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Local Government Division

ROHANPUR PAURASHAVA

MASTER PLAN: 2011-2031

MARCH, 2015

Technical Assistance: Local Government Engineering Department (LGED)

Government of the People's Republic of Bangladesh

Ministry of Local Government, Rural Development & Cooperatives

Local Government Division

ROHANPUR PAURASHAVA MASTER PLAN: 2011-2031

STRUCTURE PLAN

URBAN AREA PLAN:

- Landuse Plan
- Transportation & Traffic Management Plan
- Drainage & Environmental Management Plan

WARD ACTION PLAN

March, 2015

ROHANPUR PAURASHAVA

ROHANPUR, CHAPAI NAWABGANJ

ROHANPUR PAURASHAVA MASTER PLAN: 2011-2031

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Preface

Bangladesh has been experiencing rapid urbanization in the last four decades where level of urbanization has reached from 7.6% to nearly 29% between 1970 and 2011. Multidimensional complex factors like; socio-economic, political, demographic and climatic are responsible for this higher growth of spatial transformation. The fast urbanization is putting pressure on the small towns' limited land, urban services and environment along with countries big cities. Whereas urbanization is also considered as an opportunity and an integral part of the development process. Proper development plans and guidelines with necessary legislative measures and appropriate institutional arrangement can help to achieve sustainable urban as well as rural development.

However, presently, the Paurashavas has the legal mandate to take initiatives of formulating development plans, providing infrastructure and other services and creating opportunities for people to initiate developments with sustainable and harmonic approach. In this regards, Rohanpur had initiated steps to frame its' Master Plan (Physical Development Plan) by taking technical assistance from the Local Government Engineering Department (LGED). LGED under the Local Government Division of the Ministry of Local Government, Rural Development and Cooperatives initiated a project titled 'Upazila Towns Infrastructure Development Project (UTIDP)' providing all sorts of technical assistances to prepare long term physical development plan titled 'Master Plan' for Rohanpur Paurashava.

Master Plan of Rohanpur Paurashava has been prepared following the pre-requisite of the Local Government (Paurashava) Act, 2009. To prepare the Master Plan, LGED engaged consulting firm named AQUA Consultants & Associates Ltd. and set up a Project Management Office (PMO) deploying a Project Director, Deputy Project Director, experienced Urban Planners as Individual Consultant and support staffs. Regular monitoring, evaluation and feedback from PMO had also accelerate the pace and quality of the master plan preparation tasks. During formulation of the Master Plan, the Paurashava authority along with the project & the Consultant ensure people's opinion, observation and expectation in various ways: conducting sharing meetings, Public Hearing etc. At the end of the formulation process, the Paurashava completed all procedures necessary for its approval as per the related clauses and sub-clauses of the Local Government (Paurashava) Act, 2009. Paurashava Authority has submitted this Plan to the Local Government Division of the Ministry of Local Government, Rural Development and Cooperatives for final approval and gazette notification.

This Master Plan comprises of three tier of plan in a hierarchical order, these are: Structure Plan for 20 years, Urban Area Plan for 10 years and Ward Action Plan for 5 years. Urban Area Plan also comprises of three components namely; Land use plan, Traffic & Transportation Management plan and Drainage & Environmental Management Plan. This Master plan will serve as guidelines for the future infrastructure development of Rohanpur Paurashava together with land use control and effective management of service facilities.

The Paurashava Authority acknowledges the full support and all out cooperation from the consultant team, the Project Management office of UTIDP, LGED, Local Government Division of the Local Government, Rural Development and Cooperatives Ministry, public representatives, other stakeholders and civil society with deepest gratitude for accomplishing this remarkable assignment.

Cooperation and participation from national to local authorities, all government institutions, private entities and people of Rohanpur Paurashava will be necessary to implement this Master Plan successfully and make this Paurashava developed and livable. I hope Rohanpur Paurashava will be a model Paurashava in Bangladesh through building itself green and sustainable by successful implementation of this Master Plan.

(Md. Golam Mostafa Bisswas)
Mayor
Rohanpur Paurahsava.

Executive Summary

The Draft Plan Report of Rohanpur Pourashava has been prepared and submitted by the consultant AQUA-SCPL-RCC consortium for the partial fulfillment of the requirements stated in the Terms of Reference (ToR) for Upazila Towns Infrastructure Development Project (UTIDP; package- 9) being implemented by Local Government Engineering Department (LGED) under the Ministry of Local Government Rural Development and Co-operatives (LGRD&C) Ministry of Government of the People's Republic of Bangladesh. The Draft Master Plan Report is the fourth of the series of the reports to be submitted as per the ToR of the project "Upazila Town Infrastructure Development Project-Preparation of Rohanpur Pourashava Master Plan (Structure Plan, Urban Area Plan and Ward Action Plan)".

Prior to starting the Draft Plan report the consultant undertook field visit and organized a meeting with the stakeholders to understand the growth pattern, problems and prospects in future developing aspects of the project area. Rohanpur was established as "B" class municipality in January 1995. Existing Pourashava boundary coveran area of of 3577.42 acres or 14.48 sq. km but 3577.42 acre was delineated as planning area for preparation of Master Plan with due emphasis on local and regional development agenda for next 20 years.

The pattern of settlements in the Pourashava reflects that the Pourashava still possesses predominantly the rural characteristics. No planned residential area exists in the Pourashava. Structures are established without any planning standard and in haphazard manner. Population density of the Pourashava area is found 2413/ sq. km in the year 2011. The Growth Rate of Rohanpur Pourashava is estimated to be 1.44 %. The expected population for 2031 is 46507. The gross density of the area will be 13ppa (person per acre) in 2031. People in this Pourashava mostly belong to middle income groups. Only a small number of people belong to higher income group. According to BBS 2011, among the economically active age group of population, 44.91% are found engaged directly in Employment activities. Not working population found about 14.55 %, whereas looking for work found 0.22% and 40.31% of population found engaged in house hold work. The major occupations found are agriculture, industry and services in government, non-government and private organizations, day-laboring in agriculture.

Rohanpur is located within the flood plain of Padma River and on the southern side of the Punarvaba River, a branch of Mohanonda River. As the town is located in a well-connected place in the region, it offers great opportunities for establishment of industries encouraging investments leading to employment generation. The development activities taking place within the Pourashava area is attracting migration from the rural areas. Rohanpur is located to north-east of Chapai-Nawabganj district, some 25 km away from the district town of Chapai-Nawabganj and about 7 km away towards south from the Upazila Headquarters of Gomastapur.The area has good road connection to Chapai Nawabganj district and the remainder of Rajshahi Division. The Rohanpur-Singhabad Railway Section connects India with Rohanpur at north. This route is mainly used for the movement of goods traffic between Bangladesh and India.

The average elevation of the land of the Pourashava area is 21.81 mPWD. Mean elevation of different wards of Rohanpur Pourashava is very close to the mean value for the entire Pourashava. From Surface Analysis, it can be found that the Northern parts of the pourashava are

comparatively higher than others.The poura area is combined of pucca, katcha and semi-pucca roads while most of them are pucca but absent of proper inter ward connectivity due to inconsistency of road patterns.

The project area is just like predominantly agricultural in character like other upazilla towns. Land use survey reveals that agriculture is the most dominant land use category of the Rohanpur Pourashava. The land under agriculture purpose use is mostly double cropped area, which are low-lying depressions and remain under water during the monsoon flood. Pourashava Commercial, open space and mixed use lands are very much negligible in percentage. Core areas (Ward Nos.3, 5 and 6) of the town along this highway and its close vicinity developed with diversified land use without any proper planning guidelines causing many difficulties such as, traffic congestion, drainage problems and environmental degradations etc. for the town. Existence of PunorvabaRiver and quite a good number of canals in and around the Pourashava created opportunities for cultured fisheries in the Pourashava area. Good transportation linkage within the region and other parts of the country and potential for agriculture and fishery has created abundant scope for establishment of agro-based industries with adequate forward and backward linkages in the Pourashava.

The structure plan (Part-A) area consist of different zones (Core Area, Fringe Area, Peripheral Area, New Urban Area, Agriculture, Water body and Major Circulation) and it covers about 3593.63 acres of land. Agricultural area is the highest percentage of land (59.41%) while the core area covers the lowest percentence of land which is 3.60.

Urban Area Plan is the mid level plan that covers the the area 3593.63 acres. It lays down the land use zoning plan and infrastructure development proposals at the town level. Land use planning is an important part of Master Plan ensuring that land is used efficiently for the benefit of economy, society and environment of Rohanpur Pourashava. Urban Area Plan is the first phase illustration of the Structure Plan intended to be implemented over a time span of 10 years that includes 1st phase (1st-5th year) and 2nd phase (6th-10th year) of development programs.

The components of Urban Area Plan include Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan, Proposals for Urban Services. The future housing area estimates on a recommended planning standard of 100/150 persons per acre. With this standard, the maximum land required to accommodate total projected population (46507) in the year 2031 will be 725.49 acres. Existing residential land of Rohanpur Pourashava is 847.7 acres and net residential density of 10 persons per acre. The consultant, therefore, recommended 757.7 acres of land for housing and for different urban services for the population of the Pourashava in 2031 (net density will be about 65 persons per acre). Total commercial land in 2031 has been fixed at 40.41 acres, Education 67.44 acres, open space 102.32. But in the time of land use proposal of Rohanpur Pourashava it is not possible to maintain the all standard due to insufficient land. In land use proposal 253.96 acres of land is for Urban Residential Zone where 515.22 is for rural settlement.

The Transportation and Traffic Management Plan covers the scope of improvement of the existing network and system and plan proposals for new development. The proposals on improvement and new development are made for the project area up to 2031. The existing circulation network of Rohanpur Pourashava is 67.75 km and the proposed circulation network is 89.02 km. Primary Roads have been proposed to 80ft (ROW) and minimum width of road 20ft (ROW) in entire

Pourashava. The main intention of transport plan is to ensured proper functional linkage within other regional centres'. one truck terminals, one bus terminal and four tempo stand is proposed to cover the whole area.

The purpose of the Drainage Plan is to make an assessment of the present drainage facilities and to improve future development. This Plan shall be a planning tool and shall be used as a guideline for Rohanpur Pourashava that shall be responsible for the approval of drainage improvements. Natural canal in Rohanpur Pourashava is acting as a critical role in entire pourashava. Total 207.54 acres of water body is found in this pourashava but among them which covers greater than 0.25 acres have been identified in Master Plan. As some missing link of khals have been reconnected in master plan, the water bodies included in master plan is around 203.23 acres. Present man made drain is about 18.03 km and all this drains is pucca. The proposed drain of Rohanpur Pourashava is about 66.14 km where 5.31 km is primary drain, 30.42 is secondary drain and 30.42 is Tertiary drain. This will designated up to 2031.

Rohanpur Pourashava is lacking for sewerage system and people are used to dispose household sewer to the surface drains and or surface water bodies. This Pourashava does not possess good solid waste management system. The Rohanpur Pourashava has no solid waste disposal system as well as no transfer station. The Pourashava has only three temporary cleaner engaged for cleaning the Pourashava office building only. It has one dump truck, one pull cart but no dustbin. The solid waste management coverage is only a part of the total area. In master plan 8.5 acres of land is reserved for dumping ground and it is located in ward no 9. Total 04 waste transfer stations have been proposed in entire area.

In Part-C of the report contains Ward Action Plan of each individual Ward and this Development Proposals will be implemented within 1st to 5th year of planning period.

The Ward Action Plans (Part-C) are prepared under the framework of Structure Plan and Urban Area Plan. The Ward Action Plans contain details of development proposals at Ward level including the problems and opportunities existing therein and also include the proposals made in the upper level plan that is in the Urban Area Plan. The Ward Action Plans have been formulated for execution within a period of 5 years.

Finally, The Pourashava is self-sufficient neither in preparation of plan nor in implementation of plan proposals; is dependence on central government for technical and financial assistance huge. This dependence might hinder the overall plan making and implementation process. Besides, plan implementation would require the Pourashava to have a good coordination among various stakeholders and with the line ministry (LGRD&C) in place. Therefore a right kind of Institutional arrangement, and implementation framework would be required for successful implementation of the plan proposals and its future updating. However, the current project regarding Preparation of Master Plan for Rohanpur Pourashava under "UTIDP" emphasizes on having proper guidelines and planning standards by the Pourashava for ensuring sustainable and planned development of the Pourashava.

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ACRONYMS

BM	Bench Mark
BTM	Bangladesh Transverse Mercator
CBD	Central Business District
CNG	Compressed Natural Gas
CS	Cadastral survey
DGPS	Differential Global Positioning System
DLRS	Directorate of Land Records and Survey
DPA	Demarcation of Planning Area
DPHE	Department of Public Health and Engineering
GCP	Ground Control Point
GIS	Geographic Information System
GPS	Global positioning system
K.P.H	kilometers Per Hour
K.M.	Kilometer
LGED	Local Government Engineering Department
MSL	MeanSea Level
O-D	Origin and destination Survey
PCU	Passenger Car Unit
PWD	Public Works Department
RHD	Roads and Highway Department
RTK-GPS	Real Time Kinematics Global Positioning System
SOB	Survey of Bangladesh
TCP	Temporary Control Points
TIC	Tentative points)
TS	Total Station
UTIDP	Upazila Towns Infrastructure Development Project

LOCAL WORDS

Khal	Canal
Tempo	Human hauler
Bazar	Trade Center
Hat	Weekly an occasional Market
Paurashava	Municipality

Chapter 1: Introduction

1.1 General

Urbanization in Bangladesh is moving at a rapid pace. Between1961 to 1981, the average urban growth rate was 8%. The present average growth rate is about 4.5%. According to the population census of 2001, the share of urban population was about 23.29% and at present (2011) it is approximately 25%. By the year 2015, the share of urban population will be about 37% of the national population. The importance of urban development is emphasized in terms of its role in the national economy. More than 60% of the national GDP is derived from the non-agricultural sectors that are mainly based in urban areas. Again, the most foreign exchange earning sectors, like, garment and knitwear enterprises are agglomerated in urban areas. These sectors earn over 70% of the foreign exchange. Remittance is also a major sector of foreign exchange earnings and a large share of the remittance goes into the purchase of urban land. Surplus remittance is invested in business and manufacturing located in urban areas. These phenomena indicate the increasing role of urban areas being played in the national economy. The expansion of urban economy leads to the growth of urban population and concomitant haphazard urban spatial growth without planning. The rapid urbanization is marked by the creation of Paurashavas, whose number at present stands at 318. Paurashavas are created not only to provide urban services to their citizens, but also to create a livable environment through development of planned and environmentally sound living space.

The present infrastructure provisions in the Paurashavas are in a precarious state. Drains are mostly clogged that cannot drain out water during heavy rains and natural drainage systems have either been filled up or occupied by land grabbers creating water logging during monsoon. Traffic in Paurashavas is increasing day by day with the increase in population and demand. But the sub-standard road network cannot keep pace with the growing demand for movement. As a result, congestion becomes a common problem. Road networks are not developed in planned and systematic way leaving room for traffic congestion that increases economic loss to the people due to travel delay. The land use development in the Paurashavas is unorganized and unplanned, which is a major source of environmental deterioration. Building Construction Rules are not effectively enforced in the Paurashavas mainly for want of a well formulated Master Plan and qualified planning professional.

Under the above circumstances, it is high time to think about solving the problems of the Paurashavas that might otherwise be emerged critically in the future. To overcome all likely problems to come in future, the Paurashavas should go for planned development through preparation and implementation of a Master Plan. The Master Plan can be prepared exercising the power conferred to them by the Local Government (Paurashava) Act 2009. The Upazila Town Infrastructure Development Project (UTIDP) aims to prepare Master Plan for 223 Upazila level Paurashavas and Kuakata Tourism center under 12 packages for a period of next 20 years. The project has provisions for separate plans for land use control, drainage and environment, traffic and transportation management and improvement. The project also aims to prepare a Ward Action Plan (WAP) to ensure systematic execution of future infrastructure development projects. There is

also aim to prepare proposals to enhance Paurashava revenue so that it becomes more capable to meet its own capital needs.The location of Rohanpur within Bangladesh is shown in**Map 1-1**.

Map 1-1: Rohanpur Paurashava within Bangladesh

Thus the Master Plan of Rohanpur Paurashava suggests for the development of urban infrastructure, such as new roads and bridges/culverts, drainage facilities, street lights, markets, bus stands, solid waste management, sanitation, water supply, community facilities and other such infrastructure in order to equip the Paurashava to face future challenges of urbanization and economic regeneration. The Master Plan will initially focus on growth and development, social integration and environmental improvement following principles of sustainable development.

1.2 Philosophy of the Preparation of Master Plan

The philosophy behind preparation of Master Plan of the Upazila level Paurashava lies in the very motive of providing community welfare through a process of spatial organization, socio-economic rejuvenation, environmental improvement and provision of amenities to the present and future generations. The Master Plan aims for rational use of scarce land resources for concentrated development at urban scale following the principles of sustainable development.

1.3 Objectives of the Master Plan

As per the Terms of Reference (TOR), the objectives of the preparation of Master Plan of Rohanpur Paurashava are to:

a) Find out development issues and potentials of the Rohanpur Paurashava and make a 20- year development vision for the Paurashava and prepare a Master Plan in line with the vision for the development;

b) Plan for the people of Rohanpur Paurashava to develop and update provisions for better transport and communication network, housing, roads, markets, bus terminals, sanitation, water supply, drainage, solid waste management, electricity, education, leisure and such other infrastructure facilities for meeting the social and community needs of the poor and the disadvantaged groups for better quality of life;

c) Prepare a multi-sector short and long term investment plan through participatory process for better living standards by identifying area based priority-drainage master plan, transportation and traffic management plan, other need specific plan as per requirement in accordance with the principle of sustainability;

d) Provide controls for private sector development, with clarity and security in regard to future development;

e) Provide guideline for development considering the opportunity and constrains of future development of the Upazila Town; and

f) Prepare a 20-year Master Plan to be used as a tool to ensure and promote growth of the Rohanpur Paurashava in line with the guiding principles of the Master Plan and control any unplanned growth by any private and public organization.

1.4 Approach and Methodology

The UTIDP Project is aimed for substantial development of infrastructure and services for the Paurashava with optimum provision of opportunities for Paurashava dwellers and making scope for extending services to surrounding areas.

The current project is preparing a Master plan of the Paurashava, where the existing condition and different problems are identified, studied and analyzed and the probable solutions are to be sought

to ameliorate the same. The study moves through a process of data collection-analysis and fixation of objectives for planning. The approach is based on field survey for data collection and collection of information from secondary sources. The data is presented through maps, text and tabular form. Then the survey report and maps are prepared and submitted. Analysis of collected data is carried out to identify the nature and extent of problems prevailing in the Paurashava in order to fix the objectives of the actions to be undertaken in the form of planning and the interim report prepared and submitted. Through the process, involvement of the stakeholders has been ensured to make the planning as much sustainable as possible. For this purpose, continuous formal and informal discussions and meetings have been carried out throughout the project period using participatory approach. The discussions serve two purposes, first, a sense of belongingness develops within the minds of the stakeholders, particularly among the citizens, about the master plan to be prepared, and secondly, identification of problems and finding their solutions become easier with the participation of stakeholders, as the local stakeholders are More knowledgeable about local problems and possible solutions of those problems.

After doing all these jobs thoroughly the Master Plan had been done based on a prepared planning standard for Paurashava level town and formulating future strategies for the corresponding area. Again after final consultation with the stakeholders on the prepared plan the Final Master Plan has to be completed.

1.5 Scope of Work

The scope of work under this consultancy services covers all aspects related to the preparation of Master Plan, which includes Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan and Ward Action Plan for the proposed Paurashava. In order to prepare these plans, the activities contain but not limited to the following:

1. Visits have been made to the Paurashava at different stages of work of the preparation of Master Plan of Rohanpur Paurashava.
2. Feasibility for preparation of Master Plan has been submitted to the office of the PD, UTIDP.
3. An Inception Seminar has been organized at the Paurashava level to inform the Paurashava about the scope and Terms of Reference for the preparation of Master Plan. A thorough investigation has been made based on potential scope and opportunities available in the Paurashava to develop a 20 year development vision for it linking the ideas and view of the Paurashava people.
4. Determination of the study area and planning area has been done based on existing condition, demand of the Paurashava and potential scope for future development. A detailed survey has been conducted on the existing conditions of socio-economic, demographic, transportation and traffic, physical features, topographic, and land use of the Paurashava area following the approved format and data have been collected from primary and secondary sources. Analysis of such data and information has been carried out to find out the possible area of intervention to forecast future population of the Paurashava (15-20 years), vis-a-vis assess their requirement for different services, such as physical infrastructure facilities, employment generation, housing, right of way and land requirement for the existing and proposed roads, drains, playgrounds, recreation centers

and other environmental and social infrastructure. The following major tasks have been accomplished:

a. Identification and investigation of the existing natural and man-made drains, natural river system, the extent and frequency of floods, area of planning intervention have been done. Other works include study of the contour and topographic maps produced by the relevant agencies and review of any previous drainage Master Plan available for the Paurashava.

b. A comprehensive (storm water) Drainage Master Plan for a plan period of 20 years has been prepared considering all relevant issues including discharge calculation, catchments areas, design of main and secondary drains along with their sizes, types and gradients and retention areas with preliminary cost estimates for the proposed drainage system.

c. Recommendations have been made on planning, institutional and legal mechanisms to ensure provision of adequate land for the establishment of proper rights of way for (storm water) drainage system in the Paurashava.

d. Collection and assessment of the essential data relating to existing transport Land Use Plan, relevant regional and national highway development plans, accident statistics, number and type of vehicles registered for each Paurashava have been made.

e. Assessment has been made on the requirements of critical data and data have been collected through reconnaissance and traffic surveys, which should estimate present traffic volume, forecast the future traffic growth, identification of travel patterns, areas of traffic conflicts and their underlying causes.

f. Study has been conducted on the viability of different solutions for traffic management and development of a practical short term traffic management plan has been accomplished, including one way systems, restricted access for large vehicles, improved signal system, traffic islands, roundabouts, pedestrian crossings, deceleration lanes for turning traffic, suitable turning radius, parking policies and separation of pedestrians and rickshaws etc.

g. Assessment has been done on the non-pedestrian traffic movements that are dominated by cycle rickshaw. Special recommendations should be made as to how best to utilize this form of transport without causing unnecessary delays to other vehicles. Proposals should also consider pedestrians and their safety, with special attention for the children.

h. Assessment has been made on the current land use with regard to road transportation, bus & truck stations, railway stations etc, and recommendations to be provided on actions to optimize this land use.

i. Preparation of a Road Network Plan based on topographic and base Map prepared under the Project. Recommendation has been made on the road development standards, which serve as a guide for the long and short term implementation of road. Also Traffic and Transportation Management Plan and traffic enforcement measure have been suggested.

j. Preparation of the Master Plan with all suitable intervention, supported by appropriate strategic policy, outline framework, institutional arrangement and possible source of fund for effective implementation of the plan.

k. Preparation of a plan has been set out proposed Master Plan at 3-levels namely Structural Plan, Urban Area Plan and Ward Action Plan.

l. At the first level, policies and strategies have been worked out for the preparation of a Structure Plan for each Paurashava under the package. The Master Plan has been prepared consisting of Structural Plan, Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan and Ward Action Plan.

m. A total list of primary and secondary roads, drains and other social infrastructures for each Paurashava for a plan period of next 20 years has been made. Examining and classifying according to the existing condition, long, medium and short term plans have been proposed and estimated cost for improvement of drain and road alignment and other infrastructures have been prepared.

n. In line with the proposed Master Plan, a Ward Action Plan has been proposed with list of priority schemes for the development of roads, drains, traffic management and other social infrastructures for implementation during the first five years of plan period.

o. With the help of concerned Paurashava, at least 2 public consultation meetings or seminars have been organized, one for discussion on Interim Report and the other on Final Report on the proposed Master Plan. Beneficiary's point of view has been integrated in the plan with utmost careful consideration.

p. Preparation and submission of Master Plan and Report with required standards as per the TOR.

1.6 Organization of the Master Plan Report

The Master Plan Report is organized in three major parts with an introduction at the beginning. The three major parts contain various components of work under the UTIDP of LGED. The three major parts of the Master Plan of Rohanpur Paurashava are as follows:

INTRODUCTION: It describes the ToR of the UTIDP, philosophy and objectives of the Master Plan, methodology and scope of the work and organization of the Master Plan Report.

PART – A: The Structure Plan sets the conceptual framework and strategies for planned development of the Paurashava based on its potentials for next 20 years up to 2031.

PART – B: Urban Area Plan includes i) Land Use Plan; ii) Transportation and Traffic Management Plan; iii) Drainage and Environmental Management Plan; and iv) Proposals for Urban Services.

PART – C: Ward Action Plan presents ward wise detailed proposals for implementation within first five years of the Master Plan period of 20 years.

Chapter 2: Introduction to Structure Plan

The Master Plan Report is the fourth of the series of the reports to be submitted as per the ToR of the project "Upazila Town Infrastructure Development Project - Preparation of Rohanpur Paurashava Master Plan (Structure Plan, Urban Area Plan and Ward Action Plan)". Part A of this report describes the Structure Plan of Rohanpur Paurashava and Chapter 2 describes the conceptual issues related to the preparation of Structure Plan for Rohanpur Paurashava.

2.1 Background of the Paurashava

As per the Local Government (Paurashava) Act 2009, the Paurashavas in Bangladesh are categorized mainly into A, B, and C classes based mainly on annual income of the Paurashava. There is also a separate category called "Special Class", basically for industrial and commercial hubs of Narayanganj and Tongi within the Dhaka Metropolitan Development Area (DMDA).

Rohanpur Paurashava is located under Chapai Nawabgonj district. It was established as a "B" class Paurashava in 1995 through a government notification dated on September 07, 1994. The pourashav comprises an area of about 3577.42 acre with 9 wards following the Paurashava Ordinance 1977. The Paurashava is located to to the north-east of Chapai-Nawabganj district, some 25 km away from the district town of Chapai-Nawabganj and about 7 km away towards south from the Upazila Headquarters of Gomastapur. This Paurashava have good road connections to Dhaka as well as to Chapai-Nawabganj District. It has road connections to the regional centres of Chapai Nawabganj, Chapainawabganj and other northern parts of Bangladesh. The location of within Chapai Nawabganj District is shown in**Map 2-1**.

Rohanpur Paurashava is located within the Gomastapur Upazila. The upazilla came into existence in 1983 as Thana and Upazila in 1984 of Nawabganj district. The Upazila consists of two Paurashavas namely Rohanpur and Gomastapur.Nothing is definitely known about the origin of the Upazila name. It is learnt that in the past there lived a number of revenue collectors of zamindars meaning Gomasta (in Bengali) in this locality. They were very much influential and well known to all. It is generally believed that the Upazila might have derived its name from the above word Gomasta.

Rohanpur is located within the flood plain of Padma River and on the southern side of the Punarvaba River, a branch of Mohanonda River. As the town is located in a well-connected place in the region, it offers great opportunities for establishment of industries encouraging investments leading to employment generation. The development activities taking place within the Paurashava area is attracting migration from the rural areas.The town is not subject to annual flooding but was inundated during the flood of 1988, 1996, 1998 and 2004. Most of the areas of Rohanpur Paurashava are comparatively highly elevated and mostly free from annual flooding. On the other hand, the fringe areas of the Paurashava such as Khairabad, Prasadpur and the western part of Huzrapur are of low lying and the houses in these areas are mostly constructed above 2-3 feet high from the ground level.

The area was developed along the bank of Punarvabai River where the river is on north to Rohanpur. The Chapai-Gomostapur-Rohanpur-Sapahar Highway passing through the Rohanpur

Paurashava acts as a major road of this area and it connects Rohanpur with Chapai-Nowabganj, Chapai Nawabganj, Naogaon and its surroundings. The railway network there also is present. The Rohanpur-Singhabad Railway Section connects India with Rohanpur at north. This route is mainly used for the movement of goods traffic between Bangladesh and India. At national level, the area is recognized as economically backward.The predominant agriculture along with some small scale industries, trade and commerce, public sector organizations, academic institutions and informal sector provide the major base of economic activities in Rohanpur area. Many agricultural Products produced in this area are exported throughout the country. The area became more important after construction of Jamuna Bridge. A significant number of garments worker live in this upazila and they contribute much more the national garments sector for a long periodThis area is almost free from flood but subject to water logging due to insufficient drainage facility and the problem occurs mainly during the heavy rain of monsoon. Most of the buildings within the town are constructed in normal height but the houses out side of the urban areas are mostly constructed on the elevated land to keep them free from annual water logging. There exist a small number of unsanitary pools, kharis (canal), ditches and filth within the Paurashava. These depressions serve as catchments basin and help in reducing the flood intensity and also mitigate the flood damages during and after heavy rainfall in the monsoon period. Most of the buildings within the town are constructed in normal height but the houses outside the urban areas are mostly constructed on the elevated land of 3 and 4 meters above natural ground level to keep them free from annual flooding.

2.2 Vision of the Structure Plan

The vision of the plan is the creation of an urban liveable environment, where people irrespective of their socio-economic, demographic and religious identities can live and enjoy today within affordable means without sacrificing interests of tomorrow. The implementation of Master Plan of the Paurashava will translate this vision into reality.

Map 2-1: Location Map of Rohanpur Paurashava within Bogra District

2.3 Objectives of the Structure Plan

To guide long term growth within the Structure Plan Area by means of demarcation of the future growth areas and indication of potential locations of major development areas includes: a) indication of important physical infrastructure; and b) setting out policy recommendations for future development. According to the Terms of Reference, the objectives of Rohanpur Paurashava Structure Plan are:

- Description of the Paurashava's administrative, economic, social, physical environmental growth, functional linkage and hierarchy in the national and regional context; catchments area; population; land use and urban services; agencies responsible for different sectorial activities, etc.
- Identification of urban growth area based on analysis of patterns and trends of development, and projection of population, land use and economic activities for next 20 years.
- Identification and description of physical and environmental problems of Rohanpur Paurashava.
- Discussion of relevant policies to analyze and find out potential scopes for the use in the present exercise and also find out constraints and weakness of the existing policy to suggest appropriate measures for the development and management of Rohanpur Paurashava.
- To provide land use development strategies.
- To provide strategies and policies for sectorial as well as socio-economic, infrastructural and environmental issues of development.
- To discuss about implementation issues including institutional capacity building and strengthening of Paurashava, resource mobilization etc.

2.4 Concepts, Content and Format of the Structure Plan

Concept

Structure Plan is a kind of guide plan, or framework plan, or an indicative plan that is presented with maps and explanatory texts in a broader planning perspective than other components of Master Plan. Structure Plan indicates the broad magnitudes and directions of urban growth, including infrastructure networks, the placement of major facilities such as hospitals and Upazila complex. A Structure Plan is not intended to specify detailed lot by lot land use or local road configurations and development proposals. Rather it identifies the areas where growth and change are such that more detailed local and action plans are needed. Structure Plan does not require excessive effort in gathering data and it is flexible and dynamic and can be changed to accommodate demanded changes. The present Structure Plan is an overall long term strategic plan for the Paurashava Town, Rohanpur.

Structure Plan is the 1st component of the Master Plan package. The other two lower level components are Urban Area Plan and Ward Action Plan. Structure Plan lays down the framework of the future plan including strategy and the sectorial policies. The Urban Area Plan and the Ward Action Plan detail out development proposals under the framework of Structure Plan. The extended area was selected in consultation with the Paurashava for possible extension of the Paurashava. But no development proposals are suggested for the extended part as existing

Paurashava area is enough to accommodate population and services during Structure Plan period, that is, up to the year 2031.

Content and Format of the Structure Plan

The Structure Plan is an indicative plan that gives a brief on the future development of an area with policy guidelines. It is a long-term plan with flexibility in the sense that it sets down a broad framework for future development, but not the details. The format of a Structure Plan comprises written document and indicative major development locations presented in maps and diagrams as parts of the report. The written text analyses the issues that are not possible to be presented as diagrams, drawings and maps. Therefore, the written document is as important as the physical plan and diagrams and should be read in conjunction with each other.

2.5 Duration and Amendment of the Structure Plan

The Structure Plan is to remain valid for a period of 20 years from the time of its approval that is up to the year 2031. Structure Plan can contain two Urban Area Plan for the time period of 10 years each and four Ward Action Plan for the time period of 5 years each.

2.6 Structure Plan Area

The total area of Rohanpur Paurashava Structure Plan is 3577.42 acres that include total area of Paurashava, and there is no extended area in the structure plan of Paurashava. All the 9 wards of the Paurashava are covered by Structure Plan area.

Chapter 3: Existing Development Status of Rohanpur Paurashava

This chapter of the report makes a review of the various issues related to existing growth trend of the Paurashava and unveils its problems. The existing scenario in development status concerning socio-economic, physical infrastructure and environment is presented in the following paragraphs.

3.1 Social Development

Development is a dynamic issue. Measurement of social development essentially requires time series data. Consultant collected recent data of the project area by means of sample survey (5% of total households) with no reference to previous situation. Population census reports are the only sources of information for Paurashava level data, but they cover only a selected number of issues that are not sufficient to make a qualitative judgment of social improvement. It makes a review of social development based on available population census data of 1991 and 2001 and presents the current situation using the sample socio-economic survey data. This social review indicates positive social development in Rohanpur Paurashava. As per BBS2011, present average household size of the Paurashava is 4.5. This indicates the success of family planning programme at Rohanpur Paurashava though the figure is still much lower than the national average (4.8%). Literacy rate is at a quite satisfactory level. Literacy rate is56.5%. The employment situation is also slightly improved in this Paurashava.

3.2 Economic Development

Economic Development is the prime requirement for future prosperity of any urban centre. The higher is the economic activity, the higher will be the level of employment and consequent physical growth. So, before going for a development plan, it is necessary to assess the current level, constraint and prospects of economic activities of the Paurashava.

3.2.1 Economic Activities

The principal criterion to judge the economy of an urban centre is to learn about its main sources of employment. Besides, the number of productive enterprises and tertiary level activities are also the indicators of the pattern and level of economic activities in any area. It is revealed from the sample survey on all categories of people, although 66 % economic active labour force is engaged in agricultural activitieswhile people engaged in service sector is only 28.66%and only 5.14% of people are engaged on industrial activities. So, the economic picture of the Paurashava is not very bright. Poverty haunts over one third of its population and activities in the service sector have not yet gained momentum.

Industry

Except some small scale processing units, there is virtually no manufacturing, as such, in the Paurashava. The town actually has no strong industrial base. There are a number of rice processing units and saw mills in the town that may grow in the future, and should choose suitable locations in the Master Plan.

Commerce

The commercial activities in the Paurashava are dominated by retail small business. Besides the katcha bazaar, one cettle hut and another grocery hat is the one of the prime source of Paurashava income and commercial activity. The retailers mostly collect their goods from this bazar, which is also the largest wholesale market.

Services

According to BBS 2011, about 28.66% of total economic active population was engaged in service activitieswhile majority of the labour force are engaged on agricultural activities.

Agriculture

Agriculture is the dominating sector in terms of labour force in Rohanpur Paurashava. According to BBS 2011, 66% of active labourforce are engaged in this sector for maintain their livelihood. The farmers and farm laborers work in farm lands, both, within and outside the Paurashava. It is evident from land use survey of the Paurashava that about 34.03% of the Paurashava lands are still under agriculture.

Agro-based

As the Paurashava is mostly rural in nature at present, with effective agricultural extension services, the agricultural output can be increased many times to serve the agro-based industries in future. In this backdrop, the major challenge is to strike a balance between urbanization and maintenance of rural nature of the project area.

Informal Sector Economic Activities

Informal sector study was not a part of ToR, so the consultant did not conduct any formal study on the informal sector. It can be considered that the informal sector characteristics at upazila level Paurashava are same all over Bangladesh. It is more prominent, where the concentration of people takes place. Informal sector is a part and parcel of urban economy in developing countries. They have small capital and are usually self-employed. In , the concentration of informal businesses is found around the bazar area, transport terminal and stoppage areas and also near the river bank.

3.2.2 Existing Employment Pattern

Out of the employed male population, more than half of the peopleare engaged in agricultural related jobs. Since secondary sector employment is seriously lacking in the town, people move to self-employment like small business. Trading has not been found feasible as employment in the town, mainly, because of lower level of affordability of the people powered by remittance they receive from abroad regularly. Of the total working population of surveyed households of Rohanpur Paurashava, about 8131people are in the active working force.

About 14.55percent of the working force is unemployed. The scenario is unlikely to change unless there is any major investment in the industrial sector that can pool a large number of workers and render the local economy more vibrant services.

It is evident from the household survey that there is insignificant employment in the service sector. Already mentioned earlier, a small portion of males is employed in government/autonomous organizations. It is observed that hardly any female population is employed in private company. It is unlikely that public sector jobs will show any major improvement in future. But with the increase in business, and industry there is possibility that private sector jobs will show further increase.

Small business is an important source of income in this region. About 7.39% of the Paurashava households get involves in this sector.

3.3 Population

According to BBS 2011, the total population of Rohanpur Paurashava was 34941 and the density of population was 2413.50persons/ sq.km with an annual growth rate of 1.44. At Present, Ward 05is the most densely populated area. The density per sq.km is 7245.48in this Ward, followed by 7076 in Ward no. 03 and 5970.01for Ward no. 04.

Table 3-1: Population Distribution in Rohanpur Paurashava

WARD NO	Area (in sq. km)	Population 2001 (BBS)	Density (persons/ sq.km)	Population 2011	Density (persons/ sq.km)
WARD-1	0.47	2,636	5609	2567	5462
WARD-2	0.34	2,246	6606	2404	7071
WARD-3	0.27	1,739	6441	2010	7444
WARD-4	0.53	2,131	4021	2304	4347
WARD-5	0.33	2,030	6152	2141	6488
WARD-6	0.54	2,010	3722	2065	3824
WARD-7	0.28	1,781	6361	2343	8368
WARD-8	0.37	1,303	3522	1187	3208
WARD-9	0.47	1,444	3072	1522	3238
Total	**3.59**	**17,320**	**4825**	**18543**	**5165**

Sex Ratio

The average sex ratio (males per 100 females) for the project area is 101: 100, slight lower than the national average (106:100).

Again, percentage of elderly (65+) male population is much higher than the percentage of elderly female population. In the total population, however, the male population outnumbers the female population. These are some interesting information that can be observed from sample household survey at Rohanpur Paurashava.

Marital Status

According to the BBS 2011, the percentage of married women is about 65.9 whereas the percentage is 64.9 for males. A negligible percentage of population is widow or widower and divorce.

Religious Status

Religious composition of population has various implications for area planning and overall welfare of the population. Almost 95 percent people of the study area belong to the Muslim community followed by Hindu and only seven Christian people live in this municipality.

Education

According BBS 2011,about 43.5% people are illiterate in Rohanpur Paurashava. At thesame time the percentage of people having education at the graduation level and above is not that satisfactory. Women are lagging behind in respect of education in all the levels. According to the Census report 2011, a literacy rate in Rohanpur Paurashava is about 57.1% for males and 55.9% for females.

Monthly Income and Expenditure of the Household

Majority of peoples' income are into the income range between 5000-1000 and 10000-15000. The income level BDT 20000 and above comprises very low percentage (4%) of the households in the Paurashava. It appears that the most of the people in this Paurashava are of middle income group. Income and expenditure level is given in ***Fig 3-1***.

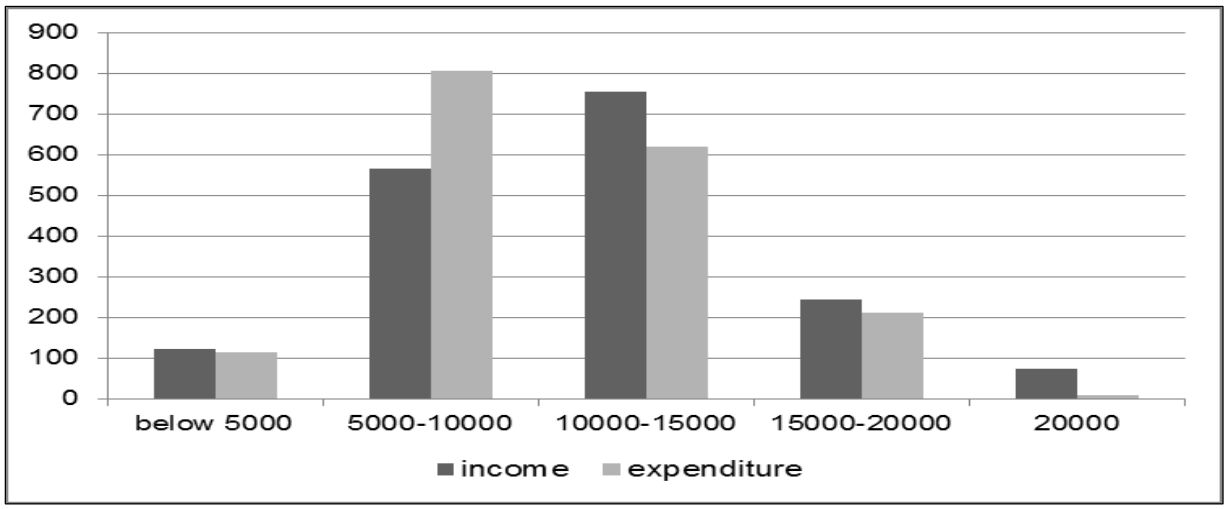


Fig 3-1: Percentage Distribution of the Household by Monthly Income and Expenditure at Rohanpur Paurashava

Of the other hand, The Survey reveals that in most of the cases households have to spend all their earnings without any savings. People, earning more than BDT 20,000, can save negligible portion of their earnings.

Migration Pattern

In this Paurashava there is no significant migration scenario. Migration rate from surrounding area is nominal and they migrated in this Paurashava due to better economic opportunity.

3.4 Physical Infrastructure Development

Buildings and Structures

Paurashava has mainly grown following the major transport networks and the banks of the rivers. Buildings and structures developed are based on road network system of the Paurashava. The dweiiling units in the project area is dominated by Katcha structure (41.07%) followed by Semi-pucca (40.16%), and lastly Pucca (18.77%). maximum Pucca structures are located in the Ward Nos. 5.

In RohanpurPaurashava it is found that, about 83.77% structures are single storied. The Survey findings also reveal that, among the Wards highest percentage of 1 storied building found in Ward no. 5, highest number of 2 storied building in Ward no. 5 and highest number of 3 storied building is also in this ward. In this Paurashava it is found that about 0.36% structures (38) are used for Governmental institution. It can be noticed that these governmental offices are located in wards in 3, 4, 5 and 6 only. Paurashavas education, health, recreation, commercial and automobile facilities are mainly located in the Ward nos. 03, 04 05 and 06.

Transport and Communication

The Chapai-Gomostapur-Rohanpur-Sapahar Highway passing through the Rohanpur Paurashava acts as a major road of this area and it connects Rohanpur with Chapai-Nowabganj, Chapai Nawabganj, Naogaon and its surroundings. Total length of roads in the Paurashava is 69.75 km. Length of katcha road is 13.38 km, semi-pucca 26.53 km and pucca road 29.54 km within the Paurashava area. In this Paurashava there are some LGED roads. The Chapai-Gomostapur-Rohanpur-Sapahar Highway is main roads in this Paurashava which is owned and maintained by Roads and Highway Department.The Paurashava has no bus terminal but a bus stoppage adjacent to the railway station. Land beside bazar areais being used for parking.

The railway network there also is present. The Rohanpur-Singhabad Railway Section connects India with Rohanpur at north. This route is mainly used for the movement of goods traffic between Bangladesh and India. Rohanpur is also well connected by rail with the district town of Rajshai and Chapai-Nowabganj.

3.5 Utility Services

The following paragraphs present the existing condition of utility services in the Paurashava.

Electricity

In Rohanpur Paurashava there is electricity connection. The survey finding shows that there are 699 electric poles within the Paurashava area. Map 3.11 shows the location of electric poles in Rohanpur Paurashava. The people of the Paurashava complained that they face severe problem of load shedding.

Water Supply

In Rohanpur Paurashava, there are mainly two ways of water supply facilities. These are tube-well and piped water supply. In this Paurashava the main source of water supply is tube-well. About 62.42 % people use tube-well for their water source and rest of them use other available sources such as piped water supply, well, pond, tap etc. Mentiond that though piped water supply is provided by the poura authority but still a large portion of people are detached from this service

Telecommunication

As a Paurashava, telephone network exists in Rohanpur Paurashava. According to survey, the Paurashava accommodates 1 telephone pole. Besides land phone the Paurashava is well served by the private own mobile operator companies.

Solid Waste Management

Solid waste collection and disposal in Rohanpur Paurashava is the responsibility of Paurashava authority. The Paurashava has no solid waste disposal site of its own. It normally dumps the solid waste into low lying areas and canals. Though the poura authority has some sort of equipments for this service but the practice absent. Dumping place or waste transfer station is hardly found in the poura area. The collected waste is dumped into the wetland. CBO or NGO based collection system does not exist within the Paurashava area.

Gas Supply

The Paurashava has no gas supply facility at present.

Drains

It has been found that the entire drains of Rohanpur Paurashava are Pucca. The field survey indicates that there is moderate amount of drainage in Rohanpur Paurashava. In this Paurashava, there is 18.03km drain.

3.6 Environmental Issues

Surface water of ponds, canals and rivers at is observed to be fresh and free from salinity. Water Development Board has taken a project to protect the Paurashava from river erosion by constructing embankment. With the development of a planned drainage system some environmental problem will be minimized.

Paurashava authority has taken initiative to reduce surface water pollution. At present, 98% inhabitants of the Paurashava use sanitary latrine.

From the overall survey findings, it has been revealed that the inhabitants of the Paurashava do not face any severe environmental problem. The problems that exist here can be mitigated through proper planning of the Paurashava.

The urban environment of Rohanpur Paurashava includes both built and natural environment. Urbanization has some increased hazards on natural environment. Where the built environment overburdens the natural environment urban development cannot be sustainable. The urbanization is vital for country's economic growth. Urban centers concentrate services, infrastructure, labor, knowledge, entrepreneurship and markets. Cities and towns are key generators of economic activities. The urban economies are critically important in national economic growth and of development goal. Urbanization is unavoidable. So in every phase of planning processes, all these environmental issues shall be evaluated and proper measure shall be taken to minimize the adverse environmental impacts on land pollution, water and air quality, biodiversity resources and marine resources by energy usage, transport network, waste management, slum improvement, disaster etc. The town of Rohanpur is no different from other towns of Bangladesh, but as disasters are concerned it is highly vulnerable to at least one disaster, earthquake, due to its location in a particular seismic zone. Geological explorations and extractions make the area More vulnerable to any other town of the country. So care should be taken in construction of buildings in the town. Buildings are needed extra care to make them earthquake resistance to reduce loss of life and property. Special building codes are needed to prepare particularly for this region.

Rohanpur is located within the flood plain of Padma River and on the southern side of the Punarvaba River.The town is not subject to annual flooding but was inundated during the flood of 1988, 1996,1998 and 2004. Some part of Khairabad, Prasadpur and the western area experience little drainage problem. Paurashava in not normally affected by flood from the adjacent rivers. But the Paurashava is almost regularly affected by the storm water during monsoon period due to the inability of the existing drainage system to cope up with the situation. The existing drains cannot discharge the huge volume of storm water efficiently to the defined out falls. Because of prevailing such situation, local flooding occurs in many places of the Paurashava.

3.7 Institutional Capacity

The implementation of the Master Plan will require strengthening of the capacity of the Paurashava Authority. Although the capacity building is going in different ways by the government, the institutional capacity building for implementing the Master Plan of the Paurashava has not yet been seriously considered. This will be an important task for the government to restructure the organogram and include the required technical staff with appropriate job description for addressing the issues of implementing the Master Plan.

Existing Manpower

According to Paurashava manual, there should have been 70 officials and staff engaged in a"B" class Paurashava to manage the engineering, administrative, health, family planning, and conservancy works within the Paurashava area. In the organogram, Mayor is the head of the institution. Chief Executive Officer coordinates the three major divisions. These divisions are Engineering (headed by Assistant Engineer), Administrative (headed by Secretary), and Conservancy, Health and Family Planning (headed by Health Officer). In this organogram, both full time and contractual officials are included.

Existing manpower scenario of Rohanpur Paurashava is not so good. There is acute shortage of manpower in each section of the Paurashava. The important posts lying vacant are the Posts, Executive Engineer, Tax Collector, the Health Officerand the Town Planner. Though a standard 'B' class Paurashava comprises of 32 personnel in Engineering Department, but Rohanpur Paurashava has to depend on 12personnel in Engineering Department. Again in the administrative section the Paurashava has to depend on only 17personnel for the administrative works.

Paurashava Town Planning and Implementation Capacity of Master Plan

At present, the Paurashava has no town Planning Department or any appropriate manpower, especially Town planner to prepare or implement town plan. The existing capacity of the Paurashava is seriously inadequate to implement the Paurashava Master Plan. The Paurashava must strengthen its capacity to implement its Master Plan, when it is completed by employing requisite manpower.

Conservancy and Health Services

Conservancy service of Rohanpur Paurashava is also very poor. Paurashava has no fixed waste dumping land. The waste collection and dumping is operated in traditional way. Conservancy department of the Paurashava is not established yet. Staffs are recruited on contract basis to convey the work of conservancy service. There is no community based organization (CBO) for introducing house to house waste collection system in the Paurashava.

There is only one Upazila Health Complex exists in the Paurashava area but the service which is provided has failed to provide serve the quality service.

Logistic Support/Equipment

According to the Paurashava manual, a "B" class Paurashava should get logistic support/equipment to continue the work properly. This includes one jeep, one road roller (5-7 ton), two trucks/tractors, two motor cycles, three bicycles (according to the needs of the Paurashava), one mixture machine, one type writer machine, one photocopier machine and one duplicating machine. Paurashava got almost all of these logistic supports from the government, except the jeep and truck/tractor. Additionally, they have one Computer and printer for official support.

3.8 Urban Growth Area

The main concentration of development observed around the Bazar area adjacent to railway station as well as urban development is taking place along both sides of the Vohalahat-Hujrapur road. Most of the administrative offices including the Paurashava Office also are located in Rohanpur mouza. The development pattern of the area mostly is concentrated in this mouza and new development is taking place in Prasadpur, Huzrapur and the northern part of Khairabad. The intensity of development in the town center is relatively high covering parts of wards 3, 5, 6 and is found preponderance of mixed uses. The southern side of the Paurashava especially ward 8, 9 are predominantly rural with scattered settlements. Ward 9 is comparatively isolated and about 5 km away from the town center towards south. This area is not yet blessed with any urban services and facilities.

The future growth potential of Rohanpur Paurashava is moderate. Recent trend in population increase indicates that high population density will not be a big problem in this Paurashava.

However, it is obvious, and more likely that the growth of this Paurashava will follow natural increase and a little migration in population.

Analyzing the existing structure of the Paurashava and other growth factors it is expected that the future growth direction will occur in Growth direction indicates that Rohanpur, Huzrapur and Prosadpur, located in the northern part of the project area having higher concentration of development pressure and the surroundings of the Rohanpurraod area of Rohanpur Paurashava are highly dense. Several factors will lead such future growth direction.

In Rohanpur Paurashava most of the physical growth has taken place in the northern portion of the project area. The agrarian economic base of southern part of the project area makes it unattractive for in migration. The existing low densities do not demand more areas to be brought under urban builtup. Road width of most of the roads is not satisfactory in the Paurashava area; as a result, traffic congestion is common and frequent in the Paurashava area, specifically near the Bazaar area.

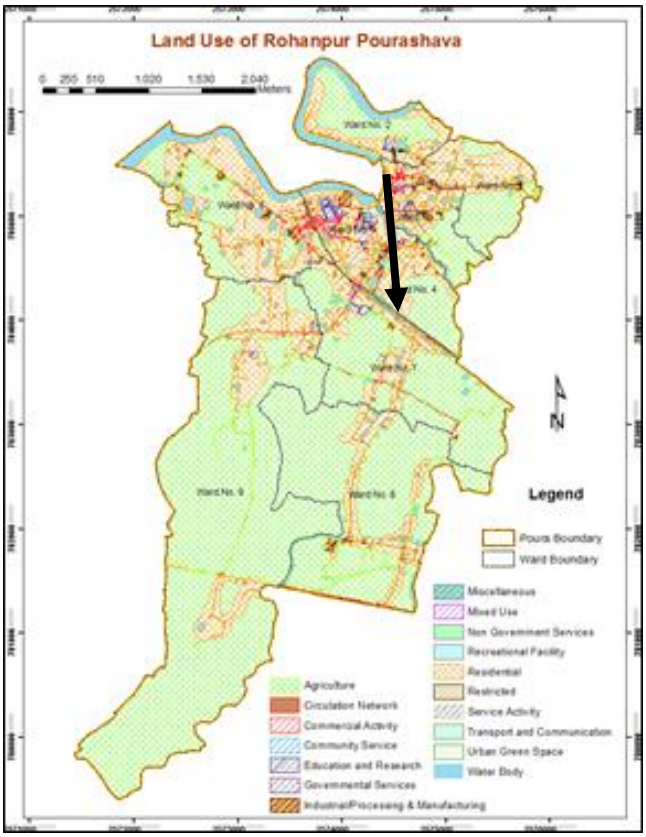


Fig 3-2: Future Growth Direction of Rohanpur Paurashava

3.9 Catchments Area

It is widely recognized that there is a strong interdependence of social, economic and environmental development between rural and urban areas. The cities and towns play an important role in rural development as markets for their goods and products, and also as the sites for food processing and other agricultural related activities, and as source of non-farm income, especially from wage labour. On the other hand, urban areas rely on rural areas for food production, labour, and raw materials for manufacturing and markets for their products. This

linkage is stronger in samll town like the Paurashavas, primarily due to their proximity to the surrounding rural hinterland. People of the catchment areas can access public service offices and hospitals in the towns with less difficulty than offices in cities, while schools and other facilities serve a large number of the catchment area population, contributing significantly to rural development.

The adjacent Gomastapur Upazilas have some influence over Rohanpur Paurashava. The favorable location has benefits in two ways: it allows people to come to to purchase goods and services, and it allows businesses, including wholesale businesses, to deliver goods and services to places outside the town. Rohanpur is located on Gomastapur Upazilla. The Upazila comprises 2 Paurashava namely Rohanpur Paurashava and Gomastapur Paurashava. It is one of the Upazila of chapai-nawabganj district. As Upazila headquarters it has the administrative functions as well as those that go with its more established role related to its status as a Paurashava.

Transport and communication connectivity is an important factor for economic development of an area. Rohanpur is located to the north-east of Chapai-Nawabganj district, some 25 km away from the district town of Chapai-Nawabganj. This Paurashava has good road connections to Dhaka and also have good road connection to Chapai-Nawabganj District.The regional transportation network is shown in **Map 3-1**.

3.10 Land Use and Urban Services

In the land use pattern of the Paurashava, 17 types of land uses are found. The highest land is devoted for agricultural purpose (almost 64.44%) dominates the Paurashava area, followed by residential (23.68%), water bodies (5.80%), road network and transport and communication (only 1.8%), and government services and educational land use occupy same percentage of land (less than 0.5%). Paurashava has experienced major development along the Punarvaba River.

Settlemets are found particularly in the areas of higher elevation following linear pattern along side the roads and More specifically around the central bazar. The trend of settlement growth is greater in areas close to the main road. The core part of the Paurashava is the most built up part of the planning area. Apart from core area, in most of the other areas, residential developments have taken place as dispersed settlements on high lands. Dispersed settlements make provision of services difficult.

3.11 Paurashava Functional Linkage with the Regional and National Network

Any development initiative at the local level must relate to the national level plans in order to achieve cohesion and integrity with overall development of the country to attain the national development objectives.

The present system of national level planning hardly links the local level plans. The present system of allocation of resources in national development budget is a top down approach, which is highly influenced by political objectives. As a result, urban sector is not yet considered a priority sector and due to resource constraint, many problems of the Paurashavas remain unresolved. Therefore, it is important to establish a linkage between the local plans and the national development plan so that aspirations of the people can be realized. National development plans are prepared

considering the overall needs and aspirations of the country with respect to different sectors of development.

This necessitates for a bottom up approach of development planning and the budget allocation should be made according to the choice of the local governments who are accountable to the Paurashava people directly. Budget should be allocated according to the priority list of the projects prepared by the Paurashava that is supposed to reflect the needs of the Paurashava people as the list can be prepared by the counselors and the Mayor who are directly elected by the people.

The aim of the Structure Plan is to prepare a development plan for Rohanpur Paurashava with full participation of its stakeholders. In the process of planning, a large number of development projects have been identified in different sectors. Implementation of development projects will improve infrastructure and services and will create an environment for utilization of local resources. This will attract more investment in the locality to generate new employment. New employment will generate income for the poor people and shall improve the poverty situation, which is the main objective of PRSP. New jobs will also be created during implementation of various development projects of the Paurashava prepared under the master plan. New and improved road infrastructure will increase mobility vis-a-vis economic activities of the Paurashava that will help to address the problems of unemployment.

The current program of Paurashava Planning helps to address urban poverty through adequate steps taken up to accelerate urban infrastructure development based on the Rohanpur Paurashava plan. The new developments will induce new investments in trade and industry and lead to generation of More employment in the service, construction, transport and informal sectors. This will directly assist in reducing poverty. It will help absorb additional work force of rural areas as a result of natural growth of population. Agricultural sector has limitations in absorbing labor force.

Map 3-1: Communication Network of Bogra Region showing Connectivity with Rohanpur Paurashava

3.12 Role of Agencies for Different Sectoral Activities

The successful implementation of Structure Plan depends upon the efficiency of the stakeholders and the degree of integration and coordination among them. Structure Plan of a town involves a complex affair having numerous stakeholders influencing the decision making process of development.

Care has been taken for all programmes and projects to be developed in a sound manner technically, socially, environmentally and institutionally with full participation of local communities. Due care has been taken so that there have no significant adverse internal or external environmental impacts. Sustainable urban development based on a continuous dialogue between the actors involved in urban development is needed to improve the urban environment. It is expected that after the completion and implementation of the Master Plan and as well as the mentioned projects and programmes of other organizations in Rohanpur, this small town will develop with its full potential.

Development Schemes Implemented by the GOs

The recent infrastructure development schemes implemented by the Government includes roads, road lights etc.

Rohanpuris an agriculture-based urban area and Upazila Agriculture Office has a significant influence on its agricultural sector. Central Government use subsidy for the betterment of the farmers. Local office distributes fertilizer to the poor farmers with 20 kg per head through the Paurashava. Some times, the agriculture office distributes 10 kg per head to balance between demand and allocation of fertilizer. Besides, agriculture office also arranges training workshops for the farmers on modern techniques of cultivation that increase production.

Upazila Fisheries and Livestock Office distribute fish fry and fertilizers for fish and vaccination of poultry and other livestock to the people free of cost. They also arrange training session to train the people. Upazila Parisad some times takes initiatives for afforestation and distribution of saplings.

Upazila Health Complex only implements a few activities like vaccination, training on child and mother health etc.

In Rohanpur Paurashava there is electricity connection. The survey finding shows that there are 699electric poles, few telecommunication towers and 1telephone poles within the Paurashava area. In Rohanpur Paurashava there is no electric substation.The people of the Paurashava complained that they face severe problem of load shedding.

The Rural Electrification Board (REB) at present is providing electricity facility within Paurashava area. There is no existing substation within the Paurashava or even in the entire Rohanpur Upazila. The power is being distributed from Chapai Nawabganj Palli Bidyut Samiti sub-station through transmission line to the Paurashava area.

DPHE recently conducted a survey in Rohanpur. It covers Paurashava and its surrounding areas. Main responsibility of DPHE within the Paurashava is to design water supply network, implement and maintain the network. The authority has prepared water supply network for Rohanpur Paurashava, but failed to implement it.

Local Government and Engineering Department (LGED) has upcoming project of construction of road, culverts and box culverts within the Paurashava.

Development Schemes Implemented by the NGOs

There is no mentionable infrastructure development project undertaken by the NGO's in the Paurashava. Several NGOs are working in Rohanpur to develop socio-economic condition and to alleviate poverty of the local people providing infrastructure service and other facilities. Operationally important NGOs are Asroy, Human Right Organization, Bangladesh Warrior's Sanshad, BRAC and Social Work Centre.

Development Schemes Implemented by Private Sector

There are a few development works that have been implemented by private sector. Some commercial activities and private schools have been developed by private initiative.

Chapter 4: Critical Issues for Planning

Deficiency in infrastructure and services is one of the major critical problems of the Paurashavas in Bangladesh, and Rohanpur is no exception. The reasons for such deficiency may vary, but are mostly linked with the institutional capacity and resource potential of the Paurashavas. The institutional capacity of each similar category Paurashava in terms of manpower and other logistics at present can be same across the country, but their efficiency and performance in practice may vary for a variety of reasons.

Chapter 4 describes the critical issues for planning based on the existing conditions in respect of Socio-Economic and Demographic issues, Transport and Communication, Urban Utilities, Drainage and Environment, related other issues namely disaster, land use control, law and regulation etc. The weaknesses in the present development processes are also taken into consideration to identify the critical issues for planning at Rohanpur Paurashava.

4.1 Socio-Economic and Demographic Issues

Most of the Paurashavas in Bangladesh are basically urban centers with direct links to rural areas. There are significant differences in the standard of socio-economic well being and demographic characteristics of these small towns with large cities in the country. Most of these Paurashava towns have small population, not enough to sustain economic growth to render services and facilities for quality of life needed in an urban environment. As a result, qualities in socio-cultural and demographic matters suffer from inadequacies in their requirements of facilities and services of various kinds. Since Rohanpur Paurashava has all such problems and shortcomings, in the preparation of various components of the Master Plan, this aspect of reality in development has to be addressed for sustainable solutions.

4.2 Transportation and Communication

Transportation and communication network plays very important role in the growth pattern of both urban and rural settlements and their socio-economic and environmental development. Houses and other establishments always prefer road side lands to have easy access to different places and functions. The transportation and communication network at Rohanpur Paurashava is not yet planned and developed to serve a town. The Paurashava has a very low traffic volume to sustain high cost of development in this sector, particularly in areas of low population density and scattered settlements. However, without planning a transport network for the Paurashava area as a whole, a standard transport network and an efficient traffic management system for the future cannot be ensured. The nature of problems and deficiencies are identified below.

a. Unplanned and Narrow Road

Roads in the town are being developed without using any planning standard and network plan. As a result, narrow roads with tortuous pattern are common. Narrow roads and poor maintenance of roads are major problems for traffic movement in some parts of the Paurashava. New houses and other structures are cropping up along these sub-standard narrow roads. This is likely to poise traffic movement problems in the future, when development becomes more intense and density of

population increases. The existing narrow roads require widening and improvements of pavement. Some road segments within the Paurashava are built in an unplanned manner. These segments will require improvement as per future traffic volume and required space for turning lane in the intersections.

b. Traffic Congestion

A very level of vehicular traffic in the streets of the town at present does not pose a threat for congestion in the near future. However, occasional congestions are found to arise from non-motorized traffic at selected locations, where public assembly is profound, especially Rohanpur Masjid intersection. At present such congestions happen due to poor designing of the intersections. The slow moving rickshaws, on street parking and on street loading-unloading of goods are found to be the major sources of traffic congestion.

Manually operated rickshaw is a cosy and cheap traffic mode that can take passengers to their door steps. It is, therefore, a very popular mode that requires special planning attention in the design of transportation network and individual roads. Walking and cycling is encouraged in contemporary town planning practices to create healthy environment for all. Pedestrian safety should be an important element in the design of roads and other related infrastructure. These aspects require special attention in the Master Plan of Rohanpur Paurashava.

Reason for Congestion

- Lack of management is the prime reason for traffic congestion. There is a common tendency among the rickshaw pullers to disobey rules. They roam about the busy areas in search of passengers and park rickshaws at critical points leading to congestion.
- There is no proper and adequate space for parking auto-rickshaws and tempos. They are parked on the road. On road waiting for trips by these vehicles is also a source of congestion.
- Local buses often take passengers from wherever they find. In the same way, they disembark passengers according to their desires. These practices hamper smooth traffic movement.

c. Bus, Truck, and Tempo Terminal/Stand

Rohanpur has no formal bus and truck terminals and designated parking space for tempos and slow moving vehicles, such as rickshaws, van or cart. It has few bus stoppages along the main road. For the planned development of township in the future, these facilities are to be provided at suitable locations.

Map 4-1: Existing Road Network Map ofRohanpur Paurashava

4.3 Urban Utilities

A key issue related to the sustainable development of planning area providing a minimum quality and standard of living, pertains to the availability of and accessibility to basic infrastructure facilities, viz. water, power, sewerage, drainage and solid waste management. The present state of infrastructure problems in the Paurashava may become a cause of crisis. At present, state of telecommunications and power scenario in Rohanpur Paurashava is not so good. There is no water and gas supply system in this Paurashava. Thus critical need of advance action and arrangement is required for adequate provision of physical infrastructure.

4.4 Drainage and Environment

Majority of the population at Rohanpur Paurashava is deprived of drainage facility. Uncollected waste is washed out into the roadside drains and natural canals. Blockage of drains by solid waste reduces the carrying capacity of drains and natural canals and become a source of pollution. Paurashava has very limited resources to clean the drains. It has been observed that in some areas, domestic sewage conveys directly to the water channels. Water logging is a problem at some parts of Rohanpur Paurashava, causing water logging between June and November every year.

The sources of surface water pollution are domestic waste, unhealthy sanitation and extensive use of fertilizer in the agriculture. Condition of solid waste management at Rohanpur Paurashava is very poor. There are only 6 dustbins. One truck and two push carts are used to collect solid waste. Hospital waste is dumped to their own dustbin. Garbage of kitchen markets is dumped to nearby dustbins. The present conditions demand substantial improvement to ensure desirable environment.

4.5 Related Other Issues

Rohanpur Paurashava is located under Bogra District. The Rohanpur Paurashava is important in the national context for some reasons. It is well connected by road with all over the country via Bogra Divisional headquarter. An east-west connecting road links from Rohanpur- Bograroad provides good access to the Upazila headquarters. Many agricultural Products produced in this area are exported throughout the country.

4.6 Disaster Issues

As Rohanpur is located along the tectonic plate boundary, the Paurashava is highly vulnerable to earthquake. Mitigation measures following building designs and construction rules are to be suggested in the Plan of the Paurashava town. In the planning and designing of the drainage system, the aspect of flooding has to be considered seriously.

4.7 Land Use Control

A Land Use Plan of the town was prepared in 1987 by Urban Development Directorate (UDD), but it was never brought into practice due to lack of regulatory measure for implementation. Instead, discretionary decisions are used in case of land use decisions. The Land Use Plan at that time was prepared for the Upazila Headquarters by UDD, but remained under the administrative control of the Ministry of LGRD & C. So conflict and lack of legal basis in implementation prevailed. In the

present context of socio-economic demand and land use dynamics in the country, development of a Paurashava without a Master Plan cannot be imagined. The preparation of Master Plan is mandatory as per Local Government (Paurashava) Act 2009.

4.8 Laws and Regulations

Absence of adequate planning and development control is a problem in all urban areas of Bangladesh and Rohanpur is no exception. A number of legislative measures are there to help the administration of urban area, urban development and management. But all of these planning laws cannot be readily enforced and many of them are not adequate in regulating planned development. Due to lack of proper implementation and enforcement, many important laws are mostly not applied by the urban local governments. As a result, weakness in the implementation of planned development in the Paurashava remains to be a critical problem and has to be addressed.

A substantial portion of national resource is invested in building construction in both public and private sectors. In order to ensure optimum return of this investment and to achieve satisfactory performance of the buildings in terms of safety, serviceability, health, sanitation and general welfare of the people, building construction needs to be controlled and regulated. Legislative measure for such control has been provided in the Building Construction Act, 1952 and from time to time, regulations have been promulgated by the government under the Section 18 of this Act. As per law, it is mandatory to get any structure approved from appropriate authority before construction. Permission for building construction in the Paurashava is administered by this authority within its jurisdiction. However, as elsewhere in the country, noncompliance to these rules is also observed here.

a. Weak Local Government

Though Paurashava is a democratically elected urban local government, its authority is limited to work as a local government. In most cases, prior government permission is required before taking any legal action against unscrupulous acts. Section- 66, Section-69 (1) and (2), Section- 72 (4), Section-32 (2) of the Local Government (Paurashava) Act 2009 are few examples. This is one of the reasons that there has been a little progress in decentralization of governance at local level in Bangladesh.

b. Lack of Fund

Local bodies in this country are in constant shortage of funds as is the case in Rohanpur. The sources of the Paurashavas income are generally taxes, rates, fees and charges levied by it, and rents and profits accruing from individuals and institutions. The government grants, profits from investments, receipts accruing from the trusts placed with it, loans raised by it and proceeds from other services are the other sources of income for the Paurashava.

The lack of efficient manpower, poor assessment system, and weak legal enforcement for practicing an efficient revenue generation and collection system are the main reasons for the current weakness in the financial management. It is widely accepted that there are also corrupt practices in our public institutions in delivering services, which require to be addressed through institutional and legal reforms.

c. Public Participation in Plan Making Process

The planning and development Acts of earlier times had contained a little scope for the authorities concerned to seek public opinion on their city/town plans prepared before they are sent to the government for final approval. Not having any scope for public participation is against the democratic norms of an elected urban local government like the Paurashava Authority. The authority must involve people by law in the planning and development process, and hear their views, needs and grievances to mitigate problems. This vital aspect should be incorporated in a stronger manner in the law through revision.

d. Coordination of Activities of Public Sector Development Agencies

There are a large number of public sector development agencies working in the town and surrounding areas, but there is lack of coordination among activities of these development agencies. Absence of coordination results wastage of resources and often brings misery to the people. This is commonly evident in our urban development works, for example, as one agency digs the streets for telecommunication network and repairs the streets, another agency starts digging for sewerage ducts. Effective coordination by law in this case is necessary for an integrated approach in development saving time and resources. There should be legal provisions for such coordination by the Paurashava Authority to ensure accountability of the agencies working for their respective jobs in the Paurashava area.

e. New Rules for Practicing Planning Standards

At present, there is no standard for infrastructure, services and facilities provided by the public sector. There is need to formulate standard rules for services and facilities and get incorporated in the Local Government (Paurashava) Act 2009 to secure public interests. A standard has been set in the UTIDP for future land use proposals in the Master Plan of the Paurashava.

f. Betterment fee

Due to failure of execution of the powers of charging betterment fee, all the benefits of land value enhancement due to Paurashava development of infrastructure go to the adjacent landowners or the persons having interest therein. A proper execution of betterment fees will help increase in revenue earning of the Paurashava.

g. Penalty for Violation of Plan Provisions

The penalty for violation of plan provisions provided in the Act (Section 49) is only Tk. 5000/- and for delay Tk.50/day, if violation continues further after notification. This is an extremely low rate of penalty, which should be revised for a substantial increase to prevent any violation effectively. The penalty provision should be more stringent to ensure enforcement of plan provisions.

4.9 Existing Problems and Weaknesses in the Development

The two major problems that currently exist in Rohanpur Paurashava include the following:

a) The Paurashava town has a weak economic and revenue base that does not support improvement in the socio-economic wellbeing of the people. The Paurashava authority for lack of resources, fails to make required investments in the development of physical infrastructure to improve the quality of life of the people living in the town.

b) The Paurashava has also no definite plan for the development of various physical infrastructures in a planned manner. With lack of resources, it also lacks in professionally skilled manpower to carry out development in a planned way.

Thus for making this Paurashava a viable urban centre, attention should be paid toward cost-effective development of all of its required infrastructure in phases, with the help of professionally skilled manpower and utilizing the newly prepared Master Plan as an important tool for all sorts of development.

Chapter 5: Reviews of Policies, Laws and Regulations

5.1 Introduction

The urban planning and land use regulations per se are essential for municipal development. They impact on land market favourably or unfavourably and result in social benefits and costs depending on their nature and the specific contexts in which they are applied. Policies, regulations and processes that facilitate availability of land and its uses for planned development at affordable costs need to be continued and those lead to contrary results need t0o be eliminated or modified.

5.2 Review of Relevant National Policies

The various existing policies, regulations and laws of the country have direct and indirect effects on the preparation and implementation of Master Plans of the Paurashavas in the country. These are briefly reviewed in this chapter to examine their adherence with the Master Plans of the Paurashavas.

5.2.1 Directives of the Local Government (Paurashava) Act 2009 for Preparing the Master Plan

The Paurashava Ordinances at different times since 1960's till the present time have iterated that a Paurashava as it gets established must prepare its Master Plan for planned development of the municipal town. So far, three ordinances have been made in the year 1967, 1977 and 2008, all suggesting for planned development. The Paurashava Ordinance 2008 was later modified and enacted as Local Government (Paurashava) Act 2009 in the national Parliament on 6, October, 2009.

The 2009 Act made provision for having the Master Plan prepared by a Paurashava within five years of its inception. The Master Plan of a Paurashava town is aimed for ensuring planned development, and should include the following:

- Survey of history, detailed statistical information, public service activities and other mentioned subjects of the Paurashava;
- Development, extension and up gradation of any area within the Paurashava; and
- Control and regulation of development of any land, any building construction and renovation within the Paurashava.

Actions Suggested in the Act to Prepare Master Plan

The Local Government (Paurashava) Act 2009 suggests for having qualified Town Planner in its Organogram of Manpower to undertake the job of preparing the Master Plan of the Paurashava. Until such qualified Town Planner is not available in the Paurashava, the Paurashava may require a competent national government authority to prepare such plan for the Paurashava. The Act also makes it contingent to form a Town Planning Committee within the capacity of it's manpower to execute the Master Plan of the Paurashava Town.

Rohanpur Paurashava has no Town Planner and Town Planning Committee at the moment. This makes the Paurashava dependent on having the Master Plan currently being prepared by LGED.

5.2.2 National Land Use Policy 2001

To safeguard the use of its land resources, particularly the valuable agricultural land of the country, the government in 2001 declared the National Land Use Policy. The policy proposed for the preparation of national land use plan, which is very much relevant to the current plan of the Paurashava.

The land use plan is to be based on the criteria of land productivity, land capability and land suitability, use and requirement of land by agriculture, forestry, industrialization, urbanization and housing. Following are the key issues of the national land use plan:

- Execution of coordinated land conservation programs aimed at prevention of desertification and weathering of land, conservation of land fertility, development and conservation of land.
- Prevention of destroying the landscape by earth cutting, excavation and removal of land.
- Formulation and effective execution of Land Use Plan in order to ensure planned use of land.
- Payment of compensation to those who will be affected by land weathering and land acquisition by the government.
- Monitoring, survey and research on desertification, land reclamation, prevention of weathering of land, conservation and development of land and watershed areas.

The policy emphasizes on the planned and the best use of land, and stressed on the most intensive use of this scarce resources of the country. The policy aims to introduce 'land use zoning' based on particular characteristics of land, prevent unplanned expansion of residential areas and control of indiscriminate growth of industrial and commercial activities. In absence of execution, the situation in land use and land management is severely being deteriorated.

5.2.3 National Housing Policy, 1993

The Government of Bangladesh formulated the first ever housing policy of the country in 1993. The priority of the government is to create affordable housing, which might be possible through controlling unplanned and haphazard housing area development. The policy is committed to encourage private developers in land and infrastructure development, and house construction. The policy also made commitment to provide government assistance on participatory housing infrastructure development involving the community, NGOs, CBOs, private developers and social welfare organizations.

The policy declares that in housing activities, the government will continue to remain as a facilitator in housing sector. The government intends to provide housing only to the poor and the rootless classes of the society. The policy makes commitments to encourage private organizations, NGOs and CBOs in housing development, income generation and environmental improvement under local planning. The preparation of Master Plan of the Paurashavas is, therefore, a step forward to address the various development issues including housing for mass people at local level.

5.2.4 Population Policy 2004

Prepared in 2004, the Population Policy of Bangladesh responds to the critical need to deal with the complex national population problem in a holistic way. It aims to build national consensus and synergy among institutions: public, private, civil society and NGOs about the problem.

The objectives of the National Population Policy are to improve the living standard of the people through making a desirable balance between population and development. The Policy proposals can broadly be divided into four sectors, human resources development, decentralization of population activities, participation of NGOs and private sector in population planning. The population policy aims to create a large skilled workforce, emphasizing on education and training strategies.

The policy calls for decentralization of population activities and ensure people's participation through decentralization of services and devolution of power to the local levels. The policy aims to prepare Action Plan through participation of local elites, opinion makers, representatives of poorer section of the society along with the local level government officials. With a view to give a holistic approach, the population policy calls for making the NGOs and private sector as important partners in population activities at various levels.

5.2.5 Transportation Policy 2004

Prepared in 2004, following are the policy objectives of Transport Policy:

- To provide a safe and dependable transport service for all.
- Removal of unnecessary control and formulation of laws and regulations conducive to providing services.
- Fare control and reduction of transport cost of goods for export.
- Determining the roles of the Government sector and the private sector.
- To maintain an economic and environmental balance.
- To ensure maximum utilization of Government funds.
- Expansion of the role of transport in the ever increasing economic activities.
- Growth of traffic commensurate with economic development.
- Introduction of an integrated transport system and provision of alternate transport systems.

The aim is to encourage greater private sector participation with national ownership of road and rail infrastructure. Lease of infrastructure may be allowed on long term basis. The Government is interested to establish a user role within its transport planning process. The Government intends to make arrangements to realize the cost of transport operation and road maintenance from road users through new fiscal policies and protect public interests. The Government will regulate tariffs for passenger and goods both in road and rail transport.

5.2.6 National Environment Policy 1992

Government declared an environmental policy in 1992 with a view to safeguard the national environment. The main objectives of the policy are:

- To promote natural balance and overall development by means of conservation and development of environment.
- To save the country from natural disaster.
- To identify and control all sources of pollution and degradation.
- To ensure environment friendly development in all sectors.
- To ensure sustainable, long term and environment friendly use of all national resources.
- To get involved with all international initiatives on environmental issues.

The comprehensive environmental policy covers as many as 15 sectors of development namely, agriculture, industry, health and health promotion, energy, water resources, flood control and irrigation, land, forest, wild life and biodiversity, fish and animal resources, food, coastal and maritime environment, transport and communication, housing and urbanization, population, education and public awareness, science, technology and research, legal framework, institutional structure. The consultant highlights only those sectors that have relevance to urban development and planning.

Industrial Sector

The following environmental measures are important:

- Potential polluting industries must incorporate control measures in its set up.
- All industries must conduct EIA and take pollution control measures.
- All industries in residential areas to be gradually shifted and new locations to be
- identified for planned industrial development.
- The industries producing pollutants should have their own system of pollution monitoring.
- Recycling of waste in order to reduce the volume of waste.
- Safeguard health of industrial workers.

Health Sector

The following environmental issues are important:

- Supply of safe drinking water in the Paurashava area and introduction of low cost healthy sanitation system.
- Control of pollution in all kinds of water bodies by municipal, industrial and toxic materials.
- Ban on carrying waste during day time and in open garbage trucks.
- Steps to be taken to protect public health and environment from all activities harmful for human health.
- Inclusion of environment in the academic syllabi.

Energy Sector

The following are some relevant policies:

- Large scale for introduction of improved cooker and wide dissemination of the technology to conserve energy and save environment.
- Promotion of biogas, solar energy, mini hydro electric unit and wind mill as sources of energy.

- Take up measures to reduce the amount of harmful elements in fuel including, sulfur in diesel and lead in petrol.
- Care has to be taken so that use and transformation of primary and commercial energy does not create any adverse impact on the environmental balance.
- Appropriate measures have to be taken during extraction and distribution of different natural resources like, oil, gas coal, peat so that they do not create any adverse impact on air, water, land, hydrological balance and the eco-system.
- Care has to be taken during giving fitness certificate to vehicles that emit black smoke. Mobile courts will have to be arranged to enforce the relevant legal provisions.

Transport and Communication Sector

The important aspects are:

- Care to be taken to make the road infrastructure development congenial to environment and the development of roads does not impede drainage of water.
- Appropriate measure to be taken so that the passengers and the transport do not endanger public health by indiscriminate throwing of solid waste and defecation.
- The rail, road and water transport must adopt measures to control emission of excessive black smoke.
- Creation of public awareness about the effect of pollution of river water.
- Control on water pollution to be ensured in inland river ports and dockyards.
- Encourage railway rolling stocks that generate less pollution.
- Forestation on both sides of railways and roads.

Population Sector

The important aspects are:

- Conduct study on the impact of population growth on environment and take appropriate measures to mitigate the problems of population growth.
- Prepare manpower utilization plan to make planned and effective use of human resources congenial to environment.
- Emphasize participation of women in environment conservation.
- Appropriate measures are needed to safeguard health of the poor and save them from the adverse effects of environmental degradation.

5.2.7 Industrial Policy 2005

The key aspects of the Industrial Policy 2005 are to:

- set up planned industries considering the real domestic demand, prospect of exporting goods abroad, and discouraging unplanned industries in the light of the past experience.
- accept private initiatives as the main driving force of economic development and uphold the government's facilitating role in creating a favourable atmosphere for private investments.
- take necessary initiatives to establish industries on state initiative in those sectors that are considered very important and essential, where private entrepreneurs are not forthcoming.

- cater to the needs of consumer satisfaction of the local products; measures to be undertaken to: produce quality products, diversify goods, and provide support for enhancing productivity using appropriate and advanced technology.
- provide inspiration for the speedy expansion of cottage industries and SMEs, and for further investment in these sectors so that new employment opportunities are generated, unemployment reduced and poverty alleviation programs made available.
- prioritize the expansion and development of agro-based and agricultural processing industries, and assist in the expansion of poultry, dairy and goat-sheep industry as agricultural industries.
- provide women entrepreneurs with all necessary assistance in establishing industries in various sectors.
- provide all necessary assistance for producing environment-friendly product with the objective to creating a pollution-free environment in the industrial sector.
- Enrich the industrial sector with the proper utilization of various natural and mineral resources.

5.2.8 National Tourism Policy 1992 and 2010

Recognizing the contribution of tourism to the socio-economic development of the country, the government framed the National Tourism Policy in 1992. The government in a gazette notification in May 2010 declared that the government may declare any potential site as a tourist area and if declared so, any development within the area will require formal permission from the government. The attractions of tourism can be varied, and the major policy thrusts for the sector are:

- To create interest in tourism among the people
- To preserve, protect, develop and maintain tourism resources
- To take steps for poverty-alleviation through creating employment
- To build a positive image of the area concerned
- To identify sectors for private capital investment
- To arrange entertainment and recreation
- To strengthen solidarity and integrity among the peoples

5.2.9 Agriculture Policy 1999

Agriculture Policy of Bangladesh was framed in 1999. A new policy is currently under preparation. The following are the important considerations in the 1999 Agriculture Policy.

The major issues dealt within the policy are, seed, fertilizer, irrigation, pest management, agricultural research, extension services, marketing of agro-products, land use, education and training, environment and agriculture, women and agriculture, coordination of various agencies engaged in agricultural development. Most of these issues are not relevant to the current Master Plan. The only relevant issue is the land use. So, review has been carried out on the land use only.

The Policy stresses on all possible steps to ensure optimum use of land. Its use has to be compatible with the overall goals of socio-economic services and utility provisions. The policy targeted to take the following steps to ensure planned utilization of land:

- Land zoning programme will be taken up by the Soil Resources Development Institute (SRDI) on a priority basis. Integrated approach of SRDI will be further strengthened for this purpose.
- To ensure maximum utilization of land, bottom up planning through people's participation will be started from the mouza or village level.
- Measures can be taken to stop fertile agricultural land being used for non-agricultural purposes, such as private construction, house building, brickfield, etc.
- Acquisition of land in excess of requirement for non-agricultural purposes will be discouraged.

About one percent of agricultural lands are being converted into non-agricultural use every year. In a country of constantly growing population, withdrawal of land from agriculture will affect food production. So it is necessary to safeguard farm land from conversion. But this vital issue has been partially addressed in the policy. It states only about fertile land and not agricultural in general.

Government has not framed any effective mechanism to discourage acquisition of land in access of requirement for non-agricultural purpose. To protect agricultural land, immediate steps are necessary to delineate agricultural lands. This issue has not been covered in the policy. It has been found that large areas of agricultural lands are unnecessarily being included within Paurashava. Sometimes, it is about 70% of the total Paurashava area.

5.2.10 Urban Forest Policy 1994

Representing an amendment of the forest policy of 1979, current national forest policy was enacted in 1994 and officially announced on 31st May 1995. The policy was formulated to initiate a 20-year Forestry Master Plan (FMP). The plan provides a framework for optimizing the forestry sector's ability to stabilize environmental conditions and assist economic and social development. Three imperatives were identified: sustainability, efficiency and people's participation. Important objectives are:

- To afforest about 20% of the total area of the country by initiating various a forestation programmes in forest lands, fallow lands, lands not useful for agriculture, hinter lands and other possible areas to meet the basic needs of the present and future generations and to ensure greater contribution of the forestry sector to economic development;
- To enrich biodiversity in the existing degraded forests by conserving the remaining natural habitats of birds and animals.
- To strengthen agriculture by extending assistance to those sectors related with forest development, especially by conserving land and water resources
- To provide for and implement a forestation programmes on both public and private lands.

The policy statements which are most relevant to local participatory forestry are as follows:

- tree growing by communities, local groups or individual families on roadsides, windbreaks, canal/river banks and other public or marginal lands will be promoted through NGOs and relevant state agencies;
- Buffer zones attached to protected areas may be allocated for tree farming and agro-forestry on a long term lease basis;

- The State will provide technical assistance and financial support to promote all forms of homestead forestry;
- Cottage and small scale labor intensive industries, which contribute to the local economy and process wood and other forest based raw materials, will be promoted;
- The traditional rights of people living within and adjacent to designated forest areas will be maintained and their forest-related cultural values and religious beliefs will be respected.

5.2.11 National Plan for Disaster Management, 2008-15

National Plan for Disaster Management 2008-2015 is an outcome of the national and international commitments of the Government of Bangladesh (GoB) for addressing the disaster risks comprehensively. The plan is developed to reduce the vulnerability of the poor to the effects of natural, environmental and human induced hazards to a manageable and acceptable humanitarian level. The objectives of this Plan are to:

- Align the strategic direction of disaster management programs with national priorities and international commitments.
- Articulate the vision and goals for disaster management
- Outline the strategic direction and priorities to guide the design and implementation of disaster management policies and programs.
- Create a cohesive and well-coordinated programming framework incorporating government, non-government and private sector.
- Ensure that disaster management has a comprehensive and all-hazards focus comprising disaster risk reduction and emergency response.
- Illustrate to other ministries, NGOs, civil society and the private sector how their work can contribute to the achievements of the strategic goals and government vision on disaster management.

A holistic approach for disaster management has been emphasized to work together with all the stakeholders and build strategic, scientific and implementation partnerships with all the relevant government departments and agencies, other key non-government players including NGOs, academic and technical institutions, the private sector and the donors. The role of Government is mainly to ensure risk reduction and comprehensive disaster management.

5.2.12 National Plan of Action for Person's with Disabilities (PWDs) as well as Autism, 1995

In line with the Government policy the Department of Social Services under the Ministry of Social Welfare has an enthusiastic vision & mission to address the social issues relating to Person's with Disabilities (PWDs) as well as Autism. The National policy for the persons with disability, 1995 calls for social protection and ensured the rights of the vulnerable groups. In the recent time, dynamic and sustainable steps have been taken for the PWDs. The steps are:

- To establish separate ticket counters in railway station, bus terminals, river ports, steamer terminal, airport and airways office to facilitate easy availability of tickets for the PWDs.
- To maintain reserve seats in the bus, train and water transports for PWDs.

- To fill up 10 percent reserved quota for employment in government jobs by orphans and PWDs.
- To construct a ramp in all the government offices to facilitate easy movement of the PWDs.
- To withdraw the existing restrictions regarding appointment of PWDs in the Govt. class I & class II jobs, and arrange micro-credit for PWDs by all the Nationalized Commercial Banks (NCBs).

5.2.13 Review of Relevant Laws and Regulations

5.2.13.1 The Act (36 of 2000) for Conservation of Play field, Open space, Park and Natural Water Reservoir in Mega City, Divisional Town, District Town and Paurashavas of Bangladesh

According to the section 5 of the Act, any land having such use as play field, park and natural reservoir can not be changed or can not be used for any other purpose(s). However, in absence of Paurashava Master Plan, the Act can not be properly applied. This emphasizes upon having Master Plan for each Paurashava.

In the existing provision of the Act, any person violating the Act may be liable to punishment up to 5 years of imprisonment or Tk. 50,000 fine or both. The Act makes a provision for appeal, however, and any land owner having any land with above mentioned use may apply to the appropriate authority to have permission to change the use. The authority shall convey the results of appeal within 60 days of the appeal.

5.2.13.2 Bangladesh National Building Code (BNBC) 1993

The Bangladesh National Building Code (BNBC) 1993 was formulated in 1993, but given legal status in 2008. The purpose of Bangladesh National Building Code (BNBC) is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of all buildings in order to safeguard within achievable limits, life, limb, health, property and public welfare. It aims to insure public safety, health, and general welfare in so far as they are affected by the construction, alteration, repair, removal, demolition, use or occupancy or buildings, structures of premises, through structural strength, stability, means of egress, safety from fire and other hazards, sanitation, light and ventilation. The BNBC suggests for conservation and restoration of historic buildings.

5.2.13.3 The Building Construction Act 1952

This Act was prepared in 1952 to prevent haphazard construction of buildings and excavation of tanks that are likely to interfere with the planning of certain areas in Bangladesh. The Act is usually exercised in areas under the urban local governments. The Act sets some conditions regarding construction of buildings in urban areas, where the Act will be in execution.

Preparation of Master Plan

The Act calls for preparation of a Master Plan of the urban area concerned before approval of building plan. The Master Plan shall show the future land use of the area through land use zoning. The buildings will be approved according to the land use provisions of the zoning plan. Having a Master Plan prepared, a Paurashava has the scope of exercising the following provisions/actions:

Building Construction Rules

The Act in its Section 18 keeps provision for preparation of Building Construction (BC) rules to ensure healthy and environment friendly building development. The last BC Rules were prepared in 1996. However, due to special characteristics of building development in Dhaka city a separate set of BC Rules was prepared for Dhaka City in 2008 under the same Act.

Power to Removal of Construction (Section 3B)

The Act gives special power to plan approval authority to remove any building that did not follow the specified rules of the Act or take action against any building owner who constructs building violating the rules after approval of the building plan.

Restriction on Cutting of Hills (Section 3C)

The Act forbids cutting of any hill without prior permission of appropriate authority.

Removal of Unauthorized Building (Section 7)

The Act empowers the authority to remove any building that has been built violating the BC rules. On failure to do so, the authority itself shall dismantle it and the entire cost shall be recovered from the owner as public demand.

Appeal

The Act, however, keeps provision for appeal, if the owner finds himself aggrieved due to any action by the authority.

Observation on the Building Construction Act

For appropriate execution of the Act, there is necessity of having Master Plan for a Paurashava. At the moment, there is serious lack of monitoring of disobedience of rules by the builders. Once the Master Plan is made for a Paurashava Town, the Paurashava Authority will be able to follow the rules properly.

5.3 Applicability of the Acts, Regulations and Policies in the Paurashava Master Plan

The key aspects of the policies presented in this Chapter have both direct and indirect relationships with the preparation of Master Plan of Paurashava Town in general, and Rohanpur Paurashava in particular. The Local Government (Paurashava) Act 2009, the Building Construction Act 1952, the BNBC, the Conservation Act 2000, Agriculture Policy etc. have serious stakes in the execution of Paurashava Master Plan. The other policies also have relevance in the preparation of Master Plan for an Urban Centre. As a result, the relevant aspects of the Acts, rules, and policies are mentioned in this chapter and are taken into consideration in the preparation of the Master Plan for the Paurashava. The key aspects that are most relevant with the preparation of Paurashava Master Plan are shown in**Table 5-1**.

Table 5-1: Important provisions of different Acts, Policies and Rules having relevance with the preparation of Paurashava Master Plan

Act/Ordinance, Policies, Rules	Relevance with Paurashava Master Plan
Local Government (Paurashava) Act 2009	Makes provision for having a Master Plan of the Paurashava Town. Provides legal basis for the preparation and implementation of Paurashava Master Plan. Suggests on the content and structure, and other relevant issues, such as provision for qualified Town Planner in the Paurashava staff.
National Land Use Policy 2001	Formulation and effective execution of Land Use Plan in order to ensure planned use of land. Suggests for aforestation, conservation and development of land maintaining landscape.
National Housing Policy, 1993	To create affordable housing through controlling unplanned and haphazard housing area development. To encourage private developers in land and infrastructure development, and house construction. Participatory housing infrastructure development involving the community, NGOs, CBOs, private developers and social welfare organizations.
Population Policy 2004	To improve the living standard of the people through a desirable balance between population and development. The proposals are divided into four sectors - human resources development, decentralization of population activities, participation of NGOs and private sector. The policy aims to create a large skilled workforce providing education and training.
Transportation Policy 2004	To provide a safe and dependable transport service for all. Removal of unnecessary control and formulation of laws and regulations conducive to providing services, determining the role of public and private sectors, maintaining an economic and environmental balance, maximum utilization of Government funds and introduction of an integrated transport system and provision of alternate transport systems.
National Environment Policy 1992	To promote natural balance and overall development by means of conservation and development of environment, save an area from natural disaster, identify and control all sources of pollution and degradation, ensure environment friendly development in all sectors, ensure sustainable, long term and environment friendly use of all national resources, and get involved with international initiatives on environmental issues.
Industrial Policy 2005	To set up planned industries considering the real domestic and export demand discouraging unplanned industries, provide necessary assistance for producing environment-friendly products with the objective of creating a pollution-free environment, and enrich the industrial sector with the proper utilization of various natural and mineral resources. To prioritize the expansion and development of agro-based and agricultural processing industries, and assist in the expansion of poultry, dairy and goat-sheep industry as agricultural industries; and provide women entrepreneurs with all necessary assistance in establishing such industries.
National Tourism Policy 1992 and 2010	To create interest in tourism among the people, preserve, protect, develop and maintain tourism resources, take steps for poverty-alleviation through creating employment, build a positive image of the area concerned, arrange entertainment and recreation, identify sectors for private capital investment, and strengthen solidarity and integrity among the peoples.

Act/Ordinance, Policies, Rules	Relevance with Paurashava Master Plan
Agriculture Policy 1999	To strengthen land zoning program, ensure maximum utilization of land through bottom up planning and people's participation, stop fertile agricultural land being used for non-agricultural purposes, and discourage acquisition of land in excess of requirement for non-agricultural purposes.
Urban Forest Policy 1994	To afforest about 20% of the total area of the country by initiating various aforestation programs in forest lands, fallow lands, lands not useful for agriculture, hinter lands and other possible areas to meet the basic needs of the present and future generations and to ensure greater contribution of the forestry sector to economic development; enrich biodiversity in the existing degraded forests by conserving the remaining natural habitats of birds and animals; To strengthen agriculture by extending assistance to those sectors related with forest development, especially by conserving land and water resources; and implement aforestation programs on both public and private lands.
National Plan for Disaster Management, 2008-15	To align the strategic direction of disaster management programs with national priorities and international commitments, articulate the vision and goals for disaster management, outline the strategic directions and priorities to guide the design and implementation of disaster management policies and programs, create a cohesive and well-coordinated programming framework incorporating government, non-government and private sector, and ensure that disaster management has a comprehensive and all-hazards focus comprising disaster risk reduction and emergency response.
National Plan of Action for Persons With Disabilities (PWDs) as well as Autism, 1995	To establish separate ticket counters in railway station, bus terminals, river ports, steamer terminal, airport and airways office to facilitate easy availability of tickets for the PWDs, fill up 10 percent reserved quota for employment in government jobs by orphans and PWDs, construct a ramp in all the government offices to facilitate easy movement of the PWDs, and withdraw the existing restrictions regarding appointment of PWDs in the Goverment Class I & class II jobs.
The Act (36 of 2000) for Conservation of Play field, Open space, Park and Natural Water Reservoir in Mega City, Divisional Town, District Town and Paurashavas of Bangladesh	To protect the existing use of land such use as play field, park and natural reservoir, and ensure punishment for conversion of such lands by any person/authority without proper permission from the appropriate authority..
Bangladesh National Building Code (BNBC) 1993	To establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of all buildings in order to safeguard within achievable limits, life, limb, health, property and public welfare. It aims to insure public safety, health, and general welfare in so far as they are affected by the construction, alteration, repair, removal, demolition, use or occupancy or buildings, structures of premises, through structural strength, stability, means of egress, safety from fire and other hazards, sanitation, light and ventilation. The BNBC also suggests for conservation and restoration of historic buildings.

Act/Ordinance, Policies, Rules	Relevance with Paurashava Master Plan
The Building Construction Act 1952	The Act calls for preparation of a Master Plan of the urban area concerned before approval of building plan. The Master Plan shall show the future land use of the area through land use zoning. The buildings will be approved according to the land use provisions of the zoning plan. To ensure healthy and environment-friendly building development. To empower special power to remove any building that did not follow the specified rules of the Act. To take action against any building owner who constructs building violating the rules after approval of the building plan. To forbid cutting of any hill without prior permission of appropriate authority. To keep provision for appeal, if the owner finds himself aggrieved due to any action by the authority.

Chapter 6: Projection of Future Growth by 2031

The future growth projection is helpful to draw mechanisms for improving and guiding long-term development strategies, identifying existing problems and future demand and making possible suggestions, to formulate viable projects for urban development and increase management capabilities of the concerned authority.

6.1 Projection of Population

It is a difficult task to collect detailed information of population for a recently declared Paurashava in Bangladesh. Perhaps no single factor is more important for planning than the size and composition of a region's population and the way it changes in the future. Estimation of future population for a specific period of a particular area is one of the most difficult tasks in the planning process. For Bangladesh, population projection is a very difficult task as the required data are not available for the particular area of a Paurashava and same is the case for Rohanpur.

The population figures collected from secondary sources, especially for the Paurashava were very much ambiguous. So for the final projection, several discussions were made with experts and BBS officials. Following the annual growth rate for the study area available from the 2001 Population Census, the projection up to the year 2031 with five years interval has been made.The data found from several sources is arranged in different formats according to their requirement and analysis. So, comparison of data between different sources is very difficult. As a result, projection with various sources of information on population shows variable results in the calculation. Migration information is not available in population census by BBS as it only considers the natural growth rate. But actual population projection requires both natural growth rate and migration rate. For this unavailability of migration rate, population projection becomes very difficult. By the formula population in any requisite year can be projected using the following equation which is also known as Geometric Progression Method of the following formula.

Pn = Po (1+R/100) 10----------(i)

As projections are based on the assumption that the past trends will continue to operate in the future, population of current year (according to BBS, 2011) have been taken to estimate the future population. The existing population of Rohanpur Paurashava is34941in 2011 within an area of 3577.42 acres. According to 2001 Population Census, the population was 30466. With an annual growth rate of 1.44%, the forecasted population of Rohanpur Paurashava for 2031will be-

Pn = Po (1+R/100) n
Pn = 34941 (1+1.44/100) ^{20}
Pn = 46507

Mentioned that, in BBS 2011, the growth rate of Rohanpur Paurashava is not mentioned clearly. In this case growth rate has been calculated from urban area growth rate of Gomastapur Upazilla 2011, which is 1.44%. In case of this report the higher growth rate which is 1.44has been selected. The gross density of the area will be 13ppa (person per acre). Due to the maximum concentration of residence in Ward no. 05, the density of population will also be higher (39ppa) in this area. **Table 6-1** shows ward wise population distribution of RohanpurPaurashava based on growth rate1.44%.

Table 6-1: Population Projection with Density for Rohanpur Paurashava Up to 2031

Ward	Area (Acre)	Pop'01	PPA	Pop'11	PPA	Pop'16	PPA	Pop'21	PPA	Pop'26	PPA	Pop'31	PPA
1	201.53	3174	16	3611	18	3879	19	4166	21	4475	22	4806	24
2	207.17	2365	11	2626	13	2821	14	3030	15	3254	16	3495	17
3	125.75	3393	27	3601	29	3868	31	4154	33	4462	35	4793	38
4	135.39	2832	21	3271	24	3513	26	3774	28	4053	30	4354	32
5	143.1	3842	27	4196	29	4507	31	4841	34	5200	36	5585	39
6	404.69	5160	13	6170	15	6627	16	7118	18	7646	19	8212	20
7	452.84	3322	7	3918	9	4208	9	4520	10	4855	11	5215	12
8	633.97	2466	4	2903	5	3118	5	3349	5	3597	6	3864	6
9	1272.97	3912	3	4645	4	4989	4	5359	4	5756	5	6183	5
Total	**3577.42**	**30466**	**9**	**34941**	**10**	**37530**	**10**	**40311**	**11**	**43299**	**12**	**46507**	**13**

Source: BBS, 2011.Estimation by the Consultant

Note: Annual Medium Growth rate for Population projection has been considered as 1.44%.

Table 6-2 shows the ward wise population growth of Rohanpur Paurashava up to 2031 at higher population growth rate consider as 1.94%.

Table 6-2: Population Projection with Density for Rohanpur Paurashava Up to 2031

Ward	Area (Acre)	Pop'01	PPA	Pop'11	PPA	Pop'16	PPA	Pop'21	PPA	Pop'26	PPA	Pop'31	PPA
1	201.53	3174	16	3611	18	3975	20	4376	22	4817	24	5303	26
2	207.17	2365	11	2626	13	2891	14	3182	15	3503	17	3856	19
3	125.75	3393	27	3601	29	3964	32	4364	35	4804	38	5288	42
4	135.39	2832	21	3271	24	3601	27	3964	29	4364	32	4804	35
5	143.1	3842	27	4196	29	4619	32	5085	36	5598	39	6162	43
6	404.69	5160	13	6170	15	6792	17	7477	18	8231	20	9061	22
7	452.84	3322	7	3918	9	4313	10	4748	10	5227	12	5754	13
8	633.97	2466	4	2903	5	3196	5	3518	6	3873	6	4263	7
9	1272.97	3912	3	4645	4	5113	4	5629	4	6197	5	6821	5
Total	**3577.42**	**30466**	**9**	**34941**	**10**	**38464**	**11**	**42343**	**12**	**46613**	**13**	**51313**	**14**

Source: BBS, 2001. Estimation by the Consultant

Note: High Growth rate for Population projection has been considered as 1.94%.

Table 6-3 shows the ward wise population growth of Rohanpur Paurashava up to 2031 at a low annual population growth rate consider as 0.94%.

Table 6-3: Population Projection with Density for Rohanpur Paurashava Up to 2031

Ward	Area (Acre)	Pop'01	PPA	Pop'11	PPA	Pop'16	PPA	Pop'21	PPA	Pop'26	PPA	Pop'31	PPA
1	201.53	3174	16	3611	18	3784	19	3965	20	4155	21	4354	22
2	207.17	2365	11	2626	13	2752	13	2884	14	3022	15	3166	15
3	125.75	3393	27	3601	29	3773	30	3954	31	4144	33	4342	35
4	135.39	2832	21	3271	24	3428	25	3592	27	3764	28	3944	29
5	143.1	3842	27	4196	29	4397	31	4608	32	4828	34	5059	35
6	404.69	5160	13	6170	15	6465	16	6775	17	7100	18	7440	18
7	452.84	3322	7	3918	9	4106	9	4302	10	4508	10	4724	10
8	633.97	2466	4	2903	5	3042	5	3188	5	3340	5	3500	6
9	1272.97	3912	3	4645	4	4867	4	5101	4	5345	4	5601	4
Total	**3577.42**	**30466**	**9**	**34941**	**10**	**36614**	**10**	**38368**	**11**	**40205**	**11**	**42131**	**12**

Source: BBS, 2001. Estimation by the Consultant

Note: Low Growth rate for Population projection has been considered as 0.94%.

With an annual growth rate of 1.94% (assuming higher growth rate), the forecasted population of Rohanpur Paurashava will be 51313in the year 2031. The gross density of the area will be 14ppa (person per acre). Due to the maximum concentration of residence in Ward no. 05, the density of population will also be higher (43ppa) in this zone.

Again, with low growth rate of 0.94%, the forecasted population of Rohanpur Paurashava will be 42131 in the year 2031. The gross density will be12ppa (person per acre). Due to the maximum concentration of residence in Ward no. 5 and 3, the density of population will also be higher (35ppa) in this zone.

In this case the medium growth rate which is 1.44% has been accepted for the population forecast.

6.2 Identification of Future Economic Opportunities

The contribution of the small towns to the economic development of their hinterlands depends largely on the urban development in these urban centers. Depending on transport, communication and storage facilities, this Paurashava can play a vital role in linking rural farmers to the urban market. For instance, development of road network between this small town and its rural hinterlands may greatly benefit rural farmers as it enables them to transfer their agro produces to bigger markets. The industrial development in the Paurashava will have significant impact on the demand for raw materials that are required for the industrial production. All sorts of production materials, like brick, wood, bamboo etc. are produced in the countryside, serving as supply centers for urban demand. To support urban industries and related activities, it requires adequate infrastructure, such as urban rural transfer routes, communication and information structures. Investments in these projects result in enhanced productivity in both urban and rural areas.

Table 6-4 shows the work force of Paurashava. From the BBS- 2011, it is revealed that the among the economically active age group of population, 44.91% people are engaged with economic activity while a big portion 40.31 are engaged in household activities and about 14.55 % populationa are not contributing in economic activities. A relativel smaller portion of people are looking for work. From the Household Survey it is revealed that the small business is the dominant occupation class in the town. The next highest occupation class found is the agricultural sector. Most of the households' earning members often adopt a secondary occupation which indicates that under-employment is very much prevalent in the project area.

In the project area, most of the economically active population whose age is 10 years and above are involving in agriculture (farming), small business and transport sector.

Table 6-4: Existing Working Force for Rohanpur Paurashava

Status	Number	Percentage
Employed	3652	44.91
Looking for Work	18	0.22
Household Work	3278	40.31
Not Working	1183	14.55
Total	8131	100

Source: Community Series (Zila: Chapi-Nawabganj), Bangladesh Population Census-2011

However, it is extremely difficult to make any precise projection about future economy of this small urban center. Considering the present level of economic activities, no major change is anticipated in the local economy in the near future.

The town has good prospects to local economic upliftment provided appropriate government policies and initiatives are taken. People have money, but they will have to convert it into capital. The following suggestions may be considered.

First, training on entrepreneurship may be arranged for prospective young and educated entrepreneurs to encourage them to invest in manufacturing, in particular.

Second, local entrepreneurs may go for consumer goods production targeting local market.

Third, prospective investors may also explore possibilities of investment in agriculture sector for local as well as export market, particularly, in fisheries, poultry and horticulture.

Thoug agriculture is an important source of income mainly in Chapai-nawabganj region, services play an significant role in this area. Remittance is the main source of income of 50percent of the household of Paurashava (BBS, 2011 and household survey). They mainly invested on land, which is considered the safest investment, as the land value never falls. Without investment in basic industries, it is unlikely that the local economy will experience a major boost in the near future. Both government and private initiatives will bring prospective up gradation of the economy through proper policy for utilization of the remitted money inflow. It is the high time to create some special incentive packages for their investment make a rewarding role in the economy of the country.

6.3 Projection of Land use

Projected land use is a critical component to a comprehensive plan. The forecast determines the amount of land needed to accommodate future growth, and includes the land required for residential, commercial and industrial uses. In some instances, a community may have enough vacant lands within its boundary to accommodate its forecasted population increases and land use demands. In other instances, there may be a need to consider land outside a community's boundaries to accommodate this increase. According to land use projection it is reveals that there is no land required for residential purpose in the year 2031. The Consultants estimates about 715.49 of land for residential uses with a net residential density of 65 people per acre. Including existing commercial activities, the total commercial land in 2031 has been fixed at 53.91 acres. Again need of educational land for projected population will be 67.44 acres and 13.46 acres of land for community facilities. A huge land (102.32acres) will require for open space and recreational facilities covering play field, park, neighborhood, park and stadium. The projection and demand on land requirements as per the planning standard approved by the PMO office of UTIDP project are discussed details in Chapter-10 and Section 10.1.2.

Chapter 7: Landuse Zoning Policies and Development Strategies

This chapter sets land use policies and development strategies for planning area. It classifies the Structure Plan area into categories and also includes strategies for optimum use of urban land resources, plans for new area development and areas for conservation and protection.

7.1 Zone of Structure Plan Area

To guide long term growth within the Structure Plan Area by means of demarcation of the future growth areas and indication of potential locations of major development zones are broadly classified into seven categories. **Table 7-1** shows the Structure Plan area zones, its area and percentage coverage. Details of the description of structure planning zones are given in the following paragraphs. ***Map 7-1*** and *Appendix-1* shows the structure plan of Rohanpur Paurashava.

Table 7-1: Structure Plan Policy Zoning

Zoning	Description of the Zone	Area (acre)	%
Core Area	This area is also known as built-up area. This is defined as the area which has the highest concentration of services; it also has the highest population concentration & density. It will absorb most population growth during the Land use Plan (2011-2031) period.	129.02	3.60
Fringe Area	This zone is developing areas which will take further decades to reach the population densities of the urban core area. Low initial densities in these areas do not justify supply of a full range of services as they will initially be underused. However, it is essential that planning and reservation of rights of way, at least for primary networks, be undertaken soon to enable provision when justified by increased density levels and allowed by resources.	143.06	3.75
Peripheral Area	This is the zone where a slow trend of urbanization is continuing in unplanned manner. The area identified in the Structure Plan as the likely choice for new urban development beyond the core area. Ideally, it might be reasonable to provide primary infrastructure networks in this area to foster development and encouraged to enable a more rapid urbanization in a planned way.	642.36	17.89
New Urban Area	This zone will be the required additional area for future planned urban development as per population projection. New facilities & services like road, drains, footpath, waste transfer station & other civic services will be provided. This area is proposed to grow within 2031.	132.70	3.70
Agriculture	Agricultural land (also *agricultural area*) denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture. The land under annual crops, such as cereals, other technical crops, potatoes, vegetables, and melons; also includes land left temporarily fallow; land under permanent crops (e.g., fruit plantations); areas for natural grasses and grazing of livestock.	2121.61	59.41
Water body	Water body containing an area equals to or more than 0.25 acres excluding those of khal, irrigation canal and river will be treated as this category.	201.42	5.65

Zoning	Description of the Zone	Area (acre)	%
Major Circulation	Major circulation contains major road network and railways linkage with regional and national settings.	207.25	5.57
Total		**3577.42**	**100**

Map 7-1: Structure Plan Zone of Rohanpur Paurashava

7.1.1 Core Area

Total 129.02 acres of land, which covers 3.60% of Structure Plan area, is declared as Core Area (**Map 7-1** and ***Fig 7-1***). It is located with in Ward nos.5and 3. It includes the highest concentration of services area for an example, schools, post office, police box, Bazar area etc. and it has the highest potentiality of development. Because the town developed based on the railway line, which is passes through the east west direction of the Paurashava, there are differences in levels of provision, particularly between the formally developed and planned areas and the majority of unplanned areas. Levels of provision should be maintained in the planned areas. Since these areas are forecasted to show density increase and increased demand and therefore will require regular upgrading. The main thrust to improve services should be in the unplanned zones, particularly where the deficiencies already are great and quality of life will sharply decline when the services also have to cater for the additional population.

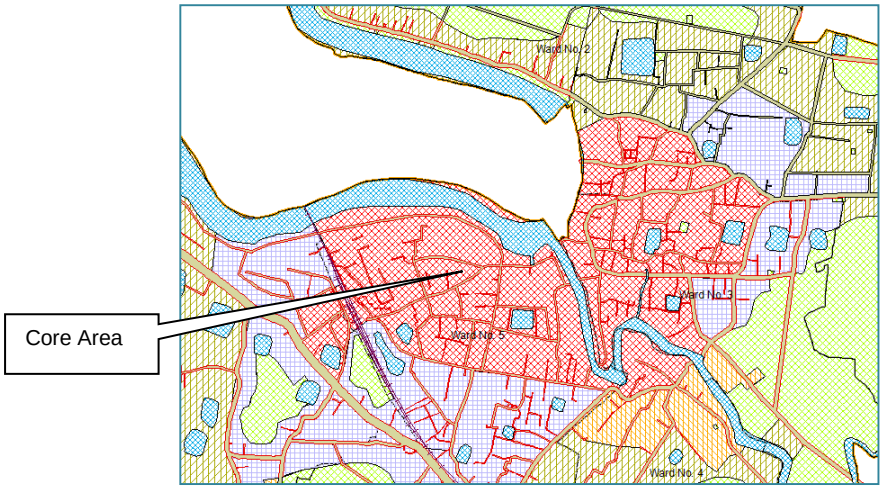


Fig 7-1:Core Area of Rohanpur Paurashava

7.1.2 Fringe Area

A total of 143.06 acres of land covering only 3.75% of Structure Plan area is declared as Fringe Area (**Map 7-1** and **Fig 7-2**). Maximum fringe are of proposed structure plan is located surrounding of Core area. It covers large portion area of Ward nos.6 and 7. This area mainly proposed, where a slow trend of urbanization is continuing in unplanned manner. The area is identified in the Structure Plan as the likely choice for new urban development beyond the core area. Ideally, it might be reasonable to provide primary infrastructure networks in this area to foster development encouraging a more rapid urbanization in a planned way.

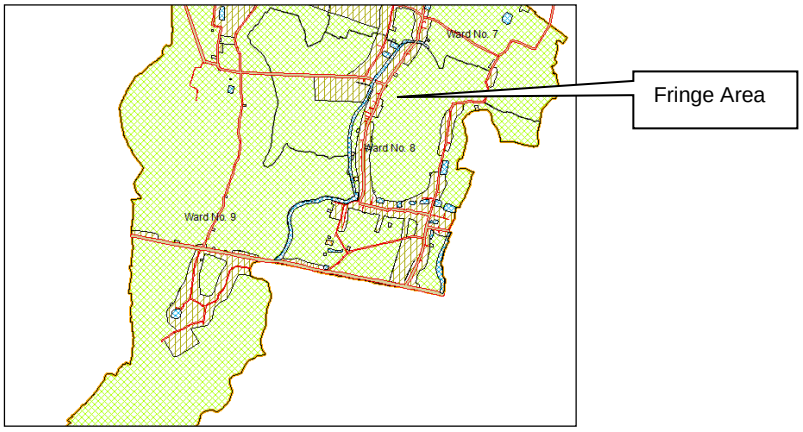


Fig 7-2:Fringe Area of Rohanpur Paurashava

7.1.3 Peripheral Area

A total of 642.36 acres of area, which covers 17.89 % of Structure Plan area, is declared as Urban Peripheral Area (**Map 7-1** and ***Fig 7-3***). Peripheral area covers some portion of the all the wards except ward no. 3,4,5and 6 of the Paurashava. This zone is developing areas that will take a longer time to reach the population densities of the urban core area. Low initial densities in these areas do not justify supply of a full range of services as they will initially be underused. However, it is essential that planning and reservation of rights of way, at least for primary networks, be undertaken soon to enable provision when justified by increased density levels and allowed by resources.

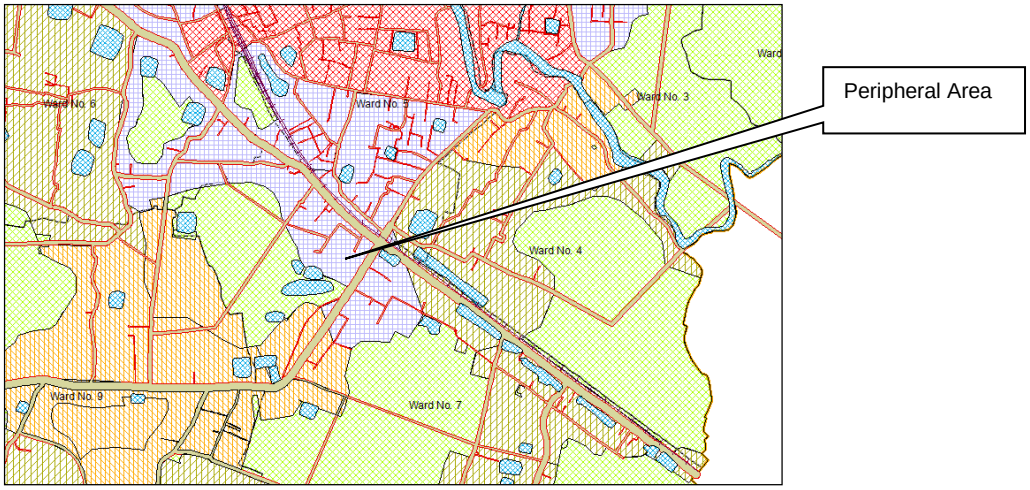


Fig 7-3:Peripheral Area of Rohanpur Paurashava

7.1.4 New Urban Area

Total 132.70 acres of land covering 3.70% of Structure Plan area is declared as New Urban Area (**Map 7-1** and ***Fig 7-4***). New urban area mainly located within Ward nos. 9 and 6. All these wards has partially involved with new urban area. It is assumed that town will be developed based on established as trade center which is mostly depends on successfully communication network and establish trading relation with others. So most of the new urban lands in Ward nos. 9 and 6 will be use to meet the extra pressure of development trend for this for this reason.

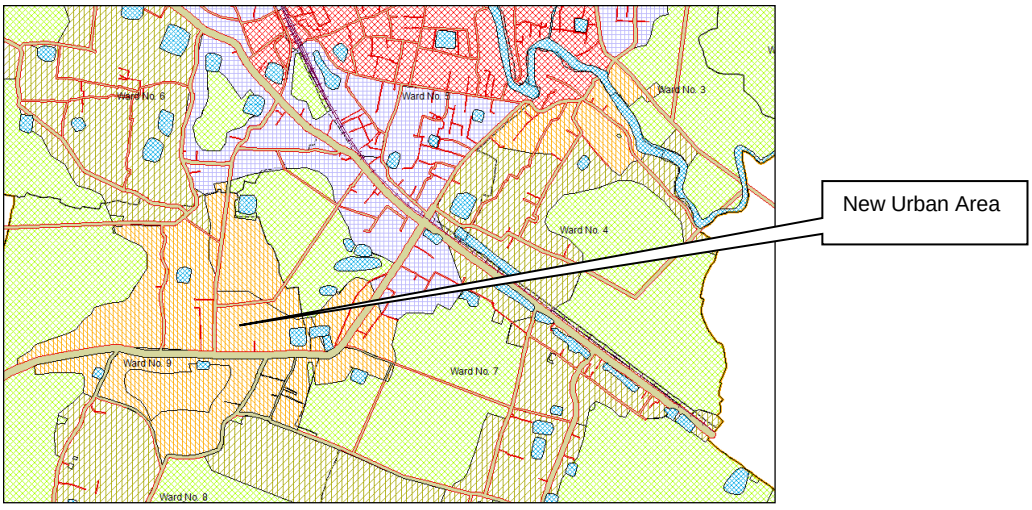


Fig 7-4:New Urban Area beside Core Area

7.1.5 Agriculture

Total 2121.61 acres of land covering 59.41 % of Structure Plan area is declared as Agriculture Area (**Map 7-1** and ***Fig 7-5***). Agriculture Area is quite spread all over the Paurashava.

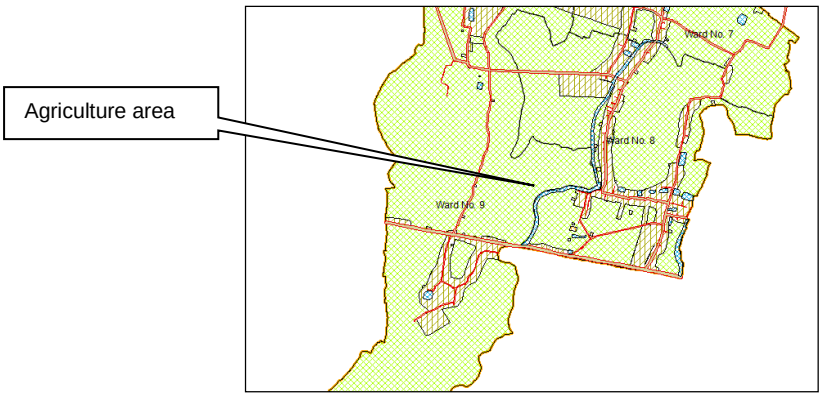


Fig 7-5: Agriculture Land spread all over of the Paurashava

7.1.6 Water body/Retention Area

Total 201.42 acres area, which covers 5.65 % of Structure Plan area, is declared as water body (**Map 7-1**). It includes pond, ditch and all the canals and river within the Paurashava. More detail information is provided in drainage and environmental plan.

7.1.7 Major Circulation Network

It contains major road network with Chapai Nawabganjand other neighbor urban center and also included the major road way network required for maintaining existing internal communication. Total 207.25 acres land which cover 6% of total structure plan area. **Map 7-1** shows major circulation network.

7.2 Strategies for optimum use of Urban Land Resources

7.2.1 Optimum use of Urban Land Resources

With a limited land mass, Bangladesh is the most densely populated country in the world. The land area of the country remains static amid continuously increasing population. Such a situation calls for strict regulation to utilize its scarce land resources for non-agricultural purposes. Increase in urban population means more demand for houses, roads, schools, hospitals, factories, bazars, shops, business centres, offices, other service facilities etc. Providing all these facilities require land and that is at the cost of valuable agricultural land, as the country has hardly any fallow land to accommodate all these land uses. Rohanpur Paurashava is surrounded by valuable fertile agricultural land. Any urban expansion will cost net deduction of agricultural land that will consequently affect local food and cash crop production. Practice of thriftiness on land utilization is, therefore, essentially needed in plans and development proposals. Such practice should start through adoption of conservative and rational standards of space use and their proper application in planning, designing and development. **Table 7-2** shows the optimum use of urban land resources.

Table 7-2: Policy for optimum use of urban land resources

Policy	Justification	Means of Implementation	Implementing Agency
Policy UA/1: Optimization of Available Land Resources Growth within the established urban area is not compact in Rohanpur. There are still large amount of land lying vacant amid all categories of land uses within the Paurashava area and beyond. Infilling of these lands should be promoted and encouraged to optimize use of land.	Keeping large land areas vacant within the existing built up area, extension of physical boundary of the town is not logical. Such a tendency might cause valuable agricultural land out of use. There is a need to economize the use of land, which is a scarce resource against an expanding population in the country.	*Control:* Imposition of tax on the land remaining vacant for a long time can be tried to discourage speculation on the land use practices. Measures should be adopted to minimize the use of land by public sector agencies. Policies to discourage large scale land acquisition for development by the public sector can be tried. *Promotion*: The public sector should develop infrastructure facilities and services in deprived areas to enable the land owners for development.	- Rohanpur Paurashava; - Ministry of Land
Policy UA/2: Utilisation of Khas Land for Urban Development	Khas lands are public land that should be made best use for community purpose. Instead of evicting people from their own land for implementing development proposals, khas land should be used as much as possible.	Taking over of khas land by Paurashava that falls under different development proposals under the current development plan. Paurashava can later on hand over the land to the concerned authority that will implement the particular development proposals.	-Rohanpur Paurashava -Ministry of Land -DC, Bogra

7.2.2 Plans for New Area Development

Table 7-3 shows policy to develop new urban area. It includes justification of new area development, means of implementation and agencies for implementation.

Table 7-3: Policy for new area development

Policy	Justification	Means of Implementation	Implementing Agency
POLICY UA/3: INITIATIVES FOR NEW URBAN AREA DEVELOPMENT	New areas with their growing stage offer excellent opportunity for organized development with little or no compensation cost for eviction and less hindrances in motivation of the local residents in favor of organized development	Participatory approach to new urban area development is to be supported by innovative ideas of spatial development. Long motivational activities will have to be carried out for this purpose. Public sector with technical and financial support of the private sector and cooperation from service giving agencies will make the task easier.	- Rohanpur Paurashava - DPHE - Private sector

7.2.3 Areas for Conservation and Protection

To ensure liveable environment in the planning area, different areas are conserved in various forms, namely agricultural land, low land, pond and natural drainage, green belt, historic and heritage areas, etc. Details are given in **Table 7-4**.

Table 7-4: Area for conservation and protection

Type of Land	Means of Implementation	Implementing Agency
Loss of Productive Agricultural Land: The Master Plan area has a vast agricultural land in the northern side of this project. After implementation of the project, environment of agriculture will be converted into non-productive urban and semi-urban area.	The EIA Guidelines of DOE emphasized on the avoidance of productive agricultural land for any development project. Therefore, it will be wise to consider more economical use of land to avoid fertile lands. The town expansion and land acquisition should be based on the growth rate of population. According to population projection for the year 2031, the present residential land use area will grow with increasing density. So a large share of agricultural land can be spared at least for the time being.	- RohanpurPaurashava - DOE
Low Land, Pond and Drainage Path: A total of 180 ponds with an area equal to or more than 0.25 acres within the Paurashava are declared as retention area. In no way permission for filling up of these ponds should be given. Paurashava should acquire these ponds at suitable time to use them for retention and emergency use.	This area is declared as water body in the Master Plan. As per the guideline of Wetland Conservation Act 2000, this area will be conserved as water body. According to population projection for the year 2031, the present residential land use area can be developed with increasing density up to this year. So a large share of water body can be spared.	- Rohanpur Paurashava - Water Development Board
Green Belt: The Bank of the Boral river is declared as green belt. This area will be used for aforestation and recreational purposes for conservation of environment and creation of opportunity for tourism development in this town.	This area is declared as green belt in the Master Plan.	- Rohanpur Paurashava

7.3 Policies for Development

This section of the chapter sets forth strategies and policies for various components of the Master Plan on sectoral basis.

7.3.1 Policies for Socio-economic Sector

Population

Controlling population should be given utmost importance nationally, as because of the uninterrupted population growth, the country's economic problems are being accentuated, pressing on its resources. It makes poverty reduction difficult, which is the key to overall national development. It is, therefore, necessary to enhance population control drive. The people at the grassroots can play an effective role in this regard. An efficient, well trained and well paid grassroots level work force can help profoundly in achieving the targets of population control policy of the government. Side by side, promotion of education can be very effective in the creation of

awareness about small family size. The Paurashava may undertake relevant measures in line with national objectives to strengthen its own position in population planning.

Strategy

- Raise the level of education among mass people and emphasize more on grassroots level family planning workers' services with effective delivery of birth control services.

Table 7-5: Policy for Population Sector

Policy	Executing Agency
Policy 1: Declaring population as one of the most critical sectors of national development	-Ministry of Planning -Ministry of Health and Family Planning
Justification: Per capita national growth is being eaten up by constantly growing population. By controlling population, national benefits earned from economic growth can be shared in a better way, raising the level of living standard of the people.	
Policy 2: Putting more efforts and resources in raising the level of education.	-Ministry of Education -Ministry of Planning -Ministry of Health and Family Planning
Justification: Education would not only create awareness among the masses about the benefits of small family size, it will also help secure better job with higher pay that would reduce poverty.	
Policy 3: Creation of well paid and well trained grassroots level family planning workers for motivational work.	-Ministry of Planning -Ministry of Health and Family Planning
Justification: Grassroots level workers can give door to door motivational services and distribute birth control materials in a better way. To get good services theymust be efficient and well paid.	

Economic Development and Employment Generation

Economic development of any place is associated with generation of employment. The generation of employment depends on the rate of investment in various sectors of an economy. An urban economy of any town starts building up with investment in the basic sector that leads to the building up of the non-basic sector. Investment in basic sector is not very bright in Rohanpur as it is a very small town with a very small size of population. However, the Paurashava must ensure that any foreseeable opportunity in economic development is given due attention for its own growth and economic benefits.

Strategy:

- Creating basic sector investment climate and leading the local economy forward through promotion of Small and Medium Enterprises (SME).

Table 7-6: Policy for Economic Development and Employment Generation

Policy	Executing Agency
Policy 1: Provision of bank loans on easy terms to attract prospective investors in the SME	-Ministry of Industries -Ministry of Commerce

Policy	Executing Agency
Justification: Easy loans would encourage and attract prospective investors for investment in small scale industries.	
Policy 2: Taking of measures to channelize remittance to value adding productive sectors.	-Ministry of Industries -Ministry of Commerce
Justification: Larger amount of remittance is being diverted to land purchase, which is considered as the safest investment. This huge capital may be diverted to productive sectors to help create more employment.	
Policy 3: Arranging entrepreneurship training programmes for prospective investors.	-Ministry of Industries -Ministry of Commerce
Justification: There are many potential investors who are ignorant of the ways and means of investment and operation of an enterprise. The training can help them get educated in these lines.	

Housing

As the town has low level of population, housing is yet to become a problem here. Housing policy and programmes are provided and executed by the national government. There is no local office of the National Housing Authority to execute housing programmes at Upazila level. As a local government, Paurashava can facilitate housing area development by means of providing road infrastructure, drainage, water supply, etc in designated housing zones. The consultant supports the prevailing national housing policy and advocates its execution at all levels, which at the moment is highly lacking.

No slums are observed in this small town, the way they are exposed in large cities. So no slum and squatter related problems are there in the town. This provides a better scope for planned housing development in the Paurashava.

Strategy:

- Upholding the role of Paurashava, as a facilitator to provide all necessary infrastructure and services to enable housing by people in general. As a least cost approach, involvement of the land owners can be encouraged in housing area development on a public-private partnership basis.

Table 7-7: Housing and Slum Improvement

Policy	Executing Agency
Policy House/1: Provision of necessary services and facilities to promote housing at private sector.	- National Housing Authority - Ministry of LGRD - Rohanpur Paurashava
Justification: It is more difficult to provide housing on public sector initiatives, as it involves funding and land acquisition that takes a long time. By providing infrastructure and services, general people can be encouraged to build their own houses.	

Policy	Executing Agency
Policy House/2: Housing zone land owners can be involved in a participatory development approach, where Paurashava will provide infrastructure and the cost will be shared by land owners.	- National Housing Authority - Ministry of LGRD - Rohanpur

Social Amenities and Community Facilities

Social amenities and community facilities include, education facilities, health facilities, open space recreation facilities like, park and playground, amusement park and community centre. For comfortable and healthy urban living, these facilities are the fundamentals. Since these are social services, they must be provided by the public sector agencies as public good. For education and health facilities, the national governments have policies and there are separate ministries and their agencies to execute the policies through programmes and projects. There are also Upazila level offices of the concerned agencies to take care of the execution of national education and health policies and programmes. For providing amenities like, park and playground and community centre, the responsibility lies with the Paurashava.

For park and playground, the Paurashava may secure local khas land. The open space recreation is difficult to provide as population expands and land price goes higher. Once time is lost, vacant lands are also lost. Amid soaring land price and absence of vacant land, it becomes extremely difficult to provide open space recreation. So, it is better to secure vacant lands for open space before density of population increases and land becomes scarce and pricier. For community center, intensive use of land should be made by making multiple use of the same space, for example, providing community center, ward councilor's office, clinic or any other use in the same building.

Strategy:

- Exploring khas /public land within the Paurashava and using the unused/vacant land for providing amenities, before density of population increases and land becomes scarce and dearer.

Table 7-8: Social Amenities and Community Facilities

Policy	Executing Agency
Policy-Amenity/1: Procurement of khas and other public land for park, playfield, community centre. Justification: Since above facilities are non-revenue earning, they should be procured at least cost.	-Ministry of Land -DC Office, Bogra - Ministry of LGRD - Rohanpur Paurashava
Policy-Amenity/2: Land should be procured for open space facilities as quickly as possible, because when land value will be higher, cost of providing the facilities will also be very higher. Besides, with the growth of population, vacant land will disappear gradually, so no land will be available at strategic locations for providing open space facilities.	-Ministry of Land -DC Office, Bogra - Ministry of LGRD - Rohanpur Paurashava

7.3.2 Physical Infrastructure Sector

Transport

By far, transport is the most important means to revitalize an urban center. Intra and inter urban transportation facilities create economies of scale for prospective investors and enables easy and comfortable mobility of the residents. Easy and cheaper transportation of raw materials and finished goods create good investment climate for manufacturing enterprises that lead to development of the service sector firms. New employment generates and the non-basic sector expands leading to thriving urban center. To create transportation facilities, quality inter-Upazila and inter-District road network will have to be created that makes movement faster and easy. With good transport infrastructure, economic development may become attractive. Besides, quality of local roads will have to be upgraded to encourage people live in the town. Once population starts increasing, it will expand local consumer market and will attract new investments in consumer goods production.

Strategy:

- Creation of efficient inter-city and intra-town communication for easy transportation of goods and passengers.

Table 7-9: Policy for Transport Sector

Policy	Executing Agency
Policy-Transport/1: Development of efficient inter-city road network with standard road.	- Roads & Highways Department (RHD)
Justification: Increased inter-city mobility will increase business transactions and generate investment and employment.	
Policy-Transport/2: Promotion of efficient road transport facilities between urban centers.	-Bangladesh Road Transport Authority (BRTA) -Bogra District
Justification: Not only that communication is needed between urban centers, but to attract investment, emphasis must be laid on quality of roads built.	
Policy-Transport/3: Development of local road network through participatory approach.	- Rohanpur Paurashava - Local Government Engineering Department (LGED)
Justification: Development of roads will involve huge cost. Participatory development will enable cost sharing, which will reduce cost of road construction substantially.	

Utility Services

Utility services are the most essential parts of urban life. To make an urban center livable, there must be adequate provision for utility services. Utility services include water supply, solid waste management, power supply, sanitation and drainage. Except power supply, the rest are the responsibilities of the Paurashava..

Strategy:

- Attainment of self-reliance in revenue collection and adoption of participatory approach to service provision to ensure better services and facilities to the people.

Table 7-10: Policy for Utility Services

Policy	Executing Agency
Policy-Utility/1: Exploration of alternative sources of water to ensure sustainable supply.	- LGED - Rohanpur Paurashava
Justification: Justification: Amid constant rise of urban population, it is time to explore alternative sources of water like, rain water harvesting and surface water supply.	
Policy-Utility/2: Involvement of beneficiaries in solid waste management.	- Rohanpur Paurashava - NGOs and CBOs
Justification: Involvement of beneficiaries in solid waste management will make the operation more effective and reduce financial responsibility of the Paurashava.	
Policy-Utility/3: Exploring re-use and recycling of waste materials to extract resources.	- Rohanpur Paurashava - NGOs and CBOs
Justification: Re-use and recycling of waste materials will produce resources and reduce cost of waste management.	
Policy-Utility/4: Publicity on the benefits of hygienic sanitation to motivate people and enable people to have easy access to sanitary materials.	- LGED - Rohanpur Paurashava - NGOs and CBOs
Justification: Motivation will encourage people to adopt healthy sanitation and reduce health risks.	
Policy-Utility/5: Protection of natural drainage system and preparation of hierarchical drainage network.	- LGED - Rohanpur Paurashava
Justification: Natural drainage systems are being grabbed and filled up, which increases the risk of water logging. Well planned hierarchical drainage network helps smooth drainage of storm and waste water.	

7.3.3 Environmental Issues

From environmental point of view Rohanpur Paurashava is not yet badly affected. There are some issues that must be taken care of. The issue of sanitation has already been dealt within the utility services section. Except cyclone, there is no natural hazard. There is no mentionable air, water or soil pollution in the Paurashava from any mentionable sources at present.

Natural Resources

The Paurashava is not endowed with many natural resources that can be conserved. Among the meager natural resources that are available, 227 number of ponds and natural drainage canals can be mentioned. Out of the total ponds 180 with an area equal to or more than 0.25 acres and the natural khals need to be protected and conserved to ensure sustainability in drainage and water supply of the Paurashava.

Strategy:

- All khas land and canals should be vested with Paurashava for use in community interest.

Table 7-11: Policy for Natural Resources

Policy	Executing Agency
Policy-Nature /1: All khas lands within the Paurashava must be assessed and handed over to the Paurashava for use in community interest.	- Ministry of Land - Rohanpur Paurashava
Justification: This will prevent misuse of khas lands by political and powerful local people.	
Policy-Nature /2: All natural canals within the Paurashava must be vested with the Paurashava for maintenance and proper use as drainage canal.	- Ministry of Land - Rohanpur Paurashava - NGOs and CBOs
Justification: This will help prevent unauthorized occupation and filling of natural drainage.	

Chapter 8: Implementation Issues

This chapter deals with the issues of implementation of the Master Plan. Here, recommendations have been made about capacity building and resource mobilization for the implementation of the plan.

8.1 Institutional Capacity Building of the Paurashava

In the present context of spatial and legal jurisdiction of the Paurashava for planned development of its area, some recommendations are made here. Also, observing the financial and Institutional strength of individual stakeholders in relation to their liabilities and identifying their shortages and absence of any perfect coordinating body, some suggestions have been made as remedial measures as a whole.

- All urban local governments including Upazila level Paurashavas must be given More independence and autonomy to perform their responsibilities. At the same time, their accountability to the government and people regarding their performance has to be ensured. For this purpose the legal framework of the urban local governments has to be reviewed and updated. The legal provisions have to be consolidated and simplified and make them compatible to changing circumstances. Opportunities must be created in the Act allowing scope for privatization of service providing activities.
- To avoid duplication of development functions, there should be clear line of separation between central government and the urban local government.
- A double entry cash accounting system has to be introduced to modernize the accounting system. For this purpose, massive training programme has to be arranged for the relevant municipal staff.
- To improve revenue collection, the urban local governments should be given more power and responsibilities. Measures should be taken for strengthening the Paurashava administration for municipal development.
- Section-50 of the Local Government (Paurashava) Act 2009 needs to be revised and more power should be given to the Executive Officer for appointment of employees.

It cannot virtually function effectively as a Paurashava under such a stringent financial condition. To function, effectively, it must raise its revenue earning. But it is reported that the Paurashava cannot collect all its holding tax from the citizens. Holding tax is the most important source of its own revenue earning. It must take care to ensure 100% recovery of holding tax. The Paurashava cannot function effectively depending upon government grant only. The existing manpower position of the Engineering, Development control and Accounts should be substantially raised to handle future volume of work. Moreover, additional staff especially for the implementation of Master Plan will soon be required.

The present plan package imposes a large number of development projects on Rohanpur Paurashava for implementation. Paurashava will not only be the custodian of the plan, it will also directly implement much of the development projects. Besides, it will also be responsible for monitoring and implementation of the development projects by other urban development and

service giving agencies. This situation calls for strengthening of the existing capability of Paurashava.

8.1.1 Staffing and Training

As a traditional system of the Paurashava, engineer and secretary are appointed directly by the Ministry of Local Government and other staffs are appointed locally through the approval of the Ministry after the advertisement on the newspapers. In Rohanpur Paurashava, the revenue income is too low. That's why it is not capable to pay the salary of all the officials and staffs. The salary is recovered from the government grant and BMDF allocation. This is the main reason for under staffing of the Paurashava.

There is no proper arrangement for staff training. As a result, the staffs are mostly unskilled. They can not deliver proper service to the citizens. Besides, most of them are not qualified enough to render proper services.

8.1.2 Lack of Automation

Most works in the Paurashava are done manually. Such practice delays works and deprives the citizens from services. This is also a source of mal-practice and corruption. Modern office and working equipment should be installed. Use of modern technology will increase efficiency in planning and record keeping, finally expedite decision making process.

8.1.3 Town Planning Capacity

8.1.3.1 Institutional Framework

To rearrange the institutional framework for the Paurashavas recently the government has made a committee to reform the organogram of all the Paurashavas of Bangladesh. According to the clause no. 72-78 (Paurashava Officer & staff, provident fund etc) of Paurashava Act, 2009 and on the basis of the type and category of works, the committee suggested appropriate section/units/divisions within the Paurashava framework. Planning unit or division will be necessary to set sequentially as the authority can perform it's mandatory responsibility 'town development and control' well and serve the inhabitants presently as well as in the future. The planning unit/division may have some sections that are as follows:

Planning unit/Division:
a) IT Section
b) Planning Section
c) Beautification and recreation Section

According to the division and it's relevant sections, what so ever appropriate with the necessity and capacity over time, it is recommended to set up necessary manpower for each category of Paurashava. Possible scope of proposed planning unit/division is given bellow:

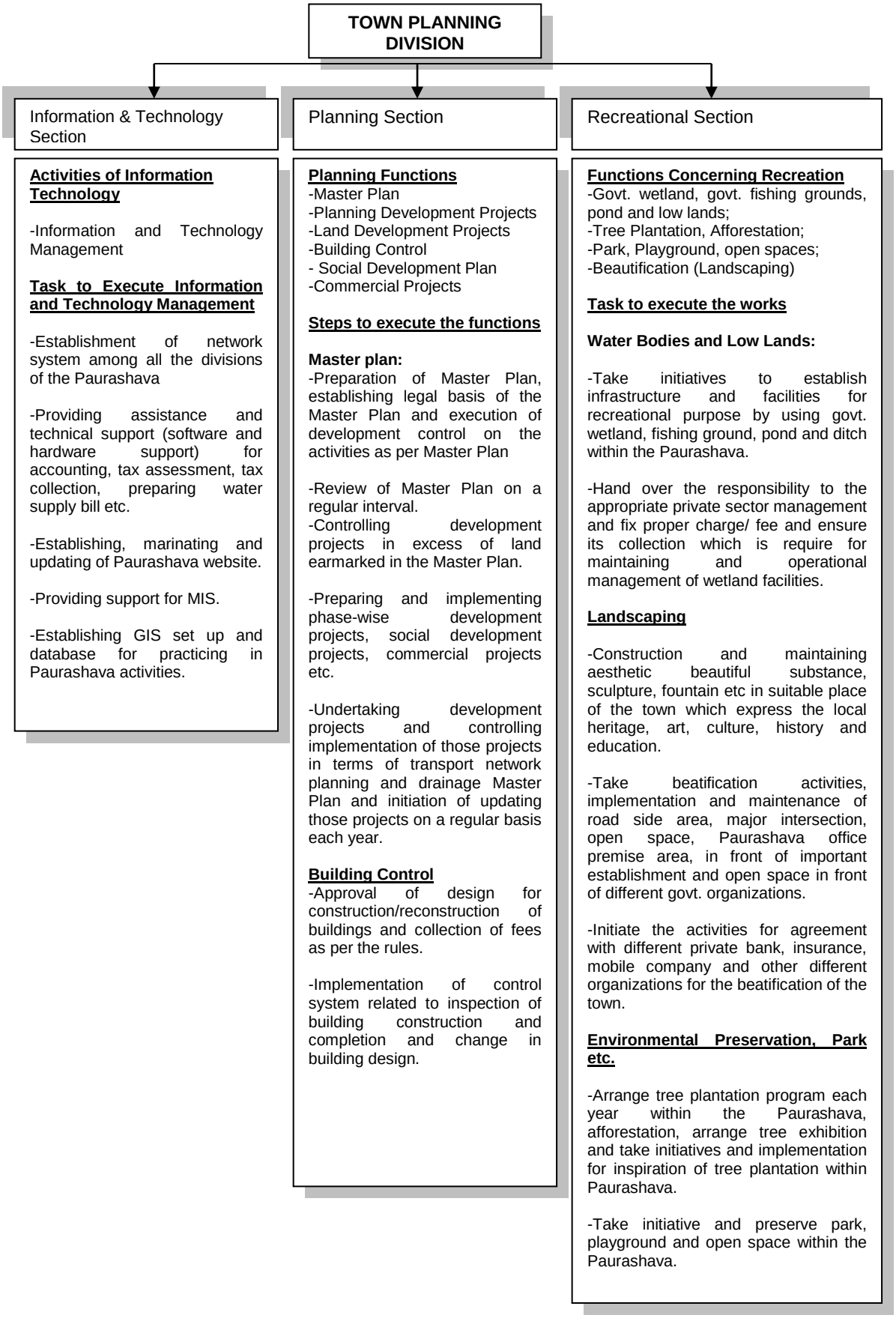


Fig 8-1: Scope of Work for Planning Division

8.1.3.2 Lack of Paurashava Town Planning Capacity

At present, the Paurashava has no town Planning Department or any appropriate manpower to prepare and implement the Master Plan. For proper implementation of the Master Plan for each Paurashava under UTIDP, establishment of a separate Planning Department is indispensable. The Paurashava must strengthen its capacity to implement its Master Plan when it will be completed. It will otherwise be in trouble for implementation, monitoring and updating the Master Plan.

Rohanpur is a 'B' class Paurashava. For the 'B class Paurashava Government approved an organogram/ manpower requirement. If we compare the existing manpower with the approved organogram we find that there is a huge gap between the two. Many positions have been vacant since the inception of Paurashava. Out of total 130 numbers of allocated positions only 53 numbers are filled up. However, strengthening of the Town Planning Department is a pre-requisite for successful implementation of the Structure Plan. Following organogram of the Town Planning Department is proposed for staffing capacity building of this Unit.

8.1.4 Legal Aspects

The drive to establish strong urban local governance in the Paurashava is yet to be legalized. The governance programs at present are operated project wise based on the formulated policies of the implementing agencies of the national government. The Laws that the country inherited are mostly prepared during the colonial rule to serve its own interests. Even after independence from the British, the issue of good governance was not infused into the new Acts formulated.

8.1.5 Good Governance in Legal Provisions

There is hardly any Act where the elements of good governance are clearly visible. The consultant has identified some Acts, where some elements of good governance can be traced.

The Paurashava/Municipal Act/Ordinances prepared at different times since 1960's have iterated for the preparation of Master Plan by the Paurashava/Municipality for its planned development. So far urban local government Ordinances/Acts made in 1967, 1977, 2008 and 2009, all suggested for planned development. The Local Government (Paurashava) Act 2009 has made the provision of having a Master Plan prepared by a Paurashava within five years of its inception. The function of the Paurashava also includes that it ensures planned development following the rules of the Ordinance. But there is no provision for public participation in the Paurashava Act 2009. In all these legal documents, people's role has been ignored which is the violation of the norms of good governance.

The constitution of the Peoples' republic of Bangladesh clearly spells out that the Government should work to minimize the gap between urban and rural areas. A planned Paurashava development in that pursuit can provide necessary services to improve quality of life in both urban and rural areas within the Upazila.

8.1.6 Financial Issues

Governance in Rohanpur Paurashava

Financial governance refers to transparency and accountability of financial matters. All financial matters must be transparent to all. People must know about the policies and programs of the Paurashava, how much revenue is collected each year and the amount of expenditure made on annual development. They must also be answerable to the people on how the public money is being spent and accounts being maintained.

The Ministry of LGRD and Cooperative has undertaken a number of projects in respect of establishing governance in upgrading Paurashava accounts system, like, UGIIP, STIFPP. Computer and accessories are supplied under these projects for automation of the accounts system. Besides, trainings are also offered to the Paurashava accounts staff for enabling introduction of automation in accounts system. But all these services have not yet reached Rohanpur Paurashava.

Revenue Management

The Paurashava still follows a traditional management system in tax collection and revenue management though a scheme of computerized automotive financial system has already been introduced in this Paurashava. Assessment section is responsible to asses the tax of the Paurashava and tax collection, and license and bazar section are responsible to collect the tax of the Paurashava. The public is mainly informed about tax collection during the presentation of annual budget. They may, however, get information from the councillor or Paurashava accounts office.

Paurashava's Financial Capacity and Plan Execution

The main focus of Paurashava financial governance is to establish automation in entire financial management. This includes computerization of accounts system, holding tax management, and billing of different service charges. Software for above functions have been supplied and installed in the Paurashavas covered by financial automotive projects. The projects also provided training to the relevant staffs for functioning of the systems. With the implementation of these projects people can now instantly know about the status of their tax payment, bill payment, and licensing. This has not only made the functions of the Paurashava easy, but also has freed the citizens for paying bribe, and experiencing hassle.

The size of annual budgets of the Paurashavas indicates the poor financial status of the Paurashavas. With low income, Rohanpur Paurashava will have to depend substantially on the government funding for implementing the development projects. But the government has limitations of its resources. In such a situation, if the Paurashava can not raise its own revenue adequately, it will not be able to execute much of the development projects under the Master Plan.

8.1.7 Monitoring, Evaluation and Updating

Monitoring and evaluation is a very important part of plan implementation. Monitoring helps check if the plan is being implemented properly. It also measures the level of implementation of the plan. If the plan implementation is not on track, corrective measures can be taken to put execution on the track. After expiry of any plan, evaluation is made about the errors and omissions. Such

evaluation helps take corrective measures in the next plan. Such monitoring and evaluation must be carried out from within the Paurashava. But Rohanpur Paurashava is not equipped with qualified manpower to make such evaluation. Monitoring and evaluation of a plan is essentially, the responsibility of qualified and experienced planners. As there is no planner in the Paurashava, monitoring of plan implementation will be seriously affected. However, plan evaluation can be accomplished by means of out sourcing as and when it is required.

8.1.8 Periodic Review and Updating

The plan package needs to be updated regularly to make it respond to the spatial changes over time. But such updating would require relevant technical professionals and requisite fund that are highly lacking in Rohanpur Paurashava. As there is no planner or planning section in the Paurashava, review and updating of the Master Plan will require service of senior level planners that Paurashava might not be able to provide. This service will have to be procured by out sourcing and the Paurashava is not even capable to accomplish this financially either. This will create problem when the plans or its components gets obsolete or need to be changed. Another problem would arise when the duration of plans ends. It is necessary that the entire plan document (including all planning and land use proposals) should be reviewed every 4th year of the plan period and will come into execution from the 5th year. The aim of the review will be to analyze the status of implementation of plan provisions, the changing physical growth pattern, infrastructure development, and the trend of public and private physical development including growth direction.

A new set of plans will have to be prepared replacing the old ones. This problem, however, can be overcome by undertaking another planning project by LGED. So, for regular updating and changes, and plan implementation monitoring, the Paurashava should immediately set up a planning section with a number of planners and other staff. The section will not only look after planning, but will also be responsible for development control, estate management, and project preparation. Since the planners would be qualified and skilled in computer operation, they can also help achieving automation of the Paurashava functions.

8.2 Resource Mobilization

Resource mobilization will be one of the most challenging tasks in implementing the current plan package. Though the development proposals are said to be executed by a large number of development agencies, but it is beyond doubt that the heaviest burdens will have to be shouldered by the Paurashava. As a local government agency, it suffers from resource constraint due to low level of urbanization and investment by both public and private sectors. The land value will maintain perpetually low growth rate in the town. Therefore, prospect of mobilization of substantial resource from sale of serviced land is extremely meager. For the same reason, revenue earning from betterment fee, planning permission and other sources may also remain low. Paurashava is heavily dependent on the government for executing its development projects as it is unable to collect sufficient revenue from its tax and non-tax sources. Therefore, it is clear that execution of development projects under the current plan will depend heavily on the government response to supply adequate fund. This situation calls for increasing revenue earning by generating new revenue sources.

8.3 Concluding Remarks

From the past experience, it has been observed that plans are prepared for organized development, but development control has been subject to negligence. In most cases, execution has been piece-meal. It is unfortunate that town planning has not yet become a part of our urban development culture. Individuals develop lands and construct buildings with a little respect for planned development, and the concerned authority is also unable to exercise full control on development. Some strict measures are necessary to make stakeholders follow up plans and development rules. Awareness is to be built among the people to follow the Master Plan provisions and plan. Government agencies must be compelled to follow plans. Existing laws in this regard must be updated incorporating provisions of plan execution.

Chapter 9: Urban Area Plan

This is the first chapter of Part- B that starts with Urban Area Plan. Urban Area Plan is the mid-level plan that covers the existing Paurashava. It lays down the land use zoning plan and infrastructure development proposals at the town level. Land use planning is an important part of Master Plan ensuring that land is used efficiently for the benefit of economy, society and environment of Rohanpur Paurashava. This planning means the scientific, aesthetic, and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic and social well-being of urban communities.

9.1 Goals and Objectives of Urban Area Plan

Urban Area Plan is the first phase illustration of the Structure Plan intended to be implemented over a time span of 10 years that includes 1st phase (1st-5th year) and 2nd phase (6th-10th year) of development programs. The Urban Area Plan has been prepared within the policy framework of the Structure Plan and aims to attain the overall project objectives. So there is a hierarchical relationship between the two. In fact, Urban Area Plan is the first phase detailed illustration of the policies and strategies of the structure plan.

The preparation of Master Plan for Rohanpur Paurashava is aimed towards its future development, and covers the areas that are likely to become urban in future. The Urban Area Plan is aimed to:

- determine the present and future functional structure of the town, including its land uses; and
- provide infrastructure proposals for improving and guiding development of future urban area.

9.2 Methodology and Approach to Planning

The base map supporting for land use survey was obtained from the physical feature survey that contained all categories of physical features within the planning area (Chapter 3 of Survey Report). During physical feature survey, all structures and the functions of principal buildings were picked up and depicted on the map. The physical features were superimposed on a mouza map and printed for land use survey on the map. The map was carried to the field by investigators for detailed plot to plot land use survey (Chapter 4 of Survey Report). The field investigators carrying the map visited each and every plot and the structures therein and noted their uses in writing and marking them on the map with colour pencil. They also verified the land uses and put during the physical feature survey. Back in the office, the common land uses of plots were delineated in the map as per land use format given in the ToR. The delineated zones were then digitized and a new land use map was prepared for the entire planning area. After land use demarcation, field checking was done to correct possible errors.

Urban Land Use Plan is aimed to guide the physical development of Rohanpur town including its economic and social activities. This plan adheres to the policy directives spelled out in the Structure Plan. The current Urban Area Plan is akin to the traditional Master Plan approach prevalent in the country that designates plot-to-plot use of land apart from infrastructure development proposals. Thus it will also serve as a development control mechanism/instrument.

The Urban Area Plan is, therefore, more rigid than Structure Plan. Making a land use plan on a cadastral map makes the Urban Area Plan more rigid. Once the plan on a cadastral map is drawn and accepted by the government and formalized, it gains a formal status and thus becomes a binding for all concerned.

The objectives of the Urban Area Plan have been attained through:

- orderly location of various urban land uses;
- location of appropriate transportation and drainage network; and
- Orderly location of services and facilities.

9.2.1 Delineation of Planning Areas

For delineation of Master Plan area, it is necessary to identify the possible future urban growth locations. The objective of project area demarcation is to determine the boundary of the area and mark it on the map as well as in the field. Logic behind the delineation of the Planning area of Rohanpur Paurashava for the year 2031 has been done on the basis of the gazette notification of the Paurashava and after the reconnaissance survey within the area, the discussions with all groups of stakeholders, analyzing the present trend of developmental growth of the town. Cooperation of the Paurashava was more important in delineating the Paurashava area in the cadastral map and the future planning area boundary (detail was given in Chapter 2, Section 2.4 of Survey Report). As conversant with local conditions and the future trend of development, valuable advices were received from the Poura Mayor and its engineers and other staffs. **Table 9-1** presents the detail about the mouzas, within the 9 wards of the Paurashava along with their areas in acre.

Table 9-1: List of Mouza Maps of Rohanpur Paurashava

Sl No	Paurashava	Mouza Name	J.L No	Sheet No	Mouza Type	Source
1	Rohanpur	Hujrapur	148	00	RS	DLRS
2	Rohanpur	Khoirabad	160	01	RS	DLRS
3	Rohanpur	Khoirabad	160	02	RS	DLRS
4	Rohanpur	Khoirabad	160	03	RS	DLRS
5	Rohanpur	Proshadpur	161	01	RS	DLRS
6	Rohanpur	Proshadpur	161	02	RS	DLRS
7	Rohanpur	Proshadpur	161	03	RS	DLRS
8	Rohanpur	Rohanpur	130	01	RS	DLRS
9	Rohanpur	Rohanpur	130	02	RS	DLRS
10	Rohanpur	Rohanpur	130	03	RS	DLRS

Source: Field Survey, 2010

9.2.2 Content and Form of Urban Area Plan

The Urban Area Plan is presented in both map and textual format. The plan map is presented in 1:1980 or 1 inch to 165 feet scale, superimposed on latest cadastral/revenue map having plot boundaries within mouzas. The plan is accompanied by an explanatory report supported by necessary figures, maps and data. The report explains the various plan proposals and other

components of the plan. At present, the Urban Area Plan covers the total area of Structure Plan area of 3593.48 acres with a present population (2011) of 34941 of Rohanpur Paurashava. The Urban Area Plan of the Master Plan of Rohanpur Paurashava contains several components. These are:

i) Land Use Plan;
ii) Transportation and Traffic Management Plan;
iii) Drainage and Environmental Management Plan and
iv) Proposals for Urban Services.

Chapter 10: Landuse Plan

The Land Use Plan is the main part of the Urban Area Plan and is planned for the period of first 10 years. The proposals in the Land Use Plan will be implemented through the 1st and 2nd phase development programs of the Master Plan. The 1st phase development projects are identified as priority projects and are listed in the Ward Action Plan for implementation within the first five years of the Master Plan.

10.1 Existing and Projected land use

This section describes the analysis of existing and proposed land uses and at the same time mentions estimation on the requirement of land for different land uses. It also lays down the land use zoning plan and infrastructure development proposals at the town level.

10.1.1 Existing Land Use

Map 10-1illustrates how the land uses are distributed at present in the Paurashava area. The information helps the preparation of Master Plan providing background information for selection of areas of different land uses. In the land use pattern of the Paurashava, 17types of land uses are found. It is clearly evident from the table that agricultural land use (almost 64.44%) dominates the Paurashava area, followed by residential (23.68%), water bodies (5.08%), circulation network (1.07) and transport and government services and educational land use occupy same percentage of land (less than 0.5%).

Table 10-1: Existing Land use Classification of Rohanpur Paurashava

Sl.No.	Land Use Category	Area in Acres	%
1.	Agriculture	2305.34	64.44
2.	Circulation Network	60.95	1.70
3.	Commercial Activity	40.80	1.14
4.	Community Service	6.17	0.17
5.	Education and Research	26.09	0.73
6.	Governmental Services	8.10	0.23
7.	Industrial/Processing & Manufacturing	32.76	0.92
8.	Miscellaneous	2.60	0.07
9.	Mixed Use	3.19	0.09
10.	Non Government Services	3.39	0.10
11.	Recreational Facility	1.95	0.06
12.	Residential	847.02	23.68
13.	Restricted	0.22	0.01
14.	Service Activity	9.22	0.26
15.	Transport and Communication	3.49	0.10
16.	Urban Green Space	18.72	0.52
17.	Water Body	207.39	5.80
18.	Vacant Land	0.00	0.00
19.	Forest Area	0.00	0.00
Total		3577.42	100

Source: Land Use Survey, 2010

Map 10-1: Existing Land Use Map of Rohanpur Paurashava

10.1.2 Land Requirement Estimation

This section proposes land use zoning plan for different land uses of the future town. The estimations have been made according to the Planning Standard approved by the client. The category wise land allocations are provided below.

Housing

Housing is the most significant segment of urban development scenario. The future housing area need to be based on a recommended planning standard of 100-150 persons per acre. At present the net density of the Paurashava is 41.22 person/acre and the target net popouation desnisty is 65 person/acre within 2031. With this standard, the estimation shows, the maximum land required to accommodate total projected population (46507) in the year 2031 will be 715.49 acres. But survey of existing land use has identified 847.7 acres of land is currently under housing use with a density of population (about 41.22 persons/acre). Actual 769.18 acre of land is used for the plan. It is more than the estimation because of considered for the low income population settlement or some short of housing projects in near future. The consultant considered the standard forgeneral housing as 65 persons /acre. **Table 10-2** shows the detail.

Table 10-2: Estimation of Housing Land Requirement

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
General Housing	150 persons/acre	465.07	847.7	Existing land is More than enough
	100 persons/acre	310.05		

Commerce and Shopping

Market facilities are usually provided privately on commercial basis depending on the trend of sale of goods. So it is not possible to fix a standard or project actual area for these services. The standard for commercial use can only be applied if ever these facilities are provided by the Paurashava. However, for the sake of current planning, we can earmark land as per standard at appropriate location, where commercial facilities may be developed privately or publicly. Including existing commercial activities, the total commercial land in 2031 has been fixed at 53.91 acres. **Table 10-3** shows the detail.

Table 10-3: Estimation of Land Requirement for Commerce and Shopping

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Wholesale market	1.00 acre/ 10000 population	4.65	-	-
Neighborhood/Local market	1.00 acre/per neighborhood Market	46.51	-	-
Retail Sale Market	acres/ 1000 population	0.25	-	-
Super Market	1.50 – 2.50 acres/per super market	1.00	-	-
Corner Shop		1.50	-	-
Total:		**53.91**	40.81	**13.10**

Source: Estimation by the Consultants

Industry

According to approved planning standard, the total land for industries is estimated to be 116.27 acres with 46.51 acres for small scale industries and 69.76 acres for cottage industries. **Table 10-4** shows the details.

Table 10-4: Estimation of Land Requirement for Industries

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Small scale	1.50 acres /1000 population	46.51	32.76	13.75
Cottage/Agro-Based	1.00 acres /1000 population	69.76	0.00	69.76
Total:		**116.27**	32.76	**83.51**

Source: Estimation by the Consultants

Education

Estimation of land according to standard indicates that there will be a land requirement of 41.35 acres to accommodate educational facilities by the year 2031. Existing land uses under various education facilities of Rohanpur Paurashava is 26.09. There will be need of additional 34.49 acres of land for education facilities. Details are shown in **Table 10-5**.

Table 10-5: Estimation of Land Requirement for Education Facilities

Use/Facility	**Recommended Standard**	**Land in Acre**		
		Estimation	**Existing Land**	**Addl. Requirement**
Nursery	0.5 acre/10,000 population	2.33	-	-
Primary School/ kindergarten	2.00 acres/5000 population	18.60	-	-
Secondary/High School	5.00 acres/ 20,000 population	11.63	-	-
College	10.00 acres/20,000 population	23.25	-	-
Vocational Training Centre	5 – 10 acres / Upazila	0.00	-	-
Other	5.00 acres/ 20,000 population	11.63	-	-
Total:		**67.44**	**26.09**	**41.35**

Source: Estimation by the Consultants

Health

Existing health services is quite promising in Rohanpur. In future, as the population and density increases, demand for local health facilities other than Health Complex will increase which currently use 3.83 acre. So the Paurashava requires additional 13.87 acres of land for the Health center/Maternity clinics in future. Table **10-6** shows the detail.

Table 10-6: Estimation of Land Requirement for Health Facilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Upazila health complex/ hospital	10 -20 acres/Upazila HQ	10.00	3.83	10
Health center/ Maternity clinic	1.00 acre/ 5,000 population	9.30	1.60	4.45
Total:		**19.30**	**5.43**	**13.87**

Source: Estimation by the Consultants

Administration

Estimation of land according to standard indicates that there will be a land requirement of 18 acres to accommodate administrative facilities by the year 2031. If we deduct 8.10 acres of existing land under various administrative facilities, additional 9.9 acres of land for these facilities will be required. **Table 10-7** shows the details.

Table 10-7: Estimation of Land Requirement for Administration

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Upazila complex	15.00 acres	10.00	2.50	7.5
Paurashava office	3 – 5 acres	3.00	0.50	2.5
Others	10 acres/Upazila HQ	5.00	5.1	-
Total:		**18**	**8.10**	**9.90**

Source: Estimation by the Consultants

Community Facilities

For various community facilities, the total land requirement has been fixed at 13.46acres. About 1.16 acres have been earmarked for mosque, 1.16 acres for eidgah, 2.33for Paurashava provided graveyard. No additional land is required for mosque, church and graveyard. **Table 10-8** shows the details.

Table 10-8: Estimation of Land Requirement for Community Facilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Mosque/Church/Temple	.5 acre /20,000 population	1.16	-	-
Eidgah	1.0 acre/20,000 population	1.16	-	-
Graveyard	1.0 acre/20,000 population	2.33	-	-
Community center	1.00 acre /20,000 population	2.33	-	-
Police Station	3 – 5 acres/Upazila HQ	3.00	-	-
Police Box/outpost	1.00 acre/ 20,000 population	0.00	-	-
Fire Station	3 – 5 acres/Upazila HQ	2.33	-	-
Post office	0.5 acre /20,000 population	1.16	-	-
Total:		**13.46**	**6.17**	**9.83**

Source: Estimation by the Consultants

Open Space/Recreational Facilities

Field survey shows no public park or play field in the town, except play grounds in the premises of educational institutions. The total land required for various open space recreation facilities recommended by client stands at 102.32 acres. The facilities include, play field/ground, parks of various categories and stadium/sport complex. **Table 10-9** shows the detail.

Table 10-9: Estimation of Land Requirement for Open Space/Recreational Facilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Play field/Urban Green Space	3.00 acres/20,000 population	6.98	-	-
Park	1.0 acre /1000 population	46.51	0.00	-
Neighborhood	1.00 acre /1000 population	46.51	0.00	-
Stadium/sports complex	5 - 10 acres/Upazila HQ	0.00	0	-
Cinema/Theatre	1.0 acre /20,000 population	2.33	-	N/R
Total:		**102.32**	**18.72**	**83.60**

Source: Estimation by the Consultants

Utilities

A number of utility establishments are required in a town to run services properly. The consultant, according to approved standard, has earmarked 2.33 acres for water supply installations, like, pump stations and other establishments related to water supply; and 2.33 acres have been fixed for gas related facilities. The total land requirement for dumping site is 5 acres. **Table 10-10** shows the details.

Table 10-10: Estimation of Land Requirement for Utilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Water supply	1.00 acre /20,000 population	2.33	-	-
Gas	1.00 acre /20,000 population	2.33	0.00	-
Solid waste disposal site	1.00 acre /20,000 population	5.00	0.00	-
Waste transfer station	4– 10 acres/Upazila HQ	0.25	0.00	-
Electric sub-station	1.00 acre /20,000 population	2.33	0.00	-
Telephone exchange	1.00 acre/20,000 population	1.16	-	-
Total		**13.39**	**2.22**	**11.17**

Source: Estimation by the Consultants

Transport and Communication

Estimation of land according to standard indicates that there will be a land requirement of 3.74acres to accommodate transport and communication facilities by the year 2031. If we deduct

the already available 3.49 acres of existing land uses under various facilities, an additional 0.25 acres of land is required for this category of land use. **Table 10-11** shows the details.

Table 10-11: Estimation of Land Requirement for Transport and Communication

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Bus terminal	1.00 acre /20,000	2.33	-	-
Truck terminal	0.50 acre /20,000 population	1.16	-	-
Launch/steamer terminal	1.00 acre /20,000 population	0.00	-	-
Railway station	4.00 acre / per Station	0.00	-	-
Baby taxi/tempo stand	0.25 acre /one baby taxi/tempo stand	0.25	-	-
Rickshaw/van stand	0.25 acre /one Rickshaw/van stand		-	-
Pessenger Shed		-	-	-
Total:		**3.74**	**3.49**	**0.25**

Source: Estimation by the Consultants

10.2 Land Use Proposals

Bangladesh is the most densely populated country in the world. The land area of the country remains static amid continuously increasing population. Such a situation calls for strict regulation to utilize its scarce land resources for non-agricultural purposes. Increase in urban population means more demand for houses, roads, schools, hospitals, factories, bazars, shops, business centers, offices and other service facilities. Providing all these facilities require land and that is at the cost of valuable agricultural land, as the country has hardly any fallow land to accommodate all these land uses. Rohanpur Paurashava is surrounded by valuable fertile agricultural land. Any urban expansion will cost net deduction of agricultural land that will consequently affect local food and cash crop production. A conservative and rational standard of space use and their proper application in planning, designing and development is therefore, followed in the land use proposals.

10.2.1 Designation of Future Land Use

Designation of the future land uses in the Land use Plan is an important task of planning as it will ensure the compliance with the Structure Plan guidelines and provide the details of land use pattern along with transport and drainage network and utility lines. The existing uses and new proposals of land uses for future development have been identified and designated on the map for compliance by law. The land use categories with quantity of land required are based on the sectoral needs for now and in future. The implementation of the plan will require cooperation and collaboration of relevant authorities and agencies, and the Paurashava being the custodian of the Plan will safeguard the status of the Plan.

10.2.2 Land Use Zoning

Development control is an essential part of urban planning. For development control certain procedures have to be followed for approval of designs of various categories of structures, establishments and land uses. The first condition is to secure land use permit according to approved zoning plan followed by approval of the design of proposed building/structure.

10.2.2.1 Types of Land Use Zoning

In land use zoning, the entire area of a town is divided into suitable land use zones to create congenial and livable environment and thereby enhance land value. In Bangladesh such land use zoning is incorporated as a part of the master plan / land use plan/urban area plan. Before submitting building plans for approval an applicant must secure land use permit from the Paurashava. For land use permit, an applicant's prospective use of structure must be compatible with the approved land use zone of the site. Land use zoning limits activities that can or cannot function on a land parcel by establishing a range of development options. Land use zoning is a legal instrument by application of which a Paurashava can control.

i) The height of building/structure,
ii) The area of a land parcel that must be left vacant, and
iii) The use of a buildings and land.

Zoning can be of three types, area zoning, density zoning and height zoning.

Area Zoning

By area zoning an area is divided into zones suitable for that particular area. The main objectives of such zoning are done mainly from environmental point of view that accrues other social benefits.

Density Zoning

The aim of the density zoning is to limit the size of population in any particular area by means of density control. The size of population has bearing on the capacity of designed utility facilities and amenities and traffic volume and crowding, especially in the residential areas. Such zoning is done to ensure a healthy and enjoyable community living.

Height Zoning

Height zoning restrict the height of buildings structures in any particular area. This zoning is aimed to promote the proper and sound development of areas. Height zoning is of particular importance in airport areas to ensue take-off and landing of aircrafts.

Considering the existing level of development and development prospects, the consultant recommends to follow the area zoning only. Zoning is only a part of development control regulations. A prospective developer in a Paurashava has to comply with other rules and regulations, like, Building Construction Rules, 1996 under Building Construction Act 1952, Bangladesh National Building Code 1993 and other conditions of construction method, building safety and associated issues.

10.2.2.2 Classification of Land Use Zoning

After a detailed consultation between the client and the consultants of the project, the land use classification for the Paurashava Master Plan is finalized as shown in **Table 10-12**. ***Map 10-2*** and ***Appendix-2*** shows the Land Use Plan of Rohanpur Paurashava.

Table 10-12: Proposed Land Use Categories for Urban Area Plan of Rohanpur Paurashava

Sl. #	Land Use Category	Remarks	Area (acre)	%
1.	Urban Residential Zone	Urban Residential area is a land use in which housing predominates. These include single family housing, multi-family residential, or mobile homes. Zoning for residential use may permit some services or work opportunities or may totally exclude business and industry. It may permit high density land use.	253.96	6.73
2.	Rural Settlement	Rural settlement includes the low dense residential area which is scattered and rural in nature. It may permit only low density uses. Aiming to control the growth in this zone, less service and facilities will be provided.	515.22	14.35
3.	Commercial Zone	The land used for commercial activities is considered as commercial land use. These activities include the buying and selling of goods and services in retail businesses, wholesale buying and selling, financial establishments, and wide variety of services that are broadly classified as "business". Even though these commercial activities use only a small amount of land, they are extremely important to a community's economy. Commercial land includes established markets and areas earmarked for markets.	40.09	1.12
4.	Mixed Use Zone	Mixed land use refers to the area without a dominant land use (Residential, commercial, industrial etc.).	21.03	0.58
5.	General Industrial Zone	Green and Orange A categories as per The Environment Conservation Rules, 1997	62.42	1.74
6.	Heavy Industrial Zone	Other toxic and pollutions Industries (Orange B and Red categories as per The Environment Conservation Rules, 1997)	00	00
7.	Government Office	All Government Offices except large scale service based offices as Civil Surgeon Office, DC Office, Police Box, Police Fari, Police Station, LGED Office, Paurashava Office, Settlement Office, Union Parishad Office, Upazila Headquarter, BADC Office, Fisheries Office, Ansar/VDP Office, Agriculture Office, Zila Parishad Office, Post Office, Telephone Exchange Office and Other Government Offices.	11.58	0.32
8.	Education & Research Zone	All kinds of educational institutes like Primary/ secondary/other Schools/ Colleges etc are mentioned to calculate the land use for education and research purpose.	29.29	0.82
9.	Agricultural Zone	Agricultural land denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture. It includes productive land (single, double and triple cropped), seed bed, fisheries, poultry farm, dairy farm, nursery, horticulture etc.	2118.09	59.33
10.	Water body	Equal or More than 0.25 acre and justification by the consultant and wet land will merge with water body	201.50	5.66
11.	Open Space	Playground, Botanical Garden, Stadium, Zoo etc. (Facilities without or with minimum building structure)	46.59	1.39

Sl. #	Land Use Category	Remarks	Area (acre)	%
12.	Recreational Facilities	Facilities other than those mentioned to Open Space and indoor based facilities with designated building structure i.e. Cinema Hall, Theater Hall etc.	0.27	0.05
13.	Circulation Network	Road and Rail communication	207.24	6.08
14.	Transportation Facilities	Under transport and communication land use both transport and communication services are considered. This category includes airport, bus terminal/ stand, ferry ghat, filling station, garage, launch terminal, post office, passenger shed, telephone exchange, ticket counter, transport office etc.	9.14	0.25
15.	Utility Services	Utility services include Overhead Tank ,Power Office/Control Room, Public Toilet, Sewerage Office, Waste Disposal ,Fire Service, Water Pump House, Water Reservoir, Water Treatment Plant etc.	9.63	0.27
16.	Health Services	This land will be used to provide health facility.	13.22	0.37
17.	Community Facilities	All community facilities including funeral places and other religious uses	9.44	0.14
18.	Historical and Heritage Site	The entire mentionable historical and heritage site.	0	0
19.	Restricted Area	A Restricted Area is an area where no one but certain people can enter. Here the areas which are not accessible for the general public except some high ranked personnel are considered as restricted area.	0.22	0.01
20.	Overlay Zone	If the consultant justify any area that should not be defined as other given definitions but the facility(s) may not be avoidable, they may use this category	Not applicable	
21.	Urban Deferred	Optional depending on the Paurashava and the Consultant's judgment	23.28	0.64
22.	Forest	Designated Forest Area	Not applicable	
23.	Beach	Sea Beach	Not applicable	
24.	Miscellaneous	Any other categories which are not related to above 23 categories.	5.36	0.15
Total:			**3577.42**	**100**

According to the proposed land use zoning categories shown in table 10.12, the amount of land for each land use category was calculated.

In the sections below, the general definition of the use and description of associated permitted and conditionally permitted uses under each land use zone have been provided. The uses that are not listed here in any of the categories shall be treated as Miscellaneous Use for the corresponding land use category and shall not be permitted unless unanimously decided otherwise by the appropriate authority. In such situations, the use shall get permission in the category of New Use. The following is a short description of recommended land use zones. Land use plan of Rohanpur Paurashava is given in ***Map 10-2*** and *Appendix-2*.

Urban Residential Area

Urban residential zone refers to all categories of urban residential areas, including exiting ones and the residential land use proposed under the present Master Plan. In total, this zone covers 253.96 acres of land delineated up to the year 2031, considering standard provided by LGED. Table A.1, Annexure- A shows the permitted use of urban residential area and conditional permission will be given to a number of other land uses as specified in Table A.2, Annexure- A. Annexure-D shows the planning schedule of Urban Residential Area in Rohanpur Paurashava.

Rural Settlement

Most of the Paurashava has some rural characteristics. So in Urban Area Land use category for UTIDP Master Plan the residential settlements within the agricultural belt are categorized as rural settlements. These settlements have usually temporary type of structures. Paurashava is mostly rural in character. About 64.44% existing land use is in agriculture practice and most of the settlement situated surrounding or within this agricultural land. So in a manner to develop control of Rohanpur Paurashava some portion of land declare as rural settlement. This settlement occupies 515.22 acres of land, which comprises about 14.35% of the total land. There is proposals of Low Income Housing having 17.1 acre and Resettlement Area having 11.14 Acre in ward 8. The areas of rural settlement have some restrictions for non-agricultural development. Table A7, Annexure-A shows the permitted land use of rural settlement and Table A8, Annexure-A conditionally permitted use in this zone. Annexure-D shows the planning schedule of Rural Settlement Area in Rohanpur Paurashava.

General Industry

General Industrial Zone (**Table 10-13**) is intended to provide locations, where manufacturing and processing industries can be set up and function without creating hazards to surrounding land uses. There is scope to establish Green and Orange-A category industry as per mentioned in The Environmental Conservation Rule, 1997.As a small urban center, it is unlikely that any major industrial development will take place here in the near future. This zone has an area of 32.35 acres designated up to 2031. Though as per the planning standard provided by PMO office, Paurashava require 116.27 industrial lands (**Table 10-4**). But the town has no such potentiality to develop such industrial estate in terms of basic infrastructure, utility connection, raw materials, market of the products, labor force and unavailability local entrepreneur to establish industry. So rest of industrial land is declared as urban deferred in land use proposal.

Table 10-13: New Development Proposal for General Industrial Area

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
General Industrial Area	32.35	7,9	Khoirabad 160_01, Proshadpur 161_02	404,332-334,338-340,398-403,405,1429-1437,1439,1448-1451,1453-1464,1468	Land acquisition and developed basic infrastructure	Establish Industry	Ensure full functioning of industrial area

Map 10-2: Land use Proposal forRohanpur Paurashava

Again, since there is no industrial agglomeration within the town, the industrial zone will be meant for new industries. In this zone, a complex line of industrial and supporting non-industrial land uses will be permitted as per Table A.3, Annexure- A and conditional permission will be given to a number of other land uses as specified in Table A.4 and Annexure- A. **Table 10-13** shows new land use proposals for this type of activity inRohanpur Paurashava. This land will be provided in the general industrial area.

Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails and wholesale can be set up and function without creating hazards to surrounding land uses. This zone has an area of 40.09 acres (1.12%) designated up to 2031 and zone will allow commercial uses as listed in Table A.5, Annexure- A, and conditional uses as listed in Table A.6, Annexure- A.

Table 10-14: New Development Proposal for Commercial Zone

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Slaughter House	1.62	7	Proshadpur_161_02	Partial-1463, 4164, 1465, 1467	Land acquisition and establishment	Maintaining and improve facilities	
Neighborhood Market	0.18	1	Rohanpur_130_02	Partial- 722, 788, 789	Land acquisition and establishment	Land acquisition and establishment	Maintaining and improve facilities
	0.89	2	Rohanpur_130_03	Partial- 1201, 1209, 1210	Land acquisition and establishment	Land acquisition and establishment	Maintaining and improve facilities
	0.92	3	Rohanpur_130_03	Partial- 1494, 1498-1500	Land acquisition and establishment	Land acquisition and establishment	Maintaining and improve facilities
	0.22	4	Proshadpur_161_02	Partial- 1094, 1098	Land acquisition and establishment	Land acquisition and establishment	Maintaining and improve facilities
	0.42	5	Proshadpur_161_01	Partial- 233	Land acquisition and establishment	Land acquisition and establishment	Maintaining and improve facilities
	1.08	6	Hujrapur_148_00	Partial- 265, 268, 269, 272, 273			Maintaining and improve facilities
	1.36	7	Proshadpur_161_02	Partial-1561-1564, 1566, 1568-1571	Land acquisition and establishment	Maintaining and improve facilities	
	0.73	8	Proshadpur_161_03	Partial-3417-3420	Land acquisition and establishment	Maintaining and improve facilities	
	1.20	9	Khoirabad_160_01	Partial-132-139	Land acquisition and establishment	Maintaining and improve facilities	
Total	**8.61**						

Mixed Use Area/Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. In a small town like, as the trend shows, an exclusive commercial land use is unlikely to function. This land

use will allow flexibility of development, instead of restricting development. Total area for mixed uses has been put to 21.03 acres, including both, existing and proposed land uses. This zone will allow residential structures together with commercial uses as listed in Table A.11, Annexure-A, and conditional uses as listed in Table A.12, Annexure-A. Table 10.14 presents the proposed land uses and their phase-wise development proposals.

Table 10-15: New Development Proposal for Mixed Use Zone

Use	Ward No	Mouza Name	Plot No.	Area (Acres)	Phase
Ward Center	Ward 1	Rohanpur 130_02	Partial-808, 810, 900	1.02	1st Phase
Ward Center	Ward 2	Rohanpur 130_01	Partial-268-269	0.56	1st Phase
Ward Center	Ward 3	Rohanpur 130_03	Partial – 1610-1612, 1614-1623, 1629	0.71	1st Phase
Ward center	Ward 4	Proshadpur_161_02	Partial-1053, 1061-1067, 1157-1159	1.15	1st Phase
Ward center	Ward 5	Proshadpur_161_01	Partial-230, 232, 233	0.49	1st Phase
Ward Center	Ward 6	Hujrapur_148_00	Partial-280, 281, 283	0.75	1st Phase
Ward Center	Ward 7	Proshadpur_161_02	Partial-1303	1.09	1st Phase
Ward Center	Ward 8	Proshadpur_161_03	Partial-3277, 3278	0.79	1st Phase
Ward Center	Ward 9	Khoirabad_160_01	Partial-312, 313, 320, 321	0.76	1st Phase
Total				**7.32**	

Governmental Services

Administrative zone covers all kinds of government and non-government offices in the town. No new government services have been proposed.

Education and Research Area

Institutional zone refers to mainly education, health and other social service facilities as listed in Table A.13, ***Annexure-A***, and conditional uses as listed in Table A.14, ***Annexure-A***. The total area under this use has been determined as 29.29 acres although the standard suggests about 41.35 acres of land. Detail new land proposal for education and research is shown in **Table 10-14**. Total seven primary schools, one secondary school, one vocational training institute and one college will be established in this land.

Table 10-16: New Land Proposal for Education and Research

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Primary School	1.2	5	Proshadpur (161_01)	221-225,250	Land acquisition and establish	Continue the further development of the Primary school.	
Secondary School	3.18	1	Rohanpur (130_02)	727,705-708,723,724,735,736,745	Land acquisition and establish	Continue the further development of the Primary school.	

Agriculture Area/ Agricultural Zone

The Paurashava has a vast area of agricultural land that demands formation of a separate zone of, agriculture. Agriculture zone is primarily meant for agriculture; land uses related to it and land uses that support it. Detail of land use is presented in Table A.17, Annexure- A and conditional uses as listed in Table A.18, Annexure- A. The total area under this use has been estimated as 2118.09 acres that include existing and proposed land uses.

Water Body

The plan suggests preserving most of these water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or More than 0.25 acres will be preserved as the water retention ponds. There will be permitted uses in this zone as stated in Table A.23, Annexure- A and some other uses may conditionally be permitted as stated in Table-A.24, Annexure- A. Annexure-D shows the planning schedule of Water Body Area in Paurashava.

Open Space/Recreational Facilities

This zone has been provided to meet the active and passive recreational needs of the people and at the same time, conserve the natural resources. The total area estimated for this zone stands at 46.59 acres. The details of permitted and conditional permits have been presented in Table A.19 Annexure- A, and conditional uses as listed in Table-A.20, Annexure- A. **Table 10-15** shows the detail of new land proposal for open space proposal in Rohanpur Paurashava. There are seven playgrounds, one stadium, one central park and 08 local parks will be established in this proposed open space. The rest land will use for establishing green belt on the bank of Punorvaba River.

Table 10-17: New Land Proposal for Open Space

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Playground	0.7	2	Rohaonpur (130_01)	289,291,301			Land acquisition and establishment
Playground	0.9	4	Proshadpur (161_02)	1057,1157,1159,1161,1162			Land acquisition and establishment
Playground	1.01	6	Hujrapur (148_00)	297-302,319-320			Land acquisition and establishment
Playground	1.2	3	Rohaonpur (130_03)	1495-1597,1501,1508,1583,1594	Land acquisition and establishment	Maintaining the playground and improve facilities.	
Central Park	2.8	4	Proshadpur (161_02)	1053,1001,1003-1011,1867	Land acquisition and establishment	Maintaining the playground and improve facilities.	
Playground	1.3	5	Proshadpur (161_01)	311-312,235,238,239		Land acquisition and establishment	Maintaining and improve facilities.
Playground	1.57	9	Khoirabad (160_01)	312,313,314	Land acquisition and	Maintaining the playground and	

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
					establishment	improve facilities.	
Playground	2.4	7	Proshadpur (161_02)	1303,1514-1517,1520,1521,1528,1529	Land acquisition and establishment	Maintaining the playground and improve facilities.	
Neighborhood Park	1.29	8	Proshadpur (161_03)	3471-3473		Land acquisition and establishment	Maintaining and improve facilities.
Neighborhood Park	2.11	1	Rohanpur (130_02)	860-867,871,889		Land acquisition and establishment	Maintaining and improve facilities.
Neighborhood Park	2.23	3	Rohaonpur (130_03)	145-147, 1857-1860	Land acquisition and establishment	Maintaining the playground and improve facilities.	
Neighborhood Park	2.5	5	Proshadpur (161_01)	203,207.208		Land acquisition and establishment	Maintaining and improve facilities.
Neighborhood Park	3.3	6	Hujrapur (148_00)	114-116,119,121-123,126		Land acquisition and establishment	Maintaining and improve facilities.
Neighborhood Park	4.04	2	Rohaonpur (130_01)	282,284-286,288-291,300,301,325-327,345	Land acquisition and establishment	Maintaining the playground and improve facilities.	
Neighborhood Park	4.03	9	Khoirabad (160_01)	312-316,318-322,341		Land acquisition and establishment	Maintaining and improve facilities.
Neighborhood Park	4.5	7	Proshadpur (161_02)	1515-1517,1520-1530		Land acquisition and establishment	Maintaining and improve facilities.

Circulation Network

The road network is mainly considered as circulation network. National highway, pucca/ semi-pucca/ katcha road, footpath, flyover, over- bridge, underpass, bridge, culvert, railway, railway bridge all are include in circulation network. Total 207.24 acre land which covers 6.08% of total planning area of Rohanpur Paurashava has been indicated in this plan.

Transportation Facilities

Ttransportation facilities incorporate transport and communication services. For an example airport, bus terminal/ stand, ferry ghat, filling station, and garage, launch terminal, post office, passenger shed, telephone exchange, ticket counter, transport office etc. Total 9.14 acres land (0.25% of total area) will be used for this purpose. **Table 10-18** shows the new transportation facilities for Rohanpur Paurashava.

Table 10-18: New Transportation Facilities

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Bus Terminal	2.23	7	Proshadpur (161_02), Khoirabad (160_01)	113,368,1372-1374,1394-1402,1410,1411,1415,1416		Land acquisition and establishment	Maintaining and improve facilities
Tempu Stand	0.05	5	Proshadpur (161_01)	160,203		Land acquisition	Maintaining and

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
						and establishment	improve facilities
Tempu Stand	0.17	3	Proshadpur (130_03)	1494,1495	Land acquisition and establishment	Maintaining the playground and improve facilities.	
Tempu Stand	0.18	7	Proshadpur (161_01)	503,186,188,189		Land acquisition and establishment	Maintaining and improve facilities
Tempu Stand	0.4	8	Proshadpur (161_03)	3357,3358		Land acquisition and establishment	Maintaining and improve facilities
Truck Terminal	3.02	7	Proshadpur (161_02))	1432-1436,1439,1463,1467,1468			

Utility Services

It incorporated all utilities and service facilities except the health service. For an example water treatment plant, water reservoir, water pump house, public toilet, fire service, waste disposal, sewerage office, power office or control room and over head tank. In survey stage this type land use was define as service activity. Total 9.63 acres land which covers .27% total area of Rohanpur Paurashava. Total 04 waste transfer stations, one waste dumping station will be newly established to fulfill the desired need of Paurashava.

Table 10-19: New Land Use Proposal for Utility Services

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Waste Transfer Station	0.04	6	Proshadpur (161_01)	210	Land acquisition and establishment	Maintaining and improve facilities	
Waste Transfer Station	0.12	8	Proshadpur (161_03)	3437,3470	Land acquisition and establishment	Maintaining and improve facilities	
Waste Transfer Station	0.16	7	Proshadpur (161_01)	503,186,188	Land acquisition and establishment	Maintaining and improve facilities	
Waste Transfer Station	0.17	3	Rohanpur (130_03)	1495	Land acquisition and establishment	Maintaining and improve facilities	
Waste Dumping Site	8.5	9	Khoirabad (160_02)	1670,1672-1687,1705,1710,1992	Land acquisition and establishment	Maintaining and improve facilities	

Health Services

The Paurashava is suffering from the adequate health services; Albeitthe upazilla health complex is present in the Paurashava premises, it is not sufficient to fulfil the future demand. Total 8 community clinics are proposed in this paurashava and total 13.21 acres land has been fixed for health services up to 2031 for this service.

Community Facilities

Community services include community centre, club house, fire service, health facilities, religious centres, other community services etc. In additionally all funeral places and other religious uses incorporated in this category. In this Paurashava one new Community Center is proposed in Ward 3. Total 9.44 acres land which covers .14% of total planning area will be used for this purpose. Annexure-D shows the planning schedule of Community Facilities in Rohanpur Paurashava.

Restricted Area

A Restricted Area is an area where no one but certain people can enter. Here the areas which are not accessible for the general public except some high ranked personnel are considered as restricted area. No land for restricted purposed in this plan for Rohanpur Paurashava.

Urban Deferred

The Urban Deferred refers to lands lying outside of the urban growth boundary and identified as Urban Reserve. The total area under this use has been proposed as 23.28 (0.64%) acres that include existing and proposed land uses. Annexure-D shows the planning schedule of Urban Deferred Area in Paurashava. The following are permitted Uses within the Urban Reserve (UR) Zone:

- Agriculture, Livestock based
- Agriculture, Vegetation based (mushroom farms shall not be permitted)
    - Existing facilities up to the date of gazette notification of the Master Plan. Condition is that, no further extension will be permitted.

10.2.3 Land Use Permission

One of the major purposes of land use zoning is to restrict an area for a particular use meant for the zone. This is intended to maintain a disciplined land use distribution and development. But there are many uses other than the use meant for the zone that are considered for permit in the zone. Sometimes such applications are accommodated to support or assist the area, with conditions imposed in giving land use permit, sometimes strict restrictions are maintained by refusal of applications. Detailed lists of permissible and conditionally permissible uses have been provided in Annexure-A according to land use categories.

10.3 Plan Implementation Strategies

This section deals with the issues of implementation of land use plan. Discussion is made on development regulation and recommendation on implementation, monitoring and evaluation of urban land use plan.

10.3.1 Land Development Regulations to implement the Land Use Plan

Urban planning regulations are necessary for the smooth functioning of land use plan. The land use regulations impact on planned development and result in social benefits and costs depending on their nature and the specific contexts in which they are applied. Careful reforms of these regulations can result in a lower cost for urban development and for housing. An additional benefit could be in terms of a More functional spatial organization of the town. Regulations and processes that facilitate land availability and uses for planned development at affordable costs need to be continued. Regulatory and process reforms can lead to:

- more compact towns, containment of urban sprawl, more efficient urban forms,
- less costly urban infrastructure,
- more market-friendly development of urban land;
- more intensely used central areas, better efficiency of public transportation systems and decrease in trip length and transportation costs;
- less violations in zoning, sub-division and building regulations, and reduction in non-conforming and non-compatible uses and slums;
- reduction in difference between what is allowed under regulations and what is financially feasible due to land use reforms leading to reduced opportunities for corruption;
- generally lower land prices in city/town but higher prices in some prime commercial and business districts driven by market forces;
- Average urban population densities likely to stay constant as more efficient land use consumption.

The following measures of Land Development Regulations should strictly be followed for the proper implementation of the Land use Plan.

a. Restriction on Use of Land Contrary to the Master Plan

No person shall use any land for any purpose other than that laid down in the land use zoning of the Master Plan approved by the Government. All future developments and constructions, both public and private within the area of Structure Plan shall be in conformity with the Master Plan approved by the Government. No compensation shall be payable to any person owing to demolition of any construction developed in violation of the Master Plan provisions.

b. Building Permission and Construction Approval

Development control mechanism will be one of the major plan implementation instruments to be carried out through the Building Construction Rules under Section 17 of the EBBC Act 1952 and the land use provisions of the Master Plan.

c. Building Permission in Proposed Development Areas

The Master Plan proposes a number of development projects. Many of the lands under these development projects are under private ownership. No development in these lands by their owners will be allowed. They will remain in the present form till they are taken over by the respective authority for development or the development project is abandoned.

d. Parking in Commercial and Mixed Use Areas

For parking, BC Rules, 1996 has specific provisions for housing and commercial areas. But no provision has been suggested for mixed use areas. According to the rules for commercial area, 23 sq.m areas, has to be reserved for every 200 sq.m of commercial space. The consultant suggests that for mixed areas, BC Rules, 1996 meant for commercial area should also be applied to the mixed areas under the current plan.

f. Rules for Realization of Betterment Fee

The Act enables Paurashava to charge betterment fees on land owners or any other person having interest in it for an increase in land value due to execution of any development scheme by the Authority. The Authority should develop appropriate procedures in this regard and get them approved to start charging betterment fee. Due to failure of execution of the powers of charging betterment fee, all benefits of land value enhancement due to Paurashava development projects goes to the land owner at the cost of the community. So it is not irrational for the road developer to demand a share of the benefit accruing to the land owner following road development.

g. Planning Rules for Real Estate Companies

With the increase in population, there will be further rise of land based real estate activities. But there is no provision in the Paurashava Act to control the activities of real estate companies. It is needed that infrastructure and services provided in the housing plans of the real estate projects be standardized to secure interest of the buyers. Strict vigilance is needed against any fraudulent practices that might affect public interest.

However, any control imposed on the housing companies must be imbued with a positive approach, so that it does not affect the housing promotion activities of the private sector. The intention would be to allow them function under certain control that would secure public interest and at the same time will not discourage private investment in housing. The infrastructure, services and facilities provided in a housing project must be standardized.

To control apartment development, the national rules under EBBC Act 1952 will be applied. The rules for land based real estate projects exist for Dhaka only. In anticipation of expansion of real estate projects, there is an urgent need to prepare a set of rules for small towns. The real estate companies seeking approval for their housing project layout plan must fulfill certain conditions as set in the rules. The set of rules is clearly described in the Private Residential Land Development Rule-2004.

h. Minimum Road Width

Building Construction Rules, 1996, should be amended in the following way by incorporating the minimum road width standard.

To ease future traffic movement, it is necessary to keep provision for wider roads in the present plan. It is an uphill task to widen roads after development has taken place along the road. So it is wiser to reserve wider right of way for new roads now. Building Construction Rules, 1996 has determined the minimum road width as 12 ft. or 3.65 meter for roads in general and approximately 10 ft. for private roads.

i. Low Land, Pond and Drainage Path

No low land that retains water for certain period of the year can be filled up and no obstruction to natural or man made drainage system shall be allowed. Prior permission of Rohanpur Paurashava will be required for filling up of any low lands. The Paurashava shall accord such permission based on prevailing laws. All ponds should not be allowed to be filled up as they are a good source of urban water supply as well as serve as open space. As per the Wetland Conservation Act 2000, the use of these water bodies can not be changed without prior permission of the authority.

j. Security Areas - Cantonment, BDR, Police Stations

BDR, Police, etc. areas have to be safe guarded from any possible incompatible development.

k. Radio, Television, Water Treatment and Pump Station and Power Station Sites

The key point installations including radio, television, water treatment and pump station and power station sites will have to be safeguarded from any possible undesirable development around these areas that can endanger their security. No building except vegetation should be allowed within 183 meters around the transmission towers.

10.3.2 Implementation, Monitoring and Evaluation of the Land Use Plan

Monitoring and evaluation is a very important part of plan implementation. Monitoring helps check if the plan is being implemented properly. It also measures the level of implementation of the plan. If the plan implementation is not on track, corrective measures can be taken to put the execution on track. After expiry of any plan, evaluation is made about the errors and omissions. Such evaluation helps take corrective measures in the next plan. Such monitoring and evaluation must be carried out from within the Paurashava.

Updating of Plans

The plan package needs to be updated regularly to make it respond to the spatial changes over time. But such updating would require relevant technical professional and fund that are highly lacking in Rohanpur Paurashava. There is no planner or planning section in the Paurashava. Updating would require service of senior level planners that Paurashava would not be able to provide. This service will have to be procured by out sourcing and the Paurashava is not even capable to accomplish this financially either. This will create problem when the plans or its components gets obsolete or need to be changed. Another problem would arise when the duration of plans ends. A new set of plans would have to be prepared replacing the old ones. This problem, however, can be overcome by undertaking another planning project by LGED. So, for regular updating and changes and plan implementation monitoring, the Paurashava should immediately move for setting up a planning section with planner(s) and other staff. The section will not only look after planning, but will also be responsible for development control, estate management and project preparation. Since the planners would be qualified and skilled in computer operation, they can also help achieving automation of the Paurashava functions.

Chapter 11: Traffic and Transportation Management Plan

11.1 Introduction

11.1.1 General

The transportation system directs the urban development pattern. The performance of transportation system largely influences the economy and social progress of an area. It provides mobility to people, goods and services to their destination. It has linkages with other sectors of development and for a sustainable development of any area, its traffic and transportation system should be adequately addressed. The current chapter of the report is about Transportation and Traffic Management Plan covering the scope of improvement of the existing network and system and plan proposals for new development. The proposals on improvement and new development are made for the project area up to 2031. The report also provides the purpose and the role of Transportation and Traffic Management Plan and its relation with Structure Plan & Land Use Plan.

11.1.2 Approach and Methodology

Transport study provides special attention to urban transportation planning as it greatly influences the location decisions and travel behaviour of people, goods and services. Transportation is critical for the efficiency of towns contributing to their productivity and economic growth. A good network of roads & other transportation mode coupled with an efficient transport management system makes a substantial contribution to the "working efficiency" of cities and towns and enables them to become catalysts for social and economic development. On the other hand, the impact of a poorly designed urban transport system is manifested in terms of traffic congestion, delays, accidents, high energy consumption, high pollution of the environment and inequitable access to services. A well-planned transportation system results in orderly urban growth, greater use of urban public transport, lower vehicular pollution, and shorter auto trips.

Standard methodology was followed for traffic study in the project area. Traffic volume survey was carried out in one intersection using given format by LGED for 2 days (hat day and regular days. Two surveyors in each link of the intersection with one supervisor (Urban planner) in that node were responsible to carry out the survey. The collected data were stored and analyzed by using the Microsoft Excel software. Analyzed data has been presented in tabular and graphical form with necessary illustration and maps. With reference to their observations, survey time was set from 6:00 AM to 12:00 PM for those two days when traffic movements were frequent.

In order to identify the major causes of the congestion and the nature of the problem on transportation networks, a number of tasks were undertaken. Those tasks included traffic volume counting at the directions, speed and delay studies, Origin-Destination (O-D) survey at major traffic generating intersections and consultation with the stakeholders regarding the generated problems. The volume and movement pattern of people and goods within the planning area were collected through a series of volume and O-D surveys.

In addition to collect information on volume and pattern of traffic movement by traffic survey, the Consultant accommodates certain important questions regarding people's attitude and preferences.

The volume counts were conducted at four points in a node. For this, Manual counting method was followed to conduct the traffic volume survey and data was recorded in prescribed formats (**Table 11-1**).

Table 11-1: Sample Size and Location Number According to Surveys

Types of Survey	Sample Size/Locations
Volume count	1 nodes
O-D survey	50 Samples at three location
Journey Speed/Delay	Bogra - Rohanpur highway and link connecting Ward 5 to Upazila Road

Details methodology of the work is shown in a flow chart (***Fig 11-1***) below.

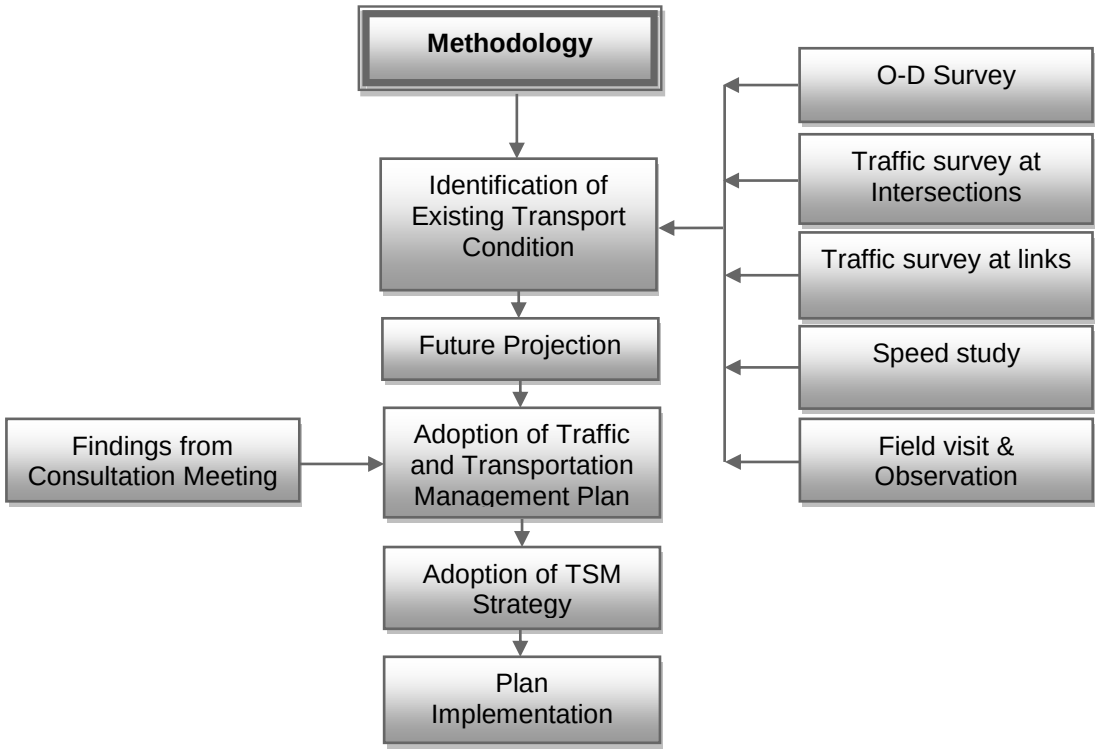


Fig 11-1: Flow Chart of the Methodology

11.2 Existing Conditions of Transportation Facilities

11.2.1 Roadway Characteristics and Functional Classification

The planning area covers 3593.63 acres and road length is 69.45 km. There are only one important road intersections named College more providing linkages with other secondary roads.The areas towards the south are predominantly rural with little commercial development. The road network and hierarchy within the Paurashava boundary is relatively better established. There remainsalso railway facility in this Paurashava.

The roads of the Paurashava belong to number of agencies. Local Government Engineering Department (LGED) responsible for construction and maintenance of Upazila and Union roads and

Paurashava responsible for construction and maintenance of roads within the Paurashava area. Existing transportation system is dominated by road network catering to the passenger service and freight transport (**Table 11-2**).

Table 11-2: Road status in Rohanpur Paurashava

Type of Road	Length (km)	Percentage (%)
Pucca	29.54	42.53
Katcha	13.38	19.27
Semi-pucca	26.53	38.20
Total	69.45	100.00

Source: Transportation Survey of Rohanpur Paurashava by AQUA, 2010.

Major trips of vehicles are generated from, within the Paurashava, Masjid More, Fulbari, and Koier Para. Existing transportation system is dominated by road network catering to the passenger service and freight transport.

The major routes which connect Rohanpur Paurashava are:

- Rohanpur – Nachal
- Rohanpur – Gomastapur
- Rohanpur–Chapai Nawabganj

Apart from major roads, a large number of local roads having width varying from 10 ft. to 20ft width, provide access to individual houses and establishments and connect them to major roads.

11.2.2 Mode of Transport

Road is the only mode of transport in the Paurashava. The road is using for efficient movement and multi-dimensional purposes. As a result, transportation survey includes only the road transportation and the outcome of the survey is presented in the following paragraphs.

11.2.3 Intensity of Traffic Volume

To analyze the existing traffic situation, one location has been identified where the volume count survey were conducted for 18 hour basis. To find out total discharging traffic volumes both in peak hour and off peak hour traffic survey has been analyzed. The Traffic Volume survey was conducted on the following Masjid Moar that is very important considering the locational importance as these locations do not only cover the inter-Upazila traffic but also provide accurate view of the local traffic. The following figure shows details of the traffic node. Motorized traffic flow occurs in east-west direction according to diagram, especially only for bus service. The north (towards Upazila) and south (Baroipara) links can be characterized by two funnel connected face to face in the node. A general overview of the traffic flow has been given in the following ***Fig 11-2***. It is found that traffic movement in general occur mainly Masjid More to Upazila direction from perpendicular links. A significant number of vehicle trips are also attracted towards south-east corner of the node where the bazaar is located.

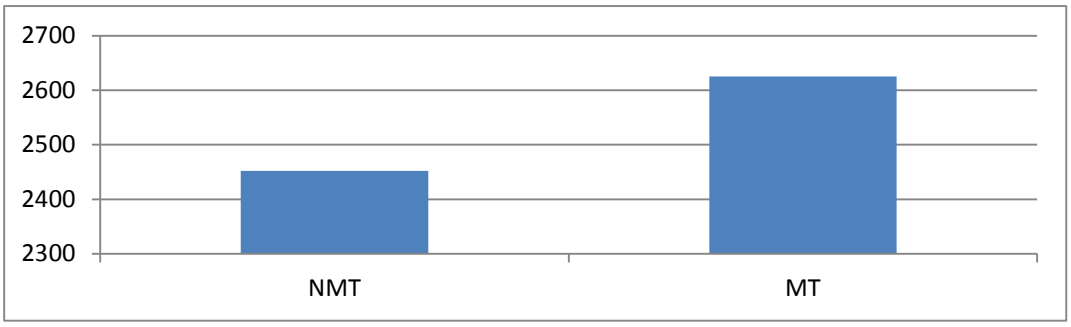


Fig 11-2: Directional Composition of MT and NMT Composition at College Moar Intersection

11.2.4 Level of Service: Degree of Traffic Congestion and Delay

Traffic Congestation

Traffic conflict is common and frequent in towns, where there is combination of transport vehicles-slow and fast-on the streets. Major conflict and congestions occur in the places, where intensity oftraffic movement is high, on street parking is made and on street loading or unloading of goodsare taken place. The consultant studied the traffic movement all over the town and has identifiedthree main points, where the traffic congestion is the highest. These are located at Volahat-Huzurpur Road, College Moar Intersection and Stationpara Dakbanglo Road. At thesepoints, the slow moving vehicles like, byclicle & vans come in conflict with motor vehicles, creating traffic congestion. As the no. of slow moving vehicles is higher, the conflicts areusually frequent.

Delay

The traffic delays in Rohanpur town is caused by the interaction of various factors, such ascongestion, inadequacy of carriageway widths, mixed traffic conditions, parked vehicles andheavy pedestrian flow and such delays are called congestion delays or operational delays andare difficult to measure precisely. It is observed that peak period takes on an average 10-15%excess time than off-peak period due to congestion, narrow road and improper design of Rohanpur Bazar intersection.

Table 11-3: Roadway Level-Of-Service (LOS) Ratings of Wikipedia

LOS	Description	Speed (mph)
A	Traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes.	Over 60
B	Slightly congested, with some impingement of maneuverability. Two motorists might be forced to drive side by side, limiting lane changes.	57-60
C	Ability to pass or change lanes is not assured. Most experienced drivers are comfortable, and posted speed is maintained, but roads are close to capacity. This is often the target LOS for urban highways.	54-57
D	Typical of an urban highway during commuting hours. Speeds are somewhat reduced, motorists are hemmed in by other cars and trucks.	46-54

LOS	Description	Speed (mph)
E	Flow becomes irregular and speed varies rapidly, but rarely reaches the posted limit. On highways this is consistent with a road over its designed capacity.	30-46
F	Flow is forced; every vehicle moves in lockstep with the vehicle in front of it, with frequent drops in speed to nearly zero mph. A road for which the travel time cannot be predicted.	Under 30

[N.B. This table summarizes roadway Level of Service (LOS) rating. These only account for motor vehicle traffic speeds and congestion delay. Other impacts and modes are often ignored.]

11.2.5 Facilities for Pedestrians

Most of the public generally considers pedestrian facilities to be limited to sidewalks; however, they encompass a much broader scope of services and facilities. Pedestrian facilities include, but are not limited to, traffic control devices, curb ramps, grade separations (overpasses and underpasses), crosswalks, and design features intended to encourage pedestrian travel (such as traffic calming devices including speed bumps or center refuge islands). In general, these facilities parallel the roadway system and provided as part of the public right-of-way. Pedestrian facilities or "pedestrian lanes" provide people with space to travel within the public right-of way that separated from roadway vehicles. It improves mobility for pedestrians and provides access and an alternative means of travel to and from home, work, parks, schools, shopping areas, and transit stops. It also provides places for children to walk, run, skate, bike, and play, where no walkways are provided, or where walkways are in poor repair or have missing sections. It is obligatory to mention here that, at present there is no pedestrian facilities available at Rohanpur Paurashava.

11.2.6 Analysis of Existing Deficiencies

Like any other town, Rohanpur has also transportation deficiencies, which are identified from two different sources. Firstly, by reconnaissance survey of the town, field observation interview of passenger and operator and secondly, by means of household sample survey.

11.2.6.1 Roadway Capacity Deficiencies

Primary Road (Regional Road)

The College Road is known as primary road as per Paurashava, length is 1.8km and average width 5 meter.The road has been proposed upto 80 feets. Besides Proshadpur Hiropara road, Volahat-hujrapar road Pirasonmor Hugligari more road is also proposed as primary roads with a proposed with of 80 feets.The ROW of the existing primary road in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on the primary road and it is about 500 to 1000 PCU/hours.

Secondary Road:

There are several major secondary roads are in the Paurashava named Pirason Road, length is 0.5 km and average width3 meter, Bohipara-Proshadpur Road, length is 2.1km and average width 3 meter and Khoirapara Tulippur Bus stand Road, length is 0.8 km and average width 3meter. Besides Bazar Road and Rohanpur Khoirmor Road are also secondary roads.

Road standard (ROW) recommended is 40 feet to 80 feet, proves that the ROW of the existing secondary roads in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on those secondary roads is about 350 PCU/hour.

Tertiary Road:

In the Paurashava, some major tertiary roads have been identified and among themStationpara-Upazilla Road, length is 0.58km and average width 2.05meterand some unnamed roads are mentionable.

Road standard (ROW) recommended for tertiary road is 20 feet to 40 feet, proves that the ROW of existing tertiary roads in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on those tertiary roads is about 400 PCU/hour.

Access road:

Road standard (ROW) recommended may be imposed on access road and it is 20 feet to 40 feet. In the Paurashava, all access roads are less than 12 feet and most of them are using as footway. Non-motorized vehicles named Van sometimes use those walkways.

Narrow Road Width

Narrow widths of roads and poor maintenance have marked by most respondents as major road problems in the town. From the survey, it has found that there are various problems in connection with transport such as problem of narrow road, and damaged during rainy season etc. This will cause traffic on the street will rise and will create serious traffic congestion on the narrow streets. The project area is served by 69.45kilometers of roads. When asked about the problem of roads, they pointed to narrow width of roads, flooding of roads during monsoon, poor condition of roads due to lack of maintenance, traffic congestion at particular points of the town.

When asked about the problem of roads, most households respondents answered affirmative (Household survey, 2010). Indicating to major road problems, they pointed to narrow road; broken roads due to poor maintenance, flooding of roads during monsoon, and traffic congestion.

Map 11-1: Width of some Major Roads in Rohanpur Paurashava

Traffic Conflict

Traffic conflict is common and frequent in towns where there is admixture of transport vehicles – slow and fast – in the streets. Areas of conflict occur at point where the intensity of traffic movement is high. The consultant studied the traffic movement in all over the town and identified one main point where the traffic conflict is highest, which is Bazar Morr Intersection. At this point the slow moving vehicles, like, rickshaw and vans come in conflict with motor vehicles, creating traffic congestion. As the slow mobbing vehicles are higher, the conflict is usually frequent.

The identified reasons for traffic conflict are improper intersection design, parking of vehicles on the street, waiting of operators on the roads looking for possible passengers, absence of traffic signal, disobedience of traffic rules etc.

11.2.6.2 Operational, Safety, Signal and other Deficiencies

Traffic management system is absent in the Paurashava. No operational system yet being imposed on traffic movement.

Due to the minimum PCU/hr. both in hat and non-hat day, availability of non-motorized vehicles and absent of available built-up area, road safety exists naturally in the Paurashava.

Traffic signalling system is totally absent in the Paurashava. Generally, traffic signalling system will not be needed up to the limit of the planning period. On some specific point of primary and secondary roads, traffic signalling will be needed.

11.2.7 Condition of other mode of transport (Rail/Water/Air)

There is no air transport facility in Rohanpur, for air travelling the people of Rohanpur depending upon the Capital City Dhaka.

11.3 Future Projections

Road design standards are prescribed in the section 21 of the Public Roads Act, 2004. The regulations of the sections are:

1. The Government may declare design standards for roads by publication in the Official Gazette.
2. The road design standards shall set out design requirements for roadways and road-related areas including structures located on roadways or road-related areas.
3. A road authority shall comply with the road standards when carrying out works on a roadway, road-related area or when installing, modifying or maintaining a structure on a roadway or road-related area.
4. Despite sub-section (3), a road authority is not required to comply with the road standards if:
    a. The road authority is carrying out maintenance and, in the view of the road authority; it would not be practicable to comply with the road design standards.
    b. The Government has, in writing, exempted the road authority from complying with the road design standards in relation to the works or structure.

c. The Government may revoke or amend road design standards in the same manner as a declaration.

The Urban Area Plan for Dhaka City has recommended road standards with the consideration of traffic volumes, which were not undertaken in conjunction with the Dhaka Integrated Transport Study (DITS). A wide range of standards was suggested for various classes of roads, ranging from 4 meters to 24 meters, as mentioned below. The required right of way (ROW) is also indicated:

- Main Road 24.0 meter (78 ft) ROW
- Arterial Road 14.5 meter (47.5 ft) ROW
- Collector Road 13.0 meter (42.6 ft) ROW
- Access Road 9.0 meter (29.5 ft) ROW
- Access Road 6.0 meter (19.7 ft) ROW
- Non-motorized Road 4.0 meter (13.4 ft) ROW
- Footpath 2.5 meter (8.2 ft) ROW

In order to promote development of all roads in a systematic manner, new road standards were recommended for both built up areas, as well as for less built-up areas. However in the UTIDP, the recommended planning standards prescribed by PMO are indicated in **Table 11-7** below.

Table 11-4: Recommended Planning Standard of Rohanpur Paurashava

Types of Road	Recommended width
Paurashava Primary Roads	150-100 feet
Paurashava Secondary Roads	100-60 feet
Local Roads	40-20 feet

Source: UTIDP Planning Standard, LGED

11.3.1 Travel Demand Forecasting for Next 20 Years

Existing road network is quite enough for accommodating present volume of traffic. The study area is rural in nature. Most of the roads are katcha and needs to be constructed as pucca or at least semi-pucca. Katcha roads become clayey in the rainy season and bring immense sufferings for the users. As a result, social, cultural and economic activities are disrupted significantly at that time. A very limited uses of small boats are found for transportation of goods within the short distance particularly on hat day. Due to the absence of effective alternatives, passengers and goods movement of the study area is largely dependent on road transportation. This dependency will be calculated according to the increase of accessibility, consideration of the missing links, volume of traffic movement, bulk density of the area and economic importance of the area. Growth direction is also a considerable component for the demand analysis of the road.

11.3.2 Transportation Network Considered

The growth of transport networks obviously affects the social and economic activities that an area can support; yet the dynamics of how such growth occurs is one of the least understood areas in transport, geography, and planning. Transport network changes are treated exclusively as the

result of top-down decision-making. Changes to the transport network are rather the result of numerous small decisions (and some large ones) by property owners, firms, developers, towns, cities, counters, and MPOs in response to market conditions and policy initiatives. Understanding how markets and policies translate into facilities on the ground is essential for scientific understanding and improving forecasting, planning, policymaking, and evaluation.

11.4 Transportation Development plan

11.4.1 Plans for Road Network Development

11.4.1.1 Road Network Plan

Planning standard is a fundamental tool for formulation of any planning perspective including transport plan. Following are the suggested planning standards (**Table 11-5**) for road network development. The standards are meant for use by UTIDP, LGED and other planning and development agencies. The standards have been adopted by the consultants to draw up the transportation development plan.

Table 11-5: Proposal for Road Standard in the Project area

Roads 9-15% of the total built up area	
Road Type	**Recommended Widdth**
Paurashava primary roads	ROW 80-100ft
Paurashava secondary roads	ROW 40-60 ft
Paurashava tertiary roads	ROW 25-30 ft
Access Road/ Local Road	ROW 20 ft

Source: Upazila Towns Infrastructure Development Project and Proposed by Consulting Firm, Interim Report Rohanpur Paurashava.

Neighborhood and Local Road

The right of way (RoW) of all neighborhoods (mahallah) roads may be in between 20 ft. to 30 ft wide depending on their functions.

Standard Road Design

All urban roads should have flexible pavements. The road intersection should be designed to allow easy movement of vehicles. At bridge, the road design should provide for an adequate sight distance and a smooth riding.

Functions of Roads

Each category of road has its particular functions to perform. Access road carries traffic from buildings to the collector road and collector road carry traffic to the major road and vice versa. In reality, however, it is almost impossible to maintain this hierarchical use of roads except in an entirely planned area. However, functions will not be dependent on the road width, rather on the location of the road, surrounding land use and the link it is providing or the volume of traffic it is carrying. Thus a 40 feet wide secondary road can become a major road due to its strategic location and the purpose it is serving.

11.4.1.2 Proposal for improvement of the existing road networks

Traffic management measures may be adopted to increase traffic capacity and safety. The improvement could be done by removing the deficiencies in the existing core road network by widening and /or strengthening of selected stretches / corridors in a phased manner and improvement of road geometrics and safety provisions. The proposals for widening of roads existing roads are listed in tabular form (**Table 11-6**) below.

Table 11-6: Road Improvement Proposal in Rohanpur Paurashava

Road Width (in ft)	Length (in meter)	Length (in km)	Percentage	Road Type
20	15539.94	15.54	42.86	Local Access
30	5838.95	5.8	16.10	Tertiary Road
40	18851.92	18.85	52.00	Secondary Road
60	4044.17	4.04	11.15	Secondary Road
80	7697.43	7.7	21.23	Primary Road
Grand Total	36256.08	36.26	100.00	

N.B.= Roads width above 20 ft have been presented

Source: Upazila Towns Infrastructure Development Project and Proposed by Consulting Firm

Map 11-2: Proposed Road map of Rohanpur Paurashava

11.4.1.3 List of Proposed new roads

To improve existing transportation system about 19.21 km new road is in the transport development plan. The highest 7.3km (37.78%) new road is proposed with 20 ft right of way (RoW), which will function as access road. Then 23.4 km (17.67%) new road isproposed with 60 ft RoW, which will function as Secondary road. **Table 11-7** shows the summary of road wideningproposal.

Table 11-7: List of Proposed New Roads in Rohanpur Paurashava

RoW (in ft)	Length (in meter)	Length (in km)	Percentage	Road Type
20	7259.48	7.3	37.78	Access/Local Road
30	1931.83	1.9	10.05	Tertiary Road
40	6648.81	6.6	34.60	Secondary Road
60	3395.03	23.4	17.67	Secondary Road
Total	19217.026	19.21	100	

Table 11-8: List of Proposed Roads in Rohanpur Paurashava

Road ID	RoW in meter	Road Type	Length in Meter	Phase-wise development		
				First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
NRR478	12.23	Secondary Road	999.03		Second Phase	Development will continue
NRR466	6.12	Access Road	1510.73	First Phase	Development will continue	
NRR465	6.12	Access Road	857.59	First Phase	Development will Continue	
NRR464	12.23	Secondary Road	637.72		Second Phase	Development will Continue
NRR463	6.12	Access Road	743.92	First Phase	Development will continue	
NRR453	9.17	Tertiary Road	552.54		Second Phase	Development will Continue
NRR452	18.35	Secondary Road	400.95		Second Phase	Development will Continue
NRR451	12.23	Secondary Road	453.66		Second Phase	Development will Continue
NRR450	6.12	Access Road	81.99	First Phase	Development will Continue	
NRR449	12.23	Secondary Road	378.35		Second Phase	Development will Continue
NRR448	12.23	Secondary Road	531.05		Second Phase	Development will Continue
NRR455	12.23	Secondary Road	408.15		Second Phase	Development will Continue
NRR446	12.23	Secondary Road	757.87		Second Phase	Development will Continue
NRR445	12.23	Secondary Road	1930.66		Second Phase	Development will Continue
NRR444	18.35	Secondary Road	960.47		Second Phase	Development will Continue
NRR443	18.35	Secondary Road	2033.61		Second Phase	Development will Continue

11.4.2 Plan for Transportation Facilities

11.4.2.1 Transportation Facilities Plan

Bus Terminal

There is no designated bus terminal in this Paurashava. Considering inter-town movement of high speed vehicular traffic without interrupting safe urban living of the Paurashava inhabitants, an inter town bus terminal is proposed at the south side of College Road. Detail land use information of Bus Terminal is given in Table 11-13.

Truck Terminal

The Rohanpur Paurashava is the route to carry the goods. Besides, there is much importance of trucks for the Paurashava/Upazila. Therefore, a truck terminal is proposed to the extreme west corner of the Paurashava. Detail land use information of Truck Terminal is given in Table 11-13.

Tempo/Rickshaw Stand

Tempo and Rickshaw is now a major and cheap commuter in small towns that play important role in commuter transportation. There is no formal tempo stand in the Paurashava. Detail land use information of Tempo Stand is given in Table 11-13.

Table 11-9: List of Proposed Transportation Facilities in Rohanpur Paurashava

Proposed ID	Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
						First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
BT	Bus Terminal	2.23	7	Proshadpur (161_02), Khoirabad (160_01)	113,368,1372-1374,1394-1402,1410,1411,1415,1416		Land acquisition and establishment	Maintaining and improve facilities
TMS_1	Tempu Stand	0.05	5	Proshadpur (161_01)	160,203		Land acquisition and establishment	Maintaining and improve facilities
TMS_2	Tempu Stand	0.17	3	Proshadpur (130_03)	1494,1495	Land acquisition and establishment	Maintaining the playground and improve facilities.	
TMS_3	Tempu Stand	0.18	7	Proshadpur (161_01)	503,186,188,189		Land acquisition and establishment	Maintaining and improve facilities
TMS_4	Tempu Stand	0.4	8	Proshadpur (161_03)	3357,3358		Land acquisition and establishment	Maintaining and improve facilities
TT	Truck Terminal	3.02	7	Proshadpur (161_02))	1432-1436,1439,1463,1467,1468			

11.4.2.2 Parking and Terminal Facilities

There is no parking facilities provided in Rohanpur Paurashava. People are habituated for parking beside the roads. This parking practice occupied considerable spaces and reduces the effective road width. Particularly in bazaar area where a number of markets exist the parking problem become acute during weekly hat days. If it is possible to integrate parking area for tempo, rickshaw, van, etc. near to Bazar area the congestion problem will be solved.

In order to mitigate the traffic congestion and traffic conflict at the Bazar area one parking area is proposed at the north side of Rohanpur Paurashava (Map11-2). On-street parking shall be prohibited on all roads within the Bazar area except at places where it is specifically permitted for parking.

Adequate terminal facilities will be provided at the bus and truck terminal for the convenience and comfort of the commuters.

The bus terminal should have to accommodate the following services:

- Ticket Counter
- Passenger-shed
- Workshop
- Cleaning and washing facility
- Loading and unloading place
- Bus parking space
- Toilet facility
- Waiting room

Proposed facilities accommodate in the truck terminal complex:

- Workshop
- Cleaning and washing
- Loading and unloading place
- Truck parking space
- Toilet facility

11.4.2.3 Development of Facilities for Pedestrians, Bicycles and Rickshaws

Footpath may refer to sidewalk, which runs along vehicular roads. It is a separate lane exclusively designed for the purpose of pedestrian movement. The footpath is quite safe and free from any accident. Unfortunately, there is no footpath besides any road of Rohanpur Paurashava.

The transportation system within residential neighbourhoods should favour pedestrian movement and discourage vehicular through traffic in both new and existing neighbourhoods. A pedestrian system that utilizes neighbourhood streets and paths to link the residents with the commercial and school functions serving the area will be encouraged.

The provision of separate bicycle or rickshaw lane is not a requisite for a low level of non-motorized traffic movement pattern, which is prevalent in any Upazila level small town like Rohanpur Paurashava.

11.4.2.4 Other Transportation Facilities

Traffic Signs and Signals

Traffic signs and signals are required in order to provide for the safe and orderly movement of motorized and non-motorized traffic and pedestrians. These provide information about routes, directions, destinations and points of interest. They also provide information on regulations, which apply to specific locations or at specific times, and warn of hazards, which may not be evident. When a traffic sign is correctly used, the majority of motorists will comply with the posted regulation or warning, and drive in a safe and orderly manner. In order to minimize the rate of traffic conflict the following signs and signals should be provided at the key location considering the prevailing traffic situation and traffic management option (**Table 11-13**).

Table 11-10: Traffic Control Facilities in Rohanpur Paurashava

Traffic Control System sub-division		Present	Remarks
Traffic Signs (Traffic signs are devices placed along, beside, or above a highway, roadway, pathway, or other route to guide, warn, and regulate the flow of traffic, including motor vehicles, bicycles, pedestrians and other travellers.)	Regulatory	None	Should be Installed
	Warning	None	Should be Installed
	Marker	None	Should be Installed
	Guide & Informational Signs	None	Should be Installed
	Others	None	Should be Installed
Traffic Signals (Traffic signals are electrically operated traffic control devices which alternately direct traffic to stop and to proceed.)		None	Should be Installed
Traffic Police control Hour (Under this system, a person or a group of persons according to law by local/national authorities facilitate the movement of traffic and to prevent and/or report any breach of road traffic regulations on roadway.)		None	Should be Installed

Source: Transportation Surveyof Rohanpur Paurashava by AQUA, 2010

11.4.3 Waterway Development/Improvement Options

Rohanpur is located within the flood plain of Padma River and on the southern side of the Punarvaba River, a branch of Mohanonda River. Some strategies have been developed to conserve and maintain the waterbody.

11.5 Transportation System Management Strategy (TSM)

Traffic Management for Rohanpur Paurashava is not just to consideration of vehicle movement rather considering the suitability to walk comfortably, to ride bicycle, distance consideration, easy access to market, parking facilities, etc. Traffic management context for a local Town can be reconsidered as the following Figure:

11.5.1 Strategies for Facility Operations

- **Creation of major linkage**

As the town grows and the traffic intensifies on the streets, an efficient network of roads has to be built based on major North-South link. This would ensure direct connection between different curial

nodes of the network and help reduce both travel length and time. This is a nonstop process and will be closely in interaction with the spatial development policies for the Town.

- **Lane-based traffic management**

Determining number of lanes on every street and their individual capacity and rooting the traffic management and any future expansion on that capacity assessment. Lanes can be designated for different modes. Use of every segment of the road has to be pre-designed and clearly defined e.g. movement, parking, pedestrian crossing etc.

- **Promote use of FFT (Fuel Free Transport) and discourage FDT (Fuel Dependent Transport)**

Use of fossil fuel and harmful emissions are a major environmental issue all over the world. That's where FFT can play a vital role. Modes like walking, bicycling are in general called 'green transport' for their environmental friendliness. Promotion of these means of mobility can eliminate long-term negative impacts of fuel-based vehicles and enhance health and safety of the inhabitants.

- **Promote Plantation on the Walking way besides of the Roads**

Embankment cum Roads and other major roads have been proposed for promoting plantation with street furniture.

- **Providing Properly Designed Pedestrian Ways**

Rohanpur Paurashava has no provisions of pedestrian ways, which is one of the major crucial problems for the Town in Transport sector. All necessary facilities should be provided for the pedestrians. A designed pedestrian ways must be integrated closely with other transportation elements so that walking becomes a recognized mode and becomes a pleasure and a place for brief social gatherings for the Paurashava dwellers.

- **Road space allocation:**

Road space should be allocated among different mode and use based on the hierarchy of the road and its adjacent land-use. This is essential for safety and effectiveness of the road.

- **Development & availability of Public Transport (PT)**

This should form the major share of the motorized vehicle. PT has to be available within comfortable walking distance from any part of the Paurashava. Maintenance of an efficient public transport provides a cheap and accessible solution for mass movement.

- **Preserve and utilize natural network (adjacent River/ Khals) as Transport Corridors**

Establishing the network of Khals and River as vital corridors of transportation, especially for goods movement would create a viable alternative to road transport and also help preserve this traditional mode. Water transport is usually cheap and as goods delivery generally has a lead time, waterways can play crucial role in this sector. It can also serve recreational purposes for the city dwellers.

- **Minimizing Transfer Times**

The present deficiencies in the inter-modal integration of the transport system are economically unsustainable in the long run. The current systems are time consuming to travel by more than one mode for the Town of Rohanpur Paurashava.

- **Integrating the Management of Land Use and Transportation in Rohanpur Paurashava**

The growth of the Town still concentrated to the core part of the area adjacent to the bazaar area which is just North Portion of the Municipality. To bring out a proper traffic and transport design core part of the town have to manage with high consideration and the semi core and fringe area should have to design for future projection basis.

11.5.2 Strategies for Traffic Flow and Safety

The following strategies have been identified for Traffic flow and safety

- **Avoid dispersed and scattered development patterns**

Dispersed and scattered type of development promotes 'sprawl' and increases for travel. It raises the need for more and more transport corridors inducing ever greater traffic.

- **Consider traffic impact of land use and occupancy of structure while giving building construction and land use permit**

Kind of use for the any structure has to be clearly defined. 'Transportation Clearance' should be given considering the structure size and proposed use and has to be a compulsory criterion for receiving building permit.

- **Effective road network design has to consider for the mixed land-use areas that provide both places to live and work**

Mixed land use provides the commercial base for supporting viable public transit. For providing effective road network design the study has been proposed the road cross section according to the road categories.

- **Widening the existing Roads**

All existing Roads have to be widening according to the Land use Importance.

- **Provide parallel service roads along the National Highway and Ensure less Use of this Highway from Local Purposes**

Direct connection of over access roads, cattle using, haphazard way passenger/ vehicle over-crossing, adjacent tea shops/vegetable markets etc should be avoided. For this purpose service roads have been proposed for the High way to save from over connection of local roads and other high way related services.

- **Separate lane for NMT**

Provisions of Separate lane for NMT will help to avoid traffic jam and conflicts.

- **Pedestrian First**

All the roads of the Paurashava necessary facilities should be provided for the pedestrians. A designed pedestrian ways must be integrated closely with other transportation elements so that walking becomes a recognized mode and becomes a pleasure and a place for brief social gatherings for the city dwellers.

- **Parking Provision**

Auto Rickshaw, Rickshaw stoppage will be provided on the suitable place for the present need and also for growing future demand. Set up Rickshaw or Auto Rickshaw stops on street corners and other suitable locations.

11.5.3 Strategies for Traffic Management

The following strategies have been identified for Traffic Management

- **Formulate a Local Area Traffic Management Unit (LATMU)**

Designing, modeling and at last managing traffic and Transport is not an easy task. It needs important decisions of policy makers from both Public and Administrative representatives. For the Upazila Towns Mayor is the principle for taking any decisions whereas traffic and Transport related decisions require a Coordination Board where high official's opinion is very much important. For this purpose a small Town Transport Planning and management unit is require to manage traffic and transport situations.

- **Integrating the Management of Land Use and Transportation in Rohanpur Paurashava**

As transport is basically a function of land use, any proposed development should be examined with respect to the traffic impact it has on the locality. Kind of use for the any structure has to be clearly defined. 'Transportation Clearance' should be given considering the structure size and proposed use and has to be a compulsory criterion for receiving building permit.

The growth of the Town still concentrated to the core part of the area adjacent to the bazaar area which is just North Portion of the Municipality. To bring out a proper traffic and transport design core part of the town have to manage with high consideration and the semi core and fringe area should have to design for future projection basis. Mixed land-use creates vibrant, lively neighborhoods/communities and reduces the need for longer distance travel and commuting. Short distances travel also encourages use of sustainable alternatives like walking and bicycling. Mixed land use provides the commercial base for supporting viable public transit. This would also imply restricting development of new strictly single-use zones (like residential, commercial etc.)

Dispersed and scattered type of development promotes 'sprawl' and increases for travel. It raises the need for more and more transport corridors inducing ever greater traffic. Therefore, avoiding and discouraging this kind of development by various policy measures would help reduce creating new trips.

- **Developing an Integrated Transportation System**

As there is no transport studies have conducted before for the Upazila Towns, no serious effort has been made for the functional integration of different modes of transport. However, it is well known that without effective integration of transportation systems, economic benefit, convenience and comfort from transportation services cannot be derived.

- **Avoid dispersed and scattered development patterns**

Dispersed and scattered type of development promotes 'sprawl' and increases for travel. It raises the need for more and more transport corridors inducing ever greater traffic. Therefore, avoiding and discouraging this kind of development by various policy measures would help reduce creating new trips.

- **Need for Integration between Modes**

The main challenge in the area is to identify and link together the most appropriate modes for any journey. Unfortunately the existing modes (BUS -Try Auto Rickshaw -NMT) are acting independently of each other. As a result the passengers suffer due to the lack of inter-connection and scheduling and freight traffic faces delays and increased costs particularly when it is carried by waterways from outstations for destinations inside of the Paurashava. There is an urgent need for integration between modes for economic reasons and for convenience and comfort of the passengers. Traffic management is the It encompasses traffic engineering, but also includes policy making, planning and consultation processes and that's why a traffic management unit has to be launched. One traffic management unit will launch which will be under the UpazilaParishad and must be merged with the Paurashava for regulation, organization, guidance and control of all kinds of stationary and moving road users, and vehicles, including pedestrians, cyclists, motorcyclists, truck and cars, respecting the needs of abutting land uses.

- **Aspects of Access Control**

Maximum use should be made of the existing infrastructure before new roads are contemplated. In moving towards areas of vehicle restrictions and the management of demand a number of measures will be necessary in order to reduce congestion and pollution in the core part of the Town.

- **Minimizing Transfer Times**

The present deficiencies in the inter-modal integration of the transport system are economically unsustainable in the long run. The current systems are time consuming to travel by more than one mode for the Town of Rohanpur Paurashava.

11.6 Plan Implementation Strategies

11.6.1 Regulations to Implement the Transportation Plan

There is no specific policy provided for the local urban traffic and transport management for the small town of Bangladesh though there exists National Land Transport policy for Bangladesh. For this purposes to implement the transport plan national land transport policy can be followed. Again a traffic transport management authority must have to provide merge with Paurashava urban planning sector to manage transport related development and implementation.

The roles of the municipality will be largely unchanged. Their functions will still be to provide essential services for the population including in the transport sector – public transport, traffic management signal systems, parking control and management and street lighting. The development of transport systems and infrastructure within the municipalities will be in accordance with the Structure Plan that will be provided under the Master Plan.

- **Effective co-ordination in transport**

Better coordination to be established between the Upazila Parishad and Departments under its control; & regulations will be formulated to achieve the goal of creating better working links between the Government and the public and private sectors. A committee has to develop to monitor the entire development project of the Paurashava to analysis about transport sector violation.

Government to promote clearer objectives and responsibilities for each sector in order to create more integrated working relationships.

- **Promoting the role of the transport users**

The Government will examine how best the interests of users can be represented within the existing national government and local authority system; The Government will establish a user role within its transport planning process.

- **Transport users should pay for the costs of services**

The Government makes arrangements to realize cost of transport operation and road maintenance from road users through new fiscal policies; to protect public interest, the Government will regulate tariffs for passenger and goods both in road and rail transport.

- **Subsidies for transport services**

The government should allow subsidy to the transport sector only on consideration of public interest.

11.6.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

In Urban area planning the most significant role will be played by Paurashava planning section. The Planning Section will carry out the entire work of project initiation and plan formulation. These works are complicated and time consuming, and require multidisciplinary professionals. But there is no provision of Planning Section in Rohanpur Paurashava. It is not possibly by the existing Paurashava personnel to undertake UAP programme after discharging all its regular office functions. This would necessitate strengthening of the institutional capacity of the traffic and transport Planning Section. Under the reorganized organogram of the Planning Section, a Planning division can be created to deal with all affairs of area planning for the ‘C’ category Paurashava.

Under the current government policy regarding public sector agencies, it is unlikely that a major reshuffling can be achieved in improvement of existing manpower position of the Planning Section. As a result a large part of the planning process may have to be done through private consultancy.

According to the Local Governmnet (Paurashava) Act 2009, Paurashava will, in the prescribed manner, prepare and execute a Road Maintenance and Development Program. A Paurashava also maintain the measures on Street lighting, street watering, traffic control, and public vehicles. They will maintain such public streets and other means of public communication as may be necessary for the comfort and convenience of the inhabitants of the municipality and of the visitors thereto.

Chapter 12: Drainage and Environmental Management Plan

A. Drainage Plan

12.1 Introduction

The purpose of the Drainage Plan is to make an assessment of the present drainage facilities and the scope for future development within 3593.63 acres study area of the Rohanpur Paurashava that consists of partially developed commercial, residential area and infrastructure. The purpose of the survey was to gather information available and use them at the time of the preparation of the drainage Plan that shall act as a guiding document for designing of drains in future. This Drainage Plan shall be a planning tool and shall be used as a guideline for Rohanpur Paurashava that shall be responsible for the approval of drainage improvements. In the past, the term drainage included only the hydrologic and hydraulic aspects for discharge of storm runoff. Perhaps the most pressing challenge that now a days we face include the management of our water resources and flood hazard, maintain a continuous supply of water for industrial, agricultural, transportation, recreation, and potable water for present and future generations. The Drainage Plan aspects shall also include the flood and water resources management and pollution abatement. The Drainage Plan will propose improvements necessary to the major drainage systems to accommodate storm runoff of the Rohanpur Paurashava. This planning process will consider both structural and non-structural techniques to reduce the effect of the storm runoff which may be summarized as follows:

- Improvements to major drainage outfalls
- Improvement of the drainage network
- Management of available water resources
- Conservation of existing natural drainage channels

12.1.1 Goals and Objectives

Following are the overall objectives of the drainage plan of Rohanpur Paurashava:

- To allow smooth drainage of storm water and the waste water of the town.
- To develop a comprehensive drainage network with area coverage and capacity.
- To prevent encroachment to natural drainage system.
- To create awareness about disposing of solid waste in the drainage system.

12.1.2 Methodology and Approach to Planning

Preparation of the Drainage Plan involves (I) analyzing the existing conditions related to drainage facilities and the flood management (II) identifying major drainage outfalls and on the basis of the outfalls splitting the total drainage area into a number of drainage zones (III) defining all pertinent design criteria and (IV) defining drainage facility requirements and sizing.

The drains are designed to collect excess rainfall that comes as surface runoff from urban area, convey the runoff and finally discharge them to outfalls. The design of drains involves hydrological computations of rainfall intensity, its frequency of occurrence, duration etc., and the total runoff of a

particular catchment area. The US Soil Conservation Service (SCS) method shall be used as an alternative of the Modified Rational Method for larger catchment areas.

In Modified Rational Method, the overall watershed is divided into zones that contribute to hydraulically significant points of concentration. The boundary of the zones is established based upon local topographic boundaries such as streets, existing drainage systems, etc., using good engineering practice.

Method Used

Storm and used water: The drains are designed to collect excess rainfall that comes as surface runoff from urban area, convey the runoff and finally discharge them to outfalls. The design of drains involves hydrological computations of rainfall intensity, its frequency of occurrence, duration etc., and the total run off of a particular area. The modified rational method shall be used for calculation of peak runoff for a definite frequency and duration from particular drainage basin. One limitation of this method is that it cannot be used for catchment area greater than 320 acres. The Natural Resources Conservation Service (NRCS) method formerly the US Soil Conservation Service (SCS) method shall be used.

In Modified Rational Method, the overall watershed is divided into zones that contribute to hydraulically significant points of concentration. The boundary of the zones is established based upon local topographic boundaries such as streets, existing drainage systems, etc., using good engineering practice. The design flow rate by Modified Rational Formula is –

Q = CsC r IA

Where:

Q	=	Design runoff flow rate (cfs)
I	=	Rainfall intensity (in/hr)
Cs	=	Storage coefficient
Cr	=	Runoff coefficient
A	=	Drainage area (acres)

Rainfall Intensity (I): The rainfall intensity is the average rainfall rate for a particular drainage basin or sub-basin. The intensity is selected on the basis of the design rainfall duration and return period. The return period is established by design standards as a design parameter. Rainfall intensity with 5 years return period is generally employed for design of primary drains and canal improvement. Rainfall intensity with 3 years return period is employed for design of secondary drains. The design duration is equal to the time of concentration for the drainage area under consideration. Time of concentration is a critical parameter both for the Modified Rational Equation and SCS method. Time of concentration is generally defined as the longest runoff travel time for contributing flow to reach the outlet or design point, or other point of interest. It is frequently calculated along the longest flow path physically.

Estimating the time of concentration involves identification of an appropriate flow path or paths and estimating runoff travel times along the flow paths. Where post-development conditions include significant pervious surfaces, the time of concentration for just impervious portions of the basin may be required to calculate and compare peak flow response for the basin as a whole against that of the more rapidly-draining impervious surfaces alone. The Time of Concentration composed of the Initial Time of Concentration, sometimes referred to as the Inlet Time or Time of Entry and

the Travel Time. Initial Time of Concentration is that time required for runoff to travel from the most remote point in the drainage area to the first point of concentration. This can be determined using the Ki pitch equation. The Initial Time of Concentration must be five minutes or longer. In instances where Initial Times of Concentration are estimated to be shorter than five minutes, five minutes shall be applied.

The second part of the Time of Concentration is the Travel Time that takes the flow to travel along the drain. Channel flow occurs in channels carrying integrated flows, pipes (flowing partially full), and streams. Where storage is not significant, Travel Times can be estimated by applying Manning's Equation, and using estimates of channel characteristics and appropriate roughness values for pipe, channel, or stream features as tabulated in**Table-12-1**.

Table 12-1: Storage Coefficients for flat land

Characteristicsofsurface	StorageCoefficient		
	Slope <1: 1000	Slope <1: 500	Slope <1: 500
Residential urban	0.70	0.80	0.90
Commercial	0.80	0.90	1.00
Industrial	0.70	0.80	0.90
Residential Rural nature	0.60	0.70	0.80
Agricultural	0.50	0.60	0.70
Forest/wood land	0.30	0.40	0.50
Aquatic land	0.30	0.40	0.50
Paved area/road	0.80	0.90	1.00

Source: Countywide Comprehensive Plan (Master Drainage Plan) Exhibit-VIII

V= [1.49/n] [R 2/3] [S 1/2]

Where

V = Velocity of flow, feet/second
N = Manning's roughness coefficient for channel flow
S = Slope, feet/foot
R = Hydraulic radius, feet

And

T t = V / (60L)

Where

T t = Travel time, minutes
V = Velocity, feet/second
L = Length, feet

Storage Coefficient (Cs): Due to very flat topography of Bangladesh, the runoff is significantly slow. The rainfall after evaporation and infiltration accumulates first in the depressions, until these have been reached their capacity and then runoff. To take these effects a storage coefficient is used. The value of the storage coefficient is based on average ground slope and the nature of the ground surface. Some of the storage coefficients are listed in **Table-12-2**.

Table 12-2: Modified Rational Method Runoff Coefficients

Landusedesignation	RunoffCoefficient C_r
Residential rural	0.30
Residential semi urban	0.40
Residential urban	0.50~0.60
Apartment professional	0.70
Neighborhood Commercial	0.85
Community Commercial	0.85
Industrial	0.70~0.75
Slumarea	0.50~0.55
Agricultural exclusive	0.25
Forest and watershed	0.20~0.25
Public facilities	0.3~0.60
Forest/ woodland	0.25
Pavedarea/road	0.99

Source: Countywide Comprehensive Plan (Master Drainage Plan) Exhibit-VIII

Catchment Area:

The size and shape of the catchment or sub-catchment for each drain shall be determined by plan metering topographic maps and by field survey. In determining the total runoff of a catchment area the following assumptions to be made:

a. The peak rate of runoff at any point is a direct function of the average rainfall for the time of concentration to that point.

b. The recurrence interval of the peak discharge is same as the recurrence interval of the average rainfall intensity.

c. The Time of Concentration is the time required for the runoff to become established and flow from the most distant point of the drainage area to the point of discharge.

Projection

In implementing various infrastructures for development, drainage is generally given less priority and is normally considered to be the last or final steps for development. Such scenario is particularly true for Bangladesh; although different types of drainage infrastructures are among others by far the heaviest impact on physical infrastructure network. As a result, physical environment, health, hygiene and standard of living suffer seriously. In development projects, Government, Semi-government and Public sector allocated funds are mostly spent on buildings, roads and other more visible infrastructures and drainage comes as the last item of development. By the time, drainage development begins to start, there appears shortage of fund, consequently as a matter of policy-do little or do-nothing situation appears and as eyewash very little is done for drainage development. In case of urban development, if drainage is not given priority, sufferings of the inhabitants will continuously increase with the passage of time.

Drainage development for urbanization should start with drains. Drains can be classified as Plot drains, Block drains, Tertiary drains, Secondary drains and Primary drains. Other natural drainage

infrastructure is lowland, outfall areas, khals and rivers. Man-made drains are Plot, Block, Tertiary, Secondary and Primary drains and others are natural drainage infrastructures. In planning for drainage network, care will be given on road network in terms of conflict of drainage and waterways with roads. In the following and subsequent sections major element, their principle, purpose and function of drainage infrastructures are discussed and presented in lower to higher order which will be considered as a method for drainage plan.

Plot Drains

Plot drains are provided around a building on a plot. In most cases, the drain is made of bricks and is rectangular in shape that can carry storm water generated in the plot and from the building. Plot drain is connected to the Block or Mohallah drain.

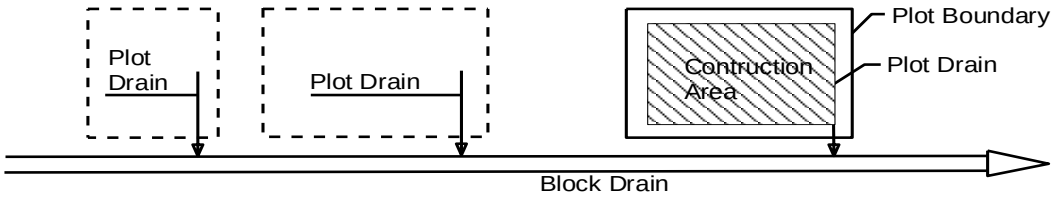


Fig 12-1: A sketch showing plot and block drain

Block Drain

Block drain is provided at the outside of a block that accommodates several buildings of the block. The block drains are made of bricks like plot drains but bigger in size so that it can serve the storm water generated within the block and the buildings and open areas within the block. Sometimes the block drain may serve few neighboring blocks or Mohallahs. Block drains carry storm water coming from the plot drains. Shape of the block drain is also rectangular, bigger than plot drains and its bottom is lower than plot drain. Sketch of the plot drain also shows the block or Mohallah drain under plot drain.

Other Drainage Related Infrastructures

In order to facilitate or mitigate drainage issues some infrastructures are provided or used, these are namely

i. Bridges, culverts, box culverts
ii. Drainage sluices, pipe sluices, siphons
iii. Flood protection embankments and flood walls
iv. Sluice gates, Regulators, Navigation lock
v. Flood protection and drainage structures.

i. Bridges, Culverts and Box Culverts

These structures are provided at places wherever roads cross the drainage network system. Such structures are built on the roads to free passage of drainage water and sometimes to provide navigation/ boat passages. Consequently the conflict between drainage and road networks is mitigated. Figures below show bridge and culverts in such system.

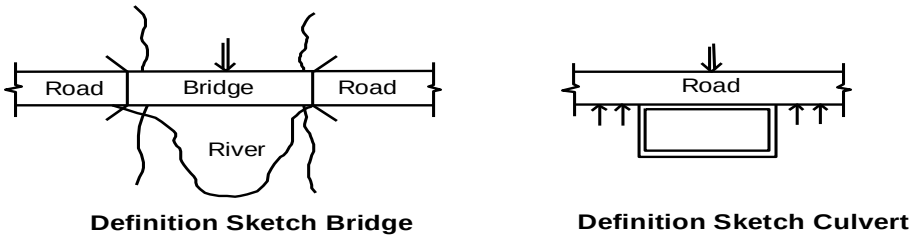


Fig 12-2: Bridge and culvert

ii. Drainage sluices, pipe sluices and siphons

Drainage sluices, pipe sluices and siphons are provided on the embankments. Embankments protect the area from floods coming from outside rivers and make the project area flood free. However storm water from rainfall-runoff within the area causes localized flood, drainage congestion and submergence. A sketch below shows a few of such structures.

A schematic view of Drainage sluice, pipe sluice and siphon on embankment which relieve drainage congestion.

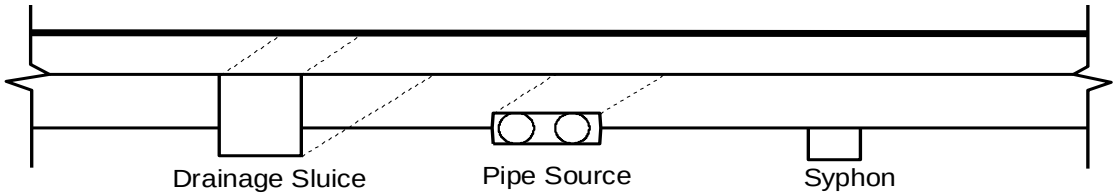


Fig 12-3: A schematic view of Drainage sluice, pipe sluice and siphon on embankment which relieve drainage congestion.

Primary Drain

Primary drains are also called main drains. Primary drains cover larger storm drainage area than tertiary and secondary drains. Sometimes primary drain bears local name. In ascending order its position is third. Its cross-section is larger than other types; carrying capacity is high and is constructed of brick, cement concrete and sometimes reinforced concrete. Primary drains may be of earthen structure provided sufficient land is available and land value is low. Contributing drainage water comes from tertiary and secondary drains. Primary drains discharge its drainage water to outfall, natural khal, river or large lowland area / Beels.

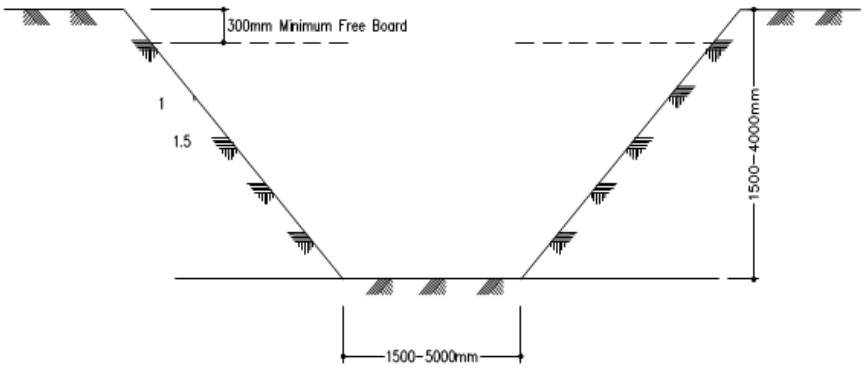


Fig 12-4: Typical Earthen drain

Secondary Drain

Secondary drains collect discharge from tertiary drains. One secondary drain may receive drainage discharges from several tertiary drains in its course. Size and capacity of secondary drain is much bigger than tertiary drains; its catchment area is much bigger than tertiary drain. Like tertiary drain, it may run parallel to bigger roads. Secondary drains may run along and through the middle of its storm water contributing area.

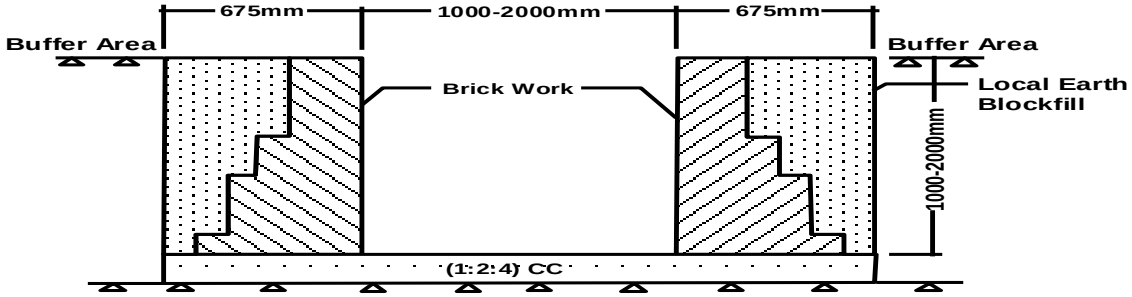


Fig 12-5: A Typical Secondary Drain

Tertiary Drain

Tertiary drain carry run-off or storm water received from the above mentioned plot drains and block or Mohallah drains. Their catchment area or storm water contributing area is bigger than Mohallah drains. In most Paurashava areas it is difficult to find such naming or classifications. However, such classifications can be seen in references. Tertiary drains generally are the under jurisdiction of Paurashava. Those drains or drainage networks are constructed and maintained directly by the Paurashava.

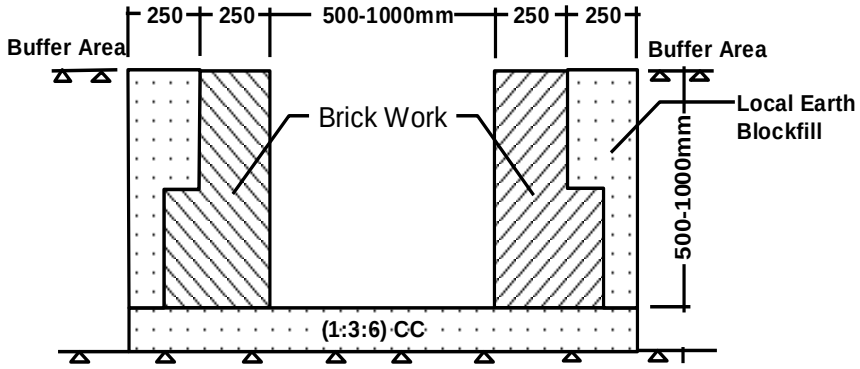


Fig 12-6: A Typical Tertiary Drain

Reservoirs

Large tanks, ponds, Dighis, lakes, etc. serve as immediate detention areas for storm water. Those structures are man-made and also natural; may be privately owned or government-owned or khas land. These structures function as drainage relief and source of water for emergency use, fisheries, duckeries, environment and nature preservation. For every mouza such reservoir is available. Physical feature survey maps and field survey maps (tank, pond and reservoir) show the existence of reservoirs and database shows their dimensions. Those structures should not be disturbed or removed by physical interventions by fillings or other means rather should be properly maintained and preserved.

Quaternary Drain

Quaternary Drains had to be introduced in this particular project due to the complexity of the existing system. These drains are the smallest parts of a large drainage system. It takes the discharge of a small area to a tertiary drain. These are the smallest drains considering the depth and width.

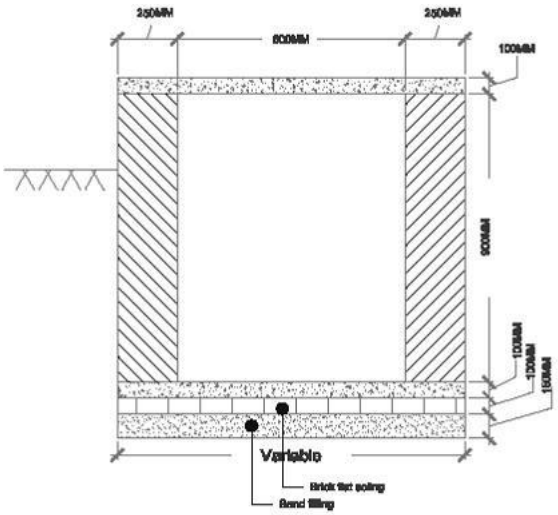


Fig 12-7: A Typical Quaternary Drain

Other kinds of drainage infrastructure are lowland, outfall areas, khals and rivers. Man made drains are Plot, Block, Tertiary, Secondary and Primary drains and others are natural drainage infrastructures. In planning for drainage network, care should be given for road network in terms of conflict of drainage and waterways with roads. In the following and subsequent sections major element, their principle, purpose and function are discussed and presented in lower to higher order.

Drainage Khals and Waterways

Khals and waterways are natural channels and act as drainage elements. In every mouza more or less such natural channel, khals and waterways carry the excess storm water to the connecting river lying further in the down stream. Sometimes old and silted-up khals are re-excavated to improve drainage efficiency. Most of the natural khals carry the local storm water particularly runoff from the Mouza / Mouzas those it passes through. Khals are narrow and deep in cross-sections; on the other hand waterways are shallow and wider. Physical feature survey maps, field survey maps (river, khal / drainage) show the drainage khals and waterways and their database shows the dimensions.

12.2 Existing Drainage Network

12.2.1 Introduction

For the preparation of Drainage Plan, survey started through field reconnaissance and review of available document related to the study area. The Rohanpur Paurashava and its adjacent area have been visited several times to identify the sources of flooding, existing drainage pattern, flood flow pattern and geographical position of the study area. Field trips have also been carried out to identify the infrastructures, rivers, canals, beels, ponds etc., those required to be surveyed for preparation of maps. It is investigated whether any Drainage Plan has been prepared by any other

agency. The Mayor of Rohanpur Paurashava informed that no such plan has been prepared earlier.

12.2.2 Existing Drainage System/Network

The drainage system of the Rohanpur Paurashava has been surveyed and classified into three categories: (i) unlined natural canals and khals acting as primary drains, (ii) beels playing important role in acting as retention ponds and (iii) brick masonry secondary and tertiary drains and earthen shallow secondary drains. The natural primary drains of the Rohanpur Paurashava have emerged as a natural process following the natural slope of the ground, for the flow of storm runoff without human intervention.

Natural Drainage System:

The natural drainage network is composed with 673 water bodies in Rohanpur Paurashava out of which 170 are ponds and 482are ditches, one river and 16 khals. Total area devoted to water bodies in Rohanpur Paurashava is around 2170.02 acres.

There are natural drainage systems along roadside and the linkage between natural and man-made drainage system in somewhere. The existing two canals in north and south part of the Paurashava provide opportunity of natural drainage system.

There are linkages between natural and man-made drainage system. But how much effective and active the linkage is with the poorly maintained man-made drains is a question. Almost half of the depth of the man-made drain is filled with solid garbage's; as a result, the channel is not properly functioning (**Table 12-3**).

Table 12-3: Existing natural drainage network of Rohanpur Paurashava

Ward No	Pond		Khal		Ditch		River		Char		Total	
	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)
1	14	3.91	2	18.39	75	9.69	00	00	0	00	91	32.00
2	7	2.21	2	13.56	29	9.05	1	1001.62	3	969.33	42	1995.76
3	36	12.26	2	3.49	87	9.93	1	10.19	1	4.57	127	40.44
4	8	1.79	2	7.77	13	3.84	00	00	00	00	23	13.40
5	30	6.30	2	5.99	62	5.25	00	00	00	00	94	17.54
6	15	2.70	00	00	32	2.67	00	00	00	00	47	5.37
7	23	8.77	3	11.60	55	9.94	00	00	00	00	81	30.31
8	20	6.32	2	1.10	61	5.10	00	00	00	00	83	12.52
9	17	8.90	1	8.80	68	5.00	00	00	00	00	86	22.70
Total	170	53.16	16	70.70	482	60.45	1	1011.82	4	973.89	673	2170.02

Source: Physical Feature Survey, 2010.

Man-made Drains

The following table shows the ward-wise drainage coverage and type on the basis of construction pattern in Rohanpur Paurashava. From the table it is seen there exists Pucca and Katcha drains in Rohanpur Paurashava. The table also indicates that there is limited amount of drainage in Rohanpur Paurashava. In this Paurashava there is only 1.148 km drain. Uncovered drains are

mostly in existence with poor condition. Detail statistics of existing man-made drainage network is shown in the **Table-12-4**.

Table 12-4: Type of drain in Rohanpur Paurashava

Ward No	Length(km)		Total Length (km)
	Pucca	Katcha	
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.089	0.00	0.089
4	0.11	0.00	0.11
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.894	0.00	0.894
8	0.055	0.00	0.055
9	0.00	0.00	0.00
Total	**1.148**	0.00	**1.148**

Source: Drainage and Environmental Survey in Rohanpur Paurashava, 2010

In Rohanpur there are no mentionable long drains with designated outfall. Only the following four drains can be considered as large drain compared to other drains (**Table 12-5**).

Table 12-5: Location, start and end of some drains in Rohanpur Paurashava

Sl No	Location	Type	Ward No	Length (m)	Width (m)	Start	End (Outfall)
1	Pora Office	Pucca	3	34.188	0.4	Exixting Poura Office	Another Drain
2	Godwon	Pucca	1	44.598	1	Godwon	Pond
3	Durga Mondir	Pucca	3	106.912	.25	Durga Mondir	Ditch
4	Community Clinic	Pucca	5	429.423	1.5	Community Clinic	Another Drain
5	Godwon	Pucca	6	236.947	1.5	Godwon	Punarvoba River

Source: Drainage and Environmental Survey in Rohanpur Paurashava, 2010

In this Paurashava there is 18.03 km drain. These drains are constructed by the Paurashava.

12.2.3 Analysis on land level (Topography)

Land Levels/Spot Levels

The Total Station (TS) based surveys were conducted for measuring the spot levels/land levels of the project area (Northing, Easting, Elevation or RL). Later on these spot levels were used for generating the contour of the project area. In general the spot levels on the land were taken approximately at 50 meter intervals.

Maximum level of Rohanpur Paurashava is 29.753 m and lowest point is recorded as 15.843 m. Average elevation of RohanpurPaurashava area is derived as 21.81m. Average spot height gives the indication of relative of various wards. It seen that ward 2, 4, 6 and 5 are comparatively high land area .Details statistical summary of land levels survey are shown in **Table 12-6** and **Table 12-7** below.

Table 12-6: Summary of Spot Level Data of Rohanpur Paurashava

No.	Spot Unit	Value
1	Total Spot Number	28050
2	Maximum Height	29.753 m
3	Minimum Height	15.843m
4	Average Spot Height	21.81 m
5	Standard Deviation	1.210177 m

Source: Topographic Survey in Rohanpur Paurashava, 2010

Table 12-7: Characteristics of Land Levels of Rohanpur Paurashava

Ward No	Land Level Characteristics
Ward no 01	High
Ward no 02	High
Ward no 03	High with small low part
Ward no 04	High
Ward no 05	High
Ward no 06	High
Ward no 07	High with small low part
Ward no 08	High with small low part
Ward no 09	Low

Source: Derived from Topographic Survey Data of Rohanpur Paurashava, 2010

General Contour Descriptions

Paurashava is situated in a high land area. More interpretation can be derived from a Surface Analysis. In the following there are two maps. The first **Map 12-1** shows the contour description and **Map 12-2** surface analysis of Rohanpur Paurashava. From the surface analysis map it can be found that the north-west part of the Paurashava is comparatively higher than other areas. This part comprises of parts of ward 1, and 2. From the surface analysis map it is found that mixed use lands are usually higer than other lands and agricultural lands are low land.

Map 12-1: Contour Map of Rohanpur Paurashava

Map 12-2: Surface Analysis (IDW Method) of Rohanpur Paurashava

12.2.4 Analysis of peak runoff and identification of drainage outfalls

The size and shape of the catchments or sub-catchments for each drain shall be determined by planimeter from topographic maps and by field survey. In determining the total runoff of a catchment area the following assumptions to be made:

- The peak rate of runoff at any point is a direct function of the average rainfall intensity for the Time of Concentration to that point.
- The recurrence interval of the peak discharge is same as the recurrence interval of the average rainfall intensity.
- The Time of Concentration is the time required for the runoff to become established and flow from the most distant point of the drainage area to the point of discharge.

Regarding runoff discharge it has been observed that there are 2 numbers of Rivers passing through the Rohanpur Paurashava. Those are the only natural drainage channels which receives part of the runoff volume from part of the town.

It has been observed from the drainage network survey that some km brick masonry drains have been constructed by the Paurashava and the DPHE during last few years. Some of the drains are working properly but most of them are temporarily connected to ditches or discharging to paddy field. These drains have been constructed in an unplanned way and without considering proper outfalls. The drains are constructed as piece meal, no proper size and gradient has been maintained. As a result, with the expansion of township some of them already have to abandon. The common run-off coefficients of different types of areas are listed in**Table 12-9** below.

Table 12-8: Common Run – off coefficients for Different Types of Area

Type of Drainage Area		Run-off Coefficient: C
Business	Downtown areas	0.70 – 0.95
	Neighborhood area	0.50 – 0.70
Residential	Single – family areas	0.30 – 0.50
	Multi – units, detached	0.40 – 0.60
	Multi – units, attached	0.60 – 0.75
	Suburban	0.25 – 0.40
	Apartment dwelling areas	0.50 – 0.70
Industrial	Light areas	0.50 – 0.80
	Heavy areas	0.60 – 0.90
	Parks, cemeteries, playgrounds	0.10 – 0.35
	Rail road yard areas	0.20 – 0.40
	Unimproved areas	0.10 – 0.30
	Streets; Driveways and roofs	0.10 – 0.95
Lawns	Sandy soil, flat, 2%	0.05 – 0.10
	Sandy soil, avg, 2 – 7%	0.10 – 0.15
	Sandy soil, steep, 7%	0.15 – 0.20
	Heavy soil, flat, 2%	0.13 – 0.17
	Heavy soil, avg, 2 – 7%	0.18 – 0.22
	Heavy soil, steep, 7%	0.25 – 0.35

Source: Handbook of Hydrology, by - David R. Maidment

12.3 Plans for Drainage Management and Flood Control

12.3.1 Plan for Drain Network Development

Sustainable drainage network system, an alternative to conventional drainage is introduced to mimic natural drainage, with the aim of reducing flooding and improving the quality of water draining from urban surfaces (runoff). A comprehensive drainage network is developed leaving the existing beels and River to remain their natural form. To solve the overall drainage problem of the Rohanpur Paurashava a Drainage Plan has to prepare as integral part of Paurashava Master Plan. During preparation of land use plan special emphasis to be given to retain the existing water bodies. Special attention to be given to protect the khash lands of khals and beel from illegal encroachment and no circumstances it shall be allowed to change their nature. As part of the Drainage Plan the Paurashava to be divided into several drainage zones. Runoff from each drainage zones shall reach to the primary drains. The existing tertiary drains those will match with the proposed network will be rehabilitated, those not have to abandon.

12.3.1.1 Drain Network Plan

The activity for the relevant authority will be assisted by the preparation of the drainage master plan for the Paurashava which details the necessary corridors, plot sizes and generalized locations for:

- Storage ponds.
- Silt traps.
- River

Initially, the Paurashava will encourage implementation of the first phase recommendation of the drainage master plan. A brief summary of the proposals to be undertaken in Phase-1 is given below. Reference should be made to the Map for identification of the drainage areas referred in the text.

12.3.1.2 Proposal for Improvement of the Existing Drainage Networks

Based on the results of drainage study it is recommended for the existing drain that:

- Rehabilitate broken drains;
- Cover the open drains based on budget allocation.
- Fencing off some of the channels to prevent dumping of refuse.
- Construction of new channels and rehabilitation of old ones with enough drainage head.
- Remove all un-authorized structures, which developed on drainage structures.

In order to drain out the anticipated future peak runoff to be generated from rainfall due to increase in impervious land cover as well as built-up areas and to mitigate the vulnerability of rainfall induced flooding and water logging, some existing secondary drains have been identified for improvement. The details of improvement of identified existing drains are shown in **Table 12-9**.

Table 12-9: List of Drains for Proposed Improvement

Sl No	Location	Type	Ward No	Length (m)	Width (m)	Start	End (Outfall)	Proposed Width (m)
1	Pora Office	Pucca	3	34.188	0.4	Exixting Poura Office	Another Drain	0.8
2	Godwon	Pucca	1	44.598	1	Godwon	Pond	1.5
3	Durga Mondir	Pucca	3	106.912	.25	Durga Mondir	Ditch	0.8
4	Community Clinic	Pucca	5	429.423	0.8	Community Clinic	Another Drain	1.2
5	Godwon	Pucca	6	236.947	0.8	Godwon	Punarvoba River	1.2

Source: Drainage and Environmental Survey in Rohanpur Paurashava, 2010

Drainage corridors: If a drainage network has to be installed, the drainage originating throughout the Paurashava would be carried by means of surface drains and culverts. These should be accommodated within road reserves.

General location required: For sewerage treatment plant, large plot will be needed, preferably on outskirts of the Paurashava. For sewerage pumping station, small plots throughout the Paurashava will be needed and a system should be introduced.

Maintaining of land slope: Important component of the drainage network is land slope, which was not maintained during the construction of existing drains. The slope of the Paurashava is found towards east and southeast. Slope of all drains should maintain this direction.

12.3.1.3 List of Proposed New Drains

For effective functioning of existing drainage network, some new drains have been proposed in the project area which is listed in **Table 12-10**. The list has been prepared based of analysis of topographic map, existing drainage network, field visits and consultation with the Paurashava officials and local people. So the detail drainage master plan should get prior consideration while implementing this plan.

The proposed drains along with existing drains and other drainage infrastructures are shown in ***Map 12-3***.

Table 12-10: Proposal of New Drains

Proposed ID	TYpe	Length (m)	Phase	Width(m)	Depth (m)	Outfall
DR2	Tertiary	450.71	First Phase	0.80	1.00	Ditch
DR3	Tertiary	530.39	First Phase	0.80	1.00	Pond
DR4	Primary	1068.03	First Phase	1.20	1.50	Khal
DR6	Secondary	796.95	Second Phase	1.00	1.20	DR13
DR7	Tertiary	525.22	First Phase	0.80	1.00	DR6
DR10	Tertiary	537.73	First Phase	0.80	1.00	DR11
DR11	Secondary	2628.84	Second Phase	1.00	1.20	DR13
DR12	Secondary	1292.47	Second Phase	1.00	1.20	Khal

Proposed ID	TYpe	Length (m)	Phase	Width(m)	Depth (m)	Outfall
DR13	Secondary	1481.75	Second Phase	1.00	1.20	Ditch
DR14	Secondary	1219.32	Second Phase	1.00	1.20	DR15
DR15	Secondary	2636.14	Second Phase	1.00	1.20	DR4
DR16	Secondary	427.88	Second Phase	1.00	1.20	Khal
DR21	Tertiary	343.88	First Phase	0.80	1.00	Pond
DR22	Tertiary	574.45	First Phase	0.80	1.00	DR16
DR23	Tertiary	572.09	First Phase	0.80	1.00	DR28
DR24	Secondary	1260.22	Second Phase	1.00	1.20	DR14
DR28	Tertiary	642.53	First Phase	0.80	1.00	DR16
DR32	Tertiary	315.97	First Phase	0.80	1.00	Pond
DR33	Tertiary	505.38	First Phase	0.80	1.00	DR28
DR35	Secondary	953.67	Second Phase	1.00	1.20	Pond
DR41	Secondary	745.07	Second Phase	1.00	1.20	DR66
DR43	Secondary	573.07	Second Phase	1.00	1.20	DR35
DR49	Tertiary	287.08	First Phase	0.80	1.00	DR41
DR50	Tertiary	335.98	First Phase	0.80	1.00	DR66
DR54	Tertiary	317.01	First Phase	0.80	1.00	DR63
DR56	Secondary	1177.96	Second Phase	1.00	1.20	River
DR61	Tertiary	263.94	First Phase	0.80	1.00	Pond
DR63	Secondary	1139.64	Second Phase	1.00	1.20	DR91
DR64	Secondary	555.14	Second Phase	1.00	1.20	Pond
DR65	Secondary	563.88	Second Phase	1.00	1.20	DR35
DR66	Secondary	916.69	Second Phase	1.00	1.20	DR24
DR69	Secondary	734.82	Second Phase	1.00	1.20	River
DR71	Secondary	998.40	Second Phase	1.00	1.20	DR64
DR72	Secondary	599.87	Second Phase	1.00	1.20	Pond
DR74	Tertiary	317.96	First Phase	0.80	1.00	DR71
DR76	Tertiary	392.57	First Phase	0.80	1.00	DR210
DR77	Tertiary	252.27	First Phase	0.80	1.00	DR72
DR84	Tertiary	447.23	First Phase	0.80	1.00	DR214
DR89	Secondary	359.75	Second Phase	1.00	1.20	DR71
DR91	Secondary	1175.81	Second Phase	1.00	1.20	DR24
DR99	Tertiary	253.36	First Phase	0.80	1.00	DR82
DR101	Tertiary	290.58	First Phase	0.80	1.00	River
DR102	Tertiary	296.39	First Phase	0.80	1.00	DR93
DR112	Secondary	631.94	Second Phase	1.00	1.20	DR211
DR115	Secondary	318.61	Second Phase	1.00	1.20	DR71
DR116	Tertiary	363.44	First Phase	0.80	1.00	River
DR123	Secondary	579.14	Second Phase	1.00	1.20	DR63
DR129	Tertiary	256.00	First Phase	0.80	1.00	DR102
DR134	Tertiary	486.92	First Phase	0.80	1.00	DR217
DR143	Tertiary	269.53	First Phase	0.80	1.00	DR134
DR151	Secondary	785.94	Second Phase	1.00	1.20	Ditch
DR164	Tertiary	356.40	First Phase	0.80	1.00	DR217
DR168	Tertiary	258.51	First Phase	0.80	1.00	DR151
DR171	Tertiary	271.69	First Phase	0.80	1.00	DR56
DR173	Tertiary	539.74	First Phase	0.80	1.00	Pond

Proposed ID	TYpe	Length (m)	Phase	Width(m)	Depth (m)	Outfall
DR178	Secondary	460.06	Second Phase	1.00	1.20	DR217
DR179	Tertiary	619.51	First Phase	0.80	1.00	DR178
DR184	Secondary	921.81	Second Phase	1.00	1.20	DR202
DR185	Tertiary	282.32	First Phase	0.80	1.00	DR217
DR190	Tertiary	598.95	First Phase	0.80	1.00	DR202
DR193	Tertiary	254.16	First Phase	0.80	1.00	Pond
DR196	Tertiary	774.35	First Phase	0.80	1.00	Ditch
DR197	Secondary	859.16	Second Phase	1.00	1.20	DR202
DR198	Secondary	1258.31	Second Phase	1.00	1.20	River
DR200	Tertiary	703.22	First Phase	0.80	1.00	DR197
DR202	Secondary	1826.55	Second Phase	1.00	1.20	DR217
DR207	Tertiary	338.21	First Phase	0.80	1.00	DR120
DR210	Tertiary	589.59	First Phase	0.80	1.00	DR210
DR211	Primary	774.78	First Phase	1.20	1.50	River
DR212	Tertiary	316.31	First Phase	0.80	1.00	DR13
DR213	Primary	1243.59	First Phase	1.20	1.50	Khal
DR214	Primary	1183.11	First Phase	1.20	1.50	River
DR216	Tertiary	396.41	First Phase	0.80	1.00	Ditch
DR217	Primary	1251.57	First Phase	1.20	1.50	DR211
DR218	Secondary	433.32	Second Phase	1.00	1.20	Ditch

Map 12-3: Drainage Plan Map of Rohanpur Paurashava

12.4 Plan Implementation Strategies

Rohanpur Paurashava is affected frequently by rainfall run-off due to inability of the existing secondary and tertiary drains to drain out the run-off efficiently. There are inadequate no of secondary and tertiary drains in Rohanpur Paurashava. Presently due to lack of adequate no of secondary and tertiary drains, most of the areas of the Paurashava are subjected to water logging during the intensive rainfall in the monsoon period. The existing secondary and tertiary drains may be improved and its different component needs to link with an overall integrated system. The existing borrow pit along the highway, secondary and tertiary drains are observed to suffer from continued negligence in respect of maintenance, clearing, removal of blocking etc.

The existing borrow pit/ drains will be incorporated into the proposed system to the extent to achieve available drainage system for the Paurashava. The drainage management plan of the Paurashava has been prepared for the peak monsoon period when the drainage system stands critical and drainage problem develops due to blocking, inadequate section of the khals and obstruction in the drainage path. Therefore, adequate numbers of new secondary and tertiary drains have to be constructed, following a systemic drainage network.

12.4.1 Regulations to implement the Drainage and Flood Plan

In preparing drainage management plan, the flowing design approach has been presented in this report. In the design approach, the Consultants have considered the practical aspects of desired results, cost efficiency, durability including ease of construction and maintenance. Visible social improvements for the urban population are considered to be the most important and mitigation of the annual flooding damage is considered to be the greatest tangible benefit. Reduction of diseases, infant Morrtality and increase of life span are considered to be the greatest intangible benefits.

In line with these considerations, the following broad approach has been adopted in preparing the drainage management plan for Rohanpur Paurashava.

Land Acquisition

New land acquisition has to be kept to as absolute minimum due to the high cost and time required for acquisition. New land acquisition is negligible as most of the proposed drains passes through land owned by Paurashava or Khas land.

Storing and Detention Ponds

Existing borrow pits, ponds, low pockets within the urban areas and agricultural low lands within the fringe area, all ac as retention ponds and all these serve to delay the peak floods during heavy storms. The retention areas also recharge the aquifer water level. In the absence of internal storage areas within the Paurashava area, the existing ponds (>= 0.25 acre) , proposed retention area, low pockets etc. continue to serve as reservoir in the coming years and the Paurashava should endeavor to remain these low lands in the future.

Drainage System Capacity

The drainage systems (tertiary and secondary drain) has been designed to handle the average runoff for 1.1 year recurrence interval for tertiary drain and 2 years recurrence interval for

secondary drain from peak storms without overflowing considering the estimated development level as up to the year 2031. This means that fully built-up areas will be designed for the present situation, while areas, which are not fully built-up, will have excess capacity to handle rainfall of greater intensity during the developing period.

Drainage Channel Sections

The drainage system has been designed to handle the average annual run-off from peak storms with 100mm freeboard for tertiary drain and 150mm freeboard for secondary drain overtopping.

Three standard open channel sections are proposed to be used for the works, as shown in the following table. The rectangular pucca Type-1 drain is suitable for collection of run-off from medium size catchments areas and is proposed to be used for tertiary roadside drains and secondary drains in congested areas. Type-1 drain may be constructed from brick or reinforced concrete, as most appropriate and economical one.

The trapezoidal section of drain Type-2 and 3 are suitable for collection of run- off from medium and large catchments areas, and are to be used for secondary and primary drains in unconstructed areas. Drain Type- 2 is proposed to be pucca drain using nominal reinforced concrete with cement plaster surface to improve its flow characteristics and durability, add to reduce the long term costs of cleaning and maintenance. Drain Type-1 is also proposed to be a pucca drain using brick work lining, but may initially be constructed as an earthen (Katcha) drain suitable for future upgrading depending on the availability of land, flow requirements and cost. The bottoms of drains Type-2 and 3 are to be redesigned with a transverse slope of 1:8 (V: H) to keep the flow velocity as high as possible during the dry season.

Construction criteria and locations to be used are shown in the following **Table 12-11**.

Table 12-11: List of Construction Criteria and Locations

Sl. No.	Type of Drain	Construction Criteria	Locations to be Used
1.	Type- 1	Lined, Brick work	Tertiary and secondary improvement on the existing drains
2.	Type- 2	Lined, Brick	Secondary and primary drains
3.	Type- 3	Lined, Katcha Drain	Primary katcha drains

Trash Rack and Sumps

Trash racks and sumps are normally used to prevent debris (silt/ solid wastes) from entering into the drainage systems where major problems could occur as a result of debris accumulation. Trash racks and sumps are considered appropriate for the Paurashava situation. In the drainage management plan, locations for trash racks and sumps along the major road network will identify during preparation of final plan.

Preventive Maintenance Program

For the proper functioning of the drainage system, it is essential to have an appropriate maintenance program. The program must include inspection, enforcement, cleaning and repair. The frequency of inspection and cleaning will be dependent on the season of the year with More

frequent inspection and cleaning at the start of the rainy season and on the importance of the drain. The maintenance programs are:

a) Inspection

- Open pucca drains - monthly in general; weekly in market areas
- Covered pucca drains - monthly with drains opened in February
- Kutcha drains - monthly
- All drains - following first heavy rainfall in year

b) Cleaning

- Open pucca drains - as required
- Covered pucca drains - in February when opened
- Kutcha drains and culverts - January to February prior to rains
- All drains - as revealed by inspection

The inspections will also show where repairs are required and where encroachment into the drain and deliberate blocking of the drain is taking place. Appropriate action to enforce the regulations must be initiated immediately. The cleaning of permanently closed pucca drains and small culverts is difficult and time consuming. New drains should have removable covers to facilitate cleaning.

Responsibility of development and construction of khal/drains rests with Engineering Department. Whereas, the responsibility of cleaning and conservancy of drains is falls under the conservancy section under health department. Operation and maintenance of drains of the Paurashava involve the set vices in the following areas.

- Conservancy (Cleaning of drains)
- Mosquito killing
- Solid waste management
- Structural maintenance of drains

It is essential that the Paurashava should develop a routine preventive maintenance program for the drainage system. The structural improvements to be taken up under the project will provide a sustainable benefit. A failure to develop the capacity and methods related to preventative maintenance program will entirely eliminate the benefits of the program in the long run.

Though the needs and methods must ultimately be identified by the personnel responsible for the maintenance, it is suggested that the following guidelines should be followed for initial development of the staffing and equipment for a preventive maintenance program:

- drain should be cleaned once per month, but not less frequently than once per three month;
- task objective for I cleaner/sweeper should be 50m of primary / secondary drains, per day;
- supervisors should be provided at the rate of 1 Jamader for-each 10 sweepers, and I sanitary inspector for each 4 Jamaders;
- Adequate equipment should be provided for efficient operations of cleaning crews, including wheel barrows and miscellaneous hand tools for each drain cleaner, 3 ton dump truck for waste transport and disposal.

Based on this, standard drain cleaning crews consisting of 51 cleaners, 5 Jamaders and 2 sanitary inspectors will be adequate to carry out the routine preventive maintenance operation required to keep the system in good operating condition.

12.4.2 Implementation, Monitoring, Evaluation & Coordination of the Plan

In some specific area of Rohanpur Paurashava, there are some scattered low-lying areas which are subjected to water-logging during and after heavy rainfall in a year between July and August normally for 30-40 days. The depth of stagnant water varies between 0.25 m to 0.35m and usually lasts for 4.00 to 6.00 hours. The water—logging situation is likely to further aggravate in the years to come with increasing urbanization. The primary causes of this water-logging are as follows:

- Lack of cleaning and maintenance of the /drains
- Unplanned and under designed existing drainage system
- Obstruction and encroachments in the / drains
- Lack of construction and integration of tertiary, secondary drains and primary drain.
- Due to non-existence of drains in different places.

In order to address the above mentioned problem the following proposals have been made in the drainage master plan:

- The proposed drainage system for Rohanpur Paurashava has been planned with a view to discharges most, of the storm run-off in the River by gravity flow and no pumping is necessary.
- Under the provision of proposed drainage master plan, Major River constitute the storm water run-off delivery system and have been defined as the primary river. Timely undertaking of the drainage master plan including study is considered a timely venture to know the drainage issues within Rohanpur Paurashava and to formulate and investment project to reduce sufferings of the Paurashava residents.
- The proposed drainage management plan is justified technically, economically and socially. The priority program is recommended for implementation considering the present serious drainage problems faced by the Paurashava residents. The project after implementation will mitigate the major drainage problems in the core and semi-core area where the density of population varies from high to medium.
- The proposed drainage master plan is likely to be co-coordinated with other utility providing organizations to avoid over-lapping and duplication. As such, very close co-ordination with DPHE, BWDB and other utility organizations should be maintained during the project implementation so that, disruption does not take place in utility services.
- It is recommended that cadre cost of the first phase of the project priority program is funded as grant financing to Paurashava by ADB because the Paurashava is not in a position to implement this project from their own resources.
- The revenue collection of Rohanpur Paurashava is moderate. The Rohanpur Paurashava authority' is unable to make assessment of tax timely. Rohanpur Paurashava shall have to improve significantly in revenue collection and the efficient financial management so that the Rohanpur Paurashava can properly maintain the drainage system including the control of environmental sanitation.

- Financial sustainability is possible by increasing revenue collection efficiency with activities like more arrear collection & re-assessment of taxes in regular intervals. Re-assessment in every 5 years is recommended. Re-assessment process should commence sufficiently in advance so that appeal process could be completed prior to the effective date. Distress warrants against big-defaulters both in terms of amount due and years overdue may be executed in order to achieve good Governance & financial sustainability.

B. Environmental Management Plan

12.5 Introduction

Improvement of the environmental system has been identified as one of the highest priority needs of the Paurashava authority as well as the resident. This is an essential part for the future development of the urban areas. The main objectives of the environmental study are to assess the existing environmental condition in the Rohanpur Paurashava and to identify the future requirements of the control over environmentally critical and vulnerable areas and living things.

12.5.1 Goals and Objectives

Following are the overall objectives of environmental management plan:

- To create a sustainable living environment.
- To create awareness among citizens about livable environment.

12.5.2 Methodology and Approach to Planning

The environmental management plan consists of the Supplementary Living Environment Survey, the Comprehensive Ecological Survey and the Water Quality Survey. The Supplementary Living Environment includes water supply, land pollution, sewerage and sanitation, solid waste management, and resettlement of population due to construction of canals and primary drains. The Comprehensive Ecological Survey aims at facilitating comprehensive environmental assessment by subsequent urbanization and implementation of the drainage on the ecological elements of fauna and flora, agricultural and aqua cultural resources etc. The Water Quality Survey is the sampling and analysis of surface water from rivers, natural canals, ponds etc., and from ground water. These are required to be done to ensure necessary urban environment enhancement measures. Moreover, an overall evaluation of environmental condition due to urbanization with flood management and drainage is required in order to justify the necessity of the Drainage Plan. In planning process special attention required to reduce the insect breeding areas, and preserve and management of natural drainage area.

12.6 Existing Environmental Condition

12.6.1 Introduction

The urban environment of the Rohanpur Paurashava includes both build and natural environment. Build environment includes waste management, water, air quality, energy usage, transport network, slum improvement, and disaster mitigation. The urbanization where the build environment overburdens the natural environment cannot be sustainable. But urbanization is vital for countries economic growth. Urban centers concentrate services, infrastructure, labor, knowledge, entrepreneurship and markets.

So in every phase of planning processes all these environmental issues will be evaluated and proper measure will be taken to minimize the adverse environmental impacts on land pollution, water and air quality, biodiversity resources and marine resources by energy usage, transport network, waste management, slum improvement, disaster mitigation etc.

12.6.2 Geo-morphology

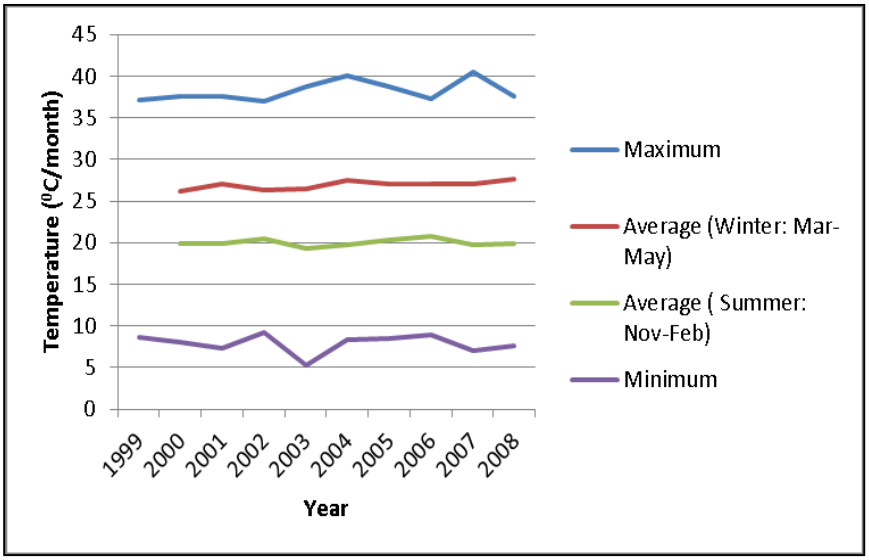
Geological condition

It is known from the agricultural officer of Rohanpur Upazila that there are several types of soils in this area. According to agricultural office at Rohanpur there is 2/3 of the soil is loomy soil. Besides, doash and sandy soil are also found there.

Morphological condition

Temperature

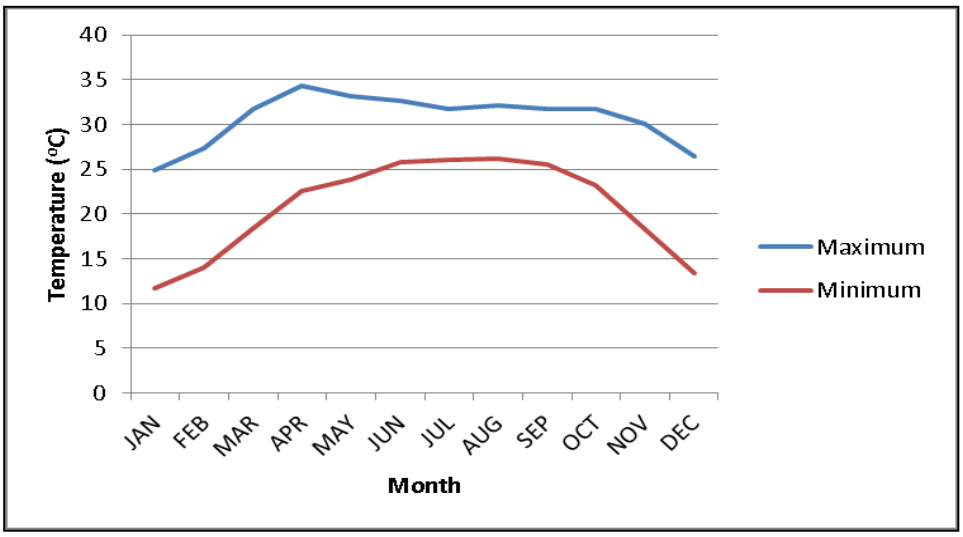
Temperature is a measurement of the average kinetic energy of the molecules in an object or system and can be measured with a thermometer or a calorimeter. It is a means of determining the internal energy contained within the system. The following figure shows the temperature characteristics of last 10 years in Rohanpur Paurashava. From the figure it is seen that maximum temperature has an increasing trend over the years.



Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-8: Temperature characteristics of last 10 years in Rohanpur Paurashava

The following figure shows the Normal Maximum and Minimum Temperature Characteristics across the year in Rohanpur Paurashava. From the figure it is seen that there exist maximum temperature in the month of April.It is also observed that in the mid-year (from April to October) the temperature is higher compared to other section of the year.

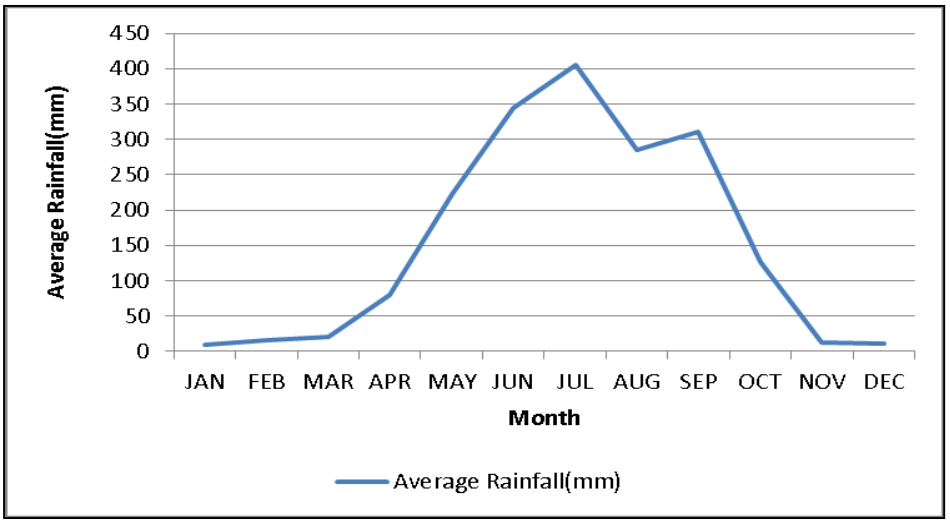


Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-9: Normal Maximum and Minimum Temperature Characteristics across the year in Rohanpur Paurashava

Rainfall

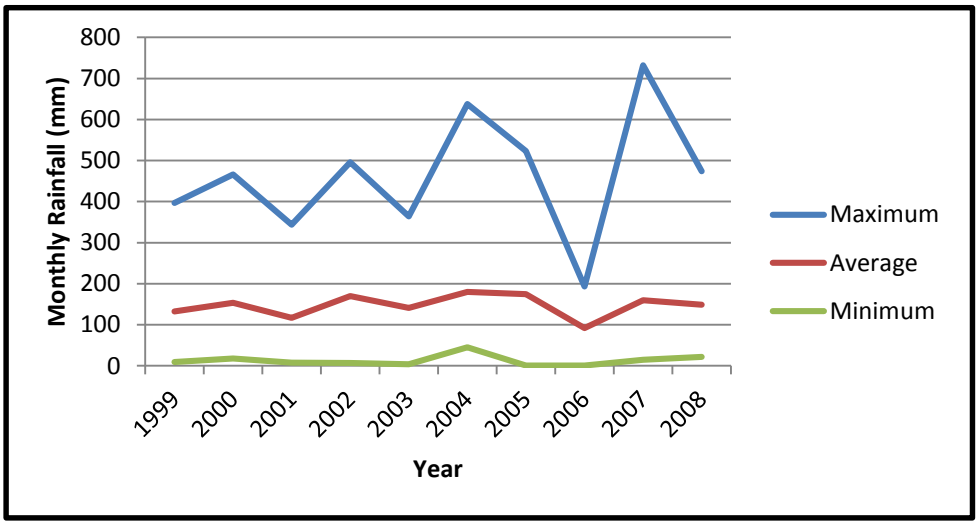
Rainfall is the amount of precipitation of any type, primarily liquid. It is usually the amount that is measured by a rain gauge. The following figure shows the Average Rainfall Characteristics across the year in Rohanpur Paurashava. From the figure it is seen that the highest rainfall occurs mainly in the month of June, July and August.



Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-10: Average Rainfall Characteristics across the year in Rohanpur Paurashava

The following figure shows the rainfall characteristics of last 10 years in Rohanpur Paurashava. From the figure it is seen that maximum rainfall has an increasing trend over the years and it becomes highest in the year 2007.

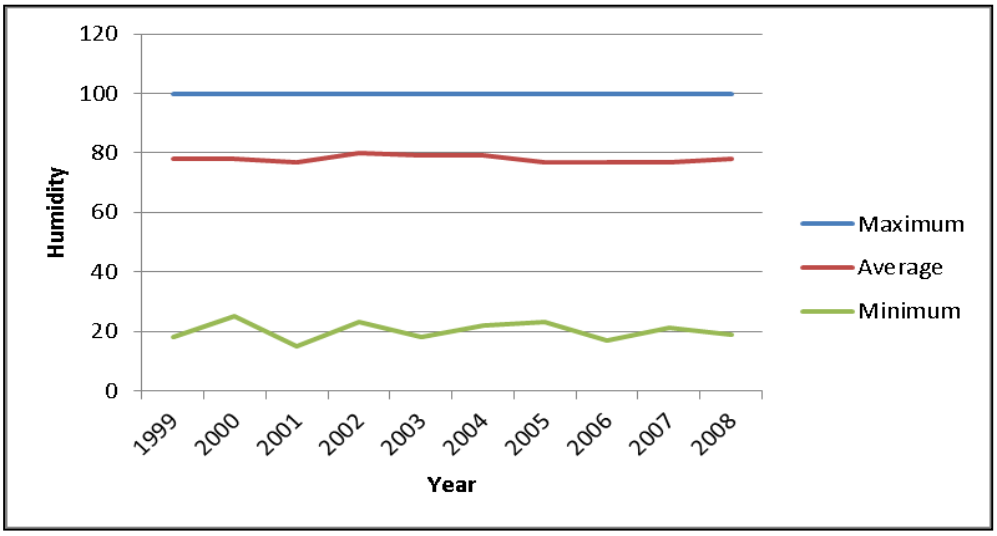


Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-11: Rainfall Characteristics for last 10 years in Rohanpur Paurashava

Humidity

The following figure shows the humidity characteristics of last 10 years in Rohanpur Paurashava. From the figure it is seen that there is no much change in humidity in Rohanpur over the years.



Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-12: Humidity characteristics of last 10 years in Rohanpur Paurashava

12.6.3 Solid Waste and Garbage disposal

The solid waste and garbage disposal of Rohanpur Paurashava includes house hold waste, industrial waste, kitchen market waste, clinic/hospital waste, latrine waste, brickfield waste and fertilizer/chemical related waste.

The production of solid waste in Rohanpur Paurashava per person per day is around 250gm. The household waste is thrown by the people to roadside drains or open spaces adjacent to their houses. The garbage from kitchen market and untreated hospital waste from UHC disposed to open space by the side of the road, drain or ditch and polluting living environment which is a great threat to human health.

12.6.4 Waste Management System

It has been observed that the solid waste management in the Rohanpur Paurashava is not well managed. Solid waste is generated from kitchen markets, Upazila Health Complex (UHC), many schools, colleges, offices and, small and cottage industries within the Rohanpur Paurashava. The Rohanpur Paurashava has no solid waste disposal system. The Paurashava has neither any dumping yard of its own nor any transfer station. The Paurashava has only two temporary cleaner engaged for cleaning the Paurashava office building only. It has no dump truck, no pull cart and no dust bin. The solid waste management coverage is only a part of the total area.

12.6.5 Pollutions

12.6.5.1 Water

Water pollution is the presence of pollutants, particles or contaminants in water beyond the level which is desirable for drinking. Saltwater encroachment associated with over drafting of aquifers or natural leaching deposits are natural sources of groundwater pollution. Most concern over groundwater contamination has centred on pollution associated with human activities. Human groundwater contamination can be related to waste disposal (private sewage disposal systems, land disposal of solid waste, municipal wastewater, wastewater impoundments, land spreading of sludge, brine disposal from the petroleum industry, mine wastes, deep-well disposal of liquid wastes, animal feedlot wastes, and radioactive wastes).

In Rohanpur Paurashava there is no significant level of ground water pollution. Here both groundwater and surface water are free from significant pollutant. One of the main reasons behind this is the absence of industrial effluents in this area and the presence of Jamuna River. Besides the generation of solid waste and municipal waste water is not a huge amount.

12.6.5.2 Air

Air pollution is the introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or damages the natural environment into the atmosphere. An air pollutant is known as a substance in the air that can cause harm to humans and the environment. Pollutants can be in the form of solid particles, liquid droplets, or gases. In addition, they may be natural or man-made. Sources for air pollution include stationary sources such as smoke stacks of power plants, manufacturing facilities and waste incinerators, as well as furnaces and other types of fuel-burning heating devices, mobile sources such as motor

vehicles and other sources such as chemicals, dust and fumes from agricultural and industrial processing.

In Rohanpur Paurashava some sorts of pollutant are found to be exposed in the air causing air pollution. For instance, emissions from vehicle exhausts of old and poorly maintained buses and trucks, loading, unloading, and carrying of sand and soil without any dust preventive measures are found within the Paurashava. But the amount of pollution is insignificant and within acceptable level. It can be mentioned that within the Paurashava there are 05 saw mils and about 08rice mills. On the other hand there are 04 flour mills. It is observed and known that the saw mills generate dusts and rich mills emit smoke which pollute environment to some extent.

12.6.5.3 Sound

Sound pollution is a type of energy pollution in which distracting, irritating, or damaging sounds are freely audible. It is displeasing human, animal or machine-created sound that disrupts the activity or balance of human or animal life. The source of most outdoor sound pollution is mainly construction and transportation systems, including motor vehicle noise, aircraft noise and rail noise. Indoor and outdoor sound pollution sources include car alarms, emergency service sirens, mechanical equipment, fireworks, compressed air horns, grounds keeping equipment, barking dogs, appliances, lighting hum, audio entertainment systems, electric megaphones, and loud people. In Rohanpur Paurashava, the source of sound pollution is found to be little. In this Paurashava there is a little incident of much construction work. The movement of motorized vehicle is also less. So sound pollution in this Paurashava is not significant and disturbing.

12.6.5.4 Arsenic

In Rohanpur Paurashava there is no significant level of ground water pollution. Here both groundwater and surface water are free from significant pollutant. Several element of ground water are in accepting level. One of the main reasons behind this is the absence of industrial effluents in this area. Besides the generation of solid waste and municipal waste water is not a huge amount. So in this Paurashava arsenic contamination is not significant.

12.6.6 Natural Calamities and Localized Hazards

12.6.6.1 Cyclone

In Rohanpur Cyclone is not a regular phenomenon. In fact till now no record is found regarding the occurrence of Cyclone passing through this Paurashava. In this Paurashava there is no Cyclone shelter because the incident of Cyclone is not regular.

12.6.6.2 River Erosion

River bank erosion is not happened in this Paurashava.

12.6.6.3 Flood

Rohanpur Paurashava in not normally affected by flood. But the Paurashava is almost regularly affected by the storm water during monsoon period but not turned into a serious issue. The existing drains generally discharge the storm water to the defined out falls.

12.6.6.4 Earthquake

Like Cyclone, Earth Quake in this area is not a regular phenomenon. Although several Earth Quake were observed in this area over the past decades but the intensity was very low and damages occurred due to Earth Quake.

12.6.6.5 Water Logging

Inundation occurs in some parts of the Paurashava due to localized storm that is affecting the drainage system of the Paurashava and creating a worse environment for the residents living in those areas.

The depth of inundation and duration varies from place of place. However, it is ranged from 0.5m to 2.5m in depth and the duration of water logging varies from 6 hrs to 20 hrs and even it lasts for several days. The reasons for water logging are as follows:

a) Absence of planned drainage system.
b) Absence of integrated drainage network of tertiary and secondary drains with primary drainage system.
c) Existing drains with low discharge capacity.
d) Indiscriminate disposal of solid waste into the drainage system that reduces the flow capacity of the whole system.
e) Lack of proper initiative for cleaning and maintenance of existing drainage system.

It is known from the local people that the Paurashava authority did not take any substantial initiative to remove or to reduce the problem of water logging.

12.6.6.6 Fire Hazard

In this Paurashava no mentionable fire hazard occurred in the last decade.

12.7 Plans for Environmental Management and Pollution Control

12.7.1 Proposals for Environmental Issues

12.7.1.1 Solid waste management Plan

Solid waste management is not yet an environmental problem in the town because of low density of population and low consumption rate. But in future population will rise and density will increase. So, solid waste will pose a major environmental problem in future. It is better to take precautionary measures now to avoid any future hazard.

A waste disposal ground is proposed at South-West corner of Ward-9 for final dumping of solid waste in order to ensure a habitable environment and to keep the urban environment free from pollution. To solve the solid waste management problem door to door collection program should be introduced. The Paurashava authority along with NGO’s and CBO’s will collect wastes from the households and storage points daily. The van will move into the wards and whistle to announce its arrival. The same vehicle will cover other institutions, societies, complexes. Thus the system will cover the whole town and finally they will dump the wastes to the proposed waste disposal ground.

A minimum charge will be fixed by the Paurashava authority for waste collection to the inhabitants. The total process is exposed under ***Fig 12-13***.

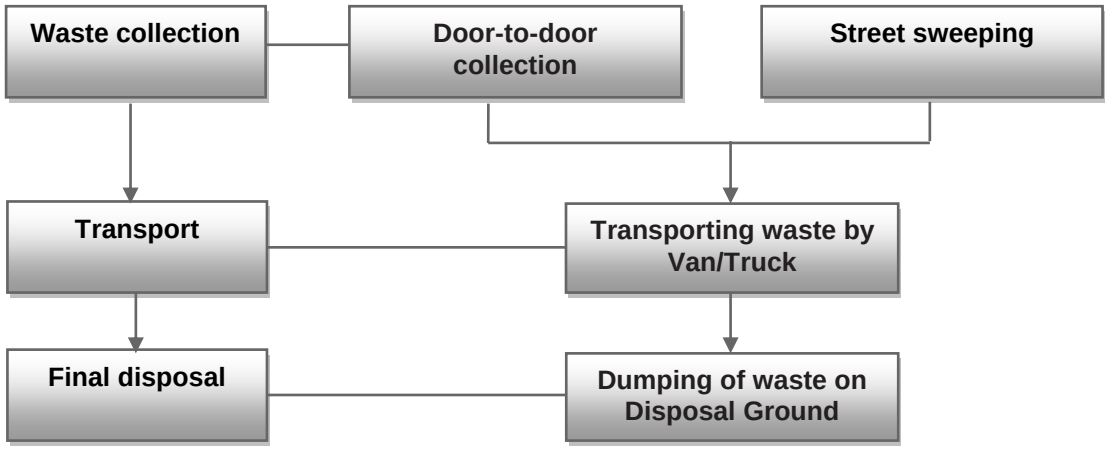


Fig 12-13: Overview of the Solid Waste Management Plan

12.7.1.2 Plan for Protecting Open Space, Wet-Land and Relevant Features

Parks and Recreational Places

A few play fields are the main recreational sites in the area. However, with implementation of this plan, new open space, playground, parks, lake, etc. will provide more leisure places for the people.

Enhancement Activities:

- Ensure new open space, playground, parks, increasing facilities to visit the river bank etc. to increase recreational facilities in the Paurashava area.
- Develop khal side as walking area with properly designed modern facilities to attract outside visitors also.

Responsible Organizations: Paurashava, Bangladesh Parjatan Corporation

Loss of Wetlands

Wetlands are mainly affected first by the urbanization process. Earth filling fills up the ponds, low land, khals. Waste water affects the aquatic ecosystem and makes the ponds, khals unproductive and as a result the aquatic plants, fishes and animals have to die or migrate to other places. Suitable urban facility attracts more residential development with the cost of filling of low cost wetland. There is no strict regulation on earth filling of ponds. However, Wetlands Conversation Act exists in Bangladesh, which is applicable only to natural beels and khals. Number of ponds in Rohanpur Paurashava is reduced every year to accommodate housing and commercial structures. Wetlands play an important role as a reservoir of rain and flood water. They are also important to maintain the balance of ecosystems and for replenishing the ground water level through seepage.

Mitigation:

- Cutting of drainage outlets to the khals and ponds.
- Avoiding wetlands during road alignment fixation.

- Stopping housing estate, industries and other development works in wetlands through earth filling.
- Stopping earth filling of ponds in Paurashava area through creation of public awareness.
- Strict implementation of Wetland Conservation Act, 2000.

Responsible Organizations: Paurashava, DOE and NG

12.7.1.3 Proposals for Pollution Control

12.7.1.3.1 Industrial

Industrialization is not prominent economic sector in Rohanpur Paurashava. With implementation of this project and establishment of Industrial Zone nearby with road, drainage, water, gas, electricity and telephone facilities will attract the promoter and NBRs to invest here and help in industrialization in the project area.

Enhancement Activities:

- Arrangement for gas pipe line in the industrial zone.
- Arrangement for water, electricity, telephone, fire-service and drainage facility in industrial zone.
- Arrangement for soft-loan for agro-industry, garments, electronics, IT etc.
- Strengthening the activities of Rohanpur Shilpa and Banik Samity (RSBS).
- Invite the national and foreign investors to visit and invest in industrial zone.
- Initiate the local entrepreneurs through incentives for industrialization.
- The existing brick fields can continue next 10 year and after that they have to relocate outside the Paurashava boundary. The existing brick field must follow Brick manufacturing (Control) Act, 1989.
- Any new brick field cannot permit in the Paurashava area.

Responsible Organizations: Board of Investment, Banks, Rohanpur Shilpa and Banik Samity

12.7.1.3.2 Air/Water/Land/Sound

Noise Pollution

Noise is unacceptable level of sound that creates annoyance, hampers mental and physical peace and may induce severe damage to the health. Along with the increasing degree of air and water pollution, noise pollution is also emerging as a new threat to the inhabitants of Paurashava. Motorized traffic is one of the major sources of noise pollution in urban areas. Although there are many sources of noise, which include industries, construction works and indiscriminate use of loud speakers, motorized traffic is the principal source of creating noise in urban areas. With the increase in the number of motorized vehicles in the city, the hazard of noise pollution has increased and exceeded the level of tolerance. The noisiest area in Rohanpur Paurashava is Chowrasta intersection

Exposure to high level of noise may cause severe stress on the auditory and nervous system of the city dwellers, particularly the children. Regular exposure to loud noise damages the hearing capability and has adverse effects on health, like increasing mental stress and blood pressure and sleeplessness, resulting in poor work performance. With expansion of urban area, the noise pollution will be increased for increasing motor vehicles, market places, industries etc.

Mitigation:

- Stop using hydraulic horn in buses, trucks and other motor vehicles.
- Declare some areas like hospitals, schools, parks, etc. as silent zone.
- Strict implementation of law.
- To control abnormally high noise from saw mill the old machines should be repaired or replaced.
- Foundation of machines should be specially prepared to reduce noise.
- Special type of silencer may be attached with the machines to reduce noise.
- Welding and blacksmith workshops can be fenced with classes to protect the passersby from possible pollution effects.
- People constantly working in welding and blacksmith workshops should wear earplugs and glasses. Regular medical checkups can be carried out to identify possible health problems.

Responsible Organizations: Paurashava, BRTA, Rohanpur Upazila Health Complex, Motor Owners Association and Labor Unions, etc.

Air Pollution

Almost all the project area has the same level of air quality. As from the standard of The Environment Conservation Rules, 1997 (ECR, 1997) the air quality of the category “Residential and rural” has the density of different air particles in the project area as follows:

- Suspended Particulate Maters (SPM) = 200 microgram per cusec meter,
- Sulpher-dioxide = 80 microgram per cusec meter,
- Carbon Monoxide = 2000 microgram per cusec meter and
- Oxides nitrogen = 80 microgram per cusec meter.

Mitigation:

- Use catalytic converter in buses, trucks, taxis and tempos.
- Use CNG instead of petrol.
- Set up 120 ft. high stack in brickfields and use filter to reduce the CO, SO2 and NO2 gases in atmosphere.
- Stop the operation of brick-fields which have grown near the homesteads, bazars and growth centers.
- Impose ban on movement of stone and sand carrying trucks using the tertiary and access roads.

Responsible Organizations: Paurashava, DOE, BRTA, DC office, Motor Owner and Labor Unions, etc.

Drainage Congestion

Drainage congestion may increase further with the present trend of development. Faulty design, slope problem in head and tail area, solid-waste and rubbish dumping, encroachment and un-authorized structures, siltation, lack of renovation and re-excavation are the main causes of drainage congestion. As a result discharge of new drainage network will create severe drainage problem in Paurashava area, particularly in monsoon period.

Mitigation:

- Excavation of the primary drainage networks specially the existing and the proposed khals.
- Re-excavate the water retention and detention area with link khals proposed in the master plan.
- Remove all un-authorized structures, developed on drainage structures.
- Make proper drainage network in new area considering the slope and local topographical condition.
- Strictly prohibit the people in dumping of rubbish and solid waste in drain.
- Regular cleaning and maintenance by the concerned authorities.

Responsible Organizations: Paurashava, LGED

Surface Water Pollution

The surface water quality of khals, ponds and ditches are polluted in respect of pH, turbidity and coliform bacteria with national standard. The present pollution level of these sites is found to be low except coliform bacteria. The main causes of surface water pollution are industrial wastewater, sanitary sewage, solid waste dumping. The present trend of development in the project area, the surface water pollution level may further increase for high volume of discharge of wastewater, sanitary sewerage, over spilling of pit and septic tank, industrial effluents, surface run-off of katcha bazars, indiscriminate solid and medical waste dumping.

Mitigation:

- Stop katcha, hanging and pit latrines.
- Create underground sewerage system for Paurashava area.
- Use pucca latrine with septic tank and soak well.
- Prohibit indiscriminate dumping of medical and solid waste in drainage, khals and river.
- Improve sanitation condition of slaughter house, fish market and katcha bazars.
- Prohibit the direct discharge of Paurashava waste water to any chhoras, low lying areas and river.
- Establish waste water and sewerage treatment plant.

Responsible Organizations: Paurashava, LGED and DOE

Groundwater Depletion

Groundwater level of Paurashava has a considerable lowering over the last few decades. It has been calculated that in 2031 the lowering of ground water level might be 20m. Eventually fall of groundwater table is a common phenomenon in project area during dry period (Feb.-May). With expansion of urbanization and industrialization, the groundwater table may further fall if present tradition of using groundwater is continued.

Mitigation:

- Use khals water for pipeline supply to households and industries.
- Use of surface water treatment plant to purify the river water and use as drinking water.
- Introduce rainwater harvesting system and use in the project area.
- Stop land filling of ponds and water bodies (area more than 0.25 acre) to maintain the groundwater level through recharge and leaching process.

Responsible Organizations: Paurashava, DPHE, and NGOs

Groundwater Pollution

Groundwater pollution due to manganese, iron and hardness is a major problem in the project area. With expansion of urban area, more dependency on groundwater sources may increase the pollution level of sub-surface water.

Mitigation:

- Use surface water of khals for supply water system.
- Introduce rain water harvesting system.
- Reduce dependency on groundwater.
- Preserve surface water in ponds, khals, ditches and rivers for irrigation.

Responsible Organization: Paurashava, LGED, BWDB, DOE and NGOs

12.7.1.3.3 Other Pollution

Any pollution other than mentioned above is not yet identified at Rohanpur Paurashava.

12.7.2 Natural Calamities and Hazard Mitigation Proposals

12.7.2.1 Plan for Addressing Natural Calamities (Structural and non-structural measures)

Earthquake

Earthquake is among the most destructive and terrifying disaster that nature can unleash. Bangladesh Sits on several seismically active faults are the focal point of tremors. Rohanpur Paurashava is located in the seismic zone 3 and so it is less vulnerable to earthquake. Earth quake of 4 to 5 magnitude has the probability of occurrence in the locality. Unplanned and unregulated urbanization and disregard to BNBC rules in building construction aggravate the situation more. With the implementation of master plan the planned urbanization will strictly follow the actual zoning plan and following of BNBC rule will minimize the earthquake damage. In DMDP Urban Area Plan Volume- II, (Part-3, Interim Planning Rules) development restriction considering the geological fault line areas states “Structures above 2 storey’s situated within 500 meters of a geological fault is not allowed unless built to the BNBC standards for Seismic Zone 3 (BNBC Section 6 Chapter 2.25)”. Similar measures are also suggested for Rohanpur Paurashava.

Enhancement Activities:

- Ensure all new buildings are designed and constructed following the guideline of BNBC.
- Development of a comprehensive plan for managing post-earthquake situation.
- Train community workers who would carry out the initial search and rescue efforts.
- Launch a massive public awareness campaign.

Responsible Organizations: Paurashava, Civil Surgeon, Civil Defence, Fire Service and DOE

Change in Topography

Topographically Rohanpur Paurashava is flat and gentle sloping. The natural topography of Paurashava area has already been changed for urbanization. The present trend of development like roads, drainage, bridge/culvert, housing and industrial estates and bazars will radically change

the natural topography and land use pattern of the area. The agricultural area will be converted into urban and semi-urban area. The present green scenic beauty will disappear, water bodies will be lost and general slope will be diminished for earth cutting due to rapid urbanization. The current effort of master plan will ensure sustainable development.

Mitigation:

- Careful planning to minimize the change of topography.
- Avoid water bodies during construction of roads, housing and industrial estates.
- Practice good architectural/engineering design during planning of housing estates, buildings and the intersections of main roads.
- Enhancement of plantation and gardening to increase the scenic beauty of the city.
- Preserve the natural greenery, ponds, khals and large water bodies.

Responsible Organizations: Paurashava, DOE and Forest Department

Land Use Change

With the implementation of master plan, the Peripheral-urban and agricultural land use will be controlled and conserved using landuse control mechanism.

Mitigation:

- Careful planning to reduce change of agricultural land use and rural set up.
- Conserve water bodies and productive agricultural land free from haphazard urban development.
- Economical use of land.

Responsible Organizations: Paurashava and Ministry of Agriculture& Livestock, DOE

12.7.2.2 Plan for Addressing Hazards

Traffic Congestion

Traffic congestion is space-based problem. It occurs at particular junction and or at a particular land use area. Urbanization and growth of population will increase movement of vehicles in and around the Paurashava. Number of rickshaws will also increase to meet the people's demand. Rickshaws will be the main cause of traffic congestion in Rohanpur Paurashava in future.

Mitigation:

- Phase wise implementation of proposed road network.
- Strict implementation of traffic rules to improve traffic management.

Responsible Organization: Paurashava, LGED, RHD

Fire Hazard

In future the probability of fire may increase for more offices, institutions, markets, growth centers and industries. Electric short-circuit is mainly responsible for fire hazards in urban area. However, human error may also cause for fire sometimes. Slums and some industries like garments and plastic products are more susceptible to fire hazards. The present fire station facility is not enough to cope with future fire hazards.

Mitigation:

- Set up one new fire station at proposed location
- Collect modern fire prevention devices.
- Refrain people from using low quality electrical wire in buildings and industries.
- Ensure periodical checking of electric lines.
- Create awareness of people about fire hazards.
- Ensure fire-fighting devices in new industries, high-rise buildings and markets.
- Strict implementation of BC rule.
- Large and medium scale water bodies should be conserved for quick and huge supply of water at the time of emergency.

Responsible Organizations: Paurashava, PDB, DOE and Fire Service and Civil Defence

Loss of Habitat

The habitat for fauna and wildlife has been losing day by day in the Paurashava area. For urbanization and industrialization, agricultural land will be disappear, water bodies will be filled up, rivers and khals will be polluted and trees will be cut down for new settlement. Birds, fishes and other animals will permanently lose their habitat and food in the urban area.

Mitigation:

- Careful planning to avoid the sensitive ecosystem.
- Minimum use of land for urbanization.
- Preservation of water bodies and khals.
- Initiate people to avoid tree cutting and vegetation clearing.

Responsible Organizations: Paurashava, DoE and NGOs

Loss of Biodiversity

Continuous expansion of the urban area will enhance the urban development in this area. Urban elements like roads, infrastructure development, housing, commercial places, industrialization etc. will replace the existing green natural environment to manmade environment. Trees will be cut down, water bodies will be filled up and polluted; garden and bush will disappear for urban expansion in new area. Wild animals, birds and fishes will lose their habitats and as a result a big loss of biodiversity will happen for urban expansion in the Paurashava area.

Mitigation:

- Avoid critical ecological area and refugee sites from development works.
- Aware people for keeping some trees and bushes around the homesteads.
- Increase tree plantation in roadsides along the river and khals and homesteads.
- Preserve the lakes for aquatic birds and fishes and some bush areas as wildlife refuge sites.
- Ban on hunting of birds and wildlife.

Responsible Organizations: Paurashava, Forest Department, Fisheries Department and NGO's

Loss of Capture Fisheries

The project area is mainly high and medium high land. Khals and low lands are very limited. Therefore, open water fisheries resources are low in the project area. Only 15-20% fish demand is met by the capture fisheries. Ponds and khals support the capture fisheries in the project area. Lowering of water level in the river also there is no water in the khals in dry season is a major reason of the damage of aquatic environment.

With the continuing urbanization, the capture fisheries will be remarkably reduced for loss of habitat due to water pollution of sewerage and drainage discharge, industrial effluent, solid waste dumping, earth filling and less flushing. Area of khals, beels and other water bodies will be reduced for land development and urbanization.

Mitigation:

- Stop direct drainage outfall to river, khals and beels.
- Set up sewerage and wastewater treatment plant.
- At the early monsoon, keep open the gates of sluices and regulators during spawning period of fish.
- Excavation of khals and natural water bodies
- Strict regulation on land filling of water body.

Responsible Organizations: Paurashava, and DOE

Loss of Ponds and Culture Fisheries

With urbanization and industrialization through this project, many ponds will be lost for land filling by the owners for increasing land value due to human pressure, settlement and development accordingly loss of fishes. There is no strict regulation on earth filling of ponds in the area.

Mitigation:

- Designate all ponds in Master Plan Map and protect the large ones according to the ecological importance and public interest.
- Protect the ponds having area more than 0.25 acre as per regulatory framework of Master Plan.
- Create public awareness about the importance of ponds and its role in culture fisheries, bathing and water reservoir for surface run-off during monsoon.

Responsible Organizations: Paurashava, DOE and DC (Land)

Loss of Productive Agricultural Land

The Master plan Project has included a vast area of agricultural land in the project area. Both highlands and lowlands fall into this project. After implementation of MP project, agricultural environment will be converted into un-productive urban and semi-urban area.

Mitigation:

The DOE EIA Guidelines emphasized on the avoidance of productive agricultural land during any development project. Therefore, it will be wise to consider more economical use of land to avoid some fertile lands. The land acquisition should be based on the growth rate of population. The

designated agricultural land in the master plan must conserve from any type development or land use change. Strict rules and regulation must be imposed to control the agricultural land.

Responsible Organizations: Paurashava and DOE

12.8 Plan Implementation Strategies

12.8.1 Regulations to Implement the Environmental Management Plan

Drainage and Environmental Management plan should be performed under the clauses in the Paurashava Act 2009 and other national rules existed in Bangladesh.

According to the second part of section 50-71 of Paurashava Ordinance:

Removal, collection and disposal of refuse

1) A Paurashava shall make adequate arrangements for the removal of refuse from all public streets, public latrines, urinals, drains, and all buildings and land vested in the Paurashava and for the collection and proper disposal of such refuse.
2) The occupiers of all other buildings and lands within the municipality shall be responsible for the removal of refuse from such buildings and lands subject to the general control and supervision of the Paurashava.
3) The Paurashava may cause public dust-bins or other suitable receptacles to be provided at suitable places and where such dust-bins or receptacles are provided, the Paurashava may, by public notice, require that all refuse accumulating in any premises or land shall be deposited by the owner or occupier of such premises or land in such dust-bins or receptacles.
4) All refuse removed and collected by the staff of the Paurashava or under their control and supervision and all refuse deposited in the dust-bins and other receptacles provided by the Paurashava shall be the property of the Paurashava."

Latrines and urinals

1) "A Paurashava may, and if so required by the Government shall, provide and maintain, in sufficient number and in proper situation, public latrines and urinals for the separate use of each sex, and shall cause the same to be kept in proper order, and to be properly cleaned.
2) The occupier of any premises to which any latrine or urinal pertains shall keep such latrine or urinal in a proper state to the satisfaction of the Paurashava and shall employ such staff for the purpose as may be necessary, or as may be specified by the Paurashava.
3) Where any premises are without privy or urinal accommodation, or without adequate privy or urinal accommodation, or the privy or urinal is on any ground objectionable, the Paurashava notice require the owner of such premises.

The privy or urinal disposed in the Paurashava's dustbin or disposal ground is the property of Paurashava."

12.8.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

Resettlement

Resettlement is a burning question for any urban development project. For Master Plan Project land will be required for roads, markets & bazars, educational organizations, housing & industrial estates, open spaces, play grounds, parks, lakes, etc. Therefore, land acquisition is required from

people in the project area. People have been living in their homesteads for many years in ancestral way and reluctant to leave their croplands and homesteads. The project authority should take proper care during land acquisition. Requisition of sensitive and conflict land area should be done in consultation with the landowners, local ward commissioners/ members/ chairmen and political persons. Without appropriate rehabilitation and compensation, no one should be evacuated from his homesteads. Slum people do not have the land right, they should be rehabilitated in new places with full compensation of housing and occupation.

Compensation

Land acquisition should be discussed with individuals affected and through participation of local people. The compensation of each affected landowner should be paid in the shortest possible time. If anyone loses his/her occupation/business/income source for land acquisition, it should be incorporated in compensation package. This would necessitate amendment of compensation rules. Persons losing their homesteads for housing project may be rehabilitated with due compensation and sanction of one plot in housing estate.

Section 12 of the Environment Conservation Act (ECA) 1995 stipulates that “no industrial unit or project shall be established or undertaken without obtaining environmental clearance from the Director General, Department of Environment, in the manner prescribed by the rules.”

The Environment Conservation Rules (ECR) 1997 have been prepared under the clause (2) (f) of the section 20 of Environment Conservation Act (ECA) 1995. The requirements of EIA for new development projects came into enforcement under the ECR 1997. These are the first set of rules promulgated under the Environment Conservation Act 1995. Among other things, these rules set out the requirements for and procedures to obtain environmental clearance. This also explains the requirements for IEE/EIA according to different categories (green, orange/amber or red) of industrial and development interventions.

During the implementation of Master plan, environmental clearance procedure will be guided by the Environment Conservation Rules 1997 of the Department of Environment. Paurashava will have the authority to approve the plan as per agreed principles in the Master plan but the owner of the plot will be obliged to get clearance from the DOE before actual implementation.

For implementation of the mitigation plan emphasis has to be laid on implementing the mitigation measures. Appropriate institutional set up will be required to implement the measures. Government must allocate sufficient budget for this purpose.

Duration, Revision and Updating

The proposed Structure Plan along with a set of policy guidelines has been provided for a period of 20 years, 2011 through 2031. However, to suit in time and space, revision and updating of the Structure Plan will be necessary at a regular interval.

Structure Plan should be regularly reviewed and updated during the end of every fifth year of the five-year term. In this way, four revisions will be carried out during its twenty years lifetime.

Chapter 13: Plan for Urban Services

This chapter describes the urban basic services development proposals for future development of the Paurashava. The proposals have been made at the town level, that is, the area under the urban area plan. The local level development proposals will be addressed in the Ward Action Plan. The development proposals deal with the basic urban services, like, water supply, drainage, sanitation, solid waste, telecommunication, electricity and gas, community facilities, education and health.

13.1 Water Supply

The Paurashava is yet to develop its own network based water supply system. The entire water supply system of the Paurashava is based on household tube well and pond. However, not many of the tube wells provide saline free drinking water. As result hand tube well water is mostly used for washing purpose. Water from ponds is mainly used for drinking. Developing a network based supply system will depend on availability of fresh water aquifer. Detailed geological investigation is required to find out fresh water aquifers. A water treatment plant of .70 acres is propose for more use of surface water. Before that is done Paurashava should take a programme to preserve and maintain all major ponds in the Paurashava. This will require taking over passion of all major waters supply ponds in the Paurashava for the greater interest of the people at large. It has been estimated that by the year 2031 there will demand for 2123.5cubic meter of water in the Paurashava each day. Currently available ponds of the Paurashava will be able to supply a significant amount of water in future, while the rest will be procured from tube wells or by the implementation of piped water supply system. Initially, Paurashava should provide more tube wells for public use.

As an alternative to drinking water supply harvesting of rain water may be explored. The idea of rainwater harvesting is unknown to the local people. NGOs working in rain water harvesting training and motivation may be engaged for this purpose. Paurashava may take initiative to prepare a programme for popularizing rain water harvesting among the Paurashava people.

13.2 Solid Waste Management

There will be 8 waste transfer stations with an area of 0.87acres for collection of solid waste located at suitable locations. A dumping site will be developed over an area of 2.12 acres for final disposal of the solid waste. The waste dumping site is located in Ward-05 at the west corner boundary of the Paurashava.Detail land use information of waste transfer station and waste dumping station is given in Table 10.17, Chapter 10 of this report.

Table 13.1: Solid Waste Management Proposals

Type of Facilities	Ward No.	Area in Acre
Waste Transfer Station	3	0.18
	6	0.04
	7	0.16
	8	0.12
Waste Dumping Ground	9	8.50

Type of Facilities	Ward No.	Area in Acre
Total		**12.15**

13.3 Sanitation

As the field survey shows, the present sanitation system of the Paurashava is composed of a variety of types, like, hanging latrine, pit latrines of different types, water sealed latrines and septic tank based sanitary latrine.

The record of sanitation condition is also not perfectly available. However according to census 2011, nearly 89% Households covered Pucca sanitary latrine and there is 3.7 % open latrine in this Paurashava.

Due to prohibitive expenditure one should not expect establishing network and treatment plant based sewerage system in the town by the Paurashava. So, for long the sanitary system of the Paurashava will remain on site. To promote healthy sanitation, Paurashava should promote low cost sanitary latrines in the town together with awareness building for healthy sanitation. It is proposed to set up public toilets in public gathering areas, like, existing and proposed bus stand, bazar and the main town center. This will cause to set up 01 number of public toilets in the town.

13.4 Electricity and Gas

Power Development Board (PDB) is mainly responsible for electricity supply in the Paurashava, supported by the Rural Electrification Board (REB). PDB works for power production and distribution, while REB is responsible for distribution only. Both, PDB and REB have their own plans for power supply in the town, which is executed in phases, depending on demand for power. In its infrastructure plan has shown the future power supply network of the town. The required electricity facility within the Paurashava will be provided through existing power system master plan of both REB and PDB. But the greatest problem of power supply in the entire country remains to be handicapped by the shortage of supply due to low production.

Area for gas related facilities is not proposed in the plan, because there is no scope for installation gas facilities in this Paurashava within the planning period. If land required in future for gas related facilities will be allocated from propose urban differed area. Gas network has been shown along all major roads and to the designated industrial site. A recent policy of the government forbids supply of gas for domestic purpose.

13.5 Telecommunication

The town enjoys the networks of all mobile and PSTN telecommunication companies operating in the country. Besides, there also exist landlines of BTCL, the national telephone company. Due to easy and cheaper access to mobile, the demand for land lines has decreased substantially.

Map 13-1: Proposed Basic Urban Services of Rohanpur Paurashava

Chapter 14: Ward Action Plan

14.1 Introduction

This chapter presents Part-C of the report which contains Ward Action Plan of each individual Ward. First, the issues prevailing in different Wards have been briefly described followed by description of Development Proposals in first ward action plan (1st to 5th year of planning period) for each Ward.

14.1.1 Background

The Ward Action Plans are prepared under the framework of Structure Plan and Urban Area Plan. The Ward Action Plans contain details of development proposals at Ward level including the problems and opportunities existing therein and also include the proposals made in the upper level plan that is in the Urban Area Plan. The Ward Action Plans have been formulated for execution within a period of 5 years.

Ward Action Plan is a vital part of the current plan package as far as spatial development and development control is concerned. Absence of Ward Action Plan not only hampers undertaking of development projects by planning authority, but also leads to uncontrolled and unwanted spatial development in the private sector. Land use zoning is also provided in the Ward Action Plan to enable detailed view of proposed land use and development.

14.1.2 Content and Form of Ward Action Plan

The Ward Action Plan is detailed area plan based on the policy framework, guideline indication of Structure Plan and more detailed guideline of Urban Area Plan. The provision of Ward Action Plan is inherent in the Structure Plan with some specific purposes. The Ward Action Plan is to:

a) Provide basic micro level infrastructure and services in the study area through systematic planning, under the framework of Structure Plan and proposals of the Urban Area Plan;
b) Create congenial environment to promote economic activities;
c) Improve drainage system and protect natural water channels from encroachment; and
d) Create service centers to promote urban growth.

14.1.3 Linkage with Structure and Urban Area Plan

Ward Action Plan is the 3rd component of the Master Plan package. The other two upper level components are Structure Plan and Urban Area Plan. Structure Plan lay down the framework of the future plan including strategy and the sectorial policies. The Urban Area Plan and the Ward Action Plan detail out development proposals under the framework of Structure Plan.

14.1.4 Approach & Methodology

The methodology could be illustrated through tri-step process for the assessment of Ward Action Plan. The first step of the methodology of Ward Action Plan is to conceptualize the content and background of the plan. In the next step, the linkage with Structure Plan & Urban Area Plan is identified. The final phase of the study is to adopt ward action plan in details. The proposal and

planning, priority tasks and cost estimation are incorporated here to get a pictorial view of the Ward Action Plan.

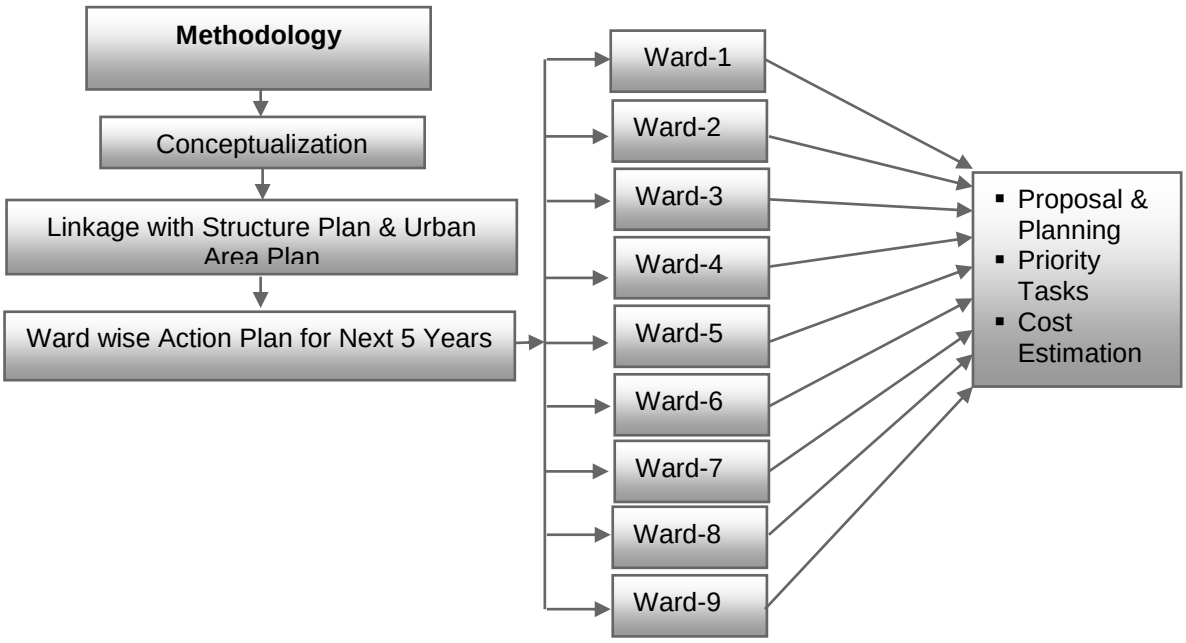


Fig 14-1: Flow Chart of Methodology

14.2 Derivation of the Ward Action Plan

The Ward Action Plan is derived from the conceptual framework, and guidelines and strategies for development under Structure Plan and detailed proposals of Urban Area Plan. Ward Action Plan is aimed to provide detailed infrastructure plan to guide the physical development of Rohanpur town including its all economic and social activities. This plan adheres to the policy directives spelled out in the Structure Plan.

14.2.1 Revisiting Structure Plan and Urban Area Plan

To guide long term growth of the Paurashava, potential locations of major development areas are identified and the Structure Plan Area is broadly classified into nine categories, namely Established Urban Area, Sub Urban Area, New Urban Area, Recreational Facility, Circulation Network, Restricted Area, Urban Peripheral Area, Agriculture Area and Water Retention Area. The Urban Area Plan is prepared under the framework of Structure Plan and the infrastructure identified for improvement and development are listed as proposals in the Urban Area Plan. The broad classification of lands in the Structure Plan and detailed proposals in the Urban Area Plan form the basis for Ward Action Plan.

14.2.2 Prioritization

The prioritization of project proposals in Ward wise Action Plan are made on the basis of urgency for development depending on the needs of people and the town's requirement for infrastructure development.

14.2.3 Ward Wise Action Plan for Next Five Years

The Ward Action Plan is prepared for each of the nine Wards and is presented in order of their serial number. The Ward Action Plans are a series of detailed spatial development plans of different use and facilities. The plans comprise maps of appropriate scale supported by explanatory report. The Ward Action Plans have been formulated for execution within a period of 5 years. They do not initially cover the entire Structure Plan area. While all sub-areas will eventually require Ward Action Plan, only priority areas are to be dealt with initially. The aim of a Ward Action Plan is to prevent haphazard urban development and ensure liveable environment in areas that are likely to be urbanized soon. Initially Detailed Area Plan should be covered for only those areas where action is needed immediately or where development pressure is high.

Public involvement is a key issue. To this end, the Paurashava has adopted a "Planning for Real" based approach which allows hands-on participation by all the residents of each local community. They help by identifying local issues and problems which the Plan can tackle; expressing their views on the Paurashavas policies; and suggesting how these could be improved. Ward Action Plan must be topical and relevant. The Paurashavas target is to ensure that they are reviewed on a 5 yearly cycle. A comprehensive Map of Ward Action Plan is shown in **Map 14-1**.

Map 14-1: Ward Action Plan Map of Rohanpur Paurashava

Ward Action Plan for Ward-01

14.3 Demographic Conditions of Ward-01

Ward No. 01 is located at the Northern part of Rohanpur Paurashava. The area of the Ward is 55.13 acres. The Population was 4107 in 2011 according to BBS.

Table 14-2: Population Statistics of Ward No. 01

Item	Year	
	2011	2031
Area (acre)	201.53	201.53
Population	4107	8331
Density of Population (per acre)	20	41

14.4 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 6.07 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 3.67 km road is pucca, 1.89 km is semi-pucca and 0.5 km is katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 20 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.5 Ward Action Plan Proposals

14.5.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Residential land and it is 91.91 acres. The second major land use is agriculture occupying about 86.24 acres. Besides, there is about 6.76 acres commercial activities and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.5.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 22.38 acres of land delineated up to the year 2031 in Ward No. 01.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 5.57 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 0.63 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 0.50 acres of land designated up to 2031.

v) Government Office

This zone covers all kind of Government offices. This zone has some gap in regard to govt. office.

vi) Rural Settlement

This zone covers about 9.92 acres within ward no. 01.

vii) Agricultural Zone

Ward No. 01 has a limited use of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 55.10 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds.

ix) Circulation Network

Existing and proposed roads covers a total of 16.16 acres of land of the whole ward.

x) Open Space

In this ward there is limited outdoor recreational space like park. So the consultants accommodate 1.55 acres of land for open space.

14.5.3 Road Network Development Plan

In road network development plan there is about 16.16 acres of land is allotted for ward no 01. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all the existing road.

Table 14-1: Proposal of Roads for Ward-01

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Access Road	New Road	NRR 457	270.49	6.12	Pucca
Access Road	Widening Road	WRR 397	261.37	6.12	Pucca
Access Road	Widening Road	WRR 390	226.51	24.46	Pucca
Access Road	Widening Road	WRR 392	207.86	6.12	Pucca

N.B.- Road above 50 m length are presented

14.5.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4187.68 meters of drains for ward no. 01 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-2: Proposal of Drain for Ward-01

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Primary	DR 211	Pucca	772.38	1.2	DR 211
Tertiary	DR 179	Pucca	619.505	0.80	DR 178
Tertiary	DR 164	Pucca	350.014	0.80	DR 217
Tertiary	DR 185	Pucca	268.65	0.80	DR 217
Tertiary	DR 168	Pucca	258.512	0.80	DR 151
Tertiary	DR 160	Pucca	242.95	0.80	DR 178
Tertiary	DR 188	Pucca	237.3	0.80	DR78
Tertiary	DR 183	Pucca	217.66	0.80	Pond
Tertiary	DR 177	Pucca	202.66	0.80	DR 217
Tertiary	DR 165	Pucca	201.71	0.80	DR 217
Tertiary	DR 181	Pucca	187.15	0.80	DR 179

**Length grater than 200 m are shown here*

14.5.5 Development Proposals of ward no-01

The urban services is the pre condition of any potential development. The proposal for service facilities of ward no 01 is shown in table 14-4 together with mouza name and plot number.

Table 14-3: Proposal for Other Facilities of Ward-01

ID	Use	Area (Acres)
CHC_6	Community Clinic	1.3
HS	High School	3.2
NM_1	Neighbourhood Market	0.17
NP_2	Neighbourhood Park	2.1
WC_1	Ward Center	1.02

Map 14-2: Action Plan Map of Ward-01

Map 14-3: Service and Drainage Network Map of Ward 01

Ward Action Plan for Ward-02

14.6 Demographic Conditions of Ward-02

Ward No. 02 is located at the west part of Rohanpur Paurashava. The area of the Ward is 207.17 acres. The Population was 3104 in 2011 according to BBS.

Table 14-4: Population Statistics of Ward No. 02

Item	Year	
	2011	2031
Area (acre)	207.17	207.17
Population	3104	6297
Density of Population (per acre)	15	30

14.7 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 4.37 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 1.57 km road is pucca, 2.00 km is semi-pucca and 0.80 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 10 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.8 Ward Action Plan Proposals

14.8.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Agricultural land and it is 84.66 acres. The second major land use is residential land occupying about 56.37 acres of the Paurashava area. Besides, there is about 3.01 acres circulation network, about 3.13 acres education & research and other lands are being used for commercial activities, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.8.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 0.94 acres of land delineated up to the year 2031 in Ward No. 02, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 1.01 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 1.52 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 3.11 acres of land designated up to 2031.

v) Government Office

This zone covers all kinds of Government Offices. There is a gap in this zone.

vi) Rural Settlement

The total area under this use has been proposed as 47.33 acres.

vii) Agricultural Zone

The Paurashava including Ward No. 02 has a little area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been designated as 77.27 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 51.47 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 11.10 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 10.06 acres of land for open space.

14.8.3 Road Network Development Plan

In road network development plan there is about 7.52 acres of land is allotted for ward no 02. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-5: Proposal of Roads for Ward-02

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Access Road	New Road	NRR 495	752.61	6.116	Pucca
Access Road	New Road	NRR 499	645.9	6.116	Pucca
Access Road	Widening Road	WRR 414	507.29	6.116	Pucca

N.B.- Road above 50 m length are presented

14.8.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4571.48 meters of drains for ward no. 02 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-6: Proposal of Drain for Ward-02

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Tertiary	DR 200	Pucca	703.22	0.80	DR 197
Tertiary	DR 190	Pucca	596.52	0.80	DR 202
Tertiary	DR 193	Pucca	254.16	0.80	Pond

14.8.5 Development Proposals of ward no-02

The urban services are the pre condition of any potential development. The proposal for service facilities of ward no 02 is shown in table 14-7 together with mouza name and plot number.

Table 14-7: Proposal for Other Facilities of Ward-02

ID	Use	Area (Acres)
CHC_7	Community Clinic	1.44
NM_5	Neighbourhood Market	0.89
NP_6	Neighbourhood Park	4.05
WC_2	Ward Center	0.56
PG_1	Playground	0.70

Map 14-4: Action Plan Map of Ward-02

Map 14-5: Service and Drainage Network Map of Ward 02

Ward Action Plan for Ward-03

14.9 Demographic Conditions of Ward-03

Ward No. 03 is located at the north eastern part of Rohanpur Paurashava. The area of the Ward is 125.75 acres. The Population was 4319 in 2011 according to BBS.

Table 14-8: Population Statistics of Ward No. 03

Item	Year	
	2011	2031
Area (acre)	125.75	125.75
Population	4319	8761
Density of Population (per acre)	34	70

14.10 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 6.82 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 4.41 km road is pucca, 1.95 km is semi-pucca and 0.46 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that

without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 10 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.11 Ward Action Plan Proposals

14.11.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Agricultural land and it is 48.42 acres. The second major land use is Residential land occupying about 45.61 acres of the Paurashava area. Besides, there is about 10.82 acres water body, about 5.34 acres circulation network, about 4.94 acres commercial activities and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.11.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 36.85 acres of land delineated up to the year 2031 in Ward No. 03, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 9.44 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 1.34 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 1.78 acres of land designated up to 2031.

v) Government Office

This zone covers 0.96 acres within this ward.

vi) Rural Settlement

The total area under this use has been proposed as 0.38 acres.

vii) Agricultural Zone

The Ward No. 03 has a little amount of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been designated as 44.16 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 10.28 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 13.73 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 5.41 acres of land for open space.

14.11.3 Road Network Development Plan

In road network development plan there is about 13.73 acres of land is allotted for ward no 03. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-9: Proposal of Roads for Ward-03

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Local Access	Widening Road	WRR 295	388.108	6.12	Pucca
Local Access	Widening Road	WRR 192	284.95	6.12	Pucca
Local Access	Widening Road	WRR 302	194.31	6.12	Pucca
Local Access	Widening Road	WRR 308	156.9	6.12	Pucca

N.B.- Road above 50 m length are presented

14.11.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4639.81 meters of drains for ward no. 03 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-10: Proposal of Drain for Ward-03

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Primary	DR 211	Pucca	774.78	1.20	River
Tertiary	DR 134	Pucca	486.92	0.80	DR 217
Tertiary	DR 217	Pucca	479.19	0.80	DR 211
Tertiary	DR 101	Pucca	280.9	0.80	River
Tertiary	DR 143	Pucca	265.76	0.80	DR 134
Tertiary	DR 141	Pucca	208.44	0.80	DR 134

14.11.5 Development Proposals of ward no-03

The urban services are the pre condition of any potential development. The proposal for service facilities of ward no 03 is shown in table 14-11 together with mouza name and plot number.

Table 14-11: Proposal for Other Facilities of Ward-03

ID	Use	Area (Acres)
CC	Community Center	0.12
CHC_5	Community Clinic	1.1
NM_6	Neighbourhood Market	0.9
NP_3	Neighbourhood park	2.2
PG_4	Playground	1.2
WC_3	Ward Center	0.7

Map 14-6: Action Plan Map of Ward-03

Map 14-7: Service and Drainage Network Plan Map of Ward 03

Ward Action Plan for Ward-04

14.12 Demographic Conditions of Ward-04

Ward No. 04 is located at the eastern part of Rohanpur Paurashava. The area of the Ward is 135.39 acres. The Population was 3662 in 2011 according to BBS.

Table 14-12: Population Statistics of Ward No. 04

Item	Year	
	2011	2031
Area (acre)	135.39	135.39
Population	3662	7429
Density of Population (per acre)	27	55

14.13 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 3.14 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 0.51 km road is pucca, 2.59 km road is semipucca and 0.041 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 27 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.14 Ward Action Plan Proposals

14.14.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Agricultural land and it is 65.16 acres. The second major land use is Residential land occupying about 55.93 acres of the Paurashava area. Besides, there is about 5.50 acres waterbody and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.14.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 14.42 acres of land delineated up to the year 2031 in Ward No. 04, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 0.81 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 1.15 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 0.54 acres of land designated up to 2031.

v) Government Office

This zone covers 0.40 acres of land under this ward.

vi) Rural Settlement

The total area under this use has been proposed as 31.98 acres.

vii) Agricultural Zone

The Ward No. 04 has a little amount of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been designated as 107.69 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 124.51 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 215.43 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 3.75 acres of land for open space.

14.14.3 Road Network Development Plan

In road network development plan there is about 215.43 acres of land is allotted for ward no 04. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-13: Proposal of Roads for Ward-04

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Local Access	Widening Road	WRR 191	425.33	6.116	Pucca
Local Access	Widening Road	WRR 216	141.45	6.116	Pucca
Local Access	New Road	NRR494	62.96	6.116	Pucca

N.B.- Road above 50 m length are presented

14.14.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 3392.36 meters of drains for ward no. 04 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-14: Proposal of Drains for Ward-04

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Tertiary	DR 62	Pucca	209.75	0.80	DR 43
Tertiary	DR 67	Pucca	190.775	0.80	River

14.14.5 Development Proposals of ward no-04

The urban services are the pre condition of any potential development. Playground, Tempo stand, Eidgah, Clinic etc are proposed here. The proposal for service facilities of ward no 04 is shown in table 14-15 together with mouza name and plot number.

Table 14-15: Proposal for Other Facilities of Ward-04

ID	Use	Area (Acres)
CHC_8	Community Clinic	2.18
CP	Central Park	2.8
NM_2	Neighbourhood Market	0.22
PG_2	Playground	0.89
WC_4	Ward Center	1.15

Map 14-8: Action Plan Map of Ward-04

Map 14-9: Service and Drainage Network Plan Map of Ward 04

Ward Action Plan for Ward-05

14.15 Demographic Conditions of Ward-05

Ward No. 05 is located at the middle part of Rohanpur Paurashava. The area of the Ward is 143.10 acres. The Population was 4382 in 2011 according to BBS.

Table 14-16: Population Statistics of Ward No. 05

Item	Year	
	2011	2031
Area (acre)	143.10	143.10
Population	4382	8889
Density of Population (per acre)	31	62

14.16 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 10.27 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 5.48 km road is pucca, 3.22 km is semi-pucca and 1.57 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 31 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.17 Ward Action Plan Proposals

14.17.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Residential land and it is 60.73 acres. The second major land use is Waterbody occupying about 21.48 acres of the Paurashava area. Besides, there is about 13.58 acres Commercial activities, about 9.33 acres Circulation Network and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.17.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 50.20 acres of land delineated up to the year 2031 in Ward No. 05, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 12.94 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 2.22 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 7.25 acres of land designated up to 2031.

v) Government Office

This zone covers 9.65 acres of land under this ward.

vi) Rural Settlement

The total area under this use has been proposed as 3.9 acres.

vii) Agricultural Zone

This zone covers any type of agricultural land constituting 0.43 acres of land.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 20.54 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 16.3 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 6.13 acres of land for open space.

14.17.3 Road Network Development Plan

In road network development plan there is about 16.3 acres of land is allotted for ward no 05. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-17: Proposal of Roads for Ward-05

Existing Road Type	Proposed Road Type	ID	Length (k.m)	Proposed Width (m)	Proposal Type
Access Road	Widening Road	WRR188	766.3	6.116	Pucca
Access Road	Widening Road	WRR 209	605.82	6.116	Pucca
Access Road	Widening Road	WRR 218	446.0	6.116	Pucca

N.B.- Road above 50 m length are presented

14.17.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 8847.55 meters of drains for ward no. 05 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-18: Proposal of Drain for Ward-05

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Tertiary	DR 116	Pucca	363.44	0.80	River
Tertiary	DR 207	Pucca	338.21	0.80	DR 120
Primary	DR 214	Pucca	338.06	1.20	River
Tertiary	DR 74	Pucca	317.96	0.80	DR 71
Tertiary	DR 61	Pucca	263.95	0.80	Pond
Tertiary	DR 99	Pucca	253.36	0.80	DR 82
Tertiary	DR 77	Pucca	252.27	0.80	DR 72
Tertiary	DR 120	Pucca	229.11	0.80	DR 89
Tertiary	DR 83	Pucca	208.77	0.80	DR 71
Tertiary	DR 82	Pucca	201.57	0.80	DR 74

14.17.5 Development Proposals of ward no-05

The urban services are the pre condition of any potential development. Playground, Tempo stand, Eidgah, Clinic etc are proposed here. The proposal for service facilities of ward no 05 is shown in table 14-19 together with mouza name and plot number.

Table 14-19: Proposal for Other Facilities of Ward-05

ID	Use	Area (Acres)
NM-3	Neighborhood Market	0.42
WC-5	Ward Centre	0.49
NP-4	Neighbourhood Park	2.5
PKS-1	Primary School	1.2

ID	Use	Area (Acres)
PG_5	Playground	1.3
TMS_1	Tempu Stand	0.05

.

Map 14-10: Action Plan Map of Ward-05

Map 14-11: Service and Drainage Network Plan Map of Ward 05

Ward Action Plan for Ward-06

14.18 Demographic Conditions of Ward-06

Ward No. 06 is located at the middle part of Rohanpur Paurashava. The area of the Ward is 404.69 acres. The Population was 6509 in 2011 according to BBS.

Table 14-20: Population Statistics of Ward No. 06

Item	Year	
	2011	2031
Area (acre)	404.69	404.69
Population	6509	13204
Density of Population (per acre)	16	33

14.19 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 10.10 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 2.56 km road is pucca, 5.47 km is semi-pucca and 2.06 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 16 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.20 Ward Action Plan Proposals

14.20.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Residential land and it is 194.58 acres. The second major land use is Agricultural land occupying about 111.16 acres of the Paurashava area. Besides, there is about 66.09 acres Waterbody, about 8.13 acres Circulation Network, about 8.10 acres commercial activities and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.20.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 31.14 acres of land delineated up to the year 2031 in Ward No. 06, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 6.5 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 0.90 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 3.55 acres of land designated up to 2031.

v) Government Office

This zone covers some land under this ward covering 0.56 acres within this ward.

vi) Rural Settlement

There is about 140.10 acres of land covered under this zone.

vii) Agricultural Zone

The Ward No. 06 has 106.62 acres of agricultural land that demands formation of a separate zone like, agriculture zone.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 65.15 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 33.56 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 6.5 acres of land for open space.

14.20.3 Road Network Development Plan

In road network development plan there is about 33.56 acres of land is allotted for ward no 06. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Existing Road Type	Proposed Road Type	ID	Length (k.m)	Proposed Width (m)	Proposal Type
Access Raod	New Road	NRR 466	1481.7	6.116	Pucca
Access Raod	New Road	NRR 465	558.4	6.116	Pucca
Access Raod	New Road	NRR 207	498.79	6.116	

N.B. - Road above 50 m length are presented

14.20.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 9676.11 meters of drains for ward no. 06 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-22: Proposal of Drain for Ward-06

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Tertiary	DR 210	Pucca	589.59	0.80	DR 210
Tertiary	DR 173	Pucca	539.74	0.80	Pond
Tertiary	DR 196	Pucca	529.16	0.80	Ditch
Primary	DR 214	Pucca	528.82	1.2	River
Tertiary	DR 76	Pucca	392.57	0.80	DR 210
Tertiary	DR 84	Pucca	331.02	0.80	DR 214
Tertiary	DR 54	Pucca	317.01	0.80	DR 63
Tertiary	DR 102	Pucca	296.39	0.80	DR 93
Tertiary	DR 171	Pucca	271.69	0.80	DR 56
Tertiary	DR 129	Pucca	256	0.80	DR 102
Tertiary	DR 199	Pucca	241.87	0.80	DR 53
Tertiary	DR 50	Pucca	236.62	0.80	DR 66

14.20.5 Development Proposals of ward no-06

The urban services are the pre condition of any potential development. Playground, Tempo stand, Eidgah, Clinic etc are proposed here. The proposal for service facilities of ward no 06 is shown in table 14-23 together with mouza name and plot number.

Table 14-23: Proposal for Other Facilities of Ward-06

ID	Use	Area (Acres)
NP-5	Neighborhood Park	3.3
NM-7	Neighborhood Market	1.08
WC-6	Ward Center	0.75
PG-3	Playground	1.01
WTS_1	Waste Transfer Station	0.04
CHC-4	Community Clinic	1.04

Map 14-12: Action Plan Map of Ward-06

Map 14-13: Service and Drainage Network Plan Map of Ward-06

Ward Action Plan for Ward-07

14.21 Demographic Conditions of Ward-07

Ward No. 07 is located at the eastern part of Rohanpur Paurashava. The area of the Ward is 452.84 acres. The Population was 4123 in 2011 according to BBS.

Table 14-24: Population Statistics of Ward No. 07

Item	Year	
	2011	2031
Area (acre)	58.64	58.64
Population	4123	8364
Density of Population (per acre)	9	18

14.22 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 9.50 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 3.82 km road is pucca, 3.30 km is semi-pucca and 2.37 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 08 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.23 Ward Action Plan Proposals

14.23.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Agricultural land and it is 318.66 acres. The second major land use is Residential land occupying about 89.79 acres of the Paurashava area. Besides, there is about 18.25 acres Waterbody, about 9.94 acres Circulation Network, about 2.94 acres Commercial activities and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.23.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 28.19 acres of land delineated up to the year 2031 in Ward No. 07, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 4.35 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 5.46 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 6.46 acres of land designated up to 2031.

v) Government Office

This zone covers no land within this ward.

vi) Rural Settlement

This zone covers 43.54 acres of land within this ward.

vii) Agricultural Zone

The Ward No. 07 has a vast amount of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been designated as 286.13 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 15.29 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 31.43 acres of land of the whole ward.

14.23.3 Road Network Development Plan

In road network development plan there is about 31.43 acres of land is allotted for ward no 07. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-25: Proposal of Roads for Ward-07

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Access Road	New Road	NRR454	255.635	6.12	Pucca
Access Road	New Road	NRR463	743.924	6.12	Pucca
Access Road	Widening Road	WRR150	24.353	6.12	Pucca
Access Road	Widening Road	WRR120	190.918	6.12	Pucca
Access Road	Widening Road	WRR121	93.403	6.12	Pucca
Access Road	Widening Road	WRR114	61.898	6.12	Pucca
Access Road	Widening Road	WRR81	170.395	6.12	Pucca
Access Road	Widening Road	WRR75	87.986	6.12	Pucca
Access Road	Widening Road	WRR67	206.478	6.12	Pucca
Access Road	Widening Road	WRR62	471.626	6.12	Pucca

N.B.- Road above 50 m length are presented

14.23.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 8442.02 meters of drains for ward no. 07 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-26: Proposal of Drain for Ward-07

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Tertiary	DR 28	Pucca	642.53	0.80	DR 16
Tertiary	DR22	Pucca	574.45	0.80	DR 16
Tertiary	DR23	Pucca	572.09	0.80	DR 28
Tertiary	DR33	Pucca	505.38	0.80	DR 28
Tertiary	DR216	Pucca	396.41	0.80	Ditch
Tertiary	DR21	Pucca	343.88	0.80	Pond
Tertiary	DR 212	Pucca	316.31	0.80	DR 13
Primary	DR 214	Pucca	316.23	1.20	River
Tertiary	DR32	Pucca	315.98	0.80	Pond

14.23.5 Development Proposals of ward no-07

The urban services are the pre condition of any potential development. Playground, Tempo stand, Eidgah, Clinic etc are proposed here. The proposal for service facilities of ward no 07 is shown in table 14-27 together with mouza name and plot number.

Table 14-27: Proposal for Other Facilities of Ward-07

ID	Use	Area (Acres)
NP_8	Neighborhood Park	4.51
PG_7	Playground	2.42
CHC_3	Community Clinic	2.01
NM_9	Neighborhood Market	1.36
WC_7	Ward Center	1.09
BT	Bus Terminal	2.24
SAH	Slaughter House	1.62
TT	Truck Terminal	3.03
TMS_3	Tempo Stand	0.18
WTS_3	Waste Transfer Station	0.16
GIA	Industrial Area (Partial)	32.35

Map 14-14: Action Plan Map of Ward-07

Map 14-15: Service and Drainage Network Plan Map of Ward-07

Ward Action Plan for Ward-08

14.24 Demographic Conditions of Ward-08

Ward No. 08 is located at the south eastern part of Rohanpur Paurashava. The area of the Ward is 633.97 acres. The Population was 3255 in 2011 according to BBS.

Table 14-28: Population Statistics of Ward No. 08

Item	Year	
	2011	2031
Area (acre)	633.97	633.97
Population	3255	6603
Density of Population (per acre)	5	10

14.25 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 8.32 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 3.82 km road is pucca, 2.72 km road is semipucca and 1.78 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 05 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.26 Ward Action Plan Proposals

14.26.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Agricultural land and it is 499.00 acres. The second major land use is Residential land occupying about 96.59 acres of the Paurashava area. Besides, there is about 21.36 acres Waterbody, about 7.76 acres circulation network, about 0.92 acres commercial activities and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.26.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers no land delineated up to the year 2031 in Ward No. 08, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 1.09 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 0.84 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 0.85 acres of land designated up to 2031.

v) Government Office

This zone covers no land within this ward.

vi) Rural Settlement

The total area under this use has 111.78 acres of land.

vii) Agricultural Zone

The Ward No. 08 has some agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been designated as 455.15 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 23.92 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 30.99 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 1.57 acres of land for open space.

14.26.3 Road Network Development Plan

In road network development plan there is about 30.99 acres of land is allotted for ward no 08. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-29: Proposal of Roads for Ward-08

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Access Road	Widening Road	WRR13	357.06	6.12	Pucca
Access Road	New Road	NRR504	174.78	6.12	Pucca

N.B.- Road above 50 m length are presented

14.26.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 7111.11 meters of drains for ward no. 08 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-30: Proposal of Drain for Ward-08

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Primary	DR 213	Pucca	1243.59	1.20	Khal
Tertiary	DR 10	Pucca	537.73	0.80	DR11
Tertiary	DR 7	Pucca	525.22	0.80	DR6
Tertiary	DR 8	Pucca	148.58	0.80	Khal
Tertiary	DR 9	Pucca	153.41	0.80	DR11
Tertiary	DR 5	Pucca	51.16	0.80	Pond

14.26.5 Development Proposals of ward no-08

The urban services are the pre condition of any potential development. Playground, Tempo stand, Eidgah, Clinic etc are proposed here. The proposal for service facilities of ward no 08 is shown in table 14-31 together with mouza name and plot number.

Table 14-31: Proposal for Other Facilities of Ward-08

ID	Use	Area (Acres)
CHC_2	Community Clinic	1.31
NM_4	Neighborhood Market	0.73
NP_1	Neighborhood Park	1.28
WC_8	Ward Center	0.79
LIH	Low Income Housing	11.14
RSZ	Resettlement Zone	17.12
TMS_4	Tempo Stand	0.43
WTS_2	Waste Transfer Station	0.12

Map 14-16: Action Plan Map of Ward-08

Map 14-17: Service and Drainage Network Plan Map of Ward-08

Ward Action Plan for Ward-09

14.27 Demographic Conditions of Ward-09

Ward No. 09 is located at the most southern part of Rohanpur Paurashava. The area of the Ward is 1272.97 acres. The Population was 4869 in 2011 according to BBS.

Table 14-32: Population Statistics of Ward No. 09

Item	Year	
	2011	2031
Area (acre)	81.08	81.08
Population	4869	9877
Density of Population (per acre)	4	8

14.28 Critical Issues and Opportunities of the Ward

a. Critical Issues

i. Problems of Road Infrastructure

The ward is not served by adequate number of roads. The total length of roads in the ward is only 10.89 km. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. Another problem of roads is that they are meandering in their layout. All these will pose serious problems in movement when population rises in the ward. Quality of roads on average is not satisfactory. Only about 3.71 km road is pucca, 3.40 km is semi-pucca and 3.79 km road is Katcha.

ii. Poor Drainage

The ward does not have adequate drainage network serving the entire area. All the households do not have drainage outlet to discharge their waste water. Lack of drainage, though, is not a serious problem now but will emerge as a critical problem as density of population increases in future. In future due to construction the net run off area will increase that will cause water logging at places. So, necessary arrangements will have to be made now to get rid of future drainage problems.

iii. Haphazard Development

Like all other urban areas, unplanned development is a typical characteristic of this ward. Land owners are building their houses and structures anywhere. There is no land use plan, no adherences to building constructions are observed. This is not only destroying the aesthetic of the area but also its livable environment.

iv. Water Supply

Like all other wards water supply is also a critical problem in this ward. Tubewell is the main source of drinking and washing. When population will increase the existing ponds will be inadequate to supply adequate water for the local people that will lead to severe water crisis. More over, there are no arrangements for proper maintenance of the ponds. There is likelihood that without proper maintenance caretaking the ponds might get polluted by unhygienic use of water that will endanger health of the local people.

v. Low Density of Population: Problem for Providing Infrastructure

Infrastructure development is not cost effective if the density of population remains very low. The cost of service line is the same for all sizes of population. So, if the population size is small more cost has to be incurred per head of population for providing infrastructure, which is not cost effective.

vi. Lack of Threshold Population for Business

The town possesses a very low level of population which is not adequate to run large retail business activities. This size of population will not help grow the local economy grow. Besides, the average income of the people is also very low which is not conducive to economic flourishment of the town. Higher the size of population more demand is created for goods and services leading to more economic activities and employment. No urban centre can flourish without adequate economic prosperity.

b. Development Opportunities

i. Low Density of Population

The present density of population in the ward is low, only 4 persons /acre. From environmental point of view this of population can create a very livable environment for the area with respect to ventilation, use of road and other basic services.

ii. Potential for Small Scale Manufacturing

Cheap labour, availability of raw materials can help grow small scale manufacturing in this town. Jewelry, handicrafts of different kinds, small engineering can be developed here. This, however, would require local initiative. Local entrepreneurs may be provided with small capital to serve as incentive.

14.29 Ward Action Plan Proposals

14.29.1 Riview of Existing Land Use

Study of existing land use of the ward reveals that major land use goes to Agricultural land and it is 1091.62 acres. The second major land use is Residential land occupying about 155.51 acres of the Paurashava area. Besides, there is about 9.7 acres Circulation Network, about 7.49 acres Waterbody, about 2.53 acres Commercial activities and other lands are being used for education, community service, government services, manufacturing or industry, service activity, Urban green space and vacant.

14.29.2 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 58.02 acres of land delineated up to the year 2031 in Ward No. 09, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 2.61 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 5.78 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 2.08 acres of land designated up to 2031.

v) Government Office

This zone covers no land within this ward.

vi) Rural Settlement

The total area under this use has been kept 81.56 acres of land.

vii) Agricultural Zone

The Ward No. 08 has some agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been designated as 1016.84 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. Total waterbody in this ward covers 4.84 acres.

ix) Circulation Network

Existing and proposed roads covers a total of 42.41 acres of land of the whole ward.

x) Open Space

In this ward there is no outdoor recreational space like park etc. So the consultants accommodates 5.54 acres of land for open space.

14.29.3 Road Network Development Plan

In road network development plan there is about 42.41 acres of land is allotted for ward no 09. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered for all of the existing road.

Table 14-33: Proposal of Roads for Ward-09

Existing Road Type	Proposed Road Type	ID	Length (m)	Proposed Width (m)	Proposal Type
Access Road	Widening Road	WRR3	397.65	6.12	Pucca
Access Road	Widening Road	WRR506	120.71	6.12	Pucca
Access Road	New Road	NRR450	81.99	6.12	Pucca
Access Road	Widening Road	WRR122	67.64	6.12	Pucca
Access Road	New Road	WRR63	230.25	6.12	Pucca

N.B.- Road above 50 m length are presented

14.29.4 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 9214.66 meters of drains for ward no. 09 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-34: Proposal of Drain for Ward-09

Drain Type	ID	Construction Type	Length (m)	Average Width (m)	Outfall
Primary	DR4	Pucca	1068.03	1.2	Khal
Tertiary	DR3	Pucca	530.39	0.80	Pond
Tertiary	DR2	Pucca	450.71	0.80	Ditch
Tertiary	DR25	Pucca	231.51	0.80	DR13
Tertiary	DR205	Pucca	162.29	0.80	DR24
Tertiary	DR36	Pucca	140.47	0.80	DR66
Tertiary	DR1	Pucca	138.49	0.80	DR2
Tertiary	DR17	Pucca	108.02	0.80	DR14

14.29.5 Development Proposals of ward no-09

The urban services are the pre condition of any potential development. Playground, Tempo stand, Eidgah, Clinic etc are proposed here. The proposal for service facilities of ward no 09 is shown in table 14-35 together with mouza name and plot number.

Table 14-35: Proposal for Other Facilities of Ward-09

ID	Use	Area (Acres)
GIA	Industrial Area (Partial)	32.35
CHC_1	Community Clinic	1.28
NM_8	Neighborhood Market	1.20
PG_6	Playground	1.57
NP_7	Neighborhood Park	4.03
WDG	Waste Disposal Ground	8.50
WC_9	Ward Center	0.76

Map 14-18: Action Plan Map of Ward-09

Map 14-19: Service and Drainage Network Plan Map of Ward-09

14.30 Implementation Guidelines

14.30.1 Tasks of Paurashava Authority

As a planning and development authority Paurashava shoulders the responsibilities of undertaking and implementing Ward wise Action Plans. Discussion meetings and negotiations with local leaders will have to be carried out relentlessly for successful execution of any detailed area plan through their active participation. The Paurashava must have the Planning division.

14.30.2 Institutional Strengthening

In Ward wise planning the most significant role will be played by Paurashava Authority. The Planning Section must have to launch in the Paurashava which will carry out the entire work of project initiation and plan formulation. These works are complicated and time consuming, and require multidisciplinary professionals.

14.30.3 Role of Municipal Authority

According to the section 35 of Paurashava Law-2010, Paurashava may, and if so required by the prescribed authority shall, draw up a Master Plan for the municipality within five years of its establishment. The Paurashava should have to play an important role by implementing all the priority tasks without any delaying otherwise the plan proposals will be inactive for implementation in wrong periods.

14.30.4 Publicity and Circulation of the Plans and Documents

In order to enable greater access of the Paurashava inhabitants, the plan documents must have wide circulation. This is necessary to create awareness among people about city planning and development. The plan document should be sent to every public office. Copies of plans and reports should be made available for purchase by people in general. This will be a step forward in promoting good governance through enabling beneficiary participating in planning and development activities.

14.31 Concluding Remarks

This master plan is developed a comprehensive vision for Rohanpur in context with its location, natural resources, and visions of the community. Rohanpur Master Plan will describe a strategy to address the need for facility improvements and for capital investments to support current and future development of the Paurashava. The community will be involved every step of the way. It wills guild the future development of the Paurashava.

In order to make the plans sustainable through people's participation, it is now emphasized involvement of the local stakeholders in the planning development process. Such participation creates a sense of ownership of the plan among the stakeholders that brings support for the plan and helps to create favourable conditions to implement the plan provisions. Keeping this approach in mind the present Structure Plan, Urban Area Plan and Ward Action Plans for Rohanpur Paurashava has been prepared. It will shape and guide the growth of city in order to meet its social, cultural, environmental, economical, and recreational and many other needs of city dwellers.

Paurashava will be not only the custodian of the plan; it will also be responsible for implementing much of the development projects. Besides, it will also be responsible for monitoring implementation of the development projects by other urban development and service giving agencies. This situation calls for strengthening the existing capacity of Paurashava to handle future volume of work.

Annexure

Annexure-A: Land Use Permission

Annexure- A: Land use Permission

a. Urban Residential Land Use

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.1: Land Use Permitted

Permitted Urban Residential Uses
Artisan's Shop
Assisted Living or Elderly Home
Confectionery Shop
Barber Shop
Child Daycare \ Preschool
Cleaning \ Laundry Shop
Communication Service Facilities
Communication Tower Within Permitted Height
Condominium or Apartment
Cottage
Cyber Café
Daycare Center (Commercial or Nonprofit)
Drug Store or Pharmacy
Employee Housing (Guards \ Drivers) \ Ancillary Use
General Store
Grocery Store
High School
Household Appliance and Furniture Repair Service (No Outside Storage)
Housing For Seasonal Firm Labor
Landscape and Horticultural Services
Mosque, Place Of Worship
Newspaper Stand
Nursery School
Orphanage
Eidgah
Photocopying and Duplicating Services (No Outside Storage)
Pipelines and Utility Lines
Playing Field
Primary School
Private Garages (Ancillary Use)
Project Identification Signs
Property Management Signs
Public Transport Facility
Satellite Dish Antenna
Shelter (Passers By)
Shoe Repair or Shoeshine Shop (Small)
Permitted Urban Residential Uses
CBO Office
Special Dwelling
Temporary Tent
Temporary tent for Permitted Function
Newspaper Stand
Specialized School: Dance, Art, Music, Physically Challenged & Others
Transmission Lines
Urban-Nature Reserve
Utility Lines
Woodlot
Children's Park (Must Have Parking)
ATM Booth
Water Pump \ Reservoir
Monument (Neighborhood Scale)
Bill Payment Booth
Boarding and Rooming House
Dormitory
Memorial Structure (Ancillary)
Neighborhood Center* *(Where Neighborhood Center exists)*
Permitted
Community Center
Doctor \ Dentist Chamber
Cultural Exhibits and Libraries
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Fitness Centre
Gaming Clubs
Departmental Stores
Retail Shops \ Facilities

Source: Compiled by the Consultants

*Permission of Neighborhood Center Facilities in absence of formal neighborhood should be subject to Landuse Permit Committee

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee following appropriate procedure while the application meets the criteria mentioned in the requirement.

Table A.2: Land Use Conditionally Permitted

Conditionally Permitted Urban Residential Uses

Conditionally Permitted Urban Residential Uses
Addiction Treatment Center
Amusement and Recreation (Indoors)
Funeral Services
Art Gallery, Art Studio \ Workshop
Automobile Driving Academy
Beauty and Body Service
Billiard Parlor \ Pool Hall
Book or Stationery Store or Newsstand
Building Maintenance \ Cleaning Services, No Outside Storage
Bus Passenger Shelter
Graveyard \ Cemetery
Coffee Shop \ Tea Stall
Correctional Institution
Courier Service
Crematorium
Plantation (Except Narcotic Plant)
Furniture & Variety Stores
Emergency Shelter
Energy Installation
Garages
Garden Center or Retail Nursery
Fire Brigade Station
Police Station
Temporary Rescue Shed
Guest House
Slaughter House
Static Transformer Stations
Tourist Home or Resort
Market (Bazar)
Optical Goods Sales
Outdoor Café
Outdoor Fruit and Vegetable Markets
Community Hall
Neighborhood Co-Operative Office
Overhead Water Storage Tanks
Row House
Paints and Varnishes Store
Parking Lot
Patio Homes
Photofinishing Laboratory
Post Office
Postal Facilities
Sports and Recreation Club
Tennis Club
Flood Management Structure
Telephone Sub Station
Electrical Sub Station

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

b. General Industry
Land use Permitted

General Industry land use category approve only Green and Orange-A category industry mentioned in *The Environmental Conservation Rule, 1997*.The following uses in the tables are proposed to be applicable for this zone only.

Table A.3: Land Use Permitted

Permitted General Industrial Activities
Confectionery Shop
Bank & Financial Institution
Bicycle Assembly, Parts and Accessories
Blacksmith
Bus Passenger Shelter
Communication Tower Within Permitted Height
Freight Transport Facility
Police Box \ Barrack
Fire \ Rescue Station
Grocery Store
Household Appliance and Furniture Repair Service
Machine Sheds
Meat and Poultry (Packing & Processing)
Mosque, Place Of Worship
Newspaper Stand
Photocopying and Duplicating Services
Pipelines and Utility Lines
Printing, Publishing and Distributing
Public Transport Facility
Restaurant
Retail Shops \ Facilities
Salvage Processing
Salvage Yards
Satellite Dish Antenna
Sawmill, Chipping and Pallet Mill
Shelter (Passers By)
Television, Radio or Electronics Repair (No Outside Storage)
Transmission Lines
Truck Stop & Washing or Freight Terminal

Permitted General Industrial Activities
Utility Lines
Wood Products
Woodlot
ATM Booth
Water Pump \ Reservoir
Effluent Treatment Plant
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee following appropriate procedure.

Table A.4: Land Use Conditionally Permitted

Conditionally Permitted General Industrial Land Uses
Amusement and Recreation (Indoors)
Appliance Store
Plantation (Except Narcotic Plant)
Cyber Café
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Electrical and Electronic Equipment and Instruments Sales
Employee Housing
Energy Installation
Fast Food Establishment \ Food Kiosk
Garages
Grain & Feed Mills
Incineration Facility
Super Store
Lithographic or Print Shop
Motor Vehicle Fuelling Station \ Gas Station
Motorcycle Sales Outlet
Outdoor Fruit and Vegetable Markets
Outside Bulk Storage
Overhead Water Storage Tanks
Painting and Wallpaper Sales
Paints and Varnishes
Parking Lot
Parking Lot (Commercial)
Private Garages
Retail Shops Ancillary To Studio \ Workshop
Jute Mill

Source: Compiled by the Consultants

Restricted Uses

All other uses; except the permitted and conditionally permitted uses.

c. Commercial Zone

Land Use Permitted

Commercial zone is mainly intended for supporting the office and business works. There are several functions that are permitted in this zone.

Table A.5: Land Use Permitted

Permitted Commercial Activity
Accounting, Auditing or Bookkeeping Services
Billboards, Advertisements & Advertising Structure
Agri-Business
Agricultural Sales and Services
Ambulance Service
Antique Shop
Appliance Store
Auction Market
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Auto Leasing or Rental Office
Auto Paint Shop
Auto Parts and Accessory Sales (Indoors)
Auto Repair Shop (With Garage)
Automobile Wash
Automobile Sales
Confectionery Shop
Bakery or Confectionery Retail
Bank & Financial Institution
Bar (Licensed)
Barber Shop
Beauty and Body Service
Bicycle Shop
Billiard Parlor \ Pool Hall
Book or Stationery Store or Newsstand
Building Material Sales or Storage (Indoors)
Bulk Mail and Packaging
Bus Passenger Shelter
Cinema Hall
Communication Service Facilities
Communication Tower Within Permitted Height
Computer Maintenance and Repair
Computer Sales & Services
Conference Center
Construction Company
Courier Service
Cyber Café
Daycare Center (Commercial or Nonprofit)
Department Stores, Furniture & Variety

Permitted Commercial Activity
Stores
Doctor \ Dentist Chamber
Drug Store or Pharmacy
Electrical and Electronic Equipment and Instruments Sales
Fast Food Establishment \ Food Kiosk
Freight Handling, Storage & Distribution
Freight Transport Facility
Freight Yard
General Store
Grocery Store
Guest House
Hotel or Motel
Inter-City Bus Terminal
Jewelry and Silverware Sales
Junk \ Salvage Yard
Super Store
Market (Bazar)
Mosque, Place Of Worship
Motorcycle Sales Outlet
Multi-Storey Car Park
Newspaper Stand
Outdoor Fruit and Vegetable Markets
Outdoor Recreation, Commercial
Parking Lot (Commercial)
Pet Store
Photocopying and Duplicating Services
Photofinishing Laboratory & Studio
Pipelines and Utility Lines
Post Office
Preserved Fruits and Vegetables Facility \ Cold Storage
Printing, Publishing and Distributing
Project Identification Signs
Property Management Signs
Public Transport Facility
Refrigerator or Large Appliance Repair
Resort
Restaurant
Retail Shops \ Facilities
Salvage Processing
Salvage Yards
Satellite Dish Antenna
Sawmill, Chipping and Pallet Mill
Shelter (Passers By)
Shopping Mall \ Plaza
Slaughter House
Software Development
Sporting Goods and Toys Sales
Taxi Stand
Telephone Exchanges
Television, Radio or Electronics Repair (No Outside Storage)
Theater (Indoor)
Transmission Lines
Utility Lines
Vehicle Sales & Service, Leasing or Rental
Veterinarian Clinics, Animal Hospitals, Kennels and Boarding Facilities
Warehousing
Wood Products
Woodlot
ATM Booth
Water Pump \ Reservoir
Agro-Based Industry (Rice Mill, Saw Mill, Cold Storage)
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

Some functions are permitted with some condition in this zone.

Table A.6: Land Use Conditionally Permitted

Conditionally permitted commercial activities
Amusement and Recreation (Indoors)
Bicycle Assembly, Parts and Accessories
Broadcast Studio \ Recording Studio (No Audience)
Coffee Shop \ Tea Stall
Concert Hall, Stage Shows
Construction, Survey, Soil Testing Firms
Trade Shows
Craft Workshop
Plantation (Except Narcotic Plant)
Energy Installation
Firm Equipment Sales & Service
Agricultural Chemicals, Pesticides or Fertilizers Shop
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Forest Products Sales
Fuel and Ice Dealers
Garages
Garden Center or Retail Nursery
Police Box \ Barrack

Conditionally permitted commercial activities
Fire \ Rescue Station
Grain & Feed Mills
Household Appliance and Furniture Repair Service
Incineration Facility
Indoor Amusement Centers, Game Arcades
Indoor Theatre
Lithographic or Print Shop
Motor Vehicle Fuelling Station \ Gas Station
Musical Instrument Sales or Repair
Optical Goods Sales
Painting and Wallpaper Sales
Paints and Varnishes
Parking Lot
Patio Homes
Postal Facilities
Poultry
Private Garages
Professional Office
Retail Shops Ancillary To Studio \ Workshop
Stone \ Cut Stone Products Sales

Source: Compiled by the Consultants

Restricted Uses

All other uses except;, the permitted and conditionally permitted uses.

d. Rural Settlement

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.7: Land Use Permitted

Permitted Rural Settlement
Agricultural Dwellings
Animal Husbandry
Animal Shelter
Graveyard \ Cemetery
Child Daycare \ Preschool
Primary School
Communication Tower Within Permitted Height
Cottage
Crematorium
Dairy Firming
General Store
Grocery Store
Handloom (Cottage Industry)
Housing For Seasonal Firm Labor
Mosque, Place Of Worship
Newspaper Stand
Nursery School
orphanage
Outdoor Religious Events (Eidgah)
Playing Field
Satellite Dish Antenna
NGO \ CBO Facilities
Special Dwelling (E.G. Dorm For Physically Challenged Etc.)
Temporary Shed \ Tent
Specialized School: Dance, Art, Music, Physically Challenged & Others
Static Electrical Sub Stations
Transmission Lines
Utility Lines
Woodlot
Plantation (Except Narcotic Plant)
Social Forestry
Memorial Structure

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee following appropriate procedure while the application meets the criteria mentioned in the requirement.

Table No. A.8: Land Use Conditionally Permitted

Conditionally permitted uses under Rural Settlement
Artisan's Shop (Potter, Blacksmith, and Goldsmith Etc.)
Research organization (Agriculture \ Fisheries)
Energy Installation
Fish Hatchery
Garden Center or Retail Nursery
Emergency Shelter
Sports and Recreation Club, Firing Range: Indoor

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

e. Mixed use zone

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.11: Land Use Permitted

Permitted uses in Mixed Use Zone
Accounting, Auditing or Bookkeeping Services
Addiction Treatment Center
Billboards, Advertisements & Advertising Structure
Agricultural Sales and Services
Antique Store
Appliance Store
Art Gallery, Art Studio \ Workshop
Artisan's Shop
Assisted Living or Elderly Home
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Auto Leasing or Rental Office
Automobile Wash
Automobile Driving Academy
Confectionery Shop
Bakery or Confectionery Retail
Bank & Financial Institution
Barber Shop
Bicycle Shop
Billiard Parlor \ Pool Hall
Blacksmith
Boarding and Rooming House
Book or Stationery Store or Newsstand
Bus Passenger Shelter
Child Daycare \ Preschool
Cleaning \ Laundry Shop
Commercial Recreational Buildings
Communication Service Facilities
Communication Tower Within Permitted Height
Community Center
Condominium or Apartment
Correctional Institution
Courier Service
Cyber Café
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Employee Housing
Fabric Store
Fast Food Establishment \ Food Kiosk
Funeral Services
General Store
Grocery Store
Guest House
Hospital
Jewelry and Silverware Sales
Landscape and Horticultural Services
Mosque, Place Of Worship
Newspaper Stand
Nursery School
Photocopying and Duplicating Services
Pipelines and Utility Lines
Primary School
Project Identification Signs
Property Management Signs
Public Transport Facility
Resort
Satellite Dish Antenna
Shelter (Passers By)
Shoe Repair or Shoeshine Shop (Small)
Slaughter House
Social organization
Software Development
Special Dwelling
Toys and Hobby Goods Processing and Supplies
Training Centre
Transmission Lines
Utility Lines
Vehicle Sales & Service, Leasing or Rental
Warehousing
Woodlot
Children's Park
ATM Booth
Water Pump \ Reservoir
Social Forestry
Dormitory
Rickshaw \ Auto Rickshaw Stand

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee.

Table A.12: Land Use Conditionally Permitted

▪ **Conditionally permitted uses in Mixed Use Zone**
Agricultural Chemicals, Pesticides or Fertilizers Shop
Amusement and Recreation (Indoors)
Beauty and Body Service
Broadcast Studio \ Recording Studio (No

▪ Conditionally permitted uses in Mixed Use Zone
Audience)
Building Maintenance \ Cleaning Services, No Outside Storage
Building Material Sales or Storage (Indoors)
Graveyard \ Cemetery
Coffee Shop \ Tea Stall
Computer Maintenance and Repair
Computer Sales & Services
Concert Hall, Stage Shows
Conference Center
Construction Company
Construction, Survey, Soil Testing Firms
Cottage
Counseling Services
Craft Workshop
Crematorium
Plantation (Except Narcotic Plant)
Cultural Exhibits and Libraries
Department Stores, Furniture & Variety Stores
Drug Store or Pharmacy
Energy Installation
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Freight Handling, Storage & Distribution
Freight Transport Facility
Gaming Clubs
Garages
Garden Center or Retail Nursery
Commercial Office
Project Office
Government Office
Hotel or Motel
Household Appliance and Furniture Repair Service
Indoor Amusement Centers, Game Arcades
Indoor Theatre
Lithographic or Print Shop
Market (Bazar)
Health Office, Dental Laboratory, Clinic or Lab
Musical Instrument Sales or Repair
Optical Goods Sales
Outdoor Café
Outdoor Fruit and Vegetable Markets
Painting and Wallpaper Sales
Paints and Varnishes
Patio Homes
Photofinishing Laboratory & Studio
Poultry
Printing, Publishing and Distributing
Psychiatric Hospital
Retail Shops Ancillary To Studio \ Workshop
Radio \ Television or T&T Station With

▪ Conditionally permitted uses in Mixed Use Zone
Transmitter Tower
Refrigerator or Large Appliance Repair
Restaurant
Retail Shops \ Facilities
Sporting Goods and Toys Sales
Sports and Recreation Club, Firing Range: Indoor
Telephone Exchanges
Television, Radio or Electronics Repair (No Outside Storage)

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

f. Education and Research Area

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.13: Land Use Permitted

▪ Permitted uses under Education & Research Zone
Addiction Treatment Center
Billboards, Advertisements & Advertising Structure
Art Gallery, Art Studio \ Workshop
Automobile Driving Academy
Confectionery Shop
Bus Passenger Shelter
Child Daycare \ Preschool
College, University, Technical Institute
Communication Service Facilities
Communication Tower Within Permitted Height
Conference Center
Correctional Institution
Cultural Exhibits and Libraries
Cyber Café
Freight Transport Facility
General Store
Grocery Store
High School
Hospital
Lithographic or Print Shop
Mosque, Place Of Worship
Multi-Storey Car Park
Newspaper Stand
Nursery School
Outdoor Religious Events
Photocopying and Duplicating Services
Post Office

▪ Permitted uses under Education & Research Zone
Primary School
Professional Office
Project Identification Signs
Property Management Signs
Public Transport Facility
Satellite Dish Antenna
School (Retarded)
Scientific Research Establishment
Shelter (Passers By)
Specialized School: Dance, Art, Music & Others
Training Centre
Transmission Lines
Utility Lines
Vocational, Business, Secretarial School
Woodlot
ATM Booth
Water Pump \ Reservoir
Social Forestry
Dormitory
Veterinary School \ College and Hospital

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table A.14: Land Use Conditionally Permitted

Conditionally permitted uses under Education and Research Zone
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Bank & Financial Institution
Barber Shop
Boarding and Rooming House
Book or Stationery Store or Newsstand
Coffee Shop \ Tea Stall
Counseling Services
Courier Service
Plantation (Except Narcotic Plant)
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Drug Store or Pharmacy
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Gallery \ Museum
Garages
Indoor Theatre
orphanage
Outdoor Café

Conditionally permitted uses under Education and Research Zone
Parking Lot
Pipelines and Utility Lines
Postal Facilities
Psychiatric Hospital

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

g. Government Office

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.15: Land Use Permitted

Permitted uses under Government Office Zone
Accounting, Auditing or Bookkeeping Services
Billboards, Advertisements & Advertising Structure
Confectionery Shop
Bus Passenger Shelter
Civic Administration
Communication Service Facilities
Communication Tower Within Permitted Height
Construction, Survey, Soil Testing Firms
Cultural Exhibits and Libraries
Cyber Café
Emergency Shelter
Freight Transport Facility
General Store
Project Office
Government Office
Grocery Store
Guest House
Multi-Storey Car Park
Newspaper Stand
Outdoor Religious Events
Photocopying and Duplicating Services
Post Office
Professional Office
Public Transport Facility
Satellite Dish Antenna
Scientific Research Establishment
Shelter (Passers By)
Training Centre

Permitted uses under Government Office Zone
Transmission Lines
Utility Lines
Woodlot
ATM Booth
Water Pump \ Reservoir
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table A.16: Land Use Conditionally Permitted

Conditionally permitted uses under Government office
Amusement and Recreation (Indoors)
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Bank & Financial Institution
Boarding and Rooming House
Book or Stationery Store or Newsstand
Coffee Shop \ Tea Stall
Conference Center
Courier Service
Plantation (Except Narcotic Plant)
Daycare Center (Commercial or Nonprofit)
Detention Facilities
Doctor \ Dentist Chamber
Energy Installation
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Freight Handling, Storage & Distribution
Freight Yard
Gallery \ Museum
Garages
Police Box \ Barrack
Fire \ Rescue Station
Lithographic or Print Shop
Mosque, Place Of Worship
Outdoor Café
Parking Lot
Parking Lot (Commercial)
Pipelines and Utility Lines
Postal Facilities

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

h. Agricultural Zone

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A17: Land Use Permitted

Permitted uses under Agricultural Zone
Food Grain Cultivation
Vegetable Cultivation
Cash Crop Cultivation
Horticulture
Arboriculture
Dairy Firming
Deep Tube Well
Shallow Tube Well
Irrigation Facilities (Irrigation Canal, Culvert, Flood Wall etc)
Temporary Structure (Agricultural)
Animal Shelter
Duckery
Aquatic Recreation Facility (Without Structure)
Tree Plantation (Except Narcotic Plant)
Aquaculture
Static Transformer Stations
Transmission Lines
Utility Lines
Woodlot
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

Table A18: Land Use Conditionally Permitted

Conditionally permitted uses under Agricultural Zone
Graveyard \ Cemetery
Communication Tower Within Permitted Height
Crematorium
Fish Hatchery
Garden Center or Retail Nursery
Poultry

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

j. Open Space

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.19: Land Use Permitted

Permitted uses under Open Space

Permitted uses under Open Space
Botanical Garden & Arboretum
Bus Passenger Shelter
Caravan Park \ Camping Ground
Carnivals and Fairs
Circus
Plantation (Except Narcotic Plant)
Landscape and Horticultural Services
Open Theater
Park and Recreation Facilities (General)
Pipelines and Utility Lines
Playing Field
Special Function Tent
Tennis Club
Transmission Lines
Urban-Nature Reserve
Utility Lines
Woodlot
Zoo
Roadside Parking
Social Forestry
Memorial Structure

Source: Compiled by the Consultants

Landuse Conditionally Permitted

Table A 20: Land Use Conditionally Permitted

Conditionally permitted uses under open space
Communication Tower Within Permitted Height
Trade Shows
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Golf Course
Motorized Recreation
Outdoor Recreation Facilities
Outdoor Recreation, Commercial
Outdoor Sports and Recreation
Park Maintenance Facility
Retreat Center
Sports and Recreation Club, Firing Range: Indoor

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted.

k. Water Body

Retaining water is the main purpose of this type of Landuse.

Land Use Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table A.21: Land Use Permitted

Permitted uses under Water Body
Aquatic Recreation Facility (Without Structure)
Fishing Club
Utility Lines
Water Parks
Memorial Structure

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table A.22: Land Use Conditionally Permitted

Conditionally permitted uses under water body
Plantation (Except Narcotic Plant)
Marina \ Boating Facility
Motorized Recreation

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted.

Annexure-B: Details of Proposed Road

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
WRR1	9.17	357.03	0.00	Tertiary Road	Second Phase	Ward No. 9
WRR2	9.17	129.14	0.00	Tertiary Road	Second Phase	Ward No. 9
WRR3	6.12	397.65	0.00	Access Road	First Phase	Ward No. 9
WRR4	9.17	536.35	0.00	Tertiary Road	Second Phase	Ward No. 9
WRR5	9.17	133.00	0.00	Tertiary Road	Second Phase	Ward No. 9
WRR6	18.35	487.47	0.00	Secondary Road	Second Phase	Ward No. 8
ERR7	2.54	25.52	2.54	Pathway		Ward No. 8
WRR8	24.46	1295.02	0.00	Primary Road	Third Phase	Ward No. 8
WRR8	24.46	1134.79	0.00	Primary Road	Third Phase	Ward No. 9
WRR9	12.23	1533.99	0.00	Secondary Road	Second Phase	Ward No. 9
WRR10	12.23	1123.82	0.00	Secondary Road	Second Phase	Ward No. 9
ERR11	2.51	37.88	2.51	Pathway		Ward No. 8
WRR12	9.17	825.56	0.00	Tertiary Road	Second Phase	Ward No. 8
WRR13	6.12	357.06	0.00	Access Road	First Phase	Ward No. 8
ERR14	2.56	17.32	2.56	Pathway		Ward No. 8
ERR15	2.00	18.86	2.00	Pathway		Ward No. 8
ERR16	3.01	145.31	3.01	Pathway		Ward No. 8
WRR17	12.23	854.43	0.00	Secondary Road	Second Phase	Ward No. 8
WRR18	12.23	659.00	0.00	Secondary Road	Second Phase	Ward No. 7
ERR19	1.54	31.55	1.54	Pathway		Ward No. 8
ERR20	1.00	45.26	1.00	Pathway		Ward No. 8
ERR21	1.31	185.26	1.31	Pathway		Ward No. 8
ERR22	2.04	75.06	2.04	Pathway		Ward No. 8
ERR23	3.54	92.86	3.54	Pathway		Ward No. 8
ERR24	3.00	65.71	3.00	Pathway		Ward No. 8
ERR25	2.52	18.37	2.52	Pathway		Ward No. 8
ERR26	2.00	14.37	2.00	Pathway		Ward No. 8
ERR27	2.00	12.00	2.00	Pathway		Ward No. 8
ERR28	2.05	23.50	2.05	Pathway		Ward No. 8
ERR29	1.40	33.12	1.40	Pathway		Ward No. 8
ERR30	2.00	32.56	2.00	Pathway		Ward No. 8
ERR31	2.03	23.20	2.03	Pathway		Ward No. 8
ERR32	1.30	41.10	1.30	Pathway		Ward No. 8
ERR33	1.80	60.40	1.80	Pathway		Ward No. 8
ERR34	2.00	36.84	2.00	Pathway		Ward No. 8
ERR35	2.53	35.47	2.53	Pathway		Ward No. 8
ERR36	2.00	387.07	2.00	Pathway		Ward No. 9
ERR37	2.05	27.34	2.05	Pathway		Ward No. 8
ERR38	2.55	11.85	2.55	Pathway		Ward No. 8
WRR39	9.17	77.28	3.00	Tertiary Road	Second Phase	Ward No. 8
WRR40	9.17	312.07	0.00	Tertiary Road	Second Phase	Ward No. 8
WRR40	9.17	243.61	0.00	Tertiary Road	Second Phase	Ward No. 7
WRR41	18.35	100.95	1.65	Secondary Road	Second Phase	Ward No. 8
WRR42	18.35	58.53	3.00	Secondary Road	Second Phase	Ward No. 8

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
ERR43	2.56	20.49	2.56	Pathway		Ward No. 8
ERR44	2.00	47.94	2.00	Pathway		Ward No. 8
ERR45	2.52	44.60	2.52	Pathway		Ward No. 7
WRR46	12.23	562.03	0.00	Secondary Road	Second Phase	Ward No. 7
ERR47	2.56	27.96	2.56	Pathway		Ward No. 7
ERR48	2.08	5.72	2.08	Pathway		Ward No. 7
WRR49	12.23	452.16	0.00	Secondary Road	Second Phase	Ward No. 7
ERR50	3.00	79.97	3.00	Pathway		Ward No. 8
WRR51	18.35	1892.51	0.00	Secondary Road	Second Phase	Ward No. 8
WRR51	18.35	214.39	0.00	Secondary Road	Second Phase	Ward No. 7
ERR52	3.06	95.60	3.06	Pathway		Ward No. 9
ERR53	1.52	36.22	1.52	Pathway		Ward No. 7
ERR54	2.07	26.25	2.07	Pathway		Ward No. 9
ERR55	2.51	88.70	2.51	Pathway		Ward No. 7
ERR56	3.02	42.08	3.02	Pathway		Ward No. 7
WRR57	12.23	175.37	0.00	Secondary Road	Second Phase	Ward No. 9
WRR57	12.23	94.80	0.00	Secondary Road	Second Phase	Ward No. 7
WRR58	12.23	96.29	3.10	Secondary Road	Second Phase	Ward No. 9
WRR59	24.46	515.29	0.00	Primary Road	Third Phase	Ward No. 7
WRR60	24.46	167.01	4.47	Primary Road	Third Phase	Ward No. 7
ERR61	3.03	34.91	3.03	Pathway		Ward No. 7
WRR62	6.12	471.63	0.00	Access Road	First Phase	Ward No. 7
WRR63	6.12	230.25	0.00	Access Road	First Phase	Ward No. 9
ERR64	2.52	76.94	2.52	Pathway		Ward No. 7
ERR65	2.54	11.19	2.54	Pathway		Ward No. 7
ERR66	3.50	63.48	3.50	Pathway		Ward No. 9
WRR67	6.12	206.48	0.00	Access Road	First Phase	Ward No. 7
ERR68	2.04	53.76	2.04	Pathway		Ward No. 7
ERR69	2.03	56.16	2.03	Pathway		Ward No. 9
ERR70	2.02	37.21	2.02	Pathway		Ward No. 7
ERR71	2.06	21.80	2.06	Pathway		Ward No. 9
ERR72	1.53	46.89	1.53	Pathway		Ward No. 9
ERR73	1.80	86.09	1.80	Pathway		Ward No. 9
ERR73	1.80	1.82	1.80	Pathway		Ward No. 7
ERR74	2.03	47.92	2.03	Pathway		Ward No. 9
WRR75	6.12	87.99	0.00	Access Road	First Phase	Ward No. 7
ERR76	2.04	88.40	2.04	Pathway		Ward No. 9
ERR77	2.04	21.72	2.04	Pathway		Ward No. 7
ERR78	3.14	12.82	3.14	Pathway		Ward No. 7
WRR79	18.35	518.07	0.00	Secondary Road	Second Phase	Ward No. 7
ERR80	2.54	39.69	2.54	Pathway		Ward No. 7
WRR81	6.12	170.40	0.00	Access Road	First Phase	Ward No. 7
ERR82	2.03	45.20	2.03	Pathway		Ward No. 7
ERR83	2.09	9.47	2.09	Pathway		Ward No. 9

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
ERR84	2.54	22.09	2.54	Pathway		Ward No. 7
ERR85	2.00	61.18	2.00	Pathway		Ward No. 9
ERR86	2.00	103.37	2.00	Pathway		Ward No. 9
WRR87	24.46	1218.22	0.00	Primary Road	Third Phase	Ward No. 9
WRR87	24.46	595.08	0.00	Primary Road	Third Phase	Ward No. 7
WRR87	24.46	61.16	0.00	Primary Road	Third Phase	Ward No. 5
ERR88	3.00	343.28	3.00	Pathway		Ward No. 7
WRR89	18.35	84.57	2.52	Secondary Road	Second Phase	Ward No. 7
WRR90	12.23	495.69	0.00	Secondary Road	Second Phase	Ward No. 9
WRR91	12.23	540.96	0.00	Secondary Road	Second Phase	Ward No. 9
ERR92	2.14	41.59	2.14	Pathway		Ward No. 9
ERR93	3.00	221.73	3.00	Pathway		Ward No. 7
ERR94	2.05	157.67	2.05	Pathway		Ward No. 7
ERR95	2.03	38.69	2.03	Pathway		Ward No. 7
ERR96	2.08	41.29	2.08	Pathway		Ward No. 7
WRR97	24.46	488.58	0.00	Primary Road	Third Phase	Ward No. 7
WRR97	24.46	1.94	0.00	Primary Road	Third Phase	Ward No. 5
ERR98	2.06	56.18	2.06	Pathway		Ward No. 7
WRR99	12.23	642.67	0.00	Secondary Road	Second Phase	Ward No. 7
WRR100	9.17	67.14	0.00	Tertiary Road	Second Phase	Ward No. 9
ERR101	3.03	67.14	3.03	Pathway		Ward No. 9
ERR102	3.60	308.49	3.60	Pathway		Ward No. 7
ERR103	2.17	21.33	2.17	Pathway		Ward No. 9
ERR104	3.54	28.14	3.54	Pathway		Ward No. 7
ERR105	3.50	113.28	3.50	Pathway		Ward No. 7
ERR106	3.50	15.00	3.50	Pathway		Ward No. 7
WRR107	12.23	62.53	3.00	Secondary Road	Second Phase	Ward No. 9
WRR108	12.23	187.07	0.00	Secondary Road	Second Phase	Ward No. 9
WRR109	12.23	381.87	0.00	Secondary Road	Second Phase	Ward No. 4
WRR109	12.23	143.27	0.00	Secondary Road	Second Phase	Ward No. 5
ERR110	2.52	85.77	2.52	Pathway		Ward No. 7
ERR111	1.51	48.25	1.51	Pathway		Ward No. 4
WRR112	9.17	553.38	0.00	Tertiary Road	Second Phase	Ward No. 4
ERR113	2.52	41.82	2.52	Pathway		Ward No. 4
WRR114	6.12	61.90	2.00	Access Road	First Phase	Ward No. 7
ERR115	2.05	15.94	2.05	Pathway		Ward No. 4
WRR116	9.17	71.21	3.16	Tertiary Road	Second Phase	Ward No. 9
WRR117	9.17	366.46	0.00	Tertiary Road	Second Phase	Ward No. 9
WRR118	24.46	318.01	0.00	Primary Road	Third Phase	Ward No. 7
WRR118	24.46	1725.93	0.00	Primary Road	Third Phase	Ward No. 6
WRR119	12.23	237.19	0.00	Secondary Road	Second Phase	Ward No. 9
WRR119	12.23	577.61	0.00	Secondary Road	Second Phase	Ward No. 6
WRR120	6.12	190.92	0.00	Access Road	First Phase	Ward No. 7
WRR121	6.12	93.40	2.00	Access Road	First Phase	Ward No. 7

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
WRR122	6.12	67.64	0.00	Access Road	First Phase	Ward No. 9
ERR123	2.09	85.19	2.09	Pathway		Ward No. 7
WRR124	6.12	68.42	0.00	Access Road	First Phase	Ward No. 5
WRR125	6.12	94.56	2.57	Access Road	First Phase	Ward No. 5
ERR126	4.03	50.67	4.03	Pathway		Ward No. 4
ERR127	2.52	47.56	2.52	Pathway		Ward No. 4
ERR128	2.52	41.24	2.52	Pathway		Ward No. 5
WRR129	9.17	99.84	3.00	Tertiary Road	Second Phase	Ward No. 7
ERR130	3.00	22.97	3.00	Pathway		Ward No. 7
ERR131	3.04	24.51	3.04	Pathway		Ward No. 5
ERR132	2.13	26.58	2.13	Pathway		Ward No. 7
ERR133	2.17	14.56	2.17	Pathway		Ward No. 7
ERR134	2.03	57.63	2.03	Pathway		Ward No. 5
WRR135	12.23	192.92	0.00	Secondary Road	Second Phase	Ward No. 4
WRR135	12.23	478.40	0.00	Secondary Road	Second Phase	Ward No. 5
ERR136	2.60	28.91	2.60	Pathway		Ward No. 5
ERR137	2.00	38.33	2.00	Pathway		Ward No. 6
ERR138	2.00	141.30	2.00	Pathway		Ward No. 5
ERR139	3.60	34.39	3.60	Pathway		Ward No. 5
ERR140	2.56	53.41	2.56	Pathway		Ward No. 5
WRR141	6.12	73.40	2.00	Access Road	First Phase	Ward No. 5
ERR142	3.00	35.49	3.00	Pathway		Ward No. 6
WRR143	12.23	278.45	0.00	Secondary Road	Second Phase	Ward No. 6
ERR144	3.00	46.03	3.00	Pathway		Ward No. 7
ERR145	2.56	16.92	2.56	Pathway		Ward No. 7
ERR146	2.02	48.63	2.02	Pathway		Ward No. 5
ERR147	2.52	43.72	2.52	Pathway		Ward No. 4
ERR148	2.55	11.85	2.55	Pathway		Ward No. 6
WRR149	12.23	619.50	0.00	Secondary Road	Second Phase	Ward No. 3
WRR150	6.12	24.35	2.04	Access Road	First Phase	Ward No. 7
WRR150	6.12	41.57	2.04	Access Road	First Phase	Ward No. 6
WRR151	9.17	124.31	0.00	Tertiary Road	Second Phase	Ward No. 7
WRR151	9.17	129.50	0.00	Tertiary Road	Second Phase	Ward No. 6
ERR152	2.02	111.94	2.02	Pathway		Ward No. 5
ERR153	3.51	55.70	3.51	Pathway		Ward No. 4
ERR153	3.51	8.33	3.51	Pathway		Ward No. 5
ERR154	3.00	112.30	3.00	Pathway		Ward No. 5
ERR155	3.03	153.35	3.03	Pathway		Ward No. 5
ERR156	2.03	56.92	2.03	Pathway		Ward No. 5
ERR157	2.52	45.46	2.52	Pathway		Ward No. 5
ERR158	1.55	53.21	1.55	Pathway		Ward No. 5
ERR159	2.00	128.57	2.00	Pathway		Ward No. 4
ERR160	3.97	113.92	3.97	Pathway		Ward No. 5
ERR161	2.00	49.19	2.00	Pathway		Ward No. 6

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
WRR162	6.12	226.71	0.00	Access Road	First Phase	Ward No. 5
ERR163	3.02	136.24	3.02	Pathway		Ward No. 4
ERR164	2.00	102.06	2.00	Pathway		Ward No. 5
ERR165	1.40	83.72	1.40	Pathway		Ward No. 5
WRR166	6.12	252.01	0.00	Access Road	First Phase	Ward No. 5
ERR167	1.31	89.06	1.31	Pathway		Ward No. 5
ERR168	3.53	43.37	3.53	Pathway		Ward No. 4
ERR169	1.30	34.78	1.30	Pathway		Ward No. 5
ERR170	3.00	63.23	3.00	Pathway		Ward No. 6
ERR171	1.30	35.70	1.30	Pathway		Ward No. 5
ERR172	1.30	49.44	1.30	Pathway		Ward No. 5
ERR173	2.51	66.62	2.51	Pathway		Ward No. 5
ERR174	1.56	62.35	1.56	Pathway		Ward No. 6
ERR175	2.98	25.98	2.98	Pathway		Ward No. 5
ERR176	3.00	12.89	3.00	Pathway		Ward No. 5
ERR177	2.54	31.79	2.54	Pathway		Ward No. 4
ERR178	1.59	34.04	1.59	Pathway		Ward No. 6
ERR179	3.00	28.60	3.00	Pathway		Ward No. 5
ERR180	3.04	24.34	3.04	Pathway		Ward No. 6
ERR181	3.04	51.32	3.04	Pathway		Ward No. 5
ERR182	3.00	104.50	3.00	Pathway		Ward No. 5
ERR183	2.08	55.14	2.08	Pathway		Ward No. 5
ERR184	3.60	88.60	3.60	Pathway		Ward No. 4
ERR185	2.05	12.85	2.05	Pathway		Ward No. 5
ERR186	1.02	80.69	1.02	Pathway		Ward No. 5
ERR187	3.55	24.17	3.55	Pathway		Ward No. 4
WRR188	6.12	766.30	0.00	Access Road	First Phase	Ward No. 5
WRR189	6.12	155.63	3.02	Access Road	First Phase	Ward No. 6
ERR190	3.00	39.83	3.00	Pathway		Ward No. 5
WRR191	6.12	425.33	0.00	Access Road	First Phase	Ward No. 4
WRR192	6.12	87.93	0.00	Access Road	First Phase	Ward No. 5
WRR192	6.12	284.95	0.00	Access Road	First Phase	Ward No. 3
ERR193	2.56	15.46	2.56	Pathway		Ward No. 4
ERR194	1.54	45.98	1.54	Pathway		Ward No. 6
WRR195	12.23	85.01	3.01	Secondary Road	Second Phase	Ward No. 4
WRR195	12.23	83.81	3.01	Secondary Road	Second Phase	Ward No. 3
WRR196	12.23	37.16	2.92	Secondary Road	Second Phase	Ward No. 9
WRR196	12.23	179.50	2.92	Secondary Road	Second Phase	Ward No. 6
WRR197	6.12	181.22	0.00	Access Road	First Phase	Ward No. 6
WRR198	6.12	149.86	0.00	Access Road	First Phase	Ward No. 6
ERR199	2.06	81.87	2.06	Pathway		Ward No. 5
WRR200	6.12	45.09	2.02	Access Road	First Phase	Ward No. 5
WRR201	6.12	259.52	0.00	Access Road	First Phase	Ward No. 5
WRR202	6.12	243.71	2.83	Access Road	First Phase	Ward No. 6

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
ERR203	4.02	61.23	4.02	Pathway		Ward No. 5
ERR204	3.52	19.32	3.52	Pathway		Ward No. 5
ERR205	2.50	39.88	2.50	Pathway		Ward No. 6
WRR206	6.12	59.21	3.00	Access Road	First Phase	Ward No. 6
WRR207	6.12	498.79	0.00	Access Road	First Phase	Ward No. 6
WRR208	9.17	497.98	0.00	Tertiary Road	Second Phase	Ward No. 5
WRR209	6.12	605.82	0.00	Access Road	First Phase	Ward No. 5
WRR209	6.12	56.22	0.00	Access Road	First Phase	Ward No. 3
WRR210	6.12	138.56	2.00	Access Road	First Phase	Ward No. 5
ERR211	2.11	58.79	2.11	Pathway		Ward No. 6
ERR212	2.07	27.17	2.07	Pathway		Ward No. 6
ERR213	2.04	57.24	2.04	Pathway		Ward No. 6
ERR214	1.67	95.22	1.67	Pathway		Ward No. 6
WRR215	9.17	457.33	0.00	Tertiary Road	Second Phase	Ward No. 4
WRR216	6.12	141.45	0.00	Access Road	First Phase	Ward No. 4
ERR217	2.02	59.56	2.02	Pathway		Ward No. 5
WRR218	6.12	446.00	0.00	Access Road	First Phase	Ward No. 5
ERR219	1.54	52.34	1.54	Pathway		Ward No. 6
ERR220	1.53	112.81	1.53	Pathway		Ward No. 5
WRR221	6.12	160.23	3.49	Access Road	First Phase	Ward No. 6
ERR222	2.51	71.95	2.51	Pathway		Ward No. 6
WRR223	6.12	63.83	3.27	Access Road	First Phase	Ward No. 5
WRR224	6.12	237.58	0.00	Access Road	First Phase	Ward No. 5
ERR225	2.03	69.57	2.03	Pathway		Ward No. 5
WRR226	6.12	133.46	3.24	Access Road	First Phase	Ward No. 5
ERR227	2.03	103.37	2.03	Pathway		Ward No. 5
WRR228	6.12	291.31	0.00	Access Road	First Phase	Ward No. 6
ERR229	3.05	22.35	3.05	Pathway		Ward No. 6
ERR230	1.81	27.41	1.81	Pathway		Ward No. 5
ERR231	1.02	87.50	1.02	Pathway		Ward No. 5
ERR232	4.07	78.76	4.07	Pathway		Ward No. 6
ERR233	2.00	28.87	2.00	Pathway		Ward No. 3
ERR234	3.00	13.43	3.00	Pathway		Ward No. 5
ERR235	2.50	80.05	2.50	Pathway		Ward No. 3
WRR236	6.12	184.67	0.00	Access Road	First Phase	Ward No. 5
ERR237	2.08	19.00	2.08	Pathway		Ward No. 3
ERR238	1.99	95.30	1.99	Pathway		Ward No. 3
WRR239	6.12	96.13	2.02	Access Road	First Phase	Ward No. 5
WRR240	6.12	161.00	4.05	Access Road	First Phase	Ward No. 5
ERR241	2.62	60.66	2.62	Pathway		Ward No. 5
ERR242	3.05	42.27	3.05	Pathway		Ward No. 3
WRR243	6.12	30.90	0.00	Access Road	First Phase	Ward No. 5
WRR243	6.12	178.42	0.00	Access Road	First Phase	Ward No. 6
WRR244	6.12	136.42	3.70	Access Road	First Phase	Ward No. 6

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
ERR245	2.50	87.47	2.50	Pathway		Ward No. 3
ERR246	1.10	48.69	1.10	Pathway		Ward No. 5
ERR247	3.20	83.86	3.20	Pathway		Ward No. 5
WRR248	12.23	92.54	2.00	Secondary Road	Second Phase	Ward No. 3
ERR249	2.50	103.79	2.50	Pathway		Ward No. 3
ERR250	2.00	24.08	2.00	Pathway		Ward No. 3
ERR251	3.20	69.13	3.20	Pathway		Ward No. 5
ERR252	2.02	57.03	2.02	Pathway		Ward No. 5
ERR253	2.50	31.89	2.50	Pathway		Ward No. 3
ERR254	2.50	9.60	2.50	Pathway		Ward No. 3
ERR255	2.50	32.39	2.50	Pathway		Ward No. 3
ERR256	3.01	112.06	3.01	Pathway		Ward No. 3
WRR257	6.12	115.59	2.62	Access Road	First Phase	Ward No. 6
ERR258	1.01	119.59	1.01	Pathway		Ward No. 5
ERR259	2.00	44.10	2.00	Pathway		Ward No. 3
WRR260	6.12	174.04	0.00	Access Road	First Phase	Ward No. 6
WRR261	6.12	242.23	0.00	Access Road	First Phase	Ward No. 5
ERR262	2.00	64.57	2.00	Pathway		Ward No. 5
ERR263	3.77	93.54	3.77	Pathway		Ward No. 5
ERR264	3.53	25.19	3.53	Pathway		Ward No. 5
ERR265	2.00	49.68	2.00	Pathway		Ward No. 3
WRR266	6.12	160.45	2.04	Access Road	First Phase	Ward No. 6
ERR267	2.53	58.00	2.53	Pathway		Ward No. 5
ERR268	2.98	23.26	2.98	Pathway		Ward No. 5
ERR268	2.98	31.10	2.98	Pathway		Ward No. 6
ERR269	3.01	228.22	3.01	Pathway		Ward No. 5
ERR270	3.00	45.90	3.00	Pathway		Ward No. 5
ERR271	4.00	114.32	4.00	Pathway		Ward No. 6
ERR272	2.02	19.48	2.02	Pathway		Ward No. 5
ERR273	3.00	18.47	3.00	Pathway		Ward No. 5
ERR274	2.09	65.49	2.09	Pathway		Ward No. 3
ERR275	2.02	70.28	2.02	Pathway		Ward No. 3
ERR276	2.00	58.08	2.00	Pathway		Ward No. 3
WRR277	12.23	151.16	0.00	Secondary Road	Second Phase	Ward No. 3
WRR277	12.23	6.17	0.00	Secondary Road	Second Phase	Ward No. 1
WRR278	12.23	242.94	0.00	Secondary Road	Second Phase	Ward No. 3
ERR279	2.50	54.47	2.50	Pathway		Ward No. 3
ERR280	2.52	75.31	2.52	Pathway		Ward No. 3
ERR281	2.00	34.90	2.00	Pathway		Ward No. 3
ERR282	1.58	69.46	1.58	Pathway		Ward No. 6
WRR283	6.12	59.72	2.50	Access Road	First Phase	Ward No. 3
ERR284	2.54	54.05	2.54	Pathway		Ward No. 3
ERR285	3.00	40.94	3.00	Pathway		Ward No. 3
ERR286	2.50	57.09	2.50	Pathway		Ward No. 3

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
WRR287	6.12	98.69	3.03	Access Road	First Phase	Ward No. 5
WRR288	6.12	107.71	3.03	Access Road	First Phase	Ward No. 5
ERR289	3.00	23.07	3.00	Pathway		Ward No. 5
ERR290	3.02	113.80	3.02	Pathway		Ward No. 5
ERR291	2.53	28.45	2.53	Pathway		Ward No. 3
ERR292	2.01	33.34	2.01	Pathway		Ward No. 3
ERR293	3.10	32.76	3.10	Pathway		Ward No. 5
ERR294	2.03	44.98	2.03	Pathway		Ward No. 3
WRR295	6.12	388.11	0.00	Access Road	First Phase	Ward No. 3
ERR296	2.53	35.95	2.53	Pathway		Ward No. 3
ERR297	1.96	48.36	1.96	Pathway		Ward No. 3
WRR298	6.12	58.87	0.00	Access Road	First Phase	Ward No. 3
ERR299	1.53	79.11	1.53	Pathway		Ward No. 5
ERR300	2.09	34.73	2.09	Pathway		Ward No. 3
ERR301	2.00	44.08	2.00	Pathway		Ward No. 3
WRR302	6.12	194.31	0.00	Access Road	First Phase	Ward No. 3
ERR303	2.00	53.29	2.00	Pathway		Ward No. 3
WRR304	18.35	115.38	0.00	Secondary Road	Second Phase	Ward No. 6
ERR305	2.50	62.22	2.50	Pathway		Ward No. 3
ERR306	1.06	17.52	1.06	Pathway		Ward No. 5
ERR307	3.00	28.98	3.00	Pathway		Ward No. 5
WRR308	6.12	157.00	4.00	Access Road	First Phase	Ward No. 3
ERR309	2.00	100.49	2.00	Pathway		Ward No. 6
ERR310	2.00	73.32	2.00	Pathway		Ward No. 6
ERR311	2.09	19.97	2.09	Pathway		Ward No. 3
ERR312	2.02	85.29	2.02	Pathway		Ward No. 3
ERR313	3.00	97.06	3.00	Pathway		Ward No. 5
ERR314	3.04	242.29	3.04	Pathway		Ward No. 5
WRR315	6.12	5.50	2.50	Access Road	First Phase	Ward No. 5
WRR315	6.12	86.89	2.50	Access Road	First Phase	Ward No. 3
ERR316	2.29	34.02	2.29	Pathway		Ward No. 5
ERR317	2.00	36.49	2.00	Pathway		Ward No. 3
WRR318	6.12	98.31	0.00	Access Road	First Phase	Ward No. 3
ERR319	3.01	52.28	3.01	Pathway		Ward No. 3
ERR320	2.51	64.91	2.51	Pathway		Ward No. 3
ERR321	3.04	35.15	3.04	Pathway		Ward No. 3
WRR322	6.12	88.65	0.00	Access Road	First Phase	Ward No. 3
WRR323	9.17	205.37	0.00	Tertiary Road	Second Phase	Ward No. 6
WRR324	9.17	143.42	2.50	Tertiary Road	Second Phase	Ward No. 6
ERR325	2.02	43.93	2.02	Pathway		Ward No. 3
ERR326	3.02	87.18	3.02	Pathway		Ward No. 3
ERR326	3.02	6.27	3.02	Pathway		Ward No. 1
WRR327	6.12	79.02	0.00	Access Road	First Phase	Ward No. 6
ERR328	3.04	31.76	3.04	Pathway		Ward No. 3

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
WRR329	6.12	355.35	0.00	Access Road	First Phase	Ward No. 5
ERR330	2.01	45.46	2.01	Pathway		Ward No. 3
WRR331	6.12	107.43	0.00	Access Road	First Phase	Ward No. 3
ERR332	4.00	85.26	4.00	Pathway		Ward No. 3
ERR333	2.04	34.49	2.04	Pathway		Ward No. 3
WRR334	12.23	387.58	0.00	Secondary Road	Second Phase	Ward No. 3
WRR334	12.23	103.39	0.00	Secondary Road	Second Phase	Ward No. 1
WRR335	9.17	379.88	0.00	Tertiary Road	Second Phase	Ward No. 1
WRR336	6.12	0.73	3.02	Access Road	First Phase	Ward No. 3
WRR336	6.12	130.05	3.02	Access Road	First Phase	Ward No. 1
WRR337	6.12	161.49	0.00	Access Road	First Phase	Ward No. 6
WRR338	6.12	72.43	3.00	Access Road	First Phase	Ward No. 3
ERR339	3.74	35.16	3.74	Pathway		Ward No. 3
ERR339	3.74	40.31	3.74	Pathway		Ward No. 1
ERR340	1.99	89.34	1.99	Pathway		Ward No. 1
ERR341	3.02	38.11	3.02	Pathway		Ward No. 1
ERR342	2.01	0.82	2.01	Pathway		Ward No. 3
ERR342	2.01	86.82	2.01	Pathway		Ward No. 1
WRR343	6.12	58.50	2.01	Access Road	First Phase	Ward No. 6
ERR344	2.10	21.53	2.10	Pathway		Ward No. 1
ERR345	2.02	56.63	2.02	Pathway		Ward No. 1
ERR346	3.98	100.83	3.98	Pathway		Ward No. 1
ERR347	3.00	129.40	3.00	Pathway		Ward No. 1
ERR348	1.50	74.58	1.50	Pathway		Ward No. 6
ERR349	2.05	10.48	2.05	Pathway		Ward No. 1
ERR350	2.01	51.94	2.01	Pathway		Ward No. 1
ERR351	3.05	172.13	3.05	Pathway		Ward No. 3
ERR352	1.97	36.28	1.97	Pathway		Ward No. 1
ERR353	2.02	57.45	2.02	Pathway		Ward No. 1
ERR354	3.13	40.27	3.13	Pathway		Ward No. 1
WRR355	12.23	1.76	0.00	Secondary Road	Second Phase	Ward No. 3
WRR355	12.23	463.72	0.00	Secondary Road	Second Phase	Ward No. 1
ERR356	2.12	15.10	2.12	Pathway		Ward No. 1
WRR357	6.12	59.81	3.05	Access Road	First Phase	Ward No. 1
ERR358	3.52	71.16	3.52	Pathway		Ward No. 1
ERR359	2.51	60.02	2.51	Pathway		Ward No. 1
ERR360	1.50	99.89	1.50	Pathway		Ward No. 6
WRR361	6.12	80.62	3.20	Access Road	First Phase	Ward No. 1
WRR362	6.12	0.45	0.00	Access Road	First Phase	Ward No. 3
WRR362	6.12	70.84	0.00	Access Road	First Phase	Ward No. 1
WRR363	6.12	71.80	2.05	Access Road	First Phase	Ward No. 1
WRR364	6.12	155.76	0.00	Access Road	First Phase	Ward No. 1
ERR365	2.05	28.39	2.05	Pathway		Ward No. 1
WRR366	6.12	161.31	3.04	Access Road	First Phase	Ward No. 1

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
ERR367	2.52	132.55	2.52	Pathway		Ward No. 1
WRR368	12.23	473.86	0.00	Secondary Road	Second Phase	Ward No. 1
WRR368	12.23	1101.42	0.00	Secondary Road	Second Phase	Ward No. 2
ERR369	2.04	24.45	2.04	Pathway		Ward No. 6
WRR370	6.12	117.49	2.52	Access Road	First Phase	Ward No. 1
ERR371	3.00	37.47	3.00	Pathway		Ward No. 1
ERR372	2.50	21.10	2.50	Pathway		Ward No. 1
ERR373	2.50	21.09	2.50	Pathway		Ward No. 1
ERR374	2.06	23.31	2.06	Pathway		Ward No. 1
ERR375	3.00	279.53	3.00	Pathway		Ward No. 6
ERR376	3.53	38.21	3.53	Pathway		Ward No. 1
ERR377	2.00	52.98	2.00	Pathway		Ward No. 1
ERR378	3.00	41.57	3.00	Pathway		Ward No. 1
ERR379	4.10	121.09	4.10	Pathway		Ward No. 1
WRR380	12.23	664.31	0.00	Secondary Road	Second Phase	Ward No. 2
WRR381	12.23	211.56	0.00	Secondary Road	Second Phase	Ward No. 1
WRR381	12.23	48.21	0.00	Secondary Road	Second Phase	Ward No. 2
ERR382	2.02	47.52	2.02	Pathway		Ward No. 1
ERR383	2.04	62.48	2.04	Pathway		Ward No. 6
ERR384	2.05	39.78	2.05	Pathway		Ward No. 1
ERR385	2.02	20.76	2.02	Pathway		Ward No. 1
ERR386	1.59	6.71	1.59	Pathway		Ward No. 6
WRR387	6.12	61.44	0.00	Access Road	First Phase	Ward No. 1
WRR388	6.12	33.77	0.00	Access Road	First Phase	Ward No. 1
ERR389	2.01	67.47	2.01	Pathway		Ward No. 1
WRR390	6.12	226.50	0.00	Access Road	First Phase	Ward No. 1
ERR391	2.12	19.81	2.12	Pathway		Ward No. 2
WRR392	6.12	207.87	0.00	Access Road	First Phase	Ward No. 1
WRR393	6.12	269.90	0.00	Access Road	First Phase	Ward No. 6
ERR394	3.00	199.82	3.00	Pathway		Ward No. 1
ERR395	3.57	18.95	3.57	Pathway		Ward No. 1
WRR396	6.12	1.71	3.02	Access Road	First Phase	Ward No. 1
WRR396	6.12	136.54	3.02	Access Road	First Phase	Ward No. 2
WRR397	6.12	261.37	0.00	Access Road	First Phase	Ward No. 1
WRR398	6.12	1.11	0.00	Access Road	First Phase	Ward No. 1
WRR398	6.12	111.85	0.00	Access Road	First Phase	Ward No. 2
ERR399	2.60	35.01	2.60	Pathway		Ward No. 2
WRR400	6.12	1.61	0.00	Access Road	First Phase	Ward No. 1
WRR400	6.12	101.90	0.00	Access Road	First Phase	Ward No. 2
ERR401	4.51	43.51	4.51	Pathway		Ward No. 6
WRR402	6.12	60.01	3.42	Access Road	First Phase	Ward No. 2
ERR403	2.02	196.73	2.02	Pathway		Ward No. 2
ERR404	2.02	43.09	2.02	Pathway		Ward No. 2
WRR405	6.12	71.18	2.51	Access Road	First Phase	Ward No. 2

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
ERR406	2.01	148.31	2.01	Pathway		Ward No. 2
ERR407	1.23	50.32	1.23	Pathway		Ward No. 6
ERR408	2.02	37.24	2.02	Pathway		Ward No. 2
WRR409	12.23	584.68	0.00	Secondary Road	Second Phase	Ward No. 6
WRR410	12.23	207.43	6.03	Secondary Road	Second Phase	Ward No. 6
WRR411	12.23	206.98	0.00	Secondary Road	Second Phase	Ward No. 6
ERR412	2.65	8.99	2.65	Pathway		Ward No. 2
ERR413	3.07	29.69	3.07	Pathway		Ward No. 2
WRR414	6.12	507.29	0.00	Access Road	First Phase	Ward No. 2
ERR415	2.03	88.35	2.03	Pathway		Ward No. 6
ERR416	2.12	5.96	2.12	Pathway		Ward No. 2
ERR417	2.06	78.16	2.06	Pathway		Ward No. 2
ERR418	2.08	34.03	2.08	Pathway		Ward No. 2
ERR419	2.53	53.17	2.53	Pathway		Ward No. 2
WRR420	24.46	176.40	4.98	Primary Road	Third Phase	Ward No. 6
ERR421	3.08	60.63	3.08	Pathway		Ward No. 2
ERR422	2.04	19.93	2.04	Pathway		Ward No. 2
WRR423	6.12	55.09	2.52	Access Road	First Phase	Ward No. 2
WRR424	6.12	114.17	3.00	Access Road	First Phase	Ward No. 2
WRR425	6.12	36.15	1.58	Access Road	First Phase	Ward No. 2
ERR426	2.10	46.50	2.10	Pathway		Ward No. 2
ERR427	2.03	51.26	2.03	Pathway		Ward No. 2
ERR428	2.04	31.93	2.04	Pathway		Ward No. 2
ERR429	2.12	12.34	2.12	Pathway		Ward No. 2
ERR430	2.05	14.31	2.05	Pathway		Ward No. 2
ERR431	1.53	34.24	1.53	Pathway		Ward No. 2
ERR432	2.63	38.76	2.63	Pathway		Ward No. 2
ERR433	1.55	34.98	1.55	Pathway		Ward No. 2
ERR434	2.58	36.41	2.58	Pathway		Ward No. 2
ERR435	2.50	48.05	2.50	Pathway		Ward No. 2
ERR436	1.54	25.69	1.54	Pathway		Ward No. 2
ERR437	1.54	24.68	1.54	Pathway		Ward No. 2
ERR438	2.50	39.88	2.50	Pathway		Ward No. 2
WRR439	6.12	46.67	0.00	Access Road	First Phase	Ward No. 2
ERR440	3.02	109.61	3.02	Pathway		Ward No. 2
ERR441	3.03	28.19	3.03	Pathway		Ward No. 5
ERR442	2.51	40.74	2.51	Pathway		Ward No. 9
NRR443	18.35	760.87	0.00	Secondary Road	Second Phase	Ward No. 9
NRR443	18.35	90.39	0.00	Secondary Road	Second Phase	Ward No. 6
NRR444	18.35	723.15	0.00	Secondary Road	Second Phase	Ward No. 8
NRR444	18.35	237.32	0.00	Secondary Road	Second Phase	Ward No. 9
NRR445	12.23	0.51	0.00	Secondary Road	Second Phase	Ward No. 7
NRR446	12.23	195.74	0.00	Secondary Road	Second Phase	Ward No. 3
NRR447	12.23	1.87	0.00	Secondary Road	Second Phase	Ward No. 4

Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
NRR447	12.23	208.36	0.00	Secondary Road	Second Phase	Ward No. 3
NRR448	12.23	524.58	0.00	Secondary Road	Second Phase	Ward No. 4
NRR449	12.23	282.38	0.00	Secondary Road	Second Phase	Ward No. 9
NRR449	12.23	95.97	0.00	Secondary Road	Second Phase	Ward No. 6
NRR450	6.12	81.99	0.00	Access Road	First Phase	Ward No. 9
NRR451	12.23	453.66	0.00	Secondary Road	Second Phase	Ward No. 6
NRR452	18.35	400.95	0.00	Secondary Road	Second Phase	Ward No. 6
NRR453	9.17	188.98	0.00	Tertiary Road	Second Phase	Ward No. 9
NRR453	9.17	363.57	0.00	Tertiary Road	Second Phase	Ward No. 7
NRR454	6.12	255.64	0.00	Access Road	First Phase	Ward No. 7
NRR455	12.23	408.15	0.00	Secondary Road	Second Phase	Ward No. 3
NRR456	6.12	173.22	0.00	Access Road	First Phase	Ward No. 1
NRR457	6.12	270.50	0.00	Access Road	First Phase	Ward No. 1
NRR458	6.12	126.04	0.00	Access Road	First Phase	Ward No. 1
NRR459	6.12	89.34	0.00	Access Road	First Phase	Ward No. 1
NRR460	6.12	182.80	0.00	Access Road	First Phase	Ward No. 1
NRR461	9.17	232.12	0.00	Tertiary Road	Second Phase	Ward No. 1
NRR461	9.17	7.97	0.00	Tertiary Road	Second Phase	Ward No. 2
NRR462	12.23	132.63	0.00	Secondary Road	Second Phase	Ward No. 3
NRR463	6.12	743.92	0.00	Access Road	First Phase	Ward No. 7
NRR464	12.23	426.37	0.00	Secondary Road	Second Phase	Ward No. 9
NRR465	6.12	558.40	0.00	Access Road	First Phase	Ward No. 6
NRR466	6.12	29.03	0.00	Access Road	First Phase	Ward No. 5
NRR466	6.12	1481.70	0.00	Access Road	First Phase	Ward No. 6
WRR467	12.23	246.05	0.00	Secondary Road	Second Phase	Ward No. 7
WRR468	12.23	508.08	0.00	Secondary Road	Second Phase	Ward No. 8
WRR468	12.23	128.14	0.00	Secondary Road	Second Phase	Ward No. 7
WRR469	18.35	172.34	0.00	Secondary Road	Second Phase	Ward No. 8
WRR470	18.35	95.77	0.00	Secondary Road	Second Phase	Ward No. 8
WRR471	12.23	564.49	0.00	Secondary Road	Second Phase	Ward No. 3
ERR472	4.00	53.85	4.00	Pathway		Ward No. 3
WRR473	6.12	26.35	0.00	Access Road	First Phase	Ward No. 1
WRR474	6.12	31.77	0.00	Access Road	First Phase	Ward No. 1
WRR475	12.23	258.48	0.00	Secondary Road	Second Phase	Ward No. 3
WRR475	12.23	901.49	0.00	Secondary Road	Second Phase	Ward No. 1
WRR476	12.23	96.97	0.00	Secondary Road	Second Phase	Ward No. 3
WRR477	12.23	8.15	0.00	Secondary Road	Second Phase	Ward No. 3
NRR478	12.23	708.20	0.00	Secondary Road	Second Phase	Ward No. 1
NRR478	12.23	11.79	0.00	Secondary Road	Second Phase	Ward No. 2
NRR479	12.23	137.89	0.00	Secondary Road	Second Phase	Ward No. 1
NRR480	6.12	143.27	0.00	Access Road	First Phase	Ward No. 6
NRR481	9.17	239.04	0.00	Tertiary Road	Second Phase	Ward No. 6
WRR482	12.23	257.32	0.00	Secondary Road	Second Phase	Ward No. 6
ERR483	2.00	46.79	2.00	Pathway		Ward No. 6

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Pro_ID	Pro Width (m)	Length (m)	Ex_Width(m)	Type	Phase	Ward_No
NRR484	6.12	71.87	0.00	Access Road	First Phase	Ward No. 6
ERR485	2.49	52.01	2.49	Pathway		Ward No. 3
NRR486	9.17	67.28	0.00	Tertiary Road	Second Phase	Ward No. 1
WRR487	18.35	199.89	0.00	Secondary Road	Second Phase	Ward No. 9
WRR488	18.35	104.31	0.00	Secondary Road	Second Phase	Ward No. 9
NRR489	9.17	94.16	0.00	Tertiary Road	Second Phase	Ward No. 6
WRR490	12.23	159.55	0.00	Secondary Road	Second Phase	Ward No. 6
NRR491	6.12	15.36	0.00	Access Road	First Phase	Ward No. 5
NRR491	6.12	64.14	0.00	Access Road	First Phase	Ward No. 6
NRR492	6.12	240.34	0.00	Access Road	First Phase	Ward No. 5
WRR493	9.17	129.10	0.00	Tertiary Road	Second Phase	Ward No. 4
NRR494	6.12	62.96	0.00	Access Road	First Phase	Ward No. 4
NRR494	6.12	69.36	0.00	Access Road	First Phase	Ward No. 5
NRR495	6.12	752.61	0.00	Access Road	First Phase	Ward No. 2
NRR496	6.12	73.12	0.00	Access Road	First Phase	Ward No. 2
NRR497	6.12	251.35	0.00	Access Road	First Phase	Ward No. 2
NRR498	6.12	41.30	0.00	Access Road	First Phase	Ward No. 2
NRR499	6.12	646.00	0.00	Access Road	First Phase	Ward No. 2
NRR500	6.12	99.84	0.00	Access Road	First Phase	Ward No. 2
ERR501	3.00	65.53	3.00	Pathway		Ward No. 3
NRR502	6.12	110.31	0.00	Access Road	First Phase	Ward No. 3
NRR503	6.12	151.11	0.00	Access Road	First Phase	Ward No. 1
NRR504	6.12	174.78	0.00	Access Road	First Phase	Ward No. 8
ERR505	4.04	21.64	4.04	Pathway		Ward No. 8
WRR506	6.12	120.71	0.00	Access Road	First Phase	Ward No. 9
NRR507	0.00	363.69	0.00	Pathway		Ward No. 9

Annexure-C: Proposed Drain Inventory

ANNEXURE

Type	ID	Length (m)	Width (m)	Dept (m)	Outfall	Ward_No	Phase
Primary	DR4	1068.03	1.20	1.50	Khal	Ward No. 9	First Phase
	DR211	774.78	1.20	1.50	River	Ward No. 3	First Phase
	DR213	1243.59	1.20	1.50	Khal	Ward No. 8	First Phase
	DR214	316.22	1.20	1.50	River	Ward No. 7	First Phase
	DR214	338.07	1.20	1.50	River	Ward No. 5	First Phase
	DR214	528.82	1.20	1.50	River	Ward No. 6	First Phase
	DR217	479.19	1.20	1.50	DR211	Ward No. 3	First Phase
	DR217	772.38	1.20	1.50	DR211	Ward No. 1	First Phase
Secondary	DR6	796.95	1.00	1.20	DR13	Ward No. 8	Second Phase
	DR11	1936.42	1.00	1.20	DR13	Ward No. 8	Second Phase
	DR11	692.43	1.00	1.20	DR13	Ward No. 7	Second Phase
	DR12	1291.13	1.00	1.20	Khal	Ward No. 8	Second Phase
	DR12	1.34	1.00	1.20	Khal	Ward No. 7	Second Phase
	DR13	390.94	1.00	1.20	Ditch	Ward No. 8	Second Phase
	DR13	375.72	1.00	1.20	Ditch	Ward No. 9	Second Phase
	DR13	715.10	1.00	1.20	Ditch	Ward No. 7	Second Phase
	DR14	1219.32	1.00	1.20	DR15	Ward No. 9	Second Phase
	DR15	2636.14	1.00	1.20	DR4	Ward No. 9	Second Phase
	DR16	427.88	1.00	1.20	Khal	Ward No. 7	Second Phase
	DR24	686.03	1.00	1.20	DR14	Ward No. 9	Second Phase
	DR24	574.19	1.00	1.20	DR14	Ward No. 7	Second Phase
	DR35	912.63	1.00	1.20	Pond	Ward No. 4	Second Phase
	DR35	36.65	1.00	1.20	Pond	Ward No. 5	Second Phase
	DR41	266.07	1.00	1.20	DR66	Ward No. 9	Second Phase
	DR41	469.43	1.00	1.20	DR66	Ward No. 7	Second Phase
	DR41	9.56	1.00	1.20	DR66	Ward No. 5	Second Phase
	DR43	487.37	1.00	1.20	DR35	Ward No. 4	Second Phase
	DR43	85.70	1.00	1.20	DR35	Ward No. 5	Second Phase
	DR56	1177.96	1.00	1.20	River	Ward No. 6	Second Phase
	DR63	38.21	1.00	1.20	DR91	Ward No. 9	Second Phase
	DR63	1101.43	1.00	1.20	DR91	Ward No. 6	Second Phase
	DR64	555.14	1.00	1.20	Pond	Ward No. 5	Second Phase
	DR65	563.88	1.00	1.20	DR35	Ward No. 4	Second Phase
	DR66	547.77	1.00	1.20	DR24	Ward No. 9	Second Phase
	DR66	368.92	1.00	1.20	DR24	Ward No. 6	Second Phase
	DR69	734.82	1.00	1.20	River	Ward No. 4	Second Phase
	DR71	998.40	1.00	1.20	DR64	Ward No. 5	Second Phase
	DR72	3.69	1.00	1.20	Pond	Ward No. 7	Second Phase
	DR72	596.18	1.00	1.20	Pond	Ward No. 5	Second Phase
	DR89	359.75	1.00	1.20	DR71	Ward No. 5	Second Phase
	DR91	615.55	1.00	1.20	DR24	Ward No. 9	Second Phase
	DR91	560.26	1.00	1.20	DR24	Ward No. 6	Second Phase
	DR112	629.04	1.00	1.20	DR211	Ward No. 3	Second Phase
	DR112	2.91	1.00	1.20	DR211	Ward No. 1	Second Phase

Type	ID	Length (m)	Width (m)	Dept (m)	Outfall	Ward_No	Phase
	DR115	318.61	1.00	1.20	DR71	Ward No. 5	Second Phase
	DR123	579.14	1.00	1.20	DR63	Ward No. 6	Second Phase
	DR151	439.14	1.00	1.20	Ditch	Ward No. 3	Second Phase
	DR151	346.80	1.00	1.20	Ditch	Ward No. 1	Second Phase
	DR178	460.06	1.00	1.20	DR217	Ward No. 1	Second Phase
	DR184	11.38	1.00	1.20	DR202	Ward No. 1	Second Phase
	DR184	910.43	1.00	1.20	DR202	Ward No. 2	Second Phase
	DR197	859.16	1.00	1.20	DR202	Ward No. 2	Second Phase
	DR198	884.41	1.00	1.20	River	Ward No. 1	Second Phase
	DR198	4.67	1.00	1.20	River	Ward No. 2	Second Phase
	DR202	5.82	1.00	1.20	DR217	Ward No. 3	Second Phase
	DR202	725.29	1.00	1.20	DR217	Ward No. 1	Second Phase
	DR202	1095.45	1.00	1.20	DR217	Ward No. 2	Second Phase
	DR218	433.32	1.00	1.20	Ditch	Ward No. 3	Second Phase
Tertiary	DR1	138.44	0.80	1.00	DR2	Ward No. 9	First Phase
	DR2	450.71	0.80	1.00	Ditch	Ward No. 9	First Phase
	DR3	530.39	0.80	1.00	Pond	Ward No. 9	First Phase
	DR5	51.16	0.80	1.00	Pond	Ward No. 8	First Phase
	DR7	525.22	0.80	1.00	DR6	Ward No. 8	First Phase
	DR8	184.58	0.80	1.00	Khal	Ward No. 8	First Phase
	DR9	153.41	0.80	1.00	DR11	Ward No. 8	First Phase
	DR10	537.73	0.80	1.00	DR11	Ward No. 8	First Phase
	DR17	108.03	0.80	1.00	DR14	Ward No. 9	First Phase
	DR18	85.82	0.80	1.00	Pond	Ward No. 7	First Phase
	DR19	207.05	0.80	1.00	DR22	Ward No. 7	First Phase
	DR21	343.88	0.80	1.00	Pond	Ward No. 7	First Phase
	DR22	574.45	0.80	1.00	DR16	Ward No. 7	First Phase
	DR23	572.09	0.80	1.00	DR28	Ward No. 7	First Phase
	DR25	231.51	0.80	1.00	DR13	Ward No. 9	First Phase
	DR27	187.37	0.80	1.00	DR22	Ward No. 7	First Phase
	DR28	642.53	0.80	1.00	DR16	Ward No. 7	First Phase
	DR30	225.24	0.80	1.00	DR24	Ward No. 7	First Phase
	DR32	315.97	0.80	1.00	Pond	Ward No. 7	First Phase
	DR33	505.38	0.80	1.00	DR28	Ward No. 7	First Phase
	DR34	79.47	0.80	1.00	DR24	Ward No. 7	First Phase
	DR36	140.48	0.80	1.00	DR66	Ward No. 9	First Phase
	DR39	163.76	0.80	1.00	Pond	Ward No. 7	First Phase
	DR40	128.52	0.80	1.00	DR41	Ward No. 7	First Phase
	DR42	148.09	0.80	1.00	Pond	Ward No. 7	First Phase
	DR44	160.02	0.80	1.00	DR72	Ward No. 5	First Phase
	DR45	50.08	0.80	1.00	DR44	Ward No. 5	First Phase
	DR46	64.85	0.80	1.00	DR44	Ward No. 5	First Phase
	DR47	152.30	0.80	1.00	DR66	Ward No. 6	First Phase
	DR48	55.46	0.80	1.00	DR72	Ward No. 5	First Phase

ANNEXURE

Type	ID	Length (m)	Width (m)	Dept (m)	Outfall	Ward_No	Phase
	DR49	252.04	0.80	1.00	DR41	Ward No. 7	First Phase
	DR49	35.05	0.80	1.00	DR41	Ward No. 6	First Phase
	DR50	97.36	0.80	1.00	DR66	Ward No. 7	First Phase
	DR50	238.62	0.80	1.00	DR66	Ward No. 6	First Phase
	DR51	147.31	0.80	1.00	DR61	Ward No. 5	First Phase
	DR52	93.52	0.80	1.00	DR77	Ward No. 5	First Phase
	DR53	63.77	0.80	1.00	DR72	Ward No. 5	First Phase
	DR54	317.01	0.80	1.00	DR63	Ward No. 6	First Phase
	DR55	110.70	0.80	1.00	Pond	Ward No. 5	First Phase
	DR57	92.32	0.80	1.00	DR52	Ward No. 5	First Phase
	DR58	112.14	0.80	1.00	DR63	Ward No. 6	First Phase
	DR59	178.41	0.80	1.00	Pond	Ward No. 5	First Phase
	DR60	87.96	0.80	1.00	DR77	Ward No. 5	First Phase
	DR61	263.94	0.80	1.00	Pond	Ward No. 5	First Phase
	DR62	209.75	0.80	1.00	DR43	Ward No. 4	First Phase
	DR67	190.78	0.80	1.00	River	Ward No. 4	First Phase
	DR67	7.28	0.80	1.00	River	Ward No. 5	First Phase
	DR68	52.82	0.80	1.00	Pond	Ward No. 5	First Phase
	DR70	55.65	0.80	1.00	Pond	Ward No. 5	First Phase
	DR73	105.41	0.80	1.00	DR74	Ward No. 5	First Phase
	DR74	317.96	0.80	1.00	DR71	Ward No. 5	First Phase
	DR75	56.09	0.80	1.00	DR210	Ward No. 6	First Phase
	DR76	392.57	0.80	1.00	DR210	Ward No. 6	First Phase
	DR77	252.27	0.80	1.00	DR72	Ward No. 5	First Phase
	DR78	98.49	0.80	1.00	DR71	Ward No. 5	First Phase
	DR79	87.98	0.80	1.00	DR71	Ward No. 5	First Phase
	DR80	141.70	0.80	1.00	DR71	Ward No. 5	First Phase
	DR81	75.77	0.80	1.00	DR80	Ward No. 5	First Phase
	DR82	201.57	0.80	1.00	DR74	Ward No. 5	First Phase
	DR83	208.77	0.80	1.00	DR71	Ward No. 5	First Phase
	DR84	116.21	0.80	1.00	DR214	Ward No. 5	First Phase
	DR84	331.03	0.80	1.00	DR214	Ward No. 6	First Phase
	DR85	187.83	0.80	1.00	DR115	Ward No. 5	First Phase
	DR86	110.27	0.80	1.00	River	Ward No. 3	First Phase
	DR87	62.13	0.80	1.00	Pond	Ward No. 5	First Phase
	DR90	133.62	0.80	1.00	Pond	Ward No. 6	First Phase
	DR92	16.69	0.80	1.00	DR89	Ward No. 5	First Phase
	DR93	2.22	0.80	1.00	DR214	Ward No. 5	First Phase
	DR93	155.09	0.80	1.00	DR214	Ward No. 6	First Phase
	DR94	93.09	0.80	1.00	DR82	Ward No. 5	First Phase
	DR95	78.20	0.80	1.00	DR82	Ward No. 5	First Phase
	DR96	142.54	0.80	1.00	Pond	Ward No. 3	First Phase
	DR97	44.35	0.80	1.00	River	Ward No. 3	First Phase
	DR98	118.67	0.80	1.00	Ditch	Ward No. 3	First Phase

Type	ID	Length (m)	Width (m)	Dept (m)	Outfall	Ward_No	Phase
	DR99	253.36	0.80	1.00	DR82	Ward No. 5	First Phase
	DR100	91.16	0.80	1.00	DR83	Ward No. 5	First Phase
	DR101	9.68	0.80	1.00	River	Ward No. 5	First Phase
	DR101	280.90	0.80	1.00	River	Ward No. 3	First Phase
	DR102	296.39	0.80	1.00	DR93	Ward No. 6	First Phase
	DR103	154.63	0.80	1.00	DR89	Ward No. 5	First Phase
	DR104	106.63	0.80	1.00	DR85	Ward No. 5	First Phase
	DR106	65.83	0.80	1.00	DR207	Ward No. 5	First Phase
	DR108	123.60	0.80	1.00	DR102	Ward No. 6	First Phase
	DR110	58.00	0.80	1.00	Pond	Ward No. 3	First Phase
	DR111	71.56	0.80	1.00	DR108	Ward No. 6	First Phase
	DR113	122.60	0.80	1.00	DR106	Ward No. 5	First Phase
	DR116	363.44	0.80	1.00	River	Ward No. 5	First Phase
	DR117	40.43	0.80	1.00	DR151	Ward No. 3	First Phase
	DR118	41.96	0.80	1.00	DR151	Ward No. 3	First Phase
	DR119	42.83	0.80	1.00	DR151	Ward No. 3	First Phase
	DR120	229.11	0.80	1.00	DR89	Ward No. 5	First Phase
	DR121	47.95	0.80	1.00	DR218	Ward No. 3	First Phase
	DR122	50.80	0.80	1.00	DR151	Ward No. 3	First Phase
	DR124	166.04	0.80	1.00	River	Ward No. 5	First Phase
	DR125	60.01	0.80	1.00	DR151	Ward No. 3	First Phase
	DR126	67.94	0.80	1.00	DR151	Ward No. 3	First Phase
	DR127	93.55	0.80	1.00	DR134	Ward No. 3	First Phase
	DR128	68.29	0.80	1.00	DR151	Ward No. 3	First Phase
	DR129	256.00	0.80	1.00	DR102	Ward No. 6	First Phase
	DR130	62.81	0.80	1.00	DR151	Ward No. 3	First Phase
	DR131	20.15	0.80	1.00	DR141	Ward No. 3	First Phase
	DR132	96.01	0.80	1.00	DR134	Ward No. 3	First Phase
	DR134	486.92	0.80	1.00	DR217	Ward No. 3	First Phase
	DR135	67.00	0.80	1.00	Pond	Ward No. 3	First Phase
	DR136	59.72	0.80	1.00	DR134	Ward No. 3	First Phase
	DR137	7.51	0.80	1.00	River	Ward No. 5	First Phase
	DR137	80.92	0.80	1.00	River	Ward No. 3	First Phase
	DR138	73.62	0.80	1.00	DR145	Ward No. 3	First Phase
	DR139	47.03	0.80	1.00	DR135	Ward No. 3	First Phase
	DR140	172.45	0.80	1.00	DR142	Ward No. 6	First Phase
	DR141	208.44	0.80	1.00	DR134	Ward No. 3	First Phase
	DR142	110.17	0.80	1.00	DR56	Ward No. 6	First Phase
	DR143	265.76	0.80	1.00	DR134	Ward No. 3	First Phase
	DR143	3.76	0.80	1.00	DR134	Ward No. 1	First Phase
	DR144	150.04	0.80	1.00	DR217	Ward No. 3	First Phase
	DR145	154.19	0.80	1.00	DR127	Ward No. 3	First Phase
	DR146	89.53	0.80	1.00	Pond	Ward No. 3	First Phase
	DR146	2.71	0.80	1.00	Pond	Ward No. 1	First Phase

ANNEXURE

Type	ID	Length (m)	Width (m)	Dept (m)	Outfall	Ward_No	Phase
	DR147	74.15	0.80	1.00	DR141	Ward No. 3	First Phase
	DR147	3.66	0.80	1.00	DR141	Ward No. 1	First Phase
	DR148	54.98	0.80	1.00	Pond	Ward No. 3	First Phase
	DR149	28.75	0.80	1.00	DR151	Ward No. 3	First Phase
	DR149	26.73	0.80	1.00	DR151	Ward No. 1	First Phase
	DR150	50.27	0.80	1.00	DR42	Ward No. 6	First Phase
	DR152	108.21	0.80	1.00	Pond	Ward No. 1	First Phase
	DR153	65.04	0.80	1.00	DR56	Ward No. 6	First Phase
	DR154	0.48	0.80	1.00	DR149	Ward No. 3	First Phase
	DR154	29.04	0.80	1.00	DR149	Ward No. 1	First Phase
	DR155	74.52	0.80	1.00	DR144	Ward No. 3	First Phase
	DR155	2.98	0.80	1.00	DR144	Ward No. 1	First Phase
	DR156	94.04	0.80	1.00	River	Ward No. 1	First Phase
	DR157	96.58	0.80	1.00	DR144	Ward No. 3	First Phase
	DR157	0.01	0.80	1.00	DR144	Ward No. 1	First Phase
	DR158	78.66	0.80	1.00	DR217	Ward No. 1	First Phase
	DR159	91.87	0.80	1.00	DR149	Ward No. 1	First Phase
	DR160	242.95	0.80	1.00	DR178	Ward No. 1	First Phase
	DR161	14.04	0.80	1.00	DR159	Ward No. 1	First Phase
	DR162	64.56	0.80	1.00	DR162	Ward No. 1	First Phase
	DR163	104.08	0.80	1.00	DR153	Ward No. 6	First Phase
	DR164	350.01	0.80	1.00	DR217	Ward No. 1	First Phase
	DR165	201.70	0.80	1.00	DR217	Ward No. 1	First Phase
	DR166	131.73	0.80	1.00	DR166	Ward No. 1	First Phase
	DR167	177.71	0.80	1.00	River	Ward No. 1	First Phase
	DR168	258.51	0.80	1.00	DR151	Ward No. 1	First Phase
	DR169	80.45	0.80	1.00	DR151	Ward No. 1	First Phase
	DR170	41.80	0.80	1.00	DR180	Ward No. 1	First Phase
	DR171	271.69	0.80	1.00	DR56	Ward No. 6	First Phase
	DR172	46.70	0.80	1.00	DR174	Ward No. 1	First Phase
	DR173	539.74	0.80	1.00	Pond	Ward No. 6	First Phase
	DR174	150.25	0.80	1.00	DR166	Ward No. 1	First Phase
	DR175	122.45	0.80	1.00	DR178	Ward No. 1	First Phase
	DR177	202.56	0.80	1.00	DR217	Ward No. 1	First Phase
	DR179	619.51	0.80	1.00	DR178	Ward No. 1	First Phase
	DR180	159.37	0.80	1.00	DR167	Ward No. 1	First Phase
	DR181	187.15	0.80	1.00	DR179	Ward No. 1	First Phase
	DR182	105.54	0.80	1.00	Pond	Ward No. 1	First Phase
	DR183	217.66	0.80	1.00	Pond	Ward No. 1	First Phase
	DR183	3.76	0.80	1.00	Pond	Ward No. 2	First Phase
	DR185	268.65	0.80	1.00	DR217	Ward No. 1	First Phase
	DR186	8.78	0.80	1.00	DR202	Ward No. 1	First Phase
	DR186	116.94	0.80	1.00	DR202	Ward No. 2	First Phase
	DR187	10.61	0.80	1.00	DR202	Ward No. 1	First Phase

ANNEXURE

Type	ID	Length (m)	Width (m)	Dept (m)	Outfall	Ward_No	Phase
	DR187	100.19	0.80	1.00	DR202	Ward No. 2	First Phase
	DR188	237.30	0.80	1.00	DR178	Ward No. 1	First Phase
	DR188	12.38	0.80	1.00	DR178	Ward No. 2	First Phase
	DR189	130.03	0.80	1.00	DR84	Ward No. 2	First Phase
	DR190	2.43	0.80	1.00	DR202	Ward No. 1	First Phase
	DR190	596.52	0.80	1.00	DR202	Ward No. 2	First Phase
	DR191	104.10	0.80	1.00	DR191	Ward No. 2	First Phase
	DR192	134.07	0.80	1.00	DR184	Ward No. 2	First Phase
	DR193	254.16	0.80	1.00	Pond	Ward No. 2	First Phase
	DR194	55.98	0.80	1.00	DR190	Ward No. 2	First Phase
	DR196	529.16	0.80	1.00	Ditch	Ward No. 6	First Phase
	DR199	241.89	0.80	1.00	DR53	Ward No. 6	First Phase
	DR200	703.22	0.80	1.00	DR197	Ward No. 2	First Phase
	DR201	139.63	0.80	1.00	DR202	Ward No. 2	First Phase
	DR203	14.46	0.80	1.00	River	Ward No. 6	First Phase
	DR205	162.29	0.80	1.00	DR24	Ward No. 9	First Phase
	DR206	105.15	0.80	1.00	DR64	Ward No. 5	First Phase
	DR207	338.21	0.80	1.00	DR120	Ward No. 5	First Phase
	DR208	105.44	0.80	1.00	River	Ward No. 2	First Phase
	DR209	70.62	0.80	1.00	Pond	Ward No. 2	First Phase
	DR210	589.59	0.80	1.00	DR210	Ward No. 6	First Phase
	DR212	316.31	0.80	1.00	DR13	Ward No. 7	First Phase
	DR215	5.78	0.80	1.00	River	Ward No. 5	First Phase
	DR215	63.22	0.80	1.00	River	Ward No. 3	First Phase
	DR216	396.41	0.80	1.00	Ditch	Ward No. 7	First Phase

Annexure-D: Schedule of Land Use Planning Proposal

Planning Schedule of Water body of Rohanpur Paurashava

Landuse Type	Mouza	Plot No.	Area (acre)
Waterbody	Hujrapur 148_00	12,15,17,19,20,21,28,32,33,48,51,52,53,54,55,56,63,64,70,72,73,74,77,113,114,115,121,122,126,127,128,163,169,171,172,173,176,179,180,181,188,190,213,214,217,218,219,220,224,225,235,246,247,251,252,255,256,259,260,263,280,281,283,284,285,293,303,314,316,317,318,341,342,343,344,345,348,349,353,354,357,361,362,364,365,366,370,373,374,383,398,413,414,424,430,431,438,439,440,442,443,444,457,458,459,460,463,467,471,472,474	59.17
	Khoirabad 160_01	26,28,92,93,94,100,101,103,109,127,128,145,146,150,151,152,154,157,159,165,167,168,246,247,263,264,270,278,279,282,287,288,310,312,321,322,398,399,418	3.93
	Khoirabad 160_02	738,739,931,934,935,936,937,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1109,1110,1111,1112,1113,1114,1118,1127,1130,1131,1132,1133,1136,1163,1164,1181,1194,1215,1216	2.09
	Khoirabad 160_03	1512,1513,1710,1712,1727,1764,1768,1780,1781,1782,1783,1786,1976	1.45
	Proshadpur 161_01	15,16,17,21,23,30,31,57,58,59,60,61,62,64,68,69,70,73,88,89,101,102,103,104,105,109,110,111,124,125,128,130,131,132,160,162,168,169,176,177,178,179,180,181,182,183,184,186,188,189,195,197,200,201,203,207,208,225,226,227,228,230,231,233,235,238,239,307,310,312,319,320,321,348,349,350,358,359,360,361,368,393,394,395,420,421,422,423,424,458,460,477,478,479,480,481,489,490,503,540	31.82
	Proshadpur 161_02	1001,1002,1009,1010,1019,1020,1021,1022,1023,1024,1034,1035,1075,1076,1077,1079,1083,1097,1121,1123,1156,1157,1204,1205,1206,1207,1208,1237,1242,1243,1244,1245,1246,1247,1248,1251,1301,1302,1303,1304,1305,1313,1326,1327,1343,1344,1392,1393,1394,1403,1404,1515,1517,1518,1524,1525,1531,1533,1534,1535,1537,1540,1541,1548,1549,1550,1560,1561,1570,1571,1599,1600,1609,1613,1615,1616,1617,1634,1635,1636,1641,1642,1643,1647,1648,1666,1667,1670,1671,1673,1704,1705,1716,1718,1719,1720,1721,1722,1797,1798,1799,1800,1806	20.43
	Proshadpur 161_03	3114,3115,3116,3117,3120,3122,3124,3125,3126,3127,3128,3129,3141,3185,3188,3189,3190,3191,3211,3212,3214,3215,3216,3217,3223,3224,3225,3226,3232,3233,3234,3235,3259,3269,3277,3310,3311,3350,3356,3357,3358,3359,3362,3363,3364,3365,3366,3370,3371,3380,3381,3384,3385,3392,3393,3397,3398,3399,3404,3408,3417,3420,3421,3431,3441,3471,3499,3506,3507,3508,3509,3510,3511,3512,3513,3514,3515,3519,3520,3522,3523,3524,3525,3526,3527,3528,3529,3530,3534,3535,3537,3573,3577,3578,3579,3609,3610,3611,3633,3635,3636,3637,3658,3659,3660,3661,3663,3664,3667,3678,3679,3680,3681,3682,3683,3690,3693,3694,3695,3697,3698,3699,3700,3701,3702,3703,3706,3707,3708,3709,3711,3712,3727,3728,3731,3742	21.35
	Rohanpur 130_01	1,3,4,7,12,13,14,15,16,17,23,24,33,34,35,36,37,38,67,68,69,70,72,76,78,79,80,81,82,83,86,87,172,173,174,175,180,181,182,189,197,198,199,200,201,202,203,247,248,249,274,276,282,283,284,301,322,326,328,329,330,335,337,338,339,340,341,342,345,349	51.51

Landuse Type	Mouza	Plot No.	Area (acre)
	Rohanpur 130_02	710,712,722,728,729,730,731,732,733,734,735,745,761,763,767,769,801,802,810,814,815,816,832,833,835,872,873,875,876,877,885,888,889,892,893,894,917,920,952,953,954,959,960,975,976,1057,1059,1074,1075,1076,1081,1082,1083,1084,1085,1086,1087,1088,1089,1101	9.86
	Rohanpur 130_03	1227,1241,1262,1272,1283,1284,1285,1286,1364,1385,1395,1396,1417,1418,1419,1495,1508,1509,1648,1660,1662,1663,1669,1682,1757,1758,1760,1762,1764,1769,1784,1789,1790,1792,1793,1800,1803,1813,1814,1827,1828,1829,1831,1838,1840,1844,1846,1847,1848,1849,1851,1853,1857,1858,1859,1863,1865,1866,1867,1886	6.03

Planning Schedule of Development Proposal of Rohanpur Paurashava

ID	Use	Area (acre)	Ward_No
BT	Bus Terminal	2.24	Ward No. 7
CP	Central Park	2.77	Ward No. 4
CC	Community Center	0.13	Ward No. 3
CHC_6	Community Clinic	1.26	Ward No. 1
CHC_7	Community Clinic	1.44	Ward No. 2
CHC_5	Community Clinic	1.09	Ward No. 3
CHC_8	Community Clinic	2.20	Ward No. 4
CHC_4	Community Clinic	1.04	Ward No. 6
CHC_3	Community Clinic	2.01	Ward No. 7
CHC_2	Community Clinic	1.31	Ward No. 8
CHC_1	Community Clinic	1.28	Ward No. 9
HS	High School	3.18	Ward No. 1
GIA	Industrial Area	32.35	Ward No. 9
LIH	Low Income Housing	11.14	Ward No. 8
NM_1	Neighborhood Market	0.18	Ward No. 1
NM_5	Neighborhood Market	0.89	Ward No. 2
NM_6	Neighborhood Market	0.92	Ward No. 3
NM_2	Neighborhood Market	0.22	Ward No. 4
NM_3	Neighborhood Market	0.42	Ward No. 5
NM_7	Neighborhood Market	1.08	Ward No. 6
NM_9	Neighborhood Market	1.36	Ward No. 7
NM_4	Neighborhood Market	0.73	Ward No. 8
NM_8	Neighborhood Market	1.20	Ward No. 9
NP_2	Neighborhood Park	2.11	Ward No. 1
NP_6	Neighborhood Park	4.05	Ward No. 2
NP_3	Neighborhood Park	2.23	Ward No. 3
NP_4	Neighborhood Park	2.54	Ward No. 5
NP_5	Neighborhood Park	3.29	Ward No. 6
NP_8	Neighborhood Park	4.51	Ward No. 7
NP_1	Neighborhood Park	1.28	Ward No. 8
NP_7	Neighborhood Park	4.03	Ward No. 9
PG_1	Playground	0.70	Ward No. 2
PG_4	Playground	1.21	Ward No. 3
PG_2	Playground	0.89	Ward No. 4

PG_5	Playground	1.26	Ward No. 5
PG_3	Playground	1.01	Ward No. 6
PG_7	Playground	2.42	Ward No. 7
PG_6	Playground	1.57	Ward No. 9
PKS_1	Primary School	1.19	Ward No. 5
RSZ	Resettlement Zone	17.12	Ward No. 8
SAH	Slaughter House	1.62	Ward No. 7
TMS_2	Tempo Stand	0.17	Ward No. 3
TMS_1	Tempo Stand	0.05	Ward No. 5
TMS_3	Tempo Stand	0.18	Ward No. 7
TMS_4	Tempo Stand	0.43	Ward No. 8
TT	Truck Terminal	3.03	Ward No. 7
WC_1	Ward Center	1.02	Ward No. 1
WC_2	Ward Center	0.56	Ward No. 2
WC_3	Ward Center	0.71	Ward No. 3
WC_4	Ward Center	1.15	Ward No. 4
WC_5	Ward Center	0.49	Ward No. 5
WC_6	Ward Center	0.75	Ward No. 6
WC_7	Ward Center	1.09	Ward No. 7
WC_8	Ward Center	0.79	Ward No. 8
WC_9	Ward Center	0.76	Ward No. 9
WDG	Waste Disposal Ground	8.50	Ward No. 9
WTS_4	Waste Transfer Station	0.17	Ward No. 3
WTS_1	Waste Transfer Station	0.04	Ward No. 6
WTS_3	Waste Transfer Station	0.16	Ward No. 7
WTS_2	Waste Transfer Station	0.12	Ward No. 8

Annexure-E: Resolution and Attendance list of Final Consultation meeting

Annexure-F: Paurashava Gazette

রেজিস্টার্ড নং ডি এ-১

বাংলাদেশ গেজেট

অতিরিক্ত সংখ্যা

কর্তৃপক্ষ কর্তৃক প্রকাশিত

বুধবার, সেপ্টেম্বর ৭, ১৯৯৪

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

স্থানীয় সরকার, পল্লী উন্নয়ন ও সমবায় মন্ত্রণালয়

স্থানীয় সরকার বিভাগ

(পৌর-৩ শাখা)

প্রজ্ঞাপন

তারিখ: ২১শে ভাদ্র, ১৪০১/৫ই সেপ্টেম্বর, ১৯৯৪

এস, আর, ও নং ২৬৫-আইন/৯৪/পৌর-৩/রাবি-গ-৫৭/৯৩—যেহেতু সরকার নবাবগঞ্জ জেলার গোমস্তাপুর থানাধীন নিম্ন তফসিলে উল্লিখিত শহর এলাকাসমূহকে মিউনিসিপ্যালিটি ঘোষণার প্রস্তাব করিয়াছিল ;

এবং যেহেতু সরকার The Declaration and Alteration of Munioipalities Rules, 1978, অতঃপর উক্ত Rules বলিয়া উল্লিখিত, এর rule 3 এর অধীন প্রস্তাবিত মিউনিসিপ্যালিটি ঘোষণার ব্যাপারে পরামর্শ এবং আপত্তি আহবান করিয়া পাবলিক নোটিশ জারী করার জন্য সংশ্লিষ্ট ডেপুটি কমিশনারকে নির্দেশ প্রদান করিয়াছিল ;

এবং যেহেতু প্রস্তাবিত মিউনিসিপ্যালিটি ঘোষণার ব্যাপারে ডেপুটি কমিশনারের প্রতিবেদন বিবেচনা করিয়া সরকার উক্ত Rules এর rule 4(2) এর অধীন উল্লিখিত এলাকাসমূহকে মিউনিসিপ্যালিটি ঘোষণা করার জন্য চূড়ান্ত সিদ্ধান্ত গ্রহণ করিয়াছে;

(৪১৬৫)

মূল্য: টাকা ১.০০

অতএব, সেহেতু উক্ত Rules এর rule 5 এ প্রদত্ত ক্ষমতাবলে সরকার এতদ্বারা নিম্ন তফসিলভুক্ত শহর এলাকাসমূহ সমন্বয়ে আগামী ১-১-১৯৯৫ ইং তারিখ হইতে রহনপুর মিউনিসিপ্যালিটি গঠনের ঘোষণা করিল:

তফসিল

ক্রমিক নং	ইউনিয়নের নাম	মৌজার নাম	জে, এল, নং	দাগ নং
১	রহনপুর	(ক) রহনপুর	১৩০	১—১৮৯৫
	ঐ	(খ) প্রসাদপুর	১৬১	১—৩৭৪৭
২	গোমস্তাপুর	(ক) খয়রাবাদ	১৬০	১—১৯৯২
	ঐ	(খ) ছজরাপুর	১৪৮	১—৪৭৪

রাষ্ট্রপতির আদেশক্রমে

কে, এম, নাজমুল আলম সিদ্দিকী
যুগ্ম-সচিব (উন্নয়ন)।

মোঃ মিজানুর রহমান, উপ-নিয়ন্ত্রক, বাংলাদেশ সরকারী মুদ্রণালয়, ঢাকা কর্তৃক মুদ্রিত।
মোঃ আব্দুর রশীদ সরকার, উপ-নিয়ন্ত্রক, বাংলাদেশ ফরমস ও প্রকাশনী অফিস, তেজগাঁও, ঢাকা কর্তৃক প্রকাশিত।

Appendix

Appendix-1: Structure Plan of Rohanpur Paurashava

Appendix-2: Land Use Plan of Rohanpur Paurashava

Appendix-3: Transportation and Traffic Management Plan

Appendix-4: Drainage and Environmental Management Plan