Government of the People's Republic of Bangladesh
Prime Minister's Office
Bangladesh Economic Zones Authority (BEZA)
Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj and Mirsarai Economic Zones)
Monem Business District (Level-11)
111, Bir Uttam C. R. Dutta Road, Dhaka-1205, Bangladesh

Memo No: Ref.: 03.07.0000.054.028.015.22-**676** Date: 06 December 2022

Request for Expressions of Interest (EOI) for
"Topographic Survey Works for Araihazar Economic Zone (Japanese Economic Zone) by PIU of Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj & Mirsarai Economic Zone) in Bangladesh"

1	Ministry/Division	Prime Minister's Office			
2	Agency	Bangladesh Economic Zones Authority (BEZA)			
3	Name of Procuring Entity	Project Director, Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj and Mirsarai Economic Zones)			
4	Title of Service	Procurement of Service named 'Survey' for Araihazar Economic Zone (Japanese Economic Zone) by PIU of Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj & Mirsarai Economic Zone) in Bangladesh"			
5	Procuring Entity District	Dhaka			
6	Expression of Interest for	Procurement of Service named 'Survey'			
7	EoI Ref No.	03.07.0000.054.028.015.22-**676**			
8	Date	06 December, 2022			
KEY INFORMATION					
9	Procurement Method	Open Tendering Method (OTM)			
FUNDING INFORMATION					
10	Budget and Source of Fund	Development Budget, GOB			
11	Development Partners	N/A			
PARTICULAR INFORMATION					
12	Project/Program Code	224000200			
13	Project/Program Name	Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj and Mirsarai Economic Zones)			
14	EoI closing Date and Time	02 January 2023, 12:00 PM			
INFORMATION FOR APPLICANT					
15	Brief Description of the Assignment	a. Survey of the Service Lane @3m and underground drain with ancillary physical feature along the boundary wall of the project area (Japanese Economic Zone) b. Spot elevation survey of approximately 459 acres land c. Canal Cross sectional survey d. Gas pipeline survey (existing and relocated portion) e. Power Transmission Line survey (outside the area of Phase II			
16	Experiences, Resources & Delivery Capacity Required	a. The Survey firm shall have a minimum specific experience as a lead survey firm in topographic survey (Route Survey and Area Survey), aerial survey, bathymetry survey of at least 01 (one) contract successfully completed/partially completed within last 10 (Ten) years with a value of at least BDT 0.45 Crore (Forty-five lakh) in Government/semi-government/Private organization. b. Organization brief containing fields of expertise and advantages. c. Statement of accomplished works in survey in last 05 (five) years. d. Legal registered business entity in Bangladesh (i.e., Trade License, TIN, BIN etc.) e. Financial solvency certificate.			
17	Other Details (if applicable)	N/A			
18	Association with foreign firm	N/A			
19	Ref. No.	Phasing of Services	Location	Indicative Start Date (Month/Year)	Indicative Completion Date (Month/Year)
	03.07.0000.054.028.015.22-	Single	Bangladesh	January 2023	May 2023
PROCURING ENTITY DETAILS					
20	Name of Official inviting EoI	Saleh Ahmed (Joint Secretary)			
21	Designation of Official inviting EoI	Project Director, Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj and Mirsarai Economic Zones)			
22	Address of Official inviting EoI	Office of the Project Director, Monem Business District (Level-11), 111, Bir Uttam C. R. Dutta Road, Dhaka-1205.			
23	Contact details of Official inviting EoI	Telephone: 02-9632510	Fax: None	E-mail: saleh15th@gmail.com	
24	The procuring entity reserves the right to accept or reject all EOIs				

06.12.2022

(Saleh Ahmed)
Project Director
(Joint Secretary)

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Terms of Reference

for

Procurement of Services named 'Survey'

Package: PS-01

Ref.: 03.07.0000.054.028.015.22

1. OBJECTIVE OF THE ASSIGNMENT

The objective of the study is to provide Consultancy Services for "Topographic Survey Works" for Japanese Economic Zone by PIU of Acquisition of Land for Establishment of Economic Zones (Araihazar, Narayanganj & Mirsarai Economic Zone) in Bangladesh.

2. SCOPE OF WORK

The Scope of work follows the contents below

a. Survey of the Service Lane @3m and underground drain with ancillary physical feature along the boundary wall of the project area
b. Spot elevation survey of approximately 459 acres land
c. Canal Cross sectional survey
d. Gas pipeline survey (existing and relocated portion)
e. Power Transmission Line survey (outside the area of Phase II (i.e. approx. 459 acres)

3. PROJECT LOCATION

Project location is in the Japanese Economic Zone (BSEZ), in Araihazar, Narayanganj.

Figure: Location of the Project Area

4. RECONNAISSANCE SURVEY:

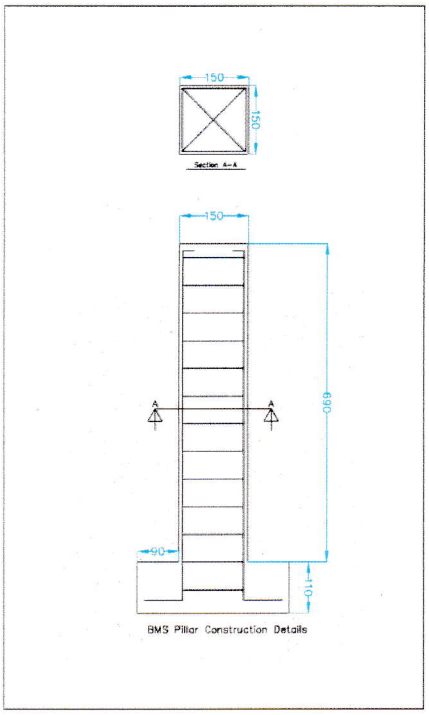
Reconnaissance survey of the site will have to be carried out prior to commencement of works (Phase II). Survey team leader and survey representative from the Employer will visit the site to explore site conditions, route features for the service lanes and underground drains, presence of infrastructures, identify the canals, Gas line and Power transmission lines etc. as well as location of Benchmark and any other issues important to the project. Observations and findings will be communicated and discussed with the Employer over meetings arranged by the Employer followed by submission of a Reconnaissance Survey Report as part of the Preliminary report as per work schedule.

a. BENCHMARKS INSTALLATION

Total Three Benchmarks (Permanent Benchmark) are already established in the Project area as a primary benchmark, from where the whole survey will be done. Details of the Benchmarks will be provided from the Employer and Secondary Benchmarks will have to be established to carry out the survey works. Minimum number of additional two permanent benchmarks shall be established in a convenient location near the second phase of the project area so, that the survey results can be verified in any time in the future. The Benchmarks shall be permanently positioned and well protected in stable place and convenient for the control and topographic survey work.

The Secondary benchmark shall be made from concrete with the reinforcing steel bar inside. The size of the benchmark shall be 15 cm x 15 cm x 130 cm, then ± 100 cm shall be buried underground as shown in figure right or equivalent as stable. The place shall be suitable for GNSS survey such as, getting clear line of sight to the sky, avoiding the multipath and radio interference etc. A set of two secondary benchmarks which are visible each other shall be established by +/-0.5 km interval (a total 20 (twenty) secondary benchmarks) The code of the secondary benchmarks will be named as "BMS1", "BMS12", "BMS20" etc.

Some Temporary point (Survey Nails) will have to be install in the concrete surface to continue the survey works and demarcate those properly with the color in the surface.



BMS Pillar Construction Details

Specification of Materials of secondary Benchmark (BMS):

1. Strength standard shall be in accordance with Bangladesh Survey Control points standard.
2. Proportion of cement: sand: crushed stone chips = 1:1.5:3 of ¾" down grade size.
3. The Survey pin with a cross notch shall be buried at top center and Benchmark code and project name "JEZ" shall be engraved on top surface before dried up.
4. The BMs should be painted by bright sky-blue enamel paint after the concrete has dried up.

b. HORIZONTAL CONTROL SURVEY FOR THE SECONDARY BENCHMARKS

The secondary benchmarks shall be measured by using GPS/GNSS (Global Navigation Satellite System). GNSS survey network shall be made relation to at least three (3) Project Control Points that has precise and accurate UTM zone 46N horizontal coordinates.

1. The GNSS Observation is to be performed by using at least 4 GNSS receivers-Hemisphere/Trimble or equivalent same accuracy/quality to other GNSS receiver with an accuracy of 5mm + 1 ppm and dual frequency in static mode, approved by the Employer.
2. Observation method is "Static Positioning" with at least 120 minutes' duration times and at least 6 tracking satellites for each session.
3. The GNSS/ GPS data shall be assessed by the ambiguity (must be fixed) and Geometric Dilution of Precision (GDOP ≤ 2). GNSS data shall include observation time and hours, antenna height, masking angle, tracking satellites numbers, ambiguity resolution state, GDOP, accuracies for three (3) dimensional elements and Ratio (Ambiguity Resolution Validation Value > 5), etc. Therefore, those shall be recorded and submitted with field raw data.
4. Baseline processing and adjustment are performed by using software published with the above. Initial processing shall not be used for network adjustment calculation. All baselines shall be processed independently, and well-arranged results shall be submitted first.
5. GNSS observation Parameter shall be applied parameter of WGS84/UTM zone 46N confirmed by the Employer and EGM2008 shall be used to get the elevation on the Geoid surface from ellipsoidal data.
6. The down loaded raw field data of the GNSS with field sheet shall be submitted as electronic data within one day after the observation.

c. VERTICAL CONTROL SURVEY

To establish survey vertical control network, a series of Leveling measurement will be performed by the following method. Leveling survey network shall be made relation to the project Benchmarks authorized by JEZ.

- All benchmarks shall be measured by Direct Leveling method with Digital Level machine.
- The measurement of levelling will be commenced from the nearest existing SOB benchmark. which has elevation confirmed and cross-checked by GPS survey, and then continue to next BM, TBM newly established on site.
- The double stand (with independent staves) or forward and backward Leveling method shall be applied for each leveling observation.
- At the beginning and at least once a week, all Digital Level shall be executed instrument checking observation and record it.
- The down loaded raw field data of the Digital Level with field sheet shall be submitted as electronic data within one day after the observation.
- In case the benchmark is on the top of the building, RTK survey confirming with indirect leveling with Total station shall be executed.

Accuracy of Vertical Control Survey should be within the following tolerance:

The tolerance of leveling measurement is $10\sqrt{D}$ mm, where D is total leveling distance in km.

CONNECTED TRAVERSE SURVEY

Connected Traverse Survey will be performed to establish horizontal control network in the area of 2nd phase. Surveying method of connected traverse will be implemented as follows:

1. Traverse angle measurement will be done at least 2 times for observation of double-angle measurement for the position of ordinary and extraordinary.
2. Traverse survey will be implemented at least 2 times, and the measurement of the distance will be implemented at least 5 times for forward and backward.
3. Route of traversing will be commenced from existing permanent station as the correct reference points and then continue to next permanent station, secondary stations and newly established on stations at site.

   Linear closing error will not exceed 1/2000.

d. SURVEY WORKS FOR THE SERVICE LANE

For the Service Lane of 10 feet (approx. 3m), Cross section survey has to be performed along the project boundary of the BSEZ project.

1. Total approx. 7.15 km. existing condition of the Route, cross section survey has to perform @ 20m Interval along the Project boundary with greater detail over all edges and undulations, following the location of the Project boundary wall.
2. The width of the cross section will be a minimum of 5m from the toe of the service road meters depending on the location, height of the service lane embankment and right of way of the existing road.
3. Final width of cross section is to be determined by the Employer.

5. SPOT ELEVATION OF THE LAND AREA

A Spot elevation survey has to be performed to prepare a contour map of 380.00 acres land. Aerial Survey will have to be performed for this land area with high accuracy and Identification of the Land boundary, ditch, canal inside the boundary also have to carry out by total station.

1. Georeferenced Ortho-mosaic Photo (Target GSD is 2cm).
2. Digital Surface Model (DSM).
3. Digital Terrain Model (DTM).
4. The Grid Interval must be 10x10m with total station survey.
5. The contour interval should be 0.5m.

The Contour interval should be 0.5m Additional spot levels shall be taken to determine, wherever applicable, the extent of the following:

1. Pavements, curbs, channels, and centerlines of roads at (specified) intervals between cross-section – detailed plans & spot levels to be indicated.
2. The top and bottom of steps and ramps.
3. Corners of buildings and other structures, including overhangs.
4. Hilltops, depressions, and saddles – plan details to be indicated.
5. Top and bottom of embankments.
6. Ditches/Ponds, out falls, streams, culverts, nallah and drains, including bank and bed/invert levels – widths shall be indicated.

7. Water levels, with date of survey of rivers, streams, watercourses, canals, ponds, lakes, nallah reservoirs etc., and flood water levels.
8. Storm water gullies, manholes, inspection covers, ducts and conduits.
9. Heights of overhead cables & transmission lines.
10. Chainage/Length of Pipeline to be routed above ground (on supports) shall be identified with the guidance of Representatives of the Owner/Contractor and the same has to be indicated in the Ground Plan & in LS.
11. The entire Major, Minor roads and street shall be mapped within the project boundary
12. Existing incoming water / sewer pipe diameter and invert levels.
13. Other features of interest.

6. DELIVERABLES FOR TOPO-SURVEY

a. The locations of the temporary benchmarks and survey markers with coordinates and levels. Documents related to reference benchmark shall be submitted to the client. It is preferable to install benchmarks at such a location that one is visible from the other one so that total Station can be set at least one of the consecutive benchmarks in safe and easy way.
b. Contour maps with spot levels in Auto-CAD. The contours and spot levels shall indicate the 'Z' value/elevation in properties. Contour lines shall be continuous and not exploded.
c. Topography layout shall indicate topographical features like land use, land cover, water bodies, structures, services, roads etc. as described above in general requirement with description like agriculture fields, industrial area, forest areas, vegetation areas, hills, barren lands, ponds, dams, natural streams, rivers, canals, trenches, well, habitants, temples, mosques, bunds, buildings, overhead transmission lines, pipe lines, drains, dirt road, WBM road, bitumen road, concrete road, Brick road etc. Various features shall be provided in separate layers in AutoCAD. For utilities and service power pole, transformer, telephone pole, power pylon, etc are to be taken in survey. The direction and capacity of overhead power line are to be shown in final drawing by using the approved template of PGCB.
d. Layout shall be provided with grids and co-ordinates in Universal Transverse Mercator (UTM) format
e. As per clients' specified filling level the survey company should be provided total sand filing volume. The methodology adopted for such volume calculation will have to be prior approved by the client
f. North line in all drawings, Match lines for drawing sheets, Kilometer markers etc.
g. Features captured should be clearly described in specified text height and style in the drawing
h. .csv files with different IDs for different types of physical feature along with elevation and co-ordinates will have to be submitted as soft copy to the client
i. Type of culverts/bridges (Pipe/Slab/Box etc.), span/pipe diameter etc. shall be clearly described in the drawing. The direction of flow (U/S and D/S) shall also be clearly marked in the drawing
j. The final report should be submitted in soft copy (approved format by employer) and two sets binding copies separately in each task: (i) survey of service lane, (ii)spot elevation survey of 380 acres land, (iii) canal cross section survey, (iv) Gas pipeline survey (existing and relocated portion), (v) Power Transmission Line (outside the area Phase III) Topography survey with Mouza Map and report submitted by web GIS

7. SURVEY OF THE GAS LINE

Survey has to be carried out for identifying existing gas line are in the project area and intersection of original and relocated part. The survey should include

a. Removal part of the outside zone and the relocated part of the gas line.
b. The contractor shall carry out necessary trench excavation wherever necessary to delineate the exact route of the gas pipelines Final drawing should be included with the details of physical properties of pipes, alignment, depth and all other supplementary information in the final report

8. POWER TRANSMISSION LINE SURVEY

An existing transmission line passes through the project area. Proposal of a transmission line outside the project boundary as well as a detailed route survey of existing transmission line will have to be performed. A minimum of 3 Preliminary route alignment proposed line have to be outlined with bee line length, actual line length, angle points, line profile superimposed in the current drawing. After discussion with the employer, a line should be selected and should be detailed survey will be carried out including

a. Number of the towers and angles of the towers.
b. Route transmission line that has the crossing of the ditch, land, large trees, buildings,
c. Distance between the tower to tower and the slope of the land.
d. The alignment should consider a ROW of 50m.
e. A detailed survey of the land area where the towers will locate.

9. SURVEY OF THE CANALS

A total of 4 canals/ditch has to be surveyed with echosounder/ by total station in the project and its adjacent areas.

a. Dawrakhali towards main canal
b. Bhiyapara towards main canal
c. Singati towards main canal
d. Kachikata towards main canal

Bathymetric Survey shall be executed by following manner.

For shallow waters, which are inaccessible by boats with echo sounders, the survey shall be conducted using Total Stations or GNSS receivers. Back sights for the total station survey and datum point check for GNSS survey shall be carried out at appropriate intervals to confirm the stability of total station and vertical height.

For other areas that can be accessed by the boats, the survey shall be carried out with an echo sounder equipped with GNSS. Calibrations related to the supersonic speed of water shall be performed both at the start and end of each daily survey. It shall be recorded in the deepest locations and where the nature of water changes. Tide level also will be recorded at appropriate intervals and be used for the correction for the depth reading if necessary. But for GNSS-connected echo sounders, this may be unnecessary. The cross-checking survey line shall be carried out at each daily survey.

The following points shall be indicated in the drawing:

a. Changes in slope

b. For flat areas, elevations must be observed at 5m intervals, at least
c. Changes in land use
d. Water level
e. Lowest points on the river or main canals
f. Canal alignments in MOUZA Maps with space at 15m intervals

10. AERIAL SURVEY OF THE PROJECT AREA

Aerial survey shall be carried out along the project area (Approx.1500 Acres) and enough width shall be captured for final output about (50 ~ 100m outside from the project boundary) to produce a three-dimensional topographic map, Ortho-mosaic Photo, Digital Surface Model (DSM) and Digital Terrain Model (DTM) of the survey area. Prior to the fright operation, all Primary and secondary control points shall be marked as below to be used as Ground Control Points (GCPs).

Also, Horizontal and Vertical Survey of the GCPs shall be connected to the primary and secondary benchmark. The deliverables should be included

a. Georeferenced Ortho-mosaic Photo (Target GSD is 2cm).
b. Digital Surface Model (DSM).
c. Digital Terrain Model (DTM).
d. Superimposed with the topographic map.

11. EQUIPMENT LIST

The Consultant (contractor) shall submit necessary catalogues, specifications, calibration certificates of the equipment's to be used for the survey activities and take prior approval of the client before commencement of works. This equipment are:

a. Digital Level Machine
b. Total Station
c. RTK GPS
d. Drone with Lidar
e. Hydrography Equipment
f. Gauge for Water Level.

12. GENERAL EXPERIENCE

a. Survey firm must have a minimum experience in Engineering survey of at least 10 (Ten) contracts successfully completed in the last 10 years. Certificate must be submitted.
b. Survey firm shall own the equipment mentioned above in the tender and calibration certificate/ownership document must be submitted.

13. SPECIFIC EXPERIENCE

The Survey firm shall have a minimum specific experience as a lead survey firm in topographic survey (Route Survey and Area Survey), aerial survey, bathymetry survey of at least 01 (one) contract successfully completed/partially completed within last 10 (Ten) years with a value of at least BDT 0.75 Crore (seventy-five lakh) in Government/semi-government/private organization.

14. OTHER CONDITIONS

Other relevant conditions as requested by the Client and not specified or needs adjustment due to prevailing site condition herein shall be provided and delivered by the Consultant.

15. DELIVERABLES

i) Topographic Survey Map
ii) RL with SOB Reference Map
iii) Canal Topography
iv) Contour Map
v) Canal RL with X-Section Map
vi) Canal Contour Map
vii) Mouja Acquisition Map
viii) All Mouja information data of the project area
ix) Project Photography by drone
x) Areal Map by drone
xi) Gas Line Route Survey Map
xii) Electric Line Route Survey Map
xiii) DSM & DTM
xiv) Sand fill volume calculation
xv) Surface water modelling
xvi) Mouja information report submitted by WEB GIS and CAD file

16. Terms of Reference

The Terms of Reference (ToR) is the key document in the RFP. It explains the objectives, scope of work, activities, tasks to be performed, respective responsibilities of the Client and the Consultant, and expected results and deliverables. Adequate and clear ToR are essential for the understanding of the assignment and its correct execution by the Consultant. It also helps reducing the risk of ambiguities during the preparation of proposals by the Consultant, contract negotiation, and execution of the services.

Terms of Reference normally contain the following sections:

- *Background of the project;*
- *Objectives of the assignment;*
- *Scope of Services;*
- *Transfer of Knowledge (training) (when appropriate);*
- *List of reports, Schedule of deliveries, period of performance;*
- *Data, personnel, facilities and local services to be provided by the Client, and*
- *Institutional arrangements*