Annex –V

TERMS OF REFERENCE (TOR)

FOR

Physical Feature Survey

Under

"চট্টগ্রাম জেলার মীরসরাই উপজেলার উন্নয়ন পরিকল্পনা প্রণয়ন ঃ সার্বিক দুর্যোগ ব্যবস্থাপনাকে ভূমি ব্যবহারের মাধ্যমে সম্পৃক্তকরণ"

(Preparation of Development Plan for Mirsharai Upazila, Chittagong District: Risk Sensitive Landuse Plan)

URBAN DEVELOPMENT DIRECTORATE
Ministry of Housing and Public Works
Government of the People's Republic of Bangladesh
November, 2016

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APPENDIX-01

BACKGROUND INFORMATION OF THE PROJECT

1.1 Project Background

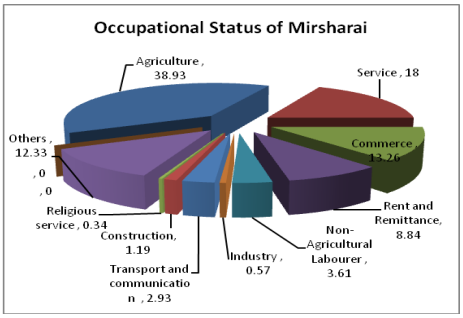
Mirsharai Upazila (CHITTAGONG DISTRICT) area 482.88 sqkm (BBS)/509.80sqkm (GIS Data), located in between 22°39' and 22°59' north latitudes and in between 91°27' and 91°39' east longitudes. It is bounded by TRIPURA state of India, CHHAGALNAIYA and FENI SADAR upazilas on the north, SITAKUNDA upazila and BAY OF BENGAL on the south, FATIKCHHARI upazila on the east, SONAGAZI and COMPANIGANJ (NOAKHALI) upazilas on the west. Mirsharai Thana was formed in 1901 and it was turned into an upazila in 1983. Mirsharai Upazila consists of 2 Municipality, 16 Union and 113 Mouza.

Mirsharai, the combination of lake and hilly area contains attractive scenic beauty on the southernmost part of Bangladesh. The most important attraction of the upazila is that one can travel Mohamaya Chara Lake by speed boat and explore hilly area and can enjoy Khoiyachora, Baghbiani, Napitachora, Sonaichora, Mithachora and Boyalia waterfalls. This area is located 192.2 km far from DHAKA and 4.5 hour bus journey. Anyone can travel by rail and it is 197 km of rail journey and it takes 4.5 hour from Dhaka to Mirsharai Upazila. 56 km from the CHITTAGONG Divisional headquarters and takes 1.5 hour travel by bus. The Bangladesh Road Transport Corporation introduced a direct bus service from Dhaka to *Mirsharai* via comilla.(Source: Banglapedia,2012)

At Mirsharai Upazila main river is Feni; Sandwip Channel is notable; canal 30, most noted of which are Feni Nadi, Isakhali, Mahamaya, Domkhali, Hinguli, Moliaish, Koila Govania and Mayani Khal. The hills range on the northern and eastern side of this upazila along the bank of the Feni River extended up to Chittagong and the Chittagong hill tracts

Historical Events: Sultan Fakhruddin Mobarak Shah conquered Chittagong in 1340 AD and established the Muslim rule in this region. During the reign of Gaur Sultans Hussain Shah and Nusrat Shah, Paragal Khan and Chhuti Khan were the rulers of this area. Subsequently Nizam Shah, brother of emperor Sher Shah, was the ruler of this area. Nizampur Pargana is named after Nizam Shah and the whole area of Mirsharai came under the control of Nizampur pargana. From the beginning of the 16th century this region was very rich in Bangla literature. Most of the time between 1580 and 1666 this region was under the control of the Arakanese. The place at which (of the present Mirsharai thana) Bujurg Umed Khan, son of Subadar Sayesta Khan, landed after crossing the Feni River was named as Bujurg Umedpur. With the conquest of Chittagong by Bujurg Umed Khan in 1666, this region came permanently under the Mughal rule. Towards the end of British rule in India, Durgapur and Karerhat areas of Mirsharai upazila were the centres of revolutionary activities of Chittagong. A fierce battle was fought between the freedom fighters (under Capt. Wali Ahmed) and the Pak army at a place adjacent to the Fenafuni Bridge on the south of Mirsharai sadar in which about 100 Pak soldiers were killed. Besides, direct encounters were held between the freedom fighters and the Pak army at many' places including Shuvapur Bridge, Hinguli Bridge, Aochi Mia Bridge and Mostan Nagar.

Main occupations: Agriculture 38.93%, non-agricultural labourer 3.61%, industry 0.57%, commerce 13.26%, transport and communication 2.93%, service 18%, construction 1.19%, religious service 0.34%, rent and remittance 8.84% and others 12.33%. Total cultivable land 22,896.40 hectares, fallow land 147713 hectares; single crop 38.91%, double crop 42.46% and treble crop land 18.63%. At present Cultivable land under irrigation is 6,917.85 hectare. Ownership of agricultural land Landowner 51.30%, landless 48.70%; agricultural landowner: urban 38.82% and rural 52.09%.



Value of land : The market value of the first grade arable land is Tk 30000 per 0.01 hectare. Main crops Paddy, potato, aborigine, bean, tomato, pumpkin and radish. Extinct or nearly extinct

crops Sugarcane, jute, arahar, mustard, sesame, linseed, ground nut. Main fruits Mango, blackberry, jackfruit, banana, papaya, litchi, pineapple, water-melon.

Communication facilities Roads: Pucca road 230 km, semi-pucca road 119 km, mud road 1435 km; railway 16 km; waterway 11 nautical miles, Rail junction 4. Extinct or nearly extinct traditional transport Palanquin, bullock cart. Noted manufactories Carpet industry, pipe mill, ice factory, rice mill, bakery, brick-field, steel furniture, fish- poultry' feed' factory, bidi factory. There are also Cottage industries, Goldsmith, blacksmith, potteries, weaving, tailoring, bamboo and wood work. Hats, bazars and fairs Hats and bazars are 52, fairs 5, most noted of which are Abu Torab Bazar, Kamar Ali Bazar, Bara Daroga Hat, Mahajan Hat, Karer Hat, Baraia Hat, Shantir Hat, Zorwarganj Baishakhi Mela, Baruni Snan Mela and Shadhinata Mela. Main exports product is Bamboo, fish, paddy, potato, banana, vegetables.

NGO Activities: Operationally important NGOs are BRAC, Proshika, ASA, Sheba, CARE, and Hunger Project. Upazila health complex 1, family planning centre 16, satellite clinic 11.

Opportunity: Bangladesh can earn money in local and also in foreign exchange by opening a tourist resort at *Mirsharai*. The spot, if properly developed will become an excellent holiday resort and tourist centre. Rowing facility can be arranged easily; fishing and hunting facilities are already there. The success of developing *Mirsharai* as a tourist centre and Special Economic Zone depends much on good communication facilities and availability of modern amenities. Moreover, the proposed *Special Economic Zone* would generate many industry related new activities including huge vehicular traffic such as air, rail, road and water. This phenomenon would have both positive and negative impact on the socio-economic condition and existing land use pattern of the region. The proposed planning package would guide such probable changes in the socio-economic condition and land use pattern of the region, and would also address the adverse impact of such changes.

The proposed project would be prepared on a regional development perspective considering the region as a part of whole of Mirsharai Upazila and its 16 unions. In this development planning package since its location is strategically important from the regional context because this upazila is situated on the way to Dhaka Chittagong highway as the highway runs through this upazila.

Description of the Project Area: A detailed description of the Project Area is given below:

Table: Area, Population and Density of the Project Area:

Municipality	Union	Mouza	Village	Population		Density (per sq km)	Literacy Rate (%)
				Urban and Other Urban	Rural		
2	16	103	208	31206	367510	826	55.1

Source: BBS, 2011

Mirsharai sea beach, hilly area, Mohamaya Chara Lake, Khaiya Chara region has the greater potential for tourism development as there are abundant resources to attract tourists. Mirsharai is developing in an unplanned and haphazard manner very rapidly due to the ample opportunity for tourism development, which is acting as pull factor for private sector developers. Hence, this project has been under taken to protect the region from depletion of its natural resources and character and tourism development as well.

Moreover, Honourable MoHPW Minister expressed his heartiest interest to develop char of this Upazila as an exclusive economic zone; as well as to establish a tourist zone and economic zone covering Mirsharai upazila.

1.2 Objectives of the Project

The objective of the project is to optimize resources and activities for sustenance of marginal people. The activities and resources are very important to the economy and life of the people of Bangladesh whose living conditions are inextricably linked to the productivity and sustainability of the region. There is no long term Holistic Development Plan for the Project area. Coastal zone needs to be integrated with the mainstream of development process of the country. So, an interdisciplinary development planning approach is urgent to optimize livelihood of the region. The Physical development planning problems, needing attention, are as follows:

(i) To integrate ecology, economy and social resources with the mainstream of development process of the country.
(ii) To frame policies for the best use of land and its control for the Mirsharai Upazila.
(iii) To optimize environment for sustenance of people.
(iv) Formulation of Policies and plans for mitigation of different types of hazards, minimizing the adverse impacts of climate change and recommend possible adaptation strategies for the region.
(v) Formulation of Policies and plans for gradual nucleation of settlements with policies and plans for development of growth centers of the area.
(vi) Formulation of a guideline for development of tourism in Mirsharai Upazila, and also to accommodate future changes in existing land use pattern, socio-economic condition of the area and quality of life of the people.

APPENDIX-02

SCOPE OF WORK FOR SCANNING AND DIGITIZATION OF MOUZA MAP, ESTABLISHMENT OF GROUND CONTROL POINT, GEOREFERENCING OF MOUZA MAP, AND PREPARATION OF DATABASE AND SURVEY

2.1 Scope of Work

UDD project team members' shall prepare the plan for the development of Mirsharai Upazila Region. The survey firm shall conduct all necessary 2-Dimensional & 3-Dimentionl surveys and studies for the project and prepare working paper on the relevant fields under study, and also assist the UDD team members in preparation of final plan and all relevant report till completion of the project.

The survey firm would extend all necessary assistance particularly in mouza map procurement, scanning, digitization, editing, geo-referencing, printing etc; establishment of BM Pillar, satellite image procuring, processing, geo-referencing, database preparation, ground truthing, collection of attributes of the physical features, documentation, printing, etc; GIS database operation and management, analysis and preparation of all maps and reports till completion of the project.

The survey firm would also conduct different type of other surveys and studies covering hydrological surveys and studies, environmental studies, demographic studies, agricultural surveys and studies etc. The survey firm shall also arrange workshops/seminar and conduct other ancillary activities relating to the project activities as directed by the PD wherever necessary. UDD project team would conduct all PRA session and the survey firm would extend necessary assistance in communication with the Mayor, ward councilors of the paurashava, Union Parishad Chairman and other stakeholders as directed by PD for arranging the PRA sessions. All maps and plans shall be in 2-D as well as 3-D form. The consulting shall provide in house training to UDD personnel on both 2-D and 3-D GIS and RS for future up-gradation of database and upcoming action plan according to governmental desire.

The survey firm shall be responsible for quality of data and information collected, data processing, cleaning and editing, and presentation into tabular form including preparation of working paper as required by PD. The survey firm shall deliver all raw and processed data along with working papers containing guidelines for preparing the planning package.

Traditional practice of Development Plan is to expand urban facilities, ignoring or suppressing the priority of agriculture, fisheries, forestry or ecology. The current project would emphasize over the mainstreaming ecology, economy and social myriads of relationship. It would emphasize over the eco-friendly development in and around Mirsharai Upazila Region and also livelihood of the local people, who are very much depended on coastal resources. The current project would also emphasize over the change in land category, land use and livelihood pattern. Spatial development planning is an evolving process.

2.2 Strategic Plan for Mirsharai Upazilas at Regional Level: The survey firm would assist in preparing Regional Plan for Mirsharai Upazila Region would be prepared for 20 years according to the guidelines form: National policies, Formulated and Integrated different sectoral strategies at regional level, spatially interpreted sectoral strategies at sub regional level, formulated Conservation Plan at regional level and formulated Development Plan.

It is also necessary to figure it out the economic disparity by using "shift-share analysis" or "input-out put analysis" technique among the zilas and Upazilas for drawing the future socio-economic development scenario. The Plan would also study on the following component at regional level of Mirsharai Upazilas:

- Lands Study:
  - Review existing Land use and Development Plans, Upazila Plan Books.
  - Change in Land Category and Land Use after FCD
  - Assessment of change in land use after construction of major infrastructure
  - Settlement Pattern
  - Hinterland, Location and level of major facilities at sub regional level
  - Hierarchy of settlements within the sub region
  - Identification of major criteria of the settlements
- Environmental studies:

- Related Environmental Policies, Acts and Laws (in regional planning study)
- Environmental Procedures and Guidelines (in sub regional planning study)
- Economic, Social, Biological and Physical Environment at sub regional level

- Hazard management :
  - Review on guidelines on Hazard management at sub regional level
  - Hazard mapping considering natural hazards: Flood, water logging, drainage congestion, salinity intrusion according to guidelines on Hazard and Risk management at sub regional level
- Water Resource Management
  - Agriculture water management at sub regional level
  - Domestic water management at sub regional level
- Transport Studies (Rail, road, and water)
  - Overview of the Existing Transport Situation
  - General Situation of Road Infrastructure
  - Situation of Road Transport (Passengers)
  - Road Transport (Goods)
  - Water Transport
  - Major Traffic Generating Centres and Areas of Congestion
  - Traffic Flow Characteristics
  - Road Transport Services
  - River Traffic Situation
  - Travel Pattern
  - Road Network Development
  - Situation of Rural Transport
  - Location of key point installation at sub regional level
  - Strategic Issues to be addressed in planning the Future Transport System
- Population Study
  - Spatial distribution of population and its changes since 1991
- Study on Basic services (major urban area):
  - Housing,
  - Sanitation
  - Communication
  - Energy
  - Education
  - Health
- Economic Activities:
  - Agriculture
  - Industry
  - Fisheries
  - Forestry
  - Disparity analysis
- Anthropological and Ethnographical Study
  - Livelihood Study of local people
  - Ethnographical Study
- Heritage, Archaeology and Tourism management
  - Potentials of Tourism in the in the sub region
  - Planning Tourism in the for the sub region
  - Linkage of Tourism to Recreation and Sports
  - Potential Sites of Heritage
  - Archaeological sites

2.3 Sub- Regional Structure Zoning Category: In order to promote and protect public safety welfare by (i) minimising adverse effect resulting from the inappropriate location or use of sites and structures, (ii) conserving limited land resources and encouraging their efficient use. To carry out the purposes and provisions of the project as they apply within the context of the Sub-regional Structure Plan, the following land zoning category would be followed:

- Main flood flow zone
- Sub flood flow zone
- Wetland
- Forest
- Agricultural land
- Urban area
- Rural settlements
- Forest settlements
- Industrial moderate hazards

- Industrial low hazards
- Water supply protection zone
- Restricted flood protection reserve
- Restricted military / public safety
- Restricted road / rail/ utility reserve
- Restricted special

2.4 Conservation Plan*:* Major Landuse pressure is heavily depending on the ecosystems and resources of the existing nature. Land-use conflicts and clearly unsustainable uses may be found in planning areas. There is a clear need for broad-based, multi-sectoral and long term development management, including community-based initiatives in sanitation, biomass preservation and collective management of natural resources, including more detailed priorities such as ecosystem preservation of fisheries habitat, maintenance of biological diversity and productivity, forestry management, containment of saltwater intrusion and population risk management. Also needed are institutional and regulatory actions.

Contrary to some current impressions, conservation and economic development are not conflicting ideas. In fact, well-planned conservation-oriented development will add to the general economic and social prosperity of a coastal community, while bad development will sooner or later have a negative effect. With innovative management based upon sustainable use, communities may be able to achieve a desirable balance without serious sacrifice to either short-term development progress or longer-term conservation needs. In broad sense Conservation Plan would cover ecology and environment, land forms: forest, wetland, rivers and agricultural land, Major infrastructures, area of archaeological/ anthropological interest.

2.5 Development Plan for Mirsharai Upazila This would guide need of future Landuse and infrastructure within the next 20 years.

This Development Management Plan would include five components:

a. **Structure Plan** for Mirsharai Upazila including paurashava and all unions
b. **Urban Area Plan** for the declared urban areas Mirsharai Upazilas
c. **Development Control Plan** for the whole of upazilas under the project
d. **Rural Area Plan**
e. **Action Area Plan**

a. Structure Plan for Mirsharai Upazila would provide guideline for landuse and infrastructure within next 20 years. The principal components of such a plan are as following:

- An inventory of existing physical, demographic, economic, social and infrastructure features.
- An analysis of the major existing problems.
- An estimation of trends and changes likely in future (for the next 20 years).
- The identification of the major constraints on and opportunities for development.
- Consideration of the major development options and policies.
- An indication of the most suitable areas for such development.
- The identification of the priorities in each sector and the major activities needed to implement the development strategy.

The structure plan concentrates on the broad structure for paurashava and unions of upazila under the project is not concerned with the details of physical layout or individual development details which cannot be implemented until the later stages of the planning period. In those areas and sectors where action is anticipated or proposed within a relatively short time however, more detail may be needed than is provided in the structure plan. Such appropriate level of detail is provided in the action area planning level.

The Structure Plan would cover up to the year 2036 with the content and meaning of the development policy of Planning Commission and guidelines laid in the Government Policy, Act & Low, Vision 2021, Perspective Plan 2020, Sustainable Development Goals (SDG), National Water Management Plan (NWMP), Coastal Zone Management Project (CZMP), Disaster Management Plan, Comprehensive Disaster Management Programme, Wetland Protection Act, Environmental Laws, Forest Act, Economic Zone Act, The Building Construction Act, 1952 etc.

The Structure Plan would include studies on:

- Disaster management: Flood, water logging, drainage congestion, salinity intrusion and cyclone, Earthquake, river erosion, drought etc.
- Water Resource Management
- Land Study: Change in Land Category and Land Use after FCD
- Livelihood Study (pattern before and after FCD)
- Settlement Pattern (before and after FCD)
- Population Study
- Housing, Water supply and Sanitation
- Communication, energy, education and health
- Agriculture and fisheries
- Transport system (road and water)
- Ecology and Environment

These sectoral studies would provide planning guidelines for land use and physical infrastructure. Land use, physical feature and spot level survey would be carried over the whole project area. This is in order to promote and protect public safety welfare by (i) minimising adverse effect resulting from the inappropriate location or use of sites and structures, (ii) conserving limited land resources and encouraging their efficient use.

To carryout the purposes and provisions of the project as they apply within the context of the Structure Plan, the following land zoning category would be followed:

- Main flood flow zone
- Sub flood flow zone
- Water supply protection zone
- Mixed use planned zone
- Mixed use spontaneous zone
- Rural settlements
- Industrial low hazards
- Restricted flood protection reserve
- Restricted military/public safety
- Restricted road/rail/utility reserve
- Restricted special
- Height Restriction Zone for (e.g., Civil Aviation)
- Spring and Neap tide zone
- Exclusive Tourists and Recreation zone
- Trade and Commercial zone
- Fish Processing and Fishing Village zone
- Forest Resources zone

The purpose of a Structure plan is to lessen uncertainty about what presently exists and what is likely to happen in future and to provide a basis for different agencies, public and private, to proceed on the basis of a common goal by providing a framework for overall development. The structure plan examined the existing situation, drew attention to key problems, assessed likely changes and their implications and proposed how some major problems might be tackled.
Very briefly, the structure plan of "Mirsharai Upazila" notes an anticipated population increase of some certain percentage of population growth in the project area by the end of the plan period and assesses the implications of this growth. Amongst its major proposals are the needs for more modern inputs to sustain agricultural productivity, the need for new non-agricultural jobs, improved infrastructure to promote the tread between two neighbouring countries. It concentrates on the framework and not the details of layout or individual development. Where action is anticipated or proposed within a relatively short time however, more detail may be needed than is provided in the structure plan. The structure plan identifies the major actions needed to bring about development in accordance with its recommendations.

b. The Urban Area Plan would emphasise over potential areas (Mirsharai Upazila) for urban development for next 10 years within the proposed framework of Structure Plan. The function of the Urban Area Plan, in particular, would provide diagnostically analysis of the towns on the basis of which proposed Plans and Programme can be prepared.

Content (with thematic map) of Urban Area Planning Study are the following:

- Existing physical features and Occupancy Type and Use Class
- Proposed or on-going Development Activities
- Population Study: The population statistic shall have to be collected from all possible sources, such as: (a) Census. (b) Municipal Record. Analysis of existing population should bring out the following characteristics: Male/Female ratio, Age-sex pyramid, Reasons for population growth/decline (Birth rates, Death rates, Immigration, emigration)
- Traffic Survey:
    - Trip generation survey
    - Statistical analysis of the past trends in growth.
    - Types and Numbers of different Vehicles
    - The Traffic flow in major arterial roads and maps and charts showing origin and destination
    - Critical traffic Junctions
    - Existing roads type, width, condition of pavement and possibility for future extension
- Industrial Surreys:
    - Location, size and capacity of the existing industries
    - labourer statistics with the housing conditions
    - Future trend.
- Recreational Open Space: Parks, playgrounds should be surveyed to find out its details like location, size and attached facilities.
- Water Supply Data:
    - Source and extend of existing supplies
    - The capacity and system of water supply
    - future programme of expansion
- Power Supply:
    - Existing power supply sources and probable future expansion
    - Existing supply lines and the future probable lines
- Growth of the Town:
    - Spatial coverage of the town within broad time-frame
    - Strategic growth option for the town

- Health Facilities:
    - Location of health facilities and their hinterland
- Educational Facilities:
    - Location of health facilities and their hinterland
- Shopping: Shops and Commercial establishments differentiated into wholesale and retail shopping should be recorded. Growth or decline of shopping during the last 10 years
- Municipal Budget: Municipal Budget for last five years should be collected and presented with explanatory notes on the capacity of Municipality with respect to their development activities.
- Municipal Achievements: Maps and publications on the town itself in the form of books and book-lets, etc. should be collected and presented.
- Disposal Services: The methods of collection and disposal of garbage should be surveyed and presented with comments.
- The graveyards, Cremation ground, etc. should, be surveyed and presented. The methods of sewage disposal should be surveyed and presented with comments with probable location of treatment plant.
- Hazard mapping considering natural hazards: Flood, water logging, drainage congestion according to guidelines on Hazard and Risk management in regional plan

c. The Development Control Plan for National and Regional Highway Corridor would cover the areas outside the urban areas under Mirsharai Upazila along with the national and regional highway of the Region to prohibit ribbon development. The planning period for the component is 10 years. The plan would emphasize over retaining efficiency of the national highway. Content (with thematic map) of The Development Control Plan for Highway Corridor will be the similar or revised version (where necessary) of The Urban Area Plan.

d. The Rural Plan is the guideline for the land use control for the rural areas for next 10 years except the urban area and highway corridor area. The plan would emphasize over retaining the characteristic of the rural part of the project. It also provides guide line for necessary physical & social infrastructure which may needed for sustainable rural development particularly for rural growth centres. The main concern of

this plan is to preserve the agriculture land as much as possible. Content (with thematic map) of Rural Planwill be the similar or revised version (where necessary) of The Urban Area Plan.

e. The Action Plan is a separate document covering the first five-year period of the structure plan. It examines, in the context of the structure plan, those items that might be implemented in this period and thus contains more detail on a more limited range of subjects than the structure plan. It tries to provide the planning area with guidance in deciding between priorities.

Project Selection for action plan: This consists, basically, of the actions listed for the first five-year period in the implementation chapter of the structure plan. While the importance of maintenance has been stressed throughout the structure plan, maintenance activities by themselves, except where they form a part of a development project, are not included in the action plan. Their selection is based on a variety of criteria. These include the maintenance of existing provision levels.

Project Evaluation for action plan: Project evaluation is done for those, which might be locally funded, and for those unlikely to be locally funded but which are the responsibility of a Ministry or another central agency. Ideally, funds would be made available for implementing priority projects following evaluation. This unfortunately is not the case but the evaluations will assist the local agencies in deciding upon priorities for using local development funds and in pressing for action by national agencies. The evaluations vary according to information available but overall are more qualitative than quantitative.

They cover the following aspects:

- Nature of project
- Location
- Justification (why project needed)
- Approximate cost including maintenance element
- Beneficiaries, direct and indirect
- Agency responsible
- Risk/difficulties/problems anticipated

Establishing Priorities for action plan: It is worth repeating that all the actions/projects selected and evaluated are required to bring about development along the lines advocated in the structure plan. Nevertheless, constraints make it difficult to carry out all these activities in even such a small programme. Where possible, therefore, priorities are recommended. It is the funding authority concerned, which should decide upon priorities, but the evaluations can assist in this decision.

2.6 Typology for Mouza Map Processing, editing, Printing and Different Types of Surveys, Studies and Activities

The Survey firms' shall have to follow the following step-wise integrated activities for the stated scope of work on the intended different survey works. He/she would have to interlink the intended survey activity with different steps of other related activities conducted by other different survey firms'. A detailed methodology of the specific survey work including procedure for relating its output with that of other different surveys and activities (both attribute and spatial data of physical feature, topographic, land use, transportation, hydrological, socio-economic and other required hard and soft data), which would be imparted by other different survey firms' has to be mentioned clearly in the proposed technical proposal. The survey firm has to combine the rural database with that of database (GIS database) of municipality area. A presentation of the proposed methodology shall have to make before the Proposal Evaluation Committee (PEC) as part of technical proposal evaluation. The bidder has to make the presentation by using his/her own hardware and software along with valid licence. The Client may the premise of the firm without providing prior notice (if necessary).

A. The project would provide a framework for a planned development of tourism along with all necessary facilities at Mirsharai Upazila. To accomplish the task a GIS mapping survey based on the mouza maps from the respective sources is required. Components of the survey work are:

The tasks for the include:

2.1 Collection of Mouza Maps

Available mouza map shall be collected from concerned DC Office and Directorate of Land Records and Survey (DLRS) and scanning of mouza maps will be carried out using drum scanner. Flat bed scanner will not be allowed for scanning of mouza maps. Rotation and alignment must be maintained during

scanning of mouza maps. After scanning of mouza maps all scanned files, in digital format, will be submitted to Project Director (PD) for preservation.

Survey Firm will be liable to pay and communicate with the respective authority to collect the maps.

2.2 Scanning of Mouza Map

Scanning of mouza maps will be carried out using drum scanner. Flat bed scanner will not be allowed for scanning of mouza maps. Rotation and alignment must be maintained during scanning of mouza maps. After scanning all scanned files in digital format will be submitted to Project Director (PD) for preservation.

2.3 Accuracy and DPI management during Scanning

During scanning of the Mouza maps at least 300 dpi resolutions and maximum error 2 mm. maintaining the appropriate resolution is mandatory. The scanner machine would be of latest technology with highest specifications.

2.4 Digitizing the Mouza Maps

On screen digitization method will be used for digitization of mouza maps. Arc GIS software will be used for this purpose. Feature wise manuscripts will be developed for digitizing the mouza maps and all features will be stored as layer coverage with a separate ID or code number of respective features in the GIS database. To keep uniqueness of all features the ID or code numbers of respective features will be finalised as per suggestion and discussion with Project Director (PD).

To carry out the huge mouza maps, there would be adequate digitization stations to the Survey Firm 's office to carry out in time. During the digitization, accuracy has to be ensured by the Survey Firm .

2.5 Manuscript 01: Point Features.

This manuscript will contain all point features like boundary and other pillars, traverse stations, GT stations, benchmarks etc. Every point will contain a numeric user ID representing feature type.

2.6 manuscript 02: Polygon Features

This manuscript will contain all polygon type features or closed boundary like water bodies, land uses, and topography. All features will be closed polygon and every polygon will contain a numeric user ID representing feature type.

2.7 Manuscript 03: Line Features.

This manuscript will contain all line type features like administrative boundaries, roads, drainage, bridge/culvert, embankment/flood wall, sluice gate, water ways, rail ways etc.

2.8 Quality Measures during digitizing *(Edit Plot Checking of Digitized Coverage)*

After digitisation of mouza maps edit plots will be produced containing all the features in different colours to maintain the quality of the digitization of the mouza maps and ensure the proper projections while map projections will be carried out. The digitized mouza maps will be checked and verified by superimposing on the original mouza maps using the light table. This checking will be done with the joint team of UDD and the respective personnel appointed by the Survey Firm .By this edit plot check all possible errors (missing arcs, dislocated arcs, wrong or missing polygon labels, tic location and ID etc) will be solved and final digitized mouza maps will be prepared. After finalisation of digitization of mouza maps, all data both soft and hard copy will be submitted to Project Director (PD).

2.9 Joining of Mouza Maps and Demarcation of Study Area

Joining of mouza maps will be done using ArcGIS software where surveyed GCPs will be used as TIC point. Afterward all Geo-referencing mouza sheets will be joined and Mouza map will be prepared using ArcGIS. The geo-referenced mouza maps will be prepared in original mouza scale. This map lay out will be submitted to Project Director (PD) in hard and soft format.

Study area will be demarcated by joint team, duly approved and signed by Project Director (PD) which will be considered as project area. While joining mouza maps, edge matching shall be performed in consultation with the PD.

2.10 Preparation of GIS Map Lay Out

A standard map layout will be developed with consultation of Project Director (PD). Scale, Paper size and Grid for preparation of map lay out will be prepared as specified by the PD. Legend for features in the map will be selected from the available symbol palettes in ArcGIS will be used to develop a standard layout. BBS geo-code may be used for administrative unit.

3. GEO-REFERENCING MAPS, GROUND CONTROL POINT (GCP) SURVEY

3.1 Map Projection Systems

The Maps will be projected in BTM coordinates. Survey Firm will be needed to collect the appropriate parameters and implement it during the map projections.

3.2 Quality Control of Geo-referencing

To ensure the quality and accuracy of the geo-referencing, the Survey Firm has to take all the measure including taking the GCP points and geo-reference the maps utilizing the GCP points.

3.3 Selection of Ground Control Point (GCP)

At least 8 nos. of GCP (Tic) should be selected in ground for each of mouza sheet for conducting GCP survey. The joint team of UDD and the personnel appointed by the Survey Firm will select the GCP. Geo-referenced (x, y, z) permanent Bench Mark (BM) pillars uniformly distributed covering the project area have to be established to carry out the total topographic, physical feature and land use survey or as per direction of PD. Design drawing of BM pillars has to be approved by the Project Director (PD).

3.4 GCP Survey for ground truthing

For each mouza sheets, at least 8 GCP points has to be selected and taken utilizing the RTK GPS. The configuration of the RTK GPS has to be of latest technology with highest level of accuracy.

GCP survey will be carried out using RTK GPS based static survey technique. The positional accuracy level of GCP survey must be <± 1meter. Survey data (GPS and Total Station data) will be stored in BTM (EVEREST 1830) Projection (Northing Easting ellipsoidal/SOB/PWD height in meter) system in an available file format. However, conversion into Arc/Info format will be made with data stored in format. All GCP survey data both soft and hard copy will be submitted to UDD immediately after completion of GCP survey.

4. OUTPUT

4.1 Map Printing at proper scale

After completing the survey and all the GIS processing, the Maps has to be printed by the Survey Firm . Maps would be printed at the scale 1:990 with proper annotations, titles and legend. The color grading and symbols for the map layout should be in accordance with the standards of the Client.

4.2 Attribute Data Base of the Digitized Mouza Map

The Survey Firm shall submit all attribute data of all the features in the mouza map including individual plot number that would be generated from the spatial database.

4.3 On job training

Survey Firm will provide training to the Client (10-15 professionals) in carrying out the GIS mapping desk jobs, establishing GCP and so on.

4.4 Survey Report

After completing all the surveys, a survey report including both spatial and attribute database has to be submitted by the Survey Firm along with its progress report.

5. INSTITUTIONAL ARRANGEMENT

The client will form a committee to communicate, monitor and check the tasks accomplished by the Survey Firm .

6. TEAM COMPOSITION

The Survey Firm will form a highly qualified team to accomplish the tasks as specified above.

Adequate personnel and technical capabilities for providing training on the above-mentioned tasks.

The survey firm has to perform the following tasks including surveys and studies:

B. Construction and Establishment of Bench Mark (BM)/Ground Control Point (GCP): Pillars covering the project area including approximately 5 km. grid in 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.

C. Preparation of Base Map through Satellite Image Procuring, Processing, Digitized and Geo-referenced Mouza Map: Base map shall be prepared with the help of photogrammetric system by using 3-D image (four band) with resolution 0.5m accuracy by the survey firm under the supervision of PD. The base map shall be presented at the scale of 1: 3960/1980. The survey firm shall also digitize mouza map and geo-reference them by using RTK-GPS. The survey firm shall also geo-reference the base map, which would be prepared from satellite image processing, with mouza map with the scale of 1: 3960/1980 as available from the source.

D. Existing Land Use Survey: The land use survey (both attribute and spatial) will indicate the use of each plot of land and each building construction/age, vulnerable condition (pounding, short Coolum, etc) survey in the Project area. The Surveyors will visit each and every site to record existing usage with specified notation and colours as per direction of the PD. The output of this Survey will be one or more maps showing existing Gross Rural agricultural land use, Residential, Commercial, Administrative and Cultural zones, nature of rural area or rural urban fringe area (high, lower), water courses and water bodies, roads demarcating the main zones and plantation/vegetations as per direction of PD .

Scale of Survey: The survey should be conducted on maps of RF 1: 3960 or as per direction of PD.

Notation or colour—Survey information shall be recorded and presented in any colours as specified by Urban Development Directorate.

E. Physical Feature Surveys: Physical feature survey will have to be conducted for the whole of project (rural or rural-urban fringe) area. Location and dimension (X, Y, Z value) of all existing structures including building type, height, floor type and use of each floor, year of construction/ age, collection of household population data, Ownership of the building and to transfer the data compatible to cohort population forecast, homestead boundary, homestead area, cropping pattern, cropping intensity, location of riser of gas of each household, location of well, tube well, pond, tap water etc, toilet with sewerage facility, safety tank and open drain etc. all water control structures including khal (natural and man-made), cross section of water bodies specially khal , hill areas with one feet interval and existing routes/ roads, embankments, dykes, box culvert, sluice gate etc, vegetation cover, culmination between flood Plain and homestead, ground water harvesting devise, river *ghat/ganj*, railway station and railway line, all type of roads, location of all existing exposed light/electric, telephone posts and national electric grid/towers/transformer, gas, water, sewerage line etc.

Physical feature survey firm also will have to be conducted of 12.62 sq.km Urban survey with RTK GPS and total station survey for the urban area of project area, 10% hill area survey out of total hill area130.00 sq.km/32124.40 acre (Calculated from GIS) with RTK GPS and total station survey of project area(tracking & cannel), 50% Plain area survey out of total plain area 379.80 sq.km/93850.11 acre (Calculated from GIS) Rural survey with Satellite image and ground-checking of major settlements through RTK GPS and total station survey of the Project area. (All kind of Survey Uses by RTK GPS), 50% Plain area survey out of total plain area 379.80 sq.km/93850.11 acre (Calculated from GIS) Rural survey with Satellite image and ground-checking of except settlements through RTK GPS and total station survey of the Project area (RL Verification and other Information Collection), Urban survey with RTK GPS and total station survey for the urban area of project area, Two nos BM Pillar for Mirshari urban area , Two nos BM Pillar for Baraiarhat urban area. Rural survey with Satellite image and ground-checking of major settlements through RTK GPS and total station survey for the rural area. One nos BM Pillar for rural survey area each union. Different Types of Survey (as Directed by PD) and Studies (Different scale of survey maps and print outs will be finalized in consultation with the PD). It also includes the cost of personnel needed to conduct the necessary surveys and all draft/final survey printing charges.(excluding hill area & forest area), Secondary Data Collection (excluding rural and urban area) etc.

F. Topographic Survey: The Topographic database shall be obtained from geo-referenced 3-D (four band) image and further cross-checked and ground truthing by using RTK-GPS and Total Station to obtain and verify 3-D data (X,Y,Z value) on location and alignment of all data obtained from physical feature survey including roads, flood embankments and other drainage divides. Location and alignment of all drainage and irrigation channels/canals showing depth and direction of flow. Closed boundary/outline of homestead, water bodies, swamps, forest etc. junctions, spot heights or land levels at roughly 10/5 m intervals for the Plain area, 1 m hill area, appropriate interval for sea area and close interval as and when required such as dyke, embankment, roads, rail-roads, river bank, rail line etc.

G. Other Surveys and Studies

a. Survey of Development Activities: Site plan, land acquisition plans of new development projects shall have to be collected and presented in the map of RF 1: 990.

b. Population Studies: The population statistic shall have to be collected from all possible sources, such as:
(a) Census. (b) Municipal Record,
Analysis of existing population should bring out the following characteristics—
(i) Male/Female ratio, (ii) Age-sex pyramid, (iii) Reasons for population growth/decline (Birth rates, Death rates, Immigration, emigration)/extension of Municipal boundary, etc and
(iv) General economic conditions of the people.

c. Road Surveys: In this survey detail of existing roads like type and condition of pavement, existing width and possibility for future extension should be studied and presented with appropriate explanatory notes. Road survey would include hierarchy, network and circulation pattern. Open space, relationships, etc.

d. Water Supply:
(a) Source and extend of existing supplies shall have to be recorded on maps and its future programme of expansion should be shown side by side in different colours.
(b) The capacity and system of water supply and future programme of expansion from municipality or public Health Engineering Department or any other appropriate agency.

e. Power Supply:
(a.) Capacity of the existing power supply sources and probable future expansion shall have to be presented in appropriate maps.
(b) Existing supply lines and the future probable lines should be presented on the same map side by side preferably in different colours.

f. Telephone Service:
(a) Types of Telephones Exchange and future programme.
(b) Existing Communication lines and future probable expansion shall be shown side by side.

g. Growth of the Town: Historical background with graphic materials on the existing Municipal area along with proposal for future expansion should be collected and presented with detail information.

h. Shopping: Shops and Commercial establishments differentiated into wholesale and retail shopping should be recorded. Growth or decline of shopping during the last 10 years should be collected and presented with explanatory notes on the causes for growth or decline.

i. Municipal Budget: Municipal Budget for last five years should be collected and presented with explanatory notes on the capacity of Municipality with respect to their development activities.

j. Municipal Achievements: Maps and publications on the town itself in the form of books and book-lets, etc. should be collected and presented.

k. Disposal Services: The methods of collection and disposal of garbage should be surveyed and presented with comments. The graveyards, Cremation ground, etc. should, be surveyed and presented.

The methods of sewage disposal should be surveyed and presented with comments with probable location of treatment plant.

l. Hydrology: Drainage network, drainage depth, width at 50 meter interval, flow diversion, water level, Drainage condition (Katha, Pacca, Semi-pacca) for both urban rural area, covered/uncovered, type of drainage, die of pipe drain, Outlet, cross-section etc. Identification of Catchment & Sub catchment and delineation of Primary, Secondary and Tertiary drain, flow direction, general slope of drain etc.

m. Agriculture Survey: Total agriculture land, Soil Type, Cropping Pattern, Intensity, Seasonal Variation, Agriculture Land Coverage by Irrigation, Rate of agriculture land reduction etc.

The survey firm shall prepare report on the basis of output of the obtained surveyed and studied data showing a possible quality of existing and possible future pollution in the project area with tentative remedial measures and adaptation for Project area. All the collected environmental pollution and disaster related attribute and spatial data shall be linked with other spatial database by the survey firm. All Information should be transport to mouza map and GIS Database.

2.6.1 Presentation:

(a) All type of survey result should be presented in two forms: first on the map of RF 1: 990/1980 or as directed by the PD; secondly in report form. The design of the map should be appropriate in size so that it is not difficult for handling. If the maps are too large it should be cut into standard sizes, which can be fitted during any kind of discussion and presented without any inconvenience. The colours and indications to be used should be obtained from Urban Development Directorate.

(b) Final survey results shall be analysed, interpreted and presented in Report form. The maps in this Report or report should be advantageous size for publications and the graphs, charts, etc., and appropriate to match with the report shape.

(C) Scale of Survey and Notation or colour shall be determined in consultation with PD.

2.7 Planning Stages for the Project: A number of planning stages would be developed as an outcome from analysis of diversified data and information that would be obtained from the results of different surveys and studies.

(i) The Environmental Conservation Plan would identify the environmentally critical and sensitive areas in the beach and adjacent coastal region of Mirsharai Upazila and provide guidelines for preserving the particular area from depletion and preserve the natural resources for future generation to attain **"Sustainable Development"**.

(ii) The Environmental Management Plan would contain an environmental management framework upon which different sectors of coastal resource would develop and spread. This would help effective functioning of coastal resources, preservation of cultural heritage, natural resources of the area.

(iii) The Water Management Plan would provide guidelines for sources, quality, and quantity of water, for requirement for the plan period including their management system.

(iv) The Social Space Plan would identify different social spaces in a systematic way to define characteristics of particular spaces for local and foreign tourists, inhabitant (both local people and tribes) of the area including particular space (tangible) and nature (intangible) of their interaction, borderline of interaction with appropriate solution to conflicts that exist and/or might also arise at different stages of interaction and development.

(v) The Spatial Plan would provide planned shape of physical and social infrastructure of the area to promote tourism in Mirsharai Upazila.

(vi) The Tourism Plan would provide space for tourist zone with adequate services and facilities in and around the beach. This also include exclusive tourists' zone for foreign tourists.

(vii) The Food Grain Management Plan would provide guidelines for sources, quality, and quantity of food grain for requirement for the plan period including their management system.

(viii) The Energy Management Plan would provide guidelines for sources, quality, and quantity of energy for requirement for the plan period including their management system.

(ix) The Waste Management Plan would provide guidelines and recommendations for management of different types wastes that would be generated by diversified activities that are expected to take place as a result of implementation of the plan including site selection for waste dumping and management system of the generated waste; and

(x) The Disaster Management Plan would provide a management system for different types of disasters (both man made and natural) that threaten the region along with provision of appropriate guidelines and recommendations for disaster risk reduction.

(xi) The Institutional Development Programme would contain an institutional framework upon which different sectors of coastal resource would develop and spread. This would help effective functioning of coastal resources, preservation of cultural heritage, natural resources of the area.

(xii) The Financial Management Plan for different sectoral bankable projects that would be identified from analyses that would provide guidelines for economic input and expected out, probable sources of financial cash flow and method of financing, expected economic return including providing calculation of Opportunity Cost, Benefit-Cost Ratio (BCR), Internal Rate of Return (IRR) and Break Even Analysis etc. for the concerned project to make them economically viable.

2.8 STEP WISE ACTIVITIES FOR THE SURVEY AND PLANNING WORK

The survey firms shall have to follow the following step-wise integrated activities for the stated scope of work on the intended different survey and planning works. He/she would have to interlink the intended survey activity with different steps of other related activities conducted by other different survey firms. The A detailed methodology of the specific survey work including procedure for relating its output with that of other different surveys and activities (both attribute and spatial data of physical feature, topographic, land use, transportation, hydrological, socio-economic and other required hard and soft data), has to be mentioned clearly in the proposed technical proposal. The survey firm has to combine the rural database with that of database (GIS database) of municipality area. A presentation of the proposed methodology shall have to make before the Proposal Evaluation Committee (PEC) as part of technical proposal evaluation. The bidder has to make the presentation by using his/her own hardware and software along with valid licence. The Client may visit the premise of the firm without providing prior notice (if necessary).

STEP 1 MOBILIZATION, RECONNAISANCE SURVEY, PROJECT DESIGN AND SUBMITION OF MOBILIZATION REPORT

Deployment of Key Personnel and supporting staff for the intended project and tentative work schedule. The survey firm shall conduct reconnaissance survey; initiate the collection of mouza maps and other relevant maps, 3-D Satellite image and other secondary materials etc.

Submission of Mobilization Report

STEP 2 COLLECTIONS OF MAPS, BASIC STATISTICS AND INFORMATION AND SUBMISSION OF INCEPTION REPORT

To start the planning process the existing situation of the planning area has to be represented in a set of maps and in a collection of basic statistics and information.

Step 2-I Collection of Geo-physical maps and reports Includes

- Geology (sedimentation, stratification, fault lines, lineaments etc.)
- Hydrology (contour lines, water bodies/courses, embankments, pump house, related structure etc.)
- Soils major type.
- As a first 'overlay' to the, base map the geo-physical situation of the planning area has to be given.

Step 2-II Collection of Topographical maps and reports Includes

- Physical features (land/water, urban/rural, built-up/open, landmarks, bridge/culvert, and embankment/floodwall, sluice gate, Tree, Boundary wall, Structure etc)
- Infrastructure (drainage, roads, public transportation and utilities etc)
- Land use (in broad categories such as residential, industrial, commercial, agricultural, cropping pattern & intensity, flood flow, etc. As per direction of PD)
- As a second overlay the existing topographical features has to be shown.
- Most of the information can be derived from existing sources (desk research).
- At this stage 'field visits by the survey firms' are useful to get a general impression of the character and the quality of the planning area.

STEPS 2-III Collection of Basic statistics: present activities

- Number of inhabitants/households, Ownership of House, differentiated according to income level/type/density and quality of housing
- Production and employment (formal/informal, number and size of establishments, type of production/activity, income/education level)
- Public services (education, health, security etc.) and utilities (drinking water, sewerage/sanitation, garbage disposal, gas, electricity, telecommunication etc); administrative institutions
- Commercial activities (shops, markets both formal and informal etc)
- Transportation facilities (roads, public transportation, parking facilities, waterways, railway, foot path etc)

Step 2-lV Submission of Inception Report

The report should include the following (with necessary maps/figures/diagrams/graphs etc.)

(1) An introduction narrating the purpose of the study, objectives and scope of services and activities to be performed.
(2) A brief of the Sixth Five Year Development Plan and Sustainable development Goals(SDG) with principal objectives of the development plan within the broad scope of Urban and Regional Planning, Water Supply and Housing Sector of the National Development Plan, provision of National Water Management Plan (NWMP), National Perspective Plan and other relevant national level plan, policy etc.
(3) A Review of the work plan, time schedule, input and management plan.
(4) An assessment of the actual provision of inputs in relation to the expected outputs.
(5) Analysis and findings from reconnaissance survey including problems and possible solutions to the survey activities and prospects of development.
(6) Review of all relevant reports, documents and other materials, which will form the base for the contract indicating those items already acquired and those requiring official assistance for acquisition.
(7) An assessment of all additional data collected and survey works to be carried out for completion of the database for the contract. This should be accompanied by a detailed program for the collection of the remaining data.
(8) Development of methodology for each component of the physical feature survey work showing relationship with planning package (i.e., sub-regional plan, structure plan, urban area plan, rural area plan, action area plan) etc.

STEP 3 SATELLITE IMAGE PROCURING, PROCESSING, GEOREFERENCING AND PREPARATION OF BASE MAP

(1) A review of the work plans and time schedule for the remaining period of the contract.
(2) Activities to be performed by the survey firms for Survey Report:

- Satellite image Procuring, processing etc

- Preparation and compilation of base map and demarcation of project boundary

Step-wise detailed activities to be performed by the survey firms are described below:

STEP 3.1 SATELLITE IMAGE PROCESSING BY USING PHOTOGRAMMETRIC METHOD

Photogrammetric method by using satellite/aerial stereo images to create Digital Elevation Model and make geospatial database more effectively. With the advent of latest trends in the technologies and unique customer requirements, photogrammetry is now the leading technology for mapping. The field of photogrammetry is a rapid science with new technologies being developed constantly. Within a short period of time, the practice of photogrammetry has changed from analog to digital. The development of digital aerial cameras has advanced significantly over the past 4-5 years. The use of digital aerial images would be more advantageous for all map and image production especially for Digital vector data and Orthophoto generation.

Step 3.2.1 Methodology

- Since the internal precision of extracted DEMs is strictly related to the mean scale of photographs, image quality, pixel dimension and, obviously, morphology of the area, *Image Collection* is a crucial part of the project. Image will be collected from Satellite image provider.
- The Satellite image in 0.5-meter panchromatic and 2.0-meter multi spectral four-band images in stereo pairs will be procured for whole project area. The 0.5-meter pan and 2.0-meter multi spectral imagery will also be fused to yield 0.5-meter colour imagery (pan-sharpened) and 2.5-meter stereo image will also be collected for country area, Collecting, Computing, Geo-Referencing of all Existing secondary data for preparation in initial base map.

Step 3.2.2 Image Processing

Image processing will be done after collecting raw digital images. The tasks involved in image processing and editing are:

- Epi-polar Correction
- Color Balance
- Contrast Adjustment
- Sharpening
- Pyramid
- Bit Rate Setting

Step 3.2.3 GCP Collection

- Ground control points will be selected by photo identification of existing ground features. Considerable number of GCP will be collected as required for the whole study area. All GCPs will be collected by conducting field survey using RTK GPS method. After collecting GPS data of the GCP, post processing will be done day to day in the sites. Accuracy level will be maintained within 10 cm.

Step 3.2.4 Aerial Triangulation

- Aerial Triangulation is a mathematical process used to determine the real world position, height from mean sea level and orientation of each photograph. Aerial Triangulation will provide the accurate stereo (3D) model of image. One of the most advanced aerial triangulation is Inpho Match-AT.

Input for AT	Output of AT
- IMU, RPC data - GPS (on board) - GCP (collected from field) - Image	Geo-referenced Stereo Model

Step 3.2.4 Digital Mapping from Stereo Model

- After the orientation of stereo models, digital mapping will be carried out. We propose ArcGIS Geodatabase/ shapefile model for storing geo-spatial data. The proposed Geo-database and its Feature classes will be designed based on the followings:
  - Projection Parameters of the Coordinate System
  - Name and type of layer (feature classes)
  - Structure of Attribute Tables of the Feature classes
- Digital Photogrammetric Workstation e.g. Datem Summit Evolution (DPW) will be used as the platform for acquiring features from digital stereo images (model).
- Feature registration will be done considering and measuring the position of the object under its accuracy level. The Summit Evolution & Stereo Plotter of DAT/EM will be used for identifying and registration of the objects and ArcGIS 10 or higher version of ESRI will be used for vector data storing and editing.

Step 3.2.5 Attribute Data Collection

- Attribute data of the features will be collected from the field after producing base map. It will be a step by step procedure.
- Attribute of different floors in each building would be collected by the survey firm.

Step 3.2.6 Map Updating

- Attribute data collected from the field, will be incorporated into the features in this stage.

Step 3.2.7 Field Check

- Field checking will be done check the following:
  - Dimension and shape of the features
  - Accuracy of feature's attributes
  - Missing objects.
  - Data will be collected by total station where cloud will be found in the image or some object which is not able to identify in image.

Step 3.2.8 DTM/DEM/TIN/Contour Generation

- **DTM Point:** Digital photogrammetry is able to acquire 3D points for high spatial resolution DEM generation through semi-automatic procedures, overcoming the problems of process. In the approach, DTM Points will be generated from Stereo Pair images by the software, and editing of the software generated DTM points will be done by the Photogrammetrist comparing them with stereo model. Creating and editing of Break lines will be done after this stage.

- **Contour:** After creating DTM Points, Contour lines will be produced. The contour lines will be delivered in 1 km x 1 km or 5 km x 5 km blocks or one single file for the project area.

- **DEM:** Using DTM Points DEM will be generated at a resolution of 10 meters in 1 km x 1 km or 5 km x 5 km blocks or one single file for the project area.

- **TIN:** Using DTM Points TIN will be generated and delivered in 1 km x 1 km or 5 km x 5 km blocks for the project area.

- **OrthoPhoto:** An orthophoto or orthophotograph is a photograph which terrain corrected ("orthorectified") such that the scale is uniform: the photo has the same lack of distortion as a map. Orthophotographs are commonly used in the creation of a Geographic Information System (GIS).

a. Ortho-rectification of Images

Ortho rectification is a process by which image distortions caused by topography and image orientation are geometrically corrected by the incorporation of a terrain model.
Ortho-rectification of every image will be carried out using digital photogrammetric system based on result of aerial triangulation and the generated DEM.

b. **Mosaicing of OrthoPhoto**

Individual rectified photograph will be assembled to form seamless mosaic.
Mosaicing of OrthoPhoto includes the following tasks
i) Seam line Drawing: Drawing the boundary of the image delineating which part of the image will go which image.
ii) Balancing of Color and Contrast within different images
iii) Feathering

Step 3.3 SUBMISSION OF REPORT ON SATELLITE IMAGE PROCESSING, GEOREFERENCING AND PREPARATION OF DEM AND BASE MAP

Study Area Map (Digital copy in ARC/INFO format & Hard Copy) along with report stating the status of collected information, procedure of establishment of permanent Ground Control Point (GCP) and Temporary Ground Control Point (TGCP), demarcation of study area boundary including the technical specifications have to be submitted. The report also accompany with image procurement, processing, GCP collection, Aerial Triangulation, Digital mapping from stereo model, attribute data collection, map updating, map updating, DEM/contour generation etc.

After completion of satellite processing, georeferencing and preparation of base map, the survey firm will submit report on procurement, processing and georeferencing of satellite image and preparation of DEM/DTM/DSM and base map along with the base map repaired.

STEP 4 SURVEY ACTIVITIES (Field Survey information in original format have to be submitted to the Project Director (PD) at the end of every week.) AND SUBMISSION OF SURVEY REPORT

(1) A review of the work plans and time schedule for the remaining period of the contract.
(2) Activities to be performed by the survey firm for Survey Report:

- All survey data including
  - Topographic Survey
  - Physical Feature Survey
  - Land Use Survey
  - Other related survey (Bathymetric report studies, hydro-geological survey, survey of Urban and Rural Economy, environment studies, disaster studies, social space studies, hotel/motel accommodation survey, Industrial survey etc)
  - Collection of Socio Economic data from published sources

Step-wise detailed activities to be performed by the survey firms are described below:

Step 4-I Topographical Ground Truthing Survey

- Topographic survey will cover the following features:

- Topographic survey by using RTK-GPS and Total Station to obtain 3-D data (X,Y, Z value)-location and alignment of all roads, flood embankments and other drainage divides. Location and alignment of all drainage and irrigation channels/canals showing depth and direction of flow. Closed boundary/outline of homestead, water bodies, swamps, forest etc. junctions, spot heights or land levels at roughly 10 m intervals for urban area and 20 m intervals for rural areas.

- All collected raw data shall be submitted to PD before processing.

- Generating contours at 0.5 meter intervals with denser intervals for undulations.

- Alignment and crest levels (not exceeding 50meter) of road, embankment, dykes and other drainage divides.

- Alignment of rivers, lake, canal and drainage channels etc

- Outline of bazaars, water body, swamps etc.

STEP 4-II PHYSICAL INFRASTRUCTURE SURVEY

- All existing structures position and dimension (3-D-X,Y, Z value).

- Cross section, long section, type, width, length and name of road, road level above datum, flooding, land slopes, borrow pit.

- Identification of any bridge or culvert on the road and their length, width and span of the bridge, condition of abutments, condition of the dyke, wing walls abutment.

- Type, size, depth, inlet and outlet location of drain along with flow direction width and depth of the canal, place of encroachment.

- Type of sewer system, size, type and location of sewerage line, location of bins, identification of any other sewerage collection system.

- Identification of the water supply system, location of deep tubes well, overhead water tank and its capacity, catchment area of overhead tank.

- Identification, location and capacity of electric substation, telephone exchange, Titas gas subs station etc. Treatment plant and waste disposal facilities.
- Identification, location and capacity of electricity, telephone, gas, and waste disposal and treatment system.

Step 4-III LAND USE SURVEY

Land use information have to be extracted from physical feature survey as per specification of TOR After completion of data processing and draft mapping, land use survey have to be updated through field verification.

Step 4-lV OTHER SURVEYS AND STUDIES

STEP 4-lV-A Surveys will be conducted on the issues like tourism development, housing for disadvantaged group, informal economic activity, traffic congestion, drainage, water logging, unauthorized encroachment, waste disposal, play ground and park, stakeholders participation for planning and development control.

STEP 4-lV-B Inventory of survey will have to be prepared as per format. Data processing, analysis of survey data, mapping and reporting will be made as per requirement of TOR.

Step 4-IV-C Other Related Surveys
Other related surveys and studies (traffic survey, hydrological studies, Drainage Survey, bathymetric report studies, environment studies, disaster studies, social space studies, baseline survey of flora and fauna etc.) shall also be conducted in consultation with PD.

Step 4-VI Submission of Survey Report along with relevant maps, figures and charts (physical feature, land use & other related survey findings) for approval.

Step 4-VII Linking of all collected spatial and attribute data with other spatial database.

Step 4-VIII The survey firm shall also conduct digital survey for the building structures that would be affected by widening roads, and take photograph and geo-coordinate of the building structure, and upload them in the Web site instantly through online communication device.

The Survey firm shall conduct RTK-GPS based Survey (as and when necessary is consultation with the PD) for proper joining of the both dataset.

STEP 4-VIII After completion of all survey work and linking all attribute and spatial database with each other the survey firm will submit survey report. The survey firm shall submit all raw database and spatially linked database along with survey report.

STEP 5: DATA PROCESSING, ANALYSIS, INTERPRETATION, PRESENTATION, FORMULATION OF WORKING PAPER AND SUBMISSION OF INTERIM REPORT

(1) A review of the work plans and time schedule for the remaining period of the contract.
(2) Activities to be performed by the survey firms for Interim Report:

- Preparation of working paper for all relevant components of the planning package including, but not limited to the following:
  - Topography, physical feature and undulation of the area
  - Land Use including spatial quality, and trends and patterns of growth
  - Housing and socio-economic condition
  - Social and Urban Infrastructure
  - Agriculture
  - Drainage
  - Utilities and Services including water supply, sanitation, sewerage disposal,
  - Transportation and traffic
  - Hydrology and bathymetric studies (if any)
  - Geology including both engineering and hydro-geology
  - Urban and Rural Economy including informal economic and industrial sector
  - Environment, Disaster Risk Assessment, Waste Management and Pollution
  - People's participation and Social space
  - Historical Importance, archaeology and Tourism

Interim report containing requisite working papers (if more than above stated required) shall be prepared by the survey firms as directed by the PD.

Step 5-I: All the working papers (number and content of working papers shall be determined in consultation with the PD) shall contain analysis of existing situation and local demand; people's view, attitude and opinion regarding development problem.

Step 5-II: Land suitability analysis shall be made on the basis of the results of engineering geological survey, hazard study, topography, land use, physical feature and other related surveys and studies upon which planning proposals shall be made.

Step 5-III: SWOT analysis, and Identification of problem area and requirement on space and analyzing them with respect to surveyed data and information.

Step 5-IV: Formulation of planning standard with respect to spatial variation in character and natural setting.

Step 5-V: Formulation of policies for planning package and development of alternate strategies to attain the policies;

Step 5-VI: Analysis of alternative strategies and selection of most appropriate option among the developed alternatives for preparing the planning package.

Step 5-VII: Submission of Interim Report along with all working papers containing the issues as stated in step 6-I to step 6-VI.

Step 6 Preparation of Draft Final Report for Planning Package for the Project

(1) A review of the work plans and time schedule for the remaining period of the contract.
(2) Activities to be performed by the survey firms for preparing Planning Package:

The survey firm shall assist UDD planning team in preparation of planning package, which consists of the following steps:

Step 6-I-A: Preparation of guidelines for Sub-Regional Strategic Plan for Chittagong Districts would be prepared for 20 years according to the guidelines from: National policies, Formulated and integrated different sectoral strategies at sub regional level, spatially interpreted sectoral strategies at sub regional level, formulated Conservation Plan at sub regional level and formulated Development Plan.

Step 6-I-B: The economic disparity among the Upazila within districts under study shall be figured out by using "shift-share analysis" and "input-output analysis" technique for drawing the future socio-economic development scenario.

Step 6-I-C: The sub-regional plan shall be formulated on the basis of regional (i) lands study, (ii) hydrology, (iii) Environmental studies, (iv) Hazard management, (v) Water Resource Management, (vi) Transport Studies, (vii) Population, (viii) Basic services, (ix) Economic Activities, (x) Anthropological and Ethnographical Study, (xi) Heritage, Archaeology and Tourism management and so on.

Step 6-I-D: Regional Structure Zoning Category would be determined following (i) Main flood flow zone, (ii) Sub flood flow zone, (iii) Wetland, (iv) Forest, (v) Agricultural land, (vi) Urban area, (vii) Rural settlements, (viii) Forest settlements, (ix) Industrial hazards, (x) Restricted flood protection reserve, (xi) tidal zone (x) Restricted military / public safety etc.

Step 6-IE: Conservation Plan under sub-regional plan shall be prepared depending on the ecosystems and resources of the existing nature and Land-use conflicts.

Step 6-II: Structure plan shall be prepared based on the outputs of sub-regional plan and other surveys and studies to develop the indicative plans for the upazilas. The structure plan would establish inter and intra-regional connectivity, economic base, set policies and develop strategies to achieve the policies. The plan would identify the urban areas and different rural centres of the upazila; and would also determine the planning requirements for the urban area, rural centres and rural area. The plan would also come up with a basis for preparing urban area plan, rural area plan and detailed plan for the upazila.

Step 6-III: Urban Area plan shall be prepared for the urban areas of the upazila, which would be identified at the structure planning stage, and based on the planning requirements for the urban areas, which would be identified at the structure planning stage. The plan would also come up with a basis for preparing detailed plan for the urban areas.

Step 6-IV: Rural Area plan shall be prepared for the rural areas of the upazila, and based on the planning requirements for the rural areas, which would be determined at the structure planning stage.

Step 6-IV: Action plan shall be prepared for the proposed bankable projects for the upazilas,

Step 7 Preparation of Final Report for Planning Package for the Project

The survey firm has to assist the UDD planning team in preparation of final report in the following manner;

Step 7-I: After approval of the draft final report by the Project Implementation Committee, survey firm has to assist the UDD Planning team in public hearing at the respective upazilas.

Step 7-II: The survey firm shall assist the UDD planning team for necessary modification of the planning package and finalization thereby.

Step 8: Printing of Final Reports and Maps and posting in WEB Page

The survey firm shall be responsible for final printing of the planning area report and also assist the web developer in prepare the documents in web compatible format and publishing in web page.

2.9 Report submission schedule and Mode of Payment

Reports shall be presented and illustrated in a clear and concise professional manner, including maps, plans, diagrams and other graphics. Schedule of submission:

Report	Language	Copy	Period of Submission	Binding Status	Mode of Payment (% of Contract amount)
Mobilisation Report	English	50	Within 30 days of signing contract	Spiral Binding	Not more than 5%
Inception Report	English	50	End of 2nd Month	Spiral Binding	Not more than 15%
Report Procurement, Scanning, Digitization, Editing, Geo referencing and Mosaicing of Mouza Map and Satellite Image Processing, Geo referencing and Preparation of Base Map	English	50	End of 3rd Month	Spiral Binding	Not more than 25%
Interim Report	English	50	End of 4th month	Spiral Binding	Not more than 25%
Draft Survey Report	English & Bangla	100	End of 5h month	Spiral Binding	Not more than 10%
Final Survey Report	English & Bangla	100	End of 6th month	Spiral Binding	Not more than 20%

2.9.1 Presentation

(a) Study result should be presented in two forms: first on the map of RF 1: 50000 indicating the national/ regional settings and RF 1: 250000 indicating the planning area; secondly in report form. The Scale, colors and indications to be used must be according to the instruction of Urban Development Directorate (UDD).
(b) Final study results shall be analyzed, interpreted and presented in Report form.
(c) Reports shall be prepared in MS word 2010 version and font shall be Times New Roman 12 pt
(d) All table, graph, diagram, chart, map shall be interactive with its original program such as MS Office and GIS
(e) All report shall be submitted in Web format
(f) Audio-visual presentation shall be made by the survey firm before submitting each and every report

2.10 Deliverable:

- Working papers concerned with objectives of the study (both hard and soft copy)
- All database to be handed over to the client
- All collected data, Original Mouza Map, information, book, journal and other relevant documents to be handed over to the client
- Handover Original set of 3-D Image to the client by the survey firm.
- The corrected copies of draft mouza map after geo referencing should be handed over the client
- All other maps shall be submitted as per direction of PD

2.11 Progress Reports: Progress Reports shall have to be submitted to UDD by Survey firm in every 3 (three) month on the basis of the approved working schedule.

- Medium of language of the progress report shall be English.
- Both soft copy and hard copy shall be submitted by the survey firm.

- Progress report shall be submitted within 1st week of the next quarter

2.12 Information leaflet (Submission at the end of the First month)

(1) The leaflet will be used by UDD to publicize the project.
(2) A short illustrated five page leaflet describing the project, giving reasons for the project and advantages expected to be generated by the project.
(3) 5000 copies of such leaflet should be prepared and supplied by the survey firm.
(4) Periodical paper and TV cable advertisements shall be arranged at survey firm's cost.

2.13 Others

(i) The survey firm requires to gather 3-D data (all feature's vertex must have Z value) to identify flood flow zone (Main/sub), water logging, drainage system, drainage congestion , to get profile of road (any where), identify features more correctly and accurately and also to create precise DEM, it is very much needed to have 3D data.

(ii) All vehicles, equipments and other inconsumable materials procured for survey firm by the UDD under this project must be returned to UDD after completion of the project.

(iii) After completion of survey works and after submission of Final Report a Seminar / Workshop should be arranged by the survey firm with the elite, Draft reports, Public representative businessmen, professionals etc. of the region.

(iv) Penalty shall be imposed or cancellation of contract shall be made by UDD on the survey firm who will violate the TOR or for any other misconduct by the survey firm.

(v) No payment will be made to the survey firm before accepting the Reports by the Implementation Committee.

(vi) Full time survey firms must stay in the survey firm's office.

(vii) All reports & detailed area plans will be prepared by the survey firms within the quoted price.

(viii) The development plan for Mirsharai Upazila Town should be composed of in a DVD and supplied to UDD.

(ix) The client reserves the right to accept any or reject any or all tenders within assigning any reason there of.

(x)The client reserves the right to increase or decrease any item or specifications in the schedule

(xi) Scale, dimension and quality of Map/3-D map shall be determined is consultation with the PD.

(xii) The survey firm team members shall be permanent employee of the survey firm and shall have practical knowledge experience as first and knowledge.

(xiii) The survey firm shall submit Legal software license documents (License Number) in the proposal to prove their technical strength and capabilities.

(xiv) An inventory shall be made on the logistics of the survey firm (if necessary).

(xv) The survey firm shall present the technical proposal before PEC (if necessary).

2.14 List of Reports, Schedule of Deliveries, Period of Performance by the Individual Survey firms

All the Individual Survey firms have to submit work programme within 15days of signing contract.

The individual survey firms have to submit working paper after completion of the assignment as directed by the PD and also require submitting fortnightly progress report to the PD on the assigned task.

3.15 Data, personnel, facilities and local services to be provided by the client

The client, UDD would provide project office with furniture/fixtures to the individual survey firms.

3.16 Institutional arrangements

Inter Ministerial Steering Committee and Project Implementation Committee (PIC) should be set up to monitor the project. The Secretary of the Ministry of Housing and Public Works will chair the Steering Committee and the Director of the Directorate will chair the PIC. In addition Proposal Opening Committee (POC) shall be formed to open the EOI and RFP of the Project and Proposal Evaluation Committee shall be formed to evaluate the EOI and RFP for selection of survey firm.

2.17 The Project Team of the Survey firm should be constituted as Follows:

(a) Survey Expert– 1 Person (1x6 = 6 mm.)

Qualification: B.Sc Engineering in Surveying/Civil/URP.
Experience: Minimum 10 years practical experience in Digital Geo-referenced physical feature and topographic survey and 3-D surveying.
Responsibility: (i) To design different surveys for the project (ii) To conduct, coordinate and monitor physical feature, topographical and land use, transportation and other related surveys and studies;(ii) Ensure quality and accuracy of survey data; (iii) To compile all the survey data into digital form; (iv) To assist the GIS Expert in transferring survey data into GIS, (v) To arrange survey trainings for UDD staff. (iv) Preparation of working paper, reports and plan of the project as assigned by the PD; (vii) Any other survey and studies related Jobs

(b) GIS Expert– 1 Person (1x6 = 6 mm.)

Qualification: M.Sc in Geography, Geo-informatics, GIS, Urban/Regional Planning, Information Technology or a relevant combination of education.
Experience: At least 10 years professional experience in relevant field. Advance knowledge in Mapping using GIS, remote sensing, relational database management and Geo-database modelling and experience in planning and implementation of field mapping logistics as well as advance knowledge in the use of, ArcGIS 9, ArcSDE, RTK GPS for gathering field data is essential.
Responsibility:
(i) To prepare topographic, physical feature, land use and other related map of the area, (ii) To prepare, supervise, manage and monitor digital database (Spatial and attribute) of the project. (iii) Installation and troubleshooting of GIS in UDD project office and head office; (iv) Ensure the quality of the map and related work. (v) To work with a multi-disciplinary team environment to synchronize the multi-sectoral data into GIS database. *(vi) Preparation of working paper, reports and plan of the project as assigned by the PD;* (vii) Any other related Jobs.

(c) Photogrammetric Expert– 1 Person (1x6= 6 mm.)

Qualification: M.Sc in Geography, Geo-informatics, GIS, Urban/Regional Planning, Information Technology or a relevant combination of education.
Experience: At least 5 years professional experience in relevant field. Advance knowledge in 3D Mapping using GIS, remote sensing and experience in planning and implementation of Stereo mapping logistics as well as advance knowledge in the use of, ArcGIS9 or later version.
Responsibility:
(i) To prepare topographic, physical feature, land use and other related map of the area, (ii) To prepare, supervise, manage and monitor digital database (Spatial and attribute) of

the project. (iii) Installation and troubleshooting of GIS in UDD project office and head office; (iv) Ensure the quality of the map and related work. (v) To work with a multi-disciplinary team environment to synchronize the multi-sectoral data into GIS database. *(vi) Preparation of working paper, reports and plan of the project as assigned by the PD;* (vii) Any other related Jobs.

D. Other related personnel should be recruited by the survey firm survey for accomplishment of the survey tasks within the budget.

SURVEY FIRM'S PROFILE

The survey consultants should have at least the following criteria:

- At least 5 years of field level survey and planning related project work experience
- Adequate office space with all sorts of survey, mapping and printing equipments, e.g.
  - RTK GPS with latest specifications
  - Plotter capable of Large Map Printing
  - A3 Size Printer
  - Scanner capable of large map scanning
  - Server Computers with latest configurations
  - ArcGIS 10 Suits for Mapping
  - Erdas Imagine software for Image Processing
  - Archive of authorized Satellite Images
  - Photogrammetric Workstation with relevant licensed software etc.
- Adequate manpower with finest expertise and highest length of work experiences
- Expert consultant pool

APPENDIX-03
BIDDING FOR TENDER

3.1 Contents of the Technical Proposal

According to the provisions laid in the Public Procurement Regulations 2008.

3.2 Financial Proposal

Financial proposal should be prepared as per following format in the firm's own letter head.

Format of Financial Offer

Sl No	Description of Survey and Studies	Area/no.	Rate (TK.)	Total Amount(TK.)
01	Satellite Image Processing, 3-D digitization, database preparation, 3-D geo-referencing, printing by using Photogrammetric method			
02	Mouza map scanning, digitization, editing, printing, geo-referencing etc.			
03	Detailed Land Use Survey at 1' = 82.5" (1:990)			
04	Spot level survey at minimum 10 m. grid on the whole project area with respect to the established S.O.B. bench mark			
05	Physical Feature Survey using RTK-GPS, Total station, ground truthing, grabbing all information of attribute data of urban and rural area of project.			
06	Carrying out different types of survey& study for project area			
07	Bench mark establishment at project area			
08	Composition and Printing of Plan Book (175 colour copies)			
09	Project Team of Survey firm			
	TOTAL			

N.B. – Above Quoted rates should be inclusive of the cost Salaries, Management, Transportation, Contingency, Incidental, Income Tax & VAT and other related cost including printing and binding of maps and reports etc.

APPENDIX-04
SURVEY FORMAT

4.1 Physical Infrastructure Survey Format

Sl. No	Physical Feature Name	Data Type			Z Value (Z measurement level)			Description
		Point	Line	Polygon	On Top	On Ground/level	Not Required	
1A. Water bodies								
1	1. River Edge			x		x		
2	2. Khal Edge			x		x		
3	3. Drainage Channels			x		x		Name, width
	4. Drainage Centreline		x					Name, width
4	5. River/khal centreline		x			x		Name, width
5	6. Flow direction		x				x	
6	7. Ponds/Tanks/Diches			x		x		Depth
7	8. Coastline		x			x		
B. Building/Structure		Pucca / Semi pucca / stories, Building area>15 sqm (Depending on map Scale)						
8	1. House			x	x			Residential Building
9	2. Industry			x	x			Industrial Building
10	3. Commercial			x	x			Commercial Building
11	4. Mixed			x	x			Mixed Use
12	5. Boundary Wall		x		x			Wall use as boundary
C. Roads								
13	1. Road Pucca		x	x		x		Ashphalt Road
14	2. Road HBB		x	x		x		HBB Road
15	3. Road Katcha		x	x		x		Katcha Road
16	4. Path Pucca		x	x		x		Pucca Path
17	5. Path Katcha		x	x		x		Katcha Path
18	6. Traffic Island/ Divider		x	x		x		
19	8. Road/Path Centreline		x			x		Name, width
D. Railways								
20	1. Railway Row Line		x			x		
21	2. Railway centreline		x			x		
22	3. Railway Junction Points	x				x		
E. Other Structure and Flood works				Length, width, condition of abutments and wing-walls				
23	1. Bridge / Culverts			x	x			Type, area, Name
24	2. Embankments			x	x			Name, length
25	3. Pump Station for Flood			x		x		Name
26	4. Sluice Gates		x		x			Name
27	5. Bus/Trucks Terminals			x		x		Indicate right way and areas

28	Harbor/ Bathing/boat Jetty		x		x			Harbor, Boat jetty
F. Natural Features								
29	1. Forest			x	x			Area > 2500 Sqm
30	2. Group of trees			x	x			Area < 2500 Sqm
31	3. Group of Trees Point	x			x			
32	4. Wetlands / Bog/ Marshland/ Flood prone area			x		x		Consultation with PD
33	5. Sand/Sand Dunes			x		x		Area < 2500 Sqm
34	Significant Single Tree	x				x		Easily identified single tree
E. Utility Services								
35	1. High voltage Electric Line/pole		x		x			National/regional grid
36	2. Telephone Line/pole		x		x			
37	3. Gas Line/raiser		x			x		
38	4. Utility Substation	x				x		Electric, Telephone exchange, Gas
39	5. Overhead Water Tank			x	x			Name, Capacity
40	4. Waste disposal and treatment plant	x		x		x		A dustbin of municipality and other informal points
41	3. Water work			x		x		
42	5. Deep Tube well Stations	x				x		R.C.C EPHE and other deep tube well stations and output
43	Tube well	x						
F. Area Polygon								
43	Residential Area			x		x		Planned, Unplanned, Density (High, Middle, Low)
44	Commercial Area			x		x		Established markets with ancillary shop, groups of shops including small workshops
45	Institutional, Educational, Health Govt office			x		x		School/college/madrasa, clinics, hospital, govt office
46	Industrial (as classified by acts and rules)			x		x		Main activity, type of waste effluent

47	Agricultural Area			**x**		**x**		All types of agricultureal uses
48	Recreation / sports			**x**		**x**		Parks/play/sports ground, indoor facilities, zoological garden. Stadium area
49	Religious / cemetery			**x**		**x**		Mosques, Temples, Church, Mazar and others
49	Graveyard. Cemetery			**x**		**x**		Sites
51	Historic Place			**x**		**x**		Sites
52	Borrow Pits			**x**		**x**		Areas cut for filling material
53	Vacant Land			**x**		**x**		Vacant land with no apparent use
54	Public gathering			**x**		**x**		Place of public meeting, open-air cultural performance and religious gathering
55	Garden			**x**		**x**		Indication Rea, pineapple etc
56	Disaster prone areas			**x**		**x**		Flood, (indicating the flood affected area in 1998) Earthquake and fault line
57	Brickfield			**x**				

4.2 Spot Level Survey Format

Sl. No		Survey Item	Illustrated			
		Special DEM Object	Map object which may be used if registered with a view to DEM use			
			As break line	As terrain points	For delimitation of un-surveyed	For Mask Areas
		Spot height	Road Pucca		Coastline	Building
		Special elevation point	Road Katcha		Pond	Pond
		Contour line	Path Pucca			Wetland/bog/marsh land
		Break line	Path Katcha			
		Mask Area	River Edge			
		Un-surveyed Area	Khal Edge			
		DEM Boundary	Pond			
			Drain channel			

Note: Name of settlements, village, roads, khals, markets, etc. must be clearly indicated in the physical features maps.

4.3 Occupancy Type and Use Class

Occupancy Type		Code	Nature of Use or Occupancy
A:	Residential	A1	Detached single family dwelling
		A2	Flats or apartments
		A3	Mess, boarding house dorms, hostels
		A4	Minimum standard housing
		A5	Hostels & lodging hours
B:	Educational	B1	Educational facilities
		B2	Pre-school facilities
C:	Institutional	C1	Child care Institutional
		C2	Custodial institutions for physically handicapped
		C3	Custodial institutions for physically capable
		C4	Penal mental institutions
D:	Health care	D1	Normal medical facilities
		D2	Emergency medical facilities
E:	Assembly	E1	Large assembly with fixed seat
		E2	Small assembly with fixed seat
		E3	Large assembly with fixed seat
		E4	Small assembly with fixed seat
		E5	Sports facilities
F:	Business Mercantile	F1	Offices
		F2	Small shops & markets
		F3	Large shops & markets
		F4	Garages & petrol stations
		F5	Essential services
		F6	Footloose business/ mechanism
G:	Industrial	G1	Low hazard industries
		G2	Moderate hazard industries
H:	Storage	H1	Less fire risk storage
		H2	Moderate fire risk storage
J:	Hazardous	J1	Explosion hazard buildings
		J2	Chemical hazard buildings
K:	Misc.	K1	Private garages & special structures
		K2	Fences, tanks & towers
L:	Open Space	L1	Cropping including forestry
		L2	Fishing
		L3	Livestock
		L4	Recreational
		L5	Reserved
M:	Mixed use	M1	As applicable

4.4 Summary of Permitted and Conditional Uses

LEGENDS **PERMITTED USE O** **CONDITIONAL USE C** **PLAN REVIEW REQUIRED P** **NOT PERMITTED N**	**PLANNING ZONES**	MAIN FLOOD FLOW	SUB FLOOD FLOW	WATER SUPPLY PROTECTION	MIXED USE-PLANNED	MIXED USE-SPONTANEOUS	INDUSTRIAL-LOW HAZARD	INDUSTRY-MODERATE	OPEN SPACE	RESTICTED-AIRPORT	RESTRICTED-FLOOD	RESTRICTED-MILITARY/PUBL IC	RESTRICTED-ROAD/UTILITY	RESTRICTED SPECIAL
LAND USES														
AGRICULTURE, FORESTRY & GRAZING		O	O	O	N	N	N	N	O					
AQUACULTURE & FISHERIES		O	O	O	N	N	N	N	O					
BRICKFIELDS		O	O	O	N	N	N	N	N					
CAUSEWAYS: ROAD, RAILWAY		O	O	O	O	O	O	O	C					
CEMETARIES / GRAVEYARD		N	N	N	C	C	C	C	C					
CINEAMAS		N	N	N	C	C	N	N	N					
CLINICS, MEDICAL		N	N	N	O	O	O	C	N					
CLUBS, PRIVATE		N	N	N	O	O	C	N	O					
COLLEGES & UNIVERSITIES		N	N	N	P	P	N	N	N					
DOCKS & JETTIES		O	O	O	O	O	O	O	N					
DWELLINGS, FARM		N	O	O	O	O	N	N	O					
DWELLINGS, MINIMAL HOUSING		N	C	N	O	O	C	N	N					
DWELLINGS, SINGLE/MULTI FAMILY.		N	C	N	O	O	N	N	N					
EMBASSIES, HIGH COMMISSIONS		N	N	N	O	O	N	N	N					
EXPLOSIVES MANUFACTURE & STORAGE		N	C	N	N	N	N	C	N					
FLOOD MANAGEMENT STRUCTURES		O	O	O	O	O	O	O	O					
GOLF COURSES		P	P	P	N	N	N	N	P					
HOSPITALS (WITH MORGUE)		N	N	N	P	P	N	N	N					
HOTEL GUEST HOUSE		N	N	N	O	O	N	N	N					
HOTEL INTERNATIONAL CLASS		N	N	N	P	P	N	N	N					
INDUSTRIAL CLASS 2		N	N	N	C	C	O	O	N					
INDUSTRIAL CLASS 3		N	C	N	N	N	C	O	N					
INDUSTRIAL CLASS 4		N	N	N	N	N	N	O	N					
INSTITUIONS		N	O	N	O	O	O	N	N					
MAJOR DEVELOPMENT		N	N	N	C	C	C	C	N					
OFFICES / SERVICES		N	N	C	O	O	C	C	N					
PARKING FACILITIES, COMMERCIAL		N	N	N	C	C	O	O	N					
PETROL STATIONS		N	C	N	C	C	O	O	N					
PRISONS		N	P	N	P	P	P	N	N					
PUBLIC USES & STRUCTURES		N	O	O	O	O	O	O	N					
RECREATION FACILITIES, OUTDOOR		O	O	O	O	O	O	N	O					
RELIGIOUS USES & STRUCTURES		N	O	O	O	O	O	N	O					
REPAIR SHOPS, MAJOR		N	N	N	N	N	O	O	N					
REPAIR SHOPS, MINOR		N	O	N	O	O	O	O	N					
RETAIL SHOPS & RESTAURANTS		N	C	N	O	O	C	C	N					
RETENTION PONDS		N	N	N	O	O	O	O	O					
SALVAGE, SCRAP STORAGE & PROCESSING		N	N	N	N	N	C	C	N					
SCHOOLS, PRIVATE		N	N	N	C	C	N	N	N					
SCHOOLS: GOVERNMENT, RELIGIOUS		N	N	N	O	O	N	N	N					
SHIP & BOAT SERVICING		N	O	N	N	N	O	O	N					
SHOPPING CENTRES / LARGE MARKETS		N	N	N	P	P	N	N	N					
STADIUM, SPORTS		N	N	N	P	P	N	N	N					
TERMINALS. TRAIN, BUS, FREIGHT		N	P	N	P	P	P	P	N					
TRADE CENTRES		N	N	N	P	P	N	N	N					
UTILITY INSTALLATIONS TYPE A		N	O	O	O	O	O	O	N					
UTILITY INSTALLATIONS TYPE B		O	O	O	P	P	P	P	N					
WAREHOUSING & DISTRIBUTION		N	N	N	C	C	O	O	N					
WASTE DISPOSAL & PROCESSING/MINARATOR		N	N	N	N	N	P	P	N					

APPENDIX-05
FORMAT OF CURRICLUM VITAE AND PROJECT TEAM

5.1 Format of Curriculum Vitae of Professionals

According to the provisions laid in the Public Procurement Regulations 2008.

5.2 Format of the Proposed Project Team

Sl. No.	Position	Name	Age (in Years)	Length of Experience (Year)	Qualification	Man month
1.						
2.						
3.						
4.						

5.3 Format of the Major Experience in Similar Project Completed During Last 10 Years

Sl. No.	Name of the project	Name of the Client	Cost of the Project	Project Duration
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

APPENDIX-06
PROJECT COMMITTEES

6.1 Proposal Opening Committee (POC), Proposal Evaluation Committee (PEC), TEC, QEC etc will be formed as per direction of PPA-6 & PPR-8.

Terms of Reference (TOR) of POC

Proposal Opening Committee (POC), Proposal Evaluation Committee (PEC), TEC, QEC etc committee shall open the EOI and RFP at the scheduled time as per provisions made under PPR 2008.

6.2 Project Implementation Committee (PIC)

Sl. No.	Designation	Organization	Position
1	Director	Urban Development Directorate	Chairperson
2	One Representative	Deputy Chief, Ministry of Housing and Public Works	Member
3	One Representative	Senior Asstt Chief, Planning Cell, Ministry of Housing and Public Works	Member
4	One Representative	Water Resources Planning Organization (WARPO)	Member
5	One Representative	UNO office at Mirsharai upazila	Member
6	One representative	Physical Infrastructure Division, Planning commission	Member
7	One representative	Implementation Monitoring & Evaluation Division	Member
8	One representative	Roads and Highways Department	Member
9	One representative	District Commissioner Office, Chittagong	Member
10	One representative	Concerned upazila Parishad	Member
11	Mayor	Concerned Pourashava, Misharai paurashava	Member
12	Mayor	Concerned Pourashava, Baraiarhat paurashava	Member
13	One Representative	Concern of Soil Research and Development Institute, Misharai Upazila, Chittagong	Member
14	One Representative	Local Government Engineering Department	Member
15	One Representative	Bangladesh Parjatan Corporation	Member
16	One Representative	Department of Environment	Member
17	One Representative	Geological Survey of Bangladesh	Member
18	One Representative	Department of Forest	Member
19	One Representative	Department of Disaster Management and Relief	Member
20	One Representative	Chittagong Port Authority	Member
21	One Representative	Agriculture Extension Department	Member
22	One Representative	Bangladesh Water Development Board	Member
23	One Representative	Mirsharai Economic Zone, Mirsharai upazila, Chittagonj	Member
24	One Representative	Bangladesh Export Processing Zones Authority	Member
25	Project Director	Urban Development Directorate	Member-secretary

Terms of Reference of PIC

1. To evaluate the progress of the project, detection of technical problems and to provide necessary guidance to mitigate the problems.
2. The committee may co-opt new member (if necessary).

6.5 Steering Committee (SC)

Sl. No.	**Person**	**Position**
1	Secretary, Ministry of Housing and Public Works	Chairperson
2	Additional Secretary (Development), Ministry of Housing and Public Works	Member
3	Deputy chief, Ministry of Housing and Public Works	Member
4	One Representative, Physical Infrastructure Division, Planning Commission, Ministry of Planning	Member
5	One Representative, Implementation Monitoring & Evaluation Division, Ministry of Planning	Member
6	One Representative, Ministry of water resources	Member
7	One Representative, Finance Division, Ministry of Finance	Member
8	One Representative, Ministry of Education	Member
9	One Representative, Ministry of Road Transport and Bridge	Member
10	One Representative, Ministry of Environment and Forest	Member
11	One Representative, Ministry of Land	Member
12	One Representative, Local Government Division, Ministry of Local Government, Rural Development & Cooperatives	Member
13	One Representative, Ministry of Civil Aviation and Tourism	Member
14	One Representative, Ministry of Shipping	Member
15	One Representative, Ministry of Disaster Management and Relief	Member
16	One Representative, Ministry of Chittagong Hill Tracts Affairs	Member
17	One Representative, Bangladesh Export Processing Zones Authority	Member
18	Project Director, Concerned Project	Member
19	Director, Urban Development Directorate.	Member-Secretary

N.B. Not below the Rank of Joint Secretary

Terms of Reference of SC

1. Provide sectoral decisions; minimize sectoral conflict; approve sectoral options.
2. The committee would meet once in every eight months in general but can meet more frequently if necessary.
3. The committee may co-opt new member if necessary.