

## CHAPTER FOUR: OUTPUT AND DELIVERABLES

Reports and maps are the ultimate output of any kind of planning activity, consultants' submission requirements of reports, maps and ancillary materials have been specified in the ToR. The reports and maps have to be submitted in both hard and soft version. On the other hand some ancillary materials like Bench Mark Pillars and Borehole have to be erected in suitable locations of the project area.

### 4.1. Data Precession

#### 4.1.1 Data Precession of Digitization of Mauza Maps

In Data Precession of Digitization of Mauza Maps with ARC/INFO version 3.5 NT/Arc GIS/Arc View the accuracy level will be considered  $\pm 0.002$  inches as per ToR.

### 4.2 Map

#### 4.2.1 Map Layout

The following format will be followed for preparation of all kinds of map:

Sl. No.	Description of Map	Scale
1	Mauza Map	Original Mauza Scale
2	Original collected Mauza maps	Original Mauza Scale
3	Study Area Map (for field survey)	1" = 330' or 1:3960
4	Field Survey (Original survey marking)	1" = 330' or 1:3960
5	Physical Feature Survey Map	1" = 330' or 1:3960
6	Land use Survey Map	1" = 330' or 1:3960
7	Topographic Survey Map	1" = 330' or 1:3960
8	Road network Map	1" = 330' or 1:3960
9	Utility Services Map	1" = 330' or 1:3960
9a	Khal/ Drainage/sewerage	1" = 330' or 1:3960
9b	Gas/Electricity/Water Supply	1" = 330' or 1:3960
10	Base Map (for plan preparation)	1" = 330' or 1:3960
11	Structure Plan	1: 10,000
12	Urban Area Plan	1" = 330' or 1:3960
13	Landuse Plan	1" = 330' or 1:3960
14	Drainage & Environmental Management Plan	1" = 330' or 1:3960
15	Risk Map	1" = 330' or 1:3960
16	Population Density Map	1" = 330' or 1:3960
17	Transportation & Traffic Management Plan	1" = 330' or 1:3960
18	Utility Services Network Plan	1" = 330' or 1:3960
18a	Sewerage/ Drainage network Plan	1" = 330' or 1:3960
18b	Gas/Electricity Plan	1" = 330' or 1:3960
18c	Water Supply Plan	1" = 330' or 1:3960
19	Detailed Area Plan	1" = 330' or 1:3960
19a	Road network Plan	1" = 330' or 1:3960
19b	Sewerage/ Drainage network Plan	1" = 330' or 1:3960
19c	Gas/Electricity Plan	1" = 330' or 1:3960
19d	Water Supply Plan	1" = 330' or 1:3960
19e	Landuse Plan	1" = 330' or 1:3960

### 4.2.2 Thematic Maps

- Water supply: source, distribution line & installations.
- Drainage & flood protection: storm water, rainwater, in-let, out-let.
- Electricity: source, distribution line & installations (primary, secondary, and tertiary).
- Gas: source, distribution lines & installations (primary, secondary, and tertiary).
- Sanitation: source, distribution lines & installations (primary, secondary, and tertiary).
- Household, industrial, clinical wastes collection, dumping, and treatment & sludge disposal.
- Accessibility: circulation, passenger & goods movement (motorized & non-motorized), walkways, station stoppage, waiting & parking facilities.
- Heritage, open space conservation & maintenance
- Land level: Buildable land, landfill (frame2' and 3' interval).
- Recreation (open, close)
- Housing (High, medium, low income)
- Employment (industry, commerce, informal employment)
- Special area (KPI, military, flood prone, earth quake prone, hazardous industry)
- Social infrastructure (education, health care, community use, religious, bank, post office, police, fire brigade, assembly place)
- Land ownership (private, khas, Govt. acquisition for various agencies, vested)
- Commitment area (Govt. private for development work)

### 4.3 Map Legend

Map legend will incorporate all categories of features (point, line, and polygon) in map layout to give a clear view. The legend item may increase or decrease as per requirement based on physical survey with prior approval from UDD. The palette name/number (both pen and marker) and size need to be finalized with respect to scale of the map at the inception of the project. The final map legend proposed by the consultant is enclosed herewith in Figure 4. 2.

North Arrow	Map Heading/Title		Drawing No
<div style="border: 1px solid black; width: 90%; margin: auto; padding: 10px;"> <p style="font-size: 1.2em; margin: 0;">Map View Frame</p> </div>			
CLIENT	Name of the Project		CONSULTANT
	Linear Comparative Scale (Meter & Feet)		<div style="border: 1px solid black; width: 100%; height: 100%; display: flex; align-items: center; justify-content: center;"> <p style="font-size: 1.2em; margin: 0;">INDEX MAP</p> </div>
Signature		<div style="border: 1px solid black; width: 100%; height: 100%; display: flex; align-items: center; justify-content: center;"> <p style="font-size: 1.2em; margin: 0;">LEGEND</p> </div>	

































Figure 4.1.: Map Layout

## Map Legend

Category	Symbol	Color and Size
<b>Administrative/Revenue/Project Boundaries</b>		
International Boundaries		True Black, Size 6.0, ( Size 4.50 , Color Sector R-255, G-190, B-232 )
Divisional Boundaries		True Black, Size 1.65, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
District Boundaries		True Black, Size 1.50, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
Upazila Boundaries		True Black, Size 1.30, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
Union Boundaries		True Black, Size 1.20, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
Mauza Boundaries		True Black, Size 1.00, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
City Corporation Boundaries		Blue, Size 6.00, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
Paurashava Boundaries		True Black, Size 1.20, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
Ward Boundaries		Blue, Size 1.30, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
Mauza Sheet Boundaries		Blue , Size 1.20, ( Size 4.25 , Color Sector R-255, G-190, B-232 )
CS/RS/SA/BS Plot Boundaries		True Black, 1.00
<b>Transport Networks</b>		
National Highway		Red, True Black, Size 4.25, ( Size 4.25 , Color Sector R-255, G-55, B-55 )
Regional Highway		Red, True Black, Size 3.85, ( Size 4.25 , Color Sector R-255, G-55, B-55 )
Zila Road		Red, True Black, Size 3.85, ( Size 3.70 , Color Sector R-255, G-55, B-55 )
Pucca Road		Blue, Size 2.4, ( Color Sector R-0, G-112, B-255 )
Semi Pucca Road		Size 1.15, ( Color Sector R-197, G-0, B-255 )
Kutchia Road		Size 1.00, ( Color Sector R-185, G-0, B-255 )
Footpath		Size 2.60, ( Color Sector R-115, G-223, B-255 ) ( Color Sector R-223, G-115, B-255 )
Road Island		Size 2.60 (R-255, G-255, B-115) (R-223, G-115, B-255)
Railway Line ( Broad Gauge)		True Black
Railway Line ( Meter Gauge)		True Black
<b>Utility and Services</b>		
Power Station/Sub-Station		(R-0, G-255, B-0)
Pumphouse		(R-255, G-0, B-0)
Irrigation Wells ( Deep & Shallow)		True Black, 15, (R-255, G-127, B-127)(R-255, G-127, B-127)
Refuelling Station ( Gas/Petrol Pump )		Size - 15, (R-0, G-255, B-0)
Tower ( Radio/T V/Tele-com/Mobile )		True Black, 16
Telephone Exchange		Size - 15, (R-205, G-46, B-49)
Water Treatment Plant		True Black, 15, (R-255, G-127, B-127)
Overhead Tank		True Black, 15, (R-255, G-0, B-0)
National Grid Pole		True Black, 15, (R-56, G-168, B-0)
Electricity Pole		True Black, 25
Telephone Pole		True Black, 25
Primary School		True Black, 15, (R-209, G-255, B-115)

Figure 4.2: Legend use to Demonstrate the Feature in the Map

## Map Legend

Category	Symbol	Color and Size
<b>Utility and Services</b>		
High School		True Black, 15, (R-209, G-255, B-115)
College		True Black, 15, (R-209, G-255, B-115)
University		True Black, 15, (R-209, G-255, B-115)
Madrasa/Fazil/ Kamil		True Black, 15, (R-209, G-255, B-115)
Mosque		True Black, 15, (R-255, G-255, B-115)
Temple		True Black, 15
Church		True Black, 15
Police Station		True Black, 18, (R-255, G-0, B-0)
Fire Fighting Station		True Black, 18, (R-255, G-0, B-0)
Post Office		True Black, 15, (R-255, G-0, B-197)
Bank		True Black, 15, (R-255, G-239, B-164)
Hotel		True Black, 14
Restaurant		True Black, 20
Airport		True Black, 18
Launch Terminal		True Black, 20
Ferry Ghat		True Black, 20
River Port		True Black, 20
Railway Station		True Black, 18, (R-115, G-0, B-0)
Bus Terminal		True Black, 25
Bus Stop		True Black, 25
National Power Grid		True Black, 1
Electricity Line		True Black, 1, (R-223, G-115, B-255)
Telephone Line		True Black, 14
Drainage Line		True Black, 12
Water Supply		Size 12, ( R- 0, G-197, B-255 )
Gas Pipe Line		Size 12, ( R- 245, G-202, B-122 )
<b>Structures</b>		
Pucca		True Black, 1, (R-255, G-115, B-223)
Semi Pucca		True Black, 1, (R-115, G-178, B-115)
Kutcha		True Black, 1, (R-255, G-211, B-127)
Tin shed		
<b>Geo-technical Features</b>		
Fault Line		True Black, 14
<b>Physical Infrastructures</b>		
Flood Embankment		True Black, 3, (R-255, G-255, B-0) (R-255, G-167, B-127)

## Map Legend

Category	Symbol	Color and Size
<b>Physical Infrastructures</b>		
Flood Wall		Size 20 (R-202, G-122, B-245)
Road Embankment ( Pucca )		Size 3 (R-205, G-245, B-190)(R-115, G-178, B-255)
Road Embankment ( Kutcha )		Size 3 (R-205, G-245, B-190), True Black
Bridge/Culvert		True Black 25
Sluice Gate		True Black 25
Retention Pond/Reservoir		True Black, Size 50
<b>Land Use</b>		
Residential		Size 1 (R-255, G-170, B-0)
Business & Mercantile		Size 1 (R-255, G-255, B-0)
Public Administration		Size 1 (R-209, G-255, B-115)
Industrial and Storage		Size 1 (R-114, G-137, B-68)
Diplomatic		Size 1 (R-223, G-115, B-255)
Mixed ( Resi-Com )		Size 1 (R-102, G-153, B-205)
Mixed ( Resi-Off )		Size 1 (R-255, G-167, B-127)
Office ( Private/Non-Government )		Size 1 (R-56, G-168, B-0)
Agricultural		Size 1 (R-76, G-230, B-0)
Forest		Size 1 (R-168, G-168, B-0)
Educational and Research		Size 1 (R-202, G-122, B-245)
Health Services		Size 1 (R-137, G-68, B-68)
Religious		Size 1 (R-205, G-205, B-102)
Recreational		Size 1 (R-251, G-234, B-81)
Utility and Services		Size 1 (R-0, G-132, B-168)
Assembly		Size 1 (R-232, G-190, B-255)
River		True Black 1 (R-115, G-223, B-255)
Char/Sandy		True Black 1
Canal/Khal		Size 1 (R-115, G-223, B-255)
Lake		Size 1 (R-115, G-223, B-255)
Pond		Size 1 (R-115, G-223, B-255)
Ditch		Size 1 (R-64, G-101, B-235)
LowMarsh Land		Size 1 (R-115, G-223, B-255)
Open Space		Size 1 (R-168, G-168, B-0)
Security/Defense		Size 1 (R-255, G-170, B-0)
Parks and Play Ground		Size 1 (R-115, G-76, B-0)
Institution		Size 1 (R-200, G-130, B-130)
Drain		Size 1 (R-169, G-0, B-230)
<b>Others</b>		
Bench Mark ( BM )		True Black 15 (R-255, G-0, B-197)
Ground Control Point ( GCP )		True Black 15 (R-255, G-0, B-197)

Figure 4.2: Legend use to Demonstrate the Feature in the Map

#### 4.4 Check List for Survey and Studies

In the study different survey techniques have been used such as: Topography and Physical feature survey, Landuse survey, Socio-economic survey, etc. Details about different survey and studies have been attached here with the help of following tables:

**Table 4.1: Demarcation of the Study Area**

No	Name of Activities	Description
1	Collection RS/CS Mauza Maps	RS / CS mauza sheets/maps will be collected for the entire Planning/study area. The mauza sheets having distortion due to rapping or pasting cloths/tape on the mauza maps will be avoided during the collection. These maps will be collected from the local Upazilas/ Paurashava office and DLRS office.
2	Scanning of Mauza Maps	To minimize the distortion and deviations scanning of mauza maps will be carried out using drum scanner. Extra care will be taken for maintaining the proper rotation and alignment of mauza sheets during scanning
3	Identification of GCP (T.C) on Digitized Maps	At least 4 Ground Control Points (GCP)/Geo-spatial Reference Points (TICs) will be selected on each mauza identical with the real field condition. For accuracy and quality work, maximum efforts will be given to identify as many as GCP for each mauza sheets.
4	Edge Matching and Preparation of study area map	Edge matching will be with the map of GPS reading. The four TIC points on each sheet will enable the work of edge matching with perfection. Layout of study area map will be done as per ToR using based Arc/info 3.5/ NT/ Arc GIS software. All the features of mauza maps including plot, mauza and boundary of the project area will be identified and shown in the base map in separate layer.
5	Digitization of RS/CS Mauza Maps	Screen digitization method will be used for digitization of mauza maps. GIS based Arc/Info software will be used for this purpose. Feature wise manuscripts will be developed for digitizing the mauza maps and all features will be stored as layer coverage with a separate ID or code number of respective features in the GIS database.
6	Edit Plot Check of Digitized Coverage	After digitization of mauza maps, edit plots will be produced containing all the features and boundaries in different colors. The digitized mauza maps will be checked and verified by superimposing on the original mauza maps using the light table. All possible errors will be solved with this edit plot check and final digital mauza maps will be prepared.
7	Geo-referencing of Mauza Maps	Geo-referencing of mauza sheets will be done using GCP points (Northing, Easting) and GIS based software Arc/Info 3.5/ Arc/view and ArcGIS. After geo-referencing of all the mauza sheets of the project area, the mosaic mauza maps will be found having all the mauza features (point, line, and polygon) with GCP points in different layers.

#### 4.5 Reports

There are different types of report will be submitted during project period. Reports will be presented and illustrated in a clear and concise professional manner, including maps, plans, diagrams and other graphics. All types of report are described in table 4.3

**Table 4.2: Category of Reports**

Report	Language	Copy	Period of Submission	Binding Status
Mobilization Report	English	20	Within 15 days of Signing contract	Spiral Binding
Inception Report	English	20	End of 1st month	Spiral Binding
Progress Report	English	02	Every three month	
Draft Survey Report	English	20	End of 9th month	Spiral Binding
Final Survey Report	English	20	End of 10th Month	Spiral Binding
Draft Final Report	English	20	End of 18th Month	Spiral Binding
Final Report	English & Bengali	20	End of 21th month	Hard Binding

#### 4.6 Plans

There are different types of plan will be submitted to the UDD. The following plans will be submitted to UDD.

- Sub-regional Plan
- Structure Plan
- Urban Area Plan
- Landuse Plan
- Rural Area Plan
- Action Area Plan
- Drainage & Environmental Management Plan
- Transportation & Traffic Management Plan
- Utility Services Network Plan
- Sewerage/ Drainage network Plan
- Road network Plan

**Table 4.3: Establishment of Bench Mark (BM)**

No	Name of Activities	Description
1	Selection of Reference BM	Selection of reference BM is essential for establishment of BM network for the project area. Reference BM provides geo-reference (x, y) and elevation (z) with respect to a datum. For geo-referencing available SoB BMs in the project area and its periphery will be used as reference.
2	Planning proposed BM	Planning the proposed BM/Control points network and selection of tentative locations for those BM/Control Points
3	Constructions and Installation of BM Pillars	<p>The BM pillars will be constructed and installed before the survey work start. As mentioned in the ToR, covering the project area including approximately 1BM pillar per 5 sq.km. grid in urban area and 1BM pillar per 20 sq.km grid rural area (pillar 10"X10", Base 3' X 3', height 5"). RCC pillars are to be constructed marking unique identification number Coordinate X, Y of these pillars along with Z value is to be marked on base map for future reference. The BM pillars will be constructed and installed before the survey work start. The construction design and specification BM pillars will be obtained from the UDD. The BMs will be established with uniformly distributed grid covering the total project area.</p> <ul style="list-style-type: none"> <li>• Construction and Installation of BM pillars.</li> <li>• Establishment of Co-ordinate of BM Pillars (x, y, z i.e. Northing, Easting &amp; RL in mMSL).</li> <li>• BM ID and location description of the BM</li> </ul>

No	Name of Activities	Description
4	Establishment of Co-ordinates (x, y, z) of BM Pillars/Ground Control Points	Establishment of co-ordinate (northing, easting, and elevation in m PWD) of BM Pillars needs extensive GPS survey, data processing, and development of Local Geoids Model. The total work will be followed by selection of reference BM (x, y, z) and RTK-GPS Static Method.

**Table 4.4: Sectoral Studies and Survey**

No	Name of Activities	Description
1	Household Survey	<ul style="list-style-type: none"> <li>▪ Family Size</li> <li>▪ Age and Sex Structure</li> <li>▪ Religious Groups</li> <li>▪ Educational Status of Household Members</li> <li>▪ Households' Income and Expenditure Levels</li> <li>▪ Migration</li> <li>▪ Status of Residence</li> <li>▪ Occupational Pattern</li> </ul>
2	Slum Survey	<ul style="list-style-type: none"> <li>▪ Age and Sex Structure</li> <li>▪ Educational status of slum population.</li> <li>▪ Occupational Status of Slum Population.</li> <li>▪ Monthly Income of Slum Household</li> <li>▪ Reasons behind Migration</li> <li>▪ NGOs working in the Slum Area</li> <li>▪ Facilities Provided by NGOs</li> </ul>
3	Urban and Rural Economic Activity Survey	<ul style="list-style-type: none"> <li>▪ Findings of Study of Informal Sector Economy</li> <li>▪ Informal Activities</li> <li>▪ Initial Capital</li> <li>▪ Sources of Loan</li> <li>▪ Rate of Interest</li> <li>▪ Monthly Income</li> <li>▪ Monthly Expenditure</li> </ul>
4	Transportation and traffic volume survey	<ul style="list-style-type: none"> <li>▪ Water way</li> <li>▪ Travel demand forecasting</li> <li>▪ Number of ghats and their conditions</li> <li>▪ Road Traffic Survey and Traffic Volume Survey</li> <li>▪ O-D Survey</li> <li>▪ Pedestrian facilities</li> <li>▪ Travel demand forecasting</li> <li>▪ Identification of traffic accident points and their causes</li> <li>▪ Right of way</li> </ul>
5	Drainage and Environmental Survey	<ul style="list-style-type: none"> <li>▪ Existing conditions</li> <li>▪ Drainage Network</li> <li>▪ Existing policies</li> <li>▪ Environmental Survey</li> <li>▪ Hazard identification and mapping</li> <li>▪ Vulnerability analysis and assessment</li> <li>▪ Risk Analysis</li> </ul>
6	Formal and Informal Industrial Survey	<ul style="list-style-type: none"> <li>▪ Location of Industry</li> <li>▪ Type and Size of Industry</li> <li>▪ details of labor statistics with the housing conditions</li> <li>▪ quality of life of labor</li> </ul>

## 4.7 Processed Data

While different types of surveys will be conducting a bulk amount of raw data of physical features survey, topographic survey, Landuse survey, socio-economic survey and traffic and transportation survey will be produced and for all surveys GIS based layers will be prepared. For each type of survey this raw data will be processed separately. After processing all types of survey data will be submitted into CDs to UDD.

## 4.8 Leaflet/Awareness Development

A leaflet has been designed, printed and distributed in order to create mass awareness to the people on plan preparation and its important, necessity and the overview of project area. A leaflet has been attached in Appendix-IX.

## 4.9 Workshop and Meeting

Two workshops in Shibpur, Raipura and Ishwarganj upazila will have been conducted. One workshop will have been conducted in each upazila during 2<sup>nd</sup> week of June, 2015. And another workshop will have been conducted after the submission of draft plan. Several types of meeting will be held at union and upazila level. Already twelve numbers of consultation meeting conducted at union and upazila level. The Consultants and implementing organization will organize consultation meetings and workshop with the Upazila and Union level to ensure the participation of stakeholders from all walks of life.

- Consultation Meetings with Stakeholders: Arranging Upazila and Union level meeting and Workshop to disseminate knowledge and initiate the process for Development Plan of project implementation.
- First Consultation: Explanation, discussion and consultation with Upazila and Union leaders/representatives/communities to involve and participate in the process of plan preparation.
- Stakeholder Participation in Planning: Consultation with Local residents at ward level will be conducted to design the Action Area Plan.
- Second Consultation: Analysis of outputs of First consultation meeting and Adoption of Development Strategies, Plan Proposals, Approaches, and Standards appropriate for the Upazilas.
- Preparation of proposal for better land use development control and zoning of development activity as per practical analysis and desire of the Upazilas and following the policies/guidelines proposed in the Structure Plan of the concerned Upazila.
- Submission of Draft Plan Report along with Maps and Figures (Hard and Soft Copy) Detail Description and Design of Development Plans and Planning Proposals with Alternative Development Options and Plan Proposals.
- Incorporation of comments collected from formal public hearing and submission of final plan as specified in ToR.