

**Terms of Reference  
for  
Digital Topographical Survey for Bridge**

Name of the Project: .....

Name of Work: .....

Road Name: .....

Road Identification No.: .....

Bridge Identification No.: .....

Bridge Location Chainage on Road Link: .....

Upazila: ..... District: .....

**Background of the Program:**

The Government of Bangladesh has received a loan from the World Bank (WB) toward the cost of the program titled "Program for Supporting Rural Bridges (SupRB)". The program will be implemented by the Local Government Engineering Department (LGED) through the Project Director's Office (PMU) and contract administration of civil works will be carried out by LGED District/Upazila offices. The program will be implemented in total 61 districts out of 64 districts of the country, except three hill districts at a cost of USD\$618million.

The program Components include (i) Major and minor maintenance of 85,000 meters of bridges, rehabilitation of 24,000 meters of bridges, Capacity Expansion (Widened) of 5000 meters of rural bridges, replacement or newly construction of 20,000 meters of bridges, technical, fiduciary, procurement, social and environmental capacity improvement of LGED including design and implementation of climate resilient bridges, and establishment and operationalize of Grievance Redress System (GRS).

The specific project will require the services of the firm that will conduct detailed Digital Topographical Survey of selected bridges sites to rationalize structural design for each bridge.

**Scope of work:**

The scope of work will include, but not limited to, the following:

1. Detailed topographic survey by using Real Time Kinematic Global Positioning system (RTK-GPS) and Total Station. Latitude, Longitude and altitude (X, Y, Z) values of all points need to be taken at 4 m interval with an accuracy of at least 10 cm in both horizontal and vertical;
2. Use of well-known brand equipment will be preferred (for example Trimble/ Leica/ Sokkia/ Spectra Precision/ Ashtech);
3. A north direction shall be prominently shown.
4. All the physical features, such as road network, ponds, permanent structures, drains, hills, wells shall be shown at their exact locations.
5. (a) One river/ channel/ khal cross section to be exclusively taken along the center line of the proposed bridge alignment and other sections at distances of 0.5, 1, 1.5 and 4 times channel widths at upstream and at distances of 0.5, 1 and 1.5 times channel widths at downstream. Spot levels on river cross section to be taken at 3.0m intervals or as necessary.  
(b) The length of each cross section should cover the full channel width(minimum 100m) plus same length of left & right banks.
4. Road cross sections to be taken along approach road at both ends of the proposed bridge. Four road sections at each end of the bridge @25m interval shall be taken. Spot levels on road cross sections to be preferably taken at 1.0m interval.
5. Bank line survey of both sides of the channel shall be carried out minimum 300m towards upstream and downstream of the river course way.
6. All details within the area as instructed by the client to be surveyed which shall show summarized information about road alignment, side slope, bridges, homesteads, government/ non-government offices, Important or historic buildings or structures, trees, electrical installations markets, community center and other public places.
7. Sufficient spot levels to be taken at the rate of one per 16sqm area i/c river bank, road edges and embankment toes.



8. HFL need to be provided with reference to the PWD/SOB Bench Mark (BM).
9. All RLs to be taken with respect to SOB/PWD Bench mark available near by the bridge site and location of TBM to be clearly shown on the map.
10. All survey data to be submitted in an appropriate electronic form suitable for inputting in to design software being used by the Engineer.
11. Survey data must be prepared in GIS shape file using Bangladesh Universal Transverse Mercator **BUTM projection system** where X,Y,Z values of the all features and necessary attribute information (such as name, type etc.) need to be provided;
12. Survey data shall also be submitted in print format **(with seal and signature)** with suitable text in a **suitable scale** as required by the Engineer, showing all the topographical features surveyed, spot levels with x, y, z, such that these can be used to establish Digital Terrain model (DTM).
13. Three permanent spots near each bridge site shall be marked with Global Co-ordinates (Longitude & Latitude) and Elevation.
14. Digital photographs at daylight condition shall be provided which shall show, Canal/River/khal/approach/access road to the site and other important features around the site.
15. Co-ordinate (longitude & latitude) of both ends of all cross section of Roads and River/Canal/khal shall be shown on Topographic Survey Map. A satellite photograph (taken from Google earth) shall be provided and these co-ordinates shall also be identified properly on it.
16. Total job shall be carried out up to the satisfaction of the Design Unit, LGED.
17. In addition to the above requirements if any other special parameters are needed for a particular project site that shall be invariably incorporated.
18. Before submission, the topography map and physical feature map need to be duly checked and signed by the concerned local official of LGED.

#### **Eligibility Capacity:**

The consulting firm would need to have field experience in digital topo survey and production of digital maps at least 5 years including having sufficient experiences of preparation of GIS database with topo survey information.

#### **Duration of the Assignment:**

The duration of the assignment will be 15 days.

#### **Facilities to be provided by XEN, LGED:**

- Necessary data and information.
- Identification of location and area for the bridge.
- Necessary checking and inspection.
- All necessary co-operation and suggestion for the assignment.

#### **Deliverables:**

##### **(i) Softcopy**

- GIS format data of topographic survey
- Digital Elevation Model (DEM)
- All survey data in digital format (such as CAD etc.)

##### **(ii) Hard copy report-3 sets including following maps (Map shall be in A3 paper):**

- Features Map (GIS & CAD format)
- Dimension map of all features in CAD format
- Spot level map of survey area in CAD format
- Map of Digital Elevation Model of survey Area in GIS format
- Contour Map of survey area in GIS format
- Google Earth image covering area of the bridge
- Photograph both printed and soft copy in JPEG format