

Welcome to The Presentation on

WORKSHOP ON DRAFT FINAL DEVELOPMENT

PLAN OF RANGUNIA UPAZILA

Wednesday, 14 March, 2018.

Presented By

Dr. M. MAKSUDUR RAHMAN

Team Leader, Package - 05

Preparation of Development Plan for Fourteen Upazilas (Package-05)





Government of the People's Republic of Bangladesh
Ministry of Housing and Public Works
Urban Development Directorate (UDD)

Preparation of Development Plan for Fourteen Upazilas Package 05-(Rangunia Upazila)

CONSULTANT



Joint Venture of
HOUSE OF CONSULTANTS LIMITED (HCL)
DISASTER MANAGEMENT WATCH (dm.Watch)



PRESENTATION OUTLINE

- ❑ Project Description**
- ❑ Project Phases**
- ❑ At a Glance of Rangunia Upazila**
- ❑ Conducted Surveys for the Accomplishment of Project**
- ❑ Survey Outputs**
- ❑ Five Tier Plans**

BACKGROUND OF THE PROJECT

| | |
|------------------------------|--|
| <i>Name of the Project:</i> | Preparation of Development Plan for Fourteen Upazilas |
| <i>Implementing Agency:</i> | Urban Development Directorate (UDD) |
| <i>Financial assistance:</i> | Government of the People's Republic of Bangladesh (GoB) |
| <i>Project Package:</i> | Package 05-(Ramu Upazila, District-Cox's Bazar and Rangunia Upazila, District-Chittagong) |
| <i>Project Area:</i> | Rangunia Upazila : 361.54 Sq. kilometer (BBS,2011) |
| <i>Main Goal of RDP:</i> | Preparation of Five tiers Development Plan |
| <i>Plan Namely:</i> | Sub Regional Plan, Structure Plan, Urban Area Plan, Rural Area Plan and Action Area Plan |

OBJECTIVE OF THE PROJECT

National Development Objectives

- To find out the development issues and potentials of the Upazila
- Make a 20 years development vision for the Upazila (both urban and rural area)
- Prepare a development plan in line with the vision for the development

Immediate Objectives

Objective 1: Determination of present and future functions of the Upazila

Objective 2: Mechanisms for improving and guiding development

Objective 3: Review of existing problems and propose initiatives

Objective 4: Formulation of bankable projects

Objective 5: Increasing capacity/formulation of local authorities for urban and rural management and development

PROJECT PHASES

| Phases | Major Deliverables | Punlic Involvement | Survey Period |
|-----------------|-------------------------|--|---------------------------|
| Inception Stage | Mobilization Report | Reconnaissance Survey, Focus Group Discussion, Courtyard Meeting | January, 2015 |
| | Inception Report | | |
| Survey Stage | Survey Report | 11 types of survey | July, 2015 to April, 2016 |
| Planning Stage | Draft Plan Report | Public Consultation | November, 2017 |
| | Draft Final Plan Report | Public Hearing | February, 2018 |

PROFILE OF RANGUNIA UPAZILA

RANGUNIA THANA was formed on 24 January 1962

RANGUNIA UPAZILA was formed in 1983

Rangunia Pourashava was formed on 4 July 2000

Area: **361.54** sq. km (BBS,2011) But **347.87** sq. km (Georeferenced Mouza Map, 2016)

Number of Unions: 15

Wards: 144

Villages: 156

Mouzas: 72

Populations: **339,004** people

Total Households: **67792** (BBS,2011)

- Total length of Road: 1278.51 km

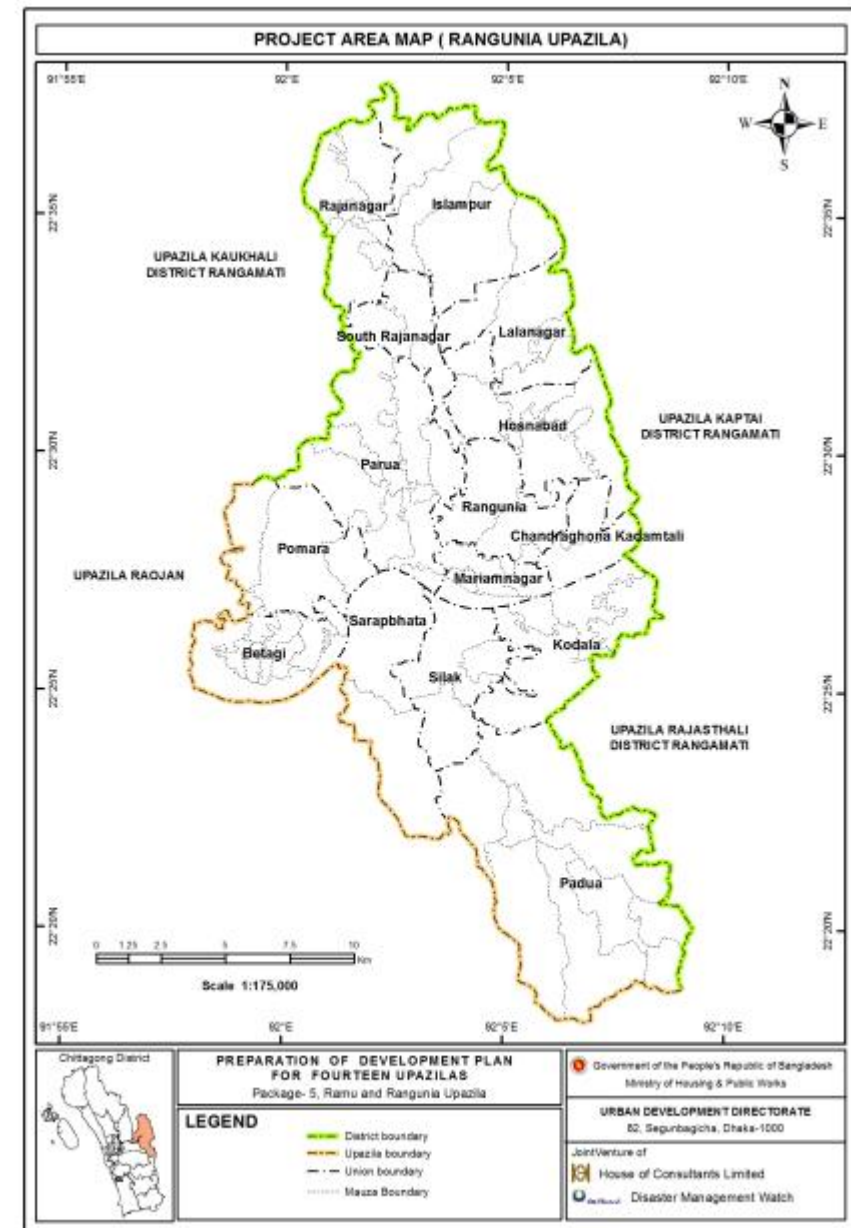
Pucca Road: 252.17 km

HBB Road: 384.96 km

Katcha Road: 641.39 km

- Agricultural Area -43.98 %
- Hilly Area- 36.08 %
- Water body- 6.99 %
- Rural Settlement- 5.37 %
- Educational Institutions: College 9, Secondary school 33, Primary School 107, Madrasa 101

(Source: Field Survey, 2016)



INCEPTION STAGE

- Reconnaissance Survey
- FGD (Focus Group Discussion)
- Courtyard Meeting
- Collection of secondary data and information
 - Mouza Map Collection
 - Collection of Satellite image

RECONNAISSANCE SURVEY



Source: Field Survey, 2015

FOCUS GROUP DISCUSSION (FGD)



Meeting with Mayor and Councilor



Meeting at Pomra Union Parishad

COURTYARD MEETING

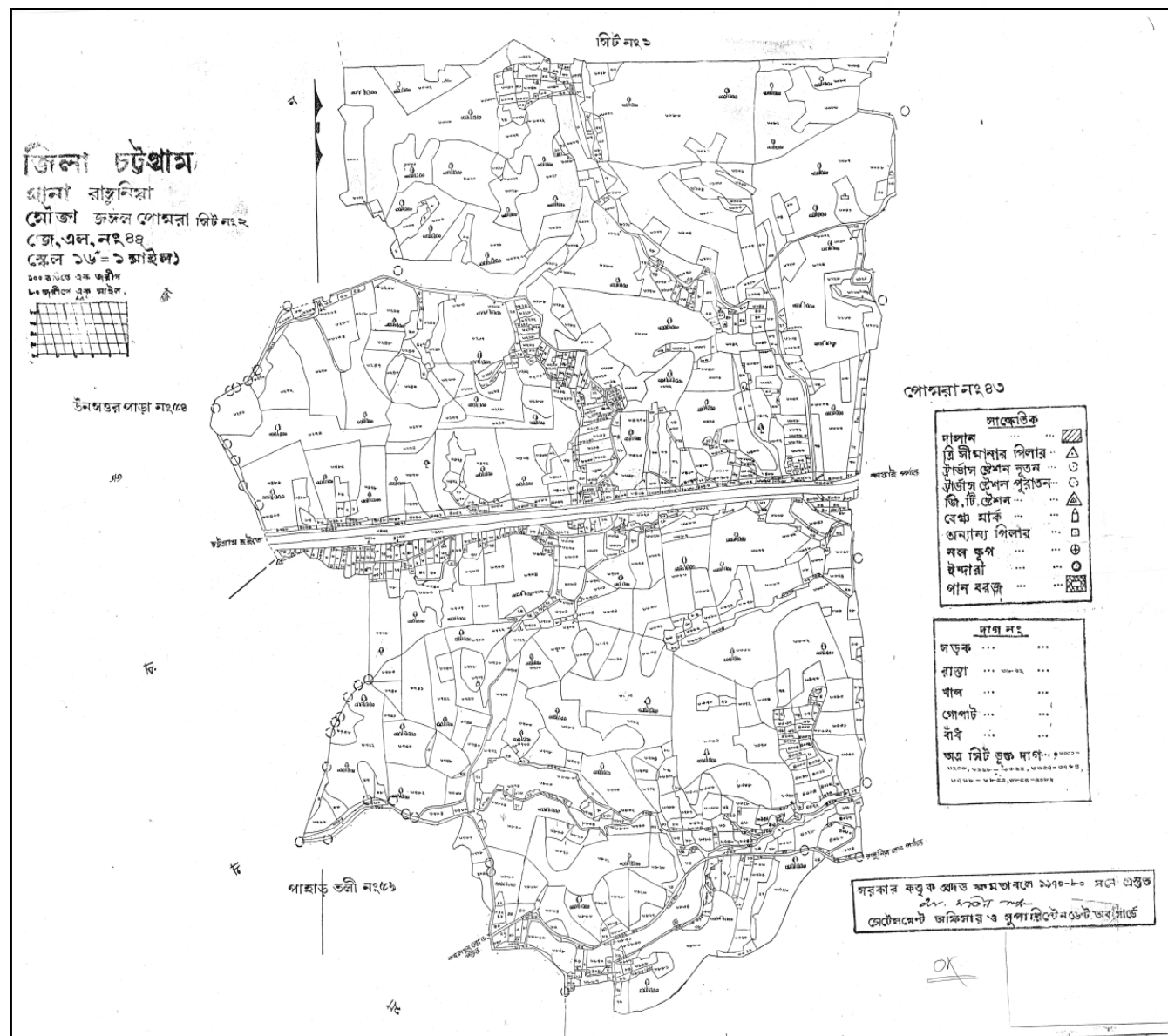


Meeting with Mass People at Ichakhali Bazar



Meeting with at Rangunia Club

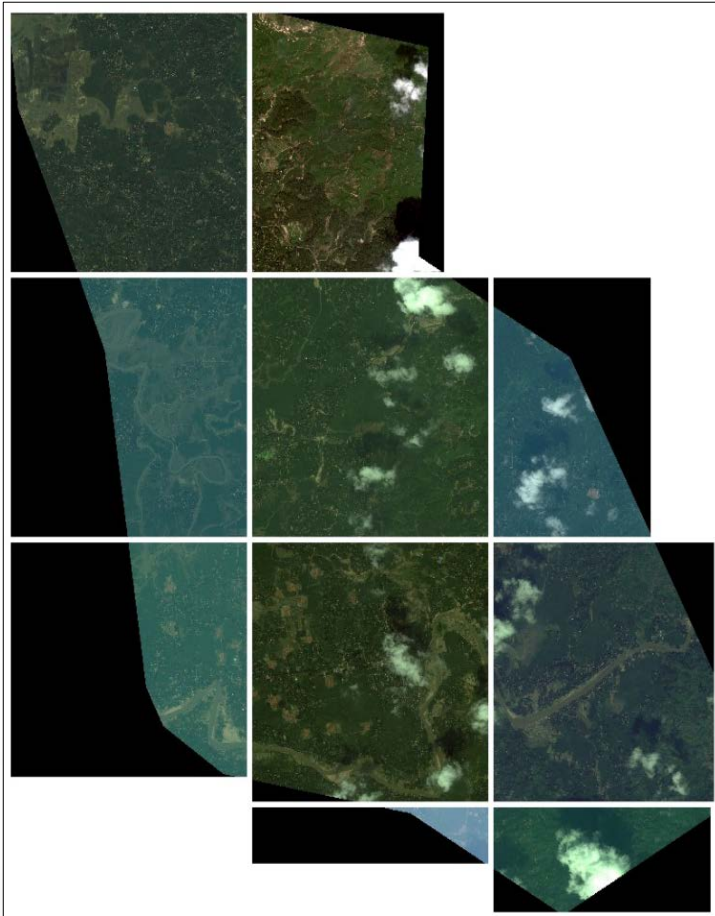
SCANNED MOUZA MAP



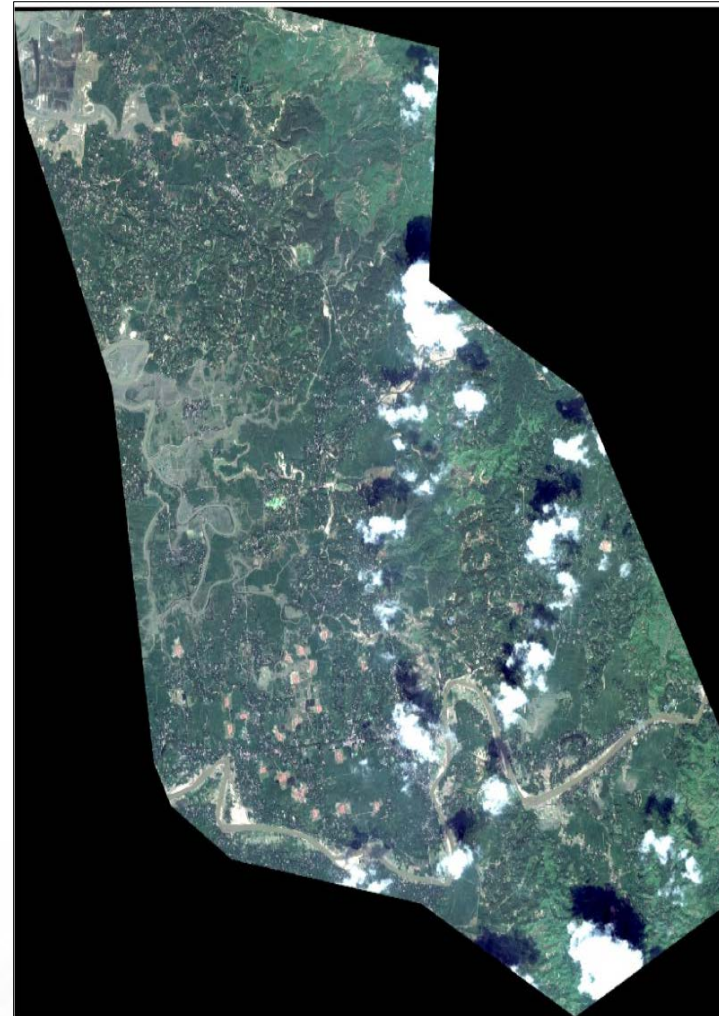
Sample of Scanned Mauza Map

PROCESSING OF SATELLITE IMAGE

Tiles



Color & Contrast
Balance

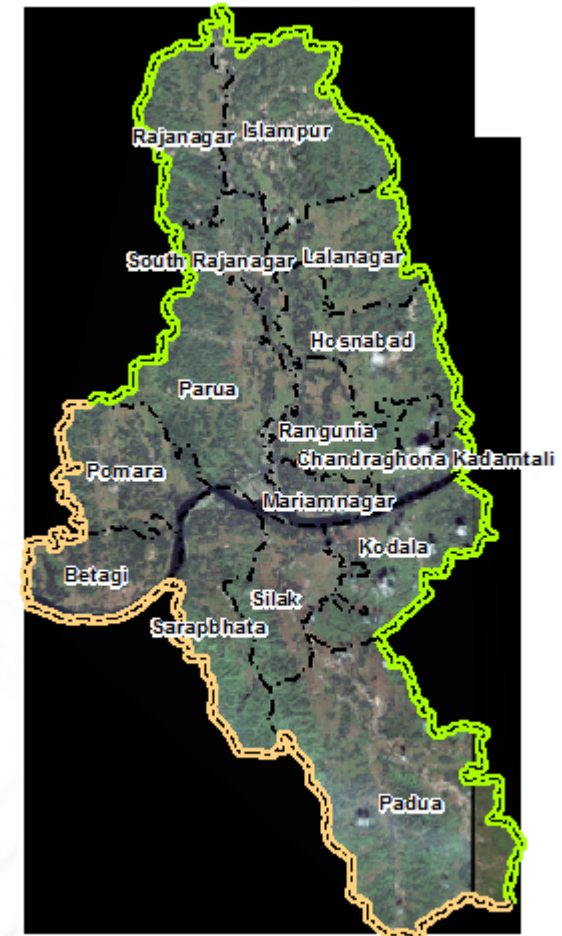


PROCESSING OF SATELLITE IMAGE

Feature Extraction

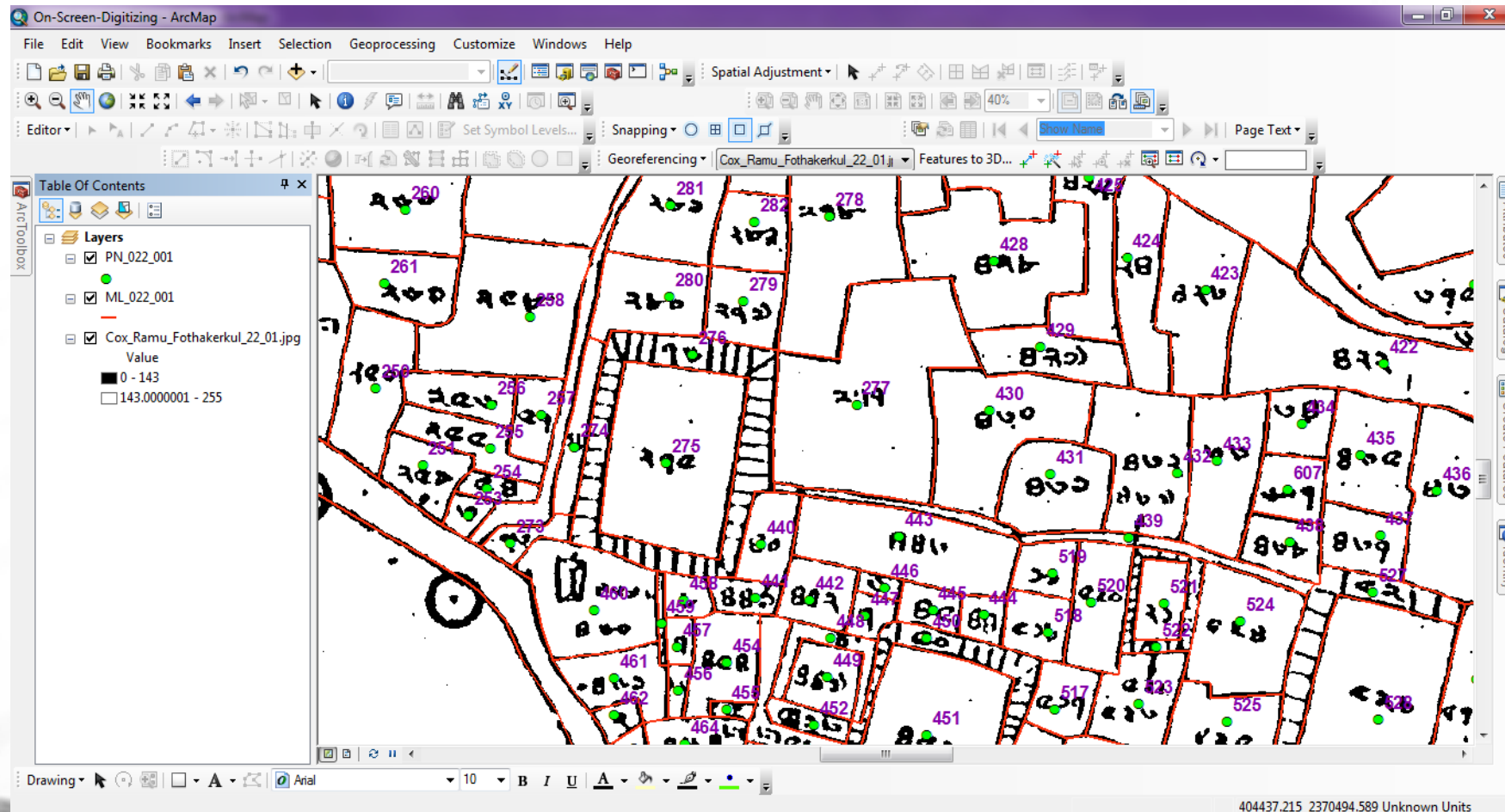


Ortho-Photo / Ortho-Rectified Image of RANGUNIA



DIGITIZATION OF MOUZA MAP

| Upazila | Mauza Maps | | Digitization Percentage |
|----------|---------------------------|------------------------------|-------------------------|
| | Total No. of Mauza Sheets | Total No of Digitized Sheets | |
| Rangunia | 202 | 200 | 99% |

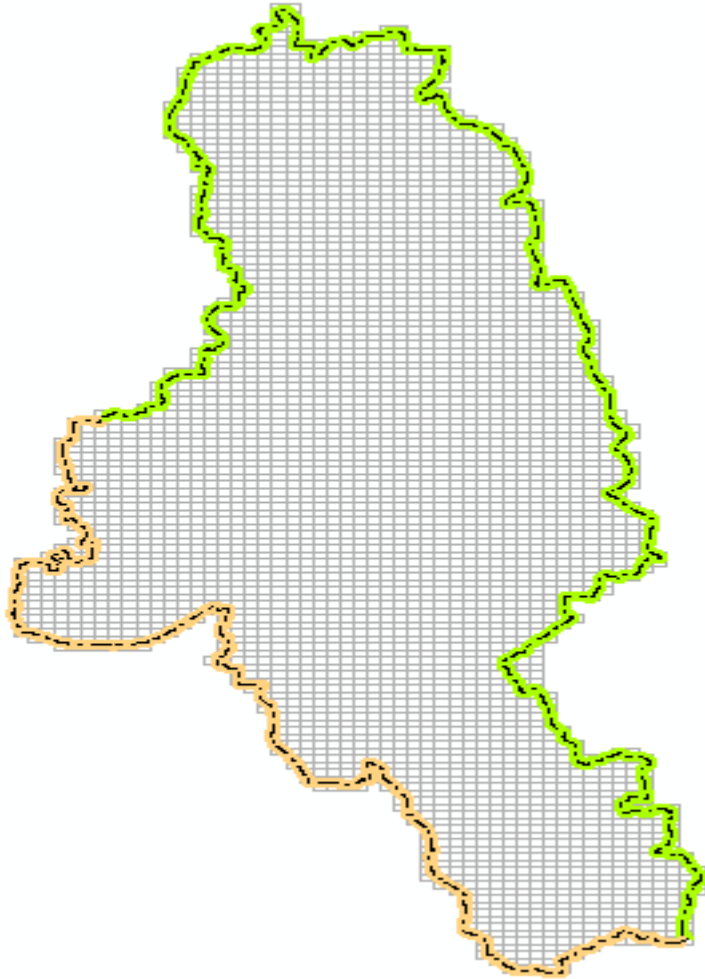


GEOREFERENCING OF MOUZA MAP



MAP PREPARATION FOR PHYSICAL FEATURE SURVEY

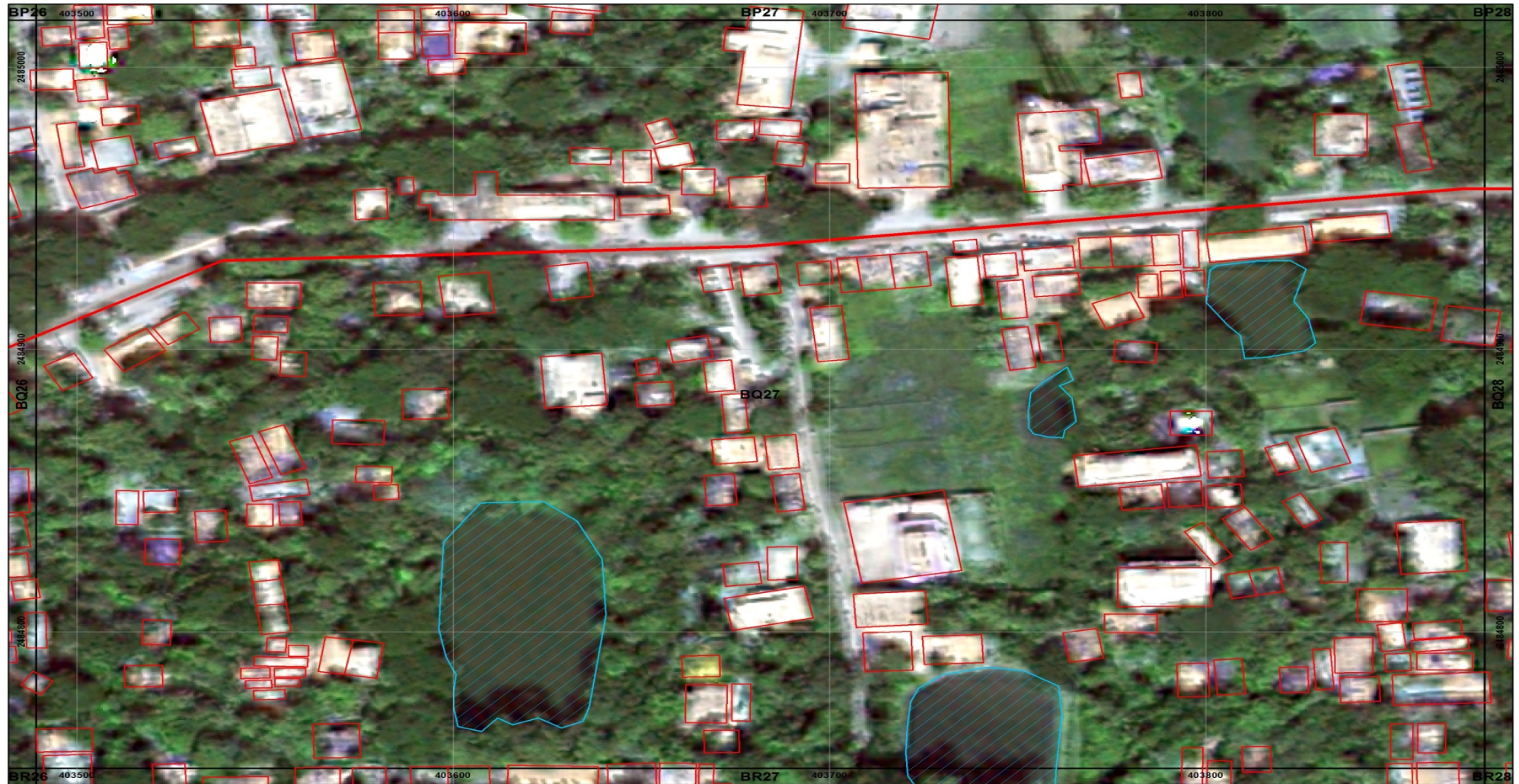
Grids/Sheets of Rangunia for Survey Base Map at RF 1:990



| | | | | | | | | | | | |
|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| | | | | | | BF 10 | BF 11 | BF 12 | BF 13 | BF 14 | BF 15 |
| | | | BG 7 | BG 8 | BG 9 | BG 10 | BG 11 | BG 12 | BG 13 | BG 14 | BG 15 |
| | BH 5 | BH 6 | BH 7 | BH 8 | BH 9 | BH 10 | BH 11 | BH 12 | BH 13 | BH 14 | BH 15 |
| | BI 5 | BI 6 | BI 7 | BI 8 | BI 9 | BI 10 | BI 11 | BI 12 | BI 13 | BI 14 | BI 15 |
| | BJ 5 | BJ 6 | BJ 7 | BJ 8 | BJ 9 | BJ 10 | BJ 11 | BJ 12 | BJ 13 | BJ 14 | BJ 15 |
| BK 4 | BK 5 | BK 6 | BK 7 | BK 8 | BK 9 | BK 10 | BK 11 | BK 12 | BK 13 | BK 14 | BK 15 |
| BL 4 | BL 5 | BL 6 | BL 7 | BL 8 | BL 9 | BL 10 | BL 11 | BL 12 | BL 13 | BL 14 | BL 15 |
| BM 4 | BM 5 | BM 6 | BM 7 | BM 8 | BM 9 | BM 10 | BM 11 | BM 12 | BM 13 | BM 14 | BM 15 |
| BN 4 | BN 5 | BN 6 | BN 7 | BN 8 | BN 9 | BN 10 | BN 11 | BN 12 | BN 13 | BN 14 | BN 15 |
| BO 4 | BO 5 | BO 6 | BO 7 | BO 8 | BO 9 | BO 10 | BO 11 | BO 12 | BO 13 | BO 14 | BO 15 |
| | BP 5 | BP 6 | BP 7 | BP 8 | BP 9 | BP 10 | BP 11 | BP 12 | BP 13 | BP 14 | BP 15 |
| | BQ 5 | BQ 6 | BQ 7 | BQ 8 | BQ 9 | BQ 10 | BQ 11 | BQ 12 | BQ 13 | BQ 14 | BQ 15 |
| BR 4 | BR 5 | BR 6 | BR 7 | BR 8 | BR 9 | BR 10 | BR 11 | BR 12 | BR 13 | BR 14 | BR 15 |
| BS 4 | BS 5 | BS 6 | BS 7 | BS 8 | BS 9 | BS 10 | BS 11 | BS 12 | BS 13 | BS 14 | BS 15 |

MAP PREPARATION FOR PHYSICAL FEATURE SURVEY

Survey Base Map of Rangunia at RF 1:990

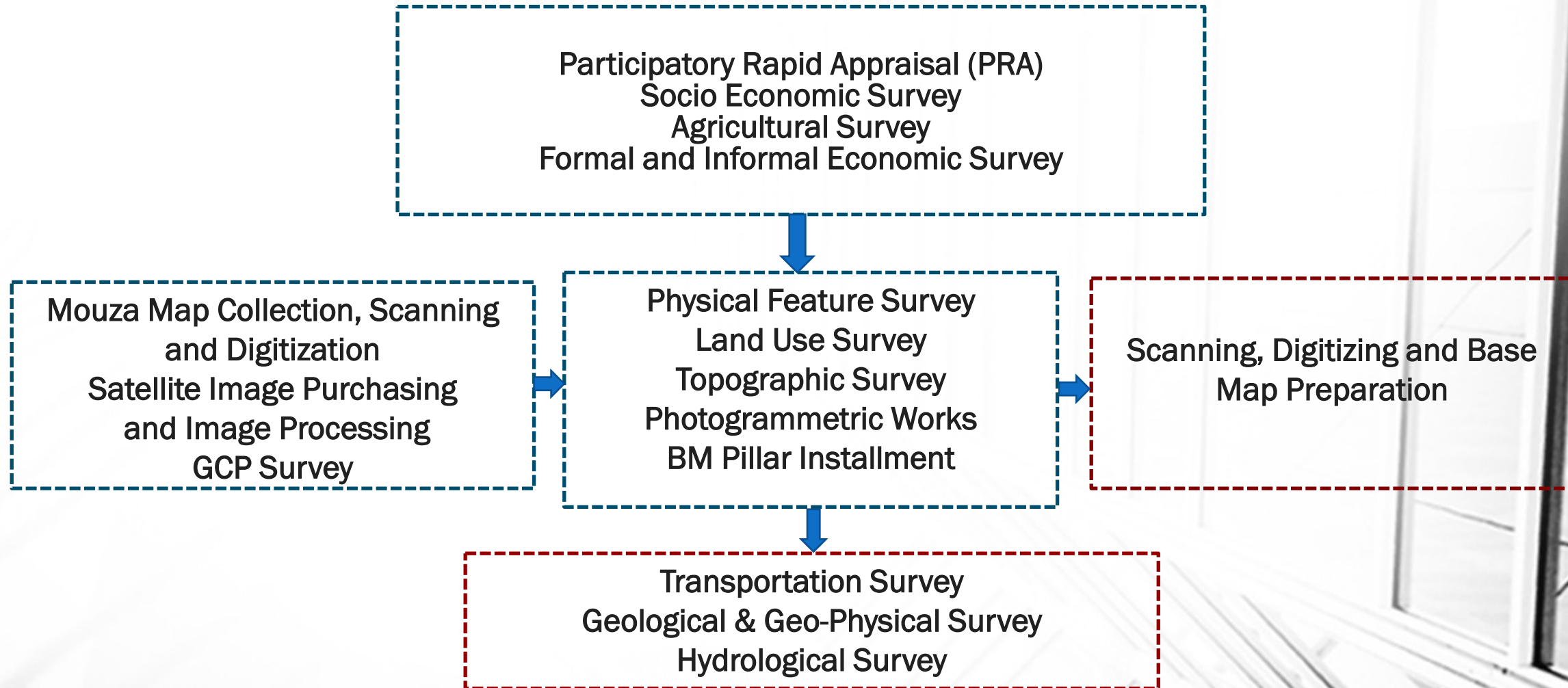


WORKSHOP AT RANGUNIA



Upazila Chairman of Rangunia, VC of CUET, Director of UDD; Workshop at Rangunia (1 November 2015)

WORKS ACCOMPLISHED UNDER SURVEY STAGE



PARTICIPATORY RAPID APPRAISAL (PRA)

PRA (Participatory Rapid Appraisal) is an innovative approach to empower the people by sharing information and making decisions regarding the Development Project and to involve the local people in the planning process by letting the local people identify their own problems, potentials, development needs and planning priorities for next 20 years.

PRA Session: Total **35** PRA in Rangunia (24) Upazila

Number of PRA Conducted: Rangunia Upazila: 15 in 15 Unions

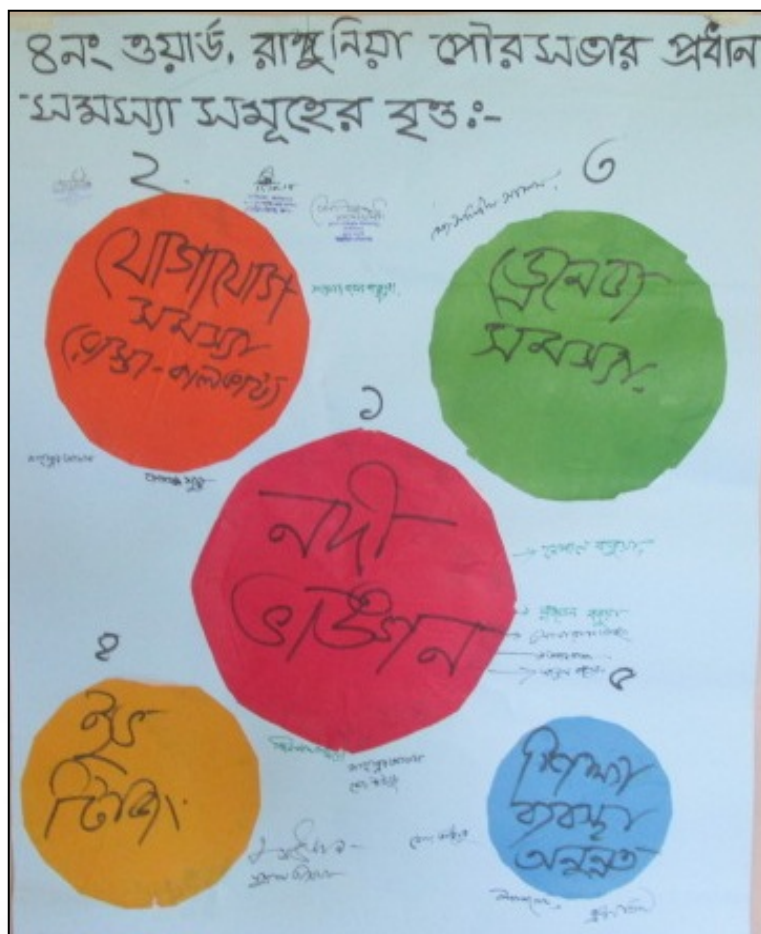
Rangunia Paurashava: 9 in 9 Wards

PRA Tools

- ☐ Social Mapping
- ☐ Venn Diagram (Problems and Potentials) and
- ☐ Technology of Participation (ToP)

PARTICIPATORY RAPID APPRAISAL (PRA)

(July-October, 2015)



Venn Diagram for Problem
Prioritization



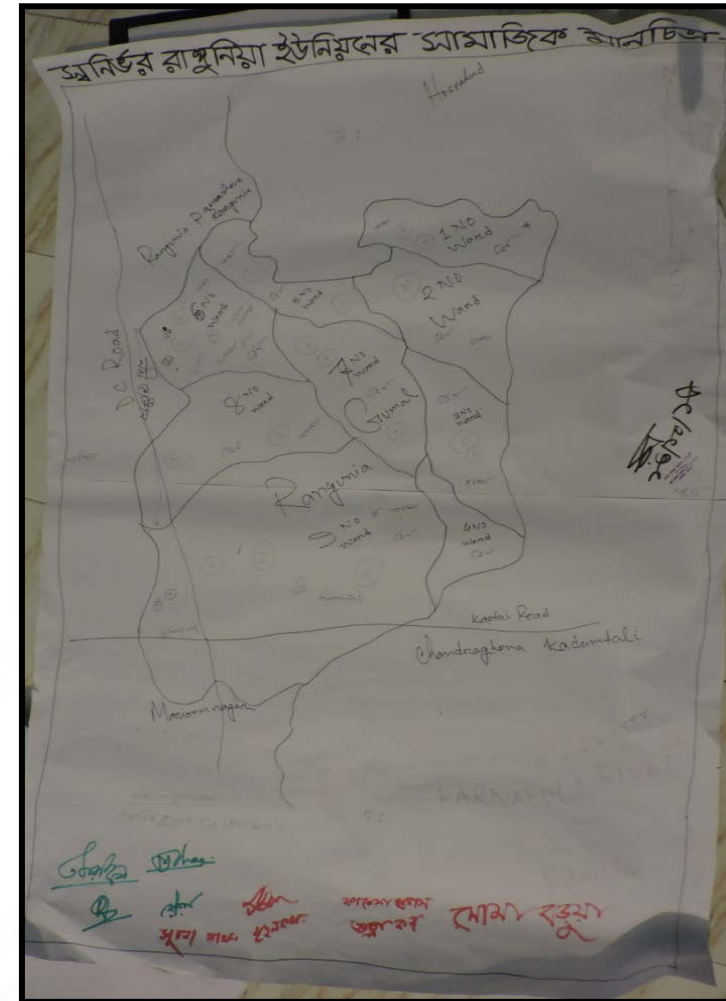
Venn Diagram for Potential
Prioritization

PARTICIPATORY RAPID APPRAISAL (PRA)

(July-October, 2015)



Social Map of Betagi Union showing
after sketching, Rangunia



Social Map

PARTICIPATORY RAPID APPRAISAL (PRA)

(July-October, 2015)

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
গৃহায়ন ও গণপূর্ত মন্ত্রণালয়
নগর উন্নয়ন অধিদপ্তর (UDD)
“প্রিপারেশন অব ডেভেলপমেন্ট প্রায় ফর ফোরটিভ উপজেলাস”
প্যারফর্ম-০৫ ওয়ার্ড-১, রংগুনিয়া, নগর-১, উত্তর উপজেলা-রংগুনিয়া, জেলা-চট্টগ্রাম

সমস্যা, কারণ, প্রভাব ও সম্ভাবনা যাচাই

| চিহ্নিত সমস্যাসমূহ | কারণসমূহ | প্রভাবসমূহ | সম্ভাবনা/সক্ষমতা |
|--------------------|---|---|---------------------------|
| ১. নদীভাঙ্গন | • বালু ই. নদীর/অন্য নদীর • নদীর নাব্যতা হ্রাস • পানির বিচ্ছিন্নতা/অন্য কারণ | • অসংলগ্ন ও অসংলগ্ন • বালু ই. নদীর/অন্য নদীর | • পর্যাপ্ত-অন্য-ও অসংলগ্ন |
| ২. ব্যাপারযোগ | • বালু ই. নদীর/অন্য নদীর • পানির বিচ্ছিন্নতা/অন্য কারণ | • অসংলগ্ন ও অসংলগ্ন • বালু ই. নদীর/অন্য নদীর | • পর্যাপ্ত-অন্য-ও অসংলগ্ন |
| ৩. নদীভাঙ্গন | • পানির বিচ্ছিন্নতা/অন্য কারণ • অসংলগ্ন ও অসংলগ্ন | • অসংলগ্ন ও অসংলগ্ন • বালু ই. নদীর/অন্য নদীর | • পর্যাপ্ত-অন্য-ও অসংলগ্ন |
| ৪. নদীভাঙ্গন | • পানির বিচ্ছিন্নতা/অন্য কারণ • অসংলগ্ন ও অসংলগ্ন | • অসংলগ্ন ও অসংলগ্ন • বালু ই. নদীর/অন্য নদীর | • পর্যাপ্ত-অন্য-ও অসংলগ্ন |

Problems, Causes, Effects and Potentialities
Diagram (W-1, Rangunia)

ওয়ার্ড-১, রংগুনিয়া, নগর-১, উত্তর উপজেলা-রংগুনিয়া, জেলা-চট্টগ্রাম

আগামী ২০ বছরে আপনার চাহিদাগুলি কি কি ???

| সাম্প্রদায়িক/স্বল্প চাহিদা | উন্নয়ন/স্বল্প চাহিদা | নদীভাঙ্গন/স্বল্প চাহিদা | উন্নয়ন/স্বল্প চাহিদা | সাম্প্রদায়িক/স্বল্প চাহিদা | সাম্প্রদায়িক/স্বল্প চাহিদা |
|-----------------------------|-----------------------|-------------------------|-----------------------|-----------------------------|-----------------------------|
| ১. নদীভাঙ্গন | ২. নদীভাঙ্গন | ৩. নদীভাঙ্গন | ৪. নদীভাঙ্গন | ৫. নদীভাঙ্গন | ৬. নদীভাঙ্গন |
| ৭. নদীভাঙ্গন | ৮. নদীভাঙ্গন | ৯. নদীভাঙ্গন | ১০. নদীভাঙ্গন | ১১. নদীভাঙ্গন | ১২. নদীভাঙ্গন |
| ১৩. নদীভাঙ্গন | ১৪. নদীভাঙ্গন | ১৫. নদীভাঙ্গন | ১৬. নদীভাঙ্গন | ১৭. নদীভাঙ্গন | ১৮. নদীভাঙ্গন |
| ১৯. নদীভাঙ্গন | ২০. নদীভাঙ্গন | ২১. নদীভাঙ্গন | ২২. নদীভাঙ্গন | ২৩. নদীভাঙ্গন | ২৪. নদীভাঙ্গন |

ToP Preparation (W-9, Rangunia)

PARTICIPATORY RAPID APPRAISAL (PRA)

(July-October, 2015)



A Successful PRA Session in Sharafbhatta Union, Rangunia.



Team Leader and Project Manager attending at PRA Session in Rangunia Pourashava (Ward-05)

PARTICIPATORY RAPID APPRAISAL (PRA)

(July-October, 2015)

**People's
Participation
in different
tasks at PRA
Session**



PARTICIPATORY RAPID APPRAISAL (PRA)

| Major Problems of the Area | | |
|----------------------------|------------------------------------|---|
| SL | Type of problems | Name of the UP |
| 1 | Transportation | Rajanagar, Hosnabad, Shonirbhar Rangunia, Mariamnagar, Betagi, Sharafvata, Shilok, Padua, Chondroghona Kadamtali, Kodala, Islampur, Daksin Rajanagar, Lalanagar |
| 2 | Educational Institution | Rajanagar, Hosnabad, Mariamnagar, Parua, Betagi, Sharafvata, Shilok, Chondroghona Kadamtali, Kodala, Lalanagar |
| 3 | Health/Medical Facilities | Rajanagar, Mariamnagar, Parua, Betagi, Sharafvata, Shilok, Padua, Kodala, Islampur, Daksin Rajanagar, Lalanagar |
| 4 | River Erosion | Mariamnagar, Parua, Betagi, Shilok, Padua, Kodala, Daksin Rajanagar, Lalanagar |
| 5 | Security system/ Terrorism/Robbery | Rajanagar, Islampur |
| 6 | Electricity | Shonirbhar Rangunia, Parua |
| 7 | Drainage | Shonirbhar Rangunia, Mariamnagar, Pomra |
| 8 | Gas | Rajanagar, Hosnabad, Shonirbhar Rangunia, Pomra, Betagi, Chondroghona Kadamtali |

PARTICIPATORY RAPID APPRAISAL (PRA)

| SL | Type of problems | Name of the UP |
|----|----------------------------|--------------------------------------|
| 10 | Unemployment | Rajanagar, Hosnabad |
| 11 | Water logging and salinity | Chondroghona Kadamtali |
| 12 | Drug | Islampur |
| 13 | Haat/Bazar | Hosnabad, Islampur, Daksin Rajanagar |
| 14 | Eve teasing | Shonirbhar Rangunia |
| 15 | Road | Parua, Pomra |
| 16 | Sanitation | Pomra |
| 17 | Irrigation | Pomra |
| 18 | Recreation facilities | Sharafvata |
| 19 | Housing | Sharafvata |
| 20 | Disturbance of elephant | Padua |

(Source: PRA Survey, 2016)

SOCIO ECONOMIC SURVEY

Socio-economic survey tools provide a means of improving understanding of local resource management systems, resource use and the relative importance of resources for households and villages.

Objective: To map the socio economic status of the population.

Working Methodology: Simple systematic random sampling

No. of Sampling: 1100 households in each Upazila

SOCIO ECONOMIC SURVEY

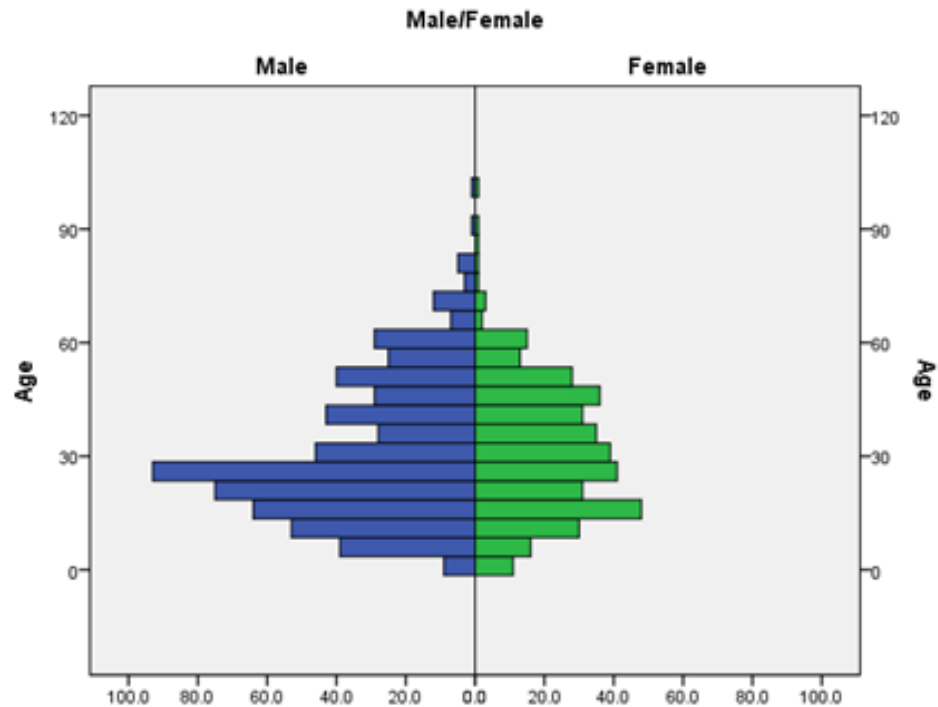
Socio economic survey includes:

- Basic Demographic Profile of the Household and Population
 - Age-Sex Pyramid of the Population
 - Education level of the population
 - Occupation of the population
 - Marital status of the population
 - Land ownership and type of land
- Status of basic infrastructure and access
- Access and status of drainage system
- Environmental degradation/pollution

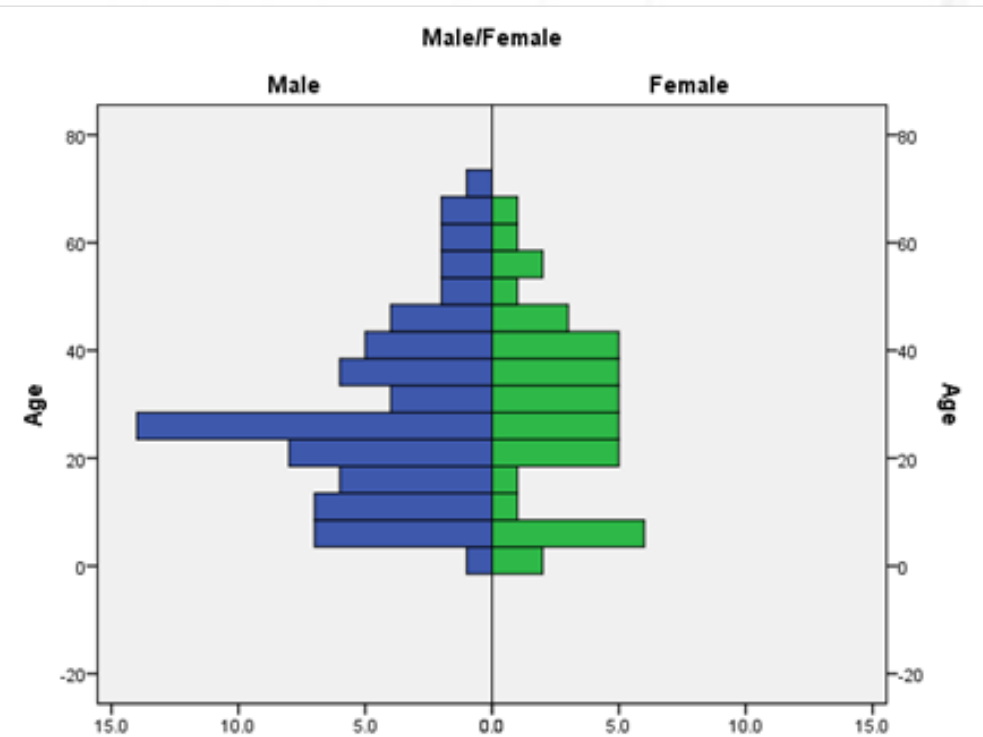
SOCIO ECONOMIC SURVEY

Age-Sex Pyramid: Rangunia

- Rural Area

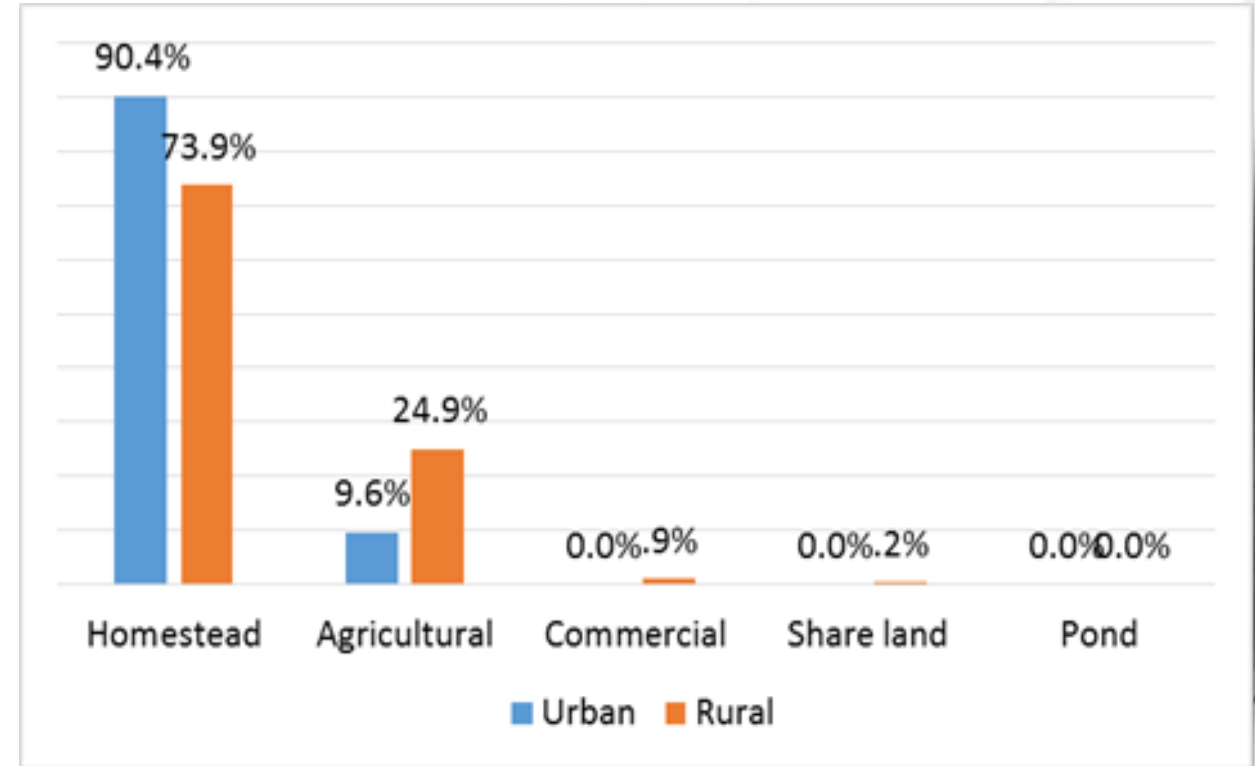
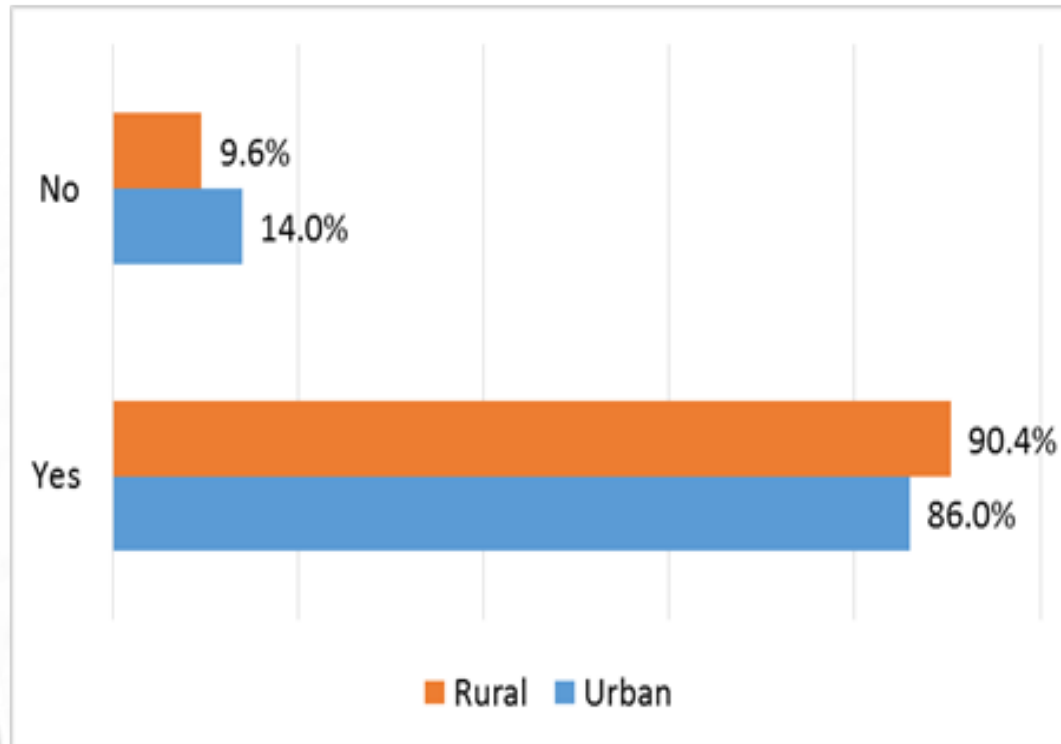


- Urban Area



SOCIO ECONOMIC SURVEY

Land Ownership and Type of Land Where They Live: Rangunia



SOCIO ECONOMIC SURVEY

(October-November,
2015)



Socio Economic Data Collection in
Ichakhali, Rangunia Pourashava



Socio Economic Data Collection from
Tribal Community in Padua, Rangunia

SOCIO ECONOMIC SURVEY

Socio-Economic Problems of the Area

Transport : 63.5% said about transportation problem.

Road : 76.6% participants said about road problem.

Waste Management: 73.6% mentioned about waste management related problems.

Electricity: 45.5% said about electricity problems.

AGRICULTURAL SURVEY

The study is to determine the present scenario in agriculture practices and assessment the potential sustainable future development of the sector.

The purpose of the Agricultural survey is to preserve the Double and Triple Cropped Agricultural Land according to the Bangladesh Government.

Acquired Data: Primary and Secondary Data

Primary data has been collected from **Sub-Assistant Agriculture Officer (SAAO)** of each Union and through Questionnaire Survey (**300** Questionnaire in each Upazila) during Socio Economic Survey and Secondary data has been collected from Upazila Parishad.

AGRICULTURAL SURVEY



**Meeting with
Agricultural
Officer and
SAAO**



FORMAL AND INFORMAL ECONOMIC SURVEY

The study is to analyze the present economic base of the Upazila how the significance of its economic base is changing compared to the national economy which will determine the future growth potentials of the area.

Methodology: Questionnaire Survey

Formal Sectors: Industry, Market/Hat/ Bazar, Bank/Bima, NGO, CBO.

Informal Sectors: Floating economic business but not included in certain territory.

The findings of these analyses will depict a clear picture about future employment and investment prospects in the study area.

FORMAL AND INFORMAL ECONOMIC SURVEY



Fish Storage in Mariamnagar, Rangunia (December, 2015)

TRAFFIC AND TRANSPORTATION SURVEY

The growth and development of towns and cities or any region are so much dependent on the condition of transportation, any deterioration of it will decline of the respective growth of towns or regions

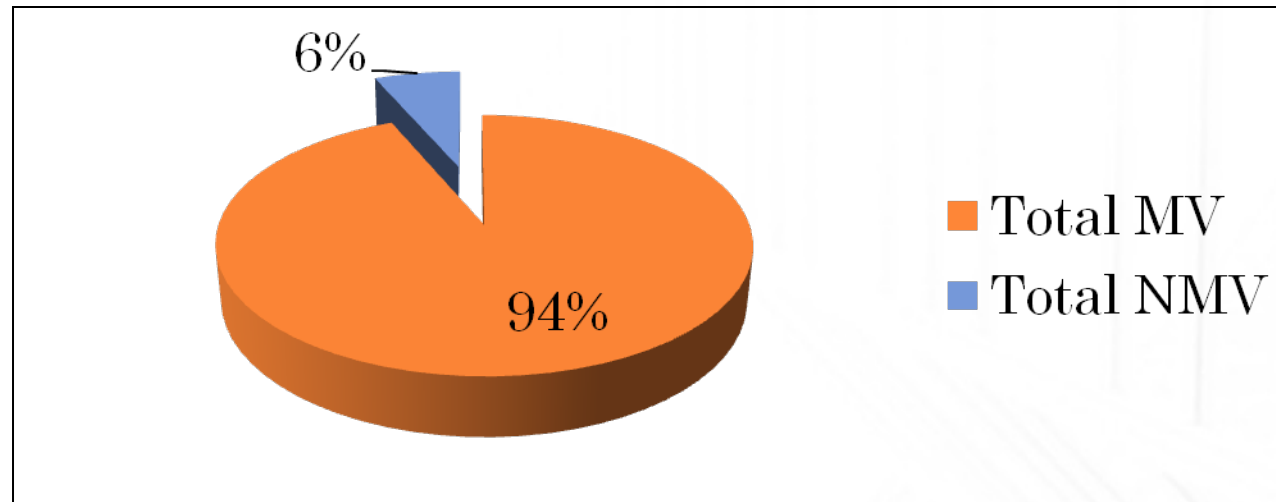
Objective: To understand the present nature and impact of the transportation system several surveys were conducted.

Undertaken Survey:

- ☐ Traffic Volume Count
- ☐ Origin and Destination (O D) Survey
- ☐ Bus Passengers Survey
- ☐ Regional Survey

TRAFFIC AND TRANSPORTATION SURVEY

All vehicle passes through the different link of the intersection above 80% are motorized vehicle and up-to 20% are non-motorized vehicle.



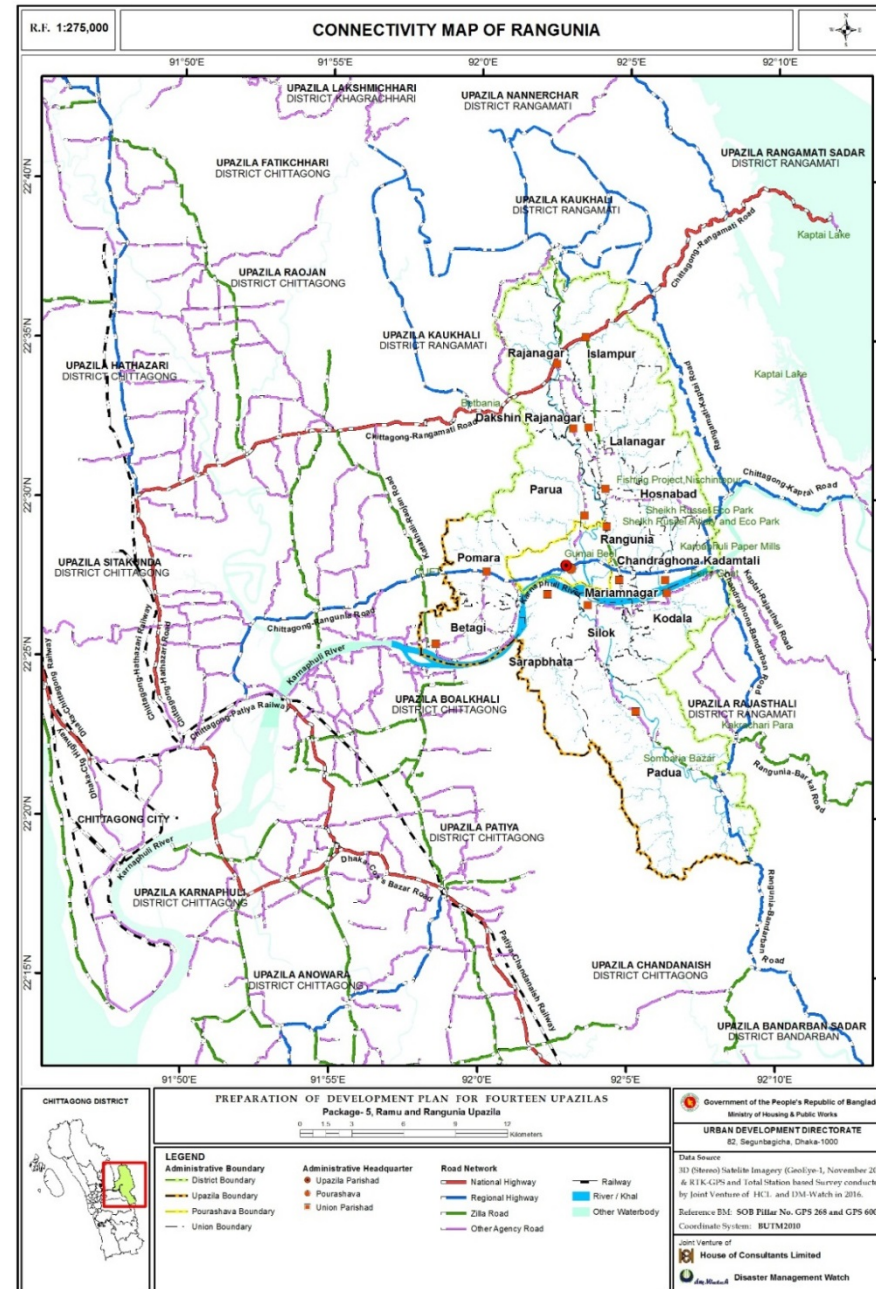
Motorized and Non-Motorized Vehicles at Shantirhat-Godown link

TRAFFIC AND TRANSPORTATION SURVEY

(December, 2016)



Field Supervision By Transport Expert at Mariamnagar, Rangunia



Source: Prepared by Consultant Team Based on Field Survey, 2016

GEOLOGICAL SURVEY

Sub Soil/Geotechnical Investigations will be executed to acquire information regarding the physical characteristics of soil and rocks. The purpose of geotechnical investigations is to design foundations for structures.

Methods of Field Work:

- ☐ Wash Boring
- ☐ Soil Sampling
- ☐ Standard Penetration Test (SPT)

No. of Boreholes at Rangunia: 34

GEOLOGICAL SURVEY



Field Preparation for PS Logging near
Rangunia Pourashava and Chondroghona
Kadamtali, Rangunia



Sample Collection after Bore Holing

GEOLOGICAL SURVEY



Aligning the acquired sample according to the characteristics

GEOPHYSICAL SURVEY

The work aims to estimate local site effects against earthquakes.

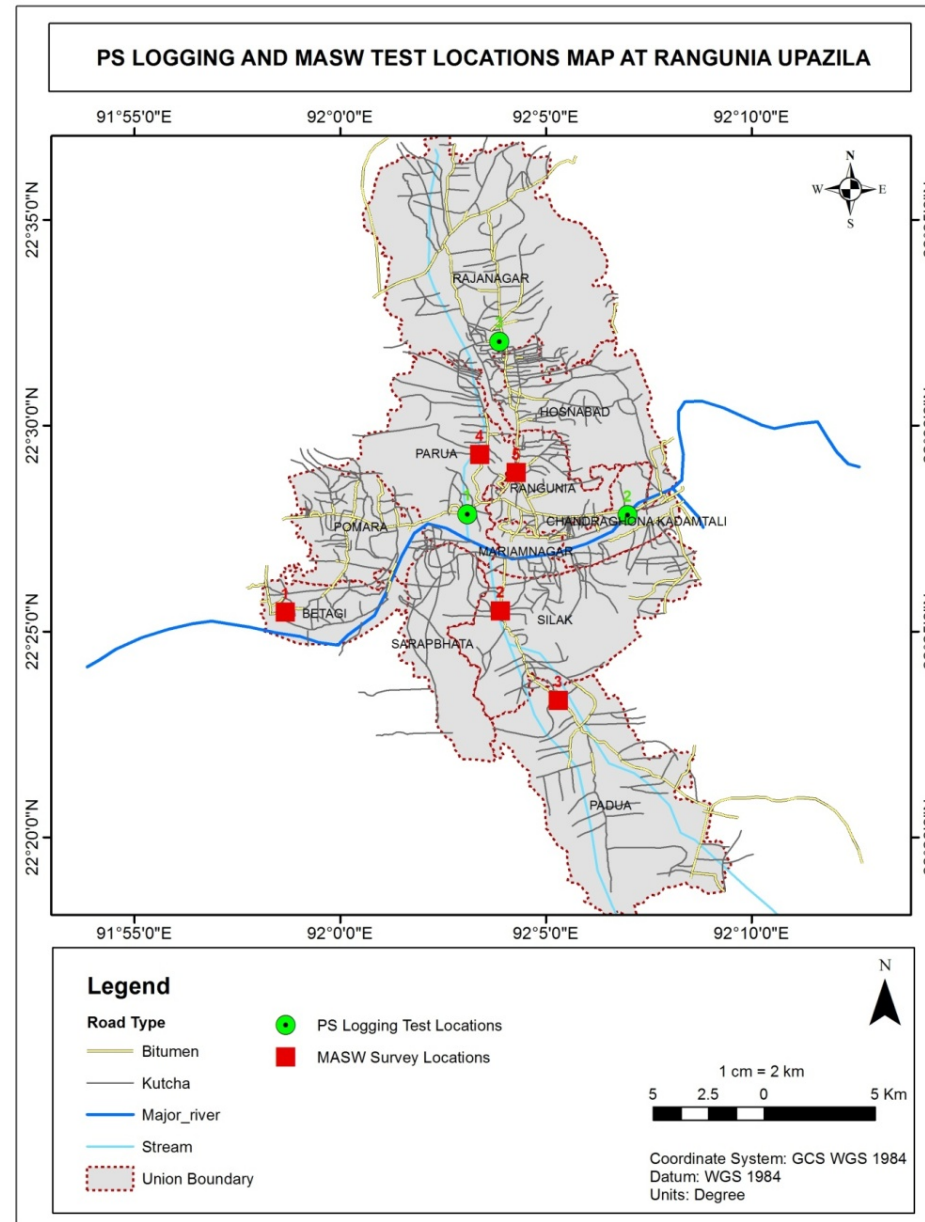
The **Objective** of the work is three-fold:

- 1) To determine shear wave velocity profile at various sites,
- 2) 2) To classify soil conditions according to seismic design specifications and
- 3) 3) To analyze soil amplifications in the area.

Two geophysical exploration methods namely

- 1) Seismic Down Hole Test and
- 2) Multichannel Analysis of Surface Wave (MASW)

GEOPHYSICAL SURVEY



Geophysical Survey Locations

GEOPHYSICAL SURVEY

(March, 2016)



Performing PS Logging Operation and Data Acquisition in Rangunia

HYDROLOGICAL SURVEY

Hydrological Survey is done to provide bathymetric survey which incorporates bathymetric information of existing rivers and the field information will be adjusted with the DEM.

Objectives of the survey works

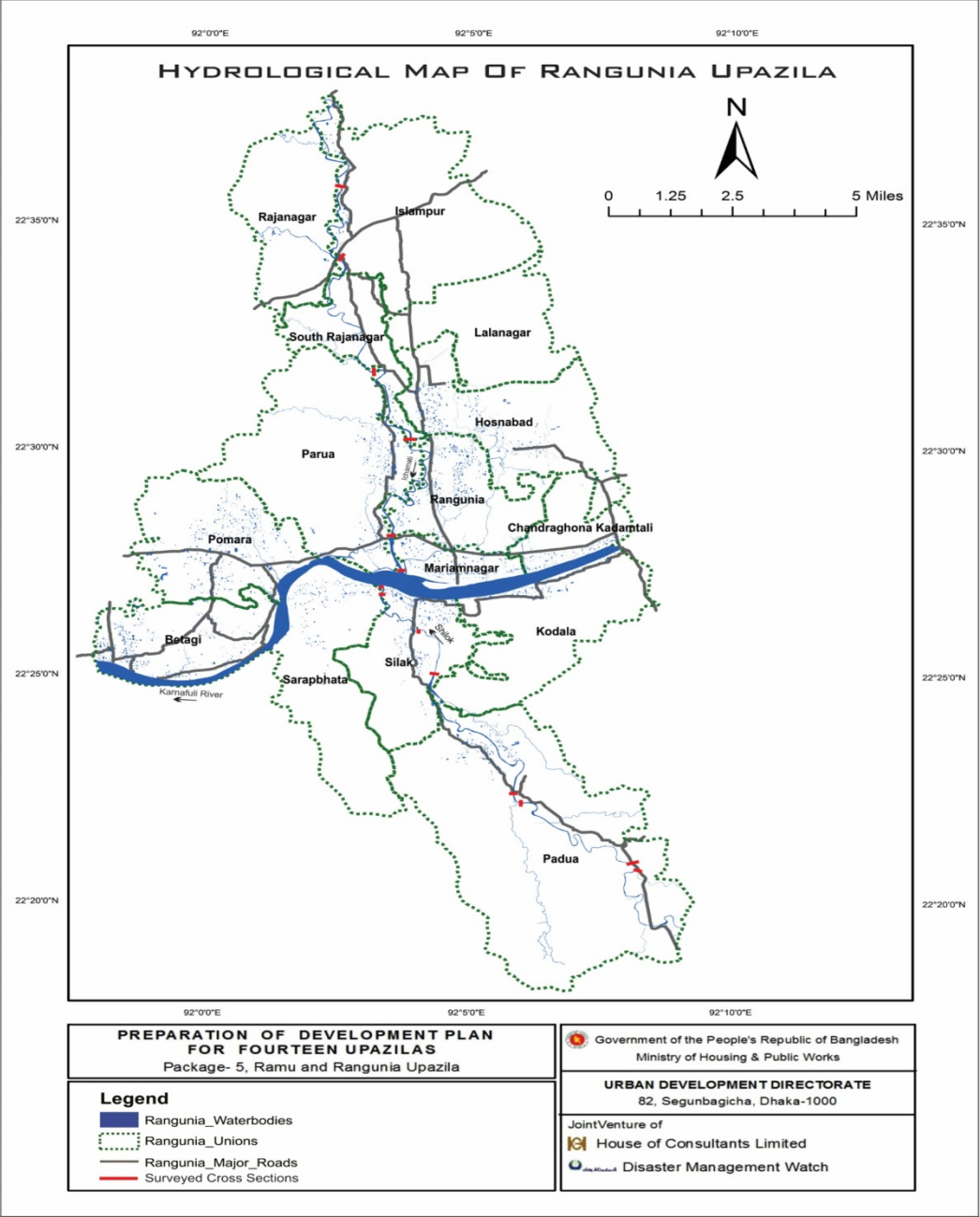
To collect water level data W124 and SW125 at Rangunia and rainfall data of BWDB stations CL316, CL317, CL322 and CL330.

Collection of bathymetric data of the major rivers at Rangunia.

Identification of hydraulic structures and collection of information about sill levels, openings etc.

Rivers in Rangunia: Ichakhali and Shilok

HYDROLOGICAL SURVEY



Map showing the locations of surveyed cross-sections, direction of flow and stagnant water bodies

HYDROLOGICAL SURVEY

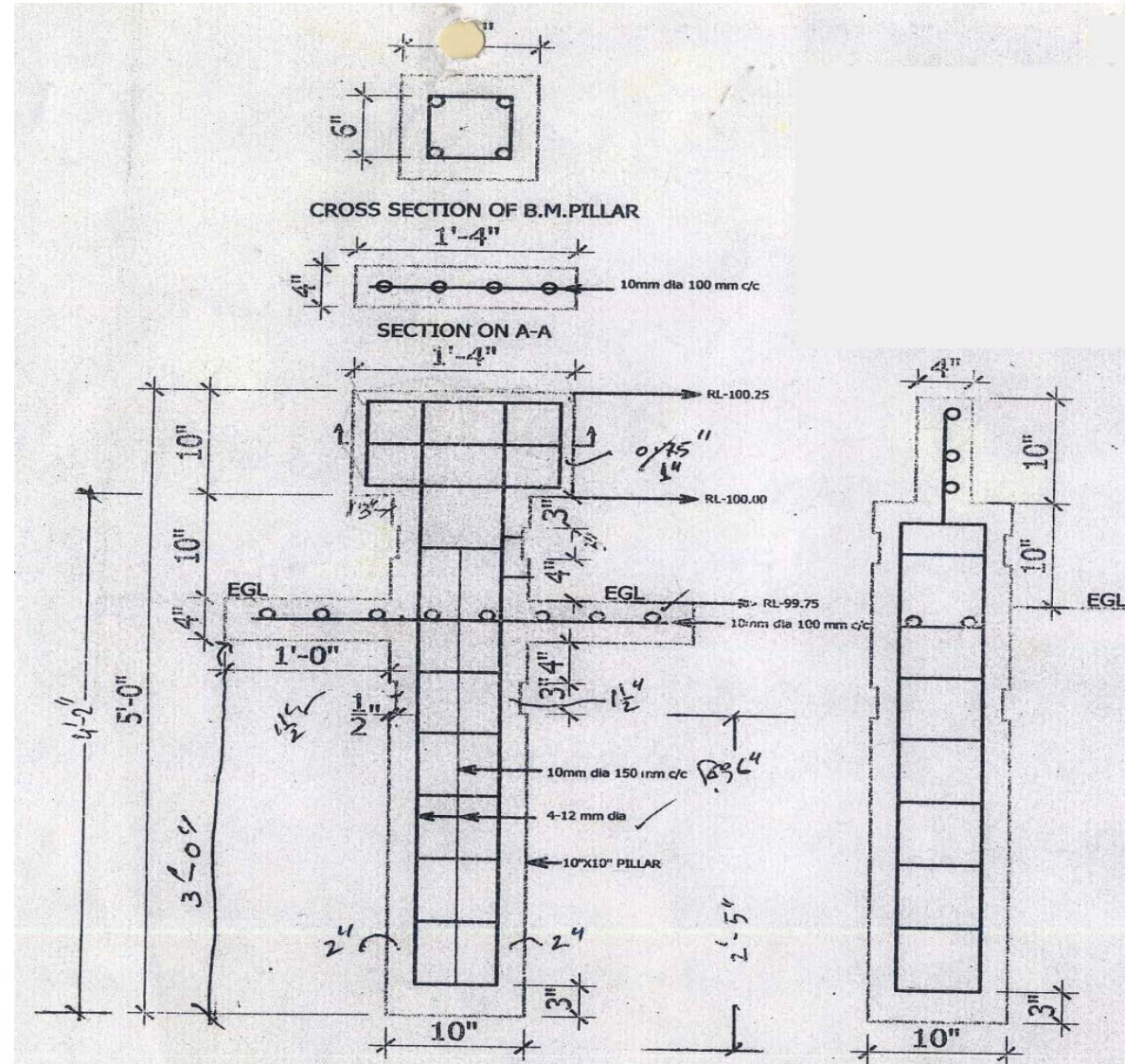


Hydrology Survey through Leveling Machine and GPS in Bogabili,
Rangunia

Design of BM Pillar

PRECAST BENCH MARK PILLAR

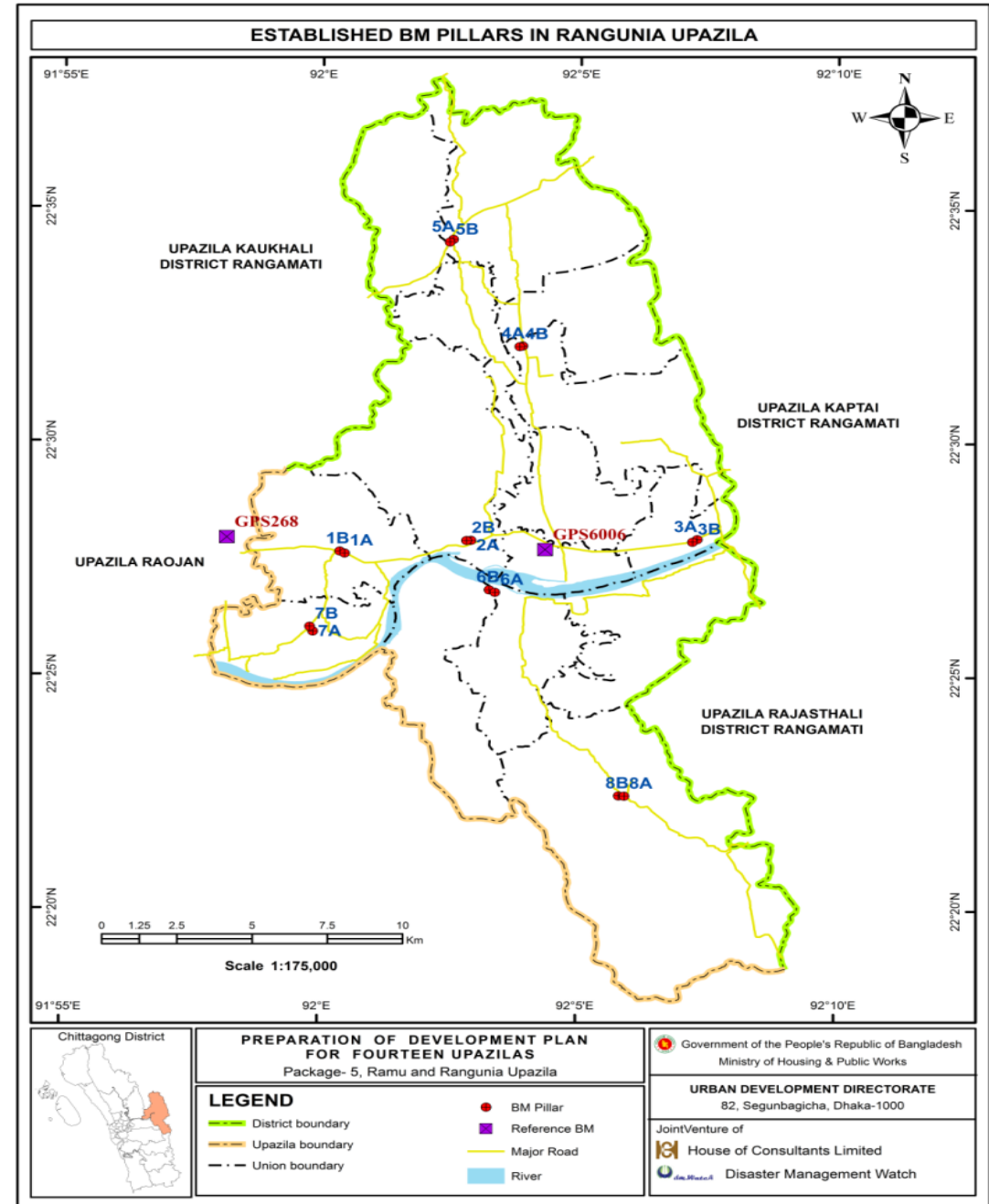
1. CONCRETE 1:1.5:3
2. Reinforcement : $f_y = 400 \text{ Mpa}/350 \text{ Mpa}$
(Which ever available good)
3. WATER- CEMENT RATIO ≤ 0.50
4. AS CAST FINISH
5. UNDERGROUND PART CAST IN GRAY CEMENT i.e; Cement EN-197:CEM-II, 42.5 N
6. UPPER PART: CONCRETE CAST WITH WHITE CEMENT + RED/YELLOW PIGMENT.
(Sample Shall be Pre- approved)
7. MODULAR SHUTTER SHALL BE USED FITTED WITH ALPHABET AS TO BE WRITTEN
8. BENCH MARK NUMBER & UDS SHALL BE WRITTEN ON SLAB FACE AS WELL IN GROOVE FORM, PRE SET DURING CAST
9. TOP CAST IN -SITU HEAD SHALL BE CAST IN MODULAR SHUTTER (Pre approved)
10. SLAB ON GRADE : TOP MAY BE WITH NCF + RED/ YELLOW PIGMENTS
11. ADMIXTURE TYPE G ASTM C-494 SHOULD BE USED
12. HANDLING CARE SHALL BE MAINTAINED SO THAT THERE ARE/IS NO SURFACE INJURY IN ANY.



BENCH MARK INSTALLATION

Locations of Installed BM Pillars

Rangunia Upazila is covered by 16 BM pillars.



GCP-RTK SURVEY



OBSERVATION DURING NATURAL HAZARDS



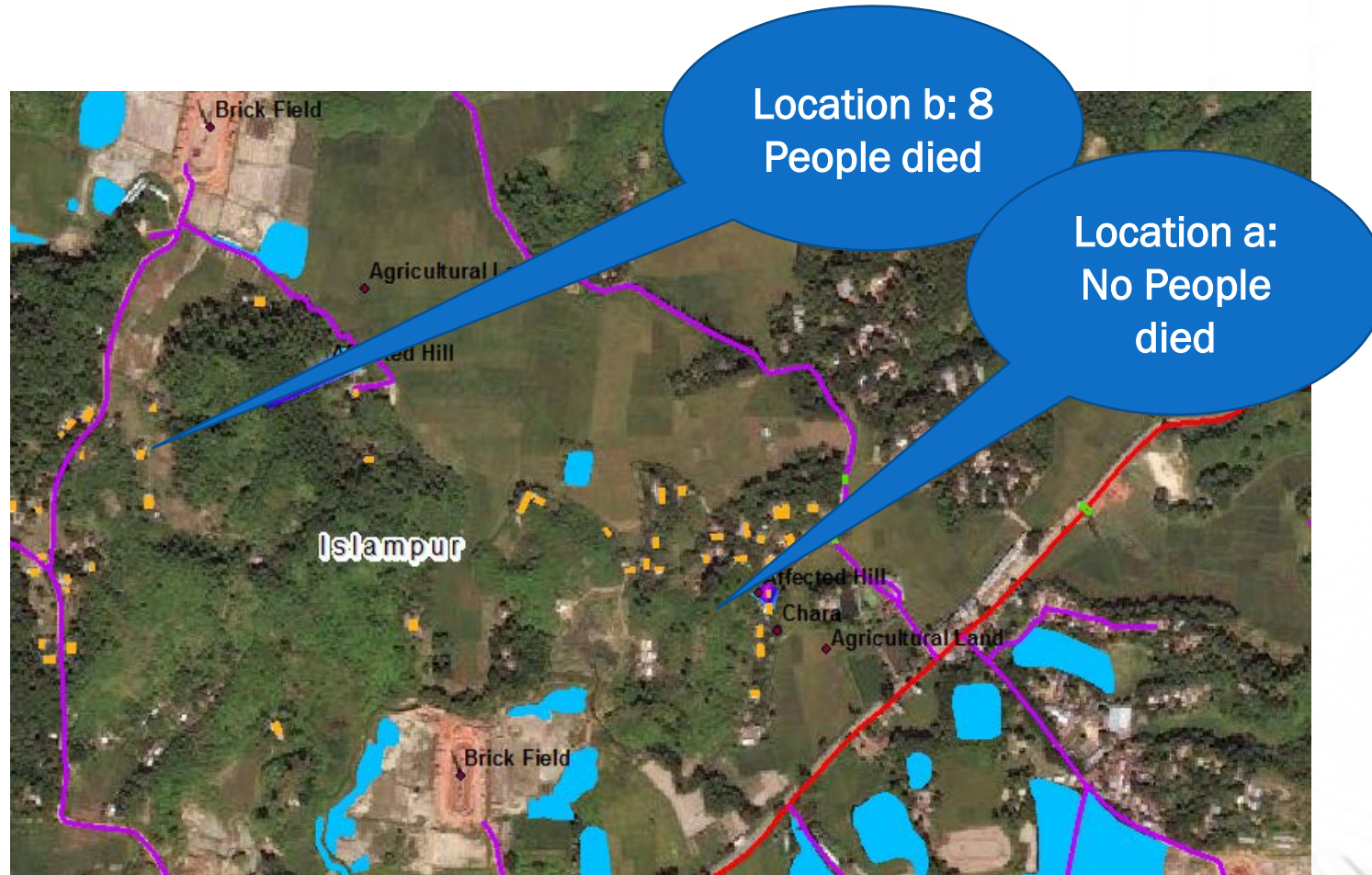
Flash Flood in Rangunia Upazila

OBSERVATION DURING NATURAL HAZARDS



Landslide in Rangunia Upazila

OBSERVATION DURING NATURAL HAZARDS



Locations of Landslide at Mogaichari, Islampur Union in Rangunia Upazila

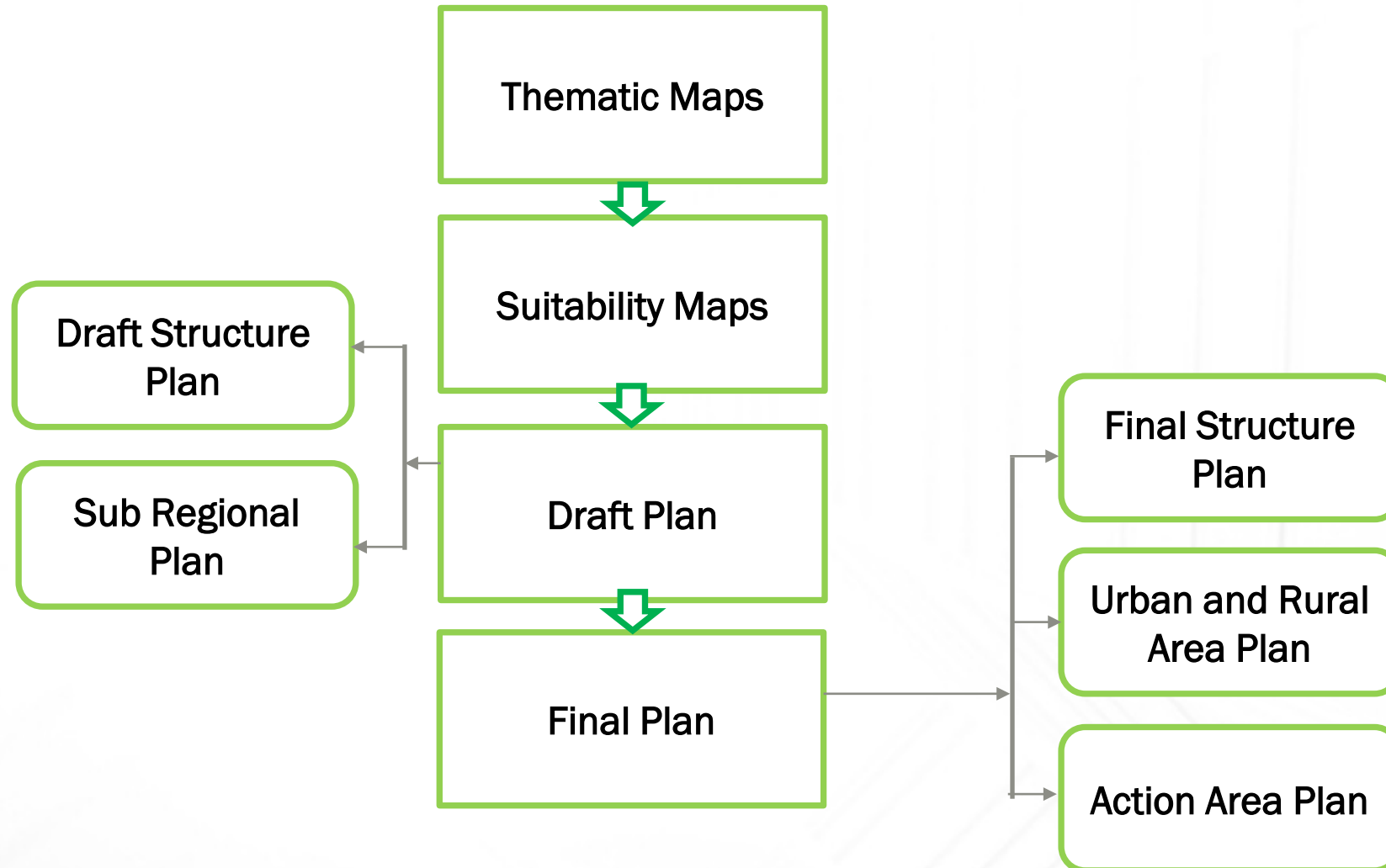


DRAFT PLANNING PHASE OF FIVE TIER PLAN

PREPARATION OF FIVE TIER PLAN

- ☐ Sub-Regional Plan
- ☐ Structure Plan
- ☐ Urban Area Plan
- ☐ Rural Area Plan
- ☐ Action Area Plan

WORKING PROCESS OF FIVE TIER PLAN

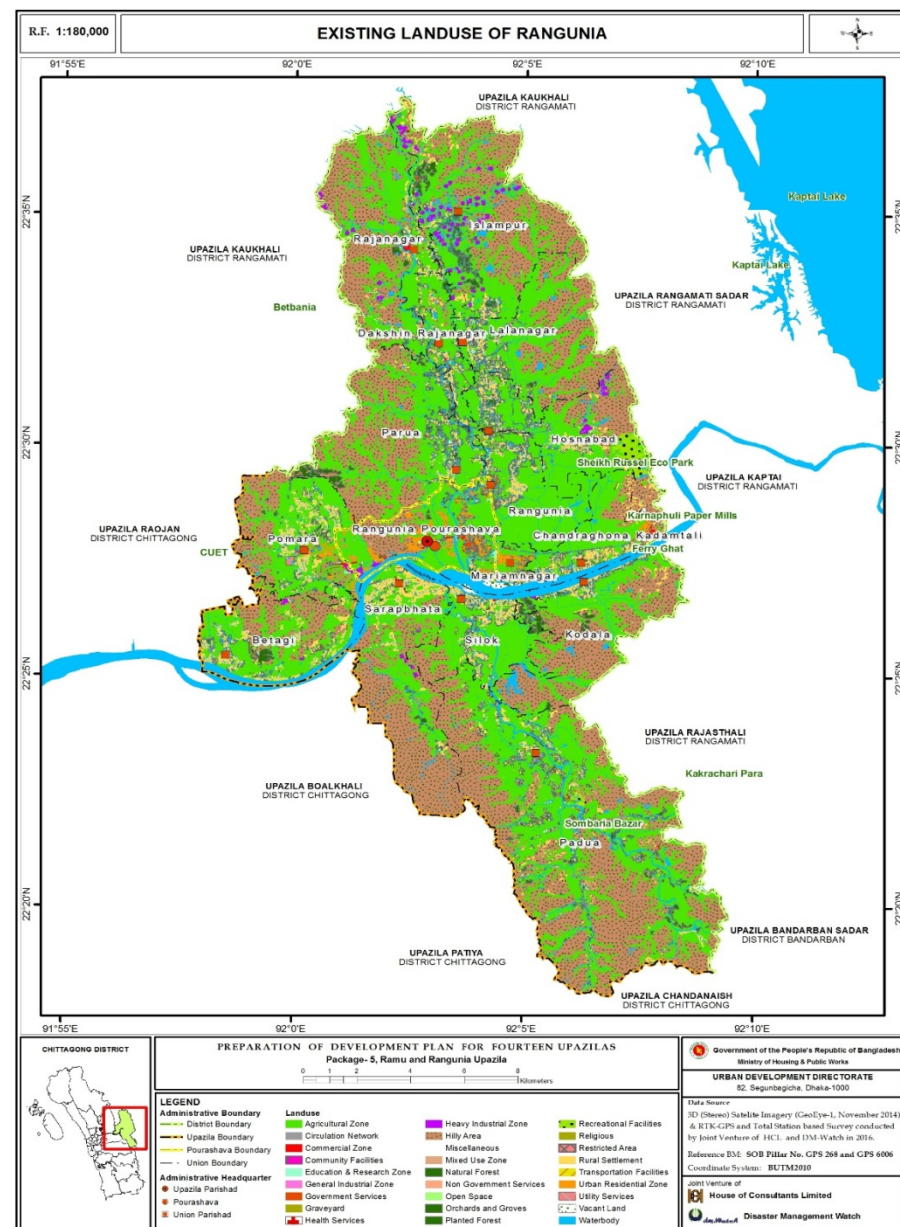


The background of the slide features a high-angle, black and white photograph of a modern building's exterior. The building has a complex, geometric design with a prominent glass facade that reflects the sky. The lines of the building's structure create a sense of depth and perspective. A solid blue horizontal bar is positioned across the middle of the image, containing the title text in white.

THEMATIC MAPS

EXISTING LANDUSE MAP

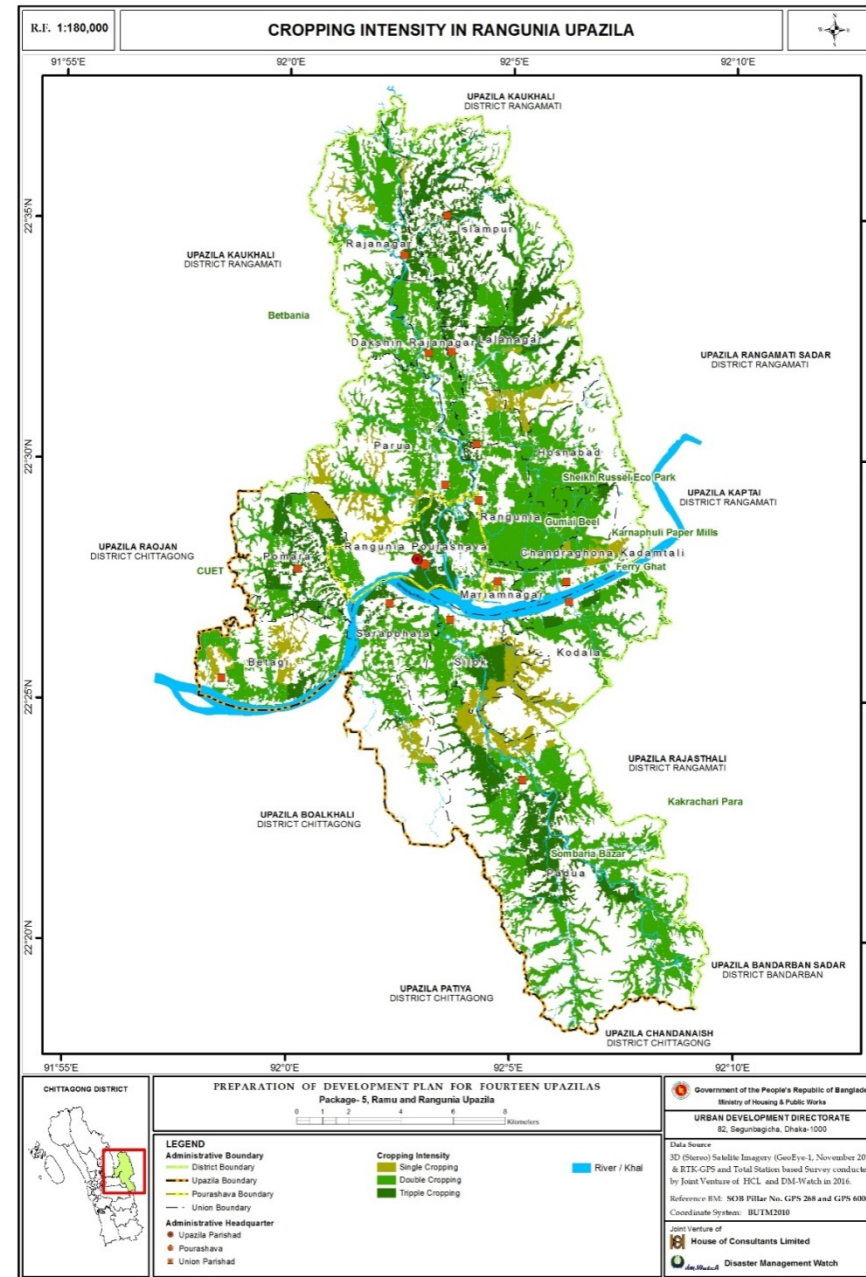
| Existing Landuse | Area in Sq.m | Area in Sq.km | Area in Acre | Percentage |
|---------------------------|---------------|---------------|--------------|------------|
| Agricultural Zone | 152862887.810 | 152.863 | 37773.242 | 43.94 |
| Commercial Zone | 1027124.875 | 1.027 | 253.808 | 0.30 |
| Community Facilities | 72822.257 | 0.073 | 17.995 | 0.02 |
| Education & Research Zone | 505751.451 | 0.506 | 124.974 | 0.13 |
| General Industrial Zone | 33520.834 | 0.034 | 8.283 | 0.01 |
| Government Services | 180141.230 | 0.180 | 44.514 | 0.05 |
| Graveyard | 362683.843 | 0.363 | 89.621 | 0.10 |
| Health Services | 24620.423 | 0.025 | 6.084 | 0.01 |
| Heavy Industrial Zone | 2336319.504 | 2.336 | 577.317 | 0.67 |
| Hilly Area | 125385495.804 | 125.385 | 30983.431 | 36.04 |
| Miscellaneous | 2715.130 | 0.003 | 0.671 | 0.00 |
| Mixed Use Zone | 244225.692 | 0.244 | 60.349 | 0.07 |
| Natural Forest | 5878452.103 | 5.878 | 1452.597 | 1.69 |
| Non-Government Services | 997.820 | 0.001 | 0.247 | 0.00 |
| Open Space | 143969.470 | 0.144 | 35.576 | 0.04 |
| Orchards and Groves | 7938794.084 | 7.939 | 1961.719 | 2.28 |
| Planted Forest | 1364161.216 | 1.364 | 337.092 | 0.39 |
| Recreational Facilities | 1573313.330 | 1.573 | 388.774 | 0.45 |
| Religious | 481867.827 | 0.482 | 119.072 | 0.14 |
| Restricted Area | 32961.768 | 0.033 | 8.145 | 0.01 |
| Rural Settlement | 18652541.111 | 18.653 | 4609.143 | 5.36 |
| Transportation Facilities | 6599.796 | 0.007 | 1.631 | 0.00 |
| Urban Residential Zone | 3725652.153 | 3.726 | 920.629 | 1.07 |
| Utility Services | 156199.608 | 0.156 | 38.598 | 0.04 |
| Vacant Land | 589929.545 | 0.590 | 145.775 | 0.17 |
| Waterbody | 24281900.149 | 24.282 | 6000.188 | 6.98 |
| Total | 347865648.832 | 347.866 | 85959.474 | 100 |



Source: Prepared by Consultant Team Based on Field Survey, 2016

CROPPING INTENSITY MAP

| Cropping Pattern | Area in Sq.m | Area in Sq.km | Percentage |
|------------------|--------------|---------------|------------|
| Single Cropping | 16944338.06 | 16.94433806 | 11.18 |
| Double Cropping | 98836278.79 | 98.83627879 | 65.22 |
| Triple Cropping | 35758450.5 | 35.7584505 | 23.60 |
| Total | 151539067.3 | 151.5390673 | 100 |



Source: Prepared by Consultant Team Based on Field Survey, 2016

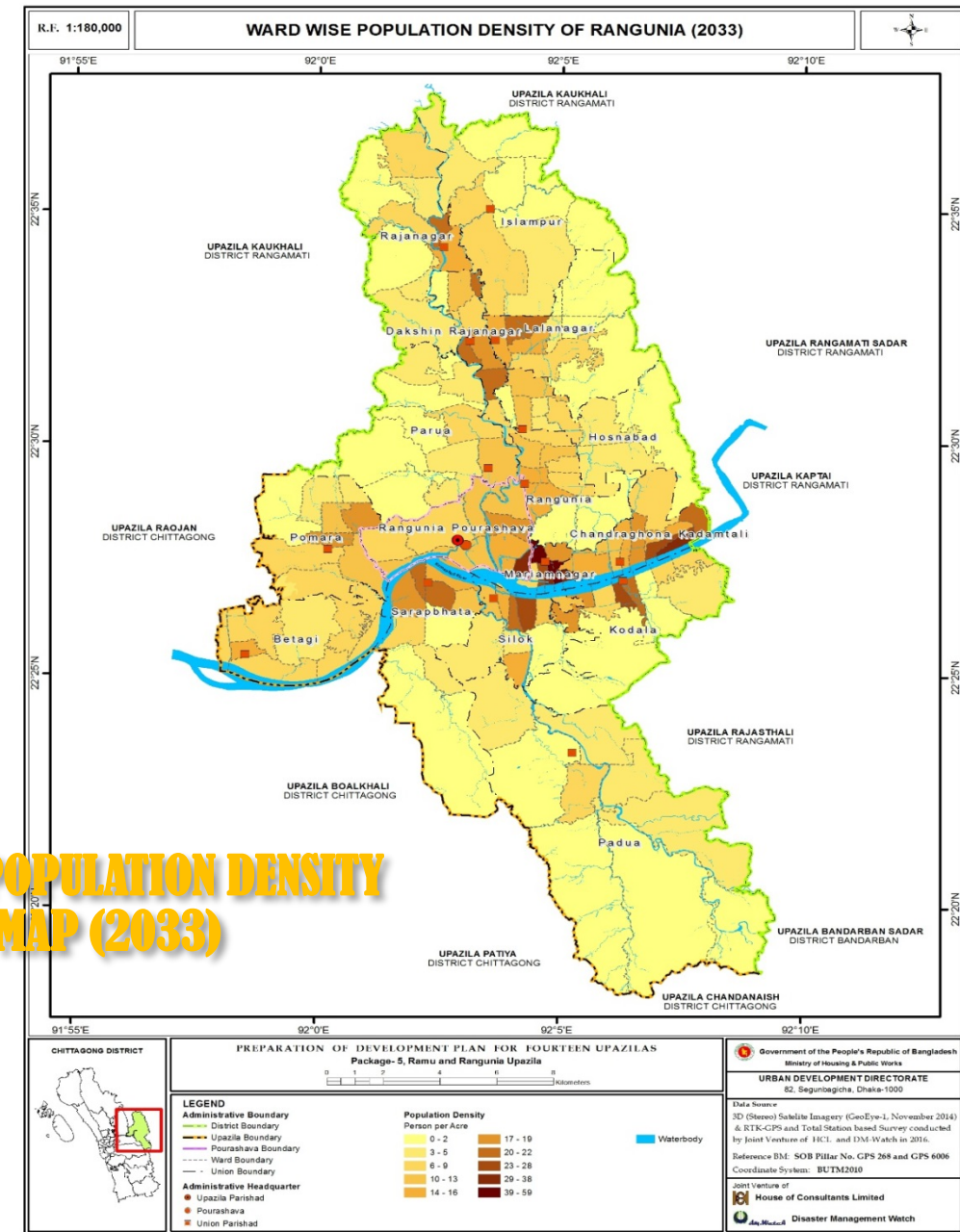
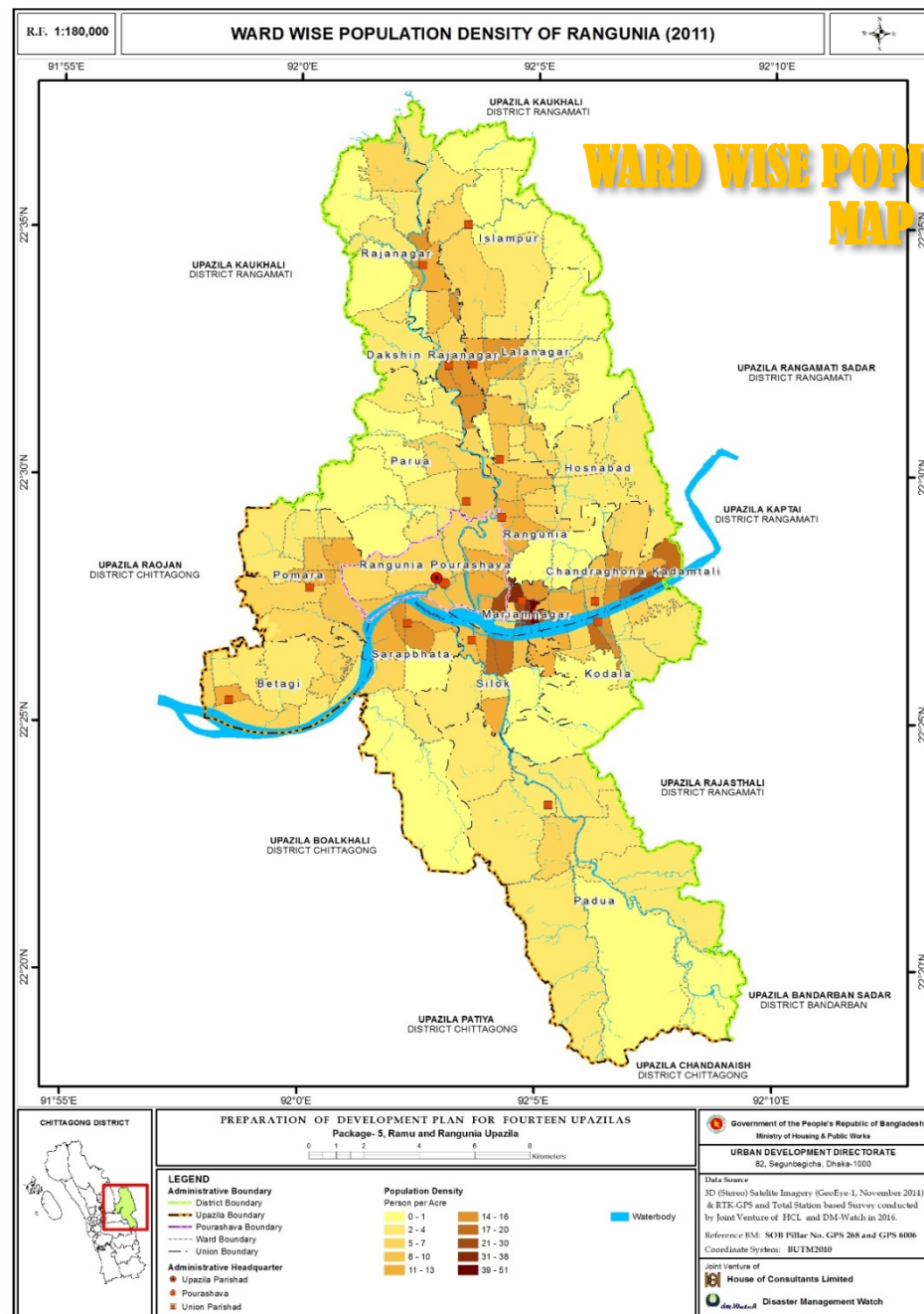
EXISTING STRUCTURAL INFORMATION

STRUCTURE TYPE

| Structure Type | No. of Structures |
|----------------|-------------------|
| Katcha | 30327 |
| Pucca | 10509 |
| Semi Pucca | 14205 |
| Total | 55041 |

STRUCTURE USE

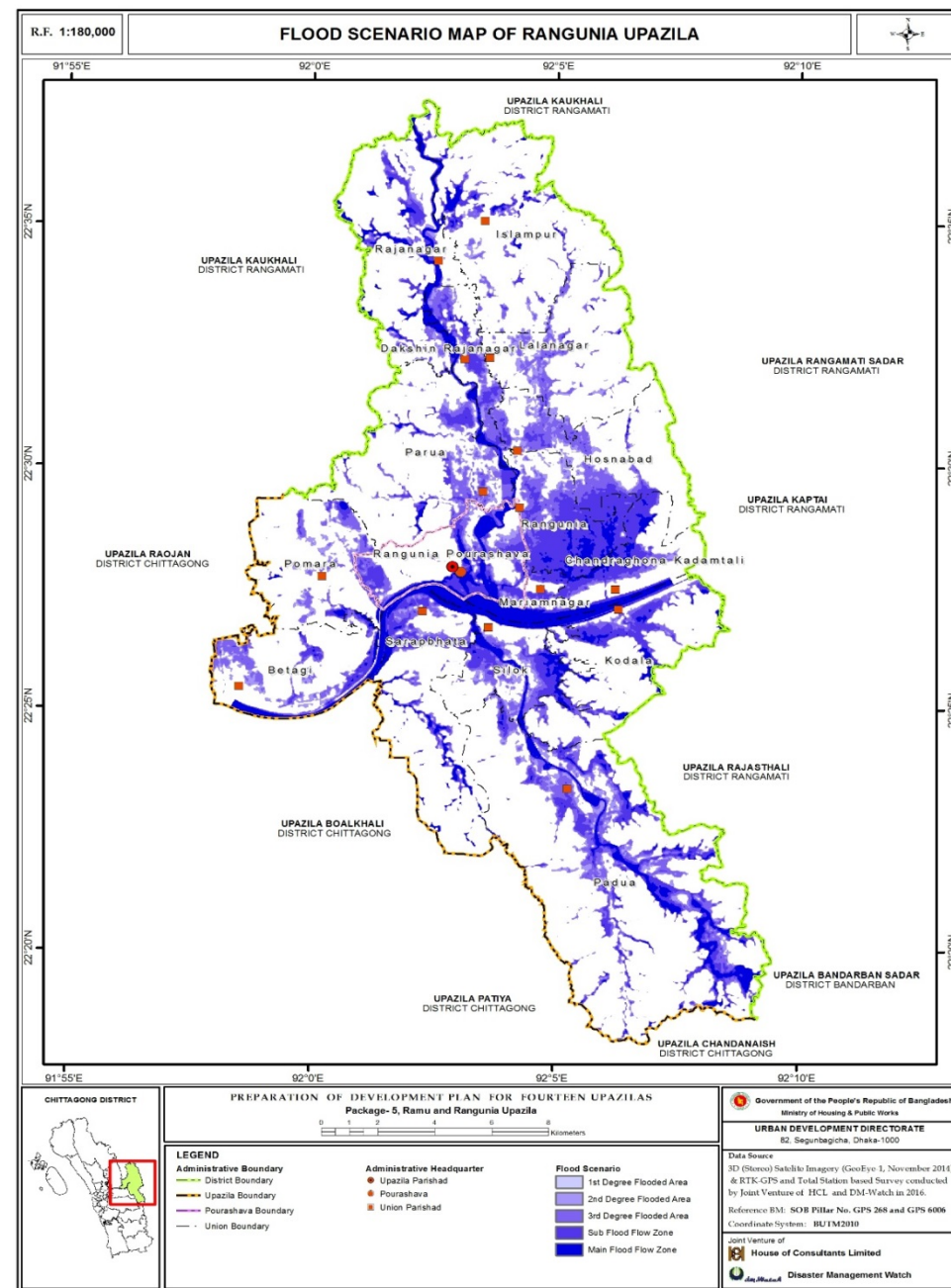
| Structure Use | No. of Structures |
|---------------------------|-------------------|
| Agricultural | 747 |
| Commercial | 3434 |
| Community Facilities | 45 |
| Education and Research | 663 |
| General Industrial | 107 |
| Government Services | 102 |
| Health Services | 46 |
| Heavy Industrial | 30 |
| Miscellaneous | 757 |
| Mixed Use | 65 |
| Non-Government Services | 14 |
| Open Space | 23 |
| Recreational Facilities | 3 |
| Religious | 971 |
| Residential | 47921 |
| Transportation Facilities | 57 |
| Utility Services | 56 |



Source: Prepared by Consultant Team Based on Field Survey, 2016

FLOOD SCENARIO MAP

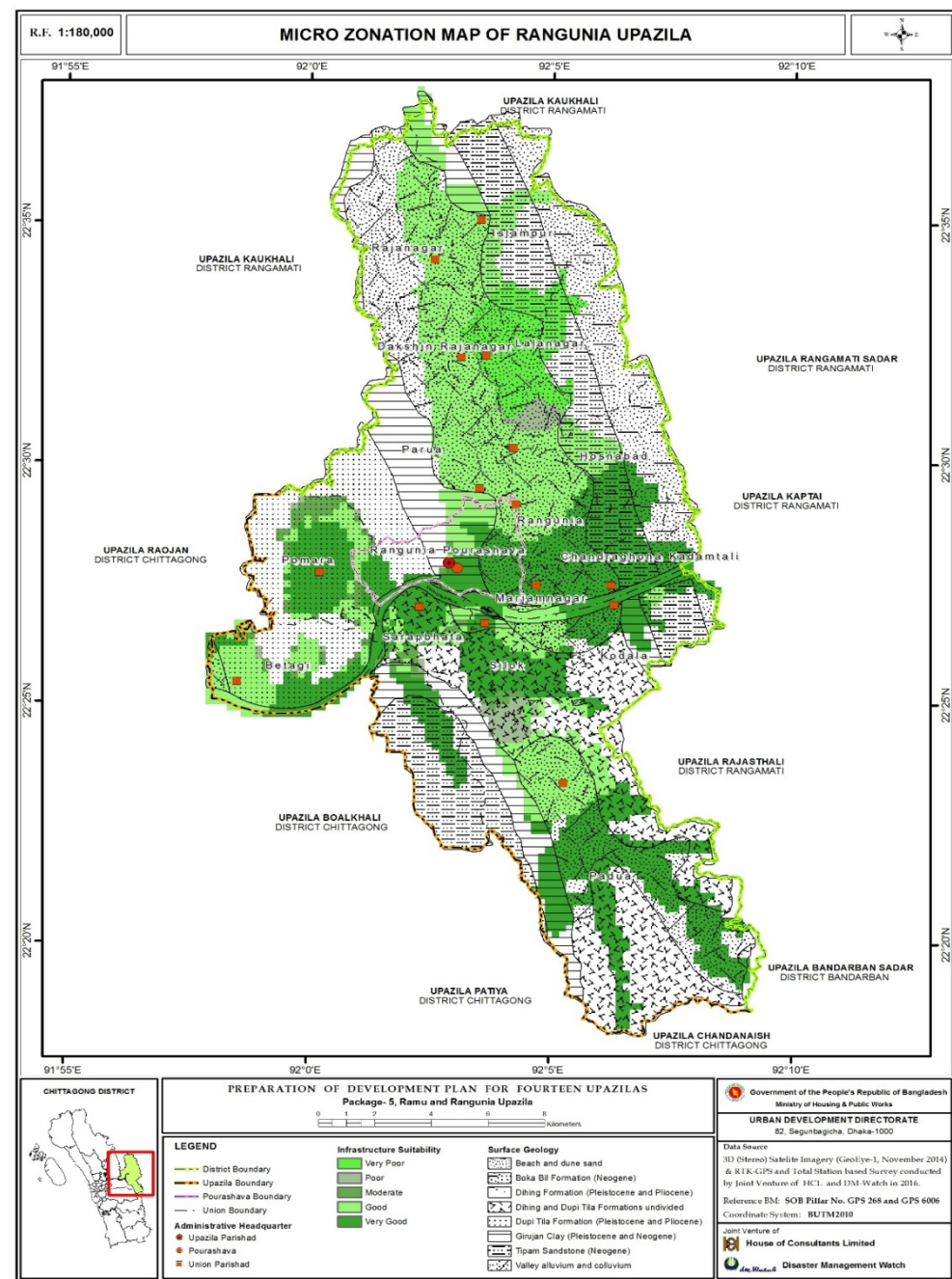
| Different Flooding Scenario | | | | | | |
|-----------------------------|------------------|-------------|--------------|-------------|------------|----------------------|
| Flooded Land Category | Water Height (m) | Area (sq.m) | Area (sq.km) | Area (Acre) | Percentage | Remarks |
| 1st Degree Flooded area | 0-0.3 | 400 | 0.00 | 0.10 | 0.0003 | |
| 2nd Degree Flooded area | 0.3-0.9 | 2140650 | 0 | 5289.6 | 18.5132 | |
| 3rd Degree Flooded area | 0.9-1.8 | 3506250 | 0 | 8664.1 | 30.3234 | |
| 4th Degree Flooded area | 1.8-3.6 | 3536710 | 0 | 8739.4 | 30.5868 | Sub Flood Flow Zone |
| 5th Degree Flooded area | >3.6 | 2379200 | 0 | 5879.1 | 20.5762 | Main Flood Flow Zone |
| Total | | 115628500 | 115.63 | 28572.42 | 100.00 | |



Source: Prepared by Consultant Team Based on Field Survey, 2016

MICRO ZONATION MAP

| Infrastructure Suitability | Subsurface Sediments | Infrastructure foundation suitability | Suggested land use suitability |
|----------------------------|--|--|--|
| Very Good | Tipam Sandstone (Neogene), Dupi Tila Formation (Pleistocene and Pliocene), | 4-6 story light infrastructure is suitable with a foundation depth of up to 2 m. Large and tall infrastructure requires pile foundation placed on Soil layer no 4. | Commercial area Residential area Industrial zone |
| Good | Dihing and Dupi Tila Formations undivided | 4-6 story light infrastructure is suitable in Dupitila Formation. General foundation depth is within 5 m, at places higher Large and tall infrastructure requires pile foundation placed on layer no 4 | Commercial area Residential area Industrial zone |
| Moderate | Dihing Formation (Pleistocene and Pliocene) | 4-6 story light infrastructure requires on-site subsoil investigation and proper foundation design. Deep pile foundation is needed for large and tall infrastructure | Industrial zone Residential area Commercial area Agricultural Zone Park and Recreation |
| Poor | Girujan Clay (Pleistocene and Neogene) | Detail subsoil investigation and proper foundation design is required for all types of infrastructure, due to low bearing capacity with hazard potential. | Agricultural zone Flood flow zone Wetland Rural settlement Park and Recreation |
| Very Poor | Valley alluvium and colluviums. Mainly silty clay, with alternate layers of Organic clay and peat. Thickness is more than 10 m. In low floodplain areas less organic layers can be expected. | Detail subsoil investigation for deep pile foundation is essential, due to very low bearing capacity and high hazard potential. Shallow foundation is not preferred. | Agricultural zone Flood flow zone Wetland Rural settlement Park and Recreation |

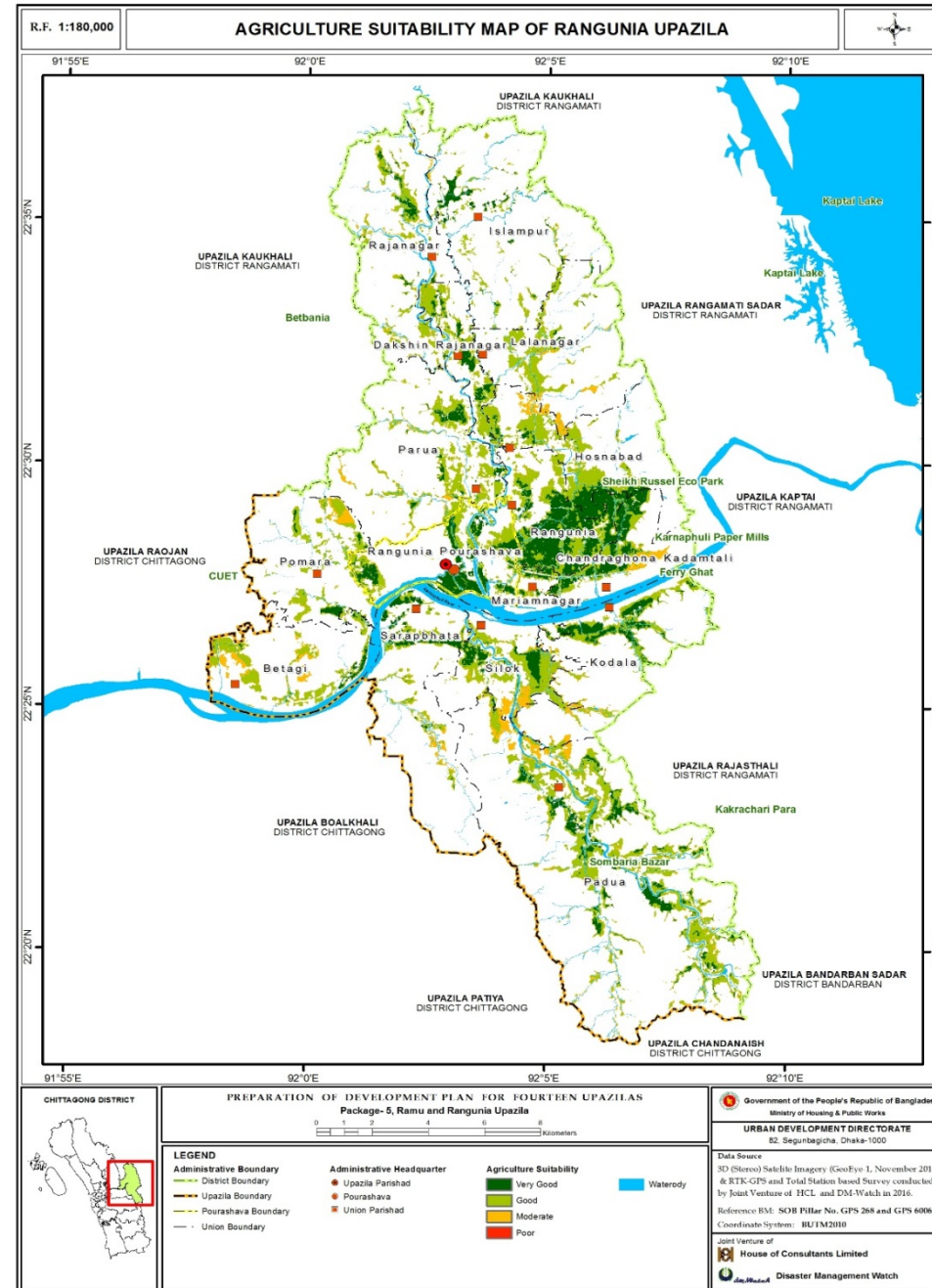


Source: Prepared by Consultant Team Based on Field Survey, 2016



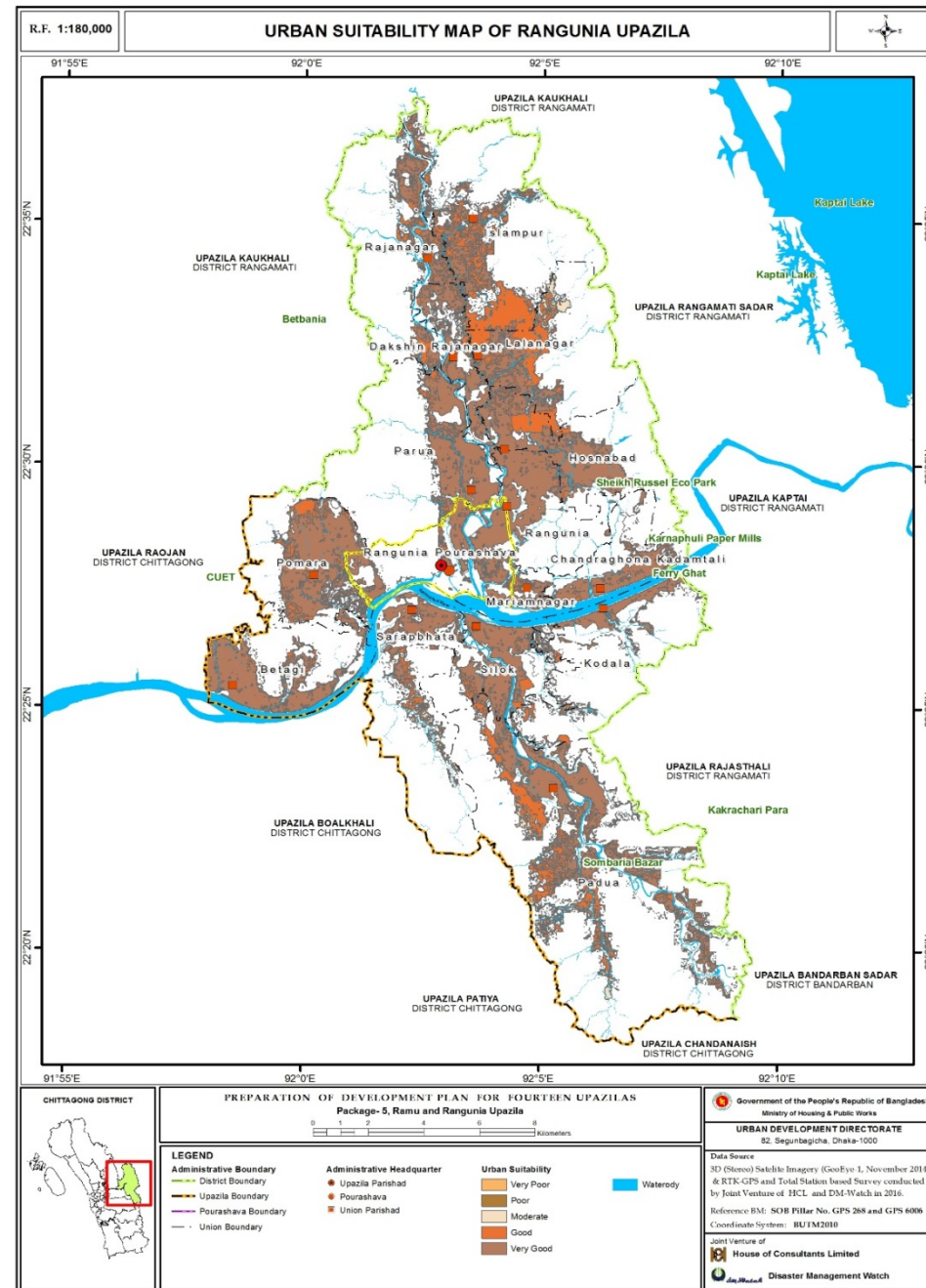
SUITABILITY MAPS

SUITABLE AREA FOR AGRICULTURE



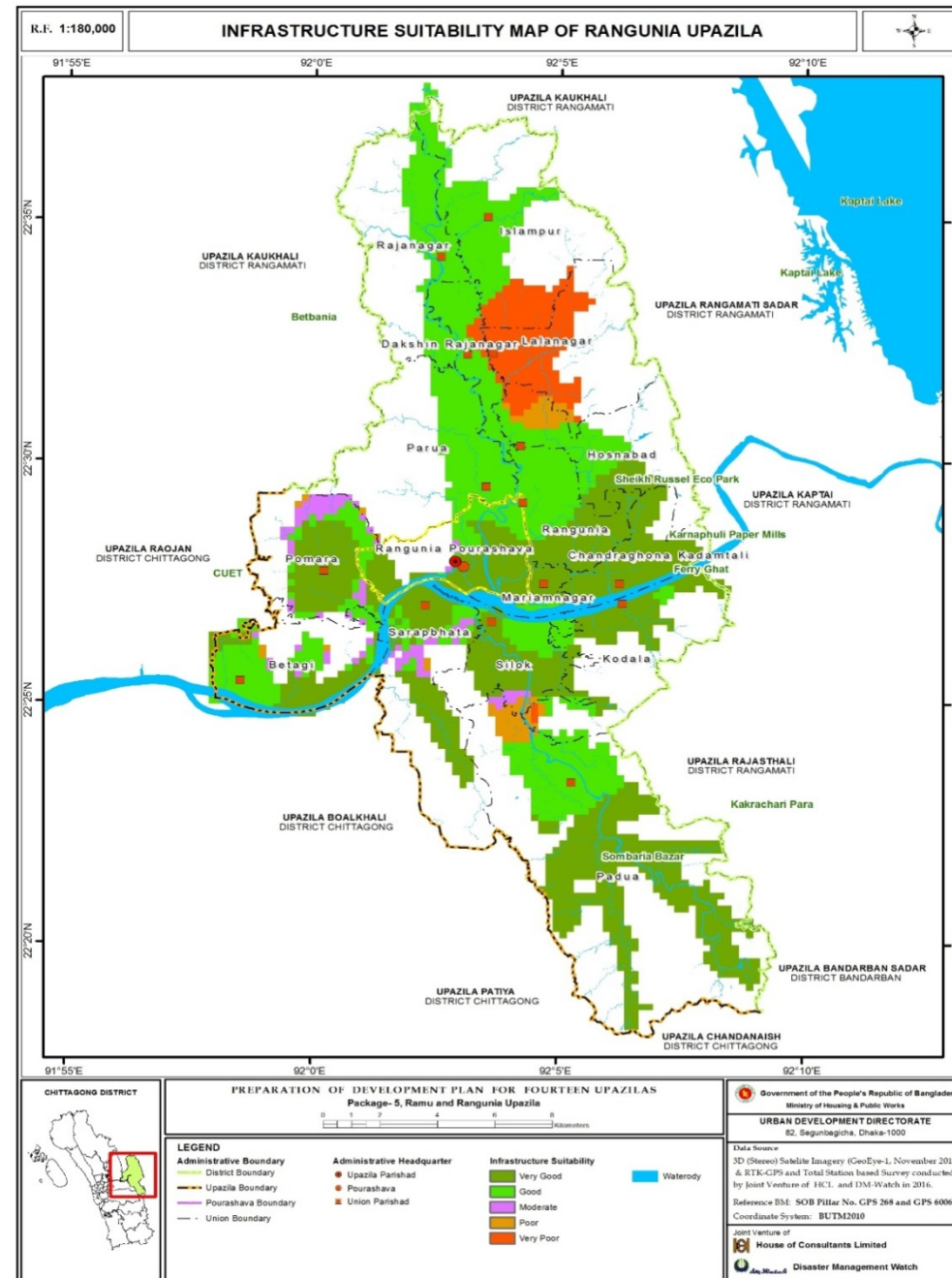
Source: Prepared by Consultant Team Based on Field Survey, 2016

SUITABLE URBAN AREA MAP



Source: Prepared by Consultant Team Based on Field Survey, 2016

SUITABLE AREA FOR INFRASTRUCTURE



Source: Prepared by Consultant Team Based on Field Survey, 2016

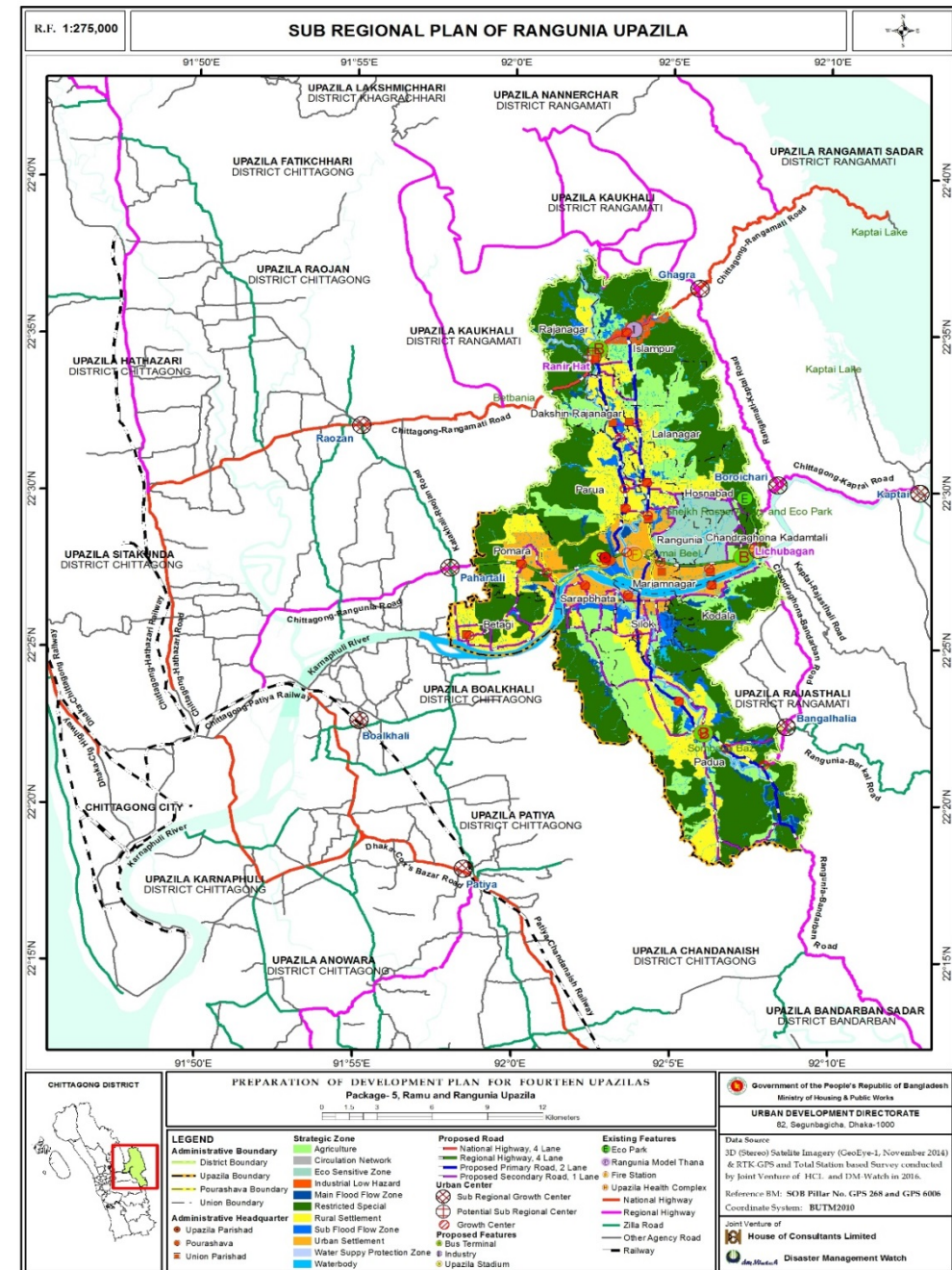
The background of the slide features a high-angle, black and white photograph of a modern building's exterior. The building has a complex, geometric design with a prominent glass facade that reflects the sky. The lines of the building's structure create a sense of depth and perspective. A solid blue horizontal bar is positioned across the middle of the image, containing the text "SUBREGIONAL PLAN" in white, bold, sans-serif capital letters.

SUBREGIONAL PLAN

SUB REGIONAL PLAN

Components of Sub-regional Plan

- ☐ Connectivity and Transportation Network
- ☐ Biodiversity and Nature Conservation
- ☐ Community Resilience through Disaster Management



Source: Prepared by Consultant Team Based on Field Survey, 2016

SUB REGIONAL PLAN

Policies for Sub-regional Planning

Connectivity and Transportation Network

Policy 1: Prioritize inter- (Zila-Upazila/Upazila-Upazila) and intra- (Urban-Rural-GC) regional connectivity.

Policy 2: Accelerate high standard road links through widening of primary and secondary and construction of new tertiary roads.

Policy 3: Build an integrated (land, rail and water) transportation network.

Biodiversity and Nature Conservation

Policy 1: Conserve natural/environmental resources like hills, reserve forests and water bodies.

Policy 2: Conserve ecosystem through the delineation or demarcation of eco-sensitive zones.

Policy 3: Execute land use planning for the enhancement of ecosystem and species diversity.

Community Resilience through Disaster Management

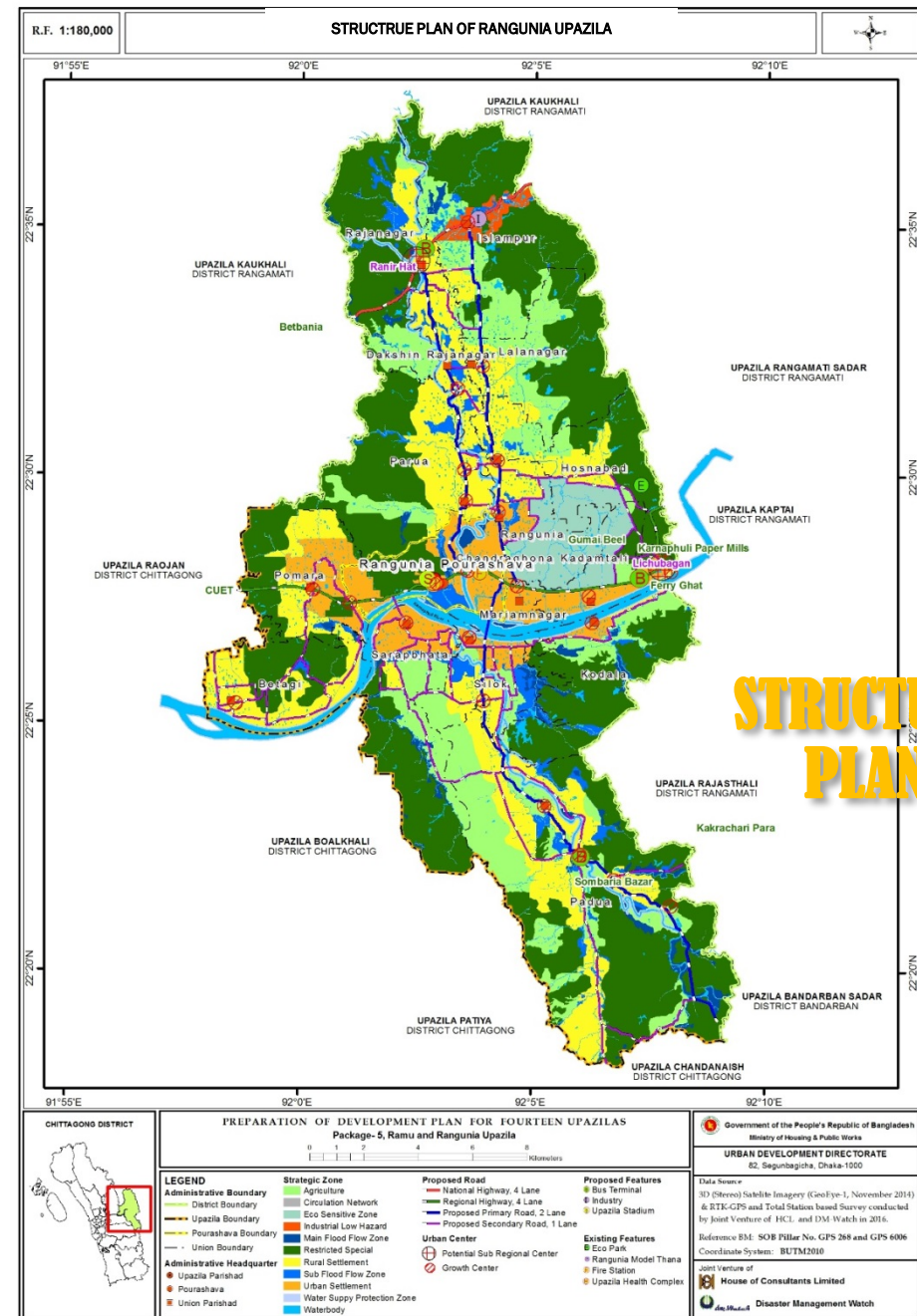
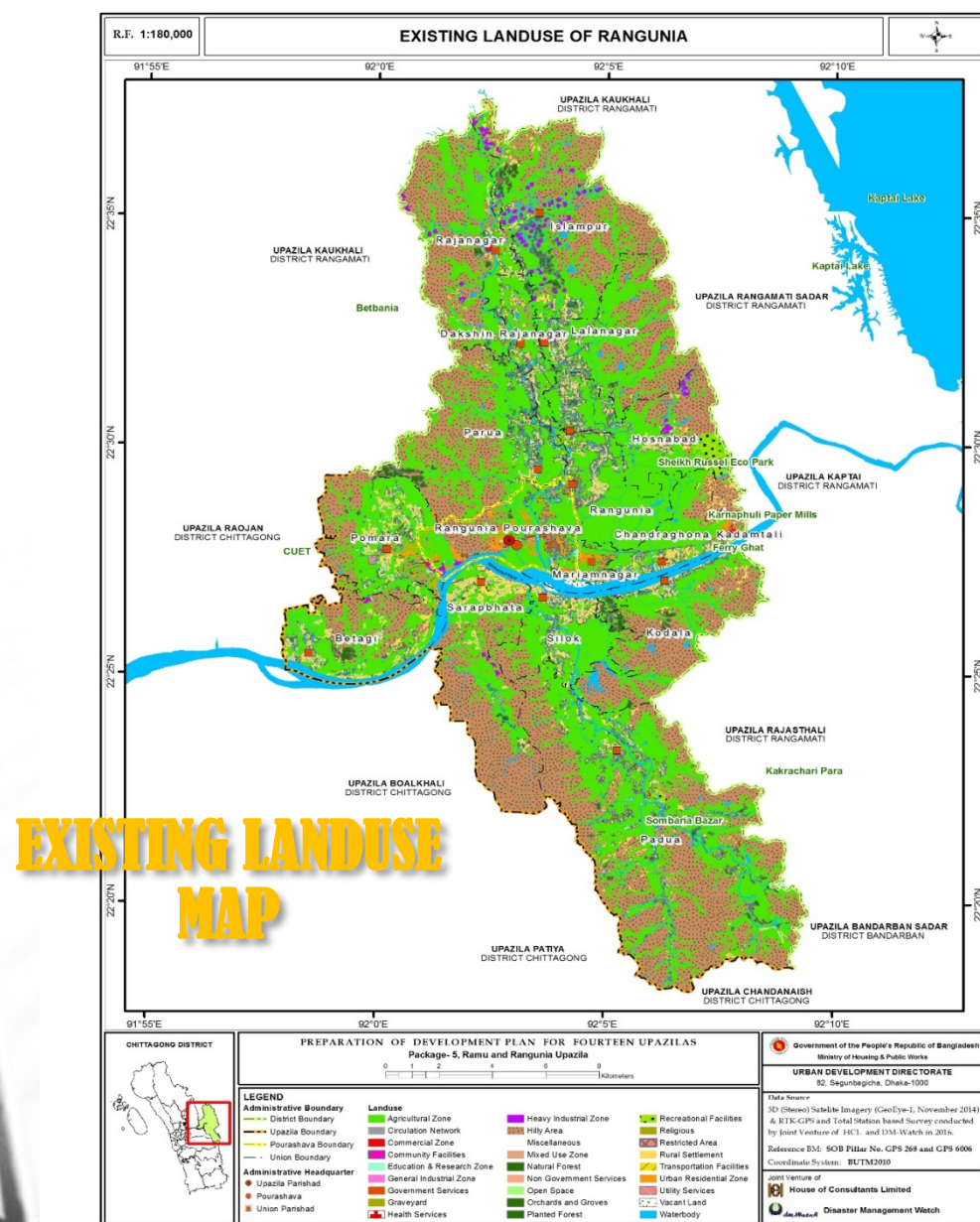
Policy 1: Identification of seismic hazard prone zones.

Policy 2: Identification of flood hazard prone zones and river erosion areas.

Policy 3: Provision and implementation of a risk sensitive land use planning.



STRUCTURE PLAN



Source: Prepared by Consultant Team Based on Field Survey, 2016

STRUCTURE PLAN

| Zoning | Area(sq.meter) | Area(sq.km) | Area(Acre) | Percentage |
|------------------------------|----------------|-------------|-----------------|------------|
| Agriculture | 49115452 | 49.115452 | 12136.6925 | 14.12 |
| Circulation Network | 2511658 | 2.511658 | 620.644208 2 | 0.72 |
| Eco sensitive | 13362467 | 13.362467 | 3301.93750 5 | 3.84 |
| Grey Zone | 2369117 | 2.369117 | 585.42156 | 0.68 |
| Main Flood Flow Zone | 6466736 | 6.466736 | 1597.965266 | 1.86 |
| Restricted Special | 138811711 | 138.8117109 | 34301.12078 | 39.90 |
| Rural Settlement | 61211028 | 61.211028 | 15125.57442 | 17.60 |
| Sub Flood Flow Zone | 10820750 | 10.82075 | 2673.86555 7 | 3.11 |
| Urban Settlement | 25012196 | 25.012196 | 6180.64823 4 | 7.19 |
| Water Supply Protection Zone | 31300583 | 31.300583 | 7734.54250 2 | 9.00 |
| Water Body | 6883951 | 6.883951 | 1701.061338 | 1.98 |
| Total | 347865648.9 | 347.8656489 | 85959.4738 8 | 100.00 |



URBAN AREA PLAN

PROPOSED FEATURES FOR URBAN AND RURAL AREA PLAN

| Rural/Union | Urban/Built up Area | Upazila |
|---|--|--|
| <ul style="list-style-type: none"> ➤ Growth Center ✓ Wholesale Market ✓ Retail Market ✓ CNG/Tempo/Auto Rickshaw /Rickshaw Stand ➤ Primary School/Kindergarten ➤ High School ➤ Health Center/Maternity Clinic ➤ Play Ground/Field ➤ Eidgah ➤ Graveyard ➤ Mosque/Pagoda/Temple ➤ Community Center ➤ Post Office ➤ Electric Substation ➤ Small Scale Industry | <ul style="list-style-type: none"> ➤ Primary School/Kindergarten ➤ High School ➤ College ➤ Neighborhood Park ➤ Play Ground/Field ➤ Health Center/Maternity Clinic ➤ Mosque/Pagoda/Temple ➤ Eidgah ➤ Graveyard ➤ Community Center ➤ Post Office ➤ Water Reservoir ➤ Waste Secondary Transfer Station ➤ Electric Substation ➤ Wholesale Market ➤ Retail Market | <ul style="list-style-type: none"> • Retail Trade Zone • Wholesale Trade Zone • Dairy Food Zone • Fruit processing Zone • Hi Tech Park • Hotel Motel Zone • Economic Zone • Poultry and Fish Processing Zone • Amusement park • IT Park • Low Income/Landless Affordable Housing • Stadium • Water Treatment Plant • Textile and Sweetmeat Zone • Bus Stand • Truck Stand and Freight Zone • Solid Waste Disposal • Botanical Garden • Tourist Zone • Eco Park • Auditorium/Cinema Hall • Monument |

PROPOSED FEATURES FOR UPAZILA

| Proposed Strategic Location | Union Name |
|----------------------------------|--|
| Upazila Stadium | Paurashava |
| Bus Terminal | Lichu Bagan, Chandraghona Kadamtali |
| Bus Terminal | Ranirhat, Rajanagar |
| Bus Terminal | Rajarhat, Padua |
| Truck Terminal | Lichu Bagan, Chandraghona Kadamtali |
| Bus Terminal | Dhamair hat, Lalanagar |
| Affordable Housing | Chandroghona |
| Wholesale Trade Zone | Chandraghona Kadamtali |
| Food Processing Zone | Chandraghona |
| Hotel Motel Zone | Chandraghona |
| Bus Stand | Pourashava |
| Industrial Zone | Islampur |
| Amusement Park | Paurashava |
| Truck Stand | Paurashava |
| Auditorium/Cinema Hall | Paurashava |
| Monument | Paurashava |
| Retail Trade Zone | Paurashava |
| Poultry and Fish Processing Zone | Pomra |
| Water Treatment Plant | Islampur |
| Sludge Treatment Plant | Parua |
| Monument | Chandraghona |
| Monument | Hosnabad |
| Monument | Mariamnagar |
| Eco park | Padua |
| Wild Life Sanctuary | Padua |

PROPOSED IMPORTANT FEATURES FOR UPAZILA

| Union | Ward | Type |
|-------------|------|-------------------------|
| Betagi | 2 | Proposed Primary School |
| Mariamnagar | 1 | |

| Union | Ward | Type |
|-------------|------|------------------------------|
| Sorapbhata | 7 | Proposed Neighborhood Market |
| Mariamnagar | 1 | |
| Paurashava | 4 | |

| Union | Ward | Type |
|-------------------|------|----------------------|
| Betagi | 3 | Proposed High School |
| Chandraghona | 2 | |
| Mariamnagar | 5 | |
| Parua | 2 | |
| Rajanagar | 8 | |
| Shilok | 6 | |
| Dakshin Rajanagar | 2 | |
| Hosnabad | 1 | |

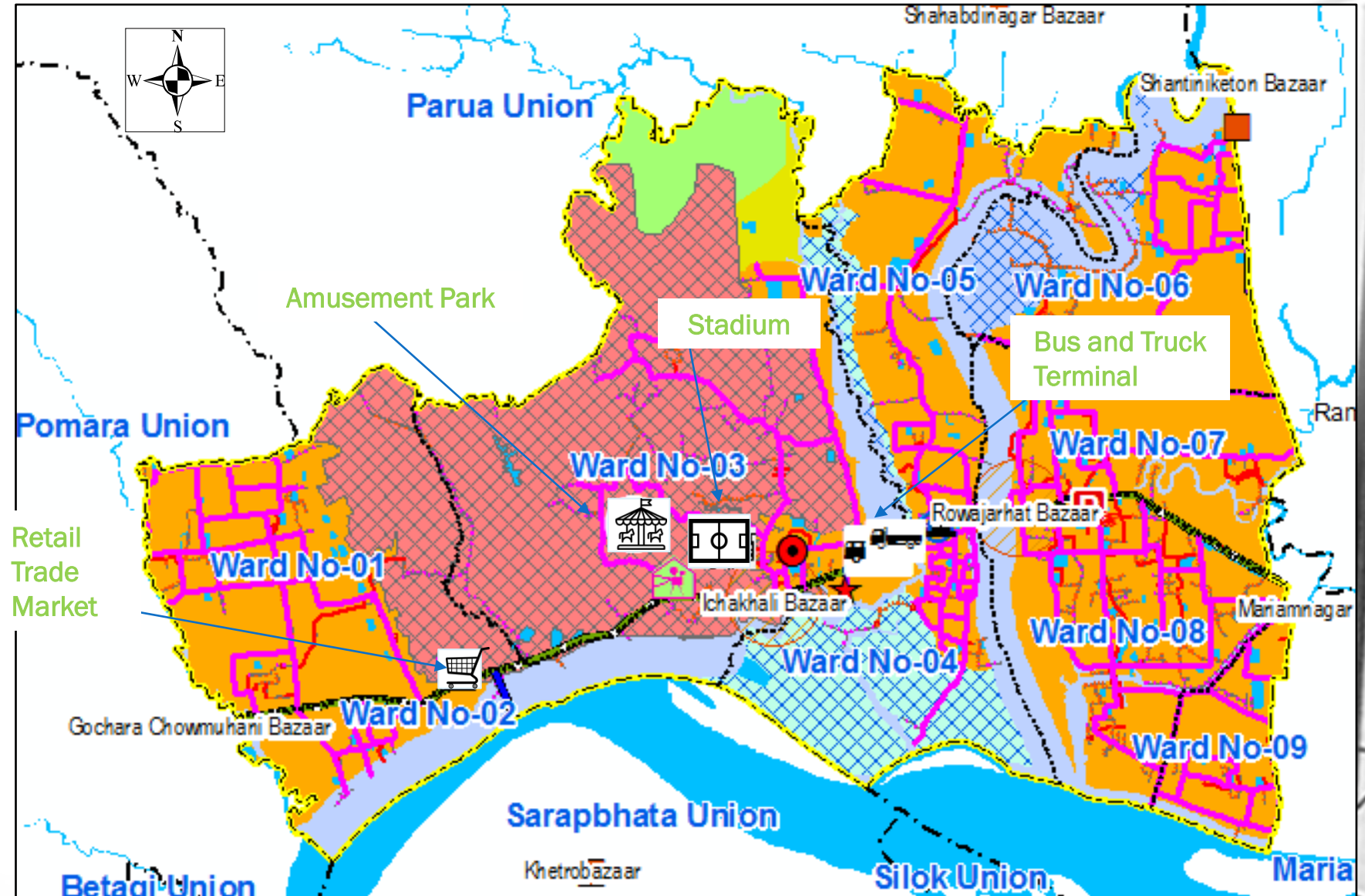
| Union | Ward | Type |
|-----------|------|-----------------|
| Padua | 4 | Proposed Clinic |
| Parua | 4 | |
| Pomra | 7 | |
| Rajanagar | 7 | |
| Silok | 8 | |
| Kodala | 4 | |

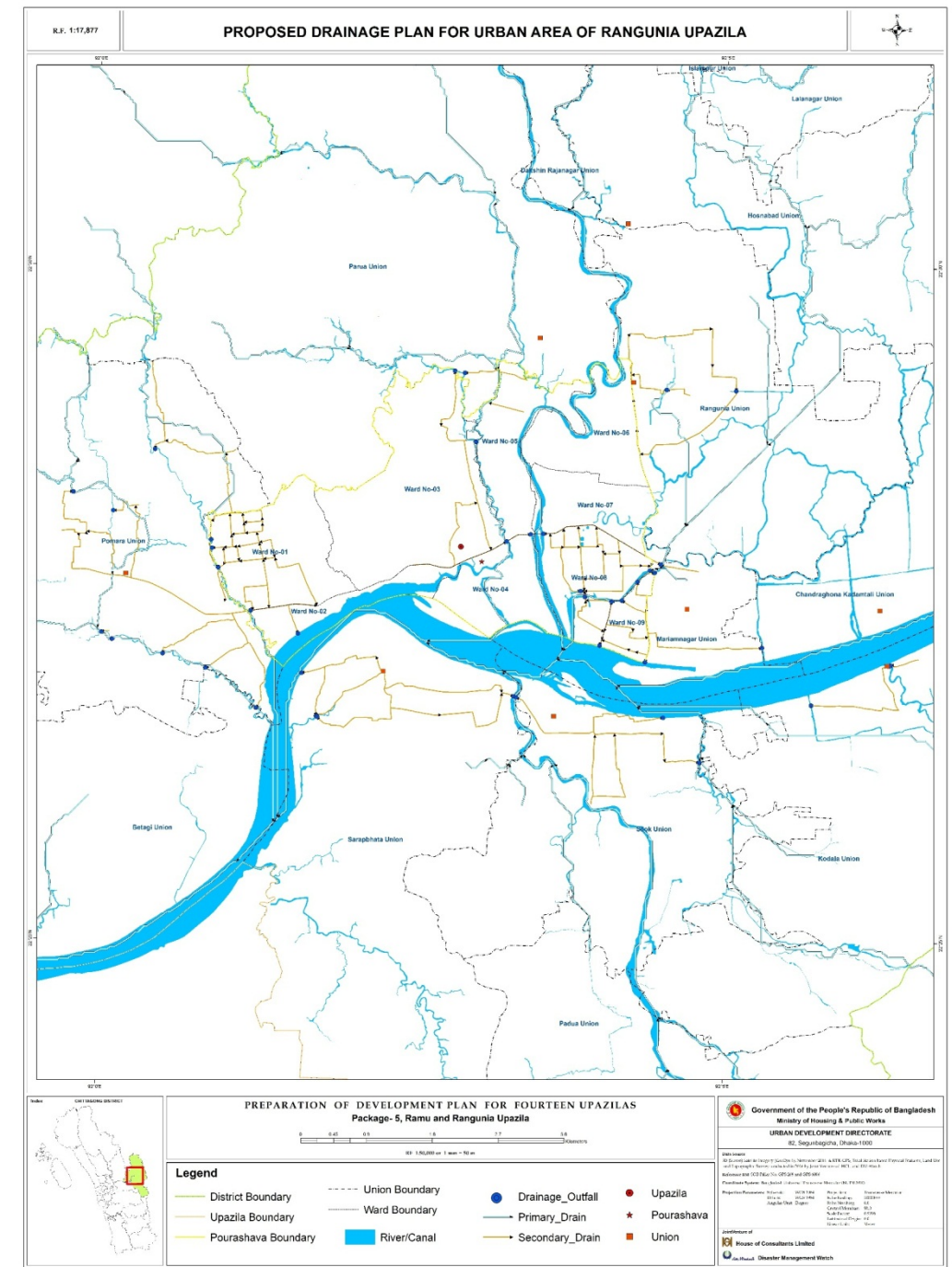
PROPOSED IMPORTANT FEATURES FOR UPAZILA

| Union | Ward | Type |
|-------------------|------|--------------------------|
| Betagi | 3 | Proposed Tempo/CNG Stand |
| Sorapbhata | 8 | |
| Mariamnagar | 9 | |
| Padua | 5 | |
| Padua | 8 | |
| Parua | 9 | |
| Parua | 9 | |
| Pomara | 6 | |
| Pomra | 8 | |
| Rajanagar | 8 | |
| Rangunia | 6 | |
| Silok | 4 | |
| Dakshin Rajanagar | 6 | |
| Islampur | 4 | |
| Kodala | 5 | |
| Lalanagar | 2 | |

| Union | Ward | Type |
|-------------------|------|--|
| Betagi | 7 | Proposed RSSC (Rural Sales and Service Center) |
| Padua | 8 | |
| Parua | 9 | |
| Pomra | 8 | |
| Dakshin Rajanagar | 7 | |
| Islampur | 4 | |
| Kodala | 5 | |

URBAN AREA PLAN

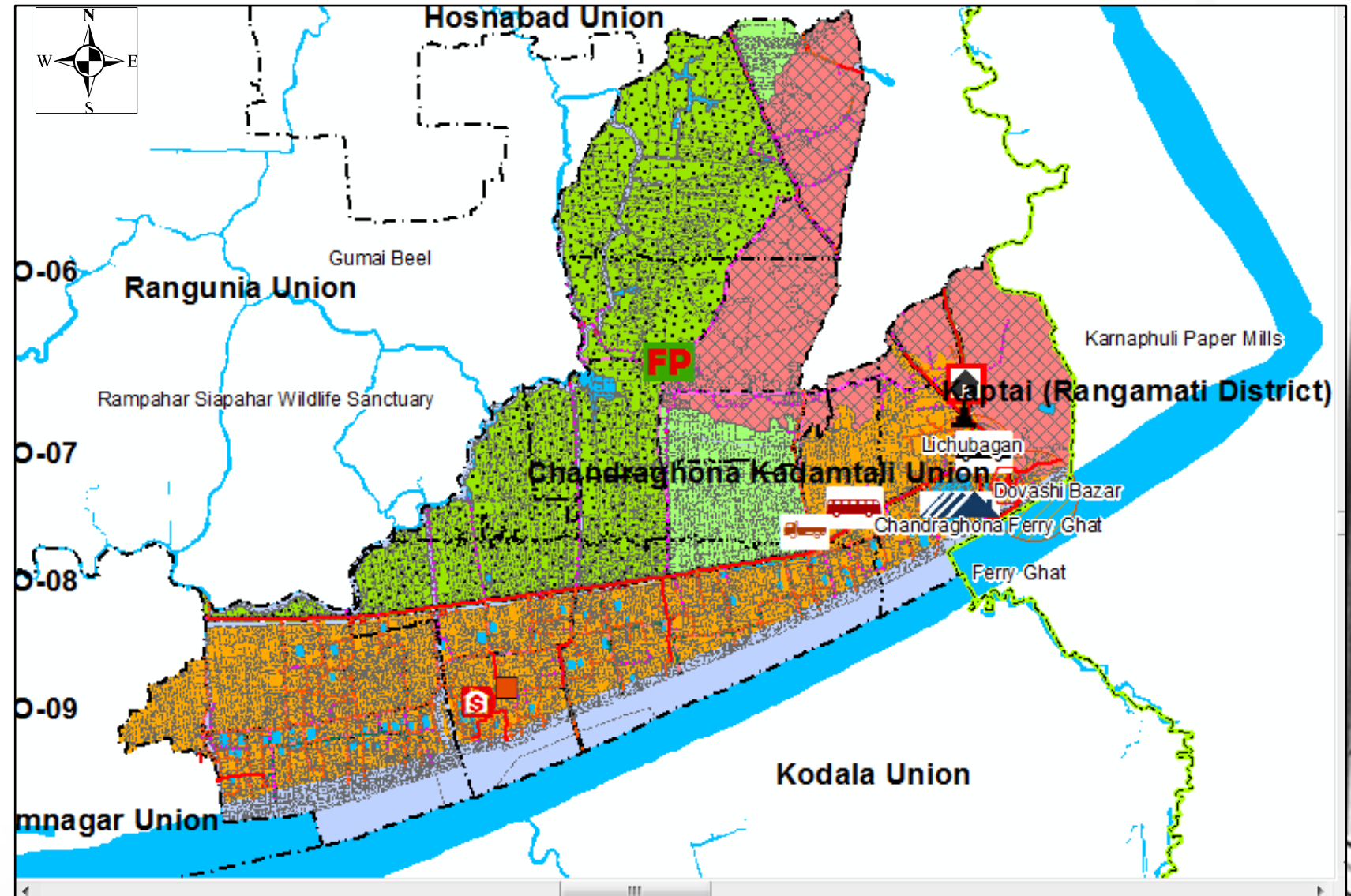
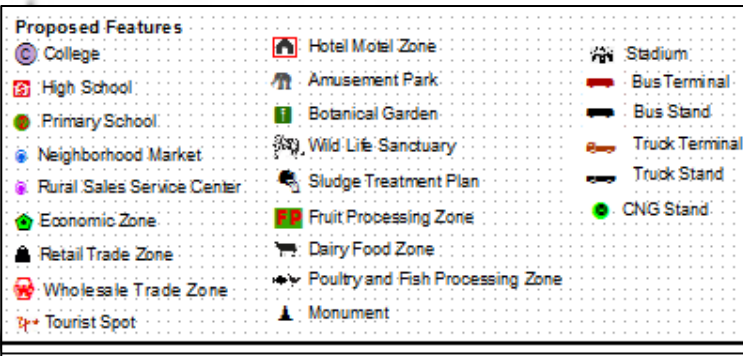




The background of the slide features a blurred, high-angle view of a modern building's interior. On the right side, a staircase with a glass railing is visible, leading downwards. The large glass windows of the building create a grid-like pattern of light and shadow across the scene.

RURAL AREA PLAN

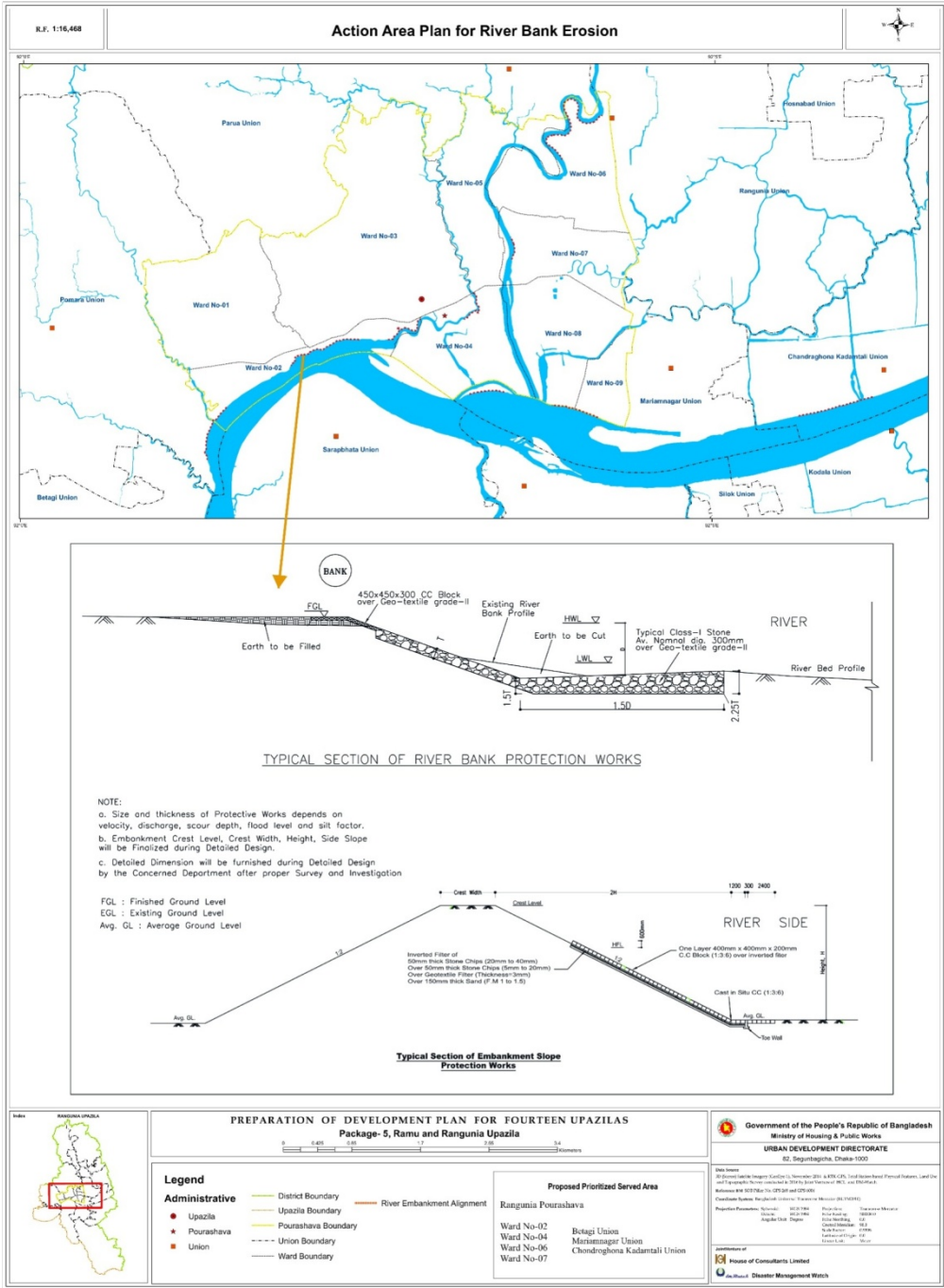
RURAL AREA PLAN

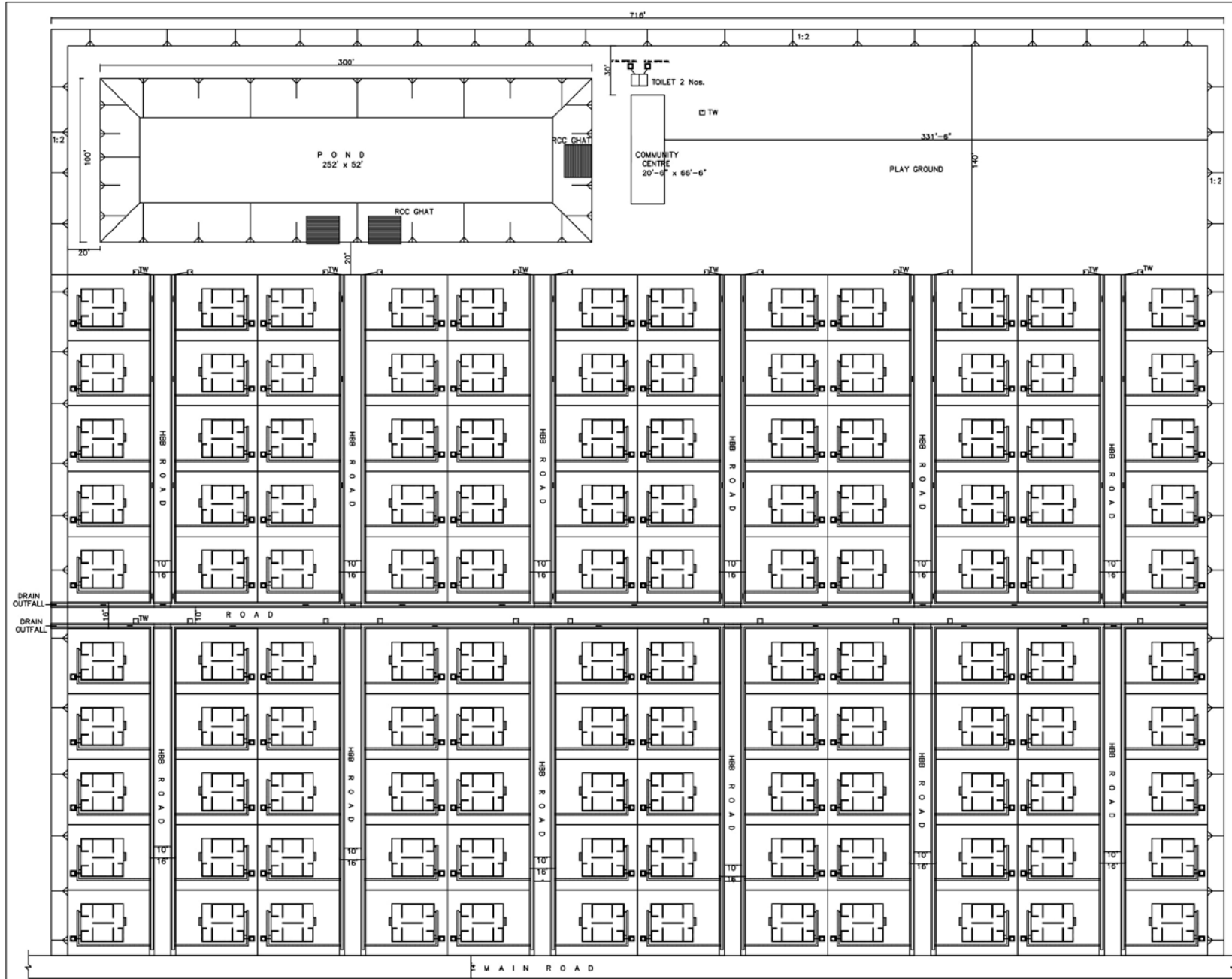


The background of the slide features a blurred, high-angle view of a modern building's glass and steel structure. A solid blue horizontal bar is positioned in the upper-middle section of the image, serving as a backdrop for the title text.

ACTION AREA PLAN

RIVER BANK EROSION PROTECTION



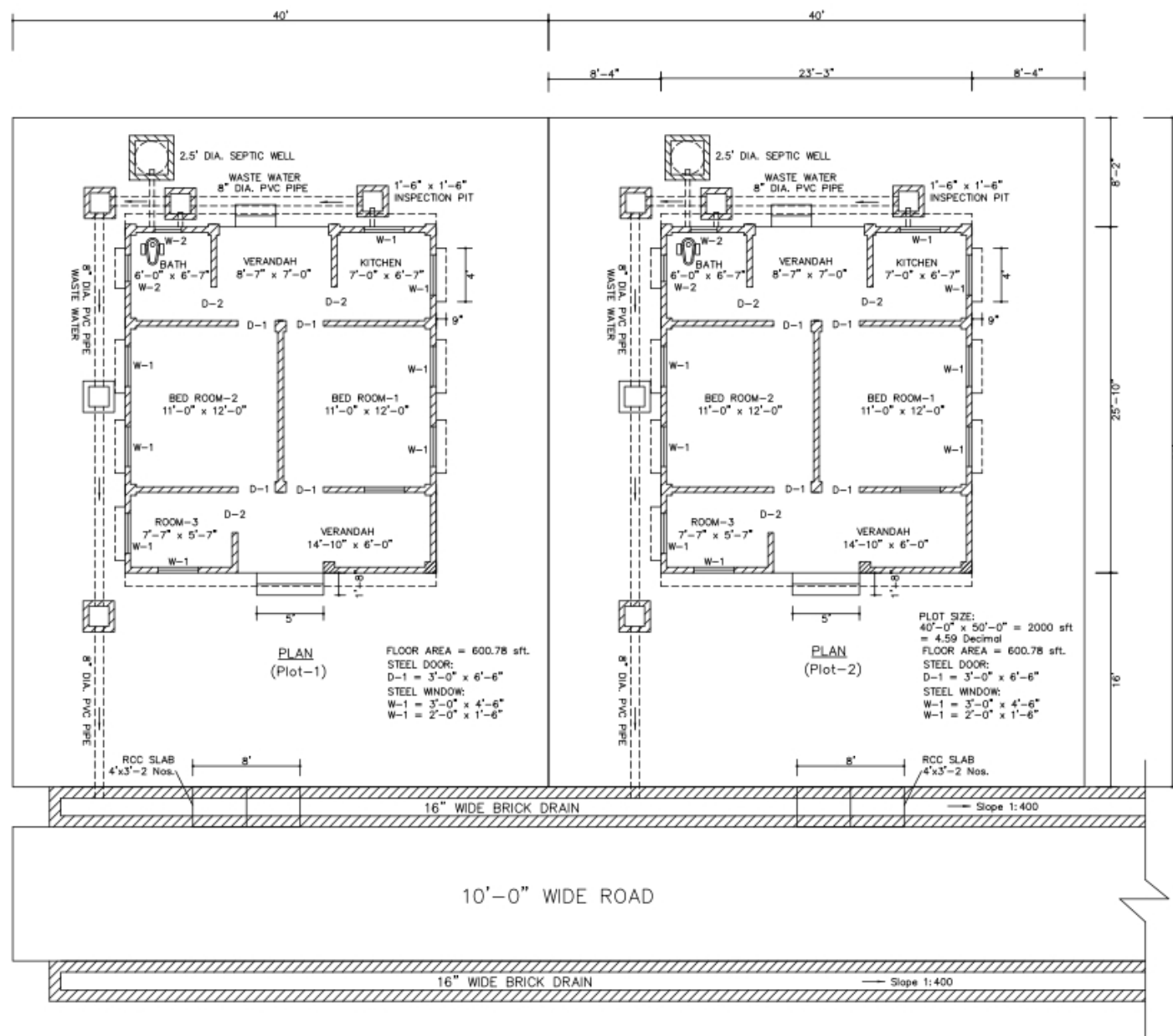


TYPICAL LAYOUT PLAN OF LOW COST HOUSING

TYPICAL LAYOUT PLAN OF LOW COST HOUSING

- SALIENT FEATURES:
FOR ONE LOW COST
HOUSE:**
- Total no. of House = 120.
 - Size of each House = 23'-3" x 25'-10".
 - Plinth Area of each House = 600.78 sft.
 - Size of each Plot = 40'x50' = 4,591 decimal.
 - Area Required for Housing = 6.84 acre.
 - Community Pond = 1 no. (0.69 acre).
 - Community Centre = 1 no. (1363 sft).
 - Play Ground = 1 no.
 - No. of Tube-well = 24 nos.
 - Length of HBB Road = 3096 ft.
 - Length of Brick Drain = 3120 ft.
 - Total Area Required for Low Cost Housing = 9.31 acre.

PLAN OF INDIVIDUAL LOW COST HOUSE

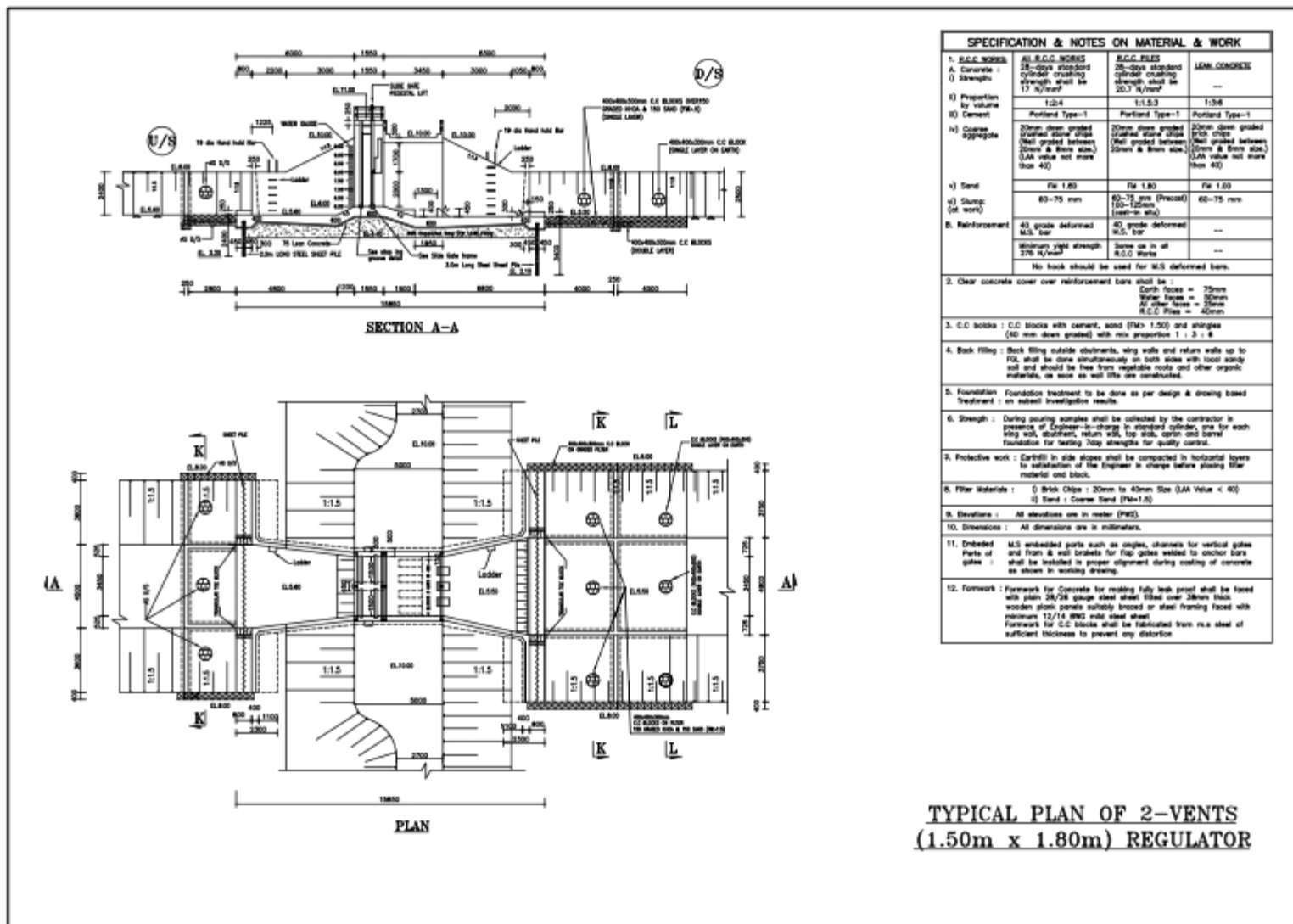


PLAN OF INDIVIDUAL LOW COST HOUSE FOR EACH PLOT

[illegible]

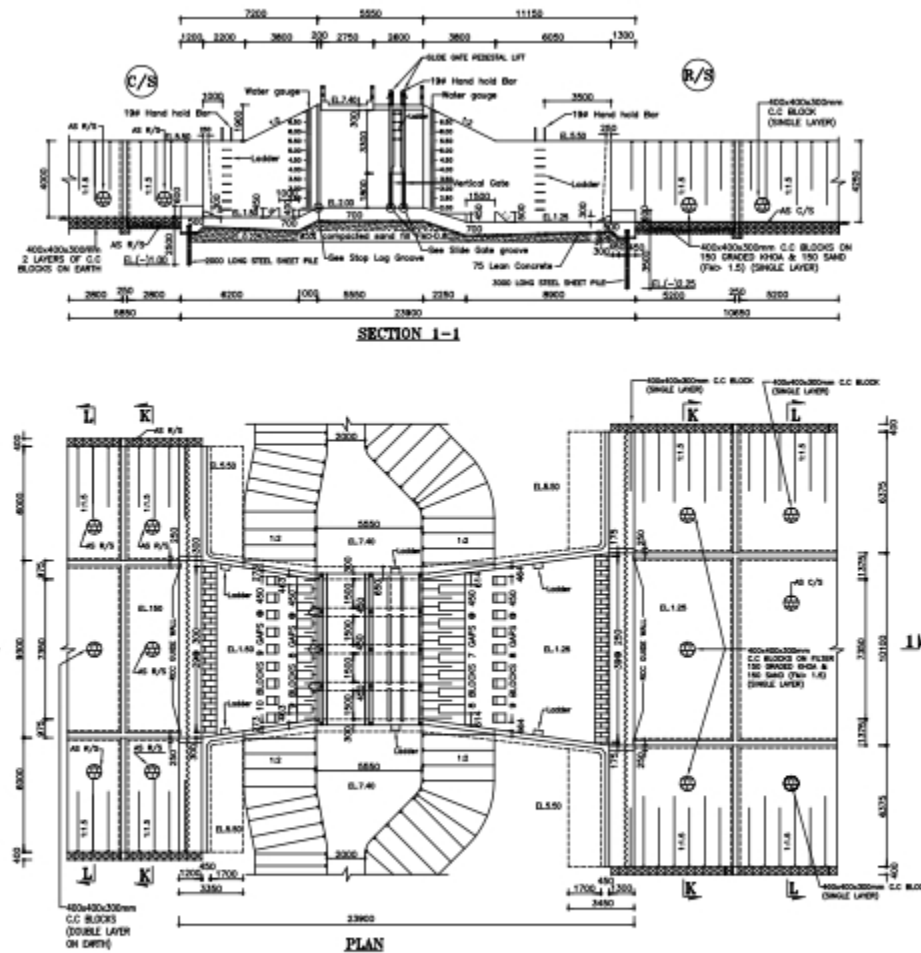


TYPICAL PLAN OF 2-VENTS REGULATOR



**TYPICAL PLAN OF 2-VENTS
(1.50m x 1.80m) REGULATOR**

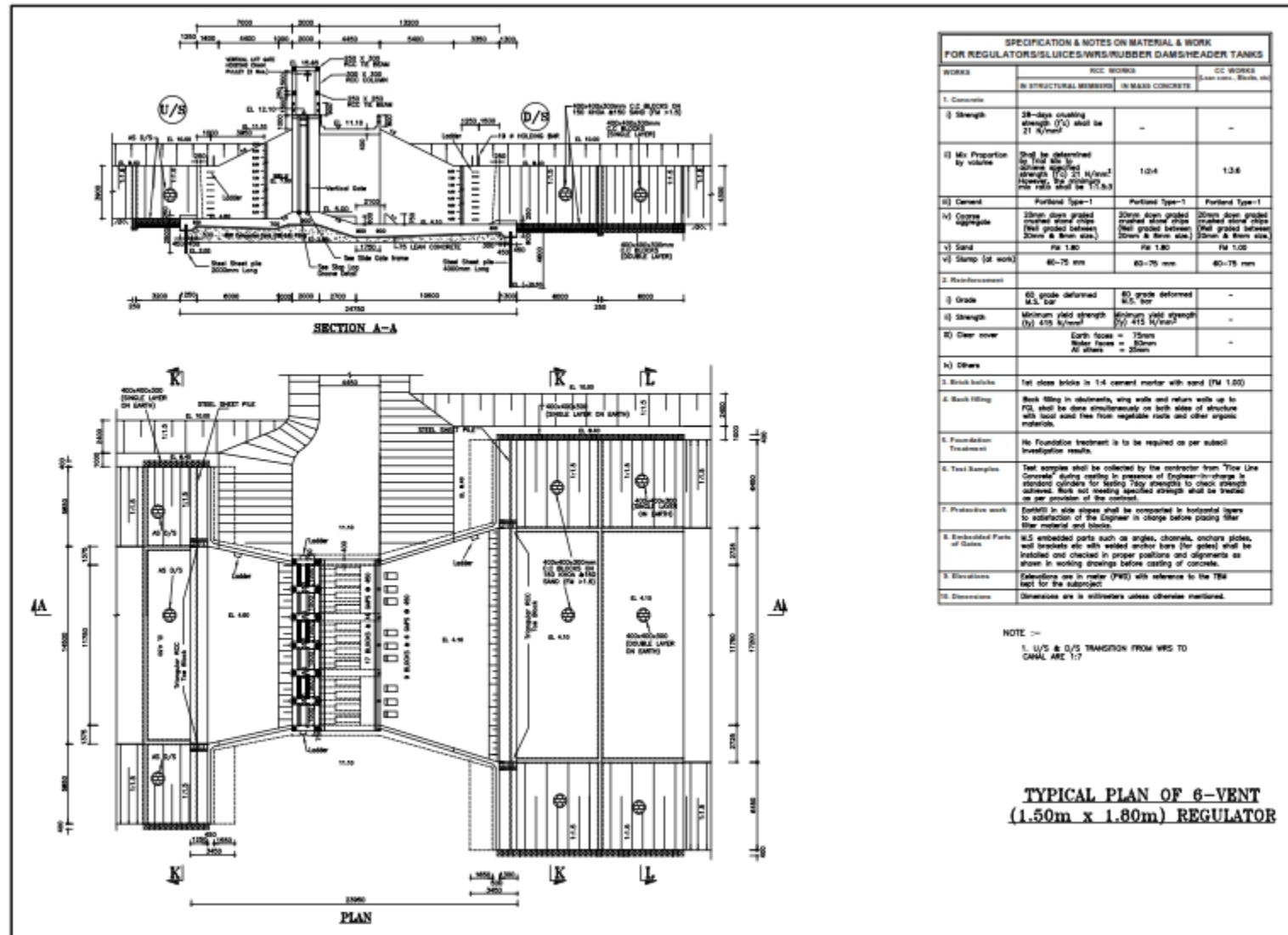
TYPICAL PLAN OF 4-VENTS REGULATOR



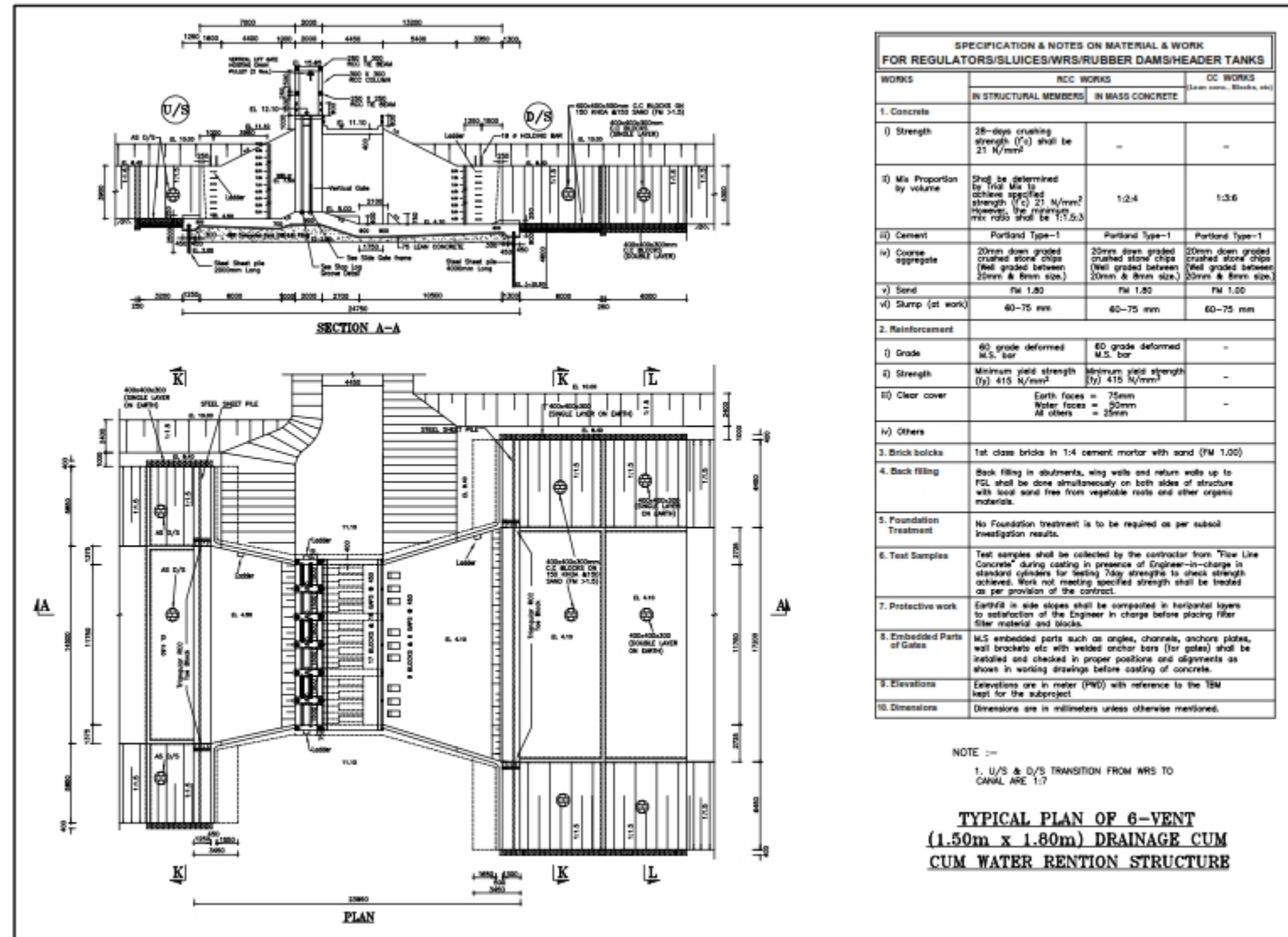
SPECIFICATION & NOTES ON MATERIAL & WORK FOR REGULATORS/SLUICES/WRS/RUBBER DAMS/HEADER TANKS

| WORKS | RCC WORKS | | CC WORKS |
|------------------------------|--|---|---|
| | IN STRUCTURAL MEMBERS | IN MASS CONCRETE | |
| 1. Concrete | | | |
| i) Strength | 28-days crushing strength (f_{ck}) shall be 21 N/mm ² | - | - |
| ii) Mix Proportion by volume | Shall be determined by trial mix to achieve strength (f_{ck}) 21 N/mm ² (Refer to IS: 456-1978, Table 11.3.3) | 1:2:4 | 1:3:6 |
| iii) Cement | Portland Type-1 | Portland Type-1 | Portland Type-1 |
| iv) Coarse aggregate | 20mm down graded crushed stone chips (Well graded between 20mm & 5mm size.) | 20mm down graded crushed stone chips (Well graded between 20mm & 5mm size.) | 20mm down graded crushed stone chips (Well graded between 20mm & 5mm size.) |
| v) Sand | FM 1.80 | FM 1.80 | FM 1.80 |
| vi) Slump (at work) | 60-75 mm | 60-75 mm | 60-75 mm |
| 2. Reinforcement | | | |
| i) Grade | 60 grade deformed M.S. bar | 60 grade deformed M.S. bar | - |
| ii) Strength | Minimum yield strength (f_y) 415 N/mm ² | Minimum yield strength (f_y) 415 N/mm ² | - |
| iii) Clear cover | Earth faces = 75mm Water faces = 50mm All others = 25mm | - | - |
| iv) Others | | | |
| 3. Brick works | 1st class bricks in 1:4 cement mortar with sand (FM 1.00) | | |
| 4. Back filling | Back filling in abutments, wing walls and return walls up to FGL shall be done simultaneously on both sides of structure with local sand free from vegetable roots and other organic materials. | | |
| 5. Foundation Treatment | Foundation treatment to be done as per design & drawing based on subsoil investigation results. | | |
| 6. Test Samples | Test samples shall be collected by the contractor from 'Flow Line Concrete' during casting in presence of Engineer-in-charge in standard cylinders for testing 7day strengths to check strength achieved. Work not meeting specified strength shall be treated as per provision of the contract. | | |
| 7. Protective work | Earthfill in side slopes shall be compacted in horizontal layers to satisfaction of the Engineer in charge before placing filter material and blocks. | | |
| 8. Embedded Parts of Gates | M.S. embedded parts such as angles, channels, anchors plates, soil brackets etc. with welded anchor bars (for gates) shall be installed and checked in proper positions and alignments as shown in working drawings before casting of concrete. | | |
| 9. Elevations | Elevations are in meter (FM) with reference to the 1984 level for the subproject. | | |
| 10. Dimensions | Dimensions are in millimeters unless otherwise mentioned. | | |

TYPICAL PLAN OF 6-VENTS REGULATOR



TYPICAL PLAN OF 6-VENTS DRAINAGE CUM WATER RETENTION STRUCTURE





Thanks for your kind attention

Download Link

https://drive.google.com/file/d/1AhQJHQLQnSRr86duFJ5BHnaP_MqKC16D/view?usp=sharing