BORDER ROAD ORGANISATION
(Ministry of Defence)
Government of India

E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*

REQUEST FOR PROPOSAL
(RFP)

Sep 2018

BORDER ROADS ORGANISATION
DIRECTOR GENERAL BORDER ROADS
SEEMA SADAK BHAWN, RING ROAD
DELHI CANTT - 110010

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NOTICE INVITING TENDER
(NATIONAL COMPETITIVE BIDDING)
BORDER ROAD ORGANISATION
DIRECTOR GENERAL BORDER ROADS
BORDER ROADS ORGANIZATION

1. Director General Border Roads Organization, (BRO) has been assigned the work of E*ngaging Technical Consultant for preparation of feasibility study (FS) and detailed project report (DPR) for construction of Highway Tunnel including approach road across Chattergala, approximately in between km 114.00 and km 151.00 on Basoli-Bani-Bhaderwah road under project Beacon in J & K State.*

2. Proposals are hereby invited from eligible Technical Consultant for E*ngaging Technical Consultant for preparation of feasibility study (FS) and detailed project report (DPR) for construction of Highway Tunnel including approach road across Chattergala, approximately in between km 114.00 and km 151.00 on Basoli-Bani-Bhaderwah road under project Beacon in J & K State*. The Letter of Invitation (LOI) and Terms of Reference (ToR) including Request for Proposal (RFP) is available online on e-tender portal of NIC https://eprocure.gov.in . The document can also be downloaded from BRO website (for reference only). Cost of tender documents is not required to be attached/submitted with downloaded tender, however tenderer should have submitted cost of tender documents in case tender form is supplied by the Department.

3. **The RFP has also been uploaded on "INFRACON"** (www.infracon.nic.in). As such before submitting the proposal the Consultant shall mandatorily register and enlist themselves (the firm and all key personnel), on the MoRTH portal "INFRACON" and furnish registration details along with its RFP. Infracon Operation Procedure is available on Infracon Portal for bidders reference and also described in the RFP in subsequent clauses.

4. **All the bidders registered on Infracon shall form a Team on Infracon and which would be assigned unique Infracon Team ID. Bidders while submitting the proposal shall quote the Infracon Team ID.**

5. Bid must be submitted online at e-tender portal i.e https://eprocure.gov.in on or before **as per schedule.**

6. The BRO has appointed Independent Monitors for this pact in consultation with the Central Vigilance Commission **(Name and Address of the Monitors as amended from time to time, can be referred to on the MoD website at www.mod.nic.in)**. Following are the independent monitors for this work:-

Sl No	Name of IM	E-mail ID
1	Shri Kumar Pande, IAS (Retd)	hempande@nic.in Mobile No:- 9810132693
2	Shri Anjan Kumar Banerjee, IA&AS (Retd)	anjan.banerjee@gov.in Mobile No:- 8853381627

7. The bidding process schedule is given as under :

Publish date	03 Oct 2018 (02.00 PM) Onwards
Bid document download/Sale start date	05 Oct 2018 (10.00 AM)
Clarification start date	08 Oct 2018 (10.00 AM)
Clarification end date	11 Oct 2018 (02.00 PM)
Pre bid meeting	16 Oct 2018 (10.00 AM)
Bid submission start date	17 Oct 2018 (10.00 AM)
Bid document download/ Sale end date	09 Nov 2018 (10.00 AM)
Bid submission end date	09 Nov 2018 (12.00 PM)
Bid opening date	12 Nov 2018 (12.00 PM) Onwards

24034/DGBR/Consultancy Tunnel/BCN/ /EPC Cell

Headquarters
Director General Border Roads (EPC Cell)
Seema Sadak Bhawn, Rring Road
Delhi Cantt - 110010

(RK Garg)
SE (Civ)
Dir (EPC)
For DGBR
Oct 2018

Tel : 011-25686846 Fax : 011-25684632
E-mail : bro-direpc@gov.in Website : bro.gov.in

DISTRIBUTION FOR INFORMATION AND WIDE PUBLICITY

1.	HQ CE (P)..... C/O 56 APO, 99 APO .....BRTF (GREF), C/O 56 APO	For info please along with a copy of NIT
2.	All India Tenders Information Bureau, Post Box No. 25 (Post Office) Shastri Nagar ,Jaipur (Rajasthan) e-mail – support-eproc@nic.in	For wide publicity at their end please.
3.	National Highways Authority of India, G 5&6, Sector 10, Dwarka, New Delhi -110075, Fax- 011-25093507 e-mail – bssinghla@nhai.org	-do-
4.	NHIDCL, Corporate Office, 3rd Floor, PTI Building, 4-Parliament Street, New Delhi -110001 e-mail – info@nhidcl.com	-do-
5.	Head Office, Builder Association of India, G-1/G-20 Commerce Centre, 7th floor, Dodajee road,Tardeo,Mumbai-400034 e-mail – baidelhi16@gmail.com	-do-
6.	The Chief Engineer (HQ) Govt. of Uttarakhand. Public Work Department (PWD), Dehradun (UK) e-mail - cehq.pwduk@gov.in	-do-
7.	Special Director General (NR) Sewa Bhawan, R K Puram, New Delhi- 110066 e-mail - sdgnr.cpwd@nic.in	-do-
8.	Chief Engineer, CPWD 20- Subhash Road Dehradun, Uttarakhand -248001	-do-
9.	EDP Cell HQ DGBR	: Please paste the NIT on BRO Web site by mentioning last date of submission of bids as **09 Nov 2018.**

Letter of Invitation (LOI)

Dear Sir,

Sub: E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*

1. Introduction

1.1 The Director General Border Roads, Border Roads Organization has been entrusted with the assignment of E*ngaging Technical Consultant for preparation of feasibility study (FS) and detailed project report (DPR) for construction of Highway Tunnel including approach road across Chattergala, approximately in between km 114.00 and km 151.00 on Basoli-Bani-Bhaderwah road under project Beacon in J & K State*. (BRO) now invites proposal from Technical consultants for carrying out detailed project report as per details given in **Annexure-1**.

1.2 A brief description of the assignment and its objectives are given in the Appendix-I, ***"Terms of References".***

1.3 The Director General Border Roads invites Proposals (the "**Proposals**") ***through e-tender*** (on-line bid submission) for selection of Technical Consultant (the "**Consultant**") who shall prepare DPR**.** A Consultant with "a Particular Team" may submit proposals for more than one package. However, a Consultant is not allowed to bid for a package with more than one team. For the sake of clarity, it is mentioned that one consultant cannot submit two proposals/ bids for the same package. A consultant (either as sole or as in JV/Association) can be awarded only up to 2 packages. Consultants are hereby invited to submit proposals in the manner as prescribed in the RFP. A Consultant with "a Particular Team" may submit only one "proof of eligibility (Part 1)" and "Technical Proposal (Part II)" for any number of packages applied for by them. However, the packages for which a Consultant with "a Particular Team" applies should be clearly mentioned. Financial proposal for each package are to be submitted separately. Financial proposal are only to be submitted online and no hard copy of the financial proposal should be submitted. The most preferred bidder (H-1) for each package would be determined on the basis of Quality and Cost as mentioned in the RFP. Award of work to a Consultant with "a Particular Team" either as sole or as in JV/Association shall be limited to one package only. In case, a Consultant with "a Particular Team" turns out to be the most preferred bidder (H-1) in more than one package, the package which is to be awarded to this Consultant with "a Particular Team" shall be determined on the basis of least cost to Director General Border Roads (BRO) considering the financial quote of H-1 bidder and H-2 bidder limited to those packages, which shall be worked out as per the procedure given in the RFP. The consultants are hereby invited to submit proposals in the manner prescribed in the RFP.

1.4 The consultants shall submit proposals either in sole capacity or in JV or in Association. Joint Venture/Association shall not have more than two firms. Any entity which has been barred by the Ministry of Road Transport and Highways (MORTH) or its implementing agencies for the works of Expressways, National Highways, ISC and EI Works and the bar subsists as on the date of application, would not be eligible to submit the bid, either individually or as a member of a Joint Venture.

1.5 To obtain first hand information on the assignment and on the local conditions, the consultants are encouraged to pay a visit to the client, local State PWDs and the project site before submitting a proposal and attend a pre-proposal conference. They must fully inform themselves of local and site conditions and take them into account in preparing the proposal.

1.6 Financial Proposals will be opened only for the firms found to be eligible and scoring qualifying marks in accordance with Para 5 hereof. The consultancy services will be awarded to the highest ranking consultant on the basis of Quality and Cost.

1.7 Please note that (i) costs of preparing the proposal and of negotiating the contract, including visits to the Client, etc., are not reimbursable as a direct cost of the assignment; and (ii) BRO is not bound to accept any of the proposals submitted and reserve the right to reject any or all proposals without assigning any reasons.

1.8 The proposals must be properly signed as detailed below:

1.8.1 *i. by the proprietor in case of a proprietary firm*

ii. by the partner holding the Power of Attorney in case of a firm in partnership (A certified copy of the Power of Attorney on a stamp paper of Rs. 100 and duly notarized shall accompany the Proposal).

iii. by a duly authorized person holding the Power of Attorney in case of a Limited Company or a corporation (A certified copy of the Power of Attorney on a stamp paper of Rs. 100 and duly notarized shall accompany the proposal).

iv. by the authorized representative in case of Joint Venture.

1.8.2 In case a Joint Venture/Association of firms, the proposal shall be accompanied by a certified copy of legally binding Memorandum of Understanding (MOU) on a stamp paper of Rs.100, signed by all firms to the joint venture confirming the following therein:

i. Date and place of signing

ii. Purpose of Joint Venture/Association (must include the details of contract works for which the joint venture has been invited to bid)

iii. A clear and definite description of the proposed administrative arrangements for the management and execution of the assignment. Name of Lead Firm and other partner of JV should be clearly defined in the MOU

iv. Delineation of duties/ responsibilities and scope of work to be undertaken by each firm along with resources committed by each partner of the JV/Association for the proposed services

v. An undertaking that the JV firms are jointly and severally liable to the Employer for the performance of the services

vi. The authorized representative of the joint venture/Association

The Association firm shall give a Letter of Association, MOU as in i) to vi above except v, letter of Authorization, copies of GPA/SPA for the person signing the documents and a certificate of incorporation.

1.8.3 In case of Joint venture, one of the firms which preferably have relatively higher experience will act as the lead firm representing the Joint Venture. The duties, responsibilities and powers of such lead firm shall be specifically included in the MOU /agreement. It is expected that the lead partner would be authorized to incur liabilities and to receive instructions and payments for and on behalf of the Joint Venture. Payment to be made to the JV can also be made to the account of the JV. For a JV to be eligible for bidding, the experience of lead partner and other partner should be as indicated in data sheet.

1.8.4 A firm can bid for a project either as a sole consultant or in the form of joint venture with other consultant or in association with any other consultant. However, alternative proposals i.e. one as sole or in JV with other consultant and another in association / JV with any other consultant for the same package will be summarily rejected. In such cases, all the involved proposals shall be rejected.

1.9 Pre-proposal conference shall be held on the date, time and venue given in Data Sheet.

1.10 **Bid Security**

1.10.1 The applicant shall furnish as part of its Proposal, a Bid Security of Rs 2,00,000 (Rupees two lakhs only) in the form of a Bank Guarantee issued by one of the Nationalized/Scheduled Banks in India in favour of the CE (P) BEACON payable at Sri-Nagar (J&K) (the **"Bid Security"**) **valid for a minimum period of 150 days (i.e.30 days beyond the validity of the bid) from the last date of submission of proposals.** This Bid Security is returnable not later than 30 (thirty) days from the date of Opening of the Financial proposals except in case of the two highest ranked Applicants. Bid Security of the Selected Applicant and the Second ranked Team shall be returned, upon the Selected Applicant signing the Agreement.

1.10.2 Any bid not accompanied by the Bid Security of the required value and minimum required validity shall be rejected by the authority as non-responsive.

1.10.3 The CE (P) Beacon shall not be liable to pay any interest on the Bid Security and the same shall be interest free.

1.10.4 The Applicant, by submitting its Application pursuant to this RFP, shall be deemed to have acknowledged that without prejudice to the CE (P) Beacon any other right or remedy hereunder or in law or otherwise, the Bid Security shall be forfeited and appropriated by the Authority as the mutually agreed pre-estimated compensation and damage payable to the Authority for, *inter alia* the time, cost and effort of the CE (P) Beacon in regard to RFP including the consideration and evaluation of the Proposal under the following conditions :

a) If an Applicant withdraws its Proposal during the period of its validity as specified in this RFP and as extended by the Applicant from time to time.

b) In the case of the Selected Applicant, if the Applicant fails to reconfirm its commitments during negotiations as required vide Para 6.

c) In the case of a Selected Applicant, if the Applicant fails to sign the Agreement.

2 Documents

2.1 To enable you to prepare a proposal, please find and use the attached documents listed in the Data Sheet.

2.2 Consultants requiring a clarification of the documents must notify the Director General Border Roads, in writing, by **14:00 Hrs, 11 Oct 2018**. Any request for clarification in writing or by tele-fax/e-mail must be sent to the address given for pre-proposal conference as indicated in the Data Sheet. The Director General Border Roads will replies to pre-bid queries in writing by Tele fax/E-Mail/uploaded on BRO site. Any clarification leading to amendment to RFP will be uploaded on CPP/Infracon Portal.

2.3 At any time before the submission of proposals, the BRO may, for any reason, whether at its own initiative or in response to a clarification requested by a Consulting firm, modify the Documents by amendment or corrigendum. The amendment will be uploaded on BRO website, www.bro.gov.in. The Director General Border Roads may at its discretion extend the deadline for the submission of proposals and the same shall also be uploaded on BRO website, www.bro.gov.in.

3. Preparation of Proposal

The proposal must be prepared in three parts viz,

Part 1 : Proof of eligibility
Part 2 : Technical Proposal
Part 3 : Financial Proposal

3.1 Document in support of proof of eligibility

3.1.1 The minimum essential requirement in respect of eligibility has been indicated in the Data Sheet. The proposal found deficient in any respect of these requirements will not be considered for further evaluation. The following documents must be furnished in support of proof of eligibility as per Formats given in Appendix-II:

(i) **Forwarding letter for Proof of Eligibility in the Form-E1.**

(ii) **Firm's relevant experience and performance for the last 10 years:** Project sheets in support of relevant experience as per Form-E2/T3 supported by the experience certificates from clients in support of experience as specified in data sheet for the project size preferably in terrain of similar nature as that of proposed project shall be submitted. The experience certificate should indicate clearly the firms DPR experience in Tunnels related to Highway/Railway/Metro project preferably in hilly terrain, details (including configuration) of structures for hill slope stabilization, rock bolting, ground improvement, 2/4/6 laning of highway etc. Scope of services rendered by the firm should be clearly indicated in the certificate obtained from the client. The information given in Form E2/T3 shall also be considered as part of Technical Proposal and shall be evaluated accordingly.

The Consultants are therefore advised to see carefully the evaluation criteria for Technical Proposal and submit the Project Sheets accordingly.

(iii) **Firm's turnover for the last 5 years:** A tabular statement as in Form E3 showing the turnover of the applicant firm(s) for the last five years beginning with the last financial year certified by the Chartered Account along with certified copies of the audit reports shall be submitted in support of the turnover.

(iv) **Document fee:** The fee for the document amounting to **Rs. 5,000 (Rupees Five Thousand only)** in the form of Demand Draft favoring **CE (P) Beacon** payable at Srinagar, J&K must be furnished in a separate envelope while submitting the proposal in case tender form is supplied by the department. However, fee is not required to be attached/ submitted in case downloaded tender form.

(v) **Bid Security:** Bank Guarantee in support of bid security for an amount specified in Data Sheet and having validity for a minimum period of 150 days (i.e. 30 days beyond the validity of the bid), from the last date of submission of proposals in the Form E4.

(vi) Power of Attorney on a stamp paper of Rs.100 and duly notarized authorizing to submit the proposal.

(vii) In case a Joint Venture/Association of firms, the proposal shall be accompanied by a certified copy of legally binding Memorandum of Understanding (MOU) on a stamp paper of Rs.100, signed by all firms to the joint venture/Association as detailed at para 1.8.2 above.

3.1.2 The minimum essential requirement in respect of eligibility has been indicated in the data sheet, the proposal found deficient in any respect of these requirements will not be considered for further evaluation.

3.2 Technical Proposal

3.2.1 You are expected to examine all terms and instructions included in the Documents. Failure to provide all requested information will be at your own risk and may result in rejection of your proposal.

3.2.2 During preparation of the technical proposal, you must give particular attention to the following:

Total assignment period is as indicated in the enclosed TOR. ***A manning schedule in respect of requirement of key personnel is also furnished in the TOR which shall be the basis of the financial proposal.*** *You shall make your own assessment of support personnel both technical and administrative to undertake the assignment. Additional support and administrative staff need to be provided for timely completion of the project within the total estimated cost.* ***It is stressed that the time period for the assignment indicated in the TOR should be strictly adhered to.***

3.2.3 The technical proposal shall be submitted strictly in the Formats given in Appendix- III And shall comprise of following documents:

i) Forwarding letter for Technical proposal duly signed by the authorized person on behalf of the bidder, as in Form-T-1

ii) Details of projects for which Technical and Financial Proposals have been submitted by a Consultant with a particular Team as in Form-T-2

iii) Firm's references - Relevant Services carried out in the last seven years as per Form-E2/T-3. This information submitted as part of Proof of Eligibility shall be evaluated and need not be submitted again as a part of the Technical proposal

iv) Site Appreciation: limited to four A4 size pages in 1.5 space and 12 font including photographs, if any (Form-T-4).

v) Comments on Terms of Reference: limited to two A4 size pages in 1.5 space and 12 font (Form-T-5).

vi) The composition of the proposed Team and Task Assignment to individual personnel: Maximum three pages (Form-T-6).

vii) Proposed methodology for the execution of the services illustrated with bar charts of activities, including any change proposed in the methodology of services indicated in the TOR, and procedure for quality assurance: Maximum 4 pages (Form-T-7)

viii) The proposal should clearly identify and mention the details of Material Testing lab facilities to be used by the Consultants for the project (Form-T-8). In this connection, the proposals of the Consultants to use in-house lab facilities up to a distance of maximum 400 km from the project site being feasible would be accepted. For all other cases suitable nearby material Testing Laboratory shall be proposed before Contract Agreement is executed.

ix) The proposal shall indicate as to whether the firm is having the facilities for carrying out the following field activities or these are proposed to be outsourced to specialized agencies in the Form- T-9.

a) Pavement Investigation
b) Geo-technical Investigation

In case the consultant envisages outsourcing any or all of the above services to the expert agencies, the details of the same indicating the arrangement made with the agencies need to be furnished. These agencies would however, be subject to approval of the Director General Border Roads to ensure quality input by such agencies during technical negotiation before award of the work. For out-sourced services, proposed firms/consultants should have such experience on similar projects

x) Details of office equipment and software owned by the firm in Form-T10

xi) CVs of Key Personnel in Form-T11.

3.2.4 **CVs of Key Persons:**

i. The CVs of the key personnel given at Enclosure -I in the format as per Form T-11 is to be furnished. *It may please be ensured that the format is strictly followed and the information furnished therein is true and correct. The CV must indicate the work in hand and the duration till which the person will be required to be engaged in that assignment. Experience certificates shall also be submitted. If any information is found incorrect, at any stage, action including termination and debarment from future BRO projects upto 2 years may be taken by Director General Border Roads on the personnel and the Firm.*

ii. No alternative to key personnel may be proposed and only one CV may be submitted for each position. The minimum requirements of Qualification and Experience of all key personnel are listed in Enclosure-II of TOR. CV of a person who does not meet the minimum experience requirement as given at enclosure-II of TOR shall be evaluated and the marks obtained shall be taken into consideration during evaluation of Technical Proposal (except Team leader). However if a firm with such key personnel is declared the "most preferred bidder" for a particular package , such key personnel should be replaced at the time of Contract Negotiations with a person meeting requirements of Qualification and Experience as given at enclosure-II of TOR and whose CV secures 75 % marks and above. If a proposed key personnel does not possess the minimum (essential) educational qualification as given at enclosure-II of TOR, Zero marks shall be assigned to such CV and such CV shall not be evaluated further. ***The CV of the proposed Team Leader should score at least 75 % marks otherwise the entire proposal shall be considered to have failed in the evaluation of Technical Proposals*** *and shall not be considered for opening of Financial Proposals.*

iii. Team Leader, Highway cum Pavement Engineer, Bridge Engineer, Geo-technical cum material engineer and Senior Survey Engineer should be available from beginning of the project. 3 Key Personnel namely Environmental Specialist, Quantity Surveyor / Documentation expert and Traffic and safety expert are allowed to be deployed/proposed in 2 teams at a time. ***If same CV is submitted by two or more firms, zero marks shall be given for such CV for all the firms.***

iv. The availability of key personnel must be ensured for the duration of the project as per proposed work programme. If a firm claims that a key personnel proposed by them is a permanent employee of the firm (the personnel should have worked in the firm continuously for a period of at least 1 year) , a certificate to the effect along with ***pay slips are required to be submitted****.*

v. The age limit for key personnel is 70years as on the date of bid submission except for Senior survey engineer in which case the age limit is 65 years. The proof of age and qualification of the key personnel must be furnished in the technical proposal.

vi. An undertaking from the key personnel must be furnished that he/she will be available for entire duration of the project assignment and will not engage himself/herself in any other assignment during the currency of his/her assignment on the project. After the award of work, in case of non-availability of key personnel in spite of his/her declaration, he/she shall be debarred for a period of two years for all projects of BRO

vii. Age limit for supporting staff to be deployed on project is 65 years as on the date of bid submission.

viii. A good working knowledge of English Language is essential for key professional staff on this assignment. Study reports must be in English Language.

ix. Photo, contact address and phone/mobile number of key personnel should be furnished in the CV.

x. Availability of few key personnel engaged for preparation of Detailed Project Report for the envisaged project may be ensured during first 3 to 4 months after start of the civil work at site during the period of survey and review of DPR by the Supervision consultant/Authority Engineer. For this purpose, payment shall be made as per actual site deployment of the key personnel at the man month rates quoted by the firm in their financial proposal.

xi. It may please be noted that in case the requirement of the 'Experience' of the firm/consortium as mentioned in the "Proof of Eligibility' is met by any foreign company, their real involvement for the intended project shall be mandatory. This can be achieved either by including certain man-months input of key experts belonging to the parent foreign company, or by submitting at least the draft feasibility report and draft DPR duly reviewed by the parent firm and their paying visit to the site and interacting with CE (P) Beacon. In case of key personnel proposed by the foreign company, they should be on its pay roll for at least last six months (from the date of submission).

*xii. 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.*

xiii. Original Curriculum Vitae (CV) and photocopies of certificates shall be recently signed in blue ink by the proposed key professional staff on each page and also initialed by an authorized official of the Firm and each page of the CV must be signed. The key information shall be as per the format. Photocopy of the CVs will not be accepted. Unsigned copies of CVs shall be rejected.

3.2.5 The technical proposal must not include any financial information.

3.3 Financial Proposal

3.3.1 The Financial proposal should include the costs associated with the assignment. These shall normally cover: remuneration for staff (foreign and local, in the field, office etc), accommodation, transportation, equipment, printing of documents, surveys, geotechnical investigations etc. This cost should be broken down into foreign and local costs. Your financial proposal should be prepared strictly using, the formats attached in ***Appendix – IV***. Your financial proposal should clearly indicate the amount asked for by you without any assumptions of conditions attached to such amounts. Conditional offer or the proposal not furnished in the format attached in *Appendix-IV* shall be considered non-responsive and is liable to be rejected.

3.3.2 The financial proposal shall take into account all types of the tax liabilities including GST and cost of insurance specified in the Data Sheet.

3.3.3 **Costs shall be expressed in Indian Rupees in case of domestic as well as for foreign Consultant**. The payments shall be made in Indian Rupees by the CE (P) Beacon and the Consultant themselves would be required to obtain foreign currency to the extent quoted and accepted by CE (P) Beacon. Rate for foreign exchange for payment shall be at the rate established by RBI applicable at the time of making each payment installment on items involving actual transaction in foreign currency. No compensation done to fluctuation of currency exchange rate shall be made.

3.3.4 Consultants are required to charge only rental of equipments/ software(s) use so as to economize in their financial bid.

4 Submission of Proposals

4.1 The Applicants shall submit the proposal (Proof of Eligibility and Technical Proposal) in hard bound form with all pages numbered serially and by giving and index of submissions. Applications submitted in other forms like spiral bound form; loose form etc shall be rejected. Copies of Applications shall not be submitted and considered. A Consultant with "a Particular Team" may submit only one hard copy (in original) of "proof of eligibility (Part 1)" and "Technical Proposal (Part II)" to Director General Border Roads for all the packages applied by them with a particular team on or before the deadline of submission of bids. A consultant can apply for a particular package with one team only. The packages for which a Consultant with "a Particular Team" applies should be clearly mentioned in their proposal. However, Consultants are required to submit a copy of Proof of Eligibility and Technical Proposal online separately for each package. Financial proposal for each package are to be submitted separately. Financial proposal are only to be submitted online and no hard copy of the financial proposal should be submitted.

4.2 You must submit original proposal as indicated in the Data Sheet. "Proof of Eligibility" in original and hard bound should be enclosed in an envelope which should be marked as "Part-I – Proof of Eligibility". Similarly, "Technical Proposal" in original and hard bound should be enclosed in an envelope which should be marked as "Part-II – Technical Proposal" The proposal will be sealed in an outer envelope which will bear the address and information indicated in the Data Sheet and shall be submitted to Director General Border Roads on or before the deadline for submission of bids. The envelope must be clearly marked:

Tender No: CE (P)/BEACON/DPR CONSULTANCY/07/2018-19, Project Name: E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*

Do not open, except in presence of the evaluation committee

4.2.1 This outer envelope will contain three separate envelopes. The first envelope containing "Proof of Eligibility" (which should be clearly marked), the second envelope containing "Technical Proposal" (which should be clearly marked) and the third envelope containing a demand draft of **Rs. 5,000/- (cost of RFP)** in case of tender form is supplied by the Department only, Bid Security of required amount and validity as mentioned in the RFP. Only one bid security and one DD of Rs 5000/ (as cost of Document) may be submitted by a consultant applying with a particular team for a number of packages. However for consultants applying with 2 teams, 2 Nos of Bid Security of Rs 2 lakhs each and 2 no's of DD of Rs 5000/ each as mentioned in RFP have to be submitted.

4.2.2 The proposal must be prepared in indelible ink and must be signed by the authorized representative of the consultants. The letter of authorization must be confirmed by a written power of attorney accompanying the proposals. All pages of the Proof of Eligibility and Technical Proposal must be initialed by the person or persons signing the proposal.

4.3 The proposal must contain no interlineations or overwriting except as necessary to correct errors made by the Consultants themselves, in which cases such corrections must be initialed by the person or persons signing the proposal.

4.4 Your completed Proof of eligibility and Technical proposal (in hard copy) must be delivered on or before the time and date at the address stated in Data Sheet. Proof of Eligibility, Technical Proposal and Financial Proposal for each package shall have to be submitted online also on or before the time and date at the address stated in Data Sheet.

4.5 Your proposal must be valid for the number of days stated in the Data Sheet from the closing date of submission of proposal.

5 Proposal Evaluation

5.1 The proposals would be evaluated by a Committee constituted by BRO. A three-stage procedure will be adopted in evaluating the proposal.

In the first stage- Proof of Eligibility, it will be examined as to whether:

i) There is no tender fee for downloading the document. However, the proposal is accompanied by Document fee in case hard copy of tender form is supplied by the Department.

ii) The Proposal is accompanied by Bid Security of required value and of validity equal or more than the minimum required validity

iii) The firms(s) have required experience

iv) The firms(s) have required turnover

v) The documents are properly signed by the authorized signatories and whether the proposal contains proper POA as mentioned at para 1.8.1 above

vi) The proposals have been received on or before the dead line of submission.

vii) In case a Joint Venture/Association of firms, the proposal shall be accompanied by a certified copy of legally binding Memorandum of Understanding (MOU) on a stamp paper of Rs.100, signed by all firms to the joint venture/Association as detailed at para 1.8.2 above.

In case answers to any of the above items is 'No' the bid shall be declared as non-responsive and shall not be evaluated further.

A Consultant satisfying the minimum Eligibility Criteria as mentioned in the Data sheet and who had submitted the above mentioned documents shall be declared "pass" in Proof of Eligibility and the Technical Proposals of only those consultants shall be opened and evaluated further.

5.2 In the second stage the Technical proposal shall be evaluated as per the detailed evaluation criteria given in Data Sheet.

A proposal securing 75 points shall be declared pass in the evaluation of Technical Proposal .**The technical proposal should score at least 75 points out of 100 to be considered for financial evaluation**. **The CV of the proposed Team Leader should score at least 75 % marks otherwise the entire proposal shall be considered to have failed in the evaluation of Technical Proposals** and shall not be considered for opening of Financial Proposals.

5.3 Evaluation of Financial Proposal

5.3.1 In case for a particular package, only one firm is eligible for opening of Financial Proposals, the Financial Proposal shall not be opened, the bids for that package shall be cancelled and Director General Border Roads shall invite fresh bids for this package. For financial evaluation, total cost of financial proposal excluding GST shall be considered. GST shall be payable extra.

5.3.2 The evaluation committee will determine whether the financial proposals are complete (i.e. whether they have included cost of all items of the corresponding proposals ; if not, then their cost will be considered as NIL but the consultant shall however be required to carry out such obligations without any compensation. In case, if BRO feels that the work cannot be carried out within overall cost of financial proposal, the proposal can be rejected. The BRO shall correct any computational errors and correct prices in various currencies to the single currency specified in Data Sheet. The evaluation shall exclude those taxes (including GST), duties, fees, levies and other charges imposed under the applicable law applied to foreign components/ resident consultants.

5.3.3 For a package, the procedure as mentioned at Clauses 5.3.4, 5.4 and, 5.5 as mentioned below shall be followed for determining the "most preferred bidder (H-1 bidder)" for this package.

5.3.4 The lowest financial proposal (FM) will be given a financial score (SF) of 100 points. The financial scores of other proposals will be computed as follows:

SF = 100 x FM/F
(SF = Financial Score, FM= Amount of lowest bid, F= Amount of financial proposal converted in the common currency)

5.4 Combined evaluation of Technical and Financial Proposals. Proposals will finally be ranked according to their combined technical (ST) and Financial (SF) scores using the weights indicated in the Data Sheet:

S= STxT + SFxf
Where,
S = Combined Score,
ST = Technical Score out of 100
SF = Financial Score out of 100

T and f are values of weightage for technical and financial proposals respectively as given in the Data Sheet.

5.5 For a particular package, a Consultant with a "particular Team" having the maximum Combined score (S) shall be declared as the **most preferred bidder** (H-1).

In case work has to be awarded for multiple packages, award of work to a Consultant with "a Particular Team" either as sole or as in JV/Association shall be limited to one package only. At first, Consultants who become H-1 in one package each shall be assigned the respective package. Then packages in which a Consultant with "a Particular Team" turns out to be the most preferred bidder (H-1) in more than one package shall be considered. In case, a Consultant with "a Particular Team" turns out to be the most preferred bidder (H-1) in more than one package, the package which is to be awarded to this team of a consultant shall be determined on the basis of least cost to Director General Border Roads considering the Financial Quote of H-1 bidder and H-2 Bidder limited to those packages. Procedure to be followed for awarding work based on QCBS including assessment of least cost to BRO under special circumstances i.e. When a Consultant with "a Particular Team" turns out to be the most preferred bidder (H-1) in more than one package is given at given at Annex-II.

6. Negotiations

6.1 Prior to the expiration period of proposal validity, the Client will notify the most preferred Consultant/Bidder i.e. the highest ranking consultant in writing by registered letter, e-mail, or facsimile and invite him to negotiate the Contract.

6.2 **Before the start of negotiations, the most preferred Consultant/Bidder (H-1) shall be asked to give justification for the cost quoted by them to the full satisfaction of Director General Border Roads (DGBR).**

Each key personnel of the preferred consultant shall be called for interview at the time of negotiation at the cost of consultant before the award of work.

6.3 Negotiations normally take two to three days. The aim is to reach agreement on all points and initial a draft contract by the conclusion of Negotiations.

6.4 Negotiations will commence with discussion on technical proposal, the proposed methodology (work plan), staffing and any suggestions made to improve the TOR, the staffing and bar charts, which will indicate activities, periods in the field and in the home office, staff months, logistics and reporting. The financial proposal is subject to rationalization. Special attention will be paid to optimize the required outputs from the Consultants within the available budget and to define clearly the inputs required from the BRO to ensure satisfactory implementation of the Assignment.

6.5 Changes agreed upon will then be reflected in the financial proposal using proposed unit rates.

6.6 Having selected Consultants, among other things, on the basis of an evaluation of proposed key professional staff, the BRO expects to negotiate, within the proposal validity period, a contract on the basis of the staff named in the proposal and, prior to contract negotiations, will require assurances that the staff will be actually available. **The DGBR may ask to give a replacement for the key professional who has scored less than 75% marks by a person of at least 75% score**. **No reduction in remuneration would be made on account of above change.**

The DGBR will not consider substitutions during contract negotiations except in cases of incapacity of key personnel for reasons of health. Similarly, after award of contract the DGBR expects all of the proposed key personnel to be available during implementation of the contract. The client will not consider substitutions during contract negotiations/ contract implementation except under exceptional circumstances. For the reason other than death/ extreme medical ground, where replacement is proposed by the Consultant due to non availability of the originally proposed key personnel or in cases where replacement has become necessary as a key personnel proposed by the Consultant has been found to be unsuitable for the project by Director General Border Roads during contract negotiations / contract implementation , the following shall apply

(i) for total replacement up to 33% of key personnel, remuneration shall be reduced by 5%

(ii) for total replacement between 33% to 50%, remuneration shall be reduced by 10%

(iii) for total replacement beyond 50% and 66% remuneration shall be reduced by 15%

(iv) for total replacement beyond 66% of the total key personnel, the Client may initiate action for debarment of such consultant for future projects of BRO for a period of 6 months to 24 months. **If for any reason beyond the reasonable control of the consultants, it becomes necessary to replace any of the personnel, the consultants shall forthwith provide as a replacement a person of equivalent or better qualification and experience**.

6.7 The negotiations will be concluded with a review of the draft Contract Agreement attached at Appendix-V. The Client and the Consultants will finalize the contract to conclude negotiations.

6.8 If a Consultant fails to conclude the negotiations with BRO or in case a consultant withdraws without starting / completing the negotiations with BRO, it shall attract penalty – encashment of Bid Security submitted by the Consultant

7. Performance Security

The consultant will furnish within 15 days of the issue of Letter of Acceptance (LOA), an unconditional Bank Guarantee from a Nationalized Bank, IDBI or ICICI/ICICI Bank/Foreign Bank/EXIM Bank / Any Scheduled Commercial Bank approved by RBI having a net worth of not less than 500 crore as per latest Annual Report of the Bank. In the case of a Foreign Bank (issued by a Branch in India) the net worth in respect of Indian operations shall only be taken into account. In case of Foreign Bank, the BG issued by Foreign Bank should be counter guaranteed by any Nationalized Bank in India. In case of JV, the BG shall be furnished on behalf of the JV or by the lead member of the JVs for an amount equivalent to ***10 %*** of the total contract value to be received by him towards Performance Security valid for a period of ***two years*** beyond the date of completion of services, or end of civil works contract, whichever earlier. **The Bank Guarantee will be released by CE (P) Beacon upon expiry of 2 years beyond the date of completion of services, or end of civil works contract, whichever earlier, provided rectification of errors if any, found during implementation of the contract for civil work and satisfactory report by CE (P) Beacon in this regard is issued.** If a Consultant fails to submit the Performance Security (as specified above), it shall attract penalty – encashment of Bid Security submitted by the Consultant

8. Penalty

The consultant will indemnify for any direct loss or damage that accrue due to deficiency in services in carrying out Detailed Project Report. Penalty shall be imposed on the consultants for poor performance/deficiency in service as expected from the consultant and as stated in General Conditions of Contract.

9. Award of Contract

After successful Negotiations with the selected Consultant the CE (P) Beacon shall issue letter of award and ask the Consultant to provide Performance Security as in Para 7 above. If negotiations (as per para 6 above) fail or the selected Consultant fail to provide performance security within the prescribed time or the Consultant fail to sign the Contract Agreement within prescribed time the BRO may invite the 2nd highest ranking bidder Consultant for Contract negotiations and follow the procedure outlined in Para 6, 9 and 10 of this Letter of Invitation.

10. Signing of Contract Agreement

After having received the performance security and verified it, the CE (P) Beacon (BRO) shall invite the selected bidder for signing of Contract Agreement on a date and time convenient to both parties within 15 days of receipt of valid Performance Security.

11. The Director General Border Roads shall keep the bidders informed during the entire bidding process and shall host the following information on its website:

i) Notice Inviting Tender (NIT)
ii) Request For Proposal (RFP)
iii) Replies to pre-bid queries, if any
iv) Amendments / corrigendum to RFP

v) List of bidders who submitted the bids up to the deadline of submission
vi) List of bidders who did not pass the eligibility requirements, stating the broad deficiencies
vii) List of bidders who did not pass the Technical Evaluation stating the reasons.
viii) List of bidders along with the technical score, who qualified for opening the financial bid
ix) Final Score of qualified bidders
x) Name of the bidders who is awarded the Contract

12. Confirmation

We would appreciate you informing us by facsimile/e-mail w*hether or not you will submit a proposal.*

Thanking you.

Yours sincerely,

Encl. as above

Dir (EPC)
For DGBR

Annex-1

Details of the stretch proposed for DPR preparation

E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*

S.No.	NH No.	Section	State	Tentative length (in Km)	Tender No.
1	2	3	4	5	6
1.	-	E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*	Jammu & Kashmir	7.000	CE (P)/BEACON/ DPR Consultancy/ 07/2018-19

Signature of contractor For Accepting Officer

Annex-II

Procedure of Awarding Work based on QCBS including Assessment of Least Cost to BRO under Special Circumstances i.e. When a Consultant with a particular team becomes H-1 bidder in more than one package

A Consultant with a particular Team can apply for any number of packages with one team. However, Award of work to a Consultant with "a Particular Team" either as sole or as in JV/Association shall be limited to one package only**.** Following procedure shall be followed for the selection of the most preferred bidder for the consultancy assignment:

1. **At first, Consultants who become H-1 in one package each shall be assigned the respective package.** Then packages in which a Consultant with "a Particular Team" turns out to be the most preferred bidder (H-1) in more than one package shall be considered. In case, a Consultant with "a Particular Team" turns out to be the most preferred bidder (H-1) in more than one package, the package which is to be awarded to this team of a consultant shall be determined on the basis of least cost to BRO the Financial Quote of H-1 bidder and H-2 Bidder limited to those packages which shall be worked out as per procedure illustrated with an example as mentioned below.

2. Suppose there are 8 packages namely Package-1, Package-2, Package -3, Package-4, Package -5, package -6, package-7 and Package-8 respectively. It is also assumed that 10 consultants namely P, Q, R, S, T, U, V, W, X and Y has applied for these packages. It is also assumed that three Consultants namely P, R and U has applied with two Teams and the remaining Consultants have applied with only one team. It is also assumed that the following is the position of various firms after opening of the Financial proposals (and after arithmetic corrections if any of the Financial bids) of the packages and after applying QCBS

	H-1	H-2	H-3	H-4	H-5	H-6
Package no.	Name of Consultants and Financial Quotes (Rs in lakhs)					
Package-1	P (team-1)	Q	W	X	T	Y
	230 lakhs	200 lakhs	240 lakhs	220 lakhs	200 lakhs	230 lakhs
Package-2	V	U(team-1)	X	P (team-2)	T	Y
	240 lakhs	210 lakhs	240 lakhs	220 lakhs	200 lakhs	230 lakhs
Package-3	V	P(team-1)	U(team-1)	R (team-2)	X	Y
	200 lakhs	230 lakhs	250 lakhs	230 lakhs	220 lakhs	200 lakhs
Package-4	R (team-1)	T	U (team-2)	P (team-2)	Y	X
	250 lakhs	220 lakhs	250 lakhs	260 lakhs	220 lakhs	245 lakhs
Package-5	R (team-1)	V	S	U(team-2)	W	T
	220 lakhs	240 lakhs	260 lakhs	250 lakhs	220 lakhs	240 lakhs
Package-6	Q	T	S	P (team-2)	W	U (team-2)
	210 lakhs	240 lakhs	250 lakhs	220 lakhs	200 lakhs	230 lakhs
Package-7	R (team-1)	U (team-1)	Q	S	W	Y
	200 lakhs	220 lakhs	240 lakhs	255 lakhs	230 lakhs	240 lakhs
Package-8	V	R(team-1)	W	S	P (team-1)	Y
	190 lakhs	250 lakhs	220 lakhs	240 lakhs	255 lakhs	240 lakhs

The different packages shall be awarded to consultants as mentioned below

2.1 **Step-1 :**

In this case, Consultants P (team-1) and Q are the H-1 in only one package each namely package-1 and package-6 respectively. Consultant V is H-1 in 3 packages namely Package-2, Package-3 and Package-8 respectively. Consultant R (team-1) is H-1 in 3 packages namely Package-4, Package-5 and Package-7 respectively. Since Consultant P (team-1) is H-1 in Package-1 only and Consultant Qis H-1 in Package-6 only, **Consultant P (team-1) shall be awarded Package-1 and Consultant Q shall be awarded Package-6**.

2.2 **Step-2:**

After **Consultant P (team-1) is awarded Package-1 and Consultant Qis awarded Package-6, the scenario for the remaining 6 packages is as given below** .P (team-1) and Q occurring anywhere else stands deleted as they have already been awarded one work each

	H-1	H-2	H-3	H-4	H-5	H-6
Package No.	Name of Consultants and Financial Quotes (Rs in lakhs)					
Package-2	V	U(team-1)	X	P (team-2)	T	Y
	240 lakhs	210 lakhs	240 lakhs	220 lakhs	200 lakhs	230 lakhs
Package-3	V	U(team-1)	R (team-2)	X	Y	
	200 lakhs	250 lakhs	230 lakhs	220 lakhs	200 lakhs	
Package-4	R (team-1)	T	U (team-2)	P (team-2)	Y	X
	250 lakhs	220 lakhs	250 lakhs	260 lakhs	220 lakhs	245 lakhs
Package-5	R (team-1)	V	S	U (team-2)	W	T
	220 lakhs	240 lakhs	260 lakhs	250 lakhs	220 lakhs	240 lakhs
Package-7	R (team-1)	U (team-1)	S	W	Y	
	200 lakhs	220 lakhs	255 lakhs	230 lakhs	240 lakhs	
Package-8	V	R(team-1)	W	S	Y	
	190 lakhs	250 lakhs	220 lakhs	240 lakhs	240 lakhs	

Consultant V s h a l l be awarded only one package out of the 3 packages for which it is H-1 namely Package-2, Package-3 and Package-8 respectively. Similarly Consultant R (team-1) Shall be awarded only one package out of the 3 packages for which it is H-1 namelyPackage-4, Package-5 and Package-7 respectively. The determination of package to be awarded to Consultant V and Consultant R (team-1) shall be worked out in a single step (i.e. one at a time) .New H-1 for the remaining packages (4 packages) shall be worked out only after determination of packages to be awarded to the H-1 bidders at this stage [i.e. Consultant V and R (Team-1) in the instant case] in one step . Determination of Package to be awarded to each of Consultant V and Consultant R (team-1) shall be worked out as follows

(i) After the award of Package-1 to Consultant –P (team-1) and Package -6 to Consultant –Q and also considering that a Consultant with a particular team can be awarded only one work , **the details of H-1 and H-2 / New H-2 in the remaining 6 packages are as mentioned below .Since V is H-1 in more than one package and shall be awarded one of these packages, V has been deleted from all other packages .Similarly, since R(Team-1) in more than one package and shall be awarded one of these packages, R (Team-1) has been deleted from all other packages.**

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	H-1	H-2 / New H-2	Remarks
Package-2	V	U(team-1)	
	240 lakhs	210 lakhs	
Package-3	V	U(team-1)	Since Consultant P(Team-1) is awarded Package-1, Consultant **U(team-1) becomes the new H-2**
	200 lakhs	250 lakhs	
Package-4	R (team-1)	T	
	250 lakhs	220 lakhs	
Package-5	R (team-1)	S	
	220 lakhs	260 lakhs	
Package-7	R (team-1)	U (team-1)	
	200 lakhs	220 lakhs	
Package-8	V	W	Consultant-R(team-1) has not been considered as H-2 since Consultant –C (team-1) is to be awarded one package out of the packages 4,5 and 7 in which it is H-1. Hence **Consultant – W is the new H-2**
	190 lakhs	220 lakhs	

(ii) Package to be awarded to Consultant –V who is H-1 in three packages namely Package - 2, 3 and 8 respectively shall be determined on the basis of least cost to BRO considering the Financial Quote of H-1 bidder and H-2 Bidder limited to those packages The situation for least cost to BRO shall be when the firm with Consultant **–G is awarded the package for which Financial Bid of second ranked team (H-2) minus Financial Bid of the first ranked team (H-1) is maximum.** The same is illustrated as given below

	H-1	H-2 / New H-2	Financial Bid of H-2/ NewH-2minus Financial Bid of H-1	Remarks
Package-2	V	U(team-1)	210-240 = (-) 30 lakhs	
	240 lakhs	210 lakhs		
Package-3	V	U(team-1)	250 – 200 = **(+) 50 lakhs**	H-2 minus H-1 is Maximum. Hence **Consultant V shall be awarded Package-3**
	200 lakhs	250 lakhs		
Package-8	V	W	220 – 190 = (+) 30 lakhs	

In a similar way, **Package to be awarded to Consultant – R (team-1) who is H-1 in three packages namely Package -4, 5 and 7 respectively shall be determined as illustrated below:**

	H-1	H-2 / New H-2	Financial Bid of H-2/ NewH-2minus Financial Bid of H-1	Remarks
Package-4	R (team-1)	T	220-250 = (-) 30 lakhs	
	250 lakhs	220 lakhs		
Package-5	R (team-1)	S	260 – 220 = **(+) 40 lakhs**	H-2 minus H-1 is **Maximum**. Hence **Consultant – R (team-1) shall be awarded Package- 5**
	220 lakhs	260 lakhs		
Package-7	R (team-1)	U (team-1)	220 – 200 = (+) 20 lakhs	
	200 lakhs	220 lakhs		

2.3 Step-3

(i) **After the award of the above mentioned 4 packages** namely, Package-1 to Consultant–P (team-1), Package -6 to Consultant –Q, Package -3 to Consultant –V, Package -5 to Consultant –R (team-1) and also considering that a Consultant with a particular team can be awarded only one work, **the details of new H-1 and New H-2 in the remaining 4 packages are as mentioned below**

	H-1 (New H-1)	H-2 (New H-2)	Remarks
Package-2	U(team-1)	X	Since Consultant V is awarded Package-3 , **Consultant U (team-1) becomes the new H-1 and Consultant X becomes the new H-2**
	210 lakhs	240 lakhs	
Package-4	T	U (team-2)	Since Consultant -R(team-1) is awarded Package-5 , **Consultant T becomes the new H-1 and Consultant U (team-2) becomes the new H-2**
	220 lakhs	240 lakhs	
Package-7	U (team-1)	S	Since Consultant R(team-1) is awarded Package-5 , **Consultant U (team-1) becomes the new H-1 and Consultant S becomes the new H-2**
	220 lakhs	255 lakhs	
Package-8	W	S	Since Consultant V is awarded Package-3 , **Consultant W becomes the new H-1 and Consultant S becomes the new H-2**
	220 lakhs	240 lakhs	

(ii) Consultant T is the new H-1 for only one package namely Package-4. Similarly Consultant W is the new H-1 for only one package namely Package-8. Accordingly **Package - 8 shall be awarded to Consultant–W** and **Package -4 shall be awarded to Consultant–T.**

2.4 Step-4:

Consultant U (team-1) is the new H-1 for package- 2 and Package-7 respectively and Consultant U (team-1) shall be awarded only one package out of this 2 packages. Package **to be awarded to Consultant –U (team-1) shall be determined as illustrated below**

	H-1	H-2 / New H-2	Financial Bid of H-2/ NewH-2minus Financial Bid of H-1	Remarks
Package-2	U(team-1) 210 lakhs	X 240 lakhs	240-210 = (+) 30 lakhs	
Package-7	U (team-1) 220 lakhs	S 255 lakhs	255 – 220 = **(+) 35 lakhs**	H-2 minus H-1 is Maximum. Hence **Consultant – U (team-1) shall be awarded Package- 7**

2.5 Step-5 :

(i) After the award of the above mentioned 7 packages namely, Package-1 to Consultant –P (team-1) , Package -6 to Consultant –Q, Package -3 to Consultant –V , Package -5 to Consultant –R (team-1), Package-4 to Consultant -T, Package -8 to Consultant-W, package -7 to Consultant –U (team-1) team and also considering that a Consultant with a particular team can be awarded only one work , **the details of new H-1 and / New H-2 in the remaining package i.e. package -2 is as mentioned below**

	H-1 (New H-1)	H-2 (New H-2)	Remarks
Package-2	X 240 lakhs	A (team-2) 220 lakhs	Since Consultant V is awarded Package-3 and **Consultant U (team-1) is awarded package- 7 , Consultant X becomes the new H-1 and Consultant P(team-2) becomes the new H-2**

(ii) Consultant X is the new H-1 for only one package namely Package-2. Accordingly, **Package -2 shall be awarded to Consultant –X**.

3. Thus as per the above mentioned procedure **the 8 packages are awarded to the following Consultant at the Financial Quoted (after arithmetic Corrections) by them for the respective packages**

Signature of contractor For Accepting Officer

Package No.	Name of Consultants awarded packages
Package-1	Consultant- P (team-1)
Package-2	Consultant- X
Package-3	Consultant- V
Package-4	Consultant- T
Package-5	Consultant- R (team-1)
Package-6	Consultant- Q
Package-7	Consultant- U (team-1)
Package-8	Consultant- W

Signature of contractor For Accepting Officer

DATA SHEET

1. (References to corresponding paragraphs of LOI are mentioned alongside)
The Name of the Assignment and description of project as mentioned in Annex-I (Ref. Para 1.1)

(The Name of project and Package No. should be indicated in the format given in the technical proposal)

2. **The name of the Client is** : The Chief Engineer
Project Beacon
Rangret, opposite SIDCO
Distt – Badgam (J&K)
Pin - 190007

3. **Duration of the Project** – 24 months

4. **Date, Time and Venue of Pre-Proposal Conference**

Date: 16 Oct 2018

Time: 10:00 Hrs
Venue: HQ DGBR
Seema Sadak Bhawan
Ring Road, Delhi Cantt
Delhi - 110010
Ph. 011-25686846

5. **The Documents are**:

i. Appendix-I:	Terms of Reference (TOR)
ii. Appendix-II	Formats for Proof of Eligibility
iii. Appendix-III:	Formats for Technical Proposal
iv. Appendix-IV:	Formats for Financial Proposal
v. Appendix -VI	Draft Contract Agreement

(Ref. Para 2.1)

6. **Bid Security: Rs 2.00 Lakhs** **(Ref Para 1.10)**

7. **Tax and Insurance** (Ref. Para 3.3.2)

(i). The Consultants and their personnel shall pay all taxes (including GST), custom duties, fees, levies and other impositions levied under the laws prevailing seven days before the last date of submission of the bids. The effects of any increase / decrease of any type of taxes levied by the Government shall be borne by the Client / Consultant, as appropriate.

(ii). Limitations of the Consultant's Liability towards the BRO shall be as per Clause3.4 of Draft Contract Agreement.

(iii). The risk and coverage shall be as per Clause 3.5 of Draft Contract Agreement

8. The number of copies of the proposal required to be submitted: 1 no. (ref. para 4.1)

The address is ---(Ref. para 4.2)

HQ DGBR (EPC Cell)
Seema Sadak Bhawan
Ring Road, Delhi Cantt
Delhi - 110010
Ph. 011-25686846
E-Mail : bro-direpc@gov.in

The envelopes must be clearly marked:

i) Original Proposal;
ii) Documents in proof of eligibility and technical proposal as appropriate; and,
iii) Do not open, except in presence of the evaluation committee on the outer envelope.
iv) Tender No. :----------
v) Project Name: ----------
vi) Name and Address of Consultant

The date, time and Address of proposal submission are

Date	**09 Nov 2018**
Time	**12:00 Hrs**
Address	**HQ DGBR (EPC Cell), Seema Sadak Bhawan, Ring Road, Delhi Cantt** Pin : 110010

11. Proposal Validity period (Number of days): 120 days

12. Evaluation criteria: (Ref Table 1 Para 3,5,12.2,12.3 & 12.4)

12.1 First stage evaluation – eligibility requirement. (Ref Para 3.1& 5.1)

Table-1: Minimum Eligibility Requirements

S.No.	Minimum experience and performance of Preparation of DPR of Tunnel related to Road/Rail/Metro in the last 10 years (for past performance attach undertaking for any litigation history/ and arbitration).	Annual average turnover
1.	Firm applying should have prepared DPR for at least one project of Tunnel related to Road/Rail/Metro of minimum 60% of the indicative length(i.e. 4.20 km Road/Rail/Metro tunnels)	Annual average turnover for last 3 years of the firm should be equal to or more than **Rs.15.00 Crores.**

Note: The experience of a firm in preparation of DPR for a private concessionaire/contractor shall be considered only if the experience certificate is authenticated by the concerned competent Government department/ Authority.

i) The sole applicant shall fulfill all the requirements given in Table-1.

(ii) In case of JV, the Lead Partner should fulfill at least 75% of all eligibility requirements and the other partner shall fulfill at least 50%of all eligibility requirements.

(iii) If the applicant firm has / have prepared the DPR/FS projects solely on its own, 100%weightage shall be given. If the applicant firm has prepared the DPR/FS projects as a lead partner in a JV, 75% weightage shall be given. If the applicant firm have prepared the DPR projects as the other partner (not lead partner) in a JV 50% weightage shall be given. If the applicant firm have prepared the DPR/FS projects as an associate, 25% weightage shall be given.

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12.2 Second stage technical evaluation (Refer 5.2)

S.No.	Description	Points
1	Firm's relevant experience in last 10 years	30
2	Adequacy of approach and methodology	**20**
3	Material testing, survey & investigation, equipment and software proposed to be used	0
4	Qualification and relevant experience of the proposed key personnel	50
	Total	**100**

Further break-up of each criteria has been detailed out below:

A. Firm's relevant experience in last 10 years

For standard highways, the following is the break-up: **Deleted**

As tunnel projects require specialized capabilities and skill sets, the following is the break-up:

S.No	Description	Maximum Points	Sub-Points
1	**Specific experience of the DPR consultancy related to the assignment for eligibility**	**10**	
1.1	**Aggregate Length of DPR / Feasibility study of Road/Rail/Metro Tunnel projects**	**15**	
1.1.1	More than 60% the indicative Length of the package applied for		7.50
1.1.2	More than the indicative Length of the package applied for		10.00
1.1.3	More than 2 times the indicative length of the package applied for		12.50
1.1.4	More than 3 times the indicative length of the package applied for		15.00

S.No	Description	Maximum Points	Sub-Points
2	**DPR of Bridge having length more than 200 m**	**Deleted**	
2.1	1 bridge		
2.2	2 bridges		
2.3	3 bridges		
2.4	4 or more bridges		
3	**Specific experience of firms in terms of turnover**	**4**	
3.1	Firm's Average Turnover of last 5 years >= 30 crore		4
3.2	Firm Average Turnover of last 5 years > = 15 crore but < 30 crore		3
3.3	Firm Average Turnover of last 5 years < 15 crore		0
4	**DPR for Road/Rail/Metro Tunnel projects**	**Deleted**	
4.1	1 project		
4.2	2 projects		
4.3	3 projects		
4.4	4 projects		
4.5	5 or more projects		
5	**AEM Survey of min. area of 20 Sq.Km. and depth more than 400 M**	**5**	
	1 project		1.50
	2 projects		3.00
	3 or more projects		5.00
6	**Vertical/Inclined drilling including sampling >1200 m in One project**	**6**	
	1 project		2
	2 projects		4
	3 or more projects		6

Note: In case feasibility study is a part of DPR services the experience shall be counted in DPR only. In case bridge is included as part of DPR of highway the experience will be (1) and (2).

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B. Adequacy of approach and methodology – Submit a proposal in details bringing out methodology proposed to be followed the bidder for preparing the DPR.

S. No.	Description				Max points
(i)	Site Appreciation				5
(ii)	Comments on TOR				5
(iii)	Team Composition and Task assignment				5
(iv)	Methodology				5
	Total Points				**20**
	Rating given below shall be applicable on all above				
	Below Average.	Average	Good	Excellent	
	50%	75%	90%	100%	

C. Material testing, survey and investigation, equipment and software proposed to be used - Deleted

D. Qualification and relevant experience of the proposed key personnel

The weightage for various key staff is as under:

S.No	Key personnel	Points
1	Team Leader Cum Senior Tunnel Engineer	15
2	Tunnel Design Expert	10
3	Senior Geo-Physicist	05
4	Senior Geo Technical Engineer	05
5	Senior Geologist	05
6	Ventilation/Lightening Expert (Senior E/M Expert)	05
7	Environmental Expert	05
	Total	**50**

The number of points assigned during the evaluation of qualification and competence of key staff are as given below:

S.No	Description	Maximum Points	Sub-Points
1	**General Qualification**	**25**	
1.1	Essential education qualification		20
1.2	Desirable education qualification		5
2	**Relevant experience and adequacy for the project**	**65**	
3	**Employment with the Firm**	**10**	
3.1	Less than 1 year		0
3.2	1 year to 2 years		5
3.3	> 2 years		10

12.3 Detailed evaluation criteria which is to be used for evaluation of technical bids is as indicated at Appendix-V.

The Consultant should carryout self-evaluation based on the evaluation criteria at Appendix-V. While submitting the self-evaluation along with bid, Consultant shall make references to the documents submitted in their proposal which have been relied upon in self-evaluation.

Result of technical evaluation shall be made available to the bidders through e-mail and giving opportunity to the bidders to respond within 7 days in case they have any objection

12.4 Third stage – Evaluation of Financial proposal

Financial Proposals of all Qualified Consultants in accordance with clause 5.2 and 5.3 of Letter of Invitation shall be opened.

The consultancy services will be awarded to the consultant scoring highest marks in combined evaluation of Technical and Financial proposals in accordance with clause 1.3 and 5.4 hereof.

The Factors are:

The weight given to Technical Proposal (T) = 0.80

The weight given to Financial Proposal (f) = 0.20

13. The common currency is **"Indian Rupee".** (Ref. Para 3.3.3)

Consultant has to quote in Rupees both for domestic Consultant as well as Foreign Consultants

Commencement of Assignment (Date, Location): The Consultants shall commence the Services within fifteen days of the date of effectiveness of the contract at locations as required for the project stretch stated in TOR. (Ref. Para 1.2 of LOI and 2.3 of GCC/SC)

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APPENDIX I

TERMS OF REFERENCE (TOR) FOR CONSULTANCY SERVICES FOR "*ENGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*".

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Terms of Reference for Consultancy Services (TOR)

1. General

1.1 The Director General Border Roads has been entrusted with the assignment of "E*ngaging Technical Consultant for preparation of feasibility study (FS) and detailed project report (DPR) for construction of Highway Tunnel including approach road across Chattergala, approximately in between km 114.00 and km 151.00 on Basoli-Bani-Bhaderwah road under project Beacon in J & K State*". The Director General Border Roads now invites proposal from Technical consultants for carrying out detailed project report as per details given in **Annexure-1.**

1.2 CE (P) Beacon will be the employer and executing agency for the consultancy services and the standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed time schedule.

1.3 The Selected Consultancy firm shall prepare and submit Detailed Project Report (DPR) for the Tunnel along with Approach Road separately.

2. Objective

2.1 The main objective of the consultancy service is to prepare detailed project report for Construction of Tunnel along with the approach Roads, with a aim to construct/provide all weather roads across Chattergala Pass. The approach roads would be of 4/2-lane plus paved shoulders configuration based on the approved tunnel alignment & configuration. The above said project site locations are Avalanche and landslide prone and Hence, Avalanche Protection works and slope stabilization measures are required to be provided to make it all weather road. The consultants are required to undertake detailed study in this regard in consultation with Snow and Avalanche Study Establishment (SASE) and other Authorities working in the region. The selected Consultant is required to establish the technical, economical, and financial viability of the project and prepare Detailed Project Report for development and construction of Project Tunnel and their approach roads.

2.2 The viability of the project shall be established taking into account the requirements with regard to construction of project tunnel as per Annexure-I based on Tunnel alignment & design, approach roads highway pavement design, avalanche protection measures, provision of service roads wherever necessary, type of intersections, rehabilitation and widening of existing and/or construction of new bridges and structures, Tunnel/road safety features, quantities of various items of works, cost estimates alongwith economic analysis.

2.3 The preparation of Detailed Project Reports would inter-alia include

(a). Information Study and Conceptual Planning.
(b). Site Reconnaissance and Surveys including AEM survey.
(c). Alignment Finalisation, Geometric Requirements and Constructability.
(d). Subsurface Investigations
(e) Seismicity study and Design.
(f). Environmental Studies.
(g). Geospatial Data Management
(h). Geotechnical Reports

Planning for a road tunnel requires multi-disciplinary involvement and assessments, and generally adopt the same standards as for surface roads and bridge options, with some exceptions. Certain considerations, such as lighting, ventilation, life safety, operation and maintenance, etc must be addressed specifically. In addition to the capital construction cost, a life cycle cost analysis should be performed taking into account the life expectancy of 120 years for a tunnel.

2.4 The DPR consultant should ensure detailed project preparation incorporating aspects of value engineering, quality audit and safety audit requirement in design and implementation. The DPR Consultant should give a certificate in the DPR that they have addressed the safety related concern with inputs from the road safety expert (to be named).

2.5 The consultant should, along with Feasibility Report, clearly bring out through financial analysis the preferred mode of implementation on which the Tunnel Construction Works along with approaches are to be taken up. The consultant should also give cost estimates along with Feasibility Report/ Detailed Project Report.

2.6 If at feasibility stage, employer desire to terminate the contract, the contract will be terminated after payment up to that stage.

3. Scope of Services for Tunnel

3.1 The early investigations for planning and feasibility studies can be confined to information studies and preliminary reconnaissance. Geological mapping and minimum subsurface investigations are typically required for EIS, alternative studies and conceptual design. EIS studies may also include limited topographical and environmental investigations to identify potential "fatal flaws" that might stop the project at a later date. A substantial portion of the geotechnical investigation effort should go into the Preliminary Design Phase to refine the tunnel alignment and profile once the general corridor is selected, and to provide the detailed information needed for design. As the final design progresses, additional test borings might be required for fuller coverage of the final alignment and for selected shaft and portal locations. Lastly, depending on the tunneling method selected, additional investigations may be required to confirm design assumptions, or to provide information for contractor design of temporary works. Figure 3-2 illustrates the flow process of the phases of investigations.

3.2 Deleted

3.3 INFORMATION STUDY & CONCEPTUAL PLANNING

3.3.1 The first phase of an planning & investigation program for a road tunnel project starts with collection and review of available information to develop an overall understanding of the site conditions and constraints to identify existing conditions and features that may impact the design and construction of the proposed tunnel, and can guide in planning the scope and details of the subsurface investigation program. Published topographical, hydrological, geological, geotechnical, environmental, zoning, and other information must be collected, organized and evaluated. Historical seismic records, records of Avalanches & landslides caused by earthquakes, documented by SASE and other Government Agencies be analyzed to avoid locating tunnel portals and shafts at these potentially unstable areas.

3.3.2 TOPOGRAPHICAL DATA

Topographic maps and aerial photographs useful in showing terrain and geologic features (i.e., faults, drainage channels, sinkholes, etc.) when overlapped with published geological maps can often, by interpretation, show geologic structures. Aerial photographs taken on different dates can be used to reveal the site history in terms of Avalanches, erosion and scouring, past construction, etc. Survey of India's topographic maps may be used for preliminary route selection and defining the Project Corridor Influence Area. However, after the project corridor has been defined, new aerial photography should be obtained and photogrammetric maps should be prepared to facilitate portal and shaft design, site access, right-of-way, drainage, depth of cover, geologic interpretation and other studies.

3.4 SITE RECONNAISSANCE AND SURVEYS INCLUDING AEM SURVEY

3.4.1 Site Reconnaissance and Preliminary Surveys

Available contour maps published by Survey of India or online available contour mapping are sufficient only for initial planning purposes. A preliminary survey will be needed for concept development and preliminary design to expand existing topographical data and include data from field surveys and an initial site reconnaissance. Initial on-site studies should start with a careful reconnaissance over the tunnel alignment, paying particular attention to the potential portal and shaft locations. Features identified on maps and air photos should be verified. Rock outcrops, often exposed along the existing highway and other locations, provide a source for information about rock mass fracturing and bedding and the location of rock type boundaries, faults, dikes, and other geologic features. Features identified during the site reconnaissance should be photographed, documented and if feasible located by hand-held GPS equipment.

The reconnaissance should cover the immediate project vicinity, as well as a larger regional area so that regional geologic, hydrologic and seismic influences can be accounted for. A preliminary horizontal and vertical control survey may be required to obtain general site data for route selection and for design.

3.4.2 Airborne Electro-Magnetic (AEM) Survey

The purpose of electromagnetic (EM) methods is to delineate the subsurface resistivity distribution. It measures the distortion of the EM field which is caused by local changes of the electrical resistivity. The AEM Survey preferably be carried out using dual transmitter mode configuration with a low moment (LM) and a high moment (HM) with a stronger peak moment, capable of a good trade-off between near surface resolution starting at 5 to 10 m and sufficient depth of investigation down to 400 to 800 m. The AEM survey shall be carried out in a width of approx. 1000m (i.e. 500 M on both side of initial proposed alignment) for the entire proposed tunnel length.

The airborne survey crew shall include a senior geophysicist, assisted by the project manager, a geophysicist and a field technician. A detailed risk assessment and safe job analysis shall be performed before starting the airborne survey work.

It may be noted that the high altitude and wind condition might prevent the survey for few days. Preliminary data will be presented and discussed on site with the authority.

3.4.2.1 Processing method

Processing of the electromagnetic, magnetic, and GPS data shall start immediately after completion of the survey. The DGPS systems are to be used for time stamping, positioning, and correlation of the EM and magnetic datasets.

The raw data processing consists of:

- Import of the raw voltage with navigation data and automatic conversion to the local UTM coordinate system;
- Removal of tree top reflections from the altitude data;
- Editing outliers and areas with poor signal to noise level;
- Couplings due to man-made structures are removed and checked manually.

The inversion procedure shall consist of:

A preliminary inversion using smooth models and Laterally Constrained Inversion (LCI) methodology. Noisy data, which have not been culled during data processing and which cannot be fitted are removed ; An intermediate and a final inversion using a 3D model or SCI preferably with (usually) a discrete number of layers.

The inversion results can be visualized in several ways. One way involves creating maps over the investigation area that depict mean resistivity in a certain depth or elevation interval. If viewed successively, these slices show how resistivity changes with depth in the investigation area. Resistivity-depth sections shall also be extracted from the inverted data along profiles.
Ultimately, individual resistivities can be interpreted as different geological units (i.e. bedrock topography). Conductive areas can be distinguished from less conductive areas. Additional geological or geophysical surface data required for reliable interpretation must be obtained.

3.4.2.2 Interpretation and Extraction of Geological Models

The maps and vertical sections shall be interpreted by a team of geophysicist, geologists and geotechnicians. Correlation between the resistivity models and borehole logs can provide potential extend of weakness zones. Requirements and Positions for further subsurface investigations with ‘Vertical and Inclined Coring’ and ‘Horizontal and Directional Coring’ shall be recommended based on AEM results.

As a result of the interpretation, based on a better understanding of the resistivity response to the regional geological setting, geophysicists shall extract meaningful geological units from the resistivity models. These resistivity 3D models shall be translated into usable geological models in a format that is the most efficient, potentially in 3D.

3.5 ALIGNMENT FINALISATION, GEOMETRIC REQUIREMENTS AND CONSTRUCTIBILTY

3.5.1 Finalisation of Alignment and Portal Locations

Based on geological models developed as a result of AEM Survey, the Consultant Shall suggest the most viable, economical alignment after carrying out Risk Assessment.

3.5.2 Topographic data compilation

After finalisation of Alignment and Portal location, detailed topographic maps, plans and profiles must be developed to establish primary control for final design and construction based on a high order horizontal and vertical control field survey. As on a road tunnel system, centerline of the roadway and centerline of tunnel may not identical because of clearance requirements for walkways and emergency passages, A tunnel centerline developed during design should be composed of tangent, circular, and transition spiral sections that approximate the complex theoretical tunnel centerline within a specified tolerance. This centerline should be incorporated into the drawings of the tunnel, and all tunnel control should be based on this centerline.

Topographical survey and mapping, structural and stratographical maps, Isopak maps, preparation of cross sections. (Quantum of Survey shall be as per relevant Indian standard (IS Code) or international Code (S) for high way Tunnels)

Ground marking of alignment and report on tentative tunnel alignment, section, grade, portal positions and finding altitude and grid reference of the portal

3.5.3 Geometric Design and Constructability Cross Section

3.5.3.1 A road tunnel cross section must be able to accommodate the horizontal and vertical traffic clearances, as well as the other required elements. The typical cross section elements include:

- Travel lanes
- Shoulders
- Sidewalks/Curbs
- Tunnel drainage
- Tunnel ventilation
- Tunnel lighting
- Tunnel utilities and power
- Water supply pipes for firefighting
- Cabinets for hose reels and fire extinguishers
- Signals and signs above roadway lanes
- CCTV surveillance cameras
- Emergency telephones
- Communication antennae/equipment
- Monitoring equipment of noxious emissions and visibility

Life Safety

Emergency egress illuminated signs at low level (so that they are visible in case of a fire or smoke condition)

Additional elements conforming to IRC SP 91and other standards may also be needed under certain design requirements and should be taken into consideration when developing the tunnel geometrical configuration.

3.5.3.2 HORIZONTAL AND VERTICAL ALIGNMENTS

Planning and design of road tunnel alignments must consider Maximum grade, horizontal and vertical curves, and other requirement/constraints for road tunnel

3.5.3.3 MAXIMUM GRADES

Road tunnel grades should be evaluated on the basis of driver comfort while striving to reach a point of economic balance between construction costs and operating and maintenance expenses. Maximum effective grades in main roadway tunnels preferably should not exceed 3% as per IRC SP-91.

3.5.3.4 HORIZONTAL AND VERTICAL CURVES

Horizontal and vertical curves shall satisfy IRC's geometrical requirements. The horizontal alignment for a road tunnel should be as short as practical and maintain as much of the tunnel length on tangent as possible, which will limit the numbers of curves, minimize the length and improve operating efficiency. When horizontal curves are needed, the minimum acceptable horizontal radii should consider traffic speed, sight distances, and the super-elevation provided.

3.5.3.5 SIGHT AND BRAKING DISTANCE REQUIREMENTS

Sight and braking distance requirements cannot be relaxed in tunnels. When designing a tunnel with extreme curvature, sight distance should be carefully examined; otherwise it may result in limited stopping sight distance.

3.5.3.6 TUNNEL CONFIGURATION

Based on the traffic studies and safety requirement, the consultant shall suggest the Tunnel Configuration including cross section of main and egress tunnel as applicable.

3.5.3.7 TRAVEL CLEARANCE PROFILE (TCP)

Clearance profile of all potential vehicles traversing the tunnel shall be established using dynamic vehicle envelopes which consider not just the maximum allowable static envelope, but also other dynamic factors such as bouncing, suspension failure, overhang on curves, lateral motion, resurfacing, etc. The clearance profile should take into consideration potential future vehicle heights, vehicle mounting on curbs, construction tolerances, and any potential ground and structure settlement. Ventilation equipment, lighting, guide signs, and other equipment should not encroach within the clearance profile. Vertical clearance should be selected as per IRC's recommendations. The vertical clearance shall also take into consideration for future resurfacing of the roadway once. Consideration should also be given for potential truck mounting on the barrier in the tunnel or on low sidewalk and measures shall be used to prevent such mounting from damaging the tunnel ceiling or tunnel system components mounted on the ceiling or the walls.

3.6 SUB-SURFACE INVESTIGATION

Subsurface investigation is the most important type of investigations to obtain ground conditions, as it is the principal means for:

- Defining the subsurface profile (i.e. stratigraphy, structure, and principal soil and rock types)
- Determining soil and rock material properties and mass characteristics;
- Identify geological anomalies, fault zones and other hazards (squeezing soils, methane gas, etc.)
- Defining hydrogeological conditions (groundwater levels, aquifers, hydrostatic pressures, etc.); and
- Identifying potential construction risks.

Subsurface investigations will involve borings, sampling, in situ testing, geophysical investigations, and laboratory material testing. These investigations shall provide factual information about the distribution and engineering characteristics of soil, rock and groundwater at a site, allowing an economical design, determining a reliable construction cost estimate, and reducing the risks of construction.

Induction of a complete drilling equipment and complete set of accessories including water pumps etc. required for the job at the tunnel site (bore hole location) in good serviceable condition for the first time and induction of directional coring equipment in any length along the proposed directional coring trajectory including its de-induction after completion of all works.

Shifting of a complete drilling equipment and complete set of accessories including water pumps etc. required for the job from one bore hole location to the other at proposed tunnel site

Notes:

1. Core recovery in bed rock portions shall not be less than 80% for hard rock in general. However the percentage of core-recovery may vary with the type of rock encountered for which the minimum percent recovery will be guided by relevant code provisions. Drilling activity to includes the followings:-

a) Boring holes and carrying out all relevant tests for ascertaining rock properties. This includes geological logging, electrical logging, geothermal logging and Geohydrological logging of bore holes.

b) Determination of in situ stress field by over coring methods or any other techniques available such as hydro-fracture technique.

c) Water percolation tests are to be conducted in the hole at ground level, at every six metre depth intervals, at proposed tunnel grade level and at the junction of different lithological strata at three different pressures as per relevant IS Codes.

d) Any deviation of holes from verticality is to be actually measured accurately and reflected.

2 (a) Bore hole locations and their depths are indicated as guide lines only. Final locations, their dimensions, choice of field tests and their interval, choice of drilling equipment, establishing the correct procedure for drilling, sampling and field tests including any additional holes are to be suitably modified with approval of department.

2(b) The report is to bring out clearly the technical and other problems that may be encountered during the construction and maintenance of the tunnel and also clear recommendations regarding the feasibility of the tunnel in the prevailing conditions. Final portal locations, tunnel sections and geometrics to be defined in this report.

2 (c) Preliminary indications of cost of the tunnel project and the time involved for the construction to be indicated. In short, report should be self explanatory to enable the department to take a decision regarding feasibility of the tunnel, expertise available within the country for construction and preliminary costs for purposes of getting Administrative Approval for the works. This report should also bring out other detailed studies involved at pre-construction stage, construction stage and post construction stage.

3.6.1 VERTICAL AND INCLINED TEST BORINGS

Vertical and inclined test borings and soil/rock sampling are key elements of any subsurface investigations for underground projects. The location, depth, sample types and sampling intervals for each test boring must be finalised based on geological models developed after AEM survey. In general, borings should be extended to at least 1.5 tunnel diameters below the proposed tunnel invert. However, if there is uncertainty regarding the final profile of the tunnel, the borings should extend at least two or three times the tunnel diameter below the preliminary tunnel invert level.

Drilling vertical holes (core drilling) one at each portal sites & at distances as laid down in IRC:SP:91 between portal measured along the proposed tunnel alignment from any portal end down to the tunnel grade (preferably at or near the junction of different lithological strata) which may involved diamond drilling using NX-Bits to the extent of 400 metres for an individual hole. Additional holes if required in this area shall be undertaken by BX- Bits, if unavoidable, will be resorted to only with prior approval of the department.

Drilling 04 vertical boreholes of approx 400 m depth up to tunnel grade along the alignment at suitable locations and Drilling four (4) Inclined holes (core drilling)at an angle of 30 degrees (Approx) with vertical , one at 50 mtr distance& another at 100 mtr distance from each portal sites measured along the proposed Tunnel alignment or as required, down to the tunnel grade as specified in IRC:SP:91 which may involve diamond drilling using NX-Bits to the extent of 400 meters for an individual hole. The inclined drill holes must intersect the proposed tunnels cross section at tunnel grade level (IRC:SP:91) .Additional holes if required in this area shall be under taken . BX- Bits, if unavoidable, will be resorted to only with prior approval of the department.

3.6.2 HORIZONTAL AND DIRECTIONAL CORING

Horizontal boreholes along tunnel alignments provide a continuous record of ground conditions and information which is directly relevant to the tunnel alignment. The location, length and sample types along the tunnel alignment must be finalised based on geological models developed after AEM survey.

3.6.3 SAMPLING – ROCK CORE

In rock, continuous rock core should be obtained below the surface of rock. Double and triple tube core barrels should be used to obtain higher quality core more representative of the in situ rock. For deeper holes, coring should be performed with the use of wire-line drilling equipment to further reduce potential degradation of the recovered core samples. Boring shall be carried out using at least Nx size coring bits. Core runs should be limited to a maximum length of 3 M in moderate to good quality rock, and 2 M in poor quality rock. The rock should be logged soon after it was extracted from the core barrel. Following information is to be noted for each core run on the rock coring logs:

- Depth of core run
- Core recovery in length and percent
- Rock Quality Designation (RQD) percent
- Rock type, including color texture, degree of weathering and hardness
- Character of discontinuities, joint spacing, orientation, roughness and alteration
- Nature of joint infilling materials.

In addition, drilling parameters, such as type of drilling equipment, core barrel and casing size, drilling rate, and groundwater level logged in the field shall also be recorded. Acoustic bore hole televiewers will be used while drilling.

3.6.4 BOREHOLE SEALING

All borings should be properly sealed at the completion of the field exploration, if not intended to be used as monitoring wells. This is typically required for safety considerations and to prevent cross contamination of soil strata and groundwater.

3.6.5 TEST PITS

Test pits are to be excavated to investigate the shallow presence, location and depth of existing utilities, structure foundations, top of bedrock and other underground features that may interfere or be impacted by the construction of shafts, portals and tunnels. The excavation pits are to be backfilled with excavation spoil, and the backfill is compacted to avoid excessive future settlement. Tampers and rollers may be used to facilitate compaction of the backfill.

3.6.6 SOIL AND ROCK IDENTIFICATION AND CLASSIFICATION

3.6.6.1 SOIL IDENTIFICATION AND CLASSIFICATION

Distinguish between visual identification and classification is important to minimize conflicts between general visual identification of soil samples in the field versus a more precise laboratory evaluation supported by index tests. The field classification of soil for a tunnel project shall be similar to that for other geotechnical applications except that special attention must be given to accurately defining and documenting soil grain size characteristics and stratification features since these properties may have greater influence on the ground and groundwater behavior during tunneling than they may have on other types of construction, such as for foundations, embankments and cuts.

Items of particular importance to tunnel projects which greatly influence ground behaviour and groundwater inflow during construction, and the selection of the tunneling equipment and methods are listed below:

- Groundwater levels (general and perched levels), ground permeability (loss of drilling fluid; rise or drop in borehole water level; etc.), and artesian conditions
- Consistency and strength of cohesive soils
- Composition, gradation and density of cohesionless soils
- Presence of lenses and layers of higher permeability soils
- Presence of gravel, cobbles and boulders, and potential for nested boulders
- Maximum cobble/boulder size from coring and/or large diameter borings (and also based on understanding of local geology), and the unconfined compressive strength of cobbles/boulders (from field index tests and laboratory testing of recovered samples)
- Presence of cemented soils
- Presence of contaminated soil or groundwater.

3.6.6.2 ROCK IDENTIFICATION AND CLASSIFICATION

In rock, rock mass characteristics and discontinuities typically have a much greater influence on ground behavior during tunneling and on tunnel loading than the intact rock properties. Therefore, rock classification needs to be focused on rock mass characteristics, as well as its origin and intact properties. Special intact properties are important for tunneling application particularly for selecting rock cutters for tunnel boring machines and other types of rock excavators, and to predict cutter wear. Typical items included in describing general rock lithology include:

- General rock type
- Color
- Grain size and shape
- Texture (stratification, foliation, etc.)
- Mineral composition
- Hardness
- Abrasivity
- Strength
- Weathering and alteration.

Rock discontinuity descriptions to be noted in rock classification include:

- Predominant joint sets (with strike and dip orientations)
- Joint roughness
- Joint persistence
- Joint spacing
- Joint weathering and infilling

Other information typically noted during subsurface rock investigations include:

- Presence of faults or shear zones
- Presence of intrusive material (volcanic dikes and sills)
- Presence of voids (solution cavities, lava tubes, etc.)
- Groundwater levels, and evidence of rock mass permeability (loss of drilling fluid; rise or drop in borehole water level; etc.)

Method of describing discontinuities of rock masses is in accordance with International Society of Rock Mechanics (ISRM)'s "Suggested Method of Quantitative Description of Discontinuities of Rock Masses" (ISRM 1981). Index properties obtained from inspection of the recovered rock core include core recovery (i.e., the recovered core length expressed as a percentage of the total core run length), and Rock Quality Designation or RQD (the combined length of all sound and intact core segments equal to or greater than 4 inches in length, expressed as a percentage of the total core run length). Often, materials encountered during subsurface investigations represent a transitional (intermediate) material formed by the in place weathering of rock. Such conditions may sometimes present a complex condition with no clear boundaries between the different materials encountered. Tunneling through the intermediate geomaterial (IGM), in some cases referred as mixed-face condition, can be extremely difficult especially when groundwater is present. In the areas where tunnel alignment must cross this transition zone, the subsurface investigation is conducted much as for rock, and when possible cores are retrieved and classified, and representative intact pieces of rock should be tested.

3.6.6.3 PRESERVATION OF CORE SAMPLES

It is desirable to preserve the rock cores retrieved from the field properly for years until the construction is completed and disputes/claims are settled. The rock cores are to photographed and preserved in core boxes for review by designers and contractors.

3.6.6.4 GEOTECHNICAL REPORTS:

Preparation of a Geological and Geotechnical Interpretative Report (GIR) which includes a detailed analysis and interpretation of data contained in the above mentioned geological and Geotechnical Factual Report (GFR) culminating in the development of a final geological model of the ground within the route corridor based on the AEM Survey, Horizontal Directional Coring, and vertical and inclined coring. This final geological model will be created on the basis of direct interference from surface mapping, groundwater chemical studies, petro-graphical studies, and mineralogical studies as well as the reasonable and appropriate extrapolating of the geology and structures from the results of surface mapping.

Based on the final geological model, geotechnical hazards shall be identified and characterized allowing the review of selected alignment, if needed the alignment can be modified and frozen.

The final geological model will be presented in the form of a geological longitudinal section (A1 size) clearly demarcating the various interred lithological boundaries and ground types along the alignment, the groundwater conditions permeability and relevant structural information such as the width of fault zones, shear zones and lineaments/discontinuities with attitude and orientation.

3.7 ENVIRONMENTAL ISSUES

Although tunnels are generally considered environmentally-friendly structures, certain short-term environmental impacts during construction are unavoidable. Long-term impacts from the tunnel itself, and from portals, vent shafts and approaches on local communities, historic sites, wetlands, and other aesthetically, environmentally, and ecologically sensitive areas must be identified and investigated thoroughly during the project planning and feasibility stages, and appropriately addressed in environmental studies and design. The specific environmental data needed for a particular underground project very much depend on the geologic and geographic environment and the functional requirement of the underground facility. Some common issues can be stated, however, and are identified below in the form of a checklist:

- Existing infrastructure, and obstacles underground and above
- Surface structures within area of influence
- Land ownership and uses (public and private)
- Ecosystem habitat impacts
- Contaminated ground or groundwater
- Long-term impacts to groundwater levels, aquifers and water quality
- Control of runoff and erosion during construction
- Naturally gassy ground, or groundwater with deleterious chemistry
- Access constraints for potential work sites and transport routes
- Sites for muck transport and disposal
- Noise and vibrations from construction operations, and from future traffic at approaches to the completed tunnel

- Air quality during construction, and at portals, vent shafts and approaches of the completed tunnel
- Maintenance of vehicular traffic and transit lines during construction
- Maintenance of utilities and other existing facilities during construction
- Access to residential and commercial properties
- Pest control during construction
- Long-term community impacts
- Long-term traffic impacts
- Temporary and permanent easements
- Tunnel fire life safety and security
- Legal and environmental constraints, enumerated in environmental statements or reports, or elsewhere. Environmental Impact Assessment, Environmental Management Plan and Rehabilitation and Resettlement Studies shall be carried out by the Consultant meeting the requirements of the lending agencies like ADB/ World Bank/JICA, etc.

3.8 SEISMICITY

The release of energy from earthquakes sends seismic acceleration waves traveling through the ground. Such transient dynamic loading instantaneously increases the shear stresses in the ground and decreases the volume of voids within the material which leads to an increase in the pressure of fluids (water) in pores and fractures. Thus, shear forces increase and the frictional forces that resist them decrease. Other factors also can affect the response of the ground during earthquakes.

- Distance of the seismic source from the project site.
- Magnitude of the seismic accelerations.
- Earthquake duration.
- Subsurface profile.
- Dynamic characteristics and strengths of the materials affected.

In addition to the distance of the seismic source to the project site, and the design (anticipated) time history, duration and magnitude of the bedrock earthquake, the subsurface soil profile can have a profound effect on earthquake ground motions including the intensity, frequency content, and duration of earthquake shaking.

3.9 Deleted

3.10 The consultant shall be guided in its assignment by the Model Concession/ Contract Agreements for EPC projects, as applicable and the Manual of Specifications and Standards for two/ four/ six laning of highways published by IRC (IRC:SP:73 or IRC:SP:84 or IRC:SP:87, as applicable) (the "Manual") along with relevant IRC codes for design of long bridges.

3.11 The consultant shall prepare the bid documents including required schedules (as mentioned above) as per EPC documents. For that it is suggested that consultant should also go through the latest EPC documents of MoRTH before bidding the project. The Consultant shall assist the BRO and it's Financial Consultant and the Legal Adviser by furnishing clarifications as required for the financial appraisal and legal scrutiny of the Project Highway and Bid Documents. Submission of reports covering all above information including preliminary indication of cost for the Project and recommendation for further detailed studies. Framing and submission of report covering all the following aspects:-

(a) Preparation of preliminary design and schedule of quantities

b) Study and analysis of working faces, tunnelling method, cost analysis and types of equipments for various operations such as drilling, blasting, mucking, haulage and disposal of muck, fire-fighting, extrication of poisonous gases, ventilation, lighting, side cover, power and water supply systems etc. Possibilities of using TBM are to be evaluated with specific limitations

c) Engineering studies pertaining to leakage, de-watering, grouting, blasting, ground acceleration due to blasting, tunnel closures supports system etc.

(d) Tentative constructions schedule including critical path analysis

(e) Listing of various codes of practice both Indian and Foreign applicable

(f) Preparation and submission of phase II report covering all the aspects of studies and recommendations listed and specified at Sr No (a) to (j) of schedule-'A' PHASE-II above

3.12.1 Consultant shall be responsible for sharing the findings from the preparation stages during the bid process. During the bid process for a project, the consultant shall support the authority in responding to all technical queries, and shall ensure participation of senior team members of the consultant during all interaction with potential bidders including pre-bid conference, meetings, site visits etc. In addition, the consultant shall also support preparation of detailed responses to the written queries raised by the bidders.

4. General (Scope of service- Road works and structure)

4.1 Primary Tasks

General Scope of Services shall cover but be not limited to the following major tasks (additional requirements for Preparation of Detailed Project Report for Hill Roads and Major Bridges are given in **Supplement I** and **II** respectively):

i. review of all available reports and published information about the project road and the project influence area;

ii. Environmental and social impact assessment, including such as related to cultural properties, natural habitants, involuntary resettlement etc.

ii (a) Public consultation, including consultation with Communities located along the road, NGOs working in the area, other stake-holders and relevant Government departments at all the different stages of assignment (such as inception stage, feasibility stage, preliminary design stage and once final designs are concretized).

iii. Detailed reconnaissance;

iv. identification of possible improvements in the existing alignment and bypassing congested locations with alternatives (if any), evaluation of different alternatives comparison on techno-economic and other considerations and recommendations regarding most appropriate option;

v. traffic studies including traffic surveys and Axle load survey and demand forecasting for next thirty years;

vi. Inventory and condition surveys for road;

vii. Inventory and condition surveys for bridges, cross-drainage structures, other Structures, river Bank training/Protection works and drainage provisions;

viii. Detailed topographic survey using mobile/ aerial LiDAR or equivalent technology.

ix. Pavement investigations;

x. Sub-grade characteristics and strength: investigation of required sub-grade and sub-soil characteristics and strength for road and embankment design and sub soil investigation;

xi. Identification of sources of construction materials;

xii. 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 require, even lesser height embankment. Detailed design of structures preparation of GAD and construction drawings and cross-drainage structures and underpasses etc.

xiii. Identification of the type and the design of intersections;

xiv. Design of complete drainage system and disposal point for storm water

xv. Value analysis / value engineering and project costing;

xvi. Economic and financial analyses;

xvii. Contract packaging and implementation schedule

xviii. Strip plan indicating the scheme for carriageway widening, location of all existing utility services (both over- and underground) and the scheme for their relocation, trees to be felled, transplanted and planted and land acquisition requirements including schedule for LA: reports documents and drawings arrangement of estimates for cutting/ transplanting of trees and shifting of utilities from the concerned department;

xix. To find out financial viability of project for implementation and suggest the preferred mode on which the project is to be taken up.

xx. Preparation of detailed project report, cost estimate, approved for construction Drawings, rate analysis, detailed bill of quantities, bid documents for execution of civil works through budgeting resources.

xxi. Deleted.

xxii Deleted.

xxiii. Deleted.

xxiv. Tie-in of on-going/sanctioned works of BRO/MORT&H/ NHAI/ other agencies.

xxv. Preparation of social plans for the project affected people as per policy of the lending agencies/Govt. of India R & R Policy.

4.2 While carrying out the field studies, investigations and design, the development plans being implemented or proposed for future implementation by the local bodies, should be taken into account. Such aspect should be clearly brought out in the reports and drawings.

4.3 Deleted.

4.4 The local and slow traffic may need segregation from the main traffic and provision of service roads and physical barrier including fencing may be considered, wherever necessary to improve efficiency and safety.

4.5. Standards and Codes of Practices

1. 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) and Bureau of Indian Standards (BIS). For aspects not covered by IRC and BIS, international standards practices, may be adopted. The Consultants, upon award of the Contract, may finalize this in consultation with CE (P) Beacon and reflect the same in the inception report.
2. All notations, abbreviations and symbols used in the reports, documents and drawings shall be as per IRC:71.

4.6 Quality Assurance Plan (QAP) and Method Statements

1 The Consultants should have detailed Quality Assurance Plan (QAP) & Method Statements along with data formats for all field studies including topographic surveys, traffic surveys, engineering surveys and investigations, design and documentation activities. The quality assurance plans & Method Statements for separate and different field studies, exclusive to tunnels (As per the scope of work) and roads engineering surveys and investigation, design and documentation activities should be presented as separate sections for highway tunnels like General geology, Topographical survey and mapping, Rock mass property, Photo-geological and remote sensing studies, geo-physical studies, Chemical analysis of water and QAP for road portion like engineering surveys and investigations, traffic surveys, material geo-technical and sub-soil investigations, road and pavement investigations, investigation and design of bridges & structures, environment and R&R assessment, economic & financial analysis, drawings and documentation, preparation, checking, approval and filing of calculations, identification and tractability of project documents etc. Further, additional information as per format shall be furnished regarding the details of personal who shall be responsible for carrying out/preparing and checking/verifying various activities forming part of feasibility study and project preparation, since inception to the completion of work. The detailed Draft QAP Document must be discussed and finalised with the concerned CE (P) Beacon officers immediately upon the award of the Contract and submitted as part of the inception report.

2. It is imperative that the QAP is approved by CE (P) Beacon before the Consultants start the field work.

4.7 Review of Data and Documents

1. The Consultants shall collect the available data and information relevant for the Study. The data and documents of major interest shall include, but not be limited to, the following:

i. Climate;
ii. Road inventory
iii. Road condition, year of original construction, year and type of major maintenance/rehabilitation works;
iv. Condition of bridges and cross-drainage structures;
v. sub-surface and geo-technical data for existing bridges;
vi. Hydrological data, drawings and details of existing bridges;
vii. Existing geological maps, catchment area maps, contour plans etc. for the project area.
viii. Condition of existing river bank / protection works, if any.
ix. Details of sanctioned / on-going works on the stretch sanctioned by BRO/other agencies for Tie-in purposes
x. Survey and evaluation of locally available construction materials;
xi. Historical data on classified traffic volume (preferably for 5 years or more);
xii. Origin-destination and commodity movement characteristics; if available
xiii. Speed and delay characteristics; if available;
xiv. Commodity-wise traffic volume; if available;
xv. Accident statistics; and,
xvi. Vehicle loading behavior (axle load spectrum), if available.
xvii. Type and location of existing utility services (e.g. Fibre Optical Cable, O/H and U/G Electric, Telephone line, Water mains, Sewer, Trees etc.)
xviii. *Environmental setting and social baseline of the project.*

4.8. Social Analysis

The social analysis study shall be carried out in accordance with the MORT&H/World Bank/ADB Guidelines. The social analysis report will, among other things, provide a socio-economic profile of the project area and address in particular, indigenous people, communicable disease particularly HIV/AIDS poverty alleviation, gender, local population, industry, agriculture, employment, health, education, health, child labor, land acquisition and resettlement.

4.9 Traffic Surveys

All traffic surveys and studies will be completed in feasibility studies.

4.9.1 Number and Location of Survey Stations

1. The type of traffic surveys and the minimum number of survey stations shall normally be as under, unless otherwise specifically mentioned.

Sl.NR.	Description	Number of Survey Stations
1.	Classified Traffic Volume Count	3
2.	Origin-Destination and Commodity Movement Characteristics	Minimum 2
3.	Axle Loading Characteristics	2
4.	Intersection Volume Count	All Major Intersections
5.	Speed-Delay Characteristics	Project Road Section
6.	Pedestrian/animal cross traffic count	All major inhabitations along the highway

2. The number of survey locations indicated in the table above are indicative only. The Consultants shall, immediately upon award of the work, submit to CE (P) Beacon proposals regarding the total number as well as the locations of the traffic survey stations as put of inception report. Suitable maps and charts should accompany the proposals clearly indicating the rationale for selecting the location of survey Station

3. The methodology of collection and analysis of data, number and location of traffic survey stations shall be finalized in consultation with CE (P) Beacon

4.9.2 Classified Traffic Volume Count Survey

1. Consultant shall make use of traffic survey done by Indian Highways Management Company Limited (IHMCL) using ATCC systems. If required, especially in cases where a particular stretch is not covered by IHMCL, DPR consultant should carry out classified traffic volume count survey using ATCC (Automatic Traffic Counter and classifier) systems or equivalent technologies.

2. Consultant shall use ATCC systems that can meet the following accuracy levels after validation/ correction:
   (a) Classification of vehicles: better than 95%
   (b) Counting of vehicles: better than 98%

   Before validation and correction, the ATCC system shall meet the following accuracy levels:
   (a) Classification of vehicles: better than 90%
   (b) Counting of vehicles: better than 95%

   For verification of above accuracy levels, audit of raw ATCC shall be done on a sampling basis.

3. ATCC systems such as Pneumatic Tube Detector, Inductive Detector Loop, Video Image Detection, and Infrared Sensor or equivalent technologies shall be adopted.

4. The classified traffic volume count surveys shall be carried out for 7 days (continuous, direction-wise) at the selected survey stations. The vehicle classification system as given in relevant IRC code may be followed. However, the following generalized classification system is suggested in view of the requirements of traffic demand estimates and economic analysis:

Motorized Traffic	Non-Motorized Traffic
2-Wheeler	Bi-Cycle
3-Wheeler	Cycle-Rickshaw
Passenger Car	Animal Drawn Vehicle (ADV)
Utility Vehicle (Jeep, Van etc.)	Hand Cart

			Other Non-Motorised Vehicle
Bus	Mini Bus Standard Bus		
LCV	LCV-Passenger LCV-Freight		
Truck	MCV : 2-Axle Rigid Chassis		
	HCV : 3-Axle Rigid Chassis		
	MAV	Semi Articulated	
		Articulated	

5. All results shall be presented in tabular and graphical form. The survey data shall be analyzed to bring out the hourly and daily variations. The traffic volume count per day shall be averaged to show a weekly average daily traffic (ADT) by vehicle type. The annual average daily traffic (AADT) shall be worked out by applying seasonal factors.

6. The consultant shall compile the relevant traffic volume data from secondary sources also. The salient features of traffic volume characteristics shall be brought out and variations if any, from the traffic census carried out by the State PWD/other agencies shall be suitably explained.

4.9.3 Origin-Destination and Commodity Movements Surveys

1. The consultants shall carry out 1-day (24 hour, both directions) O-D and commodity movement surveys at locations finalized in consultation with CE (P) Beacon. These will be essentially required around congested towns to delineate through traffic. The road side interviews shall be on random sample basis and cover all four-wheeled vehicles. The location of the O-D survey and commodity movement surveys shall normally be same as for the classified traffic count.

2. The location of origin and destination zones shall be determined in relation to each individual station and the possibility of traffic diversion to the Project Road from/to other road routes including bypasses.

3. The trip matrices shall be worked out for each vehicle type information on weight for trucks should be summed up by commodity type and the results tabulated, giving total weight and average weight per truck for the various commodity types. The sample size for each vehicle type shall be indicated on the table and also in the graphical representations.

4. The data derived from surveys shall also be analyzed to bring out the lead and load characteristics and desire line diagrams. The data analysis should also bring out the requirement for the construction of bypasses.

5. The distribution of lead and load obtained from the surveys should be compared The axle load surveys shall normally be done using axle load pads or other sophisticated instruments. The location(s) of count station(s) and the survey with those derived from the axle load studies.

6. The commodity movement data should be duly taken into consideration while making the traffic demand estimates.

4.9.4 Turning Movement Surveys

1. The turning movement surveys for estimation of peak hour traffic for the design of major and minor intersections shall be carried out for the Study. The details regarding composition and directional movement of traffic shall be furnished by the Consultant.

2. The methodology for the surveys shall be as per IRC: SP: 41-1994. The details including location and duration of surveys shall be finalized in consultation with CE (P) Beacon officials. The proposal in response to this TOR shall clearly indicate the number of locations that the Consultants wish to conduct turning movement surveys and the rationale for the same.

3. The data derived from the survey should be analyzed to identify requirements of suitable remedial measures, such as construction of underpasses, fly-overs, interchanges, grade-separated intersections along the project road alignment. Intersections with high traffic volume requiring special treatments either presently or in future shall be identified.

4.9.5 Axle Load Surveys

1. Axle load surveys in both directions shall be carried out at suitable location(s) in the project road stretch on a random sample basis normally for trucks only (both empty and loaded trucks) for 2 normal days - (24 hours) at special count stations to be finalized in consultation with CE (P) Beacon. However, a few buses may be weighed in order to get an idea about their loading behavior. While selecting the location(s) of axle load survey station(s), the locations of existing bridges with load restrictions, if any, should be taken into account and such sites should be avoided.

2. Axle load surveys shall normally be done using axle load pads or other sophisticated instruments. The location(s) of count station(s) and the survey methodology including the data formats and the instrument type to be used shall be finalized before taking up the axle load surveys

3. The axle load data should be collected axle configuration-wise. The number of equivalent standard axles per truck shall be calculated on the basis of results obtained. The results of the survey should bring out the VDF for each truck type (axle configuration, if the calculated VDF is found to be below the national average, then national average shall be used. Furthermore, the data from axle load surveys should be analyzed to bring out the Gross Vehicle Weight (GVW) and Single Axle Load (SAL) Distributions by truck type (axle configuration).

4. The Consultant shall ascertain from local enquiries about the exceptional live loads that have used the highway in the past in order to assess the suitability of existing bridges to carry such loads.

4.9.6. Speed-Delay Surveys

The Consultants shall carry out appropriate field studies such as moving car survey to determine running speed and journey speed. The data should be analyzed to identify sections with typical traffic flow problems and congestion. The objective of the survey would be to recommend suitable measures for segregation of local traffic, smooth flow of through traffic and traffic safety. These measures would include the provision of bypasses, under-passes, fly-overs, interchanges, grade-separated intersections and service roads.

4.9.7 Pedestrian / animal cross traffic surveys:

These may be conducted to determine if provision of viaduct for pedestrians/animals is necessary to improve the traffic safety.

4.9.8 Truck Terminal Surveys

The data derived from the O-D, speed-delay, other surveys and also supplementary surveys should be analyzed to assess requirements for present and future development of truck terminals at suitable locations en route.

4.10 Traffic Demand Estimates

1. The consultants shall make traffic demand estimates and establish possible traffic growth rates in respect of all categories of vehicles, taking into account the past trends, annual population and real per capita growth rate, elasticity of transport demand in relation to income and estimated annual production increase. The other aspects including socio-economic development plans and the land use patterns of the region having impact on the traffic growth, the projections of vehicle manufacturing industry in the country, development plans for the other modes of transport, O-D and commodity movement behavior should also be taken into account while working out the traffic demand estimates.

2. The values of elasticity of transport demand shall be based on the prevailing practices in the country. The Consultants shall give complete background including references for selecting the value of transport demand elasticity.

3. It is envisaged that the project road sections covered under this TOR would be completed and opened to traffic after 3 years. The traffic demand estimates shall be done for a further period of 30 years from completion of two/four lane. The demand estimates shall be done assuming three scenarios, namely, optimistic, pessimistic and most likely traffic growth. The growth factors shall be worked out for five-yearly intervals.

4. Traffic projections should be based on sound and proven forecasting techniques. In case traffic demand estimated is to be made on the basis of a model, the application of the model in the similar situation with the validation of the results should be established. The traffic projections should also bring out the possible impact of implementation of any competing facility in the near future. The demand estimates should also take into account the freight and passenger traffic along the major corridors that may interconnect with the project. Impact of toll charges on the traffic estimates should be estimated.

5. The methodology for traffic demand estimates described in the preceding paragraphs is for normal traffic only. In addition to the estimates for normal traffic, the Consultants shall also work out the estimates for generated, induced and diverted traffic.

6. The traffic forecasts shall also be made for both diverted and generated traffic.

7. Overall traffic forecast thus made shall form the basis for the design of each pavement type and other facilities/ancillary works.

4.11. Engineering Surveys and Investigations

4.11.1. Reconnaissance and Alignment

1. The Consultants should make an in-depth study of the available land width(ROW) topographic maps, satellite imageries and air photographs of the project area, geological maps, catchment area maps, contour plans, flood flow data and seismological data and other available relevant information collected by them concerning the existing alignment. Consultant himself has to arrange the required maps and the information needed by him from the potential sources. **Consultant should make efforts for minimizing land acquisition.**

2. The detailed ground reconnaissance may be taken up immediately after the study of maps and other data. The primary tasks to be accomplished during the reconnaissance surveys include;

i. topographical features of the area;
ii. typical physical features along the existing alignment within and outside ROW i.e. land use Pattern;
iii. possible alignment alternatives, vis-a-vis, scheme for the construction of additional lanes parallel to the existing road;
iv. realignment requirements including the provision of bypasses, ROBs / Flyovers and via-duct for pedestrian crossings with possible alignment alternatives;
v. preliminary identification of improvement requirements including treatments and measures needed for the cross-roads;
vi. traffic pattern and preliminary identification of traffic homogenous links;
vii. sections through congested areas;
viii. inventory of major aspects including land width, terrain, pavement type, carriageway type, bridges and structures (type, size and location), intersections(type, cross-road category, location) urban areas (location, extent), geologically sensitive areas, environmental features:
ix. critical areas requiring detailed investigations; and,
x. Requirements for carrying out supplementary investigations.
xi. soil (textural classifications) and drainage conditions
xii. Type and extent of existing utility services along the alignment (within ROW).
xiii. Typical physical features along the approach roads
xiv. Possible bridge locations, land acquisition problems, nature of crossings, likely length of approaches and bridge, firmness of banks, suitability of alignment of approach roads.

3. 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.

4. The data and information obtained from the reconnaissance surveys should be documented. The data analysis and the recommendations concerning alignment and the field studies should be included in the Inception Report. The data obtained from the reconnaissance surveys should form the core of the database which would be supplemented and Sepmented using the data obtained from detailed field studies and investigations.

5. The data obtained from the reconnaissance surveys should be compiled in the tabular as well as graphical (chart) form indicating the major physical features and the proposed widening scheme for CE (P) Beacon comments. The data and the charts should also accompany the rationale for the selection of traffic survey stations.

4.11.2. Topographic Surveys

1. The basic objective of the topographic survey would be to capture the essential ground features along the alignment in order to consider improvements and for working out improvements, rehabilitation and upgrading costs. The detailed topographic surveys should normally be taken up after the completion of reconnaissance surveys.

2. The carrying out of topographic surveys will be one of the most important and crucial field tasks under the project. Technologies which can meet the following accuracy levels shall be adopted. For land based surveys (a) Fundamental horizontal accuracy of 2 cm or better (b) Fundamental vertical accuracy of 2 cm or better (c) More than 50 points shall be measured per sq. m and for aerial based surveys (a) Fundamental horizontal accuracy of 5 cm or better (b) Fundamental vertical accuracy of 5 cm or better (c) More than 10 points shall be measured per sq. m. To establish accuracy, a check point survey using DGPS (for horizontal accuracy) and Auto Level (for vertical accuracy) shall be carried out to establish the fundamental horizontal and vertical accuracy. A minimum of 25 check points, or check points once every 4 km should be established, and these should be strictly different from any geo-referencing or control network points.

3. The following are the set of deliverables which should be submitted after completion of survey: (a) Raw DGPS data for the entire highway length and adjoining areas of interest (b) Point cloud data/ Data of points captured for the entire highway length and adjoining areas of interest (c) Topographic map of scale 1:1000 of the entire highway length and adjoining areas of interest (d) Contour map of 50 cm of entire highway length and adjoining areas of interest (e) Cross section of the highway at every 1 m in *.dwg format.

4. For land based surveys, Mobile LiDAR (Light Detection and Ranging) or equivalent technology that can meet above requirements shall be adopted. For aerial based surveys, Aerial Mobile LiDAR (Light Detection and Ranging) or equivalent technology that can meet above requirements shall be adopted. In shadow areas such as invert levels below culverts, where LiDAR or equivalent technologies cannot survey accurately, traditional methods of Total Station/ Auto Level shall be used to complete the study.

5. In case of mobile LiDAR or equivalent technology, 360 degree panoramic images of the entire highway length and adjoining areas of interest shall be submitted. In case of aerial LiDAR or equivalent technology, ortho-images of the entire highway length and adjoining areas of interest shall be submitted.

6. The detailed field surveys would essentially include the following activities:

   i. Topographic Surveys along the Existing Right of Way (ROW): Carrying out topographic survey using LiDAR or equivalent technology along the existing road and realignments, wherever required and properly referencing the same with reference pillars fixed on either side of the centre-line at safe places within the ROW

   ii. The detailed field surveys would essentially include the topographic surveys along the proposed location of bridge and alignment of approach road.

   iii. The detailed topographic surveys should be carried out along the approach roads alignment and location of bridge approved by CE (P) Beacon.

   iv. Collection/ Extraction of details for all features such as structures (bridges, culverts etc.) utilities, existing roads, electric and telephone installations (both O/H as well as underground), huts, buildings, fencing and trees (with girth greater than 0.3metre) oil and gas lines etc. falling within the extent of survey.

7. The width of survey corridor will generally be as given under:

   i. The width of the survey corridor should take into account the layout of the 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 centre line of the existing carriageway) should be taken into consideration so that the topographic surveys cover sufficient width beyond the centre line of the proposed divided carriageway. Normally the surveys should extend a minimum of 30 m beyond either side of the centre line of the proposed divided carriageway or land boundary whichever is more.

   ii. In case the reconnaissance survey reveals the need for bypassing the congested locations, the traverse lines would be run along the possible alignments in order to identify and select the most suitable alignment for the bypass. The detailed topographic surveys should be carried out along the bypass alignment approved by CE (P) Beacon At locations where grade separated intersections could be the obvious choice, the survey area will be suitably increased. Field notes of the survey should be maintained which would also provide information about traffic, soil, drainage etc.

   iii. The width of the surveyed corridor will be widened appropriately where developments and / or encroachments have resulted in a requirement for adjustment in the alignment, or where it is felt that the existing alignment can be improved upon through minor adjustments.

   iv. Where existing roads cross the alignments, the survey will extend a minimum of100 m either side of the road centre line and will be of sufficient width to allow improvements, including at grade intersection to be designed.

8. 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 45cm shall be cast in RCC of grade M 15 with a nail fixed in the centre of the top surface. The reference pillar shall be embedded in concrete up to a depth of 30cm with CC M10 (5 cm wide all around). The balance 15 cm above ground shall be painted yellow. The spacing shall be 250m apart, incase Bench Mark Pillar coincides with Reference Pillar, only one of the two need be provided.

ii. Establishing Bench marks at site connected to GTS Bench marks at a interval of250 metres on Bench mark pillar made of RCC as mentioned above with RL and BM No. marked on it with red paint.

iii. ***Boundary Pillars****- Wherever there is a proposal of realignment of the existing Highway and/or construction of New Bypasses, Consultant shall fix boundary pillars along the proposed alignment on the extreme boundary on either side of the project Highway at 50 m interval.*

4.11.2.1 Longitudinal and Cross-Sections

The topographic surveys for longitudinal and cross-sections shall cover the following:

i. Longitudinal section levels along final centre line at every 1 m interval, at the locations of curve points, small streams, and intersections and at the locations of change in elevation.

ii. Cross sections at every 1 m interval in full extent of survey covering sufficient number of spot levels on existing carriageway and adjacent ground for profile correction course and earth work calculations. Cross sections shall be taken at closer interval at curves.

iii. Longitudinal section for cross roads for length adequate for design and quantity estimation purposes.

iv. Longitudinal and cross sections for major and minor streams shall cover Cross section of the channel at the site of proposed crossing and few cross sections at suitable distance both upstream and downstream, bed level up to top of banks and ground levels to a sufficient distance beyond the edges of channel, nature of existing surface soil in bed, banks & approaches, longitudinal section of channel showing site of bridge etc. These shall be as per recommendations contained in IRC Special Publication No. 13 (Guidelines for the Design of Small Bridges and Culverts) and provisions of IRC:5 ("Standard Specifications & Code of Practice for Road Bridges, Section 1 – General Features of Design").

At feasibility study stage cross sections at 50m interval may be taken.

4.11.2.2 Details of utility Services and Other Physical Features

1. The Consultants shall collect details of all important physical features along the alignment. These features affect the project proposals and should normally include buildings and structures, monuments, burial grounds, cremation grounds, places of worship, railway lines, stream / river / canal, water mains, severs, gas/oil pipes, crossings, trees, plantations, utility services such as electric, and telephone lines (O/H & U/G) and poles, optical fibre cables (OFC) etc. The survey would cover the entire right-of-way of the road on the adequate allowance for possible shifting of the central lines at some of the intersections locations.

2. Consultant shall also map out sub-surface utilities. The following criteria shall be met by the process of sub-surface utility mapping: (a) Coverage and mapping of all sub-surface utilities within project RoW, especially those under additional carriageway width (b) Accurate mapping and resolution of all sub-surface utilities up to a depth of 4 m (c) Differentiation between sub-surface utilities such as live electric cables, metallic utilities and other utilities (d) Sub-surface utilities radargrams further processed into utility maps in formats such as PDF, JPEG and AutoCAD. To meet the accuracy levels, consultant shall use Ground Penetrating Radar (GPR), Induction Locator or equivalent technologies.

3. The information collected during reconnaissance and field surveys shall be shown on a strip plan so that the proposed improvements can be appreciated and the extent of land acquisition with L.A schedule, 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.

4.11.3 Road and Pavement Investigations

The Consultants shall carry out detailed field studies in respect of road and pavement. The data collected through road inventory and pavement investigations should be sufficient to meet the input requirements of HDM-IV.

4.11.3.1 Road Inventory Surveys

1. Detailed road inventory surveys shall be carried out to collect details of all existing road and pavement features along the existing road sections. 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; vertical curve

vii. Road intersection type and details, at every occurrence;

viii. Retaining structures and details, at every occurrence;

ix. Location of water bodies (lakes and reservoirs), at every occurrence;

x. Height of embankment or depth of cut @ every 200m and every change of feature whichever is earlier

xi. Land width i.e. ROW

xii. Culverts, bridges and other structures (type, size, span arrangement and location)

xiii. Roadside arboriculture

xiv. Existing utility services on either side within ROW.

xv. General drainage conditions

xvi. Design speed of existing road

2. 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.

4.11.3.2 Pavement Investigation

1. Pavement Composition

i. The data concerning the pavement composition may be already available with the PWD/Concerned agency. However, the consultants shall make trial pits to ascertain the pavement composition. The test pit interval will be as per Para 4 below.

ii. For each test pit, the following information shall be recorded:

- *test pit reference (Identification number, location):*
- *pavement composition (material type and thickness); and*
- *subgrade type (textural classification) and condition (dry, wet)*

2. Road and Pavement Condition Surveys

i. Detailed field studies shall be carried out to collect road and pavement surface conditions. The data should generally cover:

- *pavement condition (surface distress type and extent);*
- *shoulder condition;*
- *embankment condition; and*
- *drainage condition*

Pavement Condition

- *cracking (narrow and wide cracking), % of pavement area affected;*
- *raveling, % of pavement area affected;*
- *potholing, % of pavement area affected;*
- *edge break, length (m); and,*
- *rut depth, mm*

Shoulder Condition

- *Paved: Same as for pavement*
- *Unpaved: material loss, rut depth and corrugation,*
- *Edge drop, mm.*

Embankment Condition

- *general condition; and*
- *extent of slope erosion*

ii. *The objective of the road and pavement condition surveys shall be to identify defects and sections with similar characteristics. All defects shall be systematically referenced, recorded and quantified for the purpose of determining the mode of rehabilitation.*

iii. *The pavement condition surveys shall be carried out using visual means. Supplemented by actual measurements and in accordance with the widely accepted methodology (AASHTO, IRC, OECD, TRL and World Bank Publications) adapted to meet the study requirements. The measurement of rut depth would be made using standard straight edges.*

iv. *The shoulder and embankment conditions shall be evaluated by visual means and the existence of distress modes (cuts, erosion marks, failure, drops) and extent (none, moderate, frequent and very frequent) of such distress manifestations would be recorded.*

v. *For sections with severe distresses, additional investigations as appropriate shall be carried out to determine the cause of such distresses.*

vi. *Middle 200m could be considered as representative sample for each one km. of road and incase all other things are considered similar.*

Drainage Condition

- *General condition*
- *Connectivity of drainage turnouts into the natural topography*
- *Condition in cut sections*
- *Condition at high embankments*

The data obtained from the condition surveys should be analyzed and the road segments of more or less equal performance may be identified using the criteria given in IRC: 81-1997.

3. **Pavement Roughness**

i. *The roughness surveys shall be carried out using Bump Integrator or similar instrument. The methodology for the surveys shall be as per the widely used standard practices. The calibration of the instrument shall be done as per the procedure given in the World Bank's Technical Publications and duly got authenticated by established laboratory/institution acceptable to the client*

ii. The surveys shall be carried out along the outer wheel paths. The surveys shall cover a minimum of two runs along the wheel paths for each directions.

iii. The results of the survey shall be expressed in terms of BI and IRI and shall be presented in tabular and graphical forms. The processed data shall be analysed using the cumulative difference approach to identify road segments homogenous with respect to surface roughness.

4. Pavement Structural Strength

i. The Consultants shall carry out structural strength surveys for existing pavements using Benkelman Beam Deflection technique in accordance with the CGRA procedure given in IRC:81-1997 ("Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique").

ii. It is suggested that the deflection surveys may be carried out as per the scheme given below:

- *mainline testing; and,*
- *control section testing.*

iii. The deflection tests for the mainline shall be carried out at every 500 m along the road sections covered under the study. The control section testing shall involve carrying out deflection testing for each 100 m long homogenous road segment along the road sections. The selection of homogenous segment shall be based on the data derived from pavement condition surveys. The total length of such homogenous segments shall not be less than 100 m per kilometre. The deflection measurements for the control section testing should be at an interval of not more than 10 m.

iv. Test pits shall be dug at every 500 m and also along each homogeneous road segment to obtain pavement composition details (pavement course, material type and thickness) so as to be able to study if a correlation exists between deflection and composition. If so, the relationship may be used while working out the overlay thickness for the existing pavement.

v. Benkelman Beam Deflection surveys may not be carried out for severely distressed sections of the road warranting reconstruction. The Consultants, immediately upon the award of the contract, shall submit to CE (P) Beacon the scheme describing the testing schedule including the interval. The testing scheme shall be supported by data from detailed reconnaissance surveys.

vi. In case, the Consultants wish to use any acceptable method(s) other than Benkelman Beam deflection technique for the evaluation of pavement strength, viz. Falling weight deflectometer method etc. details of such methods or innovative features for deflection testing using Benkelman Beam technique along with the methodology for data analysis, interpretation and the use of such data for pavement overlay design purposes using IRC or any other widely used practices, such as AASHTO guidelines, should be got approved by CE (P) Beacon. The sources of such methods should be properly referenced.

4.11.3.3 Subgrade Characteristics and Strength

1. Based on the data derived from condition (surface condition, roughness) and structural strength surveys, the project road section should be divided into segments homogenous with respect to pavement condition and strength. The delineation of segments homogenous with respect to roughness and strength should be done using the cumulative difference approach (AASHTO, 1993).
2. The data on soil classification and mechanical characteristics for soils along the existing alignments may already be available with the PWD/Concerned agency. The testing scheme is, therefore, proposed as given under:
   i. For the widening (2/- Laning) of existing road within the ROW, the Consultants shall test at least three sub-grade soil samples for each homogenous road segment or three samples for each soil type encountered, whichever is more.
   ii. For the roads along new alignments, the test pits for sub grade soil shall be @5km or for each soil type, whichever is more. A minimum of three samples should be tested corresponding to each homogenous segment.
3. The testing for subgrade soil shall include:
   i. in-situ density and moisture content at each test pit
   ii. Field CBR using DCP at each test pit
   iii. Characterization (grain size and Atterberg limits) at each test pit and,
   iv. Laboratory moisture-density characteristics (modified AASHTO compaction);
   v. Laboratory CBR (unsoaked and 4-day soak compacted at three energy levels) and swell.
4. 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 CE (P) Beacon officers after the problematic soil types are identified along the road sections.
5. The laboratory for testing of material should be got approved from CE (P) Beacon before start of work.

4.11.4 Investigations for Bridges and Structure

4.11.4.1 Inventory of Bridges, Culverts and Structures

The Consultants shall make an inventory of all the structures (bridges, viaducts, ROBs,/RUB and other grade separated structures, culverts, etc.) along the road under the project. The inventory for the bridges, viaducts and ROBs shall include the parameters required as per the guidelines of IRC-SP:35. The inventory of culverts shall be presented in a tabular form covering relevant physical and hydraulic parameters.

4.11.4.2 Hydraulic and Hydrological Investigations

1. The hydrological and hydraulic studies shall be carried out in accordance with IRC Special Publication No. 13 (“Guidelines for the Design of Small Bridges and Culverts”) and IRC:5 (“Standard Specifications & Code of Practice for Road Bridges, Section I General Feature of Design”). These investigations shall be carried out for all existing drainage structures along the road sections under the study.
2. The consultant shall also collect information on observed maximum depth of scour.

3. In respect of major bridges, history of hydraulic functioning of existing bridge, if any, under flood situation, general direction of river course through structure, afflux, extent and magnitude of flood, effect of backwater, if any, aggradation/degradation of bed, evidence of scour etc. shall be used to Sepment the available hydrological data. The presence of flood control/irrigation structures, if affecting the hydraulic characteristics like causing obliquity, concentration of flow, scour, silting of bed, change in flow levels, bed levels etc. shall be studied and considered in design of bridges. The details of any future planned work that may affect the river hydraulics shall be studied and considered.

4. The Consultants shall make a desk study of available data on topography(topographic maps, stereoscopic aerial photography), storm duration, rainfall statistics, top soil characteristics, vegetation cover etc. so as to assess the catchment areas and hydraulic parameters for all existing and proposed drainage provisions. The findings of the desk study would be further supplemented and Sepmented by a reconnaissance along the area. All-important hydrological features shall be noted during this field reconnaissance.

5. The Consultants shall collect information on high flood level (HFL),low water levels (LWL), high tide level (HTL),low tide level (LTL) where applicable, discharge velocity etc. from available past records, local inquiries and visible signs, if any, on the structural components and embankments. Local inquiries shall also be made with regard to the road sections getting overtopped during heavy rains.

6. Conducting Model studies for bridges is not covered in the scope of consultancy services. If Model study is envisaged for any bridge, requirement of the same shall be spelt out in the RPF documents separately indicating scope and time frame of such study. Salient features of the scope of services to be included for model study are given in the supplement- II Terms of Reference.

4.11.4.3 Condition Surveys for Bridges, Culverts and Structures

1. The Consultants shall thoroughly inspect the existing structures and shall prepare a report about their condition including all the parameters given in the Inspection pro-forma of IRC-SP; 35. The condition and structural assessment survey of the bridges / culverts / structures shall be carried out by senior experts of the Consultants.

2. For the bridges identified to be in a distressed condition based upon the visual condition survey, supplementary testing shall be carried out as per IRC-SP:35 and IRC-SP:40. Selection of tests may be made based on the specific requirement of the structure.

3. The assessment of the load carrying capacity or rating of existing bridges shall be carried out under one or more of the following scenarios:

    i. when the design live load is less than that of the statutory commercial vehicle plying or likely to ply on bridge;

    ii. if during the condition assessment survey and supplementary testing the bridge is found to indicate distress of serious nature leading to doubt about structural and / or functional adequacy, and

    iii. Design live load is not known nor are the records and drawings available

4. The evaluation of the load carrying capacity of the bridge shall be carried out as per IRC-SP:37 ("Guidelines for Evaluation of Load Carrying Capacity of Bridges"). The analytical and correlation method shall be used for the evaluation of the load carrying capacity as far as possible. When it is not possible to determine the load carrying capacity of the bridge using analytical and correlation method, the same shall be carried out using load testing. The consultant has to exhaust all other methods of evaluation of strength of bridges before recommending to take up load testing of bridges. Road closure for testing if unavoidable shall be arranged by CE (P) Beacon for limited duration say 12 hours or so.

5. Consultant shall carryout necessary surveys and investigations to establish the remaining service life of each retainable bridge or structure with and without the proposed strengthening and rehabilitation according to acceptable international practice in this regard.

4.11.4.4 Geo-technical Investigations and Sub-Soil Exploration

1. The Consultants shall carry out geo-technical investigations and sub-surface explorations for the proposed Bridges / Road over bridges/ tunnels/ viaducts/ interchanges etc., along high embankments and any other location as necessary for proper design of the works and conduct all relevant laboratory and field tests on soil and rock samples. The minimum scope of geo-technical investigations for bridge and structures shall be as under:

S.No	Description	Location of Boring
1	Overall length = 6 – 30 m	One abutment location and One abutment location and at least one intermediate location between abutments for structures having more than one span
2	**Overall length = 30 – 60 m**	One abutment location and at least one intermediate location between abutments for structures having more than one span.
3	Overall length >60 m	Each abutment and each pier locations.

2. The deviation(s), if any, by the Consultants from the scheme presented above should be approved by CE (P) Beacon.

3. However, where a study of geo-technical reports and information available from adjacent crossings over the same waterway (existing highway and railway bridges) indicates that subsurface variability is such that boring at the suggested spacing will be insufficient to adequately define the conditions for design purposes, the Consultants shall review and finalize the bore hole locations in consultation with the CE (P) Beacon officers.

4. Geotechnical Investigations and Sub soil Explorations hall be carried out to determine the nature and properties of existing strata in bed, banks and approaches with trial pits and bore hole sections showing the levels, nature and properties of various strata to a sufficient depth below the level suitable for foundations, safe intensity of pressure on the foundation strata, proneness of site to artesian conditions, seismic disturbance and other engineering properties of soil etc. Geotechnical investigation and Sub-soil Exploration will be done as per IRC 78.

5. The scheme for the borings locations and the depth of boring shall be prepared by the Consultants and submitted to CE (P) Beacon for approval. These may be finalized in consultation with CE (P) Beacon.

6. The sub-soil exploration and testing should be carried out through the Geotechnical Consultants empanelled by MORT&H The soil testing reports shall be in the format prescribed in relevant IRC Codes.

7. For the approach road pavement, bore holes at each major change in pavement condition or in deflection readings or at 2 km intervals whichever is less shall be carried out to a depth of at least 2 m below embankment base or to rock level and are to be fully logged. Appropriate tests to be carried out on samples collected from these bore holes to determine the suitability of various materials for use in widening of embankments or in parts of new pavement structure.

4.11.5 Material Investigations

1. The Consultants shall identify sources (including use of fly-ash/ slag), quarry sites 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 haul diagram for haulage purposes giving quarry charts indicating the location of selected borrow areas, quarries and the respective estimated quantities.

   "Environment friendly materials"

   "As per MORTH circular No. RW /NH-33044/53/2013-S&R(R) dated 20th November, 2013, alternative pavement materials and technologies for road construction shall be assessed and compared in the design stage. The alternative resulting in substantial reduction in GHG (Green House Gas Emission) and with least life cycle cost shall be recommended for implementation.

   Technical and economic feasibility of using industrial byproducts, recyclable and waste materials shall be assessed depending on their availability in the concerned region.

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 for obtaining the required formation levels.

3. Environmental restrictions, if any, and feasibility of availability of these sites to prospective civil works contractors, should be duly taken into account while selecting new quarry locations.

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

5. The Material Investigation aspect shall include preparation and testing of bituminous mixes for various layers and concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler etc.) as identified during Material Investigation to conform to latest MoRT&H specification.

4.12 Detailed Design of Road and Pavements, Bridges, Structures

4.12.1 General

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

i. High speed highway double lane with undivided carriageway without paved shoulders configuration complete in all respects with service roads at appropriate locations;

ii. Design of pavement for the additional lanes and overlay for the existing road, paved shoulders, medians, verges;

iii. Bridges, viaduct/subways and other grade separated structures including ROBs/RUBs etc.

iv. At-grade and grade-separated intersections, interchanges (if required);

v. ROB for railway crossings as per the requirement and the standards of the Indian Railways; and,

vi. Prepare ali gnment plans, longitudinal sections and cross-sections @ 50mintervals;

vii. Designs for road furniture and road safety/traffic control features;

viii. Designs and drawings for service road/under passes/overpass / cattle passes tree planting/fencing at locations where necessary / required

ix. Deleted

x. Short bypasses at congested locations

xi. Drainage design showing location of turnouts, out falling structures, separate drawings sheet for each 5 km. stretch.

xii. Bridges and structures rehabilitation plan with design and drawings

xiii. Deleted

xv. Design of pavement for approach road

xvi. Design of river bank protection / training works. Innovative type of structures with minimum joints, aesthetically, pleasing and appropriate to the topography of the region shall be designed wherever feasible.

4.12.2 Design Standards

1. The Consultants shall evolve Design Standards and material specifications for the Study primarily based on IRC publications, MoRT&H Circulars and relevant recommendations of the international standards for approval by CE (P) Beacon.
2. The Design Standards evolved for the project shall cover all aspects of detailed design including the design of geometric elements, pavement design, bridges and structures, traffic safety and materials.

4.12.3 Geometric Design

1. The design of geometric elements shall, therefore, take into account the essential requirements of such facilities.
2. Based on the data collected from reconnaissance and topographic surveys, the sections with geometric deficiencies, if any, should be identified and suitable measures for improvement should be suggested for implementation.

3. The data on accident statistics should be compiled and reported showing accident type and frequency so that black spots are identified along the project road section. The possible causes (such as poor geometric features, pavement condition etc.) of accidents should be investigated into and suitable cost-effective remedial measures suggested for implementation.

4. 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, including refuge lane (50m) at every 2kms.*
   - *iv. junctions, intersections and interchanges;*
   - *v. bypasses; and,*
   - *vi. service roads as and when require i.e built up area..*

5. 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.

6. The consultants shall make detailed analysis of traffic flow and level of service for the existing road and workout the traffic flow capacity for the improved project road. The analysis should clearly establish the widening requirements with respect to the different horizon periods taking into account special problems such as road segments with isolated steep gradients.

7. In the case of closely spaced cross roads the Consultant shall examine different options such as, providing grade separated structure for some of them with a view to reduce number of at-grade crossings, services roads connecting the cross-roads and closing access from some of the intersections and prepare and furnish appropriate proposals for this purpose keeping in view the cost of improvement, impact on traffic movement and accessibility to cross roads. The detailed drawings and cost estimate should include the provisions for realignments of the existing cross roads to allow such arrangements.

8. The Consultant shall also prepare design of grade separated pedestrian crossings (viaducts) for large cross traffic of pedestrians and / or animals.

9. The Consultant shall also prepare details for at-grade junctions, which may be adopted as alternative to the grade separated structures. The geometric design of interchanges shall take into account the site conditions, turning movement characteristics, level of service, overall economy and operational safety.

10. The Consultants shall prepare design and other details in respect of the parallel service roads in urbanized locations and other locations to cater to the local traffic, their effect of the viability of the project on commercial basis if service roads are constructed as part of the project and the implications of not providing the service roads.

11. The consultant shall prepare complete road and pavement design including drainage for new bypass option identified around congested town en-route.

4.12.4 Pavement Design

1. The detailed design of pavement shall involve:

i. *strengthening of existing road pavement and design of the new pavement if any, if the findings of the traffic studies and life-cycle costing analysis confirm the requirement for widening of the road beyond 2lane undivided carriageway standard;;*
ii. *pavement design for bypasses; and,*
iii. *design of shoulders.*

2. The design of pavement shall primarily be based on IRC publications.
3. The design of pavement shall be rigorous and shall make use of the latest Indian and International practices. **The design alternatives shall include both rigid and flexible design options. The most appropriate design, option shall be established on life-cycle costing and techno-economic consideration.**
4. For the design of pavement, each set of design input shall be decided on the basis of rigorous 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 flowcharts indicating the various steps in the design process, their interaction with one another and the input parameter required at each step.
5. For the design of overlays for the existing 2-lane pavement, the strengthening requirement shall duly take into account the strength of the existing pavement vis-à-vis the remaining life. The overlay thickness requirements shall be worked out for each road segment homogenous with respect to condition, strength and sub-grade characteristics. The rehabilitation provisions should also include the provision of regulating layer. For existing pavement with acceptable levels of cracking, provision of a crack inhibiting layer should also be included.
6. Latest techniques of pavement strengthening like provision of geo-synthetics and cold/hot pavement recycling should be duly considered by the consultant for achieving economy.
7. The paved shoulders shall be designed as integral part of the pavement for the main carriageway. The design requirements for the carriageway pavement shall, therefore, be applicable for the design of shoulder pavements. The design of granular shoulder should take into account the drainage considerations besides the structural requirements.
8. The pavement design task shall also cover working out the maintenance and strengthening requirements and periodicity and timing of such treatments.

4.12.5 Design of Embankments

1. The embankments design should provide for maximum utilization of locally available materials consistent with economy. Use of fly ash wherever available within economical leads must be considered. In accordance with Government instructions, **use of fly ash within 100 km from Thermal Power Stations is mandatory.**

2. The Consultants shall carry out detailed analysis and design for all embankments of height greater that 6 m based on relevant IRC publications.
3. The design of embankments should include the requirements for protection works and traffic safety features.

4.12.6 Design of Bridges and Structures

1. The data collected and investigation results shall be analyzed to determine the following:

    i. HFL
    ii. LWL
    iii. LBL
    iv. Erodibility of bed/scour level
    v. Design discharge
    vi. Linear waterway and effective linear waterway
    vii. Likely foundation depth
    viii. Safe bearing capacity
    ix. Engineering properties of sub soil
    x. Artesian conditions
    xi. Settlement characteristics
    xii. Vertical clearance
    xiii. Horizontal clearance
    xiv. Free board for approach road
    xv. Severity of environment with reference to corrosion
    xvi. Data pertaining to seismic and wind load
    xvii. Requirement of model study etc.

2. The Consultant shall prepare General Arrangement Drawing (GAD) and Alignment Plan showing the salient features of the bridges and structures proposed to be constructed / reconstructed along the road sections covered under the Study. These salient features such as alignment, overall length, span arrangement, cross section, deck level, founding level, type of bridge components (superstructure, substructure, foundations, bearings, expansion joint, return walls etc.) shall be finalized based upon hydraulic and geo-technical studies, cost effectiveness and ease of construction. The GAD shall be supplemented by Preliminary designs. In respect of span arrangement and type of bridge a few alternatives with cost-benefit implications should be submitted to enable CE (P) Beacon to approve the best alternative. After approval of alignment and GAD the Consultant shall prepare detailed design as per IRC codes /guidelines and working drawings for all components of bridges and structures.
3. The location of all at-grade level crossings shall be identified falling across the existing level crossings for providing ROB at these locations. The Consultants shall prepare preliminary GAD for necessary construction separately to the CE (P) Beacon. The Consultant shall pursue the Indian Railways Authorities or/and any statutory authority of State/Central Government for approval of the GAD from concerned Authorities.
4. GAD for bridges/structures across irrigation/water way channels shall be got approved from the concerned Irrigation/Water way Authorities. Subsequent to
approval of GAD and alignment plan by CE (P) Beacon the Consultants shall prepare detailed design as per IRC codes/guidelines for all components of the bridges and structures.

5. Subsequent to the approval of the GAD and Alignment Plan by CE (P) Beacon and Railways, the Consultant shall prepare detailed design as per IRC and Railways guidelines and working drawings for all components of the bridges and structures. The Consultant shall furnish the design and working drawings for suitable protection works and/or river training works wherever required.
6. 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.
7. The existing structures having inadequate carriageway 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.
8. Suitable repair / rehabilitation measures shall be suggested in respect of the existing structures as per IRC-SP:40 along with their specifications, drawings and cost estimate in the form of a report. The rehabilitation or reconstruction of the structures shall be suggested based on broad guidelines for rehabilitation and strengthening of existing bridges contained in IRC-SP:35 and IRC-SP:40.
9. Subsequent to the approval of the GAD and the alignment plan by CE (P) Beacon, detailed design shall also be carried out for the proposed underpasses, overpasses and interchanges.
10. The Consultants shall also carry out the design and make suitable recommendations for protection works for bridges and drainage structures.
11. In case land available is not adequate for embankment slope, suitable design for RCC retaining wall shall be furnished. However, RES wall may also be considered depending upon techno-economic suitability to be approved by CE (P) Beacon (BRO).

4.12.7. Drainage System

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.
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.
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.

4.12.8. Traffic Safety Features, Road Furniture and Road Markings

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

4.12.9. Arboriculture and Landscaping

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. The Transplantation of trees shall also be proposed wherever feasible.

4.12.10. Toll Plaza - Deleted

4.12.11. Weighing Station, Parking Areas and Rest Areas - Deleted

4.12.12. Miscellaneous Works

1. The Consultants shall make suitable designs and layout for miscellaneous works including rest areas, bus bays, vehicle parking areas, telecommunication facilities etc. wherever appropriate.
2. The Consultants shall prepare the detailed scheme and lay out plan for the works mentioned in Para 1.
3. The Consultants shall prepare detailed plan for the traffic management and safety during the construction period.

4.13. Environment and Social Impact Assessment

The consultant shall under take the detailed environmental and social impact assessment in accordance with the standard set by the Government of India for projects proposed to be funded by BRO/MORT&H. In respect of projects proposed to be funded by ADB loan assistance, Environmental Assessment Requirements, Environmental Guidelines for selected infrastructure projects, 1993 of Asian Development Bank shall be followed. Similarly, for projects proposed to be funded by World Bank loan assistance, World Bank Guidelines shall be followed.

4.13.1 Environmental Impact Assessment

Environment impact assessment or initial environment examination be carried out in accordance with ADB's Environmental Assessment Requirements of ADB 1998 guidelines for selected infrastructure projects 1993 as amended from time to time /World Bank Guidelines / Government of India Guidelines, as applicable

1. The consultant should carry out the preliminary environmental screening to assess the direct and induced impacts due to the project.
2. The consultant shall ensure to document baseline conditions relevant to the project with the objective to establish the benchmarks.
3. The consultant shall assess the potential significant impacts and identify the mitigation measures to address these impacts adequately.
4. The consultant shall do the analysis of alternatives incorporating environmental concerns. This should include with and without scenario and modification incorporated in the proposed project due to environment considerations.
5. The consultant shall give special attention to the environmental enhancement measures in the project for the following:

(a) Cultural property enhancement along the highways
(b) Bus bays and bus shelters including a review of their location,
(c) Highway side landscape and enhancement of the road junctions,
(d) Enhancement of highway side water bodies, and
(e) Redevelopment of the borrow areas located on public land.

6. The consultant shall prepare the bill-of-quantities (BOQ) and technical specifications for all items of work in such a way that these may be readily integrated to the construction contracts.
7. The consultant shall establish a suitable monitoring network with regard to air, water and noise pollution. The consultant will also provide additional inputs in the areas of performance indicators and monitoring mechanisms for environmental components during construction and operational phase of the project.
8. The consultant shall provide the cost of mitigation measures and ensure that environmental related staffing, training and institutional requirements are budgeted in project cost.
9. The consultant shall prepare the application forms and obtain forestry and environmental clearances from the respective authorities including the SPCBs and the MOEF on behalf of CE (P) Beacon The consultants will make presentation, if required, in defending the project to the MOEF Infrastructure Committee.
10. The consultant shall identify and plan for plantation and Transplantation of the suitable trees along the existing highway in accordance with IRC guidelines.
11. The consultant shall assist in providing appropriate input in preparation of relevant environment and social sections of BPIP.

4.13.2 Social Assessment

1. The consultant would conduct base line socio-economic and census survey to assess the impacts on the people, properties and loss of livelihood. The socioeconomic survey will establish the benchmark for monitoring of R&R activities. A social assessment is conducted for the entire project to identify mechanisms to improve project designs to meet the needs of different stakeholders. A summary of stakeholder discussions, issue raised and how the project design was developed to meet stakeholders need would be prepared.
2. The consultant shall prepare Land Acquisition Plan and assist CE (P) Beacon in acquisition of land under various Acts.
3. The consultant would prepare Resettlement and Rehabilitation Plan and assess feasibility and effectiveness of income restoration strategies and suitability and availability to relocation sites. The resettlement plan which accounts for land acquisition and resettlement impacts would be based on a 25% socio-economic survey and 100 % census survey of project affected people which provides the complete assessment of the number of affected households and persons, including common property resources. All untitled occupants are recorded at the initial stages and identify cards will be issued to ensure there is no further influx of people in to the project area. All consultations with affected persons (to include list of participants) should be fully documented and records made available to CE (P) Beacon.

- Assessment on the impact of the project on the poor and vulnerable groups along the project road corridor.
- Based on the identified impacts, developing entitlement matrix for the project affected people.
- Assessment on social issues such as indigenous people, gender, HIV/AIDS, labourers including child labour.
- Implementation budgets, sources and timing of funding and schedule of tasks.
- Responsibility of tasks, institutional arrangements and personnel for delivering entitlement and plans to build institutional capacity.
- Internal and external monitoring plans, key monitoring indicators and grievance redress mechanism.
- Incorporating any other suggestions of the CE (P) Beacon, till the acceptance of the reports by the CE (P) Beacon.

4.13.3 Reporting Requirements of EIA

- The consultant would prepare the stand-alone reports as per the requirement of the ADB/World Bank / CE (P) Beacon, as applicable, with contents as per the following:
- Executive Summary
- Description of the Project
- Environmental setting of the project.
- Identification and categorization of the potential impacts (during pre-construction, construction and operation periods).
- Analysis of alternatives (this would include correlation amongst the finally selected alternative alignment/routing and designs with the avoidance and environmental management solutions).
- The public consultation process.
- Policy, legal and administrative framework. This would include mechanisms at the states and national level for operational policies. This would also include a description of the organizational and implementation mechanism recommended for this project.
- Typical plan or specific designs for all additional environmental items as described in the scope of work.
- Incorporating any other as per the suggestions of the ADB/ World Bank / MORT&H/ CE (P) Beacon, till the acceptance of the reports by the ADB/ World Bank / MORT&H/ CE (P) Beacon, as applicable.
- EMP Reports for Contract Package based on uniform methodology and processes. The consultant will also ensure that the EMP has all the elements for it to be a legal document. The EMP reports would include the following:

  - Brief description of the project, purpose of the EMP, commitments on incorporating environmental considerations in the design, construction and operations phases of the project and institutional arrangements for implementing the EMP.
  - A detailed EMP for construction and operational phases with recourse to the mitigation measures for all adverse impacts.

- Detailed plans for highway-side tree plantation(as part of the compensatory aforestation component).
- Environmental enhancement measure would be incorporated.
- Enhancement measures would include items described in the scope of work and shall be complete with plans, designs, BOQ and technical specifications.
- Environmental monitoring plans during and after construction including scaling and measurement techniques for the performance indicators selected for monitoring.
- The EMP should be amendable to be included in the contract documents for the works.
- Incorporating any other as per the suggestions of the ADB/ World Bank/ CE (P) Beacon, till the acceptance of the reports by the ADB/ World Bank / CE (P) Beacon as applicable.

4.13.4 Reporting requirements of RAP

Analysis on the resettlement plan be conducted based on ADBs Hand Book on Resettlement, A Guide to Good practice 1998 as amended time to time/ World Bank Guidelines / Government of India Guidelines, as applicable.

- Executive summary
- Description of project
- Objectives of the project.
- The need for Resettlement in the Project and evaluation of measures to minimize resettlement.
- Description and results of public consultation and plans for continued participation of PAPs.
- Definition of PAPs and the eligibility criteria.
- Census and survey results-number affected, how are they affected and what impacts will they experience.
- Legal and entitlement policy framework-support principles for different categories of impact.
- Arrangements for monitoring and evaluation (internal and external) Implementation schedule for resettlement which is linked to the civil works contract
- A matrix of scheduled activities linked to land acquisition procedures to indicate clearly what steps and actions will be taken at different stages and the time frame
- The payment of compensation and resettlement during the acquisition process.
- An itemized budget (replacement value for all assets) and unit costs for different assets.

5. Estimation of Quantities and Project Costs

1. The Consultants shall prepare detailed estimates for quantities (considering designs and mass haul diagram) and project cost for the entire project (civil packages wise), including the cost of environmental and social safeguards proposed based on MoRT&H's Standard Data Book and market rate for the inputs. The estimation of quantities shall be based on

detailed design of various components of the projects. The estimation of quantities and costs would have to be worked out separately for civil work Package as defined in this TOR.

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.

4. The project cost estimates so prepared for CE (P) Beacon /ADB/WB projects are to be checked against rates for similar on-going works in India under CE (P) Beacon / World Bank/ ADB financed road sector projects.

6. Viability and Financing Options

1. The Project Road should be divided into the traffic homogenous links based on the findings of the traffic studies. The homogenous links of the Project Road should be further subdivided into sections based on physical features of road and pavement, sub-grade and drainage characteristics etc. The economic and commercial analysis shall be carried out separately for each traffic homogenous link as well as for the Project Road.

2. The values of input parameters and the rationale for their selection for the economic and commercial analyses shall be clearly brought out and got approved by CE (P) Beacon.

3. For models to be used for the economic and the commercial analyses, the calibration methodology and the basic parameters adapted to the local conditions shall be clearly brought out and got approved by CE (P) Beacon.

4. The economic and commercial analyses should bring out the priority of the different homogenous links in terms of project implementation.

6.1 Economic Analysis

1. The Consultants shall carry out economic analysis for the project. The analysis should be for each of the sections covered under this TOR. The benefit and cost streams should be worked out for the project using HDM-IV or other internationally recognized life-cycle costing model.

2. The economic analysis shall cover but be not limited to be following aspects:

   i. assess the capacity of existing roads and the effects of capacity constraints on vehicle operating costs (VOC);
   ii. calculate VOCs for the existing road situation and those for the project;
   iii. quantify all economic benefits, including those from reduced congestion, travel distance, road maintenance cost savings and reduced incidence of road accidents; and,
   iv. estimate the economic internal rate of return (EIRR) for the project over a 30-year period. In calculating the EIRRs, identify the tradable and non-tradable components of projects costs and the border price value of the tradable components.
   v. Saving in time value.

3. Economic Internal Rate of Return (EIRR) and Net Present Value (NPV), "with "and "without time and accident savings" should be worked out based on these cost-benefit stream. Furthermore, sensitivity of EIRR and NPV worked out forth different scenarios as given under:

Scenario – I	*Base Costs and Base Benefits*
Scenario - II	*Base Costs plus 15% and Base Benefits*
Scenario - III	*Base Costs and Base Benefits minus 15%*
Scenario - IV	*Base Costs plus 15% and Base Benefits minus 15%*

The sensitivity scenarios given above are only indicative. The Consultants shall select the sensitivity scenarios taking into account possible construction delays, construction costs overrun, traffic volume, revenue shortfalls, operating costs, exchange rate variations, convertibility of foreign exchange, interest rate volatility, non-compliance or default by contractors, political risks and force majeure.

4. The economic analysis shall take into account all on-going and future road and transport infrastructure projects and future development plans in the project area.

6.2 Financial Analysis

1. It is envisaged that the project stretch should be implemented on EPC/BOT basis, therefore, the Consultant shall study the financial viability of the project under a commercial format and under different user fee scenarios and funding options. The Consultants shall submit and finalize in consultation with the CE (P) Beacon officers the format for the analysis and the primary parameters and scenarios that should be taken into account while carrying out the commercial analysis. The financial model so developed shall be the property of CE (P) Beacon.
2. The Financial analysis for the project should cover financial internal rate of return, projected income statements, balance sheets and fund flow statements and should bring out all relevant assumptions. The sensitivity analysis should be carried out for a number of probabilistic scenarios.
3. The financial analysis should cover identification, assessment, and mitigating measures for all risks associated with the project. The analysis shall cover, but be not limited to, risks related to construction delays, construction costs overrun, traffic volume, revenue shortfalls, operating costs, exchange rate variations, convertibility of foreign exchange, interest rate volatility, non-compliance or default by contractors, political risks and force majeure.
4. The consultant shall suggest positive ways of enhancing the project Viability and furnish different financial models for implementing on BOT format.

7. Time period for the service

1. Time period envisaged for the study of the project is indicated in **Annex-I to LOI.** The final reports, drawings and documentation shall be completed within this time schedule.

2. CE (P) Beacon 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

8. Project Team and Project Office of the Consultant

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.

2. List of suggested key personnel to be fielded by the consultant with appropriate man-month of consultancy services is given in Enclosure I as per client's assessment.

3. A Manning Schedule for key personnel mentioned above is enclosed as Enclosure I along with broad job- description and qualification as Enclosure II. The information furnished in Enclosures I & II are to assist the Consultants to understand the client's perception about these requirements and shall be taken by the Consultants for the purpose of Financial Proposal and deployment schedule etc. in technical proposal to be submitted by them. Any deviation proposed may be recorded in the comments on TOR. All the 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 Data sheet. The bio-data of the key personnel should be signed on every sheet by the personnel concerned and the last sheet of each bio-data should also be signed by the authorized signatory of the Consultants.

4. The Consultants shall establish an office at the project site manned by senior personnel during the course of the surveys and investigations. All the project related office work shall be carried out by the consultant in their site office unless there are special reasons for carrying out part of the office work elsewhere for which prior approval of CE (P) Beacon shall be obtained. The address of the site office including the personnel manning it including their Telephone and FAX numbers will be intimated by the Consultant to CE (P) Beacon before commencement of the services.

5. The Consultant shall maintain an Attendance Register to be signed by each individual key personnel at site as well as at Head Office. The Consultant shall furnish certificate that all the key personnel as envisaged in the Contract Agreement have been actually deployed in the Projects at the time of submission of their bills to the CE (P) Beacon from time to time.

9. Reports to be submitted by the Consultant to CE (P) Beacon

9.1 All reports, documents and drawings are to be submitted separately for each of the traffic homogenous link of the Project Road. The analysis of data and the design proposals shall be based on the data derived from the primary surveys and investigations carried out during the period of assignment. The sources of data and model relationships used in the reports shall be indicated with complete details for easy reference.

9.2 Project preparation activities will be split into six stages as brought out below.

Preliminary design work should commence without waiting for feasibility study to be completed. Stage 3, 5 and 6 shall run in parallel with Stage 2 and 4

Stage 1: Inception Report

Stage 2: Feasibility Report/Alignment selection

Stage 3: LA & Clearances I Report

Stage 4: Detailed Project Report (DPR)

Stage 5: Technical Schedules

Stage 6: LA & Clearances II Report

9.3 Consultant shall be required to complete, to the satisfaction of the CE (P) Beacon, all the different

stages of study within the time frame indicated in the schedule of submission in para 10 pertaining to Reports and Documents for becoming eligible for payment for any part of the next stage.

10. Reports and Documents to be submitted by the Consultant to CE (P) Beacon

1. The Consultant shall submit to the client the reports and documents in bound volumes (and not spiral binding form) after completion of each stage of work as per the schedule and in the number of copies as given in Enclosure III. Further, the reports shall also be submitted in floppy diskettes / CD's in addition to the hardcopies as mentioned in Enclosure-III. Consultant shall submit all other reports mentioned specifically in the preceding paras of the TOR.

2. The time schedule for various submissions prescribed at s.l.no.1 above shall be strictly adhered to. No time-over-run in respect of these submissions will normally be permitted. Consultant is advised to go through the entire terms of reference carefully and plan his work method in such a manner that various activities followed by respective submissions as brought out at Sl.No.1 above are completed as stipulated. Consultant is, therefore, advised to deploy sufficient number of supporting personnel, both technical and administrative, to undertake the project preparation activities in construction package (Section) simultaneously. As far as possible, the proposal should include complete information such as number of such persons, name, position, period of engagement, remuneration rate etc. The Consultant is also advised to start necessary survey works from the beginning so as to gain time in respect of various other activities in that stage.

STAGE 1

10.1 Quality Assurance Plan (QAP) Document

1. Immediately upon the award, the Consultants shall submit four copies of the QAP document covering all aspects of field studies, investigations design and economic financial analysis. The quality assurance plans/procedures for different field studies, engineering surveys and investigation, design and documentation activities should be presented as separate sections like engineering surveys and investigations, traffic surveys, material geo-technical and sub-soil investigations, road and pavement investigations, investigation and design of bridges &structures, environment and R&R assessment, economic & financial analysis, drawings and documentation; preparation, checking, approval and filing of calculations, identification and traceability of project documents etc. Further, additional information as per format shall be furnished regarding the details

of personnel who shall be responsible for carrying out/preparing and checking/verifying various activities forming part of feasibility study and project preparation, since inception to the completion of work. The field and design activities shall start after the QAP is approved by CE (P) Beacon.

2. The data formats proposed by the Consultants for use in field studies and investigations shall be submitted within 14 days after the commencement of services and got approved by CE (P) Beacon.

10.2 Inception Report (IR)

1. The report shall cover the following major aspects:

   i. Project appreciation;
   ii. Detailed methodology to meet the requirements of the TOR finalized in consultation with the CE (P) Beacon officers; 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;
   iii. Task Assignment and Manning Schedule;
   iv. Work programme;
   v. Proforma for data collection;
   vi. Design standards and proposed cross-sections;
   vii. Key plan and Linear Plan;
   viii. 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;
   ix. Quality Assurance Plan (QAP) finalized in consultation with CE (P) Beacon.
   x. Draft design standards; and

2. The requirements, if any, for the construction of bypasses should be identified on the basis of data derived from reconnaissance and traffic studies. The available alignment options should be worked out on the basis of available maps. The most appropriate alignment option for bypasses should be identified on the basis of site conditions and techno-economic considerations. Inception Report should include the details regarding these aspects concerning the construction of bypasses for approval by CE (P) Beacon.

STAGE 2:

10.3 Feasibility Report

1. The consultant shall commence the Feasibility Study of the project in accordance with the accepted IR for both Tunnel and Road & Bridges shall contain the following::

   i. Executive summary
   ii. Overview of CE (P) Beacon *organization and activities, and project financing and cost recovery mechanisms*
   iii. Project description including possible alternative alignments/bypasses and technical/engineering alternatives

iv. Geology profile along the alignment based on surface geological studies.
v. Rock-Mass classification of tentative support design.
vi. Methodology adopted for the feasibility study
vii. Socioeconomic profile of the project areas
viii. Indicative design standards, methodologies and specifications
ix. Traffic surveys and analysis
x. Environmental screening and preliminary environmental assessment
xi. Initial social assessment and preliminary land acquisition/resettlement plan
xii. Cost estimates based on preliminary rate analysis and bill of quantities
xiii. Economic and financial analysis
xiv. Conclusions and recommendations

2. Deleted

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

4. The Final Feasibility Study Report incorporating comments, revisions and modifications suggested by CE (P) Beacon shall be submitted within 15 days of comments from CE (P) Beacon on draft feasibility study report.

STAGE 3:

10.4 Strip Plan and Clearances

1. The Consultants shall submit the following documents:

i. Details of the center line of the proposed Tunnel/widened Highway along with the existing and proposed right-of-way limits to appreciate the requirements of land acquisition;
ii. The information concerning the area including ownership of land to be acquired for the implementation of the project shall be collected from the revenue and other concerned authorities and presented along with the strip plans;
iii. Strip plans showing the position of existing utilities and services indicating clearly the position of their relocation;

iv. Details for various clearances such as environment and forest clearances;

v. Separate strip plan showing shifting / relocation of each utility services in consultation with the concerned local authorities;

vi. 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;

vii. Detail schedules for acquisition of additional land and additional properties in consultation with the revenue authorities; and

viii. Land Acquisition Plan shall be prepared after digitization of cadastral / land revenue maps. The digitized map shall exactly match the original map, like a contact print, since the dimensions and area of plots, or the whole village is to be extracted from the map itself. An accuracy of 1mm or higher in a 1:1000 scale map shall be ensured, as this translates into an accuracy of 1 m or higher on ground.

2. The strip plans and land acquisition plan shall be prepared on the basis of data from reconnaissance and detailed topographic surveys.

3. The Report accompanying the strip plans should cover the essential aspects as given under:

i. Kilometer-wise Land Acquisition Plan (LAP) and schedule of ownership thereof and Costs as per Revenue Authorities and also based on realistic rates.

ii. Details of properties, such as buildings and structures falling within the right-of way and costs of acquisition based on realistic rates.

iii. Kilometer-wise Utility Relocation Plan (URP) and costs for relocation per civil construction package as per concerned authorities.

iv. 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. The strip plans shall clearly indicate the scheme for widening. The views and suggestions of the concerned State PWDs/Concerned agency should be duly taken into account while working out the widening scheme (left, right or symmetrical). The widening scheme shall be finalized in consultation with CE (P) Beacon.

5. Kilometer-wise Strip Plans for section (Package) shall be prepared separately for each concerned agency and suggested by CE (P) Beacon.

10.5 Land Acquisition Report

1. The Land acquisition report shall be prepared and submitted for section (package).

   The report shall include detail schedules about acquisition of landholdings as per revenue records and their locations in a strip plan and also the costs as per district authorities. Details shall be submitted in land acquisition proforma to be supplied by CE (P) Beacon. The land acquisition report shall be submitted in both Hind and English languages.

2. The land acquisition report should be prepared in consultation with affected persons, non-governmental organizations and concerned government agencies and should cover land acquisition and resettlement plan and costs of resettlement and rehabilitation of such affected persons. It should also include plan of compensating afforestation, its land requirement with specific locations and cost involved for undertaking all activities in this regard.

10.6 Deleted

STAGE: 4

10.7 Draft Detailed Project Report (DPR)

1. The draft DPR Submission shall consist of Construction methodology, contract model and its merits and demerits, Main Report, Design Report, Ventilation, Lightening and various safety measures, Report on Geo-Physical and Geo-Technical investigations, Materials Report, Engineering Report, Drainage Design Report, Economic and Financial Analysis Report, Environmental Assessment Report including Resettlement Action Plan (RAP), bid Documents and Drawings.

2. The Report volumes shall be submitted as tabulated in para 10 above.

3. The Documents and Drawings shall be submitted for the Package and shall be in the following format:

Reports

i. ***Volume-I, Main Report:*** *This report will present the project background, social analysis of the project, details of surveys and investigations carried out, analysis and interpretation of survey and investigation data, traffic studies and demand forecasts designs, cost estimation, environmental aspects, economic and commercial analyses and conclusions. The report shall include Executive Summary giving brief accounts of the findings of the study and recommendations including reports such as General Project Description, Horizontal and Vertical Tunnel Alignment, Typical cross section, Pavement, Tunnel Safety concept, Ventilation Concept and design, Ventilation shafts etc., Hydraulic Design , Construction Method, Geotechnical/Geological evaluation (Geotechnical Factual report, Geotechnical Interpretive Report, High Resolution Satellite Imagery) and Rock Mass classification , Tunnel Support System, Portal Design and Construction Time, Construction Cost etc.*

The Report shall also include maps, charts and diagrams showing locations and details of existing features and the essential features of improvement and upgrading. The Environmental Impact Assessment (EIA) Report for contract package shall be submitted as a part of the main report.

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 Main Report.

ii. ***Volume - II, Design Report:*** *This volume shall contain design calculations, 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 bridges, tunnels and cross-drainage structures while Part-II shall deal with the design of road features and pavement composition. The sub-soil exploration report including the complete details of boring done, bore log report, geotechnical base line report, comparison between conventional and TBM construction, analyses and interpretation of data and the selection of design parameters shall be included as an Appendix to the Design Report.*

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 the existing site conditions, restrictions and other considerations. The report should clearly bring out the details of these aspect and the standards adopted.

iii. ***Volume - III, Materials Report:*** *The Materials Report shall contain details concerning the proposed borrow areas and quarries for construction materials and possible sources of water for construction purposes. The report shall include details on locations of borrow areas 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 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 stabilization (cement, lime, mechanical) should be included in the Report.

iv. ***Volume - IV, Environmental Assessment Report including Environmental Management Plan (EMP) & Resettlement Action Plan (RAP):*** *The Report shall be prepared conforming to the Guidelines of the Government of India, State Government and World Bank / ADB as appropriate for construction package. The report should invariably include but not limited to the reports such as Muck Disposal Plan, Landslide mitigation, Snow Avalanche Mitigation, Solid Waste Management, Energy Alternatives, Health Care, Noise Pollution & Air control, R & R reposts, Environmental Monitoring, Summary of cost, etc. in addition to relevant report for road portion.*

v. ***Volume - V, Technical Specifications:*** *The MORT&H's Technical Specifications Tunnel and Road works shall be followed for this study(IRC :SP:91 and Ministry Circular No. RW/NH-34072/1/2015-S&R (B) dated 18.08.2016). However, Volume IV: Technical specifications shall contain the special technical specifications which are not covered by MOST Specifications for Tunnels and Roads Bridges (latest edition / revision) and also specific quality control norms for the construction of works.*

vi. ***Volume - VI, Rate Analysis:*** *This volume will present the analysis of rates for all items of works. 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. The rates for material, labour and machinery should be based on the "Standard Data Book for Analysis of Rates" (SoR) of Ministry of Road Transport and Highways published by Indian Road Congress (IRC). Where the SoR rates do not cover all items for tunnel construction works, all machinery, labour and/or material rates concerning tunnel construction should be determined from international price data of the relevant year and verified with actual Indian highway tunnel projects with similar layout and boundary conditions (such as Pahtnitop Tunnel and Rohtang Tunnel).*

vii. ***Volume - VII, Cost Estimates:*** *This volume will present the contract package wise cost of each item of work as well as a summary of total cost.*

viii. ***Volume - VIII, Bill of Quantities:*** *This volume shall contain the package-wise detailed Bill of Quantities for all items of works.*

ix. ***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:*

- *General*

(i)Area Map (1:200000/ 1:75000)
(ii) General Layout Tunnel – Plan view (1:10000)
(iii) General layout Tunnel- Longitudinal Section (1:10000)
(iv) Geotechnical Longitudinal Section of Tunnel with Ground condition and support (1:10000)
(v) Tunnel System and Installations – (N.T.S)
(vi) General Construction Sequence – (N.T.S)

- *Geometry*

(i) Typical cross Section of Tunnel, Clearance profile and installations, Jet Fan Cabinet, clearance profile and installations , Inner Lining - (1:50)

- *Hydraulic System*

(i) General Schematic layout, plan view (N.T.S.)

- *Excavation*

Excavation and primary support of tunnel and ventilation shafts in all support categories- 1:100

- *Ventilation shafts*

Typical cross section- 1:50, 1:1000
Main & Subsidiary measuring sections- 1:100

- *E&M*

(i) Elementary diagram of safety installations- 1:10000
(ii) Typical cross section installations: 1:100
(iii) Power supply scheme: N.T.S
(iv) Schematic Layout of technical equipment in front and in the inner area of the tunnel - N.T.S
(v) Schematic layout of main tunnel lighting - N.T.S
(vi) Schematic diagram of video surveillance system- N.T.S
(vii) Schematic diagram of Fire alarm and detection system- N.T.S
(viii) Schematic diagram of Integrated tunnel control system- N.T.S
(xi) Operators workplaces main control center - N.T.S

Road Portion

- *Horizontal Alignment and Longitudinal Profile.*
- *Cross-section @ 50m interval along the alignment within ROW*
- *Typical Cross-Sections with details of pavement structure.*
- *Detailed Working Drawings for individual Culverts and Cross Drainage Structures.*
- *Detailed Working Drawings for individual Bridges, tunnels and Structures*
- *Detailed Drawings for Improvement of At-Grade and Grade-Separated.*
- *Intersections and Interchanges.*
- *Drawings for Road Sign, Markings and other Facilities.*
- *Schematic Diagrams (linear chart) indicating but be not limited to be following:*
    - *Widening scheme;*
    - *Locations of median openings, intersections, interchanges, underpasses, overpasses, bypasses;*
    - *Locations of service roads;*
    - *Location of traffic signals, traffic signs, road markings, safety features; and,*
    - *Locations of parking areas, bus bays, rest areas, if any*

- *All drawings will be prepared in A2 size sheets. The format for plan, cross section and profile drawings shall be finalized in consultation with the concerned CE (P) Beacon officers. The drawings shall also include details of all BM and reference pillars, HIP and VIP. The co-ordinates of all points should be referenced to a common datum, preferably GTS referencing system. The drawings shall also include the locations of all traffic safety features including traffic signals, signs, markings, crash barriers, delineators and rest areas, busbays, parking areas etc.*
- *The typical cross-section drawings should indicate the scheme for future widening of the carriageway. 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.*

10.8 Final Detailed Project Report, Documents and Drawings (6 Sets)

1. The Final package-wise DPR consisting of Main Report, Tunnel Design Report, Drainage Design Report and Materials Report, incorporating all revisions deemed relevant following receipt of the comments from CE (P) Beacon on the draft DPR shall be submitted as per the schedule given in Enclosure-III.

STAGE: 5

10.9 Technical Schedules

1. Civil Work Contract Agreement: A civil works contract agreement shall be submitted.

STAGE: 6

10.10 LA & Clearances II Report

1. Draft 3a, 3A, 3D notification/or notification as per LA Act of concern state/or land acquisition under NH Act shall be submitted by the consultant.

2. All the necessary project related clearances such as environment, forest and wildlife clearance from MOEF, Railways in respect of ROB/ RUBs, Irrigation Deptt and any other concerned agencies shall be obtained by the consultant. The final approvals shall be obtained and submitted to CE (P) Beacon so that project implementation can straight away proceed without any hold up. For utility clearances, consultant shall prepare draft utility shifting estimates using the latest Schedule of Rates and obtain final approval from utility agency and CE (P) Beacon

11. Interaction with CE (P) Beacon

1. During entire period of services, the Consultant shall interact continuously with CE (P) Beacon and provide any clarification as regards methods being followed and carryout modification as suggested by CE (P) Beacon. A programme of various activities shall be provided to CE (P) Beacon and prior intimation shall be given to CE (P) Beacon regarding start of key activities such as boring, survey etc. so that inspections of CE (P) Beacon officials could be arranged in time.

2. The CE (P) Beacon officers and other Government officers may visit the site at any time, individually or collectively to acquaint/ supervise the field investigation and survey works. CE (P) Beacon may also appoint a Proof Consultant to supervise the work of the DPR consultant including inter-alia field investigation, survey work, Design work and preconstruction activities

3. The consultant shall be required to send 3 copies of concise monthly Progress Report by the 5th day of the following month to the designated officer at his Head Quarter so that progress could be monitored by the CE (P) Beacon. These reports will indicate the dates of induction and de-induction of various key personnel and the activities performed by them. Frequent meetings with the consultant at site office or in Delhi are foreseen during the currency of project preparation.

4. All equipment, software and books etc. required for satisfactory services for this project shall be obtained by the Consultant at their own cost and shall be their property.

12. Payment Schedule

1. The Consultant will be paid consultancy fee as a percentage of the contract values as per the schedule given in the Draft Contract Agreement.

13. Data and Software

1. The floppy diskettes/CD's containing all basic as well as the processed data from all field studies and investigations, report, appendices, annexure, documents and drawings shall be submitted to CE (P) Beacon at the time of the submission of the Final Report. The data can be classified as follows:

   i. ***Engineering Investigations and Traffic Studies:*** *Road Inventory, Condition, Roughness, Test Pit (Pavement composition), Benkelman Beam Deflection, Material Investigation including test results for sub-grade soils, Traffic Studies(traffic surveys), axle load surveys, Sub-soil Exploration, Drainage Inventory, Inventory data for bridge and culverts indicating rehabilitation, new construction requirement etc. in MS EXCEL or any other format which could be imported to widely used utility packages.*

   Tunnels :*General Geology, Structural data, Engineering Geology, description of Ground pattern, salinity and coefficient of permeability.*

   Topographical Survey and mapping, Structural Stereographical maps Isopak maps, preparation of cross section, Rock Mass property, Rock stresses, Ground water conditions, Geothermal Ground gradient, Inflammable gases,

   i. ***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 files would be submitted in dxf or dwg format.*

   ii. ***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 for the purpose of updating the cost of the project.*

   iii. ***Economic and Financial Analysis***

2. **Software**: The Consultant shall also hand-over to CE (P) Beacon floppies/CD's containing any general software including the financial model which has been specifically developed for the project.

3. The floppy diskettes/CD's should be properly indexed and a catalogue giving contents of all floppies/CD's and print-outs of the contents (data from field studies topographic data and drawings) should be handed over to CE (P) Beacon at the time of submission of the Final Report.

4. Consultant shall include editable soft copies of the final versions of all documents, including but not limited to the strip plan, plan & profile drawings, cross sections of right of way and details of structures as well as any cost workings.

SUPPLEMENT I

ADDITIONAL POINTS TO BE CONSIDERED FOR HILL ROADS IN ADDITION TO POINTS COVERED IN MAIN TOR

S. No.	Clause No. of TOR	*Additional points*
1.	2.2	a) Provisions of tunnels if required.
2.	2.3	a) Design of tunnels, if required b) 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
3.	3	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 by provision of structures and provision of tunnels if required
4.	4.1	a) Inventory and condition survey for tunnels, if required. b) Identification of faults in rock strata and impact of faults in design of tunnels, if required c) Detailed design of road considering and incorporating specific aspects related to hill region like terrain, topographic conditions, extreme weather conditions, altitude effects etc. d) 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 e) Design of scenic overlooks/watering points etc.
5.	4.5 (1)	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. For aspects not covered by IRC and BIS, international standard practices, such as, British and American Standards may be adopted.
6.	4.7	Review of data and documents pertaining to a) Terrain and soil condition b) Condition of tunnels, if required. c) Sub-surface and geo-technical data for existing tunnels, if required. d) Drawing and details of existing tunnels, if required. e) Existing protective works, erosion control and land slide control/

		protection works, slope stabilization measures, snow drift control measures, avalanche protection measures f) Existing land slide and snow clearance facilities g) Geological details of rock strata in the area in case of tunnels
7.	4.11(1)	The Consultant should make an in depth study of available geological and meteorological maps of the area.
8.	4.11 (2)	The primary tasks to be accomplished during the reconnaissance survey shall also include: 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) Realignment requirements including provision of tunnels, if required. d) Inventory of tunnels and geologically sensitive areas like slip prone areas, areas subject to landslides, rock fall, snow drifts, erosion, avalanche activity etc.
9.	4.11.2.1 (ii)	Cross sections shall be taken at every 25 m. in case of hill roads and at points of appreciable changes in soil conditions. While taking cross sections, soil conditions shall also be recorded.
10.	4.11.3.1 (1)	The inventory data shall also include: a) General elevation of road indicating maximum & minimum heights negotiated by main ascents & descents and total no. of ascents &descents. b) Details of road gradients, lengths of gentle & steep slopes, lengths & 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. c) Details of tunnels d) Details & types of protective structures, erosion & land slide control/protection measures, snow drift control measures, avalanche protection/control measures etc.
11.	4.11.3.2 (2)	Pavement :- a) Location of crust failures along with their causes b) Conditions of camber/cross falls/super elevations etc., whether affected by subsidence. Embankment: Extent of slope erosion on hill and valley side

12.	--	Condition Surveys & Investigation for Slope Stabilization, Erosion Control, Landslide Correction/Protection & Avalanche Protection Measures: a) Inventory & Condition Surveys of Existing Protective/Control Measures: The consultant shall make an inventory of all the structures 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. b) 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 of existing slide area and to identify potential slide areas. This shall be followed by further investigations like geological/geotechnical/hydrological investigation to determine specific site conditions prevailing in the slide area as per relevant IRC specifications/publications, MORT&H circulars and relevant recommendations of the international standards for hill roads. The result of the investigations shall provide basis for engineering analysis and the design of protection/remedial measures.
13.	4.11.4.4	a) For tunnels if required, geotechnical and subsurface investigation shall be done asper IRC:SP:91. b) Geotechnical and subsurface investigation and testing for tunnels shall be carried out through the geotechnical Consultants who have the experience of geotechnical and subsurface investigation in similar project.
14.	4.12.1 (1)	The Consultant shall also carry out detailed designs and prepare working designs for the following: a) cross sections at every 25 m intervals b) Slope stabilization and erosion control measures c) Design of protection/control structures in areas subject to subsidence, landslides, rock fall, rock slide, snow drifts, icing, scour, avalanche activity etc. d) Design of protective structures in slip prone and unstable areas e) Design of scenic overlooks, watering points etc. f) Safety features specific to hill roads
15.	4.12.2 (1)	The Consultant shall evolve Design Standards and material specifications

	4.12.2 (2)	for the Study primarily based on IRC publications, MORT&H Circulars and relevant recommendations of the international standards for hill roads for approval by CE (P) Beacon The Design Standards evolved for the project shall cover all aspects of detailed design including the design of geometric elements, pavement design, bridges and structures, tunnels if required, traffic safety and materials.
16.	4.12.3	Wherever practicable/feasible hairpin bends and steep gradients shall be avoided by realignments, provision of structures or any other suitable provisions.
17.	4.12.4	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 operations etc. must also be considered along with traffic intensity, its growth, axle loads and design life.
18.	4.12.5(3)	The design of embankments should include the requirements for protection works and traffic safety features including features specific to hill roads.
19.	--	Design and Drawing of Tunnels: The Consultant shall prepare design and drawings for tunnels, if required as per the results of feasibility study, as per the relevant specifications of IRC:SP:91/MORT&H and other international specifications.
20.	4.12.7	a) Topography of hills generates numerous water courses and this coupled 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. b) 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.
21.	4.12.8	The Consultant shall design suitable traffic safety features and road furniture including traffic signals, signs, markings, overhead sign boards, crash barriers ,delineators etc. including any feature specific to hill roads. The locations of these features shall be given in the reports and also shown in the drawings.
22.	4.12.3 (1)	The Consultant 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.
23.	10.7 (1)	Volume II: Design Report : a) Inventory of protection measures and other structures b) Inventory of tunnels, if required. c) Proposed preliminary designs for tunnels, if required. Volume III: Drawings a) Drawings for protection/control measures and other structures b) Drawings for tunnels, if required.
24.	10.7 (3)	Volume II: Design Report (Part II) Part II of Design Report shall also deal with design of tunnels, if required and design of other protection/control structures. Volume IX: Drawing Volume This shall also include : a) Detailed working drawings for tunnels, if required. b) Detailed working drawings for protection/control structures

Signature of contractor For Accepting Officer

SUPPLEMENT II

S.No.	Clause No. of TOR	*Additional points*
1	4.1	**For standalone bridge projects the scope of work shall include detailed design of approach road extending at least up to 2 km on either side of the bridge**
1.	4.11.4.2(6)	**Model Studies for Bridges** 1. **Objective** Physical/ Mathematical Model study for detailed Hydraulic / Hydrologic investigations regarding the proposed bridge for hydraulic design of the bridge and assessment and hydraulic design of required river training works. 2. **Methodology** **Physical/Mathematical M**odel study shall be carried out at a reputed/recognized institution. The consultant will be responsible for identifying the institution, supplying Information /Documents /Data required for modal studies as indicated in para 4 below and coordinating the model study with the institution concerned 3. **Scope of Work** **3.1 Physical Model study** Physical modeling with appropriate model scale for Hydraulic and Hydrologic Investigations to : i) Finalize span arrangement causing uniformity in flow distribution, and work out the alignment and orientation of river training works and bridge axis. ii) Provide information on estimated/observed maximum depth of scour. iii) Provide information on required river training works for proposed bridge iv) Provide hydraulic design for the bridge and the required river training works. v) Quantify the general direction of river course through bridge, afflux, extent and magnitude of flood, effect of backwater, if any, aggradation/degradation of bed, evidence of scour etc. shall be used to Sepment the available hydrological data. The presence of flood control/irrigation structures, if affecting the hydraulic characteristics like causing obliquity, concentration of flow, scour, silting of bed, change in flow levels, bed levels etc. shall be studied and considered in Hydraulic design of proposed bridge. The details of any planned work

		in the immediate future that may affect the river hydraulics shall be studied and considered. **3.2 Mathematical Model study** Mathematical modeling for detailed Hydraulic / Hydrologic investigations regarding the proposed new bridge to: i) Finalize the site/location of the proposed new bridge based on mathematical modeling. ii) Provide information on estimated/observed maximum depth of scour.. iii) Provide information on required river training works for proposed bridge iv) Provide hydraulic design for the bridge and the required river training works. v) Quantify the general direction of river course through bridge, afflux, extent and magnitude of flood, effect of backwater, if any, aggradation/degradation of bed, evidence of scour etc. shall be used to Sepment the available hydrological data. The presence of flood control/irrigation structures, if affecting the hydraulic characteristics like causing obliquity, concentration of flow, scour, silting of bed, change in flow levels, bed levels etc. shall be studied and considered in Hydraulic design of proposed bridge. The details of any planned work in the immediate future that may affect the river hydraulics shall be studied and considered. **4. Information /Documents /Data required for Physical /Mathematical Model study** i) Plan layouts showing the locations of the proposed bridge as well as the existing bridges / barrages etc., in the vicinity of the proposed bridge with the chainages with respect to a standard reference marked on it. ii) High flood discharges and corresponding flood levels at the locations of the existing bridges in the vicinity of the proposed bridge. iii) General arrangement drawing (GAD) of the existing bridges showing number of spans, pier and well dimensions, founding levels, maximum scour level, the design discharge and the HFL, guide bund details. On this, the plan form of the river course with the bridge alignment may also be shown as far as possible.

		iv) General arrangement drawing (GAD) of the proposed new bridge showing number of spans , pier and foundation dimensions. On this, the plan form of the river course with the bridge alignment may also be shown as far as possible. v) River cross sections at 500m longitudinal spacing (maximum) up to a distance of 2 times the bridge total length on the upstream side and up to a distance equal to the bridge total length on the downstream with right bank and left bank clearly marked on it. At least one cross section to be provided at the location of the proposed bridge. At each cross section, the bed levels to be taken at a maximum lateral distance of 8 m in flow section and at 25 m in non flow section respectively. The abrupt variations in the bed levels to be captured by taking measurements at closer locations both in longitudinal as well as lateral directions. vi) The cross sections, as for as possible, from high bank to high bank. vii) The longitudinal profile of the river along the length of the proposed alignment. viii) Size distribution of the river bed material and the bore log data at different locations at the site of the proposed bridge. ix) The series of annual peak flood of the river for at least 15 years period.

SUPPLEMENT-III

ADDITIONAL REQUIREMENT OF SAFETY AUDIT

The use of checklists is highly recommended as they provide a useful "aide memoire" for the audit team to check that no important safety aspects are being overlooked. They also give to the project manager and the design engineer a sense of understanding of the place of safety audit in the design process. The following lists have been drawn up based on the experience of undertaking systematic safety audit procedures overseas. This experience indicates that extensive lists of technical details has encouraged their use as "tick" sheets without sufficient thought being given to the processes behind the actions. Accordingly, the checklists provide guidelines on the principal issues that need to be examined during the course of the safety audits.

Stage F-During Feasibility Study

1. The audit team should review the proposed design from a road safety perspective and heck the following aspects

CONTENTS	ITEMS
Aspects to be checked	A. Safety and operational implications of proposed alignment and junction strategy with particular references to expected road users and vehicle types likely to use the road. B. Width options considered for various sections. C. Departures from standards and action taken. D. Provision of pedestrians, cyclists and intermediate transport E. Safety implications of the scheme beyond its physical limits i.e. how the scheme fits into its environs and road hierarchy
A1 : General	➢ Departure from Standards ➢ Cross-sectional variation ➢ Drainage ➢ Climatic conditions ➢ Landscaping ➢ Services apparatus ➢ Lay-byes ➢ Footpath ➢ Pedestrian crossings ➢ Access (minimize number of private accesses)

	➢ Emergency vehicles ➢ Public Transport ➢ Future widening ➢ Staging Contract ➢ Adjacent development
A2 : Local Alignment	➢ Visibility ➢ New/existing road reference ➢ Safety Aids on step hills
A3 : Junctions	➢ Minimize potential conflicts ➢ Layout ➢ Visibility
A4 : Non-Motorized road users Provision	➢ Adjacent land. ➢ Pedestrians ➢ Cyclists ➢ Non motorized Vehicles
A5 : Signs and Lighting	➢ Lighting ➢ Signs/Marking
A6 : Construction and operation	➢ Buildability ➢ Operational ➢ Network Management

Stage 1 – Completion of Preliminary Design

1. The audit team should review the proposed check the following aspects design from a road safety perspective and check the following aspects	
Contents	Items
Aspects to be checked	A. Safety and operational implications of proposed alignment and junction strategy with particular references to expected road users and vehicle types likely to use the road. B. Width options considered for various sections. C. Departures from standards and action taken. D. Provision of pedestrians, cyclists and intermediate transport. E. Safety implications of the scheme beyond its physical limits i.e. how the scheme fits into its environs and road hierarchy
B1 : General	➢ Departure from Standards ➢ Cross-sectional variation ➢ Drainage ➢ Climatic conditions ➢ Landscaping ➢ Services apparatus ➢ Lay-byes ➢ Footpath ➢ Pedestrian crossings ➢ Access (minimize number of private accesses) ➢ Emergency vehicles ➢ Public Transport ➢ Future widening ➢ Staging Contract ➢ Adjacent development
B2 : Local Alignment	➢ Visibility ➢ New/existing road reference ➢ Safety Aids on steep hills
B3 : Junctions	➢ Minimize potential conflicts ➢ Layout ➢ Visibility

B4 : Non-Motorized road users Provision	➢ Adjacent land. ➢ Pedestrians ➢ Cyclists ➢ Non motorized Vehicles
B5 : Signs and Lighting	➢ Lighting ➢ Signs/Marking
B6 : Construction and operation	➢ Buildability ➢ Operational ➢ Network Management

Stage 2 – Completion of Detailed Design

1. The audit team should satisfy itself that all issues raised at Stage 1 have been resolved. Items may require further consideration where significant design changes have occurred.
2. If a scheme has not been subject to a stage 1 audit, the items listed in Checklists B1 to B6 should be considered together with the items listed below.

Contents	Items
Aspects to be checked	A. Any design changes since Stage 1. B. The detailed design from a road safety viewpoint, including the road safety implications of future maintenance (speed limits; road signs and markings; visibility; maintenance of street lighting and central reserves).
C1 : General	➢ Departure from Standards ➢ Cross-sectional variation ➢ Drainage ➢ Climatic conditions ➢ Landscaping ➢ Services apparatus ➢ Lay-byes ➢ Access ➢ Skid resistance ➢ Agriculture ➢ Safety fences ➢ Adjacent development
C2 : Local Alignment	➢ Visibility ➢ New/existing road reference

C3 : Junctions	➢ Layout ➢ Visibility ➢ Signing ➢ Lighting ➢ Road Marking ➢ T,X,Y- Junction ➢ All roundabouts ➢ Traffic signals
C4 : Non-Motorized road users Provision	➢ Adjacent land. ➢ Pedestrians ➢ Cyclists ➢ Non motorized Vehicles
C5 : Signs and Lighting	➢ Advanced direction signs ➢ Local Traffic Sings ➢ Variable message signs ➢ Other traffic signs ➢ Lighting
C6 : Construction and operation	➢ Buildability ➢ Operational ➢ Network Management

Enclosure-I

MANNING SCHEDULE

E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*

Total Project Assignment (24 months)

S.No	Key Personnel	Total Time Period (mm)
1	Team Leader Cum Senior Tunnel Engineer	23
2	Tunnel Design Expert	12
3	Senior Geophysicist	6
4	Senior Geotechnical Engineer	12
5	Senior E& M Expert	6
6	Senior Geologist	9
7	Senior Surveyor Engineer	12
8	Environmental Expert	6
9	Material Engineer	6
10	Highway cum Pavement Engineer	4.5
11	Quantity Surveyor/Documentation Expert	6
	Total	**102.5**

1. Consultants have to provide a certificate that all the key personnel as envisaged in the Contract Agreement have been actually deployed in the projects. They have to furnish the certificate at the time of submission of their bills to CE (P) Beacon from time to time.

2. In case Tunnels are to be constructed, necessary input of Tunnel Experts shall be provided in addition to above mentioned Manpower requirement.

Signature of contractor For Accepting Officer

Enclosure-II

Qualification and Experience Requirement of Key Personnel
Team Leader cum Senior Tunnel Engineer

i)	**Educational Qualification**	
	Essential	Graduate in Civil Engineering/Tunnel Engineering/Mining Engineering
	Desirable	Post Graduate in Civil Engineering/Tunnel Engineering/Mining Engineering/Rock Mechanics
ii)	**Essential Experience**	
	a) Total Professional Experience	Min. 20 years
	b) Experience in Tunnel projects	(i) Professional experience in handling major tunnel projects (Road/Rail/Metro) (ii) Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro) (iii) Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro) (iv) Experience in DPR preparation of minimum 5 km Tunnel length (v) Experience in construction/construction supervision/ preparation of DPR/feasibility report of major tunnel projects (Road/Rail/metro)
	c) Experience in similar capacity	(i) Experience as Team Leader or similar capacity in major tunnel construction/ construction supervision projects (Road/Rail/ Metro) (ii) Experience as Team Leader or similar capacity feasibility in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro) (i) Experience as Team Leader or similar capacity in major tunnel construction/construction
iii)	**Age Limit**	**70 years on the date of submission of proposal**

Enclosure-II(contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Tunnel Design Expert

i)	**Educational Qualification**	
	Essential	**Degree in Civil/ Mining Engineering**
	Desirable	**Post Graduation in rock mechanics / Geotech or equivalent.**
ii)	**Experience**	
	a)Total Professional Experience	Min. 15 years
	b) Experience in Tunnel projects	(i) Professional Experience in handling major tunnel projects (Road/Rail/Metro) (ii) Experience of major tunnel Construction/ construction supervision projects (Road/Rail/Metro) (iii) Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)
	c) Experience in similar capacity	(i) Professional Experience as Tunnel Design Engineer (Structural) (ii) Experience as Tunnel Design Engineer (Structural) of major tunnel construction/construction supervision projects (Road/Rail/Metro) (iii) Experience as Tunnel Design Engineer (Structural) of major tunnel for preparation of DPR projects (Road/Rail/Metro) (iv)Experience as Tunnel Design Engineer (Structural) in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)
iii)	**Age Limit**	**70 years on the date of submission of Proposal**

Enclosure-II(contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Senior Geotechnical Engineer

I	**Educational Qualification**	
	Essential	Civil Engineering/Mining Engineering /Engineering Geology
	Desirable	Geotechnical Engineering /Foundation Engineering/Rock Mechanics/Geo science or equivalent
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Tunnel Projects	(i) Professional experience in handling major tunnel projects (Road/Rail/Metro) (ii) Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro) (iii)Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)
	c) Experience in similar capacity	(i) Professional Experience as Senior Geotechnical Engineer (ii) Experience as Senior Geotechnical Engineer or similar capacity in major tunnel construction/construction supervision projects (Road/Rail/Metro) (iii) Experience as Senior Geotechnical Engineer or similar capacity in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro) (iv) Experience as Senior Geotechnical Engineer or similar capacity in preparation of DPR/Feasibility report of major tunnel projects (Road/Rail/Metro)
III	**Age Limit**	70 years on the date of submission of proposal

Enclosure-II(contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Senior Geophysicist

I	**Educational Qualification**	
	Essential	Graduate in Geophysics/Geo science/ Earth science or equivalent
	Desirable	Post Graduation in Geophysics/Geo science/ Earth science or equivalent
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Relevant works	Professional Experience in handling tunnel/ mineral and oil exploration projects (ii) Experience of carrying out AEM survey for tunneling/ mineral and oil exploration or any other similar work for area of more than 2.7 sq km (iii) Processing, Interpreting, generating 3D resistivity model of AEM survey's raw data for tunneling/ mineral and oil exploration or any other similar work for area of more than 2.7 sq km (iv) Experience in carrying out AEM survey, processing, interpreting, generating 3D resistivity of AEM survey's raw data for major tunnel work (Rail/Road/Metro)
III	**Age Limit**	70 years on the date of submission of proposal

Enclosure-II (contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Senior *Geologist*

I	**Educational Qualification**	
	Essential	Post Graduate Degree in Geology.
	Desirable	Phd in Geology/Related fields.
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Tunnel Projects	He should have a minimum 10 years of professional experience and should have involved in project preparation / DPR/ Tunnel Design for at least two major Tunnel projects.
	c) Experience in similar capacity	He should have experience in similar capacity per five years on Design/ Construction/ Supervision of Tunnel Projects.
III	**Age Limit**	70 years on the date of submission of proposal

Signature of contractor For Accepting Officer

Enclosure-II (contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Senior E&M Expert

I	**Educational Qualification**	
	Essential	Degree in Electrical/Mechanical Engineering.
	Desirable	Post Graduation in Degree in Electrical/Mech Engineering
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Tunnel Projects	10 years in Tunnel Projects and should have worked for atleast five years as an E&M Expert for Tunnel Design/ Construction projects
	c) Experience in similar capacity	He should have handled atleast two tunneling projects in similar capacity
III	**Age Limit**	70 years on the date of submission of proposal

Signature of contractor For Accepting Officer

Enclosure-II (contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Senior Survey Engineer

I	**Educational Qualification**	
	Essential	Degree or equivalent in Civil Engineering/Diploma in Surveying.
	Desirable	Post Graduation in Survey Engineering/Surveying /Remote Sensing
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Tunnel Projects	Min. 5 years on similar projects in project preparation and construction & thorough understanding of modern computer based methods of surveying
	c) Experience in similar capacity	Senior Survey Engineer for projects preparation of highway project (NH/SH/Expressways) involving 2/4/6 laning of minimum aggregate length of 80 km.
III	**Age Limit**	65 years on the date of submission of proposal

Signature of contractor For Accepting Officer

Enclosure-II(contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Environmental Specialist

i)	**Educational Qualification**	
	Essential	Graduate in Civil Engineering / Environment Engineering / Masters in Environment Science
	Desirable	**Post Graduate in Environmental Engineering**
ii)	**Essential Experience**	
	a) Total Professional Experience	**Min. 10 years**
	b) Experience in Highway Projects	Min. 5 years in environment impact assessment of highway projects (2/4/6 laning)
	c) Experience in similar capacity	Environmental Specialist in at least two highway projects (2/4/6 laning)
iii)	**Age Limit**	**70 years on the date of submission of proposal**

Signature of contractor For Accepting Officer

Enclosure-II (contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Highway cum Pavement Engineer

I	**Educational Qualification**	
	Essential	Degree in Civil Engineering or Equivalent.
	Desirable	Post Graduation in Highway Engg/Transportation Engineering
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Highway Projects	Minimum 10 years experience in pavement design and maintenance of highways
	c) Experience in similar capacity	Pavement design for major highway projects (2/4/6 lane NH/SH/ Expressways) of minimum aggregate length of 80 km.
III	**Age Limit**	70 years on the date of submission of proposal

Signature of contractor For Accepting Officer

Enclosure-II(contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Quantity Surveyor/Documentation Expert

i)	**Educational Qualification**	
	Essential	Graduate or equivalent in Civil Engineering/ Certificate course from 'Institution of Quantity Surveying'
	Desirable	
ii)	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Highway Projects	Min. 5 years in Preparation of Bill of Quantities, Contract documents and documentation for major highway projects involving two/ four laning
	c) Experience in similar capacity	Quantity Surveyor / Documentation Expert in highway projects (NH/SH/Expressways) involving two/four/six laning of minimum aggregate length of 80 km.
iii)	**Age Limit**	**70 years on the date of submission of proposal**

Signature of contractor For Accepting Officer

Enclosure-II (contd.)

QUALIFICATION AND EXPERIENCE REQUIREMENT OF KEY PERSONNEL

Material Engineer

I	**Educational Qualification**	
	Essential	Graduate in Civil Engineering/Material Science and Engineering or equivalent.
	Desirable	Post graduation in Material Science and Engineering or equivalent
II	**Essential Experience**	
	a) Total Professional Experience	Min. 15 years
	b) Experience in Highway Projects	Minimum 8 years on Tunnel projects in design and /or construction. Experience on Tunnel projects shall be preferred
	c) Experience in similar capacity	Material Engineer on highway projects (2/4/6 lane NH/SH/Expressway) of minimum aggregate length of 80 km.
III	**Age Limit**	70 years on the date of submission of proposal

Signature of contractor For Accepting Officer

Enclosure-III

Schedule for submission of Reports and Documents

Stage No.	Activity	No. of copies	Time Period in days from date of commencement
1	**Monthly Reports**	3	by 10th day of every month
2	**Inception Report** (i) Draft Inception Report including QAP document	3	60
	(ii) Inception Report including QAP document	3	90
3	**F.S. REPORT** i) Draft Feasibility Study Report including option study report	4	225
	ii) Comments of client	1	270
	iii) Final Feasibility Study Report incorporating compliance of comments of Client.	4	**315**
4	**LA & Clearances I Repor t**		
	i) Draft LA & Clearances I Report	4	500
	ii) Comments of client	1	540
	iii) Final Geotechnical Factual report	2	400
	iv) Final Geotechnical Interpretative Report	2	540
	v) High Resolution Satellite Imagery	2	400
	vi) Final LA & Clearances I Report incorporating compliance of comments of Client	4	580

Signature of contractor For Accepting Officer

5	Detailed Project Report i) Draft DPR	4	600
	ii) Comments of client	1	660
	iii) Final DPR incorporating compliance of comments of Client	6	720
6	Technical Schedules		
	i) Draft Technical Schedules	4	600
	ii) Comments of client	1	660
	iii) Final technical schedule	6	700

Signature of contractor For Accepting Officer

APPENDIX-II

Proof of Eligibility

Form-E1

Letter of Proposal (On Applicant's letter head)

(Date and Reference)

To, **********

****

****

Sub: Appointment of Consultant for preparation
of Detailed Project Report for ……...

Dear Sir,

With reference to your RFP Document dated ……, I/we i.e M/s----------
----------(Name of Bidder) h a v i n g examined all relevant documents and understood their contents, hereby submit our Proposal for selection as Consultant. The proposal is unconditional and unqualified.

2. All information provided in the Proposal and in the Appendices is true and correct and all documents accompanying such Proposal are true copies of their respective originals.
3. This statement is made for the express purpose of appointment as the Consultant for the aforesaid Project.
4. I/We shall make available to the Authority any additional information it may deem necessary or require for supplementing or authenticating the Proposal.
5. I/We acknowledge the right of the authority to reject our application without assigning any reason or otherwise and hereby waive our right to challenge the same on any account whatsoever.
6. I/We certify that in the last three years, we or any of our Associates have neither failed to perform on any contract, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award against the Applicant, nor been expelled from any project or contract by any public authority nor have had any contract terminated by any public authority for breach on our part.

Signature of contractor For Accepting Officer

7. I/We understand that you may cancel the Selection Process at any time and that you are neither bound to accept any Proposal that you may receive nor to select the Consultant, without incurring any liability to the Applicants in accordance with Clause 1.7 of the RFP document.
8. I/We declare that we/any member of the consortium, are/is not a Member of any other Consortium applying for Selection as a Consultant.
9. I/We certify that in regard to matters other that security and integrity of the country, we or any of our Associates have not been convicted by a Court of Law or indicted or adverse orders passed by a regulatory authority which would cast a doubt on our ability to undertake the Consultancy for the Project or which relates to a grave offence that outrages the moral sense of the community.
10. I/We further certify that in regard to matters relating to security and integrity of the country, we have not been charge-sheeted by any agency of the Government or convicted by a Court of Law for any offence committed by us or by any of our Associates.
11. I/We further certify that no investigation by a regulatory authority is pending either against us or against our Associates or against our CEO or any of our Directors/Managers/employees.
12. I/We hereby irrevocably waive any right or remedy which we may have at any stage at law or howsoever otherwise arising to challenge or question any decision taken by the Authority [and/ or the Government of India] in connection with the selection of Consultant or in connection with the Selection Process itself in respect of the above mentioned Project.
13. The Bid Security of Rs. 2,00000 (Rupees Two Lakh Only) in the form of a Bank Guarantee is attached, in accordance with the RFP document.
14. I/We agree and understand that the proposal is subject to the provisions of the RFP document. In no case, shall I/we have any claim or right of whatsoever nature if the Consultancy for the Project is not awarded to me/us or our proposal is not opened or rejected.
15. I/We agree to keep this valid for 120 (One hundred and twenty) days from the Proposal Due Date specified in the RFP.
16. A Power of Attorney in favour of the authorized signatory to sign and submit this Proposal and documents is attached herewith.

Signature of contractor For Accepting Officer

17. In the event of my/our firm/consortium being selected as the Consultant, I/we agree to enter into any Agreement in accordance with the form Appendix V of the RFP. We agree not to seek any changes in the aforesaid form and agree to abide by the same.
18. I/We have studied RFP and all other documents carefully and also surveyed the Project site. We understand that except to the extent as expressly set forth in the Agreement, we shall have no claim, right or title arising out of and documents or information provided to us by the Authority or in respect of any matter arising out of or concerning or relating to the Selection Process including the award of Consultancy.
19. The Proof of Eligibility and Technical proposal are being submitted in separate covers in hard copy and they are being submitted online also. Financial Proposal is being submitted online only. This Proof of Eligibility read with Technical Proposal and Financial Proposal shall constitute the Application which shall be binding on us.
20. I/We agree and undertake to abide by all the terms and conditions of the RFP Document. In witness thereof, I/we submit this Proposal under and in accordance with the terms of the RFP Document.

Yours faithfully,
(Signature, name and designation of the authorized signatory)
(Name and seal of the Applicant/Lead Member)

Signature of contractor For Accepting Officer

Appendix- II

Form-E2/T3

FIRM'S REFERENCES

Relevant Services Carried out in the Last Ten Years (2008-09 onwards)
Which Best Illustrate Qualifications

The following information should be provided in the format below for each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was legally contracted by the client:

<table>
<tr><td colspan="2">Assignment Name:</td><td>Country:</td></tr>
<tr><td colspan="2">Location within Country :</td><td>Professional Staff Provided
by your firm:</td></tr>
<tr><td colspan="2">Name of Client :</td><td>No. of Staff :</td></tr>
<tr><td colspan="2">Address :</td><td>No. of Staff Months :</td></tr>
<tr><td>Start Date
(Month /
Year)</td><td>Completion Date
(Month / Year)</td><td>Approx. Value of
Services : (in INR/current USD) :</td></tr>
<tr><td colspan="2">Name of JV/Association Firm(s) if any :</td><td>No. of Months of Professional
Staff provided by Associated Firm(s)</td></tr>
<tr><td colspan="3">Status of your Company in the Assignment i.e., Sole/Lead Member/Other Member/Associate</td></tr>
<tr><td colspan="3">Narrative Description of Project :</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by your Company:</td></tr>
</table>

Signature of Authorized Representative

(Certificate from Employer regarding experience should be furnished)

Signature of contractor For Accepting Officer

APPENDIX-II

Form- E3

Financial Capacity of the Applicant

Name of Applicant:

S.No.	Financial Year	Annual Revenue (Rs/US $ in million)
1	2017-18	
2	2016-17	
3	2015-16	
4	2014-15	
5	2013-14	

Certificate from the Statutory Auditor[$]

This is to certify that ----------(name of the Applicant) has received the payments shown above against the respective years on account of Consultancy Services.

Name of the audit firm Seal of the audit

firm Date

(Signature, name and designation of the authorized signatory)

[$] In case he Applicant does not have a statutory auditor, it shall provide the certificate from its chartered accountant that ordinarily audits the annual account of the Applicant.

Note:

Please do not attach any printed Annual Financial Statement.

Signature of contractor For Accepting Officer

APPENDIX-II

Form- E4

BANK GUARANTEE FORMAT FOR BID SECURITY

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

Ref.: **Tender No. _____, dated _____**

Bank Guarantee:

Date:

WHEREAS, _____ (Name of Bidder) ____(hereinafter called "the bidder") has submitted his bid dated _____ (date) for the **Tender No.** _____, dated _____ (hereinafter called "the Bid". KNOW ALL MEN by these presents that We, _____ [Name of Bank] of _____ [Name of Country] having our registered office at _____ (hereinafter called "the Bank") are bound unto _____ [name of employer] (hereinafter called "the Employer") in the sum of Rs. _____ (Rupees _____Lakhs only) for which payment will and truly to be made to the said employer the bank binds himself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank this _____ day of ____ 201_.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws his Bid during the period of bid validity specified in the Bid document; or
2. If the Bidder does not accept the correction of arithmetical errors of his Bid Price in accordance with the Instructions to Bidder; or
3. If the Bidder having been notified of the acceptance of his Bid by the Employer during the period of bid validity,

   a. fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or

   b. fails or refuses to furnish the Performance Security, in accordance with the letter of invitation, we undertake to pay the Employer up to the above amount upon receipt of his first written demand, without the 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 one or any of the conditions, specifying the occurred condition or conditions.

   This Guarantee will remain in force up to and including the date 150 (one hundred and fifty) days after the deadline for submission of bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

   Notwithstanding anything contained herein before, our liability under this guarantee is restricted to _____ Rs._____ (Rs. _____) and the guarantee shall remain valid till _____. Unless a claim or a demand in writing is made upon us on or before _____ all our liability under this guarantee shall cease

   DATE _____

   SIGNATURE OF THE BANK _____

   SEAL OF THE BANK _____

   SIGNATURE OF THE WITNESS _____

   Name and Address of the Witness _____

   The bank guarantee shall be issued by a bank (Nationalized/Scheduled) located in India

Appendix III

(Form-T1)

TECHNICAL PROPOSAL

FROM: TO:

_____ _____

_____ _____

_____ _____

_____ _____

Sir:

Subject Consultancy Service for

_____

_____

Regarding Technical Proposal

I/We _____ (name of Bidder) Consultant/ Consultancy firm herewith enclose Technical Proposal for selection of my/our firm/organization as Consultant for_____.

Yours faithfully,

Signature

Full Name

Designation

Address

(Authorized Representative)

Signature of contractor For Accepting Officer

(Form-T-2)

Details of projects for which Technical and Financial Proposals have been submitted

Sl.No.	***Name of Project***	Consultancy Package No.	Names of Proposed Key Personnel
1			
2			
3			
4			

Signature of contractor For Accepting Officer

Form-E2/T3

FIRM'S REFERENCES

Relevant Services Carried out in the Last Seven Years
Which Best Illustrate Qualifications

The following information should be provided in the format below for each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was legally contracted by the client:

<table>
<tr><td colspan="2">Assignment Name:</td><td>Country:</td></tr>
<tr><td colspan="2">Location within Country :</td><td>Professional Staff Provided
by your firm:</td></tr>
<tr><td colspan="2">Name of Client :</td><td>No. of Staff :</td></tr>
<tr><td colspan="2">Address :</td><td>No. of Staff Months :</td></tr>
<tr><td>Start Date
(Month /
Year)</td><td>Completion Date
(Month / Year)</td><td>Approx. Value of
Services : (in INR/current USD) :</td></tr>
<tr><td colspan="2">Name of JV/Association Firm(s) if any :</td><td>No. of Months of Professional
Staff provided by Associated Firm(s)</td></tr>
<tr><td colspan="3">Status of your Company in the Assignment i.e., Sole/Lead Member/Other Member/Associate</td></tr>
<tr><td colspan="3">Narrative Description of Project :</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by your Company:</td></tr>
</table>

Signature of Authorized Representative

(Certificate from Employer regarding experience should be furnished)

Signature of contractor For Accepting Officer

Form- T4

SITE APPRECIATION

Shall give details of site as per actual site visit and data provided in RFP and collected from site supported by photographs to demonstrate that responsible personnel of the Consultant have actually visited the site and familiarized with the salient details/complexities and scope of services.

Signature of contractor For Accepting Officer

Form- T5

COMMENTS/ SUGGESTIONS OF CONSULTANT ON THE TERMS OF REFERENCE

1.

2.

3.

4.

5.

….

….

Signature of contractor For Accepting Officer

Form- T6

Composition of the Team Personnel and the task Which would be assigned to each Team Member

I. Technical/Managerial Staff

S.No.	Name	Position	Task Assignment
1.			
2.			
3.			
4.			
….			
….			
….			

II. Support Staff

S.No.	Name	Position	Task Assignment
1.			
2.			
3.			
4.			
….			
….			
….			

Form- T7

APPROACH PAPER ON METHODOLOGY PROPOSED FOR PERFORMING THE ASSIGNMENT

The approach and methodology will be detailed precisely under the following topics.

1) Composition of the team [not more than 1 page]
2) Methodology for services, surveying, data collection and analysis [not more than 2 pages]
3) Quality Assurance system for consultancy assignment [not more than 1 page]

Signature of contractor For Accepting Officer

Form- T8

Details of Material Testing Facility

1. State whether the Applicant has in-house Material Testing Facility Available / Outsourced / Not Available

2. In case answer to 1 is Available, attach a list of Lab equipment and facility for testing of materials and location of laboratory

3. In case laboratory is located at a distance of more than 400 km from the project site, state arrangements made/proposed to be made for testing of materials

4. In case answer to 1 is Outsourced/ Not Available state arrangements made/proposed to be made for testing of materials

Signature of contractor For Accepting Officer

Form- T9

Facility for Field investigation and Testing

1. State whether the Applicant has in-house Facility for

a) Airborne Electromagnetic Survey (AEM) Available/ Outsourced/ Not Available
b) Geo-technical investigation Available/ Outsourced/ Not Available

2. In case answer to 1 is Available a list of field investigation and testing equipments available in-house

3. In case answer to 1 is Outsourced/ Not Available arrangements made/proposed to be made for each of above Field investigation and testing

4. For experience in LiDAR or equivalent technology for topographic survey, GPR and Induction Locator or equivalent technologies for detection of sub-surface utilities and digitization of cadastral maps for land acquisition, references need to be provided in following format:

REFERENCES

Relevant Services Carried
Which Best Illustrate Qualifications

The following information should be provided in the format below for each reference assignment for which your firm, either individually as a corporate entity or as one of the major companies within a consortium, was legally contracted by the client:

Signature of contractor For Accepting Officer

<table>
<tr><td colspan="2">Assignment Name:</td><td>Country:</td></tr>
<tr><td colspan="2">Location within Country :</td><td>Professional Staff Provided by your firm:</td></tr>
<tr><td colspan="2">Name of Client :</td><td>No. of Staff :</td></tr>
<tr><td colspan="2">Address :</td><td>No. of Staff Months :</td></tr>
<tr><td colspan="3">Technology Used:</td></tr>
<tr><td>Start Date (Month / Year)</td><td>Completion Date (Month / Year)</td><td>Approx. Value of Services : (in INR/current USD) :</td></tr>
<tr><td colspan="2">Name of JV/Association Firm(s) if any :</td><td>No. of Months of Professional Staff provided by Associated Firm(s)</td></tr>
<tr><td colspan="3">Status of your Company in the Assignment i.e., Sole/Lead Member/Other Member/Associate</td></tr>
<tr><td colspan="3">Narrative Description of Project :</td></tr>
<tr><td colspan="3">Description of Actual Services Provided by your Company:</td></tr>
</table>

Signature of Authorized Representative

(Certificate from Employer regarding experience should be furnished)

Signature of contractor For Accepting Officer

Form- T10

Office Equipment and software

Attach a list of office equipment and software owned by the Applicant

Signature of contractor

For Accepting Officer

Form- T11

Photo

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 schools, dates attended and degrees obtained).* ***(Please furnish proof of qualification)***

Contact Address with Phone and mobile numbers:

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).
A) Education:
i) Field of graduation and year
ii) Field of post-graduation and year
iii) Any other specific qualification

B) Experience
i) Total experience in highways: ___ Yrs.
ii) Responsibilities held: a) ___Yrs.
b) ___Yrs.
c) ___ Yrs.
iii) Relevant experience: ___ Yrs.

C) Permanent Employment with the firm: ___Yrs.
If yes, how many years:
If no, what is the employment:
Arrangement with the firm?

Certification:

1. *I am willing to work on the project and I will be available for entire duration of the project assignment and I will not engage myself in any other assignment during the currency of this assignment on the project*

2. I, the undersigned, certify that to the best of my knowledge and belief, this biodata correctly describes myself my qualification and my experience.

Signature of the Candidate _____

Place _____
Date _____

Signature of the Authorized Representative of the firm_____

Place _____
Date _____

Note: Each page of the CV shall be signed in ink by both the staff member and the Authorized representative of the firm. Photocopies will not be considered for evaluation.

UNDERTAKING FROM THE PROFESSIONAL

I, ……. (Name and Address) have not left any assignment with the consultants engaged by MORT&H/ contracting firm (firm to be supervised now) for any continuing works of MORT&H without completing my assignment. I will be available for the entire duration of the current project (named……..). If I leave this assignment in the middle of the completion of the work, I may be debarred for an appropriate period to be decided by CE (P) Beacon. I have also no objection if my services are extended by CE (P) Beacon for this work in future.

UNDERTAKING FROM CONSULTING FIRM

The undersigned on behalf of ……. (name of consulting firm) certify that Shri……(name of the proposed personnel and address) to the best of our knowledge has not left his assignment with any other consulting firm engaged by MORT&H / contracting firm (firm to be supervised now) for the ongoing projects. We understand that if the information about leaving the past assignment with CE (P) Beacon without completing his assignment is known to CE (P) Beacon, CE (P) Beacon would be at liberty to remove the personnel from the present assignment and debar him for an appropriate period to be decided by CE (P) Beacon.

Signature of contractor For Accepting Officer

Appendix IV

(Form-I)

FINANCIAL PROPOSALS

FROM: TO:

_____ _____
_____ _____
_____ _____

Sir:

Subject: Consultants' Services for
_____
_____

Regarding Price Proposal

I/We_____ Consultant/consultancy firm herewith enclose

Price Proposal for selection of my/our firm/organization as Consultant for

Yours faithfully,

Signature _____

Full Name _____

Designation _____

Address _____

(Authorized Representative)

*** i) The Financial proposal is to be filled strictly as per the format given in CPP Portal i.e www.eprocure.gov.in and shall be uploaded online only.**

ii) Form-II, III & IV is specimen copy and not to be submitted offline (In hard copy)

(Form-II)

Format of Financial Proposal (To be uploaded as per format given in CPP Portal i.e www.eprocure.gov.in

Summary of Cost in Local Currency

No.	Description	Amount (LC)* (INR)
I	**Local Consultants** Remuneration for Local Staff (inclusive of per diem allowance)	
II	Support Staff (inclusive of per diem allowance)	
III	Transportation	
IV	Duty Travel to Site	
V	Office Rent	
VI	Office Supplies, Utilities and Communication	
VII	Office Furniture and Equipment (Rental)	
VIII	Reports and Document Printing	
IX	Surveys & Investigations	
A B	Topographical Survey Investigations	
X	Airborne Electromagnetic Survey (AEM) and Sub-soil Investigation	
	Subtotal Local Consultants :	
	Foreign Consultants	
F-I	Remuneration for Expatriate Staff	
F-II	Mobilization and Demobilization	
	Total Cost Net of Tax	
Taxes and Duties	I. Income Tax (Expatriate) II. Import duties III. Value added tax	
	Total cost net of GST**	
	GST	
	TOTAL COSTS (Including GST)	

LC* Local Currency

** Total Cost Net of GST shall be considered for financial evaluation

Note:

- **No escalation will be payable during the services**
- **Insurances shall not be allowed separately .These will be incidental to main items.**
- ***Rates for all items shall be quoted in figures as well as in words.***
- ***The client will provide air effort/helicopter for AEM survey and rates be quoted accordingly.***

Signature of contractor For Accepting Officer

(Form-III)

Estimate of Local Currency Costs

I. Remuneration for Local Staff (including per diem allowance)

I(a) – E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*.

S.No.	Position	Name	Rate (INR)	SM	Amt.(INR)
	Professional Staff				
1	Team Leader Cum Senior Tunnel Engineer			23	
2	Tunnel Design Expert			12	
3	Senior Geophysicist			6	
4	Senior Geotechnical Engineer			12	
5	Senior E& M Expert			6	
6	Senior Geologist			9	
7	Senior Surveyor Engineer			12	
8	Environmental Expert			6	
9	Material Engineer			6	
10	Highway cum Pavement Engineer			4.5	
11	Quantity Surveyor/ Documentation Expert			6	
	Sub-Total:			102.5	
	Sub-Professional Staff	(To be assessed by Consultant as per requirement of assignment)			
1					
2					
3					
4					
5					
6					
7					
	Sub-Total:				
	TOTAL				

SAMPLE

II. Support Staff

No.	Position	Name	Staff Months	Billing Rate(INR)	Amount (INR)
1	Office Manager				
2	Typist				
3	Office Boy				
4	Night Watchman				
				Total :	

SAMPLE

III. Transportation (Fixed costs)

S. No	Description	Qty.	Nos. of months	Rate/ Month (INR)	Amount (INR)
1	The vehicles provided by the Consultants shall include the cost for rental, drivers, operation, maintenance, repairs, insurance, etc. A. For use of consultants				
	Total				

IV. Duty Travel to Site (Fixed Costs)

Month	Rate (INR)	Amount (INR)

V. Office Rent (Fixed Costs)

The rent cost includes maintenance, cleaning, repairs, etc.
__ months x

Total__

VI. Office Supplies, Utilities and Communication (Fixed Costs)

No.	Item	Months	Monthly Rate (INR)	Amount inINR.
1	Office Supplies Drafting			
2	Supplies Computer			
3	Running Costs			
4	Domestic and International Communication			

TOTAL :----------

VII. Office Furniture and Equipment (Rental)

No.	**Description**	**Unit**	**Quantity**	**Rate (INR)**	**Amount (INR)**
1	Office Furniture and Equipment		LS		
				Total	

SAMPLE

Signature of contractor For Accepting Officer

VIII. Reports and Document Printing

No.	Description	No. of Copies	Rate per Copy (INR.)	Amount (INR.)
1	Monthly Report	3 Per Month		
2	Inception Report & QAP	3		
3	Environment and Social Impact Screening Report	4		
4	Draft Feasibility Report	4		
5	Final Feasibility Report	6		
6	Strip Plan with L.A. Reports	6		
7	Draft LA and Clearances I Report	4		
8	Final LA and Clearances I Report	4		
9	Draft Environmental Assessment report & RAP	4		
10	Final Environmental Assessment report & RAP	6		
11	Draft Detailed Design Report & Drawings etc.	4		
12	Draft EMP	4		
13	Draft Bidding Documents	4		
14	Final Detailed Project Report with Bill of Quantities, Cost Estimates, Updated Drawings etc.	6		
15	Final EMP	6		
16	Final Bidding Documents	6		
17	Draft 3(a) ,3(A) and 3(D) relevant notification AS PER NH Act or State Act for land acquisition (3 copies each)	9		
18	LA & Clearances II Report	6		
			Total	

SAMPLE

IX. Survey and Investigation

A. Topographical Survey (Fixed Rate)

No.	Item	Job	Rate (INR)	Amount (INR)
1	Complete Topographic survey using mobile/aerial LiDAR or equivalent technology for project area (with approaches) including hire charges for equipment and supply of survey teams comprising of project survey field staff etc. Inclusive of cost of materials, labourer, preparation of Drawings and their submission as per contract provision.	01		

B. Investigation (Fixed cost)

No.	Description	Quantity	Amount (INR)
1	Road and Bridge Inventory		
2	BBD Test and Pavement Evaluation		
3	Roughness Survey		
4	Axle Load Survey		
5	Material Survey and Investigation		
6	Sub-grade Investigation		
7	Traffic Survey		
8	Socio-economic & Census Survey/Studies		
9	Land Acquisition Studies		
	Total		

.

X. Airborne Electromagnetic Survey (AEM) and Sub-soil Investigation:

The payment under this schedule will be paid based on actual quantity executed at site

		Quantity	Rate in INR	Amount in INR
1	Carrying out Airborne Electromagnetic Survey to delineate the sub-surface resistivity distribution using dual transmitter mode configuration upto the bottom of tunnel, processing, interpreting, generating 3D resistivity model. Translation of 3D resistivity model into usable geological models in a format that is most efficient, potentially in 3D. Fixing of the most preferred alignment including validation of the survey through Seismic Refraction or any other approved Method. (The rate quoted in sq km shall be used for actual payment for AEM survey of all tunnels and include all charges **but excluding air effort / helicopters which will be provided by the client**)	21 Sq Km		
2	Sub-Soil Investigation for Tunnel			
	a) Boring in all type of strata (other than hard rock)	2000m		
	b) Boring in hard rock	800m		
3	Directional coring in any length along the proposed directional coring trajectory (corehole size NQ). The rate includes transportation of all plant, manpower, drilling accessories, sampling equipment work site, erection on site for Horizontal Directional Coring (Soil drilling testing and rock coring), trial pit , hand Sepuring, reinstatement of borehole etc including grouting in zones of weakness.			
3.1	Inclined soil, artificial hard material or boulder drilling and directional coring in hard rock material or boulder from the launch site at ground level to the commencement of the HDC trajectory.	800m		
3.2	Not exceeding 100m in length from chainage 0.000 (i.e. commencement of HDC trajectory) in rock	400m		
3.3	Exceeding 100m in length but not exceeding 200m length in rock	400m		
3.4	Directional coring in any length along the proposed directional coring trajectory in Material other than rock	400m		

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(Form-IV)

Estimate of Costs for Expatriate Consultants (in Indian Rupees)

I. Remuneration of Expatriate Staff including per diem allowances

No.	Positions	Name	Rate ( )	SM	Amount ( )
			Total :		

SAMPLE

II. Mobilization and Demobilization

1. International Airfares (Fixed costs)

Position	Round Trips	Rate	Amount
		Total	

2. Inland Travel in Home Country (Fixed Costs) Lump Sum ……

3. Other Miscellaneous expenses (like DA, internal travel expenses other incidentals)(fixed cost)
Lump Sum …….

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TENTATIVE QUANTITIES FOR SUB-SOIL INVESTIGATIONS (BORING)

(Form –V)

Deleted

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Appendix-V

DETAILED EVALUATION CRITERIA

1. First Stage Evaluation -Proof of Eligibility (Para 12.1 of Data Sheet)

1.1 Eligibility criteria for sole applicant firm.

The sole applicant firm shall satisfy the following criteria.

(i) A Firm applying should have Experience of preparation of Detailed Project Report for Road/Rail/ Metro tunnels of aggregate length equal to 60% of 7.00 Km (indicative length) length of the package. Firm should have also prepared DPR for at least one project of Road/Rail/Metro tunnel of minimum length of 4.2 Km in last 10 years (i.e. from 2008-09 onwards).

S. No.	Package No.	Tentative Length	Minimum length of a Eligible Project (Single Road/Rail/Metro Tunnel)
			DPR = 0.6 x Tentative Length
1	2	3	5
1.	I	7.00 Kms	4.20 Kms

(ii) Annual Average Turn Over for the last 3 years {In cases where, Audited/Certified copy of Balance Sheet for the FY 2017-18 is available, last three years shall be counted from 2015-16 to 2017-18. However, where audited/certified copy of the Balance Sheet for the FY 2017-18 is not available (as certified by the Statutory auditor) then in such cases last three years shall be considered from 2014-15 to 2016-17} of the firm from Consultancy services should be equal to more than Rs 15 crore

1.2 Eligibility criteria for Lead Partner/Other Partner in case of JV.

In case of JV, the Lead Partner should fulfil at least 75% of eligibility requirements and the other partner shall fulfil at least 50% of eligibility requirement as given at 1.1 above.

Note: (i) Weightage to be given when experience by a Firm as Sole Firm/Lead Partner in a JV/Other Partner in a JV/As Associate

No.	Status of the firm in carrying out DPR/ Feasibility Study	Weightage for experience
1	Sole firm	**100%**
2	Lead partner in a JV	**75%**
3	Other partner in a JV	**50%**
4	As Associate	**25%**

(ii) The experience of a firm in preparation of DPR for a private Concessionaire/contractor shall not be considered.

2. Second Stage Evaluation -Technical Evaluation (Para 12.2 of Data Sheet)

2.1 Firm's Relevant Experience

For standard highways, the following is the break-up: Deleted

As tunnel projects require specialized capabilities and skill sets, the following is the break-up:

S.No	Description	Maximum Points	Sub-Points
1	Specific experience of the DPR consultancy related to the assignment for eligibility	**15**	
1.1	Aggregate length of DPR/Feasibility study of Road /Rail/Metro Tunnel projects	15	
1.1.1	More than 60% of the indicative Length of the package applied for		7.50
1.1.2	More than the indicative Length of the package applied for		10.00
1.1.3	More than 2 times the indicative length of the package applied for		12.50
1.1.4	More than 3 times the indicative length of the package applied for		15.00

S/N	Description	Max Points	Sub Points
2	**DPR of Bridge having length more than 200 m**	**Deleted**	
2.1	1 bridge		
2.2	2 bridges		
2.3	3 bridges		
2.4	4 or more bridges		
3	**Specific experience of firms in terms of turnover**	**4**	
3.1	Firm's Average Turnover of last 5 years < 15 crore		0
3.2	Firm Average Turnover of last 5 years > = 15 crore but < 30 crore		3
3.3	Firm Average Turnover of last 5 years >= 30 crore		4
4	**DPR for Road/Rail/Metro tunnel**	**Deleted**	
4.1	1 Project		
4.2	2 Projects		
4.3	3 Projects		
4.4	4 Projects		
4.5	5 or more Projects		
5	**AEM Survey of min. area of 8 sq. km and depth more than 300 M**	**5**	
5.1	1 Project		1.50
5.2	2 Projects		3.00
5.3	3 or more Projects		5.00
6	**Directional Coring for investigating preparing continuous record of ground conditions and geological information for a minimum horizontal length of 250m at a depth of 200m or more than ground surface**	**6**	
6.1	1 Project		2
6.2	2 Projects		4
6.3	3 or more Projects		6

Note: (i) Weightage to be given when experience by a Firm as Sole Firm/Lead Partner in a JV/ Other Partner in a JV/As Associate

No.	Status of the firm in carrying out DPR/ Feasibility Study	Weightage for experience
1	Sole firm	100%
2	Lead partner in a JV	75%
3	Other partner in a JV	50%
4	As Associate	25%

(ii) The experience of a firm in preparation of DPR for a private Concessionaire/contractor shall not be considered.

2.2. Adequacy of the proposed work plan and methodology in responding to the TOR:

S. No.	Description				Max points
(i)	Site Appreciation				5.00
(ii)	Comments on TOR				5.00
(iii)	Team Composition and Task assignment				5.00
(iv)	Methodology				5.00
	Total Points				**20**
	Rating given below shall be applicable on all above				
	Below Average.	Average	Good	Excellent	
	50%	75%	90%	100%	

2.3 Material testing, Survey and investigation equipment and software proposed to be used: Deleted

S.No	Description	Maximum Points	Sub-Points
1	**Availability of in-house material testing facility**	**0**	
1.1	Available		0
1.2	Outsourced		0
1.3	Not Available		0
2	**Field Investigation Facilities**	**0**	
2.1	**Geo technical Investigation**	**0**	
2.1.1	Available		0
2.1.2	Outsourced		0
2.1.3	Not Available		0
2.2	**Pavement Investigation**	**0**	
2.2.1	Available		0
2.2.2	Outsourced		0
2.2.3	Not Available		0
3	**Experience in LiDAR or equivalent technology for topographic survey**	**0**	
3.1	1 project		0
3.2	2 or more projects		0
4	**Experience in using GPR and Induction Locator or equivalent technologies for detection of sub-surface utilities**	**0**	
4.1	1 project		0
4.2	2 or more projects		0
5	**Experience in digitization of cadastral maps for land acquisition**	**0**	
5.1	1 project		0
5.2	2 or more projects		0

2.4 Qualification and Competence of the Key Staff for adequacy of the Assignment. (Para 12.2 of Data Sheet and Enclosure II of TOR)

2.4.1 TEAM LEADER cum SENIOR TUNNEL ENGINEER

S. No.	Description		Max. Points
I	**General Qualification**		**25**
i)	Degree in Civil Engineering/Tunnel Engineering / Mining Engineering		20
ii)	Post Graduation in Civil Engineering /Tunnel Engineering/Mining Engineering/Rock Mechanics		5
II	**Relevant Experience & Adequacy for the Project**		**65**
a)	**Total Professional Experience**		**10**
	<20 years	0	
	20-25 years	8	
	>25-28 years	9	
	>28 years	10	
(b)	**Experience in Tunnel Projects**		**40**
(i)	**Professional experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<12 years	0	
	>=12 – 14 years	6	
	>14 – 15 years	7	
	>15years	8	
(ii)	**Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	>=10 – 12 years	7	
	>12 years	8	
(iii)	**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	>=10 – 12 years	7	
	>12 years	8	
(iv)	**Experience in DPR preparation of minimum 5 km Tunnel length**		**8**
	< 3 projects	0	
	3 or more projects	8	
(v)	**Experience in construction/construction supervision/ preparation of DPR/feasibility report of major tunnel projects (Road/Rail/metro)**		**8**
	<10 years	0	
	>=10 – 12 years	7	
	>12 years	8	

(c)	**Experience in Similar Capacity**		**15**
(i)	**Experience as Team Leader or similar capacity in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**7**
	=2 projects	5	
	= 3 to 5 projects	6	
	> 5 or more projects	7	
(ii)	**Experience as Team Leader or similar capacity in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	= 2 projects	6	
	= 3 to 5 projects	7	
	> 5 or more projects	8	
III	**Employment with Firm**		**10**
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

- ***Major Tunnel Project = having length more than 1.5 km.***

2.4.2 Highway cum Pavement Engineer: Deleted
2.4.3 Senior Bridge Engineer: Deleted
2.4.4 Traffic and Safety Engineer: Deleted

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2.4.5 Senior Geotechnical Engineer

S. No.	Description		Max. Points
I	**General Qualification**		**25**
(i)	Degree in Civil Engineering/Mining Engineering / Engineering Geology		20
(ii)	Post Graduation in Geotechnical Engineering /Foundation Engineering/Rock Mechanics/Geo science or equivalent		5
II	**Relevant Experience & Adequacy for the Project**		**65**
(a)	**Total Professional Experience**		**10**
	<15 years	0	
	15-20 years	8	
	>20 -25years	9	
	>25 years	10	
(b)	**Experience in Tunnel Projects**		**24**
(i)	**Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(ii)	**Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(iii)	**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(c)	**Experience in Similar Capacity**		**31**
(i)	**Professional Experience as Tunnel Design Engineer (Structural)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(ii)	**Experience as Tunnel Design Engineer (Structural) of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	

(iii)	**Experience as Tunnel Design Engineer (Structural) of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iv)	**Experience as Tunnel Design Engineer (Structural) in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)**		**7**
	<8 years	0	
	>=8 – 10 years	6	
	>10-12 years	7	
III	**Employment with Firm**		**10**
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

- ***Major Tunnel Project = having length more than 1.5 km.***

2.4.6 Senior Survey Engineer: Deleted

2.4.7 Environmental Specialist Engineer:

S. No.	Description		Max Points
I	**General Qualification**		**25**
(i)	Graduate in Civil Engineering / Environment Engineering / Masters in Environment Science		20
(ii)	Post Graduate in Environmental Engineering		5
II	**Relevant Experience & Adequacy for the Project**		**65**
(a)	**Total Professional Experience**		**10**
	<15 years	0	
	15-20 years	8	
	>20 -25years	9	
	>25 years	10	
(b)	**Experience in Tunnel Projects**		**24**
(i)	**Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	

(ii)	**Experience in major tunnel construction/supervision of survey projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(iii)	**Experience in environment impact assessment of highway projects (2/4/6 laning) and preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(c)	**Experience in Similar Capacity**		**31**
(i)	**Professional Experience as Environmental Specialist Engineer**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(ii)	**Experience as Environmental Specialist Engineer of major tunnel construction/survey supervision projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iii)	**Experience Environmental Specialist Engineer of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iv)	**Experience as Environmental Specialist Engineer in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)**		**7**
	<3 projects	0	
	>=3-5 projects	6	
	5 or more projects	7	
III	**Employment with Firm**		**10**
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

- ***Major Tunnel Project = having length more than 1.5 km.***

2.4.8 Quantity Surveyor/Documentation Expert: Deleted

2.4.9 Tunnel Design Expert

S. No.	Description		Max Points
I	**General Qualification**		**25**
(i)	Degree in Civil/ Mining Engineering		20
(ii)	Post Graduation in rock mechanics / Geotech or equivalent.		5
II	**Relevant Experience & Adequacy for the Project**		**65**
(a)	**Total Professional Experience**		**10**
	<15 years	0	
	15-20 years	8	
	>20 -25years	9	
	>25 years	10	
(b)	**Experience in Tunnel Projects**		**24**
(i)	**Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(ii)	**Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(iii)	**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(c)	**Experience in Similar Capacity**		**31**
(i)	**Professional Experience as Tunnel Design Engineer (Structural)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(ii)	**Experience as Tunnel Design Engineer (Structural) of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	

(iii)	**Experience as Tunnel Design Engineer (Structural) of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iv)	**Experience as Tunnel Design Engineer (Structural) in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)**		**7**
	<3 projects	0	
	>=3-5 projects	6	
	5 or more projects	7	
III	**Employment with Firm**		**10**
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

- ***Major Tunnel Project = having length more than 1.5 km.***

2.4.10 Senior Geophysicist

S. No.	Description		Max. Points
I	**General Qualification**		**25**
(i)	Degree in Civil Engineering/Mining Engineering / Engineering Geology		20
(ii)	Post Graduation in Geotechnical Engineering /Foundation Engineering/Rock Mechanics/Geo science or equivalent		5
II	**Relevant Experience & Adequacy for the Project**		**65**
(a)	**Total Professional Experience**		**10**
	<15 years	0	
	15-20 years	8	
	>20 -25years	9	
	>25 years	10	
(b)	**Experience in Tunnel Projects**		**24**
(i)	**Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	

(ii)	**Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(iii)	**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(c)	**Experience in Similar Capacity**		**31**
(i)	**Professional Experience as Tunnel Design Engineer (Structural)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(ii)	**Experience as Tunnel Design Engineer (Structural) of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iii)	**Experience as Tunnel Design Engineer (Structural) of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iv)	**Experience as Tunnel Design Engineer (Structural) in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)**		**7**
	<8 years	0	
	>=8 – 10 years	6	
	>10-12 years	7	
III	**Employment with Firm**		**10**
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

- ***Major Tunnel Project = having length more than 1.5 km.***

2.4.11 Senior Geologist

S. No.	Description		Max Points
I	**General Qualification**		**25**
(i)	Post Graduate Degree in Geology/Related field		20
(ii)	Phd in Geology/Related fields		5
II	**Relevant Experience & Adequacy for the Project**		**65**
(a)	**Total Professional Experience**		**10**
	<15 years	0	
	15-20 years	8	
	>20 -25years	9	
	>25 years	10	
(b)	**Experience in Tunnel Projects**		**24**
(i)	**Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(ii)	**Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(iii)	**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(c)	**Experience in Similar Capacity**		**31**
(i)	**Professional Experience as Senior Geologist**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(ii)	**Experience as Senior Geologist of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iii)	**Experience as Senior Geologist of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	

(iv)	**Experience as Senior Geologist in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)**		**7**
	<3 projects	0	
	>=3-5 projects	6	
	5 or more projects	7	
III	Employment with Firm		10
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

- ***Major Tunnel Project = having length more than 1.5 km.***

2.4.12 Ventilation/Lightening Expert (Senior E/M Expert)

S. No.	Description		Max Points
I	**General Qualification**		**25**
(i)	Degree in Electrical/Mechanical Engineering		20
(ii)	Post Graduation in Degree in Electrical/Mech Engineering		5
II	Relevant Experience & Adequacy for the Project		65
(a)	**Total Professional Experience**		**10**
	<15 years	0	
	15-20 years	8	
	>20 -25years	9	
	>25 years	10	
(b)	**Experience in Tunnel Projects**		**24**
(i)	**Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(ii)	**Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(iii)	**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**
	<10 years	0	
	10-12 years	6	
	>12-14years	7	
	>14 years	8	
(c)	**Experience in Similar Capacity**		**31**
(i)	**Professional Experience as E&M Expert**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	

(ii)	**Experience as E&M Expert of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iii)	**Experience as E&M Expert of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**
	<8 years	0	
	>=8-10 years	6	
	>10-12years	7	
	>12 years	8	
(iv)	**Experience as E&M Expert in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro)**		**7**
	<3 projects	0	
	>=3-5 projects	6	
	5 or more projects	7	
III	**Employment with Firm**		**10**
	Less than 1 Year	0	
	1-2 years	5	
	more than 2 years	10	
	Total		**100**

Signature of contractor For Accepting Officer

Assumptions to be made regarding Similar Capacity for various positions

1.	**Team Leader cum Senior Tunnel Expert**	
(i)	On behalf of the Consultant/Contractor:	Team Leader/Senior Highway Engineer.
(ii)	In Government Organizations:	Superintending Engineer (or equivalent) and above
2.	**Tunnel Design Engineer**	
(i)	On behalf of the Consultant/Contractor:	Tunnel Design Engineer
(ii)	In Government Organizations:	**……**
3.	**Senior E&M Expert**	
(i)	On behalf of the Consultant/Contractor:	Senior E&M Expert (Tunnels)
(ii)	In Government Organizations:	**……**
4.	**Senior Geologist**	
(i)	On behalf of the Consultant/Contractor:	Geologist
(ii)	In Government Organizations:	Geologist
5.	**Material cum Geotechnical Expert**	
(i)	On behalf of the Consultant/Contractor:	Material Engineer/ Material Expert/ Geo-Technical Engineer
(ii)	In Government Organizations:	Executive Engineer (or equivalent) and above
6.	**Senior Survey Engineer**	
(i)	On behalf of the Consultant/Contractor:	Senior Survey Engineer/Survey Engineer/ Senior Surveyor
(ii)	In Government Organizations:	Surveyor/ Engineer (or equivalent)
7.	**Traffic and Safety Expert**	
(i)	On behalf of the Consultant/Contractor:	Traffic Engineer/ Transportation Engineer/ Road Expert
(ii)	In Government Organizations:	Executive Engineer (or equivalent) and above
8.	**Environment Expert**	
(i)	On behalf of the Consultant/Contractor:	Environment Expert
(ii)	In Government Organizations:	Officers who have dealt /forest matter
9.	**Highway cum Pavement Engineer**	
(i)	On behalf of the Consultant/Contractor:	Highway Engineer/Highway Design Engineer/Pavement Engineer
(ii)	In Government Organizations:	Executive Engineer (or equivalent) and above
10.	**Quantity Surveyor/ Documentation Expert**	
(i)	On behalf of the Consultant/Contractor:	Quantity Surveyor
(ii)	In Government Organizations:	Assistant Engineer (or equivalent)

Appendix VI

DRAFT
CONTRACT AGREEMENT

Between

Border Roads Organisation,
Chief Engineer Project Beacon
(Ministry of Defence)

and

M/s ……..in JV / Association with M/s…….

For

E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE*

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Signature of contractor For Accepting Officer

DRAFT CONTRACT FOR CONSULTANT'S SERVICES

Signature of contractor

For Accepting Officer

INDIA
CONTRACT FOR CONSULTANT'S SERVICES

E*NGAGING TECHNICAL CONSULTANT FOR PREPARATION OF FEASIBILITY STUDY (FS) AND DETAILED PROJECT REPORT (DPR) FOR CONSTRUCTION OF HIGHWAY TUNNEL INCLUDING APPROACH ROAD ACROSS CHATTERGALA, APPROXIMATELY IN BETWEEN KM 114.00 AND KM 151.00 ON BASOLI-BANI-BHADERWAH ROAD UNDER PROJECT BEACON IN J & K STATE.*

This CONTRACT (hereinafter called the "Contract") is made on the ----------day of the month of ----------2018 , between, on the one hand, The Chief Engineer, Project Beacon, Rangret, opposite SIDCO, Distt – Badgam (J&K), Pin - 190007, (hereinafter called the "Client") and, on the other hand, M/s ---------- in JV with ---------- and in Association with …….(hereinafter called the "Consultants").

WHEREAS

(A) the Client has requested the Consultants to provide certain consulting services as defined in the General Conditions attached to this Contract (hereinafter called the "Services");

(B) the Consultants, having represented to the Client that they have the required professional skills, personnel and technical resources, have agreed to provide the Services on the terms and conditions set forth in this Contract;

NOW THEREFORE the parties hereto hereby agree as follows:

1 The following documents attached hereto shall be deemed to form an integral part of this Contract:

(a) The General Conditions of Contract (hereinafter called "GC");

(b) The Special Conditions of contract (hereinafter called "SC");

(c) The following Appendices:

Appendix A: Terms of reference containing, inter-alia, the Description of the Services and Reporting Requirements

Appendix B: Consultants' Sub consultants, Key Personnel and Sub Professional Personnel, Task assignment, work programme, manning schedule, qualification requirements of key personnel, and schedule for submission of various report.

Appendix C: Hours of work for Consultants' Personnel

Appendix D: Duties of the Client

Appendix E: Cost Estimate

Appendix F: Minutes of Financial/ Contract Negotiations with the Consultant

Appendix G: Copy of letter of invitation

Appendix H: Copy of letter of acceptance

Appendix I: Copy of Bank Guarantee for Performance Security

Appendix-J: Minutes of the pre-bid meeting

2. The mutual rights and obligations of the Client and the Consultants shall be as set forth in the Contract; in particular:

(a) The Consultants shall carry out the Services in accordance with the provisions of the Contract; and

(b) Client shall make payments to the Consultants in accordance with the provisions of the Contract.

IN WITNESS WHEREOF, the Parties hereto have caused this Contract to be signed in their respective names as of the day and year first above written.

FOR AND ON BEHALF OF
CE (P) Beacon

By
Authorized Representative

Witness

1 Signature
Name
Address

2. Signature
Name
Address

FOR AND ON BEHALF OF
(Consultant)

By
Authorized Representative

Witness

1. Signature
Name
Address

2. Signature Name Address

GENERAL CONDITIONS OF CONTRACT

Signature of contractor

For Accepting Officer

GENERAL CONDITIONS OF CONTRACT

1. GENERAL PROVISIONS

1.1 Definitions

Unless the context otherwise requires, the following terms whenever used in this Contract have the following meanings:

(a) "Applicable Law means the law and any other instruments having the force of law in the India and in force from time to time.

(b) "Contract" means the Contract signed by the Parties, to which these General Conditions of Contract are attached, together with all the documents listed in Clause 1 of such signed Contract;

(c) "Effective Date" means the date on which this Contract comes into force and effect pursuant to Clause GC 2.1;

(d) "foreign currency" means any currency other than the currency of Government;

(e) "GC" means these General Conditions of Contract;

(f) "Government" means the Government of India;

(g) " local Currency" means the currency of Government of India;

(h) "Member", in case the Consultants consist of a joint venture or consortium of more than one entity means any of these entities, and "Members" means all of these entities;

(i) "Personnel" means local persons hired by the Consultants or by any Sub Consultant as employees and assigned to the performance of the Services or any part thereof; "foreign Personnel" means such persons who at the time of being so hired had their domicile outside india; and "local Personnel" means such persons who at the time of being so hired had their domicile inside India;

(i) "Party" means the Client or the Consultants, as the case may be, and Parties means both of them;

(j) "Services" means the work to be performed by the Consultants pursuant to this Contract for the purposes of the Project, as described in Appendix A hereto;

(k) "SC" means the Special Conditions of Contract by which these General Conditions of Contract may be amended or supplemented;

(l) "Sub Consultant" means any entity to which the Consultants subcontract any part of the Services in accordance with the provisions of Clause GC 3.7; and

(m) "Third Party" means any person or entity other than the Government, the Client, the Consultants or a Sub Consultant.

1.2 **Relation between the Parties**

Nothing contained herein shall be construed as establishing a relation of master and servant or of agent and principal as between the Client and the Consultants. The Consultants, subject to this Contract, have complete charge of Personnel performing the Services and shall be fully responsible for the Services performed by them or on their behalf hereunder.

1.3 **Governing Law and Jurisdiction**

This Contract, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Laws of India and the Courts at Sri Nagar (Jammu & Kashmir) shall have exclusive jurisdiction over matters arising out of or relating to this Agreement.

1.4 **Language**

This Contract has been executed in the language specified in the SC, which shall be the binding and controlling language for all matters relating to the meaning or interpretation of this Contract.

1.5 **Table of Contents and Headings**

The table of contents, headings or sub-headings in this agreement is for convenience for reference only and shall not be used in, and shall not limit, alter or affect the construction and interpretation of this Contract.

1.6 Notices

1.6.1 Any notice, request or consent required or permitted to be given or made pursuant to this Contract shall be in writing. Any such notice, request or consent shall be deemed to have been given or made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent by registered mail, facsimile or e-mail to such Party at the address specified in the SC.

1.6.2 Notice will be deemed to be effective as specified in the SC.

1.6.3 A party may change its address for notice hereunder by giving the other Party notice of such change pursuant to the provisions listed in the SC with respect to Clause GC 1.6.2.

1.7 Location

The Services shall be performed at such locations as are specified in Letter of Acceptance (Appendix-I) hereto and, where the location of a particular task is not so specified, at such locations, whether in India or elsewhere, as the Client may approve.

1.8 Authority of Member in Charge

In case the Consultants consist of a joint venture of more than one entity, with or without an Associate the Members hereby authorize the entity specified in the SC to act on their behalf in exercising all the Consultants' rights and obligations towards the Client under this Contract, including without limitation the receiving of instructions and payments from the Client.

1.9 Authorized Representatives

Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Client or the Consultants may be taken or executed by the officials specified in the SC.

1.10 Taxes and Duties

Unless otherwise specified in the SC, the Consultants shall pay all such taxes/GST, duties, fees and other impositions as may be levied under the Applicable Law.

2. COMMENCEMENT, COMPLETION, MODIFICATION AND TERMINATION OF CONTRACT

2.1 Effectiveness of Contract

This Contract shall come into force and effect on the date of the Client's notice to the Consultants instructing the Consultants to begin carrying out the Services. This notice shall confirm that the effectiveness conditions, if any, listed in the SC have been met.

2.2 Termination of Contract for Failure to Become Effective

If this Contract has not become effective within such time period after the date of the Contract signed by the Parties as shall be specified in the SC, either Party may, by not less than four (4) weeks' written notice to the other Party, declare this Contract to be null and void, and in the event of such a declaration by either Party, neither Party shall have any claim against the other Party with respect hereto.

2.3 Commencement of Services

The Consultants shall begin carrying out the Services at the end of such time period after the Effective Date as shall be specified in the SC.

2.4 Expiration of Contract

Unless terminated earlier pursuant to Clause GC 2.9 hereof, this Contract shall expire when services have been completed and all payments have been made at the end of such time period after the Effective Date as shall be specified in the SC.

2.5 **Entire Agreement**

This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

2.6 **Modification**

Modification of the terms and conditions of this Contract, including any modification of the scope of the Services, may only be made by written agreement between the Parties. Pursuant to Clause GC 7.2 hereof, however, each party shall give due consideration to any proposals for modification made by the other Party.

2.7 Force Majeure

2.7.1 **Definition**

(a) For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Party, and which makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent), confiscation or any other action by government agencies.

(b) Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or such Party's Sub Consultants or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected to both (A) take into account at the time of the conclusion of this Contract and (B) avoid or overcome in the carrying out of its obligations here under

(c) Force Majuere shall not include insufficiency of funds or failure to make any payment required hereunder.

2.7.2 **No Breach of Contract**

The failure of a Party to fulfill any of its obligations hereunder shall not be considered to be a breach of, or default under, this Contract insofar as such inability arises from an event of Force Majeure, provided that the Party affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of this Contract.

2.7.3 Measures to be Taken

(a) A party affected by an event of Force Majeure shall take all reasonable measures to remove such Party's inability to fulfill its obligations hereunder with a minimum of delay.

(b) A party affected by an event of Force Majeure shall notify the other Party of such event as soon as possible, and in any event not later than fourteen (14) days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give notice of the restoration of normal conditions as soon as possible.

(c) The Parties shall take all reasonable measures to minimize the consequences of any event of Force Majeure.

2.7.4 Extension of Time

Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

2.7.5 **Payments**

During the period of their inability to perform the Services as a result of an event of Force Majeure, the Consultants shall be entitled to be reimbursed for additional costs reasonably and necessarily incurred by them during such period for the purposes of the Services and in reactivating the Services after the end of such period.

2.7.6 **Consultation**

Not later than thirty (30) days after the Consultants, as the result of an event of Force Majeure, have become unable to perform a material portion of the Services, the Parties shall consult with each other with a view to agreeing on appropriate measures to be taken in the circumstances.

2.8 Suspension

The Client may, by written notice of suspension to the Consultants, suspend all payments to the Consultants hereunder if the Consultants fail to perform any of their obligations under this Contract, including the carrying out of the Services, provided that such notice of suspension (i) shall specify the nature of the failure, and (ii) shall request the Consultants to remedy such failure within a period not exceeding thirty (30) days after receipt by the Consultants of such notice of suspension.

2.9 Termination

2.9.1 **By the Client**

The Client may, by not less than thirty (30) days' written notice of termination to the Consultants (except in the event listed in paragraph (f) below, for which there shall be a written notice of not less than sixty (60) days), such notice to be given after the occurrence of any of the events specified in paragraphs (a) through (f) of this Clause 2.9.1, terminate this Contract:

(a) if the Consultants fail to remedy a failure in the performance of their obligations hereunder, as specified in a notice of suspension pursuant to Clause 2.8 hereinabove, within thirty (30) days of receipt of such notice of suspension or within such further period as the Client may have subsequently approved in writing;

(b) if the Consultants become (or, if the Consultants consist of more than one entity, if any of their Members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;

(c) if the Consultants submit to the Client a statement which has a material effect on the rights, obligations or interests of the Client and which the Consultants know to be false;

(d) if, as the result of Force Majeure, the Consultants are unable to perform a material portion of the Services for a period of not less than sixty (60) days; or

(e) if the Client, in its sole discretion and for any reason whatsoever, decides to terminate this Contract.

2.9.2 **By the Consultants**

The Consultants may, by not less than thirty (30) day's written notice to the Client, such notice to be given after the occurrence of any of the events specified in paragraphs through (d) of this Clause 2.9.2, terminate this Contract:

(a) if the Client fails to pay any money due to the Consultants pursuant to this Contract and not subject to dispute pursuant to Clause 8 hereof within forty-five(45) days after receiving written notice from the Consultants that such payment is overdue;

(b) if the Client is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Consultants may have subsequently approved in writing) following the receipt by the Client of the Consultants' notice specifying such breach;

(c) if, as the result of Force Majeure, the Consultant are unable to perform a material portion of the Services for a period of not less than sixty (60) days; or

(d) if the Client fails to comply with any financial decision reached as a result of arbitration pursuant to Clause 8 hereof

2.9.3 **Cessation of Rights and Obligations**

Upon termination of this Contract pursuant to Clauses 2.2 or 2.9 hereof, or upon expiration of this Contract pursuant to Clause 2.4 hereof, all rights and obligations of the Parties hereunder shall cease, except (i) such rights and obligations as may have accrued on the date of termination or expiration, (ii) the obligation of confidentiality set forth in Clause 3.3 hereof, (iii) the Consultant's obligation to permit inspection, copying and auditing of their accounts and records set forth in Clause 3.6 (ii) hereof, and (iv) any right which a Party may have under the Applicable Law.

2.9.4 **Cessation of Services**

Upon termination of this Contract by notice of either Party to the other pursuant to Clauses 2.9.1 or 2.9.2 hereof, the Consultants shall, immediately upon dispatch or receipt of such notice, take all necessary steps to bring the Services to a close in a prompt and orderly manner and shall make every reasonable effort to keep expenditures for this purpose to a minimum. With respect to documents prepared by the Consultants and equipment and materials furnished by the Client, the Consultants shall proceed as provided, respectively, by Clauses 3.9 or 3.10 hereof.

2.9.5 **Payment upon Termination**

Upon termination of this Contract pursuant to Clauses 2.9.1 or 2.9.2 hereof, the Client shall make the following payments to the Consultants (after offsetting against these payments any amount that may be due from the Consultant to the Client):

(i) remuneration pursuant to Clause 6 hereof for Services satisfactorily performed prior to the effective date of termination.

(ii) reimbursable expenditures pursuant to Clause 6 hereof for expenditures
actually incurred prior to the effective date of termination; and

(iii) except in the case of termination pursuant to paragraphs (a) through (d) of Clause 2.9.1 hereof, reimbursement of any reasonable cost incident to the prompt and orderly termination of the Contract including the cost of the return travel of the Consultants' personnel and their eligible dependents.

2.9.6 **Disputes about Events of Termination**

If either Party disputes whether an event specified in paragraphs (a) through (e) of Clause 2.9.1 or in Clause 2.9.2 hereof has occurred, such Party may, within forty-five(45) days after receipt of notice of termination from the other Party, refer the matter to arbitration pursuant to Clause 8 hereof, and this Contract shall not be terminated on account of such event except in accordance with the terms of any resulting arbitral award.

3. OBLIGATIONS OF THE CONSULTANTS

3.1 General

3.1.1 **Standard of Performance**

The Consultants shall perform the Services and carry out their obligations here under with all due diligence, efficiency and economy, in accordance with generally accepted professional techniques and practices, and shall observe sound management practices, and employ appropriate advanced technology and safe and effective equipment, machinery, materials and methods. The Consultants shall always act, in respect of any matter relating to this Contract or to the Services, as faithful advisers to the Client, and shall at all times support and safeguard the Client's legitimate interests in any dealings with Sub-Consultants or Third Parties.

3.1.2 **Law Governing Services**

The Consultants shall perform the Services in accordance with the Applicable Law and shall take all practicable steps to ensure that any Sub Consultants, as well as the Personnel and agents of the Consultants and any Sub Consultants, comply with the Applicable Law. The Client shall advise the Consultants in writing of relevant local customs and the Consultants shall, after such notifications, respect such customs.

3.2 Conflict of Interests

3.2.1 **Consultants not to Benefit from Commissions, Discounts, etc.**

The remuneration of the Consultants pursuant to Clause 6 hereof shall constitute the Consultants' sole remuneration in connection with this Contract or the Services and the Consultants shall not accept for their own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Contract or to the Services or in the Discharge of their obligations hereunder, and the Consultants shall use their best efforts to ensure that any Sub Consultants, as well as the Personnel and agents of either of them, similarly shall not receive any such additional remuneration.

3.2.2 Consultants and Affiliates not to be otherwise interested in Project

The Consultants agree that, during the term of this Contract and after its termination, the Consultants and any entity affiliated with the Consultants, as well as any Sub Consultant and any entity affiliated with such Sub Consultant, shall be disqualified from providing goods, works or services (other than the Services and any continuation thereof) for any project resulting from or closely related to the Services.

3.2.3 **Prohibition of Conflicting Activities**

Neither the Consultants nor their Sub Consultants nor the Personnel of either of them shall engage, either directly or indirectly, in any of the following activities:

(a) during the term of this Contract, any business or professional activities in the Government's country which would conflict with the activities assigned to them under this Contract; or

(b) after the termination of this Contract, such other activities as may be specified in the SC.

3.3 Confidentiality

The Consultants, their Sub Consultants and the Personnel of either of them shall not, either during the term or within two (2) years after the expiration of this Contract, disclose any proprietary or confidential information relation to the Project, the Services, this Contract or the Client's business or operations without the prior written consent of the Client.

3.4 Liability of the Consultants

Subject to additional provisions, if any, set forth in the SC, the Consultants' liability under this Contract shall be as provided by the Applicable Law.

3.5 **Insurance to be taken out by the Consultants**

The Consultants (i) shall take out and maintain, and shall cause any Sub consultants to take out and maintain, at their (or the Sub consultants', as the case may be) own cost but on terms and conditions approved by the Client, insurance against the risks, and for the coverage, as shall be specified in the Special Conditions (SC), and (ii) at the Client's request, shall provide evidence to the Client showing that such insurance has been taken out and maintained and that the current premiums therefore have been paid.

3.6 **Accounting, Inspection and Auditing**

The Consultants (i) shall keep accurate and systematic accounts and records in respect of the Services hereunder, in accordance with internationally accepted accounting principles and in such form and detail as will clearly identify all relevant time charges and cost, and the bases thereof (including the bases of the Consultants' costs and charges), and (ii) shall permit the Client or its designated representative periodically, and up to one year from the expiration or termination of this Contact, to inspect the same and make copies thereof as well as to have them audited by auditors appointed by the Client.

3.7 **Consultants' Actions requiring Client's prior Approval**

The Consultants shall obtain the Client's prior approval in writing before taking any of the following actions:

(a) Appointing such members of the Personnel as are listed in Appendix B;

(b) Entering into a subcontract for the performance of any part of the Services, it being understood (i)that the selection of the Sub-Consultant and the terms and conditions of the subcontract shall have been approved in writing by the Client prior to the execution of the subcontract, and (ii) that the Consultants shall remain fully liable for the performance of the Services by the Sub-Consultant and its Personnel pursuant to this Contract;

(c) Any other action that may be specified in the SC.

3.8 Reporting Obligations

The Consultants shall submit to the Client the reports and documents specified in Enclosure III of TOR hereto, in the form, in the numbers and within the time periods set forth in the said Appendix.

3.9 Documents prepared by the Consultants to be the Property of the Client

All plans, drawings, specifications, designs, reports and other documents prepared by the Consultants in performing the Services shall become and remain the property of the Client, and the Consultants shall, not later than upon termination or expiration of this Contract, deliver all such documents to the Client, together with a detailed inventory thereof. The Consultants may retain a copy of such documents. Restrictions about the future use of these documents shall be as specified in the SC.

3.10 Equipment and Materials furnished by the Client

Equipment and materials made available to the Consultants by the Client, or purchased by the Consultants with funds provided by the Client, shall be the property of the Client and shall be marked accordingly. Upon termination or expiration of this Contract, the Consultants shall make available to the Client an inventory of such equipment and materials and shall dispose of such equipment and materials in accordance with the Client's I instructions. While in possession of such equipment and materials, the Consultants, unless otherwise instructed by the Client in writing, shall insure them in an amount equal to their full replacement value.

4. CONSULTANTS' PERSONNEL

4.1 **General**

The Consultants shall employ and provide such qualified and experienced Personnel as are required to carry out the Services.-

4.2 **Description of Personnel**

(a) The titles, agreed job descriptions, minimum qualification and estimated periods of engagement in the carrying out of the Services of each of the Consultants' Key Professional / Sub Professional Personnel are described in Appendix B.

(b) If required to comply with the provisions of Clause 3.1.1 of this Contract, adjustments with respect to the estimated periods of engagement of Key Professional / Sub Professional Personnel set forth in Appendix B may be made by the Consultants by written notice to the Client, provided

(i) that such adjustments shall not alter the originally estimated period of engagement of any individual by more than 10% or one week, whichever is larger, and

(ii) that the aggregate of such adjustments shall not cause payments under this Contract to exceed the ceilings set forth in Clause 6.1 (b) of this Contract. Any other such adjustments shall only be made with the Client's written approval.

(c) If additional work is required beyond the scope of the Services specified in Appendix A, the estimated periods of engagement of Key Personnel set forth in Appendix B may be increased by agreement in writing between the Client and the Consultants.

4.3 **Approval of Personnel**

The Key Personnel and Sub Consultants listed by title as well as by name in Appendix B are hereby approved by the Client. In respect of other Key Personnel which the Consultants propose to use in the carrying out of the Services, the Consultants shall submit to the Client for review and approval a copy of their biographical data. If the Client does not object in writing (stating the reasons for the objection) within twenty-one (21) calendar days from the date of receipt of such biographical data, such Key Personnel shall be deemed to have been approved by the Client.

4.4 Working Hours, Overtime, Leave, etc.

(a) Working hours and holidays for Key Professional / Sub Professional Personnel are set forth in Appendix C hereto. To account for travel time, foreign Personnel carrying out Services inside the Government's country shall be deemed to have commenced (or finished) work in respect of the Services such number of days before their arrival in (or after their departure from) the Government's country as is specified in Appendix C hereto.

(b) The Key Professional / Sub Professional Personnel shall not be entitled to be paid for overtime nor to take paid sick leave or vacation leave except as specified in Appendix C hereto, and except as specified in such Appendix, the Consultants' remuneration shall be deemed to cover these items. All leave to be allowed to the Personnel is included in the staff- months of approval of the Client by the Consultants, who shall ensure that absence for leave purposes will not delay the progress and adequate supervision of the Services.

4.5 **Removal and/or Replacement of Personnel**

Removal and/or replacement of Personnel shall be regulated as under:

4.5.1 In case notice to commence services pursuant to Clause 2.1 of this Contract is not ordered by Client within 120 days of negotiations the key personnel can excuse themselves on valid grounds, e.g., selection on some other assignment, health problem developed after contract negotiation, etc. In such a case no penalty shall be levied on the Firm or on the person concerned. The firm shall however be asked to give a replacement by an equal or better scoring person, whenever mobilization is ordered.

4.5.2 In case notice to commence services is given within 120 days of negotiations there placement shall be as below:

a. Replacement up to 33%: Replacement shall be by an equal or better scoring person. Reduction in remunerations for the balance period shall be @ 5% of the monthly rate.

b. Replacement of more than 33% and up to 50%: Replacement shall be by an equal or better scoring person. Reduction in remunerations for the balance period shall be @ 10% of the monthly rate.

c. Replacement beyond 50% and upto 66%. Replacement shall be by an equal or better scoring person. Reduction in remunerations for the balance period shall be @ 15% of the monthly rate.

d. Replacement beyond 66 %shall normally not be considered. However in exceptional circumstances, where it becomes absolutely essential the remunerations of the substitute shall be reduced by 50 % of the original person replaced. Replacement shall be by an equal or better scoring person, The Department may initiate action for termination/debarment of such Consultant for future projects of BRO/ MORTH for a period of 6 months to 24 months depending upon the severity of case.

4.5.3 Replacement after original contract period is over:

There shall be no limit on the replacements and no reduction in remunerations shall be made. The replacement shall however be of equal or better score.

4.5.4 If the Employer (i) finds that any of the Personnel has committed serious misconduct or has been charged with having committed a criminal action or (ii) has reasonable ground to be dissatisfied with the performance of any of the Personnel, then the Consultant shall, at the Employer's written request specifying the grounds therefore, forthwith provide are placement with qualifications and experience acceptable to him.

4.5.5 If the team leader or any other key personnel/ specialist considered pivotal to the project is replaced, the substitute may be interviewed by CE (P) Beacon to assess their merit and suitability.

4.5.6 If any member of the approved team of a Consultant engaged by CE (P) Beacon leaves that Consultant before completion of the job, he shall be barred for a period of 6 months to 24 months from being engaged as a team member of any other Consultant working (or to be appointed) for any other BRO / MORT&H projects.

4.5.7 In exceptional situations where the replacement with equivalent or better qualification is not available, replacement with lower qualifications than the originally approved may be accepted with reduction in remuneration as per the procedure prescribed below. This kind of relaxation shall however, be limited to replacement of 2 key personnel only in one consultancy contract package.

i) The new proposed personnel as a replacement has to be evaluated as per the criteria fixed at the time of evaluation of original proposal and marks/rating and then:

-If the original personnel (included in the original proposal based on which the contract was awarded) is to be replaced at the instruction of CE (P) Beacon and the new proposed personnel is having less qualification/ experience i.e marks/rating (but fulfilling the minimum requirement as per TOR), his remuneration would be reduced by 15% over and above the stipulated conditions in the contract because of less qualified personnel.

-If the original personnel (included in Contract Agreement) is to be replaced by the Consulting firm and the new proposed personnel is having less qualification/ experience (marks/rating), then his remuneration would be decreased proportionally in comparison to the marks of the original personnel. This will also take into account the contract condition and if the proposed reduction is less than that stipulated in contract condition, it would be as per the contract provision.

It will be ensured that the new proposed personnel should score at least 75% of the marks of the originally approved key personnel. Both the Consulting firm and the proposed personnel should give the undertaking in the format available in Form VII of Appendix II along with the replacement CV.

ii) The CV should be signed by personnel and the consulting firm in every page. If the CV is found incorrect at later date, the personnel accepted would be removed from the assignment and debarred from further CE (P) Beacon works for an appropriate period to be decided by CE (P) Beacon and the new proposed personnel in place of removed personnel would be paid 15% less salary than the original personnel. 15% reduction in the salary will be imposed as penalty for submitting the incorrect information. This penalty will be imposed only once. If the same consulting firm submits incorrect information again second time, necessary action will be taken by CE (P) Beacon to blacklist the firm.

4.6 Resident Project Manager

If required by the SC, the Consultants shall ensure that at all times during the Consultants' performance of the Services in the Government's country a resident project manager, acceptable to the Client, shall take charge of the performance of such Services.

5. OBLIGATION OF THE CLIENT

5.1 Assistance and Exemptions

Unless otherwise specified in the SC, the Client shall use its best efforts to ensure that the Government shall:

(a) provide the Consultants, Sub Consultants and Personnel with work permits and such other documents as shall be necessary to enable the Consultants, Sub Consultants or Personnel to perform the Services;

(b) assist for the Personnel and, if appropriate, their eligible dependents to be provided promptly with all supporting papers for necessary entry and exit visas, residence permits, exchange permits and any other documents required for their stay in India;

(c) facilitate prompt clearance through customs of any property required for the services;

(d) issue to officials, agents and representatives of the Government all such instructions as may be necessary or appropriate for the prompt and effective implementation of the Services;

5.2 **Access to Land**

The Client warrants that the Consultants shall have, free of charge, unimpeded access to all land in the Government's country in respect of which access is required for the performance of the Services. The Client will be responsible for any damage to such land or any property thereon resulting from such access and will indemnify the Consultant and each of the Personnel in respect of liability for any such damage, unless such damage is caused by the default or negligence of the Consultants or any Sub consultants or the Personnel either of them.

5.3 **Change in the Applicable Law**

If, after the date of this Contract, there is any change in the Applicable Law with respect to taxes and duties which increases or decreases the cost or reimbursable expenses incurred by the Consultants in performing the Services, then the remuneration and reimbursable expenses otherwise payable to the Consultants under this Contract shall be increased or decreased accordingly by agreement between the Parties hereto, and corresponding adjustments shall be made to the ceiling amounts specified in Clause 6.1(b),

5.4 **Services, Facilities and Property of the Client**

The client shall make available to the Consultants and the Personnel, for the purposes of the Services and free of any charge, the services, facilities and property described in Appendix D at the times and in the manner specified in said Appendix D, provided that if such services, facilities and property shall not be made available to the Consultants as and when so specified, the Parties shall agree on (i) any time extension that may be appropriate to grant to the Consultants for the performance of the Services, (ii) the manner in which the Consultants shall procure any such services, facilities and property from other sources, and (iii) the additional payments, if any, to be made to the Consultants as a result thereof pursuant to Clause 6.1(c) hereinafter.

5.5 Payment

In consideration of the Services performed by the Consultants under this Contract, the Client shall make to the Consultants such payments and in such manner as is provided by Clause 6 of this Contract.

6. PAYMENT TO THE CONSULTANTS

6.1 Cost Estimates ; Ceiling Amount

(a) An abstract of the cost of the Services payable in local currency (Indian Rupees) is set forth in **Appendix E**.

(b) Except as may be otherwise agreed under Clause 2.6, the payments under this Contract shall not exceed the ceiling specified in the SC on conclusion of contract. The Consultants shall notify the Client as soon as cumulative charges incurred for the Services have reached 80% of the ceiling.

(c) Notwithstanding Clause 6.1(b) hereof, if pursuant to Clauses 5.4 hereof, the Parties shall agree that additional payments shall be made to the Consultants in order to cover any necessary additional expenditures not envisaged in the cost estimates referred to in Clause 6.1(a) above, the ceiling set forth in Clause 6.1(b) above shall be increased by the amount or amounts, as the case may be, of any such additional payments.

6.2 Currency of Payment

(a) The payment shall be made in Indian Rupees.

6.3 Mode of Billing and Payment

Billing and payments in respect of the Services shall be made as follows:-

(a) The Client shall cause to be paid to the Consultants an advance payment as specified in the SC, and as otherwise set forth below. The advance payment will be due after provision by the Consultants to the Client of a bank guarantee by a bank acceptable to the Client in an amount (or amounts) and in a currency (or currencies) specified in the SC, such bank guarantee (i) to remain effective until the advance payment has been fully set off as provided in the SC, and ii) **in such form as the Client shall have approved in writing.**

(b) Payment Schedule

The Consultant will be paid stage-wise as a percentage of the contract value as per the schedule given below:

S.No	Item	Payment as % of contract value
1	Submission of final Inception Report	5%
2	Topographical survey of corridor including walk over survey by geologist	10%
3	Conduct of AEM Survey with interpretation	10%
4	Conduct of Vertical and Horizontal drilling with sampling	10%
5	Submission of final Alignment Report	10%
6	Submission of final Feasibility Report	5%
7	Submission of final Land Acquisition Report	10%
8	Submission of clearance proposals	5%
9	Submission of Draft DPR	10%
10	Approval of Final DPR	10%
11	Approval of Technical Schedules	5%
12	Retention to be released after 2 years	10%
	Total:	100%

Note: Consultants have to provide a certificate that all key personnel as envisaged in the Contract Agreement has been actually deployed in the project. They have to submit this certificate at the time of submission of bills to CE (P) Beacon from time to time.

(c) No payment shall become eligible for the next stage till the consultant completes to the satisfaction of the client the work pertaining to the preceding stage. The payment for the work of sub-soil investigation (Boring)will be as per plan approved by the client and will be paid as per actual at the rates quoted by the consultants .The payment for the quantity given by the client for boring will be deemed to be included in the above mentioned payment schedule. Any adjustment in the payment to the consultants will be made in the final payment only.

(d) The Client shall cause the payment of the Consultants in Para 6.4 (b) above as given in schedule of payment within thirty (30) days after the receipt by the Client of bills. Interests at the rate specified in the SC shall become payable as from the above due date on any amount due by, but not paid on, such due date.

(e) The final payment under this Clause shall be made only after the final report and a final statement, identified as such, shall have been submitted by the Consultants and approved as satisfactory by the Client. The Services shall be deemed completed and finally accepted by the Client and the final report and final statement shall be deemed approved by the Client as satisfactory one hundred and eighty (180) calendar days after receipt of the final report and final statement by the Client unless the Client, within ninety(90) day period, gives written the final notice to the Consultants specifying in detailed deficiencies in the services, report or final statement. The Consultants shall thereupon promptly make any

necessary corrections, and upon completion of such corrections, the foregoing process shall repeated. Any amount which the Client has paid or caused to be paid in accordance with this Clause in excess of the amounts actually payable in accordance with the provisions of this Contract shall be reimbursed by the Consultants to the Client within thirty (30) days after receipt by the Consultants of notice thereof. Any such claim by the Client for reimbursement must be made within twelve (12) calendar months after receipt by the Client of a final report and a final statement approved by the Client in accordance with the above.

(f) All payments under this Contract shall be made to the account of the Consultants specified in the SC.

7. Responsibility for Accuracy of Project Documents

7.1 General

7.1.1 The Consultant shall be responsible for accuracy of the data collected, by him directly or procured from other agencies/authorities, the designs, drawings, estimates and all other details prepared by him as part of these services. He shall indemnify the CE (P) Beacon (BRO) against any inaccuracy in the work which might surface during implementation of the project. The Consultant will also be responsible for correcting, at his own cost and risk, the drawings including any re-survey / investigations and correcting layout etc. if required during the execution of the Services.

7.1.2 The Consultant shall be fully responsible for the accuracy of design and drawings of the bridges and structures. All the designs and drawings for bridges and structures including all their components shall be fully checked by a Senior Engineer after completion of the designs. All drawings for bridges and structures shall be duly signed by the (a) Designer, (b) Senior Checking Engineer, and (c) Senior Bridge / Structure Expert. The designs and drawings not signed by the three persons mentioned above shall not be accepted. The Consultant shall indemnify the Client against any inaccuracy / deficiency in the designs and drawings of the bridges and structures noticed during the construction and even thereafter and the Client shall bear no responsibility for the accuracy of the designs and drawings submitted by the Consultants.

7.1.3 The survey control points established by the Consultant shall be protected by the Consultants till the completion of the Consultancy Services.

7.2. Retention Money

An amount equivalent to 10% of the contract value shall be retained at the end of the contract for accuracy of design and quantities submitted and the same will be released after the completion of civil contract works or after 3 years from completion of consultancy services, whichever is earlier. The retention money will however be released by the Client on substitution by Bank Guarantee of the same amount valid up to the period as above.

7.3. Penalty

7.3.1. Penalty for Error/Variation

i) If variation in any of the main quantities of work like earth work including sub grade, GSB, WMM, Bituminous works (BM/DBM/AC/BC),drains, total concrete quantities and reinforcing steel in bridge works or overall project cost, found during execution is more than +/- 15%, the penalty equivalent to 5% of the contract value shall be imposed. For this purpose retention money equivalent to 5% of the contract value will be forfeited. This shall exclude any additional/deletion of items/works ordered during the execution.

ii) For inaccuracies in survey/investigation/design work the penalties shall be imposed as per details given in Table below:

Sl. No.	Item	Penalty (%age of contract value)
1	Topographic Surveys	0.5 to 1.0
	a) The horizontal alignment does not match with ground condition.	
	b) The cross sections do not match with existing ground.	
	c) The co-ordinates are defective as instruments of desired accuracy not used.	
2	Geotechnical Surveys	0.5 to 1.0
	a) Incomplete surveys	
	b) Data not analysed properly	
	c) The substrata substantially different from the actual strata found during construction.	
3	Traffic data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.	0.2 to 0.5
4	Axle load data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.	0.20 to 0.5
5	Structural Designs found to be unsafe or grossly over safe	1.0 to 2.0

7.3.2 **Penalty for delay**

In case of delay in completion of services, a penalty equal to 0.05% of the contract price per day subject to a maximum 5% of the contract value will be imposed and shall be recovered from payments due/performance security. However in case of delay due to reasons beyond the control of the Consultant, suitable extension of time will be granted.

7.3.3 Total amount of recovery from all penalties shall be limited to 10% of the Consultancy Fee.

7.4 ACTION FOR DEFICIENCY IN SERVICES

7.4.1 Consultants liability towards the Client

Consultant shall be liable to indemnify the client for any direct loss or damage accrued or likely to accrue due to deficiency in service rendered by him.

7.4.2 Warning / Debarring

In addition to the penalty as mentioned in para 7.3, warning may be issued to the erring Consultants for minor deficiencies. In the case of major deficiencies in the Detailed Project Report involving time and cost overrun and adverse effect on reputation of CE (P) Beacon, other penal action including debarring for certain period may also be initiated as Per policy of CE (P) Beacon.

8. FAIRNESS AND GOOD FAITH

8.1 Good Faith

The Parties undertake to act in good faith with respect to each other's rights under this Contract and to adopt all reasonable measures to ensure the realization of the objectives of this Contract.

8.2 Operation of the Contract

The Parties recognize that it is impractical in this Contract to provide for every contingency which may arise during the life of the Contract, and the Parties hereby agree that it is their intention that this Contract shall operate fairly as between them, and without detriment to the interest of either of them, and that, if during the term of this Contract either Party believes that this Contract is operating unfairly, the Parties will use their best efforts to agree on such action as may be necessary to remove the cause or causes of such unfairness, but no failure to agree on any action pursuant to this Clause shall give rise to a dispute subject to arbitration in accordance with Clause 9 hereof.

9. SETTLEMENT OF DISPUTES

9.1 Amicable Settlement

The Parties shall use their best efforts to settle amicably all disputes arising out of or in connection with this Contract or the interpretation thereof.

9.2 Dispute Settlement

Any dispute between the Parties as to matters arising pursuant to this Contract which cannot be settled amicably within thirty (30) days after receipt by one Party of the other Party's request for such amicable settlement may be submitted by either Party for settlement in accordance with the provisions specified in the SC.

10. Change of Scope

The change of Scope on account of variation of total length NHDL length of project Highway from the indicative length as given at Annex-1 of Letter of Invitation of the RFP shall be dealt as follows

i) During the course of consultancy services in case it is considered necessary to increase/decrease the scope of services (of total length or 4 lane length as compared to indicative Length as given in the RFP) by the client the same shall be notified by Change of scope notice. Similarly, if the Consultant determines that change of scope is needed, he shall inform of the same to the Client. The Client will examine and shall either reject the proposal or issue change of scope notice.

ii) The Consultancy fee shall be revised on account of change of scope as below:

- In case the total length of project increase/decrease up to 10% of the length as indicated in the RFP :**No change in Consultancy Fees**
- In case the increase/decrease in total length of project is more than 10% of the indicative length as given in the RFP : The consultancy fee shall be increase/decrease in the same proportion in which the length of project road is increased/decreased beyond 10%

iii) Length of Bypass / realignment shall not be treated as additional to the existing length of the highway for the purpose of change / variation in length. Increase/decrease in length on account of bypasses/realignment shall not be considered as change of scope. However, the total length of the project highway (including bypasses and realignment) along the finally approved alignment shall be compared with the indicative length in the RFP for the purpose of variation.

SPECIAL CONDITIONS OF CONTRACT

Number of
GC Clause

A. Amendments of, and Supplements to, Clauses in the General Conditions

1.1(a) The words "**in the Government's country"** are amended to read "**in INDIA"**

The language is: **English**

The addresses are:

For the Client : **The Chief Engineer**
Project Beacon
Rangret, opposite SIDCO
Distt – Badgam (J&K)
Pin - 190007

Attention : **Commander 32 BRTF**
C/O 56 APO
Pin : 930032
Ph. 0194-2300908
Email: bro-32brtf@nic.in

For the Consultant :
Attention : **Name**
Designation
Address
Tel : **Fax :** **Email :**

1.6.2 Notice will be deemed to be effective as follows:
(a) In the case of personal delivery or registered mail, on delivery;
(b) In the case of facsimiles, 24 hours following confirmed transmission.
(c) In case of E mail, 24 hours following confirmed transmission.

1.8 Entity to Act as Member in charge (In case of Joint Venture of Consultants) with or without an Associate:
- ……..
1.9 The Authorized Representatives are:

For the Client : (--)
Director, <**Agency**> (--)

For the Consultant: Name
Designation

1.10 The Consultants and the personnel shall pay the taxes, duties, fees, levies and other impositions levied under the existing, amended or enacted laws (prevailing 7 days before the last date of submission of bids) during life of this contract and the Client shall perform such duties in regard to the deduction of such tax as may be lawfully imposed

2.1 The effectiveness conditions are the following:

a) The contract has been approved by CE (P) Beacon.

b) The consultant will furnish within 15 days of the issue of letter of acceptance, an unconditional Bank Guarantee from a Nationalized Bank, IDBI or ICICI/ICICI Bank/Foreign Bank/EXIM Bank / Any Scheduled Commercial Bank approved by RBI having a net worth of not less than 500 crore as per latest Annual Report of the Bank. In the case of a Foreign Bank (issued by a Branch in India) the net worth in respect of Indian operations shall only be taken into account. In case of Foreign Bank, the BG issued by Foreign Bank should be counter guaranteed by any Nationalized Bank in India. In case of JV, the BG shall be furnished on behalf of the JV or lead partner of JV for an amount equivalent to 10 %of the total contract value to be received by him towards Performance Security valid for a period of three years beyond the date of completion of services.

2.2 The time period shall be "four months" or such other time period as the parties may agree I writing.

2.3 The time period shall be "fifteen days" or such other time period as the Parties may agree in writing.

2.4 The time period shall be -------- months or such other time period as the parties may agree in writing.

3.4 Limitation of the Consultants' Liability towards the Client

(a) Except in case of negligence or willful misconduct on the part of the Consultants or on the part of any person or firm acting on behalf of the Consultants in carrying out the Services, the Consultants, with respect to damage caused by the Consultants to the Client's property, shall not be liable to the Client:

i) for any indirect or consequential loss or damage; and
ii) for any direct loss or damage that exceeds (A) the total payments for Professional

Fees and Reimbursable Expenditure made or expected to be made to the Consultants hereunder, or (B) the proceeds the Consultants may be entitled to receive from any insurance maintained by the Consultants to cover such a liability, whichever of (A) or (B) is higher.

(b) This limitation of liability shall not affect the Consultants' liability, if any, for damage to Third Parties caused by the Consultants or any person or firm acting on behalf of the Consultants in carrying out the Services.

3.5 The risks and the coverage shall be as follows:
(a) Third Party motor vehicle liability insurance as required under Motor Vehicles Act, 1988 in respect of motor vehicles operated in India by the Consultants or their Personnel or any Sub consultants or their Personnel for the period of consultancy.

(b) Third Party liability insurance with a minimum coverage, for Rs. 1.00 million for the period of consultancy.

(c) (i) The Consultant shall provide to CE (P) Beacon Professional Liability Insurance (PLI) for a period of Five years beyond completion of Consultancy services or as per Applicable Law, whichever is higher.

(ii) The Consultant will maintain at its expense PLI including coverage for errors and omissions caused by Consultant's negligence in the performance of its duties under this agreement, (A) For the amount not exceeding total payments for Professional Fees and Reimbursable Expenditures made or expected to be made to the Consultants hereunder OR (B) the proceeds, the Consultants may be entitled to receive from any insurance maintained by the Consultants to cover such a liability, whichever of (A) or (B) is higher.

(iii) The policy should be issued only from an Insurance Company operating in India.

(iv) The policy must clearly indicate the limit of indemnity in terms of "Any One Accident" (AOA) and "Aggregate limit on the policy" (AOP) and in no case should be for an amount less than stated in the contract.

(v) If the Consultant enters into an agreement with CE (P) Beacon in a joint venture or 'in association', the policy must be procured and provided to CE (P) Beacon by the joint venture/in association entity and not by the individual partners of the joint venture/ association.

(vi) The contract may include a provision thereby the Consultant does not cancel the policy midterm without the consent of Employer. The insurance company may provide an undertaking in this regard.

(d) Employer's liability and workers' compensation insurance in respect of the Personnel of the Consultants and of any Sub consultant, in accordance with the relevant provisions of the Applicable Law, as well as, with respect to such Personnel, any such life, health, accident, travel or other insurance as may be appropriate; and all insurances and policies should start from the date of commencement of services and remain effective as per relevant requirements of contract agreement.

3.9 The Consultants shall not use these documents for purposes unrelated to this Contract without the prior written approval of the Client.

4.6 The person designated as Team Leader cum Senior Highway Engineer in Appendix B shall serve in that capacity, as specified in Clause 4.6.

6.1 (b) The ceiling amount in local currency is **Rs…… Excluding GST**)

6.3 (a) No advance payment will be made.
6.3 (e) The interest rate is : @ 12% per annum
6.3 (f) The account is :

9.2 Disputes shall be settled by arbitration in accordance with the following provisions:

9.2.1 Selection of Arbitrators

Each dispute submitted by a Party to arbitration shall be heard by a sole arbitrator or an arbitration panel composed of three arbitrators, in accordance with the following provisions:

(a) The parties shall make efforts to agree 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 and waive applicability of Sub Section-12 of Arbitration and Concillation Act 1996 and amendment thereto for purpose by an express agreement in writing. However, if such an attempt does not succeeded within 30 days then Indian Road Congress will be approached to appointment an Engineer Officer as Arbitrator.

(b) Where the Parties agree that the dispute concerns a technical matter, they may agree to appoint a sole arbitrator or, failing agreement on the identity of such sole arbitrator within thirty (30) days after receipt by the other Party of the proposal of a name for such an appointment by the Party who initiated the proceedings, either Party may apply to the President, Indian Roads Congress, New Delhi, for a list of not fewer than five nominees and, on receipt of such list, the Parties shall alternately strike names there from, and the last remaining nominee on the list shall be the sole arbitrator for the matter in dispute. If the last remaining nominee has not been determined in this manner within sixty (60) days of the date of the list, the president, Indian Roads Congress, New Delhi, shall appoint, upon the request of either Party and from such list or otherwise, a sole arbitrator for the matter in dispute.

(b) Where the Parties do not agree that the dispute concerns a technical matter, the Client and the Consultants shall each appoint one arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the arbitrators named by the Parties do not succeed in appointing a third arbitrator within thirty (30) days after the later of the two arbitrators named by the Parties has been appointed, the third arbitrator shall, at the request of either Party, be appointed by Secretary, the Indian Council of Arbitration, New Delhi.

(c) If, in a dispute subject to Clause SC 9.2.1 (b), one Party fails to appoint its arbitrator within thirty (30) days after the other Party has appointed its arbitrator, the Party which has named an arbitrator may apply to the Secretary, Indian Council of Arbitration, New Delhi, to appoint a sole arbitrator for the matter in dispute, and the arbitrator appointed pursuant to such application shall be the sole arbitrator for that dispute.

9.2.2 Rules of Procedure

(a) Arbitration proceedings shall be conducted in accordance with procedure of the Arbitration & Conciliation Act 1996, of India

(b) The arbitrator shall give reasons for the award in each and every case irrespective of the value of the claims or counter claims.

(c) The award shall be made within a period of twelve months from date of appointment of arbitrator i.e. date of receipt of order on appointment by the arbitrator.

(d) The parties may by concerned extend the periods for making award for a further period not exceeding six months.

(e) If the award is not made within the above specified period or the extended period, the mandate of the arbitrator shall terminate unless the court has either prior to or on expiry of the period so specified extended the period.

(f) If agreed by both the parties in writing fast tract procedure as stipulated at article 29 (b) of Arbitration and Conciliation Act 1996 and amended thereto may also be followed to resolve the dispute.

(g) **No suspension of work on Account of Arbitration:** the reference to the Arbitration shall proceed not withstanding that works shall not then be or alleged to be complete, provided always that the obligations of the arbitration being conducted during the progress of work. Neither party shall be entitled to suspend the work to which the dispute relates on account of arbitration.

9.2.3 Substitute Arbitrators

If for any reason an arbitrator is unable to perform his function, a substitute shall be appointed in the same manner as the original arbitrator.

9.2.4 Qualifications of Arbitrators

The sole arbitrator or the third arbitrator appointed pursuant to paragraphs (a) through (c) of Clause 8.2.1 hereof shall be an internationally recognized legal or technical expert with extensive experience in relation to the matter in dispute.

9.2.5 Miscellaneous

In any arbitration proceeding hereunder:

(a) Proceedings shall, unless otherwise agreed by the Parties, be held at a place as fixed by the arbitrator at his discretion.

(b) The appropriate Court of Sri Nagar (Jammu & Kashmir) shall alone has jurisdiction to decide any dispute arising out of or in respect of this contract.

(c) The English language shall be the official language for all purposes; and [Note: English language may be changed to any other Language, with the agreement of both the Parties.]

(d) The decision of the sole arbitrator or of a majority of the arbitrators (or of the third arbitrator if there is no such majority) shall be final and binding and shall be enforceable in any court of competent jurisdiction, and the Parties hereby waive any objections to or claims of immunity in respect of such enforcement.

(e) The maximum amount payable per Arbitrator in Arbitration clauses shall be as under

S.No	**Particulars**	**Maximum amount payable per Arbitrator/ per case**
1	Arbitrator fee	Rs 15,000/- per day subject to a maximum of Rs 4 lacs or Rs 2.5 lakh (lump sum) subject to publishing the award within 12months.
2	Reading charges	Rs 15,000/-
3	Secretarial Assistance and Incidental charges(telephone, fax, postage etc)	Rs 20,000/-
4	Charges for publishing/ declaration of the award	Rs 20,000/-
5	Other expenses (As per actual against bills subject to maximum of the prescribed celling given below)	
	Traveling expenses Lodging and Boarding	Economy class (by air), First class AC (by train) and AC Car (by road) a) Rs 15,000/- per day (in metro cities) b) Rs 7,000/- per day (in other cities) c) Rs 3,000/- per day if any Arbitrator makes their own arrangements.
6	Local travel	Rs 1,500/- per day
7	Extra charges for days other than hearing/ meeting days (maximum for 2 days)	Rs 3,500/- per day
Note:-	1. Lodging boarding and traveling expenses shall be allowed only for those members who are residing 100 kms. Away from place of meeting. 2. Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad shall be considered as Metro Cities.	

(f) In exceptional cases, such as cases involving major legal implications/ wider ramifications/ higher financial stakes etc., a special fee structure could be fixed in consultation with the Contractor/ Supervision Consultants and with the specific approval of the CE (P) Beacon before appointment of the Arbitrator,

Appendix A

Terms of reference containing, inter alia, the Description of the Services and Reporting Requirement

Signature of contractor

For Accepting Officer

Appendix B

Consultants' Sub consultants, Key Personnel and Sub Professional Personnel

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Signature of contractor

For Accepting Officer

Appendix C

Hours of work for Consultants' Personnel

The Consultant's personnel shall normally work for 8 hours in a day and six days a week. Normally Sundays shall be closed for working. In addition they shall also be allowed to avail holidays as observed by the Client's office in the relevant state without deduction of remunerations. In case any person is required to work on Sunday or Holiday due to exigency of work, he/she shall be given compensatory leave within the next 15 days.

Signature of contractor For Accepting Officer

Appendix D

Duties of Client

Signature of contractor

For Accepting Officer

Appendix E
Cost Estimate

(excluding GST, refer clause 6.1(b) of special Condition of Contract)

Signature of contractor For Accepting Officer

Appendix F

Minutes of Financial/Contract Negotiations with the Consultant

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Signature of contractor

For Accepting Officer

Appendix G : Copy of letter of Invitation

Signature of contractor

For Accepting Officer

Appendix H : Copy of letter of acceptance

Signature of contractor

For Accepting Officer

Appendix - I

Format for Bank Guarantee for Performance Security (For individual work)

BANK GUARANTEE FOR PERFORMANCE SECURITY

To,

The Chief Engineer
Project Beacon
Rangret, opposite SIDCO
Distt – Badgam (J&K)
Pin - 190007

In consideration of "CE (P) Beacon" (hereinafter referred as the "Client", which expression shall, unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/s.……having its office at …….. (Hereinafter referred to as the "Consultant" which expression shall repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns), a contract by issue of client's Contract Agreement no. / Letter of Acceptance No…….. dated …… and the same having been unequivocally accepted by the Consultant, resulting in a Contract valued at Rs……../- (Rupees…..…….) excluding GST for "E*ngaging Technical Consultant for preparation of feasibility study (FS) and detailed project report (DPR) for construction of Highway Tunnel including approach road across Chattergala, approximately in between km 114.00 and km 151.00 on Basoli-Bani-Bhaderwah road under project Beacon in J & K State*" (Total Length-7.000 Kms) in the states of…….under Contract Package No. …. (Hereinafter called the "Contract"), and the Consultant having agreed to furnish a Bank Guarantee to the Client as "Performance Security as stipulated by the Client in the said contract for performance of the above Contract amounting to Rs……./- (Rupees…….).

We, ……..having registered office at …….., a body registered/constituted under the …….(hereinafter referred to as the Bank), which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the client immediately on demand any or, all money payable by the Consultant to the extent of Rs.
……..(Rupees……..……..) as aforesaid at any time up to ……..without any demur, reservation, contest, recourse or protest and/or without any reference to the consultant. Any such demand made by the client on the bank shall be conclusive and binding notwithstanding any difference between the Client and the Consultant or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. We agree that the Guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Client discharges this guarantee.

The Client shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee, from time to time to vary or to extend the time for performance of the contract by the Consultant. The Client shall have the fullest liberty without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the consultant and to exercise the same at any time in any

manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the Client and the Consultant any other course or remedy or security available to the Client. The bank shall not be relieved of its obligations under these presents by any exercise by the Client of its liberty with reference to the matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Client or any other indulgence shown by the Client or by any other matter or thing whatsoever which under law would but for this provision have the effect of relieving the Bank.

The Bank also agrees that the Client at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Consultant and notwithstanding any security or other guarantee that the Client may have in relation to the Consultant's liabilities.

Notwithstanding anything contained herein,

a) Our liability under this Bank Guarantee is limited to Rs. …….(Rupees…… …) and it shall remain in force up to and including ……and shall be extended from time to time for such period as may be desired by M/s……., on whose behalf this guarantee has been given.

b) This Bank Guarantee shall be valid up to ……..

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ……(date of expiry of Guarantee).

(Signature of the Authorized Official)

(Name & Designation with Bank Stamp)

NOTE:

(i) The bank guarantee(s) contains the name, designation and code number of the officer(s) signing the guarantee(s).

(ii) The address, telephone no. and other details of the Head Office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing Branch.

(iii) The bank guarantee for Rs. 10,000 and above is signed by at least two officials (or as per the norms prescribed by the RBI in this regard).

Signature of contractor For Accepting Officer

Appendix J : Reply to queries of the Bidder

Signature of contractor

For Accepting Officer