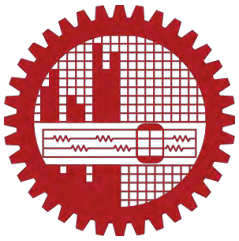
APPRAISAL OF DETAILED AREA PLAN AND DEVELOPMENT OF A REVISED CONCEPTUAL PLAN FOR DHAKA CITY

By

Sarnav Talukder

A thesis submitted to the Institute of Appropriate Technology (IAT), Bangladesh University of Engineering and Technology (BUET) in partial fulfillment of the requirements for the degree of

Master of Science in Management of Technology (MoT)



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Abstract

Dhaka the capital and largest city of Bangladesh is one of the fastest-growing megacities of the world which is suffering from traffic congestions, waterlogging, housing shortage, pollution, waste management, utility services, inadequate recreational facilities, and many other problems. To mitigate these problems RAJUK launched many development projects from its inception. But none of these are successful. Rajuk's one of the recent initiatives was the Detailed Area Plan (DAP), the lowest tier in the three-level planning process of Dhaka Metropolitan Development Plan-DMDP (1995-2015). It was basically a local level plan which is supposed to illustrate details of the proposed Landuse zoning, infrastructure and utility services including the 3-D vision of each segment of the local sector. The stages of DAP preparation included geo-referencing of mauza maps, different types of surveys, consultation with stakeholders, draft plan preparation, public hearing, and final plan preparation. But after all these initiatives DAP is accused as a failure, because of the wrong time frame and vague deliverables.

The objectives of this research were to assess DAP 2010 to evaluate the physical development planning method of DAP for DMDP to find its shortcomings and to propose a pragmatic DAP approach which is contextual and implementable. A functional and implementable sample concept DAP for BUET has been presented that shows essential parts of a DAP.

During the study, it was found that socio-economic survey, physical feature survey, topographic survey and land use survey were done during the period of 2005-2006. DAP is supposed to be launched almost simultaneously with the structure plan. But in this case, DAP was launched in 2010 with many deviations that had already happened in DMDP 1995-2015. Delayed launching itself was a great failure. This idea of initiating DAP was good. There were a lot of limitations found after evaluating the DAP report and database. Therefore, the study tried to figure out some idea for the development of a functional and implementable DAP for Dhaka City. After reviewing the international concepts of DAP, a guideline for doable was prepared and a checklist is developed for the evaluation of DAP. On the basis of the checklist, DAP by RAJUK was assessed. Then an application Model is developed on a case study area which was Bangladesh University of Engineering and Technology, Polashi, Dhaka area to provide an idea about DAP. The model gives an idea of up to what extent a DAP should be worked out to make it a success. This model may be followed to make DAP for other areas of Dhaka city or any other urban areas of Bangladesh. It is important and necessary to launch DAP at an appropriate time. On the other hand DAP is basically an urban design initiative which should describe all sort of detail information regarding infrastructure, utility, road, street furnishing, streetscape, landscape etc. related detail description i.e. location of water network, drainage, parking, lighting, open spaces etc. up to 3-D built-environment of user level. This study would help prepare future DAP and implement at an appropriate time frame with responsive urban design details. The appropriate urban design of Dhaka will result in a livable city.

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List of Abbreviations

ADB	Asian Development Bank
ADP	Annual Development Plan
BBS	Bangladesh Bureau of Statistics
BEPZA	Bangladesh Export Processing Zone Authority
BEZA	Bangladesh Economic Zones Authority
BR	Bangladesh Railway
BRT	Bus Rapid Transit
BRTA	Bangladesh Road Transport Authority
BRTC	Bangladesh Road Transport Corporation
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CRDP	City Region Development Project
CUA	Central Urban Area
DAP	Detailed Area Plan
DMDP	Dhaka Metropolitan Development Plan
GIS	Geographic Information System
HBRI	House Building Research Institute
ITS	Intelligent Transport Systems
IWM	Institute of Water Modelling
LG	Local Government
LGED	Local Government Engineering Department
LGRD	Local Government and Rural Development
MRT	Mass Rapid Transit
NHA	National Housing Authority
O&M	Operation and Management
PPP	Public-Private Partnership
RAJUK	Rajdhani Unnayan Kartripakkha
RDP	Regional Development Planning
STP	Strategic Transport Plan
SWOT	Strength Weakness Opportunity and Threat
ToR	Term of References
UAP	Urban Area Plan
URP	Urban and Regional Planning
DWASA	Dhaka Water Supply and Sewerage Authority

Chapter 1: Introduction

1.1 Background

Detailed Area Plan (DAP) is the third and final tier of the Dhaka Metropolitan Development Plan (DMDP) 1995-2015. DMDP is a three-tier plan package, the Structure Plan, the Urban Area Plan, and the Detailed Area Plan. Preparation of Dhaka Metropolitan Development Plan (DMDP) under the project 'Preparation of Structure Plan (SP), Urban Area Plan (UAP) and Detailed Area Plan (DAP)-Metropolitan Development Plan Preparation and Management in Dhaka' (UNDP No. BGD/88/052 and TAPP No. TA/BGD/88-052) was started in 1992. The Dhaka Structure Plan (1995-2015) and the Urban Area Plan (1995-2005) were completed under DMDP package during 1992-1995, which was approved and published in the Bangladesh Gazette in 1997 and Detailed Area Plan (2010-2015) was approved and published in the Bangladesh Gazette on June 2010 (DMDP, 1997). DAP has been prepared following the policies and guidelines made in the Structure Plan and Urban Area Plan. It has provided more detailed planning proposals for specific sub-areas of Dhaka metropolitan area. Rajdhani Unnayan Kartipakkha (RAJUK) is its custodian. The duration prescribed in the structure plan for the implementation of this DAP was up to the year 2015. RAJUK was supposed to guide the other authorities to implement their projects according to the DAP guidelines and all the physical development activities to follow the proposals prescribed in it. But it is now being widely acknowledged that the implementation of the DAP is a complete failure primarily because it's being launched after 15 years of DMDP of which it was the detail. There is a sense of despair among the planning community and environmentalists (Morshed, 2013). The private land developers have filled out a large tract of wetlands in the fringe areas of Dhaka despite the enactment of various environmental acts and policies, thereby significantly deviating from the policies stated in the structure plan of the city (Islam, 2009). Many of the housing projects did not maintain the rules and regulation and the proposed land use that is described in DAP (Mohsinat, 2011). Invariably, the finger is pointed towards the land development companies putting aside the mistakes of the DAP. While they are to blame, the simple matter of fact is that the land use plans like DAP did not work because of its inadequacies (Morshed, 2013). Besides, no organized program was undertaken to implement the consolidation strategies stated in the DMDP (Islam, 2011). RAJUK has already started in advance to prepare New Structure Plan and the New

Detailed Area Plan (DAP) for the period of 2016-2035 with the ADB finance under City Region Development Project as the existing DMDP and DAP were made for the period up to 2015 (RAJUK, 2015). With the advance of the knowledge base and technology, detailed and extensive urban form and function data are becoming increasingly available, with great potential to provide new insights for sustainable urban planning which preserves the eco-system and maintains or even increases social equity. Yet no attempt was made in DAP to conduct any analytical or empirical analysis using data related to interactions between the built environment, transport, land use, and other socio-economic processes. Again, in DAP the Geographic Information System (GIS)-based technology is mainly used for mapping and visual displays, which are limited to static displays of past and current data sets (Bari, 2009). In this case, rapid use of technology-based planning is able to play a vital role to prepare the plan and to make it successful to implement. So it is necessary to find out ways to implement the development initiatives for Dhaka city. This research work is to find out the limitations of DAP, identify the reasons for DAP not being successful in implementation for DMDP and learn from the failure of DAP. This research also attempts to develop a checklist for future DAP, conceptual sample plan to enable future DAP to be functional and implementable.

1.2 Objectives of the Study

The objectives of this research work are to access and evaluate the physical development planning method of DAP for DMDP and to propose a pragmatic DAP which is contextual and implementable. The objectives of the study are:

1. Appraisal and identification of the status of DAP for DMDP;

2. Development of a functional and implementable concept DAP implementable in Dhaka city.

1.3 Profile of the Study Area

The Detailed Area Plan (DAP) was prepared for the Dhaka Metropolitan Development Plan (DMDP) area under RAJUK jurisdiction. It covers the current extent of RAJUK's control area of 1432sq.km and proposes an additional 96 sq.km (a total of 1528sq. km or 590 sq. mile) incorporating the extended area of Gazipur City Corporation and remaining part of Dhamsona Union of Savar Upazila. RAJUK divided its jurisdiction into five

groups and eleven locations in order to complete the task efficiently. Group-A (North-East Part) covers three paurashavas including Tongi, Gazipur, and Kaliganj together with surrounding rural settlements and flood Plain areas of Balu, Sitalakhya and Brahmaputra River. Group-B (South-East Part) covers Narayanganj Paurashava, Kadam Rasul Paurashava, and its surrounding areas, Dhaka-Narayanganj-Demra (DND) Triangle flood protected areas including Siddhirganj Paurashava. Group-C (Central Part) is surrounded by the river Buriganga, Sitalakkhya, Balu, Turag and Tongi Khal. Dhaka City Corporation (DCC) jurisdiction area is within Group-C. Group-C covers important establishments of capital Dhaka like Bangladesh Secretariat, Motijheel, Kawran Bazar commercial areas, International Airport, Old Dhaka, etc. Group-D (South-West Part) covers Keraniganj and Zinjira. Rest of the area of this Group is mainly Dhaleswari flood plain. Group-E (North-West Part) covers Savar Paurashava, Export Processing Zone (EPZ), Turag flood plain. Locations-9, 11, 16 covers the eastern fringe areas of Dhaka. Other locations are in the different parts of Dhaka (DAP, 2010).

1.4 Organization of Dissertation

This thesis is divided into six chapters. This introductory chapter is chapter 1, which presents background information on DAP and present situation including setting an objective of the research. Chapter 2 is the Research Methodology which describes the details research procedure. Chapter 3 reviews the Detailed Area Plan (DAP) and Past Plans to assess the gaps. It includes a review of DAP, present plans, Dhaka and DAP related plans and researches. Chapter 4 finds the way of development of a theoretical framework for analysis. It describes international concepts and parameters of a functional DAP, international case studies were done and checklist developed from the literature review and case studies for the evaluation of Dhaka-DAP. Chapter 5 makes the analysis and synthesis of DAP to assess inbuilt problems. Chapter 6 is a proposed application model of DAP on a case study area which shows the process for an efficient DAP. The process may be extended to different parts of Dhaka DAP. Finally, Chapter 7 is the chapter of recommendations and conclusion which summaries the key finding and suggest improvements.

1.5 Summary of Context

The Dhaka Metropolitan Development Plan (DMDP) in the form of Structure Plan and Urban Area Plan was prepared during the period 1992-1995 to provide policy guidelines for the development of Dhaka Metro for the 1995-2015 period. The policies and strategies adopted in the plan were to provide a development control guidelines for the Dhaka Metro until the preparation of the third of the three-tier new urban development plan document named Detailed Area Plan (DAP). But from the problem statement, it has been found that there are some strong reasons behind the failure of DAP. Each tier of the urban development plan document should be closely and progressively placed within the first five years to keep each tier relevant to its previous tier. The objectives of this study are the appraisal and identification of the status of DAP and to propose a functional and implementable concept DAP for Dhaka city. DAP, in reality, is the urban design of the area concerned and not a blown-up map as is normally presented.

Chapter 2: Research Methodology

2.1 Introduction

This research work followed some specific methods and processes. They have been divided into sub-sections. The study has been completed by following the steps shown below:

Step 1: Problem identification and conceptualization

Firstly, the report of DAP for DMDP, relevant literature, journals, research papers, etc. were studied and reviewed to understand an ideal DAP. The softcopy of Geographic Information System (GIS) database of DAP for DMDP was collected from RAJUK for its detail analysis using ArcGIS software. These were the secondary source of data.

Step 2: Development of a framework for research by analyzing international examples and to identify authentic DAP formulation process.

Step 3: Format of desktop research based on published data, from various sources.

Step 4: Designing of questionnaire and interview formats to complement the desktop research.

In this step, a survey questionnaire was developed. This was the primary source of data which was used to develop a conceptual framework for the development of Dhaka city. The interview format was prepared to collect the opinions of the expert people like urban planners, engineers, architects, environmentalists and the relevant people of DAP for DMDP. This evaluated DAP and accumulated the ideas to prepare a new conceptual plan for Dhaka city.

Step 5: Compilation of analysis and interpretation of the collected data

The collected data was compiled, analyzed and interpreted to synthesize the result and research report was prepared. Microsoft Excel used for data analysis and ArcGIS was used for spatial analysis. In this study, SWOT analysis was used to find out the appraisal of DAP. On the other hand, a model of sample DAP has been developed to analyze the proposals from the expert for the conceptual development plan of Dhaka city.

Step 6: Documentation of findings

The last task of the study was the preparation of the thesis report. Just after the completion of the analysis of the study, the draft report was prepared.

2.2 Research Tools

2.2.1 Checklist Development

A checklist was developed from the literature review and case studies for the evaluation of DAP. Parameters found from the checklist have been used to evaluate the present status of DAP and propose an appropriate one.

2.2.2 SWOT Analysis

SWOT Analysis (Figure 2-1) is a strategic planning technique. It is used to evaluate strength, weaknesses, opportunities, and threats for particular technological replacements and alternatives. Each box in the following figure indicating the internal and external factors of strength, weaknesses, opportunities, and threats for any technological choices. It involves specifying the objective of the technology project or technology assessment and identifying the internal and external factors that are favorable and unfavorable to achieve that objective. SWOT technique was credited to Albert Humphrey. (Humphrey, 2005).

Figure 2-1: SWOT Analysis

(Source: SWOT, 2019)

Parameters of SWOT

Parameters of SWOT are Strengths, weakness, opportunities, and threats. Among these strengths and weakness are frequently internally-related, on the other hand, opportunities and threats commonly focus on the external environment. The name is an acronym for the four parameters the technique examines the following characteristics.

Strengths: It contains the characteristics of the technology project that give it an advantage over others.

Weaknesses: In includes the characteristics that place the technology project at a disadvantage relative to others

Opportunities: It describes the elements that the project could exploit to its advantage

Threats: It defines elements in the environment that could cause trouble for the technology project.

The objective setting should be done after the SWOT analysis has been performed. This would permit to achieve goals or objectives to be set for the organization. The benefit of SWOT analysis is not limited to profit-seeking organizations. SWOT analysis used in any technology decision-making situation when a desired end-state has been defined. SWOT analysis is done to identify the problems and prospects of an area and develop a program for implementation responding to the SWOT. Examples include non-profit organizations, governmental units, and individuals. A SWOT analysis may also be used in pre-crisis technology planning and preventive crisis technology management. This analysis may also be used in creating a recommendation during a viability study or survey for ant technological assessment and forecasting.

2.3 Research Method

In this research, SWOT Analysis was considered as a research tool for evaluating each and every sector of Detailed Area Planning (DAP) and formulate a detailed development program responding to the context.

It considered the following sectors,

1. Land Use Planning
2. Transport Planning

3. Urban Housing
4. Public Facilities: Drainage, Water Supply, Solid Waste Management, Sewerage and Sanitation, Energy and Telecommunication, Education Facilities, Health Care Facilities, Telecom technologies internal and external features considering the strategic fit of strength, weakness, opportunity, and threat.
5. Environmental Planning
6. Open Space For Recreation And Aesthetics
7. Disaster Prevention And Mitigation
8. Cityscape with Urban Design and Landscape
9. Governance and Institutional Development

2.3.1 Source of Data

There were two sources of data. These are,

a. Primary Data

DAP document was thoroughly studied to assess the structure and procedural lapses and gaps. A survey questionnaire was also developed which was the primary source of data complementing the observations. It was used to develop a conceptual framework to find out the appraisal of DAP and to develop a functional conceptual plan for Dhaka city. The interview format was prepared to collect the opinions of the expert people like urban planners, engineers, architects, environmentalists and the relevant people or worked of DAP for DMDP. GIS database of DAP was collected from the RAJUK.

b. Secondary Data

The secondary sources for data and information were the internet, books, journals, related studies, journal, publications and other sources of information.

2.3.2 Sampling Design

For the purpose of the study and for empirical research, experts are selected from the people involved in various process of DAP using judgmental sampling techniques. Firstly, the experts were approached for their valued feedback on selecting techniques based on their industry experience and expertise. Secondly, General users have been chosen based on their user experience. The sampling design is summarized in the following table (Table 2-1).

Table 2-1: Summary of Sampling Design

Type	Details
Expert Opinion	Experts who worked in the different sectors of the Detailed Area Plan (DAP)
Number of Experts	Twenty (20)
Sampling Technique	Judgmental

Chapter 3: Review of DAP and Past Plans

This chapter reviews the literature to provide a background on the issue discussed in this thesis. It describes the Detailed Area Plan (DAP) under the Dhaka Metropolitan Development Plan (DMDP) by RAJUK.

3.1 Detail Area Plan (DAP)

The Detailed Area Plan (DAP) is the result of the last several years of extensive activities related to the preparation of the physical plan of Dhaka City, the capital of Bangladesh. The stages of DAP preparation included geo-referencing of mauza maps, different types of surveys, consultation with stakeholders, draft plan preparation, public hearing, and final plan preparation. The socio-economic survey, physical feature survey, topographic survey, and land use survey was done during the period of 2005-2006. The high tech digital GIS (Geographic Information System) database was prepared for the very first time for Dhaka under the project. Quality checking of survey activities was done by Survey of Bangladesh (SOB) (DAP, 2010). This rigorous survey is supposed to provide the existing situation of the planning area. However, it may be noted that.

3.1.1 Purpose of the Detailed Area Plan

The provision of the Detailed Area Plan (DAP) is inherent in the Structure Plan with some specific purposes. These are:

a. Provide detailed basic infrastructure and services in the project area through systematic planning.

b. Create a congenial environment to promote economic activities.

c. Improve the drainage system and protect flood flow zones from encroachment.

d. Create service centers to enable urban growth.

e. Serve as a reference document for building permission and land clearance.

f. Provide guidelines for public and private investment priorities.

g. Provide relevant planning policies for sustainable development at the micro-level.

h. Serve as a detailed document for Land use and development control, both at intermediate and micro level.

3.2.2 Objective of the Project

The main objectives of the DAP are as follows:

a. To provide a quality urban design having aesthetic, flexibility and functional characteristics.

b. To develop a program for public sector action aiming at the implementation of the plan.

c. To prepare a database and disseminate it in a professional manner.

d. To provide and guide private sector development.

e. To provide security and clarity to future inhabitants and investors.

f. To prepare guidelines for future infrastructure development in detail.

3.2.3 General Objectives of DAP

The general objectives for the preparation of the DAP were:

a. Implement the Structure Plan (SP) and the Urban Area Plan (UAP) policies,

b. To Guide and control urban development in an orderly manner in preferred areas, as per guidelines set in SP and UAP.

c. Create an urban environment where citizens enjoy the services that suit urban living. It is usually at the user level, i.e. micro-level, with every detail.

3.2.4 Specific Project Objectives

The specific objectives in the proposal to prepare the DAP are:

a. Implementation of Dhaka Metropolitan Development Plan 1995-2015.
b. Data Management and Dissemination.
c. Preparation of Multi-sector Investment Plan.
d. Ensuring Clarity and Security of Investment.

e. Providing Detailed 3-D Guideline for Development.
f. Ensuring Sustainable Environment.

3.1.5 Duration of the Detailed Area Plan (DAP) and Amendment Options

Dhaka Metropolitan Development Plan (DMDP) prepared for 20 years carrying 1995-2015 periods. Detailed Area Plan (DAP) prepared under this project extended to 2015 (Figure 3-1). However, every plan requires periodic review and updating which is usually done every five years. The consultants propose that the plan should be reviewed at the end of 2015. At the same time initiative should be taken to review and update of the plan accordingly at the end of 2015, so that it can be extended for a further period of 10 years, i.e. 2025. RAJUK is empowered to amend its plan from time to time by Section 74 (2) of the Town Improvement Act. If development and expansion trend during this period 2015 to 2025 calls for the preparation of a fresh three-tier development plan, RAJUK by dint of the authority conferred to it by Section 73 (1) of Town Improvement Act could take initiative for its jurisdiction (DAP, 2010).

SP, UAP, and DAP should be successively introduced within the first 5 years of the launching of the Structure Plan (SP) to keep it relevant to the context. The DAP under discussion was launched 15 years after launching of SP.

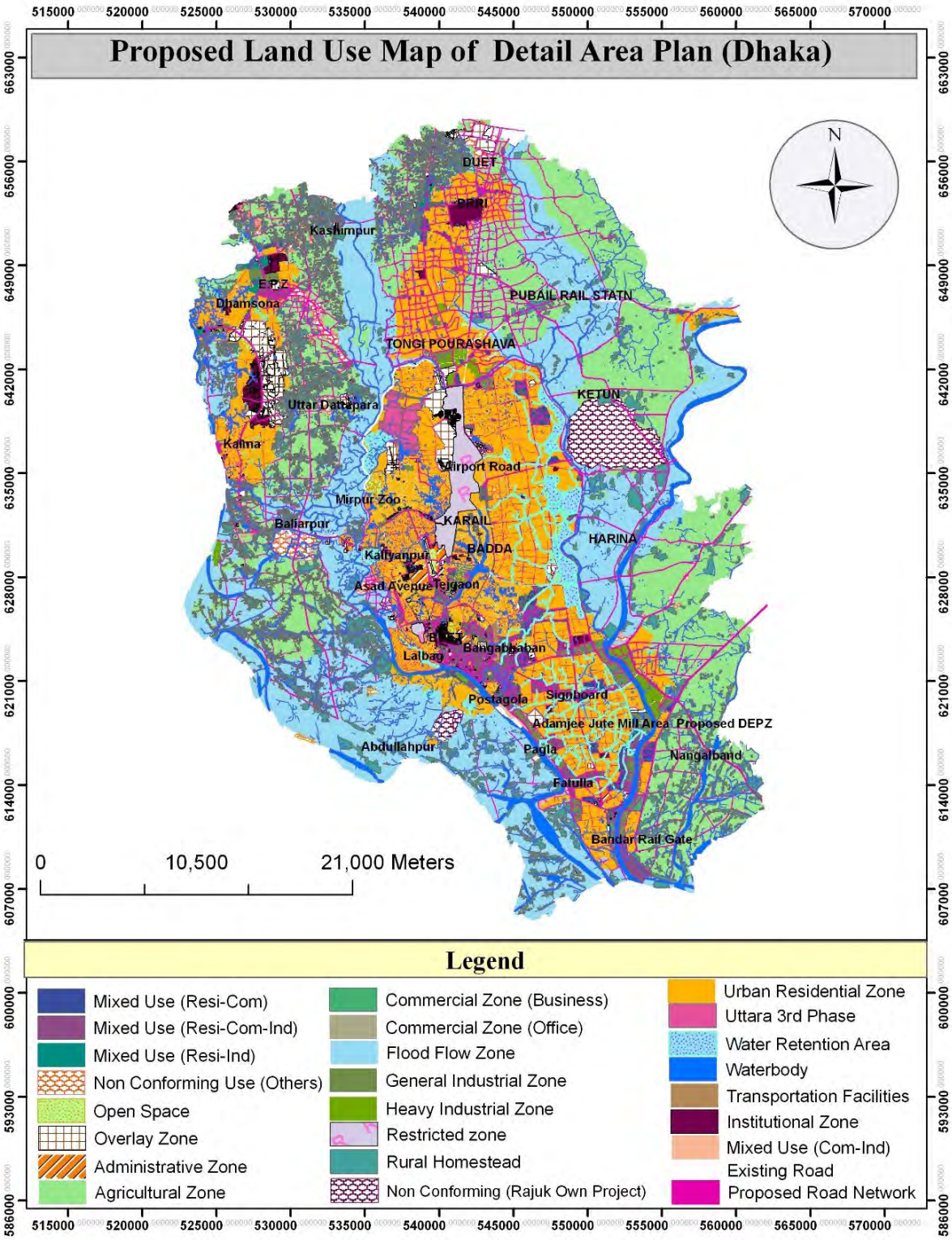


Figure 3-1: Proposed Land Use Map of Detail Area Plan (2010-2015), Dhaka

(Source: Rajuk, 2010)

3.2 Review of Present Plans

3.2.1 Dhaka Metropolitan Development Plan (DMDP)

DMDP was prepared in 1995 by RAJUK for its entire 1528 sq.km area. It was a package of three plans- Structure Plan, Urban Area Plan, and Detailed Area Plans. Every plan category was designed to meet some particular need. The project was funded by UNDP, World Bank, Asian Development Bank and executed by UNCHS/HABITAT in Dhaka. The main objective of the project was to prepare a hierarchical multi-sectoral development plan comprised of Structure Plan, Master Plan, and Detailed Area Plan. The nomenclature of the mid-level plan that is Master Plan, was, however, later changed to Urban Area Plan to avoid confusion with the plan title mentioned in the Town Improvement Act 1953 (RAJUK, 2009).

It includes three parts:

a. Structure Plan: 1995-2015
b. Urban Area Plan: 1995-2005
c. Detailed Area Plan (DAP): 2010-2015

a. Structure Plan 1995-2015

The structure plan (Figure 3-2) identifies the magnitude and direction of spatial growth within the DMDP area and sets forth spatial and sectoral policies over a longer period of time (1995-2015). The major and critical strategic decisions and policies regarding spatial growth are reviewed in this section. The review of the status of implementation of the Structure Plan gives a frustrating picture. Most proposals were vastly ignored and remained unattended. MDP Structure Plan proposed 31 policies under different sectors like, spatial and environmental sector, infrastructure sector, socioeconomic sector, etc. of which only 8 policies were partly implemented and 23 policies which were a staggering three-fourth were not implemented at all. As a consequence, the city failed to gain the benefits of the policies and recommendations of the DMDP Structure Plan (Mowla, 2015).

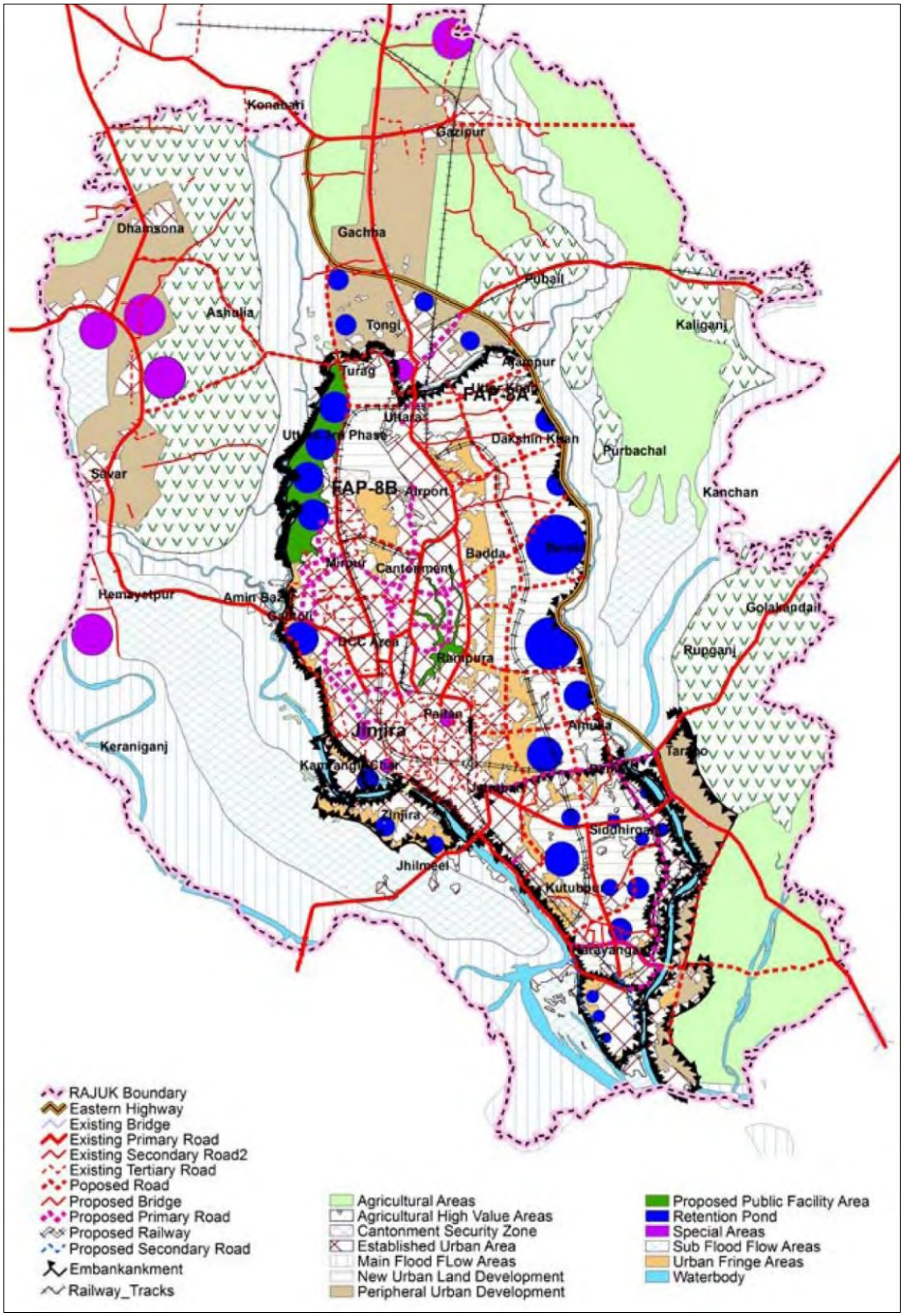


Figure 3-2: DMDP Structure Plan (1995-2015)

(Source: RAJUK, 1997)

Achievements and Failures

The Structure Plan Area demarcated the DMDP area into several classifications to guide future growth areas and an indication of potential locations to manage future growth. This plan also suggested long-term planned new area development through flood protection and conventional development in dispersed flood-free areas. Suggestions were also made to integrate cantonment and control and rehabilitation of the urban core. This initiative was good but suggested long-term planned new area development through flood protection and conventional development in dispersed flood-free areas did not succeed.

b. Urban Area Plan 1995-2005

It is the second tier of the three-stage DMDP plan package. The urban area plan (1995-2005) provides a mid-term strategy for ten years from 1995. This plan has defined the geographic boundary that covers mainly the urban areas. Part-1 of the UAP report describes the Spatial Planning Zone (SPZ), existing infrastructure locations, and public and private sector development commitments therein. The approach towards management of Urban Land Use Zones is described in the Part-2 of the report. Part-3 of the report contains the interim planning and development rules. Its proposals divided structure plan area into 26 strategic planning zones to implement Urban Area Plan (UAP). Then proposals were made for each zone (RAJUK, 2009).

There has been a mixed-status of implementation UAP proposal. About fifty percent of the proposals were implemented consciously or unconsciously. For example, it is not under a central framework, by various development authorities including RAJUK, while many of the proposals were left out.

RAJUK has very limited capacity to influence other agencies about their segment of implementation. It is a major reason for the failure to implement proposals. Nor does it have the capacity to procure huge capital from the government for project implementation. In this plan, DMDP proposed a new apex planning organization which should be established with sufficient authority and power. The issues relating to transport were later dealt with by newly commissioned Dhaka Transport Coordination Authority (DTCA) (RAJUK, 2015).

Transport and urban planning are interrelated issues. But DTCA lacked urban planning components. As a result, DTCA may contribute very little in bettering the critical and important city transport problems and issues. It also unsuccessful to implement many of the policies and proposals of the structure plan. Later, the Strategic Transport Plan was formulated by the government, which also has largely remained unimplemented (RAJUK, 2015).

Achievements and Failures

Urban Area Plan which mid-term strategies for 10 years from 1995 to 2005. Under this entire DMDP area was divided into 17 SPZ and detail land use development recommendation has been given after identifying the problems of each SPZ. But this plan did not complete in time. Urban area plan was a subdivision of structure planning zones.

c. Detailed Area Plan (DAP) 2010-2015

It is the third tier of the three-stage package of DMDP plan that is meant to be implemented and not just a development guideline. RAJUK took up this project in 2004 and completed in 2010, fifteen years (2010) after the preparation of the DMDP. What were the RAJUK's consideration for the delay is not known but it amounts to inefficiency? The DAP was prepared for the entire 1528 sq. km of RAJUK area and it was not for selected SPZs as suggested in the structure plan (RAJUK, 2015).

The major focus of the DAP was, first to regulate over free for all development within the RAJUK area through land-use zoning and second, to lay down the framework for the development of future infrastructure and services. While the first objective could not be achieved, the second focus has virtually been ignored.

DAP prepared a land-use zoning plan besides the infrastructure development plan 15 years after DMDP. The land-use plan specified where future land uses have to be located. It was based on DMDP' 1995 and in 15 years much of the scenario had changed, making the DAP a farce. It is a part of development control. Any developer intending to make any use of any particular land or develop any structure has to obtain a land-use clearance from RAJUK consistent with DAP. But it was observed that developments have been in many places where land uses are being cropped up ignoring the DAP land-use zoning plan. In such cases, either the developer totally ignores RAJUK by not seeking any permission or

violates his approved permission. Development does not take place in one day. The violations took place due to RAJUK's inefficiency and corruption. In many such cases, RAJUK simply ignored and overlooked, as these misdeeds are mostly done by the rich and the powerful. Regarding infrastructure development, no step has been taken to implement any negligible guidelines. This has hampered planned spatial growth of the city and deprived the new developers, particularly in the city fringe.

Achievements and Failures

Definitely, the Detailed Area Plan (DAP) was a great initiative to make Dhaka city livable. But now it is partially serving as a reference document for land clearance and building permission. Its main objectives were not successful. It is a blown-up version of the urban area plan. It did not provide quality urban design guidelines having aesthetic, functional and flexibility characteristics. Topographically, DAP is supposed to be very precise to enable development initiatives in detail at micro-level but there is a complaint of serious survey error. Minor survey errors may be acceptable in DMDP but definitely not in DAP.

3.2.2 Review of Dhaka Structure Plan 2016-2035

RAJUK is the implementing agency of Dhaka Structure Plan (2016-2035). It has been prepared under the Regional Development Planning (RDP) Project within the City Region Development Project (CRDP, Package No. CRDP/ RAJUK//S-01, Loan No. BAN-2695). This project was started in December 2012 and completed in March 2015 (RAJUK, 2015).

Review of existing DMDP (1995-2015) was the main objective of the Regional Development Planning (RDP) Project. Preparation of a revised and updated strategic plan for Dhaka Metropolitan Region for the period of 2016-2035 was another goal of this project. The core consideration of this project was the shifting of underlying viewpoints of the current situation of Dhaka city, spatial planning and future vision of the Dhaka Metropolitan Region (DMR) (RAJUK, 2015).

Dhaka Structure Plan 2016-2035 borrows heavily from the immediate past structure plan of RAJUK under DMDP. The proposed new one has deteriorated further and has altogether discarded the DMDP-1995 instead of improving upon it. Unfortunately, none of these past successive plans were implemented properly and the relevant authorities

never tried to learn anything from our past failures. Dhaka Structure Plan's main task was serious scrutiny of DMDP-1995 as per the terms of reference (ToR) of ADB during this project "Regional Development Planning (RDP) under City Region Development Project (CRDP). It was to learn and implement future strategy and policies from it. But it did not take consideration from the past plans and starting anew from the scratches. Therefore it loses its link with the past and the context. This clearly reveals the urban governance challenges of Dhaka City. The complexity opens the door for building capacities, improving efficiency and reducing corruption. It can be combined from its reactive posture to one of anticipation based on the principles of foresight, integration, and engagement which will be fine. But it argues that by non-compliance of the main ToR of the RDP under CRDP, the Dhaka Structure Plan 2016-2035 in its present format is actually a failure and requires gross revision (Mowla, 2015)

Achievements and Failures

DMDP Structure Plan (2016-2035) did not fulfill the objectives for which it was commissioned. Apparently, it has tried to envision realistic and feasible alternatives for development be drawn for well-coordinated execution of proposed strategies and plans. It was intended to build in-house capacity for preparation and implementation of policies, plans, and projects. The Structure Plan is a policy document that sets the ground or assists and serves as the guideline for subsequent local level plans. But this plan has the same errors as the previous one. Though launched almost in time, it failed to take care of the next two tiers of execution i.e. DAP in time. Most of the basic ingredients of a typical structure plan like waterlogging, traffic congestions are missing in it, which was supposed to be there and a review of DMDP' 1995, to determine the future strategy was also ignored.

3.3 Review of Dhaka Related Plans

3.3.1 DACCA Town Planning Report, 1917

The famous Town Planner Sir Patrick Geddes was commissioned to make a development plan recommendation for Dhaka city during the British colonial period. Geddes created a proposal after a weeklong visit to the city. Because of the time constraint, he mentioned the inadequacy of his own 'diagnostic survey' in Dhaka. But he showed the way to deal with particular aspects of the city and proposed that further surveys should be conducted

in the same line to complete the process of diagnostic survey and consequently to produce a more authentic master plan for the city. His emphasis was to conserve the indigenous character of the town during making plans to accommodate growth. His plan divided Dhaka city into zones, which offered an outline for the development of the old town area with colonial offices and residential buildings around Ramna Green. His idea was in favour of "conservative surgery" and not gross "amputation". But that plan was never adopted formally or no efforts were taken for its implementation.

3.3.2 East Pakistan Planning Sub-Committee, 1948

A comprehensive planning gap was felt to accommodate sudden growth. Due to the absence of any planning body, in 1948, the East Bengal (or East Pakistan) government created a planning division under which a sub-committee prepared a physical plan for the city's expansion (Islam, 1996). However, this plan lacked formal background studies. The plan was a sort of development scheme concentrated on about 50 square kilometers area around Dhaka. It suggested improvement of roads, new roads construction, new residential area (Dhanmondi for high class, Azimpur, and Motijheel for government employee), an industrial area (Tejgaon), 'New Market' shopping center and hotel development (Shahbagh). The residential plan was partially implemented but the impacts of these development projects have been quite significant on the spatial structure of the city (Ameen, 1998). All these areas have revealed to be centers of activities. Mirpur and Mohammadpur were designated to rehabilitate non-Bengali refugees arriving from India. These represented the first introduction and overview of the Western concept of 'sites and services' and the 'core house' for the general masses (Islam, 1996). Tejgaon was developed to encourage factory development and expansion to provide employment to basically non-Bengali immigrants. These schemes and plans were later adopted in the 1959 master plan. These new physical developments, though piecemeal in their efforts, reflect European concepts of urban planning and design with functional zoning of land use (Mowla, 2007).

3.3.3 DACCA Master Plan, 1959

The first comprehensive master plan for Dhaka was prepared by a consortium of British firms Minoprio, Spensely, and Macfarlane in 1959 under Colombo Plan of

Commonwealth. The objective of this master plan was to establish planning principles rather than to lay down a detailed, comprehensive and inflexible scheme. Two main problems for the development of the city were identified by it:

i. Shortage of land above the flood level on which to build and;

ii. The congestion in the old central area of Dhaka (Minoprio, Spensely and Macfarlane 1959)

The plan was prepared over a 20-year planning horizon (1958 to 1978) with an estimated population increase of 40% (1.75% per annum) during the period. The plan defends the land use pattern, zoning, water bodies, flood prone and buildable zones and proposed major infrastructure including the road. It expected that the population will increase from 575,000 to 816,000 in the main city and from 1,035,000 to 1,466,000 in the conurbations during the plan period.

In the Master Plan of Dhaka 1959, recommendations were made for residential, commercial, industrial and open space zoning. Also, the recommendations were given in various sectors such as Commerce, Education, Public Buildings, and Transportation, etc. The plan discouraged any extensive development in the old town, as it would involve displacing residential population for whom alternative accommodation would be difficult to find.

3.3.4 Dhaka Metropolitan Area Integrated Urban Development Project (DMAIUDP), 1981

The Dhaka Metropolitan Area Integrated Urban Development Project (DMAIUDP) was the first urban development strategic plan in Bangladesh. It was quite comprehensive and was prepared between 1979-1981 with the financial assistance of the UNDP and ADB. The project was executed by the Planning Commission under the Ministry of Planning. The aim of the project was to prepare a long term development strategy for future Dhaka City with flood protection as the main focus. The most important policy issues dealt with in the DMAIUDP were economy, physical planning, and socio-cultural aspects, etc. The project first drew up two concepts of future Dhaka city development. One was based on the basis of the idea of developing the city as an ‘urban village’ in cluster form. The idea emphasized on agricultural development as the mainstay of the economy with water transport as the primary means of transport. The second view was ‘concentric peripheral

growth' in compact form aiming and directing at reducing travel distance and optimizing linkage between wide ranges of economic activities. This approach called for land reclamation and retrieval in the fringe. However, the study team discarded both the concepts as impractical later. Next DMAIUDP worked out nine options to the future development of the Dhaka City (RAJUK, 2015).

However, DMAIUDP was shelved like many other project reports. The identified reasons for non-implementation of DMAIUDP are as follows:

- It was not a statutory plan like other plans of RAJUK;
- It was undertaken by Planning Commission which is not empowered to execute a policy or plan;
- Its recommendations were not formally adopted by the highest body of the government as future Dhaka development policies.

DMAIUDP proposed the expansion of Dhaka city towards the north in order to shelter projected 9 million people by the year 2000. The task force report proposed the establishment of new satellite towns and the speedy growth of existing satellite towns in order to confine Dhaka's population within a quarter of the national urban population. The study was funded by ADB which strongly recommended that further flood protection investment shall await the outcome of a broad multi-sectoral strategic study to evaluate metropolitan planning options (DAP, 2010).

3.4 Review of DAP Related Researches

Detailed Area Plan (DAP) provides more detailed planning proposals for specific and precise sub-areas of the city. It presents the detailed implementation guides that integrate the development policies, guidelines, and framework set by the Structure Plan for different subareas of the city. Specific sub-areas for the provision or improvement of the road network, access roads, community facilities, utilities and services and a detailed pattern of land uses are provided by planning proposals for DAP. This plan is more likely to be implemented, respected and followed by the community since it is prepared at the community scale, community participation in their planning and implementation can be an important consideration. Since independence, many physical development plans have been prepared for major cities in Bangladesh. But most of them have hardly received adequate patronization as far as their implementation is concerned. It is now proven that

plan implementation is more difficult than plan preparation in this country. A large amount of public money is required to prepare a plan. But taking an account of their execution of these plans reveals a frustrating scenario. A very few of the development plan proposals have so far been implemented properly. A frustrating picture of implementation is exposed after formal acceptance of the Dhaka Metropolitan Development Plan (DMDP) in 1997. The Detailed Area Plan (DAP) is a part of DMDP which opens up a new extent of development opportunities and land use control at a very lower level i.e. user level. The land use areas have been marked indicating the mouza and dag numbers in detail maps. It was expected that the controversies concerning land use will be resolved by following DAP proposals. Now willingness and sincerity are the most important matter to make DAP successful (Seraj, 2013). A gross shortcoming of DAP is the absence of detailed 3-D implementable guidelines.

Urban planning in Bangladesh is still pivoted around fulfilling the formal requirements of the relevant authorities. However, government intervention and involvement in the land market by direct provision violates the planning system. Besides the National Housing Policy benefits the already better-off groups. It does not provide housing solutions for the urban majority population. On the other hand, land use plan like DAP is an externally imposed standard for the land developers. A complex market in the absence of formal recognition is presented by the Private residential subdivisions. However, subdivisions present a homogenous trend all over the world, that is, they can by-pass legal requirements, and the legalization, recognition, and densification of these are time-consuming and costly processes. Moreover, the local stakeholders like political leaders and landowners, land developers are the deciding factors of land development, rather than the planning guidelines. Therefore, the scope of land development is mostly dependent on the interests of the local stakeholders and on the local geography. It is merely a consequence of the planning process and public policy. DAP is impossible to implement properly because land-use proposals of the DAP does not address the interests of the local stakeholders or has no relevance with the site conditions. Any external and top-down planning system is bound to fail unless the planning system can address the interest of the local stakeholders and compromise. As a result, the implementation of proper planning is a discipline of compromise (Morshed, 2013). After the failure of most plans, it can be assumed that the people engaged in the planning process do not know the nature and expert of deliverables in each tier of the planning.

3.5 Lessons Learned from Past Plans

Most of the past plans for Dhaka city were not implemented properly. The main reason behind this was their failure to complete the plan properly. Besides planning concept was also not been clear or, spelled out. These plans were prepared by consultant companies. Mostly, they were interested to prepare the plan to collect the bill. As a result, the quality of the plans was not good or holistic. Besides, there were a lot of limitations in those plans and the new plan preparation did not consider the failures of the past. Every time the plans were made a new with any link with the past plans for the present context were considered. There was never a long term vision nor do they stick to a time frame. Each plan and each tier of the plans were disjoint and independently done with no link with past, present, and future. People engaged in the planning process must understand the deliverables at each tier and appropriate time frame for each. Planning agency in Dhaka has failed in both the situation situations. They were doomed to fail but made some people rich in the process.

Lessons learned through this review is that ‘stick to the basics’, learn from the past and respond to the need of the present context, which will not cause harm in the future.

Chapter 4: Development of a Theoretical Framework for Analysis

4.1 International Concepts and Parameters of the Detailed Area Plan

The world has been changing rapidly since the World War-II. The urban population grew from 746 million in 1950 (29.6 percent of the world population) to 2.85 billion in 2000 (46.6%), and it has reached 3.96 billion in 2015 (54%). It is expected to rise to a total of 5.06 billion by 2030 (60% of the world population). In response to that transformation, the International Guidelines on Urban and Territorial Planning are also transforming and are intended to be a framework for improving global policies, plans, designs, and implementation processes. This will lead to more compact, socially inclusive, better connected and integrated cities and territories that foster sustainable urban development and are resilient to climate change or another contemporary context (UN-Habitat, 2015).

4.1.1 Detailed Area Plan

Detailed Area Plan relates to a particular lot or lots and may be prepared and submitted to enhance, elaborate or expand on the details or provisions contained in a Proposed Structure Plan or in place of a residential approval required to comply the Residential Design Codes or for any other planning purpose (Planning Procedure, 2014). It is visualized in three dimensions.

Operational Policy for Livable Neighbourhoods of Detailed Area Plans

The Western Australian Planning Commission's Operational Policy for Livable Neighbourhoods promotes the preparation of Detailed Area Plans (Planning Procedure, 2014) for:

- Lots with an area of less than 350m²;

- Lots where it is important to control vehicle access and egress;

- Lots abutting public open space;

- Narrow lots that require special conditions to be set;

- Lots and streets in the center of neighbourhoods that have been identified to accommodate a future change of use;

- Neighbourhood and Town Centers;

- Steeply sloping land where high retaining walls to streets or boundaries are proposed; and

- Addressing noise-buffering requirements.

The purpose of this Planning Procedure is to provide the guidelines and procedures under which Detailed Area Plans shall be prepared.

An example of Livable Neighbourhoods of Detailed Area Plans is shown in Figure 4-1.

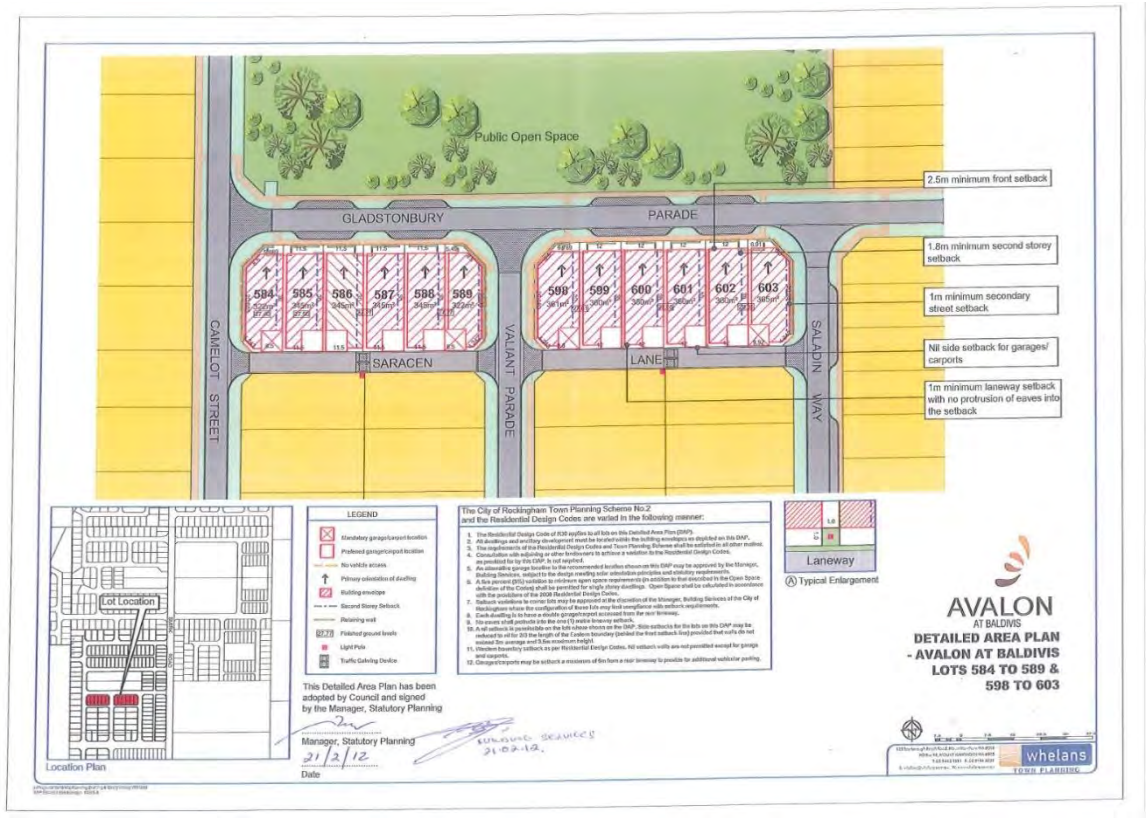


Figure 4-1: An example of Livable Neighbourhoods of Detailed Area Plans

(Source: Planning Procedure, 2014)

Detail to be Included in a Detailed Area Plan

The following information that may be included in a Detailed Area Plan:

(a) Building Envelopes;

(b) Distribution of land uses within a lot (courtyard locations);

(c) Private Open Spaces;

(d) Services;

(e) Vehicular access, parking, loading and unloading areas, storage yards and rubbish collection closures;

(f) The location, orientation, and design of buildings and the space between buildings;

(g) Advertising signs;

(h) Landscaping, finished site levels and drainage;

(i) Protection of sites of heritage, conservation or environmental significance;

(j) Special development controls and guidelines; and

(k) Such other information considered relevant by the Council.

An example of Detailed Area Plans is shown in Figure 4-2.

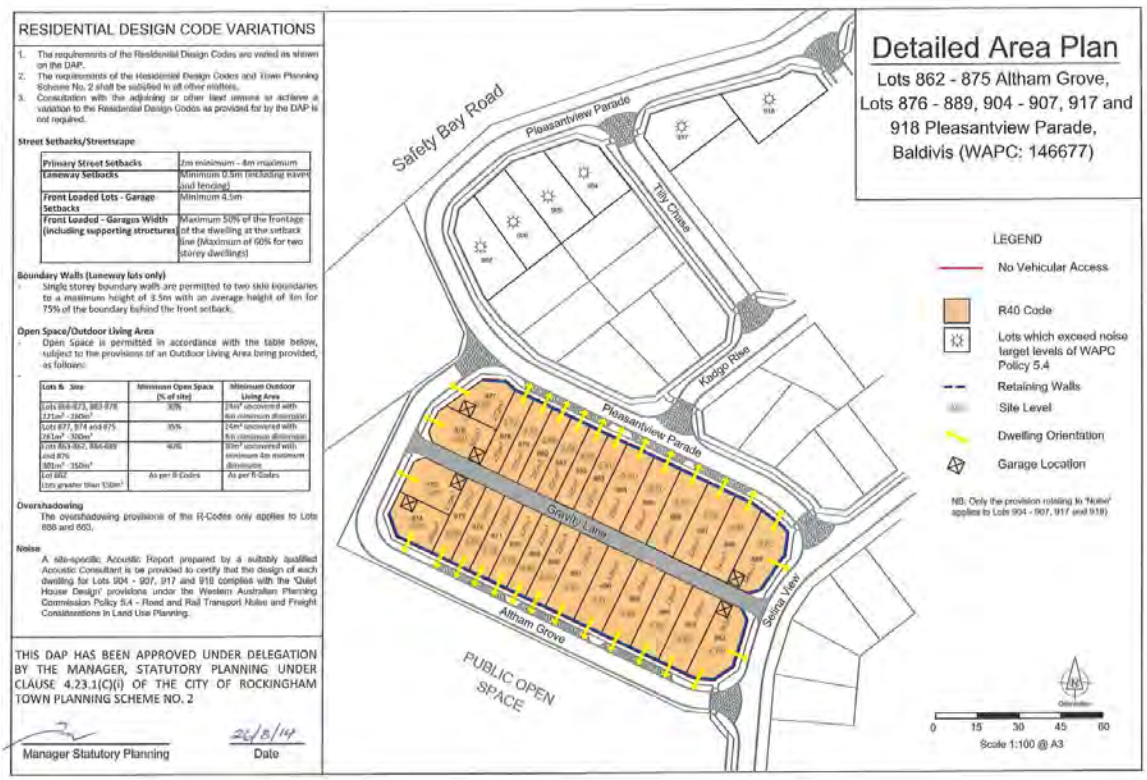


Figure 4-2: Detailed Area Plan of an Area of Baldivis, Western Australia

(Source: Planning Procedure, 2014)

4.1.2 International Guidelines on Urban and Territorial/ Regional Planning

UN-Habitat (2015) published the International Guidelines on Urban and Territorial Planning. According to it, Urban and territorial or regional planning can be defined as a decision-making process aimed at realizing economic, social, cultural and environmental goals through the development of spatial visions, plans, strategies and the application of a set of policy principles, tools, regulatory procedures institutional and participatory mechanisms. The Guidelines promote key urban and regional planning proposals and principles that can assist all countries and cities to effectively guide urban demographic changes (growth, stagnation or decline) and improve the standard of life in existing and new urban settlements.

The whole process includes the following sectors:

A. Urban Policy and Governance

B. Urban and Territorial Planning for Sustainable Development

B1. Urban and Territorial Planning and Social Development

B2. Urban and Territorial Planning and Sustained Financial Growth

B3. Urban and Territorial Planning and the Environmental Development

C. Urban and Territorial Planning Components

D. Monitoring and Implementation of Urban and Territorial Planning

4.1.3 New Urbanism Concept

New Urbanism (Figure 4-3) also known as the Neo-traditional Urbanism (Neo-traditionalism) or traditional neighbourhood development in Europe is an urban design movement which promotes environmentally friendly developments by creating walkable neighbourhoods containing a wide range of housing and job types (Boeing et al. 2014). It arose in the early 1980s in the United States. It has gradually influenced many aspects of real estate development, municipal land-use strategies, and urban planning. New Urbanism is a development and planning approach based on the principles of how cities and towns had been built for the last several centuries as accessible public spaces, walkable streets and blocks, housing and shopping in adjacent proximity. In other words,

New Urbanism focuses on human-scaled urban design (Mowla, 2002; New Urbanism, 2019).

Figure 4-3: New Urbanism Concept

(Source: New Urbanism, 2019)

4.1.4 Principles of Urbanism

The principles of new urbanism can be applied increasingly and progressively to projects at the full range of scales from a single building to an entire community.

1. Walkability

-Most things inside a 10-minute walk of home and work,

-Pedestrian-friendly design of street (buildings close to street; porches, windows, and doors; tree-lined streets; garages in the rear lane; on-street parking; hidden parking lots; narrow, slow speed streets),

-Pedestrian streets free of cars in special cases.

2. Connectivity

-Interconnected street and road grid network disperses traffic and eases walking,

-A hierarchy of narrow streets, boulevards, and alleys,

-High-quality pedestrian network and public realm make walking pleasurable.

3. Mixed-Use and Diversity

-A mix of offices, shops, apartments, and homes on site. Mixed-use within neighbourhoods, within blocks, and within buildings,

-Diversity and variety of people of ages, income levels, cultures, and races.

4. Mixed Housing

A range of types, sizes and prices in closer proximity of housing.

5. Quality Architecture and Urban Design

Quality architecture and urban design to emphasis on beauty, aesthetics, human comfort, and creating a sense of place; Special placement of civic uses and sites within the community. Application of Human scale architecture and beautiful surroundings nourish the human spirit of inhabitants.

6. Traditional Neighbourhood Structure

-It is the discernable center and edge,

-Public space at the center,

-Importance of quality public realm; public open area designed as civic art,

-Contains a variety of uses and densities at intervals 10-minute walk,

-Transect planning: Highest densities at city center; increasingly less dense towards the edge. The Transect is an analytical system that conceptualizes reciprocally reinforcing components, creating a series of specific natural habitats and/or urban lifestyle settings. The Transect integrates environmental methodology for surrounding habitat assessment with the methodology of zoning for community design and style. The specialized and particular boundary between the natural and man-made disappears, allowing environmentalists to assess the look of the human habitat and therefore the urban planning professional to support the viability of nature. This urban-to-rural transect hierarchy has acceptable building and street sorts for every space on the time.

7. Increased Density

-More residences, buildings, residences, shops, and services nearer along for easy walking, to enable an additional efficient use of resources and services, to make an additional convenient, enjoyable place to live.

-New Urbanism design principles and ideologies are applied at the full range of densities from small towns to large cities.

8. Green Transportation

-A network of high-quality trains connecting cities, towns, and neighbourhoods together,

--Pedestrian-friendly style that encourages a larger use of bicycles, rollerblades, scooters, and walking as daily transportation.

9. Sustainability

-Minimal environmental impact of development and its operations,

-Eco-friendly technologies, respect for ecology and worth of natural systems,

-Energy efficiency and less use of finite fuels,

-More local production,

-More walking, less driving.

10. Quality of Life

Taken along these add up to the top quality of life well value living, and build places that enrich, uplift, and encourage the human spirit.

4.2 International Case Studies

4.2.1 The 1972 San Francisco Urban Design Plan, USA

The Urban Design Plan of San Francisco adopted in 1972 (Figure 4-4). It was a groundbreaking and ambitious document. It was the culmination of five years of analysis and design development. This plan outlined a vision for the physical future of the city of San Francisco. This plan was a vision predicated on understanding the past, looking at the present and anticipating the future. This five years of analysis and design development were focused into four basic objectives, forty-five implementing policies, and sixty-seven fundamental design principles. These objectives, policies, and principles provide guidance for a foreseeable range of physical development questions that might face the city. The ultimate strength of the plan is that it suggests a set of qualities that define the city on which all future decisions can be based. The plan responds to issues of city pattern, conservation, major new development, and neighbourhood environment. Theoretically, these four categories should address any form of physical development or change that might face the city, particularly given the general nature of most of the policies. Reflecting the double roles of public sector urban design, within each category,

the plan specifies reactive and proactive policies; the plan provides both a set of guidelines for private development and proposals for public investment. Each consequent guidelines for private development and proposals for public investment. Each consequent objective, policy, and principle is essentially oriented towards preserving and enhancing the perceived pattern. The plan defines the city pattern as consisting of water, open spaces hills and ridges and landscaped areas, streets and roadways, and building and structures. It is the interaction of these elements which makes the city's unique pattern and makes San Francisco memorable for residents and visitors alike. San Francisco is so characterized by a real splendid combination of the natural setting and built environment, the similarity of which is often marked more by chance than by design (San Francisco, 1972).

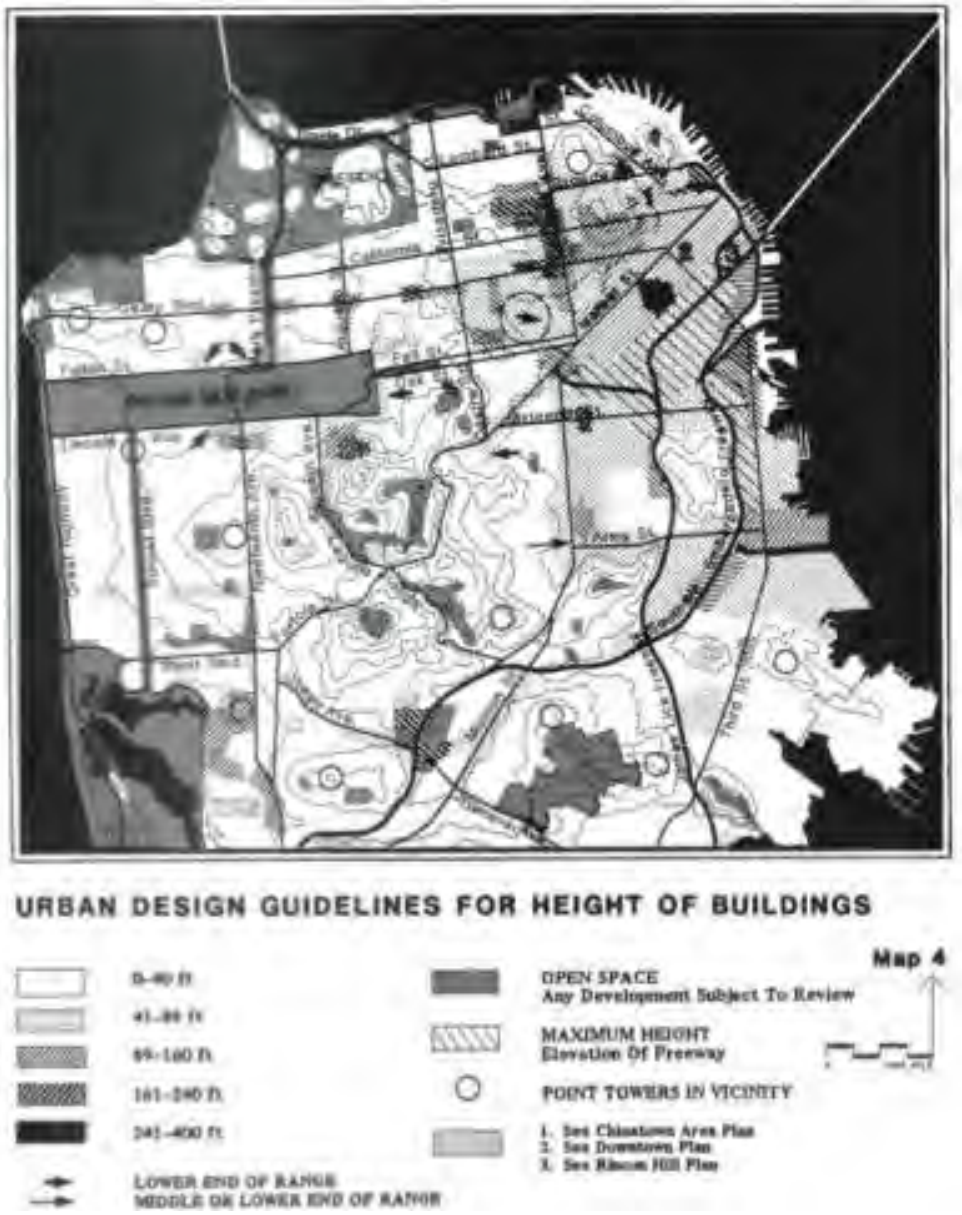


Figure 4-4: An example of Guidelines from the San Francisco Urban Design Plan.
(Source: San Francisco, 1972)

Attributes of San Francisco Master Plan

The San Francisco Master Plan emphasized the characteristic pattern which gives to the city and its neighborhoods an image, a sense of purpose, and a means of orientation. It has an image and character in its city design which depends especially upon views, streets, topography, building form and major landscaping. This pattern gives an organization and sense of purpose to the city, denotes the extent and special nature of districts and identifies and makes prominent the centers of human activity. The pattern also assists in location for travel on foot, by automobile and by public transportation. The city pattern should be protected, recognized and enhanced. It describes every detail of the city planning e.g. different street lighting for different types of streets. It emphasized conservation of resources which provide a sense of nature, continuity with the past, and freedom from overcrowding. This master plan described the moderation of major new development to complement the city pattern, the resources to be conserved, and the neighborhood environment. It also described the improvement of the neighborhood environment to increase personal safety, comfort, pride, and opportunity (San Francisco, 1972).

4.2.2 Urban Design in Hong Kong

Hong Kong has the world's freest economy, a vibrant international financial center and a trading hub with total trade value above three times its gross domestic products, excellent port and airport infrastructure, etc. Besides its urban design practice is fabulous. There is a careful transition linkage between the urban and rural area at the context of defining the urban fringe area. It has a height profile which will protect and enhance the relationship of city and natural landscape context. It has diversity in building height and massing of developments in different localities. The urban design of Hong Kong has emphasized on development of responsive to unique topographical and landscape setting e.g. landmarks, commercial centers. Appropriate height profile was maintained in it and rural areas were protected. It has described the vehicular and pedestrian circulation ensuring maximum accessibility and permeability to the waterfront and open space. It ensured the safe, clean and accessible pedestrian environment and easy access for disabled persons. It described every detail design including roadside planning, high-quality street furniture, flyovers, footbridges, underpasses, etc. It also highlighted the heritage conservation. The urban design has provided the guidelines for landscaping, commercial zones, residential zone

and village, industrial zone, air ventilation, linkage of roads and transport routes, open spaces, and pedestrian areas, widening and building setbacks, internal transport facilities, etc. (Mowla, 2015).

Attributes of Urban Design in Hong Kong

Urban Design in Hong Kong described every detail of necessary urban elements. It included the sample detail design figures to describe the guidelines of city design and development. It included the integrated high-density zone designed to address land use and traffic and transportation necessity. It described site development proposals by providing visual description using figures and maps (Mowla, 2015).

4.2.3 Detailed Master Plan of Amaravati the Capital of Andhra Pradesh, India

Amaravati, Andhra Pradesh, India is built on a 217 sq. km open field in Guntur district. It is being designed to have 51% of green spaces and 10% of water bodies, with a plan to house some of the most iconic buildings there (Figure 4-5). The city is being modeled on Singapore, with the master plan being prepared by two Singapore government-appointed consultants. Other international consultants and architects will then be roped in to give it an international flavor. The following zoning districts are proposed for the Capital city:

- Residential
- Commercial
- Industrial
- Transport and Communication
- Open Spaces and Recreation
- Institutional Facilities
- Infrastructure Reserve

This plan aims to be world-class and at par with the standards set forth by countries such as Singapore. The new capital city will be an economic powerhouse that will create a range of jobs for existing residents as well as provide high-tech and knowledge-based industry jobs to be globally competitive. Housing will be at the core of its planning and will aim to provide affordable and quality homes to all its residents. It will prove the global quality of life standards and will offer high levels of convenience to people of all

ages. Sustainability, optimum utilization and efficient management of resources will form an important pillar of this city (Amaravati, 2017).

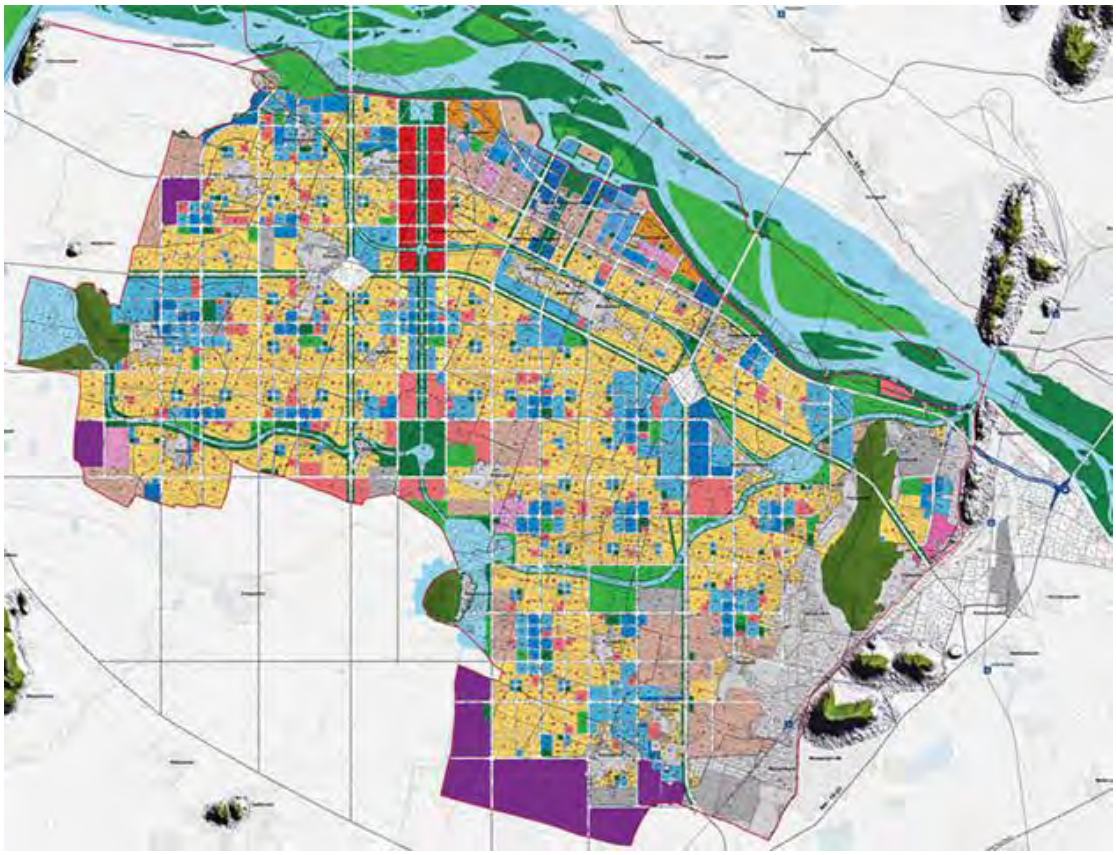


Figure 4-5: Detailed Master Plan of Amaravati the Capital of Andhra Pradesh
(Source: Amaravati, 2017)

Attributes of Amaravati Master Plan

Amaravati is envisioned to be the people-centric pioneer Smart City of India built around sustainability and livability principles. The Amaravati Capital City development has 6 (six) major goals which will help realize the vision set forth (Amaravati, 2017). The goals and the strategies for achieving them are,

1. World Class Infrastructure: 145 km of public transport corridors by 2050 and > 1,000 km of the road network by 2050
2. Jobs and Homes for All: 3.5 million resident population by 2050 and 1.8 million jobs by 2050
3. Green and Clean: >20% is reserved for Green and Blue areas and more than 30 km of public river waterfront

4. Quality of Living: Parks and public facilities within 5-10 minute walking distance
5. Efficient Resource Management: Net Zero Discharge; Efficient use of green and renewable energy
6. Identity and Heritage: > 250 km of heritage and tourism network using roads, metro, and waterways.

This Master Plan Document of this city is divided into Detailed Master Plan of Capital City Amaravati and Amaravati Zoning Plan. It includes every sector-wise zoning regulations for a detailed master plan of Capital City – Amaravati with a zoning regulation matrix. This document describes the detail designs of infrastructural development.

4.2.4 Development Guide Plan, Singapore

Singapore is divided into fifty five (55) urban planning areas each with a Development Guide Plan (DGP). DGP is a detailed and comprehensive urban land use plan for each of the fifty five (55) planning zones in Singapore designated by the Urban Redevelopment Authority (URA), Singapore's national planning and conservation authority.

URA released the revised Concept Plan, which maps out the vision for Singapore's long term physical and infrastructural development for a population of 4 million in 1991. With the completion of the Concept Plan, URA proceeded to prepare detailed plans called DGPs for gazetting as the new Master Plan.

Singapore was divided into fifty five (55) planning areas for the purpose of preparing the detailed plans. For each of these areas, a DGP was prepared where the broad vision of the Concept Plan was detailed into specific proposals.

Each DGP covers a planning area with a population of around 150,000 served by a town center. The planning areas are further divided into subzones, each served by a commercial center. The size of each planning area and its subzone differs depending on the land use, proximity and nearness to the Central Area and existing physical separators such as major open spaces, rivers, expressways, and other demarcates.

All the fifty five (55) DGPs were completed in December 1998 and were gazetted as the new statutory Master Plan, known as Master Plan 1998. The landowners are provided a clear guide by the Master Plan on what their land can be used for, and is reviewed every

five years. The term "Development Guide Plan (DGP)" is no longer in use after 1998 (URA, 1991).

4.2.5 Master Plan 2014, Singapore

The Master Plan 2014 is driven by the vision of an inclusive, livable, economically vibrant, and green home for Singaporeans. They work to ensure that sufficient land is available for a whole range of land uses, and especially for critical needs such as housing, schools, and jobs centers. They also plan for a quality living environment - with amenities for all ages, where jobs come closer to their homes, and for healthy spaces with active communities (URA, 2014).

The vision for Master Plan 2014 can be seen across six key focuses (Figure 4-6):

1. Housing,
2. Economy
3. Transport
4. Recreation
5. Identity
6. Public Spaces

Figure 4-6: Six key focuses of Master Plan 2014, Singapore

(Source: URA, 2014)

Attributes of Master Plan 2014, Singapore

In planning for Singapore's land use is a long-term approach. This is to optimize its limited land and to ensure the current and future needs of the people are met. The long-term planning involves broad strategies, identifying land for various needs, and establishing Singapore's overall development. These lead to planning for the necessary infrastructure and resources to support the proposed land use. The goal is to create a sustainable Singapore that provides a quality living environment, offers plentiful growth and development opportunities and jobs for the people, and safeguards our clean and green landscape to balance economic, social and environmental considerations. This master plan has two parts, the concept plan, and the master plan. The Concept Plan is a strategic land use and transportation plan that guides the development of Singapore over the next 40-50 years. The Singapore Master Plan (MP) is the statutory land use plan which guides its development and growth in the medium term over the next 10 to 15 years.

4.2.6 Dubai 2020 Urban Master plan

The urban master plan of Dubai 2020 aims to build upon and express the vision of His Highness Shiakh Mohammed Bin Rashid Al Maktom the Ruler of Dubai to promote Dubai city as an advanced global city and a vibrant regional gateway to the world. Dubai Municipality developed a planning proposal in cooperation with various administrative authorities and major developers. Its main goal was to adopt a sustainable and competitive approach to guide Dubai's urban development to 2020 and beyond. The main objectives of this plan contain the effective use of present infrastructure, rationalizing a well-integrated land-use planning and mobility network, increasing investments opportunities, protecting key economic assets, environment preservation, diversifying energy sources, being responsive to the socio-economic transformation and legislative improvement and governance framework to streamline the planning process. The Dubai 2020 Urban Master plan covers the Dubai Emirates areas which contain the offshore area within the 12 nautical miles, existing urban area, and committed land for mega real estate projects, and desert and rural territory excluding Hatta area (Dubai Municipality, 2012).

Attributes of the Dubai 2020 Urban Master plan

Dubai 2020 Urban Master plan has some urbanization parameters. It has divided the city area into four types. Area 1 is the offshore islands, area 2 is a metropolitan area, area 3 non-urban area like deserts and area 4 is a non-urban special area like oil, gas extraction zones. This master plan has described a different type of development plan for different area. It describes various guidelines and design for infrastructural development, circulation network, safety, landscaping, etc.

4.3 Checklist Developed from Literature Review and Case Studies for Evaluation

4.3.1 Basics and Attributes of DAP

DAP should recognize the positive attributes of the city. The direction and concept would be to preserve and enhance the positive attributes while improving aspects of built-environment that are less than satisfactory. It may be dealt in various levels and scale that is at a macro level focusing on the image of a city; at an intermediate level focusing buildings and spaces and at micro level focusing on user environment.

Macro-level is more or less decided at Structure Plan (SP) and Urban Area Plan (UAP) level and the DAP focuses more on an intermediate and micro level by splitting UAP on a sectoral basis. The attributes at the intermediate level and the micro level expected from DAP is as follows (See, 5.4 for further details).

a. Intermediate Level: Building and Spaces

- Composition
- Design of spaces and architecture
- Urban place and city squares
- Streets and street pattern
- View Corridors
- Connectivity and integration
- Massing, heights, and density
- Landmarks and heritage artifacts
- Open Space and Parks
- Sidewalks and pedestrian linkages

b. Micro Level: Uses Environment

- Human Scale
- Harmony
- Street furnishing
- Materials, colours, and texture
- Transition
- Street scope

Case study and literature review shows that DAP under review falls short of what is expected from an appropriate DAP. Deliverables at each level and phase should be clearly identified and the execution process is given.

4.3.2 Development of Checklist for the Evaluation of DAP

From the above studies, it is clear that an appropriate DAP has some specific criteria. The DAP in Dhaka has remained at DMDP level, presented on a bigger scale. On the basis of International Concept and Parameters of the Detailed Area Plan (DAP) and case studies, the following elements including 3-D details or visualization are mandatory for an appropriate DAP. These are:

1. A proper time frame with respect to DMDP
2. Detail Land development
3. Detail Description of Distribution of land uses
4. Details of Housing and Residential Area
5. Details of Commercial Activity and User Environment
6. Details of Industrial Location and User Environment
7. Details of Transport and Communication and StreetScape
8. Details of Open Spaces and Recreation Facilities
9. Details of Institutional Facilities like hospitals, educational institutions
10. Details of government and non-government official Infrastructure
11. Protection of sites of heritage, conservation or environmental significance
12. Landscaping details up to land grading, vegetation, drainage, walkways, etc.
13. Drainage and Environment
14. Disaster Management
15. Special development controls and guidelines.

Chapter 5: Analysis and Synthesis of DAP

In the DAP, SWOT analysis is done for the relevant issues to ascertain what to do and what not to do at (detail) user level. Once that is identified that forms the core of the programme. The programme is then quantified for execution on the site. General procedural sections deal with SWOT analysis.

5.1 SWOT Analysis

In this research work, SWOT (Strength, Weakness, Opportunity, and Threat) was used to find out the appraisal and identify the reasons for not being successful to implement DAP for DMDP' 1995. In this section, DAP report, GIS (Geographic Information System) database and expert opinions from questionnaire survey were compiled to find out the Strength, Weakness, Opportunity, and Threats of Detailed Area Plan (DAP). This analysis gives an idea regarding the status of the Detailed Area Plan for Dhaka City.

5.1.1 Land Use Planning

SWOT analysis of proposed land use plan in the Detailed Area Plan is given below.

Strength

- Mostly low rise development, consolidation possible.
- Availability of large undeveloped peripheral and fringe areas for planned development of land uses.
- Dhaka is surrounded by a network of rivers.
- Wide right of way in most existing roads for future expansion of carriageway and provide mass transit facility.
- A large number of peripheral urban centers for decentralization of core area activities.
- Large undeveloped land in the city periphery for providing open space recreation.
- Corridor is available from Narayanganj to Tongi.

Weakness

- Lack of Understanding of planning framework.
- Ineffective implementation of the planning schemes and strategic plans.
- Weak enforcement of land development regulations (Inefficient regulatory mechanism).
- Lack of coordination among government agencies.
- Did not learn lessons from past failures.

Opportunity

- Large grey and brownfield are available for land adjustment.
- Regional, sub-regional, specialized centers and community centers for densification.
- Reduction of the population in the main city will reduce traffic in the main city easing movement.
- Execution of new land-use policies will cause overspill of population in the periphery and will reduce pressure on housing and services in the core city.
- Shifting of different institutions from the core part of the city will create an opportunity for the development of recreational centers/park/cultural centers;
- Integration of spatial development with transport corridor will reduce travel time and travel demand.
- The proposed urban center based concept will bring under control dispersed development in suburban areas.
- Fringe land and water bodies are opportunities.

Threat

- Faulty land survey
- The scanty supply of capital might interrupt the development of infrastructure and services creating uncertainties in policy execution.
- Delay in the execution of infrastructure development projects might accentuate problems of unplanned development affecting livability.
- Without effective control over development, mainly in mixed-use areas will directly affect in attaining city vision.
- Filling up of water bodies and open spaces;

- Rapid unplanned development in the flood flow zone;
- Rising land price in suburban centers.
- Uncontrolled mixed-use development in peripheral areas.
- Indiscriminate development in outer urban areas making provision of infrastructure and services difficult.
- Inefficient regulatory mechanism and corruption.

5.1.2 Transport Planning

SWOT analysis of proposed Transport Plan in Detailed Area Plan is given below.

Strength

- High rate (about 20%) of pedestrian traffic (RAJUK, 2015).
- Strong private sector involvement in the transport sector.
- An adequate number of passengers to support mass transit.
- Existence of circular waterway around Dhaka City.
- Existence of a railway corridor through the city.

Weakness

- Different modes are not adequately hooked up with each other.
- Absence of Mass Transit facility.
- Absence of continuous east-west connectivity in the core city area.
- Absence of Ring Road to diverse traffic which has no business in the core city area.
- Absence of updated technology to reduce traffic congestion for smooth movement of traffic;
- Mismanaged traffic system.
- Poor Public transport system, including bus services;
- Absence of adequate parking facility.

Opportunity

- Railway line passing through the heart of the city.
- Scope of transport network development in the suburban area.
- Provision of Transit-Oriented Development (TOD) along Mass Transit Stations may promote compact development;

- Promotion of compact development will reduce travel demand.

Threat

- The huge growth of population leading to the growth of vehicular traffic and congestion.
- Uncoordinated development of flyover and expressway.
- Failure to timely development of sub-urban connectivity.
- Overconcentration of the population in the core city area.
- The increasing cost of development of transport infrastructure.

5.1.3 Housing Facilities

SWOT analysis of proposed Housing Facilities in the Detailed Area Plan is given below.

Strength

- Very high demand for housing.
- Vibrant real estate market with the existence of a large number of developers.
- An adequate supply of locally produced building materials.
- Existence of a National Housing Policy that sets a direction for the sector.

Weakness

- The low-income group is left out from housing provision.
- Scarcity of buildable land for affordable housing projects.
- Absence of initiatives for directing real-estate development towards existing urban agglomerations outside the core city of Dhaka.
- Weak control over private developers engaged in land development and building construction rules.
- Hassle and delay in the approval of building plans by the relevant authority.
- Lack of capacity of public agencies such as RAJUK, NHA, HBRI, etc.
- Failure to take up need-based actions according to National Housing Policy to address the housing crisis of low and middle-income population.
- Poor communication network to connect CBD.

Opportunity

- Increasing the purchasing power of the people due to the expansion of the economy and inflow of remittance.

- Provision of incentives to private sector developers for keeping a reasonable share of units in their projects as affordable housing units by means of cross-subsidization.
- Promoting public-private partnership in the provision of affordable housing for a greater population.
- Promotion of low-cost building technology by House Building Research Institute.
- Strengthening of House Building Finance Corporation for provision of Soft loans to low and middle-income population.

Threat

- Political instability.
- A very high rate of rural to urban migration resulting in mushroom growth of informal settlements.
- The ever increasing demand for housing is pushing prices and rents of land and dwelling units beyond the reach of the majority of the population.
- Absence of a ceiling on land and real estate ownership and legalization of investing black money in purchasing real estate properties has skewed the market towards the better-off segment of the society.
- The high-interest rate on bank credit.
- Lack of adequate infrastructure and services to facilitate housing.

5.1.4 Public Facilities

SWOT analysis of proposed Public Facilities in the Detailed Area Plan is given below.

Strength

- An adequate number of legal backup in place to support the provision of basic services within the planning boundaries.
- Drainage Master Plan, Water Supply Master Plan and Sewerage Master Plan of DWASA National Water Policy and National Water Management Plan
- Organized service giving agencies.
- Strong telecommunication connectivity.
- The substantial number of education and health facilities.

Weakness

- Poor solid waste management.
- Increased traffic congestion due to the absence of school zoning concept;
- Inadequate sewerage network in core area;
- Absence of sewerage network outside Dhaka core area.
- Poor coordination among service giving agencies.
- Weak enforcement of law and inefficiency of government organizations;
- Weak institutional arrangement and complex bureaucratic system;
- Fund constraints and lack of infrastructure maintenance.

Opportunity

- Available and accessible water channels to drain out drainage water.
- Available surface water channels/ water bodies for water extraction.
- Good scope of rainwater harvesting by households and institutions in order to increase water supply;
- Scope to incorporate 3R strategy as reduce, reuse, recycle with the view of waste minimization may relieve the necessity of landfill site;
- A good number of water sources for potable water supply;
- Presence of a vast amount of natural areas;
- Prospect of renewable energy.
- Growing public awareness;
- Increasing public awareness.

Threat

- Illegal filling and encroachment of flood flow areas and water channels.
- Congestion of traffic due to over concentration of public gathering institutions.
- Increasing pressure on public facilities due to overpopulation;
- Surface water pollution is increasing constantly due to industrial, clinical, other hazardous waste;
- Over-commercialization of education and health services.

5.1.5 Environmental Planning

SWOT analysis of proposed Environmental Plan in Detailed Area Plan is given below.

Strength

- A strong presence of natural environment in DMR areas of the city.
- Substantial supply of rain and water during monsoon.
- Watercourses around Dhaka city for the discharge of wastewater after treatment.
- Substantial Natural green in suburban areas.

Weakness

- Surface water pollution.
- Degradation of environment due to mismanagement of solid waste.
- Presence of high level of Suspended Particulate Matter (SPM).
- Hazardous and dying industrial area poses a serious threat to the environment,
- Public health, surrounding areas and contributes to river pollution.

Opportunity

- Availability of water bodies and green areas;
- Relocation of heavy and hazardous industry form the core part of the city.

Threat

- Depletion of greenery in and around the city.
- Filling and encroachment of water body.
- Absence of designated location for hazardous and noxious industries.
- Over-extraction of groundwater.
- Climate change will compound problems of environmental degradation and lead to deterioration of ecosystems, adding yet another dimension to poverty.
- Unplanned and uncontrolled urban expansion.

5.2 Discussion on DAP-2010

SWOT analysis leads a way to find out the appraisal of DAP. Besides a questionnaire survey on the basis of expert opinions leads a way to find out the first objective of this study which is appraisal and identify the reasons for not being successful to implement DAP for DMDP.

This opinion based questionnaire survey was a collection of opinions of twenty experts who were related to DAP. Sixteen of them told that DAP-2010 is not working properly. They explained that even RAJUK is not following DAP properly. RAJUK has developed a lot of land area on low and wetlands against DMDP' 1995 guidelines. This is a violation of DAP. Jhilmil project is an example of it. In DAP it was mentioned to save the water bodies and natural river flow. But RAJUK and other developers with the help of RAJUK are changing the riverway and filling up the low and wetlands. Huge Purbachal New Township development plan by RAJUK is a total violation of DMDP'1995.

5.2.1 Development Matrix

A development matrix (Table 5-1) has been developed on the basis of SWOT analysis.

Table 5-1: Development Matrix

Issues	Strengths	Weakness	Opportunities	Threat	Key Issues to Address	Proposed Program
Landuse Planning	Availability of large undeveloped peripheral areas	Lack of Understanding of DAP	Regional, sub-regional, specialized centers	Faulty land survey	Detail Plan	●Urban center-based concept ●Governance needs a drastic change
Transport Planning	circular waterway, railway corridor	Mismanaged traffic system	Waterway and Railway	Overconcentration of population	Traffic Management	●Transit-Oriented Development (TOD)
Housing	High Demand	Low income	low-cost building technology	The high rate of rural to urban migration	Housing	●Promotion of low-cost building technology ●Plot based allocation to be discouraged
Public Facilities	Drainage Master	Poor solid waste	rainwater harvesting	Surface water pollution	surface water	●Growing public

Issues	Strengths	Weakness	Opportunities	Threat	Key Issues to Address	Proposed Program
	Plan, Water Supply Master Plan and Sewerage Master Plan of DWASA	management			pollution	awareness ●Open Space ●Parking Space ●Amenities
Environment	The strong presence of the natural environment	Public health, surrounding areas and contributes to river pollution	water bodies and green areas	Climate change	Water, Air pollution	●Relocation of heavy and hazardous industry

5.2.2 Topographic and Physical Feature Survey

According to the experts, topographic and physical feature survey method was appropriate in the context of that time. 60% of them said yes and 10% did not comment (Figure 5-1). But there were some opinions they said the survey was not properly done. The method is alright but not done sincerely.

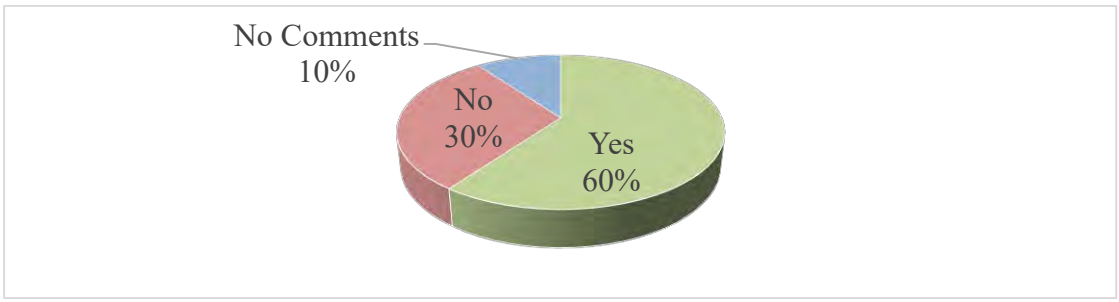


Figure 5-1: Appropriateness Topographic and Physical Feature Survey

(Source: Author, 2019)

Below is an example of checking the DAP database on a random location of DMDP area (Figure 5-2). After proper geo-referencing, a lot of deviation was found in the database of DAP. So, it is clear that DAP has a lot of database error. Detailed Area Plan was developed on a faulty database resulting in faulty DAP layout.

An error was found in all types of the database after analyzing the other shapefiles (GIS database) of DAP. Road names and alignments, structure names and alignments, categories and other information were not entered properly. Therefore it is clear that survey and database error was playing a vital role in the failure of DAP.

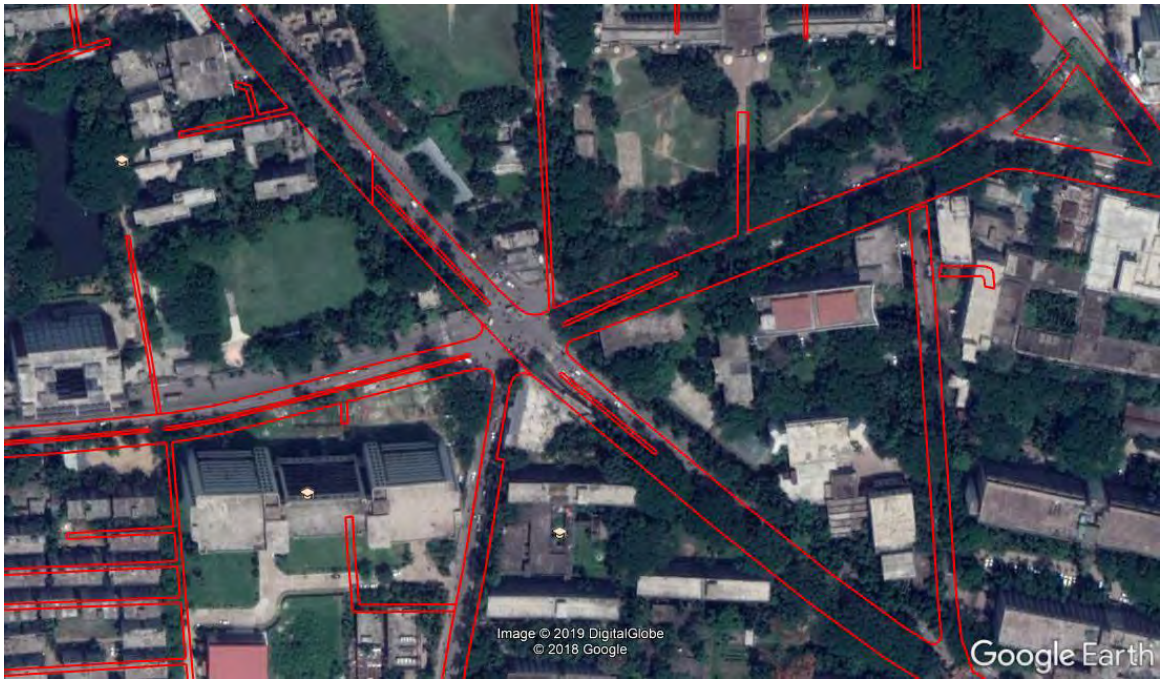


Figure 5-2: Error in Road Database of DAP
(Location: Group C: Palashi Mor, BUET Campus)
(DAP Database: RAJUK; Image: Google Earth)

5.2.3 Socio-economic Survey

100% of respondents said that the socio-economic survey was not proper. They accused surveyors did not collect data properly and mentioned that there were problems in sampling. Data was also manipulated resulting in not giving the right idea about the existing and upcoming socio-economic condition of DMDP area. Though SPSS, Stata, MS Excel, etc. software was used for data entry and data analysis faulty and biased input gave errors in results.

5.2.4 Transportation and Traffic Management

Traffic and Transportation planning is not well coordinated. Traffic Volume Survey at major intersections, Traffic Volume Survey at major roadway links, Speed and Delay studies, Origin-Destination (O-D) survey was done for transportation and traffic management. But 100% of respondents said that transportation and traffic management

Survey was not proper. They blamed surveyors did not collect data properly. Already it has been evident that there is no benefit of DAP in transportation and traffic management sector. Because day by day the traffic problems are increasing in Dhaka city. Besides the identification of road, railway and riverway network its application guidelines are not proper in DAP.

5.2.5 Housing Facilities

The whole area of DMDP area will not be urbanized. It includes the urbanized area, commercial area, open space, waterbody, flood flow area, road, utility corridor, rural area, industrial area, and agricultural land, etc. In this regard, it is very necessary to finalize a planning standard. This Planning Standard was formulated based on following guidelines of the higher-level plan, considering the existing condition, reviewing the international standard and consulting with the review committee. Proposed Standards of Neighbourhood Facilities of 12,500 people according to DAP is shown in the following table (Table 5-2).

Table 5-2: Proposed Standards of Neighbourhood Facilities

Sl.	Name of the Facility	Quantity		Area		
		Min.	Max.	Minimum for Unit Facility	Sub Class Total	Class Total
		(No.)	(No.)			(Acre)
1	Primary School(Public or private)	2	3	1 Acre		3
2	High School(Public or private)	1	2	1.5 Acre		3
3	Open space			10 Acre		12
	i)Park/children's park	1	2	0.3 Acre	1 Acre	
	ii)Water body/ Canal/Pond	As per Planner		1.5 Acre	6 Acre	
	iii)Play field	2	3	1 Acre	3 Acre	
	iv) Green/Vegetation/Water Front	As per Planner		0.5 Acre	2 Acre	
4	Mosque and Maktab/ Worship Places	2	3	0.2 Acre		0.6
5	Library(central)	1	1	0.1 Acre		0.2
6	Services			0.3 Acre		0.5
	i)Dentist/Doctor's Chamber	2	3	40 sq.m	120 sq.m	
	ii) Beauty Parlour	1	2	50 sq.m	100 sq.m	
	iii) Laundry	2	3	16 sq.m	50 sq.m	
	iv) Hair Dresser	2	3	12 sq.m	40 sq.m	
	v) Cyber Café/Internet service provider	1	2	50 sq.m	100 sq.m	
	vi) Photocopy / mobile / land phone / fax	2	2	12 sq.m	40 sq.m	
	vii) Computer based (word processing, printing etc) services	1	1	30 sq.m	30 sq.m	
	viii) Motor bike Repair,	1	1	50 sq.m	50 sq.m	

Sl.	Name of the Facility	Quantity		Area		
		Min.	Max.	Minimum for Unit Facility	Sub Class Total	Class Total
		(No.)	(No.)			(Acre)
	vulcanizing etc.(optional)					
	ix) NMT repair service (Rickshaw, bicycle etc)	1	2	30 sq.m	60 sq.m	
	x) Post Office / Courier Services	1	2	20 sq.m	40 sq.m	
	xi) Sports / Recreational facilities(games, indoor games etc)	1	2	50 sq.m	100 sq.m	
	xii) Rickshaw/Auto stand (General)	2	4	100 sq.m	400 sq.m	
	xiii) Restaurant, Tea bar, Fast food	2	4	10 sq.m	100 sq.m	
	xiv) Tailoring	1	2	20 sq.m	40 sq.m	
7	Solid waste transfer station(may also small scale processing)	1	1	0.5 Acre		1
8	Utility Facilities					1*
9	Neighbourhood Co-operative Office Complex			0.33 Acre		0.5
	i) Offices	2	4	15 sq.m	60 sq.m	
	ii) Committee rooms	2	3	40 sq.m	120 sq.m	
	iv) Community Club including indoor games (male and female)	2	2	200 sq.m	400 sq.m	
	v) Cultural Facilities (Rehearsal, Music room etc)	1	2	30 sq.m	60 sq.m	
	vi) Community Police Barrack	1	1	40 sq.m	50 sq.m	
	vii) Technician Service (Electrical, Plumber, AC, Freeze etc.)	2	4	25 sq.m	100 sq.m	
10	Community Hall	1	2	0.33 Acre		0.5
11	Shops			0.33 Acre		0.5
	i) General store	3	4	25 sq.m	100 sq.m	
	ii) Grocery	4	6	25 sq.m	150 sq.m	
	iii) Stationary	2	3	25 sq.m	150 sq.m	
	iv) Confectionary / Bakery	2	3	25 sq.m	80 sq.m	
	v) Departmental Store**	1	2	100 sq.m	200 sq.m	
	vi) Medicine Shop	2	3	25 sq.m	80 sq.m	
	vii) Sweet Meat Shop	2	3	25 sq.m	80 sq.m	
	viii) Book / Newspaper Stall	2	3	10 sq.m	30 sq.m	
	ix) Fresh Corner (Vegetable, fish, meat, egg, chicken etc.)	2	3	12 sq.m	40 sq.m	
	x) Fruit Shop	2	3	10 sq.m	30 sq.m	
	xi) Flower Stall	2	2	10 sq.m	30 sq.m	
	xii) Gift shop	1	2	10 sq.m	30 sq.m	
Total Area for the Neighbourhood Facilities				22.8 Acres (approx.)		

Source: RAJUK, 2009

5.2.6 Proposed Land Use of Detailed Area Plan (DAP)

A detailed land use planning guideline has been formulated to comply with rapid population growth considering all the planning aspects. After reviewing the existing land

use pattern, seventeen different types of land use have been proposed in this plan. This type of land use pattern is generally known as land-use zoning. The detailed land-use guidelines are shown in Table 5-3. In Detailed Area Plan, 17.19% of the total area is allocated for Urban Residential Use, 3.29% is for Mixed-Use having residential use, 8.46% is allocated for Rural Settlement. Rest of the DMDP area is allocated for other necessary purposes. Various types of land use are required along with residential use to make a city environmentally sustainable. In this regard, it is necessary to must find out a strategy in an integrated manner to settle a large number of people in the limited size of land. Otherwise, it is essential to slow down population growth in Dhaka city.

Table 5-3: Proposed land-use guidelines

Sl.	Land Use	Area		% of DMDP Area
		Acre	Hectare	
1	Urban Residential Zone	64913.14	26269.56	17.19
2.	Commercial Zone (Business)	1193.32	482.92	0.31
3.	Commercial Zone (Office)	6.88	2.79	-
4.	General Industrial Zone	3866.68	1564.78	1.01
5.	Heavy Industrial Zone	2012.86	814.57	0.53
6.	Mixed Use Zone (Commercial–General Industrial)	327.65	132.59	0.08
7.	Mixed Use Zone (Residential-Commercial)	8098.03	3277.16	2.13
8.	Mixed Use Zone (Residential-Commercial-General Industrial)	3733.12	1510.75	0.97
9.	Mixed Use Zone (Residential- General Industrial)	739.21	299.15	0.19
10.	Institutional Zone	3879.252	1569.898	1.02
11.	Administrative Zone	980.49	396.78	0.26
12.	Agricultural Zone	89471.1	36207.8	23.68
13.	Flood Flow Zone	81024.21	32789.47	21.45
14.	Open Space	3080.091	1246.48	0.8
15.	Rural Settlement Zone	31982.89	12943.05	8.46
16.	Water Retention Area	5737.876	2322.053	1.52
17.	Water Body	18782.14	7600.91	4.95
Total		**328052**	**132758**	

Source: RAJUK, 2009

5.2.7 Drainage and Environmental Management

Development in some areas is prohibited to preserve, protect and manage natural resources including streams and other water bodies, wetlands, woodlands and wildlife habitats in Detailed Area Plan. These will be treated as Environmental Protection Overlay Site in DAP. The natural drainage system in the Dhaka city comprises of several retention

and detention areas including khals (canals), which are linked to the surrounding rivers. The city rainfall runoff is accumulated in the retention and detention areas and discharged to the surrounding rivers through the khals. The Dhaka West has 13 khals having a total length of more than 31 km while the Dhaka East has 27 khals of a total length of about 60 kilometers. Approximately 80% of the city area is drained through these channels to the surrounding rivers of Dhaka. The catchments area of the khals in the Dhaka West varies from 6 to 40 sq. km (Chowdhury, 2000). There are also many water storage areas such as lakes and low lying lands which function as retention areas. Among the city canals, the Dholai Khal which once used to be the artery of an important navigational route for country boats to and from destinations within the metropolis has almost disappeared due to four decades of wrong policies of the city administration to construct roads by closing the canal (Huq, 2003). The canals had their outlets to the Buriganga, the Sitalakkhya, the Balu and the Turag rivers, which were inter-connected. An ancient canal, the Dholai Khal used to encircle the oldest part of old Dhaka joining the Buriganga near Mitford Hospital and the Mill Barracks. The closing of the Khal had a far-reaching impact on the natural drainage system of the city. But it is a matter of sorrow that, RAJUK is violating its own master plan. Nowadays RAJUK is working like a developer rather than the regulatory authority. It is busy with different land development and housing projects. It has changed the direction of Shitalakkha River for Pubachal project. Besides, it permitted a lot of government and non-government land development by filling the low lands like Jhalsiri, Jhilmil, etc. Besides 100% of respondent gave their negative opinion on Drainage and Environmental survey process, database and planning in DAP.

After the above discussion, it is clear the DAP has some critical problems due to the faulty procedure and for not knowing the extent of deliverables which leads to the failure of the plan. As per the SWOT analysis, it had a lot of scopes to build Dhaka into a livable city. Improper survey procedure and a database with a lot of wrong information and information gap the master plan weak. A responsive master plan is necessary for the development of any city. Therefore, it is necessary to develop a functional and implementable conceptual plan for Dhaka city, which will form the basis of DAP.

5.2.8 Disaster Management

There is no proper disaster management initiative or guidelines in DAP. It is resulting in sufferings of the inhabitants from disasters. The risk of disasters can be reduced by proper planning and design provisions.

2010 Dhaka Fire (Nimtali Area of Old Dhaka)

The 2010 Dhaka fire accident was a fire in the city of Dhaka, Bangladesh, on 3 June 2010 that killed at least 124 persons (117 on spot, others later in hospital) which occurred in the Nimtali area of Old Dhaka (Figure 5-3). The fire started when an electrical transformer exploded. The head of the fire department speculated that the fire was fanned by chemicals and other flammable products stored in shops. The density of the residential area made it difficult for firefighters to quell the blaze. Also, the narrow lanes of Old Dhaka and staircases of old buildings made it difficult for fire service equipment to enter the area (Wikipedia, 2010). Disaster potential for each area needs to be assessed and urban response should be proposed. Planning strategy for the dense area was not formulated. The DAP published in 2010 without any provision of disaster management strategy in spite of the fact that was not different than. But the situation did not change. A lot of manmade disasters occurred during the past years because of inappropriate planning.

2013 Savar Building Collapse (Rana Plaza)

The 2013 Savar building collapse or Rana Plaza (an eight-story commercial building) collapse was a structural failure that occurred on 24 April 2013 in the Savar Upazila of Dhaka District, Bangladesh (Figure 5-4). The search for the dead persons ended on 13 May 2013 with a death toll of 1,134. Around 2,500 injured people were rescued from the building alive. It is considered the deadliest structural failure accident in modern human history, and consequently also the deadliest garment factory accident in history (BBC, 2013). The building contained clothing factories, apartments, a bank, and several shops. The bank and maximum shops on the lower floors were immediately closed after cracks were discovered in the building. The building's owners overlooked warnings to avoid using the building after cracks had appeared the day before. Garment workers were ordered to return the following day, and the building collapsed during the morning rush-hour (Wikipedia, 2013). It was an example manmade disaster after the violation of building code and design. But DAP was responsible for land use and structure use. Rana

Plaza was a commercial building, but it was used for the industrial purpose also. There was no safety, security or evacuation plan. It is an example of a complete failure of regulatory.

2019 Dhaka Fire (Chawk Bazar, Old Dhaka)

A fire accident started in a road accident between a pickup van and a private car and fire broke out in Chawk Bazar, Old Dhaka, Bangladesh on 20 February 2019, after the collision the private car's gas cylinder exploded (Figure 5-5). The fire then spread to a group of buildings being used to store chemicals, and quickly expanded to nearby buildings in the densely packed historic district of Chawk Bazar in Old Dhaka. The fire left at least 80 people dead and 50 others injured (Wikipedia, 2019). This is also, fundamentally a case of inappropriate provision of infrastructure in a dense area which caused rapid spread of fire and also made evacuation difficult. Each area needs a unique planning strategy. In the detail or user level, it is close in DAP, but this DAP ignored it.

Figure 5-3: Fire Accident of Nimtoli, Old Dhaka
(Source: Bangladesh Fire Service, 2010)

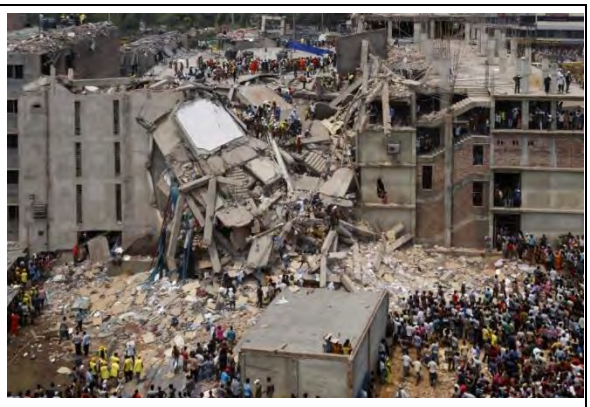


Figure 5-4: Savar Building Collapse (Rana Plaza) of 2013
(Source: Wikipedia, 2013)

Figure 5-5: Fire accident in Haji Wahed Mansion, Chawkbazar, Old Dhaka
(Source: Banglatribune, 2019)

Figure 5-6: Fire Accident of FR Tower, Banani
(Source: The Daily Star, 2019)

2019 FR Tower Fire, Banani, Dhaka

The FR Tower Fire broke out on the eighth floor of the 22-story building called FR Tower at the commercial Banani area of Dhaka city (Figure 5-6). It caused 25 deaths and more than 70 others were injured. There was no fire safety system (CNN, 2019). Besides FR Rower violated RAJUK rules for building construction, and also the planning and design of the street/ block.

Fire incidences at NImtoli, Chawk Bazar and FR Tower and the collapsing of Rana Plaza are all results of the faulty plan, design, and management.

After the above examples, it is clear that the disaster management system is very inadequate in Dhaka city. But DAP is a way to grow a proper disaster management system. Each building type or use has the same inherent potentialities for disaster, DAP should take care of these threats in its disaster management plan. It also a case of negligence, mismanagement, inefficiency, and corruption on the post of the regulatory body.

5.2.9 Checklist wise Appraisal of the DAP

The following are the most important criteria to make a DAP successful if the properly addressed result will show the appropriateness of DAP.

1. **Time Frame**

   DAP started on delay. It missed its time frame again and again. Survey work of DAP delayed. Consulting firms failed to completed work in time.

2. **Land development**

   DAP is basically urban design and guideline. It is a local level plan which provides the proposed Land-use zoning, infrastructure, and utility services. But after the assessment, it has found that DAP (2010-2015) is a larger version of the Urban Area Plan (1995-2005). Details of land development are not properly available besides, the private land developer is filled the low land areas. Besides RAJUK and other developers also are filling the low land. It seems that Rajuk is violating it of development guideline like DAP. Jhilmil Project is a project of Rajuk which is developed by filling a low water retention land.

3. Detail Description of Distribution of land uses

Considering all the planning aspects, a detailed land-use planning guideline has been formulated to comply with rapid population growth. Reviewing the existing land use pattern, 17 different types of land use have been proposed. This type of land use pattern is generally known as land-use zoning. The detailed land-use guidelines are shown in 5-2. Nevertheless, all these land use proposals are made to make Dhaka environmentally sustainable and improve living standard. But our one of the major problem is the housing crisis. In Detailed Area Plan, 17.19% of the total area is allocated for Urban Residential Use, 3.29% is for Mixed-Use having residential use, 8.46% is allocated for Rural Settlement. Rest of the DMDP area is allocated for other necessary purposes. To make a city environmentally sustainable, various types of land use are required along with residential use.

4. Details of Housing and Residential Area

There are no population growth control steps in DAPS. Dhaka, for instance, every year more than 0.5 million people are added to this mass. It means that every year at least 0.1 million new household units are needed to fulfill the growing housing demand. It is clear that the present housing demand of the capital is hardly met, let alone fulfilling the future demand (Seraj, 2013). Detailed Area Plan (DAP) of RAJUK completed in 2010, the area earmarked for residential (including rural homestead) land use was 41,498 hectares. But the actual residential area found in the 2013 survey of RDP project is 55,852.51 hectare (36.47% of total RDP area). This is due to the recent rapid development, both planned and spontaneous between 2008 and 2013 (RDP, 2013).

5. Details of Commercial Activity

There are no commercial activity details in DAP 2010-2015. Commercial hubs are not mentioned.

6. Details of Industrial Location

Locations of industries are shown in DAP but without a disaster management plan.

7. Details of Transport and Communication

It is more important to ensure proper management of the existing transportation system than that of the establishment of new roads. Without proper management, any future planning will be failed. There are some proposals in the Detailed Area Plan which are very crucial for the improvement of the transportation network. To ensure uninterrupted vehicle movement, local roads have been proposed on both sides of

national and regional highways. Moreover, to avoid time-sharing at road intersections, cloverleaf overpass has been proposed. Special emphasis has been given to establish a dedicated lane for Rapid Bus Transit. It has been recommended to start the commuter train from Nayrayangonj to Gazipur. On the other hand, Dhaka is a deltaic city, water in the form of rivers, canals, waterways, ponds and flood plains formed the matrix of Dhaka. It is obvious that water can provide an inexpensive transport solution for the city. So it has been recommended to ensure movement through circular waterway around Dhaka. Besides, there were a lot of errors in survey data. So, traffic and transportation plan has some contradictory issues. Pedestrian traffic is never considered in any planning including DAP, causing it to fail.

8. **Details of Open Spaces and Recreation**

   There is land use description but no illustrations of open space and recreation plan and details.

9. **Details of Institutional Facilities like hospitals, educational institutions**

   There are no proper details of institutional facilities like hospitals and educational institutions.

10. **Details of government and non-government official Infrastructure**

    In DAP there is no provision of redistribution and renovation of government and non-government official Infrastructure.

11. **Protection of sites of heritage, conservation or environmental significance**

    There is a proposal for Shankhari Bazar area. It can be developed under the Urban Renewal programme and a part of it can be preserved as a historical conservation site under a heritage conservation program. Details of the conservation strategy for heritage area or buildings or other features were not spelled out.

12. **Landscaping**

    There is no proper landscaping plan in DAP. On the other hand landscaping including vegetation, pedestrian ways, land grading, and drainage is one of the most important priority of any sustainable city plan and DAP.

13. **Drainage and Environment**

    Most of the natural drainages of Dhaka City has already disappeared or are in the way to lose their existence due to unauthorized occupation through encroachment. These encroachments are taking place mostly through unplanned development and

unauthorized landfilling to develop new residential areas. Geo-climate factors were not considered in the drainage and environmental planning and design.

14. Disaster Management

There is no proper provision of the disaster management plan in the DAP, But it is one of the most necessary elements of DAP.

15. Development Control Problems of DAP

There are special development controls and guidelines in DAP. Development control is largely hampered by various reasons:

- DAP did not consider existing planning rules.
- DAP did not set clear guidelines to implement it.
- There is an absence of a database management system and new technology in regular practice.

Correct data on all issues mentioned above, within an appropriate time frame will result in a pragmatic DAP. More detailed basics and attributes and a responsive checklist evaluation are presented in Section 5.4.

5.3 Development of a functional and implementable concept of DAP

It is necessary to overcome the existing weakness of DAP to make it functional and implementable. In most of the cases, town planning is still ignored in our urban development process. People prefer to develop their land without following planning norms. At the same time, concerned authorities are unable to exercise full control over development. But stakeholders should be compelled to follow existing plans and development rules. Awareness is to be built among the people to follow the plan. Government agencies must be compelled to implement plans. In order to achieve the goals set forward in the Detailed Area Plan, some follow up actions are required. Among those some major actions are described below:

5.3.1 Time frame to implement DAP

It is necessary to design DAP within a certain time frame. Structure Plan (SP) and the Detail Area Plan (DAP) are interrelated. This plan needs to work in a slightly staggered parallel way. An example of the time frame (Figure 5-7) is given below. DAP implementation will start after 5 years of the starting of SP. New structure plan (Structure Plan-2) will start 5 years before the completion of DAP. Planning is a continuous process.

In this sequence, the structure plan and detail area plan will ongoing for the improvement and advancement of a city.

Plan Type	Time Frame (Year)										
Structure Plan	5	10	15	20	25						
DAP		5	10	15	20	25					
Structure Plan-2						5	10	15	20	25	
DAP-2							5	10	15	20	25

Figure 5-7: Staggered Timing of Structure Plan (SP) and Detail Area Plan (DAP)

5.3.2 DAP as an Urban Design Tool

City planning principle named "New Urbanism" or "Neo-Traditional Neighbourhood Design" has gained acceptance in recent years. It is being one of the approaches in addressing a variety of problems in urban communities of DMDP area. DAP should be deliverable on urban design level as practiced worldwide. In the city of Rockingham, DAP units are for only 350 square meter area. So, block-wise DAP will be a solution. Besides disaster management should be detailed out in it.

5.3.3 Revision of Existing and Formulation of New Legal Provisions

There are a number of rules and regulation in use for development and development control. But with the passage of time, these rules and regulations have become obsolete which need review and refurbishment in the light of the present context. In recent days three-tier development plans in the form of Structure Plan, Urban Area Plan and Detailed Area plans are prepared. Recommendations have been given to implement DAP through Action Area Plans with people's participation. This is a new concept, hence it requires legal coverage and thereby it is necessary to enact a new law for this purpose. Theoretically and practically, the DAP is also an Action Plan universally with people's participation.

5.3.4 Capacity Building of RAJUK

The planning section of RAJUK especially plan implementation and monitoring wing should be equipped with the sufficient number of qualified planners, designers, and logistics to monitor the development trend. This type of initiative will ensure planned development in specific areas of urban expansion.

5.3.5 Provision of Penalty for Plan Violation

There should be a provision of punishment for violation of the plan provision by individuals as well as private and public sector agencies including RAJUK. Planning provision violation makes it difficult to implement planning properly.

5.3.6 Determination to Implement the Plan

RAJUK on the adoption of the planning document should show its intent to implement the plan through effective control measures and budget allocation. RAJUK needs to be better equipped with the necessary logistics, honest, and efficient manpower to implement the plan properly.

5.3.7 Proper Application of Modern Technology

Management of the survey method and output was one of the main shortage of DAP 2010-2015. It is not possible in a short span of time to do this type of huge topographic, land use and traffic survey with traditional survey methods. Design and Maps of DAP were mainly based on satellite images of google earth. But nowadays drones, lidar, etc. are also available which can able to provide a very high-quality image of the real world in real-time. Besides using GIS software for data compilation and processing will provide an accurate result. Now technology is available. So proper management for using these technologies is very necessary which will reduce DAP preparation time.

5.3.8 Using a Common Web base Platform

In Dhaka city, there are a lot of development authorities working, but there is no coordination among them. A web GIS-based platform will help to make coordination among them and share the data. It will reduce the cost of repeated survey expenses and time. It will also reduce the overlapping of work. Besides everybody will be aware of the DAP proposals which will make DAP easily implementable.

5.4 Basics and Attributes of a Good DAP

The urban design revolves around three cornerstones of development, conservation, and community participation. It should focus on the basics of urban design which recognize the positive attributes of a city. The concepts and direction would be to enhance and preserve the positive attributes while improving aspects and characteristics of the built environment that are less than satisfactory. Strength and opportunities are on one side of the development scale while weakness and threats are on the other side. A SWOT analysis is helpful in this respect. The Strengths (direct inbuilt helpful forces or positive approaches), Weakness (visible bar/ obstacles to fulfill the objectives), Opportunities (Context that can be positively manipulated or success), and Threats (hidden obstacles to attain long-term success) of urban areas are evaluated by the SWOT analysis. After SWOT analysis 'dos' and 'don'ts' for the project is determined, which is then quantified to develop a program. Depending on the level of intervention, the urban design attributes may be enumerated as follows (Mowla, 2019):

Macro Level: Image of the City

- Natural setting and Topography
- Infrastructure
- Conservation
- District character and amenities
- Axial planning
- Urban pattern and form
- Gateways
- Functional districts
- Land use and activities

Intermediate Level: Buildings and Space

- Composition
- Design and architecture
- Urban place and city squares
- Streets and street pattern
- View corridors
- Connectivity and integration
- Massing and heights

- Landmarks
- Open space and parks
- Sidewalks and pedestrian linkages

Micro Level: User Environment

- Human scale
- Harmony
- Street furnishing
- Materials, colour, and textures
- Transition
- Streetscape

5.4.1 Checklist for Urban Design Evaluation

Macro Level

Natural

- Key attributes/ components of the natural setting
- Direct and indirect impacts on physical and visual quality of natural landscape cultural, social or socio-economic assets
- Compatibility with natural and landscaping setting

Man-made

- Urban Context
- Contribution to the cityscape in terms of adding legibility and creating a high-quality city environment
- Visual impact and suitability of landmark feature
- Suitability and visibility of visual features
- Compatibility with landscape and development pattern
- Compatibility with overall height profile and massing
- Contribution to the local character
- Compatibility with heritage setting

Intermediate Level

Natural

- Direct and indirect impacts on the physical and visual qualities of the natural landscape

Man-made

- Location suitability
- Relationship with the visual corridors
- Impact on the penetration of light and air
- Compatibility with the street pattern
- Visual impact and suitability of landmark feature
- Compatibility with overall height profile and massing
- Compatibility with local heritage
- Impact on the surroundings

Micro Level

Natural

- Functional appropriateness in relation to the natural environment
- Response to the natural landscape in the local context

Man-made

- Contextual and functional appropriateness at street level
- Contribution to the pedestrian-friendly environment
- Human scale and quality enhancement
- Creation of spatial feeling

5.5 Summary of Findings

This study is a concept based research. After analyzing the DAP 2010-2015, it is clear that it has some serious limitations which lead it to a contradictory and failed document. Already the implementation period of DAP has been expired. Already Dhaka Structure plan 2015-2035 has been published. So, it necessary to overcome the limitations of expired DAP. Master plan like DAP is used all over the world. It is the city development design as well as a guideline. So, functional and implementable model DAP developed in this research can be helpful to make a whole a comprehensive DAP which will be successful.

Chapter 6: Application Case Study to Validate the DAP Process

6.1 Introduction

DAP 2010-2015 was faulty and incomplete. It had serious limitations. In this chapter, a model of a DAP is described. A small study area has been selected to apply DAP properly. It will be a hypothetical sample DAP for a small area of Dhaka city. The other areas of Dhaka city could be developed by following the same process. It could be a guideline on how an efficient Detailed Area Plan can be prepared. This sample application model of DAP has been prepared on the basis of the checklist developed in Chapter 4: Development of a Theoretical Framework for Analysis.

6.2 Study Area

6.2.1 Selection of the Study Area

Bangladesh University of Engineering and Technology (BUET), Palashi area is one of the most important areas in Dhaka City. This area is dominantly used for educational purpose, residential purpose, commercial purpose, medical service, and other purposes. An indicative application of DAP in this area is expected to fulfill almost all of the categories of necessary elements of DAP.

6.2.2 Profile of the Study Area

Bangladesh University of Engineering and Technology (BUET) focuses on the study of engineering and architecture (Figure 6-1). It has 91.37 acres (0.37 square km) of area (UGC, 2014). In DAP of RAJUK, this area is described as the education and research category of land use.

6.2.3 Database Development

ArcGIS software was used for database development. Google earth and google maps were used for the satellite image and geographic information.

6.3 Conceptual Application Model in BUET

Necessary elements of DAP have been sorted out from the checklist in chapter 4. A sample DAP application model has been described below for BUET area (Figure: 6-1). The GIS software application is appropriate. Because it works with both spatial and tabular data. ArcGIS software has been used to develop the DAP application model for BUET area. This application model has been developed by fulfilling the criteria mentioned in the checklist.

Three steps were followed to develop the conceptual application model. These were,

1. Survey: It is to identify the existing problems and prospects.

2. Policy and Program: It will describe the dos and don't for sustainable development.

3. Urban Design: It will give actual development proposal guideline in 3-D at the user level.

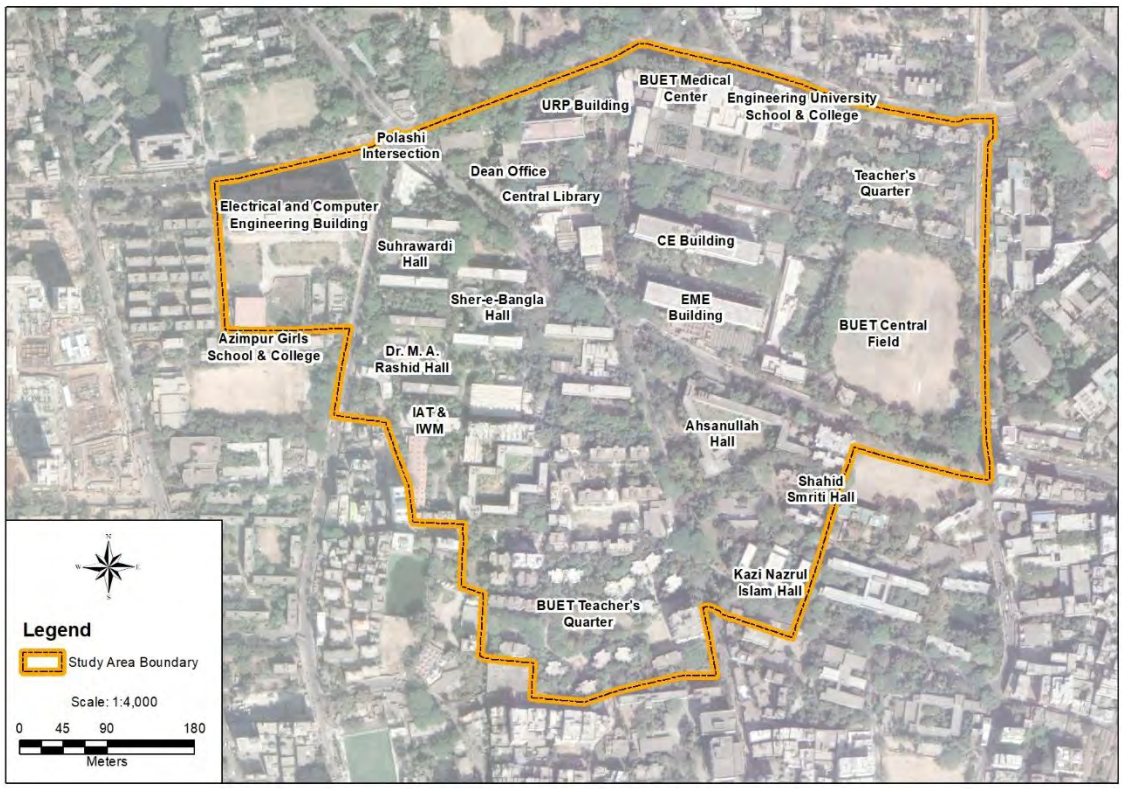


Figure 6-1: Study Area Boundary

6.3.1 Identified Existing problems in BUET Area

The following major problems were identified in the survey and observation of the site and surroundings of BUET (Mowla, 2019).

a. Segregation of Campus and Zoning:

Students have to walk across the Polashi node to get access to the new academic building. It brings difficulties to the students and it is also very dangerous to cross the busy road, as there is no over the bridge or other facilities (figure 6.2). This campus needs proper zoning for land use like academic zone, administrative zone, residential zone, and teacher-student zone, all connected to a focal point.

Figure 6-2: BUET Campus is Divided into Three Parts

(Source: Mowla, 2019)

b. Entrance from Surroundings:

The north boundary (figure 6.3) of the BUET campus doesn't provide access to the campus, while it may link the campus with a calm environment with another necessary entrance., Besides there is no entry gate, symbolic or physical to identify BUET in the area.

Figure 6-3: North Boundary of the Campus Doesn't Provide an Access
(Source: Mowla, 2019)

c. No Visual or Physical or Physical Linkage:

There is a lack of visual or physical linkage with the important landmarks around BUET (figure 6.4) making it an isolated entity and not contributing to the city fabric.

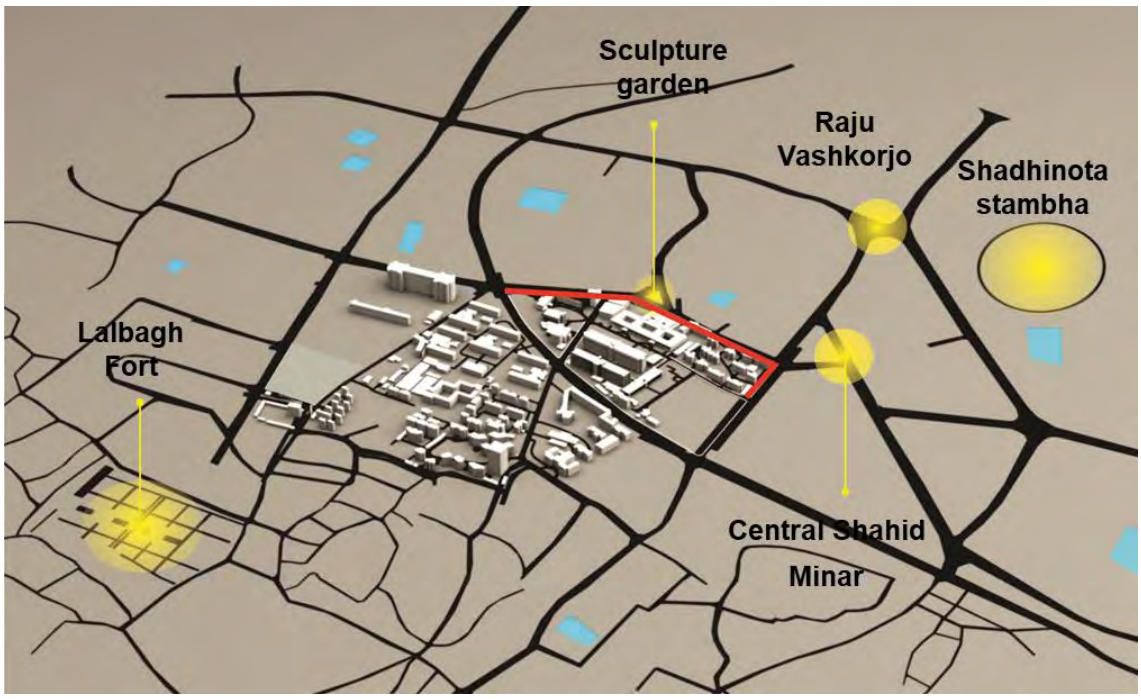
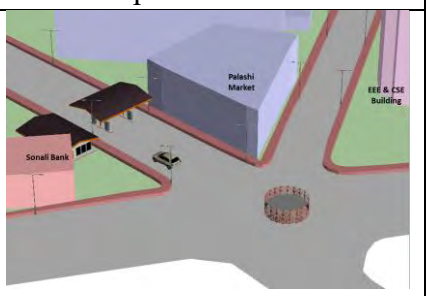
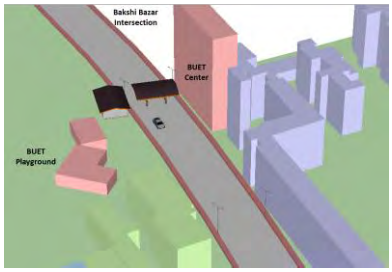


Figure 6-4: Important Landmarks around BUET
(Source: Mowla, 2019)

6.3.2 Policy and Program Formulation

The following development policy has been taken to mitigate existing problems. According to the policy, the programs should be formulated. Then the sample urban design describes the detail of development activity.

<table>
<tr><th>Policy</th><th>Program</th><th>Urban Design</th></tr>
<tr><td rowspan="4">Policy 1:
To create clear activity and functional zoning
BUET Campus should be divided into 4 Zones. These four zones should have their own focal point and these should be connected to the central focal point (Figure 6.5-8).</td><td>1. Academic Zone:
It will contain faculty wise 5 (five) sub-zones as,
1. Faculty of Engineering
2. Faculty of Civil Engineering
3. Faculty of Mechanical Engineering
4. Faculty of Electrical and Electronics Engineering
5. Faculty of Architecture and Planning</td><td rowspan="4"> 
 
 
Sample Focal Points</td></tr>
<tr><td>2. Administrative Zone</td></tr>
<tr><td>3. Residential Zone:
It should be divided into three parts as.
1. Students
2. Teachers
3. Staffs</td></tr>
<tr><td>4. Teacher-Students Welfare Zone</td></tr>
<tr><td>Policy 2:
Integration of BUET Campus:
To integrate the BUET campus crossed by two public roads (Figure 6-7).</td><td>1. To create BUET gateway for campus identity. In the context, Palashi and Bakshi Bazar, there are two locations where possible gateways may be created. Because most of the BUET traffic passes through this point, and BUET Shaheed Minar lays in the node connecting academic and residential zones.</td><td> 

Proposed Gateway location in Palashi Intersection
 

Proposed Gateway location in Bakshibazar Intersection</td></tr>
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Policy	Program	Urban Design
	2. To create physical accessibilities to all the major sectors preferably from the central hub.	
Policy 3: **To create and development of a BUET central focus area/ central hub for BUET** (Figure 6-7)**.**	1. To create a public place near the BUET Shahid Minar Area. Because two central communication spines cross at that point.	
	2. To create some public gathering places near the central node.	 Sample public gathering place
	3. To connect four major zones with the central hub.	
Policy 4: **The central hub to be connected with sub-centers** (Figure 6-7)	1. To create sub-centers for each functional zone and connect them with the central hub.	
	2. To give a clear identity and character to each of the functional zones.	 Demarcation will enhance the focal points.
	3. To provide development guidelines for each functional zone.	

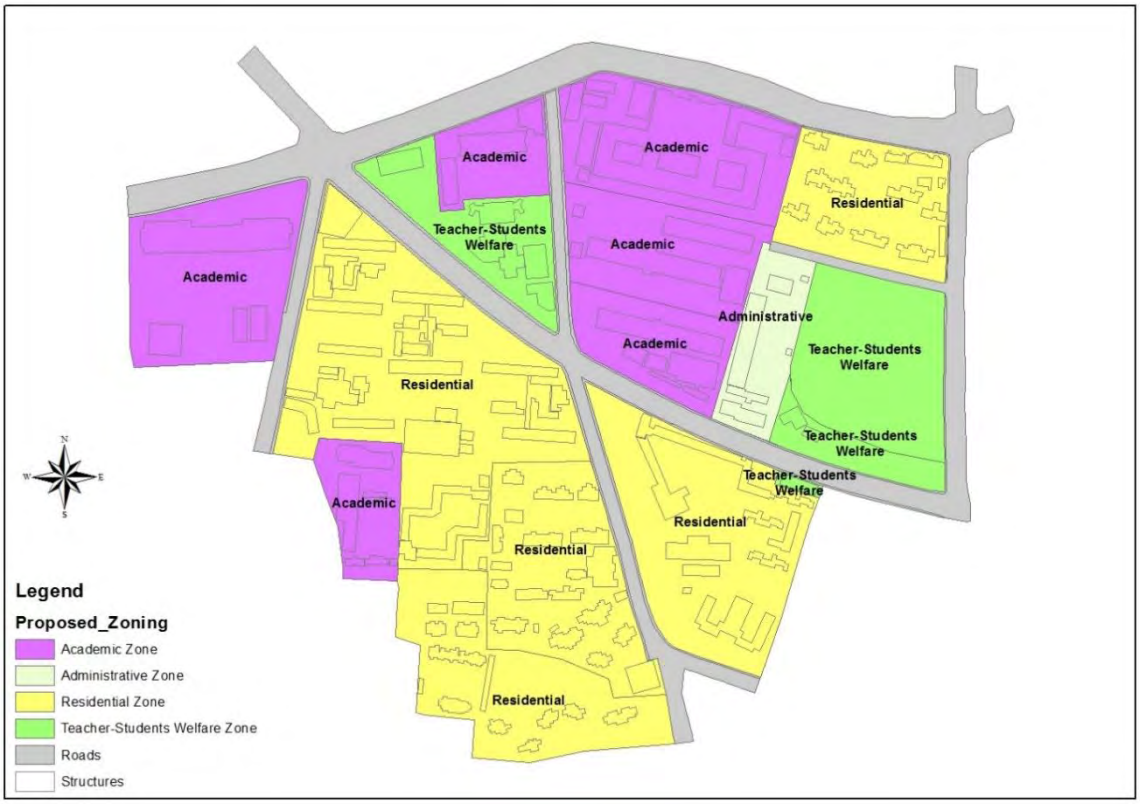

Figure 6-5: Proposed major four activity and functional zoning in BUET Area

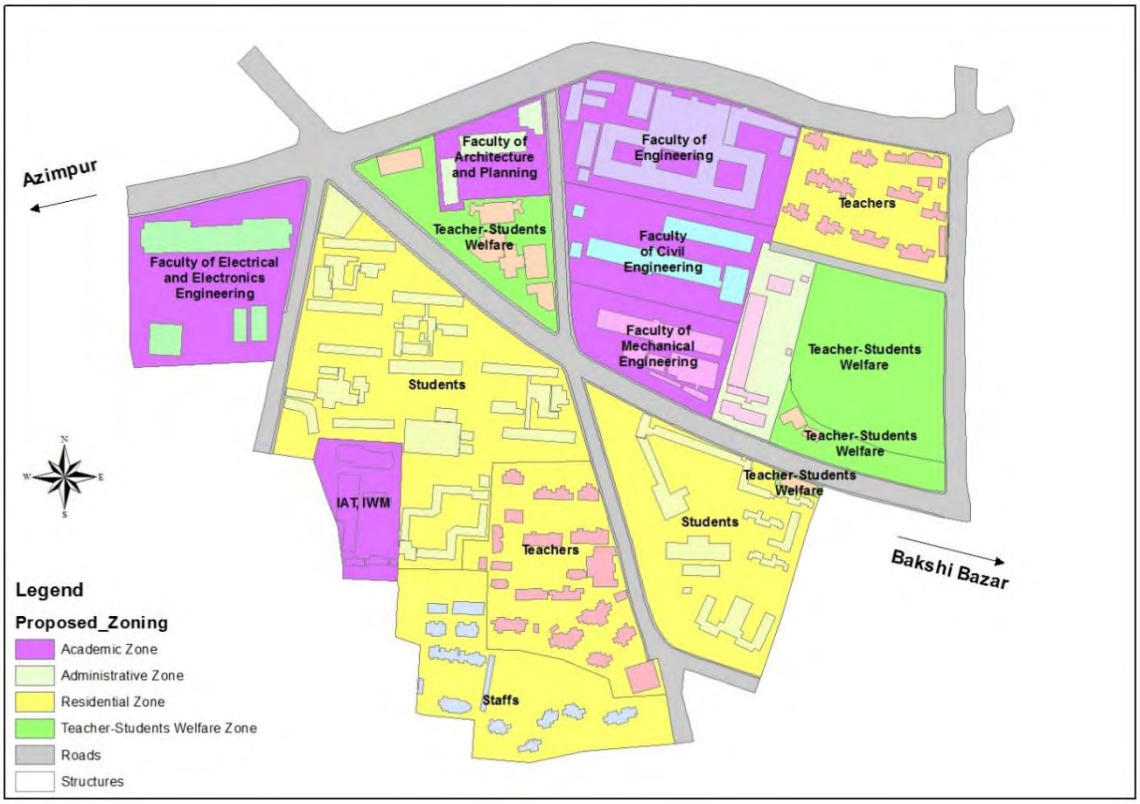

Figure 6-6: Proposed Sub-Zones in BUET area

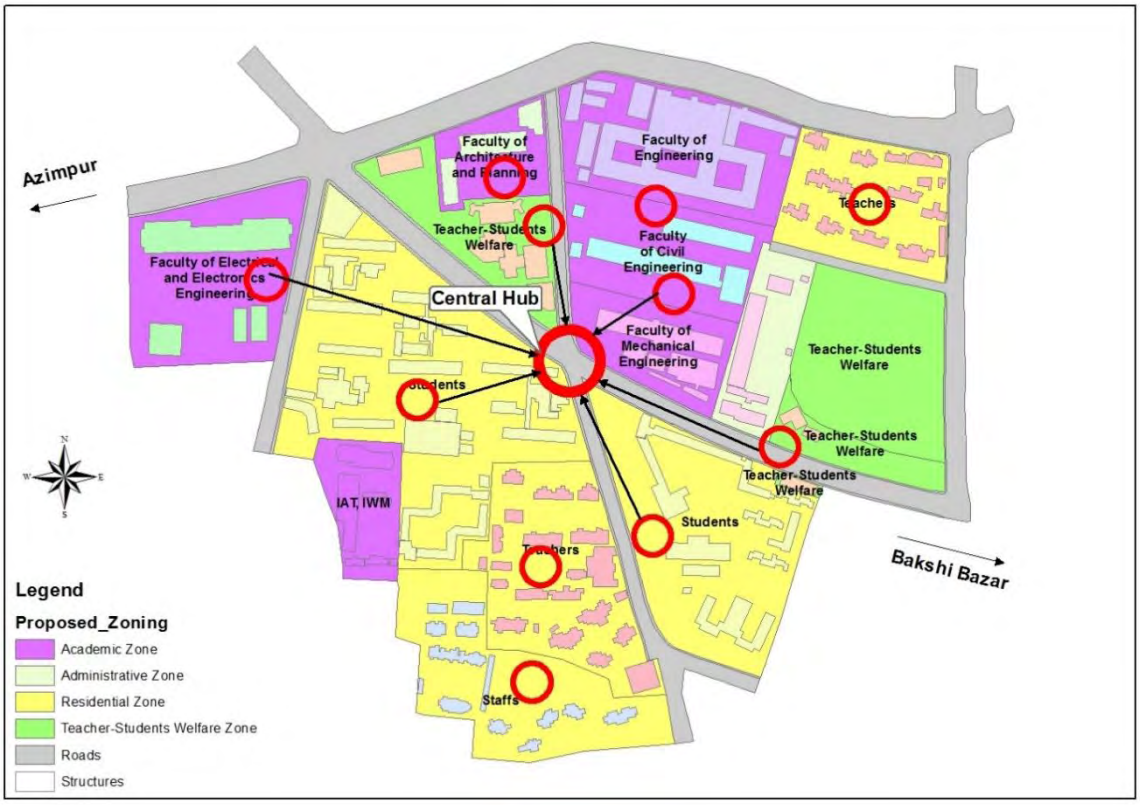

Figure 6-7: Proposed Locations of Focal Points (Red Marks) of Sub-Zones and Linkage with Central Hub

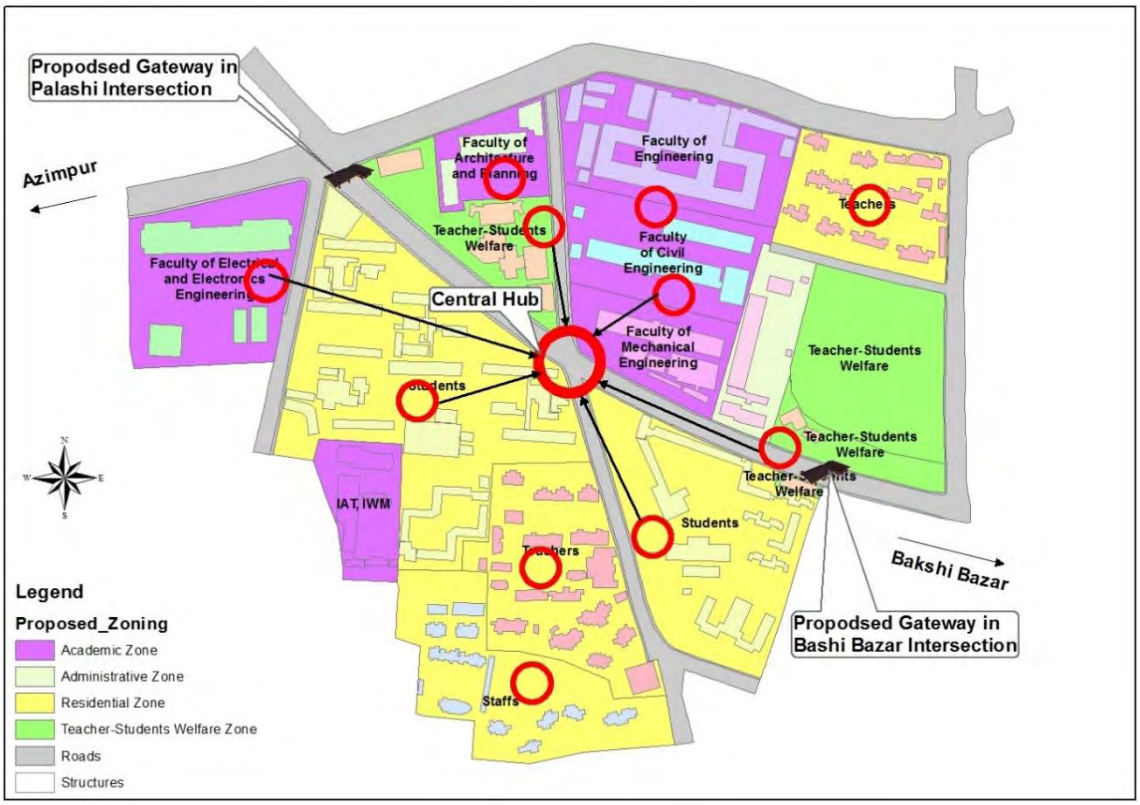

Figure 6-8: Proposed Gateways in Palashi Intersection and Bakshi Bazar Intersection

6.3.3 Development of Time Frame

DAP for BUET area is divided into three phases within a time frame of 5 years. Table 6-1 is showing phase-wise development schemes.

Table 6-1: Phase-wise Development Schemes

Phase	Period	Development Schemes
Phase 1	First and Second Year	# Widening the Existing Roads and Preparation of Walkways and Separate lanes for Non-Motorized Vehicles/ Bicycle Lane. # Drainage Construction for the Built-up area. # Construction Piped Water Supply System for both daily use and fire hydrants for fire safety.
Phase 2	Third and Fourth Year	# Preparation of New Roads. # Construction of Rickshaw/ Bicycle Stands at Different Points. # Solid Waste Disposal Site Development.
Phase 3	Fifth Year	# Beautification and Landscaping. # Protection of sites of heritage, conservation or environmental significance

6.3.4 Land development

DAP is basically an urban design guideline. It is a local level plan which provides a coordinated proposal of Land-use zoning, infrastructure, and utility services. Land use (Figure 6-2) of BUET has been divided into five categories. Table 6-2 shows land use. In DAP there should be a description of the land development process. Development should follow a guideline for which a master plan is the first step. BUET does not have a master plan.

Table 6-2: Land Use Classification

Land Use Type	Area (Sq. Km)	%
Commercial Area	0.002	0.54
Institutional Zone	0.123	33.24
Open Space and landscape	0.023	6.22
Residential Zone	0.153	41.35
Transportation and Communication	0.069	18.65
Grand Total	**0.370**	**100**

6.3.5 Detail Description of Distribution of land uses

Though BUET is an educational institution, its major land use has been occupied by residential use (41.65%) for teachers, students, and staffs. Every residential area and the institutional building needs adequate open space in hierarchic order. BUET has optimum open but not adequately organized. DAP need to provide detail land use guideline and land use is restricted as the structure plan. The campus does not have a focused and hierarchic public open space in a planned manner (figure 6-9).

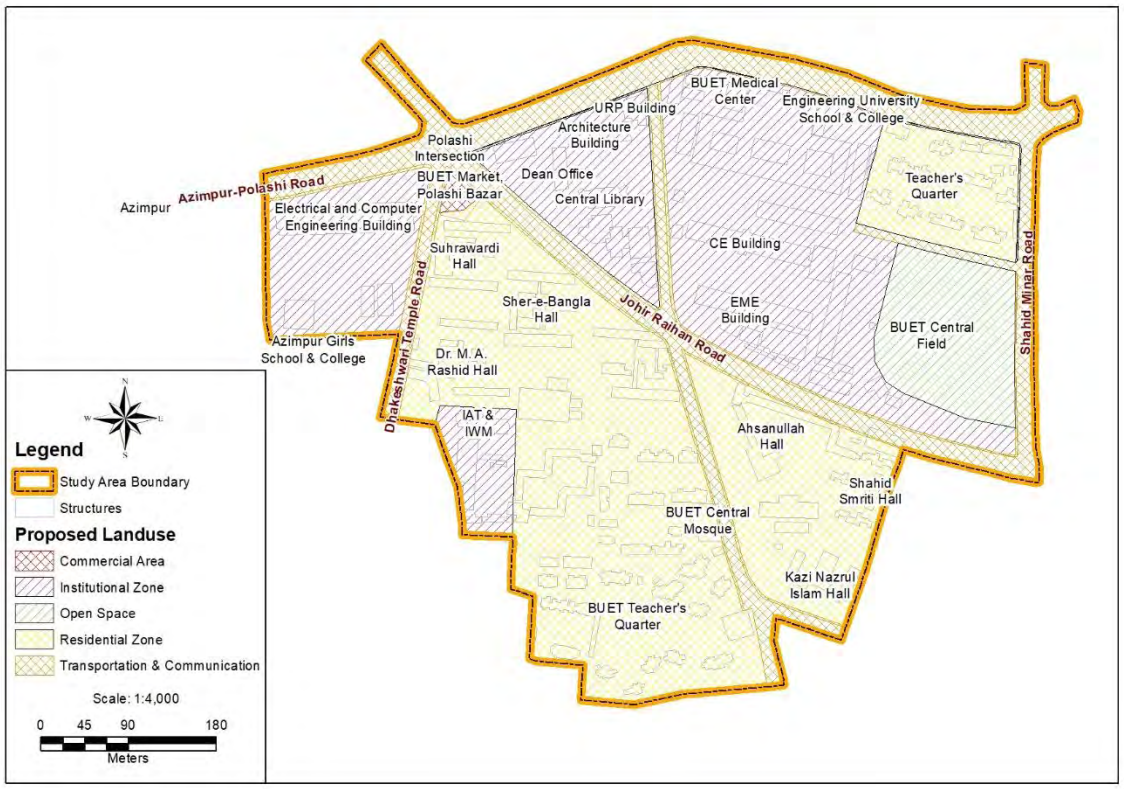

Figure 6-9: Land use of BUET Area

6.3.6 Details of Housing and Residential Area

The maximum land-use area is residential (41.35%) in BUET area. DAP of the study area shows categories of the building structure (Figure 6-10). Every residential building needs to be defined in the DAP area with the necessary facilities and infrastructure needed.

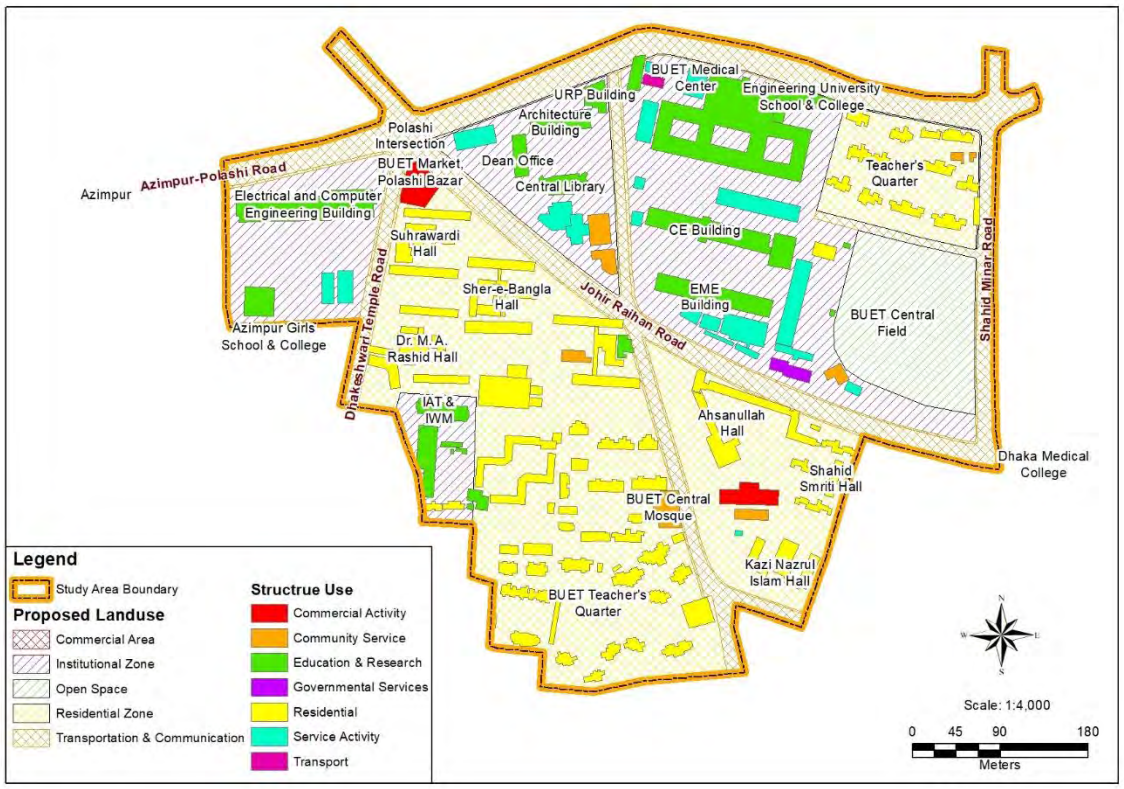

Figure 6-10: Structure Use of the Study Area

6.3.7 Details of Commercial Activity

DAP of the study area shows categories of land use and building structure of the commercial area (Figure 6-10). Every commercial building should be defined in the DAP area and properly distributed. BUET's main commercial area is Palasi Intersection and the second hub is near the central mosque, between Ahsanullah Hall and Nazrul Islam Hall.

6.3.8 Details of Industrial Location

Though there is no major industrial activity in the study area, there are workshops, auto shops, the power plant, and water treatment plant, etc. scattered in the campus. These have been included in the service activity category. DAP should describe the locations of industrial activity with commensurate infrastructure and amenities including relocation if needed.

6.3.9 Details of Transport and Communication

It is more important to ensure proper management of the existing transportation system than that of the establishment of new roads. There is no need for the establishment of the new road, but existing roads need improvement. Walkway cum bicycle lane may be introduced for mobility and enhance green transportation. Figure 6-11 is showing proposal of walkway cum bicycle lane in the study area. This development work is for the first phase of DAP in the study area. BUET has three types of traffic loads, these are heavy, medium and light (figure 6-12). Through the campus is at a pedestrian scale, no infrastructure of pedestrian traffic is available. Most of the traffic within the campus is pedestrian, therefore, through pedestrian connectivity, the fragmented campus may be united.

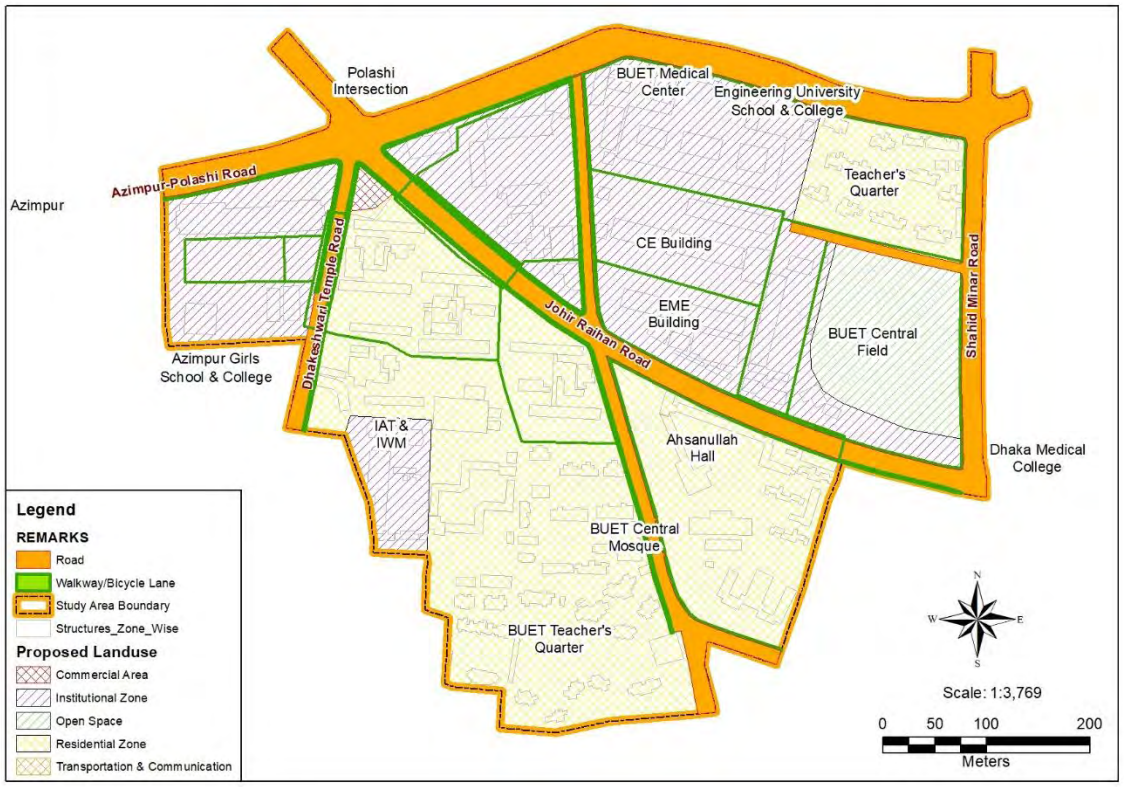

Figure 6-11: Transportation and Communication Plan

Figure 6-12: Locations of Heavy, medium and light traffic load
(Source: Mowla, 2019)

Development Proposal

It is necessary to control and regulate the traffic movement in the university campus area. There is no entrance gate of this area to create an identity and demarcate the campus in the following illustration, two gate location is proposed to clearly identify the campus. One is proposed in the Palashi intersection and another near Dhaka Medical College (Figure 6-13).

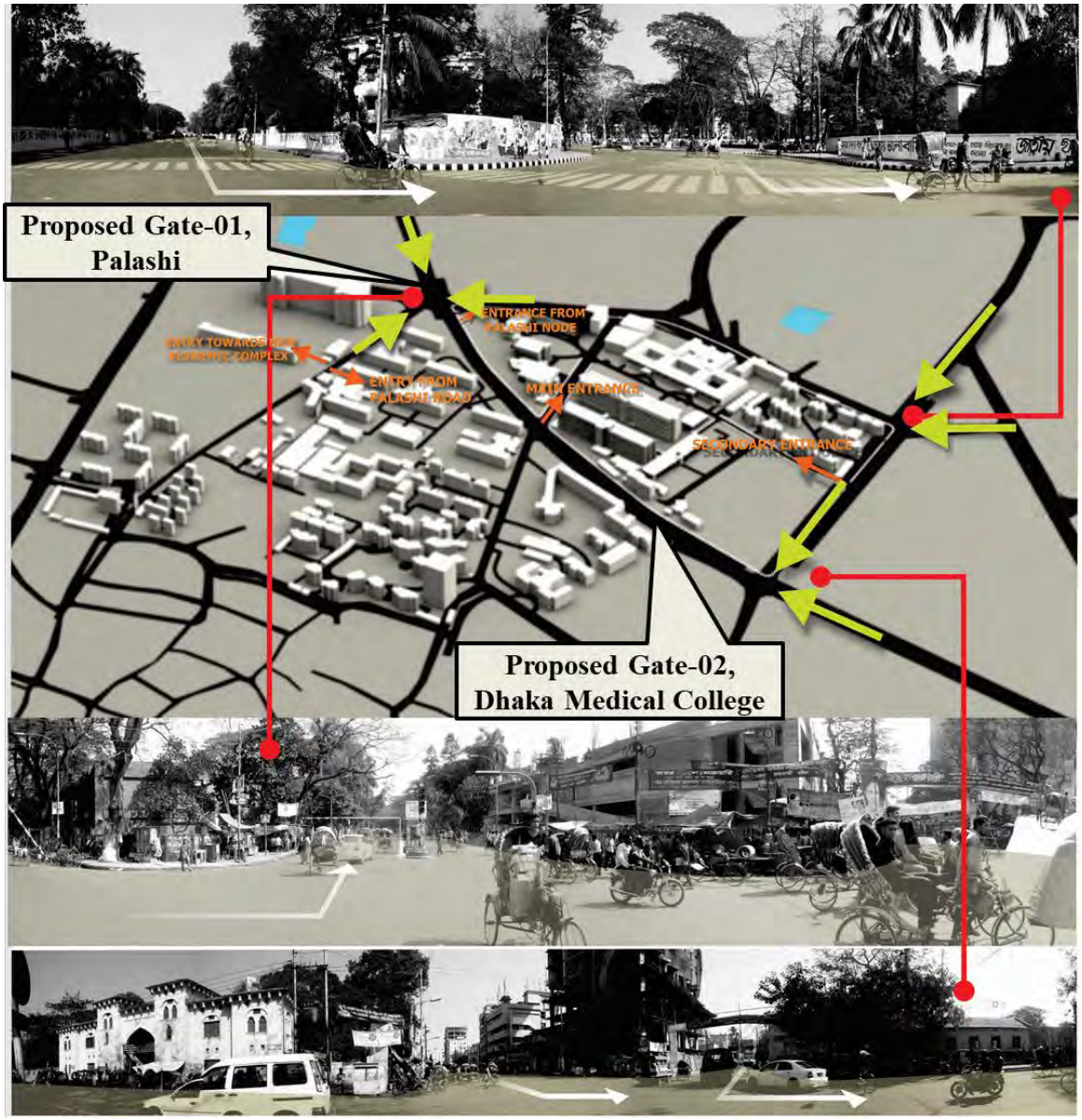

Figure 6-13: Proposals of Two Entrance/ Exit Gates in BUET Area

(Source: Mowla, 2019)

There is no easy access to or from BUET medical center. In case of emergency, it is really tough to get immediate help from Dhaka Medical College Hospital. An emergency gateway may be proposed in front of BUET Medical Centre on Shaheed Sarani (Figure: 6-14).

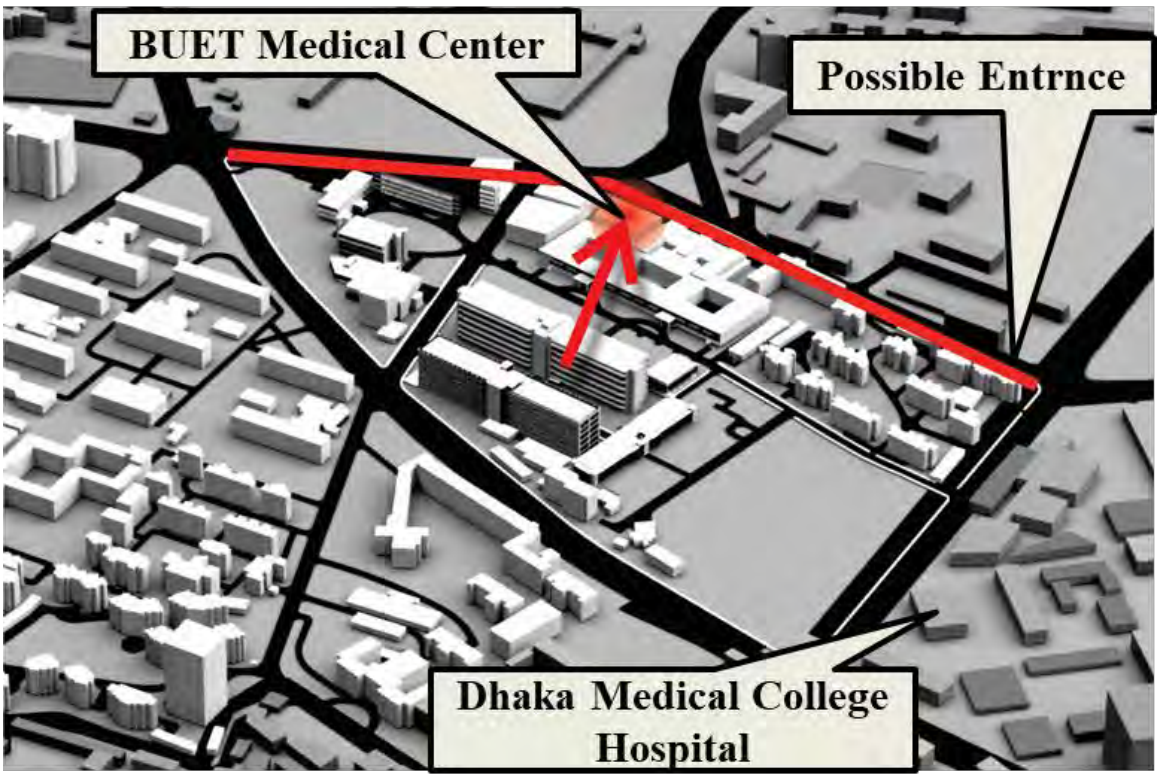

Figure 6-14: Proposal for Hospital Access

(Source: Mowla, 2019)

6.3.10 Details of Open Spaces and Recreation

Figure 6-2 shows the land use description for open space and recreation. BUET central play filed is the only defined open spaces in this model DAP. But there is a lot of more open spaces available around the structures of the study area. Connectivity and accessibility to the open spaces are not defined. There is no hierarchy of open and recreational spaces. Open spaces available may be connected in a hierarchic manner, that would enhance this campus environment (Reference: Figure: 6-11)

6.3.11 Details of Institutional Facilities like hospitals, educational institutions

There are proper details of institutional facilities like hospitals and educational institutions in the study area. Figure 6.3 shows the locations of the hospital and

educational usages. Besides the service activity category shows the locations of mosques, the power station, the water supply station, market, etc.

6.3.12 Details of government and non-government official Infrastructure

There is no proposal for redistribution and renovation of government and non-government official Infrastructure in the study area. Though the locations are shown in figure 6.2. ECE faculty has been recently relocated to west Polasi campus from EME site.

6.3.13 Protection of sites of heritage, conservation or environmental significance

Some buildings have historical values in the study area. Protection of sites of heritage, conservation or environmental significance work is proposed for the third phase. Rashid Bhaban has already been protected. Engineering office, Medical Centre, Old structures within OAB and secret building needs protection and integration with the master plan.

6.3.14 Drainage and Environment

Drainage is one of the most important things for DAP. The manmade drainage system has been proposed for the study area (Figure 6-15). There is no natural drainage system in the study area. So, the drainage line will join to the main sewerage network of DWASA following the natural topography of the campus. This work would be completed within the first phase.

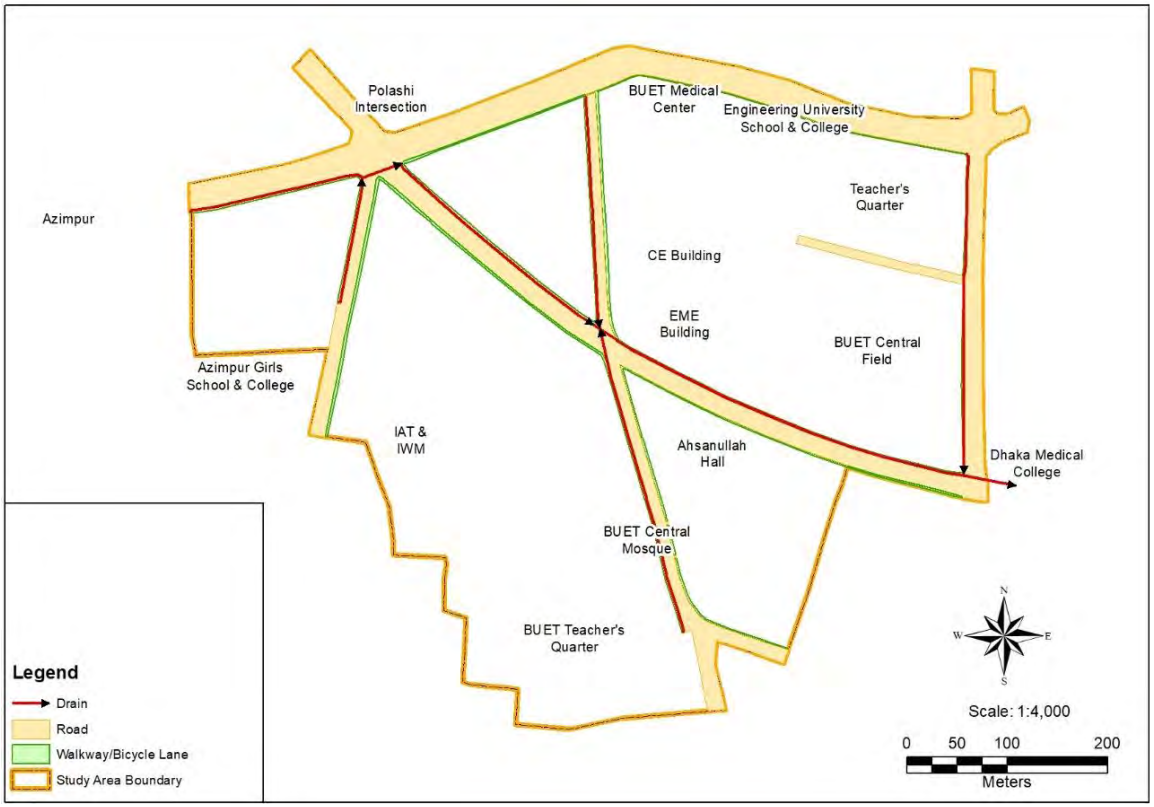

Figure 6-15: Drainage Network Plan

6.3.15 Landscaping

After the completion of most tasks like new construction, drainage, walkway/ bicycle lane development, disaster safety the third step will be introducing the landscaping for the study area. Building usage category wise rooftop treatment, landscape details walkways signs, symbols, amenities, etc. will give the study area a cohesive functional look. However, this master plan and landscape plan should be visualized properly.

6.3.15 Disaster Management

Fire safety is one of the most discussed matter nowadays in Dhaka after the recent accidents in Dhaka city e.g. Chaw Bazar, Banani F.R. Tower, etc. For disaster prevention, fire hydrant can play a vital role. Water network and location of a fire hydrant on the basis of available equipment is proposed for the study area. Figure 6.15 is showing the water network plan for the study area. There is an existing water treatment plant. Total 15 fire hydrants have been proposed with water pipeline with the distance of 400feet. Figure

6-16 shows the locations of fire hydrants, fire station, and water treatment plant. Dedicated assembly points need to be identified for the gathering of people during disaster. Mobility of fire fighting and rescue operations is needed to be ensured in a planned manner.

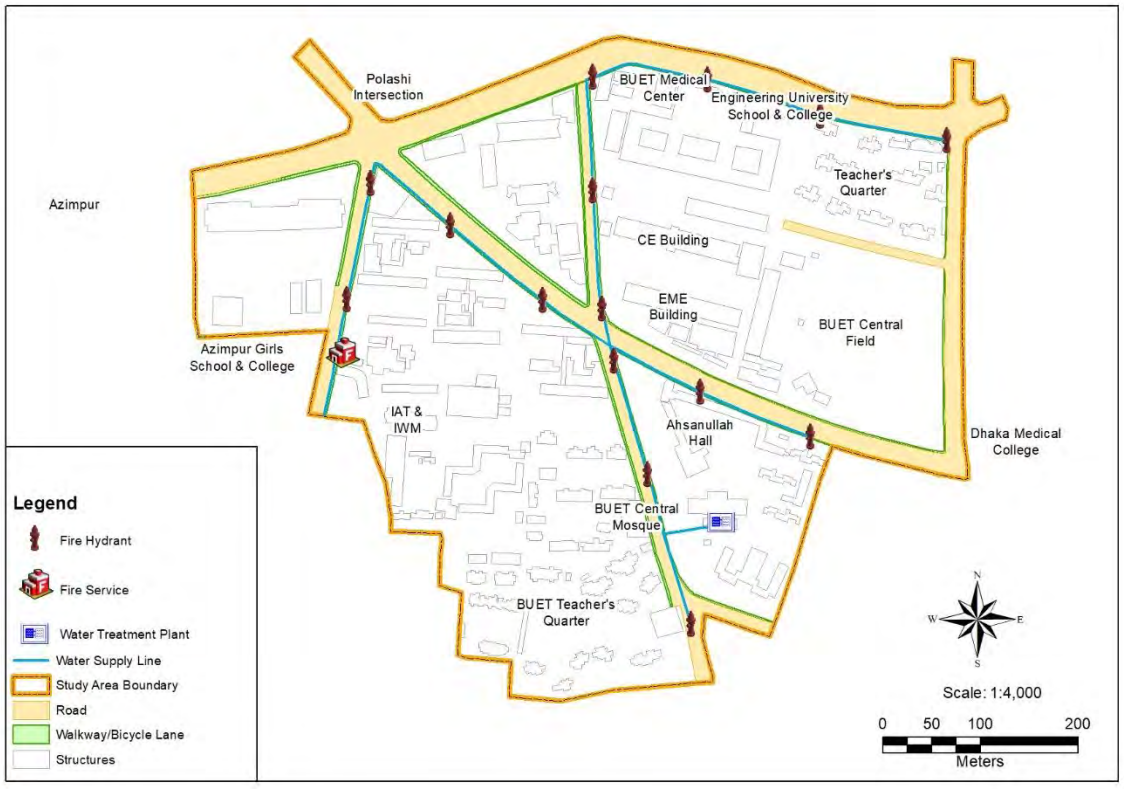

Figure 6-16: Water Network Plan and Location of Fire Hydrants

6.3.16 Development Control Problems of DAP

Development control is the most essential element of any planning. A perfect plan can be destroyed if the development is not controlled. A separate development control section, i.e. estate planning and design section can be formed to control the growth according to the master plan in the study area.

Chapter 7: Recommendations and Conclusion

7.1 Introduction

As per the objectives of the research, the first part was to appraise the DAP 2010 for Dhaka and the second objective was to suggest a conceptual guideline for an appropriate DAP. The appraisal of DAP' 2010 shows that it was not visualized as needed. DAP at various levels should be visualized in a different manner and scale (Reference: Section 5.4) based on the finding a checklist was developed for the evaluation of DAP. This research made an attempt to follow the checklist by applying it to the BUET campus. Review of present DAP, development of basic guidelines to be followed at various levels and the development of an evaluation checklist has been done after the appraisal of the DAP' 2010. On the basis of that guideline and checklist, it is evident that DAP' 2010 for Dhaka has some serious problem.

The appraisal shows that the DAP' 2010 did not follow the planning and design process recommended for a DAP, nor the deliverables of DAP in such details that can be expected in the site in a set time frame.

For the second objectives of the thesis, the checklist is applied in parts to show its validity in the case study "BUET Campus". Due to the time and logistic constraints full application of the checklist could not be demonstrated, however, it gives an indication of a recommended DAP format.

7.2 Recommendations

7.2.1 Recommendations

DAP is very necessary for Dhaka city. So, in order to overcome the failure of DAP is very essential to reevaluate the DAP process. It is required to update and enhance the qualifications of urban planners and designers irrespective of the decision related to the development authorities planning and implementation wing to mitigate the existing problems. In chapter 6 there is a model application of DAP to show the ideal nature of a DAP. It gives the idea to prepare a worthy DAP. Besides it is necessary to consider possibilities for improving capacity for planning design and project implementation for sectoral agencies like DWASA, City Corporations, and the local Paurashavas when the responsibilities for planning and implementation are delineated. But the most essential

part is the responsibilities of the development authority RAJUK. Development authorities role should be as a regulator. It is an alarming matter that in practice it acts as a developer. Development authorities can be divided into two separate wings for continuing these two works in a parallel manner.

7.2.2 Further Research

Due to the time and logistic constraints application guidelines and the checklist developed in section 5.4 could not be fully demonstrated. It is recommended that further research be carried out based on section 5.4.

7.3 Concluding Remarks

Dhaka, the largest city of Bangladesh is suffering from various city-related problems like traffic congestions, housing problem, pollution, lack of utility services, recreations and many other problems. To mitigate city-related problem RAJUK launched many activities and development project since its inception. But these were not adequate, appropriate and successful. The Detailed Area Plan (DAP) is Rajuk's one of the initiatives which should be based on the structure plan. The stages of DAP preparation included geo-referencing of mauza maps, different types of surveys, consultation with stakeholders, draft plan preparation, public hearing, and final plan detailed preparation for application at the user level. Socio-economic survey, physical feature survey, topographic survey, and land use survey was done during the period of 2005-2006. The high tech digital GIS (Geographic Information System) database was prepared for the very first time for Dhaka under the project. But after all these efforts DAP fell short of described deliverables and considered a failure. It has been failed to mitigate existing problems. But this idea DAP was good and inconsistency with the practice worldwide. Its first failure was the time frame. It has published in 2010, where the main DMDP project duration was 1995-2015. Besides, there are a lot of limitations found after evaluating the DAP report and database. The research has tried to figure out some idea for the appropriate development of a functional and implementable DAP for Dhaka City. Lessons from the DAP 2010 failure would show the path to develop the next DAP. The outcome of the research would help to implement DAP as an appropriate urban design document to make Dhaka a livable city in upcoming days. The DAP that would follow the structure plan 2016-35 should not repeat the same flaws and this study aims to address these.

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