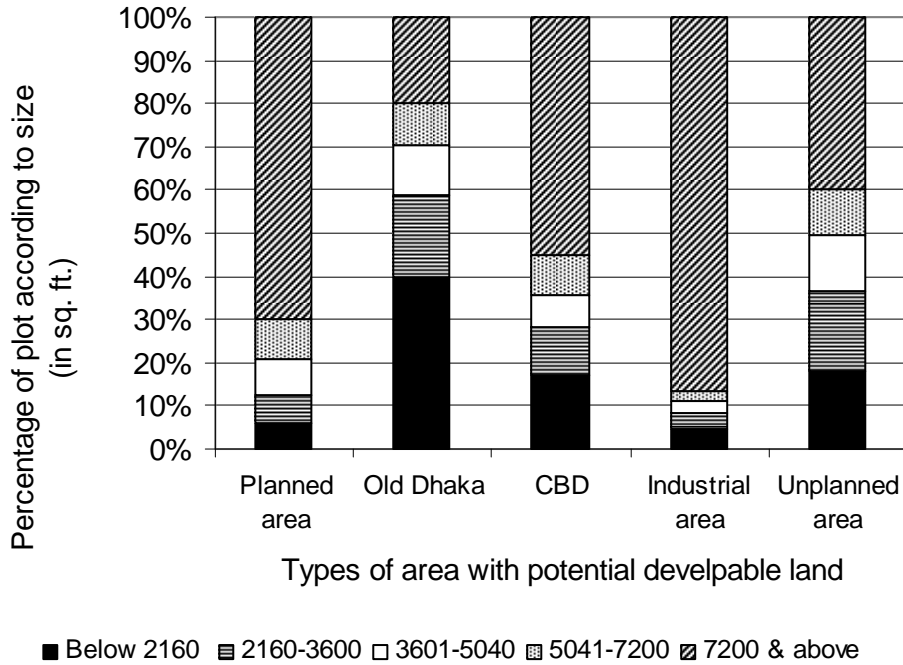


**Figure. 2 Existing developed plots according to size of plot and location**

Source Calculated from DCC map

It is evident from the available data that about 59. 34% of existing developed plots are above the size of 7200 sq. ft. Only 18% of the redevelopment projects were done on smaller plots (below 3600 sq. ft.). It is revealed that bigger plots are preferred by the developers for redevelopment projects. It is found that amount of land parcel above 10 *katha* (1 *katha*=720 sq. ft.) is high in all category of locations except in Old Dhaka. Development in bigger parcels is

more pronounced in planned areas. In addition to bigger size of plots, planned areas attract developers because of availability of better infrastructure facilities. It is evident from the field survey that replacement of low structures by high-rise apartments is also taking place in smaller plots of old Dhaka and unplanned residential areas. Such kind of redevelopment trend in these areas is posing severe pressure on prevailing poor infrastructure and facilities.



**Figure 3: Potential developable plots according to plot size in different locations**

Several interesting issues are exposed, while studying the characteristics of potential developable lands. It is evident from data analysis that major share of potential developable plots are above 7200 sq.ft in size (51.3 percent). In the study areas a significant amount of land is underutilized and occupied with semi pucca/kutchra or one/two storied structures. Figure 3 represents the available potential land according to plot size in different locations. Above 7200 sq.ft plots are available in the planned, CBD and industrial areas. Whereas most of the smaller parcels of potential development land are available in Old Dhaka and unplanned areas. To encourage consolidation in smaller plots, it is necessary to develop planning tools like “land pooling” “land readjustment techniques” to ensure sustainable development in these areas.

## **Potential Developable Land and Associated Factors**

According to Crookston, and *et al* (1996), in promoting urban consolidation the character and amenity of established residential neighborhoods will be retained and relatively higher density development will be promoted as appropriate in the inner urban area, along important roads, and in areas well served by public transport”.

After the estimation of potential developable land, it has been attempted to see the factors that influence this consolidation process. Prior to any consolidation approach it is necessary to have detail information on various aspects like density, socio-economic fabric of the community, status of roads and infrastructure etc. With the limited scope of this research, only few of such factors were studied which includes (i) Density (ii) Width of Access Road (iii) Width of Main Road (iv) Distance from Main Road (v) Distance from CBD. Following discussion will briefly explain these aspects.

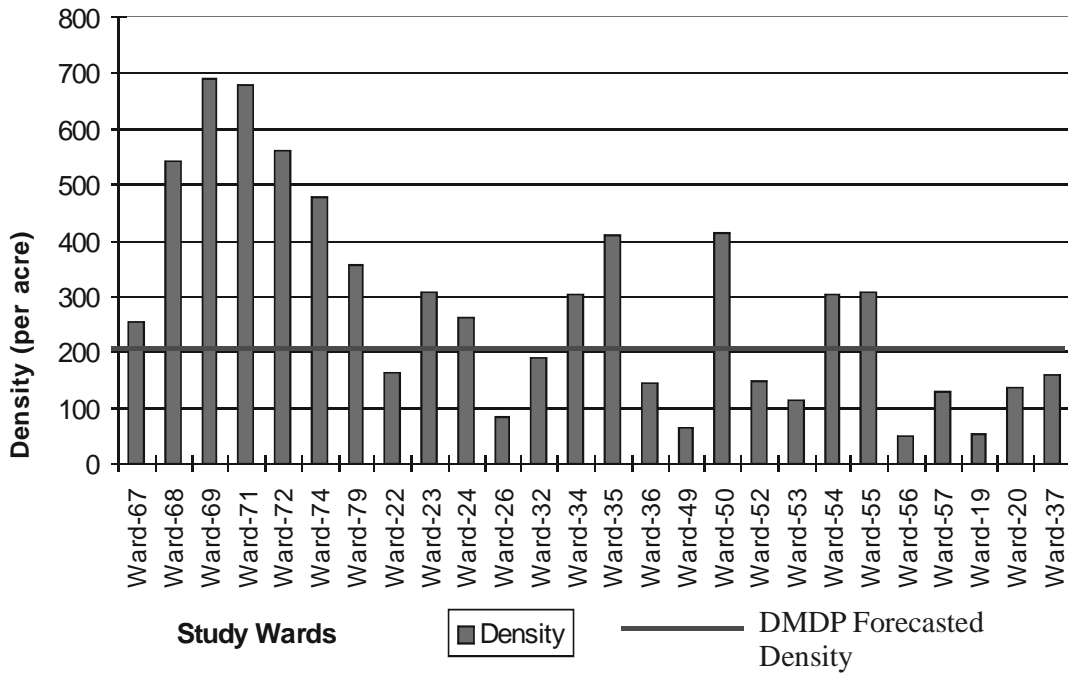
### ***Density***

Density is an important factor for urban consolidation as the ultimate target of consolidation is to increase the density of population and structure. Claudio (2000) describes that there is no universal recipe for urban densities in terms of an ideal or most appropriate density particularly for residential development. What is regarded as a high or low density and what is an acceptable density differ between continents and countries and even within cities. However there was evidence that a general process of change is leading to more compact cities. This study also did not take any attempt to assign any specific value of intensity of development and population density in each ward to attain optimum scenario to carry on consolidation process. Therefore in this study, it has been tried to observe the density situation of the selected 26 wards based on the forecasted density in the DMDP.

### ***Distribution of Wards based on Forecasted Density***

In DMDP (1995-2015) Structure Plan, it had been forecasted that the average density of the gross built up urban areas would be 209 person /acre in the year 2015. Based on this statement, this study attempts to highlight the present scenario for the density of the selected 26 wards of Dhaka city.

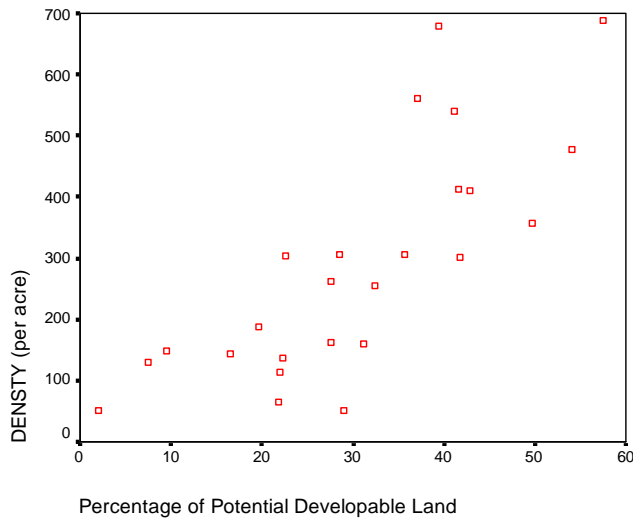
Though the average density of 209 person/acre had been forecasted for the year 2015, but according to the census 2001 the average density of Dhaka city has already reached 214 person/acre. Figure 4 shows that prevailing density in some wards is more than three times than the average and about 12 study wards remain below the average density. It is revealed from the density scenario that the scope for consolidation in Dhaka City is still there in some wards where density is comparatively low. Redistribution of population and improvement of infrastructure can widen the scope of consolidation in densely populated areas where potential developable lands are available.



**Figure 4 Distribution of wards based on forecasted density.**

*Correlation between Density and Developable Land*

This study attempts to have an idea about how the density and potential developable land is correlated. The correlation has been done using the population density data and availability of potential developable land in the selected 26 wards.



**Figure 5 Correlation between density of population and percentage of developable land in 26 wards of Dhaka.**

It has been seen from the Figure 5 that density and potential developable land is positively correlated (Correlation Value- +0.79) that is percentage of developable land increases with the increase of density of population in the wards. It is an interesting outcome of this study and further detail investigation in the wards reveals the fact that higher percentage of non permanent structures is spread horizontally in many areas where large number of low income population resides in higher density. In this research plot areas occupied by these non permanent structures have been assumed as potential developable land. It can be concluded that densely populated areas are crowded mostly with non permanent and low story structures which requires proper strategies to be brought under planned development schemes.

### ***Status of Access Road and Main Road***

Width of the access road is an important factor to be considered for consolidation approach. Redevelopment in under utilized and vacant plots requires good accessibility. Developers consider the width of the access road with immense importance. Due to this reason developers mostly concentrate their works in the planned areas like Dhanmondi, Gulshan, Uttara, and Green Road where road width is comparatively wider compare to other areas. Again for the same reason, Old Dhaka, Malibag, Shahjahanpur are less attractive to the developers.

From planning perspective, a well planned city maintains a minimum standard of road width to ease the accessibility. Therefore it has been attempted here to assess the width of the access roads and main road adjacent to the potential developable plots. For this purpose five sample wards have been selected from each category of localities. These study wards includes ward 32 from CBD, ward 37 from industrial area, ward 35 from unplanned area, ward 23 from planned area and ward 71 from old Dhaka. To estimate the width of adjacent roads about 10% of the developable plots have been considered as sample.

The Table 4 shows the maximum, minimum and average width of the sample roads of different category of areas. Data of the maximum road width clearly presents the poor road condition of unplanned area and old Dhaka, The condition of the minimum road width is severe in all the cases. Again, it has been seen that minimum width of road even in cases of planned area is only 0.7m. which is too minimum.

Categories of Locations	Access Road			Main Road		
	Maximum Width (meter)	Minimum Width (meter)	Average Width (meter)	Maximum Width (meter)	Minimum Width (meter)	Average Width (meter)
CBD	24.11	1.20	5.39	47.19	8.79	32.94
Industrial	20.97	1.9	10.44	38	20	30.11
Planned	15.17	0.7	6.83	32	16.8	24.7
Unplanned	7.5	1.09	3.74	24	13.2	18.92
Old Dhaka	8.5	0.37	3.03	40	5.6	19.6

**Table 4. Maximum, minimum and average width of access road and main road adjacent to the study plots**

*Source: Calculated from GIS Maps of study wards*

***Distance from Main Road***

Distance from main road is another major consideration in case of redevelopment projects under taken by developers. It is a measurement of the provision to have greater accessibility to other facilities. In this chapter distance from main road of the developable plots has been observed for the five sample wards for each category of areas. The Table 5 shows the maximum, minimum and average distance of plots from the main road.

**Table 5 Maximum, minimum and average distance of plots from the main road**

Category of Area	Maximum Plot Distance (meter)	Minimum Plot Distance (meter)	Average Plot Distance (meter)
CBD	269	7	119.21

Industrial	1082	16	360.96
Planned	579	2	216.97
Unplanned	595	12	246.21
Old Dhaka	156	6	57.7

*Source: Calculated from GIS maps of study wards.*

It is evident from the Table 4 that in industrial area though the width of the road is comparatively better but the average distance of plots are quite high. According to some interviewee developers, preferred distance from main road ranges between 35 to 40m. But Table 5 reveals that the average distance from main road in all the areas is far above the expected range of the developers except Old Dhaka.

## **Recommendation and Conclusion**

In the backdrop of land crisis and other development constraints, this paper made estimation on potential developable land within DCC area based on certain assumptions. The study shows that the total developable land is 24.29% (2100 acre) of total land areas of DCC which includes vacant and under utilized land. While existing developed land covers only about 6.15% of DCC area. It is also important to note that large amount of land owned by various public agencies are remained under utilized and has high redevelopment scope with higher density. It is evident from present redevelopment trend that bigger parcels (about 7200 sq.ft) attract the developers most. Again the research findings show that major share of available developable plots are 7200 sq.ft or more with exception in Old Dhaka. Older part of Dhaka is characterized by high density and poor environment. But at the same time it has the major share of land which possesses consolidation potential. About 50 % land of Old Dhaka can be brought under consolidation process through proper planning strategies. Considering present trend and social context of Bangladesh some issues required to be addressed to undertake programs towards of urban consolidation.

- In Planned Residential Areas vertical expansion can be encouraged in such a manner that would not pose pressure on existing services and facilities.
- Piecemeal redevelopment projects on single plots, especially in smaller plots would further deteriorate the environmental condition of the city. Rather land readjustment or land pooling strategies can be applied to undertake redevelopment schemes in covering larger areas.



- In case of Old Dhaka extra caution need to be undertaken to deal with historic sites, tradition and culture of the local people.
- Redistribution of population density should be a major concern of consolidation process.
- In a developing country like Bangladesh, consolidation should be a continuous process and a part of urban policy and programs. Potential priority areas can be developed as model redevelopment sites.
- Improvement of infrastructure and amenities are prerequisite to consolidation process.
- Large scale projects can be undertaken with partnership of public, formal private and private land owners. Public agencies can support as service providers. In addition, financial aspects of consolidation process require further detail study.

Searle (2003) considers five kinds of possible limitations on urban consolidation in existing urban areas of cities: infrastructure capacity, land capacity, maximum density, loss of economic activity, and market demand. The major findings of this study depict the present scenario and portray the potentials and constrains of consolidation in Dhaka city. Some contradictory issues are associated with consolidation approach. Among them the issue of slum settlements is important. Low income people reside in large share of these potential developable lands. Their shanty dwellings of non permanent structures are occupying the precious urban land because no program has yet been under taken to provide housing to this poorer section of the society. Again the provision of infrastructure amenities and other facilities are prerequisite to any consolidation approach to ensure safe and healthy living environment. It is alarming to observe the present trend of densification process in the inner city and its adverse impact on overall environment. Consolidation approach though mentioned as a strategy in DMDP, but without government intervention and support accompanied by formal private sector participation this would fail to grasp expected outcome for the city.

## References

- BBS, 2001 Bangladesh Population Census Report 2001, Community Series. Dhaka: Bangladesh Bureau of Statistics.
- BBS, 2003 Population Census 2001: National Report (Provisional), Dhaka: Bangladesh Bureau of Statistics.
- Burgess, R. 2000 The Compact City Debate: A Global Perspective. In Jenks, M and Burgess, R. 2000. ed. Compact Cities: Sustainable Urban Forms for Developing Countries, pp: 9-24. London: Spon Press.
- Claudio C. 2000 Can Urban Management Deliver the Sustainable City? Guided Densification in Brazil versus Informal Compactness in Egypt. In Jenks, M. and Burgess, R. 2000. ed. Compact Cities: Sustainable Urban Forms for Developing Countries. Pp:127-140. London: Spon Press.
- Crookston, M., Clarke, P., and Averley, J., 1996 The Compact City and the Quality of Life. In Jenks, M. Burton, E. and Williams, K. 1996. ed. The Compact City: A Sustainable Urban Form?" pp: 134-142. London: Spon Press.
- DMDP, 1997 Dhaka Metropolitan Development Plan (1997-2015) Volume I & II", Dhaka: Dhaka Metropolitan Development Planning(DMDP), Rajdhani Unnayan Karttripakha (RAJUK).
- Fatema, R. 2003 "Analysis of Land Suitability for Urban Development in the Eastern Fringe of Dhaka City; Application of Multi Criteria Evaluation Technique", an unpublished Masters Thesis, Department of Urban and Regional Planning, Bangladesh University of Engineering and Technology, Dhaka
- Islam, I. 2008 Wetland of Dhaka Metro Area: A Study from Social, Economic and Institutional Perspectives. Dhaka: AH Development Publishing House.
- Islam, N. 2005 Dhaka Now: Contemporary Urban Development. Dhaka: Bangladesh Geographical Society (BGS)
- Jones, T. L. 2000 "Compact City Policies for Megacities: Core Areas and Metropolitan Regions". In Jenks and Burgess, 2000. (ed.) Compact Cities: Sustainable Urban Forms for Developing Countries. Pp: 37-52. London: Spon Press.
- Louis Berger and Bangladesh Consultants Ltd. 2005 Strategic Transport Plan for Dhaka (Revised Final Draft). Dhaka: Ministry of Communications, Government of Bangladesh.
- REHAB, 2004 Annual Report. Dhaka: Real Estate and Housing Association of Bangladesh.
- Searle, G. 2003 "The Limits to Urban Consolidation", Paper No. 14 July 2003 Urban Frontiers Program University of Western Sydney – Campbelltown, Locked Bag 1797 , Penrith South DC NSW 1797, email: [urbanfrontiers@uws.edu.au](mailto:urbanfrontiers@uws.edu.au), <http://www.urbanfrontiers.uws.edu.au>
- Seraz, T. M. 2007 "Beshorkaree Abashon Shilper Shambhabona abong Bhabishat Karanio" (in Bangla), paper presented in REHAB Week Conference, November, 19, 2007. Dhaka
- Shankland Cox and Partnership, 1981 Dhaka Metroplita Area Integrated Urban development Project, Volume I-V, Planning Commission, UNDP & ADB, Dhaka
- Williams, B., and Jenks 1996 "Achieving the Compact City through Intensification: an Acceptable Option?", in Jenks, Burton and Williams (ed.), "The Compact City: A sustainable Urban Form?," London: Spon Press.
- Williams, K. Burton, E. Jenks, M. 2001. "Defining Sustainable Urban Form: Introduction" in Williams, K., Burton, E. and Jenks M. (ed.) Achieving Sustainable Urban Form. Pp: 7-8. London : Spon Press.

Zaman, Q. M. M. and Lau, S.S.Y. 2000 “ City Expansion Policy versus Compact City Demand: The Case of Dhaka”, in Jenks, M. and Burgess, R. (ed.), “Compact Cities: Sustainable Urban Forms for Developing Countries”. Pp: 141-152. London: Spon Press.

Zhang, X.Q. (1996), “High-Rise and high Density Compact Urban Form: The Development of Hong Kong”, in Jenks, M. and Burgess, R. (ed.), “Compact Cities: Sustainable Urban Forms for Developing Countries”. Pp: 245-254. London: Spon Pres

