

Ref No. NHRCL-CO/DV/CA/01/NHSR-DV/108/2/OHQ481

Date: 18.09.2020

To:
M/s AARVEE-GSL JV
Aarvee Associates Architects Engineers & Consultants Pvt. Ltd.,
#8-2-5, Ravula Residency, Srinagar Colony Main Road,
Hyderabad- 500082, Telangana, India
Phone:040-48483301
E mail: sneharedia@aarvee.net, nakul@gsigeo.com

Sub: Final Alignment design including Aerial LIDAR survey and other related works for Delhi-Varanasi High Speed Corridor (about 865 kms. long)- Letter of Acceptance

Ref:

1. Financial Bid opened on 27.08.2020
2. Tender/ Bid opened on 11.08.2020
3. Your Bid dated 10.08.2020
4. Tender No. NHRCL/CO/CONTRACT/LIDAR/2020/15 including Addendum No. 1

Kind Attention: Ms Sneha Redia,
Authorised Representative on behalf of AARVEE-GSL JV

Dear Sir,

With reference to above, this is to notify you that your Bid dated 10.08.2020 for execution of the "Final Alignment design including Aerial LiDAR survey and other related works for Delhi-Varanasi High Speed Corridor (about 865 kms. long)" Tender No. NHRCL/CO/CONTRACT/ LIDAR/ 2020/15 dated 10.07.2020 for the Accepted Contract Amount of Rs.7,92,46,741 (including 12% GST) (Rupees Seven Crore Ninety Two Lacs Forty Six Thousand Seven Hundred Forty One only), as corrected and modified in accordance with the Instructions to Tenderers, is hereby accepted by the Employer.

You are requested to furnish the Performance Security within 30 days in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Annexure to ITT.

The accepted BOQ is enclosed as Annex-1. The scope of work, payment schedule & other terms & conditions shall be as given in the Tender document including all Addendums.

Further, soft copy of Route alignment (KMZ file) of the Project Alignment is enclosed herewith.

Addl. General Manager- Procurement/ NHRCL will be Employer Representative for this contract. You are requested to contact Addl. General Manager- Procurement/ NHRCL for further necessary action.

Please submit a copy of this LOA duly signed by the authorized signatory as a token of your acceptance within 7 days of issue of this LOA.

Thanking You,



Yours Sincerely,
For & on the behalf of
National High Speed Rail Corporation Limited

(Indudhara Sastry) 18/9/20
General Manager/Contract

Enclosure: As above

नेशनल हाई स्पीड रेल कॉर्पोरेशन लिमिटेड
(एक संयुक्त राज्य एवं भाग लेने वाली राज्य सरकारों की संयुक्त नौकरी कांपनी)

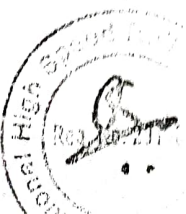
National High Speed Rail Corporation Limited
(A Joint Sector Company of Govt. of India and Participating State Government)

पंजीकृत कार्यालय एशिया भवन, द्वितीय तल, रोड नं.-205, सेक्टर 9, द्वारका, नई दिल्ली-110077
Registered Office: Asha Bhawan, Second Floor, Road No. 205, Sector 9, Dwarka, New Delhi 110077

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CIN No. U60200DL2016G01291007

IN/NHSRCL @nhsrcl www.nhsrcl.in



BILL OF QUANTITIES (BOQ)

NAME OF WORK: Final Alignment design including Aerial LiDAR survey and other related works for Delhi-Varanasi High Speed Corridor (ABOUT 865 KMS LONG)

Tender No: NHSRCL/CO/CONTRACT/LIDAR/2020/15

Name of Tenderer: M/s AARVEE-GSL JV

Schedule: A

Item no	Item Description	Unit	Total qty (a)	Rate (b) (INR)	Amount Rs. (a) x (b) (INR)
1	Carrying out reconnaissance survey of obligatory points and verification of ground features including tunnel portals, station location, river crossings, etc. with Sol topo sheets of scale 1: 50,000. The work Included service of engineers, alignment design engineers, scientists, surveyors, draftsmen, CAD operators, labours, helpers and others (computer, printers & tracing etc.). Payment will be made as under: i) 50% payment will be released on completion of field works and submission of draft Final Alignment report ii) 50% payment will be released on acceptance of Final Alignment report	Km	865	5,162.88	44,65,887.05
2	Final Location Survey using Aerial LiDAR Technology as per Terms of Reference. The work broadly includes: (i) Collection & paper study of existing alignment reports, data, drawing, documents, ground control points etc.; (ii) Getting all clearance such as DGCA etc. for Aerial LiDAR survey along the proposed corridor (iii) Mobilization of Aircraft/Helicopter with required LiDAR and Camera equipment (iv) Ground Control Survey as follows: a. Carrying out reconnaissance survey of the project area for identifying the Control Points for carrying out DGPS survey and preparing a plan of a grid network	Km	865	43,092.00	3,72,74,580.00

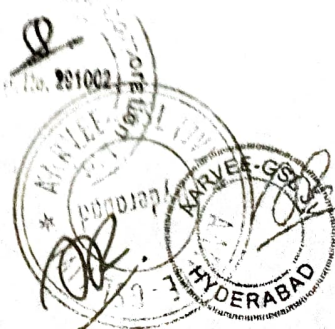
of Control Points on SOI topo-sheets/satellite imagery.

- b. Survey of India Benchmarks to be located during the above reconnaissance survey. These benchmarks shall be tested for stability and the same shall be reported to the client. The entire horizontal and vertical control shall be linked to the approved GTS Benchmarks for conversion of LIDAR data to MSL.
- c. Master Control Network comprising of interconnected triangles (with baseline of about 25km) to be established for overall horizontal control with approx. 25 km baseline length throughout the alignment. Secondary Control Network comprising of interconnected triangles weaved with Master control network (with base line of 3-5 KM) to be established with a baseline length of approx. 3-5 km throughout the alignment. Target LIDAR points to be established at an interval of approx. 5 km within the final alignment. To densify Horizontal Control Network, the GNSS triangulation method should be adopted and processing of data for network adjustment should be done to achieve an accuracy of 1: 100,000 in horizontal. Additional Topographic Survey using DGPS/Total stations if required, at critical important locations for development of vertical/horizontal alignment
- d. Establishment of vertical control referenced to Sol MSL Permanent Benchmarks to be undertaken by double tertiary leveling along the entire route by connecting target points. The threshold limit for levelling loop closure accuracy should be $12\sqrt{K}$ mm, where K is in km.

(Note: Control points should preferably be fixed on permanent structures. Monumentation of Master and Secondary Control Points If required shall be paid separately in S No 5)

(v) Aerial LIDAR data capture with a point density of 10 points per sqm

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with a Fundamental Vertical and Horizontal Accuracy as per TOR.

(vi) Aerial Imagery capture with a resolution of 10 cm GSD

(vii) Ground survey using traditional methods such as Echo Sounders etc. along areas such as river crossings etc. where Aerial LIDAR data needs to be complemented, including the following:

a. 4 KM (2 KM on each side of centerline) along all river crossings with river cross-section soundings (or alternate acceptable method) taken at centerline and then at every 500 m distance along upstream and downstream of the river and up to 50 m beyond high bank

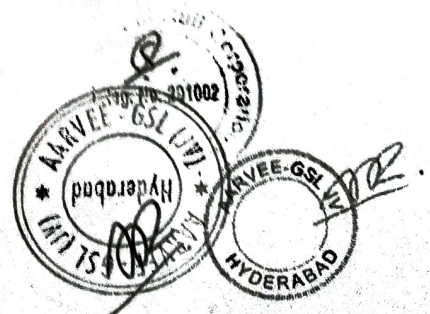
b. The DEM from this data shall be suitably merged or complemented suitably with the LIDAR DEM in consultation with the client. Separate cross sections of river @ 500-meter interval shall be provided.

(viii) Pre-processing and post processing of data to give the final outputs as below:

- Classified Point Cloud in LAS (.las) format (Soft Copy format)
- Three-dimensional Topographic survey drawing of 150 m corridor on either side of the railway centerline on a scale of 1:2500
- Contour map at 0.5 m interval for 150 m corridor width on either side of the railway centerline
- Digital Elevation Model (DEM)/ Digital Terrain Model from topographic survey data for 150 meter on either side of the centreline of track
- Longitudinal and Cross Sections at 20 m interval
- Digital Orthophotos of 10 cm GSD resolution (in tiles and seamlessly mosaicked over the survey area)



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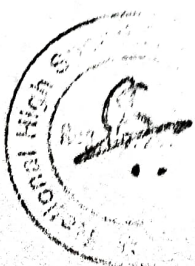
	• 3 sets of all deliverables to be provided in Hard Copy. • Soft copy of all deliverables to be provided. (ix) Preliminary land acquisition plan-Digitisation of the Revenue Map (to be given by NHRCL) after mosaicling and Georeferencing, transfer of final alignment approved for LIDAR study on the maps and calculation of area of the land to be acquired along with the details of the plot and its owners and preparation of preliminary land acquisition plan. Note: The final output should be compatible with AutoCAD Civil 3D Software. Appropriate QA/QC to be undertaken for the data to ensure adherence to accuracy requirements as per TOR. Updations of preliminary land acquisition plan prepared during preliminary stage, as per modified final alignment after LIDAR survey. Payment will be made as under: 10% payment will be released on submission of preliminary Land acquisition plan. 10% payment will be released on completion of Ground Control Survey and submission of report 25% payment will be released on completion of Aerial Data capture and clearance of Data from MoD 20% payment will be released on submission of Aerial LiDAR Data outputs 35% payment will be released on acceptance of Aerial LIDAR data outputs				
3	Contractor will list out the number of trees with in the following corridor – - ROW with in 6.5 mtr either side of centerline 5 mtr on either side of 13 mtr corridor as per item a) above.	Km	865	2,041.20	17,65,638.00



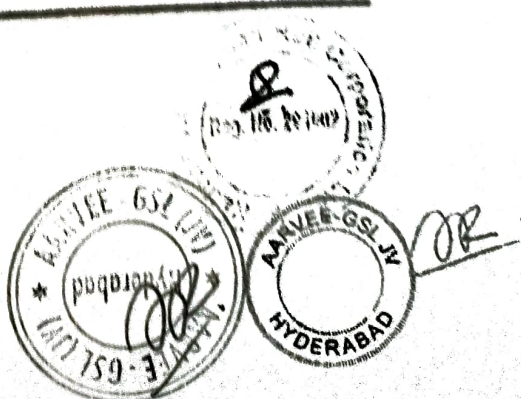
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	c. Within Stations, TSS/DSS/Ramps, depot and other facilities. Payment will be made as under: i. 60% payment will be released on completion of field work and submission of data and reports. ii. 40% payment will be released on acceptance and certification.				
4	(i) List of Transmission lines / distribution towers/ High mast line for districts which are parallel and lie within the following corridors room proposed center line of HSR alignment with elevation & span length based on LIDAR data a. ROW with in 6.5 mtr either side of centerline b. 5 mtr on either side of 13 mtr corridor as per item a above. c. Between 11.5 mtr upto 50 mtrs on either side. d. Within Stations, TSS/DSS/Ramps, depot and other facilities. (ii) List of other utilities including buildings/structures for all districts along the corridor which are infringing and lie based on LIDAR data within following corridors: a. ROW with in 6.5 mtr either side of centerline b. 5 mtr on either side of 13 mtr corridor as per item a above. c. Between 11.5 mtr upto 50 mtrs on either side. d. Within Stations, TSS/DSS/Ramps, depot and other facilities (Output will be listed in Excel Format and AutoCAD drawing) Payment will be made as under: i. 60% payment will be released on completion of field work and submission of data and reports. ii. 40% payment will be released on acceptance and certification	Km	865	2,494.80	21,58,002.00



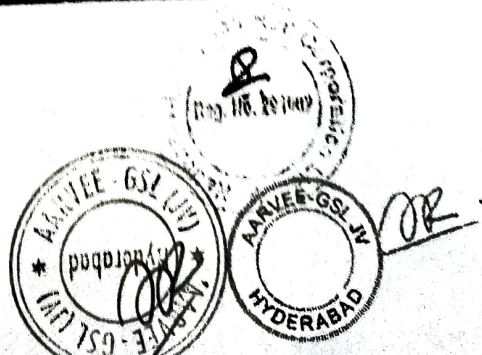
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	c. Within Stations, TSS/DSS/Ramps, depot and other facilities. Payment will be made as under: i. 60% payment will be released on completion of field work and submission of data and reports. ii. 40% payment will be released on acceptance and certification.				
4	(i) List of Transmission lines / distribution towers/ High mast line for districts which are parallel and lie within the following corridors room proposed center line of HSR alignment with elevation & span length based on LIDAR data a. ROW with in 6.5 mtr either side of centerline b. 5 mtr on either side of 13 mtr corridor as per item a above. c. Between 11.5 mtr upto 50 mtrs on either side. d. Within Stations, TSS/DSS/Ramps, depot and other facilities. (ii) List of other utilities including buildings/structures for all districts along the corridor which are infringing and lie based on LIDAR data within following corridors: a. ROW with in 6.5 mtr either side of centerline b. 5 mtr on either side of 13 mtr corridor as per item a above. c. Between 11.5 mtr upto 50 mtrs on either side. d. Within Stations, TSS/DSS/Ramps, depot and other facilities (Output will be listed in Excel Format and AutoCAD drawing) Payment will be made as under: i. 60% payment will be released on completion of field work and submission of data and reports. ii. 40% payment will be released on acceptance and certification	Km	865	2,494.80	21,58,002.00



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5	Erection of cast in-situ RCC Pillars (1:1:2) of size 500mmx500mmx1000mm, 300 mm projected above ground level for Master Control Points, Secondary Control Points etc., with the provision of 700mm long M.S. angle of size 50x50x6 mm with brass nailing on the MS angle for marking the Control Points and engraving the CP pillar number on the MS plate of size 125mm x 125mm x 5mm embedded in concrete by four 6 mm dia rods 150mm long as per attached drawing. The pillar should have the following reinforcement: 4nos-10mm dia longitudinal and 8mm dia rings@150mm c/c. The Foundation size of the pillar should be: 800mm x 800mm x 150mm with a PCC (Nominal mix 1:2:4) base. (Wherever feasible, marking should be done on existing permanent structure. Payment to be made only for actual pillars erected at site.) Refer attached drawing for details.	Nos	865	7,938.00	68,66,370.00
6	Final Alignment Design - Design of approved alignment on Integrated Base Map, DTM, Contours and Orthophotos based on Aerial LIDAR Survey and Hydrological Survey Data will be used in conjunction with the parameters of HSR including Yard plans using Bentley PRT or similar software. Preparation of Index plan and profile including marking of tentative RoW boundary on the Plan based on the data provided by the Client. Preparation of final land acquisition plan. Activities as per TOR are also covered in the scope of this item. Payment will be made as under: 10% payment will be released after submitting final land acquisition Plan 20% payment will be released on submission of 50% design reports 30% payment will be released on submission of remaining design reports and all deliverables including draft Final Alignment Design Report 40% payment will be released on acceptance of all deliverables	Km	865	29,872.74	2,58,39,915.95

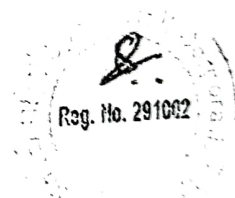


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Reg. No. 291002

	and acceptance of Final Alignment Design report				
7	Hydrological Investigation for Bridges: Study of major & minor rivers. Cross sections shall be generated for dry River/Nallah from LiDAR data. Cross section for perennial river shall be developed using traditional methods. Collection of Hydrological data and undertaking hydrological calculations to finalize waterway, High flood level HFL, Low water level of the bridges (LWL), Total waterway. Payment will be made as under: 60% payment will be released on completion of field work and submission of data and reports. 40% payment will be released on acceptance and certification	Nos.	33	26,556.01	8,76,348.40
TOTAL AMOUNT In INR (Inclusive of 12% GST)					7,92,46,741.39
Rupees Seven Crore Ninety Two Lakh Forty-Six Thousand Seven Hundred Forty-one and Thirty Nine Paise only					



Signature Not Verified

Digitally signed by Nishant Singhal
Date: 2021.06.29 15:58:49 IST
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