

BORDER ROADS ORGANISATION
MINISTRY OF DEFENCE,
GOVT OF INDIA
CHIEF ENGINEER, PROJECT DANTAK, C/O 99 APO

Name of
Work:

**SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT
AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR
CONSTRUCTION OF ROAD SHINGKAR-GORGAN FROM KM 0.00 TO KM
56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER
PROJECT DANTAK INSIDE BHUTAN**

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(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)

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For Accepting Officer

SECTION-I

INVITATION OF BID

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

BORDER ROADS ORGANISATION
CHIEF ENGINEER PROJECT DANTAK, C/O 99 APO
INVITATION OF BID

Name of Work: **SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKCHAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN**

1.1 INVITATION OF BID

1.1.1 Chief Engineer, Project DANTAK has been entrusted with the responsibility of improvement of Road Shingkhhar-Gorgan, (length about 56.00 Km) in the Eastern Bhutan to Secondary National Highway Specifications of Bhutan by Royal Govt. of Bhutan, Chief Engineer, Project DANTAK on behalf of President of India, here under described as "Employer/Client", invites Technical and Financial bid from **the consultants who have executed similar works** for "**SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKCHAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN**".

1.1.2 The road Shingkhhar-Gorgan has been approved for construction/improvement to Secondary National Highway Specifications of Bhutan under MEA funding. This road is proposed to be improved/constructed to Secondary National Highway Specifications of Bhutan with a view to have upgrade the road network to meet the growing traffic requirement in this part of the country by augmenting the road capacity for safe and efficient movement of the traffic. The responsibility for improvement of this road rests with Border Roads Organisation. The road alignment at present from Shingkhhar meets the obligatory point Pelphu at about 36 km and will be a new construction. From Pelphu (km 36.00) to Gorgan (km 56.00) the road will be improved from existing Farm road (Fmn width - 4.0 to 4.5 m, carriage way - 2.75 m) alignment. It is accordingly proposed to invite Technical and Financial bid for the purpose.

1.2 SCOPE OF SERVICES

1.2.1 The job to be carried out by the Consultant under this contract comprises of but not limited to the following:-

- a) Determination of the techno-feasibility or any other suitable alternative for the study section to cater for traffic needs for the design period of 15 years and evolve most cost-effective solution.
- b) Preparation of Feasibility Report, and Detailed Project Report for the selected alternative, including field surveys and investigation, trial pit exploration at high embankment sites, soil and material surveys and evaluation, detailed engineering designs and drawings for the proposed works in accordance with standard codes, specifications and sound engineering practices in vogue in India/Bhutan.
- c) Preparation of work/scope of work and its specifications, bills of quantity and cost estimates
- d) To draw programme for implementation of the project on ground.

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1.3 PROCEDURE FOR OBTAINING BIDDING DOCUMENTS: -

- 1.3.1 The consulting **consultants who have executed similar works** may download bid document from BRO web site www.bro.gov.in and CPPP site <https://eprocure.gov.in> as per the schedule given in CRITICAL DATE SHEET as under.

CRITICAL DATE SHEET

Date of Publishing of NIT	30 Jul 2015
Publication of Advt in Newspaper & ITJ	12 Aug 2015
Bid Document Download/Sale Start Date	17 Aug 2015 at (1000 Hrs BST)
Clarification Start Date	17 Aug 2015 at (1100 Hrs BST)
Pre Bid Meeting	01 Sep 2015 at (1100 Hrs BST)
Clarification End Date	04 Sep 2015 at (0900 Hrs BST)
Bid Submission Start Date	17 Aug 2015 at (1400 Hrs BST)
Bid Document Download / Sale End Date	08 Sep 2015 at (1200 Hrs BST)
Bid Submission End Date	08 Sep 2015 at (1200 Hrs BST)
Bid Opening Date for 'T' Bid	08 Sep 2015 at (1230 Hrs BST)
Bid Opening Date for 'Q' Bid	Will be intimated separately

- 1.3.2 **Bids shall be submitted Manual or through Post.** Tender documents may be downloaded from BRO website www.bro.gov.in, www.bro.nic.in or www.eprocure.gov.in and printout is to be taken on A4 size paper. It is advisable that the downloaded tender document to be printed through laser printer preferably. Submission of photocopy of tender is not permitted. **Bidders are advised to follow the instructions provided in the 'Instructions to the bidder for the submission of the bid'**
- 1.3.3. The estimated cost of work is **Rs 133.00 Lacs** (Rupees One Crore Thirty Three Lacs only) approximately or as subsequently amended in tender documents and uploaded in BRO website. This estimate, however, is not a guarantee and is merely given as a rough guide, and if work costs more or less, tenderer shall have no claim on that account of what so ever nature.
- 1.3.4 Bidders must provide Demand Draft for **Rs 1,000/-** (Rupees One thousand only) towards cost of tender documents, in favour of Accepting officer i.e., **Chief Engineer Project Dantak C/O 99 APO and Payable at SBI Hasimara (WB), Code No 1447** obtained from **any branches of State Bank of India only** valid for three months. The all applicable bank charges shall be borne by the applicant and he shall not have any claim what so ever on this account on Government. In case of re-tendering, the firm which has submitted the DD in earlier calls will require to submit DD along with their tender/application in subsequent calls also. **Tender not accompanied with the cost of tender document is liable to be rejected.** However, public sectors undertaking /Govt undertaking firms are exempted from the payment towards cost of tender documents..
- 1.3.5 Bid documents are not transferable.
- 1.3.6 Bid Security for **Rs 1,99,500/-** (Rupees One lacs ninety nine thousand five hundred) shall be submitted in the form of Deposit at Call Receipt/ Term Deposit Receipt/Special Term Deposit Receipt and bank guarantee bond issued in favour of the Chief Engineer (P) DANTAK, C/O 99 APO by a Scheduled Bank.

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1.4 PRE-BID MEETING

Intending bidder may obtain further information/clarification in respect of this bid during the pre-bid meeting to be held on **01 Sep 2015 at 1100 Hrs (BST)** at the office of **Chief Engineer, Project DANTAK, PIN: 931708, C/O 99 APO.**

- 1.5.1 A Hard Copy of the Technical Bid shall be submitted in hard bound with pages serially numbered and provided with an index page in sealed cover in manual form to the **Chief Engineer, Project DANTAK, PIN: 931708, C/o 99 APO** accompanied with the original instruments in respect of cost of tender document, bid security, original copy of affidavits, credit facility certificate and all the requisite documents connected to eligibility criteria must be delivered to **The Chief Engineer Project DANTAK, PIN: 931708, C/O 99 APO** alongwith bid documents **on or before the bid opening date/time** as mentioned in critical date sheet. The bids may be delivered during office hours on all working days (except Sunday and Gazetted holidays). Bid not accompanied with the cost of tender is liable to be rejected. **Chief Engineer, Project DANTAK C/O 99 APO** will not be responsible for any delay, loss or non-receipt of Tender document sent by post/courier. Further, Accepting Officer shall reserve the right to accept/reject any or all applications without assigning any reason thereof.
- 1.5.2 Not more than one bid shall be submitted by one firm or firms in partnership or joint venture. Under no circumstances will a father or his son (s) or other close relatives who have business relationship with one another (i.e., when one or more partner (s)/director(s) are common) be allowed to tender for the same contract as separate competitors. A breach of this condition will render the tenders of both parties will liable to rejection.
- 1.5.3 Bid documents may be submitted by the bidder either in person or through an agent or by post. In case of submission of bid documents by post, the risk and responsibility for loss/delay in transit of the same shall solely lie on the bidder.
- 1.5.4 The bids received by the Chief Engineer, Project DANTAK C/O 99 APO will be opened (i.e. T-bid) at the office of the Chief Engineer, Project DANTAK, C/O 99 APO on **08 Sep 2015 at 1230 hrs (BST)**. Q-bid will however be opened subsequently on the prescribed date after technical evaluation. However, Q-bid in respect of non-qualified firms will be returned back unopened.
- 1.5.5 The bid shall be valid for a period of **120 days (One hundred twenty days)** from the last date of receipt of bids.
- 1.5.6 The submission of a tender by a tenderer implies that he had read this notice and conditions of contract and has made himself aware of the scope and specifications of the work to be done and of the conditions and rates at which stores, tools and plants etc will be issued to him, local conditions and other factors bearing on the execution of the work.

1.6 PERIOD OF COMPLETION

- 1.6.1 The contract will run for a period of **180 days (One hundred eighty days)** from the date of placing of work order.

1.7 LANGUAGES

- 1.7.1 All the design work and documents shall be prepared and submitted in English language only.
- 1.7.2 All the correspondence shall be in English only. The key design and management staff and advisors shall be proficient in spoken and written English.

1.8 MODE OF PAYMENT

- 1.8.1 Payment to the Consultant will be made in Indian Rupees through NEFT/RTGS only.

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For Accepting Officer

1.9 CONTACT ADDRESS FOR FURTHER INFORMATION

1.9.1 The following official may be contacted for any other information required in connection with the subject. The bidder may also visit BRO website www.bro.nic.in or www.bro.gov.in for further details.

(a) **Commander 19 BRTF**

Address

Headquarters, 19 BRTF (GREF)

C/O 99 APO

Tele No. 009755-252201/252228 Fax No: 009755 – 252229

Email: bro-19brtf@nic.in, 19brtf@gmail.com

(b) **Dir/ SW (Contract), Headquarters Project Dantak.**

Address

HQrs Chief Engineer,

Project Dantak

C/O 99 APO

Tele No. 009752 - 351082/351086 Fax No: 009752 – 351085

Email: bro-dtk@nic.in, brodtk@gmail.com

Above particulars may change due to Adm or any other reasons and shall be available on <https://eprocure.gov.in> or BRO website <http://bro.gov.in>. Therefore, bidders/contractors are requested to visit these websites frequently and at least THREE DAYS prior to End date of Bid Submission for changes in above particulars.

1.10 ADDRESS OF BIDDER/CONSULTANT

The bidders shall furnish the postal address of their main and site office. Any notice or instruction to be given to the bidder/Consultant under the terms of the contract shall be deemed to have been served, if it has been delivered to his authorised agent or representative at main or site office or has been sent by registered post to the main or site office or to the address of firm last provided by the bidder/consultant.

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For Chief Engineer
30 Jul 2015

(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)
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For Accepting Officer

SECTION-II
INSTRUCTION TO BIDDERS

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

SECTION – II

INSTRUCTION TO BIDDERS

2.1 GENERAL

- 2.1.1 The bids are invited for the works referred to in Terms of Reference (T.O.R) vide Section– IV from the consultants who have executed similar works. (The date and time of actual receipt of bids at the said notified place will only count for consideration of the bids).
- 2.1.2 The applicant, before bidding, shall carefully study the conditions and the details appended herein. In case the applicant have any doubts and requires clarification, he shall obtain, from the Client at the contact address given in Section **1.9.1** or in the pre-bid conference to be held on **01 Sep 2015 at 1100 Hrs (BST)**. The site of the proposed works may be inspected by the bidder or his representative at his own cost. Technical persons of the department will accompany the applicant, if necessary on prior requisition.

2.2 BIDDING

- 2.2.1 The bidders shall submit bids in a complete shape with all the particulars called for in the Bid documents. All the required details and all other relevant information shall be submitted to enable the Client to evaluate the suitability of the bids and to take a decision as per the Terms of Reference incorporated in the schedules. The bidders may, if necessary, amplify and furnish additional information. If the information furnished is not complete, the bid is liable to be rejected.
- 2.2.2 The bidder, as far as possible, shall follow the job mentioned in Terms of Reference.
- 2.2.3 Clarifications, amplifications or any other correspondence from the bidder subsequent to opening of the bids will not be entertained. The bidder shall therefore ensure that their bids are submitted in a complete shape without any conditions.
- 2.2.4 The attention of bidder is drawn to the Indian Official Secret Act 1923 (XIX of 1923) as amended up to date, particularly section 5 thereof for compliance with its provision.

2.3 COST OF BIDDING

- 2.3.1 The bidder shall bear all costs associated with the preparation and submission of his bid and the Client will in no case be responsible or liable for these costs, regardless of the outcome of the bidding process.

2.4 SITE VISIT

- 2.4.1 The bidder is advised to visit and examine the site of works and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing the bid and entering into a contract. The cost of visiting the site shall be at bidders own expense. Technical person of the Client will accompany the applicant, if required.

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For Accepting Officer

2.4.2 The bidder and any of his authorized agents or personnel will obtain permission from the Ministry of External Affairs, Royal Govt. of Bhutan to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the bidder, his personnel or agents, will release and indemnify the Client and his personnel and agents from and against all liability in respect thereof and will be responsible himself for personal injury (whether fatal or otherwise), loss or damage to property and any other loss, damage, cost and expenses howsoever caused, which, but for the exercise of such permission would not have arisen.

2.5 ELIGIBILITY OF FIRMS AND JOINT VENTURE OF FIRMS

2.5.1 The engineering consultancy firms **who have executed similar works** and past record in similar nature of jobs **are only eligible to submit the bids.**

2.5.2 If the bid is made by a proprietary firm, it shall be signed by the proprietor above his fully typewritten name, name of his firm with current address and registered office with the office stamps.

2.5.3 If the bid is made by a firm in partnership, it shall be signed by all the partners of the firm above their full type written names and current addresses or alternatively by a partner holding a valid power of attorney for the firm from all the partners for signing the bid, in which case a certified copy of the power of attorney shall accompany the bid, including the certified copies of the partnership deed, current address of the firm and the full names and the current address of the partner in India/Bhutan and their registered office. It should also clearly state which member of the partnership would be acting as a lead member on behalf of the partnership in all its relations and communication with the Employer.

2.5.4 If the bid is made by a limited company or a limited corporation, it shall be signed by a duly authorized person holding a valid power of attorney, which should accompany the bid. Such limited company or corporation may be required to furnish satisfactory evidence of its existence if job is to be awarded. They should also furnish the articles of memorandum and certificate of incorporation of the Company.

2.5.5 If the bid is made by a joint venture of firms, the sponsoring firm shall submit complete information pertaining to each firm in the group and state which member of the joint venture will be acting as lead member on behalf of the joint venture. The sponsoring firm shall also furnish evidence admissible in law in respect of the authority assigned to such firm on behalf of the general group of firms and for completion of the job. A detailed memorandum of understanding (MOU) between the members of joint venture stating the inter-relationship and division of work between the members, and undertaking to the effect that firms are jointly and severally liable to the employer for the performance of the services should be submitted along with the tender for examination by the Client. Powers of attorney from each member shall authorize the lead member to submit the tender and to negotiate the proposal on their behalf and complete the job in all respect.

2.5.6 It shall be noted that if any member of the group combines the function of a Consultant or designer with those of a contractor and / or manufacturer, all relevant information must be provided regarding such relationship, along with an undertaking to the effect that the member agrees to limit their role to that of a Consultant and / or designer and to disqualify themselves, their associates / affiliates and / or parent firm from work on any other capacity (including tendering related to any goods or services for any part of the project) on this project other than that of Consultant and/or designer.

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

- 2.5.7 If, in connection with the performance of the consulting services any group member intends to borrow, hire temporarily personnel from contractors, manufacturer or suppliers, he must include in their proposal all relevant information about such personnel. In such cases the bid will be acceptable only if those contractors, manufacturers and suppliers disqualify themselves from work on this Project (including tendering related to any goods or services for any other part of the Project) other than that of Consultant and / or designer.
- 2.5.8 Each tenderer, or any other associate will be required to confirm and declare in the tender document that no agent or middleman or any intermediary has been or will be, engaged to provide any services, or any other items of work related to the award and performance of the contract. It shall be confirmed and declared in the submittal that no agency commission or any payment that may be construed as an agency commission has been or will be paid and that the tender price will not include any such amount.
- 2.5.9 All witnesses and sureties shall be from persons of stature and probity and their full names, occupations and addresses shall be stated below their signatures.
- 2.5.10 The bid from the consultants shall be accompanied by an attested copy of the Income Tax Return for the previous financial year, a photocopy of PAN card and Passport.

2.6 DISQUALIFICATION OF THE FIRMS

- 2.6.1 Not more than one tender shall be submitted by one firm or firms in partnership or joint venture. Under no circumstances will a father or son(s) or other close relatives who have business dealing with one another be allowed to tender for the same contract as separate competitors. A breach of this condition will render tenders of both the parties liable for rejection.
- 2.6.2 Joining together of two or more Consultants' team, who have applied separately for issue of tender documents, to submit a single tender will not be permitted.
- 2.6.3 Firms employing a retired official of the Border Roads Organisation within two years from the date of retirement shall ensure that the prior permission of the Government of India has been obtained for the purpose. The contract is liable to be cancelled if either the bidder or any of his employees is found at any time to be such a person who had not obtained the permission of the Government as aforesaid before.

2.7 LANGUAGE & LOCATION OF DESIGN OFFICE

- 2.7.1 All the documents and subsequent design shall be prepared and submitted in English language only. The key design and management staff proposed to be deployed for the work shall be proficient in spoken and written English.
- 2.7.2 The consultants core team shall during field survey and investigation be located near the work site preferably at **Shinghar** and **Gorgan**. The detailed design and report preparation may however be carried out at firm's main office/Branch office.

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For Accepting Officer

2.8 BID SECURITY

- 2.8.1 The bidder shall submit, along with their tender, a Bid Security, in the form of TDR/STDR/CDR/FDR issued by any Branch of a scheduled commercial bank based in India, for an amount of **Rs. 1,99,500/- (Rupees One Lacs Ninety Nine Thousand Five Hundred Only)**, in favour of **“The Chief Engineer, Project DANTAK, C/O 99 APO with a validity period of 120 days from the last date of submission of tender. The bidder shall also submit Bank Guarantee for Bid security (Refer Appendix J2).**
- 2.8.2 The original of this Bid Security shall be submitted in a separate sealed envelope inside the envelope containing the **Technical Bid**. This envelope shall be opened in the presence of the tenderers to confirm the compliance of this requirement. **Offer submitted without the valid Bid Security will be rejected outright.**
- 2.8.3 The Bid Security of the successful bidder will be returned on receipt of a Performance Guarantee and the signing of the contract as required herein. The Bid Security of the unsuccessful bidders will however be returned after finalization of bids or on expiry of **120 days** from the last date of receipt of bids which ever is earlier at the request of the bidder.
- 2.8.4 The Client reserves the right to call in the Bid Security if the successful bidder fails to respond to clarifications sought and sign the contract within the specified time frame or withdraws the offer within the period of **120 days** from the date of receipt of bids. Submission of false statements entails call-in of Bid Security of the bidders, irrespective of his being successful or otherwise.

2.9 BID VALIDITY

- 2.9.1 The bid shall be valid for a period of **120 days (One hundred twenty days)** from the last date of receipt of bids.

2.10 PRE-BID MEETING

- 2.10.1 A pre-bid meeting will be convened at the Office of the **Chief Engineer, Project DANTAK, C/O 99 APO on 01 Sep 2015 at 1100 Hrs (BST).**
- 2.10.2 The purpose of the meeting will be to clarify issues and to answer questions or any matter that may be raised at that stage.
- 2.10.3 The bidder is requested preferably to submit any question in writing or by fax to reach the Client not later than **one week** before the meeting, or ask in the pre-bid meeting.
- 2.10.4 In case the bidder is not in a position to attend the meeting, minutes of the meeting including copies of the questions raised and replies given, will be furnished expeditiously to all those attending the meeting and subsequently to all purchasers of the bidding documents. Any modification in the tender documents, which may become necessary as a result of the pre-bid meeting, shall be made by the Client exclusively through the issue of an addendum in pursuant to the following clause and not through the minutes of the pre-bid meeting.

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2.11 AMENDMENT OF BIDDING DOCUMENTS

2.11.1 At any time prior to the dead line for submission of bids, the Client may, for any reason, whether at his own initiation or in response to a clarification requested by a prospective bidder modify the bidding documents by the issue of an Addendum / Amendment.

2.11.2 The addendum / amendment will be uploaded on web site.

2.12 DEAD LINE FOR SUBMISSION OF BIDS

2.12.1 Bids must be submitted **Manually (offline) on or before 1200 Hrs (BST) on 08 Sep 2015.**

2.12.2 The Client may at his discretion extend the deadline for submission of bids issuing an amendment in accordance with the above in which case all rights and obligations of the Client and the bidders previously subject to the original deadline shall there after be subject to the new deadline as extended.

2.13 MODIFICATION AND WITHDRAWAL OF BIDS

2.13.1 In case the bidder has to revise/ modify the rates quoted in the schedule 'A' before tender submission end date as mentioned in critical data sheet, resubmission bid shall be allowed.

2.13.2 In case the tenderer has to revise /modify /withdraw his quoted rates / offer after it is submitted, he may do so before the latest date & time fixed for submission of tenders. Any revision/modification in offer/withdrawal of offer in the form of an open letter shall not be taken into account, while considering in his original offer.

2.13.3 No bid may be modified subsequent to the last date and time for submission of bid.

2.13.4 Withdrawal of a bid by L1 during the interval between the last date and time for submission of bid and the expiry of the period of bid validity specified under clause 2.9.1 will result in the call-in of the Bid Security by the Client.

2.14 BID FORMAT AND SIGNING OF BIDS

2.14.1 The bidder has to submit only one copy of the tender document in Original.

2.14.2 The bid shall be typed/printed and shall be signed by a person or persons duly authorized to sign on behalf of the firm, or joint venture.

2.14.3 Proof of authorization shall be furnished in the form of a written power of attorney, which shall accompany the bid. The person or persons signing the bid shall initial all pages of the bid where entries or amendments have been made.

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2.14.4 The Complete bid shall be without alterations, interlineations or erasures, except those by the bidders, in which case such corrections shall be initialed by the person or persons signing the bid.

2.14.5 Only one bid may be submitted by each bidder. No bidder may participate in the bid of another for the same contract in any capacity whatsoever.

2.14.6 The complete set of bidding documents issued/downloaded for the purpose of the bidding together with any addendum / amendment there to, issued by the Client in accordance with clause 2.11 and any modification issued as a result of pre-bid meeting in accordance with clause 2.10.4 and the documents furnished, pursuant to clause 2.5 will form part of the agreement.

2.15 TECHNICAL AND FINANCIAL BID

2.15.1 The bidders shall submit the bids in two separate sealed covers with the following superscription on top of the covers. Both the sealed covers, shall be placed in the single cover while submitting the bid.

2.15.2 **Envelope 'A' (Technical):** Technical proposals, Bid Security, tender fee in original in a separate sealed envelope alongwith all the documents required for technical qualification.

2.15.3. **Envelope 'B' (Financial):** Price bid and Financial Proposals.

2.16 TECHNICAL PROPOSAL

2.16.1 Under the technical proposal, particular about the following shall be furnished as per the formats specified at Section-VII. No indication of the price-bid shall be given under this proposal and the requisite details alongwith Bid Security in original in a separate sealed envelope shall be submitted under this package.

(a) The composition of the proposed Team of experts and Task Assignment to each key personnel and support staff.

(b) Approach and methodology proposed to be followed for various services listed in TOR, including quality assurance plan.

(c) Proposed work programme for the execution of the services illustrated with bar charts of activities.

(d) Manning schedule of each key personnel supported by bar diagrams showing the time proposed (person x months) for each Key Professional staff.

(e) The name, background, qualifications and professional experience of each key staff including the team leader to be assigned for the services. One set of original Curriculum Vitae (CV) of each key staff needs to be recently signed in blue ink by the proposed key professional staff and also by an authorized official of the Firm. The key information shall be as per the specified format. The authorized signatory shall sign on each page of each CV (i.e. original as well as photocopies). Unsigned copies of CVs shall be rejected.

(f) Equipments/Instruments proposed to be used for the services.

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- (g) Computer Hardware and softwares proposed to be used for the services.
- (h) In case the consultant envisages to outsource certain specialized services to the expert agencies, the details of the same indicating the arrangement made with the agencies be also furnished. These agencies would however, be subject to the approval of the client to ensure quality input by such agencies. For geo-technical investigations, only consultants with experience in similar nature of works shall be employed.

2.16.2 During preparation of the technical proposal, particular attention be given to the Following:

- a) The various manpower i.e. key personnel, technical and administrative support staff are assigned in adequate number and in a manner that the services specified at TOR are completed in the specified time schedule as per the desired details and standard. It is emphasized that the time period for the assignment indicated in the TOR should be strictly adhered to.
- b) At least 25% of the proposed Technical Key Personnel must have been employed for the last 6 months (reckoned from the date of submission) by the firm/consortium submitting the proposal. A documentary evidence in support of this should be enclosed.
- c) In case a firm is proposing key personnel from educational/research institutions, a '**No Objection Certificate**' from the concerned institution should be enclosed with the CV of the proposed key personnel committing his services for the instant project.
- d) No alternative key personnel may be proposed and only one CV may be submitted for each position **in the format given at Section-VI. The minimum requirements of qualification and Experience of all key personnel are listed at annexure - 'I' to Section-VI. The proposal not meeting the minimum requirement specified shall not be evaluated further. However, the client reserves the right to lower the minimum requirements in the interest of work without giving any notice.**
- e) Specific experience in case of Retd EE/SE/CE from State/Central Govt. would be considered for specific position.
- f) Where graduation is the required qualification, M.Tech would be considered equivalent to 2 years experience and PHD equivalent to 3 years.
- g) Team Leader, Highway Engineer, Geo-Technical cum material engineer and Survey Engineer should be available from beginning of the project.
- h) The availability of key personnel must be ensured at site during the period shown in the manning schedule.
- i) The proof of age and qualification of the key personnel must be furnished in the technical proposal.
- j) Age limit for support staff to be deployed on project is 60 years.

(Signature of the Consultant with seal)

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- k) Copy of tender guarantee.
- l) Copy of Power of attorney to submit tender.
- m) Tender document duly signed each page thereof with price bid as per Schedule 'A' and annexure thereto (Refer section-V).

2.16.3 The Undermentioned documents are to be submitted alongwith Technical Proposal

(a) Working capital or credit facility certificate for at least 10% of the estimated cost of works as given in the NIT i.e., Rs 13.30 lacs from a Scheduled National Bank. If necessary Department will make inquiries with the tenderer's Banker.

(b) The tenderer should possess immovable property of residual market value (i.e free from loan/mortgage) more than 10% of estimated cost of work given in NIT. Tenderer shall submit Affidavit for immovable property incorporating following certificates in affidavit along with valuation report from Registered (with any Govt body) valuer & registration certificate with any Govt body of required valuer :-

(i) That the immovable property is free from mortgages, hypothecation or any other disputes and encumbrances and clearly belongs to the Contractor.

Or

That the immovable property is free from any disputes and encumbrances and clearly belongs to the Contractor. The immovable property has been mortgaged/hypothecated for Rs..... Market value of immovable property as per valuation report given by Registered valuer is Rs..... Therefore Residual market value of property i.e. Rs..... (market value minus mortgaged value) is free from any mortgage/hypothecation

(ii) That the said immovable property has not been shown for seeking enlistment of a sister concern in BRO.

(iii) That the said immovable property will not be sold, transferred, gifted or otherwise disposed off till satisfactory completion of the work.

(c) **Experience.** Tenderer should have successfully completed or substantially completed** three similar works costing not less than the amount equal to 40% of estimated cost or two similar works costing not less than the amount equal to 50% of estimated cost of work or one similar works costing not less than the amount equal to 80% of estimated cost of work in "last seven & current" financial years. These similar works should have been successfully completed or sustainably completed** at an altitude of 500m & above, if work is required to be executed at an altitude of 2100m & above. Works proving eligibility criteria of experience shall be highlighted and performance certificate from client in respect of these works shall be submitted (Substantially completed works means those works which are 90% completed on the date of submission (i.e. gross value of work done up to the last date of submission is 90% or more of the original contract price) and continuing satisfactorily)

(d) List of works executed in the following format:

- (a) Name of work & CA No.
- (b) Brief scope of work
- (c) Name & address of employer/client
- (d) Accepted contract amount
- (e) Date of commencement of work
- (f) Original date of completion
- (g) Extended date of completion
- (h) Actual date of completion/present progress
- (j) Cost of completed work
- (k) Remarks explaining reasons of delay if any.

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(e) The completion cost of works shall be brought to common base on date of receipt of tender as per following formula:

Completion cost X (1 + (Period in days from date of completion to date of receipt of tender/365 days) X 0.1))

(f) Affidavit on Performance and other requirements on the following:-

(i) There should not be poor/slow progress in running works due to defaults of the tenderer.

(ii) There should not be serious defects observed in works which stand unrectified by the tenderer.

(iii) There should not be any Cancelled/abandoned contracts in which Govt. unrealized recoveries exist

(iv) Tenderer should have not been blacklisted by any Govt. Deptt.

(v) These should not be any Govt. dues, outstanding against the tenderer.

(vi) Tenderer should not be habitual litigant i.e. having more than 3 unsuccessful arbitration/court cases during the last 5 years in which his views/claims substantially rejected.

(vii) Proprietor/partners/directors of firm should not be involved in anti national/social activities and should have neither been convicted nor any proceedings should be pending in court for such activities.

(g) Information of all arbitration/court cases decided during last five & current financial years and also presently in progress as per following format:-

(a) Name & address of employer.

(b) Cause of dispute.

(c) Amounts involved

(d) Brief of Court judgment/arbitration award (if published) otherwise present progress.

(h) Constitution of firm along with copy of partnership deed (in case of partnership firms) and memorandum of articles and association (in case of limited companies).

(i) Copies of passport of proprietor/partners/directors (if available). If not submitted and Accepting officer has doubt in character and antecedents of proprietor/partners/directors he may get these verified from police authorities.

(j) Copies of PAN Card of proprietor/partners/directors.

(k) The tenderer should have the following in procession:-

(a) Mobile LiDAR Data Collection Units : 03 Nos.

(b) Terrestrial Laser Scanner : 01 No.

(c) DGPS Instruments : 10 No.

(d) UAV : 01 No

(e) Supportive documents showing the owning of the above instruments should be submitted.

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- (l) Affidavits shall be submitted on Non-judicial stamp papers of appropriate values duly attested by the Magistrate/Notary Public.
- (m) All the pages of the bid should have been duly signed by the bidder/authorized representative.
- (n) Cost of tender documents.
- (o) If contractor is not enlisted with BRO or enlisted with BRO but has not submitted standing security deposit, he should have submitted Bid Security.
- (p) Photocopies of documents shall be attested by Gazetted officer/public notary and also self attested.
- (q) Relaxation may be given in any one criteria (except in criteria of Experience and performance & other requirements) up to 25% extent i.e ABC may be permitted up to 75% of estimated cost of work/VEP may be permitted upto 75% of total Nos of requisite VEP/Working capital may be permitted upto 75% of requirement/Immovable property may be permitted up to 75% of requirement/Engineering establishment may be permitted upto 75% of requirement. No relaxation shall be permitted in criteria of Experience and performance & other requirements.

2.17. FINANCIAL PROPOSAL

- 2.17.1 This proposal clearly labeled **Financial Proposal** on the envelope shall comprise of the costs associated with the assignment. These shall normally cover, remuneration for key and other staff, accommodation, transportation, equipment, printing of documents, surveys, geo-technical investigations etc. The financial proposal should clearly indicate the amount asked for without any assumptions of conditions attached to such amounts. Conditional offer or the proposal not furnished in the format specified shall be considered non-responsive and is liable to be rejected.
- 2.17.2 The financial proposal shall take into account all types of the tax liabilities and cost of insurance including services taxes.
- 2.17.3 Costs shall be expressed in Indian Rupees only both in figure and words.
- 2.17.4 All payments shall be subjected to deduction of Indian Income tax @ 2 % and BCT @ 3% for Indian firms and @ 2% for Bhutaneese firms at source in accordance with the Income tax act as applicable.

2.18 SEALING AND MARKING OF BIDS

- 2.18.1 The bidder shall submit the bid in sealed cover.
- 2.18.2 The inner and outer envelopes shall be addressed to **Chief Engineer, Project DANTAK, C/O 99 APO, PIN-931708** and shall bear the following identifications.
Bid for the work of "SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKHAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN "
- 2.18.3 The inner envelopes shall indicate the name and address of the Bidder to enable the bid to be returned unopened in case it is declared that bid is otherwise unacceptable. If the

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outer envelope is not sealed and marked as instructed above, the clients will assume no responsibility for the misplacement or premature opening of the bid submitted. A bid opened prematurely for this cause may be rejected by the Client and returned to the bidder.

2.19 SUBMISSION OF BIDS

2.19.1 **Bids shall be submitted Manually.** Hard copy of technical bid along with supporting documents will either be received by hand at the address indicated at Para 2.18.2 or through registered post at Bidders risk. The department does not take any responsibility for the postal delays.

2.20 BID OPENING

2.20.1 The Client will open the bids **Manually at 1230 hours (BST) on 08 Sep 2015 at Headquarters, Chief Engineer Project Dantak, PIN 931708, C/O 99 APO.** Bids for which an acceptable notice of withdrawal has been submitted pursuant to clause 2.13 shall not be opened.

2.20.2 The Client will examine all the Technical proposals for completeness against the stipulated requirements whether the documents are complete, have been properly signed and are in order. The Client will commence tender evaluation subsequently.

2.21 EVALUATION OF PROPOSALS

2.21.1 A two-stage procedure will be adopted in evaluating the proposals with the technical evaluation being completed prior to opening of any Financial Proposals.

2.22. TECHNICAL PROPOSAL

2.22.1 Under this proposal, it will be examined whether cost of tender document, Bid Security has been submitted and the consultant has experience in similar nature of work.

2.22.2 The Technical Proposals will be evaluated by Technical Expert Committee to be appointed by Chief Engineer, Project DANTAK. The following criteria will be applied for evaluation of documents (Total points-1000 as per the break-up details given below): -.

- | | |
|--|--------------|
| a) Composition of the proposed team of experts and task assignment to each key personnel | 100 points |
| b) Approach and methodology proposed | - 100 points |
| c) Proposed work programme | - 100 points |
| d) Manning schedule of each key personnel | - 200 points |
| e) Qualification, related experience and competence of each key personnel proposed for the assignment (Total 400 points as per the break up given below):- | |
| i) Team leader cum Highway Engineer | 100 points |
| ii) Senior Survey Engineer | 100 points |

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- iii) Material Cum Geo-technical Engineer 100 points
- iv) Quality Surveyor/Document Expert 100 points
- f) Equipments/Instruments proposed to used : 50 points
- g) Computer Hardware and soft ware proposed to be used : 50 point

2.23 AWARD CRITERIA

2.23.1 Technical Proposal

2.23.1 The bids which are not found with cost of tender document and Bid Security will be considered non responsive. In case the consultant is **not found have executed similar nature of works**, the firm will not be technically acceptable.

2.23.1.1 Competence, experience, understanding and approach of the consulting service shall be considered as the paramount requirement for the technical acceptance of the proposal. The bids whose technical proposal scores a minimum of **60%** marks will only be considered as technically acceptable. All the proposals acceptable technically as per the criteria listed here above will only be considered for opening of Financial Proposal. The accepting officer may however review the criteria depending upon the extent of competition and other related issues.

2.23.1.2 After the Technical evaluation is completed, the Client shall notify those consultants whose proposals didn't meet the criteria as mentioned above or were considered non-responsive about non selection of their firm for opening of Financial proposals and will be returned unopened after completing the selection process. The Client shall simultaneously notify the consultants that have secured the minimum qualifying points, indicating the date and time set for opening the Financial Proposal through registered letter/Mail/Fax.

2.23.2 Financial Proposal

2.23.2.1 The Financial proposal shall be opened **manually** on the prescribed date and time fixed by the accepting officer in the presence of the consultant/their representatives who choose to attend. The Client shall prepare minutes of the financial bid opening.

2.23.2.2 The Evaluation Technical Expert Committee will determine whether the Financial Proposal are complete (i.e., whether they have costed all items of the Technical Proposals, and if not, the client will cost them and add their cost to the initial price), and will correct any computational errors.

2.23.3 Final Evaluation

2.23.3.1 The lowest financial proposal if found complete and in order in all respect will generally be invited for execution of contract agreement. However, Accepting Officer is not bound to accept the lowest or any bid received or to give any reasons for doing so.

2.24. CONFIDENTIALITY OF PROCESS

2.24.1 After the opening of bids, information relating to the examination, clarification, evaluation and comparison of bids and recommendations concerning the award of contract shall not be disclosed to bidders or other persons not officially concerned

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with such process until the award of the contract to the successful bidder has been announced. Any effort by a bidder (or any of his representatives) to influence the Client in the process of examination, clarification evaluation and comparison of bids, and in decisions concerning award of contract may result in the rejection of the bidder's bid.

2.25 AWARD

2.25.1 Prior to the expiration of the period of bid validity, the Client will issue a letter of acceptance to the successful tenderer, on approval of competent authority. The issue of the letter of Acceptance shall constitute the formation of the contract and Consultant shall commence the work immediately thereafter on receipt of Notice to Proceed.

2.26 SIGNING OF AGREEMENT

2.26.1 The successful bidder has to sign the agreement within a period of **15 days** from the date of communication of acceptance of his bid, otherwise the Bid Security deposited by him will be called-in without further notice.

2.26.2 After Acceptance and signing of Contract Agreement, the Client will promptly inform the unsuccessful bidders and return the Bid Security as submitted by them with the tender documents.

2.27 PERFORMANCE GUARANTEE (RETENTION MONEY)

2.27.1 Immediately after the successful tenderer receives the letter of Acceptance, but not later than the date of agreement is signed between the parties, the tenderer shall submit a Performance Guarantee having value equivalent to **5% of the contract price**, in the form of a Bank Guarantee issued by a Branch of a Schedule Commercial Bank based in India/Bhutan. The performance **guarantee shall remain valid for the period of 36 months** after completion of the services. The performance guarantee initially submitted shall have **validity upto 36 months** which shall be extended suitably by the bidder on the request of the client for further period, if so required. The guarantee shall be as per format given at Section-VI.

2.27.2 The Bid Security as submitted with the tender documents will however be returned back immediately on receipt of the performance guarantee from the successful tenderer.

2.28 RESPONSIBILITY FOR ACCURACY OF PROJECT PROPOSALS

2.28.1 The consultants shall be responsible for accuracy of all data used in project preparation and the /drawings and estimates prepared by him as part of the project. permanent location marks adequate for identification during execution shall be kept at the site at the cost of consultant. He shall indemnify the employer against any inaccuracies in the work which might surface out at the time of ground implementation of the project and for this purpose, he shall furnish bank guarantee for an amount to the extent of 10% of the total consultancy fees to be received by him. In such cases, the consultant is responsible to correct the drawings including any re-surveys/investigations (including correcting the layout etc.) as required. The bank guarantee shall be valid for a period of 3 years from the date of submission of the final Report. The final installment of 20% of the fees shall be released only on receipt of this bank guarantee. It is too made clear that total Bank Guarantee

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aggregating to **10% of contract price valid up to 36 months after completion of the work** which shall be extended suitably by the bidder on the request of client for further period, if so required. The guarantee shall be as per the format given at Section-VI. The performance guarantee submitted at the time of signing of contract agreement will be released at the time of payment of final bill.

2.28.2 An undertaking should be given by the consultant that they will provide required technical assistance/clarification when requested by the employer during construction of the said road.

2.29 PROGRESS OF WORK

2.29.1 If for any reason, which in the opinion of the employer's representative does not entitle the Consultant to an extension of time or the rate of progress of the works of any section is at any time, too slow to make it impossible for the Consultant to complete the study by the prescribed time or extended time, the Employer may notify the delay to the Consultant in writing and the Consultant shall there upon with the approval of the Employer, which shall not be unreasonably withheld take such steps as and necessary to expedite progress so as to complete the works on such sections by the prescribed time or extended time. The Consultant shall not be entitled to any additional payment for taking such steps. Such extension shall be without prejudice to the right of Employer to terminate the contract. Officer

2.30 JOINT VENTURE AGREEMENT

2.30.1 In case the successful tenderer is a joint venture of certain firms, the tenderer, immediately on receipt of acceptance letter, shall submit the joint venture agreement between the firms, duly signed by each member of the joint venture. However, joint venture is applicable only for works costing more than 25 Crores.

2.31 ADDITIONAL INFORMATION

2.31.1 Every effort will be made to provide additional information to tenderers that has been requested for in writing. However, request for additional information and any delay in providing information is entirely at tenderer's risk and shall not be considered as a reason for late delivery of tenders or a reason for delaying the submission of tenderers by the stated date.

2.31.2 Any information asked for by the bidder or provided by the Client that is not given in writing, shall not be considered by the Client and acceptable as a reason for late delivery of tenders or a reason for delaying the submission of tenders on the stated date.

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FORM OF AGREEMENT

This agreement made this Day of 2015 between Chief Engineer, Project DANTAK of Border Roads Organization (hereinafter called "the Client") on one hand and on the other hand* _____ of

_____ (hereafter called "the Consultant").

***Note :**

The Consultant is a Joint Venture of the following firms

- a)
- b)
- c)

The members authorize _____ to be known as the lead firm, and to act on their behalf in all matters in connection with or arising out of this agreement. The members of Joint Venture undertake together and individually (Jointly and Severally) the obligation of the Joint Venture under the agreement.

Whereas the Consultant has offered to perform certain services in this Contract for "**SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKHAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN**" and the Client has accepted the offer by the Consultant for the performance of such Services.

2.32 NOW THIS AGREEMENT WITNESS AS FOLLOWS

2.32.1 In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of the Client/ Consultant Services Agreement hereinafter referred to.

2.32.2 The following documents shall be deemed to form and be read and construed as part of this Agreement, namely

- (a) Invitation of Bid
- (b) The Letter of Acceptance.
- (c) Conditions of Client / Consultant Services Agreement (Section III).
 - Part I – General Conditions Of Agreement
 - Part II – Particular Conditions Of Agreement
- (d) Terms of References (Section – IV).
- (e) Form of Tender (Section-V)
- (f) Technical proposal
- (g) Performance Guarantee.
- (h) Joint Venture Agreement between the firms (If applicable).

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2.32.3. In consideration of the payments to be made by the Client to the Consultant as hereinafter mentioned the Consultant hereby agrees with the Client to perform the Services in conformity with the provisions of the Agreement.

2.32.4 The Client hereby agrees to pay the Consultant in consideration of the performance of the Services such amounts as may become payable under the provisions of the Agreement at the times and in the manner prescribed by the Agreement.

In Witness whereof the parties hereto have caused this Agreement to be signed in their respective hands as of the day and year first before written.

FOR AND ON BEHALF OF THE CLIENT

Accepting Officer

Name _____

Signature _____

Address _____

FOR AND ON BEHALF OF THE CONSULTANT

By Authorised Representative

Witness:

Name _____

Signature _____

Address _____

Note :- If the Consultant consist of more than one entity, all of these entities should also appear as signatories.

Witness :

(i)

(ii)

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SECTION – III

CONDITIONS OF THE CONTRACT

PART – I: GENERAL CONDITIONS OF CONTRACT

PART – II: CONDITIONS OF PARTICULAR APPLICATION

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PART I**GENERAL CONDITIONS OF CONTRACT****3.1 DEFINITIONS**

3.1.1 The following words and expressions shall have the meanings assigned to them except where the context otherwise requires.

3.1.1.1 "Project" means the project named in Part-II for which the consultancy services are to be provided.

3.1.1.2 "Service" means the services to be performed by the Consultant in accordance with the Agreement and comprise Normal Services, Additional services and Exceptional Services.

3.1.1.3 "Works" means the permanent works to be executed (including the goods and equipment to be supplied to the Client) for the achievement of the Project.

3.1.1.4 "Government" means the President of India, his successor in office and assigns.

3.1.1.5 "Employer / Client" means Chief Engineer, (P) DANTAK, who employs the Consultant, and legal successors to the Client and permitted assignees on behalf of Government.

3.1.1.6 "Accepting Officer" means Chief Engineer, Project Dantak who accepts the contract on behalf of the President of India.

3.1.1.7 "Engineer" means the officer of the rank of COL/SE(CIV)/Executive Engineer (Civil)/Maj authorised by the Accepting Officer to administer and direct the contract and who certifies the measurements and payments as due to the consultant. All notices to be given and all actions to be taken on behalf of the Government in respect of this contract may be given or taken by the Engineer.

3.1.1.8 "Consultant" means the party named in the Agreement, who is employed as an independent professional firm by the Client to perform the Services, and legal successors to the Consultant and permitted assignees.

3.1.1.9 "party" and "parties" means the Client and the Consultant and "third party" means any other person or entity, as the context requires.

3.1.1.10 "Agreement" means the conditions comprising invitation of bid, Parts I and II together with Terms of Reference specified at Section IV, Form of tender (Section-V). Performance Guarantee, Letter of Acceptance and Formal Agreement if completed, or otherwise as specified in Part II.

3.1.1.11 "Dte GBR" means "Directorate General Border Roads".

3.1.1.12 "DGBR" means "Director General Border Roads".

3.1.1.13 "CE" means "Chief Engineer".

3.1.1.14 "day" means the period between any one midnight and the next.

3.1.1.15 "month" means a period of one month according to the Gregorian calendar commencing with any day of the month.

3.1.1.16 "Local Currency" (LC) means the currency of India (i.e. Indian Rupee) and "Foreign Currency" (FC) means any other currency.

3.1.1.17 "Agreed Compensation" means additional sums as defined in Part II which are payable under the Agreement.

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3.1.1.18 'CTF' means the 'Commander Task Force' of the rank of SE or Colonel authorized by the accepting officer to direct the contract and release the payments for the services offered as per the terms of contract.

3.2 INTERPRETATION

3.2.1 The headings in the Agreement shall not be used in its interpretation.

3.2.2 The singular includes the plural, the masculine includes the feminine, and vice-versa where the context requires.

3.2.3 If there is conflict between provisions of the Agreement, the last to be written chronologically shall prevail, unless otherwise specified in Part II.

3.3 SCOPE OF SERVICES

3.3.1 The Consultant shall perform Services relating to the Project. The Terms of Reference of the services are stated at Section IV.

3.4 NORMAL, ADDITIONAL AND EXCEPTIONAL SERVICES

3.4.1 Normal services are those described as such in the Terms of Reference.

3.4.2 Additional Services are those described as such in Terms of Reference or which by written agreement of the parties are otherwise additional to Normal Services.

3.4.3 Exceptional Services are those which are not Normal or Additional Services but which are necessarily performed by the Consultant in accordance with clause 3.25.

3.5 DUTY OF CARE AND EXERCISE OF AUTHORITY

3.5.1 The Consultant shall exercise reasonable skill, care and diligence in the performance of his obligations under the Agreement.

3.5.2 Where the Services include the exercise of powers or performance of duties authorized or required by the terms of a contract between the Client and any third party, the Consultant shall:

- (a) Act in accordance with the contract provided that the details of such powers and duties are acceptable to him where they are not described in the Terms of Reference.
- (b) If authorized to certify, decide or exercise discretion, do so fairly between the Client and third party not as an arbitrator but as an independent professional acts by his skill and judgment.
- (c) If so authorized vary the obligation of any third party, subject to obtaining the prior approval of the Client to any variation which can have an important effect on costs or quality or time (except in any emergency when the Consultant shall inform the Client as soon as practicable).

3.6 CLIENT'S PROPERTY

3.6.1 Anything supplied by or paid for by the Client for the use of the Consultant shall be property of the Client and where practicable shall be so marked. When the Services are completed or terminated the Consultant shall furnish inventories to the Client of what has not been consumed in the performance of the Services and shall deliver it as directed by the Client.

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3.7 INFORMATION

3.7.1 The client shall so as not to delay the services and within a reasonable time give to the Consultant free of cost all information in his power to obtain which may pertain to the Services.

3.8 DECISIONS

3.8.1 On all matters properly referred to him in writing by the Consultant, the Client shall give his decision in writing so as not to delay the Services and within a reasonable time.

3.9 ASSISTANCE

3.9.1 In respect of the Consultant, his personnel and dependents, as the case may be, the Client, pursuant to the applicable Indian Laws shall do all in his power to assist in:

3.9.1.1 The provision of documents necessary for entry, residence, work and exit;

3.9.1.2 Providing unobstructed access wherever it is required for the services;

3.9.1.3 Providing access to other organizations for collection of information, which is to be obtained by the consultant.

3.10 SUPPLY OF PERSONNEL

3.10.1 The personnel who are sent by the Consultant to work in the Project shall have been physically examined and found fit for their assignments, and their qualification shall be acceptable to the client.

3.11 REPRESENTATIVES

3.11.1 For the administration of the Agreement each party shall designate the official or individual to be his representative.

3.11.2 If required by the Client, the Consultant shall designate an individual to liaise with Client's representative at the place of the Project.

3.12 CHANGES IN PERSONNEL

3.12.1 If it is necessary to replace any person, the party responsible for the appointment shall immediately arrange for replacement by a person of comparable competence.

3.12.2 The cost of such replacement shall be borne by the party responsible for the appointment except that if the replacement is requested by the other party.

3.12.2.1 Such request shall be in writing stating the reasons for it and

3.12.2.2 The party making the request shall bear the cost of replacement unless misconduct or inability to perform satisfactorily is established as the reason in the opinion of the accepting officer.

3.13 LIABILITY**3.13.1 Liability of the Consultant**

3.13.1.1. The Consultant shall only be liable to pay compensation to the Client arising out or in connection with the Agreement if a breach of Clause 3.5.1 is established against him in the opinion of Accepting Officer.

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3.13.2 Compensation

3.13.2.1 If it is considered that consultant is liable to the client, compensation shall be payable only on the following terms:

3.13.2.1.1 Such compensation shall be limited to the amount of reasonably foreseeable loss and damage suffered as a result of such breach, but not otherwise.

3.13.2.1.2 In any event, the amount of such compensation will be limited to the amount specified in Clause 3.15.1.

3.14 DURATION OF LIABILITIES

3.14.1 Neither the Client nor the Consultant shall be considered liable for any loss or damage resulting from any occurrence unless a claim is formally made on him before the expiry of the relevant period stated in Part II, or such earlier date as may be prescribed by law.

3.15 LIMIT OF COMPENSATION AND INDEMNITY**3.15.1 Limit of Compensation**

3.15.1.1 The maximum amount of compensation payable by consultant in respect of liability under Clause 3.13 is limited to the amount stated in Part-II. This limit is without prejudice to any Agreed Compensation specified under Clause 3.22.2 or otherwise imposed by the Agreement.

3.15.1.2 However, the accepting officer reserves the right to reduce or waive off the amount of compensation on merit and justification of the circumstances.

3.16 INSURANCE FOR LIABILITY AND INDEMNITY

3.16.1 The Consultant shall take out and maintain, and shall cause any sub-consultant to take out and maintain at their (or the sub-consultant's, as the case may be) own cost but on terms and conditions acceptable to the client, insurance against the risks and for the coverage as specified hereunder.

3.16.1.1 Insures against his liability under Clause 3.13.1, with a minimum coverage equal to the 100 % of the contract amount.

3.16.1.2 Increases his insurance against liability under Clause 3.13.1 over that for which he was insured at the date of the Client's first invitation to him for a proposal for the Services to the limit specified above.

3.16.1.3 Insures against public/third party liability, with a minimum coverage of Rs 1.00 million.

3.16.3.4 Increases his insurance against public/third party liability over that for which he was insured at the date of the Client's first invitation to him for a proposal for the Services, to the amount specified above.

3.16.3.5 Effects other insurances viz. third party motor vehicle liability insurance as per Motor Vehicle Act-1988, workers' compensation insurance in respect of personnel of the consultant and of any sub-consultant in accordance with the relevant provision of applicable laws, life, health, accident, travel or other insurance as may be appropriate in respect of his personnel and of any sub-consultant.

3.16.4 The consultant shall make all reasonable endeavors to maintain in force the insurances as specified above throughout his period of liability. Whenever requested by the client, the consultant shall submit evidence of the relevant

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insurance. In case the consultant fails to maintain the insurance cover with respect to the liability listed at clause 3.16.1.1 and 3.16.1.3 above, the client reserves the right to recover cost of such premium including penalty, if any, thereon from any payments as due to the consultant and pay it to the insurance company directly.

3.17 INSURANCE OF CLIENT'S PROPERTY

3.17.1 Unless otherwise requested by the Client in writing the Consultant shall make all reasonable efforts to insure on terms acceptable to the Client:

3.17.1.1 Against loss or damage to the property of the Client supplied or paid for under Clause 3.6.

3.17.1.2 Against liabilities arising out of the use of such property.

3.17.2 The cost of such insurance shall be at the expense of the Client.

3.18 AGREEMENT EFFECTIVE

3.18.1 The Agreement is effective from the date of receipt by the Consultant of the Client's Letter of Acceptance of the Consultant's proposal or of the latest signature necessary to complete the Formal Agreement, if any, whichever is the later.

3.19 COMMENCEMENT AND COMPLETION

3.19.1 The Services shall be commenced and completed at the times or within the periods stated in Part II subject to extensions in accordance with the Agreement.

3.20 VARIATIONS

3.20.1 The agreement can be varied on application by either party by written agreement of the parties.

3.21 FURTHER PROPOSALS

3.21.1 If requested by the Client in writing, the Consultant shall submit proposals for altering the Services. The preparation and submission of such proposals shall be an Additional Service.

3.22 DELAYS

3.22.1 Time is of the essence of this contract. In case the services or any part thereof are not so completed by the consultant within the specified time, for the reasons, which are solely the responsibility of the Consultant, the Consultant shall be liable to pay agreed compensation as per the stipulation given in Part II of the Service Agreement. This shall be in addition to the liability under clause 3.13 and 3.5.1.

3.23 CHANGED CIRCUMSTANCES

3.23.1 If circumstances arise for which the Consultant is not responsible and which make it irresponsible or impossible for him to perform in whole or in part the Services in accordance with the Agreement he shall promptly dispatch a notice to the Client.

3.23.2 In these circumstances if certain Services have to be suspended, the time for their completion shall be extended until the circumstances no longer apply plus a reasonable period not exceeding 30 days for resumption thereof.

3.23.3 If the speed of performing certain Services has to be reduced, the time for their completion shall be extended as may be made necessary by the circumstances.

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3.24 ABANDONMENT, SUSPENSION OR TERMINATION

- 3.24.1 The Client may suspend all or part of the Services or terminate the Agreement by notice of at least 30 days to the Consultant who shall immediately make arrangements to stop the Services and minimize expenditure.
- 3.24.2 If the Client considers that the Consultant is without good reason not discharging his obligations he can inform the Consultant by notice stating the grounds for the notice. If a satisfactory reply is not received within 21 days the Client can by a further notice cancel the Agreement and get the balance services completed through any other agency (ies) or means, at the risk and cost of consultant. The extra cost incurred by the client in doing so, over and above the amount that would have been payable to the consultant for the balance services, shall be recovered from the payment due, performance guarantee and securities etc of the consultant. In case adequate amount of consultant is not available with the client, the consultant on demand from client shall pay the amount, however, in case, cost of completion of balance services works out less than that would have been payable to the consultant for the same services, the advantage shall accrue to the client.

3.25 EXCEPTIONAL SERVICES

- 3.25.1 Upon the occurrence of circumstances described in clause 3.23 or abandonment or suspension or resumption of Services or upon termination of the Agreement otherwise than under the provisions of clause 3.24.2 any necessary work or expense by the Consultant extra to the Normal and Additional Services shall be regarded as Exceptional Services.
- 3.25.2 The performance of Exceptional Services shall entitle the Consultant to extra time necessary for their performance and to payment for performing them.

3.26 RIGHTS AND LIABILITIES OF PARTIES

- 3.26.1 Termination of the Agreement shall not prejudice or affect the accrued rights or claims and liabilities of the parties.
- 3.26.2 After termination of the Agreement, the Provision of Clause 3.15 shall remain in force.

3.27 PAYMENT TO THE CONSULTANT

- 3.27.1 The Client shall pay the Consultant for Normal Services in accordance with the Conditions and with the details stated in Section-V, and shall pay for Additional Services at rates and prices which are given in or based on those in Section-V and annexure thereto so far as they are applicable but otherwise as are agreed in accordance with clause 3.20.
- 3.27.2 Unless otherwise agreed in writing the Client shall pay the Consultant in respect of Exceptional services.
- 3.27.2.1 As for Additional services for extra time spent by the Consultant's personnel in the performance of the Services.
- 3.27.2.2 The net cost of all other extra expense incurred by the Consultant.
- 3.27.3 The decision of the accepting officer shall be final and binding in evaluating the value of Exceptional Services.

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3.28 TIME FOR PAYMENT

3.28.1 Amounts due to the Consultant shall be paid promptly

3.29 CURRENCY OF PAYMENT

3.29.1 The Currency applicable to the Agreement is that stated in Part II.

3.30 DISPUTED INVOICES

3.30.1 If any item or part of an item in an invoice submitted by the Consultant is contested by the Client, the Client shall give prompt notice with reasons and shall not delay payment on the remainder of the invoice.

3.31 INDEPENDENT AUDIT

3.31.1 The Consultant shall maintain up-to-date records which clearly identify relevant time and expense.

3.31.2 Except where the Agreement provides for lump sum payments, not later than twelve months after the completion or termination of the Services, the Client can at notice for not less than 7 days require that a reputable firm of accountants nominated by him audit any amount claimed by the Consultant by attending during normal working hours at the office where the records are maintained.

3.32 LANGUAGES AND LAW

3.32.1 In part II there is stated the language or languages of the Agreement, the ruling language and the law to which the Agreement is subject.

3.33 CHANGES IN LEGISLATION

3.33.1 If after the date of the Agreement, the cost or duration of the Services is altered as a result of changes in or additions to the regulations in any country in which the Services are to be performed except that of the Consultant's principal place of business stated in Part II the agreed remuneration and time for completion shall be adjusted as per the provisions stipulated in Part-II.

3.34 COPYRIGHT

3.34.1 The client shall have the copyright of all the documents prepared by the Consultant in performing the services under the agreement provided that:

3.35.1.1 The Consultant can retain copies of all such documents prepared by them.

3.35.1.2 The Consultant can use the purely technical contents of all such documents for his professional purposes.

3.35 CONFLICT OF INTEREST

3.35.1 Unless otherwise agreed in writing by the Client, the Consultant and his personnel shall have no interest in nor receive remuneration in connection with the Project except as provided for in the Agreement.

3.35.2 The Consultant shall not engage in any activity, which might conflict with the interests of the Client under the Agreement.

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3.36 NOTICES

3.36.1 Notices under the Agreement shall be in writing and will take effect from receipt at the address stated in Part-II. Delivery can be by hand or facsimile message against a written confirmation of receipt or by registered letter or by fax subsequently confirmed by letter.

3.37 PUBLICATION

3.37.1 Unless otherwise specified in Part-II the Consultant can publish material relating to the professional services. Publication shall be subject to approval of the Client if it is within two years of completion or termination of the Services.

3.37.2 The consultant, their sub-consultant and personnel of either of them shall not, either during the term or within two years after the expiration of this contract, disclose any proprietary or confidential information relating to the Project, the Services, the Works, this contract or the Client's business or operations. Attention of consultant is drawn to the Indian Official Secret Act-1923, as amended up to date, particularly section 5 thereof for compliance with its provision.

3.38 AMICABLE DISPUTE RESOLUTION

3.38.1 The parties shall seek to resolve in good faith any dispute or difference arising between them in respect of any matter connected with this Agreement. If the parties cannot resolve any such dispute or difference within 14 days, or such a period as the parties may subsequently agree, then it shall be submitted to Additional Director General (Border Roads)

3.38.2 If the Additional Director General (Border Roads) is unable to reach agreement on any matter referred to them, within 14 days or any such period as the parties may subsequently agree, then that matter or those matters shall be attempted to be settled by conciliation as per the provisions made in Part-III of Indian Arbitration and Conciliation Act-1996.

3.39 CONCILIATION AND ARBITRATION

3.39.1 All disputes relating to this contract on any issue whether arising during the progress of the Services or after the completion or abandonment thereof or any matter directly or indirectly connected with this Services Agreement shall in the first place be referred to a mutually agreed sole conciliator to be appointed by DGBR.

3.39.2 The conciliator shall make the settlement agreement after the parties reach agreement and shall give an authenticated copy thereof to each of the parties.

3.39.3 The settlement agreement shall be final and binding on the parties. The settlement agreement shall have the same status and effect as of an arbitration award.

3.39.4 The views expressed, or the suggestions made or the admissions made by either party in the course of conciliation proceedings shall not be introduced as evidence in any arbitration proceedings.

3.39.5 Any dispute that cannot be settled through the conciliation procedure shall be settled by arbitration in accordance with the rules stipulated in Part II in force at the effective date of the Agreement.

3.39.6 The parties agree to comply with the awards resulting from arbitration and waive their rights to any form of appeal insofar as such waiver can be validly made.

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3.39.7 In the event of cancellation of contract under clause 3.24 herein before, the reference shall not take place until alternative arrangements have been finalized by the client to get the balance services completed through other agency or agencies or means.

3.40 PERFORMANCE GUARANTEE

3.40.1 Immediately after the receipt of the letter of Acceptance, but not later than the date the agreement is signed between the parties, the Consultant shall submit to the Client a Performance Guarantee having value 5 % of the contract price, in the form of a Bank Guarantee issued by a Scheduled Commercial Bank based in India, in favour of 'The Chief Engineer, Project DANTAK as per the specified proforma. The performance Guarantee shall remain valid till end of the defect liability period as stated at part-II.

3.40.2 The Client reserves the right to recover all the compensation or other sums of money payable by the Consultant to the Client under this contract or any other contract with the Client or any other department of Government of India from the said Performance Guarantee.

3.41 RESPONSIBILITY FOR ACCURACY OF PROJECT PROPOSALS

3.41.1 The consultants shall be responsible for accuracy of all data used in project preparation and the /drawings and estimates prepared by him as part of the project. Permanent location marks adequate for identification during execution shall be kept at the site at the cost of consultant. He shall indemnify the employer against any inaccuracies in the work which might surface out at the time of ground implementation of the project and for this purpose, he shall furnish bank guarantee for an amount to the extent of 10% of the total consultancy fees to be received by him. In such cases, the consultant is responsible to correct the drawings including any re-surveys/investigations (including correcting the layout etc.) as required. The bank guarantee shall be valid for a period of 3 years from the date of submission of the final Report. The final installment of 20% of the fees shall be released only on receipt of this bank guarantee. It is to made clear that total Bank Guarantee aggregating to 10% of contract price valid for 3 years should be submitted buy consultant at the time of submission of final bill. The performance security submitted at the time of signing of contract agreement will be released at the time of payment of final bill.

3.41.2 An undertaking should be given by the consultant that they will provide required technical assistance/clarification when requested by the employer during construction of the said road.

3.42 DEDUCTION OF INCOME TAX AT SOURCE

3.42.1 While releasing the payments to Consultant for the services provided, the Client reserve the right to make suitable deduction at source on account of Income Tax as per the provisions of Indian Income Tax Act and amendments thereto from time to time and Bhutan Tax as applicable. The Client will however issue a Tax Deduction Certificate to the Consultant for the deduction made at source on the prescribed proforma.

3.43 JOINT VENTURE AGREEMENT

3.43.1 In case the successful tenderer is a Joint Venture of certain firms, the tenderer immediately on receipt of acceptance letter shall submit the joint venture agreement between the firms as per the joint venture agreement form published by FIDIC and duly signed by each member of the Joint Venture. It shall clearly state which firm of the Joint Venture will be acting as 'Lead Firm' to act on their behalf in all the matters in connection

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with or arising out of the agreement. The member of Joint Venture shall undertake together and individually (jointly and severally) the obligation of Joint Venture under the Agreement. However, joint venture is permitted only for works costing more than Rs 25 Crores.

3.44 CHANGE IN CONSTITUTION

3.44.1 Consultant shall promptly notify the Client of any changes in the constitution of the Consultant. It shall be open for the Client to terminate the Agreement upon death, retirement, insanity or insolvency of any person being the proprietor / partner of the Consultant or on the addition or introduction of a new partner / firm managing the Project for the Consultant without the approval in writing from the Client. But in absence of and until its termination by the Client as aforesaid, this agreement shall be in full force, and effect notwithstanding any changes in the constitution of the firm by death, retirement, insanity or insolvency of any of its proprietors / partners or addition on introduction of new partners / firm. In case of death or retirement, the surviving or remaining partners of the firm shall be jointly and severally liable for the due and satisfactory performance of all terms and condition of the Agreement, and likewise on the addition of a new partner / firm, the latter will also become jointly and severally liable.

3.45 COMPLETION

3.45.1 The services shall be completed by the consultant to the entire satisfaction of the client and in accordance with the specified time schedule and terms of reference.

3.45.2 Immediately after completion of an item of service or a group of services for which a separate period of completion has been mentioned in the contract, the consultant shall give notice thereof to the client.

3.45.3 The 'Engineer' shall take over from the consultant from time to time the item or group of items of services for which a separate period of completion has been mentioned in the contract and which have been completed to his satisfaction, before the completion of entire services, but for all purpose of the contract the completion of entire contract shall be taken into account.

3.45.4 The 'Engineer' shall certify to the consultant the Date(s) on which the item or group of items of service are completed and taken over and state thereof.

3.45.5 The 'Engineer' shall also certify to the contractor the state of items or group of items of the service at the end of the 'Liability period'.

3.46 MEASUREMENT FOR PAYMENT

3.46.1 Measurements pertaining to the work completed under this contract will be recorded as per the accounting unit mentioned in Schedule A and signed in the measurement book (IAFW-2261) by the Junior Engineer.

3.46.2 The measurement recorded by the Junior Engineer shall be 100% checked and signed by the Engineer-in-Charge.

3.46.3 25% test check will be carried out by OC Contract on each day of measurement by the Engineer-in-Charge.

3.46.4 5% test check will be carried out by the Cdr Task Force before making payment to the Contractor.

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3.46.5 The measurements should also be signed by the contractor as token of acceptance of the measurement.

3.46.6 In case of discrepancies in arriving out work done details, the decision of the Accepting Officer will be final and binding for both the parties.

3.47 FORCE MAJURE

3.47.1 The consultants shall not be liable for delay in completion of services, in the event of such delays being due to force majeure, which include war (declared or undeclared), riot, invasion act of foreign enemies, hostilities, revolution, rebellion, insurrection, military or power, damage from aircraft, civil commotion, fire other than those caused due to negligence on the part of consultant or his partner/ employees and unrest (other than those by the consultants employees) which is beyond the control of the consultant.

3.47.2 Intimation of the happening and cessation any such occurrences shall be given by the consultants to the client within 7 days of happening and cessation. The client on establishing such causes as force majeure shall extend the period of completion of the services suitably keeping in view the duration of incident and effect of such cause. The decision of the accepting officer in the matter of extension of time shall be final and binding.

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PART-II**CONDITIONS OF PARTICULAR APPLICATION****A. References from Clauses in Part-I**

3.1	Definitions
3.1.1.1	(a) The Project is " <u>SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKHAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN</u> ".
3.1.1.8	The Consultant is a firm but joint venture of the following member firms:- (a) (b) The members authorize....., to be known as the lead firm , to act on their behalf in all matters in connection with or arising out of the agreement. The members of joint venture undertake together and individually (jointly and severally) the obligation of joint venture under the agreement.
3.10.1	If requested by the Client, necessary certificate on physical examination and fitness of their personnel be produced to him.
3.11	The Consultant may from time to time delegate any of the duties and authorities vested in the consultant to personnel approved by the Client and he may at any time revoke such delegation. Any such delegation or revocation shall be in writing through a "Power of Attorney" and shall not take effect until a copy of it has been delivered to the Client. The consultant's delegate may at his discretion choose not to exercise any such delegation and can refer to the consultant for any necessary action.
3.14	Liability obligation shall remain valid till a period of 36 (Thirty Six) months reckoned from the date of completion of services.
3.15.1.1	Limit of Compensation <u>shall be equal to 10% of the Contract amount</u>
3.19	The date of commencement <u>shall be the date of issue of Notice to proceed by the Client.</u> <u>The Completion date of this Contract shall be 180 (One hundred eighty) days after the date of notice to proceed.</u>
3.22.2.1	Agreed compensation on account of delay by the Consultant shall be payable at the rate of 0.05% (Zero point zero five percent) of the contract amount per day of delay subject to a maximum of 10% (Ten percent) of the contract amount.
3.28.2	Time for payment to be reckoned from the date the bill is received complete in all respect by the Client from the Consultant is 45 days (Forty five days) .

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3.29	Currency of Agreement	: Indian Rupee (INR)
3.30.1	The Consultants and their personnel shall pay such taxes, duties, fees and other impositions as may be levied under the Applicable Laws, the amount of which is deemed to have been included in the contract price, including the consultancy service tax payable in India.	
3.33	Language(s) of the Agreement	<u>English.</u>
	Ruling Language	<u>English</u>
	Law to which Agreement is subject	<u>Indian Laws</u>
3.34.1	No adjustment to price is admissible on any account.	
3.34.1	Consultant's Principal place of business:	
3.38	<p>All the notices and correspondence with respect to this contract shall be addressed to the 'Engineer' as appointed by the accepting officer, at the address given hereunder. Subsequent change in the address, if any, will however be intimated separately and shall take effect accordingly. A copy of such notices and correspondence shall also be endorsed to Accepting Officer, Cdr 19 TF, OC 64 RCC C/O 99 APO for his information at the address given below: -</p> <p>Client's address</p> <p>(a) HQrs, 19 BRTF (GREF) - Commander 19 TF's Address C/O 99 APO Tele No. 009755-252201/252228 Fax No: 009755 – 252229</p> <p>(b) HQrs Chief Engineer, - Accepting Officer's Address Project Dantak C/O 99 APO Tele No. 009752 - 351082/351086 Fax No: 009752 – 351085 Email: <u>bro-dtk@nic.in</u> bro.dtk@gmail.com</p> <p>Consultant's address</p> <p>.....</p> <p>.....</p> <p>Fax No.</p> <p>Telephone No.</p>	
3.40.1	Designated representatives for amicable dispute resolution shall be:	
	Client's representative	Accepting Officer shall act as the Client's representative
	Consultant's representative	

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3.41	<p><u>RULES FOR ARBITRATION</u></p> <p>If the efforts to resolve all or any of the disputes through the conciliation fail, then such disputes shall be referred with in 30 days to Arbitration in accordance with the following provisions:</p> <ul style="list-style-type: none">(a) Matters to be arbitrated upon shall be referred to the sole Arbitrator of an Engineer Officer to be appointed by Director General Border Roads; or in his absence the officer officiating as the DGBR whose decision shall be final and binding.(b) The arbitrator shall give reasons for the award in each and every case irrespective of the value of claims or counter claims.(c) The award of the arbitrator shall be final and binding on both the parties.(d) <u>No Suspension of Work on Account of Arbitration</u>. The reference to arbitration shall proceed notwithstanding that works shall not then be or alleged to be complete, provided always that the obligations of the Employer and the Consultant shall not be altered by reasons of arbitration being conducted during the progress of works. Neither party shall be entitled to suspend the work to which the dispute relates on account of arbitration.(e) <u>Rules Governing the Arbitration Proceedings</u>. The arbitration proceedings shall be governed by Indian Arbitration and Conciliation Act 1996, as amended from time to time including provisions in force on Arbitration Award.(f) <u>Interest on Arbitration Award</u>. Where the Arbitration Award is for payment of money, no interest shall be payable on whole or any part of the money for any period, till the date on which the award is made.(g) <u>Venue of Arbitration</u>. The venue of Arbitration shall be place or places as may be fixed by the arbitrator at his direction.(h) <u>Jurisdiction of Court</u>. The appropriate court at Siliguri/Kolkata in the State of West Bengal shall alone have jurisdiction to decide any dispute arising out of or in respect of this contract.(i) The expenses incurred by each party in connection with preparation, presentation etc of its proceedings as also fees and expenses paid to the arbitrator shall be borne by each party.
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SECTION – IV

TERMS OF REFERENCE

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SECTION-IV**TERMS OF REFERENCE****4.1 DESCRIPTION OF THE PROJECT**

4.1.1 The work for construction/improvement of road Shingkar-Gorgan, approximate 56.00 kms in length, has been entrusted to Project Dantak by Royal Govt. of Bhutan to upgrade the road network to meet the growing traffic requirement in this part of the country by augmenting the road capacity for safe and efficient movement of the traffic.

4.1.2 The road is aimed at connecting the Tourist and Economic Power Center of Bhumtang to Lhuntse valley, which passes through at an altitude ranging from 8000 to 13000 feet and crosses Shingmala pass. Numerous of hair pin bends, besides the unstable soil condition will encounter on route.

4.1.3 In this context the responsibility for construction of **road Shingkar-Gorgan from km 0.00 to km 56.00 to Secondary National Highway Specifications of Bhutan** has been entrusted to Project Dantak of Border Roads Organisation.

4.1.4 Road Shingkar-Gorgan

4.1.4.1 The road alignment from Shingkar meets the obligatory point Pelphu at about 36 km and will be a new construction. From Pelphu (km 36) to Gorgan (km 56) the road will be improved from existing Farm road alignment (Fmn width - 4.0 to 4.5 m, black topping - 2.75 m) to **Secondary National Highway Specifications of Bhutan**.

4.1.4.2 Now, it is proposed to prepare Feasibility report and Detailed Project Report for construction of stretch from Km 0.00 to Km 56.00 Shingkar-Gorgan to **Secondary National Highway Specifications of Bhutan**. The entire alignment passes through mountainous terrain with existing hill slopes varying from 50⁰ to 85⁰ with dense forest growth. Considering the difficult terrain condition, unstable soil formation and various engineering challenges likely to be encountered, there is requirement to undertake the survey using expert in the field. Further for such work involving difficult terrain and inclement weather conditions, it is suggested use of LIDAR technology for survey of road work.

4.1.5 The scope of services for construction/improvement of **Secondary National Highway Specifications of Bhutan** therefore includes: -

(a) Determination of the most suitable and cost-effective alignment for its construction/improvement to **Secondary National Highway Specifications of Bhutan** standards and getting approval thereof from RGoB.

(b) Preparation of Feasibility report and Detailed Project Preparation for the selected alignment, including field surveys and investigation, trial pit at high embankment sites, soil and material surveys and evaluation, detailed engineering designs and drawings for the proposed road construction works in accordance with

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standard codes, specifications and sound engineering practices in vogue in Bhutan/India.

(c) Preparation of work and performance specifications, bills of quantity and cost estimate for the proposed works.

(d) Chalking out programme for implementation of project on the ground.

(e) Wherever required, consultant will liaise with concerned authorities and arrange all clarifications. Approval of alignment and all drawings including detailed engineering drawings be also obtained from Client/DoR/RGoB. The estimates for shifting of utilities of all types involved be also included suitably in the Feasibility report and DPR in consultation with concerned local authorities.

(f) Assist the client in obtaining approval of the alignment, Feasibility report and DPR including cost estimates from Client/DoR/RGoB.

4.2 **OBJECTIVE**

4.2.1. The main objective of the consultancy service is to establish a suitable alignment from the techno, environmental, economical and trafficable considerations and preparation of Feasibility report, Detailed Project Reports, get its approval from Client/DoR/RGoB for construction/improvement of the road to **Secondary National Highway Specifications of Bhutan** standards.

4.2.2. The Feasibility report and Detailed Project would inter-alia include detailed highway design, design of pavement, GAD of cross drainage structures and grade separated structures, quantities of various items, detailed working drawings, detailed cost estimates as appropriate for construction of the road to the standards as specified here above.

4.2.3 Design of protective works, slope stabilization measures, erosion control measures, land slide, control/protection measures snow drift control/ snow clearance measures, avalanche protection measures, if required.

4.2.4 Feasibility study and preparation of Detailed Project Report for hill roads shall be Done in accordance with best international practices and wherever practicable/feasible steep gradients and hair pin bends may be avoided by realignments and by provision of structures

4.3. **BRIEF DESCRIPTION OF THE PRIMARY TASK**

4.3.1 General Scope of Services shall cover but be not limited to the following major tasks.

i) Review of all available reports and published information about the project road and project influence area;

ii) Detailed reconnaissance;

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- iii) Evaluation of different alternatives based on techno-economic and other considerations and recommend most appropriate option and get approval thereof from Client/DoR/RGoB and prepare Feasibility report thereof.
- iv) Traffic studies including traffic surveys and Axle load survey and demand forecasting for next fifteen years;
- vi) Detailed topographic surveys using [LIDAR](#)
- vii) Pavement investigations, including Sub-grade characteristics and strength:
- viii) Identification of sources of construction materials; and ways means to use the locally available materials to the maximum extent;
- viii) Detailed design of road, its x-sections, horizontal and vertical alignment and design of embankment of height more than 6m and also in poor soil conditions and where density consideration required, even lesser height embankment. Detailed design of structures, preparation of GAD and construction drawings of cross - drainage structures.
- ix) Design of complete drainage system and disposal point for storm water.
- x) Techno-economic analysis to select the best alternative.
- xi) Implementation schedule /programme.
- xii) Strip plan indicating the scheme for carriageway widening, location of all existing utilities services and the scheme for their relocation. Reports, documents and drawings arrangements of estimates for cutting of trees and shifting of utilities from the concerned department and assist the client in getting approval thereof from the concerned authority.
- xiii) Preparation of Feasibility report and Detailed Project Report, cost estimate, construction drawings, rate analysis, detailed bill of quantities.
- xiv) Design of parking areas and rest areas if any.
- xv) Any other user oriented facility en-route.
- xvi) Facilitate the approval of Feasibility Report and Detailed Project Report from Client/RGoB.

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SERVICES TO BE PROVIDED BY THE CONSULTANTS**4.4 GENERAL REQUIREMENTS**

- 4.4.1 The Consultants shall perform the detailed survey, investigation and design of the highway and other related works as described above with reasonable skill, care and diligence to meet his obligation under this contract. In the conduct of this work the Consultant shall cooperate fully with the client, which shall provide all the available relevant data and reports and assist in arranging details from other departments if so required, to the consultants. Other data as considered necessary however be collected by the consultant. He shall, however, be solely responsible for the analysis and interpretation of all such data received and collected and for the conclusion and recommendations contained in the report.
- 4.4.2. Detailed design of road considering and incorporating specific aspects related to hill region like terrain, topographic conditions, extreme weather conditions, altitude effects etc
- 4.4.3 Design of protective works, slope stabilization measures, erosion control measures, land slide control/protection measures, snow drift control/snow clearance measures, avalanche protection measures, if required.
- 4.4.4 Design of scenic overlooks/watering points etc
- 4.4.5 All units of measurement used in the study shall be in accordance with the International system of Unit (S.I.). All notations abbreviation and symbol used in the reports, documents and drawings shall be as per IRC :- 71-1977.
- 4.4.6 All design works and documents shall be prepared and submitted in the English Language only. The key design and management staff shall be proficient in spoken and written English.
- 4.4.7 All the activities related to field studies, design and documentation shall be carried out in accordance with the latest guidelines/circulars of **MoRT & H** and relevant publication of IRC standards.
- 4.4.8 The consultants shall ensure that there are no named or proprietary produce in the documents or on the drawings.
- 4.4.9 The consultant's core team shall be based suitably near the site and company's main/branch office. Tender shall indicate clearly the part of work, which they proposed to carry out at the worksite and that at their Headquarter.
- 4.4.10 During all the stage of the consultancy services, the consultants shall maintain a proper and close co-ordination with the Employer and his representatives and arrange and convene regular meetings, working sessions, adhoc questions and answer sessions so that the Employer is kept well informed of the progress of the services. Drawings, computer simulations and outputs, models and graphic sketch etc shall be used to explain and illustrate the details of the proposal wherever necessary.

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- 4.4.11 The frequency of regular meeting shall be monthly or as and when required or instructed by the Employer's representative.
- 4.4.12 The deptt official may visit site at any time individually or collectively to acquaint themselves about the field investigation and survey. The consultants shall attend to such visits and explain about the progress thereon.
- 4.4.13 The consultants shall submit a monthly progress report one each to OC Contract/Commander Task Force by 5th day of followings month indicating date of induction and de-induction of various key personnel and activities performed/progress and extent thereof.
- 4.4.14 In addition to the express requirement stated herein above the consultants shall whenever the Employer's representative so requests, provide information and participate in discussion and arrange presentation that related to design matter and quality control.
- 4.4.15 All equipment, software and books etc as required for satisfactory service for this project shall be obtained by the consultant at their own cost and shall be their property.

4.5 QUALITY ASSURANCE PLAN [QAP]

- 4.5.1 The consultants should have detailed Quality Assurance Plan (QAP) for all field studies including topographic surveys, traffic surveys, engineering surveys and investigations, design and documentation activities. The quality assurance plans/procedures for different field studies, engineering surveys and investigations, design and documentation activities should be presented as separate, sections, like engineering surveys and investigations, traffic surveys, material geo-technical, road and pavement investigations, R&R assessment, economic & financial analysis, drawings and documentation, preparation, checking, approval and filing of calculations, identification and tractability of project documents etc. It shall also furnish information regarding the details of personal who shall be responsible for carrying out/preparing and checking/verification of various activities since inception to the completion of the services.
- 4.5.2 All activities related to field studies, design and documentation shall be done as per the latest guidelines/circulars of MoRT&H and relevant publications of the Indian Roads Congress (IRC)/Bureau of Indian Standards (BIS) for hill roads.
- 4.5.3 It is imperative that the QAP is approved by Accepting officer before the consultants start the field work.

4.6 FIELD SURVEY AND INVESTIGATIONS

- 4.6.1 **TRAFFIC SURVEYS** The traffic surveys to be carried out based on the volume of traffic likely to be diverted along Shingkar-Gorgan road after construction from the existing road Bumthang-Mongar-Gorgan.

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4.6.1.1. The methodology of collection and analysis of data, number and location of traffic survey stations shall be finalised in consultation with the engineer. The following methodology be followed for conduct of the survey. The vehicle classifications system as given in IRC-37 be followed for the traffic survey.

a)	The classified traffic volume count survey	For 7 days (continuous, direction-wise) at the selected survey station as per guidelines of MoRT&H.
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4.6.1.2 Traffic survey so conducted shall be presented properly as per the guidelines of MoRT&H on the subject and relevant IRC codes. The studies shall clearly highlight.

4.6.1.3 The hourly and daily variations in traffic, weekly Average Daily Traffic (ADT) and the Annual Average Daily Traffic (AADT) (by applying seasonal factors), based on the classified traffic volume counts.

4.6.3 ENGINEERING SURVEYS AND INVESTIGATIONS

4.6.3.1. Reconnaissance and Alignment

- (a) Details of terrain (steep or, mountainous) cliffs and gorges, general elevation of the road including maximum heights negotiated by main ascents and descents, total number of ascents and descents, hair pin bends, vegetation etc.
- (b) Climatic conditions i.e. temperature, rain fall data, snow fall data, fog conditions, unusual weather conditions etc.
- (c) Inventory of geologically sensitive areas like slip prone areas, areas subject to land slides, rock fall, snow drifts, erosion, avalanche activity etc
- (d) The Consultants shall make an in-depth study of the available land width (ROW), topographic maps, satellite imageries and aerial photographs of the project area and other available relevant information collected by them concerning the proposed alignment. Consultant himself has to arrange the required maps and the information needed by him from the potential sources, however client will extend all necessary assistance for the purpose and provide available information with the deptt.
- (e) The detailed ground reconnaissance may be taken up immediately after the study of maps and other data. This shall include but not limited to:
 - i. Topographical features' of the area
 - ii. Typical physical features along the existing alignment within and outside ROW i.e. land use pattern

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- iii. Feasibility of improving the existing alignment and proposed re-alignment to the desired standards including deficiency, in the existing alignment with respect to radius of curves, sight distances and gradient and need for re-alignment thereof.
 - iv. Traffic pattern and preliminary identification of traffic homogenous links
 - v. Inventory of major aspects including land width, terrain, pavement type carriageway type urban areas (location. Extent), geologically sensitive areas, environmental features
 - vi. Critical areas requiring detailed investigations; and,
 - vii. Requirements for carrying out supplementary investigations.
 - viii. Soil (textural classifications) and drainage conditions.
 - ix. Type and extent of existing utility services along the alignment (within ROW).
 - x. Existing pavement width, composition and its condition
 - xi Meteorological data i.e. annual average intensity of rain fall, duration of rain fall,
 - xii Max and min temperature humidity etc and its bearing on availability of working period in a year.
- (c) The data derived from the reconnaissance surveys are normally utilized for planning and programming the detailed surveys and investigations. All field studies including the traffic surveys should be taken up on the basis of information derived from the reconnaissance surveys.
- (d) The data obtained from the reconnaissance surveys should be compiled in the tabular as well as graphical (chart) form indicating the major physical features. The report shall clearly bring out **Three various alignments** suggested with merits/de-merits thereof and to facilitate selection of proper alignment for further detailed survey and investigation. The data and the charts should also accompany the rationale for the selection of traffic survey stations.

4.6.3.2. TOPOGRAPHIC SURVEYS

- (a) The basic objective of the topographic survey would be to capture the essential ground features along the selected alignment. The detailed topographic surveys should be taken up after the completion of reconnaissance surveys and approval of the alignment by the client.
- (b) The carrying out of topographic surveys will be one of the most

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important and crucial field tasks under the project. The detailed field surveys shall be carried out using high precision instruments i.e. **LIDAR**. The data from the topographic surveys shall be available in (x, y, z) format for use in a sophisticated digital terrain model (DTM). The Consultants would be fully responsible for any inaccuracy in surveys.

(c) The detailed field surveys would essentially include the following activities:

(i) Topographic Surveys along the selected alignment: Running a continuous open Traverse along the selected alignment, wherever required, and fixation of all cardinal points such as horizontal intersection points (HIP's), center points and transit points etc. and properly referencing the same with a pair of reference pillars fixed on either side of the center-line at safe places within the ROW.

(ii) Collection of details for all features such as existing road, structures, utilities, electric and telephone installations huts, buildings, fencing and trees (with girth greater than 0.3 metre) oil and gas line etc. falling within the extent of survey.

(d) The width of survey corridor will generally be maintained as under:

(i) The width of the survey corridor should take into account the layout of the proposed selected alignments/existing alignment including the extent of embankment and cut slopes and the general ground profile. While carrying out the field surveys the widening scheme (i.e. right left or symmetrical to the center line of the existing carriageway) should be taken into consideration so that the topographic surveys cover sufficient width beyond the center line of the proposed carriageway. Normally the surveys should extend a minimum of 200 m on either side of the proposed/ selected alignment.

(ii) Where existing roads cross the alignments, the survey will extend for a minimum of 100 m length on either side of the road center line and will be of sufficient width to allow improvements, including at grade intersection to be designed.

(e) The surveyed alignment shall be transferred on to the ground as under:

(i) Reference Pillar and Bench Mark/Reference pillar of size 15 cm X 15 cm X 60 cm shall be cast in RCC of grade M 15 with a nail fixed in the center of the top surface. The reference pillar shall be embedded in ground upto a depth of 30 cm. The balance 60 cm above ground shall be painted yellow. The spacing shall be 200m apart. Incase Bench Mark Pillar coincides with Reference Pillar only one of the two need be provided.

(ii) Establishing Benchmarks at site connected to GTS Bench marks at a interval of 200 meters on Bench mark pillar made of RCC as mentioned above with RL and BM No. marked on it with red paint.

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4.6.3.3 Longitudinal And Cross-Sections

(a) The topographic surveys with **LIDAR technology** for longitudinal and cross-sections shall cover the following:

(i) Longitudinal section levels along final centerline at every 25 m interval, at the locations of curve points, small streams, intersections and at the locations of change in elevation.

(ii) Cross sections at every 50 m interval in plain area in full extent of survey cambering sufficient number of spot levels on proposed/ existing carriageway and adjacent ground for profile correction course and earth work calculations. Cross sections shall be taken at every 25 m intervals in case of hill roads and at points of appreciable changes in soil conditions. While taking cross sections, soil conditions shall also be recorded.

(iii) General elevation of road indicating maximum & minimum height negotiated by main ascents & descent and total no. of ascents & descents

(iv) Details of road gradients, length of gentle & steep slope, length & location of stretches in unstable areas, areas with cliffs, areas with loose rocks, Land slide prone areas, snow drift prone areas, no & location of hairpin bends etc

(v) Details & types of protective structure, erosion & land slide control/protection measures, snow drift control measures, avalanche protection/control measures etc

(vi) Finalise the horizontal and vertical alignment of the road from Client/DoR and prepare Feasibility report and DPR document thereof.

(b) At feasibility study level, stage cross sections at greater interval may be taken.

(c) Topographic survey

(i) Proposed road corridor/alignment survey with alternative routes using UAV (unmanned aerial vehicle).

(ii) Topographic survey of one of the selected road (from UAV survey) after local vegetation clearance using TLS (Terrestrial Laser Scanning).

(iii) Contours Map for 500 m either side (1 km) corridor from UAV data as preliminary survey data.(Contour interval 2m) for the selected alignment (0.5 m contours).

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- (iv) Prepare Detailed Project Report (DPR) for proposed road alignment.
 - (v) GCPs (Ground Control Points) at every 5 km intervals.
 - (vi) Colorized 3D point cloud based corridor visualization.
- (d) The proposed alignment is on a steep slope of mountains covered with dense forest for most of stretch and considering the inaccessibility and forest coverage the following hybrid approach is adopted:
- (i) Preliminary survey by deploying UAV (unmanned aerial vehicle LiDAR/Optical Sensor/Survey).
 - (ii) Tripod mounted LiDAR survey.
 - (iii) Preliminary survey deploying UAV to generate 2 m contour/contour at appropriate interval adapting to the terrain for a corridor of 500m either side of the center line. This will enable alignment and planning of alternate road corridor. Using this contour map and DTM, the firm/Consultant will plan for three alternate alignments based on given parameters and constraints. After the selection of a particular alignment, a minimal jungle clearance for its ground swath would be undertaken by the client.
 - (iv) LiDAR Based Survey: Approx, staking & pegging, the selected corridor will be staked and pegged on the ground for prominent Turning points. Subsequent to the jungle clearance, the firm/consultant will undertake the LiDAR based focused scanning by deploying tripod fixed LiDAR (TLS) Terrestrial LiDAR Survey for a narrow corridor of 100m, so as to create an accurate digital terrain model and contours at 0.5 m intervals. Thus based on this accurate terrain data, cut and fill estimates and the final alignment of the road will be carried out to generate the DPR ultimately.
 - (v) Final staking and pegging. The final road alignment will be staked and pegged for all turning points to enable guided construction of the road.
 - (vi) GCPs should be provided at every 5 km or agreed interval in pairs to enable LiDAR based future work.

4.6.3.4 **Details of utility Services and Other Physical Features**

- (a) The Consultants shall collect details of all-important physical features along the alignment. These features affect the project proposals and should normally include built and structures, monuments, burial grounds, cremation grounds, places of worship, stream river, canal, water mains, sewer, gas/oil pipes, crossings, trees, plantations, utility services such – as electric, and telephone lines (O/H & U/G) and poles, optical fiber cables (OFC) etc. The survey would cover the entire right-of-way of the

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road with adequate allowance for possible shifting of the central lines at some, of the intersections /curve locations.

- (b) The information collected during reconnaissance and field surveys shall be shown on a strip plan so that the proposed improvements can be appreciated, utility removals of each type etc. assessed and suitable actions can be initiated. Separate strip plan for each of the services involved shall be prepared for submission to the concerned agency.

4.6.3.5 Road Inventory Surveys

- (a) Detailed road inventory surveys shall be carried out to collect details of all the road features along the selected alignment. The inventory data shall include but not limited to the following:
- i) Terrain (flat. Rolling, mountainous)
 - ii) Land-use (agricultural. Commercial. Forest, residential etc) @ every kilometer
 - iii) Carriageway width, surfacing type @ every 500m and every change of feature whichever is earlier
 - iv) Shoulder surfacing type and width, @ every 500m and every change of feature whichever is earlier
 - v) Sub-grade local soil type (textural classification) @ every 500m and every change of feature whichever is earlier
 - vi) Horizontal curve and vertical curve
 - vii) Road intersection type and details at every occurrence
 - viii) Retaining structures and details. At every occurrence
 - ix) Height of embankment or depth of cut @ every 200m and every change of feature whichever is earlier
 - x) Land width i.e. ROW
 - xi) Culverts and other structures (type, size, span arrangement and location)
 - xii) Roadside arboriculture
 - xiii) Existing utility services on either side of ROW
 - xiv) General drainage conditions.
- (b) The data should be collected in sufficient detail. The data should be compiled and presented in tabular as well as graphical form. The inventory data would be stored 'in computer files using simple utility packages, such as **EXCEL**.

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4.6.3.6 **Sub grade Characteristics and Strength**

(a) Based on the data derived from alignment survey, the project road section should be divided into segments homogenous with respect to pavement condition and strength.

(b) The samples on soil classification and mechanical characteristics be collected as given under:

i) For the widening of existing road within the ROW, the consultants shall test subgrade soil samples @ 500 m for each homogeneous road segment.

ii) For the roads along new alignments, the test pits for subgrade soil shall be @ 200 m for each soil type, whichever is more.

(c) The testing for subgrade soil shall include:

i. In-situ density and moisture content at each test pit.

ii. Laboratory CBR (unsoak and 4-day soak compacted at three energy levels) and swell.

(d) For problematic soils, the testing shall be more rigorous. The characteristics with regard to permeability and consolidation shall also be determined for these soils. The frequency of sampling and testing of these soils shall be finalised in consultation with the client after the problematic soil types are identified along the road sections.

4.6.4 **GEO-TECHNICAL INVESTIGATIONS AND SUB-SOIL EXPLORATION**

4.6.4.1 The Consultant should make an in-depth study of available geological and meteorological maps of the area.

4.6.4.2 The Consultants shall carry out soil investigations and with the help of trial pits for the proposed high embankments and proper design of the embankment and conduct all relevant laboratory and field tests on soil and rock samples.

4.6.4.3 For the road pavement, trial pit at each major change in pavement condition or at 1 km intervals whichever is less shall be carried out to a suitable depth below embankment base or to hill slope level. Appropriate tests to be carried out on samples collected from these trial pits to determine the suitability of various materials for use in construction of embankments or in new pavement structure.

4.6.5 **MATERIAL INVESTIGATIONS**

4.6.5.1 The Consultants shall identify sources, quarry sites, availability of construction materials and its by product and borrow areas, undertake field and laboratory testing of the materials to determine their suitability for various components of the work and establish quality and quantity of various construction materials and recommend their use on the basis of techno-economic principles. The Consultants shall prepare mass

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haul diagram for haulage purposes giving quarry charts indicating the location of selected borrow areas, quarries and the respective estimated quantities.

4.6.5.2 It is to be ensured that no material shall be used from the right-of-way except by way of leveling the ground as required from the construction point of view, or for landscaping and planting of trees etc. or from the cutting of existing ground floor obtaining the required formation levels.

4.6.5.3 Environmental restrictions, if any, and feasibility of availability of these, should be duly taken into account while selecting new quarry locations.

4.6.5.4 The Consultants shall make suitable recommendations regarding making good the borrow and quarry areas after the exploitation of materials for construction of works.

4.6.5.5 The Material Investigation aspect shall include testing of bituminous mixes for various layers and concrete mixes of different design as identified during Material Investigation to conform to latest DoR specification as per direction of client.

4.6.5.6 As far as possible feasibility of locally available materials and its by product shall be explored and designs evolved incorporating these materials.

4.6.5.7 The undermentioned tests should be carried out for assessing the quality of materials:-

(i) Stone : Water absorption test in accordance with IS:1124.

(ii) The contractor should convert stone to Fine and Coarse Aggregates and tests for Aggregate Impact Value, Flakiness Index & Elongation Index and Soundness should be conducted in accordance with IS:2386 Part-I to V.

4.7 DESIGN OF ROAD, PAVEMENTS AND STRUCTURES

4.7.1 GENERAL

4.7.1.1 The Consultants are to carryout detailed designs and prepare working drawings for the following:

- i. Secondary National Highway standards of Bhutan carriageway configuration complete in all respects.
- ii. Design of pavement for the selected alignment.
- iii. Prepare alignment plans, longitudinal sections and cross-sections @ 50m intervals in plain/rolling area and 25 mtr at curves and hill section.
- vi. Designs for road furniture and road safety/traffic control features;

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- vii Design and drawings for service road locations where necessary/ required.
- ix.. Drainage design showing location of turnouts, out falling structures.
- x Traffic amenities (Parking Areas, Weighing Station and Rest Areas, etc.).

4.7.2. GEOMETRIC DESIGN

- 4.7.2.1 Based on the data collected from reconnaissance and topographic surveys, the new sections and the sections with geometric deficiencies, if any, should be identified and suitable measures for construction/ improvement should be suggested for implementation.
- 4.7.2.2 The detailed design for geometric elements shall cover, but not be limited to the following major aspects:
 - i. Horizontal alignment;
 - ii. Longitudinal profile;
 - iii. Cross-sectional elements.
 - iv. Junctions, intersections and interchanges if any.
- 4.7.2.3 The, alignment design shall be verified for available sight distances as per the standard norms. The, provision of appropriate markings and signs shall be made wherever the existing site conditions do not permit the adherence to the sight distance requirements as per the standard norms.
- 4.7.2.4 The consultant shall prepare complete road design.
- 4.7.2.5 The consultant shall make an inventory& condition survey of existing protective/control measures of all the structure related to slope stabilization, erosion control, landslide control/protection, Avalanche Protection etc. This shall include details of effectiveness of control measures already done and condition of protective/control structures.
- 4.7.2.6 The consultant should do landslide investigation. This shall be carried out to identify landslide prone areas, to suggest preventive measures or alternate routes that are less susceptible to landslide hazard. Further in existing slide areas this shall help to identify factors responsible for instability and to determine appropriate control measures needed to prevent or minimize recurring of instability problems. Initial preliminary studies shall be carried out using available contour maps, topographical maps, geological/geo-morphological maps, aerial photographs etc. for general understanding for existing slide area and to identify potential slide areas. This shall be followed by further investigations like geological/geo-technical/hydrological investigation to determine specific site condition prevailing the slide area as per relevant IRC

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specification/publication, MoRT&H circular and relevant recommendations of the international standards for hill roads. The results of the investigation shall provide basic for engineering analysis and the design of protection/remedial measures

- 4.7.2.7 The alignment plan so finalized shall be got approved from the Client/DoR/RGoB which shall then form basis for preparation of Feasibility report and DPR document.

4.7.3 PAVEMENT DESIGN

- 4.7.3.1 The detailed design of pavement shall include the Design of new pavement for carriageway;
- 4.7.3.2 The design of pavement shall primarily be based on IRC-37:2012 publications.
- 4.7.3.3 For the design of pavement, each set of design input shall be decided on the basis of testing and evaluation of its suitability and relevance in respect of in-service performance of the pavement. The design methodology shall accompany the design proposals and shall clearly bring out the basic assumptions, values of the various design inputs, rationale behind the selection of the design inputs and the criteria for checking and control during the implementation of works. In other words, the design of pavement structure should take due account of the type, characteristics of materials used in the respective courses. Variability of their properties and also the reliability of traffic predictions. Furthermore, the methodology adopted for the design of pavement shall be complete with flow charts indicating the various steps in the design process their interaction with one another and the input parameter required at each step.
- 4.7.3.4. Latest techniques of sub-grade strengthening like provision of geo-synthetics should be duly considered by the consultant for achieving economy, where CBR value is quite low.
- 4.7.3.5 While designing pavement for hill roads specific aspects relevant to hill regions like terrain & topographic conditions, weather conditions, altitude effects etc. shall be duly considered and suitably incorporated, in design so that pavement is able to perform well for the design traffic and service life. Effects of factors like heavy rainfall, frost action, intensive snow and avalanche activity, thermal stresses due to temperature difference in day and night, damage by tracked vehicles during snow clearance operation etc. must also be considered along with traffic intensity, its growth axle loads and design life.

4.7.4 DESIGN OF EMBANKMENTS

- 4.7.4.1 The embankments design should provide for maximum utilization of locally available materials consistent with economy.

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- 4.7.4.2 The Consultants shall carry out detailed analysis and design for all embankments of height greater than 6 m based on relevant IRC publications.
- 4.7.4.3 The design of embankments should include the requirements for protection works and traffic safety features and also extend of slope erosion on hill and valley side.

4.7.5 GENERAL ARRANGEMENT DRAWING OF STRUCTURES

- 4.7.5.1 The Consultant shall prepare General Arrangement Drawing (GAD) and Alignment Plan showing the salient features of the structures proposed to be constructed / reconstructed along the road sections covered under the study.
- 4.7.5.2 In case land available is not adequate for embankment slope, suitable design for RCC retaining wall shall be furnished. However, RSE wall may also be considered depending upon techno-economic suitability to be approved by the client.
- 4.7.5.3 Dismantling/reconstruction of existing structures shall be avoided as far as possible except where considered essential in view of their poor structural conditions/inadequacy of the provisions etc. The existing structures having inadequate strength width shall be widened / reconstructed in part or fully as per the latest MoRT&H guidelines. The Consultant shall furnish the detailed design and working drawings for carrying out the above improvements.
- 4.7.5.4 The Consultants shall also carry out the design and make suitable recommendations for protection works for drainage structures.

4.7.6 DRAINAGE SYSTEM

- 4.7.6.1 The requirement of roadside drainage system and the integration of the same with proposed cross-drainage system shall be worked out for the entire length of the project road section.
- 4.7.6.2 In addition to the roadside drainage system, the Consultants shall design the special drainage provisions for sections with super-elevated carriageways, high embankments and for road segments passing through cuts. The drainage provisions shall also be worked out for road segments passing through urban areas.
- 4.7.6.3 The designed drainage system should show locations of turnouts/outfall points with details of outfall structures fitting into natural contours. A separate drawing sheet covering every 5 km stretch of road shall be prepared.
- 4.7.6.4 Topography of hills generates numerous watercourses and this coupled

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with continuous gradients of roads in hills and high intensity of rainfall calls for effective drainage of roads. The drainage system shall be designed to ensure that the water flowing towards the road surface may be diverted and guided to follow a definite path by suitable provision of road side drains, catch water drains, interceptors etc. and flow on valley side is controlled so that stability is not affected. Further, adequate provision shall be made for sub-surface/subgrade drainage to take care of seepage through the adjacent hill face of the road & underground water flows.

4.7.7 TRAFFIC SAFETY FEATURES, ROAD FURNITURE AND ROAD MARKINGS

4.7.7.1 The Consultants shall design suitable traffic safety features and road furniture including traffic signs, markings, overhead sign boards, crash barriers, delineators etc. including any future specific to hill roads. The locations of these features shall be given in the reports and also shown in the drawings.

4.7.8 ARBORICULTURE AND LANDSCAPING

4.7.81 The Consultants shall work out appropriate plan for planting of trees (specifying type of plantation), horticulture, floriculture on the surplus land of the right-of-way with a view to beautify the highway and making the environment along the highway pleasing. The existing trees / plants shall be retained to the extent possible.

4.7.9 PARKING AREAS AND REST AREAS

4.7.9.1 The consultant shall select suitable sites for parking areas and rest areas and prepare suitable separate designs in this regard. The common facilities like first-aid medical facilities, police office, restaurant, vehicle parking etc. should be included in the general layout for planning. The facilities should be planned to be at approximately 25 km interval. At least each facility (3 Nos) is foreseen to be provided for this project stretch.

4.7.10 MISCELLANEOUS WORKS

4.7.10.1 The Consultants shall make suitable designs and layout for miscellaneous works including rest areas, bus bays, vehicle parking areas, telecommunication facilities, scenic overlooks, watering points etc wherever appropriate.

4.7.10.2 The Consultants shall prepare detailed plan for the traffic management and safety during the construction period.

4.8 ESTIMATION OF QUANTITIES AND PROJECT COSTS

4.8.1. The Consultants shall prepare detailed estimates for quantities (considering designs and mass haul diagram) and project cost for the

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entire project including the cost of environmental and social safeguards proposed, based on DGBR SSR rates and market rates. The estimation of quantities shall be based on detailed design of various components of the projects.

- 4.8.2 The Consultants shall make detailed analysis for computing the unit rates for the different items of works. The unit rate analysis shall duly take into account the various inputs and their basic rates, suggested location of plants and respective lead distances for mechanized construction. The unit rate for each item of works shall be worked out in terms of manpower, machinery and materials. Where ever, rates are available in DGBR SSR, that may be followed with suitable addition on account of extra lead, market rate of material, POL, bitumen etc.

4.9 ECONOMIC ANALYSIS

- 4.9.1 The economic analysis shall cover but be not limited to be following aspects:

- a) Assess the capacity of existing roads.
- b) Quantify all economic benefits
- c) Saving in time value.

- 4.9.2 The consultant shall suggest positive ways of enhancing the project viability.

4.10 SUBMISSION OF REPORTS

4.10.1 GENERAL

- 4.10.1.1 All reports, documents and drawings shall be submitted in the manner specified hereunder and as per IRC-SP-19-2001 manual for Survey, Investigation and preparation of Road Projects.

- 4.10.1.2 Reports shall be submitted in four stages as brought out below.

Stage 1: Inception Report

Stage 2: Feasibility Report.

Stage 3: Preliminary Project Report (PPR)

Stage 4: Detailed Project Report (DPR)

- 4.10.1.3 The Consultant shall submit to the client the reports and documents in bound volumes after completion of each stage of work as per the time schedule and in the number of copies as specified hereunder. Three soft copies of each report shall also be submitted alongwith the number of hard copies as mentioned below.

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4.10.1.4 The time schedule for 'various submissions prescribed at above shall be strictly adhered to. No time-over-run in respect of these submissions will normally be permitted.

4.10.2 **INCEPTION REPORT (IR)**

4.10.2.1 The report shall cover the following major aspects:

- a) Project appreciation;
- b) Detailed methodology to the requirements of the TOR finalized in consultation with the deptt including scheduling of various sub activities to be carried out for completion of various stages of the work; stating out clearly their approach & methodology for project preparation after due inspection of the entire project stretch and collection/collation of necessary information;
- c) Task Assignment' and Manning Schedule;
- d) Work programme.
- e) Proforma for data collection;
- f) Design standards and proposed cross-sections;
- g) Key plan and Linear Plan;
- h) Development plans being, implemented and/or proposed for implementation in the near future by the local bodies and the possible impact of such development plans on the overall scheme for field work and design for the study;
- i) Quality Assurance Plan (QAP) finalized in consultation with the deptt.
- j) Draft design standards

4.10.3 **FEASIBILITY REPORT**

4.10.3.1 The Consultant shall commence the Feasibility Study of the project in accordance with the accepted Inception Report. The feasibility report shall contain the following:

- Executive summary
- Project description including need for re-alignment and technical/engineering alternatives.
- Methodology adopted for the feasibility study.

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- Various alternative alignments considered and proposed final alignment from technical and economical consideration.
- Socio-economic profile of the project areas.
- Traffic surveys and analysis
- Indicative design standards, methodologies and specifications.
- Utility shifting plan.
- Preliminary Cost estimates.
- Techno Economic analysis.
- Conclusions and recommendations.

4.10.3.2 The basic data obtained from the field studies and investigations shall be submitted in a separate volume as an Appendix to Feasibility Report.

4.10.3.3 The Final Feasibility Study Report incorporating comments, revisions and modifications suggested by the Client/DoR/RGoB shall be submitted within 15 days of receipt of comments from Client/DoR/RGoB on draft feasibility study report.

4.10.3.4 The consultant shall also prepare DPR documents based on the approved feasibility report.

4.10.4 **STRIP PLAN AND CLEARANCE**

4.10.4.1 This report shall contain the following documents:

- a) Details of the center line of the proposed stretch along with the existing and proposed right-of-way limits.
- b) Strip plans showing the position of existing utilities and services indicating clearly the position of their relocation;
- c) Separate strip plan showing shifting/relocation of each utility services in consultation with the concerned local authorities;
- d) The utility relocation plans should clearly show existing right-of-way and pertinent topographic details, including buildings, major trees, fences and other installations such as water-mains telephone, telegraph and electricity poles, and suggest relocation of the services along with their crossings the highway at designated locations as required and prepare necessary details for submission to the Service Departments;

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- 4.10.4.2 The strip plans shall be prepared on the basis of data from reconnaissance and detailed topographic surveys.
- 4.10.4.3 The Report accompanying the Strip Plans should cover the essential aspects as given under:
- (a) Kilometer-wise Utility Relocation Plan (URP) and costs for relocation as per concerned authorities, if any.
- (b) Kilometer-wise account in regard to felling of trees of different type and girth and value estimate of such trees based on realistic rates obtainable from concerned District forest office.
- 4.10.4.4 The strip plans shall clearly indicate the scheme for construction/widening. The views and suggestions of the deptt should be duly taken into account while working out the proposed scheme. The proposed scheme shall be finalised in consultation with the client.
- 4.10.4.5 Kilometer-wise Strip Plans shall be prepared separately for each concerned agency and as suggested by the client.

4.10.5 PRELIMINARY PROJECT REPORT (PPR)

- 4.10.5.1 The Draft PPR shall contain the following:

Volume - I: Preliminary Feasibility Report

- Executive summary
- Project description
- Summary of FIA/IEE and Action Plan
- Updated cost estimates
- Updated economic and financial analyses
- Conclusions and recommendations

Volume - II: Design Report

- Summary of survey and investigations data
- Proposed design basis standards and specifications
- Preliminary design of pavement, drawings of culverts
- Inventory of protection measures and other structures.

Volume -III: Drawings

- Location map.
- Layout plans
- Typical cross sections showing pavement details.
- Typical Drawings for cross-drainage works i.e. culverts
- Road junction designs if any.

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- Utility shifting plan.
- Drawings for protection/control measures and Other structures.

4.10.5.2 The basic data obtained from the field studies and investigations and input data used for the preliminary design shall be submitted in a separate volume as an Appendix to PPR.

4.10.5.3 The Final PPR incorporating comments, revisions and modifications suggested by Client/DoR/RGoB shall be submitted within 15 days of the receipt of comments of Client/DoR, RGoB on the draft PPR.

4.10.6 **DRAFT DETAILED PROJECT REPORT (DPR)**

4.10.6.1. The draft DPR Submission shall consist of Main Report, Design Report, Materials Report, Engineering Report, Drainage Design Report, Economic and Financial Analysis Report.

4.10.6.2 Report, the Documents and Drawings shall be submitted in the manner specified hereunder: -

(a). **Volume-I:- Main Report:** This report will present the project background, social analysis of the project, details of survey and Investigations carried out, analysis and interpretation of survey and investigation data, traffic studies and demand forecasts. designs, cost estimation, economic and commercial analyses and conclusions. The report shall include Executive Summary giving brief accounts of the findings of the study and recommendations. It shall also include the following:

- i) Maps, charts and diagrams showing locations and details of existing features and the essential features of improvement and upgrading, if involved.
- ii) The basic data obtained from the field studies and investigations and input data used for the preliminary design in a separate volume as an Appendix to Main Report,

b) **Volume: – II: - Design Report:** This volume shall contain design calculation, supported by computer printout of calculations wherever applicable, The Report shall clearly bring out the various features of design standards adopted for the study. The design report will be in two parts. Part-I shall primarily deal with the design of road features and pavement composition while Part-II shall deal with the General Arrangement of cross-drainage structures. The detailed design for all features should be carried out as per the requirements of the Design Standards for the project. However, there may be situations wherein it has not been possible to strictly adhere to the design standards due to

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the existing site conditions, restrictions and other considerations. The report should clearly bring out the details of these aspect and the standards adopted. The consultant shall carry out designs and prepare working designs for the following:-

- (a) Cross section at every 25 mtr intervals
 - (b) Slope stabilization and erosion control measures
 - (c) Design of protection/control structure in areas subject to subsidence, landslide, rock fall, rock slide, snow drift, icing, scour, avalanche activity etc
 - (d) Design of protective structure in slip prone and unstable areas
 - (e) Design of scenic overlooks, watering points etc
 - (f) Safety features specific to hill roads
 - (g) The Consultants shall evolve Design Standards and materials specification for the study primarily based on IRC publication, MoRT & H circular and relevant recommendations of the international standards (American, British etc) for hill roads.
 - (h) Wherever practicable/feasible hairpin bends and steep gradients shall be avoided by realignments, provision of structures or any other suitable provisions.
 - (i) Protection/control measures and other structures.
- c) **Volume: - III, Materials Report:** The report shall include details on locations of borrow area, possible source of work and quarries shown on maps and charts and also the estimated quantities with mass haul diagram including possible end use with leads involved, the details of sampling and testing carried out and results in the form of important index values with possible end use thereof. The materials Report shall also include details of sampling, testing and test results obtained in respect of physical properties of sub grade soils. The information shall be presented in tabular as well as in graphical representations and schematic diagrams. The Report shall present soil profiles along the alignment. The material Report should also clearly indicate the locations of areas with problematic soils. Recommendations concerning the improvement of such soils for use in the proposed construction works, such as stabilisation (cement, lime, mechanical) should be included in the Report.
- d). **Volume-IV: - Technical Specifications:** The DoR's Technical Specifications for Road and Bridge works shall be followed for this study, However, technical specifications which are not covered under DoR Specifications for Roads and Bridges (latest edition /

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revision) (such as on soft aggregated) be evolved and specified suitably including norms thereof for the construction works and quality control measures to be followed.

- e). **Volume – V: - Rate Analysis:** This volume will present the analysis of rates for all items of works based on the **DGBR SSR2012**. The details of unit rate of materials at source, carriage charges, any other applicable charges, labour rates, machine charges as considered in arriving at unit rates will be included in this volume.
- f). **Volume – VI:- Cost Estimates:** This volume will present the cost of each item of work as well as a summary of total cost.
- g). **Volume – VII:- Bill of Quantities:** This volume shall contain the detailed Bill of Quantities for all items of works.
- h). **Volume-VIII: - Resources Appreciation:** It is proposed to undertake construction of these roads departmentally by the client. A proper appreciation on requirement of veh/eqpt/plants including capacity thereof for implementation of this Project, keeping in view the available working periods and proposed time schedule, be also analysed and presented in this report. This shall also include a proper appreciation of requirement of skilled/unskilled manpower, construction materials and stores including specification thereof viz stone and aggregate thereof, sand, cement, bitumen, steel (size wise, timber etc).
- j). **Volume – IX:- Drawing Volume:** All drawings forming part of this volume shall be good for construction drawings. All plan and profile drawings will be prepared in scale 1:250V and 1:2500H scale to cover one km in one sheet. In addition this volume will contain 'good for construction' drawings for the following. All drawings will be prepared on A2 size sheet. The drawing shall include details of all BMs and reference pillars. The co-ordinates of all points should be referenced to a common datum, preferably GTS referencing system.
- (i) Horizontal Alignment and Longitudinal Profile.
- (ii) Cross-section @ 50m interval along the alignment within ROW
- (iii) Typical Cross-Sections with details of pavement structure.

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- (iv) Detailed Working Drawings for individual Culverts.
- (v) Drawings for Road Sign, Markings, and other Facilities.
- (viii) Schematic Diagrams (linear chart) indicating but be not limited to be following:
 - Widening scheme;
 - Locations of median openings, intersections if any.
 - Location of traffic signs, road markings, safety features; and,
 - Locations of parking areas, weighing stations, bus bays, rest areas, if any.
- k) Detailed working drawings for protection/control structure.
- l) The proposed cross-sections of road segment passing through urban areas should indicate the provisions for pedestrian movements and suitable measures for surface and sub-surface drainage and lighting, as required.

4.10.6 FINAL DETAILED PROJECT REPORT; DOCUMENTS AND DRAWINGS (6 SETS)

4.10.6.1 The Final DPR consisting of Main Report, Design Report, Drainage Design Report and Materials Report, incorporating all revisions deemed relevant following receipt of the comments from the client on the draft DPR shall be submitted as per the specified schedule.

4.11 ASSISTANCE IN OBTAINING APPROVAL OF THE PROJECT FROM CONCERNED AUTHORITIES

4.11.1 Consultant shall extend all the necessary assistance to client in obtaining approval of the competent authority for implementation of this project. This shall include.

(a) Approval of Alignment plan, Feasibility report and DPR documents and cost estimates from [DOR/RGoB](#)

4.11.2 The consultant shall suitably interact with these authorities on submission of the concerned report/proposals, provide appropriate clarifications, additional details as required by these authorities and facilitate approval thereof within the reasonable time.

4.12 TIME PERIOD FOR THE SERVICE

4.12.1 Time period envisaged for, the study of this road projects is **180 days (One hundred eighty days)** from the date of notice to proceed. The final reports, drawings and documentation shall be completed within this time schedule.

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4.12.2 The client shall arrange to give; approval on all sketches, drawings, reports and recommendations and other matters and proposals submitted for decision by the Consultant in such reasonable time so as not to delay or disrupt the performance of the Consultant's services.

4.13 PROJECT TEAM AND PROJECT OFFICE OF THE CONSULTANT

4.13.1 The Consultants shall be required to form a multi-disciplinary team for this assignment. The consultants Team shall be manned by adequate number of experts with relevant experience in the execution of similar detailed design assignments.

4.13.2 All type of key personnel mentioned will be evaluated at the time of evaluation of technical proposal. Consultants are advised in their own interest to frame the technical proposal in an objective manner as far as possible so that these could be properly assessed in respect of points to be given as part of evaluation criteria as mentioned in section III. It shall be ensured by the consultant that adequate strength of key personnel, technical and administrative support staffs are assigned for the service to meet the TOR requirements and the time schedule specified.

4.14 SUBMISSION OF DOCUMENTS AND TIME SCHEDULE THEREOF

4.14.1 All the documents as described herein above shall be submitted to the Employer as per the following. Two soft copy of each report shall be delivered together with the number of hard copy sets specified below within the specified time schedule.

S/No	Name of report	No. of hard copies	Time period from the date of issue of Notice to proceed
a)	Inception report	06	Within 30 days
b)	Feasibility report	04	Within 60 days
c)	Strip plan and clearance	06	Within 70 days
d)	Preliminary Project report	06	Within 120 days
e)	Draft detailed Project report	04	Within 150 days
f)	Final detailed Project report	10	Within 180 days

4.14.2 Subsequently, on submission of the Alignment Plan, Feasibility report and Final Detailed Project report, the consultant shall assist the client in getting approval of all these reports and cost estimates from [DoR/RGoB](#).

4.15 PRICE

4.15.1 The consultant shall quote his price for the consultancy services referred herein above in the manner prescribed on lumpsum basis. The amount shall be set out in the Financial Proposal. The price as quoted shall include all direct and indirect cost, expenses including taxes, insurance premium etc, payable by the consultant as per the applicable laws. The Consultant shall allow in his pricing for all to meet the requirement of the services as stated in the documents. Service tax as payable shall however be quoted separately.

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4.15.2 Tenders are to take note that a suitable deduction at source on account of the Indian Income Tax @ 2% as per the Indian Income Tax Act and BCT @ 3% for Indian firms & @ 2% for Bhutaneese firms will be effected as per the Bhutan Tax while releasing the payment.

4.15.3 The Accepting officer is not bound to accept lowest bid or any other bid.

4.16 DATA AND SOFTWARE

4.16.1 The CDs containing all basic as well as the processed data from all field studies and investigations shall be submitted by the consultant at the time of the submission of the final Report. The data can be classified as follows:

- (a). **Engineering Investigations and Traffic Studies**: Road Inventory, Condition, Test Pit (Pavement composition), Material Investigation including test results for subgrade soils, Traffic Studies (traffic surveys), Drainage Inventory" Inventory data for culverts indicating rehabilitation, new construction requirement etc. in MS EXCEL or any other format which could be imported to widely used utility packages.
- (b). **Topographic Surveys and Drawings**. All topographic data would be supplied in (x, y, z) format along with complete reference so that the data could be imported into any standard highway design software. The drawing file would be submitted in dxf or dwg format.
- (c) **Rate Analysis**: The Consultant shall submit the rate analysis for various works items including the data developed on computer in this relation so that it could be used by the Authority later on for the purpose of updating the cost of the project.
- (d) **Software**: The Consultant shall also hand-over CD's containing any general software including the financial model which has been specifically developed for the project.

4.16.2 The CD's should be properly indexed and a catalogue giving contents of all CD's and print-outs of the contents should be handed over at the time of submission of the Final Report. Two copies of CDs and print-out be submitted for the purpose.

4.17. PROFESSIONAL INDEPENDENCE

4.17.1 The consultant shall have no direct or indirect interest in commercial, manufacturing or contracting activities that might tend to influence his professional judgment. His approach for the assignment shall be objective and provide solution by using sound technical and economical principles, which serve the best interest of the employer/state

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SECTION-V

SPECIFICATIONS OF **LiDAR TECHNOLOGY**

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General LiDAR Specifications

	Description	Specifications
1	Coverage	<i>Description of the survey area with reference to detailed diagram(s) provided as Attachment A and available in digital (shape file) format. The defined survey area should be buffered by a minimum of 20m.</i>
2	Date of Capture	<ol style="list-style-type: none"> 1. LiDAR: <i>specific capture window requirements.</i> 2. Field Data: <i>specific requirements relative to LiDAR acquisition.</i>
3	Delivery Dates	<i>Tender process, data acquisition, product delivery and reporting. Any requirements for any staged delivery of services and products should also be specified.</i>
4	Network Accuracy Requirements	<p>The survey must conform to the following network accuracy standard:</p> <ol style="list-style-type: none"> a. Vertical Network Accuracy (VNA) <ol style="list-style-type: none"> i. 0.30 m, 95% confidence level (0.15m, 68%) b. Horizontal Network Accuracy (HNA) <ol style="list-style-type: none"> i. 1.00 m, 95% confidence level (0.50m, 68%) <p><i>The above VNA and HNA values fall within Tiers F and H.</i></p> <p><i>NB the above VNA and HNA values are appropriate for generating 0.5m contours and different values may be required for other output products.</i></p>
5	Map Projection	The projected coordinate system for all deliverables should be adopted.
6	Vertical Datum	<ol style="list-style-type: none"> 1. <u>Orthometric</u>: <i>The Orthometric ht will be based on an international GEOID, close to MSL of Survey of India.</i> 2. <u>Ellipsoid</u>: <i>All deliverables specified below as ellipsoidal.</i>
7	Adjustment to LVD	<ol style="list-style-type: none"> 1. Adjustment to LVD as defined above is required under the following circumstances: <ol style="list-style-type: none"> a. Where the vertical accuracy described above is exceeded when the Geoid derived orthometric heights are validated against LVD, or b. Where a bias in the vertical validation resulting from anomalies in the Geoid model or other sources is identified across the whole project area. 2. Details of this adjustment are required as part of the 'Post-Survey Spatial Accuracy Report'.
8	Survey Control	<ol style="list-style-type: none"> 1. All survey control data used or derived from this contract must be supplied to ensure independent Quality Assurance (QA) of the survey operations. It is therefore essential that all primary ground stations are permanently marked in accordance with the appropriate system. 2. The primary ground control and check point surveys must be referenced to survey control marks and coordinates and Spherical and UTM. 3. Survey to establish new primary control shall use techniques to achieve a minimum standard of: <ol style="list-style-type: none"> a. Horizontal: Order 5 b. Vertical: Order 5 or 3V. <p><i>Elevation data must be validated and corrected for systematic errors to ensure accuracy specifications are met. Documentation must describe how this has been achieved. Refer to the Quality Assurance Section for specific deliverables in relation to this topic.</i></p>

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9	Sensor Requirements	<p>The sensor must be capable of:</p> <ol style="list-style-type: none"> a. detecting multiple discrete returns, with a minimum of 4 potential returns for each outbound laser pulse. b. recording the intensity of each return. <p><i>Full waveform collection is both acceptable and welcomed; however, waveform data is regarded as supplemental information. The requirement for deriving and delivering multiple discrete returns remains in force in all cases. These requirements may be varied according to specific user requirements.</i></p>
	Collection Requirements	<ol style="list-style-type: none"> 1. The survey design must plan on: <ol style="list-style-type: none"> a. recording a minimum Nominal Post Spacing (NPS) of two (2) outbound pulses per square metre b. a scan angle not exceeding 40° Total FOV (+/- 20° from nadir) c. an across/along track point spacing ratio not exceeding 2/3. <p><i>Note: This requirement is primarily applicable to oscillating mirror LiDAR systems. Other instrument technologies may be exempt from this requirement. A minimum NPS of one (1) outbound pulse per square metre may be approved in less complex terrain.</i></p> 2. Flight line overlap must be 10% or greater, as required to ensure there are no data gaps between the usable portions of the swaths. Collections in high relief terrain are expected to require greater overlap. Any data with gaps between the geometrically usable portions of the swaths will be rejected. 3. Data Voids (areas => 4xNPS²), measured using 1st-returns only within a single swath are not acceptable, except: <ol style="list-style-type: none"> a. where caused by water bodies b. where caused by areas of low near infra-red (NIR) reflectivity such asphalt or composition roofing c. where appropriately filled-in by another swath 4. The spatial distribution of geometrically usable points is expected to be uniform and free from clustering. In order to ensure consistent data densities throughout the project area: <p><i>Note: This requirement may be relaxed in areas of significant relief where it is impractical to maintain a consistent NPS.</i></p> 5. Environmental conditions for data capture. <ol style="list-style-type: none"> a. Cloud and fog free between the aircraft and the ground. b. Floodplain/wetland data must be captured during times of base-flow and outside of significant surface inundation due to natural events and /or regulated environmental flows. c. Coastal surveys (areas under tidal influence) should be flown within 2 hours either side of low tide to minimise the effect of standing water or wave action. d. Flights should not be undertaken during periods of heavy smoke haze. <p><i>With prior approval, collections for specific scientific research projects may be exempt from these requirements.</i></p>

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	Collection Requirements	<p>6. The survey design must plan on:</p> <ol style="list-style-type: none"> a. recording a minimum Nominal Post Spacing (NPS) of two (2) outbound pulses per square metre b. a scan angle not exceeding 40° Total FOV (+/- 20° from nadir) c. an across/along track point spacing ratio not exceeding 2/3. <p><i>Note: This requirement is primarily applicable to oscillating mirror LiDAR systems. Other instrument technologies may be exempt from this requirement. A minimum NPS of one (1) outbound pulse per square metre may be approved in less complex terrain.</i></p> <p>7. Flight line overlap must be 10% or greater, as required to ensure there are no data gaps between the usable portions of the swaths. Collections in high relief terrain are expected to require greater overlap. Any data with gaps between the geometrically usable portions of the swaths will be rejected.</p> <p>8. Data Voids (areas => 4xNPS²), measured using 1st-returns only within a single swath are not acceptable, except:</p> <ol style="list-style-type: none"> a. where caused by water bodies b. where caused by areas of low near infra-red (NIR) reflectivity such as asphalt or composition roofing c. where appropriately filled-in by another swath <p>9. The spatial distribution of geometrically usable points is expected to be uniform and free from clustering. In order to ensure consistent data densities throughout the project area:</p> <p><i>Note: This requirement may be relaxed in areas of significant relief where it is impractical to maintain a consistent NPS.</i></p> <p>10. Environmental conditions for data capture.</p> <ol style="list-style-type: none"> e. Cloud and fog free between the aircraft and the ground. f. Floodplain/wetland data must be captured during times of base-flow and outside of significant surface inundation due to natural events and /or regulated environmental flows. g. Coastal surveys (areas under tidal influence) should be flown within 2 hours either side of low tide to minimise the effect of standing water or wave action. h. Flights should not be undertaken during periods of heavy smoke haze. <p><i>With prior approval, collections for specific scientific research projects may be exempt from these requirements.</i></p>
1	Unclassified Point Cloud	<ol style="list-style-type: none"> 1. All returns, all collected points, fully calibrated and adjusted to specified vertical datum, <u>by swath</u>. 1 file per swath, 1 swath per file, (file size not to exceed 2GB). 2. <u>Fully compliant</u> LAS v1.2 (or v1.3), point record format with all standard attributes including: <ol style="list-style-type: none"> a. Intensity values (native radiometric resolution). b. Return number. c. Georeferencing information in all LAS file headers. d. GPS times recorded as adjusted GPS time, at a precision sufficient to allow unique timestamps for each pulse. 3. LAS v1.3 deliverables with waveform data are to use external "auxiliary" files with the extension ".wdp" for the storage of waveform packet data. See the LAS v1.3 specification for additional information). 4. Data is to be provided in the following Vertical Datums: <ol style="list-style-type: none"> a. Ellipsoidal. 5. File naming as per Attachment B.

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LiDAR Point Cloud Specifications

	Deliverables	Specifications															
2	Classified Point Cloud	<ol style="list-style-type: none"> 1. All returns, all collected points, fully calibrated and adjusted to specified vertical datum, and classified as specified below. 2. <u>Fully compliant</u> LAS v1.2 (or v1.3), point record format with all standard attributes including: <ol style="list-style-type: none"> a. Intensity values (native radiometric resolution). b. Return number. c. Georeferencing information in all LAS file headers. d. GPS times recorded as adjusted GPS time, at a precision sufficient to allow unique timestamps for each pulse. e. ASPRS/LAS "Overlap" classification (Class=12) shall not be used. ALL points not identified as "Withheld" are to be classified. 3. LAS v1.3 deliverables with waveform data are to use external "auxiliary" files with the extension ".wdp" for the storage of waveform packet data. See the LAS v1.3 specification for additional information) 4. Data is to be provided in the following Vertical Datums: <ol style="list-style-type: none"> a. Orthometric. b. Ellipsoidal. 4. Tiled delivery, as per Data Supply Specifications below. 5. File naming as per Attachment B. 															
3	LiDAR Point Cloud Classification Scheme	<ol style="list-style-type: none"> 1. All classified point cloud data must adhere to the following modified ASPRS classification scheme. 2. <i>The minimum number of point classes to be delivered according to this scheme is defined by the Classification Level specified below.</i> <table style="margin-left: 40px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Number</th> <th style="text-align: left;">Point class</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>Unclassified</td> <td>Created, never classified</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Default</td> <td>Unclassified</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Ground</td> <td>Bare ground</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Vegetation</td> <td>0 – 0.3m (essentially sensor 'noise')</td> </tr> </tbody> </table>	Number	Point class	Description	0	Unclassified	Created, never classified	1	Default	Unclassified	2	Ground	Bare ground	3	Vegetation	0 – 0.3m (essentially sensor 'noise')
Number	Point class	Description															
0	Unclassified	Created, never classified															
1	Default	Unclassified															
2	Ground	Bare ground															
3	Vegetation	0 – 0.3m (essentially sensor 'noise')															

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4	LiDAR Point Cloud Classification Levels <i>continued</i>	<p style="text-align: center;">Level 1 Ground Correction.</p> <p>Significant and highly supervised (often manual or semi-automated) effort is generally required for this level to ensure that only actual ground points are assigned to class 2. Typically, this editing will both remove and add points to the ground, vegetation and water classes derived using the automated algorithms. Full manual line scan editing of batch output may be required in highly complex environments.</p> <p><i>Typically this level of classification (in addition to Level 4 below) would only be undertaken to meet highly specific project requirements (such as hydrological modelling) over localised areas which typically make up a small proportion of the total survey area such as vegetation along water courses.</i></p> <p>Features which may require special attention include water and areas where the ground surface may be obscured including: densely vegetated water courses, rainforest, dense coastal vegetation or grass, rocky outcrops/boulders, contour/levee banks, wood/rubbish piles and islands.</p> <p><u>Classification Accuracy Required: 99% for ground points (minimum), and other classes as specified.</u></p> <p style="text-align: center;">Level 2. Detailed Classification and Correction</p> <p>Detailed classification and correction of all specified classes. This may include all or a subset of classes listed in section 3. When specified, each class must achieve the required classification accuracy. Development of a hydrologically conditioned DEM will generally require a higher level of editing to remove man-made structures such as buildings, bridges and culverts.</p> <p><i>Typically this level of classification would only be undertaken to meet highly specific project requirements.</i></p> <p><u>Classification Accuracy Required: 99% for all specified classes.</u></p> <p><i>Level 3 and 4 may often require reference imagery to achieve the required specifications.</i></p>
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LiDAR Derivative Data Specifications

The Contract Authority should edit this section of the Template for format requirements and if not all deliverables below are required.

Deliverables		Specifications
1	Intensity Image	<ol style="list-style-type: none"> 1. 1m grid intensity image 2. Mosaic generated using average laser intensity values from “first return” LiDAR points. 3. ECW format using 5:1 compression. 4. Tiled delivery, as per Data Supply Specifications below. 5. File naming as per Attachment B.
2	Digital Surface Model (DSM) (orthometric)	<ol style="list-style-type: none"> 1. 1m grid Digital Surface Model (DSM) 2. The DSM should be generated from the “first return” LiDAR mass point data. This will include ground and non-ground points such as vegetation and buildings. 3. The DSM generation should employ a Point to TIN and TIN to Raster process with Natural Nearest Neighbour interpolation. 4. Void areas (i.e., areas outside the project boundary but within any tiling scheme) shall be coded using a unique “NODATA” value. 5. File format required by Contract Authority (eg ESRI ASCII GRID). 6. Tiled delivery, as per Data Supply Specifications below. 7. File naming as per Attachment B.

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3	Digital Elevation Model (DEM) (orthometric)	<ol style="list-style-type: none"> 1. 1m grid bare earth Digital Elevation Model (DEM) 2. The DEM should be generated from the LiDAR mass point data classified as “Ground” only, so that it defines the “bare earth” ground surface. 3. The DEM generation should employ a Point to TIN and TIN to Raster process with Natural Nearest Neighbour interpolation. 4. Hydro-flattening will be undertaken for natural and man-made water bodies and water courses as defined below: <ol style="list-style-type: none"> a. Non-tidal water bodies with a surface area greater (>) than 625m² b. Non-tidal water courses greater than 30m nominal width. This should not unnecessarily break a stream or river into multiple segments. At times it may squeeze slightly below 30m for short segments. Data producers should use their best professional judgment. c. Flat and level bank-to-bank with a gradient following the immediate terrain. d. Water courses should break at road crossings and bridges. e. Sinks must not be filled. f. The entire water surface edge must be at or immediately below the surrounding terrain. g. Tidal variations over the course of the collection or between different collections may result in discontinuities along shorelines. The provider must confirm with the Contract Authority <u>if and how</u> these shorelines and water bodies will be processed. h. Any additional data layers created for the purposes of hydro-flattening such a masks or breaklines must be provided as shapefiles. The Contract Authority must be provided with all necessary data to re-produce the DEM from the mass point data. i. The methodology used for hydro-flattening is at the discretion of the data producer. <p><i>Note: The “hydro-flattening” specifications defined above are not intended to satisfy detailed hydrological or hydraulic modelling.</i></p> 5. Void areas (i.e., areas outside the project boundary but within any tiling scheme) shall be coded using a unique “NODATA” value 6. File format required by Contract Authority (eg ESRI ASCII GRID). 7. Tiled delivery, as per Data Supply Specifications below. 8. File naming as per Attachment B.
4	Canopy Height Model (CHM)	<ol style="list-style-type: none"> 1. 2m grid 2. Height of all LiDAR mass point returns above the ground by subtracting the ground elevation from the maximum first return for each 2m bin. 3. Void areas (i.e., areas outside the project boundary but within any tiling scheme) shall be coded using a unique “NODATA” value 4. File format required by Contract Authority (eg ESRI ASCII GRID). 5. Tiled delivery, as per Data Supply Specifications below. 6. File naming as per Attachment B.

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5	Foliage Cover Model (FCM)	<ol style="list-style-type: none"> 1. 10m grid 2. One minus the gap fraction probability as defined by the proportion of counts from all vegetation returns at least 2m above the ground for each 2m bin expressed as a percentage (%). 3. Non-thinned data must be used. 4. Void areas (i.e., areas outside the project boundary but within any tiling scheme) shall be coded using a unique "NODATA" value 5. File format required by Contract Authority (eg ESRI ASCII GRID). 6. Tiled delivery, as per Data Supply Specifications below. 7. File naming as per Attachment B.
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Data Supply Specifications

Deliverables		Specifications
1	File naming	See Attachment B for file naming conventions.
2	Coordinate Origins for Gridded Data.	The origin of all gridded data must be placed on a whole metre coordinate value.
3	Data Tiling	<ol style="list-style-type: none"> 1. All standard data sets should be supplied as single files where possible and tiled to manageable file sizes if necessary as below: <ol style="list-style-type: none"> a. NZTopo50 subtiles that are 960m wide by 1440m high and based on coordinates. b. Larger tile sizes which maximise workflow efficiency will be considered. c. The origin of the tile must be placed on a whole metre coordinate value of the south west corner of each tile. e.g. 5429000 mN_1749000mE 2. A Tile Index is to be provided by the contractor in ESRI shape file format (unless a different format is specified by the Contract Authority). The tile name as specified above must be included as an attribute in the Tile Index file. 3. File naming as per Attachment B.
4	GPS data for occupations of base-stations	<ol style="list-style-type: none"> 1. GPS data for all base station occupations in excess of 6 hours is to be provided in RINEX V1.2 format (Receiver Independent Exchange Format). 2. GPS observation log sheets which include the following details: <ol style="list-style-type: none"> a. Survey mark id b. Occupation time & date c. Antenna height measurements d. Instrument /antenna types & serial numbers <p>The GPS observation log sheets should be provided in pdf format or Excel spreadsheet if data is captured digitally.</p> <p><i>Where appropriate, some jurisdictions may find it useful to also request GPS data for any static primary control surveys.</i></p>
5	Data Delivery Reports	<ol style="list-style-type: none"> 1. A delivery report describing the contents of the data supplied with every data delivery (interim, staged, final). The delivery report must also contain reference to the metadata supplied within the delivery.

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6	Metadata	<ol style="list-style-type: none"> 1. For each supplied data product a complete metadata statement consistent with the ANZLIC Metadata Profile (Version 1.1) must be provided in XML format. The ANZMET Lite metadata tool will be used to validate all XML records. 2. In addition, a specific LiDAR metadata tool (developed for the Australian National Elevation Data Framework (NEDF)) will be used to provide additional LiDAR specific metadata. The LiDAR metadata tool reads an XML metadata record created by ANZMET Lite. The tool (with a configuration file for New Zealand) is available (from the ICSM website - TBC) 3. The list of additional metadata required is provided in Attachment C. 4. Metadata must be provided with every delivery including interim, partial and final deliveries. 5. The job will not be signed off by Contract Authority until the metadata is satisfactorily supplied.
8	Delivery Media	<ol style="list-style-type: none"> 1. Data should be delivered on DVD or External Hard Drive (USB or FireWire). External hard drives will be retained by the Contract Authority. 2. Data deliveries should be clearly labelled with name of Service Provider, date of supply and list of contents.
9	Report Formats	All reports are to be provided in Word (.doc) format, Excel spreadsheet (.xls) or appropriate digital format approved by the Contract Authority.

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Project Planning and Reporting Specifications

Deliverables		Specifications
1	Project Plan	Project plan detailing work breakdown structure, agreed data capture plans, project milestones and delivery schedules, progress reporting schedules etc within 10 days of the acceptance of the Contractors quote.
2	Pre-Survey Quality Assurance Plan	<p>The Contractor shall prepare and submit to the Contract Authority a Quality Assurance Plan that conforms to an identified management system and generally complies with ISO 9001.</p> <p>The plan must address the organisation and management of the project, work procedures, environmental considerations, safety and risk control and test procedures.</p> <p>The Plan must also detail the procedures to be used in verifying that the deliverables meet the required specification including:</p> <ul style="list-style-type: none"> • The procedures and methodologies to be used to verify that the deliverables meet the required specifications. • Details of proposed calibration checks and methodology to be used to establish both reference stations and ground test sites. <p>The Project Plan must be submitted and accepted prior to commencement of the survey.</p>
3	Post-Survey Spatial Accuracy Report	<p><u>Acceptance of the Post-Survey Spatial Accuracy Report and related information is required before point classification and other product derivation is to proceed.</u></p> <p>The absolute and relative accuracy of the data, both horizontal and vertical, and relative to known control, shall be verified prior to classification and subsequent product development.</p> <p>This validation is limited to the Fundamental Spatial Accuracy (defined below), measured in clear, open areas. A detailed report of this validation is a required deliverable.</p> <p>The report will include the following:</p> <ul style="list-style-type: none"> • Flight trajectories as specified below. • Details of system calibration checks. • Results of relative (flight run) matching and details of any adjustments made. • Source of primary ellipsoidal height control. • Details of ellipsoid to orthometric corrections applied including any final adjustment to LVD supplemental to NZGeoid2009 + offset. • Results of vertical and horizontal accuracy validation. • All survey control coordinates, site id and check point comparisons in both Excel spreadsheet and ESRI shape file formats (unless a different format is specified by the Contract Authority). • Digital photographs of all survey and check sites, with the site id included in the filename. The bearing of the photo direction should also be included. • Other related information.
4	Flight Trajectories	All flight trajectories used for the capture of the delivered LiDAR data will be supplied in ESRI Shape files (unless a different format is specified by the Contract Authority). The shape file table's must include the date of capture, local start time, local end time and which reference station was used for each trajectory.

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5	Progress Reports	<p>The contractor, as a minimum will report by email each two week period (or as agreed with the Contract Authority).</p> <p>The report should contain a summary of progress, delivery and implementation, and details of any problems encountered and remedial action taken.</p> <p>The report should also address the planned activities for the two weeks ahead, regardless of whether successful capture has been achieved.</p>
6	Project Report	<p>The Project Report should comprise a technical discussion addressing how each of the contract specifications has been met, a statement of consistency with any specified standards, results of independent accuracy and validation tests, metadata statements and extra-ordinary issues that may have affected the nature or delivery of the project.</p> <p>All aspects of the project operations must be adequately reported.</p>

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Quality Assurance Specifications

Description		Specifications
1	Spatial Accuracy Validation	<p><u>Vertical Accuracy Validation</u></p> <ol style="list-style-type: none"> 1. The fundamental vertical accuracy of the point cloud dataset must be determined with check points located only in open, relatively flat terrain, where there is a very high probability that the sensor will have detected the ground surface. 2. The vertical accuracy of the point cloud dataset is to be tested using a TIN surface constructed from bare-earth LiDAR points compared against ground survey check points. 3. Check points are to be surveyed independently of any LiDAR GPS operations. 4. The number of check points (locations) is dependent on the extent of the survey. The following strategy should be used as a guide: <ol style="list-style-type: none"> a. Check points must be established to adequately cover the full extent of the survey area, and be representative of the project area landscape. b. A minimum of 20 check points (locations), then 1 per 50km² where LiDAR coverage exceeds 400km². When 20 points are tested, the 95 percent confidence interval would generally allow 1 point to fail the threshold given in product specifications 5. The proposed check point survey design must be submitted with the quotation, and approved by the Contract Authority prior to implementation. Acceptance of the post-survey spatial accuracy report discussed above is dependent on the quality, number and distribution of these check points. 6. If additional independent validation is required, data should be assessed in accordance with ASPRS Accuracy Reporting Guidelines. <p><u>Horizontal Accuracy Validation</u></p> <ol style="list-style-type: none"> 7. The onus for reaching the required accuracy lies with the data supplier. Independent accuracy assessments may also be carried out by the Contract Authority. 8. Independent testing of horizontal accuracy for LiDAR products is not required as part of this base specification. Instead data producers are required to report on the expected horizontal accuracy of elevation products as determined from system and sensor calibration studies. 9. In the above circumstances a "compiled to meet" statement of horizontal accuracy at 95 percent confidence should be reported. 10. As an alternative, the producer may demonstrate compliance through analysis of distinct features which are identifiable in the elevation data (e.g fences) or intensity images with other data sources such as high resolution imagery with known horizontal accuracy. 11. If additional independent validation is required, data should be assessed in accordance with ASPRS Accuracy Reporting Guidelines.

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2	Supplemental Vertical Accuracy Validation (SVA)	<p><i>If information is required on the vertical accuracy achieved within land cover categories outside of bare open ground, either to meet the same specification as the fundamental vertical accuracy or a more relaxed specification, then supplemental vertical accuracies (SVA) shall be specified by the Contract Authority, and tested and reported for each land cover class of interest by the data supplier. The following should be used as a guide where SVA testing is required, and agreed with the contract authority:</i></p> <ol style="list-style-type: none"> 1. Each land cover type representing 10% or more of the total project area, and additional land cover categories specified by the Contract Authority must be tested and reported as an SVA 2. For supplemental and consolidated accuracy tests, the 95th percentile method shall be employed to determine accuracy 3. The methodology for establishing check points, testing and reporting must be consistent with the Fundamental Spatial Accuracy Validation and approved by the Contract Authority. 												
3	Classification Accuracy Validation	<ol style="list-style-type: none"> 1. It is expected that due diligence in the classification process will produce datasets that meet the required classification accuracies according to the specified LiDAR Point Cloud Classification Levels and specified classes. It is expected that the data will meet the following tests within any 1km x 1km area: <table data-bbox="516 724 1234 1008"> <thead> <tr> <th data-bbox="516 724 917 808">Classification Level</th> <th data-bbox="917 724 1234 808">Demonstrated erroneous classification values for specified classes</th> </tr> </thead> <tbody> <tr> <td data-bbox="516 819 917 850">Level 0 - Unclassified</td> <td data-bbox="917 819 1234 850">Unspecified</td> </tr> <tr> <td data-bbox="516 856 917 888">Level 1. Automated Classification</td> <td data-bbox="917 856 1234 888"><=5%</td> </tr> <tr> <td data-bbox="516 894 917 926">Level 2. Ground surface improvement</td> <td data-bbox="917 894 1234 926"><=2%</td> </tr> <tr> <td data-bbox="516 932 917 963">Level 3. Ground Correction</td> <td data-bbox="917 932 1234 963"><=1%</td> </tr> <tr> <td data-bbox="516 970 917 1008">Level 4. Detailed Classification and correction</td> <td data-bbox="917 970 1234 1008"><=1% for all specified classes</td> </tr> </tbody> </table> <p><i>These requirements may be relaxed to accommodate collections in areas where the Contract Authority agrees classification to be particularly difficult.</i></p> 2. In most circumstances detailed visual inspections of individual classified scan line profiles and use of high quality reference imagery will be sufficient to independently demonstrate if classification standards have been achieved for the specified classes. 3. Classification accuracy tests should be presented in the form of an error matrix for each specified class reporting errors of omission and commission generated from randomly selected points. 	Classification Level	Demonstrated erroneous classification values for specified classes	Level 0 - Unclassified	Unspecified	Level 1. Automated Classification	<=5%	Level 2. Ground surface improvement	<=2%	Level 3. Ground Correction	<=1%	Level 4. Detailed Classification and correction	<=1% for all specified classes
Classification Level	Demonstrated erroneous classification values for specified classes													
Level 0 - Unclassified	Unspecified													
Level 1. Automated Classification	<=5%													
Level 2. Ground surface improvement	<=2%													
Level 3. Ground Correction	<=1%													
Level 4. Detailed Classification and correction	<=1% for all specified classes													
4	Classification Consistency Validation	<ol style="list-style-type: none"> 1. Point classification is to be consistent across the entire project. 2. Noticeable variations in the character, texture, or quality of the classification between tiles, swaths, lifts, or other non-natural divisions will be cause for rejection of the entire deliverable. 												
5	Spatial Distribution of Points Validation	<ol style="list-style-type: none"> 1. In order to ensure uniform densities throughout the data set: <ol style="list-style-type: none"> a. A regular grid, with cell size equal to the design NPS*2 will be laid over the data. b. At least 90% of the cells in the grid shall contain at least 1 LiDAR point. c. Assessment to be made against single swath, first return data located within the geometrically usable centre portion (typically ~90%) of each swath. d. Acceptable data voids identified previously in this specification are excluded. 												
6	Interpolation Consistency Validation	<p>All products derived from the LiDAR mass point data as tiles will show no edge artefacts or mismatch. A quilted appearance in the overall project surfaces, whether caused by differences in processing quality or character between tiles, swaths, lifts, or other non-natural divisions, will be cause for rejection of the entire deliverable.</p>												

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For Accepting Officer

SECTION-VI

FORM OF TENDER **(FINANCIAL PROPOSAL)**

(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)

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For Accepting Officer

From :

To,

The Chief Engineer,
HQrs Chief Engineer
Project DANTAK
C/O 99 APO PIN-931708

Name of Service: “**SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN**”.

Sir,

1. Having examined the Tender Documents for the subject contract as set out in your Notice of Invitation to Bid, Instructions to Bidders, the Conditions of Contract, Terms of Reference and the matters set out in the Schedule 'A' and annexures thereto, we undertake to perform the consultancy services for the work referred in Terms of Reference for the Lump Sum Price of Rs. _____ (INR) (Rupees

_____ only) as per the break up details given at Schedule 'A' :

2. If our tender is accepted we will provide performance guarantee for the due performance of the contract as stipulated in the General Conditions of Contract hereto.

3. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof shall form a binding Contract between us.

4. We agree to abide by this bid for the period of **120 days** from the date fixed for receiving the same, and it shall remain binding upon us and may be accepted any time before expiration of that period.

5. We understand fully that you are not bound to accept the lowest or any bid received.

Yours faithfully,

Signature

Full Name :

Designation:

Address :

(Authorised Representative)

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

Name of Service: “SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN”.

SCHEDULE ‘A’

S/ No.	Description	Unit	Length involved	Rate Rs. (INR)	Amount Rs. (INR)	Remarks
<u>ROAD SHINGKAR-GORGAN</u>						
I.	Survey, Investigation, project preparation and approval of Project report from Km 0.00 to 36.00 (New Construction) as described in terms of reference along the alignment proposed at Term of reference.	Kms	36 Kms			Period of completion shall be 180 days from the date of issue of order to proceed as per the break up schedule specified at clause 4.15 of TOR
II.	Survey, Investigation, project preparation and approval of Project report from Km 36.00 to 56.00 (Existing road) as described in terms of reference along the alignment proposed at Term of reference.	Kms	20 Kms			
Total				(Rs. in INR)		
(Rupees _____ only)						

Note : 1. The break up details of the lump-sum price quoted for items at Srl No-I and II above be given at annexure ‘I’ to schedule ‘A’.

2. The length of the finalized alignment shall be considered finally to arrive at the total cost of items specified at Srl No I & II above.

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For Accepting Officer

Annexure 'I' to Schedule 'A'

**QUANTITIES AND UNIT PRICES CONSIDERED TO ARRIVE AT LUMP SUM PRICE
QUOTED FOR ITEMS AT SRL NO 'I' AND 'II' OF SCHEDULE 'A'**

(To be used subsequently for valuation of additional and exceptional services, if any)

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

Annexure 'II' to Schedule 'A'**LIST OF KEY PERSONNEL/SPECIALIST TECHNICAL AND ADMINISTRATIVE
SUPPORT STAFF INCLUDING NAMES THEREOF TO BE PROVIDED FOR THE
SERVICES BY THE CONSULTANT**

Sl/No	Responsibility	Job description in brief	Man months
1	Geologist	Study of rock characteristics identification of slide prone zone	03
2	Geo technician	Conduct of tests for geotechnical specifications	04
3	Surveyor (LiDAR survey Specialist)	Conduct the survey using LiDAR Technology	04
3	Hydrologist	a) Study of road construction over river, Nallah and diversion of extreme in reserve forest area for road construction. b) Study of run off, flood in flood in reserve forest area along the road alignment.	02

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Dated : 2015

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For Accepting Officer

Annexure-III to Schedule 'A'**REMUNERATION AND PAYMENT****1. PRICES FOR THE SERVICES**

- 1.1. The consultant shall quote his prices for the subject work in a fixed lump sum cost basis for the consultancy services referred herein at terms of reference, with break-up details thereof as per the activity-wise schedule given at schedule 'A'
- 1.2. The price as quoted shall include all fees and expenses including taxes. Service tax, insurance premium etc as payable by the consultant as per the applicable laws.
- 1.3. The lump sum price as quoted above is made up of quantities and unit prices given at annexure I to Schedule 'A' which shall be used subsequently for the valuation of additional and exception services. The quantities shall not be subject to re-measurement for Normal services. However, payment for items not covered at annexure I to Schedule 'A' shall be at actual cost. The decision of accepting officer shall be final and binding on valuation of the cost of Additional and Exceptional services.

2. SCHEDULE OF PAYMENT

- 2.1. All the payments released to the, consultant shall be treated as stage/advance payment except the last one which shall be the final payment.
- 2.2. All such payments except the last one shall be treated as installments and the consultant shall remains a debtor in respect of them until final settlement.
- 2.3. All the payments as released to the consultant shall be subjected to deduction of Income-Tax at source applicable @ 2% as per the Indian Income Tax Act and BCT @ 3% will be effected as per the Bhutan Tax.
- 2.4. All the stage payments shall be subjected to deduction of retention money @ 5% of the total value of the bill which will be however be finally released/adjusted in the final bill.
- 2.5. To maintain a complete record of the services performed under this contract and release of payments thereon, all the activities having financial value shall be described and recorded in the measurement book and signed by both the parties as token of their acceptance.

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Dated : 2015

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3. STAGE PAYMENT

3.1. The stage payment to the consultant shall be released by the client in a manner as follow: -

A. For the activity listed under serial 'I' & 'II' of schedule 'A'

S/No	Item of Work	Percentage
1	Submission of report on setting up of ground station and initial reeve report	15%
2	Submission of report on proposed alignment for road	15%
3	Submission of final reeve report with option of feasible alignment	25%
4	Submission of DPR	30%
5	Stacking & Pegging along the final alignment	5%
6	Inspection of road to ensure correctness of alignment	3% (@ 0.50% for every visit)
7	After completion of Road	7%

4. FINAL PAYMENT

- 4.1 The final payment to the consultant shall be released on completion of all the services as listed at TOR. The final amount payable shall be reviewed at the stage of preparation of final bill on completion of all the services listed at TOR, based on the actual length of approved alignment and actual quantity of drilling activities correct out.
- 4.2 The final bill shall be accompanied by all abstracts, vouchers, orders etc supporting it and shall be prepared in the manner prescribed by the Engineer.
- 4.3 No further claims shall be made by the consultant after submission of final bill and these be deemed to have been waived and extinguished.
- 4.4 The consultant shall be entitled for the payment of final sum less the value of stage payments already made, subject to the certification of the final bill by the Engineer.
- 4.5 No fees and expenses shall be allowed to the consultant on account of preparation of final bill.

5. MODE OF PAYMENT

5.1 The payment will be released through E-Payment mode, for which the contractor is required to submit the NEFT/RTGS Mandate Form (enclosed at **Appendix 'K'**) duly filled in the specified details.

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Dated : 2015

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For Accepting Officer

Annexure 'IV' to Schedule 'A'

**PERSONNEL EQUIPMENT, FACILITIES AND SERVICES OF
OTHERS TO BE PROVIDED BY THE CLIENT**

-NIL-

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

SECTION -VII

FORMATS FOR TECHNICAL PROPOSALS

&

GUARANTEES

(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)

SW

For Accepting Officer

(Form-I)

To:

The Chief Engineer
HQrs, CE, PROJECT DANTAK
C/o 99 APO
PIN- 931 708

Sir:

TECHNICAL PROPOSAL FOR SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGK HAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN

I, We _____ Consultant/Consultancy firm (s) herewith enclose Technical Proposal for selection of my/our firm for the subject Consultancy services.

Yours faithfully,

Signature

Full Name

Designation

Address

(Authorized Representative)

(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)

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For Accepting Officer

Appendix 'A'**COMPOSITION OF THE PROPOSED TEAM OF EXPERTS
AND TASK ASSIGNMENT TO EACH KEY PERSONNEL AND SUPPORT STAFF**

Please give this details in a tabular form indicating position, Name and Task assignment of the key personnel, technical support and administration support staff proposed to be made available for the services.

1. KEY PERSONNEL

Position	Name	Task Assignment
----------	------	-----------------

2. TECHNICAL SUPPORT STAFF

Position	Name	Task Assignment
----------	------	-----------------

3. ADMINISTRATIVE SUPPORT STAFF

Position	Name	Task Assignment
----------	------	-----------------

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Dated : 2015

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For Accepting Officer

Appendix 'B'**APPROACH AND METHODOLOGY**

Please list your approach and methodology proposed to be followed for survey, data collection, analysis, design and report submission including your Quality Assurance plan for this assignment. Your proposed team structure in the form of organization chart shall also be presented here. Please describe these details in not more than three pages.

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Dated : 2015

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For Accepting Officer

Appendix 'C'**WORK PROGRAMME**

Keeping in view the service requirement as listed at Terms of Reference and time schedule indicated for the purpose, please describe your detailed work programme, and present it in a tabular form giving type of services and activities involved there under, duration thereof and month wise plan in bar chart manner for performing the activity including the category of experts who would have primary responsibility for the activity.

Category of key personnel responsible	Description of activity	Total Duration	Month-wise plan					
			1	2	3	4	5	6
	1 INCEPTION REPORT (IR) <ul style="list-style-type: none"> • Mobilization • Review of data and documents • Reconnaissance survey • Preparation of Quality Assurance plan • Draft Design Standards • Preparation of Inception Report 							
	2 FEASIBILITY REPORT (FR) <ul style="list-style-type: none"> • Socio-Economic profile of the Project Area • Traffic survey • Analysis of Traffic Data and Forecast of Traffic • Identification of Traffic Homogeneous links • Topographic Survey including fixing of reference Pillars/Bench Marks • Inventory and Condition Survey of Roads • Inventory and Condition Survey of Culverts • Pavement Investigation • Materials Investigation 							

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Category of key personnel responsible	Description of activity	Total Duration	Month-wise plan					
			1	2	3	4	5	6

- Hydraulic and Hydrological Investigations
- Drainage Studies
- Identification of Proposals of Widening and Strengthening of Existing Road and Alignment Option for Realignments
- Finalization of Design Standards
- Pavement (Type) Option Study and Preliminary Design of Pavement
- Identification of Locations for Amenities and Preparation of Typical Design
- Carrying Out Safety Audit
- Preliminary Environmental Screening and Assessment
- Preliminary Social impact Screening and Assessment
- Approximate Cost Estimate
- Preliminary Economic Analysis
- Draft Feasibility Report
- Final Feasibility Report

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For Accepting Officer

Category of key personnel responsible	Description of activity	Total Duration	Month-wise plan					
			1	2	3	4	5	6

3. PRELIMINARY PROJECT REPORT (PPR)

- Finalization of Proposals for Alternative alignments/Widening and Improvement of Existing Road
- Preliminary Design of Road, Pavement, High Embankments and Culverts
- Preliminary Design of Structures including Details GADs
- Preliminary Design of All Ancillary Road Works like Junction, Service Roads, Drainage measures
- Weighting Station, Parking Areas and Rest Areas
- Traffic Safety Features, Road Furniture and Road Markings
- Alignment Plans
- Miscellaneous Works
- Arboriculture and Landscaping
- Update Cost Estimate
- Update Economic and Financial Analysis

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For Accepting Officer

Category of key personnel responsible	Description of activity	Total Duration	Month-wise plan					
			1	2	3	4	5	6

- Strip Plans
- Draft Preliminary Project Report and Drawings
- Financial Social Impact Assessment (SIA) Report including Resettlement and Rehabilitation Framework
- Final Preliminary Project Report and Drawing

4 DETAILED PROJECT REPORT (DPR)

- Detailed Design of Road, Pavement, High Embankment and Culverts
- Detailed Design of All Ancillary Road Works like Drainage Measures, Traffic Safety Features, Road Signs/ Markings and Way-side Amenities, etc
- Detailed Design and Layouts for Miscellaneous works
- Detailed Drawings
- Technical Specifications
- Final Cost Estimate and Bill of Quantities (BOQ)
- Draft Detailed Project Report and Drawings
- Final Detailed Project Report and Drawings
- Submission of Project Clearances from RGoB & MEA

(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)
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For Accepting Officer

Appendix 'D'**MANNING SCHEDULE OF KEY PERSONNEL**

Category of key personnel responsible	Description of activity	Total Duration	Month-wise plan					
			1	2	3	4	5	6

Total

- Notes: 1. Shown only for key personnel.
2. Show duration by solid line for continuous inputs and by broken line for staggered inputs
-

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

Appendix 'E'**Format of Curriculum Vitae (CV) For Proposed Key Staff**

1. Proposed _____ Position:

_____.

2. Name _____ of _____ Staff _____ :

_____.

3. Date of Birth: _____ (Please furnish proof of age)

4. Nationality: -

_____.

5. Educational Qualification:

(Summarize college/university and other specialized education of staff member, giving names of school dates attended and degrees obtained). (Please furnish proof of qualification)

6. Membership _____ of _____ Professional _____ Societies:

_____.

7. Publication:

(List of details of major technical reports/papers published in recognized national and international journals)

8. Employment Record:

(Starting with present position, list in reversed order, every employment held. List all positions held by staff member since graduation, giving dates, names of employing organization, title of positions held and location of assignments. For experience period of specific assignment must be clearly mentioned, also give client references, where appropriate).

9. Summary of the CV

(Furnish a summary of the above CV. The information in the summary shall be precise and accurate. The information in the summary will have bearing on the evaluation of the CV).

(Signature of the Consultant with seal)

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For Accepting Officer

Dated : 2015

of CV s shall be rejected.

Appendix 'F'

EQUIPMENT & INSTRUMENTS PROPOSED TO BE USED

Sl. No	Name of Equipments/ Instruments	Nos proposed to be deployed
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Appendix 'G'

COMPUTER HARDWARE AND SOFTWARE PROPOSED TO BE USED

Sl. No	Description	Nos proposed to be used
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Appendix 'H'

SERVICES PROPOSED FOR OUTSOURCING

Please give details of services proposed to be out sourced and agency proposed to be engaged for the purpose.

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

Appendix 'I'**QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL**

Sl.No	Description	Essential Qualification	Minimum professional/ Experience (in years)	Minimum Experience in Highway Projects
01.	Highway Engineer	Graduate in Civil Engineering	15 yrs	10 yrs on Project Preparation of DL Highways and minimum one Project of hill road of any type
02.	Material Engineer cum Geotechnical Engineer	Graduate in Civil Engineering/M SC Geology	15 yrs	08 yrs on similar Project in design and/or construction
03.	Senior Survey Engineer	Diploma in Civil Engineering or surveying/graduate in civil Engineering	10 yrs	05 yrs on similar Project preparation. Should have proper understanding of LiDAR Technology.
04.	Quantity Surveyor/Document Expert	Certificate course from Institution of Quantity surveyor/Graduate in civil Engineering	15 yrs	05 yrs in preparation of DPR of Highways Projects/Hill roads.

Note:- Maximum age limit for each expert is 65 years.

(Signature of the Consultant with seal)

Dated : 2015

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For Accepting Officer

Appendix 'J'

**Appendix J1-Form of Bank Guarantee For Performance Guarantee
Appendix J2- Form of Bank Guarantee for Tender Guarantee**

(Signature of the Consultant with seal)

Dated : 2015

EE (Civ)

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For Accepting Officer

Appendix 'J1'

FORM OF BANK GUARANTEE FOR PERFORMANCE GUARANTEE

(Reference clause 2.28)

(To be stamped in accordance with the Stamp Act of India)

To :

The Chief Engineer
Headquarters
Project DANTAK
C/O 99 APO

WHEREAS(Name and address of Consultant) (hereinafter called "the Consultant") has undertaken, in pursuance of contract No.dated..... to execute the detailed design the consultancy services for **SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN** (hereinafter called "the contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Consultant shall furnish you with a bank guarantee by a recognized bank for the sum specified herein as security for compliance with his obligations in accordance with the contract in lieu of cash deposits held by you for such compliance of obligation/ performance guarantee.

AND WHEREAS we have agreed to give the consultant such a bank guarantee. NOW THEREFORE we hereby affirm that we are the guarantor and responsible to you, on behalf of the consultant up to a total of(amount of guarantee).....(in words), such sum being payable in Indian Rupees, and we hereby unconditionally, irrevocably and without demur undertake to immediately pay you, upon your first 'written demand' and without cavil or argument any sum or sums within the limits of(amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the consultant before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract or of the works to be performed there under or of any of the contract documents which may be made between you and the consultant shall in any way release us from any liability under the guarantee and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid for 48 months from the date of commencement of the Services. The tendency of any dispute or arbitration or other proceeding shall not affect this guarantee in any manner.

SIGNATURE AND SEAL OF THE GUARNATOR

NAME OF BANK
ADDRESS
NAME OF OFFICIAL
AND HIS DESIGNATION
DATE

Notes:

- 1. The stamp papers of appropriate value shall be purchased in the name of the bank which issues the 'Bank Guarantee'. The 'Bank Guarantee' shall of a scheduled commercial bank based in India and acceptable to client.

(Signature of the Consultant with seal)

EE (Civ)
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For Accepting Officer

Dated : 2015

Appendix 'J2'**FORM OF BANK GUARANTEE FOR BID SECURITY**

(Reference Clause 2.9)

(To be stamped in accordance with Stamp Act, if any, of the country of issuing bank)

KNOW ALL MEN by these presents that (Name of Bank) of India, having our registered office at(hereinafter called "the bank") are bound unto CHIEF ENGINEER, PROJECT DANTAK, C/O 99 APO (hereinafter called " the employer") in sum of Rs.for which payment well and truly to be made to the said employer the bank binds himself, his successors and assigns by these presents.

WHEREAS.....(Name of bidders) (hereinafter called " the bidder") has submitted his tender dated.....for the consultancy **SURVEY, INVESTIGATION AND PREPARATION OF FEASIBILITY REPORT AND DETAILED PROJECT REPORTS USING LIDAR TECHNOLOGY FOR CONSTRUCTION OF ROAD SHINGKHAR-GORGAN FROM KM 0.00 TO KM 56.00 TO SECONDARY NATIONAL HIGHWAY SPECIFICATIONS UNDER PROJECT DANTAK INSIDE BHUTAN .**

WHEREAS the bidder is required to furnish a bank guarantee for the sum of Rs.....(Amount in figures and words) as Tender Guarantee against the bidder's offer as aforesaid.

AND WHEREAS(name of bank) have, at the request of the bidder, agreed to give this guarantee as hereinafter contained.

We further agree as follows:

(i) That the employer may without affecting this guarantee grant time or other indulgence to or negotiate further with the bidder in regard to the conditions contained in the said tender and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between the employer and the bidder.

(ii) That the guarantee hereinbefore contained shall not be affected by any change in constitution of our bank or in the constitution of the bidder.

(iii) That any account settled between the employer and the bidder shall be conclusive evidence against us of the amount due hereunder and shall not be questioned by us.

(iv) That this guarantee commences from the date hereof and shall remain in force till:

(a) The bidder in case his tender is accepted by the employer, executed a formal agreement after furnishing the performance guarantee on an Indian bank

(Signature of the Consultant with seal)

EE (Civ)

SW

Dated : 2015

For Accepting Officer

acceptable to the employer.

- (b) Thirty days after the date of validity or the extended date of validity of the tender as the case may be which ever is earlier.
- (c) That the expression "the bidder" and the "the bank" herein used shall, unless such an interpretation is repugnant to the subject or context, include their respective successors and assigns.

The conditions of this obligation are:

- (i) If the bidder withdraws his tender during the period of tender validity specified in the form of tender or
- (ii) If the bidder provides false information in his bid.
- (iii) If the bidder having been notified of the acceptance of his tender by the employer during the period of tender validity.
 - (a) Fails or refuses to furnish the performance guarantee and /or
 - (b) Fails or refuses to enter in to a contract within the time limit specified.

We undertake to pay to the employer up to the above amount upon receipt of his first written demand, without employer having to substantiate his demand provided that in his demand the employer will note that the amount.

claimed by him is due to him owing to the occurrence of any or more of the conditions (i), (ii), (iii) mentioned above, specifying the occurred condition or conditions.

Signature of
Authorized Official of
the Bank
Name of official
Designation
Stamp/Seal of the
bank

Note :-

1. The stamp paper of appropriate value shall be purchased in the name of bank, which issues the 'bank guarantee'.
2. The 'Bank guarantee' shall be from a scheduled commercial bank based in India and acceptable to client.

(Signature of the Consultant with seal)

EE (Civ)

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For Accepting Officer

Dated : 2015

Appendix 'K'**(Ref clause 5 of Annexure-IV of Schedule 'A'
, Section V, Form of Tender)****NEFT/RTGS MANDATE FORM**

(1)	Name of firm/contractor as per account in the Bank	
(2)	Beneficiary's Account Number (As appearing on the Cheque Book)	
(3)	Name of Bank where a/c is held	
(4)	Name of Branch	
(5)	Address of Branch	
(6)	Telephone No. of Branch	
(7)	IFSC Code of Branch	
(8)	9-Digit MICR Code Number of the Bank & Branch	
(9)	E-Mail ID of Contractor	

Note Please attach a blank cancelled cheque for verification of the above particulars.

I, hereby, declare that the particulars given above are correct and complete. If the transaction is delayed or not effected due to incomplete or incorrect information of the bank details, I will not hold the payment releasing authority responsible for it.

Dated :

Signature of the contractor
(Seal)

CERTIFICATE BY BANK

Certified that the particulars furnished above are correct as per our records.

Seal of Bank
Dated :

Signature of the branch manager
of the Bank

(Signature of the Consultant with seal)

EE (Civ)
SW

Dated : 2015

For Accepting Officer