

Payra-Kuakata Comprehensive Plan Focusing on Eco-Tourism

Amtali Rural Area Plan: 2021-2031

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বাংলাদেশ



গেজেট

অতিরিক্ত সংখ্যা
কর্তৃপক্ষ কর্তৃক প্রকাশিত

বৃহস্পতিবার, আগস্ট ২৯, ২০২৪

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
গৃহায়ন ও গণপূর্ত মন্ত্রণালয়
পরিকল্পনা শাখা-৩

প্রজ্ঞাপন

তারিখ: ০৬ ভাদ্র ১৪৩১ বঙ্গাব্দ/ ২১ আগস্ট ২০২৪ খ্রিষ্টাব্দ

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(২৪৪৫১)

মূল্য : টাকা ৪.০০

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মোহাম্মদ খাদেমুর রহমান
সহকারী সচিব।

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Executive Summary

The Rural Area Plan (UAP) was developed to serve as a guide for future city infrastructure development as well as land use control. A metropolitan area plan is prepared for the Upazila area and is intended for a period of 10 years. Rural planning is more complex than structural planning and is divided into four chapters - strategic planning areas, traffic and traffic management guidelines, environmental and drainage management guidelines, and action plans of the neighborhood including the land use guide. Therefore, the Rural plan is a mid-level plan that includes the existing Rural plan of Amtali Upazila. The Rural Area Plan will guide potential regional land and infrastructure uses for Rural settlements over the next 10 years. This plan aims to develop Rural area plans and action regional plans at the local level. The presentation of this Report is following the Terms of Reference for Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism. Amtali Upazila was established in 1998 and covers an area of 1651.32 acres, including 9 yards and 4 mauzas. The current population is approximately 25,223, with a growth rate of 0.27%. Based on planning standards and the demand of local residents, the UAP proposes the allocation of 1651.32 acres of land for Rural services over the next 10 years. The plan considers future development infrastructure, amenities, and service facilities to meet the needs of the growing population.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Rural Area Plan is prepared as per the Terms of Reference (TOR) of the project. The policies, strategies, and planning standards adopted in the Structure Plan have guided the process of preparing the Rural Area Plan for Amtali Upazila. Typically, a collaborative process involving a range of stakeholders, including government representatives, planners, architects, developers, community leaders, and residents, results in the creation of the Rural area plan. Periodically revising the plan is possible to consider shifting goals and needs as well as alterations to the Rural area's social, economic, and physical landscape.

Rural area should be developed sustainably and with care, and its surroundings should be protected, according to an Rural area plan. This Plan is naïve about projects that have been permitted for development but haven't yet been built as well as about development that is now underway when defining the boundaries of the metropolitan area. The Rural Area Plan covers areas that need economic, physical, and social renovation as well as those that are anticipated to experience significant development during the plan's duration.

The Rural Area Plan has four parts, one of which is the Land use Plan. Land usage Land use is regulated by planning rules, which are statutory regulations. It is based on land use policies, such as Local Plans, which address issues including development density, road quality, the provision of infrastructure, and service availability. The legal instruments in effect with relation to the execution of planning control and standards are the pertinent Acts and Master Plans of the cities. As a result, the relationship between the proposed and current land uses will influence the future land use of the Amtali Rural Area.

An Rural area plan, in general, offers a blueprint for a city's or Rural area's sustainable growth and development, balancing economic, social, and environmental factors, and assuring that the Rural area will stay thriving, livable, and competitive throughout time.

The Rural Area Plan (RAP) will consist of the following plans:

- Land use Plan
- Transportation and Traffic Management Plan
- Plan for future Rural services

1.2 Purpose of Rural Area Plan

Rural Area Plan is a statutory planning document to guide future development of Rural up to 2031. The plan will play an important role of enabling Upazila parishad to play greater role as a facilitator for promoting private sector development initiatives. These plans guidance to how it can develop the roles i.e. to promote development, to co-ordinate development and to control development.

1.3 Background of the Rural Area Plan

The process of raising the standard of living and economic security of rural residents is known as rural development. Rural Area Plan, which addresses the development of rural areas within the project area, offers a long-term strategy for 10 years. The People's Republic of Bangladesh's Prime Minister emphasizes the importance of providing all metropolitan amenities for rural residents in order to improve their quality of life. In order to realize the "Amar Gram-Amar Shohar" vision, the government must provide rural residents with access to urban amenities such as electricity, increased trade and business, development of all forms of communication, planned housing and sewage systems, clean drinking water, healthcare facilities, and internet and technology-based communication. This chapter discusses the current land use scenario, projected land requirements for the rural area plan, a list of the most pressing issues discovered during the rural sector PRA, and suggested facilities for the rural area.

1.4 Objectives of the Rural Area Plan

Rural Area Plan will be a statutory guide and control for development of the six unions of Amtali Upazila. This plan is prepared on mauza map with sectoral development proposals. The Rural Area Plan is aimed to determine the present and future functional structure of the rural area, including land use and provide infrastructure proposals for improving and guiding development of rural area of Amtali Upazila. The objectives of the plan will be attained through orderly location of rural land uses and location of different services and facilities.

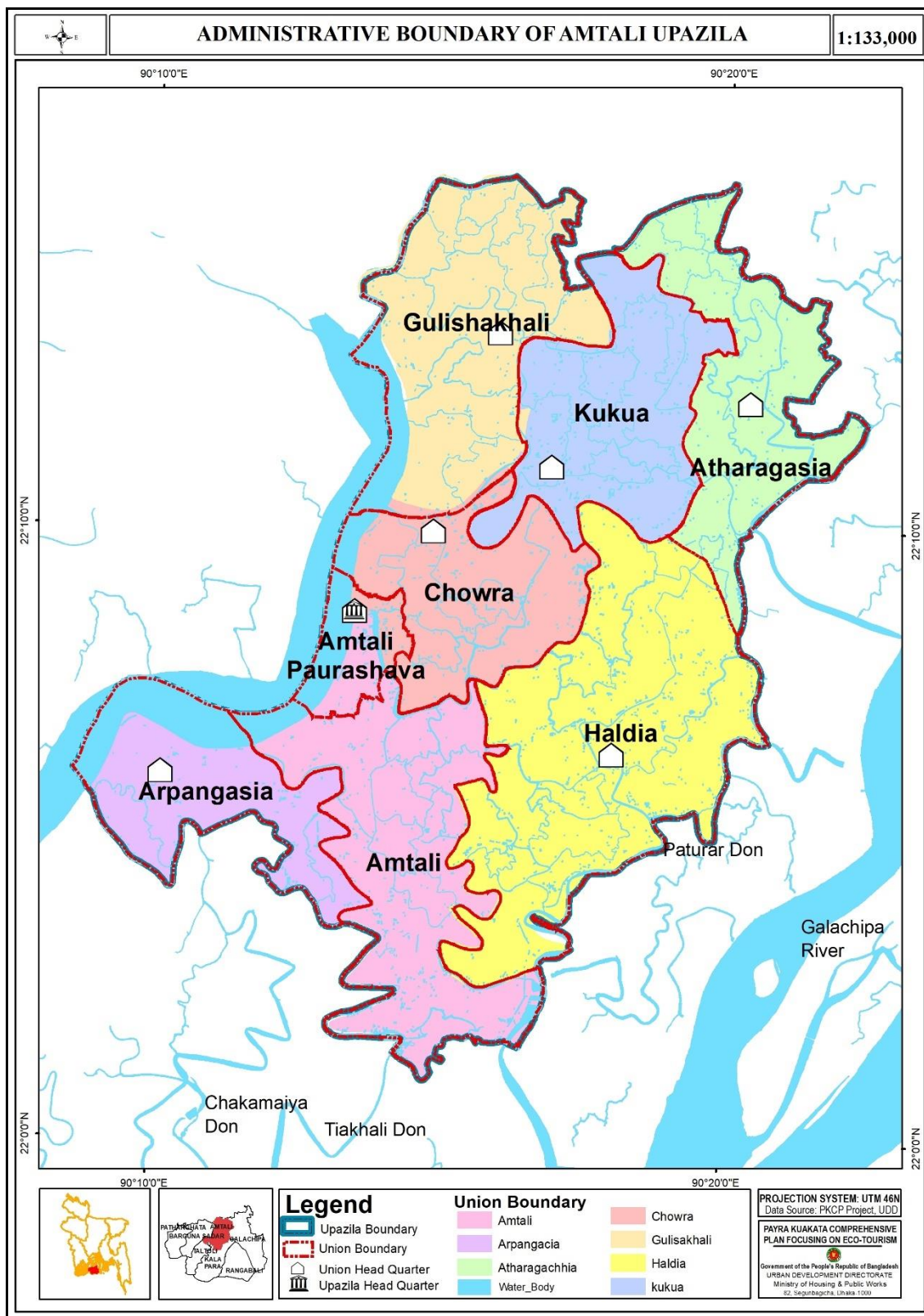
1.5 Area Coverage under Rural Area Plan

The Seven unions of Amtali Upazila are considered as the jurisdiction of Rural Area Plan. According to the GIS database, the Rural Area Plan of Amtali Upazila covers total an area of 77050.67 acres (311.81 sq.km.) of land. Map 1. 1 shows the administrative boundary of the

Rural Area Plan. Table 2. 1 shows the administrative boundary, existing and projected population of the Rural Area Plan. The Mitha Bazar area is witnessing high density Rural growth, per the structure plan. The Transport Network, Drainage Plan, and Future Facilities are all included in the Rural Area Plan. Future Demand has been estimated in this chapter using derived planning standards, and a proposal has been produced based on available facilities. This chapter has a summary of the recommendations for future service allocation. The future Rural area has been defined based on current land usage, population projections, and Upazila area.

Table 1.1: Union-wise Area of Amtali Upazila

Union Name	Area (Acre)	Area (Sq. km)
Amtali Union	15914.00	64.40
Gulishakhali Union	13887.00	56.20
Athrogasia Union	11269.00	45.60
Kukua Union	11288.00	45.68
Haldia Union	22154.00	89.65
Arpangasia Union	8624.00	34.90
Chowra Union	10239.00	41.44
Total	93375.00	377.88



Map 1.1: Administrative map of Amtali Upazila

CHAPTER TWO: EXISTING SCENERIO

2.1 Demographic Setting and Projected Population

In 2022 the total population of the Amtali Upazila was 189223. which has increased in 2011 compared to 2011. The growth rate of this Upazila was 1.23 % in 2011. The below Table 2.1 shows the demographic scenario of Amtali Upazila.

Table 2.1: Union Wise Population Projection

Union Name	Population, 2011(BBS)	Population, 2021	Population,2022 (BBS)	Population, 2031	Population, 2041
Amtali Union	24155	27187	29572.00	35341	40596
Gulishakhali Union	28458	32030	30205.00	31868	33225
Athrogasia Union	23444	26387	26700.00	30015	32875
Kukua Union	24028	27044	29318.00	35067	40308
Haldia Union	27929	30460	34325.00	41325	47743
Arpangasia Union	14873	16740	15338.00	15768	16112
Chowra Union	20802	23413	23765.00	26790	29408
Total	163689	183262	189223.00	216178	240271

2.2 Existing Landuse

Land use is the principal component for the preparation of Rural area plan. There are eight landuse categories exist in the Amtali Upazila which covered 1651.32 Acre of land area.

Table 2.2: Existing Landuse Category

Existing Landuse			
Sl. No.	Landuse Type	Area (Acre)	(%)
1	Administrative/ Public Service	32.07	0.04
2	Agriculture	47344.51	63.43
3	Commercial	87.27	0.12
4	Community Service	273.30	0.37
5	Education and Research	207.54	0.28
6	Health Service	13.18	0.02
7	Manufacturing and Processing	251.67	0.34
8	Mixed Use	60.35	0.08
9	Open Space and Recreational	2.03	0.00
10	Residential	14379.97	19.27
11	Road	1070.22	1.43
12	Service Activity	30.38	0.04
13	Transportation and Communication	364.17	0.49
14	Vacant Land	517.37	0.69
15	Vegetation	738.48	0.99
16	Waterbody	9263.26	12.41
	Total	74635.84	100



Map 2.1: Existing Landuse Map of Amtali Upazila

CHAPTER THREE: TRAFFIC AND TRANSPORTATION MANAGEMENT GUIDELINE

3.1 Introduction

This section of the Rural Area Plan (RAP) intends to set out some guidelines for the transport sector development and its relevant institutional setup. The major areas of concern are network and infrastructure, traffic regulations, services, and institutional aspect. Also, different instructions are grouped under individual guidance notes on different topics.

The critical question here is how far the scenario of the future can be predicted with some level of accuracy. Specially, in a sector like transport that is heavily dependent upon technology, the underlying assumptions can shift quickly that can turn much of the decisions invalid.

3.2 Objective

The objective of the transportation system guidelines should be to offer a sustainable transportation system that satisfies community demands by allowing the movement of people, goods, and wealth at the highest possible degree of safety, economy, and efficiency.

3.3 Transportation Survey Findings

From the transportation survey, it is observed that, on average, 4.37 trips per household are generated within the Amtali area per day among which 67.74% is travel by walking. As the study area is surrounded by a river network and the most disaster-prone area, the travel pattern is not as same as the dry season in the rainy season. The survey also unveils that toiler and drinking facilities were not at a satisfactory level. The parking facility and road condition surrounding the Bazar area required up-gradation. the participants mentioned that congestion creates due to on-street parking, narrow road network, and lack of parking facilities. The roads were observed to have narrow carriage width considering the requirements for two vehicles to pass side by side. The roads had several sharp turns as well. Road condition is very bad; roads are not paved, there is a crack in roads, brick soling, wholes exist in here and there, ongoing construction works etc.

3.4 Existing Conditions of Transportation Facilities

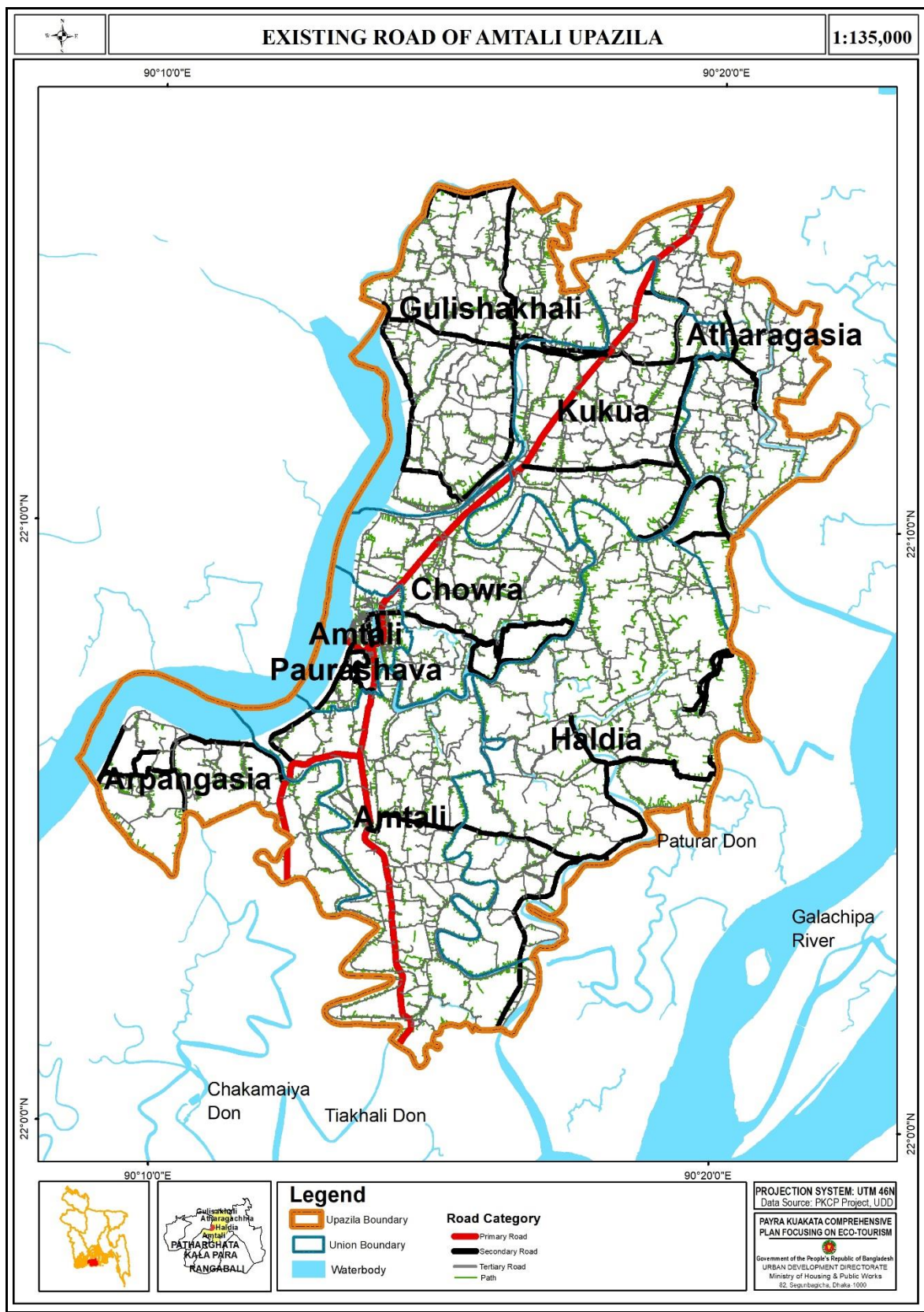
From the transportation survey and public consultation in the PRA session, it is unveiled that congestion is caused by on-street parking, a narrow road network, and a lack of parking. Local people also emphasized how ferry crossings add a significant amount of time to travel. Land use, environmental quality, economic growth and viability and achieving lifestyle objectives are

obvious factors that must be considered in evolving a comprehensive plan. The majority of the notable crossroads are located on the Amtali-Khepupara-Kuakata Regional Highway (R881) and the Patuakhali-Amtali Regional Highway (R880). Both regional highways (R880 and R881) must be developed for the future since the access road would instantly serve the Payra Deep-Sea Port and Payra 1320 MW Thermal Power Plant. There are no public bus stops nearby, and the roads in Upazila and Union are not suitable for supporting vehicular traffic.

Amtali intersection is the most significant among the other intersections and merits further development planning since Kuakata-Khepupara regional highway (R881) and Barguna-Amtali-Patuakhali regional highway meet here. All types of vehicles must pass through this intersection to get to the Payra-Kuakata tourism zone. Amtali crossroads was also found to be the busiest intersection in the research area since it serves as a gateway to the main town area, local and long-distance bus stoppages, and important business hubs for this area.

3.4.1 Existing Road Network

This part analyzes current shortcomings in the transportation sector by describing existing transportation infrastructure, including roadway characteristics, modal share of vehicular traffic, level of service, which incorporates degree of traffic congestion and delay of Amtali. The majority of the roads have such poor conditions that driving a motor vehicle on them is dangerous. The majority of the roads are brick and katcha pavement roads, both of which are in poor shape. Roads become flooded and muddy during a flood, leaving locals completely reliant on waterways for transportation. The launch ghat is also in poor condition. Additionally, it has been noted that the disorganized and temporary stands for local buses, electric auto rickshaws, and motorbikes cause traffic congestion in the Amtali chowrasta area.



Map 3.1: Existing Road network of Amtali Upazila

3.4.2 Roadway Characteristics and Functional Classification

The primary roads are the Rural highways whose function is to channelize the longer movement from one place to another and beyond. The primary road of Amtali Upazila is connected in north and north east directions and these roads maintain connectivity with the outside areas of Upazila. Moreover, the primary roads are also connected with secondary and access roads and all these roads maintain good connectivity within the Upazila area. Secondary road cannot provide access to individual buildings because the consequent frequency of interruptions would give rise to traffic dangers. Tertiary road connects secondary road with access road. But in Amtali Upazila most of the roads cannot be defined according to road hierarchy.

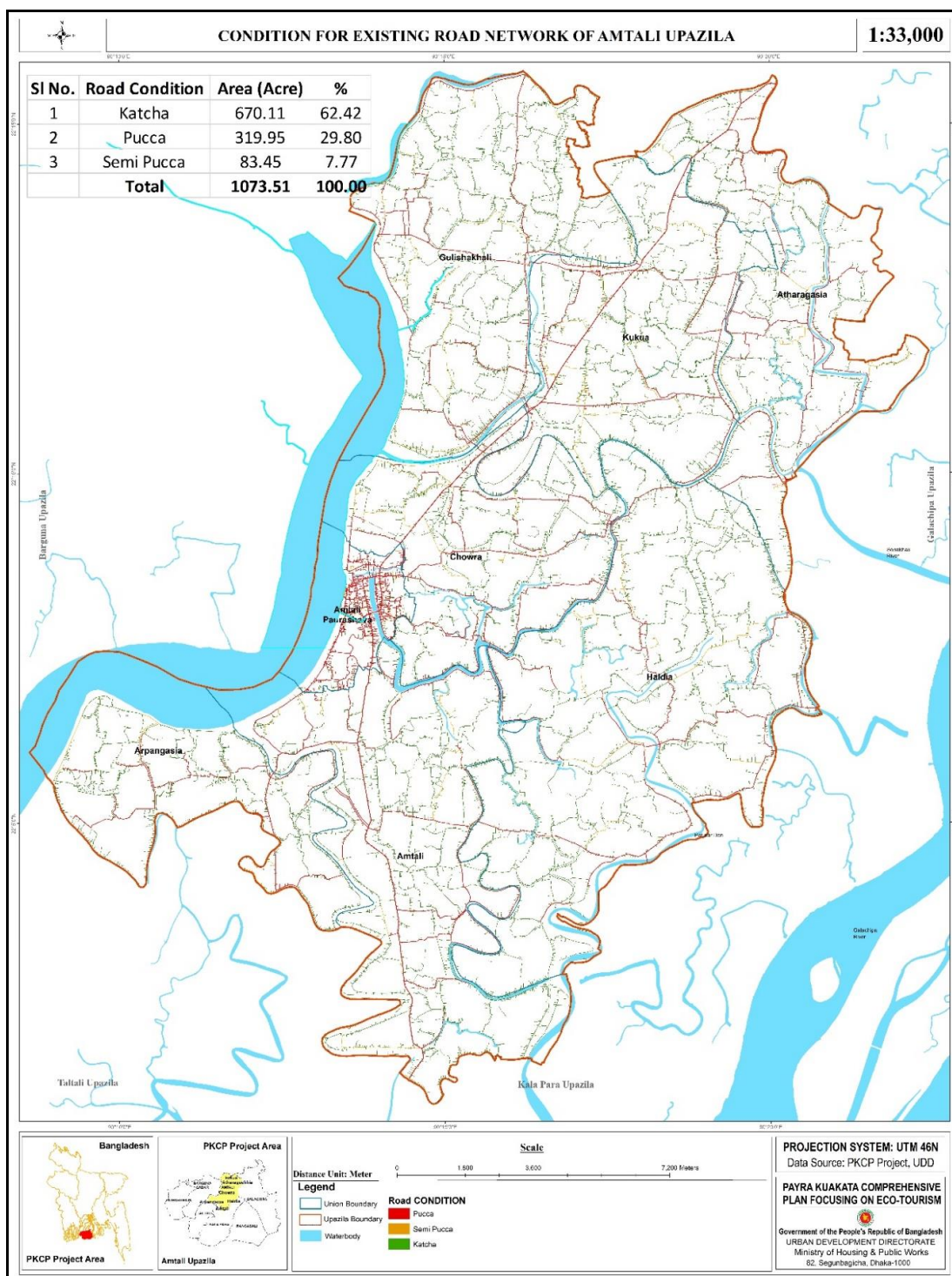
Table 3.1: Existing Functional Category of Amtali Upazila

Functional Category	Area	(%)
Path	723.66	723663.6
Primary Road	37.21	37217.39
Secondary Road	130.77	130775.7
Tertiary Road	1014.25	1014257
Total	1905.91	1905914

From the physical feature survey, it has been observed that about 19.82% (377781.98 m) of the roads are Pucca, 73.33% (1397617.58 m) roads Katcha and the rest of the roads are Semi-pucca 6.85% (130514.55m). There are 44 bridges at Amtali Upazila.

Table 3.2: Existing Road Network of Amtali Upazila

Road Type	Area (m)	Percentage (%)
Katcha	1397617.58	73.33
Pucca	377781.98	19.82
Semi Pucca	130514.55	6.85
Total	1905914.11	100



Map 3.2: Existing Road Type of Amtali Upazila

3.4.3 Existing Waterways

From transportation survey it is found that overall ferry service in Patuakhali and Barguna is in awful condition over the years. Most of the ferries are now at risky situation due to low demand. Overall ferry service in Patuakhali and Barguna is in awful condition over the years. 10 ferries are already shutdown a long time ago.

Most of the ferries are now at risky situation due to cracks that let water in and it often requires removal of the water with pumping machines.

Three of the ferries are active now: (i) Lebukhali point on Paira River along with Patuakhali-Barisal road, (ii) Amtali on the Paira River along Patuakhali-Barguna road and (iii) at Bainchutki along Barguna-Kakchira road in Barguna district.

The ferry service is unavailable and only used to transport heavy vehicles. So, not more than one ferry mainly serves this area. The pontoo Bike, Easybike or Auto Rickshaw,

3.4.4 Existing Ferry Ghat and Launch Terminal

Existing Ferry Ghat and Launch Terminal is situated at Long: 22° 07' 59.1600" N, 90° 13' 50.5200" E Noyabangoli road, TNT road, Arambag road, Sobujbag road intersect Lauch ghat road. All are located within north-west of R880. All the roads are constructed with flexible pavement. Road surface along with the Amtali bazar area is started deteriorating. Condition of access road for ferry is poor. Largest economic hub in the study area made most crowded place. On street parking. Easy bikes, Mahindra, Electric auto van and Motorbikes. Boats, trawler, launches in waterway.

3.4.5 Existing Boat Ghat

The Location of Amtoli Upazila is boat ghat. Vehicle Type is Trawler/ Cargo. Goods Type is Rice, Wheat, Salt, Flour, Oil etc. The Capacity of existing boat ghat is 300-400 tons. Frequency is Every Tuesday two boats come from Jhalakathi but not stay in Amtoli. On season almost 12 boats come to the ghat and stay at the boat ghat.

3.4.6 Bot Tola Truck Stand

Amtoli Bot Tola is the only prominent truck stand in Amtoli Upazila. During off-season, around 100 trucks come to the stand and about 40-50 trucks leave the stand per day. On an average 50-60 trucks stay there every day for a duration of 2 hours - 2 days. During on-season mainly in January and April, around 500 trucks come and go every day. Sometimes 100 trucks stay for a

single day. These trucks mainly come from different locations such as Dhaka, Rajshahi, Jessore, Khulna, Satkhira, Bagura etc by carrying various types of goods like paddy, rice, wheat, tin, fruits (mango, water melon) etc.

3.4.7 Manikjhuri Bus Stop

Manikjhuri Bus Stop is at Amtali. Latitude/Longitude: 22° 06' 08.7559" N, 90° 13' 40.1706" E. T-intersection joining Barishal-Kuakata and Amtoli Sonachar Road. The regional highway condition at this point is fair. Emergence of crocodile crack. The condition of Amtali- Sonachar road at intersecting point is paved though the pavement is started to deteriorating. Ruralized area so most crowded place. Encroached by different economic activities. On street parking. Easy bikes, Mahindra, Electric auto van and Motorbikes, Bus for long distance.

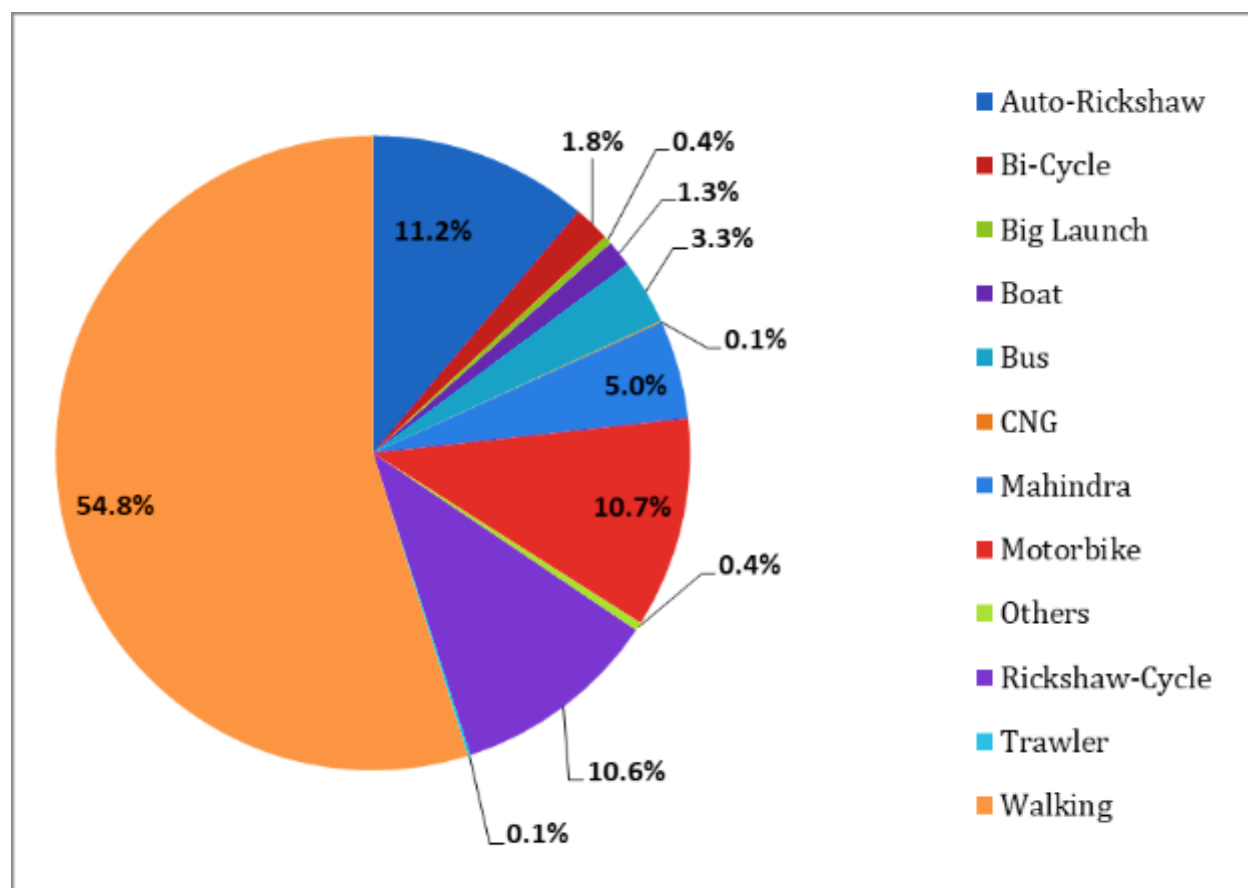


Figure 4.1: Mode of Travel in Amtali Upazila

3.5 Transportation Development Plan

Prepare inventory of existing transportation infrastructure, land use and socioeconomic data. Develop a computer based 4-step travel demand forecasting model for the base year using CUBE software package with the input data from Step 1, i.e., taking 2018 as the base year. Identify major bottle necks within the network and match those with the findings from the survey. Prepare an inventory of all the future land use and transportation infrastructure projects that will have impact on travel demand and supply throughout the design life. Obtain the future land use and projected socioeconomic data for every five years till the end of the design period of the project. Identify the bottle necks; determine the origin-destination pairs having high flow but at high travel cost. Propose new transportation infrastructure projects to address the concerns raised by the outcome of Step 6. It is important to create several alternative infrastructure project proposals at this step. Evaluate the efficacy of various future scenarios represented by various future transportation infrastructure projects and rank them based on their effectiveness.

3.5.1 Deteriorated Pavement Condition

Problem: Except for several zila highways and regional routes, it was discovered that nearly the entire road network's pavements were in poor condition. There are various factors at play here: Weak construction, poor maintenance, flooded pavement during the rainy season, pavement utilized as bazaars and parking lots leading to creep failure despite fatigue failure being taken into consideration, etc.

Solution: The responsible authorities should have well thought out pavement maintenance plans in addition to improving local pavement construction practices. Additionally, regular pavement condition monitoring is required to lower maintenance costs. As was previously indicated, bazaar areas can be moved away from the main carriage width. It is necessary to build separate parking facilities at the same time. By doing this, pavements will be subjected to the least amount of dead load that could result in creeping collapse.

3.5.2 Bazar Area Congestion

Problem: In the study region, it was noted that congestion almost always occurs around bazaar areas, which are frequently found close to junctions. This occurs because these places frequently draw a sizable number of visitors. At the same time, these bazaars are easily accessible from the road system, and frequently they are built on top of the actual highways. A significant amount of

items are also brought to and from these bazaars in addition to people. Roads are blocked while such loading and unloading occurs. These bazaars are frequently leased by different local authorities.

Solution: Every growth center should assign a certain land area to serve as the bazar area, at least 250 meters away from the intersections. The location should have clearly marked access points and dedicated areas for the loading and unloading of cargo. To prevent jaywalking, which poses a risk to both operations and safety, decent pedestrian amenities should be built.

3.5.3 Congestion due to Unconventional Modes of Transport Parking

Problem: It was clear that unconventional modes of transportation (UCM) have significantly increased to fulfill the rising demand for travel because suitable public transportation facilities are lacking in many areas of the research area. These UCMs almost typically lack a parking area and are uncontrolled. As a result, they intrude on public roadways, frequently reducing the carriage width to less than one legitimate lane. At crossroads, the situation is significantly worse.

Solution: Every major stop in the study area that serves as a point of entry or exit for UCMs must have a parking place for them that is accessible from a local road. UCMs will use those spots that are off the road to load and unload people. Access to UCM stands should also include proper pedestrian facilities. These stands should be built with the idea that they will still be functional when UCMs are replaced by more traditional public transportation, such buses, in the future.

3.5.4 Congestion at Intersections

Problem: Culturally the development work in Bangladesh often take place keeping the intersections in focus. It causes substantial problems as in one side it attracts traffic from all directions and at the same time there is not enough space or set rules to channelize their movement without conflict. Often, there are no parking areas or locations for proper access and egress from vehicles.

Solution: Intersections need to be widened and various major movements are to be channelized constructing physical barriers. Also, parking facilities should be constructed in such way that they don't hinder the traffic movement at intersections.

3.5.5 Lack of River Crossing Facilities for Vehicular Traffic

Problems: It was found that although ferry services are available at various locations, particularly on the regional roads, their condition is quite dilapidated causing huge safety concern. Moreover, often the frequency of ferry services is inadequate creating long queues.

Solution: At present, several initiatives have been taken to construct bridges replacing the ferries. It is expected that once such projects reach completion, this issue will mostly get resolved. At the same time, once the computer-based model is constructed, analyzing the origin-destination demand matrix, locations where new ferry services can be introduced to reduce travel time can be identified.

3.5.6 Poor Pavement Condition

Problem: It was found that other than the regional road and some zila roads, pavements in almost all the road network is in dilapidated condition. There are several reasons for it: i) weak construction, ii) lack of maintenance, iii) pavement going under water during the rainy season, iv) pavement being used as bazar and parking area resulting in creep failure although they were designed considering fatigue failure, etc.

Solution: Apart from enhancing the local practice of pavement construction, concerned authorities should have well designed maintenance plans for pavements. Also, regular monitoring of pavement conditions is necessary to reduce the cost of maintenance. Bazar areas can be relocated from the main carriage width as mentioned earlier. At the same time, separate parking facilities are required to be constructed. This will ensure that pavements are subjected to minimum dead load that may cause creeping failure.

3.5.7 Lack of Properly Designed Inter-Modal Transfer Opportunities

Problem: Being a riverine region, it is quite expected that waterways will play a significant role in transportation of people and goods. However, waterways cannot provide the ‘last-mile’ connectivity which is in general provided through road network. In order to ensure proper operation of inter-modal transfer opportunities, proper facilities are to be designed connecting these two modes. Often such facilities are unplanned creating congestion and delay.

Solution: Inter-modal transfer areas need to be properly designed for both goods and passengers. There should be designated public transport, personal vehicle and goods vehicle loading-

unloading-parking areas designed in such areas. People should also be provided with waiting areas with basic amenities.

3.6 Proposed Road Network

To maintain Amtali Upazila Rural Area's status as a modern metropolis and to provide for the needs of the administrative, financial, and commercial hub of the nation, comprehensive and efficient transportation systems with good interlinkages are crucial. To ensure that everyone has equal access to the many advantages of Rural living, the city must be able to provide an effective and equitable transportation system. Due to the Rural area's current ineffective transportation system, the country could suffer serious socioeconomic losses and lose its competitive edge internationally. New Road Network has been proposed and widening of existing roads also proposed.

3.7 Future Plan and Direction

Safe, affordable, sustainable and connected communities. Communities will find better places to live, work and raise a family, with easy and safe access to social and economic opportunities. An effective network of connectivity will foster the safe, efficient movement of people and goods and contributes to Amtali Upazila economy. Roads and highways and other mass transits directly connect to other transportation modes and are vital to moving of products to markets both within and outside the Rural area. To achieve the goal following issues will have to be addressed:

- Providing a greater choice of travel modes (BUS/CAR/TRUCK)
- distributing goods and services more efficiently;
- Improving road safety and road widening;
- Reducing the environmental impacts of the transport system;
- Fostering medium density development;
- Utilization of water way transport network;

To attain the above goal the following objectives policies have been recommended.

CHAPTER FOUR: RURAL DRAINAGE AND ENVIRONMENT MANAGEMENT PLAN

4.1 Drainage Management Plan

This chapter states about goals and objectives, and methodology of Drainage Development Plan. An inventory of the existing drainage system of Amtali has been made as a part of the comprehensive topographical survey to be taken-up under this project. While assessing the drainage conditions, the serviceability, structural conditions, obstruction, siltation, blockages are taken into consideration. And finally describe the drainage and environmental management plan, and its implementation strategies.

4.2 Goals and Objectives

Provision of drainage facilities are important concern to human settlements to create better living environment. Failure to provide the adequate drainage facilities results in flooding and detrimental environmental quality. Drainage of high rainfall region particularly in the context of Barishal region is very important. The objectives of drainage planning are described as follows:

- To analyze drainage aspects in the planning of the Upazila.
- To study geological fault and lineament of the project area and its surroundings.
- To study the existing water development, flood protection and flood control project (if any) in the area and their impacts in the Upazila plan.
- To present planning options for drainage of the future Upazila area.
- To study conservation of the natural resources like parks, open space, water bodies, existing ponds etc.
- To conserve place of historical, architectural (if any) and agricultural importance including natural fisheries.

4.3 Methodology and Approach to Planning

Drainage Network Survey for Amtali Upazila has been carried out through the guideline of ToR. In this survey explore the existing drainage network system at Amtali Upazila. The main vision of this survey is explored the length, depth, flow direction, coverage area and satisfactory level of the Upazila inhabitants. The information of drainage network gathered from topographic, socioeconomic and physical feature survey. Major feature of drainage and environment survey are as follow:

- Survey the main drainage channels from their heads to the outfalls and to estimate their capacity to discharge water.
- Collect and analyze meteorological data over time in the area to determine the meteorological conditions and predict storm surges.
- Determine the efficiency of the present drainage systems and make recommendation to government.
- Organize a public enlightenment campaign to expose the adverse effects of dumping refuse in drainage channels, through a mass media meeting.
- Drainage channels were surveyed by leveling from the head of the channels to the outfall using a surveyor's level. A zero datum was chosen at the head of each channel. These zero heights were then used to level the channel from the head to the toe or outfall. In areas where water flow was observed, the velocity of the flow was recorded.

4.5 Existing Digital Elevation Model (DEM)

Drainage catchments for the Upazila and Rural area are delineated using digital elevation model (DEM) with spatial resolution of 1m which is collected from Tiller consulting firm. However, this DEM is resampled into 10m spatial resolution for the processing of drainage catchment delineation. The Sub-watershed analysis has been conducted using ArcGIS spatial analysis and Arhydro extension tools.

4.6 Flow Direction

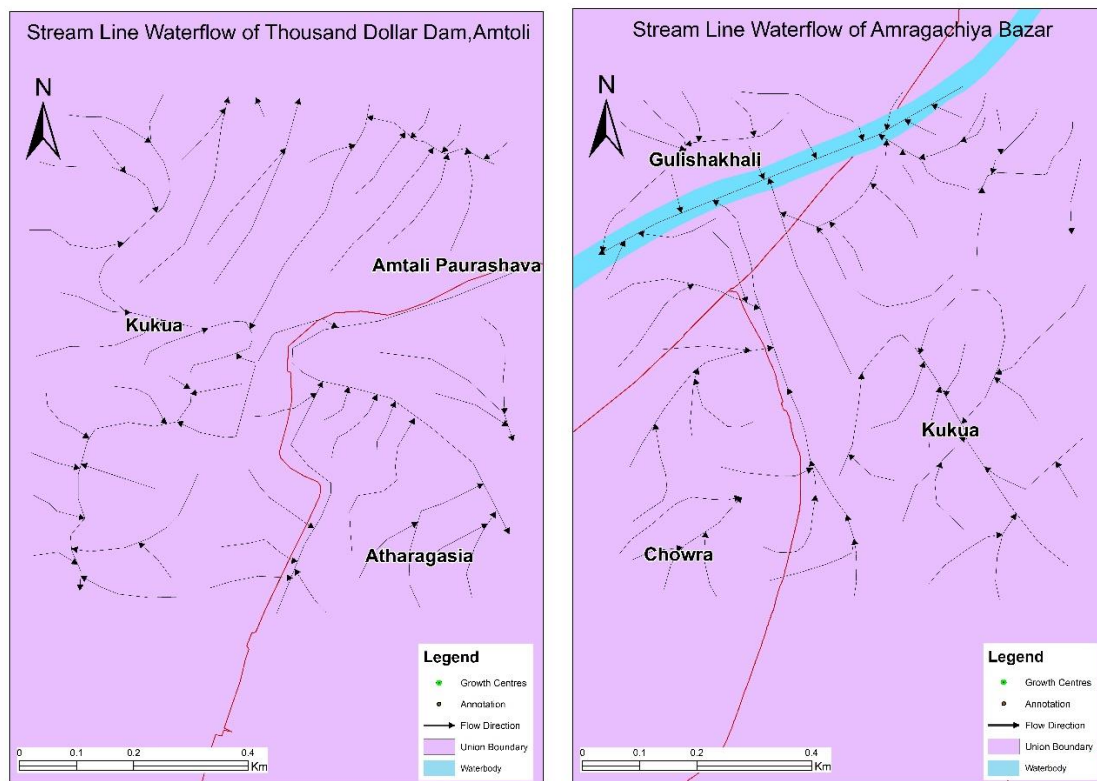
Watershed analysis requires fill the sinks (depression) of the study area as first step. The sinks are low elevation areas in DEMs that are surrounded by higher terrain that disrupts the flow path. Filling sinks creates a hydrologically connected DEM for watershed analyses. The fill process helps to raising the value of a cell identified as a sink cell to match the elevation of its downhill neighbor.

Using Arc hydro tool extension of ArcGIS, flow direction has been determined for the study area from the processed DEM. The main concept of the model is that water from cell that would flow to the adjacent cell which has steepest gradient. It also assumes the catchment as depression less without any ponds or pits. After filling the DEM sinks, a flow direction was computed by calculating the steepest slope and by encoding into each cell eight possible flow directions to

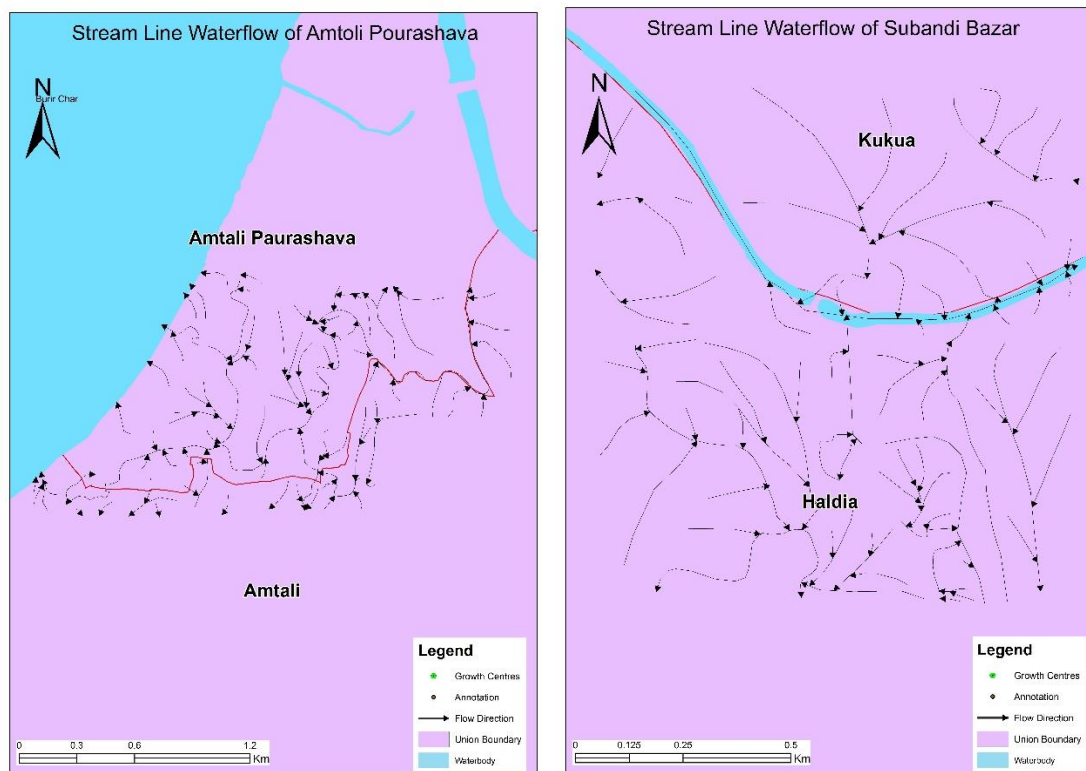
Unions the surrounding cells. This is called the 8-direction pour point model to determine flow path.

4.7 Stream Network

The stream network can be divided into segment which will determine the outlets of the basin. Watershed divide is assumed as a line whose flow accumulation value is zero and those cells, which have flow accumulation value greater than a threshold value provided by the user, is assumed as stream channel or river. After applying trial and error methods, the threshold value of 7% (Amtali) of the longest flow path was used to determine the drainage network. An extensive field survey in Amtali Rural area was done to check the accuracy of delineated drainage network. However, some major corrections of delineated drainage network are made on the basis of field report information. The drainage network of the all Upazila and Rural area.



Map 4.1: Water Flow Direction Map



Map 4.2: Water Flow Direction Map

4.8 Drainage Outfall

Based on the above threshold value and field report information, there are 14 sub-catchments and 4 outlets are found in Amtali Upazila. Based on the above threshold value and field report information, there are 14 sub-catchments and 4 outlets are found in Amtali Upazila. Moreover, the location of two drainage outlets of Amtali Upazila are near the Bashasuki Sluice Gate Road and rest two are near the Wapda Road and all the outlets are fall into the Payra River.

There are only 2 sluice gates exists, without any formal outfall of drains in or outside Amtali Upazila. The secondary drains mainly discharge storm water to the nearby khals and borrow pits, which will be act as primary drain. One of the existing sluice gate situated by the side of Amtali-Patuakhali road is being proposed to up grate up to three gates. Total 27 drainage out falls and 2 new sluice gates are proposed for drainage development plan of Amtali Upazila.

This plan should address the major environmental issues facing a Upazila. From environmental agreement perspective it is important that critical areas, natural resource lands and the

environment be protected. In addition, environmental infrastructure such as water supply, storm drainage sanitary sewer and solid waste management facilities that are required to mitigate negative environmental consequences resulting from individual and collective human activities, should be properly planned and implemented. Proper management of existing infrastructure and services is also of crucial. This plan should cover the following environmental features and issues where applicable:

Natural Resources

- Forests and natural vegetation Streams and water bodies
- Wetlands
- Shorelines
- Aquifers
- Water quality
- Air quality

CHAPTER FIVE: RURAL SERVICES, UTILITIES PLANS

The Rural service plan includes following three components-

- Rural Water Supply Management Plan
- Rural Sanitation and Solid Waste Management Plan
- Energy, ICT and Other Rural Services Plan.

The scopes of each of the plan are discussed in the following paragraphs-

5.1 Rural Water Supply Management Plan

The water supply management plan should address the major issues related to water supply and management. The scopes of the plan include:

- a) Outlining the water supply scenario of the Municipality and other Rural areas of the upazila considering the projected population for the planning period.
- b) Preparation of detailed inventory of existing drinking water sources (including water quality) through inventory of groundwater resources, and surface water sources within/surrounding the Rural areas, and hydro-geological setting of the area; assessment of precipitation characteristics for potential use of rainwater as a water source
- c) Proposal of a more detail layout of water supply system within the Rural areas in line with the proposal of the Structure Plan.
- d) Recommendation of a suitable institutional arrangement, for implementation and management of the water supply system in line with relevant rules and regulations of the Government.
- e) Identification and prioritization of relevant projects through rigorous public participation and stakeholder engagement.

5.2 Rural Sanitation and Solid Waste Management Plan

The sanitation and solid waste management plan is concerned with important environmental infrastructure such as sanitary sewer and solid waste management facilities that are required to mitigate negative environmental consequences resulting from individual and collective human activities.

The scopes of this plan include:

- a) Outlining the sanitation and waste management targets for the Rural areas including
- b) Preparation of a baseline status for sanitation practices and solid waste generation
- c) Identification of infrastructure and land requirements for complete onsite sanitation system (including fecal sludge management, in line with the institutional and regulatory framework for fecal sludge management of the Government) and solid waste management (focusing on resource recovery options).
- d) Preparation of plan for household wastewater (grey water) disposal options.
- e) Preparation of a plan for inclusive sanitation system for the Rural areas, considering onsite sanitation system, including facilities of mechanical desludging and fecal sludge treatment, and decentralized wastewater treatment system (DEWATS).
- f) Designing a solid waste management system in line with the 3R policy of the Government, with waste collection system and solid waste processing site(s) for safe processing (including resource recovery) disposal of solid waste.
- g) Proposal of institutional arrangement for sanitation (including Fecal Sludge Management) and solid waste management, in line with relevant rules and regulations of the Government.
- h) Identification and prioritization of relevant projects through rigorous public participation and stakeholder's engagement.

5.3 Energy, ICT and Other Rural Service Plan

The energy, ICT and other service plan is concerned with allocation of space for the mentioned service sectors to develop their infrastructure, service line and the institutional arrangements that are necessary for efficient implementation of the plan. The plan must also consider future possible expansion of the infrastructure as well as technology changes and shifts along with effects thereof on other domains (eg, in environment, power requirement).

The scopes of this plan include:

- a) Preparation of detailed inventory of existing energy sources, amount of energy used etc.

- b) Outlining the energy demand for the Municipality and other Rural areas of the upazila considering the projected population and economic activities in the planning period.
- c) Allocation of space for infrastructure to meet the future demand of energy system in line with the both sectorial and spatial strategies proposed in the Structure Plan.
- d) Developing a 10-year road map for clean energy, RE and energy conservation strategies in the Rural areas of the upazila.
- e) Outlining the ICT infrastructure and service requirement of the upazila considering the projected population for the planning period. Preparation of detailed inventory of ICT infrastructure.

5.4 Priority Development Project

Table 5.1: Sector wise Priority Development projects with Implementing Agencies

Sector	Priority Projects	Financing and Implementing agency
Transport	Road, Bridge, Culver, Terminals and Bus Stops, Taxi, Tempo and Rickshaw Stands	Upazila and Local Agencies of Ministry of LGRD&C and Ministry of Road Transport & Bridges
Drainage	Drains, Sluice Gate,	Upazila and Local Agencies of Ministry of LGRD&C
Utilities	Waste Disposal Ground, Waste Collection Point/ Centre for each Union of Upazila	Upazila and Local Agencies of Ministry of LGRD&C
Social Services	Community Centre	Upazila and Local Agencies of Ministry of Social Welfare/Ministry of LGRD&C

Housing	Housing Complex, Satellite Town/ Neighbourhood Town	NHA and Local Agencies of Ministry of Works
Commercial- Industrial	Retail/ Sales/ Neighbourhood Shopping Complex/ Kitchen/ Agro Market	Local Agencies of Ministry of Works & Ministry of LGRD&C
Tourism	Lake Development, Sites for Tourism Development/ River Front Development	Upazila and Local Agencies of Ministry of LGRD&C & Tourism
Cultural	Eidgah, Graveyard, Crematorium, Mosque, Temple, Pagoda	Upazila and Local Agencies of Ministry of Cultural Affairs

CHAPTER SIX: RURAL AREA PLAN

6.1 Introduction

This chapter contains Rural Area Plan of each individual Union. First, the issues prevailing in different Unions have been briefly described followed by description of Development Proposals in Rural Area Plan for each Union.

The land use plan is the principal component of the Rural Area Plan. The plan must consider the allocation of land for residence, business, industry, potential municipal facilities, public and private recreation, major institutional facilities, mixed uses, open space and natural and fragile areas. Optimum intensities and standards of development must be established for each use classification and location based upon current development, natural land characteristics, and projected municipal services and facilities.

Allocations of land use must consider impacts on surface and ground water resources, wetlands, coastal features, and other sensitive and fragile natural resources. Judgments must be made on the ability of various existing and new land use controls to properly protect these natural resources.

The characteristics, trends and projections of population and employment will be essential input to the allocation of land areas for use. The plan should show how the projections have been used to determine amounts of land needed for residential, industrial, and other purposes. These quantitative relationships carry over to other components of the plan in that certain facilities and services (utilities, transportation, recreation areas etc.) are needed to support the land allocation to each use.

6.2 Background

The Rural Area Plans are prepared under the framework of Structure Plan and Regional Plan. The Rural Area Plans contain details of development proposals at Union level including the problems and opportunities existing therein and also include the proposals made in the upper level plan that is in the Rural Area Plan. The Rural Area Plans have been formulated for execution within a period of 10 years.

Rural Area Plan is a vital part of the current plan package as far as Strategic development and development control is concerned. Absence of Rural Area Plan not only hampers undertaking of development projects by planning authority, but also leads to uncontrolled and unwanted Strategic development in the private sector. Land use zoning is also provided in the Rural Area Plan to enable detailed view of proposed land use and development.

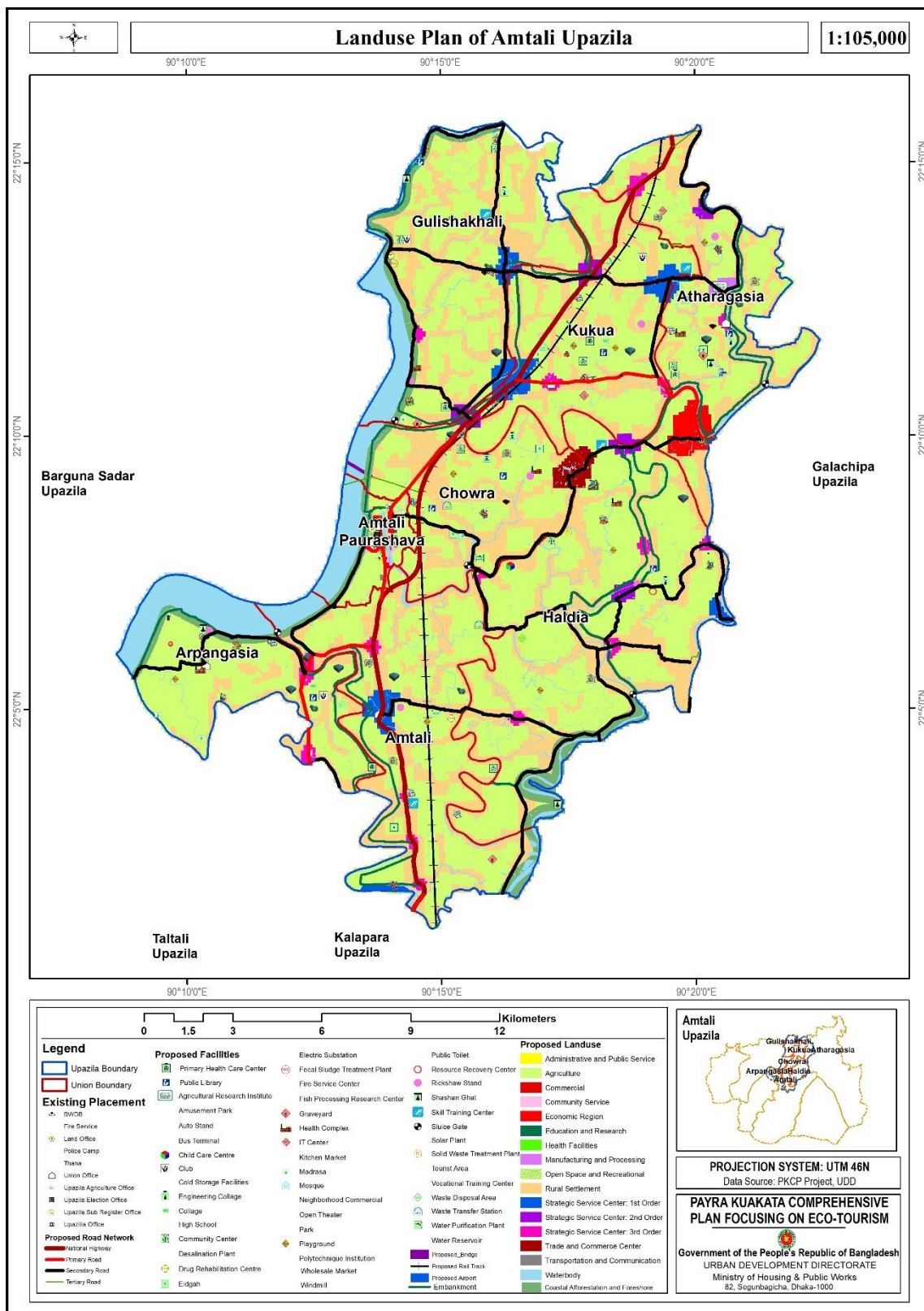
6.3 Land Use Categories in the Rural Area Plan

The Rural Area Plan (RAP) is prepared with a number of detailed land use categories to guide the implementation of the Rural Area Plan in a planned manner. Separate land use categories are considered for the rural area of Amtali Upazila. The land use categories considered for the Rural Area Plan of Amtali Upazila are provided in Table 8.

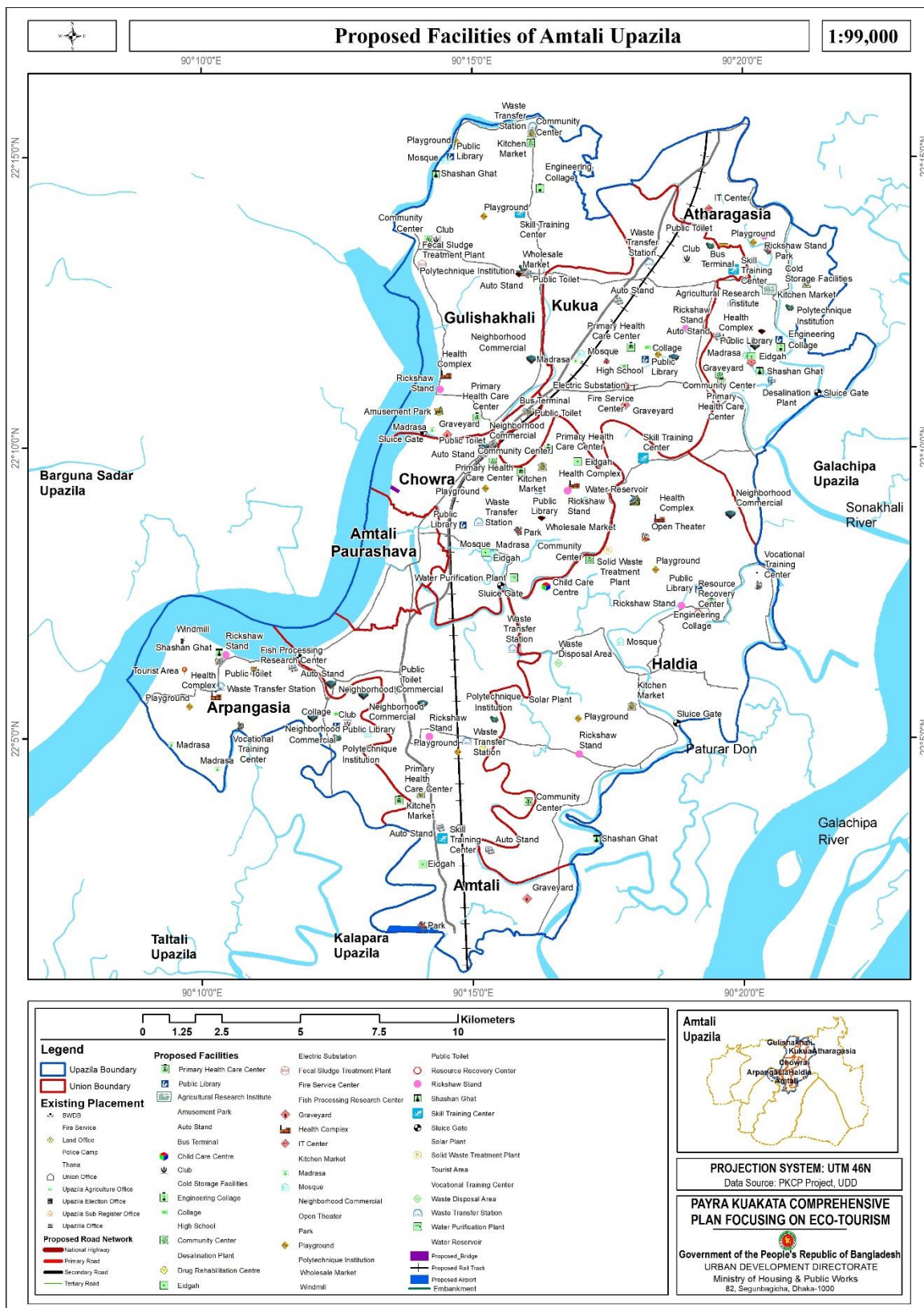
Table- 8: Land Use Categories Considered for the Rural Area Plan of Amtali Upazila

Land Use Categories	Description of the Categories
Administrative	Administrative area covers all kinds of government and nongovernment offices in the project area.
Agricultural Area	Agricultural land (also agricultural area) denotes the land suitable for agricultural production, both crops and livestock. It includes land left temporarily fallow; land under permanent crops (e.g., fruit, plantations); areas for natural grasses and grazing of livestock.
Circulation Network	All types of roadways, walkways, railways.
Commercial Area	Commercial areas generally contain one or more of a wide variety of uses that includes business uses, offices, hotels, public houses, and limited forms of retailing. Mainly bazar, shopping agglomerations and areas suitable for commercial development have been placed under this category.
Community Facilities	This land use covers all categories of community facilities and establishments like mosque, temple, church, Eidgah, graveyard, community center etc.
Education and Research	Land belonging to educational use includes all categories of educational and training institutions. Educational institute like Medical College, University etc. have been included in this zone.
Industrial Area	Processing and manufacturing industries
Health Services	The health service zone includes all existing health service establishments and the areas proposed for health facilities
Mixed Use Area	Mixed Use area will allow residential structures together with commercial uses and other services and facilities

Land Use Categories	Description of the Categories
Open Space and Recreation	Open space covers the parks, play fields and the existing open space areas like, forest, park, etc.
Residential Area	Different categories of housing areas have been proposed in the development plan under the categories of residential use. These categories have been made for promotion of housing through private and public initiatives. The residential category includes all areas of future residential development, public housing, hotels and lodging and also the existing housing areas.
Transportation and Communication	Transport facilities like, bus and truck terminals have been included in this zone
Utility Services	Public utilities for various services like, fire service, post office, solid waste transfer station, solid waste disposal center, electric substation, filling station, etc. fall under this category
Water bodies	Khal, irrigation canal and river are treated as water bodies.



Map 6.1: Rural Plan Map of Amtali Upazila



Map 6.2: Proposed Facilities of Amtali Upazila

6.3 Union Action Plan Proposal

6.3.1 Background

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

6.3.2 Existing Landuse of Amtali Upazila

Out of total 74635.84 acres of land of this Union, Amtali Upazila is primarily an island and majority of Upazila is rural. Some wards are primarily composed of urban features. However, the growth and spread of activities have already been impacted in recent years by the development of communication. The existing land use of the Upazila shows that 63.43 percent of the land is used for agricultural activity, and other mentionable land-use area is 19.27 percent residential, 0.99 Vegetation land and 12.41 percent Waterbody.

Table 6.11: Existing Landuse

Existing Landuse			
Sl. No.	Landuse Type	Area (Acre)	(%)
1	Administrative/ Public Service	32.07	0.04
2	Agriculture	47344.51	63.43
3	Commercial	87.27	0.12
4	Community Service	273.30	0.37
5	Education and Research	207.54	0.28
6	Health Service	13.18	0.02
7	Manufacturing and Processing	251.67	0.34
8	Mixed Use	60.35	0.08
9	Open Space and Recreational	2.03	0.00
10	Residential	14379.97	19.27
11	Road	1070.22	1.43
12	Service Activity	30.38	0.04
13	Transportation and Communication	364.17	0.49
14	Vacant Land	517.37	0.69
15	Vegetation	738.48	0.99
16	Waterbody	9263.26	12.41
	Total	74635.84	100

6.3.3 Proposed Land use for Rural Area Plan

Out of total 74657.27 acres of land of this Union, more than 26185.42 acres of land i.e. 35.07% is used in Rural Settlement. The agricultural use with 33201.94 acres, occupies 44.47% of total land, water bodies 26.53%, Economic Region 0.68%, Public services and utilities 2.90% and Circulation Network 1.55%.

Table 6.12: Proposed Landuse

Proposed Structure Plan Zone	Area	Percentage (%)
Agriculture	33201.94	44.47
Economic Region	510.04	0.68
Industrial and manufacturing Zone	124.72	0.17
Potential Urban Area	761.67	1.02
Rural Settlement	26185.42	35.07
Strategic Service Center: 1st Order	1247.67	1.67
Strategic Service Center: 2nd Order	608.15	0.81
Strategic Service Center: 3rd Order	903.23	1.21
Circulation Network	1157.72	1.55
Coastal Afforestation and Foreshore Area	738.48	0.99
Trade and Commerce Center	324.90	0.44
Urban Fringe Area	789.59	1.06
Waterbody	8103.73	10.85
	74657.27	100.00

6.3.3.1 Rural Action Plan for Amtali Union

The category wise proposals are presented here. Table shows the amount of land uses in Amtali Union. Map shows proposed land use of Amtali Union.

Table 6.13: Population Statistics of Union Amtali

<i>Figure 1: Item</i>	<i>Figure 2: 2011</i>	<i>Figure 3: 2022</i>	<i>Figure 4: 2031</i>	<i>Figure 5: 2041</i>
<i>Figure 6: Area (acre)</i>	15914			
<i>Figure 7: Population</i>	<i>Figure 8: 24155</i>	29572	<i>Figure 9: 35341</i>	<i>Figure 10: 40596</i>

Table 6.14: Existing Land Uses of Union Amtali

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	0.48	0.00
Agriculture	7344.39	61.80
Commercial	10.80	0.09
Community Service	38.41	0.32
Education and Research	29.64	0.25
Health Service	0.44	0.00
Manufacturing and Processing	61.85	0.52
Mixed Use	5.32	0.04
Residential	2201.42	18.53
Road	178.26	1.50
Service Activity	5.13	0.04
Transportation and Communication	85.31	0.72
Vacant Land	25.58	0.22
Vegetation	159.88	1.35
Waterbody	1736.39	14.61
	11883.31	100.00

Table 6.15: Proposed Land Uses of Union Amtali

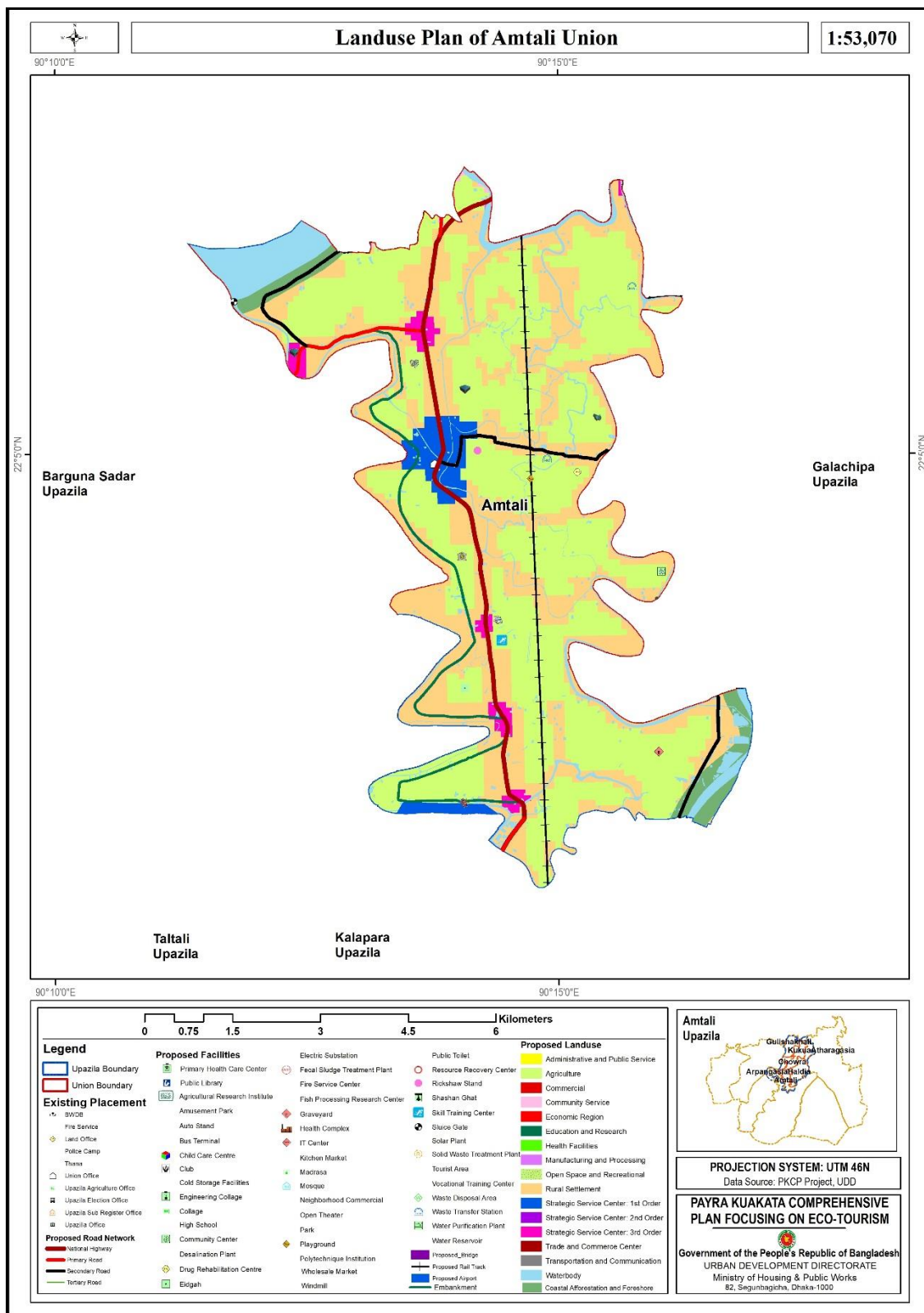
Proposed Landuse	Area_Acre	(%)
Agriculture	563.52	94.17
Circulation Network	1.02	0.17
Coastal Afforestation and Foreshore Area	0.05	0.01
Rural Settlement	6.75	1.13
Strategic Service Center: 1st Order	0.76	0.13
Strategic Service Center: 3rd Order	13.21	2.21
Waterbody	13.12	2.19
Total	598.42	100.00

Development Proposals for Amtali Union

The consultant proposes some Rural facilities in Amtali Union. It includes Waste Transfer Station, Polytechnique Institution, Eidgah, Skill Training Center, Drug Rehabilitation Centre, Community Center, Auto Stand, Rickshaw Stand, Neighborhood Commercial etc. The details of the proposal is given in the table below.

Table 6.16: Development Proposals for Union Amtali (Mouza Wise)

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Neighborhood Commercial	Amtali	4	4618	31	1.02	0.18
Sluice Gate	Amtali	4	0	31	0.05	0.01
Playground	Chalabhanga	3	2186	51	2.47	0.43
Neighborhood Commercial	Amtali	4	4536	31	0.00	0.00
Sluice Gate	Amtali	4	0	31	0.41	0.07
Eidgah	Nilganj	1	42	53	0.02	0.00
Skill Training Center	Uttar Tiakhali	3	2239	52	0.30	0.05
Auto Stand	Uttar Tiakhali	3	1928	52	0.25	0.04
Neighborhood Commercial	Nachna Para	4	3102	50	0.27	0.05
Waste Transfer Station	Chalabhanga	3	2125	51	0.12	0.02
Playground	Chalabhanga	3	2198	51	59.60	10.45
Graveyard	Pujakhola	1	342	54	88.96	15.60
Neighborhood Commercial	Amtali	4	4536	31	0.27	0.05
Kitchen Market	Uttar Tiakhali	2	843	52	39.54	6.93
Waste Transfer Station	Nachna Para	2	1301	50	14.83	2.60
Polytechnique Institution	Chalabhanga	1	765	51	22.24	3.90
Eidgah	Nilganj	1	228	53	71.65	12.56
Skill Training Center	Uttar Tiakhali	3	2249	52	22.11	3.88
Drug Rehabilitation Centre	Chalabhanga	3	2086	51	19.77	3.47
Community Center	Chalabhanga	5	3328	51	12.10	2.12
Auto Stand	Uttar Tiakhali	3	1930	52	14.19	2.49
Rickshaw Stand	Chalabhanga	2	1210	51	39.54	6.93
Neighborhood Commercial	Nachna Para	4	3116	50	98.50	17.27
Public Toilet	Amtali	5	7054	31	29.65	5.20
Waste Transfer Station	Chalabhanga	3	2125	51	11.74	2.06
Eidgah	Nilganj	1	431	53	2.46	0.43
Neighborhood Commercial	Nachna Para	4	3099	50	4.29	0.75
Neighborhood Commercial	Nachna Para	4	3102	50	0.76	0.13
Neighborhood Commercial	Amtali	4	4621	31	13.21	2.32
Total					570.32	100.00



Map 6.2: Union Action Plan for Amtali

6.3.3.2 Union Action Plan for Arpangasia Union

Demography

Arpangasia Union consists of the mouza named Arpangashia, Ghopkhali, and Tarikata.

Present population of the Union is 15338 (2022) and it will 15769 in the year 2031 and 16112 in 2041.

Review of Existing Land Use

Out of total 6658.33 acres of land of this Union, i.e. 18.38% is used in residential. The agricultural use with 3754.10 acres, occupies 56.38% of total land, water bodies 1360.64 acre and 20.44 %, commercial use 0.06%, mixed use 0.04% and Transportation and Communication 0.33%. Only 0.01% of land is used as health facilities.

Table 6.17: Existing Landuse category in Arpangasia Union

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	0.89	0.01
Agriculture	3754.10	56.38
Commercial	4.03	0.06
Community Service	20.80	0.31
Education and Research	20.59	0.31
Health Service	0.70	0.01
Manufacturing and Processing	1.29	0.02
Mixed Use	2.62	0.04
Residential	1223.51	18.38
Road	90.67	1.36
Service Activity	1.14	0.02
Transportation and Communication	21.74	0.33
Vacant Land	40.06	0.60
Vegetation	115.53	1.74
Waterbody	1360.64	20.44
	6658.33	100.00

Union Action Plan Proposals

Proposed Land Use Zoning

The category wise proposals are presented here. Table shows the amount of land uses in Arpangasia Union. Map shows proposed land use of Arpangasia Union.

Table 6.19: Proposed Land Uses of Arpangasia Union

Proposed Landuse	Area_Acre	(%)
Agriculture	1106.28	59.80
Circulation Network	6.60	0.36
Coastal Afforestation and Foreshore Area	188.15	10.17
Rural Settlement	11.17	0.60
Strategic Service Center: 3rd Order	4.86	0.26
Waterbody	23.68	1.28
Agriculture	361.22	19.52
Circulation Network	6.27	0.34
Manufacturing and Processing	116.17	6.28
Rural Settlement	7.47	0.40
Strategic Service Center: 3rd Order	0.38	0.02
Waterbody	17.81	0.96
Total	1850.07	100.00

Development Proposals for Arpangasia Union

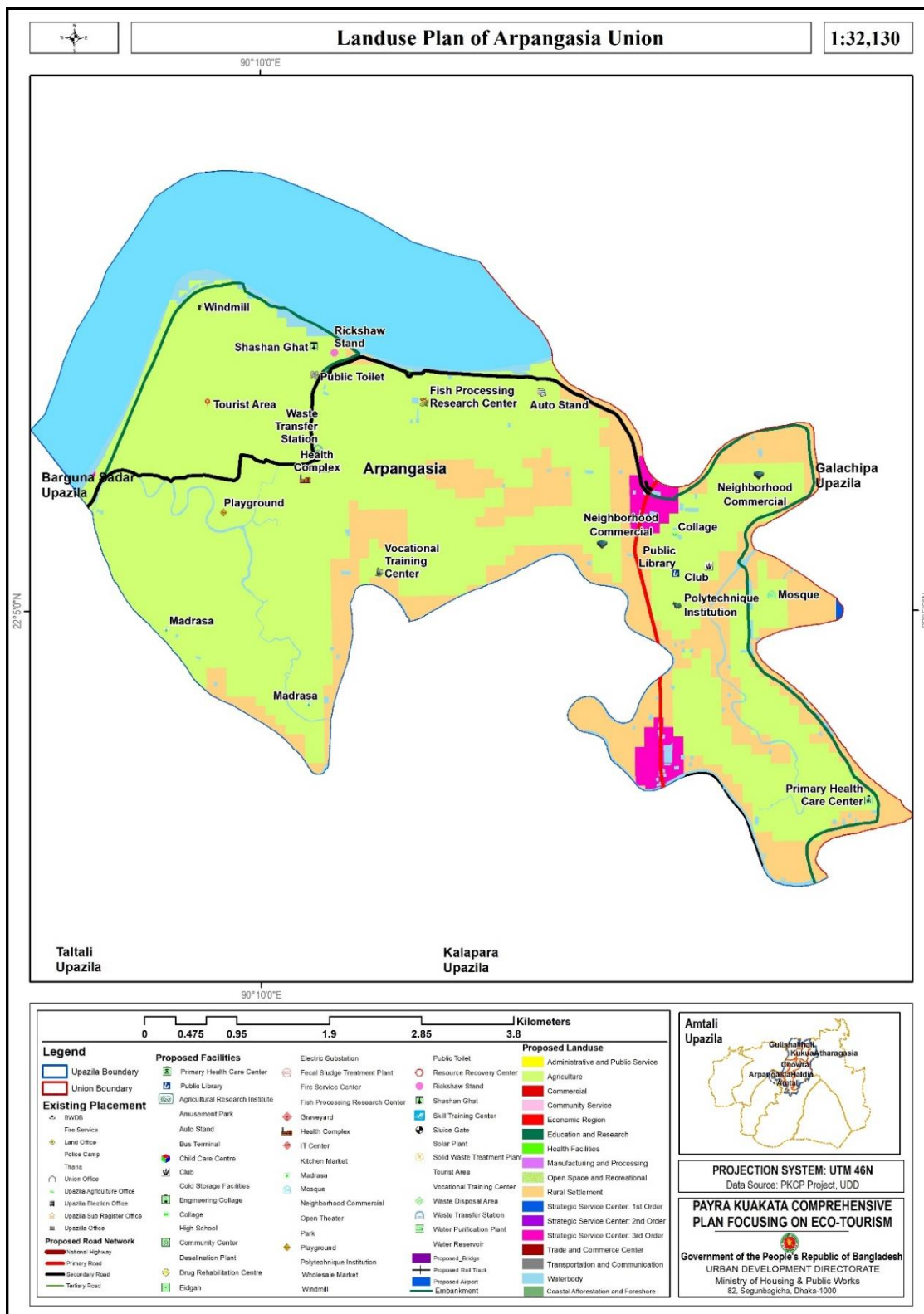
The consultant proposes some Rural facilities in Arpangasia Union. It includes Fish Processing Research Center, Health Complex, Rickshaw Stand, Auto Stand, Tourist Area etc. The details of the proposal are given below.

Table 6.20: Development Proposals for Union Arpangasia (Mouza Wise)

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Fish Processing Research Center	Arpangashia	3	2003	32	0.22	0.02
Health Complex	Ghopkhali	3	2941	33	1.56	0.13
Rickshaw Stand	Ghopkhali	2	1625	33	0.15	0.01
Auto Stand	Tarikata	1	85	49	0.10	0.01
Tourist Area	Ghopkhali	4	4340	33	4.37	0.36
Public Toilet	Ghopkhali	2	1613	33	0.13	0.01

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Waste Transfer Station	Ghopkhali	3	2642	33	0.00	0.00
Rickshaw Stand	Ghopkhali	2	1638	33	17.00	1.41
Auto Stand	Tarikata	1	96	49	6.61	0.55
Windmill	Ghopkhali	1	549	33	11.49	0.95
Shashan Ghat	Ghopkhali	2	1643	33	5.76	0.48
Health Complex	Ghopkhali	3	2911	33	0.70	0.06
Tourist Area	Ghopkhali	3	2637	33	0.97	0.08
Public Toilet	Ghopkhali	2	1626	33	0.28	0.02
Playground	Ghopkhali	3	3189	33	4.96	0.41
Fish Processing Research Center	Arpangashia	3	2240	32	2.06	0.17
Health Complex	Ghopkhali	3	3007	33	0.36	0.03
Windmill	Ghopkhali	1	155	33	0.37	0.03
Collage	Tarikata	2	1091	49	2.03	0.17
Mosque	Tarikata	3	3347	49	0.00	0.00
Tourist Area	Ghopkhali	1	778	33	12.28	1.02
Primary Health Care Center	Tarikata	6	8050	49	0.02	0.00
Madrassa	Ghopkhali	4	5200	33	0.26	0.02
Neighborhood Commercial	Tarikata	2	987	49	0.41	0.03
Madrassa	Ghopkhali	5	6215	33	0.92	0.08
Playground	Ghopkhali	3	3202	33	63.94	5.29
Health Complex	Ghopkhali	3	3547	33	57.18	4.73
Rickshaw Stand	Ghopkhali	2	1625	33	2.89	0.24
Auto Stand	Tarikata	1	105	49	17.49	1.45
Windmill	Ghopkhali	1	561	33	15.40	1.27
Collage	Tarikata	2	1064	49	48.97	4.05
Public Library	Tarikata	2	1267	49	40.45	3.35
Mosque	Tarikata	3	3334	49	20.83	1.72
Tourist Area	Ghopkhali	3	2333	33	531.98	44.02
Public Toilet	Ghopkhali	2	1613	33	3.85	0.32
Waste Transfer Station	Ghopkhali	3	2608	33	2.68	0.22

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Primary Health Care Center	Tarikata	6	8051	49	9.86	0.82
Neighborhood Commercial	Tarikata	2	1001	49	54.36	4.50
Club	Tarikata	3	3084	49	14.83	1.23
Madrasa	Ghopkhali	5	6156	33	26.99	2.23
Shashan Ghat	Ghopkhali	2	1643	33	1.33	0.11
Neighborhood Commercial	Tarikata	3	2870	49	53.01	4.39
Polytechnique Institution	Tarikata	2	1322	49	38.07	3.15
Auto Stand	Tarikata	1	146	49	0.35	0.03
Collage	Tarikata	2	1064	49	0.49	0.04
Neighborhood Commercial	Tarikata	2	996	49	3.30	0.27
Neighborhood Commercial	Tarikata	3	2885	49	0.07	0.01
Collage	Tarikata	2	723	49	4.86	0.40
Health Complex	Ghopkhali	3	2942	33	0.07	0.01
Health Complex	Ghopkhali	3	2973	33	4.25	0.35
Windmill	Ghopkhali	1	562	33	0.11	0.01
Tourist Area	Ghopkhali	1	562	33	0.11	0.01
Public Library	Tarikata	2	1269	49	1.12	0.09
Polytechnique Institution	Tarikata	2	1269	49	1.12	0.09
Fish Processing Research Center	Arpangasia	2	1180	32	31.78	2.63
Fish Processing Research Center	Arpangasia	2	1172	32	54.91	4.54
Vocational Training Center	Arpangasia	4	4652	32	21.74	1.80
Vocational Training Center	Arpangasia	4	4677	32	6.96	0.58
Total					1208.40	100.00



Map 6.3: Union Action Plan for Union Arpangasia

6.3.3.3 Union Action Plan for Athrogasia Union

Demography

Union No. 3 consists of the mouza named Chowra. Present population of the Union is 26700 (2022) and it will 30015 in the year 2031 and 32876 in 2041.

Table 6.21: Population Statistics of Athrogasia Union

<i>Figure 11: Item</i>	<i>Figure 12: 2011</i>	<i>Figure 13: 2022</i>	<i>Figure 14: 2031</i>	<i>Figure 15: 2041</i>
<i>Figure 16: Area (acre)</i>	11269			
<i>Figure 17: Population</i>	23444	26700	<i>Figure 18: 30015</i>	<i>Figure 19: 32876</i>

Review of Existing Land Use

Out of total **8888.56** acres of land of this Union, i.e. 19.02% is used in residential. The agricultural use with 5782.57 acres, occupies 65.06% of total land, water bodies 9.40%, commercial use 0.08%, mixed use 0.11% and Transportation and Communication 0.59%. Only 0.04% of land is used as Service Activity.

Table 6.22: Existing Landuse category in Athrogasia Union

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	0.14	0.00
Agriculture	5782.57	65.06
Commercial	7.10	0.08
Community Service	30.23	0.34
Education and Research	19.89	0.22
Health Service	0.93	0.01
Manufacturing and Processing	26.46	0.30
Mixed Use	9.34	0.11
Residential	1690.81	19.02
Road	122.55	1.38
Service Activity	3.52	0.04
Transportation and Communication	52.64	0.59
Vacant Land	129.60	1.46
Vegetation	177.30	1.99

Waterbody	835.49	9.40
	8888.56	100.00

Union Action Plan Proposals

Proposed Land Use Zoning

The category wise proposals are presented here. Table shows the amount of land uses in Athrogasia Union. Map shows proposed land use of Athrogasia Union.

Table 6.23: Proposed Land Uses of Athrogasia Union

Proposed Landuse	Area_Acre	(%)
Agriculture	1106.28	59.80
Circulation Network	6.60	0.36
Coastal Afforestation and Foreshore Area	188.15	10.17
Rural Settlement	11.17	0.60
Strategic Service Center: 3rd Order	4.86	0.26
Waterbody	23.68	1.28
Agriculture	361.22	19.52
Circulation Network	6.27	0.34
Manufacturing and Processing	116.17	6.28
Rural Settlement	7.47	0.40
Strategic Service Center: 3rd Order	0.38	0.02
Waterbody	17.81	0.96
Total	1850.07	100.00

Development Proposals for Athrogasia Union

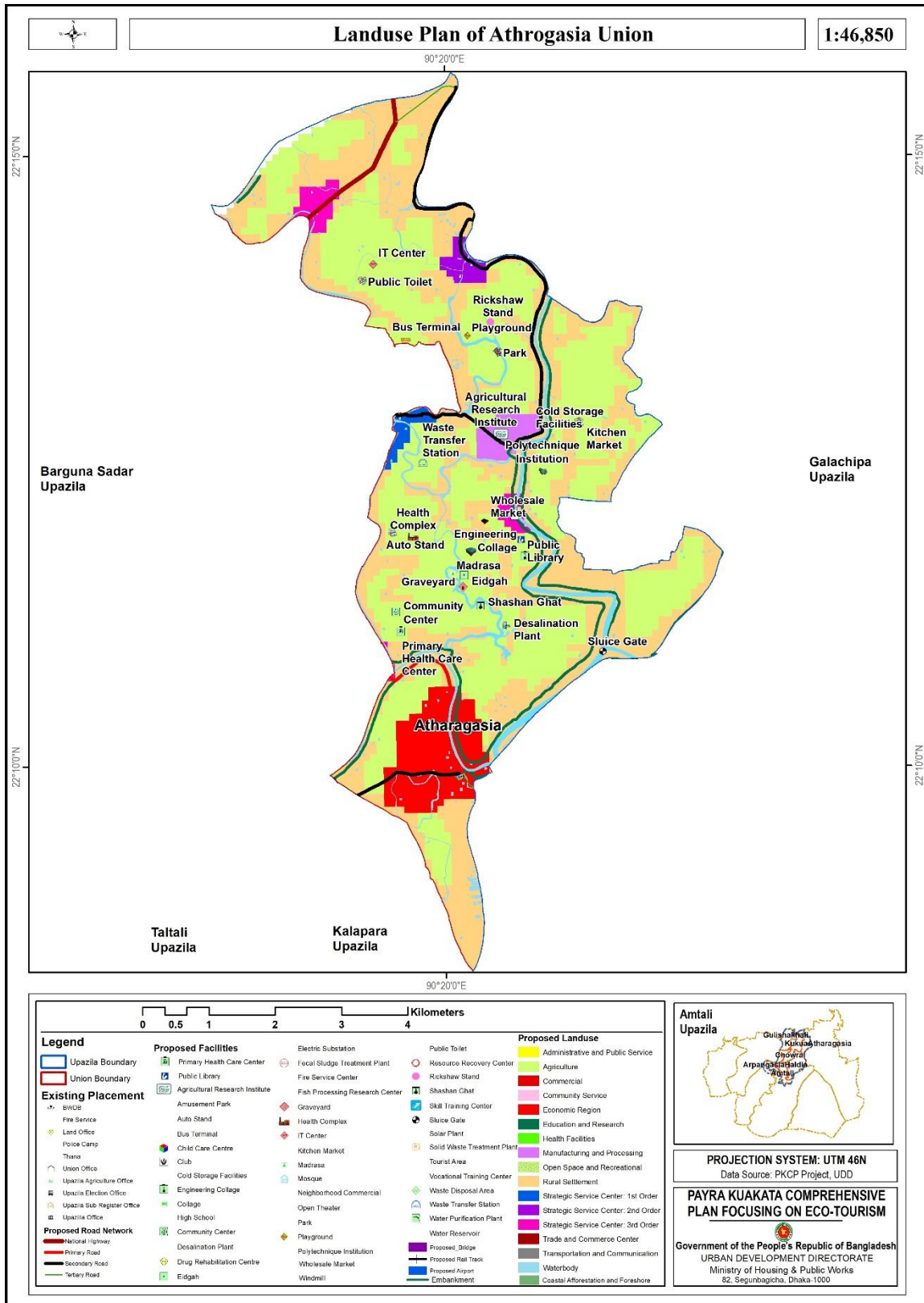
The consultant proposes some Rural facilities in Athrogasia Union. It includes Cold Storage Facilities, Agricultural Research Institute, Cold Storage Facilities, Agricultural Research Institute etc. The details of the proposal are given in the table below.

Table 6.24: Development Proposals for Athrogasia Union (Mouza Wise)

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Cold Storage Facilities	Atharagachia	4	3201	20	1.05	0.19
Agricultural Research Institute	Atharagachia	4	3118	20	5.22	0.96

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Cold Storage Facilities	Atharagachia	4	3213	20	0.02	0.00
Agricultural Research Institute	Atharagachia	4	3213	20	0.02	0.00
Agricultural Research Institute	Gerabania	2	1092	21	4.47	0.83
Playground	Atharagachia	1	400	20	0.21	0.04
Park	Atharagachia	1	767	20	7.64	1.41
Engineering Collage	Sonakhali	2	1165	23	0.26	0.05
Health Complex	Atharagachia	2	2725	20	0.58	0.11
Rickshaw Stand	Atharagachia	1	621	20	0.58	0.11
Shashan Ghat	Sonakhali	3	2081	23	2.35	0.44
Madrassa	Sonakhali	1	903	23	0.04	0.01
Graveyard	Sonakhali	1	906	23	0.08	0.01
Neighborhood Commercial	Sonakhali	1	905	23	0.01	0.00
Sluice Gate	Sonakhali	5	4429	23	0.55	0.10
IT Center	Sakharia	4	3052	19	0.27	0.05
Public Toilet	Sakharia	4	3281	19	0.22	0.04
Desalination Plant	Sonakhali	3	2203	23	0.55	0.10
Agricultural Research Institute	Atharagachia	4	3091	20	20.13	3.72
Playground	Atharagachia	1	379	20	8.95	1.65
Park	Atharagachia	1	768	20	44.07	8.14
Engineering Collage	Sonakhali	2	1231	23	29.46	5.44
Public Library	Sonakhali	2	1205	23	14.83	2.74
Health Complex	Atharagachia	2	2825	20	32.46	6.00
Auto Stand	Atharagachia	2	2772	20	15.04	2.78
Rickshaw Stand	Atharagachia	1	621	20	14.24	2.63
Shashan Ghat	Sonakhali	3	2099	23	6.70	1.24
Madrassa	Sonakhali	1	904	23	5.60	1.03
Eidgah	Sonakhali	1	906	23	7.20	1.33
Graveyard	Sonakhali	1	906	23	5.14	0.95
Community Center	Sonakhali	1	292	23	19.93	3.68
Neighborhood Commercial	Sonakhali	1	905	23	28.90	5.34
Waste Transfer Station	Atharagachia	2	2601	20	10.60	1.96
Kitchen Market	Gerabania	2	824	21	9.74	1.80
Wholesale Market	Sonakhali	2	1085	23	7.31	1.35
Primary Health Care Center	Sonakhali	1	324	23	14.83	2.74
Bus Terminal	Sakharia	4	3407	19	20.90	3.86
IT Center	Sakharia	4	3506	19	20.27	3.75
Public Toilet	Sakharia	4	3281	19	6.66	1.23
Polytechnique Institution	Gerabania	2	915	21	30.74	5.68
Desalination Plant	Sonakhali	3	2203	23	8.43	1.56

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Cold Storage Facilities	Atharagachia	4	3213	20	14.37	2.66
Agricultural Research Institute	Gerabania	2	1092	21	99.35	18.36
Agricultural Research Institute	Gerabania	2	1092	21	2.11	0.39
Playground	Atharagachia	1	377	20	0.11	0.02
Engineering Collage	Sonakhali	2	1165	23	0.23	0.04
Auto Stand	Atharagachia	2	2772	20	1.27	0.24
Sluice Gate	Sonakhali	5	4461	23	0.02	0.00
Kitchen Market	Gerabania	2	824	21	0.37	0.07
Wholesale Market	Sonakhali	2	1084	23	2.17	0.40
Bus Terminal	Sakharia	4	3408	19	0.37	0.07
Polytechnique Institution	Gerabania	2	913	21	0.81	0.15
Public Library	Sonakhali	2	1132	23	0.38	0.07
Bus Terminal	Sakharia	4	3400	19	8.60	1.59
Cold Storage Facilities	Atharagachia	4	3213	20	0.25	0.05
Agricultural Research Institute	Atharagachia	4	3213	20	0.25	0.05
Cold Storage Facilities	Atharagachia	4	3213	20	2.16	0.40
Agricultural Research Institute	Atharagachia	4	3213	20	2.16	0.40
Total					541.23	100.00



Map 6.4: Union Action Plan for Athrogasia Union

6.3.3.4 Action Plan for Haldia Union

Demography

Haldia Union consists of the mouza named Kulair Char, Paschim Chila, Uttar Taktabunia, Purba Chila, Dakshin Raogha, Kanthalia, Kulair Char, etc.

Table 6.25: Population Statistics of Haldia Union

<i>Figure 20: Item</i>	<i>Figure 21: 201 1</i>	<i>Figure 22: 202 2</i>	<i>Figure 23: 2031</i>	<i>Figure 24: 2041</i>
<i>Figure 25: Area (acre)</i>	22154.00			
<i>Figure 26: Populatio n</i>	27928.52	34325.00	<i>Figure 27: 4132 5</i>	<i>Figure 28: 4774 3</i>

Review of Existing Land Use

Out of total 17812.18 acres of land of this Union, more than 2721.73 acres of land i.e. 15.28% is used in residential. The agricultural use with 12349.32 acres, occupies 69.33% of total land, water bodies 11.80%, commercial use 0.05%, mixed use 0.04% and Transportation and Communication 0.58%. Only 0.20% of land is used as education facilities.

Table 6.26: Existing Landuse category in Haldia Union

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	2.00	0.01
Agriculture	12349.32	69.33
Commercial	8.87	0.05
Community Service	48.57	0.27
Education and Research	35.23	0.20
Health Service	1.74	0.01
Manufacturing and Processing	17.42	0.10
Mixed Use	7.30	0.04
Open Space and Recreational	0.17	0.00
Residential	2721.73	15.28
Road	203.21	1.14
Service Activity	1.89	0.01
Transportation and Communication	103.63	0.58
Vacant Land	136.47	0.77

Vegetation	73.23	0.41
Waterbody	2101.39	11.80
	17812.18	100.00

Union Action Plan Proposals

Proposed Land Use Zoning

The category wise proposals are presented here. Table shows the amount of land uses in Union no 4. Map shows proposed land use of Haldia Union.

Table 6.27: Proposed Land Uses of Haldia Union

Proposed Landuse	Area_Acre	(%)
Agriculture	847.79	92.12
Circulation Network	4.59	0.50
Coastal Afforestation and Foreshore Area	14.14	1.54
Rural Settlement	19.20	2.09
Strategic Service Center: 2nd Order	0.10	0.01
Waterbody	34.49	3.75
Total	920.31	100.00

Development Proposals for Haldia Union

The consultant proposes some Rural facilities in Haldia Union. It includes Central Eidgah, Secondary Transfer Station, Zila Parishad Dakbanglo, Health Care Center, High School etc. The details of the proposal are given in the table below.

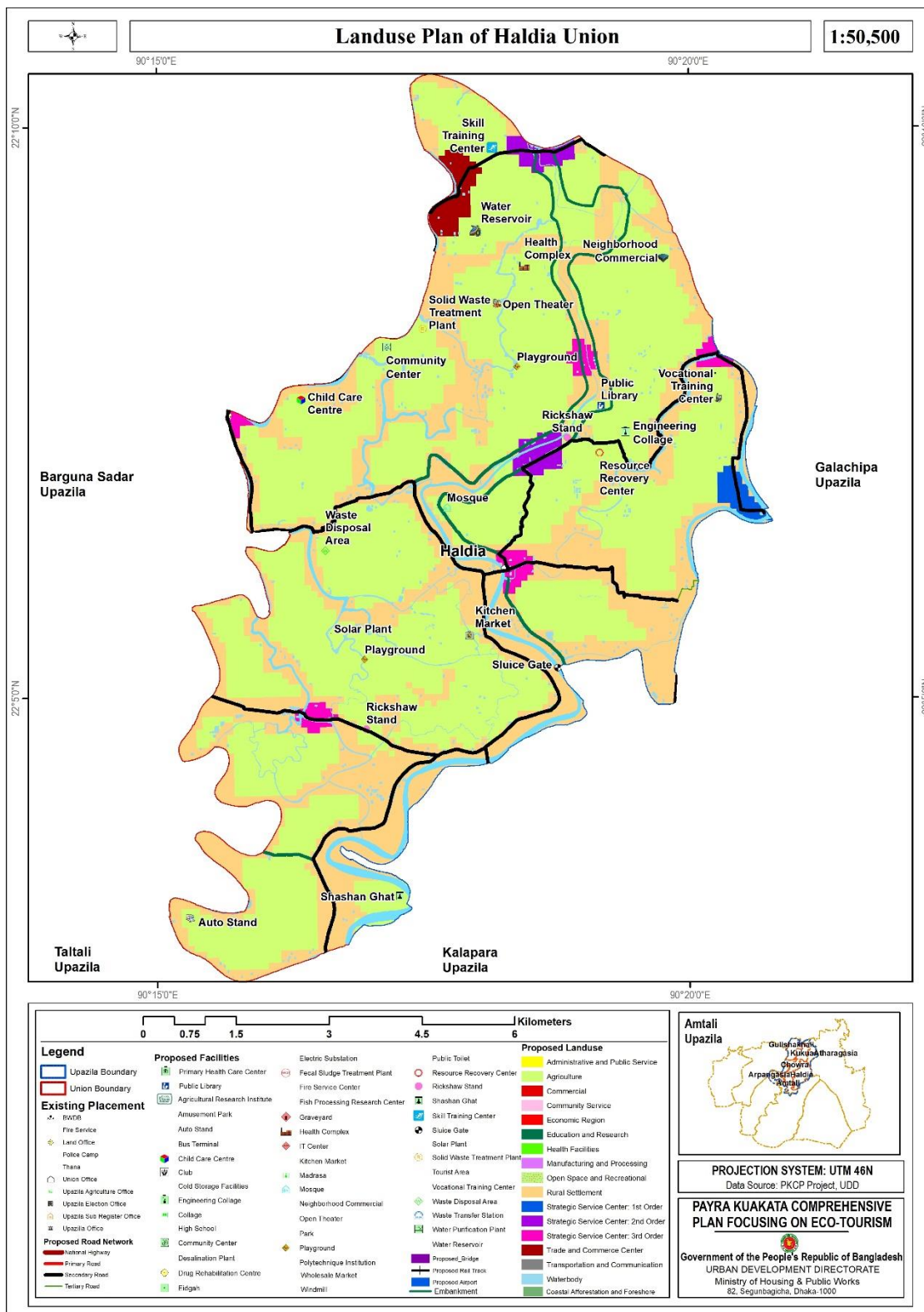
Table 6.28: Development Proposals for Haldia Union (Mouza Wise)

Proposal	Mouza_Name	Sheet No	Plot No	JL_No	Area_Acre	%
Resource Recovery Center	Kulair Char	3	790	61	0.13	0.01
Engineering Collage	Kulair Char	3	1080	61	1.40	0.16
Rickshaw Stand	Kulair Char	3	727	61	0.48	0.06
Rickshaw Stand	Paschim Chila	4	1858	56	1.49	0.17
Playground	Uttar Taktabunia	5	1844	59	6.14	0.71

Proposal	Mouza_Name	Sheet No	Plot No	JL_No	Area_Ac re	%
Playground	Purba Chila	1	201	57	3.48	0.40
Waste Disposal Area	Dakshin Taktabunia	1	8	60	0.27	0.03
Health Complex	Dakshin Raogha	1	576	26	7.19	0.84
Neighborhood Commercial	Kanthalia	1	112	62	0.00	0.00
Engineering Collage	Kulair Char	3	1054	61	2.30	0.27
Solid Waste Treatment Plant	Uttar Taktabunia	1	114	59	1.13	0.13
Public Library	Kulair Char	2	675	61	0.60	0.07
Rickshaw Stand	Uttar Taktabunia	5	2094	59	0.54	0.06
Sluice Gate	Purba Chila	3	1534	57	0.36	0.04
Solar Plant	Purba Chila	1	1	57	0.00	0.00
Mosque	Dakshin Taktabunia	2	542	60	2.53	0.29
Kitchen Market	Purba Chila	2	808	57	2.55	0.30
Open Theater	Dakshin Raogha	2	1935	26	5.70	0.66
Water Reservoir	Dakshin Raogha	1	519	26	2.58	0.30
Solid Waste Treatment Plant	Uttar Taktabunia	1	118	59	0.70	0.08
Community Center	Uttar Taktabunia	1	171	59	5.48	0.64
Playground	Uttar Taktabunia	5	1888	59	58.04	6.75
Playground	Purba Chila	1	203	57	39.42	4.58
Auto Stand	Chhanauta	4	1232	55	22.24	2.59
Waste Disposal Area	Haldia	2	1091	58	36.83	4.28
Health Complex	Dakshin Raogha	1	576	26	112.87	13.13
Resource Recovery Center	Kulair Char	3	915	61	15.26	1.78
Neighborhood Commercial	Kanthalia	1	273	62	19.77	2.30
Engineering Collage	Kulair Char	2	513	61	149.31	17.37
Solid Waste Treatment	Uttar Taktabunia	1	255	59	20.14	2.34

Proposal	Mouza_Name	Sheet No	Plot No	JL_No	Area_Ac re	%
Plant						
Public Library	Kulair Char	2	675	61	11.98	1.39
Rickshaw Stand	Uttar Taktabunia	5	2081	59	8.09	0.94
Community Center	Uttar Taktabunia	1	218	59	19.49	2.27
Solar Plant	Purba Chila	1	50	57	2.41	0.28
Vocational Training Center	Tepura	1	135	63	74.13	8.62
Mosque	Uttar Taktabunia	4	1615	59	45.43	5.28
Kitchen Market	Purba Chila	2	790	57	20.19	2.35
Child Care Centre	Uttar Taktabunia	2	840	59	19.77	2.30
Rickshaw Stand	Paschim Chila	4	1785	56	20.75	2.41
Open Theater	Dakshin Raogha	2	1936	26	95.18	11.07
Water Reservoir	Dakshin Raogha	1	159	26	4.15	0.48
Waste Disposal Area	Haldia	2	1091	58	1.18	0.14
Health Complex	Dakshin Raogha	1	135	26	8.56	1.00
Neighborhood Commercial	Kanthalia	1	273	62	0.04	0.01
Engineering Collage	Kulair Char	2	513	61	5.97	0.69
Mosque	Dakshin Taktabunia	2	330	60	3.44	0.40
Total					859.70	100

Figure 29:



6.3.3.5 Action Plan for Kukua Union

Demography

Kukua Union consists of the mouza named South Chunakhali, East Chunakhali, Kukua etc. Present population of the Union is 29318 (2022) and it will 35068 in the year 2031 and 40309 in 2041.

Table 6.29: Population Statistics of Kukua Union

<i>Figure 30: Item</i>	<i>Figure 31: 2011</i>	<i>Figure 32: 2022</i>	<i>Figure 33: 2031</i>	<i>Figure 34: 2041</i>
<i>Figure 35: Area (acre)</i>	11288			
<i>Figure 36: Population</i>	<i>Figure 37: 24028</i>	29318	<i>Figure 38: 35068</i>	<i>Figure 39: 40309</i>

Review of Existing Land Use

Out of total **9182.62** acres of land of this Union, i.e. 19.75% is used in residential. The water bodies 7.91%, commercial use 0.26%, mixed use 0.04% and Transportation and Communication 0.34%. Only 0.27 % of land is used as education facilities.

Table 6.30: Existing Landuse category in Kukua Union

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	3.53	0.04
Agriculture	6199.97	67.52
Commercial	23.90	0.26
Community Service	56.19	0.61
Education and Research	24.34	0.27
Health Service	2.89	0.03
Manufacturing and Processing	45.55	0.50
Mixed Use	3.46	0.04
Residential	1813.59	19.75
Road	144.57	1.57
Service Activity	1.70	0.02
Transportation and Communication	31.64	0.34
Vacant Land	42.91	0.47

Vegetation	61.81	0.67
Waterbody	726.56	7.91
	9182.62	100.00

Union Action Plan Proposals

Proposed Land Use Zoning

The category wise proposals are presented here. Table shows the amount of land uses in Kukua Union. Map shows proposed land use of Kukua Union.

Table 6.31: Proposed Land Uses of Kukua Union

Proposed Landuse	Area_Acre	(%)
Agriculture	483.33	97.47
Circulation Network	0.94	0.19
Rural Settlement	3.25	0.66
Waterbody	8.36	1.69
Total	495.88	100.00

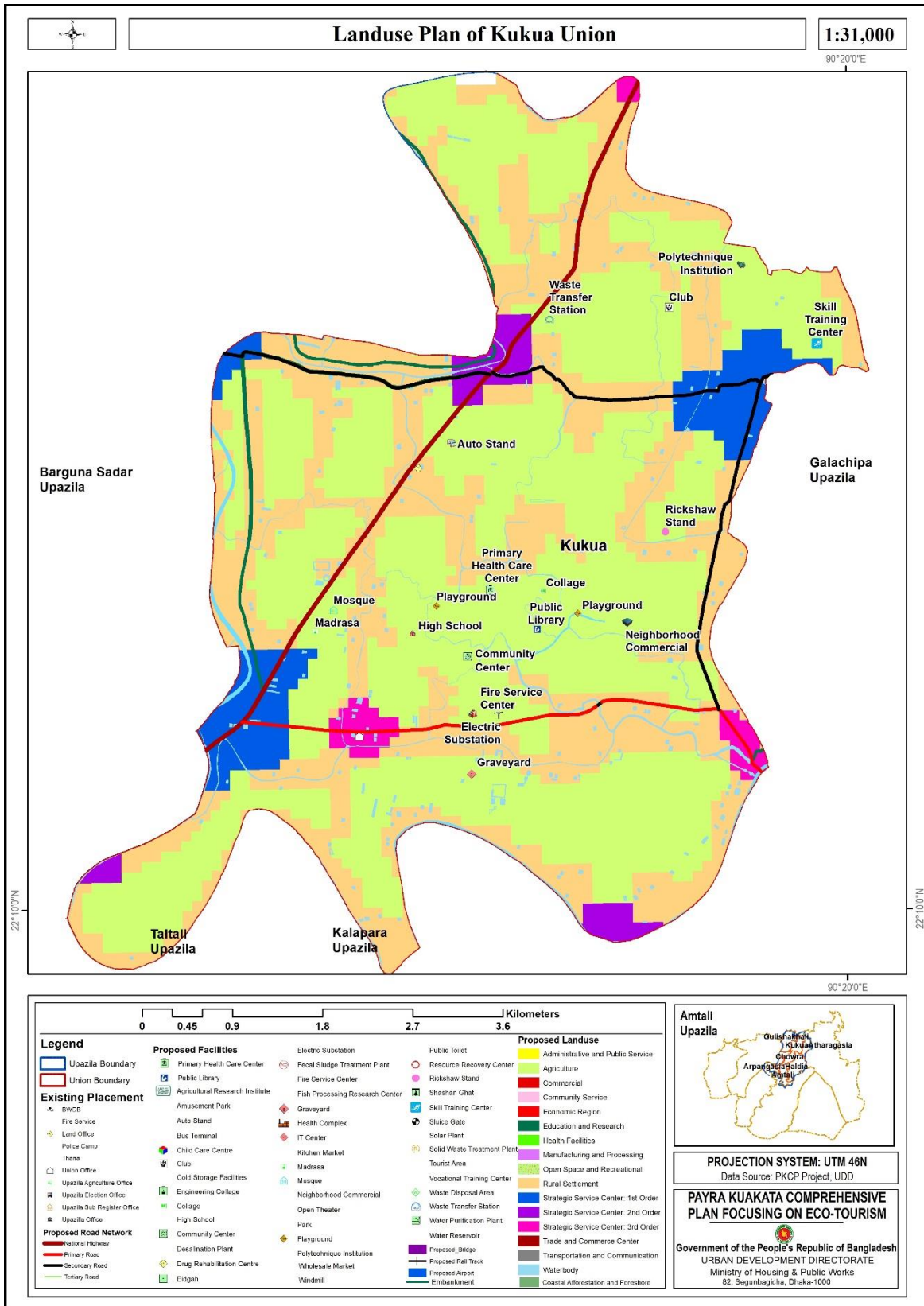
Development Proposals for Kukua Union

The consultant proposes some Rural facilities in Kukua Union. It includes Fire Service Center Mosque, Collage, Public Library, High School, Neighborhood Commercial, Primary Health Care Center and Rickshaw Stand etc. The details of the proposal are given in the table below.

Table 6.32: Development Proposals for Kukua Union (Mouza Wise)

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Mosque	South Chunakhali	1	549	12	0.39	0.08
Waste Transfer Station	East Chunakhali	1	89	9	0.55	0.12
Fire Service Center	Kukua	1	572	15	0.00	0.00
Mosque	South Chunakhali	1	573	12	0.01	0.00
Collage	Paschim Chunakhali	3	1907	11	0.38	0.08
Public Library	Kukua	2	1319	15	1.90	0.41
High School	South Chunakhali	3	2276	12	0.19	0.04
Neighborhood Commercial	Kukua	2	1379	15	0.33	0.07
Primary Health Care Center	Paschim Chunakhali	3	1660	11	0.71	0.15
Rickshaw Stand	Kukua	2	1411	15	1.29	0.28
Waste Transfer Station	East Chunakhali	1	84	9	0.02	0.00
Graveyard	Krishnanagar	2	1187	14	0.65	0.14
Community Center	Kukua	1	415	15	0.95	0.20
Club	Raybala	0	310	17	0.33	0.07
Playground	South Chunakhali	3	2277	12	1.27	0.27
Polytechnique Institution	Keowabunia	2	1515	18	0.09	0.02
Electric Substation	Kukua	1	534	15	0.14	0.03
Polytechnique Institution	Khagodon	1	171	16	1.55	0.33
Madrasa	South Chunakhali	1	427	12	23.48	5.03
Mosque	South Chunakhali	1	472	12	16.40	3.51
Collage	Paschim Chunakhali	3	1764	11	19.83	4.24
Public Library	Kukua	1	647	15	52.48	11.23
High School	South Chunakhali	3	2276	12	18.61	3.98
Neighborhood Commercial	Kukua	2	1360	15	32.65	6.99
Playground	Kukua	2	1344	15	13.71	2.94
Primary Health Care Center	South Chunakhali	3	2259	12	24.25	5.19
Auto Stand	East Chunakhali	2	1009	9	24.36	5.21
Rickshaw Stand	Kukua	2	1410	15	18.73	4.01

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Waste Transfer Station	Raybala	0	11	17	17.21	3.68
Graveyard	Krishnanagar	2	1176	14	28.56	6.11
Community Center	Kukua	1	415	15	18.66	3.99
Club	Raybala	0	311	17	16.44	3.52
Playground	South Chunakhali	3	2273	12	36.64	7.84
Polytechnique Institution	Khagodon	1	49	16	26.33	5.64
Fire Service Center	Kukua	1	563	15	12.39	2.65
Electric Substation	Kukua	1	709	15	13.67	2.93
Skill Training Center	Khagodon	1	299	16	37.07	7.93
Primary Health Care Center	Paschim Chunakhali	3	1654	11	2.93	0.63
Rickshaw Stand	Kukua	2	1402	15	0.25	0.05
Fire Service Center	Kukua	1	563	15	0.07	0.01
High School	South Chunakhali	3	2276	12	0.09	0.02
Playground	South Chunakhali	3	2276	12	0.09	0.02
High School	South Chunakhali	3	2276	12	0.79	0.17
Playground	South Chunakhali	3	2276	12	0.79	0.17
Total					467.26	100.00



Map 6.6: Union Action Plan for Kukua Union

6.3.3.6 Union Action Plan for Chowra Union

Demography

Union No. 6 consists of the mouzas named Ghutabachha and Baraitala. It is situated on the northern part of the Upazila and Upazila area is on the north and west, Union No. 5 on the south and Union No. 8 and 9 on the east. Present population of the Union is 1804 (2022) and it will 1721 in the year 2031 and 1659 in 2041. Density of population is 19 persons per acre and it will be 20 in the year 2031.

Table 6.33: Population Statistics of Chowra Union

<i>Figure 40: Item</i>	<i>Figure 41: 2011</i>	<i>Figure 42: 2022</i>	<i>Figure 43: 2031</i>	<i>Figure 44: 2041</i>
<i>Figure 45: Area (acre)</i>	10239			
<i>Figure 46: Population</i>	<i>Figure 47: 20802</i>	23765	<i>Figure 48: 26791</i>	<i>Figure 49: 29408</i>

Review of Existing Land Use

Out of total **55.78** acres of land of this Union i.e. 14.97% is used in residential. The water bodies 29.27%, commercial use 5.64%, mixed use 4.44% and Transportation and Communication 0.06%. Only 13.06% of land is used as education facilities.

Table 6.34: Existing Landuse category in Chowra Union

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	0.47	0.01
Agriculture	4827.21	64.73
Commercial	5.28	0.07
Community Service	30.32	0.41
Education and Research	25.02	0.34
Health Service	0.24	0.00
Manufacturing and Processing	56.63	0.76
Mixed Use	5.73	0.08
Open Space and Recreational	0.19	0.00
Residential	1512.89	20.29
Road	122.63	1.64

Service Activity	4.67	0.06
Transportation and Communication	9.86	0.13
Vegetation	10.75	0.14
Waterbody	845.61	11.34
	7457.51	100.00

Union Action Plan Proposals

Proposed Land Use Zoning

The category wise proposals are presented here. Table shows the amount of land uses in Union no 6. Map shows proposed land use of Union 06.

Table 6.35: Proposed Land Uses of Chowra Union

Proposed Landuse	Area_Acre	(%)
Agriculture	412.39	93.07
Circulation Network	6.81	1.54
Rural Settlement	4.86	1.10
Strategic Service Center: 1st Order	0.34	0.08
Waterbody	18.72	4.22
Total	443.10	100.00

Development Proposals for Chowra Union

The consultant proposes some Rural facilities in Chowra Union. It includes Madrasa, Mosque, Eidgah etc. The details of the proposal are given in the table below.

Table 6.36: Development Proposals for Chowra Union (Mouza Wise)

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Madrasa	Chowra	3	1899	30	0.24	0.06
Mosque	Chowra	3	1908	30	0.00	0.00
Eidgah	Chowra	3	1930	30	0.03	0.01
Madrasa	Chowra	3	2172	30	2.58	0.59
Mosque	Chowra	3	2156	30	2.01	0.46
Eidgah	Chowra	3	2149	30	2.35	0.54
Sluice Gate	Chowra	5	2718	30	0.27	0.06
Park	Chandra	2	518	27	7.43	1.70
Wholesale Market	Chandra	2	577	27	0.29	0.07
Waste Transfer Station	Chandra	1	56	27	9.88	2.26
Madrasa	Chowra	3	2172	30	4.21	0.96
Mosque	Chowra	3	2156	30	4.51	1.03
Eidgah	Chowra	3	2152	30	10.26	2.35
Park	Chandra	2	518	27	135.94	31.14
Wholesale Market	Chandra	2	688	27	9.59	2.20
Water Purification Plant	Chandra	3	1171	27	31.99	7.33
Sluice Gate	Chowra	5	2717	30	0.14	0.03
Water Purification Plant	Chandra	3	1079	27	2.47	0.57
Bus Terminal	Ghatkhali	3	2776	29	0.01	0.00
Auto Stand	Ghatkhali	4	3843	29	6.02	1.38
Neighborhood Commercial	Ghatkhali	4	3567	29	0.51	0.12
Health Complex	Patakata	4	1979	28	0.00	0.00
Community Center	Patakata	1	56	28	0.57	0.13
Auto Stand	Ghatkhali	4	3815	29	0.41	0.09
Primary Health Care Center	Patakata	3	1341	28	0.11	0.02
Playground	Patakata	1	215	28	1.34	0.31
Neighborhood Commercial	Ghatkhali	4	3559	29	0.23	0.05
Bus Terminal	Ghatkhali	3	2781	29	3.15	0.72

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Public Toilet	Ghatkhali	3	2816	29	0.82	0.19
Public Library	Patakata	2	825	28	26.23	6.01
Health Complex	Patakata	4	1978	28	32.48	7.44
Community Center	Patakata	1	62	28	9.31	2.13
Primary Health Care Center	Patakata	2	401	28	3.97	0.91
Auto Stand	Patakata	1	47	28	14.17	3.25
Rickshaw Stand	Patakata	4	1993	28	10.82	2.48
Primary Health Care Center	Patakata	3	1315	28	21.26	4.87
Public Library	Ghatkhali	5	4666	29	9.88	2.26
Playground	Patakata	1	204	28	26.06	5.97
Public Toilet	Ghatkhali	4	3802	29	5.20	1.19
Neighborhood Commercial	Ghatkhali	4	3541	29	11.00	2.52
Kitchen Market	Patakata	2	509	28	13.64	3.12
Eidgah	Patakata	4	1907	28	12.53	2.87
Primary Health Care Center	Patakata	2	391	28	0.62	0.14
Auto Stand	Patakata	1	47	28	0.62	0.14
Primary Health Care Center	Patakata	3	1315	28	0.74	0.17
Playground	Ghatkhali	5	4582	29	0.25	0.06
Bus Terminal	Ghatkhali	3	2774	29	0.34	0.08
Total					436.49	100.00

Figure 50:

6.3.3.7 Union Action Plan for Gulishakhali Union

Demography

Gulishakhali Union consists of the mouza named Ghutabachha. Present population of the Union is 1880 (2022) and it will 1951 in the year 2031 and 2008 in 2041. Density of population is 40 persons per acre and it will be 41 in the year 2031.

Table 6.37: Population Statistics of Gulishakhali Union

<i>Figure 51: Item</i>	<i>Figure 52: 2011</i>	<i>Figure 53: 2022</i>	<i>Figure 54: 2031</i>	<i>Figure 55: 2041</i>
<i>Figure 56: Area (acre)</i>	13887			
<i>Figure 57: Population</i>	<i>Figure 58: 28458</i>	30205	<i>Figure 59: 31869</i>	<i>Figure 60: 33226</i>

Review of Existing Land Use

Out of total 178.93 acres of land of this Union, i.e. 30.60% is used in residential. The agricultural use with 87.48 acres, occupies 48.89% of total land, water bodies 7.59%, commercial use 1.02%, mixed use 3.43% and Transportation and Communication 0.57%. Only 0.64% of land is used as education facilities.

Table 6.38: Existing Landuse category in Gulishakhali Union

Existing Landuse	Area_Acre	(%)
Administrative/ Public Service	0.20	0.00
Agriculture	6599.18	59.45
Commercial	12.26	0.11
Community Service	37.56	0.34
Education and Research	31.38	0.28
Health Service	1.48	0.01
Manufacturing and Processing	29.26	0.26
Mixed Use	1.86	0.02
Residential	2675.45	24.10
Road	151.84	1.37
Service Activity	2.81	0.03
Transportation and Communication	43.34	0.39
Vacant Land	142.75	1.29

Vegetation	139.98	1.26
Waterbody	1231.71	11.10
	11101.08	100.00

Union Action Plan Proposals

Proposed Land Use Zoning

Table 6.39: Proposed Land Uses of Gulishakhali Union

Proposed Landuse	Area_Acre	(%)
Agriculture	425.88	74.68
Circulation Network	1.35	0.24
Coastal Afforestation and Foreshore Area	124.01	21.75
Rural Settlement	17.21	3.02
Waterbody	1.84	0.32
Total	570.29	100.00

The category wise proposals are presented here. Table shows the amount of land uses in Gulisakhali, Khekuani. Map shows proposed land use of **Gulishakhali Union**

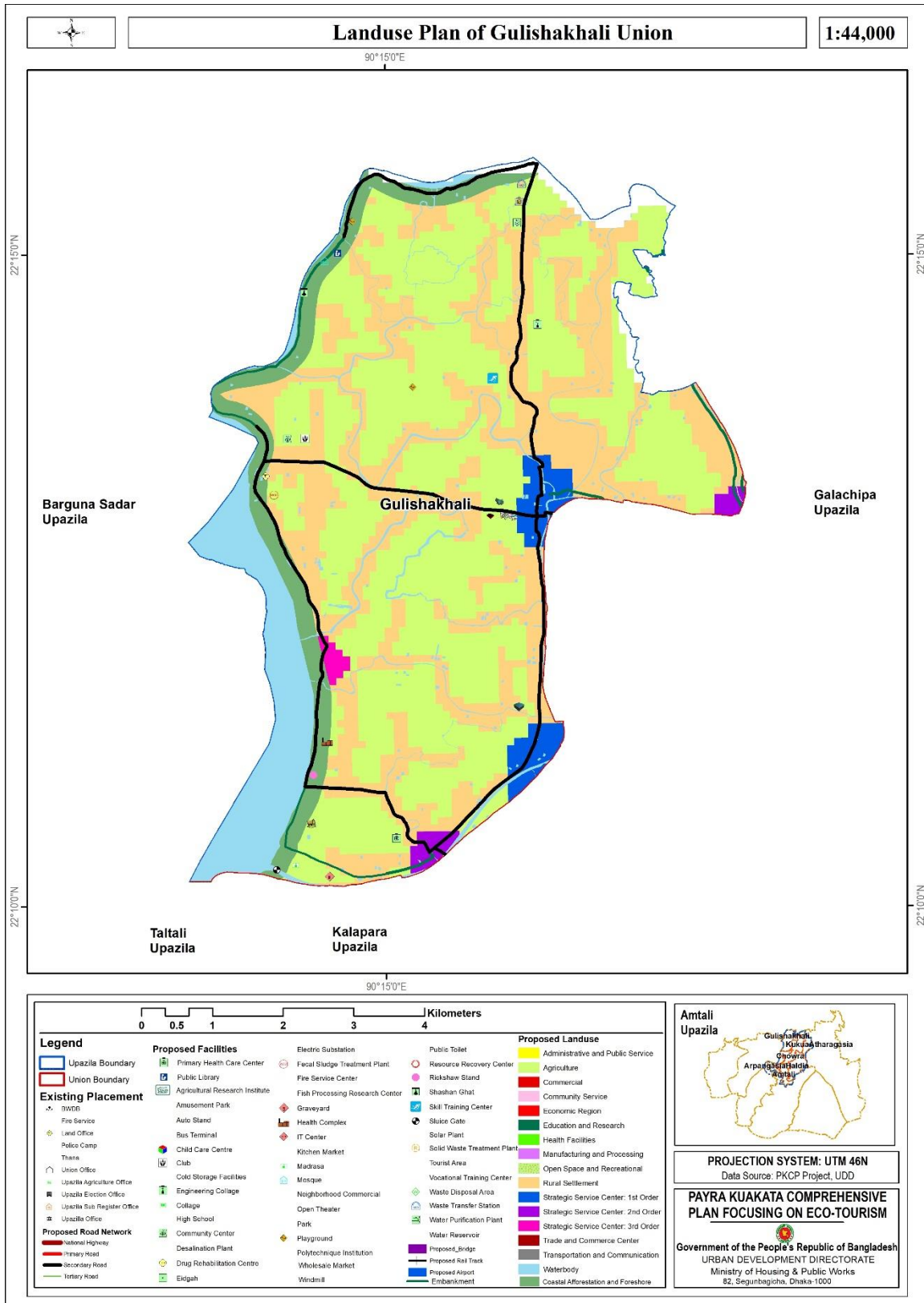
Development Proposals for Gulishakhali Union

The consultant proposes some Rural facilities in Gulishakhali Union. The details of the proposal is given in the table below.

Table 6.40: Development Proposals for Gulishakhali Union (Mouza Wise)

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Rickshaw Stand	Khekuani	2	2119	76	0.14	0.03
Wholesale Market	Gojkhali	1	768	7	0.04	0.01
Polytechnique Institution	Gojkhali	3	2573	7	0.62	0.11
Amusement Park	Khekuani	2	2552	76	52.57	9.22
Rickshaw Stand	Khekuani	2	2119	76	7.67	1.34
Madrassa	Khekuani	2	2552	76	11.39	2.00
Fecal Sludge Treatment Plant	Gulisakhali	3	3583	6	4.11	0.72
Shashan Ghat	Gulisakhali	1	342	6	3.54	0.62
Public Library	Gulisakhali	1	124	6	13.80	2.42
Mosque	Gulisakhali	1	107	6	6.01	1.05
Amusement Park	Khekuani	2	2905	76	0.00	0.00
Amusement Park	Khekuani	2	2904	76	0.64	0.11
Public Library	Gulisakhali	1	64	6	0.07	0.01
Sluice Gate	Khekuani	2	8888	76	0.21	0.04
Neighborhood Commercial	Gojkhali	5	5126	7	0.47	0.08
Amusement Park	Khekuani	2	2552	76	66.47	11.65
Madrassa	Khekuani	2	2907	76	25.77	4.52
Fecal Sludge Treatment Plant	Gulisakhali	3	3879	6	17.97	3.15
Primary Health Care Center	Khekuani	2	3078	76	24.71	4.33
Club	Gulisakhali	2	2598	6	7.36	1.29
Community Center	Gulisakhali	2	2598	6	17.35	3.04
Wholesale Market	Gojkhali	1	775	7	8.43	1.48
Public Toilet	Gojkhali	3	2604	7	3.71	0.65

Proposal	Mouza_Name	Sheet_No	Plot_No	JL_No	Area_Acre	%
Auto Stand	Gojkhali	3	2580	7	2.34	0.41
Public Library	Gulisakhali	1	221	6	2.43	0.43
Graveyard	Khekuani	2	8888	76	25.35	4.45
Neighborhood Commercial	Khekuani	3	3741	76	49.37	8.66
Playground	Fakirkhali	1	615	75	49.16	8.62
Polytechnique Institution	Gojkhali	1	754	7	31.94	5.60
Skill Training Center	Fakirkhali	1	763	75	34.59	6.07
Fecal Sludge Treatment Plant	Gulisakhali	3	3879	6	1.78	0.31
Neighborhood Commercial	Khekuani	3	3792	76	7.00	1.23
Playground	Fakirkhali	1	641	75	1.31	0.23
Skill Training Center	Fakirkhali	1	757	75	4.94	0.87
Amusement Park	Khekuani	2	2552	76	0.01	0.00
Madrasa	Khekuani	2	2552	76	0.01	0.00
Amusement Park	Khekuani	2	2552	76	0.08	0.01
Madrasa	Khekuani	2	2552	76	0.08	0.01
Waste Transfer Station	Kalagachhia	3	4187	74	0.24	0.04
Kitchen Market	Kalagachhia	3	4280	74	0.31	0.05
Playground	Kalagachia	1	201	74	1.86	0.33
Waste Transfer Station	Kalagachhia	3	4110	74	5.36	0.94
Health Complex	Khekuani	1	115	76	17.70	3.10
Kitchen Market	Kalagachhia	3	4291	74	0.45	0.08
Community Center	Kalagachhia	3	4427	74	8.44	1.48
Waste Transfer Station	Kalagachhia	3	4145	74	10.26	1.80
Kitchen Market	Kalagachhia	3	4280	74	6.81	1.19
Health Complex	Khekuani	1	141	76	11.08	1.94
Engineering Collage	Kalagachhia	4	5391	74	22.24	3.90
Waste Transfer Station	Kalagachhia	3	4147	74	2.19	0.38
Total					570.38	100.00



Map 6.8: Union Action Plan for Gulishakhali Union

6.3.4 Ideal Rural Area Facilities

Ideal Rural cities can vary based on specific cultural, environmental, and societal contexts, but there are several common criteria that are often considered important for creating livable and sustainable Rural environments. An ideal Rural city seeks to create a balanced and sustainable environment that enhances the quality of life for its residents, promotes inclusivity, fosters innovation and creativity, and preserves the city's unique cultural identity. Landuse wise Ideal Rural Area Facilities has given below.

Table 6.48: List of Rural Services for an Ideal Upazila

List of Rural Services for an Ideal Upazila	
1. Residential Land Area	
	Low Density residential
	Medium density
	Planned residential
2. Commercial land use	
	Central Business District/Town Center
	Community Commercial
	Neighborhood Commercial
	ICT /e-commerce Center
3. Open Space & recreation	
	Park
	Play-grounds (stadium, playfield)
	Natural and underdeveloped resources areas (critical habitat and natural beauty such as river bank, char
	Theatre / Cinema Hall
4. Education and Research Center	
	Primary School
	High School
	College
	Madrassa

5. Health Facilities	
Community Clinic	
Hospital	
6. Community Facilities	
Public Library	
Community Center	
Open Theatre	
Mosque or Religious Facilities	
7. Public Services and utilities	
ICT center	
Fire Service	
Sewerage Treatment	
Waste Disposal Site	
Power Station Graveyard	
8. Transportation Facilities	
Bus truck , taxi stand/ Terminal	
Rickshaw/ Tempo stand	
Launch Ghat	
Helipad	
9. Administrative	
Government	
10	Roads
11	Agriculture
12	Water bodies
13	Wet land/Ecologically Sensitive Area
14	Open Space
15	Potential Rural Extension Area
16	Shoreline
17	Water works Infrastructure (sluice gate, culverts, sewerage)

Chapter Seven: Conclusion

Conclusion

The Rural Area Plan of Amtali Upazila consists of the plans for Union level Plan for the Upazila. The Amtali Upazila has already Master Plan under execution, which has been updated for Detailed Action Area Plan under the current project. Some priority actions are suggested for short-term development. While preparing the Union level Action Area Plans under the present project, major provisions of the existing Upazila Master Plan were taken into consideration so that conflicts in development can be avoided. In the development process of the Upazila, coordination among all local authorities within Amtali Upazila will be necessary for integrated development encompassing the potentials of Rural areas. There is scope for local government authorities for cooperation and collaboration among themselves for local development in a comprehensive manner. It is expected that the Rural Area Plans prepared under the current project will provide essential tools for integrated development at Amtali Upazila.