A STUDY ON CHANGES OF OPEN SPACES IN SELECTED GOVERNMENT HOUSING PROJECTS IN DHAKA IN TERMS OF SIZE, USE, ACCESS AND FACILITIES

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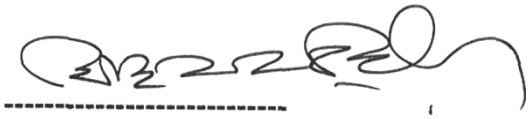

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Abstract

Open space provides an array of social, health, economic and environmental benefits to individuals and the community as a whole. Open space is an essential ingredient for enhancing the livability of an area and improving the quality of life of its residents. Since 1959, the government has developed about 18 housing projects under the Site and Service Scheme in Dhaka. As a basic element of the neighborhood, open spaces were part of these housings. Planning documents of different cities follow specific standards for open spaces. There is no planning standard of open spaces for government housing projects though prevailed private land development rules in Dhaka. The stock of open space is found to be declining in Dhaka during the last 20 years by unplanned construction and encroachment. Many parks and playgrounds have already been grabbed by governmental and non-governmental organizations.

This research is aimed to study the size and type of open spaces in the approved master plan and their present condition in the selected government housing projects. Also, it finds out their changes in term of size, use, access and availability of facilities and identifies the factors responsible for changes of selected open spaces. Parks and playgrounds of three government housing projects among 18 are selected for this research. Selected projects are i)Housing Estate at Mohammadpur, ii)Uttara Model Town (sector one to four) and iii) Khilgaon rehabilitation project. Secondary data is collected from government housing provider and maintenance authorities of the study areas and literature review. Primary data is collected with direct observation using an observation checklist, Focus Group Discussion with users of open spaces and Key Informant Interview with representatives of concerned authorities and inhabitants of housing.

In the approved master plan, neighbourhood areas were well served by the number, size and type of open spaces. Number of open spaces as well as area of open spaces were reduced and some parks were converted into playgrounds over the time. The present physical, environmental and maintenance condition of playgrounds are not so suitable for play. Lack of grass, uneven ground, noise, dust, lack of proper cleaning of playground and toilet, lack of lighting at night are problems in using active and passively of playgrounds. Parks were designed and suitable for use though there are some maintenance problems and restriction for user were imposed by scheduling of time.

In most cases, losses in number and reduction in size of open spaces are found due to full and partial encroachment by workshop, shops, rickshaw garage, club house , school for disabilities, Urban Primary Health Care Project building, water pump etc. Playgrounds are used for active and passively recreation and parks are used for passive recreation. The uses of playgrounds are interrupted by encroached buildings. Proximity and lack of alternative open space are the two vital reasons for using these playgrounds and parks though some problems are there. Though buffer area of accessibility in study areas covered all areas of Housing Estate at Mohammadpur and Uttara Model Town but actual physical distance is quite high in reality. There are other prevailing factors that obstruct the use of outdoor play and recreation facilities are location, layout type, maintenance of open spaces etc.

Lack of security, poor maintenance and inadequate facilities and play accessories are the main reasons for fewer uses in these playgrounds and parks. Conversion and encroachment

have occurred with the involvement of the maintenance authorities and influence of local leaders. Lack of proper management, maintenance, accountability and transparency of maintenance authorities are responsible for changes in number, size, use, access and lack of facilities of playgrounds and parks.

The amount of open space per person is reducing inversely with population growth in Dhaka City. So, it is very necessary to protect playgrounds and parks in Dhaka. To protect the existing playground and parks in housing areas, the list and the open space mapping should be publicly available and impose an immediate embargo. Encroached open spaces should be revived and more facilitated with play and recreational facilities to attract more users; safety, security and cleanliness should be ensured. User participation planning and management are necessary for proper management and maintenance of playgrounds and parks in government housing areas. Also necessary to provide policy support to priorities play and recreation.

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LIST OF ABBREVIATIONS

CEQR- City Environmental Quality Review

DAP - Detail Area Plan

DCC - Dhaka City Corporation

DDSP - Draft Dhaka Structure Plan

DIT - Dhaka Improvement Trust

DMDP - Dhaka Metropolitan Development Plan

DMAIUDP - Dhaka Metropolitan Area Integrated Urban Development Plan

DMR - Dhaka Metro Region

DND - Dhaka-Narayanganj-Demra

DSP - Dhaka Structure Plan

HEM - Housing Estate at Mohammadpur

HKPSG - Hong Kong Planing and Design Guidelines

HSD - Housing and Settlement Directorate

KP - Park at Khilgaon

KPG - Playground at Khilgaon

KRP - Khilgaon Rehabilitation Project

MP - Park at Mohammadpur

MPG - Playground at Mohammadpur

NGO - Non Government Organization

NHA - National Housing Authority

NUA - New Urban Agenda

PLDR - Private Land Development Rules

PWD - Public Works Department

RAJUK- Rajdhani Unnayon Kortripokkho

SDG- Sustainable Development Goals

UDD - Urban Development Directorate

UMT - Uttara Model Town

UP - Park at Uttara

UPG - Playground at Uttara

UPHCP - Urban Primary Health Care Project

VDP - Village Defence Party

WASA - Water Supply and Sewerage Authority

CHAPTER 1: INTRODUCTION

1.0. Introduction

This opening chapter gives a brief background of the research topic and focuses on the open space characteristics, the importance of open spaces, losses of open spaces, lack of specific standard and any central control of the maintenance of open spaces and present state of the problems. The research rationale, objectives, limitations of the study and organization of thesis are also presented in this chapter.

1.1. Background of the study and present state of the problems

Urban built-up area within Dhaka has soared from 5,500 hectare in 1975 to 20,549 hectare in 2005, while wetland and vegetation cover reduced to 6,027 hectare and 2,812 hectare respectively (Byomkesh et al, 2012 and Dewan et al, 2010). There is a systematic declination of vegetation cover (dense and sparse) since 1989; the total „areas of green loss" were 7,743 hectare, 2,871 hectare and 198 hectare in 1989, 2002 and 2010 respectively in Dhaka metropolitan area (Rahman et al, 2011). The scenario is even worse in the city core area. Poor planning or utter absence, coupled with a massively corrupt authorizing-monitoring regime in the regulating authority, i.e. RAJUK has allowed the individual landowner, corporate developers and industrialists to engage in widespread extra-legal building activities. The following table summarizes the findings on core areas (Byomkesh et al, 2012) :

Table 1.1: Loss of green areas in Dhaka

Year	Loss of green areas (hectare)	Rate of green loss (%)
1975	18,626	-
1988	14,818	20.4%
1999	12,966	12.5%
2005	10,009	22.8%

Source: Byomkesh et al., 2012

In the old part of Dhaka city there is only 5% open space while in New Dhaka 12 % of land is green and open. The total amount of open spaces in greater Dhaka is about 17% to 18% and the total stock of public open spaces is hardly over 5000 acres (Mowla, 2005).

A city may be blessed with a large numbers of different establishments and facilities but it falls short of its highest possibilities if it fails to provide a good quality of living environment. Due to rapid urbanization and unplanned habitation, there are some serious obstacles to safe play in many urban neighborhoods, including the environmental hazards, traffic and social security (Bartlett et al, 1999; Spencer and Blades, 2006). Neihgbourhood park and playground are an important source of social inclusion. Neighbourhood playgrounds and parks are intended to offer children and families a place to play, meet other families and participate in activities that support the establishment of a healthy

lifestyle. Primarily children spent leisure time in their adjacent playgrounds and parks during their childhood and grow up day to day. Gradually they use community and city playgrounds and parks as a grown-up process. Neighbourhood playgrounds and parks are the primary source of children to their physical and mental development. So, neighbourhood park and playground should be focused on child development and more emphasis should be provided in the research than city or regional playgrounds and parks. The essence of community interaction is disappearing from the civic life of Dhaka city due to lack of open spaces in neighbourhood level. High population density, inadequate infrastructure, economic pressure on land and poor urban management, all contribute to the shrinking of open spaces in Dhaka (Rashid, 2003).

The presence of vegetation in Dhaka is diminishing fast by unplanned construction and encroachment. Government was the first and only public housing provider in Bangladesh from 1959. Open spaces of these housing are also maintained by Government authorities like Public Works Department (PWD), National Housing Authority (NHA) and Dhaka City Corporation (DCC). As there is no single regulatory body to protect and maintain open spaces in Dhaka city. Encroachment of playgrounds, parks and open spaces is observed as a common practice in Dhaka city (Siddique, 1990; The Daily Star, 2008, 2009, 2010, 2012; Dhaka Tribune, 2017; The Independent, 2018). Many parks and playgrounds have already been grabbed by governmental and non-governmental organizations. Tikatuli Park, Uttara Sector-1 Park and Azimpur Park have already disappeared. Besides, sections of Nababganj Park, Jatrabari Crossing Park, Nayatola Shishu Park, Lalmatia New Colony Park, Panthakunja and Salimullah Road Field have been occupied to build a Water Supply and Sewerage Authority (WASA) pumping station, a corporation community centre, commissioner‟s office and community clinics (The Independent, 2018). As a result, unauthorized construction by local influential persons and renting out of these playgrounds and parks for commercial purposes are also common practices for Dhaka City Corporation. These limited facilities are used for commercial purposes and as a result, children are deprived from using these facilities (Ahmed, 2010).

It is noticed that service provider is government, maintenance authority is government and in most of the cases, government agencies are involved in the process of encroachment of open spaces. So, it is necessary to find out the reason for unplanned encroachment in open spaces of planned government housing area at Dhaka. So, this research aimed to study the playgrounds and parks in government housing areas at Dhaka city.

The ratio of recreation space to the total area in Dhaka city is far below the standards followed in other countries of the world (Biswas, 2002). Different city development authorities follow some standards regarding open spaces. Hong Kong and Mumbai are densely populated like Dhaka city. So, most of the references of standards are given from Hong Kong. According to Hong Kong Planning Standard and Guidelines (1990), the standard of provision for Local Open Space is 1m² per person. While the Mumbai Municipal Corporation of India has set open space standard at 4m² per person (BMC, 2016). In the City of Melbourne, open space per head of resident and worker was 10.5m² in 2011 and it would be 7.2m² in 2026 (MOSS, 2012). For the City of New York, 2.5 acres of Open Space/ 1,000 residents with active and passive open space (playground and community garden) is allocated (OSI, 2010).

No specific standard for open space has been followed in Dhaka city though a standard of 4 acre of open space per 1,000 population was recommended in 1959 Dhaka Master Plan. A standard is 0.96 acre found in DMDP Structure Plan (1995-2015) (DMDP, 1995). In Draft Dhaka Structure Plan 2016-2035, (DDSP), a standard of open space is set for 1,000 population is 0.86acre. Recreational open spaces within Dhaka Metropolitan Region (DMR) is recommended for Park/children‟s park (local park/ mini-park within neighbourhood) is 0.12acres/1,000 population and Playfield (local play area) is 0.24acres/1,000 in DDSP. According to Private Land Development Rules, 2004 space standard for Playground/ playfield is 0.24 acre per 1,000 population and 0.12 acre per 1,000 population for the park (PLDR, 2004).

Three government authorities such as i) Rajdhani Unnayon Kortripokhkho, (RAJUK) (previous DIT), ii) National Housing Authority, (NHA)(Previous HSD) and iii) Public Works Department, (PWD) (previous „C&B‟) are involved in Development of Township, Housing Estates and Resettlement /Rehabilitation projects in Dhaka city area. About 18 numbers of housing projects have completed by these three authorities (RAJUK, NHA, PWD). All projects are planned and have open spaces. This research aimed to study on all local parks and playgrounds for neighborhood people in these government projects in Dhaka city.

Various authorities like PWD, RAJUK and DCC manage open space in Dhaka city. Previously, the maintenance and control of open spaces of Dhaka have been shared by the authority of PWD and RAJUK. At present, most of the open spaces and parks in local areas are handed over to the Dhaka City Corporation (both North and South City Corporation). The Arbory Culture Department of PWD only take cares of the large scale green areas of Dhaka. Besides this other Government agencies also responsible to maintain the open spaces in their jurisdiction. As a result, in absence of any central control of legal bindings and lack of coordination among these agencies open spaces are not properly maintained and managed (Saha, 2010; Chowdhury, 2004; Akhter and Islam, 2011; The Independent, 2018).

Authorities are more concerned with large scale open spaces whereas open spaces in residential neighbourhood are being overlooked. The conditions of the existing open spaces have become deplorable due to lack of proper management.

1.2. Rationale of the study

In the context of developing countries, where there are high levels of poverty and a desperate need for other basic services and amenities like health, education and housing, investment in playground and open spaces may appear to be a misuse of resources (Bartlett et al, 1999). Provision for play and recreation is not a priority for most municipalities in Bangladesh (Kabir, 2004).

There are different planning standards of open spaces in Dhaka city. Private Land Development Rules prevails for private land development in Dhaka city. However, there are no specific standard for open spaces in Government Housing Projects like Private Land Development Rules.

Several studies have conducted on problems, hardware facilities, management, and maintenance aspects of open space (Siddique, 1990; Ahmed, 2010; Biswas, 2002; Akhter

and Islam, 2009; Islam et al, 2015; Sharmin, 2015; Hossain, 2004). None of these works focused on open spaces of government housing projects. This research will search the causes of changes of open spaces over time in terms of use, size, accessibility and availability of facilities in Dhaka city and will search the reason for changes from concern authorities and the community regarding this issue.

1.3. Objectives of the study

1. To study the size and type of open spaces in the approved master plan and their present condition in the selected government housing projects.

2. To find out their changes in term of size, use, access and availability of facilities.

3. To identify the factors responsible for changes in selected open spaces.

1.4. Limitations of the research

This research considers primarily the local playgrounds and parks of government housing in Dhaka Metro Area. Three among 18 government housing projects are considered as study areas for this research. The scope of the research does not cover the school playgrounds although many school playgrounds are being used by children living in the surrounding community and neighborhoods in the study areas.

There are six seasons in Bangladesh. Summer, rainy and winter seasons are climatically more prominent among the six seasons. Field survey was conducted only in the summer and rainy season for limitations of time.

Different government institutes‟ have their own housing and government allocated private housing. In this research work, only open spaces of government allocated private housing is considered.

1.5. Organization of thesis

Chapter 1 presents the introduction of the research area with background and focuses on the importance of play and recreation for people‟s development. The chapter explains the context and rationale of the research for Dhaka city. The research objectives, limitation of scope and thesis organization are also presented in this chapter.

Chapter 2 presents definition and historical perspective of open space, importance of open spaces in neighbourhood level and achieving sustainable urban development, their categories in term of use and size, calculating of their area, selecting of their proper location and their standard in different countries. How open space is allocated/included in city planning, housing estate planning, organizations involved with allocation and management of housing and open spaces, standards of open space in different planning documents practiced by institutions in Bangladesh are described in this chapter. This chapter also describes problems associated with setting Dhaka metro boundary, defining open space, loss in area and partial encroachment of open space and their management problem in the context of Dhaka.

Chapter 3 presents the methodology of research. It describes the selection of study area, selection criteria of case studies, collection of data from primary and secondary sources and data analysis using different tools.

Chapter 4 describes about the three selected housing areas and the open space inside these housing areas. The discussion focuses on location in the city context, the number, type, size and uses of the playgrounds and parks of these case studies in approved layout plans and their present situation. This chapter also presents the status of open space ratio within housing comparing with standard. It also discusses the physical, environmental, maintenance condition of the playgrounds and parks. The view of users‟ on existing condition of these playgrounds and parks is also presented here.

In chapter 5, changes of physical characteristics are presented by identifying changes of number, increasing and decreasing of size and area of open spaces and changes in ratio of open spaces from approved Master plans to present (2019) condition. Changes in uses of open spaces are described by loss and increase of open spaces, uses of open spaces , changes of type in use and use pattern for providing different community functions. This chapter presents maps showing the accessibility of the outdoor play facilities by using Centroid Radii method and considering other factors which affected the access of the playgrounds and parks. Also, this chapter shows the changes in facilities by changes of active recreation facilities, changes of passive recreational facilities and changes of ancillary facilities. Factors responsible for every type of changes are also presented in the chapter. Views of responsible authorities towards these changes of open spaces are also presents in this chapter. A time line is prepared to analyse the nature changes of playgrounds and parks in terms of size, access, use and facilities.

Chapter 6 presents an overview of the research in terms of research aim and objectives. It also elaborately discusses the key research findings and recommendations. Finally, this chapter gives concluding remarks on the research subject.

CHAPTER 2: LITERATURE REVIEW

2.0. Introduction

This chapter presents definition and historical perspective of open space, importance of open spaces in neighbourhood level and achieving sustainable urban development, their categories in term of use and size, calculating of their area, selecting of their proper location and their standard in different countries. How open space is allocated/included in city planning, housing estate planning, organizations involved with allocation and management of housing and open spaces, standards of open space in different planning documents practiced by institutions in Bangladesh are described in this chapter. This chapter also describes problems associated with setting Dhaka metro boundary, defining open space, loss in area and partial encroachment of open space and their management problem in the context of Dhaka.

2.1. Definition of Open Space

Researchers all over the world defined open space from various perspectives (Gallion, 1963; Keeble, 1969 and Rogers, 1999). Rogers (1999) defined urban open space as an important part of urban integration to achieve a quality environment. He says, "A clear articulation of public space connects neighborhoods to connect each other and link people within localities to their social institutions. They do not only provide outdoor areas to relax and enjoy the urban experience, venues for activities and places for walking and sitting-out, but they also establish a balance between people and their environment".

According to Hong Kong Planning Standard and Guidelines (1990), "A statutory land use zone for the provision of open space and recreation facilities for the enjoyment of the general public".

City Environmental Quality Review (CEQR, 2010), the procedure that guides the environmental review process in New York City, defines open space as "Publicly or privately-owned land that is publicly accessible and has been designated for leisure, play, or sport, or land set aside for the protection and/or enhancement of the natural environment".

The New York Local Open Space Planning Guide (2004) defines open space broadly, and simply, as: "Land which is not intensively developed for residential, commercial, industrial or institutional use".

According to Open Space Strategy for City of Melbourne (2012), "Open space is the publicly owned land that is set aside primarily for recreation, nature conservation, passive outdoor enjoyment and public gatherings."

Open space can be defined as "un-built lands within the city which provides environmental, social and economic benefits for the communities that cover land and water bodies devoted to recreation, scenic beauty, conservation. Open spaces are used as recreational facilities either in active or in passive mode" (DDSP, 2016).

2.2. Operational Definition of Keywords

Playgrounds: These open spaces are assigned for more or less organized out-door sports facilities both at metropolitan level (like stadiums, swimming pools and tennis complex at metropolitan scale) and at the community level (like play fields in residential areas, usually 2-9 acres). In this study, community level playgrounds are considered as playgrounds. Playgrounds are used mainly for active use (DDSP, 2016).

Park : Within urbanized areas, parks are used purely for the recreational purposes. They are of two categories mainly: city level parks (from 50- 80 acres) for all citizen and local parks (usually less than an acre) for neighborhood people mainly (DDSP, 2016). In this study community-level parks are considered as parks. Parks are used passively.

User: Users are in two categories: i) active user ii) passive user (DDSP, 2016 and HKPSG, 1990). People who are directly engaged in playing, walking, jogging are active users and people who are engaged in watching play, sitting, gathering, taking rest etc are passive users. From field survey, it is found those who are engaged in playing are mostly students and they play in groups. All type of people from child to old use the playground and park.

Play: A widely accepted definition of play in England is that play is a set of behaviors freely chosen, personally directed, and intrinsically motivated following the children‟s ideas and interests in their own way, and for their own reasons (Wilson, 2009 and DCMS, 2004). The word play describes a range of physical or mental leisure activities that are undertaken purely for enjoyment or amusement and can be undertaken by individuals or groups of children spontaneously or as part of planned activity (UNICEF, 2004).

Recreation: Recreation is any pursuit other than those associated with work which a person undertakes freely for relaxation during leisure time. Recreation includes games, sports, camping, dancing, picnics, discussion groups, drama, music, craft, arts and other activities of personal choice. Recreation consists of active participation, or quiet relaxation, listening, or watching and can be organized or unorganized and can be enjoyed alone or in a group, can be passive or active (Siddique, 1990; Rashid, 2003, Kabir, 2004). Parks can offer a wide range of recreation activities ranging from sedentary to vigorous physical activities (Floyd, 2008).

Leisure: Leisure behavior comprises a wide variety of activities like being close to nature, getting away from responsibilities of everyday life, watching TV, spending time on a hobby, taking a nap, socializing, visiting friends, playing games, walking or hiking, partying, gossiping, spending time in a quiet place, shopping etc. (Crandal, 1980). Leisure plays a dynamic role in the lives of individuals and the primary leisure time activities are psychological, educational, social, relaxation, and aesthetic (Beard and Ragheb, 1980).

Accessories for play and leisure: Goalposts, nets, sand, cricket pitch etc. Play accessories mean necessary arrangements to create the proper play environment. Play accessories are required to play games properly (Ahmed, 2010).

Tools for play and leisure: Cricket bat, ball, racket, skipping rope, toy car etc. Play tools are the necessary equipment to play with (OSPDG, 2013).

Facilities of playgrounds and parks: Play and park facilities cover the play and recreation accessories, tools together with different play and recreation opportunities.

Passive Surveillance: Providing a minimum level of road and residential frontages to open space are the major ways of improving passive surveillance and ensuring that a minimum industry benchmark is achieved in the design or layout of that open space (HKPSG, 1990).

2.3. Historical Perspective of Open Spaces

Open spaces are integral part of city planning since the emergence of cities and towns. There are numerous examples of planned open space in ancient cities to perform socio-cultural and civic activities. Greek cities were the result of continuous growth from prehistoric times. In most Greek towns, the important public gathering place was agora on flat land and easily accessible from all directions (Fletcher, 1996. p-145). The central area of the agora was free from buildings. Private houses were normally of the courtyard type in the classical period (Fletcher, 1996. p-148). The stadia for athletic contests were improved during the Hellenistic age. The stadium at Epidaurus was placed during the fourth century BC in Greece (Fletcher, 1996. p-160).

In 2nd century BC at Rome, a large fully developed family mansion occupied with its garden a whole city block. The mansion comprises an atrium at the front and a peristyle at the rear for private use (Fletcher, 1996. p-246). Roman Forum (c.AD 100-112) was located at the centre of the ancient city of Rome and the location of important religious, political and social activities(Roman Forum,2018; Fletcher, 1996. p-254).

About 1850, the park movement in America was the first urban vision that sought to introduce nature into the heart of commercial and industrial cities in the United States. Central Park by Olmstead and Vaux was one of the most public attraction in New York (Urban Planning, 2018). Dedicated urban parks, as specialized recreational space, first proliferated in the 19th century (Crouch, 1981; Cranz, 1982; Carr et al., 1992).

Mughal ruled India from 1526 to 1857. The Mughals are famous for their encampment garden, palace garden, tomb garden and mosque garden. Among large gardens without buildings, Salimar Bagh and Nishat Bagh were famous in India (Fletcher, 1996 and Wikipedia). In Dhaka, encampment gardens found in Old Fort and Lalbagh Fort and also found the green square „Chawk" inside and outside the city of Dhaka (Nilufar, 2010).

In British Period, Dhaka Municipality established Victoria Park, Coronation Park, Rajer Dewry Park and an exclusive park for women in Dhaka (Ahmed, 2010). None of the scheme establishing parks and playgrounds came into being during Pakistan Period in Dhaka. Designed playgrounds and parks in housing areas were first introduced in 1959"s Master plan of Dhaka by the Government of Pakistan (Iqbal, 2013) in policy level. After Independence, housing estates or towns were developed with neighbourhood playgrounds and parks. In 1990, 115 parks and playgrounds were identified in Dhaka (Siddique, 1990). In 2010, 192 open spaces including parks, playgrounds and stadium from community level to national level were studied in Dhaka (Ahmed, 2010).

2.4. Importance of Open Space

Open space provides an array of social, health, economic and environmental benefits to individuals and the community as a whole. Open space is an essential ingredient for enhancing the livability of an area and improving the quality of life of its residents (OSPDG, 2013).

Increasing densities, population growth, climate change and resource depletion will place further importance on the provision of quality open spaces (PARK FORUM, 2005). Easy access to well designed and diverse open spaces will assist in not only managing the impacts of these challenges but also enhancing the benefits that open spaces provide. The wide-ranging benefits of open spaces are as follows:

2.4.1. Social benefits: Open spaces offer a range of social benefits by providing leisure, cultural and celebratory activities; enhance cohesion and inclusion; and improve livability in urban environments.

Outdoor sports: Outdoor sport and recreation facilities provide a tangible focus on connecting with the local community and institutions. This connection is an important feature of community strengthening (Montgomery, 2005). Playing with other children promotes an understanding of social roles and responsibilities which contribute to social interaction and communication, the opportunity to meet friends and the enjoyment of good fellowship (Bartlett et al, 1999; Beard and Ragheb, 1980; Hughes, 1990; Mergen, 1975; Strife and Downey, 2009). It gives the opportunity to mix with other people and to talk to new and varied people and to build friendships with new people. It also helps children to understand others views and needs and provides practice in resolving conflict, agreeing on rules and learning from others (Bartlett et al, 1999).

Play gives an environment for children to work as a team and achieve a common goal for them (Hossain, 2004; Crandal, 1980). Play in natural environment enhances interaction between children (Strife and Downey, 2009).

Prevents use of drugs and reduces crimes: A survey conducted in 1997 with 16,000 private high school students of United States revealed that athletes were less likely than non-athletes to have ever smoked cigarettes regularly. The study also found that athletes were also less likely to use marijuana, cocaine, or other drugs (UNICEF, 2004). Play and sports may have an indirect impact on criminal activity by encouraging challenge and adventure, promoting positive use of leisure time, providing role models through coaches, and giving children a sense of purpose (Crandal, 1980; Bartlett, 1999).

Relaxation and stress reduction: Play provides relief from the stress and strain of life (DCMS, 2004). Studies from different countries have confirmed that physical activity reduced symptoms of stress and inactive children were more often depressed than active children (Wilson, 2009; Barnett, 1990; Floyed et al, 2008a). It has been witnessed in hospital settings and war zones that play is a way for children to gain a sense of control over difficult circumstances (Taylor et al, 2001). It allows relaxing physically and mentally. Also from the psycho-physiological study, it is revealed that recuperation from stress occurs faster and more completely during passive exposures to natural settings than in the urban environment (Schlein et al, 1990).

2.4.2. Health benefits: Access to open spaces encourages physical activity; enhances physical and mental health; helps reduce the risk of developing chronic diseases; assists in recovery from mental fatigue; and enhances children‟s development and well-being. Regular physical activity through play builds healthy bones, muscles and joints; helps control body weight; helps reduce fat and blood pressure, and most importantly the emerging problems of child obesity (Schlein et al, 1990).

Improve attention: A study conducted with children with Attention Deficit Disorder (ADD) symptoms found that those who spend some time in a natural green setting every day able to manage their study better than the children in other settings. A study conducted by Schlein et.al., (1990) also showed some positive effect of utilizing social levels of play on the appropriate play behaviour of children with autism.

Cognitive development: Through outdoor activity, psychological benefits such as a sense of freedom, enjoyment, involvement and intellectual challenges are met (Beard and Ragheb, 1980; Bartlett, 1999). Play relates directly to the problem-solving ability of a child as play provides a child with the specific skills to solve a variety of problems posed in life‟s other circumstances (Barnett, 1990; UNICEF, n.d.). Through active play children learn to use their bodies and develop their gross and fine motor skills (Moore and Wong, 1997). Bartlett (1999) noted that the data from research in the neuro-psychology and psycho-pharmacology indicate that distinct changes in the brain occurred due to healthy play and social behavior (Bartlett, 1999).

2.4.3. Environmental benefits: Green open spaces provide both aesthetic and environmental benefits, including protection of areas of conservation, biodiversity or cultural heritage value; managing climate change impacts by providing shade and cooling; contributing to storm water management; contributing to urban heat abatement, and reduction of air and noise pollution. Parks are the ideal place for mental exercise. Parks provide a natural atmosphere to induce relaxation and some degree of repose (Chowdhury, 2004).

Apart from recreation use, open space also allows the penetration of sunlight and air movement, as well as for planting areas for visual relief. It is also an essential land use element in urban design. These functions are particularly important in a high density, high-rise built-environment like Hong Kong.

2.4.4. Economic benefits: Local, regional and state economies benefit significantly from various types of open spaces. Parks are a major draw card for recreation and tourism industries and significant sources of employment for local communities and flow-on economic benefits (The Open Space Index, 2010).

Active open spaces serve the same purpose on competition days by attracting participants and spectators beyond the district and this has significant flow-on economic benefits. The location of parks can influence neighbourhood pattern and real estate values (DMDP, 1995). Parks protect physical resource in the urban environment, and also provide fresh air, sunlight, peaceful enjoyment of the unspoiled nature.

Melbourne is identified as one of the most liveable cities in the world, and one of the major contributory elements to this livability in the quality and amount of open space. In a recent

household survey undertaken during the research phase of this strategy, many people indicated they live in the municipality because of the open space (Melbourne Open Space Strategy, 2012). Open space is also extensively used by the local community and visitors from across Australia and overseas.

2.4.5. Educational benefits: There is increasing evidence to suggest that play area has a direct and positive impact on children and young people to meet formal education goals (Crandal, 1980; Beard and Ragheb, 1980).

The intellectual stimulation acquired through play helps children to learn about themselves and their surroundings and provides opportunities for initiative, interaction, creativity and socialization in the formal education system (Brown and Vaugham, 2009). Through play, children achieve intellectual developments by working out answers e.g. speed, quantity, concepts, big/little, abstract ideas etc (IPA World, n.d). Natural outdoor play environment offers opportunities for children to learn the importance of the environment. Children explore cause and effect and gradually build a knowledge base through play that cannot be taught through structural learning settings (IPA World, n.d; Strife and Downey, 2009; Crandal, 1980). The physical environment where individuals engage in their play and recreation activities which are well designed, pleasing and interesting, develop their aesthetic sense (Beard and Ragheb, 1980). One of the central roles of children‟s play is the aesthetic development of children (Crandal, 1980; Hughes, 1990).

2.5. Public Space and Sustainable Urban Development

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (SDG,2021). The 17 SDGs are integrated that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability. New Urban Agenda (NUA) for a better and more sustainable future adopted at the United Nations Conference on Housing and Sustainable Urban Development in 2016.

Goal of SDG-11 is making cities and human settlements inclusive, safe, resilient and sustainable. Three among eight targets of SDG 11 which are related with urban space. Those are i) inclusive and sustainable urbanization, ii) special attention to improving air quality, iii) provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities (CDP, 2021).

To make environmentally sustainable and resilient urban development NUA suggested to protect ecosystem and biodiversity, mitigating and adapting climate change (NUA, 2020) .

As one of the member, Bangladesh is involved in adopting the United Nations (UN) Resolution on Sustainable Development Goals and New Urban Agenda (NUA) vision. The 7^{th} and 8^{th} Five Year Plan of Bangladesh put special attention on formulation strategies to reflect the recommendations of SDG and NUA.

Urban development strategy in 8th Five Year Plan are i) Minimum standard will be defined for such issues as environmental protection, water and air quality and these standards are monitored by the higher government and ii) at the city level, the planning process will be participatory with a well-defined and structured consultation process with the residents. Under urban development strategy Urban Environmental Management strategies are also set as i) Enhancing plantation and gardening to increase the natural beauty in urban areas. ii) Introducing and promoting different environmental improvement initiatives and green initiatives e.g. green building, energy efficient building, zero emission building, green city, etc. iii) Introducing environmental audit, energy audit and water audit along with financial audit and iv) Develop Municipal-community Partnership to improve neighbourhood environment (8^{th} FYP, 2020). Neighbourhood playgrounds and parks, and community involvement can play a vital role to fulfilling these urban development initiatives in Dhaka. In 7th Five Year Plan, strategies for urban development were improving air quality in Dhaka and making green belt (7^{th} FYP, 2015). As a result, some parks in government housing areas were improved by Dhaka North City Corporation and Dhaka South City Corporation and also running this project. For sustainable urban development preserving and increasing number of playgrounds and parks are necessary though Dhaka is under land crisis.

2.6. Types of Open Spaces

A consistent and clear approach to defining and classifying open space is important throughout the whole planning and design process (OSPDG, 2013).

Stanley et al (2012), divided open spaces into seven major types : (1) food production areas; (2) parks and gardens; (3) recreational space; (4) plazas; (5) streets; (6) transport facilities; and (7) incidental space. Open spaces within each are further categorized into a city-wide, intermediate and individual building. The intermediate scale refers to spaces that serve multiple residences in a more localized portion of the city, such as a district or neighborhood.

Various approaches have been practised over time to classify public open space in Australia and these have intended to focus on the following, or a combination of the following (OSPDG, 2013):

Land ownership (Crown land, State Agency, Local Government);

2. Use or function (sports field, biodiversity, conservation, drainage, heritage);

3. Vegetation/topography (floodplain, ridgeline, bushland); and/or

4. Visitor / user catchment (state, regional, district, local).

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4. Visitor/user catchment (state, regional, district, local).

The catchment is a term often used to determine the distribution of public open space and can be effectively used in conjunction with categories, hierarchy and sizes of open space sites. The definition of open space catchment is unique in each context as it can be applied differently. However, in essence, a catchment refers to a "sphere of influence" of open space in terms of travel, use and its role within the open space system. Catchment can be explained using distance ("as the crow flies" or walk ability distance), travel time, role of the site, scale, quality and level of services, and in some cases even subsequent maintenance and resourcing required for effective asset management.

In Open Space Planning and Design Guidelines (OSPDG, 2013), open spaces according to catchment (has been used in conjunction with hierarchy, size and category) are as follows: i) Local or Small Local Open space, ii) Neighbourhood Open Space, iii) Sub District Open Space, iv) District Open space, v) Township Open space, vi) Municipal Open space, vii) Regional Open space, and viii) State Open space.

In DDSP (2016), based on primary use character the variety of open spaces in Dhaka can be classified under the following subcategories: i) Park, ii) Playground and sports facilities iii) Urban development open space, iv) Functional open space, v) Streetscapes, trails and buffer, vi) Urban forests /Natural park and vii) Protected area.

According to Hong Kong Planning Standard and Guidelines (1990) Open spaces are classified into I) Local open space, ii) District open space and iii) Regional or National open space. According to City Environmental Quality Review (CEQR) in New York (2014), Open spaces are classified into I) Local open space, ii) Community Level District open space and iii) Regional or National open space. Open spaces can be classified into three broad groups according to the extent of utility and services rendered by them (Islam et al, 2002).

2.6.1. Local open space: According to Hong Kong Planning Standard and Guidelines, a non-statutory land use for recreation open space is local open space. Local open spaces are smaller sites (where possible at least 500sqm in the urban areas) which are more passive in nature and provide sitting-out areas and children‟s playgrounds to serve neighbourhood population. For local open space for serving a larger neighbourhood, some active recreation facilities may be provided (HKPSG, 1990).

Local open spaces include play-lot, playground, playfields, parks and incidental open spaces . Playground/playfields and parks among these local open spaces are the main focus of this research.

i. Play-lot: Play-lot is a small area intended primarily for children of pre-school age. It serves as the substitution of the backyard of homes. The play-lot is equipped with devices like low swings, slides, sandboxes, jungle gyms and space for running and circle games. All equipment should be designed and arranged for small children. Enclosure in the form of a hedge or fence around the play-lot is advisable for the safety of the children and pergola or benches for mothers should be included.

ii. Playground: Playground is the center of recreation primarily designed for children of ages ranging from 6-14 years. A playground should be an area with the provision of apparatus and open space for informal play. There might be courts for various games such as soccer, tennis, volleyball etc. Playgrounds should be within walking distance of the neighbourhood. Proper lighting for evening use is essential.

iii. Playfield: Playfield is intended for young people and adults and provides a variety of recreational activities. A single playfield may serve a larger area than that served by a playground. The space should be designed with the same facilities as playground with the addition of space for sports like football, cricket etc.

iv. Parks: Small parks are designed mainly to serve neighbourhood. These provide an opportunity to get away from the noise and rush of traffic. It also affords a pleasant environment in which to engage in recreation activities. Parks should be accessible for recreation of both young and old and thereby designed correspondingly.

v. Incidental open space: This is not the land just leftover but properly designed open space. The design takes account of problems of each piece of such land to make it most effective. For example, in some areas plants may be needed to create a buffer to give privacy to adjoining dwelling units.

2.6.2. City open space: These are the open spaces that provide facilities for citywide recreation. These include city parks, parkways, green belts, stadium, sports centers, golf courses, racecourses, water bodies etc. District open spaces are medium-size sites (where possible at least 1 hectare) which provide facilities for the core activities and for passive recreation to meet the needs of a district population. City open space and district open space carries the same characteristics (HKPSG, 1990).

i. City parks: Unlike the neighbourhood parks, which serve the dual purpose of active and passive recreation, the city parks are the spaces for passive recreation only. These are provided in or around the heart or the city. It is designed to provide direct circulation, including diagonal paths and landscaped with grass, shrubs, flowers and trees to give an attractive effect. Water may be introduced in formal pools and fountains. Sittings should be provided for the conveniences of the park visitors.

ii. Parkways: The parkways and boulevards are an important part of the urban park system. The existence of such a tree-lined avenue greatly enhances the beauty of a city and enables people who have little time to visit parks to enjoy the natural environment.

iii. Green belts: Green belt serves to restrict the further outward growth of the town or city and provide farmlands for cultivation.

iv. Stadium, sports centers, athletic fields, golf courses, racecourses etc: These require comparatively larger areas than the playfields. Organized and competitive sports, games and matches between different clubs, institutions, districts and countries and sometimes between nations are played in those spaces. As a result, these attract a considerable number of spectators from all around the city, for which these spaces are required to be connected with the city's road network system.

v. Water bodies: These areas provide opportunities for swimming, fishing, and boating. These are national water bodies maintained in urban areas for recreational purposes.

2.6.3. Regional or national open space: Regional or national open space is defined as a non-statutory land use zone for recreation open space (HKPSG, 1990). Regional open spaces are large sites (at least 5 hectare) provided at prominent locations in the urban areas, at the urban fringe areas or in proximity to major transport interchanges. They provide facilities with a greater scope than the core activities and serve the wider recreational needs of the territorial population and tourists. Regional Open Spaces include the Urban Fringe Parks proposed in Metro plan. It includes regional or national parks, zoological & botanical gardens etc (Islam et al, 2002).

i. National park: Most countries have picturesque mountainous regions, marshy lowlands or foreshores that are of little use for cultivation or grazing, and are a much greater asset as scenic and scientific reserves. These are of immense value to the town dwellers on holiday. Besides, they serve a most useful purpose to scientists and researchers as study area of natural flora and fauna, geology, forest ecology, entomology and in some cases seismology and their influence on soil climate and growth under natural conditions.

ii. Botanical & zoological garden: These types of spaces are primarily provided for scientific reasons. Botanical gardens also provide opportunities for passive recreation. The majority of the visitors seek the botanical garden for their pleasant atmosphere to enjoy the beauty of the trees, flowers and lawns rather than to study the specimens. Similarly, vast majority of the people visit the zoo as an outing, usually with the children.

2.7. Type of Open Spaces According to Use

Open spaces are used as recreational facilities either in active or in passive mode (DDSP, 2016; HKPSG, 1990; The Open Space Index, 2010).

2.7.1. Active open space

Open space that is used for sports, exercise, or active play is classified as "active open space", consists mainly of recreational facilities, and includes the following: playgrounds with playground equipment, playing fields (baseball, soccer, football, track), playing courts (basketball, handball, tennis), beach areas (swimming, volleyball, frisbee, running), pools, ice skating rinks, greenways, mountain biking trails, and esplanades (used for running, biking, rollerblading, or other active play), multi-purpose play areas (open lawns and paved areas for active recreation, such as running games, informal ball-playing, skipping rope, etc.), and golf courses, including pitch and putt.

2.7.2. Passive Open space

Open space that is used for relaxation, such as sitting or strolling, is classified as "passive" and includes the following: plazas or medians with seating, a portion of beach areas (sunbathing), picnicking areas, green-ways and esplanades (sitting, strolling), paths, accessible restricted use lawns, gardens, church yards or cemeteries with seating, and publicly accessible natural areas used, for example, for strolling, dog walking, and bird watching. This study aims to study local playground and parks at the neighbourhood level.

Both playground and park intended for children to old people and provides a variety of recreational activities.

2.8. Facilities of Open Spaces

Open spaces are used actively or passively. Ancillary support is also required to run playgrounds and parks properly. According to Hong Kong Planning Standard and Guidelines (1990), facilities of open spaces are mentioned as follows:

2.8.1. Active Recreation facilities: Play equipment like play courts and pitches and play tools like cricket bat, football, racket, skipping rope, toy car etc are active recreational facilities.

2.8.2. Passive Recreation facilities: Gardens, water front promenades and landscape planting areas, sitting-out areas and rain shelter, children‟s playgrounds, paved areas for informal games and rides, ancillary pedestrian routes within open space, walking, jogging and fitness space and tools.

2.8.3. Ancillary facilities: Covered areas within open space whose primary function is to provide ancillary facilities to support the main recreation use are ancillary facilities. Pavilion, public toilets, storage areas, pump rooms, ancillary roads serving an open space etc are considered as ancillary facilities for recreation. In Hong Kong planning standard, building site coverage may be equal to or less than 5% in planning intention of local open spaces, primarily for passive use. Game Facilities are normally not provided (HKPSG, 1990).

2.8.4. Management and maintenance facilities: Preparing of play court and rides, mowing of grass and bushes, watering the field and plants, storage and supply of play tools, cleaning of fields and toilet, providing garbage bins, a supply of drinking water properly, ensure accessibility for all.

2.9. Calculation towards Open Space Standards

2.9.1.General criteria: The following criteria are provided to assist planners and others concerned in calculating the provision of open space and deciding on its countability towards satisfying the standards of provision :

(a) Open space should include the land that has been identified or reserved for open space use in town plans;

(b) Open space should provide open-air outdoor recreation to a clearly identifiable residential or worker population. As such, areas reserved for open space in comprehensive residential developments, public housing developments and some private residential and commercial/residential developments, as required in approved planning briefs, lease conditions and/or conditions of planning permission, should normally be countable.

(c) Open space should be functional and usable for active recreation (e.g. games courts and pitches) and/or passive recreation (e.g. sitting-out areas, children‟s playgrounds and landscape planting areas).

(d) Open space should be accessible to the residential or worker population it is meant to serve, including open space both at ground level and on the podium.

(e) Open space should be of a size and physical nature capable of supporting active and/or passive recreation facilities including landscaping with trees and shrub planting.

(f) Open space should be managed and maintained by a responsible agent, including a Government department or a private body.

2.9.2. Covered areas within open space

Covered areas within open space, such as pavilions, public toilets, storage areas, pump rooms, etc., whose primary function is to provide ancillary facilities to support the main recreation use should be counted as part of the open space provision.

2.9.3. Circulation Routes within Open Space

Ancillary pedestrian routes within open space, and ancillary roads serving an open space, should be counted as part of the open space.

2.9.4. Utility Reserves and Emergency Vehicular Access

a) In the case of utility reservations or emergency vehicular access routes provided within open space, whose uses are secondary to the main open space use, the areas should be countable as part of the open space.

b) The responsibility for the maintenance of special equipments (e.g. pump houses, access manholes) or special features (e.g. seawalls, access barriers, special paving) should be a matter between the relevant Government departments, and not an issue for determining the countability of open space.

2.10. Location Guidelines for Local Open Space

Open space must be planned as land use in its own right. It should be planned in the right location and should not be the remainder when other land uses have been provided. In planning the location of open space, the visibility of the open space from public roads and accessibility requirements of all segments of the population should be taken into account, including persons with disabilities to enhance as wide usage as possible.

Local Open Space should be located within a short walking distance from the residents. In public housing developments and private comprehensive residential developments, Local Open Space may be provided on the podium.

2.11. International Standard of Open Spaces

2.11.1. Open space standards in different countries: Different city development authorities follow some standards regarding open spaces.

i) National Recreation and Park Association guidelines: National Recreation and Park Association guidelines of 1.25 to 2.5 acres per 1,000 residents of neighborhood parks within one-half mile, 5 to 8 acres per 1,000 residents of community parks within one to two

miles, and 5 to 10 acres per 1,000 residents of regional parks within a one-hour drive of urban areas.

ii) Open space standards in New York: In New York City, local open space ratios vary widely, and the median ratio at the Citywide Community District level is 1.5 acres of open space per 1,000 residents. Typically, for the assessment of both direct and indirect effects, citywide local norms have been calculated for comparison and analysis. As a planning goal, a ratio of 2.5 acres per 1,000 residents represents an area well-served by open spaces and consequently used as an optimal benchmark for residential populations in large-scale plans and proposals. Ideally, this would comprise 0.50 acres of passive space and 2.0 acres of active open space per 1,000 residents. For such large-scale projects (and for planning purposes), the city also seeks to attain its planning goal of a balance of 80 per cent active open space and 20 per cent passive open space. The City‟s planning goal is based, in part, on National Recreation and Park Association guidelines (Table 2.1). Studies have shown that nonresidents, specifically workers, tend to use passive open space. The optimal ratio for worker populations is 0.15 acres of passive open space per 1,000 non-resident (Open Space- NYC, 2014).

Table 2.1: Standard for provision of open spaces in New York

Open space category	Provision of Standard	Distance of neighbourhood park from residents‟ house
Neighborhood parks	1.25 to 2.5 acres per 1000residents	within one to half mile
City wide Community District Park	5 to 8 acres per 1,000 residents of community parks	within one to two miles
Regional Park	5 to 10 acres per 1,000 residents of regional parks	a one-hour drive of urban areas

Source: City Environmental Quality Review (CEQR), NYC.gov.

iii) Open Space standards in Hong Kong: In considering the function, nature, form and intensity of development for open space and recreation facilities, and the appropriate zoning on outline zoning and outline development or layout plans, it is useful to have regard to the hierarchy of recreation and open space. Including the Metro Area and the New Towns which are more intensively developed considered as urban areas in Hong Kong. Open space and recreation facilities should be easily accessible from home; and, where applicable, from the workplace.

In the urban areas, including the Metro Area and the New Towns, the standard for provision of open space is a minimum of 20 ha per 100 000 persons i.e. 2m² per person, apportioned as follows: (a) a minimum of 10 ha per 100 000 persons (i.e. 1m² per person) for District Open Space and (b) a minimum of 10 hectors per 100 000 persons (i.e. 1m² per person) for Local Open Space.

In public housing developments and comprehensive residential developments, the standard of provision for Local Open Space is 1m² per person throughout the Territory.

Table 2.2: Standard for provision of open spaces in Hong Kong

Open space category	Provision Standard	Distance from dwellings
Local open space	10 ha per 100000 persons (1m² per person)	within a radius of not more than about 0.4km.
District Open Space	10 ha per 100000 persons (1m² per person)	No specific standard
Regional open space	No standard	No specific standard

Source: Hong Kong Planning Standards and Guidelines , 1990

iv) Open space standards in Melbourne, 2012: Open space standard in different categories of open spaces according to their catchment are as follows:

Local or Small Local: Open space serving a local catchment such that users are within safe walking distance. This could be in the range of 150m or 300m, depending on the population density and presence of barriers, etc. Size is usually less than 0.5 hectare and could be quite small sites. A minimum width of 30m could be required to achieve a reasonable proportioned open space. Examples include park lands, gardens and civic spaces.

Neighbourhood: Open space serving an area generally with a walking distance of around 400 metres from dwellings. Size generally a minimum of .75 or 1 hectare and can be up to 2 hectare. A minimum width of 50m could be required to achieve a reasonable proportioned open space. Generally provided for residents in a single neighbourhood. Examples include park lands and gardens.

Sub District: Open space serving three neighbourhoods. Size generally 5-6 hectares Generally provide several recreation nodes offering a range of opportunities. Provision of sporting facilities will depend on the settlement type and the specific catchments that relate to individual sports and types of facilities. Passive recreation provision is important as either the primary open space provision or to complement a sporting use.

District: Open space serving around six neighbourhoods or a population catchment area of 15,000 to 25,000 people. Size generally up to 10 hectares. Generally provide for a wide range of recreational activities including facilities for organized sports. Informal recreation and passive use of open space at this level are also very important. Accessible to residents by safe walking and cycling routes. Where provided beyond 1km from residences, will also cater for visitors arriving by car. Examples include district sports fields and conservation reserves.

Township: Typically used in rural areas to describe open space that services a local township area and its surrounding localities/villages. Size can up to 10 hectares and this

open space is likely to be home for the towns outdoor sporting and recreation facilities such as playing fields, outdoor courts, pavilion/hall and parkland. The passive recreation use and connectivity features of this open space will be important to ensure accessibility for the whole community. Will usually be central in a township and accessible by car for the surrounding community.

Municipal: Open space providing for the needs of the whole municipality. Might be located a minimum of 2km from residences, not necessarily needing to be in safe walking distance, therefore would provide car parking capability. Minimum of 3 hectare would be reasonable for municipal open space. Open space at a municipal level may be specialized for specific sporting infrastructure. It will be important to ensure that informal recreation and passive activities are well provided for.

Regional: Open space serving catchment including and beyond the municipality, including neighbouring municipalities. Size generally 10-30 hectares. Also includes significant sites of local or state historic, cultural and/or environmental significance.

Table 2.3: Standard for provision of open spaces in Melbourne

Open space category	Provision Standard	Distance from dwellings
Local open space	less than 0.5 hectare ,	safe walking distance
Neighborhood open space	From 0.75 up to 2hectare	400 meters from dwellings
Regional Open space	10 -30 hectare	safe walking and cycling routes

Source: Open Space Strategy, Planning for Future Growth. City of Melbourne

State: Open space serving an intrastate or interstate catchment. Usually associated with site specific environmental, landscape or cultural values. State significant open spaces usually managed by state agencies, often in partnership with the Council. Examples include National Parks and State Forests/Forest Parks. In the City of Melbourne, Open space per head of resident and worker was 10.5m2 in 2011 and it would be 7.2m2 in 2026 (Table 2.3).

v) Open Space Standards in Mumbai: Mumbai, India‟s financial capital, is spread over 604 square kilometers and, according to the 2011 census, population of 12 million. Having sufficient accessible green open spaces is a crucial ingredient to create “sustainable cities and communities,” as per the UN‟s Sustainable Development Goals. Mumbai has an abysmal 1.24 square metres of accessible open space per person (BMC, 2014).

As per the Indian housing ministry‟s 2014 Urban and Regional Development Plan Formulation and Implementation (URDPFI) guidelines, open spaces fall under three categories: recreational space, organized green space, and other common open spaces (such as vacant lands/open spaces including floodplains and forest cover in plain areas). All urban local bodies use the URDPFI guidelines for land-use planning in plain areas.

Mumbai Municipal Corporation of India has set open space standard at 4 square meters per person in 2014-34 development plan (Mankikar, 2020). The 2014-34 development plan for

Mumbai, drafted by the Brihanmumbai Municipal Corporation (BMC), bumped up the percentage of open space in the city from 26 per cent in 2012 to 46 per cent in 2016 by changing the definition of open space.

The new plan includes open spaces in the revised definition of „environmental" areas and views them as areas under coastal regulation zones I (ecologically sensitive areas like mangroves, coral reefs and biosphere reserves) and III (relatively undisturbed areas, and rural and urban areas that are not substantially developed); beaches; areas under nullahs, creeks and rivers; and areas formed because of sedimentation in the city"s creek regions (URDPFI, 2014).

vi) Open Space Standard in Dhaka: Different open space standards are prevailing in Dhaka City in different development plans. These development plans are: i) 1959"s Master plan of Dhaka, ii) Dhaka Metropolitan Development Plan (1995-2015), iii) Detail Area Plan (DAP), iv) Private Land Development Rules 2004 and v) Draft Dhaka Structure Plan(2016-2035).

Table 2.4: Open space standard of different planning documents for Dhaka City

City Development Plans/Rules	Open Space acres/1000 population	Park/children"s park (local park/ mini park within neighbourhood) acres/1000 population	Play field (local play Area) acres/1000 population
Draft Dhaka Structure Plan 2016-2035	0.86	0.12	0.24
Dhaka Metropolitan Development Plan (1995-2015)	0.16		
Detail Area Plan (2010-2015)	0.96	0.32 acres per 1000 population	
Private Land Development Rules, 2004	0.2	0.12	0.08
Building Construction Rules, 2008			10% of plot area when built area is above 1300 sqm.
Dhaka City Master Plan,1959	8 84	Park-2 acre acre Playground-2acre	

Source: Compiled by author from mentioned planning documents

There is no specific standard of open spaces in Government housing for Dhaka City. Different planning documents following different standards prevailed for open spaces. In Draft Dhaka Structure Plan a standard of open spaces 0.86 acres/1,000 population is considered for Dhaka Metropolitan area. Provision of standard in DDSP are as follows (Table 2.5):

Table 2.5: Standard for provision of open spaces in Dhaka

Type of Open Space	Standard Provision	Distance from dwellings
Park	City level parks :from 50- 80 acres for all citizen Park/children‟s park (local park/ mini park within neighbourhood) : 0.12 acres/1,000 population	Less than 1/4 miles
Playgrounds and Sports Facilities	Play field (local play area) i.e.0.24 acre/1,000 population	1/4 miles
District Park	25 acre /100,000 i.e. 0.25 acres /1,000population	3/4 miles
Metro Park	0. 25 acres /1,000 population	2-3 miles

Source: Draft Dhaka Structure Plan 2016-2035

2.11.2. Standard of local open spaces in different countries : Different city development authorities follow some standards of local open spaces.

Table 2.6 presents a comparative picture of standard for provision of local open spaces in different cities of the world.

Table 2.6: Standard for provision of local open spaces in different city at at a glance

City	Area of open space/person	Distance of neighbourhood park from residents house	Planning Document
Hong Kong	1m² per person	0.4km (0.25mile)	Honkong Planning Standard&Guidelines
New York	1.25 to 2.5 acres / 1,000 residents i.e. 5-10 m²/person	One to half mile	The City Index, CEQR
Melbourne	In 2011:10.5m²/person In 2026: it would be 7.2 m²/ person	Local open space: 150-300m Neighborhood open space: walking distance of around 400 meters (0.25mile) from dwellings.	Open Space Strategy, Planning for Future Growth. City of Melbourne,2012
Mumbai	4m² per person	No specific standard	Revised Draft Development Plan 2034 , Mumbai
Dhaka	0.86 acre /1,000 person i.e. 3.38m² / person	Less than or equal to 1/4 mile	Draft Dhaka Structure Plan 2016-2035

Source: Compiled by author

2.12. Open Spaces in Dhaka

2.12.1. City level planning in Dhaka

City level planning in Bangladesh began in the late fifties. Provincial Government apprehending large scale urban growth in spontaneous pattern caused by in-migration from India, decided to go for the master plan of three major cities - Dhaka, Chittagong and Khulna to ensure planned spatial development. With the technical assistance under Colombo Plan, a consortium of British consulting firms was engaged for this purpose.

From 1959 to 1961, master plans for Dhaka, Chittagong and Khulna were prepared. The plans were prototype and followed the post World War II British master plan style. The entire city was divided into some land use zones and connected by road network and other line services. The land use zoning plan served as the zoning regulatory measure. Dacca Master Plan 1959 was prepared in map form showing proposed land use and infrastructure development. The master plan report contents can broadly be classified into two- development proposals and implementation measures.

Development proposals were set under nine sectors - 1. Transport and Communication, 2. Public Building, 3. Population, 4. Housing, 5. Education, 6. Open Space, 7. Commercial and Shopping, 8. Industry and 9. Utility Services.

Urban Development Directorate (UDD) prepared a large number of layout plans for housing estates and upashahars at district level for Housing and Settlement Directorate (HSD). It provided planning services to the then Housing and Settlement Directorate (now National Housing Authority) which implemented all those plans.

The Town and Country Planning Act 1968 of Britain introduced a Development Plan consisting of Structure plan and plan at a strategic level, while local plan to be more certain, pertinent and detailed at local level. Such a system was also promoted by UN Habitat during 1980s.

In 1991 with United Nations Development Programme (UNDP) assistance, RAJUK launched a new urban planning project for Dhaka. A two-tier planning system-Structure Plan and Detailed Area Plan- was proposed. As the project ended abruptly without preparing the detailed area plan, the consultant prepared urban area plan suggesting interim planning measures for the main city area that will be followed till preparation of the detailed area plan (Chaudhury, 2015.

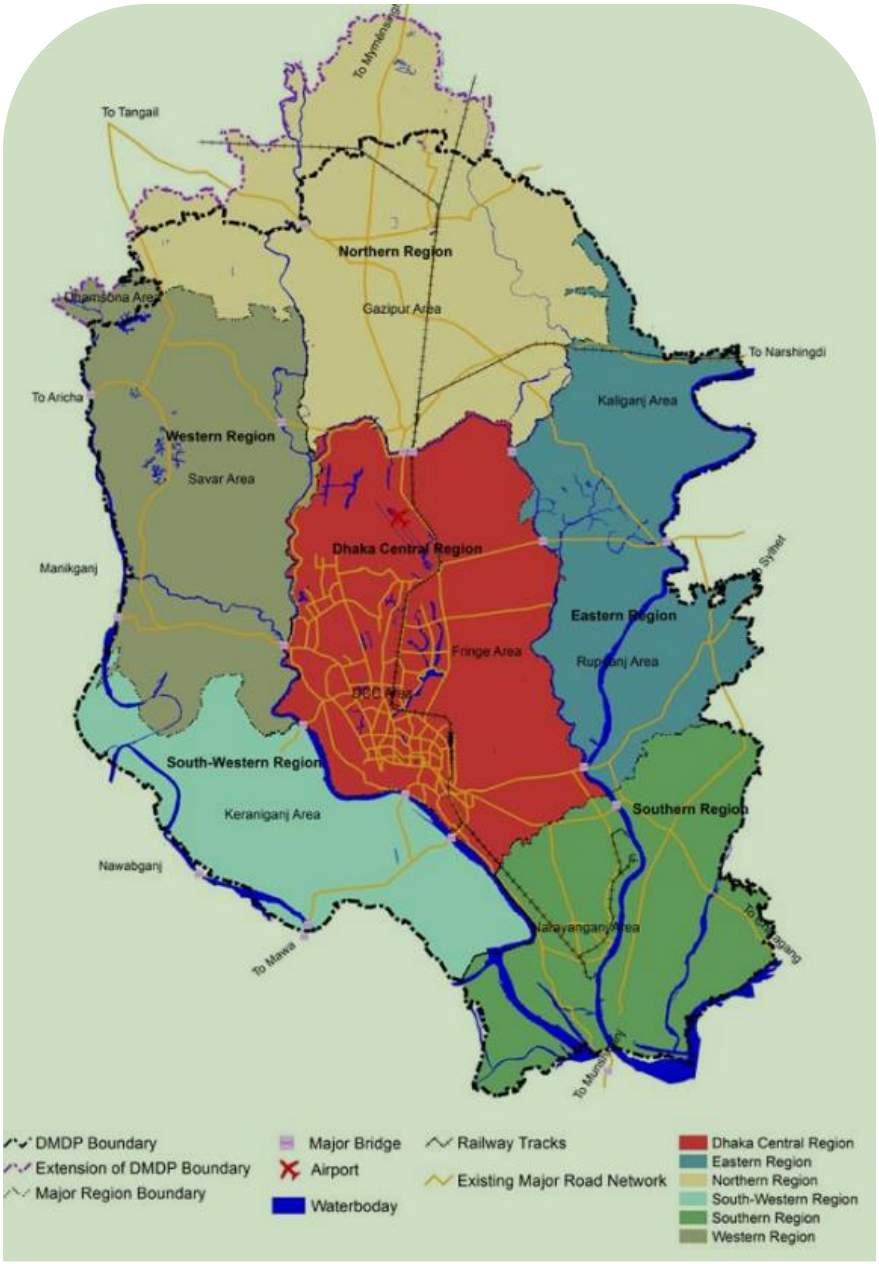
Draft Dhaka Structure Plan (2016-2035) was prepared under the Regional Development Planning (RDP) Project within City Region Development Project. The main objective of the RDP project is to review the existing DMDP (1995-2015) and prepare a revised and updated strategic plan for Dhaka Metropolitan Region for 2016 to2035 considering the shifting of underlying philosophies of spatial planning, current situation and future vision of the Dhaka Metropolitan Region (DMR). This task has been undertaken to revise the existing Structure Plan (1995-2015) that expired in 2015, and give development direction to the city for the next 20 years (2016-2035). The revision of the Structure Plan is intended to produce updated strategies keeping in mind the changed circumstances the Metropolitan Region has gone through since 1995.

The vision of DDSP (2016) is to make Dhaka a livable, functional & resilient metropolis respecting local socio-cultural fabric & environmental sustainability. Preserving Natural Environment and providing affordable Housing for City Dwellers are two major elements to make Dhaka livable.

2.12.2. Open spaces of housing areas in Dhaka

i) Multiplicity in defining Dhaka Metropolitan Region

There is multiplicity in defining the metropolitan region of Dhaka (DDSP, 2016). Quite obviously, the Statistical Metropolitan Area (SMA) of Bangladesh Bureau of Statistics



Map 2.1: Dhaka Metropolitan Area Source: Draft Dhaka Structure Plan

(BBS) and RAJUK did not refer to the same geographical extent. Besides, there is currently another popular notion of metropolitan i.e. the jurisdiction area of the Dhaka Metropolitan Police. This includes the Dhaka North & South City Corporations and the Eastern and Northern Fringe areas, bounded by the rivers Buriganga, Turag, Balu, the Tongi Khal and the Dhaka district boundary on the south. This also is a fragmented interpretation based solely on a particular institutional need (DDSP, 2016).

In 1959"s master Plan of Dhaka, projected area of 1958 to 1978 was 290 Sq. mile (751.09sq. km) and population was one million (DIT, 1960). In DMDP, proposed Metropolitan area was 1528 sq.km with an extension up to 445.71 sq.km and population considered 10.24 million in 2001 and 18.43 million in 2015 (DMDP, 1995). In DDSP, Dhaka Metro area is considered as 1528 sq.km with a proposal of extension of 96 km and the population is considered 10.28 millions in 2000 and 14.30 millions in 2035 (DDSP, 2016).

Table 2.7: Planning area of Dhaka under different development plans

Development plans	Planning area of Dhaka	Population
1959"s Master Plan	DIT area- 26,058 acre(105.45sq.km)	1 million
DMDP (1995-2015)	Dhaka Metro area-1528 sq.km area with a proposal for extension up to 445.71 sq.km.	Population of 2001 and considered as 10.24 Million. Population for 2015 and considered as18.43 million.
DDSP (2016-2035)	Dhaka Metro area-1528 sq.km area with a proposal of extension of 96 km	10.28 millions in 2000 to 14.30millions in 2035,

Source: Compiled by author

ii) Historical perspective of open spaces in Dhaka

Within five years of the establishment of Pakistan, the Town Improvement Act 1953 was passed and Dacca Improvement Trust (DIT) was formed in 1956 to improve the urban conditions of Dhaka city. Within these institutional developments in East Pakistan, the First Master Plan (FMP) was prepared for the area covered by the DIT.

In 1960, the total area of DIT planning zone was 26,058 acres and the population was 1 million. In the total land for the DIT plan zone, 20.1% was allocated for housing and ancillary, 38.75% was allocated to river and flood plains, while 5.1% was allocated to open space. The ratio of open spaces in housing was only 4% in the First Master Plan of Dhaka city(DIT, 1960).

The First Master Plan (FMP) was however described by the report as a planning principle rather than a detailed and inflexible scheme. Among two plans, one was for the core Dhaka and its adjoining areas. The motive behind the plan was to depict the fast expanding high density core Dhaka more vividly. Open space was an important part of nine sectors in the Development proposal.

The plan identified a severe scarcity of open space within the planning area (Akerland et al, 2006). In the old settings of the city adjacent the Buriganga river, there was only 0.06 acre of open space per 1,000 people. In the newer areas, slightly north of the city, things were better around the Dhaka University campus, including playing fields, a golf course and so on. But on an average for both the old and new town, there was only half an acre per 1,000 people. This compared oddly with other planned cities. The FMP recommended three to four acres per 1,000 people in Dhaka, including two acres for public parks and two acres for common neighbourhood areas, especially for playing grounds. But for the newly acquired areas of Mirpur, Fayedabad (currently known as Uttara) and Tongi, the proposal was a full four acres per 1,000 people. The total open space recommended under the FMP was 1,338 acres (Iqbal, 2013).

To secure open spaces there were several recommendations and assumptions, including the removal of the Central Jail (83 acres) to the northern periphery of the city in Tongi and the removal of the airport in Tejgaon (500 acres) to the north of the cantonment areas near Uttara. Some open spaces included the coexistence of waterways. For example, there were suggestions for a continuous waterway and walk from Ramna Green to the southwest in Motijheel. The Buckland Bund was expected to be 23-acre continuous 1-mile amenities park along the waterfront of the Buriganga.

One of the issues that continue to plague the city is the lack of open space, in terms of both water and land. Despite falling short of the high hopes for water spaces expressed in the report of Geddes, the FMP still offered more in terms of the options for open and water spaces than the Dhaka Structure Plan 2016-2035 (DDSP), Detail Area Plan (DAP), Dhaka Metropolitan Development Plan of 1995-2015(DMDP), Currently there are only 0.86 acres of open spaces for every 1,000 Dhaka inhabitants. Planning documents did not follow the previous standard in implementing the new ones.

Dhaka Metropolitan Development Plan of 1995-2015(DMDP): Dhaka Metropolitan Development Plan is comprised of the three following components: I) Structure Plan ii) Urban Area Plan and iii) Detailed Area Plans. In Structure Plan (1995-2015), recreation facilities and open space, accessible to the general public, provide an integral and necessary part of urban living, particularly in areas of high density. Parks and gardens are categorized as passive recreation. Sports, recreation and cultural activities are categorized as active recreation. The provision of local open space can be absorbed into the development costs of the formal public and private sector, or otherwise donated by the community itself.

In Urban Area Plan (UAP), Dhaka Metropolitan Area Integrated Urban Development Plan (DMAIUDP) outlined the then existing metropolitan level provision of open space. Some smaller areas of open spaces that have local significance but have not mapped. The short term priorities should be the adoption of lands study community provision standards, enforcing 5% open space provision in larger planned residential developments, making

temporary recreational use of vacant public land. In the medium term, the recommended priorities are opening up Western embankment as a linear park, after strengthening/ completion of the structure in the short term. Provision of water based recreation facilities in the Begunbari Khal and Harirampur ponds. Another national stadium is regarded as a longer term requirement.

Open Space Policy for Dhaka City in DMDP

Every city must have a policy outline for the control, preservation, reservation and use of its public open spaces. Over and above the planning principles, such policy matters need to be formulated in response to general public demand and the particular geographical and spatial situation of the city itself. In the long run, the effectiveness of public open space is related to how well such spaces are integrated into the overall design of the city. Sometimes, from a city design perspective, it is claimed that the public and private open spaces also need to integrate for better efficiency of the open spaces system. [Barnett, 1982: 185]

However, the institutional control is mostly limited to the available land which is under the state control. These are basically the metropolitan scale open areas in the cities. The planning decisions may also guide to generate open spaces at the local level for the community itself.

Dhaka City Structure Plan (1995-2015) has a clear vision regarding city's open spaces, and has formulated several policies (Dhaka Structure Plan, Vol-I,1995: 84-86). The proposed policies are, in brief, as follows:

• POLICY SE/10- AUGMENTING CITY OPEN SPACE

The Municipal Planning Authority [MPA] will seek to augment the City's existing stock of major recreational facilities by means of exploiting the resource of vacant and/or under-utilized Government land within the established urban areas.

In order to implement the POLICY SE/10, DMDP has proposed to convert the under-utilized old Airport site to Dhaka's Central Park of the twenty-first century. The central position of this area in relation to the present and future pattern of urbanization, coupled with its high accessibility, make it the ideal site for a new National Sporting Complex. Moreover, DMDP has also proposed to secure access for the public to some of the City's vastly under-utilized Government and institutional land holdings for passive recreational use [like parks and gardens] on the successful model of Zia Gardens.

• POLICY SE/11- SECURING FUTURE OPEN SPACE

The MPA intends to identify and secure sites for major recreational use in the DMDP Structure Plan's all the priority new development areas, but especially the DND Triangle and Harirampur [north of Mirpur].

It has been suggested that a long term planning is needed to secure necessary large sites before urbanization and land prices escalate. It is also recommended that necessary land for

flood retention ponds may be assessed to combine them with the recreational open spaces in Dhaka-Narayanganj-Demra (DND) Triangle and Harirampur area.

It has been also suggested that the Metropolitan Area needs to encourage picnic areas at accessible rural locations beyond the urban areas proposed in the DMDP Structure Plan. Moreover, the MPA will also support the Forestry Department in the establishment of proposed Bhawal National Park (north to Gazipur) for the people of Dhaka City.

Dhaka Structure Plan 2016-2035 (DDSP): In Draft Dhaka Structure plan, based on primary use character the variety of open spaces in Dhaka can be classified under the following subcategories.

a.Park - Within urbanized areas, parks are used purely for the recreational purposes. They are of two categories mainly: city level parks (from 50- 80 acres) for all citizen and local parks (usually less than an acre) for neighborhood people mainly.

b. Playgrounds and Sports Facilities -These are open spaces are assigned for more or less organized out-door sports facilities both at metropolitan level (like stadiums, swimming pools and tennis complex at metropolitan scale) and at community level (like playfields in residential areas, usually 2-9 acres).

c. Urban Development Open Space - These include urban plazas/parks of various sizes in commercial and institutional areas. They are mainly intermediate to small-sized green areas with pavements (usually 2- 8 acres). Some of these areas have historic, cultural or political importance. These are not purely recreational areas by nature, but they help to enhance a better urban living condition.

d. Functional Open Space - Some open spaces are very much functional in nature, like Eidgah, nursery, car parks, graveyards and cemeteries, etc.

e. Streetscapes, Trails and Buffer - These are scattered and sporadic open spaces within the city boundary, beyond the functional spaces. Open spaces and plantation along the streets, sidewalks, interchanges and street medians contribute to the green streetscape. Besides, the trails are open space corridors for conservation, recreation and alternative transportation. They are mostly linear in shape that may occur by the rivers, lakes, canals, storm water corridors/ drainage channels, utility corridors, abandoned rail lines, right-of-way along major roads, the green belts around ponds, water retention areas or outline of swamps and low land.

f. Urban Forests /Natural Park - Forest areas include national park, botanical garden, urban forest, roadside forestry and orchard garden, etc. These fairly big open areas as picnic spots or naturally pleasant sites in the form of natural parks are developed for recreational purpose at the out-skirt of the city.

g. Protected Area - Special areas of scenic and other natural values, like river banks, usually facilitate recreational use of the general public.

Open space Policy in DDSP (2016-2035):

Objective 01: To promote quality of life through enhancing open space

Policy-OS/1.1: Protect and Preserve Available Recognized Open Space.

Policy-OS/1.2: Mark and Develop Future Open Space in Advance in Proposed Urban Area

Objective 02: To create urban linkage through open space [Human Movement]

Policy-OS/2.1: Create Green Network within DMR

Objective 03: To conserve water bodies as source of aesthetics and recreation

Policy-OS/3.1: Conserve Water-bodies to Enhance Local Aesthetics and Make them Sources of Recreation

Policy-OS/3.2: Involve Community to Integrate the Water Bodies with the City Fabric

Objective 04: To encourage urban and periurban forestry and greening

Policy-OS/4.1: Establish Urban and Peri-Urban Forestry and Greenery. In 1959‟s master Plan of Dhaka, projected area of 1958 to 1978 was 290 Sq. mile (751.09sq. km) and population were one million (DIT, 1960). In DMDP, proposed Metropolitan area was 1528 sq.km with an extension up to 445.71 sq.km and population considered 10.24 million in 2001 and 18.43 million in 2015 (DMDP, 1995). In DDSP, Dhaka Metro area is considered as 1528 sq.km with a proposal of extension of 96 km and the population is considered 10.28 millions in 2000 and 14.30 millions in 2035 (DDSP, 2016).

Objective 05: To preserve antiquities and monuments

Policy-OS/5.1: Prepare Framework Plan and Urban Design Scheme for Heritage.

Dhaka city area was under urban use and the rest 61% was non-urban or semi-rural agriculture use. RDP survey (2013) reveals 48% of the entire RAJUK area under urban use and 52% non-urban use. Among these only 1142.42 acres (0.30%) of the land is used for recreational activities, which is significantly low (0.07 acre/1000 population) as compared to other major cities and falls far behind DMDP (0.16 acre/1000 population) or DAP (0.96 acres/1000 population) standards. The situation will be more critical in 2035 where population will become 8.83 million in the core area requiring 25.3% of area (ie.135.67 sq. km) to be preserved as open space following DAP standards (DDSP, 2016).

iii) Inconsistency in definition and classification of open spaces

In Dhaka, different agencies are responsible for maintaining the public open spaces. Large scale open spaces under Public Works Department (PWD) covers 302.5 acres of land. Besides, Dhaka City Corporation (DCC) maintains local level parks and playgrounds constituting about 85.25 acres. Housing and Settlement Directorate has 5.71 acres. Besides, Mirpur Zoo, Botanical Garden, and National Stadium cover 86.33 acres. Thus, the existing stock of open space within the Core city is about 480 acres. Besides, several open spaces are maintained by different institutions and authorities in and around the city where use is reserved (DDSP, 2016). Due to the diversity and complexity of management of all these open spaces the total stock of potential open spaces cannot be identified and calculated from reliable sources.

For such difficulty, maps of Dhaka rarely reflect the real stock of open spaces. Within the Dhaka Metro Region, open spaces under recreational category are 1142.42 acres only, whereas in existing land use of Detail Area Plan (DAP), 2010 open spaces of all category, including vacant and unused land, was 6962.54 acres (DDSP, 2016).

In fact, such anomalies have resulted because of inconsistency in the definition and classification of Open Spaces. Different vested groups are taking advantage of such weaknesses of the planning process and causing loss of open spaces in due course of time.

According to Park, Wetland and Open Spaces Conservation Act 2002, Section (2), open space is defined as a space marked in a master plan as „open space" or what has been declared as „open space" by government gazette notification. As a result, undetermined open spaces are always under threat of land grabbing and the total stock remains hidden in disguise.

iv) Problem associated with open spaces in Dhaka city

According to the 2011 census, Bangladesh has a population of approximately 139 million with a population density of 937persons/sq.km. Dhaka city, the capital of Bangladesh, is experiencing extremely fast urbanization with one of the highest population densities of the world at 1,502 persons/sq.km (BBS, 2001). From a small town with a population of only 200,000 people in 1947, Dhaka grew to a city of 4.2 million in 1987, and has now become a mega city of nearly 10.5 million (BBS, 2011).

Over the past two decades, studies show that urban green spaces are fast disappearing or been destructed at an alarming rate in urban areas. The urbanization takes the form of either densification of urban core or spatial expansion of urban areas outwards (urban sprawl). Studies by Honu et al (Honu et al, 2009) . found out that rapid urbanization has resulted in the conversion of several urban lands into built-up structures and excessive destruction of the natural ecosystem including green spaces. A study on 386 European cities found a decline in the coverage of green spaces and attributed urbanization as a major cause of this problem with many of the cities increasing in size (population and land area) to cover lands reserved for green spaces(Fuller and Gaston, 2009). Similarly, Corboe (2001) found an open space loss between 1990 and 2000 for all the examined 274 metropolitan areas in the contiguous United States. While many Chinese cities show mixed results, with both increases and decreases, cities in many developing countries are losing green spaces at a rapid pace (Akerlund et al, 2006).

There have been reports about the encroachment of open spaces, playgrounds and parks in Dhaka city in the daily newspapers in Bangladesh [The Independent, (2018, February 4 and 6; 2015), The Daily Star (2009, October 2; 2015, October 21), Dhaka Tribune (2018, October 18; 2017, October 29;2017, December 30; 2017, December, 28; 2017, December 30)].

As there is no regulatory body to resist encroachment in Dhaka city, encroachment of playgrounds, parks and open spaces is almost a common practice in Dhaka city [Siddique, 1990; The Daily Star (2007, December 5; 2008, December 7; 2008, September 15; 2008, December 7; 2009, April, 4)].

As a result, unauthorized construction by local influential persons and renting out of these playgrounds and parks for commercial purposes are also common practices for Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC). These limited facilities are used for commercial purposes and as a result, children are deprived of using these facilities.

The ratio of recreation space to the total area in Dhaka city is far below the standards followed in other countries of the world (Biswas, 2002). The open space ratio in Hong Kong, 1sqm per person within 0.25 mile and 1.5 to 2.5 acres per 1,000 persons within half to one mile in New York. In case of Dhaka city, the amount of open space per 1,000 people is only 0.96 acres, which is far below the level for any modern, efficient city in the globe (Rashid, 2003).

2.13. Main Institutions and their Responsibilities in Government Housing Provision

In the public sector, most activities related to housing are carried out on behalf of the Government by the Ministry of Housing and Public Works and different departments/directorates under it namely the Department of Architecture, Public Works Department (PWD), Housing & Settlement Directorate (HSD), City Development Authority namely Rajdhani Unnayn Kartripakkhya (RAJUK), Urban Development Directorate (UDD) etc.

The responsibilities of different Departments/ Directorates involved in the public housing provision under the Ministry of Housing and Public Works are stated below.

1. **The Department of Architecture** is the alone government architectural organization and responsible for designing all government buildings and public housing schemes across the country (www. architecture. gov. bd).

2. **The Public Works Department (PWD**): Public Works Department or PWD was established in 1948 when Bangladesh was a part of Pakistan. It is led by a chief engineer. It is a government department responsible for the construction of buildings and structures of government organization and agencies in Bangladesh and is located in Dhaka, Bangladesh. It is under the Ministry of Housing and Public Works. Previously this body also carried out design and drawings (http://m.pwd.gov.bd/).

In Dhaka city, two plot housing were planned and maintained by PWD: i) Dhammondi Residential area and ii) Khilgaon Rehabilitation Project. Most of the housing projects were created for government servants and also for employees of different organizations during the early fifties and afterwards. Several open spaces of these housings are also maintained by PWD still now.

3. National Housing Authority: National Housing Authority traces its origins to two different organizations, Housing and Settlement Directorate (HSD) and Deputy Commissioner Settlement. After the Partition of India, millions of refugees flowed into Pakistan. The government responded by creating a Housing Wing in the Works, Power, and Irrigation Ministry to provide housing to the refugees and low-income families. In 1971, the Housing Wing was updated to the Housing and Settlement Directorate. In 2000, the Parliament of Bangladesh passed the National Housing Authority Act. The

Housing and Settlement Directorate and Deputy Commissioner Settlement were combined to form the National Housing Authority on 15 July 2001(https://mail.nha.gov.bd/).

NHA is an autonomous body under the Ministry of Housing & Public Works, Bangladesh. It is working to solve the enormous housing problem of Bangladesh by giving allotment of plot for low and lower middle-income group and flats to the people on behalf of the Government. It has so far established 34 housing estate throughout the country with all civic and infrastructure facilities. These housing estate consists of residential and rehabilitation plots, flats, core houses, shops, health centers, schools, mosques, parks, playgrounds etc.

5. **Capital Development Authority (RAJUK):** Rajdhani Unnayan Kartripakkha, or RAJUK – literally the Capital Development Authority of the Government of Bangladesh is a Bangladeshi public agency responsible for coordinating urban development in Dhaka, Bangladesh.

RAJUK is responsible for physical plan preparation, land acquisition, land development, distribution of plots, regulation and control on private development and building permission as well as slum clearance and rehabilitation (http://www.rajukdhaka.gov.bd/rajuk).

The Rajdhani Unnayan Kartripakkha (RAJUK) had emerged through the ongoing crisis of planned and controlled development of Dhaka City. RAJUK established on April 30, 1987, by replacing Dhaka Improvement Trust (DIT) which was established in 1956 under the provision of the 'Town Improvement Act -1953' (TI Act 1953). The prime intention of the organization was to develop, improve, extend and manage the city and the peripheral areas through a process of proper development planning and development control.

In 1947, when India was partitioned, Dhaka became the seat of the provincial government of East Pakistan. The population increased from 0.28 million in 1951 to around 1.2 million in 1971. As the Capital of Bangladesh, which emerged as an independent country after the War of Liberation in 1971, Dhaka has become one of the fasted growing cities in the world and its population is likely to exceed 16 million by this time. RAJUK is trying to make the capital city Dhaka-a planned, livable and environmentally friendly city. To fulfil the goal of achieving a planned city. RAJUK has taken initiative to make it livable through solving housing, transportation problems and creation of large scale water-based public space/open space like Hatirjheel integrated project.

5. The Urban Development Directorate (UDD) limits its role only to the urban and regional planning policy and plan preparation.

6. The Ministry of Finance is responsible for funding the public housing. Therefore supplies finance for house building activities.

7. House Building Finance Corporation (HBFC) gives mortgage lending for housing construction to the people.

Different agencies are responsible for regulation and control over the design and construction of housing its location, necessary infrastructure, services and social facilities

essential for housing areas. There are also other institutions for the distribution of housing and planning in Dhaka city.

8. National Economic Council (NEC) is for policy and programme and overall decisions.

9. Planning Commission is responsible for policy and programme review.

10. Water Supply and Sewerage Authorities are responsible for water, sewerage and drainage.

11. Titas Gas is responsible for gas supply.

12. Dhaka City Corporation (North and South) is for maintenance of urban services like open spaces of Government housing, roads, drainage, slum improvement and implementation etc.

13. Housing and Building Research Institute is responsible for research and development on building and materials. Although there are so many agencies involved in the housing activities the scope of their services remains limited. Because of the lack of funds and effective housing policy, these agencies that are concerned with Mass housing are of benefit only government servants and relatively rich upper-income groups.

2.14. Playgrounds, Open Space, Park and Natural Water Bodies Protection Act

Playgrounds, Open Space, Park and Natural Water Bodies Protection Act 36 of all Municipalities of Metropolitan, Divisional Cities and District Towns in Bangladesh (Bangladesh Gazette, 2000): Under the Act, the nature of land use of all playgrounds, open spaces, parks and natural water bodies of municipality areas are protected and cannot be changed under any circumstances. The Act also protects against any sort of commercial use of these spaces and also mentions about the protection against tree cutting which can affect the basic nature of these places. A few organizations are working to safeguard these parks and playgrounds from encroachment.

The Bangladesh Paribesh Andolon (BAPA) is the most prominent among them. It works for the protection of playgrounds and parks in Dhaka city. This activist group comprises renowned social workers, architects, planners, environmental activist and protects any encroachment of these outdoor play spaces.

2.15. Conclusion

Playgrounds and Parks have different type and different types of benefits. In different cities, the standard of playground and park varies according to their natural setting, demographic and social-economic conditions. Also, there are different authorities and planning documents in setting standard of open spaces in housing projects for Dhaka city though there is no standard for government housing. Open spaces in Dhaka is reducing fast with the fast growth of population and expansion of Dhaka Metro area. Also, existing parks and playgrounds from neighbourhood to city level are encroached by partial encroachment, some parks in neighbourhood level have fully disappeared and condition of existing parks are not so comfortable. Management and maintenance authority should play a vital role to protect and improve the quality of open spaces.

CHAPTER 3 : RESEARCH METHODOLOGY

3.0. Introduction

The previous chapter discussed the type and importance of open spaces, open space scenario of Dhaka city, different standard of open spaces at national and international level and different authorities involved in allocating housing, maintaining open spaces. This chapter presents the methodology of research. It describes the selection of study area, selection criteria of case studies, collection of data from primary and secondary sources and data analysis using different tools. Data is collected from secondary and primary sources. Secondary sources of data are literature review, maps from concerned authority and google images. Primary data is collected from direct observation, Focus group discussion and key Informant Interview method. At last, time line is prepared from all types of collected data. Then analysis is done with centroid radii method and analyzing timeline.

3.1. Selection of Study Area

Open spaces have significant importance in the life of the settlements. Three government authorities such as i) National Housing Authority (NHA)(Previous HSD), ii) Public Works Department (PWD) and iii) Capital Development Authority (RAJUK) (previous DIT) are involved in Development of Housing Estates, Resettlement /Rehabilitation projects and Township in Dhaka city area in public sector. Since 1959, about 18 numbers of housing projects have completed and handed over through these authorities (Chaudhury, 2015). Playgrounds and parks are the basic elements in the housing. Many parks and playgrounds of these government housings have already encroached (The Independent, 2018; Akhter & Islam, 2011). Most of the open spaces of government housing projects are maintained by Dhaka North and South City Corporation (Akhter & Islam, 2011; The Independent, 2018; The Daily Star, 2015) and the maintenance condition of the open spaces in Government housing is very poor (Dhaka Tribune, 2017). This research aimed to study all local playgrounds and parks in the government housing projects of Dhaka city. Playgrounds and parks of three government housing among 18 are selected for this study.

3.2. Selection Criteria of Case Studies

Government was the single and first largest provider of planned housing in Bangladesh during the early fifties and afterwards (Saha, 2006). Case studies have been selected from this period only. Al1 the housings, which have selected, have been inhabited for more than 10 years with an assumption that the utilization pattern needs time to get established. Following criteria were followed while selecting study areas:

- **Three case studies are selected from three different government housing authorities:** i) Housing Estate at Mohammadpur (HEM) from National Housing Authority (NHA), ii) Khilgaon Rehabilitation Project (KRP) from Public Works Department (PWD) and iii) Uttara Model Town (UMT), sector 1 to 4 from Capital Development Authority (RAJUK).
- **Age of the housing:** Selection was done one from 1960‟s (Housing Estate at Mohammadpur-1968), one from 1970‟s (Uttara Model Town: sector 1 to 4-1977) and one from 1980‟s (Khilgaon Rehabilitation Project-1988).

- **Size of the housing:** Neighbourhood housings are selected in respect to large size (Khilgaon Rehabilitation Project-2320acre), medium size (1st phase of Uttara Model Town-950acre) and small size (Housing Estate at Mohammadpur-434.5 acre).
- **Density of the neighbourhood:** Case studies are selected keeping in mind high density housing area.

3.3. Sources of Survey Data

3.3.1. Secondary sources of data:

i) Literature survey: As secondary sources, the literature survey has provided the knowledge base for the research and develop a clear understanding the need for recreational open spaces at neighbourhood level and the changes scenario of the type and size of those open spaces. For this purpose related books, journals, Master"s thesis, reports, documents, seminar paper have been reviewed. Two types of secondary data sources have been used for this research: unpublished data sources i.e.the thesis and research papers of the research students and published data sources i.e. the various journals, magazines, books, articles etc.

ii) Collection of approved plans and Google maps/images: Approved plans of study areas were collected from concerned authorities: National Housing Authority, Department of Architecture and Capital Development Authority (RAJUK). Some of them were ammonia print and some were in scanned format as image file. Ammonia printed copies were also scanned. Then all scanned copies were drawn in Auto CAD and scaled it. All open spaces are marked on the map. The type and size of open spaces are found directly from the approved layout plans. Google image/ maps were downloaded to understand the present condition of the open spaces. Google image of Dhaka is available from 2003. To understand the chronological changes Google Images of open spaces are collected from 2003 to date.

3.3.2. Primary sources of data:

To collect the preliminary information about the existing situation and to attain the above mentioned objectives, a reconnaissance survey was conducted first. A number of observation surveys was performed to collect data on the nature of space use, the type of users, supporting facilities, scope of development etc. during 19th August to 27th September , 2019. The method for collecting primary information is used in this case is Direct observations, Focus Group Discussion with users of open spaces and Key Informant Interviews with the responsible authorities and inhabitants of surrounded localities of open spaces.

i) Direct observations: Direct observation was done two days in a week: weekday and weekend for every playground and park. Total number of three housings was 18 in number. Among them 12 in Housing Estate at Mohammadpur which takes four weeks for field survey. Three field survey was conducted at one day. There are two playgrounds and one park in Uttara Model Town (sector 1 to 4). Survey was done within one week. Playground and park of Uttara sector 4 are in one compound. In Khilgaon Rehabilitation Project, there were two playgrounds and one park. Those were surveyed one week by three surveyors. Survey was conducted from 19th August to 27th September, 2019.

Field observation was done with an observation checklist (Annex.3.2) to know the existing physical, environmental and maintenance condition of the playgrounds and parks. An observation check list was prepared from the co-relation schema (Annex. 3.1). Size, type, location and layout of the playgrounds and parks, even / uneven condition of the surface, presence of grass, flower trees and trees, full or partial encroachment were occurred by those elements or built structures of the playgrounds and parks are also included in check list (Annex. 3.2). Size of the playgrounds and parks are measured by tape (Annex. 3.2). What type of active (court, pitch, goal post. play tools), passive (walkway, exercise space and equipment, sitting and rain shelter) and ancillary facilities (toilet, drinking water, lighting and refreshment facilities, boundary wall and gate) are available in the playgrounds and parks are also assessed by direct field observation using check list. Also investigated the maintenance condition like cleanliness of the toilets in parallel with playgrounds and parks, availability of waste bin, repairing of rides, benches, walkways and field, preparing of field like watering, mowing etc.

To know the total number of user, number of active and passive user of the playgrounds and parks throughout the whole day, direct observation was conducted from 6:00am to 12:00 am for each playground and park two days a week. Eighteen hours is divided into six slots ranging from i) 6:00 am to 9:00 am, ii) 9:00 am to 12:00 pm, iii)12:00 pm to 3:00 pm, iv) 3:00 pm to 6:00 pm, v) 6:00 pm to 9:00 pm and vi) 9:00 pm to 12:00 am. Users are categorized according to age range from i) below 6 years, ii) 6-12 years, iii) 13-19 years, iv) 20-26 years, v) 27-33 years and vi) above 33 years. After 9:00 pm the playgrounds and parks start to become empty. Direct observation is conducted to find out type of active and passive uses of playgrounds and parks by the users and type of activities is common among people through the working days and weekend.

ii) Focus Group Discussion (FGD): Users of open spaces comes to the open spaces single, duet and also in groups. Focus group discussion is done with users like children age 13 to 19 years old, people from 20 to 26 and so on. FGD was done to know the purpose of visit, their frequency to visit, their dwelling place to count the distance of living from open spaces and what type of problems they face to use the open spaces by semi structured questionnaire (Annex 3.3). Groups are selected randomly.

iii) Key Informant Interview (KII): Key Informant Interview with the responsible authorities is done to know the reason for the changes of open spaces in term of size, type, access and facilities of open spaces, reason for poor maintenance of the open spaces and background history of the encroachment (Annex. 5a).

KII with inhabitants of the study areas to know their observations about changes and reason for changes of open spaces in term of size, type, access and facilities of open spaces. Collected information will help to prepare a time line of the open spaces of those areas.

iv) Preparing Timeline : Type and size of playgrounds and parks of three housing were determined from approved layout plans. Changes in type and size of open spaces were got from comparing the open spaces of approved plans with revised layout plans. From 2001 to 2019, Google Images of open spaces are available. So the changes of open spaces in type and size are determined from these images comparing with revised and approved plans. Findings from these analysis were also justified by direct field observation, measuring the

size of the open spaces in tape and then calculated the changes of area. Type of encroachment and provided facilities were found from direct observation and probable time of encroachment were known from google images , FGD with users and KII with authorities and inhabitants with semi-structured questionnaire (Annex.5b). Accessibility to the playgrounds and parks were determined by their boundary walls, gate etc. These data also were collected from field survey. Google images were downloaded five years interval. Collected of all type of data are compiled and prepared timeline.

3.4. Data Analysis:

3.4.1. Analysis and synthesis: Approved Plans of selected housings were prepared from scanned copy in scale by using Auto CAD. Size and type of open spaces in the approved plans were found from these scaled drawings .

Their present size and type were found from Google maps, direct field observation and field measurement with tape. To find out their present physical, environmental and maintenance condition, direct observation data, focus group discussion data from users are analyzed and synthesized. Frequency of use, purpose and problems for using open spaces and distance of dwelling of users from open spaces were measured from Focus Group Discussion (FGD) data.

3.4.2. Timeline analysis: Changes in open spaces have occurred in number, size, type, use and access. From timeline analysis, the changes of number were got by comparing the present number with the previous number, reduction or increase of sizes of open spaces also found by observing the changes of area with the changes of time after five years interval. To find out the changes of uses and facilities, data from Focus Group Discussion (FGD) are analyzed and synthesized. Changes of use are identified by changes of type of use from past use to current use by collected Google images and from Timeline analysis.

3.4.3. Centroid Radii method: To analyze access of open spaces in the housing, Centroid Radii method was applied. Centroid Radii Measure of accessibility is used in order to measure the accessibility of the parks and playgrounds in Government housing projects for the user of the Dhaka city. A distance of half a mile was considered according to National Recreation and Park Association‟s standard. The boundaries between buffers of each park and playground were dissolved to create one seamless buffer for the entire housing. Buffer area was calculated of approved layout plans and present plans of selected housings. And changes of buffer was calculated comparing findings.

3.5.Conclusion

The research is an attempt to find out research objectives using primary and secondary resources and different survey tools and techniques. This research is done using primary data from Direct field observation, FGD with users, KII with housing and maintenance authorities and secondary data from housing authorities and Google images. To find out the physical, environmental and maintenance condition of playgrounds and parks in Government housing users response were very important. Also, the changes of open spaces were found from timeline analysis. And reason for changes of open spaces was found from the responsible personnel of plot allocating authorities and maintenance authorities. All

findings from the analysis are combined and outlined some guidelines for recommendations.

CHAPTER 4: PROFILE OF THE STUDY AREAS

4.0. Introduction

This chapter describes about the three selected housing areas and the open space inside these housing areas. The discussion focuses on location in the city context, the number, type, size and uses of the playgrounds and parks of these case studies in approved layout plans and their present situation. This chapter also presents the status of open space ratio within housing comparing with standard. It also discusses the physical, environmental, maintenance condition of the playgrounds and parks. The view of users‟ on existing condition of these playgrounds and parks is also presented here.

4.1. Description of the Case Studies

The First Master Plan of Dhaka in 1959, focused on the relatively high land for housing in the following twenty years. The plan identified severe scarcity of open space within the planning area (DIT, 1960). As a result, about 18 Government housing projects with open spaces were designed and completed from1959 to date within Dhaka city (Map 4.1). These government housing projects are executed an managed by three government organizations. These organizations are i) Housing projects of Rajdhani Unnayan Kortripokhkho (RAJUK), ii) National Housing Authority (NHA) and Public Works Department (PWD).

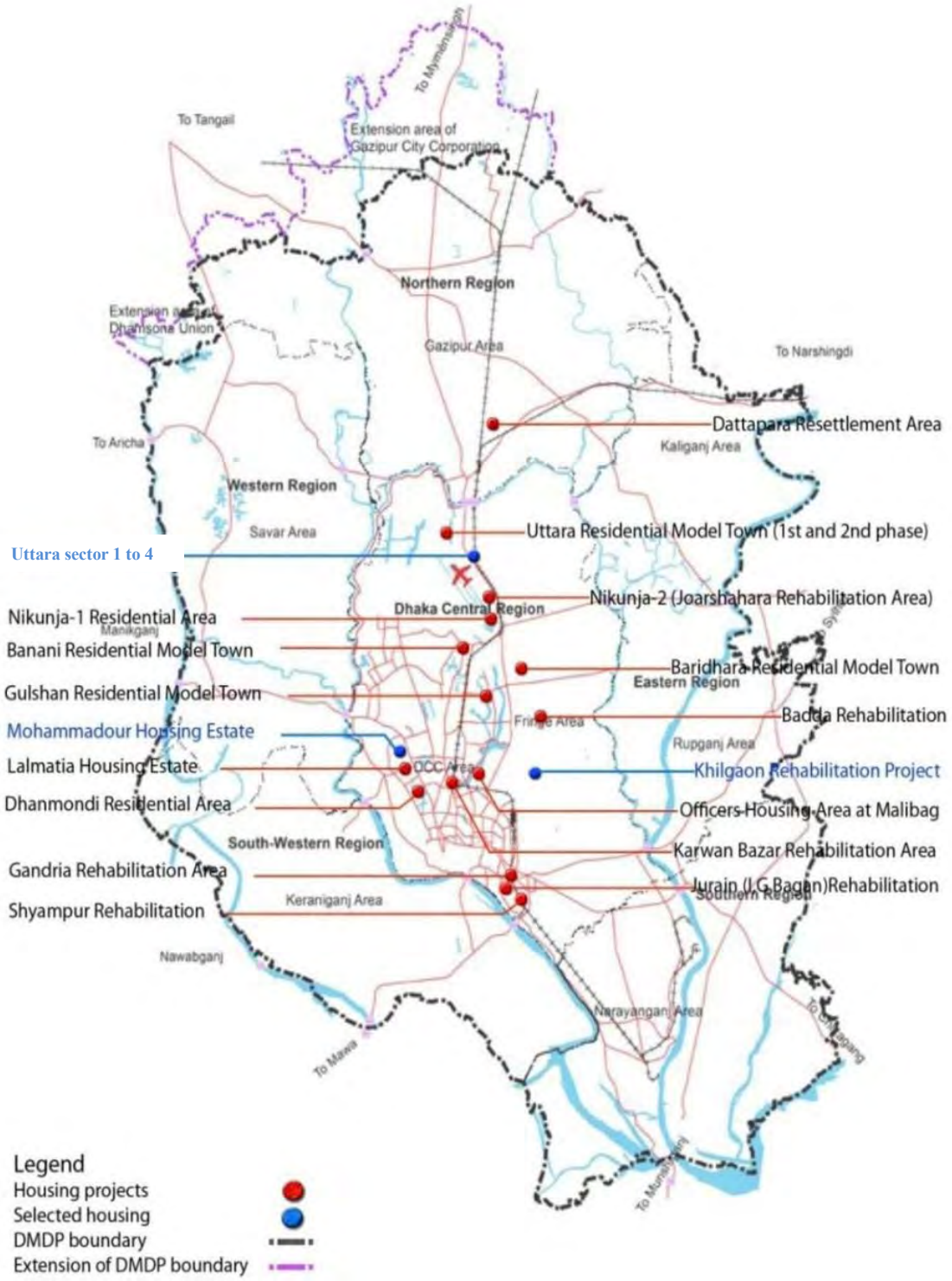
Completed projects by these three authorities are as follows:

Housing projects of Rajdhani Unnayan Kortripokhkho (RAJUK): RAJUK is responsible for 13 government housing projects such as i) Gulshan Residential Model Town, ii) Banani Residential Model Town, iii) Baridhara Residential Model Town, iv) Uttara Residential Model Town, v) Nikunja-1 Residential Area, vi) Dattapara Resettlement Area, vii) Gandaria Rehabilitation Area, viii) Karwan Bazar Rehabilitation Area, ix) Shyampur Rehabilitation, x) Officers Housing Area at Malibag, xi) Jurain (I,G Bagan) Rehabilitation, xii) Badda Rehabilitation and xiii) Nikunja-2 (Joarshahara Rehabilitation Area).

Housing Estate/Site & Services Projects of National Housing Authority (NHA) : Three government housing projects are managed by NHA, these are i) Housing estate at Mohammadpur, ii) Mirpur housing estate and iii) Lalmatia Housing estate (public private partnership).

Housing Estate/Site & Services Projects of Public Works Department (PWD-previous C&B): i) Dhanmondi Residential Area and ii) Khilgaon Residential area are under the jurisdiction of PWD.

This research aims to study all open spaces in the selected government housing projects. Among them, Housing Estate at Mohammadpur (HEM), Uttara Model Town (sector 1 to 4)(UMT) and Khilgaon Rehabilitation Project (KRP) are selected as case study areas for in depth study (Map 4.1). There are playgrounds and parks in every housing projects. Playground and parks of these housing are considered as open spaces.

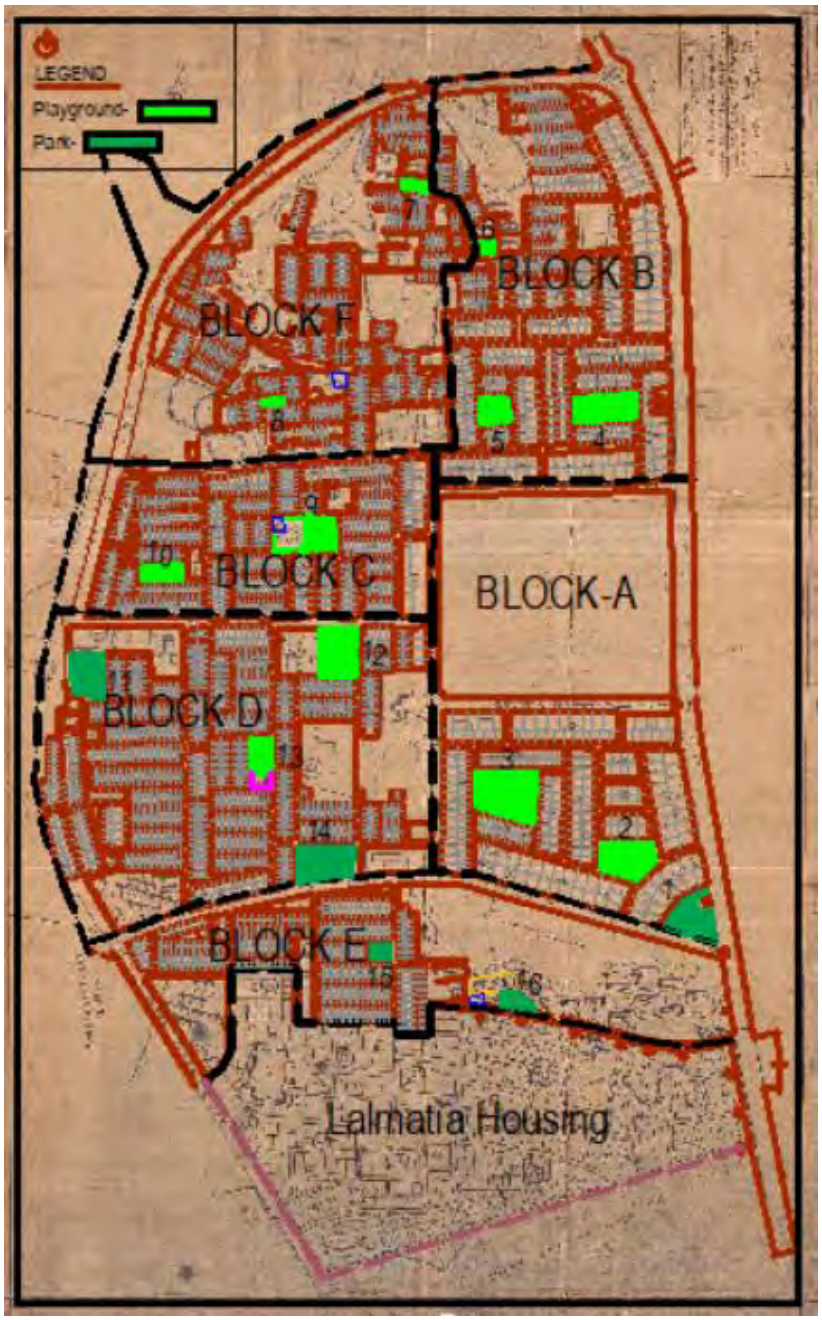


Map 4.1: Government Housing projects in Dhaka Metropolitan Region

Map Source: Draft Dhaka Structure Plan (2016-2035)

4.1.1. Housing Estate at Mohammadpur (HEM)

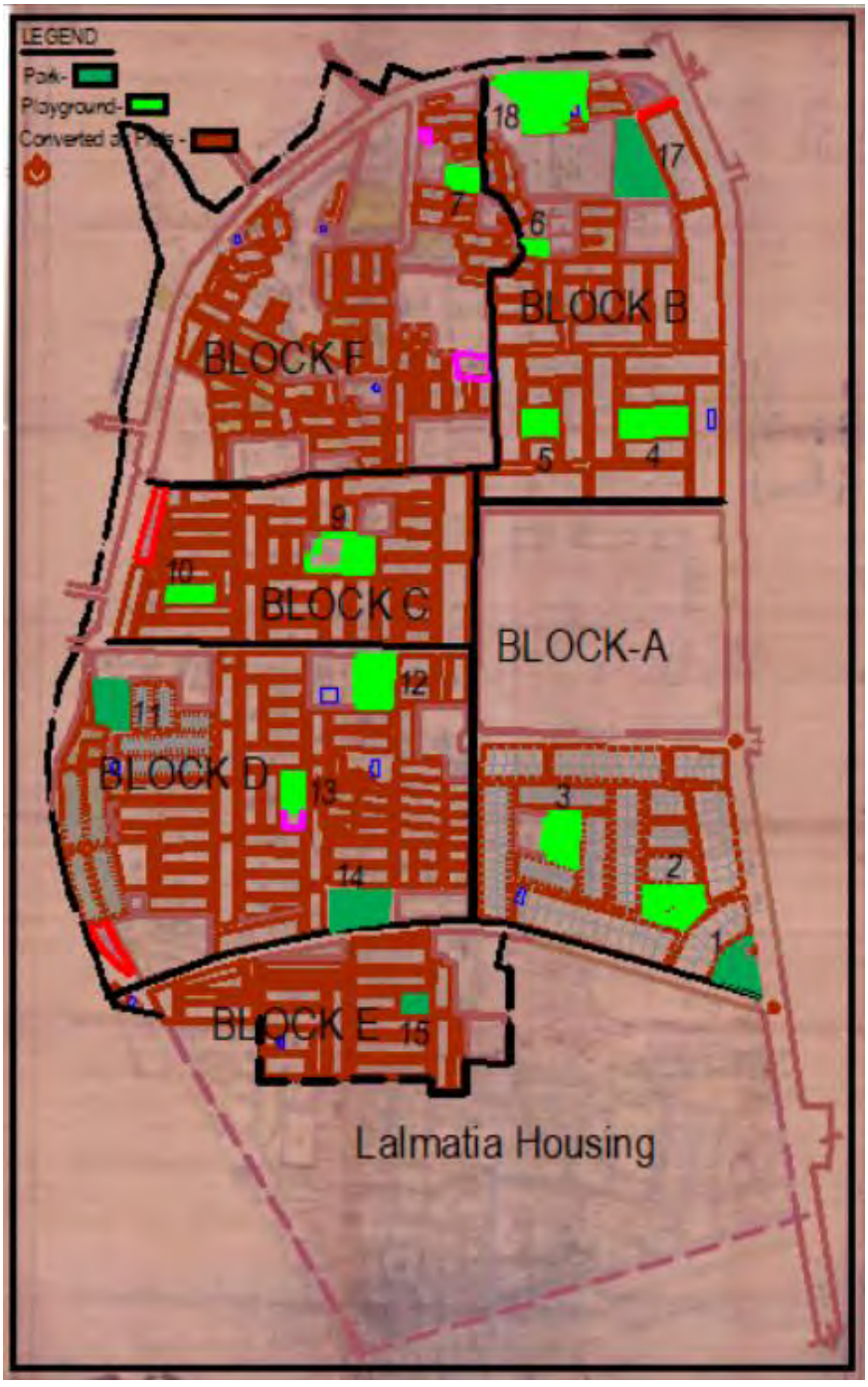
Housing Estate at Mohammadpur was planned in 1960 and therefore, it has relatively broad streets and avenues. First planning was done under Aftab Mohammad Khan"s guidelines of Housing and Settlement Department in 1961-62 at policy level. In 1968, layout plan of Housing Estate at Mohammadpur (HEM) was prepared following the previous guidance (Map 4.2). In 1978, the layout plan was revised under Housing and Settlement Department (Map 4.3). The land area of Housing Estate at Mohammadpur was primarily 434.5 acres in



Map 4.2: Layout Plan of HEM (1968)

Map Source: National Housing Authority

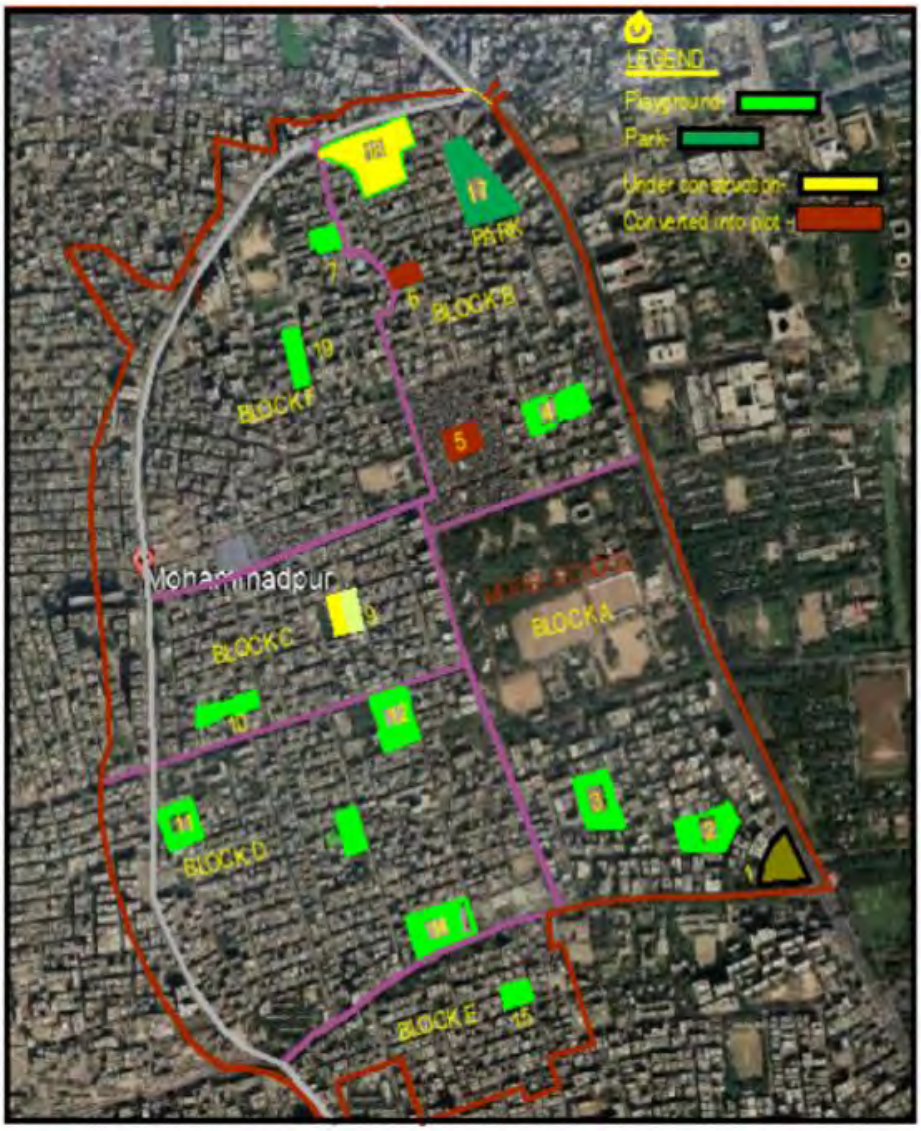
1968 and 434 acres in revised plan of 1978. The layout plan was composed of residential and commercial plots, market, open spaces, recreational spaces, nucleus house, parking, mosques, schools and streets. Mohammadpur now a "miniature city" resulted from the massive urbanization leading to degradation of natural environment. The planned area was divided into six blocks from Block A to F. Every Block had at least two open spaces. In case of large block, this number was from three to four.



Map 4.3: Layout Plan of HEM (1978)

Map Source: National Housing Authority

Local open space like play lot, playground, play field, park and incidental open spaces are not found in Housing Estate at Mohammadpur. Only play areas like playgrounds and playfields those are used by people of all ages are found in Housing Estate at Mohammadpur.



Map 4.4: Present Layout of HEM

Source: Google Image, February, 2020.

So, play areas whatever the size and user age, are considered as playground for this study. In Housing Estate at Mohammadpur (HEM), play grounds, parks and incidental open spaces in different number and sizes were found in approved plans. Among them playgrounds and parks are considered as open spaces for this study (Map 4.2). To know the present size and type of open spaces, recent Google image (Map 4.4) of the study areas are

collected. Size of the open spaces are measured in tape by field survey and also compared with the size of open spaces those are got from the previous plans and Google maps.

i) Number and type of open spaces: There were 5 parks and 11 playgrounds in the layout plan of 1968 of Housing Estate at Mohammadpur (Annex.4.1a). One play ground and one park were lost in 1978"s revised plan of the housing. Also, one playground and one children"s park were newly proposed in the 1978"s plan. Losses of playground and park was equal to newly proposed playgrounds and park in number. So total number of playgrounds and parks were remained same from 1968 to 1978"s plan. After 1978, three playgrounds and parks were lost and two playgrounds and parks were proposed. So, total loss is one from 1978 to date. At present, the number of open spaces are 15. Number and type of open spaces in Housing Estate at Mohammadpur are shown in Table 4.1.

Among five parks, three parks converted into playgrounds, one park is used as a nursery and only one is remained as park. This converted playgrounds increased the number of playgrounds. At present, the number of playgrounds is 13. Only one children"s park (MP-17) of Block B was remain unchanged from previous plan. One park is newly created after 1978 in Block C by dividing a playground into playground and park. At present, total number of parks are two. Now, there are 2 parks and 13 playgrounds in total. Type of open spaces has changed with the changes of number of open spaces. Number and type of open spaces in Housing Estate at Mohammadpur are shown below (Fig.4.1).

Table 4.1: Number, type and area of open spaces in Housing Estate at Mohammadpur

Year of assessment	Playground		Parks		Total	
	No.	Area (acre)	No.	Area (acre)	No.	Area(acre)
1968"s approved plan	11	10.94	5	5.64	16	16.58
1978"s approved plan	11	17.59	5	4.95	16	22.54
At Present	13	14.294	2	2.584	15	16.87

Source: Prepared by author from approved plans and Field survey

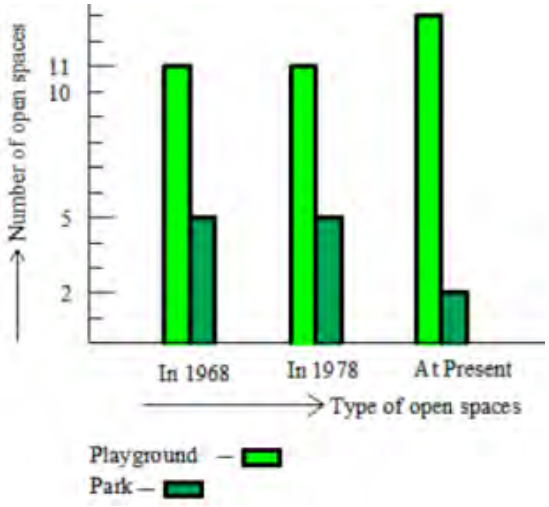


Fig. 4.1: Number and type of open spaces in Housing Estate at Mohammadpur

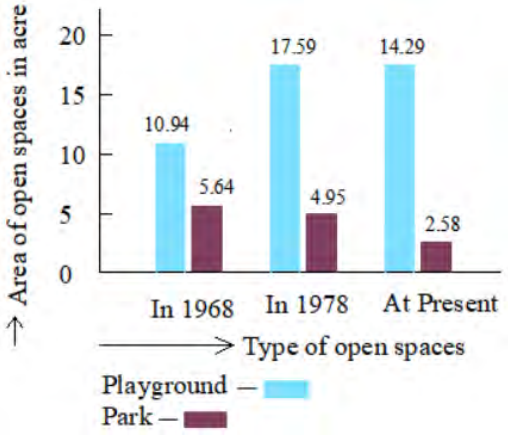


Fig. 4.2: Area and type of open spaces in Housing Estate at HEM

ii) Area and type of open spaces: In 1968, total area of playgrounds and park was 16.58 acre in Housing Estate at Mohammadpur (HEM). Among the total area, 10.94 acre was

playground and 5.64 acre was park. In 1978"s revised plan, the area of playgrounds and parks were respectively 17.59 acres and 4.95 acres among the total area of 22.54 acres. At present, the area of playgrounds and parks are respectively 14.294 acres and 2.584 acres among the total area of 16.878 acres. Area of playgrounds and parks in approved plans and existing situation are shown above (Table 4.1 and Fig. 4.2).

iii) Individual size of playgrounds and parks: Open spaces are categorized by their size. In approved layout plan of 1968, 10% of the open spaces was above two acres, 50% was within 1.5 acres to 2 acres, 20% was from 0.5 acre to one acre and rest 20% of open spaces is below 0.5 acre. In the approved layout plan of 1978, size of two fields was reduced than 1968"s plan. The size of the rest 14 open spaces" (80%) was remain unchanged. Size of all playgrounds and park was reduced partially for encroachment after 1978 with the development of housing. Partial Encroachment by school buildings, water pump and others started after 1978. Size and number of open spaces in Housing Estate at Mohammadpur are shown below (Table 4.2 and Fig. 4.3). Individual size of open spaces are in Annex.4.2a.

Table 4.2: Size and number of open spaces in Housing Estate at Mohammadpur

Size of open spaces	No. of open spaces in 1968"s plan	No. of open spaces in 1978"s plan	No.of open spaces at present		Percentage of open spaces
			Play Ground	Park	
below 1 acre	8	6	8	1	20%
1.0-1.5 acre	3	4	4		20%
1.5-2.0 acre	4	5	-	1	50%
Above 2 acres	1	1	1	-	10%
	Total=16	Total=16	Total=13	2	

Source: Calculated by author from approved plans and Field survey

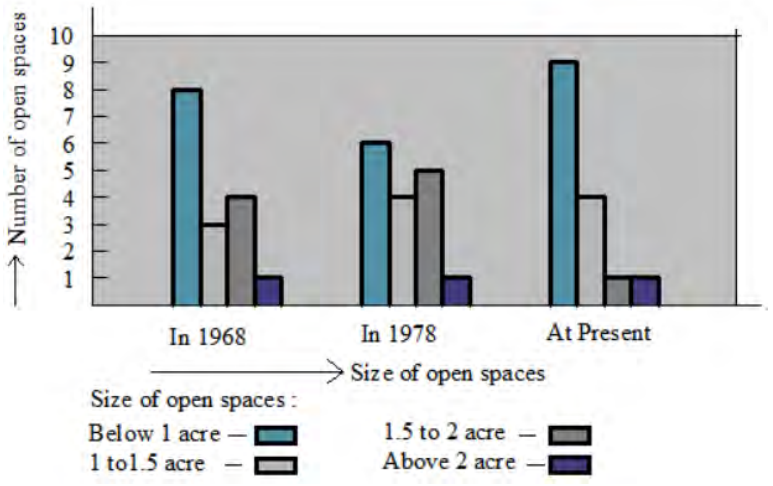


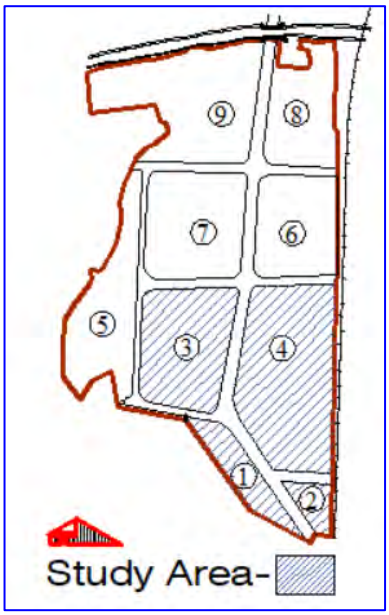
Fig. 4.3: Size and number of open spaces in Housing Estate at Mohammadpur

iv) Comparing the individual size of playgrounds and parks with standard: There was not any standard of the minimum size of individual playground and park in 1959"s master plan. According to Draft Dhaka Structure Plan (DDSP), local neighbourhood park size may be less than 1 acre and play field size in residential areas is 2-9 acres. At present, size of 12 playgrounds among 13 are below 2 acre which does not qualify the DDSP standard of minimum size of playground. Among two local neighbourhood park, size of one park is below 1 acre and another one is below 2acre. The standard of local parks is all right in size according to DDSP standard.

4.1.2. Uttara Model Town

In the early sixties, there were some severe problems like high density of population, uncongenial land uses, non-availability of flood free land which composed detriments to the DIT (former RAJUK) for providing land for housing (Ullah, 1988).

In June 1965, feasibility study was carried out by consultants for the 'Dhaka Improvement Trust' to establish a satellite town at Ajampur Faydabad mouja in the northern part of Dhaka. Finally, Uttara Model Town of 950 acres was suggested within 9 Sector over a period of 1966-67 to 1985-86. In 1980, initial name of Dhaka North Satellite Town of the project was changed in a DIT's Board of Directors meetings and was named "Uttara Residential Model Town" and subsequently it became popularized as "Uttara Model Town"(Satu, 2009).



Map 4.5: Layout Plan of Uttara Model Town (1977)
Source: RAJUK

There were three phases of development housing in Uttara. The township in its Phase I is divided into 9 Sectors (Map 4.5) in the principle of neighborhood concept. Among these Sectors, sector number-2 is reserved for police, Sector no 8 is for staff housing of different Government/ semi-Government organizations and half of the Sector no. 6 is reserved for commercial use (Ullah, 1988).

Provisions of different functions of Uttara Model Town in the Master Plan (1959):1) Residential, 2) Commercial, 3) Civic Administration, 4) Light industries and workshop, 5) Recreation & play field, 6) primary schools, 7) secondary schools, 8) colleges, 9) Special institutions with green areas, 10) Centers of communities class III/IV, 11) Roads, Squares and footpaths (excluding the highway and railway dividing the area) and 12) Lakes and water bodies (Ullah, 1988).

Uttara Model Town is divided into sectors. Every sector had open spaces. Sector one and two are smaller than sector 3 and sector 4 in size. In both sector (sector 3 and sector 4) had one playground and one park (Map. 4.6 & Map 4.7).

Map 4.6: Open Spaces in Uttara Model Town (Sector 1 to 4) in 1987
Map Source: RAJUK

Map 4.7: Open Spaces in Uttara Model Town (Sector 1 to 4) at Present

Map Source: Google Image

i) Number and type of open spaces: Uttara sector 1 to 4 belongs to Uttara Ist phase. Uttara sector 1 has no open space. It is evident from literature review that Uttara sector one had a park but this park has disappeared (The Independent, 2018). However, there is no evidence in RAJUK to support this message. Uttara Sector 2 belongs to Bangladesh Police and public has no access there. In sector 3, there were 1 playfield and 1 park and sector 4 had 1 playfield and 1 park in the plan of 1977(Map. 4.6). The total number of open space was four. There were two playgrounds and two parks. At present, park of Uttara sector 3 has converted into plots and the total number of open spaces is three. There are two playgrounds and one park at present (Map. 4.7). Type and number of open spaces in Uttara Model Town (sector 1 to 4) are shown below (Table 4.3 and Fig. 4.4). Type and number of open spaces are shown in Annex.4.1b.

Table 4.3: Type , number and area of open spaces in Uttara Model Town

Year of preparing Master plan	Playground		Parks		Total	
	Number	Area (acre)	Number	Area (acre)	Number	Area (acre)
1977	2	4.94	2	4.56	4	9.50
At Present	2	6.8	1	3.25	3	10.05

Source: Prepared by author from approved plans and Field survey

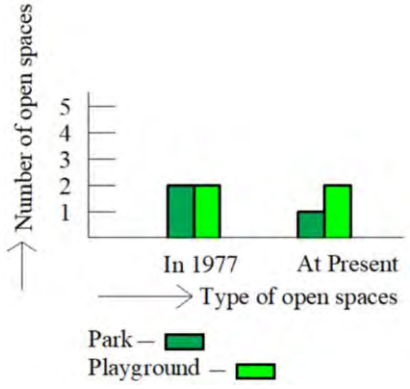


Fig. 4.4: Type and number of open spaces in UMT (sector 1 to 4)

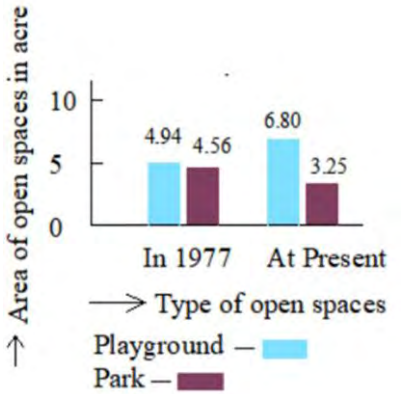


Fig. 4.5: Type and area of open spaces in UMT (sector 1 to 4)

ii) Area and type of open spaces: In 1977, 4.94 acre playgrounds and 4.56 acre park were among 9.50 acre of total open spaces in Uttara Model Town. At present, the area of playgrounds and parks are respectively 6.80 acres and 3.25 acres among the total area of 10.05 acres. Number and area of playgrounds and parks of approved plans and existing situation are shown above (Table 4.3 and Fig. 4.5).

iii) Individual size of open spaces: Open spaces are categorized by their size. In the approved layout plan of 1977, there were 2 playgrounds and 2 parks ranging from 0.94 acre to 3.62 acre. At present, this range has become 3 acre to 3.80 acre with the increase of size in open spaces. Size range and number of opens spaces in Uttara Model Town (sector 1 to 4) are shown above (Table 4.4 and Fig. 4.6). Individual size of open spaces are shown in annex 4.2b.

Table 4.4: Size and number of open spaces in Uttara Model Town (sector 1 to 4)

Size of open spaces	No. of open spaces in 1977"s plan	No. of open spaces at present	
		Playground	Park
3 to 4 acre	1	1	1
2 to 3 acre	2	1	
1.5 to 2 acre	-	-	-
1to 1.5 acre	-	-	-
below 1 acre	1	-	-
	Total=4	Total=3	

Source: Prepared by author from approved plans and Field survey

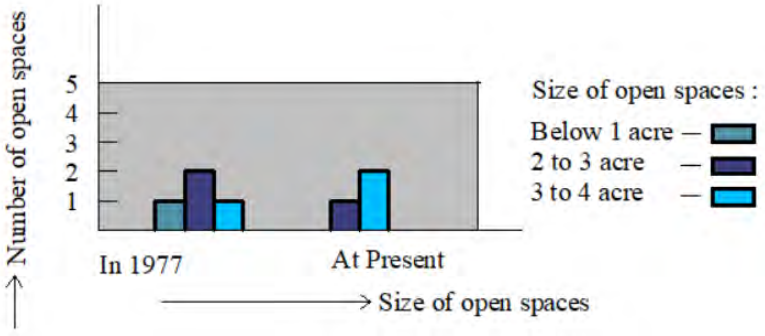


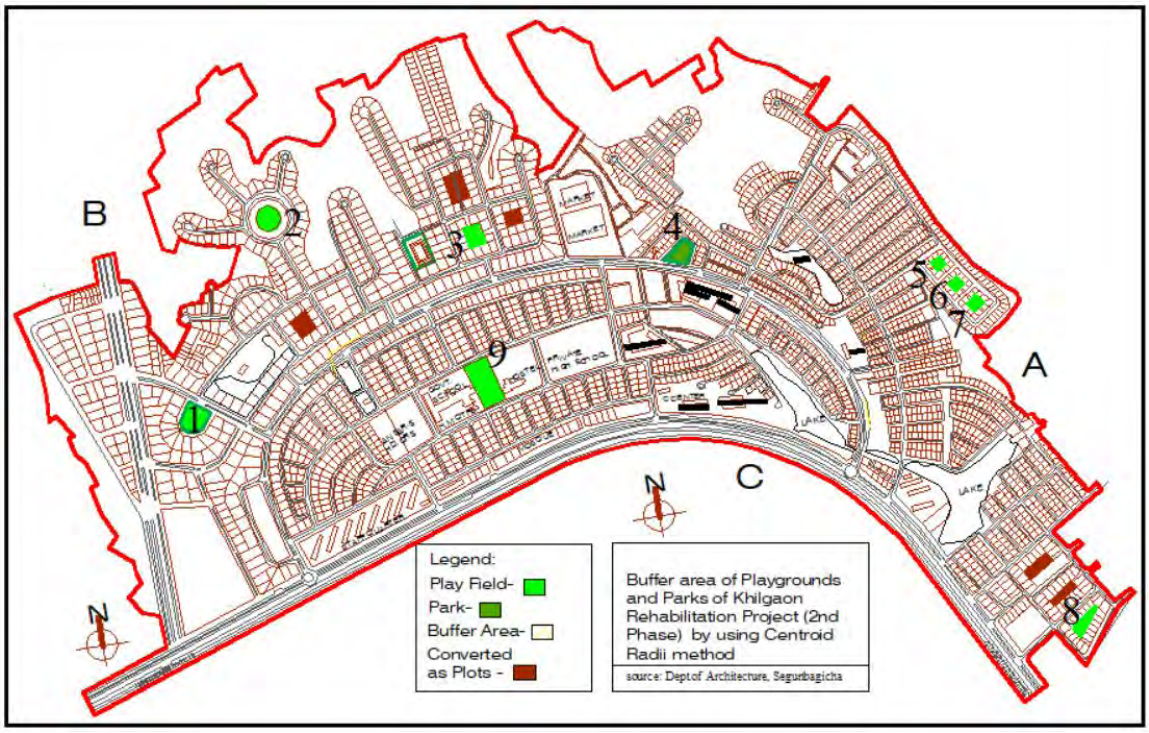
Fig. 4.6: Size and number of opens paces in Uttara Model Town (sector 1 to 4)

iv) Comparing the individual size of playgrounds and parks with standard: Size of 2 playgrounds are 3-4 acres and park is above 3 acres in Uttara Model Town (sector 1 to 4) those qualify the Draft Dhaka Structure Plan (DDSP) standard of minimum size of playground less than 1 acre and park areas is 2-9 acres.

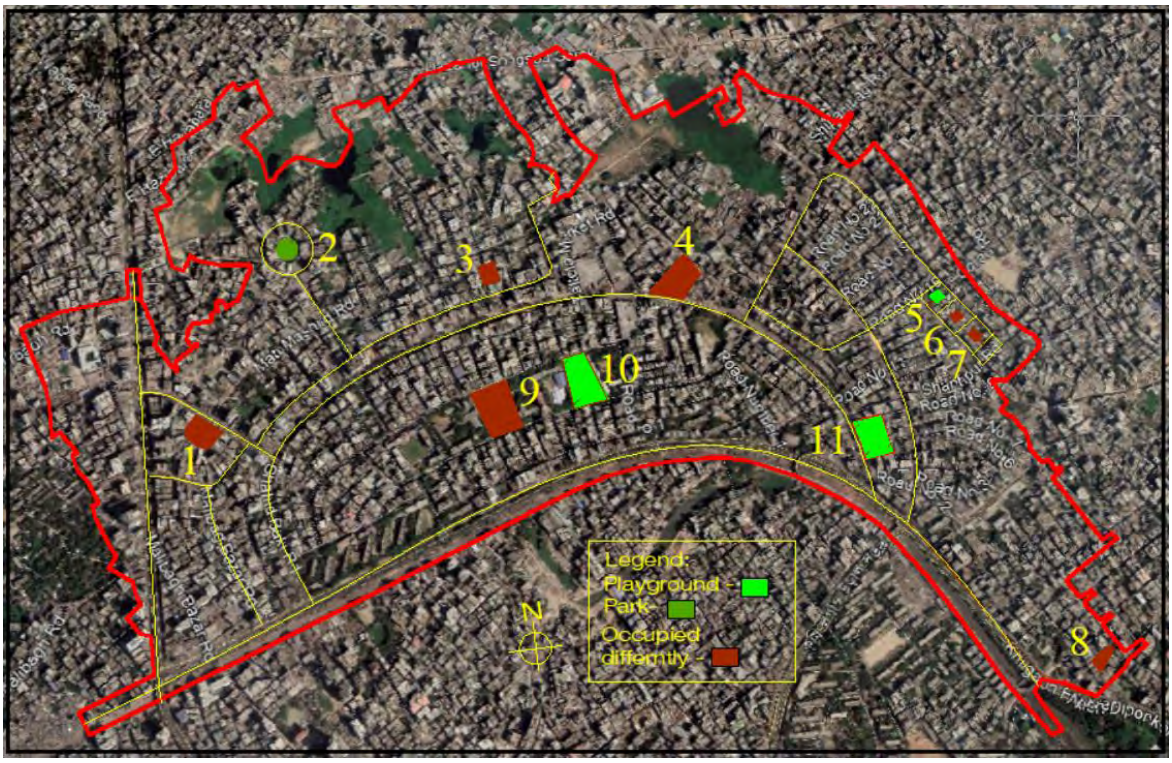
4.1.3. Khilgaon Rehabilitation Project

Khilgaon Rehabilitation Project (KRP) was assigned at 1961-1962 under Construction and Building Department (C&B) of Pakistan government. From Key Informant Interview with residents in KRP, it is found that Government acquired land for constructing Kamalapur Railway station and inhabitant of the Kamlapur area were rehabilitated in the Khilgaon Area. Area of the housing was about 2920 acre. There were wetlands. Residential plots were arranged in natural setting. The first phase layout plan of KRP was not available. So, the Department of Architecture, Segunbagicha prepared 2nd phase layout plan by field survey in 1988(2nd phase Layout Plan). From the 2nd phase Layout plan, it is evident that some open spaces had lost for conversion into the plots before preparing the 2nd phase layout of map. The plan was composed of residential plots, shops, market, boys" and girls"

high schools, primary school, college, mosque, club, godown, car parking, play ground, park, wetlands and 30‟ to 100‟ wide streets (Map 4.8). Residential plots were oriented to a central play lot. Play lot of one cluster was connected to another play lot by walkway. Large size playground were arranged in central zone of education and play.



Map 4.8:Layout Plan of Khilgaon Rehabilitation Project, 1988
Map Source:Department of Architecture, Shegun Bagicha, Dhaka



Map 4.9: Khilgaon Rehabilitation Project at Present
Map Source:Google Image, Downloaded: February,2020

Number and size of playgrounds and park decreased over time. To know the present size and type of open spaces, recent Google image (Map 4.9) of the study areas are collected and verified by direct observation and comparing with previous maps. Size of the open spaces are measured in tape and also compared with the size of open spaces those are got from the previous plans.

i) **Number and type of open spaces:** In the plan of Khilgaon Rehabilitation Project, there were nine open spaces (Annex-4.1c). There were seven play lot, one playground and one park in layout plan of 1988 (Map 4.8). Two play lots among seven were encroached partially and rest five numbers disappeared with full encroachment. Only one park was disappeared (KP-4). Playground (KPG-9) beside Government High school was used as neighbourhood playground but now it becomes restricted after creating non transparent boundary by school authority after 2011. From 2011, field of Khilgaon High school (KPG-10) was used as neighborhood playground and open to all. At present, there are 3 play grounds and one children"s park (Map-4.9). Among 3 playgrounds, one is newly created by earth filling of ponds(jor pukur math, KPG-11). The Newly created field was under construction when surveyed. Number and type of open spaces in Khilgaon Rehabilitation Project are shown in (Table 4.5, Fig. 4.7, annex 4.1c).

Table 4.5:Type , number and area of open spaces in KRP

Year of preparing Master plan	Playground		Parks		Total	
	Number	Area (acre)	Number	Area (acre)	Number	Area (acre)

1988	8	23.99	1	2.70	9	26.69
At Present	3	16.77	1	3.16	4	19.94

Source: Prepared by author from approved plans and field survey

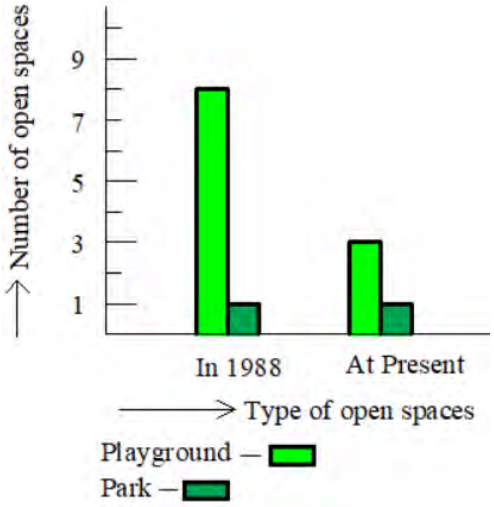


Fig 4.7: Number and type of open spaces in Khilgaon Rehabilitation Project

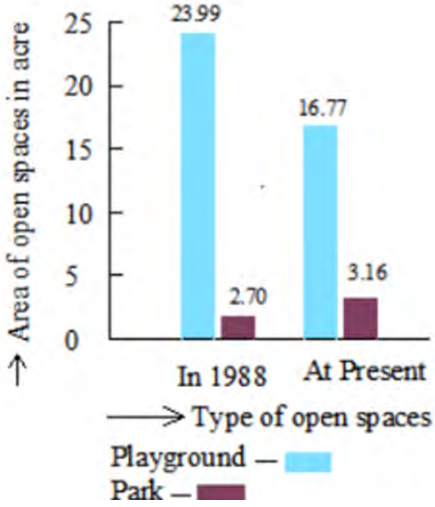


Fig 4.8: Number and area of open spaces in Khilgaon Rehabilitation Project

ii) Area and type of open spaces: In 1988, total area of playgrounds and park was 26.69 acre in KRP. Among the total area, 23.99 acre was playgrounds and 2.70 acre was park. At present, the area of playgrounds and parks are respectively 16.77 acres and 3.16 acres among the total area of 19.94 acres. Number and area of playgrounds and parks of approved plans and existing situation are shown above (Table 4.5 and Fig.4.8)

iii) Individual size of open spaces: Open spaces are categorized by their size. In the approved layout plan of 1988, there were eight playgrounds and one park ranging from 0.94 acre to 7.91acre. At present, this range has become 0.10acre to above 10 acre with the reduction of number and size of open spaces. Size and number of open spaces in Khilgaon Rehabilitation Project are shown below (Table 4.6 and Fig. 4.9). Individual size of open spaces are shown in annex 4.2c.

Table 4.6: Size and number of open spaces in Khilgaon Rehabilitation Project

Size of open spaces	No. of open spaces in 1988"s Layout plan	No. of open spaces at present	
		Play ground	Park
above 10 acre	-	1(newly created)	-
5 to 10 acre	1	1(newly created)	-
4 to 5 acre	1	-	-
3 to 4 acre	1	-	1
2 to 3 acre	3	-	-
1.5 to 2 acre	2	-	-
1.0 to 1.5 acre	1	-	-

below 1 acre	0	1	-
	Total = 9	Total = 4	

Source: Prepared by author from approved plans and Field survey

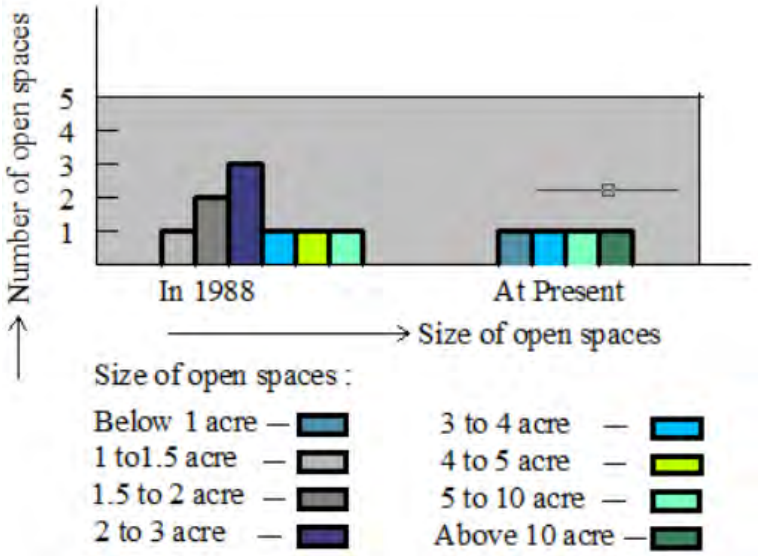


Fig 4.9: Size and number of open Spaces in Khilgaon Rehabilitation Project

iv) Comparing the individual size of playgrounds and parks with standard: According to DDSP, local neighbourhood park size may be less than 1 acre and play field size in residential areas is 2-9 acres. At present, size of 2 playgrounds are as per DDSP standard and one is below standard in KRP. only one park is up to the DDSP standard.

4.1.4. Supply of open spaces comparing with standard

The 1959‟s master plan of Dhaka, recommended open spaces for housing was 4% of housing area. The master plans of three case studies were planned between 1968 to 1988. There was no other standard of open spaces up to 1995 than 1959‟s master plan. So, open spaces of case study areas are compared with the standard of 4% of open spaces in housing. Areas of open spaces of HEM, UMT and KRP are found from Annex. 4.2a, Annex 4.2b and Annex 4.2c respectively.

Table 4.7: Ratio of open space and housing area in three case studies

Name of Housing	Year of assessment	Area of Housing (acre)	Total area of playground and park (acre)	Ratio of open spaces
HEM	1968	434.50	16.58	3.81%
	1978	434	22.54	5.19%
	At Present	434	16.878	3.88%
UMT (sector 1 to 4)	1977	301	9.5	3.15%
	At Present	301	10.05	3.33%
KRP	1988	2920	26.69	0.91%
	At Present	2920	19.94	0.72%

Note: Sector 2 of UMT is under Police Department and not accessible for neighborhood people. So, counting of percentage of open spaces area of it is excluded from total area

Source: Calculated by author from approved plans and Field survey

In HEM, two approved master plans were got, one is 1968‟s plan and another is 1978‟s plan. Percentage of open spaces were 3.81% and 5.19% in 1968 and 1978 respectively. At present this ratio is 3.88%. The percentage of open spaces in 1968 and present time are below the standard of open spaces 4%. The percentage of open spaces in revised plan of 1978 was 5.19% which was more than the standard.

Percentage of open spaces at Uttara (sector 1 to 4) in 1977 and at present are respectively 3.15% and 3.33 %. Both are less than the standard of open spaces is 4% of housing areas. Open space standard was not taken into consideration during the time of planning of master plan.

In KRP, the percentage of open space was 0.91% in 1988‟s approved plan and at present, this percentage is 0.72%. Both percentages are less than standard of 4%. At present, it is far below from the standard of open spaces of 4%.

The ratio of open space and land of three housing were less than standard of 4% in 1959‟s master plan of Dhaka at the layout level. In the initial stage of planning , standard was not taken into consideration.

4.2. Existing Condition of Playgrounds and Parks

At present, total number of playgrounds and parks of selected three housing projects is 22. Among them 18 numbers are playgrounds and four are parks. 4 playgrounds among 18 and one park among four are under construction. So,17 open spaces (14 playgrounds and 3parks) from 3 selected housing are surveyed to know the existing condition of the open spaces. Among them, 11 open spaces are taken from HEM, three from UMT and three from KRP. Existing condition of open spaces are shown in Annex 4.3a and Annex 4.3b.

4.2.1. Physical condition of playgrounds and parks

i) Physical condition of playgrounds: The physical conditions of the playgrounds are not so suitable for the play. About one third of the playground, is the surface found to be uneven. And most of them are dirty. Most of the playgrounds have a boundary wall or have a partial wall those are transparent except one and above 90% have boundary gate. Two playgrounds in Housing estate at Mohammadpur were designed in 2018 at about three feet from finished road level and universal access were also ensured. However, one ramp of Solimullah road playground of Housing estate at Mohammadpur has already disappeared. Also bins were provided and had been stolen.

In every case, it is observed that these playgrounds are encroached by club house, local co-operative, urban primary health care buildings and water pump Annex 4.4 [Photo].

ii) Physical condition of parks: Three parks those are surveyed in selected three government housing are children‟s park. Parks of the study areas were designed. There are walkways in raised level than rides and play area level, sitting arrangements under rain

shelter which are insufficient, children‟s rides, drinking facilities, toilet facilities, more trees and grass are available in the parks. There also has boundary walls and boundary gates. In Uttara sector four park has a big pond. Lighting condition in the park is better than play grounds. Park of Housing estate at Mohammadpur and Uttara Model Town (sector 1 to 4) are designed for children to old people. Both park has children‟s area. Photograph of the parks are added in Annex. 4.4 b.

4.2.2. Maintenance condition of playgrounds and parks in study areas at present

In Dhaka city, local open spaces are mostly maintained by Dhaka City Corporation.

i) Maintenance Authority of Playgrounds and parks: Maintenance authority of playgrounds and parks in Housing Estate at Mohammadpur is Dhaka North City Corporation (DNCC) and Uttara Model Town (sector 1 to 4) is Rajdhani Unnayan

Table 4.8: Maintenance Authority of Playgrounds and Parks

Name of Housing	Housing Authority	Maintenance Authority	Maintained by
HEM	NHA	DNCC	Club and Co-operatives
UMT	RAJUK	RAJUK	Club and Co-operatives
KRP	PWD	PWD & DSCC	Club and Co-operatives

Source: Prepared by author from literature review

Kortripokhkho (RAJUK). And Maintenance authorities of playgrounds and parks in Khilgaon Rehabilitation Project are Dhaka South City Corporation (DSCC) and Public Works Department (PWD). But every playground and park except Shyamoli children‟s park is maintained by local co-operative or club. Maintenance authorities of Government did not monitor these co-operatives and clubs to their responsibilities on open spaces. List of maintenance authorities is shown below in Table 4.8.

ii) Maintenance of playgrounds: Main maintenance authority of the play grounds are City Corporation. Function of City Corporation included public health, water supply and drainage, matters related to food and drink, animals, construction and maintenance of roads, street lighting, street watering, public safety, maintenance of parks and gardens and forests, education, culture, social welfare and general development of the city. As a local representative, ward commissioner has involvement with local club and co-operatives. Local club and co-operatives built their club buildings with the help of ward commissioner on playgrounds and take control over them gradually without any legal basis under main maintenance authorities concern. Later, the control of open spaces goes under local Commissioner‟s representative and also beyond control. So the maintenance of the fields was not properly done. Most of the cases open spaces are not clean and even, lack of grass and toilet facilities, play facilities, drinking water facilities are not available. From Key Informant Interview with official of City Corporation, it is known that Dhaka City Corporation has taken a new strategy under Dhaka City Neighbourhood Upgrading Project

(DCNUP) to develop and maintain open spaces of Government housing. A co-committee will be formed involving local people with city corporation representative to maintain open spaces properly.

iii) Maintenance of parks: There are three parks under this study. Uttara sector 4 park is maintained by co-operative that is formed by the local people. It is accessible for all but controlled by scheduling of time. Shyamoli Children‟s Park is open to all and closed after 12pm. Khilgaon Children‟s park is very small in size but properly maintained by locally formed club. Every park has rides, drinking water and toilet facilities. In case of repairing mazes, some ignorance is visible in Shyamoli Children‟s park which is under DNCC. Number of rides are insufficient.

4.2.3. Environmental condition of playgrounds and parks

i) Environmental condition of playgrounds: There are 15 playgrounds in selected three housing areas under this research. Almost every playgrounds are surrounded by roads. Very few of them have roads on three sides. So environmental pollutant is available in these playgrounds. It is found from direct observation that playgrounds are affected by noise pollutant and dust. Two playgrounds among 15 are surrounded by shops and buildings. These two fields have less access of pollutants. But in evening anti social activities is visible there.

ii) Environmental condition of parks: There are three parks in selected three housing areas under this research. Among three parks Shyamoli children‟s park in Mohammadpur is surrounded by roads. So environmental pollutant like noise and dust are available there. But the presence of more trees, bushes, flower trees enhance the better environment of the park. In Shyamoli children‟s park, anti social activities are visible. Chawdhury para children‟s park in Khilgaon is surrounded by housing blocks and dead end local road radially. It is very small in size and comfortable for trees, flower trees and shelter. Khilgaon children‟s park is surrounded by residential buildings. So, it is free from environmental pollutants. Park of Uttara sector 4 has roads on two sides. Uttara sector 4 park has more grass and trees. It is comfortable though there are roads in two sides. Noise problem is a common phenomenon in Shyamoli children‟s park and Uttara park.

4.3. Uses of Playgrounds and Parks

Open space should be functional and usable for active recreation (e.g. games courts and pitches) and/or passive recreation (e.g. sitting-out areas, children‟s playgrounds and landscape planting areas) (HKPSG, 1990).

i) Uses of playgrounds: Playgrounds are used for active and passive use. From Direct observation it is found that most of the playgrounds are used for playing cricket, football and badminton though there is lack of play courts and equipment. Playgrounds are also used for walking, exercising, roaming, gathering, meeting and outing depend on provided facilities in the playgrounds. Playgrounds of Uttara Model Town have walkway which is used extensively in morning and evening. However, playgrounds of Housing Estate at Mohammadpur are used passively more besides with play though there is lack of facilities (Annex.4.5a & Annex.4.5b). It is observed from direct observation that every field is used

as breathing spaces through the day less or more by different type of people from children to old .

ii) Uses of parks: Parks are planned. Every park is furnished with swing and slides but there is no mary go round or train facilities. Uttara sector 4 has a pond but no option for water games. Other two has no water games also. Every park is used for socialization like seating, taking rest, breathing space, gathering space etc. Three parks have walking tracks but no jogging or squatting spaces. Only in Shyamoli children‟s park playing cricket is observed. In Shyamoli children‟s park, hawkers enter the park and also surrounded by hawkers. Every park is used for riding swing, slides, morning and evening walk and seating arrangement for socialization (Annex.4.6a & Annex.4.6b).

4.4. Facilities of Playgrounds and Parks

4.4.1. Facilities of playgrounds:

Active Recreation Facilities: Playgrounds are extensively used for playing cricket and football. However, there is no court, cricket pitch and play tools in any among 15 playgrounds, two third of playground have cricket practice ground surrounded by nets, one third has goal post, no badminton, volley ball and basket ball court are available in any playgrounds. Goal posts are found in one third of the playgrounds (Annex. 4.3a & 4.4a).

Passive Recreation Facilities: About one third of playgrounds has walkway and seating arrangement. Every playground is shadowed by trees more or less. About half of the playgrounds have partial grass and rest half has no grass. No Children‟s corner except Solimullah road playground in HEM, no arrangement for girls and no shading facilities like umbrella are available in playgrounds. In Uttara sector three, playground has two rides for children but not properly maintained (Annex. 4.3a & 4.4a).

Ancillary Facilities: Open spaces in study areas, maximum playgrounds has not toilet and drinking water facilities, there is lack of proper lighting facilities. Only a few playgrounds has light refreshment facilities and there is no first aid facilities. Most of the playgrounds have temporary or permanent building like club that can be used as ancillary facilities of playgrounds. Toilets are found with club buildings those are only for club members (Annex. 4.3a & 4.4a).

4.4.2. Facilities of parks

The number of parks for detail study is three. Those are Shyamoli Children‟s park in HEM, Chawdhury para children‟s park in KRP and Uttara sector 4 park. These parks are used for all age group.

Passive Recreation Facilities: In general, parks are used passively than in active use. Children‟s parks are used by young to old. Shyamoli children‟s park and Uttara sector 4 park has a children‟s corner for informal play and play equipments like swing and slides. Khilgaon children‟s park is very small in size and it is used mostly for the children‟s recreation purpose.

Every park is furnished with grass, plant, flower plant and trees. Only Uttara sector 4 park has pond but there is no water ride is provided. Every park has sitting arrangements and umbrella to provide shade. Every park has walkway but there is no jogging and squatting space in these parks. Every park has swing and slides, no water games (Annex.4.3b & 4.4b).

Ancillary Facilities: Three parks have toilets, drinking water facilities, water pumps supporting for parks and neighbourhood purpose. Drinking and toilet facilities are available but not sufficient. Refreshment and shopping facilities are not available but in Shyamoli sishu park hawker is available inside and outside the park (Annex. 4.3b & 4.4b).

4.4.3. Management and maintenance facilities: Management and maintenance of open spaces are preparing of play court and rides, mowing of grass and bushes, watering the field and plants, storage and supply of play tools, cleaning of fields and toilet, providing garbage bins, supply of drinking water properly, ensure accessibility for all (PLDR, 2004).

Lack of maintenance is the main reason for not using play facilities by the children in Dhaka city. The common and major problems with the playground and parks are the lack of maintenance, inadequate toilet facilities, absence of seating facilities, anti-social activities etc. (Siddique, 1990; Biswas, 2002). Above mentioned management and maintenance facilities are absent in playgrounds. Most of the playgrounds have lack of grass, irregular mowing is found, watering of fields are very rare, inadequate toilet facilities, cleaning of field and toilet are not in satisfactory level.

The responsibility regarding the development and maintenance of parks and playgrounds in Dhaka city is very fragmented and no standard guidelines for the minimum standard of these facilities exist. There is no single agency that owns and responsible for the development and maintenance of these facilities. Management of parks is better than playgrounds. Rides of Shyamoli children‟s parks are poor in condition. Swings are not repaired timely.

Proper management of outdoor play and recreation facilities is a prerequisite for maintaining a high standard of these facilities in any city.

4.5. Users' View on the Present Condition of the Playground and Parks

Local open space is primarily intended for passive use including children‟s playground and hence, the active to passive ratio is not apply (HKPSG, 1990). Playgrounds of the study areas are used both active and passively. However, informal area of parks is used for children‟s play.

4.5.1. Profile of playground and park user

Neighbourhood playgrounds and parks are used by children to old people for different purpose. From Direct observation, it is found that age of user started from six years to about 65 years. Age below six is rarely seen in the playgrounds. Users are categories according to their age range: i) below 6 years, ii) 6 to12 years, iii) 13-19years, iv) 20-26 years, v) 27-33 years and vi) above 33 years. Open spaces are used for playing, walking, running, jogging, seating, gossiping, waiting, breathing, family outing etc. So two types of user are found in

playgrounds and parks: i) active user and ii) passive user. It is found from the Focus Group Discussion that most of the users come from nearest living place within half a mile distance (FGD).

4.5.2. Play and recreation pattern of users

Uses of playgrounds and parks are related to season of use, working and holiday of the week and time of the day. Survey was conducted in Summer season, two days a week: weekday and weekend and time schedule is from 6 am to 12 am. Activity of user was observed by using a range of time schedule like: i) 6:00am-9:00am, ii) 9:00am-12:00pm, iii)12:00am-3:00pm, iv) 3:00pm-6:00pm, v) 6:00pm-9:00pm and vi) 9:00-12:00pm. The use pattern varies from weekend to weekdays.

Use pattern of playgrounds: Activities of users were observed from 6am to12am. Playgrounds are used as active and passive mode of use. It is used for active play and passively for walking, exercising, roaming, sitting to gather, meet and socialization, enjoying outdoor space etc.

It is found that in housing estate at Mohammadpur (M) and Khilgaon Rehabilitation Project (K), people use playground less at morning than playground of Uttara (Table 4.9 & Table 4.10). Users from 13 to 19 years old are found more in the playgrounds in these two housing at morning. At morning and evening in weekday, playgrounds of Uttara are used extensively for morning and evening walk by the people who are above 33 years old. Both playgrounds of Uttara had walkway though the walkway is not so clean. At morning in weekend, number of user increased to near about double in every playground. At noon, the number of users decreased gradually.

From 9am to 3pm, users are less found in playgrounds. Users of age from 13 to 19 are found in some cases. In Uttara playgrounds users are found up to 10am for morning walk and exercise purpose. In weekend, some exception is visible in using playgrounds for the field near about mosque in Housing estate at Mohammadpur. Students of Madrasa use the

Table 4.9: Use pattern of users in Playgrounds of housings in weekday

Time / Age group	6:00 - 9:00am			9:00-12:00 pm			12:00-3:00pm			3:00-6:00pm			6:00-9:00pm		
	M	U	K	M	U	K	M	U	K	M	U	K	M	U	K
below 6	0	0	0	0	7	0	0	-	-	0	0	10	15	6	0
6-12	27	20	20	56	20	20	32	-	-	100	90	40	5	0	0
13-19	69	20	20	93	20	45	101	-	-	184	120	105	20	20	11
20-26	0	185	0	29	20	0	31	-	-	138	140	60	221	60	10
27-33	7	130	0	30	40	0	5	-	-	31	100	0	69	20	10
33+	33	410	0	16	94	0	15	-	-	5	380	0	19	250	0

Legend: HEM - , UMT- , KRP-

Source: Prepared by author from Field survey

Table 4.10: Use pattern of users in Playgrounds of housings in weekend

Time / Age	6:00 -9:00 am			9:00-12:00 pm			12:00-3:00pm			3:00-6:00 pm			6:00-9:00 pm		
	M	U	K	M	U	K	M	U	K	M	U	K	M	U	K

Gr.															
below 6	0	15	0	0	7	0	0	-	-	0	20	0	0	10	10
6-12	54	50	30	61	30	30	20	-	-	106	90	40	0	30	10
13-19	166	40	30	219	45	45	180	-	-	336	130	90	34	20	12
20-26	100	85	20	145	30	10	48	-	-	146	150	30	178	110	10
27-33	30	90	0	95	50	0	0	-	-	40	100	0	0	10	10
33_+	13	470	0	30	94	0	15	-	-	91	240	0	13	120	0

Legend: HEM - , UMT- , KRP-

Source: Prepared by author from Field survey

field for roaming before for prayer time of mosque. Some passer by take rest in some playgrounds and guardians wait for child who are in different coaching in holiday. In Khilgaon Rehabilitation Project (K), user is less found in this time range.

The crowd becomes more from 3 to 6 pm and it continued up to 9 pm. It is found from Direct Observation and Focus Group Discussion (FGD) that boys, age from 13-19 years, are the main active users of playgrounds in Government Housing of Dhaka city. There is no scope for all active user to play at a time in the fields. Younger group wait to get chance. They play informally as occupying different corner space of the playgrounds. Passive users increase from 3pm to 8pm. In weekend, every playground becomes more crowded than weekday. The crowd varies depending on the location, facilities of lighting and safety issues of the playgrounds. For example, striker field of Iqbal road becomes empty after evening whenever Solimullah road becomes more crowded. The majority of the user are found to come to the playground daily in the afternoon (3pm-6pm). Some used the playgrounds one to three times a week and not at any specific time. In Uttara, Playgrounds are closed at 8pm. So, there is no chance to use the playgrounds after 8pm.

After 8 pm crowd starts to decrease and up to 11pm most of the playground becomes empty. However, exception is visible in Shohid park in HEM. The field is surrounded by shops and non transparent from outside. Anti social activities are more in Shohid park. Presence of user is more after evening in holidays in the playground and stay more time than other field.

Use pattern of parks: It is found from Direct Observation that parks are used for morning walk, jogging, playing cricket, riding slides and for socialization like gathering, waiting, gossiping, enjoying natural beauty etc. From 6am to 9am, parks in Housing Estate at Mohammadpur (M) and Khilgaon Rehabilitation Project (K) are used for walking by the age group who are above 33 (Table 4.11). Park of sector 4 in Uttara Model Town opens at 3pm and remain open up to Magrib azan. So, there is no scope to use park in morning. From 9pm to 3 pm users are found only in Shyamoli Children"s park. People age among 27 to 33 years are found more in the parks in this time. On holiday this number increased.

Table 4.11: Use pattern of users in parks of housings in weekday

Time / Age group	6:00 -9:00 am			9:00 -12:00pm			12:00 - 3:00am			3:00-6:00pm			6:00pm-9:00pm		
	M	U	K	M	U	K	M	U	K	M	U	K	M	U	K
below 6	0	closed	-	0	closed	-	0	closed	-	5	20	8	0	closed	-
6-12	0		-	10		-	15		-	45	40	20	0		-
13-19	0		-	13		-	60		-	130	20	15	120		-
20-26	15		-	0		-	45		-	160	10	0	300		-
27-33	0		-	70		10	80		-	50	10	7	100		-

above 33	33		33	7		-	15		-	30	160	15	125		-

Legend: HEM - , UMT- , KRP-

Source: Prepared by author from Field survey

Table 4.12: Use pattern of users in parks of housings in weekend

Time / Age group	6:00 -9:00 am			9:00-12:00pm			12:00-3:00pm			3:00pm-6:00pm			6:00pm-9:00pm		
	M	U	K	M	U	K	M	U	K	M	U	K	M	U	K
below 6	0	closed	-	7	closed	-	0	closed	-	20	20	8	0	closed	-
6-12	0		-	10		-	20		-	45	60	20	0		-
13-19	0		-	12		-	0		-	15	30	15	100		-
20-26	49		-	20		-	90		-	155	15	10	1000		-
27-33	0		-	50		10	160		-	200	15	10	600		-
above 33	33		40	7		-	0		-	8	180	40	320		-

Legend: HEM - , UMT- , KRP-

Source: Prepared by author from Field survey

From 3pm the crowd starts to increase and continued up to 6pm. Age from 13 to 19 years and age from 20 to 26 years are the main user at this time in Housing Estate at Mohammadpur(M). In Uttara people above 33years and in KRP children are the main user of the park for this time period.

In weekend, people above 33 years used the park for walking from 6am to 9am. From 9am to 6pm age from 27 to 33 are main users of the parks. Number of people from 20 to 26 years old begun to increase from 5pm and increased in the peak. And this group of people stay in the park up to 9 to 10 pm at night in Shyamoli children"s park. Uttara and Khilgaon park has no scope to use at night. In weekend, the crowd becomes double and main user is identified age group of 20 to 26 years old people (Table 4.12).

4.5.3 Users' views on outdoor play and recreation

i) Users' views on playgrounds: On the whole, the users are satisfied with the shape and size of their playgrounds. Users express their dissatisfaction in playgrounds are: uneven ground, absence of grass and inadequate toilet facilities. User also report their dissatisfaction related to poor rubbish collection and cleanliness of the playgrounds, lack of drinking water facilities, play facilities, seating arrangements and field maintenance. Users are a bit less concerned about the environmental problems in their playgrounds. However, overcrowding and noise are the two environmental problem mentioned by users. No restriction on anti-social activities by people at the playground is also mentioned by some users as one of the problems of playgrounds.

ii) Users' views on parks: Close proximity to their house is the prime reason for the user to go to the park. Most of them mentioned that they visit these parks as there is no park near their house. Rides facilities, good maintenance and natural beauty are the reasons mentioned by the user for using the parks.

The users using parks are most satisfied with the condition of plants, walkways and flowers in the park. The most unsatisfactory factors reported by users are inadequate toilet facilities and lack of refreshment facilities. Other problems mentioned include noise, air pollution from vehicles, anti-social behaviour, lack of shelter and lack of security.

4.6. Conclusion

It can be concluded from this chapter that the type and size of open spaces in approved plans were near about the standard. During the time of housing development this standard was violated. As a result, some open spaces have disappeared, some encroached highly and most of the open spaces have partially encroached. At present, physical and environmental condition is not satisfactory level. Maintenance condition is also poor. It is also observed that open spaces are used extensively though there are a lot of problems. Close proximity and unavailability of alternative open spaces are reasons for using the open spaces. People from all age group use the open spaces. The crowd becomes more in weekend afternoon. However, users are satisfied to get the opportunity to use the open spaces.

CHAPTER 5 : NATURE OF CHANGES IN OPEN SPACES AND REASON FOR CHANGES

5.0. Introduction

In this chapter, changes of physical characteristics are presented by identifying changes of number, increasing and decreasing of size and area of open spaces and changes in ratio of open spaces from approved Master plans to present (2019) condition. Changes in uses of open spaces are described by i) Losses of open spaces, ii) Increase of open spaces, iii) Changes of type in use, iv) Playgrounds used as socialization purpose and v) Absence of amusement park and vi) Use pattern for providing different community functions. This chapter presents maps showing the assessment accessibility of the outdoor play facilities by using Centroid Radii method and considering other factors which affected the access of the playgrounds and parks. It also shows the changes in facilities by i) Changes of active recreation facilities, ii) Changes of passive recreational facilities and iii) Changes of ancillary facilities. Factors responsible for every type of changes are also presented in the chapter. Views of responsible authorities towards these changes of open spaces are also

presents in this chapter. A time line is prepared to analyse the nature changes of playgrounds and parks in terms of size, access, use and facilities.

5.1. Population Density of Study Areas

Process of calculating the population of study areas: Density of population varies in three case study areas. Every case study is under a thana. Thana comprises one or more wards. Area and population vary of different wards under a thana. From BBS 2001 and BBS 2011, the area and population of the wards under a thana were got. Then the total population and total area of the wards were calculated from this data. Then population density was calculated dividing the population by total area of the wards. This density of population is assumed as standard population density of the specific area of study. Then total population of the housing area in 2001 and 2010 was calculated mathematically from this data. The population growth from 2001 to 2011 is calculated and population of 2020 is counted from this growth mathematically. To find out the density of population of study areas for 2020, total population of 2020 is divided by the area of the housing. Results from the calculation are shown below (Table 5.1).

Table 5.1: Changes of population in study areas over time period

Name of Housing	Area of Housing (acre)	Population (person)			Population Density (person/ 1acre)		
HEM		In 2001	In 2011	In 2020	In 2001	In 2011	In 2020
UMT	434	57288	92,760	1,50,195	132	214	477
KRP	301	13,846	24,484	33,696	46	82	112
	2920	1,95,640	8,13,382	33,82,671	67	278	1158

Source: Calculated by author using Bangladesh Bureau of Statistics, 2011

5.2. Changes in Physical Characteristics of Open Spaces

Changes in physical characteristics of open spaces are related with changes in number, size, area and ratio of open spaces over time. Area of open spaces is also changing with the changes of increasing and decreasing in number and size of open spaces. Ratio of open spaces in housing is counted dividing the area of open spaces by population of the housing.

5.2.1. Changes in number of open spaces and reason for changes

i) Changes in number of open spaces in selected Government Housing have occurred by increasing and decreasing in number of open spaces. Some open spaces disappeared and some added. Changes of open spaces in number are shown below (Table 5.2).

Table 5.2: Changes in number of open spaces over time

Housing name	Period	Total no. of PG & P	PG (no.)	Park (no.)	Loss (no.)	Addition (no.)	Total loss
HEM	1968	16	11	5	-	-	

	1978	16	11	5	2(1PG,1P)	2(1PG,1P)	1PG
	2001	15	13	2	3(2PG,1P)	2(1PG,1P)	
	2011	15	13	2	-	-	
	at Present	15	13	2	-	-	
UMT	1977	4	2	2	-	-	1P
	2001	3	2	1	1	-	
	2011	3	2	1	-	-	
	at Present	3	2	1	-	-	
KRP	1988	9	8	1	-	-	5(4PG,1P)
	2001	3	3	0	7(6PG,1P)	1(PG)	
	2011	4	3	1	-	1(PG)	
	at Present	4	3	1	-	1(PG)	
PG = Playground , P = Park							

Source: Prepared by author using time line analysis

In Housing Estate at Mohammadpur (HEM), number of open spaces in approved master plan (1968) and revised Master plan (1978) were remain same. The number was 16. Among them, there were 11 number of playgrounds and five number of parks. Losses of open spaces were two, one was playground and one was park. One playground and one park were added in the revised Master plan of 1978 but the location was changed of newly created open spaces. From 1978 to 2001, total loss of open space is one in number. The number of total open spaces was 15 in 2001. From 2001 to date, the number of open spaces remains unchanged. One park was lost and one playground and one park were added. The number of open spaces increased from 11 to 13 and number of parks reduced to two from five.

In sector 1 to 4 of Uttara Model Town (UMT), number of open spaces in approved master plan (1977) was four in number. Among them, there were two playgrounds and two parks. One park was lost from the period of 1987 to 2001. The number of open spaces was three in 2001 and this number remains unchanged still now. At present (2019), there are two playgrounds and one park. Loss of open spaces is one in number over time.

In Khilgaon Rehabilitation Project (KRP), number of open spaces in approved master plan (1988) was nine. Among them, there were eight playgrounds and one park. From 1988 to 2001, seven open spaces were lost and one playground (KPG -10) was added. The number of open spaces was three in 2001 and there was no park in the housing area. In 2006, one playground (KP-2) was designed as children‟s park and one new playground (KPG-11) was added. At present (2019), the total number of open spaces in KRP is four, three of them are playground and one is children‟s park. From 2011 to date, this number of playgrounds and park remain unchanged. Loss of open spaces is five in number over time.

ii) Reason for changes

a) Losses of open spaces in number: In Housing Estate at Mohammadpur (HEM), one play ground converted into plots of Block F when layout plan was revised in 1978 and one park of Block E was gone under Housing Estate of Lalmatia for setting new boundary of Housing Estate at Mohammadpur (Map 4.3). After 1978, one park of Block A was

converted into a nursery, one playground of Block B was allocated as plots and one playground was grabbed by Refugees.

In Uttara Model Town (UMT), one park was lost during the period from 1987 to 2001 for conversion into plots by local influence and involvement of RAJUK.

In Khilgaon Rehabilitation Project (KRP), losses of open spaces occurred for different reason such as conversion, grabbing, full encroachment, changes of land use and imposing restriction on use of playgrounds. From 1988 to 2001, only one park (KP-4) is converted into plots and occupied by workshop, shops and storage. Government acted as a grabber of Chowdhuripara playground (KPG-1). It was grabbed by Ansar camp in 1987 and PWD has get back the right of the field again in 2018 (Rahman, 2018). However, at present (2019) the playground is under Ansar camp. Another four (KPG-3, KPG-6, KPG-7 and KPG-8) among eight playgrounds are fully encroached by local co-operatives, clubs under the concern of authority. Khilgaon Government High school occupied adjacent playground (KP-9) after establishing school building. This playground was used as neighbourhood playground but now it becomes restricted after creating non transparent boundary by school authority after 2011. Total loss of open spaces is five in number.

It takes a long time to completely develop a housing project. During this time undeveloped playgrounds and parks occupied by local co-operative to use partially for temporary use. Gradually it expanded and one time its monitoring goes under local powerful people and their expectation goes beyond their limit. Under some pressure developer authority favour this illegal demand. In this way, some playgrounds and parks of selected three housings converted into plots and fully disappeared.

Number of lost open spaces over time of Housing Estate at Mohammadpur (HEM), Uttara Model Town (UMT) and Khilgaon Rehabilitation Project (KRP) are respectively one, one and five. Total loss is seven in number of three case studies. Among the three case studies, reduction of open spaces in number is high in KRP.

b) Increase in number of open spaces: In 1978, one children‟s park was proposed from undeveloped housing plots and a playground occupying low land in revised plan of HEM. From 1978 to 2001, one playground was newly created from occupying area of roads, rehabilitation structure and some plots in Block F and one park is newly created by dividing a playground (MPG- 9) into a playground and a park. Increased number of open spaces in Housing Estate at Mohammadpur is four over time.

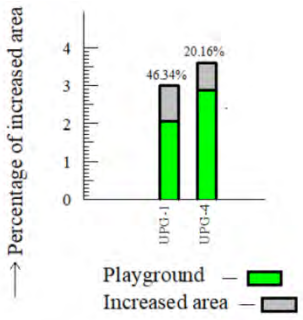
In 2001, field of Khilgaon High school (KPG-10) was opened as neighborhood playground and open to all. School Authority uses the field occasionally. Jor pukur field (KPG-11) was approached as a playground between 2001-2011. This field was under construction when surveyed for study. Total addition of open spaces is two in Khilgaon Rehabilitation Project over time.

Changes of open spaces in number occurs by losses and increasing of numbers. Losses in numbers occurred for conversion, grabbing, full encroachment and restriction imposing to use playground. Increase in number of open spaces occurred for addition of open spaces from low lying land, proposed plots, road and rehabilitation center. Every change happened

with the help of developer and maintenance authority. Also Government department act as a grabber.

5.2.2. Partial changes in size of open spaces and reason for changes

The number and size of open spaces in study areas were increased and decreased over time in different way.



I) **Increasing in size partially over time:** Among 22 open spaces, three number of open spaces have increased. In 1978‟s revised plan of HEM, size of one playground (MPG-07) has partially increased. The increased area is 0.126 acre. In Uttara Model Town (sector 1 to 4), size of two playgrounds has increased between 1987 to 2001. The increased area of UPG-1 is 0.95acre and UPG-3 is 0.91acre with the concern of allotting authority RAJUK. Changes in size of open spaces are shown in Fig. 5.1.

Fig. 5.1: Increasing of open spaces

i) Decreasing in size over time

At present, total number of playgrounds and parks of three Housing Estate is 22. Among them Housing Estate at Mohammadpur has 15 number, Uttara Model Town has three number and Khilgaon Rehabilitation Project has four number of open spaces. The size of open spaces varies from their initial approach.

In Housing Estate at Mohammadpur, all playgrounds reduced for partial encroachment in revised layout plan in 1978. This change has happened mostly after 2001 to date. In HEM, two playgrounds (MPG- 3, MPG-10) are encroached highly by creating school on the site. Above 50% area of MPG-3 was reduced in revised plan by school in 1978 and partial encroachment occurred by club house and cricket practice ground after 2001. About 84% area of MPG-10 was encroached by primary school, water pump, club and shops after 1978.

In Uttara Model Town (UMT), two playgrounds reduced by partial encroachment from 2010 to date. Only park UP-4 reduced by increasing the area of UPG-4 between 2010 to 2020 when boundary of UPG-3 and UP-4 are separated.

In Khilgaon Rehabilitation Project (KRP), there are three playgrounds and one park. Three is under this study and one is under construction. KPG-5 is highly encroached to 0.90 acre (90%) before 2001. From 2001 to 2005 , Khilgaon High School play ground (KPG-10) opened for community use and after 2010 it was partially encroached. Children‟s park (KPG-2) designed as park after 2006 and reduced in size by partial encroachment. In most of the cases in housing, partial encroachment occurred after 2001 to 2011. Reduction in area of individual open space by partial encroachment is shown below (Figure 5.2).

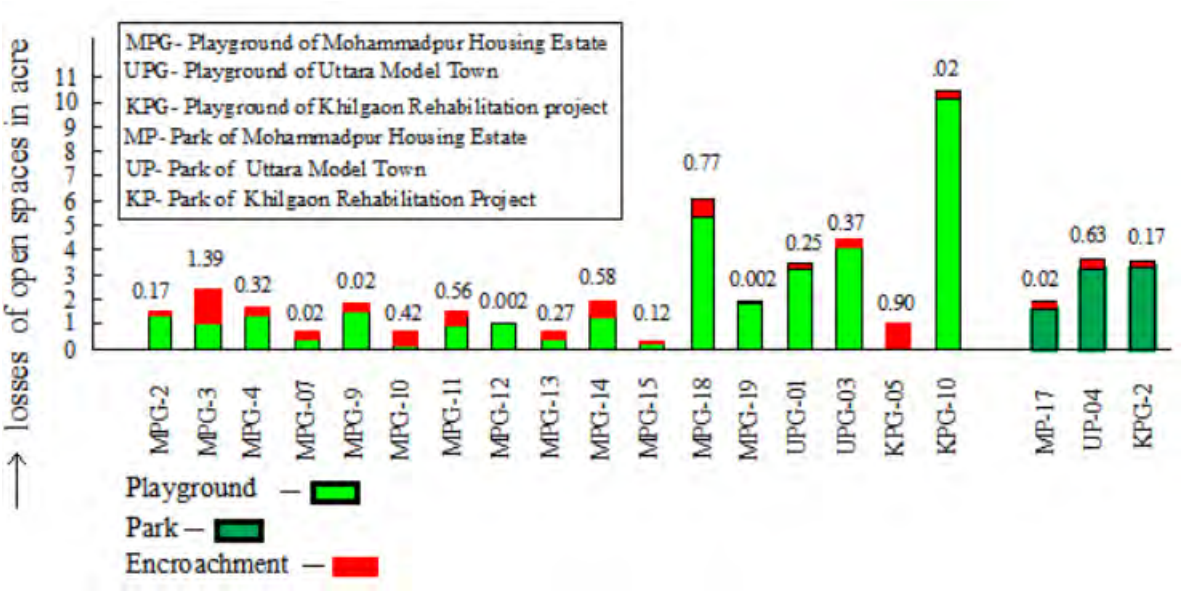


Fig. 5.2: Reduction in size of playgrounds and parks by partial encroachment

ii) Reason for changes in size of open spaces

a) **Reason for increasing in size:** In 1978"s revised layout plan of HEM, size of one playground (MPG-7) has partially increased occupying adjacent land of Government quarters. From 1987 to 2001, area of open spaces increased by occupying adjacent area of proposed school, commercial area and community center though one park was lost for conversion. The changes happened with the consent of housing authority (RAJUK).

b) **Reason for decreasing in size:** Every playground and park has encroached partially. Partial encroachment happened by built structures like school, water pump, club buildings, Urban Primary Health Care Project (UPHCP) buildings, shops, shohid minar, memorial and cricket practice ground. Encroachment rate is from 1% to above 80%.

In HEM, two playgrounds were reduced highly to establish school. Rest of the playgrounds and parks were encroached for establishing club and UPHCP building, pump house, shops, toilets, shohid minar and cricket practice ground. In UMT, partial encroachment occurred for building club house, toilets, memorial, shohid minar and cricket practice ground. In KRP, KPG-5 was encroached by the surrounded inhabitants for increasing their property line towards the playground. KPG-10 was reduced in minor level for generator room and cricket practice ground those were built in the playground. Children"s park were reduced for partial encroachment and surrounded inhabitant"s gabbling up.

To provide water supply, sanitation for the increased people of Dhaka, more water pump needed. There were no designed spaces for this type of services. Then Water supply and Sewerage Authority (WASA) took an opportunity to build water pump in the playgrounds and parks with the help of City Corporation. Urban Primary Health Care Project building of City corporation and other encroachment has develop in the same way. Dhaka City Corporation act as a grabber though it is the main authority in maintaining playgrounds and parks.

5.2.3. Changes in area of open spaces and reason for changes

Area of open spaces has changed in different categories over time. A few open spaces have completely disappeared, few have fully encroached, few are partially lost their area and area increased in some cases by increasing the size of open spaces and increasing the number of open spaces. In counting the area of open spaces in three study areas, area of completely disappeared and full encroached open spaces are deducted after the loss and encroachment. Every type of decrease and increase are counted and the net amount of open spaces are counted as the area for that period.

Table 5.3. Changes in total area of open spaces over time

Name of housing	Year of assessment	Total area of playground & park (acre)	Area of changes (acre)			Area of playground (acre)	Area of parks (acre)
			Increase	Decrease	Percentage(%)		
HEM	1968	16.58	-	-	-	10.94	5.64
	1978	22.54	5.96	-	36%	17.59	4.95
	2001	18.862	-	3.678	16.30%	16.268	2.594
	2011	17.11	-	1.752	9.28%	14.526	2.584
	At Present	16.878	-	0.232	1.37%	14.294	2.584
UMT	1977-1987	9.5	-	-	-	4.94	4.56
	2001	11.5	2	-	21.05%	7.88	3.62
	2011	10.805	-	0.695	6.04%	7.55	3.25
	At present	10.05	-	0.755	6.98%	6.8	3.25
KRP	1988	26.69	-	-	-	23.99	2.70
	2001	14.04	-	12.65	47.39%	12.65	-
	2011	21.02	6.98	-	49.71%	17.68	3.34
	At Present	19.94	-	1.078	5.12%	16.77	3.164

Source: Calculated by author using both primary and secondary data

i) **Changes in total area of open spaces over time:** Area of open spaces varies from the approved Master plans to date by increasing and decreasing the number and size of open spaces over the years.

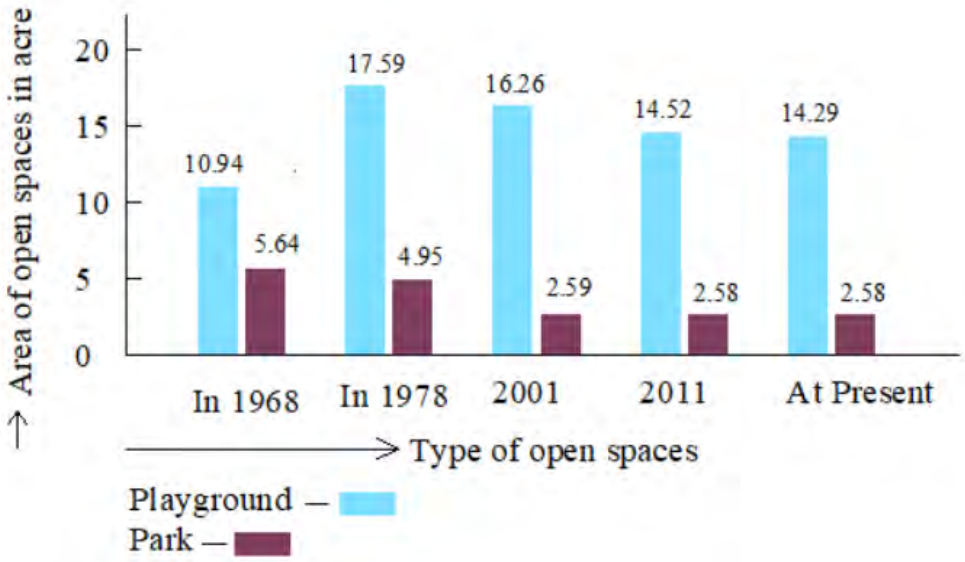


Fig. 5.3: Changes in area of playground and park in HEM

In Housing Estate at Mohammadpur, area of open spaces in approved Master plan (1968) was 16.58 acre and it became 22.54 acre in revised Master plan in 1978. In revised plan of 1978, area of open spaces increased than approved master plan. From 1978 to 2001, area of open spaces reduced 3.62 acre which is 16.30% of previous open spaces. From 2001 to 2010, the reduction was 9.28% and at present (2019) this reduction is 1.37%. From 1968 to 1978, area of open spaces increased during the development phase of housing. After 1978 to date, decreasing trend of area of open spaces is found from this analysis (Fig. 5.3). Above all, area of open spaces increased from approved master plans and the increased area is 0.292 acre.

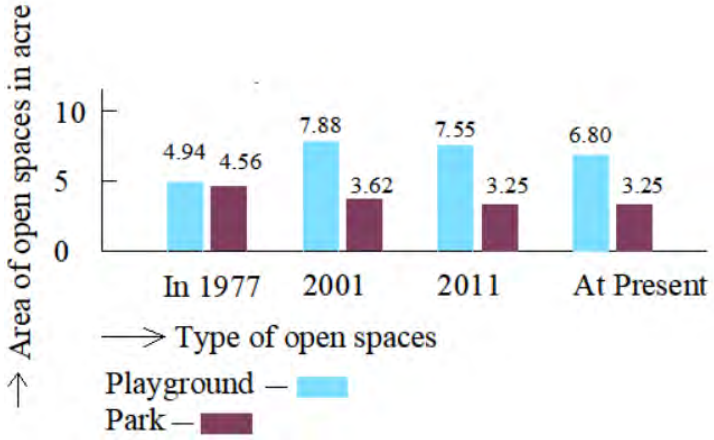


Fig. 5.4: Change in area of playground and park in UMT (sector 1 to 4)

In sector 1 to 4 of UMT, area of open spaces in approved master plan (1977 to 1987) was 9.5acre. From 1987 to 2001, area of open spaces increased by 2 acre. From 2001 to 2010, area of open space reduced and it was 6.04% of previous area of open spaces. From 2010 to date this changes is 6.98 %. From 1987 to 2001, area of open spaces in UMT increased.

After 2001 to date, decreasing trend of area of open spaces is found from this analysis. Above all, area of open spaces increased at present than approved master plan and the increased area is 0.55 acre.

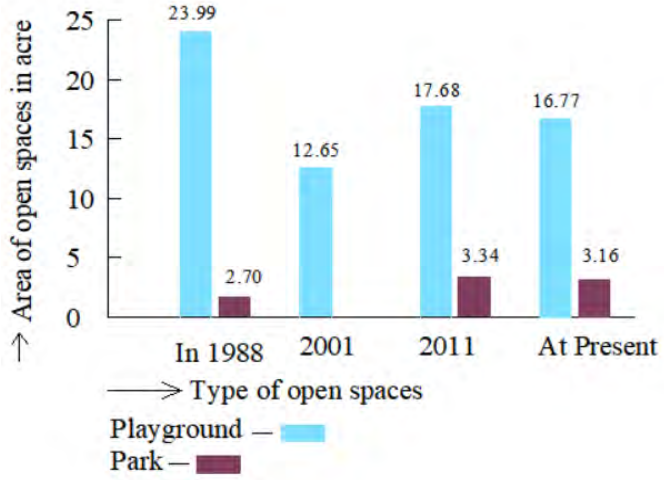


Fig. 5.5: Changes in area of playground and park in KRP

In KRP, area of open spaces in approved master plan (1988) was 26.69acre. From 1988 to 2001, area of open spaces reduced to 14.04 acre from 26.69 acre. This reduction is 47.39% of open space. From 2001 to 2010, the percentage of increasing was 49.71% and amount of open space increased to 21.02 acre from 14.04 acre. From 2010 to date, the area of playgrounds and park remain unchanged. However, total loss of open spaces is 1.078acre (5.12%) over the year in KRP. So, at present (2019) the area of open spaces is 19.94 acre. Total loss of open space is 6.75acre (25.29%) acre in KRP over the years.

ii) **Reason for changes in area of open spaces:** In revised plan of HEM in 1978, the number of lost open spaces and newly proposed open spaces was same in number. However, area of proposed open spaces was larger than lost open spaces. Area of two playgrounds were decreased for partial encroachment and area of one playground was increased occupying adjacent land of Government quarters. Above all, the area of open spaces increased in revised plan after addition and subtruction. From 1978 to 2001, area of open spaces reduced for loss of open spaces in number, grabbed partially of one open space for use of adjacent madrasa and partial encroachment of eight open spaces among 15 though one open space was added. From 2001 to 2011, area of open spaces reduced for partial encroachment of 11 open spaces and rest of the open spaces partially encroached after 2011. Play area of MPG-13 and MPG-15 are reduced not only for partial encroachment but also the new design approach of playgrounds those were done under Dhaka City Neibourhood Upgrading Project (DCNUP). From 1987 to 2001 in UMT, area of open spaces increased by occupying adjacent area of proposed school and community center though one park was lost for conversion. This changes happened under the concern of housing authority (RAJUK). From 2001 to 2011, area of open spaces reduced for encroachment by memorial, permanent cricket practice ground. Also area of open spaces

reduced by shohid minar, permanent cricket practice ground, food court etc. From 1988 to 2001in KRP, area of open spaces reduced highly for losses of open spaces in number and size. About 78% of open spaces were lost for conversion, grabbing, full encroachment and imposing restriction on using playground. And one play lot was reduced for partial encroachment. From 2001 to 2011, area of open spaces increased by adding two number of playgrounds. Area of two open spaces was also reduced in minor level for partial encroachment by generator room, cricket practice ground.

Among three Housing, area of open spaces increased in two housing estates like HEM and UMT though the number of open spaces reduced from the approved plans. In KRP, area of open spaces reduced highly with the reduction of number of open spaces in alarming rate. However, decreasing trend in area of open spaces for partial encroachment are continuing. Maintenance authority is responsible for partial encroachment.

5.2.4. Comparing the open space and population ratio with standard

It is found from literature review that there are different standard of open space prevailed for Dhaka. No specific standard of open spaces for Government housing is found. At present, DDSP standard of open spaces and Private Land Development Rules (Table 5.4) exists for planning and guiding open space standard for Dhaka. To understand the scenario of open space per 1000 population in study areas, ratio of open spaces (Table 5.5) are compared with these two standard of open spaces.

Table 5.4: Planning Standards of open spaces in Dhaka City

City Development Plans/Rules	Open space (acres/1000 population)	Local Playground (acres/1000 population)	Local park (acres/1000 population)
DDSP (2016-2035)	0.86	0.24	0.12
PLDR- 2004	0.2	0.08	0.12

Source: Compiled by author

In 2001, ratio of open space and population was 0.33acre /1000person in Housing Estate at Mohammadpur (HEM) which only satisfy Private land Development Regulation (PLDR) standard. In 2011 and at present the ratios are respectively 0.184 and 0.123 which does not qualify both Draft Dhaka Structure Plan (DDSP) and PLDR standard of open space.

In 2001, ratio of playground was 0.28acre/1000 person in HEM which satisfied both DDSP and Private land Development Regulation (PLDR) standard. Ratio of park was 0.045acre/1000 which was less than Draft Dhaka Structure Plan (DDSP) and PLDR standard.

In 2011, ratio of playground was 0.184acre/1000 person in HEM which only qualify PLDR standard. At present(2019), ratio of playground and park are respectively 0.10 acre/1000 person only satisfy PLDR standard.
In HEM, population increased from 57288 to 1,50,195 for last 20 years (Table 5.5) in rapid rate of growth but area of open spaces did not increase proportionately though a little amount 0.282 acre increased over time. Total area of open space less than Draft Dhaka Structure Plan (DDSP) and Private land Development Regulation (PLDR) standard. In

UMT, playground qualified both DDSP and PLDR standard in 2001 and it qualifies only PLDR standard at present (2019). In KRP, none of playground and park was according to any standard. So, fast increase of population and decreasing of open spaces are causes of reduction of ratio of open spaces in study areas.

Table 5.5: Ratio of of open spaces in study areas

Name of Housing		Year of assessment		
		In 2001	In 2011	In 2020
HEM	Population (person)	57288	92,760	1,50,195
	Area of open space (acre)	18.862	17.11	16.878
	Area of open space in acre/1000 person	0.33	0.184	0.123
	Area of playground in acre/1000 person	0.28	0.157	0.10
	Area of park acre/1000 person	0.045	0.028	0.00001
UMT	Population (person)	13,846	24484	33696
	Area of open space (acre)	11.50	10.805	10.05
	Area of open space in acre/1000 person	0.83	0.44	0.298
	Area of playground in acre/1000 person	0.57	0.308	0.20
	Area of park acre/1000 person	0.26	0.132	0.098
KRP	Population (person)	1,95,640	8,13,382	33,82,671
	Area of open space (acre)	26.69	14.04	19.94
	Area of open space in acre/1000 person	0.136	0.017	0.005
	Area of playground in acre/1000 person	0.064	0.021	0.004
	Area of park acre/1000 person	-	0.004	0.0009

Legend: Satisfied both DDSP and PLDR - Satisfied PLDR only(Magenta) - Satisfied none of the standards -

Source: Calculated by author using survey data

In Uttara Model Town (UMT), area of playground was 0.57acre/1000 person in 2001 and 0.308acre/1000 person in 2011 which satisfy both Draft Dhaka Structure Plan (DDSP) and Private land Development Regulation (PLDR) standard. Area of parks also satisfies both standards respectively 2001 and 2011. At present(2019), area of playground only satisfies PLDR standard and park does not satisfy any standard. In UMT, ratio of total area of open spaces only qualifies PLDR-2004 from 2001 to date.

In Khilgaon Rehabilitation Project (KRP), area of open space was 0.136 acre/1000 person in 2001which is less than both Draft Dhaka Structure Plan (DDSP) and Private land Development Regulation (PLDR) standard. Ratio of both playground and park was less than standard from the beginning and at present (2109) this condition is exploited more.

5.3. Changes in Uses of Open Spaces

Changes of open spaces happened in different ways: i) loss of open space for land use change, ii) loss of number of parks, iii) playgrounds used as socialization purpose, iv)

children‟s parks are used for all age group and e)use pattern for providing different community functions.

5.3.1. Loss of open spaces

Losses for conversion: In Housing Estate at Mohammadpur (HEM), 5 (20%) number of open spaces were lost among 20 for land use change like providing nursery, residential plots and park turned into playground etc.

Table 5.6: Changes of area for changes in use of open spaces

		Increased area		Lost area of open spaces				
Name of housing		Partially increased	Increased for newly proposed open space	lost for conversion I into plots, use change	lost for Grabbing	lost for full encroachment	Losses for restriction/ control	Reduced for Partial encroachment
HEM	Number	1PG	3(2PG, 1P)	4(3PG,1P)	1PG	-	-	15
	Area (acre)	0.126	8.178	2.278	0.633			4.972
	Increase in HEM = 8.304 acre			Loss in HEM = 7.883 acre				
UMT	Number	2 PG	-	1P		-		3
	Area (acre)	1.85		0.94 acre				1.25
	Increase in UMT = 1.85acre			Loss in UMT = 2.19 acre				
KRP	Number		2 PG	1P	1PG	4PG	1PG	3
	Area (acre)	-	17.58	2.70acre	4.26	7.30	7.91	1.078
	Increase in KRP = 17.58 acre			Loss in KRP = 23.17 acre				
	Area in total	1.976 acre	25.758 acre	5.91acre	4.89 acre	7.30 acre	7.91 acre	7.3 acre

Source: Calculated by author usingSurvey data

In Uttara Model Town(sector 1 to 4), loss of open space is 1 (25%) among 4 for allotting residential plots. In Khilgaon Rehabilitation Project (KRP), loss of open space is one

among 11 number for changes into plots which are used as commercial purpose. It is found from Table 5.6 that total loss for conversion in three housing is 5.91acre in area.

Open spaces lost for grabbing: In Housing Estate at Mohammadpur (HEM), one playground was grabbed by refugees after 1978 and one playground was grabbed by Anser camp from 1987 in Khilgaon Rehabilitation Project (KRP). Public Works Department (PWD) filed case against this grabbing and win the case and get back the right of the playground in 2018 but did not get back practically in hand. Total loss for grabbing is 4.26 acre in Khilgaon Rehabilitation Project (KRP). Total loss in three housing is 4.89 acre.

Open spaces lost for full encroachment: In Khilgaon Rehabilitation Project (KRP), four playgrounds were encroached by local co-operatives and clubs. Firstly, local cooperatives make club, club makes club house in the playground, then take the maintenance of the field. Secondly, club try to make different way for well fare and at last it makes money by creating rickshaw garage, school for differently able children etc. These are completely used for money making purpose. All are done with the help of Public Works Department (PWD). Open spaces were lost for full encroachment is 7.30 only in Khilgaon Rehabilitation Project (KRP).

Losses for restriction/control: One playfield of Khilgaon Government High school used as community playground. After creating non transparent boundary, school authority control the access of user. And a park and playground of sector 4 in Uttara Model Town(sector 1 to 4) are not open to all. It is opened for all at a fixed time of the day and open to the club members throughout the day. The loss is 7.91 acre in Khilgaon Rehabilitation Project (KRP).

Open spaces reduced for Partial encroachment at present: All playgrounds and parks are encroached partially by different common facilities. Area of partial encroachment in Housing Estate at Mohammadpur (HEM), Uttara Model Town(sector 1 to 4) and Khilgaon Rehabilitation Project (KRP) are respectively 4.972acre, 1.25acre and 1.078 acre. Total loss is 7.30 acre.

5.3.2. Increase of open spaces

Increased for newly created from plots and low land: In Housing Estate at Mohammadpur (HEM), one playground and one park were created in revised plan in 1978. One playground was initiated by Shyamoli club and created from low lying land and park was created from proposed residential plots. Another playground was created from proposed roads, rehabilitation shade and residential plots in between 1978 to 2001. In Khilgaon Rehabilitation Project (KRP), Khilgaon High School playground and Jor pukur playground were added newly for community use. The increased area of Housing Estate at Mohammadpur (HEM) and Khilgaon Rehabilitation Project (KRP) are respectively 8.178 acre and 17.58acre. Total increase is 25.758 acre.

Partially increased in occupying adjacent land: In Housing Estate at Mohammadpur (HEM), area of one playground increased by occupying the area of proposed Government quarter. In Uttara Model Town(sector 1 to 4), playgrounds increased by occupying adjacent area of proposed school, community center and the area of adjacent park when the area of

park and playground were separated and designed. The total increased area of these two housing is 1.976 acre (Table 5.6).

5.3.3. Changes of type in use

Parks are shown in the Layout plan but were not designed as park and maintained properly during the time of housing development. So, these parks were used as playgrounds. Gradually these parks turned into playgrounds with the courses of time. In HEM, Shyamoli children‟s park was proposed in 1978‟s Layout plan and designed properly in 2015, Chawdhurypara children‟s park layout was in 1988 but designed in 2006 and Uttara sector 4 park layout is in 1987 and developed in 2011(Time line).

In HEM, three parks among five are used as playground and losses of park are three(60%) among five. Number of playgrounds increased for the use change of parks.

5.3.4. Use of Playgrounds for active and passive purposes

For the decreasing number of parks, people gather in the playgrounds to serve their passive purpose like socialization, morning walk etc that can be performed in parks. Also, lack of open spaces, playgrounds used as multifunctional spaces. Playgrounds are used both active and passively in neighbourhood level. Passive user is more than active user in the playgrounds. Center part of the playgrounds are used for active use and periphery areas are used as passive use (Ahmed and Sohail, 2008). Lack of recreational open spaces is the main cause for these changes in using playgrounds. Also, playground are used as waiting space for the guardians of students at nearby schools and coaching centers.

Most of the playground have no designed walkways. After all, playgrounds are used as walkway at morning if there are no walkway facilities. .

Most playgrounds and parks are encroached by UPHCP, club buildings, water pump, generator room, cricket practice ground etc. This variety type of uses also enhance and influence the versatile use of open spaces. It is used as an income source for clubs.

Most of the open spaces are surrounded by vehicular roads. This is a discouraging issue for fewer uses of playgrounds by younger children.

100% of playgrounds and parks are somehow partially encroached by water pump, club buildings, UPHCP buildings, schools, shops, shohid minar and cricket practice ground. So, different type of uses are visible in the open spaces. Cricket practice grounds are used and monitored by clubs and it is an income source of the club. So, use of fields are controlled by the clubs. Uttara sector 4 park is not open all day long for general people but open all time for the user of the practice ground of cricket who are trained under club. Reason for this type of use change is lack of proper monitoring of the authority and illegal practice of local powerful people.

5.3.5. Physical, environmental and maintenance condition: Present condition of the open spaces is very poor. These changes happened for lack of proper maintenance and management.

Table 5.7: Reason for changes of open spaces in housing areas at a glance

Housing Estate at Mohammadpur						
Playgrounds and Parks	Open spaces (Approved plan-1968)	Open spaces(Revised Master plan-1978)	Open spaces at present	Decreased area in acre	Encroached Authority	Reason for Changes
MP 1 Block A	Park	Park	H. Centre		Dept. Of Agriculture Extension	Park Converted as Horticulture Dept. legally
MPG 2 Block A	PG	PG	PG	0.17	WASA & Club	Partially encroached by Pump & Club house, cricket practice ground
MPG 3 Block A	PG	PG	PG	1.39	School & Club	More than half area was allotted for school in revised plan. Partially encroached by club shed, cricket ground.
MPG 4 Block B	PG	PG	PG	0.32	WASA & Club	Partially encroached by pump, club shed, cricket practice ground
MPG- 5 Block B	PG	PG	Residences	-	Refugees	Refugee camp area open space is grabbed by refugees used as residences
MPG 6 Block B	PG	PG	Residences	-	NHA	Converted as plots by NHA
MPG 7 Block F	PG	PG	PG		NHA	0.126acre increased occupying adjacent open space of Government housing
MPG 8 Block F	PG	Plots	Plots		NHA	Playgrounds converted into plots by NHA.
MPG 9 Block C	PG	PG	PG & Park	0.34	City Corporation	Partially grabbed by mosque, playground designed as PG and park
MPG 10 Block C	PG	PG	PG	0.422	Govt., Club WASA,	Encroached by school, pump, club house and shops
MPG 11 Block D	Park	Park	PG		WASA, Club	Reduced in Revised layout, pump, club shed, cricket practice ground
MPG 12 Block D	PG	PG	PG	0.002	Club	Toilet, Temporary Cricket practice ground
MPG 13 Block D	PG	PG	PG	0.273	WASA, City Corporation , Club	Partially encroached by club, UPHCP,shops, mazes, walkway, landscape
MPG 14 Block D	Park	Park	PG	0.58	City Corporation,	Partially encroached by market, mosque, shops, club shed, shohid minar

					Club	
MPG15 Block E	Park	Park	PG	0.123	WASA, City Corporation	Adjacent road of one side of filed was occupied by WASA to build pump house and rest of the space of road was included with field. Club house is built on this area. Playground size is reduced for new designe approach providing landscape, exercise area etc.
MPG 16 Block E	Park	-	-	-	NHA	The park went beyond boundary in revised plan of HEM.
MP 17 Block B	Plot sroads	Park	Park	0.02	NHA	Park was created from plots and road in previous plan. Partially encroached by pump, toilets.
MPG 18 Block B	Low land	PG	PG	0.77	Club and Govt.	Playground was created from low land . Partially encroached by Club and shop.
MPG 19 Block F	Plots	Plot sroad	PG	.002	WASA, City Corporation	Partially encroached by UPHCP building, pump.

Uttara Model Town(sector 1 to 4)

Playgrounds and Parks	Open spaces in Approved plan-1977	Open spaces at present	Increased area	Decreased area	Encroached Authority	Reason for changes
UPG- 1 Sector-3	PG	PG	0.95 acre	0.25 acre	RAJUK & club	Within 2001 to 2011, size increased by occupying primary school , adjacent commercial space and area reduced for partial encroachment by memorial, shohid minar, cricket practice ground, food court from 2011 to date
UP-2 Sector-3	Park	Plots	-	-	RAJUK	Converted into plots with local influential people"s initiative and RAJUK
UPG-3 Sector-4	PG	PG	0.91acre	0.63 acre	Cooperative & club	Within 2001 to 2011, size increased by occupying adjacent community centre"s and school space, area reduced for building club shed, toilets, cricket practice ground from2011 to date
UP-4 Sector-4	Park	Park		0.37acre	Cooperative & club	Between 2001to2011 area of park reduced by adjacent playground. PG occupied partially park area.

Khilgaon Rehabilitation project

Playgrounds and Parks	Open spaces in Approved plan-1988	Open spaces at present	Decreased area	Encroached Authority	Reason for changes
KPG 1 Chowdhuripara	PG	Ansar camp		Ansar & VDP Dept	Encroached illegally
KP 2 Chowdhuripara	PG	Park	0.17 6 acre	RAJUK	Grabbed by adjacent housing partially
KPG3 Block B Taltola,	PG	Full encroached		Co-operative & club	Club, Local co-operative
KPG 4 Shohid Baki road	Park	Plots		PWD	Converted into plots
KPG 5 Goran bazar road	PG	PG	0.90 acre	PWD	Partially Grabbed by surrounded plots
KPG6 Goran bazar road	PG	Full encroached		Co-operative	Office of Co-operative, School of Disables(DCF)
KPG7 Block A Provatibag	PG	Full encroached		Co-operative club	Co-operative, rickshaw garage
KPG8 Modho Basabo	PG	Full encroached		Co-operative	Co-operative, rickshaw garage
KPG9 Khilgaon Govt. High School	PG	School playground		Govt.	Playground was adjacent with School. Later school occupied playground by creating boundary wall and gate though PWD owned the field. And it is still playground.
KPG10 Block C, Khilgaon High School	Khilga on High School	PG from School	.02 acre	PWD	School was proposed on the area, Later field is separated from school and used for all
KPG11 Tilpapara,	Low land	PG		DSCC	Playground is created from low land

Source: Calculated by author using survey data (2019)

5.4. Access of Open Spaces

5.4.1. Distribution, access and connectivity: Distribution and connectivity of open space assessed by i) easy walking distance of open spaces from where people live and work, ii) barriers to accessing existing open spaces like collector roads, street layout; public transport routes, iii) linkages to other community facilities and services (schools, activity

hubs, retail areas etc.) iv) connections to other open space functions via pedestrian and cycling networks.

The majority of open spaces require road frontages for access and connectivity and maximizing road frontages to open space also provides the opportunity for improved community access to the open space. Road frontage to open space also provides the opportunity for residential housing lots to be orientated so that they overlook or front onto the open space. Layout of open space relative to the surrounding streets and dwellings influences passive surveillance, safety and pedestrian connectivity.

Access to well distributed and connected open space influences the community use in terms of frequency and extent, feelings of safety and overall enjoyment. According to road frontage and residential frontages layout of open spaces are graded as follows (Table 5.8):

Table 5.8: Layout options and features according to OSPDG

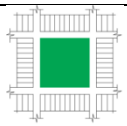
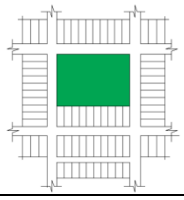
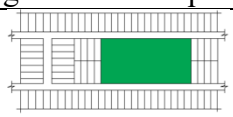
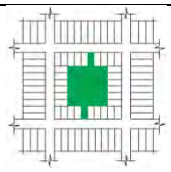
Type and Illustrations	Features
A. Neighbourhood Open Space 	• 4 road frontages (entire lengths) • 4 boundaries with direct residential frontage • 100% passive surveillance • Full pedestrian connectivity potential
B. Neighbourhood Open Space 	• 3 road frontages • 3 boundaries with direct residential frontage • 75% passive surveillance • Increased density of lots adjoining open space •Option to increase passive surveillance and connectivity with transparent fencing on adjoining residential interfaces
C. Neighbourhood Open Space 	• 2 road frontages • 2 boundaries with direct residential frontage • 50% passive surveillance
D. Neighbourhood Open Space 	• No road frontages, only access points • No direct property frontage • Extremely poor connectivity • 10% passive surveillance • Limited options to improve passive surveillance to an acceptable level as all properties are rear facing

Diagram source: Open Space Planning and Design Guidelines (OSPDG), Australia (page 57)

Table 5.9 :Open spaces' layout of three Government housing

Name of Housing	Year of assessment	Layout Type-A	Layout Type-A	Layout Type-A	Layout Type-A
HEM	1968	12	4	-	
	1978	11	5		
	At present	1	11	2	1
UTM	1987	-	4	-	
	At present	-	3	-	
KRP	1988	3	-	1	5
	At present	-	1	1	2

Source: Prepared by author using Open Space Planning and Design Guidelines, Australia

In 1968"s approved plan, 12 open spaces among 16 were designed as layout type-A and rest four were in B type in HEM. In 1978"s revised plan, one open space among 12 of layout type-A was converted into B-type for encroachment by Primary School and rest four were also in B-type. In HEM, only one children"s park is survived as layout type-A though there was partial encroachment. Another 14 has converted as type-B(11), type-C (2) and type-D (1). At present (2019), most of the playgrounds are secured by providing boundary wall and entry gate. Open spaces are controlled by one entry gate whatever the number of accessible gate. Visual connectivity and passive surveillance have reduced by partial encroachment. And there were not found any impact on partial encroachment for layout type of open spaces in government housing areas.

In UTM, layout type of open spaces did not change over the years though there happened partial encroachment.

In KRP, three open spaces were layout type-A category, one was C-type and five were D-type among nine open spaces. Play lots of type-D were connected with surrounded residences and other play lots by pedestrian access. These playlots were visible from nearby housing. In England, researches show that playgrounds which are used most are open and visible from nearby housing (Wheway and Milliard, 1997). At present (2019), there are four open spaces are existing after full encroachment and conversion. Among four open spaces, one is B-type, one is C-type and two are D-type. In KRP, losses in number of open spaces are higher than open spaces of other housing. Type-B and Type-C are created later and D-type layout of open spaces of two were remain the previous type but surrounded residences were built giving backside to the open space. And access to this two play lots are restricted by only one entry and residences has no access to these adjacent play lots according to the approved plan.

Three housing of study areas are designed and most layout of open spaces were surrounded four sides by roads in approved master plan. Open spaces were close to the people"s dwellings and also linked with schools, kitchen market and retailers in approved plans within half to one mile distance. From previous discussion, it is found that number of open spaces reduced for conversion and full encroachment and previous distribution of open

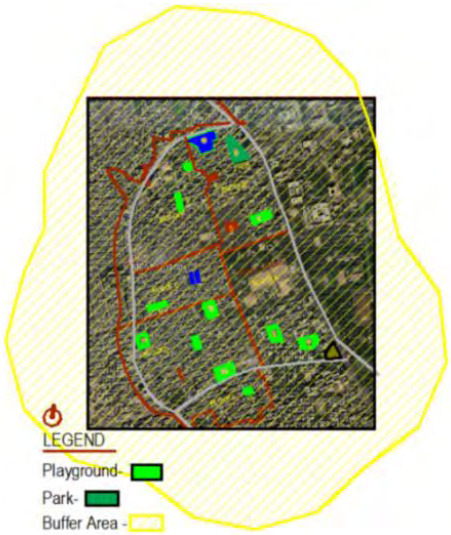
spaces was hampered for losses in number. Area of open spaces has reduced in every playground and parks for partial encroachment by school, UPHCP and Club building, pump house etc. In most of the cases these building have blocked one side of the open spaces. In some cases, it has blocked two sides of open spaces. For this reason layout of open spaces have lost road frontages and also residences have lost their road and open space frontages. Also, surrounded roads of open spaces are vehicular now and heavy traffic is everywhere in neighbourhood. It is barriers for children to enter the open spaces. Reduction of road frontages, vehicular road instead of pedestrian and inequitable distribution of open spaces have reduced accessibility, transparency of view and livability of open spaces in study areas at present (2019).

5.4.2. Changes of accessibility in playgrounds and parks over time

Housing Estate at Mohammadpur: The buffer area of all parks and playgrounds in Housing Estate at Mohammadpur (1968) within half a mile distance is about 1305 acre which is three times of housing area. This buffer area not only covered the housing area but also served the surrounded areas (Map 5.1). The buffer area of all parks and playgrounds in Housing Estate at Mohammadpur (1978) within half a mile distance is about 1330 acre which is more than three times of housing area (Map 5.2). Also, this buffer area served the surrounded areas (Map 5.2) with serving the area of Housing Estate at Mohammadpur. At present (2019), the buffer areas of all parks and playgrounds in Housing Estate of Mohammadpur reduces to 1325 acres but buffer area covers the housing with its surrounded areas (Map 5.3). From focus group discussion, it is found that most of the users of playgrounds in HEM live within the housing area though buffer area served beyond the boundary of housing. Only Shyamoli Children"s park served beyond the housing area. Changes of buffer area is not reduced within the area of housing though the number of open spaces reduced over time.

Map 5.1: Buffer area of Playgrounds and Parks in 1968's Layout Plan of HEM
Source: National Housing Authority

Map 5.2: Buffer area of playgrounds and parks in 1978's layout plan of HEM
Source: National Housing Authority



Map 5.3: Buffer area of playgrounds and parks at present of HEM
Source: Google Image, March.2019

Table 5.10 : Buffer area of Housing Estate at Mohammadpur

Year of assessment	Housing Area	Buffer area	Buffer area within housing"s boundary	Total buffer area
Approved plan in 1968	453.5acre	1305 acre	453.5 acre	851.5 acre
Approved plan in 1978	434	1330 acre	434 acre	896 acre
At Present	434	1325 acre	434 acre	891acre

Source: Calculated by author using secondary data

Uttara Model Town: The area of Uttara Model Town (sector 1 to 4) is 330 acre and buffer area of the open spaces were 850 acre in 1977(Map 5.4). Buffer area covered all area within and around the housing area. At present buffer area of open spaces reduced to 849.43 for reduction of a park. However, this buffer area also covers the area within and around the housing (Map 5.5). Buffer area was not affected with the reduction of open space in number over time within the housing area.

Table 5.11: Buffer area of playgrounds and parks in Uttara Model Town (Sec. 1 to 4)

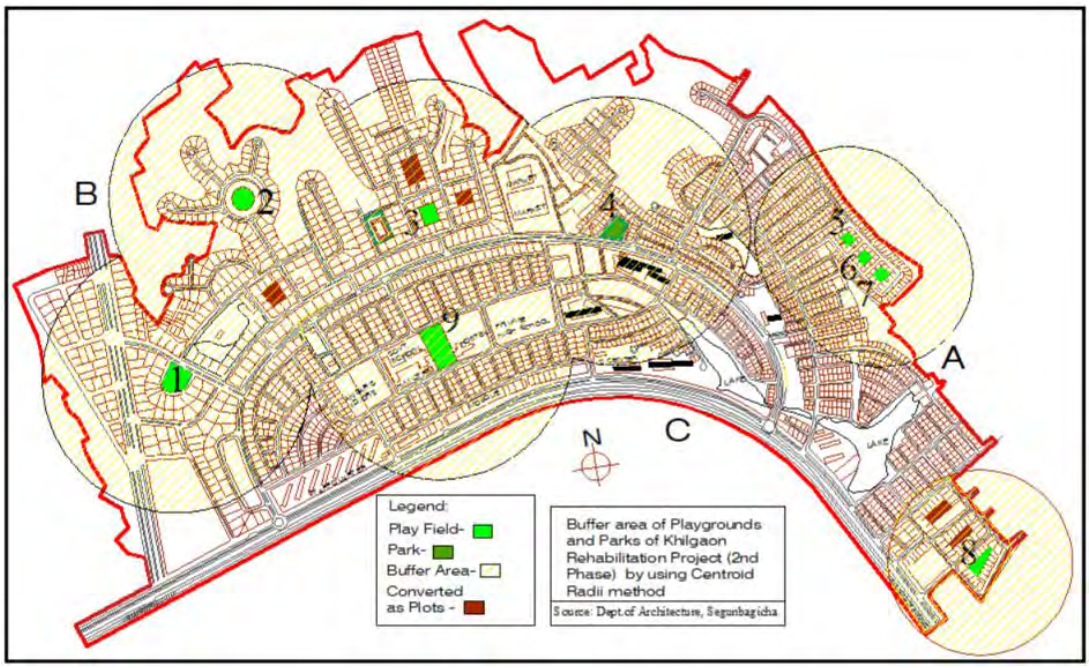
Year of assessment	Area of Housing (acre)	Buffer Area (acre)	Buffer area within housing"s boundary (acre)	Buffer area beyond housing"s boundary (acre)
Approved plan in 1977	330 acre	850	330	520
At present	330 acre	849.43	329.25	520.18

Source: Calculated by author using secondary data

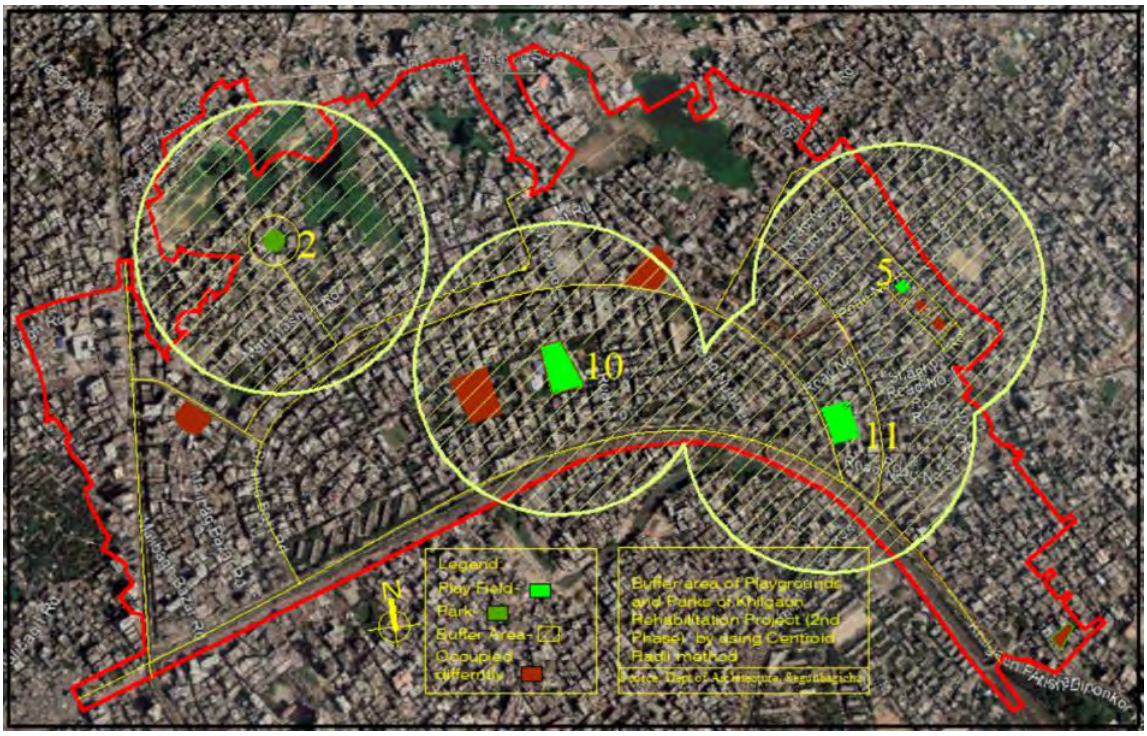
Map 5.4: Buffer area of Playgrounds and in 1977 of UMT(Sec. 1- 4)
Source: RAJUK

Map 5.5: Buffer area of Playgrounds and Parks Parks at Present of UTM(Sec. 1 to 4)
Source: Google Image,March.2019

Khilgaon Rehabilitation Project: The buffer area of all parks and playgrounds in Khilgaon Rehabilitation Project (1988) within half a mile distance was about 2899 acre in 1988 which was less than housing area (Map 5.6). At present (2019), this area reduced to 1930.62 acre with the reduction of open spaces in number over time (Map 5.7). Percentage of buffer area was about 75% in 1988 and it becomes about 50%. Khilgaon Rehabilitation Project was not well served from 1988 to date with the buffer area of playgrounds and park.



Map 5.6: Buffer area of Playgrounds and Parks in 1988 of KRP
Map Source: department of Architecture, Shegunbagicha.



Map 5.7: Buffer area of Playgrounds and Parks at Present of KRP

Map Source: Google Image, March.2019

Table 5.12: Buffer area of playgrounds and parks in KRP

Year of assessment	Housing area	Buffer area	Buffer within housing area	Ratio of Buffer and housing area
Approved plan in 1988	2920 acre	2899 acre	2198.53 acre	75.29%
At present	2920 acre	1930.62 acre	1470 acre	50.34%

Source:Calculated by author using secondary data

Actual distance from dwelling of open spaces should be verified though buffer area covers the whole area. In this case maximum distance of open spaces of dwelling‟s of user is counted as straight line measurement in current Google map. It is found from Table 5.13 that maximum distance of Shyamoli children‟s park in HEM is about 2811feet (0.53 mile) from user‟s dwelling which is a little bit greater than half a mile. In UMT, the distance of dwellings which situated in maximum distance from park is 3660 feet (0.69 mile). It is greater than half a mile of standard. In KRP, the distance of dwellings which situated in maximum distance from park is 16,660 feet (3.15 mile). The distances of HEM and UMT are within half to one mile that support City Environment Quality Review (CEQR) standard and do not satisfy National Recreation and Park Association‟s standard. However, in case of KRP it is far from both standard.

Table. 5.13 : Maximum distance from parks of study areas

Name of Housing	Maximum distance from park
HEM	Minar Masjid Park(MP 9)-2811feet (0.53 mile)
UMT	3660 feet (0.69 mile)
KRP	16660 feet (3.15 mile)

Source: Calculated by author using secondary data

There are other predominant factors that strongly influence the use of outdoor play and recreation facilities such as users safety, security, condition of the facilities etc. Therefore it follows that without improving the physical, environmental condition of outdoor play and recreation facilities and most importantly giving due consideration to the provision of facilities for younger children and creating supportive environment for the users, the physical closeness of the facilities does not mean that the children within the buffer area can use these facilities.

5.4.3. Factors affecting users' accessibility

The accessibility of play and recreation facilities to the residents living within the buffer area or service area in Dhaka city was found quite adequate. At present, this buffer area reduced with the reduction of playgrounds and parks. Buffer area is not only determinant factor for assessing accessibility but also there are other determinants in Dhaka city which are as follows:

i) Existing distribution pattern of open spaces: There is no uniformity in open space standard throughout Dhaka city (Siddique, 1990). The surveyed study areas are planned. Housing estate at Mohammadpur is divided into blocks like block-A, block B etc. Size of the blocks are not equal and common facilities like playground and parks are not equally distributed for each block. Mohammadpur Housing Estate is divided into 6 blocks. The area and shape of the blocks are not same and distribution of playgrounds and parks were not equitably distributed.

Uttara Model Town is divided into sectors. Size of sector are not equal. However, there is open space in each block. Uttara sector 3 had a park and playfield in the plan of 1987 and at present, there is no park and also the location of playground is not equitable regarding distance of the inhabitants. In sector 4 , there is a park and playground those are in the an eccentric position according to the size of the sector.

Khilgaon Rehabilitation Project is divided into zones like A, B and C though open spaces were not properly distributed. However, play lots were surrounded by housing blocks and inter connected with other play lots. This pattern of open spaces ensured safety for the children. Now most of the play lots have encroached and connection between open spaces has lost.Open spaces are not equitably distributed and distance from inhabitants are not equally set in study areas.

ii) Maintenance condition: The main reasons for not using the facilities are poor condition of the facilities, inadequate play accessories and lack of toilet facilities for children. Therefore, accessibility in terms of physical proximity does not imply that people living close to the outdoor play and recreation facilities are using them.

iii) Lack of security: It is found from field survey that there are anti-social activities in playgrounds and parks at night. The research conducted by Ahmed and Sohail (2006), Siddiqui (1990), Biswas (2002), etc. identified the lack of security measures as the most important factor affecting the accessibility of children to outdoor play and recreation facilities in Dhaka city.

iv) Encroachment: Encroachment of existing playgrounds and parks is becoming a common phenomenon in Dhaka city. As a result, the lack of awareness and no initiative of the city authority to prevent such encroachment, there is no resistance to the unauthorized encroachment by the real estate developers. Even the city authority sometimes could not prevent them from the encroachment of the scarce open space for profit oriented, commercial uses (The Daily Star, 2012).

v) Inadequate play and recreation facilities: Playgrounds of study areas are not equipped with play equipments. There are some recreational facilities in parks. The issue of inadequate play and recreational accessories in Dhaka city is identified by many researchers in the past (Ahmed, 2010).

5.5. Changes in Facilities of Playgrounds and Parks

Playgrounds and parks are used in active or passively. Ancillary support is also required to run playgrounds and parks.

5.5.1. Facilities of playgrounds: In 1968 and 1978‟s approved layout plan of Housing Estate at Mohammadpur (HEM), only outline of all facilities with plots was provided in the plan. Active recreation facilities as play equipment like play courts and pitches and play tools like cricket bat, football, racket, skipping rope, toy car etc were not provided.

From timeline analysis, it is found that ancillary facilities like boundary wall and boundary gate were provided between 2001 to 2005. Passive recreation facilities like planting areas, sitting-out areas and walking way were gradually added in some playgrounds, not in all playgrounds. Water pump, club building and Urban Primary Health Care Project (UPHCP) building were built between 2006 to 2010. UPHCP also continued up to 2015. Gym facilities and toilets were added in clubhouse that encroached playgrounds partially. Toilets are not open to all users. Only club members used this in most of the cases. Lighting facilities also added but not sufficient.

Design of park and playgrounds was started in 2015 and it is still now on going. Still, play equipment and play tools are not provided in any playgrounds .

There are passive recreational facilities like seating arrangement, food corner, walking track and rules to use the facilities in Uttara Model Town (UMT) sector 3 playground (UPG-1). Only play area is available but there is no scope of active recreational facilities like equipment and play tools. Cricket practice ground of the playground is used only for

players under club. Uttara sector 4 playground has ancillary facilities like club buildings, lighting, cricket practice ground, drinking water facilities. Up to 2005, it was not developed. From 2005-2010, Uttara welfare co-operative office established in that field. Then development started. Firstly trees increased from that time. Finally, properly maintained after 2015.

In Khilgaon Rehabilitation Project (KRP), Khilgaon Government High school play field was used as local level play field and it had no boundary wall. After providing a boundary wall it became restricted for all. After 2010 Khilgaon High school play ground is used as a local level play field and open for all. Occasionally school uses the field. There are no facilities for play beyond cricket practice ground. Local club operates this practice ground as a source of income. It is not open for all. There are no active and passive recreational facilities in playgrounds of KRP.

5.5.2. Facilities of parks: There are three parks in this study. Parks are planned. Parks are generally used for passive recreation purpose.

Every park is furnished with grass, plant, flower plant and trees. Every park has sitting arrangements and umbrellas to provide shade. Every park has walkway but there is no jogging and squatting space in these parks. Every park has swing and slides, no water games. Drinking and toilet facilities are available, not sufficient. Restaurant and shopping facilities are not available but in Shyamoli children‟s park hawker is available inside and outside the park.

In HEM, 2001 to 2015 Shyamoli Children‟s park has not found any change, only a water pump was provided between 2005 to 2010. Park was designed in 2016. Then all passive facilities were provided. Highly accessible from morning to night.

In Uttara, Sector 4 park not developed up to 2010. After establishing co-operative office vegetation increased and existing pond was counted as a recreational space. Finally, park was facilitated with rides between 2015 to 2018. Accessibility is controlled by timing.

In Khilgaon Rehabilitation Project (KRP), there was only one proposed park which was converted into plots and used for commercial purpose. In 2006, a playground was changed into a children‟s park and designed after 2011. There are passive recreational facilities like rides, rain shed, flower and other trees, bushes and grass. Ancillary facilities like lighting, walkway and toilet are available there. Accessibility is controlled by timing.

Shyamoli Children‟s park is directly maintained by Dhaka North City Corporation (DNCC). Besides, Uttara sector 4 park and Chowdhurypara children‟s park in Khilgaon are maintained by clubs and co-operatives.

5.5.3. Changes of newly designed playgrounds: Playgrounds of Zakir Hossain road and playgrounds of Solimullah road in HEM are newly designed and were open for use from 2019. In this chapter, changes of open spaces in study area have already been discussed comparing with standard. Particularly these two fields have selected to understand the nature of social inclusion after redesign of playgrounds.

Zakir Hossain road playground was accessible previously for all and now this field has raised from ground level and also provided a ramp for differently challenged personnel. But ramp is not used for lack of management. Safety net is provided to protect surrounded people from the hit of football and cricket ball. There were three entry gates in previous plan but only one was used. Now two control approaches are there and used these two approaches as entry. Play area is reduced for raising level of playground, landscaping and providing walkway. It is found from field survey that children did not get chance when seniors play. They demanded that when the field was big and play area was not separated by fence and they got space to play. Participation of user in play has reduced for providing safety net. Facilities for exercise is added but drinking water facilities yet not provided. Hawkers are available on walkway and footpath of the field. It was not taken into consideration. Also, there is no scope for using playgrounds by girls and no sitting arrangements for all. So, social segregation becomes more prominent than social inclusion in the playground after redesign of the playground.

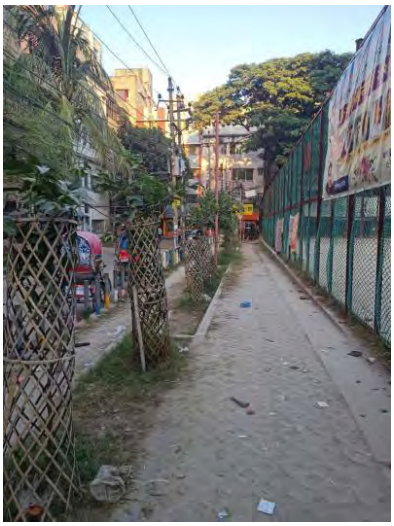
Playground of Zakir Hossain road (April, 2013), Source: Google Earth

Playground of Zakir Hossain road (November, 2020)

Source: Field survey

Access of the field (November, 2020)

Source: Field survey



Walkway of the field (November, 2020)
Source: Field survey

Entry of the play area (November, 2020)
Source: Field survey

In Solimullah road playground, previous ground was at road level and accessible for all. In new design, a ramp was provided but it has lost for misusing the field by entering vans. Walkway, landscaping, children mazes have provided. Walkway is not suitable for use. Play area has reduced for providing these facilities. Solimullah road playground has no boundary and fence like Zakir Hossain road playground. It is extensively used whole day from morning to night. There is also no scope of using playground for girls. There is no sitting arrangements, drinking water facilities and proper lighting in the field.

Playground of Solimullah road (April, 2013)
Source: Google Earth

Field with walkway and Foothpath (Nov., 2020)
Source: Field survey

Source: Google Earth Source: Field survey

Entry of the field (November, 2020)
Source: Field survey

Raised ground of the field (November, 2020)
Source: Field survey

However, those fields are not able to provide universal access to safe, inclusive and accessible open spaces particularly women and children, older persons and persons with disabilities though those are redesigned. Walkway and landscape may be omitted to increase the play area and to increase social inclusion.

5.5.4. Reason for inadequate play and recreation facilities

i) Segregation of responsibilities of relevant agencies for management of playgrounds and parks in Dhaka city: The Arboriculture division of Public Works Department (PWD), Dhaka City Corporation (DDC), Capital Development Authority (RAJUK), Bangladesh Railway, National Sports Council, Directorate of Sports etc. own the outdoor play and recreation facilities in Dhaka city. There is no separate department in DCC or in RAJUK for the maintenance and development of these facilities. As a result, most of these parks and playgrounds of Dhaka city are ill-maintained and thus have become unsuitable for use by most of the city inhabitants. The two agencies (RAJUK and DCC) are always blaming each other for neglecting their responsibilities.

ii) Lack of proper co-ordination, accountability and transparency: City Corporation is main responsible authority for development and maintenance of playgrounds and parks. But most of the case, local club play this role. Except for parks, most of the playgrounds are not designed and equipped with play accessories. Also repairing of play accessories is not properly done by City Corporation. Clubs are not monitored by City Corporation and the clubs have no accountability for their negligence in maintaining playgrounds and parks. Also, City Corporation has no clear instruction or collaboration with local clubs to maintain the playgrounds and parks. Sloppiness and lack of accountability are reasons for inadequate play and recreation facilities in playgrounds and parks.

5.6. Views of Responsible Authorities towards the Changes of Open Spaces

Capital Development Authority (RAJUK), National Housing Authority (NHA) and Public Works Department (PWD) are responsible Government authorities for developing selected three Government housings in Dhaka. Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC) and PWD are responsible to develop and maintain playgrounds and parks of selected housings. Key officials from these agencies who are directly or indirectly linked with the development of housing were interviewed. The list of

the persons interviewed is annexed in Annex:5a. A general interview guideline is followed during the interview (Annex:5b). As the persons interviewed were from different agencies with diverse roles and responsibilities, in some cases the guidelines could not be followed. It is also found during the interview that Capital Development Authority (RAJUK) and Dhaka City Corporation (DCC) blamed each other for the misappropriation of playgrounds and parks. Also, National Housing Authority(NHA) and Dhaka North City Corporation (DNCC) has some complication about the ownership of playgrounds in Housing Estate of Mohammadpur. The RAJUK representative stressed the fact of the inclusion of the playgrounds and parks in the Detail Area Plans (DAP) of Dhaka city. The City Corporation focused on the lack of political will and budget constraints for the problems related to maintenance of parks and playgrounds of Dhaka city. Representative of PWD, RAJUK and NHA admit their involvement in changes of open spaces and they have done these type of violations for political pressure. The open spaces those are fully encroached in Khilgaon Rehabilitation Project (KRP) are under processing to give ownership of the occupied tenants and has continuous political pressure and lobbying to do so. The monitoring authority PWD is also under this pressure.

5.7. Conclusion

Changes of open spaces have occurred in number, size and area over the time for conversion, full and partial encroachment, grabbing and changes of land use. Changes in use have happened for changes of land use and losses of number of playgrounds and parks. Playgrounds used as socialization purpose and children‟s park are used for all age group. Access to open space by centroid radii method does not give the complete scenario of accessibility of outdoor play and recreation facilities of Dhaka city. User access also depends on the layout of open spaces, linkages to other community facilities and services, connections to other open space functions and facilities provided in open spaces. Playgrounds in Government housing projects were not facilitated by play tools and equipment. Playgrounds are used as multifaceted space for socialization. So playgrounds should be designed properly.

CHAPTER 6: RECOMMENDATIONS AND CONCLUSION

6.0. Introduction

The concluding chapter elaborately discusses the key research findings and recommendations. Finally, this chapter gives concluding remarks on the research subject.

6.1. Major Findings

i) *Type of open spaces*: According to standard, local open space includes play lot, play ground, play field, park and incidental open spaces. All type of local open spaces are not found in any one case of study. There are playfield, park and incidental open spaces in Housing Estate at Mohammadpur (HEM), play field and park in Uttara Model Town(UMT), park, play field, play lot and incidental open spaces are found in Khilgaon Rehabilitation Project (KRP). Play field, playground and play lot all are counted as playground for the study. Playground and park of the study areas are counted as open spaces for this research.

There is no standard size of playground and park in 1959"s master plan of Dhaka. According to DDSP(2016-2035), play field size in residential areas is 2-9 acres and local neighbourhood park size may be less than 1 acre. At present, size of playgrounds is compared with the DDSP standard . It is found that size of playgrounds in Housing Estate at Mohammadpur (HEM) are not up to the standard except one but size of park is according to standard, size of playgrounds and parks in Uttara Model Town (UMT) qualify the standard and also size of playgrounds and parks in Khilgaon Rehabilitation Project (KRP) qualify the standard except one playground.

ii) *Ratio of open space in housing*: The 1959"s master plan of Dhaka, recommended open spaces for housing was 4% of housing area. Ratio of open space and land in three housing was less than standard of 4% in the approved plans of housing. In the initial stage of planning, standard was not taken into consideration.

iii) *Distribution of open spaces*: The planned area of Housing Estate at Mohammadpur (HEM) was divided into six blocks from Block A to F. Every Block had at least two open spaces. In the case of large block, this number was three to four. At present, there are at least two number of open spaces in each block except Block E. Uttara Model Town is divided into sectors. Every sector had open spaces. Sector one and two are smaller than sector 3 and sector 4 in size. Each sector, sector of three and four had one playground and one park. Residential plots were oriented to central play lots in Khilgaon Rehabilitation Project (KRP). Play lot of one cluster was connected to another play lot by the walkway. Only one play lot is survived now as reduced size. Large size playgrounds are located in central zone of education and play.

iv) *Present condition of playgrounds and parks*: Playgrounds were not designed properly except three. The present physical, environmental and maintenance condition of playgrounds are not so suitable for play. Lack of grass, uneven ground, noise, dust, lack of proper cleaning of playground and toilet, lack of lighting at night are problems in using active and passively of playgrounds. Parks were designed and suitable for use though there are some maintenance problems and restriction for user by scheduling of time.

v) *Facilities of playgrounds and parks*: There is a lack of active, passive and ancillary facilities in playgrounds. Playgrounds are used extensively though there are no play courts and pitches, lack of toilet and drinking water facilities, less walking track and seating arrangements etc. Parks are used for passive recreation. Every park is furnished with grass, plant, flower plant and trees. Uttara sector four has a pond but there is no water ride. Parks are also used extensively though there is maintenance problem.

vi) *Multipurpose use of open spaces*: It is found from this research that playgrounds used in active and passive way for recreation. Playgrounds are used not only for play but also used for walking, jogging, roaming and recreational spaces like gathering, outing etc by the children to old people. Also, parks are used for walking, jogging, gathering, resting, playing and space for children‟s recreation.

vii) *User's profile of playgrounds and Parks*: Playgrounds are used active and passively by children to old people. Children from 13 to 19 years are the main active user of the playgrounds. The majority of the user are found to come to the playground daily in the afternoon (3 pm-6 pm). In the weekend, crowd becomes about double of the weekday people. There is no amusement park in the housing. Children‟s park is used by people of all ages. Parks are used mainly for socialization and outing.

viii) *Changes in number*: Decreasing trend in number of open spaces is evident in Government housing though a few open spaces were added afterwards. Factors responsible for these changes in numbers are conversion, grabbing, full encroachment and imposing restriction on using playground.

ix) *Changes in size*: Changes of size partially occurred for increasing and decreasing area of individual open spaces. Size of open spaces increased by occupying an adjacent area of other land and decreased for building water pump, club building, health care centre and school.

Partial encroachment occurred for facilitating community people. Club houses were built for managing and maintaining the playgrounds properly. Pump houses were built to supply water for the demand of increased population. Urban Primary Health Care Project serves the community as their health issue. Providing Shohid Minar is also a social issue for celebrating national mourning day. Shops are also required for light refreshment in playgrounds and parks.

Most of the playgrounds have cricket practice ground and it is restricted. Practices are done under club and only trainee can use this ground. Play area is highly reduced for this practice ground. Partial encroachment occurred with the consent of developer and maintenance authorities.

x) *Changes in area*: Since 1978 area of open spaces was decreasing for losses of open spaces in number, grabbing by adjacent plots and partial encroachment in HEM. Play area is also reduced for new design approach of two fields. Area of open spaces of UMT is also reduced for losses of open space in number and building club house and cricket practice ground. Losses of area of open space is high in KRP. After 2011, losses of open spaces in number has stopped. At present, partial encroachment is seen in playgrounds.

xi) *Changes in ratio of open spaces*: In HEM, population increased from 57288 to 1,37,059 for last 20 years but area of open spaces reduced from 18.862 acre to 16.878 acre. Total area of open space less than DDSP and PLDR standard. In UMT, playground qualified both DDSP and PLDR standard in 2001 and it qualifies only PLDR standard. In KRP, playground and parks were according to DDSP and PLDR standard and open spaces are far from both of this standard. The same condition is found in UMT and KRP for the last 20 years like HEM. So, fast increase of population and decreasing of open spaces are causes of reduction of ratio of open spaces in study areas.

xii) *There is a decreasing trend in number and size of the playgrounds and parks facilities in Dhaka city*: It is found from the study that the number and size of open spaces vary in number and size from approved layout plans to existing condition. Also the percentage of open spaces is reduced to .59% which is far below the standard for a city with more than 17 million population. It came out from the analysis that playgrounds and parks in Dhaka city have been disappearing and there is a need to protect all the playgrounds and parks in Dhaka city.

xiii) *Changes in uses of open spaces*: It is found from this research that playgrounds and parks have encroached full and partially. So, different type of sheds like workshop, shops, rickshaw garage, club house , school for disabilities, UPHCP building, water pump etc have occupied the playgrounds and parks. Type of land use has changed.

xiv) *Buffer area of centroid radii method is not the only determining factor of accessibility for the children of Dhaka city to enjoy outdoor facilities*: Though buffer area of accessibility in study areas covered all areas of HEM and Uttara but actual physical distance is quite high in the areas. There are other prevailing factors that obstruct the use of outdoor play and recreation facilities are location, layout type, maintenance of open spaces etc.

xv) *Layout, access and connectivity*: Four side frontages open space to road is more accessible. Twenty one open spaces in study areas were in four side road frontages in approved master plans of housing. At present, this number reduced to one. For partial encroachment and losses of open spaces these open spaces turned into three side and two side frontage, that means accessibility reduce highly. Accessibility and views have obstacled by encroachment. Also, Shohid Park in HEM is surrounded by shops except for two access gates. Anti social activities are more in this field than others. To provide a transparent boundary or proper monitoring for successful use of open spaces.

xvi) *Close proximity is the main reason for using playgrounds and parks in Dhaka city*: Most of the playgrounds and parks are situated half mile distance from the residents of housing except KRP. Most of the user expressed the reason for using playgrounds and parks is the close proximity within their community.

xvii) *Lack of security, poor maintenance and inadequate facilities and play accessories are the main reasons for not using playgrounds and parks by children in Dhaka city*: Most of the playgrounds and parks are found to be noisy, unclean, littered with garbage and lack of proper lighting at night. People used playgrounds up to 10 pm. Toilet facilities are not

properly designed and cleaned. It is found that facilities for cricket, volley ball, basket ball, swings and slides are not available in playgrounds. Facilities in parks are insufficient.

xviii) *After redesign of two playgrounds, social inclusion has reduced* . Moreover, there is no provision of facilities for girls and women which was addressed in Sustainable Development Goals.

6.2. Recommendations

The recommendations made in this section are based on the research findings from users‟ view study, users survey and assessment of accessibility and equity and views of inhabitants and responsible authorities presented in different chapters.

It is revealed from the research that the needs, desires and imagination for spending leisure time are different according to different age groups and gender. This group-wise analysis and recommendations should be the basis for the planning of the outdoor play and recreation provision for Dhaka city.

i) *Mapping of open spaces and immediate embargo to protect these open spaces:* It is important to map and list all the playgrounds and parks in Dhaka city and an immediate embargo should be imposed against any other land use development in order to protect the existing playgrounds and parks of Dhaka city. To protect the existing play and recreation areas, the list and the map should be publicly available at the Ward level so that the community can resist conversion of these play and recreation areas into other land uses.

ii) *Reviving of encroached open spaces:* In KRP, it is possible to revive at least 6 number of playgrounds and park those are under PWD jurisdiction and are used for commercial purpose illegally by local people, co-operatives and club. PWD has already get back the power of playground that was grabbed by Ansar VDP (Village Defence Party) department of Government. The ownership of Khilgaon Government High School occupied playground is PWD. So it is also possible to revive and may open for community people.

iii) Structures responsible for encroachment of the open spaces should be taken into account: Function of Urban Primary Health Care and club building in open spaces may be relocated. And also these buildings may be converted into recreation purposes providing indoor play facilities, toilet facilities, first aid facilities and refreshment facilities. Cricket practice ground reduced the play area and imposed a restriction for user. It is an income source of club. So, practice ground should be open to all or it should be removed from public playground.

iv) To stop reduction by partial encroachment of open spaces: Reduction for partial encroachment is an ongoing process for reduction of area of open spaces. Play area is also reduced for new design approach of two fields. So partial encroachment should be stopped and encroached area which is less or equal to 5% should be planned and equipped with play and recreation equipment that can be used as ancillary facilities of playgrounds and parks. Also special attention should be taken in designing of play grounds and parks so that area of play and recreation area will not reduce than before.

v) *To ensure both purposes like play and other passive activities:* It is found from this research that the playgrounds used not only for play but also used for walking, jogging and recreational spaces like gathering, outing etc by the children to old people. Also, parks are used for walking, jogging, gathering, playing and space for children‟s recreation. So, playgrounds should be designed in such a way that can fulfill both play and another passive recreational purpose. Neighbourhood parks should be designed for people of all ages and play area for kids and children below 13.

vi) To provide facilities for playing cricket, football and badminton: Open spaces in selected Government Housings, has a deficiency in play facilities. After all, cricket, football and badminton are the three games observed being played by the children of Dhaka city. So, play facilities needs to be provided in the playgrounds and parks.

vii) Playgrounds and parks should be more facilitated and designed to increase the number of user within proximity: Most of the user expressed the reason for using playgrounds and parks are the proximity within their community, which can be adjacent. Uttara Sector 4 park has a pond which can be facilitated with water rides to attract more people. So, the user will be more attracted when more facilities will be added in the open spaces.

viii) *To ensure security and safety, proper maintenance and adequate facilities and play accessories for increasing the use of playgrounds and parks in Dhaka city*: To increase the use of playgrounds and parks, it is necessary to manage and maintain the open space properly, to ensure user‟s safety, to provide facilities and proper monitoring to prevent anti social activities. Also, playgrounds and parks are used at night. Providing more lighting will also increase the safety and potentiality of open spaces. Vehicular access is a threat for under aged children and old people using playgrounds and parks. For controlling the speed of this area, authority can take measure by changing material, using signage and zebra crossing in proper location.

ix) *Increase transparency and accountability*: It is important to increase the transparency and accountability of the responsible agencies for proper management of playgrounds and parks. In this respect, a single agency comprising user development, city planning and social development professionals is recommended. Every year DCC allocates a budget for various development activities. A good amount is also found for development of parks. Thus expenditure on this budget about park development must be transparent and accountable.

x) *To ensure user participation planning and management of outdoor play and recreation provision*: It is evident that users participation is a key aspect for planning and management of playgrounds and parks. It is revealed from KII with inhabitants that inhabitants of the study areas are very unhappy with the maintenance condition of the playgrounds and the club members activities. They blame the local leaders‟ illegal influences on club management. From KII with representative of City Corporation, it is found that City Corporation decided to form a committee comprises local representatives from neighbourhood and City Corporation will act as a monitoring authority of the activity of the committees. Representative of City Corporation expects that the committee that will be formed will work better under their guidance.

Local level initiatives should be encouraged to undertake community level play and recreation provision. In this respect parents together with children can take initiatives. User from all the age groups, adults, boys & girls and young children and adolescents should be involved in these initiatives.

xi) *To provide policy support to priorities play and recreation*: Finally, A policy for the play and recreation should be formulated. The policy should comprise all the community level action plans and should be developed on the basis of users‟ perspective and needs. The play policy should be integrated into the child development agenda. All concerned government agencies, development partners, particularly UNICEF and national and international NGOs, should work together to include the children‟s policy in national agenda for the children's development. Play is not just about providing safe playgrounds and parks for children. It is fundamental to protecting their rights to be free to discover and explore their physical and social world on their terms. As Louise Chawla (2002a, p.14) noted “small changes in local play environment may have a big impact on children‟s lives”. A little effort to pay heed to children can contribute in a great way to the physical and mental development of our next generation (Ahmed and Sohail, 2005).

xi) *To provide more attention in redesigning of playgrounds*: After redesigning of two parks in Housing Estate at Mohammadpur, area of play has reduced and children do not get chance to play when elders play. So, special attention should take when redesign the playgrounds and parks increasing social inclusion.

6.3. Conclusion

Open space is the place where people refresh themselves, want to escape from monotonous urban life. This is where they regenerate their views and find encouragement to work for a better future. The quality of life in urban areas is severely threatened by extreme population pressure, lack of facilities, amenities, air and noise pollution. Open spaces of Dhaka act as a buffer area between neighbourhood and commercial zones, a positive outdoor living room for neighbourhood people. Playgrounds and parks in Government Housing projects in Dhaka are reducing fast by conversion, full and partial encroachment. Due to lack of proper management and facilities the existing playgrounds and parks cannot serve the people adequately. These open spaces have the potentials to be revived with necessary facilities which would be a great relief for the city dwellers where scarcity of open space is a major challenge.

It is not always necessary to spent a big budget for reviving these open spaces, it needs initiative by the government in partnership with local people and civic society organizations. Moreover, the users of these open spaces can contribute significantly to the planning and design phases with the support of professionals.

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APPENDICES

CHAPTER 3

Annex. 3.1: Co-relation Schema

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Objectives	Simple Variables	Data Collection Technique
1. To study the size and type of open spaces in the approved master plan and their present condition in the selected government housing projects.	Size of Open Space Type of Open Space	i)Collection of Approved Master Plans from a) NHA, b) RAJUK and C)PWD ii) Drafting from scan copy of Approved Master Plans. iii) Find out the size and Type of Open spaces from Approved Master Plans.
	Size of Open Space Type of Open Space	i)To find out the size of open space at present situation by Field Measurement. ii) To find out present type of open space by direct observation iii)To find out the newly created open spaces from wetland by direct observation. iv)The open spaces that are encroached by direct field observation.
2. To find out their changes in term of size, use, access and availability of facilities.	**Uses of Playground:** -breathing space - playing basket ball, volley ball , badminton, football, cricket, playing swing, playing slides -seating, walking, gossiping -using mazes, informal games -squatting -hawker	i)Find out the size of Open spaces from Google Maps since 2001 to 2019 by 5 years interval ii) Direct Observation iii) FGD
2. To find out their changes in term of size, use, access and availability of facilities.	**Uses of Parks:** -breathing space -taking rest - playing swing - playing slides -seating -walking -Mary go round - Slides -Train -Water games -informal games -gossiping -squatting -hawker -others	i)Find out the size of Open spaces from Google Maps since 2001 to 2019 by 5 years interval ii) Direct Observation iii) FGD

	Type of User: -Address of Residence -Age -Gender **Time of Use**: chart **Frequency of use by the user**: chart	Direct Observation FGD
	Facilities for Playground: -children‟s‟ corners -seating -shading devices (umbrella, any others) -basket ball court - volley ball court -badminton court -football court -cricket court -swing -slides -seating arrangements -walkways -toilets -drinking water facilities - first aid facilities -lighting - shopping -restaurant (light refreshment) -others	Direct Observations
2. To find out their changes in term of size, use, access and availability of facilities.	**Facilities for Parks:** -Plant, Flower ,Grass, Branch -Lake/ Pond -Shed, Walkway,Lighting -Restaurant, Toilet -Children‟s Play Facilities: -Mary go round, slides,Train, Water games, -Drinking Water Facilities	Direct Observations
3. To identify the factors responsible for changes of selected open spaces.	**Reason for Changes of size**: -Encroachment by School -Encroachment by club -Transformation into plots -Transformation of plots into open space **Reason for Changes of Use**: **Location**: **Surroundings**: **Physical condition of Field:** a) even b) uneven c) raised from Road Level (RL)	Direct Observations and FGD

3.To identify the factors responsible for changes of selected open spaces.	d) down from Road Level (RL) **Grass** a) absence of grass b) lack of grass c) Abundant **Vegetation:** Trees: Bushes: **Built structure** a) Club house b) School building c)Shops d) Others **Maintenance** 1. cleaning 2. rubbish collection 3. security 4. restriction for anti-social people 5. restriction for cycle movement 6. mowing 7. toilet cleaning 9. Repairing of mazes **Maintenance Office:** a)Exist b) not Exist b)representative of maintenance authority c)Complain and suggestion option **Environmental condition** 1.Noise: 2. Industrial gases 3. Gases of buses/scootersetc. 4. Crowd 5. Used for squatting 6. Used for Toileting 7. Others 8. No problem Comments of user regarding maintenance	
3. To identify the factors responsible for changes of selected open spaces.	Authority Views (NHA, PWD, RAJUK):	Key Informant Interviews

Annex. 3.2: Field observation check list

Playground/Park Observation Checklist:

1. Name of the playground/park
2. Address of the playground/park
3. Size of the playground/park
4. Type of the playground/park

5.Condition of the playground/park
a. Physical: Location and layout type, surface condition, type of full and partial encroachment
b. Environmental condition : Presence of grass, flower trees and trees, presence of dust, noise
c. Maintenance condition: Cleanliness of the toilets in parallel with playgrounds and parks , availability of waste bin, repairing of rides, benches, walkways and field, preparing of field like watering, mowing etc.

6.Type of facilities in this playground/park
i) Active facilities: court, pitch, goal post. play tools,
ii) Passive facilities: walkway, exercise space and equipment , sitting and rain shelter
iii) Ancillary facilities: toilet, drinking water, boundary wall and gate, lighting and refreshment facilities,

7. Responsible authority for maintenance of the playground/park
8.Total number of people in the playground/park
9.Total number of active user in the playground
10.Total number of passive user in the playground
11. Type of uses of playgrounds and parks
I) Active uses: play, exercise, riding rides (data sheet)
Ii) Passive uses: walking, roaming, seating, gathering, outing, waiting,meeting, enjoying green (data sheet)
12.Type of activities according to age in number during the whole day (data sheet).
13.What type of activities is common among people in playground/park (using data sheet)?
A.Among (6-12 years):
b. Among (13-19 years) :
c. Among (20-26 years) :
d. Among (27-33 years) :
e. Above 33:
14. Other observations

Time, date and signature of the observer

Annex. 3.3. Semi structured questionnaire for FGD

Sl. no	Questions
01	Where did users come from
02	Purpose of visit
03	What type of problems they feel

CHAPTER 4

Annex. 4.1a. Type of use of playgrounds and parks over time in HEM

Address With Field Name	Type of open spaces (Approved Master plan-1968)	Type of open spaces(Revised Master plan-1978)	Type of open spaces in 2001	Type of open spaces in 2011	Type of open spaces at Present	Changes of Type
MP-1	Park	Park	H. Centre	H. Centre	H. Centre	Converted
MPG 2	PG	PG	PG	PG	PG	Not changed
MPG 3	PG	PG	PG	PG	PG	Not changed
MPG 4	PG	PG	PG	PG	PG	Not changed
MPG 5	PG	PG	plots	plots	plots	Converted
MPG 6	PG	PG	plots	plots	plots	Converted
MPG 7	PG	PG	PG	PG	PG	Not changed
MPG 8	PG	plots	plots	plots	plots	Converted
MPG 9	PG	PG	PG & Park	PG & Park	PG & Park	Added park with PG
MPG 10	PG	PG	PG	PG	PG	Not changed
MPG 11	Park	Park	PG	PG	PG	Park to PG
MPG 12	PG	PG	PG	PG	PG	Not changed
MPG 13	PG	PG	PG	PG	PG	Not changed
MPG 14	Park	Park	PG	PG	PG	Park to PG
MPG15	Park	Park	PG	PG	PG	Park to PG
MPG 16	Park	-	-	-	-	Converted
MP 17	Plots, roads	Park	Park	Park	Park	Plot to Park
MPG 18	Low land	PG	PG	PG	PG	Low land to playground
MPG 19	Plots	Plots,road Rehabilitation	PG	PG	PG	Plot to playground
	Total =16 (5P, 11PG)	Total =16 (5P, 11PG)	Total = 15 (2P,13PG)	Total =15 (2P,13PG)	Total =15 (2P,13PG)	

Annex. 4.1b. Type of use of playgrounds and parks over time in UTM (sector 1 to 4)

Address	Type in Approved Master plan -1987	In 2001	In 2011	Present Condition
UPG-1	Playground	Play ground	Play ground	Play Field
UP-2	Park	Plots	Plots	Plots
UPG-3	Playground	Playground	Playground	Play ground
UP-4	Park	Park	Park	Park
	4(2PG, 2P)	3(2PG,1P)	3(2PG,1P)	3(2PG,1P)

Annex. 4.1c. Type of use of playgrounds and parks over time in KRP

Address	Approved Master plan, 1988	In 2001	In 2011	Present Condition	Changes
KPG 1	Play ground	Ansar camp	Ansar camp	Ansar camp	Grabbed
KP 2	Play ground	Play ground	Park	Park	PG to Park
KPG 3	Play ground	Illegal Encroachment	Illegally Encroached	Illegal Encroached	Encroached
KPG 4	Park	Converted into plots	Converted into plots	Converted into plots	Converted into plots
KPG 5	Play ground	Play ground	Play ground	Play ground	Not changed
KPG6	Play ground	Encroached	Encroached	Encroached	Encroached
KPG 7	Play ground	Encroached	Encroached	Co-operative, rickshaw garage	Encroached
KPG 8	Play ground	Enchroached	Encroached	Encroached	Encroached
KPG 9	Play ground	School with Field	School with Field	School with Field	Encroached
KPG10	Proposed School	Play ground	Play ground	Play ground	No changed
KPG11	Low land	Low land	Play ground	Play ground	Low land to Playground
	9 (8PG, 1P)	3PG	4(3PG, 1P)	4(3PG, 1P)	4(3PG, 1P)

Annex. 4.2a: Size of playgrounds and parks over time in HEM

Address With Field Name	Size of open spaces (Approved Master plan-1968)	Size of open spaces(Revised Master plan-1978)	Size of open spaces in 2001	Size of open spaces in 2011	Size of open spaces at Present	Changes of size	Changes of size in percentage
MP-1	1.37 acre	1.37 acre	-	-	-		
MPG 2	1.53 acre	1.53acre	1.52acre	1.36acre	1.36acre	0.17	11.11%
MPG 3	2.39 acre	1.03acre	1.03acre	1 acre	1acre	1.39	58.15%
MPG 4	1.66acre	1.66acre	1.65acre	1.34acre	1.34acre	.32	19.27%
MPG 5	0.633acre	0.633acre	-	-	-	-	
MPG 6	0.262 acre	0.262 acre	-	-	-	-	
MPG 7	0.294acre	0.45acre	.45acre	0.42acre	.42acre	0.126acre increased	10.20%
MPG 8	.126acre	-	-	-	-	-	
MPG 9	1.84acre	1.84acre	1.5acre PG-.804 & park-.694acre	1.5acre PG-.804 & Park-.694acre	1.5acre PG-.804 & Park-.694acre	0.34/ grabbed by mosque	18.47%
MPG 10	0.522 acre	0.522 acre	.10 acre	.10acre	.10acre	0.422	80.84%
MPG 11	1.47 acre	1.3 acre	1.14 acre	0.91acre	0.91acre	0.56	38.09%
MPG 12	1acre	1acre	1acre	0.998acre	.998acre	0.002	0.2%
MPG 13	0.684acre	0.684	0.596	0.415	0.411	0.273	60%
MPG 14	0.684acre	0.684	0.596	0.415	0.411	0.273	40%
MPG15	0.37acre	0.37acre	0.37acre	0.37acre	0.247acre	0.123	33.24 %
MPG 16	0.52acre	-	-	-	-	-	
MP 17	-	1.91acre	1.90acre	1.89acre	1.89acre	0.02	1.04%
MPG 18	-	6.07 acre	6.07acre	5.3acre	5.3acre	0.77	12.68%
MPG 19	-	-	0.198acre	0.196 acre	0.196acre	.002 acre	1%
	16.58acre	22.54acre	Total = 15 (2P,13PG)	Total =15 (2P,13PG)	16.878 acre		

Annex. 4.2b: Size of playgrounds and parks over time in UMT (sector 1 to 4)

Address	Size in Approved plan -1987	In 2001	In 2011	Present Condition	Increased area	Encroached area(reduced)
UPG-1	2.05acre	3.25 acre	3.125 acre	3 acre	0.95acre	0.125acre
UP-2	0.94 acre	-	-	-	-	
UPG-3	2.89 acre	4.18 acre	4.43 acre	3.80 acre	0.91acre	0.63 acre
UP-4	3.62acre	3.62	3.25	3.25acre		0.37 acre
	9.5 acre	3(2PG,1P)	3(2PG,1P)	10.5acre		

Annex. 4.2c: Size of playgrounds and parks over time in KRP

Address	Area in Approved Master plan, 2nd Phase, 1988	In 2001	In 2011	Present Condition	Use Changes
KPG 1	4.26 acre			-	Grabbed
KP 2	3.52acre	3.52acre	3.34 acre	3.34 acre	PG to Park
KPG 3	2.80 acre	-	-	-	Encroached
KPG 4	2.70 acre	-	-	-	Converted into plots
KPG 5	1acre	0.10	0.10	0.10 acre	Not changed
KPG6	1.10acre	-	-	-	Encroached
KPG 7	1.20acre	-	-	-	Encroached
KPG 8	2.20	-	-	-	Encroached
KPG 9	7.91acre	-	-	-	7.91acre
KPG10	24 acre for school	10.42acre	10.42 acre	10.42 acre	24 acre for school
KPG11	-	-	7.16 acre	7.16 acre	Low land to PG
	26.69acre	3PG	4(3PG, 1P)	19.94acre	4(3PG, 1P)

Annex. 4.3a: Present condition and facilities of Playgrounds

Housing Estate at Mohammadpur															
Playgrounds	Surface	Clean	Court	Pitch	Goal Post	Cricket practice ground	Sitting	Walkway	Shelter	Trees	Grass	Boundary Wall	Boundary Gate	Toilet	Drinking Water
Housing Estate at Mohammadpur															
MPG 2	U	N	N	N	N	Y	N	Y	N	Y	P	Y	Y	Y	N
MPG 3	E	N	N	N	N	Y	N	N	N	Y	P	Y	Y	Y	N
MPG 4	U	N	N	N	N	Y	N	Y	N	Y	P	Y	Y	Y	N
MPG 7	U	N	N	N	Y	N	N	N	N	Y	N	Y	Y	N	N
MPG 9	E	N	N	N	N	N	N	N	N	Y	N	Y	Y	N	N
MPG 10	U	N	N	N	N	Y	Y	N	N	Y	P	Y	Y	Y	N
MPG 12	U	Y	N	N	N	Y	Y	N	N	Y	N	Y	Y	Y	Y
MPG 13	E	N	N	N	N	Y	N	Y	N	Y	N	N	N	Y	N
MPG 14	U	N	N	N	N	Y	Y	N	N	Y	P	Y	Y	N	N
MPG15	E	Y	N	N	Y	N	N	Y	N	Y	N	N	N	N	N
MPG 19	E	N	N	N	N	N	N	N	N	Y	N	Y	Y	N	N
Uttara Model Town(sector 1 to 4)															
UPG 1	U	N	N	N	Y	Y	Y	Y	N	Y	P	Y	Y	N	N
UPG-3	U	N	N	N	Y	Y	Y	Y	N	Y	P	Y	Y	Y	Y
Khilgaon Rehabilitation Project															
KPG 6	U	N	N	N	N	N	N	N	N	N	N	-	Y	N	N
KPG12	U	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	N	N
	10U(15)	13N(15)	15N	15N	5Y/15	10Y/15	5Y/15	6Y/15	15N	14Y/15	8N/7P	13Y/15	13Y/15	8N/15	2Y/15

Annex. 4.3b: Present condition and facilities of Parks

Parks	Surface Condition (Even/Uneven)	Clean(yes/not)	Informal play area	Rides	Sitting	Walkway	Shelter	Trees	Grass	Boundary Wall	Boundary Gate	Toilet Facilities	Drinking Water	Refreshment
Housing Estate at Mohammadpur														
MP 17	Even	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Uttara Model Town(sector 1 to 4)														
UP-4	Even	Y	Y	Y	Y	Y	Y	Y	P	Y	Y	Y	Y	N
Khilgaon Rehabilitation Project														
KP 3	Even	N	Y	Y	Y	Y	Y	Y	P	P	Y	Y	Y	N

Annex. 4.4a: Present condition and facilities of playgrounds (Photograph)

Playgrounds of Mohammadpur

a. Physical Condition

b. Maintenance Condition

c. Mazes

1. Panir tank / Solimullah road field (MPG 13), Mohammadpur

2. Physical Condition of Striker‟s Field (MPG 2)

3. Physical Condition of Eidgah Field (MPG 12)

Playgrounds of Uttara (sector 1-4)

a.Physical Condition

b. Facilities

c.Cricket Practice Ground

d. Facilities

4. Uttara sector 3 (UPG-1) playground

a. Physical Condition

b. Kricket Practice ground

5.Uttara sector 4 playground (UPG-3)

Playgrounds of Khilgaon Rehabilitation Project

6. Physical Condition of Khilgaon Playground (KPG-10)

7. Physical Condition of Khilgaon Playground (KPG-5)

Annex. 4.4b: Present condition and facilities of parks (Photograph)

a.Master plan

b. Vegetation

b. Trees

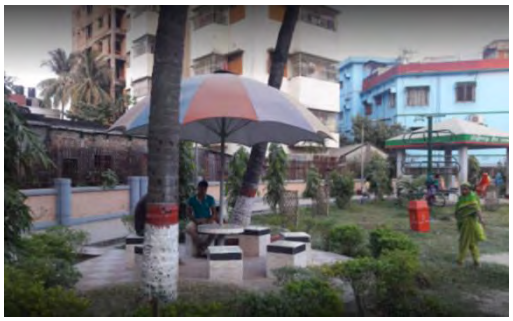
d. Children play area

1. Shyamoli Children‟s park (MP 17), Mohammadpur

a. Physical Condition

b. Pond

2. Uttara Sector 4 park (UP 4), Uttara



3. Chowdhuripara children‟s Park (KP 3), Khilgaon

Annex. 4.5a: Active and Passive uses of playgrounds in housings in weekday (Annex. 4.7)

Housing	6:00-9:00 am		9:00-12:00pm		12:00-3:00pm		3:00-6:00pm		6:00-9:00pm		9:00pm-12 am	
	A	Pa	A	Pa	A	Pa	A	Pa	A	Pa	A	Pa
HEM	113	47	120	72	47	51	365	92	65	259	2	10
UMT	75	590	40	121	-	-	270	640	-	350	-	-
KRP	80	-	85	-	145	45		30	-	-	-	-
	268	637	245	193	192	96	635	762	65	609	2	10
A-Active User, Pa-Passive user												

Annex. 4.5b: Active and Passive uses of playgrounds in housings in weekday ((Annex. 4.7)

Housing	6:00-9:00 am		9:00-12:00pm		12:00-3:00pm		3:00-6:00pm		6:00-9:00pm		9:00pm-12 am	
	A	Pa	A	Pa	A	Pa	A	Pa	A	Pa	A	Pa
HEM	336	84	262	133	85	172	506	295	30	334	2	93
UMT	105	520	85	144	-	-	250	540	-	200	-	-
KRP	80	-	85	-	-	-	175	30	-	30	-	-
	521	604	432	277	85	172	931	865	30	564	2	93
A-Active User, Pa-Passive user												

Annex. 4.6a: Active and Passive uses of parks in housings in weekday (Annex. 4.7)

Age range (years)	6:00-9:00am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
MP-17	48	100	215	450	645	4
UP-4				240		
KP-2	33	17		58		

Annex. 4.6b : Active and Passive uses of parks in housings in weekend (Annex. 4.7)

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
MP-17	82 (P)	105	270	450	2020	2
UP-4				300		
KP-2	35	10		93		

Annex. 4.7: Use pattern of playground and park users

Date:19.08.2019(Monday), Week day , Striker Field (MPG-2)

Legend: Play- ● , Walking- ▲ , Exercise- ◔ , Sitting- ■ , Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00- 9:00pm	9:00pm-12 am
Below 6						
6-12			● - 6			
13-19		■ - 1	● - 3, - 4	● -11 , ■ -9		
20-26			■ -5	■ -5	■ -20 ▲ -1	
27-33				■ -2		
Above 33	■ - 7	■ -14	■ - 6			
	7(Pa)	15 (Pa)	24(9,15)	27(11, 16)	21(Pa)	
Women guardians wait in this field of the surrounded schools						

Date:19.08.2019(Monday), Week day Iqbal road Field (MPG-3)

Legend: Play- ● , Walking- ▲, Exercise- ◔, Sitting- ■, Roaming -R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00- 3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12		● -3	● - 2	● -7, R-5		
13-19		● -12	● -12,R-10(Girls)	● -20		
20-26				● - 4	R-10	-
27-33	R-2			■ -2		
Above 33			■ - 4			
	2(Pa)	15(A)	28(14, 14)	38(31, 7)	10	

Date:19.08.2019(Monday), Week day, Humayn Road playground (MPG-4)

Legend: Play- ● , Walking- ▲, Exercise- ◔, Sitting- ■, Roaming -R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					● - 15	
6-12		● -2		● - 40		
13-19	● -10,■ - 5	● -12	R - 6, ■ 2	● - 40, ■ -2	■ - 4	
20-26		● -2	● -5	● -3	■ -20	
27-33		4			■ - 27	
Above 33	W-5					
	20(10, 10)	20 (16, 4)	20(5, 8)	85(83, 2)	66(15,51)	

Date:26.08.2019(Monday), Week day, Chaderhat Playfield(MPG 7) , Johuri moholla.
Legend: Play- ● , Walking- ▲, Exercise- ◔, Sitting- ■, Roaming -R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	● -7	● -5		● - 9	● -5	
13-19	● - 11	● - 15 , ■ -		● - 20, ■ - 10	■ -	
20-26			■ - 8	● - ■ -	■ -10 R-	■ - 2
27-33				■ -5		
Above 33	◔ - 5					
	23(A-18, 5)	20(A)	8(P)	44(29,15)	15(5,10)	2(P)

Date:26.08.2019(Monday), Week day; Name: MPG 10, Tajmahal road,
Legend: Play- ● , Walking- ▲, Exercise- ◔, Sitting- ■, Roaming -R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12:00 am
Below 6						
6-12	● -2(rides),2 (sand)	● -		● - 4		
13-19		● - 2		● -		
20-26	●	● -	● -	● -	■ -	■
27-33	●	● - ■	■		■ -	■
Above 33	■ -2			■ -5	■ - 5	
	6(A-4, P-2)	2		9(4,5)	5(p)	

Date:26.08.2019(Monday),Weekday MPG 11 Shiya Mosque, Noor Jahan Road, Block D
Legend: Play- ● , Walking- ▲, Exercise- ◔, Sitting- ■, Roaming -R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12	● - 4			● - 17		
13-19		■ - 4		● - 15 , ■ -5	■ -10	
20-26		● - 8		● - 30		
27-33						
Above 33	◔ -1				■ - 5	
	5(4,1)	12(8,4)		67(62,5)	15(p)	

Date:02.09.2019(Monday), Week day Eidgah Field (MPG-12)

Legend: Play- ● , Walking- ▲ , Exercise- ◔ , Sitting-■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12		● -2		● - 10		
13-19	● -10	● -12	● - 6 ■ -8	● -17	■ - 4	
20-26		● -2	● - 6	● -16	R- 8	
27-33	S-5	4 biker		■ -11	■ - 27	2
Above 33	W-5				◔ -1	
	20(A-10,10)	20 (A-16, P-4)	20(A-12, P-8)	54(A-43, P-11)	40	2

Date:02.09.2019(Monday), Week day Solimullah Road Playfield, Block D, MPG 13

Legend: Play- ● , Walking- ▲ , Exercise- ◔ , Sitting-■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	●	● -15	● - 4	● - 6	● -	
13-19	● -22 ■ -	● - ■ - 4	● -	● - 15 ■ - 20	■ -	
20-26	● -	● -	● - ■ -	● - 25 ■ - 30	■ -90 R-30	■ - 2
27-33	●	● - ■ -20		■ -10	■ -	
Above 33	■ - 2, ▲ - 3			■ -	■ -	
	27(A-22, P-5)	39(15,24)	4(Pa)	106(46,60)	120(30,70)	2(P)

Date:02.09.2019(Monday), Week day Shohid Park (MPG 14), Azam Road, Block D.

Legend: Play- ● , Walking- ▲ , Exercise- ◔ , Sitting-■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	●	● -15	● -	● - 5	●	
13-19	● -15 ■ - 4	● - 2 ■ - 6	● -	● - 15 ■ - 5	■ -	
20-26	● -	● - 9	● - ■ -7	● - 15 ■ - 10	■ -14 R-	■ - 2
27-33						
Above 33	■ -8				◔ - 3	
	27(A-22, P-5)	32(26,6)	4(Pa)	50(35,15	17(P)	2(P)

Date:09.09.2019(Monday), Week day MPG15, Zakir Hossain Road, Block E

Legend: Play- ● , Walking- ▲ , Exercise- ◗, Sitting-■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	● -7	● -9	● - 6	● - 9	● -	
13-19	● - ■ -	● - ■ -	● -	● - ■ - 10	■ -	
20-26	● -	● -	● - ■ -	● - ■ -	■ -18 R-	■ - 2
27-33	●	● - ■ -		■ -	■ - ● - 15	
Above 33	■ - ▲ - ◗ -			■ -	■ - ◗ -	
	7(A)	9(A)	6(A)	19(9,10)	33(15,18)	2(P)

Date:09.09.2019(Monday), Weekday, MPG 19, Byzly moholla road,Block F

Legend: Play- ● , Walking- ▲ , Exercise- ◗, Sitting-■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	● -5	● -	● -	● - 4	● -	
13-19	● - ■ -	● - 10 ■ -	● -	● - 7	■ - 2	
20-26	● -	● -	● - ■ -	● - ■ -	■ - R-	■ - 2
27-33	●	● - ■ -0		■ -	■ - ● -	
Above 33	▲ - ◗ - 3			■ -	■ - ◗ -	
	8(A)	10(A)		12(A)	2(p)	2(P)

Date:23.08.2019(Friday), Weekend, Name: Striker Field (MPG-2), Iqbal Road

Legend: Play- ● , Walking- ▲ , Exercise- ◗, Sitting- ■ , Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12						
13-19	● -20	■ - 30		● -20 ■ -14	■ - 10	
20-26	● -32 ■ -18			● - 16 ■ -2	■ -32	
27-33		▲ -14 ■ -20				
Above 33	▲ -7					
	77(32,18)	64 (14,50)		52(36, 16)	42(Pa)	

Date:23.08.2019(Friday), Weekend, Humayn Road (MPG-4)

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12	●-15	● -15				■-2
13-19	● -20, ■-4	● - 15	■-2	● -20 ■-14		
20-26		● -10		● - 16 ■- 2	■ -7	■ - 4
27-33		▲-14, ■ - 20				
Above 33						
	50(35, 4)	40 (35,5)	2	42(36, 16)	7(Passive)	6(P)

Date:23.08.2019(Friday), Weekend, Name: Eidgah Field (MPG-12)

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12						
13-19	● -45	● - 35	■-150	● -55 ■ -20	■ -10	
20-26	● -50	● -15		● - 10 ■ - 20	■ -7	■ - 4
27-33	■ - 30			■ - 10		
Above 33		■ - 20(15 Women)		R-10		■ - 40
	125 (95, 30)	70 (35,5)	150	115(65, 60)	17(Passive)	44(P)
Gathering is more for a grave of a peer						

Date:30.08.2019(Friday), Weekend

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12	● - 15	● - 20	●-12	● - 40		
13-19	● -15	● - 10	● -5	● -40	■ -10	
20-26			● - 2	● -20,■ -20	■ -7	■ - 10
27-33	■ - 10	●-10		■ - 25		
Above 33		■ - 10		R-5		
	40(30,10)	50 (40,10)	19(A)	145(100,45)	17	10(P)
Anti social activities visible						

Date:30.08.2019(Friday),Weekend Chader hat Play field(MPG 7) and eidgah, Johuri moholla,

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	● -	● -	● -	● - 9	● -	
13-19	● - ■ -	● - 20 ■ -	● -	● - 40 ■ - 10	■ -	
20-26	● -	● -	■ - 5	● -	■ -5	■ - 2
27-33	●	■ -7		■ -5		
Above 33	◗ - 3					
	23(18, 5)	27(A)	5(P)	64(49,15)	5(P)	2(P)

Date:30.08.2019(Friday), Weekend, **Name:** MPG 10,Tajmahal road Play field , Block C

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12				● - 7		
13-19		● - 10				
20-26			-	-		
27-33						
Above 33	■ -2			■ -	■ - 2	
	2(p)	10(A)		7(A)	2(p)	

Date:06.09.2019(Friday), Weekend MPG 11 Shiya Mosque, Noor Jahan Road,Block D

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm -12 am
Below 6						
6-12		● -15	● - 10	● - 17	● -30	
13-19	● -67	● -30 ■ 15	● - 15	● - 15 ■ - 20		
20-26		● - 20	● - 7, ■ -5	● - 30		
27-33						
Above 33	■ - 2				■ - 70	
	67(65,2)	80(65,15)	37(32, 5)	82(62,20)	100(30,70)	

Date:06.09.2019(Friday), Weekend MPG 13, Solimullah Road Playfield, Block D
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below						
6-12		● -5		● - 20		
13-19	● -22	● -25 ■ 10	R-12	● - 0 ■ 20	■ -	
20-26		● -		● - 25 ■ - 60	■ -90, R-30	■ - 4
27-33		■ -20		■ -20		
Above 33	■ - 8, ▲- 3			■ -8	■ -	
	27(22, 5)	39(15,24)	4(Pa)	183(75, 108)	120p	4(P)

Date:06.09.2019(Friday),Weekend, MPG 14 Weekend, Shohid Park, Azam Road, Block D
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12		-	● - 3	● - 15	●-15	
13-19		● - 15 ■ - 2	● - 10	● - 15 ■ - 5	● -15	
20-26			● - 10 ■-7	■ - 10	■ -14	■ - 20
27-33						
Above 33			■ - 5		◗ - 3	■ - 25
	27(A-22, P-5)	17(15,2)	35(23,11)	45(30,15	47(P)	45(P)
Anti social activities is more inthe field						

Date:13.09.2019(Friday), Weekend, MPG15, Zakir Hossain Road, Block E
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	●-7	● -6	●-5	● - 9	●-	
13-19	● - ■ -	● - ■ -	● -	● - 13 ■ -	■ -	
20-26	● -	● -	●- ■ -	●- ■ -	■ -5 R-	■ - 2
27-33	● -	● - ■ -		■ -	■ - ●-	
Above 33	■ - ▲ ◗ -			■-	■ - ◗ -	
	7(A)	6(A)	6(A)	22(A)	5(P)	2(P)
Small size fenced by iron mesh only used for play						

Date:13.09.2019(Friday), Weekend, MPG 19, Weekend, Byzly moholla road, Block F

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12	● -10	● -	● -	● - 9	● -	
13-19	● - ■ -	● - 20 ■ -	● -	● - 15	■ - 2	
20-26	● -	● -	● -	● -	■ -	■ - 2
27-33						
Above 33	◗ - 3			■ -		
	13(10,3)	20(A)		24(A)	2(p)	2(P)

Date:17.09.2019(Monday), Weekday, Uttara Sector 3 playground (UPG-1),

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00 - 3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6		R-7		R-10	-	
6-12	● -	● -	● -	Ride-20	● -	
13-19	● - ■ -	● - 5 ■ -	● -	● - 30 ■ - 15	■ - 10	
20-26	● - 15 ▲ - 110	● - ■ - 5	● - ■ -	● -30 ■ - 25	■ -20 R-10	
27-33	▲ - 130	■ - 20		■ -50	■ -10	
Above 33	■ - 40 ▲ - 200 ◗ - 15	■ - 7 ▲ -40		■ -40 ▲ - 100	■ - 100 ◗ - 20 ▲ - 50	
	500(15,485)	84(5,79)		310(80,230)	220(p)	
After 8:00 pm field becomes closed						

Date:20.09.2019(Friday),Weekend Uttara Sector 3 playground (UPG-1),

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6	Rides-5	R-7		R-10	-	
6-12	● -10	● - 20	● -	● - 20 Ride-20	● -	
13-19	● - ■ -	● - 15 ■ -	● -	● - 30 ■ - 15	■ - 10	
20-26	● - 15 ▲ - 40	● - ■ - 15	● - ■ -	● -30 ■ - 25	■ -20 R-10	
27-33	▲ - 90	■ - 20		■ -50	■ -10	
Above 33	■ - 40 ▲ - 210 ◗ - 15	■ - 7 ▲ -40		■ -40 ▲ - 100	■ - 50 ◗ - 20 ▲ - 50	
	480(25,375)	107(45,52)		340(100,240)	170(p)	
After 8:00 pm field is closed						

Date:17.09.2019(Monday), Weekday, MPG 7,UPG-3, PG, Uttara sector-4, Weekday,
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00- 12:00pm	12:00- 3:00pm	3:00- 6:00pm	6:00- 9:00pm
Below 6				R-10	
6-12	●-20	● - 20		● - 50 , Ride-20	●-
13-19	● - 20	● - 15		● - 60 ■ - 15	■ - 10
20-26	■ - 20	■ - 15		●-60 ■- 25	■-20, R-10
27-33	●	■ - 20		■-50	■-10
Above 33	▲ - 150 ◗ - 5	■ - 7 ▲-40		■-40 ▲- 200	■ - 20 ◗ - 10, ▲ -50
	115(60,105)	117(35,42)		500(190,410)	130P

Date:20.09.2019(Friday), Weekend UPG-3. Uttara sector-4,
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00- 12:00pm	12:00- 3:00pm	3:00- 6:00pm	6:00- 9:00pm
Below 6	R-10			R-10	-
6-12	●-40	● - 10		● - 30, Ride-20	●-
13-19	● - 40	● - 30		● - 60 ■ - 15	■ - 10
20-26	■ - 30	■ - 15		●-60 ■ - 25	■-20 R-10
27-33		■ - 30		■-50	■-10
Above 33	■ - ▲ - 200 ◗ - 5	■ - 7 ▲-40		■-40 ▲- 200	■ - 20 ◗ - 10 ▲ - 50
	325(80,145)	132(40,92)		490(150,300)	130

Date:24.09.2019(Monday), Weekday KPG-5
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00- 12:00pm	12:00- 3:00pm	3:00- 6:00pm	6:00- 9:00pm	9:00pm-12 am
Below 6					-	
6-12	●-	● - 10		● - 10	●-	
13-19	● - ■ -	● - 15 ■ -		● - 15 ■ - 15	■ -	
20-26	● - ■ -	● - ■ -		●- ■ -	■ - R-	■ -
27-33	●	● - ■ -		■ -	■ - ● -	
Above 33	■ - ▲ - ◗ -	■ - ▲-		■ - ▲-	■ - ◗ - ▲ -	
		25		40		

Date:27.09.2019(Friday), Weekend KPG-5

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6						
6-12	● -	● - 10		● - 10	● -	
13-19	● - ■ -	● - 15 ■ -		● - 15 ■ - 15	■ -	
20-26	● - ■ -	● - ■ -		● - ■ -	■ - R-	■ -
27-33						
Above 33						
		25		40		

Date:24.09.2019 (Monday), Weekday KPG-10

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6				R-10		
6-12	● -20	● - 10		● - 30	● -	
13-19	● - 20 ■ -	● - 30 ■ -		● - 60 ■ - 15	■ - 10	
20-26	● - ■ -	● - ■ -		● -60 ■ -	■ - R-10	■ -
27-33	●	● - ■ -		■ -	■ -10 ● -	
Above 33						
	40A	40A		150(135,15)	30P	

Date:27.09.2019 (Friday), Weekend, KPG-10

Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6					-	
6-12	● -30	● - 20		● - 30	● -	
13-19	● - 30 ■ -	● - 30 ■ -		● - 60 ■ -	■ - 10	
20-26	● -20 ■ -	● -10 ■ -		● -30 ■ -	■ - R-10	■ -
27-33	●	● - -		-	■ -10 ● -	
Above 33						
	80	60		120	30	

Date:09.09.2019(Monday), Week day
MP 17, Shyamoli Sishu Park ,Block B(Old B)
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6				R-5		
6-12	● -	● - 10	● - 15	● - 45	● -	
13-19	● - ■ -	● - 12 ■ - 1	● - R-60	● - ■ - 130	■ - 120	
20-26	■ - 15		■ - 45	■ - 160	■ -300	■ - 4
27-33	●	■ -70	Chess-80	■ -50	■ -100	
Above 33	▲ - 30 ◗ -3	■ -7	S-15	Chess-30 ◗ - 30	■ - 100 ◗ - 25	
	48(P)	100(22,78)	215(15,200)	450(45,305)	645(p)	4(P)

Date:13.09.2019(Friday)Weekend, Shyamoli Childrren"s Park, MP 17
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12 am
Below 6		R-7		R-20	-	
6-12	● -	● -10	● - 20	● - 45	● -	
13-19	● -	● - 12	● -	● - 15	■ - 100	R-10
20-26	● - ■ - 49	● - ■ - 20	● - ■ - 90	● - ■ - 155	■ -900 R-100	■ -
27-33		■ - 50	R-50 ■ -110	■ -200	■ -600	
Above 33	▲ - 30 ◗ - 3	■ - 7		■ -8	■ - 300 ◗ - 20	
	82 (P)	105(22, 83)	270(20,250)	450(60,390)	2020(p)	2(P)

Date:17.09.2019(Monday), Weekday UP_4 Park
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12:00 am
Below 6		R-		R-20		
6-12				● - 40		
13-19				● - 20		
20-26				■ - 10		
27-33				■ -10		
Above 33				■ -150 ◗ - 10		
				240(60,180)		

Date:20.09.2019(Friday), Weekend Uttara Sector 4 Park (UP-4)
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12:00 am
Below 6				R-20		
6-12				● - 60		
13-19				● - 30		
20-26				■ - 15		
27-33				■ -15		
Above 33				■ -170 ◗ - 10		
				300(90, 210)		

Date:24.09.2019(Monday), Weekday KP-4 ,Park
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00- 9:00 am	9:00-12:00pm	12:00-3:00pm	3:00-6:00pm	6:00-9:00pm	9:00pm-12:00 am
Below 6		R-		R-8	-	
6-12	● -	● -	● -	● -20	● -	
13-19	● -	● -	● -	● - 15	■ -	R-
20-26						
27-33	●	■ - 10		■ -7		
Above 33	■ - 15 ▲ - 15 ◗ - 3			■ -10 ▲ - 5	■ - ◗ -	
	33	10		58(35,23)		

Date:27.09.2019(Friday), Weekend KP-2
Legend: Play- ●, Walking- ▲, Exercise- ◗, Sitting- ■, Roaming-R

User"s Age range (years)	6:00-9:00 am	9:00-12:00pm	12:00-3:00pm	3:00- 6:00pm	6:00-9:00pm	9:00pm-12:00 am
Below 6		R-		R-8	-	
6-12	● -	● -	● -	Ride-20	● -	
13-19	● - ■ -	● - ■ -	● -	● - 15 ■ -	■ -	R-
20-26				- 10	R-	■ -
27-33	●	● - ■ -	R- ■ -	■ -10	■ - ● -	
Above 33	■ - 10 ▲ - 15 ◗ - 15	■ - 10		■ -20 ▲ - 20	■ - ◗ -	
	40	10		93		

CHAPTER 5

Annex. 5a: List of professionals

Sl. no	Name of the Person	Designation and Organization
01	Mr.Ashraful Islam	Deputy Town Planner Rajdhani Unnayan Kartripakkha (RAJUK) (Capital Development Authority) Dhaka
02	Mr.Asaduzzaman	Sub Divisional Engineer Dhaka City Corporation (DNCC) Urban Planning Department, Dhaka
03	Mr.Shirajul Islam	Project Director Dhaka City Corporation (DSCC) Urban Planning Department, Dhaka
04	Md. Mahbubur Rahman	Executive Engineer Arboryculture Dept. Dhaka PWD Division-IV, Dhaka
05	Md. Shirajul Mowla	UD Assistant General Section Dhaka PWD Division-IV, Dhaka
06	Mr. Towfiquzzaman Shuvo	Assistant Chief Architect, National Housing Authority, Dhaka

Annex. 5b: Checklist for Interview with professionals

Sl. no	Questions
01	Comments and views about the existing condition of play grounds and parks in case study areas which are under City Corporation jurisdiction .
02	Reason for poor maintenance, partial encroachment, losses of open spaces etc
03	Farther planning for improving the existing condition